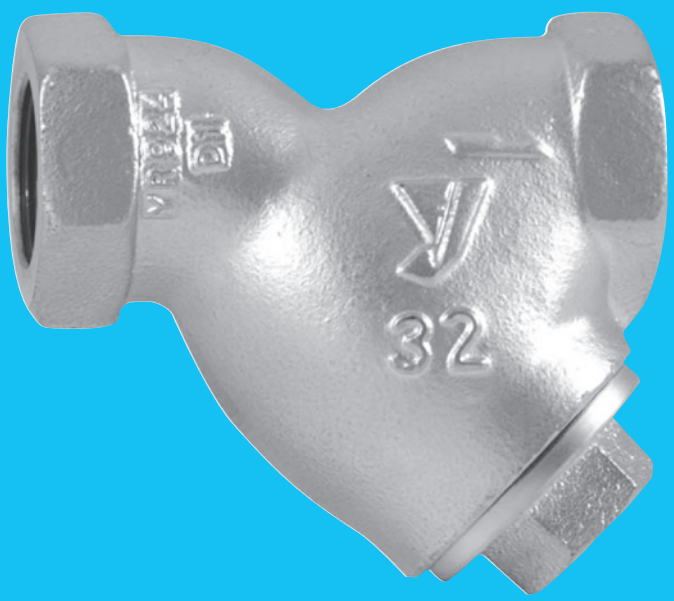
Strainer

4



Step 0 Type/Structure/Features

Please refer to this for structure and features of Strainer.

Step 1 Selection

Please look at the ID chart to choose the right products depending on the intended of uses. Confirm the additional details on the product page.

Step 2 Sizing

Please refer to norminal size selection value table or calculation formula of norminal size selection P.4-12 for selecting the suitable model and size.

Step 3 Attentions for usage

Please check guidelines for optimal usage of Strainer such as installation.

Selection of Strainer

What is a strainer ?

A strainer catches foreign substances inside of piping and prevents them to flow inside of the piping for steam, air, water, and oil systems for a factory or plant, as well as problems or damage to devices attributable to the ingress of foreign substances.

Y type strainer

●Applications
A compact type strainer with low fluid resistance and requiring less installation space.

Basket strainer

●Applications
A basket strainer is suitable for liquid, equipped with a larger filtration area than Y type strainer.

Straight type strainer

●Applications
Excellent type in workability and maintenance.

Duplex strainer

●Applications
The screen can be washed without stopping the fluid because the fluid passage can be switched.

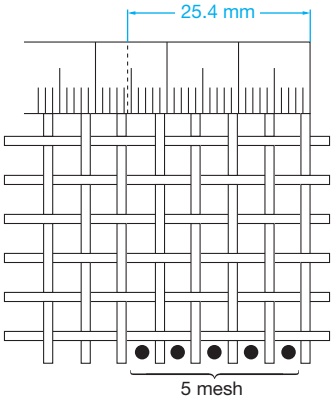
Temporary strainer

●Applications
A piping flushing type strainer to be used prior to operation.

*** On structure of strainer, it can not completely catch foreign substance less than mesh size selection as shown below.**

Meshes

What is the mesh size? → The mesh size is the number of meshes in 25.4 mm (1 inch). Example: In the right figure, the mesh size is five.



	Specification for Japanese government	Yoshitake standard
For water	40 mesh or more (80 mesh or more when installed before a solenoid valve)	40·60 mesh
For steam	80 mesh or more	80 mesh

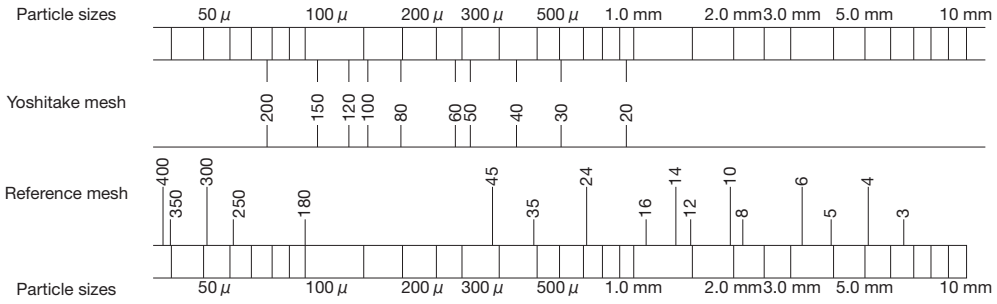
● Table of standard mesh per model

Standard meshes	Model
40 mesh	SU-6·6SS
60 mesh	SY-40C, SY-24·24-N, SY-6-N, SY-9, SU-10·10S, SU-20·20S·20C·20H, SU-12, SU-50H·50S·50SS, SW-10·10S, SU-55F, ST-10
80 mesh	SY-5, SY-40·40EN·40H, SY-6, SY-17, SY-8, SY-10-30, SY-10H·10HS, SY-20-10·20, SY-13·13SS, ST-1

Meshes

Step 0

Comparison of meshes and particle sizes



* Note that because of the structure, the capability to catch foreign substances equivalent to standard meshes may not be guaranteed. Please contact us when the passing of foreign substances is not permissible.

Porosity of screen

· Porosity of perforation

Hole diameter (mm) ——— No. of hole (holes/cm²)	Porosity (%)
φ 1.2 ——— 23.8	26.98
φ 1.3 ——— 16.2	21.59
φ 1.5 ——— 11.2	19.96
φ 2.5 ——— 7.21	35.42
φ 6 ——— 1.42	40.30
φ 6 ——— 1.80	50.63
φ 8 ——— 0.954	47.96
φ 10 ——— 0.739	58.04

· Dimensions of screen

Meshes	dimensions
20	φ 0.315
30	φ 0.25
40	φ 0.193
50	φ 0.193
60	φ 0.152
80	φ 0.12
100	φ 0.1
120	φ 0.08
150	φ 0.08
200	φ 0.05
250	φ 0.04

* This value is "only advisory".

· Screen porosity table

(%)

	Meshes										
Model	20	30	40	50	60	80	100	120	150	200	250
SY-5, 6, 9, 10, 17, 20, 24, 40, 40EN, 40H	59.5	49.6	51.3	41.6	44.8	38.6	36.7	—	—	—	—
SY-37, 38								38.6	41.6	36.7	—
SU-10, 10S, 12, 20, 20S, 50H, 50S, 50SS SW-10, 10S	59.5	49.6	51.3	41.6	44.8	38.6	36.7	38.6	41.6	—	—
SY-8 (15A-100A)	59.5	49.6	51.3	41.6	44.8	38.6	36.7	—	—	—	—
SY-8 (125A-150A)	52.5	43.2									
SY-13, SU-6	53.6	49.6	46.9	41.6	44.7	38.6	36.7	—	—	—	—
ST-1	52.5	46.4	40.7	39.2	41.7	38.7	36.8	38.6	38	36.8	36.8

How to calculate the filtration area and filtration area ratio of a strainer

Calculate the filtration area ratio of a strainer to the bore as shown below.

Filtration area of Y type strainer = Surface area of screen ($\pi \cdot ds \cdot \ell s$) x porosity of perforated sheet x porosity of mesh screen

Filtration area of basket type and duplex type strainers =

Surface area of screen ($\pi \cdot ds \cdot \ell s + \frac{\pi \cdot ds^2}{4}$) x porosity of perforated sheet x porosity of mesh screen

$$\text{Filtration area ratio to bore} = \frac{\text{Filtration area of strainer}}{\text{Inside cross sectional area of piping}\left(\frac{\pi \cdot D^2}{4}\right)} \quad \text{(D: Bore)}$$

<Calculation example>

Calculate the filtration area of an 80A SY-8 strainer with a 40 mesh screen

(ds = φ88, ℓs = 130, perforated sheet φ2.5-7.21 holes/cm²).

Filtration area of strainer = (πx 88 x 130) x 0.3542 x 0.513 ≒6530 (mm²)

Inside cross sectional area of piping = $\frac{\pi x\ 80.7^2}{4}$ ≒5114 (mm²) (Assuming that the bore is φ 80.7)

Consequently,

Filtration area ratio to bore = $\frac{6530}{5114}$ ≒1.27 (times)

Features of Y Type Strainer

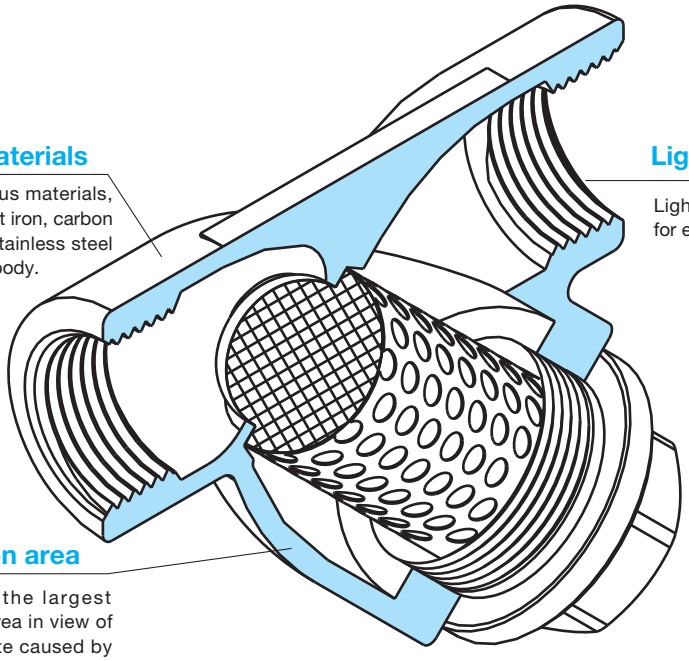
Use this strainer for applications such as:

Mainly for removing dirt and dust from steam or air piping and for protecting control valves.

The Y type strainer can be widely used for removing dirt and dust from pipelines. Lightweight and compact, the Y type strainer comes in a wide variety of structures, shapes, and mesh types.

Selectable materials

Available with various materials, including ductile cast iron, carbon steel, bronze, and stainless steel as materials for the body.

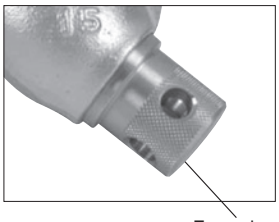


Lightweight and compact

Lightweight, compact, and designed for easy piping.

Large filtration area

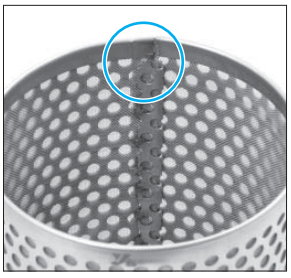
Marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.



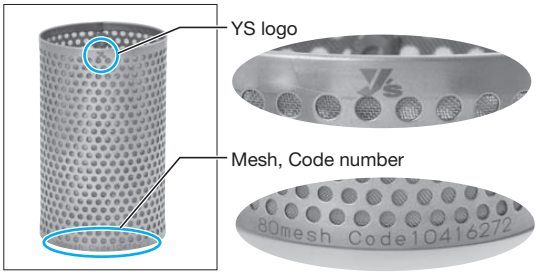
Easy plug

Available with "easy plug" which makes the removal and cleaning of the internal screen easy (SY-9).

· Adoption a folded structure by press



· Printing by laser marker



· Standard products

Model	Size	Model	Size
SY-40, SY-40H	15A-100A	SY-17	15A-50A
SY-5	10A-50A	SY-8	15A-100A
SY-6, SY-6-N	15A-50A	SY-24, SY-24-N	15A-50A

Features of Basket Strainer

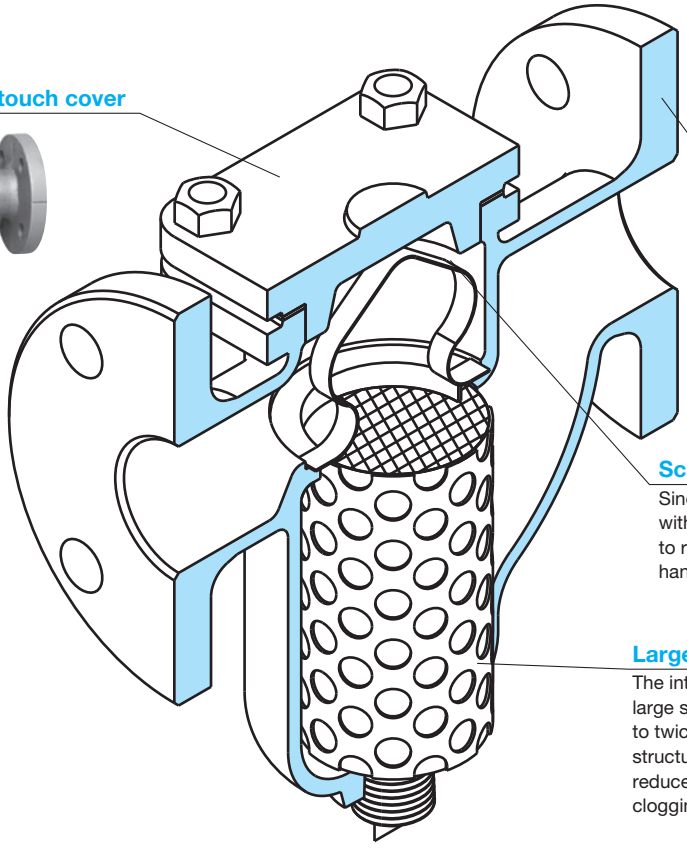
Step 0

Use this strainer for applications such as:

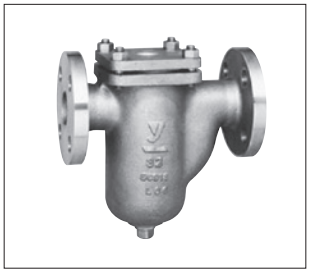
· For industrial water
· For combustion oil for boilers, etc.

The basket strainer can be widely used mainly for removing dirt and dust from pipelines for liquids.

SU-20S
Available with one-touch type allowing the screen to be removed by unfastening a bolt.



SU-20



SU-10

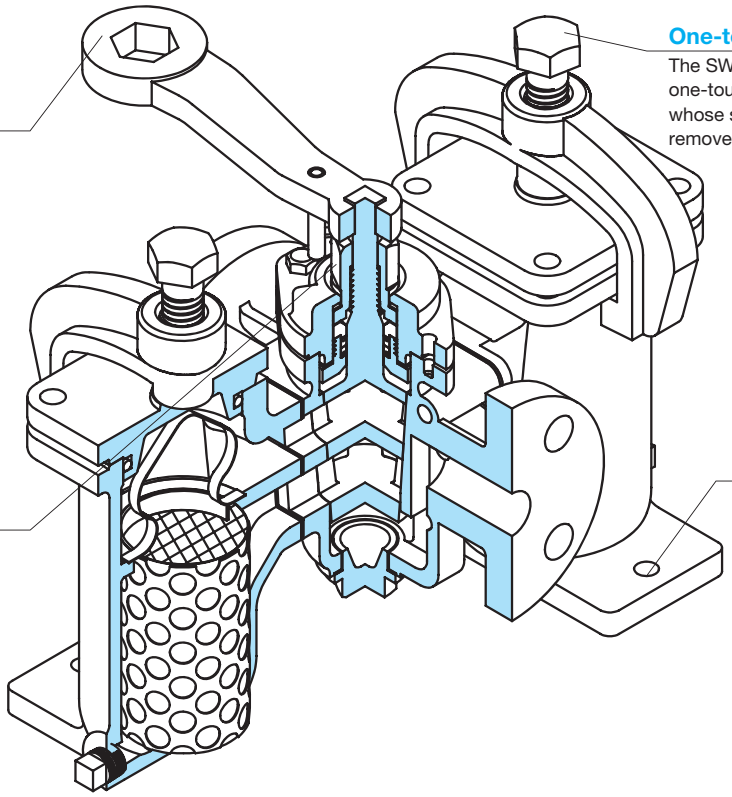
SU-50H

Features of Duplex Strainer

Use this strainer for applications such as:

Systems that must keep the fluid flowing, such as fuel supply lines.

The duplex strainer can be widely used for removing dirt and dust from pipelines for water and oil. By switching the right or left passage to the other, the screen can be washed without stopping the fluid.



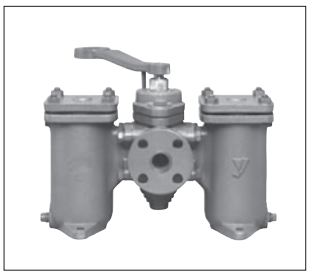
No other tools required
Switching can be performed with the attached tool.

Pull-up cock
The handle of a pull-up cock type can be effortlessly operated.

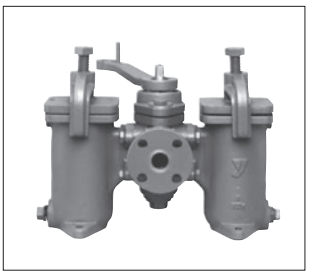
One-touch operation
The SW-10S strainer is a one-touch type strainer whose screen can be easily removed.

Anchor base
Anchor fixing is possible.

The screen can be removed and cleaned without stopping the fluid (system).
It is not necessary to install bypass piping.



SW-20



SW-10S

Features of Straight Type Strainer

Step 0

Use this strainer for applications such as:

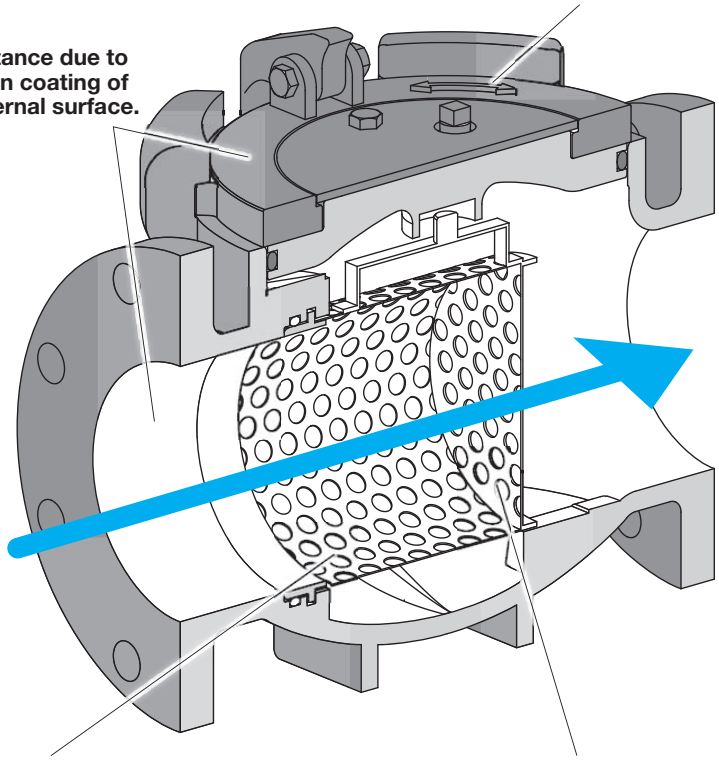
Superior workability and maintenance for water and oil pipelines.

The straight strainer can be widely used for removing dirt and dust from pipelines for water and oil.

Free installation: horizontal or vertical installation.

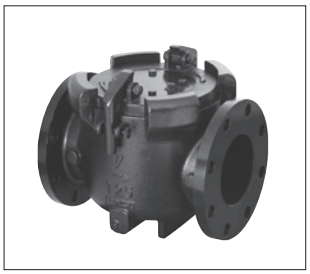
High structure maintenance.
No need other tools required for cleaning the strainer screen.

Corrosion-resistance due to electrodeposition coating of internal and external surface.



Screen is same as the direction of piping.

Size for size, the pressure loss across a straight strainer is less than that across the Y-type and Basket strainer.



Strainer ID-Charts

	Model	Type	Fluid	Material	Max. Pressure (MPa)	Max. Temperature (℃)	Connection	Size	Feature	Page
	SY-5	Y-type	Steam, Air Water, Oil	FCD450	2.0	220℃	JIS Rc	10-50A		4-15
	SY-9	Y-type	Air, Water	FCD450	1.0	80℃	JIS Rc	15-50A	· Easy plug that makes easy removal of cap	4-17
	SY-17	Y-type	Steam, Air Water, Oil	SCS13	2.0	150℃	JIS Rc	15-50A	· Stainless steel	4-19
	SY-37							15-50A	· With fine mesh (120-200 mesh)	4-19
	SY-6	Y-type	Steam, Air Water, Oil	CAC406	1.3	220℃	JIS Rc	15-50A	· Pipe end core	4-21
	SY-6-N		Water			80℃		15-50A	· Pipe end core	4-21
	SY-24	Y-type	Water	CAC406	1.6	80℃	Inlet: JIS Rc Outlet: JIS R	15-50A		4-23
	SY-24-N							15-50A		4-23
	SY-40	Y-type	Steam, Air Water, Oil	FCD450	1.0	220℃	JIS 10KFF	15-300A		4-25
	SY-40C-N		Air, Water			60℃		15-150A	· Nylon coating	4-25
	SY-40H	Y-type	Steam, Air Water	FCD450	2.0	220℃	JIS 20KFF	15-150A	· 2.0 MPa	4-27
	SY-40EN						EN PN25			4-27
	SY-2	Y-type	Steam, Air Water	FCD450	2.0	220℃	JIS 20KFF	200A	· 2.0 MPa	4-29
	SY-8	Y-type	Steam, Air Water, Oil	SCS13	1.0	150℃	JIS 10KFF	15-150A	· Stainless steel	4-31
	SY-38							15-150A	· With fine mesh (120-200 mesh)	4-31

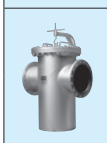
* Please contact us about other specifications.

	Model	Type	Fluid	Material	Max. Pressure (MPa)	Max. Temperature (℃)	Connection	Size	Feature	Page
	SY-20-10	Y-type	Steam, Air Water, Oil	SCPH2	1.0	260℃	JIS 10KRF	15-150A	· Cast carbon steel for 1 MPa	4-34
	SY-20-20				2.0		JIS 20KRF	15-150A	· Cast carbon steel for 2 MPa	4-34
	SY-10-30				3.0		JIS 30KRF	15-250A	· Cast carbon steel for 3 MPa	4-34
	SY-13	Y-type	Steam, Air Water, Oil	STPG· SS400	1.0	220℃	JIS 10KFF	200-600A	· Steel plate for large diameter	4-37
	SY-13SS			SUS304TP				200-600A	· Steel plate for large diameter · Stainless steel wetted parts	4-37
	SY-10H	Y-type	Steam, Air Water, High pressure gas	SCPH2	1.0	350℃ (between 2.0 and 3.0 MPa 300℃)	JIS 10KRF	15-100A	· High-pressure gas	4-34
					2.0		JIS 20KRF			
					3.0		JIS 30KRF			
	SY-10HS			SCS13	1.0		JIS 10KRF	15-100A	· High-pressure gas	4-34
					2.0		JIS 20KRF			
					3.0		JIS 30KRF			
	SU-20	Basket type	Water, Oil	FCD450	1.0	220℃	JIS 10KFF	20-150A		4-39
	SU-20H				1.0	220℃	JIS 10KFF	200A		4-50
					2.0		JIS 20KRF			
	SU-20S				1.0 (125A: 0.7 150A: 0.5)	80℃	JIS 10KFF	20-150A	· One-touch type	4-39
	SU-20C				1.0	60℃		20-150A	· Nylon coating	4-39
	SU-50H	Basket type	Water, Oil	FCD450	2.0	80℃	JIS 20KRF or EN PN16	50-150A (without 125A)	· Standard air vent plug · Drain plug for 2.0 MPa	4-43
	SU-50S				1.0				· Quick-open type	4-43
	SU-50SS		Water, Oil Flushing water						· Epoxy coating	4-43
	ST-10	Staright type	Water, Oil (light and heavy oil)	FCD450	1.0	80℃	JIS 10KFF	125-250A	· No tools required while screen cleaning	4-45

* Please contact us about other specifications.

Strainer ID-Charts

Step 1

	Model	Type	Fluid	Material	Max. Pressure (MPa)	Max. Temperature (℃)	Connection	Size	Feature	Page
	SU-10	Basket type	Water, Oil	SCS13	1.0	220℃	JIS 10KFF	20-150A	· Stainless steel	4-40
	SU-10S				1.0 (125A: 0.7 150A: 0.5)	80℃		20-150A	· One-touch type · Stainless steel	4-40
	SU-12	Basket type	Water, Oil	SCPH12	1.0 (2.0)	260℃	JIS 10KRF (JIS 20KRF)	20-150A	· Cast carbon steel	4-52
	SU-6	Basket type	Water, Oil	STPG· SS400	1.0	120℃	JIS 10KFF	200-650A	· Steel plate for large diameter	4-54
	SU-6SS·6AS			SUS304TP				200-650A	· Steel plate for large diameter · Stainless steel	4-54
	SU-55F	Basket type	Water	CAC406	1.2	60℃	JIS Rc	15A		4-58
	SW-10	Duplex type	Water, Oil	FCD450 / SUS13	1.0	80℃	JIS 10KFF	20-100A		4-56
	SW-10S			FCD450 / SCS13				20-100A	· One-touch type	4-56
	ST-1	Corn type	Steam, Air Water	SUS304	1.0 (2.0·3.0·4.0)	220℃	JIS 10KFF (20K·30K·40KFF)	25-300A	· Temporary	4-59

* Please contact us about other specifications.

How to Select Nominal Size

Step 2

A strainer can work most effectively and completely fulfill working conditions if the following are taken into account:

■Selecting a nominal size

Select a strainer of the same nominal size as that of the piping to which it will be connected (nominal size of piping = nominal size of strainer). Please remember that using a strainer of a smaller nominal size increases the pressure loss of the strainer and may disable it from keeping specified pressure at the inlet of a device.

■Selecting a piping nominal size

Selecting as large a piping nominal size as possible is an ideal way to reduce pressure loss inside piping. On the other hand, the smaller the piping nominal size, the better in view of piping and equipment costs. Additionally, heat loss rises with an increase in piping nominal size. In selecting a piping nominal size, determine permissible pressure loss based on the application, and find the smallest piping nominal size that can keep actual pressure loss within the determined range. However, an excessively high flow velocity accelerates wear in piping and may cause vibration. In general, the standard flow velocity of a fluid is set according to the application and based on the type and properties of the fluid and the piping nominal size.

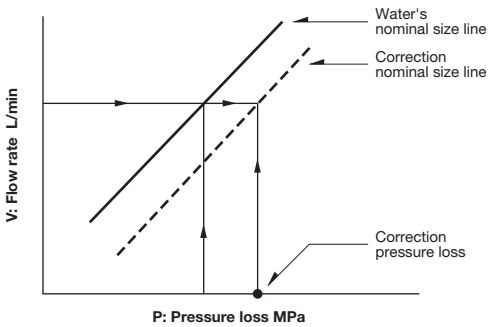
<Standard flow velocity of fluids>

Fluid	Remarks	Standard flow velocity
Saturated steam	Auxiliary piping for vacuum or small-diameter piping	15m/s(10-20)
	Large-diameter piping	30m/s(20-40)
Superheated vapor	Piping diameter: Approx. ϕ 75-ϕ 250	40m/s(30-50)
	Piping of high-grade material	70m/s(65-80)
Inlet of steam coil	0.3-0.7 MPa	30m/s(25-30)
Air	High pressure: 1.0 MPa	20m/s(20-25)
	Low pressure	15m/s(5-15)
	Extremely low pressure: 0.1 MPa	10m/s(3-10)
Water, oil		2m/s(2- 4)

* This table shows the standard flow velocity of each fluid based on the flow velocities specified in JIS F 7101 (Shipbuilding -- Pipes of machinery -- Standard velocity of flow).

How to Read Pressure Loss Chart

1. When water or a fluid close to water in viscosity and specific gravity is used:
   Find the intersection point of the flow rate V L/min and the pressure loss ΔP MPa (usually 0.02 MPa to 0.03 MPa) on the pressure loss chart for the strainer. The nominal size line above the intersection point represents the required nominal size.
2. When the fluid to be used is different from water in viscosity and specific gravity:
   Take any of each nominal size from pressure loss chart (for water) in each product, and calculate the pressure loss at that point using the expression shown below. Draw a line of the same gradient as water's nominal size line. Then, find the required nominal size as described in 1.
3. When the filter element and the filter screen are different:
   Pressure loss seldom changes even if our perforated sheet and filter screen are replaced. However, fine ones and coarse ones are different in the state and progression of clogging. Set a higher safety factor for a finer one.
4. How to calculate the pressure loss of a strainer:
   Find the intersection point of the nominal size line and the flow rate on the chart. The ΔP value at the intersection point is the pressure loss of the strainer.
   *Use the expression shown below to calculate pressure loss when a fluid other than water is used and its weight volume ratio and kinetic viscosity coefficient are different from those of water.
5. The correction coefficient ratio for basket strainer is 2.
   Please contact us for coefficent of duplex strainer.



<Calculation formula>

$$\Delta P = \Delta Pw \frac{r}{rw} (0.00379v+1)\,\alpha$$

ΔP	: Pressure loss when the fluid is flowing [MPa]
ΔPw	: Pressure loss when water is flowing [MPa]
r	: Weight volume ratio of the fluid [kg/m^3]
rw	: Weight volume ratio of water [kg/m^3]
v	: Kinetic viscosity coefficient [cSt]
α	: Correction coefficient

<Calculation example>

Calculate the pressure loss of an 80A SU-20 strainer when a lubricating oil (weight volume ratio: 900 kg/m^3, kinetic viscosity coefficient: 200 cSt) flows at a rate of 300 L/min.
Calculate the pressure loss of water from the chart.

$\Delta Pw = 0.004$ MPa

$$\Delta P = 0.004 \times \frac{900}{1000} \times (0.00379 \times 200 + 1) \times 2$$

$= 0.013$ MPa

Guidelines for Installation of Strainer

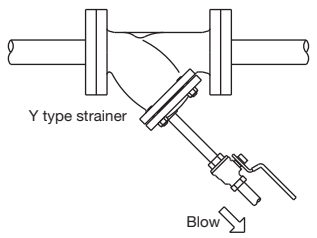
Step 3

· Use a strainer under a maximum pressure loss of 0.1 MPa or less.
· Whether a strainer is clogged can be checked by installing a pressure gauge before and after it.
· When installing a strainer, prepare space for removing the screen from it.
· Do not apply back pressure from the outlet of a strainer because the filter screen may separate from the perforated sheet.

■Guidelines for Y type strainer

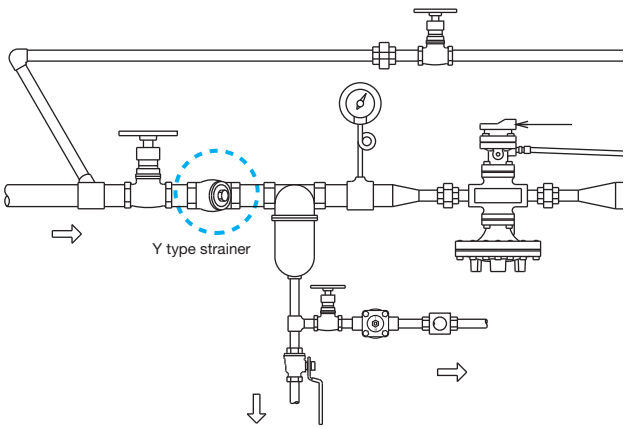
Install the Y type strainer with the cap down. Remove the drain plug, and attach a blow valve. The dirt accumulating in the lower portion of the strainer can be discharged (see Fig.1).

Fig. 1



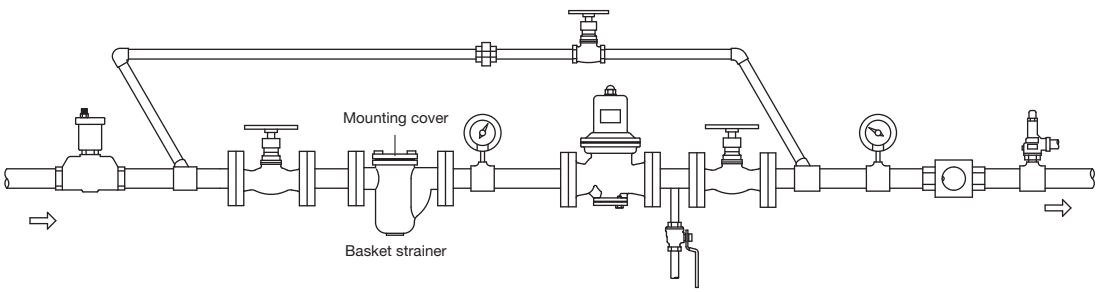
When the fluid is steam, connect piping so that the cap faces sideways in order to minimize the pooling of drain (see Fig. 2).

Fig. 2



■Guidelines for Basket strainer

Connect the basket strainer to piping with the mounting cover up.



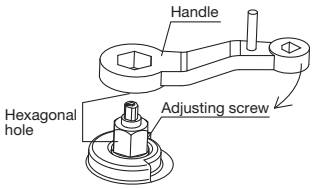
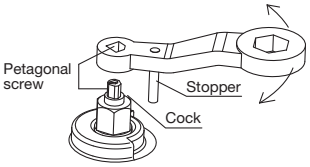
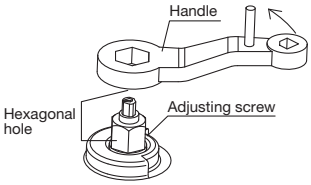
Guidelines for the Installation of Strainer

Step 3

■Duplex strainer

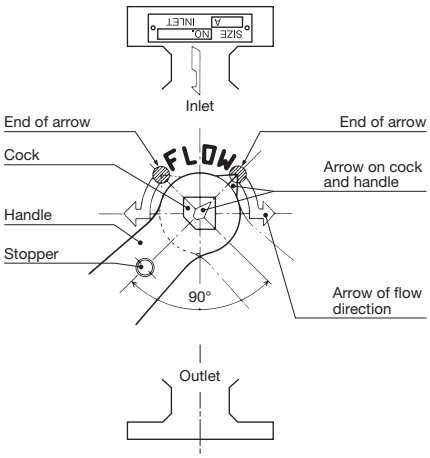
Switch the cock according to the operation procedure described below (the cock will get damaged if switching is carried out without pulling up the cock).

Operation procedure

1.	2.	3.
		
Slide the handle's head with the hexagonal hole over the adjusting screw, and give the screw one or two clockwise turns (the cock rises).	Slide the handle's head with the pentagonal hole over the cock (with the stopper down), switch the cock to the right or left.	After the cock is switched, turn the adjusting screw counterclockwise, the opposite direction of the operation in (1).

Precautions

1: The pressure loss during switching reaches a maximum value when the angle at the time of the change of the direction of flow of the fluid is 45˚.
2: Keep the fluid flowing when turning the handle (otherwise, the strainer body and the cock may be galled).
3: The cock will get damaged if switching is carried out without pulling up the cock.
4: The cock will get damaged if switching is carried out without pulling up the cock.
5: If the cock and the adjusting screw simultaneously turn, lightly hold either of them with a wrench, etc.
6: Do not tighten the adjusting screw to an excessive torque.

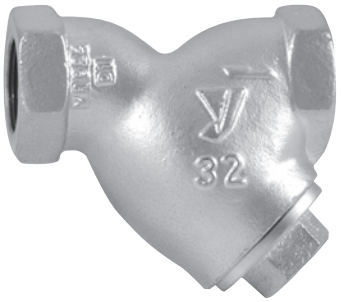


<Adjusting the direction of flow>

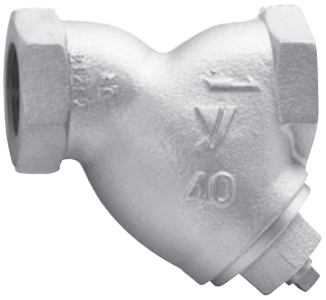
Align the arrow marked on each of the cock and the handle with the end ◍ mark of the arrow on the screen used (the position at which the handle no longer turns by the handle).

SY-5

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



10A-32A



40A-50A

■Features

1. Versatile, compact, lightweight and economical.
2. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.

■Specifications

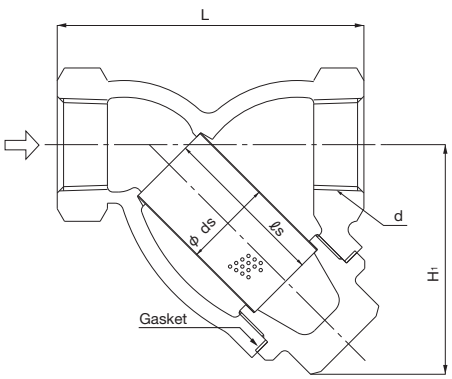
Application		Steam, Air, Cold and hot water, Other non-dangerous fluids
Maximum pressure		2.0 MPa
Maximum temperature		220℃
Material	Body	Ductile cast iron
	Screen	Stainless steel
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2
	Mesh	Standard 80 mesh
Connection		JIS Rc screwed

· Available with 20 to 100 mesh screen (perforation: ϕ 2.5-7.21 holes/cm^2) or only with perforation (ϕ 1.2-23.8 holes/cm^2) on request.
· Available with 10A to 32A attached with a plug (material: S15C).
· Available with a brass plug.

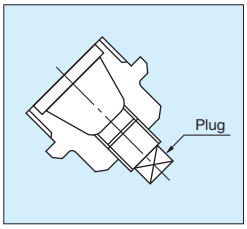
■Dimensions (mm) and Weights (kg)

Nominal size	d	L	H_1	ds	ℓs	Plug	Weight
10A	Rc 3/8	65	50	18	32	(R 1/4)	0.4
15A	Rc 1/2	75	55	20	35	(R 1/4)	0.6
20A	Rc 3/4	90	70	25	50	(R 3/8)	0.9
25A	Rc 1	110	85	32	60	(R 3/8)	1.4
32A	Rc 1-1/4	135	95	40	70	(R 3/8)	2.2
40A	Rc 1-1/2	145	105	45	75	R 3/8	3.4
50A	Rc 2	170	120	56	90	R 3/8	4.5

* Please do not use other than Yoshitake product.



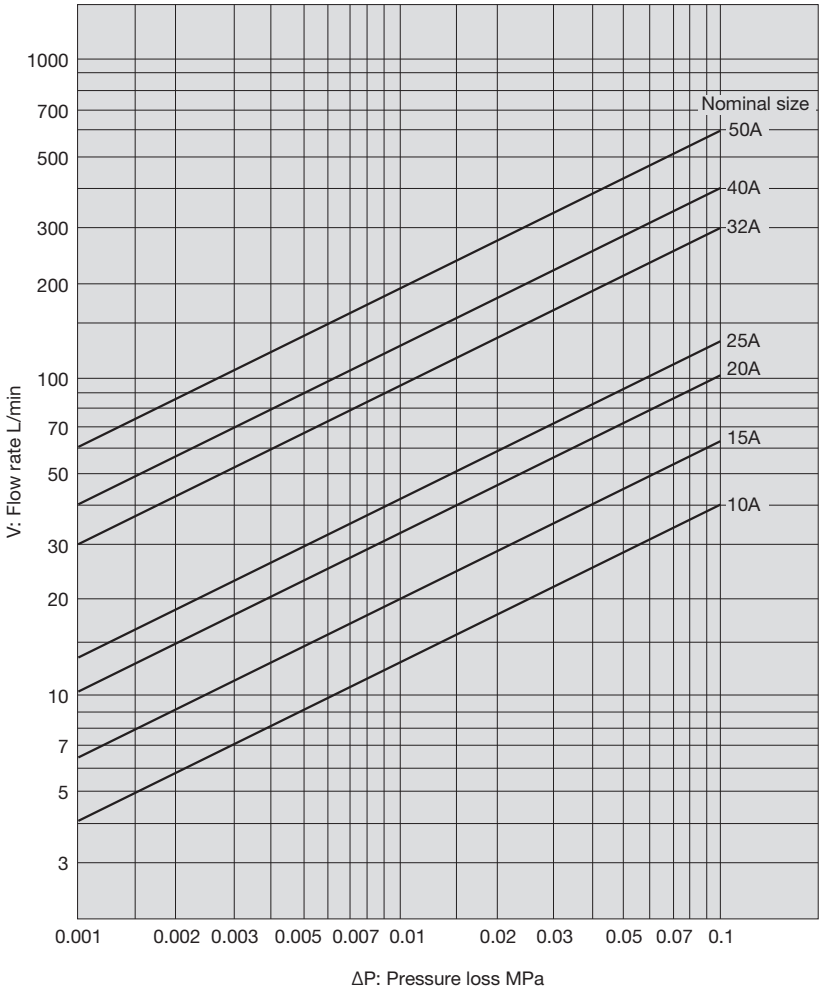
10A-32A



40A-50A

■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 80 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-9

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

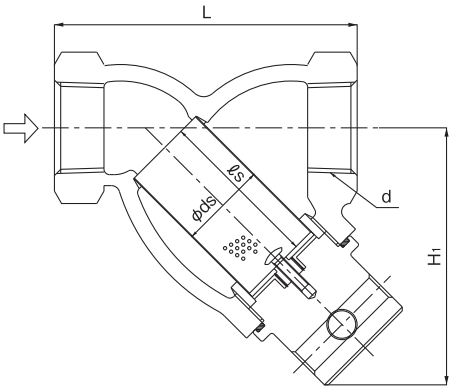
■Features

1. Light weight and compact. It is used for dust prevention in various pipe line.
2. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.
3. Disassembling and cleaning are easy. The easy plug reliefs residual pressure and makes the cap removed easily and safely.

■Specifications

Application		Air, Cold and hot water, Other non-dangerous fluids
Maximum pressure		1.0 MPa
Maximum temperature		80˚C
Material	Body	Ductile cast iron (FCD450)
	Screen	Stainless steel
	O ring	FKM (Viton)
	Cap	C3604 (Brass)
Screen	Perforation	ϕ2.5-7.21 holes/cm^2
	Mesh	Standard 60 mesh
Connection		JIS Rc screwed

· Available with 20 to 100mesh screen.



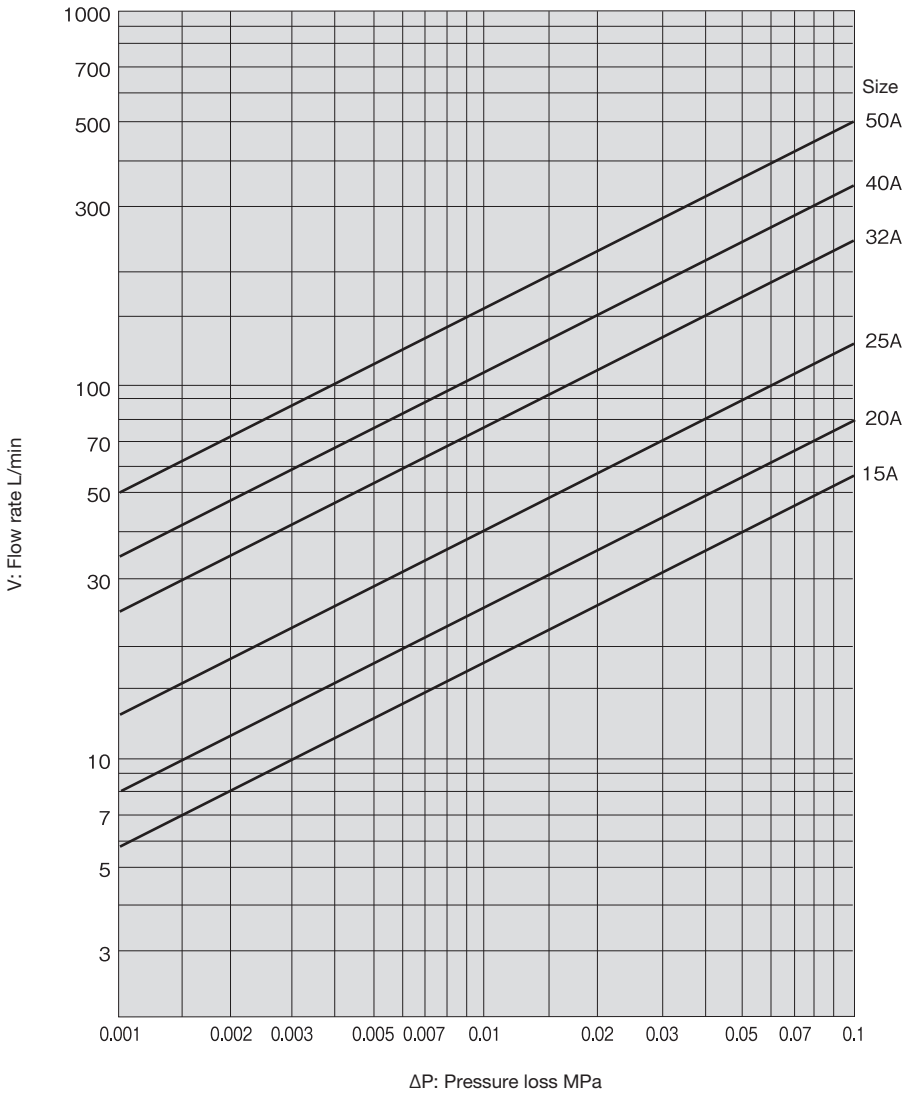
■Dimensions (mm) and Weights (kg)

Nominal size	d	L	H_1	ds	ℓs	Weight
15A	Rc 1/2	75	70	20	35	0.7
20A	Rc 3/4	90	84	25	50	0.9
25A	Rc 1	110	96	32	60	1.7
32A	Rc 1-1/4	135	114	40	70	2.8
40A	Rc 1-1/2	145	120	45	75	4.0
50A	Rc 2	170	131	56	90	5.1

* The size of plug's cross-hole is ϕ10.

■Pressure Loss Chart (For Water)

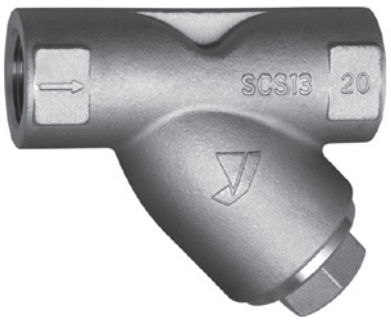
· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-17,37

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



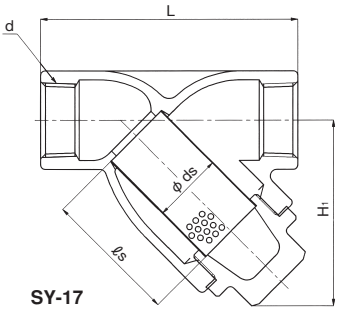
■Features

1. Stainless cast steel body is rustless, available for a wide variety of applications ranging from food, chemical industry to oil piping.
2. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.

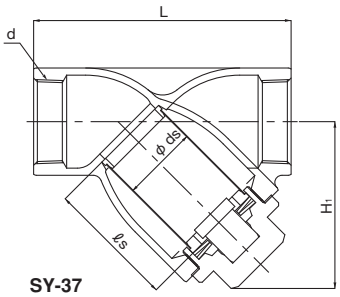
■Specifications

Model		SY-17	SY-37 (strainer with fine mesh)
Application		Steam, Air, Cold and hot water, Oil, Other non-dangerous fluids	
Maximum pressure		2.0 MPa	
Maximum temperature		150℃ (250℃)	
Material	Body	Cast stainless steel	
	Screen	Stainless steel	
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2	
	Mesh	Standard 80 mesh	120 to 200 mesh
Gasket		PTFE *	
Connection		JIS Rc screwed	

* If the temperature is more than 150℃, another material is used for the gasket. Please contact us.
· Available with 20 to 100 mesh screen (SY-17).
· The screen for SY-37, it has become the special specification called screen (P) to prevent the gap between the screen and the body.



SY-17



SY-37

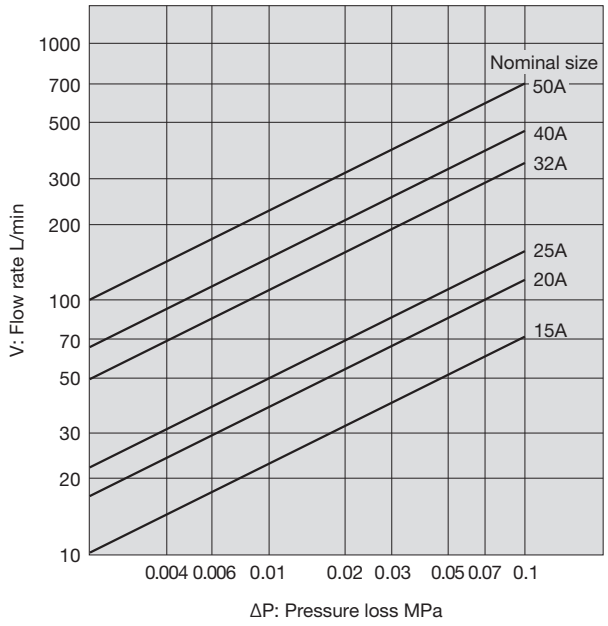
■Dimensions (mm) and Weights (kg)

Nominal size	d	L	H_1	ds	ℓs	Weight
15A	Rc 1/2	85	55	20 (18)	35	0.40 (0.4)
20A	Rc 3/4	100	69	25 (23)	50	0.68 (0.7)
25A	Rc 1	115	83	32 (30)	60	1.01 (1.1)
32A	Rc 1-1/4	135	92	40 (38)	70	1.48 (1.6)
40A	Rc 1-1/2	150	102	45 (43)	75	1.88 (2.0)
50A	Rc 2	180	117	56 (54)	90	3.34 (3.6)

· The above values in parentheses are the dimensions and weights of the SY-37.

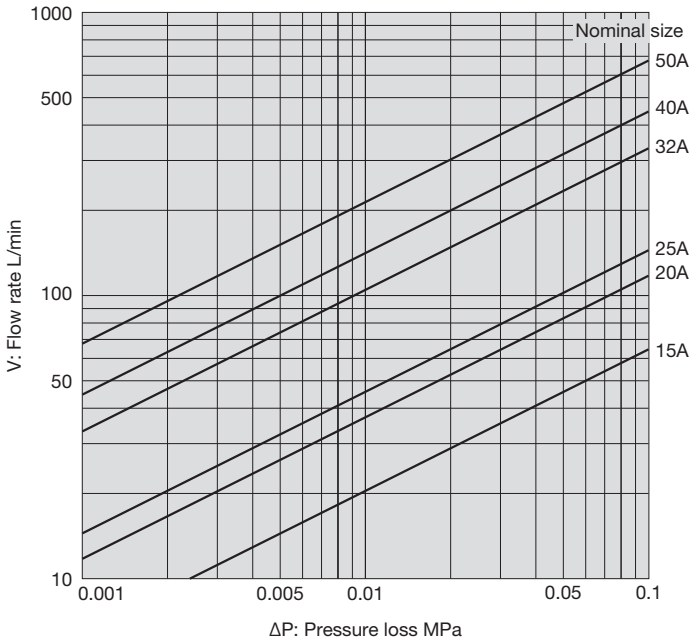
■SY-17 Strainer Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 2.5-7.21 holes/cm^2, Mesh = 80 mesh



■SY-17 Strainer Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 2.5-7.21 holes/cm^2, Mesh = 120 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-6,6-N,6L

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

▲Pipe end core

· **What is a pipe end core?**
An integral core brings the lining steel piping and the core into close contact with each other and stops the inflow of water into threaded portion for rust prevention.

■Features

1. Outstanding corrosion resistance offered by bronze body.
2. Corrosive portions, such as the end faces of lining steel piping or threads, are isolated from fluid by a pipe end core, stopping ingress of rust (SY-6L and SY-6L-N).
3. Easy plumbing and cost reduction are ensured since any piping joints, such as bronze nipples and corrosion-resistant sockets, are not needed.
4. Since an integral core is built-in, failure to insert the core no longer occurs (SY-6L and SY-6L-N).
5. The core has an O-ring structure and maintains a high degree of air-tightness (SY-6L and SY-6L-N).

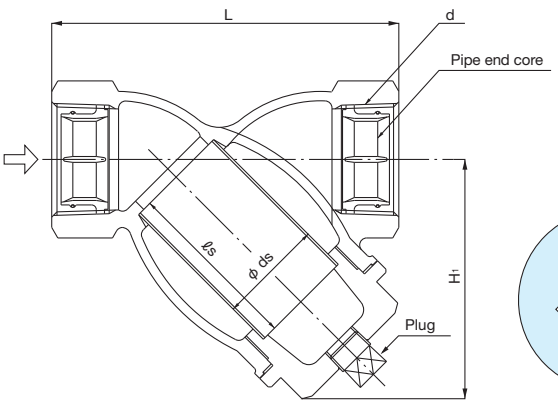
■Specifications

Model		SY-6	SY-6-N	SY-6L	SY-6L-N
Type		For general piping		Common core	
Application		Steam, Air, Cold and hot water, Oil, Other non-dangerous fluids	Cold and hot water		
Maximum pressure		1.3 MPa		1.0 MPa	
Maximum temperature		150℃ (220℃) *	80℃	40℃	
Material	Body	Cast bronze	Cast bronze (NPb-treated)	Cast bronze	Cast bronze (NPb-treated)
	Screen	Stainless steel			
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2			
	Mesh	Standard 80 mesh	Standard 60 mesh		
Connection		JIS Rc screwed			

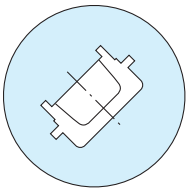
· Available with 20 to 100 mesh screen. (SY-6, SY-6L)
· Available with 10A to 32A attached with a plug.
· If the temperature is more than 150℃, another material is used for the gasket, please contact us.

■Dimensions (mm) and Weights (kg)

Nominal size	d	L	H_1	ds	ℓs	Plug	Weight
15A	Rc 1/2	86	55	20	35	(R 1/4)	0.5
20A	Rc 3/4	98	70	25	50	(R 3/8)	0.8
25A	Rc 1	117	80	32	60	(R 3/8)	1.1
32A	Rc 1-1/4	145	92	40	70	(R 3/8)	1.9
40A	Rc 1-1/2	148	105	45	75	R 3/8	2.6
50A	Rc 2	178	122	56	90	R 3/8	3.8



40-50A

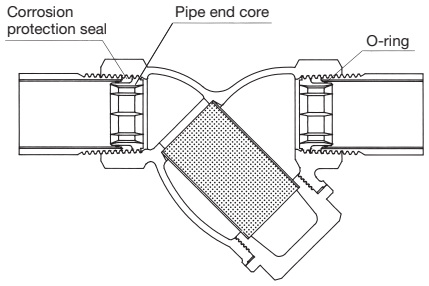


15-32A

■Precautions about Installation

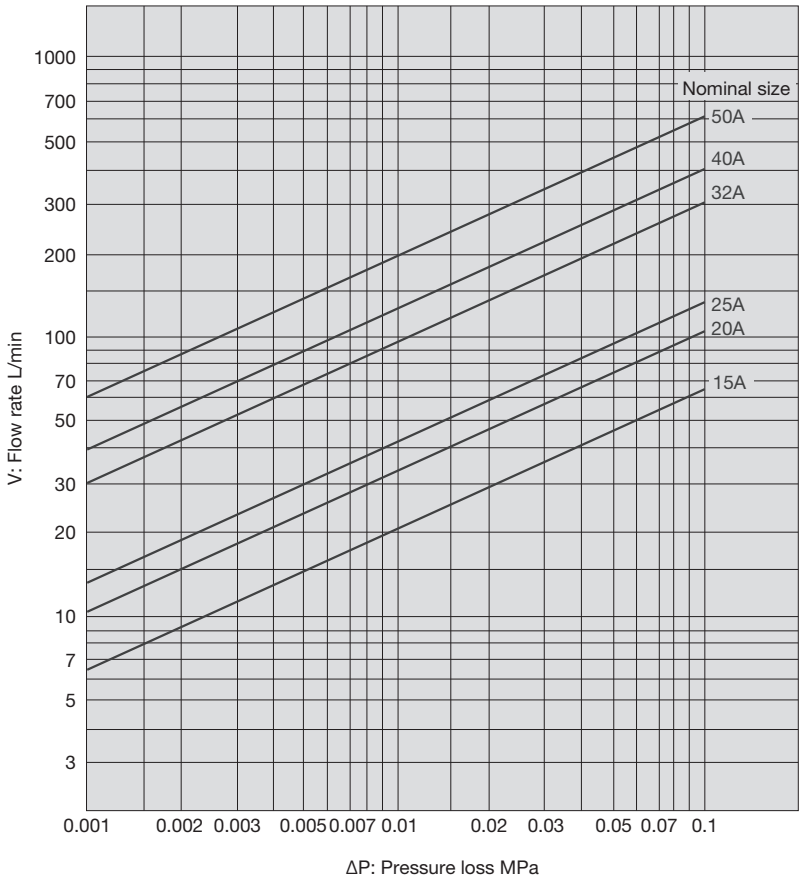
Follow the instructions below to maintain the anti-corrosion characteristic of the pipe end core.

1. Use a steel pipe complying with the JIS standard.
2. Cut threads on the pipe according to the JIS standard.



■Pressure Loss Chart (For Water)

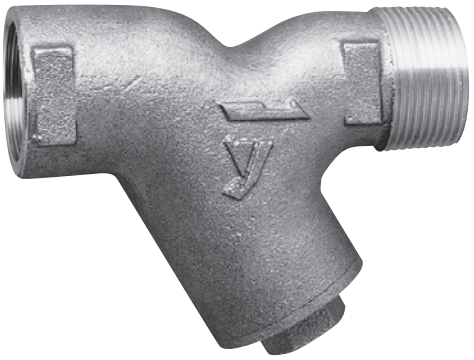
· Screen: Perforation = ϕ 2.5-7.21 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-24,24-N

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



■Features

1. Light weight and compact. Used for dust prevention in a cold and hot water line.
2. Able to connect directly to pressure reducing valve, and no need for piping equipment such as nipple.
3. Screen cleaning is easy. Cap can be removed easily since the cap sealing is O-ring.
4. Bronze body has no worry for rusty water.

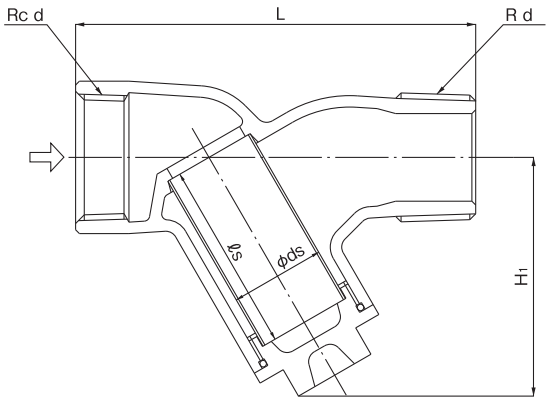
■Specifications

Model		SY-24	SY-24-N
Application		Cold and hot water	
Maximum pressure		1.6 MPa	
Maximum temperature		80℃	
Material	Body	Bronze	Bronze (NPb-treated)
	Screen	Stainless steel	
Screen	Perforation	ϕ2.5-7.21 holes/cm^2	
	Mesh	Standard 60 mesh	
Connection		Inlet: JIS Rc screwed Outlet: JIS R screwed	

· Available with 20 to 100mesh screen for SY-24.
· SY-24-N mesh are 20, 40, 60, 80, 100 mesh.

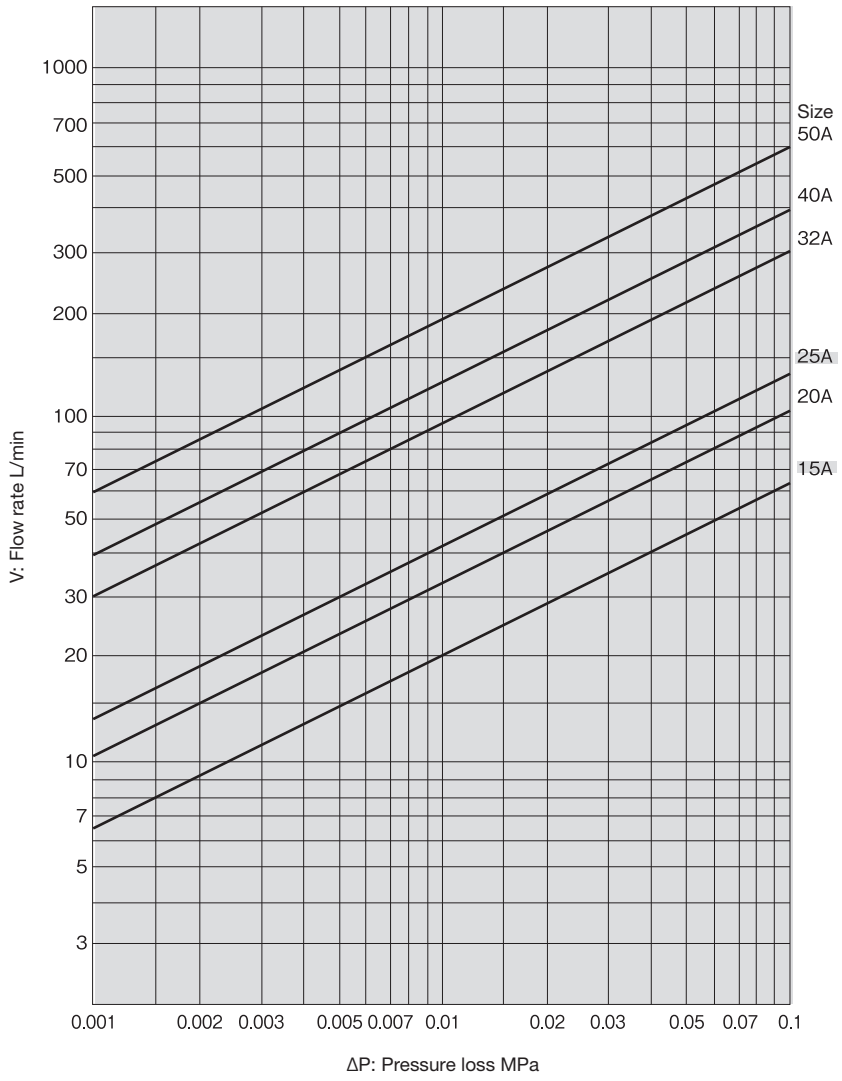
■Dimensions (mm) and Weights (kg)

Nominal size	d	L	H1	ds	ℓs	Weight
15A	1/2	80	46	18	32	0.25
20A	3/4	90	51	20	35	0.35
25A	1	105	63	25	50	0.55
32A	1-1/4	130	80	32	60	1.00
40A	1-1/2	150	90	40	70	1.44
50A	2	175	112	50	85	2.90



■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-40,40C-N

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

SY-40

SY-40C-N

15-32A

40-50A

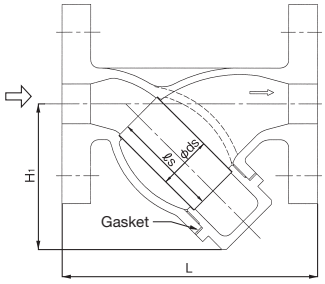
■Features

1. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.
2. 65A or more (in nominal size) is designed as compact as possible and reduced in weight, making plumbing easy.
3. The SY-40C-N (15A to 150A) offers excellent corrosion resistance since its inner and outer surfaces are coated with Nylon 12.

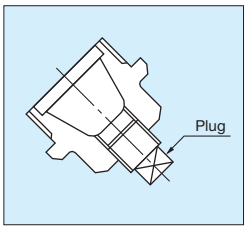
■Specifications

Model		SY-40	SY-40C
Application		Steam, Air, Cold and hot water, Other non-dangerous fluids	Air, Cold and hot water, Other non-dangerous fluids
Maximum pressure		1.0 MPa	
Maximum temperature		220˚C	60˚C
Material	Body	Ductile cast iron	
	Screen	Stainless steel	
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2	
	Mesh	Standard 80 mesh	Standard 60 mesh
Connection		JIS 10K FF flanged	

· Available with 20 to 100 mesh screen (perforation: ϕ2.5-7.21 holes/cm^2) or only perforation (15A to 80A: ϕ1.3-16.2 holes/cm^2, 100A or more: ϕ1.5-11.2 holes/cm^2) on request.
· Available with a brass plug (the standard is S15C or FCMB310).
· Available with rust-proof (65A or more).



15A-50A

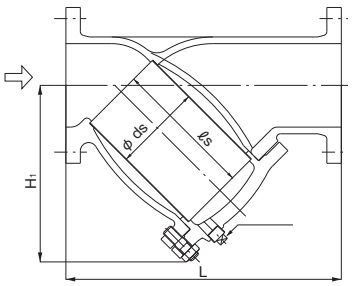


40A-50A

■Dimensions (mm) and Weights (kg)

Nominal size	L	H_1	ds	ℓs	Plug	Weight
15A	130	61	22	40	–	1.9
20A	140	75	27	56	–	2.5
25A	160	88	34	66	–	4.0
32A	175	104	43	76	–	5.2
40A	190	115	50	85	R 1/2	6.7
50A	225	140	61	107	R 1/2	10.2
65A	255	167	73	125	R 1/2	14.5
80A	330	190	88	130	R 1/2	18.3
100A	370	225	108	180	R 3/4	29.7
125A	415	263	136	200	R 3/4	40.5
150A	495	315	160	250	R 3/4	66.0
200A	565	385	210	300	R 3/4	95.8
250A	690	460	260	370	R 3/4	167.5
300A	840	556	315	442	R 3/4	286.0

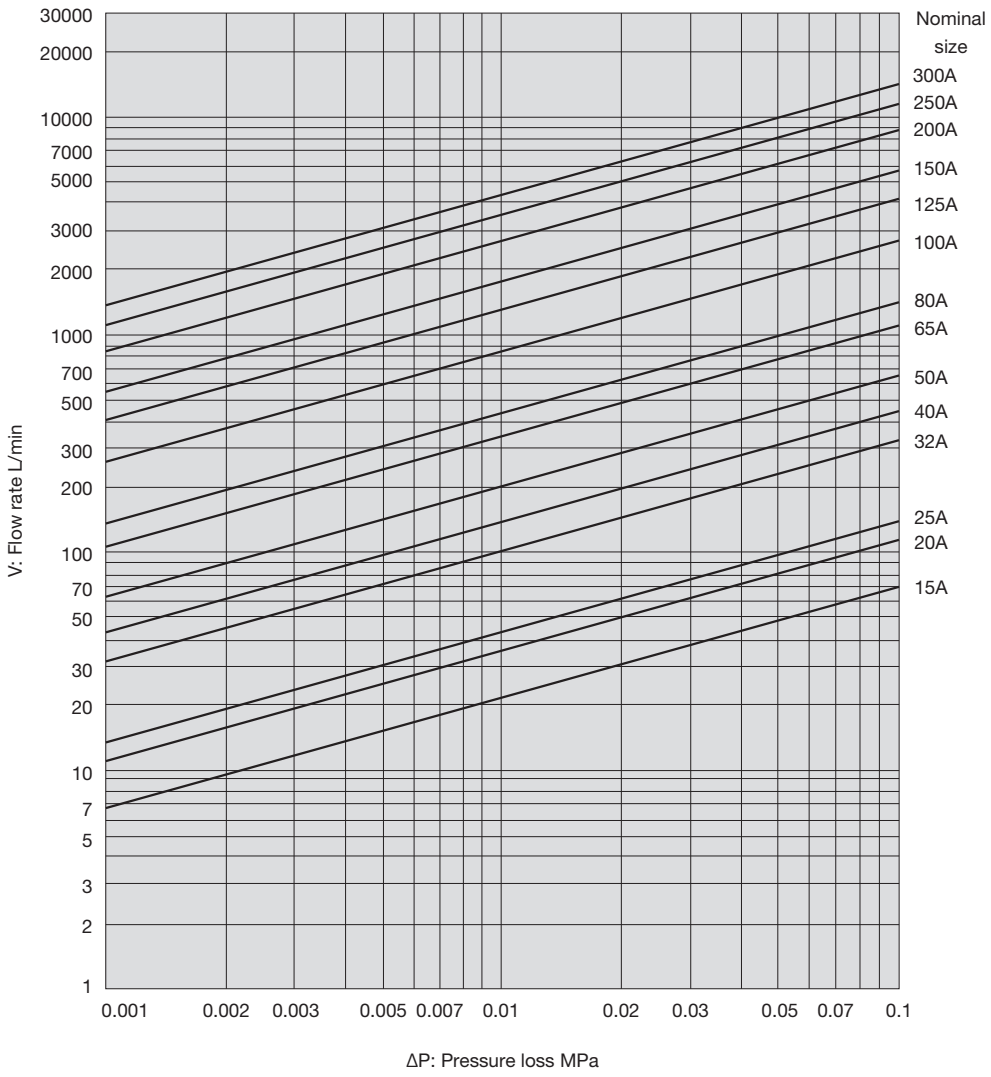
· A screwed cap is applied to 50A or less.
· Please do not use other than Yoshitake product.



65A-300A

■Pressure Loss Chart (For Water)

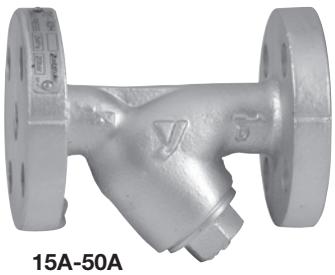
· Screen: Perforation = ϕ 2.5-7.21 holes/cm^2, Mesh = 80 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-40EN,40H

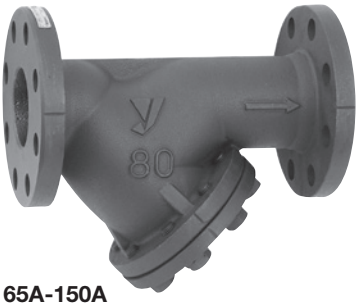
Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



15A-50A

■Features

1. The SY-40EN strainer can be replaced easily from existing strainer because it complies with face-to-face dimensions of the EN standard.
2. High-flow-rate marine type provided with the largest possible filtration area as a countermeasure against the decreasing in the flow rate caused by clogging.
3. 65A or more (in nominal size) is designed as compact as possible and reduced in weight, making plumbing easy.

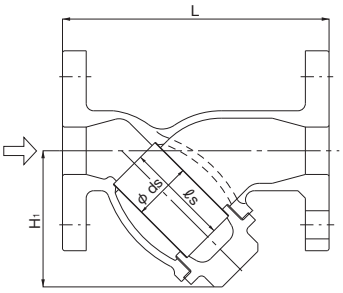


65A-150A

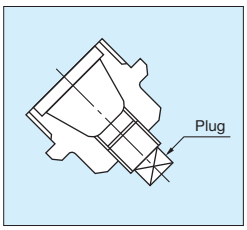
■Specifications

Model		SY-40EN	SY-40H
Application		Steam, Air, Cold and hot water, Other non-dangerous fluids	
Maximum pressure		2.0 MPa	
Maximum temperature		220°C	
Material	Body	Ductile cast iron	
	Screen	Stainless steel	
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2	
	Mesh	Standard 80 mesh	
Connection		EN1092 PN25	JIS 20K FF flanged ASME Class 300 flanged

· Available with 20 to 100 mesh screen (perforation: ϕ 2.5-7.21 holes/cm^2) or only with perforation (15A to 80A: ϕ 1.3-16.2 holes/cm^2, 100A or more: ϕ 1.5-11.2 holes/cm^2).
· Available with a brass plug (the standard is S15C or FCMB310).



15A-32A

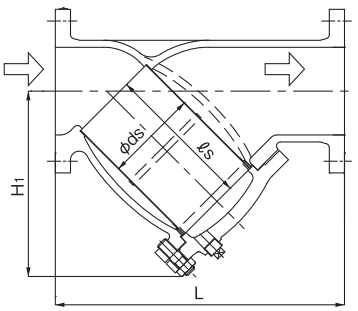


40A-50A

■Dimensions (mm) and Weights (kg)

Nominal size	L		H1	ds	ℓs	Plug	Weight	
	SY-40EN	SY-40H					SY-40EN	SY-40H
15A	130	130 (—)	61	22	40	—	2.0	1.9 (—)
20A	150	140 (—)	75	27	56	—	3.0	2.5 (—)
25A	160	160 (160)	88	34	66	—	4.5	4.0 (4.5)
32A	180	175 (180)	104	43	76	—	5.5	5.2 (6.0)
40A	200	190 (200)	115	50	85	R 1/2	8.0	6.7 (8.5)
50A	230	233 (230)	140	61	107	R 1/2	10.5	10.2 (11.0)
65A	290	290 (302)	167	73	125	R 1/2	14.0	15.0 (15.0)
80A	310	316 (330)	190	88	130	R 1/2	18.0	19.0 (20.0)
100A	350	360 (370)	225	108	180	R 3/4	27.0	28.0 (30.0)
125A	400	415 (440)	263	136	200	R 3/4	40.0	42.0 (43.0)
150A	480	495 (520)	315	160	250	R 3/4	66.0	68.0 (71.0)

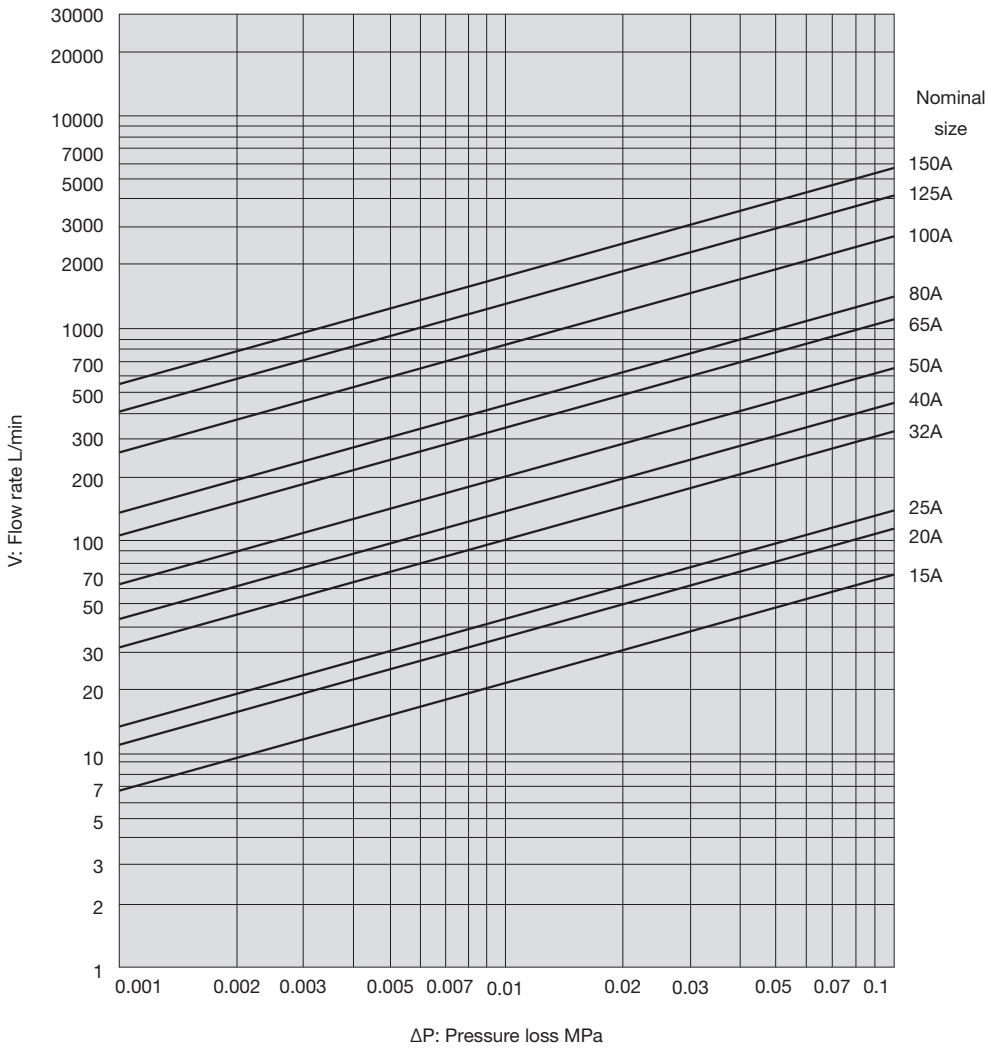
· The values in parentheses are the dimensions and weights of ASME Class 300 flanged.



65A-150A

■Pressure Loss Chart (For Water)

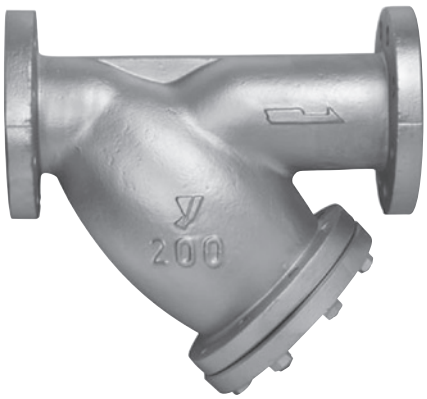
· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 80 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-2

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



■Features

1. High flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.

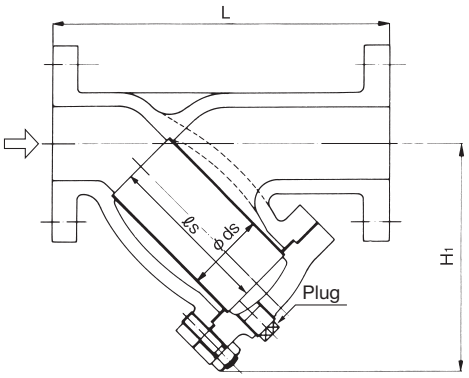
■Specifications

Application		Steam, Air, Cold and hot water, Other non-dangerous fluids
Maximum pressure		2.0 MPa
Maximum temperature		220℃
Material	Body	Ductile cast iron
	Screen	Stainless steel
Screen	Perforation	ϕ2.5-7.21 holes/cm^2
	Mesh	Standard 80 mesh
Connection		JIS 20K RF flanged

· Available with 20 to 100 mesh screen.

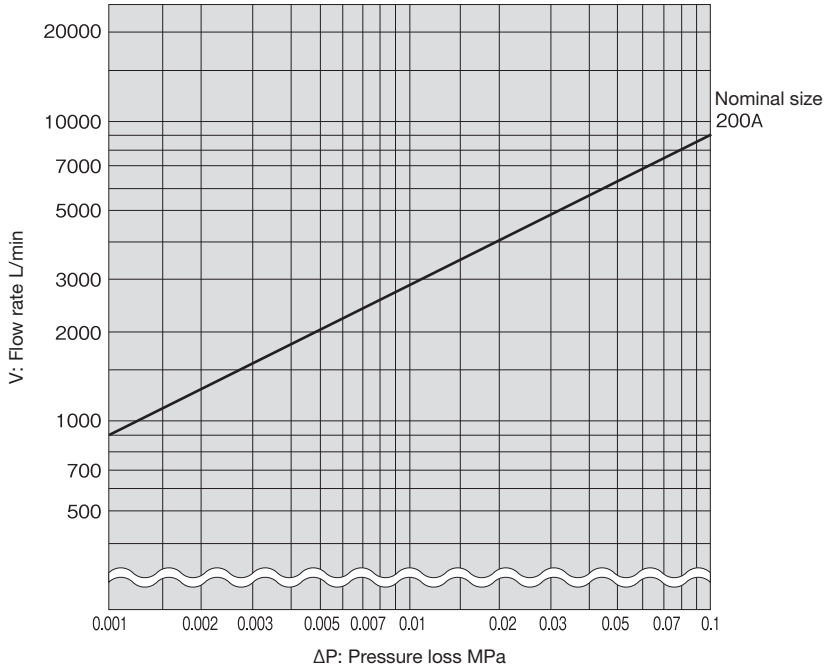
■Dimensions (mm) and Weights (kg)

Nominal size	L	H_1	ds	ℓs	Plug	Weight
200A	636	470	238	380	R 1	167.5



■Pressure Loss Chart (For Water)

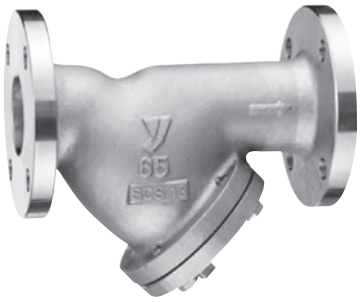
· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 80 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-8,38

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



65A-150A

15A-50A

■Features

1. Stainless cast steel body is rustless, available for a wide variety of applications ranging from food, chemical industry to oil piping.
2. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.
3. SY-38, it is available with 120-200 mesh.

■Specifications

Model		**SY-8**	**SY-38** (strainer with fine mesh)
Application		Steam, Air, Cold and hot water, Oil, Other non-dangerous fluids	
Maximum pressure		1.0 MPa	
Maximum temperature		150℃ (250℃) *	
Material	Body	Cast stainless steel	
	Screen	Stainless steel	
Screen	Perforation	15A to 100A = ϕ 2.5-7.21 holes/cm^2 125A to 150A = ϕ 6-2.05 holes/cm^2	15A to 100A = ϕ 2.5-7.21 holes/cm^2 125A to 150A = ϕ 6-1.80 holes/cm^2
	Mesh	Standard 80 mesh	120 to 200 mesh
Gasket		PTFE *	
Connection		JIS 10K FF flanged	

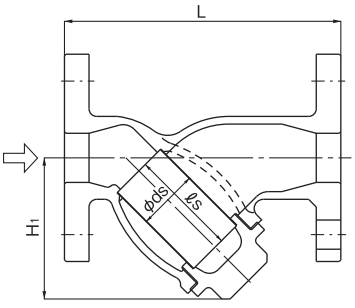
* If the temperature is over 150℃, another material is used for the gasket. Please contact us.
· Available with JIS 20K flanged (up to 50A).
· Available with 20 to 100 mesh screen (SY-8).
· The screen for SY-38, it has become the special specification called screen (P) to prevent the gap between the screen and the body.

■Dimensions (mm) and Weights (kg)

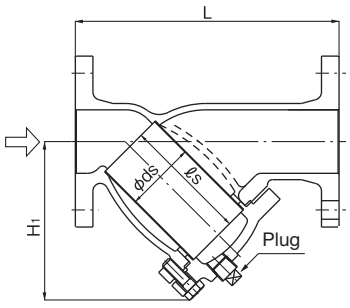
Nominal size	L	H_1	ds	ℓs	Plug	Weight
15A	125	54	20 (18)	35	–	1.8 (1.8)
20A	140	68	25 (23)	50	–	2.4 (2.4)
25A	160	81	32 (30)	60	–	3.7 (3.8)
32A	180	92	40 (38)	70	–	4.2 (4.2)
40A	190	104	45 (43)	75	–	5.9 (6.1)
50A	220	117	56 (54)	90	–	8.1 (8.3)
65A	270	162	73 (70)	125 (132)	R 1/2	13.2 (13.7)
80A	290	185	88 (85)	130 (134)	R 1/2	17.2 (18.0)
100A	350	222	108 (105)	180 (187)	R 1/2	26.0 (27.0)
125A	390	280	140 (137)	200 (207)	R 1/2	34.0 (40.0)
150A	440	318 (319)	160 (147)	225	R 1/2	60.0 (64.0)

· The values in parentheses are the dimensions and weights of the SY-38.

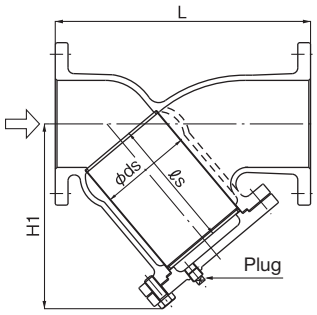
〈SY-8〉



15A-50A

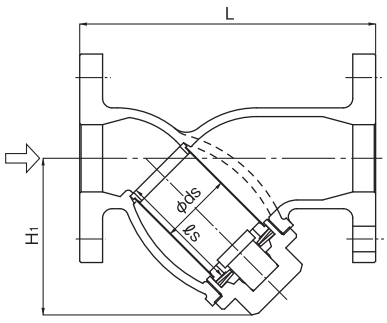


65A-100A

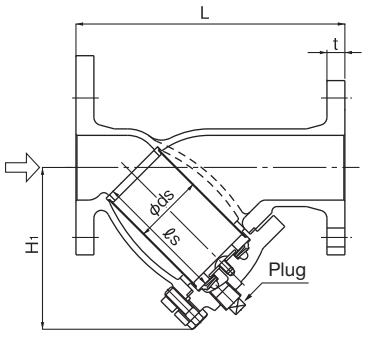


125A-150A

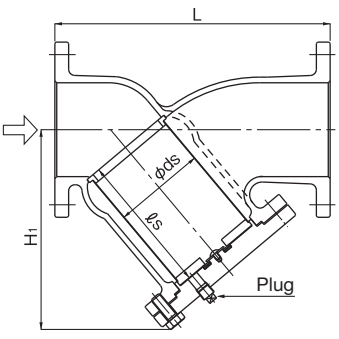
〈SY-8〉



15A-50A



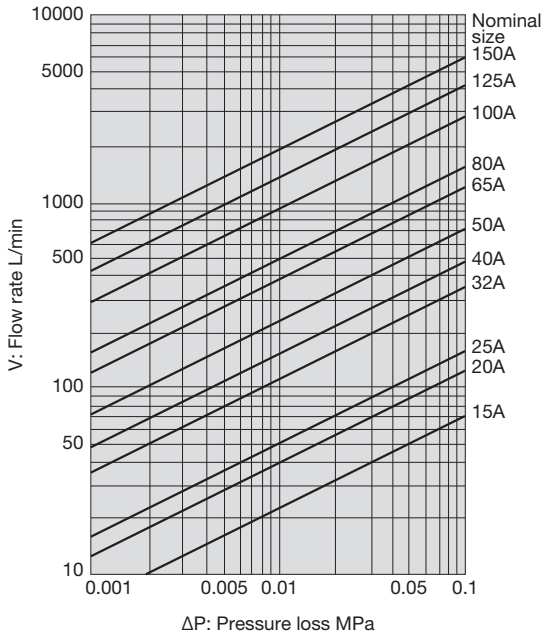
65A-100A



125A-150A

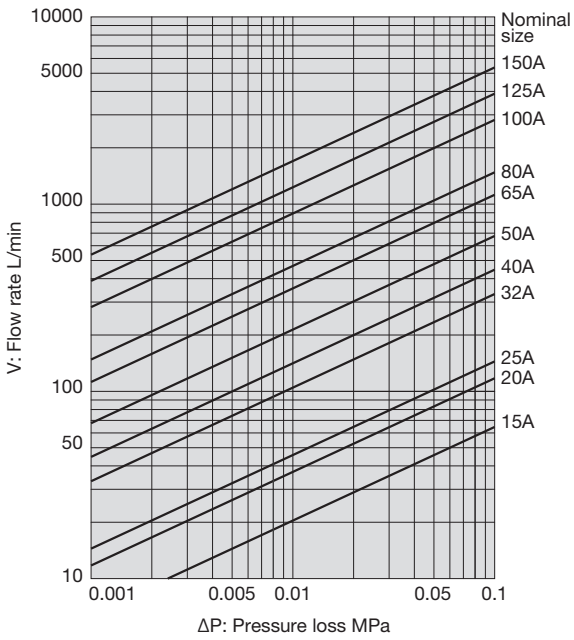
■SY-8 Strainer Pressure Loss Chart (For Water)

· Screen: 15A to 100A: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 80 mesh
125A and 150A: Perforation = ϕ6-2.05 holes/cm^2, Mesh = 80 mesh



■SY-38 Strainer Pressure Loss Chart (For Water)

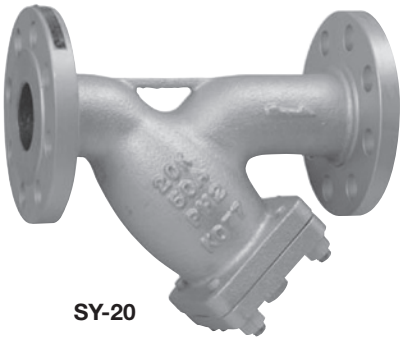
· Screen: 15A to 100A: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 120 mesh
125A and 150A: Perforation = ϕ6-1.80 holes/cm^2, Mesh = 120 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

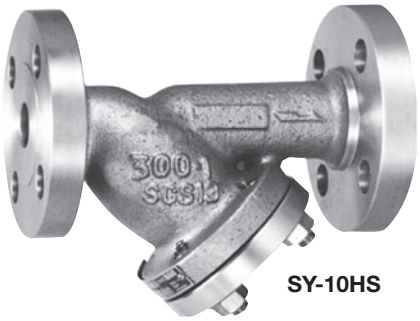
SY-20,10,10H,10HS

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



SY-20

SY-10



SY-10HS

■Features

1. High-flow-rate marine type with the largest possible filtration area in view of decrease in flow rate caused by clogging.
2. The screen standard is stainless steel made and 80 mesh.

■Specifications

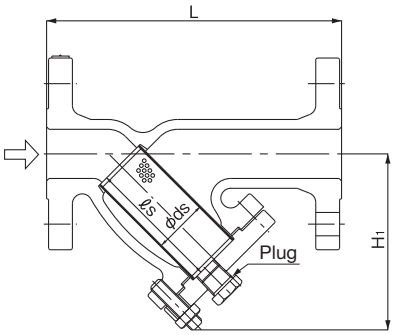
Model		SY-20-10	SY-20-20	SY-10-30
Application		Steam, Air, Cold and hot water, Oil, Other non-dangerous fluids		
Nominal size		15A-150A		15A-250A
Maximum pressure		1.0 MPa	2.0 MPa	3.0 MPa
Maximum temperature		260℃		260℃ *1
Material	Body	Cast carbon steel		
	Screen	Stainless steel		
Screen	Perforation	ϕ 6-1.80 holes/cm^2		
	Mesh	Standard 80 mesh		
Connection		JIS 10K RF flanged	JIS 20K RF flanged	JIS 30K RF flanged

· Available with 20 to 100mesh screen. (SY-20 is 20 to 60 mesh)
· Available with JIS 10K, 20K flanged for SY-10.
*1 If the temperature is over 260℃, please contact us.

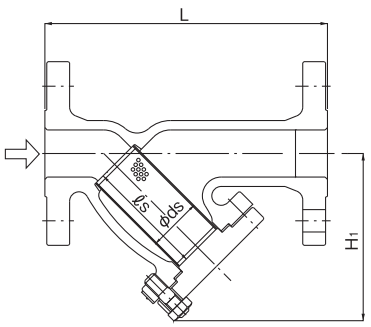
High-pressure gas approved products

Model		SY-10H-10	SY-10H-20	SY-10H-30	SY-10HS-10	SY-10HS-20	SY-10HS-30
Application		High-pressure gas, Steam, Cold and hot water, Other non-dangerous fluids					
Nominal size		15A-100A					
Maximum pressure		1.0 MPa	2.0 MPa	3.0 MPa	1.0 MPa	2.0 MPa	3.0 MPa
Maximum temperature		350℃		300℃	350℃		300℃
Material	Body	Cast carbon steel			Cast stainless steel		
	Screen	Stainless steel					
Screen	Perforation	ϕ6.0-1.80 holes/cm^2					
	Mesh	Standard 80 mesh					
Connection		JIS 10K RF flanged	JIS 20K RF flanged	JIS 30K RF flanged	JIS 10K RF flanged	JIS 20K RF flanged	JIS 30K RF flanged

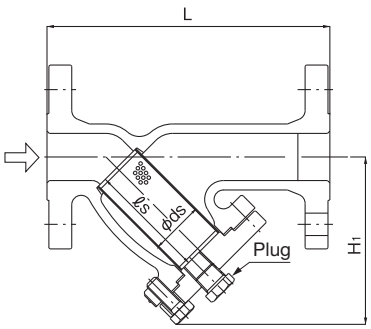
· Available with 20 to 100 mesh screen.
· When ordering, please inform application, pressure, material and things as follows.
(1) Name of end user (2) Installing place (3) Normal operation pressure and temperature
[Normal operation pressure and temperature for high-pressure gas means,the maximum pressure and temperature which the gas may transform into normal gas or liquefied gas under normal operation.]



SY-20



SY-10H·10HS



SY-10

■Dimensions (mm) and Weight (kg)

· SY-20-10, SY-20-20

Nominal size	L	H1	ds	ℓs	Plug	Weight
15A	160	104	25	65.5 (56.5)	R 3/8	3.0 (3.2)
20A	160	113	30	71.5 (67.5)	R 3/8	3.7 (4.0)
25A	180	122	33	76.0 (75.0)	R 3/8	4.8 (5.9)
32A	240	154	55	105.0 (101.0)	R 1/2	8.0 (9.3)
40A	240	154	55	105.0 (101.0)	R 1/2	8.0 (9.3)
50A	260	174	57	112.0 (114.5)	R 1/2	10.5 (13.0)
65A	275	187	74	130.0 (124.0)	R 1/2	14.3 (15.8)
80A	290 (360)	241	90	163.0 (167.0)	R 3/4	18.3 (28.0)
100A	362	280	114	187.0	R 3/4	34.2 (37.8)
125A	420 (415)	330	140	224.5	R 3/4	46.3 (57.0)
150A	520	386	184	308.5	R 3/4	75.1 (82.8)

· The value in ( ) is dimensions and weights of SY-20-20.

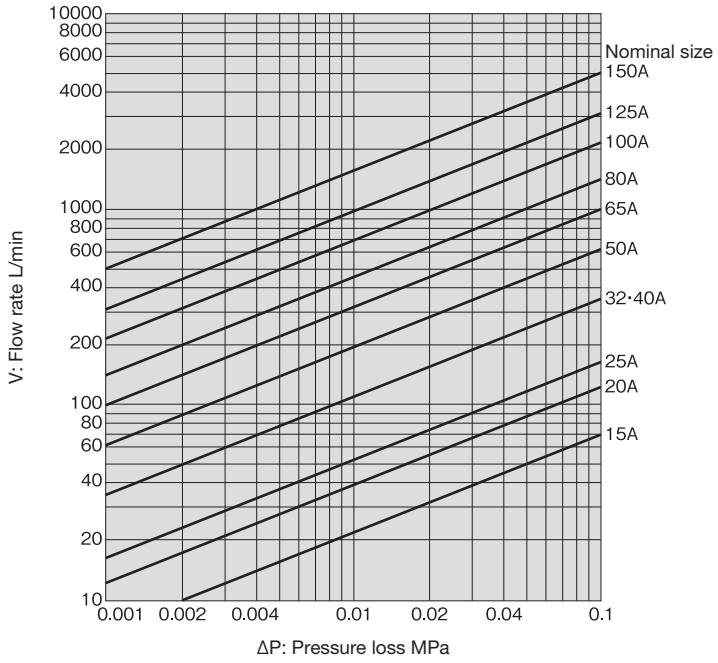
· SY-10-30, SY-10H·10HS (10K·20K·30K)

Nominal size	L	H1	ds	ℓs	Plug
15A	180	100	24	70	R 1/2
20A	180	100	24	70	R 1/2
25A	200	113	33	80	R 1/2
32A	240 (220)	140 (138)	46	100	R 1/2
40A	240 (220)	140 (138)	46	100	R 1/2
50A	275 (250)	170 (165)	56	120	R 1/2
65A	310 (300)	188 (180)	73	125	R 1/2
80A	345 (320)	215 (210)	88	145	R 1/2
100A	395 (380)	275 (270)	108	200	R 1/2
125A	470 (450)	325 (310)	138	230	R 3/4
150A	520 (500)	380 (375)	158	280	R 3/4
200A	655 (600)	475 (470)	208	350	R 3/4
250A	780 (745)	580	270	450	R 1

· SY-10H·10HS size is from 15A to 100A.
· SY-10H·10HS has no plug.
· The value in ( ) is dimensions of SY-10 (10K).

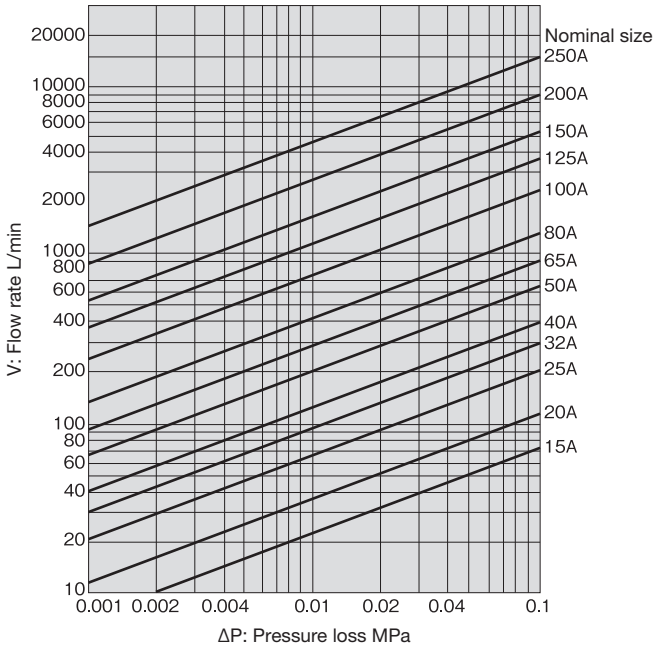
■SY-20 Strainer Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6.0-1.80 holes/cm^2, Mesh = 80 mesh



■SY-10 Strainer Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6.0-1.80 holes/cm^2, Mesh = 80 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SY-13

RoHS

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

■Features

1. Designed for large-diameter piping and lighter than cast iron strainer.

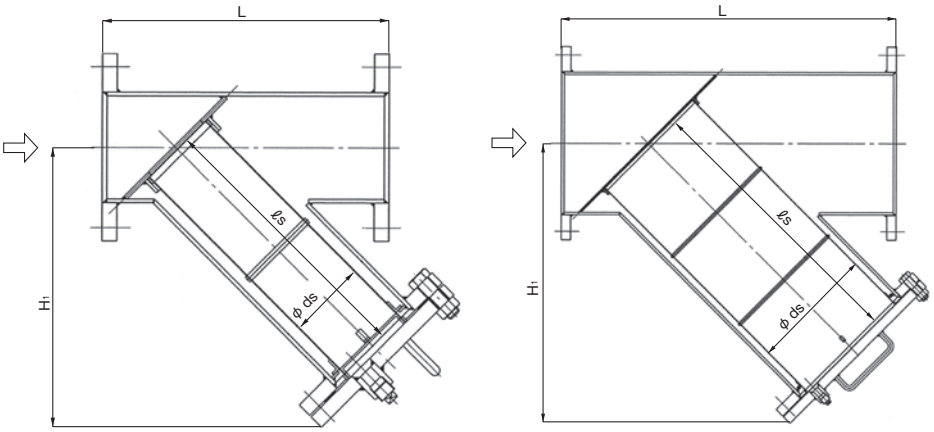
■Specifications

Model		SY-13
Nominal size		200A-600A
Application		Steam, Air, Cold and hot water, Oil, Other non-dangerous fluids
Maximum pressure		1.0 MPa
Maximum temperature		220℃
Material	Body	Carbon steel pipes for pressure service and rolled steels for general structure
	Screen	Stainless steel
Screen	Perforation	ϕ 6-1.80 holes/cm^2
	Mesh	Standard 80 mesh
Connection		JIS 10K FF flanged

· Available with 20 to 100 mesh screen (perforation: ϕ6.0-1.80 holes/cm^2) or only perforation (ϕ1.5-11.2 holes/cm^2) on request.
· Available with rust-proof (hot-dip zinc coating).
· Available with stainless wetted parts (SY-13SS).
· Available with hinge attachment for screen cover.
· Available with JIS 20K flanged, ASNI 150lb, ANSI 300lb.

■Dimensions (mm) and Weights (kg)

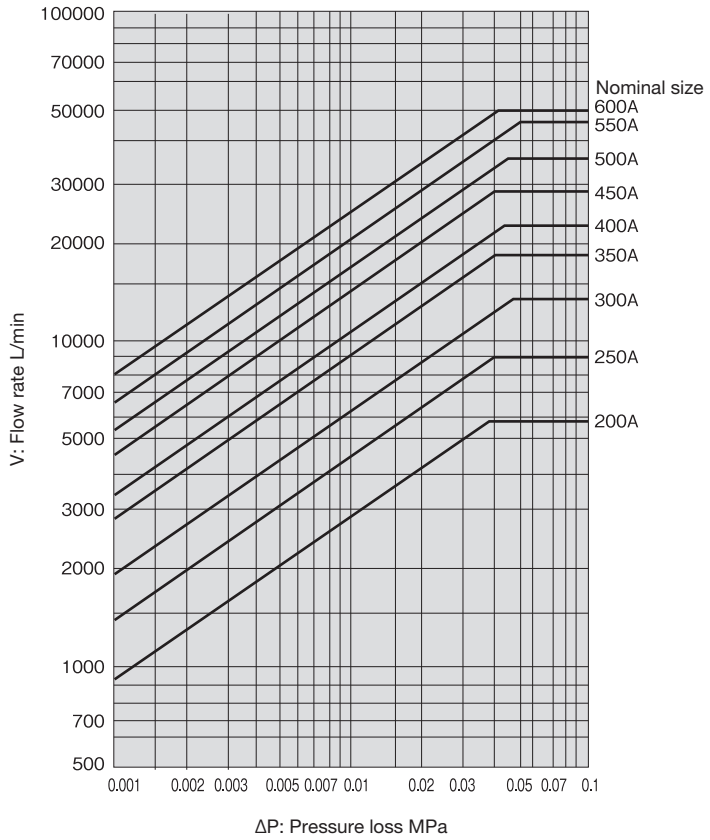
Nominal size	L	H_1	ds	ℓs	Plug	Weight
200A	580	500	170	510	R 3/4	75
250A	680	565	220	570	R 3/4	115
300A	800	660	250	680	R 3/4	145
350A	930	745	300	776	R 3/4	210
400A	1000	845	340	876	R 3/4	270
450A	1080	890	400	926	R 3/4	400
500A	1200	1045	450	1100	R 1	460
550A	1300	1175	500	1250	R 1	625
600A	1500	1260	550	1340	R 1	820



200A-250A　　300A-600A

■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6-1.80 holes/cm^2, Mesh = 80 mesh



* Please use flow rate 2 m/sec or less.

Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SU-20,20S,20C

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

SU-20

SU-20C

SU-20S

■Features

1. The largest possible filtration area in view of flow rate decrease caused by clogging.
2. Disassembling and cleaning are easy due to a simply structured cover that can be fixed and removed simply by tightening or unfastening a single bolt.
3. Excellent corrosion resistance due to the inner and outer surface coated with Nylon 11 (SU-20C).

■Specifications

· SU-20 · SU-20C

Application		Cold and hot water, Other non-dangerous fluids
Nominal size		20A-150A
Maximum pressure		1.0 MPa
Maximum temperature		220℃
Material	Body	Ductile cast iron
	Screen	Stainless steel
Screen	Perforation	ϕ 6-1.42 holes/cm^2
	Mesh	Standard 60 mesh
Connection		JIS 10K FF flanged

· Available with rust-proof (SU-20).
· Available with 20 to 250 mesh screen. Please contact us for 150 mesh or more.

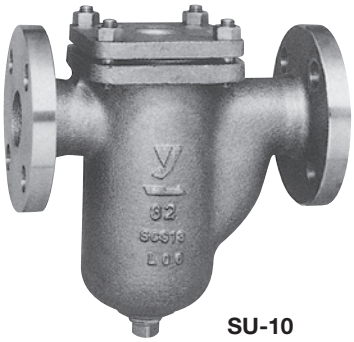
· SU-20S

Application		Cold and hot water, Oil, Other non-dangerous fluids		
Nominal size		20A-100A	125A	150A
Maximum pressure		1.0 MPa	0.7 MPa	0.5 MPa
Maximum temperature		80℃		
Material	Body	Ductile cast iron		
	O-ring	NBR		
	Screen	Stainless steel		
Screen	Perforation	ϕ 6-1.42 holes/cm^2		
	Mesh	Standard 60 mesh		
Connection		JIS 10K FF flanged		

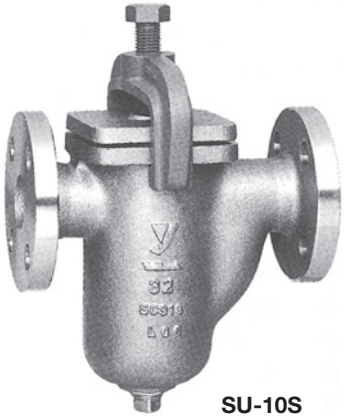
· Available with 20 to 150 mesh screen. Please contact us for 150 mesh or more.
· Available with O-ring FKM (Viton).

SU-10,10S

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



SU-10



SU-10S

■Features

1. The largest possible filtration area in view of decrease in flow rate caused by clogging.
2. Disassembling and cleaning are easy due to a simply structured cover that can be fixed and removed simply by tightening or unfastening a single bolt.
3. Stainless cast steel body is rust-less, available for a wide variety of applications ranging from food, chemical industry to oil piping.

■Specifications

· SU-10

Application		Cold and hot water, Oil, Other non-dangerous fluids
Nominal size		20A-150A
Maximum pressure		1.0 MPa
Maximum temperature		220℃
Material	Body	Cast stainless steel
	Screen	Stainless steel
Screen	Perforation	ϕ 6-1.42 holes/cm^2
	Mesh	Standard 60 mesh
Connection		JIS 10K FF flanged

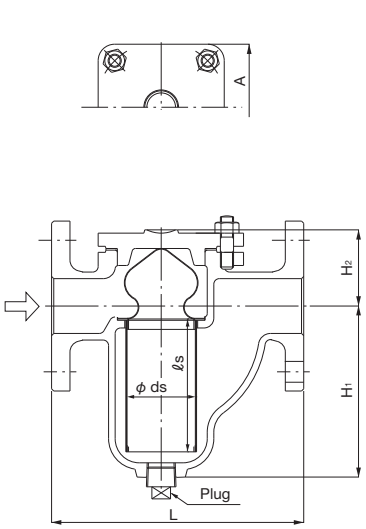
· Available with 20 to 150 mesh screen. Please contact us for 150 mesh or more.

· SU-10S

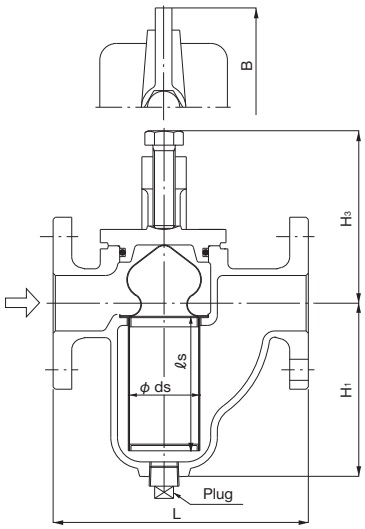
Application		Cold and hot water, Oil, Other non-dangerous fluids		
Nominal size		20A-100A	125A	150A
Maximum pressure		1.0 MPa	0.7 MPa	0.5 MPa
Maximum temperature		80℃		
Material	Body	Cast stainless steel		
	O ring	NBR		
	Screen	Stainless steel		
Screen	Perforation	ϕ 6-1.42 holes/cm^2		
	Mesh	Standard 60 mesh		
Connection		JIS 10K FF flanged		

· Available with 20 to 150 mesh screen. Please contact us for 150 mesh or more.
· Available with O-ring FKM (Viton).

■Dimensions (mm) and Weights (kg)



SU-10 · SU-20 · SU-20C

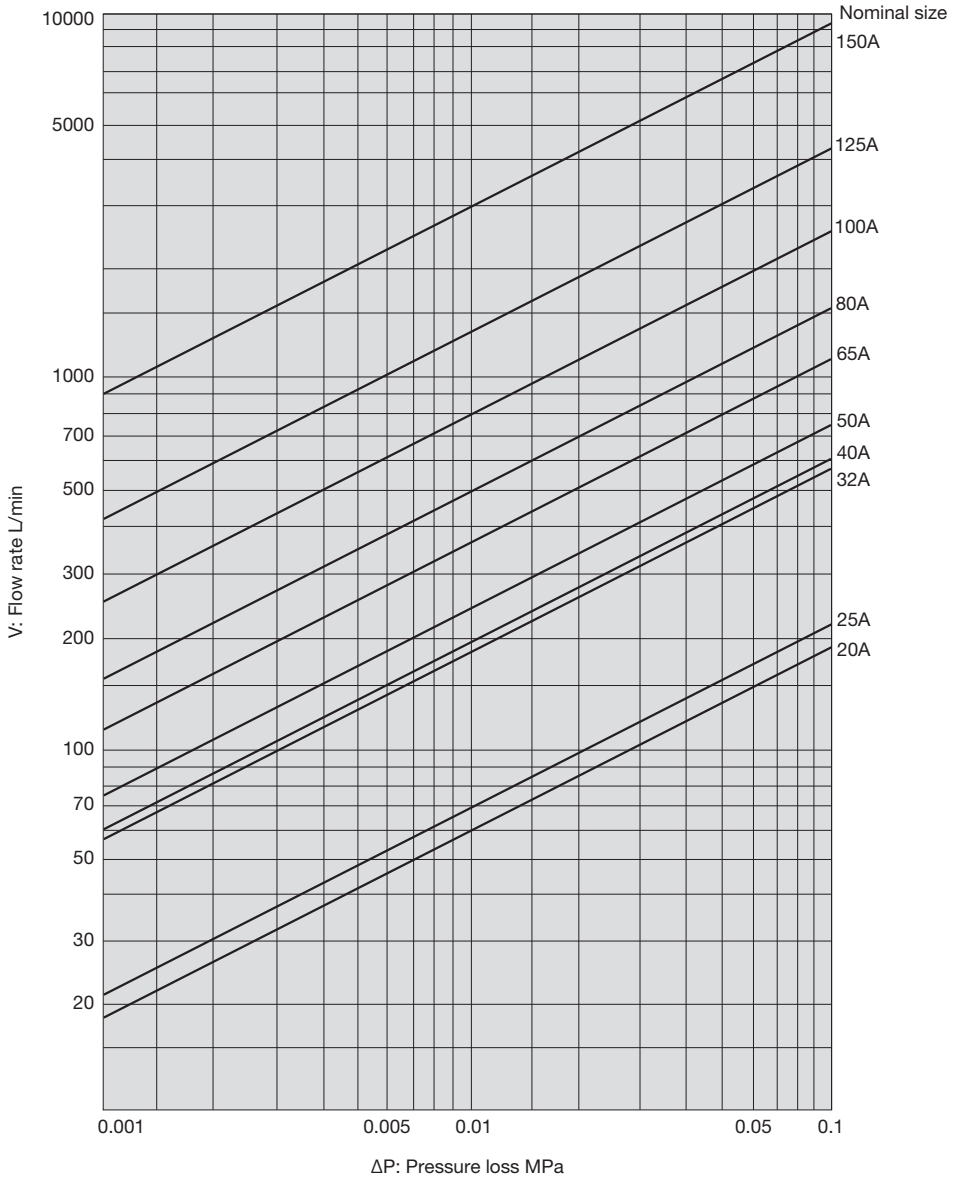


SU-10S · SU-20S

Nominal Size	L	H1	H2	H3	A	B	ds	ℓs	Plug	Weight	
										SU-20 SU-10	SU-20S SU-10S
20A	175	97.5	54	107.5	87	131	40	70	R 3/8	5.0	5.6
25A	175	97.5	54	107.5	87	131	40	70	R 3/8	6.1	6.7
32A	230	146	67.5	151	115	179	64.5	108	R 3/4	11.1	12.5
40A	230	146	67.5	151	115	179	64.5	108	R 3/4	11.8	13.2
50A	230	156	69.5	153	115	179	64.5	120	R 3/4	12.4	13.8
65A	290	182	70	153.5	134	208	77	140	R 1	18.7	20.8
80A	300	197.5	88.5	189	185	249	90	160	R 1	23.8	27.1
100A	365	262	118.5	253	220	334	120	210	R 1-1/4	41.3	48.6
125A	425	340.5	134.5	269	248	362	140	270	R 1-1/2	61.4	69.4
150A	505	378	158.5	293	305	414	175	300	R 2	98.4	108.3

■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6-1.42 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SU-50H,50S,50SS

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit


SU-50H


SU-50S

■Features

1. Standard 316 stainless steel ensures excellent rust-proof performance.
2. Cover with O-ring ensures superior sealing.
3. Quick-open type, disassembly and screen cleaning are easy (SU-50S and SU-50SS).
4. Ductile cast iron body, the maximum pressure is 2.0 MPa (SU-50H).

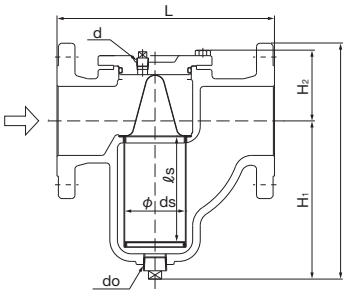
■Specifications

Model		SU-50H	SU-50S	SU-50SS
Application		Water, Oil		Water, Oil, Flushing water
Nominal size		50A, 65A, 80A, 100A, 150A		
Maximum pressure		2.0 MPa	1.0 MPa	
Maximum temperature		80℃		
Material	Body	Ductile cast iron *		Ductile cast iron with Epoxy Coating
	Cover	Ductile cast iron	Carbon steel	Stainless steel
	O-ring	NBR		
	Screen	Stainless steel (SUS316)		
Screen	Perforation	ϕ 2.5-7.21 holes/cm^2		
	Mesh	Standard 60 mesh		
Connection		JIS 20K RF flanged or BS4504 PN16 flanged		

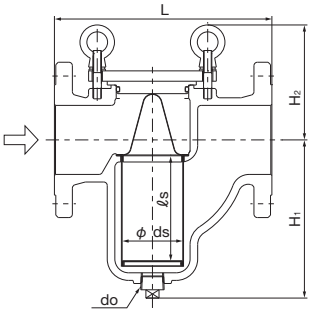
* Available with Epoxy Coating for flushing water.
· Available with 20 to 100 mesh screen.

■Dimensions (mm) and Weights (kg)

Size	L	H_1	H_2			ds	ℓs	d	do	Weight	
			SU-50H	SU-50S	SU-50SS					SU-50H	SU-50S·50SS
50A	243	166	88	140	144	64.5	108	R 1/4	R 3/4	13.0	13.0
65A	254	166	88	140	144	64.5	108	R 1/4	R 3/4	15.0	15.0
80A	300	204	98	163	165.5	77	140	R 3/8	R 1	20.0	20.0
100A	315	230	103	166.5	169	90	160	R 3/8	R 1	29.0	28.0
150A	455	385	137	211	214	140	270	R 3/8	R 1-1/2	73.5	72.0



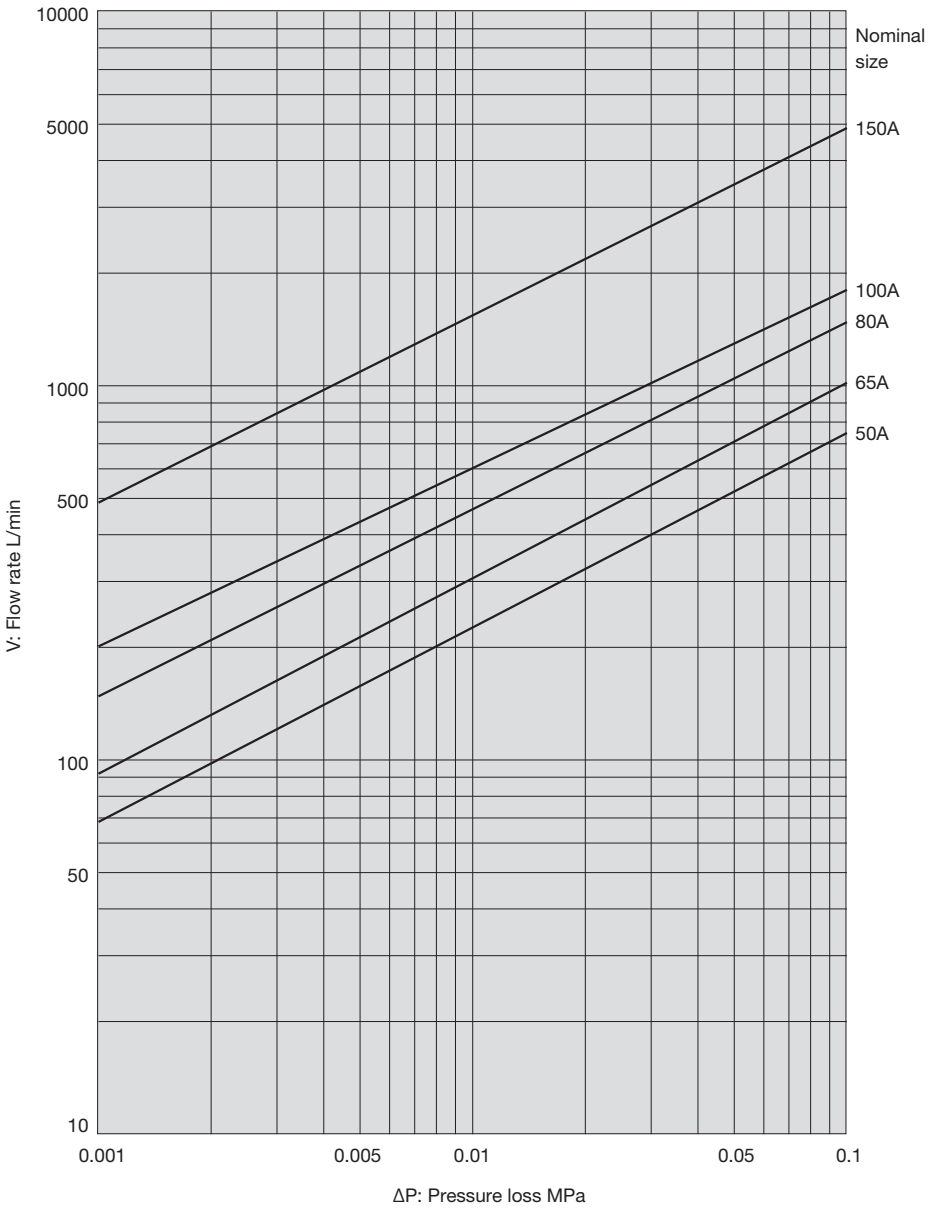
SU-50H



SU-50S, 50SS

■Pressure Loss Chart (For Water)

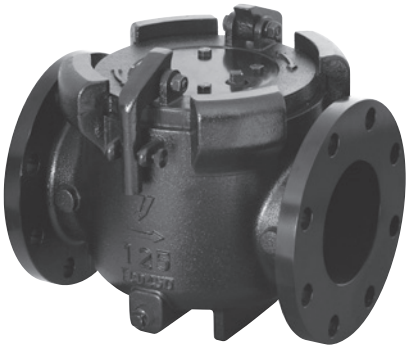
· Screen: Perforation = ϕ2.5-7.21 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

ST-10

Y type	Basket	Duplex	Straight
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



With davit

■Features

1. It can replace the screen without using the tool.
2. Significantly compact body set up a screen in the flow coaxial with the direction of the fluid.
3. Excellent durability since it is subjected to electrodeposition coating.

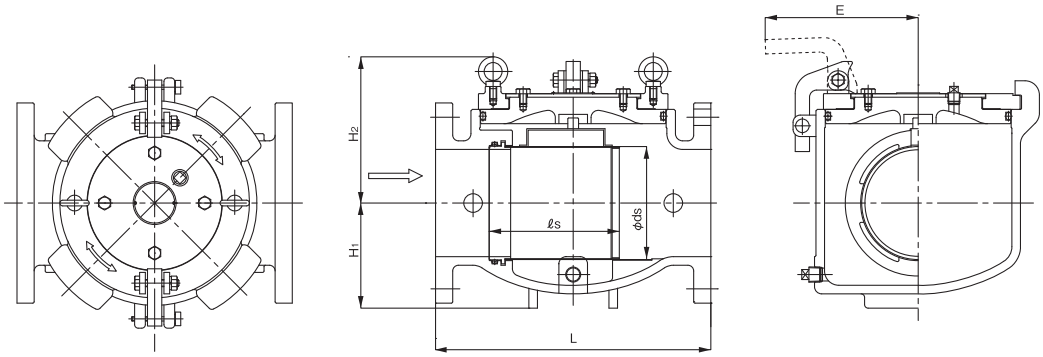
■Specifications

Model		ST-10
Nominal size		125-250A *1
Application		Cold and hot water, Oil (Kerosene, Heavy oils A and B), Other non-dangerous fluids
Maximum working pressure		1.0 MPa
maximum temperature		80℃
Connection		JIS 10K FF flanged
Installation posture		Horizontal or vertical installation *2
Material	Body	Ductile cast iron
	Screen	Stainless steel
Screen	Perforation	φ8-10P
	Mesh	Standard 60 mesh *3
Rust proof		Electrodeposition coating

Available with 20 to 150 mesh screen. Please contact us for 150 mesh or more.
*1 Available with davit for 250A.
*2 If fluid flows from bottom to top, it is necessary to install devices such as blow valve. See details in “Piping Example” on P.4-49.
*3 Available with 20, 40, 80 and 100 mesh.

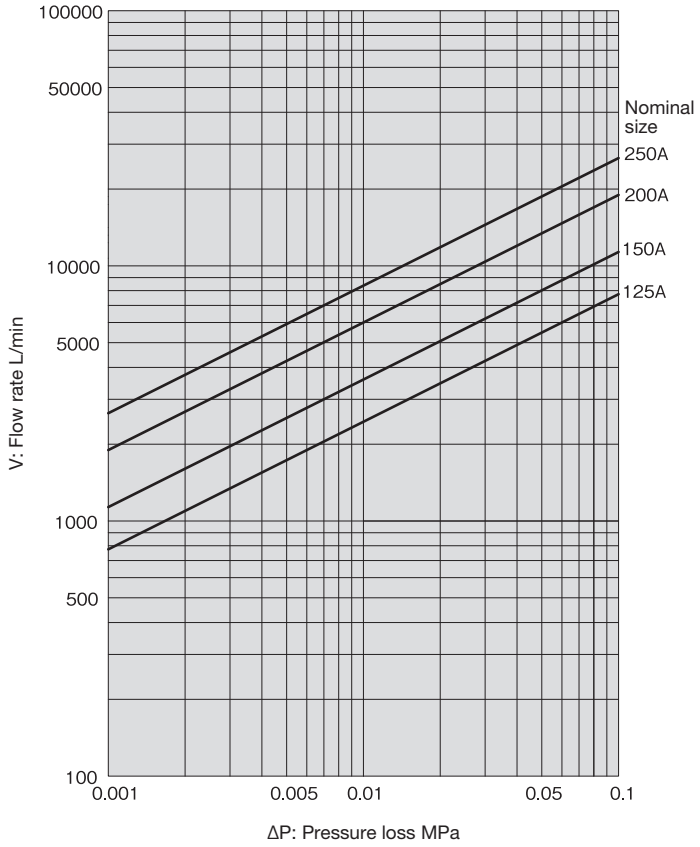
■Dimensions (mm) and Weights (kg)

Nominal size	L	H_1	H_2	Screen		Plug	Plug	Weight
				ds	Ls			
125A	335	132	179.5	133	154.5	R 1/2	R 3/8	42
150A	385	147	198	158	182	R 1/2	R 3/8	60
200A	470	175	233	208	228	R 1/2	R 3/8	100
250A	550	215	264	258	278	R 1/2	R 3/8	156



■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ8-10P, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

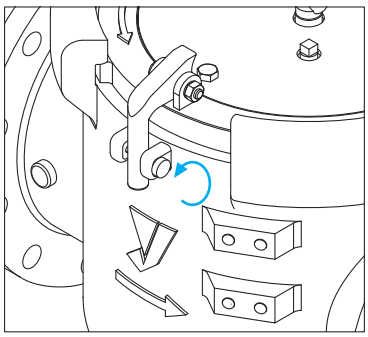
Straight Strainer

How to Detach/Clean the Screen

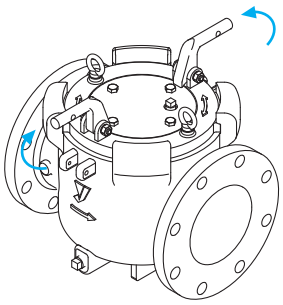
⚠Warning Completely discharge the pressure inside of the product, piping and equipment prior to detaching the screen.

4 Strainer

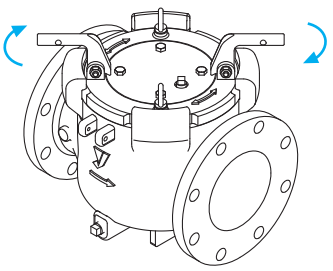
(1) Remove the thumbscrew.



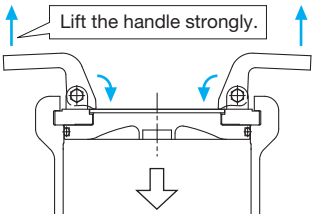
(2) Lift the handles.



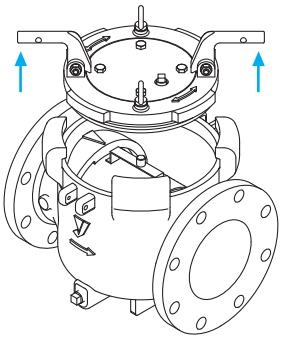
(3) Rotate the stopper ring by 45°. *1



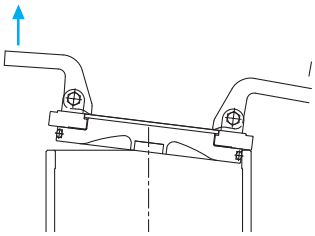
*1 If the stopper ring is not turned smoothly, lift the handle strongly. The cover is pushed down and the stopper ring can be turned smoothly.



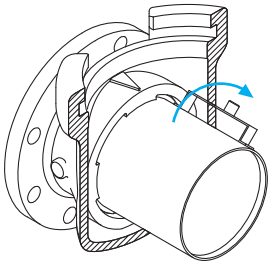
(4) Detach the cover. *2



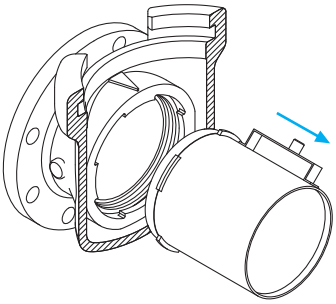
*2 To remove the cover, do not lift the both handles at the same time but lift them one by one. This will reduce the resistance of the O-ring and facilitate removal of the cover.



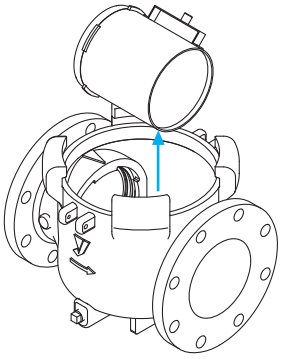
(5) Rotate the screen by 45°



(6) Pull out the screen.

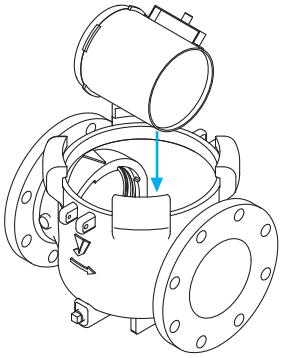


(7) Detach the screen.
Clean the screen using compressed air or a detergent.

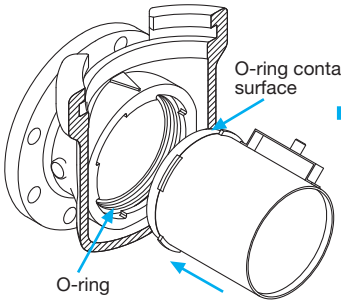


Assembly

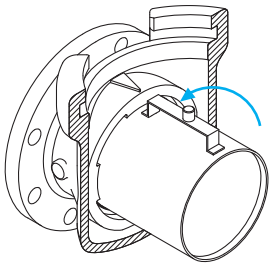
(1) Put the screen into the body.



(2) Insert the tabs of the screen between the grooves on the body. At this time, apply grease to the O-ring or its contact surface.

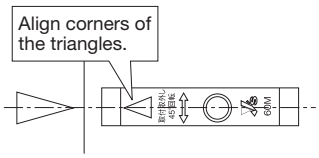


(3) Rotate the screen by 45°. *3

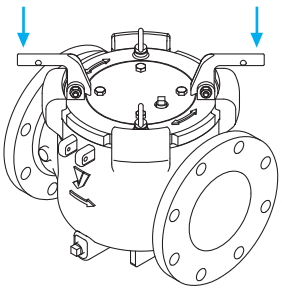


⚠ Caution

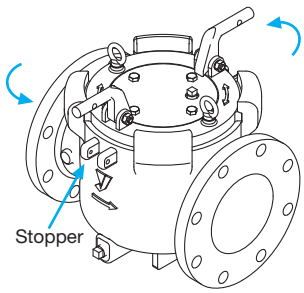
*3 Rotate the screen until the top (left) corner of the triangle embossed on the body is aligned with the top (right) corner of the triangle printed on the screen handle.
If these triangles are not aligned with each other, the screen may come off during use.



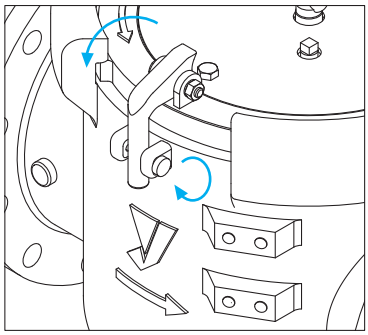
(4) Install the cover to the body.
Push in the cover strongly until the stopper ring tab comes in contact with the body.
At this time, apply grease to the O-ring or its contact surface.



(5) Rotate the stopper ring until each handle reaches the stopper.



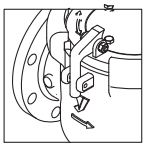
(6) Lower each of the handles between the stopper and install the thumbscrew. *4



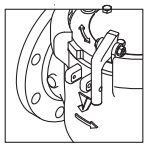
⚠ Warning

*4 Before using the product, make sure to lower each of the handles between the stopper and install the thumbscrew.
It is very dangerous to use the product in the following conditions.
Failure to follow this notice may cause the cover to come off.

NG The handle is not engaged with the stopper by the thumbscrew.



NG The handle is not between the stopper.



■Piping Example

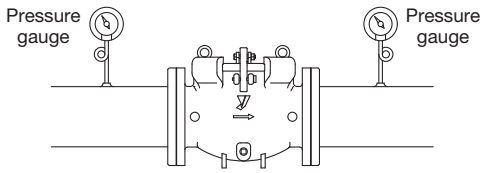


Fig. 1

1. Clogging condition inside the product can be known from the differential pressure measured when pressure gauges are installed before and after the product (see Fig. 1).
2. If fluid flows from bottom to top, install a blow valve in order to remove scale accumulated at the bottom of riser pipe (see Fig. 2).

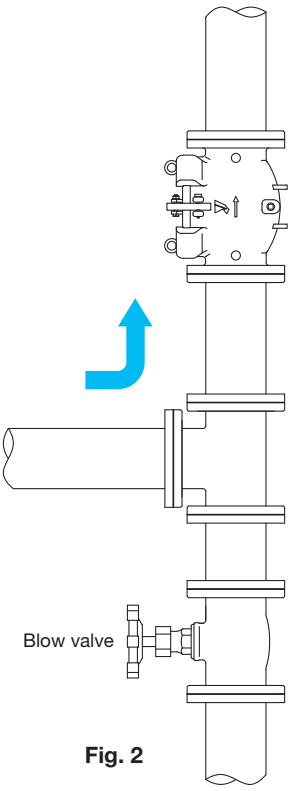
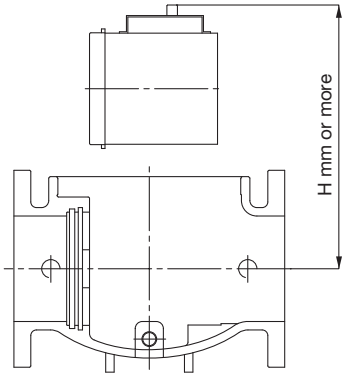


Fig. 2

■Precaution for Installation



Nominal size	H
125A	330
150A	380
200A	470
250A	560

SU-20H

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

■Features

1. The largest possible filtration area in view of flow rate decrease caused by clogging.
2. Equipped with eyebolts and anchoring leg for safety on installation.

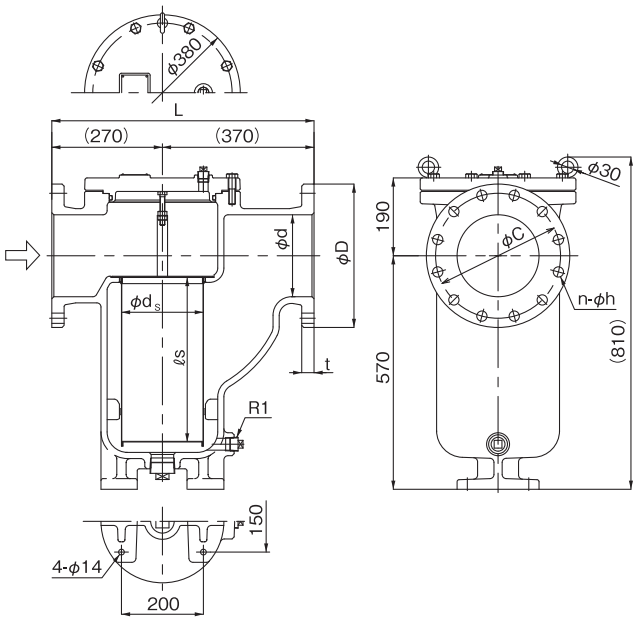
■Specifications

Nominal size		200A	
Application		Cold and hot water, Oil	
Maximum working pressure		1.0 MPa	2.0 MPa
Maximum temperature		80℃	
Material	Body	Ductile cast iron	
	Screen	Stainless steel	
Screen	Perforation	ϕ 6-1.42 holes/cm^2	
	Mesh	Standard 60 mesh	
Connection		JIS 10K FF flanged	JIS 20K RF flanged

· Available with 20 to 100 mesh or only with perforation (when only with perforation, perforation of ϕ2.5-7.21 holes/cm^2 is used).

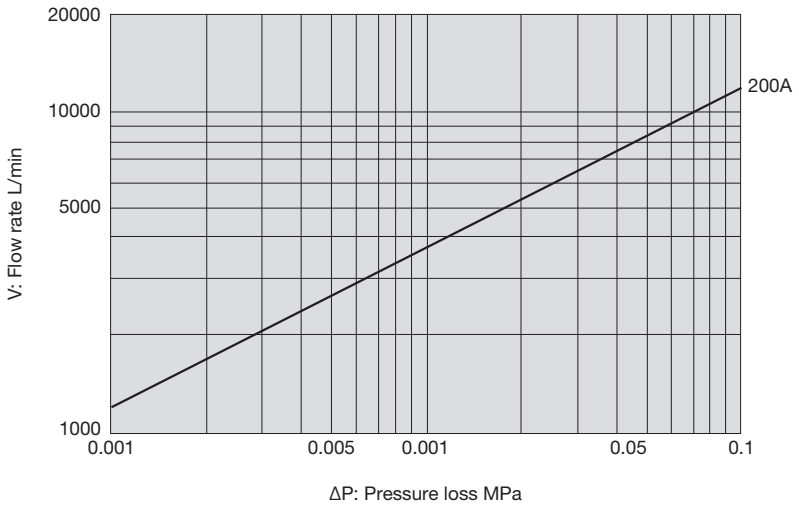
■Dimensions (mm) and Weights (kg)

Connection flange	d	D	C	n-h	L	Screen		Weight
						ds	ℓs	
JIS 10KFF	200	330	290	12-23	640	200	400	167
JIS 20KRF	200	350	305	12-25	640	200	400	170



■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6-1.42 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SU-12

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

■Features

1. Body material is cast carbon steel. Corresponds to JIS 10·16·20K RF flange and ANSI 150, 300lbRF flange.
2. Screen standard is 60 mesh.

■Specifications

Model		SU-12-10	SU-12-16	SU-12-20	SU-12-150	SU-12-300
Application		Cold and hot water, Oil, Other non-dangerous fluids				
Nominal size		20A-150A				
Maximum pressure		1.0 MPa	1.6 MPa	2.0 MPa	1.0 MPa	2.0 MPa
Maximum temperature		260℃ *1				
Material	Body	Cast carbon steel				
	Screen	Stainless steel				
Screen	Perforation	ϕ6-1.42 holes/cm^2				
	Mesh	Standard 60 mesh				
Connection		JIS 10K RF flanged	JIS 16K RF flanged	JIS 20K RF flanged	ANSI 150lb RF flanged	ANSI 300lb RF flanged

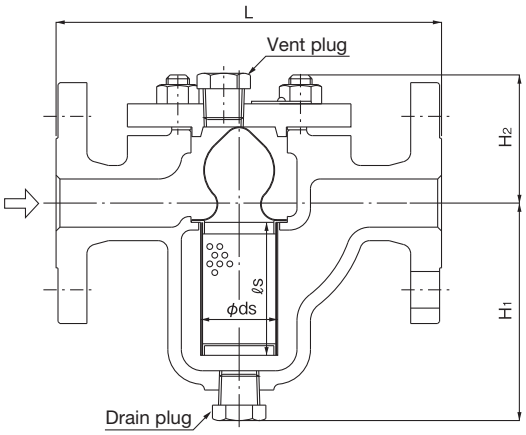
· Available with 20 to 150 mesh screen. Please inquire for over 150 mesh.
* If the temperature is more than 260℃, please contact us.

■Dimensions (mm)

· SU-12-10, SU-12-16, SU-12-20, SU-12-150, SU-12-300

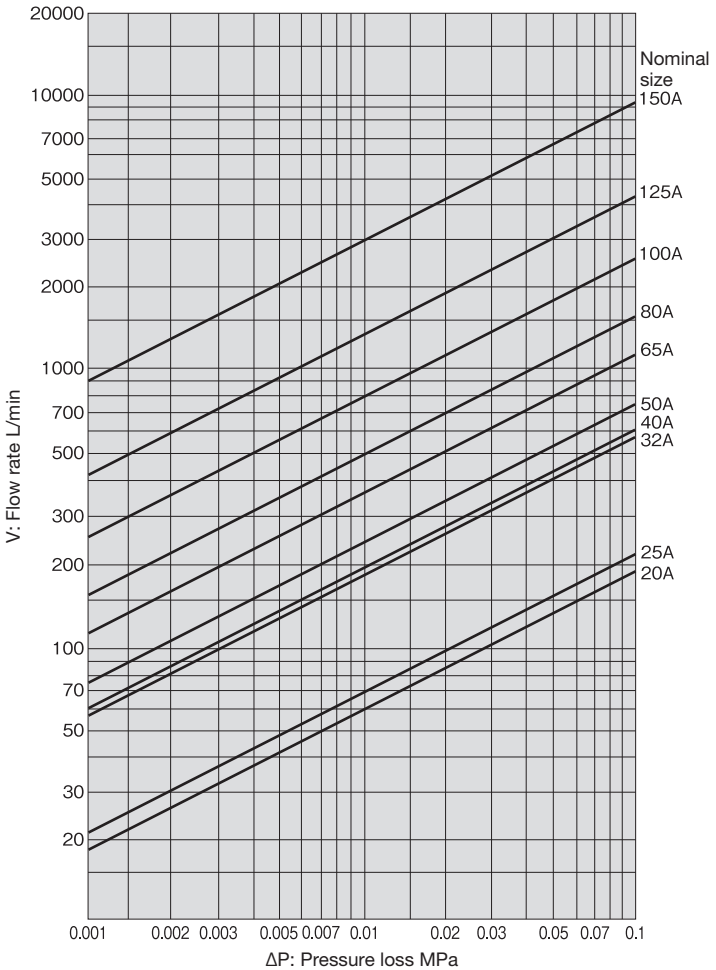
Nominal size	L	H_1	H_2	ds	ℓs	Vent plug	Drain plug
20A	200	115	65	40	70	R 1/2	R 1/2
25A	200(203)	115	65	40	70	R 1/2	R 1/2
32A	250(253)	163	84	64.5	108	R 1/2	R 3/4
40A	250(256)	163	84	64.5	108	R 1/2	R 3/4
50A	250(262)	173	86	64.5	120	R 1/2	R 3/4
65A	290(306)	200	86	77	140	R 1/2	R 1
80A	320(338)	215	105	90	160	R 1/2	R 1
100A	380(396)	282	134	120	210	R 1/2	R 1-1/4
125A	450(468)	360	155	140	270	R 3/4	R 1-1/2
150A	540(558)	400	178	175	300	R 3/4	R 2

* The value in ( ) is dimensions of SU-12-300.



■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6.0-1.42 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SU-6,6SS,6AS

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

■Features

1. Used mainly for cooling water and industrial water for dust prevention.
2. Designed for large-diameter piping and lighter than cast iron strainer.

■Specifications

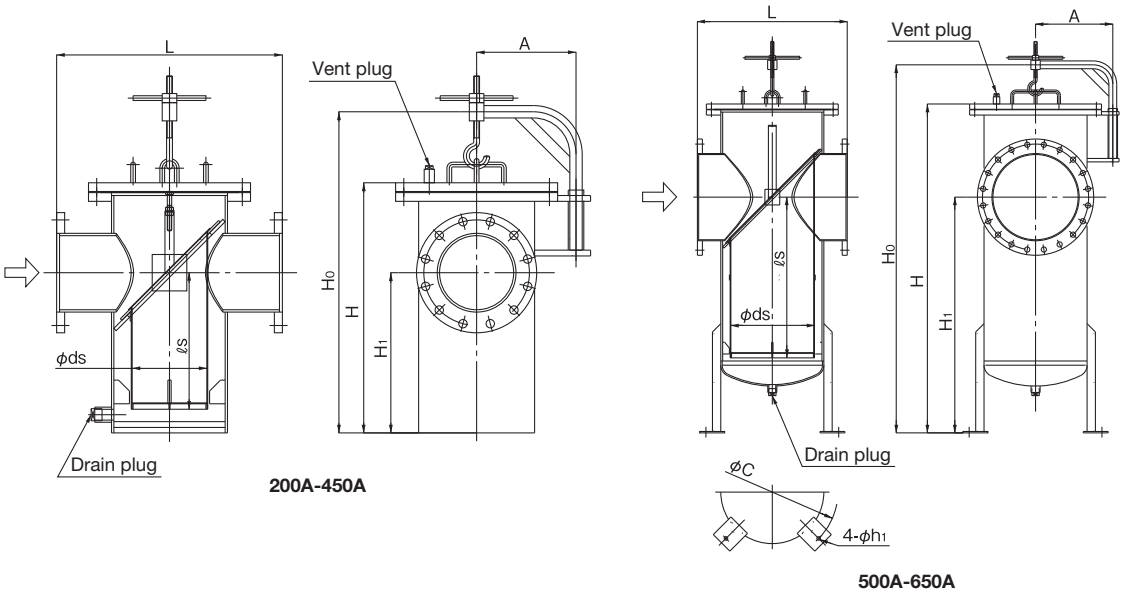
Application		Cold and hot water, Oil, Other non-dangerous fluids
Nominal size		200A-650A
Maximum pressure		1.0 MPa
Maximum temperature		120˚C
Material	Body	Rolled steel for carbon steel piping and general structural rolled steel
	Screen	Stainless steel
Screen	Perforation	ϕ10-0.8 holes/cm^2
	Mesh	Standard 40 mesh
Connection		JIS 10K FF flanged

· Available with 20 to 100 mesh screen.
· Available with rust-proof (hot-dip zinc coating).
· Available with stainless steel wetted parts (SU-6SS).
· Available with all stainless steel made (SU-6AS).

■Dimensions (mm) and Weights (kg)

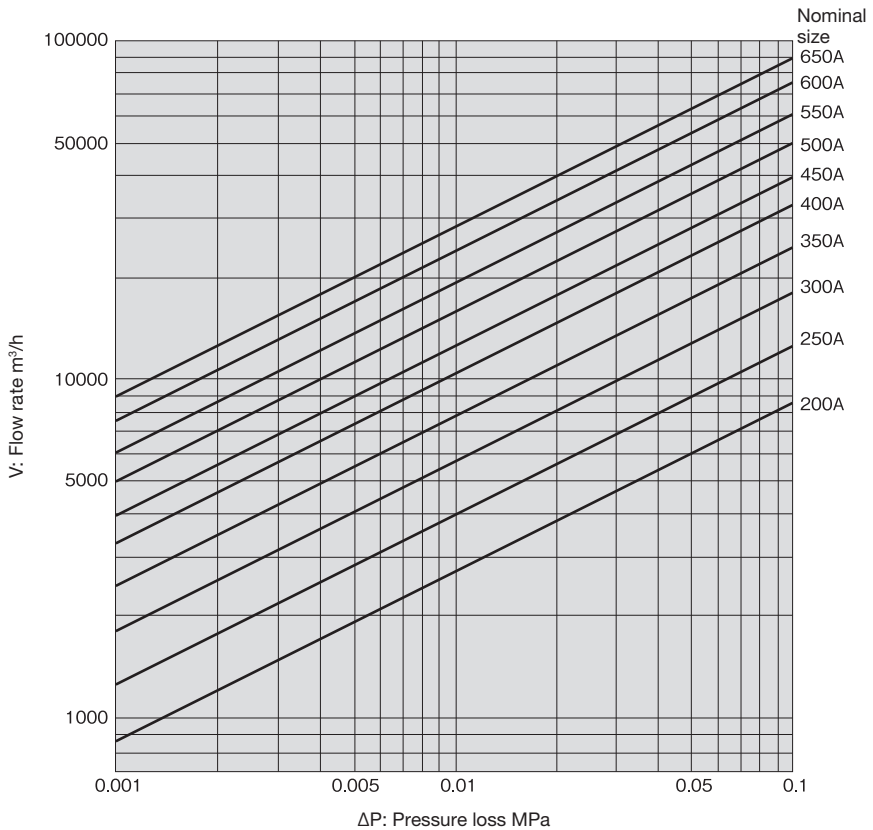
Nominal size	L	A	H_0	H	H_1	C	h_1	ds	ℓs	Drain plug	Vent plug
200A	620	273	882	687	440	–	–	210	375	R 1	R 1/2
250A	660	295	1062	867	570	–	–	240	505	R 1	R 1/2
300A	710	330	1218	1021	670	–	–	290	600	R 1	R 1/2
350A	760	350	1306	1103	710	–	–	340	640	R 1	R 3/4
400A	810	400	1492	1253	810	–	–	390	740	R 1	R 3/4
450A	860	430	1655	1405	910	–	–	440	835	R 1	R 3/4
500A	910	455	2195	1945	1400	800	19	490	930	R 1	R 3/4
550A	960	480	2353	2107	1510	840	23	540	1030	R 1	R 3/4
600A	1010	510	2538	2237	1590	920	27	590	1100	R 1-1/2	R 1
650A	1060	545	2716	2419	1720	970	27	630	1220	R 1-1/2	R 1

* Dimensions H_1 and H_0 are reference values.



■Pressure Loss Chart (For Water)

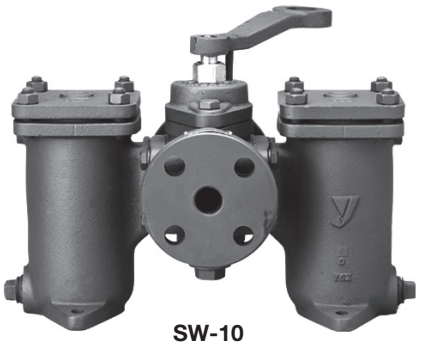
· Screen: Perforation = ϕ 10-0.8 holes/cm^2, Mesh = 40 mesh



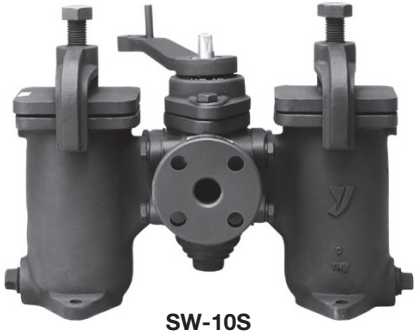
Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SW-10,10S

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



SW-10



SW-10S

■Features

1. Cleanable without stopping the filtrated fluid by switching the left and right units.
2. Cock lifting mechanism (switching by lifting the cock) makes handle operation easy.
3. Since there is no need to install a bypass, piping space can be minimized (SW-10 and SW-10S).
4. Disassembling and cleaning are easy due to a simply structured cover that can be fixed and removed simply by tightening or unfastening a single bolt (SW-10S).

■Specifications

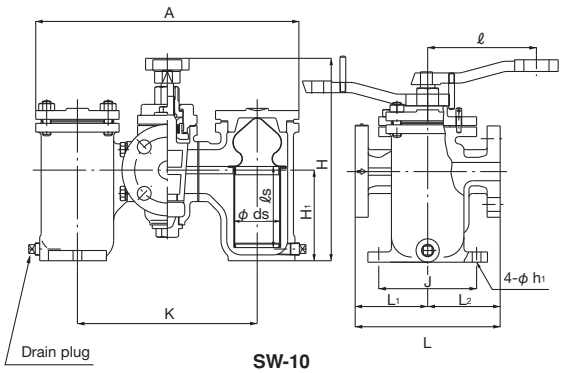
Application		Cold and hot water, Oil, Other non-dangerous fluids
Maximum pressure		1.0 MPa
Maximum temperature		80℃
Material	Body	Ductile cast iron
	Cock	Cast bronze
	Screen	Stainless steel
Screen	Perforation	ϕ 6-1.42 holes/cm^2
	Mesh	Standard 60 mesh
Connection		JIS 10K FF flanged

· Available with stainless steel (SCS13) made.
· Available with 20 to 150 mesh screen. Please contact us of over 150 mesh.
· There may be some acceptable range of leakage since the cock is metal seal.
· When switching the cock, the scale and foreign material from the gap between the cock and body may flow to the outlet side.

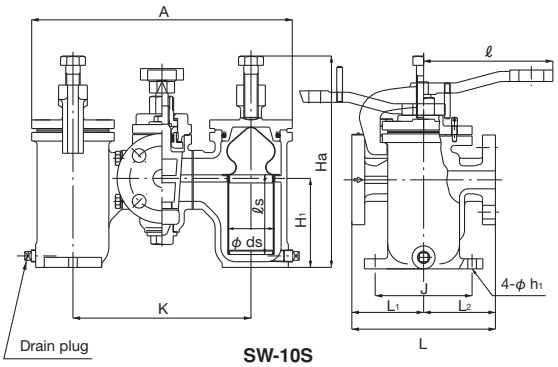
■Dimensions (mm) and Weights (kg)

Nominal size	L	L_1	L_2	H_1	H	Ha	A	R	ds	ℓs	Anchor space			Drain plug	Weight	
											J	K	h_1		SW-10	SW-10S
20A	200	100	100	126	280	292	363	180	64.5	108	135	248	12	R 1	23.9	26.7
25A	200	100	100	126	280	292	363	180	64.5	108	135	248	12	R 1	25.1	27.9
32A	205	102.5	102.5	126	280	292	363	180	64.5	108	135	248	12	R 1	26.1	28.9
40A	245	122.5	122.5	134	306	316	390	180	64.5	120	135	275	12	R 1	34.0	36.8
50A	245	122.5	122.5	134	306	316	390	180	64.5	120	135	275	12	R 1	35.9	38.7
65A	285	130	155	155	356	345	450	240	77	140	160	311	15	R 1	52.5	54.6
80A	285	130	155	155	356	345	450	240	77	140	160	311	15	R 1	53.0	55.1
100A	385	175	210	230	482	509	644	340	120	210	225	430	19	R 1	117.0	124.3

· Dimensions H_1, H, K, and A are reference values.
· The values of H_1 and H are different from those of stainless steel made.



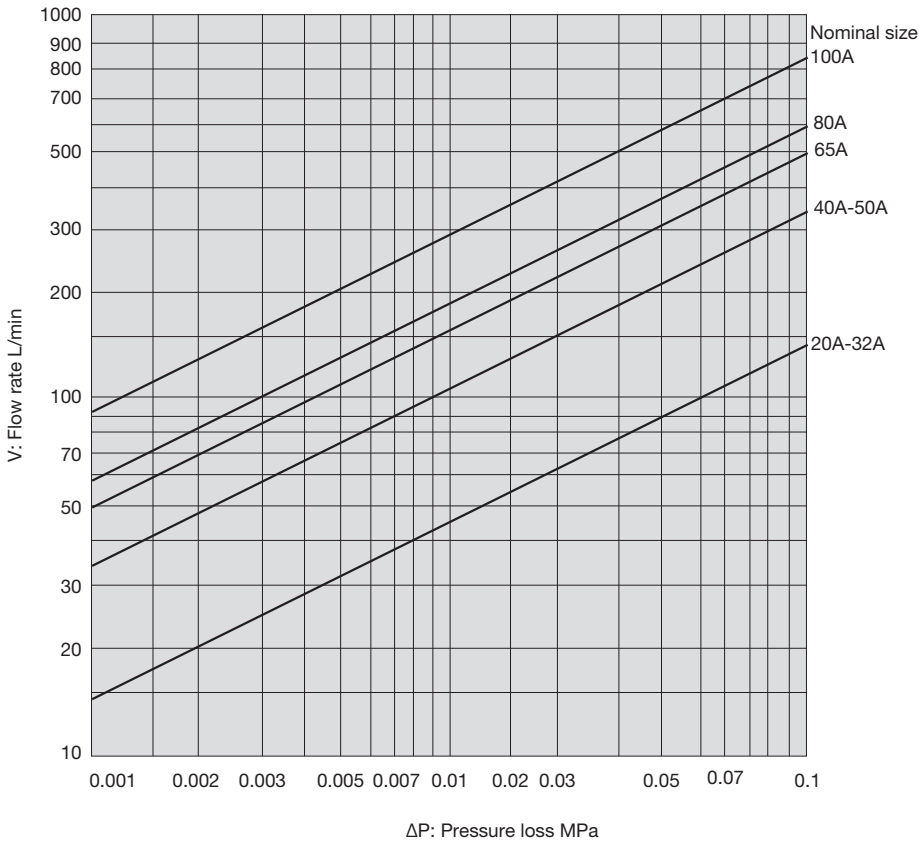
SW-10



SW-10S

■Pressure Loss Chart (For Water)

· Screen: Perforation = ϕ 6-1.42 holes/cm^2, Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

SU-55F

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit

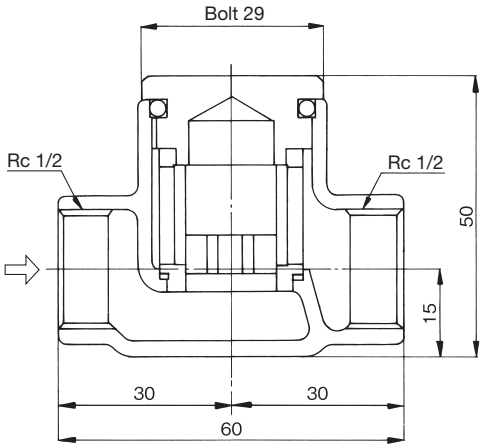
■Features

1. Adopts a vertical structure. Cap can be removed easily since the cap sealing is O-ring, and it makes the screen cleaning easy.
2. Bronze body has no worry for rusty water.

■Specifications

Application		Cold and hot water
Maximum pressure		1.2 MPa
Maximum temperature		60˚C
Material	Body	Bronze
	O ring	FKM (Viton)
Screen	Screen	Stainless steel
	Mesh	60 mesh
Connection		JIS Rc screwed

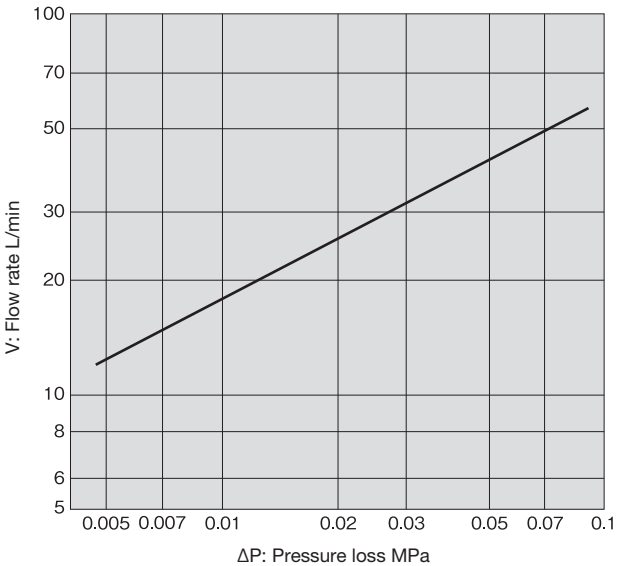
■Dimensions (mm) and Weights (kg)



· Weights: 0.3kg

■Pressure Loss Chart (For Water)

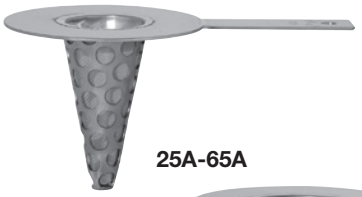
· Screen: Mesh = 60 mesh



Please refer to P.4-12 for the information about how to look the chart, and calculating example.

ST-1

Y type	Basket	Duplex	Temporary
Stainless steel	Nylon	Carbon steel	Easy plug
Pipe end core	One-touch	With fine mesh	Davit



25A-65A

80A-300A

■Features

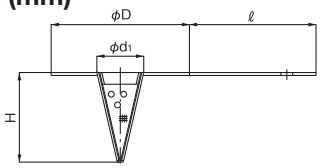
1. Used for flushing at the time of start-up.
2. Simple strainer which can be attached between flanges of short pipe.

■Specifications

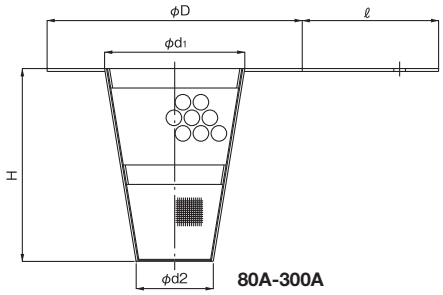
Model		ST-1-10	ST-1-20	ST-1-30	ST-1-40
Application		Steam, Air, Cold and hot water, Other non-dangerous fluids			
Maximum pressure		1.0 MPa	2.0 MPa	3.0 MPa	4.0 MPa
Maximum temperature		220˚C			
Material		Stainless steel			
Screen	Perforation	ϕ 8-0.954 holes/cm^2			
	Mesh	Standard 80 mesh			
Connection		JIS 10K flanged	JIS 20K flanged	JIS 30K flanged	JIS 40K flanged

· Available with 20 to 250 mesh screen.

■Demensions (mm)



25A-65A



80A-300A

* Structure of 150 mesh or more and high pressure products are different.

Nominal size	d1	d2	H	ℓ	D			
					ST-1-10	ST-1-20	ST-1-30	ST-1-40
25A	24	—	46	65	71	71	76	76
32A	30	—	55	65	81	81	85	85
40A	38	—	73	65	86	86	97	97
50A	48	—	93	65	101	101	111	111
65A	60	—	118	65	121	121	137	137
80A	72	36	110	70	131	137	147	147
100A	95	48	135	70	156	162	170	180
125A	118	60	165	70	187	200	205	223
150A	142	72	195	85	217	235	248	262
200A	188	95	250	85	267	280	293	312
250A	235	119	330	85	330	353	357	377
300A	280	141	395	85	375	403	417	431

Strainer – Annex

Disassembly, cleaning and assembly

Strainer

⚠CAUTION Please refer to the manual attached to the product for procedures for installation and operation.

For strainer, when clogged too much by scale etc, fluid passing area decreases, and fluid does not flow smoothly. Also, it leads to screen damage and make harmful influence on piping system. Be sure to clean periodically.

■Y Type Strainer

Disassembly and Cleaning

After checking there is no pressure inside strainer, remove cap and screen, then clean the strainer by compressed air or detergent.

Assembly

Clean gasket contact surface of the body and cap, and install new gasket to cap. Finally, set screen to ditch of cap, and install it to the body (10 to 80A).
For more than 100A, set screen inside the body at first, then install cap to the body.

■U Type Strainer

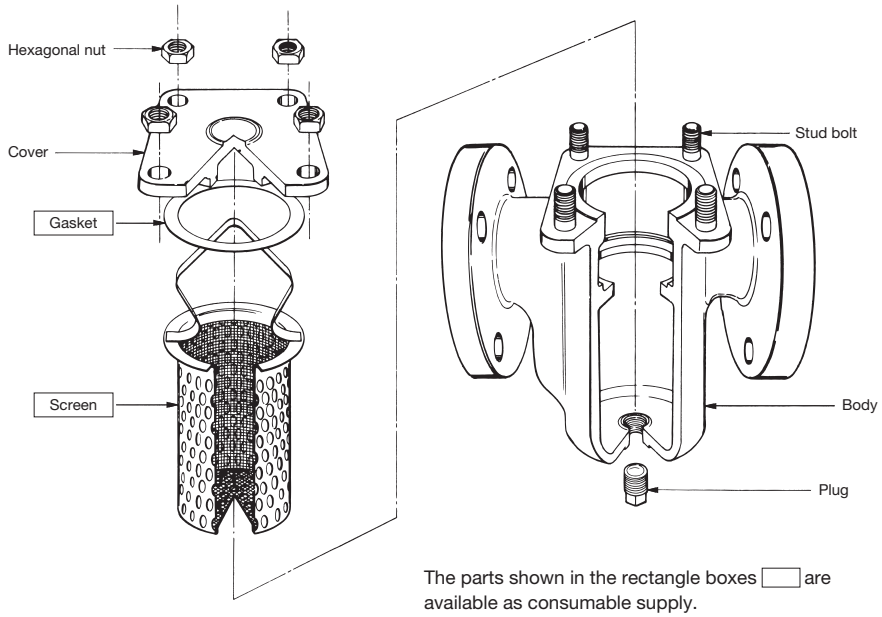
Disassembly and Cleaning

After checking there is no pressure inside strainer, hexagonal nut or hexagonal bolt, and remove cover and screen, then clean the strainer by compressed air or detergent.

Assembly

Clean gasket (O ring) contact surface of the body and cap, and set gasket (O ring) to cover. Then, set cleaned screen to inside strainer, and install cover and tighten hexagonal nut (hexagonal bolt).
* Bracket ( ) refers to one touch type.

SU-20 Exploded view



The parts shown in the rectangle boxes ☐ are available as consumable supply.

⚠CAUTION **Please refer to the manual attached to the product for procedures for installation and operation.**

■W Type Strainer

Disassembly and Cleaning

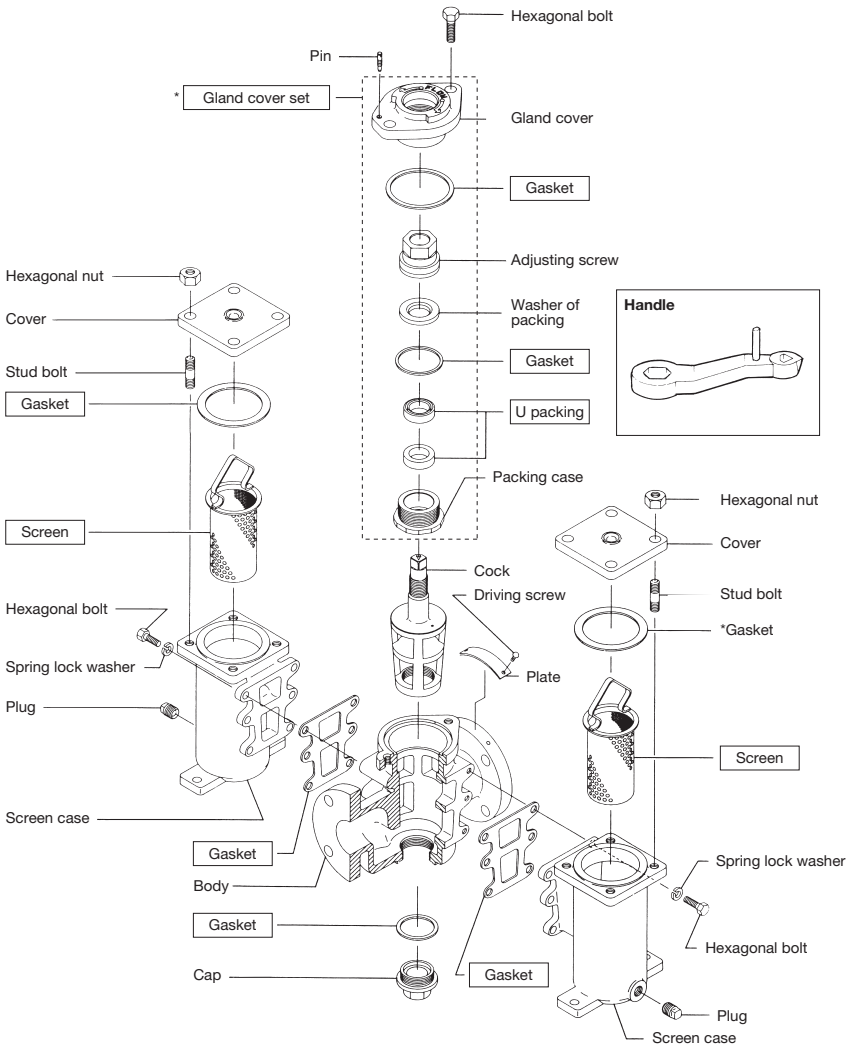
For cleaning either left or right strainer, after checking arrow showing fluid flow, remove cover and closed side, then remove screen and clean the strainer by compressed air or detergent.

Assembly

Clean screen case and gasket (O ring) contact surface of cover, and set gasket (O ring) to cover.
Then, set cleaned screen into screen case, and install cover and tighten hexagonal nut (hexagonal bolt).
* Bracket ( ) refers to one touch type.

* For replacement of cock, replace with body assembly including set of body and cock (do not replace cock only).

SW-10 Exploded view



The parts shown in the rectangle boxes ☐ are available as consumable supply.
* Gland cover set is available as set parts. As each part, gasket and U packing only.

⚠CAUTION Please refer to the manual attached to the product for procedures for installation and operation.

■Straight Type Strainer

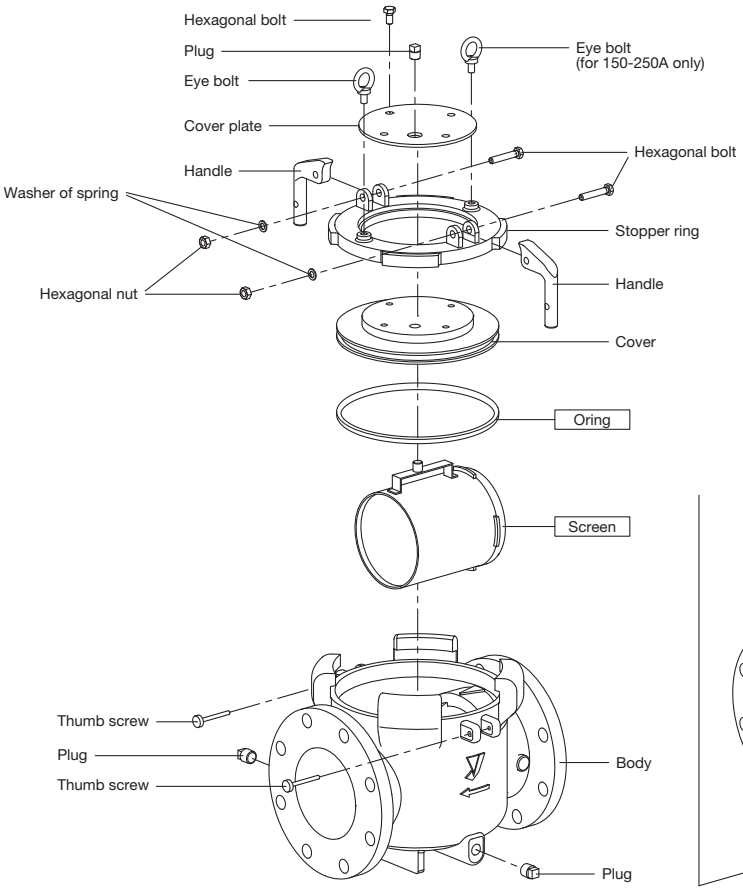
Disassembly and Cleaning

Clean screen periodically. For disassembly and cleaning procedure, follow P.4-47.

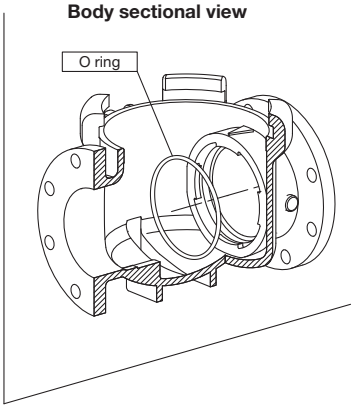
Assembly

For assembly procedure, follow P.4-48.

ST-10 Exploded view



Body sectional view



The parts shown in the rectangle boxes ☐ are available as consumable supply.

⚠CAUTION Please refer to the manual attached to the product for procedures for installation and operation.

■Screen Table (Y type strainer)

Model	Nominal size																
	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	250A	300A	350-450A	500-600A
SY-5	*80 mesh (φ2.5-7.21 hole/cm²)																
	20-100 mesh (φ2.5-7.21 hole/cm²)																
SY-6 SY-9		*60 mesh (φ2.5-7.21 hole/cm²)															
		20-100 mesh (φ2.5-7.21 hole/cm²)															
SY-17		*80 mesh (φ2.5-7.21 hole/cm²)															
		20-100 mesh (φ2.5-7.21 hole/cm²)															
SY-37		120-200 mesh (φ2.5-7.21 hole/cm²)															
SY-40 SY-40H		*80 mesh (φ2.5-7.21 hole/cm²)															
		20-100 mesh (φ2.5-7.21 hole/cm²)															
SY-2													*1				
													*2				
SY-24		*60 mesh (φ2.5-7.21 hole/cm²)															
		20-100 mesh (φ2.5-7.21 hole/cm²)															
SY-8		*80 mesh (φ2.5-7.21 hole/cm²)									*80 mesh (6-2.05 hole/cm²)						
		20-100 mesh (φ2.5-7.21 hole/cm²)									20-100 mesh (φ6-2.05 hole/cm²)						
SY-38		120-200 mesh (φ2.5-7.21 hole/cm²)									120-200 mesh (φ6-1.80 hole/cm²)						
SY-10		*80 mesh (φ6-1.80 hole/cm²)															
		20-100 mesh (φ6-1.80 hole/cm²)															
SY-13													*80 mesh (φ6-1.80 hole/cm²)				
													20-100 mesh (φ6-1.80 hole/cm²)				
SY-20		*80 mesh (φ6-1.80 hole/cm²)															
		20-80 mesh															

* Mark indicates standard screen. *1: *80 mesh (φ2.5-7.21 hole/cm²) *2: 20-100 mesh (φ2.5-7.21 hole/cm²)

■Screen Table (U type, W type strainer)

Model	Nominal size											
	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200-450A	500-650A
SU-20·20S SU-10·10S	*60 mesh (φ6-1.42 hole/cm²)											
	20-150 mesh (φ6-1.42 hole/cm²)											
SU-12	*60 mesh (φ6-1.42 hole/cm²)											
	20-150 mesh (φ6-1.42 hole/cm²)											
SU-50·50H SU-50S					*60 mesh (φ6-1.42 hole/cm²) (not 125A)							
					20-150 mesh (φ6-1.42 hole/cm²) (not 125A)							
SU-6											*40 mesh (φ10-0.80 hole/cm²)	
											20-100 mesh (φ10-0.80 hole/cm²)	
SW-10 SW-10S	*60 mesh (φ6-1.42 hole/cm²)											
	20-150 mesh (φ6-1.42 hole/cm²)											

* Mark indicates standard screen.

■Screen Table (Temporary strainer)

Model	Nominal size											
	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	250A	300A
ST-1-10	*80 mesh (φ8-0.954 hole/cm²)											
	20-120 mesh (φ8-0.954 hole/cm²)											
	150-250 mesh (φ8-0.954 hole/cm², 30 mesh reinforcement included)											
ST-1-20 ST-1-30 ST-1-40	*80 mesh (φ8-0.954 hole/cm²)					*80 mesh (outer perforation φ8-0.954 hole/cm², inner perforation φ10-0.739 hole/cm²)						
	20-120 mesh (φ8-0.954 hole/cm²)					20-120 mesh (outer perforation φ8-0.954 hole/cm², inner perforation φ10-0.739 hole/cm²)						
	150-250 mesh (φ8-0.954 hole/cm², 30 mesh reinforcement included)					150-250 mesh (outer perforation φ8-0.954 hole/cm², inner perforation φ10-0.739 hole/cm², 30 mesh reinforcement included)						

* Mark indicates standard screen.

■Screen Table (Straight type strainer)

Model	Nominal size			
	125A	150A	200A	250A
ST-10	*60 mesh (φ8-10P)			
	20-100 mesh (φ8-10P)			

* Mark indicates standard screen.