Smart Rain Gauge Sensor, Tipping Bucket

(Pulse Type) User Manual

SISCO-RS-3002

1. Product Description

1.1 Product Overview

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

The core component of this instrument, the tipping bucket, adopts a three-dimensional streamlined design that makes the tipping bucket turn over water more smoothly, and has the function of self-washing dust and easy cleaning.

1.2 Functional Features

As shown in **Fig. 1**, this instrument consists of a one-piece housing, a filter, a funnel, a backflow tipping bucket, a terminal block, a leg holder, a reed switch, and a rain gauge base. Among them, the rain gauge base is fitted with a tipping bucket shaft, a round horizontal bubble, a reed switch holder and a signal output terminal. Different from other tipping bucket rain gauge, the tipping bucket shaft sleeve of this instrument is an integrated positioning structure, and the tipping bucket is mounted in the bearing through the tipping bucket shaft. The internal structure assembly of this instrument is completed when it is shipped from the factory, and there is no need to carry out the on-site installation of the internal structure, which makes the on-site installation more convenient.

The tipping bucket of this instrument is three-dimensional streamlined design, and designed with a sagging curved surface deflector tip, which has a beautiful and smooth shape, better water turning performance and easy to clean and maintain.

This instrument is equipped with a constant magnet on the hopper, reed switch bracket is equipped with reed switch, the instrument factory magnet and reed switch have been adjusted in the appropriate coupling distance, so that the instrument output signal and the hopper turn over a number of times to determine the proportionality of the relationship.

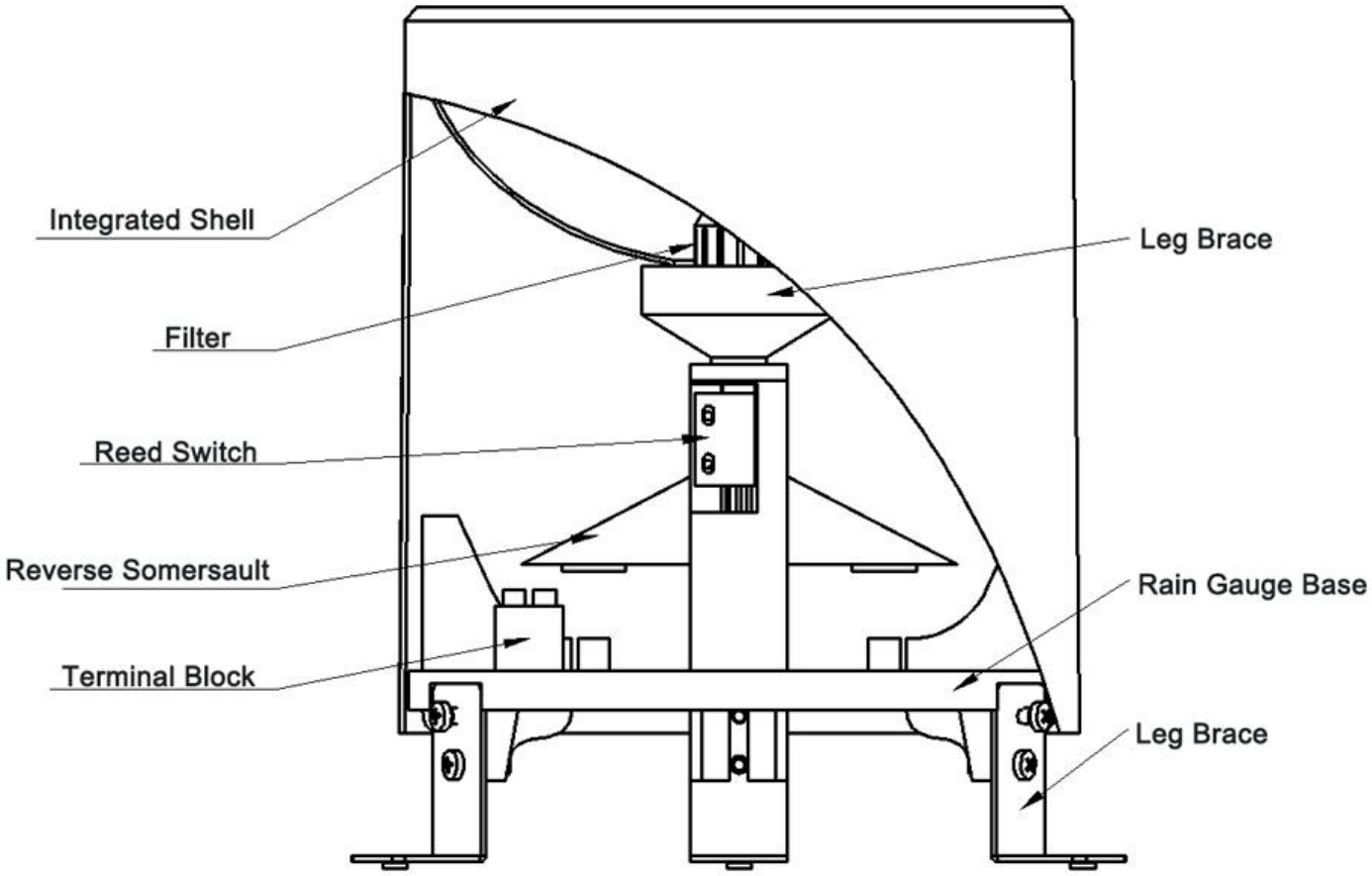

Fig. 1

1.3 Main Technical Indicators

Rain Gauge Cylinder Diameter	Φ200mm
Resolution	0.2mm/0.5mm (optional)
Sharpness of Blade	40°～45°
Output Method	Pulse type
Operating Temperature	0～55˚C
Operating Humidity	<95% (40°C)
Storage Temperature	-40～125°C
Storage Humidity	<80% (no condensation)
Measurement Error	±0.32mm (simulated rainfall 4mm/min)
Rain Intensity Range	0mm～4mm/min Maximum rainfall allowed to pass

	8mm/min
Withstand Voltage	≤100V
Withstand Current	≤0.5A

1.4 Product Appearance

2. Physical Connection

2.1 Pre-installation Check of Equipment

(1) Remove the instrument from the packing box, carefully count and check whether the equipment accessories are complete against the packing list of the instruction manual.

(2) Read the instruction manual and certificate of conformity carefully.

(3) Check whether the appearance of the instrument is damaged, especially check whether the tipping bucket is intact, and pay attention to the proper placement of the tipping bucket to prevent bruising the tip of the tipping bucket shaft and the curved diversion tip of the tipping bucket at both ends, and don't touch the inner wall of the tipping bucket with your fingers to avoid defacement of the tipping bucket, which will

damage the accuracy of the instrument.

2.2 Installation & Commissioning of Instruments in House

Remove the pearl cotton block from the bottom of the instrument and install the matching stopper to the bottom of the instrument.

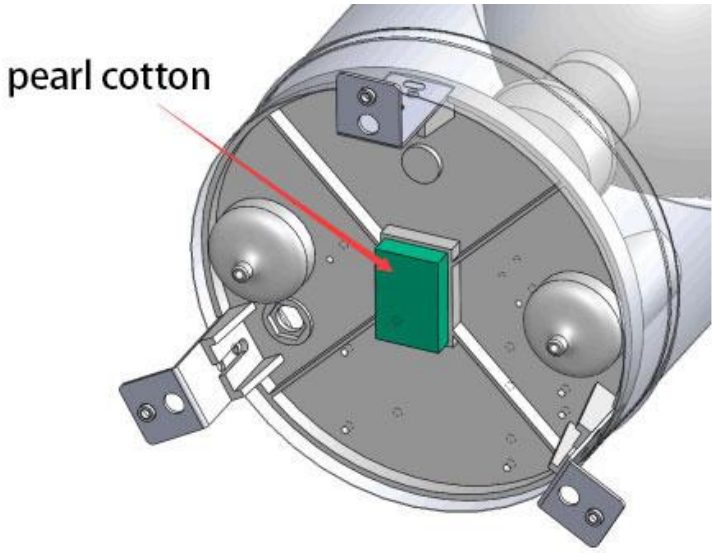

Fig. 2

2.3 Outdoor Installation & Commissioning

2.3.1 Fabrication of Installation Basis

For outdoor ground and roof installation, the cement installation base should be made according to the dimensions and requirements of Fig. 3, and the upper plane of the cement base should be horizontal. The size of cement installation base is generally 40cm*40cm square base or 40cm diameter round base with height not less than 30cm. Requirements for the instrument's rain-bearing mouth height from the ground plane distance of 70cm, and to ensure that the instrument's mouth around the

3 ~ 5 meters are not allowed to be higher than the instrument's rain-bearing mouth of the shelter.

2.3.2 Installation of Fixed Instruments, Adjustment of the Level of the Rain Port

According to the size of Figure 3 in the cement foundation to play 3 φ10 deep 8 ~ 10cm mounting holes, the expansion bolt will be placed in the mounting holes, with the lock nut locking, and then the instrument base will be mounted on the 3 height-adjusting support nut, by adjusting the height of the support nut and use a level ruler to measure the ring mouth whether it is in a horizontal state, and finally with the upper locking will be fixed instrument.

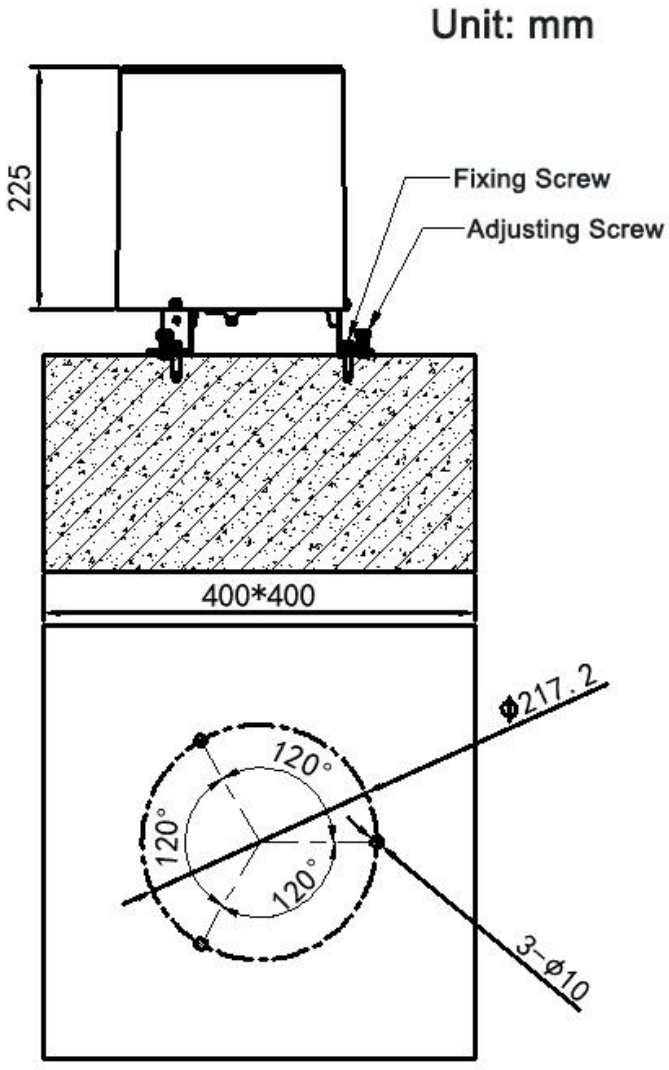

Fig. 3

3. Simulated Precipitation Experiment

This instrument has been tested with artificial precipitation simulation before leaving the factory and the relationship curve between rain intensity and accuracy shown in Fig. 6 has been compiled according to the factory inspection records for users' reference. Users generally do not need to do artificial precipitation simulation test after completing the indoor installation, and can be directly installed in the outdoor use.

If the instrument is found to be over-accurate in the process of operation, it should be tested by artificial precipitation simulation again and the instrument should be re-adjusted as follows:

a Test tool: 1 special rainfall measuring cylinder, 1 small dropper;

b Check before the test:

Before the test, remove the stainless steel outer cylinder to check whether the instrument level bubble is centered, whether the flip bucket is flexible, no stagnation phenomenon, and check whether the water circuit is smooth, and then use water to the rain bearing mouth, water diversion funnel is fully wetted.

c Water injection test

Test the measurement accuracy of the instrument by double-speed drip method, the method is:

With a special rain measuring cylinder to measure 10mm of water, through the diversion funnel slowly poured into the hopper, to be turned over when the hopper is not turned over, that is, stop injecting water, and then use the dropper to suck a number of cylinders of water, a drop by drop to join the hopper until the hopper is turned over, repeat the test in turn, the number of records of the hopper turned over and the amount of consumed water; if the hopper is turned over for 20 times, consuming water for 9.7 ~ 9.85mm, it can be identified as the apparatus Bucket tilt angle of the base point is normal, do not have to be adjusted; when the amount of water > 9.85mm, indicating that the tipping angle of the bucket is too large, the curve shifted to the left, it should be appropriate

to increase the height of the adjusting screw; when the amount of water < 9.7mm, indicating that the tipping angle of the bucket is too small, the curve shifted to the right, it should be appropriate to reduce the height of the adjusting screw; in general, the left and right adjusting screws to turn around, that is, to make the accuracy of the change of 3 ~ 4% or so.

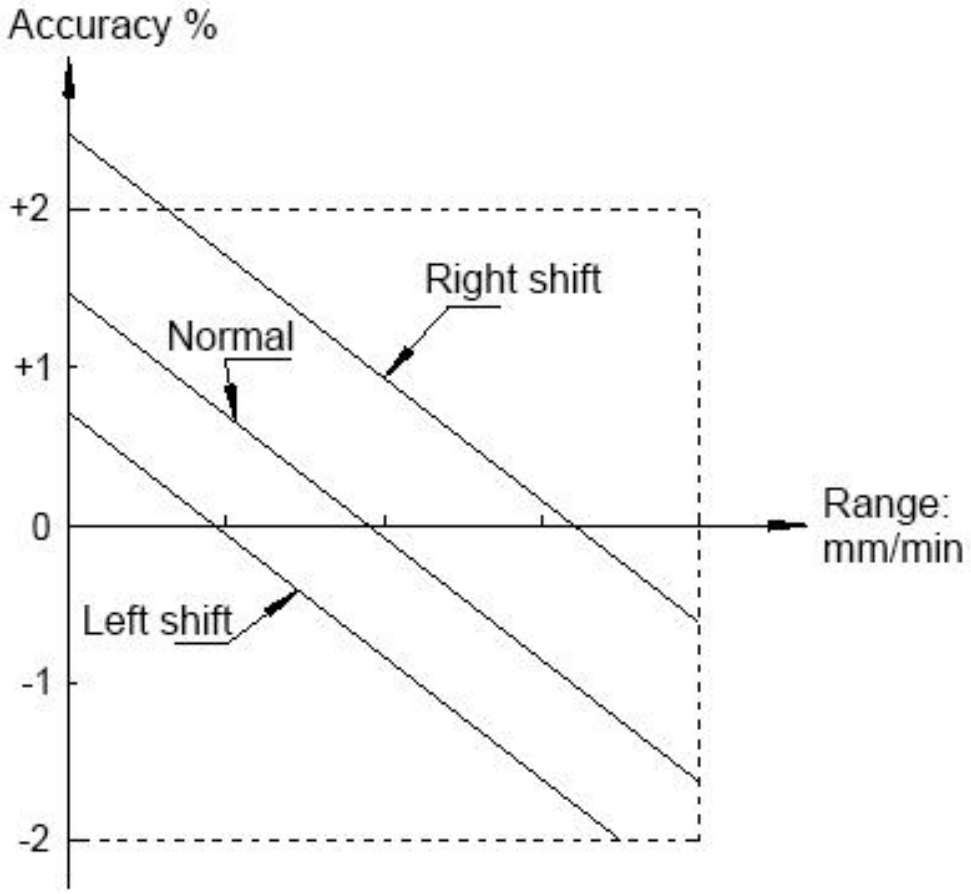

Fig. 6

4. Maintenance and Care

4.1 Daily Maintenance

This instrument is in the outdoor for a long time, the use of the environment is quite harsh, so the instrument's rain-bearing mouth of the inner wall should be often wiped with a soft cloth to keep the rain-bearing mouth clean, such as the rain-bearing mouth of the leaves and other foreign objects should be cleaned up in a timely manner, to keep the waterway unobstructed.

When the instrument is not used for a long time, the cover should be added on the instrument ring mouth to protect the rain-bearing mouth.

Instrument long-term work generally one month to clean up once, three months must be cleaned up once.

4.2 Cleaning of Tipping Buckets

The tipping bucket is the key component of this instrument, which directly affects the measurement accuracy of the instrument, with the increase of use time, the inner wall of the tipping bucket will deposit a little dust or oil, therefore, the tipping bucket should be cleaned. When cleaning, the inner wall of the hopper can be repeatedly rinsed with water or gently brushed with a degreasing brush, and it is strictly prohibited to scrub the inner wall of the hopper with hands or other objects.

5. FAQs and Solutions

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

Center Station Manifestation	Rain Sensor Failure	Solution
Failure to receive rainfall counts	● Indicates that there is no signal output from the rain sensor or the	● Check at the next station

during rainfall	transmission line is faulty ● Failure of reed switch ● The magnet is too far away from the reed switch ● Solder wire off or signal wire broken ● Bucket stuck ● The instrument is clogged	● Replacement ● Adjustment ● Repair ● Troubleshooting ● Remove
There is a big difference between the number of rainfall received and the measured rainfall gauge	● Rain sensor bucket turning base point is out of adjustment, but this kind of error is generally not more than ± 10% ● Magnet and reed switch position is not good, resulting in good and bad, so that some of the signal missed	● Re-titration of the adjustment base point ● Adjust distance ● Objective condition is such that the instrument is not faulty
The center station constantly receives the rainfall number, but the actual situation is not raining	● Check whether the socket is immersed in water, this phenomenon is often easy to occur after heavy rain	● Treat water ingress, reseal

Note: the above table, the listed fault phenomena are not necessarily all the rain gauge failure, in the check the instrument itself and troubleshooting after the instrument should also check the instrument transmission out of the line, data acquisition devices and other equipment whether there are faults, and one by one to be ruled out to solve the problem.

6. Equipment Packing List

Tipping bucket rain gauge sensor	1 set
Tipping bucket	1 pc
Cover of rain-bearing mouth	1 set
Base fixing feet	3 pcs
M5*25 screws	3 sets
M8*120 foot bolt	3 sets
Certificate of conformity	1 set
Base block	1 set