Water safety shut-off valve HON 790 790.20

For the preheater water circuit

OPERATING AND MAINTENANCE MANUAL/
SPARES

ISSUE 02/2026

Serving the Gas IndustryWorldwide

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1. General

Every person who is commissioned with the installation, operation or maintenance of the HON 790 safety shut-off valve is required to read the following documents completely and carefully in advance:

- **Technical Product Information 790.00 -** it contains technical data, dimensions and a description about structure and working methods.
- **General operating instructions for gas pressure regulators and safety devices -** this Honeywell brochure provides information about installation and operation, and contains general instructions for troubleshooting problems.
- **Operation and maintenance manual, spare parts 790.20 -** it contains further details on the installation and operation of the HON 790 safety shut-off valve.

Furthermore, for the planning and maintenance of gas pressure control systems, the corresponding **national regulations** (in Germany, see inter alia the DVGW worksheets G 600, G 491, G 495 and G 499).

The time intervals for monitoring and maintenance work are to a large extent dependent on the operating conditions. and the nature of the water. Rigid periods can therefore not be specified. For Germany, it is recommended to initially comply with the maintenance deadlines as specified in DVGW Worksheet G 495. For each system, the maintenance interval must then be determined itself in the medium term.

During maintenance work, the components must be cleaned and carefully checked. This is also necessary if irregularities in work behavior are detected during operation or during functional tests. The inspection must cover in particular seals and all moving parts and their bearings. Damaged parts and the O-rings removed during disassembly must be replaced by new ones.

You may not use any replacement parts or lubricants other than those expressly listed in this Honeywell Spare Parts Operation and Maintenance Manual. In the event that replacement parts and lubricants other than those expressly listed are used, Honeywell shall not be liable for any defects or consequential damages resulting from the use of unauthorized replacement parts or lubricants.

The item numbers specified in the special operating and maintenance instructions correspond to those in the spare parts drawings and spare parts lists.
It is recommended to keep the parts marked with a "W" in the spare parts drawings and spare parts lists ready for maintenance.
These parts are compiled on a separate sheet at the end of the spare parts lists.

1.1 Safety

Safety instructions are indicated by the following signal words or symbols

Marking	Used for:
⚠ Gefahr	Risk of personal injury
⚠ Achtung	Risk of property damage and environmental damage
Hinweis	Important additional information

2. Special operating instructions

To protect the boiler system, the HON 790 safety shut-off valve is installed in the supply and return flow of the hot water circuit. The basis for this is the DVGW worksheet G 499.

The following points must be observed in particular during installation (The numbers in the □ indicate the positions in Figure 1):

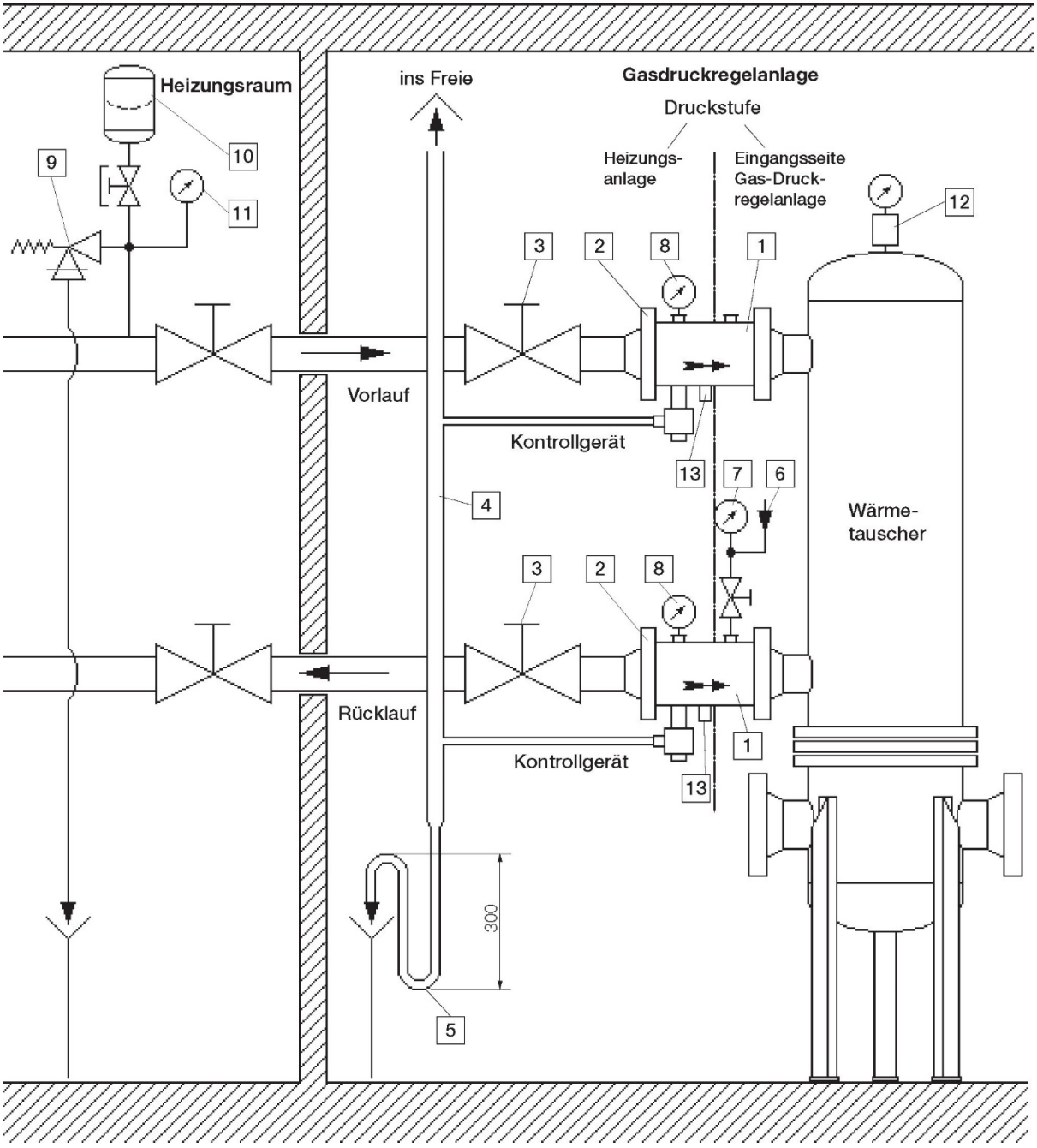


Figure 1: Construction of a natural gas preheating system

1 The arrows on the nameplate must point to the heat exchanger. The installation position is arbitrary up to DN 100, at DN 150 and DN 200 only vertically.

2 The flange on the heating side must be designed in the compression stage of the connection flange on the heat exchanger side (this is necessary because the SAV HON 790 is clamped between two external flanges).

3 The shut-off valves are required for functional testing; they are in the pressure stage of the heating unit be performed. The valves can be dispensed with if there are shut-off options in the boiler room.

4 The output of the Rp 3/4 control units must be connected to a combined outflow and collection line for gas and water. The header must be dimensioned as follows:

Response pressure of the HON 790	Pipeline
2.5 bar	R 3/4" (DN 20)
> 2.5 bar	R 1" (DN 25)

5 If the outflow and collection line is led outside, it must be protected against freezing. If the water collection pipe ends in the building, a syphon filled with water must be provided. It is intended to prevent gas from entering the installation room via the water drain in the event of damage. The height of the water column must be at least 300 mm with a length of the outflow pipe of 10 m.

6 During the functional test of the SAV's HON 790, the pressure in the heat exchanger must be raised. The lockable connection required for this purpose is only to be provided on one device. The connection thread in the device is G 1/4 (a plug screw is inserted in the delivery state).

7 The control manometer I is used to indicate the pressure applied during the test. The measuring range should be chosen so that the pressure can be raised by 5 bar to 10 bar above the response pressure of the HON 790. Since the pressure in the heat exchanger rises to the gas inlet pressure in the event of damage, a shut-off valve must be placed between the pressure gauge and the water circuit and remain closed during normal operation.

8 The control pressure gauges II are required for the functional test. The measuring range should be in line with the maximum permissible operating pressure *pmax* in the heating system. The connection thread in the device is G 1/4 (a plug screw is inserted in the delivery state). An SAV may have a pressure switch (see 2.3)

9 Safety valve response pressure see pressure graduation diagram

10 Determination of the size of the expansion vessel (see 2.5)

11 Pressure gauge with limit mark for maximum possible operating pressure in the water circuit (see 2.4)

12 In order to have a monitoring option even in the case of the smallest damage, either a floating switch or a pressure switch can also be provided.

13 All SAVs can optionally be equipped with an electrical remote transmission (position indicator). Isolation of long-distance transmission is generally not permitted. If the SAV is installed horizontally (permissible up to DN 100), the remote transmission must not be installed hanging downwards.

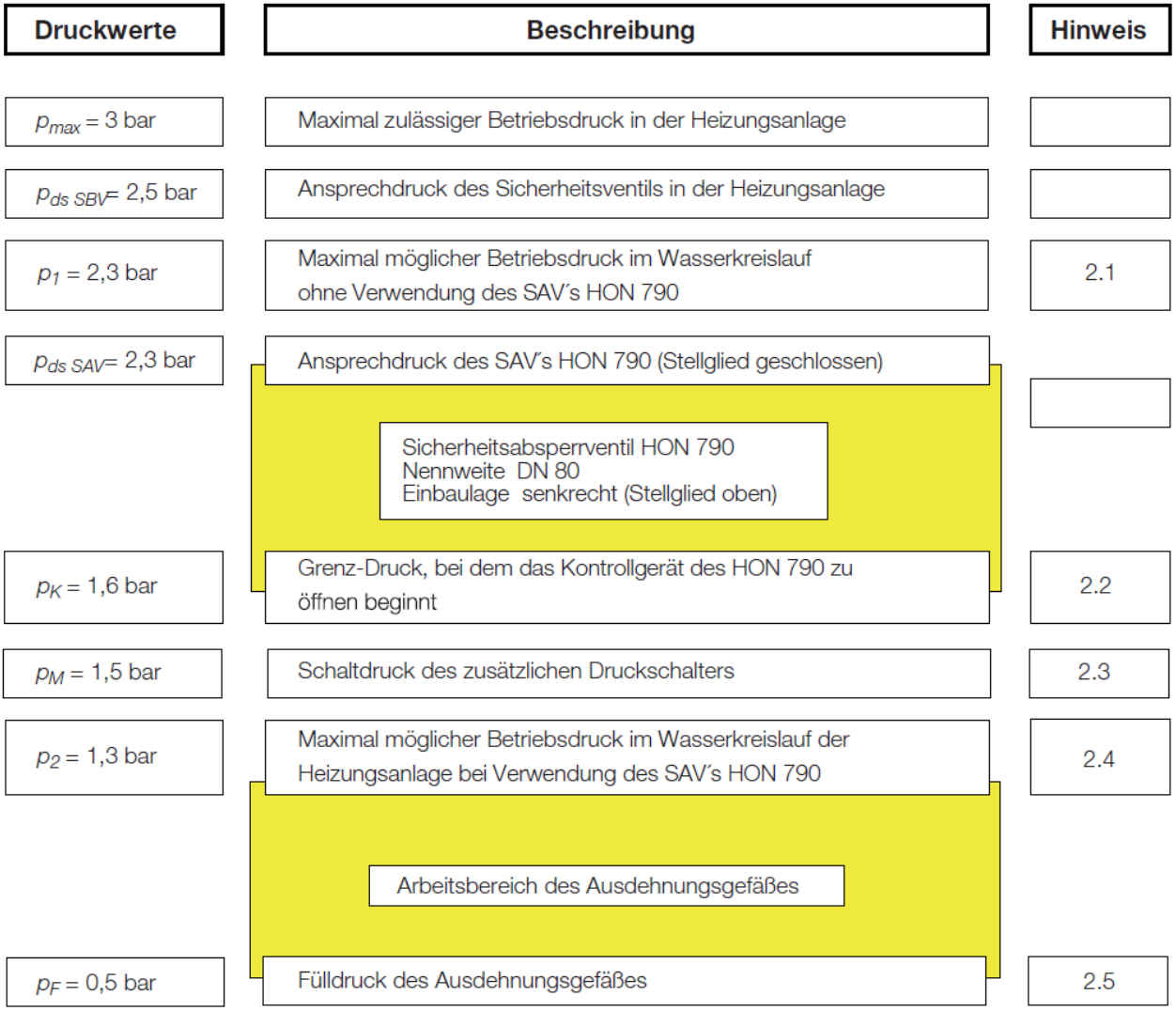


Image 2: Pressure graduation diagram (example) for a preheating system equipped with safety shut-off valves HON 790

Hinweis

2.1 The maximum possible operating pressure *p1* in the water circuit without the use of the HON 790 safety shut-off valves is required to determine the size of the expansion tank. This pressure is 0.1 bar to 0.2 bar below the pds $_{SBV}$ response pressure of the safety valve on the heating system.
(example above: *p1* = *pds* $_{SBV}$ - 0.2 bar = 2.3 bar).

2.2 The limit pressure *pK* to which the control device of the HON 790 is set depends on the desired response pressure *pds* $_{SAV}$ of the HON 790, on the nominal diameter of the actuator and its installation position.
Reference values for the limit pressure *pK* can be found in the following table.

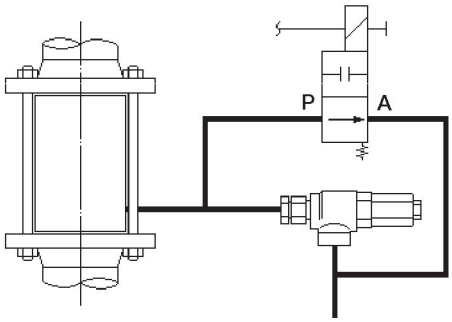
Limit pressure *pK* in bar to be set (approximate values)

Size	Installation position of the HON 790		
	vertical (top actuator)	vertical (actuator below)	horizontal
DN 25	*pds* - 0,3	*pds* - 0,4	*pds* - 0,35
DN 50	*pds* - 0,6	*pds* - 0,8	*pds* - 0,70
DN 80	*pds* - 0,7	*pds* - 1,0	*pds* - 0,85
DN 100	*pds* - 0,7	*pds* - 1,0	*pds* - 0,85
DN 150	*pds* - 0,7	*pds* - 1,0	pds - 0,85
DN 200	*pds* - 0,7	*pds* - 1,0	pds - 1,10

Example: HON 790, nominal diameter DN 80 in vertical installation position (top actuator)
pK = *pds* $_{SAV}$ - 0.7 bar = 2.3 bar - 0.7 bar = 1.6 bar

2.3 In order to have a monitoring option even in the case of minor damage, either a float switch or a pressure switch can also be provided.
A float switch is to be installed at the highest point in the heat exchanger. It is recommended to use a switch with two switching positions. The first switching position can be used for setting off an alarm and the second switching position for closing the SAVs via an additional solenoid valve arranged parallel to the control device, which opens in the process (see diagram below).

2/2 Wege-Magnetventil



2/2-way solenoid valve for hot water PN 16, DN 13, G 3/8 iEx-protected

electr. Connection	Execution	HON Part No.
24VDC	open without power	102278-rmk
230 VAC, 50 Hz	NO	102279-rmk
24 VDC	Closed without power	102280-rmk
230 VAC, 50 Hz	NC	102276-RMK

A pressure switch must be set so that the switching pressure is at least 0.2 bar above the maximum operating pressure in the water circuit and 0.1 bar to 0.2 bar below the limit pressure set on the HON 790 control device.

2.4 It is recommended that a second mark be placed on the pressure gauge of the heating system, in addition to the prescribed limit mark for the response pressure of the *pds SBV* safety valve , which indicates the maximum possible operating pressure *p2* in the water circuit of the heating system.

2.5 The use of the HON 790 safety shut-off valve restricts the maximum possible operating pressure in the water circuit of the heating system. This restriction must be taken into account by choosing a larger expansion tank.
The required volume of the expansion tank can be determined using the following formula:

$$V_2 = V_1 \times \frac{p_2 \times (p_1 - p_F)}{p_1 \times (p_2 - p_F)}$$

Using pressures as absolute values

In the formula, mean:

V_1 = required volume of the expansion tank
p_1 = maximum possible operating pressure
V_2 = required volume of the expansion tank
p_2 = maximum possible operating pressure
p_F = filling pressure of the expansion tank

without SAV HON 790

with SAV HON 790

Example page 6: The required volume increase is calculated as follows:

$$V_2 = V_1 \times \frac{2{,}3 \times (3{,}3 - 1{,}5)}{3{,}3 \times (2{,}3 - 1{,}5)} = 1{,}6 \times V_1$$

By installing the water drain barrier between the actuator and the control device, it is possible for the control device to be unscrewed for inspection or maintenance purposes without water loss.

Achtung

- If the control device is unscrewed, the function of the safety shut-off valve is no longer guaranteed.
- only the original connecting parts may be used between the recording device and the water drain barrier.

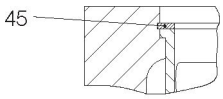
3. Special maintenance instructions

3.1 O-Ring im Valve Counter

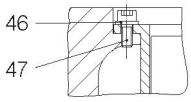
The following procedure is to be followed for the removal of the O-ring (14) - DN 25 to DN 150 / (101) - DN 200:

- DN 25 to DN 150 - PN 10/16 to Class 600
  - Pull out shielding lens (1)
  - Remove the cotter pin (13) and disc (12) from the guide piston (16), then remove the complete unit with valve disc (5)

- DN 50 to DN 100 - Class 900 and Class 1500
  - Remove retaining ring (45)
  - further work as above



- DN 150 - Class 900 and Class 1500
  - Remove Cap Bolts (47) with Washers (46)
  - further work as above



- DN 200 - all pressure levels
  - Remove countersunk screws (108)
  - Pull out the shielding disc (100) and then remove the complete unit with valve disc (109)

⚠ Achtung Shielding pane is under strong spring tension of compression spring (106)!

In the version with long-distance transmission, the long-distance transmission must be released by approx. 2 revolutions before reinstalling the valve disc unit and then readjusted.

3.2 Control panel

- DN 25 to DN 150 / DN 200 - short-term disassembly of the actuator
  - Unscrew the screw connection (33 / 127) with the complete control device from the housing for water drain barrier (19 /113)
  - Valve in water drain barrier closes, no water leakage from the SAV possible afterwards; maintenance work can now be carried out on the recording device

- DN 25 to DN150 / DN200 - Inspection of important functional parts
  - Valve closure (26 / 121) for easy movement
  - Sealing washer (35 / 131) for contamination and damage to the sealing surface

3.3 Setting Remote Electrical Transmission (Position Indicator)

DN 25 to DN 150 / DN 200 with remote electrical transmission as an option
- SAV must be in open position
- Loosen nuts on proximity initiator (59 / 149)
- Screw the proximity sensor in the housing (55 or 60 / 143 or 150) to the gear rod (54 or 61 / 148 or 151) up to the stop
- then turn the proximity sensor 150° (< 1/2 revolution) in the housing back to the distance dimension x ~ 0.4 mm
- To secure the position of the initiator, screw nuts back against the housing (55 or 60 / 143 or 150)

3.4 Screw tightening torques *MA*

Part.-No.	Tightening torque *MA* in Nm
47	6
108	6

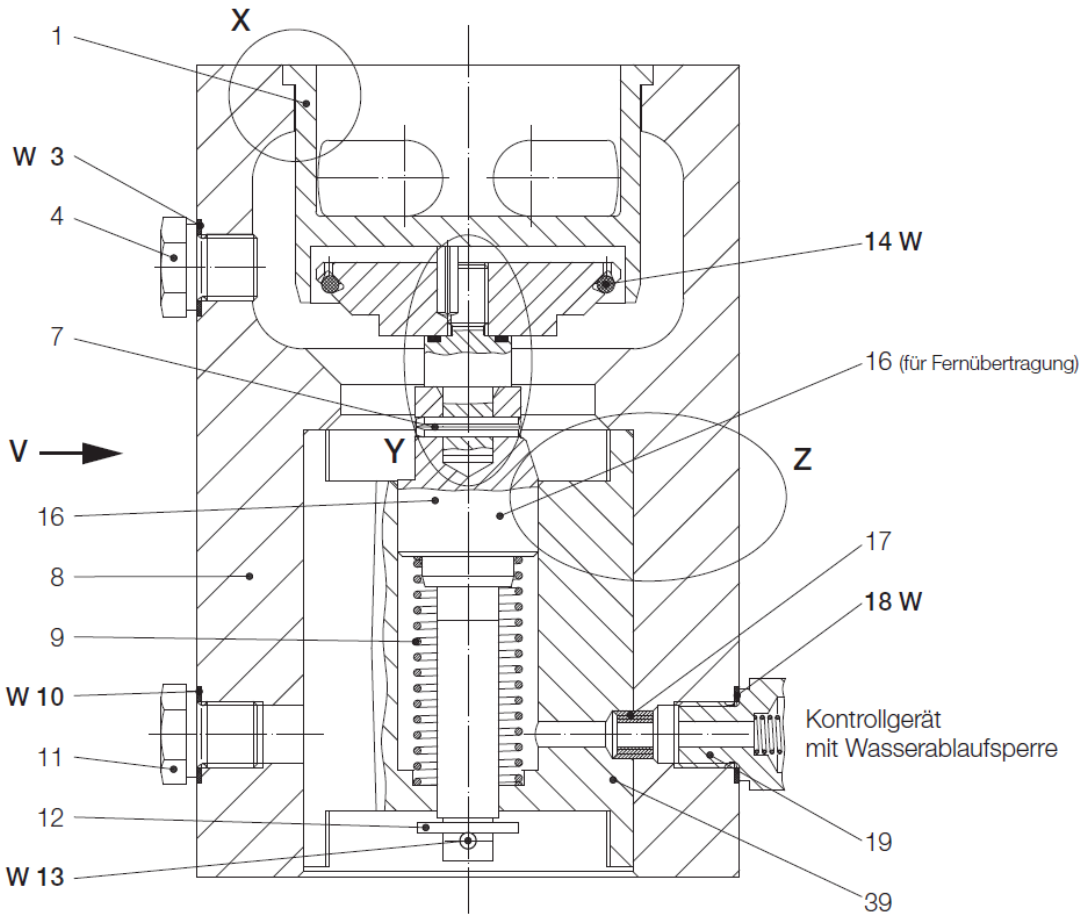
3.5 Lubricants

Devices		Lubricant	HON Part No.
all O-rings, all sliding surfaces		Silicone grease (apply thinly)	27081
DN 25 to DN 150	All fastening screws and screw connections	Silicone grease	27081
DN 200	All screw connections	Klüberalfa YV 93-302	28211

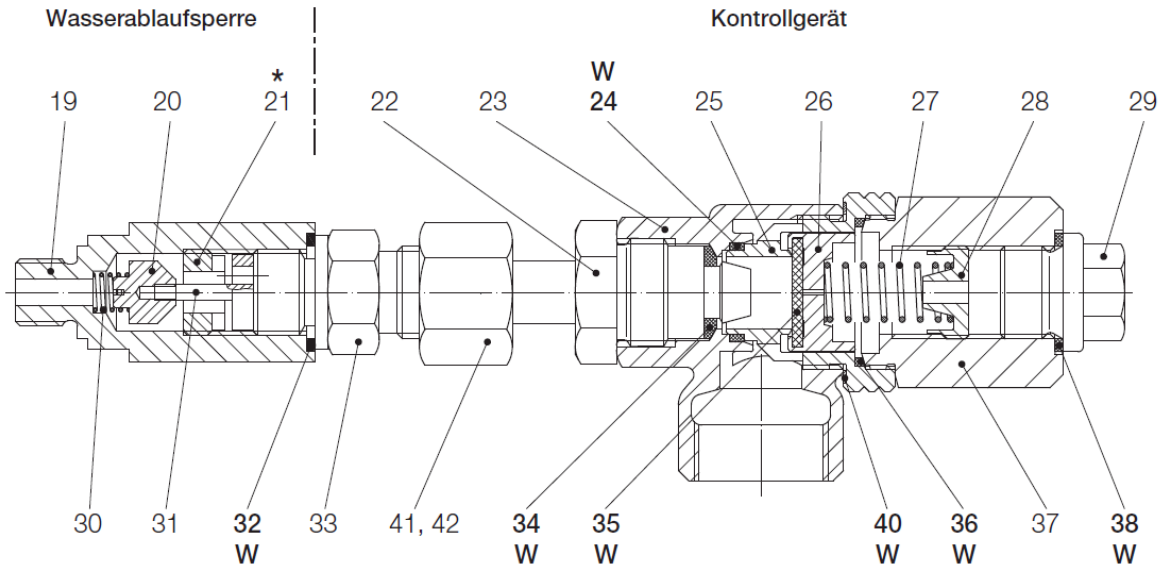
3.6 Threadlockers

Devices	Securing equipment	HON Part No.
Countersunk (108) Ensat Threaded Insert (112)	Loctite 221	26688
Rib Body (60 / 150)	Loctite 454	on request

4.1.1.1 Spare parts drawing DN 25 to DN 150
(Representation DN 50 to DN 150, PN 10 to Class 600)



Kontrollgerät mit Wasserablaufsperre



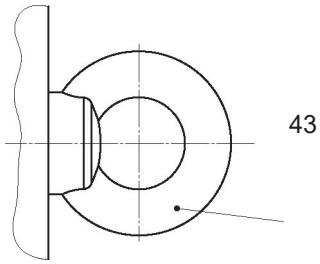
** Sealed with PTFE tape

W parts are to be kept ready for maintenance

4.1.1.2 Details

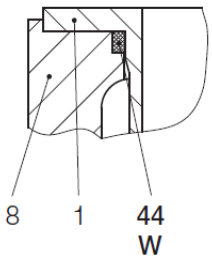
View V

Version DN 150

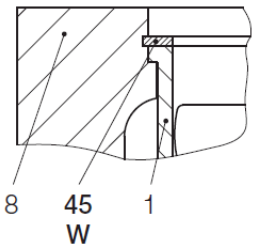


Detail X

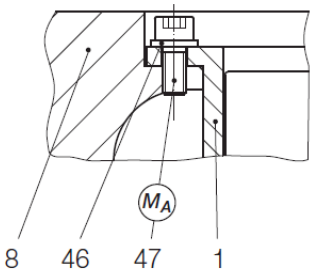
Version DN 25



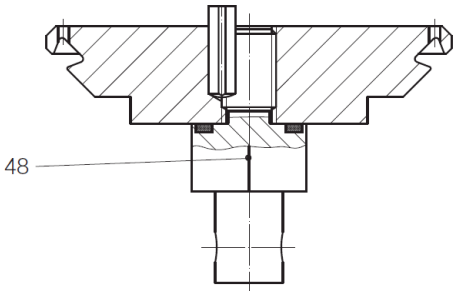
Version DN 50 to DN 100Class 900 and Class 1500



DN 150Class 900 and Class 1500 versions



Detail Y

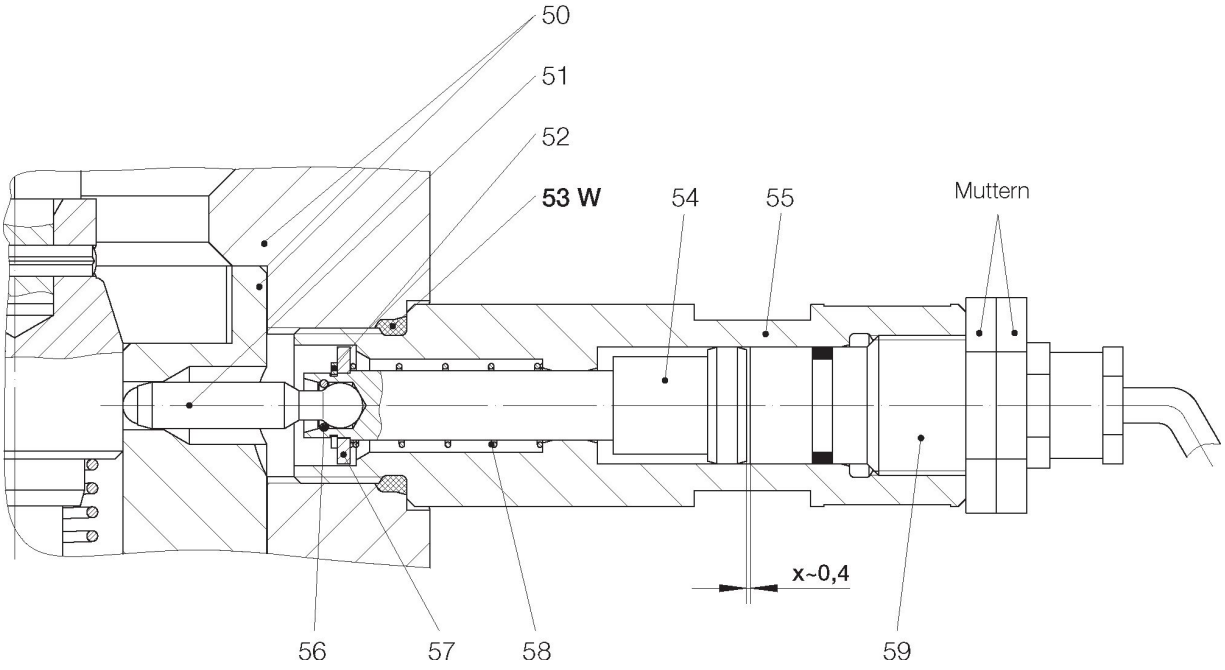


Note MA tightening torque in table page 8!

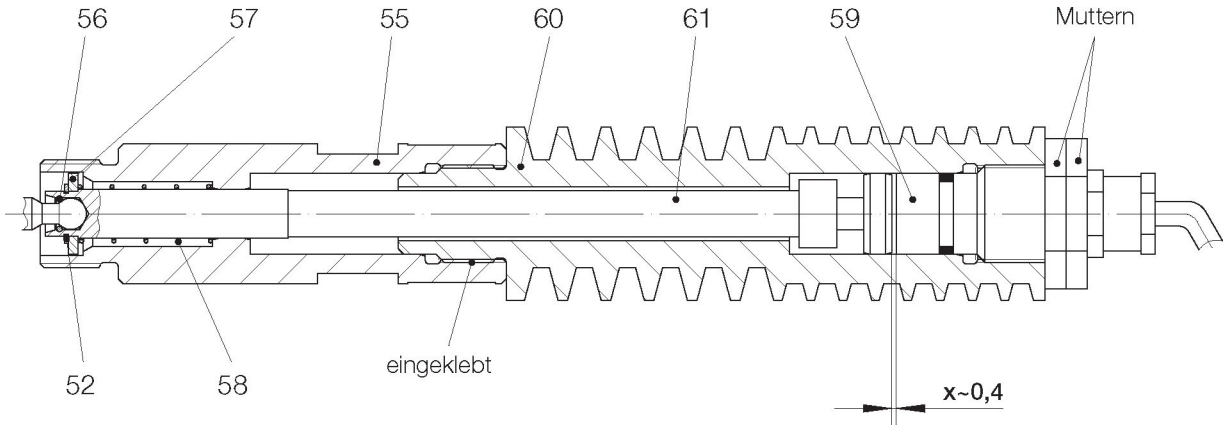
W Parts are to be kept ready for maintenance

4.1.1.3 Remote electrical transmission (position indicator)
Detail Z

Version I, *tmax* ≤ 90° C



Version II, *tmax* > 90° C



W Parts are to be kept ready for maintenance

4.1.2 Spare parts list DN 25 to DN 150

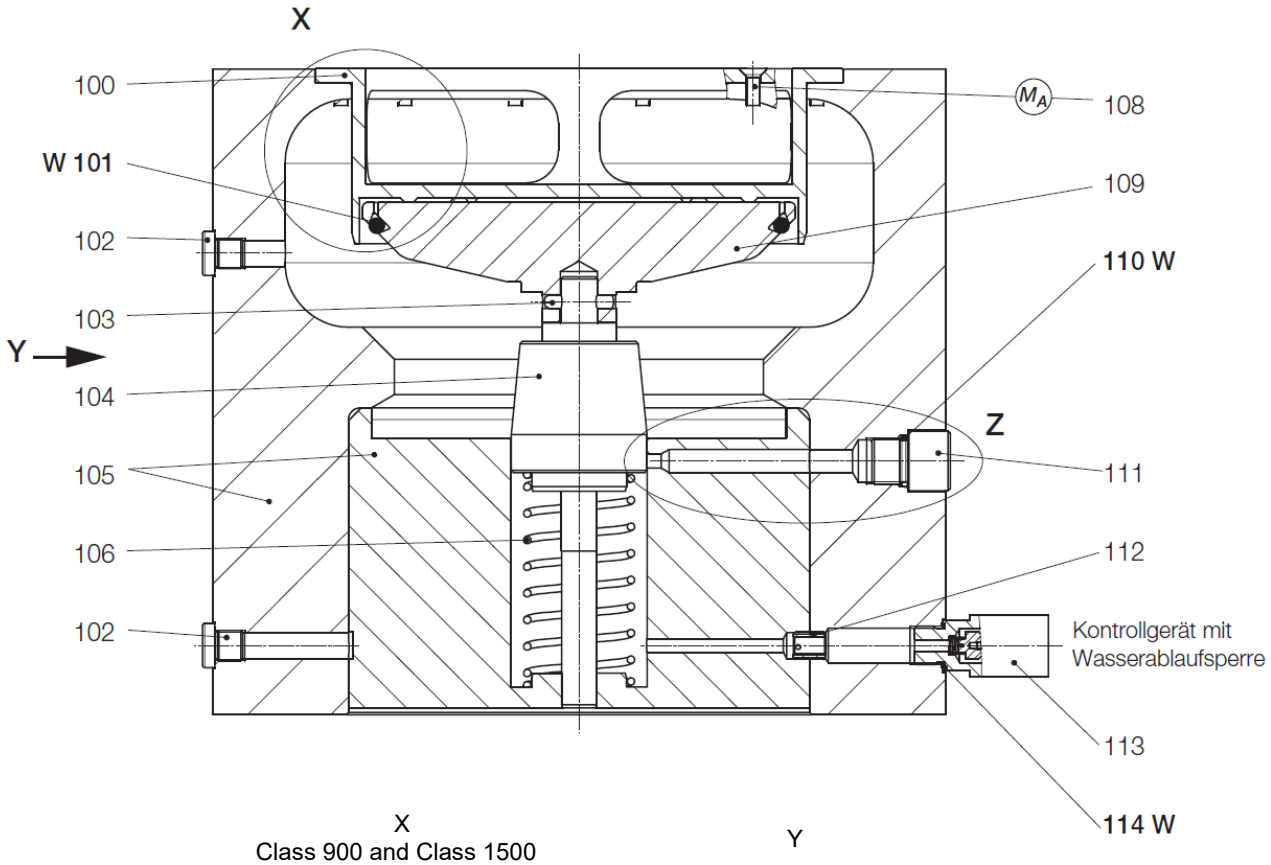
Pos. - No.	Naming	pc.	W	Werkst.	Parts Number DN 25	DN 50	DN 80	DN 100	DN 150
	Spare parts kits	1	W		**K790-001**	**K790-002**	**K790-003**	**K790-004**	**K790-005**
					Spare parts kits consisting of the following spare parts				
3	sealing ring	1	W	Cu	18802-rmk	18802-rmk	18802-rmk	18802-rmk	18802-rmk
10	sealing ring	1	W	Cu	18802-rmk	18802-rmk	18802-rmk	18802-rmk	18802-rmk
13	Splint	1	W	NSt	15031-rmk	15030	15030	15030	15030
14	O-Ring	1	W	KG	20612-rmk	20590-rmk	20617	20589-rmk	20824-rmk
18	sealing ring	1	W	Cu	18802-rmk	18802-rmk	18810-rmk	18810-rmk	18810-rmk
24	O-Ring	1	W	KG	102267-rmk	102267-rmk	102267-rmk	102267-rmk	102267-rmk
32	sealing ring	1	W	Cu	18810-rmk	18810-rmk	18810-rmk	18810-rmk	18810-rmk
34	sealing ring	1	W	KG	20903	20903	20903	20903	20903
35	Seal	1	W	KG	10008297	10008297	10008297	10008297	10008297
36	O-Ring	1	W	KG	20805	20805	20805	20805	20805
38	sealing ring	1	W	Cu	18810-rmk	18810-rmk	18810-rmk	18810-rmk	18810-rmk
40	sealing ring	1	W	LM	3916	3916	3916	3916	3916
44	O-Ring	1	W	KG	520042				
45	locking ring	1	W	NSt		519014	102269-rmk	102270-rmk	
53	O-Ring	1	W	KG	20912	20912	20912	20912	20912
48	Valve disc complete	1		MS/NSt/KG					
	to class 600				K790-007	K790-008	K790-009	K790-010	
	Class 900/1500							K790-011	
	to class 900								K790-012
	Class 1500								K790-013

W Parts are to be kept ready for maintenance

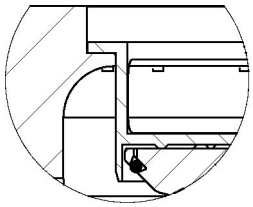
Material Identifiers

	... Steel	LM	... light metal	GMs	... Brass guss
NSt	... Stainless steel	Ms	... Brass	GZn	... Zinc casting
FSt	... Spring steel	GS	… Cast steel	AlBz	... Aluminiumbronze
NFSt	... Stainless spring steel	GGG	… Spheroidal graphite cast iron	K	... Plastic
Bz	... Bronze	GBz	… Bronze casting	KG	... Rubber-like plastic
Cu	... Copper	GLM	… Light metal casting	SSt	... Foam

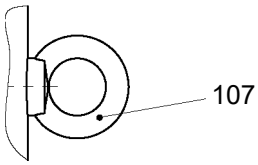
4.2.1.1 Spare parts drawing DN 200



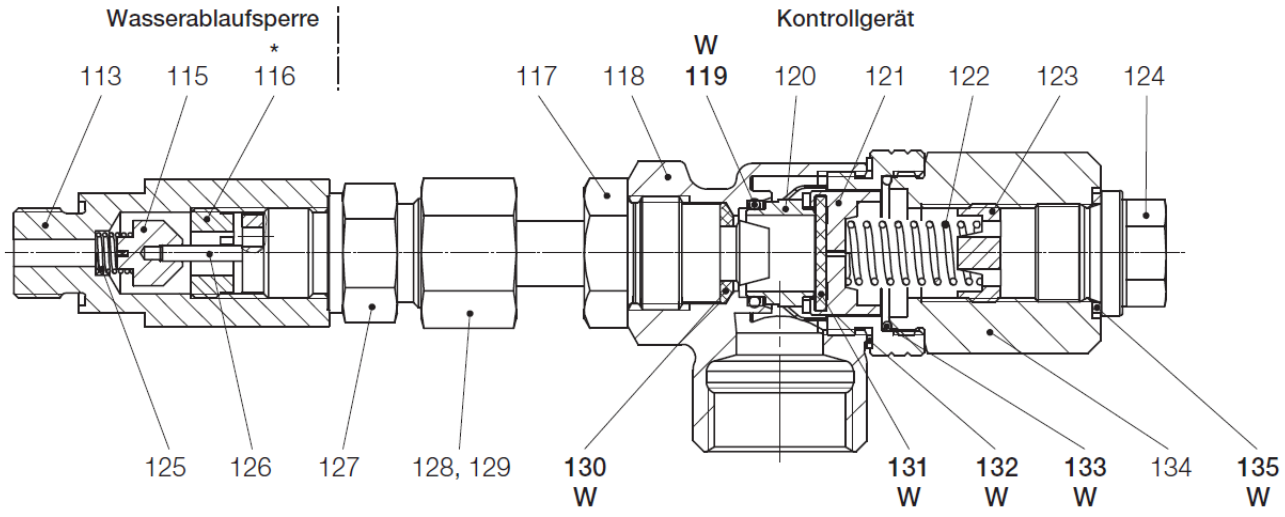
X
Class 900 and Class 1500



Y



Kontrollgerät mit Wasserablaufsperre



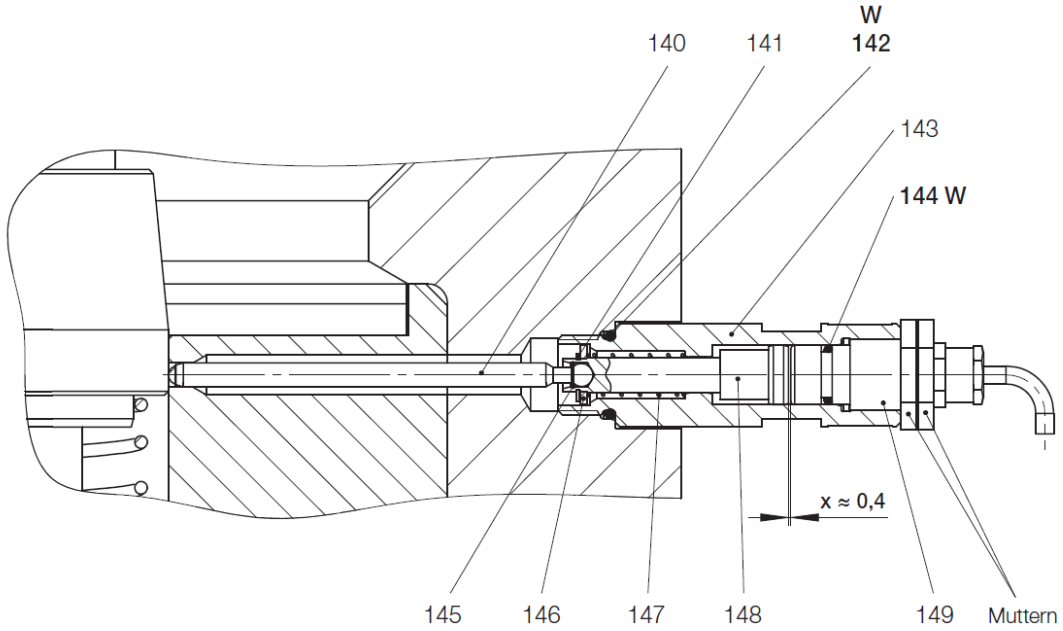
* Sealed with PTFE tape

Note MA tightening torque in table page 8!

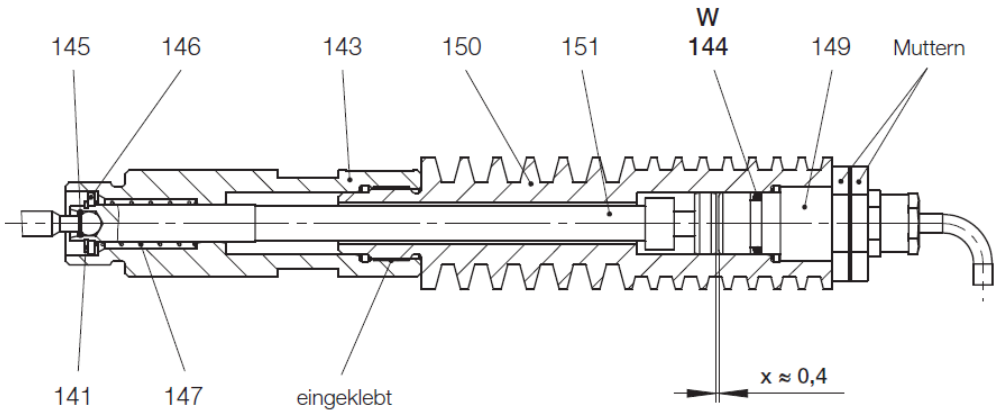
W Parts are to be kept ready for maintenance

4.2.1.2 Remote electrical transmission (position indication)
Detail Z

Version I, *tmax* ≤ 90° C



Version II, *tmax* > 90° C



W Parts are to be kept ready for maintenance

4.2.2 Spare parts list DN 200

Pos.-No.	Naming	pc.	W	Material	Parts Number
	Spare parts kits	1			**K790-06**
	Spare parts kits consisting of the following spare parts				
101	O-Ring	1	W	KG	100265-rmk
110	O-Ring	1	W	KG	102268-rmk
114	Eolastic sealing ring	1	W	KG	102260-rmk
119	O-Ring	1	W	KG	101989-RMK
130	sealing ring	1	W	KG	102259-RMK
131	Seal	1	W	KG	15299938
132	sealing ring	1	W	LM	3916
133	O-Ring	1	W	KG	101990-RMK
135	sealing ring	1	W	LM	18688
142	O-Ring	1	W	KG	102268-rmk
144	O-Ring	1	W	KG	102266-rmk

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2026-02

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