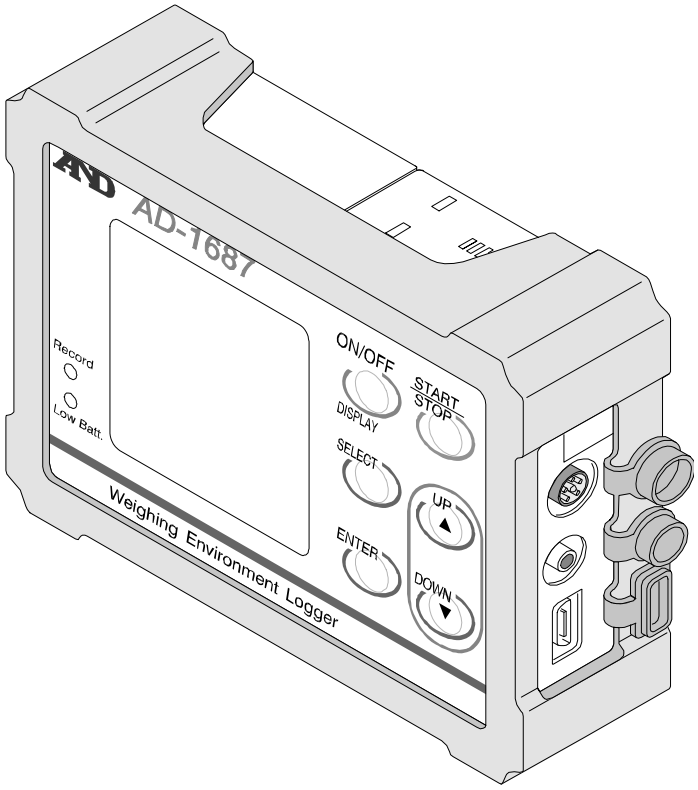
AD-1687

Environment Logger

Instruction Manual



A&D Company, Limited

1WMPD4002436D

WARNING DEFINITIONS

The warnings described in this manual have the following meanings:

⚠ **Caution** A potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the instrument.

Note Information or cautions to use the device correctly.

This manual is subject to change without any prior notice to improve the product. No part of this manual may be photocopied, reproduced, or translated into another language without the prior written consent of the A&D Company, Limited.

Product specifications are subject to change without any obligation on the part of the manufacturer.

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1. Compliance

Compliance with FCC Rules

Please note that this device generates, uses and can radiate radio frequency energy. This device has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when this device is operated in a commercial environment. If this unit is operated in a residential area, it may cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.
(FCC = Federal Communications Commission in the U.S.A.)

Compliance With EMC Directives of CE mark

CE This device features radio interference suppression, safety regulation and restriction of Hazardous Substances in compliance with the following Council Directives

Council directive	2004/108/EC
	EN61326
	EMC directive
Council directive	2011/65/EU
	EN50581
	Restriction of the use of certain Hazardous Substances

The CE mark is an official mandatory European marking. Please note that any electronic product must comply with local laws and regulations when sold or used anywhere outside Europe.

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CE

A & D Instruments Ltd. hereby declare that the following Weighing product conforms to the requirements of the council directives on …

Electromagnetic Compatibility (EMC) 2004/108/EC,
Low Voltage Equipment (LVD) 2006/95/EC amended by 93/68/EEC and
Restriction of the use of certain Hazardous Substances (RoHS) 2011/65/EU

provided that they bear the CE mark of conformity.

Model/Series....MPA Series

Standards applicable:

EN61326-1:2013
Electrical equipment for measurement, control and laboratory use -EMC requirements Part 1: General requirements

EN-61010-1:2010
Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

EN-61010-2-101:2002
Safety requirements for electrical equipment for measurement, control and laboratory use. Particular requirements for in vitro diagnostic (IVD) medical equipment

EN-50581:2012
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

CE Mark first applied 30th May 2014
Signed for A&D Instruments in Oxford England 18th June 2014

P. Argus
Managing Director

2. Introduction

This manual describes how the AD-1687 works and how to maximize performance. Please read this manual completely before using the AD-1687.
This device conforms to FCC rules and CE mark EMC directives.

2.1.Features

- The AD-1687 is a data logger equipped with 4 sensors: temperature, humidity, barometric pressure and vibration.
- By connecting the output of the AD-1687 to the RS-232C of the insutrument, it is possible to record weighing data and environmental data sets.
- Data can be saved without a computer.
- The AD-1687 has a built-in clock. This allows the date and time to be stored along with the data.
- A maximum of 10,000 data can be stored.
- The environmental data is stored in CSV format and can easily be used by software such as spreadsheet applications.
- The stored data can be read by a computer after the AD-1687 is recognized as USB memory so no special software is required.
- The AD-1687 can transmit data to programs in the computer (Ex: Excel, etc) using the USB interface. (Real time transmission mode)
- When connecting any combination of weighing instrument or computers, the power is supplied for the AD-1687 by them. In this case, AD-1687 batteries are not used.
- An External temperature sensor is available to connect as an option. When it is connected, the second temperature (T2) is displayed and the results can be stored.

2.2.Caution During Use

When operating this instrument, be sure to observe the following.

⚠ Caution

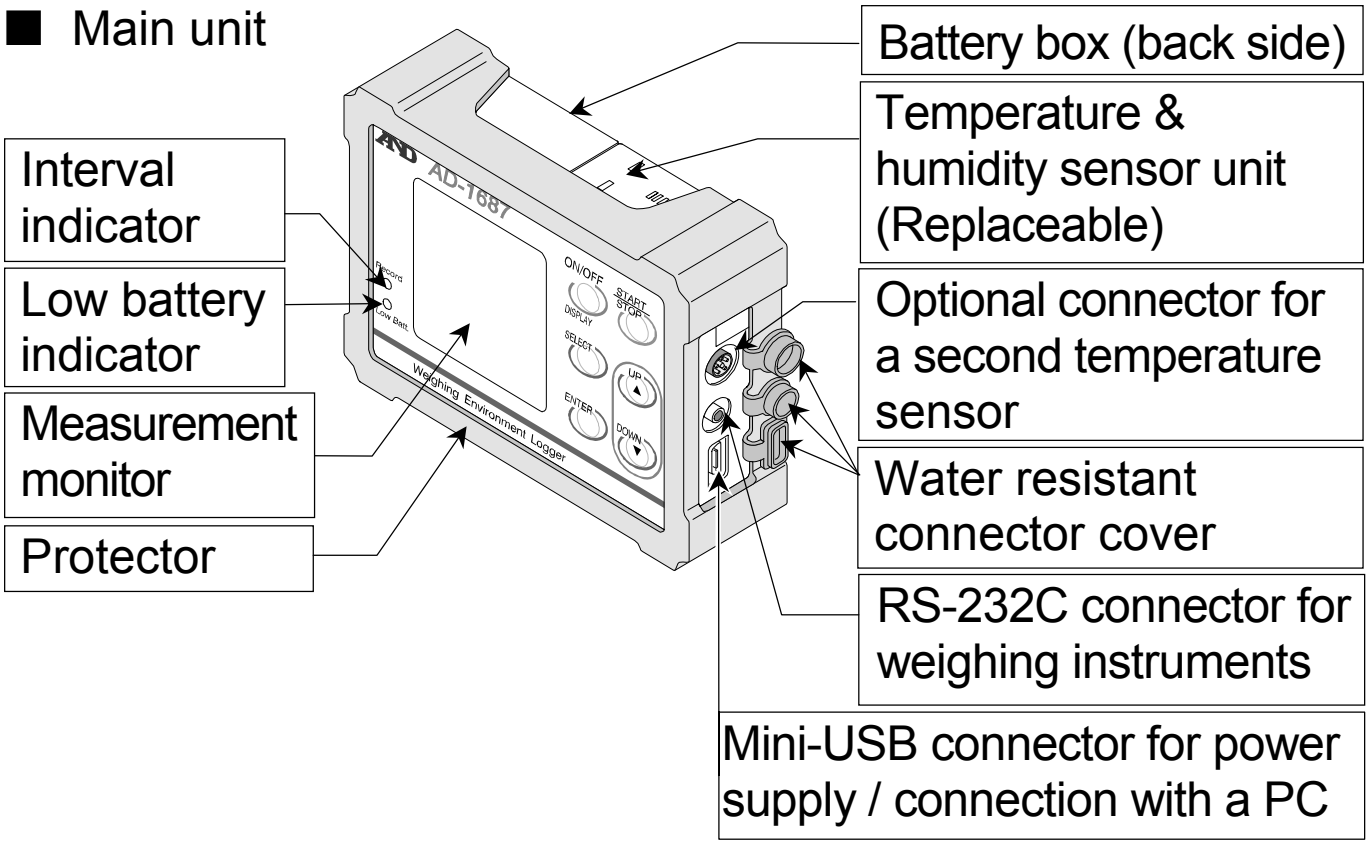
- Do not open the case to repair the AD-1687. Only authorized personnel can perfrm repairs. Attempting repairs yourself may cause damage to the AD-1687 and will void the warranty.

⚠ Caution

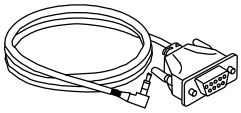
- When the battery cover and temperature & humidity sensor unit are connected to the AD-1687 and the connectors are firmly seated in the water resistant connector covers, the AD-1687 is protected against light water exposure (equivalent to IP 65). Please note that the water resistance will not endure immersion in water or high pressure runnning water.

3. Unpacking and Names

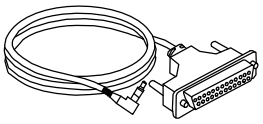
■ Main unit



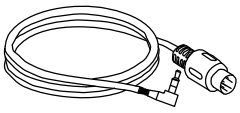
■ RS-232C cable for weighing instruments



D-Sub 9 pin (1 m)
AX-KO3571-100



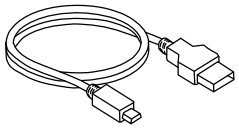
D-Sub 25 pin (1 m)
AX-KO3572-100



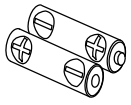
Din 7pin (1 m)
AX-KO3573-100

■ USB cable

A-mini type B (1 m)



■ Two batteries for temporary use.
Size:R6 (AA)

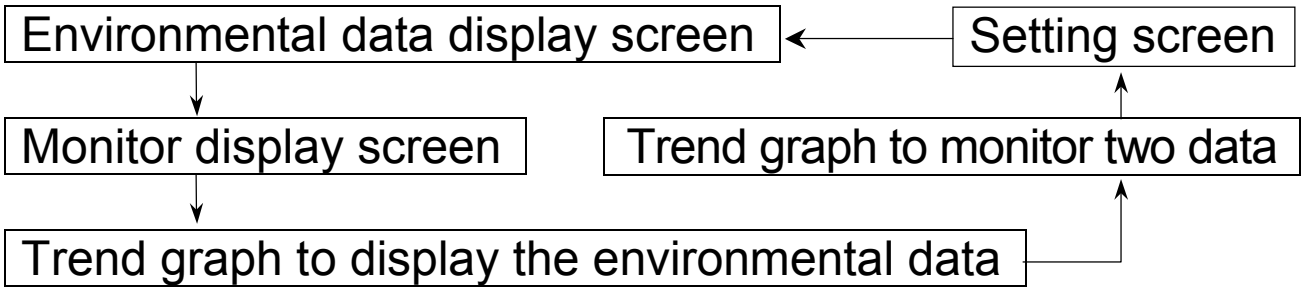


■ This instruction manual

4. Display and Key Operations

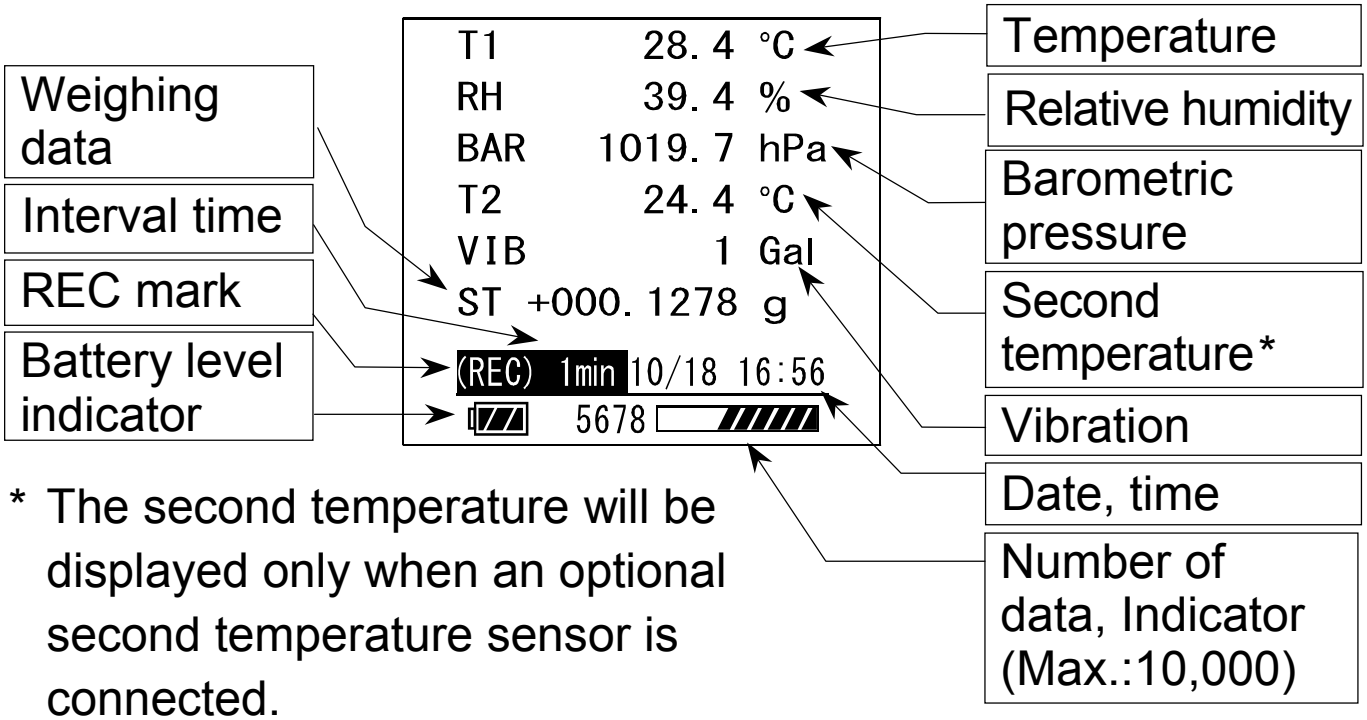
The following five displays can be selected depending on the intended use.

■ By pressing the SELECT key repeatedly, five different displays will appear.



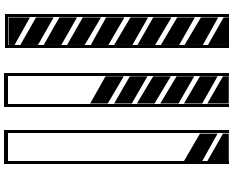
Display

1. Environmental data display screen (with example data)



* The second temperature will be displayed only when an optional second temperature sensor is connected.

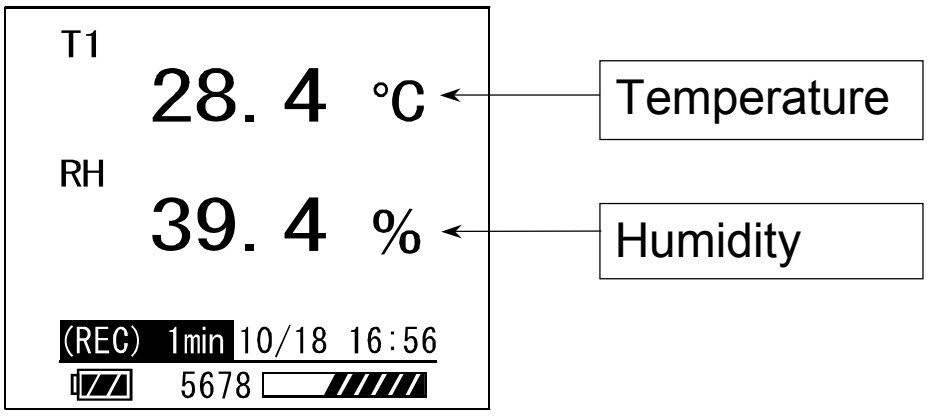
■ Recordable capacity of data storage is shown by these level indicators as follows.



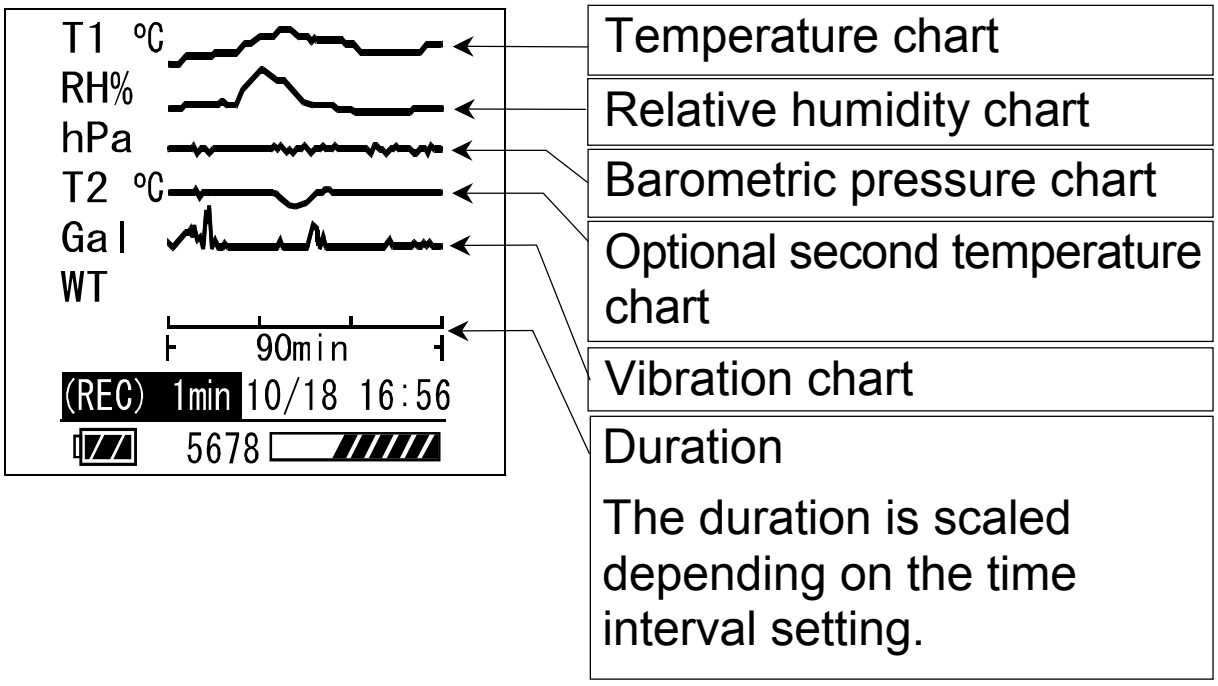
Adequate remaining space
Half remaining
Almost full

2. Monitor display screen

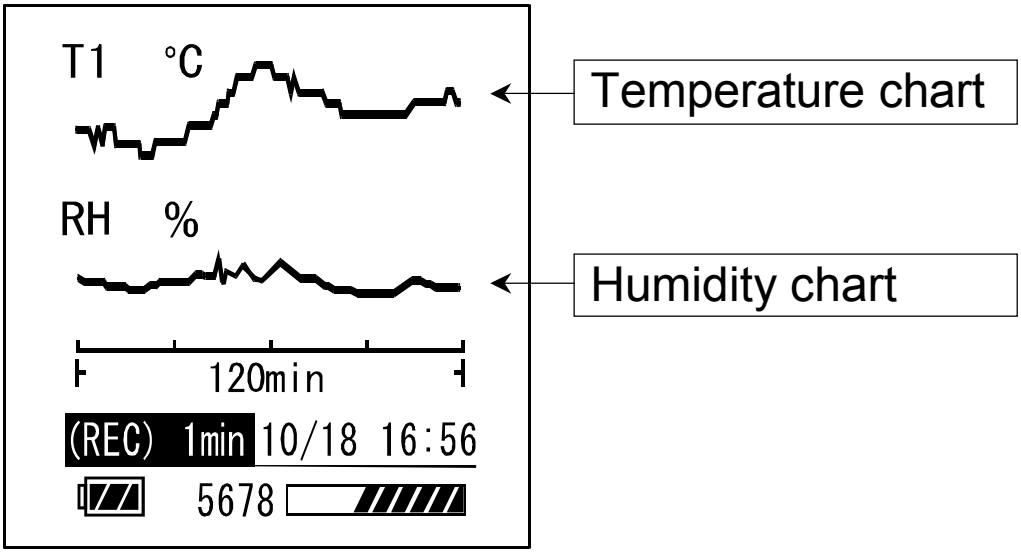
This screen displays the two environmental data that were specified in the setting screen. (Refer to "6.2 Setting the Monitor Display")



3. Trend graph to display the environmental data (with example)



4. Trend graph to monitor two data (with example)
   This screen displays the two environmental data that were specified in the setting screen.(Refer to "6.2 Setting the Monitor Display")



Note

■ The battery level indicator is displayed when the battery is used. It is not displayed when external power is used.

Key Operations

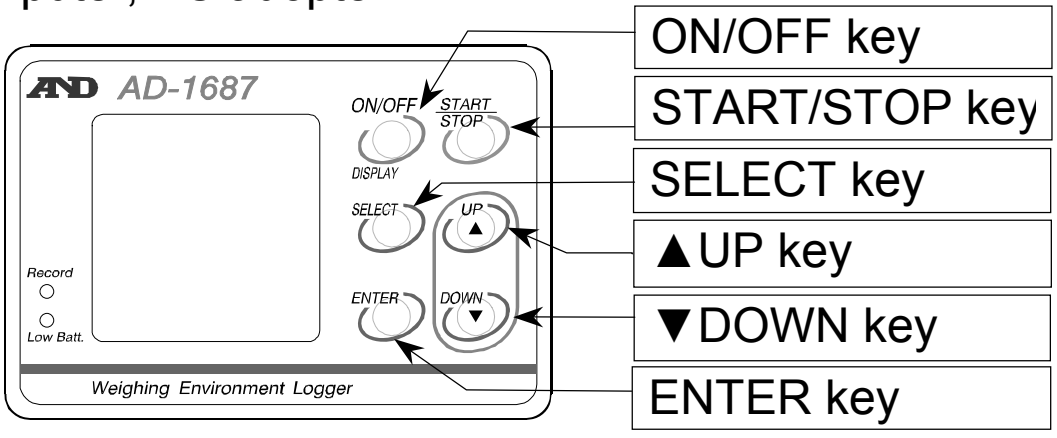
Key	***Press***: Press and release the key immediately	***Long press***: Press and hold the key for 1 second
ON/OFF (DISPLAY)	Shows the current monitor. *1 Cancels the setting operation	Turns on or off the AD-1687.*2
START/ STOP	Starts the interval measurement. Cancels the setting operation.	Stops the interval measurement
SELECT	Changes the current display.	———
ENTER	Sets or stores them.	
▲UP, ▼DOWN	Changes the parameter.	

*1. When the display is turned off when an interval measurement is being executed, press ON/OFF key and the environmental data will be displayed.

The current display will be hidden after being idle for one minute during the interval measurement to suppress the battery consumption.

*2. The display will be turned off about one minute later when battery power is used except during the interval measurement.

The AD-1687 is not turned off while the power is supplied by an external power, such as a weighing instrument, personal computer, AC adopter.



5. How to Use

1. Turn on the power.

■ In the case of the AC adapter:
The power turns on automatically. Select「EXT.POWER」, press ENTER key.

■ In the case of battery drive:
When pressing and holding the ON/OFF key, the AD-1687 will turn on.
For inserting of batteries, please refer to the "8. Replacement for Batteries and Sensor Unit".

2. The basic operation will use the keys below

Key	Operation	Function of the AD-1687
SELECT	Press	Changes the current display.
START/STOP	Press	Starts the interval measurement. The indicator REC is shown.
START/STOP	Long press	Stops the interval measurement. The indicator REC is hidden.
ON/OFF	Long press	Turns off the AD-1687 except during the interval recording or when power is supplied from a source other than batteries.

Note

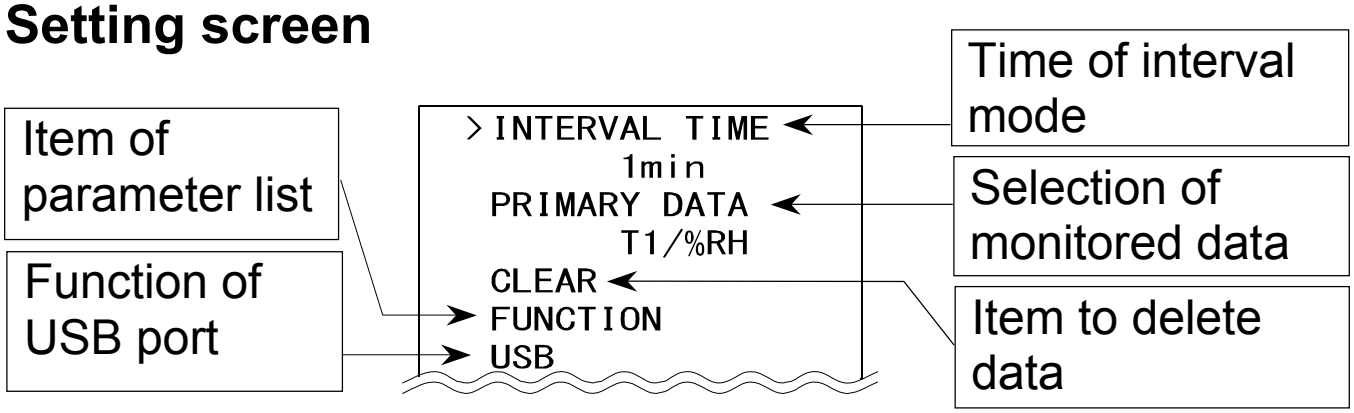
■ The time to show or hide the display can be specified at the parameter "POWER SAVE" in the "6.4 Function Table". After being idle for one minute, the AD-1687 is turned off while using battery power (The factory setting).

■ During the interval recording, should the recording data memory become full, the interval recording stops automatically, and the power is turned off.(The factory default recording system "FUNCTION" setting is "ONE-TIME".)

■ Temperature and humidity sensor unit is replaceable (life approximately 2 years).

6. Management of Items

Setting screen



1. Display the menu.

SELECT key: Press this key several times to display the menu.

2. Enter to an item of the menu.

▲UP,▼DOWN key: Selects an item.
ENTER key: Enters into the item.

3. Specify a parameter for the current item.

▲UP,▼DOWN key: Selects a parameter.
ENTER key: Stores new parameter and proceeds to next item.
ON / OFF key: Cancels and proceeds to next item or menu.

4. Operations after finishing the management.

SELECT key: Proceeds to the intended display

Note

■ Selectable items will change depending on operating conditions.

6.1.Interval Time

Specify an interval time of measurement with the interval measurement.
This is the same as item "INTERVAL TIME" of the "6.4.Function".

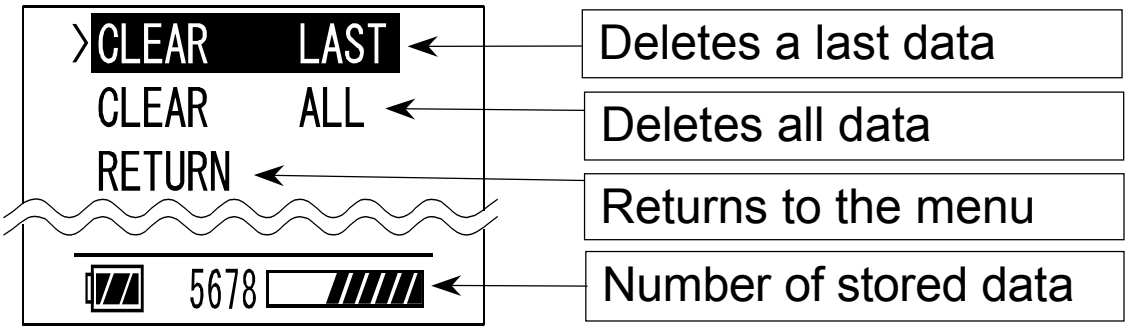
6.2.Primary Data

Specify two items to display from the temperature, relative humidity, barometric pressure, vibration and weighing data with "PRIMARY DATA" display or "Trend graph" display.
Refer to item "PRIMARY DATA" of the "6.4.Function".

6.3.Clear

Delete the stored data that is the last data or all.

1. Select CLEAR to move on to the following display.
2. Select an item with ▲UP or ▼DOWN key and execute with ENTER key.



6.4.Function Table (Function)

The function table can specify each action of the function and the communication of the AD-1687. Items of each functions are stored as a parameter. These parameters are stored in the AD-1687 even without power.

Item		Parameter and Detail
INTERVAL TIME		1, 2, 5, 10, 15, 20, 30 seconds, 1*, 2, 5, 10, 15, 20, 30, 60 minutes
PRIMARY DATA		T1*..... Temperature %RH* ..... Humidity BAR ..... Barometric pressure VIB ..... Vibration WT ..... Weighing data
RECORDING TYPE		ONE-TIME* Stops at full memory ENDLESS .. Overwrites at full ..... memory
BUZZER		OFF ..... Not sounded ON* ..... Sounds buzzer
DECIMAL POINT		.* ..... dot , ... comma
BALANCE SETTING	BAUD RATE	600, 1200, 2400*, 4800, 9600, 19200 bps
	BITS PARITY	7bits/EVEN*, 7bits/ODD, 8bits/NONE
	TERMINATOR	CR LF* CR
POWER SAVE		OFF, 30 seconds, 1*, 2, 5 or 10 minutes
DATE FORMAT		yyyy/mm/dd*, mm/dd/yyyy, dd/mm/yyyy year : yyyy, month : mm, day : dd
DATE SETTING		Example : 2015 / 12 / 31
TIME SETTING		Example : 13 : 15 : 30

ID NUMBER	8 characters. Example：ROOM-NO1 The factory setting is a serial number (Refer to "6.4.1. CSV File Name")
CONTRAST	25 to 40* to 50
Record the Maximum Value of the Vibration PEAK HOLD	OFF ..... Record the value of the vibration at the time of recording ON ..... Record the maximum value of the air flow and vibration in the interval time (Refer to "7.1. Record the Maximum Value of the Vibration")
Weighing Value Interval Recording Mode WEIGHING DATA	Every*..... Save at the time of receipt of the data Interval... Save data for each interval time (Refer to "7.2.2. The Interval Measurement for the Weighing Instrument)
Initialization of Internal Setting FUNCTION INIT	Returns to the internal settings to factory settings. It should be noted that the date/time settings are not changed.
Return	Returns to the menu

* ：Factory setting

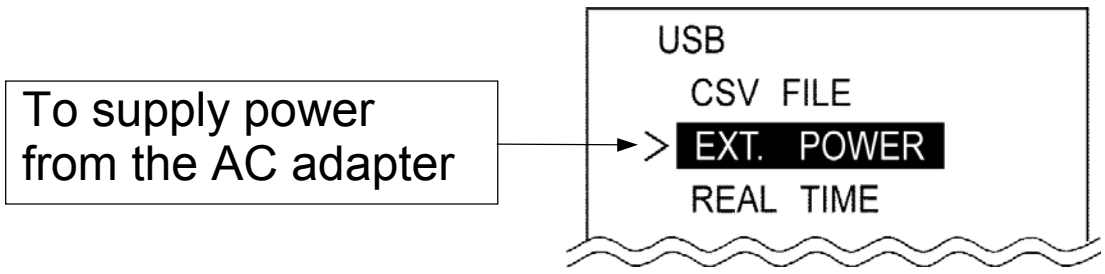
6.4.1. About CSV File Name (ID Number)

- The CSV file name that is stored in the AD-1687 will be "AD-1687_ID number .CSV"
- You can create a new name which is easier to manage by changing the ID number.

  (Example) ID number : ROOM-NO1
  CSV file name : AD-1687_ROOM-NO1.CSV
- The factory setting is a serial number on the ID number.
- Changing the ID number creates a CSV file with a new name. Leaving old files will reduce storage free space, may not store up to 10000 data.
  Remove all old files using operations "CLEAR ALL" specified in "6.3. Clear".

6.5.USB Function Selection

When connecting AD-1687 and the computer with a USB cable, the screen to select which function to use is displayed. For each function and method of operation, please see "7.3 Connecting to the computer"
Even when powered by a USB cable from the AC adapter, screen for selecting the function appears. Please select "EXT.POWER" at this time. In this case, even if other functions are selected, they would be invalidated.
When a USB is not connected, this function is not available.

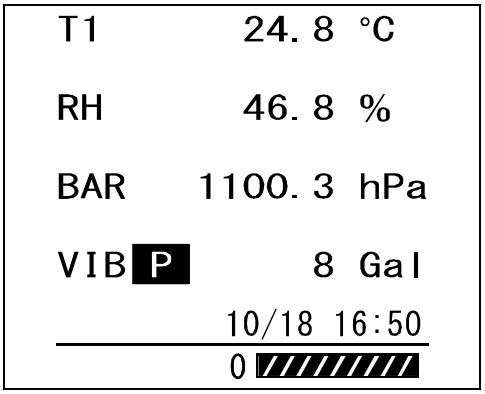


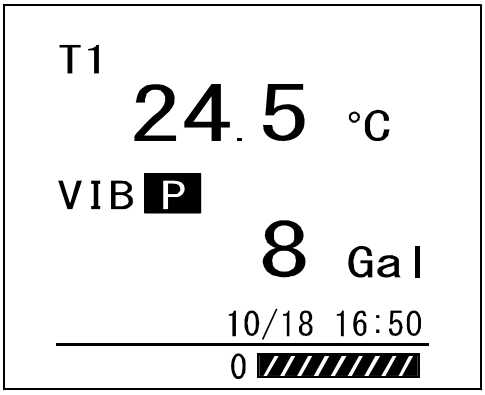
7. Applyed Funciton Setting

7.1.Record the Maximam Value of The Vibration (Peak Hold)

- In the Factory setting "PeakHold OFF", the value of the vibration to be recorded in the AD-1687 is the value of the interval recording. If "PeakHold ON" mode is set, which records the maximum value of the vibration, the peak value during each interval time is held and recorded, the peak value during each interval time is held and recorded.

- When in the PeakHold mode, **P** will be displayed next to VIB of the display screen.



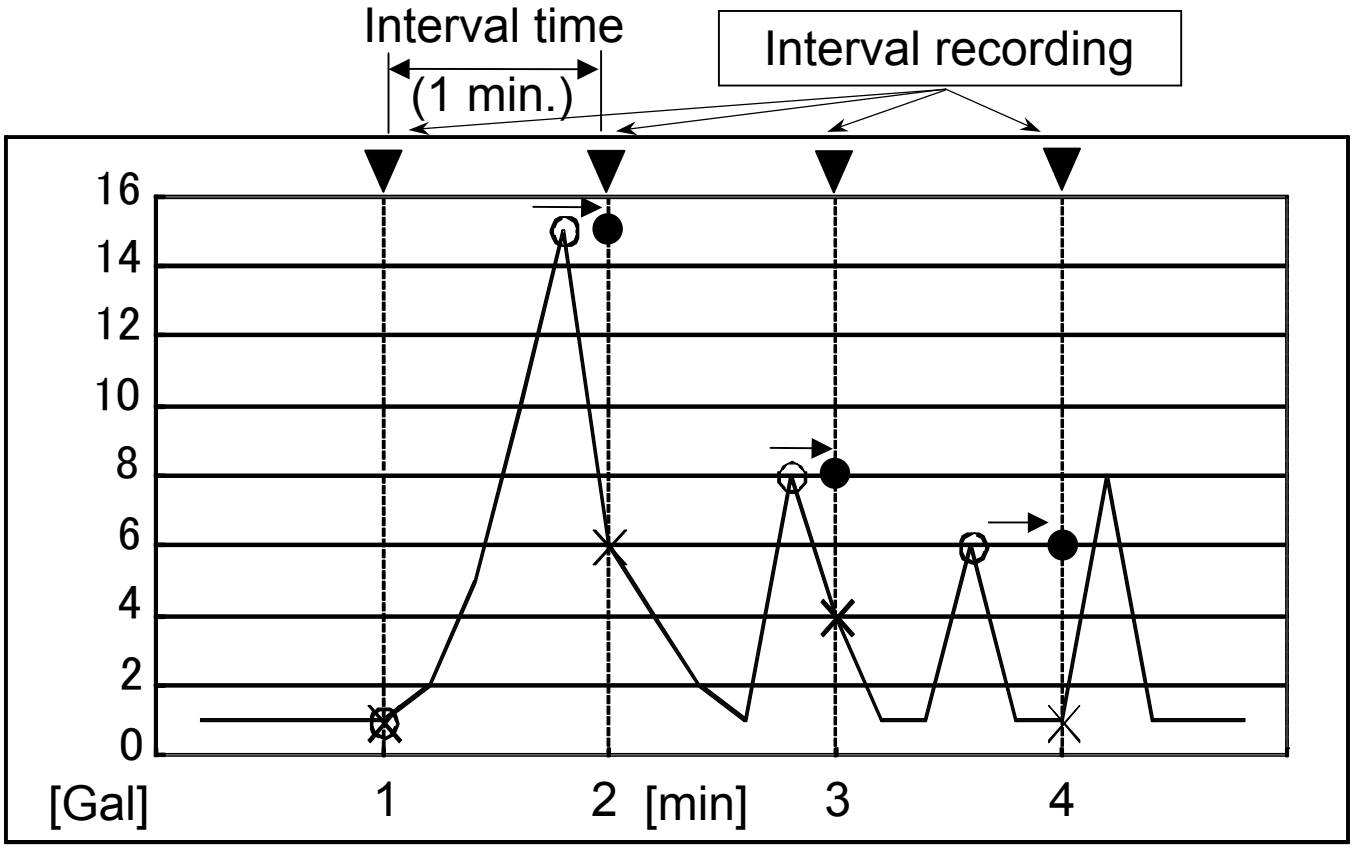


(Example) To record at 1minute interval time

Line : Vibration values received by the AD-1687.

× : The value of vibration to be recorded in the factory setting "PeakHold OFF"

○ : The value of vibration to be recorded in the peak-hold mode "PeakHold ON"



Recorded value

Recording time [min]	1 min	2 min	3 min	4 min
PEAK HOLD OFF	1 Gal	6 Gal	4 Gal	1 Gal
PEAK HOLD ON	1 Gal	15 Gal	8 Gal	6 Gal

Note

■ In the peak hold mode, the power is always ON to because sampling speed is fast. ("POWER SAVE" in the "6.4. Function" is disabled.)

■ To avoid battery depletion, connecting the AC adapter is recommended.

■ When only the battery power is available, please power OFF by holding down the ON/OFF key after finishing the measurement.

7.2. Connecting to the Weighing Instrument

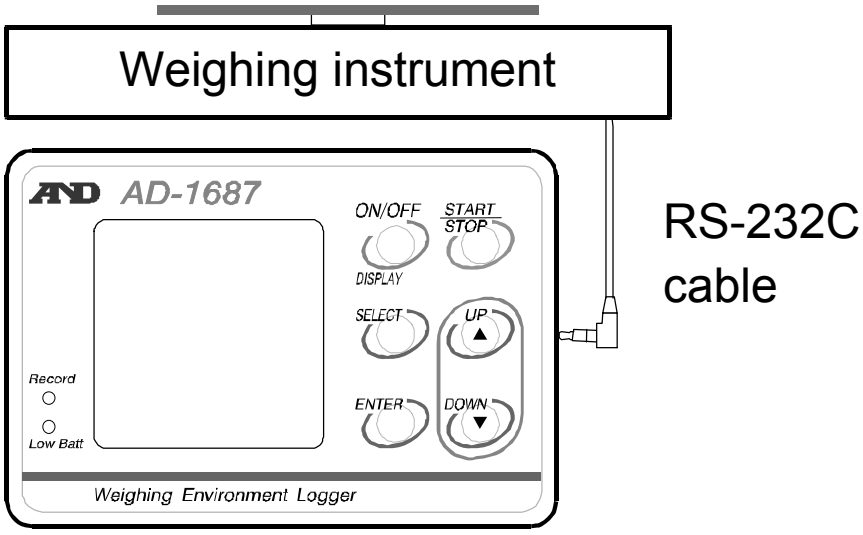
■ The AD-1687 saves the weighing data and environment data at the same time when receiving the weighing data.

7.2.1. The Management of the Weighing Data

Step 1 Connect the AD-1687 and A&D's weighing instrument using the provided RS-232C cable.

Step 2 Press the data output key (Ex.PRINT key) of the weighing instrument to transmit data. The AD-1687 receives data and the indicator REC is shown for 1second.

Step 3 Stored data is shown for 5 seconds in the measurement monitor.



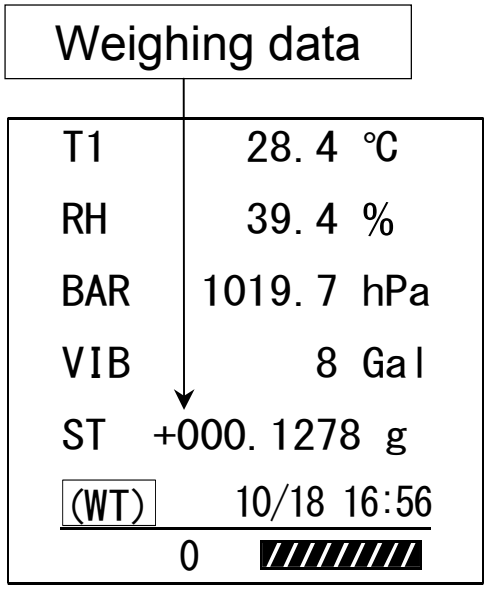
7.2.2. The Interval Measurement for the Weighing Instrument

■ By setting "Weighing value interval recording mode (WEIGHING DATA)" in "6.4. Function Table" of the AD-1687 to "Interval", it is possible to save the weighing data sent from the weighing instrument continuously (stream output) at each interval.

Step 1 Select the "Interval" at "Weighing value interval recording mode" (WEIGHING DATA) in "6.4. Function Table".
WEIGHING DATA : Interval (The factory setting is "Every")

Step 2 Connect the Weighing instrument that has been set in the stream output.
In the case that the AD-1687 has received the weighing data, (WT) is displayed at lower left corner of the screen of the AD-1687, and the weighing data is displayed. In this case, the weighing data is not saved.

Step 3 Pressing the START/STOP key, at the timing set by the interval time, starts saving weighing data.



Note

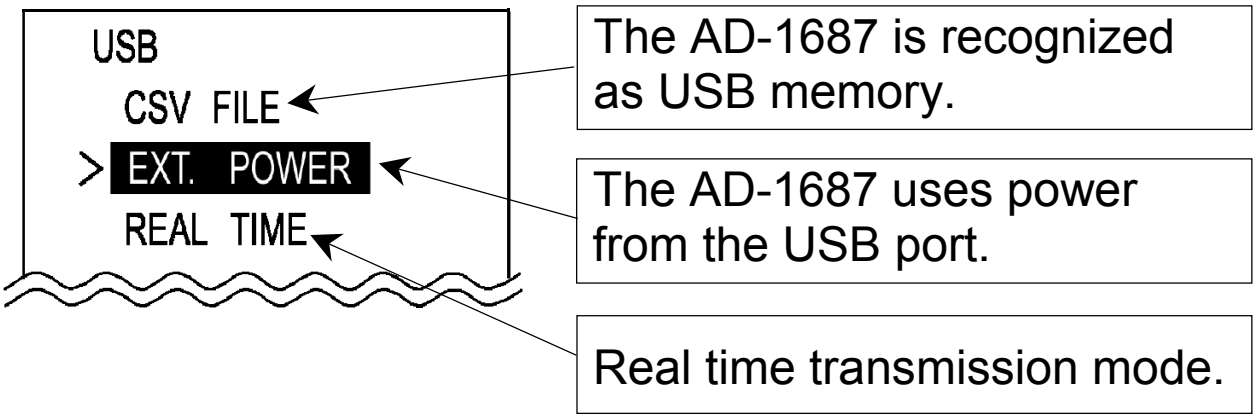
- A recording interval might deviate for a few seconds due to time lags in data reception.
- To set the display format of weighing data or to set the stream output of the weighing instrument, please refer to the "internal setting" "data format" of each instrument manual.
- When the AD-1687 body has received the weighing data, the weighing data is displayed.

7.3.Connecting to the Computer

7.3.1. Supplying the Power From USB Port of Computer

Step 1 Connect the AD-1687 and a computer with a USB cable.

Step 2 Select the item "EXT.POWER" and press the ENTER key so that the AD-1687 can use power from the USB port.



7.3.2. Transmitting Data to A Computer (CSV File)

Step 1 Connect the AD-1687 and a computer with a USB cable.

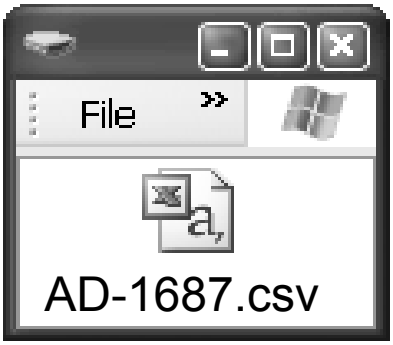
Step 2 Select "CSV FILE" and press the ENTER key

Step 3 The AD-1687 is recognized as USB memory without special software.

Step 4 The CSV file data can be read by the computer.

Step 5 To delete the CSV file in the AD-1687, use normal computer file operations.

Step 6 Follow the menu "Safely Remove Hardware" when removing the AD-1687 from the USB port of the computer.



7.3.3. Transmitting Data to A Computer (Real-TimeTransmission Mode)

This method is used to transmit the environment and weighing data directly to a computer via the USB port.
Data is not stored in the AD-1687.(Special software is not necessary)

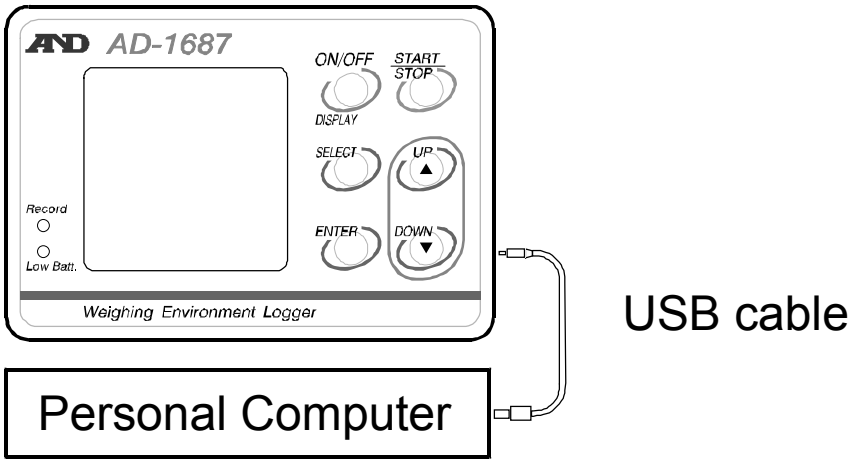
7.3.3.1 Transmitting Only Environmental Data

Step 1 Connect the AD-1687 and a computer with a USB cable.
The display will change to "7.3.1" Display after Connecting.

Step 2 Select the item "REAL TIME" and press the ENTER key to use the real time transmission mode.

Step 3 Click on a position (cell) on the program (EXCEL etc.) to receive data.

Step 4 Press and hold (Long press) the START/STOP key to transmit environment data.



7.3.3.2. Transmitting Weighing Data and Environmental Data

Step 1 Connect the AD-1687 to the weighing instrument with the RS-232c cable while the AD-1687 is powered off. After that, connect the AD-1687 unit to the PC with the USB cable. After connecting, the display will change the "8.3.1" display.

Step 2 Select the item "REAL TIME" and press the ENTER key to use the real time transmission mode.

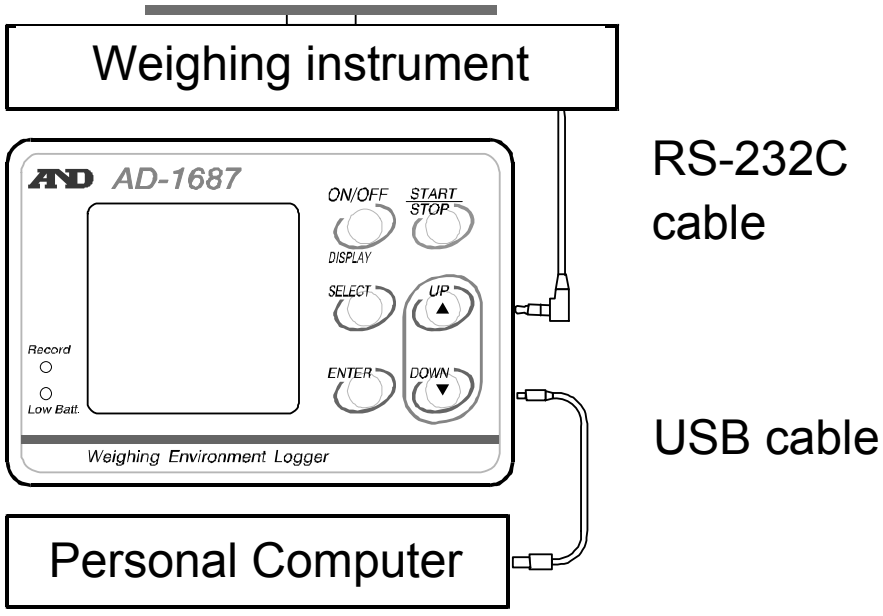
Step 3 Click on a position (cell) on the program (EXCEL etc.) to receive data.

Step 4 Press the data output key (Ex.:PRINT key) of the weighing instrument to send weighing data. When the main unit of AD-1687 receives data, a buzzer sounds and weighing data and environmental data are sent to the computer.

Step 5 Data is displayed for 5 seconds on the measurement monitor.

Note

■ If the timing of the transmission is short, data may not be saved depending on the PC performance.



8. Replacement for Batteries and Sensor Unit

Caution

- Replace with two new batteries of the same type (size AA) and maker when ▭ or ◪ (Low battery mark) is indicated.
- Do not mix an old battery with a new battery.
- Insert each battery with its positive (+) and negative (−) terminals properly aligned with the corresponding symbols in the battery compartment.
- When the batteries are drained completely, ▭ (Low battery mark) does not appear.
- The battery life is dependent upon the environmental temperature, battery type and usage.
- Remove the batteries if the device is not to be used for a long time. The batteries may leak and cause a malfunction.
- The accessory batteries are for operation check and their life may be short.

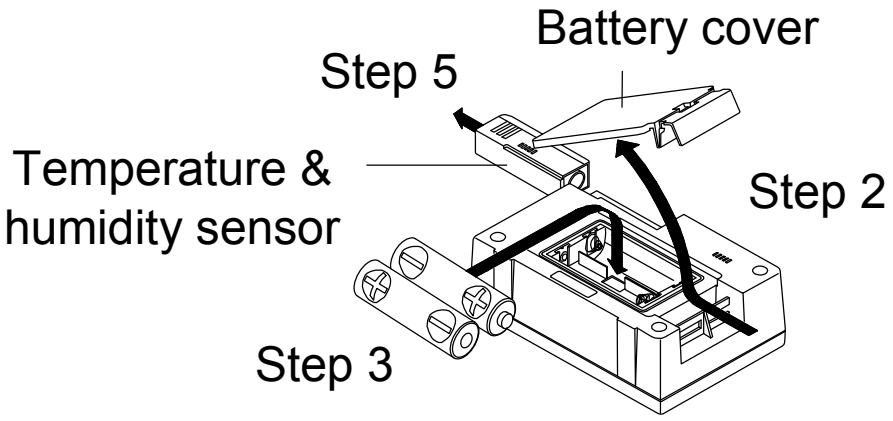
Battery Indicator

▰ Enough remaining battery
◪ Batteries are low. Recommend replacing them.
▭ Batteries are drained. Replace them with new ones.

■ The temperature & humidity sensor unit is a consumable.
(Replacement is approx 2 years each)
When the sensor life has been exceeded or condensation is present on the sensor, an abnormal value may be displayed.

Step 1 Turn of the AD-1687. Remove the protector.
Step 2 Push the side of the battery cover to release hook and open it.

Step 3 Insert two new batteries with the positive (+) and negative (−) terminals properly aligned with the corresponding symbols in the battery compartment.
Step 4 Close the battery cover.
Step 5 In case of replacing the temperature & humidity sensor unit, slide it out and replace with new one.



9. Specifications

Environmental data

	Units	Range	Accuracy
Temperature	0.1 ℃	0 to 60 ℃	±0.5℃ (20 to 30 ℃)
Relative humidity	0.1 %RH	0 to 100 %	±3 % (20 to 80 %)
Barometric pressure	0.1 hPa	500 to 1100 hPa	±4 hPa (0 to 50 ℃)
Vibration	1 Gal	0 to 2000 Gal	Static acceleration±20%

[Refer to A&D homepage for details of AD-1687]
A&D homepage：http://www.aandd.jp

Connectable equipment	For the weighing instrument (our balance-scales) with RS-232C, please check our websites.
Data capacity	Maximum 10,000 sets (including date & time)
Interval time	1, 2, 5, 10, 15, 20 or 30 seconds, 1, 2, 5, 10, 15, 20, 30 or 60 minutes
Power supply	Two alkaline batteries (LR6, AA), AC adaptor, or USB
Battery life	Approx. 6 months (Measurement interval: 1 minute, alkaline batteries)
Clock accuracy	Max.±1minute/month
Adaptable operating systems	Windows 2000, XP, Vista, 7, 8, 10 (32 bits, 64 bits)
Operating environment	0 ℃ to 60 ℃, 85 % RH or less (No condensation)
Dimensions	127(W) × 90(H) × 36(D) mm (including the protector)
The sensor unit dimensions	90(W) × 90(H) × 91(D) mm
AD-1687 body mass	Approx. 280 g (including batteries and the protector)

MEMO

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