ITF Instruction Manual for Electric Regulating Valve Body

Product Overview

ITF-D series valve bodies are applied to closed systems of HVAC and district heating, so as to control the medium flow in piping systems.

The matching actuator models are as follows:
ITF …10K/15K/18K/30K; ITF …65L/100L;

Nominal Diameter: DN15~DN300;
Nominal Pressure: PN16 , PN25。

Product Technical Parameters

■ **Applicable Medium**

ITF…D: -20℃ ~ 130℃ 【Water System】

Chilled water, high and low temperature hot water, antifreeze water and salt water.

■ **Rangeability**

DN15~DN50: ≥50;

DN65~DN300: ≥100。

■ **Leakage Rate**

Two-way valve: ≤ 0.02% of Kvs value;

Three-way valve: Straightway ≤ 0.02% of Kvs value, bypass ≤ 0.05% of Kvs value.

■ **Flange connection:** Complies with GB/T9113.1 raised face (RF) flange standard.

■ **Main Component Materials**

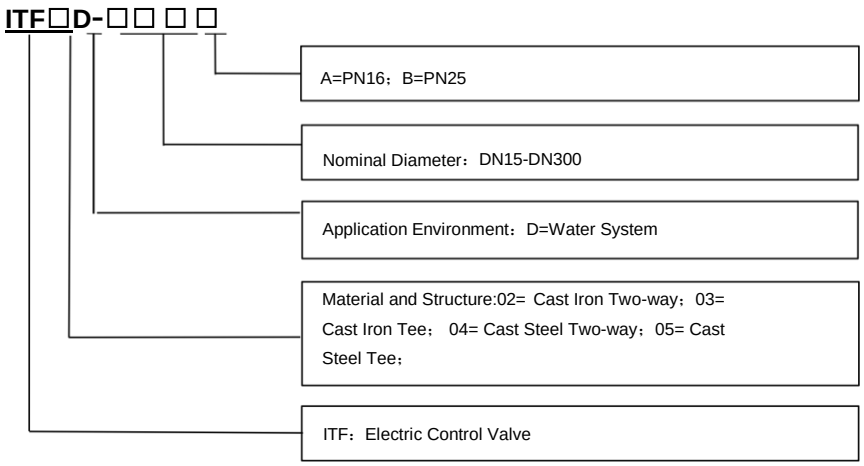
Valve body: Ductile iron QT450-10, carbon steel WCB;

Valve stem, valve core and gland: Stainless steel 304;

Sealing material: EPDM;

Stem stuffing box: PTFE + EPDM + carbon fiber.

Model Naming Rule



Terminology Explanation

1）Kvs: When the valve is fully open, with a differential pressure of 100 kPa across the regulating valve, the total flow rate of 20℃ water passing through the valve per hour.

2）ΔPs：Maximum allowable differential pressure across the valve when the electric regulating valve is securely closed (closing differential pressure).

3）ΔPmax：Maximum allowable differential pressure across the valve within the full stroke range, under which the actuator can operate normally (maximum operating differential pressure for recommended use).

4）Turndown Ratio：The turndown ratio is the ratio of the maximum flow to the minimum flow that a regulating valve can control, also known as the adjustable range.

5）Flow Characteristic：Under the condition of constant differential pressure across the valve, the relationship between the relative flow of the medium passing through the regulating valve and its opening stroke. Examples include equal percentage characteristic, linear characteristic, and quick-opening characteristic.

Parameter Table for Matching Cast Iron Two-way Valve Body and Actuator

ITF Technical Parameters of Actuator				20mm			40mm		60mm
				1000N	1500N	1800N	3000N	6500N	10000N
Control Accuracy: Basic error ±1%; Dead band: ±1% Proportional Regulating Load Capacity: Control Signal: 0(2)~10V (factory default: 2~10V) or 0(4)~20mA (positioner impedance: 250Ω); Feedback Signal: 0(2)~10V (factory default: 2~10V) or 0(4)~20mA (load capacity: ≤500Ω)									
Working Power	Control Signal	Opening Indication	Manual						
AC220V	3-digit floating point	√	√	ITF-X1-10K	ITF-X1-15K	ITF-X1-18K	ITF-X1-30K	ITF-X1-65L	ITF-X1-100L
	0(2)~ 10V or0(4)~20mA	√	√	-	-	ITF-Y1-18K	ITF-Y1-30K	ITF-Y1-65L	ITF-Y1-100L
AC24V	Control Signal	√	√	ITF-X2-10K	ITF-X2-15K	ITF-X2-18K	ITF-X2-30K	-	-
	0(2)…10V or4(0)…20mA	√	√	ITF-Y2-10K	ITF-Y2-15K	ITF-Y2-18K	ITF-Y2-30K	-	-
Full Stroke Time（s）				80	80	60	125	85	120

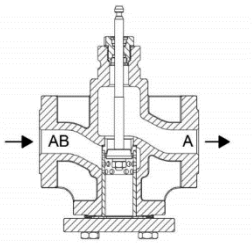
Tow-way Valve Model	Seat Structure	Nominal Diameter	Kvs (m³/h)	Stroke (mm)	ΔPs (MPa)	ΔPmax (MPa)	ΔPs (MPa)	ΔPmax (MPa)	ΔPs (MPa)	ΔPmax (MPa)	ΔPs (MPa)	ΔPmax (MPa)	ΔPs (MPa)	ΔPmax (MPa)	ΔPs (MPa)	ΔPmax (MPa)
ITF02D-015A	Unbalanced Seat	15	4	20	0.35	1.30	0.40	1.60	0.40	*1.60	-	-	-	-	-	-
ITF02D-020A	Unbalanced Seat	20	5	20	0.35	1.30	0.40	1.60	0.40	*1.60	-	-	-	-	-	-
ITF02D-025A	Unbalanced Seat	25	7.5	20	0.35	1.30	0.35	1.60	0.40	*1.60	-	-	-	-	-	-
ITF02D-032A	Balanced Seat	32	15	20	0.30	1.40	0.40	1.50	0.60	*1.60	-	-	-	-	-	-
ITF02D-040A	Balanced Seat	40	24	20	0.30	1.35	0.40	1.40	0.60	*1.60	-	-	-	-	-	-
ITF02D-050A	Balanced Seat	50	31	20	0.30	1.20	0.40	1.40	0.60	*1.60	-	-	-	-	-	-
ITF02D-065A	Balanced Seat	65	49	20	-	-	0.30	1.40	0.50	*1.40	-	-	-	-	-	-
ITF02D-080A	Balanced Seat	80	78	20	-	-	0.28	1.30	0.35	*1.40	-	-	-	-	-	-
ITF02D-100A	Balanced Seat	100	124	40	-	-	-	-	-	-	0.60	*1.40	-	-	-	-
ITF02D-125A	Balanced Seat	125	200	40	-	-	-	-	-	-	0.60	*1.20	-	-	-	-
ITF02D-150A	Balanced Seat	150	300	40	-	-	-	-	-	-	0.60	*1.20	1.30	1.50	1.60	1.60
ITF02D -200A	Balanced Seat	200	450	40	-	-	-	-	-	-	0.55	*1.10	1.10	1.30	1.50	1.60
ITF02D -250A	Balanced Seat	250	630	40	-	-	-	-	-	-	-	-	0.80	*1.20	0.80	1.20
ITF02D -300A	Balanced Seat	300	1200	60	-	-	-	-	-	-	-	-	-	-	0.80	*1.10

Notes: 1) The closing differential pressure data in the table is tested with water as the medium at a temperature of 5℃ to 30℃. Users shall select the actuator reasonably according to actual working conditions.

2) The items shaded in the table represent the recommended actuator configurations for air conditioning conditions; items marked with * represent the recommended actuator configurations for heating conditions.

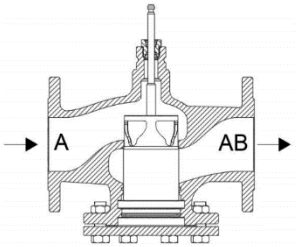
3) ΔPs: Maximum Operating Differential Pressure; ΔPmax: Maximum Shut-off Differential Pressure; Kvs: Maximum Flow Coefficient。

Structure and Characteristics of Cast Iron Two-way Valve Body

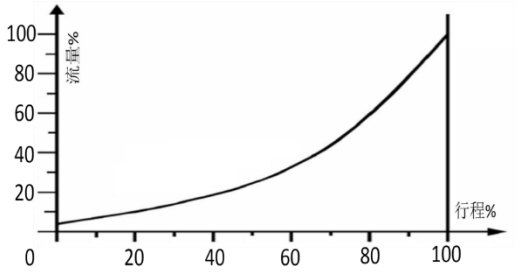


DN15-DN25， Unbalanced Seat。

Valve stem moves downward, and the valve opens.
The valve stem moves upward to close the valve.。



DN32-DN300， Balanced Seat。
Valve stem downward: valve open;
Stem upward, valve closed。



Flow Characteristic

△ The bottom cover of the two-way valve must not be removed for modification into a three-way valve.

Cast Iron Three-Way Valve Body and Actuator Matching Parameter Table

ITF Technical Parameters of Actuator				20mm			40mm		60mm
				1000N	1500N	1800N	3000N	6500N	10000N
Control Accuracy: Basic error ±1%; Dead band: ±1% Proportional Regulating Load Capacity: Control Signal: 0(2)~10V (factory default: 2~10V) or 0(4)~20mA (positioner impedance: 250Ω); Feedback Signal: 0(2)~10V (factory default: 2~10V) or 0(4)~20mA (load capacity: ≤500Ω)									
Working Power	Control Signal	Opening Indication	Manual						
AC220V	3-digit floating point	√	√	ITF-X1-10K	ITF-X1-15K	ITF-X1-18K	ITF-X1-30K	ITF-X1-65L	ITF-X1-100L
	0(2)~ 10V or0(4)~20mA	√	√	-	-	ITF-Y1-18K	ITF-Y1-30K	ITF-Y1-65L	ITF-Y1-100L
AC24V	Control Signal	√	√	ITF-X2-10K	ITF-X2-15K	ITF-X2-18K	ITF-X2-30K	-	-
	0(2)…10V or4(0)…20mA	√	√	ITF-Y2-10K	ITF-Y2-15K	ITF-Y2-18K	ITF-Y2-30K	-	-
Full Stroke Time (s)				80	80	60	125	85	120

Three-way Valve Model	Seat Structure	Nominal Diameter	Kvs (m³/h)	Stroke (mm)	20mm ΔPs (MPa)	20mm ΔPmax (MPa)	20mm ΔPs (MPa)	20mm ΔPmax (MPa)	20mm ΔPs (MPa)	20mm ΔPmax (MPa)	40mm ΔPs (MPa)	40mm ΔPmax (MPa)	40mm ΔPs (MPa)	40mm ΔPmax (MPa)	60mm ΔPs (MPa)	60mm ΔPmax (MPa)
ITF03D-015A	Unbalanced Seat	15	4	20	0.35	0.80	0.40	1.20	0.40	*1.30	-	-	-	-	-	-
ITF03D-020A	Unbalanced Seat	20	5	20	0.35	0.80	0.40	1.20	0.40	*1.30	-	-	-	-	-	-
ITF03D-025A	Unbalanced Seat	25	7.5	20	0.35	0.80	0.40	1.20	0.40	*1.30	-	-	-	-	-	-
ITF03D-032A	Unbalanced Seat	32	15	20	0.30	0.50	0.30	0.65	0.40	*0.80	-	-	-	-	-	-
ITF03D-040A	Unbalanced Seat	40	24	20	0.30	0.30	0.30	0.40	0.40	*0.50	-	-	-	-	-	-
ITF03D-050A	Unbalanced Seat	50	31	20	0.20	0.20	0.25	0.25	0.30	*0.30	-	-	-	-	-	-
ITF03D-065A	Unbalanced Seat	65	49	20	-	-	0.20	0.25	0.25	*0.30	-	-	-	-	-	-
ITF03D-080A	Unbalanced	80	78	20	-	-	0.20	0.25	0.25	*0.30	-	-	-	-	-	-

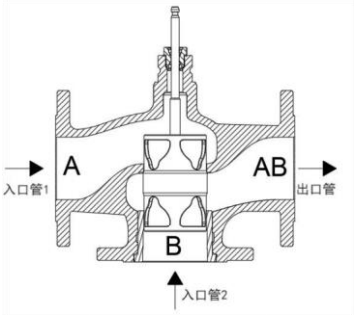
	Seat															
ITF03D-100A	Unbalanced Seat	100	124	40	-	-	-	-	-	-	0.20	*0.45	-	-	-	-
ITF03D-125A	Unbalanced Seat	125	200	40	-	-	-	-	-	-	0.30	*0.35	0.35	0.40	0.55	0.60
ITF03D-150A	Unbalanced Seat	150	300	40	-	-	-	-	-	-	0.25	*0.30	0.30	0.35	0.40	0.45
ITF03D -200A	Unbalanced Seat	200	450	40	-	-	-	-	-	-	-	-	0.15	*0.20	0.20	0.25
ITF03D -250A	Unbalanced Seat	250	630	40	-	-	-	-	-	-	-	-	0.10	0.10	0.15	*0.20
ITF03D -300A	Unbalanced Seat	300	1200	60	-	-	-	-	-	-	-	-	-	-	0.15	*0.15

Notes: 1) The closing differential pressure data in the table is tested with water as the medium at a temperature of 5℃ to 30℃. Users shall select the actuator reasonably according to actual working conditions.

2) The items shaded in the table represent the recommended actuator configurations for air conditioning conditions; items marked with * represent the recommended actuator configurations for heating conditions.

3) ΔPs: Maximum Operating Differential Pressure; ΔPmax: Maximum Shut-off Differential Pressure; Kvs: Maximum Flow Coefficient。

Structure and Characteristics of Cast Iron Three-way Valve Body

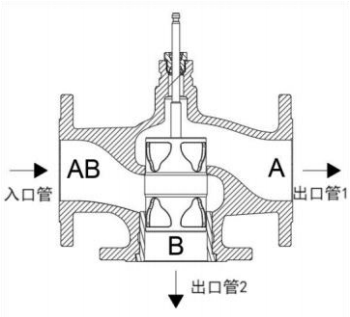


Three-way Mixing

Inlet 1 connects to port A, medium flow direction: A → AB;

Inlet 2 connects to port B, medium flow direction: B → AB;

The outlet connects to port AB.

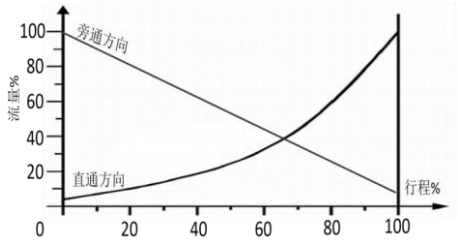


Three-way Diverting

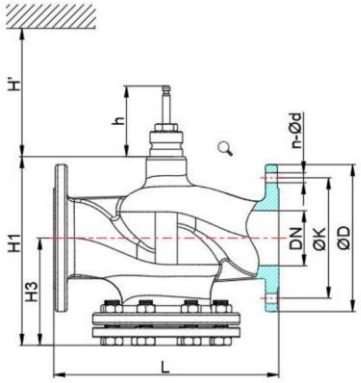
Outlet 1 is connected to port A, medium flow direction: AB → A;

Outlet 2 is connected to port B, medium flow direction: AB → B.

The inlet pipe is connected to port AB.

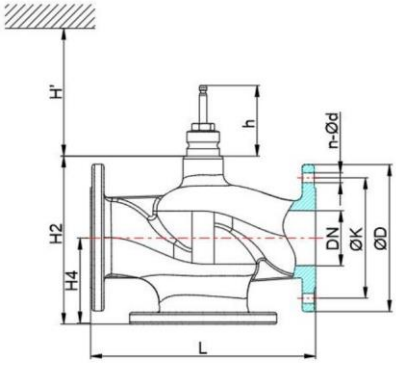


Overall Dimensions of Cast Iron Valve Body



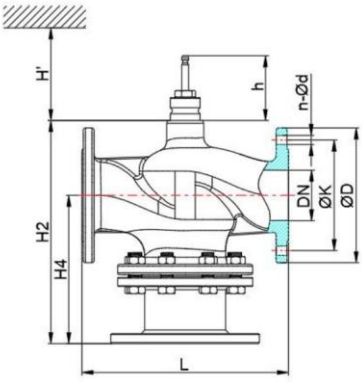
PN16 Two-way:DN15-DN300

PN25 Two-way:DN15-DN300



PN16 Three-way:DN15-DN300

PN25 Three-way:DN15-DN80



PN25 Three-way:DN100-DN300

Dimensions of Cast Iron Two-way Valve Body (mm)													H'		
Nominal Diameter	L	ΦD		ΦK		Bolt Holes and Quantity		h	H1		H3		1000N 1500N	1800N 3000N	6500N 10000N
		PN16	PN25	PN16	PN25	PN16	PN25		PN16	PN25	PN16	PN25			
DN15	130	95	95	65	65	4-Φ14	4-Φ14	96	152	152	87	87	≥448	≥524	-
DN20	140	105	105	75	75	4-Φ14	4-Φ14	96	161	161	92	92			
DN25	165	115	115	85	85	4-Φ14	4-Φ14	96	168	168	100	100			
DN32	180	140	140	100	100	4-Φ18	4-Φ18	96	188	188	114	114			
DN40	200	150	150	110	110	4-Φ18	4-Φ18	96	188	188	120	120			
DN50	230	165	165	125	125	4-Φ18	4-Φ18	96	204	234	105	137			
DN65	290	185	185	145	145	4-Φ18	8-Φ18	96	261	264	148	150			
DN80	310	200	200	160	160	8-Φ18	8-Φ18	96	262	289	150	177			
DN100	350	220	235	180	190	8-Φ18	8-Φ22	119	316	321	182	185	-	≥546	-
DN125	400	250	270	210	220	8-Φ18	8-Φ26	119	363	368	202	207			
DN150	480	285	300	240	250	8-Φ22	8-Φ26	119	419	429	245	251			
DN200	495	340	360	295	310	12-Φ22	12-Φ26	119	423	423	216	240			
DN250	622	405	425	355	370	12-Φ26	12-Φ30	119	520	520	268	268	-	-	≥810
DN300	698	460	485	410	430	12-Φ26	16-Φ30	133	576	609	295	343	-	-	≥840

Dimensions of Cast Iron Three-way Valve Body (mm)													H'		
Nominal Diameter	L	ΦD		ΦK		Bolt Holes and Quantity		h	H2		H4		1000N 1500N	1800N 3000N	6500N 10000N
		PN16	PN25	PN16	PN25	PN16	PN25		PN16	PN25	PN16	PN25			
DN15	130	95	95	65	65	4-Φ14	4-Φ14	96	127	127	63	63	≥448	≥524	-
DN20	140	105	105	75	75	4-Φ14	4-Φ14	96	136	136	68	68			
DN25	165	115	115	85	85	4-Φ14	4-Φ14	96	143	143	76	76			
DN32	180	140	140	100	100	4-Φ18	4-Φ18	96	161	161	88	88			
DN40	200	150	150	110	110	4-Φ18	4-Φ18	96	161	161	94	94			
DN50	230	165	165	125	125	4-Φ18	4-Φ18	96	173	203	75	107			
DN65	290	185	185	145	145	4-Φ18	8-Φ18	96	230	233	118	120			
DN80	310	200	200	160	160	8-Φ18	8-Φ18	96	231	258	120	147			
DN100	350	220	235	180	190	8-Φ18	8-Φ22	119	283	390	150	255	-	≥546	-
DN125	400	250	270	210	220	8-Φ18	8-Φ26	119	329	456	170	296			
DN150	480	285	300	240	250	8-Φ22	8-Φ26	119	382	514	209	337			
DN200	495	340	360	295	310	12-Φ22	12-Φ26	119	386	573	180	391			
DN250	622	405	425	355	370	12-Φ26	12-Φ30	119	481	668	230	417	-	-	≥810
DN300	698	460	485	410	430	12-Φ26	16-Φ30	133	535	755	255	487	-	-	≥840

Safety Assurance and Cavitation Phenomenon

SafetyGuarantee

Before performing any product maintenance, stop the water pump, cut off the power supply, release the pipeline pressure, and wait for the pipeline to return to normal temperature. All operations shall be carried out only under guaranteed safe conditions.

The technical parameters of the valve are only applicable to the matching actuators listed in the "Equipment Combination" section of this document. If actuators, valve bodies, accessories or other components manufactured by other suppliers are adopted, all relevant warranties shall become invalid.

Cavitation

Cavitation will accelerate the wear of the valve core and valve seat, shorten the service life of the valve, and cause adverse noises such as resonance. Therefore, operation under high pressure differential shall be avoided during use, and the maximum operating pressure differential (ΔPs) specified by the manufacturer shall not be exceeded.

Installation, Commissioning and Maintenance

- It is recommended to install the valve on the return pipe, since the temperature of the return water is lower in heating systems.
- To improve operational safety of the valve, a fine-mesh filter shall be installed at the upstream side.
- Clean the pipelines before valve installation. Pipes shall be arranged horizontally and vertically without vibration. When installing the valve, mount the actuator upward or in an upward inclined position; it shall not face downward or incline downward. (See the right figure)；
- The valve and actuator allow convenient on-site installation. Sufficient space shall be reserved for installation and maintenance.This valve shall not be installed in locations with frequent bumping, impact or vibration. The applicable ambient temperature is -15℃ to +55℃.Installation is prohibited in environments with steam, water spray or dripping water.Install the valve strictly in accordance with the flow direction marked by the arrow on the valve body.；
- The connection between the junction box and cable connector of the stem electric heater shall be welded. (Not required for models without heating device.)；
- The valve stem seal assembly is a wearing part. It may become worn after years of operation depending on service conditions. Users may purchase replacement parts and consult our company for replacement instructions.