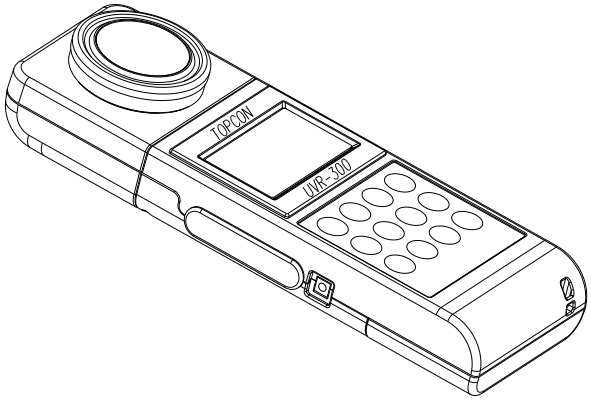
TOPCON



INSTRUCTION

UV RADIOMETER

UVR-300

Rev.11

INTRODUCTION

Thank you so much for your purchasing our TOPCON TECHNOHOUSE UV Radiometer UVR-300.

This manual describes an outline, basic operation procedure and specifications regarding the UV Radiometer UVR-300. Read this instruction manual carefully before putting the instrument into operation in a proper manner.

HANDLING PRECAUTIONS

- Be sure to use the designated AC adapter for this instrument. The use of any AC adapter which is not designated herein may result in failures. The input power voltage is AC 100V to 240V, and its frequency is 50Hz or 60Hz.
- Be sure to turn off the power switch before connecting/disconnecting the detector unit and/or USB, AC adapter.
- Do not bring any radiocommunication unit such as transceivers, etc. close to this system. This may cause the readout to be unstable.
- Do not use this instrument in an area with a lot of dust, very high humidity and possibly corrosive gases.
- Do not use this instrument in an area where the ambient temperature changes rapidly. This instrument has a built-in temperature compensation circuit, but in some cases, stable measurements may not be possible under an environment with a rapidly changing temperature.
- Do not subject to strong shock caused by falling, etc. to this instrument, and do not use or store the instrument in or on a place with continuous vibration. This instrument contains precision components which may be damaged under such conditions.
- The instrument can operate within a temperature range from −10°C to +40°C, but it is delayed a little responding with the liquid crystal display panel when used in a range of –10°C to +0°C.
- Do not store the instrument at a place having a temperature either of more than +60°C or less than -20°C.
- Remove the battery to avoid leakage and store the instrument when unused for a month or more.
- When the detector unit has got dirty, any measurement error may occur. Wipe off the detector with a dry cloth.
- The instrument case is made of plastic. Do not wipe with any chemicals (acetone, thinner, etc.). Do not bring it near any place whose temperature exceeds 60°C.
- To maintain required measurement accuracy, calibrate this instrument at least once a year. Contact your dealer or TOPCON TECHNOHOUSE to request a calibration test.
- On calibration, the correction factors memorized in this instrument are deleted. Conduct back-up recording of necessary measured data before requesting calibration.
- When the power switch is turned on, the battery is consumed because it always measures it. Please turn off the power switch for power saving when you do not use it.
- For energy saving, when the unit will not be used for an extended period of time, unplug the power plug from the socket.
- Keep the instrument away from water and liquid. This instrument is not water-resistant.

SAFETY INDICATIONS

Warnings and Cautions are indicated on this instrument and in the instruction manual to prevent injury to users and others, prevent damage to property or the like, and to ensure safe use of this instrument. After fully understanding the following indications and symbols, carefully read the section "Safety Precautions," and observe all precautions.

Display	Meaning of display
 **Danger**	This display indicates that incorrect handling with disregard for this display may cause imminent danger resulting in death or severe injury.
 **Warning**	This display indicates that incorrect handling with disregard for this display may cause danger resulting in death or severe injury.
 **Caution**	This display indicates that incorrect handling with disregard for this display may cause accidents resulting in injury*1 ,or damage to property*2.

*1: This refers to injury such as burns, electric shock or the like that does not require hospitalization or long-term medical attention.

*2: Damage to property means considerable damage to a building, furniture, livestock or pets.

Diagram	Meaning of display
	This icon indicates Prohibition. Specific content is expressed with words or an image located close to the icon.
	This icon indicates Mandatory Action. Specific content is expressed with words or an image located close to the icon.
	This indicates Hazard Alert (Warning). Specific content is expressed with words or an image located close to the icon.

SAFETY PRECAUTIONS

⚠ Warning


Prohibited

Do not use this instrument near flammable or combustible gases (gasoline, etc.).
Failure to do so might cause fire.


Prohibited

Keep the instrument away from water and liquid.
Doing so might cause fire or electric shock.


Prohibited

Do not disassemble or modify this instrument.
Doing so might cause fire or electric shock.


Mandatory

Be sure to use the supplied AC adapter or a separately sold and authorized AC adapter.
AC adapter malfunctions may result in fire or electric shock.


Prohibited

Do not disassemble the AC adapter.
Doing so might cause fire or electric shock.


Mandatory

Remove dust or moisture from the AC adapter plug.
Failure to do so might cause fire.


Mandatory

If you notice strange noise, smell or smoke from this instrument, immediately turn the instrument OFF and unplug the AC adapter from the power outlet.
Continued use of this instrument in this state might cause fire.
Contact your dealer or Topcon Technohouse Corporation.

⚠ Caution


Prohibited

Do not look directly at bright lights such as the sun or light bulb filaments.
Doing so might damage your eyes.


Prohibited

Do not place this instrument on an unstable stand or uneven surface.
Failure to do so might cause the instrument to fall or tip over.


Prohibited

Do not bring any goods with a staic charge near to ESD mark.
Otherwise, it may cause failures or incorrect measurements.

Use only specified screws when using the tripod screw and screw holes for jig attachment.
Do not tighten the screws any more than necessary. Doing so might cause internal breakage.

DISCLAIMER

- TOPCON accepts no responsibility for any damages resulting from fires, earthquakes, deeds of any third party and other accidents, as well as damages caused by the user's intentional or negligent actions, erroneous usage and other usage of the instrument under abnormal conditions.
- TOPCON accepts no responsibility for any incidental damages such as loss of business and discontinuance of business caused by use or out of commission of this instrument.
- TOPCON accepts no responsibility for any damages caused by use other than that instructed in the instruction manual.
- TOPCON accepts no responsibility for any damages caused by erroneous equipment behavior due to use in combination with other equipment or apparatus.

USER MAINTENANCE

Conduct maintenance work only as instructed in this manual. Never conduct any other maintenance work which is to be done by our service staff for safety and maintaining performance. The following maintenance work can be carried out by the user. The details of maintenance work are indicated in this manual.

Cleaning of body and lens

Remove dirt on the body cover and lens with a soft cloth with thin mild detergent, and then wipe the detergent off with a dry, soft cloth.
When the detector unit has got dirty and got oil adhesion such as fingerprints, any measurement error may occur. Wipe off the detector methodically.
Do not use solvents such as thinner, benzene or acetone. Such products may change the surface color.

CONTENTS

NOTATIONS IN THIS MANUAL

The following notational conventions are used in this manual:

Notation	Description
[CALL] , [⊿]	Means a menu title shown on a keyboard and the display of the instrument.
☞‘ ’	Indicates a text referred to in this manual.
☞“ ”	Indicates other instruction manual to be referred to.
Request	Explains matters to be acknowledged or to be considered for the operation of this instrument.
Memo	Explains matters to be referred to or to be useful for the operation of this instrument.

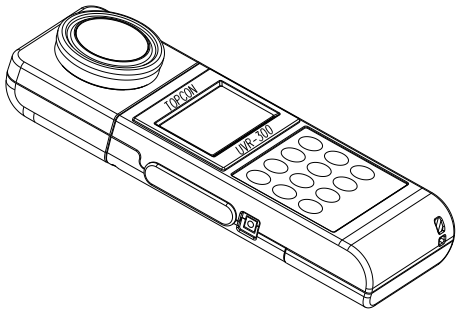
1. BEFORE USE

1.1 CHECK OF MAIN BODY AND ACCESSORIES

Check that the following main body and accessories are included.

If not complete, please contact your dealer or TOPCON TEHCHNOHOUSE.

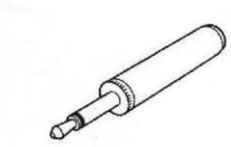
- Instrument (The detector is a separately sold optional accessory) 1



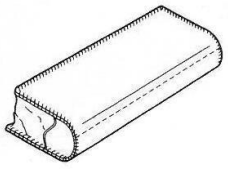
Accessories

- Cap 1
- USB Driver / instruction manual / Measurement program(CD-ROM) 1
- Leather case 1
- Analog output plug 1
- AC adapter (Separately sold optional accessory) 1

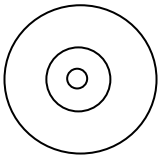
Cap



Analog output plug



Leather case

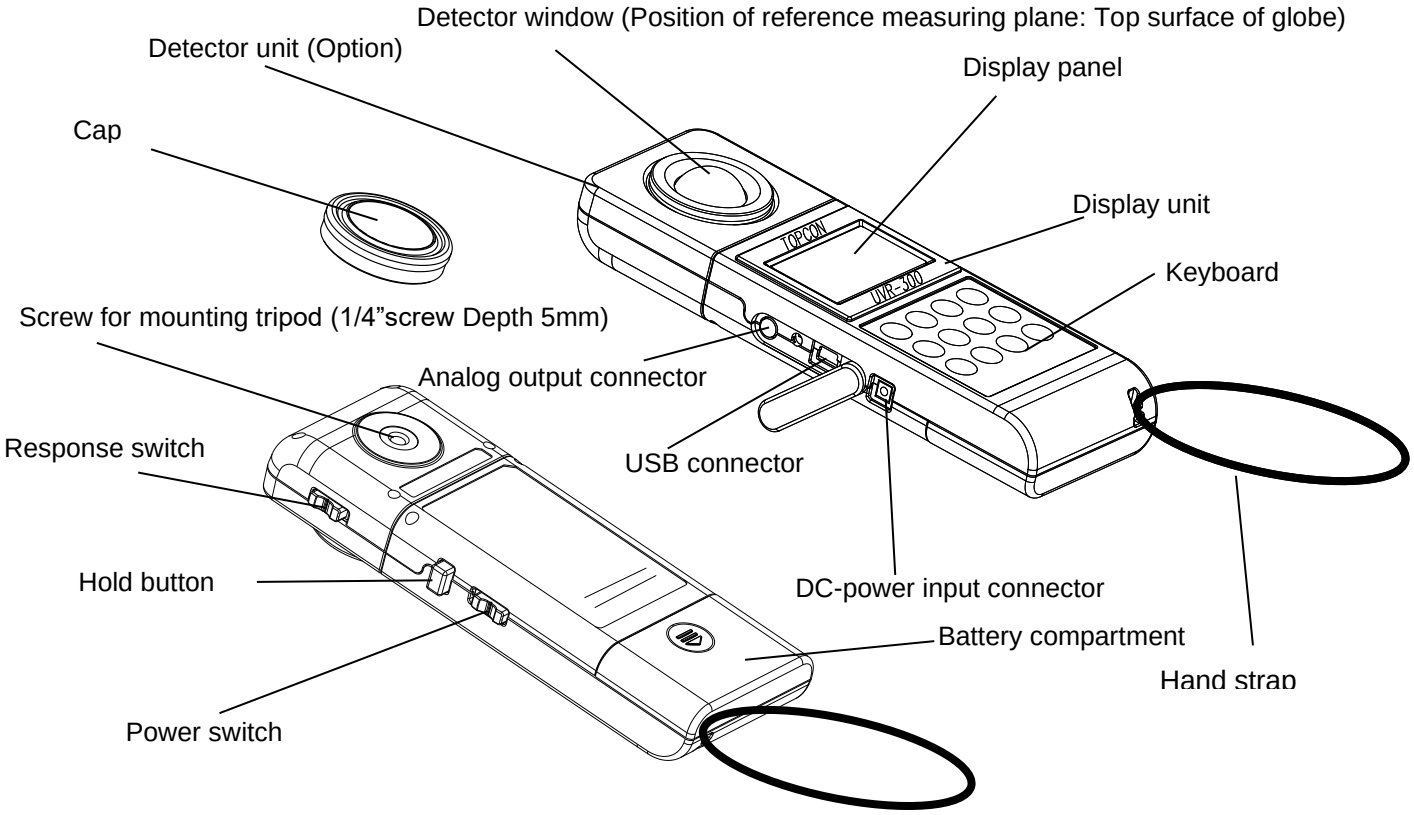


CD-ROM

AC adapter (optional)

1.2 NAMES AND FUNCTIONS OF PARTS

■Main body



The detector unit can be selected by the difference of the spectral responsivity according to three kinds.(Option)

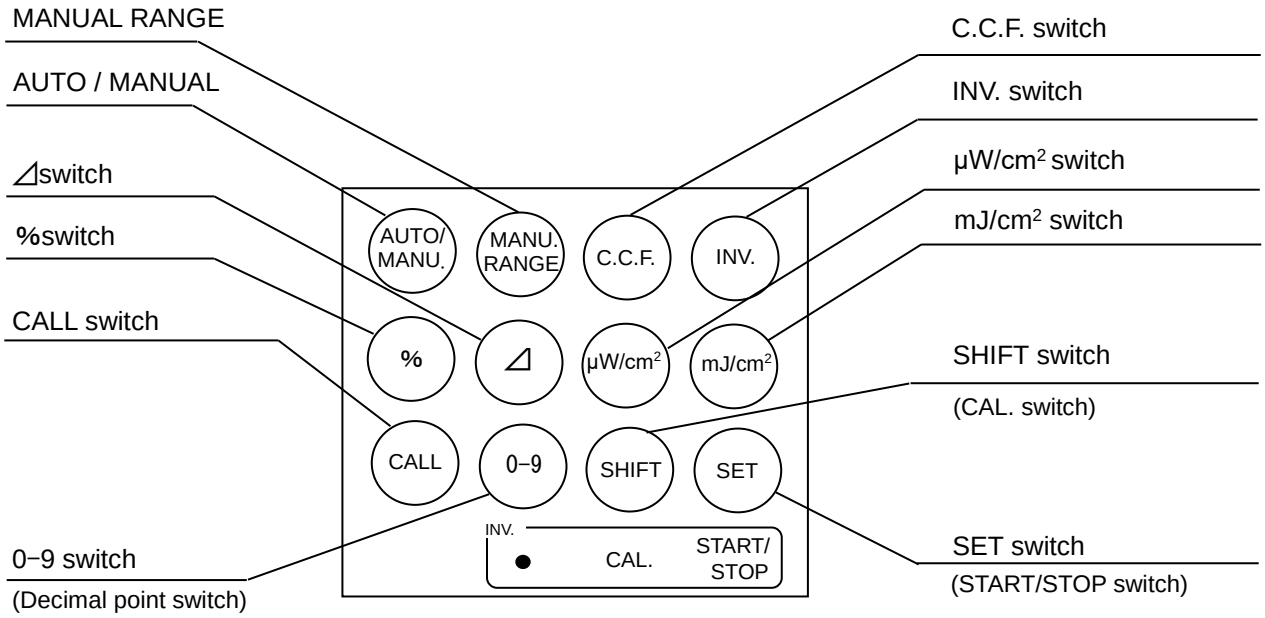
Name	Description
Detector window	The top of the detector window is the reference plane.
Display panel	Liquid crystal display panel where various information such as measurements and measuring conditions are displayed.
Response switch	The response time of the detector unit can be selected by changing the position of the Response switch. Response switch either to “FAST” or “SLOW” according to the target light source.
Hold switch	By pushing this hold switch during measurement, readout are fixed.
USB connector	This connector is used to connect devices such as a PC to conduct remote measurements. Connecting PC ☞‘1.3.4 Connecting PC’

Response switch	Range	Response speed (90%)
FAST	1	About 30 ms
	2	About 3 ms
	3	About 0.3 ms
	4	About 0.03 ms
SLOW	1 - 4	About 4 s or less

Tripod screw	A screw hole to fasten this instrument to a tripod. Specification of screw:1/4-UNC standardized for fixing a camera.
Keyboard	This keyboard is to set various functions such as switching to auto-range or manual-range and to input of correction factors.
Power switch	Power switch for this instrument.
External power Connector	Connector for output plug of the designated AC adapter. (option)

✸ **Request**	Use only specified screws when using the tripod screw and screw holes for jig attachment. Do not tighten the screws any more than necessary. Doing so might cause internal breakage.

■Names and functions of keyboard

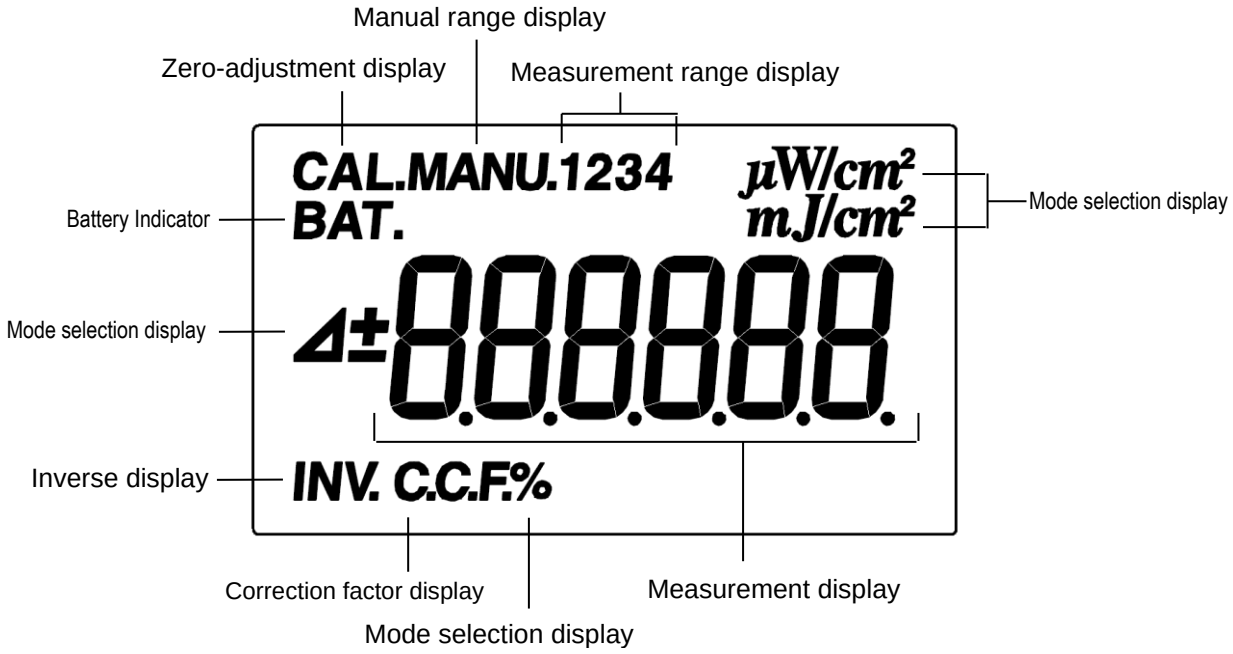


The function of each switch is as follows:

Switch	Description
[AUTO/MANU.]	For selection of the measurement-range changing method. [AUTO]: An optimum range is automatically selected depending on the measuring light source. [MANU.]: Used for manual changing. Display range ☞'2.1 Auto-range measurement and display range'
[MANU. RANGE]	For manual change of measurement range. Pushing the switch to advance to the next range as follows: 1→2→3→4 Display range ☞'2.2 Manual-range measurement and display range'
[C.C.F.]	For check and input of correction factor to measure in correction factor mode. One correction factor is memorized in available this instrument.
[INV.]	To make lower keys ([●], [CAL.], [START/STOP]) available.

[%]	For measurement of percent over and under reference value. In addition, for setting reference value.
[⊿]	For measurement of deviation from standard value. In addition, for setting reference value.
[μW/cm^2]	For measurement of irradiance.
[mJ/cm^2]	For measurement of integral irradiance.
[CALL]	Displays preset reference value for about 3 seconds in percent measurement mode and deviation measurement mode.
[0 - 9]	For increment of digit when setting standard value and correction factor in each measurement mode.
[SHIFT]	For moving blinking digit to lower position when setting reference value and correction factor of [%] and [⊿].
[SET]	For complete the setting when setting standard value and correction factor in each measurement mode.
[●] ([INV.]+[0 - 9])	For setting decimal point when setting reference value and correction factor in measurement mode.
[CAL.] ([INV.]+[SHIFT])	Form manual zero-adjustment. Zero-adjustment assures constant sensitivity of photo detector and steady measurement. Every turn-on of the power switch automatically operates zero-adjustment, which does not necessitate the use of the [CAL.] switch.
[START/STOP] ([INV.]+[SET])	For start or stop of integral irradiance mode.

■Names of parts on display screen



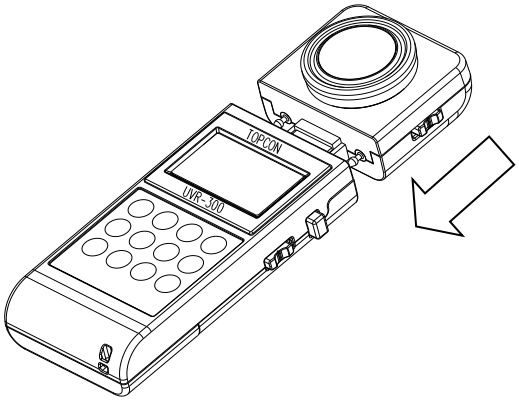
Displayed letters	Description
[CAL.]	Appears during operating zero-adjustment.
[MANU.]	Appears during operating zero-adjustment and manual range mode
[1234]	Shows the current range (One of the figures is displayed).
[μW/cm^2]	A unit for measurement of irradiance. Appears when irradiance measurement mode and input reference value in % mode, Δ mode.
[mJ/cm^2]	A unit for measurement of integrated irradiance.
[BAT.]	Appears when battery capacity is low. Replace batteries as soon as possible when this letter appears.
[Δ]	Appears when measuring deviations and inputting reference values in Δ mode.
[±]	Either [+] or [-] appears to mark the difference from the reference value in the Δ mode.
[%]	Appears when measuring the ratio of deviations and inputting reference values in the % mode.
Measurement display	Displays readout.
[INV.]	Pushing the [INV.] switch turns the display on and off Displayable only when the [INV.] switch is effective.
[C.C.F.]	Appears when the correction factor is set and live.

1.3 PREPARATION

1.3.1 HOW TO MOUNT THE DETECTOR UNIT

1 Follow the connector guide, and push in the detector along with connector guide in the arrow direction.

Be sure to turn off the power switch before connecting/disconnecting the detector unit.



1.3.2 HOW TO INSERT A BATTERY

Two AA batteries are required.
Those for operation check do not attach at the time of shipment.
Purchase those at your dealer.

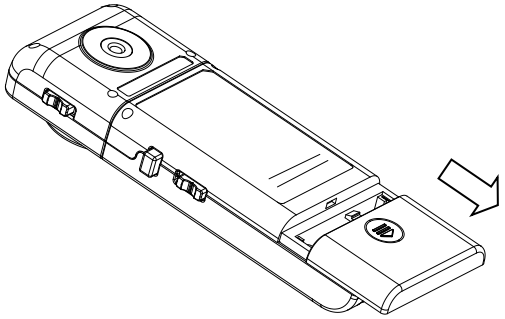
1 Turn the power switch off and uncover the battery compartment.

2 Insert a battery according to a polar indication shown on the battery compartment.

3 Mount the battery compartment.

Battery life at room temperature

	Not using USB	Using USB
Battery life	About 70 hours	About 35 hours



1.3.3 CONNECTION OF AC ADAPTER

(Separately sold optional accessory)

Compulsory

Only use the designated AC adapter.

Unapproved AC adapters may cause fire or electric shock.

Compulsory

Be sure to remove dust and water at the plug and receptacle for the AC adapter.

Otherwise, it may cause fire.

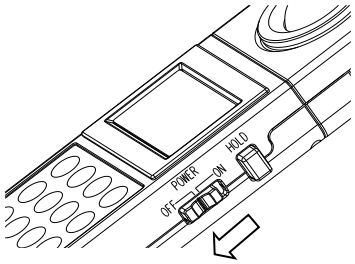
Prohibition

Do not remove or insert the plug with wet hands.

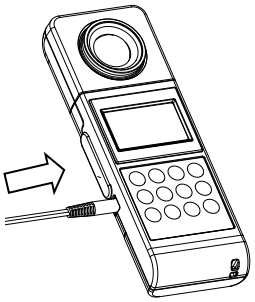
Otherwise, it may cause electric shock.

Procedure for connection of the AC adapter to this instrument is as follows:

1 Be sure that the power switch of this instrument is turned to OFF.



2 Insert the output connector of the AC adapter to the DC input connector of this instrument.



3 Insert the plug of the AC adapter to the receptacle.

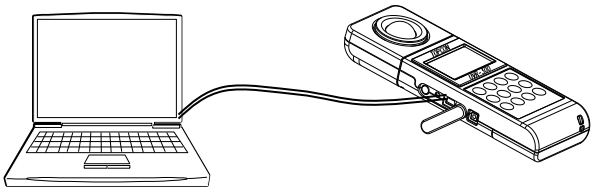
1.3.4 CONNECTING TO PC

To use this instrument with a PC, use a USB cable (Cable Type: A connector – mini B connector) to connect to the PC.

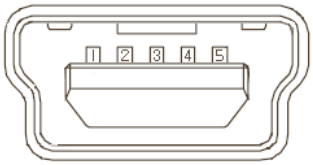
Memo

- The USB cable is not included with this instrument. Please purchase it separately.
- For connection to a PC, refer to your PC manual as well.

Request	・Never plug any connectors in or out while the instrument power is on.



■Connector Pin Assignment

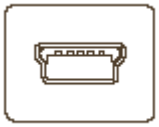


Mini USB connector

B type female (5 pin)

Instrument side

Pin No.	Signal
1	VBUS
2	D–
3	D+
4	GND
5	GND



Mini USB connector

B type male (5 pin)

■Communication parameters

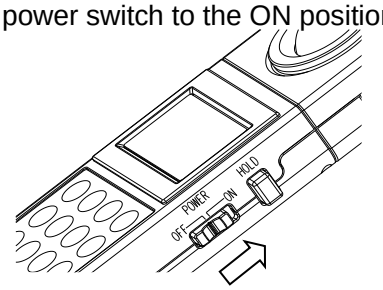
This instrument conducts USB communications through a virtual COM port. When you prepare your own communication programs the following communication parameters should be set.

Communication parameters

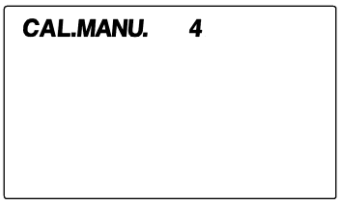
Baud rate	38400
Data length	7
Parity	ODD (odd number)
Spread bit	1

1.3.5 HOW TO TURN POWER ON/OFF

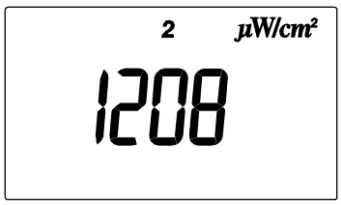
1 Push the power switch to the ON position to turn on power.



2 The mark [CAL.] is displayed and the zero-adjustment starts.



3 When the zero-adjustment finishes, the current measurement readout appears.

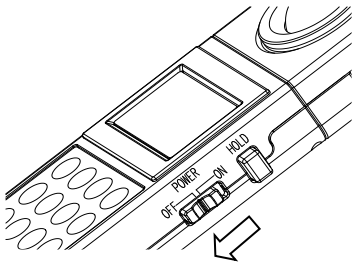


Memo

- Set the response switch before turning on power.
- With the response switch in either FAST or SLOW setting, it is possible to conduct a zero adjustment.

  Response switch ☞ '1.2 Names and functions of parts'
- The time required for a zero adjustment differs depending on the setting of the response switch. FAST: about 10 seconds; SLOW: about 45 seconds.
- It is possible to conduct a zero adjustment even if you remove the cap.

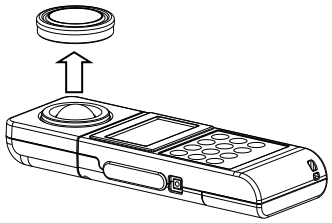
4 When turning off power, push the power switch to the OFF position.



2. MEASUREMENTS

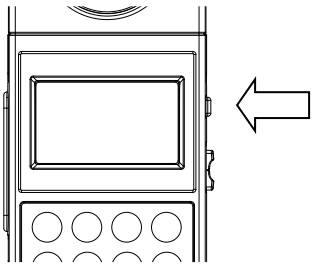
2.1 AUTO-RANGE MEASUREMENT AND DISPLAY RANGE

1 Remove the cap and start measurement.



2 The readout appears on the panel. When the readout is stabilized, read the value.

Turn on the HOLD switch, and the readout will be held.

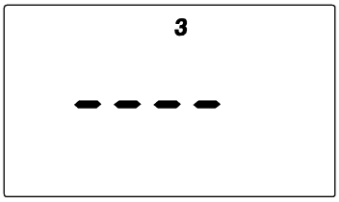


3 Turn off the HOLO switch, and measurement can be made again.

Display range and resolution in auto-range unit: μW/cm2

Range	Display range		Display resolution
	MIN	MAX	
Range 1	0.1～	280.0	0.1
Range 2	200～	2800	1
Range 3	2000～	28000	10
Range 4	20000～	280000	100

4 When a range is being changed ,it is displayed as follows.



Memo

- If the readout exceeds 280,000μW/cm^2, a code “E2” appears.
- By switching the response switch, you can select the detector responding speed. Select the responding speed [FAST] or [SLOW] depending on the light source to be measured.

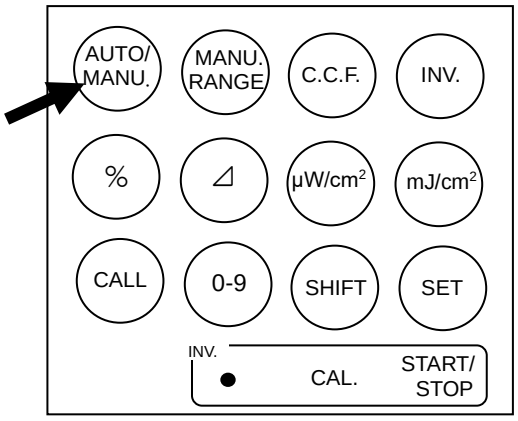
  Response ☞ ‘1.2 Names and functions of parts’
- If the readout is smaller than 0.1μW/cm^2, the figure “0” appears.

2.2 MANUAL-RANGE MEASUREMENT AND DISPLAY RANGE

1 Remove the cap and start measurement.

2 Push the [AUTO/MANU.] switch on the keyboard.

The system switches to manual range.

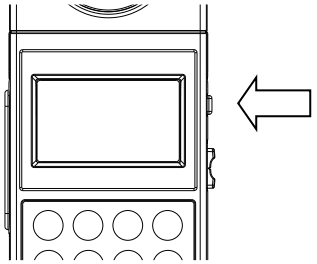


3 Pushing the [MANU. RANGE] switch to advance to the range as follows:

1→2→3→4

4 A measured value appears in the display, read the value when it becomes stable.

To fix the readout, set the hold switch to ON.



5 For continuous measurement, set the hold switch to OFF, and the measurement will start again.

Display range and resolution in manual-range unit: μW/cm2

Range	Display range		Display resolution
	MIN	MAX	
Range 1	0.1～	280.0	0.1
Range 2	1～	2800	1
Range 3	10～	28000	10
Range 4	100～	280000	100

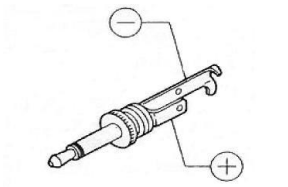
Memo

- If the readout is exceeds the display range, a code “E2” appears.
- By switching the response switch, you can select the detector responding speed. Select the responding speed [FAST] or [SLOW] depending on the measuring light source to be measured.

  Response ☞ ‘1.2 Names and functions of parts’
- If the readout is smaller than 0.1μW/cm^2, the figure “0” appears.

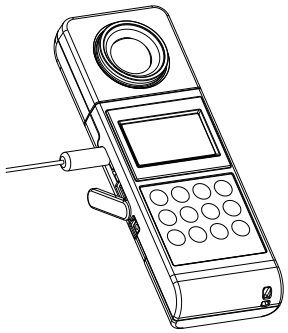
2.3 HOW TO USE THE ANALOG OUTPUT CONNECTOR

1 The analog output plug has a polarity as shown in the figure. Connect the analog output plug with a shield line by soldering and connect it with an outer recorder.



2 Insert the analog output plug into the analog output connector.

The output impedance of the instrument is not more than 100 ohm.



Memo

- The analog output voltage is calibrated to 1mV/digit (display resolution). The display resolution varies depending on the range.
- When the manual range is used, the maximum output voltage is 3 V. Therefore, values exceeding the display range are measurable. For example, when the range 1 is adopted, values in a range from 0.1 to 300.0μW/cm^2 are measurable. When analog output voltage exceeds 2.8V, E2 appears on the display.

3. SETTING PROCEDURES

3.1 NUMERIC ENTRY

Numeric entry can be processed on the C.C.F. setting, and the Δ mode and the % mode.

1 Select the numeric entry screen in the C.C.F. setting, Δ mode or % mode.

2 Enter a numeric value through the [0 - 9] switch.

3 To shift the digit, push the [SHIFT] switch.

To change the numeric value after shifting the digit, repeat procedure *2*.

4 To enter a decimal point, first push the [INV.] switch and then the [●] ([0 - 9]) switch.

5 After entering a numerical set value, push the [SET] switch to activate the set value.

3.2 IRRADIANCE MEASUREMENT(μW/cm2 MODE)

1 When you turn on the power, the instrument enter μW/cm^2 mode automatically.

2 To enter the μW/cm^2 mode from another mode, push the [μW/cm^2] switch.

3.3 CORRECTION FACTOR (C.C.F. setting)

1 Push the [C.C.F.] switch, and the currently set C.C.F. value is displayed.

If no correction factor is registered, a set of figures “0000” is displayed and the screen turns to the screen for numeric entry.

If a correction factor is registered, the current correction factor is displayed for 3 seconds and correction factor become effective.

If the [C.C.F.] switch is pushed again within 3 seconds, the screen turns to the same screen for numeric entry.

Correction factor having been entered

Correction factor not having been entered

Change of correction factor (C.C.F.)

1 Push the [C.C.F.] switch.

2 Entering a numerical value and pushing the [SET] switch to activate the correction factor.

3 After displaying the correction factor for 3 seconds, the system returns to the previous measuring mode.

Entering numerical value ☞‘3.1 NUMERIC ENTRY’

Memo

- Enter the correction factor in the range of 0.001 to 1000.
- To cancel the correction factor, enter 1.000 as the correction factor.
- After completion of the C.C.F. setting mode, the system returns to the previous measuring mode.
- Once correction factor is activated, Readout is a value multiplied by the correction factor.

  Readout = Measured value x Correction factor (C.C.F.).
- If the readout exceeds the display range of 999900 due to setting too large a correction factor, the code E4 appears.
- During measurement of the integral irradiance, the correction factor can not be changed.

3.3.1 SETTING PROCEDURE (To enter 1.2 to C.C.F.)

1 When the [C.C.F.] switch is pushed, the current correction factor appears.

2 When the correction factor is to be changed, push the [C.C.F.] switch again within 3 second after the above process, then the screen turns to the numeric entry screen.

3 Push the [0 - 9] switch to change the blinking digit to 1.

4 Push the [INV.] switch, and check if the mark INV appears.

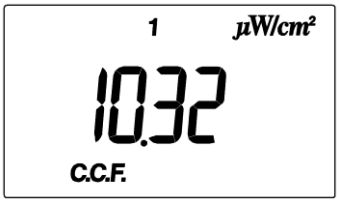
5 Push the [●] ([0 - 9]) switch to set the decimal point.

6 Push the [SHIFT] switch to move the blinking digit to a lower position.

7 Push the [0 - 9] switch to change the blinking digit figure to 2.

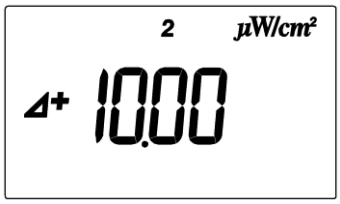
8 Push the [SET] switch to complete setting.

9 Complete setting of the correction factor to return to the measurement mode.



3.4 DEVIATION MEASUREMENT (Δ MODE)

1 Press the [Δ] switch to enter the Δ mode. In this mode, an amount of deviation from a reference value appears.



(An example showing that the deviation is +10μW/cm^2)

Deviation = (C.C.F. x Irradiance) – Reference value

(C.C.F. x Irradiance): Readout in the μW/cm^2 mode

Memo

・If a reference value is not set, the screen changes to the numeric entry screen for reference value.

How to set a reference value (based on the measurements)

1 In the μW/cm^2 mode, make measurement under the condition you want to be selected as a reference.

2 When measured value becomes stable, push the hold switch to ON, and fix the display.

3 Push the [SET] switch. The fixed value is set as the reference value.

4 Push the hold switch to OFF.

5 Push the [Δ] switch to shift to Δ mode.

How to set the reference value (setting a given value as reference)

1 Push the [Δ] switch to shift to Δ mode.

2 Enter a numerical value and push the [SET] switch to activate the reference value.

Memo

- The standard input value range is from 0.001 to 999900.
- If the value 0 is entered as the standard value, a code E7 appears.
- Once the standard value is set, it continues to be active until it is changed or the power is turned off.
- The standard value is not set when the power is turned on. If the Δ mode is selected in this condition, the screen automatically changes to the standard-value-entering screen.
- When the standard value is set with the [SET] switch, the standard value appears for 3 seconds, and then the system returns to the previous mode.

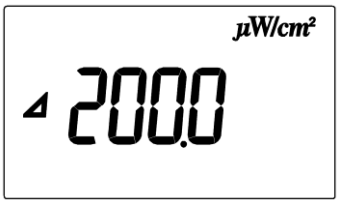
Entering numerical value ☞'3.1 NUMERIC ENTRY'
Setting procedure ☞'3.4.1 SETTING PROCEDURE'

3.4.1 SETTING PROCEDURE (Setting 100.0 as the reference value)

Memo

- The setting procedure is common to the Δ mode and % mode. The example is the Δmode. To set the % mode, push the [%] switch.

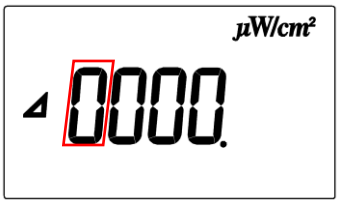
1 When the [Δ] switch is pushed, the currently set reference value appears. If the reference value is set, the currently set value appears for 3 seconds.



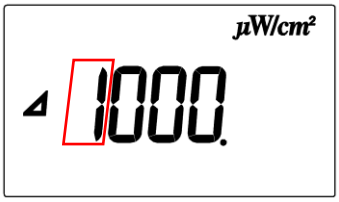
Memo

- If no reference value is set, the “0000” appears and the screen changes to the numeric entry screen.

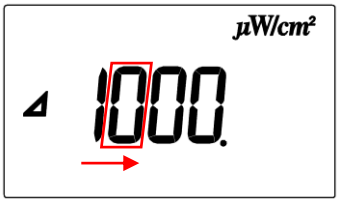
2 To change the reference value, push the [Δ] switch within 3 seconds after the above process to shift to the numeric entry screen.



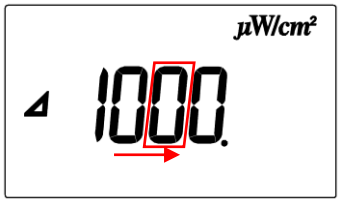
3 Push the [0 - 9] switch to change the blinking digit figure to 1.



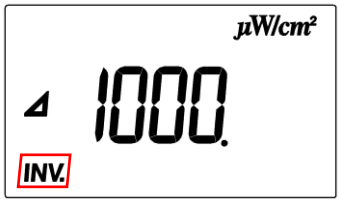
4 Push the [SHIFT] switch to move the blinking digit to a lower position.



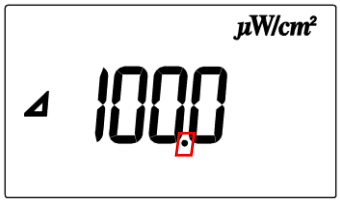
5 Push the [SHIFT] switch again to move the blinking digit to a lower position.



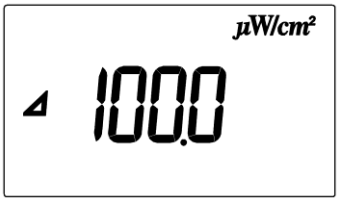
6 Push the [INV.] switch, and check if the mark INV appears.



7 Push the [●] ([0 - 9])switch to set the decimal point.



8 Push the [SET] switch to complete the setting.



Memo

- To amend the entered value before completing the setting, push the [SHIFT] switch a few times to specify the digit to be amended. The only figure able to be entered in the 5th and 6th digit is 0 (zero).
- When the reference value is set with the [SET] switch, the reference value appears for about 3 seconds and then the system returns to the previous mode.

3.4.2 HOW TO CHECK THE REFERENCE VALUE

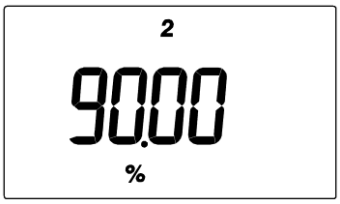
1 t is possible to check the entered reference value by pushing the [INV.] switch and then pushing the [CALL] ([SHIFT]) switch.

Memo

- The reference values for the Δ mode are the same as for the % mode.
- The [CALL] switch is valid only during a measuring operation in the Δ mode and % mode.

3.5 PERCENT MEASUREMENT (% MODE)

1 Push the [%] switch to enter the % mode, the readout shows the ratio of the measured value to the reference value.



(Example: The deviation is expressed as 90%)

Percent = ((C.C.F. x Irradiance) / reference value) × 100

How to set the reference value (on the basis of measurements)

1 In the μW/cm^2 mode, make measurement under the condition you want to be selected as a reference.

2 When the measured value becomes stable, push the hold switch to ON to fix the display.

3 Push the [SET] switch. The fixed value is set as the reference value.

4 Push the hold switch to OFF.

5 Push the [%] switch to shift to the % mode.

How to set the reference value (setting a given value as standard)

1 Push the [%] switch to shift to % mode.

2 Enter a numerical value and push the [SET] switch to activate the standard value.

Memo

- The input value range is from 0.001 to 999900.
- If the value 0 is entered as the standard value, a code E7 appears.
- The set value is hereafter held until the reference value is changed or the power switch is turned off.
- When the power is turned ON, no reference value is present. If in this state, you select the % mode, then the screen automatically changes to the numeric entry screen.
- When the reference value is set with the [SET] switch, the reference value appears for 3 seconds, and then the system returns to the previous mode.

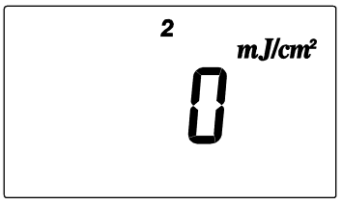
Entering numerical value ☞'3.1 NUMERIC ENTRY'
Setting procedure ☞'3.4.1 SETTING PROCEDURE'

3.6 'MEASUREMENT OF INTEGRAL IRRADIANCE' (mJ/cm^2) MODE

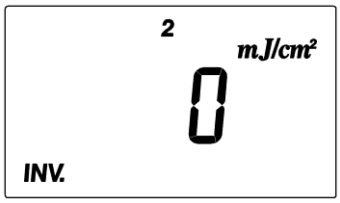
1 Press the [mJ/cm^2] switch to enter Integral irradiance mode. In this mode, Readout shows integral irradiance and integral time.

Start of integration

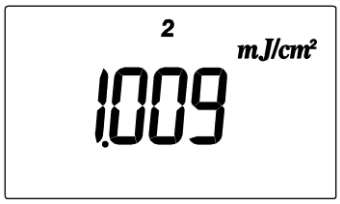
1 Push the [mJ/cm^2] switch to shift to the mJ/cm^2 mode.



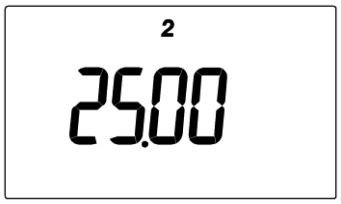
2 Push the [INV.] switch, and check if the mark INV appears.



3 Push the [START/STOP]([SET]) switch, then integration will start.



Example: Irradiation 1.009mJ/cm^2



Example: Integration time 25 seconds

Memo

- The display alternately shows the integral irradiance and integration time at 2-second intervals.
- Even after switching to another measurement mode, the integration is continued. If the [mJ/cm^2] switch is pressed again, then an integral irradiance is displayed.
- It is not possible to change the C.C.F. during integration.

Integration stop

1 In a mode other than the mJ/cm^2 mode, push the [mJ/cm^2] switch to shift to the mJ/cm^2 mode.

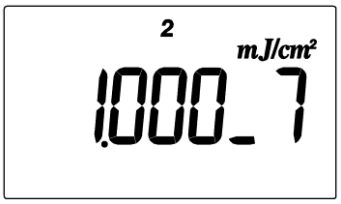
2 If the [START/STOP] switch is pushed after pushing the [INV.] switch, the integration stops.

Memo

- The value of integral irradiance by the time measuring stop is displayed.
- To check the integral irradiance and integration times by the time measuring stop, push the hold switch to ON. The integral irradiance and integral time appear alternately for a half second each.
- Push the [INV] switch and [START/STOP] switch, and then the UV-300 will start integration from 0 mJ/cm^2 and 0 second.
- Even when the mode changes to another mode after integration stops, previous integral irradiance and integral time are displayed after selecting [mJ/cm^2] mode again and push the HOLD switch to ON. Both “integral irradiance” and “integration time” are alternately displayed at 1-sec. intervals.

Range of integral irradiance and integration time

The maximum indication of integral irradiance is 1,000,000,000 mJ/cm^2 and values over 999900 mJ/cm^2 are expressed using exponents. The upper limit of the integration time is 999,900 seconds.



Example: Integral irradiance 10,000,000 mJ/cm^2

Memo

- When integral irradiance values exceed the upper limit, a code E5 appears.
- Any when integration time values exceed the upper limit, a code E6 appears.
- If you measure the integral irradiance for a long time, we recommend you use AC adapter.

Suspension of integral irradiance measurement

If the HOLD switch is turned on during the integral irradiance measurement, the integration will stop. Then the value of integral irradiance by the time integral irradiance measurement stop is alternately displayed at 0.5-sec intervals.

If the HOLD switch is turned OFF, integral irradiance measurement resume.

3.7 ZERO ADJUSTMENT (CAL MODE)

1 Zero adjustment start after pushing the [INV.] switch and then [CAL.] ([SHIFT]) switch.

Memo

- When power is turned ON, the system automatically conducts a zero adjustment.
- With the response switch in either FAST or SLOW setting, it is possible to conduct a zero adjustment.
- The time required for a zero adjustment differs depending on the setting of the response switch. FAST: about 10 seconds; SLOW: about 45 seconds.
- It is possible to conduct a zero adjustment even if you remove the cap.

4. COMMUNICATION WITH PC

4.1 COMMUNICATION COMMAND

This instrument can communicate with PCs. This chapter describes the commands for creating communication program with the UVR-300 on user own.

The following are the communication commands:

Command name	Function
STR0	Sets measurement range to auto range, and obtains measured value.
STRn	Sets measurement range to manual range, and obtains measured value n: 1 – 4
ISR0	Sets measurement range to auto range, and starts measurement of integral irradiance.
ISRn	Sets measurement range to manual range, and starts measurement of integral irradiance n: 1 – 4
ISTR0	Sets measurement range to auto range, and obtains integration status data (irradiance, integral irradiance, integration time and measurement range)
ISTRn	Sets measurement range to manual range, and obtains integration status data (irradiance, integral irradiance, integration time and measurement range) n: 1 – 4
IEND	Stops measurement of integral irradiance.
CA	Starts a zero adjustment.
WHO	Reads product name (UVR-300 is read out).
VER	Reads software version.
SRL	Reads product serial number.
SCCF_####	Sets correction factor (C.C.F.), and stores in EEPROM Enters #### or #.### or exponent notation #.###E±## Range to enter: 0.001 – 1000
RCCF	Reads correction factor (C.C.F.) #.###E±##

The "_" mark means a space. "####" is a numerical value.

When PC send a communication command to the UVR-300, the UVR-300 returns "OK" as a receipt acknowledgment. When the UV-300 receive improver command, the UV-300 returns "NG".

Memo

- No command can be accepted while zero adjustment is conducted. Send commands after completion of the zero adjustment.

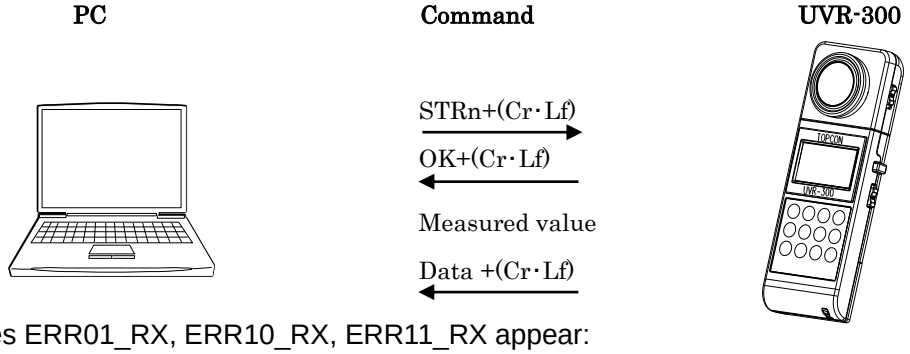
4.1.1 STRn COMMAND

When this command is sent to the UVR-300, measured data in a text format is returned from the instrument.

The UV-300 send measured data to PC after changing measurement range. The changeover time of the measurement range depending on the response switch setting.

n: 0 (Auto range)

n: 1 – 4 (Manual range)



If error codes ERR01_RX, ERR10_RX, ERR11_RX appear:

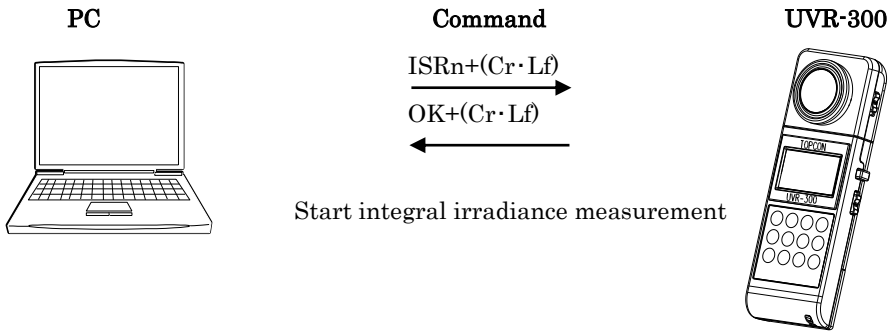
☞'5.2 COMMUNICATION ERROR CODE'

4.1.2 ISRn COMMAND

When this command is sent to the UVR-300, measurement of integral irradiance will start. If the integration measurement has been working before this command is sent to the UVR-300, this command is invalid.

n: 0 (Auto range)

n: 1 – 4 (Manual range)



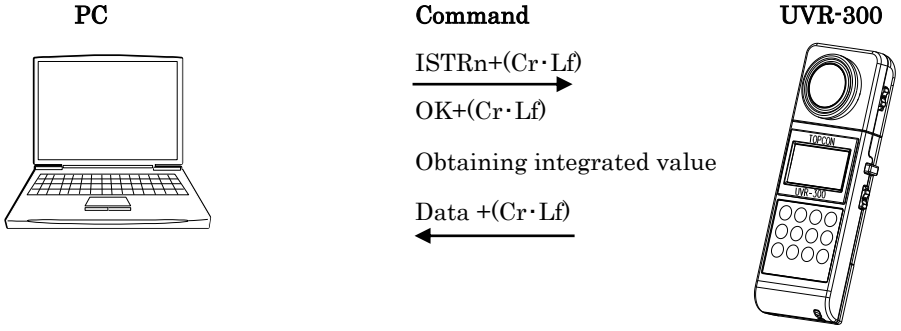
4.1.3 ISTRn COMMAND

When this command is sent to the UVR-300, the status data at this time measurement of integral irradiance is obtained.

The UV-300 send measured data to PC after the instrument change measurement range. The changeover time of the measurement range depending on the response switch setting.

n: 0 (Auto range)

n: 1 – 4 (Manual range)

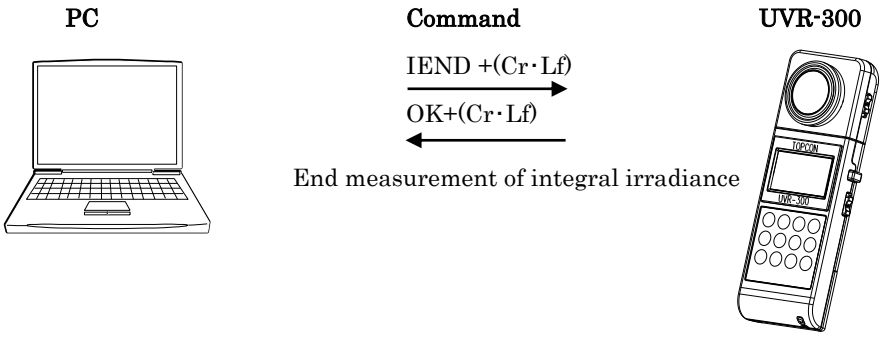


If error codes ERR01_RX, ERR02_RX, ERR04_RX, ERR05_RX, ERR06_RX, ERR10_RX and ERR11_RX appear:

☞'5.2 COMMUNICATION ERROR CODE'

4.1.4 IEND COMMAND

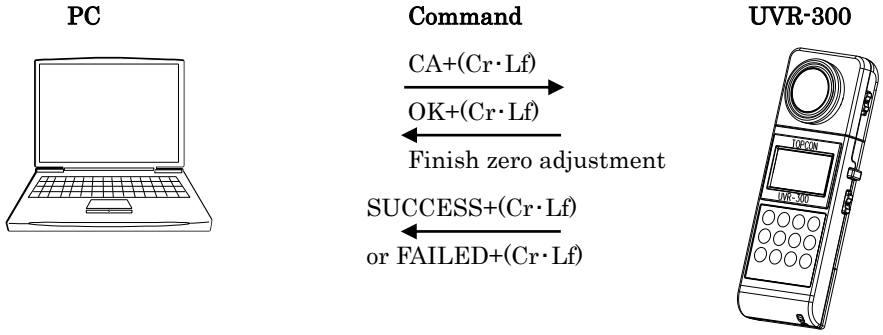
When this command is sent to the UVR-300, measurement of integral irradiance ends. This command ends the measurement of integral irradiance and does not return any values.



4.1.5 CA COMMAND

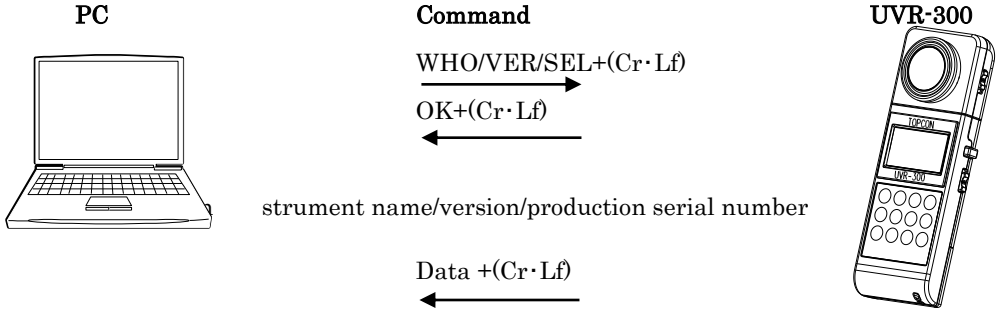
When this command is sent to the UVR-300, zero adjustment starts.

When this command is sent to the UV-300 during measuring the integral irradiance, entering reference value and entering C.C.F, this UV-300 return “FAILED”.



4.1.6 WHO/VER/SRL COMMAND

This command reads the name of this instrument, program version and production serial number.

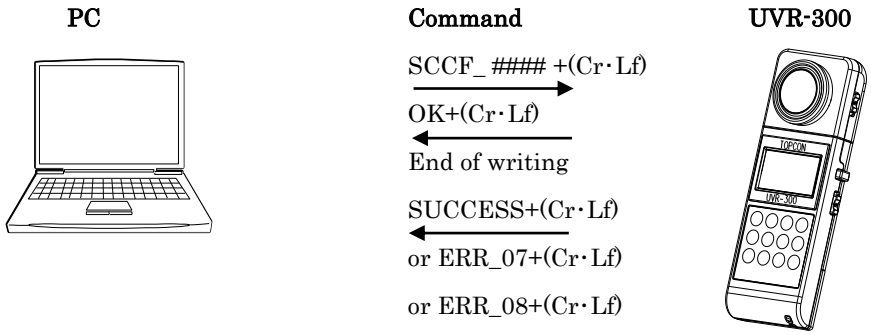


4.1.7 SCCF COMMAND

When this command is sent to the UVR-300, C.C.F. is set out and stored in EEPROM.

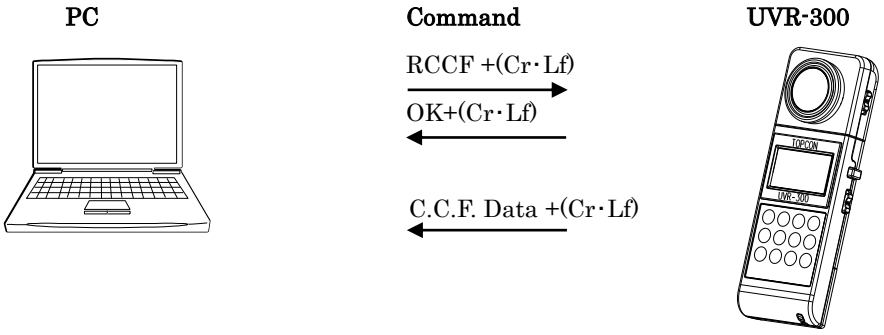
The input value can be set from 0.001 to 1000.

When an input value is over or under 0.001-1,000, the error code ERR_07 is returned from the UV-300. If recording storing fails, the code E8 is returned.



4.1.8 RCCF COMMAND

When this command is sent to the UVR-300, C.C.F. is read out.



4.2 OUTPUT FORMAT

4.2.1 OUTPUT FORMAT FOR REMOTE MEASUREMENTS

Output format list

Name of command	Format type
STRn	#.###E±##_R#UW Displayed in the same resolution as the LCD display <Example> When measured value in Irradiance is 1.0μW/cm^2 at Range 1, output data will be “1.000E+00_R1UW; “R1UW” means Range: 1 UW : Irradiance (μW/cm^2),
ISTRn	#.###E±##_#.###E±##_#.###E±##R# Displayed in the order of irradiance, integral irradiance (integrated value), integration time (seconds), range
VER	#.##
WHO	UVR-300
SRL	######## Displays production serial number in 8 digits
RCCF	#.###E±## Displayed exponential value

The mark “_” means a space. “####” is a numerical value.

4.3 USB Driver

The following describes the procedure for installing the USB drive.

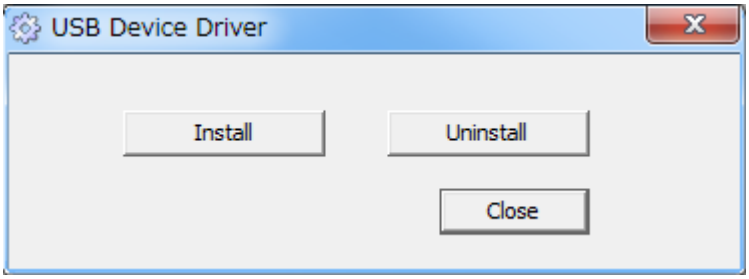
1 Insert the CD-ROM supplied with the UVR-300 into CD-ROM drive.

2 Select [USBDeviceDriver.exe] in the [Driver] folder in the CD-ROM drive, right-click and click [Run as administrator].

OS	Windows® 10 Pro(32bit／64bit) Windows® 11 Pro(64bit)

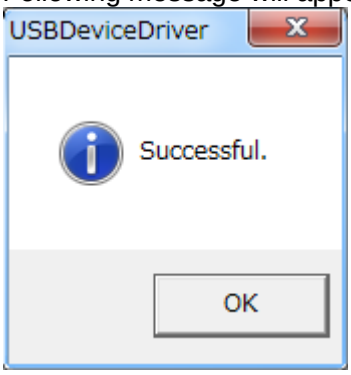
※ Windows is trademark and registered trademark by Microsoft Corporation

3 Following dialog will appear.



4 Click [Install] button.

5 Following message will appear after completing driver install. Click [OK] button.



6 Click [Finish] button to finish.

Memo

To uninstall, click [Uninstall] button for step 4 above.

Memo

The following 2 types of drivers are installed.

- Serial converter
- Serial port

5. ERROR MESSAGE

5.1 ERROR CODE FOR INSTRUMENT

Error code	Explanation	Action
E1	Appears when the zero adjustment is not complete.	Check if the detector connect to Display unit correctly. If no problems are found, contact your dealer or TOPCON TECHNOHOUSE.
E2	In manual range mode, appears when the measured value exceeds the display range. In auto range mode, appears when the measured value exceed measurement range at range 4.	Check the measurement range.
E3	Appears when the value exceeds 9999% in the % measurement mode.	The difference in irradiance between measured value and reference value is too large.
E4	Appears when a correction factor is effective and the obtained value exceeds the display range 999900 μW/cm^2.	Check if the correction factor is correct, and measure within the range not exceeding the display range.
E5	Appears when measured vale in integral irradiance exceeds 1,000,000,000 mJ/cm^2.	Measure within the range not exceeding the integral irradiance range.
E6	Appears when integration time exceeds 999900 seconds.	Measure within the range not exceeding the integration time range.
E7	Appears when entered reference values and correction factors are out of the input range.	Check the input range.
E8	Appears when data can not be written or read out due to defects of EEPROM.	Contact your outlet dealer or TOPCON TECHNOHOUSE.
E10	Appears when the response switch is turned 3 times (maximum applicable times) or more when a zero adjustment is being conducted.	Never turn the response switch when a zero adjustment is being conducted.

●If an error message is still displayed even after the above action is conducted, repair may be required.

Contact TOPCON TECHNOHOUSE or the dealer where you purchased this instrument.

5.2 COMMUNICATION ERROR CODE

When an error occurs on the instrument, which communicate with PC and conduct measurement, following error messages is sent to your PC.

Error code	Explanation	Action
ERR01_Rx	Appears when a zero adjustment is not correctly complete.	Check if the detector connect to the display unit correctly and if no problems are found, contact your dealer or TOPCON TECHNOHOUSE.
ERR02_Rx	In manual range mode, appears when the measured value exceeds the display range. In auto range mode, appears when the measured value exceed measurement range at range 4.	Check the measurement range.
ERR04_Rx	Appears when a correction factor is effective and the obtained value exceeds the display range 999900 μW/cm^2.	Check if the correction factor is correct, and measure within the range not exceeding the display range.
ERR05_Rx	Appears when measured value in integral irradiance exceeds 1,000,000,000 mJ/cm^2.	Measure within the range not exceeding the integral irradiance range
ERR06_Rx	Appears when integration time exceeds 999900 seconds.	Measure within the range not exceeding the integration time range.
ERR07	Appears when entered reference values and correction factors are out of the input range.	Check the input range.
ERR08	Appears when data can not be written or read out due to defects of EEPROM.	Contact your dealer or TOPCON TECHNOHOUSE.
ERR10	Appears when the response switch is turned 3 times (maximum applicable times) or more when a zero adjustment being conducted.	Never turn the response switch when a zero adjustment being conducted.
ERR11_Rx	Appears when STRn or ISTRn command is sent to the UVR-300 while HOLD switch is ON and measurement range is being changed.	Check if the hold switch is turned OFF.
ERR12	Appears when a command is sent when a zero adjustment is being conducted.	Send a command after completing the zero adjustment.
NG	Appears when a command is not proper.	Check if the entered command is correct.
FAILD	Appears when either command for start of integration, stop of integration or a zero adjustment has failed.	Start/stop of integration integral irradiance or zero adjustment can not be set while integral irradiance is being measured. Try it again after completing integration.

6. SUPPLEMENT

SPECIFICATIONS AND PERFORMANCE

■UVR-300 Specifications and performance

Measurement range	0.1– 280000μW/cm^2 Auto/manual 4-step range
Display	4-digit LCD Read
Linearity	± 5% of rdg.; ± 1 digit (Auto range)
Measurement wavelength range	UD-250 220 – 300 nm UD-360A 320 – 400 nm UD-400 360 – 490 nm
Temperature characteristics	Within ±3% (-10 to 40˚C; against 23˚C)
Humidity characteristics	Within ±3%
Analog signal output	0～3Vmax, 1mV/1digit
Interface	USB (Virtual COM port)
Power supply	AA battery × 2
Operating conditions	Temperature: -10 to +40˚C Humidity: 85% RH or less
Dimensions	Approx. 195 mm × 70 mm × 33 mm (including detector)
Weight	About 260 g (including detector and batteries)
Detector unit types such as UD-250, UD-360A, UD-400 are available according to measurable wavelengths range, but the display unit can be used with any of them.	
Detection element	Silicon photodiode
Calibration light source	UD-250 GL-15 UD-360A FL20S･BLB UD-400 Standard light source A

Memo

・The UV-300 can measure absolute value of the irradiance only when it measures the same light source as the calibration light source which have the same spectral distribution. Use the unit to provide relative measurements for the other light sources.

Republic of Korea	KC:Class A	해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다 A급 기기 (업무용 방송통신기자재) 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다

FCC Compliance Information

This device complies with Part 15 of FCC Rules. Operation is subject to the following twoconditions:

(1) the device may not cause interference, and

(2) the device must accept anyinterference, including interference that may cause undesired operation of this device.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expence.

EU Battery Directive

This symbol is applicable to EU members states only.

Battery users must not dispose of batteries as unsorted general waste, but treat properly.
If a chemical symbol is printed bebeath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows:
Hg: mercury(0.0005%), Cd: cadmium(0.002%), Pb: lead(0.004%)

These ingredients may be seriously hazardous to human and the global environment.

UNIT CONVERSION IN THE UV BEAM MEASUREMENT

Basic relation

Joule Watt Second
[J] = [W] × [s]

Joule erg
[J] = 10^7[erg]

[cm^2] = 10^{-4}[m^2]

Hour
[h] = 3600[s]

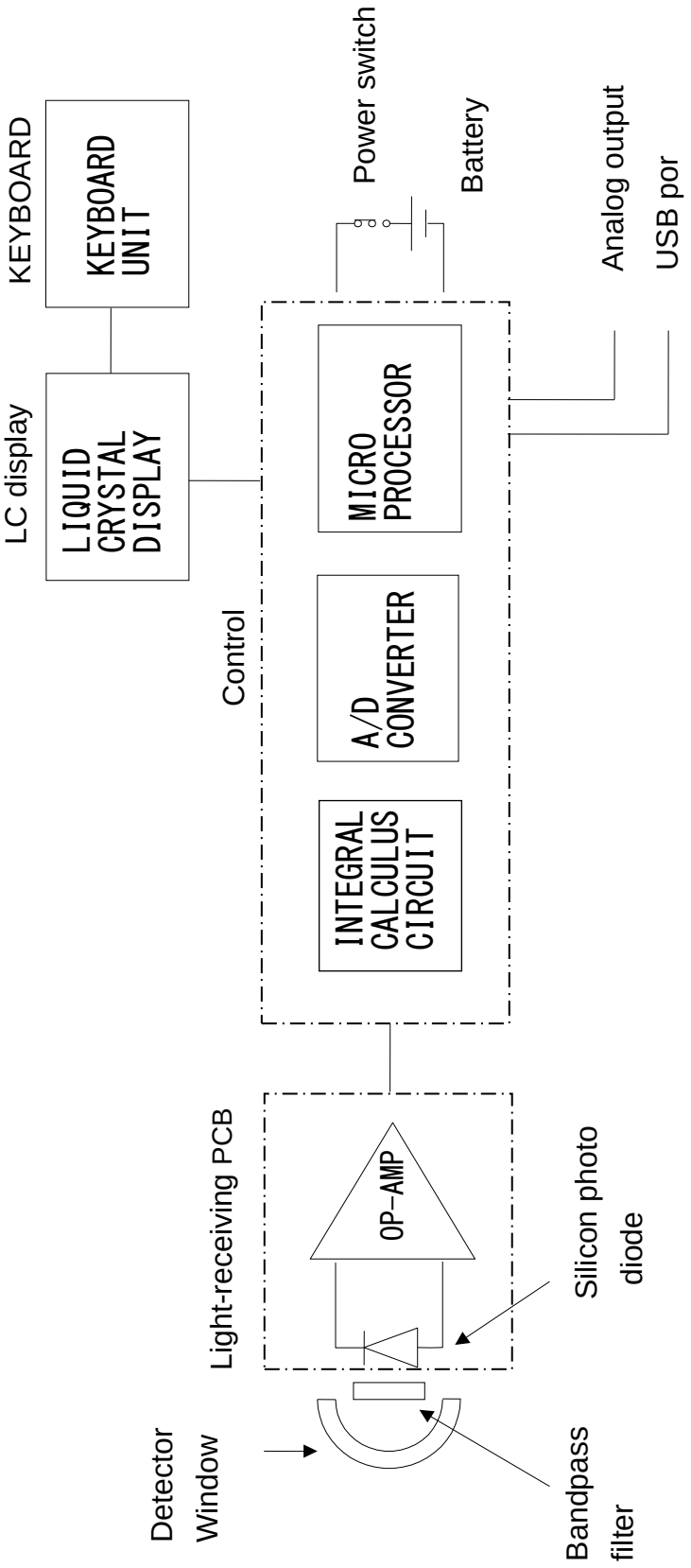
Unit conversion sample

$$mW/cm^2 = \frac{10^{-3}W}{10^{-4}m^2} = 10W/m^2$$

$$mW/cm^2 = 1000\mu W/cm^2$$

$$mW \cdot h/cm^2 \ \frac{10^{-3}W \cdot 3600s}{10^{-4}m^2} = 36000J \ / \ m^2$$

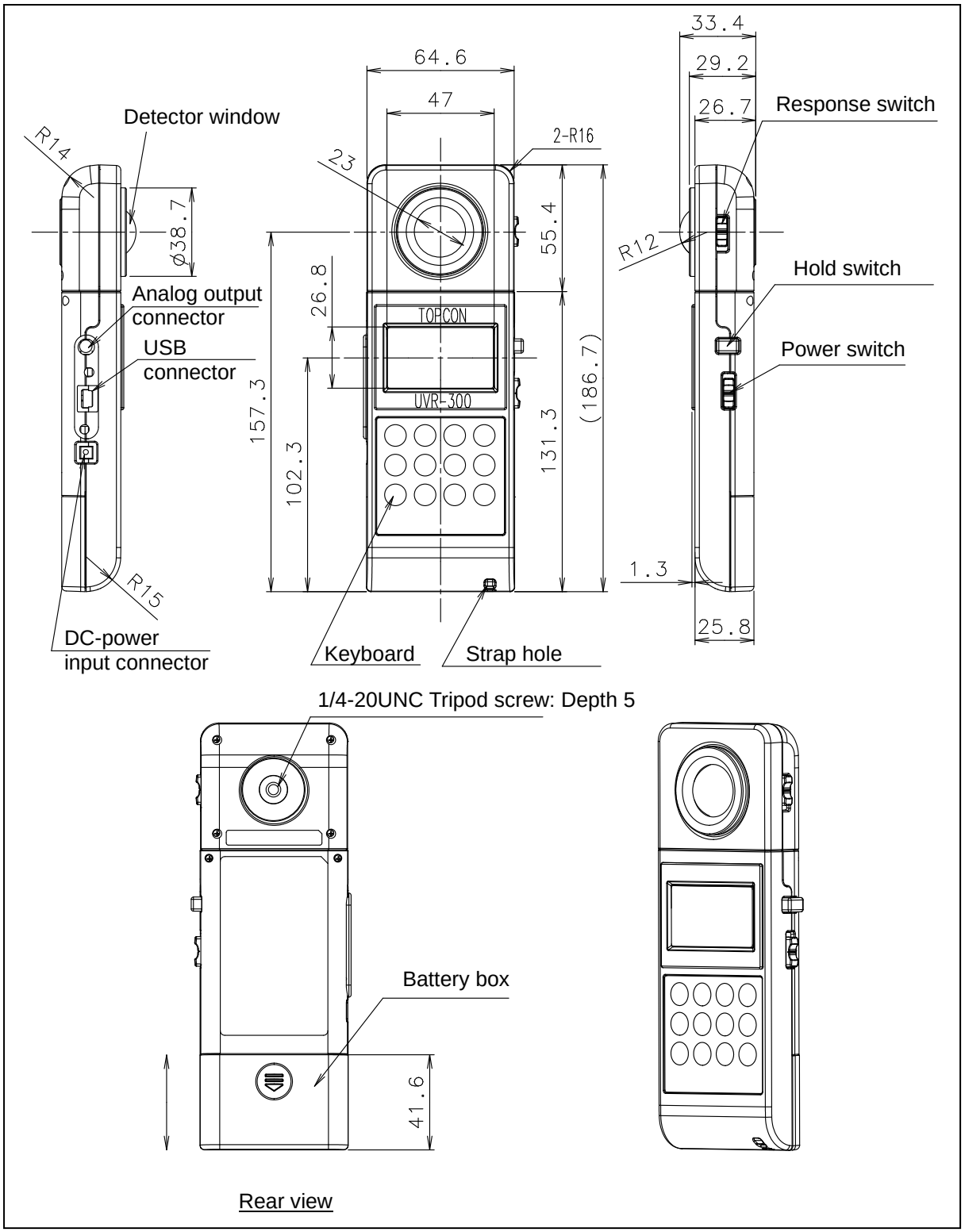
BLOCK DIAGRAM



OUTLINE DIMENSION

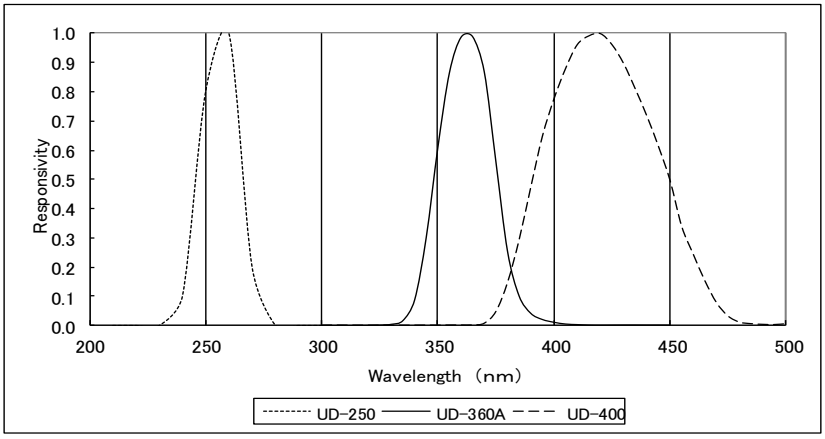
Request	Use only specified screws when using the tripod screw and screw holes for jig attachment. Do not tighten the screws any more than necessary. Doing so might cause internal breakage.

■UVR-300

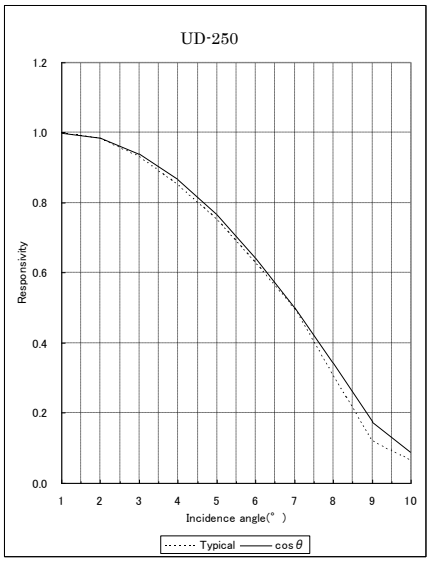


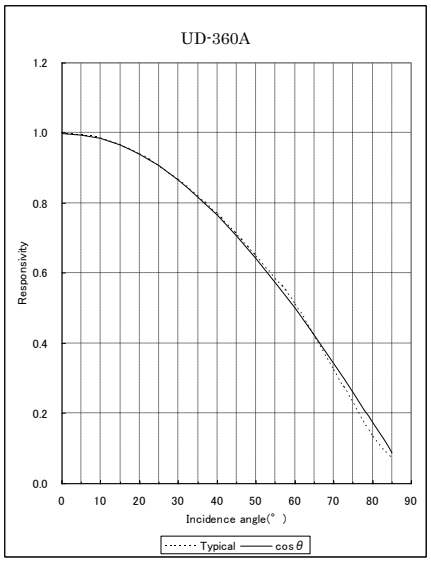
GRAPH

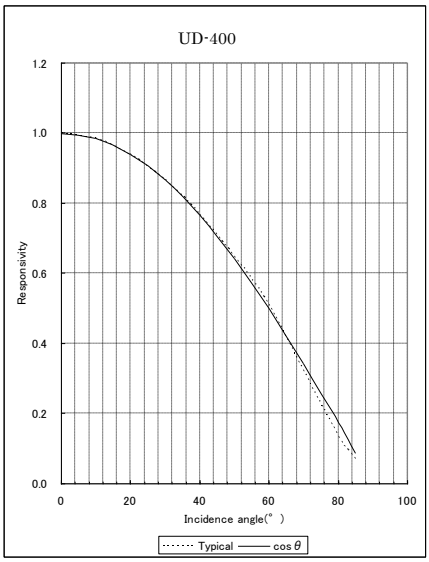
Spectral sensitivity



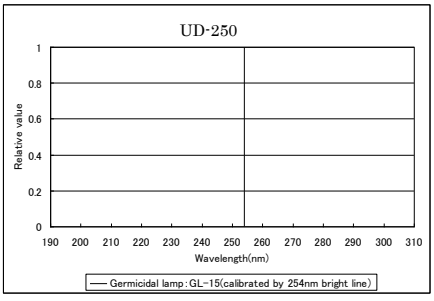
Angular incident light characteristics

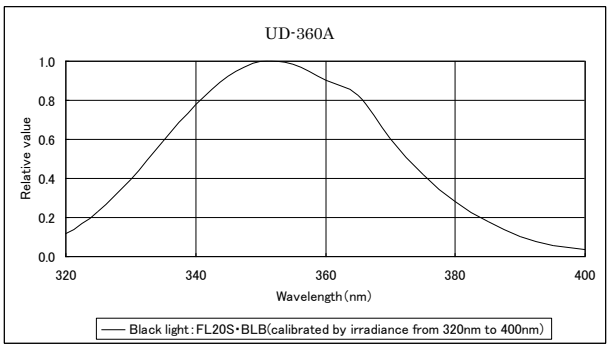


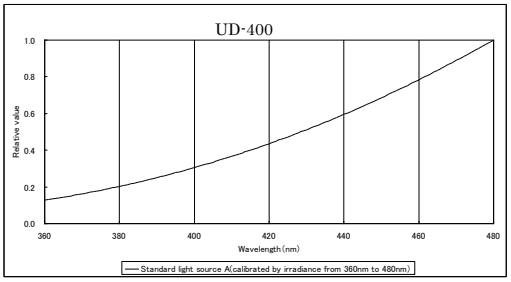




Spectral distribution of calibration light source







WARRANTY PRERIOD

One year from the date of shipment.

REPAIR DURING WARRANTY PERIOD

Failure occurs to the instrument when the instrument has been operated according to the instruction manual and, the failure caused by design or manufacture will be repaired free of charge.

REPAIR AFTER WARRANTY PERIOD

Repair after the warranty period is carried out if possible and have to be paid in full by the user.

MAINTAINABLE PERIOD

The repair parts (*1) are retained by us for eight years (*2) after purchase.

The repairable period is this period that parts are kept in stock.

Even after the storage period has elapsed, there are cases in which repair may be possible, so contact your dealer or Topcon Technohouse Corporation.

(*1) “Maintenance and repair parts” mean the parts that are necessary to maintain the function of the product.

(*2) We make our most effort to keep maintenance and repair parts in stock for the complete storage period, however, due to some unexpected occurrence, the storage period may have to be shortened.

DISPOSAL

Disposal of this instrument should be conducted in accordance with the disposal and recycling ordinances by your local government.

WHEN YOU INQUIRE OR CONSULT US, PLEASE LET US KNOW ABOUT THE FOLLOWING DATA

・Product serial No.	Listed on the ratings plate at the bottom of this instrument
・Operating period	Please let us know about the dates of system purchase and calibration.
・Operating conditions	Such as Lamp type, and its positional relation with this instrument, etc.
・Trouble situation	Let us know in detail as far as possible.

Contact See the back cover of this Instruction Manual.

UV RADIOMETER

UVR-300

Contact Information

TOPCON TECHNOHOUSE CORPORATION

75-1 Hasunuma-cho, Itabashi-ku, Tokyo 174-8580 Japan

◆ **Inquiries regarding the product**

Tel +813(3558)2666 Fax +813(3558)4661

◆ **Inquiries regarding repairs and maintenance**

Tel +813(3558)2710 Fax +813(3558)3011

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75-1 Hasunuma-cho, Itabashi-ku, Tokyo 174-8580 Japan