



# **Toyo Valve**

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## Operation Manual

For  
Flanged and Threaded  
Y Strainer  
U Strainer

Lead-free Cored Bronze Threaded Y Strainer  
shall be covered by the separate manual.

We appreciate your purchasing our products.  
Ensure to read all the contents of this manual before piping and using them.  
Also keep this manual to the  
place accessible to the operator.

This manual covers the normal use of Flanged and Threaded Y Strainer, and U Strainer, as a general guidance to users.



This manual is prepared for manual valve operation.

For electric or pneumatic valve operation, refer to the operation manual prepared by the manufacturers of relevant valve actuators.

## CAUTION AND WARNING

To ensure safe and trouble-free function and performance of the product, please read all items of this manual before handling, transportation, mounting and operation of valves. Keep this manual in a convenient place for your valve operations' easy access.

The signal words "WARNING" and "CAUTION" are defined as follows:

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

## NOTES TO USERS

This manual covers the normal usage of the product. Technical data and instructions for operation, maintenance and inspection of the product are prepared in consideration of safety. However, they are good only to cover typical applications as a general guideline to users. If technical assistance beyond the scope of this manual is required, contact KITZ Corporation or its distributors.

The illustrations given in this manual do not introduce all details. If more detailed data are needed, refer to our relevant valve assembly drawings.

※ Any information provided in this operation manual is subject to revision at any time without notice. This edition cancels all previous issues.

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## CHAPTER I

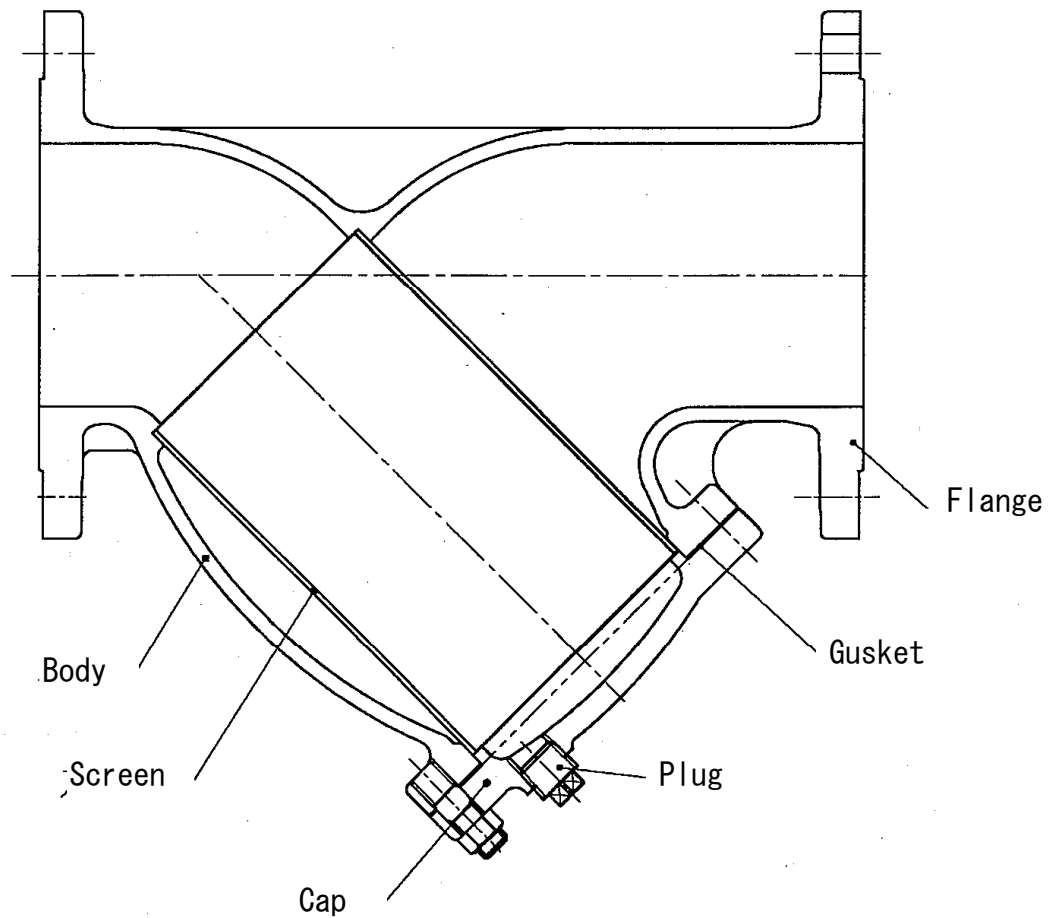
### Construction and Design Features

I Construction and Design Features

## 1. Flanged Y Strainer

1.1 The typical Y strainer design is as illustrated below.

1.2 The Y strainer is designed to remove foreign objects by the screen equipped inside the strainer. Its flow direction and installation orientation are determined by its structure.



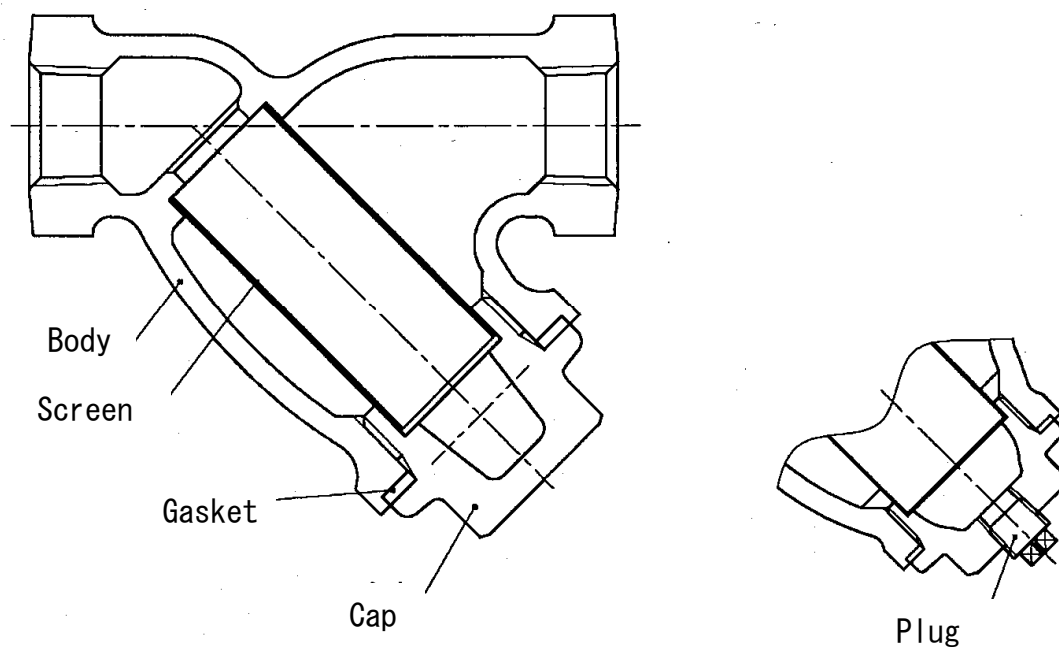
This illustration represents a typical construction.

I Construction and Design Features

## 2. Threaded Y Strainer

2.1 The typical Y strainer design is as illustrated below.

2.2 The Y strainer is designed to remove foreign objects by the screen equipped inside the strainer. Its flow direction and installation orientation are determined by its structure.



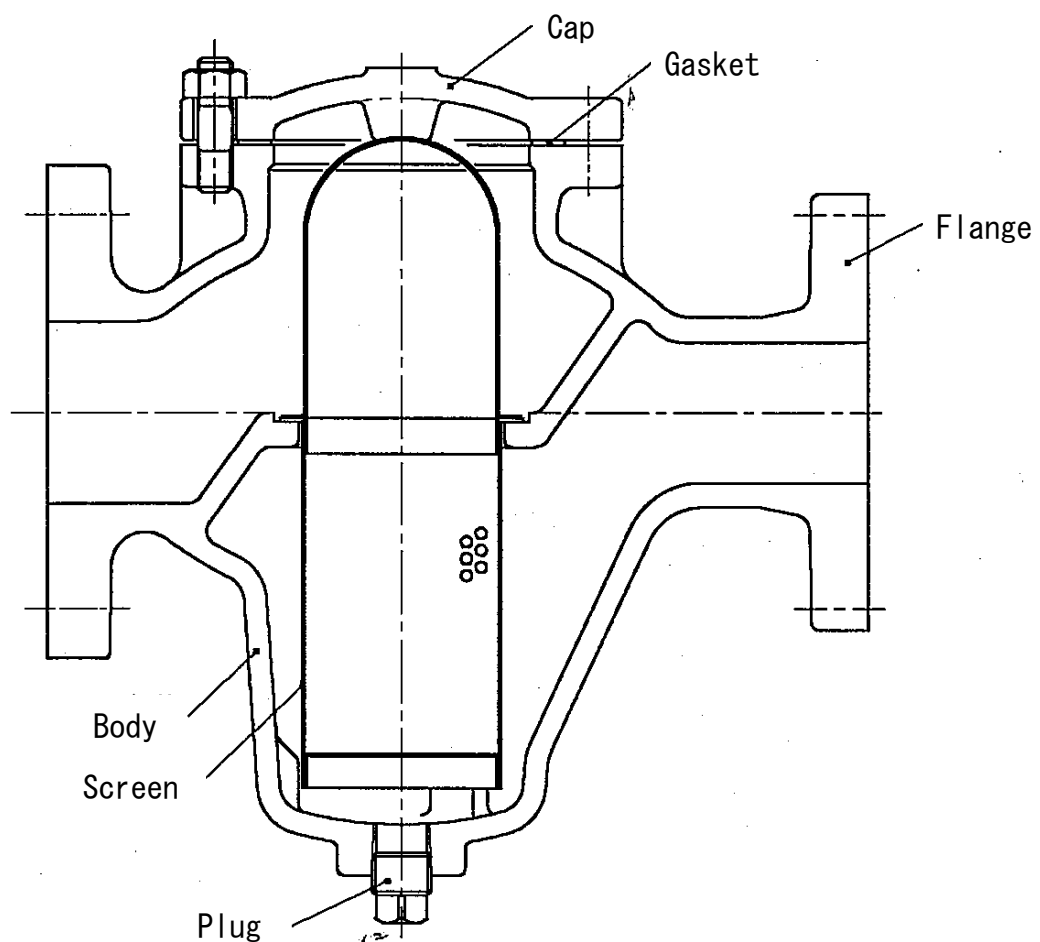
This illustration represents a typical construction.

I Construction and Design Features

## 1. U Strainer

1.1 The typical U strainer design is as illustrated below.

1.2 The U strainer is designed to remove foreign objects by the screen equipped inside the strainer. Its flow direction and installation orientation are determined by its structure.



This illustration represents a typical construction.

I Construction and Design Features

## 4. Types and Fig



Our standard strainers are summed up as follows.

Type	Nominal Pressure	End connection	Body Material	Fig
Y Type	10 K	Thread	Bronze	150-BT-N, (40M)150-BT-N
			Lead-free bronze	L150-BT-N
			Ductile iron	10FDY, 10FDYK
			PVC	VY
		Flange	Cast iron	10-FTF-N, 10FCYC, 10-FTF-N-CN, (40M)10-FTF-N, 10FCYCK, (40M)10-FTF-N-CN
			Ductile iron	10-DT-N, 10-DTF-N, (40M)10-DTF-N
			Stainless steel	UTF-N, UYBM, 10-UTF-VA, 10UYAM
			Carbon steel	10SCY
		Solder	Bronze	150-BT-SE-N, CYK
			Lead-free bronze	(40M)150-BT-SE-N
	Socket weld	P V C	VYS	
	125 LBS	Flange	Cast iron	EA125-FTF<GA101>
	16 K	Thread	Ductile iron	16-DT-N, (40M)16-DT-N
		Flange	Ductile iron	16-DTF-N, (40M)16-DTF-N
	20 K	Thread	Ductile iron	20-DT-N
Stainless steel			UT-N, UYM	
Flange		Ductile iron	20-DTF-N	
		Stainless steel	20UYA	
		Carbon steel	20SCY	
U Type	10 K	Flange	Cast iron	10FCU, 10FCUK



I Construction and Design Features

## 5. Specification

 <b>CAUTION</b>	
	<p>(1) The products used under the control of the High Pressure Gas Safety Law, Gas Utility Industry Law and Fire Service Law are subject to the regulation of these laws. Select correct strainers which are in full compliance with these laws. Facilities which use these strainers are also required to meet the relevant laws and regulations. Failure of using the appropriate products required by the standard or regulations may lead to the occurrence of the major accidents. The operators may be legally punished as a result of the violence of the requirements.</p> <p>(2) Each strainer has a different characteristic in the application, maximum permissible working pressure and temperature, and pressure loss. Select appropriate strainers in accordance with the service conditions. Improper selection of products may lead to the occurrence of accidents.</p> <p>(3) In order to have strainers working most efficiently, the strainer bore size should correspond to the pipe bore size. If the bore size of strainers is smaller than that of pipes, the pressure loss will increase and the specified pressure may not be maintained. Determine pipe nominal diameters not to exceed the service conditions specified in Section 5.2.</p>

## 5.1 Maximum Permissible Working Pressure and Temperature

Fig	Service Conditions	Max. Permissible Working Pressure
150-BT-N	Steady Flow at 120°C and lower (Size 2" and smaller) Steady Flow at 120°C and lower (Size 2 1/2" and smaller) Contact KITZ for saturated steam service.	1.6 MPa 1.37 MPa
L150-BT-N	Steady Flow at 85°C and lower Pulsating Flow at 85°C and lower	1.4 MPa 1.0 MPa
(40M)150-BT-N	Steady Flow at 85°C and lower	1.4 MPa
150-BT-SE-N	Steady Flow at 120°C and lower	1.37 MPa
CYK	Steady Flow at 85°C and lower	1.4 MPa
(40M)150-BT-SE-N	Steady Flow at 85°C and lower Pulsating Flow at 85°C and lower	1.4 MPa 1.0 MPa
10-FTF-N (40M)10-FTF-N	Steady Flow at 120°C and lower Pulsating Flow, oil*1 or air at 120°C and lower Saturated Steam Gas*2 at 120°C and lower	1.37 MPa 0.98 MPa 0.69 MPa 0.20 MPa
10FCYC 10FCYCK	Steady Flow at 40°C and lower Pulsating Flow or Oil*1 at 40°C and lower	1.37 MPa 0.98 MPa
10-FTF-N-CN (40M)10-FTF-N-CN	Steady Flow at 60°C and lower Pulsating Flow or Oil*1 at 60°C and lower	1.37 MPa 0.98 MPa

I Construction and Design Features

Fig	Service Conditions	Max. Permissible Working Pressure
10FDY 10FDYK	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower (For 2" and smaller, Maximum temperature shall be limited to 200°C.)	1.37 MPa 0.98 MPa
10-DTF-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 300°C and lower (For 1 1/2" and smaller, Maximum temperature shall be limited to 200°C.)	1.37 MPa 1.18 MPa 0.98 MPa
(40M)10-DTF-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 260°C and lower (For 1 1/2" and smaller, Maximum temperature shall be limited to 200°C.)	1.37MPa 1.18 MPa 1.07MPa
10-UTF-VA 10UYAM	Steady Flow at 120°C and lower Steam at 180°C and lower	1.37MPa 1.18MPa
UTF-N UYBM	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower	1.37MPa 0.98MPa
10SCY	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 300°C and lower	1.37MPa 1.18MPa 0.98MPa
VY	Water, Chlorine, Bromine or other chemical fluids at 50°C and lower.	0.98MPa
VYS	Water at 50°C and lower.	0.98MPa
EA125- FTF<GA101>	Water, Oil*1 or Gas at 120°C and lower Saturated steam	1.37MPa 0.86MPa
16-DT-N (40M)16-DT-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 200°C and lower	2.16MPa 1.96MPa
16-DTF-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 300°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 350°C and lower (For 1 1/2" and smaller, Maximum temperature shall be limited to 200°C.)	2.16MPa 1.96MPa 1.77MPa 1.57MPa
(40M)16-DTF-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 260°C and lower (For 1 1/2" and smaller, Maximum temperature shall be limited to 200°C.)	2.16MPa 1.96MPa 1.86MPa
20-DT-N 20-DTF-N	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 300°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 350°C and lower	2.75MPa 2.45MPa 2.26MPa 1.96MPa

I Construction and Design Features

Fig	Service Conditions	Max. Permissible Working Pressure
UTF-N UYM	Pulsating Flow, Steam, Oil*1, Gas or Air at 180°C and lower	1.96MPa
20UYA	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower	3.33MPa 3.04MPa
20SCY	Steady Flow at 120°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 220°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 300°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 350°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 400°C and lower Pulsating Flow, Steam, Oil*1, Gas or Air at 425°C and lower	3.33MPa 3.04MPa 2.84MPa 2.55MPa 2.26MPa 1.96MPa
10FCU 10FCUK	Steady Flow at 120°C and lower Oil*1 or Air at 350°C and lower	1.37MPa 0.98MPa



- \* 1 Oil refers to lubricant and operating fluid
- \* 2 Toxic or inflammable gases specified in the High Pressure Gas Safety Law are excluded.

## 5.2 Service Conditions for each fluid. Be consulted by KITZ for other conditions.

Fluid	Viscosity	Velocity
Air	—	30m/s
Stea,	—	30m/s
Water	1mPa · s or lower	4m/s or lower
Viscous fluid	2mPa · s or lower	2m/s or lower
	3mPa · s or lower	1.5m/s or lower
Differential pressure shall be limited to 0.1MPa in case the screen is clogged.		

I Construction and Design Features

## 6. Standard Screen

 <b>CAUTION</b>	
	<p>(1) The pressure loss of strainer is almost proportionate to the screen openings. However in case foreign particles are piled up in the screen or perforations or mesh is clogged, the pressure loss will increase. The screen needs to adequately be cleaned up and washed in order to secure the specified pressure.</p> <p>(2) Select screens with a proper material and mesh to the fluids to secure the specified pressure and velocity. Improper selection of the screen may lead to the operational malfunction.</p> <p>(3) Screen openings may differ depending on the thickness of wire, even if their meshes are same. Take screen openings into consideration, when selecting screens.</p>

## 6.1 Specification of Standard Strainer Screen

Strainer Type	Standard Specification	Option
Bronze, Cast Iron, Ductile Iron (Excluding Class 20K) Y Strainer	60° Perforated Stainless Steel Sheet ( $25.4 \div A(\text{diameter}) = \text{MESH}$ Equivalent)	60° Perforated Stainless Steel Sheet with the net (20·30·40·60·80·100 MESH)
Ductile Iron (Class 20K), Stainless Steel, Carbon Steel Y Strainer	40 MESH (Stainless Steel Wired Mesh reinforced by perforated sheet.)	20·30·60·80·100 Mesh (Stainless Steel Wired Mesh reinforced by perforated sheet.)
Cast Iron U Strainer	60° Perforated Stainless Steel Sheet ( $25.4 \div A(\text{diameter}) = \text{MESH}$ Equivalent)	/

## 6.2 Standard Screen Openings

	Nominal Dia. (mm)	A ( $\phi$ )	P (mm)	MESH Equivalent	Screen Openings (%)
Y Strainer	8~50	1.4	2.4	18	28.5
	65~125	1.5	2.5	17	32.7
	150·200	3.0	5.0	11	32.7
	250·300	5.0	7.0	5	46.4
U Strainer	50~100	1.5	2.5	17	32.7



## CHAPTER II



### Shipping, Handling and Storage

II Shipping , Handling and Storage

1. Shipping and Handling of Strainers

1.1 Care for Shipping and Handling of Strainers

 <b>WARNING</b>	
	(1) Keep off the strainer lifting area to prevent personal injury caused by unsecured strainer.

 <b>CAUTION</b>	
	<p>(1) Take care not to damage coated surface of valves during shipment, which may subsequently cause corrosion to valves. Any damaged surface should be adequately repaired before installation.</p> <p>(2) Carefully handle and store the strainer packed in carton cases, High humidity may damage carton cases and affects the product quality.</p>

1.2 Shipping and Handling of Strainers



1.2.1 Maintain original packing condition during shipment.

1.2.2 Handle strainers carefully so that they may not fall or drop on the ground. Any extraordinary mechanical impact should be avoided.

II Shipping , Handling and Storage

## 2. Storage

## 2.1 Care for valve storage

 <b>CAUTION</b>	
	<p>(1) DO NOT storage strainers in the corrosive environment, which may cause corrosion on threaded portions of strainers.</p> <p>(2) DO NOT fall, drop, give mechanical impact or place any objects on strainers, and DO NOT step on them. Overloading may damage strainers.</p> <p>(3) DO NOT carelessly pile up products to avoid risk of product damage and personal injury caused by unstable piling.</p>

## 2.2 Storage

- 2.2.1 Store strainers in a dust-free, low humidity and well ventilated place. Indoor storage is recommended.
- 2.2.2 Storing valves directly on the ground or the concrete floor is not recommended. Place packed strainers on the pallets or the racks for storage.
- 2.2.3 In order to protect strainers from the intrusion of foreign objects, maintain original packing condition until the strainers are installed.
- 2.2.4 Take appropriate measures to protect strainers from direct exposure to dust, rain and sunlight, when strainers are inevitably stored outdoors.



## CHAPTER III

### Strainer Installation



III Strainer Installation



## 1. General Precaution



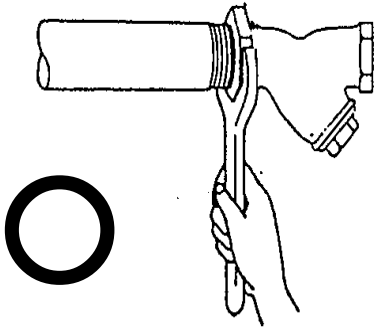
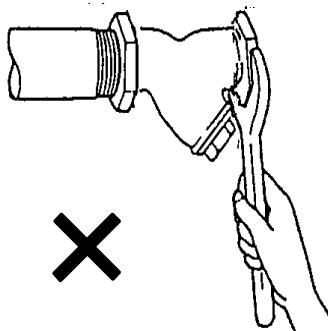
 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Keep a secure footing installation and operation of valve.</li><li>(2) Sufficient lighting should be available at all times for valve operation.</li><li>(3) Piping should be properly supported, as needed.</li><li>(4) PVC Strainers are excellent for use in any weather. However, an appropriate measure should be taken to avoid direct sunlight.</li></ul>

- 1.1 Allow a sufficient room for safe and easy operation and subsequent maintenance such as the removal of the cap or screen of strainers.
- 1.2 Take appropriate measures for smooth operation, inspection and maintenance of strainers if they are forced to be installed in small spaces.
- 1.3 Try not to install valves in the places where valve functions may be disturbed by external forces such as vibrations.

III Strainer Installation

## 2 For Safe Installation

 <b>WARNING</b>	
	(1) Keep off the strainer lifting area to prevent personal injury caused by unsecured strainer.

 <b>CAUTION</b>	
	<p>(1) Take care not to damage threads or flange surface of strainers and flanges.</p> <p>(2) DO NOT disassemble strainers during installation.</p> <p>(3) Strainers should be mounted in accordance with arrows indicated on the valve body. It is not recommended to install strainers in the vertical pipeline with the flow oriented upward. The screen will not properly work in this position.</p> <p>(4) Use an appropriate seal tape in threaded areas with the temperature and type of service taken into consideration.</p> <p>(5) DO NOT apply a pipe wrench to strainers. Use an appropriate tool such as a spanner.</p> <p>(6) When installing strainers, apply a spanner to the strainer end which was screwed into the pipe end.</p> <div style="text-align: center;">   </div> <p>(7) DO NOT apply excessive torque to screw a strainer into the pipe so that the pipe end will not damage the strainer threads.</p> <p>(8) Take care not to catch fingers or hands during installation.</p> <p>(9) Tighten threaded PVC Strainers into the pipes tight enough not to cause leak. DO NOT overly tighten the strainer, which may damage the strainer ends.</p> <p>(10) Use plastic valve sockets in the pipe ends when installing PVC Strainers to the pipes. Metal threads may damage PVC Strainers.</p>

III Strainer Installation

3. Check the following items before the installation of strainers.
  - 3.1 The service conditions should be within the range of the relevant strainer specification.
  - 3.2 Strainer threads should correspond with pipe threads.
  - 3.3 No damage should be found on both strainer and pipe threads.
  - 3.4 Make sure that pipe threads comply with the relevant standards by using thread gauges.
  - 3.5 Before installation of strainers, the connecting pipes should be cleaned to remove cutting oil, cuttings or other foreign objects.
  - 3.6 Do not give extraordinary shock to strainers by throwing, dropping, dragging or toppling them down.
  - 3.7 Remove end covers from strainers just before installation.
  - 3.8 Check all threaded areas after installation and retighten them, if needed.

III Strainer Installation

## 4. Installation Procedures for threaded strainers

4.1 Ensure that pipe ends are threaded.

4.2 Clean the end threads of strainers and the inside of connecting pipes with detergent and cleaning cloth to remove all foreign objects such as cuttings and oil.

4.3 Apply sealing paste or tape in the threaded areas of pipes.

4.4 Use appropriate tools to thread strainers into pipes.

4.5 DO NOT apply excessive torque, when threading strainers into pipes. Torques should not exceed the value shown below.

Strainer Size	1/8	1/4	3/8	1/2	3/4	1
N-m	20~29	20~29	20~29	20~29	39~49	49~59

Strainer Size	1-1/4	1-1/2	2	2-1/2	3 or larger
N-m	59~69	69~78	78~88	108~118	127~137

4.6 Gradually increase the pressure and temperature of pipeline, when conducting the pipeline test. Retighten all threaded areas of valves, if needed.

III Strainer Installation

5. Check the following items before installation of strainers.

5.1 The service conditions should be within the range of the relevant strainer specification.

5.2 Strainer flanges should correspond with pipe flanges.

5.3 Gasket contact surfaces of pipe and strainer flanges must be free from scratches or any other damages.

5.4 The appropriate space should be kept between pipe flanges for the strainer face-to-face dimensions including the gasket thickness.

5.5 Pipes and strainers should be accurately aligned.

5.6 Pipe flanges should face parallel to each other. The bolt holes of flanges should be symmetrically lined up against the center line of flanges.

5.7 Before installation of strainers, the connecting pipes should be cleaned to remove any foreign objects such as sand, dust and welding spatters.

5.8 Do not give extraordinary shock to strainers by throwing, dropping, dragging or toppling them down.

5.9 Remove flange covers from strainers just before installation.

5.10 Check all threaded areas after installation and retighten them, if needed.

### III Strainer Installation

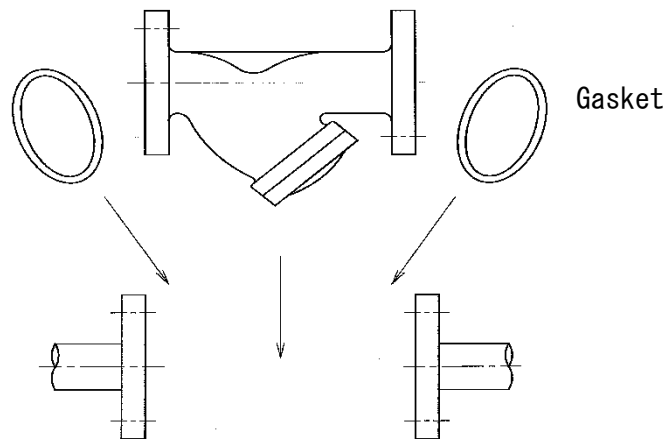
#### 6. Installation Procedure for flanged strainers

6.1 Pipes and strainers should be accurately aligned.

6.2 The appropriate space should be kept between pipe flanges for the strainer face to dimensions including the gasket thickness.

6.3 Place the strainer between the pipe flanges. Insert bolts through the bottom bolt holes and tighten them lightly. This will support the strainer during the remaining steps of installation.

6.4 Insert a gasket between the strainer and pipe flanges. It is recommended to apply lubricant (gasket paste) to gasket faces.

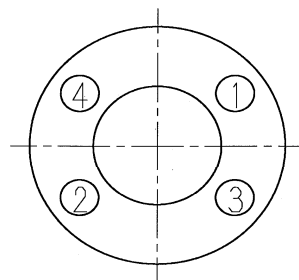


6.5 Make sure the position of the bolts used in the lower bolt holes of the flange. The gasket alignment shall be determined by these bolts.

6.6 Thread bolts through the other bolt holes and lightly tighten them.

6.7 Tighten bolts evenly, gradually and alternately in a star pattern as shown here.

The ends of all tightened bolts should equally protrude beyond nuts.



III Strainer Installation

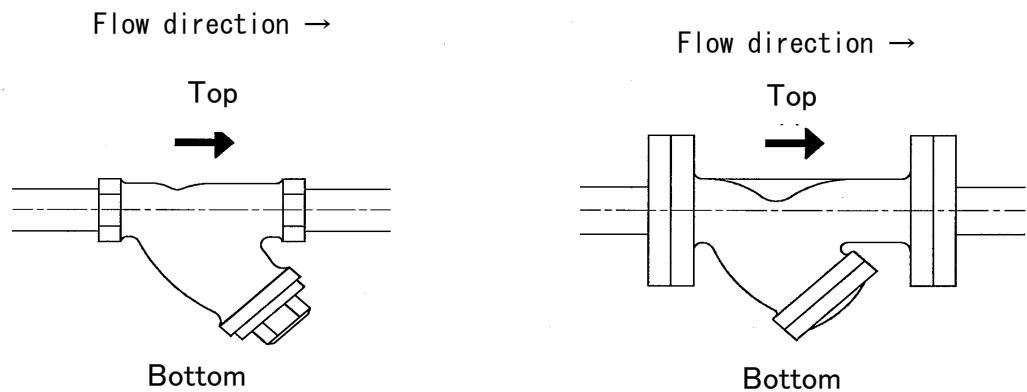
- 6.8 Gradually raise the line temperature and pressure for pilot operation. Retighten all threaded parts, if needed.
- 6.9 In case flanges are welded to pipes, DO NOT install strainers to the pipes until the welded flanges cool down.
- 6.10 In case painted strainers are suspended by a sling belt, protect the painted surface of the strainer body with cloth.
- 6.11 For painted products, use a washer under the pipe nut to protect the painted surface of the end flange. Prepare appropriate bolts, nuts, washers and gaskets beforehand for subsequent installation.

III Strainer Installation

7. Installation of Strainers

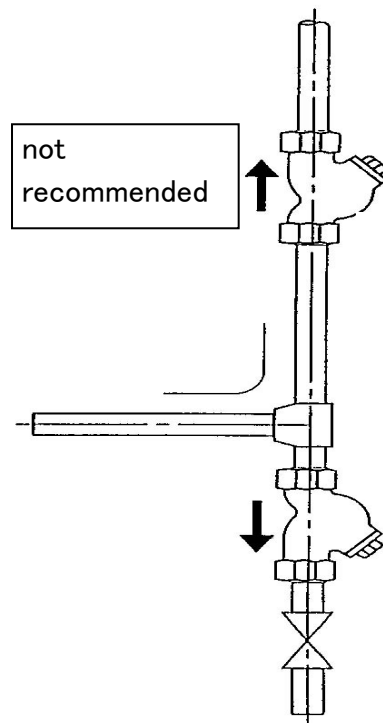
7.1 Horizontal Piping

Strainers must be installed in accordance with an arrow indicated on the body in the horizontal pipeline. Y Strainers should be placed with the cap facing down, while U Strainers placed with the cap facing up. If the strainers are installed otherwise, foreign objects caught in the screen will return into the pipeline.



7.2 Vertical Piping.

Strainers should be installed with the cap facing down in the vertical pipeline with downward flow direction. For the upward flow line, install strainers with the cap facing up. However, it is not recommended to use strainers in the vertical pipeline with upward flow direction due to its inherent design feature. U Strainers will not function in the vertical pipeline.

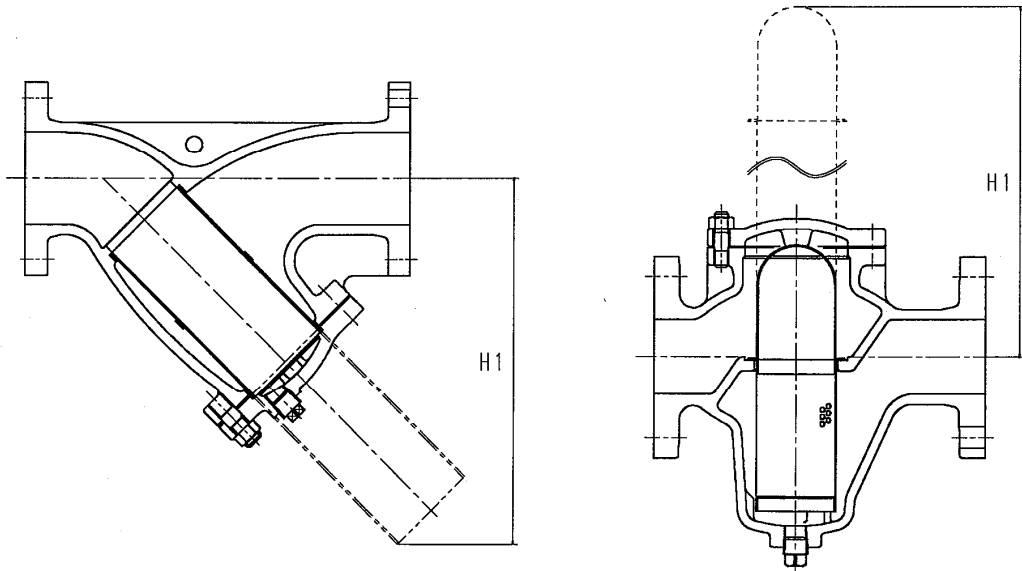




III Strainer Installation

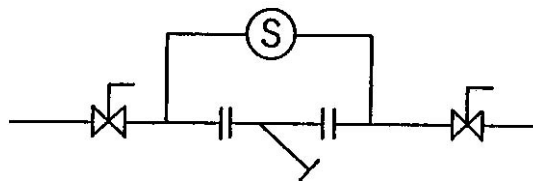
7.3 Space for the removal of the screen

Periodically the screen needs to be removed for clean-up. Therefore allow sufficient room (indicated as H1 in the illustration below) for the removal of the cap and screen when installing strainers to pipeline. Refer to the relevant product drawing for dimensional information.



7.4 Installation of shut-off valves and differential pressure gauge

Shut-off valves must be installed both on the upstream and down steam side of strainers. The use of differential pressure gauges is recommended to detect the loading of screens.





## CHAPTER IV

### Operation and Maintenance

IV Operation and Maintenance

## 1. For Safe Use

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Apply anti-corrosion painting to strainers, in case they are used in a corrosive environment. Failure to use an appropriate painting may lead to the corrosion of strainers, resulting in operational malfunction.</li><li>(2) Care should be taken in handling painted strainers so that the painting will not come off. The removal of painting may cause the corrosion of the strainers.</li><li>(3) Take appropriate protective measures for excessive cavity pressure, freezing or water-hammer, if they are expected to take place. Failure to accommodate these measures may cause damage to the products and lead to operational malfunction.</li></ul>

- 1.1 The screen of newly mounted strainers should be disassembled and cleaned up before the operation of pipeline. It may have collected foreign objects during the installation of pipeline.
- 1.2 Retighten the bolts and nuts of the end flanges and cap after the pressure and temperature of mounted strainers are increased.
- 1.3 Retighten the bolts and nuts, in case leakage is found in the end flange or cap area. Retightening should be carried out after decreasing line pressure in accordance with the procedure given in Chapter III, Section 6 “Installation Procedure for flanged strainers”.

IV Operation and Maintenance



## 2. Daily Inspection

For safe and trouble-free valve operation, your daily inspection of strainers is important. Here are the inspection items.

Inspection items	Areas to be inspected	Inspection Method	Remedial Measure
External Leakage	Cap Area	Visual Check Soap Water	Retighten the cap. Clean up or replace the gasket or O rings.
	Cap	Visual Check Soap Water	Replace the cap.
	End Flange Area	Visual Check Soap Water	Retighten the flange bolts. Replace the gasket.
	Body Surface	Visual Check Soap Water	Replace the strainer.
Abnormal Noises	Strainer	Auditory Check	Consult a piping engineer.
	Loosened threads.	Auditory Check	Retighten threads.
	Loosened bolts	Auditory Check	Retighten bolts and nuts.
	Pipe Vibration	Auditory Check	Consult a piping engineer
Loosened Cap	Cap	Visual Check Tactile Check	Retighten the cap.

IV Operation and Maintenance

3. For Handling failed strainers

 <b>CAUTION</b>	
	<p>(1) Wear protective items such as goggles, gloves and working footwear.</p> <p>(2) Operators should take protective measures to prevent direct exposure to the fluid, when the fluid spouts from flanged areas.</p> <p>(3) Reduce the line pressure to the atmospheric level, when retightening is carried out.</p>

3.1 Leakage from the Gland Area

If leakage is found in the cap area, retighten the cap, or clean up or replace the gasket.

4. Trouble shooting



Trouble	Possible cause	Solution
Leakage from the Cap	Loosened Cap	Retightening the cap.
	Damaged O rings	Replacement of the O rings
	Damaged Gasket	Replacement of the gasket
	Worn-out Cap	Replacement of the cap
Noise and Vibration	Loosened threads	Retightening threads
	Loosened bolts and nuts	Retightening bolts and nuts




## CHAPTER V

### Cleanup, Wash and Maintenance

V Cleanup, Wash and Maintenance

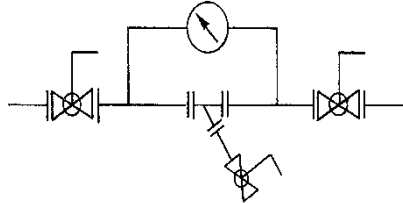
## 1. For Safe Operation

 <b>WARNING</b>	
	<p>(1) When disassembling strainers from the pipeline, discharge the fluid from the pipes and reduce the line pressure to the atmospheric level. Trapped pressure or fluid is very dangerous and may cause accidents resulting in personal injuries. Extra care should be taken for the pipeline handling toxic or flammable fluid. Take safety measures for such operation, taking fluid characteristic into consideration.</p> <p>(2) As for strainers fluids tend to be trapped in the screen, even after discharging the fluids remaining in the pipeline. Discharge the fluids in the screen by gradually loosening the plug or cap. Be careful for handling hazardous fluids. Make sure types of fluids before the operation and take appropriate measures as specified in the previous clause.</p>

 <b>CAUTION</b>	
	<p>(1) DO NOT use chlorine, chlorine solution or chlorine based detergent, when washing the screen. It may harm the stainless screen.</p>
	<p>(2) Wash the screen by flushing thoroughly enough to remove all the foreign objects before operation. Y strainers in particular may be damaged by hard particles trapped in the screen, stirred by the flow and repeatedly crashed with the cap, which may lead the attrition of the cap, resulting in possible leakage through between the cap and body.</p> <p>(3) The screen should frequently be cleaned and washed so that the screen will not be clogged. Clogged screen will cause greater pressure loss, which will result in not only the loss of sufficient flow rate but also damage to the screen.</p> <p>(4) To take off the screen, close shut-off valves located in the upstream and downstream of the strainer and ensure that the pressure inside the strainer has been relieved and then remove the cap to detach the screen. Clean up the screen by compressed air and wash it with detergent. Care should be taken not to damage the screen during this operation.</p> <p>(5) After maintenance and inspection, securely reassemble the cap and plug. Make sure that no leakage is found in the cap and plug areas.</p> <p>(6) When reassembling the strainer, replace the plug seal for new one every time it is disassembled and change the gasket according to the condition of the gasket.</p>

V Cleanup, Wash and Maintenance

- 1.1 Strainers need to be periodically cleaned and washed. If strainers have the plug on the cap, it is recommended for a valve to be installed to the plug with a hose being attached to the valve shown in the diagram below, so that efficiency in the operation to drain the fluids remaining in the screen shall be improved. This arrangement will also function as the prevention of accidents.



- 1.2 Timing to wash the screen depends on how the screen is disturbed by foreign objects. This may differ from location to location. Conduct tests on strainers in each location to examine the condition of the screen and determine the most effective replacement schedule.
- 1.3 Use compressed air or standard detergent to wash the screen.

## 2. Reassembly

- 2.1 Ensure that the screen that was washed has no damage.
- 2.2 In case the screen or gasket is replaced, select ones suitable for the fluid conditions.
- 2.3 When requesting screens for replacement, provide Product Name (Fig) and size of strainers. For optional screens, also provide Mesh No.
- 2.4 For the screwed cap design, attach the washed screen to the groove of the cap, place the cap on the body and tighten it. If the gasket is damaged, replace it for new one.
- 2.5 For the bolted cap design, insert the washed screen, place the cap on the body and fasten it with the cap bolts and nuts. If the gasket is damaged, replace it for new one.
- 2.6 All strainers, after reassembly, are subject to pressure test at given pressures to ensure that no leakage is detected.



## CHAPTER VI

### Periodic Inspection and Maintenance

VI Periodic Inspection and Maintenance



1. Periodic Inspection



- 1.1 Carry out a periodic inspection on the strainers in use at least once a year.
- 1.2 Examine strainers to ensure trouble-free safe operation.
- 1.3 See Chapter IV, Section 3 “Daily Inspection”, for inspection items and inspection methods.
- 1.4 A periodic inspection is recommended on strainers which are not subject to a daily inspection. (A periodic inspection should be carried out on all strainers.)

2. Maintenance and Inspection

In case pipelines or facilities where strainers are installed are shut down for a pipeline inspection, carry out an inspection on strainers, as needed, including pressure test as well as visual inspection to check if the screen is clogged or whether foreign particles go through to the downstream. If any failure is found, disassemble the strainers for further inspection. The strainers must pass required inspections before being sent back to the pipelines or facilities for reinstallation.

2.1 Care for disassembly and reassembly after installation

 <b>WARNING</b>	
	<ul style="list-style-type: none"> <li>(1) Discharge the fluid from the pipes and reduce the line pressure to the atmospheric level, when removing the cap.</li> <li>(2) Operators must take protective measures against the direct exposure to the fluid and prevent catching fire.</li> <li>(3) Keep off the valve lifting area to prevent personal injuries caused by unsecured valves.</li> </ul>

 <b>CAUTION</b>	
	<ul style="list-style-type: none"> <li>(1) Wear protective items such as goggles, gloves and working footwear.</li> <li>(2) Keep a secure footing for valve dismantling or mounting strainers..</li> </ul>

VI Periodic Inspection and Maintenance

## 2.2 Disassembly and Reassembly



Refer to Chapter VII for disassembly and reassembly procedure.

## 2.3 Test and Inspection

Follow instructions give below for test and inspection.

## 2.3.1 Shell Pressure Test

## (1) For Safe Shell Pressure Test

 <b>CAUTION</b>	
	<p>(1) Wear protective items such as goggles, gloves and working footwear.</p> <p>(2) Care should be taken, when conducting shell pressure test..</p>

## (2) Shell Pressure Test

All strainers are subjected to a hydrostatic or pneumatic shell test at the given test pressures after reassembly.

Refer to JIS B 2003 for test methods and procedures



## CHAPTER VII



### Disassembly and Reassembly

VII Disassembly and Reassembly

## 1. Disassembly Procedure

## 1.1 For Safe Disassembly

 <b>WARNING</b>	
	(1) Operator should take an appropriate caution for not being exposed to the fluid or catching fire.

 <b>CAUTION</b>	
	(1) Wear the protective items such as goggle, gloves and working boots. (2) Take care not to catch fingers at work.

## 1.2 Before Disassembly

- (1) Disassemble strainers in a dust-free area.
- (2) Take care not to damage the body, cap and screen.

## 1.3 Disassembly



Shut off valves on the upstream and downstream of the strainer and make sure that all the pressure is relieved from the strainer. And then Take off the cap and remove the screen. Care should be taken not to damage the screen during the operation.

- 1.4 Gaskets and screens are consumables. Replace the gasket for new one. Replace the screen for new one, if it is damaged.

VII Disassembly and Reassembly

## 2. Disassembly

## 2.1 For Safe Reassembly

 <b>CAUTION</b>	
	<ul style="list-style-type: none"><li>(1) Wear the protective items such as goggles, gloves and working boots.</li><li>(2) No fire should be allowed in working area.</li><li>(3) Take care not to catch fingers in flanges during assembly.</li></ul>

## 2.2 Before Reassembly

- (1) Check all the necessary parts before reassembly and replace them, if they are found dissatisfactory.
- (2) Make sure to clean reused parts to remove completely oil, dust and other foreign objects.
- (3) Assemble strainers in a dust-free place.
- (4) Take care not to damage the body, cap, screen and gasket.
- (5) The cap should be securely tightened.

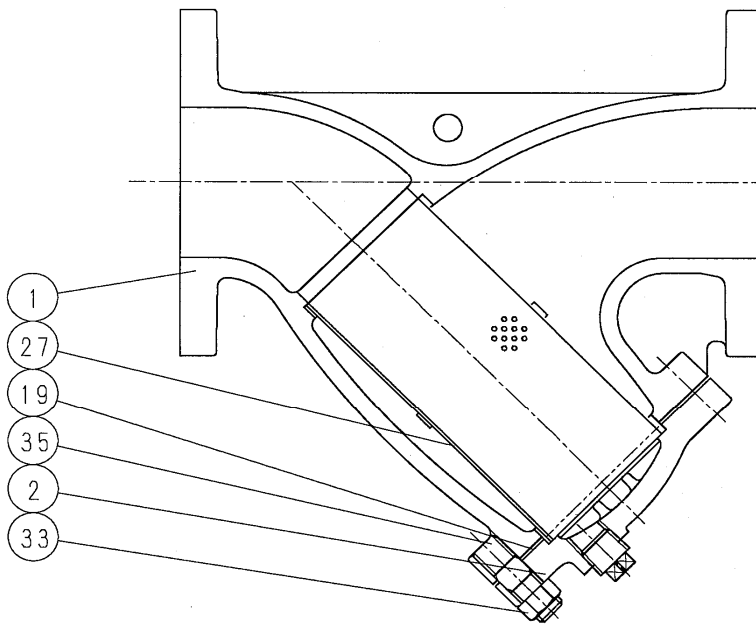
## 2.3 Reassembly

For the screwed cap design, install the new gasket to the cap, attach the washed screen to the groove of the cap and fasten the cap to the body.

For the bolted cap design, insert the washed screen first, install the new gasket to the cap and then fasten the cap to the body.

VII Disassembly and Reassembly

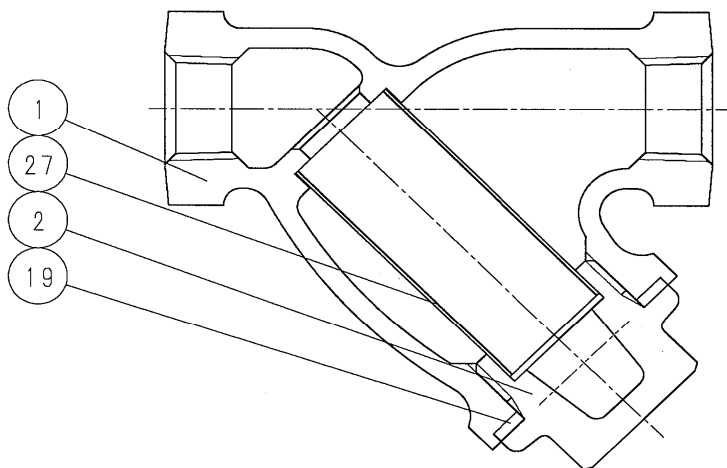
2 Assembly Illustration



No.	Parts Name
1	Body
2	Cap
19	Gasket
27	Screen
33	Cover nut
35	Cover bolt

This illustration represents a typical construction of the Flanged Y Strainer.  
Refer to the approval drawing before disassembly and assembly.

3 Assembly Illustration

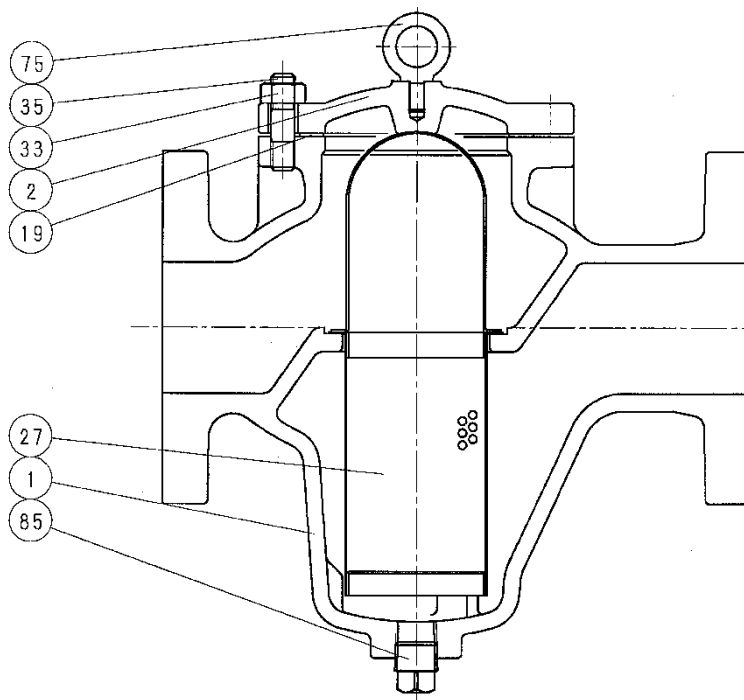


No.	Parts Name
1	Body
2	Cap
19	Gasket
27	Screen

This illustration represents a typical construction of the Threaded Y Strainer.  
Refer to the approval drawing before disassembly and assembly.

VII Disassembly and Reassembly

4 Assembly Illustration



No.	Parts Name
1	Body
2	Cap
19	Gasket
27	Screen
33	Cover nut
35	Cover bolt
75	Eye bolt
85	Plug

This illustration represents a typical construction of the U Strainer.

Refer to the approval drawing before disassembly and assembly.