Water Leakage Location Detector
AD-AS-1LDMA
Operation Manual

System Equipment Division
Electronic Material & System Equipment Group
Tatsuta Electric Wire & Cable Co., Ltd.
<<<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 this detector.
- Allow only qualified persons to carry out installation work inspection of this detector.
- Do not touch this detector with wet hands.
- When performing maintenance on this detector, wipe it with dry rags instead of using organic solvent.

⚠️ Checkpoints!

- Check the rated voltage and the detector supply voltage before installation.
- When installing and making electrical connections to this detector, follow the instructions in the operation manual.
- When inspecting and carrying out maintenance on this detector, follow the instructions in the operation manual.
- When using control output contacts, check the contact rated 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 (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 damages due to moving, dropping etc. after purchase
   (4) Failures or damages due to fire and natural disasters
   (5) Failures not attributable to this product
   (6) Fees for on-site service (visiting fee and technical fee)
Contact information:

Tatsuta Electric Wire & Cable Co., Ltd.
Operational headquarters of System Electronics and System Photo-Electronics

Kyoto Works
3-17 Osadano-cho, Fukuchiyama City, Kyoto, 620-0853
Tel: +81-773-45-6500   Fax: +81-773-45-6501

Tatsuta Technical Center
6-5-1 Kunimidai, Kizugawa City, Kyoto, 619-0216
Tel: +81-774-66-5550   Fax: +81-774-66-5556

Shanghai Representative Office
18/B, International Ocean Building, 720
Pudong Avenue, Shanghai ZIP 200120
TEL:+86-21-5058-5177 FAX:+86-21-5058-5199
# Table of contents

1. Explanation of Individual Parts of Water Leakage Location Detector ........................................ 1

2. Installation and Handling Precautions ........................................................................................................ 1
   2-1 Installation
   2-2 Handling Precautions

3. Maintenance and Inspection .......................................................................................................................... 1

4. Configuration of Water Leakage Location Detecting System ................................................................. 2

5. External Connection ........................................................................................................................................ 2
   5-1 Power Connection
   5-2 Ground Connection
   5-3 Water Leakage Sensor Connection
   5-4 Control Output Contact Connection
   5-5 Water Leakage Location Data Output Connection
      5-5-1 Connection
      5-5-2 Abnormal Water Leakage Location Data Output
   5-6 RS485 Communication (Modbus/RTU) Connection

6. Operation Check ............................................................................................................................................. 5
   6-1 Power-On
   6-2 Check for Break Detection Function
   6-3 Check for Water Leakage Detection Function

7. Operation Chart ............................................................................................................................................. 7
   7-1 Standard Operation Chart
   7-2 Operation Chart When Alarm Hold Setting is Activated

8. Indication of Modbus Address ..................................................................................................................... 9

9. Detection Sensitivity Setting ........................................................................................................................ 9

10. Buzzer Setting ............................................................................................................................................... 9

11. Specifications ............................................................................................................................................. 9
   11-1 Ratings
   11-2 Control Output Contact Specifications
   11-3 Performance

◊ Attached Drawing 1 Outside Dimensions of Water Leakage Location Detector (AD-AS-1LDMA)
◊ Attached Drawing 2 Explanation of Individual Parts of Water Leakage Location Detector AD-AS-1LDMA)
◊ Attached Drawing 3 Explanation of Operational Setting Switches of Water Leakage Location Detector
   (AD-AS-1LDMA)
◊ Attached Drawing 4 Explanation of Indicators-1 of Water Leakage Location Detector (AD-AS-1LDMA)
◊ Attached Drawing 5 Explanation of Indicators-2 of Water Leakage Location Detector (AD-AS-1LDMA)
◊ Attached Drawing 6 Explanation of Indicators-3 of Water Leakage Location Detector (AD-AS-1LDMA)
Thank you very much for purchasing the Water Leakage Location Detector (AD-AS-1LDMA). Before using, read this operation manual carefully to ensure correct operation. Keep this manual in a convenient place for quick reference.

1. Explanation of Individual Parts of Water Leakage Location Detector

The Water Leakage Location Detector (AD-AS-1LDMA) has the functions described in Drawing 1.

2. Installation and Handling Precautions

2-1 Installation

The Water Leakage Location Detector (AD-AS-1LDMA) shall be securely installed in a strong housing, on the wall, etc. inside a building. Be sure to follow the following instructions 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 switch, and convenient for quick maintenance and inspection.
3) Install the sensor using adhesive stickers, adhesive tapes, etc. according to location and environment.
4) Do not insert foreign matters, including drivers, into gaps in the case.
5) Do not use the sensor as electric wire.
6) Never use sensors other than our product “AD-LS Sensor” and electric wire. This will cause serious deviation in the location detection function.

2-2 Handling Precautions

1) Use the detector in an environment with a temperature range between -10 and 50˚C and a humidity range between 35 to 95%*.
   *86% or more is the storage humidity.
2) Do not install the detector in any location close to sources of vibration and harmful gas, and strong electromagnetic inductive power sources. This may cause malfunction and failures.
3) After installation, be sure to conduct tests in conformance with the operation check items described in Chapter 6.

3. Maintenance and Inspection

◇ When inspecting the facilities, conduct inspections in conformance with the operation check items described in Chapter 6.
   Note) During inspection of the detector, the control output contacts are functioning, so if the control output contacts are used, disconnect the wiring or connect temporary wiring in order not to affect other devices.
◇ Be careful to prevent oil-based substances, such as wax, from adhering to the sensor; this may repel water and interfere with correct detector operation.
◇ If the sensor is tainted with water absorbing substances, electrically conductive dirty water, etc., replace it with new one.
4. Configuration of Water Leakage Location Detecting System

The Water Leakage Location Detection System consists of the following components:

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

Each connection of terminal block is described in Chapter 5.

5. External Connection

AD-AS-1LDMA has a terminal block as shown in Drawing 3. (Make connections securely in conformance to Sections 1 to 5.)

5-1 Power Connection

Before connection, check that the power supply voltage is within the range of use and check the polarity, then connect it securely to the terminal block.

* Inputting a power supply voltage outside the range of use may cause malfunctions and failure of the detector, so care should be taken.

1) AC 24V (DC 24V +)
2) AC 24V (DC 24V -)
3) AC 24V (DC 24V +)
4) AC 24V (DC 24V -)

* 3 and 4 is terminal block for transition wiring. Inside the detector, 1 is connected to 3, and 2 is connected to 4.

Connecting the power source to 1, 3 or 2, 4 may cause short, so care should be taken.
5-2 Ground Connection
Be sure to ground for noise prevention.

5-3 Water Leakage Sensor Connection
The structure and configuration of the water leakage sensor (AD-LS Sensor) used for the Water Leakage Location Detector (AD-AS-1LDMA) are shown in Drawing 4 and Table 1.

* Shapes and functions of each wire vary, so extra care should be taken when connecting it to the detector. (Refer to Drawing 5.) Incorrect wiring will result in inaccurate indication of water leakage locations or break alarm output.

* While carrying out wiring, make sure that the power is switched off.

![Drawing 4 AD-LS Sensor Structure]

![Drawing 5 Terminal Block for Sensor Connection]

<table>
<thead>
<tr>
<th>Element</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braided wire</td>
<td>0.33mm² tinned soft copper wire covered with red plastic braided thread</td>
</tr>
<tr>
<td>Insulated wire</td>
<td>0.5mm² tinned soft copper wire insulated with blue plastic</td>
</tr>
<tr>
<td>Resistance wire</td>
<td>φ0.4 resistance wire covered with white plastic braided thread</td>
</tr>
<tr>
<td>External braiding</td>
<td>White plastic braided thread</td>
</tr>
</tbody>
</table>
5-4 Control Output Contact Connection

There are break output connections (Contact a), use them if external control is needed. (Refer to Drawing 6.)

![Drawing 6 Control Output Contact](image)

Alarm contacts  COM-NO: Closed when a break is detected.

* Regarding contact operation
  Changing operational setting switches shifts Contact a to Contact b. (Refer to Drawing 3.)

Water Leakage Location Data Output Connection

5-5-1 Connection

The AD-AS-1LDMA has a function that outputs the water leakage location by DC electrical current. (Option)

* Use an analog input device with an input resistance of 500 Ω or lower.

![Drawing 7 Water Leakage Location Data Output Connection](image)

(Output specifications)

Normal sensor output current = 4 (mA)
Sensor output current in the case of sensor break detection = 20 (mA)
Output current in the case of water leakage detection = 6 + 0.03 x water leakage location indication (mA)
5-5-2 Abnormal Water Leakage Location Data Output

In the case of abnormal water leakage location data output, an indication of “E01” is added on the LED. (Refer to Attached Drawing 4.)

This may result from the causes described below. Check the facilities.

1) Detector: Wiring and/or connection between external analog input devices are broken.
2) The input resistance for the external analog input devices is more than 500 Ω.

If there is no problem with the items above, the detector may be out of order. Contact the manufacturer.

5-6 RS485 Communication (Modbus/RTU) Connection

The connection terminal block that communicates with the host system is as follows. (Refer to Drawing 9)

**Drawing 8. RS485 connection terminal block**

+ Terminal: SD / RD + (hot side)
- Terminal: SD / RD + (cold side)
S terminal: GND

Note) Each + terminal and - terminal are internally connected.

To facilitate the connection of multiple units, two pairs of terminals were equipped.

**Drawing 9. RS485 wiring image**
6. Operation Check

6-1 Power-On

When the detector is powered on, the Power Indicator LED and the LCD Backlight are Lighting up. (Refer to Drawing 10.)

In the case in which either or both of the LEDs does not light up, the detector may be out of order. Power off the detector promptly and contact the manufacturer.

6-2 Check for Break Detection Function

1) **After powering off the detector**, remove the water leakage sensor from the trunk terminal block and then power on the detector.
2) The buzzer sounds, the Alarm Indicator LED flashes and the contacts (for break detection) function.
3) LCD indicates “----m”. (Refer to Drawing 11.)
4) After the operation check, **power off the detector** and then connect the sensor to the terminal block again.

6-3 Check for Water Leakage Detection Function

1) Drop tap water on the sensor.
2) The buzzer sounds, the Alarm Indicator LED lights up and the contacts (for water leakage detection) function.
3) LCD indicates as shown in Drawing 12.

   Example: In the case in which a sensor with a length of 1500 meters is connected and a point at 1000 meters is wetted.
4) Wipe the tap water dropped on the sensor with dry rags, etc. and check that the water leakage status returns to normal.
### 7. Operation Chart

#### 7-1 Standard Operation Chart
(Factory setting)
For the operation chart, refer to Drawing 13.

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power Indicator LED</strong></td>
<td>Lighting out</td>
<td>Lighting up</td>
</tr>
<tr>
<td><strong>Water leakage detection function</strong></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td><strong>Break detection function</strong></td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td><strong>Alarm Indicator LED</strong></td>
<td>Lighting out</td>
<td>Flashing</td>
</tr>
<tr>
<td><strong>Buzzer Stop Switch</strong></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td><strong>Buzzer sounding</strong></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td><strong>Control output contact (water leakage: COM-NO)</strong></td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td><strong>Control output contact (break: COM-NO)</strong></td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td><strong>Sensor length indication</strong></td>
<td>No indication</td>
<td>*1 Indication</td>
</tr>
<tr>
<td><strong>Water leakage location indication</strong></td>
<td>No indication</td>
<td>*1 Indication</td>
</tr>
<tr>
<td><strong>Water leakage location data output (4-20 mA output)</strong></td>
<td>OFF</td>
<td>4mA</td>
</tr>
</tbody>
</table>

*1 The sensor length and the water leakage location is indicated alternately.

**Drawing 13 Operation Chart-1**

Regarding Buzzer
Pressing the buzzer stop switch stops the buzzer.
When the system detects another water leakage or a break, the buzzer sounds again. Turning No.1 operational setting switch ON prevents the buzzer from sounding at any time.

It is possible to set the buzzer from the host system by the Modbus communication.
7-2 Operation Chart When Alarm Hold Setting is Activated

Changing operational setting switches activates the alarm hold setting for indication and control output contacts.
For the Operation Chart, refer to Drawing 14.

It is possible to set the control output contact from the host system by the Modbus communication.

Regarding the operation when the alarm hold setting is activated

When the alarm hold setting is activated, the alarm status is held until the cancel switch is pressed.
Electric power failure or power-off returns the contact operation status to that when the power source is shut off.

Regarding the Alarm Indicator LED

The Alarm Indicator LED does not maintain alarm status. The Alarm Indicator LED goes out when the system detects recovery from water leakage status and break status.
If the Alarm Indicator LED continues to flash even after the water leakage sensor is wiped with rags etc., this indicates that water leakage may occur at multiple locations.
After completely drying the water leakage sensor at the location that the indicator displays, press the alarm cancel switch.
* If drying is insufficient, deviation may occur between the location displayed by the indicator after the alarm cancel switch is pressed and the actual water leakage location.
8. Indication of Detector number

The Detector number, which is used when communicating to the host system, is set by use of the rotary switch below.

- The range of the Detector number is set between 1 and 15 by use of the rotary switch.
- The factory setting is 0 (no indication).

When setting the 16 to 127, set by operating “Alarm Cancel Switch” and “Buzzer Stop Switch”.

See the accompanying sheet for details.

The Detector number is indicated on the upper left of the LCD.

![Drawing 15 Indication of Detector Number]

9. Detection Sensitivity Setting

Changing operational setting switches changes the detection sensitivity level.
- The water leakage sensor detects water leakage even if it is caused by only a small amount of water (condensation, for example). Therefore, if the sensor is installed in a location subject to high temperature and high humidity, set the sensitivity level lower.
- If the sensitivity level is set as necessary to monitor fluid with high electrical resistance, such as pure water, the sensor can detect water within a stable environment with high temperature and humidity.

10. Buzzer Setting

Changing operational setting switches changes not to sound the buzzer.

It is possible to change the above setting from the host system by the Modbus communication.

11. Specifications

11-1 Ratings

For the ratings, refer to Table 2.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>AC24V or DC24V</td>
</tr>
<tr>
<td>Supply voltage fluctuation</td>
<td>± 10% of each</td>
</tr>
<tr>
<td>Power consumption</td>
<td>5W max.</td>
</tr>
<tr>
<td>Control output contact</td>
<td>See Section 11-2 Control Output Contact Specifications.</td>
</tr>
<tr>
<td>Sensor applied voltage</td>
<td>AC12.5V (maximum value)</td>
</tr>
<tr>
<td>Working ambient temperature</td>
<td>-10 to 50 °C (no icing)</td>
</tr>
<tr>
<td>Working ambient humidity</td>
<td>35 to 95%RH * (no condensation) =96% or more is the storage humidity.</td>
</tr>
</tbody>
</table>

11-2 Control Output Contact Specifications

For the control output contact, refer to Table 3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Resistance load</th>
<th>Inductive load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated load</td>
<td>AC 220V, 0.2 A</td>
<td>AC 220V, 0.1 A</td>
</tr>
<tr>
<td></td>
<td>DC 24V, 2.0 A</td>
<td>DC 24V, 1.0 A</td>
</tr>
<tr>
<td>Minimum applied load</td>
<td>DC 10mV, 10μA (reference value)</td>
<td></td>
</tr>
</tbody>
</table>

(Relay contact: G6E-134P-US Catalogue values by OMRON Corporation)
For performances, refer to Table 4.

### Table 4 Performances

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sensor circuit</td>
<td>1</td>
</tr>
<tr>
<td>Length of sensor connection</td>
<td>1 to 1500 m</td>
</tr>
<tr>
<td>Detection sensitivity level setting</td>
<td>Low, Standard, High, Highest</td>
</tr>
<tr>
<td>Water leakage detection sensitivity</td>
<td>10 ± 2.0kΩ, 25 ± 2.5kΩ, 50 ± 5.0kΩ, 100 ± 10.0kΩ</td>
</tr>
<tr>
<td>Sensitivity in the case of recovery from water leakage</td>
<td>16 ± 3.0kΩ, 37 ± 3.7kΩ, 68kΩ ± 6.8kΩ, 125 ± 12.5kΩ</td>
</tr>
<tr>
<td>Detection accuracy</td>
<td>1 to 100 m: ±1 m</td>
</tr>
<tr>
<td></td>
<td>101 to 400 m: sensor length ±1%</td>
</tr>
<tr>
<td>Surface panel operation switch function</td>
<td>Buzzer stop switch: 1</td>
</tr>
<tr>
<td></td>
<td>Alarm cancel switch: 1</td>
</tr>
<tr>
<td>Surface panel LED indication</td>
<td>Power source indication, green: 1 (lighting up)</td>
</tr>
<tr>
<td></td>
<td>Alarm indication, red: 1 (flashing in the case of water leakage detection) (lighting up in the case of break detection)</td>
</tr>
<tr>
<td></td>
<td>Maintenance indication: 1</td>
</tr>
<tr>
<td>Surface panel LCD indication</td>
<td>Modbus Address: 1 to 127</td>
</tr>
<tr>
<td></td>
<td>Sensor length and water leakage location indication: meter display or feet display</td>
</tr>
<tr>
<td>Surface panel operational setting switch</td>
<td>Used for setting change of indication, control output contacts, detection sensitivity level, etc. For details, refer to Attached Drawing 3.</td>
</tr>
<tr>
<td>Alarm buzzer</td>
<td>Average sound pressure: 90 dB/10 cm (catalogue value by manufacturer)</td>
</tr>
<tr>
<td>Control output contact</td>
<td>Contact Configuration</td>
</tr>
<tr>
<td></td>
<td>◇Contacts (For specifications, refer to Section 11-2.)</td>
</tr>
<tr>
<td></td>
<td>Water leakage: 1 for 1a</td>
</tr>
<tr>
<td></td>
<td>Break: 1 for 1a</td>
</tr>
<tr>
<td></td>
<td>*Setting change of the operation switches shifts to Contact b.</td>
</tr>
<tr>
<td>Water leakage location data output</td>
<td>4-20 mA current loop output (external load resistance: 500Ω max.) x1</td>
</tr>
<tr>
<td></td>
<td>Under normal sensor conditions: 4 mA</td>
</tr>
<tr>
<td></td>
<td>In the case of sensor break detection: 20 mA</td>
</tr>
<tr>
<td></td>
<td>In the case of water leakage detection: 6 + 0.03 x water leakage location indication (m) mA ± 1%</td>
</tr>
<tr>
<td></td>
<td>*Changing operational setting switches changes operation in the case of water leakage detection. (Refer to Attached Drawing 3.)</td>
</tr>
<tr>
<td></td>
<td>In the case of water leakage detection: 16 x water leakage location indication (m) / 250 (m) + 4 mA ± 1%</td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>AC 1500V (50/60 Hz)/ 1 minute (between the power source terminal and the body case)</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>10MΩ min. (With DC 500V Megger)/1 minute (between the power source terminal and the body case)</td>
</tr>
<tr>
<td>Noiseproofing property</td>
<td>± 1000V Pulse width: 1μSEC (noise simulator)/1 minute (between each phase and the grounding terminal)</td>
</tr>
<tr>
<td></td>
<td>Power source: 2 kV, 5 kHz</td>
</tr>
<tr>
<td></td>
<td>Sensor: 1 kV, 5 kHz</td>
</tr>
<tr>
<td></td>
<td>*IEC61000-4-4</td>
</tr>
<tr>
<td>Outside dimensions</td>
<td>(W) 106 x (H) 94 x (D) 57 (unit: mm) (Refer to Attached Drawing 1.)</td>
</tr>
<tr>
<td>Weight and color</td>
<td>Approx. 260 g, gray</td>
</tr>
</tbody>
</table>
Attached Drawing 1

*DIN rail mounting dimensions

* 60

57

Terminal block cover

DIN rail

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

TATSUTA Electric Wire & Cable Co., Ltd.

Revision date
Prepared by
Checked by
Approved by
Reason for revision

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

TATSUTA Electric Wire & Cable Co., Ltd.

Approved by
Checked by
Prepared by
Scalb

mm

Prepared in

2014.12.01

Unit

mm
**LEAKAGE LOCATION DETECTOR**

**Buzzer Stop**  Back
**Reset**

**Leak Point**  AD-AS-1LDMA

**Communication speed terminal setting switch**
*For Modbus communication use*

<table>
<thead>
<tr>
<th>RS485</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

*For maintenance use*  
(Do not use them.)

**Modbus address setting switch**  (No. 1 to 15)

**Operational setting switch**

**Power indicator LED**

**Alarm indicator LED**

**Maintenance indicator LED**

**Alarm cancel switch**

**LCD**
The items to be displayed are as follows:
- Modbus address
- Sensor length
- Water leakage point
- Details of the error

**Connection terminal board (M3)**

**Sensitivity fine adjustment VR**
*This has already been adjusted before shipment. Do not change the setting.*

**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.

*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.

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

**Operational setting**

1. **ON**
2. **OFF**

### No. 1 4-bit DIP switch

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**
   - **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

4. **OFF**
   - **Terminal resistance setting**
     - OFF: not connected; ON: terminal connection

5. **OFF**
   - **Buzzer sounding**

6. **OFF**
   - **Alarm hold for water leakage location indication**
     - OFF: Not available  ON: Available

7. **OFF**
   - **Switching between the meter and the foot indication**
     - OFF: Not available  ON: Available

8. **OFF**
   - **Alarm relay: Contact a/b operation**
     - OFF: Contact a  ON: Contact b

9. **OFF**
   - **Alarm hold for the alarm relay**
     - OFF: Not available  ON: Available

10. **OFF**
    - **Unassigned, fixed at OFF**

11. **OFF**
    - **Operational setting**
      - OFF: Activated  ON: Not activated

12. **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

* 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.
Indication under normal sensor conditions

Modbus address
No.001 SL 400m

Sensor length
AD-AS-1 LDMA
LEAKAGE LOCATION DETECTOR

Indication in the case of break detection

Modbus address
No.001 SL ---m

Sensor length
AD-AS-1 LDMA
LEAKAGE LOCATION DETECTOR

Indication of a break

Indication in the case of water leakage detection

Modbus address
No.001 SL 400m

Sensor length
AD-AS-1 LDMA
LEAKAGE LOCATION DETECTOR

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

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 reset switch. For more information, refer to the next page.

Note that assigning identical addresses to the same communication line causes a communication disturbance.
Method of setting a Modbus Address

Case where the address is set at 16 or greater

Setting steps

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

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

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

4. Using 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.

5. When 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.