

AK-21 Type Air Trap

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

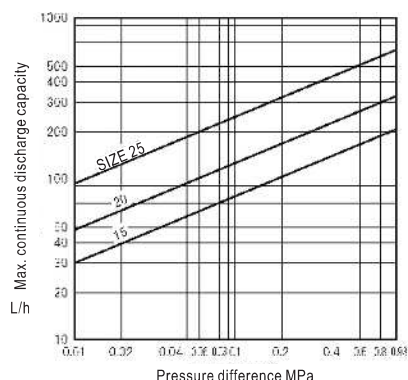
Bucket type
0.01~0.98MPa

Discharge drain from air pipeline automatically.

Mechanical structure ensures reliable operation.



FLOW CHART



- 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.
- 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.

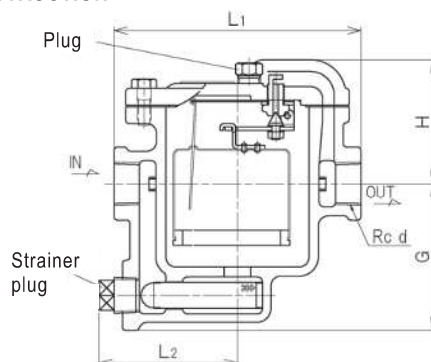
FEATURES

- 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°C
Applicable pressure	0.01~0.98 MPa
End connection	Screw 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.

DIMENSIONS

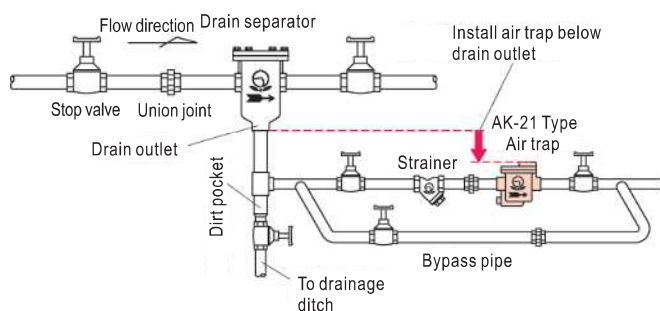
Size	d	L1	L2	G	H	Mass(kg)
15(½")	½"	130	76	72.5	68.5	2.7
20(¾")	¾"	148	87	88	74	4.4
25(1")	1"	184	94	98	81	5.8

TABLE FOR CAPACITY (Max. continual discharge amount)

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

- Before mounting the product, please wash the pipeline thoroughly.
※ Insufficient washing of the pipeline may result in leakage at valve seat due to contamination.
- 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.
- 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.
- If there is risk of freezing, remove strainer plug or take other measures (such as installation of anti-freezing valve) to prevent freezing.
- If the outlet pipe is elevated, then a check valve is needed at the outlet side of air trap.

BA-5 Type Drain Separator

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

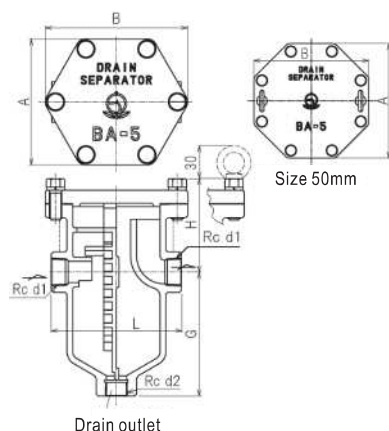
Baffle type

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.



CONSTRUCTION (Unit: mm)



Drain outlet

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°C	
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

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

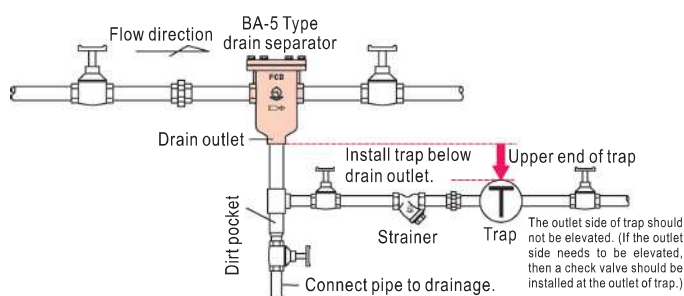
Nominal diameter of drain separator	15·20·25(½" · ¾" · 1")	32·40(1¼" · 1½")	50(2")
Drain outlet diameter	JIS Rc¾"	JIS Rc1"	JIS Rc1¼"
Nominal diameter of dirt pocket	20(¾")	25(1")	32(1¼")
Nominal diameter of trap	20(¾")	25(1")	32(1¼")

※ 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

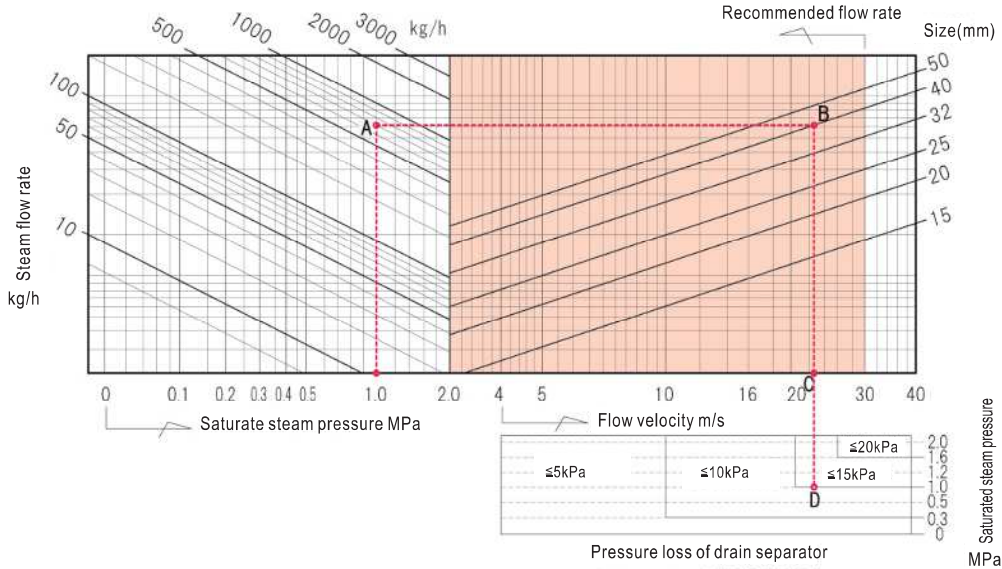
Piping Example



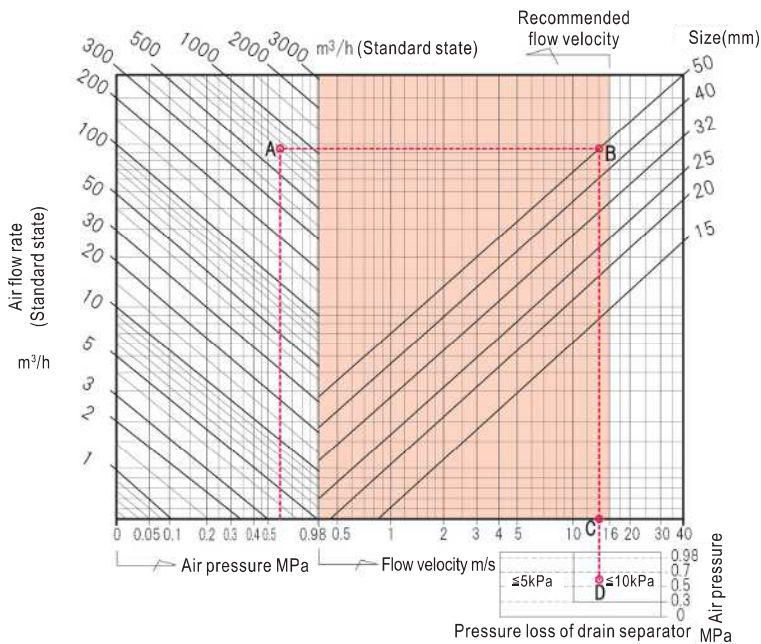
1. Wash the pipeline thoroughly before installing the product.
※ Insufficient washing may result in accumulation of dirt at drain outlet, blockage, or failure of trap.
2. To allow easy installation and dismantling, please install union joint at the inlet and outlet of the product.
3. When mounting the 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 cross 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).

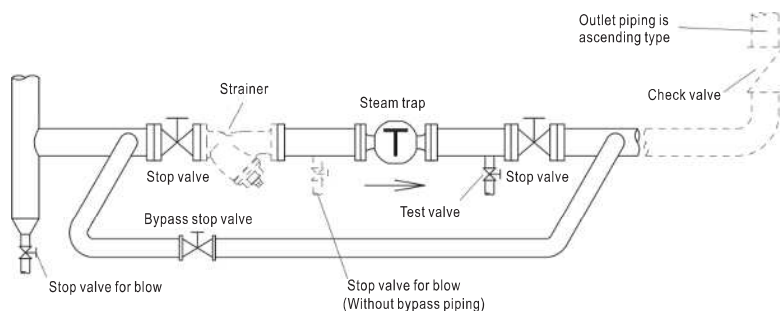
(For air)

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 cross 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 point 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.

PIPING EXAMPLE

Fig. 1 Piping example



POINTS FOR SIZE SELECTION AND INSTALLATION

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

- Select a proper size that can meet the requirement on safety factor and allow at least 3 times of planned discharge volume.
- 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)
- 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.
- 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.
- The position of steam trap should be as low as possible to allow drain flow by its weight.
- 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).
- 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).
- 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).
- 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).
- 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).
- In general, one trap is necessary for one unit of machine (see Fig.8).
- 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.
- Leave some space for disassembling and maintenance.
- Fix or support steam trap properly to avoid damage of steam trap due to the weight of pipe, stress, bending force or vibration.
- Discharge drain if there is risk of freezing.
- The secondary piping of AD-17B, 17FB Type (for cold area) should not be ascending type.

Fig.2 AT、ATB Type piping Example

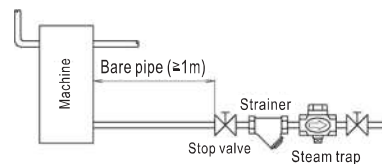


Fig.3 Installation at midway of pipe

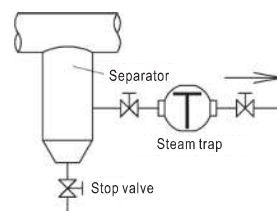


Fig.4 Pipe end installation

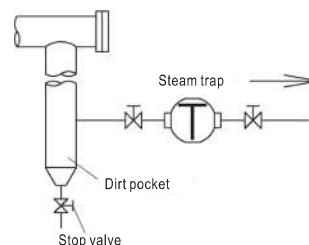


Fig.5 Drain tank piping

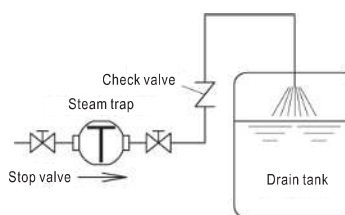


Fig.6 Waterspout Piping Example

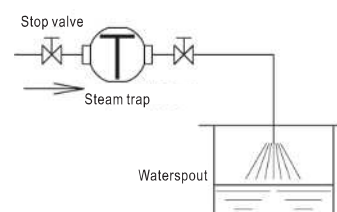


Fig.7 Discharge to atmosphere

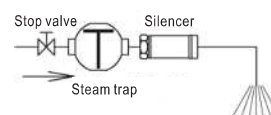


Fig. 8 Installation on machine

