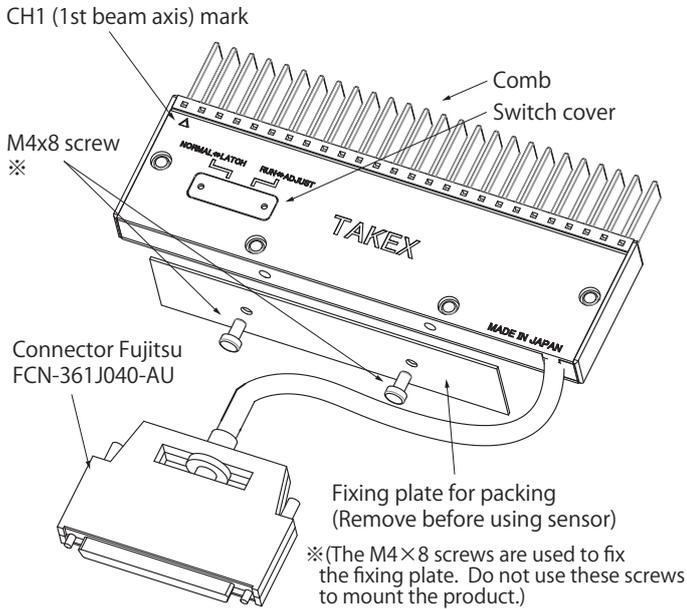


1 COMPONENTS

(refer to dimensions for shapes and sizes of each component.)



2 SAFETY CAUTIONS

The following cautions must be strictly observed in order to ensure safety.

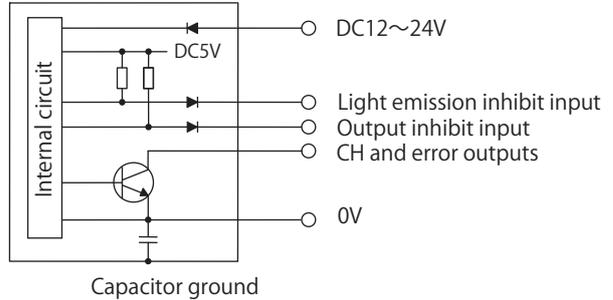
1. This product is not designed for the use in safety systems which detect the presence of human body. Do not use this product either directly or indirectly for applications.
2. Do not use this product when its case or cable is in a damaged condition.
3. Do not attempt to disassemble, repair, or modify this product.
4. Do not use this product in environments where flammable, explosive, or corrosive gases are present.
5. Do not use this product in environments where the product could be exposed to oils and chemicals.
6. Do not use this product in water, in rain, or outdoors.
7. Do not use this product under conditions or in environments which exceed the product ratings.
8. Do not use this product in locations which are exposed to direct sunlight.
9. Do not use this product in locations which receive direct vibrations or impact shocks.
10. Do not wipe this product with thinner, alcohol, or any other organic solvent.
11. Perform daily inspections and periodic inspections (approximately every week) together with the prescribed maintenance/inspection procedures to verify that the product is functioning normally.
12. This product must be discarded of as industrial waste.

3 OPERATING CAUTIONS

1. Placing high-voltage cables, power cables, and the product wiring together in a single conduit or duct could cause induction-related malfunctions and possible equipment damage. Make sure to separate these cables when wiring.
2. Avoid applying an excessive force to the cables.
3. Always install an FG (frame ground terminal) when using a commercially available switching regulator.
4. Because detection is enabled 1sec after the product's power is turned ON, always wait 1sec after power ON before attempting to the use the product. If the load and the product are connected to different power supplies, be sure to turn the product's power ON first.
5. Because an output pulse may be generated at power OFF, we recommend that the load or the load line's power be turned OFF first.
6. Do not use in applications where the power is turned ON and OFF in a continuous manner.
7. For the operation power supply, limit the current (2A) in accordance with the conductor size which is connected to the connector.
8. Screws should not be screwed-in 8 mm or more into the sensor when mounting. Choose a proper length of screws according to the thickness of the fixing body. The sensor may be damaged if inappropriately long screws are used.

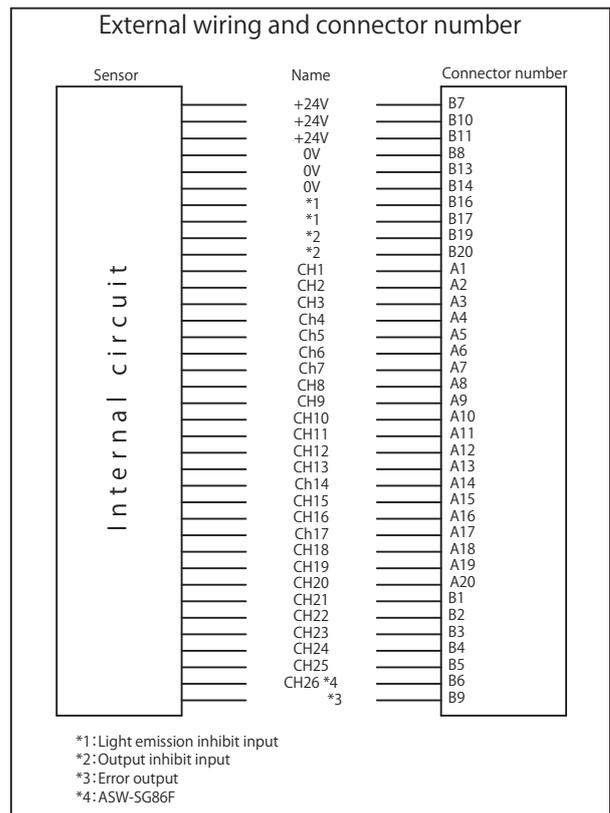
4 CONNECTIONS

● Input/output circuit



※ For a noise prevention, a capacitor is installed between the 0V power supply and the sensor's aluminum case.

● Pin configuration diagram



Each signal is passed from the sensor through the cable, and converted from serial to parallel in the connector. Three connector pins are used each for the power cable's +24V and 0V.

to allow the consumption and output current, connect the three in parallel.

When using the *1 and *2 light emission inhibit input and output inhibit input, connect the return wire to the connector's 0V (B8, B13, B14).

The two light emissions inhibit input and output inhibit output wires are connected in the sensor.

A Fujitsu FCN-361J040-AU connector is used.

Confirm that the connector is correctly connected before turning the power ON.

Do not used non-specified pin numbers for junction wiring, etc.

5 OPERATION

● Preparation

Firmly secure the wiring connectors as described in section 4 "Connections". Before turning the power ON, remove the switch cover and make the appropriate switch selections (see section 6(1) "Switches").

* After changing the switch settings, be sure to turn the power OFF and back ON.

(1) Turn the power ON.

* Before turning the power ON, check again to verify that the connections are correct.

Use care because the outputs are not equipped with short-circuit protection circuits.

(2) The TEACH mode is established when the power is turned ON.

* When in the TEACH mode, verify that nothing is blocking the light beam.

(3) Perform standard operation (see section 6 (2) "Functions").

* Because the product has been adjusted to detect wafers which are nearly transparent, a false output could occur if the product is subjected to an impact shock or vibration while the sensor is moving or stationary.

Moreover, a malfunction could occur if the comb's tip is touched by the wafer, or by a finger.

If the comb is touched in this manner, the TEACH operation must be repeated (see section 6 (2) "Functions").

* If the comb becomes damaged, replace it as described in section 8 "Maintenance and Inspection".

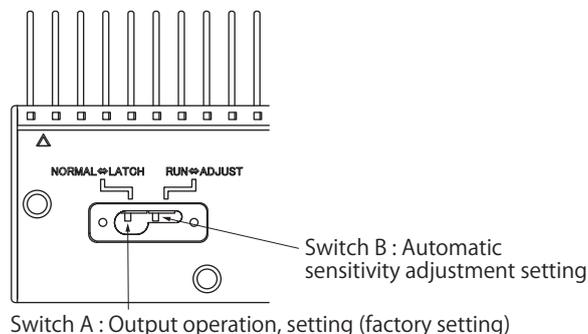
- Left-side setting: Standard operation mode (default setting)
- Right-side setting: Automatic sensitivity adjustment mode

Switch A: Output operation setting

Normal output mode ↔ Latch output mode

Switch B: Automatic sensitivity adjustment setting

Standard operation mode ↔ Automatic sensitivity adjustment



6 SETTING

(1) Switches (see Fig.1)

Open the sensor's switch cover, then specify the desired operation mode by setting the two switches.

● Switch A (output operation setting) specifies the sensor output operation.

• Normal output mode: set the switch to the left.
(Output ON/OFF occurs according to object presence/absence. This is the default setting.)

• Latch output mode: set the switch to the right
(Once the output switches ON, this ON status is maintained.)
* The latch output mode (sensor output ON HOLD) can be canceled by executing the Light emission inhibit signal.

● Switch B (automatic sensitivity adjustment setting) is used for sensor sensitivity adjustments.

This adjustment operation automatically adjusts the sensitivity of each optical axis channel individually and is required only after a comb has been replaced.

Be sure to perform the adjustment after replacing a comb which has become damaged, etc.

Set the switch B to automatic sensitivity adjustment mode and turn the power ON.

Be sure that nothing is blocking the light during the automatic sensitivity adjustment operation (light reception is required at this time).

Following the automatic sensitivity adjustment operation, be sure to return the switch setting to the standard operation sure to return the switch setting to the standard operation

(2) Functions

● Power ON and TEACH operation

When power is turned ON in the standard operation mode, the internal circuit's operation is checked, and an initial TEACH operation occurs.

Be sure that nothing is blocking the light at power ON.

If teaching cannot be performed for some reason (light is blocked, comb is missing or damaged, etc.), the error output turns ON, and the error channel's output turns ON/OFF repeatedly.

● Output inhibit input

Turns each channel's open collector output OFF regardless of the sensor operation status.

This function can be used when the outputs of multiple sensors are connected in parallel to a PLC.

This function inhibits the outputs of unnecessary sensors which is are connected to the PLC.

● Light emission inhibit input

When this input is turned ON, a "light blocked" and "output ON" status occurs at all channels.

When this input is turned OFF, a re-teaching operation occurs. Perform this re-teaching operation while the sensor remains stationary.

Do not perform a re-teaching operation while the sensor is in motion.

The re-teaching operation is completed within approximately 1sec after the light emission inhibit input is turned OFF.

After 1sec elapses, perform a motion operation.

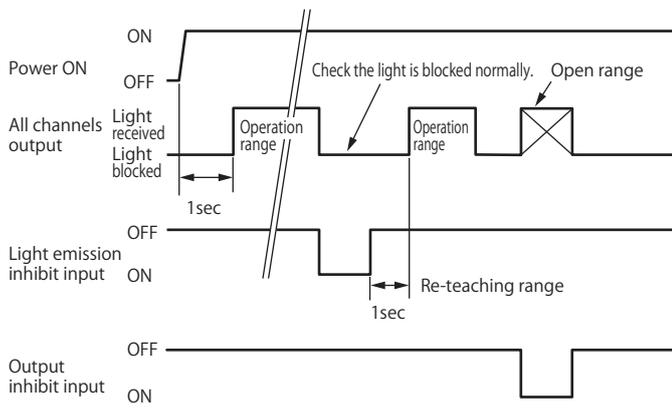
To obtain optimal detection, turn the light emission inhibit input ON → OFF while the sensor is in a standby status (before proceeding to the wafer detection operation) in order to perform re-teaching.

● Error output

An error output is issued at power ON if an operational problem exists (abnormal channel condition, insufficient light reception, light abnormality due to a damaged comb, malfunction due to ambient light interference, etc.).

When the error output turns ON, the error channel's output turns ON/OFF repeatedly.

● Time chart



Teaching occurs at power ON and at the light emission inhibit input. If teaching cannot be performed or a sensor malfunction is detected for some reason, the error output turns ON, and the error channel's output turns ON/OFF repeatedly. When using the light emission inhibit input had been used to perform re-teaching, the re-teaching operation is performed after the light emission inhibit input recovery. Therefore, always wait one second or longer before starting operation.

● Automatic sensitivity adjustment

This adjustment is used to adjust the comb sensitivity following a comb replacement. Be sure to perform the automatic sensitivity adjustment after replacing a comb. This adjustment can be performed simply by setting the switch to the automatic sensitivity adjustment mode, and then turning the power ON. Before turning the power ON, be sure that the nothing is blocking the light. All outputs are ON during the automatic sensitivity adjustment. The adjustment takes approximately 6 seconds. When completed, all outputs turn OFF, ON then OFF, indicating that the adjustment is completed. If an error channel exists when the automatic sensitivity adjustment occurs, the error channel's output turns ON/OFF repeatedly. If the adjustment is completed normally, return the switch to the standard operation mode, then turn the power OFF and back ON again before starting operation.

● Latch output mode

This mode detects the wafer edge, and is used for high transmittance (translucent/transparent) wafers. After the edge is detected, the output ON status is maintained. Note that of some wafer types (depending on the edge thickness and shape) is may not be detected. Therefore, be sure to evaluate the wafer attributes carefully before operation. Moreover, in order to detect the wafer edge, the wafer conveyance speed must be 10mm/sec. or less.

● Reset the latch output

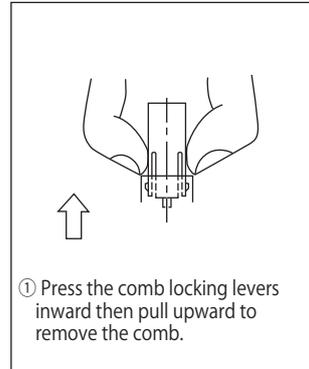
When in the latch output mode, the latch ON status can be reset (output OFF) by turning the light emission inhibit input to ON and then OFF.

8 MAINTENANCE AND INSPECTION

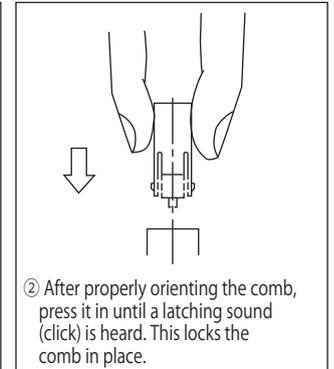
After replacing a damaged comb, be sure to perform the automatic sensitivity adjustment. See section 6-1 "Switches " for the automatic sensitivity adjustment procedure.

* Although the combs are detachable, use care when detaching them. Moreover, do not interchange the comb positions.

Detaching a comb



Attaching a comb



* Replacement sensor unit Model: ASW-F2500

9 RATINGS/PERFORMANCE/SPECIFICATIONS

Model	ASW-SG85F	ASW-SG85F-05	ASW-SG86F	ASW-SG86F-05
Wafer types	8-inch wafer (normal output mode: transmittance of 30% or less / latch output mode: transmittance of 70% or less)			
Number of channels	25ch		26ch	
pitch	6.35mm			
Detection method	Through beam			
Comb	Detachable type			
Power supply	24VDC \pm 10%, ripple 10% or less			
Current consumption	1.8W or less			
Operation mode	Dark-ON Normal output mode / latch output mode selectable (with switch) ON at error output			
Output mode	NPN open collector output Rating: sink current 30VDC or less, 20mA or less			
Response time	12ms or less			
Light source	Infrared LED (870nm)			
Light emission inhibit input re-teaching	Open collector input or contact input Light emission inhibit ON: 1.5V or less; OFF: 4V or less Normal output mode: Light emission inhibit at ON. Re-teaching at OFF. Latch output mode: Latch output reset, Light emission inhibit at ON. Re-teaching at OFF			
Output inhibit input	Open collector or contact input Output inhibit ON: 1.5V or less; OFF: 4V or less			
Connection	Attached cable with connector (Fujitsu FCN-361J040-AU) Cable length: 3m Cable length: 0.5m Cable length: 3m Cable length: 0.5m			
Material	Sensor unit: Polycarbonate; Housing: Aluminum			
Weight	Approx. 390g	Approx. 250g	Approx. 400g	Approx. 260g
Accessories	Operation manual			

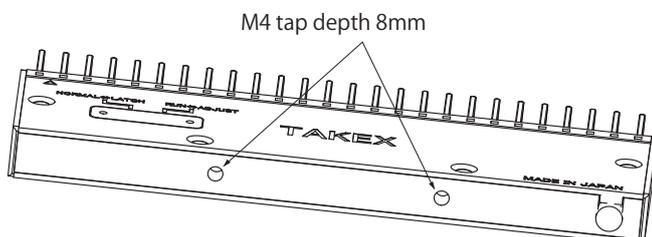
OPERATING ENVIRONMENT

Ambient illumination	1,500 lx or less
Ambient temperature	-10~+55°C (non-freezing)
Ambient humidity	35~85%RH (non-condensation)
Protective structure	I P 40
Vibration	10~55Hz double amplitude 0.5, X,Y,Z directions, 2 hours each
Shock	300m/s ² X, Y, Z directions, 3times each

※ For noise prevention, a capacitor is installed between the 0V power supply and the sensor's aluminum case.

7 Mounting instruction

M4 tap mounting holes are provided as shown below. (Refer to the Outline Dimensions for details.)

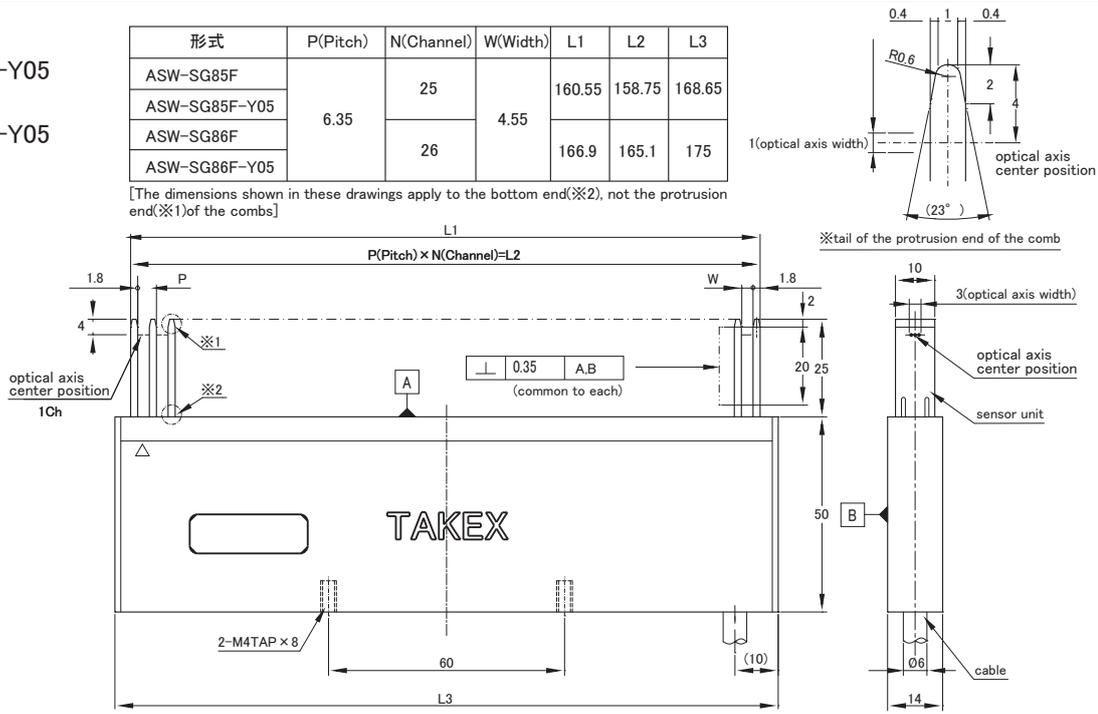


10 DIMENSIONS (Units : mm)

ASW-SG85F
ASW-SG85F-Y05
ASW-SG86F
ASW-SG86F-Y05

形式	P(Pitch)	N(Channel)	W(Width)	L1	L2	L3
ASW-SG85F	6.35	25	4.55	160.55	158.75	168.65
ASW-SG85F-Y05						
ASW-SG86F						
ASW-SG86F-Y05		26		166.9	165.1	175

[The dimensions shown in these drawings apply to the bottom end(※2), not the protrusion end(※1) of the combs]



11 WARRANTY

Takenaka Electronic Industrial Co., Ltd. (Takenaka) guarantees the quality of the product described in this manual, based on Takenaka Quality Standard. Please contact the agent or sales office where you bought the product if you find any defects.

1 《Warranty period》

The warranty period of this product is one year after the invoice date. This warranty does not apply to consumable parts such as batteries or relays. Regarding a product of another manufacturer sold by Takenaka, the warranty conforms to the quality standard of the manufacturer.

2 《Scope of warranty》

If any defect is found during the warranty period, Takenaka will repair or replace the product without charge.

The following cases are not covered by the warranty even within the warranty period. Please note that the warranty period is not extended after a repair or replacement.

- ① If the product is used inappropriately or used under inappropriate conditions that are not described in the instruction manual or specifications.
- ② If the defect is caused by improper maintenance, including a failure to replace consumable or periodical parts as described in the instruction manual or specifications.
- ③ If the defect is not directly caused by the warranted product.
- ④ If the product is modified or repaired by persons not authorized by Takenaka.
- ⑤ If the defect is caused by rough handling, dropping, or collision after the product is delivered.
- ⑥ If the defect could not be predicted from a technical viewpoint at the time Takenaka made the agreement for, manufactured, or installed the product.
- ⑦ If the defect is caused by a natural disaster such as a fire, flood, earthquake, lightning (including a lightning surge) and so on, or an accident such as an abnormal voltage that Takenaka is not responsible for.

The warranty provided here is only for the Takenaka product and does not cover any secondary damage caused by problems related to the product.

3 《Target of Warranty》

- (1) When combining the Takenaka product with a product made by another manufacturer, confirm any related laws, rules, regulations, standards, and so on. It is the customer's responsibility to confirm the suitability of the product for the system or device it is to be combined with.
- (2) This product is designed and manufactured for industrial use. This warranty does not cover the application of the product to:
 - (1) Equipment for nuclear facilities including nuclear power stations or nuclear control facilities, incineration systems, railway vehicles, aircraft or automobiles and their related facilities, medical equipment, entertainment equipment, safety devices, equipment regulated by administrative bodies or specific industries.
 - (2) Equipment that may create serious danger or adversely affect human life or property.
 - (3) Public utilities for electricity, town gas or water supply, or equipment that requires consistent reliability, such as 24-hour continuous operation.
 - (4) Usage outdoors or usage in conditions or environments that are not prescribed in the instruction manuals.
 - (5) Usage or equipment that requires considerable care or attention to safety, similar to the cases in ① to ③.

This warranty may cover these applications if Takenaka is notified about the application of the product before sale and the customer approves the compatibility and the specification of the product by written agreement and/or by providing the required safety measures.

12 DISCLAIMER

- This product is designed for industrial applications to detect the presence, absence, or passage of a variety of objects. It has no functions to prevent disasters, accidents, death or injuries. Takenaka will assume no responsibility for damages or losses resulting from accidents or disasters caused by a failure of the product, incomplete wiring or installation, or any act that does not follow the instruction manual. We will assume no responsibility for damages or losses caused by:
 - Earthquakes, lightning (including lightning surges), fires that we are not responsible for, acts or incidents caused by third parties, intentional or accidental misuse, or usage under other abnormal conditions.
 - Any secondary damage caused by the usage, faulty operation, or malfunction of the product like suspended operation or malfunction of a connected device or system, damage to a device, loss of profit, interruption of business, corruption or loss of memory contents, cost of restoration, etc.
 - Misuse, failure related to maintenance, installation or deinstallation, or failure to follow the contents of the instruction manual.
 - Any malfunction (including false alarm or lost alarm) caused by the combination with a connected device or software over that we have no control.
- The responsibility of Takenaka is limited to the extent of repair or replacement of the product. The expenses we are liable for will not exceed the original product cost.