

Runjing Special Ceramic

Hard Sealing Irrigation Valve

All-scenario Application

FAQs



China Water Conservation
Award Advanced Collective



Invention Patent
for Water Outlet
Pile Valve

ZL202411137556.5

Patent Number of
Hydraulic Valve

ZL202422969314.4

Special Ceramic Hard Sealing Irrigation Valve

All-Scenario FAQs (2026 Edition)

With 26 years of dedicated expertise in special ceramic sealing technology
Developing comprehensive intelligent irrigation solutions for all scenarios,
featuring sand resistance, fertilizer corrosion resistance and low leakage

Corporate Honors & Patent Certifications

- ✓ First China Water Conservation Award Advanced Collective
- ✓ Possessing invention patents for the ceramic irrigation valve series:
ZL202411137556.5
- ✓ Supported by over 100 utility model patents and overseas
PCT international patents
- ✓ The cumulative irrigated area implemented nationwide totals nearly 66,670
hectares, verified through field tests in multiple regions

Core Advantages of Ceramic Technology

Ultra-high temperature alumina sintering | High flatness precision grinding
Self-cleaning ceramic seal pair | Aging-free & leakage-proof
Greatly reduced field maintenance costs



WENZHOU RUNXIN MANUFACTURING MACHINE CO.,LTD.

Runjing Special Ceramic Hard Sealing Irrigation Valve All-Scenario FAQs

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User Instructions

Intended users of this manual:

1) Large-scale growers, family farms, and cooperative operators

Quickly check product application scenarios, simple installation, mobile APP irrigation control, daily maintenance, and simple troubleshooting for common errors, and master standardized irrigation solutions for water and fertilizer conservation.

2) Irrigation engineers, distributors, and field technicians

Access complete equipment technical specifications, integrated water and fertilizer system configurations, pipeline layout standards, batch commissioning protocols, and customer training materials, to facilitate irrigation project design and guide on-site construction implementation.

3) Agricultural parks, purchasers and bidders of government water-saving projects

Learn about the enterprise's technical barriers, complete patents, qualifications and honors, large-scale implementation cases, and standardized warranty terms, as supporting technical reference materials for project bidding.

4) After-sales & O&M personnel

Unified access to standardized operating procedures for error troubleshooting, parts replacement, equipment dormancy, firmware upgrade, and winter storage of all categories of valves.

Preface

Most control valves used in large-scale agricultural irrigation fields in China, including solenoid valves, diaphragm valves, plastic ball valves, butterfly valves and other products, adopt rubber or plastic soft sealing structures. They present obvious shortcomings when applied to complex domestic water conditions characterized by high sediment, high salinity and alkalinity, as well as frequent scouring from water-fertilizer solutions: they are highly susceptible to abrasion and erosion by sediment; diaphragm valves suffer from high opening and closing resistance under low-pressure drip irrigation environments, often resulting in valve failure; plastic ball valves are prone to spool seizure and leakage, and usually require full replacement in less than one year of service, which continuously drives up equipment replacement costs and water loss. In addition, traditional water outlet pile valves involve complicated pipeline layouts for multi-channel rotational irrigation on a single unit, making pressure regulation for zoned irrigation time-consuming and labor-intensive, which significantly reduces the efficiency of field irrigation management.

Adopting special ceramic materials, after precision processing, it is used as the component for passing liquid through the valve. Due to the high-precision fitting and relative rotation of flat or spherical surfaces, the opening, closing, reversing, and flow rate of liquid can be controlled. Its excellent performance such as low torque, wear resistance, and corrosion resistance has changed people's cognition regarding the traditional structure valve.

With 26 years of development, Runxin has become the world's

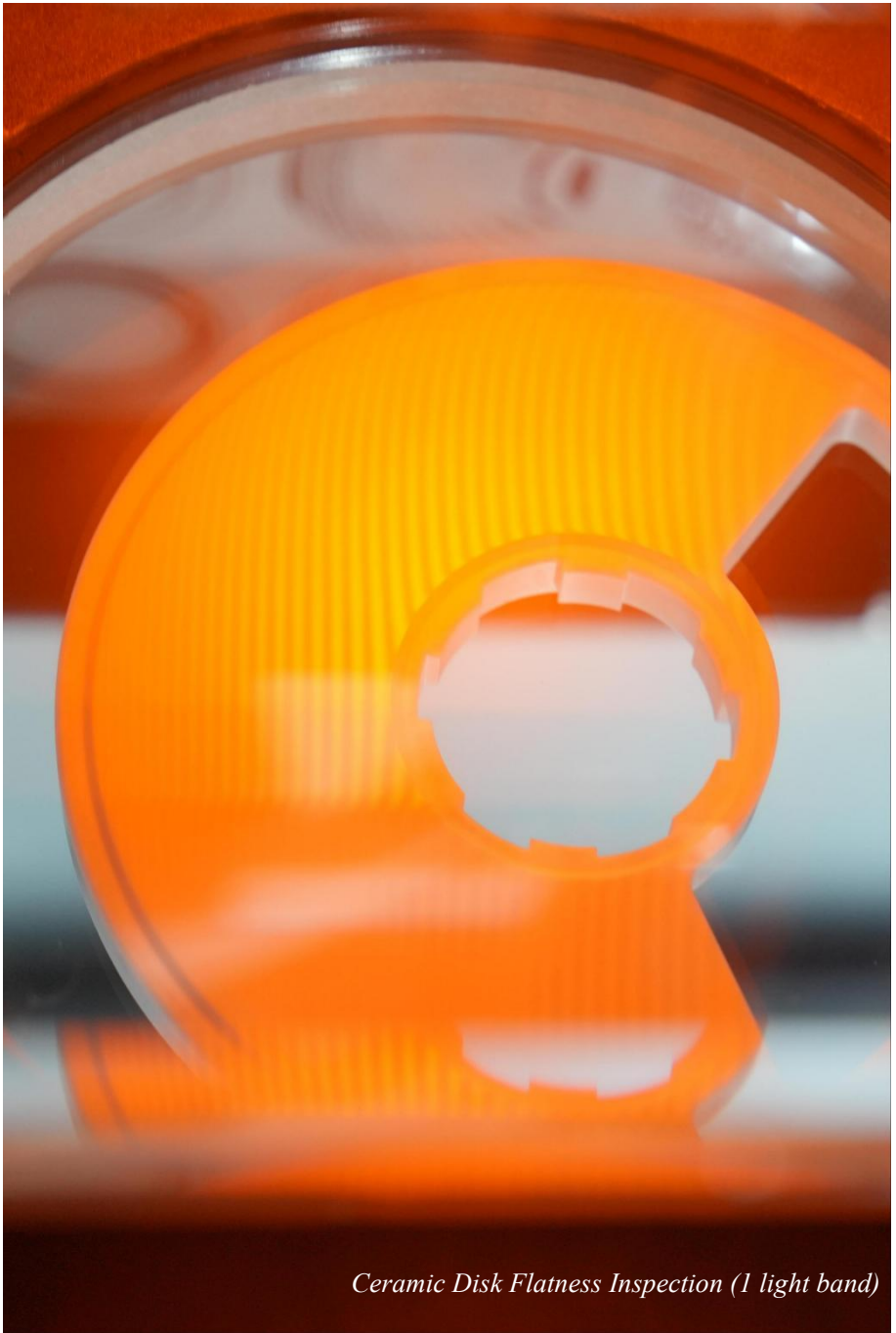
first manufacturer to pioneer the extensive application of special ceramic materials in agricultural irrigation valves. Runjing is an independent brand of Runxin specializing in ceramic hard sealing ball valves and ceramic hard sealing irrigation valves. In response to long-standing industry shortcomings, the company has developed a series of products including Runjing ceramic hermetic sealing water outlet pile valves, hydraulic valves, three-way valve for filter's backwash , disk filters, linear proportional fertilizer suction regulating valves, water and fertilizer proportional valves dedicated to integrated water and fertilizer machines, integrated water and fertilizer machines, axial flow valves, and other related products. The core opening and closing components of the full range of products uniformly adopt high-hardness, corrosion-resistant special ceramic materials, which are suitable for various complex irrigation water qualities and harsh working conditions. Featuring low operating torque (power consumption), less inspection and maintenance, reusable service for many years, the products provide high cost performance.

At present, Runjing irrigation equipment has completed large-scale field verification in multiple regions and for various crops. Runjing water outlet pile valves have been applied in cotton, oil sunflower and corn farmland in Xinjiang and Inner Mongolia, serving a cumulative irrigated area of nearly 66,670 hectares. Runjing hydraulic valves are widely used in planting bases of camellia, citrus, figs and other fruits in Jiangxi, Sichuan and Zhejiang. To help users fully understand the functional features, technical advantages, selection methods, installation standards, operation guidelines and maintenance key points of Runjing irrigation valve series products, we have compiled this manual. Adopting an easy-to-understand Q&A format, this manual answers

frequently asked questions in practical irrigation scenarios, presents the full characteristics of Runjing irrigation valves as comprehensively as possible, and helps users master product selection and operation skills, so as to achieve the goals of correct selection, smooth operation and favorable benefits.

This manual is jointly compiled by multiple departments of Runxin, including the R&D Department, Intelligent Irrigation Valve Sales Department, Marketing Department and Quality Control Department, based on years of field measurement data and practical feedback from users across China. Given the editors' limited expertise, omissions and shortcomings are inevitable in this volume. We cordially welcome constructive criticism and corrections from industry peers and readers alike.

The Editors
August 2026



Ceramic Disk Flatness Inspection (1 light band)

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I. Product Overview

1. What is an intelligent ceramic hard sealing irrigation valve?

The Runjing ceramic hard sealing intelligent irrigation valve integrates IoT, sensing detection, and electric actuators. The opening and closing core of the entire series utilizes specially formulated alumina ceramic sealing pairs. The equipment is supplied with a solar power system and supports remote control via mobile APP, WeChat Mini Program, and computer terminals. It allows for customizable irrigation schedules, automatic adjustment of outlet opening and pipe network pressure, enabling unattended precision irrigation for large fields, orchards, and greenhouses.

2. Compared to ordinary manual valves, what are the advantages of the intelligent irrigation valve?

The intelligent irrigation valve can automatically regulate pressure, thereby ensuring uniform supply of water and fertilizer, which helps increase yield and income. It eliminates the labor required to go to the field to manually open and close valves. It also prevents the spread of pests and diseases caused by manual operation. With a ceramic seal leakage rate of $\leq 0.01\%$, it significantly reduces inefficient water and fertilizer loss, resulting in much higher comprehensive benefits than traditional manual valves.

3. What crops is the intelligent irrigation valve suitable for?

It is suitable for field crops such as cotton, corn, and oil sunflower in northern regions; southern citrus and camellia oleifera orchards; greenhouse soilless cultivation; urban landscaping; and saline-alkali land facility irrigation, covering all regional operating conditions.



Cotton Field



Corn Field



Sunflower Field



Melon Field



Greenhouse



Park Landscaping

**4. What is the core technology of the Runjing irrigation valve?
How is it different from similar products on the market?**

Adopting special ceramic materials, after precision processing, it is used as the component for passing liquid through the valve. Due to the high-precision fitting and relative rotation of flat or spherical surfaces, the opening, closing, reversing, and flow rate of liquid can be controlled. Its excellent performance such as low

torque, wear resistance, and corrosion resistance has changed people's cognition regarding the traditional structure valve.

Through 26 years of development, Wenzhou Runxin Manufacturing Machine Co., Ltd. has mastered the core technologies of special ceramic raw materials, formulation, molding, sintering, precision machining, and the versatile design of structures and flow channel combinations. As a result, it has become the world's first manufacturer to pioneer the widespread application of special ceramic materials in agricultural irrigation valves.

The core differences between Runjing irrigation valves and common rubber/plastic soft-seal solenoid valves and ball valves on the market are concentrated in the following five points:

1) **Sealing Material:** Uses high-hardness alumina ceramics, while market products use aging-prone rubber and plastic.

2) **Wear Resistance:** Harder than sand particles, with no scratches or leakage after long-term scouring.

3) **Corrosion Resistance:** Chemically stable, resistant to immersion in acid/alkali fertilizers and pesticides.

4) **Operating Feel:** Ceramic is self-lubricating; torque remains stable and operation is light over years of use.

5) **Service Life:** Mechanical components come with a 5-year warranty(limited in Chinese domestic market), which is far lower than the annual replacement frequency of traditional valves, significantly reducing maintenance costs.

5. What are the main products in the Runjing irrigation valve line?

Runjing irrigation valves mainly include ceramic hermetic head faces water outlet pile valves, hydraulic valves, disk filters, integrated water and fertilizer machines, fertilizer suction regulating valves, water

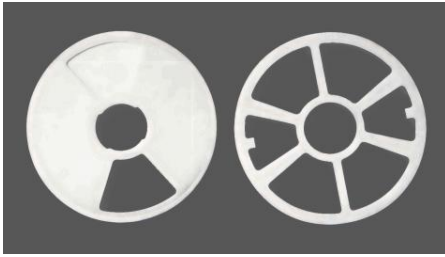
and fertilizer proportional valves, straight-through valves, axial flow valves, and foot valve for water pump, widely used in **field irrigation, protected agriculture, and landscape irrigation.**



Runjing Irrigation Valve

6. What material is used for the valve core?

The moving and fixed sealing disks are made of **high-purity special alumina ceramics**. After high-temperature sintering, they reach a hardness of HRA85 or above, far exceeding common sand particles found in irrigation water (quartz Mohs hardness approx. 7). This resists continuous scouring by field sand and mud, withstands corrosion from various water-soluble fertilizers and pesticides, and maintains sealing fit and operating torque without significant degradation after long-term opening and closing cycles.



*Runjing Water Outlet Pile Valve
Sealing Disks*



*Runjing Hydraulic Valve
Sealing Disks*

7. How are the ceramic valve cores produced?

High-purity alumina powder dry pressing molding → Ultra-high temperature sintering in a 1680°C electric kiln → Multiple precision double-sided lapping → Flatness precision inspection to 0.3 μm → Finished product screening and grading. The extremely flat sealing surfaces ensure complete contact between the two ceramic pieces, achieving a good seal for both water and gases.



Ceramic Disk Dry Pressing



*Ceramic Disk High-Temperature
Sintering*

8. What material is the valve body? What are its properties?

The valve body is made of high-performance engineering plastics such as glass fiber reinforced ABS and glass fiber reinforced nylon, strictly using no recycled materials. It has high mechanical strength and good weather resistance, with good thermal stability up to 80°C and is not prone to softening or deformation under direct sunlight,

outperforming common UPVC and glass fiber reinforced PE materials.

Table 1: Comparison Table of Mechanical and Thermal Properties of Main Materials

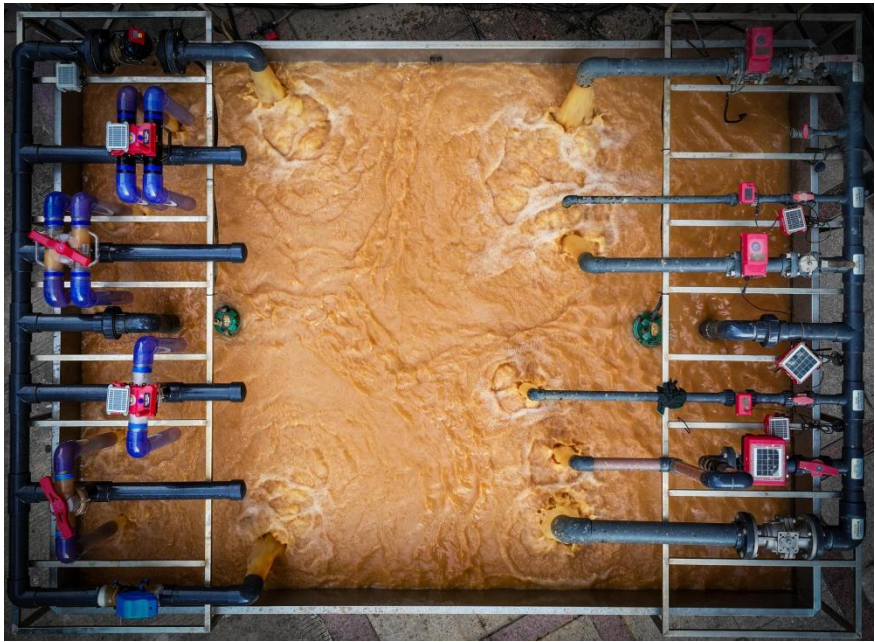
Material Type	Tensile Strength (MPa)	Flexural Strength (MPa)	Heat Deflection Temperature (°C)
Glass Fiber Reinforced ABS	≥50	≥70	≥95
Glass Fiber Reinforced Nylon	≥140	≥210	≥180
UPVC	≥40	≥50	≥70
Glass Fiber Reinforced PE	≥45	≥60	≥90

9. Is the ceramic valve core resistant to sand wear?

It is completely resistant to scouring by water sources with high sand and mud content. The hardness of alumina ceramics is far higher than that of irrigation sand particles, so sand in the water flow cannot scratch the sealing surfaces. When the valve opens and closes, the ceramic disks rotate against each other, providing a self-cleaning scraper effect, making it difficult for sediments and impurities to get stuck on the sealing surfaces. It can be used stably for long periods with well water and canal water containing sand and mud.

10. Will fertilizers and pesticides corrode the valve?

No. The special ceramic valve core, sintered at ultra-high temperatures, has good chemical stability and can resist corrosion from most acidic fertilizers and organic solvents. The high-performance engineering plastic valve body we use also possesses good corrosion resistance.



Valve Sand Resistance Test (Sand content 20kg/m³)



Water-Fertilizer Solution Resistance Test (Double concentration)

11. Why do you dare to offer a 5-year warranty? (limited in Chinese domestic market)

Runxin Company has been deeply involved in the "water" industry for over twenty years, mastering the complete set of core technologies for special ceramic raw materials, molding, sintering, and precision machining. **The independently developed and produced "Runxin Valve" series, which uses ceramic hermetic head faces structures, has been exported to 161 countries and regions worldwide. It is not uncommon for "Runxin Valves" to still function normally after fifteen years of use, and the reliability and applicability of special ceramic hard sealing technology have been widely verified.**



Display Area of 15-20 years Used Runxin Valves



*70m³/h Automatic Control Valve F153 Applied in Data Center Cooling
Circulating Water System*

The Runjing irrigation valve **is also developed based on special ceramic hard sealing technology**. Its opening, closing, flow direction switching, and flow control components use special ceramic materials, suitable for various complex irrigation water qualities and environmental conditions, with a long service life, completely different from traditional soft-seal irrigation valves.

The company conducts **18 type tests on samples** from each batch of Runjing irrigation valves, including flow rate, pressure resistance, high and low-temperature performance, enclosure protection performance, anti-interference capability, communication distance, chemical resistance, and durability. Simultaneously, field tests are conducted in areas with high sand, high wind, high heat, and extreme cold, such as Turpan, Xinjiang; Qing'an, Heilongjiang; and Weinan,

Shaanxi. Application demonstrations are also carried out in typical agricultural irrigation scenarios in multiple regions including Xinjiang, Gansu, Jilin, and Henan, **practically verifying the stability and durability of the irrigation valves under extreme environmental conditions, demonstrating their outstanding advantages in technical performance and water-saving reliability.**

Therefore, Runxin Company provides a five-year warranty service for the core components of the Runjing irrigation valves, **and has insured product liability insurance with Ping An Insurance** (Policy No.: 14801223902872127783), ensuring every user can use them with true confidence.



Runjing Irrigation Valve Sand Resistance Test Area



II. Water Outlet Pile Valve

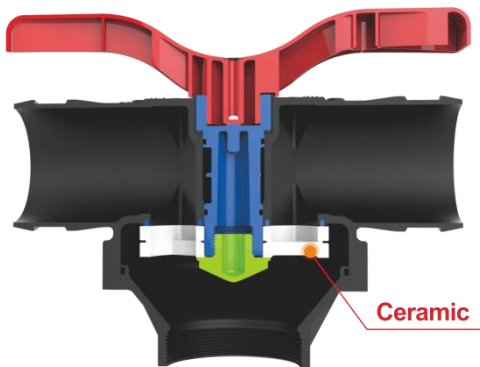
A. Performance Characteristics

1. What is a water outlet pile valve?

The water outlet pile valve is installed on the water outlet pile (water supply hydrant) of the main pipeline in the irrigation system. It enables irrigation for each rotational irrigation zone, features pressure stabilization or regulation functions, and serves to switch irrigation water on/off and adjust irrigation pressure (flow rate).

2. Does Runjing water outlet pile valve have patents?

Yes. Runxin company innovatively applied ceramic hermetic head faces sealing technology to the irrigation sector and developed the Runjing ceramic hermetic head faces sealing water outlet pile valve. It has been granted a **Chinese invention patent (ZL202411137556.5)** and two utility model patents (ZL202422009978.6; ZL202521726574.7), **featuring original proprietary technology. PCT international patent applications for the Runjing water outlet pile valve are underway, filed in the US, EU, Israel, India, Kazakhstan and other countries.**



Structural Schematic Diagram and Invention Patent Certificate of Runjing Water Outlet Pile Valve

3. Are there products with similar structures on the market?

Runxin has mastered the complete set of core technologies for special ceramics. Based on years of in-depth field investigations and research in Xinjiang, Gansu, Inner Mongolia and other places, **as early as 2024, it innovatively launched a ceramic hermetic head faces sealing structure water outlet pile valve.** After continuous testing and improvement, it has met the requirements of irrigation system applications. Runxin has not yet authorized other companies to produce.

4. What is the operating pressure range?

Normal operating pressure: 20m water head (0.2MPa); Maximum operating pressure: 60m water head (0.6MPa); Burst test pressure: 100m water head (1.0MPa). Typical field drip irrigation operates at around 10m water head, and the valve can open/close smoothly under low pressure of 2~5m water head.

5. Is it resistant to high and low temperatures?

Operating ambient temperature: 4°C~60°C. It works reliably in Xinjiang where diurnal temperature difference can reach 30°C.

Medium temperature: 4°C~50°C. Drain residual water to prevent freezing when temperature drops below 4°C in winter. Hot water, steam or highly corrosive liquids other than agricultural fertilizers are strictly prohibited.

6. What is the service life?

Service life exceeds 5 years under standard working conditions. Mechanical components carry a 5-year warranty, electric actuators a 3-year warranty, and batteries a 2-year warranty.

(limited in Chinese domestic market)

7. Is it waterproof?

Ingress protection rating IP67: dustproof and resistant to temporary submersion, suitable for field environments with rain splash and short-term standing water.

8. What motor drives the valve?

It is driven by a DC reduction motor with metal gears, featuring long service life and stable operation.

9. How to charge the battery?

Built-in solar panel for charging; alternatively, remove the battery and charge it with a dedicated charger.

10. How long does it take to fully charge the battery via solar panel?

With 6 hours of effective sunlight per day, it takes 7~10 days to charge the battery from 1% to 100%.

11. How long can a fully charged battery last?

Equipped with a high-capacity lithium battery. If solar charging is blocked by tall crops, a full charge supports 100~150 days of operation (duration varies slightly based on local 4G signal strength).

12. Will unstable or frequently cut-off municipal power affect valve operation?

No. The valve runs on battery power supplemented by solar charging and does not rely on grid electricity. Power outages will not interfere with normal opening/closing, as long as 4G signal is available around the valve.

13. How many operation modes are available?

Three modes: 1. Remote control via mobile APP or PC; 2. Local button operation when communication signal is weak; 3. Manual emergency operation with a hexagonal wrench if the actuator fails or battery is drained.

14. Will water leak if the valve does not fully close?

Under standard conditions, the tightly fitted ceramic hard sealing pair achieves zero leakage. If foreign debris jams the valve and prevents full closure, the APP will trigger an alarm "Valve not fully closed", and maintenance staff can clear the blockage to restore normal operation.

15. Is manual emergency operation laborious?

Manual emergency operation uses a hexagonal wrench; simply insert and twist for effortless control.

16. What communication methods are supported?

It supports two communication methods: 4G and LoRa.

17. How many valves can one LoRa gateway control, and what is the coverage range?

One gateway can control approximately 64 sets of LoRa valves (subject to actual valve spacing). With unobstructed line-of-sight, stable control distance reaches around 1000 meters.



Runjing LoRa Water Outlet Pile Valves Applied to Large-Scale Corn Irrigation

18. What initial data allowance comes with the built-in SIM card? How to renew and what is the annual fee?

Free 3-year data allowance pre-installed upon delivery. (limited in Chinese domestic market). After expiration, users can renew subscriptions via official WeChat mini program, with an annual fee of only 3 CNY. (limited in Chinese domestic market)

19. Is the valve prone to clogging?

The rotating ceramic disk acts as a scraper to automatically clear attached residues, effectively preventing clogging.

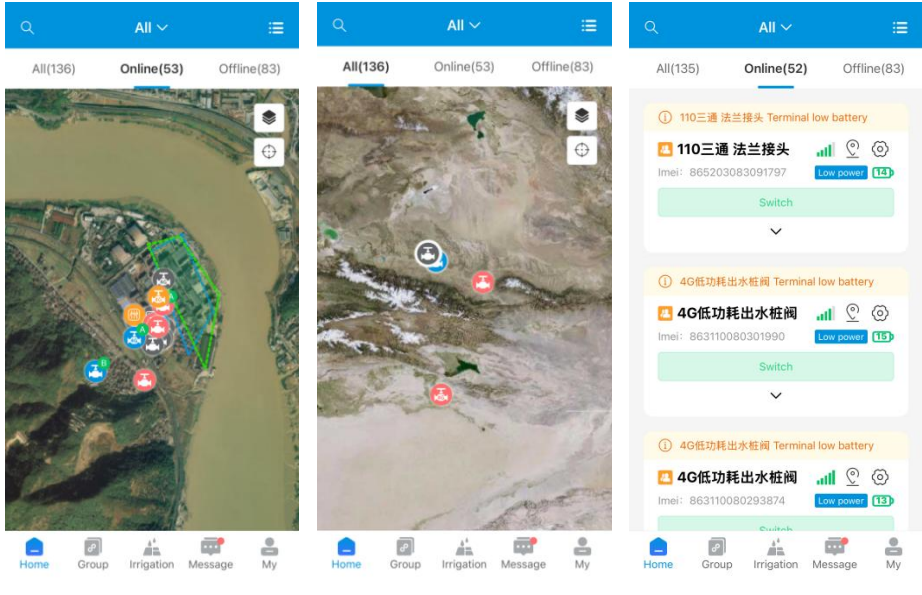
20. Is there an auxiliary drain device for freeze protection?

Built-in drainage function. It is recommended to install manual or electric drain valves at the lowest point of the piping system, and run

the winter drainage procedure for optimal freeze protection.

21. Does the valve come with a pressure sensor?

Yes, it is equipped with a pressure sensor for real-time pressure monitoring and overpressure alarms.



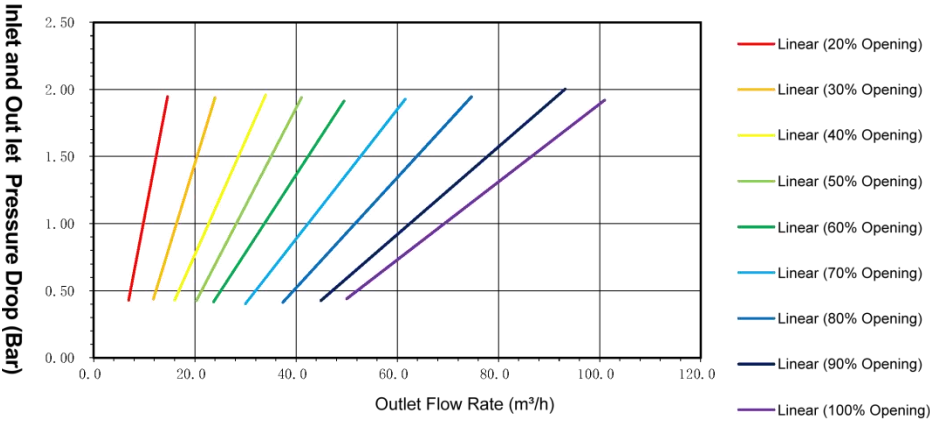
22. Does it support flow rate display?

Yes. An optional flow meter can be installed, and real-time flow data is displayed on the APP.

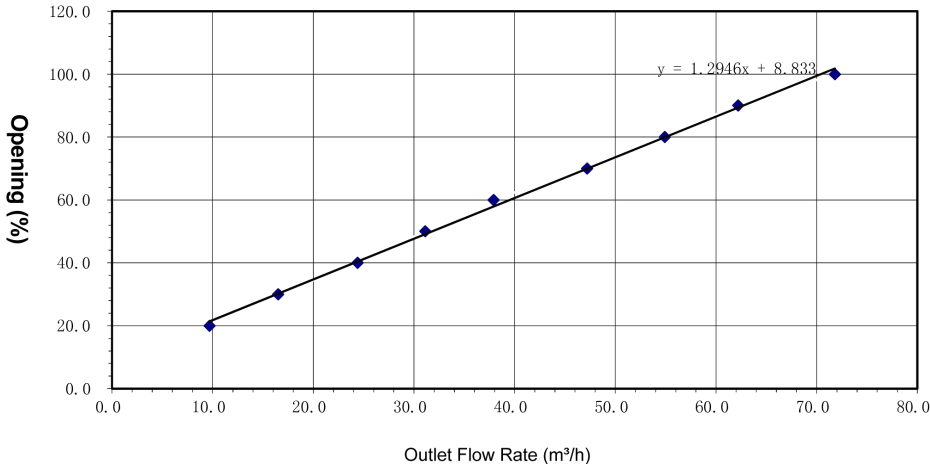
23. Does it support opening degree adjustment?

It supports stepless linear opening adjustment from 0% to 100%. Outlet flow can be adjusted in real time via mobile APP or local physical buttons.

Curve of Valve Opening, Flow Rate and Head Loss



Curve of Valve Opening vs Flow Rate at 1Bar Head Loss



24. Ceramic parts look brittle; are they easy to crack during handling and transportation?

The ceramic disk is enclosed inside the high-strength plastic valve body, which provides robust protection. Packaging has passed various simulated transport tests and real shipment validation from Wenzhou to Xinjiang. Under standard installation, operation and transportation, ceramic components will not crack.

25. Will heavy wind-blown sand affect operation?

No adverse impact. Dust-proof sealing rings between the actuator and valve body block sand from entering the inner chamber, ensuring smooth switching and reliable sealing.

26. Will idle valves leak during rotational drip irrigation?

No. The tightly bonded ceramic hard sealing pair achieves ultra-low leakage, with zero dripping under standard operation.

27. Will the valve seep under high pressure or leak heavily under low pressure with dramatic water pressure fluctuations?

No. The Runjing water outlet pile valve operates reliably up to 0.6MPa with minimal leakage. Its special design delivers improved sealing performance as operating pressure rises.

28. Will the valve operate normally after long-term idle storage?

Yes. Ceramic sealing eliminates rubber aging issues; after prolonged disuse, the valve still opens/closes smoothly with intact sealing performance.

29. Will the valve body deform or fail under long-term high temperature and intense UV radiation in summer?

No. The valve body is made of industrial-grade plastic blended with UV stabilizers, resisting deformation, brittleness and weathering under long-term intense sunlight. Its hermetic head faces sealing structure avoids the stuck-open/stuck-closed faults common to ball valves caused by thermal expansion and contraction.

30. Can the valve operate in winter?

Irrigation is recommended to cease when ambient temperature drops below 4°C to prevent internal ice formation and valve damage.

31. Will the valve freeze and break in Xinjiang's winter (-20℃ ~-30℃) when buried in field?

It will not freeze-damage as long as all residual water inside the valve core is drained before winter. Strictly follow the winter drainage procedure.

32. Will low water temperature cause the ceramic disk to contract and leak?

No. Ceramic disks are sintered at high temperatures with an extremely low thermal expansion coefficient, resisting deformation from temperature fluctuations.

33. Can this valve stabilize fluctuating pressure in drip irrigation tapes?

Stepless opening adjustment balances outlet pressure within individual irrigation zones. If inlet-outlet pressure drop is excessive, install a dedicated pressure reducing valve at the inlet (see Chapter V).



Water Outlet Pile Valve Equipped with Proportional Pressure Reducing Valve

34. Will fertilizer residue clog the valve after fertigation? Is dedicated flushing required?

No clogging under standard operation. After fertigation, continue clean water irrigation for a period to flush residual fertilizer through the piping and valve into the field; no separate valve flushing is needed. (Standard drip fertigation follows the quarter-cycle rule: the first quarter of the cycle is used to stabilize drip tape pressure prior to valve opening; the second quarter applies potash and phosphate fertilizers; the third quarter applies nitrogen fertilizer; the final quarter flushes branch pipes and drip tapes for uniform nutrient delivery to crop root zones.)

35. Is it suitable for saline-alkali farmland?

Yes. Both ceramic components and engineering plastic valve body offer outstanding resistance to saline-alkali corrosion for long-term reliable operation in saline-alkali soils.

36. Can it be used in greenhouses?

Yes. It supports linkage with humidity and temperature sensors to meet precision irrigation demands for protected agriculture.

37. Is it applicable to landscape greening irrigation?

Yes. It has been deployed in parks, residential communities and villa landscapes. Typical landscape sprinkler systems operate below 40m water head, landscape drip irrigation at 20m water head, and municipal pipelines under 35m water head. The Runjing valve also supports reclaimed water irrigation.

38. Can it be retrofitted to legacy irrigation systems?

Yes. It directly replaces traditional ball valves and diaphragm valves for system upgrading. The Runjing hydraulic valve requires minimal water pressure for switching, delivering more stable operation than conventional diaphragm valves in low-pressure irrigation systems of Xinjiang and Inner Mongolia.

39. Will simultaneous opening of multiple valves cause water hammer damage?

Built-in slow-closing function (default slow open/close) effectively mitigates water hammer pressure spikes.

40. Is performance affected at high altitudes (e.g. Qinghai - Xizang Plateau)?

No adverse impact; full normal operation is maintained.

41. Will lightning strikes damage the valves?

Valves installed at ground level suffer minimal lightning impact; lightning damage is isolated to individual units rather than entire valve clusters. However, gateway controllers are pole-mounted, so lightning protection measures are recommended for gateways.

42. Can this valve be mixed with existing ball-valve-type water outlet pile valves?

Mixing is not recommended. The two valve types have different flow capacities, leading to uneven irrigation distribution.

43. Does this valve save water compared to conventional rubber-sealed valves?

Water savings stem from two core advantages:

1) **Ultra-low leakage:** Conventional butterfly valves typically reach $\geq 5\%$ leakage after service, while Runjing water outlet pile valve leakage is limited to $\leq 0.01\%$.

2) **Balanced irrigation pressure:** Conventional valves feature non-linear correlation between opening angle, outlet pressure and flow, causing severe pressure fluctuation and uneven water distribution across irrigation zones, leading to overwatering or underwatering and reduced crop yield. The one-click pressure equalization function eliminates wasteful irrigation caused by uneven pressure.

44. Ceramic valves cost more than ordinary plastic valves – is it cost-effective?

Mechanical components carry a 5-year warranty with stable performance (limited in Chinese domestic market), drastically cutting maintenance and replacement expenses. Though upfront investment is slightly higher, long-term savings on maintenance and improved irrigation efficiency deliver superior cost-effectiveness over years of service.

45. How long is the payback period after installing Runjing water outlet pile valves?

Water conservation, labor reduction and increased crop yields combine to deliver full equipment cost recovery within a single growing season in most cases.

46. Is this new material and design validated by real market operation?

The core ceramic hard sealing technology of Runjing water outlet pile valve originates from Runxin's water treatment control valves (Runxin Valve), manufactured for over 20 years with annual shipments exceeding 3 million sets sold to more than 160 countries and regions. The technology is fully mature.

Prior to market launch, extensive extreme-condition testing was conducted in Turpan (Xinjiang), Qing'an (Heilongjiang), Weinan (Shaanxi) and other regions with diverse climate and water quality. Nearly 100,000 units have been shipped from 2025 to 2026, covering close to 66,670 hectares of farmland with positive customer feedback.

1334 hectares of cotton farmland in Shawan, Xinjiang: 2,600 sets of electric 3-way valves installed with LoRa wireless & mobile APP remote control, integrated fertigation, corrosion resistance, low maintenance and stable operation.



1334 hectares of cotton farmland in Shawan, Xinjiang

667 hectares of corn field in Artux, Xinjiang: 900 sets of electric 3-way / 5-way valves deployed with 4G/LoRa connectivity, APP remote control, solar + lithium battery power supply for extended endurance.



667 hectares of corn field in Artux, Xinjiang

667 hectares of mixed farmland (corn, bottle gourd, sunflower)

in Hejing, Xinjiang: 800 sets of electric 3-way valves with 4G remote control, rotational irrigation zones scheduled by crop water demand, delivering robust crop growth.



667 hectares of mixed farmland in Hejing, Xinjiang

67 hectares of sunflower field in Korla, Xinjiang: 90 sets of electric 3-way valves with 4G/LoRa wireless connection and mobile APP remote control, stable signal, supporting scheduled irrigation,

rotational irrigation, batch operation and one-click pressure equalization.



67 hectares of sunflower field in Korla, Xinjiang

47. Can external sensors be connected for automatic irrigation?

LoRa valves support external sensor connection, enabling automatic valve on/off control based on soil moisture, temperature and

other sensor data.

48. Is it suitable for agricultural cooperatives?

Yes. Multi-user shared accounts and grouped device management enable unified scheduling for agricultural cooperatives.

49. Can it connect to third-party control platforms?

Yes. It supports standard MQTT and API communication protocols for seamless integration with all types of agricultural IoT third-party platforms.

50. Can it connect to agricultural IoT platforms for big data analysis?

Yes. After connecting to third-party platforms via MQTT/API interfaces, collected data enables water consumption statistics and intelligent irrigation decision-making.

51. Can third-party electric actuators be fitted to the valve body?

Yes, but a customized coupling adapter must be designed for mechanical connection.

52. Is the product exportable?

Yes. It features an export-ready design with an external card slot for local SIM or global roaming SIM card installation.

B. Model Selection & Installation

1. What inlet size specifications are available?

Two inlet sizes are currently offered: DN80 and DN100.

2. What connection types are supported? How to connect existing water outlet piles?

Inlet connection options: female thread, flange, quick clamp, or barb fitting (direct hose connection). Select matching adapters based on the size and connector type of the original water outlet pile.

3. Can the outlet size be changed?

Valves with female thread outlets can be adapted via reducing connectors; DN80 female thread can be reduced to $\varnothing 90$, $\varnothing 75$, $\varnothing 63$ and other sizes.

4. Do all connectors comply with national standards?

Compliant. Threaded connections follow GB/T7307-2001 Standard for 55° Non-Sealing Pipe Threads.

5. What pipe diameters fit 3-way and 5-way valves?

3-way valve outlets support $\varnothing 75/\varnothing 90/\varnothing 110$ hose clamps, or reduced adapters for $\varnothing 63$; 5-way valve outlets fit $\varnothing 75/\varnothing 90$ hose clamps. Inlet and outlet bore sizes can be flexibly matched.

6. How many outlets can a 3-way valve open simultaneously?

Can each outlet be controlled independently?

Two outlets can be opened at the same time; each outlet can also be controlled separately (one open, one closed).

7. What are the flow rates of 3-way and 5-way valves?

At 3m water head pressure drop: 3-way $\varnothing 90$ single outlet flow: 53 m³/h, 3-way $\varnothing 110$ single outlet flow: 67 m³/h, 5-way $\varnothing 90$ single outlet flow: 40 m³/h.

8. Design and construction specifications of drip tapes for different crops in Xinjiang region?

Through on-site investigation and research of information:

Table 2: Layout Spacing and Total Length of Field Drip Tapes

Crop	Planting Mode Brief	Typical Row Spacing (cm)	Drip Tape Layout	Average Drip Tape Spacing (m)	Drip Tape Length per 666 m ² (m)
Cotton	Machine-harvest cotton (1 film, 3 tapes, 6 rows)	66+10	One film, one drip tape per two rows, centered in narrow row spacing.	0.76	875

Crop	Planting Mode Brief	Typical Row Spacing (cm)	Drip Tape Layout	Average Drip Tape Spacing (m)	Drip Tape Length per 666 m ² (m)
Wheat	Conventional planting (1 film, 2 tapes, 4 rows)	30+60+30	One film, one drip tape per two rows, centered in narrow row spacing.	0.9	740
	Uniform broadcast seeding	No defined row spacing	The spacing between drip irrigation belts is set according to soil permeability	0.9 - 1.2	740 - 555
Corn	High-density high-yield planting	40+90	(40cm) One drip tape serves two rows, drip irrigation tape located in the middle of the narrow row (40cm)	1.3	510
		60+60	One drip tape serves one row, with one drip irrigation strip for each row of crops	0.6	1110
Chili	Film mulch cultivation	30+60+30 (hill seeding)	One drip tape serves two rows, drip irrigation tape located in the middle of the small row (30cm)	0.9	740
		40+90 (hill seeding)	One drip tape serves two rows, drip irrigation tape located in the middle of the narrow row (40cm)	1.3	510
Sunflower	Edible sunflower	60+60	One drip tape serves two rows	1.2	555
		50+50	One drip tape serves two rows	1	665
	Oil sunflower	40+40	One drip tape serves two rows	0.8	830

Table 3: Dripper and Branch Pipe Spacing Specifications

Parameter	Sandy Soil Recommendation	Clay Soil Recommendation	Low-Flow System
Dripper Flow Rate	2.2-2.4 L/h	1.8-2.0 L/h	1-1.38 L/h
Burial Depth	Surface laying	1-2 cm Shallow burial 1-2 cm	0.5 cm Film mulch or 0.5cm shallow burial
Branch Pipe Spacing	70-60 m 140-120m Two-way 140-120m	80-70 m 160-140m Two-way 160-140m	150-100 m 300-200m Two-way 300-200m

9. How many square meters of farmland can one single valve irrigate?

Calculate required flow per 666 m² based on drip tape length per 666 m², dripper spacing and dripper flow rate. See table below:

Table 4: Water Outlet Pile Valve Flow Calculation Sheet
(Cotton as Example)

Item	Unit	Formula / Data Source	Value
Area per 666 m ²	m ²		666
Crop row spacing	M	Determined by crop planting row layout	0.76
Drip tape length per 666 m ²	M	Area / Crop row spacing	875
Dripper spacing	M	Determined by selected drip tape model	0.3
Total drippers per 666 m ²	Pc	Length per 666 m ² / Drripper spacing	2893
Single dripper flow rate	L/h	Determined by selected drip tape model	2
Total flow per 666 m ²	m ³	Total drippers × Single dripper flow per 666 m ²	5.8
Single outlet valve flow	m ³	From valve technical datasheet	45
Irrigable 666 m ² per single valve outlet	666 m ²	Valve single outlet flow / Flow per 666 m ²	7.75

10. How to choose between 4G valve and LoRa valve?

Primary factor: local 4G signal coverage. 4G valves are recommended if installation site meets the following conditions: RSRP (Reference Signal Receiving Power) > -100dBm, RSSNR (Reference Signal Signal-to-Noise Ratio) > 2dB; stable mobile 4G voice/data

service, unobstructed line-of-sight, and cellular base station within 2km radius.

If above conditions are unmet, select LoRa valves. Install the gateway at the center of the valve cluster with stable signal, pole-mounted at minimum 3.5m height, equipped with lightning protection.

Alternative: 4G valves with full-network SIM card and extended high-gain antenna.

11. What are the characteristics of 4G signal coverage in Xinjiang Region?

Signal strength: strong in cities, weak in suburbs—prefecture capitals > county towns > townships > mountainous and desert areas.

Continuous 4G/5G coverage along highways, national roads and railways.

China Mobile offers widest coverage; China Telecom delivers stable signal indoors and in windy/sandy terrain; China Unicom has weaker signal in remote areas.

12. Will tall row crops block communication signals?

Partial signal attenuation occurs. Remedies: mount external antenna at elevated height or select LoRa valves directly.



Water Outlet Pile Valve with External Solar Panel & Antenna

13. Will mass deployment of 4G valves in one zone interfere with cellular signal?

Cellular base station capacity depends on bandwidth consumption per device. Smart irrigation valves use low-data IoT SIM cards with minimal bandwidth occupation, so mass installation of 4G valves in a single zone causes negligible signal interference.

14. Is LoRa valve installation complicated? What are its advantages?

Valve installation procedure is nearly identical to 4G valves. Key advantage: Install one gateway at a field edge location with good 4G signal; valves operate independent of weak field cellular coverage for far more stable communication.

15. What are the installation requirements and recommended mounting height for LoRa gateways?

Mount gateway is as close to target valves as possible, within maximum 1000m distance, with unobstructed line-of-sight to all valves; antenna height minimum 3.5m above ground.

16. Can it directly replace traditional manual water outlet pile valves? Does new piping installation required?

Compatible with national standard UPVC water outlet piles and PE flexible hoses; direct drop-in replacement for manual water outlet piles, no new piping required.

17. Can an impeller flow meter be fitted if quick clamp connections are selected?

Quick clamp structure is incompatible with impeller flow meters. Select threaded or flanged valve bodies if flow monitoring is required.

18. What should be noted when installing hose clamp?

Position the clamp at the midpoint of the PVC sealing gasket; after tightening, ensure the hose sits ≥ 1 mm below the fitting shoulder.

19. What is the standard mounting height for field-installed valves?

Recommended height: outlet pipe centerline 10~15cm above ground, maximum 20cm. For uneven terrain, adjust height to ensure hoses do not drag on ground to avoid kinking or abrasion damage.

20. How to prevent accidental button press during installation and operation?

Valve physical buttons feature a safety lock function to avoid accidental triggering.

21. Are special installation tools required? Can general farm laborers complete installation?

No special tools are required; only PTFE thread tape is needed. General farm staff can complete installation after brief training.

C. App and Mini Program Operations

1. What app should be used? How to download it?

Runjing Intelligent Control App. You can search for and download it from your phone's app store; it's available on all major app stores. You can also use the "Xiaorun Smart Control" WeChat Mini Program.

2. What to do if the app can't be found in the App Store?

Scan the QR code on the right and use your mobile browser to download the installation package and install it.

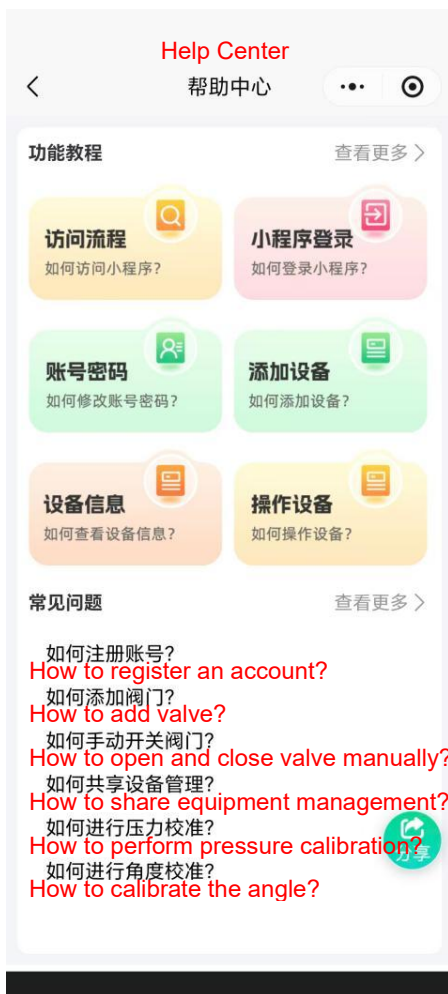


3. What WeChat Mini Program is for mobile operation?

In WeChat, tap the search button in the upper-right corner, enter "Xiaorun Smart Control", select "Xiaorun Ceramic Hard Sealing Irrigation Valve Smart Control System" and authorize to log in.

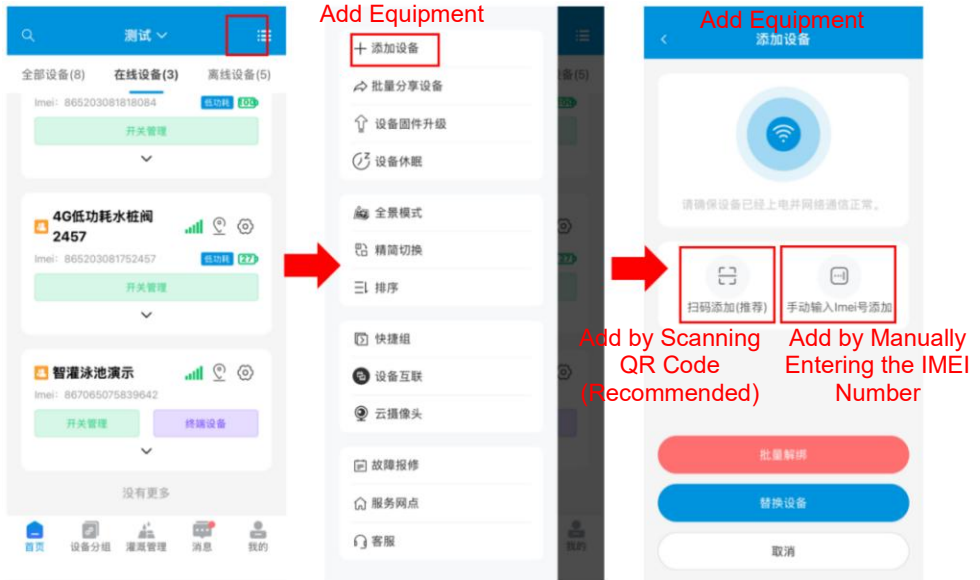
4. How to use WeChat Mini Program "Xiaorun Smart Control" ?

After opening a Mini Program in WeChat, select "Help" from the "Default Farm" drop-down menu to access the "Help Center". It contains detailed tutorials on account registration, adding devices, opening and closing valves, sharing, pressure calibration, and more.



5. How to add 4G water outlet pile valve?

On the app's home screen, tap "List" → "Add Equipment", then select "Add by Scanning QR Code" (scan the QR code on the actuator) or "Add by Manually Entering the IMEI Number" (the IMEI number is located below the QR code on the actuator).



6. How to match LoRa valves?

Add Gateway → Terminal Equipment → Terminal Management → Pair LoRa Terminal → Start Pairing → The app displays "Please put the terminal into pairing mode within 60 seconds" Press and hold the left button on the LoRa valve for 10 seconds until the indicator light turns red. Once the app indicates that the pairing is complete, the process is finished.

7. New actuators are added, but the order is messy, how to sort it?

4G-controlled water outlet pile valves can be quickly sorted by "Equipment Name" while LoRa-controlled pile valves are sorted by the

terminal number of the transceiver, allowing for sequential matching.

8. The new valves added in the LoRa version appear at the bottom of the list. Can they be moved to the top?

No, currently the valves are added in the order from 1 to 64.

9. After replacing the actuator, can the original name, group, positioning, and other information be transferred directly?

Sure, use the "Replace Device" feature.

10. Can land parcel be edited?

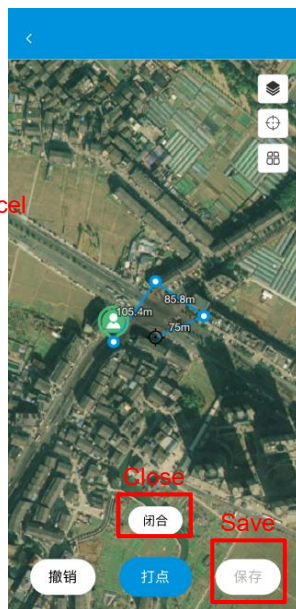
Yes. Go to "Equipment Groups" → tap the "+" icon in the upper-right corner → select "Create Equipment Group" → tap "Add Land Parcel" → drop a pin; after finishing, tap "Close" to save → enter the land parcel name and the color for the land parcel's boundary lines, then tap "Confirm" → enter the land parcel's "Name" and add the "Equipment" within that land parcel, then save.

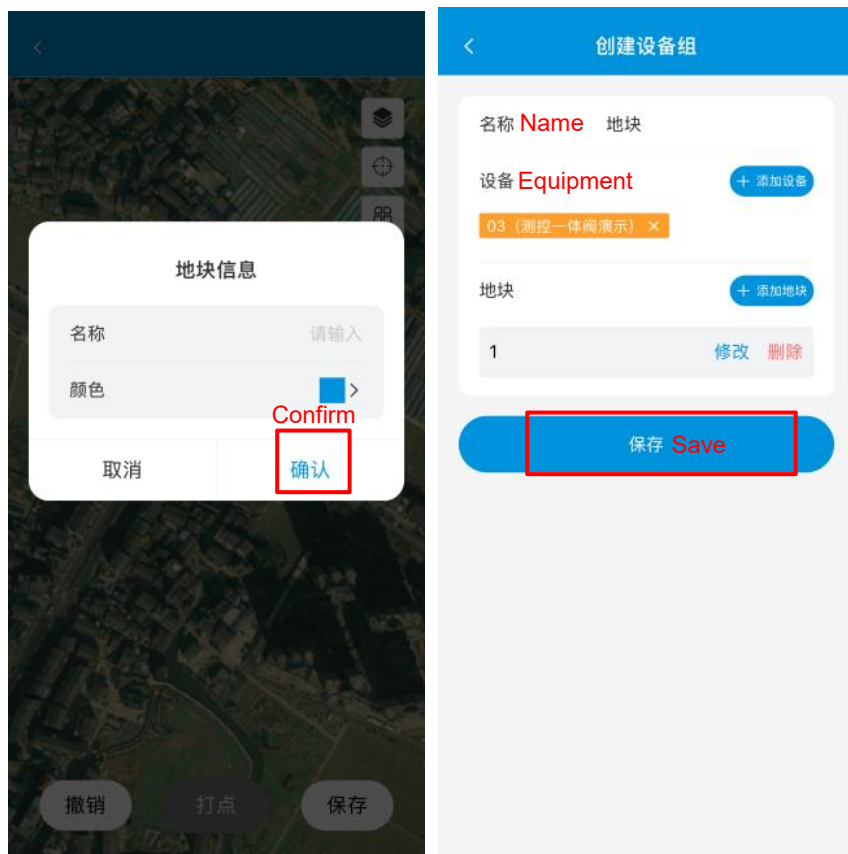


Equipment Groups



Add Land Parcel





11. Area is needed to calculate fertilizer application rates. Does the app support area calculations?

After editing a land parcel, its area will be displayed, and users can calculate the fertilizer application rate based on that area.

12. How to use the app for map positioning?

Turn on your phone's location services → walk to the valve's location → tap the location icon to the right of the device → tap the "Locate" button → once a white circle appears in panoramic mode, tap "Current Location" in the upper-right corner → Save.

13. How to quickly locate a device when there are many?

After locating a device, tap the "Pins" button under "More

Settings" to quickly switch to locating the next one.



14. Can it automatically locate its position?

No. Automatic positioning is not supported; coordinates must be manually saved on-site at the device location.

15. The map in the app is outdated and unclear. How to handle this?

The app uses a third-party map service, whose satellite imagery is subject to national regulations; the latest version is currently available.

16. How to switch the map display mode?

In the app, Panorama Mode and Dashboard Mode can be switched.

17. What's the difference between equipment grouping and rotation grouping?

Equipment grouping simply categorizes valves to make them

easier to find; rotation grouping, on the other hand, combines a specific outlet and opening level of a particular valve into a group and sets the irrigation duration, making it convenient to open them all at once and close them automatically at scheduled times.

18. How can I batch open all the valves I want in one go?

Add the corresponding outlets and opening for these valves to the same shortcut group or rotation group, and you can open them all at once with a single tap. Once the irrigation cycle is complete, the valves will not close automatically. The water pump or main supply valve must be closed first, then tap "Confirm End" to close all valves in one go.

19. If the app isn't working, are there other ways to open or close the valve?

The valve can be opened and closed at the installation site by pressing the manual button.



20. How to create rotation group?

Go to "Irrigation Management" → "Rotation Groups", tap the "+" icon in the upper-right corner → "Add", then set the group name, irrigation duration, and irrigation area in order. Select the "Controlled Switch" for the rotation group, and then save.

21. What to do if a group is missing after rotation groups are created?

It can be added to the desired location using the "Insert" function, and its position can be adjusted using the up and down keys on the left.

22. Can the same valve be added into multiple rotation groups?

Only one rotation group may be assigned to a single outlet on the same valve; duplicate assignments are not allowed.

23. How to create automatic rotational irrigation?

Enter "Irrigation Management" → "Automatic Rotational Irrigation", tap the "+" icon in the upper-right corner → "Add", enter a name for the "Rotation Schedule", tap "Edit" → "Add Rotation Group", select an existing rotation group, set the duration, arrange the groups in the desired irrigation order, and confirm to save.

24. What is the difference between the batch open/close and automatic rotational irrigation in a rotation group?

The batch open/close in a rotation group is simply a combination of "a set of valves and duration" that must be manually tapped to activate; automatic rotational irrigation, on the other hand, links multiple rotation groups in sequence. Once the duration for each group is set, the system automatically executes them in order without manual intervention.

25. Between the duration set in the automatic rotational irrigation and the rotation group, which one takes precedence?

When using the automatic rotational irrigation, the duration set in the automatic rotational irrigation settings applies.

26. During automatic rotational irrigation, will switching between the two groups cause a pipe burst?

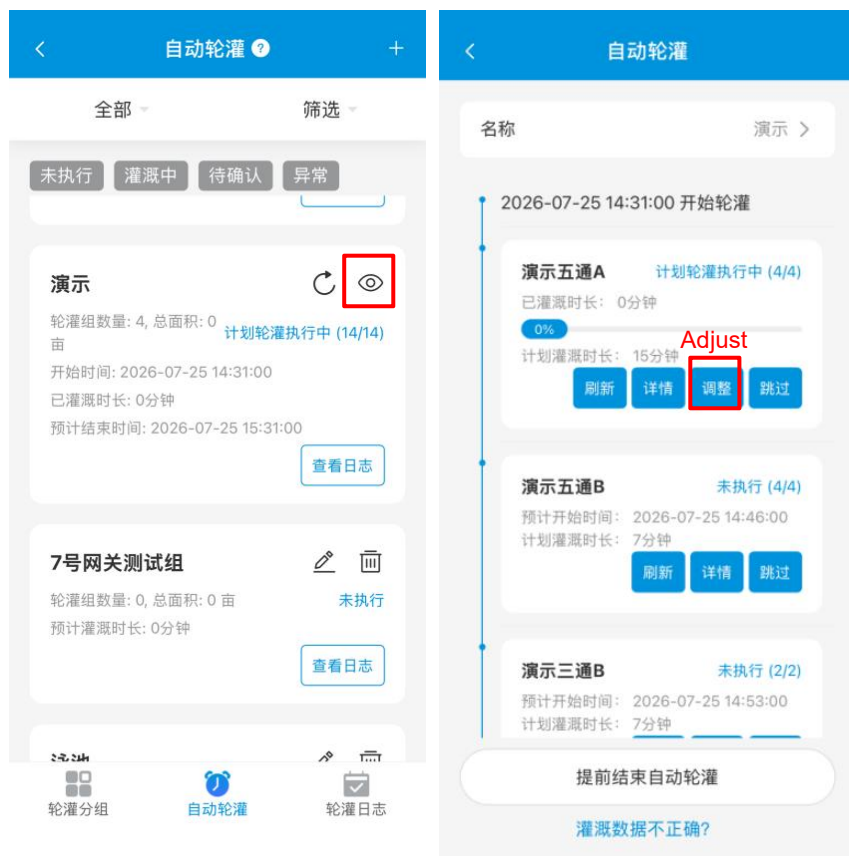
No, the system has a switching buffer. The previous set of valves is not closed until the next set opens, to prevent sudden pressure occurring.

27. After the rotational irrigation is complete, will the last rotation group automatically shut off?

No. The water pump or main supply valve must be turned off first, and then tap "Confirm and Exit" to close the valves in batches.

28. Is duration adjustable while rotational irrigation is in progress?

On the automatic rotational irrigation interface, locate the rotation schedule currently running, tap "Show" in the upper-right corner of that schedule → locate the rotation group whose time you need to adjust, tap "Adjust" → tap "Irrigation Duration" → after modifying the desired duration, tap "Confirm".





29. During automatic rotational irrigation, if the next group isn't turned on, will the previous group turn off?

The logic behind automatic rotational irrigation is that the previous group remains open for 3 minutes before shutting off. However, if the next group fails to open due to a malfunction, pressure buildup will occur once the previous group shuts off. It is recommended to monitor for abnormal pressure caused by valves in the rotational rotation group failing to open properly. It is recommended to install a Runjing pressure relief valve on the main pipeline near the pump room. (See Chapter V)

30. What should I do if I want to skip the current group and move directly to the next one while the automatic rotational irrigation is in progress?

Use the "Skip" feature, the system will first open the next group and then close the current one.

31. When batch-opening multiple rotation groups, why can't the next group be opened?

The system does not allow different outlets of the same valve to be set to open simultaneously. Please check the configuration of the rotation group.

32. The time set for the automatic rotational group has elapsed, but the ground hasn't been thoroughly watered yet. Do I need to create a new group to continue irrigating?

If irrigation is not yet complete, simply extend the irrigation duration for that rotation group. If irrigation is complete, you can create a new quick group for temporary manual control.

33. After the rotational irrigation is complete, if some land parcels weren't irrigated properly and I want to irrigate again, how can I do this in bulk?

Using the "Quick Group" feature, you can add valves that need to be replenished to a quick group and open them all with a single tap.

34. Can an ongoing rotation group be ended early?

Yes. However, ending it early will affect the irrigation schedule, and you'll need to reschedule it for the next use. Another option is to extend the duration of the current group, then reset it to the actual required time once the issue is resolved.

35. If the water pump malfunctions during automatic rotational irrigation, can the process be paused midway?

Currently, the app does not have a pause function. You can increase the irrigation duration for the current group while it is running,

and then reset it to the normal value when you need to resume.

36. If a valve goes offline during automatic rotational irrigation, will the irrigation continue?

If commands have already been successfully sent to each valve when the rotation schedule begins, the valves will automatically complete according to the set schedule even if they go offline afterward.

37. What to do if the valve goes offline when the automatic rotation schedule starts?

The app will notify you when a valve is offline. You can either have the online valves execute the irrigation schedule first and go to the field to manually open or close the offline valve, or you can wait until the offline valve comes back online and then have all valves execute the irrigation schedule together.

38. During automatic rotational irrigation, if the system detects a valve malfunction, can it pause the current group and keep the valve open?

Under automatic rotational irrigation the system cannot be paused, but rotational irrigation can be ended in advance, the valves irrigation will remain their current state and not close.

39. Why are the execution times for some rotation groups inaccurate?

The clock on the valve equipment in this group may be inaccurate. Check the time on the valve equipment in this group; if it is inaccurate, adjust the time on the mobile device and save the settings.

40. It's time for the batch shutdown, but the valve is offline and won't close. What should I do?

Go to the valve location and close it by pressing the manual button.

41. The app shows that the valve is closed, but water sound still can be heard. What's going on?

There may be residual water flowing through the pipe. Check to see if the valve is in the "closed" position. If it is fully closed but you still hear the sound of water flowing for an extended period, the ceramic disk may have been damaged by a foreign object.

42. Does it support creating rotation groups across LoRa gateways?

Yes, the app supports editing rotation groups across LoRa gateways.

43. Can water pump be connected to the app and controlled together?

Yes, it needs to be connected to the Runjing IoT controller.

44. Can the automatic rotational irrigation system control the water pump in a coordinated manner?

Currently, the automatic rotational irrigation feature cannot directly control the water pump. You can use the app's timer function to set the water pump to start automatically a few minutes after the valve opens and to stop automatically a few minutes before the valve closes, thereby achieving indirect synchronization.

45. Is one-click pressure equalization supported?

Yes. During batch opening of rotation groups or automatic rotational irrigation, wait for the valve pressure to stabilize, then tap "Pressure Balance".

46. Will abnormal pressure in individual valves affect the one-click pressure equalization function?

No. The one-click pressure equalization feature excludes values with abnormal pressure from the calculation.

47. What to note when using one-click pressure equalization?

Before using the one-click pressure equalization feature, make sure

that all valves in the rotation group are at 100% opening. It is recommended to first slightly reduce the opening of the valves close to the pump based on your experience.

In addition, the LoRa valve must actively refresh the data; wait until the pressure data has been updated before performing one-click pressure equalization.

48. Will the valve opening settings for rotational irrigation be automatically saved after one-click pressure equalization?

It will be saved automatically.

49. How to use one-click pressure equalization when automatic rotational irrigation is in progress?

During automatic rotational irrigation, you can locate the groups currently being irrigated in the "Rotation Groups" section and tap "Adjust" to use the one-click pressure equalization feature. Alternatively, you can access the one-click pressure equalization feature for the current group on the automatic rotational irrigation details page (by tapping the "eye" icon).

50. When the valve is opened manually, can automatic pressure adjustment be achieved?

Manual activation via the button does not automatically adjust the pressure. However, you can view the real-time pressure in the app and adjust the water pressure by remotely controlling the valve opening through the app or manually adjusting it using the button.

51. How to set an alarm for abnormal pressure? How to set the alarm threshold?

In the app, go to "My" → "Push Notification Settings" and enable "Drip Irrigation Valve Outlet Pressure Alert". You can adjust the upper and lower pressure limits under "Switch Management" → "Parameter Settings" → "Pressure Thresholds".

52. What is the threshold for the overpressure alarm?

By default, the app triggers an overpressure alarm when the water pressure exceeds 80 kPa (0.08MPa). You can also adjust the threshold yourself using the method described in the previous section.

53. Does it support offline alarm?

Yes. When there is a sudden change in pressure, an alert is sent, including a voice call notification.

54. Does it have an early fault warning feature?

The app monitors parameters such as battery level and pressure in real time, and actively sends alerts when abnormalities are detected, enabling early fault warning.

55. Why is the app always sending low-pressure alerts, and how to cancel it?

When the pipeline is not filled with water and the valve is open, a low-pressure alarm will be triggered. You can lower the alarm threshold under "Switch Management" → "Parameter Settings" → "Low-Pressure Threshold" to prevent frequent false alarms caused by non-abnormal low pressure. If you do not need pressure alarms, you can also disable the "Drip Irrigation Valve Outlet Pressure Alarm" feature directly under "My" → "Notification Settings".

56. A phone alert has been set up, but no call was received when a problem occurred. Why?

The settings may be incorrect. Check the following in the app under "My" → "Push Notification Settings":

- 1) Whether the phone number in "General Settings" is correct;
- 2) Whether "Voice Notification" is checked under "Drip Irrigation Valve Outlet Pressure Alarm";
- 3) Whether the alarm number is being automatically blocked by your phone.

57. Can a single IoT SIM card be used in multiple equipment?

No. One IoT SIM card can only be used with one device.

58. Is it useful to check signal strength using a mobile app (such as Cellular-Z)?

This has some reference value. When performing the test, first turn off 5G on your phone, place the phone at the valve's actual installation location and height, and check the RSRP (Reference Signal Receiving Power) and RSSNR (Reference Signal Signal-to-Noise Ratio). However, keep in mind that different regions use different carrier frequency bands, and the communication modules and antennas used by the phone and the valve differ; therefore, the test results should be used for reference only and cannot be considered entirely equivalent.

59. If my phone can make calls normally, can I use the 4G valve?

Not necessarily. It usually works when cell service is good, but in areas where calls are choppy, signal quality may be poor. It's best to test the signal at the actual installation location and height of the valve. We recommend testing the signal on-site every year in July and August, after the crops have grown taller, to create a signal quality map of the field, which will help you choose the appropriate communication method for the valves the following year.

60. Why is the 4G valve signal poor and frequently disconnecting? How should this be addressed?

Common causes: Signal tower malfunctions (power outages, aging equipment), distance from the base station exceeding 2 kilometers, signal jammers in the vicinity, valve firmware upgrades in progress, cloud server anomalies, etc.

You can check the signal quality and device logs in the valve settings. If individual valves frequently go offline and back online, you can address the issue as follows:

- 1) Confirm whether the problem is related to the base station signal; if so, file a complaint with your telecommunications carrier;
- 2) Switch to a 4G SIM card from a different carrier, replace the antenna, reduce obstruction from crops, or raise the antenna;
- 3) Check whether the actuator has water ingress or a damaged circuit board; if so, replace the actuator;
- 4) Abnormal weather conditions (e.g. sandstorms or heavy rain) may affect the signal; service typically returns to normal once the weather improves.

61. Why is the response speed of the LoRa valve slow?

The LoRa version uses a gateway to issue commands via sequential polling; commands can only be processed sequentially at any given time. As a result, batch operations take slightly longer overall than with the 4G version (which receives signals independently and in parallel). However, in areas with poor signal strength, LoRa offers more stable control than 4G.

62. How do I check the signal quality of the valve in the app?

4G Valves: Check the signal quality in "Settings"; the reference values are RSRP (Reference Signal Receiving Power) > -100 dBm;

RSSNR (Reference Signal Signal-to-Noise Ratio) > 2dB.

LoRa Valves: Check the RSRP (Reference Signal Receiving Power) in the device log; generally, a value greater > -100 dBm is generally considered good.

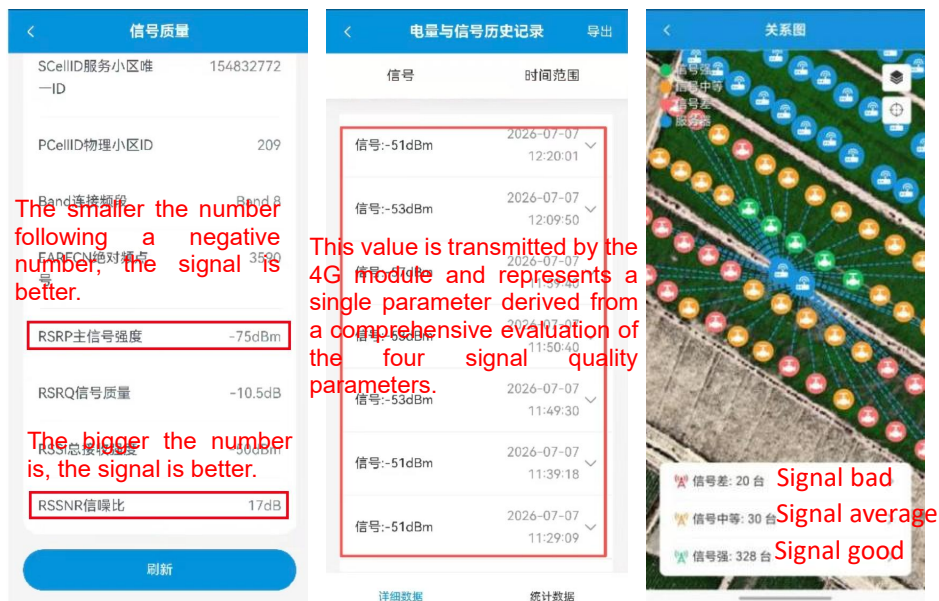
63. How to improve signal?

Raise the antenna; replace the telecom SIM card or switch to a multi-network SIM card; move the valve to an open area such as a field ridge; replace the valve with a LoRa model.

64. How can I tell if the signal has improved?

- 1) Go to "Settings" → "Carrier" → Check the frequency bands

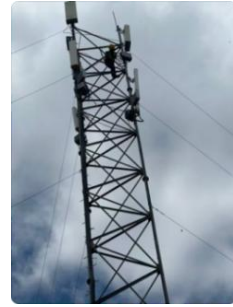
2) Check the signal quality in "Settings" and compare the RSRP (Reference Signal Receiving Power) and RSSNR (Reference Signal Signal-to-Noise Ratio) values to see if they have improved. You can also view the signal relationship chart in the app or mini program. See the image below:



65. How do I contact my carrier if I have poor signal?

In the app's valve settings, locate "Signal Quality" to identify the service provider → copy the SIM card information from the settings and use it to look up the number starting with 144 via the IoT module manufacturer's WeChat mini-program → provide the specific installation location of the valve → call the service provider's 24-hour customer service hotline to explain the situation.

You can also send the information to dealers and the company, who can then submit a service request to the carrier through the IoT SIM card supplier.



Schematic Diagram of Telecommunications Carrier Signal Towers and Distance Measurement

66. The valve status doesn't change after opening or closing it via the app. How to troubleshoot and resolve this?

First, check whether the valve is online and whether any disconnection or timeout warnings appear during operation.

If the valve is offline or times out, resolve the signal issue.

If the valve is online, go to the valve site to check whether it can operate. If it does not work when the button is pressed, replace the actuator or check whether the valve body is jammed.

67. The 4G valve doesn't have a refresh icon. How to update status?

You can refresh the status by selecting an item from the drop-down list and then releasing it.

68. Does it support querying the history?

Yes. Historical data such as switch records, battery level, signal strength, and pressure changes can all be viewed in the "Equipment Log".

69. How can I check whether there were any abnormalities in pressure or signals during a specific time period?

4G version: Go to "Switch Management" → "Equipment Log" to view.

LoRa version: Go to "Terminal Devices" → "Switch Log" or "Battery Level and Signal History" to view.

70. The app displays the message, "The device has not reached the set angle. Please check the device". How can this be resolved?

First, remove the actuator and test whether it opens and closes properly. If it does not function properly, the problem lies with the actuator, and it needs to be replaced; if it functions properly, the problem may lie with the valve body, which needs to be removed for inspection.

71. How to contact after-sales service?

You can submit a service request with one tap via the app, call 0086-0577-88630038, or contact through the official email sales@run-xin.com.

72. How to view warranty information

Open the app and scan the device's QR code.

73. How to update the firmware?

The 4G version supports remote firmware updates. The LoRa version supports local updates via Bluetooth.

74. Why is the firmware update failed?

This is usually caused by an unstable signal, low battery power, or the device suddenly going offline during the update process.

75. Can irrigation proceed normally while the app is updating?

Yes. Ongoing irrigation is not affected by app version updates.

76. Does the app charge?

No.

77. What is the maximum number of people an app account can be shared with?

No limit.

78. Can LoRa valves share data for only some of the valves connected to the same gateway?

No.

79. What to do if the app account password is forgotten?

You can recover your password by using the "Forgot Password" feature in the app.

80. How to transfer devices to a new phone number after the phone number is changed?

You can contact the service provider to perform backend operations.

81. What to do if the account bound to the valve is unknown?

If you forget your account, you can contact the service provider to have them perform the necessary actions in the backend. After unlinking the account, simply follow the normal procedure to link it again.

82. What to do if the account is accidentally deleted?

You can contact the service provider to perform backend operations and recover your account.

83. How to project the equipment platform onto a large screen to demonstrate it to farmers?

Option 1: If your TV supports a browser, go to www.app.run-jing.cn and log in. The interface will look just like the mobile app or mini program;

Option 2: Log in to the website using your computer and connect the computer to a TV or monitor via an HDMI cable.

D. After-Sales Maintenance**1. What routine for maintenance is required?**

Virtually no on-site maintenance is required. Focus primarily on monitoring device logs and exceptions within the app and ensure proper storage when the device is returned.

2. Does a large temperature difference between day and night cause condensations?

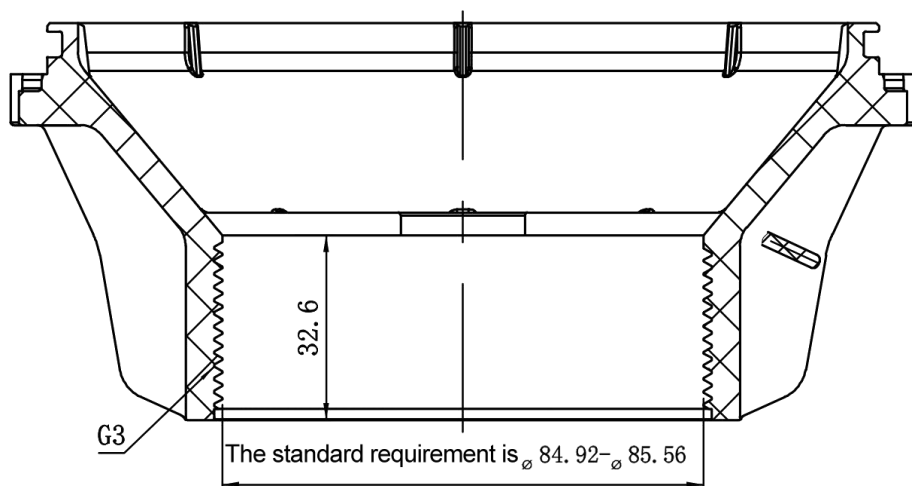
The actuator housing features a high-grade seal (IP67), the circuit board is waterproof, and the product is manufactured in a low-humidity environment, enabling it to effectively withstand condensation and humid conditions; under normal use, no condensation will form.

3. Will the valve get stuck after a few years of use?

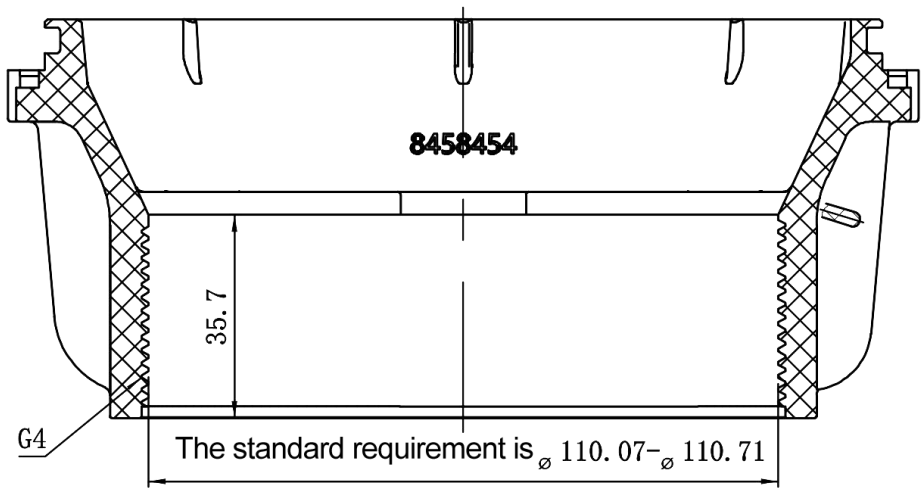
It features a special ceramic hard sealing with self-lubricating properties, ensuring it will not jam under normal use.

4. The DN100 male threaded fitting feels very loose after installation. Will it come loose?

The specifications of UPVC male threaded fittings on the market vary widely, and non-standard fittings may cause loosening or even detachment. During installation, use **male threaded fittings** that comply with the national standard GB/T 7307-2001 (**the standard outer diameter range for DN80 is 87.45~87.88 mm; for DN100, it is 112.6~113.03 mm**) to ensure a tight fit.



G3 Male Threaded Fittings That Comply with the National Standard GB/T 7307-2001



*G4 Female Threaded Fittings That Comply with The National Standard GB/T
7307-2001*

5. What to do if the existing outlet pipe already has an adhesive-bonded clamp that is incompatible with the Runjing clamp fitting?

There is no unified national standard for plastic clamps currently available on the market; existing models typically feature hermetic head face sealing, which are prone to leaks when loosened. Runjing uses inner and outer diameter sealing and is equipped with dust-proof covers. We recommend using the dedicated pipe clamps and fittings designed for Runjing's water outlet pile valve to ensure a reliable seal.

6. During automatic rotational irrigation, can a set of valves finish irrigating outlet A and then proceed directly to irrigating the other outlets?

When switching directions, the new three-way valve can switch directly from outlet A to outlet B, allowing the upper and lower rotation groups to use different outlets of the same set of valves. However, switching between outlet A and B or outlet C and D on a five-way valve requires passing through the closed position, so the upper and lower

rotation groups cannot use the same set of valves.

7. How to prevent pipe bursts when using automatic rotational irrigation?

When switching between rotation groups, the valves are closed at staggered times (the next group opens first, and the previous group closes later) to prevent momentary pressure buildup. Additionally, a pump controller can be used to achieve coordinated operation of the pumps and valves; alternatively, a Runjing pressure relief valve can be installed on the main pipeline near the pump house (see Chapter V).

8. What causes water to enter the actuator?

Common causes: Solar panel nuts not tightened properly; seals not reinstalled after the actuator was disassembled, etc.

9. What to do if water gets into the actuator?

The actuator needs to be replaced.

10. What to do when the buttons on a brand-new valve are unresponsive and the QR code fails to scan?

New valves are in offline sleep mode by default. To activate them, press and hold both the left and right buttons for about 5 seconds, then release. Once the buttons are unlocked, press and hold the left directional button for 5 seconds to enter pairing mode, then scan the QR code to complete the pairing process.

11. The valve does not open or close fully (neither the manual button nor the mechanical wrench works). What is the cause?

It is likely that a foreign object (such as a gravel, cotton stalk, or scrap piece of UPVC pipe) is lodged in the valve core. We recommend disassembling the valve body to check the valve chamber and the pipeline for any foreign objects. Before reinstalling the valve, it is best to open the valve at the end of the main pipe to flush the pipeline and remove any debris, especially if the pipeline has been repaired due to

damage.

12. If a valve breaks, can farmers fix it themselves?

Replacing the actuator is relatively easy, and you can do it yourself. If the valve body is damaged, we recommend taking it to an authorized service center or returning it to the manufacturer for repair.

13. How to replace an actuator? What should I keep in mind?

- 1) Remove the pressure sensor tube;
- 2) Remove the four screws connecting the actuator to the valve body;
- 3) Verify that the model numbers of the new and old actuators match, and adjust the new actuator to the same operating position as the old one;
- 4) Install the new actuator and tighten the screws;
- 5) Connect the pressure sensor tube between the valve body and the actuator, taking care to verify the installation order of the tubing;
- 6) Pair and add the new actuator in the app, then test to confirm it is operating normally.

14. Can ceramic disk be replaced separately when it breaks? Or the whole set should be replaced?

The ceramic disk can be replaced individually.

15. What might be the cause of broken ceramic disk?

This is mostly caused by foreign objects (such as gravels) getting stuck in the valve core; it is best to flush the system first after the main pipe has been installed.

16. The actuator pointer does not match the actual opening or closing angle of the valve body. How should this be handled?

This is usually caused by a loose screw holding the pointer in place, causing it to shift. Simply adjust the pointer to the "off" position and then tighten the screw. It may also be due to the "off" position not being properly calibrated; in that case, you can calibrate the "off" position.

17. How to handle low flow when a five-way valve is installed at varying pipe sections or at the field headland?

For pipe sections of varying lengths and for field headlands (typically 0.33~0.53 ha), a five-way valve may be used. If the flow rate is insufficient, the inlet pressure can be increased accordingly, or a five-way valve with a higher flow capacity can be selected.

There are also three other solutions:

1) It is generally recommended to increase the pipe size to reduce frictional losses; for example, upgrading from a 75mm hose to a 90mm hose;

2) Extend the irrigation duration, as frictional loss along the long pipes increases, causing a drop in operating pressure, a reduction in flow rate at the drippers, and a decrease in flow rate throughout the entire irrigation sector;

3) Reduce the irrigated area of the drip tape to lower the valve flow rate and minimize frictional losses.

18. There is water in the hose, but the pressure reading at the valve outlet shows 0 or is inaccurate. What is the cause? How should this be handled?

Possible Causes:

1) The pressure hose is connected incorrectly, reversed, damaged, or not connected at all;

2) The pressure port is clogged, or the pressure sensor is faulty;

3) Water is flowing back into the hose.

Solutions:

1) Connect the pressure hoses in the correct order; replace any that are damaged;

2) Clean the pressure port or replace the pressure plate;

3) If water is flowing back through the hose, cut the hose in the middle to resolve the issue.

19. When outlet A of the valve is open, the pressure reading for outlet A on the app shows 0. What should I do?

First, check whether there is water in the hose connected to outlet A.

If there is water, disconnect the hose from the valve body fitting and check whether the fitting is clogged; then disconnect the hose from the pressure sensor connector and check whether the hose and sensor connector are clear. If everything appears normal, the sensor may be faulty, and the actuator will need to be replaced.

If there is no water, check for actuator malfunctions and valve body issues.

20. What happens if the pressure sensor hose is connected incorrectly?

This causes the pressure reading to be abnormal.

21. When outlet A of the three-way valve is fully open, there is a slight water leak from outlet B. What is the cause?

It is possible that during production debugging, there was a calibration deviation at a workstation for certain products, resulting in **outlet A** not being fully sealed. In an emergency, **you can first reduce the opening ratio of outlet A to correct this**. After irrigating is complete, replace the actuator.

22. When outlet B of a single-outlet five-way valve is fully open, there is also water pressure in the flexible hose at outlet D. What's going on?

Backflow from the field's lateral pipes may be entering outlet D. Check the layout of the mainline and branch lines to ensure that lateral pipes for the same crop are connected to the same outlet on the valve; also, check whether any dual-outlet valve models have been mixed in.

23. The five-way valve app shows that outlet A is open, but in reality, outlet C is open on the valve body. Why is that?

Check whether the letter marked on the actuator's outlet matches

the letter on the valve body. The actuator may have been installed upside down; adjust its orientation accordingly.

24. When replacing a three-way equal tee water outlet pile valve, the system prompts: "Not the same type of equipment." How to resolve this?

Three-way equal tee water outlet pile valves are available in single-outlet and dual-outlet versions. When replacing, the new version must match the old one; otherwise, they will not be compatible.

25. Why does the valve actuate on its own and lose position feedback?

This is usually caused by water entering the actuator; simply replace the actuator.

26. What should I do if the message "Equipment is not online" appears when adding an equipment?

The device must first be activated and allowed to complete the automatic update (which takes 1~3 minutes) before you can scan the QR code to add it. If it still shows as "Offline", it may be out of battery; simply charge it.

27. How long does it take for the valve to automatically reconnect after losing connection?

It will automatically attempt to reconnect after 10~20 minutes.

28. If a valve malfunctions, can a notification be received without opening the app?

Yes. Link a WeChat Official Account or enable voice alerts.

29. If a valve malfunctions and closes automatically during irrigating, causing the pressure in the pipes to rise, will the pump shut off automatically?

Currently, when a valve malfunctions, the system can only send an alarm notification to the user; it cannot automatically shut down the pump.

30. What to watch out for when valves are still in the ground during winter?

Water accumulated in the valve should be drained in advance and set the device to sleep mode.

31. What should be kept in mind when returning valves to the warehouse for storage?

1) Clean the valve and solar panels, and remove dirt, sand, and other debris.

2) Before storing the valve, ensure the battery is at least 80% charged, and press the button to put it into sleep mode.

3) Take appropriate protective measures to prevent damage from bumps or drops.

4) Store in a dry, well-ventilated environment at temperatures between -20°C and 45°C.

5) Do not store together with corrosive substances such as chemical solvents, fertilizers, or pesticides.

6) Do not place the actuator near a fire or high-temperature heat source.

32. How to put a valve into sleep mode?

Press and hold both the left and right buttons simultaneously for about 5 seconds, then release them. Once the buttons are unlocked, press and hold the right button for 5 seconds to enter sleep mode. After the valves are retrieved and confirmed to be online, they can also be put into sleep mode in batches via the app.

33. Will the battery drain if the valve isn't used for a long time?

Yes. It is recommended to ensure the battery is at least 80% charged and in sleep mode before storing it.

34. How to determine whether the Runjing water outlet pile valve is in sleep mode or has lost power?

Press and hold the left and right buttons simultaneously for about 5

seconds, then release them. If the device unlocks (the light turns on or a beep sounds), it is in sleep mode. Otherwise, the battery is dead.

35. What to keep in mind when using it again the following year?

Wake the device from sleep mode, install the solar panel, and check the battery level. If the battery is low, place it in direct sunlight to charge or remove it and fully charge it using a dedicated charger. Afterward, use the app to check the battery level and verify that the valves are operating normally. For 4G valves and LoRa gateways, you'll also need to confirm that there are no outstanding fees for data usage.

36. How long is the warranty period? Are there any charges for repairs covered under warranty? Does wear and tear caused by wind, sand, and silt fall under the warranty?

The actuator is covered by a 3-year warranty, the battery by a 2-year warranty, and mechanical components by a 5-year warranty (limited in Chinese domestic market). No additional charges will be incurred for product quality issues during the warranty period. The ceramic hard sealing structure is highly wear-resistant; sealing failure under normal water conditions (including typical silt) is covered by the warranty. However, damage caused by extreme foreign objects such as large amounts of gravel, hard metal objects, or branches becoming lodged in the water, or by improper operation, is not covered by the warranty. The manufacturer's after-sales assessment shall be the final determination.

37. What to do if a valve needs repair after the warranty period has expired?

We recommend having it inspected at a nearby service center.

38. Is there any after-sales service centers in Xinjiang?

We have dealers in Xinjiang and an office in Urumqi to provide after-sales service.

III. Axial Flow Valve

1. What's the axial flow valve?

An axial flow valve is a type of valve in which the flow direction of the medium remains coaxial with the valve's own axis (i.e., the pipeline direction). By designing the valve's flow passage as a streamlined shape that is coaxial with the pipeline, the fluid can pass through smoothly and directly, thereby significantly reducing energy losses and turbulence. The valve core (or closing element) of an axial flow valve performs a reciprocating motion along the pipeline axis (i.e., the direction of fluid flow) to achieve opening, closing, or flow regulation.

2. What's the structure characteristic and working principle of axial flow valve?

Unlike traditional valves, the Runjing axial flow valve features a solid axial valve seat that is connected to the valve body cavity via multiple rib plates, jointly forming an annular flow passage. The valve core is designed as a hollow structure and can move axially to engage with the seat for opening and closing. When the valve is open, the flow passage assumes an axial streamlined shape, resulting in minimal head loss.

Due to the hollow structure of the valve core, the force exerted by the medium on the valve core is extremely small, resulting in a smaller required opening and closing force compared to traditional valves of the same diameter. The electric actuator adopts a rack-and-pinion mechanism, which offers high transmission efficiency and low power consumption for opening and closing, making it suitable for solar-powered remote wireless control.



DN200 Runjing Axial Flow Valve

3. What's the difference between electric axial flow valve and electric butterfly valve on the market?

During the opening and closing of the Runjing axial flow valve, the valve core moves in a reciprocating linear motion along the axial direction. The valve core adopts a hollow tubular structure, and throughout the opening and closing process, there is no relative friction between the sealing pairs, resulting in a small operating torque. For example, the DN200 electric axial flow valve can be driven by a motor of only 30W.

During the opening and closing of an electric butterfly valve, the valve disc (butterfly plate) rotates around its axis within the valve body to achieve on-off control of the flow passage. The disc always occupies the center of the flow passage, partially blocking the flow area. Moreover, when closed, the valve relies on compressing the sealing pair to achieve sealing, resulting in a relatively large operating torque. For example, a DN200 electric butterfly valve typically requires a 90W motor for actuation.

4. Where are DN200 large-diameter axial flow valves used in field irrigation?

It can be used for on-off control of the main and branch water supply pipelines.

5. What's the water flow rate?

Under a pressure differential of 0.1 MPa, the flow rate is 300 m³/h.

6. How is it powered?

The DN200 electric axial flow valve has a driving voltage of DC6V. It consumes approximately 6 W • h per single opening/closing cycle, with an actuation time of 45 seconds, resulting in extremely low energy consumption. Therefore, when used in off-grid field applications such as irrigation where no mains power is available, it only requires a lithium battery pack supplemented with solar panels to meet long-term operational needs.

7. Is there an emergency operation function?

Yes. In abnormal situations such as power failure or outage where the valve cannot be opened or closed via motor drive, a hex key (Allen wrench) can be inserted into the actuator's emergency manual override port to rotate the drive mechanism and achieve manual opening or closing of the valve.

8. How to control it?

The opening and closing of the electric axial flow valve are achieved by reversing the polarity of the power supply. It can be remotely controlled via communication methods such as decoder, 4G, or LoRa, and supports integration with automated irrigation management systems.

9. What's the waterproof rating of the actuator?

The waterproof rating is IP68. This rating is one of the highest levels in the international ingress protection standard, signifying complete dust-tightness (no ingress of dust) and maintaining waterproof performance under continuous immersion conditions (typically at a depth of 1 meter for over 30 minutes).



*Vast Xinjiang Cotton Fields
(Photographed in June 2026, Runjing Team On-site Technical Service)*

IV. Angle Valve for Field Hydrants

1. What is the function of the angle valve for field hydrants in northern regions?

In low-pressure pipeline irrigation systems in farmland across northern regions such as Henan, Shandong, and Hebei, the angle valve (or angle globe valve) installed on the hydrant serves as the "faucet" for field water distribution. Its primary function is to control irrigation water for different plots in the field. By opening or closing the angle valve to control the water flow to irrigate each field, and to control the size of the flow rate.

2. What are the pain points of traditional products?

Traditional angle valves mainly have 2 prominent problems in practical use.

First, they suffer from poor wear resistance and sealing performance, resulting in severe internal leakage. Irrigation water in northern regions often contains sand and sediment. Under frequent opening and closing, the sealing pairs of traditional angle valves are highly susceptible to wear caused by sediment scouring. Once worn, the valve fails to close tightly, leading to internal leakage. At the same time, impurities such as sand and grass roots in the water can easily become trapped between the sealing surfaces, further exacerbating the leakage. This not only wastes water resources but also causes flooding of fields due to water leakage, which affects farming operations.

Second, they are laborious to operate. Some hydrants adopt a screw-down sealing structure that requires considerable force to close tightly. After prolonged use, components such as the valve stem may rust or become stuck, preventing normal operation.

3. What's the characteristics of Runjing angle valve for field hydrants?

The opening/closing member adopts a **ceramic hermetic hard**

sealing structure, featuring high hardness, resistance to sediment, erosion, wear, and corrosion. The two ceramic sealing surfaces fit closely together and slide relative to each other with rotational motion, acting as a "scraper" that prevents impurities such as sediment and grass roots from becoming trapped between the sealing surfaces. As a result, the seal is reliable and leakage is minimized.



3 inches (DN80) Manual Angle Valve

4. What are the specifications?

The standard specifications are DN80 (3 inches) and DN100 (4 inches).

5. Can the flow rate be adjusted?

Yes. Valve opening is proportional to the flow rate, making it easy to adjust the flow rate.

6. What is the working pressure?

Normal working pressure is 0~0.6MPa.

7. Can the angle be adjusted after installation?

The water outlet can rotate 360° bidirectionally around the water supply post, adapting to the piping layout needs of different plots, with strong installation adaptability.

8. Is the operation easy?

The ceramic seals feature a self-lubricating property. Combined with the patented pressure-balancing structure, the water pressure on both sides of the valve cartridge always balanced. As a result, the operating torque for opening and closing stays stable and light, regardless of changes in the system's inlet water pressure.

V. Hydraulic Valve

1. What components constitute Runjing ceramic hard sealing hydraulic valve? How does it work?

It consists of three core parts, namely the **main valve**, **pilot valve** and **reversing valve**. Driven by the pipeline's inherent water pressure, the main valve opens, closes or adjusts flow opening by moving the piston up and down based on the pressure difference between upper and lower piston cavities. Pressure reducing, pressure sustaining and pressure relief pilot valves sense upstream and downstream pressure to realize corresponding valve functions. By using reversing valve, the pilot valve function can be switched between fully open and fully closed.

2. What are the differences between Runjing hydraulic valve and traditional hydraulic diaphragm valve?

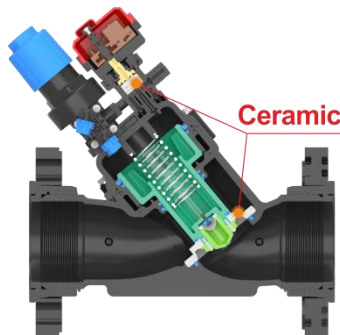
There are three major differences.

First, the sealing structure of the main valve differs. Traditional hydraulic valves adopt rubber diaphragm soft seal. Runjing hydraulic valve uses **piston lifting ceramic hermetic hard sealing**. It delivers superior wear and corrosion resistance, with outstanding anti-scour performance under high flow velocity for pressure regulation working conditions.

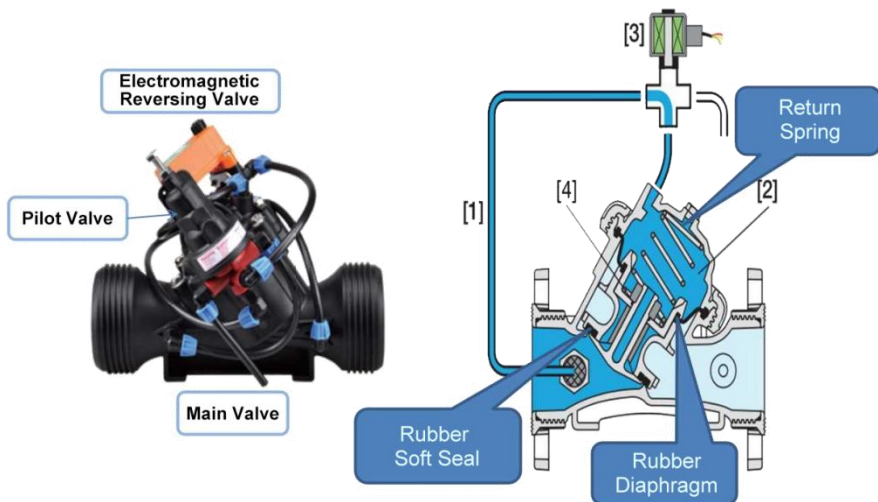
Second, the structure of the reversing valve differs. Traditional diaphragm valve pressure regulating pilot valve uses DC solenoid head, which is easily stuck by biological sludge and fails to switch normally. Runjing reversing valve adopts **ceramic hermetic hard sealing** with excellent anti-scour, anti-corrosion, anti-wear and longer service life.

Third, the pipeline connection mode differs. Traditional designs separate pilot valve and reversing valve with complicated connecting

pipelines. Runjing **integrates the two components into one assembly** with simple, fewer pipelines.



Structural Schematic of Runjing Hydraulic Valve



Structural Schematic of Traditional Hydraulic Valve

3. Does hydraulic valve have strict water quality requirements?

It has good adaptability to conventional irrigation water sources including well water, river water and pond water. However, the pilot valve contains tiny precise holes and internal flow channels. If raw water carries large amounts of sediment and impurities, install a filter at the upstream of the valve to prevent blockage (See Chapter VI).

4. What is the service life of hydraulic valve?

It can withstand more than 50,000 opening/closing cycles under water with suspended solids of 100mg/L. Calculated by 4,000 cycles per year for high-frequency irrigation scenarios, its service life exceeds 12 years. Core components are covered under a 5-year warranty, and the complete machine has a 2-year warranty.

5. Will tiny impurities cause leakage with tightly fitted ceramic sealing disks?

Leakage rarely occurs. The sealing surfaces are precisely ground and closely fitted, and the inclined valve seat prevents impurity deposition. Tiny particles will be flushed away by water flow without scratching the high-hardness ceramic sealing surface, leading to extremely low leakage risk.

Install a 20~60 mesh filter for poor or unknown water sources to protect the hydraulic valve (See Chapter VI).



Tightly Fitted Ceramic Disks

6. How is the electric hydraulic valve controlled? Can it be remotely controlled?

Function switching is realized via electronic reversing valve with

DC12V two-wire control. Function mode is switched by reversing positive and negative poles of the power supply. Remote control can be achieved by fitting a wired decoder, LoRa or 4G communication module.

7. What is the working pressure of the hydraulic valve?

0.05~1MPa (5~100 meters).

8. Is the head loss of hydraulic valve large?

When the medium flow velocity reaches 2m/s, the head loss shall not exceed 0.02MPa (2 meters).

9. What are the types of hydraulic valves?

They are classified by pilot function into pressure reducing valve, pressure relief valve, pressure sustaining valve, on-off valve, pressure reducing and sustaining valve.

Pressure reducing valve. It senses downstream pressure and stabilizes post-valve pressure at preset values. Suitable for hilly, mountainous irrigation zones with large elevation differences that require stable reduced pressure.

Pressure relief valve. It senses pipeline pressure and automatically opens for pressure release under abnormal overpressure to avoid pipe burst, serving as safety protection for pump house outlets and main pipelines.

Pressure sustaining valve. It senses upstream pressure and keeps the water pressure upstream of the valve stable. The valve closes to maintain pressure when the pressure drops below the set value. It opens when the pressure rises above the set value and keeps the upstream pressure no lower than the set value. It is suitable for outlets of parallel connected water treatment equipment (such as the disk filter system) which require guaranteed backwash water pressure.

On-off valve. It is used for on-off control of main pipes or branch pipes.

Pressure reducing and sustaining valve. It integrates pressure reduction and pressure sustaining functions, automatically switches modes according to pipeline pressure fluctuations.



Pressure Reducing Valve



Pressure Relief Valve



Pressure Sustaining Valve



On-off Valve



Pressure Reducing and Sustaining Valve

10. What is the pressure adjustment range of pressure reducing valve?

0.05~0.6MPa (5~60 meters).

11. Is the opening and closing speed of electric valve fast?

The total time for one complete open-close cycle is ≤ 5 seconds.

12. What functions can electric pressure sustaining valve realize?

It has **two functions, namely pressure sustaining and full open mode**. Switching between the two functions is realized by an electric directional valve. It is applied for filtration system service and backwash. The valve is fully open during service to reduce water resistance. When backwash is activated, it switches to the pressure

sustaining mode to provide the required backwash water pressure at the wash outlet.

13. Does the electric valve support manual adjustment during commissioning?

Yes, it can be adjusted with a hexagon socket head spanner.

14. Where is pressure reducing valve applied?

1) **Drip irrigation and sprinkler irrigation systems:** Reduce high pressure of main pipelines and adjust water pressure to the safe working range matching drippers and sprinklers.

2) **Irrigation zones with large elevation drop:** Lower pipeline pressure in low-lying plots to avoid pipe rupture caused by overpressure.

3) **Pipelines with fluctuating water pressure:** Counteract upstream pressure fluctuations and supply stable constant pressure for downstream irrigation equipment.

4) **Zoned irrigation projects:** Set independent operating pressure for each plot to realize partitioned pressure regulation.



Runjing Pressure Reducing Valve Applied to Over 66,700 m² Camellia Oleifera Forest in Ganzhou, Jiangxi (60m Elevation Drop)

15. Where is pressure sustaining valve applied?

- 1) **Filter backwash:** Installed at filter outlet to guarantee sufficient pressure for effective backwash.
- 2) **High-elevation and remote plots:** Prevent emptying of long-distance water delivery pipelines and keep the system filled with water.
- 3) **Water pump protection:** Avoid pump overload and cavitation caused by sudden pressure drop from downstream flow surge.
- 4) **Pipeline water filling control:** Slow water filling during system startup to eliminate water hammer impact.
- 5) **Greenhouse and fertigation systems:** Maintain back pressure required by fertilizer tanks, generally installed behind filters to stabilize backwash operating pressure.



*Runjing Pressure Sustaining Valve Applied to a Fig Greenhouse
in Wenzhou, Zhejiang*

16. Where is pressure relief valve applied?

- 1) **Water hammer suppression:** Automatically releases pressure during pump startup/shutdown or rapid valve closing to absorb water

hammer kinetic energy and protect pipelines and matching equipment

2) **Front-end equipment protection:** Installed at the front of filters, water and fertilizer integrated machines or pump house main pipelines to prevent equipment damage from overpressure.

3) **High-elevation pipeline protection:** Eliminate water hammer damage generated when refilling emptied high-altitude pipelines.

4) **All pressure irrigation types:** Compatible with pipe irrigation, drip irrigation, sprinkler irrigation and large center pivot irrigation machines.



Runjing Pressure Relief Valve Applied to a Golf Course in Wenzhou, Zhejiang

17. Where is on-off valve applied?

1) **Automatic rotational irrigation system:** Used as partition control valves to open and close irrigation for different plots according to preset programs.

2) **Greenhouses and planting sheds:** Used to control water

supply in different planting areas.

- 3) **Gardens and lawns:** Realize automatic irrigation control.

18. Where is pressure reducing & sustaining valve applied?

- 1) **Complex terrain irrigation:** Supply water from highland water sources to lowland plots, simultaneously preventing downstream overpressure and emptying of upstream pipelines.

- 2) **Pipelines with diversified pressure demands:** One valve meets different pressure requirements of upstream and downstream. When installed behind filter systems, it can guarantee filter backwash pressure and stabilize downstream pressure, eliminating the need for an extra pressure reducing valve.

19. Are there other extended application scenarios for hydraulic valve?

By replacing or combining different pilot valves, the hydraulic valve has four extended applications, widely adopted in municipal water supply, building plumbing, industrial circulating water and agricultural irrigation fields.

1) Flow control valve

It automatically limits instantaneous flow within preset ranges regardless of upstream pressure fluctuations. Used for DMA partition metering to avoid downstream pressure collapse caused by excessive water intake and protect precision water meters.

2) Liquid level control valve

Sensing the liquid level of the water tank/tower through a float switch, the valve automatically closes at high water level and opens for water replenishment at low water level. This is one of the most common applications of hydraulic valves for automatic water replenishment of elevated water tanks, reservoirs and fire water monitors. No electrical control is required, ensuring safe and reliable operation.

3) Pump control valve

When the pump stops suddenly, the valve quickly closes about 90% of its stroke first, then slowly closes the remaining stroke to eliminate pipeline water hammer and protect pumps and pipelines. It is standard equipment for large pump station outlets.

4) Differential pressure control valve

It senses the pressure difference between valve inlet and outlet via differential pressure pilot valve and adjusts main valve opening to stabilize the upstream and downstream pressure difference.

20. Can hydraulic valve be installed vertically?

Vertical installation is allowed, but the valve cover and pilot assemblies must face outward for convenient operation and maintenance. The flow arrow marked on the valve body must be consistent with the actual flow direction of the pipeline. Air release valves shall be installed at high points of pipelines to avoid air blockage.

21. Is flow rate a reference factor for valve model selection?

Select matching valve models according to the designed flow rate of the whole system.

22. How to select control mode for hydraulic valve?

Available control modes: manual, decoder, 4G, LoRa.

1) Manual control

Operated manually, still usable under power cut, with low operation cost. Only supports on-site operation and has low efficiency, suitable for projects without automatic centralized management demands.

2) Decoder control

Adopting two-wire control, bus power supply, no additional power supply required, stable and fast signal transmission. Supports accurate wired remote valve switching, suitable for complex field

working conditions.

3) 4G control

Rely on public cellular network without local gateway wiring, easy connection and centralized management via mobile APP or PC. Limited by unavailable 4G signals in remote mountain areas.

4) LoRa control

No wiring required, realize remote centralized control via local gateway with mobile APP or PC, low labor intensity and stable long-distance signal coverage for large-area irrigation. Especially suitable for thunderstorm-prone southern regions, as lightning damage only affects local equipment instead of the whole wired decoder network.

23. What are common faults of hydraulic valve and rapid troubleshooting methods?

Common faults. These include failure to fully close with continuous water flow, failure to open with no water output, fluctuating pressure, sticking during opening and closing, no-signal failure of electric operated models, and pressure regulation failure caused by pilot valve blockage.

General troubleshooting process. Dismantle and clean the filter screen and ceramic core of pilot valve, then recalibrate pressure regulating pilot valve. For electric valves, inspect power supply and LoRa/4G signal status.

24. Why cannot the valve fully close, and how to solve it?

Foreign debris is usually stuck between ceramic sealing disks. Dismantle the main valve core to remove impurities and reassemble. Special tools shall be used for disassembly and maintenance. Forced disassembly is not recommended.

25. Why does the drain port of pilot valve keep discharging water? How to solve it?

Foreign debris is stuck inside the pilot valve core. Dismantle the pilot valve core to remove impurities and reassemble the components.

26. Why the valve cannot be opened or water cannot be discharged? How to solve it?

Potential causes:

- 1) Pressure cannot be released from the upper cavity of piston.
- 2) Air accumulated in control pipelines.
- 3) Inlet water pressure is too low to jack up the valve core spring.

Solutions:

- 1) Dismantle the valve body and clean the upper cavity.
- 2) Vent accumulated air from pipelines.
- 3) Increase pipeline water pressure.
- 4) Inspect and raise inlet pipeline pressure.

27. Is hydraulic valve easy to assemble and disassemble? Can farmers complete maintenance independently?

We recommend flange connection with L-type rubber gaskets for easy assembly and disassembly. However, internal structural inspection and maintenance require special professional tools and trained operators. Independent disassembly and maintenance by untrained farmers is not recommended.

VI. Disk Filter System

1. What are the basic configurations of Runjing disk filter system?

It consists of three major assemblies: **Filtration unit** (filter housing, disk filter core, compression device), **Control system** (controller, sensor, ceramic hard sealing three-way backwash valve) and **Auxiliary pipeline system** (inlet pipeline, outlet pipeline, drain pipeline and various matching valves).



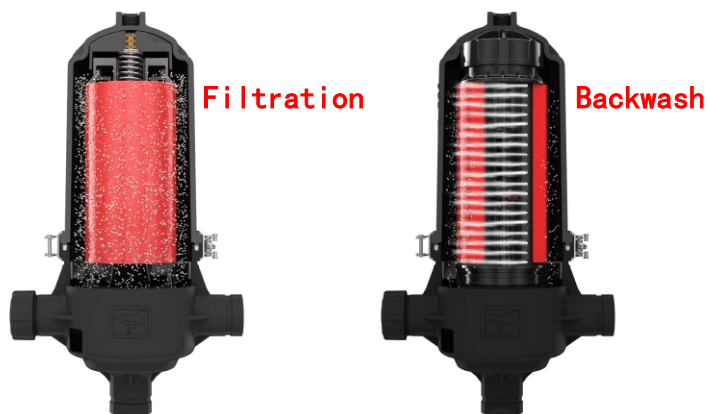
Runjing Disk Filter System

2. How does the Runjing disk filter system work?

Each filtration unit is equipped with hundreds of disks with **radial grooves**. During filtration, the disc elements are compressed by springs and water pressure. The grooves on adjacent disc elements intersect to form numerous mesh-shaped filtration passages. Impurities such as sediment and organic matter in water are trapped by the groove edges, while clean water passes through smoothly. This deep retention structure can hold more contaminants than flat screen filters and avoid rapid blockage.

When accumulated impurities reach preset pressure difference or time threshold, the filter system automatically switches to backwash

mode. **Ceramic disks of the control valve rotate relatively to instantly switch flow channels from external compression to internal flushing, and open drain outlets simultaneously. Disks of each filter head are processed in sequence. Clear water flows backward from the outlet and flushes disk grooves at high speed to** carry impurities out through drain ports. Since disks are loosened, water can thoroughly flush large particles trapped in gaps without dead corners. Each backwash lasts tens of seconds, then the system resumes normal filtration state.



Schematic of Operating Principle of Disk Filter System

3. What material are filter disks made of, and are they easy to wear?

Disks are made of PP polypropylene with good wear and corrosion resistance. The water flow rate is slow during filtration, and filtered water is used for backwashing, causing minimal abrasion to disks. With standard operation and maintenance, the service life of disks reaches 5~10 years.

4. What are the flow rate and optional filtration accuracy grades?

Standard flow rate: 7~286m³/h. Three optional filtration accuracy grades: 50μm (250 mesh), 100μm (150 mesh), 130μm (120 mesh).



Disk Filter Core

5. What is the maximum flow rate?

The maximum flow of commonly used models is $286\text{m}^3/\text{h}$.

6. Can it monitor the flow rate?

No, an independent flow meter needs to be installed separately for flow measurement.

7. What material is the filter housing?

Reinforced nylon, featuring high mechanical strength and excellent weather resistance.

8. What are the characteristics of backwash valve?

It adopts ceramic hermetic hard sealing valve core, with outstanding anti-sediment scour, wear and fertilizer corrosion resistance, as well as low opening/closing torque. Only one 24V control wire is required for simple installation. Valve reversing will not be affected by system water pressure. It is less prone to blockage and has longer service life than traditional plastic or solenoid three-way valves.



Ceramic Hard Sealing Three-way Valve

9. How to achieve backwash?

Backwash is controlled by programming with three trigger modes:

Manual forced backwash: Unlock the controller and press the manual button to enter backwash status.

Differential pressure control: The system automatically initiates cleaning when inlet-outlet pressure difference reaches preset value (0.05~0.07 MPa or 5~7 meters water head) due to accumulated impurities.

Time control: Timed backwash at preset intervals (e.g. every 8 hours) as backup protection.

10. How often is backwash done? How to set it?

The backwash interval and duration depend on raw water quality. The higher the impurity content, the longer the backwash time and the shorter the interval.

Users can set backwash interval and single-unit backwash duration on the controller or set pressure threshold via differential pressure switch. The two control modes run simultaneously. Automatic backwash will be triggered as soon as either condition is satisfied first.

11. Where does the backwash water come from?

1) **Internal backwash:** Use filtered clean water produced by the filter itself. The system suspends one filtration unit during backwash, and clean water from other running units flows backward to flush contaminated unit and discharge impurities.

2) **External backwash:** Import external clean water from clean water tanks or booster pumps for water intake when system pressure or flow is insufficient. A pressure sustaining valve is generally installed at filter outlet to maintain required backwash pressure and fully opens after flushing to reduce flow loss.

12. What is the service pressure, and are there requirements for backwash pressure?

The working pressure ranges from 0.15MPa to 1.0 MPa, and the backwash pressure shall be higher than 0.15 MPa. If the water pressure is too low, a pressure sustaining valve shall be installed at the outlet (see Chapter V) to ensure adequate pressure during backwash. Installation at the outlet should be considered in regions with low working pressure.

13. Under what conditions is a pressure sustaining valve needed?

1) When the filter outlet discharges directly into a water tank or the outlet pressure is lower than 0.15 MPa, a pressure sustaining valve shall be installed on the outlet pipeline to maintain sufficient backwash pressure. Runjing electric pressure sustaining valve switches to full open state after backwash to reduce flow resistance (See Q12, Chapter V).

2) When the outlet pressure is excessively high (the differential pressure relative to the drain outlet exceeds 0.4 MPa), a pressure sustaining valve shall be installed on the drain pipeline to ensure proper operation of the backwash rubber check valve.

3) Where field valves are not automatically controlled, the number of manually opened valves is often excessive (e.g., unauthorized valve opening for water theft). A pressure sustaining valve needs to be installed in such cases.

4) The grid voltage is unstable. The standard grid voltage is 380 V. When the drip irrigation systems in the irrigation area are all activated, the grid voltage may drop to 340 V or 280 V, resulting in insufficient operating pressure of the pump station. In this case, a Runjing electric pressure sustaining valve shall be installed after the filter (fully open without pressure sustaining during operation).

14. Are pressure display devices equipped on inlet and outlet pipelines?

Pressure gauges are installed on both inlet and outlet pipelines for real-time pressure reading. Automatic backwash filters are fitted with differential pressure switches to monitor pressure gap and trigger backwash automatically upon reaching preset value.

15. What is the maximum working pressure?

1.0MPa (100 meters).

16. What is the working voltage?

Municipal AC220V alternating current is connected to a power adapter which outputs DC24V, and the working voltage is DC24V.

17. Is RS-485 communication port equipped? Can read the working status?

Equipped with RS-485 port, which can connect with water & fertilizer integrated machines and irrigation central control systems to read filtration status, backwash status and real-time differential pressure data.

18. Can it filter media other than water?

It is primarily designed for all types of irrigation water. Adaptability for weak acid, weak alkali and low-viscosity organic solvents can be evaluated based on disk filtration accuracy and housing material. It is not recommended for strongly corrosive media.

19. What application fields and water sources are applicable for?

1) **Agricultural irrigation:** Front-end filtration system for farm irrigation water.

2) **Circulating water treatment:** Cooling water filtration for power plants, steel plants and chemical enterprises.

3) **Industrial process water:** Cleaning and spraying process filtration for food, textile and paper industries to protect equipment and

stabilize product quality.

4) **HVAC circulating water:** Filter air conditioning loop water to prevent pipeline and heat exchanger blockage.

5) **Membrane pretreatment:** Pre-protection filter for reverse osmosis (RO) and ultrafiltration (UF) membrane systems to extend service life of expensive membrane components.

6) **Municipal and wastewater treatment:** Raw water filtration for waterworks, urban reclaimed water reuse and standard wastewater discharge.

Notes: Groundwater with high ferrous sulfate or manganese ion content requires oxidation pretreatment. When the sediment content exceeds 25 ppm, pre-treatment by sedimentation tank shall be adopted. For well water with sediment content below 25 ppm, a centrifugal filter shall be used for pre-treatment. The water shall then be filtered by the disk filter system. The disk filter system has replaced the media filter. Therefore, a media filter shall not be installed upstream of the disk filter.



O Mandarin Orange Plantation, Sanyang Wetland, Wenzhou, Zhejiang



Water Supply System of a Residential Community in Yulin, Shaanxi

Treatable water sources: seawater, lake water, river water, reservoir water, rainwater, well water. Select matching filtration accuracy and system combination according to actual water quality.

20. What filtration accuracy is suitable for drip tape with flow rate 1.38L/h?

To prevent dripper clogging, drip irrigation systems generally require a filtration accuracy of no less than 120 mesh (approximately 130 μm), and 130 μm disk filters can be selected.

21. How to select the specifications and filtration accuracy of disk filters system, and what factors should be taken into consideration?

Select filter model according to raw water quality and system designed flow rate.

Table 5: Runjing Disk Filter System Selection Table

Model	RJ-D F203	RJ-D F204	RJ-D F205	RJ-D F303	RJ-D F304	RJ-D F305	RJ-D F305	RJ-D F306	RJ-D F307
Type	Single Disk Type			Double Disk Type					
Number of Filter Units	2"×3	2"×4	2"×5	3"×3	3"×4	3"×5	3"×3	3"×6	3"×7
Inlet/Outlet	DN100			DN150			DN200		
Drain	DN80			DN100			DN100		
Red Disks, Filtration Accuracy: 130 μm (120 mesh) Flow Rate (m³/h)	55	77	99	110	154	/	198	242	286
	37	53	69	74	106	138	/	170	202
	19	29	39	38	58	78	/	98	118
Orange Disks, Filtration Accuracy: 100 μm (150 mesh) Flow Rate (m³/h)	40	57	74	80	114	148	/	182	216
	25	37	49	50	74	98	/	122	146
	10	17	24	20	34	48	/	62	76
Blue Disks, Filtration Accuracy: 50 μm (250 mesh) Flow Rate (m³/h)	31	45	59	62	90	118	/	146	174
	19	29	39	38	58	78	/	98	118
	7	13	19	14	26	38	/	50	62
a. Good water quality: Urban tap water, clean water extracted from stable aquifers, turbidity < 3 degrees. b. General water quality: Circulating cooling water, surface water after effective sedimentation, general well water, drainage after effective sedimentation and complete biological treatment, general suspended solids < 30mg/L. c. Poor water quality: Groundwater extracted from aquifers with poor water quality, drainage after effective sedimentation but little biological treatment; relatively good surface water, general suspended solids < 75mg/L. d. Very poor water quality: Poor well water, surface water; drainage without sedimentation and biological treatment. It cannot be used as the inlet water source of disc filters, and pretreatment is required to improve the water quality grade.									

22. What precautions should be taken during installation and commissioning?

Install pressure sustaining valve at outlet (see Chapter V) if water pressure is low to guarantee backwash pressure. Install pressure sustaining valve on drain pipeline (see Chapter V) if outlet pressure is excessively high, to avoid service life loss of backwash rubber check valve caused by excessive differential pressure.

23. How often does the filter core need to be replaced, and what should be noted during replacement?

Under standard operation and maintenance, the service life of disk filter cores can reach 8~10 years. Replacement is only required when irreversible damage occurs, such as cracking, deformation caused by high temperature and high pressure or chemical corrosion and worn filtering channels.

24. How often should it be cleaned and maintained?

Disassemble and clean disks manually when backwash effect declines. Inspect every 15~30 days for clean well water and inspect weekly for river water and high-sediment water sources. Fully disassemble and clean all disks after each irrigation season. If backwash pressure is maintained above 20 meters by pressure sustaining valve, regular automatic backwash can replace frequent manual disassembly cleaning.

25. What should be done if outlet water flow becomes low or insufficient?

1) **Disk filter blockage. (This is the most common cause):** It is accompanied by increased pressure differential and reduced flow rate. Automatic backwash can be performed first. If this measure fails to deliver satisfactory results, manual disassembly and cleaning are required.

2) **Malfunction of mechanical components:** Check whether the

inlet pressure is normal. If the inlet pressure reads normal, the rubber check valve for backwash may be damaged. Replace this component.

3) **Improper working parameters:** Check if the external backwash pressure reaches 0.15 MPa or above. Check whether the set values for backwash pressure differential, duration and frequency are reasonable.

26. Why is there almost no water discharged from the sewage outlet or during backwash?

- 1) Three-way valve does not switch to the correct position.
- 2) Supply pressure lower than minimum backwash pressure requirement.
- 3) Controller does not send backwash trigger signal.

27. What should be done if the drain outlet keeps discharging water during normal filtration?

1) **First inspect the drain pipe.** If the drain pipe is too long, observe for 1~2 minutes after backwash completes. Draining that stops within this period indicates normal operation.

2) **Check whether the three-way valve is faulty.** If water keeps draining for a long time, the possible causes include actuator failure or large-sized impurities in water such as sand, gravel and twigs stuck between the ceramic valve disks. This may lead to blockage or damage of the ceramic disks. The three-way valve needs to be replaced.



*Runjing Intelligent Irrigation House Located
at Sanyang Wetland, Wenzhou, Zhejiang*

VII.Fertilizer Suction Regulating Valve /Fertilizer Proportional Valve /Integrated Water and Fertilizer Machine

1. What is a fertilizer suction regulating valve?

A fertilizer suction regulating valve is a flow control component used in integrated water and fertilizer machine to regulate the extraction amount of fertilizer solution, enabling stable regulation of EC and pH levels in the pipeline. It is available in two types: electric regulating valves and high-frequency solenoid valves.

Electric regulating valve: Precisely controls fertilizer liquid flow by continuously adjusting the valve open degree. The system automatically adjusts the valve open degree based on EC/pH feedback to achieve precise and continuous fertilization control, typically driven by a PLC or similar controller.

High-frequency fertilizer suction solenoid valve: A solenoid valve capable of rapid on-off switching at extremely high frequencies (tens to thousands of times per second). It commonly employs PWM (Pulse Width Modulation) technology to precisely control the average flow rate by varying the proportion of valve opening duration within a cycle (i.e., duty cycle).

2. Which type of regulating valve is the Runjing fertilizer suction regulating valve, and what are its features?

It belongs to the electric regulating valve category, featuring ceramic valve core and a low-backlash, high-precision stepper reduction motor. Its characteristics include high regulation accuracy ($\pm 0.5\%$), wear resistance, corrosion resistance, low torque, and long service life. The valve open degree exhibits a linear relationship with flow rate, facilitating precise PID regulation by the control system, making it highly suitable for water and fertilizer integration with stringent EC/pH requirements.



Runjing Fertilizer Suction Regulating Valve

3. What are the communication methods and protocols of the Runjing fertilizer suction regulating valve?

It supports RS-485 serial communication with the Modbus-RTU protocol, and the control methods include pulse control and bus control.

4. What is the regulation accuracy of the Runjing fertilizer suction regulating valve?

$\pm 0.5\%$.

5. Why can the Runjing fertilizer suction regulating valve achieve a high accuracy of $\pm 0.5\%$?

This is primarily attributed to the use of special ceramic valve core, a high-precision stepper motor, the valve's linear flow design, and the precision control system working in concert.

1) Special Ceramic Valve Core

The special ceramic material, sintered at ultra-high temperatures, exhibits extremely high hardness (second only to diamond and sapphire in nature), wear resistance, and corrosion resistance. After precision machining, the sealing surfaces fit tightly, resulting in extremely low leakage rates (below 0.01% even after 1,000 cycles under high sand

content conditions), fundamentally eliminating flow deviations caused by leakage.

2) High-Precision Stepper Motor

Utilizes a low-backlash, high-ratio (100:1) stepper reduction motor. With 5,120 pulses from the control system, the motor rotates only 0.36 degrees.

3) Linear Flow Design

The valve open degree is directly proportional to the flow area, and the open degree has a linear relationship with the flow rate. This eliminates the need for complex non-linear compensation by the controller, simplifying calculations and ensuring precise control.

4) Precision Control System

It adopts a closed-loop PID regulation. EC/pH sensors provide real-time feedback data to the controller, which uses the PID (Proportional-Integral-Derivative) algorithm to dynamically correct the valve open degree, instantly eliminating various minor disturbances and ensuring the accuracy of the final result.

6. What flow rate specifications are available for the Runjing fertilizer suction regulating valve?

Currently, two rated flow rates are available: 1 m³ /h and 6 m³ /h. Other specifications can be custom-developed.

7. Can the Runjing fertilizer suction regulating valve resist nitric acid corrosion?

Yes. It features an engineering plastic housing resistant to nitric acid corrosion, special ceramic valve core, and high-quality rubber seals.

8. What is a fertilizer proportional valve?

A fertilizer proportional valve is an automatic control valve or valve system used in integrated water and fertilizer systems to precisely mix fertilizer stock solution (high concentration) with irrigation water

(clean water) at a set ratio. Its core function is to achieve "water and fertilizer synchronization", delivering soluble solid or liquid fertilizers to the crop root zone along with the irrigation water, according to the crop's nutrient requirements.

9. What types of fertilizer proportional valves are available?

1) Hydraulically Driven Fixed Ratio Valve (Fixed-Proportion Fertilizer Pump)

Technical Feature: Completely powered by pipeline water pressure, requiring no external power supply.

Working Principle: Utilizes the pressure drop inside the valve body to drive a piston or impeller in reciprocating motion, drawing and mixing the fertilizer stock solution at a mechanically fixed volume ratio (e.g., 1:100). Ratio adjustment within a certain range requires manual replacement of the dial or adjustment screw.

2) Electric/Pneumatic Integrated Proportional Regulating Valve Assembly

Technical Feature: Comprises two independent on-off valves (typically ball valves or butterfly valves) sharing one actuator, linked mechanically via a connecting rod.

Working Principle: The actuator drives the two valves in opposing motion (one opens while the other closes synchronously), thereby achieving proportional regulation of water and fertilizer flow. The ratio can be continuously varied in response to electrical signals (e.g., 4-20mA).

3) Integrated Single-Core Electric Proportional Regulating Valve (Runjing Ceramic Three-Way Proportional Valve)

Technical Feature: Integrates the regulation function into a single valve body, utilizing a ceramic disk with hermetic head faces sealing three-way structure (two inlets and one outlet, or one inlet and two outlets), driven by a single motor rotating the valve core.

Working Principle: As the valve core rotates, the flow areas of the two inlets change in inverse linear proportion (with a constant sum). Due to the opening/closing characteristics of the ceramic valve core, the open degree is directly proportional to the flow area, enabling precise and linear regulation of the fertilizer concentration.



Runjing Fertilizer Proportional Valve

10. Where is the fertilizer proportional valve used?

The fertilizer proportional valve is primarily used in agricultural and greening irrigation systems that require water and fertilizer synchronization and precise control of fertilization concentration. It is typically installed on the main pipeline of the equipment, connecting the irrigation water and fertilizer solution inlets, regulating the EC/pH value of the main line fertilizer solution to achieve precision fertilization.

11. What are the features of the Runjing fertilizer proportional valve?

1) Integrated Single-Core Ceramic Three-Way Structure

High Integration: A single valve body and a single driving motor control the flow distribution of both water and fertilizer solution

through ceramic core rotation, replacing the traditional complex "dual-valve linkage + connecting rod mechanism" assembly. This results in a compact size and easy installation.

Ceramic Hard Sealing: The moving disk and fixed disk are made of alumina ceramic (hardness HRA ≥ 85), featuring self-lubrication, wear resistance, and corrosion resistance. This makes it particularly suitable for salt-containing and weakly acidic/alkaline fertilizer solutions, eliminating the risk of aging and leakage associated with traditional rubber seals.

Two-Inlet, One-Outlet Design: Irrigation water and fertilizer solution enter through two independent inlets, mix internally, and discharge from the outlet. The flow areas of the two inlets change inversely and synchronously, physically preventing fertilizer from backflowing into the clean water line.

2) Excellent Regulation Characteristics

Linear Regulation: The valve core rotation angle is strictly proportional to the flow areas of the two inlets (the sum of the two channel areas is constant), making the fertilizer concentration change linearly with the valve core rotation angle. This avoids the regulation dead zones inherent in ball valves, which typically exhibit equal-percentage or quick-opening characteristics.

High Regulation Accuracy: Paired with a stepper motor drive and RS-485 control signal capability, it enables stepless and precise ratio regulation, ideal for forming a closed-loop precision fertilization system with EC/pH sensors.

3) Operational Reliability

Low Opening and Closing Torque: The ceramic hermetic head faces sealing combined with a pressure-balanced structure ensures that the valve core rotation torque remains stable and light regardless of system pressure changes, significantly reducing motor power

consumption.

Strong Anti-Clogging Capability: The ceramic sealing surfaces create a "shearing" action that effectively cuts through fine particles or fibrous impurities in the water, preventing jamming and making it suitable for irrigation water sources that are not fully filtered.

Long Maintenance-Free Cycle: Its wear resistant properties ensure no leakage operation even under frequent cycling, greatly reducing operation and maintenance costs.

12. What advantages does the Runjing fertilizer proportional valve have over similar products with other structures?

1) **Structural Advantage:** A single valve core replaces dual valve linkage, eliminating the connecting rod mechanism and its associated clearance errors, reducing volume by more than 50%, significantly shortening installation and commissioning time, and minimizing system failure points.

2) **Sealing Advantage:** The ceramic hermetic head faces sealing solves internal leakage problems caused by fertilizer salt corrosion and particle wear. The self-shearing sealing surfaces prevent jamming and clogging, making it especially suitable for irrigation water sources containing impurities.

3) **Regulation Advantage:** The valve core open degree is directly proportional to the flow area, allowing fertilizer concentration to change linearly with the control signal. This enables rapid, stepless, and precise closed-loop control when paired with EC sensors, whereas the non-wires characteristics of ball valves often lead to regulation oscillation or response lag.

13. What specifications are available for the Runjing fertilizer proportional valve?

Currently available in 2"(DN50) size, with a rated flow rate of 20 m³/h.

14. How does the Runjing fertilizer proportional valve achieve precise proportioning?

The fertilizer proportional valve utilizes a **ceramic disk with hermetic head faces sealing three-way structure**. Clean water and fertilizer solution each enter through a dedicated inlet, mix internally, and discharge from the outlet. The valve opening is directly proportional to the flow area. As the valve core rotates, the channel area of one inlet gradually increases while the other synchronously decreases, causing the water and fertilizer flow rates to change in a complementary linear fashion. A precision stepper motor controls the valve core rotation, achieving linear and precise proportional regulation of water and fertilizer flow rates.

15. Are the Runjing fertilizer suction regulating valve and fertilizer proportional valve resistant to fertilizer corrosion?

Yes, they are corrosion resistant. All components in contact with the medium are made of engineering plastics and special ceramics that are resistant to acid and fertilizer solution corrosion, making them suitable for use in water and fertilizer machines for protected agriculture, such as blueberry cultivation.

16. What is the difference between the Runjing fertilizer suction regulating valve and fertilizer proportional valve?

They have different functions. The fertilizer suction regulating valve is a two-way valve (one inlet, one outlet), responsible for controlling the amount of fertilizer solution drawn from the fertilizer tank, and its goal is "how much to draw." The fertilizer proportional valve is a three-way valve (two inlets, one outlet), where clean water and fertilizer solution enter through separate inlets, mix at a set ratio, and exit through the outlet. Its goal is "what mixing concentration is required".

Table 6: Differences between Fertilizer Suction Regulating Valve and Fertilizer Proportional Valve

Comparison Dimension	Suction Regulating Valve (Suction Valve)	Fertilizer Proportional Valve (Water and Fertilizer Proportional Valve)
Core Function	Regulates suction flow rate	Regulates mixing ratio
Installation Location	Installed on the suction line, connecting to fertilizer tank	Installed on the main pipeline of the equipment, connecting water and fertilizer inlets
Valve Structure	Two-way valve (one inlet, one outlet)	Three-way valve (two inlets, one outlet)
Control Objective	Controls the amount of fertilizer drawn from the tank	Controls the ratio of water to fertilizer solution after mixing

17. What are the core components of the Runjing integrated water and fertilizer machine?

Water pump, fertilizer suction regulating valve, control cabinet, intelligent control system, sensors (EC, pH, flow).

18. How is the Runjing integrated water and fertilizer machine different from similar products?

The entire unit is equipped with a complete set of ceramic hard sealing specific valves for fertilization, distinguishing it from industry standard plastic valves and solenoid valves. It resists fertilizer crystallization and acid/alkali corrosion, offers high linearity flow regulation accuracy, supports IoT remote centralized management, and covers all planting scenarios from agriculture to greenhouses. (See Question 2 in Chapter VII)

19. What are the features of the Runjing integrated water and fertilizer machine?

- 1) Supports zone automatic irrigation and fertilization with timing and volume quantified.
- 2) Equipped with an IoT system, remotely handed by mobile

phone of the entire area.

3) Precise water and fertilizer proportioning, effectively saving water and fertilizer inputs.

4) Compatible with all types of irrigation pipelines, including drip irrigation, micro-sprinkler irrigation and sprinkler irrigation.

5) The entire unit is equipped with ceramic hard sealing valves, ensuring stable operation and lower long-term maintenance costs.

20. Can the Runjing integrated water and fertilizer machine achieve integrated pump-valve linkage?

Yes. The control cabinet synchronously controls the start and stop of the water supply pump, various hydraulic control valves, and fertilizer suction valves, enabling fully automated sequential operation of irrigation, fertilization, and pipeline flushing.

21. How many channels does the Runjing integrated water and fertilizer machine have?

Available in multiple options, including single-channel, dual-channel, and three-channel models.



Runjing Integrated Water and Fertilizer Machine

VIII. Foot Valve

1. What is a foot valve?

A foot valve is a type of check valve, typically installed at the bottom end of a pump suction pipe. Its primary function is to prevent water in the pipe from flowing back to the water source, maintaining prime in the suction line and preventing the pump from running dry and getting damaged upon restart after shutdown.

2. What is the difference between the Runjing foot valve and traditional foot valves?

Traditional foot valves often use a metal disk against a metal seat for hard sealing. The metal is prone to rust, leading to poor sealing and gradual leakage. When the pump restarts, the pipeline needs to be re-primed manually, which is troublesome and may cause the pump to run dry and burn out.

Runjing foot valve adopt high-hardness, high-flatness ceramic disks matched with ceramic seat for sealing. The assembly is rust-proof and wear-resistant, delivering long-lasting and reliable sealing performance. It features a lift-type ceramic disk combined with a tapered plastic flow guide, with no spring, resulting in low head loss. It is equipped with a patented energy-absorbing buffer rubber seal ring, providing strong resistance to water hammer impact and a service life exceeding 100,000 cycles. The tight fit of the ceramic sealing pair improves static sealing efficiency by 30% compared to traditional products, enabling faster pump priming.



Runjing Foot Valve

3. What sizes are available?

Standard specifications are 3"(DN80) and 4"(DN100), suitable for supporting conventional agricultural water intake pumps.

4. Does it cause significant head loss to the pump?

No. This product features extremely low head loss. The springless lift-type ceramic disk and tapered flow guide design reduce overall weight by 60% compared to traditional foot valves, requiring only a 10cm water column pressure drop for smooth opening, without increasing the pump's operating load.

5. Can it be installed inclined or horizontally?

Vertical installation is generally recommended; horizontal installation is not permitted. If site constraints require inclination, the angle should not exceed 30° .

6. Will sudden pump shutdown cause water hammer to damage the foot valve?

No. The Runjing foot valve is equipped with a patented energy-absorbing buffer rubber seal ring, effectively resisting water hammer impact, with a service life exceeding 100,000 cycles and high reliability.

7. How to handle leakage?

Leakage is generally caused by foreign matter trapped on the sealing surfaces. Remove the foreign matter with a tool to restore sealing.

IX. Straight-Through Valve

1. What are the features of the Runjing straight-through valve?

The valve core is made of **special ceramic material**, **hermetic head faces sealing** and a **straight-through flow channel design**, featuring good wear resistance, corrosion resistance, long service life, and low flow resistance.



Runjing Straight-Through Valve

2. What sizes are available?

Currently available from DN25 to DN50; more sizes are under development.

3. What control methods are available?

Adopt DC12V two-wire control and can be integrated with a controller for LORA or 4G remote control.

4. What scenarios is it suitable for?

Protected agriculture, landscape irrigation, and other fluid control applications.



Runlucky Company's Garden-Style Factory Campus

X. Residential Intelligent Irrigation Valve

1. What is a residential intelligent irrigation valve?

It refers to an intelligent irrigation valve that can be installed on household faucets, featuring low flow rate, easy control, and affordable pricing, suitable for small-area home watering.

2. What are the features of the Runjing residential intelligent irrigation valve?

The opening/closing flow control components (the moving disk and fixed disk) are made of special ceramic hermetic head faces sealing material. The moving disk and fixed disk rotate against each other to open and close, with self-cleaning sealing surfaces, featuring impurity resistance, low torque, and good sealing.

3. What specifications are available for the Runjing residential intelligent irrigation valve, and what are their flow rates?

Currently available in two models: RJ-ZG06 and RJ-ZG07. At a pressure drop of 0.1MPa, the flow rate reaches 2 m³ /h, sufficient to meet the watering needs of a 200 m² area.



RJ-ZG06



RJ-ZG07

4. What are the differences between the two models?

RJ-ZG06 is battery-powered with a built-in display, allowing users to set the irrigation duration and intervals directly on the device; it does not have network connectivity.

RJ-ZG07 is powered by an adapter and supports 4G IoT remote control. It can be optionally equipped with temperature/humidity sensors and flow sensors. Through the phone APP, users can remotely view real-time flow and ambient humidity, schedule timed irrigation, and set automatic start/stop based on soil moisture.

5. What scenarios are the two models suitable for?

RJ-ZG06 is suitable for ornamental flowers and green plants on balconies, patios, or other areas not exposed to rain, where precise water management is not critical. Once the irrigation duration and intervals are set, no further attention is needed.

RJ-ZG07 is suitable for courtyard crops, lawns, and similar landscaping. These plants require watering based on actual soil moisture conditions (no watering needed when rain is sufficient, automatic supplemental watering needed during drought). The intelligent control of RJ-ZG07 precisely meets this requirement. Compared to RJ-ZG06, it offers greater intelligence and remote control convenience.

6. What is the power consumption of RJ-ZG06? What battery size is used? How long does it last?

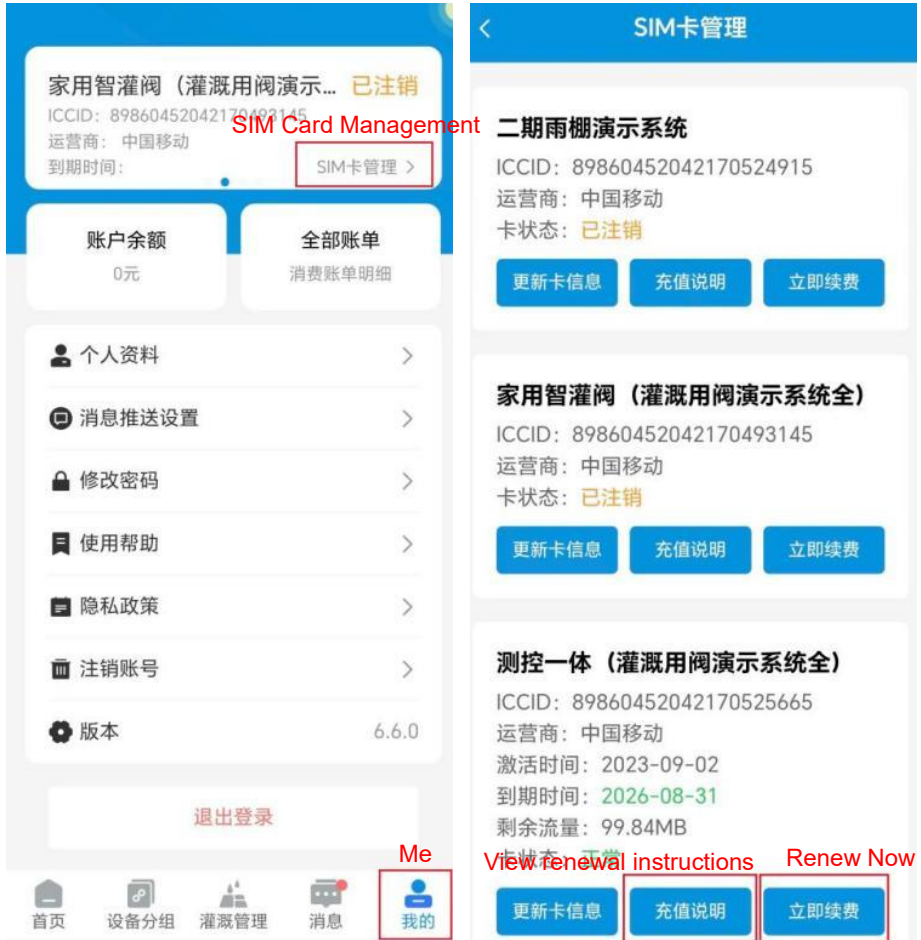
Based on laboratory data, it can last 1-2 years. Actual usage may vary.

7. How many years of data traffic are included with the IoT SIM card for RJ-ZG07 (in China)?

Includes 3 years of data traffic. Renewal is required after expiration.

8. How to renew the IoT SIM card data plan for RJ-ZG07 (in China) ?

Go to Me → SIM Card Management → Find the corresponding device for top-up → View renewal instructions → Renew Now.



9. Is installation easy? Are there any precautions?

Installation is very simple. Just screw the valve directly onto the faucet's 3/4" male thread. Ensure the sealing gasket is properly installed to prevent leakage.

10. The valve opens but no water comes out. What could be the cause?

First, listen for the sound of the valve opening. If there is a sound but little or no water flows, the inlet filter screen may be clogged. In this case, the screen needs to be removed and cleaned.

whole industry chain including R&D, production, quality inspection, marketing and after-sales service. Since the irrigation series was launched to the market in 2024, the cumulative applied irrigated area has reached nearly 66,670 hectares, with mature demonstration bases established in Xinjiang, Inner Mongolia, Jiangxi, Sichuan and other regions.

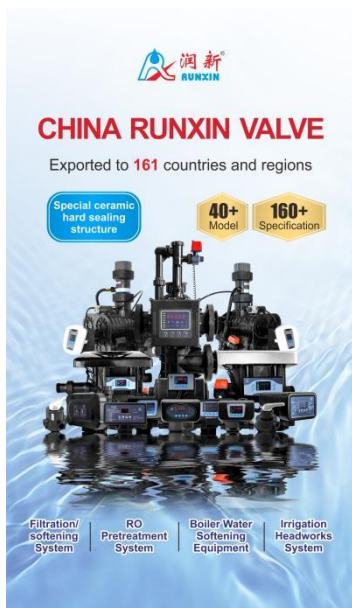
3. What is the company's development history?

Twenty-five years ago, the company rented a space above a garage in Xinqiao Residential Area, Ouhai District, Wenzhou. Starting as a small workshop, the company relied on continuous innovation in special ceramic hard sealing technology. In 2003, it developed a control valve for water treatment systems featuring a special ceramic hermetic head faces sealing structure (the Runxin Valve), creating an entirely new valve category and breaking the long-term monopoly of foreign brands.

In 2012, leveraging the core technology of Runxin Valve, the company launched the Runlucky residential (commercial) water treatment equipment, establishing a 360° whole-house water purification and softening solution centered on water softening, and officially entered the residential market.

In 2013, the company launched the Runjing ceramic hard sealing ball valves, overcoming the defects of traditional metal-core ball valves such as easy leakage, high torque and poor corrosion resistance, achieving a technological breakthrough from hermetic head faces sealing to spherical sealing.

In 2022, it developed the Runjing ceramic hard sealing irrigation valves, solving pain points of traditional irrigation valves including poor wear resistance to impurity, frequent jamming and water leakage. This successfully applied special ceramic hard sealing technology to agricultural irrigation, opening up a new business segment.



Runxin Valve



*Runlucky Residential (Commercial)
Water Treatment Equipment*



*Runjing Ceramic Hard Sealing
Ball Valve*



*Runjing Ceramic Hard Sealing
Irrigation Valve*

4. What are the company's core competitive advantages?

1) Full industry chain independent R&D and production:

Independently masters the complete set of processes including ceramic raw material proportioning, forming, 1680 °C ultra-high temperature sintering and high-precision grinding, with no reliance on external OEM manufacturing.

2) Technical Differentiation: The entire range of irrigation valves adopts ceramic flat hard sealing, which thoroughly solves the pain points of traditional rubber/plastic valves such as sediment wear, fertilizer corrosion and easy leakage.

3) Proven in Mature Markets: Water treatment ceramic valves have been validated by global markets for more than 20 years, and irrigation valves have undergone field testing under extreme conditions on farmland covering nearly 67 hectares.

4) Complete Supporting System: Independently developed IoT control system and supporting APP, with integrated software and hardware development.

5) Comprehensive Service Network: Offices and after-sales outlets are established in major agricultural production areas across China, with product and technical training provided to distributors and farmers simultaneously.

5. What is the core technology mastered by the company?

The core technology lies in the use of precision-machined special ceramics as the valve's flow-passing components. By leveraging high-precision mating and relative rotation between flat or spherical surfaces, the valve achieves precise control over fluid opening, closing, direction switching, and flow rate. This technology endows the products with superior performance such as low torque, wear resistance, durability and corrosion resistance, making them distinctly different from traditional valves.

After more than 20 years of development, **the company has formed a complete, proprietary technological system covering the processing, forming and sintering of special ceramic raw materials, as well as the versatile design of product structures and flow channels.**



Ceramic Disk



Ceramic Ball Core

6. What is the company's production capacity?

The company has three production bases. Its **headquarters** is located in Shanfu Town, Lucheng District, Wenzhou, covering an area of 4.3 hectares with a building area of more than 120,000 m². In 2019, it established **Runlucky, a wholly-owned subsidiary**, and built a production base for whole house water filters and residential softeners in Lishui Economic Development Zone, covering an area of 4.4 hectares with a building area of over 83,000 m². In 2021, it invested in constructing **a production base for special ceramic components** in Ningbo, covering an area of 1.1 hectares with a building area of nearly 20,000 m².

At present, the annual production capacity of Runxin Valves reaches 3 million sets, that of whole house water filters and residential softeners is 400,000 sets, that of ceramic hard sealing ball valves and irrigation valves is 1 million sets, and that of ceramic components is 5 million pieces.



Runxin Shanfu Factory



Runlucky Lishui Factory



*Ningbo Ceramic Parts
Production Base*

7. What is the company's level of automation?

In recent years, the company has continuously increased investment in technological upgrading, starting from bottleneck processes, and gradually realized full-process automation in injection molding, machining, assembly, testing, packaging and other procedures. Digitally automated equipment accounts for nearly 90% of key equipment. **It was awarded a National Green Factory in 2023 and selected as a Zhejiang Provincial Digital Workshop in 2024.**

The Runxin Shanfu factory is equipped with more than 150 high-precision injection molding machines and over 80 servo manipulators, realizing automatic gate removal, frame placement and insert molding. One operator can manage 15 injection molding

machines, with an average daily output of over 150,000 plastic parts. A constant-temperature, constant-humidity and dust-free injection molding workshop ensures stable product quality. There are more than 110 CNC lathes and machining centers, supported by six-axis robots and other automated equipment, processing over 600,000 parts per month. There are 6 automatic assembly lines for Runxin Valves and 2 automatic assembly lines for water outlet pile valves, realizing fully automated assembly of various series of Runxin Valves and water outlet pile valves from valve core assembly, torque testing and air tightness testing to laser coding, packaging and palletizing. With a CTU three-dimensional warehouse and information systems including PDM, ERP, MES and WMS, the company has achieved full-process digital management covering R&D, production, quality inspection, warehousing and sales.



Injection Molding Workshop



CNC Workshop



*2 Automatic Assembly Lines for
Irrigation Valves*



*6 Automatic Assembly Lines
for Runxin Valves*



*CTU Three-Dimensional
Warehouse*



MES System

Runlucky Lishui Factory is equipped with 10 large-scale blow molding machines, 22 servo injection molding machines, 9 industrial six-axis robots and 5 extruders. It is furnished with automatic equipment for housing processing, strainer welding and brine valve processing, realizing automated production of housings and key components for whole house water filters and residential softeners. Three dust-free workshops have been established and 6 complete machine assembly lines introduced, enabling automatic filling of filter media and resin, online assembly torque and air tightness testing, automatic packaging and palletizing.



Blow Molding Workshop



Complete Machine Workshop

Ningbo ceramic parts production base is equipped with 24 various presses, 11 six-axis robots and 7 electric kilns, realizing automatic dry pressing, part taking, placing and sintering of ceramic components.



Dry Pressing Workshop



Sintering Workshop

8. How does Runjing ensure the quality of irrigation valves?

The company has established a Provincial Enterprise Technology Center, the Zhejiang Provincial Water Treatment System Research Institute, and a Provincial High-Tech Enterprise R&D Center. It is equipped with a type test laboratory, testing center, water quality testing room, microbiology laboratory, and metrology room, enabling strict inspection and testing of products throughout the entire process—from raw material supply to finished product delivery—in accordance with relevant standards. **The company's testing center has obtained CNAS national laboratory accreditation.**

For Runjing water outlet pile valves, comprehensive sampling inspections are conducted on raw materials and components of each batch, including ceramic parts, plastic raw materials, rubber parts, and electrical components. Before mass production, mandatory type tests are performed, such as bursting pressure test at 1.0 MPa or above, static pressure test at 0.6 MPa or above, and 100,000-cycle pressure fatigue test under 0~0.25 MPa. Test samples are strictly retained for quality traceability. During production, the principles of first-piece inspection, in-process inspection, and final inspection are rigorously implemented. Full inspections cover product appearance, dimensions, torque, processing and assembly techniques, and order requirements. All products undergo 100% water and air pressure test. From finished products to warehousing, a total of 12 inspection procedures are carried

out through sampling verification, including order and work order verification, packaging and labeling, assembly quality, and electrical safety.



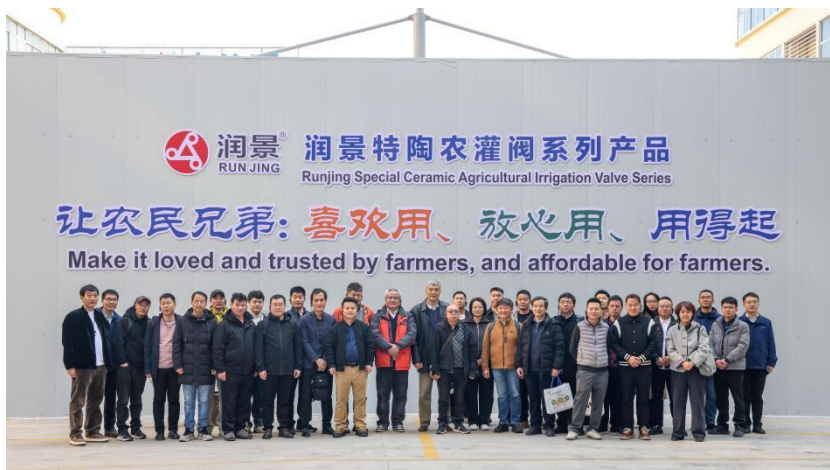
CNAS Certificate



100% air tightness test

9. What are the nine-word guiding principles?

Make it loved and trusted by farmers, and affordable for farmers.



10. Does the company engage in export business? Which regions does it export to?

Yes, it does. The company obtained the qualification for independent import and export in 2004. **In 2017, it established a joint venture, Hankscraft Runxin LLC, in Wisconsin, USA, to provide**

residential and commercial water treatment products for North American customers, marking a new stage in the development of its export business.

Up to now, **Runxin Valves have been exported to more than 160 countries and regions**, Runlucky residential and commercial water treatment systems to more than 50 countries and regions, and Runjing ceramic hard sealing ball valves to more than 40 countries and regions. The main markets cover North America, South America, Western Europe, Eastern Europe, East Asia, South Asia, Southeast Asia, the Middle East and Africa.



Hanksraft Runxin LLC in USA



Runxin Valve Marketing Network

11. Has the Runjing trademark been registered overseas?

Yes, it has. In 2025, the Runjing trademark was registered in 13 countries via the Madrid System, including the United States, Germany, Italy, Spain, Egypt, India, Israel, Turkey, Turkmenistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Tajikistan.

12. How many patents has the company been granted?

Up to now, **the company has been granted more than 200 patents in total**, including 24 invention patents and 130 utility model patents. It also holds invention patents authorized in 18 countries and regions such as the United States, the European Union and Russia, **making it the first private enterprise in Lucheng District, Wenzhou to obtain a U.S. technical invention patent.**

Through patent layout, the company has built a strong technological barrier, which plays an important role in preventing imitation by competitors, expanding market access, participating in international competition, improving product recognition and brand credibility, and maintaining long-term competitive advantages.



Patent Display Wall

13. What important honors has the company received?

The company has been recognized as a National High-Tech Enterprise, a key "Little Giant" Enterprises Specialized in Specialization, Refinement, Distinctiveness and Innovation, a First China Water-Saving Award for Advanced Collective, a National Green Factory, a Zhejiang Hidden Champion Enterprise, a Zhejiang Patent Model Enterprise, and a Zhejiang Provincial Digital Workshop, among other honors.

14. What industry awards and government special recognitions has the company received in the past five years?

It has been selected into the *National Catalog of Encouraged Industrial Water-Saving Processes, Technologies and Equipment (2025 Edition)* as a common general-purpose water-saving and water treatment equipment, and listed as a typical case as a major supporting entity for industrial water-saving technologies and equipment.

It has won the following industry awards: Top 20 Brands of the Year Award at the 2026 World Irrigation Technology Conference; Excellence in Quality and Industry Leader Awards at the 2026 NSF China Water Industry Development Forum; Excellent Enterprise of New Quality Productivity at the 2025 World Irrigation Technology Conference; Excellent Brand for Irrigation to Strengthen Agriculture at the 2024 World Irrigation Technology Conference and National Water Network Construction and Development Technology and Equipment Conference; and Era Brand, Era Power Award at the 2024 World Irrigation Technology Conference.

In 2025, the company was awarded the First China Water-Saving Award for Advanced Collective. Approved by the Office of the National Commendation Committee for Meritorious Service, Honors and Awards, and hosted by the Ministry of Water Resources, the China Water Conservation Award is presented every

three years and is the highest honor in China's water conservation field. Runxin company is the only private water-saving valve enterprise to win this award.



Honor Display Wall



Awarded the First China Water-Saving Award for Advanced Collective

15. What system certifications has the company obtained?

The company has passed the ISO9001 Quality Management System Certification for more than 20 consecutive years, and has

successively obtained certifications for Environmental Management System, Occupational Health and Safety Management System, and Energy Management System.

16. What industry-specific certifications has the company obtained?

Runxin Valves have passed the U.S. NSF certification for 15 consecutive years from 2010 to 2024, and Runlucky water softeners have obtained NSF certification for 5 consecutive years from 2020 to 2024. Both have also obtained EU CE, RoHS, French ACS, British UKCA and Russian EAC certifications.

Runjing ball valves have been granted a number of international certifications including EU CE, RoHS and Russian EAC.

A variety of Runjing products, such as water outlet pile valves, hydraulic valves have passed water-saving product certifications.



Water-saving Product Certification for Water Outlet Pile Valves

Patent No.: **ZL202422969314.4**



Water-saving Product Certification for Hydraulic Valves

17. What are the upcoming work plans in the irrigation field?

Agriculture is vital to people's livelihood. In recent years, the company has successfully applied its special ceramic hard sealing technology to agricultural irrigation, gaining recognition from the market and users. In the future, we will continue to follow this technical path, deepen our focus on scenario-based demands, develop more cost-effective new products, and use a richer product matrix to meet the diverse needs of users worldwide.

The specific work plan includes: expanding the product line by launching 170mm large-diameter ceramic disk water outlet pile valves, electric axial flow valves, angle valve for field hydrants, hydraulic valves, fertilizer suction regulating valves, water and fertilizer proportional valves and straight-through valves, covering application scenarios such as field irrigation, protected agriculture and garden irrigation. Continuously enhancing the R&D and manufacturing capabilities of special ceramic hard sealing products; expanding production capacity with the

construction of the new ninth phase factory covering an area of 9.5 hectares and a total construction area of over 190,000 m². A **new company, Zhejiang Runjing Hard Sealing Valve Co., Ltd.,** has been **registered in Lishui, Zhejiang Province,** marking a substantial step toward a new stage of development and providing stable and reliable delivery guarantees for global customers.



Intention Rendering of the Planned New Factory Building (1)



Intention Rendering of the Planned New Factory Building (2)

18. What is the sales channel structure of Runjing irrigation valves?

It adopts a distribution model at the county level (including county-level cities).

19. Are Runjing irrigation valves available online?

Yes. They can be consulted and purchased through official channels including the Runxin Taobao Store, Tmall Flagship Store, and WeChat Store.

20. Does the company provide product training?

Yes. The company adopts a combination of online and offline methods to conduct systematic training focusing on product technical features, installation key points, APP operation, as well as after-sales problem analysis and solutions. This helps users quickly master operation methods and core functions, reduce usage barriers and costs, and improve the actual user experience.



Technical Training



On-site Guidance

Appendix 1: General Technical Parameter Table of Runjing Irrigation Valves

Product Name	Model No.	Function	Inlet	Outlet	Control Method	Regulation Channels	Flow Rate	Maximum Working Pressure	Note		
Three-way water outlet pile valve	G13142S/G13242S-80/75	/	3"	75mm drip pipe	Manual	1-ch/2-ch	39/76m³/h（0.04MPa pressure differential）	0.2MPa			
	G13142L/G13242L-80/75				LoRa	1-ch/2-ch					
	G13142W/G13242W-80/75				4G	1-ch/2-ch					
	G13142S/G13242S-80/90		3"	90mm drip pipe	Manual	1-ch/2-ch	49/96m³/h（0.04MPa pressure differential）	0.2MPa			
	G13142L/G13242L-80/90				LoRa	1-ch/2-ch					
	G13142W/G13242W-80/90				4G	1-ch/2-ch					
	G13142S/G13242S-100/90	/	4"	90mm drip pipe	Manual	1-ch/2-ch			61m³/h（0.04MPa pressure differential）	0.2MPa	
	G13142L/G13242L-100/90				LoRa	1-ch/2-ch					
	G13142W/G13242W-100/90				4G	1-ch/2-ch					
	G13132S-80/90	/	3"	90mm drip pipe	Manual	1-ch	61m³/h（0.04MPa pressure differential）	0.2MPa			
	G13132L-80/90				LoRa						
	G13132W-80/90				4G						
	G13132S-100/90	/	4"	90mm drip pipe	Manual	1-ch			75m³/h（0.04MPa pressure differential）	0.2MPa	
	G13132L-100/90				LoRa						
	G13132W-100/90				4G						
	G13132S-100/110		4"	110mm drip pipe	Manual	1-ch	75m³/h（0.04MPa pressure differential）	0.2MPa			
	G13132L-100/110				LoRa						
	G13132W-100/110				4G						
Five-way water outlet pile valve	G15262S-80/75	/	3"	75mm drip pipe	Manual	2-ch	76m³/h（0.04MPa pressure differential）	0.2MPa			
	G15162L/G15262L-80/75				LoRa	1-ch/2-ch	45/76m³/h（0.04MPa pressure differential）				
	G15162W/G15262W-80/75				4G	1-ch/2-ch					
	G15262S-80/90			90mm drip pipe	Manual	2-ch	76m³/h（0.04MPa pressure differential）				
	G15162L/G15262L-80/90				LoRa	1-ch/2-ch	45/76m³/h（0.04MPa pressure differential）				
	G15162W/G15262W-80/90				4G	1-ch/2-ch					
	G15262S-100/90	/	4"	90mm drip pipe	Manual	2-ch	76m³/h（0.04MPa pressure differential）	0.2MPa			
	G15162L/G15262L-100/90				LoRa	1-ch/2-ch	45/76m³/h（0.04MPa pressure differential）				
	G15162W/G15262W-100/90				4G	1-ch/2-ch					
Axial flow valve	G7401D-200	/	DN200	DN200	Electric（LoRa or 4G）	/	300m³/h（0.1MPa pressure differential）	0.6MPa	With manual emergency override		
Angle valve for field hydrants	G52142S-80/80	/	DN80 F	DN80 M	Manual	/	60m³/h (0.1MPa pressure differential)	0.6MPa			
Hydraulic valve	G2101S-50/65/80/100/150	Pressure reducing valve	DN50-DN150		Manual	/	/	1.0MPa			
	G2101J-50/65/80/100/150				Decoder						
	G2101L-50/65/80/100/150				LoRa						
	G2101W-50/65/80/100/150				4G						
	G2201S-50/65/80/100/150	Pressure sustainin g valve	DN50-DN150		Manual	/	/	1.0MPa			
	G2201J-50/65/80/100/150				Decoder						
	G2201L-50/65/80/100/150				LoRa						
	G2201W-50/65/80/100/150				4G						

Appendix 1: General Technical Parameter Table of Runjing Irrigation Valves (Cont.)

Product Name	Model No.	Function	Inlet	Outlet	Control Method	Regulation Channels	Flow Rate	Maximum Working Pressure	Note	
Hydraulic valve	G2301S-50/65/80/100/150	Pressure relief valve	DN50-DN150		Manual	/	/	1.0MPa		
	Decoder									
	LoRa									
	4G									
	G2401S-50/65/80/100/150	On-off valve	DN50-DN150		Manual	/	/	1.0MPa		
	Decoder									
	LoRa									
	4G									
	G2501S-50/65/80/100/150	Pressure reducing and sustaining valve	DN50-DN150		Manual	/	/	1.0MPa		
	Decoder									
	LoRa									
	4G									
Three-way valve	F146AS	/	DN50		/	32m³/h（0.02MPa pressure differential）	1.0MPa			
	F146A							Electric		
	F146BS		DN80					Manual	70m³/h（0.02MPa pressure differential）	
	F146B							Electric		
Disk filter	RJ-DF203	/	2" Connection	Manual or electric	/	55（Initial operating pressure differential≤0.05MPa）	1.0MPa	Filter unit×3		
	RJ-DF204					77（Initial operating pressure differential≤0.05MPa）		Filter unit×4		
	RJ-DF205					99（Initial operating pressure differential≤0.05MPa）		Filter unit×5		
	RJ-DF303	/	3" Connection			110（Initial operating pressure differential≤0.05MPa）		Filter unit×3		
	RJ-DF304					154（Initial operating pressure differential≤0.05MPa）		Filter unit×4		
	RJ-DF305					198（Initial operating pressure differential≤0.05MPa）		Filter unit×5		
	RJ-DF306					242（Initial operating pressure differential≤0.05MPa）		Filter unit×6		
	RJ-DF307					286（Initial operating pressure differential≤0.05MPa）		Filter unit×7		
	Fertilizer suction regulating valve					G82142D-15/15		/	DN15	Electric
G82142D-25/25		DN25	6m³/h（0.03MPa pressure differential）							
Water and fertilizer proportional valve	G83242D-25/25	/	DN25	Electric	/	/	0.6MPa			
	G83242D-50/50		DN50							
Straight-through valve	G62142D-25/25	/	DN25	Electric	/	9m³/h（0.1MPa pressure differential）	1.0MPa			
	G62142D-50/50		DN50			48m³/h（0.1MPa pressure differential）				
Foot valve	G3001-80	/	DN80	/	/	/	/			
	G3001-100	/	DN100	/	/	/	/			

Appendix 2: Fault Quick Reference Table

Problem	Cause	Solution
4G version water outlet pile valve: poor signal, frequent offline.	A. Signal tower malfunction/signal jammer. B. Distance from base station exceeds 2 km, blocked by crops. C. Server abnormality. D. Influence of weather such as sand and dust.	A. Verify base station signal issues and file a complaint with the carrier. B. Change the carrier's 4G SIM card or install a higher antenna. C. Request the manufacturer to resolve server issues promptly. D. Wait for automatic recovery after abnormal weather.
LoRa version water outlet pile valve: slow response.	A. The LoRa gateway adopts a one-by-one polling mode, batch operations need to be processed sequentially. B. The polling interval is too short.	A. This is normal. In areas with poor signal, LoRa offers better stability than 4G. B. Set the polling interval to 1 hour.
Device offline is displayed when adding a water outlet pile valve via the APP.	A. The device is not activated or is undergoing automatic upgrade. B. The battery is out of electricity.	A. After activation, wait 1~3 minutes for the automatic upgrade to complete before adding the device. B. Try again after charging or replacing the battery.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
Water outlet pile valve is offline and cannot be controlled remotely.	A. Signal interruption. B. Battery exhausted. C. Actuator failure.	A. Check for signal issues. B. If there is no response when pressing the button manually on site, the battery is out of electricity. C. Replace the actuator.
After controlling the water outlet pile valve to open or close via the APP, the status shows no change.	A. Valve offline/timeout. B. Valve body stuck. C. Actuator failure.	A. Eliminate signal issues. B. If online but non-operational, remove the actuator for on-site testing. If it works normally, inspect and replace the valve body. C. If there is no response when pressing the button after removing the actuator, replace the actuator.
The APP prompts device (water outlet pile valve) has not reached the set angle.	A. Actuator failure. B. Valve body stuck.	A. Remove the actuator for separate testing, replace it if abnormal. B. If the actuator works properly, check for foreign matter stuck the valve body.
The APP displays clock chip abnormality for the water outlet pile valve.	A. Actuator failure due to clock chip damaged.	A. Resync the time in settings. If synchronization fails, replace the actuator.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
APP hardware upgrade failed.	A. Unstable signal. B. Insufficient battery power. C. Hardware version reverts to 2509.	A. Ensure a good signal. B. Retry the upgrade after the battery is fully charged. C. Try twice more. If the version remains 2509, perform an offline tool upgrade or replace the actuator.
Water outlet pile valve cannot be fully opened or closed (neither manual operation nor wrench works).	A. foreign matters (stones, cotton stalks, PVC scraps) stuck in the valve core. B. Foreign matter entered the pipeline during installation.	A. Remove the valve body and check for foreign matters in the valve chamber and pipeline. B. Clean out debris in the pipeline before installation.
Water is flowing from the outlet hose of the water outlet valve, but the pressure reading is 0 or inaccurate.	A. Pressure hose connected incorrectly/reversed/damaged/unconnected. B. Pressure port blocked or pressure sensor damaged. C. Water backflow.	A. Connect the pressure hose in the correct order and replace it if damaged. B. Clean the pressure port or replace the pressure plate. C. In case of water backflow in the hose, cut off the middle of the hose.
The APP shows the water outlet valve is closed, but water flow noise can still be heard.	A. Residual water flowing in the pipeline. B. Ceramic disk damaged by foreign matters.	A. Check if the pointer is in the closed position. B. If it is properly closed and water flow noise persists for a long time, inspect the ceramic disk for damage.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
The APP frequently pushes low-pressure alarms for the water outlet pile valve.	A. The alarm is triggered when the valve is opened while the pipeline has no water supply.	A. Manually disable the pressure alarm function.
A. The phone alarm for the water outlet valve is set in the APP but no call is received.	A. Incorrect contact number. B. Voice notification not checked. C. Number blocked by the mobile phone.	A. Check the contact number in the general settings. B. Make sure voice notification is checked. C. Check the phone's blocking settings.
A message of not the same type appears when replacing the water outlet valve.	A. The single water outlet version of the three-way three-equal valve is incompatible with the single/dual outlet version.	A. The model numbers of the old and new devices must be identical during replacement.
Significant deviation occurs when marking the water outlet pile valve's location on the APP map.	A. This may be due to compatibility issues between some mobile phones and the location/mapping service.	A. Drag the positioning point to the corresponding position by reference for marking and saving.
Risk of the water outlet pile valve cracking due to freezing in winter.	A. Water accumulated inside the valve freezes and expands.	A. Drain all accumulated water from the valve body before winter.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
Risk of pipe burst due to pressure build-up during automatic rotational irrigation with the water outlet valve.	A. The next set of valves fails to open, causing pressure build-up after the previous set closes.	A. Install a pressure relief valve on the main pipeline, or use a linked water pump controller.
Hydraulic valve fails to close completely and keeps leaking water.	A. Foreign matter is stuck between the ceramic disk of the main valve.	A. Disassemble the main valve core, remove foreign matters, and reinstall it. Special tools are required.
The pilot valve drain of the hydraulic valve keeps running water continuously.	A. Foreign matter is stuck at the pilot valve core.	A. Disassemble the pilot valve core, remove foreign matter, then reinstall it.
Hydraulic valve fails to open and no water flows out.	A. Inability to relieve pressure in the upper piston chamber. B. Air trapped in the command pipe. C. Insufficient inlet water pressure.	A. Disassemble the valve body and clean the upper chamber. B. Vent air trapped in the pipeline. C. Check and increase the inlet water pressure.
Hydraulic valve experiences fluctuating pressure and failed pressure regulation.	A. The pilot valve screen or ceramic valve core is clogged by impurities	A. Remove and clean the pilot valve screen and ceramic valve core, then recalibrate the pressure regulating pilot valve.
Hydraulic valve experiences jamming during opening or closing and operates unevenly	A. Impurities causing jamming in the valve core or dirt accumulation in the piston chamber.	A. Clean the main valve core and piston chamber to remove impurities.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
Hydraulic valve does not operate without signal and remote control fails.	A. Abnormal power supply. B. LoRa/4G signal failure. C. Directional valve failure.	A. Check the power supply cable. B. Inspect the communication signal. C. Examine the electric directional valve.
Disk filter has reduced water output and insufficient flow rate.	A. Clogged disks (common), increased pressure differential. B. Damaged rubber check valve for backwash. C. Improper backwash pressure or parameter settings.	A. Initiate automatic backwash, manually disassemble and clean if ineffective. B. Replace the check valve. C. Ensure backwash pressure ≥ 0.15 MPa, and adjust pressure differential/timer settings.
No water flows out from the drain port of the disk filter, or there is little water during backwash.	A. The backwash three-way valve is not switched properly. B. Insufficient water supply pressure. C. The controller does not trigger the backwash signal.	A. Check if the three-way valve switches properly. B. Ensure backwash pressure ≥ 0.15 MPa. C. Inspect controller settings and wiring.
The drain port of the disk filter continuously discharges water during filtration.	A. Residual water in the drain pipe (normal, stops within 1~2 minutes). B. Malfunction of the three-way valve actuator. C. Ceramic valve core stuck by large particles or damaged ceramic disk.	A. Observe for 1~2 minutes, it is normal if water stops. B. Replace the three-way valve actuator. C. Replace the three-way valve body.

Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
The axial flow valve fails to open or close electrically when power is off or on.	A. Power interruption or battery exhausted.	A. Insert an allen wrench into the emergency manual operation port of the actuator, rotate the drive mechanism to open and close manually.
Foot valve leaking, poor sealing.	A. Foreign matter stuck on the ceramic sealing surface.	A. Remove foreign matter on the sealing surface with tools to restore normal function.
Excessive head loss after foot valve installation.	A. Incorrect installation angle or horizontal installation.	A. Vertical installation is recommended with an inclination angle no greater than 30°. Horizontal installation is prohibited.
No water flow or insufficient water flow after the residential intelligent irrigation valve is opened.	A. Clogged inlet filter screen.	A. Remove the inlet filter screen, clean it, and reinstall.
Decreased adjustment accuracy and inaccurate flow rate of the fertilizer suction regulating valve/water and fertilizer proportional valve	A. Ceramic valve core worn or contaminated with impurities. B. Stepper motor malfunction. C. EC/pH sensor deviation.	A. Clean the valve core to remove impurities. B. Check motor operation. C. Calibrate the sensor.

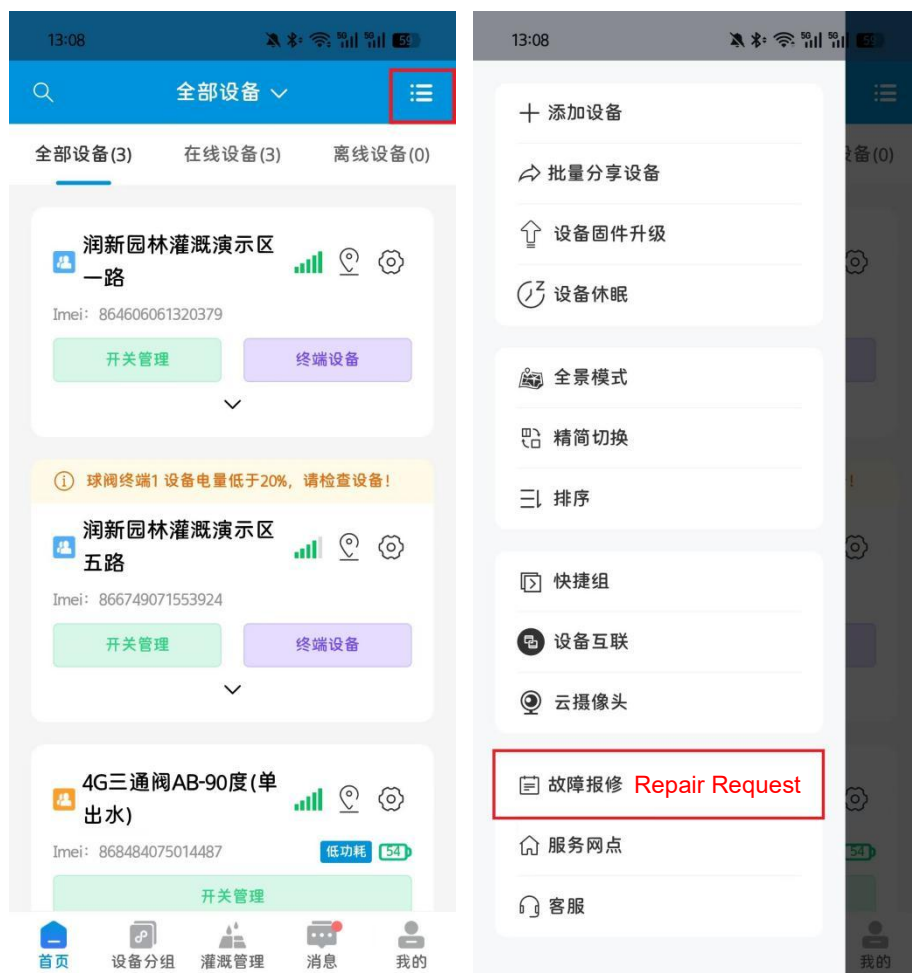
Fault Quick Reference Table (Cont.)

Problem	Cause	Solution
The fertilizer suction regulating valve / water and fertilizer proportional valve experiences stuck during opening or closing and increased torque.	A. Fertilizer crystals or impurities stuck on the ceramic sealing surface.	A. Disassemble and clean the valve core. It is recommended to flush the pipeline with clean water after using fertilizer solution.
Straight-through valve unresponsive to remote control.	A. Abnormal power supply. B. 4G/LoRa communication failure.	A. Check the DC12V power supply. B. Troubleshoot the communication module and signal.

Appendix 3: After-Sales Contact Information

1. APP service request

Click the function button in the upper right corner of the APP main interface, select "Repair Request", and follow the prompts to submit a repair request.



2. Call the after-sales service hotline

Dial 0086-577-88630038 and report the failure by following the voice prompts.

3. Contact customer service via e-mail

If customer has any questions, please feel free to write e-mail to sales@run-xin.com.



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