Multi-circuit Water Leakage Detector
AD-AS-5DRM
Operation Manual

Tatsuta Electric Wire & Cable Co., Ltd.
Electronics Division
System Department

<<<Important Safety Instructions>>>

⚠ Warning

Erroneous operation of this water leakage detector not complying with the warning labels or the following warnings may not only lead to possible fatality or serious injury, but also fire, electric shock or detector failure.

⚠ Warnings !

⚠ Strictly Prohibited!

□ Never modify or disassemble the detector.

□ Allow only persons responsible for handling this product to perform installation work on it or inspect it with the outer cover opened.

□ Do not touch any internal component with wet hands.

□When performing maintenance on the product, avoid using organic solvent. Use soft cotton wastes such as the gauze to wipe gently.

□After the detector is constructed, do not leave cover open, except for periodic inspection and maintenance purposes.

⚠ Checkpoints!

□ Check detector supply voltage and rated voltage before installing.

□ When installing and electrically connecting the detector, follow the instructions in the instruction manual.

□ When carrying out maintenance and periodic inspection on the detector, follow the instructions in the instruction manual.

□When using control output contacts, check the contact rated load in the instruction manual.

⚠ **Do not install the detector in the following locations!**

□ Locations easily accessible to the general public

□ Locations close to sources of vibration, corrosive gas or strong electromagnetic induction

□ Locations with much waste and dust.

□ Locations where there is possibility of exposure to water, or high temperature and humidity.

Warranty

Before shipping, this product is subject 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 (the division） using the contact information given below.

2. Cases not covered by the warranty

□ After the period of warranty

□ Failures due to incorrect usage, and unauthorized repairs and modifications

□ Failures or damages due to moving, dropping etc. after purchase

□ Failures or damages due to fire and natural disasters

□ Failures not attributable to this product

□ Fees for on-site service (visiting fee and technical fee)

Consultation

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Table of contents

First of all, thank you very much for purchasing the Water Leakage Detector AD-AS-5DRM.
Before using, read this operation manual carefully to ensure correct operation. Keep this manual in a convenient place for quick reference.

1.Installation and Handling Precautions

1-1 Installation

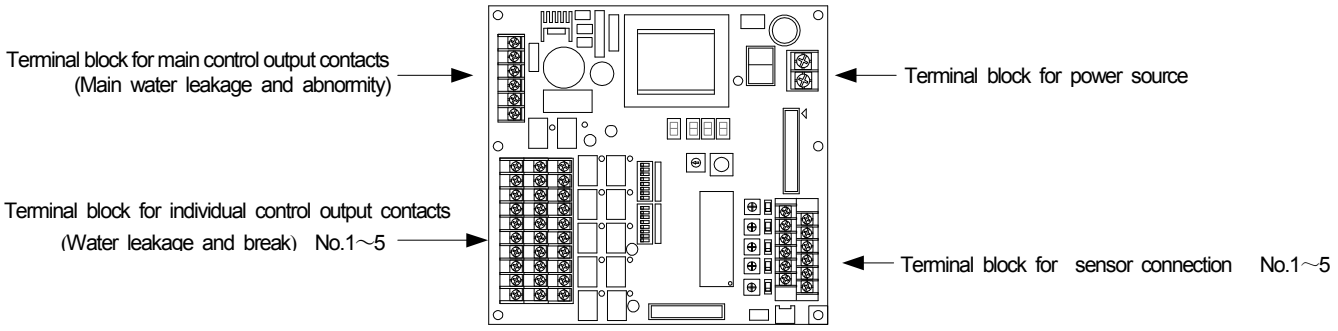
1)Remove the CPU unit from the body case. (Using M3 screw)
In winter, pay special attention to static electricity, and conduct installation by holding the baseboard edge.
2) Drill installation hole and connecting hole on the body case, do not leave cutting power, etc.
3) After the body case is installed in the setting place, install various CPU units removed in 1).
4) Install the terminal block wires and connectors of the CPU units.

1-2 Handling Precautions

1) Use the detector in an environment with a temperature range between -10˚C and 50˚C and a humidity range between 35% and 85%.
2) Do not use the detector in any location close to sources of vibration and harmful gas, and strong electromagnetic inductive power sources, which may lead to malfunction and failure.
3) Avoid using the socket lead as the power source as far as possible, and use fixed wire to connect power source.
4) After installation, be sure to conduct tests in conformance with the operation check items described in Chapter 3.

2.External Connection

Set the terminal blocks as shown in Drawing 1 on CPU unit AD-AS-CPU.

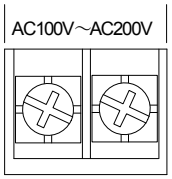


Drawing 1 Layout Drawing of Terminal Block

2-1 Power On

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

＊Inputting a power voltage outside the range of use may cause malfunctions and failure of the detector.



Drawing 2 Terminal Block for Power Source

2-2 Water Leakage Sensor Connection (Refer to Attached Drawing 3)

Connect the water leakage sensor to “S1”-“S5” of the sensor connection terminal block. The sensor has no polarity.

Example: For S1, connect the water leakage sensor to A6 and B6.

*Be sure to install break detection terminal on water leakage sensor.

If it is the point sensor, use break detection terminal built-in product AD-PA-R.

(Precautions)

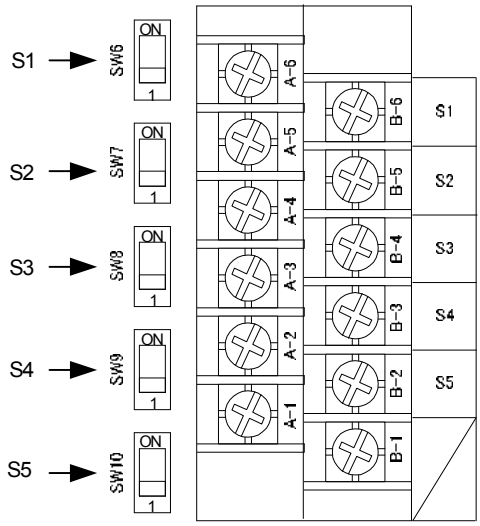
□ When the sensor is not connected, set the DIP switch at the position “ON”.

When not set at the position “ON”, break alarm will be putout.

(Note) Factory setting of DIP switch is at the position “I”.

□ When changing wires, etc., conduct at the status when the detector power source has been cut off.

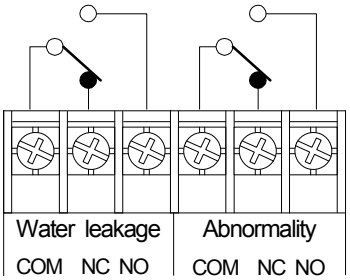
□ A-1 and B-1 are not used. Do not connect water leakage sensor to them.



Drawing 3 Terminal Block for the Sensor

2-3 Main Control Output Contacts Connection (Refer to Attached Drawing 3)

Due to main output of water leakage and abnormalities (contact c), connect when external control is required.



Drawing 4 Terminal Block for Main Control Output Contacts

Water leakage COM-NO: Closed when single-circuit water leakage is detected

COM-NC: Open when single circuit water leakage is detected

Abnormalities COM-NO: Closed when single circuit water leakage or break is detected

COM-NC: Open when single circuit water leakage or break is detected

*Contact operation

Setting SW2 on the CPU unit can enable the alarm hold and fail-safe function to be effective.

* If the fail-safe function is effective, the contact will be operated reversely.

For details, refer to Attached Drawing 5 and the Operation Chart in Chapter 4.

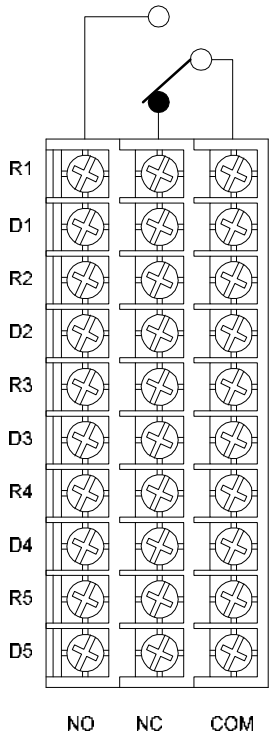
* Abnormal contacts

The operation can be changed as activated only when the break or recovery occurs by setting SW2 on the CPU unit.

For details, refer to Attached Drawing 5.

2-4 Individual Control Output Contact Connection (Refer to Attached Drawing 3)

Due to individual output contacts of water leakage or break (contact c), connect when external control is required.



Drawing 5 Individual Control Output Contacts

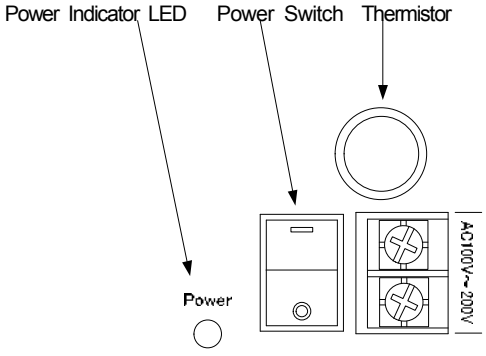
Water leakage (Rn) COM-NO: Closed when water leakage is detected under n circuit
COM-NC: Open when water leakage is detected under n circuit
Break (Dn) COM-NO: Closed when break is detected under n circuit
COM-NC: Open when break is detected n circuit

*Contact operation
Setting SW2 on the CPU unit can enable the alarm hold and fail-safe function to be effective.
*If the fail-safe function is effective, the contact is operated reversely.
For details, refer to Attached Drawing 5 and the Operation Chart in Chapter 4.

3. Operation Check

3-1 Power-On (refer to Attached Drawing 3)

When the power source switch is at -, it is on, when at o, it is OFF.
Set the CPU power source switch at “ON” and check that the power indicator LED on the CPU unit is lighting up.
In the case that the LED does not light up, the detector may be out of order. Power off the detector promptly and contact the manufacturer.



3-2 Check for Break Detection Function (Refer to Attached Drawing 3 and Drawing 3)

1) Check that the DIP switch for the circuit required to be checked has been set at the position “I”.
2) **After powering off the detector**, remove the water leakage sensor from the trunk terminal block and then power on the detector.
3) The buzzer sounds, the break Indicator LED flashes, and individual contacts (break) function.
4) After the operation check, **power off the detector**, and then connect the sensor and the DIP switch again.

*When water leakage sensor circuit is not connected, set the DIP switch at “ON”.
*When water leakage sensor circuit is connected, set the DIP switch at “1”.

3-3 Check for Water Leakage Detection Function (Refer to Attached Drawing 3 and Drawing 3)

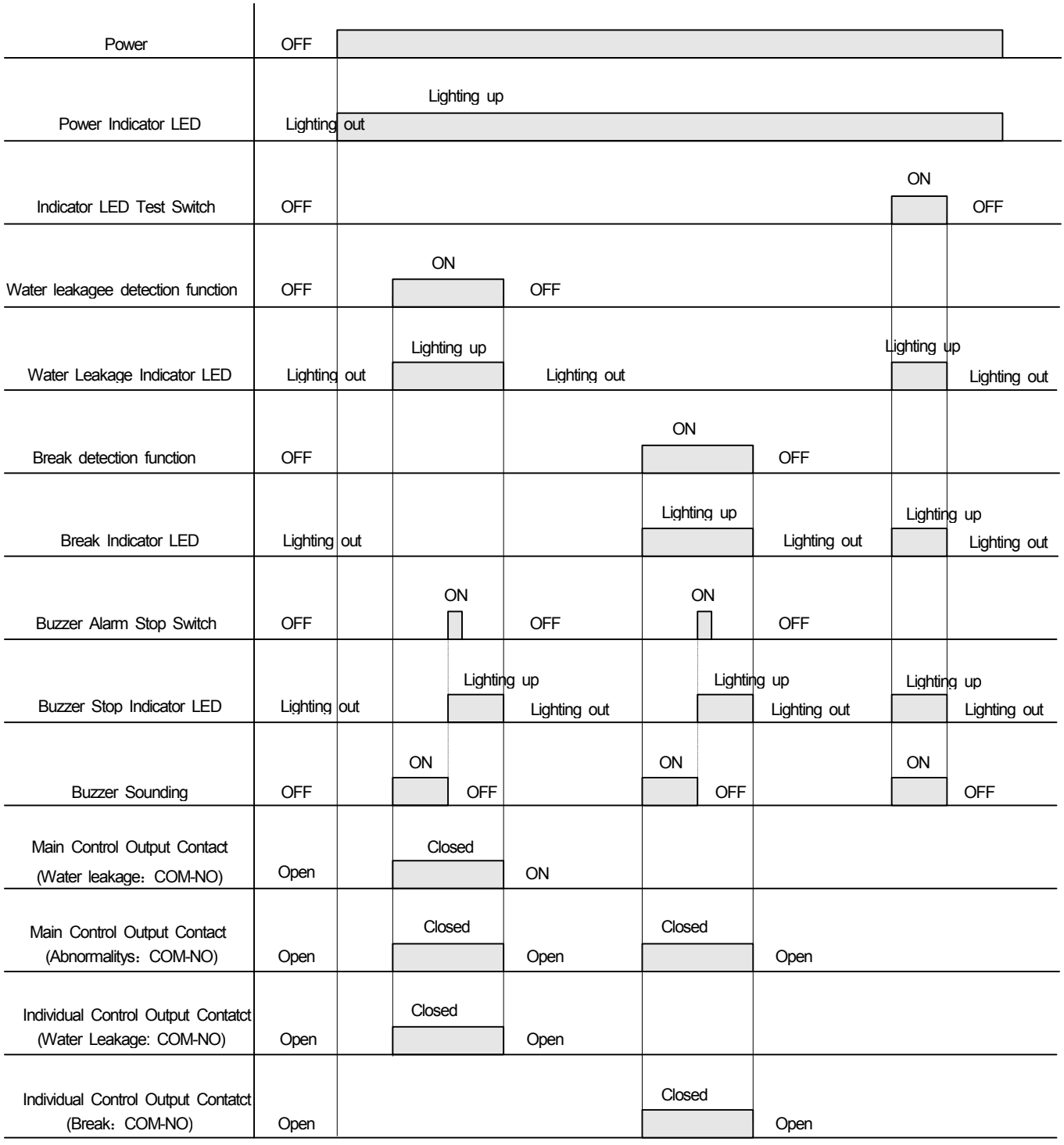
1) Check that the DIP switch for the circuit required to be checked has been set at the position “1”.
2) Drop tap water on the sensor.
3) The buzzer sounds, the water leakage Indicator LED flashes, and individual contacts (water leakage) function.
4) Wipe the tap water dropped on the sensor with dry rags, etc. and check that the water leakage status returns to normal.

4. Operation Chart

4-1 Standard Operation Chart (Factory Setting)

(* Fail-safe and alarm hold are not set)

For the Operation Chart, refer to Drawing 7



Drawing 7 Operation Chart 1

Buzzer Operation

Pressing the buzzer stop switch can prevent the buzzer from sounding.

However, if the same circuit or other circuits give out the alarms again, the buzzer will re-sound.

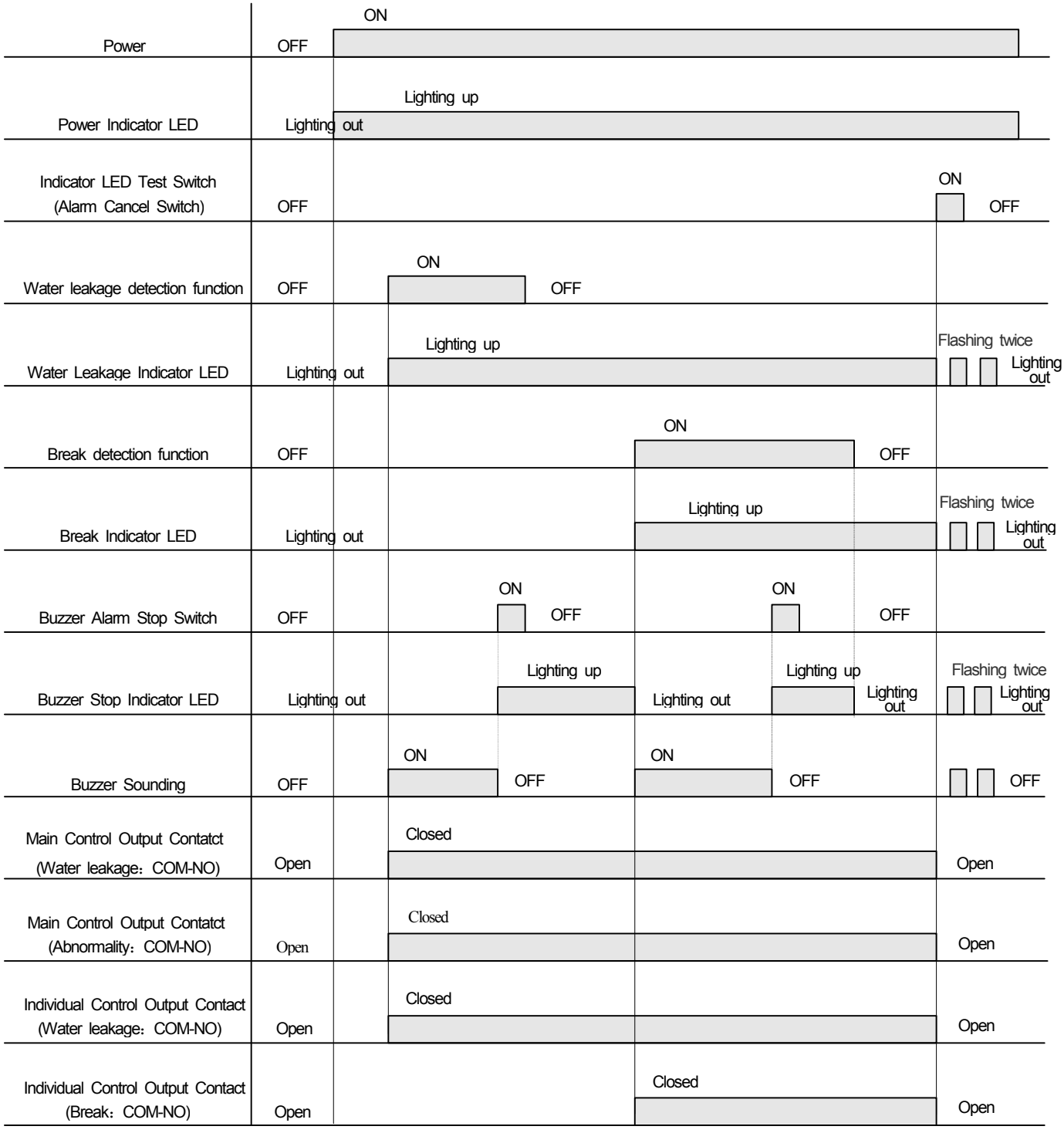
To make the buzzer not alarm, set SW2 and Bit 8 of the CPU unit ON.

Fail-safe function

If the fail-safe function is effective, the output contact is operated reversely.

4-2 Operation Chart When Alarm Hold Setting is Activated

(Water leakage and break indication, main control output contact and individual control output contacts are set for alarm hold) For Operation Chart, refer to Drawing 8



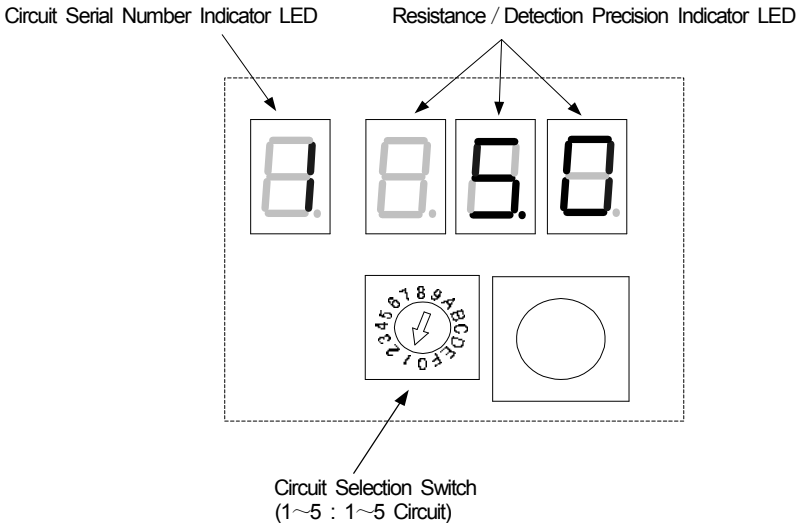
Drawing 8 Operation Chart 2

When alarm holding is activated, the alarm status is held until the indicator LED test switch (alarm cancel switch) is pressed.

Electric power failure or power off, alarm holding is canceled.

* When alarm holding is not set for Switch 1, 2 and 3, refer to Drawing 7 and Operation Chart 1.

5. Adjustment of Water Leakage Detection Precision



Drawing 9 Resistance/ Detection Sensitivity Indication

5-1 Adjustment Method (Refer to Attached Drawing 3, Attached Drawing 4 and Attached Drawing 5)

1) Rotate circuit selection switch to select the circuit required to be adjusted.
2) Set 1 of SW2 on the CPU unit ON to indicate detection precision.
   (Drawing 9 shows that the target detection precision of Circuit 1 has been set to 5.0 kΩ.)
3) Rotate the precision adjustment VR for the circuit required, observe the precision indication while adjusting the value required to be set.Clockwise rotation indicates that the precision is higher, and counterclockwise rotation indicates that the precision is lower.
   The detection precision can be adjusted within the scope 2.0 kΩ～9.0 kΩ±10% by interval. 0.5 kΩ.
4) If the precision adjustment is completed, set 1 of SW2 at CPU unit to be OFF.

The detector of the company has been adjusted to be the standard precision (about 5 kΩ) according to the characteristic of the water leakage sensor (manufactured by our company) when dispatched from the factory. When it is required to change the detection precision, contact our company for confirmation.

6. Buzzer Setting

6-1 Buzzer Volume Setting

Perform volume adjustment through the volume adjustment VR of the display unit. (Refer to Attached Drawing 2)
Clockwise rotation makes the volume to be increased and counterclockwise rotation makes the volume to be decreased.
When dispatched from the factory, the volume has been set as the maximum.

6-2 Buzzer Stop Setting

1) When alarm is given out, buzzer sounding is required to be stopped temporarily
   When alarm is given put, press the buzzer stop switch, the buzzer stops, indicator LED lights up and the buzzer stops temporarily.
   However, if the same circuit or other circuits alarms again, the buzzer stops, the indicator LED lights out and the buzzer sounds again.
   When the alarms from all the circuits recover, the buzzer stops and the indicator LED lights out.
   (Refer to Operation Chart in Chapter 4)

2) When the buzzer is required to be set no sounding often
   Set 8 of SW2 on the CPU to be ON. (Refer to Attached Drawing 5)
   The indicator LED for buzzer stop lights up, and the buzzer is set to be no sounding.

7. Maintenance and Periodic Inspection

- When inspecting the facilities, conduct inspections in conformance with the operation check items described in Chapter 3.

  （Note）During inspection of the detector, the control output contacts are functioning, so if the control output contacts are used, adopt the measures such as underlay 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 a new one.

8. Specifications

8-1. Ratings

For ratings, see Table 1.

Table 1 Ratings

Item	Specification
Rated voltage	AC100-200V (common to 50/60Hz)
Range of fluctuation for supply voltage	±10% of the rated voltage
Power consumption	12VA or less
Control output contacts	*Check Section 8-3, control output contact specification
Applied voltage of sensor	AC5.5V (maximum value)
Working ambient temperature	-10˚C～50˚C (no icing)
Working ambient humidity	35～85%RH (no condensation)

8-2 Performances

For performances, refer to Table 2.

Table 2 Performances

Item	Specification	
Number of sensor circuits	5	
Water leakage detection precision	5kΩ±10% (set within the scope 2-9kΩ± at an interval0.5 kΩ)	
Water leakage recovery precision	(detection precision+2kΩ）±10%	
Break judgment precision	30kΩ±10%	
Operating switch function for surface operation panel	For the buzzer alarm stop purpose	
	For the indication LED test use (alarm cancel)	
Surface operation panel LED indication	Power source indication, red: 1contact （lighting up）	
	Water leakage indication red: 5 contacts (lighting up)	
	Break indication red: 5 contacts (lighting up)	
	Indication during buzzer stop red: 1 contact (lighting up)	
Alarm buzzer	Maximum sound pressure: 70dB / 30 cm (manufacturer product sample value) is adjustable	
Control output contact	Contact configuration	□Main contact (refer to Section 8-3 of Specifications). Water leakage: 1c Abnormality (water leakage or break): 1c □ Individual contact Water leakage: 1c×5 Break: 1c×5
Withstand voltage	AC1500V (50/60Hz) / 1 minute (between the power source terminal and the body case)	
Insulation resistance	10 MΩ or above (with DC 500V Megger)/1 minute (between the power source terminal and the body case)	
Noiseproofng property	±1000V pulse width 1μSEC (noise simulator) / 1 minute (between each phase and the grounding terminal)	
Outside dimensions	(W)300×(H)330×(D)100 （unit: mm Refer to attached drawing 1） * Does not include the raised portions of hinges and handles.	
Weight and color	About 5.2kg , gray (5Y7 / 1 semi-gloss)	

8-3 Control Output Contact Specifications

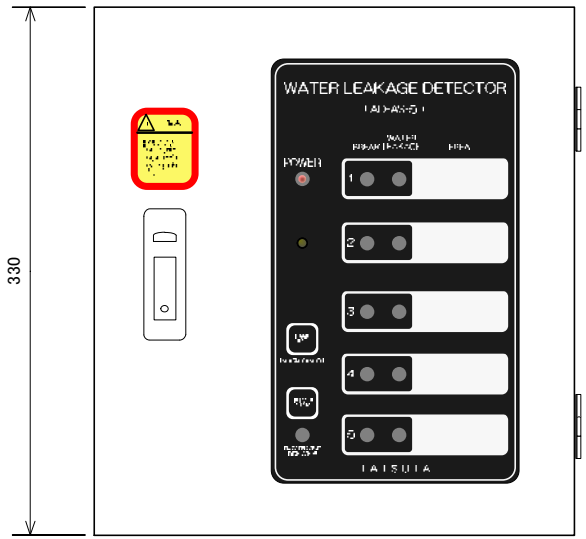
For control output contacts, see Table 3

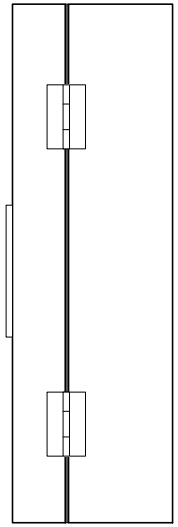
Table 3 Control Output Contact Specifications

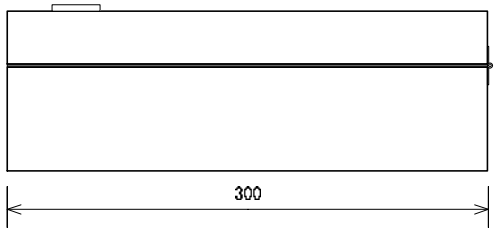
Item	Resistance load	Inductive load
Rated load	AC125V 0.4A DC 30V 2.0A	AC125V 0.2A DC 30V 1.0A
Applicable minimum load	DC10mV 10μA (reference value)	

(Relay contacts: G6E-134P-US Catalogue values by OMRON Corporation)

Attached Drawing 1

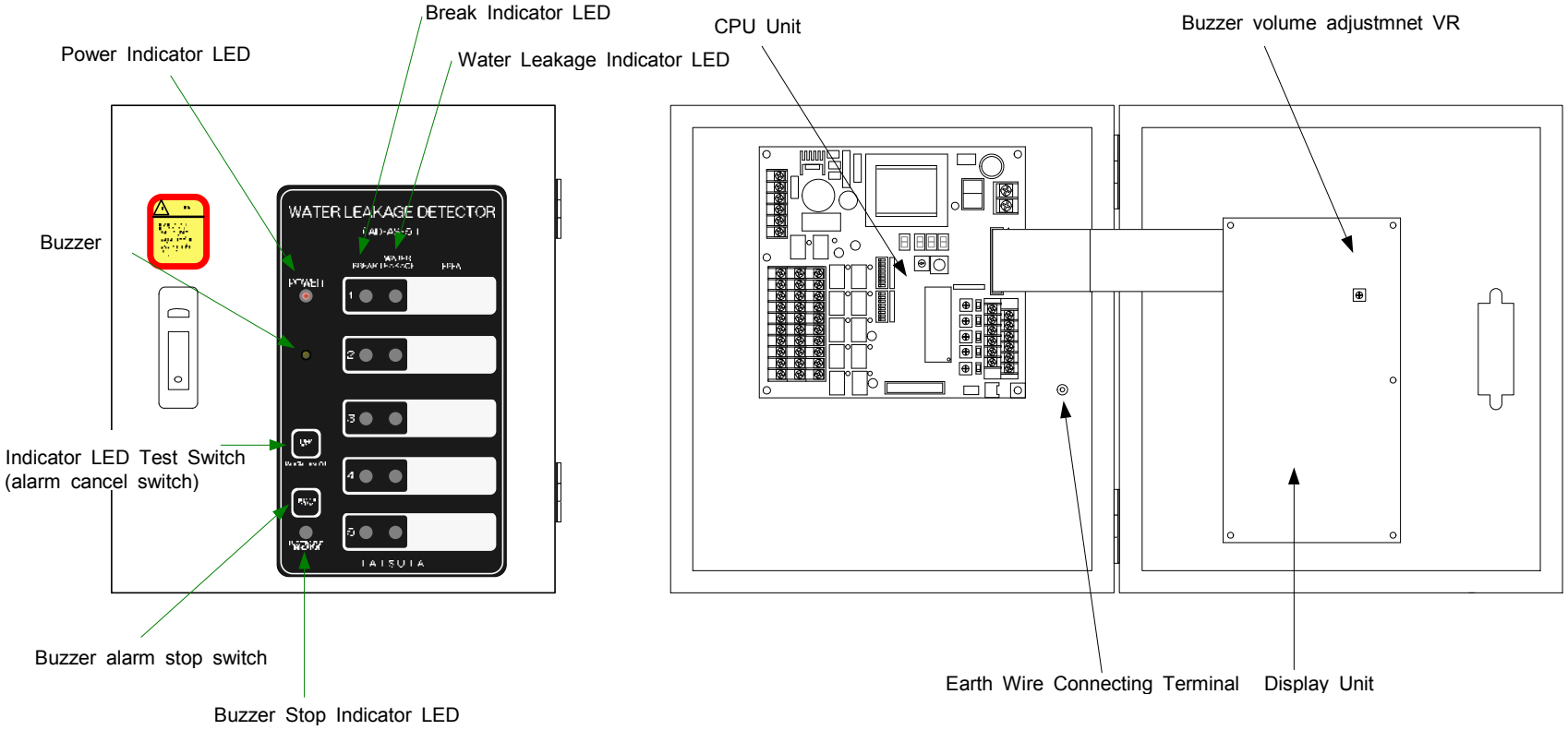






Approved by	Checked by	Prepared by	Scale	−/−	Name	Water Leakage Detector AD-AS-5DRM Outer Dimensions
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3140-2

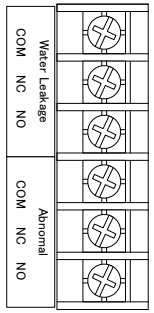
Attached Drawing 2



Approved by	Checked by	Prepared by	Scale	— / —	Name	Water leakage detector AD-AS-5DRM Paarts layout drawing
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3141-2

Attached Drawing 3

Terminal block for main control output contact
(main water leakage and abnormalitiesl)



Power Indocator LED

Power Switch

Thermistor

Terminal block for power source

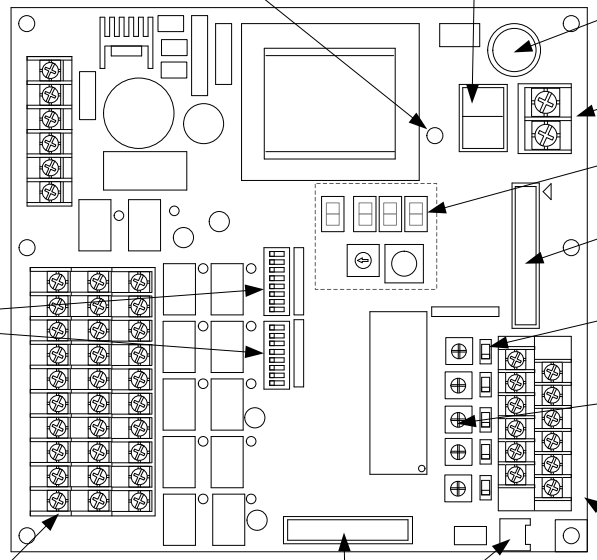
Indication for sensor resistance/detection precision

Indicator unit connector

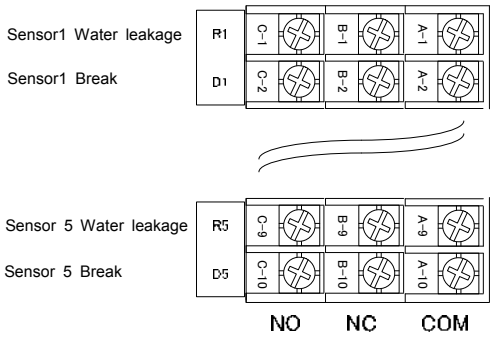
DIP switch for sensor connection/non-conection setting
＊When connected to the sensor, set as OFF
＊When not connected to the sensor, setr as

Detection precision adjustment VR

DIP switch for operational setting
SW2,SW3

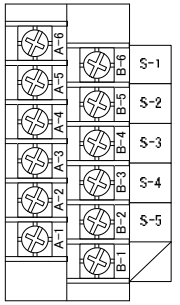


Termianl block for individual control output contacts
(water leakage and break) No.1～5



Connector for expanded unit

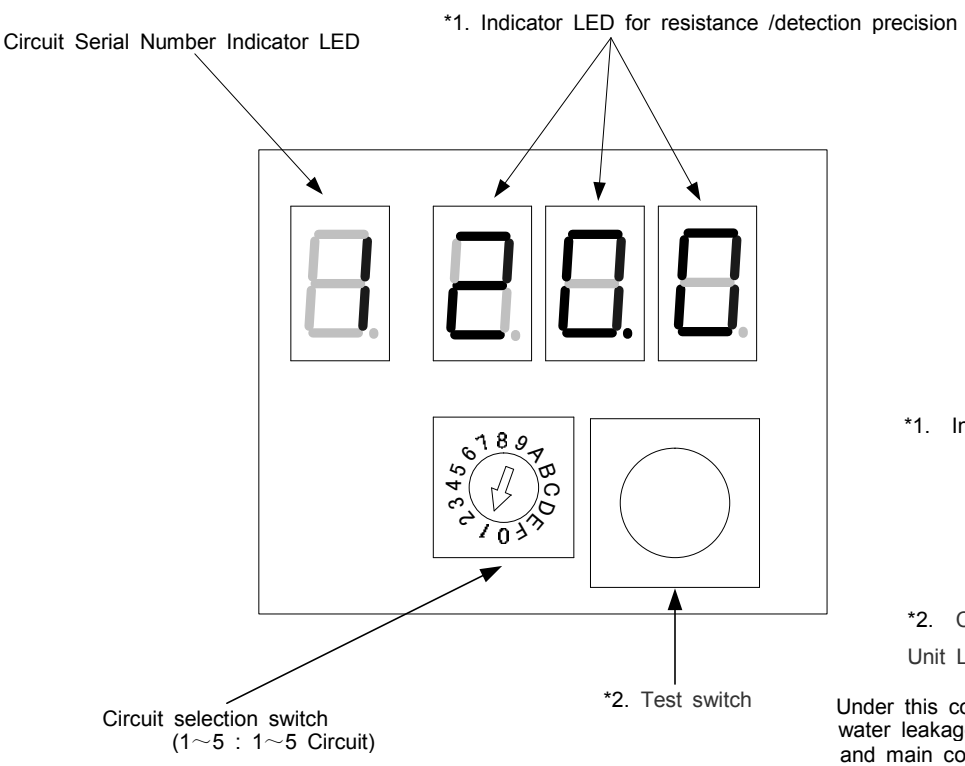
Sensor terminal block No.1～5



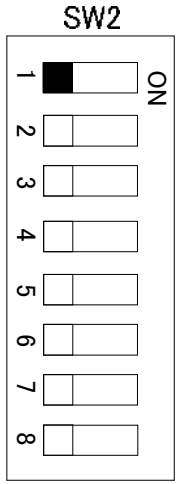
A6-B6 Connect sensor 1
A5-B5 Connect sensor 2
A4-B4 Connect sensor 3
A3-B3 Connect sensor 4
A2-B2 Connect sensor 5
A1-B1 No connection

Approved by	Checked by	Prepared by	Scale	— / —	Name	Parts layout drawing of CPU unit
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3152-3

Attached Drawing 4



Having been set ”0” when dispatched from the factory Circuit No. Indicator LED and Indicator LED for resistance/ detection precision light out



*1. Indicate that the circuit selection switch has selected the circuit information.

SW2 No. 1 of DIP is set

ON ⇒ indicate detection precision

OFF ⇒ indicate sensor resistance

Example: Sensor resistance for Circuit 1 is displayed as 20.0kΩ.

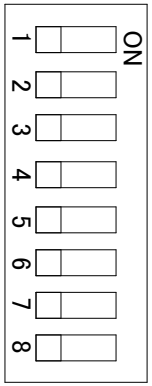
*2. Check the operation of individual control output contacts concerning Indicator Unit LED corresponding to the circuit selected through circuit selection switch.

Under this condition, when pressing the test switch, break indicator LED, water leakage indictor LED, individual control output contact (water leakage and break) and main control output contact (water leakage and break) and main control output contact (water leakage and abnormality) for the No. 1 circuit are activated.

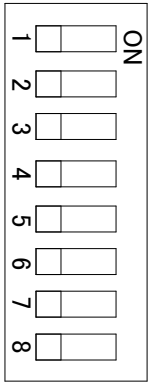
Approved by	Checked by	Prepared by	Scale	— / —	Name	Resistance/ detection precision Operation Instructions
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3143-2

Attached Drawing 5

SW2



SW3



No.	Factory setting	Operation
1	OFF	Switchover of resistance /detection precision OFF : Indicate sensor resistance ON : Indicate detection prec
2	OFF	Main relay alarm holding OFF : Not activated ON : Activated
3	OFF	Individual relay alarm holding OFF : Not activated ON : Activated
4	OFF	Indicator LED alarm holding OFF : Not activated ON : Activated
5	OFF	Fail-safe performance（main relay）*Relay operation under the condition that the sensor is normal OFF : Not activated ON : Activated
6	OFF	Fail-safe performance（individual relay）*Relay operation under the condition that the sensor is normal OFF : Not activated ON : Activated
7	OFF	Operation switchover for abnormal contatcs ON : Abnormal contact operation only in the case of break OFF : Abnormal contact operation when water leakage or break happens
8	OFF	Buzzer setting OFF : Activated ON : Not activated

*If SW2 is changed, changing setting of switches allows operations such as indication and relay.
Inadvertent setting change may result in unintended operations, so care should be taken.

*SW3 is the factory setting, do not change.
(For AD-AS-5DRM, please set OFF)

Approved by	Checked b	Prepared by	Scale	– / –	Name	Operation switchover DIP Switc Instruction AD-AS-5DRM
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire &Cable Co., Ltd.					Drawing No.	TTS-KS-W3144-3