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Supumps Integrated Smart Interception & Lifting Well **CPC-S** Intelligent Diversion Well



Rivers & Lakes

“Black and Odorous Pollution”



Introduction

To address the problem of black and odorous river water bodies caused by direct discharge of sewage from combined sewer systems, cross-connected sewage in separate sewer systems, and pollution from first flush overflows, Supumps has developed the Integrated Smart Interception & Lifting Well CPC-S and Intelligent Diversion Well.

Through the online monitoring system, dry-weather sewage and first flush rainwater are intercepted into the sewage network, while subsequent rainwater is diverted to the storm-water network or watercourse. This realizes the core functions of:

"Interception during dry weather, interception of first flush rainwater, and direct discharge during rainy seasons"

The Integrated Smart Interception & Lifting Well CPC-S and Intelligent Diversion Well efficiently perform sewage interception and collection, playing a prominent role in solving urban black and odorous water body problems.

Product functions

Dry-Weather Interception

Gravity Flow Mode: All sewage outlet gates are fully open, and stormwater outlet gates are closed. Urban sewage flows directly into the sewer network by gravity, realizing dry-weather interception.
Pressure Lifting Mode: In areas with high water levels in the sewer network, pumps operate in forced discharge mode. The pumps start and stop automatically based on liquid level readings, conveying sewage to the wastewater treatment plant for treatment.



First Flush Interception

The sewage outlet gate is open, and the stormwater outlet gate is closed. The overflow pump starts and stops automatically based on liquid level readings, conveying first flush rainwater to the wastewater treatment plant for treatment.
As rainfall continues, when the interception well detects a rising water level and reduced water pollution, the sewage outlet gradually closes to limit interception, while the stormwater outlet gate opens to continuously discharge mid-to-late stage rainwater.



Wet-Weather Direct Discharge

All sewage outlet gates are fully closed, and all stormwater outlet gates are fully open. The submersible sewage pump stops operation, and rainwater is discharged directly to the river for flood release, preventing upstream waterlogging.



Core advantages



Online Monitoring,
Unattended Operation



Dual Liquid Level System,
Precision Control



High-Precision Active Sewage
Interception, Pollution Reduction

Application area

Sponge City Construction, Black and Odorous Water Body Remediation, Sewage Interception and Pipe Connection Projects, Rainwater and Sewage Diversion Projects, Rural Domestic Sewage Treatment, Water Environment Ecological Restoration Projects.



Sponge City Construction



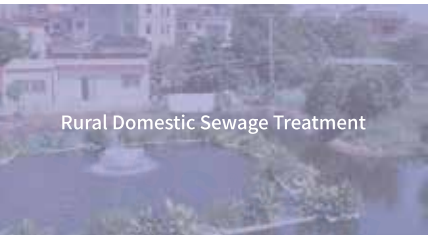
Sewage Interception and Pipe Connection Projects



Black and Odorous Water Body Remediation



Rainwater and Sewage Diversion Projects



Rural Domestic Sewage Treatment



Water Environment Ecological Restoration Projects



对接口形式：
圆形管道对接接口，通过法兰形式对接。

Supumps Integrated Smart
Interception & Lifting Well

Supumps Integrated Interception
& Lifting Well | Patent No.:
ZL201920928466.6



Flexible Intelligent Diversion Well



Intelligent Diversion Well / Tilting Gate Type

Connection Form: Stormwater box culvert and culvert outlets,
both of which are square structures with large connection areas.



Intelligent Diversion Well / Bottom-Opening Weir Type

Supumps Smart Diversion Well

Supumps Intelligent Prefabricated
Diversion Well | Patent No.:
ZL2022221426488.0

Main components

FRP Cylinder

The cylinder adopts a computer-controlled filament winding one-time forming process. Barcol hardness (HBa) of the cylinder: ≥ 50
 Axial compressive strength: ≥ 120 MPa
 Hoop tensile strength: ≥ 150 MPa
 Axial tensile strength: > 30 MPa

Online Water Quality Monitoring (Optional)

Online water quality monitoring supports continuous multi-parameter detection of water bodies based on different requirements, with selectable parameters including water temperature, pH, dissolved oxygen (DO), conductivity, turbidity, etc. Monitoring data can be uploaded to the Supumps Smart Cloud Remote Monitoring Platform, facilitating management by relevant departments.

CFD Anti-Sedimentation Base

The intelligently designed base, optimized via CFD (Computational Fluid Dynamics), features a recessed structure. It resists groundwater pressure without deformation. Only a small amount of sewage remains in the sump pit. When the pump restarts, the high flow velocity near the pit achieves a self-cleaning effect, reducing the need for manual sediment removal.

Supumps Integrated Smart Interception & Lifting Well CPC-S

Submersible Sewage Pump

These are high-end imported brand submersible sewage pumps, featuring stable performance, high efficiency, and reliable operation. Within the design load range, they operate without vibration or cavitation.

Rain Gauge

Used to monitor the start and end of rainfall, as well as rainfall intensity.

Electro-Hydraulic Knife Gate Valve

The electro-hydraulic knife gate valve is driven by a motor to move the gate plate up and down for opening and closing. The valve features a knife-edge shape, with the gate plate moving perpendicular to the fluid flow direction. It offers a simple structure, reliable sealing performance, long service life, and excellent corrosion resistance thanks to its stainless steel construction.

Electro-Hydraulic Flat Gate Valve

Composed of a flat gate valve, electro-hydraulic pusher, and gate plate, the valve is driven by the electro-hydraulic pusher to move up and down for opening and closing.
 Upward-opening type: The valve opens when moving upward.
 Downward-opening type: The valve opens when moving downward.
 Combined with a displacement sensor, it precisely controls the valve opening degree. The system is equipped with an accumulator, enabling one automatic opening or closing operation during power outages. The valve provides bidirectional sealing for water cut-off, with a water head sealing capacity of 5m. Its stainless steel construction ensures good corrosion resistance.

Trash Interception Device (Basket Screen)

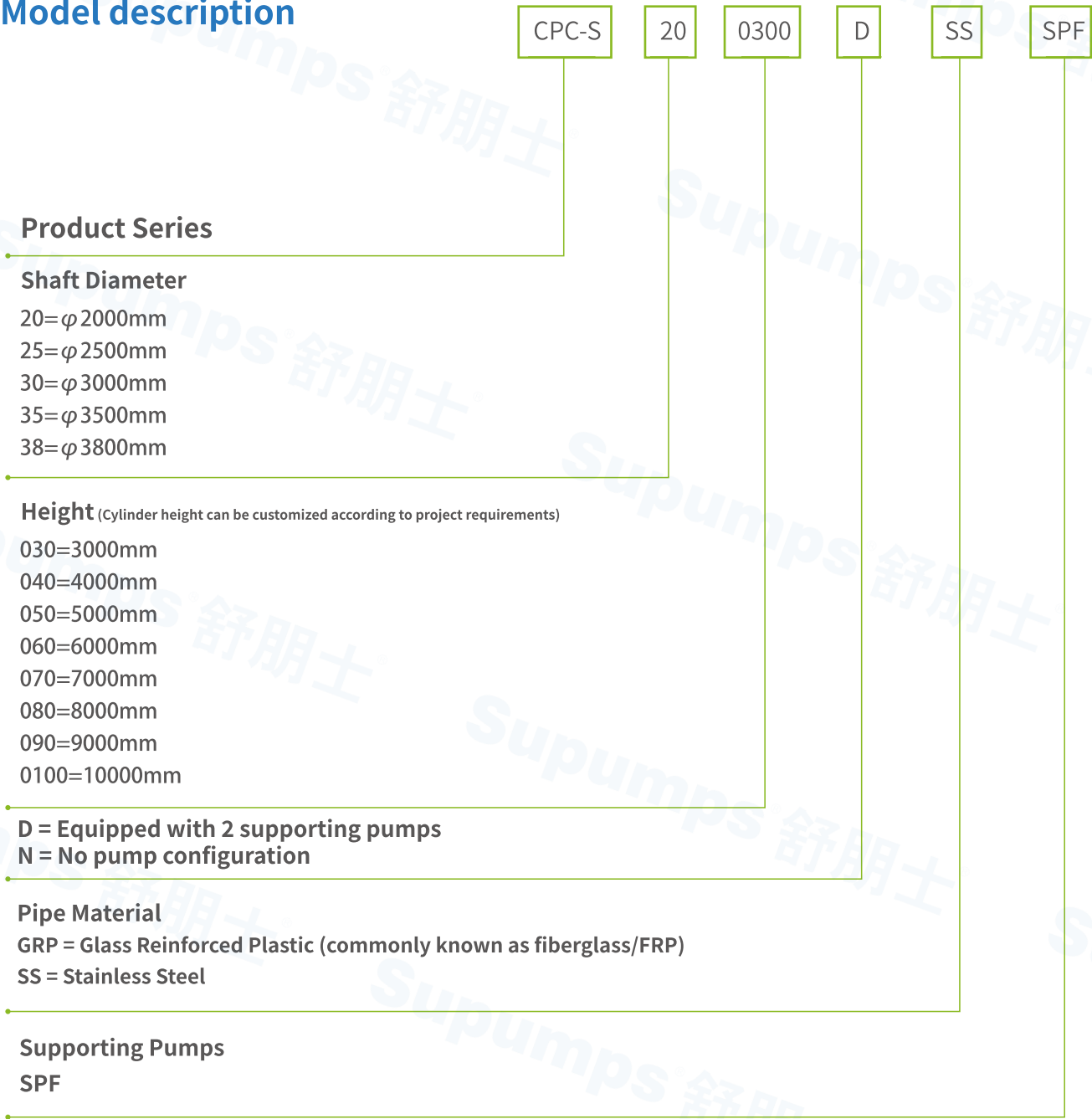
The basket screen features a perforated design, manufactured from stainless steel 304. The openings are strictly proportioned to the pump's flow passage diameter. This design prevents slender objects from passing through the screen and clogging the pump, effectively blocking large particles from entering the pump chamber of the interception and lifting well. It also offers excellent corrosion and rust resistance.

Dual Liquid Level System

Adopts float switches and liquid level sensors to realize automatic control of the liquid level in the interception well, with the two components serving as backups for each other.



Model description



Required Parameters for Equipment Selection

- Inlet pipe diameter and elevation
 - Stormwater pipe diameter and elevation
 - Sewage pressure outlet elevation and diameter / Sewage gravity outlet elevation and diameter
 - Normal water level and highest flood level elevation of the external river
- Ground elevation
 - Inlet/outlet orientation
 - Sewage flow rate
 - Pump head
 - Interception ratio

Key Components

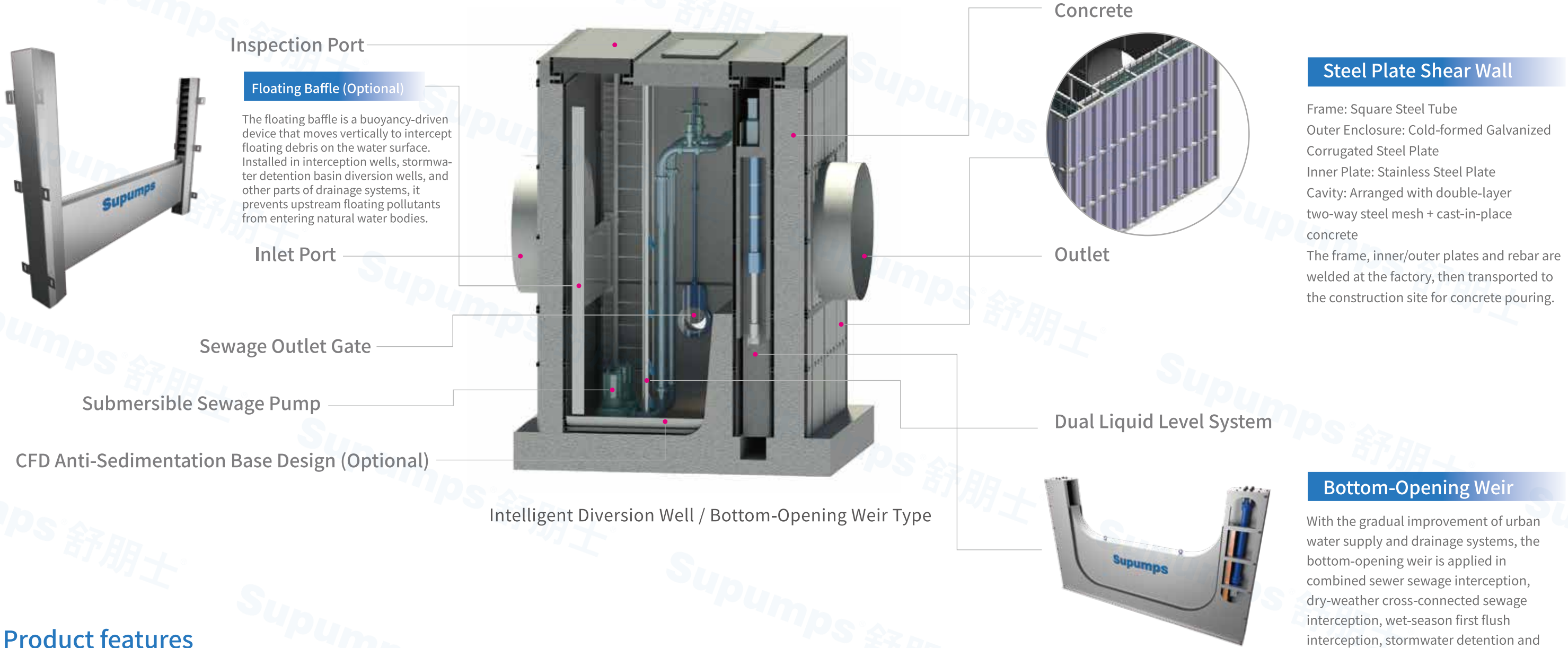
No.	Component Name	Description	Remarks
1	Shaft	GRP	
2	Safety Grille	GRP	
3	Ventilation Pipe	Stainless Steel 304	
4	Maintenance Platform	GRP	
5	Lifting Equipment Interface	Carbon Steel	
6	CFD Anti-Sedimentation Base	GRP	Pressure Flow Scheme Configuration
7	Submersible Sewage Pump	Cast Iron	Pressure Flow Scheme Configuration
8	Basket Screen	Stainless Steel 304, Perforated Design	Pressure Flow Scheme Configuration
9	Sewage Pressure Pipeline System	Stainless Steel 304	Pressure Flow Scheme Configuration
10	Valve System	Ductile Iron	Pressure Flow Scheme Configuration
11	Inlet & Stormwater Outlet	GRP	
12	Inlet/Outlet Flexible Joint	Galvanized rubber body flange / Rubber body stainless steel 304 flange	
13	Electro-Hydraulic Downward-Opening Flat Gate Valve	Frame: Stainless Steel 304, Gate plate: Stainless Steel 304	
14	Electro-Hydraulic Knife Gate Valve	Frame: Ductile Iron QT450, Gate plate: Stainless Steel 304	
15	Submersible Level Sensor		
16	Intelligent Control Cabinet	Stainless Steel 304, Outdoor type, Protection class IP54 (IP55 optional)	Equipped with Supumps Smart Cloud remote monitoring, control and O&M platform
17	Tipping Bucket Rain Gauge	Stainless Steel	
18	Ultrasonic Level Gauge		Optional
19	Video Monitoring System		Optional
20	Hazardous Gas Detector		Optional
21	Water Quality Monitor		Optional
22	Forced Ventilation Integrated System		Optional
23	UPS Power Supply		

*Some components can be customized according to project requirements

Installation Steps



Main components



Product features

- Multi-Chamber Steel Shell

The Intelligent Prefabricated Diversion Well adopts a multi-chamber steel shell structure, formed by welding square steel tubes, corrugated outer plates, and stainless steel inner plates. The internal cavities are filled with reinforced concrete, creating a steel-concrete composite structure that bears loads integrally. This design significantly enhances the structural performance and overall strength of the facility, enabling it to withstand Class I highway loads. The inner plates are constructed from stainless steel, providing excellent corrosion resistance even in acidic media. In addition, compared with precast FRP (Fiber-Reinforced Plastic) cylinders, this structure is more environmentally friendly.

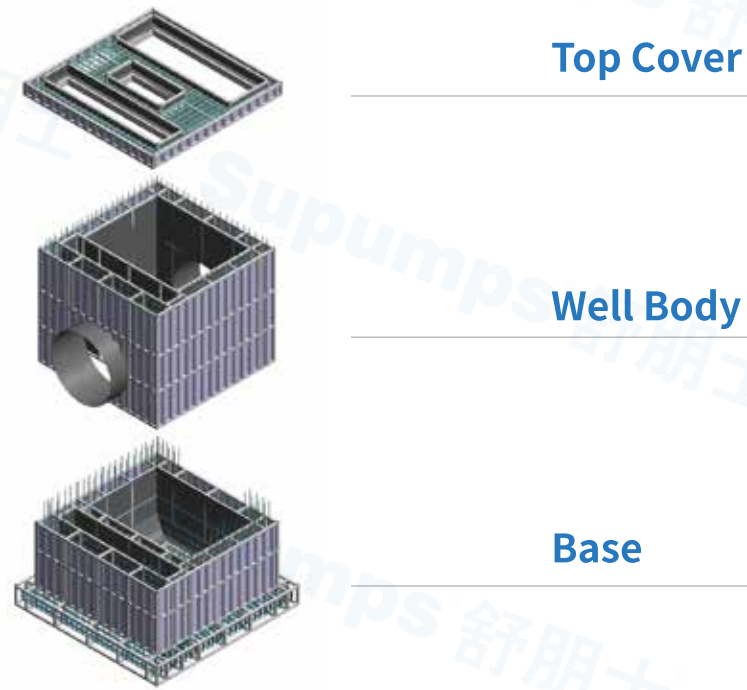
• Steel Plate Shear Wall

The Intelligent Diversion Well is specifically developed for scenarios where outfall structures are box culverts or underground conduits, serving as a supplement to the application scenarios of the Integrated Smart Interception & Lifting Well. For large-sized box culvert and underground conduit applications, it adopts a three-stage design, consisting of three parts: top cover, well body, and base.

During factory production, the frame, inner/outer plates, and rebar are welded, then transported to the construction site for overall assembly before concrete pouring.

Designed with prefabricated assembly technology, most construction work is completed in the factory, unaffected by weather conditions, which significantly improves construction efficiency.

Segmented prefabrication reduces the lifting weight of individual components, facilitating on-site construction. Meanwhile, the foundation base slab is integrated into the base section, eliminating the need for advance foundation construction.



产品优势

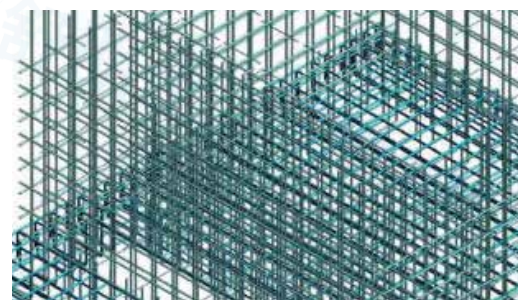
Product advantages

- 01.** Suitable for application scenarios of box culverts and underground conduits;



02.

The integral shear walls are prefabricated in the factory, then assembled and integrally cast on-site, featuring good structural performance and a short construction period; Reinforcement adopts double-layer two-way steel mesh sheets. Each section is prefabricated with rebars inserted into the upper section for connection, followed by integral pouring, ensuring higher safety.



03.

Valves can be pre-assembled and commissioned with the prefabricated steel structure at the factory, eliminating the need for secondary on-site assembly and adjustment, resulting in higher efficiency.



05.

The gate valve is designed below the inspection port, 200mm above the well floor, eliminating the need for personnel to enter the well for operation.



07.

Floating baffles or basket screens are available as optional accessories according to customer requirements.

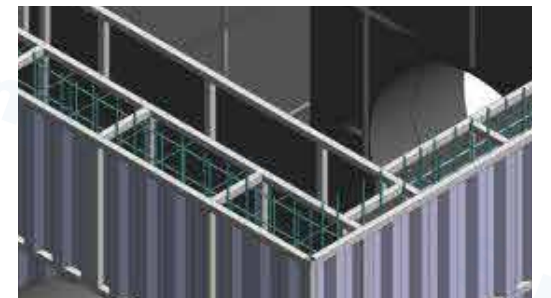
04.

The bottom of the steel structure can be optimized with CFD fluid modeling to reduce sedimentation. When used in conjunction with mechanical flushing valves, it completely solves the sedimentation problem at the bottom of the diversion well.



06.

The main structure is structurally sound and can be designed for installation under main roads.



08.

Valves such as bottom-opening weirs and tilting gates allow real-time control of opening degree. With a sensor-mechanical separation design, sensor replacement does not affect equipment operation.

09.

All inspection ports can be optionally equipped with hydraulic automatic opening/closing systems.

Main components



Horizontal Flap Gate

With the progressive improvement of urban water supply and drainage infrastructure, the application scope of horizontal flap gates has expanded considerably. They are widely deployed in scenarios including: rainwater-sewage diversion, overflow and interception facilities, stormwater regulation tanks, storage pipelines, water conservancy and hydropower stations, and drainage ditches.

Supumps Horizontal Flap Gate
Patent No.: ZL202221317216.7

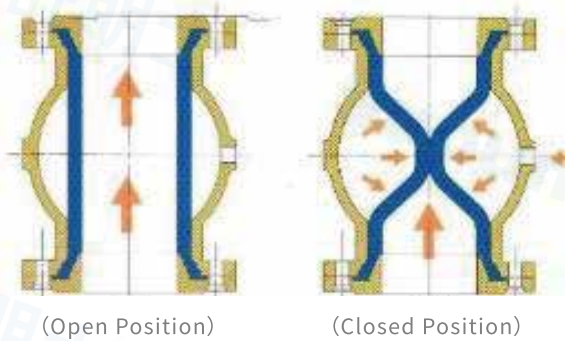
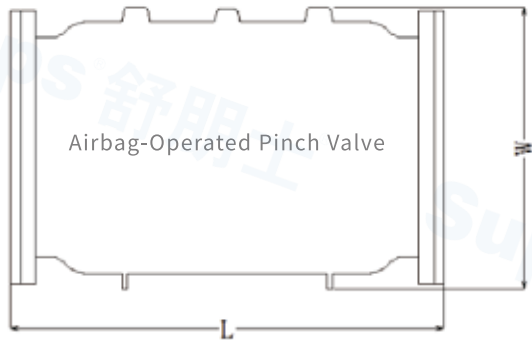
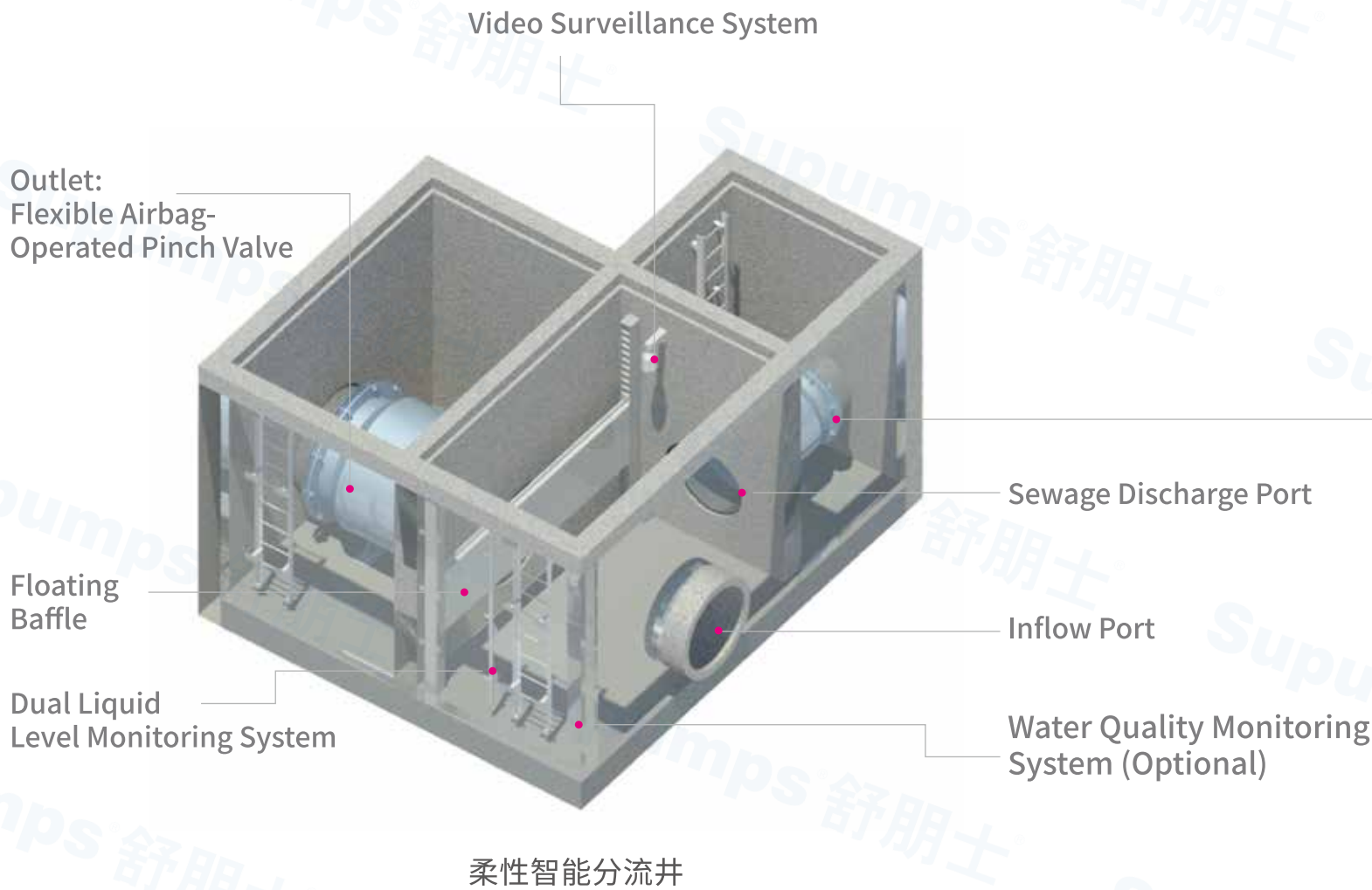
Product Features

- maintenance, and long service life.
- Capable of stopping at any position within the rotation range to control drainage flow and adjust water levels.
- Supports emergency operation during power outages. Three-sided (four-sided) water stop design with
- excellent sealing performance.
- Equipped with an automatic control system, eliminating the need for on-site personnel.
- Enables remote control and real-time monitoring of gate status.
- Sensors are separated from the mechanical structure, allowing maintenance and replacement without disrupting equipment operation.
- Requires minimal vertical space for civil works.
- Delivered as a complete unit for fast, hassle-free on-site installation.

Working Principle

Based on real-time water level data fed back from liquid level monitoring and control signals, the control system actuates the opening and closing of the weir plate via hydraulic drive. By adjusting the water retention height of the weir plate according to feedback from liquid level and gate opening signals, the system delivers three core functions: precise control of drainage flow rate, regulation of upstream water levels, and prevention of river water backflow.

Main components



Sewage Outlet Flexible Airbag Pinch Valve

An air-direct-pressure operated pinch valve, commonly known as an "airbag valve". Its working principle is described as follows:
An air chamber is formed between the liner sleeve and the valve body. When the air inside the chamber is at atmospheric pressure, the liner sleeve remains in its natural state, allowing the valve to conduct flow.
When compressed air is injected into the chamber, the liner sleeve is squeezed and deformed, closing the valve.
When the compressed air is released, the liner sleeve returns to its natural state via its own elasticity or the pipeline's internal pressure, reopening the valve.

DN300-DN3000 Series

DN(mm)	L(mm)	W(mm)
100	281	220
150	420	325
200	560	400
300	650	430
350	700	500
400	800	560
450	900	620
500	1000	690
600	1200	820
800	1600	1040
1000	2000	1350
1200	2400	1550
1500	3000	2060
1800	3600	2450
2000	4000	2650
2500	5000	3300
3000	6000	4000

Note: For other sizes and custom requirements, please consult Supumps engineers.

Product features

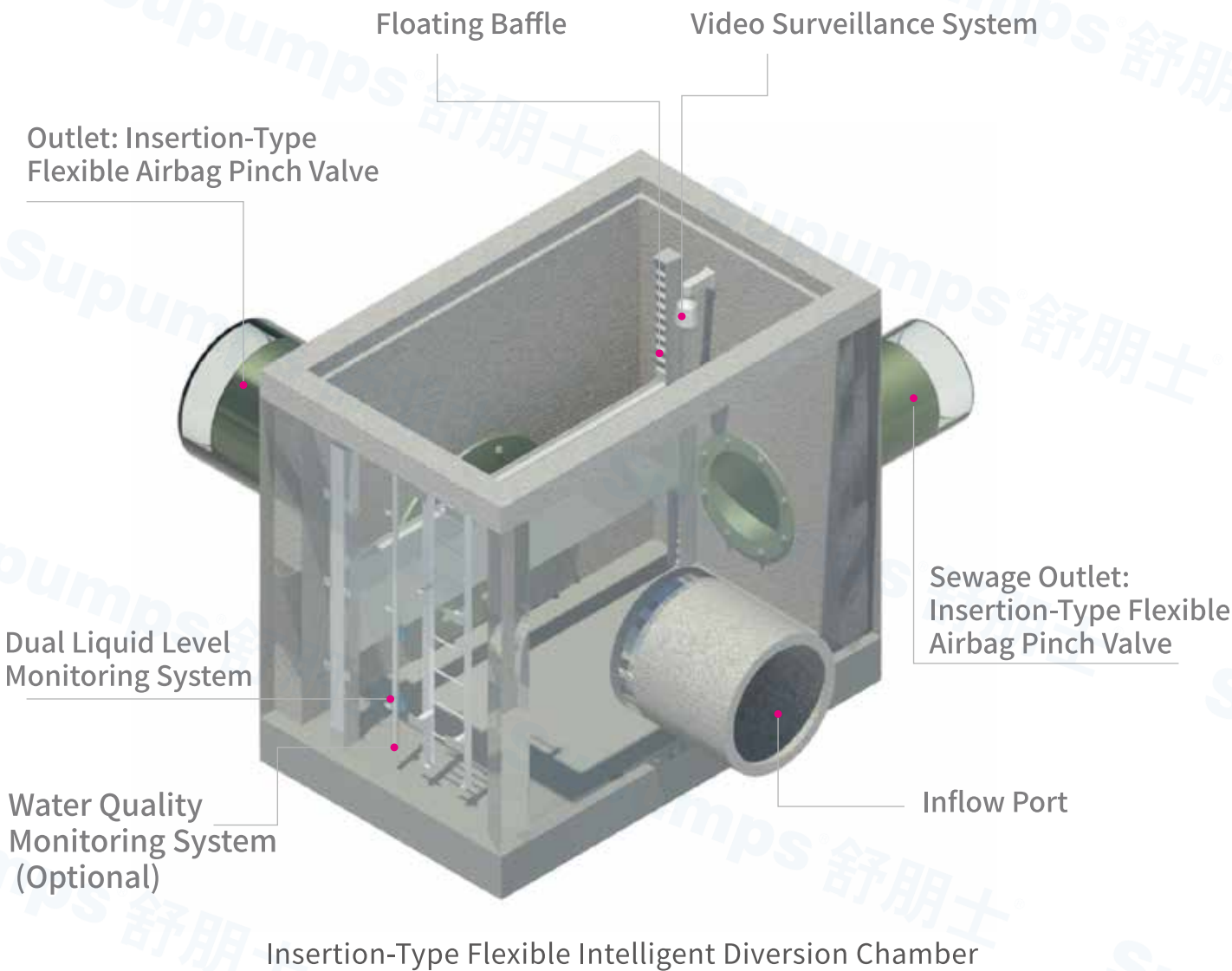
Compared with Conventional Diversion Chambers

- Low risk of valve clogging or jamming;
- Powered by mains (grid) electricity;
- Simple structure with low capital cost;
- Low maintenance cost and minimal consumable wear.

Important Notes

- Air nozzle threads and rigid component materials can be customized to meet customer requirements; A range of liner sleeve materials are available for selection:
- Natural Rubber (NR), Nitrile Butadiene Rubber (NBR), Ethylene Propylene Diene Monomer (EPDM), Silicone Rubber (VMQ), Neoprene Rubber (CR), Fluorocarbon Rubber (FKM), composite materials, etc. Food-grade options are also available.

Main components



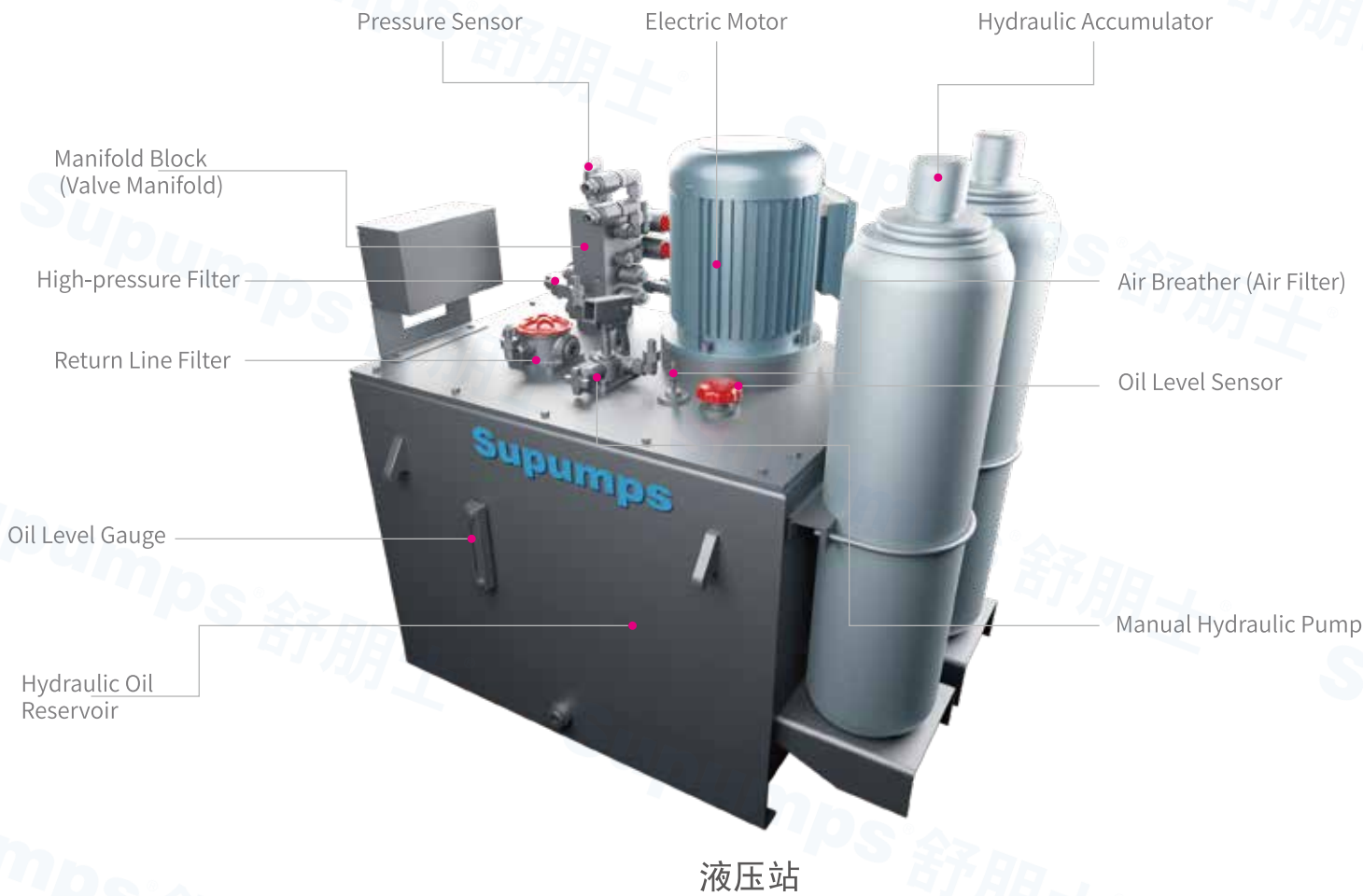
Product advantages

- Reduced footprint: The airbag pinch valve occupies only pipeline space, minimizing the overall space requirement.
- Lower concrete civil construction costs.

Key Components

No.	Item Name	Description	Remarks
01	Safety Grating	Hot-dip Galvanized Steel	/
02	Access Ladder	Stainless Steel 304	/
03	Insertion-Type Flexible Interception Device	High-strength Composite Rubber	/
04	Waterproof Sleeve	Q235B	Q235-B
05	Water Level Scale	Stainless Steel 304	Stainless Steel 304
06	Pneumatic Pinch Valve System Assembly	Rated Pressure: 7 bar	Rated Pressure: 7 bar
06.1	Air Compressor	/	/
06.2	Stainless Steel Air Receiver Tank	/	/
06.3	Air Source Treatment Triplet (FRL Unit)	/	/
06.4	Base and Short Plate Assembly	/	/
06.5	Solenoid Valve	/	/
06.6	Accessories (Valve Body)	/	/
06.7	DPS Series Digital Pressure Switch	16	/
06.8	Air Tubing	Φ16, PU Material	/
7	Intelligent Control Cabinet	/	/
07.1	Control Cabinet Housing	Stainless Steel 304	/
07.2	Air Pump Cabinet Housing	Stainless Steel 304	/
07.3	MEB Main Equipotential Bonding Box	Stainless Steel 304	/
08	Radar Level Transmitter	/	Optional
09	Tipping Bucket Rainfall Sensor	/	Photoelectric Rain Gauge available as an option
10	Storage Battery	/	/
11	Solar Panel	/	/
12	Inverter	/	/
13	Buried Enclosure	Stainless Steel 304	/
14	HD Intelligent Dome Camera	/	Optional
15	Video Surveillance Power Supply	/	Optional
16	Water Quality Monitoring	/	Optional

Main components



Product features

- Professional design of the hydraulic power unit (HPU) ensures stable product performance;
- Built with high-quality components for long service life, extended warranty coverage, and low maintenance costs;
- The hydraulic oil reservoir is constructed from stainless steel for superior corrosion resistance;
- The integrated manifold block features a uniquely engineered structure, offering a compact footprint, reliable sealing, and zero oil leakage;
- Independently manufactured, with commonly used components kept in stock for controllable lead times.

Product advantages

- Equipped with a hydraulic accumulator: In the event of a power outage, it prevents river water backflow and supports flood control, enabling remote control to ensure one complete emergency opening/closing cycle of the gate;
- Equipped with a manual operating device: Allows manual opening and closing of the gate under conditions of power outage or insufficient accumulator pressure.

Key Components of Hydraulic Power Unit (HPU)

No.	Component Name	Description	Remarks
01	Hydraulic Oil Reservoir	Cast Aluminum or Stainless Steel	/
02	Hydraulic Oil	LHM-46	/
03	Air Filter	Component	/
04	Manual Hydraulic Pump	Component	/
05	Hydraulic Pump	Component	/
06	Electric Motor	Component	/
07	Return Line Filter	Component	/
08	Oil Level Gauge	Component	/
09	Oil Level Sensor	Component	/
10	Pressure Sensor	Component	/
11	Integrated Manifold Block	Component	/
12	Cylinder Displacement Sensor	Component	/
13	Hydraulic Cylinder	Cylinder barrel and piston rod made of carbon steel; piston rod surface chrome-plated	Quantity configured according to working conditions; optional ceramic coating on piston rod
14	Flow Divider/Combiner Valve	Component	Optional
15	Hydraulic Hose	/	Length configured on-site
16	Hydraulic Accumulator	Supplied as a complete assembly	Optional

Control description

For pump configurations with one duty, one standby:
Pumps operate in an alternating start mode: Pump 1 is stopped after its first run, then Pump 2 is activated for the next cycle. This reduces start cycles per pump and avoids excessive idling of the standby unit, extending overall pump service life. The system also supports simultaneous start of both pumps when required at a preset liquid level.

Automatic Operation Mode	Control Logic	Actions Performed		
		Rainwater Outlet Gate	Pump 1	Pump 2
Dry Weather Sewage Interception	Liquid level in chamber < Pump Start Level	Closed	Stopped	Stopped
	Pump Start Level < Liquid level in chamber < Alarm Level (adjustable)	Closed	Started	Stopped
First Flush Diversion	Pump Start Level < Liquid level in chamber < Alarm Level (adjustable)	Partially Open	Started	Started
Stormwater Direct Discharge	Liquid level in chamber > Alarm Level (adjustable) (liquid level signal)	Fully Open	Stopped	Stopped
Backflow Prevention	River water level > Outlet elevation	Closed	Started	Started

Automatic Operation Mode	Control Logic	Actions Performed	
		Rainwater Outlet Gate	Sewage Outlet Gate
Dry Weather Sewage Interception	Liquid level in chamber < Pump Start Level	Closed	Open
First Flush Diversion	Pump Start Level < Liquid level in chamber < Alarm Level (adjustable)	Closed	Open
Stormwater Direct Discharge	Liquid level in chamber > Alarm Level (adjustable) (liquid level signal)	Fully Open	Closed
Backflow Prevention	River water level > Outlet elevation	Closed	Closed

Intelligent Operation Management (Smart O&M)

Automatic Operation

- Enclosure constructed from Stainless Steel 304, with IP55 protection rating and double-layer door design;
- Pumps feature automatic alternation and fault-switching functions to ensure balanced runtime across all units;
- Outlet gates operate automatically based on pre-set conditions;
- Supports inflow/outflow flow rate estimation and energy consumption estimation;
- Built-in automatic pump inspection function ensures reliable performance even after extended shutdown periods;
- Integrated pump high-temperature and leakage monitoring capabilities;
- Equipped with a high-resolution industrial touch screen.

Remote Control

- 360° infrared camera;
- Mobile APP support for real-time monitoring, on-demand access to equipment operation data, and live tracking of equipment status;
- Supumps Smart Cloud Remote Monitoring & O&M Platform:
 - Continuity: Supports resumable data transfer;
 - Timeliness: Low-latency data transmission;
 - Security: Multi-level access control system;
 - Open Integration: Compatible with any third-party platform;
 - Accuracy: Synchronized with map services including Baidu Maps and Amap;
 - Big Data Capabilities: Mass data storage and analytics functions.

Schematic Diagram of the Remote Monitoring Platform



Cases presentation



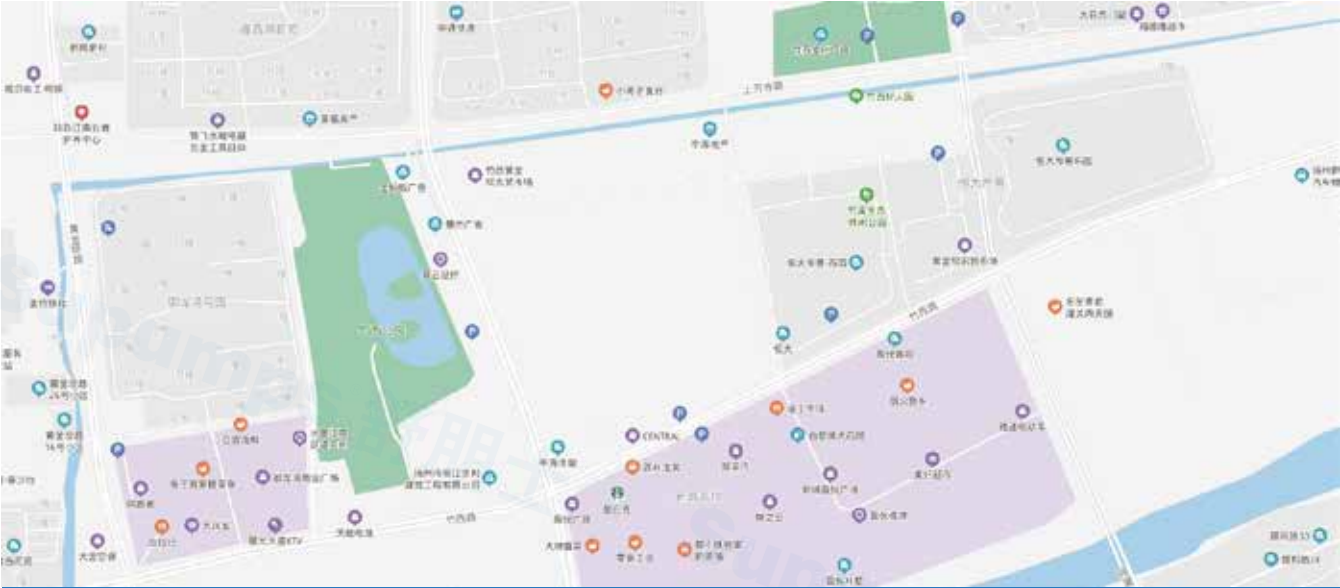
01. Remediation Project for Cross-Connected Sewage Overflow in Separate Sewerage Systems

Project Name:Source Control & Sewage Interception Project, Wangzhuang Subdistrict, Xinwu District, Wuxi
Project Product:Supumps Integrated Smart Interception & Lifting Chamber
Project Background:The drainage system of the East Zone, Phase III of Chunghao Garden adopts a rainwater-sewage separate system. During dry weather, cross-connected sewage enters the stormwater sewer network via the southern stormwater outfall, eventually discharging into the Bodu Port River. This pollutes the river water body, leading to black and odorous conditions.
Solution:To address the discharge of dry-weather sewage into the river via the community’s stormwater pipes, end-of-pipe control was implemented. A set of Integrated Smart Interception & Lifting Chamber (2.0 m in diameter, 4.18 m in height) was installed. Through pressure lifting, the system conveys dry-weather cross-connected sewage and initial stormwater to the sanitary sewer network, realizing the core functions: dry weather interception, first flush interception, and stormwater direct discharge during rainy seasons.



02. Sewage Remediation Project for Combined Sewerage Network

Project Name:Qikongqiao Diversion Chamber Project, Xuecheng District, Zaozhuang
Project Product:Supumps Intelligent Diversion Chamber (with Horizontal Flap Gate)
Project Background:The site is located alongside the Zaozhuang-Linyi Railway, with limited available construction space. The combined sewerage system discharges dry-weather sewage directly into the river, resulting in severe odor pollution.
Project Objectives:Prevent dry-weather sewage from entering the river;
Prevent river water backflow.



This project remediates 11 existing stormwater outfalls on the Guanhe River, Zhuxi River, and Cooling River. For 6 outfalls with dry-weather sewage discharge, Integrated Smart Interception & Lifting Chambers will be installed; the remaining 5 already intercepted outfalls will undergo intelligent retrofitting.



03. Stormwater Outfall Interception Remediation & Intelligent Retrofit of Traditional Interception Facilities

Project Name:Procurement and Associated Services for End-of-Pipe Interception Integrated Equipment for the Guanhe River, Cooling River, and Zhuxi River in Yangzhou
Project Product:Supumps Integrated Smart Interception & Lifting Chamber
Project Background:The manual-electric integrated cast iron bronze-faced sluice gates installed during previous outfall retrofits suffered from severe leakage, failing to meet sewage interception requirements. Additionally, these systems lacked remote control capabilities.
Solution:The existing manual-electric integrated cast iron bronze-faced circular sluice gates in interception chambers of already intercepted outfalls were removed and replaced with upward-opening electro-hydraulic flat sluice gates. Newly constructed outfall interception chambers were equipped with downward-opening electro-hydraulic flat sluice gates.
A sewage outlet was added laterally to the interception chamber, with a knife gate valve installed to connect to the dry-weather sewage lifting pump station. The pump station is fitted with a grinder screen.
Rain gauges, hydrostatic level transmitters, and ultrasonic level sensors are installed as signal sources for the intelligent interception chamber, enabling automated control based on rainfall and liquid level data.





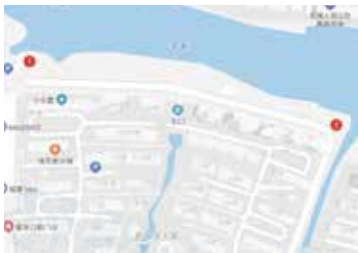
04. Huluwan River Ecological Restoration Project



05. Rainwater-Sewage Separation Reconstruction Project in the Old Town of Tengzhou City



06. Tiejian River Black and Odorous Water Remediation Project



07. End-of-Pipe Outfall Reconstruction Project at Xinliangxi Renjia, Wuxi