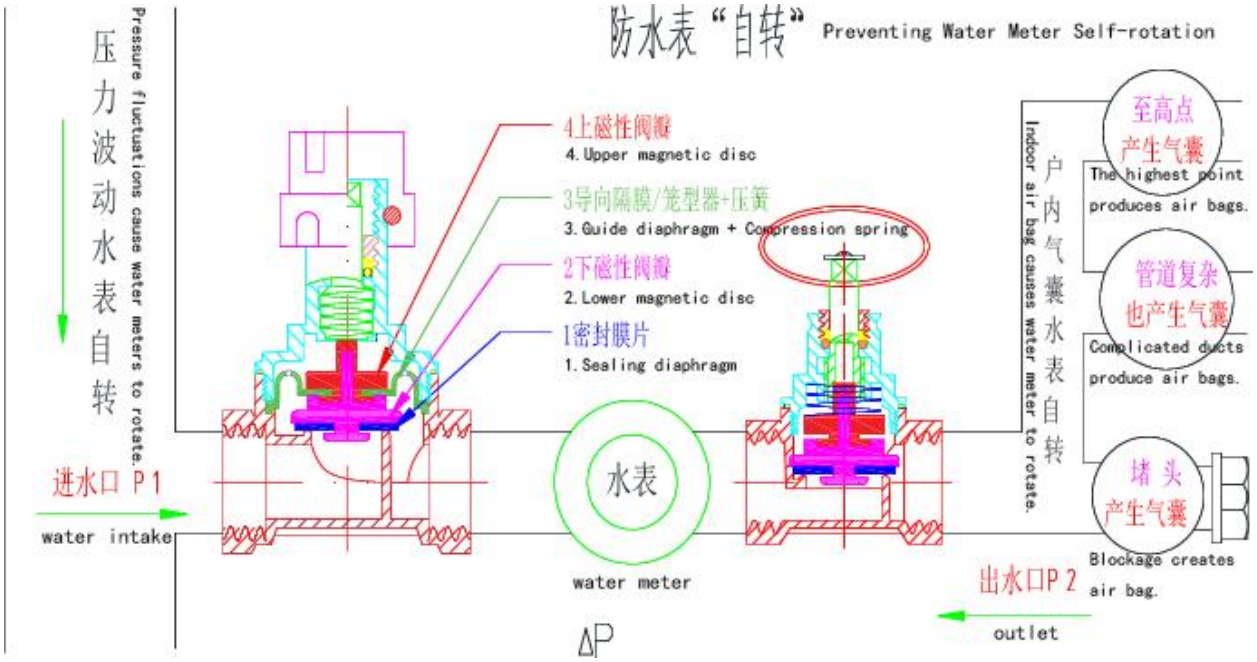
Attachment 1: Description of the Function Principle and Product Parameters of the "Three-Proof Valve" for Water Metering

Introduction to the Principle of 'Three-proof Valve'

The first Proof: Preventing Water Meter Self-rotation

Resolving water usage disputes and improving overall customer satisfaction.



The operational principle and process of the three-proof valve (principle: hydraulic self-acting dynamic check valve)

When the user is using water normally, the pressure P2 behind the valve decreases, or various factors may cause the pipeline pressure P1 to rise.

At this time, when the pressure difference: $\triangle P = P1 - (P2 + \text{magnetic force}) > 0$:

a) The separable magnetic valve disc opens rapidly (the degree of opening depends on the water usage, i.e., the size of $\triangle P$), and the water meter begins to measure.

b) When the user stops using water, or the pressure fluctuation in front of the valve stops or decreases, $\triangle P$ gradually decreases until $\triangle P \leq 0$. During this process, relying on magnetism, the separable magnetic valve disc slowly or quickly returns to its seat, achieving a new hydraulic balance (the speed of valve disc return depends on the speed of $\triangle P$ change).

c) In some extreme or special water usage situations, $\triangle P$ changes unusually frequently, often cyclically trending ≥ 0 or ≤ 0. In this case, relying on magnetism, the separable magnetic valve disc is in a "pulsating" working state (opening and closing

alternately) until a new pressure balance is reached (it may be fleeting or may last for a short time).

d) If there is an airbag inside the pipe after the meter, the airbag is initially in a gradually compressed state, P1 - P2 = △P > 0. When the airbag is further compressed to a certain extent, it generates sufficient reverse force.

At this time: △P = P2 (mainly due to the reverse force generated by the expansion of the airbag) + magnetic force - valve front pressure P1 > 0. With the further expansion of the airbag, the reverse check force of the valve is greatly enhanced: △P > 0, and the valve is in a fully closed state.

e) The structure of the water meter core determines that the forward measurement value is greater than the reverse measurement value. "Self-rotation" is caused by the repeated accumulation of forward and reverse water flow in front and behind the water meter, which eventually leads to the cumulative reading of the forward direction. The pressure in front of the pipeline cannot rise indefinitely (water supply pressure or secondary water supply pressure values are controlled). Through the repetitions, dynamic equilibrium is reached, and the water meter no longer "self-rotates."

Conclusion:

The water pressure P2 behind the water meter + the magnetic force of the upper and lower magnetic valve discs + the self-weight of the valve disc diaphragm (which can be neglected) - the water pressure P1 in front of the water meter = △P. When you add the high sensitivity of the separable magnetic valve disc to pressure fluctuations, you get hydraulic self-acting dynamic check valve.

Notes:

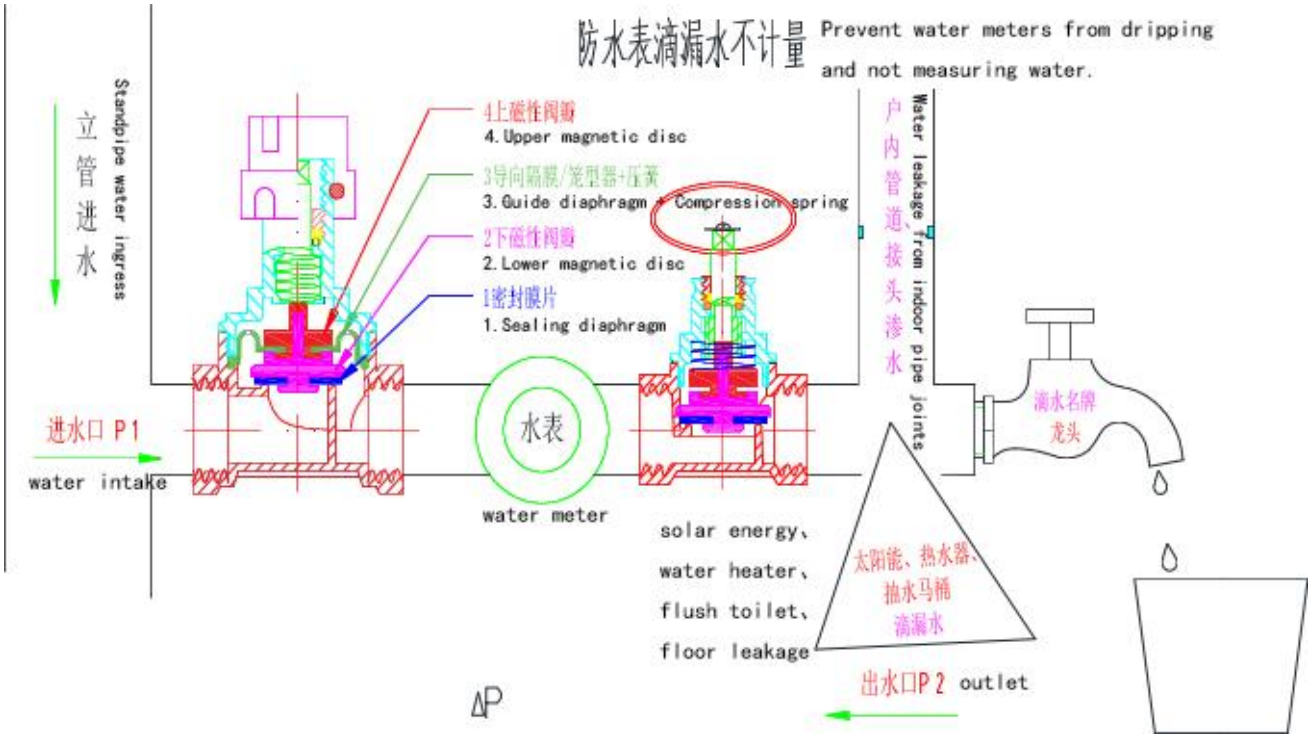
The magnetic force is approximately 15 to 20 grams, meaning that the pressure difference △P in front and behind the valve should be greater than 15 to 20 grams to open the sealed valve disc. This preload pressure not only ensures the water meter's capacity to measure small amounts of water (the principle of which will be detailed in later chapters) but also minimizes head loss.

The self-weight of the magnetic upper and lower valve discs can be neglected: special composite high-molecular-weight materials are used to generate buoyancy, and the total self-weight of the magnetic valve disc material is approximately 0.

The latest technological upgrade of the product eliminates the diaphragm with channels shown in the schematic diagram and the general type of spring (further reducing water loss).

The second Proof: Addressing the Challenge of "Running, Leaking, and Dripping," Which Hinders Water Meter Measurement or Makes It Difficult

Resolving Water Meter Measurement Sensitivity, Improving Measurement Accuracy, and Ensuring Fairness



Basic Principles and Operation:

a) When there is dripping water behind the meter, the water pressure P2 behind the three-way valve gradually decreases.

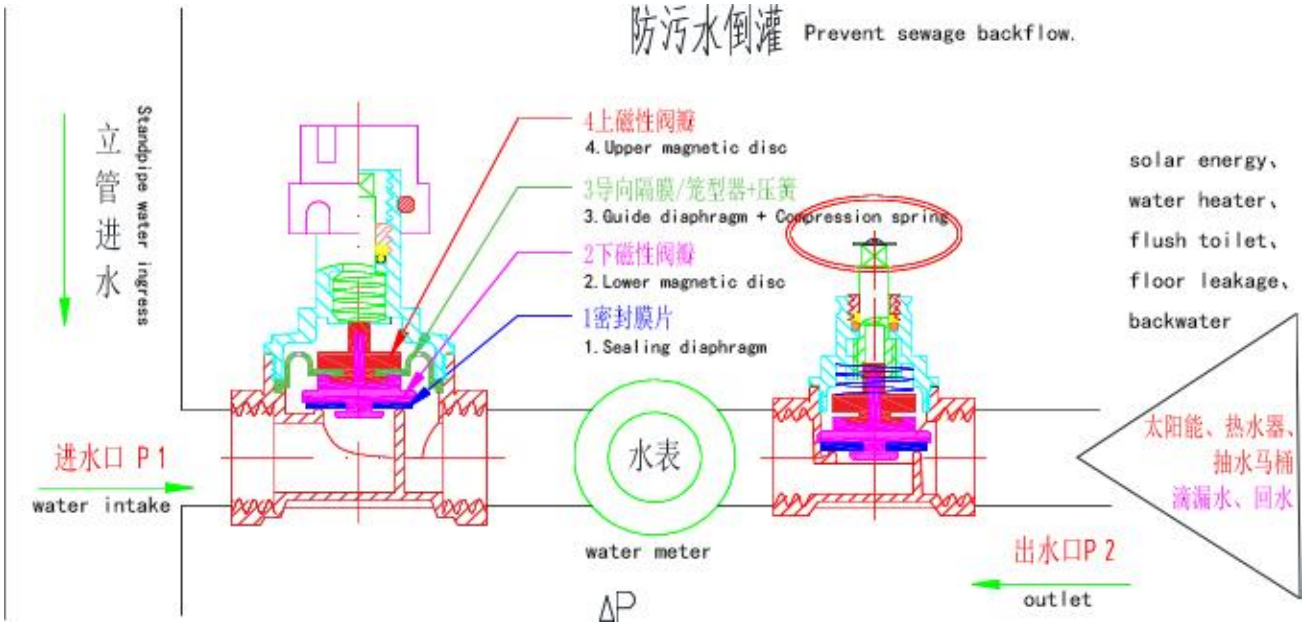
b) As time passes with dripping water, the pressure difference between the valve's inlet and outlet, $\triangle P = P1 - P2$, gradually increases.

c) Once the pressure difference △P exceeds the magnetic force, which is approximately 15-20 grams, the separable magnetic valve disc at the bottom quickly opens. Water from the valve's inlet rapidly flows into the outlet, and the water flow that balances the pressure difference instantly acts on the water meter's impeller. This flow rate is much higher than the water meter's starting flow rate, and the water meter begins measuring.

d) When this water flow passes through the water meter, the hydraulic pressure difference △P before and after the valve becomes zero. Relying on the reverse magnetic force, the separable magnetic valve disc quickly returns to its seat, achieving a new hydraulic balance.

e) Throughout the entire process of dripping water, these phenomena repeat themselves, allowing the water meter to continuously measure the amount of dripping water.

The third Proof: Preventing Backflow of Sewage and Hot Water in Water Systems Addressing the Risk of Water Pollution and Enhancing Drinking Water Safety



Basic Principles:
The specific function of the check valve sealing force (hydraulic self-acting check) is detailed in the preceding sections on "anti-rotation" and "drip water metering."

The three-proof valve features a sensitive separated valve disc structure, and with the uniform sensitivity of magnetic force between the magnetic valve discs, the three-proof valve exhibits excellent check valve sealing performance. When sewage flows backward, it serves as a barrier.

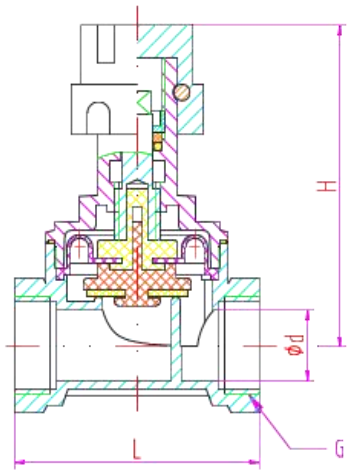
Conclusion:
Due to the pulsating repulsion effect between the magnetic valve discs' permanent magnets inside the three-proof valve chamber, this repulsion force primarily serves as a rapid and sensitive auxiliary return force and, to a lesser extent, as the initial check valve force.

Therefore, in practical applications, the common issues associated with traditional spring-loaded check valves (which mainly rely on spring-generated check forces), such as insufficient sensitivity, uneven circumferential stress, spring force degradation, and impurities causing blockages, do not occur with the three-proof valve, preventing the widespread phenomenon of gradual malfunction.

Product Basic Dimensional Parameters

1. Δ Lockable Dynamic Management Three-proof Valve C-Type / Handwheel Dynamic Management Three-proof Valve D-Type　Basic Parameters (Channel Type)

表前C型/动态管理D型 “三防阀”	型号 H11X-16TC/D	三防功能：防止水表自转、防止滴漏水水表不计量、防止污水倒灌
	C表前阀：作为通常性管理使用机械Δ锁头，可随时升级成“金拱门”磁性加密管理阀	
	D型动态管理阀：可作为表后阀或表前阀：手轮更换为“金拱门”磁性锁头后，即升级为表前管理阀	



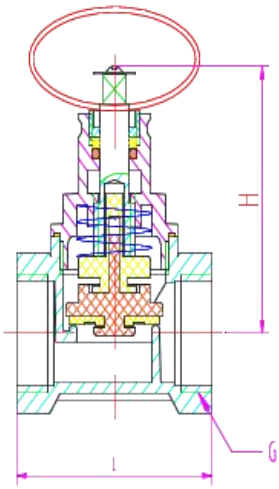
公称通径 DN	Φd(mm)	H(mm)	L(mm)
15($G\frac{1}{2}''$)	15	65	53
20($G\frac{3}{4}''$)	20	68	56

零　件	阀体　阀盖　阀杆　开口压紧帽	O型密封圈	阀杆压紧圈　阀盖密封垫	密封垫　导向隔膜	笼型器　上下阀瓣
材　料	锻造黄铜	NBR	聚四氟乙烯	食品级硅胶	环保型胶/ 天然永磁

启闭工具	金拱门磁性锁头	机械Δ锁　钥匙	金拱门磁性锁　钥匙
材　料	合金材料+304+永磁	45#淬火/2Cr13	铜+永磁+304

产品执行标准　GB/T8464-2008	注：D型动态管理阀，可作为表前或表后阀

O型动态管理 “三防阀”	型　号 HJH11X-16TO	三防功能：防止水表自转、防止滴漏水水表不计量、防止污水倒灌
	O型动态管理阀：可作为表后阀或表前阀；当手轮更换为“金拱门”磁性锁头后，即升级为表前管理阀	



公称通径 DN	Φd(mm)	H(mm)	L(mm)
15($G\frac{1}{2}''$)	18	49~55	47
20($G\frac{3}{4}''$)	18	50~56	49

零件	阀体、阀盖、阀杆、开口压紧帽	O型密封圈	阀杆压紧圈、阀盖密封垫	密封垫	压簧、螺钉	标牌	传动导向杆、下阀瓣
材料	锻造黄铜/304不锈钢	NBR	聚四氟乙烯	食品级硅胶	304	AL	合成天然永磁

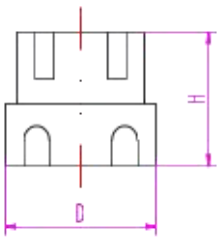
启闭工具	金拱门磁性锁头	金拱门磁性锁　钥匙	手轮
材　料	合金材料+304+永磁	铜+永磁+304	QT450

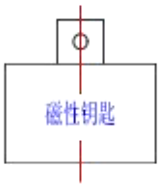
产品执行标准　GB/T8464-2008	注：O型动态管理阀，可作为表前或表后阀

2. ΔHand wheel dynamic management three-proof valve O type

“金拱门”加密磁性锁头	型　号　JGMST-16T	磁性锁头主要功能：提升户表管理能力

D(mm)	H(mm)
ø36.8	32.5

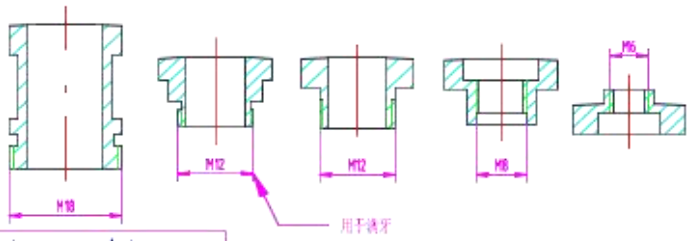




名　称	金拱门磁性锁头	金拱门磁性锁　钥匙
材　料	合金材料+304+永磁	铜+永磁+304
特　点	新一代磁性加密管理，且为独立旋转运动，不会与阀头产生卡阻等现象	

“金拱门”加密磁性锁头　转换组件	型　号 JGMZJ-16TA/B/C	转换键主要功能：普通阀门可在线升级，提升户表管理能力

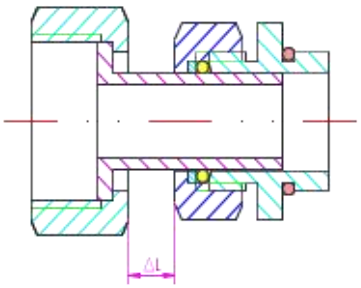
规格　M	18	12	8	6
适　用	Δ锁球阀	Δ锁阀	内/外螺纹	内/外螺纹



名　称	金拱门磁性锁头　组件	紧固弹簧垫/紧固胶圈/紧定螺钉
材　料	锻造黄铜	304/硅胶/304
特　点	增加组件可将表前：Δ锁、手轮（柄）型各类阀门升级成“金拱门”磁性管理阀	

水表专用　伸缩活接头	型　号　SSHJT-16T	主要功能：便于水表及阀门的安装、维护、更换

规　格	DN15(短)	DN15(长)	DN20(短)	DN20(长)
ΔL(mm)	13	15	17	17



名　称	伸缩杆、承口、活接螺帽、并紧螺帽	限位挡圈	并紧垫圈	密封圈
材　料	锻造黄铜	304	AL	NBR
特　点	长度可伸缩，可根据现场安装状况便于更换水表、阀门；亦可在初次安装中使用			