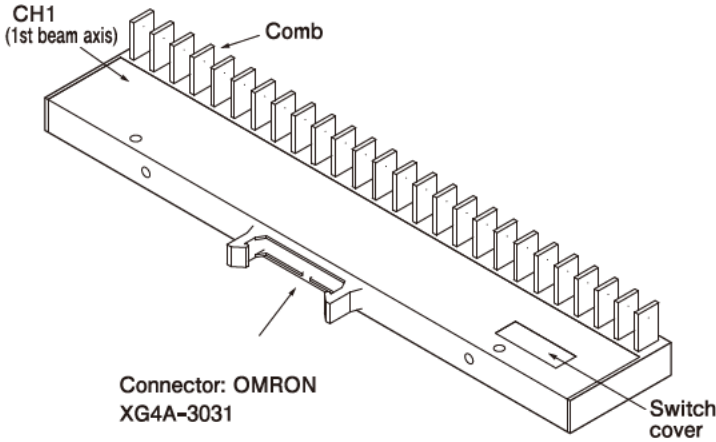


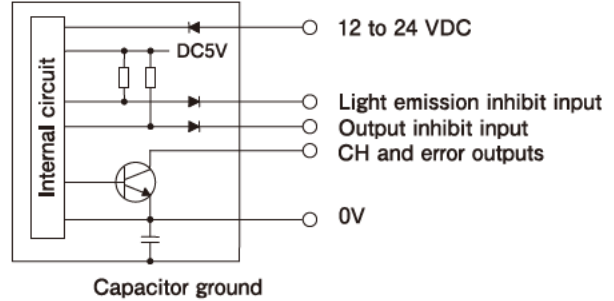
1 NAME OF EACH PART

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



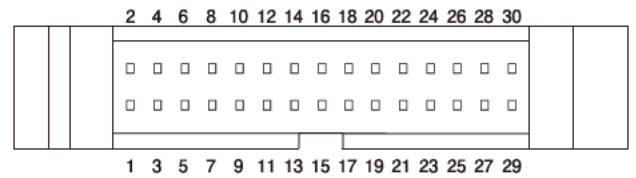
4 CONNECTIONS

● Input/output circuit



※ As a noise prevention measure, a capacitor is installed between the 0V power supply and the sensor's aluminum case. Do not perform a withstand voltage test between the sensor power supply or inputs/outputs and the aluminum case.

● Pin configuration diagram



2 SAFETY PRECAUTIONS

To ensure safety, be sure to follow the precautions below.

1. Do not use this product for life or safety critical applications.
2. Do not use this product when its housing or cable is damaged.
3. Do not attempt to disassemble, repair, or modify this product.
4. Do not use this product in an environment containing flammable, explosive or corrosive gas.
5. Do not use this product in an environment exposed to chemicals or oils.
6. Do not use this product in an environment exposed to water including outdoors or under the water.
7. Use this product within the product rating and specification.
8. Do not expose this product to direct sunlight.
9. Do not use this product in an environment exposed to vibration or shock.
10. Do not use organic solvent including alcohol and thinner to clean the product.
11. Perform a daily operation check, weekly periodical inspections, and prescribed maintenance procedures to ensure correct operation.
12. This product should be disposed of as an industrial waste.

3 PRECAUTIONS DURING USE

1. Be sure to route the sensor cables separate from any power transmission or high voltage line, or else use shielded cables. Using the same conduit or duct as high voltage or power lines will cause malfunctions or damage because of electromagnetic induction.
2. Do not apply excessive force to the cable.
3. When using a switching regulator, be sure to ground the frame ground (FG) terminal.
4. The sensor starts operation 500ms after power is supplied. Always power on the sensor prior to loads.
5. Turn off the power of the load first as this product may generate an output pulse when the power is turned off.
6. Avoid turning the power on and off consecutively.
7. For the operation power supply, limit the current (1A) in accordance with the conductor size which is connected to the connector.

Pin No.	Pin Description	Pin No.	Pin Description
1	0V	16	CH14
2	12 to 24 VDC	17	CH15
3	CH1	18	CH16
4	CH2	19	CH17
5	CH3	20	CH18
6	CH4	21	CH19
7	CH5	22	CH20
8	CH6	23	CH21
9	CH7	24	CH22
10	CH8	25	CH23
11	CH9	26	CH24
12	CH10	27	CH25
13	CH11	28	Error output
14	CH12	29	Output inhibit input
15	CH13	30	Light emission inhibit input

An OMRON XG4A-3031 item is used for the sensor connector.

5 OPERATION

● Installation

3 sets of M4 tapped holes (thru-holes) are provided.
1 set is an M4 thru-hole tap. The remaining 2 sets are tapped to a depth of 8mm. Use these holes for installation, and install with care.

● Operating procedure

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.

* **Do not attempt operation until 500ms after power has been turned ON.**

(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 7 "Maintenance and Inspection".

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

- 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

Switch A: Output operation setting
(Switch position at default setting)

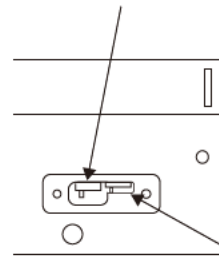


Fig.1

Switch B: Automatic sensitivity adjustment setting

(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 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 1 second after the light emission inhibit input is turned OFF.

After 1 second elapses, perform a motion operation.

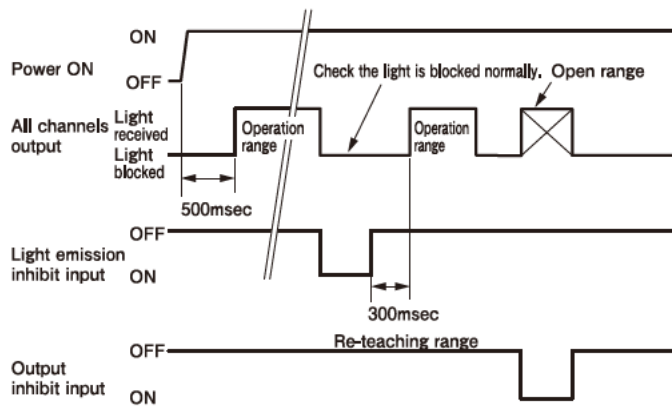
To obtain optimal detection, turn the light emission inhibit input ON → OFF while the sensor is in a standby status (before proceeding to the wafer detection operation) in order to perform re-teaching.

● 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) it 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

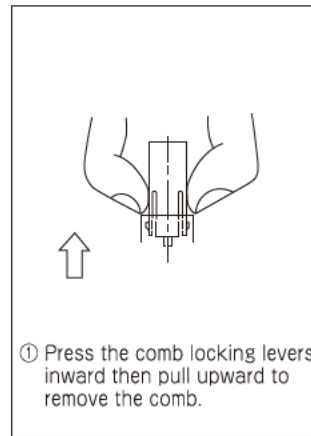
When in the latch output mode, the latch ON status can be reset (output OFF) by turning the light emission inhibit input to ON and then OFF.

7 MAIN TENANCE AND INSPECTION

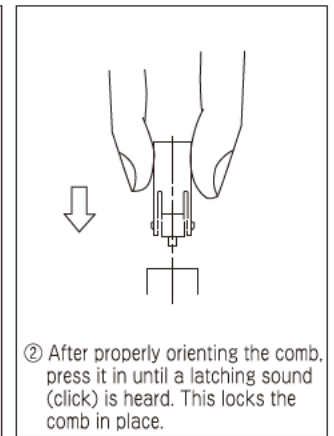
After replacing a damaged comb, be sure to perform the automatic sensitivity adjustment. See section 6-1 "Switches" for the automatic sensitivity adjustment procedure.

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

Detaching a comb



Attaching a comb



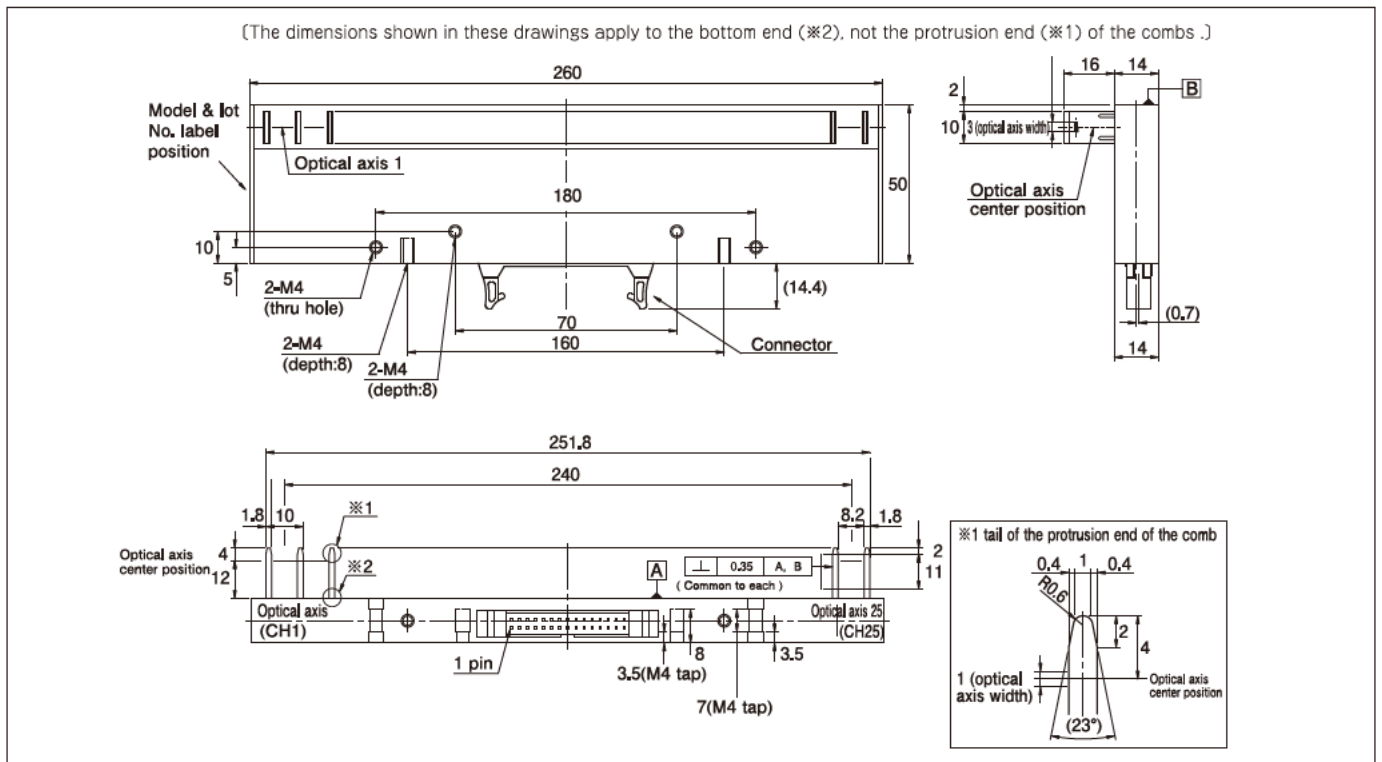
8 SPECIFICATIONS

Type	ASW-SG125VF
Wafer types	12-inch wafer (normal output mode: transmittance of 30% or less / latch output mode: transmittance of 70% or less)
Number of channels	25ch
Pitch	10.0mm
Detection method	Through beam
Comb	Detachable type
Power supply	12 to 24 VDC \pm 10%, ripple 10% or less
Power consumption	1.9W or less
Output mode	NPN open collector output, 25ch Rating: sink current 30 VDC or less, 30mA or less
Operation mode	Dark-ON Normal output mode / latch output mode selectable (with switch) ON at error output
Response time	35ms or less
Light source (wavelength)	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 more 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 more
Material	Sensor unit: Polycarbonate; Housing: Aluminum
Connection	Connector type OMRON MIL connector XG4A-3031
Weight	Approx. 270g (not including cable)
Accessories	Instruction manual

ENVIRONMENT SPECIFICATION

Ambient light	1,500 lx or less
Ambient temperature	-10 to +55°C (non-freezing)
Ambient humidity	35 to 85%RH(non-condensation)
Protective structure	I P40
Vibration	10 to 55Hz double amplitude 0.5mm, X,Y,Z directions, 2 hours each
Shock	300m/s ² X, Y, Z directions, 3 times each

9 DIMENSIONS (in mm)



10 WARRANTY

The product is covered by a warranty based on the Quality Regulations of Takenaka Electronic Industrial Co., LTD. (Takenaka). Regarding the warranty, please feel free to ask any questions to Takenaka, Takex sales office or authorized distributors.

1 (Warranty period)

The warranty period is one (1) year after delivery to a designated location. This warranty does not apply to expendable supplies like batteries or relays, and products of other manufacturers which Takenaka markets.

2 (Scope of warranty)

If any defect is found during the warranty period. Takenaka will, at its option, repair or replace the defective product at the location of delivery. This warranty is void and of no effect if the product is subject to improper use or handling, improper maintenance, modification, repair made by persons not authorized by Takenaka or a lack of reasonable care. The warranty does not cover defects caused by the other product, reason including fire, flood, earthquake, lighting surge and other natural disasters.

- 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 products 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) In case that the product is used in combination with other products or as a part of a system, Buyer should confirm the compatibility of the product to the application by relevant laws, decrees, standards and regulations.
- (2) This product is designed and manufactured for use in general industries. This warranty does not cover the application of the product to:
 - ① Nuclear power facilities including power station, incineration plant, public utilities including railway, vehicle and airway facilities, medical devices, amusement machines, safety devices and facilities that are governed by regulation of government or industrial organization.
 - ② Facilities that may cause danger or serious effects on human life and assets.
 - ③ Utilities like electricity, gas or water facilities. Facilities that are required 24 hour continuous operation.
 - ④ Outdoor use or use in improper conditions or environment.
 - ⑤ Other facilities which requires broad and detailed consideration concerning safety and reliability equivalent to the above.

This warranty may cover these application in case that Takenaka is notified about the application of the product before sale and Buyer approves the compatibility and the specifications of the product by written agreement and / or by providing required safety measures.

11 DISCLAIMER

- This product is designed to detect a presence or passage of an object. This product does not have any function to prevent 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, complete wiring or installation or any act that does not follow the instruction manual.
- 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.