YL-PL-5 single tipping bucket User manual (Pulse type)



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1. product description

1.1product description

This instrument is a primary precipitation measurement instrument, and its performance meets the requirements of the national standard GB/T 21978.2-2014 "Requirements for Precipitation Observation".

The core part of the instrument, the tipping bucket, adopts a three-dimensional streamlined design and is made of stainless steel, which makes the tipping bucket more smooth, and has the functions of self-cleaning dust and easy cleaning.

1.2Structural features

As shown in Figure 1, the instrument is composed of rain gauge housing, rain collector, funnel, tipping bucket support, tipping bucket, bearing screws, water outlet bin, sealing joint, dry reed tube, horizontal bubble, adjustment support plate, control box, leveling It is composed of device, terminal block, leg bracket, rain gauge base, etc. Among them, a tipping bucket bearing, a round horizontal bubble, a reed switch bracket and a signal output terminal are installed on the rain gauge base. Unlike other tipping bucket rain gauges, the tipping bucket sleeve of this instrument is an integrated positioning structure, and the tipping bucket is installed in the shaft bearing through the tipping bucket shaft. The internal structure of the instrument is assembled when it leaves the factory, and there is no need to install the internal structure on site. On-site installation brings convenience.

The tipping bucket of this instrument is a three-dimensional streamlined design, and is designed with a drooping curved diversion tip, which has a beautiful and smooth appearance, better tipping performance and easy cleaning and maintenance.

The tipping bucket of this instrument is equipped with constant magnetic steel, and the reed switch bracket is equipped with a reed switch. When the instrument leaves the factory, both the magnetic steel and the reed switch have been adjusted at an appropriate coupling distance, so that the output signal of the instrument and the number of flipping bucket flips have a certain ratio. relationship.

When the instrument leaves the factory, the tilt angle adjustment screw of the tipping bucket has been locked at the position of the best inclination angle base point and the tilt angle screw has been sealed with red paint. When installing the instrument on site, the user only needs to adjust the horizontal bubble according to the relevant requirements of this manual. It can be put into use when it is located in the center, and there is no need to adjust the tilt angle of the bucket on the spot.

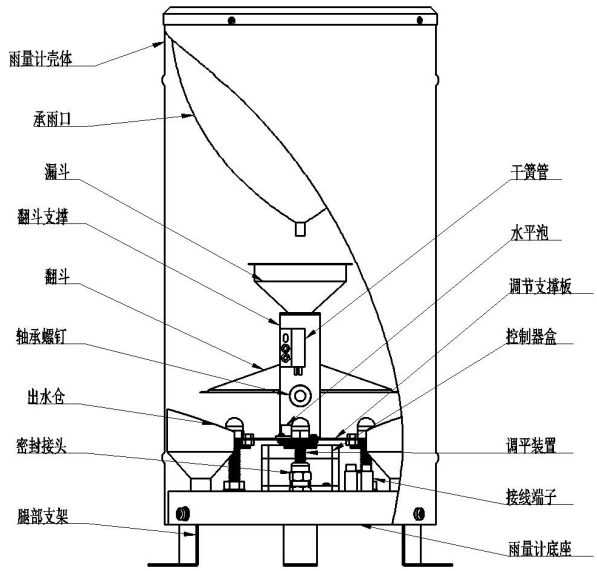


figure 1

1.3Main Specifications

Rain gauge barrel diameter	Φ200mm
Resolution	Default 0.2mm (0.5mm optional)
Sharp edge	40°～45°
output method	Pulse type
Operating temperature	0～50℃
Working humidity	<95%(40℃)
Storage temperature	-40～125℃
Storage humidity	＜80% (no condensation)
Measurement error	Typical accuracy: ≤±4% (indoor artificial precipitation, subject to the water discharge of the instrument itself)
Rain intensity range	0mm～4mm/min Maximum rain intensity allowed to pass 8mm/min
Withstand voltage	≤100V
Withstand current	≤0.5A

1.4product model

Note: Please purchase the supporting sheet separately

YL-				Rain gauge
	PL-			Pulse output
		5-		304 stainless steel material
			02	0.2mm Resolution
			05	0.5mm Resolution

2. Equipment installation instructions

2.1 Inspection before equipment installation

(1) Take the instrument out of the packing box, check carefully against the packing list in the instruction manual, and check whether the equipment accessories are complete.

(2) Carefully read the product manual and product qualification certificate.

(3) Check the appearance of the instrument for damage, especially check whether the tipping bucket is intact, and pay attention to properly placing the tipping bucket to prevent damage to the tip of the tipping bucket shaft and the arc-shaped water tip at both ends of the tipping bucket, and do not touch the inner wall of the tipping bucket with your fingers. Avoid fouling the tipping bucket to damage the accuracy of the instrument.

(4) Unscrew the three screws at the bottom of the equipment, take the stainless steel outer tube, cut off the cable tie that fixes the tipping bucket, and then install the outer tube. The preparation is complete.



2.2 Outdoor installation and debugging

2.2.1Production and installation base

As shown in Figure 4: When installing the outdoor ground and roof, the cement installation foundation should be made according to the dimensions and requirements of Figure 3, and the plane of the cement foundation should be horizontal. The size of the cement installation foundation is generally a 40cm×40cm square base with a height of not less than 30cm or a circular base with a diameter of 40cm. It is required that the distance

between the height of the rain-bearing mouth of the instrument and the ground level is 70cm, and it is ensured that no shelters higher than the rain-bearing mouth of the instrument are allowed within 3 to 5 meters around the mouth of the instrument;

2.2.2Install fixed instruments and adjust the level of the rain-bearing outlet

Drill 3 mounting holes with a depth of 8-10cm in diameter 10 on the cement foundation according to the dimensions in Figure 2, place the expansion bolts in the mounting holes, and lock them with lock nuts, and then install the instrument base on the 3 height-adjusting support nuts. Adjust the height of the supporting nut and measure whether the ring mouth is in a horizontal state with a spirit level, and finally use the upper lock to fix the instrument.

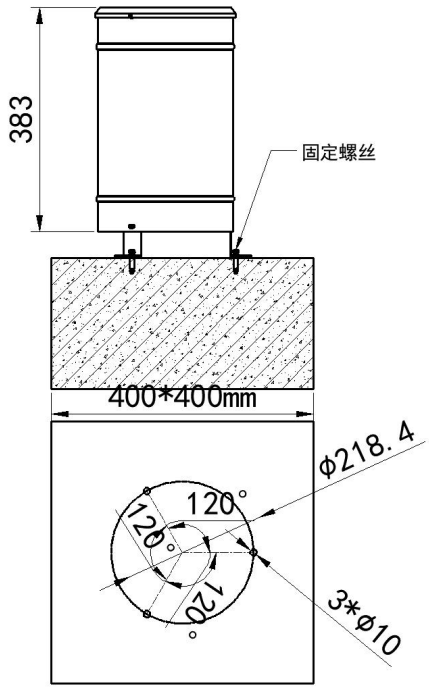


figure 2

2.2.3Adjust the rain gauge level

Remove the stainless steel outer cylinder, and keep the dome nut in the unlocked state as shown in Figure 3, just use two hands to adjust the height of the nut in the red circle, so that the bubble in the horizontal bubble is in the center. Then tighten the dome nut, check and adjust again whether the bubble of the horizontal bubble on the tipping bucket bracket is in the middle position.



image 3

3. Simulated precipitation experiment

This instrument has been subjected to artificial precipitation simulation precipitation tests before leaving the factory, and the relationship curve between rain intensity and accuracy shown in Figure 6 has been compiled according to the factory inspection records for users' reference. After the indoor installation is completed, the user generally does not need to perform artificial precipitation simulation tests, and can be directly installed and used outdoors.

If the measurement accuracy of the instrument is found to be out of tolerance during the operation of the instrument, the artificial precipitation test should be carried out again and the instrument should be re-adjusted. The method is as follows:

a Test tools: 1 special rain gauge, 1 small dropper;

b Inspection before test:

Before the test, remove the stainless steel outer cylinder to check whether the horizontal bubble of the instrument is in the center, whether the tipping bucket is flexible and free from jamming, and whether the waterway is unblocked, and then fully wet the rain-bearing mouth and the water diversion funnel with clear water;

c Water injection test

Use the two-speed drip method to check the accuracy of the instrument measurement, the method is:

Use a special rain measuring cylinder to measure 10mm of clear water, and slowly pour it into the tipping bucket through the water diversion funnel. When the tipping bucket

is about to be turned over, stop the water injection, and then use a dropper to absorb a little water in the measuring cylinder, drop by drop into the tipping bucket until the tipping bucket is turned over , Repeated tests in turn, record the number of tipping bucket flips and water consumption; if the tipping bucket flips 50 times and the water consumption is 9.7~9.85mm, it can be deemed that the base point of the tipping angle of the instrument is normal and does not need to be adjusted; when the pouring volume> 9.85mm, it is indicated If the tilt angle of the bucket is too large and the curve moves to the left, the height of the adjustment screw should be appropriately increased; when the pouring volume is less than 9.7mm, it means that the tilt angle of the bucket is too small and the curve moves to the right, and the height of the adjustment screw should be appropriately lowered; generally speaking, the left and right adjustment screws should be turned each One revolution can change the accuracy by about 3 to 4%.

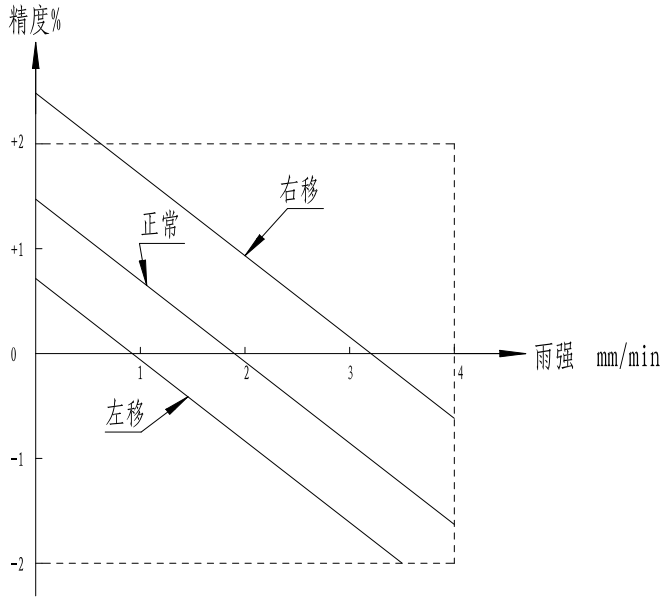


Figure 4

4. maintenance

4.1Daily maintenance

The instrument has been outdoors for a long time and the use environment is very harsh. Therefore, the inner wall of the rain port of the instrument should be wiped frequently with a soft cloth to keep the rain port clean. If there are foreign objects such as leaves in the rain port, clean up in time to keep the waterway unblocked. When the instrument is not used for a long time, a cover should be placed on the instrument ring to protect the rain-bearing mouth;

The instrument must be cleaned up once a month for long-term work, and once

every three months;

4.2Tipping bucket cleaning

The tipping bucket is a key component of the instrument, which directly affects the measurement accuracy of the instrument. Over time, a little dust or oil will be deposited on the inner wall of the tipping bucket. Therefore, the tipping bucket should be cleaned. When cleaning, the inner wall of the tipping bucket can be repeatedly rinsed with clean water or gently brushed with a degreasing brush. It is strictly forbidden to scrub the inner wall of the tipping bucket with hands or other objects.

5. Common problems and solutions

The table in this article lists the general failure phenomena, causes and troubleshooting methods that may occur in the instrument.

Central station manifestation	Rain sensor failure	Solution
Can't get the number when it rains	It means that the rain sensor has no signal output or the transmission line is faulty Reed switch failure The distance between the magnet and the reed pipe is too far Welding wire falls off or signal wire is broken Tipping bucket stuck Instrument blockage	Check the next station replace Adjustment repair exclude Clear
When it rains, the amount of rainfall received is quite different from that of the measured rain gauge	Rainfall sensor tipping bucket turning base point is out of adjustment, but this error generally does not exceed ±10% The position of the magnet and the reed pipe is not good, resulting in good times and bad times, so that some signals are missed	Re-titration adjustment base point Adjust the distance The objective situation is like this, the instrument is trouble-free
The central station keeps coming rain counts, but the actual situation did not rain	Check whether the socket is immersed in water, this phenomenon often occurs after heavy rain	Treat water ingress and reseal

Note: In the above table, the failure phenomena listed are not necessarily all the faults of the rain gauge itself. After checking the fault of the instrument itself and removing the fault, you should also check whether the transmission line, data acquisition device and other equipment of the instrument have faults, and give them one by one. Exclude and solve.