STEAM TRAPS
DRAIN SEPARATOR
AIR TRAP
SIGHT GLASS

8

Steam traps can retain steam in steam pipeline or machine and discharge unnecessary drain. In doing so, they can prevent decrease of heat exchange and the occurrence of problems such as water hammer etc.
To select the most suitable steam trap, considerations must be paid on the actual conditions.
Drain separators are able to separate water drops or drain occurred in steam/air pipeline efficiently.
Air traps can discharge water drops or drain from air pipeline automatically.
Sight glasses are ideal products for checking fluid in pipeline.

■ THERMOSTATIC TYPE

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
AT-1A,1S	Screwed	15~25(½″~1″)	Max. 100kPa	Cast bronze	Brass	142
AT-4A,4S	Screwed	15·20(½″·¾″)	Max. 0.35	Cast bronze	Stainless steel	143
ATB-5	Screwed	15~25(½″~1″)	Max. 1.0	Cast iron	Stainless steel	144
ATB-5F	Flanged	15~50(½″~2″)				
AT-6	Screwed	15~25(½″~1″)	Max. 1.0	Mild steel or Stainless steel	Stainless steel	146
AT-6F	Flanged					
AT-6FB	Flanged	15~25(½″~1″)	0.07~1.0	Mild steel or Stainless steel	Stainless steel	147

■ DISC TYPE

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
AD-17	Screwed	15~25(½″~1″)	0.03~1.6	Stainless steel	Stainless steel	148
AD-17F	Flanged					
AD-18	Screwed	15~50(½″~2″)	0.1~2.0	Stainless steel	Stainless steel	149
AD-18F	Flanged					

■ INVERTED BUCKET TYPE

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
AK-1H	Screwed	15~25(½″~1″)	0.035~0.7	Cast iron	Stainless steel	150
			0.035~1.0			
AK-2H	Flanged	32~80(1¼″~3″)	0.02~0.7	Cast iron	Stainless steel	151
		32~50(1¼″~2″)	0.02~1.0			
AK-5	Screwed	15~25(½″~1″)	0.01~2.0	Ductile cast iron	Stainless steel	152
AK-5F	Flanged					
AK-16	Screwed	15~25(½″~1″)	0.01~1.6	Stainless steel	Stainless steel	153

■ FLOAT TYPE

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
AF-12	Screwed	15~25(½″~1″)	Max. 0.4	Cast iron	Stainless steel	154
AF-15F	Flanged	20~50(¾″~2″)	Max. 0.9 or 0.4	Cast iron or Ductile cast iron	Stainless steel	155
AF-16F	Flanged	50(2″)	Max. 0.9	Cast iron	Stainless steel	156
AF-11H	Screwed	15~50(½″~2″)	Max. 0.5	Cast iron	Stainless steel	157
AF-11HF	Flanged	65·80(2½″·3″)	Max. 0.35	Cast iron	Stainless steel	158
AF-20F	Flanged	25~50(1″~2″)	Max. 1.0	Ductile cast iron	Stainless steel	159

■ STEAM TRAP SILENCERS(FOR OUTLET SIDE OF STEAM TRAP)

Model name	End connection	Size	Applicable pressure(MPa)	Materials	Page
BH-1	Screwed	15~25(½″-1″)	Max. 1.6	Mild steel or Stainless steel	147

■ DRAIN SEPARATOR

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
BA-5	Screwed	15~50(½″~2″)	Max. 2.0(for steam) or Max. 0.98(for air)	Ductile cast iron	Ductile cast iron	160

■ AIR TRAP

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
AK-21	Screwed	15~25(½″~1″)	0.01~0.98	Cast iron	Stainless steel	162

■ SIGHT GLASS

Model name	End connection	Size	Applicable pressure(MPa)	Materials		Page
				Body	Trim	
BS-1,1A	Screwed	15~25(½″~1″)	Max. 1.0	Ductile cast iron	Ductile cast iron & Stainless steel	163
BS-2,2A			Max. 0.4			

AT-1A, 1S Type Radiator Trap

Bellows type Max. 100kPa
Trap for heater radiator

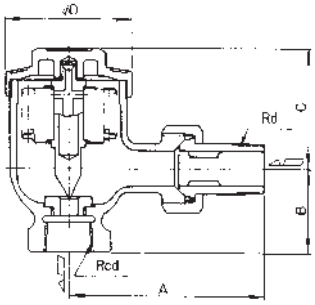
Bellows type radiator trap for Max. 100 kPa heater radiator can also be used as the pipe end trap for low pressure pipeline.

AT-1A Type

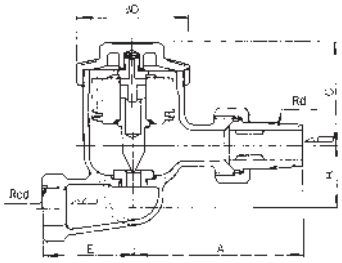
AT-1S Type

CONSTRUCTION

AT-1A Type



AT-1S Type



FEATURES

- Protects from freezing by the construction for no accumlation of drain.
- Rapidly discharge drain and air that occur when beginning of operation.

SPECIFICATIONS

Model name	AT-1A	AT-1S
Code name	**AT1A-F**	**AT1S-F**
Shape	Angle Type	Straight Type
Applicable fulid	Steam	
Fluid temperature	Max. 120℃	
Applicable pressure	Max. 100kPa	
End connection	Inlet:Screwed JIS R(Union joint), Outlet:Screwed JIS Rc	
Materials	Body(Cast bronze chrome plated), Disc & seat(Brass), Bellows(Phosphor bronze)	
Valve body pressure test	Hydraulic 200kPa(Bellows:Hydraulic 120kPa)	

DIMENSIONS AT-1A Type (Angle type)

(mm)

Size	d	A	B	C	D	Mass(kg)
15(½″)	½″	80	35	46	52	0.55
20(¾″)	¾″	87	41	52.5	57	0.72
25(1″)	1″	105	52	61.5	57	1.32

DIMENSIONS AT-1S Type (Straight type)

(mm)

Size	d	A	B	C	D	E	Mass(kg)
15(½″)	½″	80	28	48	52	43	0.66
20(¾″)	¾″	87	34	52.5	57	48	0.94
25(1″)	1″	105	40	64.5	57	60	1.56

FLOW CHART

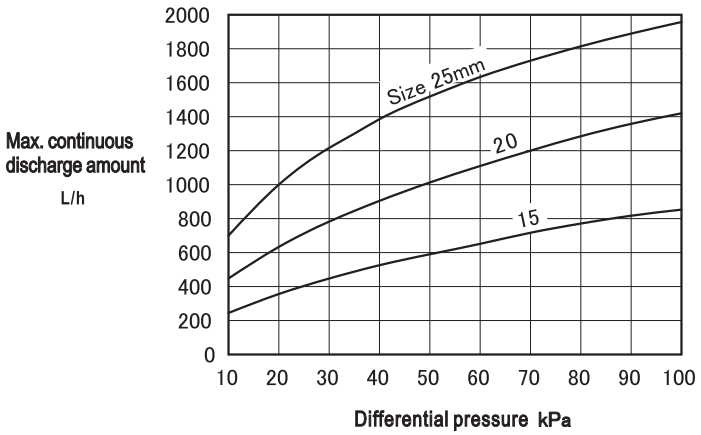


TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

Size \ Differential pressure (kPa)	10	35	50	70	100
15(½″)	240	470	570	690	840
20(¾″)	430	830	1000	1190	1390
25(1″)	700	1300	1500	1740	1930

POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.

In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

CAUTIONS ON INSTALLATION

- Confirm the direction of flow before installation.
- If union nipple is used, take cares not to damage the sealing surface between the product and the main body.
- Drain may accumulate in the valve if the outlet side piping is an ascending type. To prevent freezing in such case, install drain hole.

AT-4A, 4S Type Radiator Trap

Thermal wax type
MAX. 0.35MPa

Thermal wax type radiator trap for heater radiator Max. 0.35MPa can also be used as pipe end trap.

AT-4A Type

AT-4S Type

FEATURES

- Designed to prevent accumulation of drain in positive gradient piping, thus can prevent corrosion of pipe and freezing.
- Rapidly discharge drain and air when air supply starts.
- Rapidly close after drain is discharged.
- Hexagonal union pipe at inlet, allows easy installation.

SPECIFICATIONS

Model name	AT-4A	AT-4S
Code name	**AT4A-J**	**AT4S-J**
Shape	Angle Type	Straight Type
Applicable fulid	Steam	
Fluid temperature	Max. 150℃	
Applicable pressure	Max. 0.35MPa	
End connection	Inlet:Screwed JIS R(Union joint), Outlet:Screwed JIS Rc	
Materials	Body(Cast bronze), Disc & seat(Stainless steel)	
Valve body pressure test	Hydraulic 0.53MPa	

DIMENSIONS AT-4A Type (Angle type)

(mm)

Size	d	A	B	C	Mass(kg)
15(½″)	½″	80	35	49	0.53
20(¾″)	¾″	87	41	49	0.57

DIMENSIONS AT-4S Type (Straight type)

(mm)

Size	d	A	B	C	E	Mass(kg)
15(½″)	½″	80	28	49	43	0.6
20(¾″)	¾″	87	34	49	48	0.67

FLOW CHART

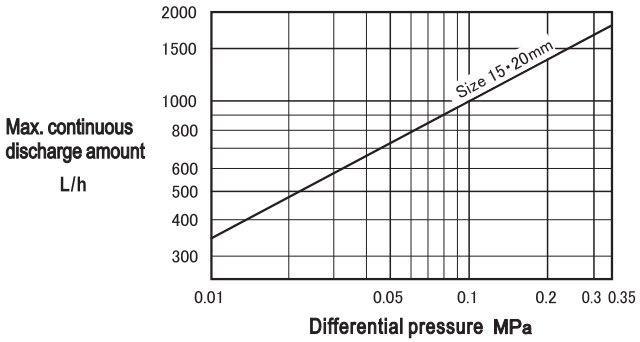


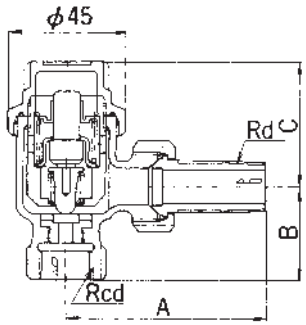
TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

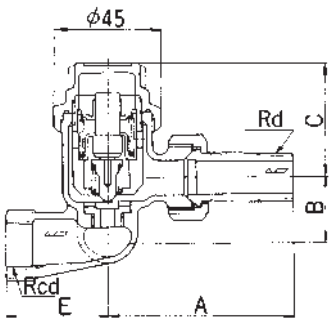
Differential pressure (MPa)	0.01	0.035	0.05	0.07	0.1	0.2	0.3	0.35
Discharge amount	350	620	730	850	1000	1370	1650	1800

CONSTRUCTION

AT-4A Type



AT-4S Type



POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.

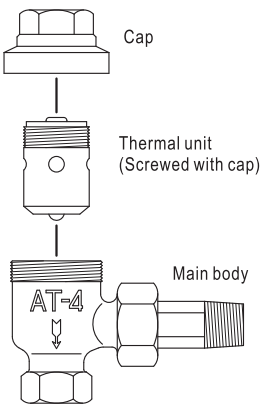
In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

CAUTIONS ON INSTALLATION

- Confirm the direction of flow before installation.
- If union nipple is used, take cares not to damage the sealing surface between the product and the main body.
- Drain may accumulate in the valve if the outlet side piping is an ascending type. To prevent freezing in such case, install drain hole.

REPLACING THERMAL UNIT

Remove the cap and replace thermal unit.



ATB-5, 5F Type Steam Trap

for Pipeline, Header, etc.

Thermo static
Max. 1.0MPa

Thermstatic trap ATB-5 Type is a compact structure with triple functions, including trap, bypass and stop valve functions, for realizing effective utilization of space and cost reduction.

ATB-5 Type

ATB-5F Type

Switching lever fixing type

Switching lever (during installation)

FEATURES

- Large discharge amount, suitable for pipe end or large equipment.
- Free installation in vertical, horizontal or lateral style [1].
- Operate at 10℃[2] below the temperature of saturated steam, prevent discharge of steam and idle operation of valve, and contribute to energy saving.
- Size 32~50mm valves have removable disc and are highly air tight and durable.
- Test valve can be installed on trap directly.

Note:
1) Size 32~50mm valves must be installed vertically to horizontal pipe.
2) Size 32~50mm valves start to operate at 15℃ below temperature of saturated steam.

SPECIFICATIONS

Model name	ATB-5	ATB-5F
Code name	**ATB5-G**	**ATB5F-G**
Type	Thermostatic	
Size	15・20・25(½″・¾″・1″)	15~50(½″~2″)
Applicable fluid	Saturated steam*1.	
Fluid temperature	Max. 184℃	
Applicable pressure	Max. 1.0MPa	
End connection	Screwed JIS Rc	Flanged JIS 10KFF
Materials	Body(Cast iron), Disc & Seat(Stainless steel), Cock(Cast bronze), Thermo element (Stainless steel)	
Allowed back pressure	Within 50% of pressure on inlet side(Minimum pressure difference:0.03MPa)	
Valve body pressure test	Steam:1.5MPa, Water:0.5MPa	

*1. The valve can not be used for super heated steam line.
*2. Please install products with size 32~50mm uprightly.

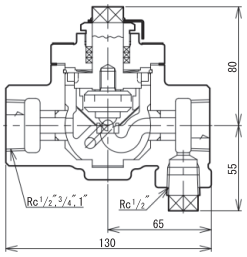
TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

Size	Differential pressure(MPa)	0.03	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
15~25mm (½″~1″)	Water	650	900	1350	1900	2400	2800	3150	3400	3700	3900	4150	4300
	Hot water of saturated steam temperature−20℃	600	800	1150	1700	2100	2400	2700	2950	3150	3300	3450	3550
32~50mm (1¼″~2″)	Water	1450	1870	2650	3750	4600	5310	5940	6510	7030	7510	7970	8400
	Hot water of saturated steam temperature−25℃	1340	1650	2250	3150	3830	4360	4800	5160	5470	5750	6000	6250

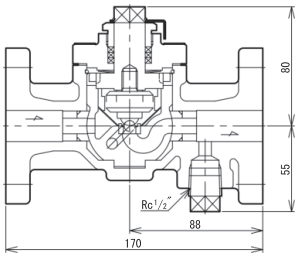
CONSTRUCTION (Unit:mm)

ATB-5 Type

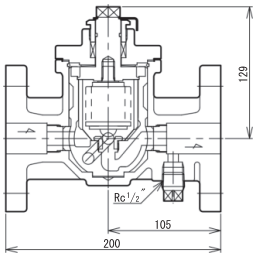


Weight:3.1kg

ATB-5F Type (Size 15~25mm)



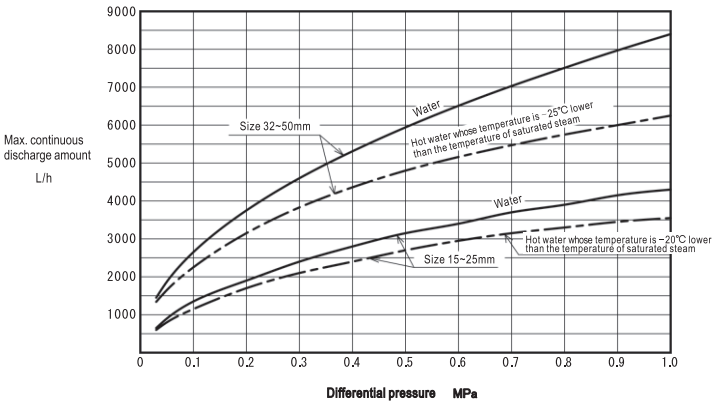
ATB-5F Type(Size 32~50mm)



MASS (ATB-5F Type)

Size	Mass(kg)
15(½″)	4.2
20(¾″)	4.5
25(1″)	5.8
32(1¼″)	10
40(1½″)	11
50(2″)	12

FLOW CHART



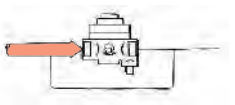
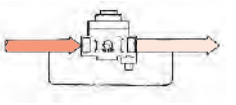
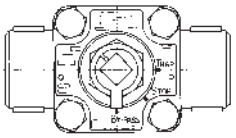
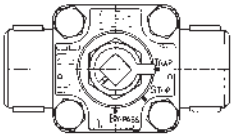
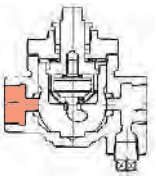
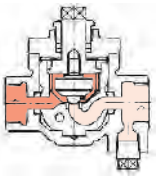
POINTS FOR SELECTION

1. Generally, hot water whose temperature is 20℃ lower than the temperature of saturated steam (for size 15~25mm valves) and hot water whose temperature is 25℃ lower than the temperature of saturated steam (for size 32~50mm valves) are used to decide the discharge amount of steam trap.
2. Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.
3. In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve. The allowed back pressure is up to 50% of the pressure of inlet side.
4. If the discharge amount of one valve is not enough, use multiple valves or select other types of valves.

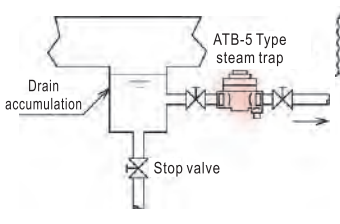
DATA/ATB-5, 5F Type Steam Trap

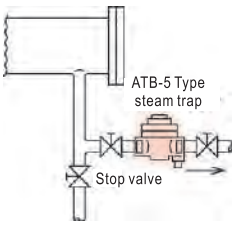
STEAM TRAP

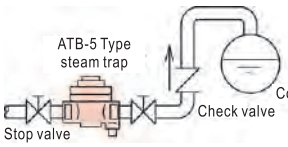
⊕ Stop valve
⊕ Bypass
Triple functions

	BY-PASS	STOP	TRAP
Function			
Handle position (Top view)			
Passage within trap (Front view)			

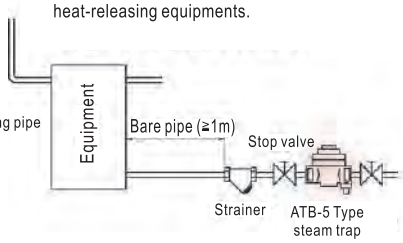
PIPING EXAMPLE







Note: Do not apply thermal insulation on steam trap. Make sure it is installed on a bare pipe at least 1 meter from heat-releasing equipments.



POINTS FOR INSTALLATION

① The arrow mark must match with the direction of drain flow. The position of the trap should be as low as possible to allow drain flow into the trap. Make sure the handle is at the STOP position.

② The inlet pipe should be naked pipe that is at least 1m in length. The trap should not be applied with any thermal insulation.

③ When installing trap on the main steam pipe, install a separator (for drain accumulation) with the same diameter as of the main pipe.

④ In the event the outlet piping is ascending type, install check valve at the outlet side, and make sure discharge the drain into pipe or device from top.

⑤ When making the initial aeration, switch the handle to BY-PASS position and blow off dirt or scale in the pipe. Then switch the handle to TRAP (steam trap) position and start normal operation.

⑥ If test valve is necessary for conforming operation or freezing prevention, install the test valve at the plug (Rc½″screw). In the event there is risk of freezing or the valve has not been used for a long time, discharge drain completely after the operation.

⑦ Leave sufficient space for maintenance or disassembly. When disassembling,switch the handle to STOP position. Make sure there is not steam pressure and the surface temperature is below 80℃ before disassemble. Do not turn the handle (cock) when disassembling.

⑧ When installing multiple steam traps at the same position, the height of the inlet side of each trap should be the same.

⑨ Steam trap should not be installed at a place where temperature is higher than the temperature of drain discharged.

⑩ There must be strainer at the inlet side of steam trap.

⑪ Close the valve if the thermo element of steam trap is damaged.

⑫ If the discharge side of steam trap faces open air, cares should be taken to avoid any danger that may occur in such case. In addition, install BH-1 silencer to reduce noise.

⑬ Do not apply any thermal insulation on steam trap.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AT-6, 6F Type Steam Trap

for Pipeline, Header, etc.

Thermostatic
Max. 1.0MPa

AT-6 Type series of thermostatic type that can rapidly discharge air and drain during beginning of steam supply, and allow effective utilization of steam and save energy instead of disc trap.

AT-6 Type

AT-6F Type

FEATURES

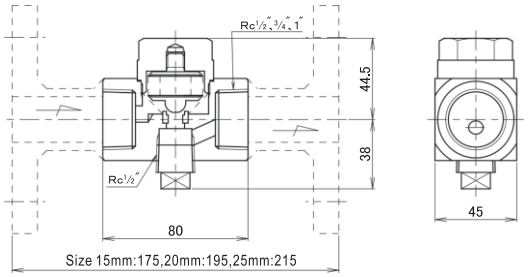
- Stainless steel thermal element, highly corrosion resistant and durable.
- Free installation, vertically, horizontally or laterally.
- Operate at a temperature 10℃ lower than the temperature of saturated steam. No discharge of raw steam or idle running of valve disc. Energy saving.

SPECIFICATIONS

Model name		AT-6		AT-6F	
Code name		AT6-N	AT6-D	AT6F-N	AT6F-D
Type		Thermostatic			
Size		15・20・25(½″・¾″・1″)			
Applicable fluid		Saturated steam*1.			
Fluid temperature		Max. 184℃			
Applicable pressure		Max. 1.0MPa			
End connection		Screwed JIS Rc		Flanged JIS 10KFF*2.	
Materials	Body	Mild steel	Stainless steel	Mild steel	Stainless steel
	Trim	Disc & Seat(Stainless steel), Thermo element(Stainless steel)			
Allowed back pressure		Within 50% of pressure on inlet side(Minimum pressure difference:0.03MPa)			
Valve body pressure test		Steam:1.5MPa, Water:0.5MPa			

*1. The valve can not be used for super heated steam line.
*2. Stainless steel body with Flanged JIS 10KRF is available.

CONSTRUCTION (Unit:mm)



MASS

(kg)

Model name \ Size	15(½″)	20(¾″)	25(1″)
AT-6	1.4	1.3	1.2
AT-6F	2.7	3	3.9

TABLE FOR CAPACITY (Max. continual discharge amount)

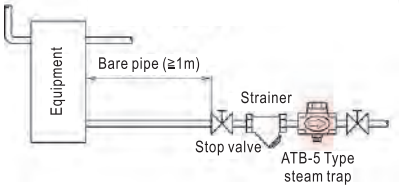
(L/h)

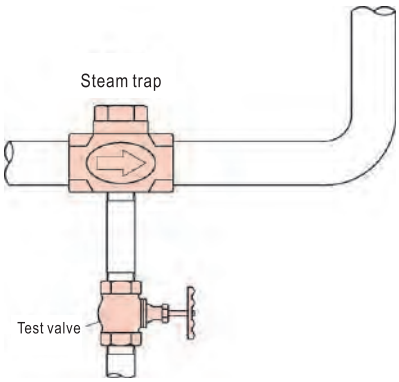
Differential pressure (MPa)		0.03	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Discharge amount	Water	450	630	940	1330	1680	1960	2200	2380	2590	2730	2900	3010
	Hot water of saturated steam temperature−20℃	420	560	800	1190	1470	1680	1890	2060	2200	2310	2410	2480

*At the sizing , take into consideration of safety factor to select the size to have 3 times as much or more capacity of required capacity, discharging from the steam trap at a hot water temperature of saturated steam temperature −20℃.

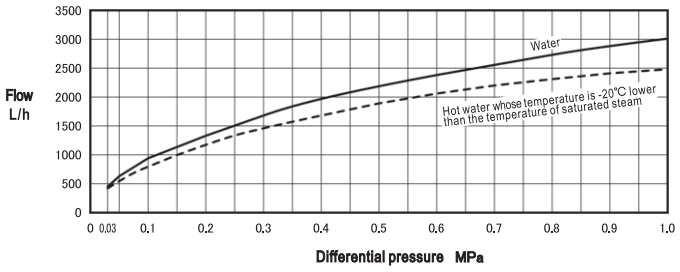
PIPING EXAMPLE

Note: Do not apply thermal insulation on steam trap. Make sure it is installed on a bare pipe at least 1 meter from heat-releasing equipments.





FLOW CHART(Size 15~25mm)



POINTS FOR INSTALLATION

1. The arrow mark on the name plate must match with the direction of drain flow.
2. Make sure steam trap is installed on a bare pipe at least 1 meter from heat-releasing equipments.
3. Do not apply any thermal insulation on steam trap.
4. Do not install steam trap to any machine that is equipped with solenoid valve allowing fast opening/closing.
5. To discharge drain generated during operation test or after the machine is stopped, install test valve at Rc½″ plug, which is at the lower part of steam trap.
6. In cold area with risk of freezing, install proper piping to prevent drain from accumulating.
7. Close valve if thermo element of steam trap is damaged.

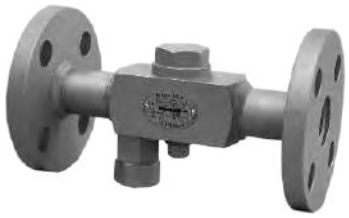
Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AT-6FB Type Steam Trap for Non-Freezing

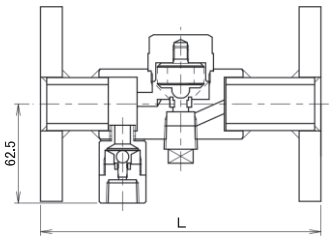
for Pipeline, Header, etc.

Thermostatic
0.07~ 1.0MPa

AT-6F Type steam strap with non-freezing valve embedded at inlet side. Suitable for applications in cold area.



CONSTRUCTION



DIMENSIONS

(mm)

Size	L
15(½″)	175
20(¾″)	195
25(1″)	215

Refer to Page 146 for TABLE FOR CAPACITY and PIPING EXAMPLE of AT-6,6F Type.

FEATURES

- Initial operation, rapidly discharge drain and air.
- Mild steel or stainless steel bodies available.
- Pressure type, non-freezing valve embedded at inlet side.

SPECIFICATIONS

Model name		AT-6FB	
Code name		AT6FB-N	AT6FB-D
Type		Thermostatic	
Size		15・20・25(½″・¾″・1″)	
Applicable fluid		Saturated steam*1.	
Fluid temperature		Max. 184℃	
Applicable pressure		0.07~1.0MPa	
End connection		Flanged JIS 10KFF*2.*3(Non-freeze valve at outlet side:Screwed JIS Rc ½″)	
Materials	Body	Mild steel	Stainless steel
	Trim	Disc & Seat(Stainless steel), Thermo element(Stainless steel)	
Allowed back pressure		Within 50% of pressure on inlet side(Minimum pressure difference:0.03MPa)	
Non-freeze valve opening pressure		0.02±0.005MPa	
Non-freeze valve close pressure		0.03±0.005MPa	

＊1. The valve can not be used for super heated steam line.
＊2. Stainless steel body with flange will be flanged JIS 10KRF.
＊3. AT-6B Type of screwed type is available upon your request.

POINTS FOR INSTALLATION

1. The arrow mark on the name plate must match with the direction of drain flow.
2. Make sure steam trap is installed on a bare pipe at least 1 meter from heat-releasing equipments.
3. Do not apply any thermal insulation on steam trap.
4. Do not install steam trap to any machine that is equipped with solenoid valve allowing fast opening/closing.
5. To discharge drain generated during operation test or after the machine is stopped, install test valve at Rc½″ plug, which is at the lower part of steam trap.
6. Close valve if thermo element of steam trap is damaged.

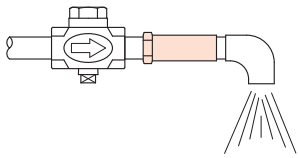
Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

BH-1H Type Steam Trap Silencers

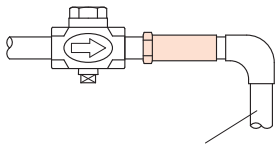
BH-1 Type steam trap silencers can reduce noise that occurs when drain is discharged.

PIPING EXAMPLE

● Direct discharge



● Indirect discharge



The pipe should lead to a safe place.
(Note: Do not allow back pressure on pipe)

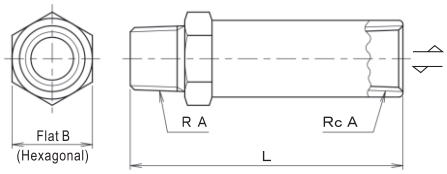
FEATURES

- Can be connected to the outlet side of steam trap and discharge drain to safe place.
- Exclusive acoustic material developed by VENN, less pressure on steam trap and outstanding silencing effect.

SPECIFICATIONS

Model name		BH-1	
Code name		BH1-N	BH1-D
Usage		Outlet side of steam Trap	
Size		15・20・25(½″・¾″・1″)	
Applicable fluid		Drain	
Applicable pressure		Max. 1.6MPa	
End connection		Screwed JIS R and Screwed JIS Rc	
Materials	Body	Mild steel	Stainless steel
	Silencing effect	Stainless steel	

APPEARANCE



Without limitation of the direction of flow

DIMENSIONS

(mm)

Size	15(½″)	20(¾″)	25(1″)
L	133	133	133
d	½″	¾″	1″
B	35	35	41
Mass(kg)	0.42	0.42	0.6

AD-17, 17F Type Steam Trap

for Pipeline, Header, etc.

Disc type
0.03~1.6MPa

Rapidly discharge air and drain during initial aeration. Short startup time.

The chamber of drain retention and evaporation in the trap ensures stable performance.

AD-17 Type

AD-17F Type

FEATURES

- Stainless body and disc.
- Free installation, horizontally, vertically (outlet facing downwardly), or laterally.
- Wide range of applicable pressures for a variety of applications.

SPECIFICATIONS

Model name	AD-17	AD-17F
Code name	AD17-D	AD17F-N
End connection	Screwed JIS Rc	Flanged JIS 10 16KFF (common use)
Type	Thermo-dynamic type	
Applicable fluid	Steam	
Fluid temperature	Max. 220℃	
Applicable pressure	0.03~1.6MPa	
Materials	Body(Stainless steel), Cap(Ductile cast iron) Disc(Stainless steel)	Body(Stainless steel), Cap(Ductile cast iron) Disc(Stainless steel), Flange(Carbon steel)
Allowed back pressure	Within 50% of pressure on inlet side(Minimum pressure difference: 0.03MPa)	
Valve body pressure test	Hydraulic 2.4MPa	
Installation	Vertical line(Flowing from top to down) and horizontal line	

∗1. Strainer with 60 mesh is installed.
∗2. Valve body with non-freezing type is available for AD-17B, 17FB Type upon your request.

DIMENSIONS AD-17 Type

(mm)

Size	d	L	G	H	Mass(kg)
15(½″)	½″	98	32	80	1.8
20(¾″)	¾″	104	36	84	2
25(1″)	1″	112	39	87	2.1

DIMENSIONS AD-17F Type

(mm)

Size	L	G	H	Mass(kg)
15(½″)	175	32	80	3.1
20(¾″)	195	36	84	3.7
25(1″)	215	39	87	4.8

Flange code JIS 10K・16K FF

TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

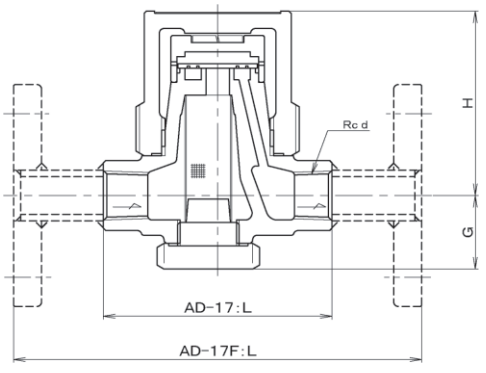
Differential pressure(MPa)	0.03	0.05	0.1	0.2	0.3	0.4	0.5	0.6
Discharge amount	40	100	180	320	430	500	550	650
Differential pressure(MPa)	0.7	0.8	0.9	1.0	1.2	1.4	1.6	
Discharge amount	700	750	780	800	850	880	900	

POINTS FOR INSTALLATION

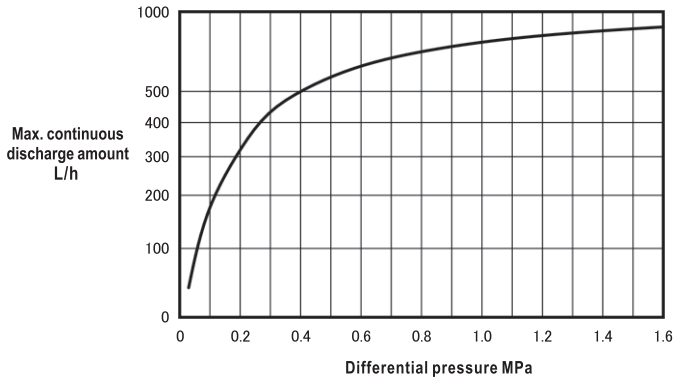
Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.
Do not apply any thermal insulation on steam trap.
The differential pressure is the difference of pressure between inlet and outlet sides.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

CONSTRUCTION



FLOW CHART (Size 15~25mm)



AD-18, 18F Type Steam Trap

for Pipeline, Header, etc.

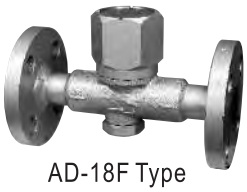
Disc type
0.1~2.0MPa

Rapidly discharge air and drain during initial aeration. Short startup time.

The chamber of drain retention and evaporation in the trap ensures stable performance.

AD-18 Type
(Size 15~25mm)

AD-18 Type
(Size 32~50mm)



AD-18F Type
(Size 15~25mm)

AD-18F Type
(Size 32~50mm)

FEATURES

- Stainless body and disc.
- Free installation, horizontally, vertically (outlet facing downwardly), or laterally.
- Wide range of applicable pressures for a variety of applications.

SPECIFICATIONS

Model name	AD-18	AD-18F
Code name	AD18-D	AD18F-N
End connection	Screwed JIS Rc	Flanged JIS 20KFF*
Type	Thermo-dynamic type	
Applicable fluid	Steam	
Fluid temperature	Max. 220℃	
Applicable pressure	0.1~2.0MPa	
Materials	Body(Stainless steel), Cap(Mild steel) Disc(Stainless steel)	Body(Stainless steel), Cap(Mild steel) Disc(Stainless steel), Flange(Carbon steel)
Allowed back pressure	Within 50% of pressure on inlet side(Minimum pressure difference: 0.1MPa)	
Valve body pressure test	Hydraulic 3.0MPa	
Installation	Vertical line(Flowing from top to down) and horizontal line	

* Flanged JIS 20KRF is available upon your request.

DIMENSIONS (AD-18 Type)

(mm)

Size	d	L	G	H	Mass(kg)
15(½″)	½″	100	32	80	1.8
20(¾″)	¾″	105	36	84	2
25(1″)	1″	115	39	87	2.1
32(1¼″)	1¼″	130	48	74	3.3
40(1½″)	1½″	140	53	83	4.2
50(2″)	2″	170	64	102	7

DIMENSIONS (AD-18F Type)

(mm)

Size	L	G	H	Mass(kg)
15(½″)	175	32	80	3.3
20(¾″)	195	36	84	3.9
25(1″)	215	39	87	5.2
32(1¼″)	245	48	74	7.4
40(1½″)	260	53	83	8.6
50(2″)	265	64	102	13.3

Flange code JIS 20KFF

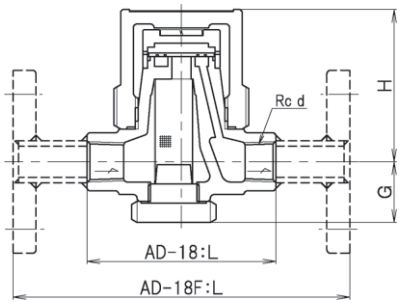
TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

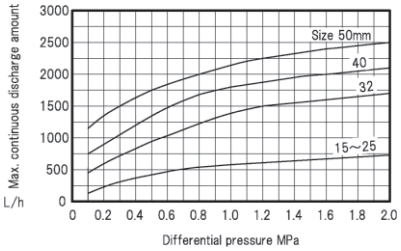
Size \ Differential pressure MPa	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
15~25(½″~1″)	120	220	310	370	420	470	510	540
32(1¼″)	450	600	720	840	950	1040	1140	1220
40(1½″)	750	900	1050	1200	1350	1470	1590	1690
50(2″)	1150	1350	1500	1640	1750	1840	1920	2000

Size \ Differential pressure MPa	0.9	1.0	1.2	1.4	1.6	1.8	2.0
15~25(½″~1″)	560	580	610	640	670	700	720
32(1¼″)	1310	1390	1500	1550	1600	1650	1700
40(1½″)	1740	1800	1870	1950	2000	2050	2100
50(2″)	2080	2150	2250	2330	2400	2450	2500

CONSTRUCTION



FLOW CHART



POINTS FOR INSTALLATION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.
Do not apply any thermal insulation on steam trap.
The differential pressure is the difference of pressure between inlet and outlet sides.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AK-1H Type Steam Trap

Bucket type
0.035~1.0MPa

General purpose trap that can be used as drain discharge trap for pipeline, header etc. All functions set in the top cover, so that allow easy maintenance.

FEATURES

- Simple internal structure makes maintenance work easier.
- With strainer embedded.

SPECIFICATIONS

Type	0.7MPa	1.0MPa
Model name	AK-1H	
Code name	AK1H-GL	AK1H-GH
Applicable pressure	0.035~0.7MPa	0.035~1.0MPa
Applicable fluid	Steam	
Fluid temperature	Max. 184℃	
End connection	Screwed JIS Rc	
Materials	Body(Cast iron), Disc & Seat(Stainless steel), Bucket(Stainless steel)	
Valve body pressure test	Hydraulic 1.5MPa	

* In case of pressure being less than 0.035MPa or less than 0.1MPa with very small capacity, select the other type (AT-1, AT-4 or AF-12 Type).

DIMENSIONS

(mm)

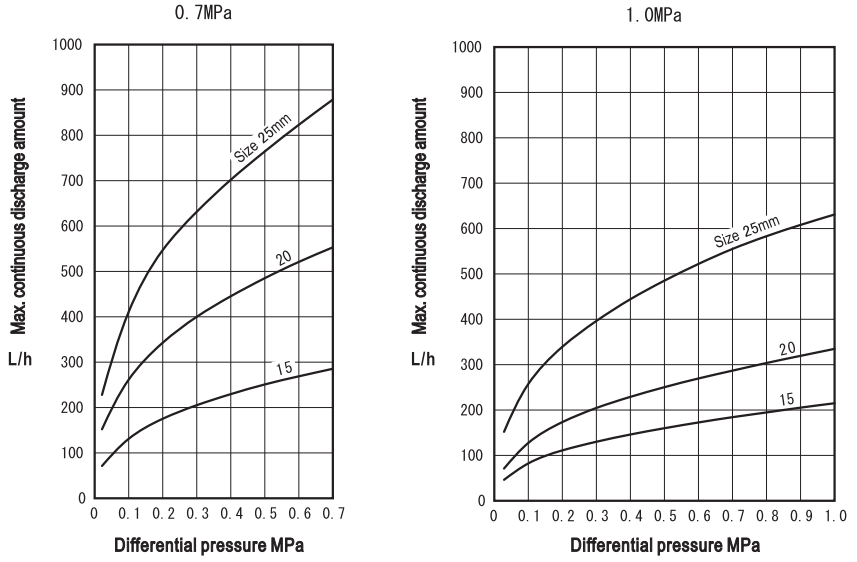
Size	d	L_1	L_2	G	H	Mass(kg)
15(½″)	½″	130	76	72.5	68.5	2.7
20(¾″)	¾″	148	87	88	74	4.4
25(1″)	1″	184	94	98	81	5.8

TABLE FOR CAPACITY (Max. continual discharge amount)

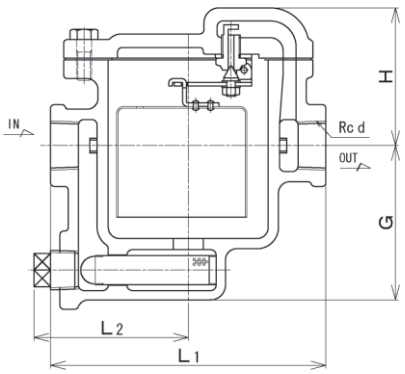
(L/h)

Type	Size \ Differential pressure MPa	0.035	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.7MPa	15(½″)	80	130	175	205	230	252	270	287	—	—	—
	20(¾″)	175	260	340	398	444	485	522	555	—	—	—
	25(1″)	255	412	548	634	703	767	825	880	—	—	—
1.0MPa	15(½″)	50	84	110	130	146	160	173	180	195	205	214
	20(¾″)	80	130	175	205	230	252	270	287	305	320	335
	25(1″)	175	260	340	398	444	485	522	555	582	608	630

FLOW CHART



CONSTRUCTION



POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.

In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AK-2H Type Steam Trap

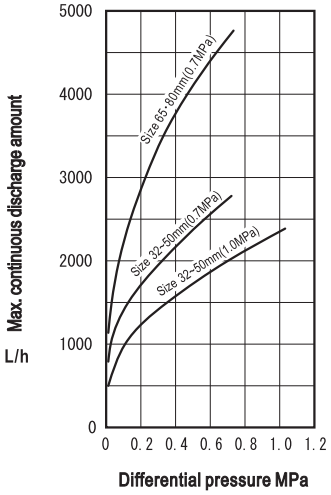
Bucket type
0.02~1.0MPa
SSR device

General purpose trap that can be used as drain discharge trap for pipeline, header etc. All functions set in the top cover, so that allow easy maintenance.

Size 32~50mm

Size 65·80mm

FLOW CHART



FEATURES(Size 32~50mm)

- The SSR (Shockless Self Return) device eliminates impact that may occur when valve is closed. The valve disc can close by itself, but not influenced by the buoyancy of the bucket, so that can be used from low pressure.
- With strainer embedded, for size 32~50mm.

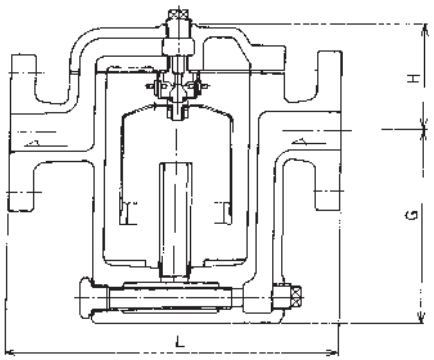
SPECIFICATIONS

Type	0.7MPa		1.0MPa
Model name	AK-2H		
Code name	AK2H-GL		AK2H-GH
Size	32·40·50(1¼″·1½″·2″)	65·80(2½″·3″)	32·40·50(1¼″·1½″·2″)
Applicable pressure	0.02~0.7MPa		0.02~1.0MPa
Applicable fluid	Steam		
Fluid temperature	Max. 184℃*		
End connection	Flanged JIS 10KFF		
Materials	Body(Cast iron), Disc & seat(Stainless steel), Bucket(Stainless steel)		
Valve body pressure test	Hydraulic 1.5MPa		

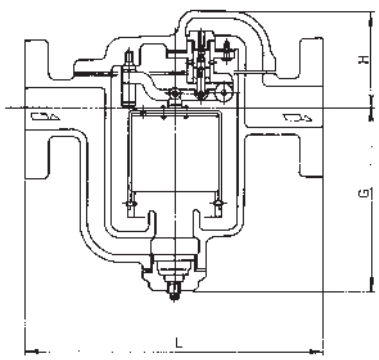
* For fluid temperature Max. 220℃, please contact our agent in your area.

CONSTRUCTION

Size 32~50mm



Size 65·80mm



DIMENSIONS

(mm)

Size	L	G	H	Mass(kg)
32(1¼″)	280	161	88	21
40(1½″)	290	161	88	22
50(2″)	290	161	88	23
65(2 ½″)	480	340	160	87
80(3″)	480	340	160	90

TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

Type	Differential pressure MPa / Size	0.02	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.7MPa	32·40·50(1¼″·1½″·2″)	800	1100	1370	1700	1940	2170	2380	2570	2750	—	—	—
	65·80(2½″·3″)	1120	1600	2150	2850	3400	3800	4130	4430	4700	—	—	—
1.0MPa	32·40·50(1¼″·1½″·2″)	500	750	950	1200	1400	1570	1740	1870	2000	2120	2240	2350

POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.

In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

POINTS FOR INSTALLATION

- In the event the trap is to be left unused for a lon period or there is risk of freezing in winter, remove the plug at the lower part of the main body and discharge drain.
- If the piping at the outlet side is an ascending type (which means there is back pressure), install check valve at the discharge side of steam trap.
- Leave sufficient space for maintenance purpose.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AK-5, 5F Type Steam Trap

for Small Machines・Equipments, High-pressure Steam Line, etc.

Small bucket type
0.01~2.0MPa
SSR device

Max.2.0MPa, small capacity bucket type steam trap for laundry machines, heating equipments, food processing equipments, and medical devices.

AK-5 Type

AK-5F Type

FEATURES

- The SSR (Shockless Self Return) device eliminates impact that may occur when valve is closed. The valve disc can close by itself, but not influenced by the buoyancy of the bucket. So that can be used wide pressure range.
- Compact body allows installation in narrow space.
- With strainer embedded.

SPECIFICATIONS

Type		0.3MPa Type	0.7MPa Type	1.0MPa Type	1.6MPa Type	2.0MPa Type
Model name	Screwed	AK-5				
	Flanged	AK-5F				
Code name	Screwed	AK5-ML	AK5-MM	AK5-MH	AK5-MS	AK5-MV
	Flanged	AK5F-ML	AK5F-MM	AK5F-MH	AK5F-MS	AK5F-MV
Size		15・20・25(½″・¾″・1″)				
Applicable pressure		0.01~0.3MPa	0.01~0.7MPa	0.01~1.0MPa	0.01~1.6MPa	0.01~2.0MPa
Applicable fluid		Steam				
Fluid temperature		Max. 184℃*			Max. 220℃	
End connection		AK-5:Screwed JIS Rc, AK-5F:Flanged JIS 10K・20KFF(common use)				
Materials		Body(Ductile cast iron), Disc & seat(Stainless steel), Bucket(Stainless steel)				
Valve body pressure test		Hydraulic 2.4MPa for 0.3~1.6MPa Type, Hydraulic 3.0MPa for 2.0MPa Type				

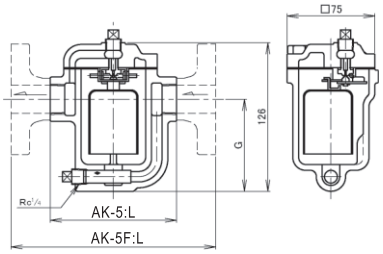
* For fluid temperature lower than 220℃, please contact our agent in your area.

TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

Differential pressure (MPa)		0.01	0.05	0.1	0.2	0.3	0.4	0.5	0.6
Discharge amount	0.3MPa Type	80	155	200	280	300	—	—	—
	0.7MPa Type	42	80	110	145	170	190	200	210
	1.0MPa Type	24	42	62	82	100	120	125	140
	1.6MPa Type	18	37	49	65	78	82	95	100
	2.0MPa Type	12	24	32	44	52	60	66	70
Differential pressure (MPa)		0.7	0.8	0.9	1.0	1.2	1.4	1.6	2.0
Discharge amount	0.7MPa Type	220	—	—	—	—	—	—	—
	1.0MPa Type	148	152	160	175	—	—	—	—
	1.6MPa Type	110	120	125	130	140	150	160	—
	2.0MPa Type	76	80	85	89	97	100	109	120

CONSTRUCTION

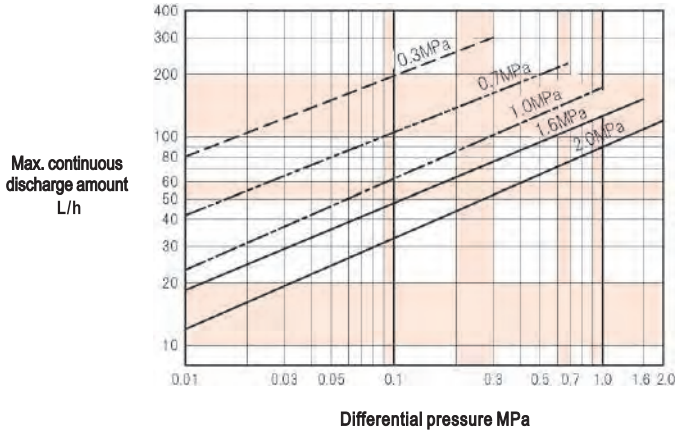


DIMENSIONS

(mm)

Model name \ Size		15(½″)	20(¾″)	25(1″)
AK-5	L	100	100	105
	G	79	79	79
	W(kg)	2	2	2
AK-5F	L	175	195	215
	G	82	82	82
	W(kg)	2.7	3	3.9

FLOW CHART (Size 15~25mm)



POINTS FOR SELECTION

1. Use the safety factor, which is 3 times of planned discharge amount, for selecting a proper size of steam trap.
2. The differential pressure is the difference of pressure between inlet and outlet sides.

POINTS FOR INSTALLATION/OPERATION

- The arrow mark on the main body must match with the direction of drain flow. The trap must be installed vertically to horizontal pipe.
- In the event the trap is to be left unused for a long period or there is risk of freezing in winter, remove the plug (Rc¼″) at the lower part of the main body and discharge drain.
- If the piping at the outlet side is an ascending type (which means there is back pressure), install check valve at the discharge side of steam trap.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AK-16 Type Steam Trap

for Small Machines・Equipments, High-pressure Steam Line, etc.

Small bucket type
0.01~1.6MPa
SSR device

Steam trap that is highly corrosion resistant, durable, and elegant

Max. 1.6MPa small capacity bucket type steam trap made of stainless steel is ideal for laundry machines, heating equipments, food processing machines and medical devices.

FEATURES

- The SSR (Shockless Self Return) device eliminates impact that may occur when valve is closed. The valve disc can close by itself, but not influenced by the buoyancy of the bucket, so that it can be used for wide pressure range.
- Compact body allows installation in narrow space.
- With strainer embedded.

SPECIFICATIONS

Type	0.3MPa Type	0.7MPa Type	1.0MPa Type	1.6MPa Type
Model name	AK-16			
Code name	**AK16-DL**	**AK16-DM**	**AK16-DH**	**AK16-DS**
Size	15・20・25(½″・¾″・1″)			
Applicable pressure	**0.01~0.3MPa**	**0.01~0.7MPa**	**0.01~1.0MPa**	**0.01~1.6MPa**
Applicable fluid	Steam			
Fluid temperature	Max. 220℃			
End connection	Screwed JIS Rc			
Materials	Body(Stainless steel), Disc & seat(Stainless steel), Bucket(Stainless steel)			
Valve body pressure test	Hydraulic 1.5MPa for 0.3~1.0Pa Type, Hydraulic 2.4MPa for 1.6MPa Type			

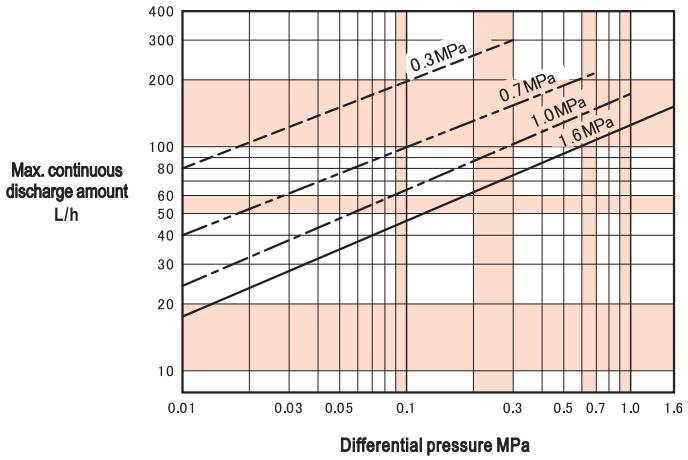
TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

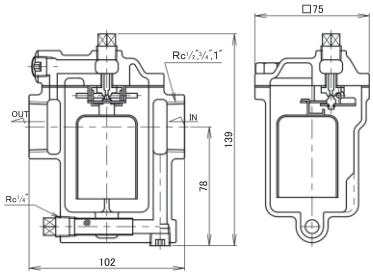
Differential pressure (MPa)		0.01	0.05	0.1	0.2	0.3	0.4	0.5	0.6
Discharge amount	0.3MPa Type	80	155	200	280	300	—	—	—
	0.7MPa Type	42	80	110	145	170	190	200	210
	1.0MPa Type	24	42	62	82	100	120	125	140
	1.6MPa Type	18	37	49	65	78	82	95	100

Differential pressure (MPa)		0.7	0.8	0.9	1.0	1.2	1.4	1.6
Discharge amount	0.7MPa Type	220	—	—	—	—	—	—
	1.0MPa Type	148	152	160	175	—	—	—
	1.6MPa Type	110	120	125	130	140	150	160

FLOW CHART (Size 15~25mm)



CONSTRUCTION (Unit: mm)



Weight:1.6kg

POINTS FOR SELECTION

1. Use the safety factor, which is 3 times of planned discharge amount, for selecting a proper size of steam trap.
2. The differential pressure is the difference of pressure between inlet and outlet sides.

POINTS FOR INSTALLATION/OPERATION

- The arrow mark on the main body must match with the direction of drain flow. The trap must be installed vertically to the horizontal pipe.
- In the event the trap is to be left unused for a long period or there is risk of freezing in winter, remove the plug (Rc¼″) at the lower part of the main body and discharge drain.
- If the piping at the outlet side is an ascending type (which means there is back pressure), install check valve at the discharge side of steam trap.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AF-12 Type Steam Trap

Small float type
Max. 0.4MPa

Float type steam trap for pipe end, low-pressure steam header and small heat exchanger, etc.

FEATURES

- With wax type air vent valve, for shorter warm-up time and prevention of air problem.
- The direction of flow can be selected, which allows easier installation.
- Hanging hardware for piping support, allows easy installation.
- Stable performance, no matter how much drain is generated.

SPECIFICATIONS

Model name	AF-12
Code name	**AF12-G**
Applicable fluid	Steam
Fluid temperature	Max. 150℃
Applicable pressure	Max. 0.4MPa
End connection	Screwed JIS Rc
Materials	Body(Cast iron), Disc & seat(Stainless steel), Float(Stainless steel)
Valve body pressure test	Hydraulic 0.6MPa

DIMENSIONS

(mm)

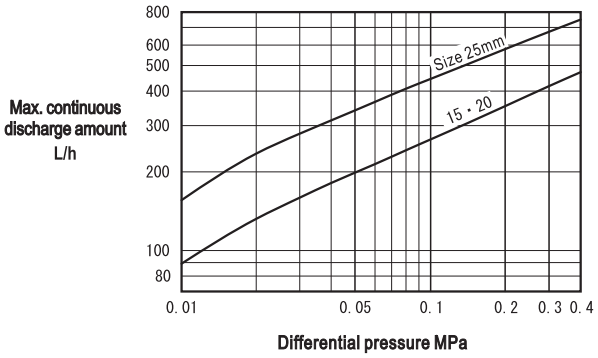
Size	d	L_1	L_2	H_1	H_2	H_3	W_1	W_2	Mass(kg)
15(½″)	½″	110	144	19.5	90	129	86	167	4.5
20(¾″)	¾″	110	147	19.5	90	129	86	167	4.5
25(1″)	1″	120	161	22.5	100	145	94	184	5.5

TABLE FOR CAPACITY (Max. continual discharge amount)

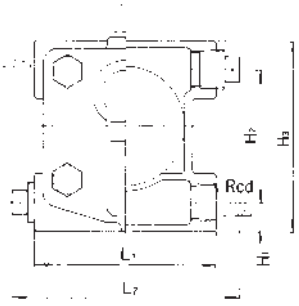
(L/h)

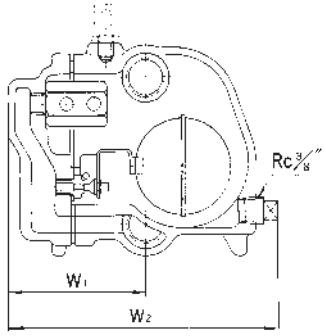
Size \ Differential pressure MPa	0.01	0.03	0.05	0.07	0.1	0.2	0.3	0.4
15・20(½″・¾″)	88	160	200	230	265	360	420	470
25(1″)	155	280	345	385	435	590	690	750

FLOW CHART

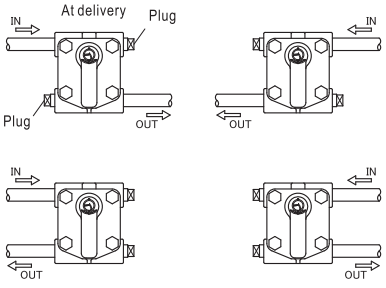


CONSTRUCTION





DIRECTION OF FLOW



POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.

In the event there is back pressure at the outlet side of steam trap, use the pressure differential between inlet and outlet sides for selecting the proper size of steam trap.

POINTS FOR INSTALLATION

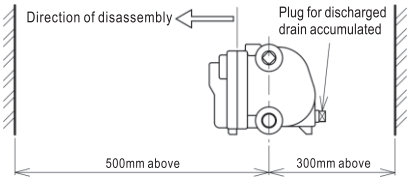
- In the case the trap is to be left unused for a long period or there is risk of freezing in water, use the plug (Rc⅜″) at the lower part of the main body to discharge drain.
- Foreign matters are the cause of most claims related to steam traps in new pipelines. To reduce such claims, install KY strainer and valve that can blow off dirt.

※ It is recommended to use 80-mesh strainer.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

- If the piping at the outlet side is an ascending type (which means there is back pressure), install check valve at the discharge side of steam trap.
- Leave sufficient space for maintenance purpose.

Maintenance space



AF-15F Type Heavy Duty Trap

for Pipeline, Header, etc.

Float type
Max. 0.9MPa

Ideal for heat control equipments or equipments/machines with large amount of drain generated.

FEATURES

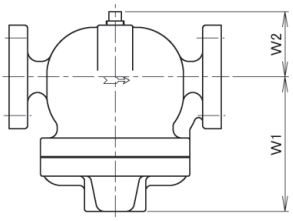
- Thermal air vent valve for reduced warm-up time and preventing air problem.
- Wide range of applicable pressures for a variety of applications.
- Stable performance, no matter how much drain is generated.
- By changing the position of cover, this product can also be used on vertical piping (up to bottom).

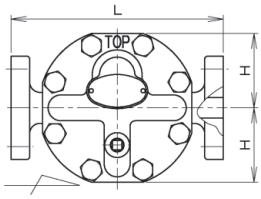
SPECIFICATIONS

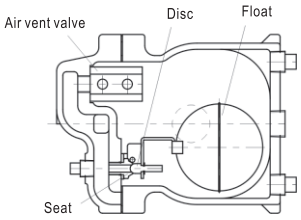
Type		0.4MPa Type		0.9MPa Type	
Model name		AF-15F			
Code name		AF15FR-GL	AF15FR-ML	AF15FR-GH	AF15FR-MH
Applicable pressure		Max. 0.4MPa		Max. 0.9MPa	
Applicable fluid		Steam			
Fluid temperature		Max. 180℃			
End connection		Flanged JIS 10KFF			
Materials	Body	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
	Disc & seat, Float	Stainless steel			
Allowed back pressure		Within 90% of pressure on inlet side			
Valve body pressure test		Hydraulic 1.5MPa			
Installation		Vertical line (flowing from top to down) and horizontal line by changing cover position*			

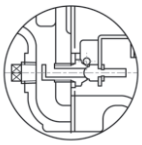
* It is possible by changing the cover position. Refer to "Installation example at vertical line and horizontal line" below.

CONSTRUCTION

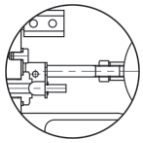








In the case of size 20~32mm(Max.0.9MPa)



In the case of size 40・50mm

DIMENSIONS

(mm)

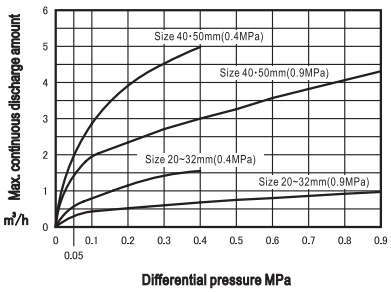
Size	20(¾″)	25(1″)	32(1¼″)	40(1½″)	50(2″)
L	205	215	245	280	290
H	72	72	72	102	102
W_1	135	135	135	170	170
W_2	65	65	65	160	160
Mass(kg)	8.3	10	11	21	23

TABLE FOR CAPACITY (Max. continual discharge amount)

(m^3/h)

Type	Size \ Differential pressure MPa	0.05	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9
0.4MPa	20・25・32(¾″・1″・1¼″)	0.57	0.8	1.15	1.55	—	—	—	—	—
	40・50(1½″・2″)	1.97	2.86	3.91	5.0	—	—	—	—	—
0.9MPa	20・25・32(¾″・1″・1¼″)	—	0.43	0.52	0.68	0.75	0.8	0.86	0.92	0.97
	40・50(1½″・2″)	—	1.97	2.34	3.0	3.26	3.57	3.82	4.1	4.31

FLOW CHART

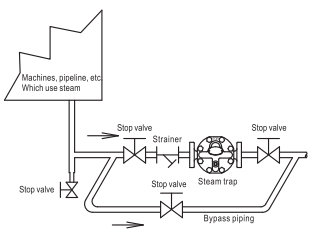


POINTS FOR SIZE SELECTION

The size should be selected with considerations paid on safety factor and a capacity that is 3 times of planned discharge amount (which is the amount of drain generated in the case of supply pipe, or steam consumption of machine in the case of process).

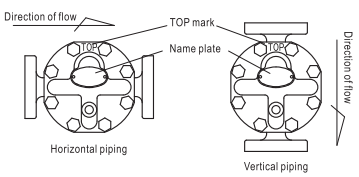
Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

PIPING EXAMPLE



Installation on vertical・horizontal piping

The name plate and the TOP mark should face upwardly



AF-16F Type Heavy Duty Trap

for Pipeline, Header, etc.

Float type
Max. 0.9MPa

Ideal for heat control equipments or equipments/machines with large amount of drain generated.

FEATURES

- Thermal air vent valve for reduced warm-up time and preventing air problem.
- Wide range of applicable pressures for a variety of applications.
- Stable performance, no matter how much drain is generated.

SPECIFICATIONS

Model name	AF-16F
Code name	**AF16F-G**
Size	50(2″)
Applicable fluid	Steam
Fluid temperature	Max. 180℃
Applicable pressure	Max. 0.9MPa
End connection	Flanged JIS 10KFF
Materials	Body(Cast iron), Disc & seat(Stainless steel), Float(Stainless steel)
Allowed back pressure	Within 90% of pressure on inlet side
Valve body pressure test	Hydraulic 1.5MPa

CONSTRUCTION (Unit:mm)

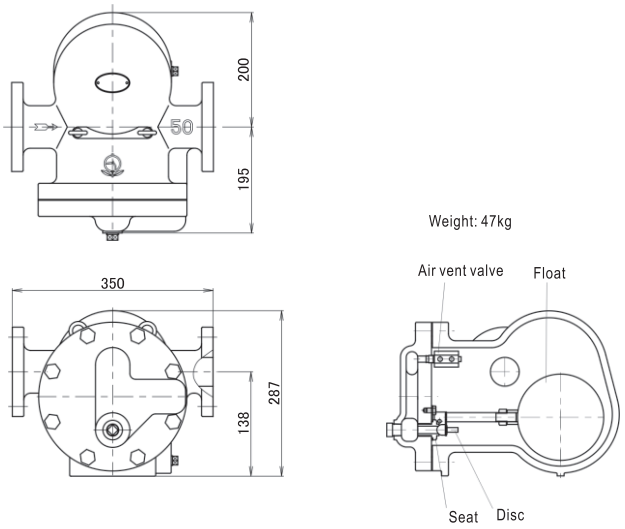


TABLE FOR CAPACITY (Max. continual discharge amount)

(m^3/h)

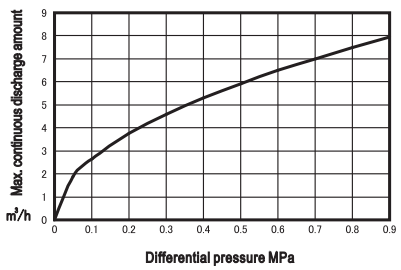
Differential pressure(MPa)	0.05	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9
Discharge amount	1.87	2.65	3.75	5.3	5.92	6.49	7.0	7.5	7.95

POINTS FOR SIZE SELECTION

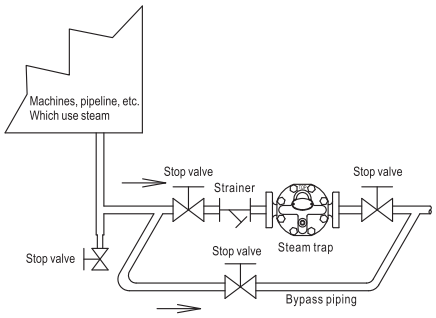
The size should be selected with considerations paid on safety factor and a capacity that is 3 times of planned discharge amount (which is the amount of drain generated in the case of supply pipe, or steam consumption of machine in the case of process).

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

FLOW CHART

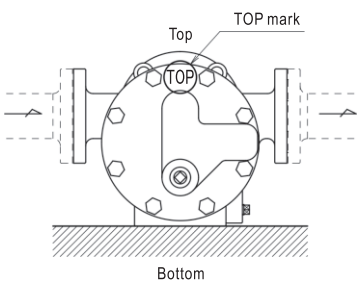


PIPING EXAMPLE



INSTALLATION STATE

The name plate and the TOP mark should face upwardly



AF-11H Type Heavy Duty Trap

Float type
Max. 0.5MPa

Ideal for heat exchanger, drying machine, header etc. with large amount of drain generated.

Simple structured, lever float type heavy duty trap with balancing structure of valve disc. Small in size but large in discharge capacity.

FEATURES

- Simple, durable structure.
- Balancing structure allows large discharge capacity.
- Easy disassembly and maintenance.
- Wax type air vent valve prevents air problem.
- Continuous discharge of drain.

SPECIFICATIONS

Model name	AF-11H
Code name	**AF11H-B**
Applicable fluid	Steam
Fluid temperature	Max. 160℃
Applicable pressure	Max. 0.5MPa
End connection	Screwed JIS Rc
Materials	Body(Cast iron), Disc & seat(Stainless steel), Float(Stainless steel)
Valve body pressure test	Hydraulic 0.75MPa

DIMENSIONS

(mm)

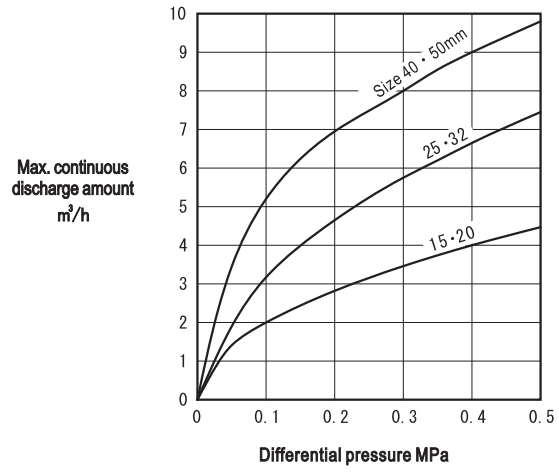
Size	d	L	H_1	H_2	H_3	D	W	Mass(kg)
15(½″)	½″	285	62	137	252	115	216	14
20(¾″)	¾″	285	62	137	252	115	216	14
25(1″)	1″	290	63	133	261	115	216	15
32(1¼″)	1¼″	290	63	133	261	115	216	15
40(1½″)	1½″	370	69	189	336	125	248	29
50(2″)	2″	370	69	189	336	125	248	29

TABLE FOR CAPACITY (Max. continual discharge amount)

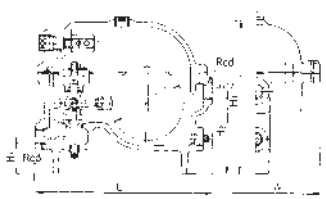
(m^3/h)

Size \ Differential pressure MPa	0.03	0.05	0.1	0.2	0.3	0.35	0.4	0.5
15・20(½″・¾″)	0.95	1.41	2.00	2.82	3.46	3.74	4.00	4.47
25・32(1″・1¼″)	1.20	1.90	3.17	4.65	5.75	6.20	6.65	7.45
40・50(1½″・2″)	2.32	3.45	5.20	6.95	8.00	8.55	9.00	9.80

FLOW CHART



CONSTRUCTION



POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.

In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AF-11HF Type Heavy Duty Trap

Float type
Max. 0.35MPa

Ideal for heat exchanger, drying machine, header, etc. with large amount of drain generated.
A heavy duty, lever float type trap developed with simple structure.

FEATURES

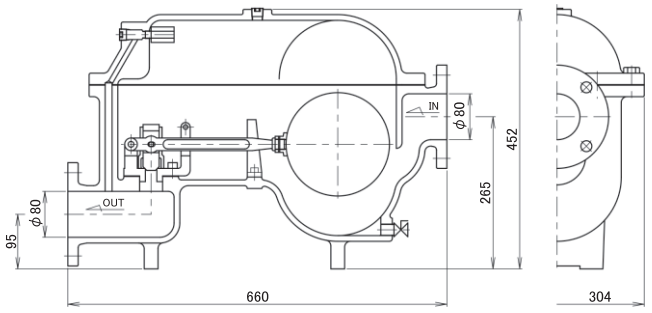
- Simple, durable structure.
- Easy disassembly and maintenance.
- Wax type air vent valve prevents air problem.
- Continuous discharge of drain.

SPECIFICATIONS

Model name	AF-11HF
Code name	**AF11HF-B**
Size	65・80(2½″・3″)
Applicable fluid	Steam
Fluid temperature	Max. 150℃
Applicable pressure	Max. 0.35MPa
End connection	Flanged JIS 5KFF*
Materials	Body(Cast iron), Disc & seat(Stainless steel), Float (Stainless steel)
Valve body pressure test	Hydraulic 0.53MPa

*Including companion flanges, bolts, nuts and gaskets.

CONSTRUCTION (Unit:mm)



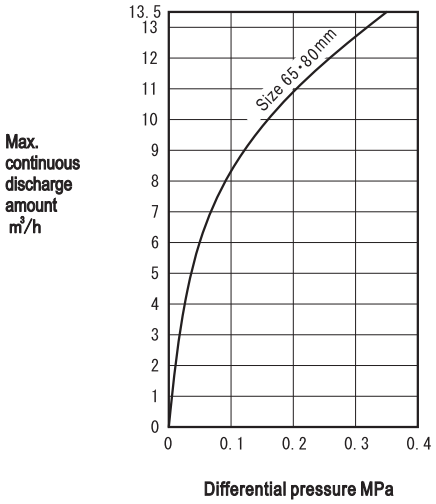
Weight:90kg

TABLE FOR CAPACITY (Max. continual discharge amount)

(m³/h)

Differential pressure(MPa)	0.03	0.05	0.1	0.2	0.3	0.35
Discharge amount	4.45	6.03	8.32	10.90	12.70	13.50

FLOW CHART



POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.

In the case there is back pressure at the outlet side of trap, use the differential pressure between inlet and outlet sides to select the size of valve.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

AF-20F Type Heavy Duty Trap

Float type
Max. 1.0MPa

This trap can be used with heat exchanger, drying machine, header, and other devices at where relatively large amount of drain is produced.

With independent pilot component, this float-type heavy-duty trap is compact and light, nevertheless has a high discharge capacity.

FEATURES

- Applicable to a variety of applications with pressure range less than 1.0 MPa.
- Prevent air failure using membrane-type air vent valve.
- Allow continuous discharge of drain.

SPECIFICATIONS

Model name	AF-20F
Code name	**AF20F-M**
Applicable fluid	Steam
Fluid temperature	Max. 184℃
Applicable pressure	Max. 1.0MPa
End connection	Flanged JIS 10KFF
Materials	Body(Ductile cast iron), Disc & seat(Stainless steel), Float(Stainless steel)
Valve body pressure test	Hydraulic 1.5MPa

CONSTRUCTION (Unit:mm)

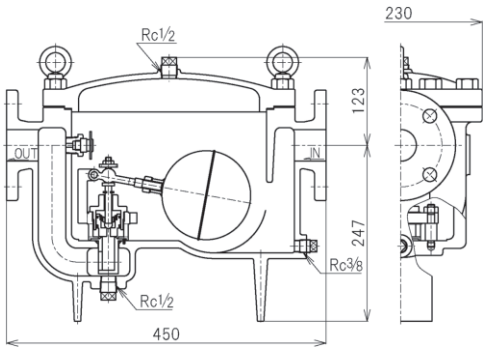
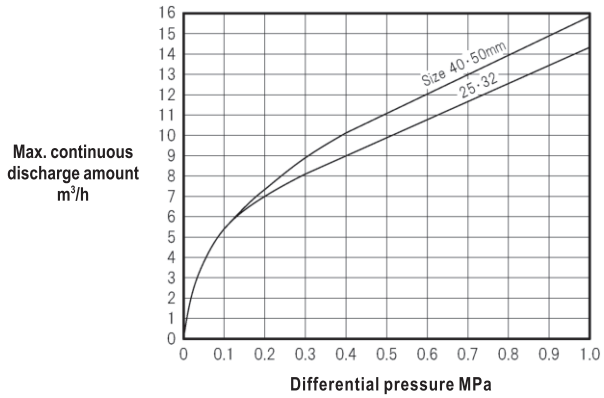


TABLE FOR CAPACITY (Max. continual discharge amount)

(m^3/h)

Size \ Pressure differential (MPa)	0.03	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
25·32(1″·1¼″)	2.80	3.78	5.40	7.00	8.11	8.98	9.87	9.76	11.65	12.55	13.44	14.32
40·50(1½″·2″)	2.80	3.78	5.40	7.34	8.90	10.11	11.07	12.03	12.97	13.94	14.89	15.84

FLOW CHART



MASS

Size	Mass(kg)
25·32(1″·1¼″)	33
40·50(1½″·2″)	35

POINTS FOR SIZE SELECTION

Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge amount.
Do not apply any thermal insulation on steam trap.
The differential pressure is the difference of pressure between inlet and outlet sides.

Note: Read POINTS FOR SIZE SELECTION AND INSTALLATION carefully (see Page 165).

BA-5 Type Drain Separator

for Main Pipe/Branch, Inlet of Equipment, etc.

Baffle type

Drain separators are used to separate water drops or drain occurred in steam or air pipe.
They can improve the dryness of steam pipeline and contribute to stable supply of heat and improvement of heating efficiency.

FEATURES

- Reduce steam hammer due to residual drain during initial operation of steam.
- Stabilize movement of regulating valve, also reduce corrosion and wearing.
- Remove water drops and reduce rust in pipeline.

SPECIFICATIONS

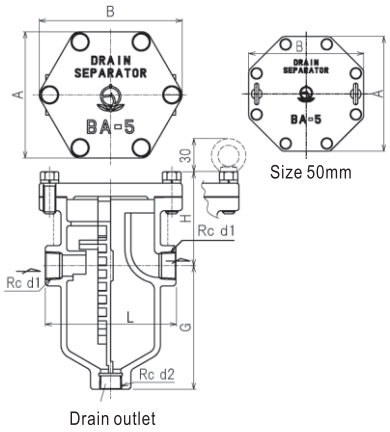
Model name	BA-5	
Code name	BA5-M	
Applicable fluid	Steam	Air
Applicable pressure	Max. 2.0 MPa	Max. 0.98 MPa
Fluid temperature	Max. 220℃	
End connection	Inlet: Screwd JIS Rc. Drain outlet: Screwd JIS Rc.	
Materials	Body, cover, baffle (Ductile cast iron)	
Valve body pressure test	Hydraulic 3.0 MPa	

DIMENSIONS

(mm)

Size	d1	d2	L	H	G	A	B	Mass(kg)
15(½″)	½″	¾″	130	91	105	128	145	7.6
20(¾″)	¾″	¾″	130	91	105	128	145	7.6
25(1″)	1″	¾″	155	109	147	150	170	11.2
32(1¼″)	1¼″	1″	186	163	197	186	212	25
40(1½″)	1½″	1″	186	163	197	186	212	25
50(2″)	2″	1¼″	218	196	268	224	224	41.5

CONSTRUCTION (Unit: mm)



SELECTION METHOD

It is recommended you to select drain separator with diameter that is the same as (or larger than) that of the pipe. For selection of drain separator with specified flow rate and pressure loss of drain separator, please refer to the flow characteristics drawing in the next page.
※ In the event of selecting drain separator according to flow rate of pipeline, it is recommended that the flow velocity of pipeline is less than 30 m/s for steam pipeline or 16 m/s for air pipeline.

● Selection of trap

Applicable fluid	Steam		Air
Applicable pressure	Max. 1.0 MPa	Max. 1.6 MPa (2.0 MPa)	Max. 0.98 MPa
Recommended trap	AD-17, AK-1H	AD-17 (AD-18)	AK-21

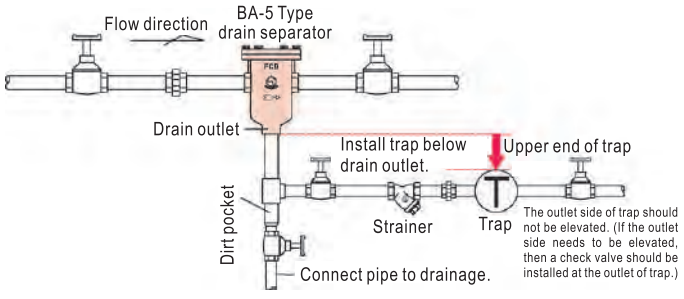
● Recommended diameter of dirt pocket and trap

Nominal diameter of drain separator	15・20・25(½″・¾″・1″)	32・40(1¼″・1½″)	50(2″)
Drain outlet diameter	JIS Rc¾″	JIS Rc1″	JIS Rc1¼″
Nominal diameter of dirt pocket	20(¾″)	25(1″)	32(1¼″)
Nominal diameter of trap	20(¾″)	25(1″)	32(1¼″)

※It is recommended that stop valve installed below dirt pocket has nominal diameter larger than 20mm.
※ See Piping Example drawing for reference.

Tips for installation and handling

Piping Example

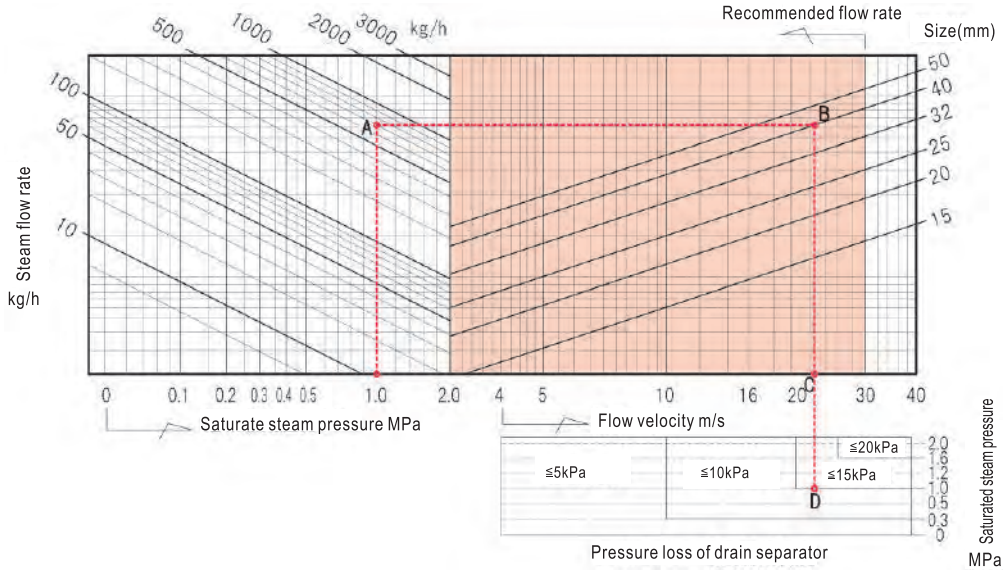


1. Wash the pipeline thoroughly before installing the product.
※ Insufficient washing may result in accumulation of dirt at drain outlet, blockage, or failure of trap.
2. To allow easy installation and dismounting, please install union joint at the inlet and outlet of the product.
3. When mounting the product on pipe, make sure the direction indicated by the arrow mark on the product matches with flow direction of fluid.
4. A trap must be installed at drain outlet. Also, drain outlet must be connected to pipeline that can lead drain to a safe place.
5. The piping diameter at drain outlet should be the same as that of connection pipe. Dirt pocket and trap should be installed. A strainer must be installed at the inlet of trap.
6. Trap should be installed below drain outlet.
7. The outlet piping of stop valve below dirt pocket should be connected to drainage ditch.
8. Use spanner or wrench to tighten hex screws for fixing the main body of the product.
9. Apply thermal insulation on drain separator if risk of freezing or condensation is anticipated.

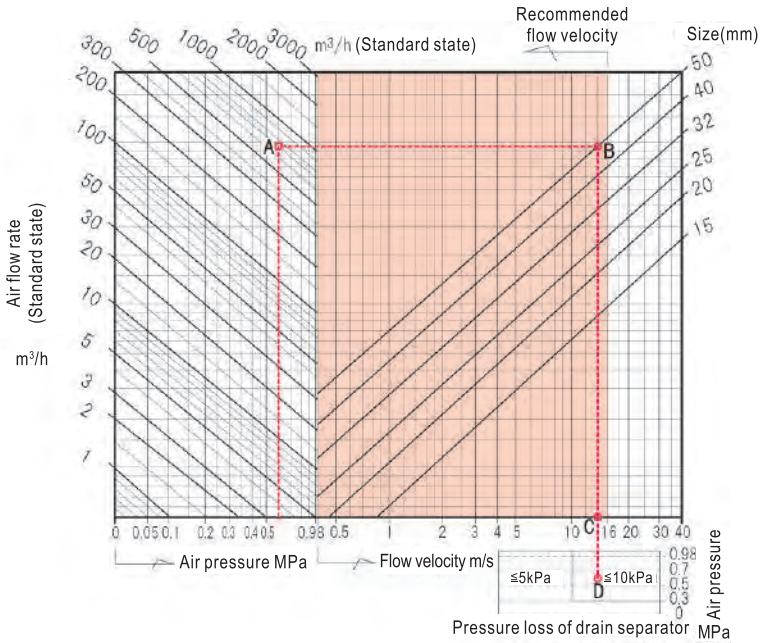
DATA/BA-5 Type Drain Separator

■ FLOW CHARACTERISTICS

(for Steam)



(for Air)



● HOW TO USE THE CHART

(For steam)

Assume saturated steam pressure is 1.0 MPa and flow rate is 700 kg/h. Let us use the diagram and find out the nominal diameter of the right drain separator, piping flow rate, and pressure loss. The recommended flow velocity of drain separator is below 30 m/s.

On the horizontal axis of saturated steam pressure, find out the 1.0 MPa point. Draw a vertical line passing through this point. On the vertical axis of flow rate, find out the 700 kg/h point. Draw a horizontal line passing through this point. The two lines crosses at point A. Now draw a horizontal line from point A until it crosses with the line representing the nominal diameter of drain separator within the range of recommended flow velocity. The crossing point is B. From point B, it is able to read the nominal diameter that we are looking for, which is “40mm” in this case.

Now draw a vertical line from point B. The line crosses with the axis representing piping flow velocity at point C and the line representing 1.0 MPa saturated steam pressure at point D in the table of pressure loss. From point C, it is able to read that piping flow velocity is 22.5 m/s. Since point D is at the boundary of the lines representing 10 kPa and 15 kPa, the larger one, which is 15 kPa is selected as pressure loss.

If the piping diameter is 50mm, then the nominal diameter of drain separator should also be 50mm, and the piping flow velocity and pressure loss can be read in the same way as described above (points B, C, and D).

(For air)

Assume air pressure is 0.6 MPa and flow rate is 700 m³/h. Let’s use the diagram and find out the nominal diameter of the right drain separator, piping flow rate, and pressure loss. The recommended flow velocity of drain separator is below 16 m/s.

On the horizontal axis of air pressure, find out the 0.6 MPa point. Draw a vertical line passing through this point. On the vertical axis of flow rate, find out the 700 m3/h point. Draw a horizontal line passing through this point. The two lines crosses at point A. Now draw a horizontal line from point A until it crosses with the line representing the nominal diameter of drain separator within the range of recommended flow velocity. The crossing point is B. From point B, it is able to read the nominal diameter that we are looking for, which is “50mm” in this case.

Now draw a vertical line from point B. The line crosses with the axis representing piping flow velocity at point C and the line representing 0.6 MPa air pressure at point D in the table of pressure loss. From pint C, it is able to read that piping flow velocity is 14 m/s. Since point D is within the range of the line representing 10 kPa, the pressure loss is 10 kPa.

AK-21 Type Air Trap

for Pipe End, Receiver Tank, Drain Separator, etc.

Bucket type
0.01~0.98MPa

Discharge drain from air pipeline automatically.
Mechanical structure ensures reliable operation.

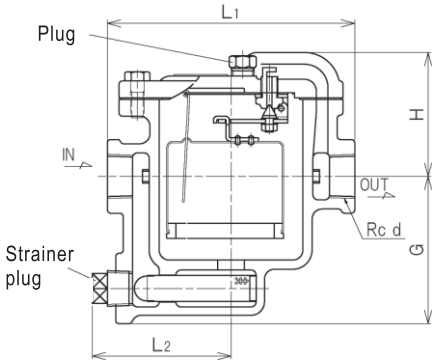
FEATURES

- Simple structure allows easy maintenance and difficulty to catch contamination or rust.
- Since drain can easily get into air trap, it is not necessary to install an equalizer.

SPECIFICATIONS

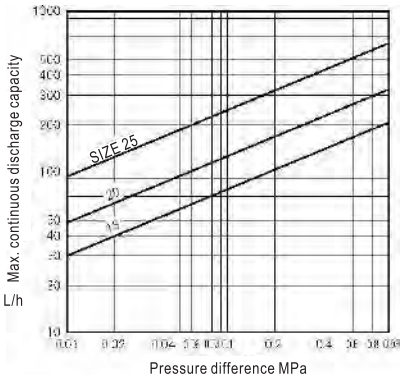
Model name	AK-21
Code name	AK21-G
Size	15·20·25(½″·¾″·1″)
Applicable fluid	Air
Fluid temperature	5~100℃
Applicable pressure	0.01~0.98 MPa
End connection	Screwd JIS Rc
Materials	Body(Cast iron), Disc&seat(Stainless steel), Bucket(Stainless steel)
Valve body pressure test	Hydraulic 1.5 MPa

CONSTRUCTION



Note: Please note that this product discharges some air due to the upward and downward movement of the bucket to facilitate flowing of drain into the product.

FLOW CHART



1. To select an appropriate nominal diameter, please consider safety rate and select one with discharge capacity that is twice larger than the planned discharge capacity.
2. If there is back pressure at the outlet of air trap, then the right nominal diameter should be selected according to the pressure difference between the inlet and the outlet.

DIMENSIONS

(mm)

Size	d	L1	L2	G	H	Mass(kg)
15(½″)	½″	130	76	72.5	68.5	2.7
20(¾″)	¾″	148	87	88	74	4.4
25(1″)	1″	184	94	98	81	5.8

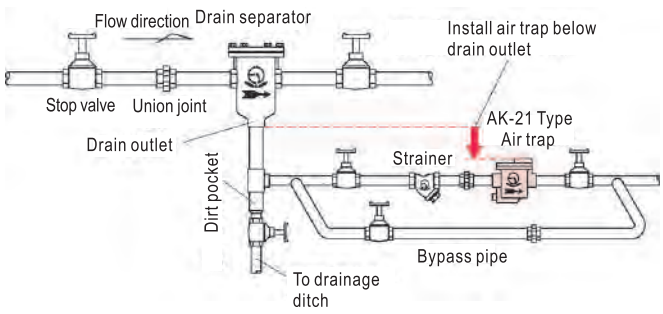
TABLE FOR CAPACITY (Max. continual discharge amount)

(L/h)

Size \ Differential pressure (MPa)	0.01	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.98
15(½″)	30	84	110	130	146	160	173	180	195	205	210
20(¾″)	48	130	175	205	230	252	270	287	305	320	330
25(1″)	94	260	340	398	444	485	522	555	582	608	625

Tips for installation and handling

Piping Example (mounting on drain separator)



Note: This product discharges air drain and some air.

※ For details of drain separator, please see Page 160 and 161.

Preparation before operation

Before operation, please remove the plug and fill water.
After filling water, screw the plug and make sure there is no leakage of water.

Reference of filling water

Size	Amount of water
15(½″)	about 300cc
20(¾″)	about 400cc
25(1″)	about 500cc

1. Before mounting the product, please wash the pipeline thoroughly.
   ※ Insufficient washing of the pipeline may result in leakage at valve seat due to contamination.
2. The product has an embedded strainer (punch hole). You may need to install an independent strainer if the mesh of the embedded strainer does not satisfy your need.
3. When mounting the product, make sure the product is vertically horizontal pipe and the direction indicated by the arrow mark on the product matches with flow direction of fluid.
4. If there is risk of freezing, remove strainer plug or take other measures (such as installation of anti-freezing valve) to prevent freezing.
5. If the outlet pipe is elevated, then a check valve is needed at the outlet side of air trap.

BS-1,1A,2,2A Type Sight Glass

Using a sight glass, the operator can check fluid inside the pipeline and the state of machine operation.

We have a lineup of sight glass products for water・liquid and steam・drain applications.

SPECIFICATIONS

Type		For water・liquid		For steam・drain	
Model name		BS-1	BS-1A	BS-2	BS-2A
Code name		**BS1-M**	**BS1A-M**	**BS2-M**	**BS2A-M**
Applicable fluid		**Water, hot water, oil *2&non-corrosive fluid**		**Steam&drain**	
Construction		See-through type	Flapper type	See-through type	Flapper type
Fluid temperature		Max. 150°C		Max. 150°C*3.	
Applicable pressure		Max. 1.0MPa		Max. 0.4 MPa*3.	
End connection		Screwd JIS Rc			
Material	Body&cap	Ductile cast iron	Ductile cast iron (flapper: Stainless steel)	Ductile cast iron	Ductile cast iron (flapper: Stainless steel)
	Glass	Reinforced glass		Reinforced glass (with mica plate at surfaces contacting with liquid)*3.	
Pressure test		Hydraulic 1.5 MPa			

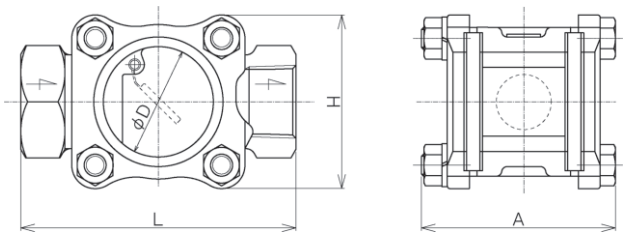
＊1. Sight glass with ball (see-through type) is also available. (BS-1B Type for water and liquid and BS-2B Type for steam and drain)
＊2. If there is any local regulation for fuel oil or diesel oil, confirm the body materials according to the regulation.
＊3. Sight glass products made of heat-resistant glass and with mica plate at surfaces contacting with liquid (BS-3 Type (see-through type) and BS-3A Type (flapper type)) are also available. (Fluid temperature: Max.220°C. Applicable pressure: Max.1.0 MPa.)

DIMENSIONS

(mm)

Size	d	L	H	A	D	Mass(kg)
15(½″)	½″	95	63	71	40	0.85
20(¾″)	¾″	100	63	71	40	0.95
25(1″)	1″	120	73	83	45	1.4

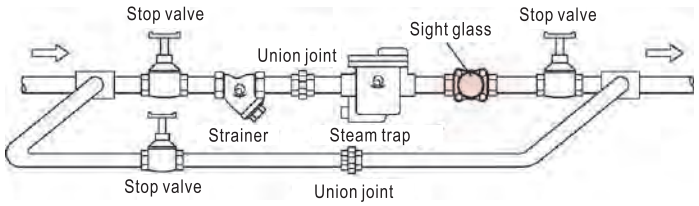
CONSTRUCTION



Tips for installation and handling

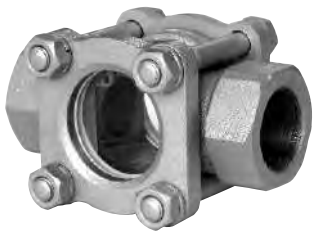
1. When installing sight glass on pipe, make sure the direction indicated by the arrow mark on the product matches with the flow direction of fluid.
2. Please install stop valve and bypass pipe before and after sight glass (see Piping Example).
3. Fix and support sight glass securely to avoid excessive load, bending, or vibration of sight glass.
4. Use sight glass with mica plate (BS-2, 2A Type) if the fluid is steam or drain.
5. When installing BS-2, 2A Type sight glass on steam trap line, make sure it is installed at the secondary side of steam trap. The glass may break due to excessive pressure if it is installed at the primary side.
6. If there is risk of freezing, please make a drain hole.

PIPING EXAMPLE

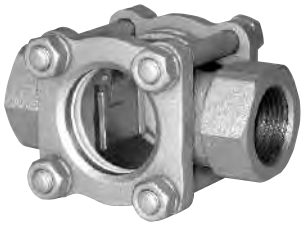


FLOW DIRECTION

See-through type		Flapper type	
Horizontal pipe	Vertical pipe	Horizontal pipe	Vertical pipe



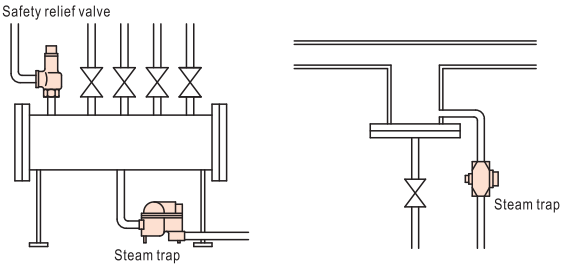
BS-1, 2 Type
(See-through type)



BS-1A, 2A Type
(Flapper type)

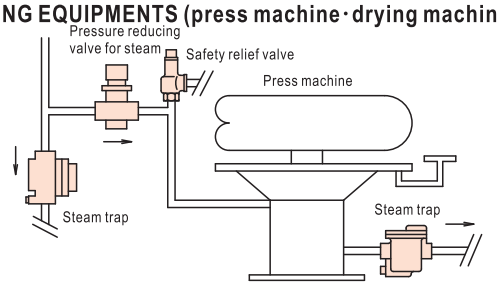
EXAMPLE: APPLICATION OF STEAM TRAP

STEAM SUPPLY PIPELINE (main pipe·branch pipe·header, etc.)



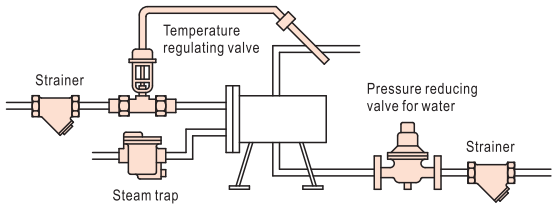
- Points for selection:
  There is a large difference between the amount of drain generated at normal operation state and that generated at start up. Large amount of air and drain generated at start up may obstruct the supply of steam.
- Applicable model:
  ATB-5, 5F/AT-6, 6F Type (thermo element type)
  AD Type series (disc type)
  AK Type series (bucket type), AF Type series (float type)

CLEANING EQUIPMENTS (press machine·drying machine, etc.)



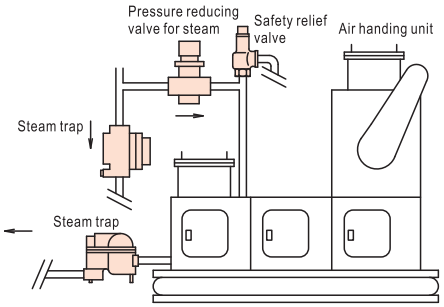
- Points for selection:
  Pay attention to selection of the size of steam trap, because the load changes drastically.
- Applicable model:
  AD Type series (disc type)
  AK Type series (bucket type)
  AF Type series (float type)

AIR CONDITIONING·MANUFACTURING EQUIPMENTS (heat exchanger, etc.)



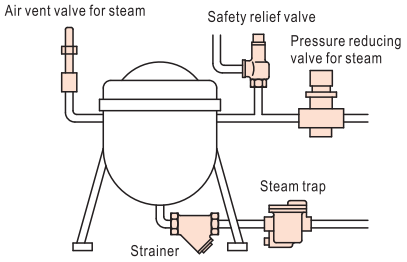
- Points for selection:
  Large amount of drain is generated for maximal utilization of the heat of steam. There is a large difference between the amount of drain generated at normal operation state and that generated at start up.
- Applicable model:
  AF Type series (float type)
  AK Type series (bucket type)

(Air handling unit)



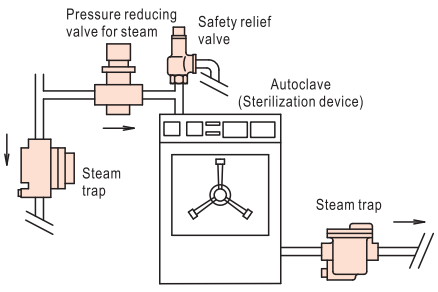
- Points for selection:
  Large amount of drain is generated for maximal utilization of the heat of steam. In addition, the amount and temperature of air feed also affect the amount of drain generated.
- Applicable model:
  AF Type series (float type)
  AK Type series (bucket type)

FOOD PROCESSING EQUIPMENTS·KITCHEN UTENSILS (stew pot·heating pot, etc.)



- Points for selection:
  Large amount of drain is generated for maximal utilization of the heat of steam. With the passing by of heating time, the amount of drain reduces.
- Applicable model:
  AF Type series (float type)
  AK Type series (bucket type)

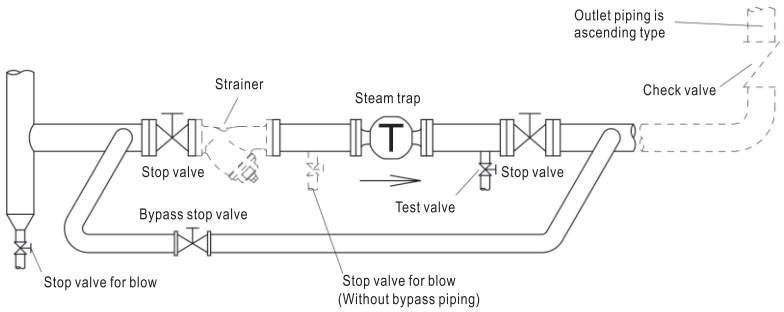
MEDICAL·PHARMACEUTICAL·FOOD PROCESSING EQUIPMENTS (autoclave·sterilizer, etc.)



- Points for selection:
  To rapidly increase the internal temperature, large amount of drain is generated during initial operation period. The amount of drain decreases after temperature becomes stable.
- Applicable model:
  ATB-5, 5F/AT-6, 6F Type (thermo element type)
  AD Type series (disc type)
  AK Type series (bucket type)

PIPING EXAMPLE

Fig. 1 Piping example



POINTS FOR SIZE SELECTION AND INSTALLATION

(Steam trap is hereinafter referred to as "trap".)

1. Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.
2. AT and ATB Type can detect drain temperature and open/close valve based on the temperature detected. When selecting size, pay attention to following issues:
   ※1.Before the temperature of saturated steam drops to the temperature for valve opening, drain accumulates at the primary side of trap. Do not install trap on machines or equipments whose functions may be affected by accumulation of drain.
   ※2.Avoid installing trap on machines or equipments using solenoid valve control for frequent feeding or stop feeding of steam. Such action may cause pressure changes drastically and reduce the durability of bellows and thermo element. (Applicable models: AT-1A, 1S, AT-6, 6F, 6FB, ATB-5, 5F Type)
   ※3.The pipe at the inlet side of trap should be naked pipe that is more than 1m in length. Do not apply thermal insulation on trap. (Applicable models: AT-6, 6F, 6FB, ATB-5, 5F Type) (see Fig.2)
3. Install strainer at the primary side of trap.
   ※ It may not be necessary to install strainer in the case of steam trap with strainer embedded. However, for ensuring stable operation, it is recommended installing strainer.
4. For devices whose operation cannot be stopped, install a bypass pipe (with stop valve) between the primary and secondary sides of steam trap (see Fig.1). If you choose not to install bypass pipe, install stop valve for blowing, which is branched from the main pipe, right before the stop valve at the primary side of steam trap, to make flushing possible.
5. The position of steam trap should be as low as possible to allow drain flow by its weight.
6. In the event trap is installed at the midway of main pipe, install a separator with the same diameter as of the main pipe (see Fig.3).
7. To install trap at pipe end, install a dirt pocket (which diameter is the same as that of main pipe) at pipe end, and install trap at the pipe which is branched from dirt pocket(see Fig.4).
8. When the discharge side of trap is piped to drain tank or waterspout, make sure such pipe does not submerge into water. In addition, install check valve to prevent back flow (see Fig. 5, 6).
9. When the discharge side of trap is piped to drain collecting pipe or other system, make sure the discharge pipe enters into such drain collecting pipe or system from the upper side, and install check valve if there is back pressure (see Fig.5).
10. In the event the discharge side of trap opens to atmosphere, make sure such outlet piping does not cause any danger. In addition, install BH-1 Type silencer to reduce noise that occurs when drain is discharged (see Fig.7).
11. In general, one trap is necessary for one unit of machine (see Fig.8).
12. The arrow mark on steam trap should match with the direction of the flow of fluid. Except for some models, steam trap should be installed vertically to horizontal pipe.
13. Leave some space for diassembling and maintenance.
14. Fix or support steam trap properly to avoid damage of steam trap due to the weight of pipe, stress, bending force or vibration.
15. Discharge drain if there is risk of freezing.
16. The secondary piping of AD-17B, 17FB Type (for cold area) should not be ascending type.

Fig.2 AT、ATB Type piping Example

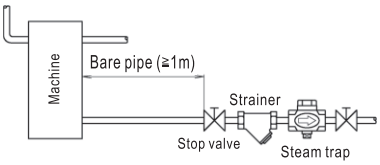


Fig.3 Installation at midway of pipe

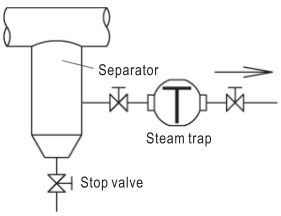


Fig.4 Pipe end installation

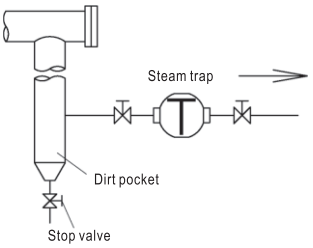


Fig.5 Drain tank piping

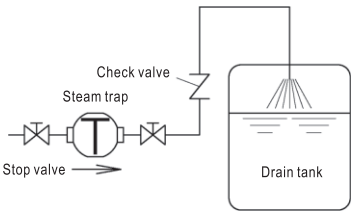


Fig.6 Waterspout Piping Example

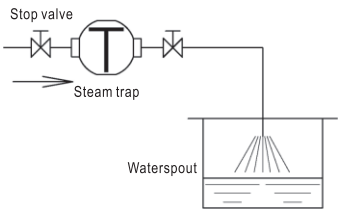


Fig.7 Discharge to atmosphere

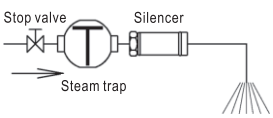


Fig. 8 Installation on machine