## Model TB-20·20F

## **STEAM TRAP**

## Installation & Operation Manual

This manual provides the installation and maintenance procedures for TB-20 steam trap manufactured by Yoshitake. Please read and understand this manual before starting operations and keep this manual carefully.

—The precautions in this manual are divided into two levels depending on the degree of injury that may result.———

▲ Warning

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**A** Caution

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It is also used to alert against property damage.

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#### 1. Specifications

Model			TB-20 TB-20F			
Nominal Size			15A.20A.25A			
Connection		JIS Rc screwed (※)	BSEN PN25 flanged GB/T PN25 flanged JIS20KFF flanged	JIS10KFF flanged		
Applie	cation			Steam condensate		
(A)		0.3 MPa				
Mar F			0.6 MPa			
Max. L	filterential Press.	(C)	1.0 MPa			
		(D)	1.6 MPa –		—	
Max. Temperature			220°C			
al	Body		Ductile cast iron			
ateri	Valve		Stainless steel (Heat treated)			
Ma	Valve seat		Stainless steel (Heat treated)			

₩ NPT connection is also available.

#### $\triangle$ Caution

Please confirm that the indications on the product name plate coincide with the specifications of the ordered product model before usage.
 ※In case they do not coincide, do not use the product and contact us.

#### 2. Dimensions and Weight



_		TB-2	20	(mm)	
Nominal size	L	Н	$H_1$	А	Weight (kg)
15A					
20A	136	183	94	117	4.3
25A					



		TB-20	)F	(mm)	
Nominal size	L	Н	$H_1$	А	Weight (kg)
15A					5.4
20A	175	183	94	117	6.0
25A					6.3

#### 3. Discharge Capacity

- (1) Be sure to consider the outlet pressure of the steam trap since the discharge capacity is based on the pressure difference between inlet and outlet. For example, the discharge capacity at 0.5 MPa inlet pressure and 0.2 MPa outlet pressure is determined at 0.3 MPa pressure difference.
- (2) Secure a safety factor of  $2 \sim 3$ . For example, it should be used a steam trap whose discharge capacity is  $200 \sim 300$  kg/h when 100 kg/h discharge is needed.





#### Fig.1 Discharge capacity chart

#### 4. Outline of Operation



-	
No.	Name of parts
1	Body
2	Cover
3	Bucket P
4	Valve
5	Valve seat

#### EPDT-199c

#### (1) Start of discharge

The air in a trap is pushed up with low-temperature condensate, passes along a upper valve seat, and is discharged at an outlet side. Low-temperature condensate also passes along the inside and the perimeter of a bucket by inflow of high-temperature condensate, and is discharged from a upper valve seat to an outlet side.



(2) Closing operation

If steam enters in a bucket following high-temperature condensate, a bucket will come floating and will close a valve seat. If there is no inflow of condensate, carrying out a closed valve is continued.



If condensate flows in again, a bucket will lose lift, and will sink. A valve will be opened and condensate will be discharged from a valve seat at an outlet side.

Henceforth, the operation of (2) and (3) is repeated according to the amount of generating of condensate.





Steam Condensate





#### 5. Installation

#### 5. 1 Precautions for installation

#### \land Warning

- (1) Connect the outlet side piping to safe places where human damage does not occur, even if condensate is blown off.
  - When condensate is blown off, there is a possibility of carrying out a burn and an injury.

### ▲ Caution



- (10) Install a trap in the lowest possible position to collect condensate to the trap by their weight. And make a slope to piping.
- (11) Make a drain-pot before a trap when the trap is installed to main steam line.
- (12) Do not install a trap where atmosphere temperature is higher than the temperature of condensate.
- (13) If a bypass pipe is installed in parallel, there are the following advantages.
  - •Available to discharge large amount of condensate and air at start-up period by opening the bypass valve.
  - •Blow-off at the time of piping establishment is possible by closing the inlet/outlet valves of the trap and opening the bypass valve.
  - Inspection of a trap and replacement of parts are possible, without stopping operation.

#### 5. 2 Piping diagrams







#### 6. Operation

#### 6. 1 Precautions for operation

#### \land Warning

- (1) Confirm that there is no danger even if steam and condensate are flown to the end of piping.
   \*\*Blow-off of steam or condensate may cause burn.
- (2) Do not stand in front of the outlet opening of piping at confirmation of trap operation. Large amount of condensate must be discharged at the first operation.※Blow-off of condensate may cause burn.

## **▲**Caution

(1) Confirm there is condensate in the trap at the first operation.

XIf the filling up of condensate does not exist, steam can be blown out continuously.

#### 7. Maintenance

#### 7.1 Troubleshooting

Trouble	Cause	Measure
No discharge	1. Operating pressure is higher than the proper pressure of the trap.	1. Replace the trap which can be used the operating pressure.
	2. Valve seat $5$ is clogged.	2. Disassemble and clean the value seat $5$ .
	3. Bucket vent is clogged.	3. Disassemble and clean the bucket vent.
	4. Screen (9) is clogged.	4. Disassemble and clean the screen.
	5. Breakage of trap by freezing or water-hammer, etc.	5. Replace the trap.
Poor discharge of condensate.	1. Too low pressure difference due to too high back pressure.	1. Examine inlet/outlet pressure of the trap and whole piping condition.
	2. Screen (9) is clogged.	2. Disassemble and clean the screen.
Condensate continues blowing off.	1. There is foreign material between valve ④ and valve seat ⑤.	1. Disassemble and clean the value (4) and the value seat (5).
	<ol> <li>There is flaw or wear between value</li> <li>and value seat<sup>5</sup>.</li> </ol>	2. Replace them by the conversion kit or the cover assembly.
3. Low discharge capacity to specified condition.		3. Replace the trap to proper one.
	4. Lever holder $\bigcirc$ is deformed.	4. Replace the trap.
	5. Too high back pressure.	5. Examine the piping condition.
	6. Disappearance of condensate in the trap.	6. Please make condensate flow in to the bucket.
Leakage to the outside	1. Leakage between body ① and cover②.	1. Replace gasket $\textcircled{10}$ between the body $\textcircled{1}$ and the cover $\textcircled{2}$ .
	2. Leakage around $plug \oplus \mathbb{O}$ .	2. Remove, rewind sealing tapes and reassemble the plug $\textcircled{1} \cdot \textcircled{2}$ .
	3. Breakage of trap by freezing.	3. Replace the trap and take a measure to prevent freezing.

\*Refer to "7.6 Exploded drawing" for the part name of the above table.

XUse a hexagonal socket (Double-side width: 1/2", 12.7mm) for disassembly and assembly of the valve seat.Contact us if you are not sure on necessity of damaged parts replacement.

#### 7.2 Cautions for maintenance and inspection

## <u>∧</u>Warning

- (1) Before starting disassembly and inspection, make sure that the residual pressure in the trap, piping and equipment is relieved and wait until the temperature of them are sufficiently lowered.
  ※If residual pressure is not relieved, you can be injured. If the temperature is still high, you can get burned.
- (2) Do not touch the trap with bare hands.
- \*There is a possibility of carrying out a burn.
- (3) Do not re-tighten the hexagonal bolts<sup>1</sup> even if there is leakage between the body<sup>1</sup> and cover<sup>2</sup>.
  \*There is a possibility of carrying out a burn by breakage of gaskets<sup>1</sup> and blowing out of steam.

## **≜**Caution

- (1) Carry out periodical inspection by following "7.5 Periodical inspection".
- \*Ordinary user must ask an inspection of special contractor.
- (2) After long time down of system, working inspection of trap should be carried out before operation.\*\*There is a possibility of malfunction with rust in the trap and piping.

#### 7.3 Cautions for disassembling and reassembling

## ▲Warning

- (1) Disassembly and reassembly should be done by experts who design, construct and/or maintain installations using steam.
  - XAn ordinary person must not disassemble a product. Ask a special contractor to take a measure for the trouble.
- (2) Before starting disassembly and reassembly, make sure that the residual pressure in the trap, piping and equipment is relieved and wait until the temperature of them are sufficiently lowered.

XIf residual pressure is not relieved, you can be injured. If the temperature is still high, you can get burned.

## ▲ Caution

- (2) Take care not to drop parts at the time of disassembly. Place the disassembled parts on soft cloth etc. not to give a crack.

XIf the parts have a crack, there is a possibility of malfunction.

(3) At the time of reassembly, take care to assemble the parts certainly and tighten the bolts at the diagonal position operation. Refer to table-1 for tightening valve seat<sup>(5)</sup> and hexagonal bolts<sup>(3)</sup>.

Reassembly and tightening in incorrect can cause malfunction and leakage to the outside.

table-1	:	Bolting torque (Recommendation val	ue)	
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table 1 . Dolting torque (Recommendation value)					
Name of parts	Bolting torque (N·m)				
Valve seat <sup>5</sup>	35				
Hexagonal bolts <sup>[]</sup>	30				

(4) Regular parts must be used for repair of a product. Do not alter the product.

- \*There is a possibility of injury or burn by the damage of product, blowing out of steam or condensate and malfunction.
- (5) Use new gaskets at the time of reassembly.
  - \*Gaskets are consumable parts. There is a possibility of leakage to the outside if it is re-used.

- (6) When the trouble of continuation blowing out by existence of foreign materials between the valve and seat, contact us since there is a possibility of necessity of parts replacement.
  - Repair of the products with the trouble of continuation blowing out by existence of foreign materials at the customer using is paid service.

#### 7.4 Procedure for disassembling and reassembling

- (1) Remove each part by removing hexagonal bolts 1 and pulling up cover 2.
- (2) Tear spindle (8) out of cover (2), and remove lever-P (6) and bucket-P (3).
- (3) Remove valve seat 5 by using hexagonal socket (Double-side width: 1/2", 12.7mm).
- (4) Remove plug 12 and pulling out screen 9.
- (5) Assembly should be performed the contrary of the disassembly procedure. Use new gaskets.
  - (5-1) Plug<sup>(1)</sup> should be tightened after confirmation that screen is certainly inserted to the back. (Fig.4).



Fig.4

- (5-2) Tighten the plug 1 after rewinding sealing tapes.
- (5-3) Refer to Table-1 for tightening the valve seat<sup>5</sup> and the hexagonal bolts<sup>3</sup>.
  Apply liquid sealant to the thread of the valve seat<sup>5</sup>.
  (Recommendation: No. 1209 Three Bond Co., LTD.)

#### 7.5 Periodical inspection

Carry out periodical inspection of trap to maintain its specified performance.

1. Periodical inspection (1 time/year)

Item to be checked	Method	Trouble and measure		
Discharge of condensate	Check with eyes	(1) No discharge		
		(2) Poor discharge	Refer to	
		(3) Continuous blowing out	7.1 Housieshooting	
Leakage to outside	Check with eyes	Refer to "7.1 Troubleshooting"		

#### 7.6 Exploded drawing



\* The parts shown in the boxes \_\_\_\_\_ are consumable items.

These are available as conversion kits as shown in the table above.

X Cover assembly shown in the broken lines []] is also available for easy replacement.

X Refer to the table below for replacement period.

No.	Name of parts	Replacement period (Estimation)
10	Gasket	At disassembly
45	Valve, Valve seat	When scratches or wear exist