CRT
CREATOR

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CRT
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CREATOR CONTROL 克俐托®

Temperature contorl and energy saving expert

Company profile

Shanghai Creator Machinery Co. ltd is a joint venture company specializing in mechanical equipment and accessories. The main products of our company include: temperature control valves, centrifuge oil purifier, water treatment equipment, etc. These products are widely used in power, petrochemical, ships, steam turbines, diesel engines, compressors, wind power and new energy industries. The temperature control valve is developed by the professional technical team and can be customized according to the needs of the customer. The core components of temperature control valve are from Europe and America. The body material covers aluminum, cast iron, alloy cast iron, cast steel, stainless steel, bronze and so on . We can provide customers with a perfect temperature control solution, good technical support and 24 hours after-sales service.

The temperature control valve provides accurate temperature control for machinery and circulation systems in various fields . Centrifuge oil purifier provides the separation and cleaning of mechanical impurities in oil and water media, which extends the life of equipment and greatly reduces the cost of use and maintenance.

We hold the “our valve can satisfy your need” sprit, and fully display the "new world, heart service” concept, so as to provide the best quality service for various industries and customers.

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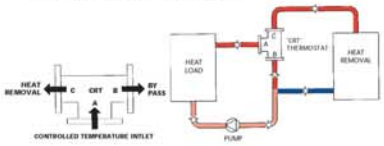
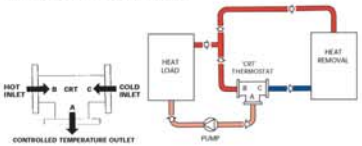
- Co-generation, Cooling Towers,
- Chillers
- Mixing/Diverting or Blending
- Temperature Regulation or Relief
- Process Temperature Control
- Thermal Dumping

TYPICAL INSTALLATION DIAGRAMS

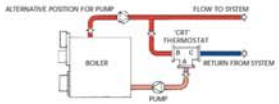
DIVERTING APPLICATIONS



MIXING APPLICATIONS

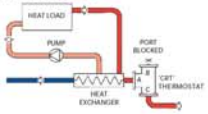


BOILER RETURN APPLICATIONS

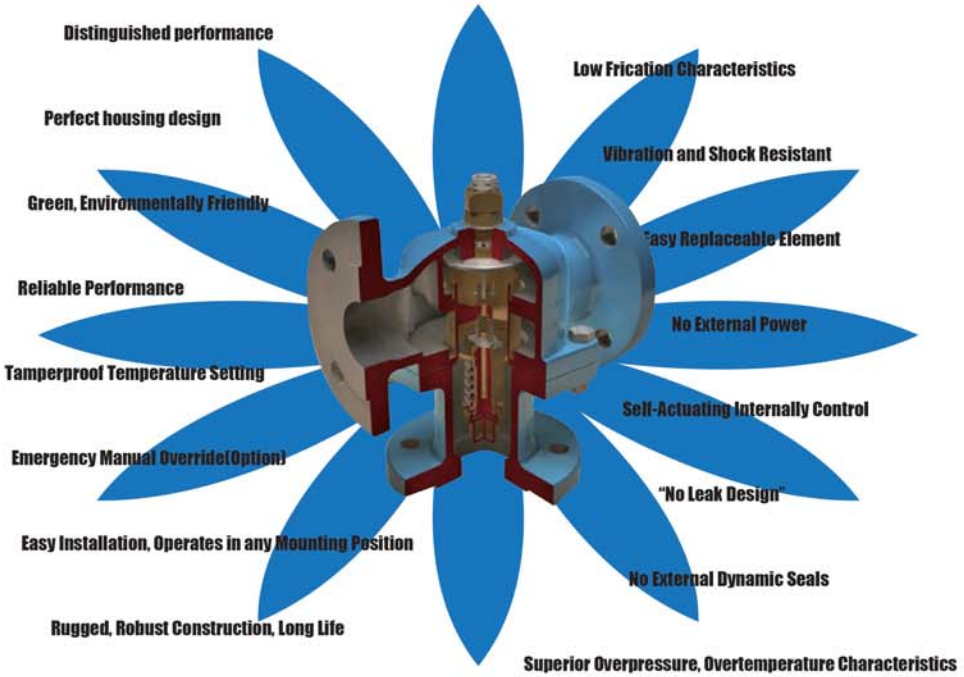


WATER SAVING APPLICATIONS

Valve as shown maintains minimum flow through cooler to conserve water, requires internal leak hole to permit small flow for sensing.



PERFORMANCE CHARACTERISTICS



GENERAL CHARACTERISTICS

BODY MATERIALS
- Cast Iron
(for fresh water and lubricating oils)
- Ductile iron
(high performance iron)
- Alloy iron
(high pressure ratings)
- Bronze
(for seawater, shock resistance and low magnetic permeability)
- Aluminium
(for light weight)
- Steel
(for high strength/pressure ratings)
- Stainless Steel
(for corrosive and special applications)

SEAL MATERIALS
- Standard material is Viton.
- Nitrile, Neoprene &Ethylene Propylene Rubber is option.

PORT CONNECTIONS
- Threaded or flanged

VALVE SIZES
- (Nominal bore):15mm Through 200mm (1/2" through 8")

ELEMENT MATERIALS
- Standard elements are of brass and bronze construction with O ring seals in Viton. These are suitable for most water and petroleum based oils
- Electroless Nickel plated element & Viton seals.There are suitable for Synthetic lubricants and Deionized water in electronic cooling circuits
- Electroless Nickel plated elements & Neoprene seals.There are suitable for Lube oil system for ammonia refrigeration compressors and Salt water systems
- Electroless Nickel plated elements & Nitrile seals.There are suitable for Lube oil system with Hydrogen Sulfide Contamination
- Neoprene seals

Lube oil system for freon refrigeration compressors

CONTROL TEMPERATURES:
- 13 Through 132°C (55 Through 270°F)

FLOWRATE:Max. to 450m^3/h (2000 US GPM)

PRESSURE RATINGS: Max. to 70bar (1000 Psi)

TEMPERATURE SETTING

CREATOR Temperature Control Valves have a wide selection of temperatures are available. Fresh water systems typically run in the range 71° to 88°C. Seawater systems do not normally exceed 49°C. Follow the equipment manufacturers' guidelines for oil systems and for specific operating temperatures of cooling/heating systems.

In general the temperature quoted is the nominal operating temperature in diverting mode on water systems.

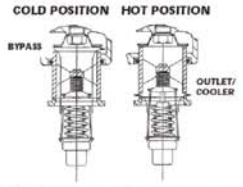
For mixing and oil circuits the temperature may be 1 to 2°C Degrees higher due to flow, viscosity and other system parameters.

For long life CREATOR valves should not be operated continuously at temperatures in excess of their maximum continuous rating. If this condition is anticipated then consult us for suitable alternatives.

OPERATING PRINCIPLE

The temperature control power is created by the expansion of a wax/copper mixture which is highly sensitive to temperature changes. Large forces are created by the warming/expansion of the mixture which in turn acts upon the sliding valve, thus regulating the flow.

The diagram opposite shows the valve actuation in diverting mode at start and cooling positions. During operation the sliding valve constantly modulates for accurate temperature control. Reliable rugged construction gives a unit sensitive to temperature variations, not easily disturbed by pressure changes and sudden surges which allows stable temperatures to be maintained over a wide range of operating conditions.

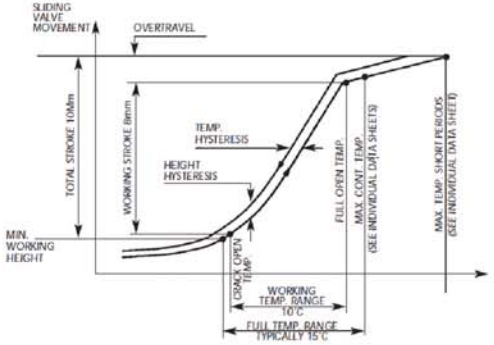


Note: Typical for sliding valve type elements

ELEMENT LEAKHOLES

Leak holes are drilled to allow a small flow of fluid between ports B and C for the following reasons:
- To allow small flows to cooler during startup which slows down warm up cycle.
- To allow small flows to maintain some flow through cooler in order to prevent condensation or in extreme cases freezing. In applications where additives are not or not be used.
- In applications where valve is used as 2 way. With port 'B' blocked, when circuit is cold and valve closed leak hole is necessary to ensure small flow in order for the element to see temperature change. Allowing the unit to function.

ELEMENT HYSTERISIS CHARACTERISTICS



HYSTERESIS
The gap found between the upstroke and downstroke curves is the element hysteresis. The hysteresis is caused by element temperature delay and by the friction of parts in motion.

CURVE
The curve illustrates the movement of the element assembly in relation to temperature.

N、F Model Valves Characteristics and Specification

Model System

List : A N40 B1 K3/1 - 160 P

- P → Elements plated Coating, Special requirement(Option).
- 160 → Control Temperature, Means 160°F (Check Table 2 for avaliable)
- K3/1 → Leakhole Code, K3/1 means Element has one leak hole with 2mm (Check Table 3) (Option)
- B1 → Port Connection, Check the Screw Or Flange Standard
- N40 → Port Norminal Bore,
- A → Ho Sing Material, "A" Means Cast Irom(Check Table 1).

"O"Seal Material standard Viton,the other's material for avaliable.

Table 1: Housing Material and Working Pressure Ratings

Code	Material	Working Pressure Ratings (bar)
A	Cast Iron	10
AL	Aluminium	20
Q	Ductile Iron	16
E	Alloy Iron	40
B	Bronze	10
S	Steel	45
SS	Stainless Steel	45

Table 2: Control Temperature °F (° C)

Control Temp °F (°C)	Rated Range °F (°C)	Control Temp °F (°C)	Rated Range °F (°C)
55(13)	47-68 (8-20)	145(63)	140-155 (60-68)
57(14)	50-65 (10-18)	150(65)	140-160 (60-71)
75(24)	68-86 (20-30)	155(68)	150-165 (66-74)
90(32)	81-95 (27-35)	160(71)	150-170 (65-76)
95(35)	85-105 (29-41)	165(74)	160-175 (71-80)
100(38)	90-108 (34-42)	170(76)	163-180 (72-82)
105(41)	95-113 (35-45)	175(79)	170-185 (77-85)
110(43)	100-117 (38-47)	180(82)	172-190 (77-88)
115(46)	104-122 (40-50)	185(85)	180-196 (82-91)
120(49)	110-131 (43-55)	190(87)	185-200 (85-93)
130(54)	120-140 (49-60)	195(91)	188-209 (87-98)
135(57)	125-145 (52-63)	200(93)	194-212 (90-100)
140(60)	130-150 (54-65)	210(99)	198-218 (92-103)

Table 3: Leakhole Code for Element

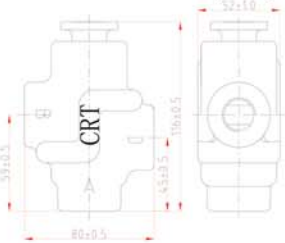
System Pressure	Code	K1	K2	K3	K4	K6	K8	K12	K16
	Hole Sizes	1 mm	1.5 mm	2 mm	3 mm	5 mm	6 mm	10 mm	12.7mm
0.69Bar	L/Min	1.106	1.409	3.162	5.605	12.65	22.495	50.746	90.131
1.38Bar	L/Min	1.564	1.988	4.469	7.915	15.79	31.735	71.574	126.87
2.07Bar	L/Min	1.916	2.435	5.453	9.695	21.85	38.817	87.48	155.27
2.76Bar	L/Min	2.212	2.821	6.324	11.21	25.3	45.065	101.492	179.88
3.45Bar	L/Min	2.473	3.147	7.082	12.497	28.25	49.988	113.61	200.71
4.14Bar	L/Min	2.711	3.446	7.725	13.709	30.9	54.912	123.835	219.65
5.52Bar	L/Min	3.132	3.976	8.937	15.868	35.79	63.622	143.527	254.87
6.9Bar	L/Min	3.499	4.469	9.998	17.723	40.14	71.196	160.569	285.16
8.28Bar	L/Min	3.825	4.885	10.944	19.427	43.93	78.012	175.717	312.05
Hole Cv			0.118	0.264	0.468	1.06	1.88	4.24	7.53

N15 Model

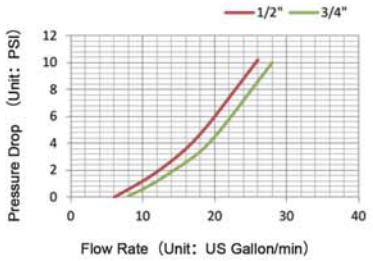
Thread Standard

Code	Thread Size	Cv value	Code	Thread Size	Cv value
N1	NPT1/2"	7.3	Z1	ZG1/2"	7.3
N2	NPT3/4"	8	N2	ZG3/4"	8
B1	BSP1/2"	7.3	J10	1/2"SAE514	7.3
B2	BSP3/4"	8	B2	1/4"SAE514	8
Element Qty:1;Code:0150; Thread standard be specified					

N15 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

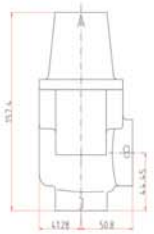


N25 Model

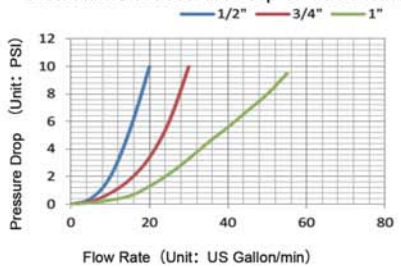
Thread Standard

Code	Thread Size	Cv value	Code	Thread Size	Cv value
N1	NPT1"	10.5	B3	BSP1/2"	7.2
N2	NPT3/4"	9.6	J10	1/2 "SAE514	7.2
N3	NPT1/2"	7.2	J12	3/4 "SAE514	9.6
B1	BSP1"	10.5	J16	1 "SAE514	10.5
B2	BSP3/4"	9.6	Element Qty:1;Code:1000; Thread standard be specified		

N25 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

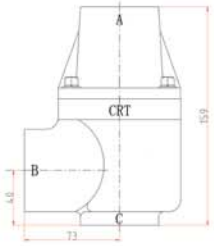


N32 Model

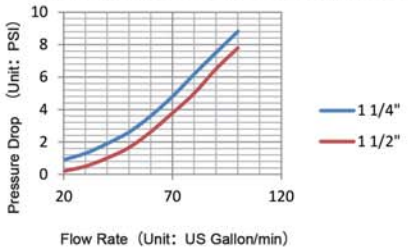
Thread Standard

Code	Thread Size	Cv value	Code	Thread Size	Cv value
N1	NPT1-1/2"	16.3	Z1	ZG1-1/2"	16.3
N2	NPT1-1/4"	14.6	Z2	ZG1-1/4"	14.6
B1	BSP1-1/2"	16.3	J20	1-5/8"SAE514	14.6
B2	BSP1-1/4"	14.6	J24	1-1/2"SAE514	16.3
Element Qty:1;Code:1000; Thread standard be specified。					

N32 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

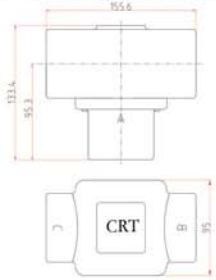


N40 Model

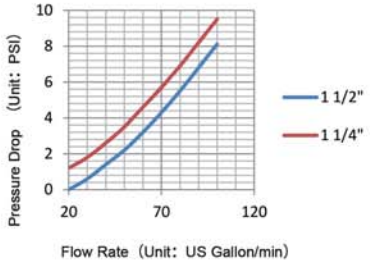
Thread Standard

Code	Thread Size	Cv value	Code	Thread Size	Cv value
N1	NPT1 1/2"	28.9	Z1	ZG1 1/2	28.9
N2	NPT1 1/4"	20.8	Z2	ZG1 1/4	20.8
B1	BSP1 1/2"	28.9	J24	1 1/2 "SAE514	28.9
B2	BSP1 1/4"	20.8	Element Qty:1;Code:1500; Thread standard be specified。		

N40 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

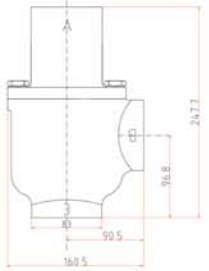


N50 Model

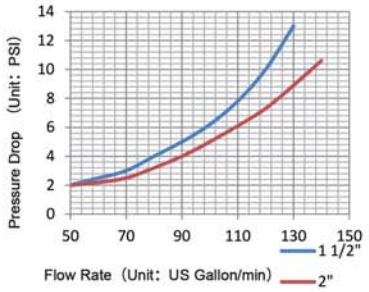
Thread Standard

Code	Thread Size	Cv value	Code	Thread Size	Cv value
N1	NPT1 1/2"	42.1	B2	BSP2"	51.2
N2	NPT2"	51.2	J24	1 1/2"SAE514	42.1
B1	BSP1 1/2"	42.1	J32	2 "SAE514	51.2
Element Qty:1;Code:2000; Thread standard be specified。					

N50 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

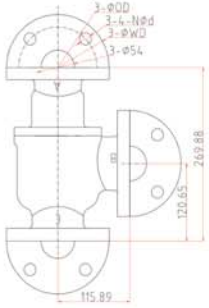


F50 Model

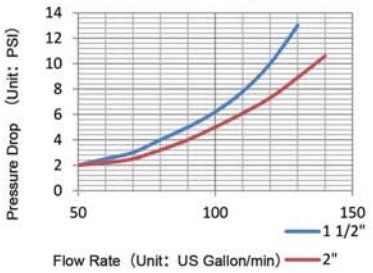
Flange Standard

Code	Standard	Norinal Bore	N-Φd	ΦOD	ΦWD	Cv Value
01	ANSI	2" flange	4-Φ19	120.65	152.4	51.2
02	ND10 /ND16		4-Φ18	125	165	
Element Qty:1;Code:2000; Thread standard be specified。						

F50 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics



T、F Model Valves Characteristics and Specification

Model System

List: A TF40 01 K3/1 - 160 P

- P: Elements plated Coating, Special requirement(Option).
- 160: Control Temperature, Means 160°F (Check Table 2 for avaliable)
- K3/1: Leakhole Code, K3/1 means Element has one leak hole with 2mm (Check Table 3) (Option)
- 01: Port Connection, Check the Flange Standard
- TF40: Port Norminal Bore,
- A: Ho Sing Material, "A" Means Cast Irom(Check Table 1).

"O"Seal Material standard Viton,the other's material for avaliable.

Table 1: Housing Material and Working Pressure Ratings

Code	Material	Working Pressure Ratings (bar)
A	Cast Iron	10
Q	Ductile Iron	16
E	Alloy Iron	40
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S	Steel	45
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Table 2: Control Temperature °F (° C)

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90(32)	81-95 (27-35)	160(71)	150-170 (65-76)
95(35)	85-105 (29-41)	165(74)	160-175 (71-80)
100(38)	90-108 (34-42)	170(76)	163-180 (72-82)
105(41)	95-113 (35-45)	175(79)	170-185 (77-85)
110(43)	100-117 (38-47)	180(82)	172-190 (77-88)
115(46)	104-122 (40-50)	185(85)	180-196 (82-91)
120(49)	110-131 (43-55)	190(87)	185-200 (85-93)
130(54)	120-140 (49-60)	195(91)	188-209 (87-98)
135(57)	125-145 (52-63)	200(93)	194-212 (90-100)
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Table 3: Leakhole Code for Element

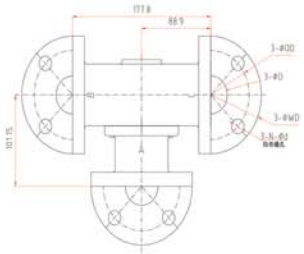
System Pressure	Code	K1	K2	K3	K4	K6	K8	K12	K16
	Hole Sizes	1 mm	1.5 mm	2 mm	3 mm	5 mm	6 mm	10 mm	12.7mm
0.69Bar	L/Min	1.106	1.409	3.162	5.605	12.65	22.495	50.746	90.131
1.38Bar	L/Min	1.564	1.988	4.469	7.915	15.79	31.735	71.574	126.87
2.07Bar	L/Min	1.916	2.435	5.453	9.695	21.85	38.817	87.48	155.27
2.76Bar	L/Min	2.212	2.821	6.324	11.21	25.3	45.065	101.492	179.88
3.45Bar	L/Min	2.473	3.147	7.082	12.497	28.25	49.988	113.61	200.71
4.14Bar	L/Min	2.711	3.446	7.725	13.709	30.9	54.912	123.835	219.65
5.52Bar	L/Min	3.132	3.976	8.937	15.868	35.79	63.622	143.527	254.87
6.9Bar	L/Min	3.499	4.469	9.998	17.723	40.14	71.196	160.569	285.16
8.28Bar	L/Min	3.825	4.885	10.944	19.427	43.93	78.012	175.717	312.05
Hole Cv			0.118	0.264	0.468	1.06	1.88	4.24	7.53

TF40 Model

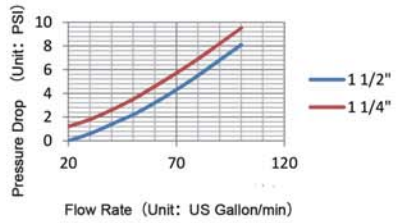
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	1-1/2" flange	4-Φ16	98.5	130	28.9
02	ND10 /ND16		4-Φ18	110	150	
03	ANSI	1-1/4" flange	4-Φ16	98.5	130	20.8
04	ND10 /ND16		4-Φ18	110	150	
Element Qty:1; Code:1500; Flange standard be specified.						

TF40 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

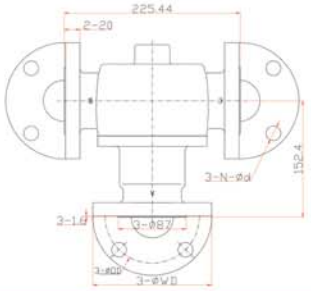


TF50 Model

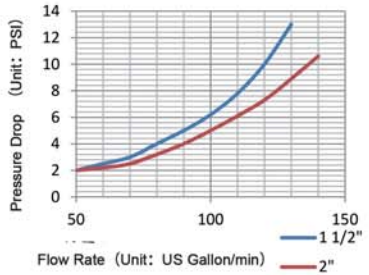
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	2" flange	4-Φ19	120.65	152.4	51.2
02	ND10 ND16		4-Φ18	125	165	
Element Qty:1; Code:2000; Flange standard be specified.						

TF50 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

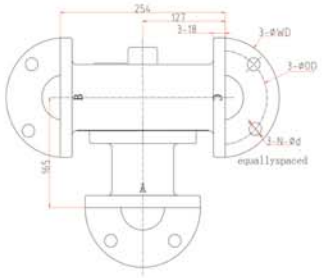


TF65 Model

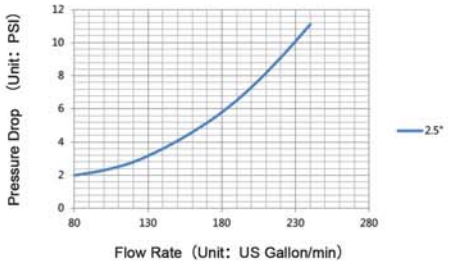
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	2.5" flange	4-Φ19	139.7	177.8	91.4
02	ND10 /ND16		4-Φ18	145	185	
Element Qty:2; Code:2000; Flange standard be specified。						

TF65 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

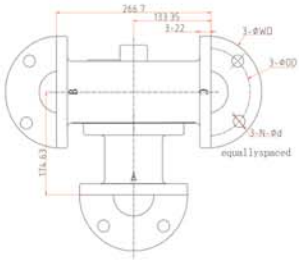


TF80 Model

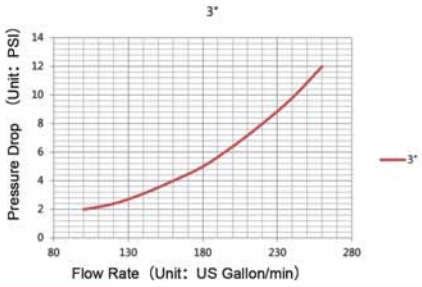
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	3" flange	4-Φ19	152.4	190	101.2
02	ND10 /ND16		8-Φ18	160	200	
Element Qty:2; Code:2000; Flange standard be specified。						

TF80 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

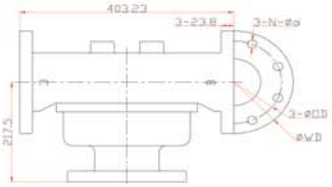


TF100 Model

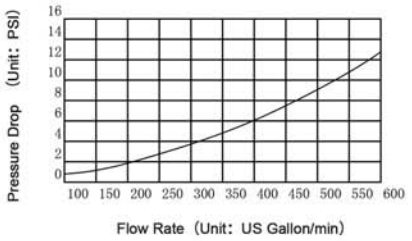
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	4" flange	8-Φ19	190.5	190	203.3
02	ND10 /ND16		8-Φ18	180	224	
Element Qty:4; Code:2000; Flange standard be specified。						

TF100 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

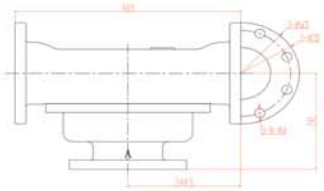


TF125 Model

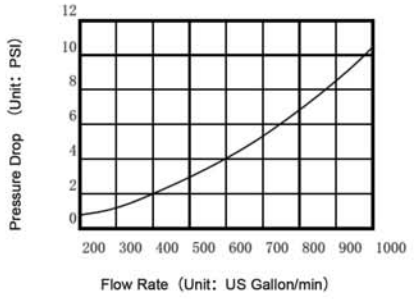
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	5" flange	8-Φ22	216	254	304.2
02	ND10 /ND16		8-Φ18	210	250	
Element Qty:6; Code:2000; Flange standard be specified。						

TF125 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

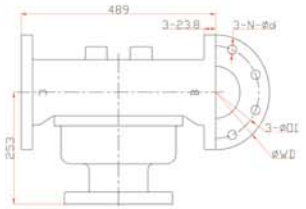


TF150 Model

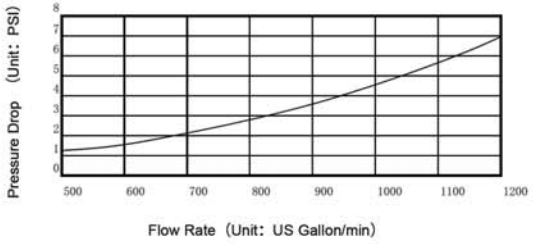
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	6" flange	8-Φ23	240	285	304.2
02	ND10 /ND16		8-Φ23	240	285	
Element Qty:9; Code:2000; Flange standard be specified。						

TF150 Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

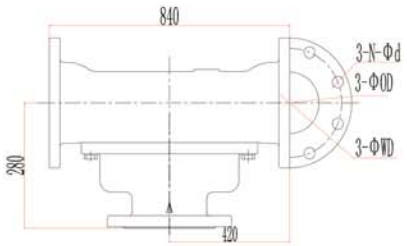


TF200 Model

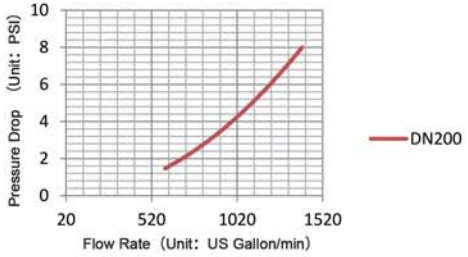
Flange Standard

Code	Standard	Nominal Bore	N-Φd	ΦOD	ΦWD	Cv value
01	ANSI	8" flange	8-Φ23	298.5	345	660.3
02	ND10 /ND16		8-Φ23	295	340	
Element Qty:16; Code:2000; Flange standard be specified。						

TF200 Model Dimension(mm)



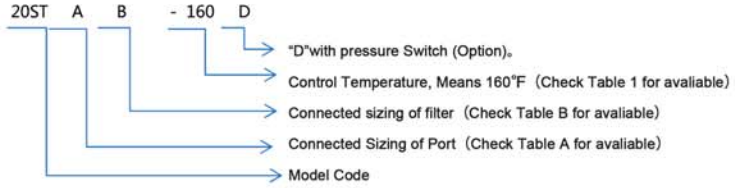
Flow Rate and Pressure Drop Characteristics



ST Model Valves Characteristics and Specification

With Oil Filter's Seat

Model System:



"O"Seal Material standard Viton,the other's material for avaliable.

Housing Mater is Aluminum, Max.Working pressure is 26 Bar

Typical Installation Diagrams:

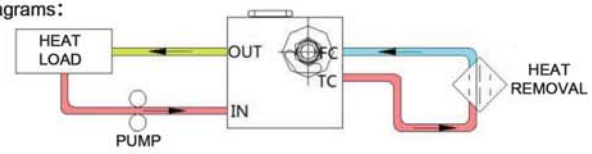


Table 1: Control Temperature ℉ (℃)

Control Temp ℉ (℃)	Rated Range ℉ (℃)	Control Temp ℉ (℃)	Rated Range ℉ (℃)	Control Temp ℉ (℃)	Rated Range ℉ (℃)	Control Temp ℉ (℃)	Rated Range ℉ (℃)
90(32)	80-100 (27-38)	130(54)	120-140 (49-60)	150(65)	140-160 (60-71)	190(87)	185-200(85-93)
100(38)	90-108 (32-42)	135(57)	125-145 (52-63)	160(71)	150-170 (65-76)	195(91)	188-209(87-98)
110(43)	100-117 (38-47)	140(60)	130-150 (54-65)	170(76)	163-180 (72-82)	200(93)	194-212 (90-100)
120(49)	110-131 (43-55)	145(63)	140-155 (60-68)	180(82)	172-190 (77-88)	210(99)	198-218 (92-103)

20ST Model

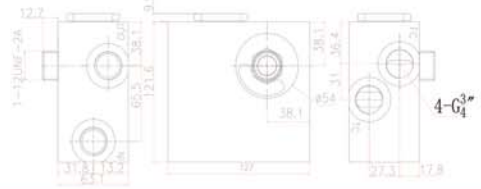
Table A.Connected Sizing of Port

	Code	Nominal Bore
A	B1	BSP3/4"
	B2	BSP1/2"
Note:	Be Customized	

Table B.Connected sizing of filter

	Code	Nominal Bore
B	101	1-12UNF-2A
	102	M26X1.5
Note:	Be Customized	

20ST Model Dimension(mm)



32ST Model

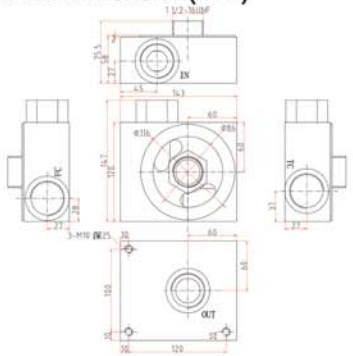
Table A.Connected Sizing of Port

	Code	Nominal Bore
A	B1	1-1/4BSP
	B2	1BSP
Note:	Be Customized	

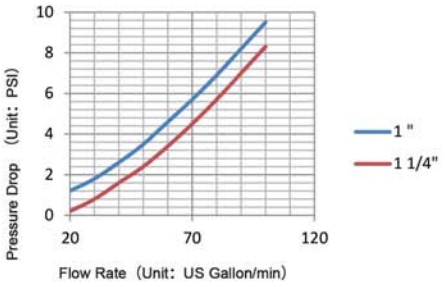
Table B.Connected sizing of filter

	Code	Nominal Bore
B	101	1 1/2-16UNF
	102	M39X1.5
Note:	Be Customized	

32ST Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics



40ST Model

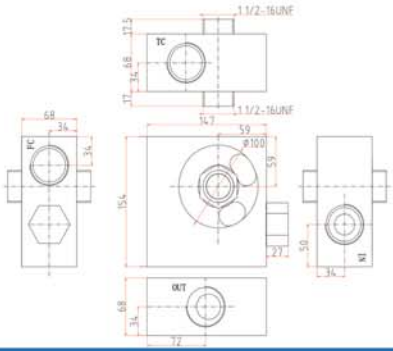
Table A.Connected Sizing of Port

	Code	Nominal Bore
A	B1	1-1/2BSP
	B2	1-1/4BSP
Note:	Be Customized	

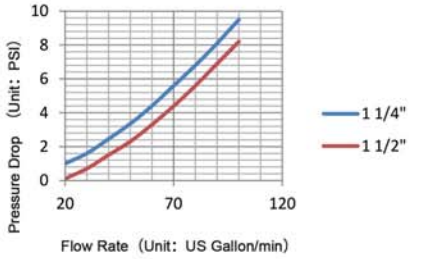
Table B.Connected sizing of filter

	Code	Nominal Bore
B	101	1 1/2-16UNF
	102	M39X1.5
Note:	Be Customized	

40ST Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics



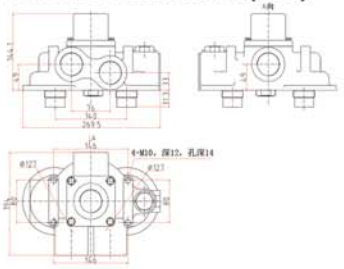
ZL40ST Model Valves Characteristics and Specification

Model System ZL40ST 102 C 160 -P

- Elements plated Coating, Special requirement(Option)
- Control Temperature, Means 160°F (Check Table 4 for avaliable)
- Port Connection (Check Table 3 for avaliable)
- Connected sizing of filter (Check Table 2 for avaliable)
- Model Code (Check Table 1 for avaliable)

Note: 1:Cover Mater is Ductile Iron,Housing Mater is Aluminum, Max.Working pressure is 24 Bar;
2:Element Qty:1;Code:1500;"O"Seal Material is Viton, Cv=28.9。

ZL40ST Model Dimension(mm)



Flow Rate and Pressure Drop Characteristics

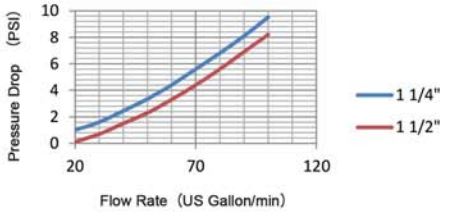


Table 1: Model Code

Code	Nominal Bore	Remark
40	1 1/2	Be Customized
32*	1 1/4	

Table 2: Connected sizing of filter

Code	Nominal Bore	Remark
101	1 1/4-11BSP (dextrorotate)	Be Customized
102	1 1/2-16UN-2A	
103	1 3/4-12UN-2B	

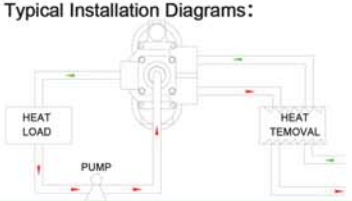
Table 3: Screw Standard

Code	Nominal Bore	Remark
N	NPT	Be Customized
B	BSP (Pl)	
V	BSP (Tr) &JIS	
M	Metric	
J	SAE	

Table 4: Control Temperature °F (°C)

Control Temp °F (°C)	Rated Range °F (°C)	Control Temp °F (°C)	Rated Range °F (°C)
55(13)	47-68 (8-20)	145(63)	140-155 (60-68)
57(14)	50-65 (10-18)	150(65)	140-160 (60-71)
75(24)	68-86 (20-30)	155(68)	150-165 (66-74)
90(32)	81-95 (27-35)	160(71)	150-170 (65-76)
95(35)	85-105 (29-41)	165(74)	160-175 (71-80)
100(38)	90-108 (34-42)	170(76)	163-180 (72-82)
105(41)	95-113 (35-45)	175(79)	170-185 (77-85)
110(43)	100-117 (38-47)	180(82)	172-190 (77-88)
115(46)	104-122 (40-50)	185(85)	180-196 (82-91)
120(49)	110-131 (43-55)	190(87)	185-200 (85-93)
130(54)	120-140 (49-60)	195(91)	188-209 (87-98)
135(57)	125-145 (52-63)	200(93)	194-212 (90-100)
140(60)	130-150 (54-65)	210(99)	198-218 (92-103)

Typical Installation Diagrams:



VDF/VQF Model Electrically/Pneumatically Operated Valve

◆ General

Electrically/Pneumatically Operated 3-Way Temperature Control valves are suitable for a variety of fluids such as water, water/glycol, sea water, lubricating and hydraulic oils. Optional body materials are available for services involving synthetic or fire resistant oils, deionized water and ammonia or freon in oil.

Valves can be directly mounted to reciprocating machinery, such as diesel engines, without vibration isolation. The heavy duty actuators are specially reinforced to provide vibration resistance.

VDF/VQF model are 3-way control valves consisting of a heavy duty rotary valve and either a quarter turn electric or pneumatic actuator. The valves provide a high degree of accuracy and repeatability for accurate temperature control and are equally accurate in mixing or diverting service over a wide flow range.

◆ Basic Data

1. Port Norminal Bore：DN50~DN400
2. Body Material：Cast Iron，Ductile Iron，Bronze，Steel，Stainless Steel
3. Flow Rate：30m3/hr~3400m3/h（Relative leakage not more than 3% of flow）
4. Setting temperature：0~120℃
5. With emergency manual control device

◆Model System

VDF/VQF Model Electrically/Pneumatically Operated Valve

Model System

A VDF 50 -X
- Flange Standard(Check Table 2)
- Port Norminal Bore
- Electrically Operated
- Hosing Material , "A" Means Cast Irom(Check Table 1).

A VQF 50 -X
- Flange Standard(Check Table 2)
- Port Norminal Bore
- Pneumatically Operated
- Hosing Material , "A" Means Cast Irom(Check Table 1).

Table 1 : Material Code

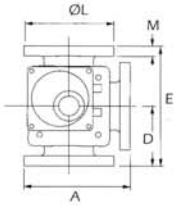
Code	Material	Code	Material
A	Cast Iron	S	steel
Q	Ductile Iror	SS	Stainless Steel
B	Bronze		

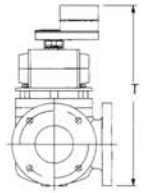
Table2:Flange Code

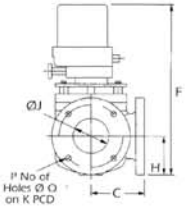
Code	Flange Standard	Code	Flange Standard
01	ANSI 125lb	11	ND6
02	ANSI 150lb	12	ND10
03	ANSI 300lb	13	ND16
21	JIS 10k	21	JIS 5k

◆ Technical Data

VDF Electrically Operated Valve　　VQF Pneumatically Operated Valve



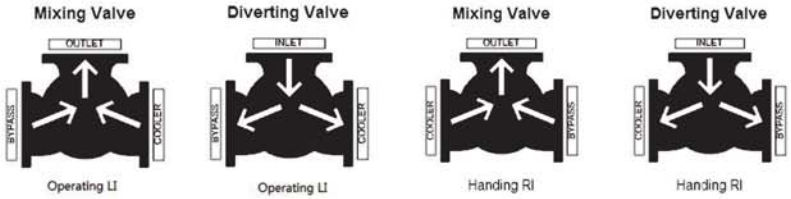




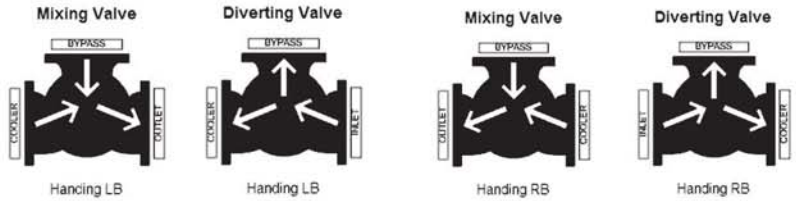
Port Size DN(mm)		2V	3V	4V	6V	8V	10V	12V	14V	16V
Flow Rate(M3/h)		30	80	130	320	555	865	1250	1620	2200
A		197.5	240	260	327	395	469	574	624	706
C		115	140	150	185	225	260	300	340	385
D		115	140	150	185	225	260	300	340	385
E		230	280	300	370	450	520	600	680	770
F		386	421	477	567	676	783	902	1017	1093
H		82.5	100	126	142	170	252	297	339	378
¢J		50	80	100	150	200	250	300	350	400
K	ND6	110	150	170	225	280	335	395	445	495
	ND10	125	160	180	240	295	350	400	460	515
	ND16	125	160	180	240	295	355	410	470	525
	ANSI125lb	120.6	152.4	190.5	241.3	298.5	361.5	431.8	467.3	539.75
	JIS5K	-	-	165	230	280	-	390	-	-
	JIS10K	-	-	175	240	290	-	-	-	-
¢L		165	200	220	285	340	405	460	520	580
M		20	22	24	27	28	28	28	30	32
P	ND6	4	4	4	8	8	12	12	12	16
	ND10	4	8	8	8	8	12	12	16	16
	ND16	4	8	8	8	12	12	12	16	16
	ANSI125lb	4	4	8	8	8	12	12	12	16
	JIS5K			8	8	8		12		
	JIS10K			8	8	8				
Q	ND6	14	19	19	19	19	18	22	22	22
	ND10	18	18	18	23	23	22	22	22	26
	ND16	18	18	18	23	23	26	26	26	30
	ANSI125lb	19	19	19	23	23	25.4	25.4	28.6	28.6
	JIS5K			19	19	23		23		
	JIS10K			19	23	23				
T		391	426	482	607	676	783	917	1032	1138

◆ Valve Handings

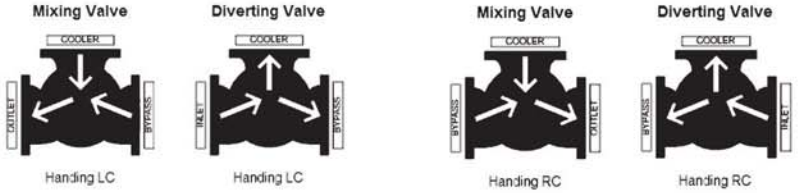
1. VDF/VQF I model



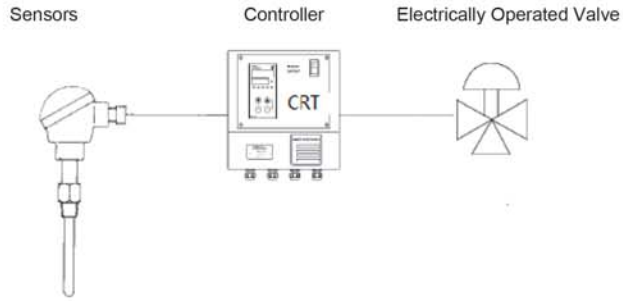
2. VDF/VQF B Model



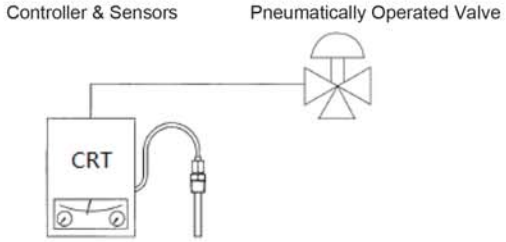
3. VDF/VQF C Model



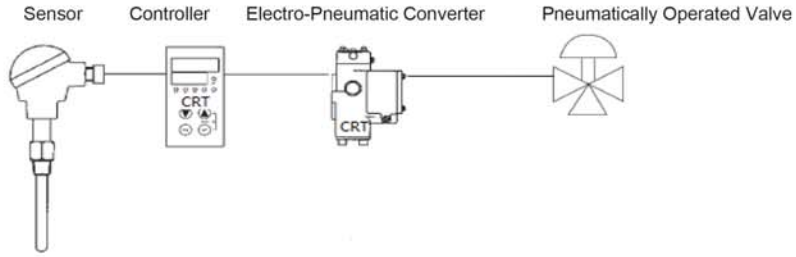
1. Electrically Operated Valve



2. Pneumatically Operated Valve



3. Electro-Pneumatically Operated Valve



ZF Model Self-Acting Temperature Control Valves

◆ General

Self-Acting Temperature Control Valve be composed of two components of control valve and temperature sensor, which will operate in all conditions-without external controls or energy supply. This kind of valve exploit the way which liquid change its volume as temperature fluctuates. Activation occurs at deviations from the set temperature, where liquid from the sensor part influences the stem of the valve through a capillary tube . Thus there are no operating costs for controlling and activating the valve.

Self-Acting Temperature Control Valves are widely used for controlling heating and cooling system for indoor heating , industrial or marine purposes . The valve van regulated cold or hot water , steam , oil or lubricating liquids.

◆ Characteristic

- Without external controls or energy supply;
- Safety & Reliability;
- Easy maintenance;
- Simple construction;
- Individual adjustment;
- Adjusting the temperature based on the requirement;
- Medium：Steam、Hot water、oil、lubricating liquids, etc.

Model System

1.1 Temperature Sensor Description

Double temperature sensor:

S 4-0.5 B
- Model variant,Five(5)models available as A、B、C、D and E
- Stroke change rate (in mm/℃) of secondary sensor
- Closing force（×100N）
- Double-sensor

Single temperature sensor:

B D 4- 0.3
- Stroke change rate (in mm/℃)
- Closing force（×100N）
- Single-sensor
- Sensor shape:B-rod shape, Without mark-spiral shape

1.2 Control Valve Description

Steam control valve:

1 F 1.6-25
- Port nominal bore(in mm)
- Nominal pressure (in MPa)
- Connection type:F-flange ; L-screw
- Number of seat:1-single ; 2-double

3 way hot water control valve

3 F 1.6-100
- Port nominal bore(in mm)
- Nominal pressure (in MPa)
- Connection type:F-flange
- 3-way

1.3 Double Temperature Sensor

Type	Sensor proportion V(Primary)/ V(Secondary)	Secondary sensor		Primary sensor		Response time S	Length of sensor mm	Max. lifting height of plunger mm
		Stroke change rate mm/℃	Temperature adjusting range ℃	Stroke change rate mm/℃	Temperature adjusting range ℃			
S4-0.5A	0.35/1	0.5	0～120	0.175	20～30	≤25	420	12
S4-0.5B	0.5/1			0.25				
S4-0.5C	0.7/1			0.35				
S4-0.5D	1.0/1			0.5				
S4-0.5E	1.4/1			0.7				

1.4 Singe Temperature Sensor

Type	Stroke change rate mm/℃	Temperature adjusting range ℃	Response time S	Length of sensor mm	Max. lifting height of plunger mm
D4-0.3	0.25	0～160	≤25	420	12
BD4-0.3				150	
D4-0.5	0.5	0～120		420	
BD4-0.5		40～160		300	
D4-1.0	1	0～60		420	
BD4-1.0		30～90		400	
BD8-1.0		60～120	120	710	

Note:

1 The standard capillary tube length is three meters,
but are available with up to twenty meters tube dependding on the customer's needs.

2 The response time means the time responsed liquid medium

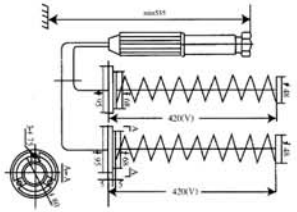
1.5 Steam Control Valve

Type	Port Nominal Bore mm	Medium	Steam		Hot water		Housing Material
			Steam flow rate kg/h	Max. differential pressure bar (kgf/cm2)	Flow Rate t/h	Max. differential pressure bar (kgf/cm2)	
1F1.6-15	15	steam hot water	110	1.764	0.85	1.59	Cast iron Cast steel Stainless Steel
1F1.6-20	20		200	0.735	1.54	0.686	
1F1.6-25	25		320	0.44	2.26	0.441	
2F1.6-32	32		520	2.351	4	2.315	
2F1.6-40	40		800	2.157	6	1.569	
2F1.6-50	50		1400	1.863	9.5	1.529	
2F1.6-65	65		2000	0.98	15.2	0.98	
2F1.6-80	80		3200	0.784	24	0.746	
2F1.6-100	100		5000	0.588	37	0.53	
2F1.6-125	125		7812	0.3	58	0.3	
2F1.6-150	150		11250	0.19	83	0.19	

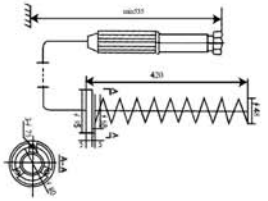
1.6 3-Way Hot Water Control Valve

Type	Port Nominal Bore mm	Medium	Hot water Flow Rate t/h	Housing Material
3F1.6-25	25	hot water	2.26	Cast iron Cast steel Stainless Steel
3F1.6-32	32		4	
3F1.6-40	40		6	
3F1.6-50	50		9.5	
3F1.6-65	65		15.5	
3F1.6-80	80		24	
3F1.6-100	100		37	

◆ Sensor Dimension(mm)

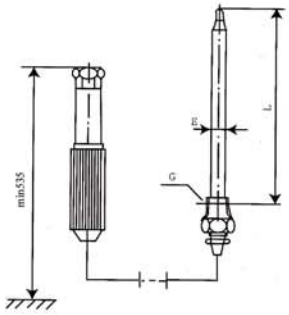


Sprial double - sensor



Sprial single - sensor

Model	L	E	G	
BD4-0.3	150	22	ZG1"	M36×2
BD4-0.5	300	22	ZG1"	M36×2
BD4-1.0	400	23	ZG1"	M36×2
BD8-1.0	710	25	G1¼"	M42×2

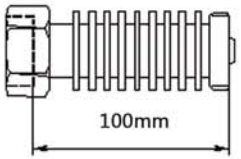


Rod single - sensor

◆ Cooling Unit

◆Application

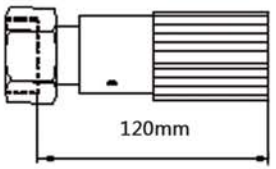
The cooling units are used in connection with control valves, thermostats and valve motors to protect the stuffing box. At valve temperatures are between 150°C and 250°C, a cooling unit of type LQ connected downwards should be applied.



LQ Cooling Unit

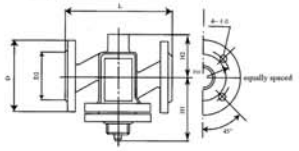
◆ Manual Adjusting Device

The device has a built-in thermostat stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 150°C).

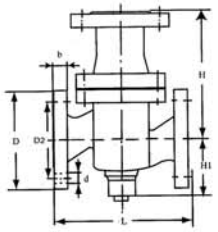


Manual Adjusting Device

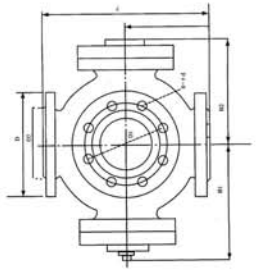
◆ Control Valves Dimension(mm)



1F-1.6、2F-1.6 steam control valve



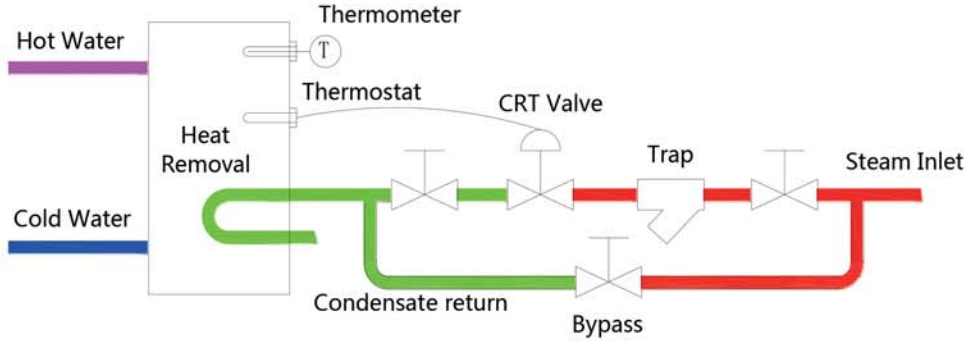
3F1.6-25~50 hot water control valve

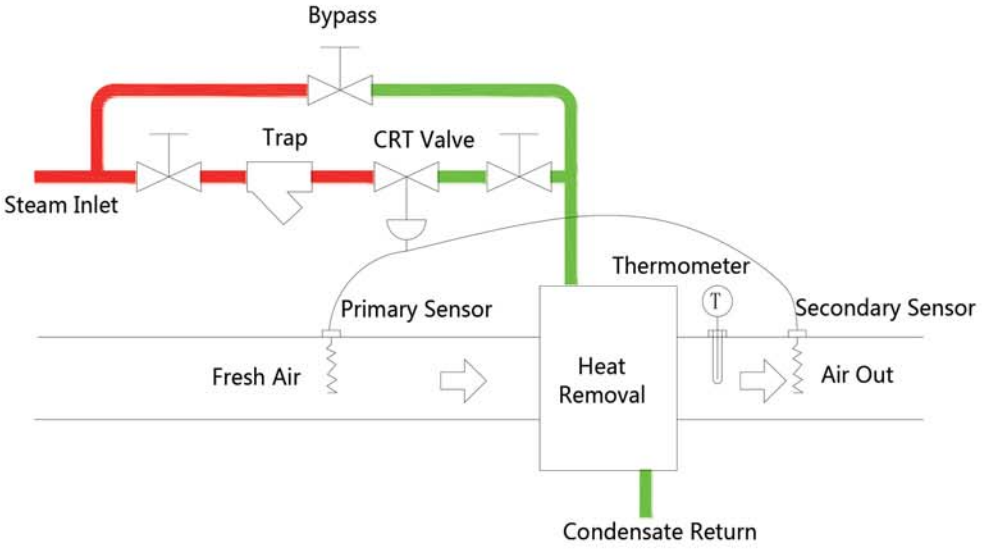


3F1.6-65~100 hot water control valve

Type	DN	L	H1	H2	D	D2	¢ -N	Weight (Kg)	Valve seat
1F1.6-15	15	130	80	60	95	65	4X14	3.1	Single
1F1.6-20	20	150	85	65	105	70	4X14	4.2	
1F1.6-25	25	160	95	70	115	85	4X14	7	Balanced
1F1.6-32	32	180	115	82	140	100	4X18	9	
2F1.6-40	40	200	132	92	150	110	4X18	11	
2F1.6-50	50	230	142	108	165	125	4X18	16	
2F1.6-65	65	290	147	192	185	145	4X18	21	
2F1.6-80	80	310	157	202	200	160	8X18	43	
2F1.6-100	100	350	180	215	220	180	8X18	61	
2F1.6-125	125	400	240	170	250	210	8X18	70	
2F1.6-150	150	480	257	190	280	240	8X22	95	
3F1.6-25	25	160	130	70	115	85	4X14	9	Double
3F1.6-32	32	180	150	75	140	100	4X18	13	
3F1.6-40	40	200	160	85	150	110	4X18	17	
3F1.6-50	50	230	190	95	165	125	4X18	23	
3F1.6-65	65	290	170	150	180	145	4X18	45	
3F1.6-80	80	310	182	165	200	160	8X18	53	
3F1.6-100	100	350	232	200	220	180	8X18	76	

◆ Typical Installation Diagrams





VALVE PARAMETER CALCULATION

Pressure Drop

CRT Valves are designed to produce minimal pressure drop. The normal recommendation in sizing valves is to select a pressure drop between 0.14 to 0.5 bar (2 and 7 Psi).

Valve Flow Coefficient

A Cv is the valve's flow coefficient (Cv), it is defined as the number of US gallons per minute of room temperature water which will flow through the valve with a pressure drop of 1 Psi across the valve.

The basic formula to find a valve's Cv is shown below. (Kv is metric coefficient).

$Kv = Q\sqrt{\frac{SG}{DP}}$

Q=Flow in m^3/h

DP=Pressure Drop in Bar

SG=Specific gravity of fluid (Water = 1.0)

Kv= Valve flow coefficient

There are two other ways that this formula can be written, to find the flow in m3/hr and to find the pressure drop in bar.

$Q = Kv\sqrt{\frac{DP}{SG}}$ $\quad DP = \left(\frac{Q}{Kv}\right)^2 SG$

Examples of Formula Calculation

To find the ideal Kv of a valve to pass 80m3/hr of water with a pressure drop of 0.3 bar across the valve.

$Kv = Q\sqrt{\frac{SG}{DP}} \quad \therefore \quad 80\sqrt{\frac{1}{0.3}} = 146$

What is the flowrate through a valve having a Kv of 200 and a pressure drop of 0.5 Bar?

$Q=Kv\sqrt{\frac{DP}{SG}} = 200\sqrt{\frac{0.5}{1}} = 141.4\ m^3/h$

Water is flowing at 145m3/hr through a valve having a Kv of 175, what is the pressure drop across the

$DP\left(\frac{Q}{Kv}\right)^2 SG \quad \therefore \quad \left(\frac{145}{175}\right)^2 \times 1 = 0.69\ Bar$

$Cv = Q\sqrt{\frac{SG}{DP}}$

Q = Flow in US gallons per minute

Dp = Pressure Drop (Psi)

SG = Specific gravity of fluid (Water = 1.0)

Cv = Valve flow coefficient

There are two other ways that this formula can be written, to find the flow in US gallons per minute and to find the pressure drop of a valve in Psi.

$Q = Cv\sqrt{\frac{DP}{SG}}$ $\quad DP = \left(\frac{Q}{Cv}\right)^2 SG$

Examples of Formula Calculation

To find the ideal Cv of a valve required to pass 50 usgpm of water with a pressure drop of 4 psi across the valve.

$Cv = Q\sqrt{\frac{SG}{DP}} \quad \therefore \quad 50\sqrt{\frac{1}{4}} = 25$

What is the flowrate through a valve having a Cv of 203 and a pressure drop of 4 Psi?

$Q=Cv\sqrt{\frac{DP}{SG}} = 203\sqrt{\frac{4}{1}} = 406 usgpm$

Water is flowing at 640 usgpm through a valve having a Cv of 203, what is the pressure drop across

$DP\left(\frac{Q}{Cv}\right)^2 SG \quad \therefore \quad \left(\frac{640}{203}\right)^2 \times 1.0 = 9.94\ Psi$

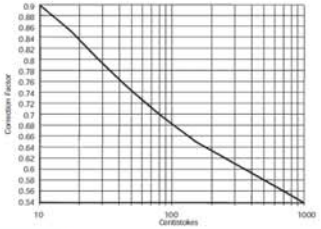
SAE OILS VISCOSITIES

viscosities of SAE oils at 40°C (CST)

	OIL	CST			
ENGINE OILS	SAE 5W	6.8	GEAR OILS	SAE 75W	22
	SAE 10W	32		SAE 80W	46
	SAE 20	46		SAE 85W	100
	SAE 20W	68		SAE 90	150
	SAE 30	100		SAE 140	460
	SAE 40	150			
	SAE 50	220			

(Based on famous oil manufacturers published data.)

VISCOSITY CORRECTION GRAPH



VISCOSITY CORRECTION

For the selection of valves for use with more viscous fluids than water the following must be calculated in addition to using the reviously mentioned formulas.

1 Viscosity: Find the viscosity of the fluid which shall be used in the valve. This will generally be in centistokes – ISO grade oil is easy to calculate as the grade no. is the viscosity. i.e. ISO VG 46 = 46 centistokes at 40°C.

2 Viscosity Correction : Once the viscosity value has been found , by using the graph below the Flow Coefficient correction factor can be established. The correction value that is produced by the graph should then be multiplied by the original Flow Coefficient . This gives the corrected Flow Coefficient which can then be used in the standard formulas.

Example: 100 CST = correction factor of 0.68

0.68 x Flow Coefficient = corrected Flow Coefficient (Kv or Cv)

FLOWRATE CONVERSION

	m3/hr	Litre/min	IMP Gallon/min	US Gallon/min
1 m3/hr =	*****	16.67	3.666	4.4
1 Litre/min =	0.06	*****	0.22	0.264
1 Imp Gallon/min =	0.273	4.546	*****	1.2
1 US Gallon/min =	0.227	3.787	0.833	*****

PRESSURE CONVERSION

	PSI	Bar	KG/cm2	Atm	KPa	In. water	In. merc
1 PSI =	*****	0.069	0.07	0.068	6.89	27.6	2.04
1 Bar =	14.5	*****	1.02	0.987	100	401.4	29.5
1 KG/cm2 =	14.22	0.981	*****	0.968	98	393.6	28.9
1 Atm =	14.7	1.013	1.033	*****	101.3	406.7	29.9
1 Kpa =	0.145	0.01	0.0102	0.0098	*****	4.01	0.295
1 In. water =	0.036	0.0025	0.0025	0.0025	0.25	*****	0.07
1 In. merc =	0.49	0.034	0.035	0.033	3.39	13.6	*****

TROUBLE SHOOTING

In the event of the cooling system failing to operate correctly the following guide may help to identify or locate the problem.

System temperature too Low

1. Insufficient heat transferred to coolant to maintain temperature.
2. Wrong nominal element temperature selected.
3. Thermostatic valve greatly oversized or cooling capacity of system much greater than required.
4. Thermostatic valve installed backwards, thus sending water to cooler at low temperatures.
5. Worn or leaking O-rings allowing leakage to cooler.
6. Excessive pressure drops across the valve.
7. Foreign matter preventing closure of elements.
8. Bi-metallic type thermometers will indicate low if calibrated in oil.

System temperature too high

1. Cooling capacity of system is in adequate.
2. Thermostatic valve too small for flow rate causing high pressure drops and possible cavitation problems.
3. Valve installed backwards, reducing flow to cooler as temperature increases.
4. By-pass will not close due to worn or pitted seats, sliding valve, seals, etc.
5. Elements may have suffered sufficient over-temperature to prevent full movement, thus preventing full cooling.
6. Solids building up on element sliding valve preventing correct operation.
7. Foreign granules stuck between sliding valve and seat.