To: _____

Specifications

Water Leakage Location Detector
AD-AS-1 LDMA

mm yyyy

System Equipment Division
Electronic Materials & System Equipment Group
TATSUTA Electric Wire & Cable Co., Ltd.

Approved by	Checked by	Prepared by

Important Safety Precautions

⚠ Warning

Failure to operate this water leakage location detector in compliance with the following warnings may lead to fatality, serious injury, fire, electric shock, or detector failure.

⚠ Precautions

⚠ Strictly Prohibited

- ☐ Never modify or disassemble the detector.
- ☐ Allow only qualified persons to install and inspect the detector.
- ☐ Do not touch the detector with wet hands.
- ☐ When performing maintenance on the detector, wipe it with dry rags; do not use organic solvent.

⚠ Checkpoints

- ☐ Check the rated voltage and the supply voltage of the detector before installation.
- ☐ When installing the detector and making electrical connection to it, follow the instructions in the operation manual.
- ☐ When inspecting the detector and carrying out maintenance on it, follow the instructions in the operation manual.
- ☐ When using control output contacts, check the rated contact load in the operation manual.

⚠ Do not install the detector in the following locations:

- ☐ Locations easily accessible to the general public
- ☐ Locations close to sources of vibration, organic gas, or strong electromagnetic induction
- ☐ Locations subject to excessive waste and dust
- ☐ Locations where there is a possibility of exposure to water, or high temperature and humidity

Warranty

Before shipping, this product is subjected to strict quality control and inspection. In the event of spontaneous failure resulting from defective manufacturing, we will repair or replace it according to the following provisions.

Warranty Provisions

1. Warranty period (for a period of one year after the delivery date of the product)
   Should the product fail during the warranty period under normal usage according to the operation manual, we will repair or replace it free of charge. Please contact us using the contact information given below.
2. Cases not covered by the warranty
   (1) After the period of warranty
   (2) Failures due to incorrect usage, and unauthorized repairs and modifications
   (3) Failures or damage due to moving, dropping and the like after purchase
   (4) Failures or damage due to fire and natural disasters
   (5) Failures not attributable to this product
   (6) Fees for on-site service (visiting fee and technical fee)

Table of contents

1. Scope

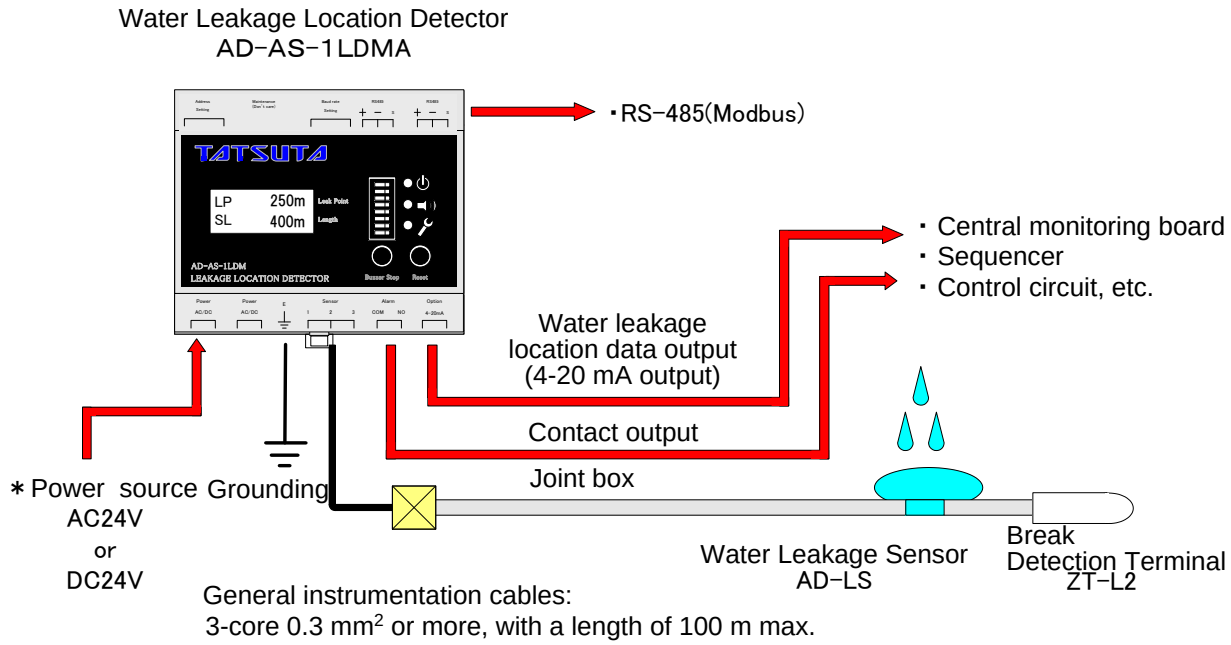
This document applies to the Water Leakage Location Detector (AD-AS-1LDMA), which is designed to protect computer rooms, important facilities, warehouses, valuable materials, etc., from damage resulting from an unexpected water leakage.

2. Configuration of Water Leakage Location Detecting System

This Water Leakage Location Detecting System consists of:

① Water Leakage Location Detector (AD-AS-1LDMA),
② Water Leakage Sensor (AD-LS), and
③ Break Detection Terminal (ZT-L2).

For details of the connections on the terminal block, refer to Attached Drawing 2.



Drawing 1　Water Leakage Location Detecting System

3. Specifications

3.1 Ratings

The ratings are given in Table 1 below.

Table 1. Ratings

Item	Specifications
Rated voltage	AC 24 V or DC 24 V
Supply voltage fluctuation	±10% of the rated voltage
Power consumption	5 W max.
Control output contact	* See Section 11.2 of Specifications, Control Output Contact Specifications
Sensor applied voltage	AC 12.5 V (max.)
Working ambient temperature	0 to 50°C (no icing)
Working ambient humidity	35 to 85% RH (no condensation)

3.2 Performance

The performance characteristics are given in Table 2 below.

Table 2. Performance characteristics

Item	Specifications			
Number of sensor circuits	1			
Length of sensor connection	1 to 400 m			
Detection sensitivity setting	Low sensitivity	Standard sensitivity	High sensitivity	Highest sensitivity
Water leakage detection sensitivity	10±2.0 kΩ	25±2.5 kΩ%	50±5.0 kΩ%	100±10.0 kΩ%
Sensitivity in the case of recovery from water leakage	16±3.0 kΩ	37±3.7 kΩ%	68±6.8 kΩ%	125±12.5 kΩ%
Detection accuracy	1 to 100 m: ±1 m 101 to 400 m: sensor length ± 1%			
Functions of surface panel operation switches	Buzzer stop switch: 1			
	Alarm cancel switch: 1			
Surface panel LED indication	Power source indication Green: 1 (lit)			
	Alarm indication Red: 1 (flashing in case of water leakage detection) (lit in case of break detection)			
	Maintenance indication: 1			
Surface panel LCD indication	Modbus address: 1 to 127 Sensor length and water leakage location indication: in meters or feet			
Surface panel operational setting switch	Used for changing the settings of the indication, control output contacts, detection sensitivity level, etc. For details, refer to Attached Drawing 3.			
Alarm buzzer	Average sound pressure: 90 dB/10 cm (manufacturer's catalog value)			
Control output contact	Contact configuration	◇Contacts (For the specifications, refer to Section 11.2 of the specifications.) Used for both water leakage and break indications: one contact point for 1a * Modbus-based communication; or can be changed to Contact b by using the operational setting switch.		
Water leakage location data output	4-20 mA current loop output (external load resistance: 500 Ω max.) × 1 Under normal sensor conditions: 4 mA In case of sensor break detection: 20 mA In case of water leakage detection: 6 + 0.03 × water leakage location indication (m) mA ± 1%			
Withstand voltage	AC 1500 V (50/60 Hz) for 1 minute (between the power source terminal and the body case)			
Insulation resistance	10 MΩ min. (with a DC 500 V megger) for 1 minute (between the power source terminal and the body case)			
Noise resistance	±1000 V pulse width: 1 μsec (noise simulator) for 1 minute (between each phase and the grounding terminal) Power source: 2 kV 5 kHz; sensor: 1 kV 5 kHz *IEC61000-4-4			
Outside dimension	106 × 94 × 57 mm (W × H × D; refer to Attached Drawing 1.)			
Weight and color	Approx. 260 g, in gray			

3.3 Control output contact specifications

The specifications of the control output contact are given in Table 3 below.

Table 3. Control output contact specifications

Item	Resistance load	Inductive load
Rated load	AC 125 V, 0.4 A DC 30 V, 2.0 A	AC 125 V, 0.2 A DC 30 V, 1.0 A
Minimum applied load	DC 10 mV, 10 μA (reference value)	

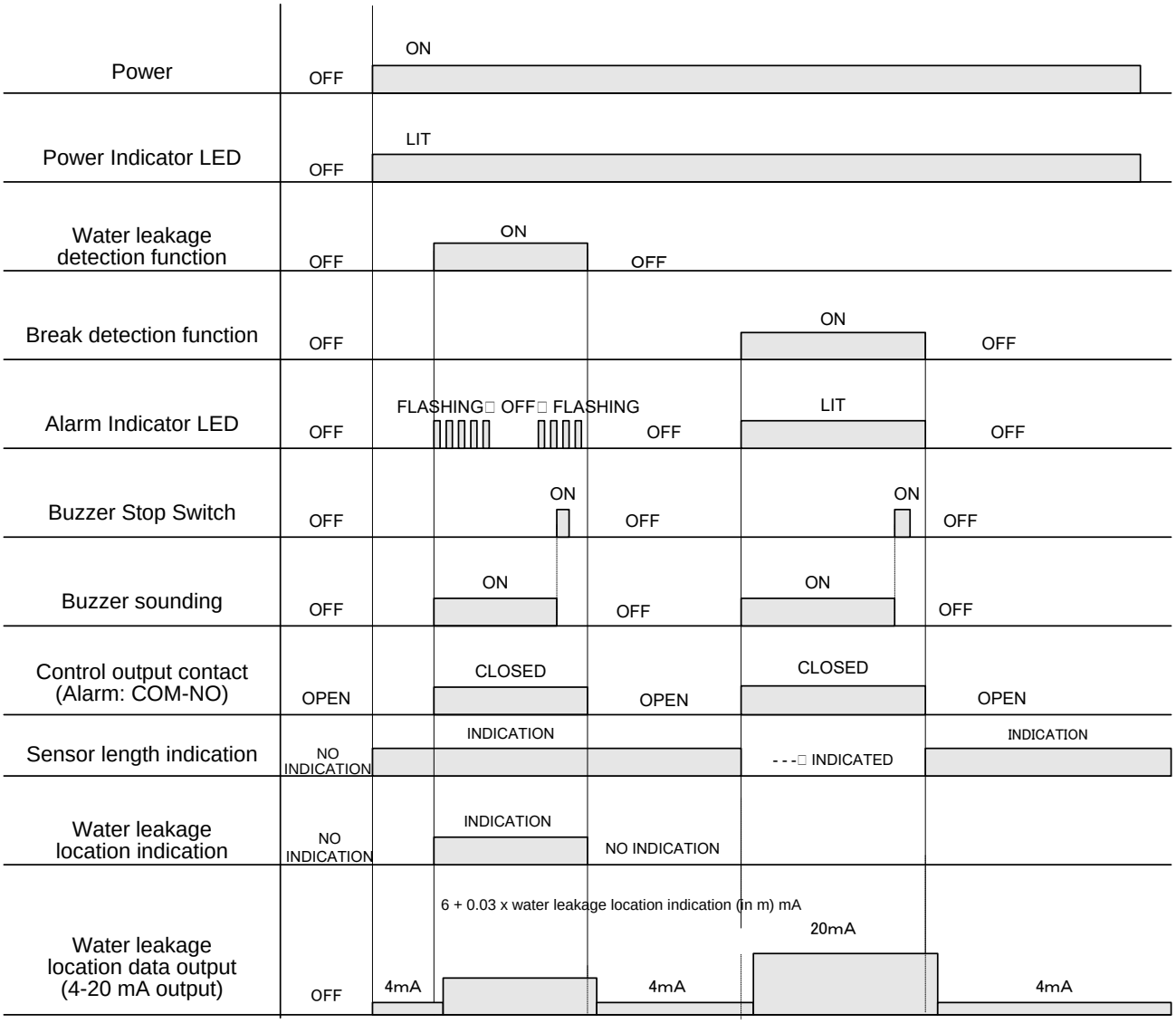
(Relay contact: G6E–134P–US, catalog value by OMRON Corporation)

4. Operation Chart

4.1 Standard operation chart

(Factory setting)

The operation chart is shown in Drawing 2 below.



Drawing 2 Operation Chart 1

Buzzer

Pressing the buzzer stop switch stops the buzzer.

When the system detects another water leakage or break, the buzzer sounds again.

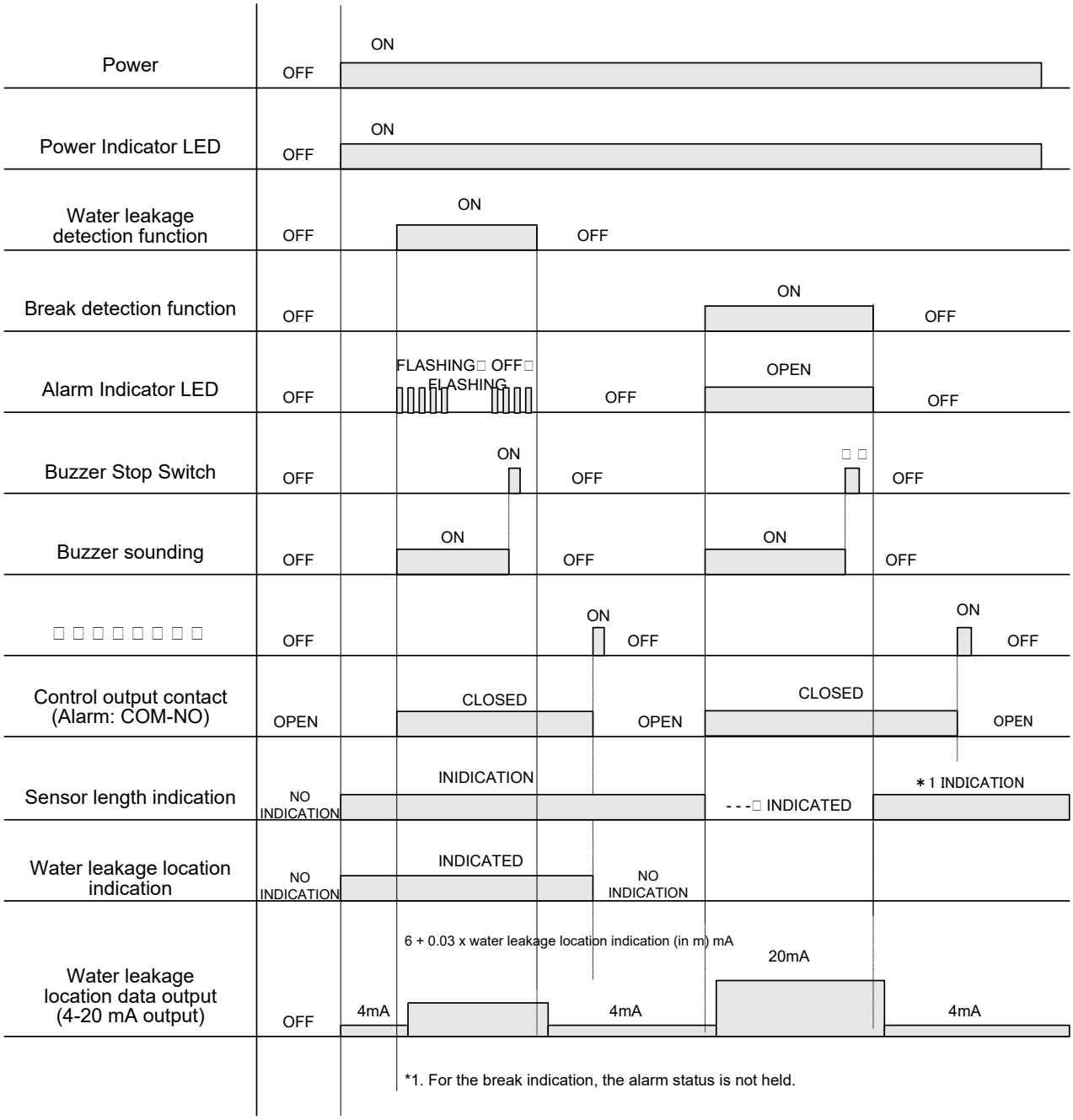
Turning the No.1 operational switch ON prevents the buzzer from sounding at any time.

The buzzer setting can be adjusted from a higher-order system through Modbus communication.

4.2 Operation chart with the alarm hold setting activated

Changing the operational setting switches allows the indication and control output contacts to be set at the alarm hold.

The operation chart is shown in Drawing 3 below.



Drawing 3 Operation Chart 2

Operation of holding an alarm status

When the alarm setting is activated, the alarm status is maintained until the alarm cancel switch is pressed.
A power failure or power-off returns the contact operation status to that prevailing when the power source was shut off.

Alarm Indicator LED

The Alarm Indicator LED does not maintain the alarm status. The Alarm Indicator LED goes out when the system detects recovery from the water leakage status and break status.
If the Alarm Indicator LED continues to flash even after the water leakage sensor is wiped with a rag, etc., this suggests that water leakage may have occurred at multiple locations.
After completely drying the water leakage sensor at the location displayed by the indicator, press the alarm cancel switch.

* If drying is insufficient, a deviation may occur between the location displayed by the indicator after the alarm cancel switch is pressed and the actual water leakage location.

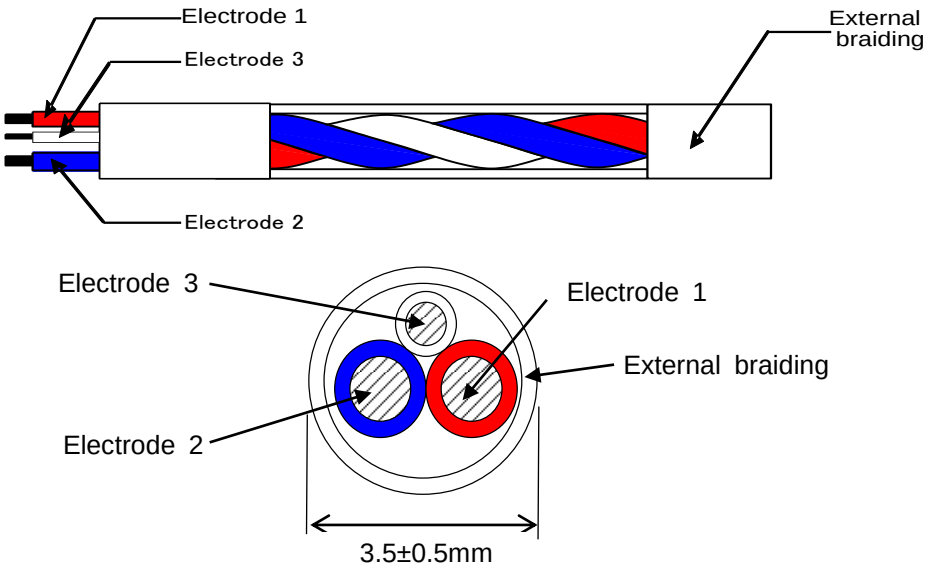
5. Installation

Securely install the Water Leakage Location Detector (AD-AS-1 LDMA) in a strong housing, on the wall, etc. inside a building.
Be sure to follow the instructions below when installing this product.

1) Avoid installing the detector in any location subject to high temperature and high humidity, excessively dusty environments and corrosive gas environments.
2) Install the detector in a location that is free from vibration, away from sources of noise such as power switches, and convenient for quick maintenance and inspection.
3) Install the sensor using adhesive stickers, pin saddles, etc. according to the location and environment.
4) Consult the manufacturer if there is a possibility of noise contamination, including electromagnetic induction, to the sensor.
5) Do not insert foreign objects, including drivers, into gaps in the case.
6) Do not use the sensor as an electric wire.
7) Never use sensors other than our product “AD-LS Sensor.” Using sensors of other makes or using ours with sensors of other makes will cause serious errors in the location detection function.

6. Water Leakage Sensor (AD-LS Sensor)

The structure and configuration of the Water Leakage Sensor (AD-LS Sensor) used for the Water Leakage Location Detector (AD-AS-1 LDMA) are shown in Drawing 4 and Table 4.
Each element wire has different characteristics and function: take care when connecting it to the detector.

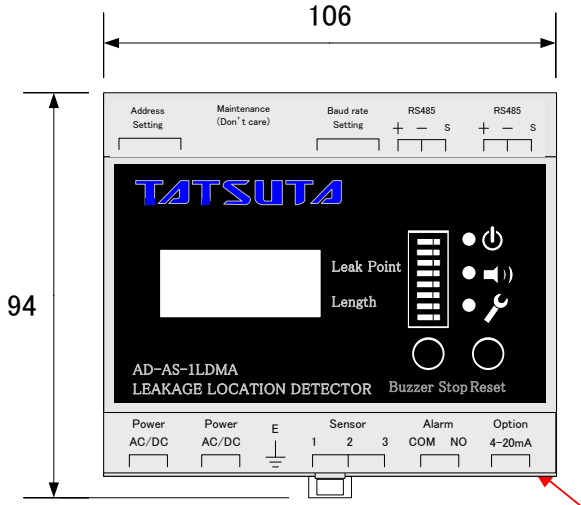


Drawing 4 AD-LS sensor configuration

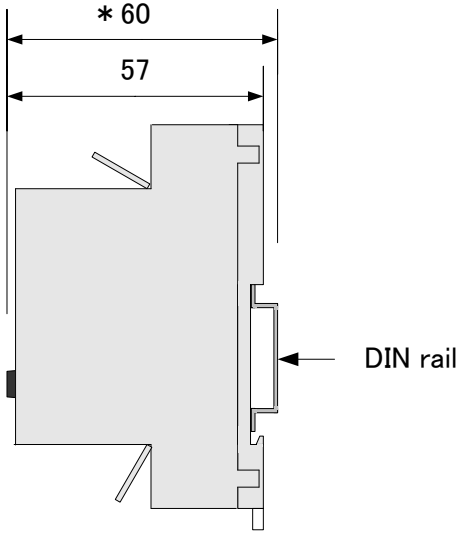
Table 4 AD-LS sensor configuration

Element	Configuration
Electrode 1	0.33 mm^2 tinned soft copper wire covered with red plastic braided thread
Electrode 2	0.5 mm^2 tinned soft copper wire insulated with blue plastic insulation
Electrode 3	φ0.4 resistance wire covered with white plastic braided thread
External braiding	White plastic braided thread

Attached Drawing 1



*DIN rail mounting dimensions



Terminal block cover

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			Unit	mm
			Prepared on	2014.12.01

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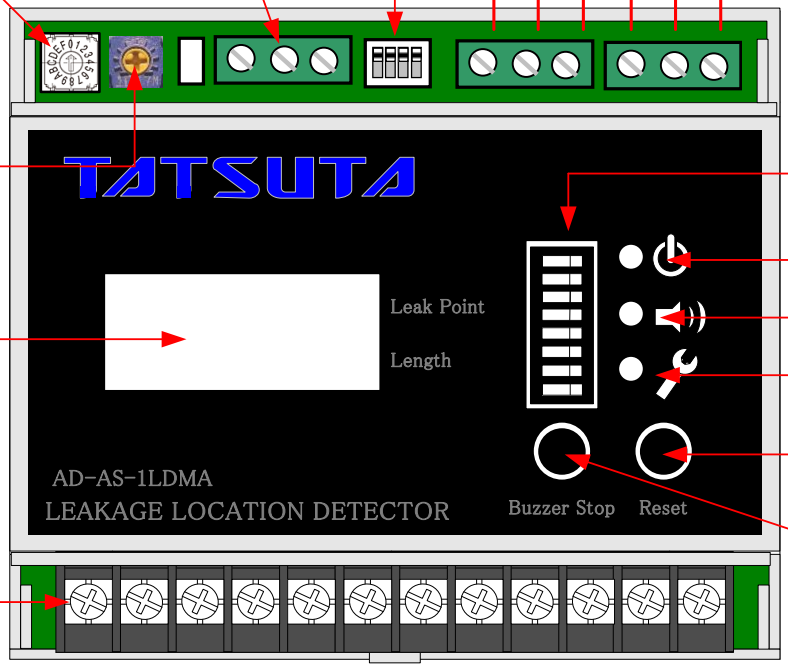
Drawing No.

Water Leakage Location Detector (AD-AS-1 LDMA) Outside Dimensions

Attached Drawing 2



*Modbus RS485
Two terminals to which connections are made are available at each location. Making connections at one of the locations will activate the system.
Use the other for connection wiring.

* Power source
An AC 24 V input has no polarity.
The + and - symbols apply to a DC 24 V input.
Two terminals to which connections are made are available at each location. Making connections at one of the locations will activate the system.
Use the other for connection wiring.

Power source □ AC24V or DC24V				E	Sensor connection AD-LS			Alarm contact (* Contact 1a)		4-20 mA output	
+	—	+	—					COM	NO	+	—

* Contact operation
Contact a can be changed to Contact b by adjusting the setting of the operational setting switch.
(Refer to Attached Drawing 3.)

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			Unit	mm
			Prepared on	2014.12.01

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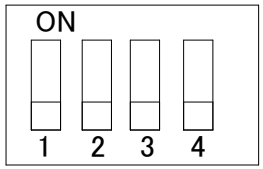
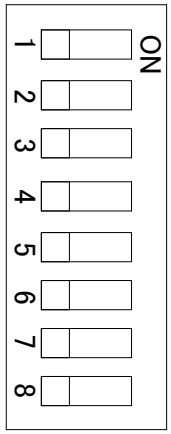
Water Leakage Location Detector (AD-AS-1 LDMA) Explanation of Individual Parts

Attached Drawing 3



No	Operational setting	Explanation of operations * Make this setting before powering on.
1	OFF	Setting of the 8-bit switch on the surface OFF: valid setting; ON: invalid setting (setting carried out through Modbus communication)
2	OFF	Communication speed setting (2) (3) OFF - OFF : 4800bps ON - OFF : 9600bps OFF - ON : 19200bps ON - ON : 38400bps
3	OFF	
4	OFF	Terminal resistance setting OFF: not connected; ON: terminal connection



No	Operational setting	Explanation of operations * When the No.1 4-bit DIP switch is at OFF, the setting change is valid.
1	OFF	Buzzer sounding OFF: Activated ON: Not activated
2	OFF	Alarm hold for water leakage location indication OFF: Not available ON: Available
3	OFF	Switching between the meter and the foot indication OFF: Not available ON: Available
4	OFF	Alarm hold for the alarm relay OFF: Not available ON: Available
5	OFF	Alarm relay: Contact a/b operation OFF: Contact a ON: Contact b
6	OFF	Unassigned, fixed at OFF
7	OFF	Detection sensitivity shifting (7) (8) OFF - OFF Standard sensitivity Approx. 25kΩ ON - OFF Low sensitivity Approx. 10kΩ OFF - ON High sensitivity Approx. 50kΩ ON - ON Highest sensitivity Approx. 100kΩ
8	OFF	

* Changing the SW causes the operations of the indications and relays to change.
Note that inadvertently changing the SW may lead to an unintended operation.

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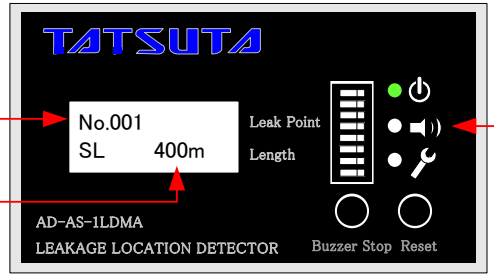
Water Leakage Location Detector (AD-AS-1 LDMA) Explanation of the operational setting switch

Attached Drawing 4

Indication under normal sensor conditions

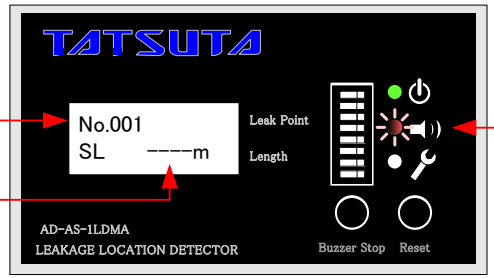


Modbus address →

Sensor length →

← OFF

Indication in the case of break detection

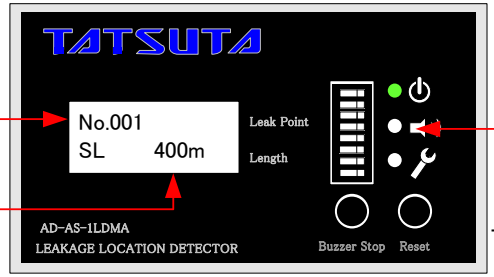


Modbus address →

Indication of a break
– – – –

← LIT

Indication in the case of water leakage detection

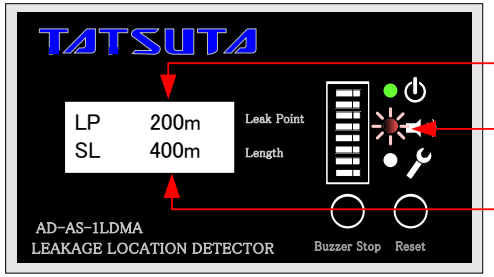


Modbus address →

Sensor length →

← OFF

↔ The two indications alternate.

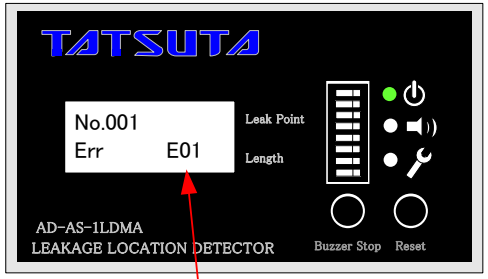


← Leakage point indication

← Flashing

← Sensor length indication

Indication of an abnormality in the water leakage detection data



An indication of “E01” is added in the following cases:
①The wiring or connection between the detector and the external analog input device is broken; or the input resistance is 500 Ω or more;
②The internal power source inside the detector for the 4-20 mA output fails.

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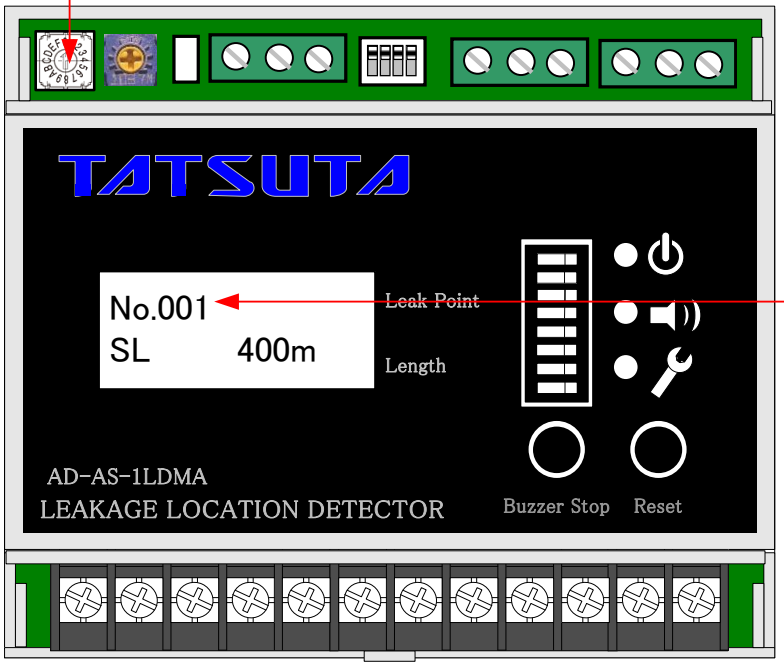
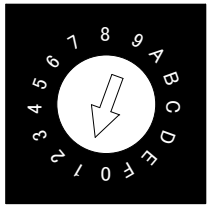
Water Leakage Location Detector (AD-AS-1 LDMA) Explanation of the indicator 1

Attached Drawing 5

Method of setting a Modbus Address ①





To set a Modbus Address, operate the rotary switch of the detector.
The addresses that can be set are from 1 to 15.
The address corresponding to a dial is as follows:

Addresses "1" to “9”: Dials “1” to “9”
Address “10”: Dial “A”
Address “11”: Dial “B”
Address “12”: Dial “C”
Address “13”: Dial “D”
Address “14”: Dial “E”
Address “15”: Dial “F”

To set an address between 16 and 127, set the dial at “0 and then use the buzzer stop switch and the res”et switch. For more information, refer to the next page.

Note that assigning identical addresses to the same communication line causes a communication disturbance.

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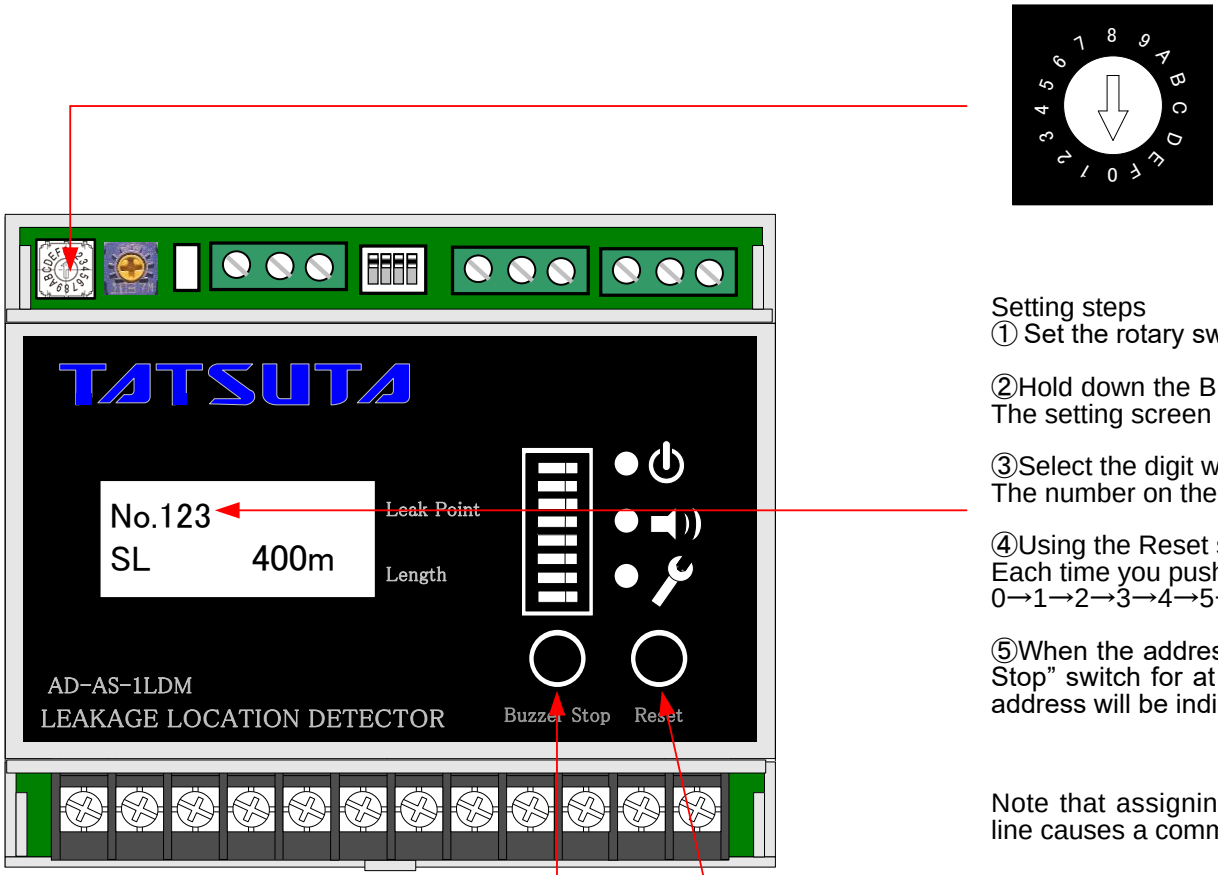
Water Leakage Location Detector (AD-AS-1 LDMA) Explanation of the indicator 2

Attached Drawing 6

Method of setting a Modbus Address②
Case where the address is set at 16 or greater



Setting steps
① Set the rotary switch of the detector at “0.”

②Hold down the Buzzer Stop and Reset switch for at least two seconds. The setting screen appears.

③Select the digit with the Buzzer Stop switch. The number on the selected digit flashes.

④Using the Reset switch, allow the desired number to appear. Each time you push the switch, the figure increases one by one in order: 0→1→2→3→4→5→6→7→8→9→0.

⑤When the address you desire is indicated, press and hold the “Buzzer Stop” switch for at least 2 seconds. This concludes the setting and the address will be indicated after “No.”

Note that assigning identical addresses to the same communication line causes a communication disturbance.

Button for adjusting the number

Selection of the number of digits/selector button

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Water Leakage Location Detector (AD-AS-1 LDMA) Explanation of the indicator 3