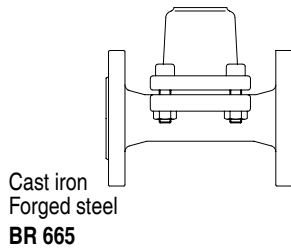


Liquid drainer

PN16 / PN40

- with flanges (BR 665....1)
- with screwed sockets (BR 665....2)
- with socket weld ends (BR 665....3)
- with butt weld ends (BR 665....4)



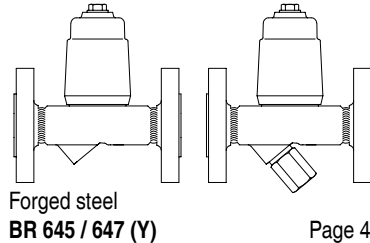
Page 2



Condensate discharge temperature limiter

PN40

- with flanges (BR 645/647....1)
- with screwed sockets (BR 645/647....2)
- with socket w. ends (BR 645/647....3)
- with butt weld ends (BR 645/647....4)



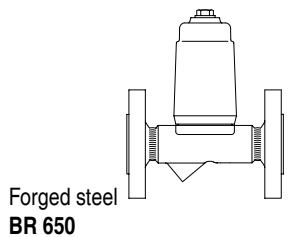
Page 4



Liquid return temperature limiter

PN25 / PN40

- with flanges (BR 650....1)
- with screwed sockets (BR 650....2)
- with socket weld ends (BR 650....3)
- with butt weld ends (BR 650....4)
- union with butt weld ends (BR 650....5)



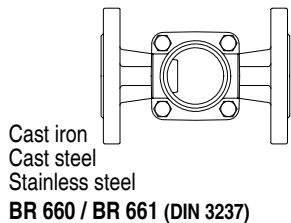
Page 6



Double window sight glasses (Flow indicator)

PN16 / PN40

- with flanges (BR 660....1)
 - with screwed sockets (BR 660....2)
 - with butt weld ends (BR 660....4)
 - with flanges (BR 661....1)
- (Design with reinforced windows acc. to DIN 3237)

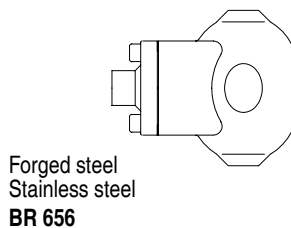


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Automatic air vent

PN16 / PN25

- with flanges (BR 656....1)
- with screwed sockets (BR 656....2)
- with socket weld ends (BR 656....3)
- with butt weld ends (BR 656....4)



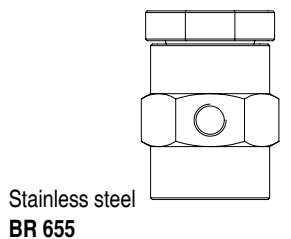
Page 10



Vacuum breaker

PN16 / PN40

- with screwed sockets (BR 655....2)

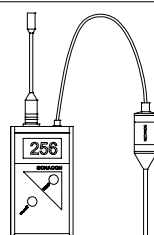


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Steam trap testing device Sonacon

Steam trap testing through ultrasonic measurement

Short instructions



Page 14



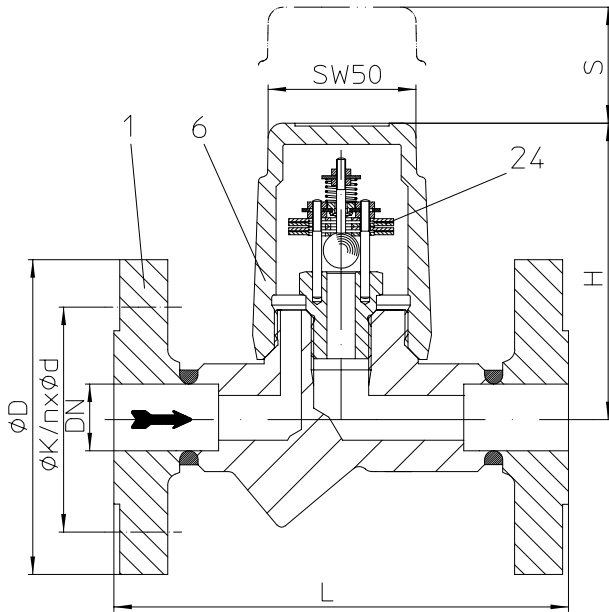
Liquid drainer made of cast iron, forged steel


Fig. 665...1 with flanges

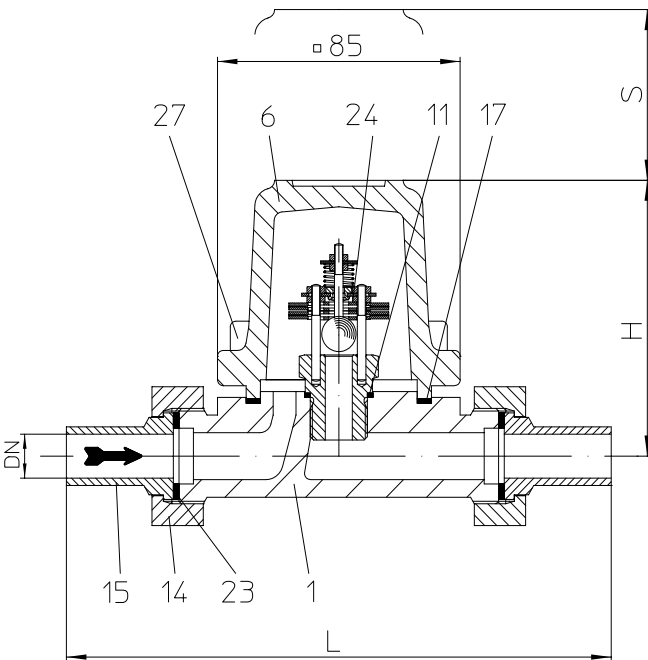


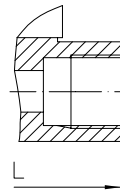
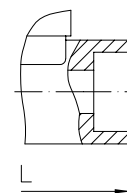
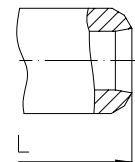
Fig. 665...5 Union with butt weld ends (only PN16)

- Automatic condensate-discharge during start-up and shut down
- On unpressurized system the liquid drainer will be opened by a compression spring inside of the controller
- On factory setting the liquid drainer will be closed at a differential pressure of $\geq 1,5$ bar. Other factory settings between 0,5 bar and 2 bar possible.
- Bimetallic elements will achieve that the closing pressure is constant
- Installation in any position
(if a frost resistant execution is required please inquire)

Fig. 12.665 PN16 - GG-25	Operating limits
Operating pressure PS (bar-g)	13
Operating temperature TS (°C)	300
Closing pressure ΔP (bar):	1,5

Fig. 45.665 PN40 - C22.8	Operating limits		
Operating pressure PS (bar-g)	32	22	14,5
Operating temperature TS (°C)	250	385	450
Closing pressure ΔP (bar):	1,5		

Types of connection		
Flanges ...1	DIN PN16	DIN PN40
Screwed sockets ....2	--	R- and NPT-thread
Socket weld ends ....3		
Butt weld ends ....4	--	DIN EN 12627
Union with butt weld ends ....5	welding sockets	--
Other types of connection on request.		


 Fig. 665...2
with screwed sockets

 Fig. 665...3
with socket weld ends

 Fig. 665...4
with butt weld ends

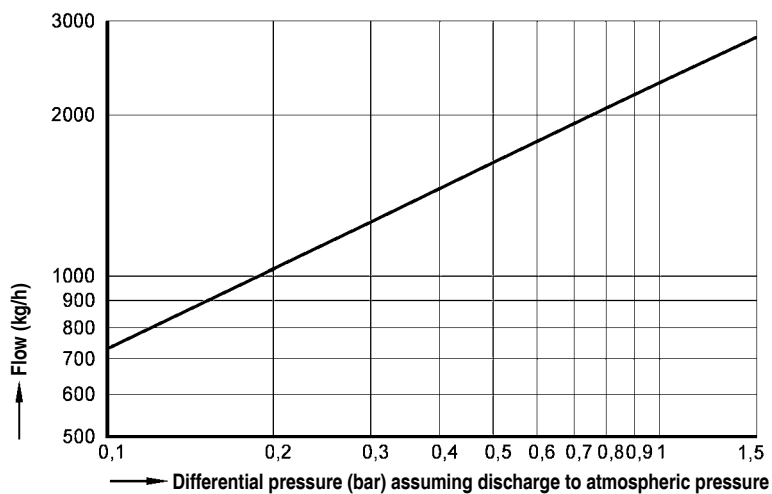
Dimensions and weights		Types of connection PN16				Types of connection PN40								
		Flanges		Union with butt weld ends		Flanges			Screwed sockets Socket weld ends			Butt weld ends		
Nominal diameters	mm inch	25 1	50 2	15 1/2	20 3/4	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1
Dimensions (mm)	L	160/180	230/236	190	190	150	150	160	95	95	95	250	250	250
	H	100	124	100	100	98	98	98	98	98	98	98	98	98
	S	70	80	70	70	70	70	70	70	70	70	70	70	70
Weight approximate (kg)		4,5	7,5	2,6	2,3	5,4	2,6	2,3	2,2	2,3	2,4	2,9	2,8	2,6

Standard-flange dimensions refer to page 17

Parts

Pos.	Description	Material (Material-No.)			
		DIN	comparable with ASTM / AISI	DIN	comparable with ASTM / AISI
1	Body	GG-25, 0.6025	SA 278 Class 40	C 22.8 (1.0460)	SA 105
6	Hood / Screw cap	GG-25, 0.6025	SA 278 Class 40	C 22.8 (1.0460)	SA 105
11	Sealing ring (body / seat) *	R-Cu99 oder X6CrNiTi18-10, 1.4541	SA 182 F 321	R-Cu99 oder X6CrNiTi18-10, 1.4541	SA 182 F 321
14	Sleeve nut	X14CrMoS17+QT, 1.4104+QT	AISI 430 F	--	--
15	Welding end	C 15, 1.0401	A 576 Grade 1020	--	--
17	Gasket (body/cover) *	CrNi laminated both sides with pure graphite		CrNi laminated both sides with pure graphite	
23	Sealing ring (body/welding end)	R-Cu99 or X6CrNiTi18-10, 1.4541	SA 182 F 321	--	--
24	Controller, cpl. *	corrosion resistant bimetal TB 102 / 85		corrosion resistant bimetal TB 102 / 85	
27	Cheese head screw	8.8	1035 / 1038	--	--

* Spare parts

Capacity chart

Selection criteria:

- Closing pressure
- Nominal diameter / nominal pressure
- Type of connection
- Material
- Place of service

Example for order data:

For the condensate discharge from a steam pipe, $\Delta P=3$ bar, max. flow 700 kg/h, flange connection, PN16, DN25

=> **Liquid drainer,**

BR 665, PN16, DN25, GG-25,

Face-to-face dimension 160 mm, flange connection

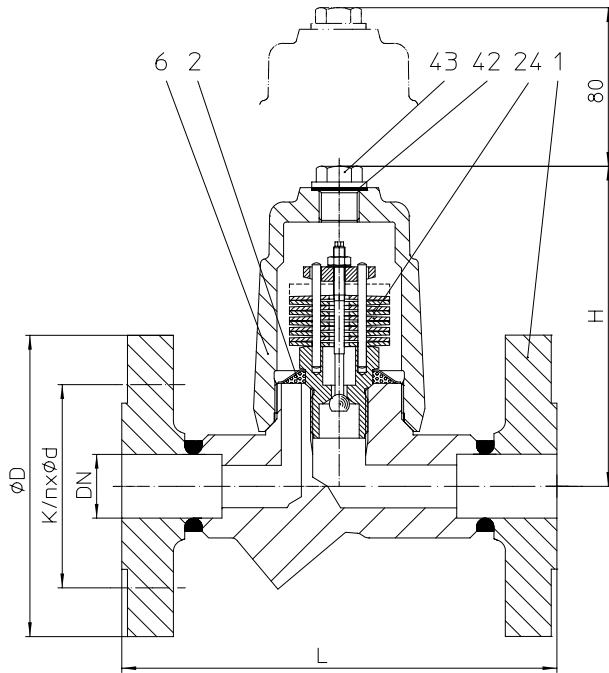
Condensate discharge temperature limiter made of forged steel


Fig. 645....1 with flanges

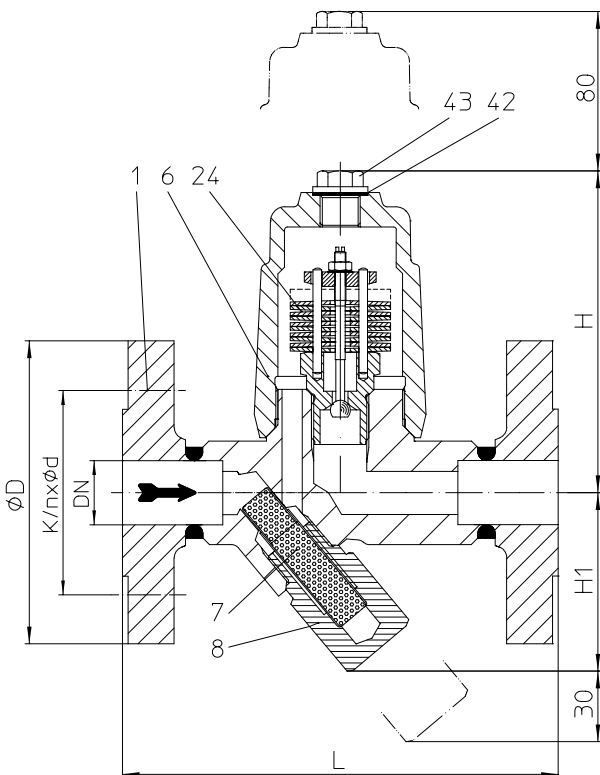


Fig. 647....1 with flanges

- Steam trap for the discharge of condensate without re-evaporation at adjustable condensate temperatures (temperature range from 60°C up to 140°C).
- With corrosion- and waterhammer resistant bimetallic controller
- Automatic ventilation during start-up and operation of the installation
- Installation in any position except screw cap downwards
- Integrated non return protection
- With inside strainer - BR 645
with outside strainer - BR 647 (Y)
- Subcooling of condensate is continuously adjustable (observe the operation instructions). (Temperature range from 60°C up to 140°C)
- The exchange of the controller is possible without disturbing the pipe connections
- For the utilization in warm water and hot water plants
- **Option:**
 - with blow down valve (Pos. 46)
 - with thermometer insert (Pos. 47 and 48) (only with inside strainer)

Fig. 45.645 / 45.647 PN40 - C 22.8	Operating limits		
Operating pressure PS (bar-g)	32	22	14,5
Operating temperature TS (°C)	250	385	450
allowable diff. press. ΔPMX (bar):	32		

Types of connection	
Flanges ....1	DIN PN40 ANSI 300 RF
Screwed sockets ...2	R- and NPT-thread
Socket weld ends ....3	
Butt weld ends ....4	
Other types of connection on request.	

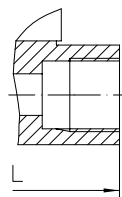


Fig. 645 / 647....2 with screwed sockets

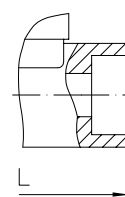


Fig. 645 / 647....3 with socket weld ends

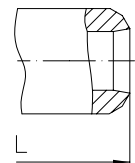


Fig. 645 / 647....4 with butt weld ends

Dimensions and weights		Types of connection								
		Flanges			Screwed sockets Socket weld ends			Butt weld ends		
Nominal diameters	mm inch	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1
Dimensions (mm)	L *	150	150	160	95	95	95	250	250	250
	H	112	112	112	112	112	112	112	112	112
	H1	65	65	65	65	65	65	65	65	65
Weight approximate (kg)		3,6	4,3	5,6	2	2,4	2,4	2,2	2	2

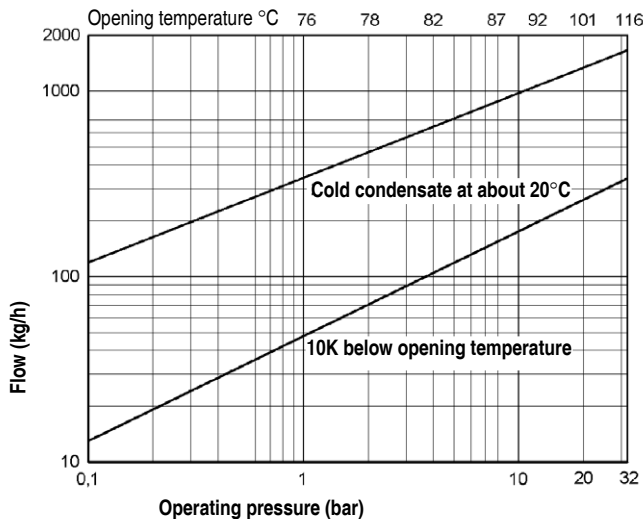
* other face-to-face dimensions on request

Standard-flange dimensions refer to page 17

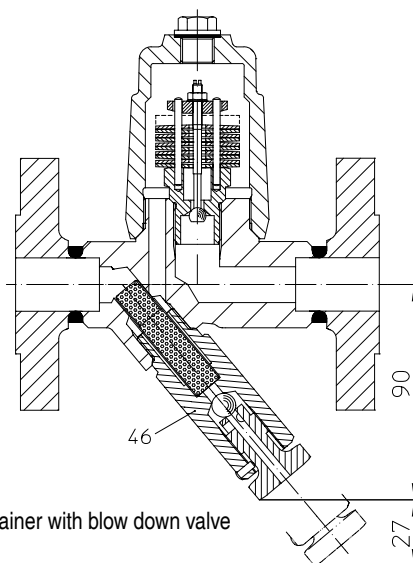
Parts

Pos.	Description	Material (Material-No.)	
		DIN	comparable with ASTM / AISI
1	Body	C 22.8, 1.0460	SA 105
2	Seat *	X5CrNi18-10, 1.4301	SA 240 Gr.304
6	Screw cap	C 22.8, 1.0460	SA 105
7 (Y)	Strainer screen *	X5CrNi18-10, 1.4301	SA 240 Gr.304
8 (Y)	Strainer plug *	X8CrNiS18-9, 1.4305	AISI 303
24	Controller cpl. *	corrosion resistant bimetal TB 102 / 85	
42	Sealing ring for plug *	R-Cu99 or X6CrNiTi18-10, 1.4541	SA 182 F 321
43	Plug *	C35E, 1.1181	1035 / 1038
46	Blow down valve cpl.	X6CrNiTi18-10, 1.4541	SA 182 F 321
47	Thermometer adapter *	X14CrMoS17+QT, 1.4104+QT	AISI 430 F
48	Thermometer display	X8CrNiS18-9, 1.4305	AISI 303

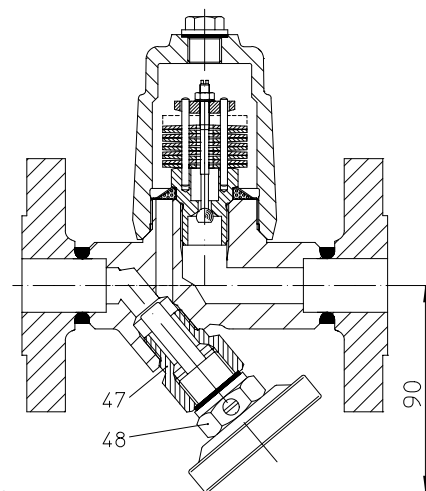
* Spare parts

Capacity chart

Capacity chart

The capacity chart shows the maximum flow quantities of cold condensate at about 20°C and condensate at 10K below the opening temperature based on the factory setting.



Option:
Outside strainer with blow down valve



Option:
thermometer insert with adapter
(Indicating range: 0°C up to 160°C)

Selection criteria:

- Inlet pressure
- Back pressure
- Quantity of condensate
- Nominal diameter / nominal pressure
- Type of connection
- Material
- Options

Example for order data:

For the condensate discharge from a steam pipe,
Operating pressure P1=4 bar(g), max. flow 50 kg/h, opening temperature 80 °C, flange connection, PN40, DN25

=> **Condensate discharge temperature limiter,
BR 647, PN40, DN25, C22.8, face-to-face dimension 160 mm,
flange connection, with thermometer.**

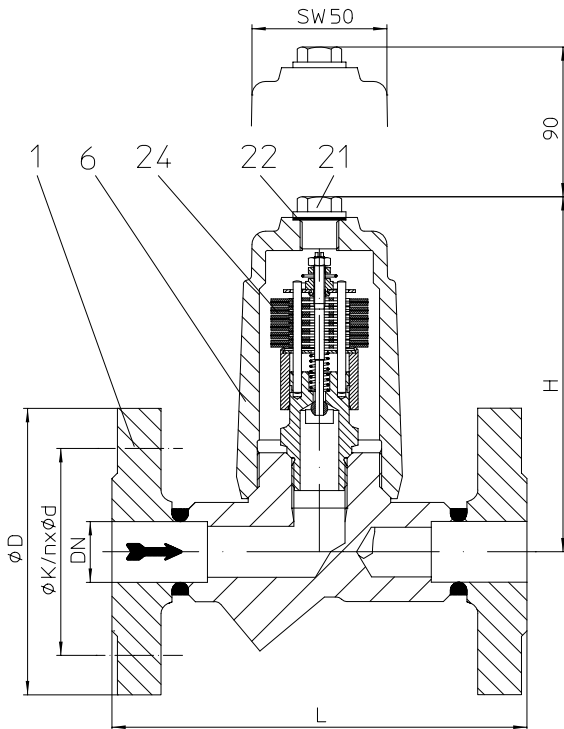
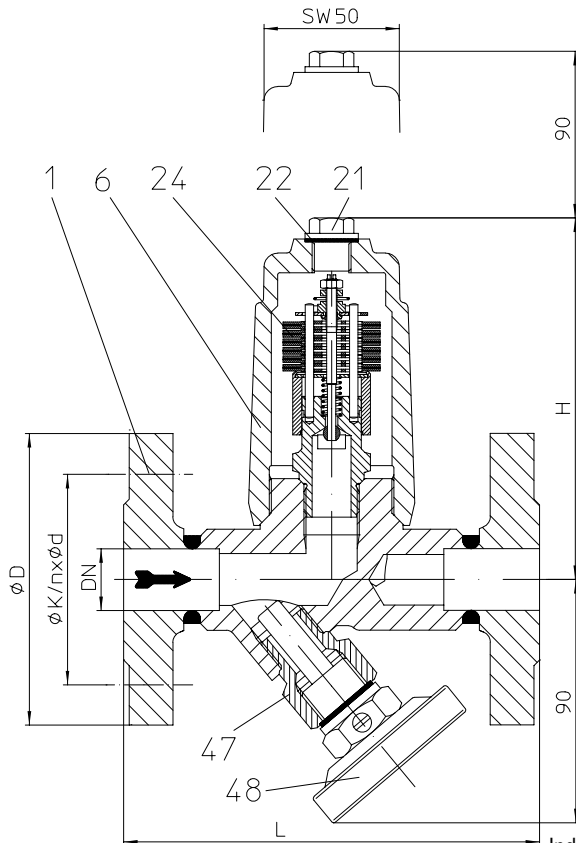
Liquid return temperature limiter made of forged steel


Fig. 650....1 with flanges


 Fig. 650....1 with flanges
 Option: with thermometer insert

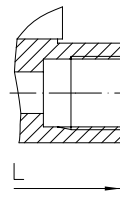
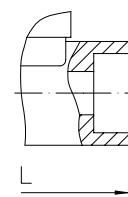
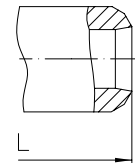
 Indicating range:
 0°C up to 160°C

Return liquid temperature limiter is applied for the return of hot water or other suitable liquids in heating systems. Temperature guided but operating from the pressure, it is providing a consumption oriented supply of hot water to heating systems. Energy saving by using reduced flow return temperatures.

- With corrosion- and waterhammer resistant bimetallic controller
- The controller has a stroke-limitation at 130 °C thus even in case of an incorrect setting the function is performed
- Scope range of closing temperature from: 60 - 130 °C
- The exchange of the controller is possible without disturbing the pipe connections
- Optimized design for quick installation
- Service advantage thanks to screw cap without sealing
- Installation: horizontal installation position is preferred
inclined installation position of the screw cap is possible
- Option: - with thermometer insert (Pos. 47 and 48)

Fig. 45.650 PN25/40 - C22.8	Operating limits
Operating pressure PS (bar-g)	22
Operating temperature TS (°C)	180
Differenzdruck ΔP (bar):	6

Types of connection		
Flanges ....1	DIN PN25 ANSI 150 RF	DIN PN40 ANSI 300 RF
Screwed sockets ....2	R- and NPT-thread	
Socket weld ends ....3		
Butt weld ends ....4		
Other types of connection on request.		


 Fig. 650....2
 with screwed sockets

 Fig. 650....3
 with socket weld ends

 Fig. 650....4
 with butt weld ends

Dimensions and weights		Types of connection								
		Flanges			Screwed sockets Socket weld ends			Butt weld ends		
Nominal diameters	mm	15	20	25	15	20	25	15	20	25
		inch	1/2	3/4	1	1/2	3/4	1	1/2	3/4	1
Dimensions (mm)	L	150	150	160	95	95	95	250	250	250
	H	130	130	130	130	130	135	130	130	130
Weight approximate (kg)		3,4	4,0	4,4	2,1	2,0	2,5	2,6	2,7	2,8

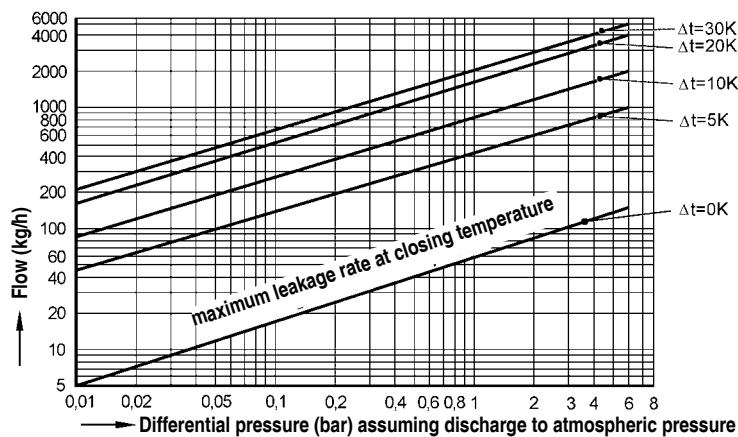
* other face-to-face dimensions on request

Standard-flange dimensions refer to page 17

Parts

Pos.	Description	Material (Material-No.)	
		DIN	comparable with ASTM / AISI
1	Body	C22.8; 1.0460	SA 105
6	Screw cap	C22.8, 1.0460	SA 105
21	Plug	C35E, 1.1181	1035 / 1038
22	Sealing ring for plug *	R-Cu99	
24	Controller *	corrosion resistant bimetal TB 102 / 85	
47	Thermometer adapter*	X14CrMoS17+QT, 1.4104+QT	AISI 430 F
48	Thermometer display	X6CrNiMoTi17-12-2, 1.4571	AISI 316 TI

* Spare parts

Capacity chart

Capacity chart

The diagram shows the maximum flow quantity of water at factory setting (90°C).

The water-temperature determines the degree of opening of the controller. The lower temperature of the water the higher the flow quantity.

Change of the factory setting

The procedure for the change of the setting can be found in the operating instructions.

Selection criteria:

- Closing pressure
- Operating pressure
- Back pressure / differential pressure
- Flow quantity
- Upstream temperature
- Required closing temperature
- Nominal diameter / nominal pressure
- Type of connection
- Material

Example for order data:

Return temperature limitation for a pipe tracing system.
Inlet pressure 4 bar (g), closing temperature 90 °C, flange connection, PN40, DN15, C22.8, face-to-face dimension 150 mm.

=> **Liquid return temperature limiter,
BR 650, PN40, DN15, C22.8, face-to-face dimension 150 mm,
T=90°C, flange connection**

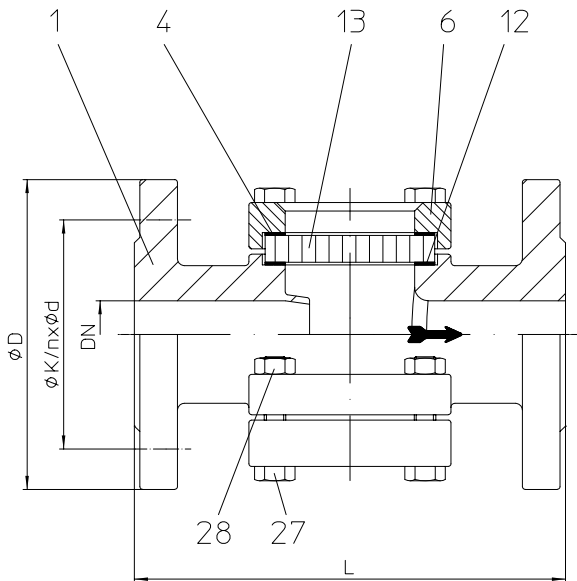
Double window sight glasses made of cast iron, cast steel, stainless steel


Fig 660....1 with flanges

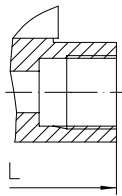


Fig. 660 / 661....2 with screwed sockets

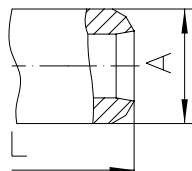


Fig. 660 / 661....4 with butt weld ends

- Double window sight glasses in straight through
- Sight glasses provide visual indication of the flow through pipe works and monitoring of the system.
- In connection with steam traps they will allow the monitoring of the function of steam traps
- **Sight glasses with reinforced windows in acc. to DIN 3237 are available (BR 661)**
- Installation in any position. In connection with the steam trap the sight glass has to be installed in front of it.

Fig. 12.660 / 32.660 / 52.660 PN16 - GG-25, 1.0619+N, 1.4408	Operating limits
Operating pressure PS (bar-g)	16
Operating temperature TS (°C)	300 (borosilicate glass)
max. PH-Wert:	9-10

Fig. 35.660 / 55.660 PN40 - 1.0619+N, 1.4408	Operating limits
Operating pressure PS (bar-g)	40
Operating temperature TS (°C)	300 (borosilicate glass)
max. pH-value:	9-10

Type of connection	PN16	PN40
Flanges ....1	DIN PN16 ANSI 150 RF	DIN PN40 (acc.to DIN 3237)
Screwed sockets ....2	G- and NPT- thread	G- and NPT- thread
Butt weld ends ....4	--	DIN EN 12627 DN 40-50 deviates (refer to table *)

Dimen- sions and weights		Types of connection PN16							Types of connection PN40								
		Flanges			Screwed sockets				Flanges			Screwed sockets			Butt weld ends ¹⁾		
Nominal diameters		L	D	Weight approx.	LGG-25	L	SW	Weight approx.	L	D	Weight approx.	L	SW	Weight approx.	L	A	Weight approx.
mm	inch	mm	mm	kg	mm	mm	mm	kg	mm	mm	kg	mm	mm	kg	mm	mm	kg
	1/4	--	--	--	100	100	42	2,2	--	--	--	100	42	2,2	--	--	--
10	3/8	--	--	--	100	100	42	2,2	--	--	--	100	42	2,2	130	20	2,2
15	1/2	130	95	4,1	100	100	42	2,2	130	95	3,9	100	42	2,2	130	24	2,2
20	3/4	150	105	4,2	120	100	42	2,2	150	105	4,2	100	42	2,2	150	28	2,2
25	1	160	115	4,2	120	130	60	4,0	160	115	6,5	130	60	4,0	160	37	4,0
32	1 1/4	180	140	8,1	150	130	60	4,0	180	140	8,1	130	60	4,0	180	42	4,0
40	1 1/2	200	150	8,5	150	150	65	4,6	200	150	11,5	150	65	4,6	200	54 *	4,6
50	2	230	165	11,5	180	230	80	7,6	230	165	14,9	230	80	7,6	230	67 *	7,6
65		290	185	23,0	--	--	--	--	290	185	23,0	--	--	--	--	--	--
80		310	200	23,5	--	--	--	--	310	200	31,0	--	--	--	--	--	--
100		350	220	36,0	--	--	--	--	350	235	40,0	--	--	--	--	--	--
125		400	250	47,0	--	--	--	--	--	--	--	--	--	--	--	--	--

Larger sizes on request

¹⁾ not in GG

Standard-flange dimensions refer to page 17

Parts

Pos.	Description	Material, Material-No.		
		DIN	DIN	DIN
1	Body	GG-25, 0.6025	1.0619+N, 1.0619.01	GX5CrNiMo19-11-2, 1.4408
4	Gasket (top flange / window) *	Pure graphite	Pure graphite	
6	Top flange	GG-25, 0.6025	1.0619+N, 1.0619.01	GX5CrNiMo19-11-2, 1.4408
12	Gasket (window / body) *	Pure graphite	Pure graphite	
13	Window *	borosilicate glass DIN 7080 max. 300°C	borosilicate glass DIN 7080 max. 300°C	
27	Hexagon screws	5	5	A4-70
28	Hexagon nuts	4.6	5.6 zinc-plated	A4-70

* Spare part

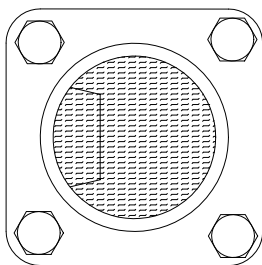
Flow conditions through a sight glass installed in front of a steam trap


Figure 1: Back pressure of condensate

On a back pressure of condensate the interior space will be filled with liquid.

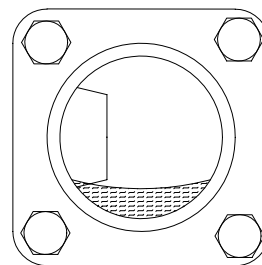


Figure 2: Steam flow

On steam flow the liquid level is lowered below the edge of the inlet pipe. Intensive mixture of water and steam can lead to an intensive bubbling.

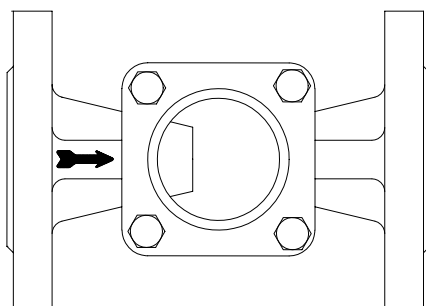


Figure 3: Tetragonal top flange (< DN 65)

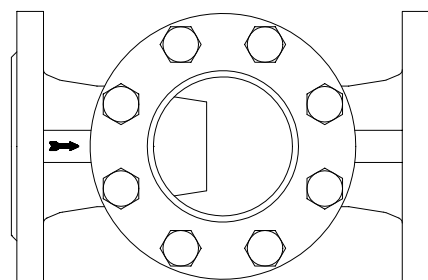


Figure 4: Circular top flange (DN65-100)

Selection criteria:

- Operating pressure
- Operating temperature
- Nominal diameter / nominal pressure
- Type of connection
- Body material

Example for order data:

For monitoring the function of steam traps in pipe work systems, PS= 22 bar, TS = 250 °C, screwed socket G 1/2, body of stainless steel, window borosilicate glass DIN 7080-16.

=> **Double window sight glass, BR 660, G 1/2, stainless steel, borosilicate glass DIN 7080-16, face-to-face dimension 100 mm, screwed sockets**

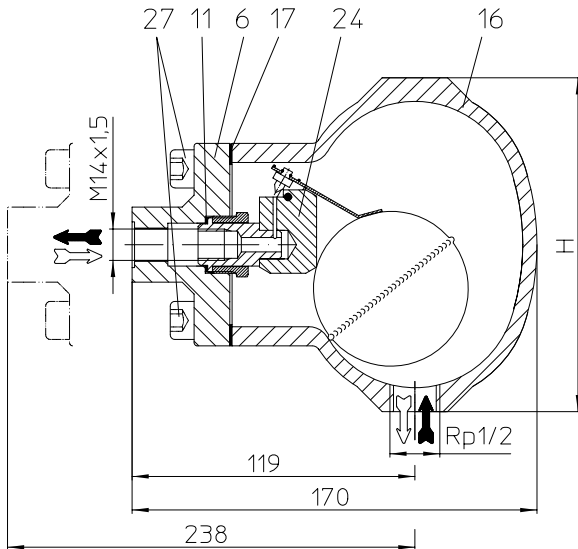
Automatic air vent made of forged steel, stainless steel


Fig. 656....2 (PN16) with screwed sockets

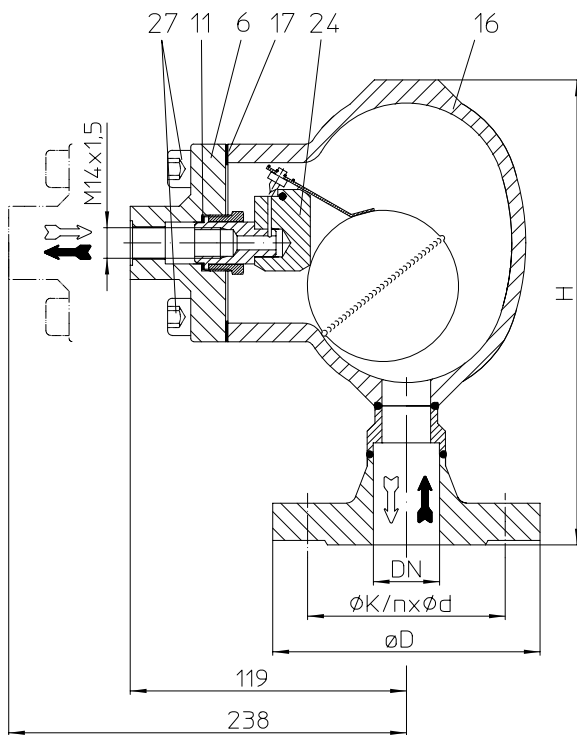


Fig. 656....1 with flanges

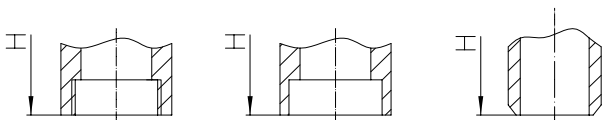


Fig. 656....2 (PN 25) with screwed sockets

Fig. 656....3 with socket weld ends

Fig. 656....4 with butt weld ends

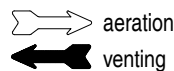
- Automatic air vents for liquid systems
- **Installation:** - above the point being vented
- inlet always at the bottom
- Hood with flanged cover
- The exchange of the controller is possible without disturbing the pipe connections
- **Option:** - Drip pipe (Pos. 54) with Union M14x1,5 for Pipe-Ø 8 mm (Pos. 53)

Fig. 22.656 PN16 - GGG-40.3	Operating limits
Operating pressure PS (bar-g)	14
Operating temperature TS (°C)	300
allowable diff. press. ΔPMX (bar): for controller:	14 R14

Fig. 34.656 PN25 - 1.0619+NN	Operating limits
Operating pressure PS (bar-g)	21
Operating temperature TS (°C)	225
allowable diff. press. ΔPMX (bar): for controller:	21 R21

Fig. 54.656 PN25 - 1.4308	Operating limits
Operating pressure PS (bar-g)	21
Operating temperature TS (°C)	300
allowable diff. press. ΔPMX (bar): for controller:	21 R21

Types of connection	
Inlet:	
Flanges ....1	DIN PN25 ANSI 150 RF
Screwed sockets ....2	R- and NPT-thread (at PN16 - GGG-40.3 only Rp 1/2")
Socket weld ends ....3	
Butt weld ends ....4	
Outlet:	
M14 x 1,5 DIN13	
Other types of connection on request.	



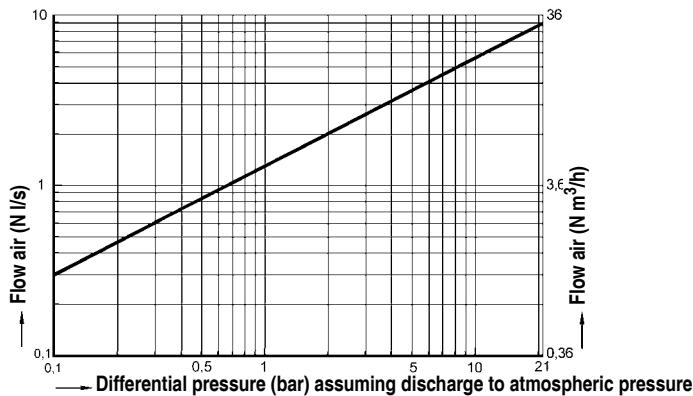
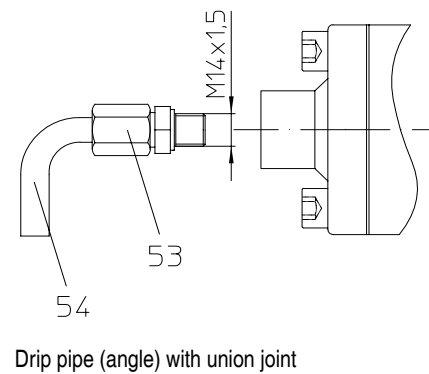
Dimensions and weights		Types of connection								
		Flanges			Screwed sockets ¹⁾ Socket weld ends ²⁾			Butt weld ends ²⁾		
Nominal diameters	mm inch	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1	15 1/2	20 3/4	25 1
Dimensions (mm)	H	196	197	200	140 ¹⁾ 175	175	186	175	175	186
Weight approximate (kg)		4,8	5,3	5,6	4,3	4,4	4,4	4,3	4,4	4,4

¹⁾ Screwed sockets: L = 140 ²⁾ not in GGG-40.3 Standard-flange dimension refer to page 15

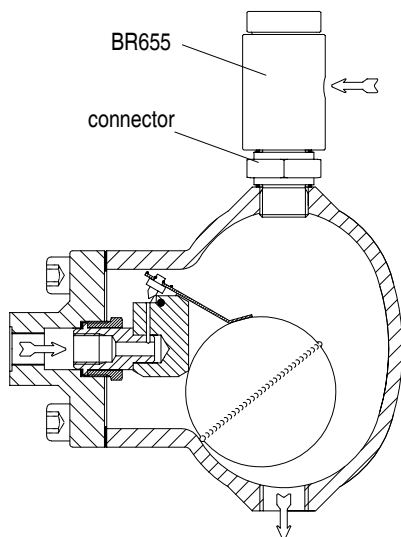
Parts

Pos.	Description	Material (Material-No.)					
		DIN	comparable with ASTM / AISI	DIN	comparable with ASTM / AISI	DIN	comparable with ASTM / AISI
6	Body	C22.8, 1.0460	SA 105	C22.8, 1.0460	SA 105	X6CrNiTi18-10, 1.4541	SA 182 F321
11	Sealing ring (body / seat) *	R-Cu99		R-Cu99		X6CrNiTi18-10, 1.4541	SA 182 F 321
16	Hood	GGG-40.3, 0.7043	SA 395	1.0619+N, 1.0619.01	SA 216 WCB	GX5CrNi19-10, 1.4308	SA 351 CF-8
17	Gasket (body / hood) *	CrNi laminated both sides with pure graphite		CrNi laminated both sides with pure graphite		CrNi laminated both sides with pure graphite	
24	Controller *	X5CrNi18-10, 1.4301	SA 240 Gr.304	X5CrNi18-10, 1.4301	SA 240 Gr.304	X5CrNi18-10, 1.4301	SA 240 Gr.304
27	Cheese head screws	X6CrNiTi18-10, 1.4541	SA 182 F321 ¹⁾	X6CrNiTi18-10, 1.4541	SA 182 F321 ¹⁾	X6CrNiTi18-10, 1.4541	SA 182 F321 ¹⁾
53	Union joint for drip pipe	X8CrNiS18-9, 1.4305	AISI 303 ¹⁾	X8CrNiS18-9, 1.4305	AISI 303 ¹⁾	X8CrNiS18-9, 1.4305	AISI 303 ¹⁾
54	Drip pipe	X6CrNiMoTi17-12-2, 1.4571	AISI 316 Ti	X6CrNiMoTi17-12-2, 1.4571	AISI 316 Ti	X6CrNiMoTi17-12-2, 1.4571	AISI 316 Ti

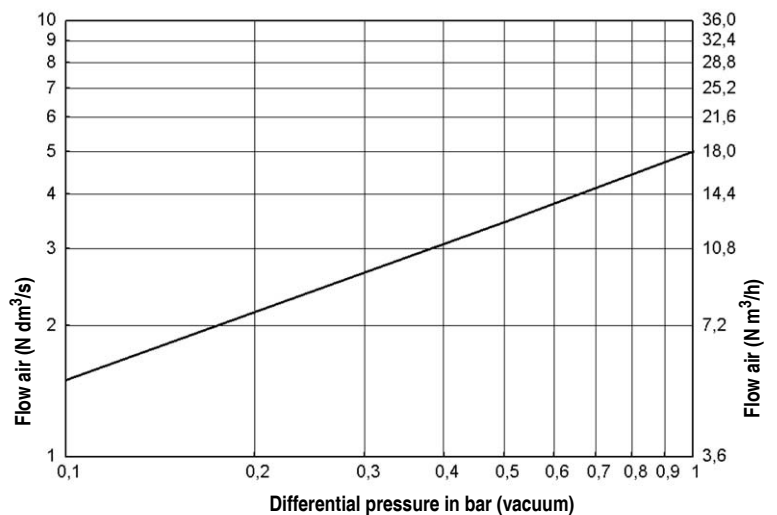
* Spare parts ¹⁾ with metric screw-thread

Capacity chart

Option

Capacity chart

The diagram shows the maximum discharge of air at standard conditions for the controllers R14 and R 21.

For higher performance with mounted vacuum breaker (BR655)


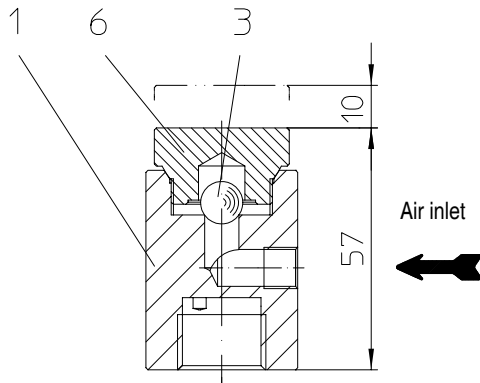
with connector and vacuumbreaker (BR655)


Capacity chart

The diagram shows the maximum discharge of air at standard conditions for the controllers R14 and R 21 with mounted vacuumbreaker.

Vacuum breaker made of stainless steel

- Ventilation valve for pipelines, condensing vapour (steam) or liquid systems, where the system pressure should not fall below the atmospheric pressure.
- Vertical position, cap on top.
- System connection downwards.



System connection

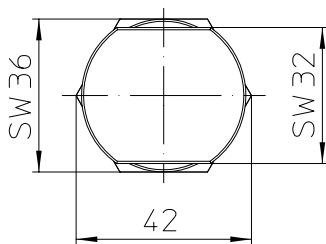


Fig. 55.655 PN40 - 1.4301	Operating limits	
Operating pressure PS (bar-g)	13	21
Operating temperature TS (°C)	400	220

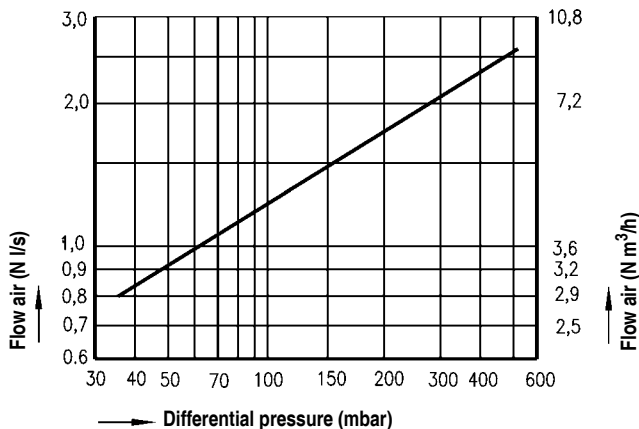
Types of connection	
System connection ....2	Rp 1/2 DIN 2999
Air inlet	Rp 1/8 DIN 2999
A dropping line can be connected. The line has to be led to an outlet.	

Technical data	
Weight:	0,38 kg
Opening pressure:	7 mbar
Kvs-value:	0,55 m ³ /h

Parts

Pos.	Description	Material (Material-No.)	
		DIN	comparable with ASTM / AISI
1	Body	X5CrNi18-10, 1.4301	SA 240 Gr.304
3	Ball	X20Cr13+QT, 1.4021+QT	AISI 420
6	Cap	X17CrNi16-2, 1.4057	AISI 431

Fig. 655....2 with screwed sockets


Capacity chart

The capacity chart shows the volume flow of air at standard condition.

„Sonacon“

Steam trap testing device



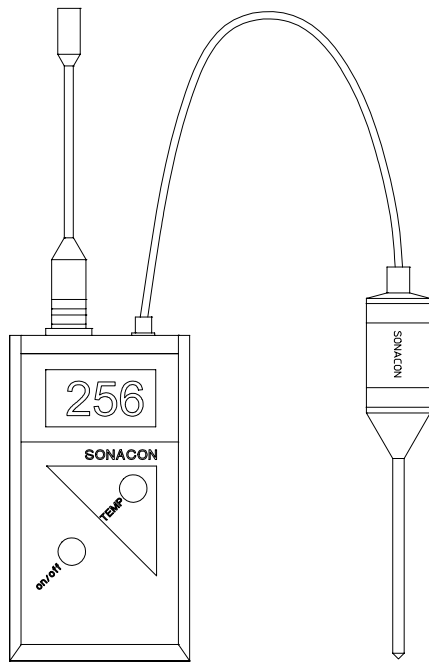
Digital monitoring for your safety...

- Precise indication of live steam loss and defective traps.
- Steam trap function indicator.
- Ultrasonic level measurement as indicator of steam loss.
- Integrated temperature measurement (condensate/steam).
- User-friendly, fast, simple operation (sensor easy to set up).

Accurate, reliable, easy to use

Technical data for „Sonacon“ refer to page 14 and 15.

Steam trap testing through ultrasonic measurement



- Evaluation of steam traps in steam systems up to 250 bar.
- Minimizing of steam losses by preventive maintenance and functional testing.

The measurement by ultrasonics on steam traps has proven to be the best measurement principle.

Sonacon is testing the correct operation of the steam trap and it enables to evaluate steam losses passing the steam trap.

Ultrasonics from the steam trap is measured and its intensity is digitally displayed.

An additional temperature measurement enhances the validity of the testing result.

Due to a short measuring duration the result is available in a few seconds.

Technical data

Sonacon
Not permitted for the application in hazardous areas
Measuring range of ultrasonics at a frequency of about 40 kHz
Surface temperature measuring up to max. 350 °C with short measuring duration due to NiCr-Ni probe
Digital reading (LCD) and switchover from ultrasonics to temperature measurement by key pad
No display illumination
Automatic power switch off after 5 min.
Battery operation time for about 100 working hours
Automatic indication if the battery has to be replaced
Dimensions [mm]: 152 x 83 x 34
Weight approximate 0,5 kg
Housing of ABS – enclosure IP 41
Scope of supply
Sonacon steam trap testing device with digital display for readings of intensity of ultrasonic sound and temperature
9V battery
Ultrasonic probe with stainless steel point and helix cable
Temperature probe for surface measurement with screwed plug and socket connection. (On request with handle and 1m length extension of the probe with temperature resistant silicone cable)
On request leather-bag with shoulder strap and pockets for the probes

Short instruction Sonacon

Ultrasonic measurement

Lightly put the point of the probe to the trap housing and wait for between 10 and 20 seconds. Should you find that the measured value oscillates between a maximum and minimum value this indicates the steam trap is operating in a cyclic fashion.

If the figures are constant and lay beneath the curve (refer to next page) then the steam trap is operating correctly.

If the measured figures lay on or above the curve this indicates a possible flow of condensate or steam.

Additional measurement with the temperature sensor is required to determine operating criteria.

Temperature measurement

If the operation pressure of the plant is known, the operating temperature of the steam trap can be measured. This enables a comparison with the saturation temperature of the steam at that pressure to determine the temperature in the steam trap.

To determine the true operating temperature, losses through the body must be considered::

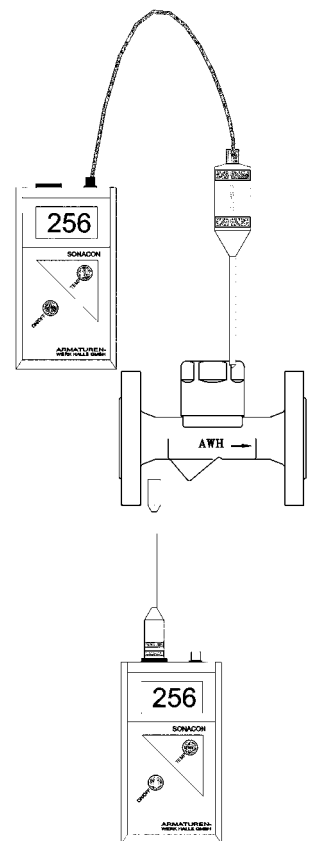
$$T(\text{operating}) = T(\text{measured}) \times 1,1$$

If the calculated operating temperature is equal to the saturation temperature of the steam it is likely that live steam is passing. In the case of float-ball steam traps the unit could be at the point of discharge.

If the calculated operating temperature is $< T_s - 5 \dots 10 \text{ K}$ below saturation temperature condensate is present in the trap.

If the operation pressure of the system is not known, temperature measurement should be taken upstream from the steam trap where live steam is known to exist. This enables a comparison between the system temperature and the operating temperature of the steam trap.

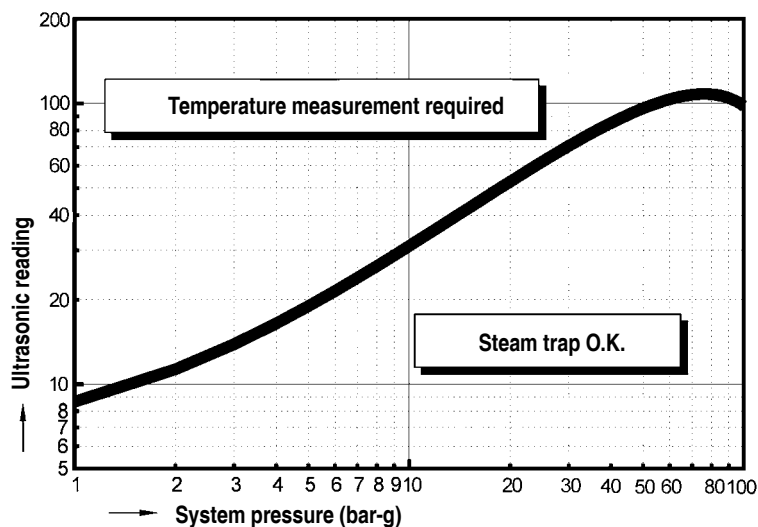
Steam saturation guidelines (values from steam curve)									
Operating pressure (bar-g)	0	1	2	3	4	5	6	8	10
Saturation temperature (°C)	100	120	133	144	151	159	165	175	184
Operating pressure (bar-g)	13	16	20	24	28	32	40	50	
Saturation temperature (°C)	194	204	214	223	231	238	250	264	
Operating pressure (bar-g)	60	80	100	120	150				
Saturation temperature (°C)	275	294	310	323	341				



Limit curve

This diagram indicates the operation condition of the steam trap from ultrasonic testing.

Results on or above the line require additional temperature measurements.



Due to the broad range of steam traps available and the application within the plant the operating validity has to be determined by the operator.

Flanges according to DIN 2501

Screwed sockets according to data sheet resp. customer request

Socket weld ends according to DIN EN 12760 (previous DIN 3239 T2) resp. customer request

Butt weld ends according to DIN EN 12627 (previous DIN 3239 T1)

Union with butt weld ends according to data sheet resp. customer request

Face-to-face acc. to data sheet resp. customer request

Informations about pipe welding of steam traps

Welding groove acc. to DIN 2559

The body materials of our steam traps which are for welding into the pipe are as following:	1.0619.01	1.0619+N acc.to DIN EN 10213-1-2 / SA 216 WCB
	1.0460	C 22.8 acc.to DIN 17243 / SA 105
	1.0401	C 15 acc.to DIN 17210 / A 576 Grade 1020
	1.4408	G-X6CrNiMo 18-10 acc.to DIN EN 101213, DIN 17440 / SA 351 Cf8M

Due to our experience, we recommend to apply an electric welding process.

Because of the different material compositions and wall thickness of the steam traps and the pipe gas welding shall not be applied. Quenching cracks and coarse grain structure may develop.

On bimetallic steam traps face-to-face of 95 mm or less, the bimetallic controller has to be disassembled prior to welding. After the traps have cooled down to the ambient temperature the bimetallic controller shall be fitted again into the body.

Steam traps with socket-weld ends shall only be welded by arc welding (welding process 111 acc. to DIN EN 24063).

If during the time of warranty others than the manufacturer or by the manufacturer authorized persons are interfering in the product and/or the setting, the right of claim for warranty will lapse!

Allocation of types

BR	formerly designation of types	
665....	<i>different types of connection</i>	
645....	....1 Flanges	C....
647....	....2 Screwed sockets	A....
650....	....3 Socket weld ends	B....
655....	....4 Butt weld ends	B....
656....	....5 Union with butt weld ends	B....
660....		....D2/1 (AD2/1, BD2/1, CD2/1)
660....		....D2/2 (CD2/2)

Information / restriction of technical rules to be observed!

Operating instructions can be ordered on request by phone (+49 52 07) 994-0 or fax (+49 52 07) 994-158 or 159.

Dimensions in mm resp. inch
 Weights in kg
 1 bar $\hat{=}$ 10⁵ Pa $\hat{=}$ 0,1 MPa
 Kvs in m³/h
 1 bar $\hat{=}$ 14,5 PSI
 1 inch $\hat{=}$ 25,4 mm

Standard - flange dimensions (DIN)

DN	PN 16			PN 40		
	∅ D	∅ K	n x ∅ d	∅ D	∅ K	n x ∅ d
15	95	65	4 x 14	95	65	4 x 14
20	105	75	4 x 14	105	75	4 x 14
25	115	85	4 x 14	115	85	4 x 14
32	140	100	4 x 18	140	100	4 x 18
40	150	110	4 x 18	150	110	4 x 18
50	165	125	4 x 18	165	125	4 x 18
65	185	145	4 x 18	185	145	8 x 18
80	200	160	8 x 18	200	160	8 x 18
100	220	180	8 x 18	235	190	8 x 22
125	250	210	8 x 18	--	--	--

Standard - flange dimensions (ANSI)

DN		ANSI 150						ANSI 300					
		∅ D		∅ K		n x ∅ d		∅ D		∅ K		n x ∅ d	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
15	1/2	89	3,50	60	2,36	4x16	4x0,62	95	3,75	66,5	2,62	4x16	4x0,62
20	3/4	99	3,90	70	2,70	4x16	4x0,62	117	4,62	82,5	3,25	4x19	4x0,75
25	1	108	4,25	79	3,10	4x16	4x0,62	124	4,88	89	3,50	4x19	4x0,75
32	1 1/4	117	4,62	89	3,50	4x16	4x0,62	133	5,25	98,5	3,88	4x19	4x0,75
40	1 1/2	127	5,00	98	3,85	4x16	4x0,62	155	6,12	114	4,50	4x22	4x0,87
50	2	153	6,00	121	4,76	4x19	4x0,75	165	6,50	127	5,00	8x19	8x0,75

Steam traps according to ASTM

- Pressure bearing parts made of ASTM / AISI -materials
- Studs and nuts made of ASTM-materials, but metric screw thread
- Face-to-face acc. to data sheet resp. customer request
- Flanges acc. to ANSI
- Pressure tests acc. to API 598

