

GESTRA Steam Systems

MK 45 MK 45A



Installation Instructions 810348-06

Steam Traps
MK 45, MK 45A



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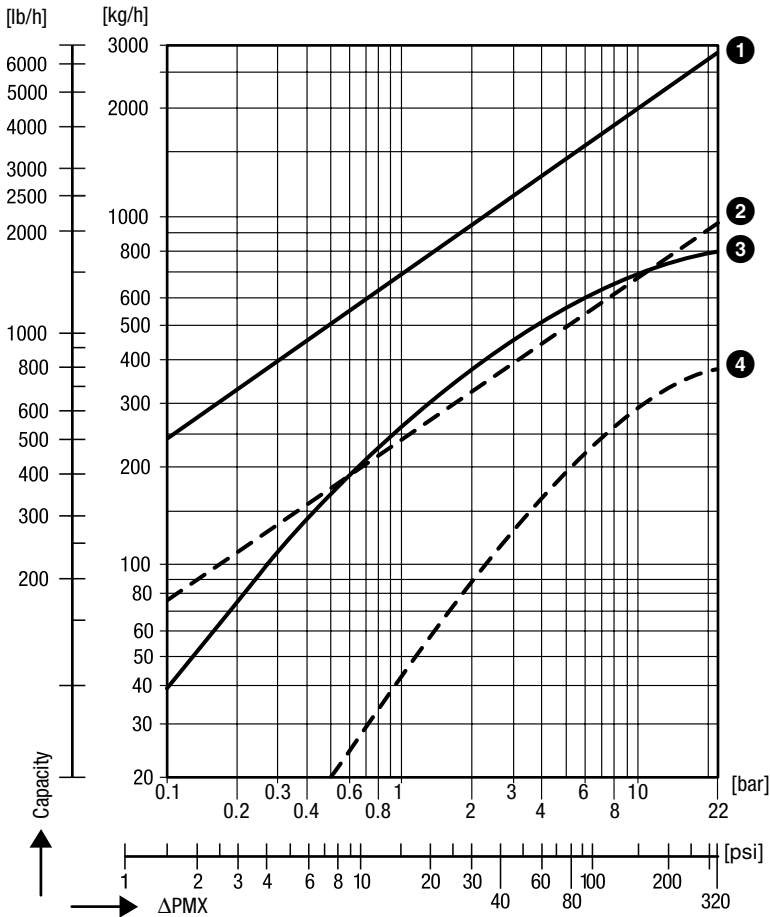
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Capacity Chart



- ① Max. flowrate of cold condensate for MK 45-2, MK 45 A-2.
- ② Max. flowrate of cold condensate for MK 45-1, MK 45 A-1.
- ③ Max. flowrate of hot condensate for MK 45-2, MK 45 A-2.
- ④ Max. flowrate of hot condensate for MK 45-1, MK 45 A-1.

Fig. 1

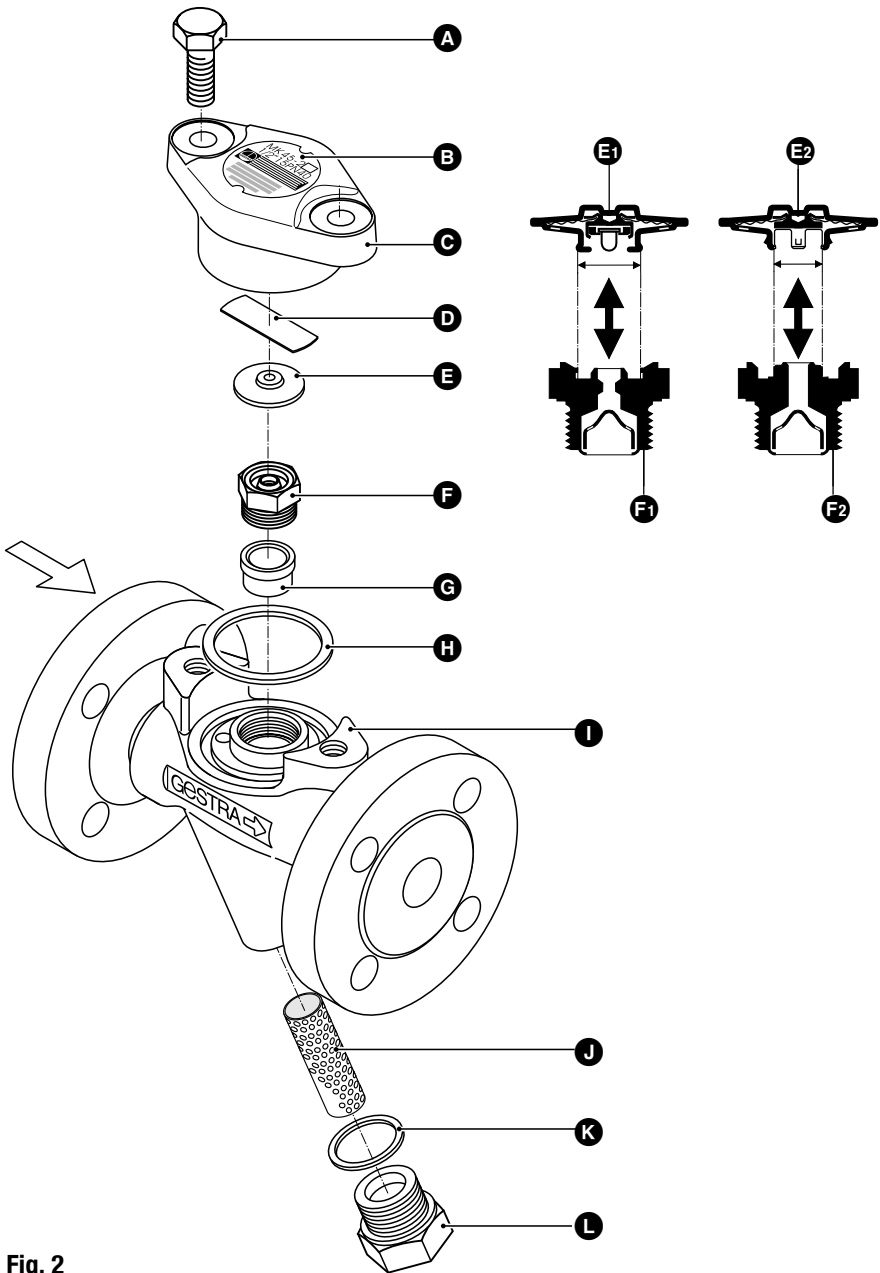
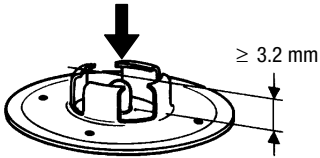


Fig. 2

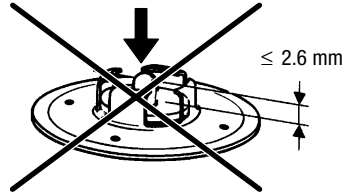
Checking of Capsule

Capsule **5** for nozzle insert with tandem seat **5 N 1, 5 U 1**

Capsule intact

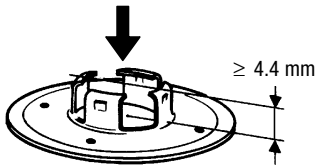


Capsule defective



Capsule **5** for nozzle insert with single seat **5 N 2, 5 U 2**

Capsule intact



Capsule defective

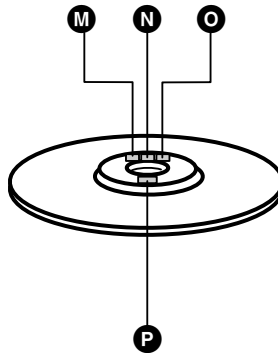
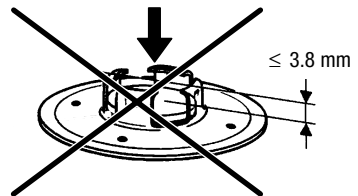


Fig. 3

Key

- A** Hexagon-head screw M 10 x 25
- B** Name plate
- C** Cover
- D** Spring
- E** Capsule
 - E1** Capsule for tandem seat
 - E2** Capsule for single seat
- F** Nozzle insert with non-return valve action
 - F1** Nozzle insert with tandem seat
 - F2** Nozzle insert with single seat
- G** Bush (interference-fitted, cannot be replaced)
- H** Gasket 40 x 48 x 2
- I** Body
- J** Strainer
- K** Plug gasket A 24 x 29
- L** Plug M 24 x 1.5

- M** Code number of pressure rating
5 = Δp 22 bar
- N** Code letter of opening temperature
N = Standard, Δt approx. 10 K
U = Undercooling, Δt approx. 30 K
- O** Code number of capacity
1 = Low capacity
2 = High capacity
- P** Manufacturing code number

Important Notes

Usage for the intended purpose

Use steam traps MK 45, MK 45A only for the discharge of condensed water or for air venting from steam spaces.

Use this equipment only for the discharge of condensate from steam lines within the specified pressure and temperature ratings and check corrosion resistance and chemical suitability for the application in question.

Safety Notes

Installation must only be performed by qualified staff.

Qualified staff are those persons who – through adequate training in engineering, the use and application of equipment in accordance with regulations concerning steam systems, and first aid & accident prevention – have achieved a recognised level of competence appropriate to the installation and commissioning of this device.



Danger

The steam trap is under pressure during operation.

When loosening flanged connections, plugs or the regulator, hot water and/or steam may escape. This presents the risk of severe scalding.

Installation and maintenance work should only be carried out when the system is depressurized: isolate the trap from both upstream and downstream pressure.

The trap becomes hot during operation.

This presents the danger of severe burns to hands and arms. Installation and maintenance work should only be carried out when the system is cold.

Sharp edges on internal parts present a danger of cuts to hands. Always wear industrial gloves for installation and maintenance work.

Conformity with EC Pressure Equipment Directive No. 97/23

The equipment has been checked and tested by us and is excluded from the scope of the Directive (Article 3, Section 3). The equipment is **not** entitled to bear the CE marking.

Explanatory Notes

Scope of Supply

MK 45

- 1 Steam trap MK 45
- 1 Installation manual

MK 45A

- 1 Steam trap MK 45A
- 1 Installation manual

Description

Thermostatic steam trap with corrosion-resistant thermostatic capsule unaffected by waterhammer. Integral Y-type strainer and non-return valve. Asbestos-free cover gasket (graphite/CrNi). Installation in any position.

The traps with standard capsule "N" discharge condensate with virtually no banking-up, the traps with special capsule "U" with an undercooling of approx. 30 K (degC).

■ **MK 45-1 with tandem seat (double sealing)**

Particularly suitable for low condensate flowrates.
Optionally either with standard capsule "5 N 1" or undercooling capsule "5 U 1".

■ **MK 45-2 with single seat**

For larger condensate flowrates.
Optionally either with standard capsule "5 N 2" or undercooling capsule "5 U 2".

■ **MK 45 A-1 with tandem seat (double sealing)**

Particularly suitable for low condensate flowrates.
Optionally either with standard capsule "5 N 1" or undercooling capsule "5 U 1".

■ **MK 45 A-2 with single seat**

For larger condensate flowrates.
Optionally either with standard capsule "5 N 2" or undercooling capsule "5 U 2".

Function

The MK 45... is a thermostatic steam trap with membrane regulator. The capsule is filled with a liquid which boils at a temperature a few degrees lower than water. As long as condensate flows through the steam trap the liquid in the capsule is completely condensed due to the low ambient temperature. The pressure inside the capsule is lower than the surrounding pressure (service pressure) and the membrane with the valve disc is pushed in the opening direction. As the condensate temperature approaches steam temperature, the liquid filling of the capsule starts to boil and evaporate. The pressure in the capsule rises and the membrane with the valve disc is moved in the closing direction.

Automatic air-venting is provided both, during start-up and during normal operation. The correct functioning of the MK 45 is neither affected by fluctuations in the upstream pressure nor by back pressure. The MK 45 can also be used for thermal air venting.

Explanatory Notes – continued –

Technical Data MK 45

Pressure / Temperature Ratings MK 45		PN 40				
p-T series		acc. to EN 1092-1, material group 3E0				
Material		1.0460 (P250GH [C22.8]) / ASTM A 105				
Size (DN)		15, 20, 25				
Connection		Flanges DIN PN 40, ASME Class 300				
Service pressure PMA	[bar g] [psi g]	40.0 580	30.2 436	25.8 370	24.0 348	23.1 335
Related temperature TMA	[°C] [°F]	-10 up to 50 14 up to 122	200 392	300 572	350 662	400 752

Pressure / Temperature Ratings MK 45		Class 150				
p-T series		acc. to ASME B16.34, Class 150, material group 1.1				
Material		1.0460 (P250GH [C22.8]) / ASTM A 105				
Size (DN)		15, 20, 25				
Connection		Flanges ASME Class 150				
Service pressure PMA	[bar g] [psi g]	19.7 287	14 203	10.2 148	8.4 121	5.6 81
Related temperature TMA	[°C] [°F]	20 68	200 392	300 572	350 662	425 797

Admissible differential pressure 1) 2)	
Max. differential pressure Δ PMX	22 bar g [320 psi g]

1) Observe pressure/temperature ratings!

2) **Inlet** pressure minus **outlet** pressure

Materials MK 45	EN	ASTM
Body	P250GH (1.0460)	A105
Cover	P250GH (1.0460)	A105
Body screws	42CrMo4 (1.7225)	A193B7
Thermostatic capsule	Hastelloy	
Other internals	stainless steel	
Body gasket	graphite / CrNi	

Explanatory Notes – continued –

Technical Data MK 45 A (Stainless Steel Design)

Pressure / Temperature Ratings MK 45A		PN 40				
p-T series		acc. to EN 1092-1 material group 13E0				
Material		1.4404 (X2CrNiMo 17 12 2) / ASTM A182-F316L				
Size (DN)		15, 20, 25				
Connection		Flanges DIN PN 40, ASME Class 300				
Service pressure PMA	[bar g] [psi g]	40.0 580	29.0 420.6	25.0 362.6	24.0 348	24.0 348
Related temperature TMA	[°C] [°F]	20 68	200 392	300 572	350 662	400 752

Pressure / Temperature Ratings MK 45A		Class 150				
p-T series		acc. to ASME B16.34, Class 150, material group 2.3				
Material		1.4404 (X2CrNiMo 17 12 2) / ASTM A182-F316L				
Size (DN)		15, 20, 25				
Connection		Flanges ASME Class 150				
Service pressure PMA	[bar g] [psi g]	15.9 230.6	11.1 161	9.7 140.6	8.4 121	5.6 81
Related temperature TMA	[°C] [°F]	20 68	200 392	300 572	350 662	425 797

Admissible differential pressure 1) 2)	
Max. differential pressure Δ PMX	22 bar g [320 psi g]

1) Observe pressure/temperature ratings!

2) **Inlet** pressure minus **outlet** pressure

Materials MK 45A	EN	ASTM
Body	1.4404 (X2CrNiMo 17 12 2)	A182-F316L
Cover	1.4404 (X2CrNiMo 17 12 2)	A182-F316L
Body screws	A2-70	A193B8
Thermostatic capsule	Hastelloy	
Other internals	stainless steel	
Body gasket	graphite / CrNi	

Name Plate MK 45

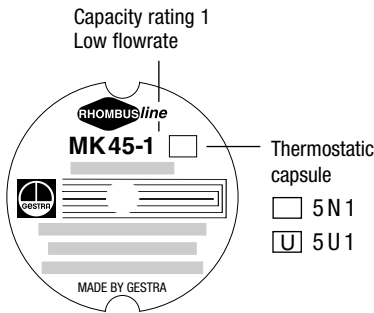


Fig. 4

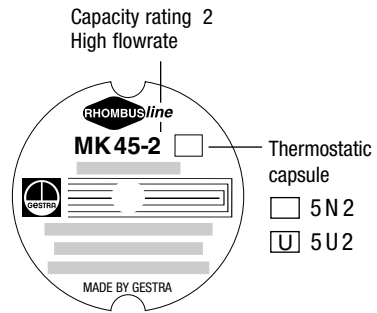


Fig. 5

Name Plate MK 45 A

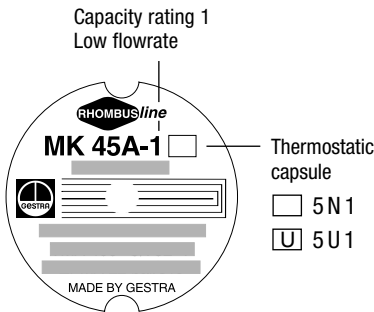


Fig. 6

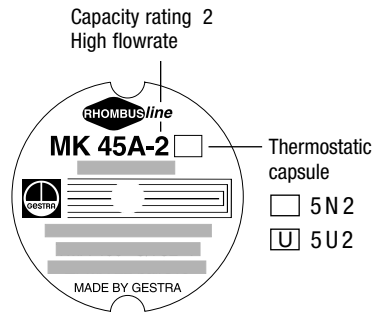



Fig. 7

Installation


MK 45, MK 45 A

The steam traps MK 45, MK 45 A can be installed in any position. In the case of a horizontal installation, make sure that the cover is at the top.


Flanged Traps

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for opening trap. When the trap is installed a minimum space of **30 mm** is required for removing cover .
4. Remove plastic plugs. They are only used as transit protection.
5. Clean seating surfaces of both flanges.
6. Install steam trap.

Screwed-Socket Traps


1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for opening trap. When the trap is installed a minimum space of **30 mm** is required for removing the cover .
4. Remove plastic plugs. They are only used as transit protection.
5. Clean thread of screwed sockets.
6. Install steam trap.

Socket-Weld Traps

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for opening trap. When the trap is installed a minimum space of **30 mm** is required for removing the cover .
4. Remove plastic plugs. They are only used as transit protection.
5. Clean thermostatic capsule as described under **Maintenance**.
6. Clean socket-weld ends.
7. Apply arc welding processes 111 and 141 in accordance with DIN EN 24053.

Installation – continued –

Butt-Weld Traps

1. Observe correct position of installation.
2. Observe direction of flow. The flow arrow is on the trap body.
3. Consider space required for opening trap. When the trap is installed a minimum space of **30 mm** is required for removing the cover .
4. Remove plastic plugs. They are only used as transit protection.
5. Clean thermostatic capsule as described under **Maintenance**.
6. Clean butt-weld ends.
7. Apply arc welding processes 111 and 141 in accordance with DIN EN 24053 or gas welding process 3 to DIN EN 24063.



Attention

- Only qualified welders certified e. g. according to DIN EN 287 may weld the steam trap into pressurized lines.
- Do **not** insulate steam trap.

Heat treatment of welds

A subsequent heat treatment of the welds is not required.

Maintenance

GESTRA steam trap MK 45... does not require any special maintenance. However, if used in new installations which have not been rinsed it may be necessary to check and clean the trap.

Check steam trap

You can check the steam trap MK 45... for steam loss during operation using the ultrasonic measuring unit VAPOPHONE® or the test unit TRAPtest®.

Should you detect any loss of live steam clean the trap and/or replace the capsule.

Clean / exchange capsule and nozzle insert

1. Observe note “Danger” on page 7.
2. Undo body screws **A**. Remove cover **C** from the body **I**.
3. Remove and clean capsule **E**. Unscrew nozzle insert **F**.
4. Replace capsule **E** in case of visible signs of wear or damage.
5. Clean body, internals and all gasket surfaces.
6. Apply heat-resistant lubricant to all threads and the seating surfaces of the nozzle insert and the cover (use for instance WINIX® 2150).
7. Screw in nozzle insert and tighten with a torque of **90 Nm**.
8. Position capsule **E** onto the nozzle insert **F** and press evenly, such that the capsule snaps into place.
9. Replace gasket **H** if there are visual signs of damage. Use the same cover **C**.
Always replace gasket **H** when using a new cover **C** or the cover of another steam trap.
10. Put cover onto the body. Tighten hexagon-head screws **A** alternately and in several steps to a torque of 25 Nm.

Tools

- Spanner A. F. 16 mm to DIN 3113, form B
- Spanner A. F. 22 mm to DIN 3113, form B
- Torque spanner 20 – 120 Nm to DIN ISO 6789

Clean / exchange strainer

1. Observe note “Danger” on page 7.
2. Unscrew sealing plug **L** and remove strainer **J**.
3. Clean strainer, sealing plug and gasket seats.
4. Exchange strainer and sealing in case of visible signs of wear or damage.
5. Exchange gasket **K** if damaged.
6. Apply heat-resistant lubricant to the thread of the sealing plug (use for instance WINIX® 2150).
7. Install sealing plug **L** with gasket **K** and strainer **J**. Tighten sealing plug with a torque of **120 Nm**.

Tools

- Spanner A. F. 30 mm to DIN 3113, form B
- Torque spanner 20 – 120 Nm to DIN ISO 6789

Torques

Item	Designation	Torque [Nm]
F	Nozzle insert	90
A	Body screws	25
L	Sealing plug	120

All torques are based at 20 °C room temperature.

Spare Parts

Spare Parts List

Item	Designation	Stock code	
		MK 45-1	MK 45-2
		MK 45A-1	MK 45A-2
E₁ F₁ H	Membrane regulator, complete 5N1	375 109	
	Membrane regulator, complete 5U1	375 111	
E₂ F₂ H	Membrane regulator, complete 5N2		375 110
	Membrane regulator, complete 5U2		375 112
K J L	Strainer set, complete	375 113	375 113
		375 382	375 382
E₁	Thermostatic capsule 5N1	376 165 ¹⁾	
	Thermostatic capsule 5U1	376 166 ¹⁾	
E₂	Thermostatic capsule 5N2		376 167 ¹⁾
	Thermostatic capsule 5U2		376 168 ¹⁾
H	Cover gasket ²⁾ 40 x 48 x 2, graphite	375 159	375 159
K	Plug gasket ²⁾ A 24 x 29, stainless steel	375 162	375 162

1) Packaged 10 per box. Contact your local dealer for smaller quantities.

2) Minimum purchasing quantity 50 pcs. Contact your local dealer for smaller quantities.



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