**General**

There have been increasing demands for both industrial use and portable water of good quality because of rapid industrial development and the betterment of consumers’ everyday life. A large amount of the waste water from both kinds of uses has been drained or discharged into rivers, causing pollution to worsen year after year.

This raises a serious social problem. Therefore, turbidity meters, conventionally used for the operation and control of a water purification plant, are nowadays being required to measure the amount of matter suspended in various sorts of industrial waste water and to detect the turbidity of chemical processes.

Since their sales began in 1959, Yokogawa's process-use turbidity meters, centering on the area of water supply, have achieved a number of records and have provided high reliability to many users.

The TB400G Surface Scattering Light Turbidity Meter has a microprocessor to provide intelligent features for advanced performance and high reliability.

**System Configuration**

For example, the diagram below is a system with automatic cleaning and automatic zero calibration.

- Equipped with a microprocessor, allowing provision of advanced performance and high reliability.
- Enhanced self-testing functions such as detection of a disconnected lamp, a converter check, and upper and lower limit alarms.
- Provided with multiple functions such as automatic zero calibration.
- Compact and light weight. The system allows access from the front, offering easy maintenance.
- Use of surface scattering-light measuring method eliminates the measurement errors caused by contamination on the cell port.
- Signal smoothing as a measure against air bubbles in sample water.
- pH meter or free available chlorine analyzer can be installed on the TB400G.

*1: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.
Standard Specifications

Measurement: Turbidity of tap water, river water, and water used in general processes
Measurement method: Surface scattering-light measurement
Measuring range: 0-2 to 0-2000 mg/L
Display: Four-digit LED display (resolution: 0.01 mg/L, maximum display value: 2200 mg/L)
Display Units: “mg/L” (standard) or “度” (selectable)

Note: In this GS, the unit “liter” is described as “L”. Real display unit is “mg/l”. The unit “度” means degree.

Output Range: 3 range switching
Remote or local (default) range switching, selectable
Auto or manual (default) range, selectable
For auto range, changeover point is user configurable.
3 ranges are user configurable.
The span should be 20% or more of the upper range limit or 2 mg/L (default), whichever is greater.

Analog Output Signal: 4 to 20 mA DC (maximum load resistance: 550 Ω) or 1 to 5 V DC (output resistance: 100 Ω or less)
Digital Output Signal: RS-232C (turbidity signal, under-maintenance signal, error signal, calibrating signal, and range signal)
Contact Output: Maintenance output (during maintenance)
Failure output (if an error is detected)
Range output (corresponding to the output range selected) (common to COM)
Configurable contact pair for (a) high and low alarm limits or (b) auto-calibration signal or (c) auto-cleaning signal

Contact status:

<table>
<thead>
<tr>
<th>Type of contact output</th>
<th>Power on</th>
<th>Power on *1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not in Action</td>
<td>In Action</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Fail</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>High/low alarm</td>
<td>Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Auto zero calibration/cleaning</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

*1: Contact status (open/closed) when power is turned on is user configurable.

Contact Rating:
Maximum opening/closing voltage:
250 V AC or 220 V DC (resistive load)
Maximum application current:
2 A AC or 2 A DC (resistive load)
Maximum opening/closing rating:
120 VA or 60 W (resistive load)

Contact Input:
Remote range switching (common to COM)
Input resistance when on: 200 Ω or less
Input resistance when off: 100 kΩ or more
Automatic Cleaning: Water jet cleaning (with configurable time cycles)
Automatic Calibration: Zero-point calibration using zero water (for a system with automatic cleaning and calibration)

Error Detection: Turbidity over-range, disconnection of lamp wiring, error in lamp voltage, error in AD circuit, memory error, CPU error

Check Function: Converter operation check
Manual Calibration:
Zero calibration:
Using zero water or with light source set to off (selectable)
Span calibration: Using a calibration plate
Other Functions: Breakpoint line-segment output, upper and lower limit alarms

Material:
Detector: Modified black PPE (wetted parts)
Piping: Hard PVC, polyethylene resin, and polypropylene resin (all for wetted parts)
Stanchion: Carbon steel or stainless steel
Converter: Aluminum alloy casting

Paint:
Converter: Baked polyurethane resin finish color; Munsell 0.6GY3.1/2.0 and Munsell 2.5Y8.4/1.2
Stanchion: Baked polyurethane resin finish color; Munsell 0.6GY3.1/2.1
Ambient temperature: -5 to 50°C (sample and tap water may need protection against freezing)
Ambient humidity: 5 to 95%RH (non-condensing)
Storage temperature: -30 to 70°C
Installation location: Indoor (weather protection is required for outdoor installation)

Installation:
Separate detector and converter;
Pipe- or rack-mounted
System with sampling system;
Fixed with anchor bolts

Piping Connections:
System with sampling system; VP40 for drain
VP16 for other purposes
System without sampling system;
25 mm ID hose joint

Cable Inlet:
5 cable glands
(on the bottom of the converter)
Outer diameter of applicable wires:
6 to 12 mm
(9 to 11 mm when with arrester option)
Wiring type:
Power, analog output, digital output, contact output, contact input (for grounding, GROUND on the connection terminals of the converter or the ground terminal on the outside of the case should be used)

Power supply:
100/110 V AC, 50/60 Hz,
200/220 V AC, 50/60 Hz
Noise filter assembly: (only for TB400G-□-□-KC)
Ambient temperature: -10 to 50°C
(no dew condensation allowed)
Storage temperature: -25 to 70°C
Construction: JIS C 0920 Watertight (IP53)

Power Consumption:
Detector and converter: 50 VA or less, respectively
With sampling system: 200 VA or less
(in full specifications, excluding combination instruments)

Automatic Cleaning Function:
Water jet cleaning. Cleaning time and interval are user configurable. (When auto cleaning is specified)
Automatic Zero Calibration Function: Zero point calibration using zero water (when auto cleaning/zero calibration is specified)

Weight:
- Detector: Approx. 3 kg
- Converter: Approx. 9 kg
- With sampling system: Approx. 50 kg
  (in full specifications, excluding combination instruments)

Dimensions:
- Detector: 245 (W) x 250 (H) x 200 (D) mm
- Converter: 260 (W) x 340 (H) x 150 (D) mm
- With stanchion: 530 (W) x 1450 (H) x 550 (D) mm

Sample water:
- With sampling system:
  - Flow rate: 2 to 10 L/min
  - Pressure: 20 to 500 kPa
  - Temperature: 0 to 50°C (ambient temperature should not exceed 30°C)
- Without sampling system:
  - Flow rate: 1.5 to 2 L/min
  - Temperature: 0 to 50°C (Ambient temperature should not exceed 30°C)

Zero water and cleaning water (tap water):
- Turbidity: 2 mg/L or less
- Temperature: 0 to 50°C (Ambient temperature should not exceed 30°C)
- Pressure: 100 to 500 kPa
- Flow rate: Zero water: 2 to 10 L/min
  Cleaning water: 3 to 6 L/min
- Consumption: Zero water:
  Approx. 380 L/day
  (at a flow rate of 2 L/min)
  Cleaning water:
  Approx. 90 L/min
  (at a flow rate of 3 L/min)
  (when auto cleaning/zero calibration is enabled and time setting is factory default)

Automatic cleaning time chart when provided with automatic cleaning, but not automatic zero calibration
Example: N (number of cleanings) = 4

Characteristics

Linearity (when using kaolin standard):
- Upper range limit of 1000 mg/L or less; ±2% of upper range limit
- Upper range limit of 2000 mg/L or less; ±5% of upper range limit

Linearity (when using polystyrene latex standard):
- Upper range limit of 100 mg/L or less; ±2% of upper range limit

Repeatability:
- Standard solution: 2% of upper range limit
- Supply voltage effects: ±1% of upper range limit / within ±10% of rated voltage
- Ambient temperature effects: ±1% of upper range limit / 10°C (when using calibration plate)
- Response time: 2 minutes or less (90% response, with a sampling system, flow rate of 3 L/min)
- Warm-up time: Approx. 30 minutes

Regulatory Compliance (for TB400G-□-□-KC)
- Korea Electromagnetic Conformity Standard Class A
- 한국 전자파적합성 기준

Default values as shipped from factory:
- Cleaning cycle: 2 hours
- Cleaning time 2: 30 sec
- Drain time 2: 0 sec
- Water fill time 2: 100 sec
- Recovery time: 150 sec

- Characteristic F03.11

Output holding: *1

*1: During calibration, output is always held.

Automatic zero calibration time chart when provided with automatic cleaning and automatic zero calibration
Example: N (number of cleanings) = 4
### Model and Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Option Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB400G</td>
<td></td>
<td>-4</td>
<td>Surface Scattering Light Turbidity Meter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-5</td>
<td></td>
</tr>
</tbody>
</table>

| Output    |             | -1          | 4 to 20 mA DC                                   |
|           |             | -2          | 1 to 5 V DC                                    |
|           |             | -3          | 100 V AC, 50/60 Hz                              |
|           |             | -4          | 110 V AC, 50/60 Hz                              |
|           |             | -5          | 200 V AC, 50/60 Hz                              |
|           |             | -6          | 220 V AC, 50/60 Hz                              |

| Power supply |             | -7          |                                                  |

| Device configuration and Application | -NN          | Without sampling system, automatic cleaning, or automatic zero calibration *1 |
|                                      | -A1          | With sampling system, but without automatic cleaning or automatic zero calibration |
|                                      | -A2          | With sampling system and automatic cleaning, but without automatic zero calibration |
|                                      | -A3          | With sampling system, automatic cleaning, and automatic zero calibration |

| Optional specification               | Mounting bracket | /P          | Mounting bracket: For pipe mounting *2 |
|                                     |                 | /R          | Mounting bracket: For rack mounting *2  |
|                                     | Piping          | /B          | Tie-in with rear piping *3              |
|                                     |                   | /L          | Bubble retardant for low range *3 *4    |
|                                     | Stanchion material | /S          | Stainless steel stanchion *3           |
|                                     |                   | /SCT        | Stainless steel tag plate              |
|                                     | Combination analyzer | /PN5      | With PH450G pH meter (without ultrasonic cleaning) *3 *5 |
|                                     |                   | /PHU5       | With PH450G pH meter (with ultrasonic cleaning) *3 *5 |
|                                     |                   | /TT3        | With 500 mL KCl reserve tank for pH sensor *5 |
|                                     |                   | /FC         | With non-reagent type free available chlorine analyzer *3 *5 |
|                                     |                   | /ARS        | With arrester *6                       |
|                                     |                   | /PSL calibration | /P/S/L  | Calibration using polystyrene latex *7 |

*1: A de-foaming tank (head tank) is to be provided. It is to be installed to adjust the sample flow to the detector at 1.5 to 2 L/min.

*2: These options are available for the specification of “without sampling system” (suffix code: -NN, -KC).

*3: These options are available for the specification of “with sampling system” (suffix code: -A1, -A2 or -A3).

*4: When measuring range is low (200 mg/L or less) and if air bubbles are likely to be formed on the sample, this option is to be specified. When measuring range is high (more than 200 mg/L), this option is not to be specified. Because air bubbles in high ranges don’t disturb the measurement, and because clogging or reduction of flow rate may occur at the removal port of air bubbles on the flow line.

*5: A pH meter with necessary units, or non-reagent type free available chlorine analyzer should be purchased separately. Both of a pH meter and non-reagent type free available chlorine analyzer can not be installed together on the TB400G.

*6: The option is not possible for the options of /PHN5, /PHU5 or /FC.

*7: Polystyrene latex solution of which concentration is 2 degrees is used as a standard solution to calibrate the TB400G. Without this option, the standard TB400G is calibrated with a Kaolin solution.

*8: No additional specifications other than “/P”, “/R” and “/SCT” can be chosen.

### Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard calibration plate</td>
<td>1</td>
<td>Housed in the converter</td>
</tr>
<tr>
<td>Silicone cloth</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lamp</td>
<td>1</td>
<td>As a spare</td>
</tr>
<tr>
<td>Fuse</td>
<td>4 each</td>
<td>1 A and 3 A (as spares)</td>
</tr>
<tr>
<td>Pipe mounting bracket</td>
<td>1 set</td>
<td>When specifying option code “/P”</td>
</tr>
<tr>
<td>Rack mounting bracket</td>
<td>1 set</td>
<td>When specifying option code “/R”</td>
</tr>
<tr>
<td>Soft PVC tube, 1 m</td>
<td>2</td>
<td>For detector piping (for without sampling system)</td>
</tr>
<tr>
<td>Clamp</td>
<td>2</td>
<td>For detector piping (for without sampling system)</td>
</tr>
</tbody>
</table>

* The power supply of FC400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.

* The power supply of PUS400G is to be suitable for the power supply of TB400G.
### Spare Parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Recommended Replacement Interval 1*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp</td>
<td>K9410DA</td>
<td>Yearly</td>
</tr>
<tr>
<td>Filter, 1 μm</td>
<td>K9008ZD</td>
<td>Yearly</td>
</tr>
<tr>
<td>Filter, 0.2 μm (when specifying option of &quot;PSL&quot;)</td>
<td>K9726EH</td>
<td>Yearly</td>
</tr>
<tr>
<td>Fuse, 1 A</td>
<td>A1109EF</td>
<td>Yearly</td>
</tr>
<tr>
<td>Fuse, 3 A</td>
<td>A1113EF</td>
<td>Yearly</td>
</tr>
<tr>
<td>Drain tube (when specifying suffix of &quot;-A2&quot; or &quot;-A3&quot;)</td>
<td>K9411JM</td>
<td>Yearly</td>
</tr>
</tbody>
</table>

1*: Replacement intervals vary depending on the application.
### External Dimensions

**Without sampling system**

**TB400G - □ - □ - NN, TB400G - □ - □ - KC**

**Unit:** mm

---

**Converter**
- 2B pipe (Ø60.5)
- Pipe mounting bracket (Option code: /P)
- Cable inlet (Ø6 to Ø12 o.d. waterproof plug)
- Rack mounting bracket (Option code: /R)

**Detector**
- 2B pipe (Ø60.5)
- Pipe mounting bracket (Option code: /P)
- Sample water output Ø25 i.d. hose joint
- Sample water input Ø25 i.d. hose joint
- Dedicated cable

---

**Noise filter assembly for TB400G - □ - □ - KC**

**Unit:** mm

---

- **External power cable inlet** (cable OD of Ø6 to Ø12)
- **Dedicated power cable outlet**
- **Weight of noise filter assembly:** Approx. 0.2 kg
- **Panel mounting bracket for noise filter assembly (Option code: /P)**
- **Mounting bracket for noise filter assembly**
- **Dedicated power cable for noise filter assembly**
- **Weight:** Approx. 0.7 kg
- **Cable length:** Approx. 0.7 m
- **Weight of power cable:** Approx. 0.2 kg
- **L1 Black, White L2, G Green**

---

- **2-inch pipe (vertical mounting OD Ø60.5) 2-Ø9 holes**
- **2-Ø5.5 holes**
- **5-Ø6.5 holes**
- **Ø6.5 x 13 hole**
- **4-Ø10 holes**
- **M8 nut x2**
- **U-bolt**
- **Weight:** Approx. 0.7 kg

---

All Rights Reserved. Copyright © 1995, Yokogawa Electric Corporation

GS 12E04A02-01E 8th Edition Nov. 30, 2017-00
With sampling system, but without automatic cleaning or automatic zero calibration

TB400G - □ - □ - A1

Unit: mm

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
*3: Option code /ARS specified for with arrester.

With sampling system, but without automatic cleaning or automatic zero calibration
with pH meter without ultrasonic cleaning

TB400G - □ - □ - A1 / PHN5

Unit: mm

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
*3: Option code /TT3KCl tank
With sampling system, but without automatic cleaning or automatic zero calibration with pH meter with ultrasonic cleaning

**TB400G - □ - □ - A1 / PHU5**

Unit: mm

With sampling system, but without automatic cleaning or automatic zero calibration with non-reagent type free available chlorine analyzer

**TB400G - □ - □ - A1 / FC**

Unit: mm

---

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.

*2: Option code /L specified for bubble retardant.
With sampling system and automatic cleaning, but without automatic zero calibration

TB400G - □ - □ - A2

Unit: mm

With sampling system and automatic cleaning, but without automatic zero calibration
with pH meter without ultrasonic cleaning

TB400G - □ - □ - A2 / PHN5

Unit: mm

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
*3: Option code /ARS specified for with arrester.

---

All Rights Reserved. Copyright © 1995, Yokogawa Electric Corporation

GS 12E04A02-01E  8th Edition Nov. 30, 2017-00
With sampling system and automatic cleaning, but without automatic zero calibration with pH meter with ultrasonic cleaning

TB400G - □×□ - A2 / PHU5

Unit: mm

With sampling system and automatic cleaning, but without automatic zero calibration with non-reagent type free available chlorine analyzer

TB400G - □×□ - A2 / FC

Unit: mm

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
With sampling system, automatic cleaning, and automatic zero calibration
TB400G - □ □ - A3 / PHN5

Unit: mm

With sampling system, automatic cleaning, and automatic zero calibration
with pH meter without ultrasonic cleaning
TB400G - □ □ - A3 / PHN5

Unit: mm

---

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
*3: Option code /ARS specified for with arrester.
With sampling system, automatic cleaning, and automatic zero calibration with pH meter with ultrasonic cleaning

TB400G - □ - □ - A3 / PHU5

Unit: mm

With sampling system, automatic cleaning, and automatic zero calibration with non-reagent type free available chlorine analyzer

TB400G - □ - □ - A3 / FC

Unit: mm

*1: Option code /B specified for rear piping. Bottom piping is without /B specified.
*2: Option code /L specified for bubble retardant.
**PIPING DIAGRAM**

With sampling system, but without automatic cleaning or automatic zero calibration

**TB400G - □ - □ - A1**

*1: Option Code /L (For bubble retardant)

*2: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.

With sampling system, but without automatic cleaning or automatic zero calibration, and with pH meter

**TB400G - □ - □ - A1 / PHN5 or TB400G - □ - □ - A1 / PHU5**

*1: Option Code /L (For bubble retardant)

*2: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.
With sampling system, but without automatic cleaning or automatic zero calibration, and
with non-reagent type free available chlorine analyzer
TB400G - □ - □ - A1 / FC

With sampling system and automatic cleaning, but without automatic zero calibration
TB400G - □ - □ - A2
With sampling system and automatic cleaning, but without automatic zero calibration, and with pH meter TB400G - □ - □ - A2 / PHN5 or TB400G - □ - □ - A2 / PHU5

*1: Option Code /L (For bubble retardant)
*2: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.

With sampling system and automatic cleaning, but without automatic zero calibration, and with non-reagent type free available chlorine analyzer TB400G - □ - □ - A2 / FC

*1: Option Code /L (For bubble retardant)
*2: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.
With sampling system, automatic cleaning, and automatic zero calibration
TB400G - □ - □ - A3

*1: Option Code /L (For bubble retardant)
*2: Reverse flow of tap water should be prevented using a check valve on the supply line of tap water.

With sampling system, automatic cleaning, automatic zero calibration, and with pH meter
TB400G - □ - □ - A3 / PHN5 or TB400G - □ - □ - A3 / PHU5

*1: Option Code /L (For bubble retardant)
*2: Reverse flow of tap water should be prevented using a check valve on the supply line of tap water.
With sampling system, automatic cleaning, automatic zero calibration, and with non-reagent type free available chlorine analyzer

TB400G - □ - □ - A3 / FC

- Sample water (VP16)
- Tap water (VP16) *2
- Drain (VP40)

*1: Option Code /L (For bubble retardant)

*2: Reverse flow of tap water should be prevented using with a check valve on the supply line of tap water.
**Wiring Diagram**

- **Analog output signal** (4 to 20 mA DC or 1 to 5 V DC)
- **Fail contact output**
- **Remote range switching input**
- **Range contact output**
- **Digital output signal** (RS-232C)
- **Maintenance contact output**
- **Upper and lower limit alarms or automatic calibration/cleaning contact output**

---

*1: Ground terminal on the outside of the converter case with a grounding resistance of 100 Ω or less. Ground the power cord instead only if the above grounding is not feasible. *(Note) Do not use two-point grounding.*

*2: Remote range switching method

<table>
<thead>
<tr>
<th>Output Range</th>
<th>Contact R1 to R2</th>
<th>Contact R1 to R3</th>
<th>Resistance (ON): 200 Ω or less (OFF): 100 kΩ or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>OFF</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Output range 2</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Output range 3</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

*3: Output range switching method

<table>
<thead>
<tr>
<th>Output Range</th>
<th>Contact A1 to A2</th>
<th>Contact A1 to A3</th>
<th>Contact A1 to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>Close</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 2</td>
<td>Open</td>
<td>Close</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 3</td>
<td>Open</td>
<td>Open</td>
<td>Close</td>
</tr>
</tbody>
</table>

*4: In the case of automatic cleaning (-A2, -A3)

*5: In the case of automatic zero calibration (-A3)

*6: Only for Korea (-KC)
Option code: /ARS (with arrester)

Detector

S1  S2  V+  V-  AG
P1  P2
S1  V+
S2  V-
V+  V-
AG
P1  P2

Converter

M1  M2  F1  F2  C1  C2  R1  R2  R3  C1  C2  R1  R2  R3
V1  V2  V3  V4  V5  V6  V7  V8  V9  V10
S2  V+
S1  V-
V+  V-
AG
P1  P2

Pinch valve

SV1

Solenoid valve

SV2

Solenoid valve

SV3

Solenoid valve

SV4

Terminal box

AR1, AR2: Arrester
CB1: Circuit breaker

Power supply  Output signal

Output signal

Output range 1  OFF  OFF
Output range 2  ON  OFF
Output range 3  OFF  ON

Resistance (ON): 200 Ω or less
(Off): 100 kΩ or more

Output Contact  A1 to A2  A1 to A3  A1 to A4
Output range 1  Close  Open  Open
Output range 2  Open  Close  Open
Output range 3  Open  Open  Close

*1: Ground terminal  on the outside of the converter case with a grounding resistance of 100 Ω or less.
Ground the power cord instead only if the above grounding is not feasible.
(Note) Do not use two-point grounding.

*2: Remote range switching method

<table>
<thead>
<tr>
<th>Output range</th>
<th>Contact</th>
<th>R1 to R2</th>
<th>R1 to R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>OFF</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Output range 2</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Output range 3</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

*3: Output range switching method

<table>
<thead>
<tr>
<th>Output range</th>
<th>Contact</th>
<th>A1 to A2</th>
<th>A1 to A3</th>
<th>A1 to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>Close</td>
<td>Open</td>
<td>Open</td>
<td></td>
</tr>
<tr>
<td>Output range 2</td>
<td>Open</td>
<td>Close</td>
<td>Open</td>
<td></td>
</tr>
<tr>
<td>Output range 3</td>
<td>Open</td>
<td>Open</td>
<td>Close</td>
<td></td>
</tr>
</tbody>
</table>

*4: In the case of with automatic cleaning (-A2, -A3)

*5: In the case of with automatic zero calibration (-A3)
**Option code: /PHN5, /PHU5 (with pH meter)**

- **PH450G pH converter** (/PHUS, /PHN5)
  - **Pinch valve** SV1
  - **Solenoid valve** SV3
  - **Solenoid valve** SV2
  - **Solenoid valve** SV4
  - **V1** to **V10**
  - **G**

**Detector Converter**
- **Dedicated cable**
- **PH450G pH converter** (/PHUS, /PHN5)
- **Sensor cable** (Wired by the customer)
- **pH holder** (PH8HF)
- **Ultrasonic oscillator** (PUS400G) *6

**Terminal box**
- **Power supply**
- **Input/output signal** *7

**Main Components**
- **PH450G pH converter** (/PHUS, /PHN5)
- **Ultrasonic oscillator** (PUS400G) *6
- **PH450G pH converter** (/PHUS, /PHN5)
- **Converter**

*1: Ground the power cord (8) with a grounding resistance of 100 Ω or less.
*2: Remote range switching method

<table>
<thead>
<tr>
<th>Output Contact</th>
<th>R1 to R2</th>
<th>R1 to R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Output range 2</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Output range 3</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

*3: Output range switching method

<table>
<thead>
<tr>
<th>Output Contact</th>
<th>A1 to A2</th>
<th>A1 to A3</th>
<th>A1 to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>Close</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 2</td>
<td>Open</td>
<td>Close</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 3</td>
<td>Open</td>
<td>Open</td>
<td>Close</td>
</tr>
</tbody>
</table>

*4: In the case of with automatic cleaning (-A2, -A3)
*5: In the case of with automatic zero calibration (-A3)
*6: In the case of with ultrasonic cleaning (/PHUS)
*7: Refer to the User’s Manual of the PH450G for details of input/output signals.
*8: Refer to the User’s Manual of the PH450G for details of jumper setting.
Option code: /FC (with non-reagent type free available chlorine analyzer)

Free available chlorine analyzer converter (FC400G)

Terminal box

Output signal

*6

Free available chlorine analyzer detector (FC400G)

Dedicated cable

*1: Ground the power cord (8) with a grounding resistance of 100 Ω or less.

*2: Remote range switching method

<table>
<thead>
<tr>
<th>Output Contact</th>
<th>R1 to R2</th>
<th>R1 to R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Output range 2</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Output range 3</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

Resistance (ON): 200 Ω or less
(Off): 100 kΩ or more

*3: Output range switching method

<table>
<thead>
<tr>
<th>Output Contact</th>
<th>A1 to A2</th>
<th>A1 to A3</th>
<th>A1 to A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output range 1</td>
<td>Close</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 2</td>
<td>Open</td>
<td>Close</td>
<td>Open</td>
</tr>
<tr>
<td>Output range 3</td>
<td>Open</td>
<td>Open</td>
<td>Close</td>
</tr>
</tbody>
</table>

*4: In the case of with automatic cleaning (-A2, -A3)

*5: In the case of with automatic zero calibration (-A3)

*6: Refer to the User's Manual of the FC400G for details of input/output signals.
Enquiry Specifications Sheet for Model TB400G Surface Scattering Light Turbidity Meter

For enquiries on the Yokogawa Surface Scattering Light Turbidity Meter, please tick (✓) the appropriate box □ and write down the relevant information in the blanks.

1. General Information
   Company name: ____________________________________________________________
   Contact Person: ________________________ Department: _______________________________(Phone: _________________)
   Plant name: _____________________________________________________________________________
   Measurement location: ______________________________________________________________________
   Purpose of use: □ Indication, □ Recording, □ Alarm, □ Control
   Power supply: ___________ V AC, ___________ Hz

2. Measurement Conditions
   (1) Sample water temperature; ___________ to ___________, Normally ___________ [°C]
   (2) Sample water pressure; ___________ to ___________, Normally ___________ [kPa]
   (3) Sample water flow rate; ___________ to ___________, Normally ___________ [L/min]
   (4) Slurry or contaminations; □ No, □ Yes ______________________
   (5) Names of sample water; _____________________________________________________________________________
   (6) Components of sample water; _____________________________________________________________________________
   (7) Others; ____________________________________________________________________________________________

3. Installation Site
   (1) Ambient temperature; approx. ___________ [°C]
   (2) Location; □ Indoors __________________________
   (3) Others; ____________________________________________________________________________________________

4. Requirements
   (1) Measuring range; ___________ to ___________ mg/L
   (2) Transmission output; □ 4 to 20 mA, □ 1 to 5 V DC
   (3) System configuration selection; □ TB400G turbidity meter, □ Sampling system, □ pH meter,
       □ PUS400G ultrasonic oscillator, □ FC400G free available chlorine analyzer,
       □ Automatic cleaning, □ Automatic zero calibration, □ Arrester
   (4) Others; ____________________________________________________________________________________________