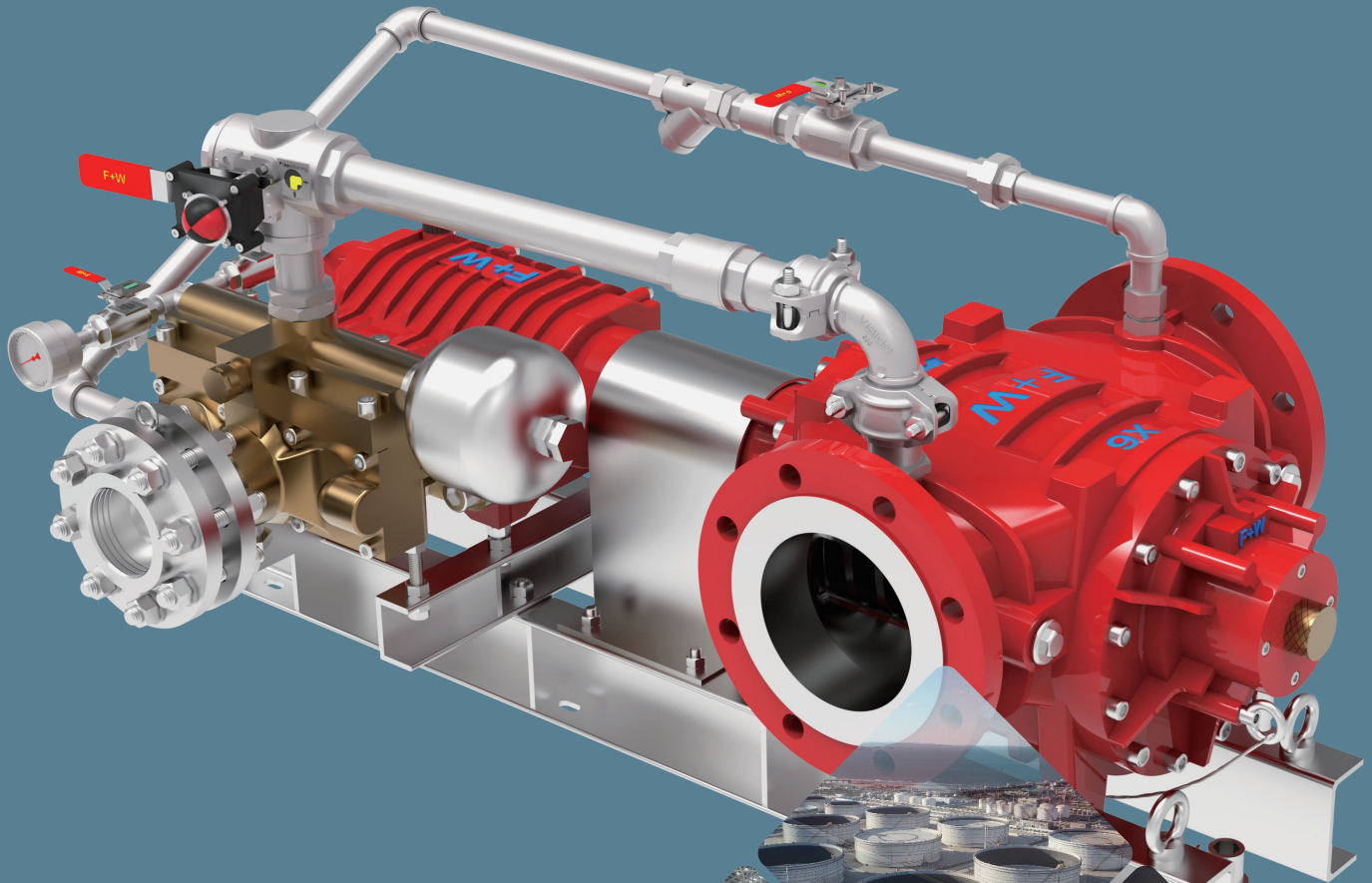




F+WTM

Proportioners

Water Motor Driven Variable Viscosity



Shanghai VISION

Innovation and Performance Are The Cornerstones of Technological Leadership. This Guiding Principle Has Defined Us As an Industrial Leader.

We specialize in the design and manufacturing of foam proportioning systems including bladder tank, balanced pressure, and water motor driven proportioner. Our products are widely used in foam extinguishing system across various industries. We deliver optimal solutions for fixed extinguishing system, fire rescue, and offshore.

We have been engaged in water motor driven proportioning systems for many years. We started distributing such products 15 years ago and gained rich experience in sales, engineering, installation, commissioning, and maintenance. With a deep understanding of these products, we acquired Ningbo Forward and integrated the F+W Water Motor Driven Proportioner into Vision product line in 2026, we will continue to innovate and launch more advanced products to better serve the market.

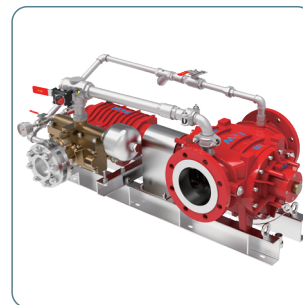
Ningbo Forward began designing and developing water motor driven proportioners in 2020. Supported by a professional R&D team and full testing infrastructure, and after innovative design and thousands of tests, it has developed the X and D series. The X series has obtained FM certification.



VISION®
Bladder Tank
Proportioning System



SureX®
Foam Pump



F+W™
Water Motor Driven
Proportioner



About Us

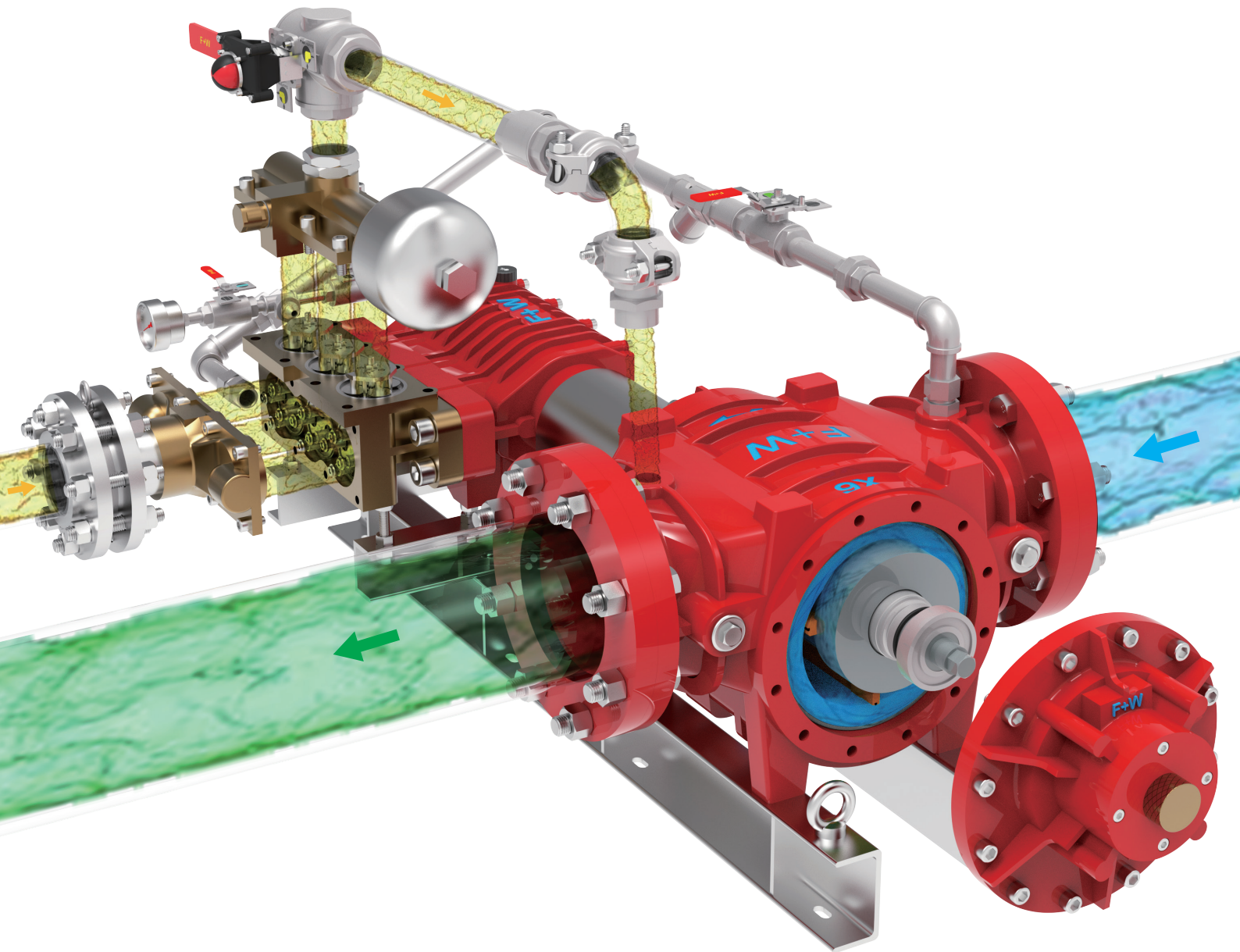
Shanghai Vision, founded in 1999, is a leading provider of grooved piping systems in China. The company offers a wide range of piping fittings and factory prefabrication services. Nowadays, the products are involved in water and foam extinguishing systems, and its FM and UL certified products are exported to international markets including Europe and the United States.



Products&Services

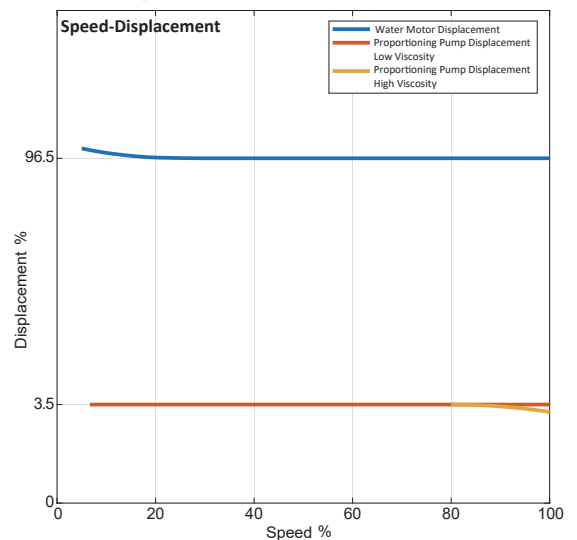
- Piping Systems
- Fire Protection Systems
- Pre-Fabrication

Purely Mechanical Water Motor Driven, No External Power Needed



The F+W water motor driven proportioner consists of a water motor, proportioning pump, coupling, piping, and base. Water flows through the water motor to drive the proportioning pump, which draws in foam concentrate and injects it into the water motor outlet, thereby achieving proportioning of foam and water.

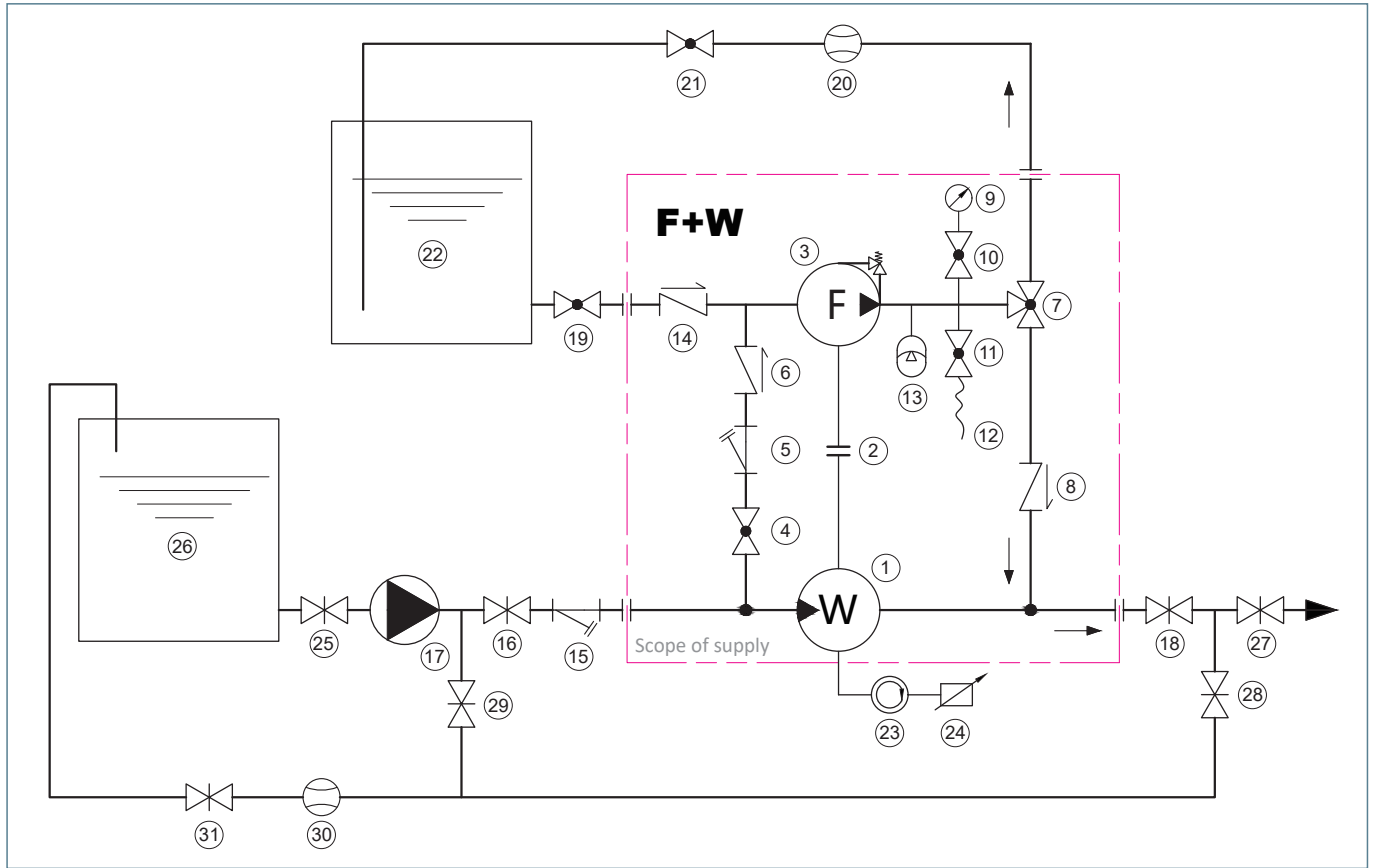
As both the water motor and foam pump are positive displacement devices, flow rate is theoretically proportional to revolution. Thus, accurate proportioning is achieved as long as their displacement ratio meets the proportioning rate. The applicable flow range depends on the deviation between theoretical and actual displacement, which is affected by internal leakage and viscosity.



Positive Displacement Proportioning

Accurate Proportioning Rate

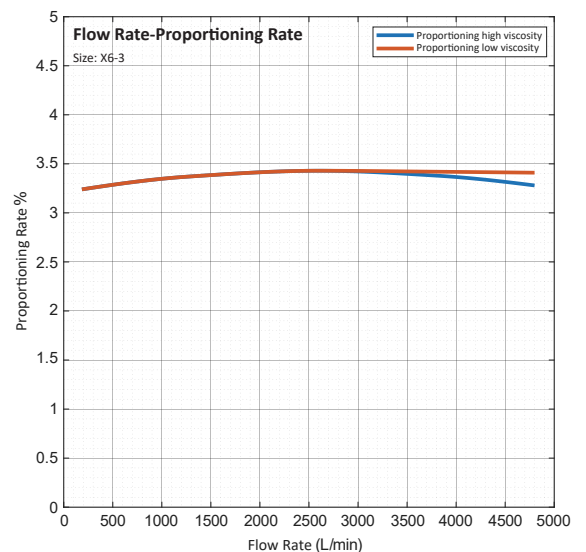
Wide Flow Range



- | | | | | |
|---------------------------|-----------------------|----------------------|-----------------------|----------------|
| 1. Water Motor | 8. Check Valve | 16. Gate Valve | 23. Speed Sensor | 31. Gate Valve |
| 2. Shaft Coupling | 9. Pressure Gauge | 17. Water Pump | 24. Flowmeter Display | |
| 3. Proportioning Pump | 10. Ball Valve | 18. Gate Valve | 25. Gate Valve | |
| 4. Ball Valve | 11. Ball Valve | 19. Ball Valve | 26. Water Tank | |
| 5. Y Strainer | 12. Flexible Hose | 20. Flowmeter | 27. Gate Valve | |
| 6. Check Valve | 13. Damper | 21. Ball Valve | 28. Gate Valve | |
| 7. 3-way Ball Valve | 14. Swing Check Valve | 22. Concentrate Tank | 29. Gate Valve | |
| "Proportioning/Returning" | 15. Strainer | | 30. Flowmeter | |

The proportioner piping includes a suction line, proportioning/returning line, flushing line, vent line, and a pressure gauge. The suction line has a swing check valve. A three-way ball valve on the proportioning/returning line switches between modes; in return mode, it allows ratio testing and remote injection. The flushing line cleans the pump and piping after each operation to avoid concentrate residue. During startup, the vent valve bleeds air, and the pressure gauge shows discharge pressure.

The FM-approved X Series proportioner's proportioning/returning three-way ball valve features a monitoring switch to indicate the proportioning or returning status.



Easy Installation Simple Operation Eco-Friendly Testing

Installation

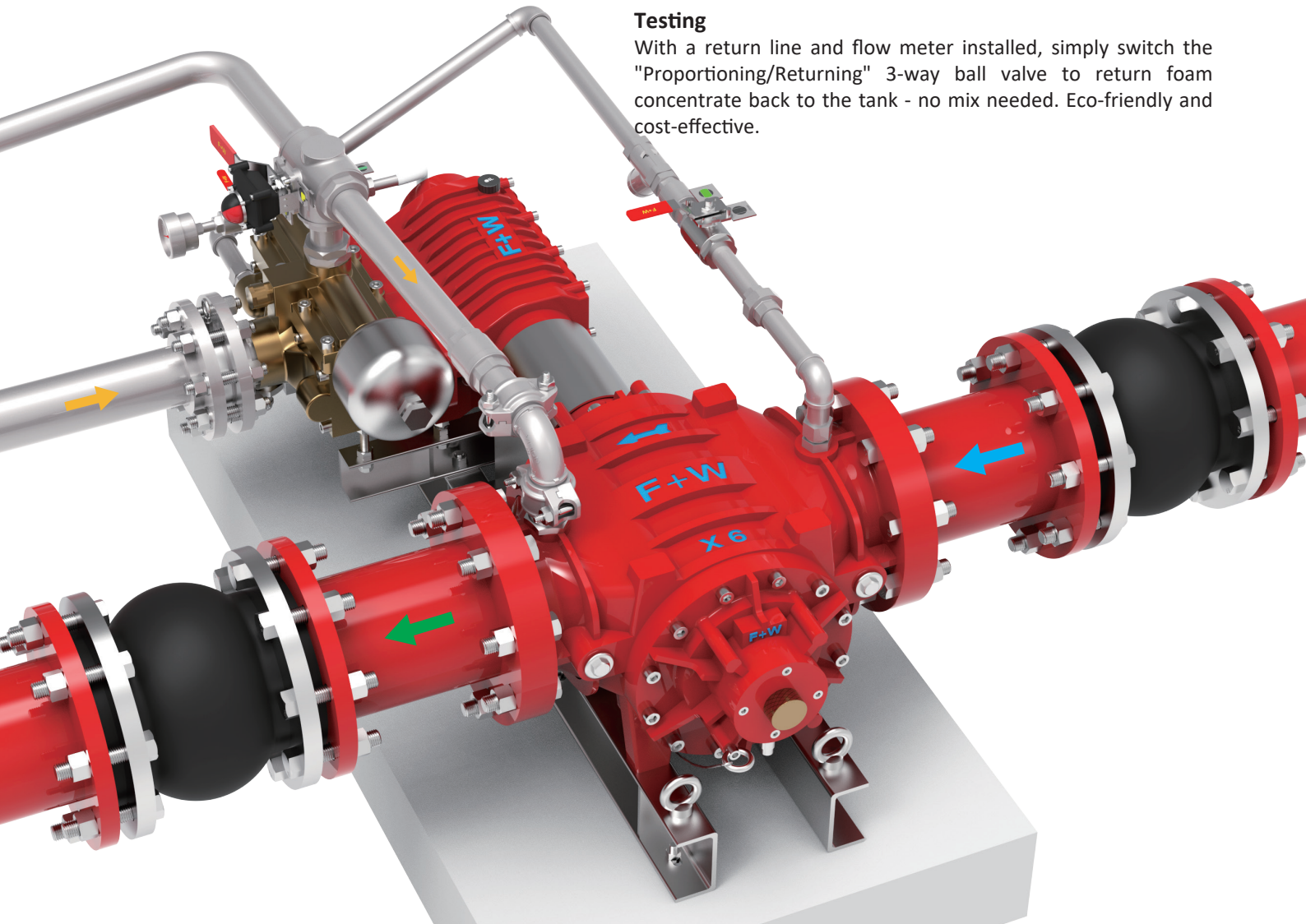
No need for an additional proportioner, pressure vessel, or electric motor/diesel engine - just connect to an atmospheric tank and fire water inlet/outlet pipes. Quick and easy installation.

Operation

Purely mechanical positive displacement proportioning, suitable for a wide range of flow and pressure. Start-up only requires opening the inlet valve - very simple operation.

Testing

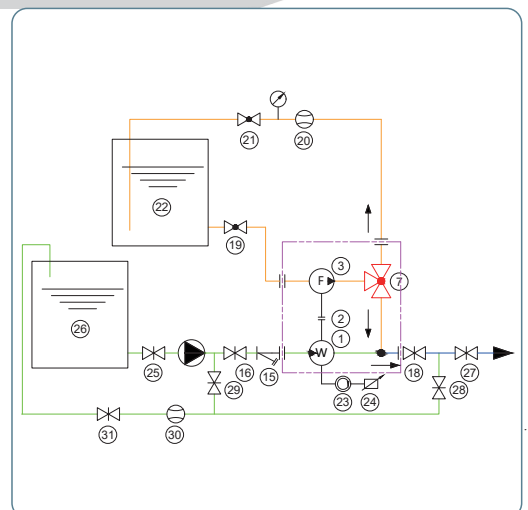
With a return line and flow meter installed, simply switch the "Proportioning/Returning" 3-way ball valve to return foam concentrate back to the tank - no mix needed. Eco-friendly and cost-effective.



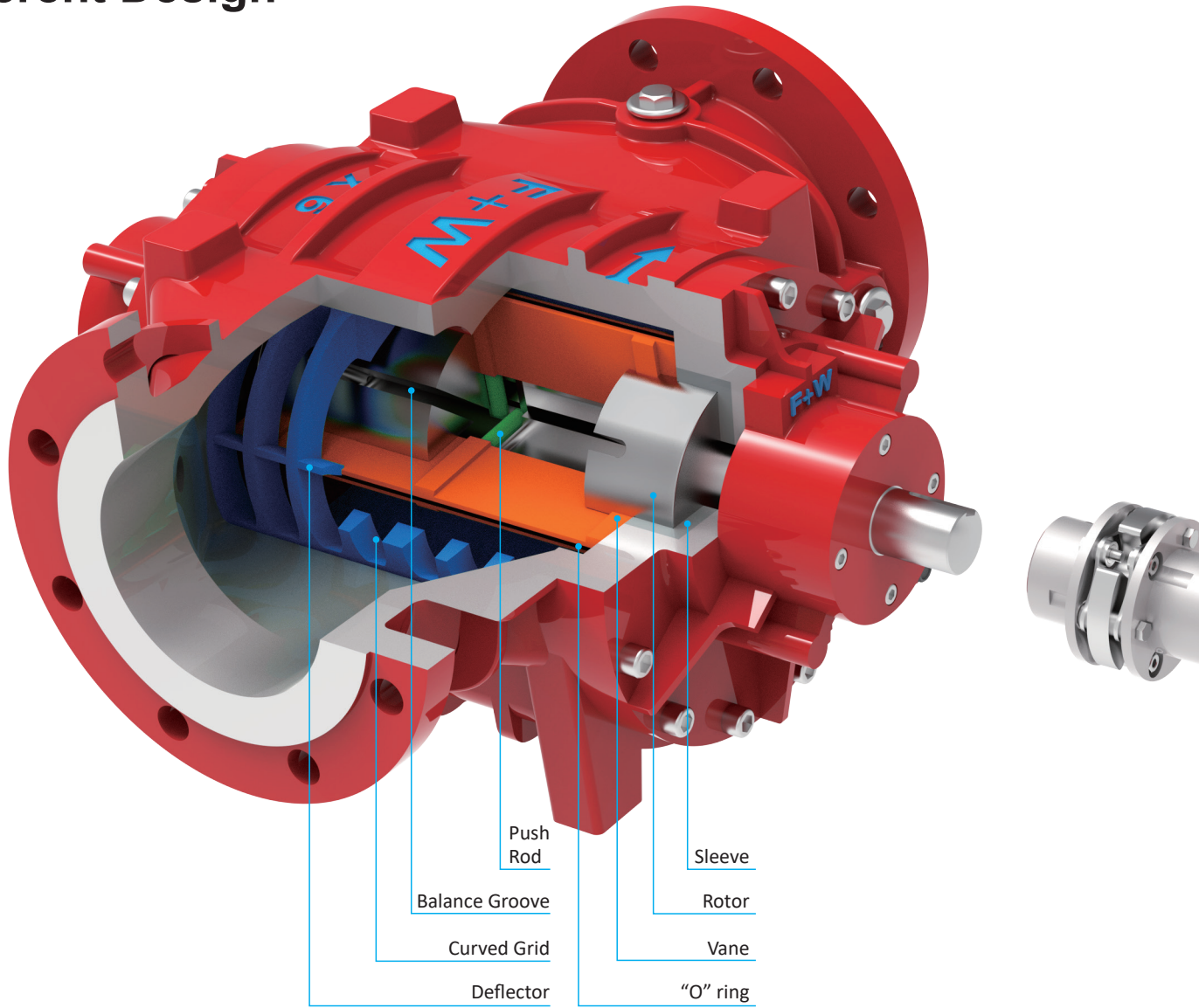
Proportioning Test | No Mixing Needed

Close valve ⑳. Open the return valve ⑦. Set the "Proportioning/Returning" 3-way valve to "Returning". Open the gate valve ⑯ to start the proportioner. Water flows back through valve ⑳, and foam concentrate returns through the 3-way valve ⑦. Flow meters ⑳ and ㉑ read the water flow rate and foam flow rate respectively. Proportioning rate can be calculated. Adjust valve ㉒ to bring the back pressure up to the water motor outlet pressure, simulating actual conditions.

The water flow rate can also be read through a speed sensor ㉓ and a flowmeter display ㉔, with a testing range of 25-100%.



Same Principle Different Design



Invention Patents

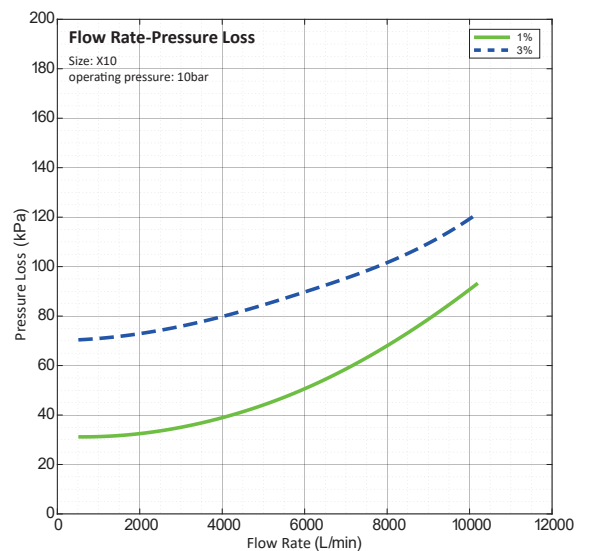
CN113719403B
EP21868322.5
US18/123415

Water Motor

The water motor uses a sliding vane design to convert fire water pressure into mechanical energy. As water flows through, the pressurized water pushes the vanes to spin the rotor, causing a certain pressure loss. The pressure loss depends on flow path, stator profile, materials, and speed.

Design Patent

ZL202230127183.9



Unique Design Excellent Performance

Stronger Suction Capability

Suction lift up to 6 meters or more.

Wider Flow Range

Max-to-min flow ratio up to 20:1 or higher.

Lower Pressure Loss

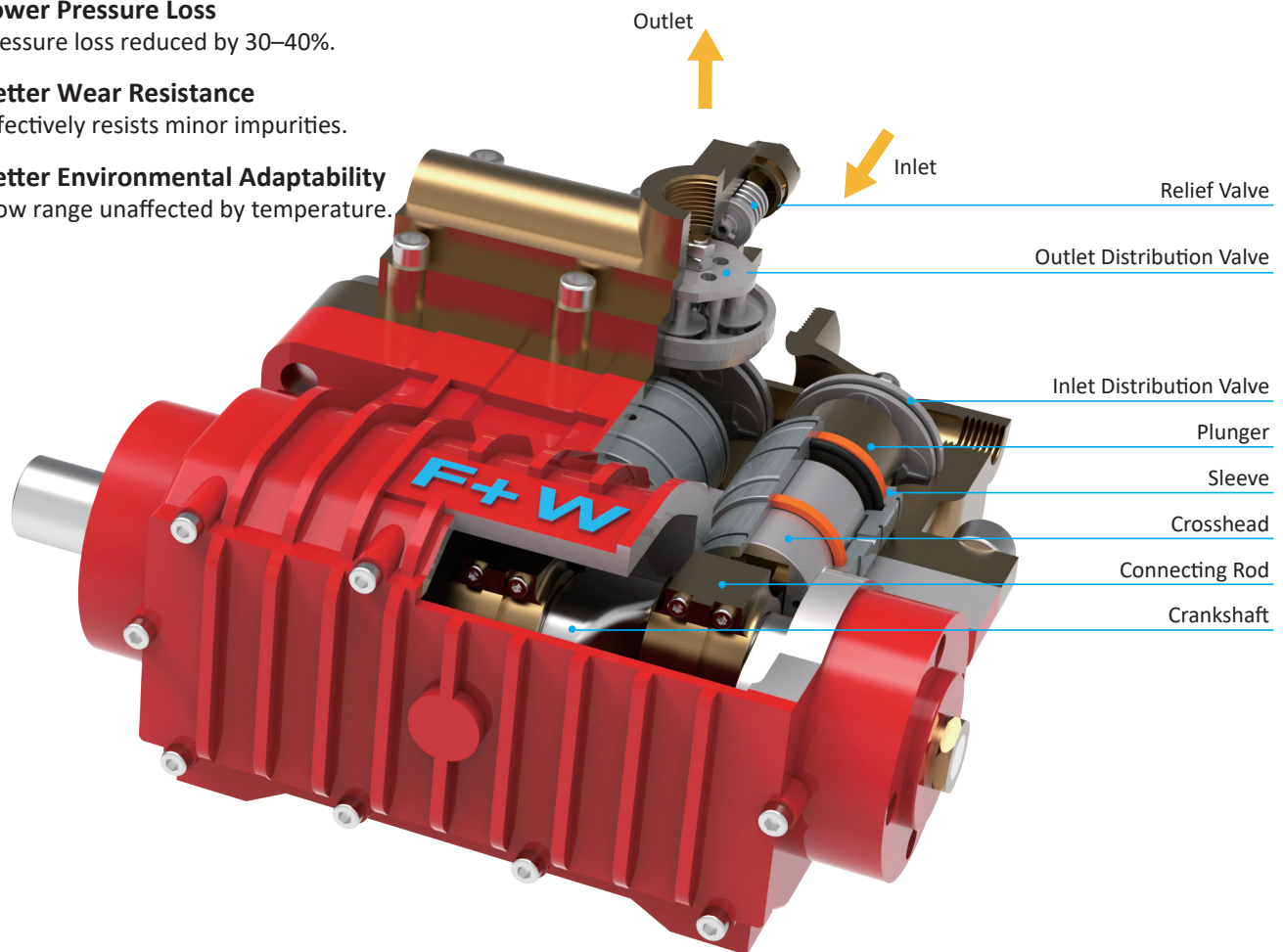
Pressure loss reduced by 30–40%.

Better Wear Resistance

Effectively resists minor impurities.

Better Environmental Adaptability

Flow range unaffected by temperature.

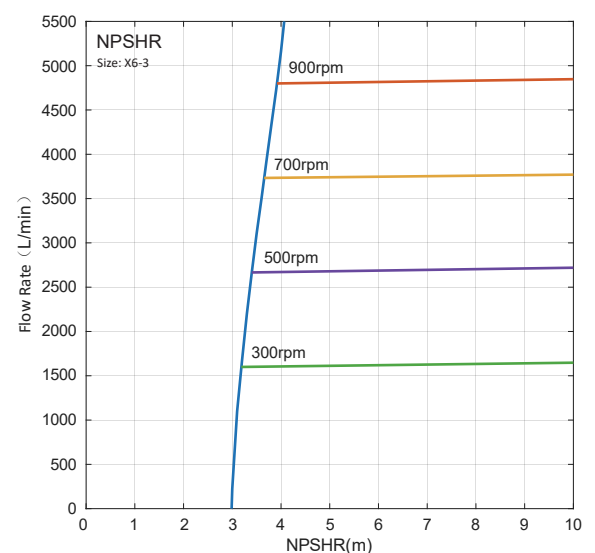


Proportioning Pump

The proportioning pump is designed as a reciprocating piston pump. Driven by the water motor rotor via a coupling, its crankshaft converts rotational motion into piston reciprocation to draw in and pressurize foam concentrate, which then mixes with fire water at the water motor outlet.

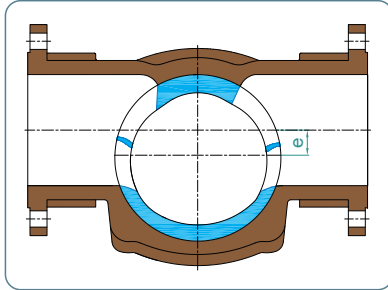
Design Patent

ZL202230127179.2



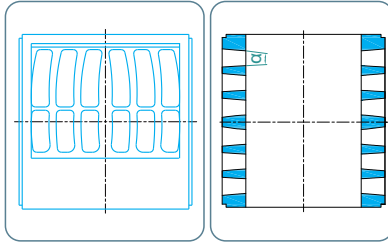
Innovative Design For Real Challenges

Stronger Suction Capability, Wider Flow Range, Lower Pressure Loss.

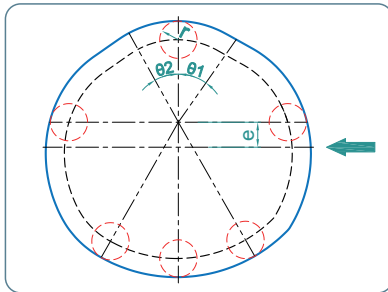


Recessed stator and unique grating design create a streamlined flow path

Streamlined housing and stator passages prevent turbulence and bubbles for stable proportioning rate, while deflector direct water to the stator chamber minimizing resistance.



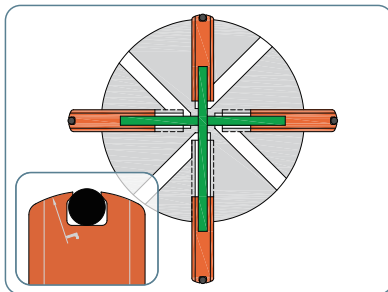
Symmetrical curved tapered gratings prevent O-ring shear at the same spot, extend service life, increase strength and stiffness. The tapered design also maximizes flow coefficient.



Asymmetric layout and envelope design optimize the operating environment

Optimized transition between working and inlet/outlet sections avoids rigid impact, improves low-speed stability, increases sealing angle, and reduces internal leakage.

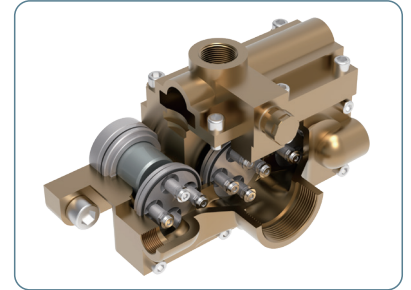
The envelope design enables the vane to swing at inlet/outlet gratings, reducing O-ring compression and wear for longer service life.



Split vane and solid rotor improves dynamic performance

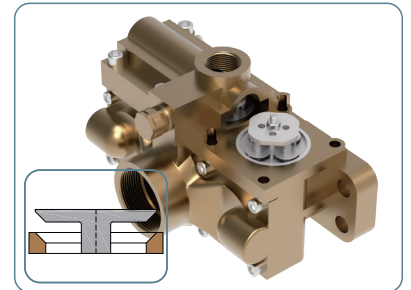
A solid rotor with balance grooves has split vanes in its slots, freely fitted with push rods, which move outward centrifugally in the sealing section to seal the O-rings against the stator and minimize internal leakage.

The convex O-ring groove allows the O-ring to rotate with the vane and spin within the groove, reducing wear and preventing breakage or dislodgement.



Central connection and suction chamber improve suction capability

End-center connection with a large suction chamber balances the three-cylinder resistance and reduces NPSHR. Offset outlet minimizes clearance volume, boosting suction vacuum and performance.



Tapered structure and modular flow distribution valve broaden foam compatibility

Precision-ground tapered sealing surfaces improve sealing. Combined with modular valve design, it suits foams of all viscosities, reduces impact, and extends service life.

Optimal Materials For Engineering Application

Better Wear Resistance and Environmental Adaptability.

Vane

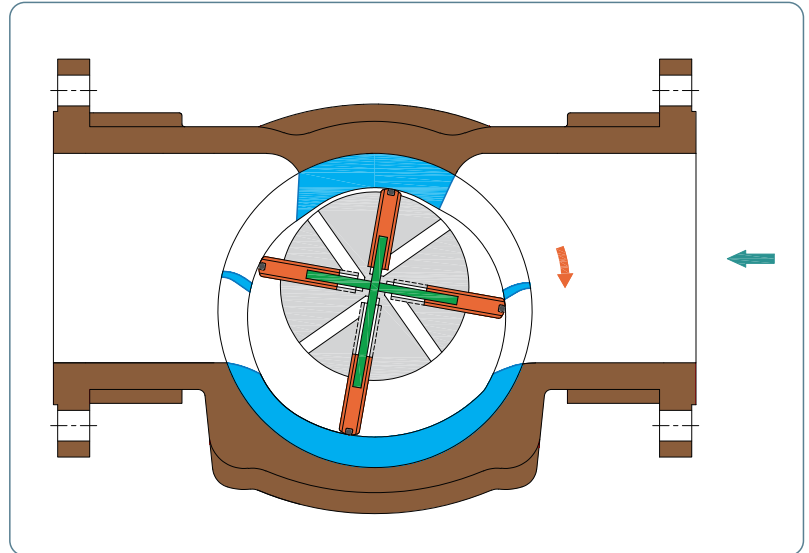
Material: Carbon fiber reinforced PVDF (Polyvinylidene Fluoride)
Increases flexural strength and hardness.
Resists trace impurities in fire water. Thermal expansion coefficient is just 1/3 of PVDF.

Push Rod

Material: carbon fiber
High strength, corrosion resistance, moderate flexibility, and a negative thermal expansion coefficient.

Stator

Material: High-strength aluminum alloy, hard anodized.
It increases hardness, wear resistance, and tolerance to trace impurities in fire water, while significantly reducing the friction coefficient to lower frictional torque and pressure loss.



With similar materials, the housing and stator have identical thermal expansion coefficients, and therefore expand radially together.

Low vane expansion and negative push rod expansion minimize assembly thermal movement; proper sizing matches radial expansion with the stator.

When temperature rises

The stator inner diameter and vane assembly length expand in sync, maintaining a small clearance to prevent seizure.

When temperature drops

The stator bore and vanes shrink together, maintaining clearance for smooth low-flow operation.

Component	Material	
	Standard Version	Seawater Version
Vane	Carbon fiber reinforced PVDF	
Push rod	Carbon fiber	
Rotor	Aluminum	Bronze
Stator	Aluminum	Bronze
Housing	Cast aluminum	Cast bronze

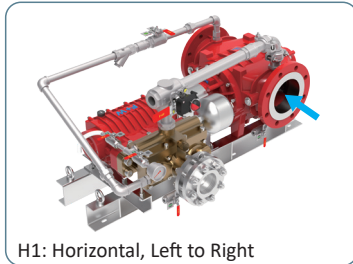
For more detailed information, please consult Shanghai VISION.

Selection

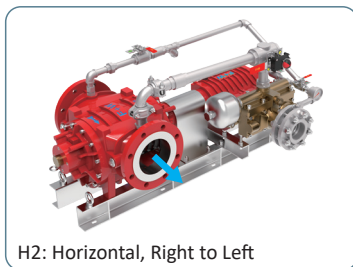
Correct Selection Is The Key To Ensuring Proper System Operation.

Selection includes fire water medium, ambient temperature, proportioning rate, maximum flow rate, minimum flow rate, water supply pressure, water flow direction, connection type and standard, etc.

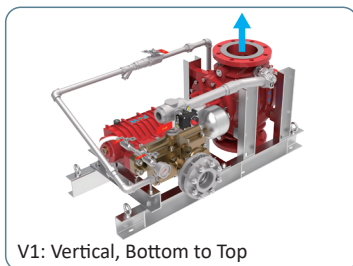
Flow Direction



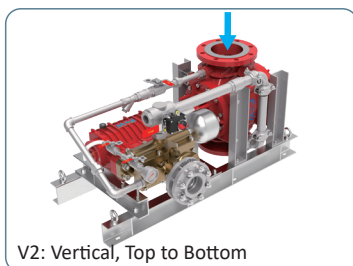
H1: Horizontal, Left to Right



H2: Horizontal, Right to Left



V1: Vertical, Bottom to Top



V2: Vertical, Top to Bottom

Standard Version

Medium: fresh water
Working pressure: 16 bar
Applicable temperature: 4-50 °C

Seawater Version

Medium: seawater
Working pressure: 16 bar
Applicable temperature: 4-50 °C

High-temperature

Medium: Standard: fresh water
Seawater: seawater
Working pressure: 16 bar
Applicable temperature: 4-80 °C

Higher Pressure

Both X and D series have an operating pressure of 16 bar. For higher hydrostatic pressure (e.g., 25 bar) or higher supply pressure (e.g., 21 bar, 25 bar, or 40 bar), we offer customized design and factory testing upon request.

Larger Flow Rate

FM approved X series (max 27,000 L/min) and D series (max 36,000 L/min). For higher flow, we offer customized design and factory testing upon request.

More Proportioning Rate

Customized proportioning rates available upon request: switching (e.g., 3%/6%), stepwise (e.g., 1%, 2%, 3% or 0.3%, 0.7%, 1%), stepless (e.g., 0.3–1%), or special proportioning rates like 8%.

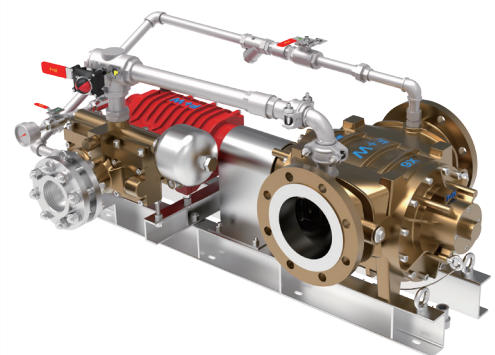
Flange Connection

M: Conform to ISO7005, EN1092
A: Conform to ASME B16.5 Class150
J: Conform to JIS B2220
S: Conform to AS 2129

Grooved Connection G: Conform to AWWA C606, ISO6182-12

Threaded Connection MT: Male thread, conform to ISO228
NT: Male thread, conform to ANSI/ASME B1.20.1
MFT: Female thread, conform to ISO228
NFT: Female thread, conform to ANSI/ASME B1.20.1

Seawater Version



Options

Well-Designed Options Bring Convenience and Value

Options include ease of operation and testing, safety, and valuable add-on features to further enhance system reliability.



Electrically Actuated Ball Valves



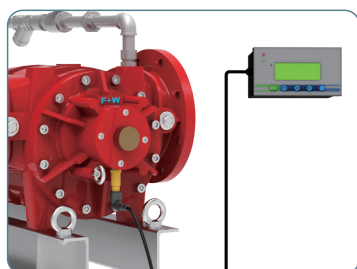
Ball and three-way valves with optional electric actuators for remote control with power: 380V/50Hz.



Position Monitoring



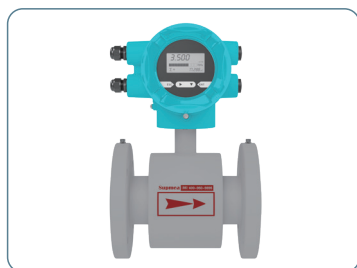
Ball valves can be fitted with supervisory switches for remote position monitoring.



Rotational sensor Flow Rate Display



Speed sensor and flow indicator on the proportioner enable simple water flow measurement with a range of 25-100%.



Foam Flow Meter



An optional electromagnetic flow meter can be provided for measuring foam concentrate flow, and a back pressure regulating valve can also be selected to form a flow test assembly.

Fixed Fire Extinguishing System

FM approved X series (max 27,000 L/min) and D series (max 36,000 L/min) cover all fixed fire extinguishing needs for oil & gas, chemical, aviation, hazardous material warehouses, and general industry.

Fire and Rescue

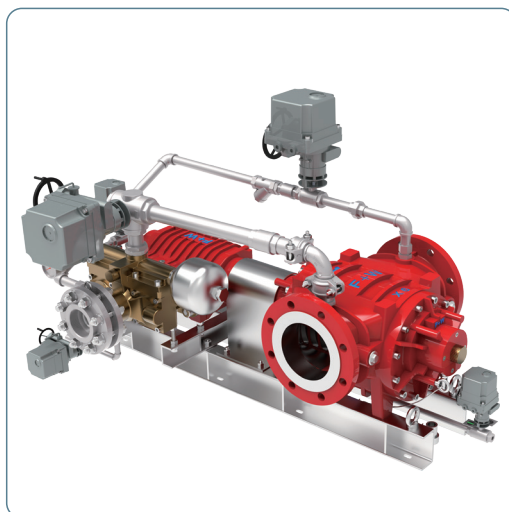
The R series, designed for mobile applications, can be vehicle-mounted, trailer-mounted, or containerized, with a max flow of 36,000 L/min. The lightweight P series is suitable for hand-carry.

Offshore

Upon request, we offer classification society approved proportioners for ships and offshore platforms, including external firefighting systems meeting FiFi 1/2, 1, 2, 3, with a max flow rate of 40,000 L/min.

Smart Configuration

With electrical valves, valve position monitoring, flow meter, pressure sensors, and a control system, the proportioner can be smart controlled - enabling real-time monitoring, smart operation, fault alerts, and automatic periodic testing of the proportioning rate.

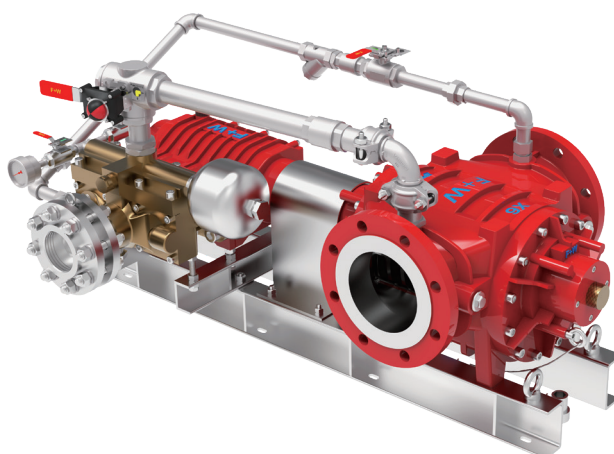


X Series

Foam Solution
Maximum Flow Rate
 27000L/min

Proportioning Rate
 1%, 3%

Operating Pressure
 5-16 bar | 73-232psi



Model	Proportioning Rate	Foam Solution Flow Rate			Water Flow Rate *		
		Min. L/min		Max L/min	Min. L/min		Max L/min
		Low Viscosity	High Viscosity		Low Viscosity	High Viscosity	
X2-1	1%	154	155	600	152	153	620
X2-3	3%	177	184	600	170	179	583
X3-1	1%	172	176	1200	170	174	1200
X3-3	3%	142	149	1200	138	145	1178
X4-1	1%	157	238	2400	155	235	2375
X4-3	3%	184	195	2400	178	189	2317
X6S-1	1%	236	236	4000	233	233	4100
X6S-3	3%	232	232	4000	225	225	3933
X6-1	1%	233	248	4800	230	245	4817
X6-3	3%	231	249	4800	223	240	4683
X8-1	1%	415	451	7200	410	445	7183
X8-3	3%	466	483	7200	450	468	7025
X8L-1	1%	499	518	8400	493	512	8300
X8L-3	3%	520	554	8400	502	537	8250
X10-1	1%	415	447	10200	410	442	10167
X10-3	3%	485	513	10200	470	497	9917
X12-1	1%	647	668	15000	640	660	14983
X12-3	3%	828	857	15000	802	830	14833
X14-1	1%	926	953	21000	917	942	21067
X14-3	3%	964	1023	21000	933	992	21500
X16-1	1%	1131	1154	27000	1120	1142	27167
X16-3	3%	1844	1948	27000	1782	1883	26500

* FM approved water flow rate, please visit www.approvalguide.com.

D Series

Foam Solution

Maximum Flow Rate

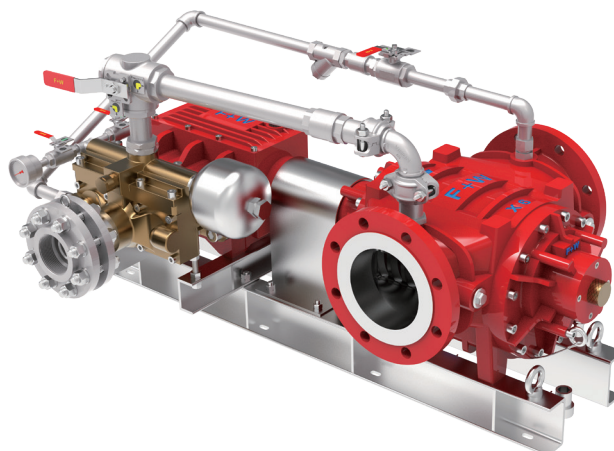
36000L/min

Proportioning Rate

0.5%, 1%, 3%, 6%, 3/3%

Operating Pressure

5-16 bar | 73-232psi



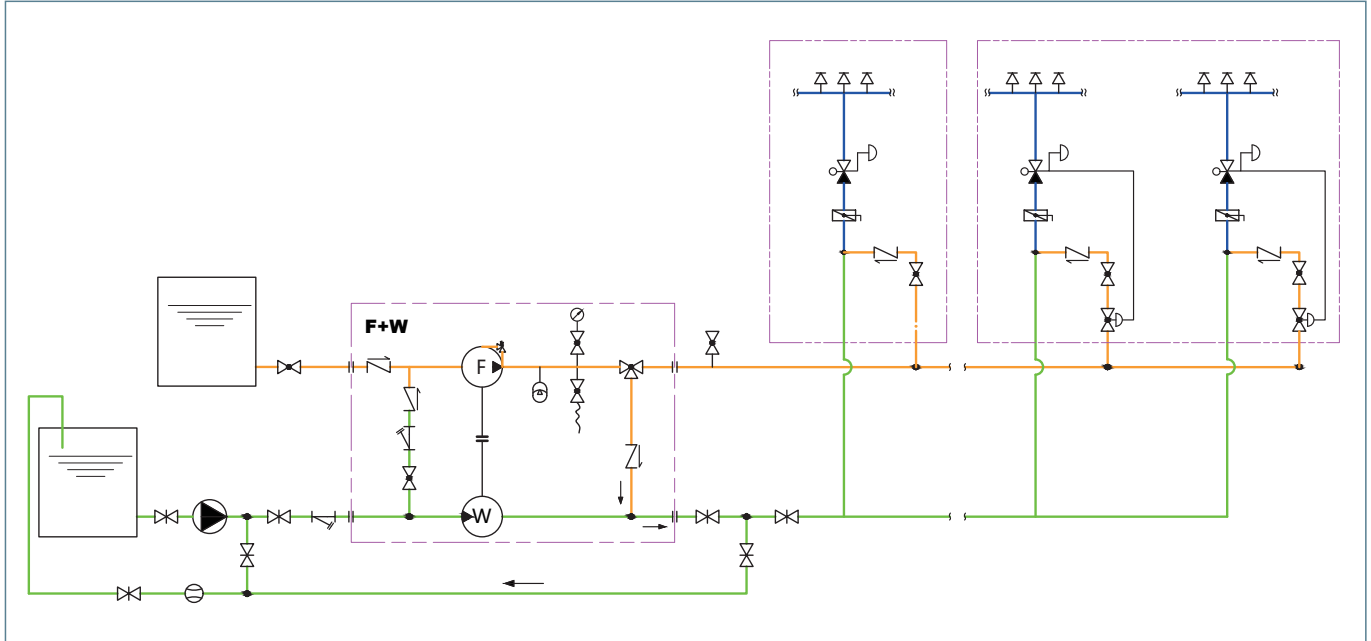
Model	Proportioning Rate	Foam Solution Flow Rate			
		Min.		Max.	
		L/min	GPM	L/min	GPM
D3	1%、3%	240	63	1200	317
D4	1%、3%	300	79	2400	634
D6s	1%、3%	360	95	4000	1057
D6	1%、3%	360	95	4800	1268
D8s	1%、3%	480	127	6000	1585
D8	1%、3%	480	127	7200	1902
D8L	1%、3%	480	127	8400	2219
D10	1%、3%	480	127	10200	2695
D10L	1%、3%	600	159	12000	3170
D12	1%、3%	960	254	15000	3963
D12L	1%、3%	1080	285	18000	4756
D14	1%、3%	1200	317	21000	5548
D14L	1%、3%	1500	396	24000	6341
D16	1%、3%	1800	476	27000	7133
D16L	1%、3%	2400	634	30000	7926
D16H	1%、3%	3000	793	36000	9511

• Contact Shanghai Vision for more information.

Design

F+W proportioners can be used in all foam fire extinguishing systems, including foam-water sprinkler systems, foam-water spray systems, low-expansion foam systems, and more.

Remote Injection



When the F+W proportioner is far from the protected area, remote injection brings the mixing point closer. With the foam line pre-filled, proportioner startup delivers instant proportioning for rapid extinguishing.

Remote injection can protect one or multiple areas. This not only brings the mixing point closer to the protected area but also reduces the number of proportioners needed, lowering initial investment.

When protecting two or more zones, a foam concentrate control valve shall be installed upstream of each injection point and actuated by the hydraulic signal from the alarm valve.

The F+W proportioner allows remote injection. Proportioning rate accurate when following two conditions are met.

- Pressure loss from discharge point to injection point is smaller than that of the water supply line.
- Pressure loss of the concentrate line plus back pressure at the injection point is less than the pump's rated pressure.

Open System

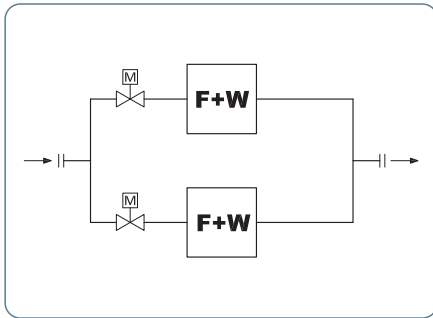
For open systems such as foam-water deluge or foam-water spray system, downstream pipes are empty at startup, causing high pump flow. Evaluate max startup flow to avoid overload — e.g., install a fire pump control valve.

In low-expansion foam systems with a motorized valve at the inlet, the valve typically takes 30 seconds or longer to open, which largely mitigates system overflow. If a hydraulic control valve is used, its opening speed must be considered.

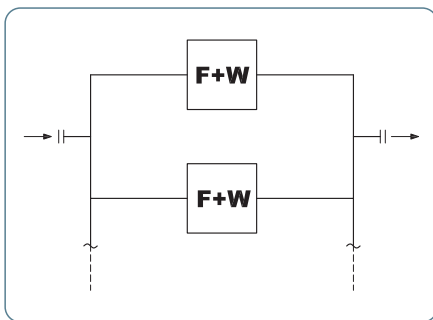
The F+W proportioner permits brief overflow operation; proportioning rate accuracy remains unaffected under the following conditions.

- 110%Q_{max}@1 hour
- 150%Q_{max}@4 minutes

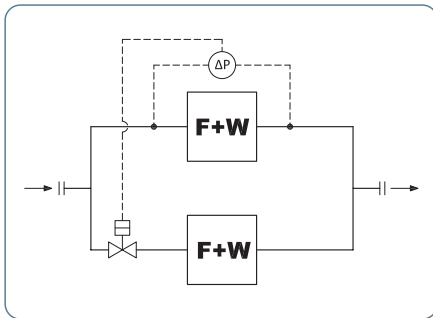
Parallel Installation



When a system requires one duty and one standby proportioner, parallel installation is used. Use inlet electrical valves or hydraulic control valves for switching. If one proportioner fails, the system quickly switches to the other. Fault detection via water motor differential pressure.



When one proportioner can't meet max flow rate, install two or more in parallel (e.g., hangar systems). For simultaneous start, independent suction lines are recommended.



If one proportioner cannot cover both minimum and maximum flow rate, use two different sizes in parallel. The smaller one handles minimum flow rate; both together handle the maximum flow rate. Start the smaller firstly; a differential valve on the larger opens when the differential pressure on the smaller one reaches the setpoint.

Hydraulic Calculation

Suction Line

Hydraulic calculation is required for foam suction line, especially for non-Newtonian foam (e.g., alcohol-resistant and some fluorine-free types), to ensure pump inlet pressure meets the NPSHR. See IOM manual for NPSHR values.

Remote Injection Line

For remote injection, use Darcy-Weisbach formula to ensure foam pressure exceeds water pressure at the injection point. Accurate calculation lowers system cost.

Maximum Flow Assessment

For open systems, maximum flow assessment shall be based on the fire pump performance curve and system characteristic curve to ensure the startup flow rate does not exceed specified requirements.

Foam Skid

For parallel installation, we offer complete foam skids — two or more proportioners mounted on a common base with piping, valves, instruments, and controls, as well as factory acceptance tests to ensure quick and easy on-site installation. Foam tanks (stainless steel or customized) are also available.





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Tel: 021-5954-6850

Web: www.visioninc.cn | www.foamandwater.com

