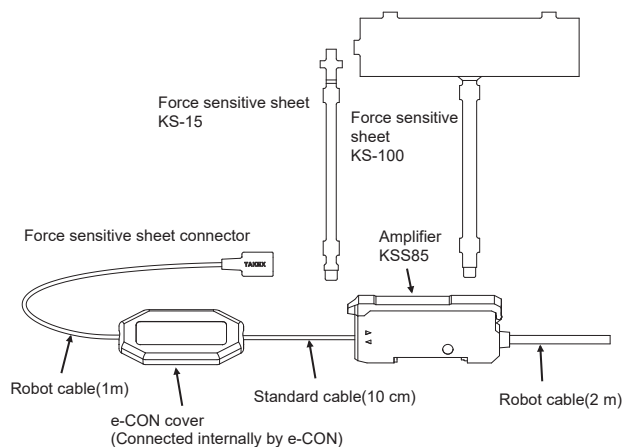


1 PARTS DESCRIPTION



2 SAFETY PRECAUTIONS

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

1. Do not use this product for 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 oil.
6. Do not use this product in an environment exposed to water including outdoors or underwater.
7. Do not exceed the rated specifications.
8. Do not use this product in a place where it may be exposed to vibration or shock.
9. Do not use organic solvents such as alcohol or thinner for cleaning.
10. Perform a daily operation check, weekly periodical check, and maintenance to ensure correct operation.
11. This product should be disposed of as industrial waste.

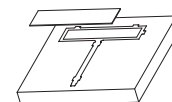
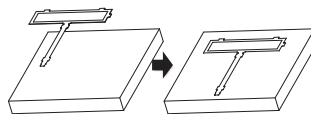
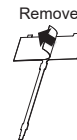
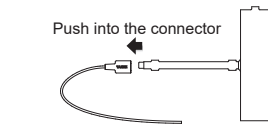
3 PRECAUTIONS FOR OPERATION

1. This sensor is not designed to weigh itself. Please use it after a sufficient evaluation. Even under a constant load, the detected value may fluctuate.
2. Please use to paste a commercially available rubber sheet in order to protect the force sensitive sheet itself.
If the detecting object is directly contacted on the sheet, the sheet may be damaged and deteriorated in its performance.
3. Do not cut or bend the force sensitive sheet before use. This sensor doesn't have any waterproof and be sure to protect it by the rubber sheet when the waterproof is necessary.
4. Applying a load longer than 24 hours may cause the sensor element to malfunction. Please conduct sufficient evaluation before use.
5. Be sure to route the sensor cables separately 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 may cause malfunctions or damage because of electromagnetic induction.
6. Do not apply excessive force to the cable.
7. When using a switching regulator, be sure to ground the frame ground (FG) terminal.
8. The sensor starts operation 100ms after power is applied. Always power on the sensor prior to the load.
9. Turn off the power of the load first as this product may generate an output pulse when the power is turned off.
10. Avoid turning the power on and off consecutively.
11. When extending the cables, use conductors of at least 0.3 mm² cross-sectional area or more.
12. Limit the current from the power supply to 2A.

4 Installation

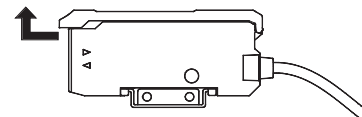
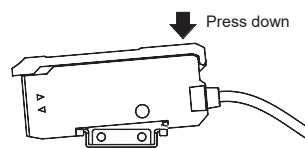
4-1 Installation of the Force sensitive Sheet (KS-100, KS-15)

- ① Connect both sides where the connector side of "TAKEX" logo on the sensor is visible and the front side (the side without protective sheet) of the force sensitive sheet.
- ② Remove the protective sheet on the back side.
- ③ Put the back side of the force sensitive sheet onto the targeting object.
- ④ Stick a rubber sheet on the force sensitive sheet to protect the sensor element. Be sure to purchase a commercially-available rubber sheet. * A rubber sheet with a thickness of 1mm, neoprene material and a Shore hardness of A60 is recommended.

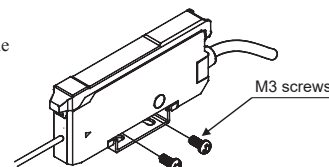


4-2 DIN rail mount (AC-BF3, dedicated mounting bracket separately available)

- ① DIN rail mount
Hook the front tab on the rail (or mounting bracket), and then press down the rear section.
- ② Removal
Press the unit forward and pull up the front section to remove the front tab.

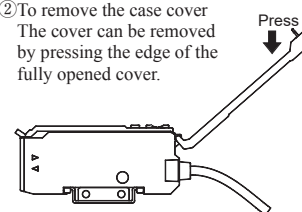
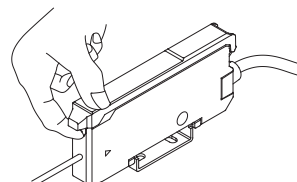


- ③ Side mount of amplifier unit
Mount the sensor unit with screws using the optional mounting bracket. Tightening torque is 0.8 Nm or less.

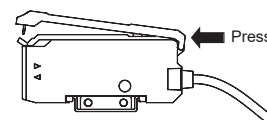


4-3 Installation of Case Cover

- ① To open the case cover
Lift the cover by pulling up the tab while holding the front part of the case cover.
- ② To remove the case cover
The cover can be removed by pressing the edge of the fully opened cover.

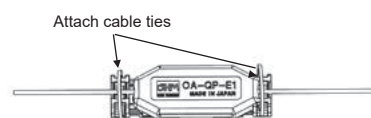
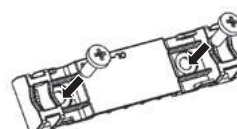


- ③ To attach the case cover
Place the removed cover on the amplifier unit as shown in the figure, and then press the hinge.

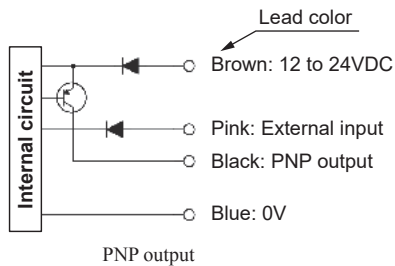
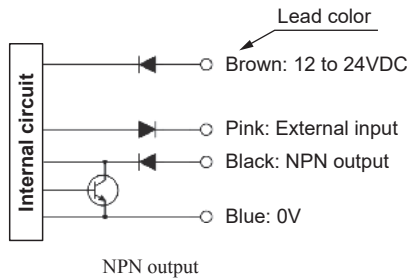


4-4 How to fix e-CON Cap

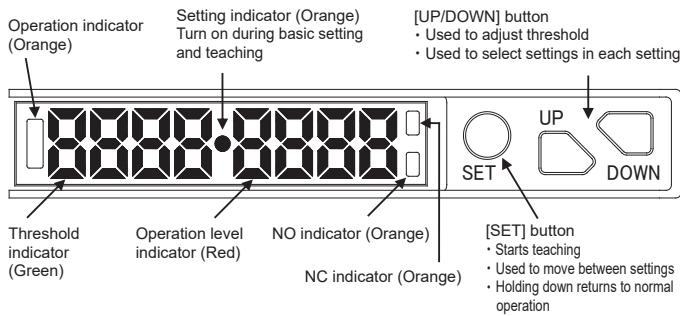
- ① Use a commercially available fixture and fix with the M4 screws.
- ② Fix the e-Con cap on the fixture with cable ties.



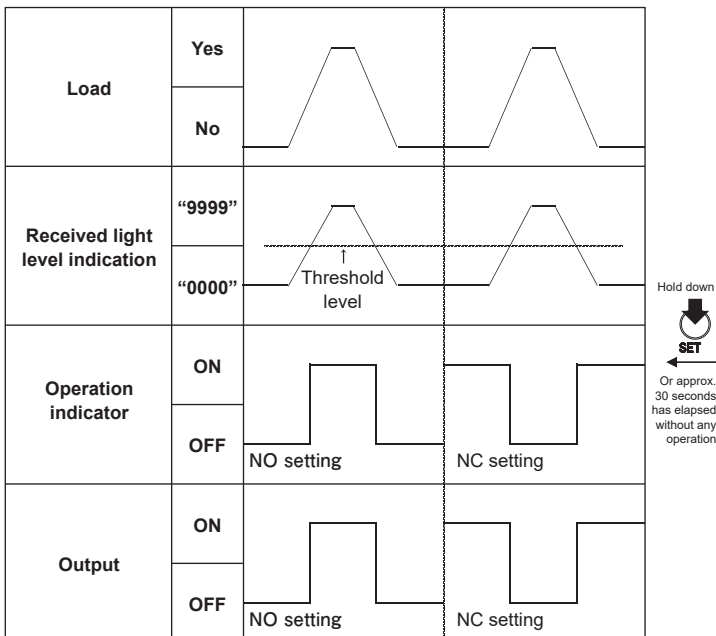
5 CONNECTION (Including I/O circuits)



6 INDICATORS AND OPERATION MODE

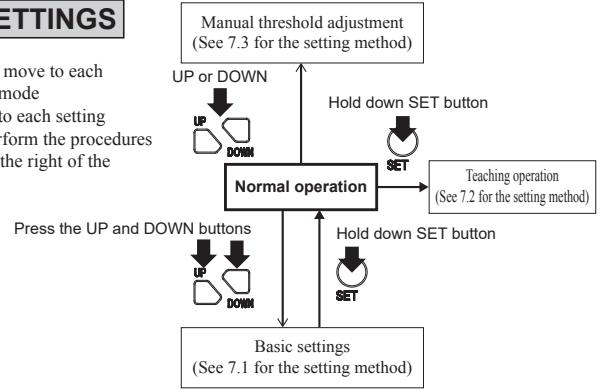


• Operation Mode



7 SETTINGS

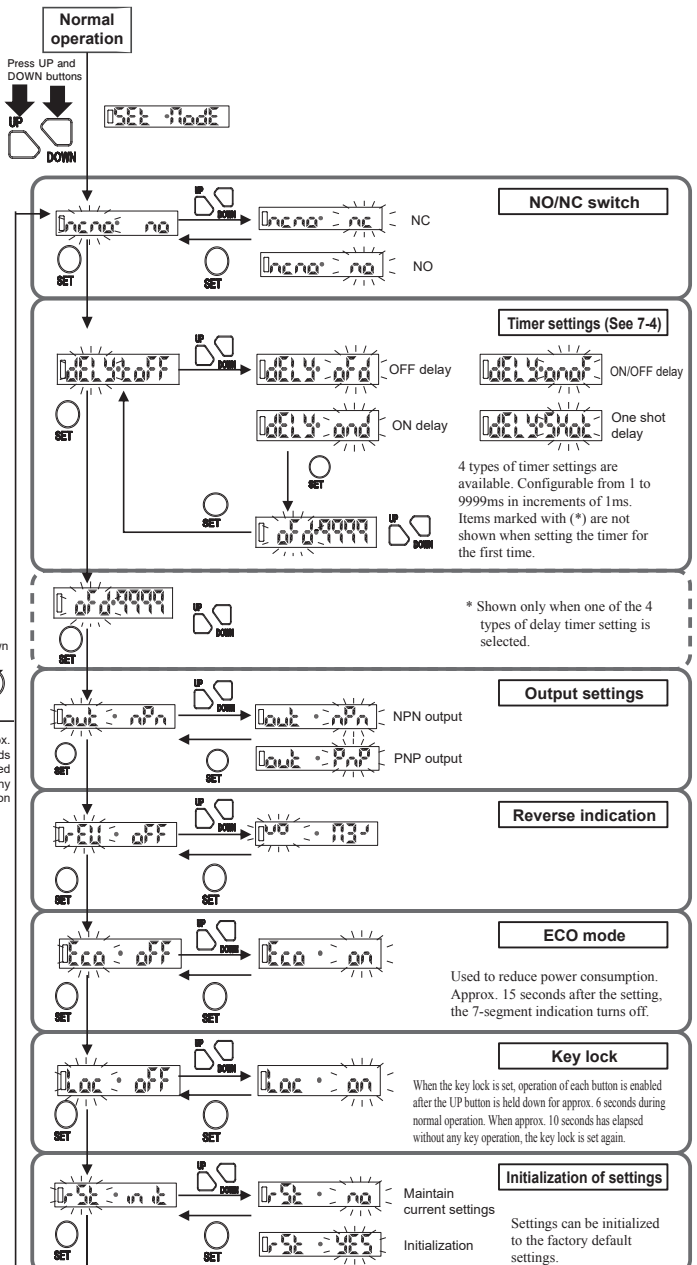
- How to move to each setting mode
To move to each setting mode, perform the procedures shown in the right of the figure.



- Basic settings :
Settings for NO/NC, timer, indicators, light intensity and others can be selected. (→ See 7.1)
- Teaching settings :
Operation for automatically setting the threshold value. (→ See 7.2)
- Manual threshold adjustment :
Threshold can be set manually. Adjust it with the UP or DOWN button. (→ See 7.3)

7-1 Basic Settings

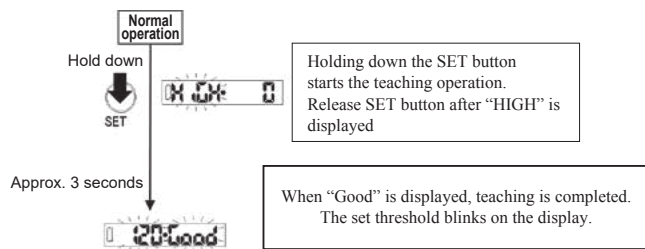
Pressing both UP and DOWN buttons during normal operation enters the setting mode. Holding down the SET button during setting mode returns the unit to normal operation. When approx. 30 seconds has elapsed without pressing any buttons, normal operation will be resumed with the current settings.



7-2 Teaching Settings

①Teaching by buttons

Hold down the SET button during normal operation. When HIGH is shown, the teaching operation is started.
After approx. 3 seconds, teaching is completed.

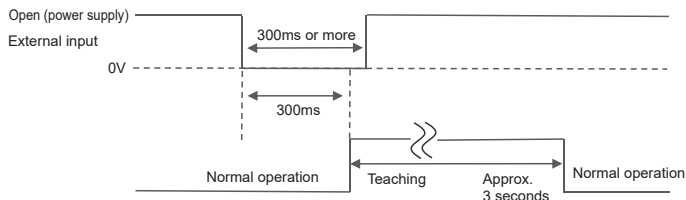


②Teaching through external input

Receiving an input pulse not less than 300ms starts the external teaching.
After approx. 3 seconds, teaching halts.

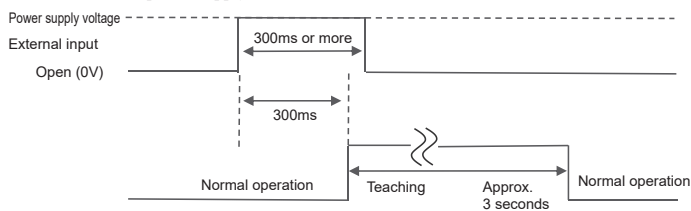
· NPN setting

* When external teaching is not connected, leave the input unconnected (open) or connect it to the power supply lead.



· PNP setting

* When external teaching is not connected, leave the input unconnected (open) or connect it to the power supply lead.



[Teaching error]

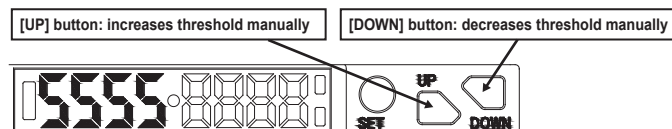
Refer to the table below for teaching errors.

(The sensor holds the threshold before teaching and returns to normal operation when teaching error occurs.)

Error No.	Description	Solution
Err 1	Threshold to be set is too high 9000 or more	Reattach the rubber sheet on the force sensitive sheet Remove the workpiece from the force sensitive sheet Replace the force sensitive sheet

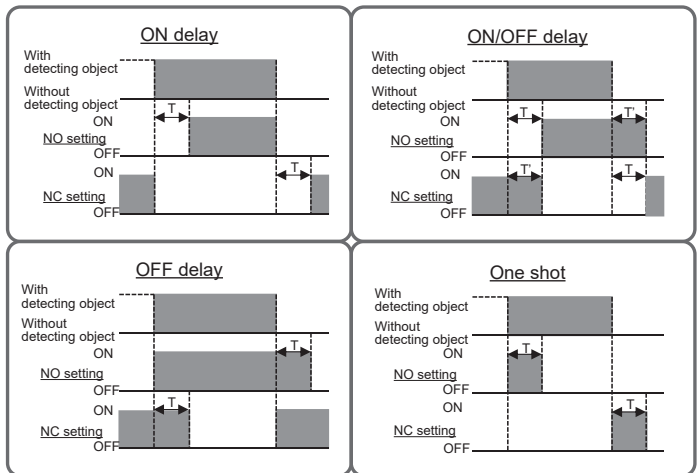
7-3 Manual Threshold Adjustment

The threshold can be adjusted by pressing the UP or DOWN buttons.



7-4 Timer Function

4 types of delay timer mode are available as shown in the figure below. (→ See 7.1 for the setting method)



8 RATING/PERFORMANCE/SPECIFICATIONS

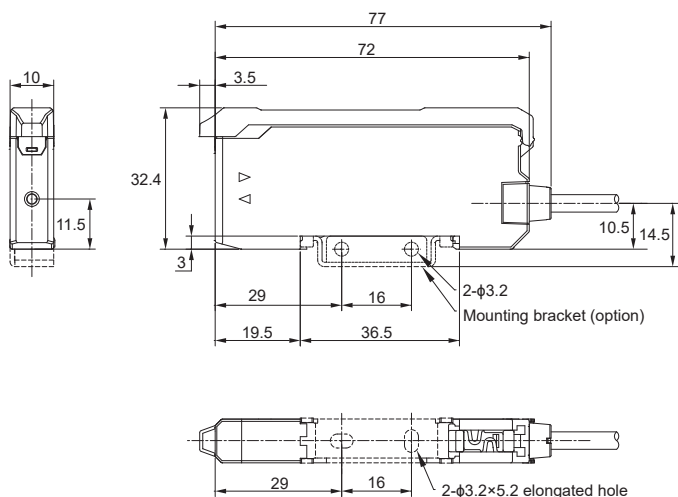
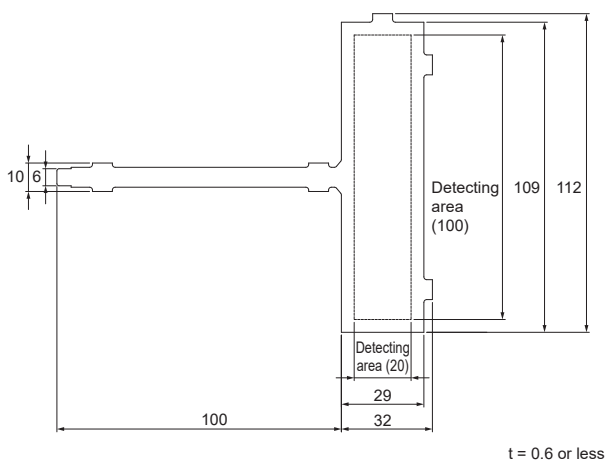
Model	Force sensitive sheet sensor (amplifier: KSS85, force sensitive sheet: KS-100, KS-15)
Power supply	12 to 24VDC, Ripple: 10% or less
Current consumption	at 24 V DC Normal mode: 600mW (current consumption 25mA or less) ECO mode: 480mW (current consumption 20mA or less)
Detection sensitivity	300 g = approx. 3 N (reference value)
Output mode	NPN/PNP switchable NPN open collector output Load current: 100mA (30V DC) or less, residual voltage: 2V or less PNP open collector output Load current: 100mA (30V DC) or less, residual voltage: 2V or less
Operation mode	NO (Normally Open) / NC (Normally Closed) switchable
Timer	ON delay / OFF delay / ON/OFF delay / One shot / Timer off Delay timer: 1ms to 9999ms (can be set at intervals of 1ms)
Response time	Without load → with load: 1ms, with load → without load: 100ms
Indicator	Operation indicator, setting indicator, NO/NC indicator: orange LED
Display	Operation level display: 4-digit red LED, threshold indicator: 4-digit green LED
Switch	[SET/TEACHING] button: teaching / setting [UP/DOWN] button: adjust threshold value / select settings
Protection circuit	Power reverse connection / reverse output / output short circuit protection
Sensitivity setting	Maximum sensitivity teaching
Sensitivity adjustment function	Equipped (automatic adjustment / manual adjustment)
Connection method	Cord drawing type (φ4.2 mm o.d.) 0.2mm ² x 4-core, 2m (robot cable)
Weight	KSS85 (amplifier): approx. 100 g, KS-100: approx. 4g, KS-15: approx. 1g
Accessory	Instruction manual

Environmental Specification

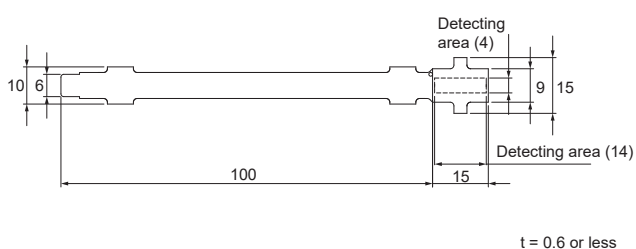
Ambient temperature	Amplifier: -25 to +55°C, pressure-sensitive sheet: 0 to +55°C (non-freezing)
Ambient humidity	35 to 85% RH (non-condensing)
Protection structure	IP40
Vibration	10 to 55Hz, double amplitude 1.5mm, X, Y, Z directions, 2 hours each
Shock	500 m/s ² , 3 times each in X, Y and Z directions
Dielectric withstand voltage	500VAC for 1min
Insulation resistance	At least 20M Ω with 500VDC Megger

9 DIMENSIONS (Unit: mm)

KSS85

**KS-100**

KS-15



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.