

# Product Guide 2020



# MIYAWAKI®

Advanced Solutions for Steam and Condensate Management

# About MIYAWAKI

## Over 85 years Experience, Technology and Quality



The company **MIYAWAKI** has over 85 years history as one of the leading Japanese manufacturers of equipment for steam and condensate lines.

MIYAWAKI has a long experience as the leading supplier of steam traps for oil refineries and chemical plants in Japan. Besides of steam traps the company offers a wide range of pressure reducing valves for steam and other media, steam-water-mixing valves, separators, strainer, sight glasses and other ancillary equipment.

MIYAWAKI offers sophisticated hardware and software solutions for managing the steam trap population in a plant.

As the world leader of the production of bimetallic temperature control steam traps, the most effective steam traps for steam tracing and steam main lines in the sense of energy conservation, MIYAWAKI contributes substantially to the reduction of CO<sub>2</sub> emissions and to the development of a healthy environment.

### Our mission



Kensuke Miyawaki,  
President, member  
of the executive board  
of MIYAWAKI Inc.

**"MIYAWAKI's mission** is to promote the ideas of energy saving and environmental protection, to fulfil the deliveries of its products with a high rate of reliability and to provide a high level of technical support for our products.

Reducing the consumption of energy in the form of steam is an extremely important goal of each modern industrial enterprise. Steam Traps are able to play an important role in this process, because by improving the management of the steam and condensate system and by regular professional steam trap surveys, up to 40% of the steam losses can be reduced which are not caused by the manufacturing process.

We have every confidence that the high quality of MIYAWAKI products will enable our customers to save energy and to meet their production goals."

### Our history

**MIYAWAKI opened its doors** in 1933 and began designing steam traps for industrial use. In 1949, after extensive experiments and tests, MIYAWAKI developed an entirely new type of steam trap, with a "Duplex"-type valve, a double-ported valve operating by the pressure differential to increase the condensate capacity.

In the following years, the design was further refined and sales soared to the point where by 1953 the company MIYAWAKI Steam Trap Manufacturing Co., Ltd. was able to incorporate. Along with the development and sales of products other than steam traps, the name changed to MIYAWAKI Inc. in April 1986.

To emphasize the growing international activities of MIYAWAKI Inc., in June 1991 the subsidiary company MIYAWAKI GmbH was established in Germany. Later a joint venture in Russia had been opened. In April 2018, the subsidiary company MIYAWAKI WEST Co., Ltd was established in China. During the last decade the network of sales representatives around the world was enlarged considerably.



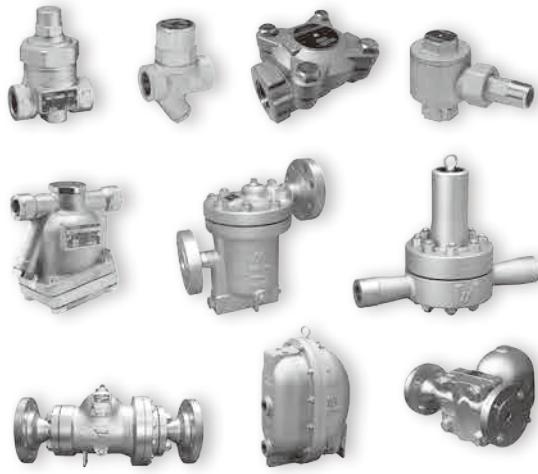
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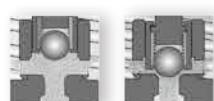
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In the interest of the development and improvement of our products, MIYAWAKI Inc. reserves the right to change the specification of the products.

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# Quality, Performance and Challenges to energy saving

Since 1933, MIYAWAKI has committed itself to a policy of **uncompromising quality, performance and challenges to energy conservation.**

Research and development has a high priority at MIYAWAKI. To meet industry's demands and to ensure quality, MIYAWAKI invests heavily in the best personnel, facilities, manufacturing techniques and quality control systems available today.

This policy of „**Technology First**“ has resulted in major advances in steam trap design and operation.

As a result of the certification MIYAWAKI can assure all our customers of its continuing policy of high quality standards and of the fact that all products are manufactured in accordance with international regulations and technical requirements.

## ISO 9001



## ISO 14001



## European Directive 2014/68/EU



## AD 2000-W0



## Certificate of Conformity Russia



# Pressure Equipment Directive 2014/68/EU of the European Parliament and of the Council



In the course of the harmonization of the laws of the EU Member States concerning pressure equipment, the Pressure Equipment Directive 97/23/EC (PED) had been adopted in May 1997. The Directive came into effect on 30 May 2002. Considering the experience and changes during the implementation of the Directive 97/23/EC, the European Union published on June 27, 2014 the new Pressure Equipment Directive 2014/68/EU. The new Directive entered into force on July 19, 2016.

According to the PED all manufacturers of pressure equipment covered by the PED, are under the obligation to subject each item of equipment to one of the conformity assessment procedures described in the PED. The conformity assessment procedures to be applied to an item of pressure equipment with a view to

affixing the CE marking shall be determined by the category, in which the equipment is classified. In this connection it is necessary to take into consideration the statement of the PED, that pressure equipment which is subject to Article 4, Section 3 of the PED "...shall be designed and manufactured in accordance with the sound engineering practice of a Member State in order to ensure safe use. ... Such equipment ... shall not bear the CE marking referred to in Article 18" of the PED.

In cooperation with TÜV Rheinland Industrie Service GmbH MIYAWAKI Inc., Osaka, Japan examined all products with respect to the PED and certified its production process in accordance with Modul A2 of the PED (internal manufacturing checks with monitoring of the final assessment).

## As a result of this certification process MIYAWAKI Inc. draws the following conclusions:

1. The following MIYAWAKI products are classified according to Article 4, Section 3 of the PED which does not allow to bear the CE marking:

### **Steam Traps:**

TB1N, TBC2, TBC2B, TB7N, TB9N, TB51, TB52, TBH71, TBH72, TBH81, TBH82, W, DC1, DC2, DV1, DL1, DX1, DF1, S31N, SC31, SC, SF, SV, SL, SU2N, SU2H, SD1, S55N, S55H, S61N, S62N, ER105, ER110, ER116, ES5, ESU5, ES8N, ES10, ES12N, ESH8N, G11N, G12N, G3N-10R (to DN65), G3N-16R (to DN50), G2, GC1, GC20, G20N

### **Steam Pressure Reducing Valves:** RE1, RE2, RE3, REC1, RE10N

### **Steam-Water-Mixing Valve:** MX1N

All above MIYAWAKI products are designed and manufactured in accordance with the sound engineering practice as requested by the PED.

2. Steam traps not included into point 1 belong to category I or category II according to Annex II & III of the PED. They will bear the CE marking and the conformity with the PED will be confirmed by issuing a declaration of conformity.



As a result of the certification by TÜV Rheinland Industrie Service GmbH MIYAWAKI can assure all our customers of its continuing policy of high quality standards and of the fact, that all products are manufactured in accordance with the regulations and technical requirements of the EU.

		First Choice	Second Choice
<b>Steam Mains</b>	< 1,6 MPa	<b>TB9N</b>	<b>GC1, D, S, ES</b>
	< 2,1 MPa	<b>TB7N</b>	<b>GC1, S</b>
	< 6,4 MPa	<b>TB51, TB52</b>	<b>S61N, S62N, ESH</b>
	< 20,0 MPa	<b>TBH71, 72, 81, 82</b>	
<b>Process Equipment</b>	Heater	<b>G, ES, ER</b>	<b>S</b>
	Heat Exchanger	<b>G</b>	<b>ES, ER</b>
	Vaporizer	<b>G</b>	<b>ES, S</b>
	Distiller	<b>D</b>	<b>ES, S</b>
	Sterilizer	<b>D</b>	<b>ES, G, S</b>
	Cylinder Dryer	<b>ES, ER</b>	
	Band Dryer	<b>G</b>	<b>ES, ER, D</b>
	Multi-Platen Presses	<b>G</b>	<b>ES, D, S</b>
	Vulcanizer	<b>D</b>	<b>S, ES</b>
	Tyre Presses	<b>D</b>	<b>S, ES</b>
<b>Laundry Equipment</b>	Autoclaves	<b>D</b>	<b>G, ES</b>
	Dryer	<b>G</b>	<b>ES, D, S</b>
	Tumbler	<b>ES, ER</b>	<b>D, S</b>
	Presses	<b>D</b>	<b>S, ES</b>
	Steam Mannequins	<b>D</b>	<b>ES, S</b>
	Steam Iron	<b>SL3</b>	<b>SD1</b>
<b>Food Processing Equipment</b>	Steam Mangles	<b>D, G</b>	<b>ES, S</b>
	Process Boiling Pans	<b>G</b>	<b>ES, D</b>
	Hot Tables	<b>D, G</b>	<b>ES</b>
	Jacketed Boiling Pans	<b>D</b>	<b>G, ES, S</b>
	Tilting Pans	<b>ES</b>	<b>D</b>
	Brewing Pans	<b>G</b>	<b>ES, D</b>
	Evaporator	<b>G</b>	<b>ES, ER</b>
<b>Heating &amp; Air Conditioning</b>	Retorts	<b>G</b>	<b>ES, ER</b>
	Steam Radiator	<b>W</b>	<b>D</b>
	Unit Heaters	<b>G</b>	<b>ES</b>
	Convector	<b>W</b>	<b>D, ES</b>
	Radiant Panels	<b>W</b>	<b>D, ES</b>
	Air Heater	<b>D</b>	<b>ES, G</b>
	Air Humidifiers	<b>ES, G</b>	<b>D, S</b>
	Heating Coils	<b>D, ES</b>	<b>G, S</b>
	Air Conditioning Units	<b>ES, G</b>	<b>D</b>
<b>Tracing</b>	Calorifiers	<b>G, ES</b>	<b>D</b>
	Steam Tracer Lines	<b>TB</b>	<b>D</b>
	Tank Heating	<b>TB</b>	<b>D, ES, S</b>
	Copper Tracing (Instrument Tracing)	<b>TB1N</b>	<b>DC1</b>

# Temperature Control Steam Traps

## SERIES TB

**Temperature Control Steam Traps** are bimetallic steam traps which do not follow the steam saturation curve. The discharge temperature can be adjusted manually, what allows to adopt these steam traps to a wide range of applications, where optional undercooling is possible and where sensible heat savings and flash steam reduction are desirable. These steam traps are perfectly fitted for reducing the steam consumption at steam main and steam tracing lines thus guaranteeing a high degree of energy savings.

### Models TB7N & TB9N

**TBU4, TBU4B**

**TB1N**

**TB51/52**

**TBH71/72/81/82**

with forged steel body for low and medium pressure applications

with stainless steel body for low pressure tracing

with steel body for low pressure applications

with forged steel body for high pressure applications

with cast steel body for high pressure applications

### Features

- All traps are equipped with the patented valve mechanism SCCV®-System (see pages 88 – 89).
- The SCCV®-System ensures a superior closing performance in the center of the port, greatly reduced wear of the internal parts and extended lifetime of the trap.
- Highly efficient in energy conservation – eliminates virtually 100% of steam loss.
- Continuous discharge of the condensate according to the adjusted temperature – not influenced by inlet pressure changes.
- Inline repairable – easy and quick replacement of the bimetal unit and the seat.
- Readjustment possible while the trap is in operation (for low pressure applications).
- All traps equipped with integral strainer.
- Can be installed both horizontally and vertically.

### Suitable for:

**TB7N**

Steam main lines and tracing lines

**TB9N**

Steam main lines, tracing and small heat exchanger applications with specific condensate undercooling

**TBU4, TB1N**

Steam tracing lines

**TB51/52**

High pressure steam main lines

**TBH71/72/81/82**

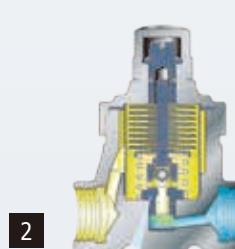
High pressure steam main lines

### Operating principle

 cold condensate     hot condensate



1



2



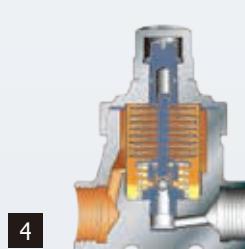
2a



3



3a



4

1) On start-up, the bimetal discs are all flat and the valve shaft is up with the valve fully open. Virtually all cold condensate and air are discharged.

2) As the temperature of the condensate increases, the bimetal discs begin to curve gradually and force the valve shaft and the valve holder to move down.

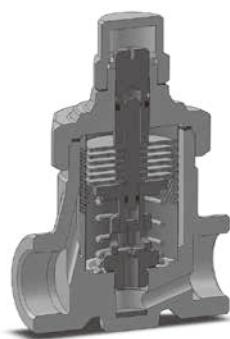
2a) Most of the condensate is still discharged quickly, since the valve and the holes in the fixed guide on the valve seat are still fully open.

3) When condensate with higher temperature (near to set temperature) flows in, the bimetal discs are curved even more and at the same time the valve shaft moves down and the valve holder closes the holes in the guide partially.

3a) The amount of condensate being discharged is reduced quickly. This prolongs the time that the hot condensate stays near the bimetal discs and the heat of the condensate is transferred to the bimetals much more effectively.

4) In case of very low condensate flow, the holes in the guide are closed completely by the valve holder and the valve will close precisely in the center of the seat. Normally, the trap is filled with hot condensate and the operation will rest in the state shown in figure 3. Condensate will be discharged continuously at a stable temperature (very close to the set temperature).

## SERIES TB Bimetal Temperature Control Trap

**TB7N****Available options TB7N**

- with ball valve (TB7BN-C)
- with blow valve (TB7BN-R)
- with scale removal (TB7N-SR)

**Special version TB7N-P**

with maximum operating pressure  
2,7 MPa / 392 psig

Special face-to-face dimensions available.

\* **Curve 1** shows the trap's maximum capacity when discharging cold condensate.

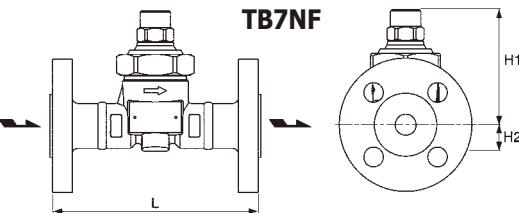
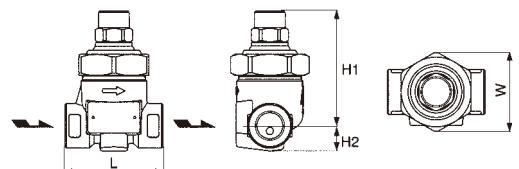
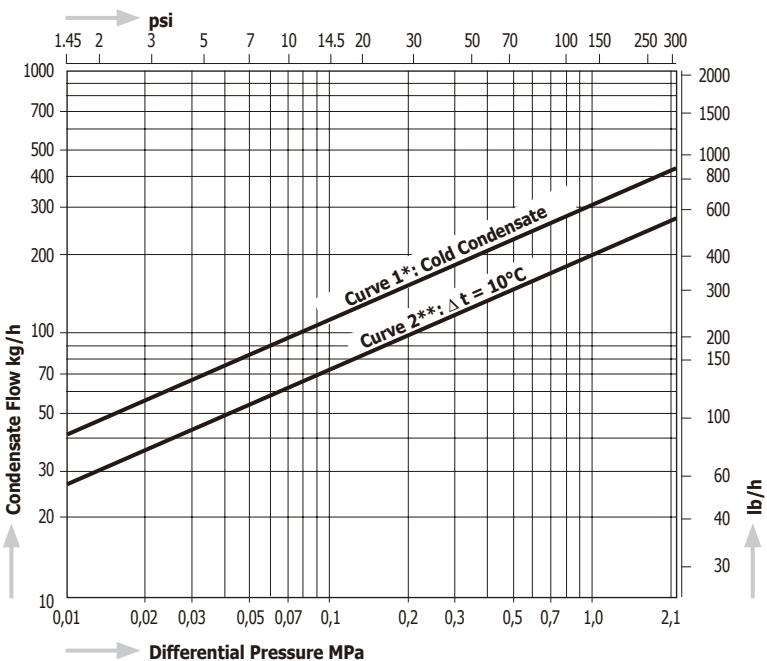
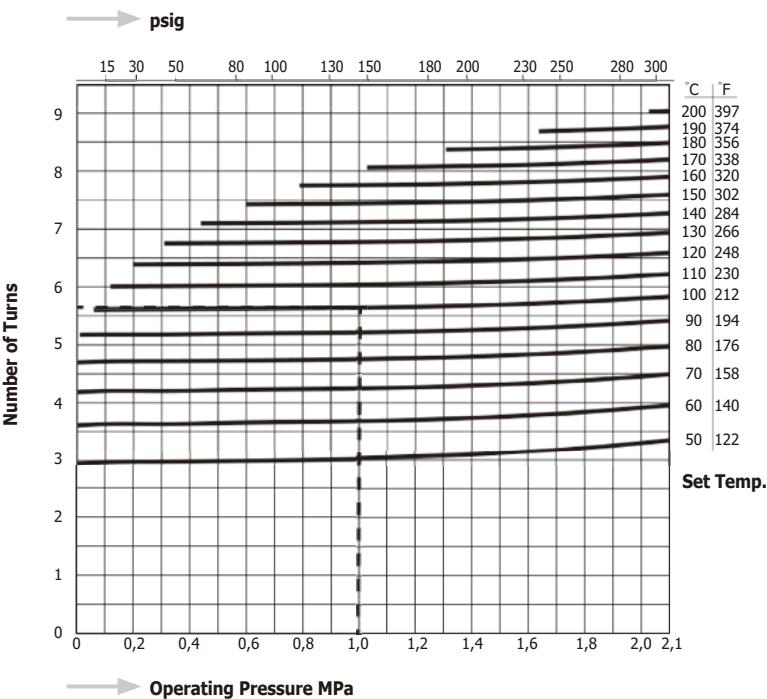
\*\* **Curve 2** shows the trap's maximum capacity when discharging hot condensate at a temperature of 10°C (18°F) below the adjusted temperature of the trap.

**Standard factory setting\*:**

100°C at 1,0 MPa (212°F at 145 psig)

\* Settings may differ in various regions.  
For more information please contact us.

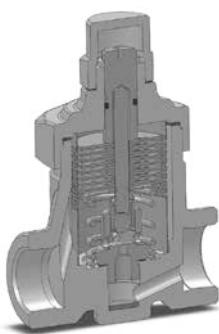
**Max. allowable pressure (PMA)** = 4,0 MPa (580 psig)  
**Max. allowable temperature (TMA)** = 400°C (752°F)

**Dimensions****TB7N / TB7NW****Capacity Chart TB7N****Temperature Stroke Chart TB7N**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)				Dimensions (in)				Body Material	Weight		
			MPa	psig	°C	°F	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb	
<b>TB7N</b>	Screwed Rc, NPT	½"	2,1	305	350	662	50 – 200	122 – 392	70	82	18	56	2,75	3,2	0,7	2,2	Forged Steel A105	0,9	2,0	
		¾"							80		19		3,1		0,75			1,0	2,2	
		1"							23		3,1		0,9		1,1			2,4		
<b>TB7NW</b>	Socket Weld JIS, ASME, DIN	½"	2,1	305	350	662	50 – 200	122 – 392	70	82	18	56	2,75	3,2	0,7	2,2				
		¾"							80		19		3,1		0,75	0,9		2,0		
		1"							23		3,1		0,9		1,0	2,2				
<b>TB7NF</b>	Flanged JIS, ASME	½"	2,1	305	350	662	50 – 200	122 – 392	145	82	18	56	5,7	3,2	0,7	2,2				
		¾"							19		19		5,7		0,75	2,0-2,6 *1		4,4-5,7 *1		
		1"							23		23		5,7		0,9	2,5-3,4 *1		5,5-7,5 *1		
	Flanged DIN PN40	DN15							150	82	18	56	5,9	3,2	0,7	2,2		3,2-4,2 *1	7,0-9,3 *1	
		DN20							160		18		6,3		0,9			2,6	5,7	
		DN25							160		18		6,3		0,9			3,4	7,5	
		DN32							170		18		6,3		0,9			4,0	8,8	

\*1 Depending on size and flange standard the weight of the traps differs. Please, look at our technical drawings.

# TB9N



## Available options TB9N

- with a ball valve (TB9BN-C)
- with a blow valve (TB9BN-R)
- with scale removal (TB9N-SR)

**Special** face-to-face dimensions available.

\* **Curve 1** shows the trap's maximum capacity when discharging cold condensate.

\*\* **Curve 2** shows the trap's maximum capacity when discharging hot condensate at a temperature of 10°C (18°F) below the adjusted temperature of the trap.

The dashed line shows the standard factory setting:

100°C at 0,5 MPa (212°F at 73 psig)

**Max. allowable pressure (PMA):**

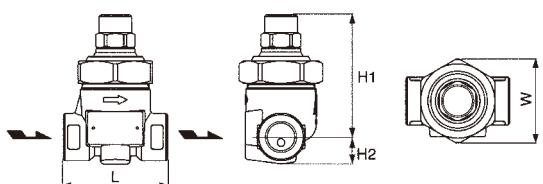
4,0 MPa (580 psig)

**Max. allowable temperature (TMA):**

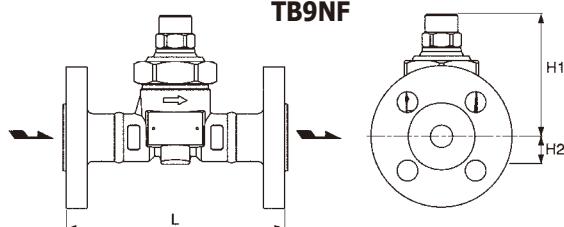
400°C (752°F)

## Dimensions

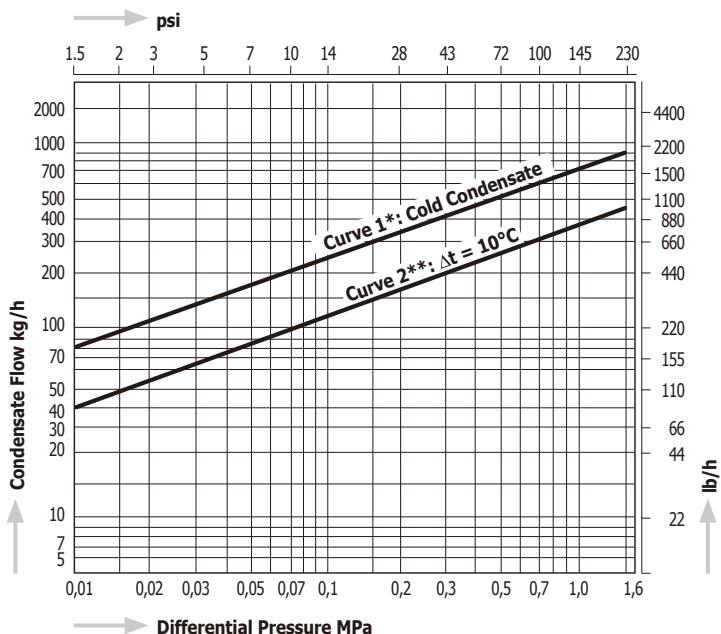
### TB9N / TB9NW



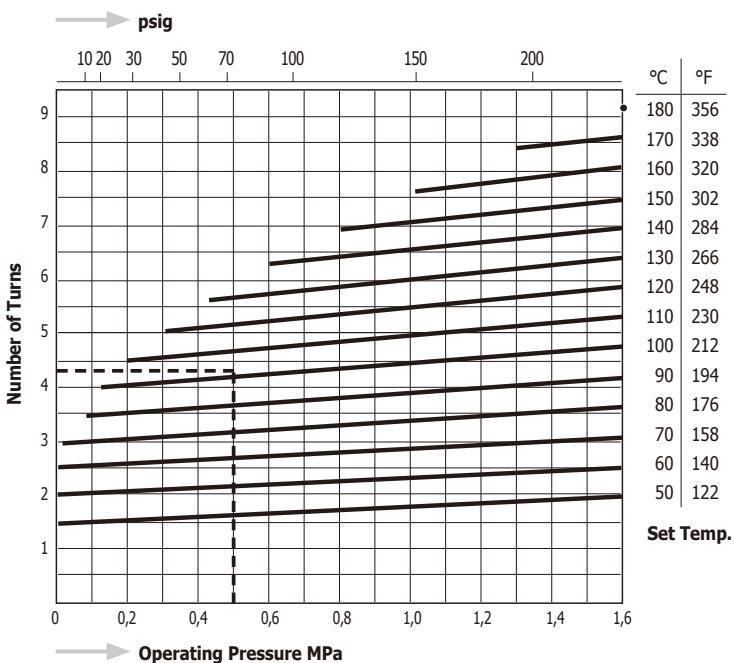
### TB9NF



## Capacity Chart TB9N



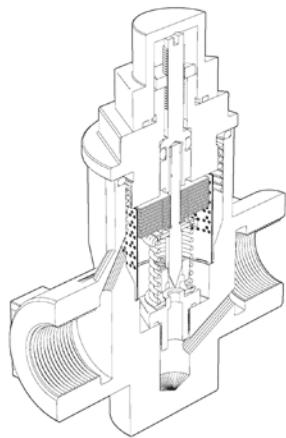
## Temperature Stroke Chart TB9N



Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
TB9N	Screwed Rc, NPT	1/2"	1,6	230	350	662	50 - 180	122 - 356	70	18	2,75	3,1	3,2	0,7	0,9	2,2	Forged Steel A105	0,9	2,0
		3/4"							80	82								1,0	2,2
		1"							80	23								1,1	2,4
TB9NW	Socket Weld JIS, ASME, DIN	1/2"	1,6	230	350	662	50 - 180	122 - 356	70	18	2,75	3,1	3,2	0,7	0,9	2,2	Forged Steel A105	0,9	2,0
		3/4"							80	82								1,0	2,2
		1"							80	23								1,1	2,4
TB9NF	Flanged JIS, ASME	1/2"	1,6	230	350	662	50 - 180	122 - 356	145	18	2,75	3,1	3,2	0,7	0,9	2,2	Forged Steel A105	2,0-2,5 *1	4,4-5,5 *1
		3/4"							145	19								2,5-3,4 *1	5,5-7,5 *1
		1"							145	23								3,2-4,2 *1	7,0-9,3 *1
	Flanged DIN PN40	DN15							150	82	18	5,7	3,2	0,75	2,2	2,6	5,7		
		DN20							160	82	18	5,9	3,2	0,7	2,2	3,4	7,5		
		DN25							160	63	4,0	8,8							

\*1 Depending on size and flange standard the weight of the traps differs. Please, look at our technical drawings.

# TBU4, TBU4B



Screwed

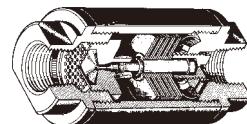


with Scale Removal



with Ball Valve

# TB1N



## Available options TBU4

with a ball valve (TBU4-B-C)  
with scale removal (TBU4-SR)

## Special version TBU4-10

Operating pressure range:

0,5 – 1 MPa (73 – 145 psig)

\* **Curve 1** shows the trap's maximum capacity when discharging cold condensate.

\*\* **Curve 2** shows the trap's maximum capacity when discharging hot condensate at a temperature of 10°C (18°F) (TBU4) / 5°C (9°F) (TB1N) below the adjusted temperature of the trap.

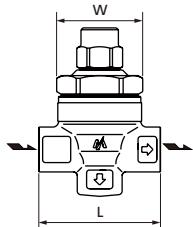
## Standard factory setting:

70°C at 0,5 MPa; 158°F at 73 psig

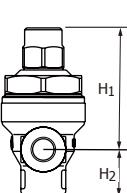
## The dashed line

shows the standard factory setting.

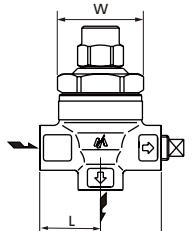
## Dimensions



## TBU4-6

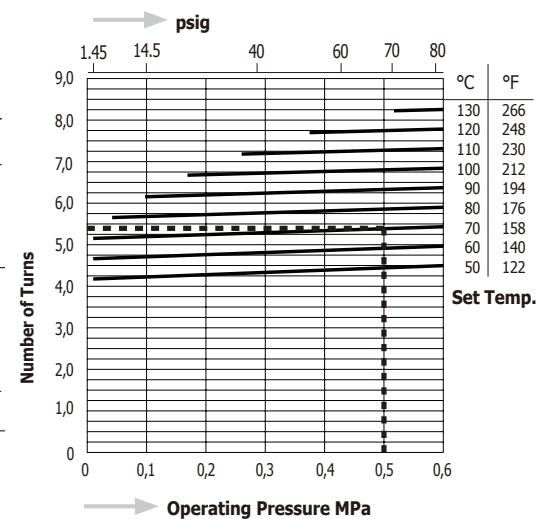


## TBU4B-6

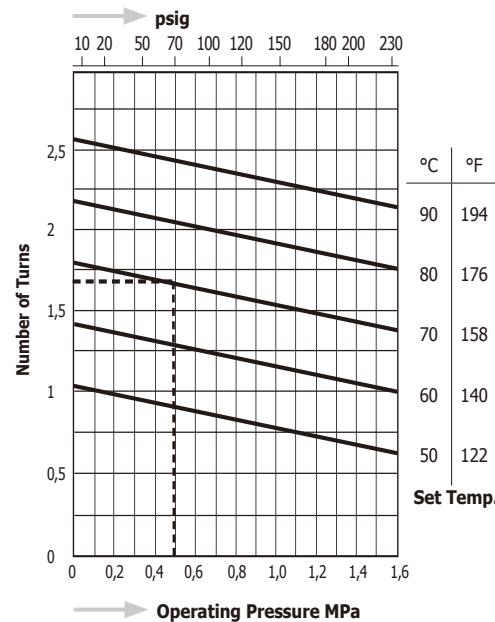


## TB1N

## Temperature Stroke Chart TBU4/TBU4B-6

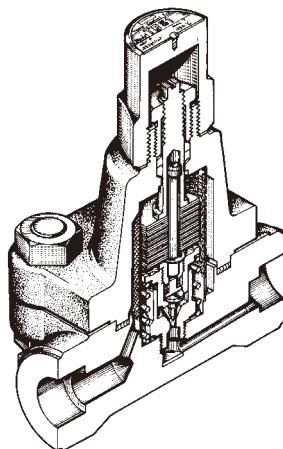


## Temperature Stroke Chart TB1N



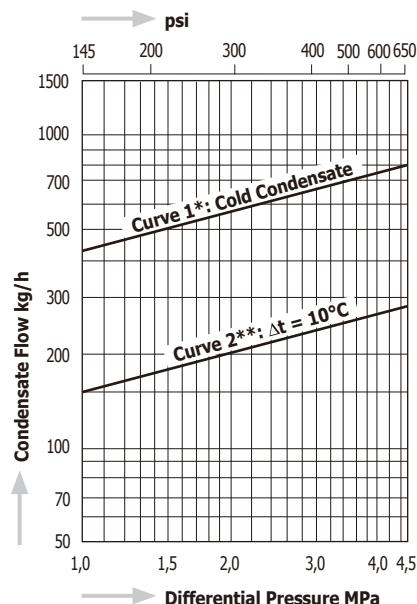
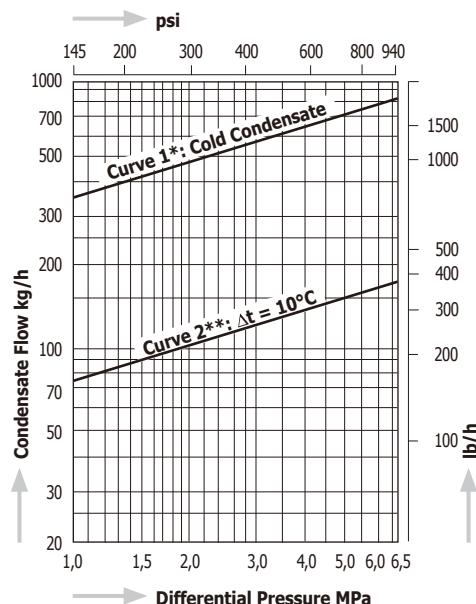
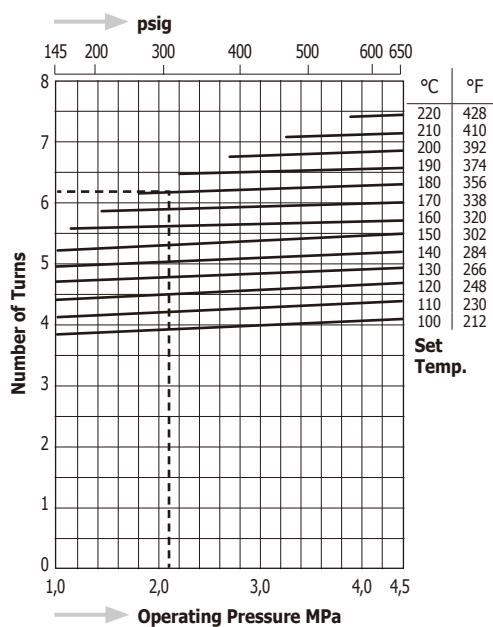
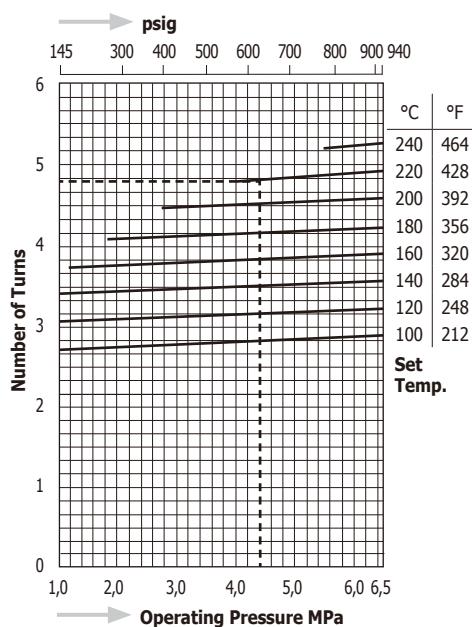
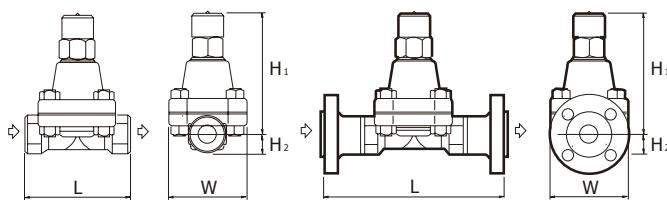
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)				Dimensions (in)				Body Material	Weight			
			MPa	psig	°C	°F	°C	°F	L	L1	H1	H2	W	L	L1	H1	H2	kg	lb		
<b>TBU4-6</b>	Screwed Rc, NPT	1/4", 3/8"	0,6	87	220	428	50 – 130	122 – 266	65	–	65	25	46	2,6	–	2,6	1,0	1,8	Stainless Steel SCS F304	0,58	1,28
<b>TBU4B-6</b>									32,5	65	22,5			1,3	2,6		0,9				
<b>TB1N</b>	Screwed Rc, NPT	1/4", 3/8"	1,6	230	350	662	50 – 90	122 – 194	70	–	–	–	38	2,8	–	–	–	1,5	Carbon Steel S25C	0,35	0,77

# TB51, TB52



Screwed &amp; Socket Weld

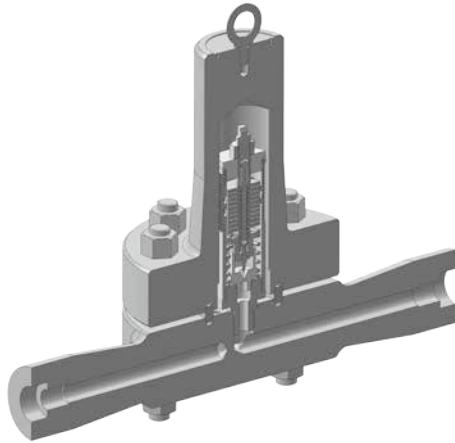
Flanged

**Capacity Chart  
TB51/52-45**

**Capacity Chart  
TB51/52-65**

**Temperature Stroke Chart  
TB51/52-45**

**Temperature Stroke Chart  
TB51/52-65**
**Dimensions TB51, TB52****TB51F, TB52F****Table 1: Face-to-face dimensions / weights**

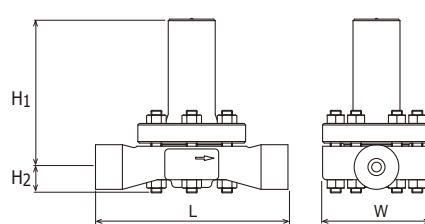
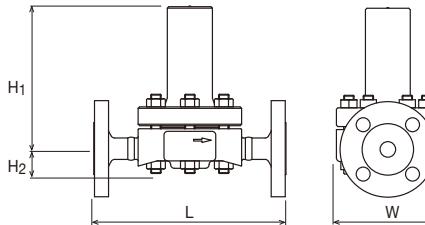
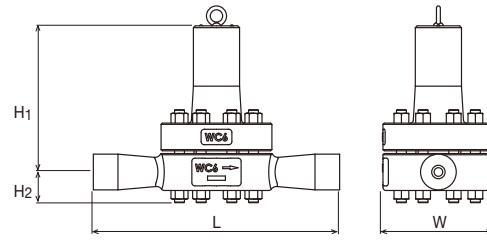
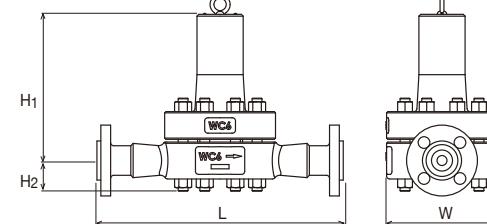
Model	Size (in)	ASME 600 lb				DIN PN63 / PN100				JIS 63 K / ASME 900 lb			
		mm	in	kg	lb	mm	in	kg	lb	mm	in	kg	lb
TB51 (TB52) 45	1/2"	200	7.9	7,3	16.1	210	8.3	9,4	20.7	220	8.7	9,6	21.2
	6,5	210	8.3	8,5	18.7	230	9.1	11,4	25.1	230	9.1	11,1	24.5
TB51 (TB52) 65	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	130	155	25	100
	6,5	943				100 – 240	212 – 464			5.1	6.1	1.0	3.9
TB51 (TB52)W 45	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	130	155	25	100
	6,5	943				100 – 240	212 – 464			5.1	6.1	1.0	3.9
TB51 (TB52)F 45	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	Table 1	155	25	100
	6,5	943				100 – 240	212 – 464			Table 1	6.1	1.0	3.9

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)			Dimensions (in)			Body Material	Weight					
			MPa	psig	°C	°F	°C	°F	L	H1	H2	W	L	H1	H2	W					
TB51 (TB52) 45	Screwed Rc, NPT	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	130	155	25	100	5.1	6.1	1.0	3.9	5,7	12.6	
			6,5	943					100 – 240	212 – 464											
TB51 (TB52)W 65	Socket Weld JIS, ASME, DIN	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	130	155	25	100	5.1	6.1	1.0	3.9	Forged Steel A105	5,7	12.6
			6,5	943					100 – 240	212 – 464											
TB51 (TB52)F 65	Flanged JIS, ASME, DIN	1/2" – 1"	4,5	653	425	(475)	800	(887)	100 – 220	212 – 428	Table 1	155	25	100	Table 1	6.1	1.0	3.9	TB52: A182 F22	Table 1	Table 1
			6,5	943					100 – 240	212 – 464											

# TBH71, TBH72 TBH81, TBH82

TBH72, TBH81, TBH82  
Socket WeldTBH71  
Flanged

## Dimensions

TBH71- ...W  
Socket WeldTBH71- ...F  
FlangedTBH72- ...W, TBH81- ...W, TBH82- ...W  
Socket WeldTBH72- ...F, TBH81- ...F, TBH82- ...F  
Flanged

## Standard factory settings

Model	MPa	psig	Model	MPa	psig
<b>TBH71-80</b>	6,5 (210°C)	942 (410°F)	<b>TBH72-80</b>	6,5 (210°C)	942 (410°F)
<b>TBH71-105</b>	8,0 (230°C)	1160 (446°F)	<b>TBH72-105</b>	8,0 (230°C)	1160 (446°F)
<b>TBH81-150</b>	10,5 (250°C)	1522 (482°F)	<b>TBH82-150</b>	10,5 (250°C)	1522 (482°F)
<b>TBH81-200</b>	15,0 (270°C)	2175 (518°F)	<b>TBH82-200</b>	15,0 (270°C)	2175 (518°F)

## Pressure shell design conditions

Model	PMA		TMA		°C	°F
	MPa	psig	MPa	psig		
<b>TBH71-80</b>	11,8 (425°C)	1711 (800°F)	593 (1,3MPa)	1100 (188 psig)		
<b>TBH71-105</b>	25,0 (492°C)	3625 (918°F)	593 (3,7MPa)	1100 (536 psig)		
<b>TBH81-150</b>	25,0 (492°C)	3625 (918°F)	593 (3,7MPa)	1100 (536 psig)		
<b>TBH81-200</b>	25,0 (520°C)	3625 (968°F)	593 (5,9MPa)	1100 (856 psig)		
<b>TBH82-150</b>	25,0 (538°C)	3625 (1000°F)	593 (7,3MPa)	1100 (1059 psig)		
<b>TBH82-200</b>						

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
<b>TBH71-80W</b>	Socket Weld JIS, ASME, DIN	1/2" – 1"	8,0	1160	470	878	100 – 260	212 – 500	250	195	33	140	9.8	7.7	1.3	5.5	Cast Steel A217WC6	13	28.6
<b>TBH71-105W</b>			10,5	1522			100 – 280	212 – 536										13	28.6
<b>TBH81-150W</b>			15,0	2175			100 – 300	212 – 572										29	63.8
<b>TBH81-200W</b>			20,0	2900			100 – 320	212 – 608										29	63.8
<b>TBH71-80F</b>	Flanged JIS, ASME, DIN	1/2" – 1"	8,0	1160	470	878	100 – 260	212 – 500	260	195	33	140	10.2	7.7	1.3	5.5	Cast Steel A217WC6	19*	41.8*
<b>TBH71-105F</b>			10,5	1522			100 – 280	212 – 536										19*	41.8*
<b>TBH81-150F</b>			15,0	2175			100 – 300	212 – 572										38*	83.6*
<b>TBH81-200F</b>			20,0	2900			100 – 320	212 – 608										38*	83.6*

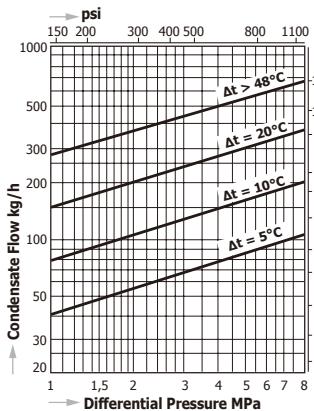
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Adjustable Range		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
<b>TBH72-80W</b>	Socket Weld JIS, ASME, DIN	1/2" – 1"	8,0	1160	550	1022	100 – 260	212 – 500	400	268	50	180	15.7	10.6	2.0	7.1	A217WC6	29	63.8
<b>TBH72-105W</b>			10,5	1522			100 – 280	212 – 536										29	63.8
<b>TBH82-150W</b>			15,0	2175			100 – 300	212 – 572										37	81.4
<b>TBH82-200W</b>			20,0	2900			100 – 320	212 – 608										68	149.6
<b>TBH72-80F</b>	Flanged JIS, ASME, DIN	1/2" – 1"	8,0	1160	550	1022	100 – 260	212 – 500	400	268	50	180	15.7	10.6	2.0	7.1	A217WC6	35*	77.0*
<b>TBH72-105F</b>			10,5	1522			100 – 280	212 – 536										38*	83.6*
<b>TBH82-150F</b>			15,0	2175			100 – 300	212 – 572										46*	101.2*
<b>TBH82-200F</b>			20,0	2900			100 – 320	212 – 608										76*	167.2*

\* The weight refers to 1" flanged type. Depending on the size and flange standard the weights may differ.

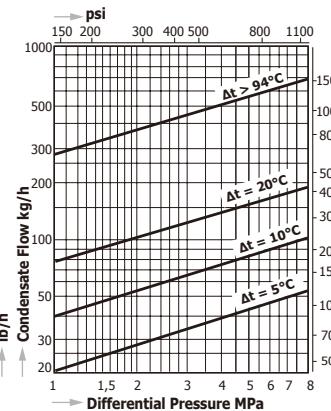
Forged Steel (A182F91) as body material for TBH72 and TBH82 is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

**Bimetal Temperature Control Trap – High Pressure SERIES TB****Capacity Charts**

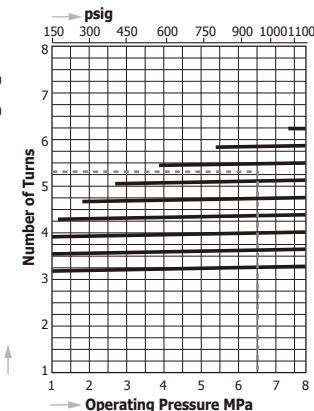
TBH71 - 80



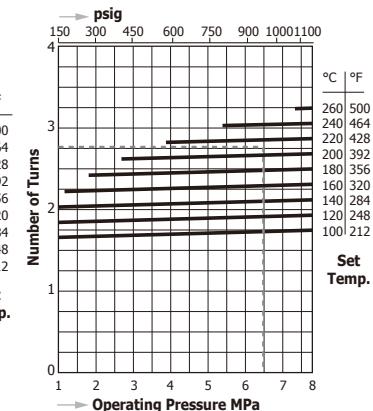
TBH72 - 80

**Temperature Stroke Charts**

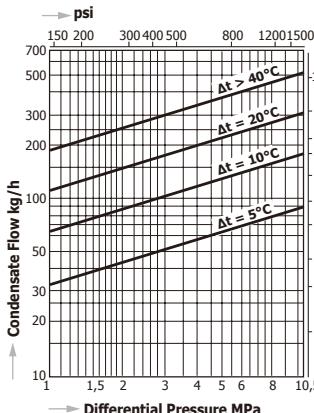
TBH71 - 80



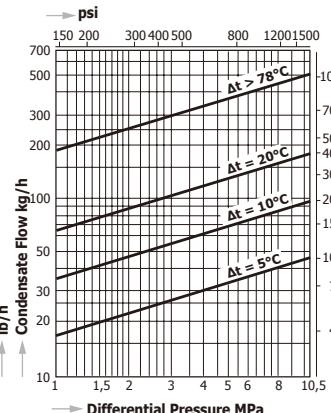
TBH72 - 80



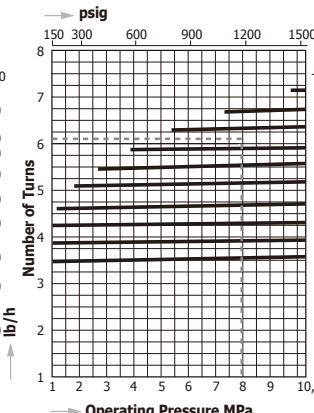
TBH71 - 105



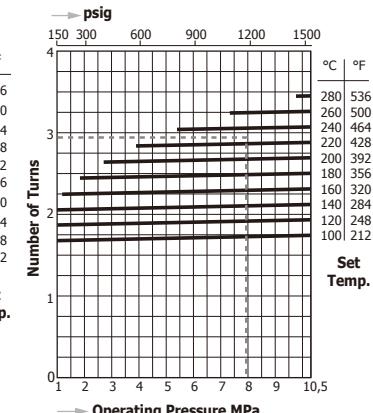
TBH72 - 105



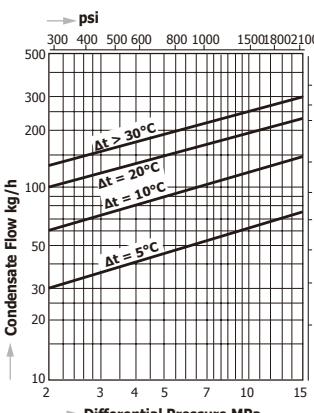
TBH71 - 105



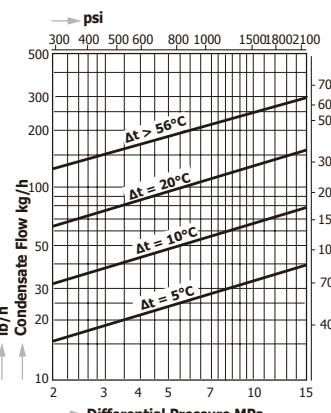
TBH72 - 105



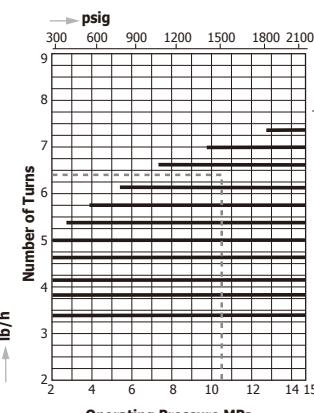
TBH81 - 150



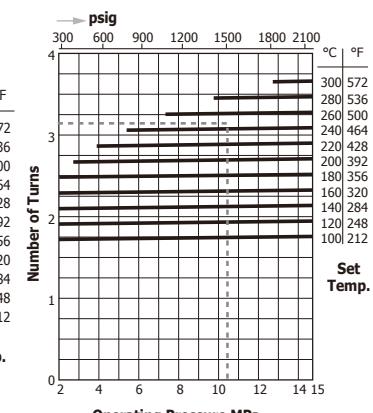
TBH82 - 150



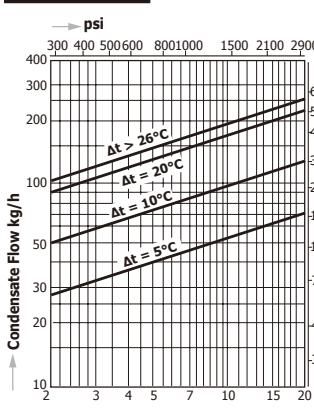
TBH81 - 150



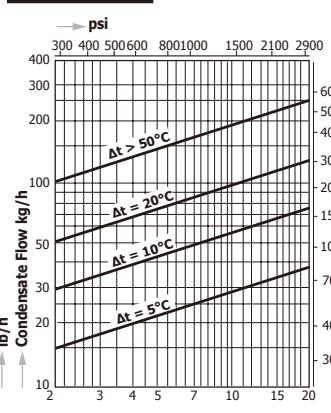
TBH82 - 150



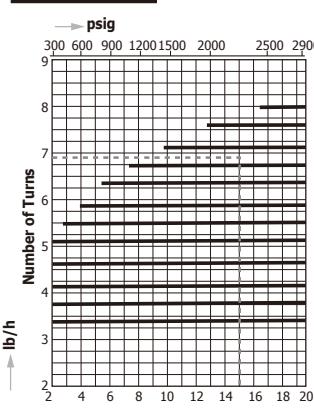
TBH81 - 200



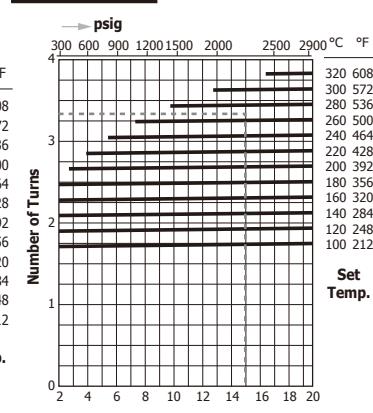
TBH82 - 200



TBH81 - 200

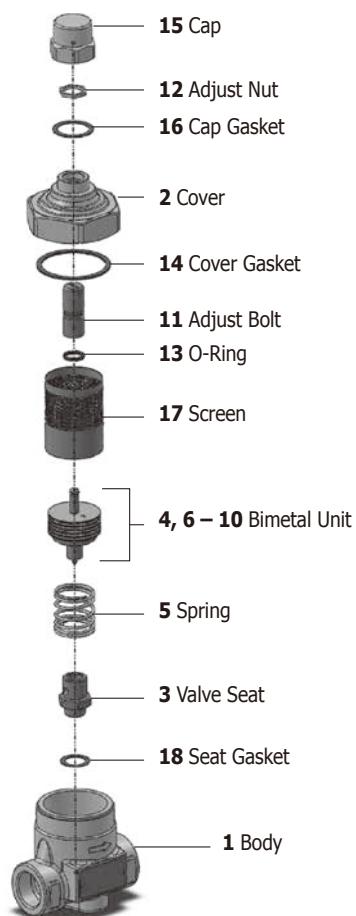


TBH82 - 200

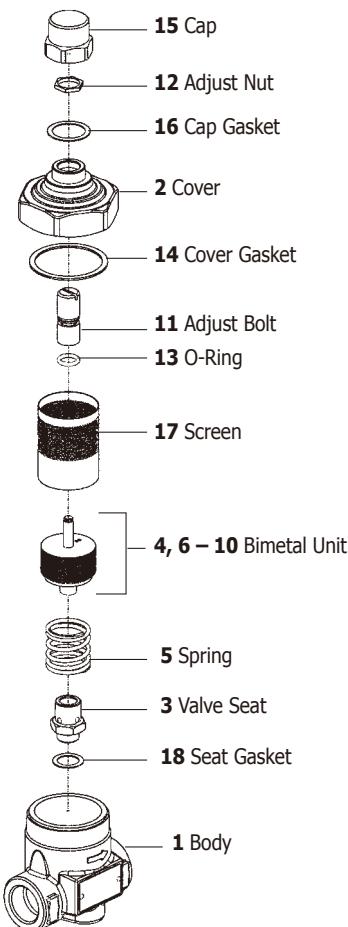


The dashed line shows the standard factory setting.

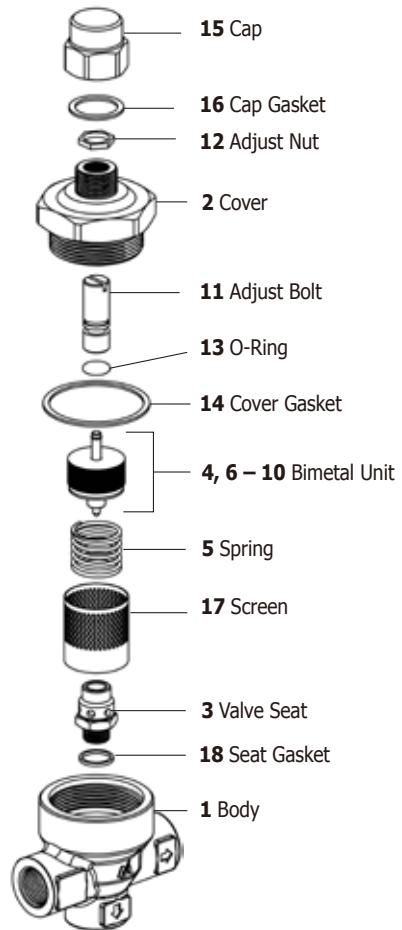
TB7N



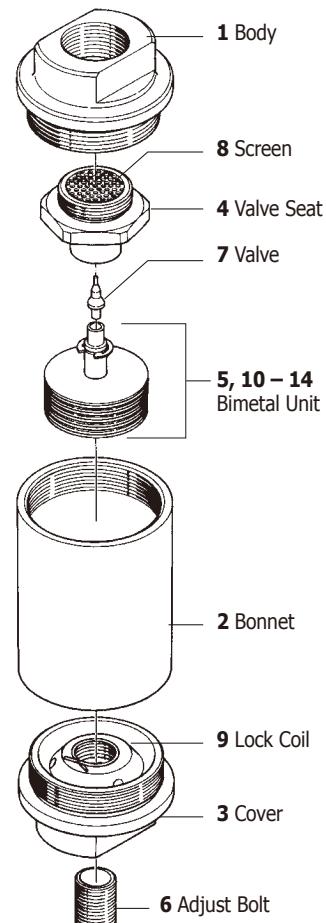
TB9N



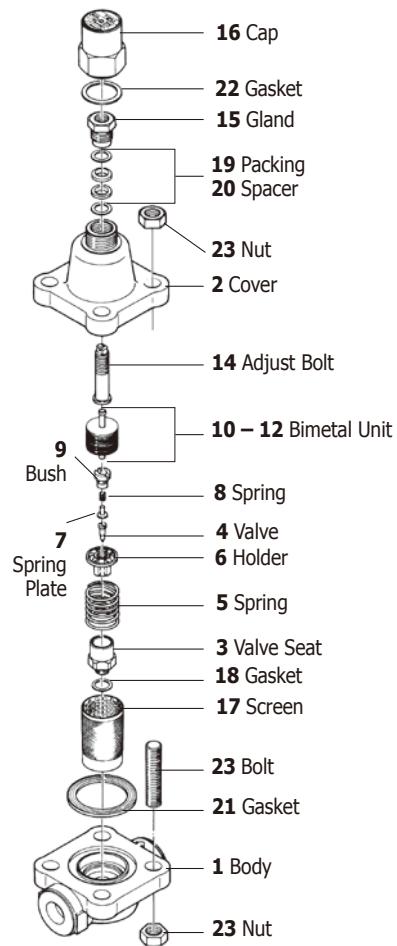
TBU4, TBU4B



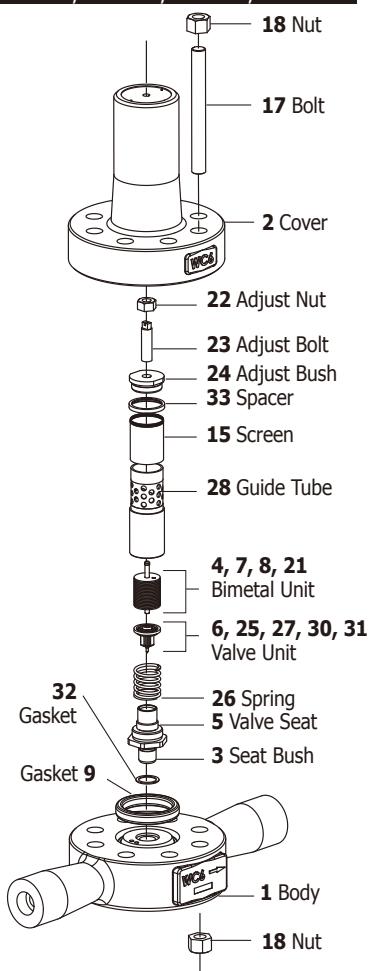
TB1N



TB51, TB52



TBH71, TBH72, TBH81, TBH82



# Balanced Pressure Thermostatic Steam Traps

## SERIES D

**Balanced Pressure Thermostatic Steam Traps** are equipped with a capsule element, which controls the discharge of condensate depending on the temperature. The capsule contains a special liquid, whose saturation temperature at a given pressure is always lower than that of the water. It ensures a very accurate functioning of the steam trap and is self-adjusting.

The discharge characteristic follows the saturation curve independent from pressure changes and the condensate load.

Series D MIYAWAKI steam traps can be delivered with 3 different capsule types:

**Types H & C** discharge hot condensate at approximately 5°C (9°F) below saturation temperature

**Type L** discharges hot condensate at approximately 15°C (27°F) below saturation temperature

### Models

**DC1, DC2,  
DV1, DL1, DX1  
DF1**

with stainless steel body and internals  
with forged steel body and stainless steel internals

### Features

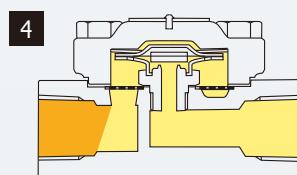
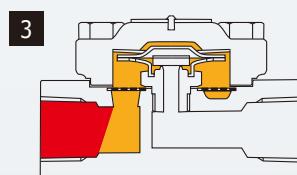
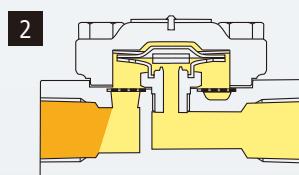
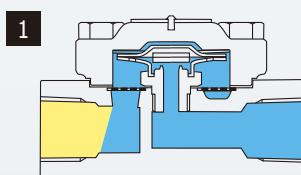
- Excellent air venting characteristics at start-up and during operation
- The operation will not be influenced by back pressure
- At time of non-operation self-draining
- No steam loss throughout its operating range
- All traps equipped with integral strainers
- Can be installed both horizontally and vertically
- Easy in-line inspection and maintenance
- Lightweight, compact design

### Suitable for

light to medium condensate loads: steam tracing, steam main drips, small heat exchangers, unit heaters, steam heating coils and many other applications in the petrochemical, chemical, textile, food, pharmaceutical and other industries.

### Operating principle

■ cold condensate ■ hot condensate ■ steam



Upon start-up in the presence of cold condensate, the capsule element is contracted and the valve plate has moved away from the seat. The wide open valve discharges condensate and air rapidly.

As the temperature inside the trap increases, the capsule element will start to expand, moving the valve plate toward the seat.

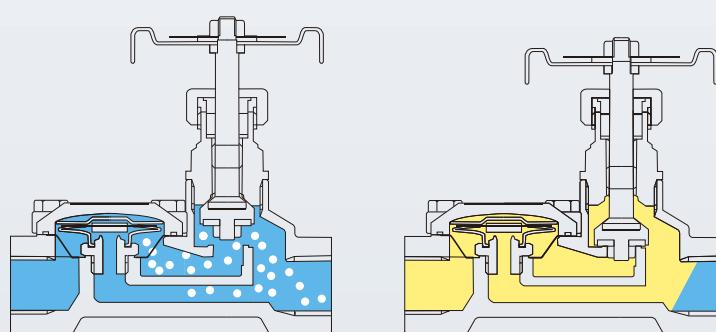
Just before the condensate reaches saturation temperature, the valve plate will close the seat completely. Steam can not enter the trap, ensuring zero steam loss.

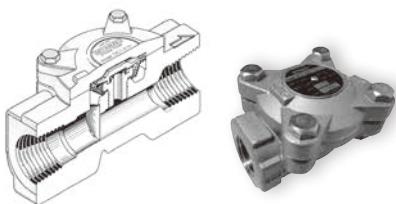
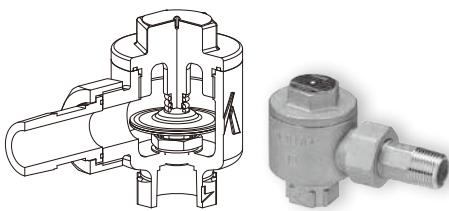
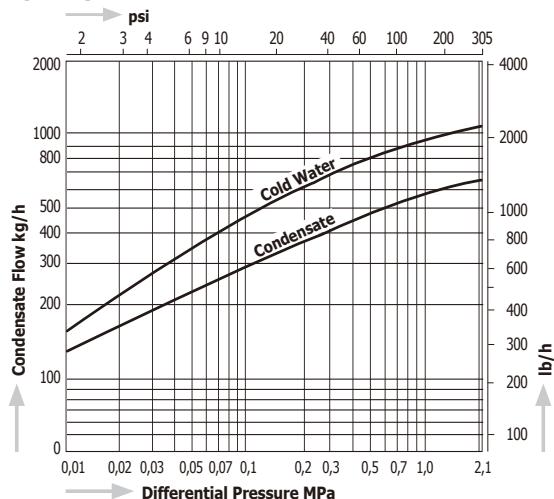
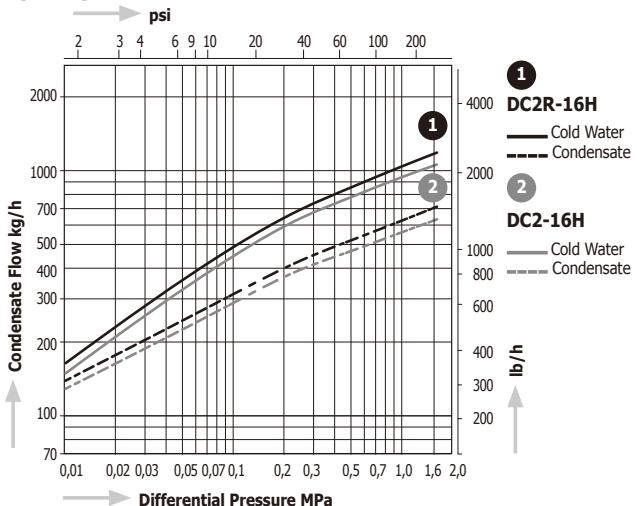
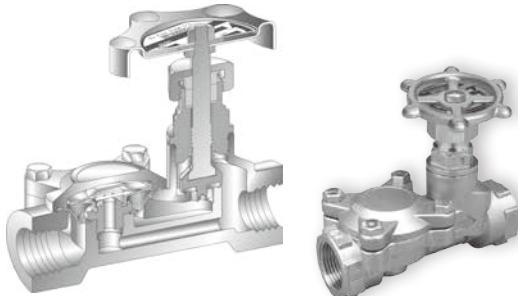
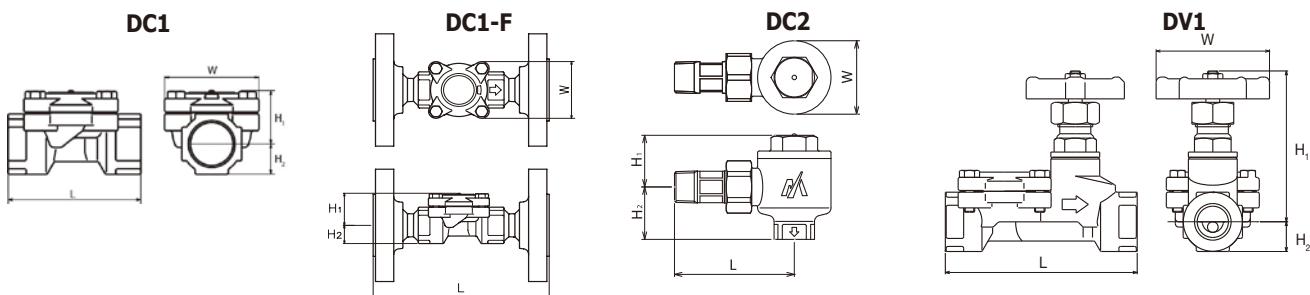
As the temperature inside the trap decreases, the capsule element moves away from the seat and the condensate will be discharged. During normal operation steps 3 and 4 will repeat continuously.

### Operating principle of DV1 when using the bypass valve

When the handle is turned in the direction indicated by the BLOW arrow on the nameplate (counterclockwise), the bypass valve will open, a bypass circuit will be formed inside the trap, and a large volume of air and condensate can be discharged quickly. Scale that has accumulated in the screen can also be blown out.

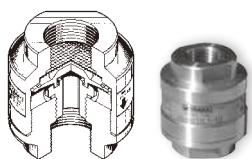
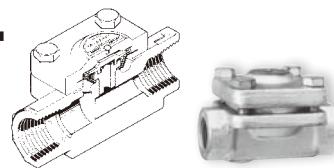
When the bypass valve is closed, the type DV1 will operate as a normal steam trap (see above operating principle).



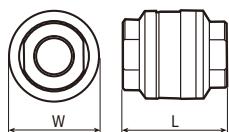
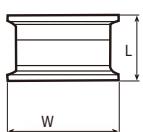
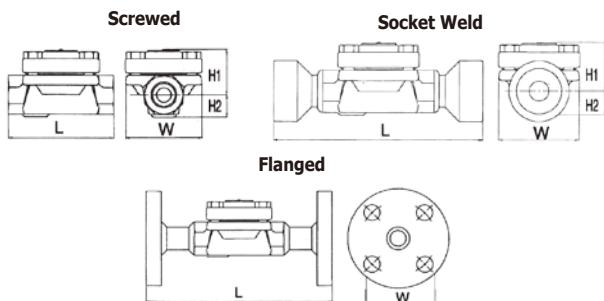
**SERIES D Balanced Pressure Thermostatic Steam Trap****DC1****DC2****Capacity Chart DC1****Capacity Chart DC2****DV1 with Bypass Valve****Dimensions**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight kg	Weight lb	
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2			
DC1-21H DC1-21L	Screwed Rc, NPT	1/4", 3/8"	2,1	305	220	428	65	29	11	2.6	1.1	0.4	Stainless Steel SCS13A	0,4	0,9	
		1/2", 3/4"					75	31	17	53	3.0	1.2	0.7	0,5	1,1	
		1"					80	34	21		3.1	1.3	0.8	0,5	1,1	
DC1-21HF DC1-21LF	Flanged JIS, ASME, DIN	1/2"					150	31	17	53	5.9	1.2	0.7	Stainless Steel SCS13A	1,3	2,9
		3/4"					160	34	21		6.3	1.3	0.8		2,2	4,9
		1"													3,1	6,8
DC2R-16H DC2-16H	Inlet: R Outlet: Rc, NPT	1/2"	1,6	230	220	428	80	35	35	49	3.1	1.4	1.4	1,9	0,7	1,5
DV1-10	Screwed Rc, NPT	1/2", 3/4"	1,0	145	185	365	110	88	17	65	4.3	3.5	0.7	2,6	0,9	1,9

DC2R-16H – Type with bypass orifice to prevent residue of condensate in steam traps.

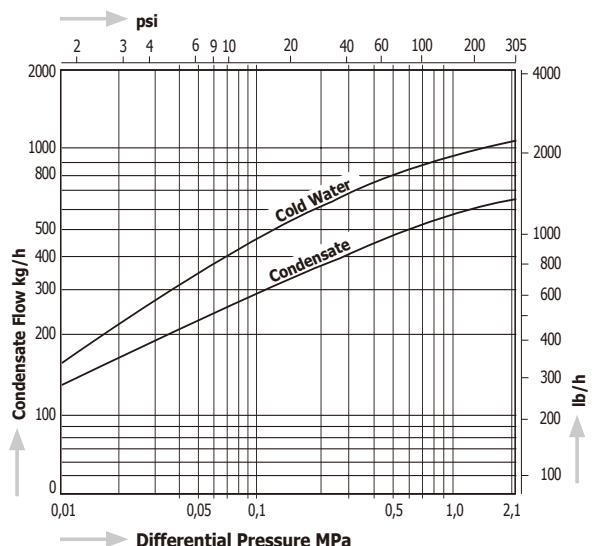
**DL1****DX1****DF1**

## Dimensions

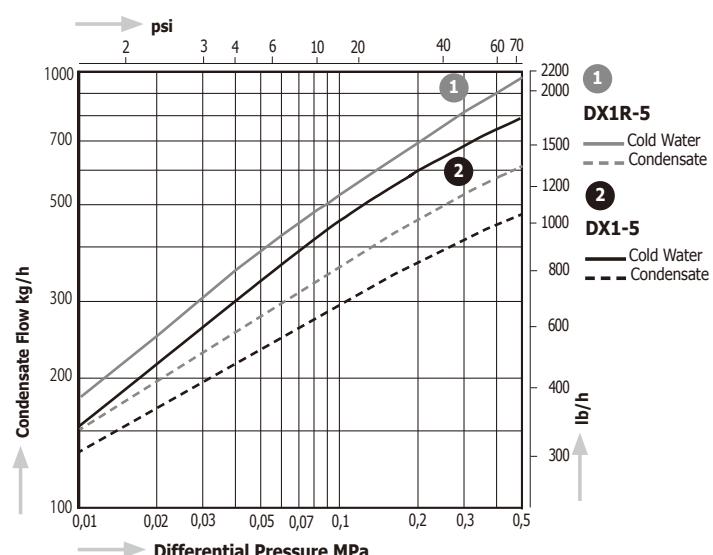
**DL1****DX1****DF1**

**Special** face-to-face dimensions available.

## Capacity Chart DL1, DF1

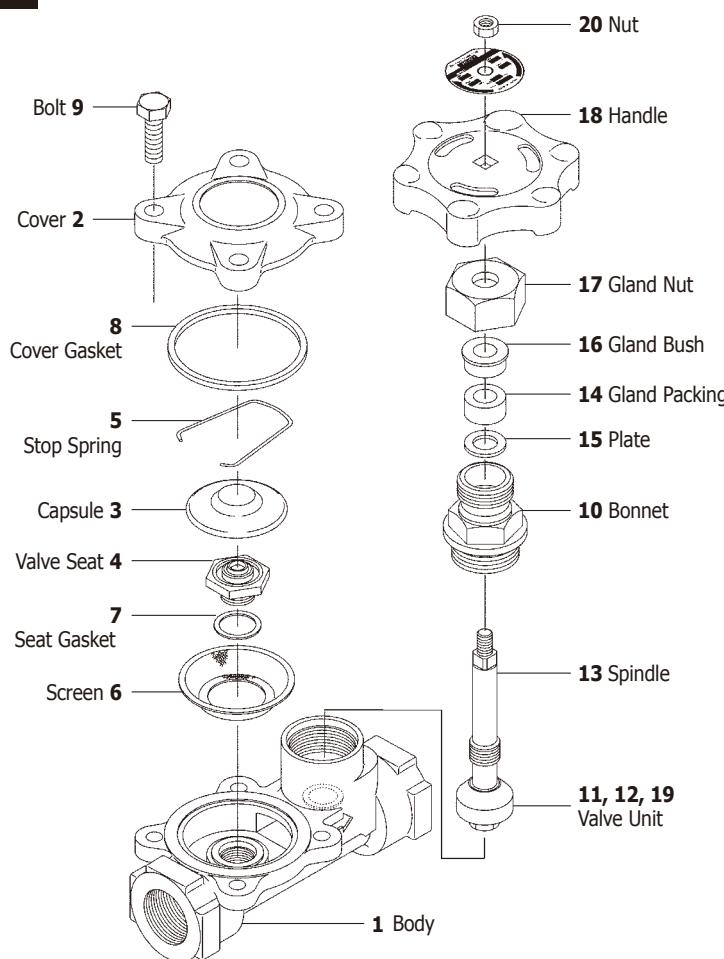
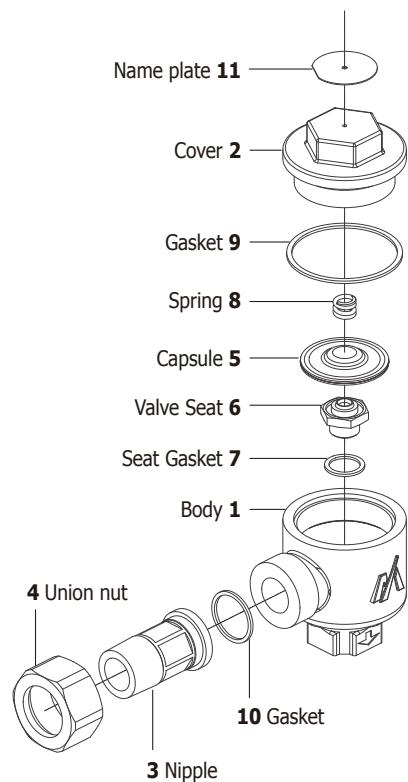
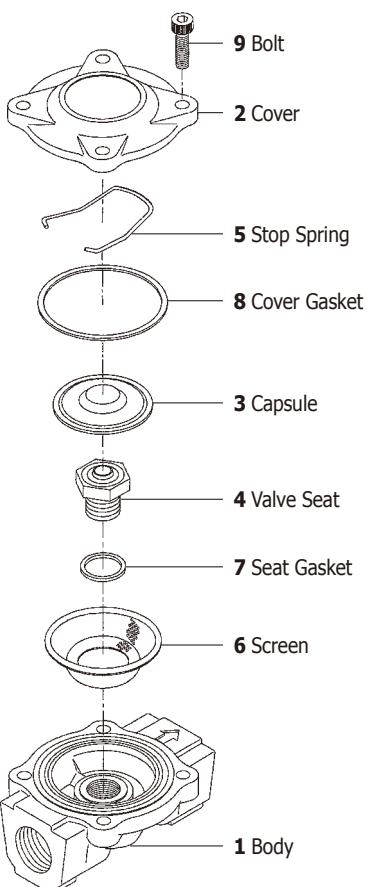
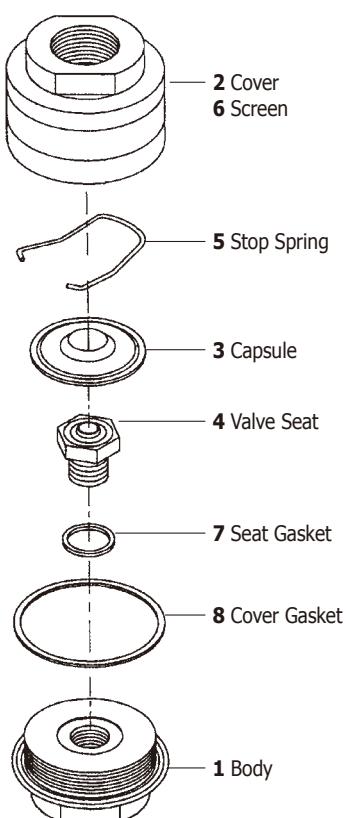
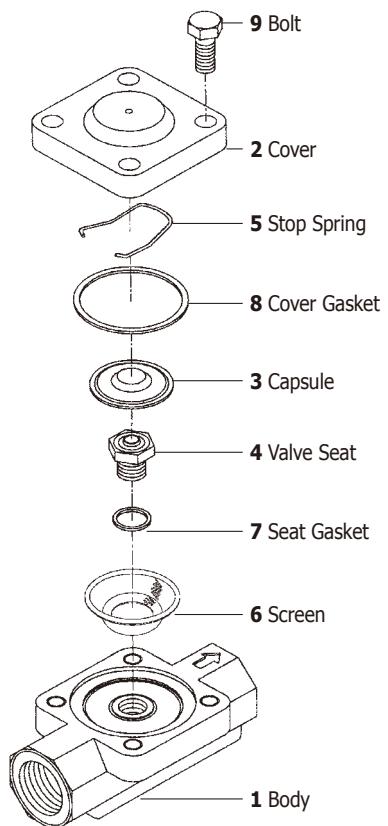


## Capacity Chart DX1



Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb	
<b>DL1-21H</b> <b>DL1-21L</b>	Screwed Rc, NPT	1/4 "	2,1	305	220	428	60				48	2.4		1.9	Stainless Steel SCS13		
		3/8 "															
		1/2 "															
		3/4 "															
		1 "															
<b>DL1-10C</b>	Screwed Rc, NPT	1/4 "	1,0	145	220	428	60				48	2.4		1.9	Stainless Steel SCS13		
		3/8 "															
		1/2 "															
		3/4 "															
		1 "															
<b>DX1-5</b> <b>DX1R-5</b>	Tri-Clamp	38 mm	0,5	72.5	160	320	30				51	1.2		2.0	Stainless Steel SUS316	0,2 0.44	
<b>DF1-21H</b> <b>DF1-21L</b>	Screwed Rc, NPT	1/2 "					85	36	18	62	3.4	1.4	0.7	2.4	Forged Steel A105		
		3/4 "															
		1 "															
<b>DF1-21HW</b> <b>DF1-21LW</b>	Socket Weld JIS, ASME, DIN	1/2 "					160	36	18	62	6.3	1.4	0.7	2.4	Forged Steel A105		
		3/4 "															
		1 "															
<b>DF1-21HF</b> <b>DF1-21LF</b>	Flanged JIS, ASME 150, 300 lb	1/2 "					175	36	18	62	6.9	1.4	0.7	2.4	Forged Steel A105		
		3/4 "															
		1 "															
	Flanged DIN PN40	DN15					195	40	23	62	7.7	1.6	0.9	2.4	Forged Steel A105		
		DN20															
		DN25															

**DX1R-5** – Type with bypass orifice to prevent residue of condensate in steam traps.

**SERIES D Spare Parts****DV1****DC2****DC1****DL1****DF1**

# Thermodynamic Disc Traps

## SERIES S

**Thermodynamic steam traps** operate on the basis of the Bernoulli principle, depending on the relationship between the velocity and the pressure exerted by the condensate and steam inside the steam trap.

They have only one moving part – the disc.

Due to their compact design and cost effectiveness thermodynamic steam traps are widely used in applications where the condensate must be removed immediately from steam lines and steam equipment. They discharge the condensate near the saturation temperature. The traps may operate up to a back pressure of 80% of the inlet pressure, but for smooth operation it is recommended that the back pressure does not exceed 50% of the inlet pressure. Thermodynamic steam traps discharge the condensate intermittently.

All steam traps are equipped with a hardened stainless steel disc and seat. After the lapping process all disc surfaces are controlled individually before releasing them for use in steam traps. These features and very high and severe quality standards for the whole production process give MIYAWAKI's thermodynamic steam traps a long and reliable service life.

### Models S31N

<b>SC31</b>	Ductile Cast Iron Steam Traps with replaceable internals
<b>SC, SF</b>	Stainless steel steam traps with replaceable internals
<b>SV</b>	Cast Iron Steam Traps for high capacity
<b>SL3</b>	Steam Traps with inbuilt bypass
<b>SU2N, SU2H, SD1</b>	Compact, very small trap for low capacity applications
<b>S55N, S55H, S61N, S62N</b>	Stainless steel steam traps for low to high pressure applications
	Forged steel steam traps for high pressure applications

### Features

- Immediate discharge of condensate
- Insensitive to waterhammer, superheated steam and freezing
- Most types contain a bimetal ring which improves the ability of the trap to discharge air and cold condensate quickly at start-up and prevents air locking during times of operation
- Can be installed in vertical or horizontal position
- In case of danger of air locking special discs available
- All traps equipped with additional cover for reduced frequency of cycling and energy savings
- All traps with inbuilt strainers (except SL3)
- Easy maintenance

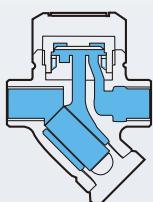
### Suitable for

light to medium condensate loads: steam tracing, steam main drips, small heat exchangers, unit heaters, sterilizers and many other applications in the petrochemical, chemical, textile, food, pharma-ceutical and further industries. Series SV Thermodynamic steam traps with inbuilt bypass are designed for special applications in the food, pharmaceutical or other industries or for laundry applications where costs and space must be saved.

### Operating principle

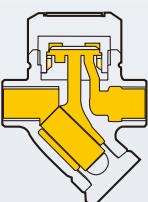
■ cold condensate ■ hot condensate ■ steam

1



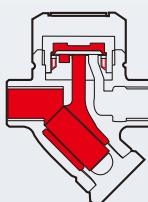
At the time of start-up the pressure of the incoming cold condensate and air raise the disc and water and air are discharged quickly.

2



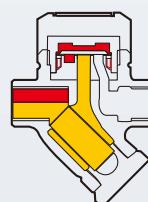
When hot condensate flows into the trap, the trap is still open and the hot condensate can be discharged quickly.

3

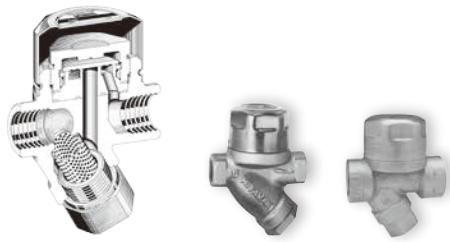
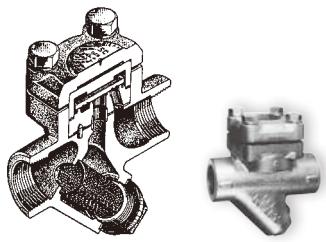
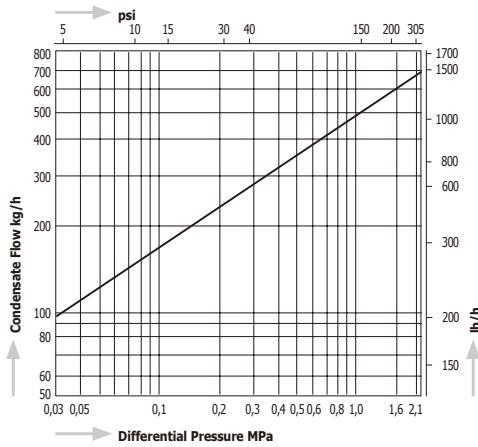
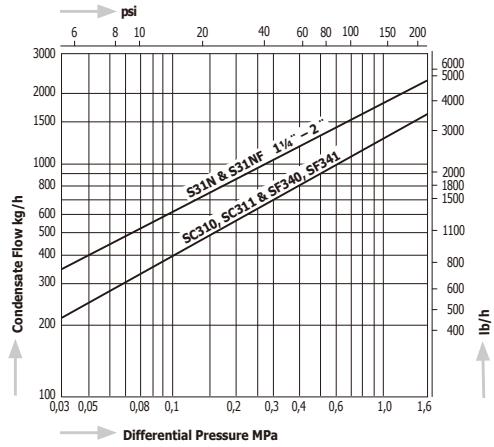
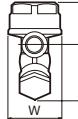
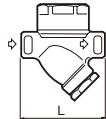
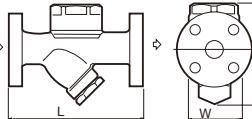
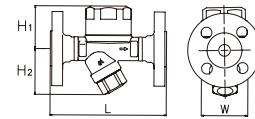
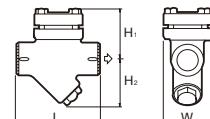
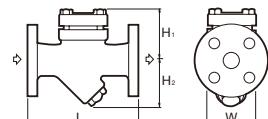


After hot condensate flows into the trap, steam enters it. As the velocity of the fluid increases, the pressure under the seat exerted by the steam decreases. At the same time the pressure in the pressure chamber above the disc increases. The disc is pressed down and closes.

4

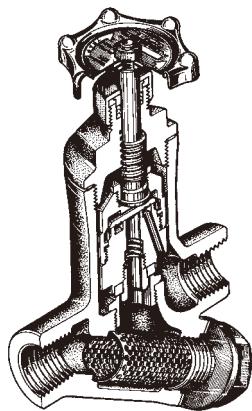
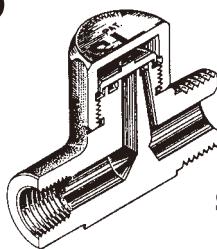
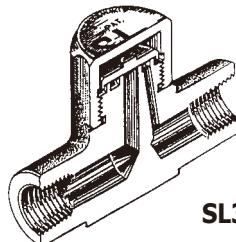
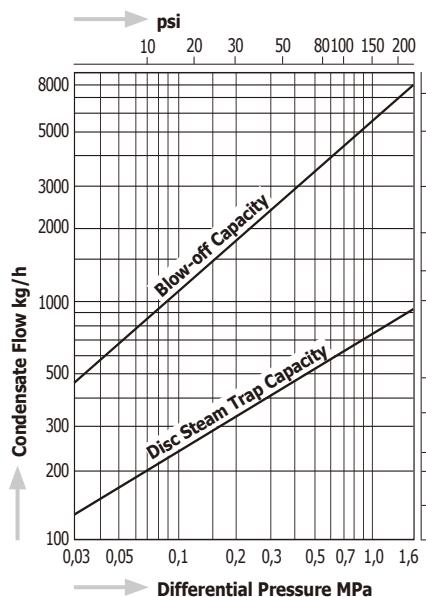
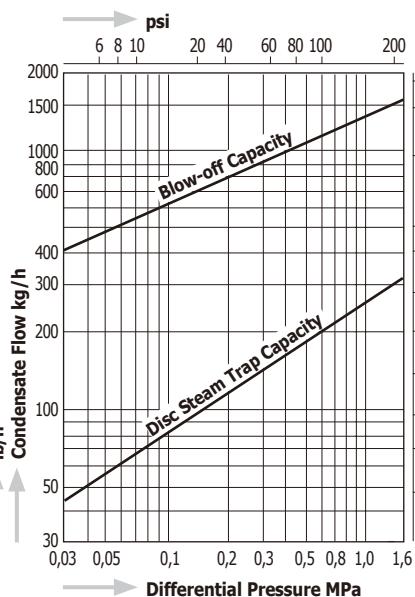
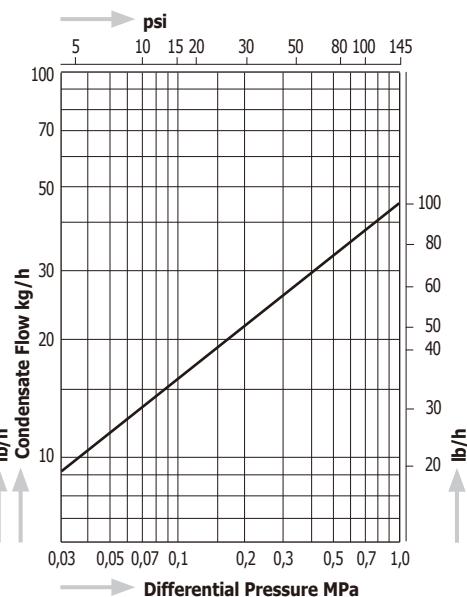
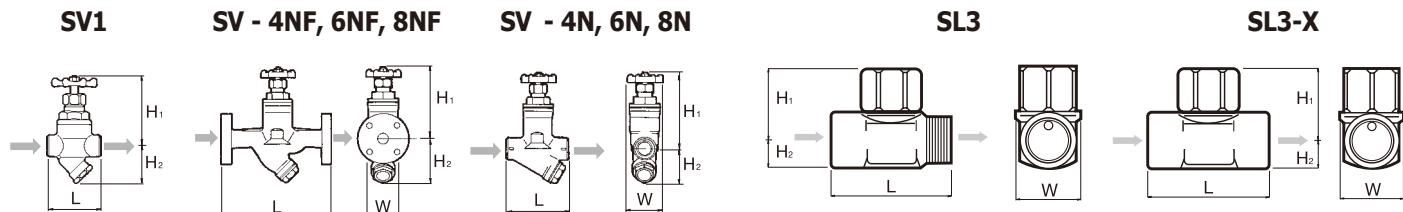


While hot condensate flows into the trap, the trap remains closed for a certain period, as far as the steam inside the pressure chamber does not condense. The more condensate flows into the trap, the more the temperature cools down. The steam inside the pressure chamber also cools down and condenses. As a result, the pressure of the incoming condensate raises the disc and condensate is discharged. Cycles 2, 3 and 4 repeat.

**S31N, SC31****SC, SF****Capacity Chart****S31 & SC31F/S31N & S31NF 1/2" – 1"****Capacity Chart****S31N & S31NF 1 1/4" – 2"; SC310, SC311 & SF340, SF341****Dimensions****S31N/SC31 1/2" – 1"****S31NF 1/2" – 1"****SC31F 1/2" – 1"****S31N 1 1/4" – 2"  
SC310, SC311****S31NF 1 1/4" – 2"  
SF340, SF341**

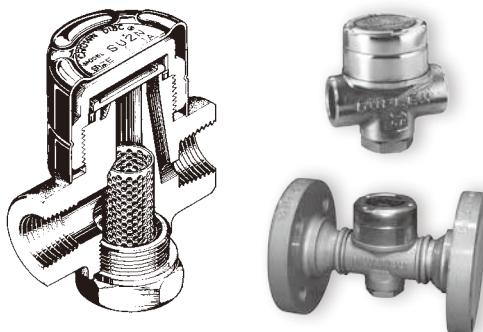
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	W	L	H <sub>1</sub>	H <sub>2</sub>	W		kg	lb
SC31	Screwed Rc, G, NPT	1/2"	2,1	305	220	428	78	55			3.1	2.2			Stainless Steel SCS14	1,0	2.2
		3/4"					90				3.5					1,3	2.9
		1"					95				3.7					1,2	2.6
SC31F	Flanged JIS, ASME	1/2"					143				5.6				Stainless Steel SCS14+SUSF304	2,7	6.0
		3/4"					155	61	59	61	6.1					3,9	8.6
		1"					175				6.9					4,7	10.4
		1 1/4"					185				7.3				Stainless Steel SCS14+SUS304	4,2-5,5 *1	9.3-12.1 *1
		1 1/2"					195				7.7					5,0-7,3 *1	11.0-16.0 *1
		2"					150	61	59	61	5.9	2.4	2.3	2.4		6,6-8,2 *1	14.6-18.1 *1
	Flanged DIN	DN15					160				6.3					2,7	6.0
		DN20														3,9	8.6
		DN25														4,7	10.4
S31N	Screwed Rc, NPT	1/2"	1,6	230	220	428	90	55			3.5	2.2			Ductile Cast Iron FCD450	1,1	2.4
		3/4"					60	65	60		3.7					1,2	2.6
		1"					95									1,3	2.9
		1 1/4"					180	104	100	106	7.1	4.1	3.9	4.2	Cast Iron FC250	8,0	17.6
		1 1/2"					111				4.4					8,7	19.1
		2"														9,3	20.5
		1/2"					140	55			5.5	2.2			Ductile Cast Iron FCD450	2,3-2,7 *1	5.1-6.0 *1
S31NF	Flanged JIS, ASME, DIN	3/4"					150	60	65	60	5.9					2,9-3,9 *1	6.4-8.6 *1
		1"					160				6.3	2.4				3,6-4,7 *1	7.9-10.3 *1
		1 1/4"					240	104	100	106	9.5	4.1	3.9	4.2	Cast Iron FC250	12,0	26.4
		1 1/2"														13,5	29.7
		2"					180	87	81	96	7.1	3.4				14,5	31.9
		1/2"					240	89			9.5	3.5	3.2	3.8	Cast Iron FC250	6,0	13.2
		3/4"														10,0	22.0
SC -	310	Screwed Rc, NPT															
	311																
SF -	340	Flanged JIS, ASME, DIN															
	341																

\*1 Depending on size and flange standard the weight of the traps differs. Please, look at our technical drawings.

**SV****SL3****SL3****SL3-X****Capacity Chart SV-N****Capacity Chart SV1****Capacity Chart SL3****Dimensions**

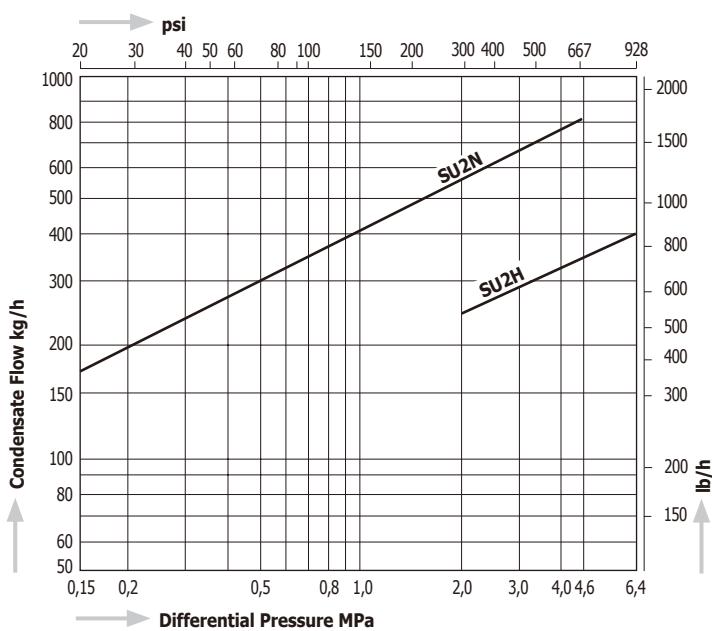
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb	
<b>SV1</b>	Screwed Rc, NPT	3/8", 1/2" 3/4", 1"					75 107	105 53	65	3.0 4.1 4.2	2.1	2.6		Forged Steel A105	1,0 1,2	2.2 2.6	
<b>SV -</b>	Screwed Rc, NPT	1/2"	1,6	230	220	428	110	60		4.3	2.4			Cast Iron FC250	2,4	5.3	
		3/4"					120	155 65	65	4.7	6.1	2.6	2.6		2,5	5.5	
		1"						70			2.8				2,7	5.9	
	Flanged JIS, ASME, DIN	1/2"					220	150	90	65	8.7	5.9	3.5	2.6	4,1	9.0	
		3/4"									9.1				4,7	10.3	
		1"					230								5,2	11.5	
<b>SL3</b>	Screwed Inlet : Rc, NPT Outlet: G	1/4"	1,0	145	400	752	40	22	8	19	1.6	0.9	0.3	0.7	Stainless Steel SUS416	0,06	0.13
<b>SL3-X</b>	Screwed Rc, NPT	1/4"	1,0	145	400	752	40	22	8	19	1.6	0.9	0.3	0.7		0,06	0.13

# SU2N, SU2H

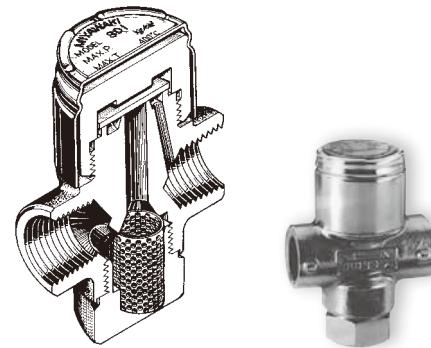


**Special** face-to-face dimensions available.

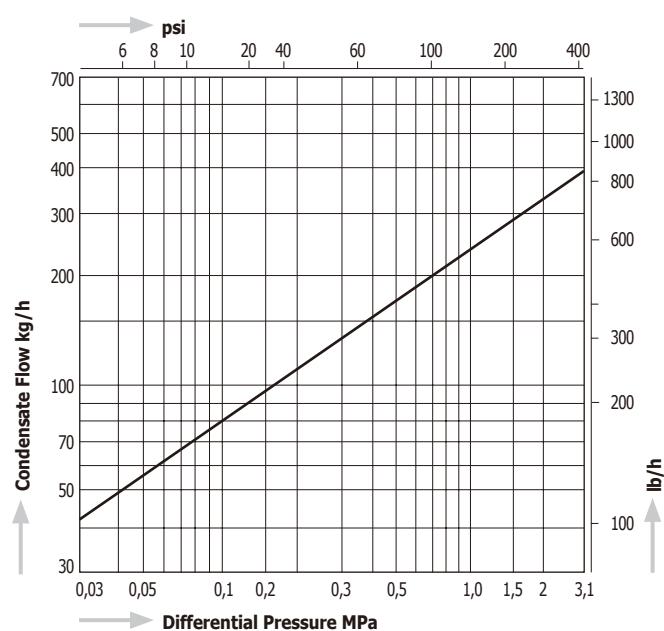
## Capacity Chart SU2N, SU2H



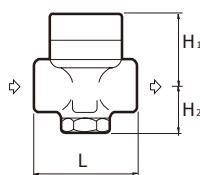
# SD1



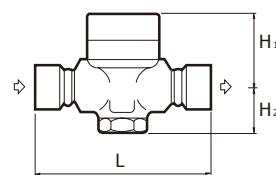
## Capacity Chart SD1



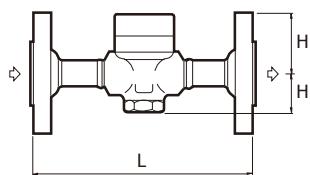
## Dimensions SU2N, SU2H



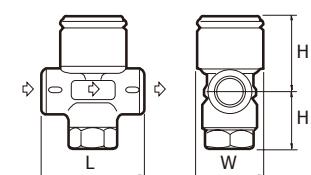
## SU2NW, SU2HW



## SU2NF, SU2HF

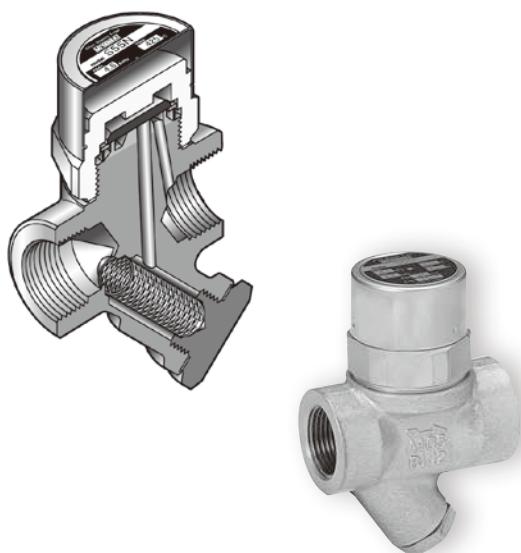


## SD1

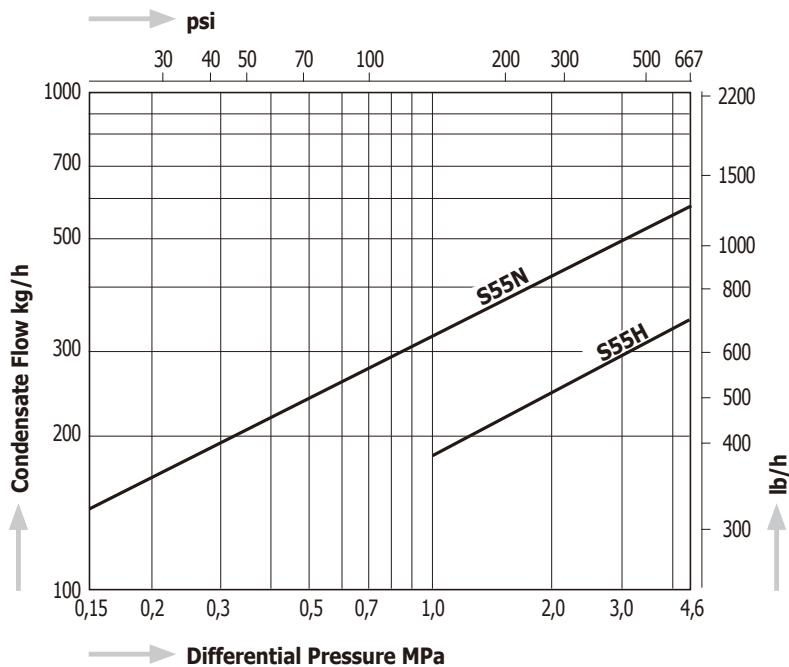


Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb	
<b>SU2N (SU2H)</b>	Screwed Rc, NPT	1/2"	4,6 (6,4)	667 (928)	425	800	70	47	32	53	2,8	1,9	1,3	2,1	Stainless Steel SUS420J2	0,8	1,8
		3/4"					75	51			3,0	2,0				0,9	2,0
		1"					140	47	32	53	5,5	1,9	1,3	2,1		1,4	3,1
		1/2"					205	47	32	53	8,1	1,9	1,3	2,1		1,3	2,9
<b>SU2NW (SU2HW)</b>	Socket Weld JIS, ASME, DIN	3/4"					150	47	32	53	5,9	1,9	1,3	2,1		1,2	2,6
		1"					160	47	32	53	6,3					2,7	5,9
		DN15														3,7	8,1
		DN20														4,3	9,5
<b>SU2NF (SU2HF)</b>	Flanged JIS, ASME	DN25													Stainless Steel SUS420J2	2,6	5,7
		1/2"														3,3	7,3
		3/4"														3,8	8,4
		1"															
<b>SD1</b>	Screwed Rc, NPT	DN15	3,1	450	400	752	52	39	25	34	2,0	1,5	1,0	1,3	Stainless Steel SUS420J2	0,3	0,7
		DN20					60	41	23		2,4	1,6	0,9				
		DN25															

# S55N, S55H



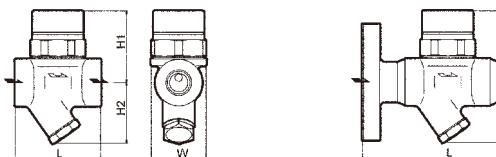
**Capacity Chart S55N, S55H**



## Dimensions

**S55N, S55H,  
S55NW, S55HW**

**S55NF, S55HF**

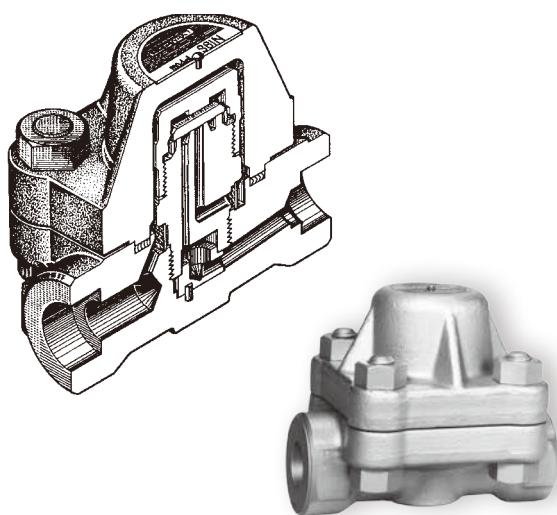


**Table 1: Weights**

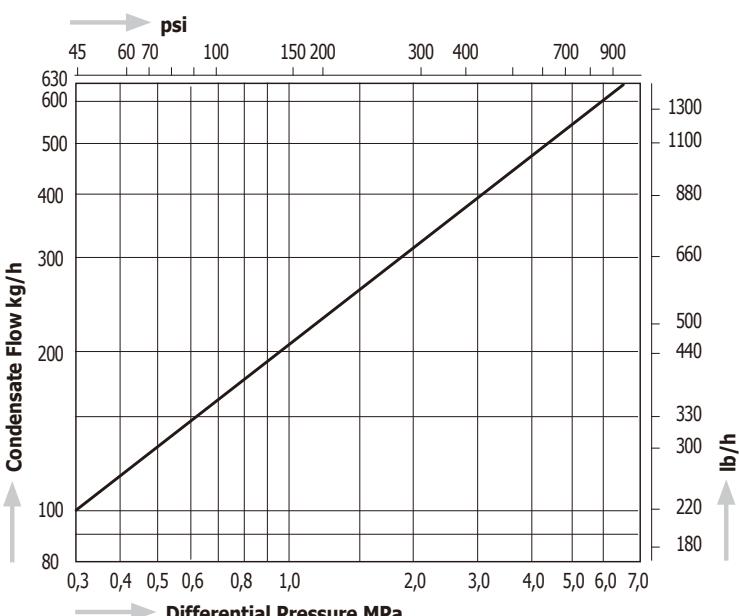
Model	Size (in)	JIS 10/16K		JIS 20K		JIS 30/40K		ASME 150lb		ASME 300lb		ASME 600lb		DIN PN40		DIN PN100	
		kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
<b>S55NF</b> <b>S55HF</b>	1/2"	2,4	5.3	2,6	5.7	3,8	8.4	2,4	5.3	2,9	6.4	3,0	6.6	3,1	6.8	3,7	8.2
	3/4"	2,9	6.4	3,1	6.8	4,2	9.3	2,9	6.4	3,8	8.4	4,0	8.8	3,7	8.2	5,3	11.7
	1"	4,0	8.8	4,3	9.5	5,4	11.9	4,0	8.8	5,3	11.7	5,5	12.1	4,4	9.7	6,3	13.9

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight		
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb	
<b>S55N</b> <b>(S55HF)</b>	Screwed Rc, NPT	1/2"	4,6	667	425	800	70	60	52	45	2.8	2.4	2.0	1.8	Forged Steel A105	1,0	2.2	
		3/4"					75	65	56	45	3.0	2.6	2.2			1,2	2.6	
		1"					140	60	52		5.5	2.4	2.0	1.8				
<b>S55NF</b> <b>(S55HF)</b>	Flanged JIS, ASME	1/2"					165				6.5			Table1		Table1		
		3/4"					175				6.9							
		1"					150	60	52	45	5.9	2.4	2.0				1.8	
<b>S55NF</b> <b>(S55HF)</b>	Flanged DIN	DN15					160	6.3	Table1	Table1								
		DN20					70	60			52	45	2.8	2.4		2.0	1.8	
		DN25					75	65			56	45	3.0	2.6		2.2		
<b>S55NW</b> <b>(S55HW)</b>	Socket Weld JIS, ASME, DIN	1/2"					70	1,0	2.2									
		3/4"					75	1,2	2.6									
		1"					75											

# S61N, S62N

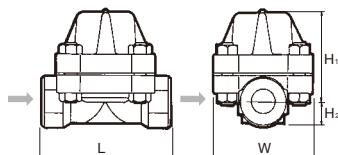


Capacity Chart S61N, S62N



## Dimensions

### S61N, S62N



### S61NF, S62NF

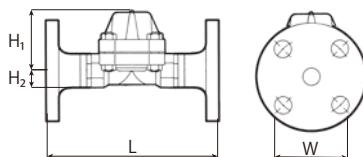


Table 1: Dimensions L and Weight

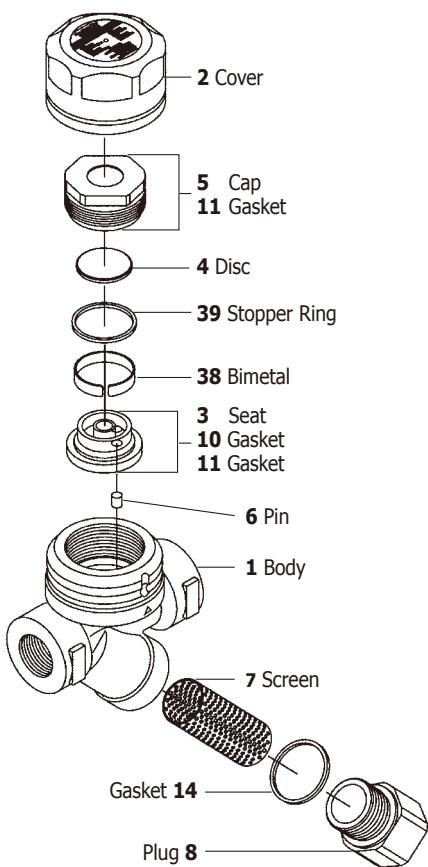
Model	Size (in)	JIS 30K				JIS 40K				JIS 63 K			
		mm	in	kg	lb	mm	in	kg	lb	mm	in	kg	lb
<b>S61NF</b>	1/2"	200	7.9	8,4	18.5	200	7.9	8,7	19.2	220	8.7	9,6	21.2
<b>S62NF</b>	3/4"	210	8.3	8,9	19.6	210	8.3	9,2	20.3	230	9.1	11,1	24.5
	1"	240	9.4	10,1	22.3	240	9.4	10,5	23.1	240	9.4	12,1	26.7

Model	Size (in)	ASME Class 300				ASME Class 600				ASME Class 900			
		mm	in	kg	lb	mm	in	kg	lb	mm	in	kg	lb
<b>S61NF</b>	1/2"	200	7.9	7,2	15.9	200	7.9	7,3	16.1	220	8.7	9,6	21.2
<b>S62NF</b>	3/4"	210	8.3	8,2	18.1	210	8.3	8,5	18.7	230	9.1	10,9	24.0
	1"	240	9.4	9,4	20.7	240	9.4	9,6	21.2	240	9.4	13,3	29.3

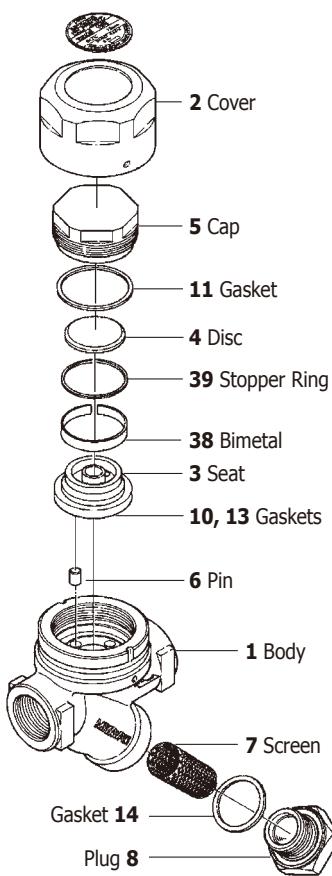
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
<b>S61N (S62N)</b>	Screwed Rc, NPT	1/2"	6,5	943	425 (S62N: 475)	800 (S62N: 887)	130	90	25	100	5.1	3.5	1.0	3.9	Forged Steel A105 (S62N: A182F22)	5,7	12.6
<b>S61NF (S62NF)</b>		3/4"					Table 1	90	25	100	Table 1	3.5	1.0	3.9		Table 1	Table 1
		1"					210	Table 1	8.3	9.1	230	9.1	9.6	21.2		9,4	20.7
<b>S61NW (S62NW)</b>	Socket Weld JIS, ASME, DIN	DN15					130	90	25	100	5.1	3.5	1.0	3.9	Forged Steel A105 (S62N: A182F22)	11,4	25.1
		DN20					210	Table 1	8.3	9.1	230	9.1	9.6	21.2		12,5	27.6
		DN25					240	Table 1	9.1	9.1	240	9.4	9.6	21.2		5,7	12.6



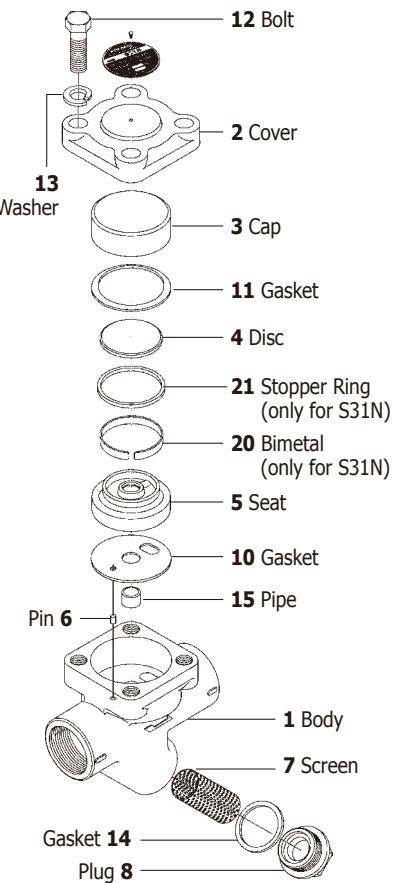
SC31



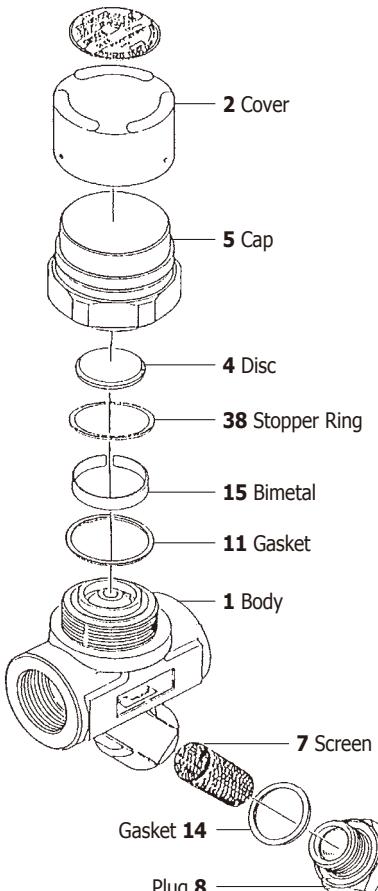
S31N (1/2"-1")



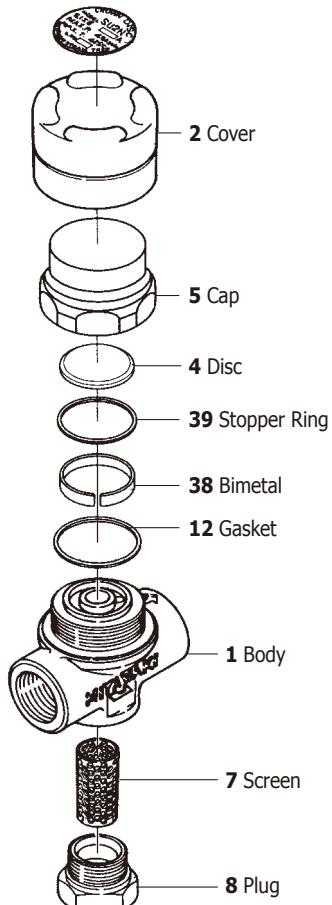
S31N (1 1/4"-2"), SC, SF (3/4"-1")



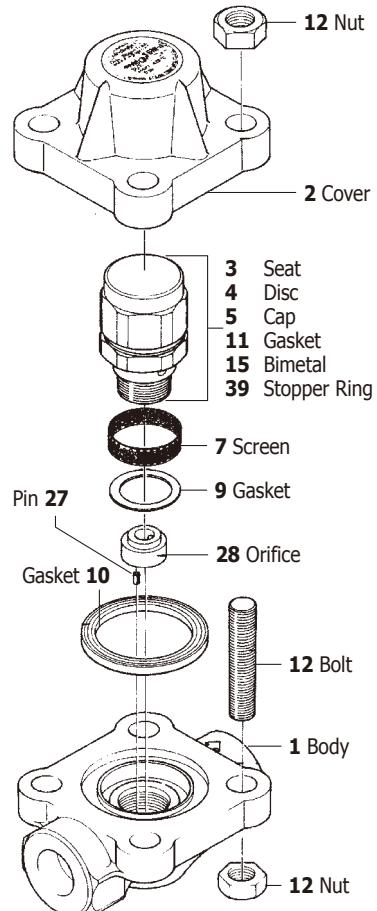
S55N/S55H



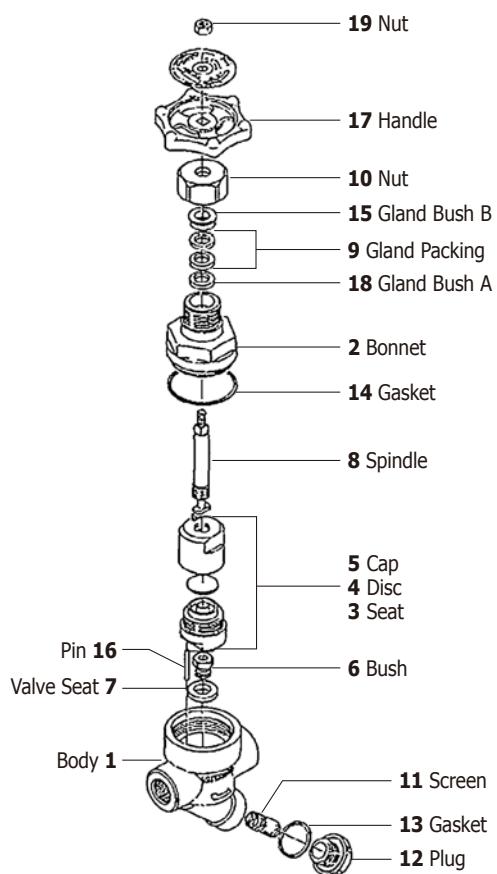
SU2N/SU2H



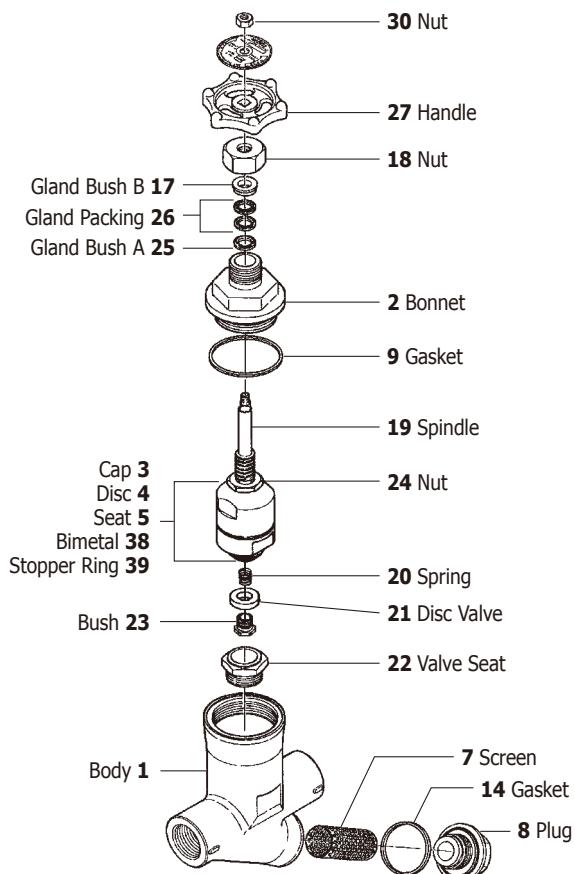
S61N/S62N



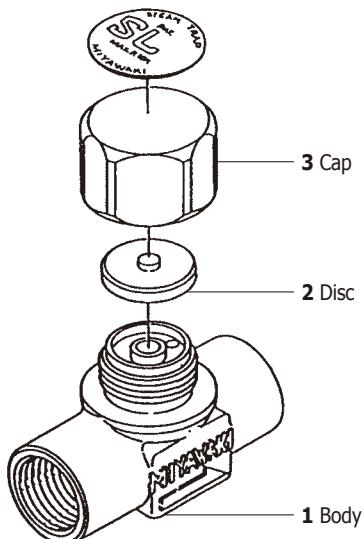
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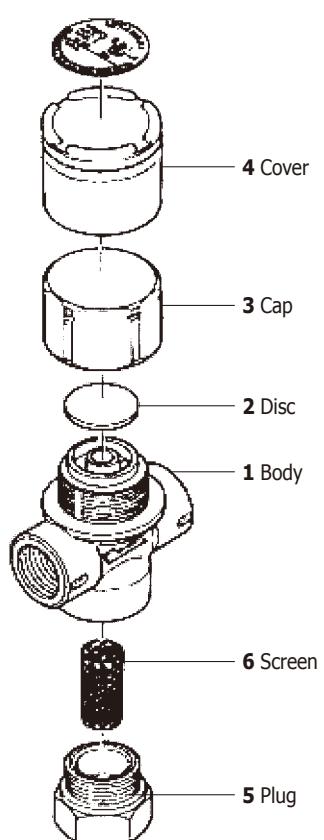
SV-N

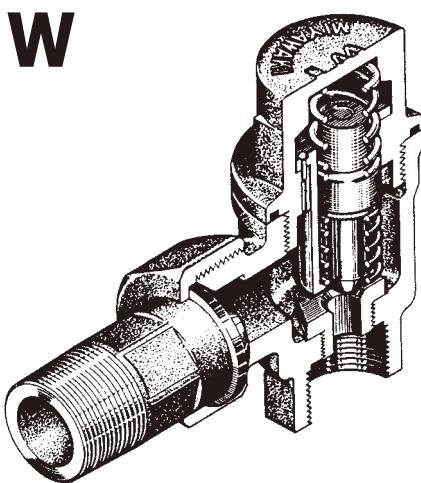


SL3



SD1



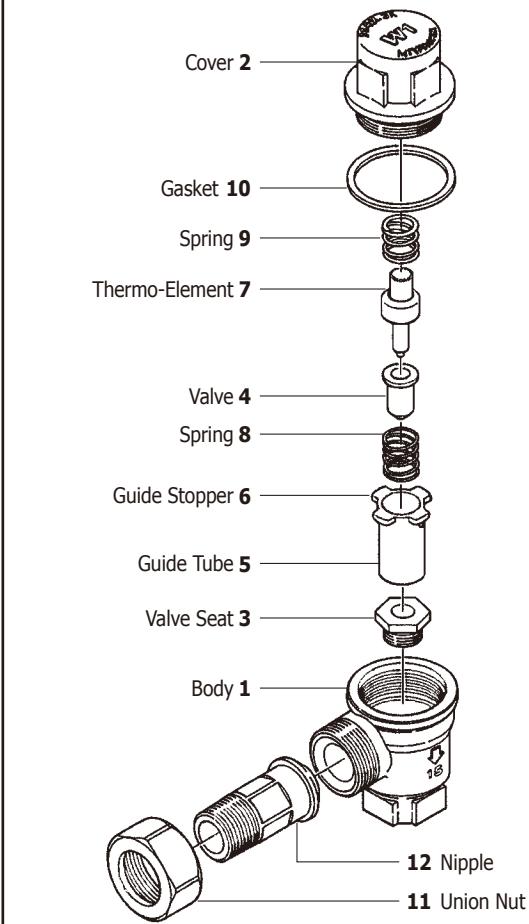
**SERIES W Thermostatic Radiator Trap**

W1

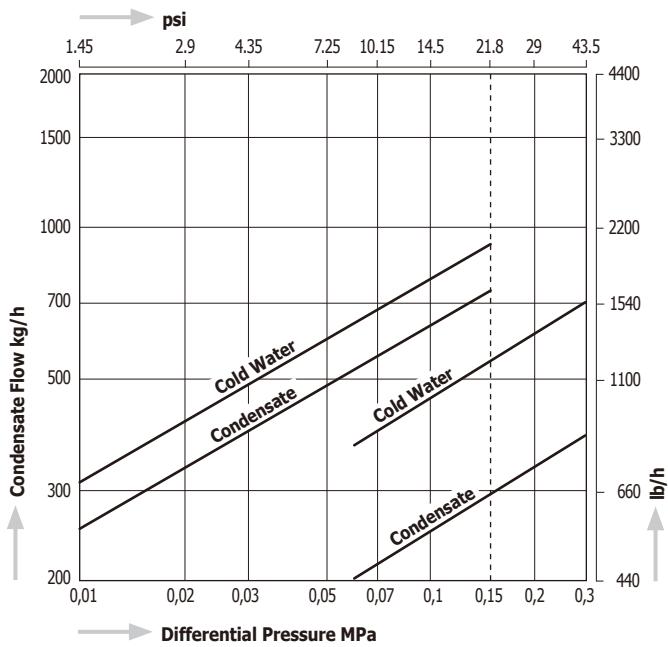


W2

W1, W2, W3



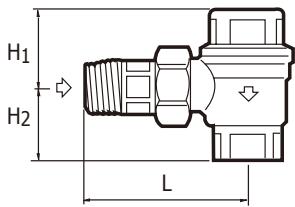
Capacity Chart W1, W2, W3

**The opening temperature of the valve is preset**

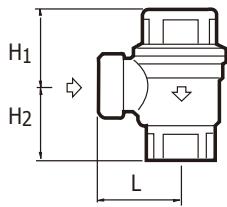
- at about 97°C (207° F) for W1-1,5, W2-1,5 and W3-1,5
- at about 115°C (239° F) for W1-3, W2-3 and W3-3

## Dimensions

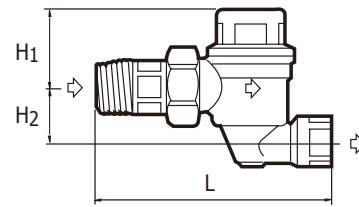
W1



W2



W3



Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight	
			MPa	psig	°C	°F	L	H1	H2	L	H1	H2		kg	lb
<b>W1-1,5</b>	Screwed Rc, NPT	1/2"	0,15	21.8	150	302	80	35	3.1	1.4	Brass C3771		0,5	1.1	
		3/4"					87	41	3.4	1.6			0,6	1.3	
<b>W1-3</b>	Screwed Rc, NPT	1/2"	0,3	43.5	150	302	80	35	3.1	1.4			0,5	1.1	
		3/4"					87	41	3.4	1.6			0,6	1.3	
<b>W2-1,5</b>	Screwed Rc, NPT	1/2"	0,15	21.8	150	302	35	35	1.4	1.4	Brass C3771		0,4	0.9	
		3/4"					42	41	1.4	1.6			0,5	1.1	
<b>W2-3</b>	Screwed Rc, NPT	1/2"	0,3	43.5	150	302	35	35	1.4	1.4			0,4	0.9	
		3/4"					41	41	1.4	1.6			0,5	1.1	
<b>W3-1,5</b>	Screwed Rc, NPT	1/2"	0,15	21.8	150	302	123	28	4.8	1.1	Brass C3771		0,6	1.3	
		3/4"					135	34	5.3	1.4			0,7	1.5	
<b>W3-3</b>	Screwed Rc, NPT	1/2"	0,3	43.5	150	302	123	28	4.8	1.1			0,6	1.3	
		3/4"					135	34	5.3	1.4			0,7	1.5	

# Inverted Bucket Steam Traps

## SERIES E

**Inverted Bucket Steam Traps** belong to the family of mechanical traps. They operate on the difference in density between steam and water. MIYAWAKI offers a very wide range of inverted bucket steam traps for small up to large condensate loads. Inverted bucket steam traps discharge the condensate intermittently.

<b>Models ER</b>	Cast Iron Inverted Bucket Steam Traps for medium up to high condensate loads
<b>ES</b>	Cast Iron Inverted Bucket Steam Traps for small up to medium condensate loads
<b>ESH, ER25</b>	Cast Steel Inverted Bucket Steam Traps for high pressure and small up to high condensate loads
<b>ESU</b>	Stainless Steel Inverted Bucket Steam Traps for small up to medium condensate loads

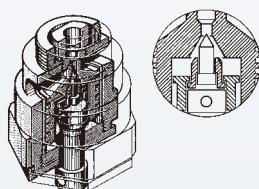
### Features

- All traps are equipped with stainless steel wear and corrosion resistant lever, valve and seat system for long and troubleless life.
- All valves and seats are lapped together.
- Traps of the series E contain the patented SCCV® (Self Closing and Centering Valve) – System, which increases the lifetime of the valve and seat substantially.
- A small hole in the top of the bucket secures continuous automatic air venting.
- All traps are designed for quick and easy inline repairability.
- Withstands high back pressure (up to 90%).

### Application

Heat exchangers, dryers, unit heaters, sterilizers and other applications, where condensate must be removed immediately

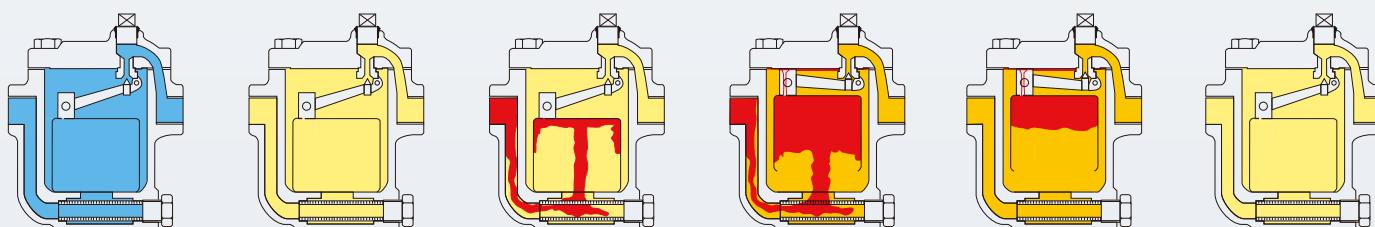
### Super-Discharger



1. Incorporates the **MIYAWAKI SCCV®-System** (see pages 88 – 89)
2. Double valve system with needle pilot valve and main valve (for ER Type)
3. Operates by the pressure difference inside the valve unit
4. Makes the discharge capacity very large
5. Designed for high pressure up to 6,4 MPa (925 psig) – only for ER25

### Operating principle

cold condensate   hot condensate   steam



1 & 2

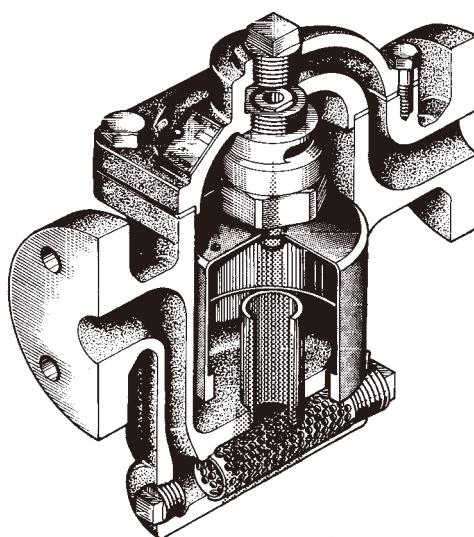
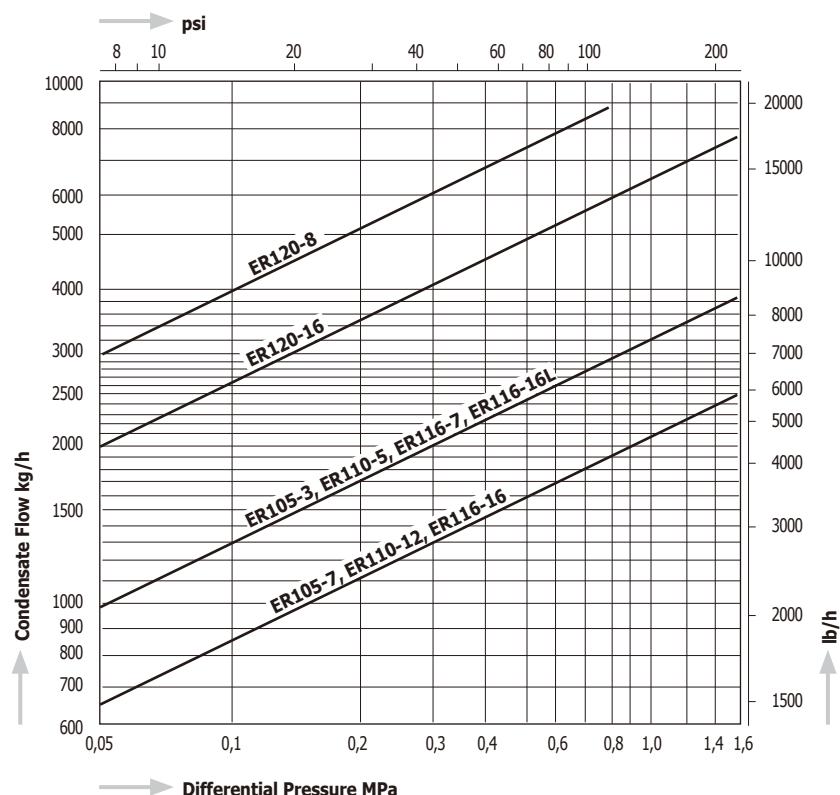
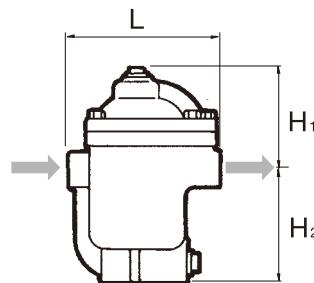
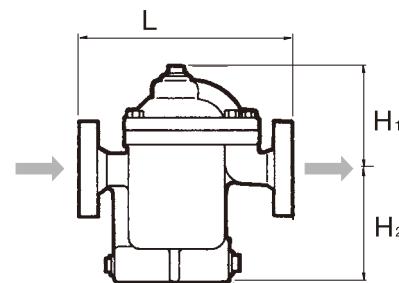
3 & 4

5 & 6

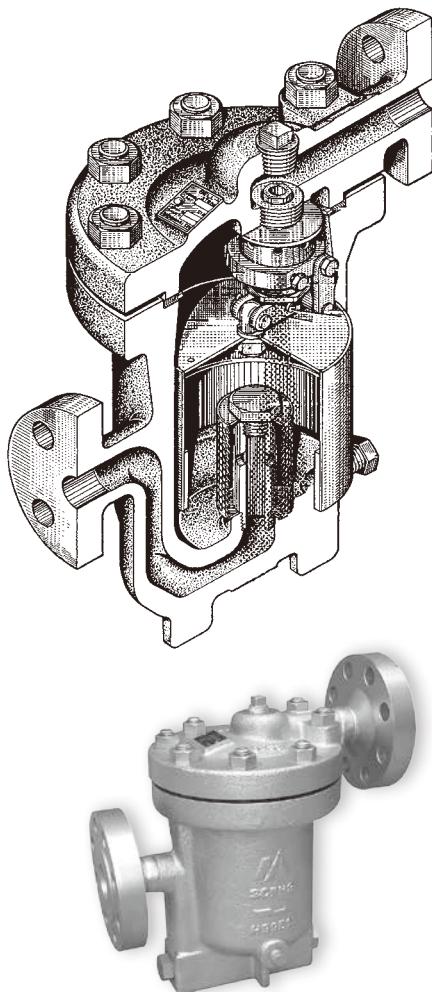
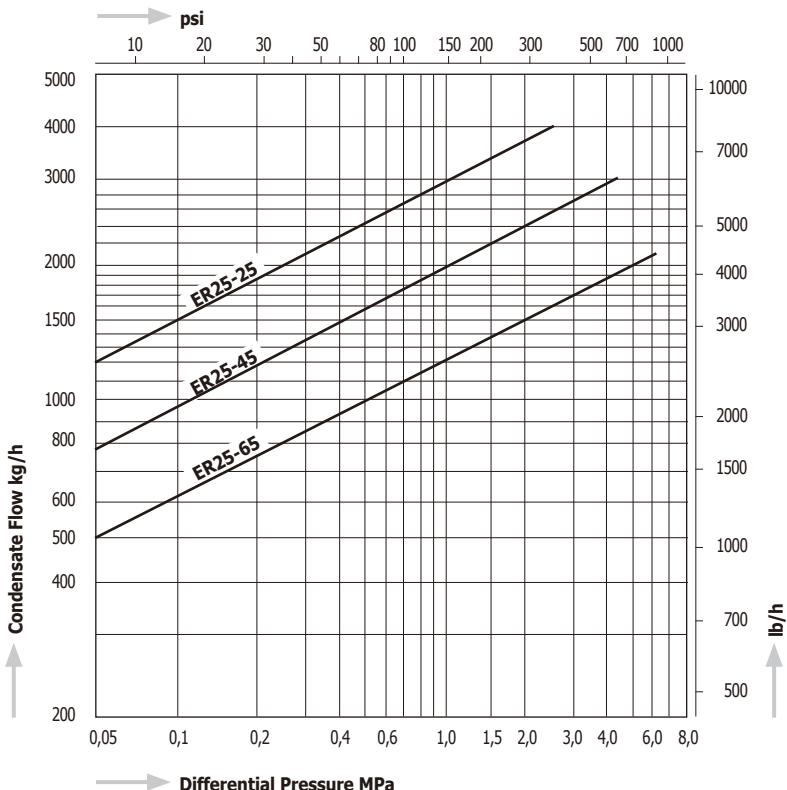
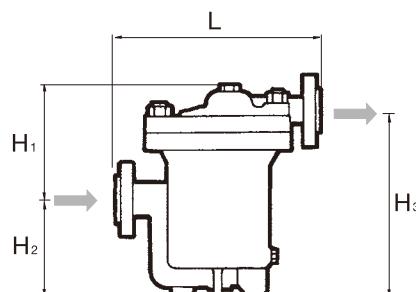
On start-up the bucket is down and the valve is open. Low temperature condensate and air, later high temperature condensate enter the trap. The condensate fills the bucket and the trap body completely. As the bucket is completely submerged in the water, it lies on the bottom of the trap, the valve is wide open and condensate will discharge.

Steam enters the trap under the bottom of the bucket. The more steam is entering the trap, the more it collects at the top of the bucket, causing the bucket to move upwards (buoyancy of the bucket inside the water). At the top position of the bucket the valve will close the seat.

Air and gases pass through a small hole in the top of the bucket and collect at the top of the trap. Steam is also passing through the hole and condensing. When more condensate is entering the trap, the bucket will lose its buoyancy and will move down. The valve will open and condensate will discharge.

**SERIES E Inverted Bucket Trap – Low Pressure / Large Capacity****ER****Capacity Chart ER****Dimensions****ER105****ER105F, ER110, ER116, ER120**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight						
			MPa	psig	°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	L	H <sub>1</sub>	H <sub>2</sub>		kg	lb					
<b>ER105 - 3</b>	Screwed Rc, NPT	$\frac{3}{4}'' - 1\frac{1}{2}''$	0,3	43			190	155	134	7.5	6.1	5.3		10,2	22.5					
			0,7	100																
<b>ER105F - 3</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}'' - 1''$	0,3	43			254	155	134	10.0	6.1	5.3		Cast Iron FC250	13,6 29.9					
		$1\frac{1}{4}'' - 2''$																		
		$\frac{1}{2}'' - 1''$	0,7	100			260	155	134	10.2	6.1	5.3								
		$1\frac{1}{4}'' - 2''$																		
<b>ER110 - 5</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}'' - 1''$	0,5	73			254	200	140	10.0	7.9	5.5		Cast Iron FC250	13,6 29.9					
		$1\frac{1}{4}'' - 2''$																		
		$\frac{1}{2}'' - 1''$	1,2	174			254	200	140	10.0	7.9	5.5								
		$1\frac{1}{4}'' - 2''$																		
<b>ER116 - 7</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}'' - 1''$	0,7	100			300	230	132	11.8	9.1	5.2		Ductile Cast Iron FCD450	19,0 41.8					
		$1\frac{1}{4}'' - 2''$																		
		$\frac{1}{2}'' - 1''$	1,6	230			300	230	132	11.8	9.1	5.2								
		$1\frac{1}{4}'' - 2''$																		
<b>ER120 - 8</b>	Flanged JIS, ASME, DIN	$1\frac{1}{2}'' - 2\frac{1}{2}''$	0,8	116			220	400	220	217	15.8	8.7	8.5	Cast Iron FC250	46,0 101.2					
			1,6	230																

**ER25****Capacity Chart ER25****Dimensions ER25****\* Available options ER25**

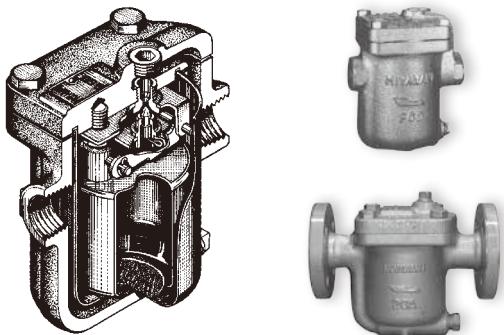
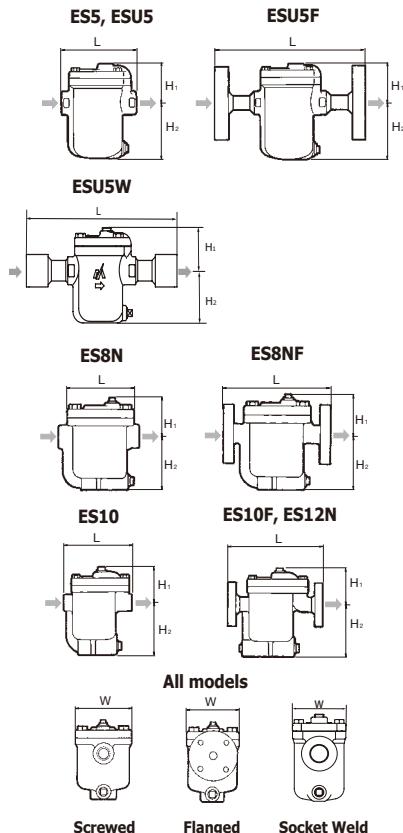
Max. operating temperature 470°C (878°F)  
with body material WC6

**Table 1: Dimensions**

Size	Flange Standards							L (mm)	L (in)
	JIS 10 – 40 K		ASME 150 lb / 300 lb RF		DIN PN40				
½ " – 1" (DN15 – 25)	ASME 600 lb RF		ASME 150 – 600 lb RJ		DIN PN63 / PN100 (DN15 / DN20)			340	13.4
	JIS 63 K		ASME 900 lb RF / RJ		DIN PN63 / PN100 (DN25)			345	13.6
	JIS 10 – 40 K		ASME 150 – 600 lb RF / RJ		–			380	15.0
1¼ " – 2" (DN32 – 50)	JIS 63 K		ASME 900 lb RF / RJ		DIN PN40 / PN63 / PN100			400	15.8

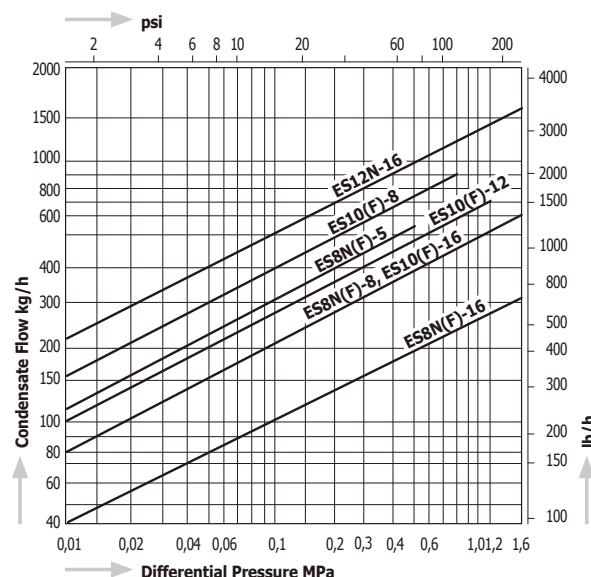
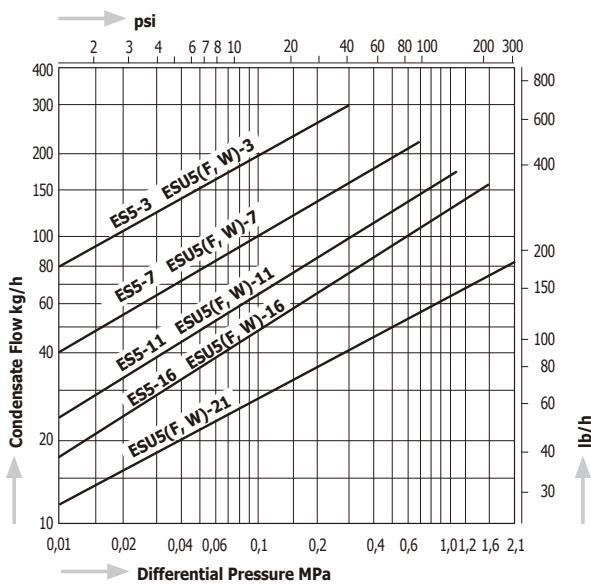
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	H3	L	H1	H2	H3	kg	lb	
ER25 -	Flanged JIS, ASME, DIN	½ " – 2"	2,5	360	425*	800	Table 1	210	180	345	Table 1	8.3	7.1	13.6	Cast Steel SCPH2	½ " – 1" 51	112.2
			4,4	640											1¼ " – 2" 58	127.6	
			6,4	925													
ER25W -	Socket Weld JIS, ASME, DIN	½ " – 2"	2,5	360	425*	800	½ " – 1½ " 340 2" 380	210	180	345	½ " – 1½ " 13.4 2" 15.0	8.3	7.1	13.6	Cast Steel SCPH2	48	105.6
			4,4	640													
			6,4	925													

**Stainless Steel as body material is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.**

**SERIES E Inverted Bucket Trap – Low Pressure****ES****Dimensions****Available options**

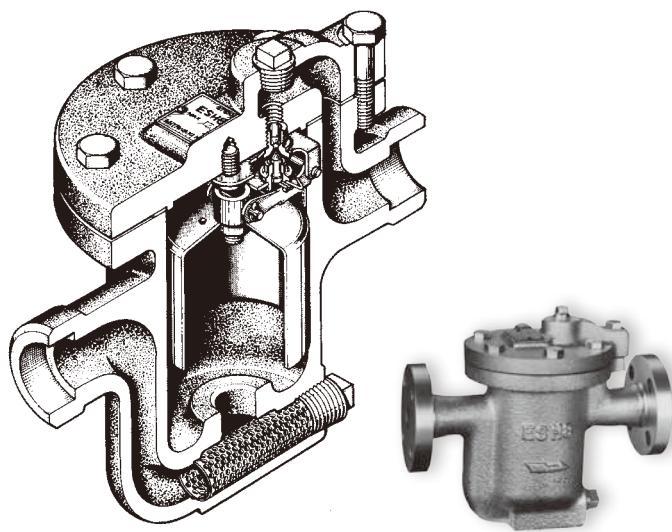
Depending on the Maximum Operating Pressure the following models are available:

Model	Max. Operating Pressure		
	MPa	psig	
<b>ES5 - 3</b>	0,3	43	
<b>ES5 - 7</b>	0,7	100	
<b>ES5 - 11</b>	1,1	160	
<b>ES5 - 16</b>	1,6	230	
<b>ES5 - 3</b>	0,3	43	
<b>ES5 - 7</b>	0,7	100	
<b>ES5 - 11</b>	1,1	160	
<b>ES5 - 16</b>	1,6	230	
<b>ES5 - 21</b>	2,1	305	
<b>ES8N - 5</b>	0,5	73	
<b>ES8N - 8</b>	0,8	116	
<b>ES8N - 16</b>	1,6	230	
<b>ES10 - 8</b>	0,8	116	
<b>ES10 - 12</b>	1,2	174	
<b>ES10 - 16</b>	1,6	230	

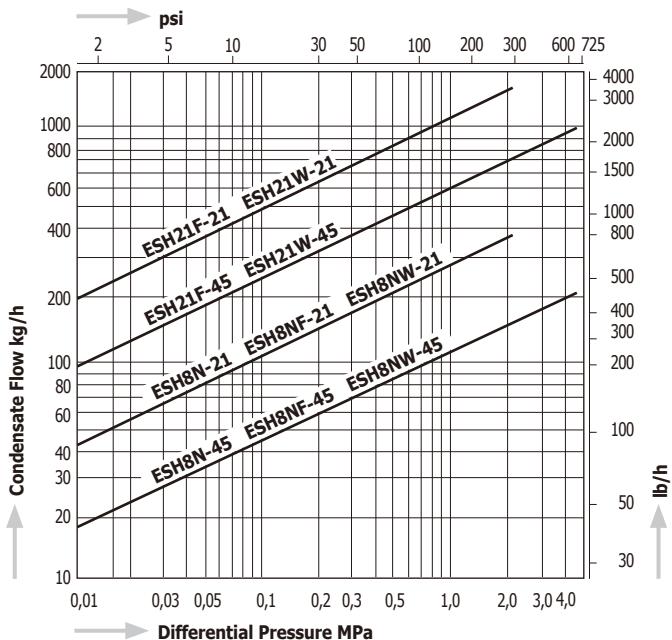
**Capacity Chart ES**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
<b>ES5</b>	Screwed Rc, NPT	1/2"	1,6	230			103	59	67	75	4.1	2.3	2.6	3.0	Ductile Cast Iron FCD450	1,9	4.2
		3/4"					105	57	69		4.1	2.2	2.7			1,9	4.2
		1"					109				4.3					2,0	4.4
<b>ESU5</b>	Screwed Rc, NPT	1/2"	2,1	305			103	57	69	75	4.1			3.0	Stainless Steel SCS13A	1,9	4.2
		3/4"					105	57	69		4.1	2.2	2.7			2,0	4.4
		1"					109				4.3					2,1	4.6
<b>ESU5F</b>	Flanged JIS, ASME, DIN	1/2"	2,1	305			175	57	69	75	6.9			3.0	Stainless Steel SCS13A	3,5	7.7
		3/4"					195	57	69		7.7	2.2	2.7			3,7	8.2
		1"					215				8.5					4,1	9.0
<b>ESU5W</b>	Socket Weld JIS, ASME, DIN	1/2"	2,1	305			203			75	8.0			3.0	Stainless Steel SCS13A	2,5	5.5
		3/4"					230	57	69		9.1	2.2	2.7			2,6	5.7
		1"					254				10.0					2,8	6.2
<b>ES8N</b>	Screwed Rc, NPT	1/2"	1,6	230			130	73	90	100	5.1	2.9	3.5	3.9	Ductile Cast Iron FCD450	3,7	8.2
		3/4"					135				5.3					3,9	8.6
		1"					175	73	90		6.9	2.9	3.5			5,3	11.7
<b>ES8NF</b>	Flanged JIS, ASME, DIN	1/2"	1,6	230			195	68	95	100	7.7	2.7	3.7	3.9	Ductile Cast Iron FCD450	5,7	12.5
		3/4"					215				8.5					6,8	15.0
		1"					254				10.0					9,3	20.5
<b>ES10</b>	Screwed Rc, NPT	3/4" - 1 1/2"	1,6	230			190	102	134	120	7.5	4.0	5.3	4.7	Cast Iron FC250	12,7	28.0
		1/2" - 1"					254	102	134		10.0	4.0	5.3			14,2	31.2
		1 1/4" - 2"					260				10.2					13,5	29.7
<b>ES10F</b>	Flanged JIS, ASME, DIN	1/2" - 1"	1,6	230			270	140	140	120	10.6	5.5	5.5	4.7	Cast Iron FC250	15,1	33.2
		1 1/4" - 2"					280	150	130		11.0	5.9	5.1				
<b>ES12N</b>																	

# ESH

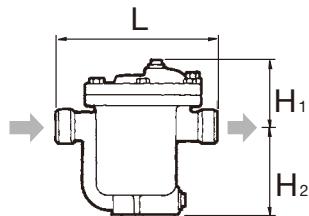


Capacity Chart ESH

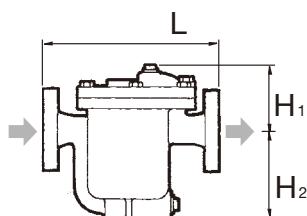


## Dimensions

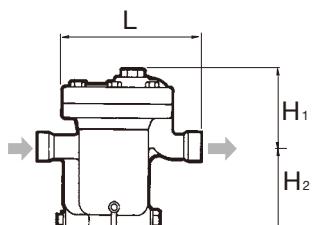
ESH8N, ESH8NW



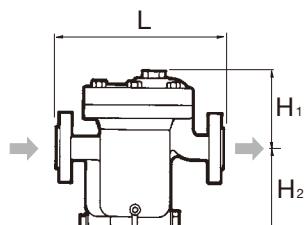
ESH8NF



ESH21W

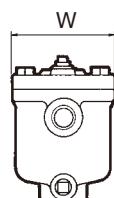


ESH21F

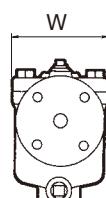


All models

Screwed, Socket Weld

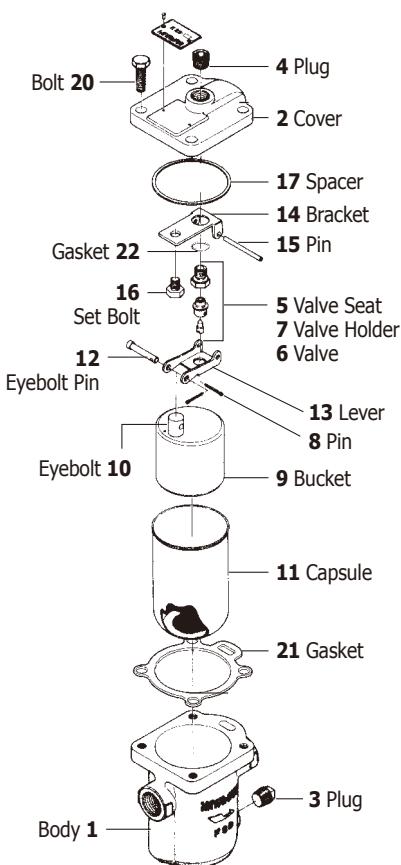
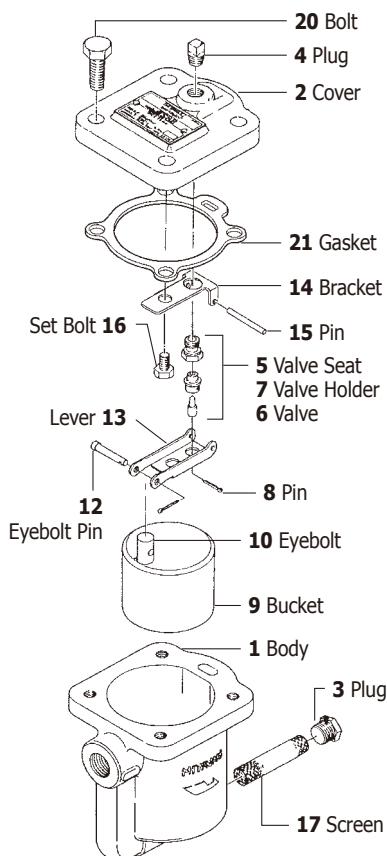
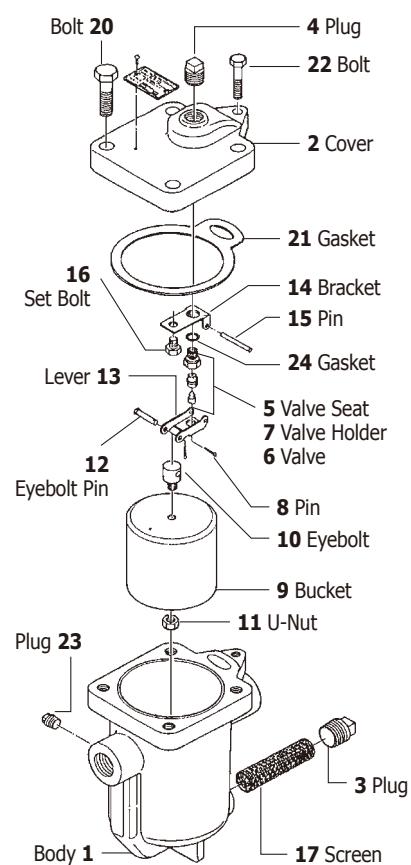
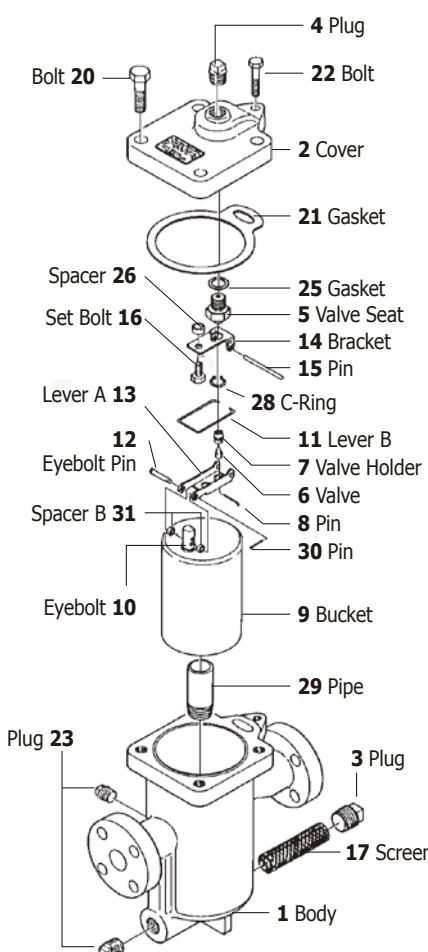
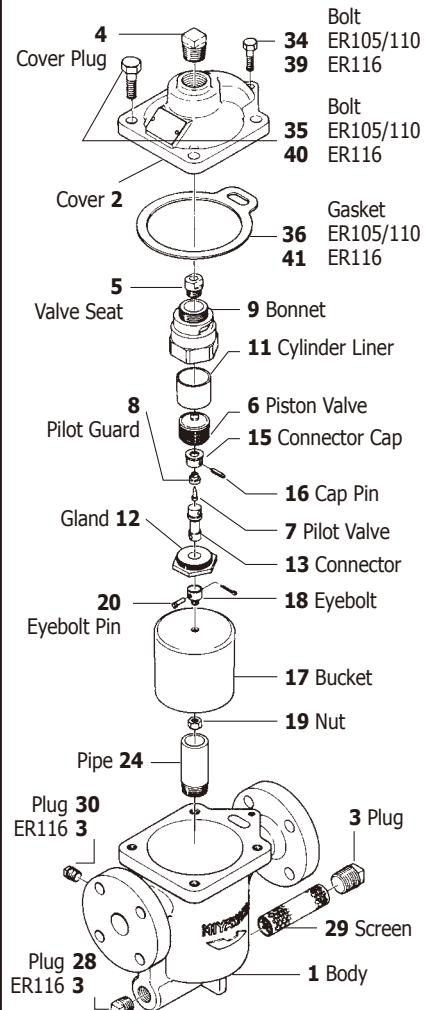
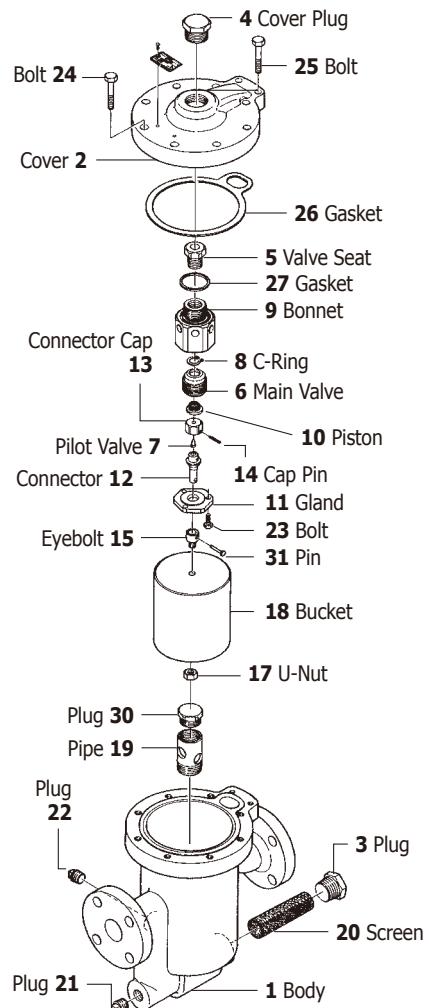


Flanged

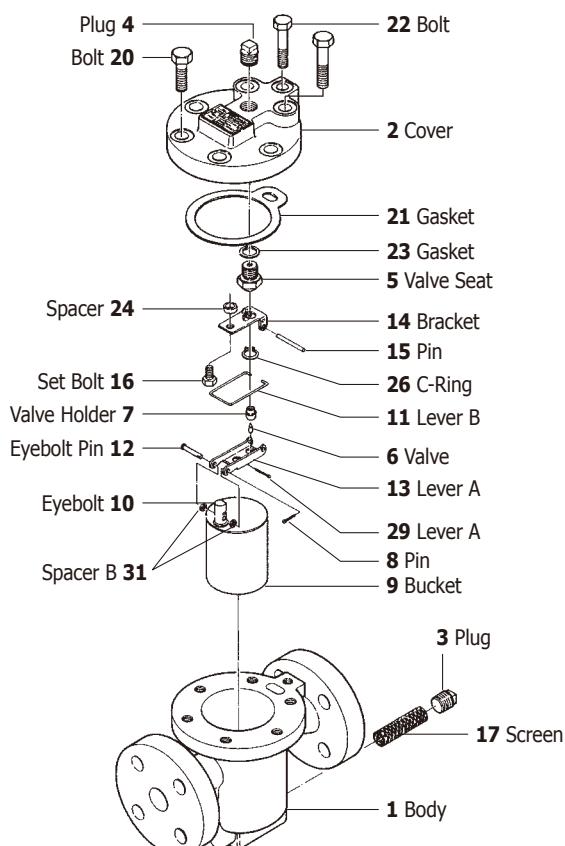


Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight			
			MPa	psig	°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	W	L	H <sub>1</sub>	H <sub>2</sub>	W	kg	lb	
<b>ESH8N - 21</b> <b>45</b>	Screwed Rc, NPT	1/2" - 1"	2,1	305			1/2" - 3/4" = 220 1" = 224	114	111	146	1/2" - 3/4" = 8.7 1" = 8.8	4.5	4.4	5.7	Cast Steel SCPH2	11,0	24.2
			4,4	640													
<b>ESH8NF - 21</b> <b>45</b>	Flanged JIS, ASME, DIN	1/2" - 1"	2,1	305			250	114	111	146	9.8	4.5	4.4	5.7	Flanged	1/2", 3/4" = 12,3 1" = 13,1	27.1 28.8
			4,4	640													
<b>ESH8NW - 21</b> <b>45</b>	Socket Weld JIS, ASME, DIN	1/2" - 1"	2,1	305			400	114	111	146	8.7	4.5	4.4	5.7	Cast Steel SCPH2	11,0	24.2
			4,4	640													
<b>ESH21F - 21</b> <b>45</b>	Flanged JIS, ASME, DIN	1/2" - 1"	2,1	305			752	145	160	205	13.8	5.7	6.3	8.1	Flanged	31,0	68.2
			4,4	640													
<b>ESH21W - 21</b> <b>45</b>	Socket Weld JIS, ASME, DIN	1/2" - 1"	2,1	305			300	145	160	205	11.8	5.7	6.3	8.1	Flanged	28,0	61.6
			4,4	640													

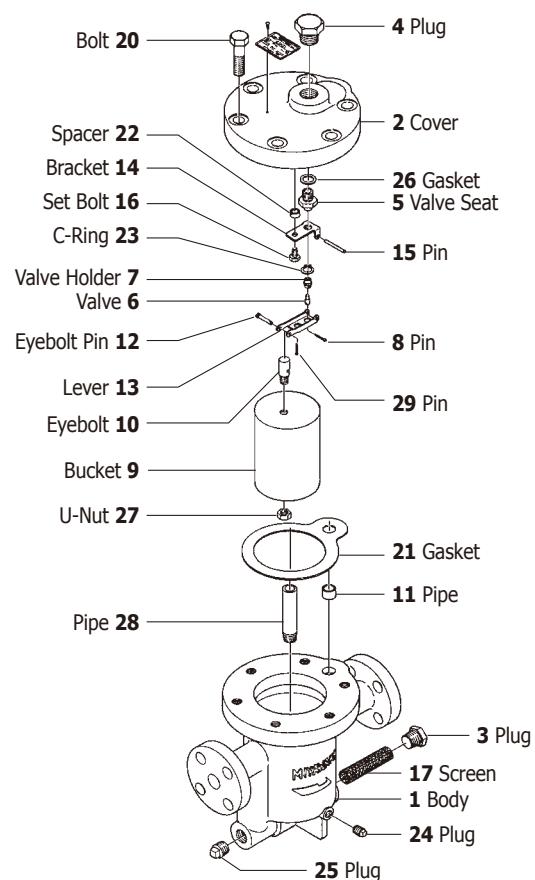
Stainless Steel as body material is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

**SERIES E Spare Parts****ES5/ESU5****ES8N****ES10****ES12N****ER105/110/116****ER120**

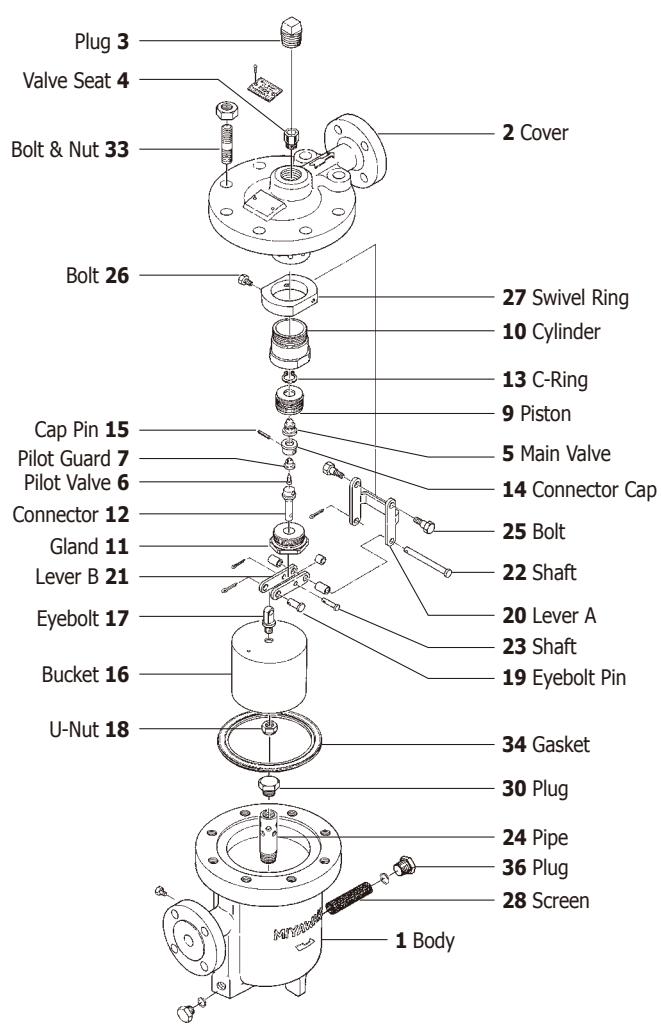
ESH8N



ESH21



ER25



MEMO

# Ball Float Steam Traps

## SERIES G

**Ball Float Steam Traps** belong to the family of mechanical traps. They operate on the difference in density between steam and water. A ball float is connected with a lever to the valve and seat or it is floating freely inside the valve body. Condensate will be discharged once it reaches a certain level inside the trap. Condensate is discharged continuously.

<b>Models</b>	<b>G11N, G12N</b>	Cast Iron Steam Traps for small and medium condensate loads
	<b>G15N</b>	Cast Iron Steam Trap for low pressure and large condensate loads
	<b>G3N, G5</b>	Ductile Cast Iron Steam Traps for large condensate loads
	<b>G2-G8</b>	Cast Iron Steam Traps for large condensate loads
	<b>G20N</b>	Ductile Cast Iron Steam Trap for medium condensate loads
	<b>GH3N, GH5, GH2-GH8, GH50, GH60, GH70</b>	Cast Steel Steam Traps for large condensate loads
	<b>GH40, GTH12</b>	Cast Steel Steam Traps for medium condensate loads
	<b>GC1, GC1V</b>	Stainless Steel Steam Traps for small condensate loads
	<b>GC20</b>	Stainless Steel Steam Trap for medium condensate loads

### Features

- All traps are equipped with stainless steel wear and corrosion resistant float, lever, valve and seat systems for a long and problem free operation.
- Each ball float steam trap is equipped with an air vent for venting air and gases at the time of start-up and during operation.
- The large capacity steam traps like G2-G8,GH2-GH8 use a double ported balance valve system, which is small in its physical size compared with the very high capacity of the traps.
- All traps are designed for quick and easy maintenance.

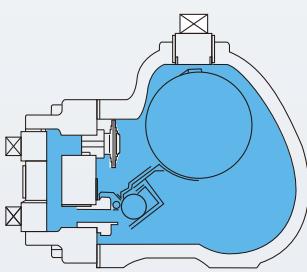
### Application

Ball Float Steam Traps can be used in all process applications, like all kind of heat exchangers, tank and unit heaters and others, where condensate must be removed immediately after it forms.

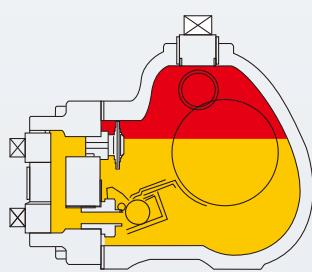
The type GC1 is especially designed for applications in the food, pharmaceutical and other industries with small condensate loads and the need for stainless steel bodies. It can be also installed for drainage of steam main lines.

### Operating principle

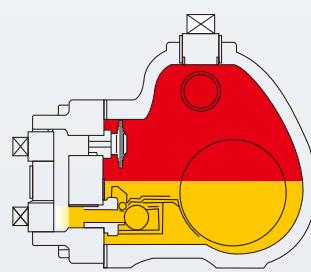
■ cold condensate ■ steam / hot air ■ hot condensate



1



2

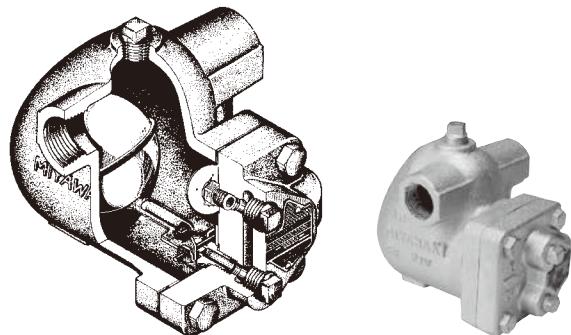


3

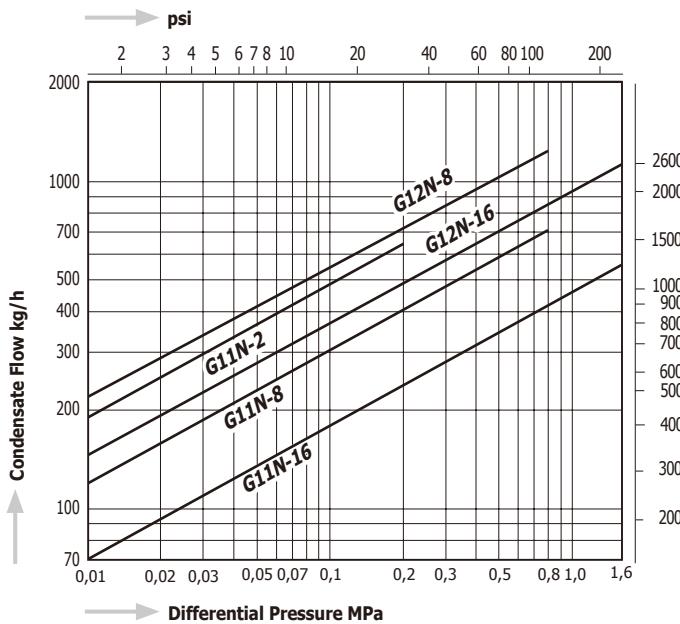
On start-up air is quickly discharged through the thermostatic air vent (membrane or bimetal type). Cold condensate fills the steam trap body. As soon as a certain water level is reached, the float rises and opens the valve. The cold condensate is discharged through the open valve and the open air vent.

When the condensate reaches saturation temperature, the air vent closes and condensate is discharged only through the main valve orifice. The condensate forms a water seal inside the trap body, which prevents live steam loss at all times.

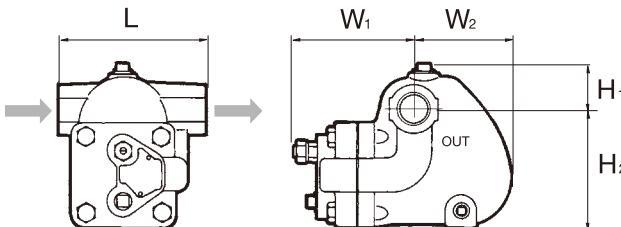
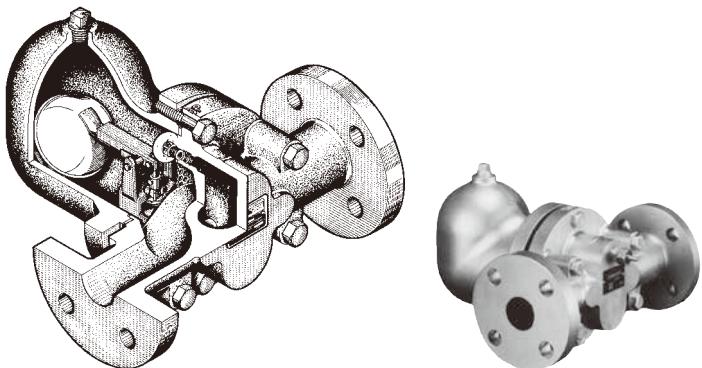
The opening degree of the valve is regulated by the water level inside the trap body. Condensate is discharged continuously. As long as air enters the trap and accumulates at the top of the trap body, the temperature cools down a little bit and the air vent, which opens slightly below saturation temperature, begins to discharge the air from the trap.

**G11N, G12N**

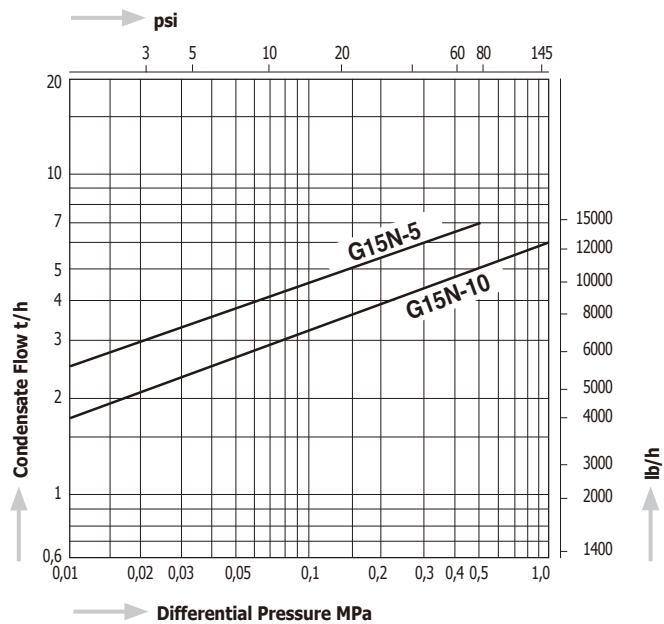
Capacity Chart G11N, G12N



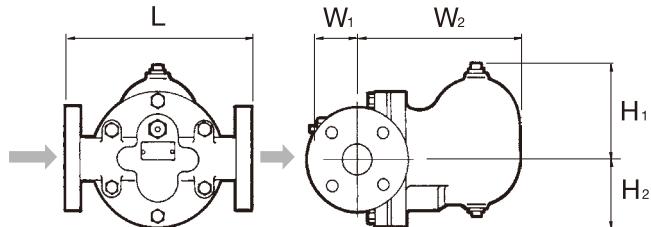
Dimensions G11N, G12N

**G15N**

Capacity Chart G15N

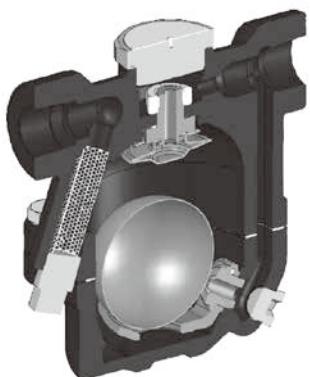


G15N



Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	W1	W2	L	H1	H2	W1	W2	kg	lb	
G11N - 8	Screwed Rc, NPT	1/2", 3/4"	0,2	29	220	428	120	37	92	97	60	4.7	1.5	3.6	3.8	2.4	Cast Iron FC250	3,9	8.6
			0,8	116															
			1,6	230															
G12N - 8	Screwed Rc, NPT	3/4", 1"	0,8	116	220	428	140	47	113	102	92	5.5	1.9	4.4	4.0	3.6	Cast Iron FC250	6,0	13.2
			1,6	230															
G15N - 10	Flanged JIS, ASME, DIN	1 1/4" - 2"	0,5	73	220	428	300	130	90	30	230	11.8	5.1	3.5	1.2	9.1	Cast Iron FC250	20,0	44.0
			1,0	145															

For G11N and G12N, flanged connection is available as special design. Please contact MIYAWAKI Inc. or an authorized representative.

**G20N**

Screwed



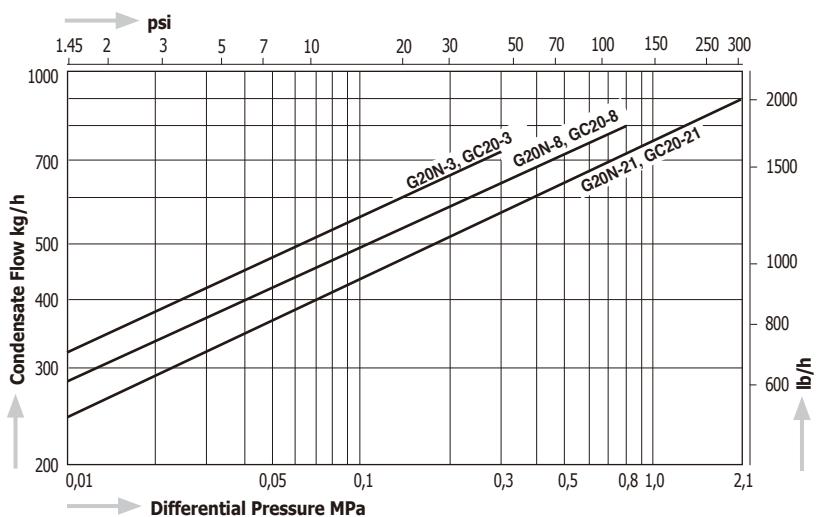
Flanged Connection

**GC20**

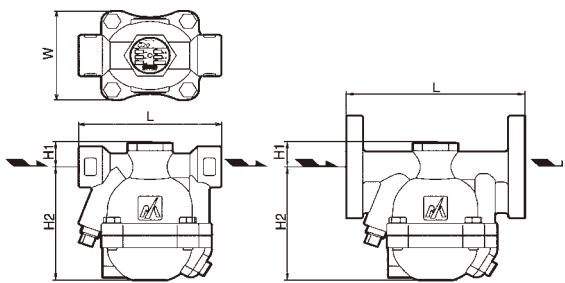
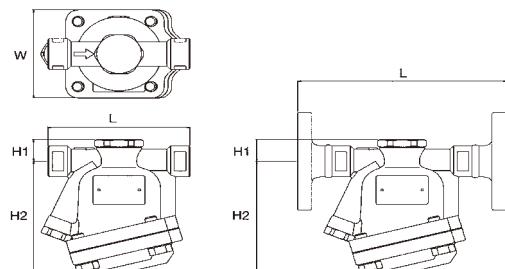
Screwed



Flanged Connection

**Capacity Chart G20N / GC20****Available versions G20N / GC20****Max. Operating Pressure:**

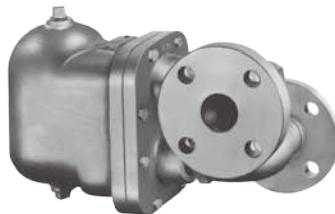
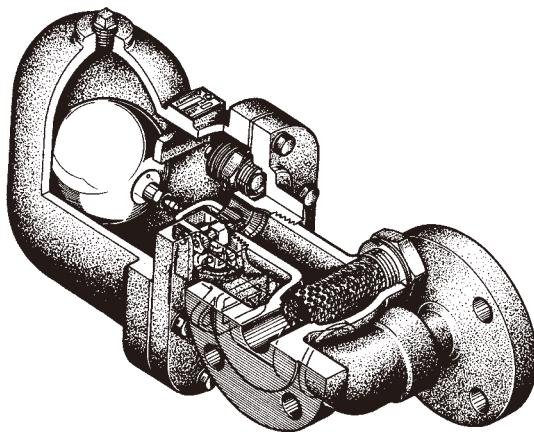
G20N (GC20)- 3 0,3 MPa (43 psig)  
 G20N (GC20)- 8 0,8 MPa (116 psig)  
 G20N (GC20)- 21 2,1 MPa (305 psig)

**Dimensions G20N****Dimensions GC20**

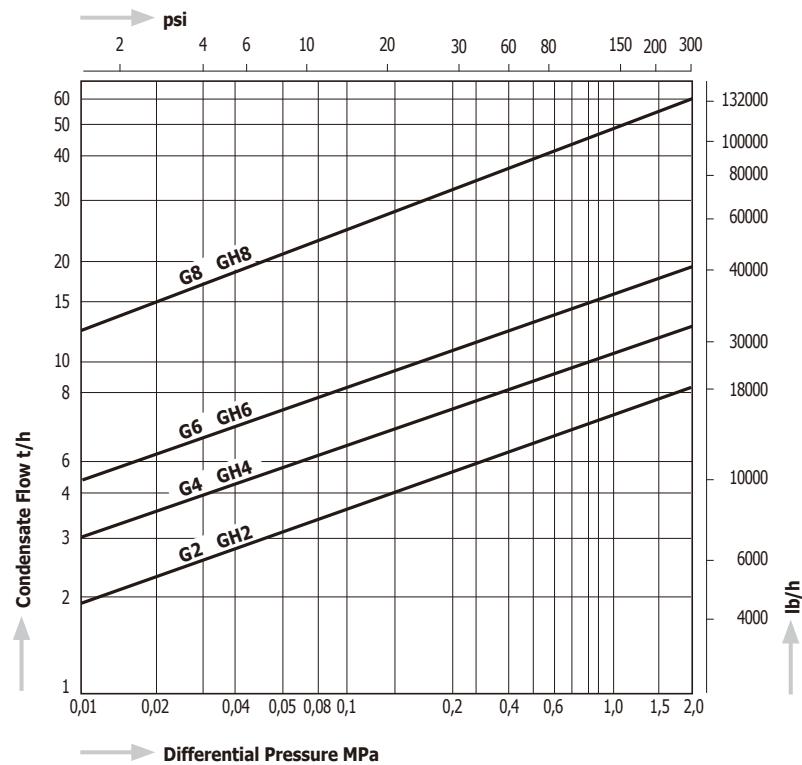
Model	Connections	Size	Max. Operating Pressure, PMO		Max. Operating Temperature, TMO		Dimensions (mm)			Dimensions (in)			Body Material	Weight				
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb		
<b>G20N</b>	Screwed Rc, NPT	1/2"					120	24	105	82	4.7	1.0	4.1	3.2		2,5 2,5 2,6		
		3/4"							105				4.1					
		1"							107				4.2					
<b>G20NF</b>	Flanged JIS, ASME	1/2"	2,1	305	220	428	150	24	5.9	82	5.9	6.3	1.0	4.1	3.2	Ductile Cast Iron FCD450	3,7* 4,2* 4,8*	
		3/4"							150				5.9					
		1"							160				6.3					
	Flanged DIN	DN15					150	24	5.9				5.9					
		DN20					150		5.9				5.9					
<b>GC20</b>	Screwed Rc, NPT	1/2"					120	21	113	86	4.7	0.8	4.4	3.4			2,4 2,4 2,5	
		3/4"							175				6.9					
		1"							195				7.7					
<b>GC20F</b>	Flanged JIS, ASME	1/2"	2,1	305	220	428	215	21	113	86	4.7	0.8	4.4	3.4	Stainless Steel SCS13A	3,9* 5,0* 5,8*		
		3/4"							215				8.5					
		1"							150	21	113	86	5.9	0.8	4.4	3.4		
	Flanged DIN	DN15							150				5.9					
		DN20							160				6.3					
		DN25																

\*Depending on the flange rating the weight may differ.

# G2, G4, G6, G8 GH2, GH4, GH6, GH8

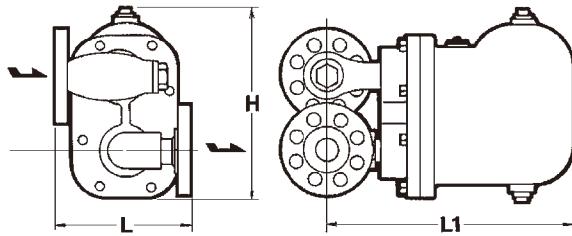


Capacity Chart

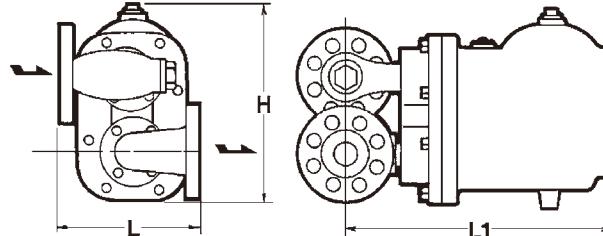


## Dimensions

## G2 / GH2

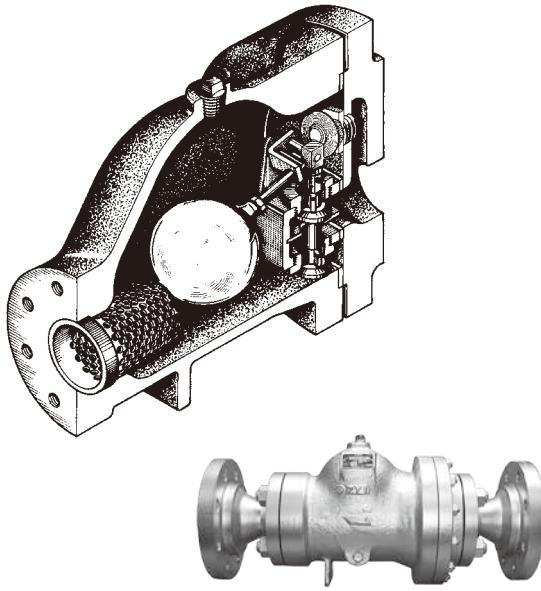


## G4, G6, G8 / GH4, GH6, GH8

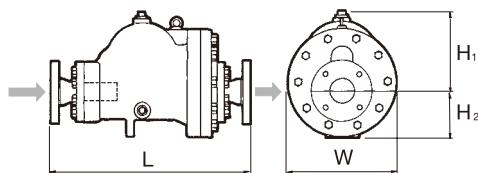


Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material	Weight	
			MPa	psig	°C	°F	L	L1	H	L	L1	H		kg	lb
<b>G2</b>	Flanged JIS, ASME, DIN	1"	1,6	230	220	428	175	310	250	6.9	12.2	9.8	Cast Iron FC250	21	46.2
		1 1/4"					180			7.1					
		1 1/2" - 2"					190			7.5					
<b>G4</b>		1 1/4" - 2"					200	380	320	7.9	14.9	12.6		38	83.6
<b>G6</b>		1 1/2" - 3"					270	410	350	10.6	16.1	13.8		62	136.4
<b>G8</b>		3" , 4"					350	570	480	13.8	22.4	19.9		147	323.4
<b>GH2</b>	Flanged JIS, ASME, DIN	1" - 1 1/2"	2,0	290	400	752	200	310	235	7.9	12.2	9.1	Cast Steel SCPH2	24	52.8
		2"					210			8.3					
		1 1/4" - 2"					200	380	320	7.9	14.9	12.6		43	94.6
<b>GH4</b>		1 1/2" - 3"					270	415	345	10.6	16.3	13.6		68	149.6
<b>GH6</b>		3" , 4"					350	590	470	13.8	23.2	18.5		162	356.4
<b>GH8</b>															

# G3N, G5 GH3N, GH5



Dimensions G3N-R, G5-R, GH3N-R, GH5-R



Capacity Chart

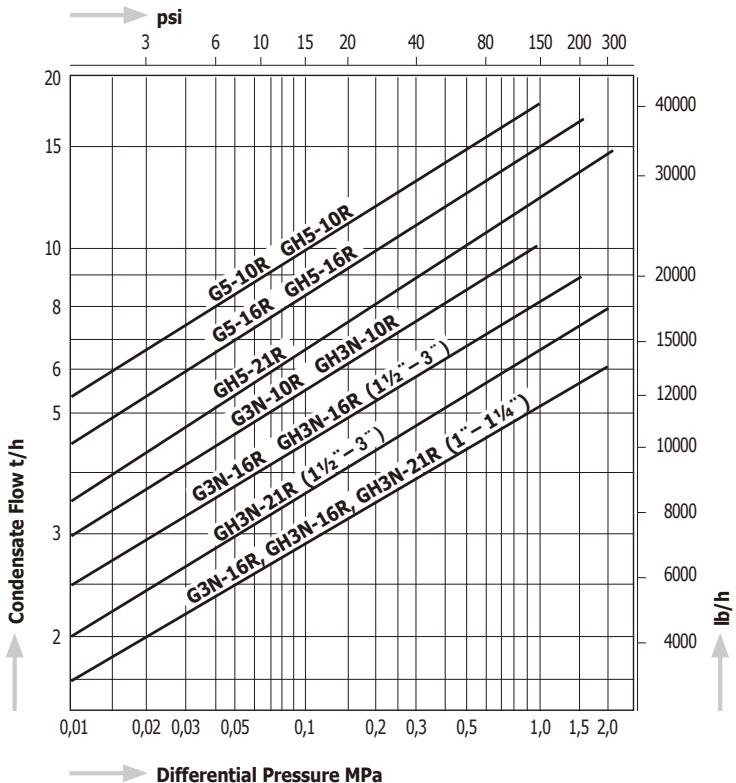


Table 1: Dimensions (ASME and DIN)

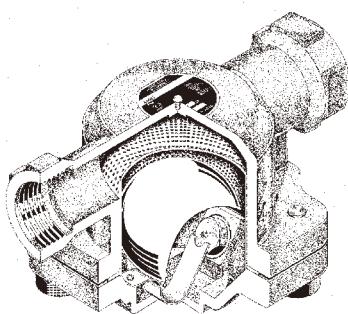
Model	Size	Flange Standards		L (mm)	L (in)	Model	Size	Flange Standards		L (mm)	L (in)
G3N-R	1" - 1 1/2"	ASME 150 lb / 300 lb RF	DIN PN16 (DN25 / DN32 / DN40)	437	17.2	G5-R	2"	DIN PN16 (DN50)		540	21.3
	2"		DIN PN16 (DN50)	467	18.4		2 1/2" , 3"	ASME 150 lb / 300 lb RF		570	22.4
	2 1/2" , 3"		DIN PN16 (DN65 / DN80)	497	19.6		4"	DIN PN16 (DN100)		600	23.6
GH3N-R	1" , 1 1/4"	ASME 150 lb / 300 lb RF	DIN PN40 (DN25 / DN32)	457	18.0	GH5-R	2"	DIN PN40 (DN50)		550	21.7
	1 1/2"		DIN PN40 (DN40)	477	18.8		2 1/2" , 3"	ASME 150 lb / 300 lb RF		580	22.8
	2"		DIN PN40 (DN50)	487	19.2		4"	DIN PN40 (DN100)		620	24.4
	2 1/2" , 3"		DIN PN40 (DN65 / DN80)	517	20.4						

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature	Dimensions (mm)			Dimensions (in)			Body Material	Weight				
			MPa	psig		°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	W		kg	lb			
G3N -	Flanged JIS, ASME, DIN	1 1/2" - 3"	1,0	145	235	455	Table 1 (*1)	140	95	198	5.5	3.7	7.8	Ductile Cast Iron FCD 450	28 - 31 (*2)	62 - 68 (*2)	
		1" - 3"	1,6	230				205	110	270	8.1	4.3	10.6		52 - 69 (*2)	114 - 152 (*2)	
G5 -		2" - 4"	1,0	145				139	106	212	5.5	4.2	8.3	Cast Steel SCPH2	38 - 50 (*2)	84 - 110 (*2)	
		2" - 4"	1,6	230				200	115	270	7.9	4.5	10.6		63 - 80 (*2)	139 - 176 (*2)	
GH3N -		1 1/2" - 3"	1,0	145													
		1" - 3"	1,6	230													
		1" - 3"	2,1	305													
		2" - 4"	1,0	145													
GH5 -		2" - 4"	1,6	230													
		2" - 4"	2,1	305													

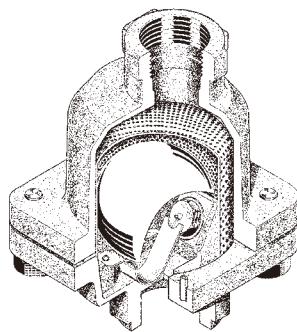
(\*1) Please look at our technical drawings for JIS dimensions.

(\*2) Depending on size and flange standard the weight of the traps differs. Please, look at our technical drawings.

Stainless Steel as body material for GH3N and GH5 is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

**GC1**

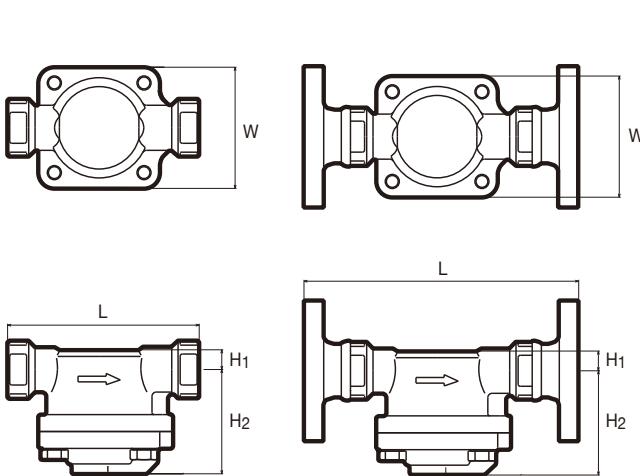
Horizontal installation

**GC1V**

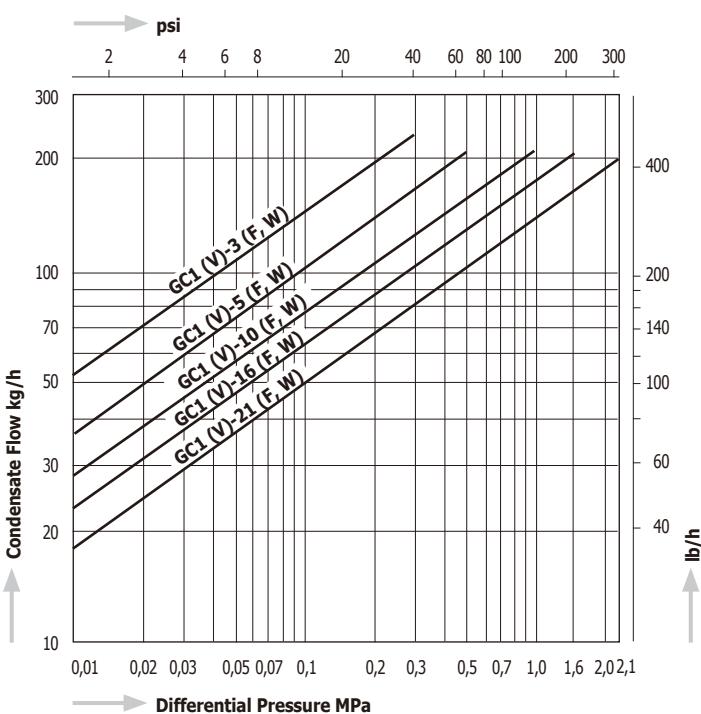
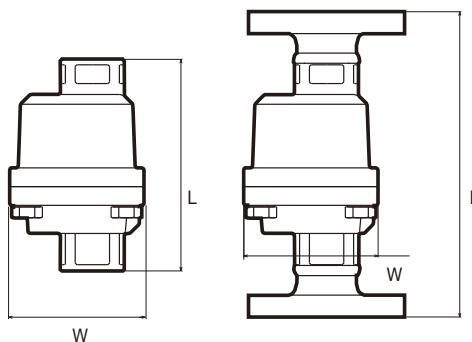
Vertical installation



## Dimensions

**GC1**

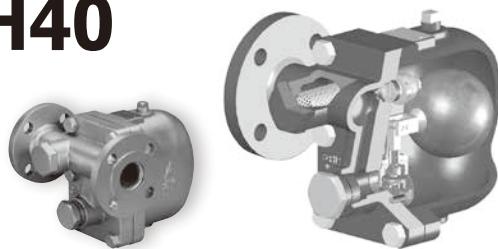
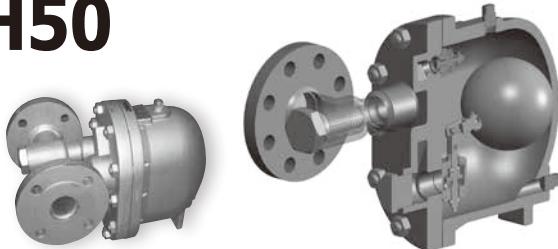
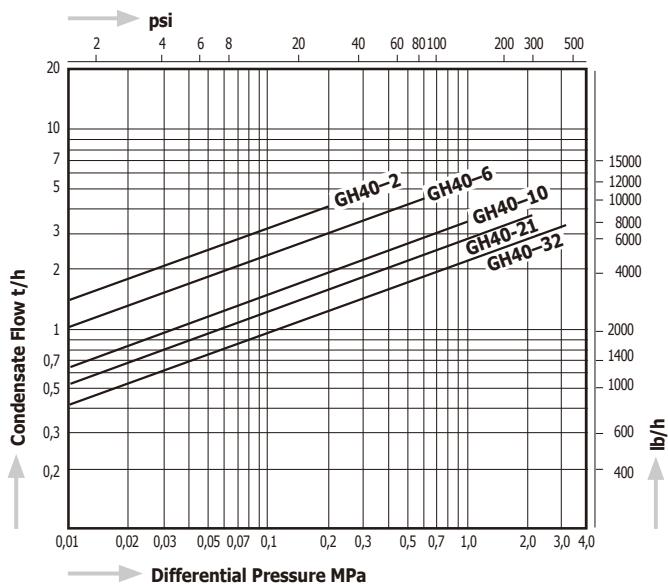
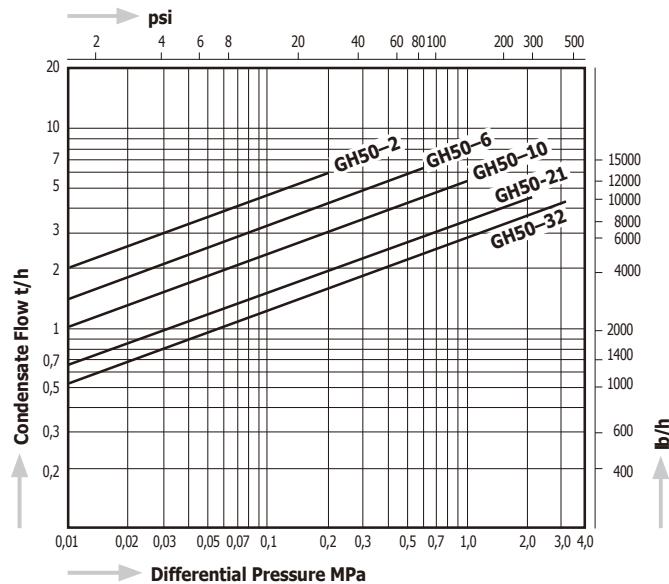
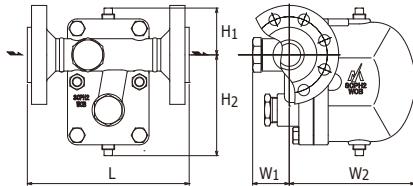
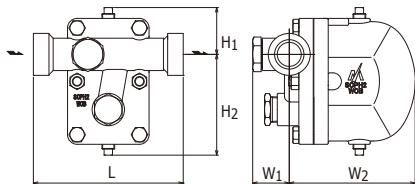
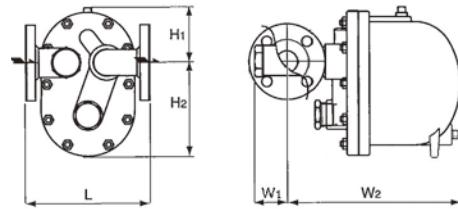
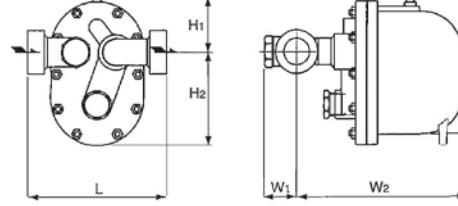
## Capacity Chart GC1 / GC1V

**GC1V**

## Available pressure ranges GC1/GC1V

Model	Max. Operating Pressure		
	MPa	psig	psig
<b>GC1 / GC1V - 21</b>	2,1		305
<b>GC1 / GC1V - 16</b>	1,6		230
<b>GC1 / GC1V - 10</b>	1,0		145
<b>GC1 / GC1V - 5</b>	0,5		72,5
<b>GC1 / GC1V - 3</b>	0,3		43,5

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
<b>GC1 (GC1V)</b>	Screwed Rc, NPT	1/2"	2,1	305	350	662	127				5,0				Stainless Steel SCS13A	1,8	4,0
		3/4"					136	15	75	86	5,4					1,9	4,2
		1"					140				5,5					2,0	4,4
<b>GC1-W (GC1V-W)</b>	Socket Weld JIS, ASME, DIN	1/2"	2,1	305	350	662	127				5,0				Stainless Steel SCS13A	1,8	4,0
		3/4"					136	15	75	86	5,4					1,9	4,2
		1"					140				5,5					2,0	4,4
<b>GC1-F (GC1V-F)</b>	Flanged JIS, ASME, DIN	1/2"	2,1	305	350	662	175				6,9				Stainless Steel SCS13A	3,3	7,3
		3/4"					195	15	75	86	7,7					4,5	9,9
		1"					215				8,5					5,3	11,7

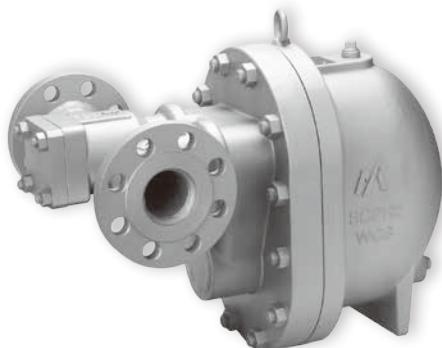
**GH40****GH50****Capacity Chart GH40****Capacity Chart GH50****Dimensions****GH40-F****GH40-W****GH50-F****GH50-W**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature, TMO		Dimensions (mm)					Dimensions (in)					Body Material	Weight
			MPa	psig	°C	°F	L	H1	H2	W1	W2	L	H1	H2	W1	W2		
<b>GH40 - F</b>	Flanged JIS, ASME, DIN	1½", 2"					230	80	170	60	210	9.1	3.15	6.7	2.4	8.3	Cast Steel SCPH2	24
<b>GH40 - W</b>	Socket Weld JIS, ASME, DIN	1½" 2"					250	80	170	60	210	9.8	3.15	6.7	2.4	8.3		19
							260					10.2						41.9
<b>GH50 - F</b>	Flanged JIS, ASME, DIN	1½", 2"					230	107	173	60	330	9.1	4.2	6.8	2.4	13.0		37
<b>GH50 - W</b>	Socket Weld JIS, ASME, DIN	1½" 2"					250	107	173	60	330	9.8	4.2	6.8	2.4	13.0		32
							260					10.2						70.4

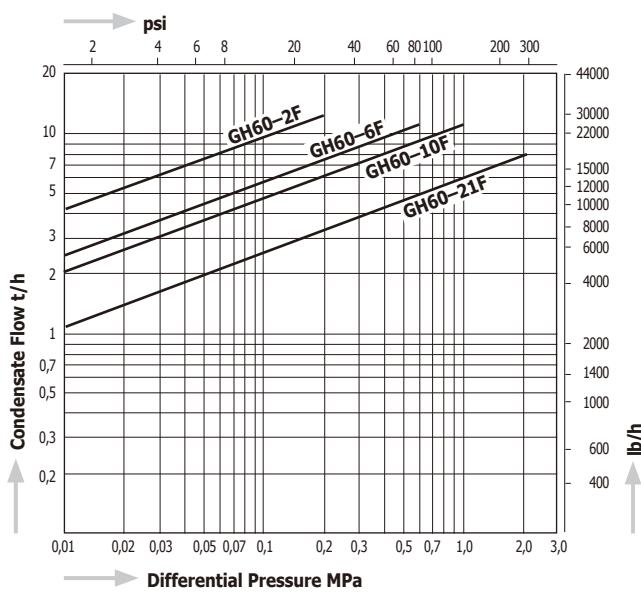
Available pressure ranges	Max. Operating Pressure (PMO)									
	MPa	psig	MPa	psig	MPa	psig	MPa	psig	MPa	psig
	0,2	29	0,6	87	1,0	145	2,1	305	3,2	464
Models	GH40-2F, GH40-2W GH50-2F, GH50-2W		GH40-6F, GH40-6W GH50-6F, GH50-6W		GH40-10F, GH40-10W GH50-10F, GH50-10W		GH40-21F, GH40-21W GH50-21F, GH50-21W		GH40-32F, GH40-32W GH50-32F, GH50-32W	

Depending on the flange standard the dimensions and the weight may differ.

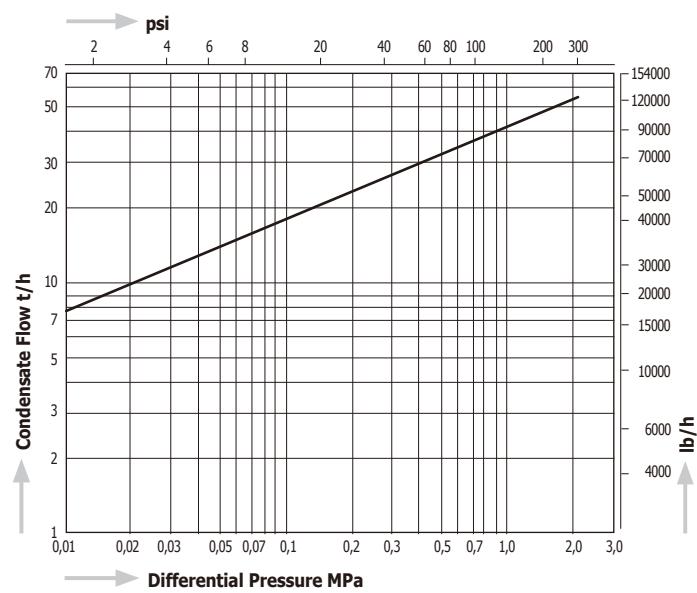
Stainless Steel as body material is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

**GH60****GH70**

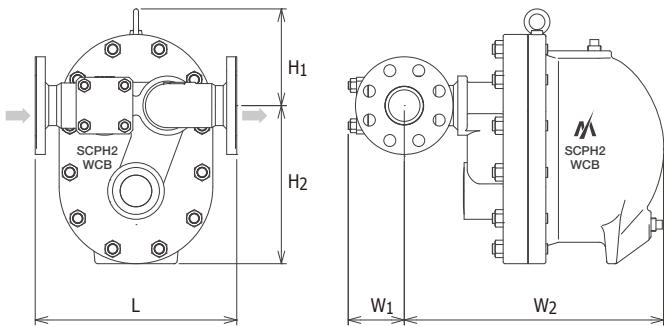
Capacity Chart GH60



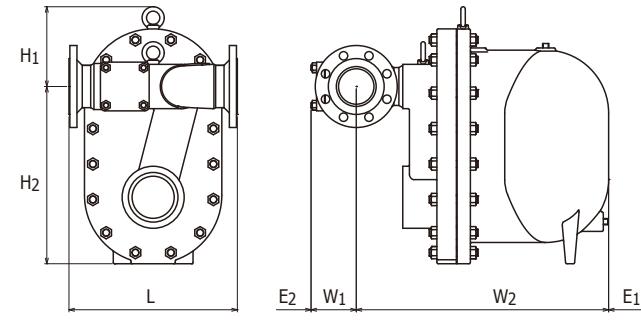
Capacity Chart GH70



Dimensions GH60



Dimensions GH70



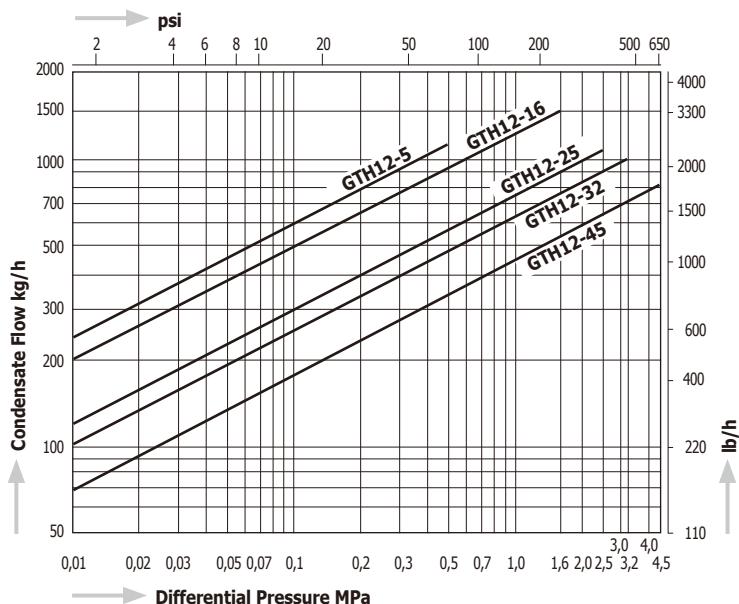
Model	Connect.	Size	Max. Operating Pressure		Max. Differential Pressure, PMX		Max. Operating Temperature, TMO		Dimensions (mm)						Dimensions (in)						Body Material	Weight	
			MPa	psig	MPa	psig	°C	°F	L	H1	H2	W1	W2	E1	E2	L	H1	H2	W1	W2	kg	lb	
<b>GH60 -2F</b>	Flanged JIS, ASME, DIN	2"- 2½"	0,2	29	0,2	29	400	752	320	155	250	90	410			12.6	6.1	9.8	3.5	16.1	Cast Steel SCPH2	75	165
<b>GH60 -6F</b>			0,6	87	0,6	87																	
<b>GH60 -10F</b>			1,0	145	1,0	145																	
<b>GH60 -21F</b>			2,1	305	2,1	305																	
<b>GH70 -21F</b>	Flanged JIS, ASME, DIN	3"	2,1	305	2,1	305	400	752	380	180	400	105	570	330	120	15.0	7.1	15.7	4.1	22.4	Cast Steel SCPH2	160	352
		4"																					

Stainless Steel as body material is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

# GTH12

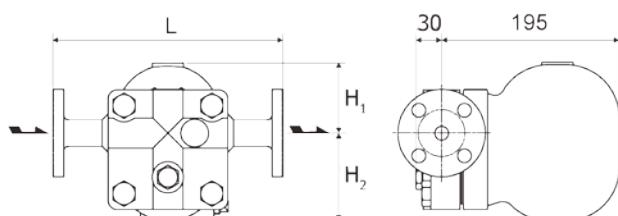


**Capacity Chart GTH12**

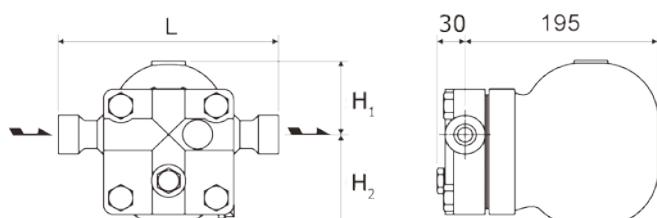


## Dimensions

**GTH12-F Flanged**



**GTH12 Screwed**  
**GTH12-W Socket Weld**

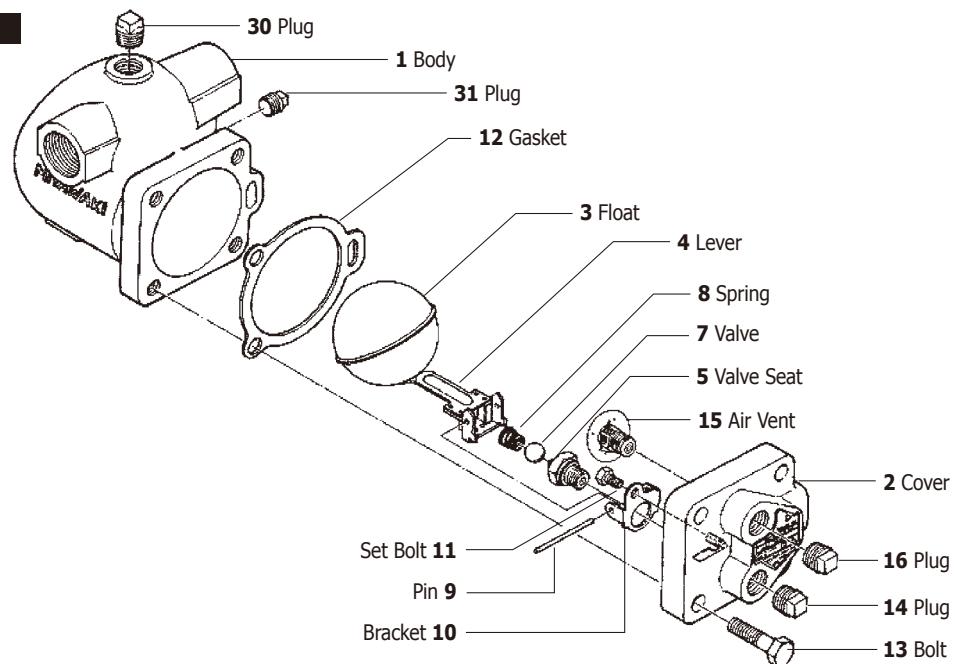
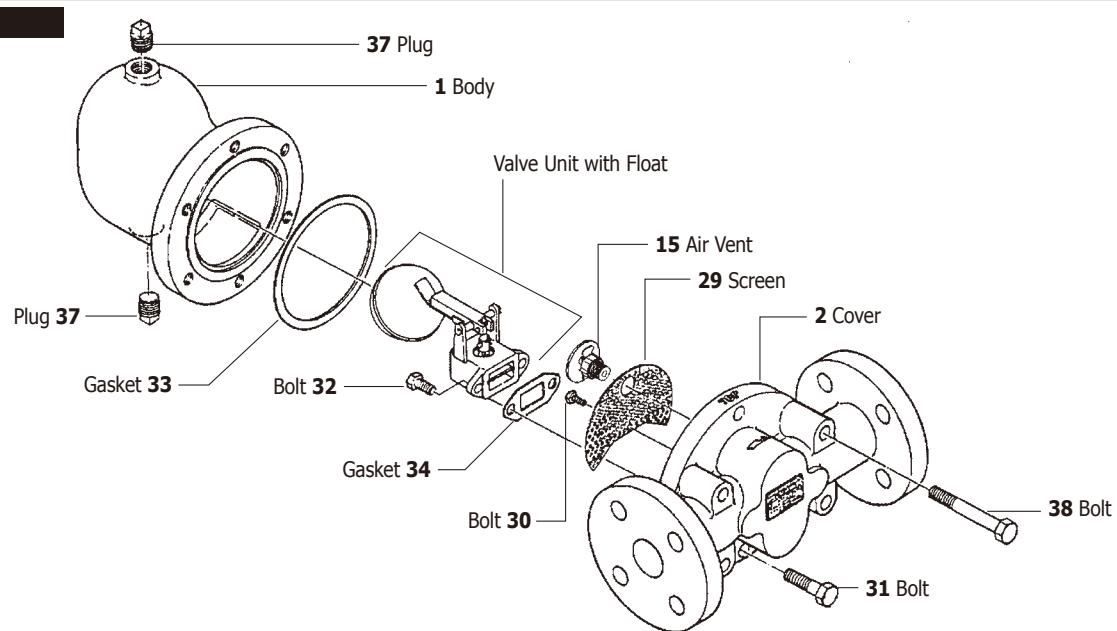
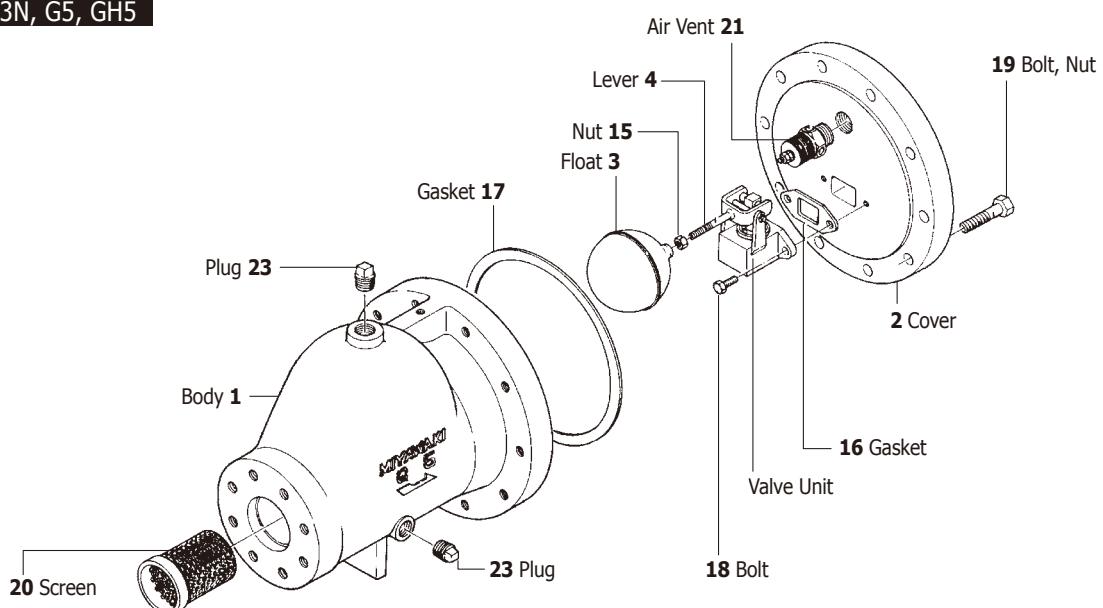


Model	Connections	Size	Max. Operating Pressure		Max. Differential Pressure, PMX		Max. Operating Temperature, TMO		Dimensions (mm)			Dimensions (in)			Body Material	Weight							
			MPa	psig	MPa	psig	°C	°F	L	H1	H2	L	H1	H2		kg	lb						
<b>GTH12- 5</b>	Screwed Rc, NPT	$\frac{1}{2}'' - 1''$	3,2 *	464 *	0,5	73	400 *	752 *	220	75	95	8.7	3.0	3.7	Cast Steel SCPH2	$\sim 11,7$	$\sim 25,8$						
<b>GTH12- 16</b>					1,6	230																	
<b>GTH12- 25</b>					2,5	363																	
<b>GTH12- 32</b>					3,2	464																	
<b>GTH12- 45</b>			5,0	725	4,5	652	425	800	250	75	95	9.8	3.0	3.7									
<b>GTH12- 5F</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}'' - 1''$	3,2 *	464 *	0,5	73	400 *	752 *								$\sim 15,2$	$\sim 33,5$						
<b>GTH12- 16F</b>					1,6	230																	
<b>GTH12- 25F</b>					2,5	360																	
<b>GTH12- 32F</b>					3,2	464																	
<b>GTH12- 45F</b>			5,0	725	4,5	652	425	800															
<b>GTH12- 5W</b>	Socket Weld JIS, ASME, DIN	$\frac{1}{2}'' - 1''$	3,2 *	464 *	0,5	73	400 *	752 *	220	75	95	8.7	3.0	3.7	Cast Steel SCPH2	$\sim 11,7$	$\sim 25,8$						
<b>GTH12- 16W</b>					1,6	230																	
<b>GTH12- 25W</b>					2,5	360																	
<b>GTH12- 32W</b>					3,2	464																	
<b>GTH12- 45W</b>			5,0	725	4,5	652	425	800															

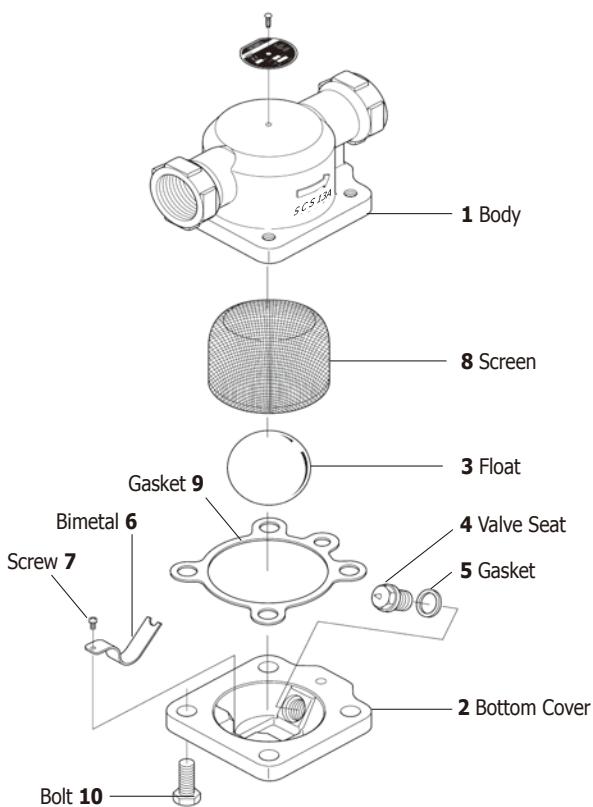
\*PMO 5,0 MPa and TMO 425 °C is available as special design.

A vertical version and Stainless Steel as body material are available as special design.

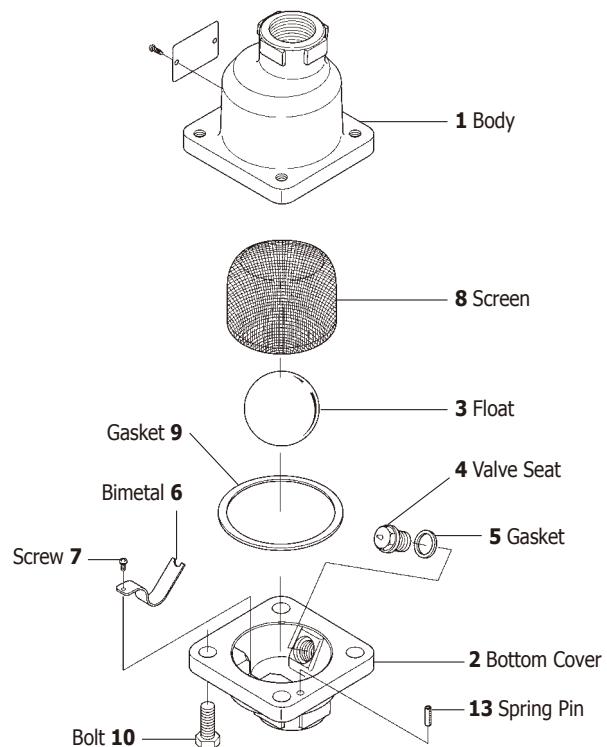
For more details, please contact MIYAWAKI Inc. or an authorized representative.

**SERIES G Spare Parts****G11N/G12N****G15N****G3N, GH3N, G5, GH5**

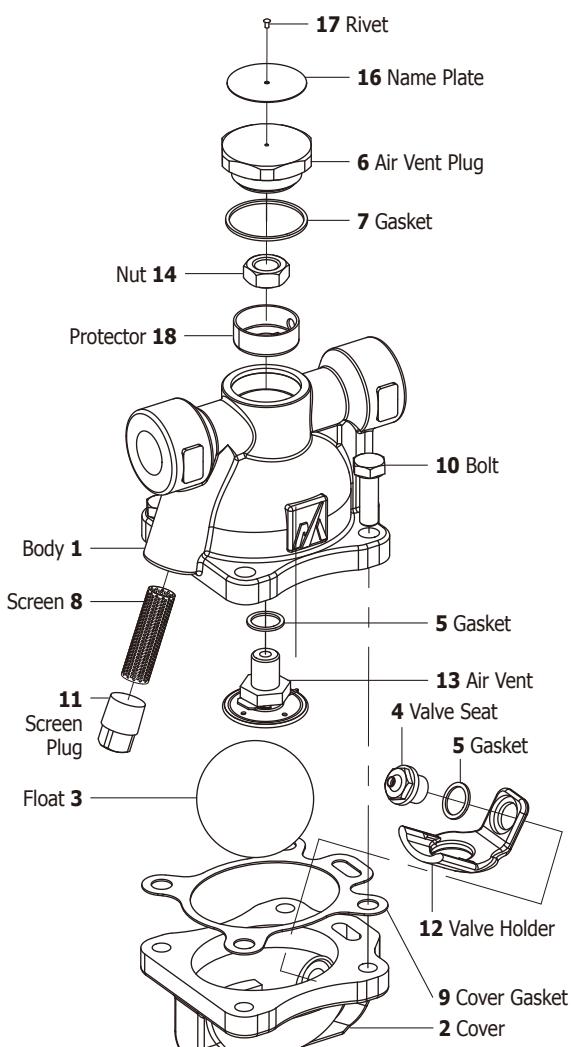
GC1



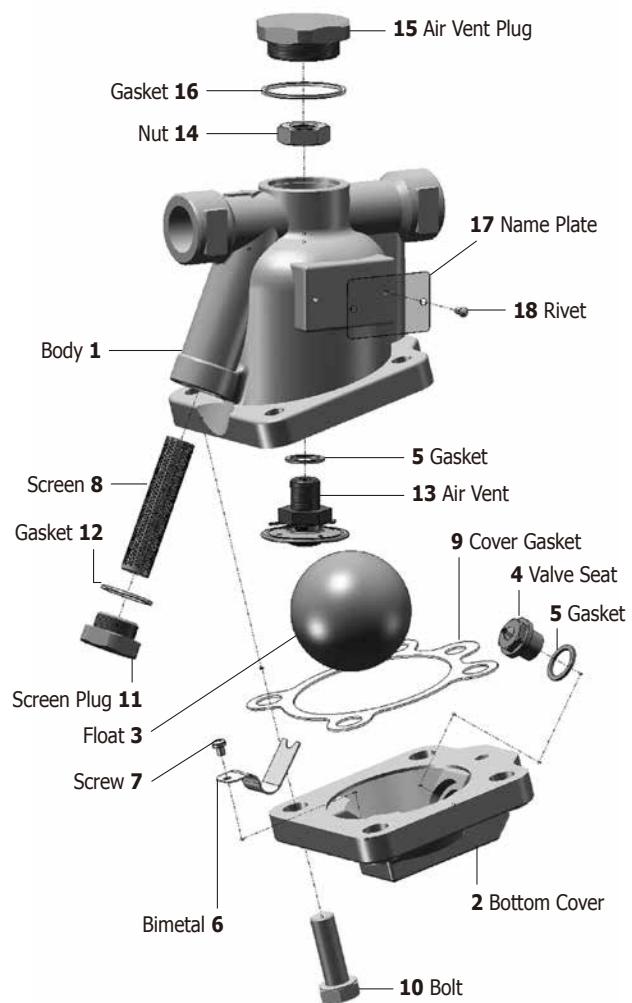
GC1V



G20N

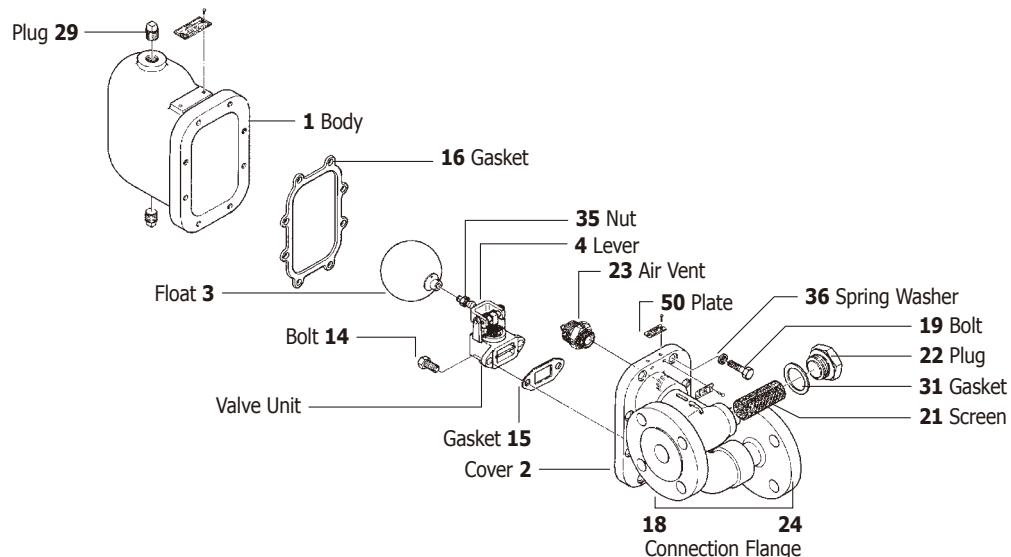
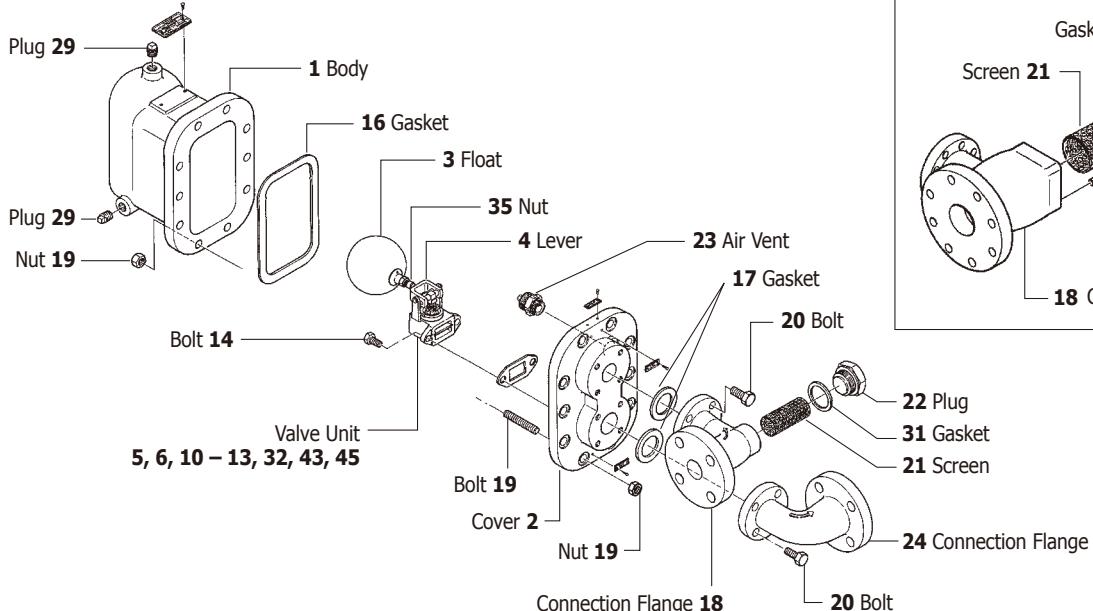
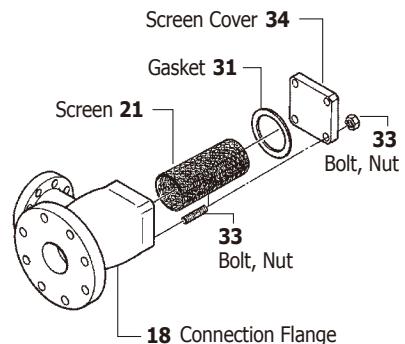
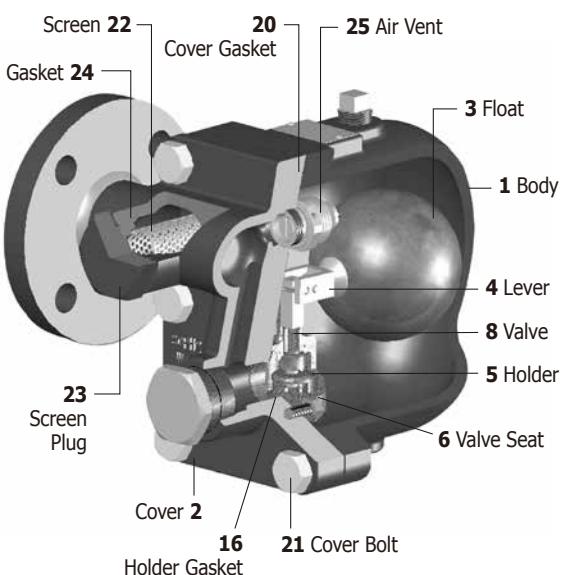
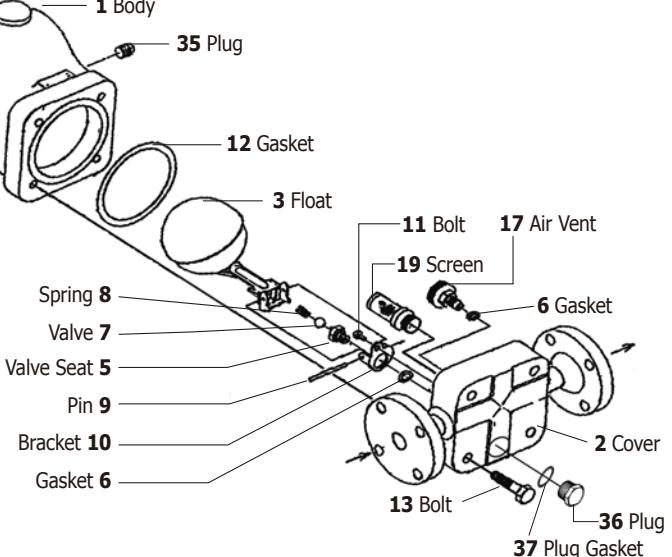


GC20

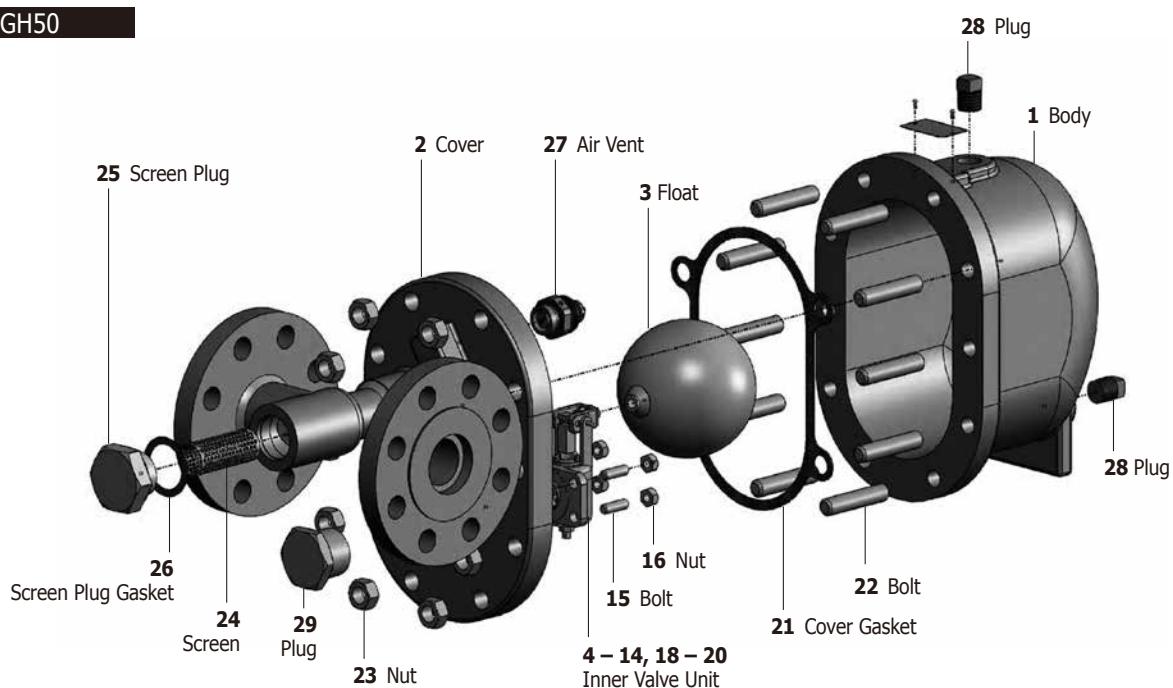


**SERIES G Spare Parts****GH2****Valve Unit**

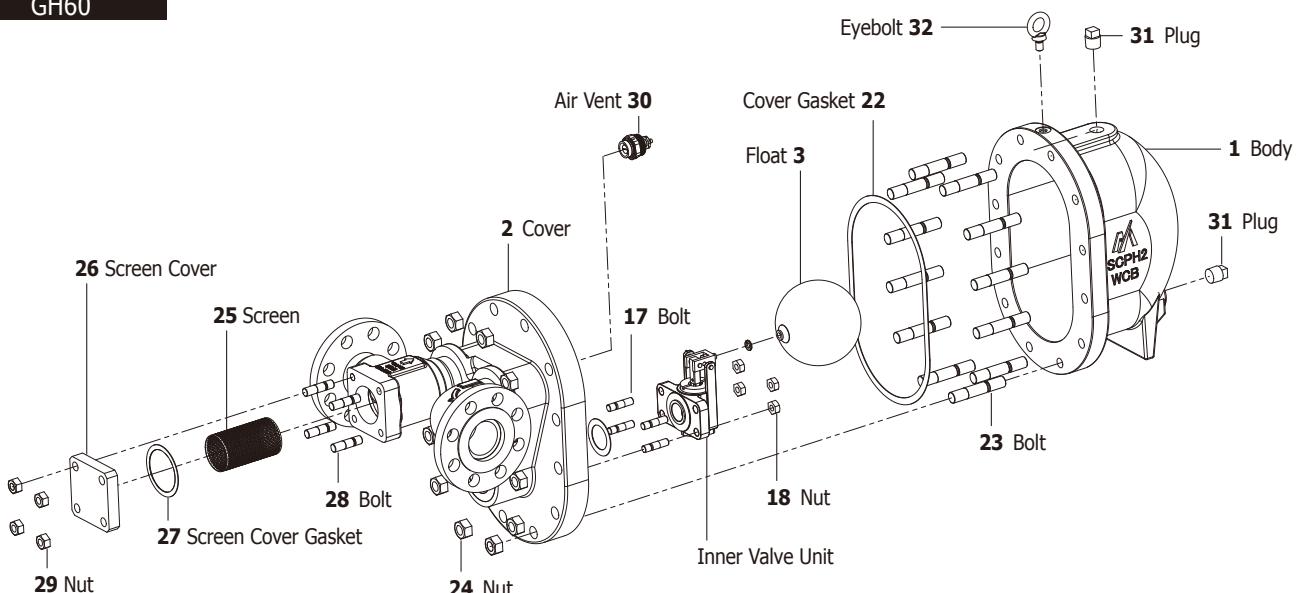
- 5 Valve Seat
- 6 Valve
- 7 Holder
- 8 Lever Nut
- 9 Nut
- 10 Connector
- 11 Nut
- 12 Guide Wing
- 13 Pin
- 32 Baffle Plate
- 39 Pin
- 43 Shaft
- 44 Collar
- 45 Split Pin
- 47 Spring Pin

**GH4, GH6, GH8****GH8 only****GH40****GTH12**

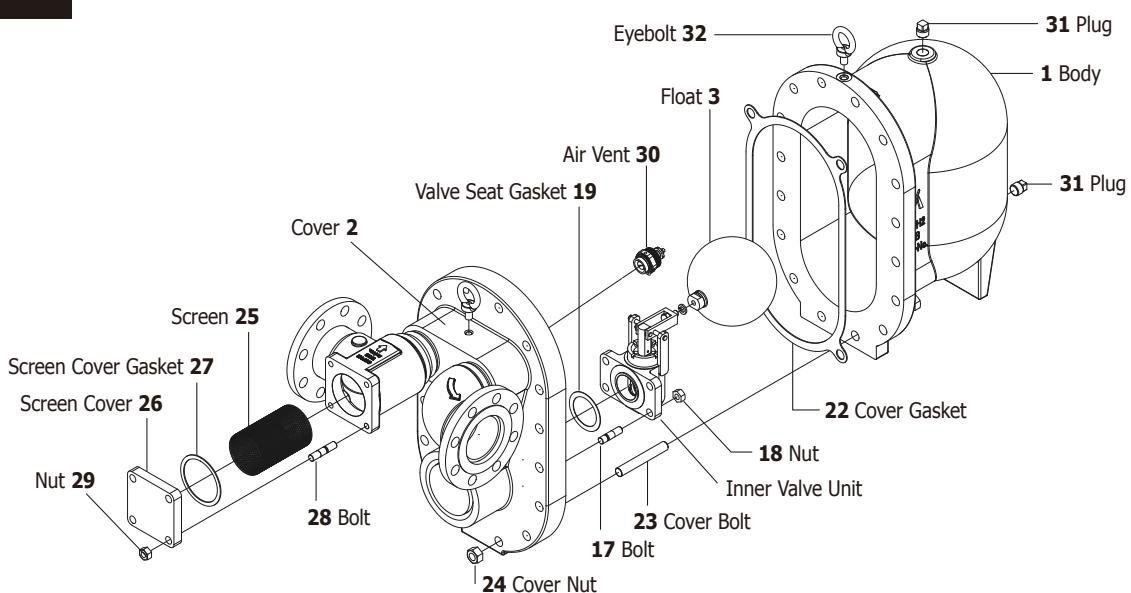
## GH50

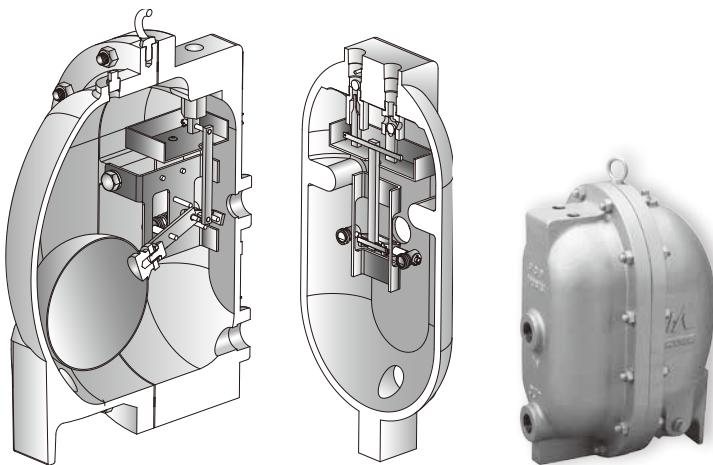


## GH60



## GH70

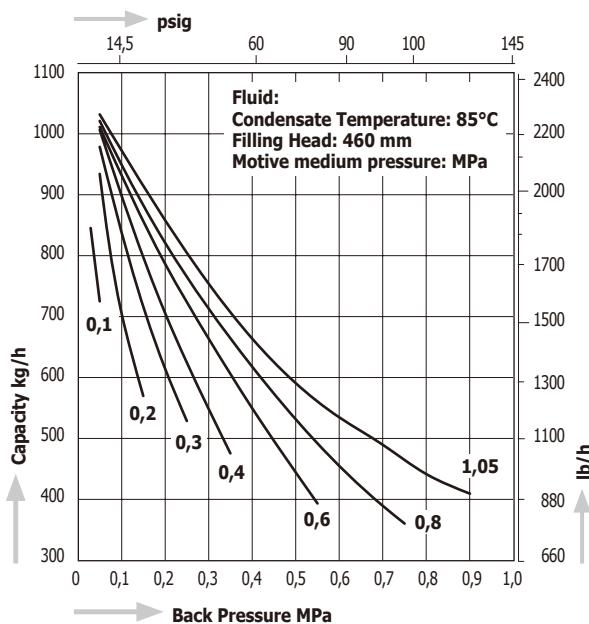
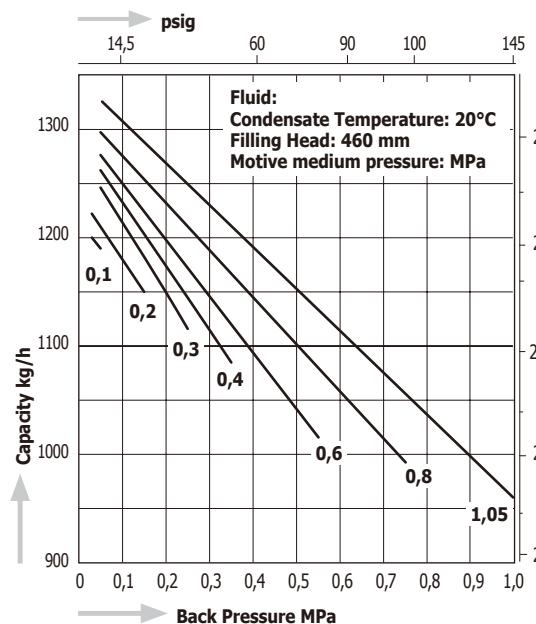


**SERIES G Pumping Trap****GL11****Features**

1. Small compact pumping trap for condensate recovery.
2. As there is no electricity needed to return the condensate, the pumping trap can be used in hazardous areas.
3. The pumping trap will work with a low filling head of only 120 mm.
4. Air or saturated steam can be used as motive medium.
5. The internal parts are manufactured of high quality stainless steel. A special spring snap mechanism between the motive medium inlet valve and the venting valve secures a long life time of the internal mechanism.

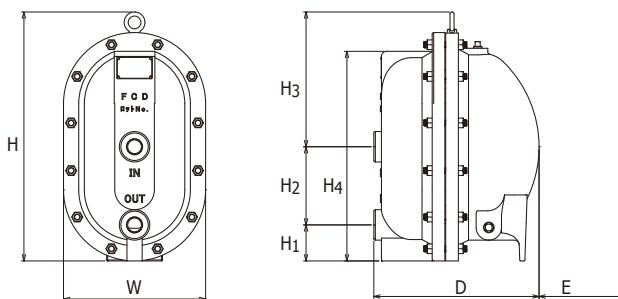
**Applications**

- Condensate return from low pressure installations
- Condensate return to places located higher than the condensate vessel
- Condensate return from vacuum system

**Flow Capacity Charts****Motive Medium: Saturated Steam****Motive Medium: Air/N2****Capacity for other filling heads:**

To get the capacity for other filling heads multiply the capacity of this chart by the "FH-factors".

Filling Head	FH-factors
mm	in
120	4.7
300	11.8
460	18.1
700	27.6
1000	39.4
1100	43.3
	1,12

**Dimensions****Recommended standard receiver tank dimensions:**

Diameter: 8" / DN200

Length: 580 mm / 22.8 inch

If a receiver tank is not available, a standard pipe (size 3" / DN80) can be used as condensate reservoir.

Use the following pipe length:

Connection				Max. Allowable Pressure PMA		Max. Allowable Temperature TMA		Max. Operating Pressure PMO		Max. Operating Temperature TMO	
Inlet Condensate	Outlet Condensate	Inlet Motive Medium	Venting Outlet	MPa	psig	°C	°F	MPa	psig	°C	°F
1" Rc	1" Rc	1/2" Rc	1/2" Rc	1,6	232	220	428	1,05	152	185	365

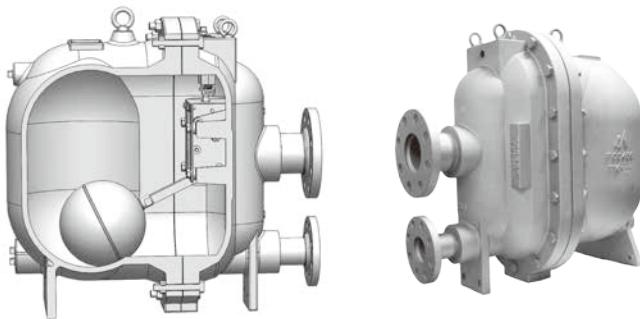
Dimensions												Body Material		Weight	
H	H1	H2	H3	H4	D	W	E*	kg	lb						
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in				
495	19.5	70	2.8	154	6.1	270	10.6	413	16.3	325	12.8	280	11.0	>165	>6.5

Ductile Cast Iron FCD450 comparable with EN-GJS-450-10 (EN-JS1040)

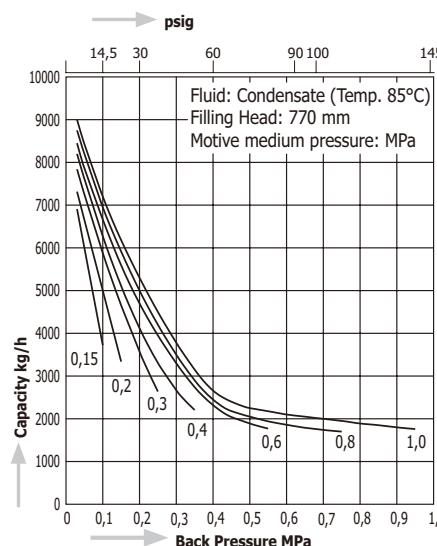
Condensate amount		Length	
kg/h	lb	mm	in
100	220	290	11.4
200	440	580	22.8
400	880	1150	45.3
600	1.320	1730	68.1
800	1.760	2300	90.6
1000	2.220	2870	113.0
1200	2.640	3450	135.8
1300	2.860	3730	146.9

\*Maintenance space

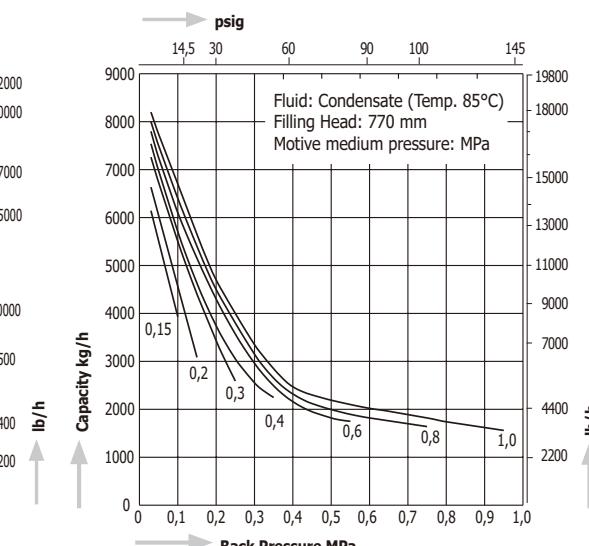
# GL81



Model: GL81



Model: GL81E



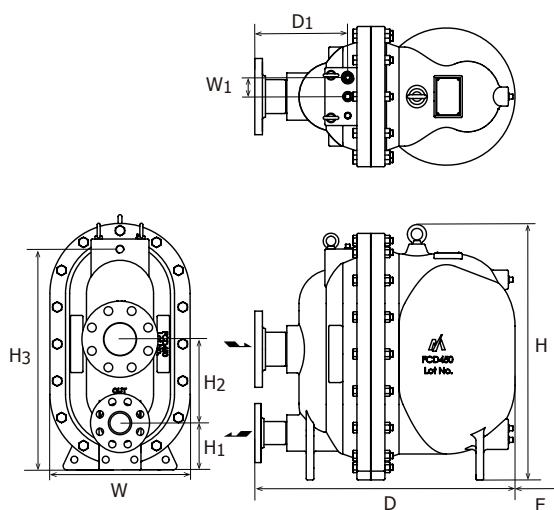
Model GL81 and GL81E: To get the capacity for air as motive medium, please ask MIYAWAKI Inc. or an authorized representative.

Model	Connection				Max. Allowable Pressure PMA		Max. Allowable Temperature TMA		Max. Operating Pressure PMO		Max. Operating Temperature TMo	
	Inlet Condensate	Outlet Condensate	Inlet Motive Medium	Venting Outlet	MPa	psig	°C	°F	MPa	psig	°C	°F
GL81E	Flanged PN16, ASME 150lb				Screwed Rc		1,6		232	220	428	1,05
	DN80 (3")	DN50 (2")	1/2"	1"					152	185	365	
GL81	Flanged JIS16KFF, ASME 150lb				Screwed Rc		1,6		232	220	428	1,05
	DN80 (3")	DN50 (2")	1/2"	1"					152	185	365	

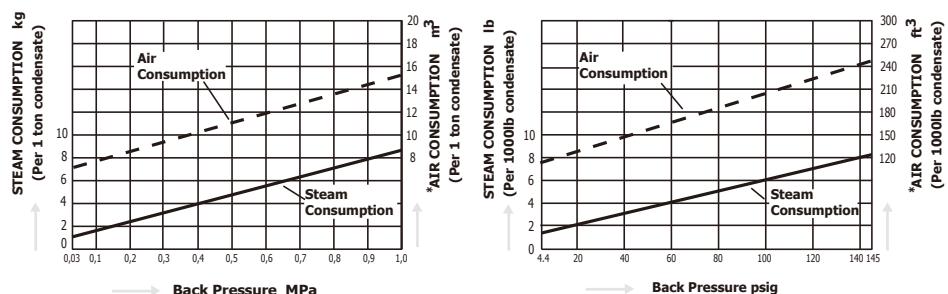
Model	Dimensions												Body Material	Weight							
	H		H1		H2		H3		D		D1		W		W1		E*		kg	lb	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in			
GL81E	670	26.4	123	4.8	220	8.7	579	22.8	680	26.8	240	9.4	368	14.5	50	2.0	> 380	> 15.0	Ductile Cast Iron FCD450 comparable with EN-GJS-450-10 (EN-JS1040)	160	353
GL81																					

\*Maintenance space

## Dimensions

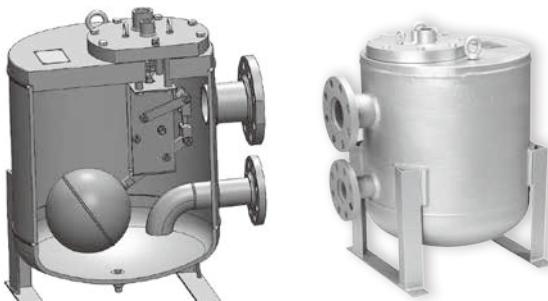


## Steam and Air consumption chart for GL81 (E)



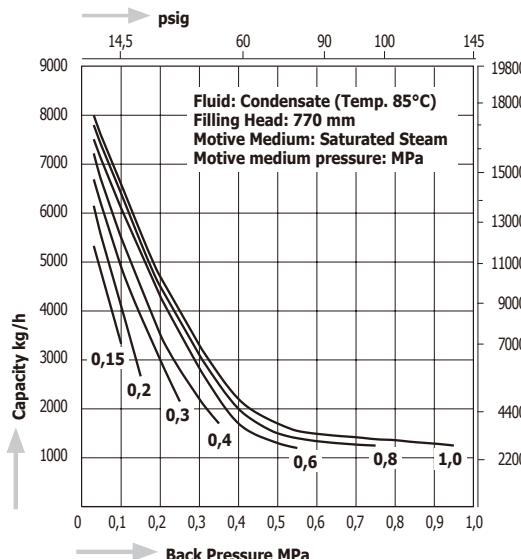
Equivalent consumption of air at 20°C (68°F) under atmospheric pressure.

# GLP81

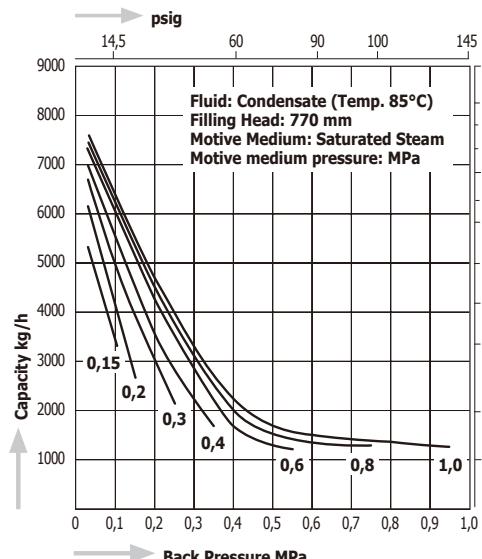


## Flow Capacity Charts

Model: GLP81



Model: GLP81E



### Capacity for other filling heads:

To get the capacity for other filling heads multiply the capacity of this chart by the "FH-factors".

Filling Head mm	Filling Head in	FH-factors	
		0.66	1.03
150	5.9	0.66	
270	10.6	0.75	
370	14.5	0.82	
570	22.4	0.92	
770	30.3	1.00	
970	38.2	1.01	
1270	50.0	1.03	

Model GLP81 and GLP81E: To get the capacity for air as motive medium, please, see our Technical Bulletin No. 017-002.

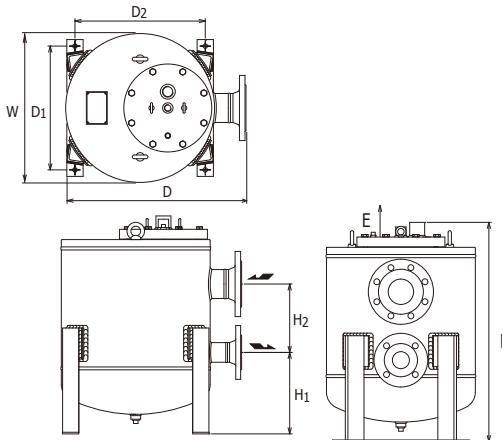
Model	Connection				Max. Allowable Pressure PMA		Max. Allowable Temperature TMA		Max. Operating Pressure PMO		Max. Operating Temperature TMO	
	Inlet Condensate	Outlet Condensate	Inlet Motive Medium	Venting Outlet	MPa	psig	°C	°F	MPa	psig	°C	°F
GLP81E	Flanged PN16, ASME 150lb		Screwed Rc		1,6	232	220	428	1,05	152	185	365
	DN80 (3")	DN50 (2")	1/2 "	1 "								
GLP81	Flanged JIS16KFF, ASME 150lb		Screwed Rc		1,6	232	250	482	1,05	152	185	365
	DN80 (3")	DN50 (2")	1/2 "	1 "								

Model	Dimensions												Body Material	Weight				
	H		H1		H2		D		D1		D2		W		E*			
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb				
GLP81E	670	26.4	250	9.8	210	8.3	550	21.7	380	15.0	400	15.7	457	18.0	> 550	> 21.7	Carbon steel (Details see Technical drawing)	112 246
GLP81	660	26.0	230	9.1			550	21.7			380	15.0						150 330

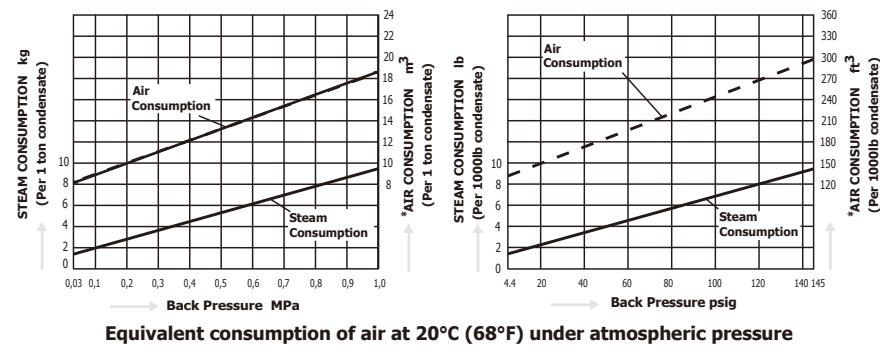
\*Maintenance space

Stainless Steel as body material for GLP81 is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

## Dimensions



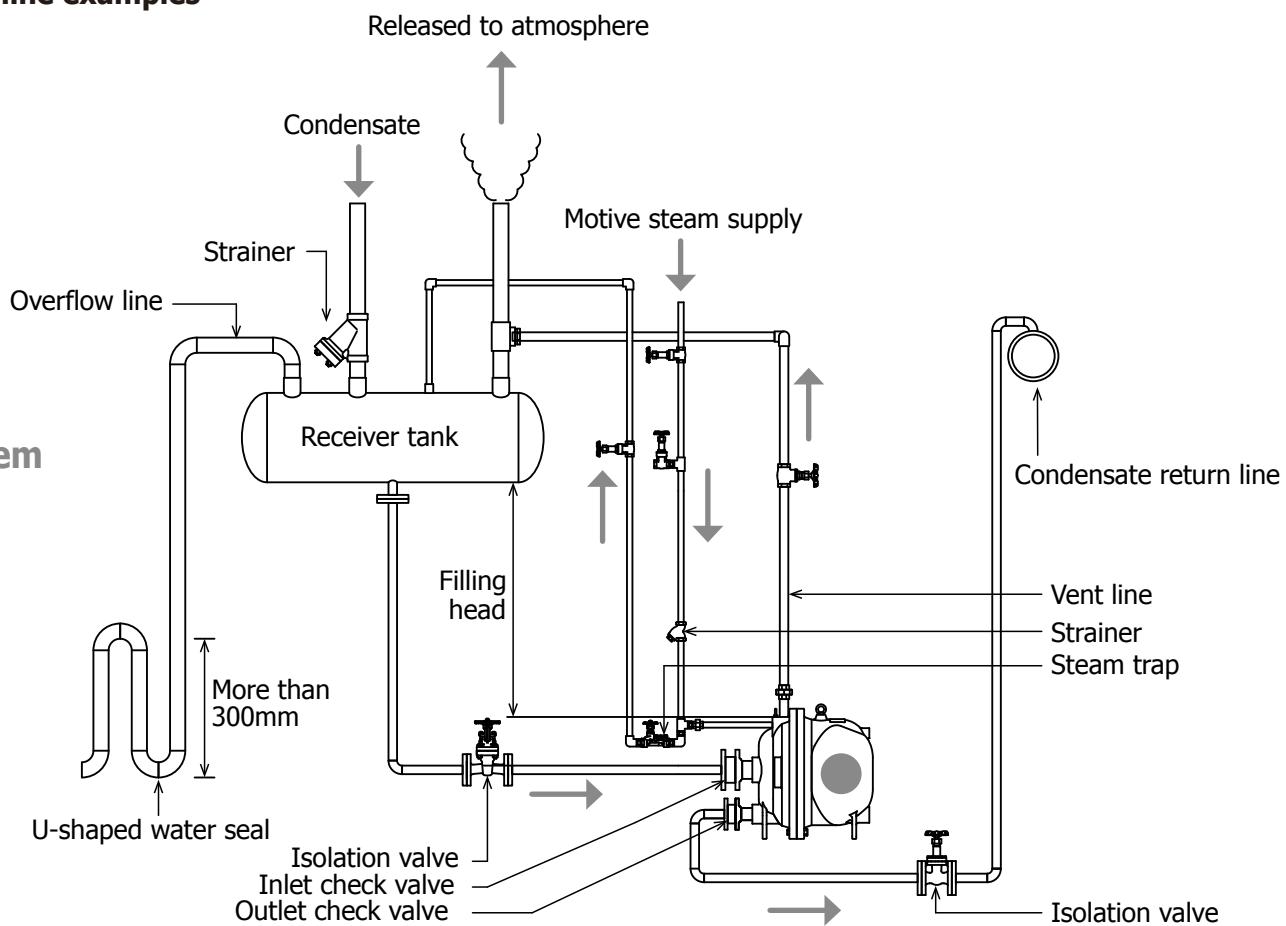
## Steam and Air consumption chart for GLP81 (E)



## Installation line examples

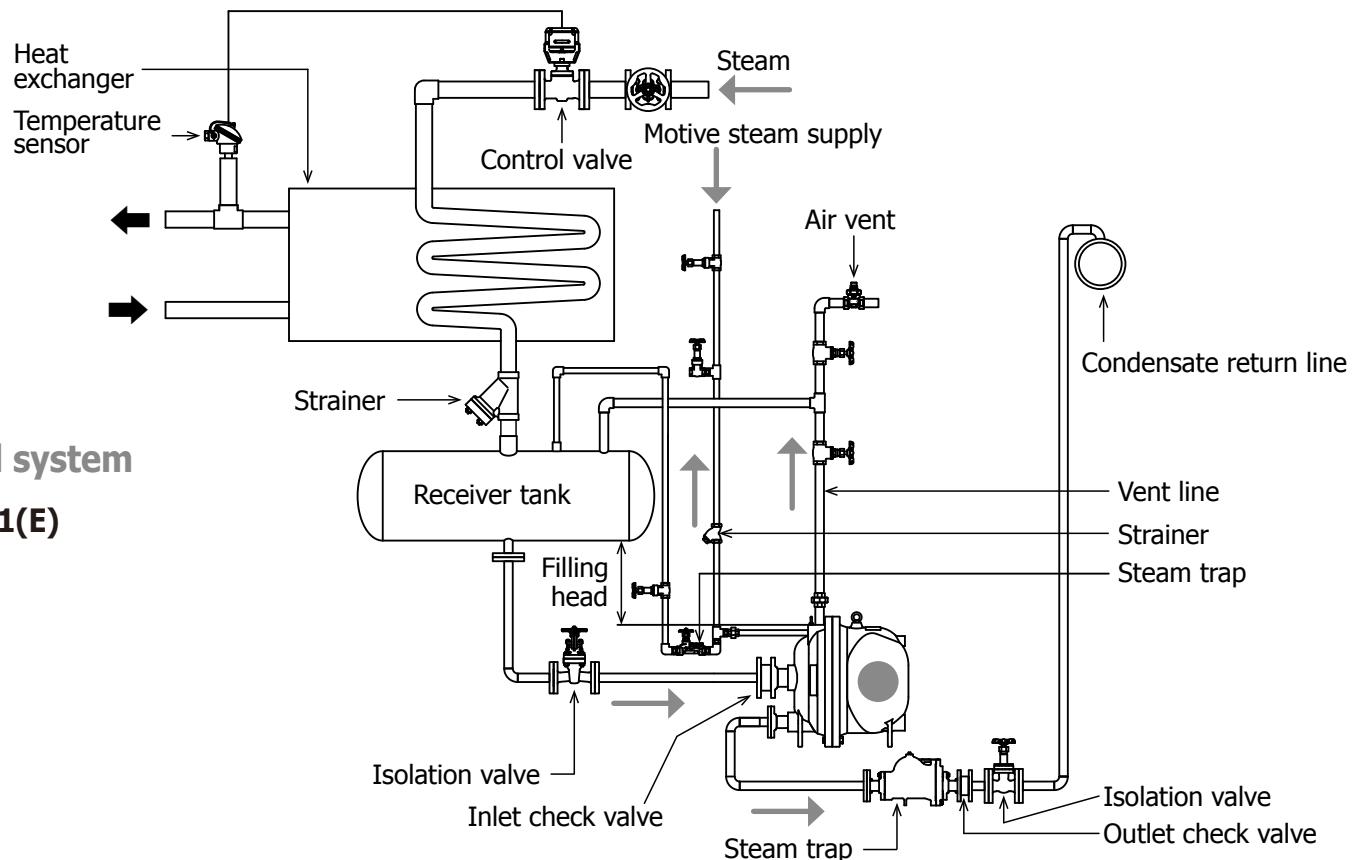
### Open system

● GL81(E)

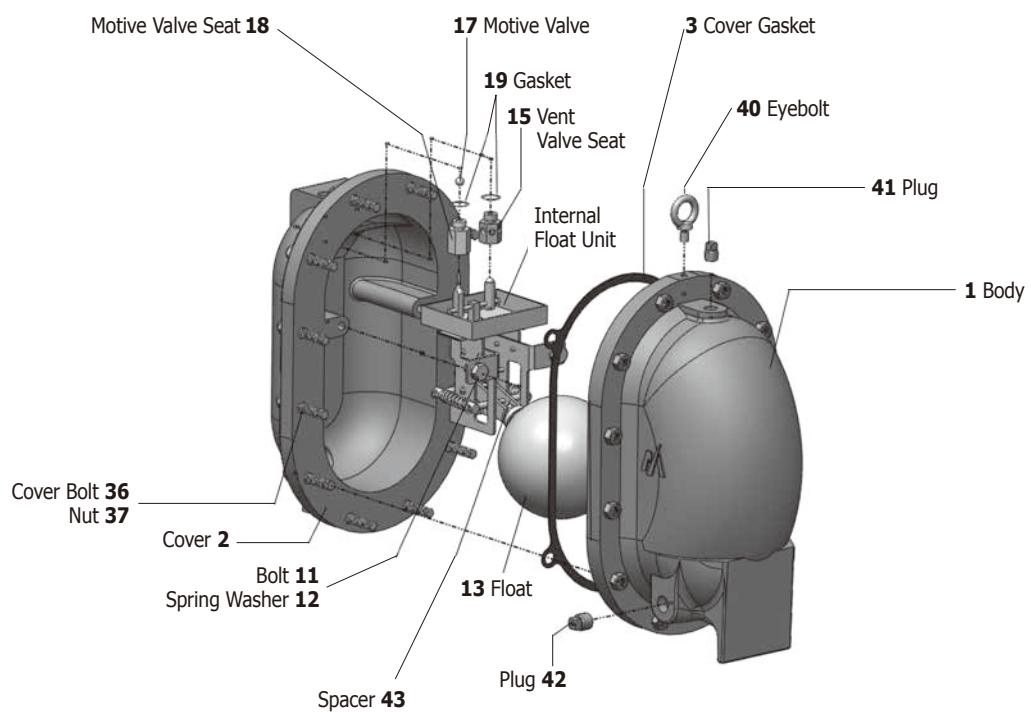


### Closed system

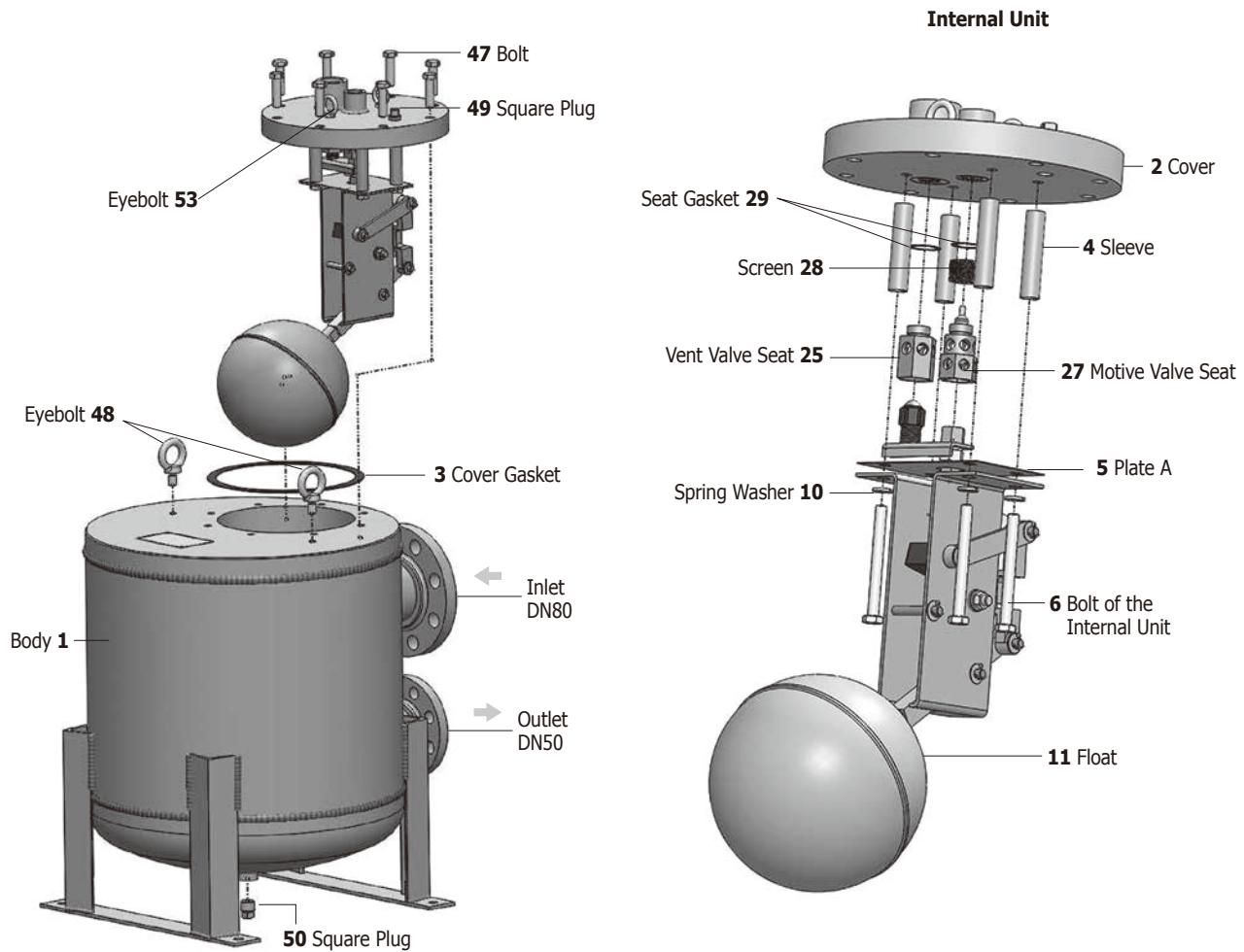
● GL81(E)



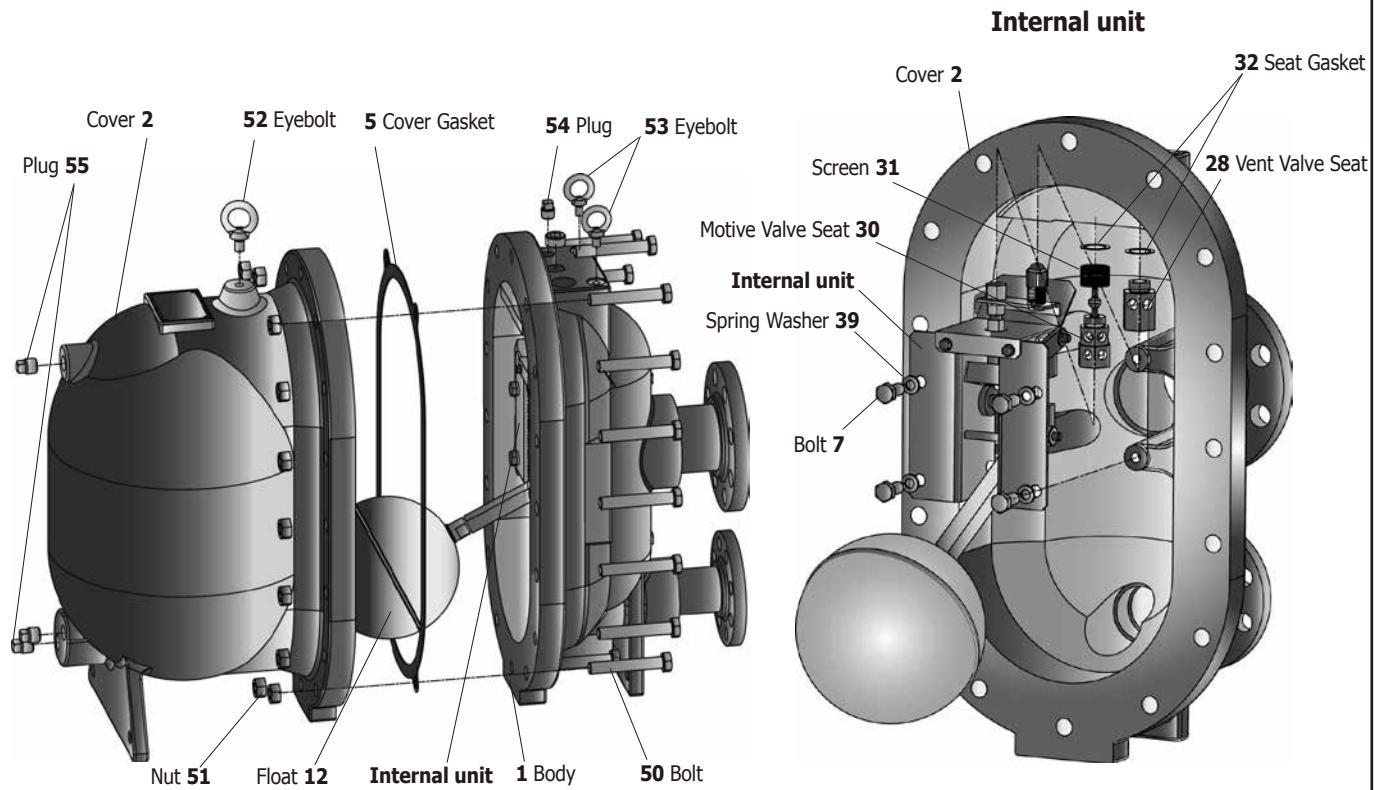
GL11



GLP81



GL81



## Steam Traps

### Steam Traps with Two-bolt Connection

## DC1-21U

Balanced Pressure  
Thermostatic Type



## SU2-32U

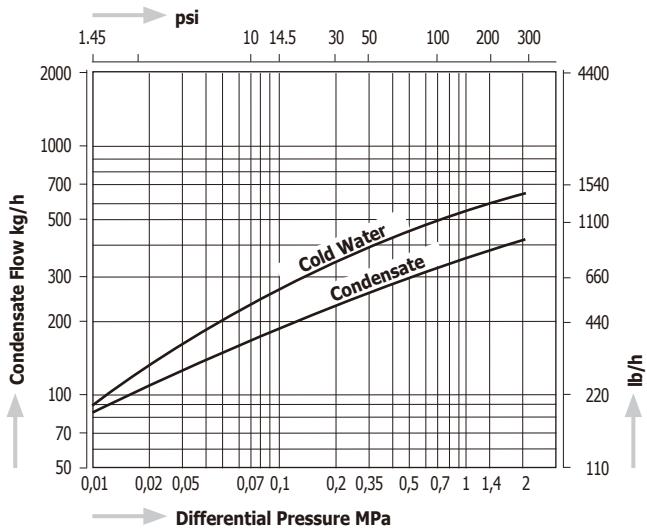
Thermodynamic Type



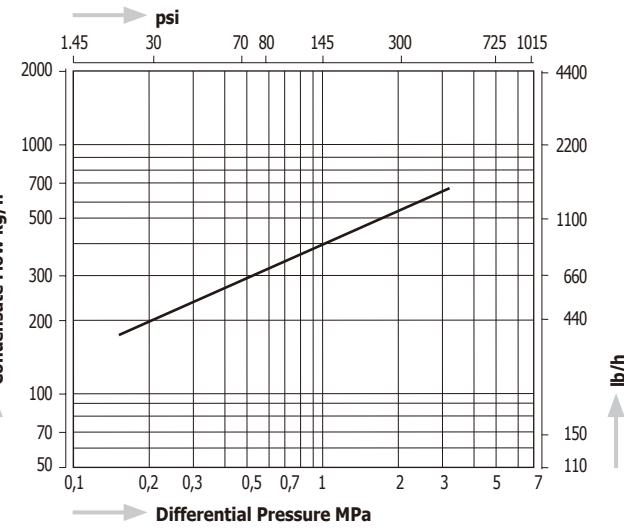
#### All models:

With stainless steel body and stainless steel internals. For horizontal and vertical installation. Two-bolt connection for simplified replacement of the steam trap.

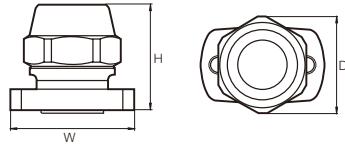
#### Capacity Chart DC1-21U



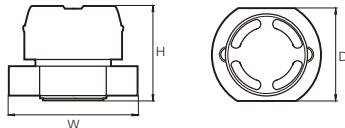
#### Capacity Chart SU2-32U



#### Dimensions



#### Dimensions



Model	Connection	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Body Material		Weight kg	Weight lb
		MPa	psig	°C	°F	D	H	W	D	H	W				
<b>DC1-21U</b>	Universal Two-bolt Connection	2,1	305	235	455	55	62	70	2,2	2,4	2,8	Stainless Steel CF8M		0,8	1,8
<b>SU2-32U</b>		3,2	464	350	662	60	55	70	2,4	2,2	2,8	Stainless Steel SUS420J2		0,8	1,8

## UNC

Connector Body for Models:  
**DC1-21U & SU2-32U**

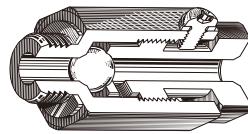


Screwed

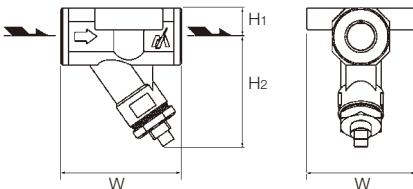
with Blow-down Valve

## VB1, VB1R

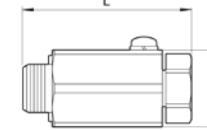
Blow-down Valve



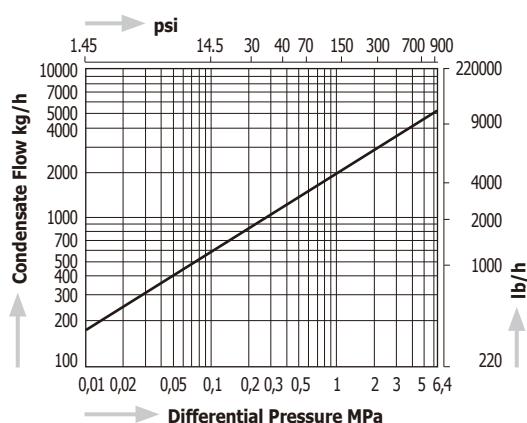
#### Dimensions



#### Dimensions



#### Capacity Chart



Model	Connection	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)			Body Material	Weight kg	Weight lb	
			MPa	psig	°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	W	L	H <sub>1</sub>	H <sub>2</sub>	W			
<b>UNC</b>	Screwed & Socket Weld	1/2"	3,2	464	400	752	80	19	73	72	3,15	0,75	2,9	2,8	Stainless Steel A351CF8M	1,0	2,2
<b>UNC-W</b>		3/4"															
<b>VB1</b>	Screwed G	1/4"	6,4	928	425	800	46				25	1,8			Stainless Steel SUS304	0,08	0,18
<b>VB1R</b>	Screwed R						50				2,0						

# Air Traps

## SERIES A

MIYAWAKI **Air Traps** are designed for discharge of condensate from air piping, receiver tanks, gas and compressed air systems.

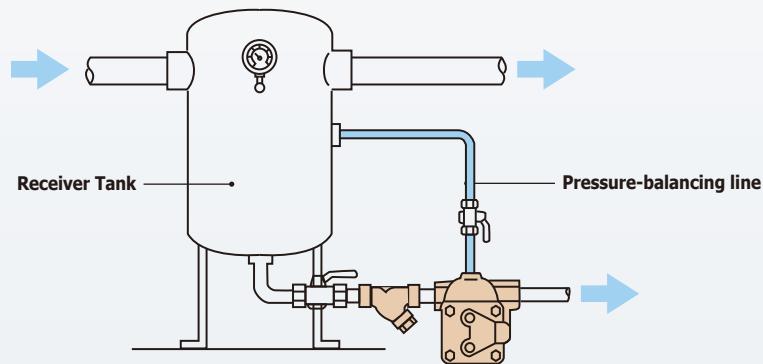
Depending on the operating conditions and applications a wide range of various types of air traps is available. Most of the traps can be fitted with a pressure – balancing line to ensure air can escape from the trap body to prevent air locking. Pressure-balancing lines are usually not necessary, if the air trap is installed directly below the equipment to be drained or if the trap is installed vertically.

MIYAWAKI offers different seat materials and various body materials (including stainless steel) for draining special gas applications.

### Models

<b>AG11, AG12</b>	Cast iron ball float air traps for medium condensate amounts
<b>AGC1V</b>	Stainless steel ball float air trap for small condensate loads (vertical installation)
<b>AG29</b>	Ductile cast iron ball float air and gas trap
<b>AGH29</b>	Cast steel ball float air and gas trap
<b>AGU29</b>	Stainless steel ball float air and gas trap
<b>AGH12, AGH50</b>	Cast Steel ball float air and gas trap
<b>AE8</b>	Ductile cast iron inverted bucket air trap
<b>AV</b>	Cast iron thermodynamic air trap with incorporated bypass

### Installation Example



### Operating principle

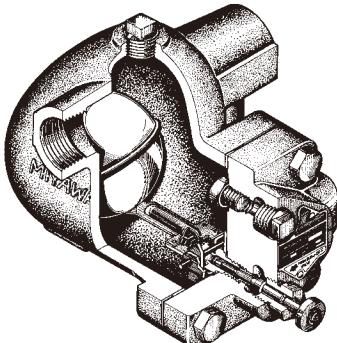
■ cold condensate   ■ air



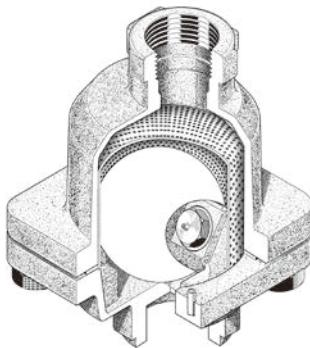
At start-up condensate enters the air trap. The float is rising and the condensate will be discharged through the wide open valve. Air, which usually enters the trap body together with the condensate, will accumulate in the upper part of the trap body. To prevent air locking, a pressure-balancing line connects the upper part of the trap with the drained equipment, so that the air can escape easily from the trap body.

Condensate continuously enters the air trap. Depending on the condensate amount the float will move upwards or downwards to open or close the valve seat. Usually a certain liquid level will be maintained in the trap body and condensate will be discharged continuously. Air will leave the trap body through the pressure-balancing line.

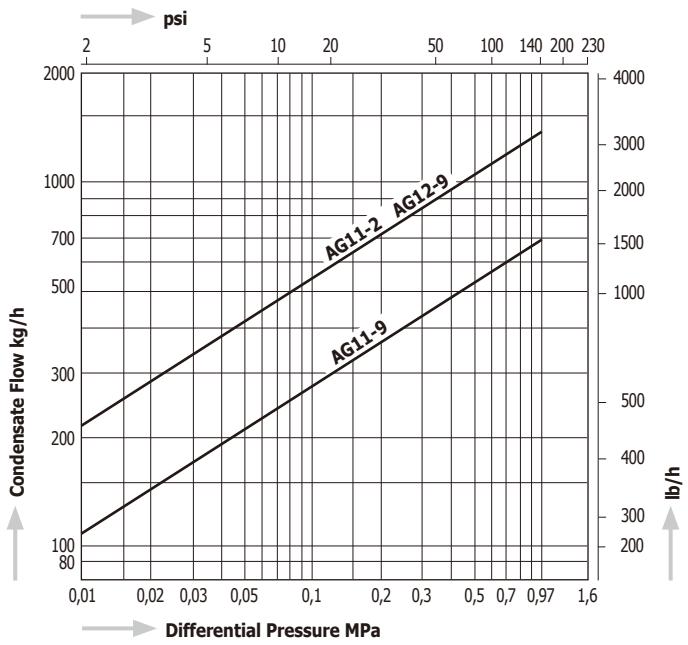
# AG11, AG12



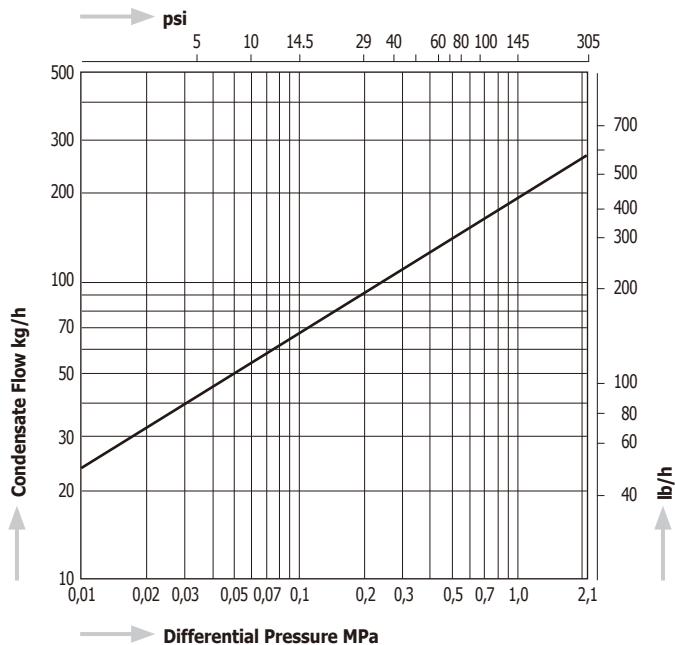
# AGC1V



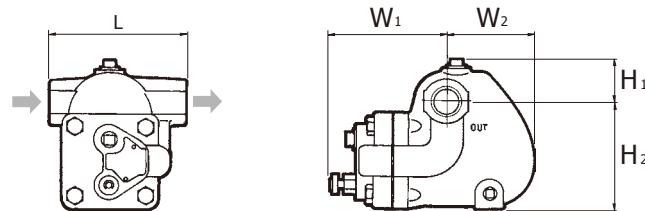
Capacity Chart AG11, AG12



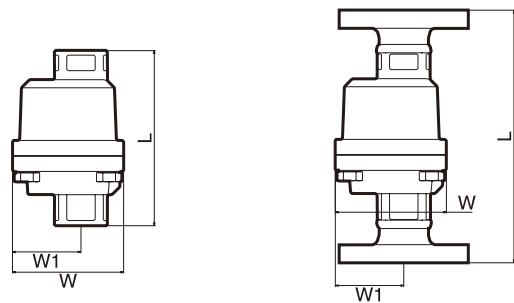
Capacity Chart AGC1V



Dimensions AG11, AG12

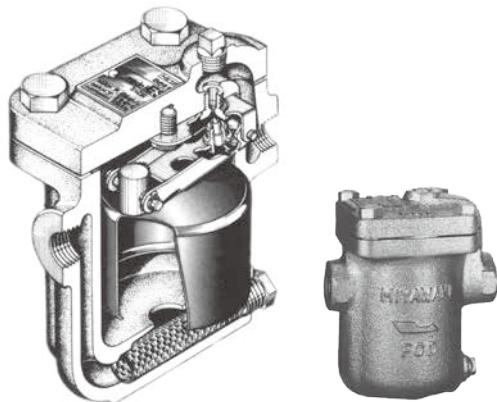
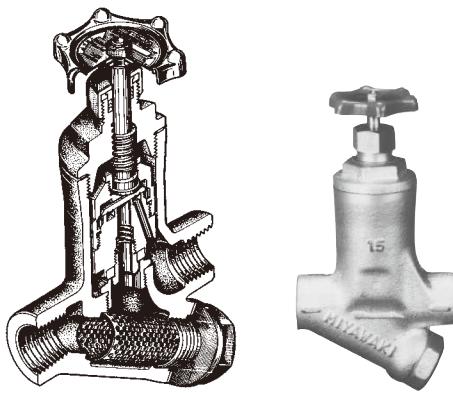
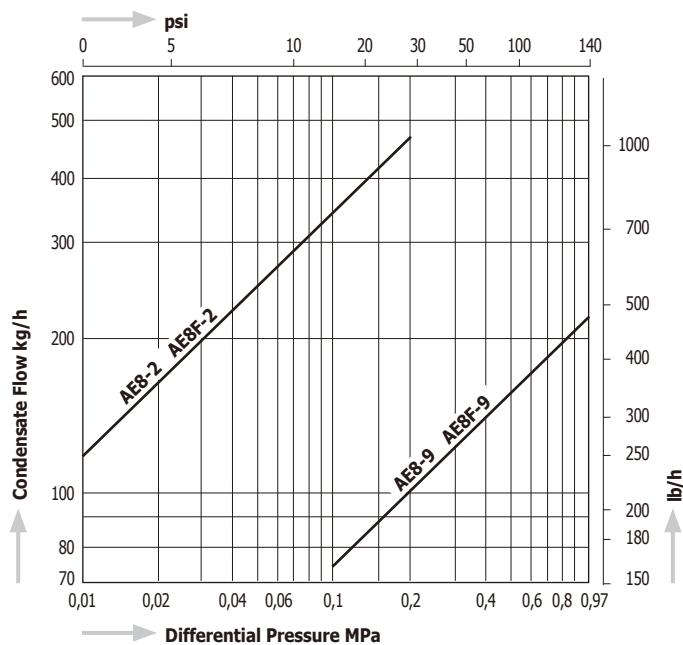
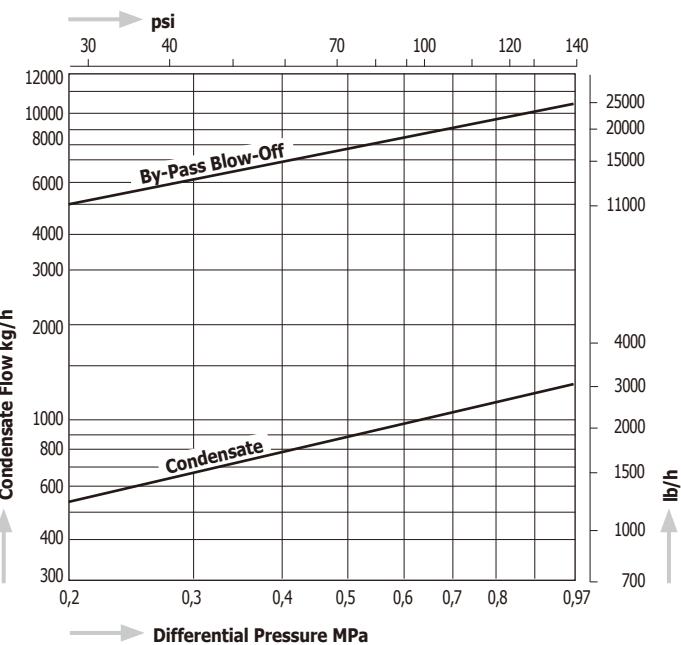
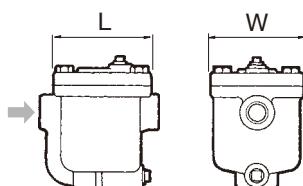
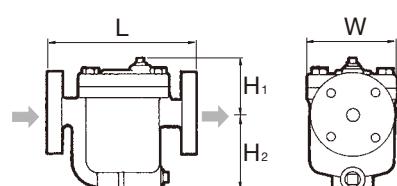
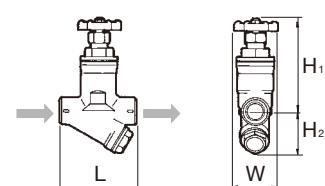


Dimensions AGC1V, AGC1V-W, AGC1V-F



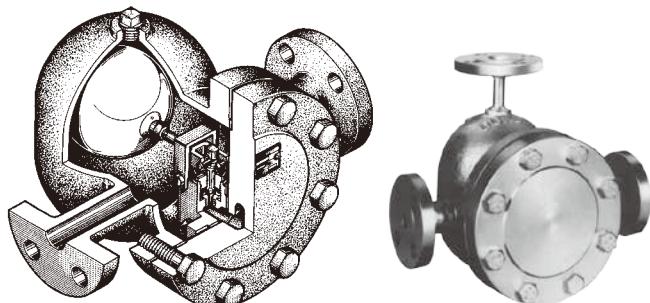
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)					Dimensions (in)					Body Material	Weight										
			MPa	psig	°C	°F	L	H1	H2	W1	W2	W	L	H1	H2	W1	W2	W	kg	lb								
<b>AG11 - 2</b>	Screwed Rc, NPT	1/2", 3/4"	0,2	29	100	212	120	37	92	121	60	-	4.7	1.5	3.6	4.8	2.4	-	Cast Iron FC250	3,9	8.6							
			0,97	140			140	47	113	129	92		5.5	1.9	4.4	5.1	3.6			5,9	13.0							
<b>AG12 - 9</b>	Screwed Rc, NPT	3/4", 1"	0,97	140	2,1	305	350	662	127	53	86	5.0	2.1	3.4	3.4	3.4	3.4	3.4	Stainless Steel SCS13A	1,8	4.0							
<b>AGC1V</b>		1/2"	2,1	305					136			5.4	2.0	2.0	2.0	2.0	2.0	2.0			1,9	4.2						
		3/4"							140			5.5									2,0	4.4						
		1"							127			5.0									1,8	4.0						
<b>AGC1V-W</b>	Socket Weld JIS, ASME, DIN	1/2"	2,1	305	350	662	136	53	53	86	5.0	2.1	3.4	3.4	3.4	3.4	3.4	3.4	Stainless Steel SCS13A	1,9	4.2							
		3/4"							136		5.4	2,0								4.4								
		1"							140		5.5	1,8								4.0								
<b>AGC1V-F</b>	Flanged JIS, ASME, DIN	1/2"	2,1	305	350	662	127	53	127	86	5.0	2.1	3.4	3.4	3.4	3.4	3.4	3.4	Stainless Steel SCS13A	1,9	4.2							
		3/4"							136		5.4	2,0								4.4								
		1"							140		5.5	3,3								7.3								

Horizontal version for AGC1V is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

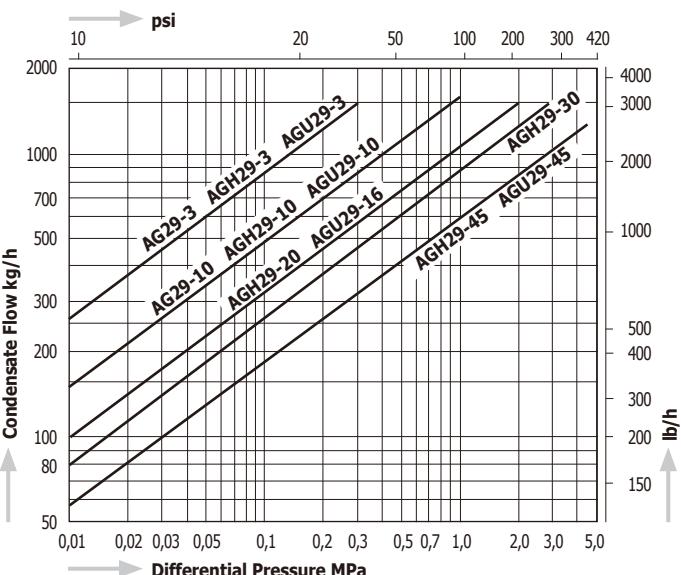
**AE8****AV****Capacity Chart AE8****Capacity Chart AV****Dimensions****AE8****AE8F****AV**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
AE8-	Screwed Rc, NPT	1/2"	0,2	29	350	662	130	73	90	100	5.1	2.9	3.5	3.9	Ductile Cast Iron FCD450	3,7	8.1
		3/4"					135				5.3					3,9	8.6
		1"					130	73	90	100	5.1	2.9	3.5	3.9		3,7	8.1
		1/2"	0,97	140	350	662	135				5.3					3,9	8.6
		3/4"					175	73	90		6.9	2.9	3.5			5,3	11.7
		1"					195	68	95	100	7.7	2.7	3.7	3.9		5,7	12.5
AE8F-	Flanged JIS, ASME, DIN	1/2"	0,2	29	350	662	215	73	90		8.5					6,8	15.0
		3/4"					175	73	90		6.9	2.9	3.5			5,3	11.7
		1"					195	68	95	100	7.7	2.7	3.7	3.9		5,7	12.5
		1/2"	0,97	140	350	662	215				8.5					6,8	15.0
		3/4"					175	73	90		6.9	2.9	3.5			5,3	11.7
		1"					195	68	95	100	7.7	2.7	3.7	3.9		5,7	12.5
AV-4	Screwed Rc, NPT	1/2"	0,97	140	150	302	110		60		4.3	2.4			Cast Iron FC250	2,4	5.3
AV-6		3/4"					120	155	65	65	4.7	6.1	2.6	2.6		2,5	5.5
AV-8		1"							70				2.8			2,7	5.9

# AG29

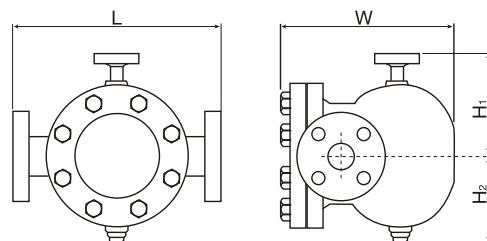


Capacity Chart AG29, AGH29, AGU29

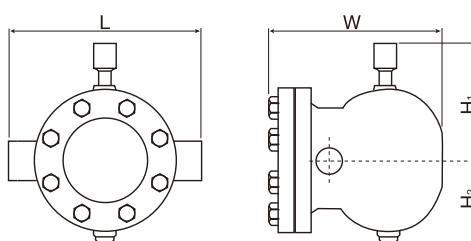


## Dimensions

AG29, AGH29, AGU29



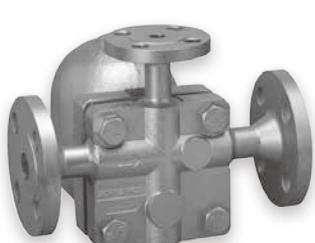
AGH29W, AGU29W



Model	Connections	Size	Max. Operating Pressure PMO		Max. Differential Pressure PMX		Max. Operating Temperature TMO		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
			MPa	psig	MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
AG29 -	Flanged JIS, ASME, DIN	1/2" - 1"	0,3	43	0,3	43	300	572	340	200	120	260	13.4	7.9	4.7	10.2	Ductile Cast Iron FCD450	26	57.2
			0,97	140	0,97	140													
AGH29 -	Flanged JIS, ASME, DIN	1/2" - 2"	3,0	435	0,3	43	400	752	340 1/2" - 1" 390 1 1/4" - 2"	200	120	260	13.4 1/2" - 1" 15.4 1 1/4" - 2"	7.9	4.7	10.2	Cast Steel SCPH2	28,0* 1/2" - 1" 32,0* 1 1/4" - 2"	61,6* 1/2" - 1" 70,4* 1 1/4" - 2"
					1,0	145													
					2,0	290													
					3,0	435													
AGH29W -	Socket Weld JIS, ASME, DIN	1/2" - 1"	3,0	435	0,3	43	400	752	280	200	120	260	11.0	7.9	4.7	10.2	Cast Steel SCPH2	25,5	56.1
					1,0	145													
					2,0	290													
					3,0	435													
					4,5	652													
AGU29 -	Flanged JIS, ASME, DIN	1/2" - 2"	3,0	435	0,3	43	400	752	340 1/2" - 1" 390 1 1/4" - 2"	200	120	260	13.4 1/2" - 1" 15.4 1 1/4" - 2"	7.9	4.7	10.2	Stainless Steel SCS13A	28,0* 1/2" - 1" 32,0* 1 1/4" - 2"	61,6* 1/2" - 1" 70,4* 1 1/4" - 2"
					1,0	145													
					1,6	230													
					4,5	652													
AGU29W -	Socket Weld JIS, ASME, DIN	1/2" - 1"	3,0	435	0,3	43	400	752	280	200	120	260	11.0	7.9	4.7	10.2	Stainless Steel SCS13A	25,5	56.1
					1,0	145													
					1,6	230													
					4,5	652													

\* The weight may differ depending on the size and flange standard.

# AGH12, AGH50

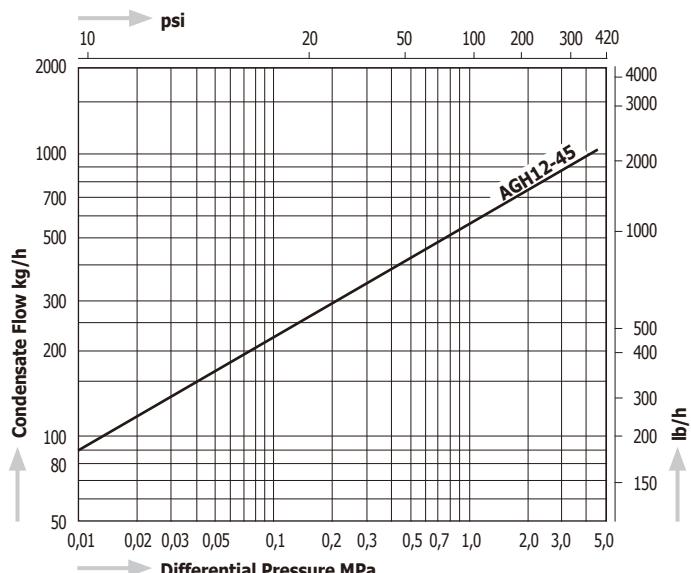


AGH12



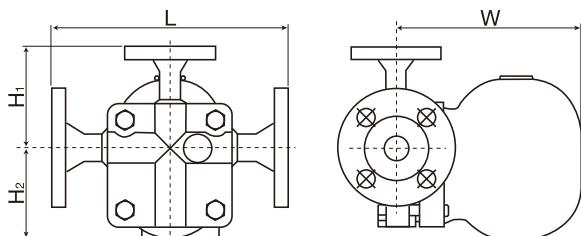
AGH50

## Capacity Chart AGH12-45

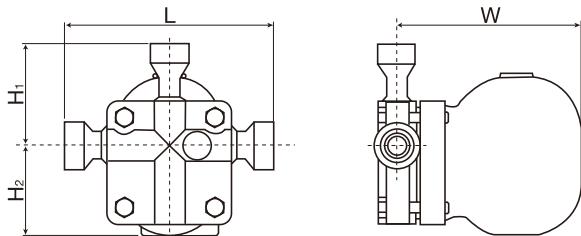


## Dimensions

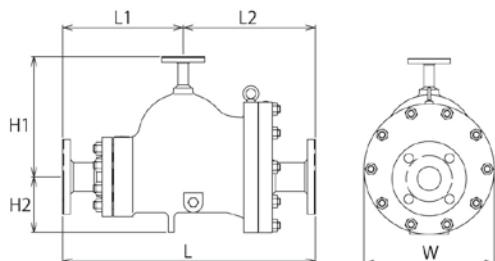
### AGH12-45F



### AGH12-45W



### AGH50



## Capacity Chart AGH50

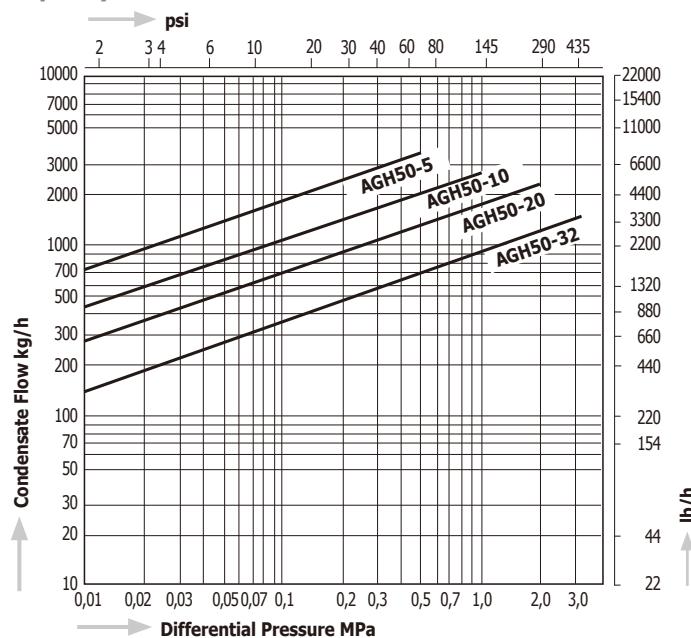


Table 1: Dimensions L and Weight

Model	Size	ASME Class* (#150, #300)						Weight*			
		Dimensions* (mm)			Dimensions* (in)			kg		lb	
		L	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	W	L	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	W
AGH50	2"	525	250	275	20.7	9.8	10.8	64		140.8	
	2½"	550	265	285	21.7	10.4	11.2	68		149.6	
	3"	555	290	21.9	10.4	11.4	72			158.4	
	4"	590	285	305	23.2	11.2	12.0	73 / 82		160.6 / 180.4	

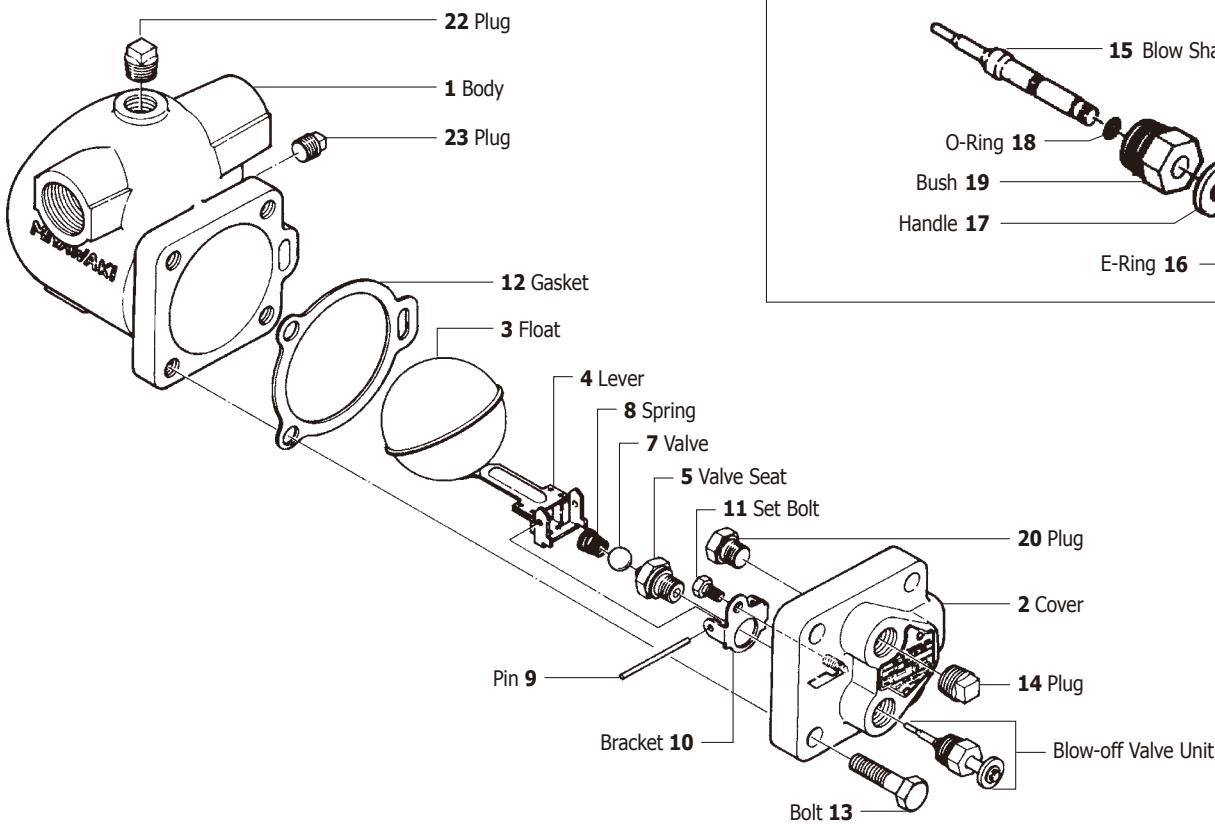
Model	Connections	Size	Max. Operating Pressure, PMO		Max. Differential Pressure, PMX		Max. Operating Temperature, TMO		Dimensions* (mm)				Dimensions* (in)				Body Material	Weight*			
			MPa	psig	MPa	psig	°C	°F	L	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	W	L	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	W	kg	lb	
AGH12 - 45F	Flanged JIS, ASME, DIN	½" – 1"	4,5	652	4,5	652	425	800	250	107	9.8	4.2	3.7	7.7	Cast Steel SCPH2	17	37.4	12	26.4		
AGH12 - 45W	Socket Weld JIS, ASME, DIN								220			75									
AGH50 - 5	Flanged JIS, ASME, DIN	2" – 4"	3,2	464	0,5	72.5	400	752	Table 1	250	115	270	Table 1	9.8	4.5	10.6	Cast Steel SCPH2	Table 1			
AGH50 - 10					1,0	145															
AGH50 - 20					2,0	290															
AGH50 - 32					3,2	464															

\* Depending on the flange standard the face-to-face dimensions and the weight may differ.

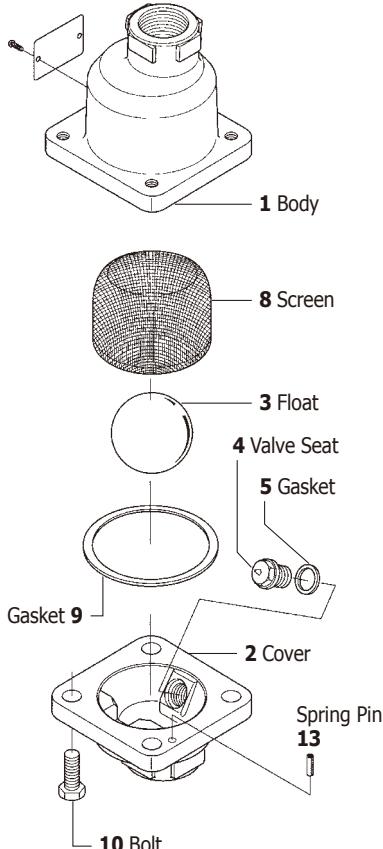
Stainless Steel as body material is available as special design. For more details, please contact MIYAWAKI Inc. or an authorized representative.

**SERIES A Spare Parts**

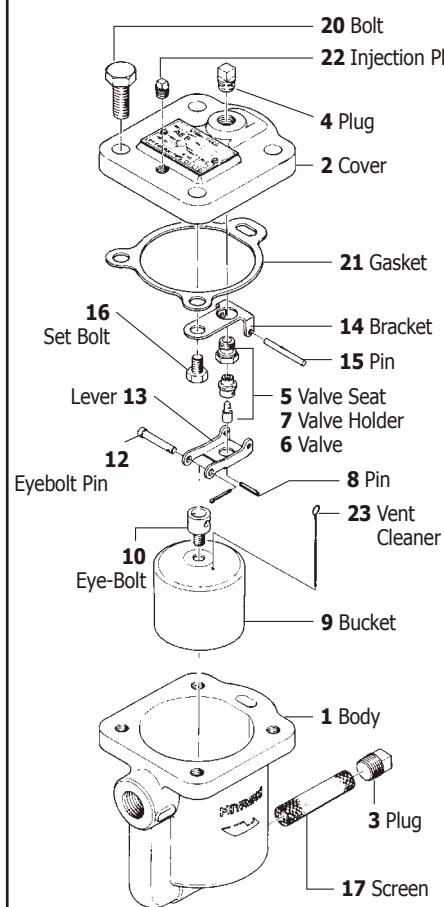
AG11/AG12



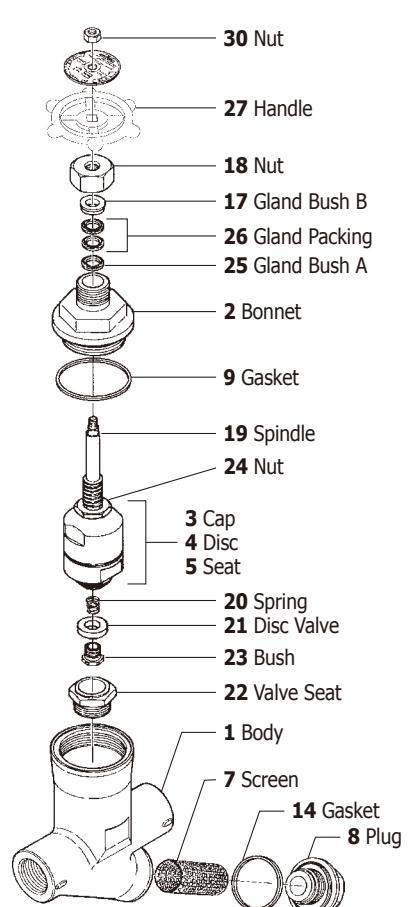
AGC1V



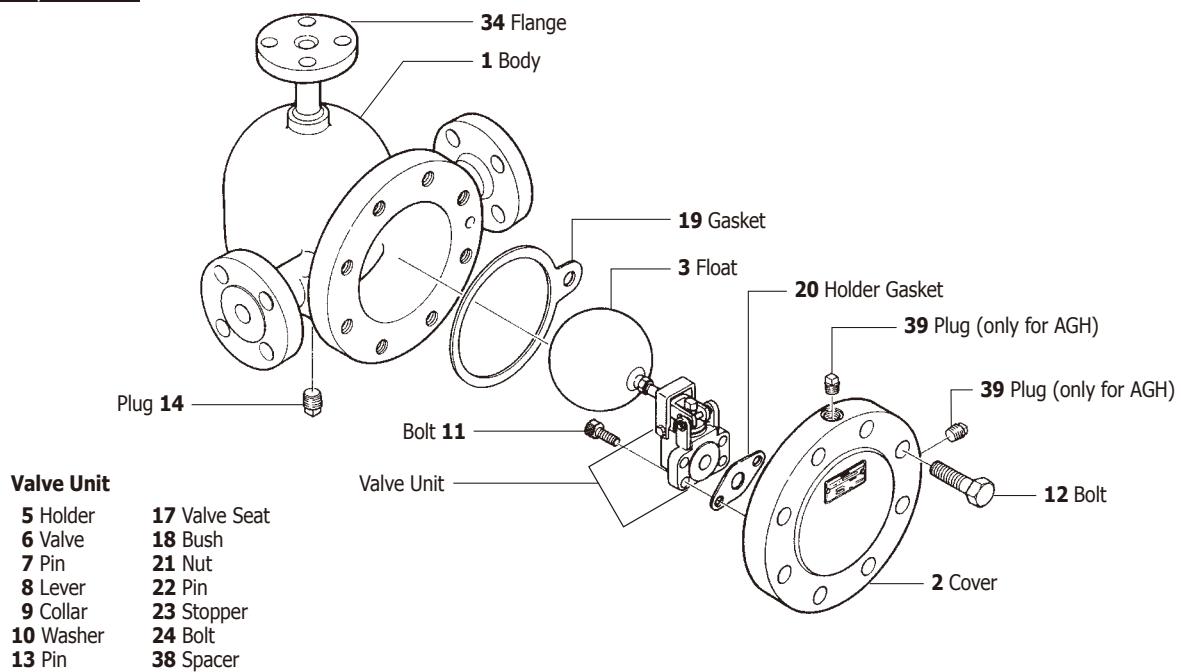
AE8



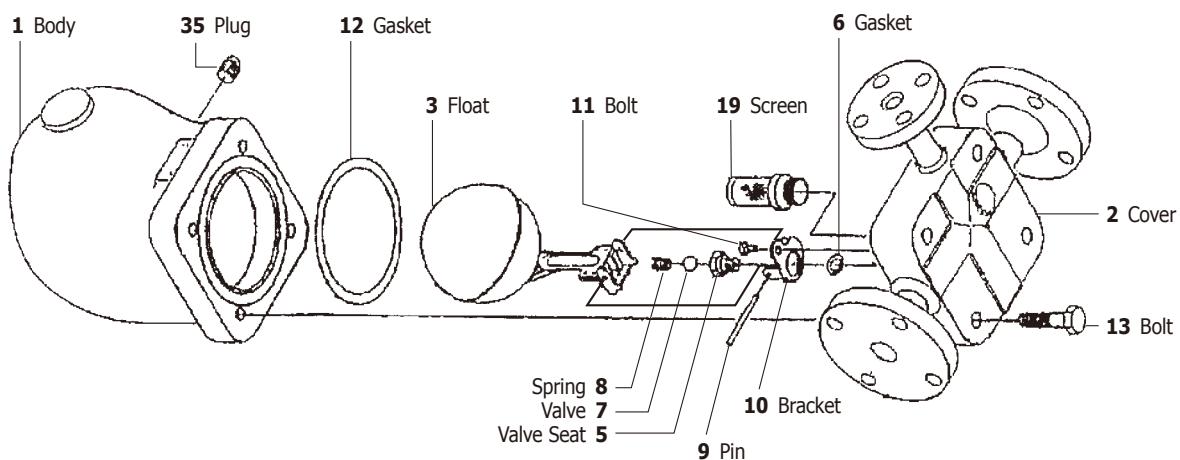
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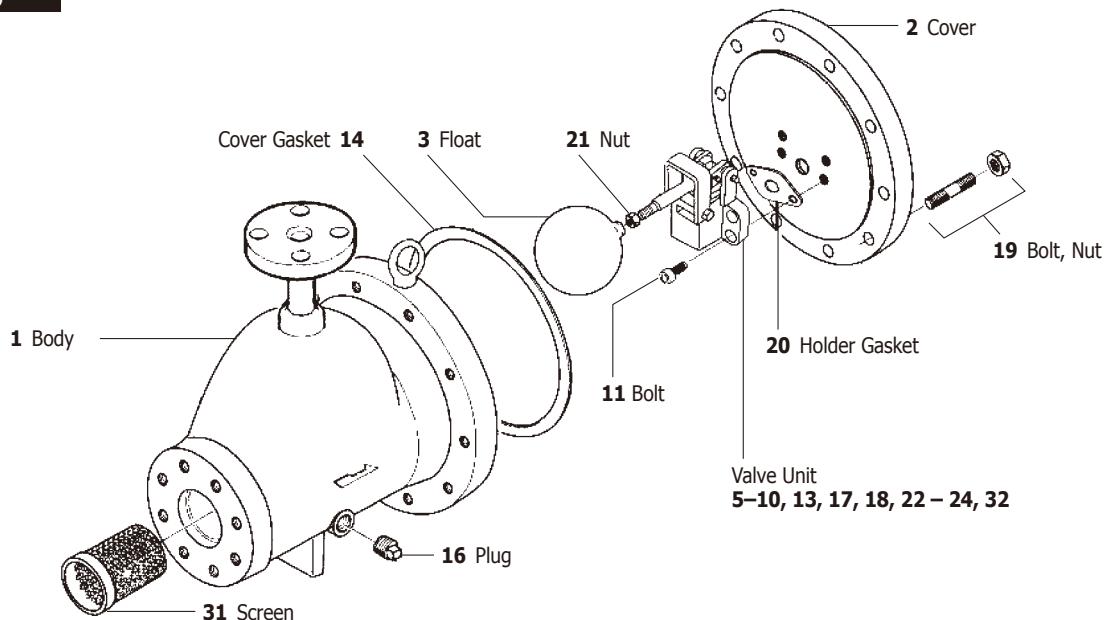
AG29, AGH29, AGU29



AGH12



AGH50



MEMO

# Air Vents

## SERIES AT, AD, AW

MIYAWAKI **Air vents** are used to remove air and gases from pipelines for steam and liquids, boilers and other special equipment.

MIYAWAKI offers a wide range of thermostatic air vent. They ensure the efficiency of the system by removing the air and gases accumulated during operation and system downtime.

Air vents must be installed at the highest point of the equipment/ system section to be vented.

### Models

**AW** Thermostatic air vents made of brass

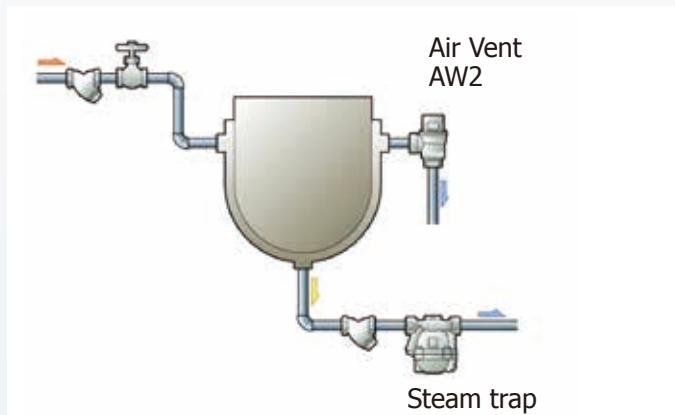
**AT7N, AT9N** Forged steel, with bimetal and with the ability to adjust the temperature of the exhaust gas-air mixture for equipment with low and medium pressure

**ADC1, ADL1** Stainless steel thermostatic air vents

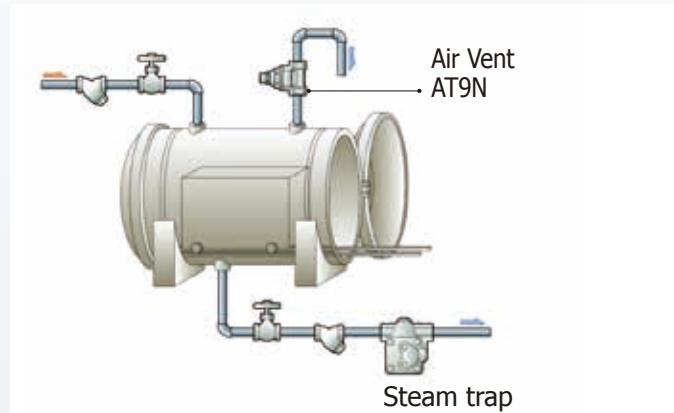
**AT51** Forged steel, with the ability to adjust the temperature of the exhaust gas mixture for high pressure equipment

### Installation Example

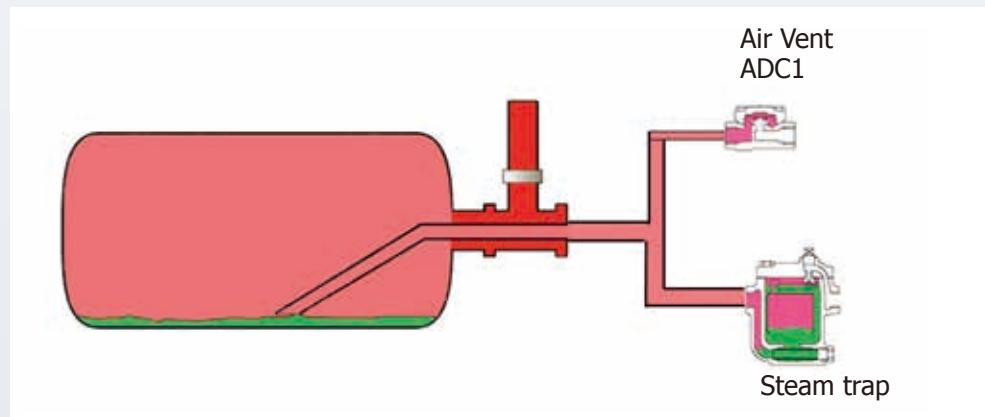
Open boiler

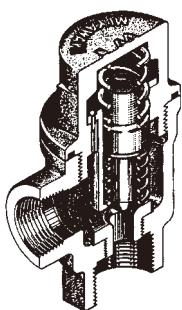
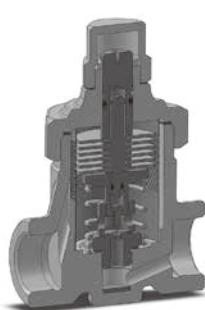


Autoclave



Drum dryer

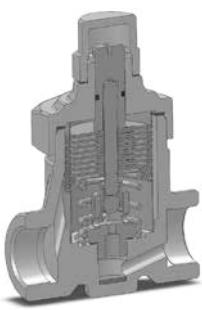


**AW2****AT7N**

Screwed &amp; Socket weld



Flanged Connection

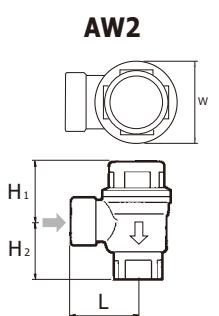
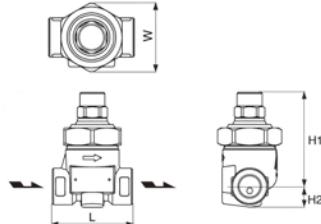
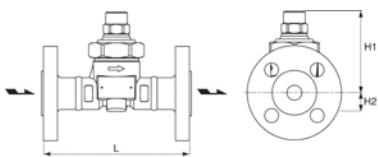
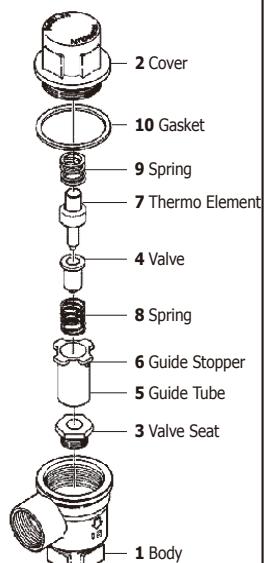
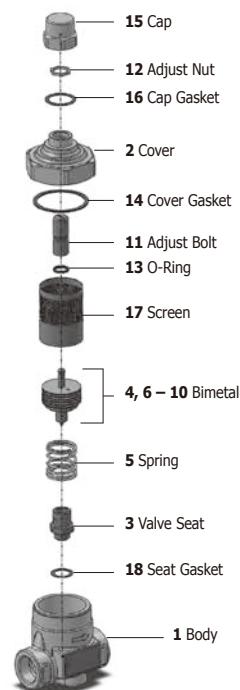
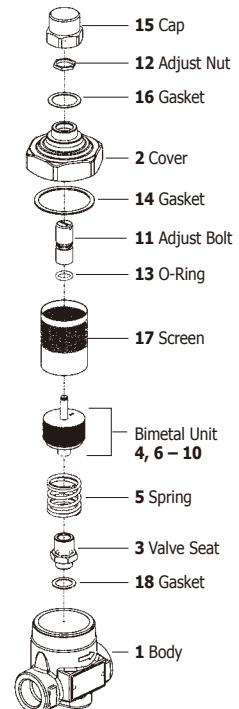
**AT9N**

Screwed &amp; Socket weld



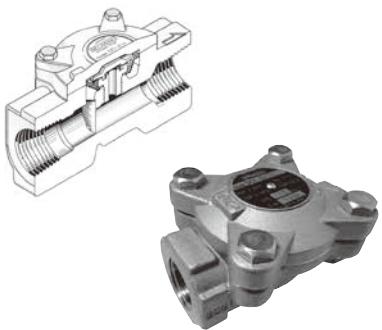
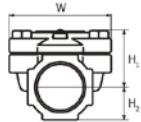
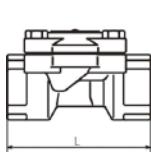
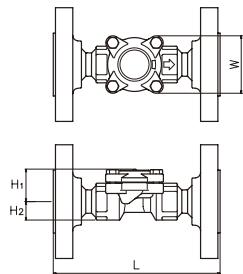
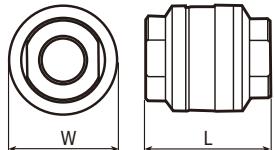
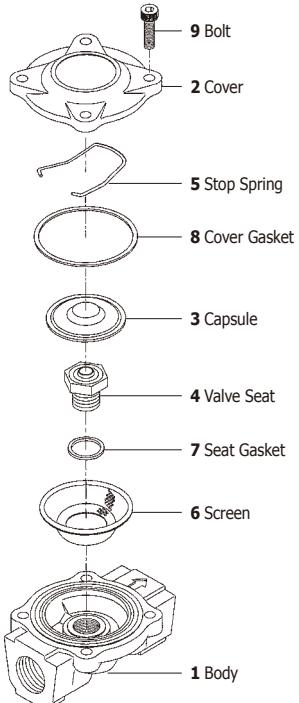
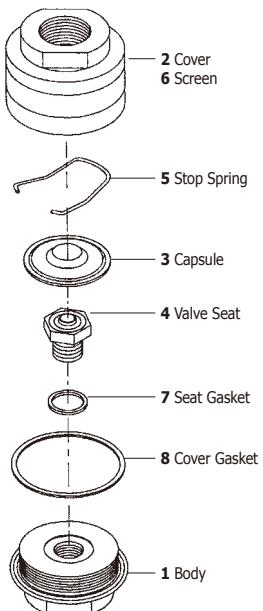
Flanged Connection

## Dimensions

**AT7N, AT7NW  
AT9N, AT9NW****AT7NF  
AT9NF****AW2****AT7N****AT9N**

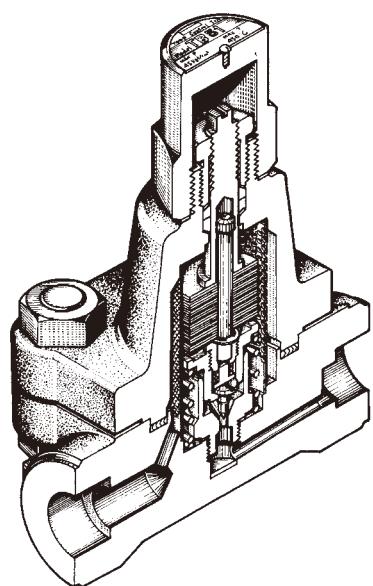
Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight			
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb		
<b>AW2-5</b>	Screwed Rc, NPT	$\frac{1}{2}''$ $\frac{3}{4}''$	0,5	73	160	320	35	42	35	41	1.4	1.7	1.4	1.6	Brass C3771	0,4	1.0		
									41				1.6			0,5	1.1		
<b>AT7N</b>	Screwed Rc, NPT	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	2,1	305	70 80 70 80	18 19 23 18 19 23	70 80 70 80	18 19 23 18 19 23	56 56 56 3.1	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2 2.2	Forged Steel A105	0,9 1,0 1,1 0,9 1,0 1,1 2,6 3,4 4,0	2.0 2.2 2.4 2.0 2.2 2.4 5.7 7.5 8.8				
<b>AT7NW</b>	Socket Weld JIS, ASME, DIN	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	2,1	305	70 80 70 80	18 19 23 18 19 23	70 80 70 80	18 19 23 18 19 23	56 56 56 3.1	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2 2.2							
<b>AT7NF</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	2,1	350	145* 82 145*	18 19 23 18 19 23	70 80 70 80 145* 82	18 19 23 18 19 23	56 56 56 5.7*	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2	Forged Steel A105	0,9 1,0 1,1 0,9 1,0 1,1 2,6 3,4 4,0	2.0 2.2 2.4 2.0 2.2 2.4 5.7 7.5 8.8				
<b>AT9N</b>	Screwed Rc, NPT	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	1,6	230	70 80 70 80	18 19 23 18 19 23	70 80 70 80	18 19 23 18 19 23	56 56 56 3.1	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2	Forged Steel A105	0,9 1,0 1,1 0,9 1,0 1,1 2,6 3,4 4,0	2.0 2.2 2.4 2.0 2.2 2.4 5.7 7.5 8.8				
<b>AT9NW</b>	Socket Weld JIS, ASME, DIN	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	1,6	230	70 80 70 80	18 19 23 18 19 23	70 80 70 80	18 19 23 18 19 23	56 56 56 3.1	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2	Forged Steel A105	0,9 1,0 1,1 0,9 1,0 1,1 2,6 3,4 4,0	2.0 2.2 2.4 2.0 2.2 2.4 5.7 7.5 8.8				
<b>AT9NF</b>	Flanged JIS, ASME, DIN	$\frac{1}{2}''$ $\frac{3}{4}''$ $1''$	1,6	350	145* 82 145*	18 19 23 18 19 23	70 80 70 80 145* 82	18 19 23 18 19 23	56 56 56 5.7*	2.75 3.2 2.75 3.2	0.7 0.75 0.7 0.75	2.2 2.2	Forged Steel A105	0,9 1,0 1,1 0,9 1,0 1,1 2,6 3,4 4,0	2.0 2.2 2.4 2.0 2.2 2.4 5.7 7.5 8.8				

\*On request also available with different face-to-face length

**ADC1****ADL1****Dimensions****ADC1****ADC1-F****ADL1****ADC1****ADL1**

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight		
			MPa	psig	°C	°F	L	H <sub>1</sub>	H <sub>2</sub>	W	L	H <sub>1</sub>	H <sub>2</sub>	W		kg	lb	
<b>ADC1-21H</b> <b>ADC1-21L</b>	Screwed Rc, NPT	1/4", 3/8"	2,1	305	220	428	65	29	11	53	2.6	1.1	0.4	2.1	Stainless Steel SCS13A	0,4	0.9	
		1/2", 3/4"					75	31	17		3.0	1.2	0.7			0,5	1.1	
		1"					80	34	21		3.1	1.3	0.8			1,3	2.9	
<b>ADC1-21HF</b> <b>ADC1-21LF</b>	Flanged JIS, ASME, DIN	1/2"	2,1	305	220	428	150	31	17		5.9	1.2	0.7			2,2	4.9	
		3/4"					160	34	21		6.3	1.3	0.8			3,1	6.8	
		1"																
<b>ADL1-21H</b> <b>ADL1-21L</b>	Screwed Rc, NPT	1/4"	2,1	305	220	428	60			48	2.4			1.9	Stainless Steel SCS13	0,7	1.5	
		3/8"																
		1/2"																
		3/4"								48	2.4			1.9				
		1"																
<b>ADL1-10C</b>	Screwed Rc, NPT	1/4"	1,0	145	220	428	60			48	2.4			1.9	Stainless Steel SCS13	0,7	1.5	
		3/8"																
		1/2"																
		3/4"								48	2.4			1.9				
		1"																

# AT51

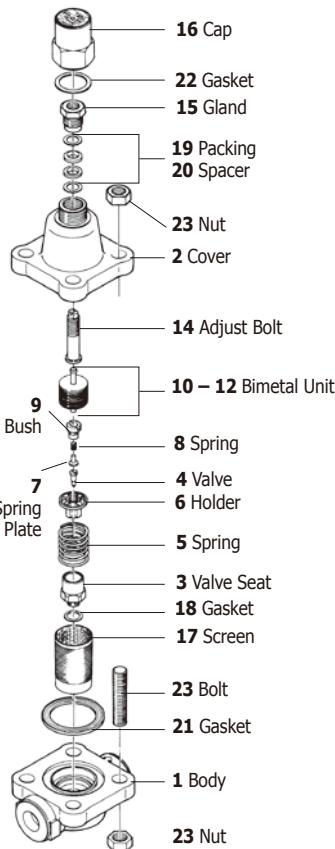


Screwed &amp; Socket Weld



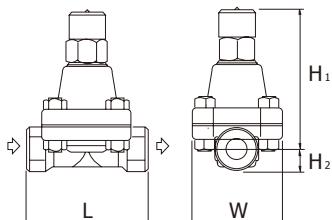
Flanged

AT51



## Dimensions

AT51 / AT51W



AT51F

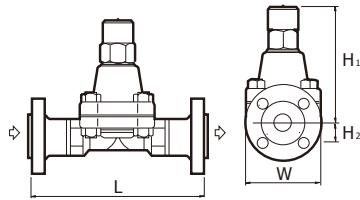


Table 1: Face-to-face dimensions / weights

Model	Size (in)	ASME 600 lb				DIN PN63 / PN100				JIS 63 K / ASME 900 lb			
		mm	in	kg	lb	mm	in	kg	lb	mm	in	kg	lb
AT51F	1/2"	200	7.9	7,3	16.1	210	8.3	9,4	20.7	220	8.7	9,6	21.2
	3/4"	210	8.3	8,5	18.7	230	9.1	11,4	25.1	230	9.1	11,1	24.5
	1"	240	9.4	9,6	21.2	230	9.1	12,5	27.6	240	9.4	12,1	26.7

Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material		Weight		
			MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb			
AT51	Screwed Rc, NPT	1/2" - 1"	4,5	653	425	800	130	155	25	100	5.1	6.1	1.0	3.9	Forged Steel A105	5,7	12.6	table1	table1
			6,5	943															
AT51W	Socket Weld JIS, ASME, DIN	1/2" - 1"	4,5	653											table1	table1	table1	table1	
			6,5	943															
AT51F	Flanged JIS, ASME, DIN	1/2" - 1"	4,5	653											table1	table1	table1	table1	
			6,5	943															

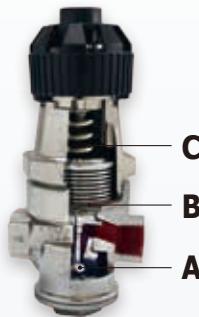
# Pressure Reducing Valves

## SERIES RE

**Pressure Reducing Valves (PRV)** are designed for regulating the downstream pressure and maintaining it within certain acceptable limits. Ideally, a PRV should provide constant downstream pressure while delivering the required flow, i.e. the PRV automatically adjusts the steam flow to meet the downstream system demand. Depending on the model, MIYAWAKI's pressure reducing valves are designed for steam, air, gases and liquids. MIYAWAKI is manufacturing three types of PRV:

- Direct acting pressure reducing valves
- Pilot operated pressure reducing valves
- Pressure reducing valves with a downstream pressure sensing line (pulse line)

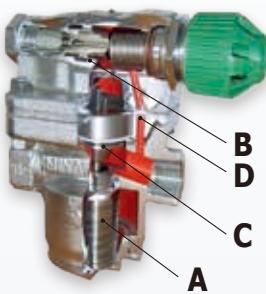
### Operating principle General



#### Direct Acting PRV

The direct acting PRV has 3 essential elements:

- A Main Valve Unit
- B Pressure Measuring Element (Bellows)
- C Adjust Spring



Changes in downstream pressure are sensed by the bellows, which expands or contracts depending on the pressure change. The movement of the bellows will be directly transferred to the spring, which will open or close the main valve, thus keeping the downstream pressure at a certain level.

#### Pilot Operated PRV

The pilot operated PRV has 4 essential elements:

- A Main Valve Unit
- B Pilot Valve (same structure as the direct-acting PRV)
- C Adjusting Unit (piston and cylinder liner)
- D Downstream pressure sensing line (pulse line)

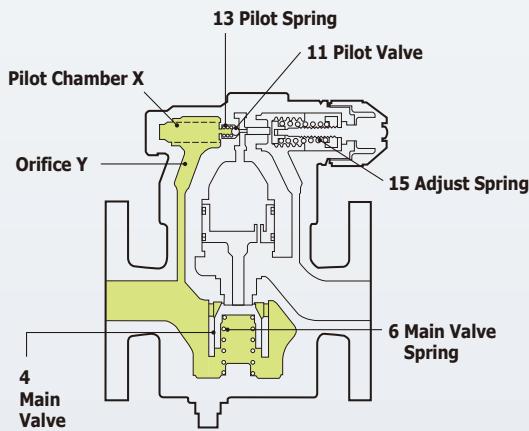
Changes in downstream pressure are sensed by the pilot valve mechanism (bellows connected with a pilot valve unit) through a signal line D, which connects the pilot valve regulator with the secondary pressure side.

Movement of the bellows will open or close the pilot valve, regulating the amount of steam influencing the movement of the piston, which will close or open the main valve, thus keeping downstream pressure on a stable level.

Pilot operated pressure reducing valves are used to improve accuracy and capacity, compared with direct acting pressure regulators. The decision whether to use a direct acting valve or a pilot operated valve depends on the demands of the steam using system.

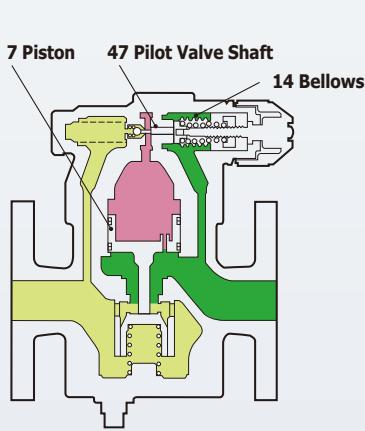
### Operating principle Pilot operated PRV

Inlet Steam Pressure      Secondary Steam Pressure      Adjusting Steam Pressure



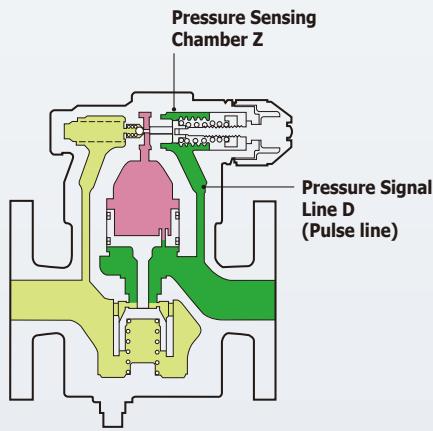
1

Before adjusting the secondary pressure the green handle must be turned clockwise to release the adjust spring (15) until the handle moves freely. In this position the main valve (4) is closed by the force of the spring (6) and the pilot valve (11) is closed by the force of the spring (13). When steam enters the valve, part of the steam enters the pilot chamber (X) through the orifice (Y).



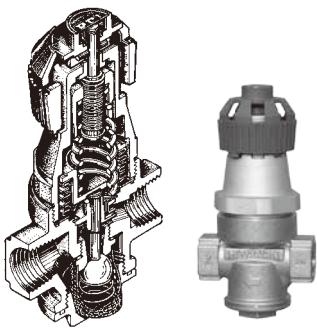
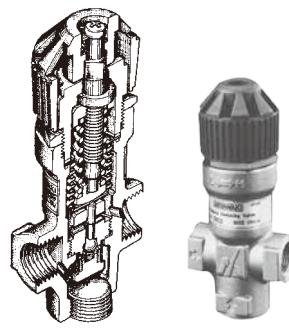
2

To adjust the secondary pressure the handle must be turned counterclockwise. As a result, the adjust spring (15) will be pressed into the bellows (14). The bellows will expand and the pilot valve shaft (47) will open the pilot valve (11). The steam, which has entered the pilot chamber (X) will flow through the pilot valve unit into the chamber above the piston (7). Due to the steam pressure the piston (7) will move downwards and open the main valve (4). Steam will flow towards the secondary side.

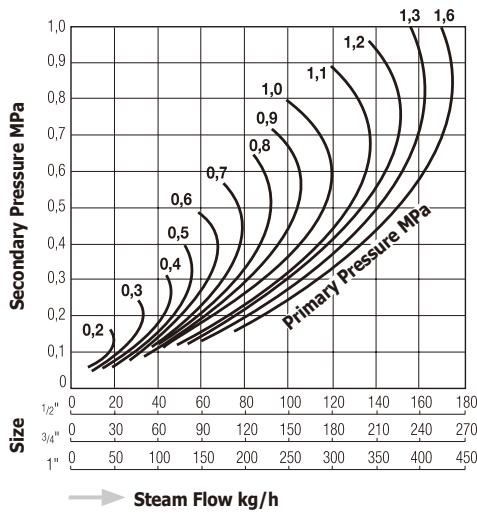


3

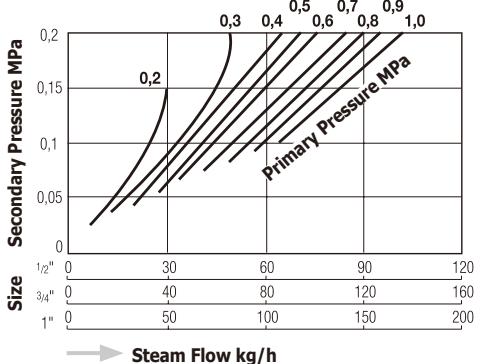
Part of the steam, which flows to the secondary side will enter the pressure sensing chamber (Z) through the pressure signal line (D). Due to the pressure influence, the bellows (14) will contract. Depending on the secondary pressure value the force exerted by the bellows and the force exerted by the adjust spring (15) will be balanced and the opening degree of the pilot valve (11) will be adjusted, thus regulating the amount of steam flowing through the pilot valve to the piston. Consequently, the opening degree of the main valve (4) will be also adjusted to regulate the steam flow in the direction of the secondary side maintaining a stable steam flow and steam pressure on the secondary side.

**RE1****RE2**

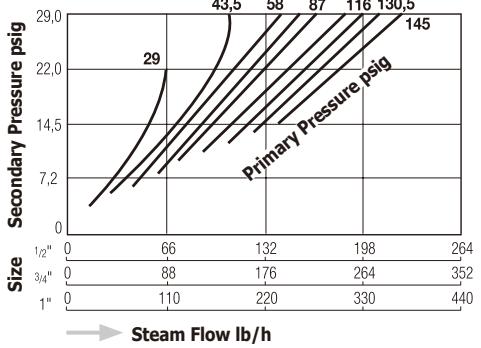
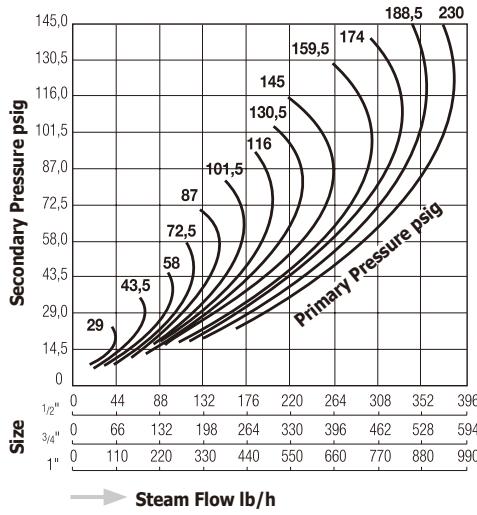
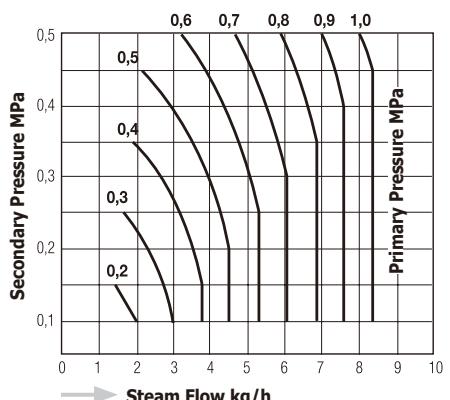
Capacity Charts RE1, RE1-4



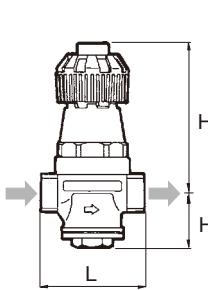
Capacity Charts RE1-2



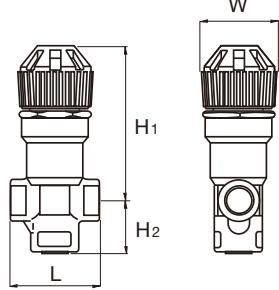
Capacity Charts RE2



Dimensions RE1



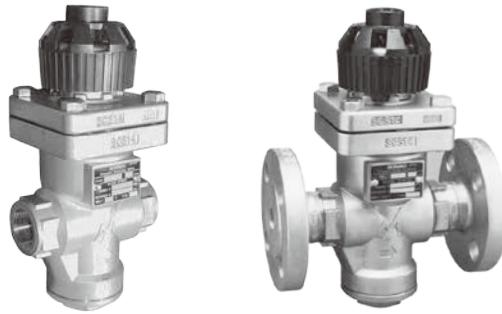
Dimensions RE2



Cv Values	Size (in)	RE1 & RE1-4		RE1-2		Kvs Values	Size (in)	RE1 & RE1-4		RE1-2	
		1/2"	1,2	1/2"	1,9			1/2"	1,0	1,6	
		3/4"	1,9	3/4"	1,9			3/4"	1,6	1,6	
	1"	3,2	2,1				1"	2,8	1,8		

Model	Connection	Size (in)	Operating Pressure (Primary)		Secondary Pressure		Max. Red. Pressure Ratio	Max. Operating Temperature		Dimensions (mm)		Dimensions (in)		Body Material	Weight					
			MPa	psig	MPa	psig		°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb	
RE1	Screwed Rc, NPT	1/2"	0,2 - 1,6	29 - 230	0,05 - 1,0	7,2 - 145	10 : 1	204	399	80	137	46	3,2	5,4	1,8	2,6	Brass	1,4	3,1	
		3/4"								90			3,5					1,6	3,5	
		1"								105	144	58	4,1	5,7	2,3			1,9	4,2	
RE1-4		1/2"	0,2 - 1,0	29 - 145	0,05 - 0,4	7,2 - 58	10 : 1	204	399	80	137	46	3,2	5,4	1,8	2,6		1,4	3,1	
		3/4"								90			3,5					1,6	3,5	
		1"								105	144	58	4,1	5,7	2,3			1,9	4,2	
RE1-2		1/2"	0,2 - 1,0	29 - 145	0,02 - 0,2	2,9 - 29	10 : 1	204	399	80	137	46	3,2	5,4	1,8	2,6		1,4	3,1	
		3/4"								90			3,5					1,6	3,5	
		1"								105	144	58	4,1	5,7	2,3			1,9	4,2	
RE2	Screwed Rc, NPT	3/8"	0,2 - 1,0	29 - 145	0,1 - 0,5	14 - 72	10 : 1	184	363	50	89	31	43	2,0	3,5	1,2	1,7	0,56	1,2	

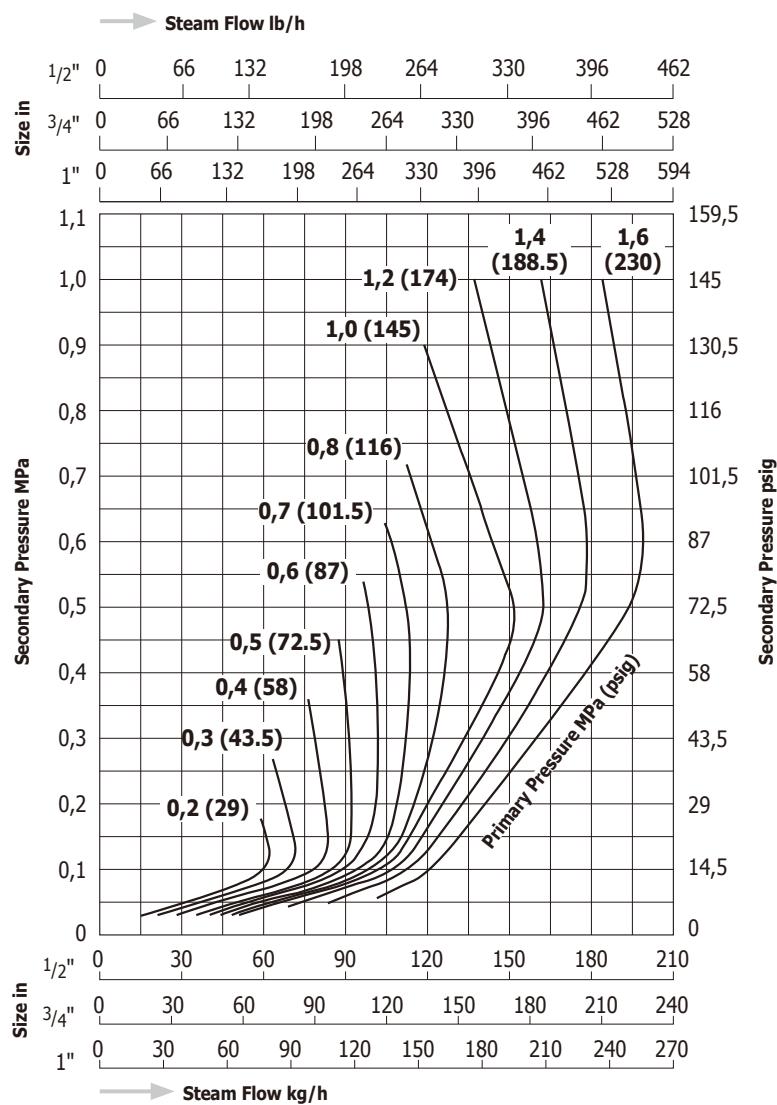
# REC1



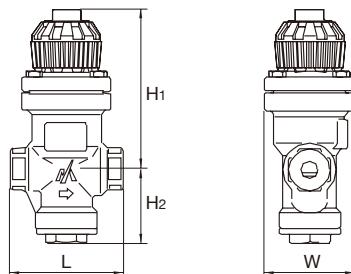
**Minimum Differential Pressure:**  
more than 10 % of Operating Pressure

**Body Material:**  
Stainless Steel SCS14

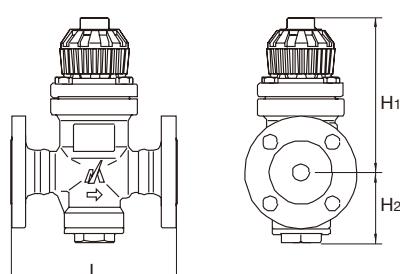
## Capacity Chart REC1



## Dimensions REC1 - Screwed

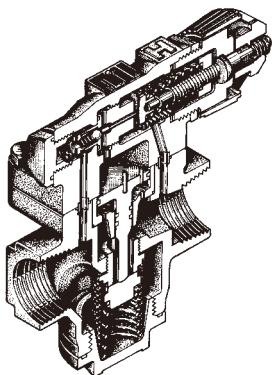


## Dimensions REC1 - Flanged

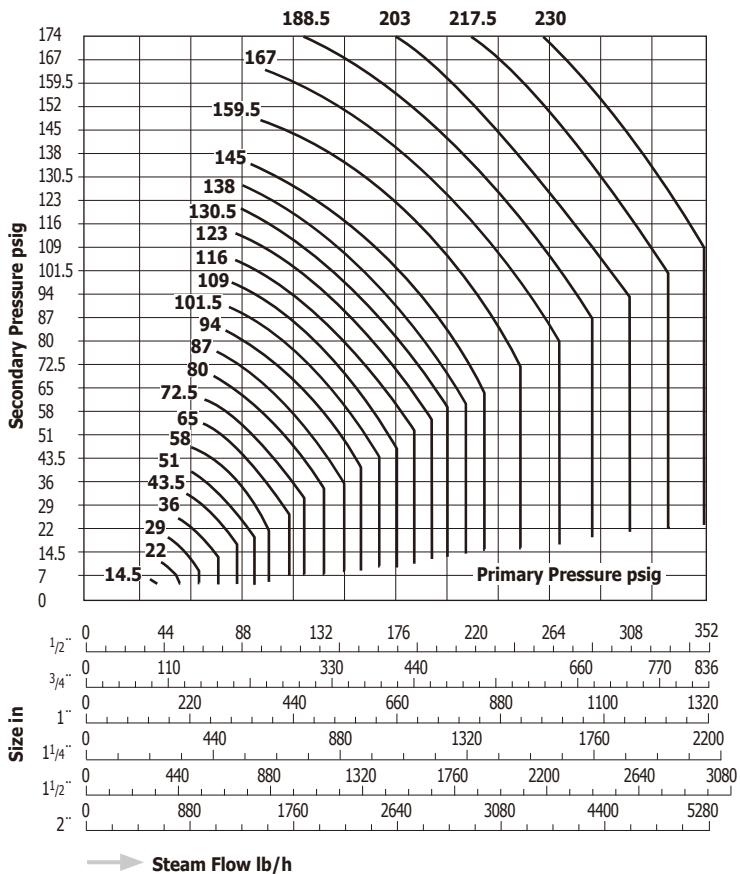
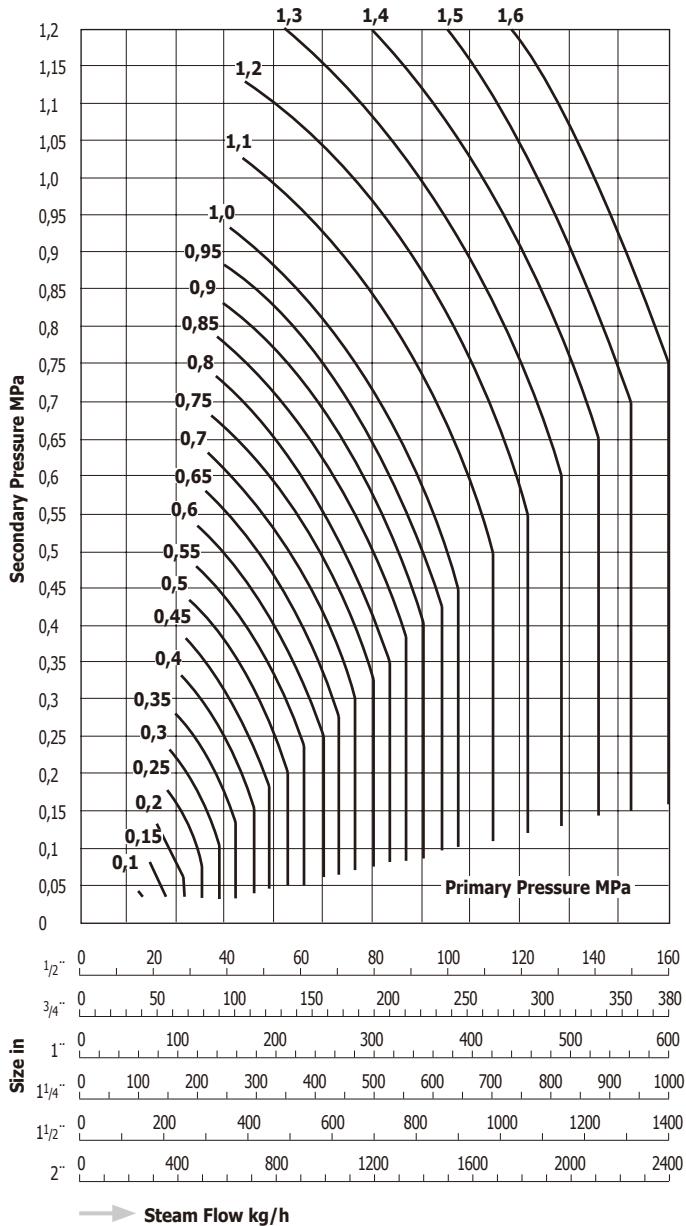
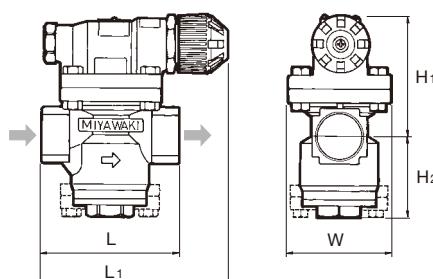


	Size (in)	REC1
Cv Values	1/2"	3,8
	3/4"	4,0
	1"	4,0
Kvs Values	1/2"	3,3
	3/4"	3,4
	1"	3,4

Model	Connections	Size (in)	Operating Pressure (Primary)		Secondary Pressure		Max. Red. Pressure Ratio	Max. Operating Temperature		Dimensions (mm)			Dimensions (in)			Weight					
			MPa	psig	MPa	psig		°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb		
<b>REC1-2</b>	Screwed Rc, NPT, Rp	1/2" – 1"	0,2 – 1,6	29 – 230	0,02 – 0,2	2,9 – 29	30 : 1	220	428	96	138	63	78	3,8	5,4	2,5	3,1	2,9	6,4		
<b>REC1-6</b>		1/2" – 1"	0,2 – 1,6	29 – 230	0,18 – 0,6	26 – 87	8,9 : 1			150	138	63	78	5,9	5,4	2,5	3,1	2,8	6,2		
<b>REC1-10</b>		1/2" – 1"	0,6 – 1,6	87 – 230	0,54 – 1,0	78 – 145	3 : 1			160				6,3				2,8	6,2		
<b>REC1-2F</b>	Flanged JIS, ASME, DIN	1/2"	0,2 – 1,6	29 – 230	0,02 – 0,2	2,9 – 29	30 : 1			150	138	63	78	5,9	5,4	2,5	3,1	4,5	9,9		
<b>REC1-6F</b>		3/4"								160				6,3				5,1	11,2		
<b>REC1-10F</b>		1"								150	138	63	78	5,9	5,4	2,5	3,1	5,9	13		
		1/2"	0,6 – 1,6	87 – 230	0,54 – 1,0	78 – 145	3 : 1			160				6,3				4,5	9,9		
		3/4"								150	138	63	78	5,9	5,4	2,5	3,1	5,1	11,2		
		1"								160				6,3				5,9	13		

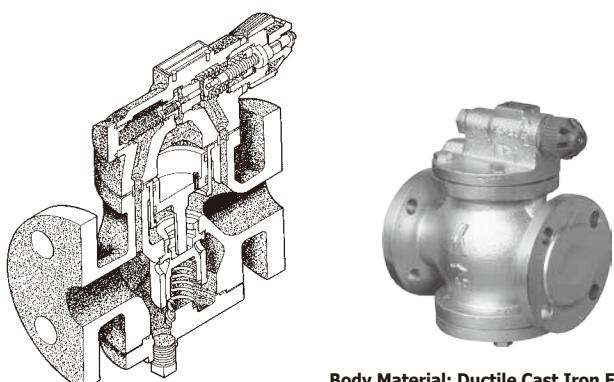
**RE3**

Body Material: Brass C3771

**Capacity Charts RE3****Dimensions RE3**

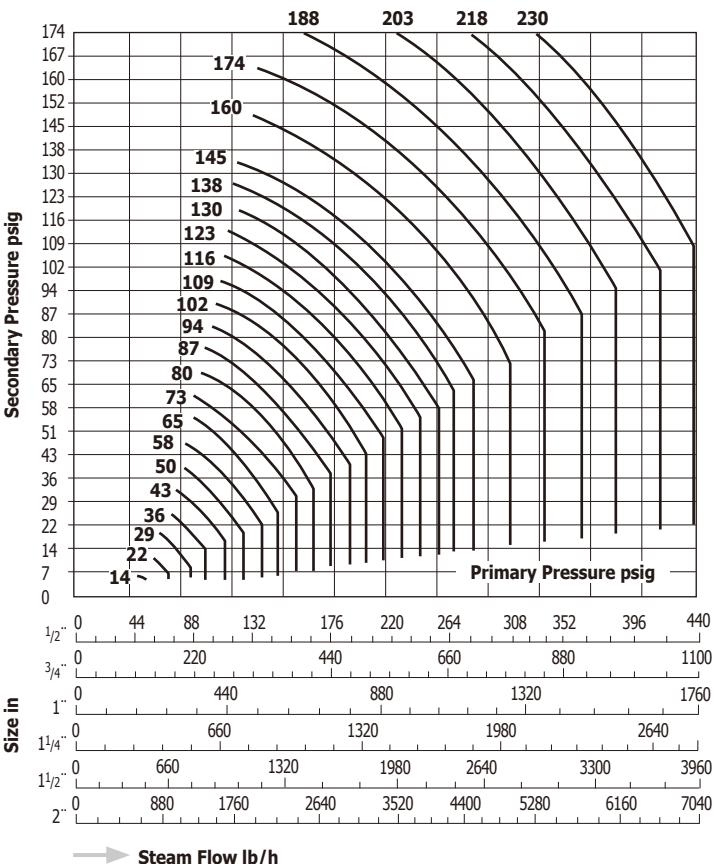
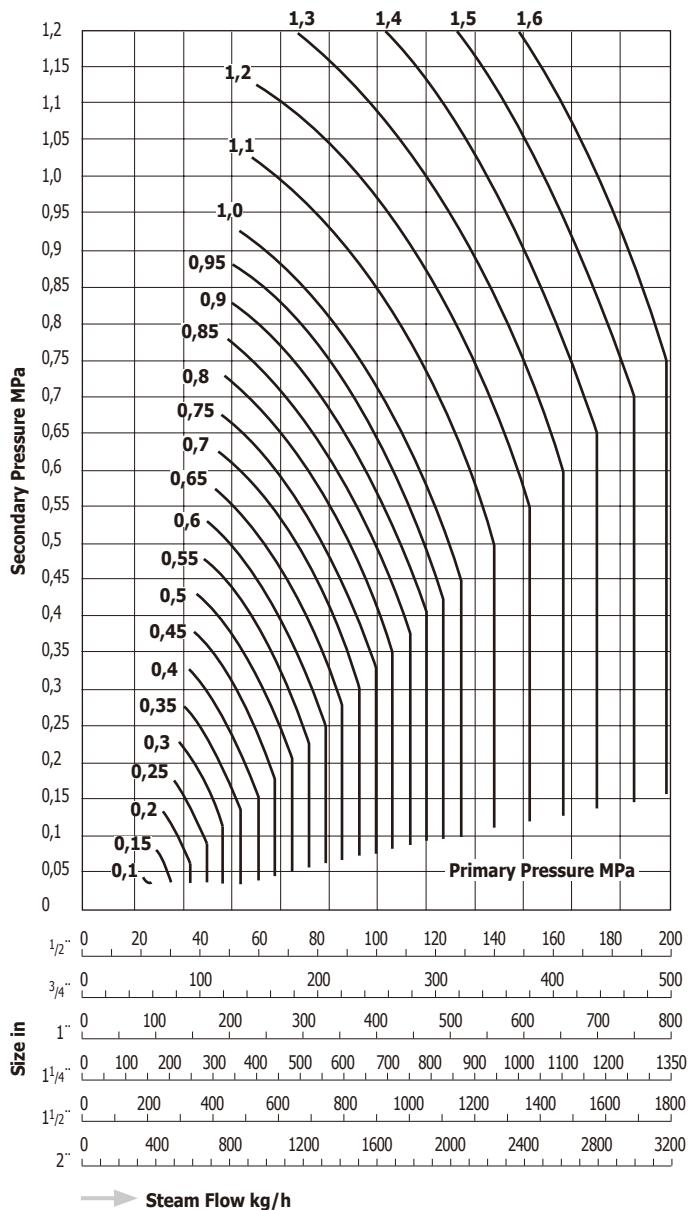
Model	Connection	Size (in)	Operating Pressure (Primary)		Secondary Pressure		Max. Red. Pressure Ratio	Max. Oper. Temperature	Dimensions (mm)				Dimensions (in)				Weight		Values						
			MPa	psig	MPa	psig			L	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	W	L	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	W	kg	lb	Cv	Kvs			
RE3	Screwed Rc, NPT	1/2"	0,1 - 1,6	14.5 - 230	0,03 - 1,2	4.4 - 174	20 : 1	220 428	90	127				3.5	5.0					2,8	6.2	0,8	0,7		
		3/4"							95	130	87	58	74	3.7	5.1	3.4	2.3	2.9				1,9	1,6		
		1"							100	132				3.9	5.2					2,9	6.4	3,0	2,6		
		1 1/4"							130	155	111	73	96	5.1	6.1	4.4	2.9	3.8				6,2	13,6	4,9	4,2
		1 1/2"							140	157	121	79	110	5.5	6.2	4.8	3.1	4.3				6,3	13,9	6,8	5,9
		2"																		8,2	18,0	12,0	10,3		

# RE10N

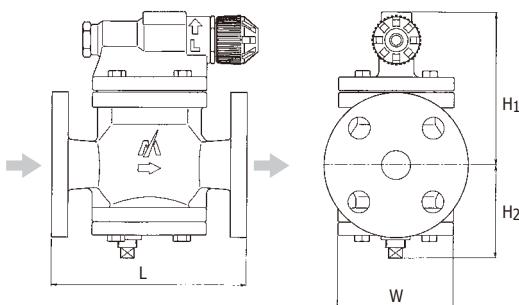


Body Material: Ductile Cast Iron FCD450

## Capacity Charts RE10N



## Dimensions RE10N



Model	Connection	Size (in)	Operating Pressure (Primary)		Secondary Pressure		Max. Red. Pressure Ratio	Max. Operating Temperature	Dimensions (mm)				Dimensions (in)				Weight		Values		
			MPa	psig	MPa	psig			°C	°F	L	H1	H2	W	L	H1	H2	W	kg	lb	Cv
RE10N	Flanged JIS, ASME, DIN	1/2"	0,1 - 1,6	14.5 - 230	0,03 - 1,2	4.4 - 174	20 : 1	220	428	160	133	80	100	6.3	5.2	3.1	3.9	7,1	15.7	1,0	0,9
		3/4"								170	154	103	130	6.7				7,4	16.3	2,5	2,2
		1"								200	154	103	130	7.9	6.1	4.1	5.1	8,5	18.7	4,0	3,4
		1 1/4"								220	154	103	130	8.7				14,2	31.3	6,5	5,6
		1 1/2"																14,3	31.5	9,0	7,7
		2"																15,6	34.4	16,0	13,8

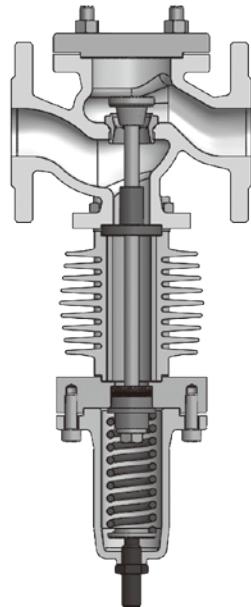
# RE20

# REH20

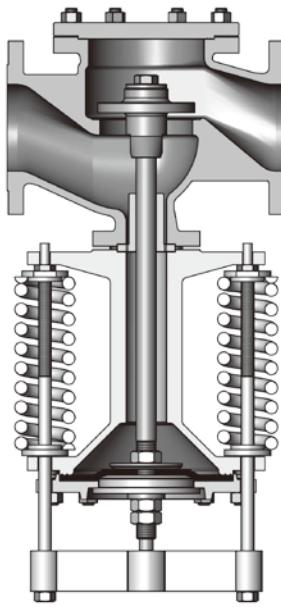
# REC20

**The model RE20** is a direct acting pressure reducing valve designed for use of steam. The valve provides a constant downstream pressure at a stable given inlet pressure and constant running flowrates. Changes in the upstream pressure and fluctuating steam consumption on the secondary side will result in variations in downstream pressure. The valve is not designed for dead-end services. Due to carefully selected springs a wide range of pressure applications is available. The pressure reducing valve can be delivered with ductile cast iron, cast steel or stainless steel housings. All important internal parts are manufactured in stainless steel. As option the valves can be equipped with a pressure gauge on the valve body.

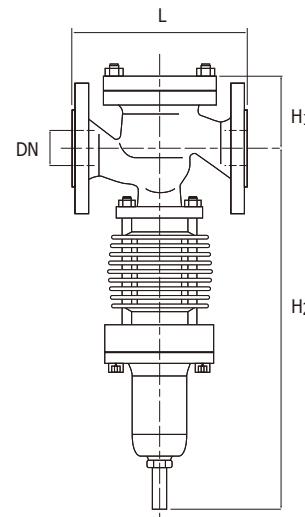
Maximum pressure reduction ratio: 25:1



Size: DN 15 – 100



Size: DN 125 – 200



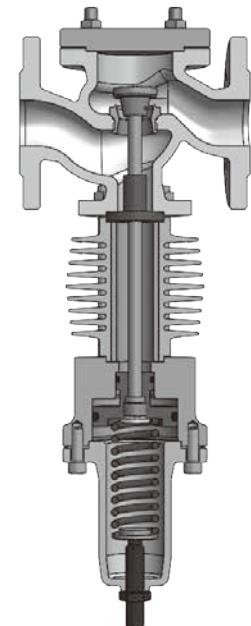
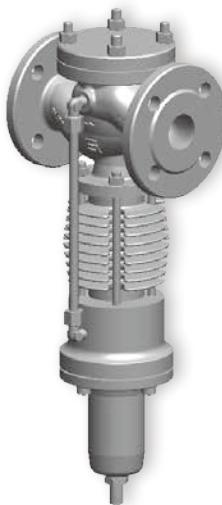
# RE20L

# REH20L

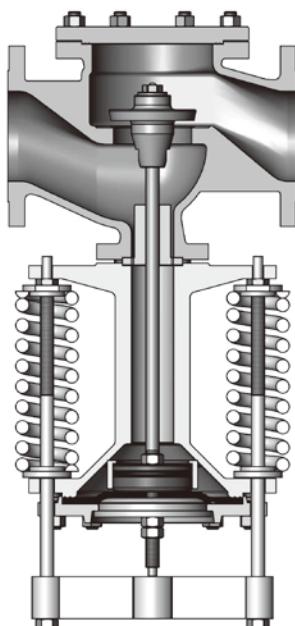
# REC20L

**The model RE20L** is a pressure reducing valve with a downstream pressure sensing line (pulse line) designed for use of steam. The valve provides a precise downstream pressure even at changing inlet pressures. Due to carefully selected springs a wide range of pressure applications is available. The valve is very well suited to intermittent or fluctuating loads at the secondary side. It closes securely when the load on the secondary side will be zero. The pressure reducing valve can be delivered with ductile cast iron, cast steel or stainless steel housings. All important internal parts are manufactured in stainless steel. As option the valves can be equipped with a pressure gauge on the valve body.

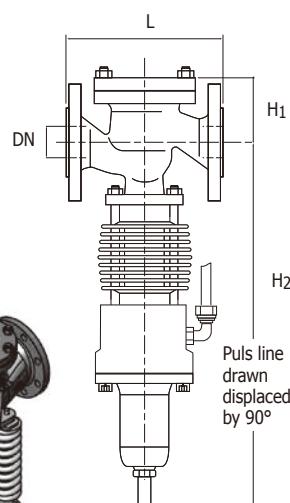
Maximum pressure reduction ratio: 25:1



Size: DN 15 – 100



Size: DN 125 – 200



# RE20 & RE20L

## Body material

RE20 / RE20L	REH20 / REH20L	REH20-M / REH20L-M	REC20 / REC20L
PN16 & PN25	PN40, PN63 & PN100	PN63 & PN100	PN40
Ductile Cast Iron EN-GJS-400-15 (GGG-40, 0.7040)	Cast Steel GP240GH (GS-C25, 1.0619)	Cast Steel G17CrMo 5-5 (1.7357)	Stainless Steel GX5CrNiMo19-11-2 (1.4408)

## Body design conditions

		RE20 / RE20L		REH20 / REH20L			REH20-M / REH20L-M		REC20 / REC20L	
		PN16	PN25	PN40	PN63	PN100	PN63	PN100	PN40	PN40
Max. design pressure (MPa)	PMA	1,6	2,5	4,0	6,3	10,0	6,3	10,0	4,0	4,0
Max. design temperature (°C)	TMA	350	350	400	400	400	530	530	400	400
Max. operating pressure (MPa)	PMO	1,5	2,2	2,8	4,0	6,4	5,7	8,4	2,9	2,9
Max. operating temperature (°C)	TMO	350	350	400	400	400	530	530	400	400

## Pressure – Temperature rating

PN	Body material	Temperature °C									
		-10...	+50	100	150	200	250	300	350	400	450
Pressure MPa											
16	0.7040	1,6	1,6	1,6	1,5	1,4	1,3	1,1			
25	0.7040	2,5	2,5	2,4	2,3	2,2	2,0	1,8			
40	1.0619	4,0	3,7	3,5	3,1	2,8	2,6	2,4	2,3		
	1.4408	4,0	3,7	3,4	3,1	2,9	2,8	2,7	2,6		
63	1.0619	6,3	5,9	5,5	4,9	4,5	4,1	3,8	3,6		
	1.7357	6,3	6,3	6,3	6,3	6,2	5,7	5,3	5,0	4,8	3,8
100	1.0619	10,0	9,3	8,7	7,8	7,1	6,4	6,0	5,8		
	1.7357	10,0	10,0	10,0	10,0	9,8	9,1	8,4	8,0	7,6	6,1
											3,5

## Available downstream pressure ranges

Downstream pressure range	RE20 REH20 REC20	RE20L REH20L REC20L		
			MPa	
< 0,05	n/a		on request	
0,05 – 0,1	n/a		✓	
0,1 – 0,16	✓		✓	
0,16 – 0,25	✓		✓	
0,25 – 0,4	✓		✓	
0,4 – 0,63	✓		✓	
0,63 – 1,0	✓		✓	
1,0 – 1,6	✓		on request	
> 1,6	on request		on request	

### Minimum differential pressure:

0.5 bar (DN15-50), 0.7 bar (DN65-125), 1 bar (DN150-200)

## Dimensions & Weights

Size (DN)	Model RE20 (REH20, REC20)						Model RE20L (REH20L, REC20L)						Kvs Value		
	Dimensions (mm)			Weight (kg)			Dimensions (mm)			Weight (kg)					
	L		H1	H2	0.7040	1.0619	1.4408	L	H1	H2	0.7040	1.0619	1.4408		
	PN16-40	PN63-100			PN16-40	PN63-100		PN16-40			PN16-40	PN63-100			
	15	130	210	410	82	11,4	12,0	12,0	130	210	82	13,0	14,5	14,5	1,8
	20	150	230		66	11,4	12,0	12,0	150	230	66	13,0	14,5	14,5	3,2
	25	160	230		66	12,5	13,0	13,0	160	230	66	14,5	16,5	16,5	5,0
	32	180	260		81	14,5	16,0	16,0	180	260	81	16,0	18,5	18,5	7,9
	40	200	260		83	16,0	18,0	18,0	200	260	83	18,0	22,0	22,0	13,0
	50	230	300		100	35,0	37,5	37,5	230	300	100	647	34,0	37,5	20,0
65	290	340	113		615	39,5	43,0	43,0	290	340	113	690	45,0	49,0	34,0
80	310	380	140		733	52,5	58,0	58,0	310	380	140	828	61,0	65,0	51,0
100	350	430	154		762	68,0	77,0	77,0	350	430	154	850	87,0	91,0	80,0
125	400		210		715	150,0	155,0	155,0	400		210	715	150,0	155,0	130,0
150	480		235		720	180,0	190,0	190,0	480		235	720	180,0	190,0	180,0
200	600		285		950	330,0	385,0	385,0	600		285	950	330,0	385,0	320,0

Connections: Flanged EN-DIN1092, ASME B16.5

For leakage class 6 acc. to ANSI order with soft sealing

MIYAWAKI · English Edition

For more information see the special MIYAWAKI leaflet.

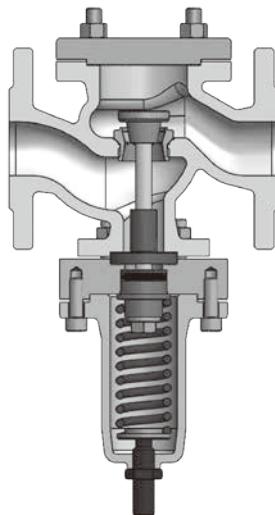
# REA20

# REAH20

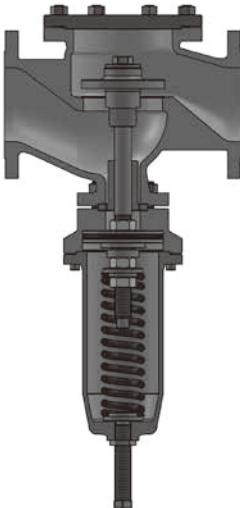
# REAC20

**The model REA20** is a direct acting pressure reducing valve designed for use of compressible media, such as air and various gases and for incompressible media such as water, oil and others. The valve provides a constant downstream pressure at a stable given inlet pressure and constant running flowrates. Changes in the upstream pressure and fluctuating consumption on the secondary side will result in variations in downstream pressure. The valve is not designed for dead-end services. Due to carefully selected springs a wide range of pressure applications is available. The pressure reducing valve can be delivered with ductile cast iron, cast steel or stainless steel housings. All important internal parts are manufactured in stainless steel. Depending on the medium the valve can be equipped with soft sealing or metal sealing valves/seats. As option the valves can be equipped with a pressure gauge on the valve body.

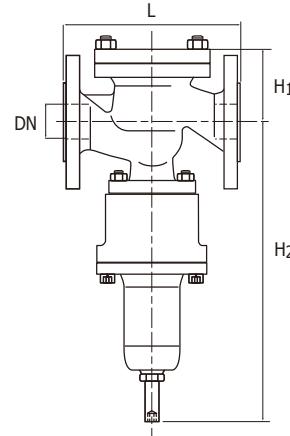
Maximum pressure reduction ratio: 25:1



Size: DN 15 – 100



Size: DN 125 – 200



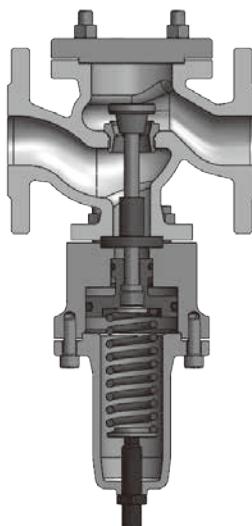
# REA20L

# REAH20L

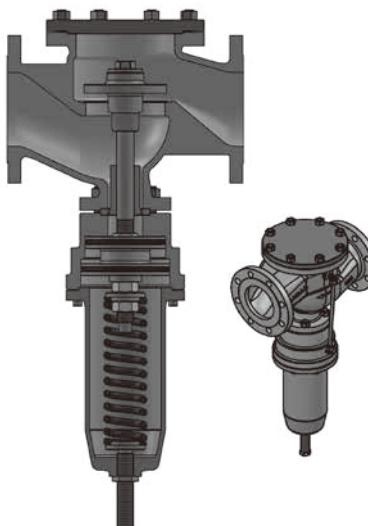
# REAC20L

**The model REA20L** is a pressure reducing valve designed for use of compressible media, such as air and various gases and for incompressible media such as water, oil and others. Due to the use of a downstream pressure sensing line (pulse line) the valve provides a constant accurate downstream pressure. Carefully selected springs secure a wide range of downstream pressure applications. The pressure reducing valve can be delivered with ductile cast iron, cast steel or stainless steel housings. All important internal parts are manufactured in stainless steel. The valve is designed for dead-end services. In case of zero consumption on the secondary side the valve closes reliably. Depending on the medium the valve can be equipped with soft sealing or metal sealing valves/seats. As option the valves can be equipped with pressure gauges.

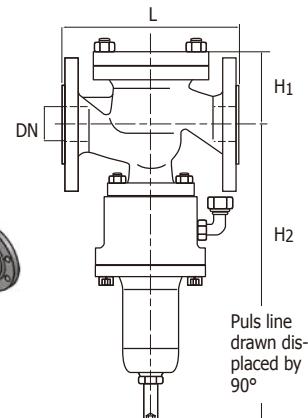
Maximum pressure reduction ratio: 25:1



Size: DN 15 – 100



Size: DN 125 – 200



**- Usable for the following gases :**

Acetylene, Ammonia, Argon, Carbon dioxide, Carbon monoxide, Chlorine, Coal gas, Hydrogen, Ethylene, Helium, Methane, Nitrogen, Oxygen\*, Sulphur dioxide

**Others may be possible as well. Please ask MIYAWAKI Inc. or an authorized representative for more detail.**

**- Special cleaning to make the product oil-free / grease-free is available at an additional cost.**

\* Special cleaning is mandatory for oxygen applications.

# REA20 & REA20L

## Body material

REA20 / REA20L	REAH20 / REAH20L	REAH20-M / REAH20L-M	REAC20 / REAC20L
PN16 & PN25	PN40, PN63 & PN100	PN63 & PN100	PN40
Ductile Cast Iron EN-GJS-400-15 (GGG-40, 0.7040)	Cast Steel GP240GH (GS-C25, 1.0619)	Cast Steel G17CrMo 5-5 (1.7357)	Stainless Steel GX5CrNiMo19-11-2 (1.4408)

## Body design conditions

	REA20 / REA20L		REAH20 / REAH20L			REAH20-M / REAH20L-M		REAC20 / REAC20L	
	PN16	PN25	PN40	PN63	PN100	PN63	PN100	PN40	
Max. design pressure (MPa)	PMA	1,6	2,5	4,0	6,3	10,0	6,3	10,0	4,0
Max. design temperature (°C)	TMA	350	350	400	400	400	530	530	400
Max. operating pressure (MPa)	PMO	1,6	2,5	4,0	6,3	10,0	6,3	10,0	4,0
Max. operating temperature (°C)	TMO	350	350	400	400	400	530	530	400

## Pressure – Temperature rating

PN	Body material	Temperature °C									
		-10... +50	100	150	200	250	300	350	400	450	500
Pressure MPa											
16	0.7040	1,6	1,6	1,6	1,5	1,4	1,3	1,1			
25	0.7040	2,5	2,5	2,4	2,3	2,2	2,0	1,8			
40	1.0619	4,0	3,7	3,5	3,1	2,8	2,6	2,4	2,3		
	1.4408	4,0	3,7	3,4	3,1	2,9	2,8	2,7	2,6		
63	1.0619	6,3	5,9	5,5	4,9	4,5	4,1	3,8	3,6		
	1.7357	6,3	6,3	6,3	6,2	5,7	5,3	5,0	4,8	3,8	2,2
100	1.0619	10,0	9,3	8,7	7,8	7,1	6,4	6,0	5,8		
	1.7357	10,0	10,0	10,0	10,0	9,8	9,1	8,4	8,0	7,6	6,1
											3,5

## Available downstream pressure ranges

Downstream pressure range	REA20 REAH20 REAC20	REA20L REAH20L REAC20L		
			MPa	
< 0,05	n/a		on request	
0,05 – 0,1	n/a		✓	
0,1 – 0,16	✓		✓	
0,16 – 0,25	✓		✓	
0,25 – 0,4	✓		✓	
0,4 – 0,63	✓		✓	
0,63 – 1,0	✓		✓	
1,0 – 1,6	✓		on request	
> 1,6	on request		on request	

**Minimum differential pressure:**  
0.5 bar (DN15-50), 0.7 bar (DN65-125), 1 bar (DN150-200)

## Dimensions & Weights

Size (DN)	Model REA20 (REAH20, REAC20)						Model REA20L (REAH20L, REAC20L)						Kvs Value				
	Dimensions (mm)			Weight (kg)			Dimensions (mm)			Weight (kg)							
	L		H1	H2	0.7040	1.0619	1.4408	L	H1	H2	0.7040	1.0619	1.4408				
	PN16-40	PN63-100			PN16-40	PN63-100		PN16-40			PN16-40	PN63-100					
	15	130	210	289	82	13,0	14,5	14,5	130	210	82	13,0	14,5	14,5	1,8		
	20	150	230		66	13,0	14,5	14,5	150	230	66	13,0	14,5	14,5	3,2		
	25	160	230		66	14,5	16,5	16,5	160	230	66	14,5	16,5	16,5	5,0		
	32	180	260		81	16,0	18,5	18,5	180	260	81	16,0	18,5	18,5	7,9		
	40	200	260		83	18,0	22,0	22,0	200	260	83	18,0	22,0	22,0	13,0		
	50	230	300		100	416	34,0	37,5	37,5	230	300	100	477	34,0	37,5	20,0	
	65	290	340	445	113	45,0	49,0	49,0	290	340	113	520	45,0	49,0	49,0	34,0	
	80	310	380		140	553	61,0	65,0	65,0	310	380	140	648	61,0	65,0	65,0	51,0
	100	350	430		154	582	87,0	91,0	91,0	350	430	154	670	87,0	91,0	91,0	80,0
	125	400			210	715	120,0	120,0	120,0	400		210	660	125,0	125,0	125,0	130,0
	150	480			235	720	130,0	135,0	135,0	480		235	680	150,0	160,0	160,0	180,0
	200	600			285	950	230,0	280,0	280,0	600		285	740	245,0	300,0	300,0	320,0

Connections: Flanged EN-DIN1092, ASME B16.5

For leakage class 6 acc. to ANSI order with soft sealing

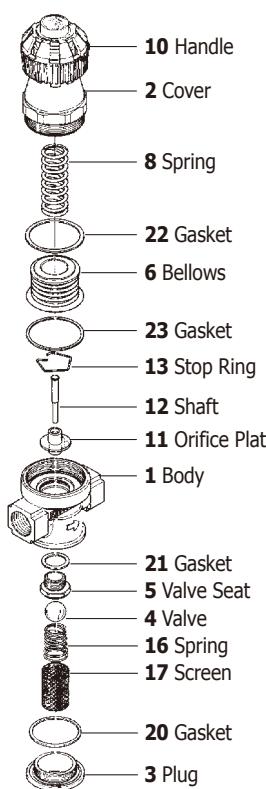
MIYAWAKI · English Edition

For more information see the special MIYAWAKI leaflet.

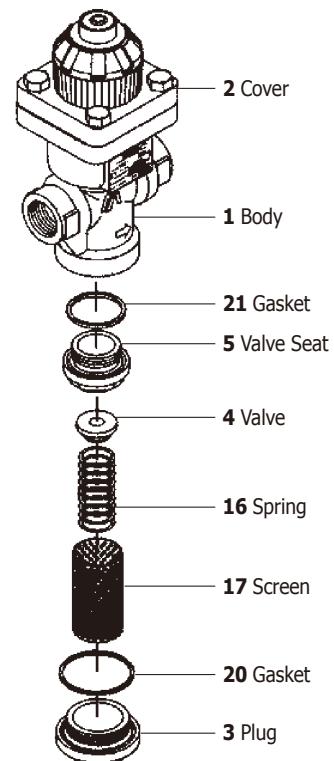
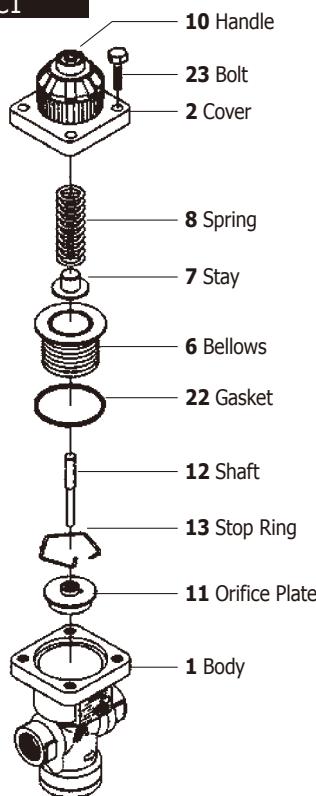
# Pressure Reducing Valves

## SERIES RE Spare Parts

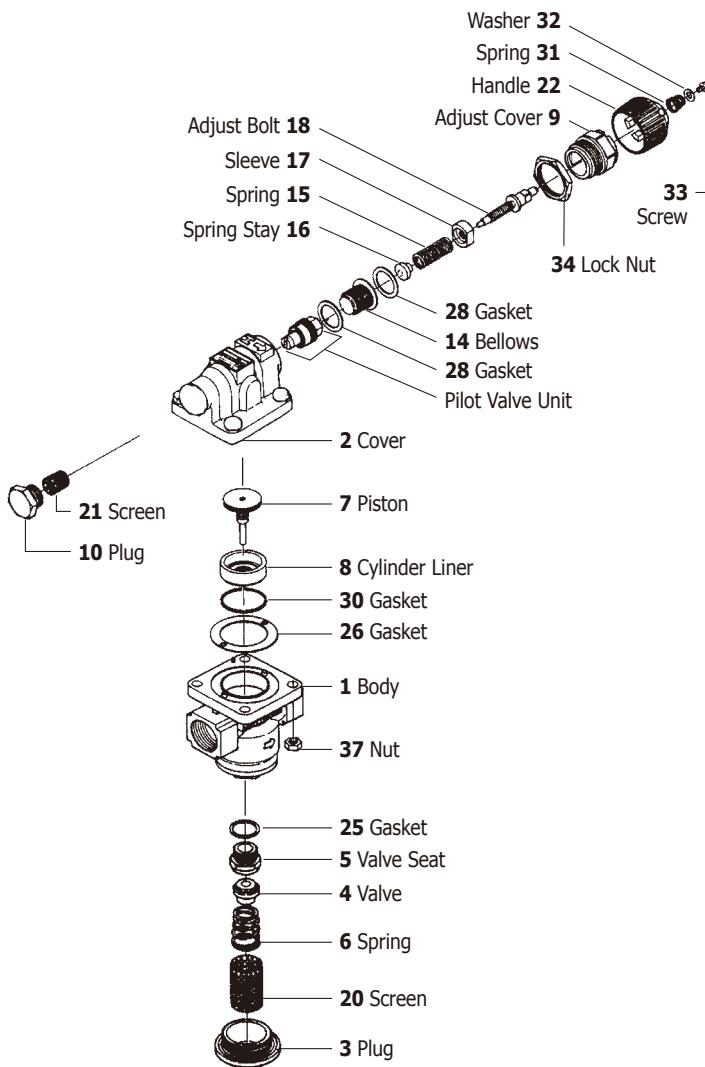
**RE1**



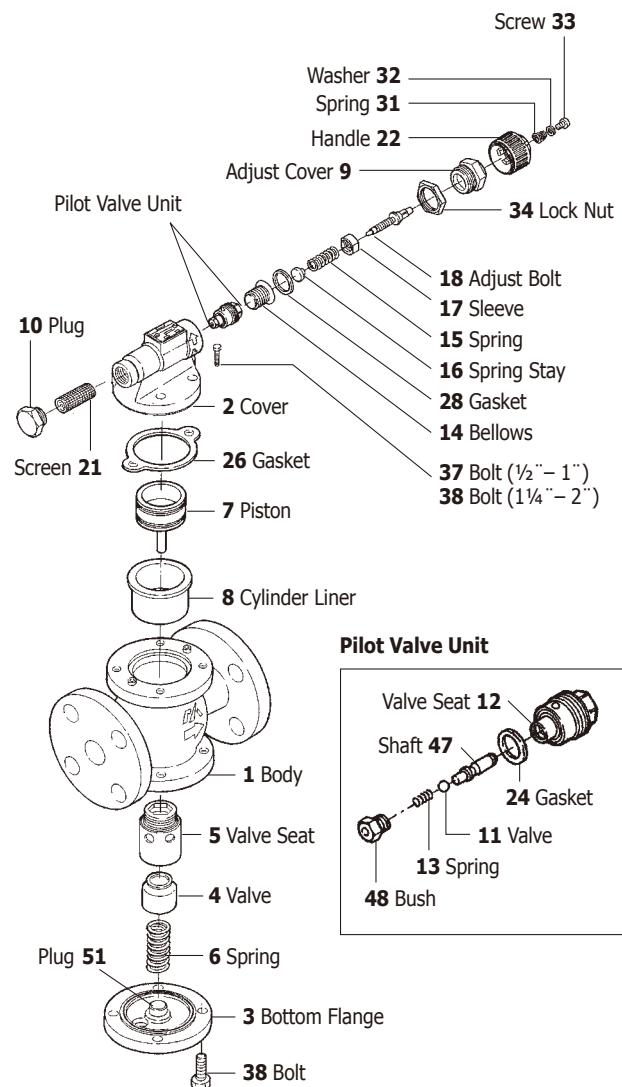
**REC1**



**RE3**



**RE10N**



# Steam-Water-Mixing Valve

SERIES MX

## MX1N

### Features

1. Temperature is thermostatically controlled.
2. Can be installed where steam and cold water are available.
3. Produces hot water quickly and efficiently.
4. Efficient energy saving.
5. Precise thermostatic control.
6. Inline repairability.
7. Nickel plated finish.

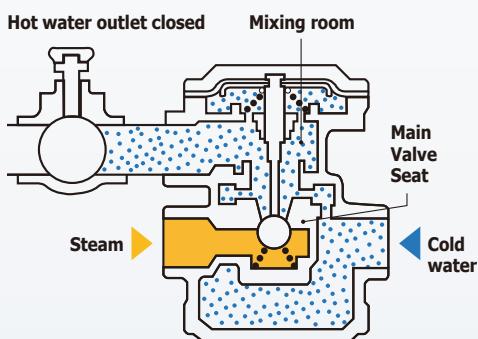


### Suitable for

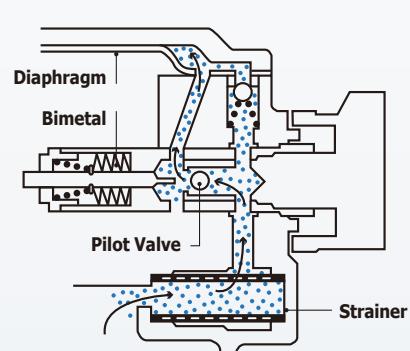
Washing down floors, vehicles, vats, jacketed vessels, backflushing filters, washing out vessels and other equipment in the dairy, brewery, food, chemical and soap manufacturing industries and wherever hot water is required economically.

### Operating principle

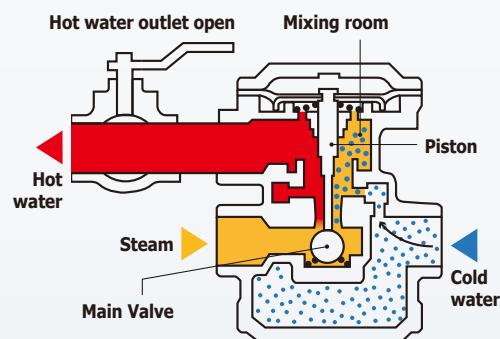
Cold water   Hot water   Steam



1



2

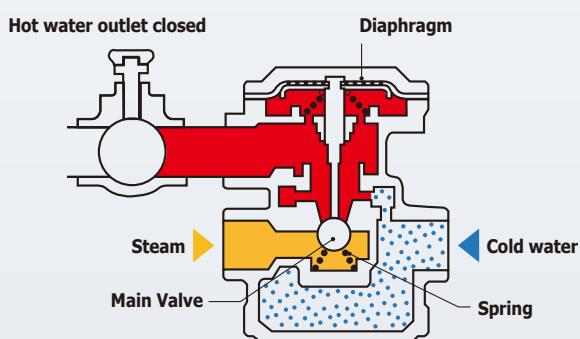


3

The cold water occupies the lower part of the body completely, flows through a hole next to the seat of the main valve into the mixing room and occupies it up to the hot water outlet. The main valve is closed. The steam can't enter the mixing room.

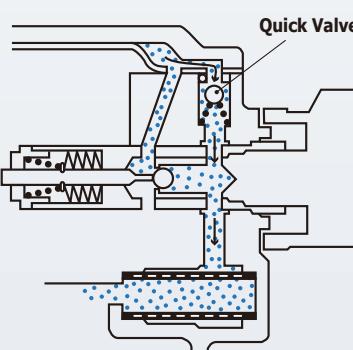
When you open the hot water outlet the cold water flows from the mixing room to the hot water outlet. During this process one part of the cold water flows through the strainer and runs behind the pilot valve (which is connected with the bimetal unit) into the space above the diaphragm.

The water pressure in the space above the diaphragm increases and pushes the diaphragm and the connected piston downwards. Consequently, the main valve opens and the steam flows into the mixing room and mixes with the cold water. The hot water flows to the hot water outlet.



4

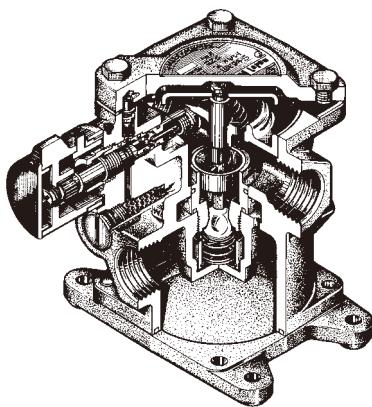
When the hot water outlet is being closed the pressure in the mixing room rises, the pressure on the diaphragm increases and the diaphragm returns to its original position. The main valve closes due to the pressure of the spring and the steam.



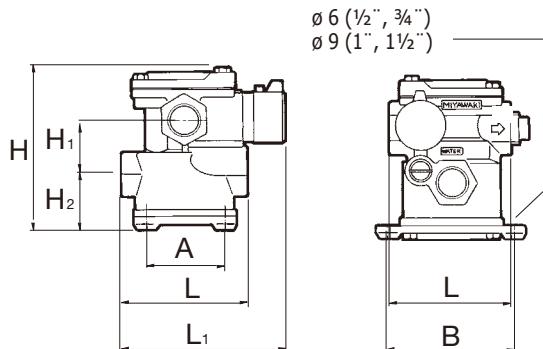
5

The pressure above the diaphragm is equalized by the quick valve. The pilot valve is closed.

## MX1N Steam-Water-Mixing Valve



## Dimensions



Connection	Size	Max. Operating Pressure				Min. Operating Pressure				Max. Temperature		Max. Pressure Ratio		Max. Temperature		Dimensions mm (in)						Weight		
		Steam		Water		Steam		Water		Steam		steam : water	water : steam	Hot Water		L	L1	H	H1	H2	A	B	kg	lb
		MPa	psig	MPa	psig	MPa	psig	MPa	psig	°C	°F			°C	°F									
Screwed Rc, NPT	1/2"	0,7	101.5	0,7	101.5	0,03	5	0,03	5	185	365	3 : 1	93	199	100 (3.9)	138 (5.4)	134 (5.3)	43 (1.7)	47 (1.9)	62 (2.4)	102 (4.0)	3,9	8,6	
	3/4"														140 (5.5)	179 (7.0)	168 (6.6)	57 (2.2)	51 (2.0)	86 (3.4)	147 (5.8)	8,6	18,9	
	1"														160 (6.3)	189 (7.4)	197 (7.8)	70 (2.8)	60 (2.4)	86 (3.4)	147 (5.8)	14,1	31,0	
	1 1/2"	0,5	72,5	0,5	72,5																			

Body Material: Brass C3771 (JIS); PMA = 1,0 MPa (145 psig), TMA = 185°C (365°F)

## Hot Water Capacity MX1N

Ratio Steam Pressure : Cold Water Pressure = 1 : 1, Cold Water Temperature 15°C

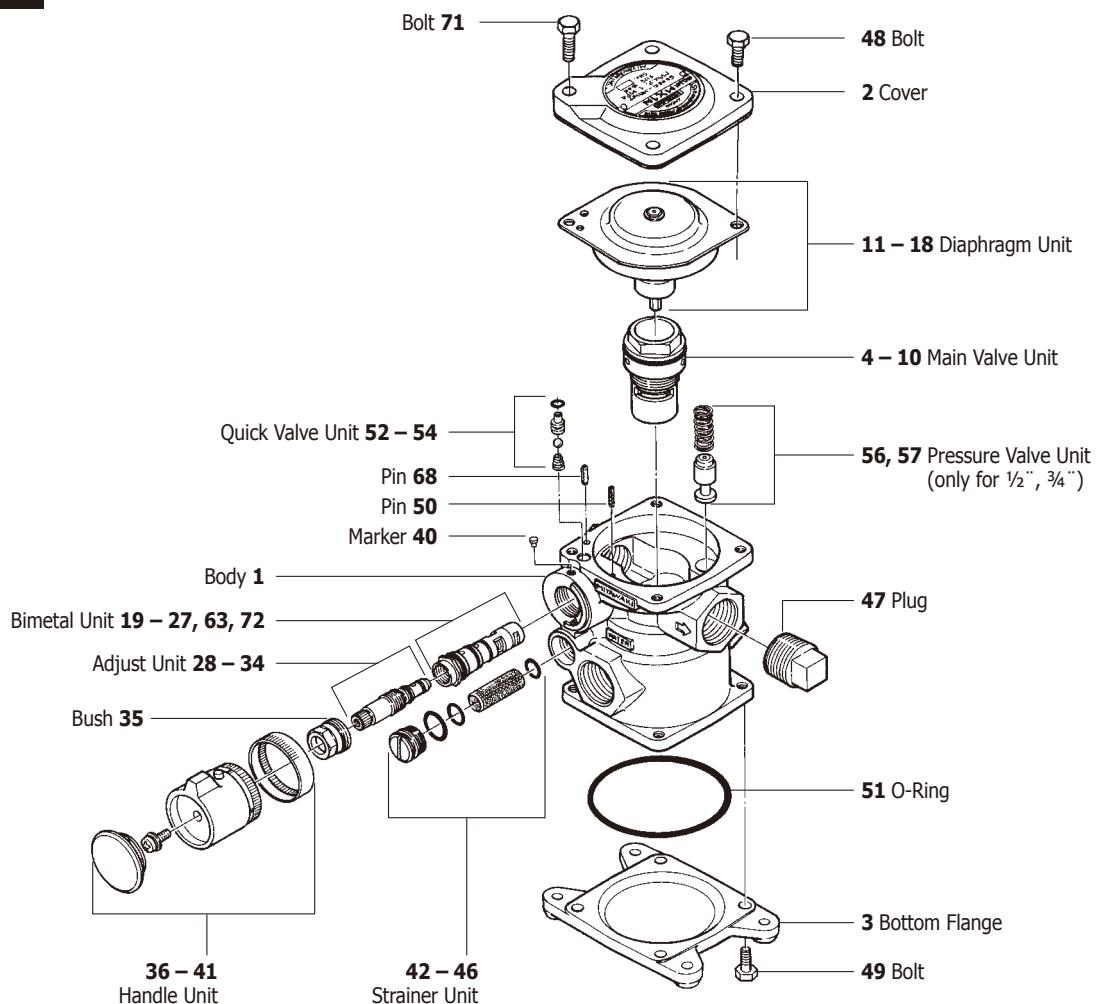
Size (in)	Pressure		Hot Water Flow Amount (l/min)											
			40°C		50°C		60°C		70°C		80°C		90°C	
	MPa	psig	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/2"	0,1	14,5	3	12	3	12	3	13	5	13	5	11	5	10
	0,2	29,0	3	20	3	21	3	21	5	20	5	17	10	14
	0,3	43,5	6	25	6	25	6	26	9	26	9	22	13	19
	0,4	58,0	6	29	6	29	6	29	12	30	12	28	17	24
	0,5	72,5	7	32	7	32	8	33	13	34	18	34	29	29
	0,6	87,0	7	35	7	36	16	36	17	37	27	37	34	34
	0,7	101,5	8	38	9	38	21	39	21	40	37	40	38	38
3/4"	0,1	14,5	5	22	5	23	5	20	8	17	8	14	9	12
	0,2	29,0	5	32	5	32	5	31	8	25	8	21	13	18
	0,3	43,5	8	39	8	39	8	40	10	34	10	28	25	25
	0,4	58,0	9	45	9	45	9	46	14	42	20	36	31	31
	0,5	72,5	11	50	11	51	11	52	15	51	23	43	37	37
	0,6	87,0	12	55	12	55	23	56	23	57	42	50	43	43
	0,7	101,5	14	59	15	60	44	61	45	62	56	56	49	49
1"	0,1	14,5	30	54	30	54	29	47	23	38	20	32	17	28
	0,2	29,0	38	76	39	77	48	70	37	57	31	49	27	42
	0,3	43,5	48	93	48	94	65	94	52	77	44	65	38	56
	0,4	58,0	54	107	55	109	66	111	67	97	57	82	49	71
	0,5	72,5	60	120	66	122	67	124	82	116	69	98	60	85
	0,6	87,0	66	131	67	133	68	135	97	136	82	115	71	100
	0,7	101,5	71	142	72	144	73	146	107	149	93	130	81	112
1 1/2"	0,1	14,5	91	140	83	116	64	90	53	74	45	63	39	54
	0,2	29,0	116	197	137	175	100	136	82	112	69	94	60	82
	0,3	43,5	136	242	170	235	136	183	112	149	94	126	82	110
	0,4	58,0	153	279	170	284	172	229	141	188	119	159	103	138
	0,5	72,5	171	312	173	317	210	276	172	226	146	191	126	166

Max. Temperature of hot water – Ratio Steam Pressure 1 : 1

1/2" | 93°C | 3/4 " | 93°C | 1" | 93°C | 1 1/2" | 93°C

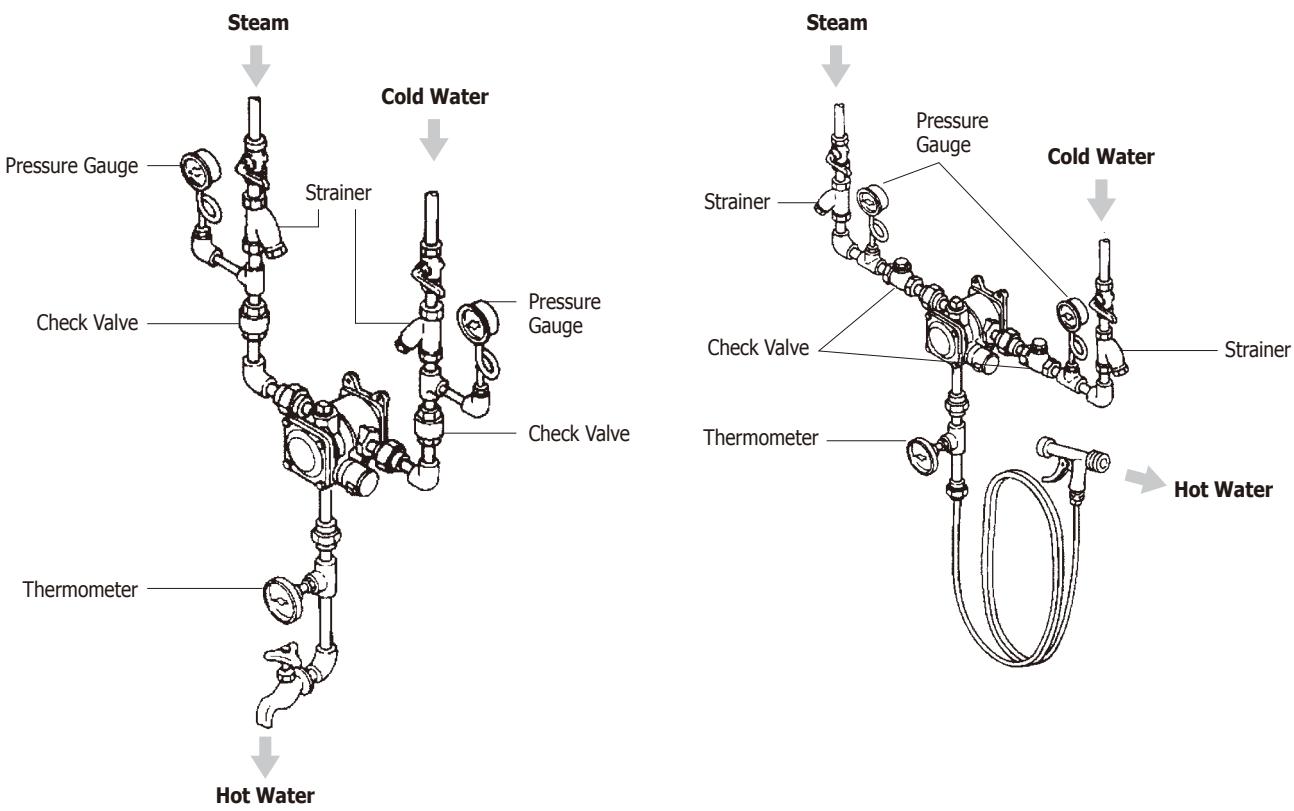
Please, look at our Website [www.miawaki.net](http://www.miawaki.net) (Products/Steam Water Mixing Valves) for more detailed flow charts containing hot water flow rates of the MX1N. If you require further technical details, please ask for our technical leaflet on Steam Water Mixing Valves.

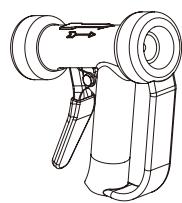
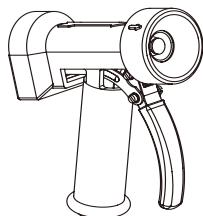
## MX1N



## MX1N

## Installation Examples



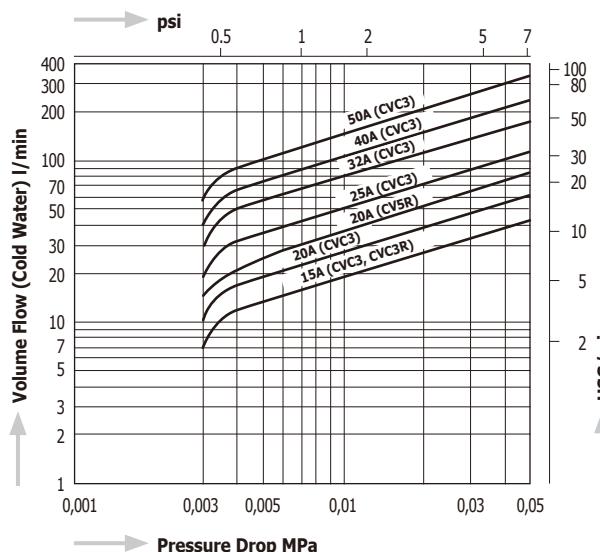
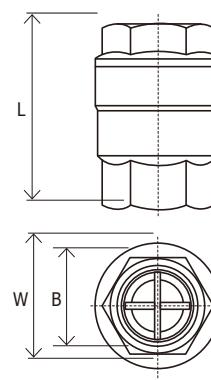
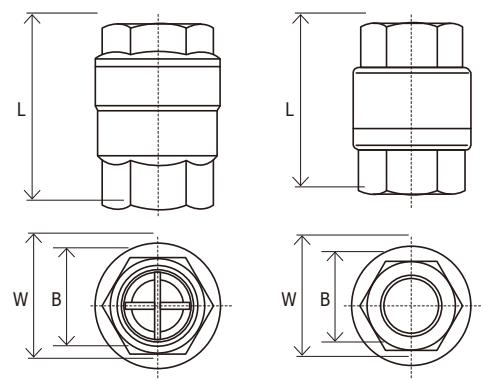
**MK Water Gun****MK****MK-2****MK-82****Features**

1. Trigger operated water gun. Front trigger or rear trigger available
2. Perfect water consumption control
3. One-handed mode with either variable spray or direct jet
4. Automatic and immediate shut-off when the trigger is released

**Suitable for****MK2** is suitable for most industrial applications**MK-MV** is recommended for use with Steam-Water-Mixing Valves

Model	Material	Rubber Cover	Trigger	Orifice Size		Max. Pressure	
				in	mm	MPa	psi
<b>MK-2</b>	Gunmetal or Stainless Steel	Black or White	rear	5/16"	7,9	0,7	101,5
<b>MK-OH</b>				7/16"	11,1		
<b>MK-MV</b>				9/16"	14,3		
<b>MK-78</b>	Gunmetal	Black or White	front	5/16"	7,9	1,4	203,0
<b>MK-80</b>				7/16"	11,1		
<b>MK-82</b>				9/16"	14,3		

Pressure	Orifice Size			Orifice Size		
	5/16"	7/16"	9/16"	5/16"	7/16"	9/16"
MPa	psig	I/min	GPM			
0,035	5,0	3,2	13,5	15,0	0,84	3,56
0,07	10,2	5,6	20,0	21,0	1,48	5,28
0,1	14,5	7,0	22,5	24,0	1,85	5,94
0,2	29,0	10,0	25,0	36,0	2,64	6,60
0,3	43,5	12,5	32,0	47,0	3,30	8,45
0,35	50,8	14,5	37,0	52,0	3,83	9,77
0,4	58,0	16,0	38,0	55,0	4,22	10,03
0,5	72,5	18,0	40,0	60,0	4,75	10,56
0,6	87,0	20,5	42,0	65,0	5,41	11,09
0,7	101,5	22,3	44,0	69,0	5,89	11,62
1,0	145,0	27,5	51,0	-	7,26	13,46
1,5	217,5	35,0	62,0	-	9,24	16,37
2,0	290,0	43,0	74,0	-	11,35	19,54
2,5	362,5	50,5	85,0	-	13,33	22,44

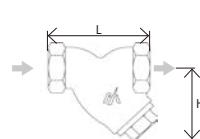
**CVC3, CVC3R, CV5R Check Valve****CVC3, CVC3R, CV5R****CVC3, CVC3R****CV5R****Pressure Drop Chart****Dimensions****CVC3, CVC3R****CV5R**

Model	Connections	Size	Max. Operating Pressure		Opening Pressure		Max. Operating Temperature	Dimensions (mm)			Dimensions (in)			Body Material	Weight		
			MPa	psig	MPa	psig		L	W	B	L	W	B		kg	lb	
<b>CVC3</b>	Screwed Rc, NPT	1/2"	2,1	305	0,003	0,44	220	428	48	35	27	1,9	1,4	1,1	Stainless Steel SCS13A	0,2	0,44
		3/4"							61	43	33	2,4	1,7	1,3		0,3	0,66
		1"							73	54	41	2,9	2,1	1,6		0,6	1,32
		1 1/4"							80,5	62	50	3,2	2,4	2,0		0,8	1,76
		1 1/2"							87	75	58	3,4	3,0	2,3		1,2	2,64
		2"							100	90	72	3,9	3,5	2,8		1,8	3,96
<b>CVC3R</b>	Screwed Rc, NPT	1/2"	2,1	305	0,003	0,44	80	176	48	35	27	1,9	1,4	1,1	SCS13A	0,2	0,44
<b>CV5R</b>	Screwed Rc, NPT	3/4"	1,6	230	0,003	0,44	80	176	60	46	34	2,4	1,8	1,3	SCS13A	0,3	0,66

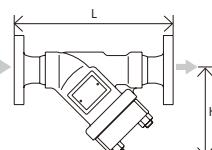
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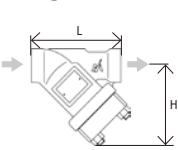
Dimensions YM1



YSF-F



YSF-W



Model	Connections	Size	Max. Operating Pressure		Max. Operating Temperature		Mesh	Dimensions (mm)		Dimensions (in)		Body Material	Weight	
			MPa	psig	°C	°F		L	H	L	H		kg	lb
YM1	Screwed Rc, NPT	1/2"	2,0	290	220	428	60	75	55	3.0	2.2	Ductile Cast Iron	0,5	1.1
		3/4"						90	70	3.5	2.8		0,9	2.0
		1"						110	85	4.3	3.3		1,4	3.1
YSF-F	Flanged JIS, ASME	1/2"	4,9	710	425	797	60	230	125	9.1	4.9	Forged Steel A105	7,0	15.4
		3/4" - 1"						310	170	12.2	6.7		8,0	17.6
		1 1/4"										Forged Steel S25C	16,0	35.3
		1 1/2" - 2"											17,0	37.5
YSF-W	Socket Weld JIS, ASME, DIN	1/2" - 1"	4,9	710	425	797	60	140	125	5.5	4.9	Forged Steel A105	5,0	11.0
		1 1/4" - 2"						190	170	7.5	6.7	Forged Steel S25C	9,5	20.9

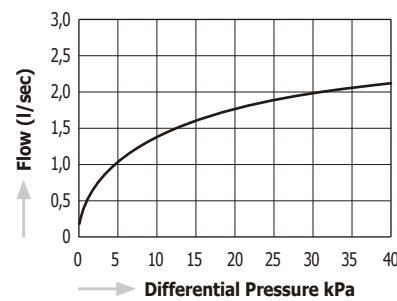
**Screwed (NPT) connection is available as special design.**

For more details, please contact MIYAWAKI Inc, or an authorized representative.

# CV11, CVU15



Capacity Chart CVU15



## Vacuum Breaker CV11, CVU15

Dimensions		CV11	CVU15
W1	W2	L	W
W1	W2	5.1	2.0
W1	W2	5.3	1.5
W1	W2	5.3	
H			
L			
W			
1/8", 1/2"			
1/2"			

Model	Connections		Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight		
				MPa	psig	°C	°F	L	H	W	W1	W2	L	H	W	W1	W2	kg	lb
CV11	Male thread R		1/2"	0,9	130	150	302	130					5.1				Stainless Steel SUS304	0,8	1.8
			3/4"					135					5.3						
			1"					135					5.3						
CVU15	System connection	Air inlet connection	1/2" x 1/8"	2,1	305	450	842	55	41	36			2.17				Stainless Steel AISI 304 (DIN 1.4301)	0,44	0.97
	1/2" Screwed (BSP, BSPT, NPT)	1/8", 1/2" Screwed (BSP, BSPT, NPT)	1/2" x 1/2"					70			1.26		2.75	1.61	1.42			0,55	1.21

## Anti-Freezing Valve F1

# F1

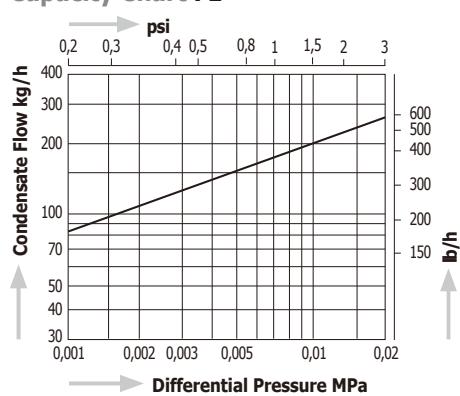
### Features

- Easy installation: compact in size
- No adjustment
- Easy maintenance

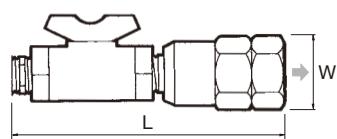
### Suitable for

Discharge of remaining condensate out of steam traps and pipe lines

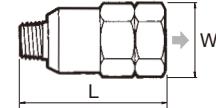
Capacity Chart F1



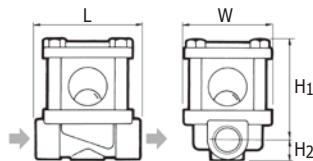
Dimensions F1B



F1



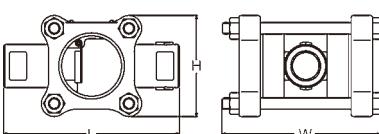
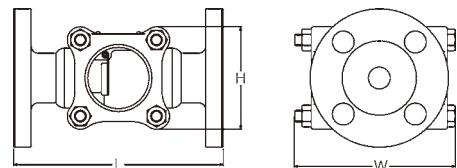
Model	Connection	Size	Max. Operating Pressure		Working Pressure				Max. Operating Temperature		Dimensions (mm)		Dimensions (in)		Body Material	Weight		
			Opening		Closing		Temperature		Dimensions (in)		Dimensions (in)		Dimensions (in)			Weight		
			MPa	psig	MPa	psig	MPa	psig	°C	°F	L	W	L	W		kg	lb	
F1B	Screwed Rc, NPT	1/4"	1,0	145	0,01 - 0,04	1,5 - 5,8	0,02 - 0,05	2,9 - 7,3	220	428	113	4,4			Brass C3604	0,19	0,42	
		3/8"									119	27	4,7	1,1		0,23	0,51	
F1		1/4", 3/8"	1,6	230							52		2,0			0,13	0,29	

**TS1, T3 Sight Glass****TS1****Dimensions TS1****T3****Features**

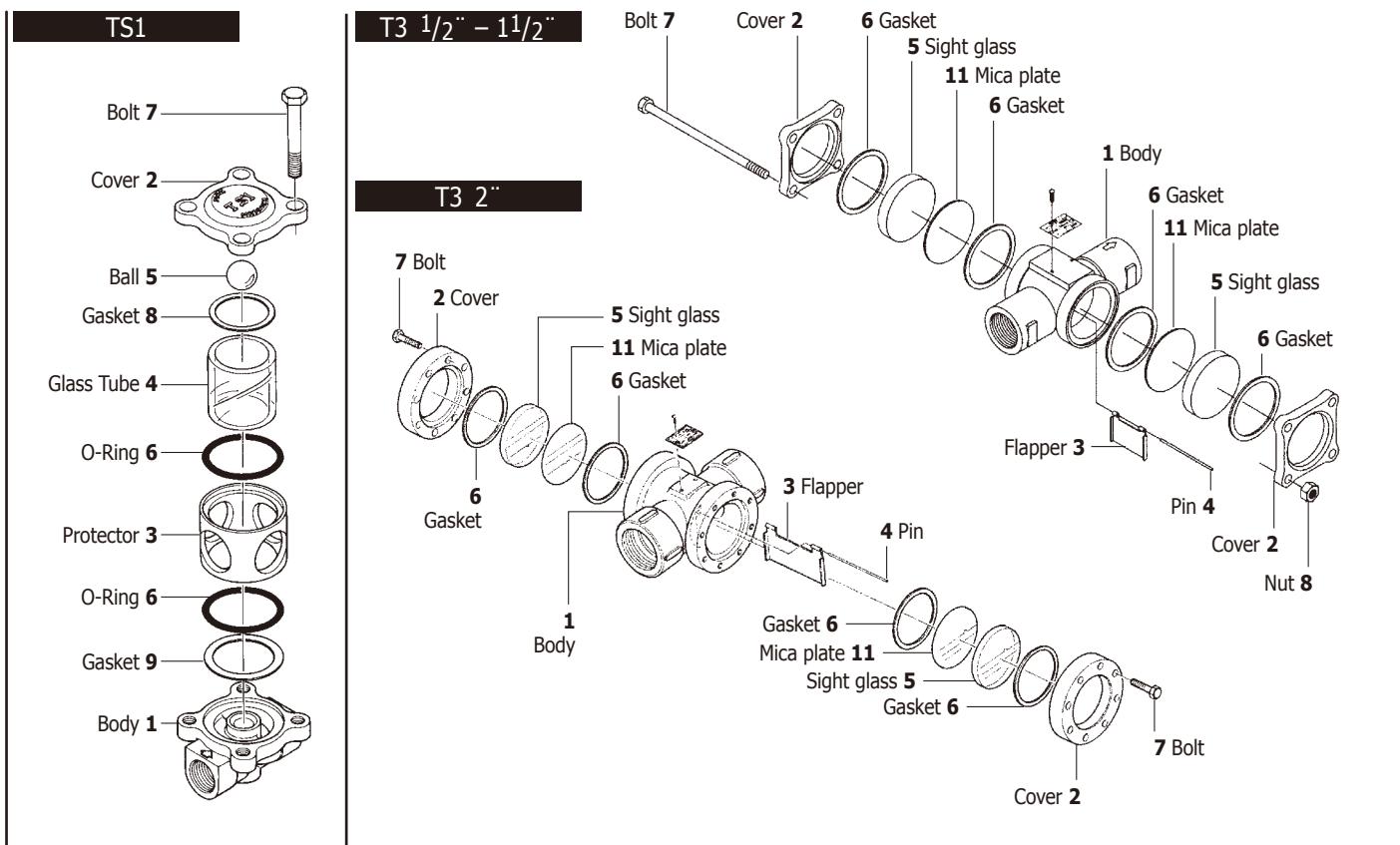
To check operation of steam traps

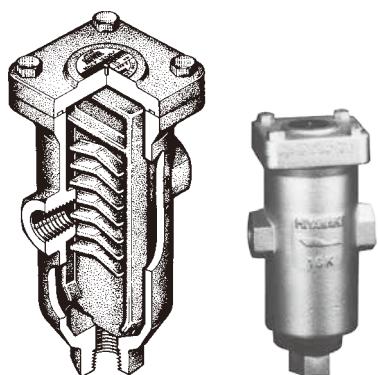
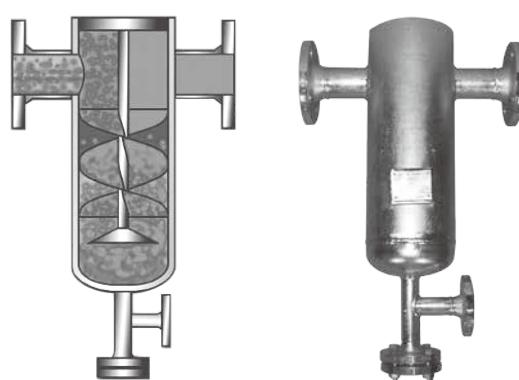
**Suitable for**

Steam and liquid lines

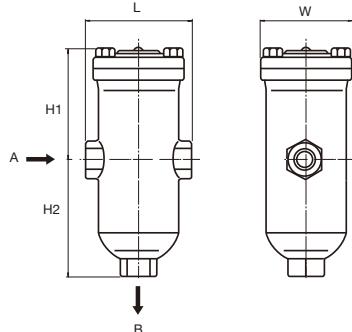
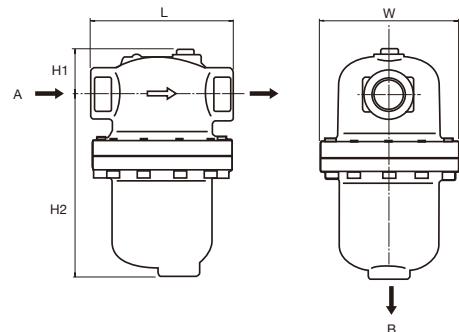
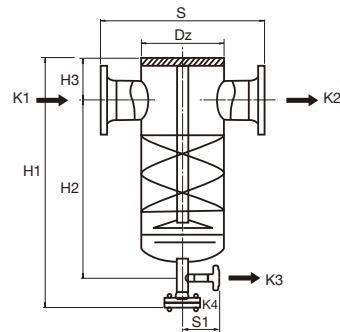
**T3****T3F**

Model	Connect.	Size	Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight					
			MPa	psi	°C	°F	L	H	H1	H2	W	L	H	H1	H2	W	kg	lb			
TS1	Screwed Rc, NPT	1/2"	0,8	Steam	116	Steam	180	Steam	356	Steam	80	60	2.7	0.5	2.4	Brass C3771	0,9	1.8			
		3/4"	1,0	Water	145	Water	100	Water	212	Water	71	2.8	0.7	2.4	2.4		1,0	2.0			
		1"	0,97	Air	140	Air	100	Air	212	Air	85	76	3.0	0.8	3.3		1,2	2.2			
T3	Screwed Rc, NPT	1/2"	1,0	145	183	361	123	70	110	4.8	2.8	110	4.8	2.8	4.3	Cast Steel A216WCB	1,6	3.5			
		3/4", 1"					170	85		155	6.7	3.3	155	6.7	3.3	1,7	3.7				
		1 1/4"					195	115		185	7.7	4.5	185	7.7	4.5	3,3	7.3				
		1 1/2"					144	70	110	5.7	2.8	110	5.7	2.8	6.1	3,2	7.0				
		2"					180	85		155	7.1	3.3	155	7.1	3.3	7.3	Cast Iron FC200				
T3F	Flanged JIS, ASME, DIN	1/2"	1,0	145	183	361	210	115		185	8.3	4.5	185	8.3	4.5	Cast Steel A216WCB	7,3	16.1			
		3/4"					144	70		110	5.7	2.8	110	5.7	2.8		3,3	7.3			
		1"					180	85		155	7.1	3.3	155	7.1	3.3		4,4	9.7			
		1 1/4"					210	115		185	8.3	4.5	185	8.3	4.5		5,0	11.0			
		1 1/2"					210	115		185	8.3	4.5	185	8.3	4.5		8,0	17.6			
		2"					210	115		185	8.3	4.5	185	8.3	4.5		9,0	19.8			
		2"					210	115		185	8.3	4.5	185	8.3	4.5		7,3	Cast Iron FC200			
							12,0	26.4													

**Spare Parts**

**H3****H5****H9XF****Features**

1. Separates mist and condensate from steam and air lines
2. Compact size – easy installation together with Pressure Reducing Valves and Steam Traps
3. Very low pressure loss (0,002 MPa)

**Dimensions****H3****H5****H9XF**

Model	Connections	Size (in)		Max. Operating Pressure		Max. Operating Temperature		Dimensions (mm)				Dimensions (in)				Body Material	Weight	
		A	B	MPa	psig	°C	°F	L	H1	H2	W	L	H1	H2	W		kg	lb
H3	Screwed Rc, NPT	1/2"	1/2"	1,6	230	220	428	100	93	120	86	3.9	3.7	4.7	3.4	Ductile Cast Iron FCD450	3,6	7.9
		3/4"	1/2"					130	120	158	108	5.1	4.7	6.2	4.3		6,7	14.7
		1"	1/2"					160	130	180	128	6.3	5.1	7.1	5.0		10,1	22.2
H5	Screwed Rc, NPT	1/2"	3/4"	2,0	290	220	428	150	50	193	146	5.9	2.0	7.6	5.7	Ductile Cast Iron FCD450	7,1	15.6
		3/4"						190	69	213	175	7.5	2.7	8.4	6.9		7,3	16.1
		1"						219	82	260	199	8.6	3.2	10.2	7.8		12,5	27.5
		1 1/4"	1"														20,5	45.1

Model	Connection	Size (DN)	PN	Inlet	Outlet	Condensate Outlet	Dirt Pocket	Dimensions (mm)					Dimensions (in)					Body Material	Weight			
				K1 (DN)	K2 (DN)	K3 (DN)	K4 (DN)	Dz	H1	H2	H3	S	S1	Dz	H1	H2	H3	S	kg	lb		
H9XF	Flanged DIN, ASME	15	16	15	15	15	15	88,9	360	240	50	240	90	3.5	14.2	9.4	2.0	9.4	Steel P265 GH	6,8	14.96	
		20		20	20			114,3	460	320	70	310	4.5	18.1	12.6	2.8	12.2	7,3		16.06		
		25		25	25			7,8	17.16													
		32		32	32			12	26.4													
		40		40	40			12,5	27.5													
		50		50	50	25	25												Steel P265 GH	26	57.2	
		65		65	65															27	59.4	
		80		80	80															29	63.8	
		100	20	100	32			273,0	900	630	160	560	120	10.7	35.4	24.8	6.3	22.0	4.3	61	134.2	
		125		125				65	143.0													
		150	25	150	40			323,9	1040	735	185	620	140	12.8	40.9	28.9	7.3	24.4		95	209.0	
		200		200																		

Other pressure ratings (PN25, PN40), connections and body materials on request.

# Steam Trap Survey Assistant

Dr. Trap® Jr.

## PM15

**It is the ideal partner for steam trap inspections.**

PM15 is capable to work with most of the steam traps of the main manufacturers.



Ultrasonic Checker PM11

Temperature Probe



SurveyPro Light PM150 V2.0

### Features PM15

The Steam Trap Ultrasonic Checker PM11 has been designed to assess the operating condition of steam traps during operation by measuring the vibration and the temperature of the surface.

- The system consists of the Ultrasonic Checker PM11, a Temperature Probe and the SurveyPro Light PM 150 Software version 2.0.
- Measures vibration and temperature at the same time
- The temperature probe can measure temperatures between 0°C and 250°C
- Estimates and displays the saturation pressure by measuring the temperature.
- Useful for testing not only steam traps, but also valves
- One key operation for all functions
- Long battery life – 40 hours or more of continuous use
- Shuts off automatically if the device is not in use for 5 minutes
- Includes a stop watch for monitoring periodic characteristics of vibrations
- Compact, lightweight and easy to carry

### Software SurveyPro Light PM150 V2.0

Software for analyzing the data which had been measured by using the steam trap checker PM11 and for determining the condition of the steam trap.

- Standard and Special versions available
- Both versions allow the estimation of CO<sub>2</sub> emissions which correspond to leaking steam traps.
- Compatible with Windows 7, Windows 8/8.1 and Windows 10 – 32 and 64 bit versions.
- Full data compatibility. Data generated by the previous version can be integrated into the new software\*
- The version 2.0 comes with an updated list of steam trap models of the main steam trap manufacturers.
- The updated software allows a better classification of steam traps to various groups and areas inside a plant with the possibility for more detailed analysis of selected groups or areas.

\* For more details please contact MIYAWAKI Inc. or an authorized representative

### Working Flow

<b>1 Tagging of Steam Traps</b> Put a tag on or text to each trap in your factory, so that it can be easily identified any time.	<b>2 Survey List set-up</b> Run the Survey Pro Light software and fill in the basic information of the steam traps. Information such as survey list name, tag number, area, manufacturer, inlet pressure or size are filled in at this moment.	<b>3 Traps inspection</b> Diagnose each trap on site using the checker PM11. Write down the vibration data measured for each trap.
<b>4 Filling out of Survey List</b> Run again the Survey Pro Light software and enter the measured vibration data into the survey list for each trap. Once the vibration value of a trap has been entered, the operating condition of the trap will be displayed immediately. The list will also display the steam loss of each trap (if detected) and the related financial losses.	<b>5 Analysis</b> After entering all test results of the survey, the software can show an analysis for each trap type and manufacturer, an analysis of steam losses and related financial losses for each manufacturer and trap type, an analysis of CO <sub>2</sub> emission, or an analysis for kind of application (process, tracing, etc.), with the possibility of showing the results by areas or groups.	<b>6 Trend Analysis</b> Comparisons can be made by Manufacturer, by the installed types, by the pressure classification and by applications. In each case: <ul style="list-style-type: none"><li>- the failure rate</li><li>- the steam loss</li><li>- and money loss tendencies</li></ul> will be shown.

### Technical Specification

<b>Probes</b>	<b>Vibration</b>	Piezo-electric-ceramic acceleration sensor (10 kHz – 40 kHz)	<b>Displays</b>	Illuminated liquid crystal display (LCD)
	<b>Temperature</b>	Thermistor Range: 0 – 250°C / 32 – 482°F	<b>Housing</b>	Heat-resistant plastic (ABS), simple waterproof design
<b>Weight</b>		230 g (incl. batteries)		
<b>Power supply</b>		2 x 1.5V AA alkaline batteries (40 hours or more) 2 x 1.2V AA NiMH (32 hours or more)	<b>Ambient working temperature</b>	0 – 40°C (32 – 104°F)

# Steam Trap Survey Assistant

Dr. Trap® Jr.

## SurveyPro Light PM150 V2.0

### Main Functions – Standard Version

#### Survey List

The screenshot shows the 'Trap Details' section with fields for Event Name (2011), Survey/Service Date (01.07.2013), and Trap Information (Additional Information). Below is a table of survey data:

Survey List Name	Trap No.	Name	Inv. Date	Valve	Inlet Press. [bar]	Set Temp. [°C]
Test	1		01.07.2013			
Test	2		01.07.2013			
Test	3		01.07.2013			
Test	4		01.07.2013			
Test	5		01.07.2013			
Test	6		01.07.2013			
Test	7		01.07.2013			
Test	8		01.07.2013			
Test	9		01.07.2013			
Test	10		01.07.2013			
Test	11		01.07.2013			
Test	12		01.07.2013			
Test	13		01.07.2013			
Test	14		01.07.2013			
Test	15		01.07.2013			
Test	16		01.07.2013			
Test	17		01.07.2013			
Test	18		01.07.2013			
Test	19		01.07.2013			
Test	20		01.07.2013			
Test	21		01.07.2013			
Test	22		01.07.2013			
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Test	31		01.07.2013			
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Test	222		01.07.2013			
Test	223		01.07.2013</td			

# Steam Trap Management System

Dr. Trap®

## PM500

### Steam Trap Management System PM500

#### Checker (PM520)

It detects the vibration and temperature in steam traps at the same time.

The survey accuracy has been improved from the previous model (PM321) by MIYAWAKI's sensor technology.



\* Tablet to be prepared by customer  
\* For Windows® only

#### Checker (PM520)

#### Trap Survey App (PM510)

The App will be installed on a tablet computer, which must be prepared by the customer.

It displays and stores survey results transferred from the checker using Bluetooth connection.

#### Software SurveyPro 4.0 (PM530)

The software will be installed on a personal computer. It aggregates and analyzes steam trap data from the Trap Survey App, identifying faulty steam traps, providing steam loss and financial loss data and includes many other possibilities to manage the steam traps easily.

It provides detailed charts and graphs.



\* Standard and Special versions available

#### Software SurveyPro 4.0 (PM530)

### Features of PM500

#### • High-speed survey

The special design of the vibration sensor integrating a contact-type thermocouple sensor guarantees a high survey speed. Each steam trap will be surveyed within 2 seconds at the shortest, and 10 seconds at the maximum.

#### • Improved survey accuracy

The holding mechanism of the probe tip ensures a pressing force, which reduces the discrepancy of survey results substantially.

#### • Simple operation

The checker is ergonomic shaped to handle and operate with one hand. The survey will start automatically by simply pressing down the probe on the trap with minimum force. It is possible to proceed with the survey uninterrupted without using the tablet.

#### • Improved durability

Dust and water protection : IP34 (Conforming to IEC 60529)  
Drop test (Conforming to IEC 60068-2-31)

#### • Estimation of CO<sub>2</sub> emissions

The software can estimate CO<sub>2</sub> emissions based on steam trap leakage amounts.

#### • Full data compatibility

After converting survey data generated by the previous version (V3.1), the data can be integrated into the new software without any problems.

### Technical Specifications

Hardware	Weight		Sensor		Ambient working temperature		Max. surface temperature		Power supply *not included in package	Continuous operating (approximately)		Working survey time	Bluetooth	
	g	lb	Vibration	Temperature	°C	°F	°C	°F		Hours	Seconds		Interface	Communication distance
Checker PM520	220	0.49	Piezo-elec- tro-ceramic sensor	Type K thermocouple	-5 to +50	23 to 122	400	752	2 x 1.2V AA size NiMH	8 (discharged capacity: 1900mAh)	10 (2 minimum)	Ver. 2.1 + EDR SPP	Approx. 5 m	

Accessory: 1 x Soft case

Display: Transmission type TFT color liquid crystal

Software	Medium	Environment						Others
		Operating System	CPU	Memory (RAM)	Hard disk	Display resolution (pixel)	Others	
Trap Survey App PM510*	CD-ROM	Windows 7, Windows 8/8.1, Windows 10 (32 or 64 bit)	1.6GHz or more	4GB or more	20GB or more free space (excl. Data area)	1280 x 800 or more	Bluetooth: Ver.2.1 + EDR SPP Microsoft .NET Framework 4.5 Microsoft SQL Server Compact 3.5 SP2	
SurveyPro PM530 V4.0			1GHz or more	1GB (64bit: 2GB) or more		1024 x 768 or more		

\* PM510 is to be installed on a tablet. The above specifications of PM510 are hardware requirement for the tablet.

# Steam Trap Management System

Dr. Trap®

## Trap Survey App PM510

The App displays and stores the survey results from the checker.

It includes a lot of new and additional functions such as viewing and editing a survey map or a camera function.

It can contribute to create a paperless environment.

The available functions depend on the version of SurveyPro 4.0, standard or special.

### Main Functions

#### Survey screen

The touch-screen tablet makes it easy to browse and edit a survey list.

A lot of detailed information is available on the survey screen and can be edited there. The survey log information will be also displayed on the screen.



#### Survey map

A survey map can be displayed and edited on the tablet computer. The map can be associated with each steam trap on the survey list.

Then, the order of the steam trap survey can be set.



#### Camera function

The camera function allows to take images and record videos on the Camera screen. It is possible to edit and save the images for each steam trap. The images and videos will be displayed on the detailed screen of each steam trap.

### PM510 Function correspondence table

Several functions of PM510 are unavailable depending on the version of PM530.

[○] : Available, [-] : Unavailable

PM530		
PM510 Function	Standard	Special
List Import/Export	○	○
List Retrieval	○	○
Edit Area	○	○
Survey	○	○
Survey map	-	○
Whole map	-	○
Edit Drawing	-	○
Camera	-	○

## SurveyPro 4.0 PM530

The software was updated from SurveyPro V3.1. It offers to analyse survey data, view trends, and manage survey files.

Same as V3.1, it displays various summary sheets and graphs depending on the purpose, and export them to Excel and image files. It helps to create survey reports. Standard and Special versions are available.

### Upgraded Functions

#### Single Sheet

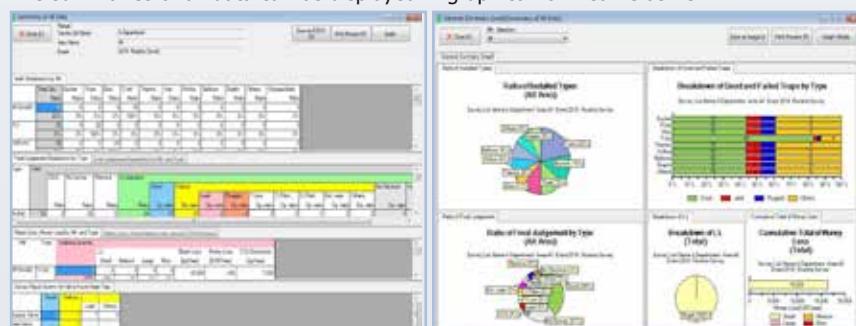
Each survey list can be displayed as a Single Sheet. Then, it can be exported to Excel as well. It is possible to browse and edit survey list detail information on the sheet at once.



#### Data Summary Sheet

Different from the previous version, SurveyPro V3.1, the data summary sheets will be displayed as one sheet. Consequently, it is easier to use various analysis functions to create summary sheets such as by Manufacturer and by Type.

The summaries of all data can be displayed in graphical form same as V3.1.



## SCCV®-System

### The MIYAWAKI SCCV®-System: worldwide patented

MIYAWAKI's internationally patented Self Closing and Centering Valve SCCV®-System has proven its high reliability and effectiveness during more than two decades. Many thousands of steam traps equipped with the SCCV®-System have proven enormous advantages for our customers:

1. A substantially longer service life compared with other steam traps
2. No partial or one-sided precipitate wear of valve and seat
3. Greatly reduced wear of all internal parts due to the reduction of the closing forces required to maintain a seal
4. No steam loss for all Temperature Control Traps



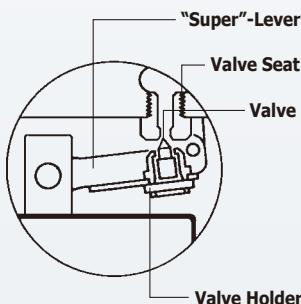
### The MIYAWAKI SCCV®-System: variable adjusted to various types

Intensive research and development activities over many years have enabled MIYAWAKI to incorporate the SCCV®-System in various types of steam traps. Thus it became possible to adopt the SCCV®-System to a wide pressure range and to utilize the SCCV®-System not only for Bimetal Steam Traps, but also for Inverted Bucket and Float Type Steam Traps.

#### Inverted Bucket Steam Traps

##### Series ES

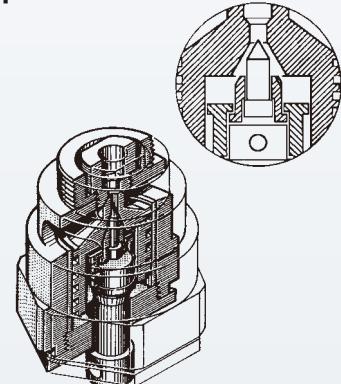
The Valve Holder is fixed to a specially developed "Super-Lever". The Valve is "free floating" inside the Valve Holder. Thus the control space inside the Valve Holder decreases the force toward the seat caused by the movement of the bucket. The Valve will close softly and exactly in the center of the seat.



#### Inverted Bucket Steam Traps

##### Series ER

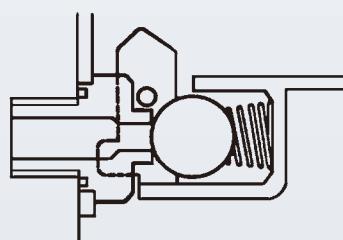
The SCCV®-System is part of a "Double Valve Unit", which is operating on the basis of the pressure difference inside the unit. The trap is thus characterized by extended lifetime of the valve assembly and a greater condensate discharge per body size when compared to conventional inverted bucket steam traps.



#### Ball Float Steam Trap

##### G11N, G12N

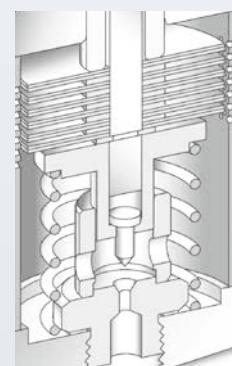
The Valve (Ball) lies inside a Valve Holder, which is directly connected through a lever with the float. By installing a spring inside the Valve Holder the movements of the float and the forces caused by it will not be directly transferred to the Valve. This will increase the service life of the sealing surfaces.



#### Temperature Control Steam Trap

##### TB7N

The Bimetal Unit including the valve are guided inside the body. A spring reduces the force caused by the deflection of the bimetals which move the valve toward the seat. The guiding of the valve within the seat and the lift of the valve is designed in such a way that the valve will close very smoothly in the center of the seat.



## SCCV®-System

### Basic Principle

#### Regulating

The design of the Valve and Seat and the Valve lift (distance between the closed and open position of the valve) are calculated and designed in such a way that the valve closes its seat at the time that the condensate reaches the steam trap adjusted temperature.

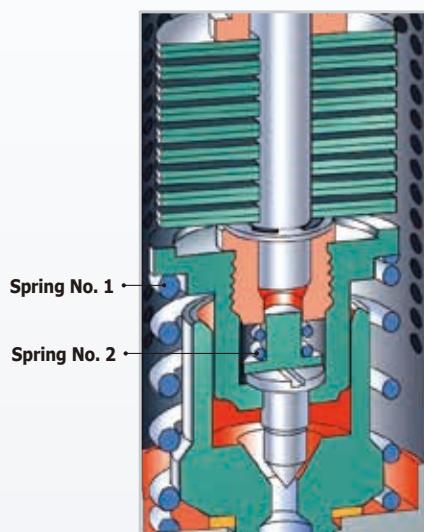
#### Centering and Soft Closing

The valve is "free floating" inside the valve holder. The valve moves to the center caused by the pressure and the flow of condensate. The tip of the valve is drawn down to the center axis of the valve seat. A spring and a stop ring inside the control chamber absorb and soften the movement of the valve (caused by the temperature and pressure of the steam system) towards its seat. The centering and soft closing characteristics prevents premature or uneven wearing of the valve and its seat, extending the lifetime of the steam trap.

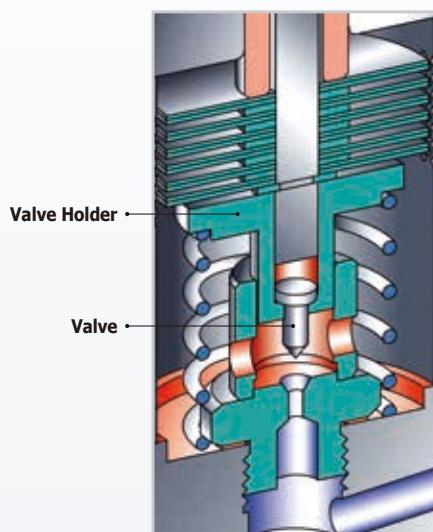
#### No Steam Loss

The valve closes exactly in the center of the seat at the adjusted temperature, slightly below the saturation temperature assuring Zero steam loss.

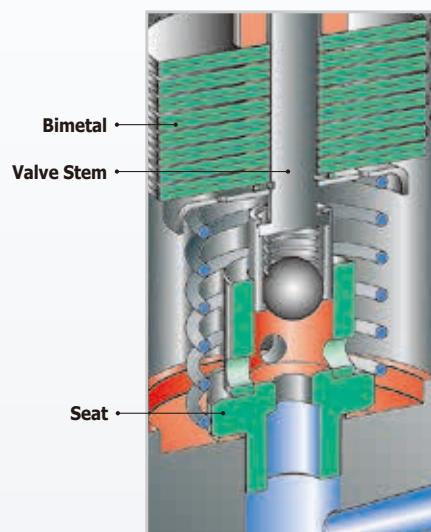
**TB51**



**TB7N**



**TB9N**

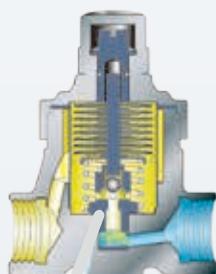


1



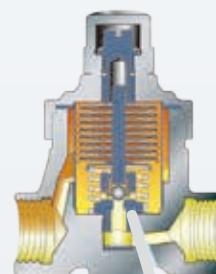
On start-up, the bimetal discs are all flat and the valve shaft is up with the valve fully open. Virtually all cold condensate and air are discharged.

2



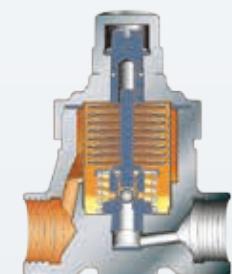
As the temperature of the condensate increases, the bimetal discs begin to curve gradually and force the valve shaft and the valve holder to move down.

3



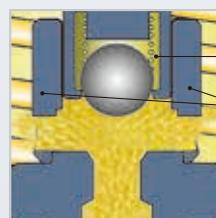
When condensate with higher temperature (near to set temperature) flows in, the bimetal discs are curved even more and, at the same time, the valve shaft moves down and the valve holder closes the holes in the guide partially.

4



In case of very low condensate flow, the holes in the guide are closed completely by the valve holder and the valve will close precisely in the center of the seat. Normally, the trap is filled with hot condensate and the operation will rest in the state shown in figure 3. Condensate will be discharged continuously.

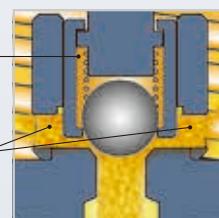
Most of the condensate is still discharged quickly, since the valve and the holes in the fixed guide on the valve seat are still fully open.



Control Chamber

Fixed guide

Fixed guide holes



The amount of condensate being discharged is reduced quickly. This prolongs the time that the hot condensate stays near the bimetal discs and the heat of the condensate is transferred to the bimetals much more effectively.

## Material Standards and Temperature

### Material Standards

Following you find a list of materials mainly used by MIYAWAKI for its Steam Traps, according to Japanese Standards and the most closely corresponding numbers of American (ASTM), European (EN) and German (DIN) Standards.

### 1. Iron Castings

JIS	ASTM	EN	DIN
FC200	A48 – class 30	EN-GJL-200	GG-20 (0.6020)
FC250	A48 – class 35	EN-GJL-250 (EN-JL 1040)	GG-25 (0.6025)
FCD450	A536 65-45-12	EN-GJS-450-10 (EN-JS1040)	GGG40.3 (0.7043)

### 2. Steel Casting and forgings

JIS	ASTM	EN	DIN
SCPH 2	A216WCB	GP240GH (1.0619)	GS-C25
SCPH 21	A217WC6	G17CrMo5-5 (1.7357)	GS17CrMo55 (1.7357)
SCPH32	A217WC9	GS12CrMo9-10 (1.7380)	10CrMo9-10 (1.7380)
SFVC2A	A105	P250GH (1.0460)	C22.8 (1.0460)
SFVAF22B	A182F22	10CrMo9-10 (1.7380)	10CrMo9-10 (1.7380)

### 3. Stainless and Heat Resisting Steels

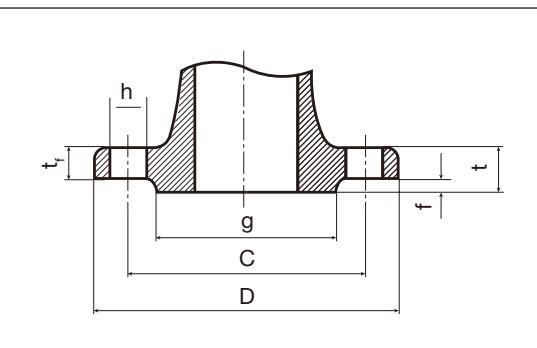
JIS	ASTM	EN	DIN
SCS13A	A351CF8	GX5CrNi19-10 (1.4308)	G-X6CrNi189 (1.4308)
SCS14	A351CF8M	GX5CrNiMo19-11-2 (1.4408)	G-X6CrNiMo1810 (1.4408)
SUS303	A582S30300	X8CrNiS18-9 (1.4305)	X10CrNiS189 (1.4305)
SUS304	A276S30400	X5CrNi18-10 (1.4301)	X5CrNi1810 (1.4301)
SUS403	A276S40300	X6Cr13 (1.4000)	X6Cr13 (1.4000)
SUS420J2	-	X30Cr13 (1.4028)	X30Cr13 (1.4028)

### 4. Alloys

JIS	ASTM	EN	DIN
C3771	C37700 (B 124-89)	CuZn39Pb2 (CW612N)	CuZn39Pb2

### Diameters and Drilling of Flanges

(see Page 91)



### Conversion Factors

$$T^{\circ}\text{C} = \frac{5}{9}(T^{\circ}\text{F} - 32) \quad T^{\circ}\text{F} = 1,8 T^{\circ}\text{C} + 32$$

°C	°F	°F	°C	°F	°F
	°C			°C	
10,0	50	122	127	260	500
12,8	55	131	132	270	518
15,6	60	140	138	280	536
18,3	65	149	143	290	554
21,1	70	158	149	300	572
23,9	75	167	154	310	590
26,7	80	176	160	320	608
29,2	85	185	166	330	626
32,2	90	194	171	340	644
35,0	95	203	177	350	662
37,8	100	212	182	360	680
40,6	105	221	188	370	698
43	110	230	193	380	716
46	115	239	199	390	734
49	120	248	204	400	752
52	125	257	210	410	770
54	130	266	216	420	788
57	135	275	221	430	806
60	140	284	227	440	824
63	145	293	232	450	842
66	150	302	238	460	860
68	155	311	243	470	878
71	160	320	249	480	896
74	165	329	254	490	914
77	170	338	260	500	932
79	175	347	266	510	950
82	180	356	271	520	968
85	185	365	277	530	986
88	190	374	282	540	1004
91	195	383	288	550	1022
93	200	392	293	560	1040
99	210	410	299	570	1058
104	220	428	304	580	1076
110	230	446	310	590	1094
116	240	464	316	600	1112
121	250	482			

**American Standard ASME B 16.5-2009**

Size (in)	Dimensions	class 150		class 300		class 600		class 900		class 1500	
		in	mm	in	mm	in	mm	in	mm	in	mm
1/2 "	D	3.5	90	3.75	95	3.75	95	4.75	120	4.75	120
	t <sub>f</sub>	0.38	9,6	0.5	12,7	0.56	14,3	0.88	22,3	0.88	22,3
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	1.38	34,9	1.38	34,9	1.38	34,9	1.38	34,9	1.38	34,9
	C	2.38	60,3	2.62	66,7	2.62	66,7	3.25	82,6	3.25	82,6
3/4 "	n x h	4 x 5/8	4 x 15,9	4 x 5/8	4 x 15,9	4 x 5/8	4 x 15,9	4 x 7/8	4 x 22,2	4 x 7/8	4 x 22,2
	D	3.88	100	4.62	115	4.62	115	5.12	130	5.12	130
	t	0.44	11,2	0.56	14,3	0.62	15,9	1	25,4	1	25,4
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	1.69	42,9	1.69	42,9	1.69	42,9	1.69	42,9	1.69	42,9
	C	2.75	69,9	3.25	82,6	3.25	82,6	3.5	88,9	3.5	88,9
1 "	n x h	4 x 5/8	4 x 15,9	4 x 3/4	4 x 19,0	4 x 3/4	4 x 19,0	4 x 7/8	4 x 22,2	4 x 7/8	4 x 22,2
	D	4.25	110	4.88	125	4.88	125	5.88	150	5.88	150
	t	0.5	12,7	0.62	15,9	0.69	17,5	1.12	28,6	1.12	28,6
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	2	50,8	2	50,8	2	50,8	2	50,8	2	50,8
	C	3.12	79,4	3.5	88,9	3.5	88,9	4	101,6	4	101,6
1 1/4 "	n x h	4 x 5/8	4 x 15,9	4 x 3/4	4 x 19,0	4 x 3/4	4 x 19,0	4 x 1	4 x 25,4	4 x 1	4 x 25,4
	D	4.62	115	5.25	135	5.25	135	6.25	160	6.25	160
	t	0.56	14,3	0.69	17,5	0.81	20,7	1.12	28,6	1.12	28,6
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	2.5	63,5	2.5	63,5	2.5	63,5	2.5	63,5	2.5	63,5
	C	3.5	88,9	3.88	98,4	3.88	98,4	4.38	111,1	4.38	111,1
1 1/2 "	n x h	4 x 5/8	4 x 15,9	4 x 3/4	4 x 19,0	4 x 3/4	4 x 19,0	4 x 1	4 x 25,4	4 x 1	4 x 25,4
	D	5	125	6.12	155	6.12	155	7	180	7	180
	t	0.62	15,9	0.75	19,1	0.88	22,3	1.25	31,8	1.25	31,8
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	2.88	73	2.88	73	2.88	73	2.88	73	2.88	73
	C	3.88	98,4	4.5	114,3	4.5	114,3	4.88	123,8	4.88	123,8
2 "	n x h	4 x 5/8	4 x 15,9	4 x 7/8	4 x 22,2	4 x 7/8	4 x 22,2	4 x 11/8	4 x 28,6	4 x 11/8	4 x 28,6
	D	6	150	6.5	165	6.5	165	8.5	215	8.5	215
	t	0.69	17,5	0.81	20,7	1	25,4	1.5	38,1	1.5	38,1
	f	0.06	2	0.06	2	0.25	7	0.25	7	0.25	7
	g	3.62	92,1	3.62	92,1	3.62	92,1	3.62	92,1	3.62	92,1
	C	4.75	120,7	5	127	5	127	6.5	165,1	6.5	165,1
2 "	n x h	4 x 3/4	4 x 19,0	8 x 3/4	8 x 19,0	8 x 3/4	8 x 19,0	8 x 1	8 x 25,4	8 x 1	8 x 25,4

**Japanese Standard: JIS B 2210 – 1984**

Size (in)	Dimensions	Dimensions at Pressure Rating (mm)					
		10 K	16 K	20 K	30 K	40 K	63 K
1/2 "	D	95	95	95	115	115	120
	t	12	12	14	18	20	23
	f	1	1	1	1	1	1
	g	51	51	51	55	55	55
	C	70	70	70	80	80	80
3/4 "	n x h	4 x 15	4 x 15	4 x 15	4 x 19	4 x 19	4 x 19
	D	100	100	100	120	120	135
	t	14	14	16	18	20	25
	f	1	1	1	1	1	1
	g	56	56	56	60	60	60
1 "	C	75	75	75	85	85	95
	n x h	4 x 15	4 x 15	4 x 15	4 x 19	4 x 19	4 x 23
	D	125	125	125	130	130	140
	t	14	14	16	20	22	27
	f	1	1	1	1	1	1
1 1/4 "	g	67	67	67	70	70	70
	C	90	90	90	95	95	100
	n x h	4 x 19	4 x 19	4 x 19	4 x 19	4 x 19	4 x 23
	D	135	135	135	140	140	150
	t	16	16	18	22	24	30
1 1/2 "	f	2	2	2	2	2	2
	g	76	76	76	80	80	80
	C	100	100	100	105	105	110
	n x h	4 x 19	4 x 19	4 x 19	4 x 19	4 x 19	4 x 23
	D	140	140	140	160	160	175
2 "	t	16	16	18	22	24	32
	f	2	2	2	2	2	2
	g	81	81	81	90	90	90
	C	105	105	105	120	120	130
	n x h	4 x 19	4 x 19	4 x 19	4 x 23	4 x 23	4 x 25
2 "	D	155	155	155	165	165	185
	t	16	16	18	22	26	34
	f	2	2	2	2	2	2
	g	96	96	96	105	105	105
	C	120	120	120	130	130	145
	n x h	4 x 19	8 x 19	8 x 19	8 x 19	8 x 19	8 x 23

**European Standard EN 1092-1**

Size (in)	Dimensions	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
		mm	mm	mm	mm	mm	mm
DN15	D	95	95	95	95	105	105
	t	16	16	16	16	20	20
	f	2	2	2	2	2	2
	g	45	45	45	45	45	45
	C	65	65	65	65	75	75
DN20	n x h	4 x 14					
	D	105	105	105	105	130	130
	t	18	18	18	18	22	22
	f	2	2	2	2	2	2
	g	58	58	58	58	58	58
DN25	C	75	75	75	75	90	90
	n x h	4 x 14	4 x 14	4 x 14	4 x 14	4 x 18	4 x 18
	D	115	115	115	115	140	140
	t	18	18	18	18	24	24
	f	2	2	2	2	2	2
DN32	g	68	68	68	68	68	68
	C	85	85	85	85	100	100
	n x h	4 x 14	4 x 14	4 x 14	4 x 14	4 x 18	4 x 18
	D	140	140	140	140	155	155
	t	18	18	18	18	24	24
DN40	f	2	2	2	2	2	2
	g	78	78	78	78	78	78
	C	100	100	100	100	110	110
	n x h	4 x 18	4 x 18	4 x 18	4 x 18	4 x 22	4 x 22
	D	150	150	150	150	170	170
DN50	t	18	18	18	18	26	26
	f	3	3	3	3	3	3
	g	102	102	102	102	102	102
	C	125	125	125	125	135	145
	n x h	4 x 18	4 x 18	4 x 18	4 x 18	4 x 22	4 x 22

**Pressure****Conversion Table from psi to bar**

psi		bar		psi		bar		psi		bar		psi		bar		psi		bar	
1	0,07		105	7,24		310	21,37		510	35,17		820	56,55		1250	86,19			
1,5	0,1		108,8	7,5		319,0	22,0		514,8	35,5		826,5	57,0		1276	88,0			
5	0,34		110	7,58		320	22,06		520	35,86		840	57,93		1300	89,66			
7,3	0,5		116,0	8,0		326,3	22,5		522,0	36,0		855,5	59,0		1305	90,0			
10	0,69		120	8,27		330	22,75		530	36,55		860	59,31		1350	93,08			
14,5	1,0		123,3	8,5		333,5	23,0		536,5	37,0		870,0	60,0		1378	95,0			
15	1,03		130	8,96		340	23,44		540	37,24		880	60,69		1400	96,55			
18,9	1,3		130,5	9,0		348,0	24,00		543,8	37,5		899,0	62,0		1407	97,0			
20	1,38		140	9,65		350	24,13		550	37,92		900	62,06		1450	100,00			
21,8	1,5		145,0	10,00		355,3	24,45		551,0	38,0		913,5	63,0		1479	102,0			
25	1,72		150	10,34		360	24,82		560	38,62		920	63,45		1500	103,45			
29,0	2,0		159,5	11,0		362,5	25,0		565,5	39,0		928,0	64,0		1523	105,0			
30	2,07		160	11,03		370	25,51		570	39,31		940	64,83		1550	106,87			
33,4	2,3		166,8	11,5		377,0	26,00		572,8	39,5		942,5	65,0		1595	110,0			
35	2,41		170	11,72		380	26,20		580	40,00		960	66,21		1600	110,32			
36,3	2,5		174,0	12,0		384,3	26,5		587,3	40,5		971,5	67,0		1624	112,0			
40	2,76		180	22,41		390	26,89		590	40,69		980	67,59		1650	113,77			
43,5	3,0		188,5	13,0		391,5	27,0		594,5	41,0		986,0	68,0		1668	115,0			
45	3,10		190	13,10		400	27,85		600	41,37		1000	68,95		1700	117,22			
47,9	3,3		195,8	13,5		406,0	28,0		609,0	42,0		1015	70,0		1711	118,0			
50	3,45		200	13,79		410	28,27		620	42,76		1020	70,34		1750	120,66			
50,8	3,5		203,0	14,0		413,3	28,5		623,5	43,0		1029	71,0		1784	123,0			
55	3,79		210	14,48		420	28,96		640	44,14		1040	71,72		1800	124,11			
58,0	4,0		217,5	15,0		420,5	29,0		652,5	45,0		1044	72,0		1813	125,0			
60	4,14		220	15,17		430	29,65		660	45,52		1060	73,10		1850	127,56			
62,4	4,3		224,8	15,5		435,0	30,0		667,0	46,0		1073	74,0		1885	130,0			
65	4,48		230	15,86		440	30,34		680	46,90		1080	74,48		1900	131,01			
65,3	4,5		232,0	16,0		449,5	31,0		696,0	48,0		1088	75,0		1929	133,0			
70	4,83		240	16,55		450	31,03		700	48,27		1100	75,86		1950	134,45			
72,5	5,0		246,5	17,0		456,8	31,5		710,5	49,0		1117	77,0		1958	135,0			
75	5,17		250	17,24		460	31,72		720	49,66		1120	77,24		2000	137,90			
79,8	5,5		253,8	17,5		464,0	32,0		725,0	50,0		1131	78,0		2030	140,0			
80	5,52		260	17,93		470	32,41		740	51,03		1140	78,62		2050	141,35			
82,7	5,7		261,0	18,0		478,5	33,0		754,0	52,0		1146	79,0		2074	143,0			
85	5,86		270	18,62		480	33,10		760	52,41		1160	80,00		2100	144,80			
87,0	6,0		275,5	19,0		485,8	33,5		768,5	53,0		1175	81,0		2103	145,0			
90	6,21		280	19,31		490	33,79		780	53,79		1180	81,38		2150	148,24			
94,3	6,5		282,8	19,5		493,0	34,0		797,5	55,0		1189	82,0		2175	150,0			
95	6,55		290	20,00		500	34,48		800	55,16		1200	82,76		2200	151,69			
97,2	6,7		297,3	20,5		507,5	35,0		812	56,0		1233	85,0		2320	160,0			
100	6,9		300	20,69															
101,5	7,0		304,5	21,0															

**Conversion Factors**

Units of measurement								
Pa	KPa	MPa	bar	kg/cm <sup>2</sup>	atm	mm H <sub>2</sub> O	mm Hg (Torr)	lbf/in <sup>2</sup> (psi)
1	0,001	1 x 10 <sup>-6</sup>	1 x 10 <sup>-5</sup>	1,01972 x 10 <sup>-5</sup>	9,86923 x 10 <sup>-6</sup>	0,101972	7,50062 x 10 <sup>-3</sup>	1,450377 x 10 <sup>-4</sup>
1000	1	0,001	0,01	0,0101972	9,86923 x 10 <sup>-3</sup>	101,972	7,50062	0,1450377
1 x 10 <sup>6</sup>	1000	1	10	10,1972	9,86923	1,01972 x 10 <sup>5</sup>	7500,62	145,0377
1 x 10 <sup>5</sup>	100	0,1	1	1,01972	0,986923	1,01972 x 10 <sup>4</sup>	750,062	14,50377
9,80665 x 10 <sup>4</sup>	98,0665	0,0980665	1	0,967841	10000	735,559	14,22334	
1,01325 x 10 <sup>5</sup>	101,325	0,101325	1,01325	1,03323	1	10332,3	760,000	14,69595
9,80665	9,80665 x 10 <sup>-3</sup>	9,80665 x 10 <sup>-6</sup>	9,80665 x 10 <sup>-5</sup>	0,0001	9,67841 x 10 <sup>-5</sup>	1	0,0735559	0,001422334
133,322	0,133322	1,33222 x 10 <sup>-4</sup>	0,00133322	0,00135951	0,00131579	13,5951	1	0,01933678
6894,76	6,89476	0,00689476	0,0689476	0,0703070	0,0680460	703,070	51,7149	1

## Properties of Saturated Steam

Absolute Pressure p MPa	Saturation Temperature ts °C	Steam Volume v'' m³/kg	Steam Density ρ'' kg/m³	Sensible Heat h' kJ/kg	Total Steam Heat h'' kJ/kg	Latent Heat r = h'' - h' kJ/kg
0,1	99,63	1,6940	0,5904	417,51	2.675,4	2.257,9
0,15	111,37	1,1590	0,8628	467,13	2.693,4	2.226,3
0,2	120,23	0,8854	1,1290	504,70	2.706,3	2.201,6
0,25	127,43	0,7184	1,3920	535,34	2.716,4	2.181,1
0,3	133,54	0,6056	1,6510	561,43	2.724,7	2.163,3
0,35	138,87	0,5240	1,9080	584,27	2.731,6	2.147,3
0,4	143,62	0,4622	2,1630	604,67	2.737,6	2.132,9
0,45	147,92	0,4138	2,4170	623,16	2.742,9	2.119,7
0,5	151,84	0,3747	2,6690	640,12	2.747,5	2.107,4
0,55	155,46	0,3426	2,9200	655,78	2.751,7	2.095,9
0,6	158,84	0,3155	3,1700	670,42	2.755,5	2.085,1
0,65	161,99	0,2925	3,4190	684,12	2.758,8	2.074,7
0,7	164,96	0,2727	3,6670	697,06	2.762,0	2.064,9
0,75	167,75	0,2554	3,9150	709,29	2.764,8	2.055,5
0,8	170,41	0,2403	4,1620	720,94	2.767,5	2.046,6
0,85	172,94	0,2268	4,4090	732,02	2.769,9	2.037,9
0,9	175,36	0,2148	4,6550	742,64	2.772,1	2.029,5
0,95	177,66	0,2040	4,9010	752,81	2.774,2	2.021,4
1,0	179,88	0,1930	5,1470	762,61	2.776,2	2.013,6
1,1	184,07	0,1747	5,6370	781,13	2.779,7	1.998,6
1,2	187,96	0,1632	6,1270	798,43	2.782,7	1.984,3
1,3	191,61	0,1511	6,6170	814,70	2.785,4	1.970,7
1,4	195,04	0,1407	7,1060	830,08	2.787,8	1.957,7
1,5	198,29	0,1317	7,5960	844,67	2.789,9	1.945,2
1,6	201,37	0,1237	8,0850	858,56	2.791,7	1.933,1
1,7	204,31	0,1166	8,5750	871,84	2.793,4	1.921,6
1,8	207,11	0,1103	9,0650	884,58	2.794,8	1.910,2
1,9	209,80	0,1047	9,5550	896,81	2.796,1	1.899,3
2,0	212,37	0,0996	10,0500	908,59	2.797,2	1.888,6
2,2	217,24	0,0907	11,0300	930,95	2.799,1	1.868,2
2,4	221,78	0,0832	12,0200	951,93	2.800,4	1.848,5
2,6	226,04	0,0769	13,0100	971,72	2.801,4	1.829,7
2,8	230,05	0,0714	14,0100	990,48	2.802,0	1.811,5
3,0	233,84	0,0666	15,0100	1.008,40	2.802,3	1.793,9
3,2	237,45	0,0624	16,0200	1.025,40	2.802,3	1.776,9
3,4	240,88	0,0587	17,0300	1.041,80	2.802,1	1.760,3
3,6	244,16	0,0554	18,0500	1.057,60	2.801,7	1.744,1
3,8	247,31	0,0524	19,0700	1.072,70	2.801,1	1.728,4
4,0	250,33	0,0498	20,1000	1.087,40	2.800,3	1.712,9
5,0	263,91	0,0394	25,3600	1.154,50	2.794,2	1.639,7
6,0	275,55	0,0324	30,8300	1.213,70	2.785,0	1.571,3
7,0	285,79	0,0274	36,5300	1.267,40	2.773,5	1.506,1
8,0	294,97	0,0235	42,5100	1.317,10	2.759,9	1.442,8
9,0	303,31	0,0205	46,7900	1.363,70	2.744,6	1.380,9
10,0	310,96	0,0180	55,4300	1.408,00	2.727,7	1.319,7
11,0	318,05	0,0160	62,4800	1.450,60	2.709,3	1.258,7
12,0	324,65	0,0143	70,0100	1.491,80	2.689,2	1.197,4
13,0	330,83	0,0128	78,1400	1.532,00	2.667,0	1.135,0
14,0	336,64	0,0115	86,9900	1.571,60	2.642,4	1.070,8
15,0	342,13	0,0103	86,7100	1.611,00	2.615,0	1.004,0
16,0	347,33	0,0093	107,4000	1.650,50	2.584,9	934,4
17,0	352,26	0,0084	119,5000	1.691,70	2.551,6	859,9
18,0	356,96	0,0075	133,4000	1.734,80	2.513,9	779,1
19,0	361,43	0,0067	149,8000	1.778,70	2.470,6	691,9
20,0	365,70	0,0059	170,2000	1.826,50	2.418,4	591,9
22,0	373,69	0,0037	268,3000	2.011,10	2.195,6	184,5
22,12	374,15	0,0032	315,5000	2.107,40	2.107,4	0,0

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**MIYAWAKI Inc.**

2-1-30, Tagawakita, Yodogawa-ku  
Osaka 532-0021  
JAPAN

Tel.: + 81 - 6 - 6302 - 5549

Fax: + 81 - 6 - 6305 - 7155

E-Mail: [export@miyawaki-inc.co.jp](mailto:export@miyawaki-inc.co.jp)

Website: [www.miyawaki.net](http://www.miyawaki.net)

**MIYAWAKI GmbH**

Birnbaumsmühle 65  
15234 Frankfurt (Oder)  
GERMANY

Tel.: + 49 - 335 - 4007 0097

Fax: + 49 - 335 - 4000 122

E-Mail: [info@miyawaki.de](mailto:info@miyawaki.de)

Website: [www.miyawaki.net](http://www.miyawaki.net)

