

Models DS-1, DS-2

Drain Separator

Operation Manual

Thank you very much for choosing the Yoshitake's product. Please read this instruction manual thoroughly before using the product, so that you may do so correctly and safely. Please carefully store this manual in a handy place.

- - - The following safety symbols are used in this manual. - - -

Warning

This symbol indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

Caution

This symbol indicates a hazardous situation that, if not avoided, may result in minor or moderate injury or may result in only property damage.

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1. Features

The drain separators are installed in the steam piping or air piping and used to separate drain inside piping.

- (1) Drain separation efficiency is high because of a cyclone type.
- (2) Pressure loss is extremely low.
- (3) These drain separators are trouble-free because they have no moving parts.
- (4) Non asbestos gasket is used.

2. Specifications

Model		DS-1	DS-2
Nominal size		15A-50A	15A-100A
Application		Steam , Air	
Maximum pressure		2.0MPa (Air: Less than 1.0MPa)	
Maximum temperature		220	
Material	Body	Ductile cast iron	
	Nozzle	Cast iron	
	Receiver	Ductile cast iron	
	Gasket	Non asbestos	
Connection		JIS Rc screwed	JIS 10KFF flanged JIS 20KFF flanged

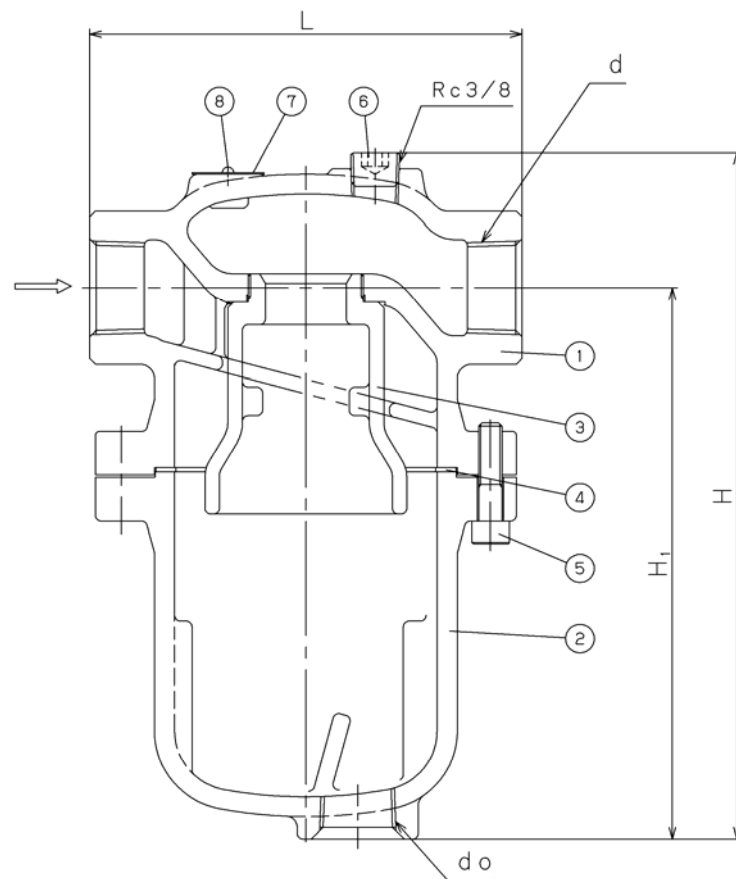
A gasket is durable for 1 to 2 years when applied to steam.

Caution

- (1) Please collate with attached name plate and specification of ordered model.
* Please consult factory in case they do not match each other.

3. Dimensions, weights, and structure

[DS-1]

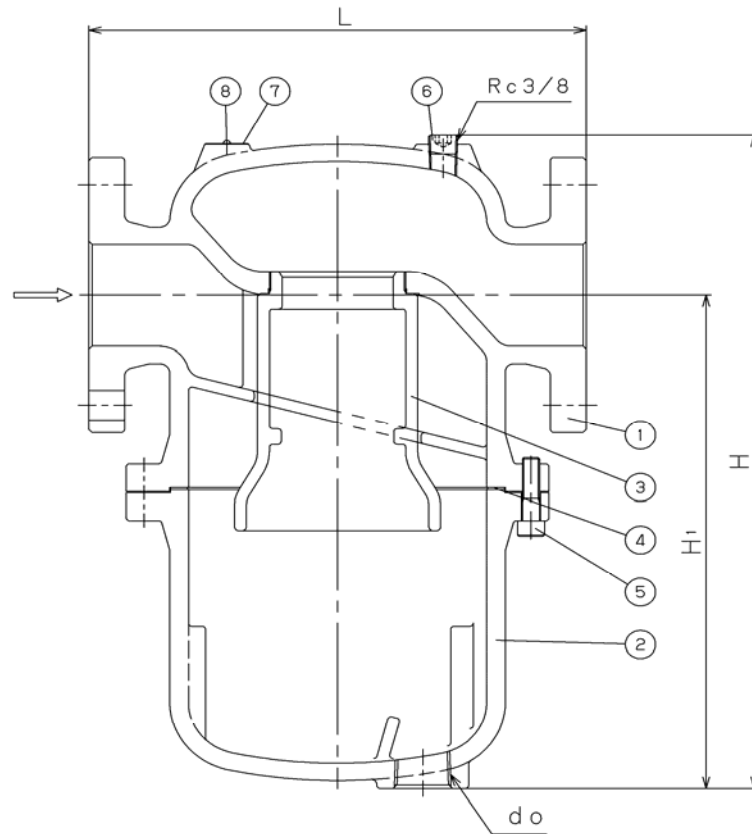


[Figure 1]

(mm)						
Nominal size	d	L	H	H ₁	d ₀	Weight (kg)
15A	Rc 1/2	150	243	193	Rc 3/4	7.1
20A	Rc 3/4	150	243	193	Rc 3/4	7.1
25A	Rc 1	150	243	193	Rc 3/4	7.3
32A	Rc 1 1/4	190	282	213	Rc 1	12.5
40A	Rc 1 1/2	190	282	213	Rc 1	12.5
50A	Rc 2	219	342	260	Rc 1	20.5

No.	Parts name	No.	Parts name
1	Body	5	Bolt
2	Receiver	6	Plug
3	Nozzle	7	Name Plate
4	Gasket	8	Rivet

[DS-2]



[Figure 2]

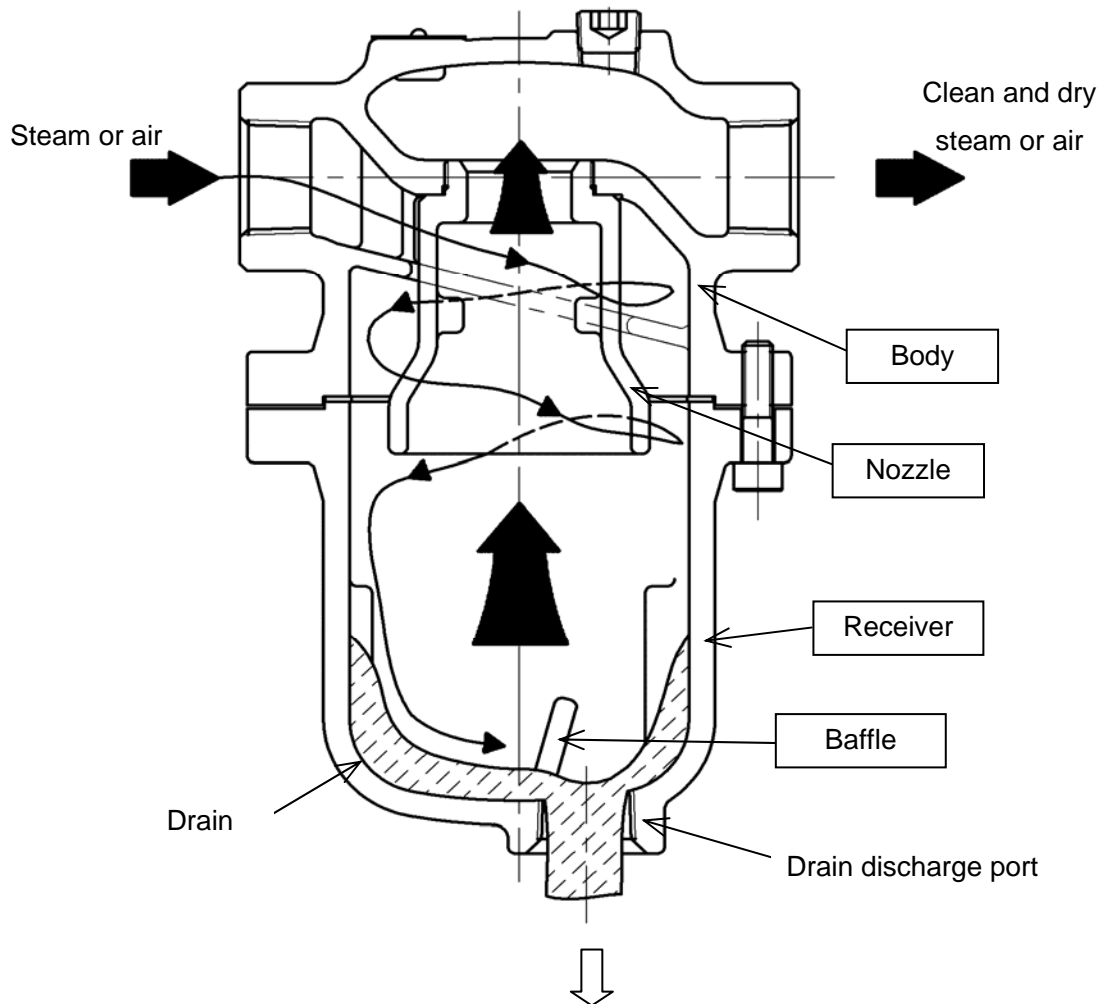
(mm)

Nominal size	L (JIS 20K)	H	H ₁	d ₀	Weight (JIS 20K) (kg)
15A	178	243	193	Rc 3/4	8.7
20A	208	243	193	Rc 3/4	9.8
25A	208	243	193	Rc 3/4	10.5
32A	226	282	213	Rc 1	16.0
40A	246	282	213	Rc 1	16.7
50A	250	342	260	Rc 1	24.9
65A	292	418	314	Rc 1	40.0
80A	343	484	361	Rc 1 1/4	65.0
100A	402	594	445	Rc 1 1/4	100.0

No.	Parts name	No.	Parts name
1	Body	5	Bolt
2	Receiver	6	Plug
3	Nozzle	7	Name Plate
4	Gasket	8	Rivet

4. Operation

The steam or air flow is subjected to a centrifugal force when it enters the drain separator. As soon as steam or air flows into the drain separator, centrifugal force starts to work by the internal structure of the body. Drain swirls along the wall surface in consequence of the difference in specific gravity between it and the steam or air, and strikes against the baffle. The drain is then guided to discharge port and released by the installed trap. So, clean and dry steam or air is flowed to the outlet side.



[Figure 3]

5. Selection of nominal size

To make the best use of the drain separator and satisfy the operating requirements to the maximum, take notice of the following.

[Selection of nominal size]

Select a nominal size equivalent to that of the pipe (piping nominal size = nominal size of drain separator). Note that the use of a smaller nominal size increases the pressure loss through the drain separator, possibly reducing the inlet pressure of equipment below the specified limit.

Table 1: Maximum flow velocity

Fluid	Maximum flow velocity
Steam	30 m/s
Air	15 m/s

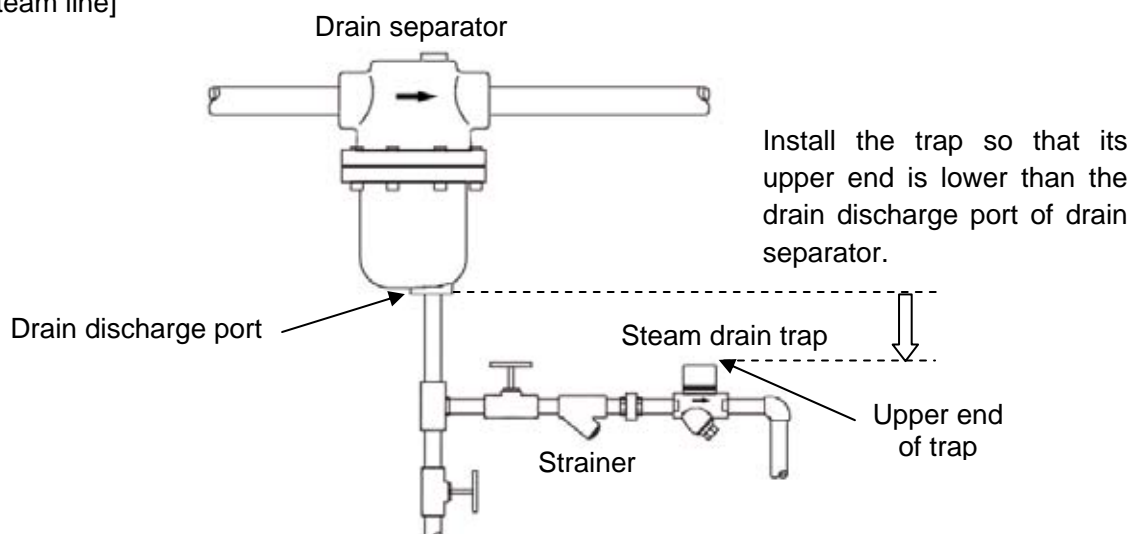
*Use drain separator at less than maximum flow velocity.

*If flow velocity is too fast, the drain separator cannot function satisfactorily.

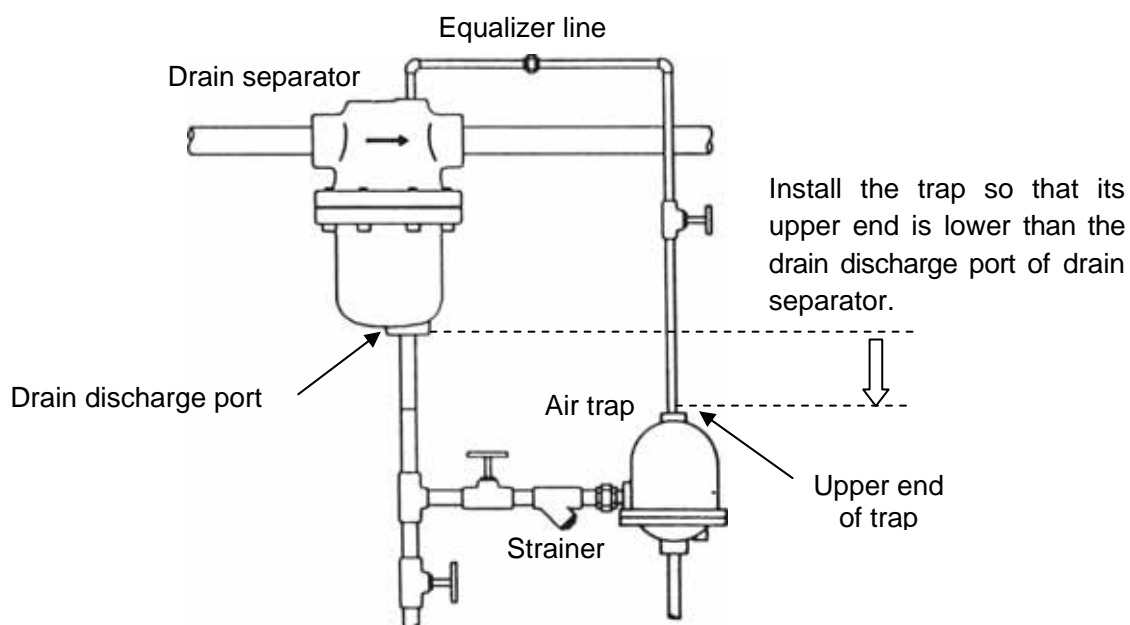
6. Installation procedures

6.1 Piping example

[Steam line]



[Air line]



[Figure 4]

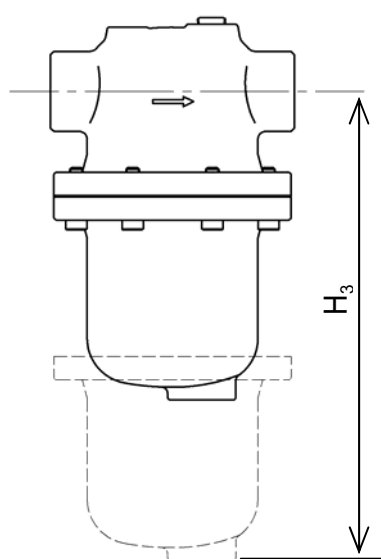
6.2 Caution in installation

⚠ Warning

- (1) The product is heavy and shall be securely suspended with a hoist or the like when installed.
(For the weight of the product, see section 3 "Dimensions, weights, and structure".)
* Failure to suspend the product may cause it to fall down, possibly resulting in injury.

⚠ Caution

- (1) Install the product in such a way that the arrow on the body follows the fluid flowing direction.
* Installing the product in a wrong direction prevents the product from performing as intended.
- (2) Firmly support pipes and secure the product.
* If an excessive stress is applied to the pipes, the product may be deformed.
- (3) When installing the product, reserve a space required for maintenance and inspection as specified in Figure 5.
* Failure to do so prevents later maintenance and inspection.
- (4) Firmly connect pipes.
* If incompletely connected, the fluid may leak from pipes when vibration is applied. The fluid may scald your skin.
- (5) Connect the drain separator horizontally to piping with the drain discharge port down.
* Failure to do so prevents the product from performing as intended.
- (6) Be sure to install a trap under the drain discharge port. (For connection size for trap, see the size of d_0 shown in section 3 "Dimensions, weights, and structure".)
* Failure to do so prevents discharging the drain.
- (7) Install the trap so that its upper end is lower than the drain discharge port of drain separator.
(See section 6.1 "Piping example".)
* Failure to do so prevents discharging the drain.



(mm)		
Model	Nominal size	H ₃
DS-1 DS-2	15A	210
	20A	
	25A	
	32A	240
	40A	
	50A	290
DS-2	65A	350
	80A	410
	100A	550

[Figure 5]

7. Operation procedures

7.1 Caution in operation

Warning

- (1) Before letting the fluid into the product, check that there will be no possibility of danger if the fluid flows into the ends of piping.
- * The hot fluid, if spouted out, may scald your skin.
 - * The fluid outflow may cause physical damage.

8. Maintenance procedures

8.1 Troubleshooting (See Figure 1 or 2)

Trouble	Cause	Measures and treatment
External fluid leak	Leaking from the gasket [4]	Disassemble the product and replace the gasket [4]. (See section 8.3 “Disassembly procedure” and 8.4 “Assembly procedure”.)
	Leaking from the plug [6]	Disassemble the plug [6] and replace sealing tape around the thread of plug. Then assemble the plug.
Drain is not observed.	Flow velocity is too fast.	Use a drain separator at less than maximum flow velocity. (See Table 1.)

8.2 Caution in disassembly and assembly

Warning

- (1) Before disassembling or inspecting the product, check that pressures inside the product, piping and devices have been released to the atmosphere.
- * A residual pressure inside the product may lead to injury or burns.
- (2) If the fluid is hot, cool it down until it can be touched by bare hand.
- * A hot fluid may scald your skin.

Caution


- (1) Clean up the faces of the body and receiver which the gasket is touching.
- * Failure to do so may lead to leak from the gasket, and may result in injury or burns.
- (2) Replace the gasket and assemble the parts securely. Tighten the bolts evenly in the diagonal order.
- * The gasket is a consumable part. If it is reused, leakage might occur. A hot fluid may scald your skin.

8.3 Disassembly procedures

* Tools used

Tool name	Nominal size
Hexagon socket wrench	Nominal 6 mm (15A-50A)
	Nominal 8 mm (65A-80A)
	Nominal 10 mm (100A)
Spinner handle	Used with hexagon socket wrench.

- (1) After confirming that no pressure is left inside the drain separator, remove the bolt [5] using a spinner handle with hexagon socket wrench.
- (2) Remove the receiver [2] and the gasket [4].

	The receiver is heavy and shall be securely suspended with a hoist or the like when removed. Failure to suspend the product may cause it to fall down, possibly resulting in injury.
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8.4 Assembly procedures

* Tools used

Tool name	Description (sizes)
Torque wrench	Use one capable of tightening at the torque of 30-150 N·m. Used with hexagon socket wrench.
Hexagon socket wrench	Nominal 6 mm (15A-50A)
	Nominal 8 mm (65A-80A)
	Nominal 10 mm (100A)

- (1) Replace the gasket [4] with a new one. Before assembling a new one, apply the paste on the entire surface and inside surface of the gasket.
(Recommended paste is SOLVEST110 manufactured by STT Co. Ltd.)
- (2) Attach the new gasket [4] to the receiver [2]. First, temporarily install the bolt [5], and then tighten it evenly with a torque wrench at the torque shown in Table 2.

Table 2: Tightening torques

Nominal size	Bolt nominal size	Tightening torque	Nominal size	Bolt nominal size	Tightening torque
15A-25A	M8	30 N·m	65A	M10	80 N·m
32A-40A		35 N·m	80A		85 N·m
50A		45 N·m	100A	M12	145 N·m

Warranty Information

1. Limited warranty

This product has been manufactured using highly-advanced techniques and subjected to strict quality control. Please be sure to use the product in accordance with instructions on the manual and the label attached to it.

Yoshitake warrants the product to be free from any defects in material and workmanship under normal usage for a period of one year from the date of receipt by the original user, but no longer than 24 months from the date of shipment from Yoshitake's factory.

2. Parts supply after product discontinuation

This product may be subject to discontinuation or change for improvement without any prior notice. After the discontinuation of the product, Yoshitake supplies the repair parts for 5 years otherwise individually agreed.

3. This warranty does not cover the damage due to any of below:

- (1) Valve seat leakage or malfunction caused by foreign substances inside piping.
- (2) Improper handling or misuse.
- (3) Improper supply conditions such as abnormal water pressure/quality.
- (4) Water scale or freezing.
- (5) Trouble with power/air supply.
- (6) Any alteration made by other than Yoshitake.
- (7) Use under severe conditions deviating from the design specifications.
- (8) Fire, flood, earthquake, thunder and other natural disasters.
- (9) Consumable parts such as O-ring, gasket, diaphragm and etc.

Yoshitake is not liable for any damage or loss caused by malfunction or defect of the product.



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