

# PROGRAMMABLE STEP ATTENUATOR MANUAL

FOCUS ON RF FIELD



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BEIJING YUEXIANG TECHNOLOGY CO.,LTD

## ENTERPRISE INTRODUCTION

### BEIJING YUEXIANG TECHNOLOGY CO., LTD

Beijing YERSON Technology Co., Ltd. with radio frequency (RF) and microwave technology as its core, has always been dedicated to the research, development, and innovation of microwave devices and instruments. It provides users with five major product categories, including RF and microwave active & passive devices, connectors and cables, instruments, communication testing, and testing system solutions. Additionally, it offers one-stop customized interconnection communication solutions, continuously empowering fields such as communication testing, radar, electronic countermeasures, industrial microwaves, aerospace, satellite communication, civil communication, medical electronics, and automotive consumption. The company strives to promote digitization and informatization, accelerating the construction of a new intelligent and interconnected world that harmoniously integrates humans with nature.

### MARKET AND SERVICE



Aerospace

Advanced communication and signal monitoring technologies serve the armed forces and air traffic control, ensuring the safety of critical infrastructure, as well as providing precise testing and measurement equipment for the aerospace and defense sectors.



Wireless Communication

Cutting-edge broadcast television, post-production, and test and measurement equipment suitable for network operators, broadcasters, studios, the film industry, and manufacturers of electronic entertainment equipment.



Research Institutes and Laboratories

High-precision communication and signal monitoring technologies relied upon by research institutes and laboratories to ensure the smooth progress of scientific research projects and advanced testing and measurement equipment for technological innovation.



Commercial Aircraft

Advanced communication and signal monitoring technologies serve as critical infrastructure products that safeguard the safety of commercial aircraft, alongside precise testing and measurement equipment tailored for the aerospace sector.



Ships

It provides solid technical support for the safe navigation and efficient operation of ships, ensuring both safety and efficiency during maritime voyages.



Medical Equipment

The application of advanced technologies and equipment provides robust safeguards for the safe and efficient operation of medical equipment, laying a solid foundation for the continuous development of the medical industry.

## HONORS AND CERTIFICATES



## Product Overview »

The programmable step attenuators can achieve step attenuation over a wide frequency range. They have the advantages of high attenuation accuracy, good repeatability, low insertion loss, and long service life. They are mainly used to control the signal level amplitude entering the system, control the output signal power of the system, and adjust the matching between the signal source and the load. They are widely used in various broadband spectrum analyzers, broadband vector network analyzers, broadband synthesized signal sources, noise figure testers, and various microwave automatic test systems.



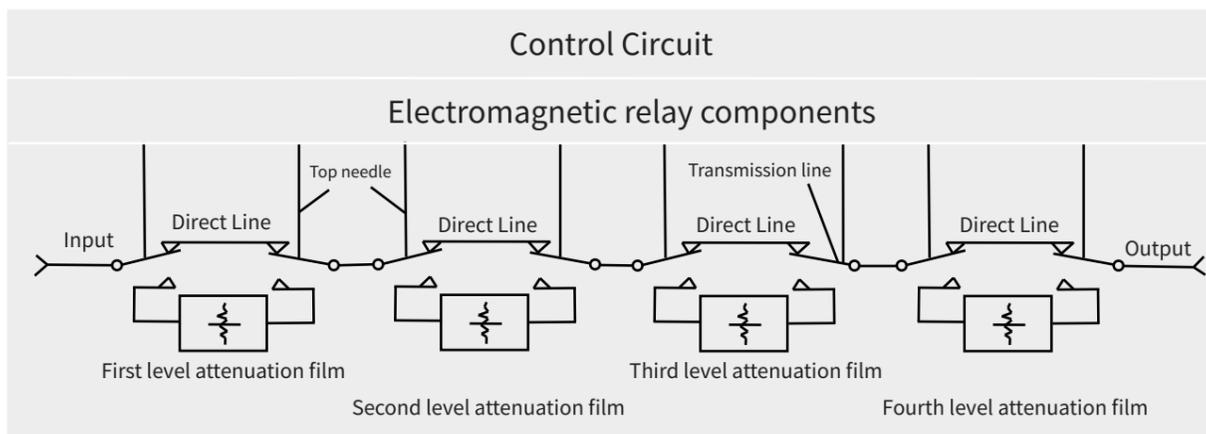
## Performance Characteristics

- Wide frequency band: DC ~ 67GHz
- High attenuation, Small step increase
- Excellent repeatability

## Application Scenarios

- Phased Array Radar
- Avionics
- Electronic Warfare (EW)
- Any scenarios with stringent requirements on loss and phase stability

## Principle Diagram



## Technical Specifications (Temperature: 23±3°C)

Model NO	Frequency (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss (dB Max)	VSWR (Max)	Power (W Max)	Repeatability (dB Max)	Interface Type
YX-PSADC-40G-115-5P1	DC-40	0-115	5	5.0	2.0	1	0.05	2.4mm
YX-PSADC-50G-10-2P1	DC-50	0-10	2	3.5	2.0	1	0.05	2.4mm
YX-PSADC-40G-90-10P1	DC-40	0-90	10	4.1	2.0	1	0.05	2.4mm
YX-PSADC-40G-60-10P1	DC-40	0-60	10	3.5	1.8	1	0.05	2.4mm
YX-PSADC-50G-60-10P1	DC-50	0-60	10	3.5	1.9	1	0.05	2.4mm
YX-PSADC-67G-90-10P1	DC-67	0-90	10	5.0	2.0	1	0.05	1.85mm
YX-PSADC-26.5G-11-1P1	DC-26.5	0-11	1	2.5	2.0	1	0.05	3.5mm
YX-PSADC-40G-11-1P1	DC-40	0-11	1	4.1	2.0	1	0.05	2.4mm
YX-PSADC-40G-70-10P1	DC-40	0-70	10	3.5	1.8	1	0.05	2.4mm
YX-PSADC-40G-35-5P1	DC-40	0-35	5	3.5	1.8	1	0.05	2.4mm
YX-PSADC-50G-35-5P1	DC-50	0-35	5	3.5	1.9	1	0.05	2.4mm
YX-PSADC-40G-75-5P1	DC-40	0-75	5	4.1	2.0	1	0.05	2.4mm
YX-PSADC-40G-110-10P1	DC-40	0-110	10	4.1	2.0	1	0.05	2.4mm
YX-PSADC-26.5G-70-10P1	DC-26.5	0-70	10	3.5	1.8	1	0.05	3.5mm
YX-PSADC-26.5G-75-5P1	DC-26.5	0-75	5	3.5	2.0	1	0.05	3.5mm
YX-PSADC-26.5G-110-10P1	DC-26.5	0-110	10	3.5	2.0	1	0.05	3.5mm
YX-PSADC-26.5G-35-5P1	DC-26.5	0-35	5	3.5	1.8	1	0.05	3.5mm
YX-PSADC-50G-14-P1	DC-50	0-14	-	3.5	2.0	1	0.05	2.4mm
YX-PSADC-50G-58-P1	DC-50	0-58	-	3.5	2.0	1	0.05	2.4mm
YX-PSADC-67G-50-10P1	DC-67	0-50	10	4	2	1	0.05	2.4mm
YX-PSADC-67G-70-10P1	DC-67	0-70	10	4.5	2	1	0.05	1.85mm
YX-PSADC-50G-110-10P1	DC-50	0-110	10	5	2	1	0.05	2.4mm
YX-PSADC-110G-20-10P1	DC-110	0-20	10	3	2	1	0.05	1.0mm
YX-PSADC-67G-75-5P1	DC-67	0-75	5	5.5	2	1	0.05	1.85mm

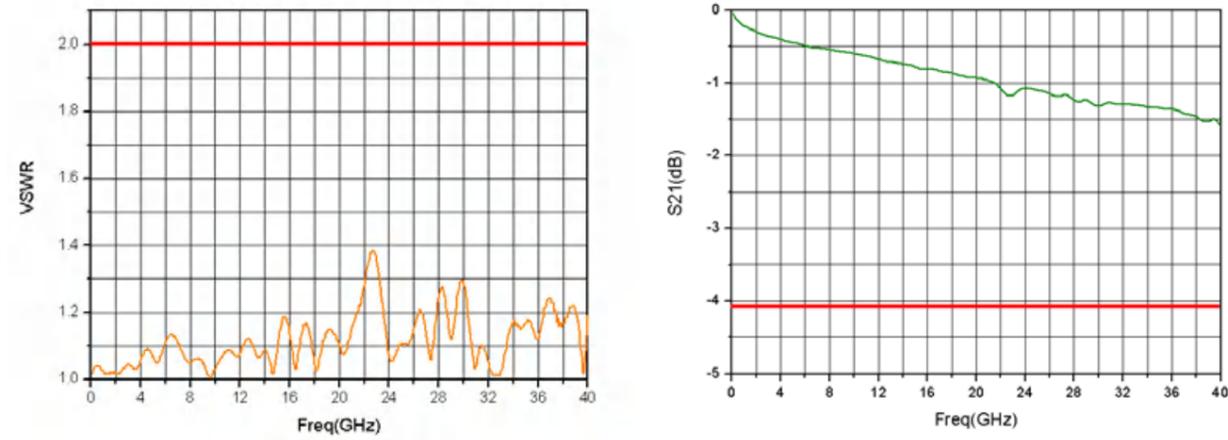
## Single-stage Attenuation Accuracy

Attenuation (dB)	DC -26.5GHz	26.5GHz -40GHz	40GHz -50GHz
1dB	±0.8dB	±1.0dB	-
2dB	±0.8dB	±1.0dB	±1.0dB
4dB	±0.8dB	±1.5dB	-
5dB	±1.0dB	±1.5dB	±1.5dB
6dB	±1.0dB	±1.0dB	±1.0dB
10dB	±1.0dB	±1.5dB	±1.5dB
20dB	±1.0dB	±1.5dB	±1.4dB
30dB	±1.0dB	±1.5dB	±1.6dB
40dB	±1.2dB	±1.5dB	-

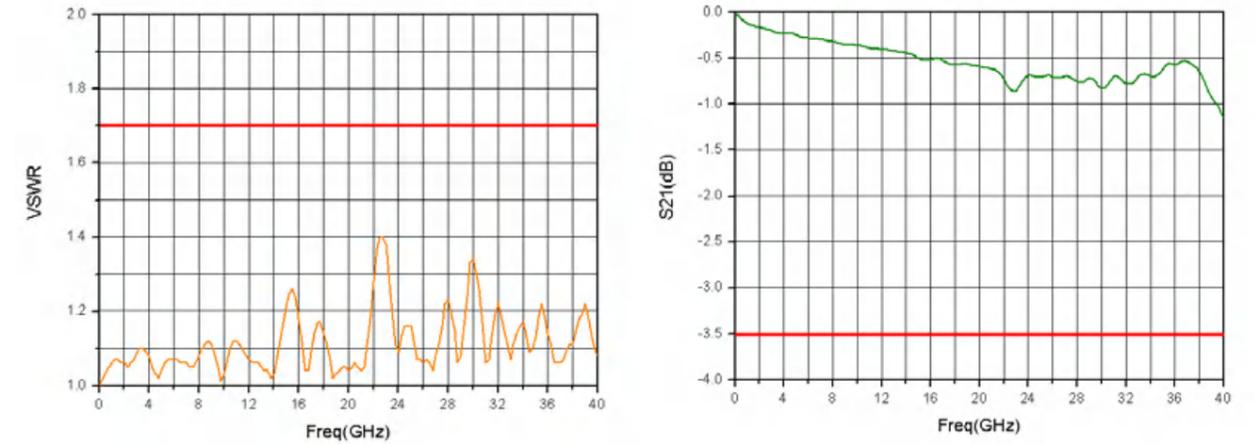
## Operating Limited Parameters

	Minimum Value	Maximum Value
Operating Temperature	- 20°C	+70°C
Storage Temperature	- 40°C	+70°C

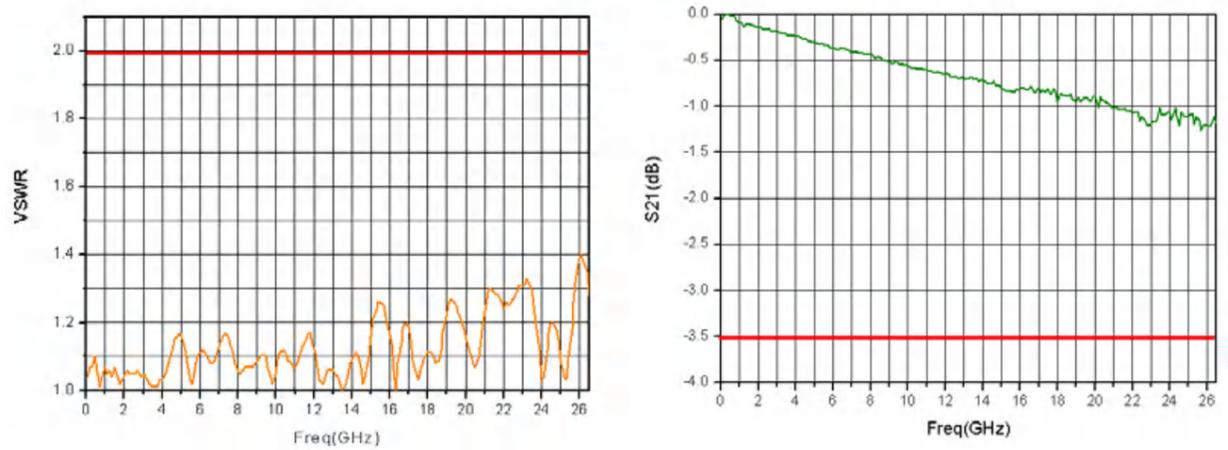
Typical Test Curve (Temperature: 23±3°C)



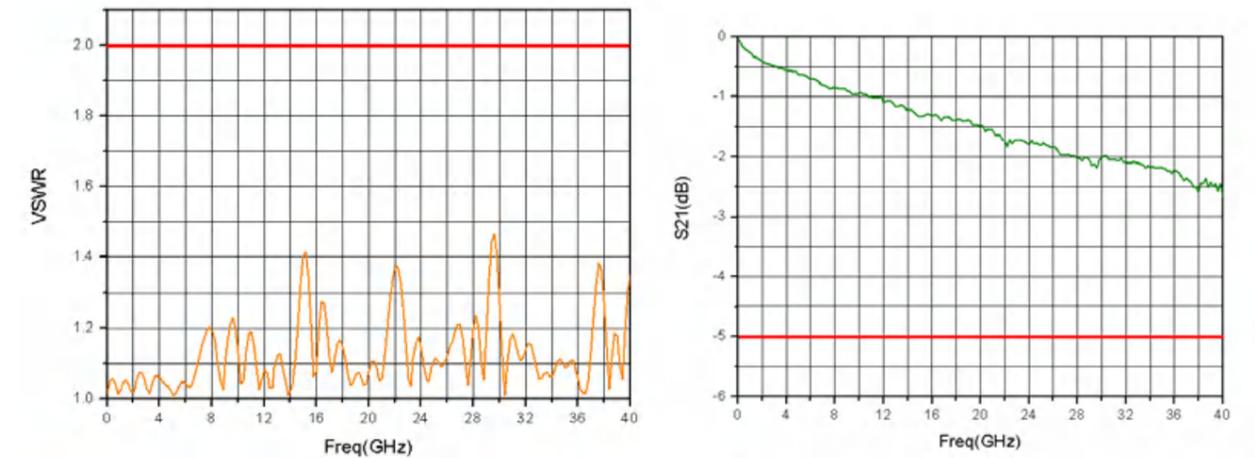
Test Cure of VSWR and insertion loss  
(Model:YX-PSADC-40G-90-10P1/YX-PSADC-40G-11-1P1/YX-PSADC-40G-75-5P1/YX-PSADC-40G-110-10P1)



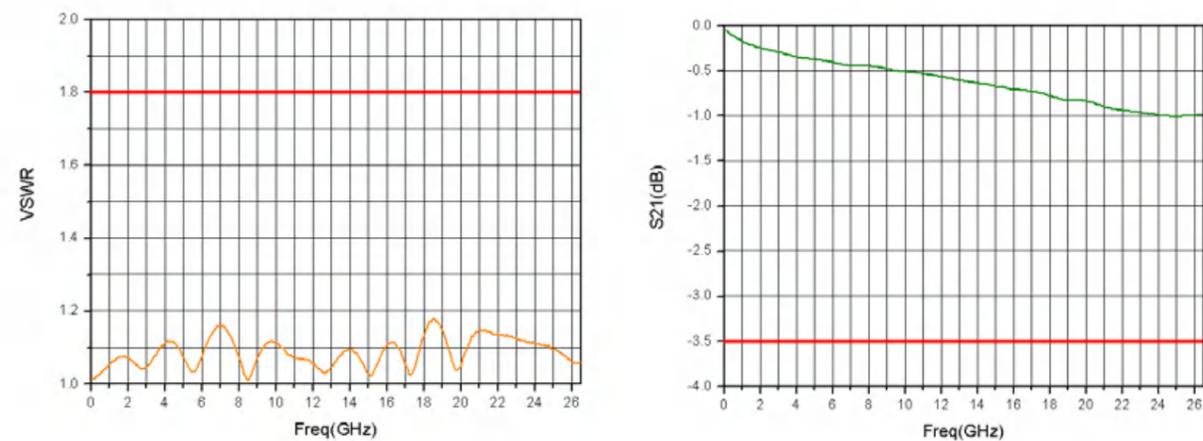
Test Cure of VSWR and insertion loss  
(Model:YX-PSADC-40G-60-10P1/YX-PSADC-40G-70-10P1/YX-PSADC-40G-35-5P1)



Test Cure of VSWR and insertion loss  
(Model:YX-PSADC-26.5G-11-1P1/YX-PSADC-26.5G-75-5P1/YX-PSADC-26.5G-110-10P1)



Test Cure of VSWR and insertion loss  
(Model:YX-PSADC-40G-115-5P1)



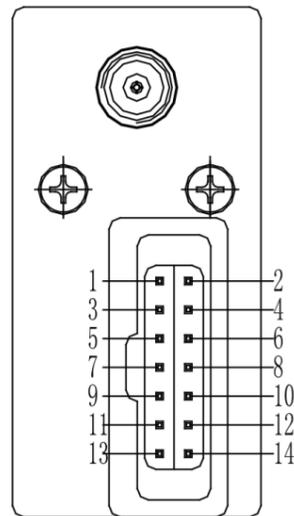
Test Cure of VSWR and insertion loss  
(Model:YX-PSADC-26.5G-70-10P1/YX-PSADC-26.5G-35-5P1 )

## Interface Definitions and Descriptions

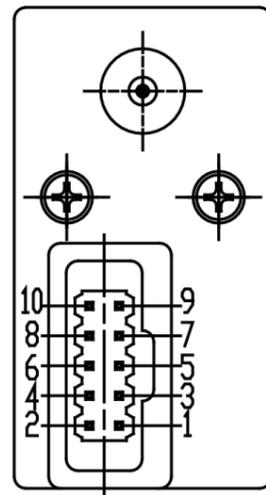
### Classification of programmable ▼

Model NO.	First Stage	Second Stage	Third Stage	Fourth Stage	Fifth Stage	
Five-stage Attenuator	YX-PSADC-40G-115-5P1	10dB	40dB	20dB	40dB	5dB
	YX-PSADC-67G-90-10P1	20dB	20dB	20dB	10dB	20dB
Four-stage Attenuator	YX-PSADC-50G-10-2P1	Switch Position	2dB	2dB	6dB	-
	YX-PSADC-40G-90-10P1	10dB	30dB	20dB	30dB	-
	YX-PSADC-26.5G-11-1P1	1dB	4dB	2dB	4dB	-
	YX-PSADC-40G-11-1P1	1dB	4dB	2dB	4dB	-
	YX-PSADC-40G-75-5P1	10dB	40dB	20dB	5dB	-
	YX-PSADC-26.5G-75-5P1	10dB	40dB	20dB	40dB	-
	YX-PSADC-40G-110-10P1	10dB	40dB	20dB	40dB	-
	YX-PSADC-26.5G-110-10P1	10dB	40dB	20dB	40dB	-
YX-PSADC-50G-14-P1	Switch Position	Capacitance Position	10dB	4dB	-	
YX-PSADC-50G-58-P1	2dB	30dB	20dB	6dB	-	
Three-stage Attenuator	YX-PSADC-40G-60-10P1	10dB	30dB	20dB	-	-
	YX-PSADC-50G-60-10P1	10dB	30dB	20dB	-	-
	YX-PSADC-40G-70-10P1	10dB	40dB	20dB	-	-
	YX-PSADC-26.5G-70-10P1	10dB	40dB	20dB	-	-
	YX-PSADC-26.5G-35-5P1	5dB	20dB	10dB	-	-
	YX-PSADC-40G-35-5P1	5dB	20dB	10dB	-	-

### Connector Schematic Diagram ▼



Five-stage Attenuator



Three-stage/four-stage Attenuator

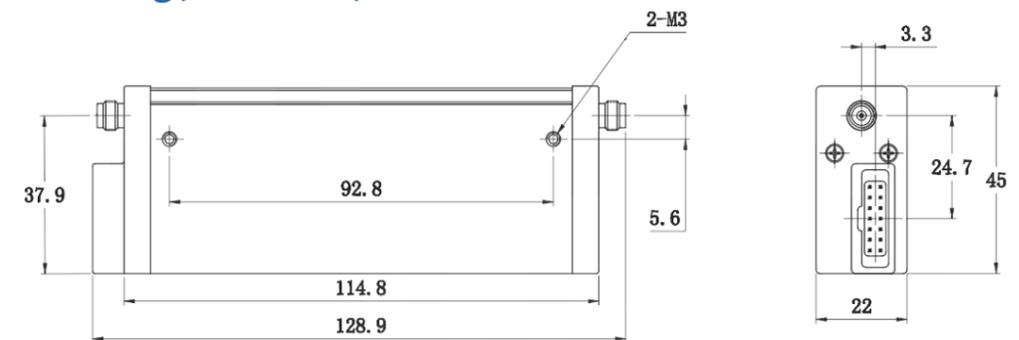
### Control method ▼

A DC voltage of 20V to 28Vdc is required to drive the relay inside of the programmable step attenuator, with a driving current of 126mA(per stage at room temperature,24V driving voltage). The relay is equipped with a latching device, and the internal driving circuit automatically cuts off the power supply after the relay working, resulting in low power consumption,the relay switching time is less than or equal to 20ms.

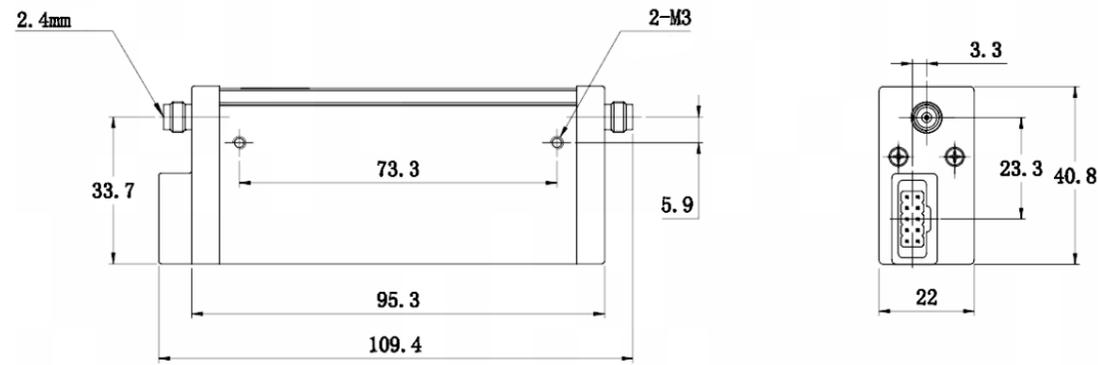
To control whether the relay selects the through path or the attenuation path, a TTL level signal needs to be input to the corresponding connector. The driving mode is edge-triggered on the falling edge (the falling edge from high to low level takes effects, and the duration of the low level needs to be greater than 20ms). The specific control relationship is as following sheet: if a certain attenuation or through pin is switched from TTL high level to low level (0V to +1.0Vdc) and the low level duration is greater than 20ms, while the other pins are at TTL high level (+4.2V to +5Vdc), their respective functions will be activated.

Model NO.	Five-stage Attenuator	Four-stage Attenuator	Three-stage Attenuator
Pin1	-	First-stage pass-through	First-stage pass-through
Pin2	-	First-stage attenuation	First-stage attenuation
Pin3	Second-stage attenuation	GND	GND
Pin4	+24Vdc	Second-stage pass-through	Second-stage bypass
Pin5	Fourth-stage attenuation	Third-stage pass-trough	Third-stage bypass
Pin6	Third-stage attenuation	Fourth-stage pass-trough	-
Pin7	Third-stage pass-through	Fourth-stage attenuation	-
Pin8	Fourth-stage pass-trough	Third-stage attenuation	Third-stage attenuation
Pin9	GND	Second-stage attenuation	Second-stage attenuation
Pin10	Second-stage pass-trough	+24Vdc	+24Vdc
Pin11	First-stage pass-trough	-	-
Pin12	First-stage attenuation	-	-
Pin13	Fifth-stage pass-trough	-	-
Pin14	Fifth-stage attenuatsion	-	-

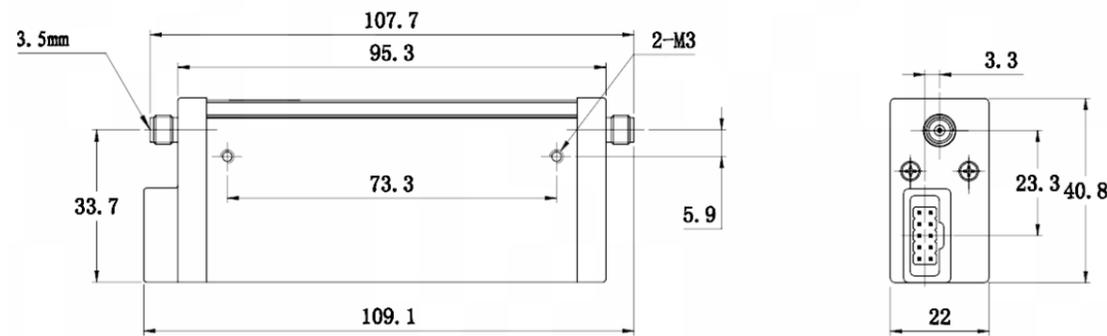
### Outline Drawing(Unit:mm)



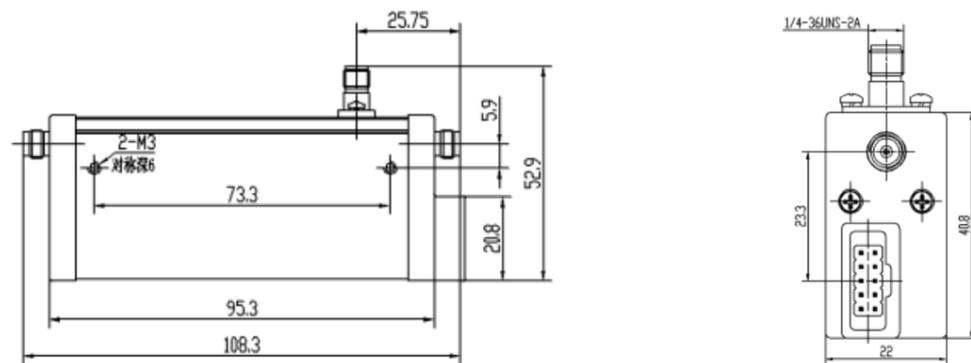
Five-stages attenuator (unit: mm)



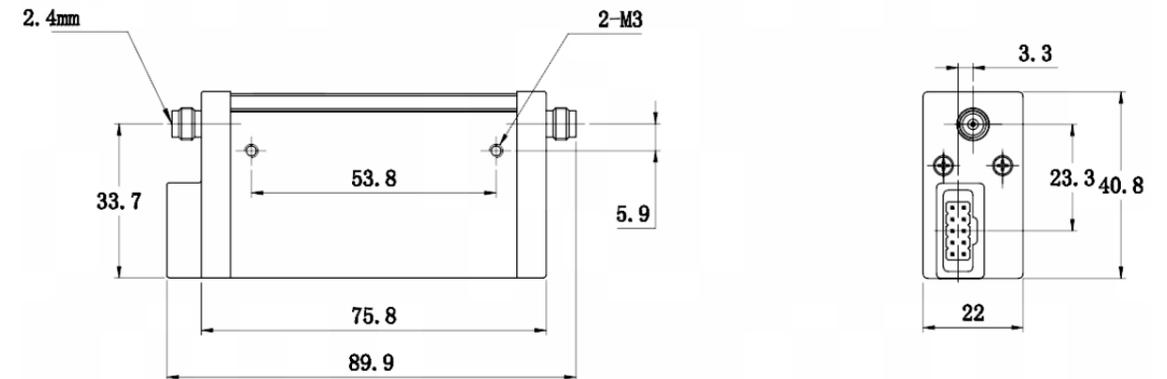
Four-stage attenuator OS2.4 Connectors (without switch position)



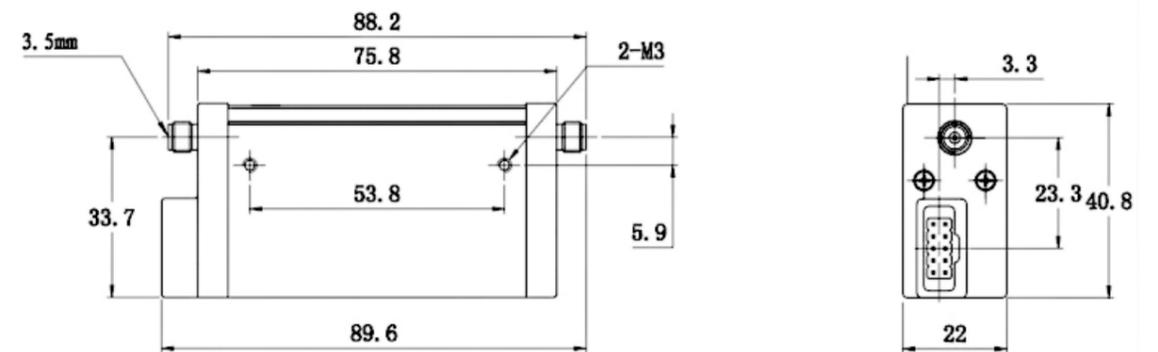
Four-stage attenuator APC3.5mm connector (without switch position)



Four-stage attenuator (with switch position)



Three-stage attenuator OS2.4 Connector



Three-stage attenuator APC3.5 Connector

### Cautions

- 1.The grounding pin must be properly grounded when supplying power to the programmable step attenuator,otherwise it may cause permanent damage to the internal components of the programmable step attenuator.
- 2.Please place it horizontally during installation in order to enhance the shock resistance of the attenuator,(i.e., with the installation screws of the attenuator perpendicular to the horizontal plane).
- 3.The attenuator sheet can only withstand a maximum power of 1W (CW), so please do not input power exceeding 1W (CW) into this attenuator port.
- 4.The ports of the programmable step attenuator are precision female connectors, which can only be connected to matching connectors, please ensure that the port size meets national standards when connecting to avoid damaging the connector and affecting the performance and lifespan of the device. Additionally, it is better use a torque wrench when connecting or disconnecting the connectors and cover the connector with a dust cap to prevent debris from entering the attenuator and affecting its performance when it is not used.
- 5.The programmable step attenuator is a non-sealed device, please store it in a dry and dust-free environment.
- 6.The technical specifications of the above products are subject to change without notice.