

Fiber Type

Liquid Type Identification Sensor

ES-5000 Series

Detection Unit : ES-5000F-※(-0500)

Control Unit : ES-5000CM

Operation Manual

In this "Safety Precautions", the ranks of safety precautions are classified as "Warning" and "Caution".

Safety Precautions

Warning : If mishandled, dangerous situations may occur and may result in death or damage.

- Installation, piping, operation / operation, maintenance, and inspection work should be performed by a person who has knowledge and skills in principles and functions such as explosion-proof structure, construction of electrical equipment, and related regulations. Otherwise, there is a risk of explosion, fire, electric shock and injury.
- Please use after confirming that the operating environment is within applicable scope.
- Do not disassemble, modify, reverse engineer, etc. this device. Otherwise, it may cause a fire or electric shock. In addition, we will not compensate for any accidents or damages caused by using this disassembled or modified device.

Caution : If mishandled, dangerous situations may occur and it is expected that moderate damage or minor injury will occur, or only property damage is expected to occur.

- For safety, please use within the specified range.
- Do not use damaged products. Otherwise, there is a risk of injury or fire.
- When disposing, please treat it as general industrial waste.

TOYOKO KAGAKU CO.,LTD.

Introduction

Thank you for your purchasing of our products this time.

Please read this "Operation Manual" carefully before installing and using the product in order to use it correctly.

If used improperly, it may cause a malfunction or matter.

Please make sure that this Operation Manual is delivered to the person in charge of using this product.

In addition, please do not use this product for any purpose other than its original purpose and do not disassemble / analyze this product.

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1. Overview

This product is a Liquid Type Identification Sensor that can discriminate between water and other liquids in addition to detecting liquids. It can also be used to distinguish between two types of liquids other than water, depending on the type of liquid. If water is set to external output 1 (OUT1), and liquids other than water are set to external output 2 (OUT2), and they can be output separately. This will result in, for example, it can be used not to detect with water but to detect with oil.

The detector is made of synthetic quartz and PFA, and can be used with a liquid that does not corrode or damage these.

In addition, since the detector uses optical fiber, it can also be used in explosion-proof areas.

✘The control unit is not explosion-proof.

2. Handling precautions for fiber sensor

! Caution

(1) Do not look directly into the light of the floodlight and detector of the control unit. Otherwise, it may hurt your eyes.

! Caution

(2) The optical fiber may be damaged or broken if you do the following. Please handle with care.

- Pull / step • • • Tensile strength [160N]
- Fold • • • Minimum bend radius [2mm]
- Heat • • • Heat resistance 105 °C (Core material PMMA)

✘Operational temperature : -10 to 60 °C

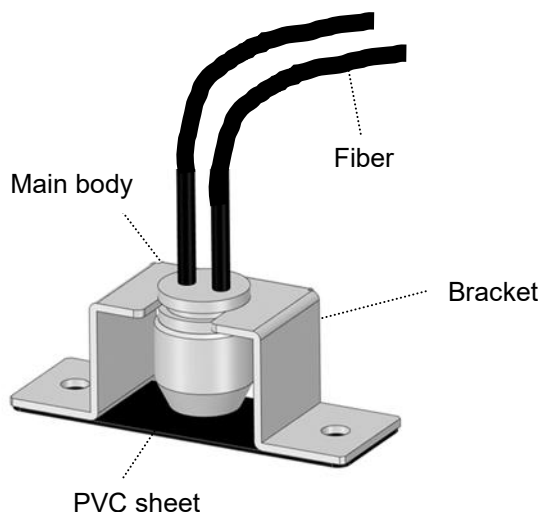
- Scratch

! Caution

(3) If the lens is scratched, the detection performance will be affected. Please handle with care so as not to damage it. Also, if there is dust or dirt on it, it may not be detected correctly. If it is dirty, wipe it with a clean cloth and use clean air to remove dust.

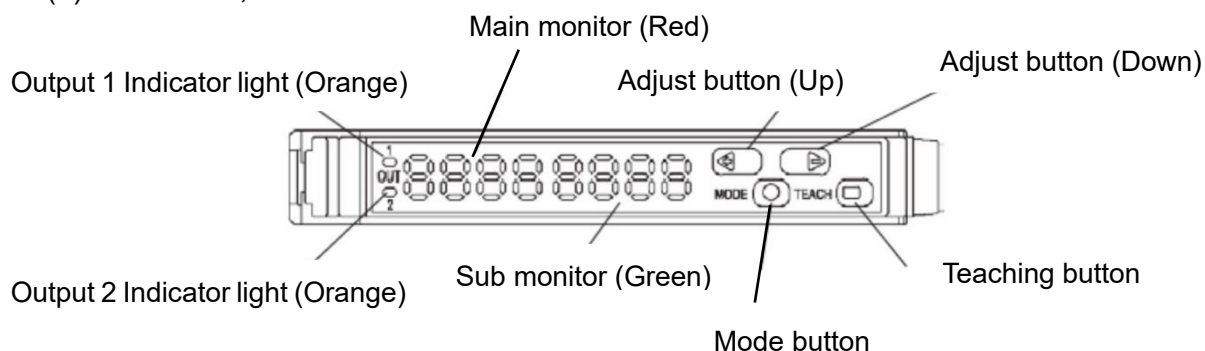
3. Name of each part

3.1 Detector ES-5000F- ※M(-0500) ※ Fiber Length



3.2 Control unit ES-5000CM

(1) Indication, button



※ Normal (Run mode)

Main monitor . . . Light receiving amount
 Sub monitor . . . Threshold

(2) Button operation

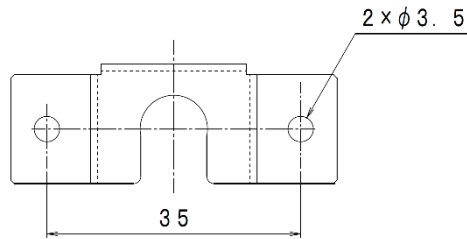
Button	Normal indication (Run mode)	During setting and teaching indication
Adjust button (+ Up)	Raise the threshold	Switch between setting menu and teaching menu
Adjust button (- Down)	Lower the threshold	
Mode button	Switch to the display during setting	Confirm the selected settings
Teaching button	Switch to the display during teaching	Perform teaching

※ It takes about 30 minutes after turning on the power until the displayed value of the amplifier stabilizes.

4. Installation

4.1 Detector

- (1) Secure the bracket in close contact with the installation surface. The mounting hole dimensions are shown in the figure below.



- ※ Be sure to use the specified bracket.
- ※ Secure the bracket on a flat surface with no irregularities. If there is unevenness, it may not be detected normally.
- ※ If you install it on a black color floor, you can get more stable operation. When installing on a non-black color floor or uneven floor, it is recommended to insert the attached black PVC sheet between the bracket and the floor.

- (2) Push the detector body all the way into the bracket and fix it so that it will not come off.

! Caution

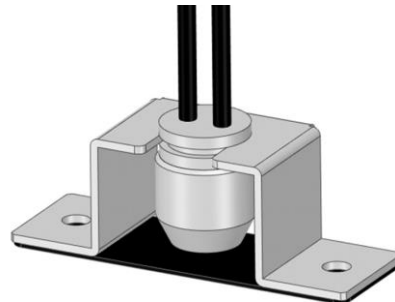
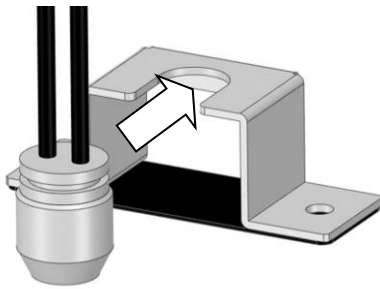
If the main body is floating from the bracket, it will not operate normally. Make sure to push it all the way in.

! Caution

Since the main body of the detector is made of resin, handle it with care so that it will not be deformed, scratched or damaged by applying excessive force.

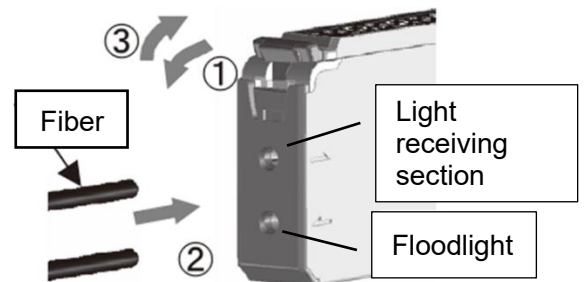
! Caution

The detector is made of synthetic quartz. Be careful not to rub it on a hard surface such as stone or concrete as it will scratch it. In addition, if the floor is made of a soft material such as vinyl chloride, it may damage the floor, so be careful.



- (3) Mounting to the control unit

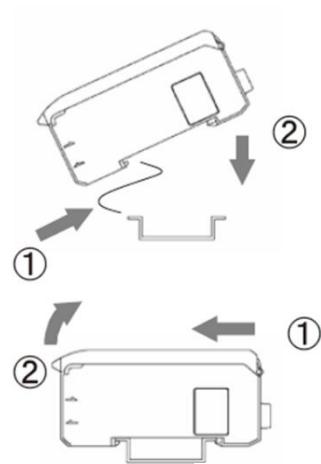
- ① Raise the lock lever.
- ② Make sure to insert the fiber of the detector into the fiber insertion slot as far as it will go.
- ③ Return the lock lever to its original Direction to secure the fiber. (Locked)



4.2 Control unit

(1) Mounting on DIN rail

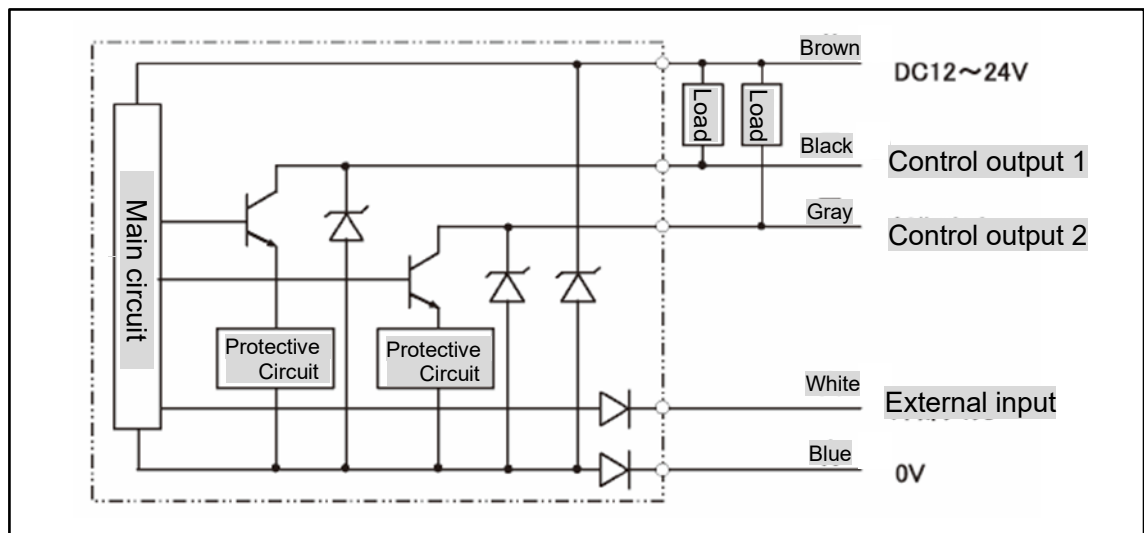
- ① Hook on the rail the claw on the insertion side of the detector.
- ② Push in until the hook clicks.



(2) Removing from DIN rail

- ① Push the main body in the direction of ①.
- ② While doing ①, lift in the direction of ②.

Input & output circuit



! Caution

If the operation is not normal, please check it referring to the following.

- (1) If nothing is displayed on the control panel, there is a possibility of poor connection or a load short circuit (damage to the control unit due to overvoltage or overload). Immediately stop using the product and check the wiring and load.
- (2) If it is displayed on the control panel but the output does not work properly, please check the wiring and load because there is a possibility that the transistor inside the control unit is defective due to wiring failure or overload.
- (3) If the detector is not fully inserted in the bracket, detection may not be performed normally. Please insert the detector firmly into the bracket again.
- (4) If the fiber of the detection unit is not firmly inserted into the fiber insertion slot of the control unit, the amount of light received may be low, and the displayed value may be too small or 0, making it impossible to detect normally.

! Warning

Do not look directly into the light from the floodlight or detector of the control unit. It may hurt your eyes.

! Caution

Since this sensor uses a photo device, it may not be detected properly when exposed to strong external light.

There is no problem with normal room temperature illuminance, but if there is a possibility of emitting strong light near the detector, or if you use it outdoors, we recommend that you take measures such as blocking the light.





! Caution

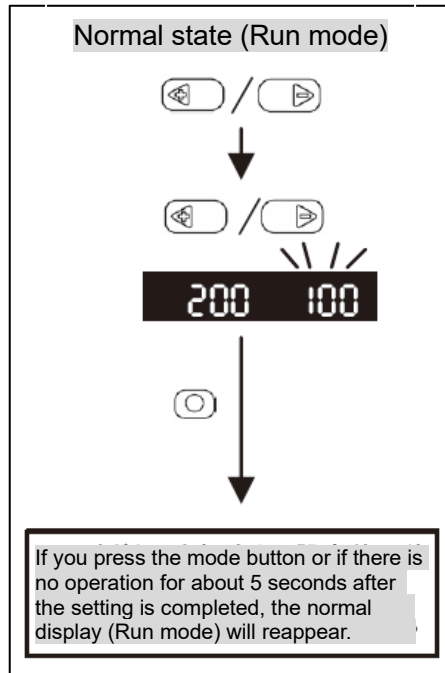
If dust, dirt, water, oil, etc. adhere to the lens at the tip of the detector, a detection error may occur. In that case, wipe off the dirt with a rag etc. If it is very dirty, wipe it off with a rag soaked in alcohol or wash it with a neutral detergent.


If you wash it with detergent, wash it off thoroughly so that no detergent remains on the lens. Please wipe off the water after cleaning.

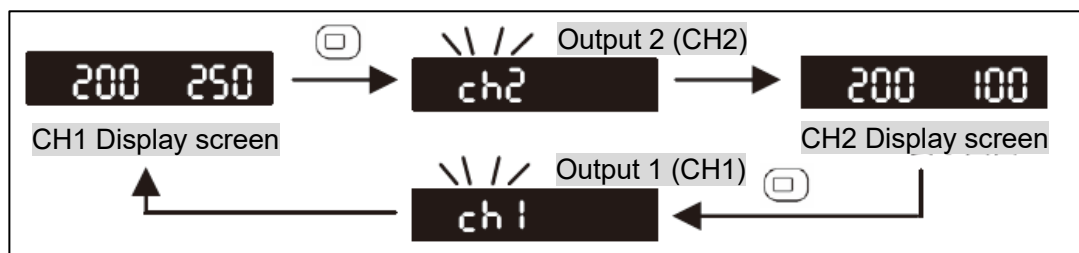
5. Threshold setting and display switching

5.1 Threshold setting



- (1) If you press  /  button during normal display, the threshold flashes to indicate that it is adjustable.
- (2) Please use  /  button to adjust to any value.

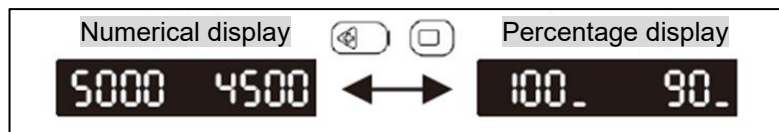




- (1) When you press the  button, the channel (output) number of the migration destination blinks and switches.

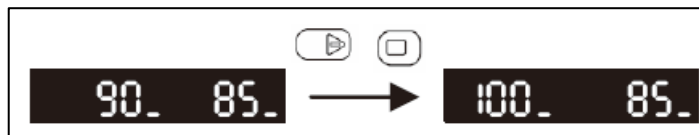


5.2 Display switching

- (1) You can switch from the numerical display to the percentage display by pressing the  button and the  button at the same time.



- (2) While the percentage is displayed, you can set the value to 100 by pressing the  and  button at the same time.



6. Recovery after liquid detection

! Warning

The leaked liquid may be mixed or generated with acids, alkalis, chemical products, etc. Those who are familiar with the liquid used and the environment should pay close attention to the work.

! Caution

Be sure to use chemical-resistant or oil-resistant gloves for work.

! Caution

For chemicals that require the use of protective glasses, protective masks, etc., be sure to take necessary protective measures.

- (1) Wipe off any leaks around.
- (2) Remove the detector from the bracket and wipe off the leaked liquid on the body and bracket. Clean the detector if necessary.
- (3) Push the detector into the bracket to secure it.
- (4) Check that the values and output of the detector are normal.

7. Specification

Detector	Model number		ES-5000F-※M(-0500)
	Fiber	Length	5m、10m
		O.D. (Cable covering)	2.2mm
		Minimum Bend Radius	2mm
	Ambient Temperature		-10~60°C
	Ambient Humidity		20~98%RH (Not condense)
	Material	Body	PFA、 Synthetic Quartz (Lens)
		Cable	PFA (Cable covering)
		Bracket	SUS304 (PFA Coated)
		PVC sheet	PVC
Waterproof Performance		IP67 equivalent	
Control Unit	Model number		ES-5000CM
	Power voltage		DC12~24V±10%
	Power consumption		936 or less (In normal mode)
	Output		NPN Transistor Open Collector, 2 outputs
			100mA / 30V or less
			Load current : 100mA or less
			Residual voltage : 1.8V or less
	Ambient Temperature		-25~55°C
	Ambient Humidity		35~85%RH (Not condense)
	Light emitting device (element)		Red LED (632 nm)
	Protective structure		IP50
	Material		PC (Cover, Case)
	Wiring specification		O.D. 3.8φ, 5 cores
	Mass		About 71 grams
Mounting method		35mm width, DIN Rail	

