

**TB830D  
Surface Scattering Light Turbidity  
Detector  
Start-up and Safety Precautions**

IM 12E04B40-01EN

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# ◆ Introduction

Thank you for purchasing TB830D Surface Scattering Light Turbidity Detector.  
This User's Manual contains all essential information for the user to make full use of TB830D.  
Please read the following respective documents before installing and using the instrument.  
The related documents are listed as follows.

## General Specifications

Contents	Document number	Note
TB830D, FLXA402T Surface Scattering Light Turbidity Detector	GS 12E04B40-01EN	Online manual

"EN" in the document number is the language code.

## User's Manual

Contents	Document number	Note
TB830D Surface Scattering Light Turbidity Detector Start-up and Safety Precautions	IM 12E04B40-01EN	Attached to the product (printed manual) (This manual)
TB830D Surface Scattering Light Turbidity Detector	IM 12E04B40-02EN	Online manual
FLXA402T Liquid Analyzer for Turbidity and Chlorine Start-up and Safety Precautions	IM 12A01G01-01EN	Attached to the product (printed manual)
FLXA402T Liquid Analyzer for Turbidity and Chlorine Installation and Wiring	IM 12A01G01-02EN	Online manual
FLXA402T Liquid Analyzer for Turbidity and Chlorine Operation of Converter	IM 12A01G01-03EN	Online manual
FLXA402T Liquid Analyzer for Turbidity and Chlorine Operation of pH	IM 12A01G02-01EN	Online manual
FLXA402T Liquid Analyzer for Turbidity and Chlorine Operation of SC	IM 12A01G03-01EN	Online manual

"EN" in the document number is the language code.

An exclusive User's Manual might be attached to the products whose suffix codes or option codes contain the code "Z" (made to customers' specifications). Please read it along with this manual.

## Technical Information

Contents	Document number	Note
FLXA402T Liquid Analyzer for Turbidity and Chlorine MODBUS Communication	TI 12A01G01-62EN	Online manual

"EN" in the document number is the language code.

You can download the latest documents from our website. Scan QR code.

<http://www.yokogawa.com/an/flxa402t/download/>



Refer to each corresponding manual for other related products.

## ■ Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.
- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.

## ■ Drawing Conventions

Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.

## ■ Trademark Acknowledgements

- FLEXA, FLXA and SENCOM are trademarks or registered trademarks of Yokogawa Electric Corporation.
- All other company and product names mentioned in this user's manual are trademarks or registered trademarks of their respective companies.
- We do not use TM or ® mark to indicate those trademarks or registered trademarks in this user's manual.

## ■ Product Disposal

The instrument should be disposed of in accordance with local and national legislation/regulations.

## ■ Warranty and service

Yokogawa products and parts are guaranteed free from defects in workmanship and material under normal use and service for a period of (typically) 12 months from the date of shipment from the manufacturer.

Individual sales organizations can deviate from the typical warranty period, and the conditions of sale relating to the original purchase order should be consulted. Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes are excluded from this warranty coverage.

In the event of warranty claim, the defective goods should be sent (freight paid) to the service department of the relevant sales organization for repair or replacement (at Yokogawa discretion). The following information must be included in the letter accompanying the returned goods:

- Part number, model code and serial number
- Original purchase order and date
- Length of time in service and a description of the process
- Description of the fault, and the circumstances of failure
- Process/environmental conditions that may be related to the failure of the device.
- A statement whether warranty or non-warranty service is requested
- Complete shipping and billing instructions for return of material, plus the name and phone number of a contact person who can be reached for further information.

Returned goods that have been in contact with process fluids must be decontaminated/disinfected before shipment. Goods should carry a certificate to this effect, for the health and safety of our employees.

Material safety data sheets should also be included for all components of the processes to which the equipment has been exposed. Read this User's Manual before operating TB830D to make full use of the function.

Throughout this user's manual, you will find several different types of caution or warnings. Follow the cautious message for safety precautions.

## ◆ CE marking products

### ■ Authorized Representative in the EEA and the Importer into the EU/EEA Market

The Authorized Representative for this product in the EEA and the importer for this product into the EU/EEA market via Yokogawa sale channel is:

Yokogawa Europe B.V.  
Euroweg 2, 3825 HD Amersfoort, The Netherlands

### ■ Importer for This Product into the Great Britain Market

In relation to UKCA marking, the importer for this product into the Great Britain market via the YOKOGAWA sales channel is :

Yokogawa United Kingdom Limited  
Stuart Road Manor Park Runcorn, WA7 1TR, United Kingdom

### ■ Identification Tag

This manual and the identification tag attached on packing box are essential parts of the product. Keep them together in a safe place for future reference.

### ■ Users

This product is designed to be used by a person with specialized knowledge.

## ◆ Safety Precautions



### WARNING

#### Installation and wiring

The TB830D should only be used with equipment that meets the relevant IEC, American or Canadian standards.

Yokogawa accepts no responsibility for the misuse of this unit.

Don't install "general purpose type" instruments in the hazardous area.

Do not use an abrasive or organic solvent in cleaning the instrument.

#### Electrostatic discharge

The TB830D contains devices that can be damaged by electrostatic discharge. When servicing this equipment, please observe proper procedures to prevent such damage. Replacement components should be shipped in anti-static packaging. Repair work should be done at grounded workstations using grounded soldering irons and wrist straps to avoid electrostatic discharge.



### CAUTION

The Instrument is packed carefully with shock absorbing materials, nevertheless, the instrument may be damaged or broken if subjected to strong shock, such as if the instrument is dropped. Handle with care.

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

When you open the front cover, make sure the screws are completely out of the screw holes, and then open the front cover slowly in order not to damage the threaded parts on the housing. If the threaded parts are damaged and the screws cannot be tightened, the waterproof performance will deteriorate.

## ■ Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.
- If this instrument is used in a manner not specified in this user's manual, the protection provided by this instrument may be impaired.
- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.
- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- The following safety symbols are used on the product as well as in this manual.



### **WARNING**

This symbol indicates that an operator must follow the instructions laid out in this manual in order to avoid the risks, for the human body, of injury, electric shock, or fatalities. The manual describes what special care the operator must take to avoid such risks.



### **CAUTION**

This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the instrument (hardware) or software from being damaged, or a system failure from occurring.

### **CAUTION**

This symbol gives information essential for understanding the operations and functions.

### **NOTE**

This symbol indicates information that complements the present topic.



This symbol indicates Protective Ground Terminal.

## ■ Warning and Disclaimer

The product is provided on an “as is” basis. YOKOGAWA shall have neither liability nor responsibility to any person or entity with respect to any direct or indirect loss or damage arising from using the product or any defect of the product that YOKOGAWA can not predict in advance.



## Control of Pollution Caused by the Product

This is an explanation for the product based on “Control of Pollution caused by Electronic Information Products” in the People’s Republic of China.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳(金属)	×	○	○	○	○	○
外壳(塑料)	×	○	○	○	○	○
印刷电路板组件	×	○	○	○	○	○

○： 表示该有害物质在该部件中所有均质材料中的含量都在GB/T26572所规定的限量要求以下。

×： 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T26572所规定的限量要求。

环保使用期限：这个标志是基于SJ/T11364，在中国（不包括台湾，香港，澳门）贩售的电子电器产品所适用的环保使用期限。



只要遵守产品上关于安全及使用上的注意事项，从制造之日起计算在该年限内，不会发生制品内的有害物质外泄，突然变异，对环境或人体以及财产产生重大影响的情况。

（注） 该年限是《环境保护使用期限》，不是产品的保质期限。

另外，关于替换部件的推荐替换周期，请阅读使用说明书。

# ◆ Compliant Standards

## Safety (\*1):

UL: UL 61010-1, UL 61010-2-030  
 CSA: CAN/CSA-C22.2 No.61010-1  
 CAN/CSA-C22.2 No.61010-2-030  
 CE, UKCA: EN 61010-1, EN IEC 61010-2-030  
 Morocco/LVD Arrêté: NM EN 61010 1, NM EN 61010 2 030  
 GB: GB30439  
 Installation altitude: 2000 m or less  
 Overvoltage Category based on IEC 61010: II(\*)  
 Pollution level: IEC 61010: 2 (\*\*)

(\*) Installation category, called over-voltage category, specifies impulse withstand voltage. Equipment with Category II is energy-consuming equipment to be supplied from the fixed installation.

(\*\*) Pollution level shows the level of existing the solid, liquid and gas which break electrical isolation. Category 2 is applied to normal room environment.

## EMC:

CE, UKCA: EN 61326-1 Class A, Table 2 (For use in industrial locations)  
 EN 61326-2-3  
 EN IEC 61000-3-2  
 EN 61000-3-2  
 EN 61000-3-3  
 Morocco/EMC Arrêté: NM EN 61326 1  
 NM EN 61326 2 3  
 NM EN 61000 3 2  
 NM EN 61000 3 3  
 RCM: EN61326-1 Class A  
 Korea Electromagnetic Conformity Standard  
 한국 전자파적합성 기준 Class A

## Environmental regulation:

RoHS Directive (\*2): EN IEC 63000  
 REACH: Regulation EC 1907/2006

## Waste Electrical and Electronic Equipment (WEEE) Directive :

This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply.

The WEEE Directive is only valid in the EU and UK.

(\*1): Except for sampling system (-A2, -A3)

(\*2): Except for sampling system (-A1, -A2, -A3)

# 1. Instrument Check

Upon delivery, unpack the instrument carefully and inspect it to ensure that it was not damaged during shipment. If damage is found, retain the original packing materials (including the outer box) and then immediately notify the carrier and the relevant Yokogawa sales office.

Make sure the model and suffix code on the nameplate match your order and the necessary accessories are included.

## ■ Model & Suffix Codes

### TB830D Surface Scattering Light Turbidity Detector

Model	Suffix code			Option code	Description
<b>TB830D</b>	.....			.....	Surface Scattering Light Turbidity Detector
Light source and Turbidity standard	<b>-F8</b>			.....	White LED, Formazin, 0-2 NTU to 0-2000 NTU
	<b>-FS</b>			.....	860 nm, Formazin, 0-2 FNU/NTU to 0-2000 FNU/NTU
Type	<b>-AB</b>			.....	General purpose for CE, RCM, China standard
	<b>-AD</b>			.....	General purpose for CSA
	<b>-AG</b>			.....	General purpose for KC
	<b>-AJ</b>			.....	General purpose
Sampling system	<b>-NN</b>			.....	Without sampling system
	<b>-A1</b>			.....	With sampling system (without automatic cleaning, without automatic zero calibration)
	<b>-A2</b>			.....	With sampling system (with automatic cleaning, without automatic zero calibration)
	<b>-A3</b>			.....	With sampling system (with automatic cleaning, with automatic zero calibration)
	<b>-A5</b>			.....	Without sampling system, with relay box
Material and Connection of Sampling system	<b>-AN</b>			.....	Without sampling system (Detector mounting bracket Carbon steel)
	<b>-SN</b>			.....	Without sampling system (Detector mounting bracket Stainless steel)
	<b>-AD</b>			.....	Carbon steel stanchion, base mounting
	<b>-AB</b>			.....	Carbon steel stanchion, rear mounting
	<b>-SD</b>			.....	Stainless steel stanchion, base mounting
Solenoid valve for Sampling system	<b>-SB</b>			.....	Stainless steel stanchion, rear mounting
	<b>-NN</b>			.....	Without Solenoid valve
	<b>-10</b>			.....	100 V AC
	<b>-12</b>			.....	110 V AC
	<b>-20</b>			.....	200 V AC
	<b>-22</b>			.....	220 V AC
—			<b>-NN</b>	.....	Always -NN
—			<b>-NN</b>	.....	Always -NN
Option			<b>/L02</b>		Connection cable for analyzer 2 m
			<b>/L03</b>		Connection cable for analyzer 3 m
			<b>/L05</b>		Connection cable for analyzer 5 m
			<b>/L10</b>		Connection cable for analyzer 10 m
			<b>/L20</b>		Connection cable for analyzer 20 m
			<b>/SCT</b>		Stainless steel tag plate
			<b>/U</b>		Pipe mounting hardware (SUS)
			<b>/R</b>		Rack or wall mounting hardware (SUS)
			<b>/CB</b>		Conduit adapter G1/2×1 pcs
			<b>/CD</b>		Conduit adapter 1/2NPT× 1 pcs
			<b>/CF</b>		Conduit adapter M20×1.5×1 pcs
			<b>/ARS</b>		With arrester
			<b>/PHN7</b>		With pH (Using FLXA402) (without ultrasonic cleaning)
			<b>/PHU7</b>		With pH (Using FLXA402) (with ultrasonic cleaning)
			<b>/TT3</b>		With 500ml KCl reserve tank for pH
			<b>/FC</b>		With Free Available Chlorine Analyzer
			<b>/PHN2</b>		With pH (Using FLXA402T 2nd input) (without ultrasonic cleaning)
			<b>/PHU2</b>		With pH (Using FLXA402T 2nd input) (with ultrasonic cleaning)
			<b>/L</b>		Air denoising for Low Range



## ● Accessories

Name	Q'ty	Remarks
Silicone cloth	1	4 pcs/Q'ty (Part number: K9657RJ)
Check tool	1	—
Desiccant	1	For spare. 4 pcs/Q'ty (Part number: K9657RU)
Desiccant	1	For operation. 4 pcs/Q'ty (Part number: K9657RU) (When the code for "Without sampling" is specified)
Pipe mounting hardware (Option)	1	For "/P" (Option)
Rack mounting hardware (Option)	1	For "/R" (Option)
Soft vinyl chloride tube (Ø33 × Ø25 Black)	1 set (1 m x 2)	For piping detector (when the code for "Without sampling" is specified)
Clamp	1	For piping detector (when the code for "Without sampling" is specified)

## 2. Wiring and Installation

For details, refer to the User's Manual IM 12E01B30-02EN.

### 2.1 Installation Site

Select an installation site where

Ambient Operating temperature:	-5 to +55 °C
Storage Temperature:	-30 to +70 °C
Humidity:	10 to 90% RH at 40°C (Non-condensing)
Power Supply Voltage	
Ratings:	100 to 240 V AC
Acceptable range:	90 to 264 V AC
Power Supply Frequency	
Ratings:	50/60 Hz
Acceptable range:	50 Hz ± 5%, 60 Hz ± 5%
Water Protection:	
IP65, Type4X (In case of using outside and under sunlight, please put an analyzer under a roof.)	

Install the TB830D Surface Scattering Light Turbidity Detector at a location that

- is free from rain water such as an indoor location or in a cabinet.
- has low vibration.
- has low corrosive gas.
- is low humidity.
- has low temperature variation and where the temperature is maintained at or as near to room temperature as possible.
- allows for sufficient maintenance space with easy maintenance access.
- allows for drainage.

For information on FLXA402T, read the user's manual.

Install the TB830D's converter and detector unit in pipes, racks or walls using their special mounting brackets, respectively. Note that these mounting brackets are supplied only when specified. Refer to General Specifications (GS 12E04B40-01EN) for details.

## 2.2 Piping

Pipe the sample, drainage, and washing water. If a sampling system is supplied with the product, connect the pipe to the sampling system. If the sampling system is not supplied, connect the pipe to TB830D detector. For proper operation of the instrument, the sample requirements, such as flow rate, have to be met.

Refer to the User's manual IM 12E04B40-02EN and connect the pipes properly so that the sample conditions are satisfied.

## 2.3 Wiring



### WARNING

When Standard "-AD" (General purpose for CSA) with conduit adapter "/C□" is specified, always use a dedicated plate for wiring to comply with safety regulations.

When wiring TB830D, first remove the detector unit cover, then attach the cable gland. Refer to user's manual IM 12E04B40-02EN for details.

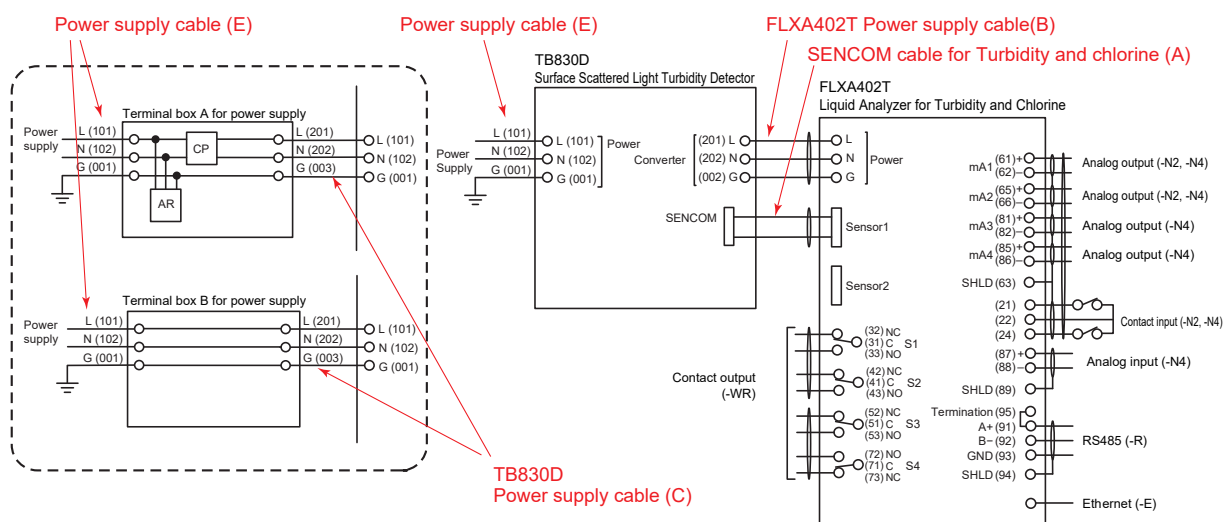
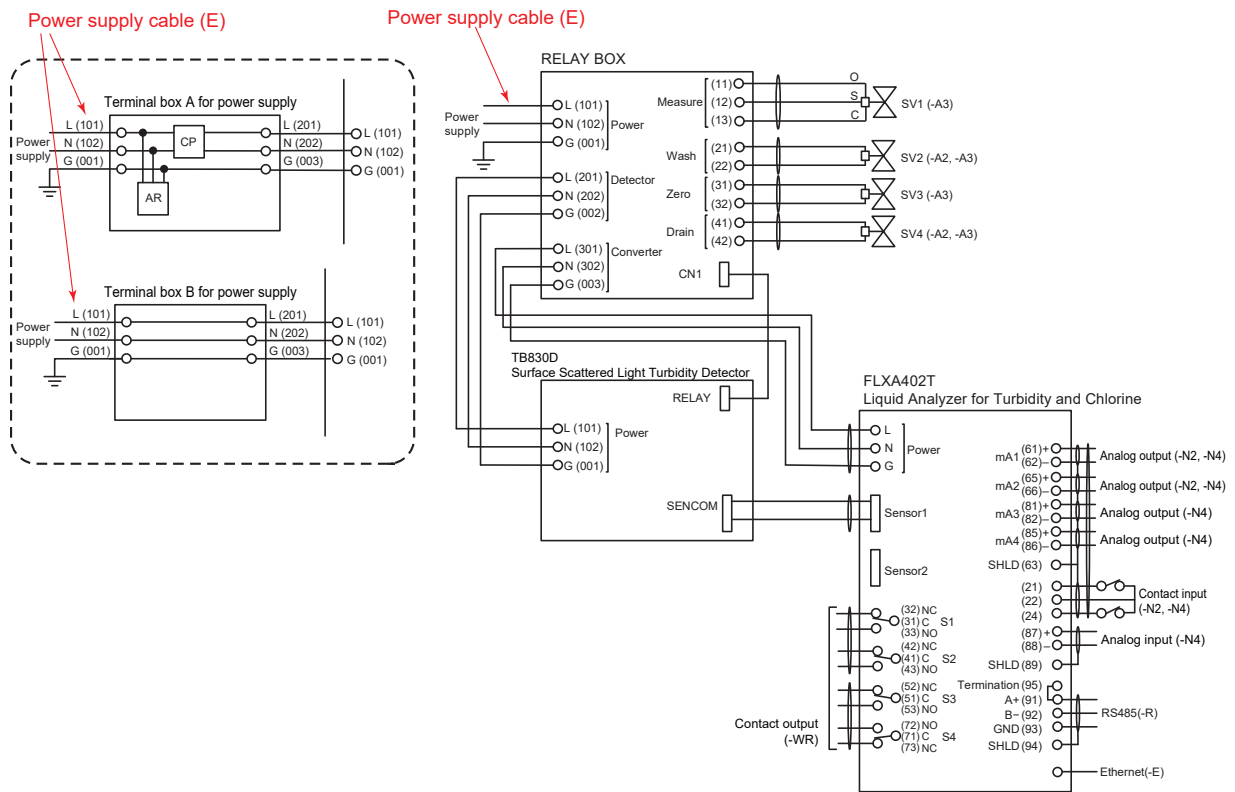
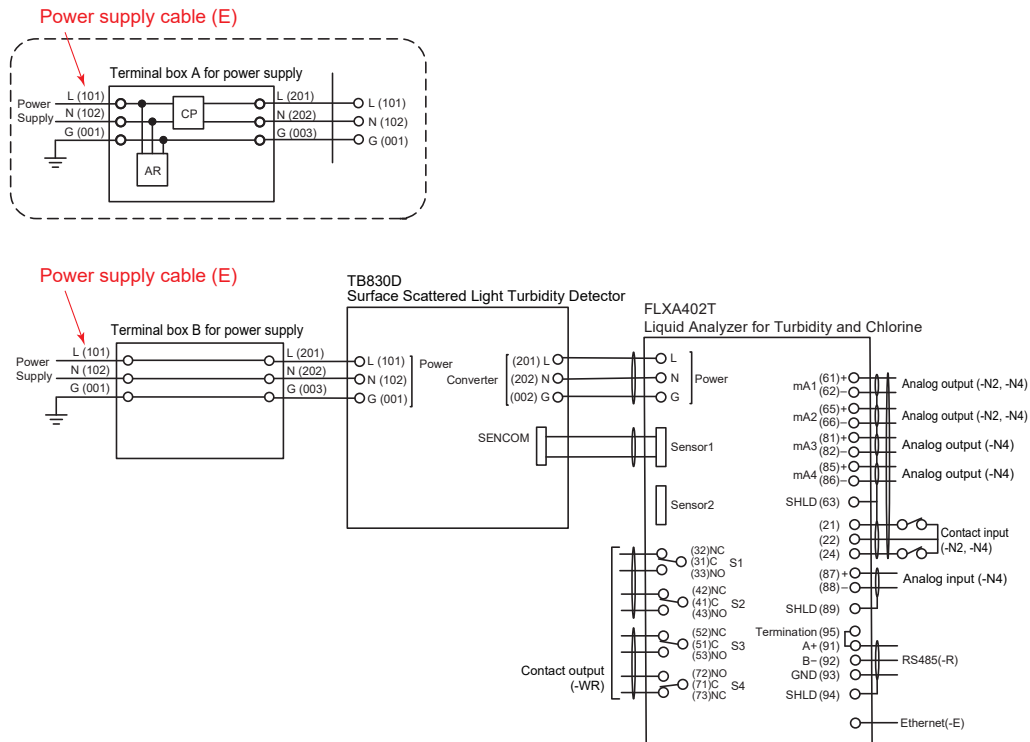
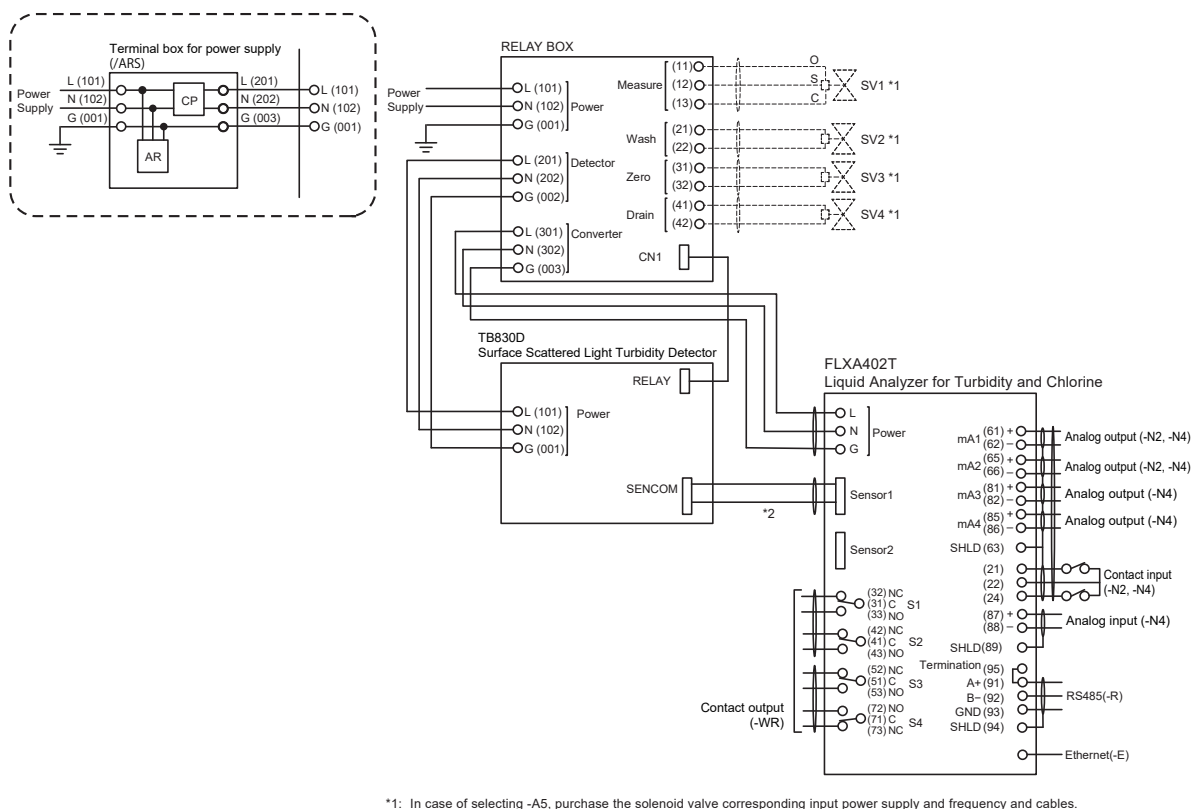


Figure 2.1 Wiring for TB830D without sampling system (NN)





\*1: In case of selecting -A5, purchase the solenoid valve corresponding input power supply and frequency and cables.

Figure 2.4 Wiring for TB830D without sampling system, with relay box (-A5)



## CAUTION

Turn off power supply to TB830D before wiring. Power rating must comply with TB830D specifications. Power voltage must match with the one indicated on the name plate.



## WARNING

- You must install external power supply switch or circuit breaker for power supply.
  - The external power supply switch or a circuit breaker must comply with a current rating of 5A or IEC60947-1 or IEC60947-3
  - Yokogawa recommend installing the external power supply switch, circuit breaker and TB830D all in the same location.
  - Install the external power supply switch or circuit breaker to the place where operators access easily. To alert users, put a label on the external power switch.
  - Fix securely onto constructions or walls all power lines including wire cables of power supply by using stanchion, cable rack, conduit or vinyl band.
- Unplugged cables are dangerous and may cause an electric shock.

## CAUTION

When you open the front cover on the detector and Relay Box, make sure the screws are completely out of the screw holes, and then open the front cover slowly in order not to damage the threaded parts on the housing. If the threaded parts are damaged and the screws cannot be tightened, the waterproof performance will deteriorate.

## ■ Wiring the power supply

The cable size of terminals is 0.13 to 2.5 mm<sup>2</sup> in cross-sectional area or AWG 26 to 14. Supplied with product cable gland is for cables finished O.D. of 6.5 to 12.5 mm. Seal up all unused cable inlets with the supplied cable glands and close-up plugs. Refer to IM 12E01B30-02EN for details.

### WARNING

The minimum cross sectional area of the protective grounding wire should be 0.75 mm<sup>2</sup>. For CSA safety standard (Standard: - AD), use cables with a cross section of 0.75 - 2.1 mm<sup>2</sup>.

## ■ Wiring of TB830D

### WARNING

Never let the power cable touch SENCOM cable, resulting in failure to comply with safety requirements.

### WARNING

- Use wiring cables with heat resistance above 75°C, waterproof rating IP65 or higher.
- Tightening torque to the four screws of Smart Box cover is 1.5 N·m.
- For power supply, wire cables with a flammability rating of UL 2556 VW-1 or equivalent.

Refer to FLXA402T Installation and Wiring IM 12A01G01-02EN.

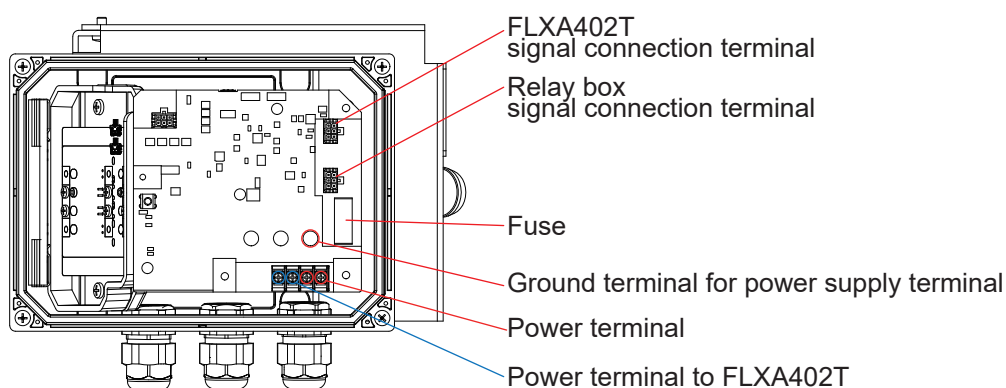


Figure 2.5 Wiring of TB830D

## ■ Wiring of Terminal Box and Relay Box

IP ratings must be greater than IP65. Tightening torque to the four screws of detector unit cover is 1.5 to 1.6 N·m.

### ● Wiring of Terminal Box A

Open the smart box. Connect the cable complying with the figure below.

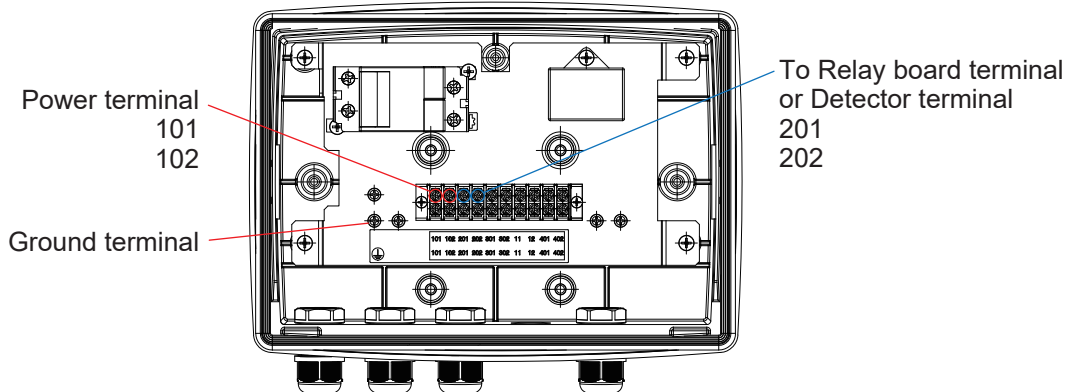


Figure 2.6 Wiring of Terminal Box A

### ● Wiring of Terminal Box B

Open the smart box. Connect the cable complying with the figure below.

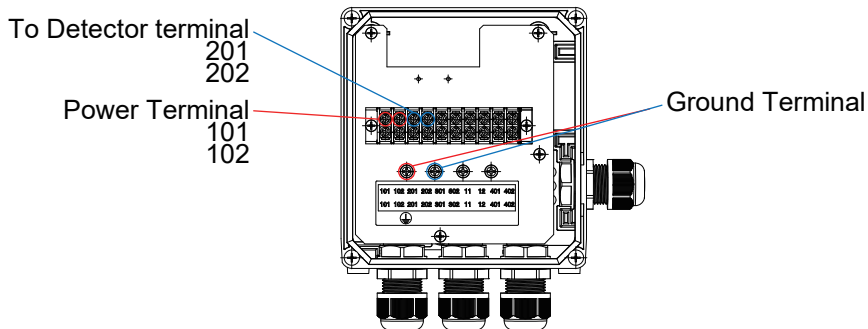


Figure 2.7 Wiring of Terminal Box B

### ● Wiring of TB830D with Relay Box for connecting solenoid valve

Open the smart box. Connect the cable complying with the figure below.

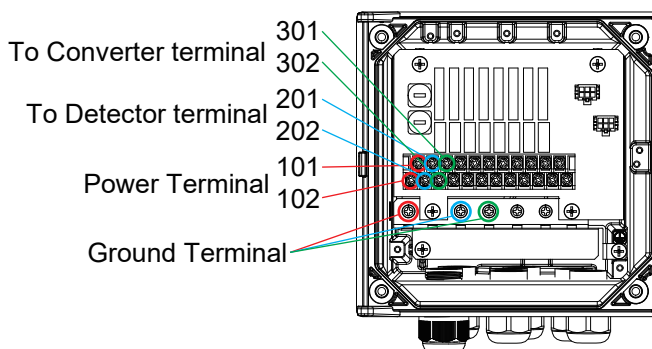


Figure 2.8 Wiring of TB830D with Relay Box for connecting solenoid valve

## 3. Operation

Before starting an operation, follow the next procedure. Refer to IM 12E04B40-02EN for details.

- (1) Check piping and wiring are all correctly provided.
- (2) Set up the desiccant.
- (3) Run water and check that there is no water leakage.
- (4) Turn on the power and set to Maintenance mode.
- (5) Configure parameters on the converter and detector unit.
- (6) Confirm the reading is stable. Perform Zero/Span calibration.
- (7) Switch to a measurement mode. Start a regular measurement.

## 4. Maintenance

### ■ Periodic maintenance

When you must open the front cover and/or glands, make sure that the seals are clean and correctly fitted when the unit is re-assembled in order to maintain the housing's weatherproof integrity against water and water vapor.

Certain parts must be replaced periodically to maintain product performance.

Refer to the user's manual IM 12E04B40-02EN for details.



### CAUTION

Never use harsh chemicals or solvents. If the instrument does become heavily stained or scratched, you may need to replace some parts. Consult Yokogawa.

### ● Fuse

There is a circuit board mounted fuse protecting the instrument. If a fuse blows soon after the change, contact Yokogawa.

# Revision record

## Sep. 2023/ 2nd Edition

Revised conformity standards. (p. 7)

## Mar. 2023/ 1st Edition

Newly released.

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