

UV Digital Probe

Code: 86129

User Manual V5.00

Please read this manual carefully before using and reserve it for reference.

I. Product Introduction

UV Digital Probe is an ultra-small intelligent UV digital probe which can be used for all situations that need UV power and temperature values. The probe has standard RS485 communication interface and MODBUS communication protocol. It is convenient to communicate with PLC, human-computer interface, computer and other equipment and collect and monitor real-time data. According to the tested UV spectrum range, application industry, etc., seven different UV digital probes have been developed:

No.	Probe Model	Spectral Response	Application
1	UVALED	340nm-420nm	For UV LED area light intensity and energy measurement in UV curing
2	UVA	315nm-400nm	For high pressure mercury lamp light intensity and energy measurement in UV curing
3	UVC	230nm-280nm	254nm UV germicidal lamp light intensity and energy measurement
4	UVALED-X1	340nm-420nm	Straight optical fiber probe, UV LED area light source, high-temperature application
5	UVA-X1	315nm-400nm	Straight optical fiber probe, high-pressure mercury lamp, high-temperature application
6	UVALED-X2	340nm-420nm	Right-angle optical fiber probe, UV LED area light source, high-temperature application
7	UVA-X2	315nm-400nm	Right-angle optical fiber probe, high-pressure mercury lamp, high-temperature application

Standards for the product

JJG 879-2015 Verification Regulation of Ultraviolet Radiometers

WST 367-2012 Regulation of disinfection technique in healthcare settings

QB/T 2826-2017 Ultraviolet curing offset ink

II. Parameters

General parameters

- 1) Communication interface: RS485
- 2) Communication protocol: MODBUS

- 3) Supply voltage: DC 5V-24V
- 4) Operating Current: 20mA
- 5) Operating Power Consumption: 100mW
- 6) Operating temperature: -25°C to 85°C ($\leq 85\%$ RH, non-condensing)

1. UVALED Probe

- 1) Spectral response: 340nm-420nm, calibrated at 395nm
- 2) Power measurement range: 0-20000mW/cm²
- 3) Resolution: 1mW/cm²
- 4) Energy measurement range: 0 - 4×10^9 mJ/cm²
- 5) Data fresh cycle: 200ms
- 6) Measurement accuracy(H is the standard value): $H < 50\text{mW/cm}^2$: $\pm 5 \text{ mW/cm}^2$, $H \geq 50\text{mW/cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: 0.5m, resistant to high temperature of 200°C

2. UVA Probe

- 1) Spectral response: 315nm-400nm, $\lambda_p = 365\text{nm}$
- 2) Power measurement range: 0-2000mW/cm²
- 3) Resolution: 0.1mW/cm²
- 4) Energy measurement range: 0 - 4×10^9 mJ/cm²
- 5) Data fresh cycle: 200ms
- 6) Measurement accuracy(H is the standard value): $H < 5\text{mW/cm}^2$: $\pm 0.5\text{mW/cm}^2$, $H \geq 5\text{mW/cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: 0.5m, resistant to high temperature of 200°C

3. UVC Probe

- 1) Spectral response: 230nm-280nm, $\lambda_p = 254\text{nm}$
- 2) Power measurement range: 0-200000 $\mu\text{W}/\text{cm}^2$
- 3) Resolution: 0.1 $\mu\text{W}/\text{cm}^2$
- 4) Energy measurement range: 0 - $4 \times 10^9 \mu\text{J}/\text{cm}^2$
- 5) Data fresh cycle: 500ms
- 6) Measurement accuracy(H is the standard value): $H < 50\mu\text{W}/\text{cm}^2$: $\pm 5\mu\text{W}/\text{cm}^2$, $H \geq 50\mu\text{W}/\text{cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 6 times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: Integrated

4. UVALED-X1 Probe

- 1) Spectral response: 340nm-420nm, calibrated at 395nm
- 2) Power measurement range: 0 - 20000 mW/cm^2
- 3) Resolution: 1 mW/cm^2
- 4) Energy measurement range: 0 – $4 \times 10^9 \text{mJ}/\text{cm}^2$
- 5) Data fresh cycle: 200 ms
- 6) Measurement accuracy(H is the standard value): $H < 50 \text{mW}/\text{cm}^2$: $\pm 5 \text{mW}/\text{cm}^2$, $H \geq 50 \text{mW}/\text{cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: Integrated
- 11) Fiber length: 1m, temperature resistant up to 300°C
- 12) Fiber orientation: parallel to measurement aperture; minimum bend radius $\geq 70\text{mm}$

5. UVA-X1 Probe

- 1) Spectral response: 315nm-400nm, $\lambda_p = 365\text{nm}$
- 2) Power measurement range: 0 - 2000 mW/cm²
- 3) Resolution: 0.1 mW/cm²
- 4) Energy measurement range: 0 – 4×10⁹ mJ/cm²
- 5) Data fresh cycle: 200 ms
- 6) Measurement accuracy(H is the standard value): $H < 5 \text{ mW/cm}^2$: $\pm 0.5 \text{ mW/cm}^2$, $H \geq 5 \text{ mW/cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: Integrated
- 11) Fiber length: 1m, temperature resistant up to 300°C
- 12) Fiber orientation: parallel to measurement aperture; minimum bend radius $\geq 70\text{mm}$

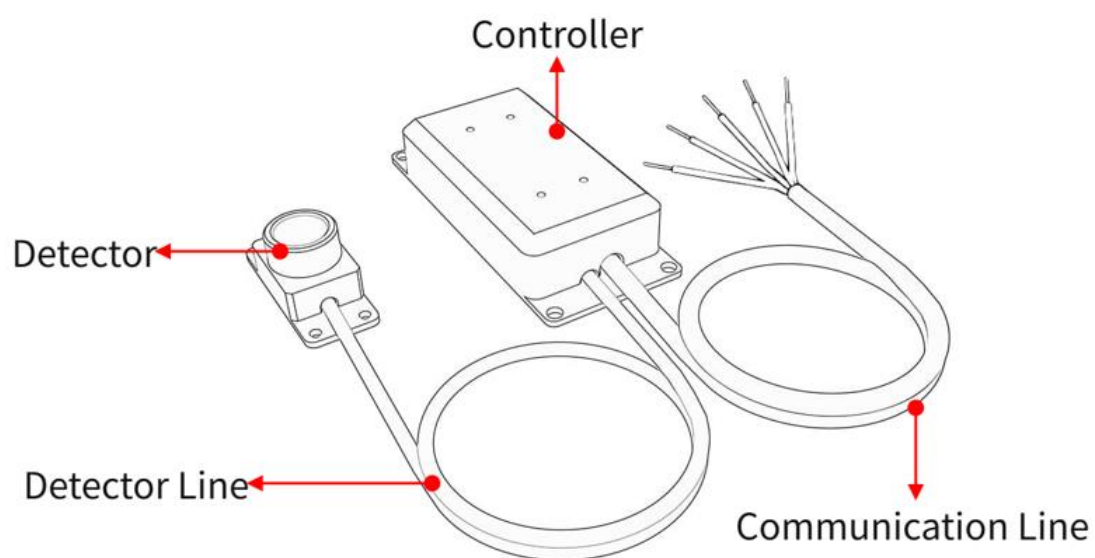
6. UVALED-X2 Probe

- 1) Spectral response: 340nm-420nm, calibrated at 395nm
- 2) Power measurement range: 0 - 20000 mW/cm²
- 3) Resolution: 1 mW/cm²
- 4) Energy measurement range: 0 – 4×10⁹ mJ/cm²
- 5) Data fresh cycle: 200 ms
- 6) Measurement accuracy(H is the standard value): $H < 50 \text{ mW/cm}^2$: $\pm 5 \text{ mW/cm}^2$, $H \geq 50 \text{ mW/cm}^2$: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: Integrated
- 11) Fiber length: 1m, temperature resistant up to 300°C
- 12) Fiber orientation: perpendicular to measurement aperture; minimum bend radius $\geq 70\text{mm}$

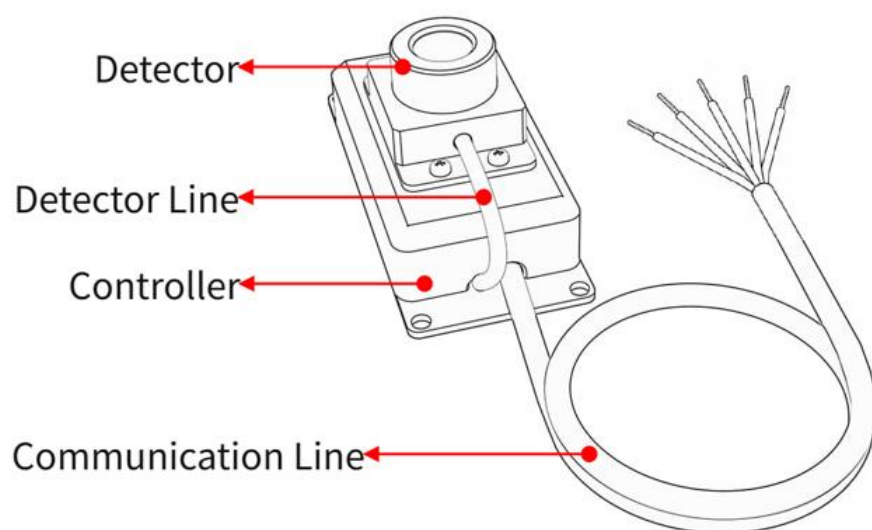
7. UVA-X2 Probe

- 1) Spectral response: 315nm-400nm, $\lambda_p = 365\text{nm}$
- 2) Power measurement range: 0 - 2000 mW/cm²
- 3) Resolution: 0.1 mW/cm²
- 4) Energy measurement range: 0 – 4×10⁹ mJ/cm²
- 5) Data fresh cycle: 200 ms
- 6) Measurement accuracy(H is the standard value): H<5 mW/cm²: $\pm 0.5 \text{ mW/cm}^2$, H≥5 mW/cm²: $\pm 10\%H$
- 7) Sampling speed: 2048times/s
- 8) Test light hole diameter: $\Phi 10\text{mm}$
- 9) Communication line length: 1m, resistant to high temperature of 80°C
- 10) Detector line length: Integrated
- 11) Fiber length: 1m, temperature resistant up to 300°C
- 12) Fiber orientation: perpendicular to measurement aperture; minimum bend radius ≥70mm

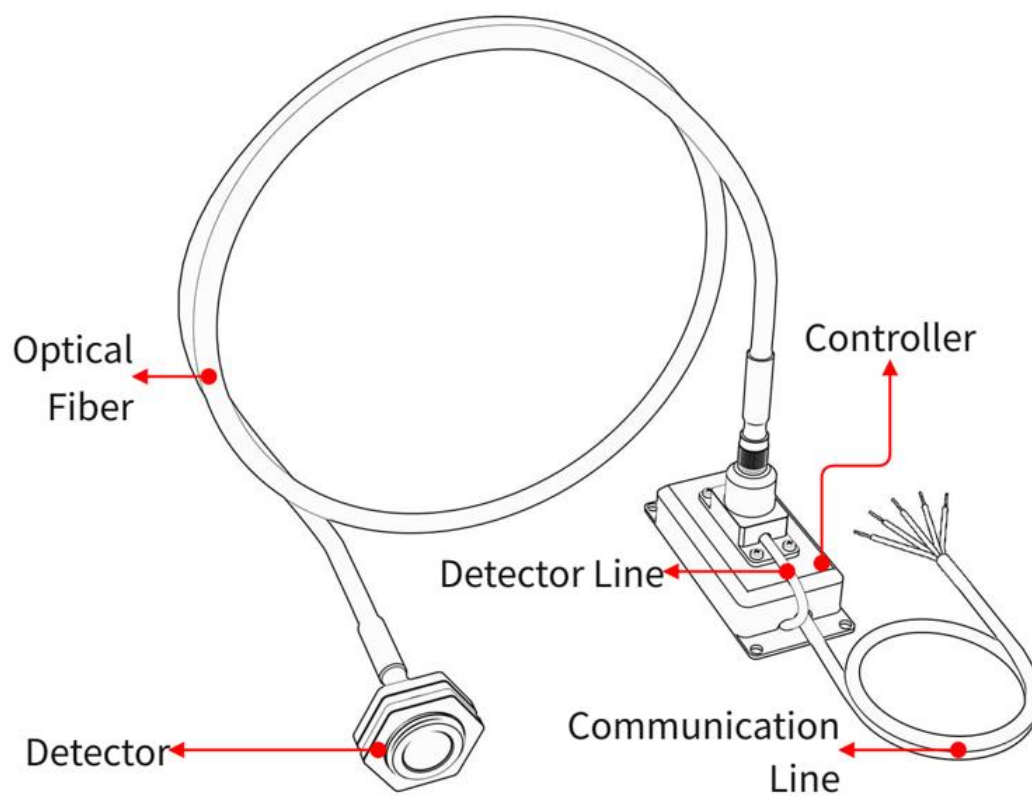
The following figure shows the appearance of each model:



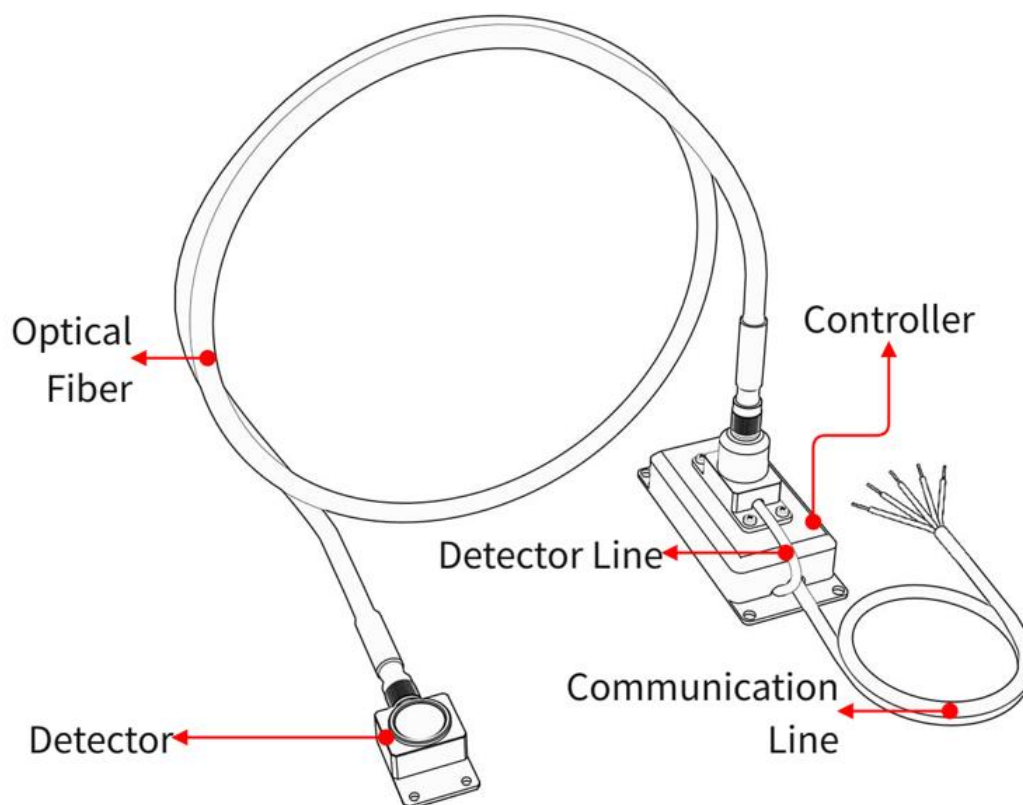
UVA/UVALED Digital probe



UVC Digital probe

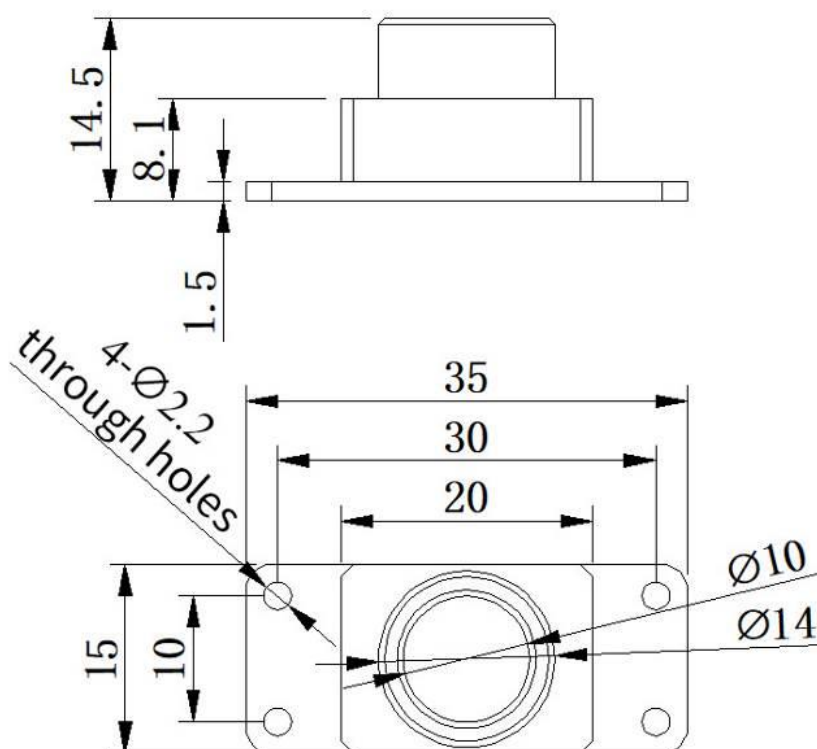


UVA-X1/UVALED-X1 Digital probe

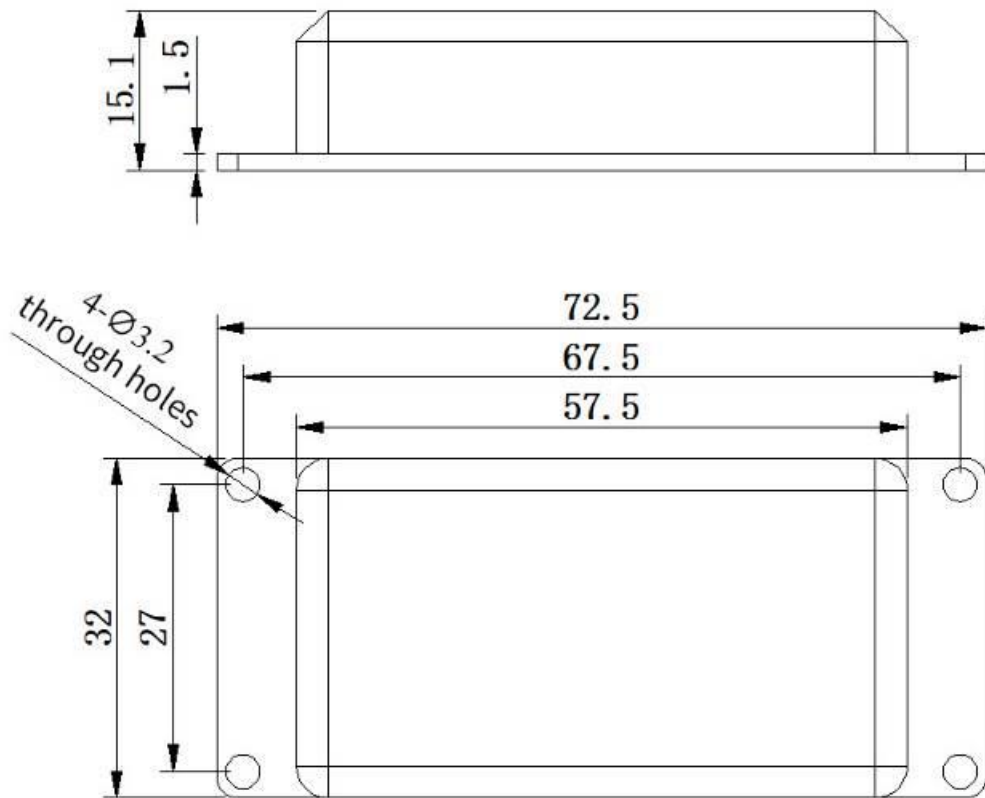


UVA-X2/UVALED-X2 Digital probe

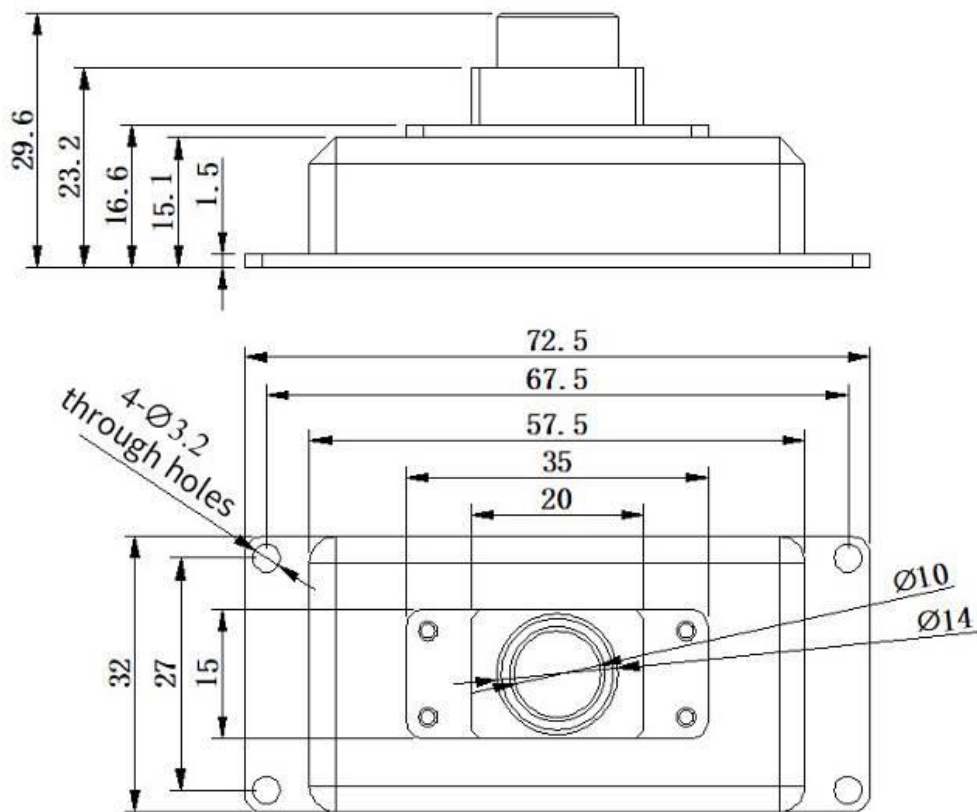
III. Dimensional drawing



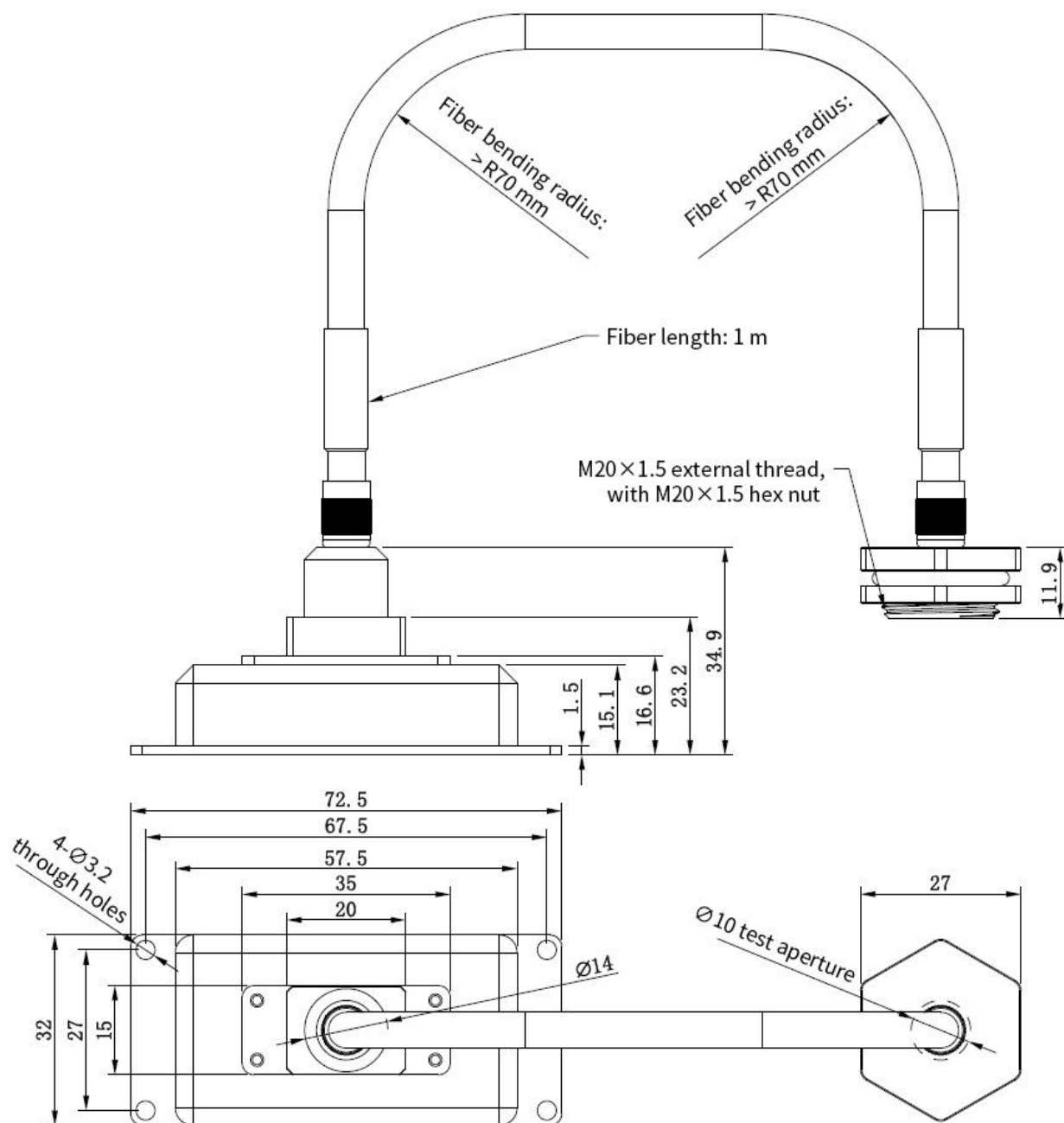
UVALED/UVA Detector Dimension Drawing



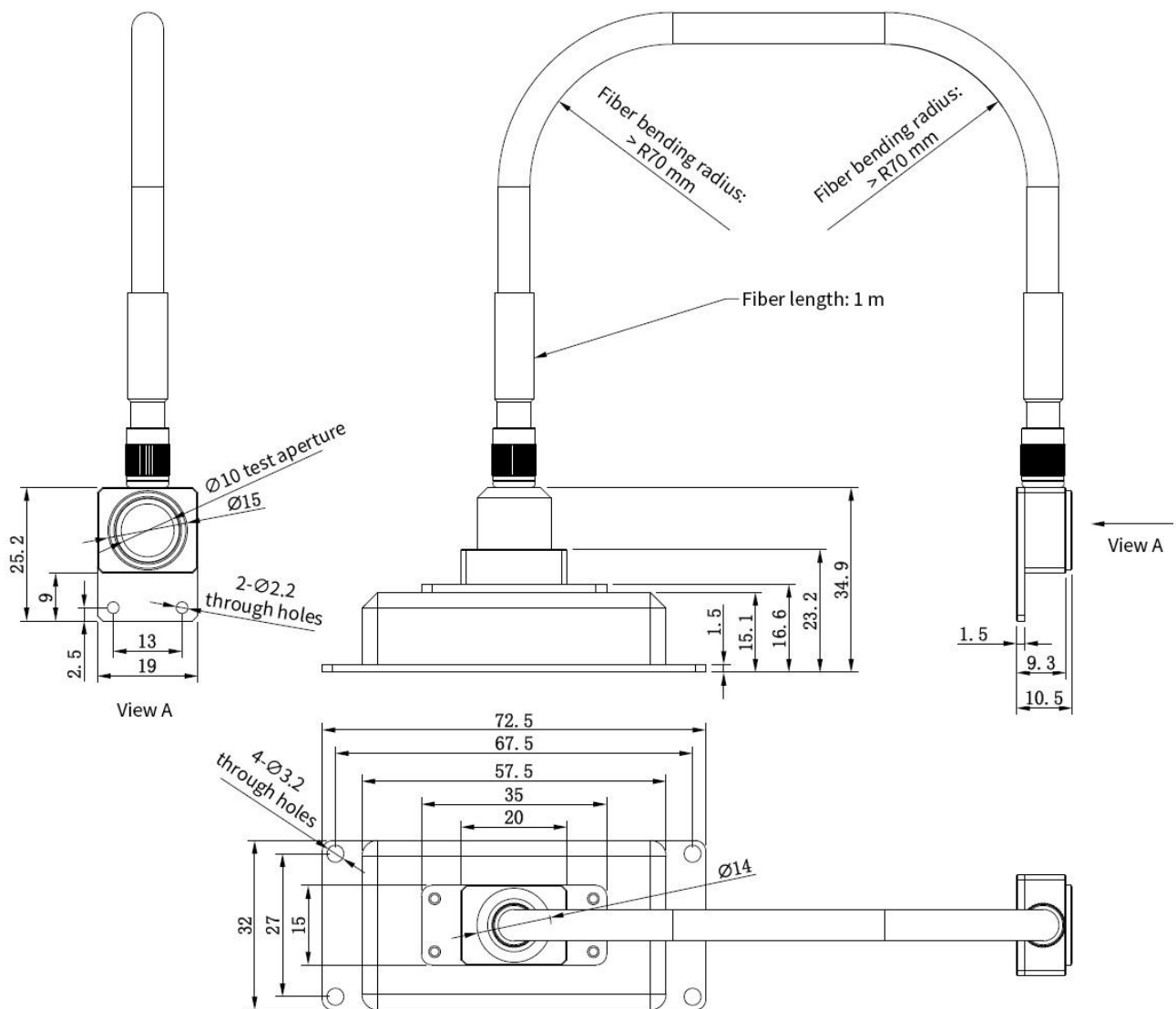
UVALED/UVA Controller Dimension Drawing



UVC Dimension Drawing

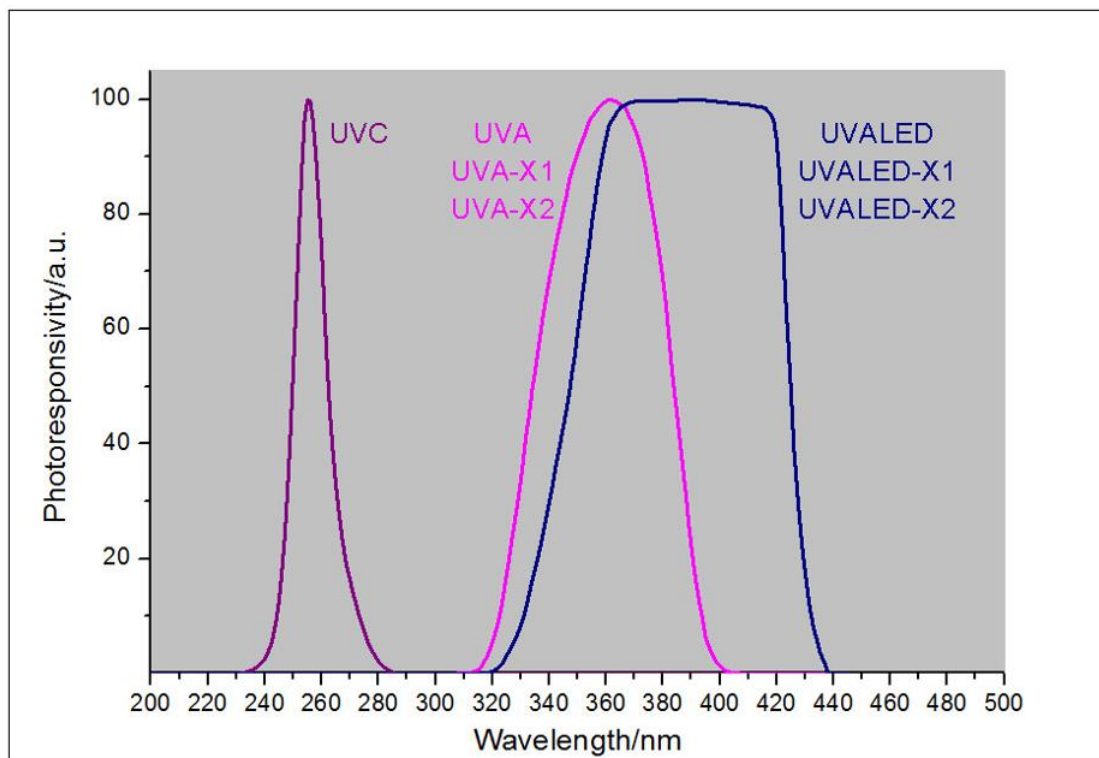


UVALED-X1/UVA-X1 Dimension Drawing



UVALED-X2/UVA-X2 Dimension Drawing

IV. Spectral response curve



V. Communication parameters

1. Station number

The digital probe supports standard MODBUS protocol. The default communication address is “1”. The communication address can be adjusted through “human-computer interface debugging tool” or communication protocol. The address setting range is 1-247.

2. Baud rate

The default Baud rate of UV digital probe is 9600bps. The Baud rate can be changed through “human-computer interface debugging tool” or communication protocol. Optional Baud rates include 4800, 9600, 19200 and 38400.

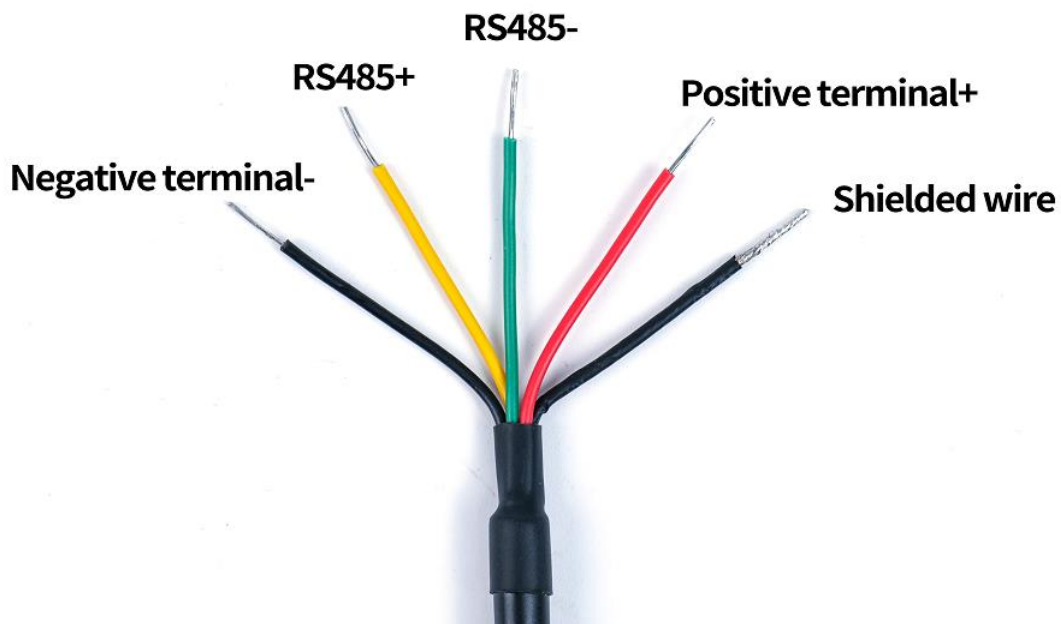
3. Communication protocol

It supports standard MODBUS protocol, and the communication protocol can be used to read probe measurement and set communication address and Baud rate. Detailed communication commands can be found in UV Digital Probe Communication Protocol.

4. Probe wiring

Electric wire	Function declaration
Black (GND)	Shielded ground
Red (DC+)	Positive power source (DC 5-24V)
Black (DC-)	Negative power source
Green/Blue	RS485-
White/Yellow	RS485+

Note: If computer connection is required, it is necessary to connect RS485 and switch RS232 or connect RS 485 and switch USB adapter.



VI. Measurement and matters needing attention

1. Face the receiving window of the probe to the UV light source and the UV radiation power density and temperature values can be obtained.
2. When installing the fiber optic probe, the bending radius of the fiber shall not be less than 70 mm.

3. Avoid contact with corrosive items and keep away from high humidity environment.
4. Proposed calibration cycle is one year.
5. As the UV probe is sensitive to humidity changes, the preservation environment is very important. If the instrument will not be used for a long time, be sure to keep the probe in a low humidity environment. For example, the probe can be stored in a dry plastic bag.

VII. Instrument features

1. The UV digital probe has a very small size, and the detector and controller adopt a split design, which is very convenient for installation where measurement is needed. It is also possible to combine the detector and controller with screws for measurement.
2. The probe is powered by a 5-24V ultra-wide DC power supply range, which is very convenient for use in different industries on spot.
3. It adopts standard RS485 communication interface and MODBUS communication protocol. Equipped with high-temperature resistant probe which can realize online monitoring in real time for a long time.

VIII. Human-computer interface debugging tool

“Human-computer interface debugging tool” is used for probe station number setting, Baud rate setting and data monitoring. This tool is not a must (optional), and the purpose is to enable customers to quickly evaluate probe and parameter settings. The setting of Baud rate and station number can also be realized by means of communication protocol. Please refer to *UV Digital Probe Human-machine Interface Manual*.

IX. Service

1. The meter has one-year warranty. If the instrument works abnormally, please send the whole instrument to our company for maintenance
2. Provide users with spare parts and lifelong maintenance services
3. Provide the users with the meter inspection service
4. Free technical support for long term