

Multi-circuit Water Leakage Detector  
AD-AS-10DRM  
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 failure.

## Warnings!

### Strictly prohibited!

- Never modify or disassemble the detector.
- The unqualified persons are forbidden to carry out the installation and the internal inspection and spot check.
- Do not touch any internal component of the detector 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 installed, do not leave the cover open, except for the periodic inspection and maintenance.

### Checkpoints!

- Check detector supply voltage and rated voltage before installing.
- 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, corrosive 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

- 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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First of all, thank you very much for purchasing the Water Leakage Detector AD-AS-10DRM.  
 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

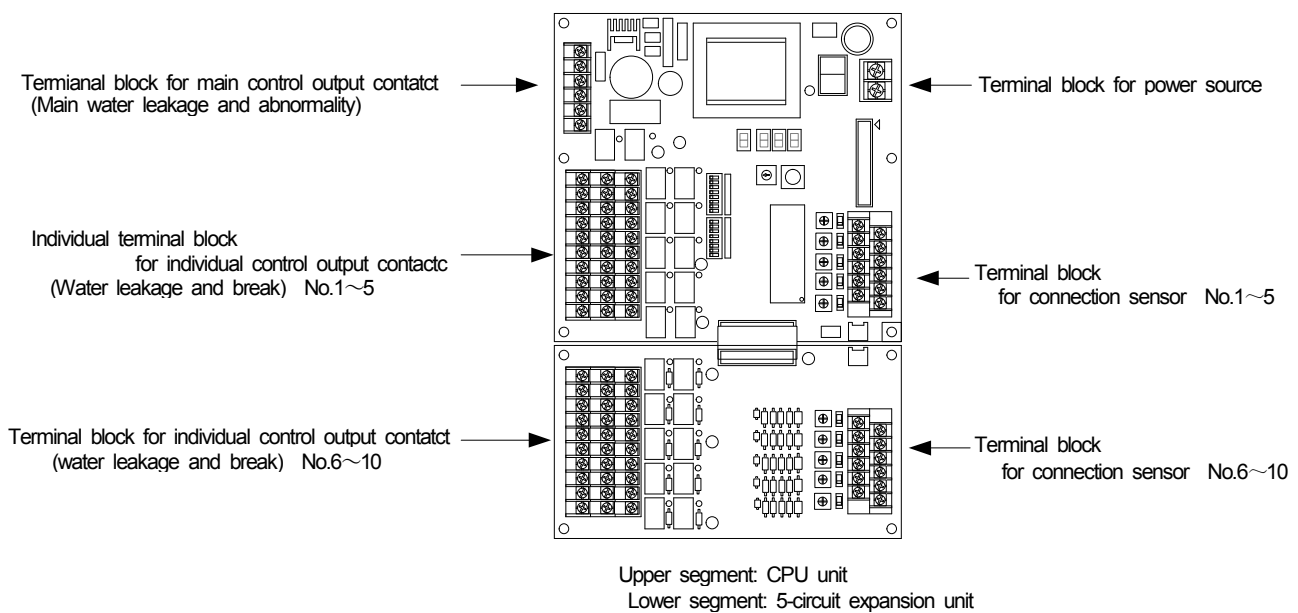
- 1) Remove CPU unit and 5-circuit expansion unit from the body case. (Use M3 screw)  
 In winter, pay special attention to static electricity and install by holding board edge.
- 2) Drill installation hole and connecting hole on the body case, do not leave cutting power, etc.
- 3) After the body case is installed in the setting place, install various units removed in 1).
- 4) Install the terminal block wires and connectors on the CPU unit and 5-circuit expansion unit.

### 1-2 Handling Precautions

- 1) Use the detector in an environment with a temperature range between  $-10^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ , 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

To form CPU unit AD-AS-CPU and 5-circuit expansion unit AD-AS-UNIT, set the terminal block as shown in Drawing 1.

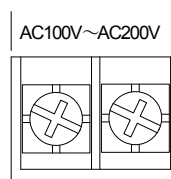


Drawing 1 Layout Drawing for Terminal Block

### 2-1 Power Connection

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, so care should be taken.



Drawing 2. Terminal Block for Power Supply

## 2-2 Water Leakage Sensor Connection (Refer to Attached Drawing 3 and Attached Drawing 4)

Connect the water leakage sensor to the "S1"-"S10" of the sensor connection terminal block. The sensor has no polarity.

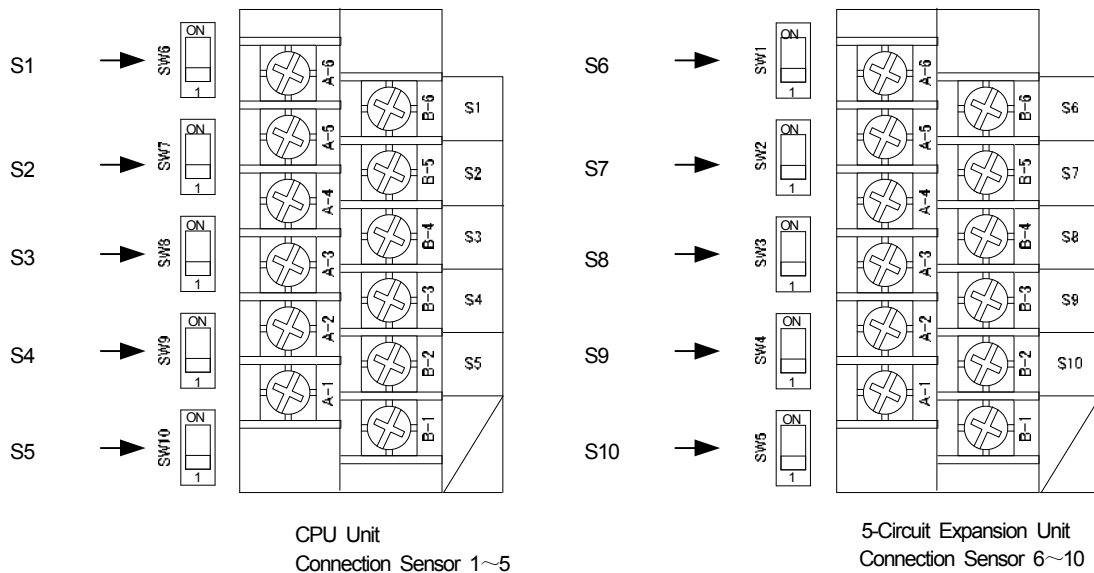
Example: For S1, connect the water leakage sensor to A-6 and B6.

\*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)

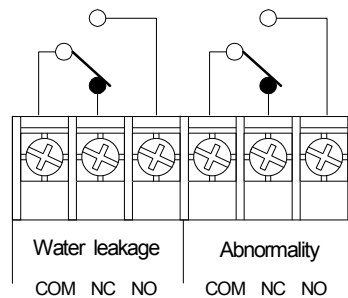
- When sensor is not connected, set the DIP switch at the position "ON". When not set "ON", break alarm will be output. (Note) DIP switch dispatched by the factory has been set at the position "1".
- When conducting wire change, etc., conduct it under the condition that the detector power source has been cut off.
- A-1 and B-1 are not used Do not connect water leakage sensor.



Drawing 3 Terminal Block for Sensor

## 2-3 Connection of Main Control Output Contact (Refer to Attached Drawing 3)

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



Drawing 4 Main Control Output Contact

Water leakage contacts	COM-NO: Closed when single-circuit water leakage is detected
	COM-NC: Open when single-circuit water leakage is detected
Abnormality	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 CPU unit can enable the alarm hold and the fail-safe function to be effective.

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

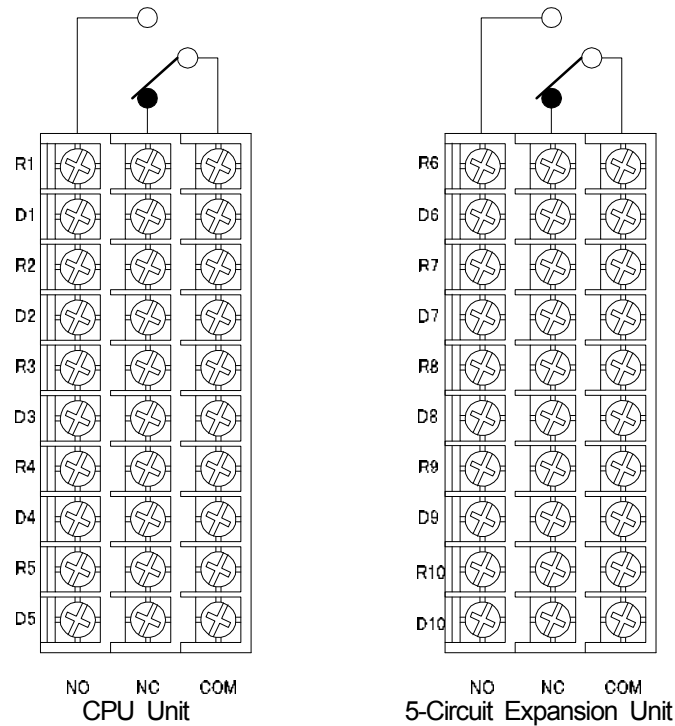
For details, refer to Attached Drawing 6 and the Operation Chart of Chapter 4.

\*Abnormal contact

Setting SW2 on CPU unit, the operation can be changed as activated only when the break and recovery occur.

For details, refer to Attached Drawing 6.

2-4 Connection of Individual Control Output Contact (Refer to Attached Drawing 3 and Attached Drawing 4)  
 Due to individual output of water leakage and 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 under n circuit

\*Contact operation

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

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

For details, refer to Attached Drawing 6 and the Operation Chart of Chapter 4.

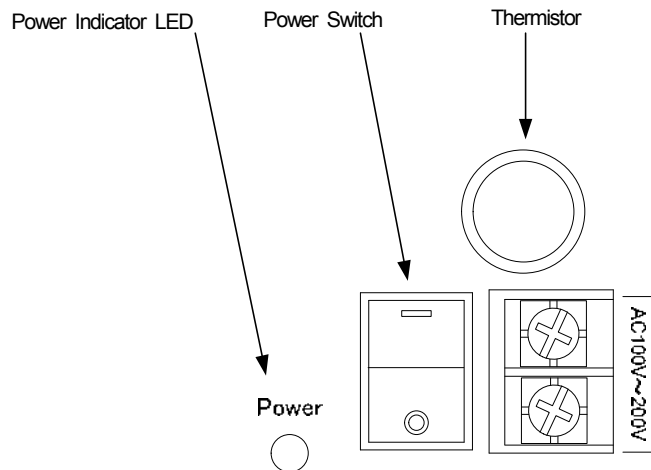
### 3. Operation Check

#### 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 unit power source switch "ON" and check that the power source indication 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.



Drawing 6 Power Switch

3-2 Check for Break Detection Function (Refer to Attached Drawing 3, Attached Drawing 4 and Drawing 3)

- 1) Check that the DIP switch for the circuit required to be checked has been set at "1".
- 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, Attached Drawing 4 and Drawing 3)

- 1) Check that the DIP switch for the circuit required to be checked has been set at "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

(\* No setting of failure safety and alarm hold)

For Operation Chart, refer to Drawing 7

Power	OFF				
Power Indicator LED	Lighting out				
Indicator LED Test Switch	OFF			ON	OFF
Water leakage detection function	OFF	ON	OFF		
Water leakage indicator LED	Lighting out	Lighting up	Lighting out	Lighting up	Lighting out
Break detection function	OFF		ON	OFF	
Break indicator LED	Lighting out		Lighting up	Lighting out	Lighting up
Buzzer Alarm Stop Switch	OFF	ON	OFF	ON	OFF
Buzzer stop indicator LED	Lighting out	Lighting up	Lighting out	Lighting up	Lighting out
Buzzer sounding	OFF	ON	OFF	ON	OFF
Total control output contact (water leakage: COM-NO)	Open	Closed	Open		
Total control output contact (Abnormal: COM-NO)	Open	Closed	Open	Closed	Open
Individual control output contact (Water leakage: COM-NO)	Open	Closed	Open		
Individual control output contact (Break: COM-NO)	Open			Closed	Open

Drawing 7 Operation Chart 1

#### Buzzer Operation

Press the buzzer stop switch and the buzzer stops.

However, if the same circuit or other circuits give 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 failure safety function is effective, the output contact will be operated reversely.



#### 4-2 Operation Chart When Alarm Hold Setting is Activated

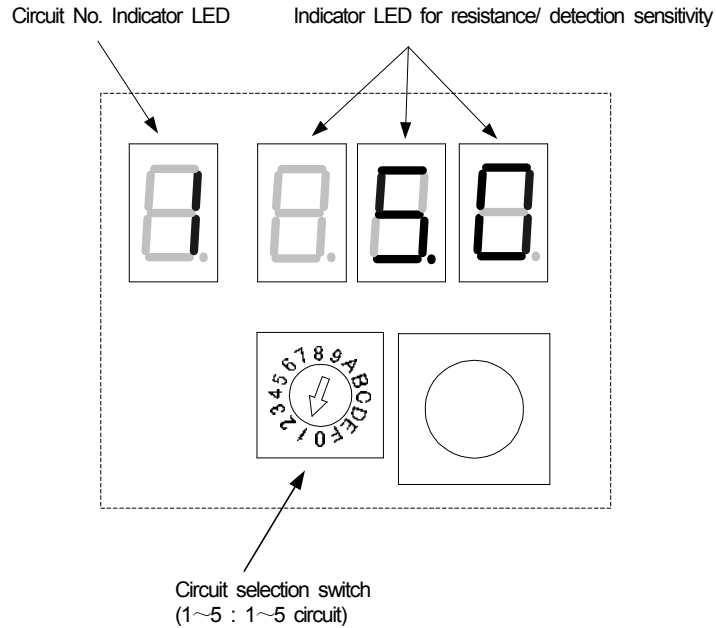
(Water leakage, break indication, main control output contact and individual control output contacts are set to be alarm hold) For Operation Chart, refer to Drawing 8

Power	OFF	ON		
Power Indicator LED	Lighting out	Lighting up		
Indication LED test switch (alarm cancel switch)	OFF		ON	OFF
Water leakage detection function	OFF	ON	OFF	
Water Leakage Indicator LED	Lighting out	Lighting up		Flashing twice Lighting out
Break detection function	OFF		ON	OFF
Break Indicator LED	Lighting out	Lighting up		Flashing twice Lighting out
Buzzer alarm stop switch	OFF	ON	OFF	ON
Buzzer Stop Indicator LED	Lighting out	Lighting up	Lighting out	Lighting up Lighting out
Buzzer sounding	OFF	ON	OFF	ON
Main control output contact (water leakage: COM-NO)	Open	Closed		Open
Main control output contact (Abnormal: COM-NO)	Open	Closed		Open
Individual control output contact (water leakage: COM-NO)	Open	Closed		Open
Individual control output contact (break: COM-NO)	Open	Closed		Open

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 hold 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, Attached Drawing 5 and Attached Drawing 6)

- 1) Rotate circuit selection switch to select the circuit required to be adjusted.
- 2) Set the 1 of SW2 on the CPU unit ON to indicate detection sensitivity.  
(Drawing 9 shows that the target detection precision of Circuit 1 has been set 5.0 kΩ.)
- 3) Rotate the precision adjustment VR of the required circuit, 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 the interval 0.5 kΩ.
- 4) If the precision adjustment is completed, set the 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 the detection precision is required to be changed, contact with our company for confirmation.

## 6. Buzzer Setting

### 6-1 Buzzer Volume Setting

Perform volume adjustment through the volume adjustment VR of the indicator unit.

When rotating clockwise, the volume is increased and when rotating counterclockwise, the volume is decreased.  
When dispatched from the factory, the volume has been set as the maximum.

### 6-2 Buzzer Stop Setting

- 1) Applicable to the occasion when alarming, buzzer sounding is required not to be activated temporarily  
When alarming 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 indicator LED for buzzer stops lights out.  
(Refer to Operation Chart in Chapter 4)
- 2) When the buzzer sounding is required not to be activated often  
Set 8 of SW2 of the CPU to be ON.(Refer to Attached Drawing 5)  
When the indicator LED for buzzer stop lights up, the buzzer sounding is set to be not activated..

## 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	20VA or less
Control output contacts	*Check Section 8-3, control output contact specifications
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	10
Water leakage detection precision	5kΩ±10% (set at the range of 2 - 9 kΩ± by interval 0.5 kΩ)
Precision in the case of recovery from water leakage	(detection precision+2kΩ) ±10%
Break judgment precision	30kΩ±10%
Surface operation panel operation switch performance	For the buzzer alarm stop purpose
	For the indicator LED test use (alarm cancel)
Surface operation panel LED indication	Power indication, red: 1 (lighting up)
	Water leakage indication red: 10 (lighting up)
	Break indication red: 10 (lighting up)
	Indication during buzzer stop red: 1 (lighting up)
Alarm buzzer	Maximum sound pressure: 70dB / 30 cm (Catalogue value by manufacturer), adjustable
Control output contact configuration	<input type="checkbox"/> Main contact (refer to Specification 8-3 ). Water leakage: 1c Abnormalities (water leakage or break): 1c <input type="checkbox"/> Individual contact Water leakage: 1c×10 contacts Break: 1c×10 contacts
Withstand voltage	AC1500V ( 50/60Hz ) / 1 minute (between power supply terminal and the body case)
Insulation resistance	10 kΩ or above (DC500V Megger ) / 1 minute (between power supply terminal and the body case)
Noiseproofing property	?1000V pulse width: 1μSEC (noise simulator ) / 1 minute (between each phase and the grounding terminal)
Outside dimensions	(W) 300 x (H) 330 x (D) 100 (unit: mm) (Refer to Attached Drawing 1) * Excluding the raised parts of hinges and handles.
Weight and color	Approx. 5.5kg, gray ( 5Y7/1 semi-gloss)

### 8-3 Control output contact specifications

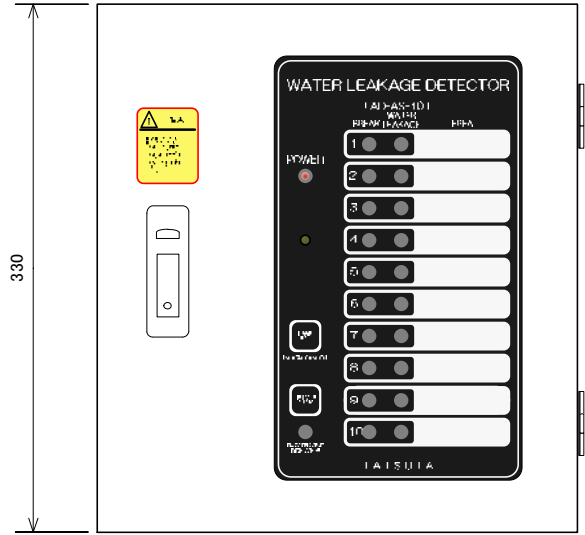
For control output contacts, see Table 3

Table 3 Control Output Contact Specifications

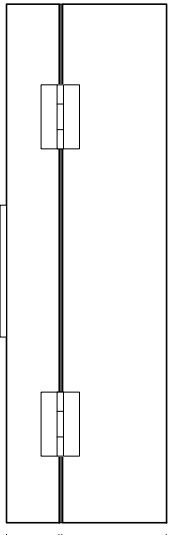
Item	Resistance load	Inductive load
Rated load	AC125V 0.4 A	AC125V 0.2A
	DC 30V 2.0 A	DC 30V 1.0A
Minimum applied load	DC10mV 10μA (reference value)	

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

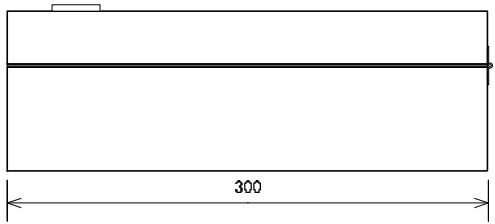
Attached Drawing 1



330



33 65 100

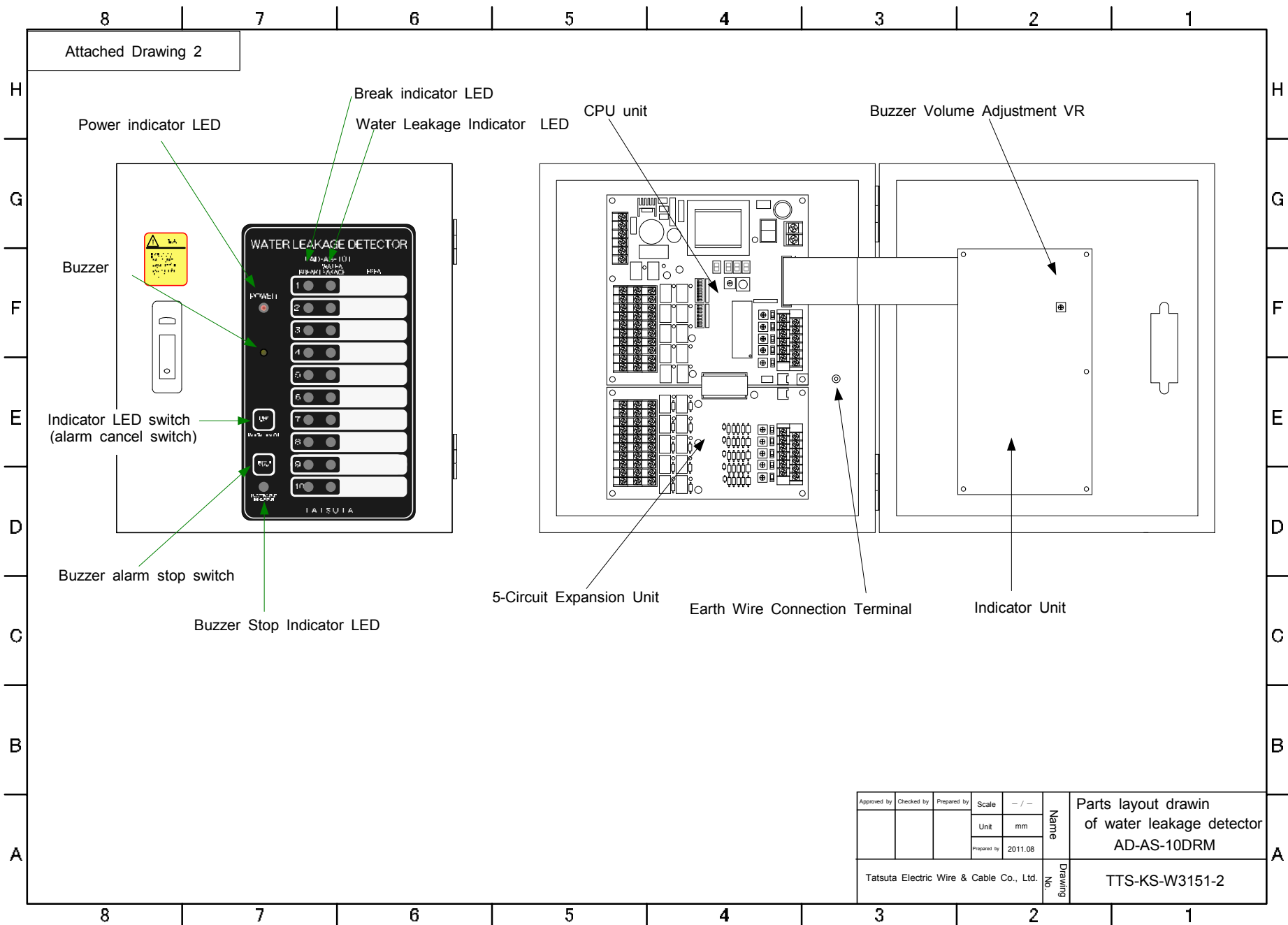


300

Approved by	Checked by	Prepared by	Scale	- / -	Name
			Unit	mm	
			Prepared on	2011.08	
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.

Outer dimension drawing  
of water leakage detector  
AD-AS-10DRM

TTS-KS-W3150-2



Attached Drawing 2

Power indicator LED

Break indicator LED

Water Leakage Indicator LED

CPU unit

Buzzer Volume Adjustment VR

Buzzer

Indicator LED switch  
(alarm cancel switch)

Buzzer alarm stop switch

Buzzer Stop Indicator LED

5-Circuit Expansion Unit

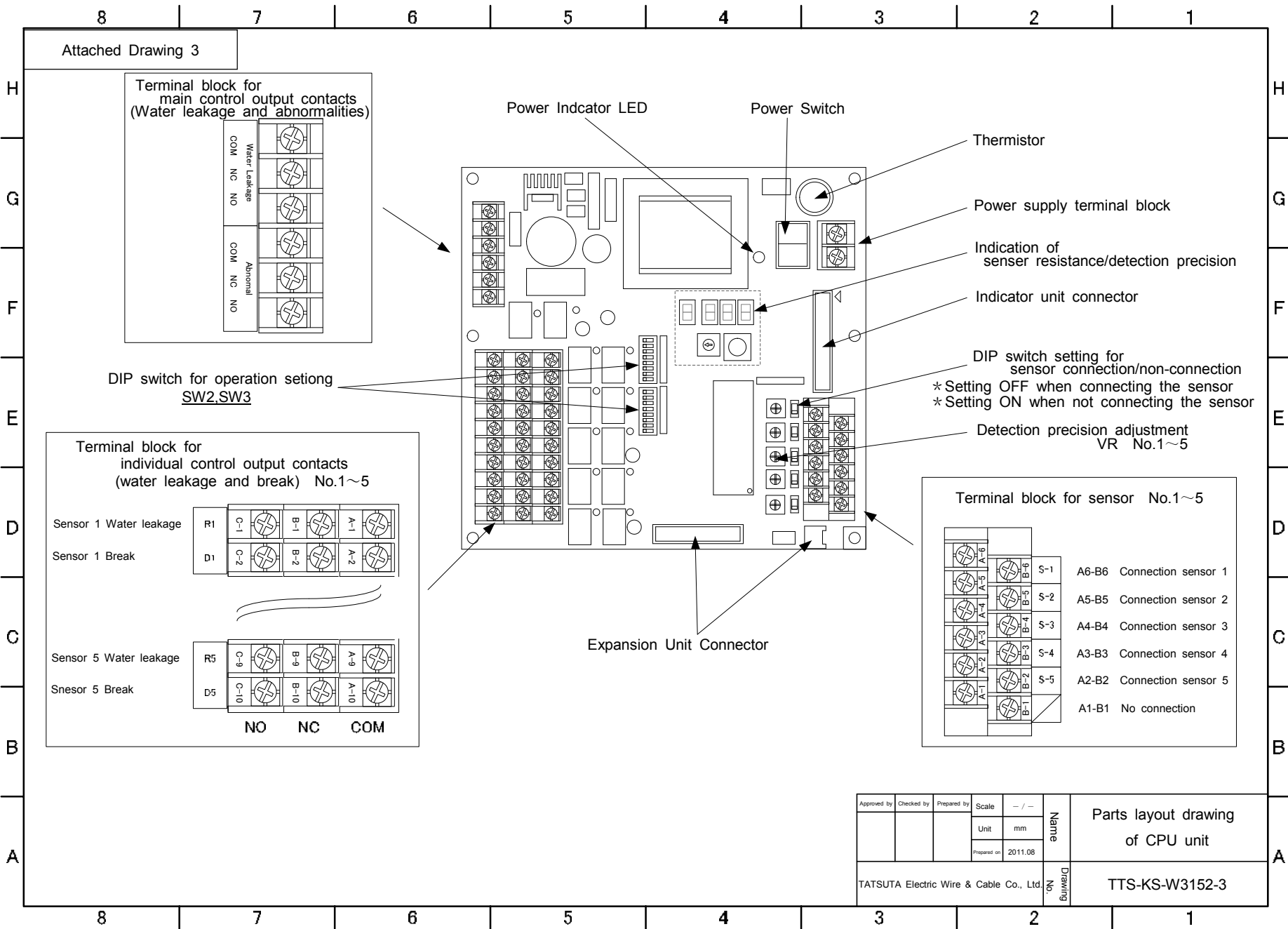
Earth Wire Connection Terminal

Indicator Unit

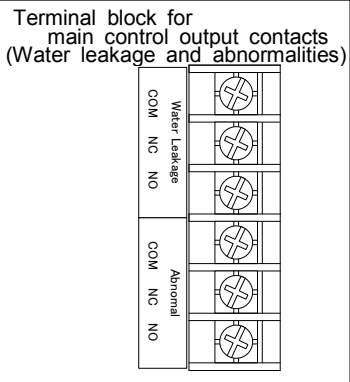
Approved by	Checked by	Prepared by	Scale	- / -	Name
			Unit	mm	
			Prepared by	2011.08	Drawing No.
Tatsuta Electric Wire & Cable Co., Ltd.					

Parts layout drawin  
of water leakage detector  
AD-AS-10DRM

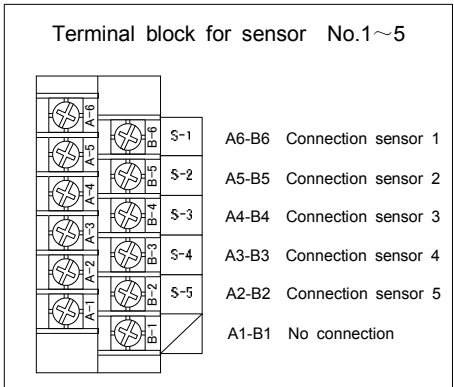
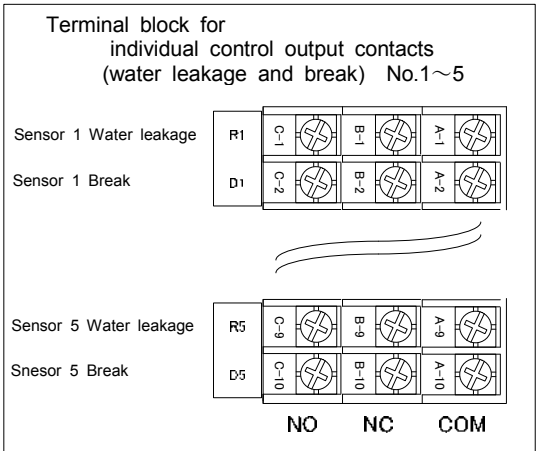
TTS-KS-W3151-2



Attached Drawing 3



DIP switch for operation setting SW2, SW3



Approved by	Checked by	Prepared by	Scale	- / -	Name
			Unit	mm	
			Prepared on	2011.08	
TATSUTA Electric Wire & Cable Co., Ltd.					Drawing No.

Parts layout drawing of CPU unit  
TTS-KS-W3152-3

8 7 6 5 4 3 2 1

Attached Drawing 3

H H

G G

F F

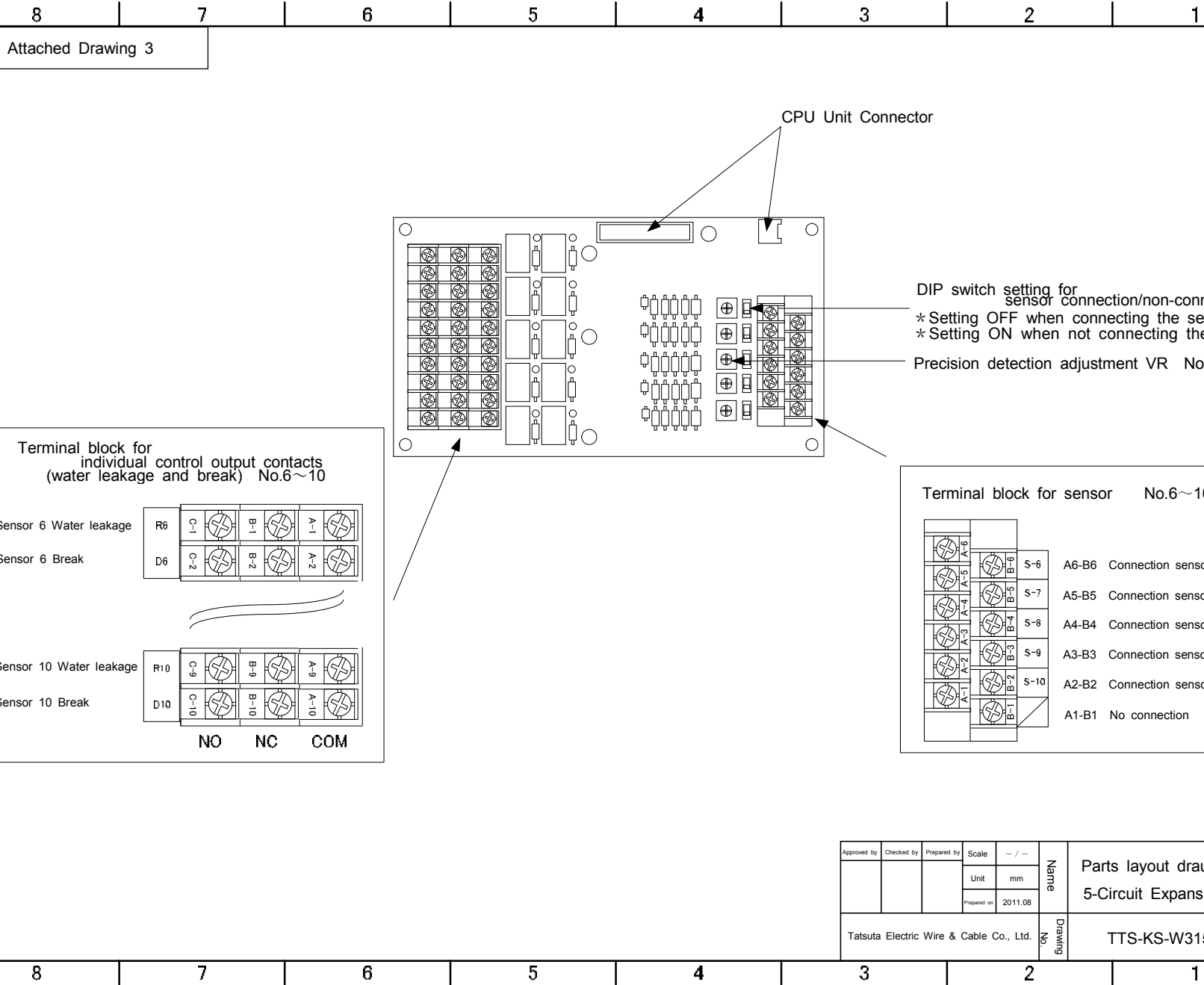
E E

D D

C C

B B

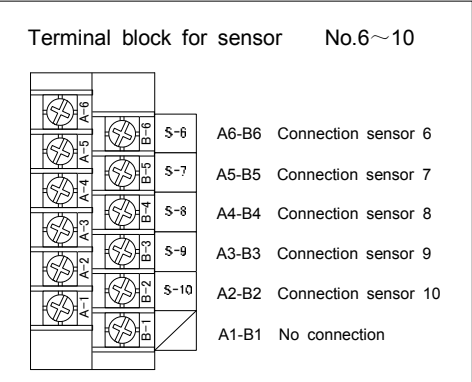
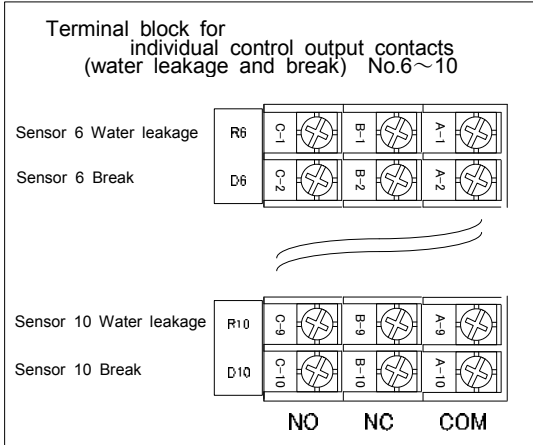
A A



CPU Unit Connector

DIP switch setting for sensor connection/non-connection  
 \* Setting OFF when connecting the sensor  
 \* Setting ON when not connecting the sens

Precision detection adjustment VR No.6~10



Approved by	Checked by	Prepared by	Scale	- / -	Name	Parts layout drawing of 5-Circuit Expansion Unit
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3153-2

8 7 6 5 4 3 2 1



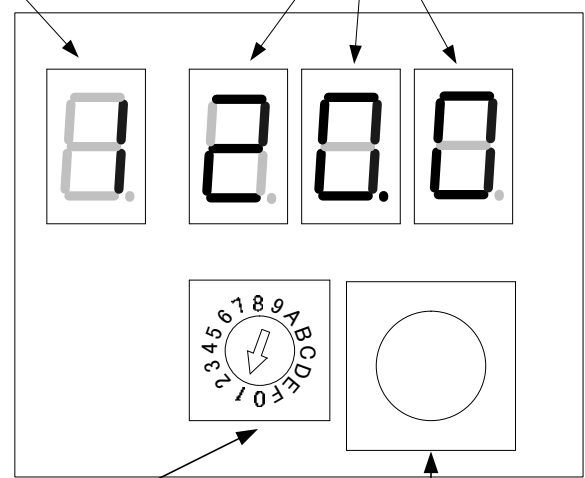
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

Attached Drawing 5

H  
G  
F  
E  
D  
C  
B  
A

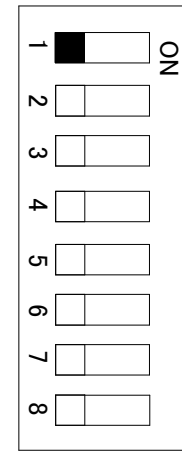
Circuit No. Indicator LED

\*1. Indicator LED for resistance/ detection precisio



Circuit Selection Switch  
(1~A : 1~10 Circuit)  
Has been set "0" when dispatched from the factory, circuit No. Indicator  
Indicator LED for resistance / detection sensitivity lights out

SW2



\*1. Indicate that the circuit selection switch has selected the circuit information.  
SW2 No. 1 of DIP is set  
ON ⇒ indicate detection sensitivity  
OFF ⇒ indicate sensor resistance  
E.g. Sensor resistance for No. 1 circuit is indicated 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 indicator LED, individual 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
			Unit	mm	
			Prepared on	2011.08	
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.

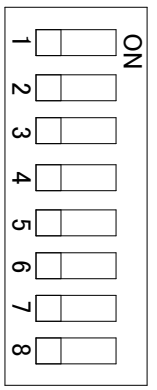
Instructions to resistance/  
detection precision  
operation  
  
TTS-KS-W3154-2

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

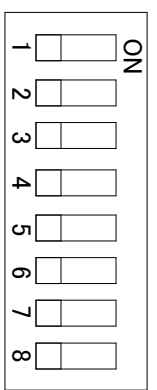
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

Attached Drawing 6

SW2



SW3



No.	Factory setting	Operation
1	OFF	Resistance / detection sensitivity switchover OFF : Indicate the resistance of the sensor ON : Indicate detection sensitivity
2	OFF	Main relay alarm hold OFF : Not activated ON : Activated
3	OFF	Individual relay alarm hold OFF : Not activated ON : Activated
4	OFF	Indicator LED alarm hold OFF : Not activated ON : Activated
5	OFF	Fail- safe performance (main relay) *relav operation when the sensor is normal. OFF : Not activated ON : Activated
6	OFF	Failure safe performance (individual relay) *relav operation when the sensor is normal. OFF : Not activated ON : Activated
7	OFF	Abnormal contact operation switchover OFF : Abnormal contact operation when water leakage and break occur ON : Abnormal contact operation only when break occurs
8	OFF	Buzzer operation setting OFF : Activated ON : Not activated



\*Changing setting of SW2, allows operations such as indication and rela  
Inadvertent setting change may result in unintended operations, so care should be taken.

\*SW3 is the setting dispatched from the factory, do not change.  
(For AD-AS-10DRM, please set OFF)

H  
G  
F  
E  
D  
C  
B  
A

H  
G  
F  
E  
D  
C  
B  
A

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

Approved by	Checked by	Prepared by	Scale	- / -	Name	Instructions to operation switchover DIP switch AD-AS-10DRM
			Unit	mm		
			Prepared on	2011.08		
Tatsuta Electric Wire & Cable Co., Ltd.					Drawing No.	TTS-KS-W3155-3