PT1E-1040

RIKEN KEIKI

Buzzer Unit

TAN-5000 Series

Operating Manual

Request for the Customers

- Read and understand this operating manual before using the buzzer unit.
- Use the buzzer unit in accordance with the operating manual.
- Regardless of warranty period, we shall not make any indemnification for accidents and damage caused by using this product.
  Make sure to read the warranty policy specified on the warranty.
- Because this is a safety unit, a regular maintenance for every six months and daily maintenance must be performed.
- If any abnormality is found in the buzzer unit, notify it to RIKEN KEIKI immediately.
  (Visit our Web site to find your nearest RIKEN KEIKI office.)

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Outline of the Product

1-1. Preface

Thank you for choosing our buzzer unit TAN-5000 series for use with the RM-5000 series. Please check that the model number of the product you purchased is included in the specifications on this manual.

This manual explains how to use the buzzer unit and its specifications.
It contains information required for using the buzzer unit properly. Not only the first-time users but also the users who have already used the product must read and understand the operating manual to enhance the knowledge and experience before using the buzzer unit.
The buzzer unit must be used in combination with the RM-5000 series indicator/alarm unit. Be sure to read the operating manual of the indicator/alarm unit.

1-2. Purpose of use

- The buzzer unit, when receiving an alarm signal from either of the multiple RM-5000 series indicator/alarm units, sounds an alarm buzzer and activates the common first and second alarm contacts to inform of a danger.

Model	Alarm activation
TAN-5000	Self-latching type
TAN-5000L	Lock-in type

- The buzzer unit, when receiving a fault alarm signal from either of the multiple RM-5000 series indicator/alarm units, activates the common fault alarm contacts to inform of an abnormality to external circuits.

1-3. Definition of DANGER, WARNING, CAUTION, and NOTE

⚠ **DANGER**	This message indicates that improper handling may cause serious damage on life, health or assets.
⚠ **WARNING**	This message indicates that improper handling may cause serious damage on health or assets.
⚠ **CAUTION**	This message indicates that improper handling may cause minor damage on health or assets.
NOTE	This message indicates advice on handling.

2

Important Notices on Safety

2-1. Danger cases

DANGER

This is not an explosion-proof unit. Do not operate the buzzer unit in a place where combustible gases or vapors are present. Operating the buzzer unit in such an environment will lead to extreme dangers.

2-2. Warning cases

WARNING

- Indicator/alarm unit
  Connect the buzzer unit only to the RM-5000 series indicator/alarm unit.
  Otherwise, the buzzer unit or equipment connected to it may be damaged.

- Power supply
  Before turning on the buzzer unit, always check that the power supply voltage is compliant with the specifications.

- Need of grounding circuit
  Do not cut the grounding circuit inside or outside the buzzer unit or disconnect the wire from the grounding terminal. In both of the cases, the buzzer unit will be in danger.

- Defects in protective functions
  When seeming defects are found in the protective functions, such as protective grounding and fuses, do not start the buzzer unit.Before starting the buzzer unit, check the protective functions for defects.

- Fuse
  To prevent fire, use a fuse with the specified ratings for the buzzer unit.
  Turn the power switch OFF and cut the mains power before replacing a fuse.
  Do not use an unspecified fuse or short-circuit the fuse holder.
  For more information on fuses, please contact RIKEN KEIKI.

- External connection
  Before connecting the buzzer unit to external equipments or external control circuit, securely connect it to a protective grounding circuit.

- Response to a gas alarm
  There are extreme dangers if a gas exceeding an alarm setpoint is detected. Take proper actions based on your judgment.

2-3. Precautions

CAUTION

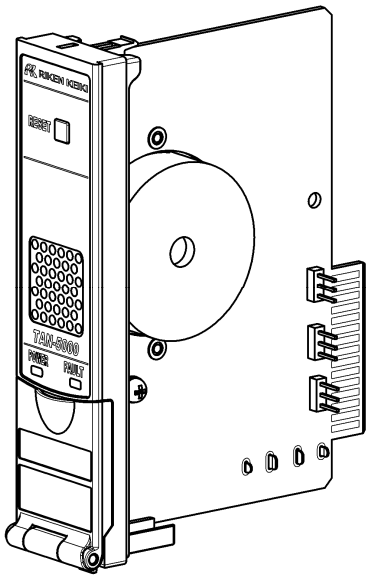
- Do not use a transceiver or mobile phone, etc. near the buzzer unit.
  Radio wave from a transceiver near the buzzer unit or its cables may disturb operations. If a transceiver or other such device is used, it must be used in a place where it disturbs nothing.
- To restart the buzzer unit, you must wait five seconds or more before doing it.
  Restarting the buzzer unit in less than five seconds may cause errors.
- The safety and quality of the product cannot be guaranteed if this operating manual is ignored when operating or maintaining the buzzer unit or it is altered in any way or repaired using unspecified parts. We will not be liable for any accidents caused by these conditions.
- Careful consideration should be given to instrumentation to maintain safety even when a trouble like disconnection of power/signal cable or unexpected malfunction or failure occurs.
- This is an electrical appliance. Be careful that it may be affected, in rare cases, by power supply noises, static electricity, and electromagnetic noises. Before using this product in an environment with such noises, provide for protective measures against them.

3

Product Components

3-1. Main unit and accessories

<Main Unit (TAN-5000 Series)>



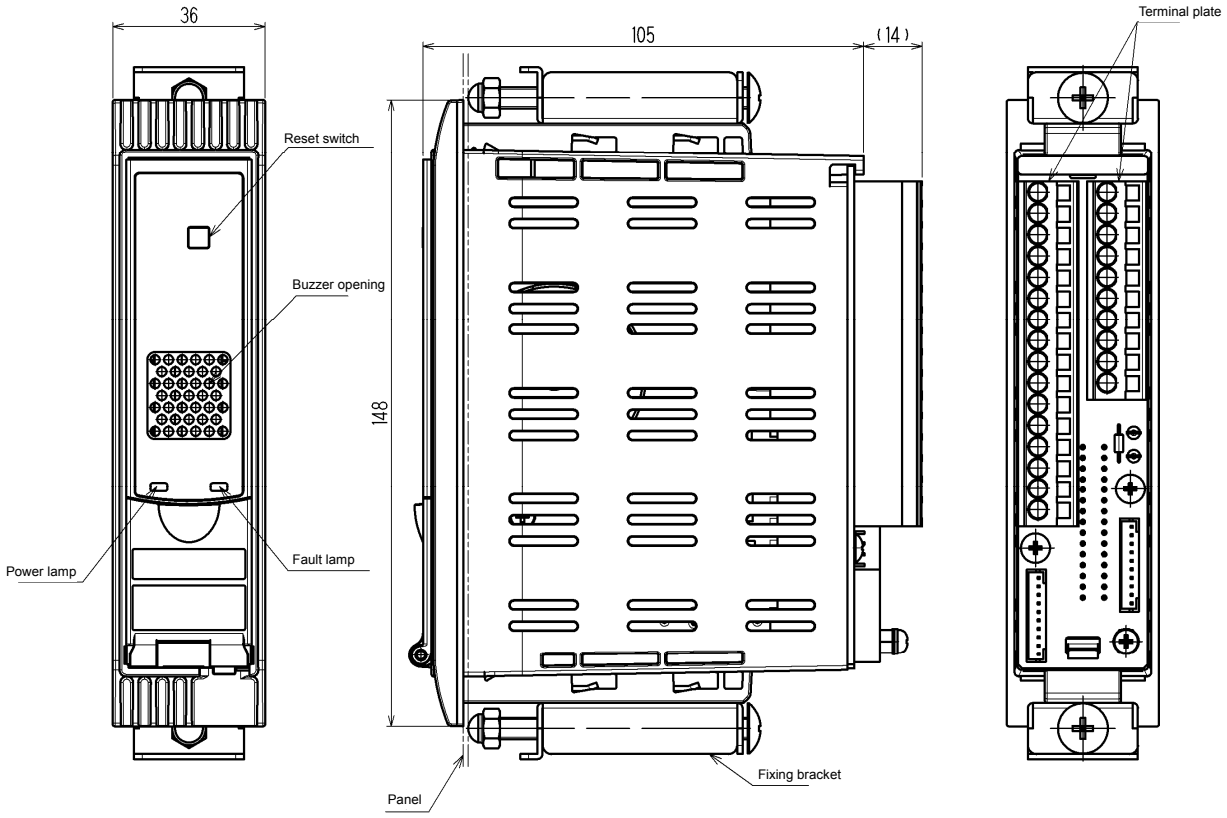
<Accessories>

- Operating manual
  One copy per system regardless of the number of units to be delivered

3-2. Outline drawing

NOTE

Install the buzzer unit in a single-unit case (option) or multi-unit case (option) before using it.
This section explains using the single-unit case.
For information on using the multi-unit case, see the operating manual of the multi-unit case.



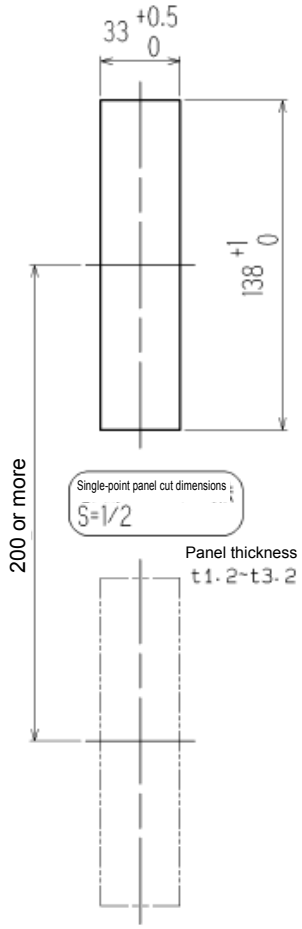
3-3. Installation drawing

NOTE

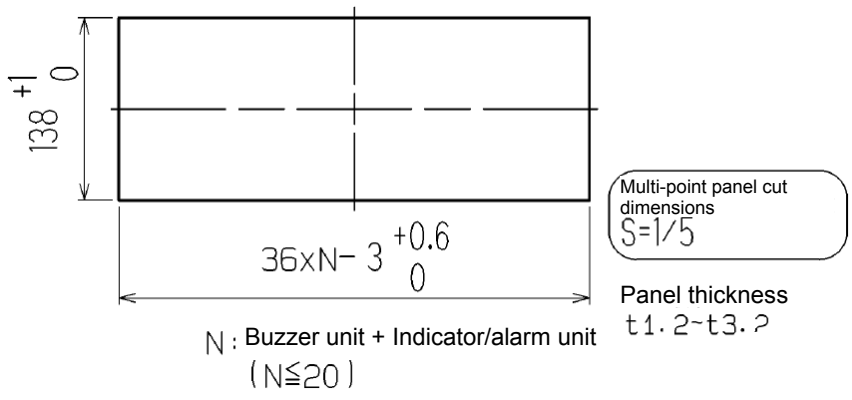
Install the buzzer unit in a single-unit case (option) or multi-unit case (option) before using it.
This section explains using the single-unit case.
For information on using the multi-unit case, see the operating manual of the multi-unit case.

<Panel Cut Dimensions>

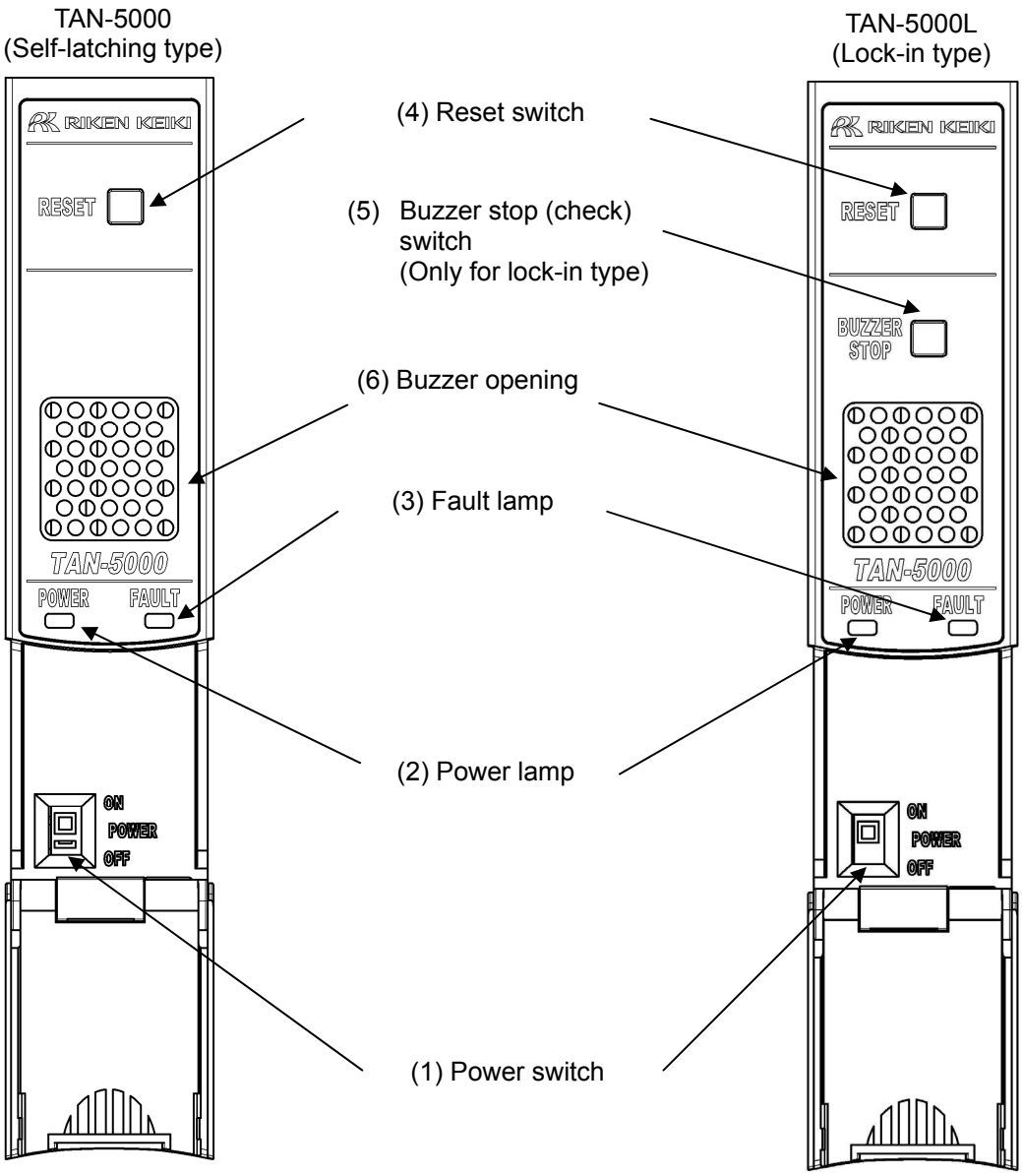
When installed in two rows vertically



When installed in one row vertically and N columns horizontally



3-4. Names and functions for each part



(1) Power switch (POWER): Power switch.
(2) Power lamp (POWER): Power lamp. It lights up when the buzzer unit is in operation.
(3) Fault lamp (FAULT): Fault lamp. It lights up when the buzzer unit fails.
(4) Reset switch (RESET): Switch for resetting.
(5) Buzzer stop switch (BUZZER STOP): Switch for buzzer stop (check). (Only for lock-in type)
(6) Buzzer opening: Buzzer sounds are emitted from here.

3-5. Detaching and attaching the buzzer unit

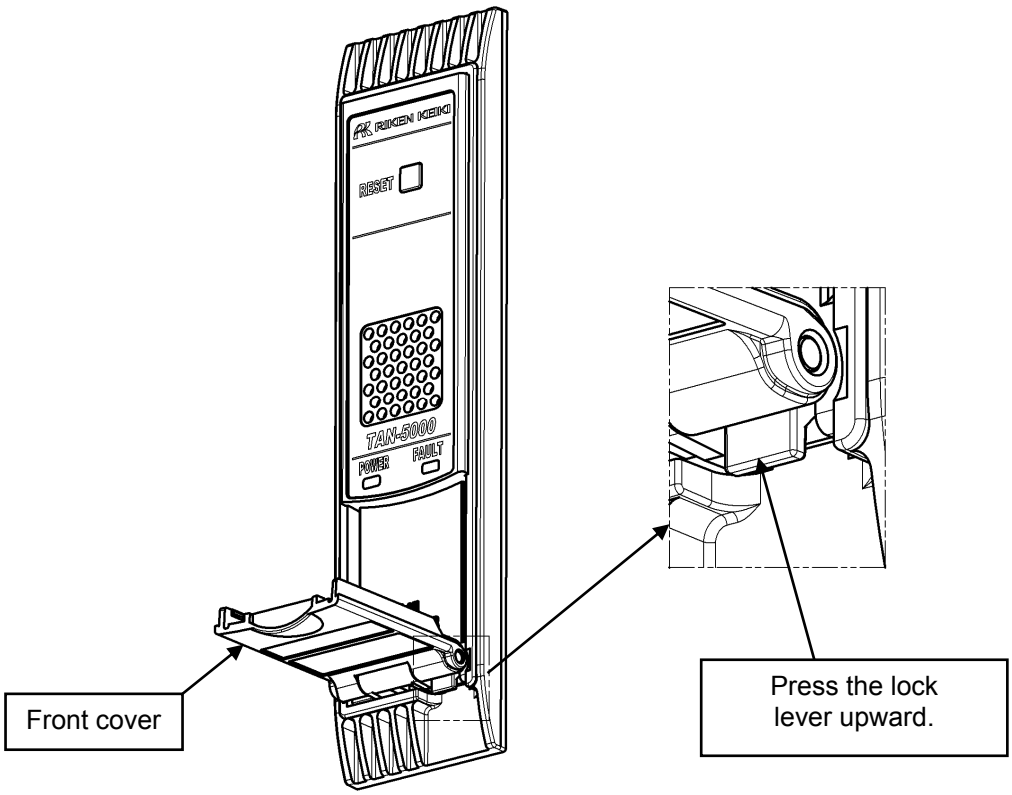
Detach or attach the buzzer unit from the single-unit case or multi-unit case according to the following procedure.

(1) Attaching procedure

- Open the front cover of the buzzer unit.
- Make sure that the power switch of the buzzer unit is OFF.
- Insert the buzzer unit along the rail into the single-unit case or multi-unit case.
- Push it in until an click is heard and you feel that it is locked in.
- Gently pull it to make sure that the buzzer unit does not come off.
- Close the front cover of the buzzer unit.

(2) Detaching procedure

- Open the front cover of the buzzer unit.
- Make sure that the power switch of the buzzer unit is OFF.
- While pressing the lock lever on the lower right of the buzzer unit, hold the front cover and pull it out of the case.
- Close the front cover of the buzzer unit.



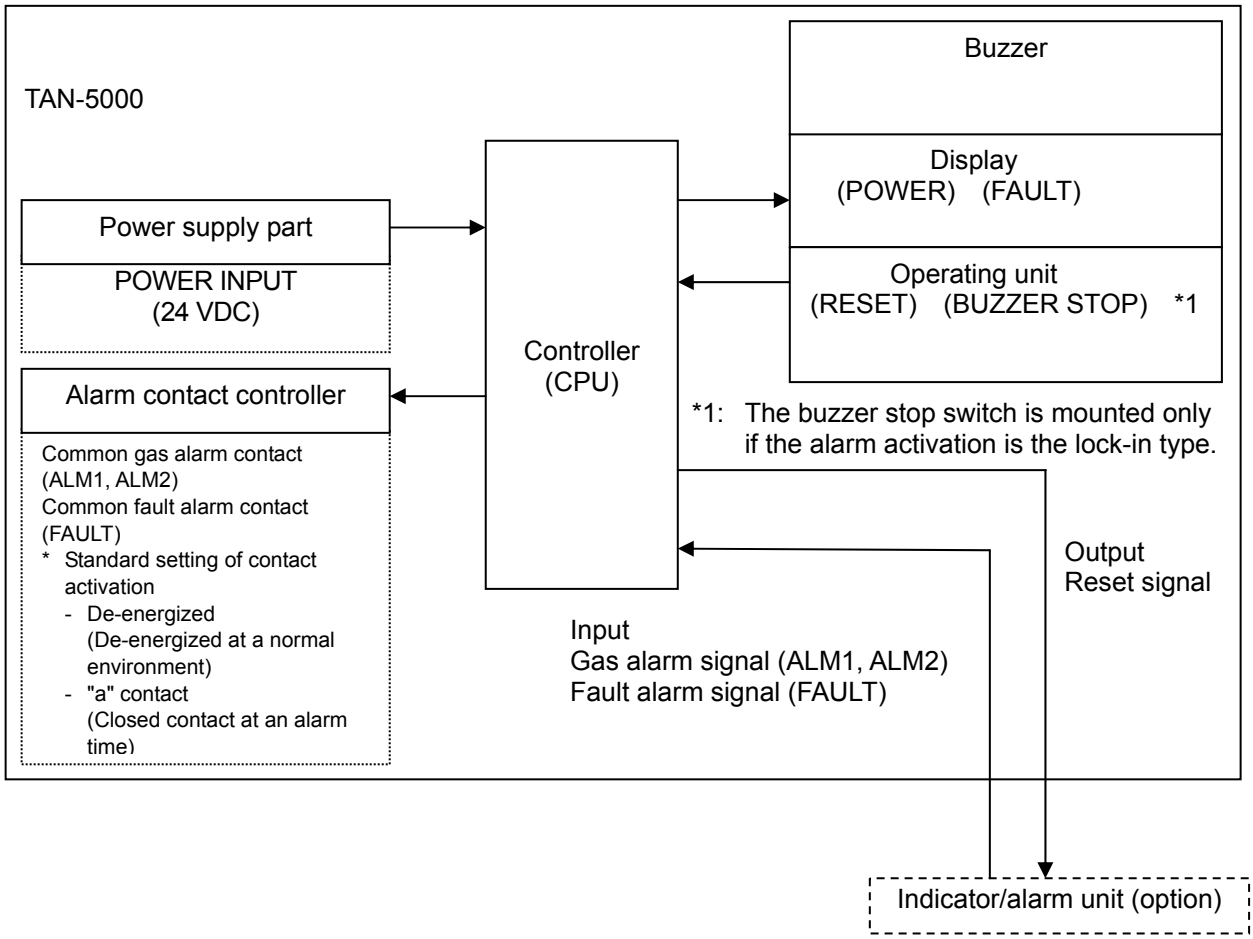
CAUTION

Turn off the power of the buzzer unit before attaching or detaching it. Otherwise, a failure may be caused.

CAUTION

This is a precision device. Be careful not to drop it when detaching it. Dropping the unit compromises its original performance or causes malfunctions.

3-6. Block diagram



4

How to Use

4-1. Before using the buzzer unit

Not only the first-time users but also the users who have already used the product must follow the operating precautions.
Ignoring the precautions may damage the buzzer unit, resulting in inaccurate gas detection.

NOTE

Install the buzzer unit in a single-unit case (option) or multi-unit case (option) before using it.
This section explains using the single-unit case.
For information on using the multi-unit case, see the operating manual of the multi-unit case.

4-2. Precautions for installation points

CAUTION

This is a precision device. Because the buzzer unit may not provide the specified performance in some places (environments), check the environment in the installation point, and then take appropriate actions if necessary.

Do not install the buzzer unit in a place with vibrations or shocks.
The buzzer unit consists of sensitive electronic parts. The buzzer unit must be installed in a stable place where it cannot drop and without vibrations or shocks.

Do not install the buzzer unit in a place exposed to water, oil or chemicals.
When selecting installation points, avoid a place where the buzzer unit is exposed to water, oil or chemicals.

Do not install the buzzer unit in a place where the temperature drops below -10ºC or rises over 40ºC.
The operating temperature of the buzzer unit is -10 to 40ºC. The buzzer unit must be installed in a stable place where the operating temperature is maintained and does not change suddenly.

Do not install the buzzer unit in a place exposed to direct sunlight or sudden changes in the temperature.
When you select installation sites, avoid a place where it is exposed to direct sunlight or radiant heat (infrared rays emitted from a high-temperature object), and where the temperature changes suddenly. Condensation may be formed inside the buzzer unit.

Keep the buzzer unit (and its cables) away from noise source devices.
When selecting installation points, avoid a place where high-frequency/high-voltage devices exist.

Do not install the buzzer unit in a place where maintenance of the buzzer unit cannot be performed or where handling the buzzer unit involves dangers.
Regular maintenance of the buzzer unit must be performed.
Do not install the buzzer unit in a place where the machinery must be stopped when maintenance is performed in its inside, where parts of the machinery must be removed to perform maintenance, or where the buzzer unit cannot be removed because tubes or racks prevent access to it. Do not install the buzzer unit in a place where maintenance involves dangers, for example, near a high-voltage cable.

Do not install the buzzer unit in machinery which is not properly grounded.
Before installing the buzzer unit in machinery, the machinery must be grounded properly.

Do not install the buzzer unit in a place where other gases exist around it.
The buzzer unit must not be installed in a place where other gases exist around it.

4-3. Precautions for system designing

CAUTION

An unstable power supply and noise may cause malfunctions or false alarms.
The descriptions in this section must be reflected on the designing of a system using the buzzer unit.

Using a stable power supply
The external output and alarm contact of the buzzer unit may be activated when the power is turned on, when momentary blackout occurs, or when the system is being stabilized. In such cases, use a UPS (uninterrupted power supply), or take appropriate actions on the receiving side.
The buzzer unit must be provided with the following power supply.

Power supply voltage	24 VDC (21.6 – 26.4 VDC) (Terminal voltage of the buzzer unit)	
Allowed time of momentary blackout	Up to 10 milliseconds (To recover from the momentary blackout for 10 milliseconds or more, restart the buzzer unit.)	Example of actions To ensure continuous operation and activation, install a protective power supply outside the buzzer unit.
Others	Do not use it with a power supply of large power load or high-frequency noise.	Example of actions Use a line filter to avoid the noise source if necessary.

Heat radiation designing
When it is installed in the closed instrumentation board, attach ventilation fans above and below the board.

Introducing protective measures against lightning

If cables are installed outside the factory/plant, or if internal cables are installed in the same duct as the cables coming from outside the factory/plant, "lightning" will cause problems. Because lightning acts as a large emission source while cables act as a receiving antenna, devices connected to the cables may be damaged.
Lightning cannot be prevented. Cables installed in a metal conduit or under the ground cannot be completely protected from inductive lightning surge caused by lightning. Although complete elimination of disasters caused by lightning is impossible, the following protective measures can be taken.

Protection against lightning	Take appropriate measures in accordance with the importance of the facilities and the environment. • Connect the transmission signal route by using optical fiber. • Provide protection by a lightning arrester (cable arrester). (Although inductive lightning surge can be transmitted through the cable, it is prevented by installing a lightning arrester before the field devices and central processing equipment. For information on how to use a lightning arrester, please contact the manufacturer.)
Grounding	In addition to lightning, there are more sources of surge noise. To protect units from these noise sources, the units must be grounded.

* The lightning arrester has a circuit to remove a surge voltage which damages field devices, so that signals may be attenuated by installing the arrester. Before installing a lightning arrester, verify that it works properly.

Proper use of alarm contact

The alarm contact of the buzzer unit is used to transmit signals to activate an external buzzer or alarm lamp. Do not use the buzzer unit for controlling purposes (e.g., controlling the shutdown valve).

CAUTION

The "b" contact (break contact) under de-energized state may be opened momentarily by a physical shock, such as external force.
When the "b" contact is selected for the alarm contact, take appropriate actions to prepare for a momentary activation, for example, add signal delay operation (approximately one second) to the receiving side of the "b" contact.

The specifications for the alarm contact of the buzzer unit are based on the resistant load conditions. If inductive load is used at the alarm contact, the following errors will occur easily because counter electromotive force is generated at the contact.

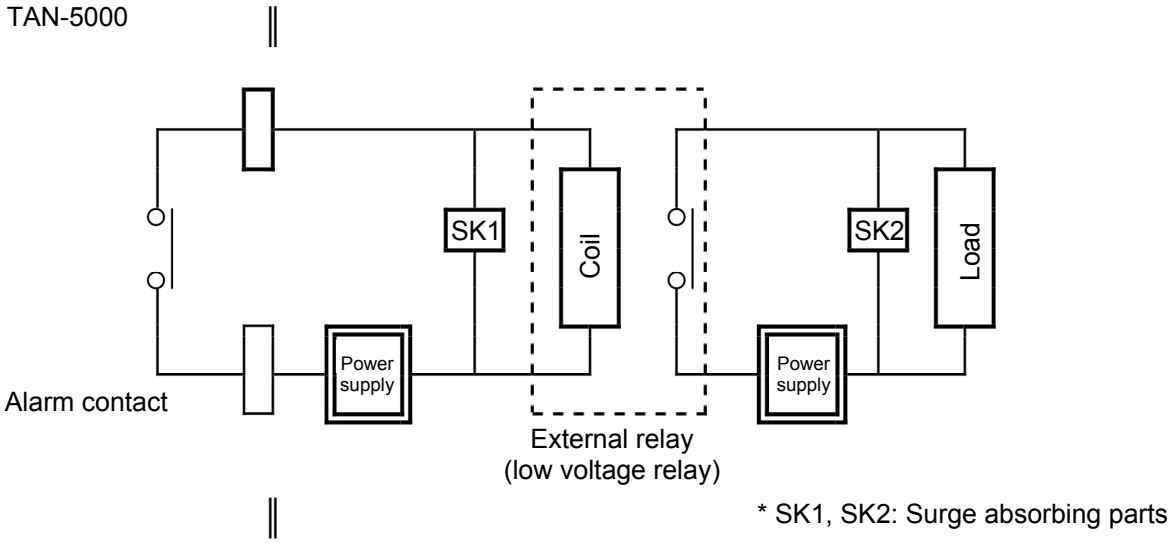
- Deposition, defective insulation or defective contact at the relay contact
- Damage of any electric parts due to high-voltage generated inside the buzzer unit
- Abnormal operations by an out-of-control CPU

CAUTION

- In principle, do not activate inductive load at the alarm contact of the buzzer unit. (In particular, never use the inductive load to activate a fluorescent lamp or motor.)
- If inductive load is activated, relay it with an external relay (contact amplification). However, because the coil of an external relay also involves inductive load, select a relay at a lower voltage (100 VAC or below), and then protect the contact of the buzzer unit with an appropriate surge absorbing part, such as a CR circuit.

If load is to be activated, appropriate measures must be taken to stabilize the operation of the buzzer unit and protect the alarm contact referring to the following information.

- Relay it with an external relay at a lower voltage of 100 VAC or below (contact amplification). At the same time, the surge absorbing part SK1 suitable for the specifications must be attached to the external relay.
- In addition, the surge absorbing part SK2 must be attached to the loaded side of the external relay if necessary.
- It may be recommended that the surge absorbing part should be attached to the contact for certain load conditions. It must be attached to an appropriate position by checking how the load is activated.



4-4. How to wire

CAUTION

- When wiring, be careful not to apply stresses on the terminal plate when (overweight) cables are installed.
- The power cables and signal cables must not be installed together with the motor power cables, etc.
- When stranded wires are used, prevent wires from contacting each other.
- Use the specified tools to wire.

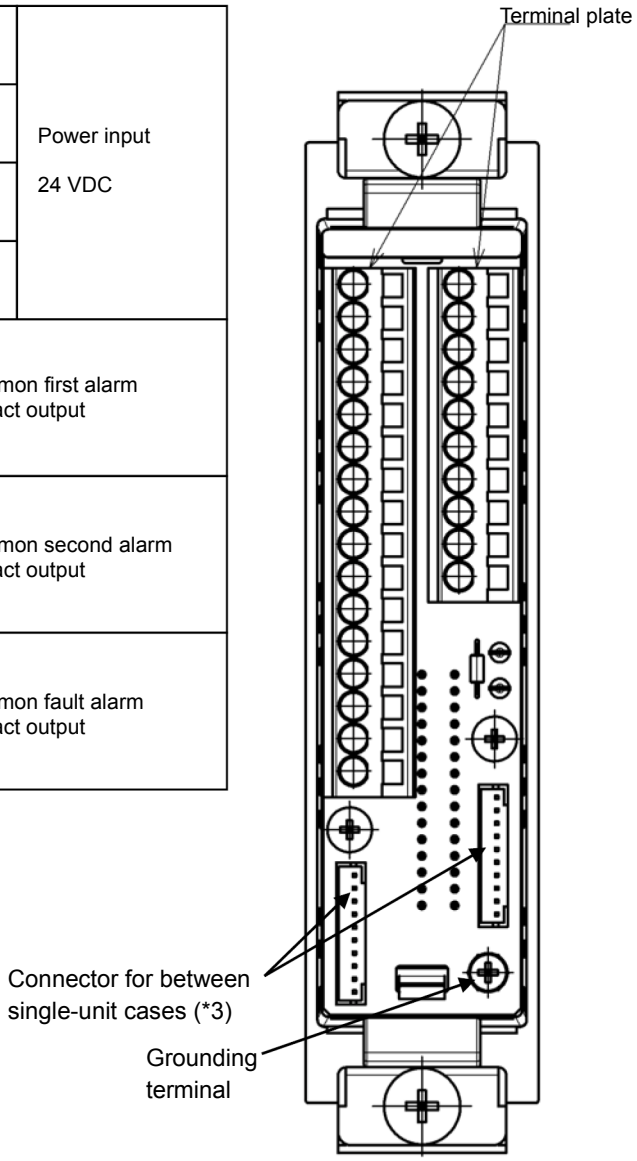
<Figure of Terminal Plate>

NOTE

Install the buzzer unit in a single-unit case (option) or multi-unit case (option) before using it.
This section explains using the single-unit case.
For information on using the multi-unit case, see the operating manual of the multi-unit case.

11	Unassigned	
12		
13	Buzzer stop (check) Signal input (from outside)	
14	Reset signal input (from outside)	
15	Reset signal output(*3)	
16	Unassigned	
17	Buzzer stop (check) Signal output (*3)	
18	Common (*3)	
19	First alarm signal input (*1, *3)	
20	Second alarm signal input (*1, *3)	
21	Fault alarm signal input (*1, *3)	
22	Buzzer signal input (*1, *3)	
23	Unassigned	
24		
25	A	RS-485 Input-output (*2, *3)
26	B	

1	+	Power input 24 VDC
2	+	
3	−	
4	−	
5	Common first alarm contact output	
6		
7	Common second alarm contact output	
8		
9	Common fault alarm contact output	
10		

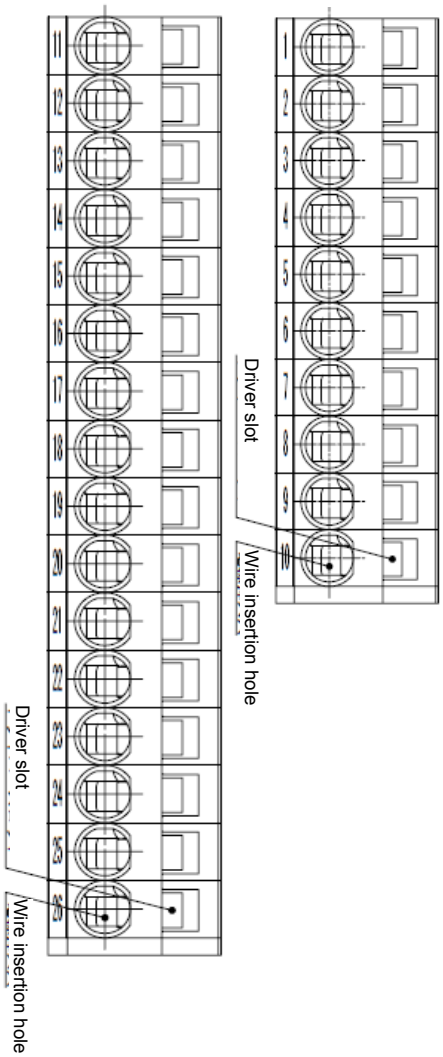


*1: A signal to be used between the indicator/alarm unit (option) and the buzzer unit. This may not be used by the user.
*2: Output only if RS-485 (option) is installed in the indicator/alarm unit.The buzzer unit does not have the RS-485 function. The input-output from the indicator alarm unit passes through the buzzer unit.
*3: Used for transition wiring for signals between devices when single-unit cases (option) are connected. When this connector is used, no transition wiring between cases is required at the terminal plate.

<Specifications of Terminal Plate>

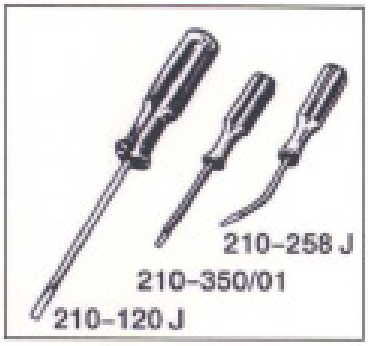
Specifications of terminal plate

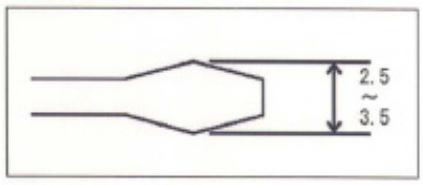
- Rated voltage: 250 VAC
- Rated current: 12 A



Connection conditions

- Cable: 0.08 - 2.5mm^2
- Bare wire length: 8 - 9 mm
- Connecting tools: Dedicated screwdrivers manufactured by WAGO and equivalent (edge width 3.5 mm x 0.5 mm or less)



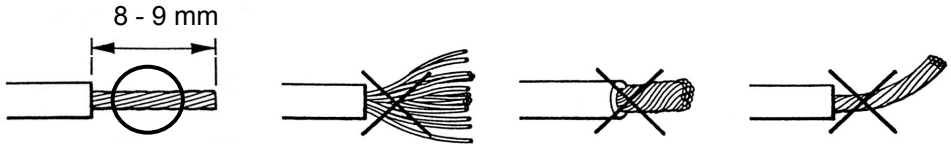


- Dedicated products
210-120J:.....Standard model
210-350/01:..Short model
210-258J:.....Angle model

- When using a general-purpose screwdriver, use one with an edge width of from 2.5 mm to 3.5 mm. Do not use a screwdriver that does not fit into the screwdriver slot or cannot open the spring properly.

CAUTION

The specified bare wire length must be observed when the wire insulation is peeled off.
Improper clamping of the wire due to a shorter bare wire length may cause defective electric conduction or heating.
Catching the wire insulation due to a shorter bare wire length may cause defective electric conduction or heating.
Exposing the wire due to a longer bare wire length may cause defective insulation or a short circuit.
Be careful not to break up the wire.If the wire is broken up when inserted to the terminal, this may cause defective insulation or heating.



Compatible bar terminal

For a bar terminal, the following items are available.

- Bar terminal (ferrule): Model 216 Series (manufactured by WAGO)
- Crimping tool: Model VarioCrimp 4 (206-204) (manufactured by WAGO)

CAUTION

A bar terminal of the specified model must be used. Using other bar terminals invalidates the warranty of the performance.

<How to Connect to Terminal Plate>

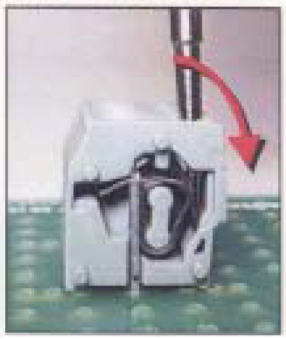
When cables are connected to the terminal plate, use the dedicated screwdriver or a compatible flathead screwdriver to do it as shown below.

CAUTION

The right tools must be used. Only one wire can be connected to one wiring hole.
When the wire is inserted into the driver slot by mistake, it does not contact the conductive part. This may cause defective electric conduction or heating.
When the wire is inserted under the spring by mistake, it does not contact the conductive part. This may cause defective electric conduction or heating.

■ Wiring: Perform wiring as shown in the figure below.

(1) Insert the screwdriver at an angle into the operating slot (square hole).



(2) While standing the screwdriver upright, insert it all the way securely.

(3) If you have done the previous steps properly, the screwdriver is kept upright when you let it go.

(4) Properly peel off a wire and insert it into the wiring hole (round hole).
The wire will go in smoothly if you insert the wire along the edge of the round hole.

(5) When the wire is inserted as far as it will go, pull out the screwdriver while holding the wire.

(6) To check whether the wire is connected securely, pull the wire gently.
(Do not pull the wire strongly.)

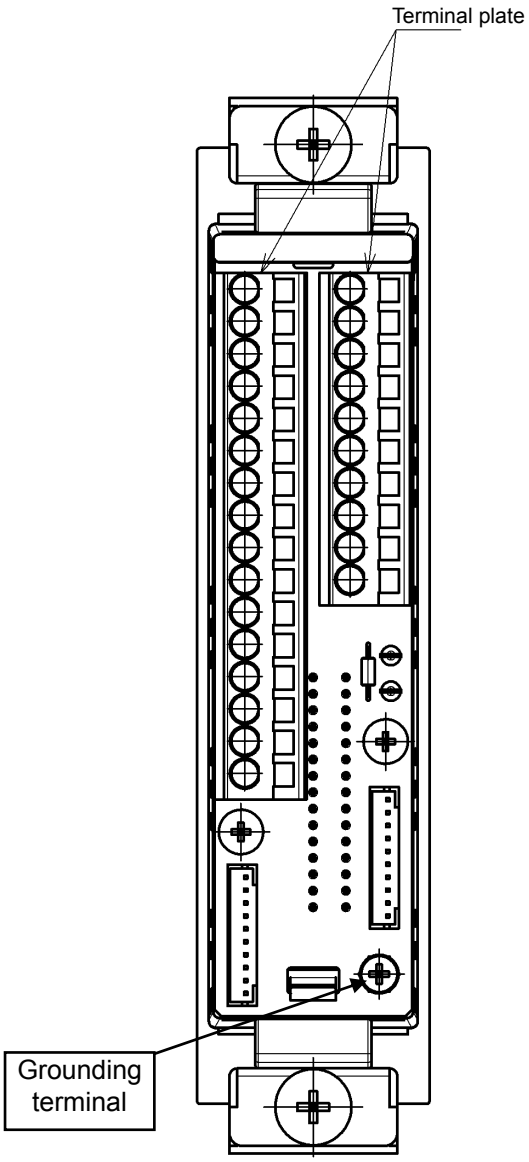
■ Removal: In the same way as for the wiring procedure, insert the screwdriver to remove the wire.

4-5. Grounding

Connect the buzzer unit to your grounding terminal.

WARNING

Before turning on the buzzer unit, never fail to connect it to a grounding terminal.
For stable operation of the buzzer unit and safety, it must be connected to a grounding terminal. Do not connect the grounding wire to a gas pipe. The grounding must be made as D type grounding (below 100 Ω of grounding resistance).



5

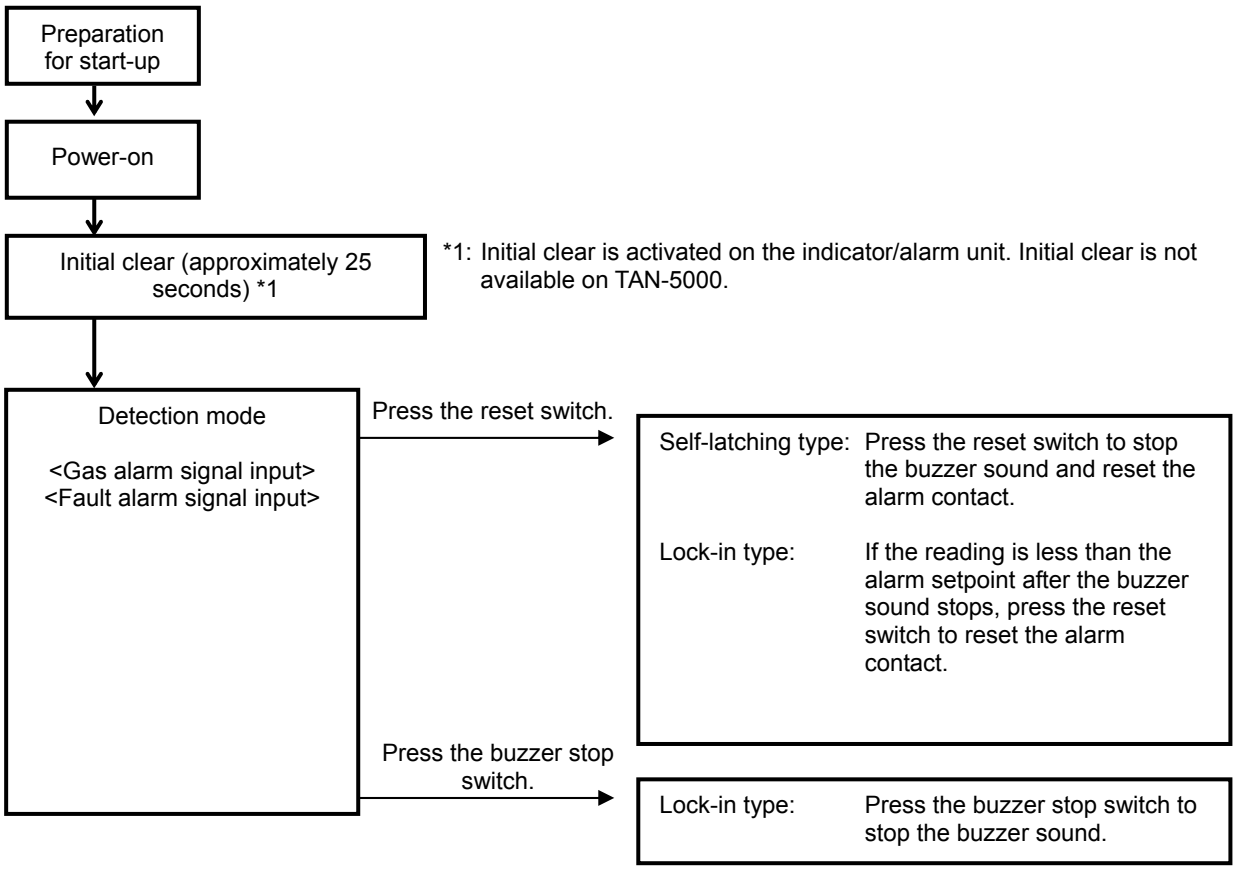
How to Operate

5-1. Preparation for start-up

Before supplying power, read and understand the following precautions. Ignoring these precautions may cause an electric shock or damage the buzzer unit.

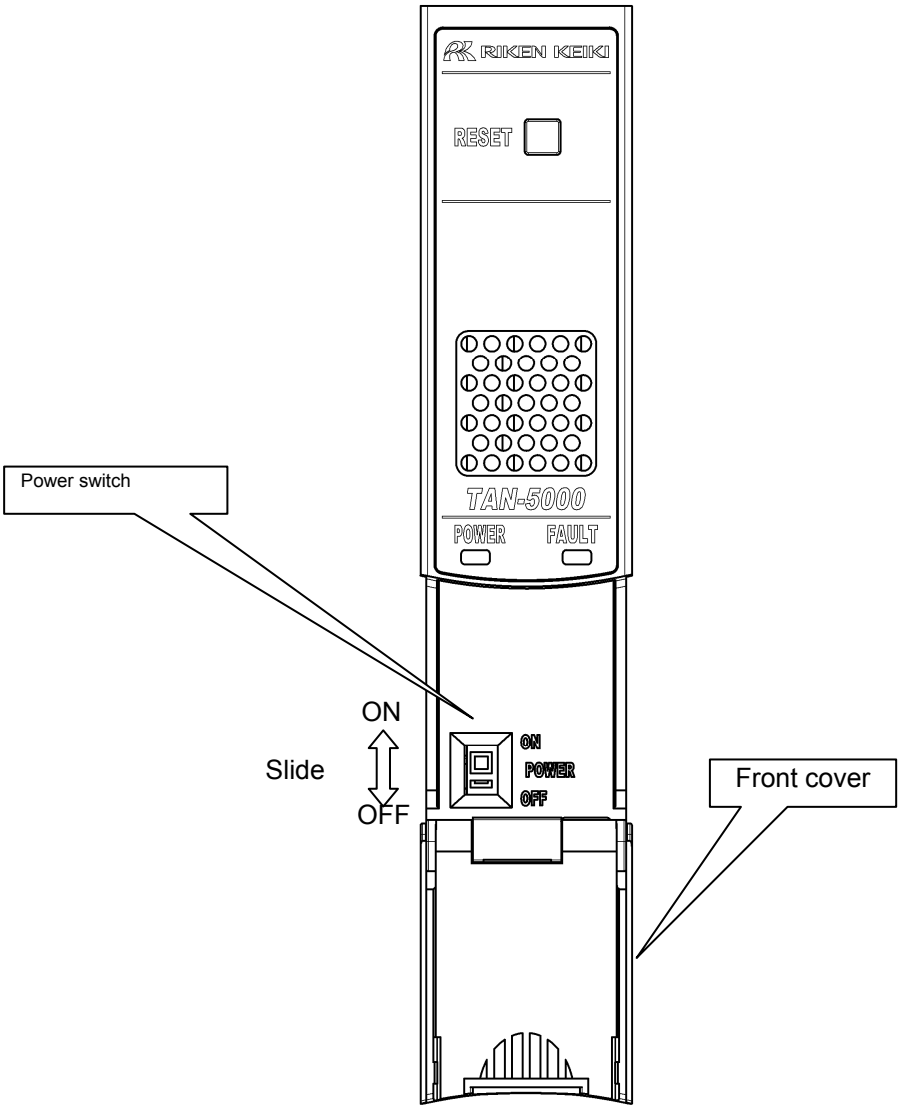
- Connect the buzzer unit to a grounding circuit.
- Check that the wiring is connected to external device properly.
- Check that the power supply voltage is compliant with the specifications.
- Because the external contact may be activated during the adjustment, take measures to prevent an activated contact from having influences on external circuits.
- Make sure to use a fuse with the specified ratings to prevent fire.

5-2. Basic operating procedures



5-3. How to start the buzzer unit

- Before turning on the power switch, check that the buzzer unit is installed properly.
- Open the front cover of the buzzer unit to find the power switch.
- Turn ON the power switch.
- The power lamp lights up and the operation is started.



5-4. Description of operation

5-4-1. Common first and second alarm activation

(1) Self-latching type
The indicator/alarm unit outputs a gas alarm signal when the reading exceeds each of the gas alarm setpoints. The buzzer unit, when receiving this signal, sounds the buzzer and activates the common first and second alarm contacts.
The buzzer and the common first and second alarm contacts are the self-latching type. Press the reset switch to stop the buzzer sound and reset the common first and second alarm contacts.

(2) Lock-in type
The indicator/alarm unit, outputs a gas alarm signal when the reading exceeds each of the gas alarm setpoints. The buzzer unit, when receiving this signal, sounds the buzzer and activates the common first and second alarm contacts.
The buzzer and the common first and second alarm contacts are the self-latching type. Press the buzzer stop switch to stop the buzzer sound. The reset switch is effective if the reading is less than the alarm setpoint after the buzzer stop switch is pressed. It resets the common first and second alarm contacts.

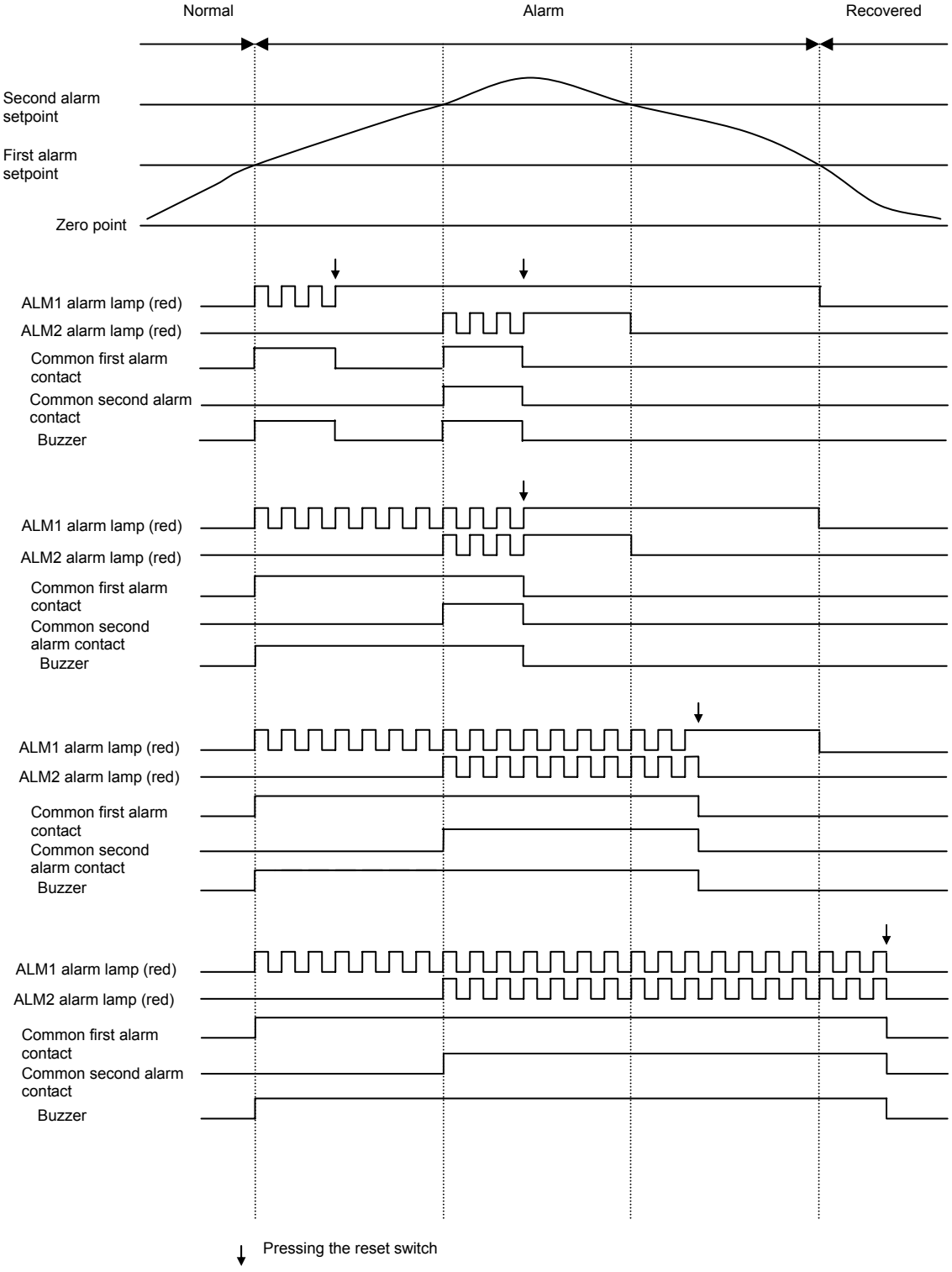
5-4-2. Common fault alarm activation

The indicator/alarm unit outputs a fault alarm signal when the self-diagnostic function discovers a fault. The buzzer unit, when receiving this signal, activates the common fault alarm contact <<Auto-Reset>>. The common fault alarm contact is automatically reset after the system recovers from the fault status.

NOTE

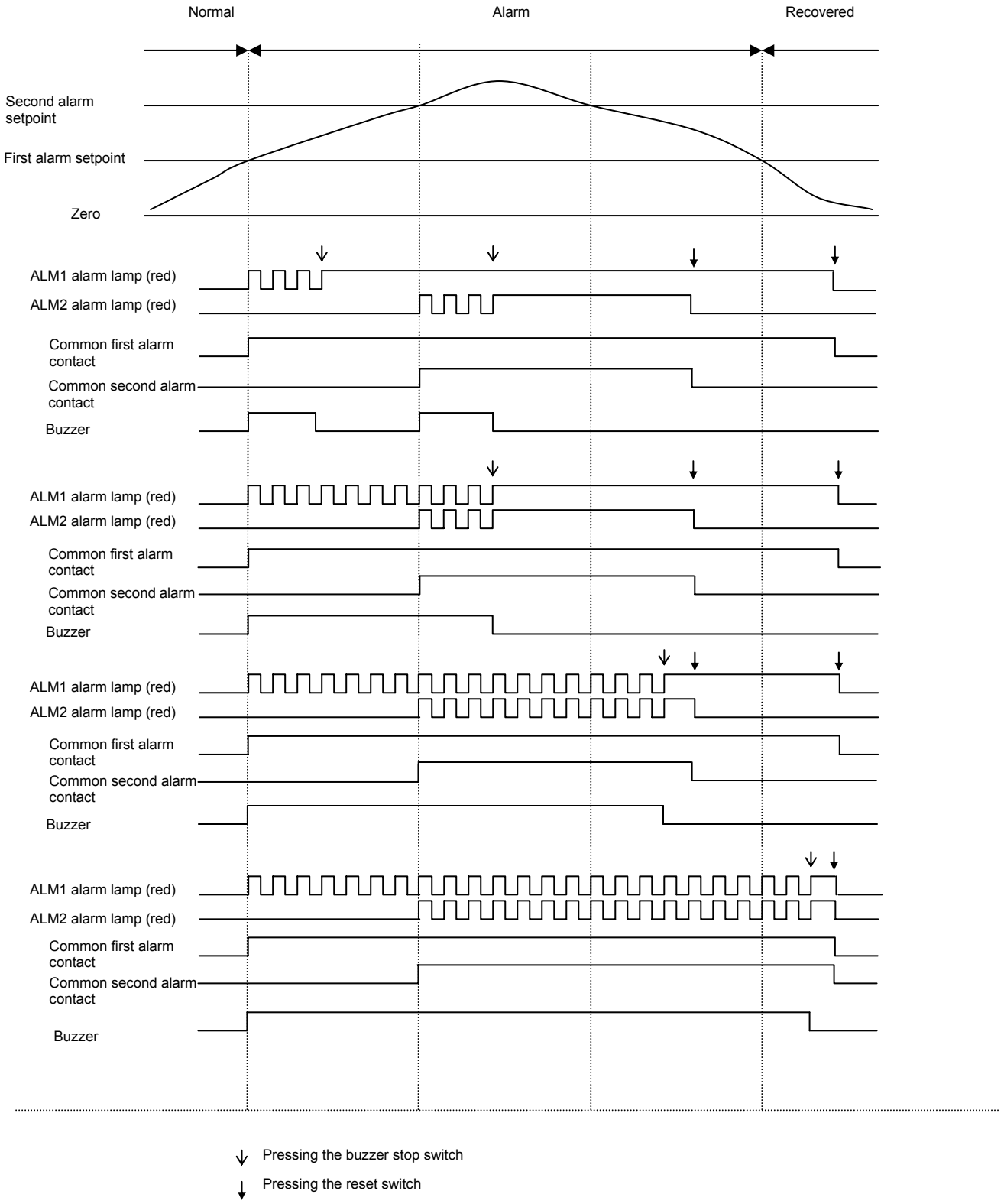
The buzzer does not sound when a fault alarm is triggered <<Standard Setting>>.
To enable sounding of the buzzer when a fault alarm is triggered, please contact RIKEN KEIKI.

self-latching type alarm operation timing chart 1



* The operations of ALM1 and ALM2 alarm lamps shown in this chart are those of the indicator/alarm unit (option).

Lock-in type alarm operation timing chart



↓ Pressing the buzzer stop switch

↓ Pressing the reset switch

* The operations of ALM1 and ALM2 alarm lamps shown in this chart are those of the indicator/alarm unit (option).

5-5. Description of operation

5-5-1. How to change alarm contacts

There are two types of alarm contacts: (1) Common first and second alarm contacts for gas alarm signals from the indicator/alarm unit and (2) Common fault alarm contacts for fault alarm signals.
To change the settings of the contact specifications (such as the "a" or "b" contact), please contact RIKEN KEIKI.

5-5-2. Maintenance mode

If the gas concentration reading exceeds the alarm setpoint of the indicator/alarm unit during the adjustment or calibration of the detector head, the buzzer unit sounds the buzzer and activates the first or second alarm contact. Use the maintenance mode to disable these operations.

Entering the maintenance mode

- Keep the reset switch pressed.
- The power switch starts blinking <<Maintenance Mode>>.

Exiting the maintenance mode

- Keep the reset switch pressed.
- The power switch remains lit <<Detection Mode>>.

WARNING

- When the buzzer unit enters the maintenance mode from the detection mode while an alarm is activated, the alarm contact is released.
- After the adjustment is completed, do not forget to keep the reset switch pressed and return to the detection mode. If the buzzer unit remains in the maintenance mode, it automatically returns to the detection mode in ten hours.

6

Measures for Abnormalities

The power lamp (green lamp) is off.

- Fuse open-circuit

<Causes and Actions>

- The cause can be either a failure of the buzzer unit or a failure of the external power supply. Find out the cause, take appropriate action, and then replace the fuse with a specified spare part.

7

Product Specifications

7-1. List of specifications

[TAN-5000]

Power display	POWER lamp on or blinking (green)
Gas alarm display	Buzzer
Gas alarm pattern	Self-latching
Gas alarm contact	No-voltage contact 1a or 1b (2 step independent) De-energized (energized at an alarm) or energized (de-energized at an alarm)
Fault alarm/self diagnosis	System abnormalities, indicator/alarm unit common fault alarm
Fault alarm display	FAULT lamp on (yellow) with or without buzzer sounds
Fault alarm pattern	Auto-reset
Fault alarm contact	No-voltage contact 1a or 1b De-energized (energized at an alarm) or energized (de-energized at an alarm)
Contact capacity	100 VAC - 0.5A/30 VDC - 1.5A (resistant load)
Power supply	24 VDC (21.6 – 26.4 VDC)
Power consumption	Maximum 2 W
Operating temperatures	-10 - 40℃ (at a constant condition)
Operating humidities	10 to 90%RH (Non-condensing)
Structure	Card type with front display used enclosed in a case (a single-unit or multi-unit case)
External dimensions	Approx. 29.6 (W) x 120 (H) x 92 (D) mm (projection portions excluded)
Weight	Approx. 80g

* Specifications subject to changes without notice.

[TAN-5000L]

Power display	POWER lamp on or blinking (green)
Gas alarm display	Buzzer
Gas alarm pattern	Lock-in
Gas alarm contact	No-voltage contact 1a or 1b (2 step independent) De-energized (energized at an alarm) or energized (de-energized at an alarm)
Fault alarm/self diagnosis	System abnormalities, indicator/alarm unit common fault alarm
Fault alarm display	FAULT lamp on (yellow) with or without buzzer sounds
Fault alarm pattern	Auto-reset
Fault alarm contact	No-voltage contact 1a or 1b De-energized (energized at an alarm) or energized (de-energized at an alarm)
Contact capacity	100 VAC - 0.5A/30 VDC - 1.5A (resistant load)
Power supply	24 VDC (21.6 – 26.4 VDC)
Power consumption	Maximum 2 W
Operating temperatures	-10 - 40°C (at a constant condition)
Operating humidities	10 to 90%RH (Non-condensing)
Structure	Card type with front display used enclosed in a case (a single-unit or multi-unit case)
External dimensions	Approx. 29.6 (W) x 120 (H) x 92 (D) mm (projection portions excluded)
Weight	Approx. 80g

* Specifications subject to changes without notice.

Warranty Policy

RIKEN KEIKI CO., LTD., warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year from date of shipment from RIKEN KEIKI CO., LTD., Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis.

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the operator's manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RIKEN KEIKI CO., LTD., INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RIKEN KEIKI CO., LTD., BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users by authorized distributors, dealers, and representatives as appointed by RIKEN KEIKI CO., LTD.

We do not assume indemnification for any accident or damage caused by the operation of this gas monitor, and our warranty is limited to the replacement of parts or our complete goods.