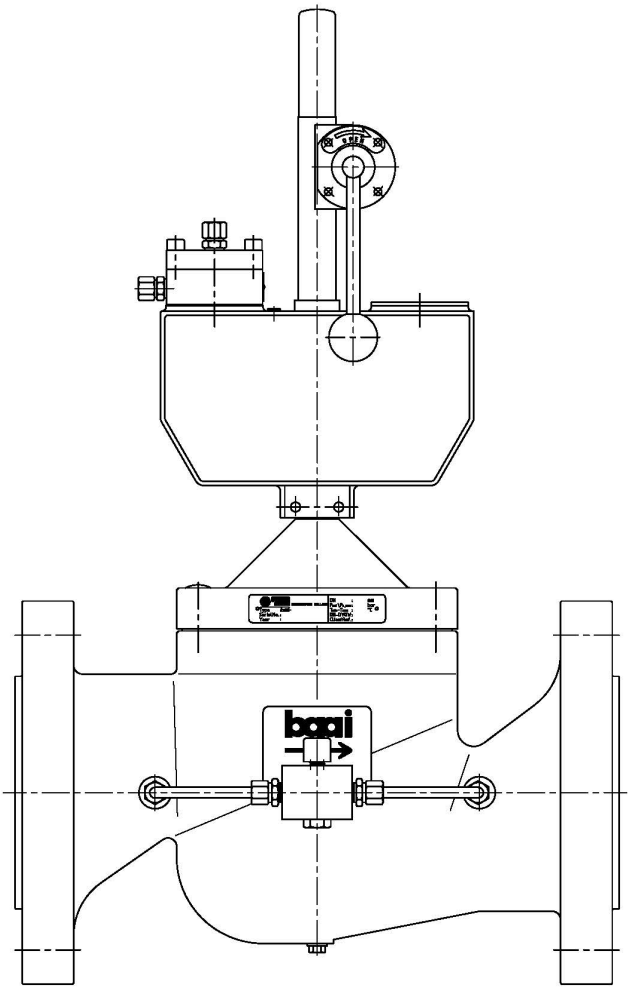
Honeywell

Safety Shut-off Valves
HON HSV086

Operation & Maintenance Manual



Honeywell Process Solutions
Honeywell Gas Technologies GmbH
Osterholzstr. 45, 34123 Kassel, Germany
+49 (0)561 5007-0 (General)
www.honeywellprocess.com

Document number; 8098060403010
Document name; HON HSV086 manual
Revision; 03

© 2017 Honeywell International Inc

Revision	Description	Page	Date	Revised by
01	Update grease; add bolt preload table; update table III; update dimension and weight table		25-07-2018	J.Tong
02.1	Listing of pressure classes with types of certification. Update operational temperature range via ETO without CE to -20 up to 85°C Added “and the gear rack”	5 5 22	Oct 2022	A. Vermaat
02.2	Remove Pos.34 on Table IXa	40	Oct 2022	A. Vermaat
03	Updated weights	6, 8	Oct 2022	V. Peng

© 2017 Honeywell International Inc

Contents

1 Technical specifications **5**

1.1 General 5
1.2 Materials 5
1.3 Dimensions and weights 1” – 12” 6
1.4 Dimensions and weights 16”- 20” 8
1.5 Determination of the capacity 9
1.6 Pressure converter and setpoint springs 10
1.6.1 Pressure converter: setpoint range 10
1.6.2 Pressure converter: setpoint springs 10
1.6.3 Choice of pressure converter and setpoint springs 11
1.7 Type indication 11

2 Operation **12**

2.1 General 12
2.2 Switch and reset mechanism 13
2.2.1 Overpressure protection 14
2.2.2 Underpressure protection 14
2.2.3 Operation of the emergency button 14
2.3 Releasing and opening 15

3 Installation instructions 17
3.1 Connection of the signal lines 17
3.2 Some remarks 17

4 Operational guidelines **18**

4.1 Replacing the setpoint springs 18
4.2 Setting the lower threshold value 18
4.3 Setting the higher threshold value 19
4.4 Operational test 19
4.5 Commissioning 21
4.6 Taking out of operation 21

© 2017 Honeywell International Inc

5 Maintenance **22**

5.1 General 22
5.2 Lubricants 22
5.3 Pressure converters SM 23
5.4 Valve and body HON HSV 26
5.5 Valve and body HON HSVS 28
5.6 Spare-part sets 31
5.7 Parts list shut-off device 32
5.8 Parts list valve and body 33
5.9 Parts list switch and reset mechanism SVC086 37
5.10 Parts list pressure converters SM 39
5.11 Bolt preload for assembly 40

6 Failure solutions **42**

7 Accessories **44**

7.1 Accessories, general 44
7.2 By-pass pipeline 45

Appendix

HSV086 safety manual rev 01 ..... page 1 to 6

While great care has been taken in composing the text and illustrations, Honeywell does not accept liability for any inaccuracies.

© 2017 Honeywell International Inc

1 Technical Specifications

1.1 General

Type	:	**HON HSV086 / HON HSVS086**
Nominal diameter	:	1" – 20"
• Pressure categories	:	class 150, class 300, class 600, class 900 and class 1500
Design	:	EN 14382, EN 12516, EN 13445, ANSI B16.10
Certification		PED 2014/68/EU – For class 900 and class 1500: type testing alligned to EN 14382
Operating pressure	:	up to 250 bar
Threshold value:		
• against high pressure	:	1.23 to 49.5 bar ANSI 300 / 1.23 to 95 bar ANSI 600 60 to 130 bar ANSI 900/1500
• against low pressure	:	0 up to 15 bar
Reproducibility		
• high pressure	:	AG 1 between 17 - 130 bar
	:	AG 2.5 between 1.23 – 81 bar
• low pressure	:	AG 10 between 0 - 15 bar
Temperature range	:	-20 up to +60°C,
	:	-20 up to +85°C, on request via ETO without CE marking
Closing time	:	< 1 sec.
Building-in position	:	horizontally with switch and reset mechanism up
PIN-DVGW No. HON HSV(S)	:	CE-0085BS0202

1.2 Materials

Valve body / Cover	:	A352 Gr.LCC, A350, S355NL, P355N or equal
Valve rod	:	X17CrNi16-2
Guides	:	X17CrNi 16-2 + QT800 or X2CrNiMoN 22-5-3
Valve stem	:	C35 or equivalent
O-rings	:	Viton and NBR or equivalent
Diaphragm	:	NBR with nylon
SVC086 (operational parts)	:	stainless steel
Dual tripping device	:	brass and steel

When corrosive gasses are used, other materials may be necessary. We would advise always to describe the composition of the gas exactly when placing the order.

© 2017 Honeywell International Inc

1.3 Dimensions and weights 1”- 12”

DN	ANSI 150			ANSI 300				ANSI 600			
size	L	H	W	L		H	W	L		H	W
				RTJ	RF			RTJ	RF		
1”	203	681.5	28		203	681.5	30	216	216	681.5	33
2”	267	702	42		267	712	45	292	292	710	51
3”	318	759	70	334	318	766	70	356	356	766	80
4”	356	785.5	105		356	798	105		432	807.5	115
6”	445	875	190	460	444	886	200	562	559	903.5	230
8”	559	1087	290		559	1087	300		660	1092	350
10”	787	1232	650		787	1232	690		787	1232	760
12”	838	1278	880		838	1278	900	838	838	1278	950

DN	ANSI 900				ANSI 1500			
size	L		H	W	L		H	W
	RTJ	RF			RTJ	RF		
1”					254	254	716.5	43
2”					371	368	775.5	80
3”		381	789	132	473		801	156
4”		546	1028	245		546	1028	580
6”	711	711	1211	660		711	1211	780
8”	841	841	1188	1050	841	841	1188	1260
10”	1000		1423	1240	1000	1000	1305	1340
12”	968	965	1278	1325		1146	1308	1900

Table I: Dimensions L and H (mm) and weight W (kg)
For dimensional drawing see figure 1a (barring alterations)

© 2017 Honeywell International Inc

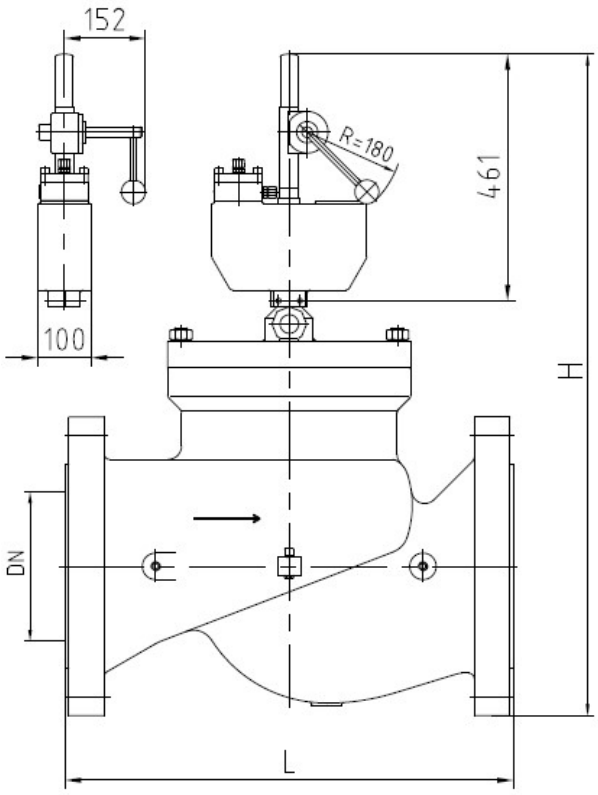


Figure 1a: Dimensional drawing

1.4 Dimensions and weights 16”- 20”

DN	ANSI 300(RF)			ANSI 600(RF)		
Size	**L**	**H**	**W**	**L**	**H**	**W**
16”	990	1744	1550	990	1744	1600
20”	1397	2023	2350	1397	2023	2500

Table II: Dimensions L and H (mm) and weight W (kg)
For dimensional drawing see figure 1b (barring alterations)

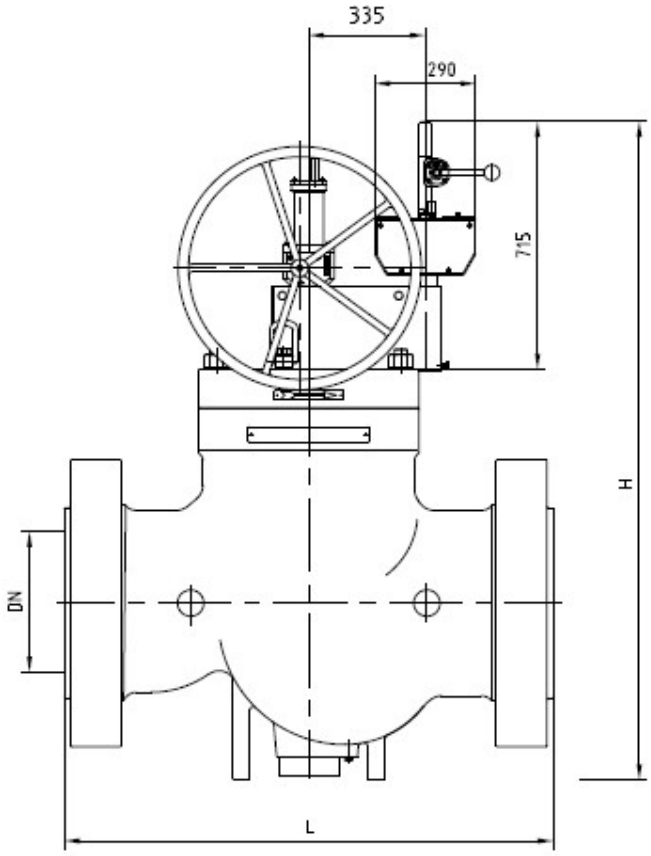


Figure 1b: Dimensional drawing.

© 2017 Honeywell International Inc

1.5 Determination of the capacity

To determine the pressure loss of a safety device with fully open valve, you may use this formula:

$$\Delta p = \frac{\left\{Qn.\sqrt{d.(Tu+273)}\right\}^2}{(13{,}57.Cg)^2.pi}$$

For natural gas with q_n = 0.831 kg/m³
d = 0.643

When using other gasses
d= q_n gas / 1.29

with Q_n = flow rate in m_n^3/h
p_i = inlet pressure in bar (abs)
Cg = capacity rate
d = relative density (air = 1)
Tu = inlet temperature of the gas (°C)
q_n = gas density (Tu = 273 K = 0°C)

DN	1"	2"	3"	4"	6"	8"	10"	12"	16"	20"	24"
C_g	480	1950	4300	7050	15100	26060	40800	60050	104150	166640	287953

Table II: Capacity rates C_g(up to 600#, high pressures on request)

To limit the flow forces we would advise not to exceed the following flow rate. You have to use the formula below for this purpose.

$$Q_{max} \leq K\, D_1 \sqrt{p_{i\ min}}$$

in which D_1 = nominal diameter in mm
pi_{min} = minimum inlet pressure in bar (abs)
Q_{max} = maximum flow in m_n^3/h

K= 100 for DN = 1" up to 6"
K= 200 for DN = 8" up to 12"
K= 300 for DN =16" up to 24"

© 2017 Honeywell International Inc

1.6 Pressure converter and setpoint springs

1.6.1 Pressure converter: setpoint range

	SETPOINT RANGE IN BAR			
pressure converter	W_{du} bar	AG	W_{do} bar	AG
SM1.9-A	0.5 - 2.5	10	1.4 - 21.0	2.5
SM1.4-A	1.0 - 5.0	10	17.0 - 46.0	1
SM1.2-A	2.0 - 10.0	10	38.0 - 81.0	2.5
SM2/2500	2 - 15	10	60 - 130	1
SM90	0.0 - 0.8	10	1.23 - 2.53	2.5

Table III: Setpoint range of the pressure converters

1.6.2 Pressure converter: setpoint springs

Springs	sensing element type SM				
Color / Code nr.	1.9A	1.4A	1.2A	2/2500	90
	bar	bar	bar	bar	mbar
Green 8501114120470	0 to 0.8	0 to 1.8	0 to 3	0 to 7	0 to 90
Yellow 8501114120480	0.6 to 1.5	1.3 to 3.2	2 to 5.5	5 to 12	70 to 170
Black 8501114120490	1.4 to 3.8	3 to 8.2	5 to 14	10 to 40	230 to 450
White 8501114120500	3.7 to 7.1	7.8 to 15 *	13 to 25*	30 to 60	430 to 830
Orange 8501114120510	6.2 to 9.6	13.5 to 20	22 to 35*	50 to 80	730 to 1130
Grey 8501114120520	7.9 to 11.3	17 to 24	28 to 41*	70 to 90	930 to 1330
Purple 8501114120530	10.5 to 16.5	23 to 35	38 to 60	80 to 140	1230 to 1930
Brown 8501114120540	15.5 to 21.5	33 to 46	56 to 78	130 to 180	1830 to 2530

Table IV: setpoint springs, the grey marked are most preferred spring choices.

© 2017 Honeywell International Inc

1.6.3 Choice of pressure converter and setpoint springs

In order to choose the correct pressure converter and setpoint springs for a required threshold value, proceed as follows:

- The lower threshold value is only determined by the force of the minimum spring;
- Choose the pressure converter for the required threshold value from table III;
- When you have a choice of 2 pressure converters, choose the pressure converter with the largest sensing surface (SM2 is the smallest, SM90 is the largest);
- Now select from table IV the relevant setpoint spring for the minimum threshold value of the pressure converter you have just decided on;
- The maximum threshold value is determined by means of the force of the minimum and maximum spring. In order to determine the maximum threshold value, the minimum threshold value should be deducted from the maximum. The pressure difference determines the selection of the maximum spring;
- Using the calculated pressure difference, you select from table IV the setpoint spring of the maximum threshold value.

Example of selection of the setpoint springs for the minimum and maximum threshold value

Given: Minimum threshold value 2 bar
Maximum threshold value 22 bar

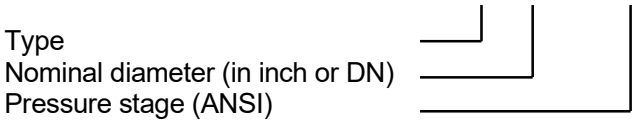
Calculate the pressure difference between maximum and minimum threshold value:
Result: 22 bar - 2 bar = 20 bar.

Choosing the pressure converter and setpoint springs:

- acc. table III, pressure converters SM1.4-A and SM1.9-A are suitable. The SM1.9-A has the larger diaphragm surface and is to be chosen;
- in table IV we find for a lower threshold value of 2 bar the black setpoint spring with a pressure range of 1.4 to 3.8 bar;
- for the maximum threshold value of 20 bar we find the brown setpoint spring with a pressure range of 15.5 to 21.5 bar.

1.7 Type indication (example)

HON HSV086 - .." - ANSI 600 -



© 2017 Honeywell International Inc

2 Operation

2.1 General

The HON HSV086 is a mechanical safety shut-off device of the slam shut type. The safety shut-off device is not self-acting. Having solved the failure, the valve has to be opened by someone locally (i.e. at the device). The valve can only be opened when the failure has been solved and the switch mechanism (the SVC086) has already been released.

The safety shut-off device functions very precisely and has a limited switching trajectory, so that the threshold value may be relatively close to the set pressure of the regulator.

At an undesired failure in the pressure converter or an impulse line the valve shuts automatically.
Owing to the application of two pressure converters and two minimum/maximum springs, a "one of the two" redundancy is possible for each shut-off valve. Standard, the safety shut-off device has been equipped with an emergency button. In addition, several accessories are available.

The working of the shut-off valve rests on three main elements:

- The switch and reset mechanism SVC086 functions as a sensor and forces a switching-on;
- Subsequently the locking of the valve is released;
- The valve then blocks the flow to be protected.

© 2017 Honeywell International Inc

2.2 The switch and reset mechanism

The switch and reset mechanism SVC086 is used standard on all HON HSV safety shut-off devices. When the stroke of the HON HSV is smaller than 110 mm, the SVC086 may be mounted directly onto the body.

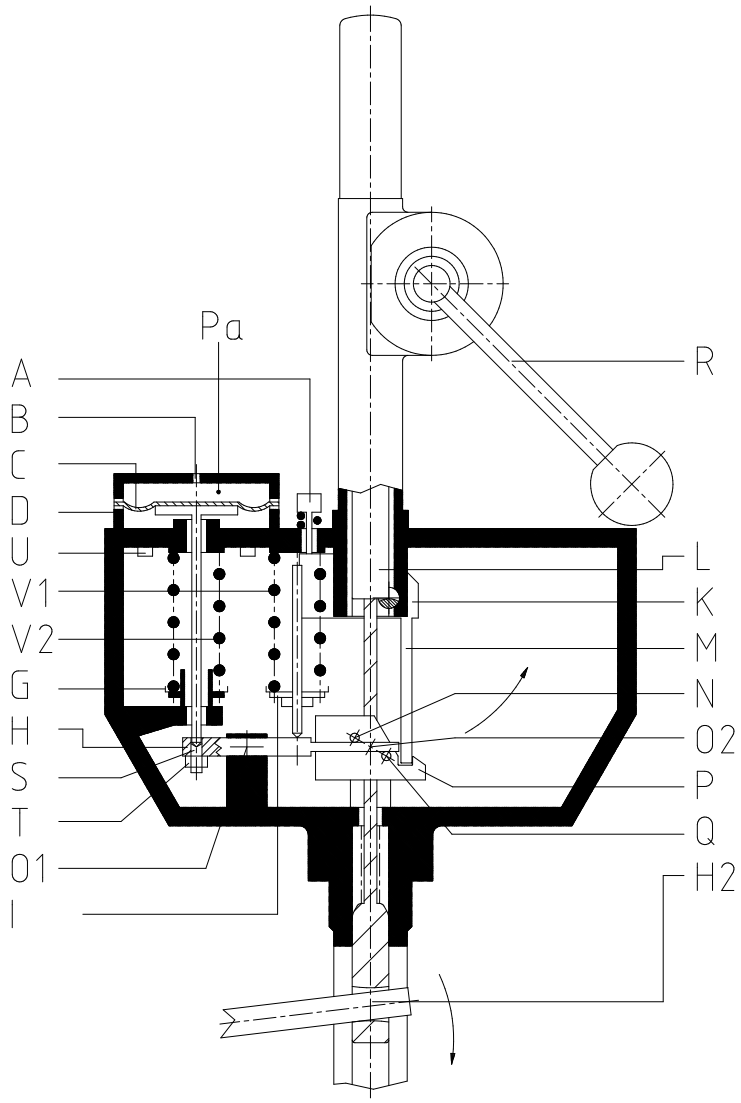


Figure 2: Working principle of the switch and reset mechanism SVC086

2.2.1 Overpressure protection

(see figure 2 / figure 3)

When the pressure Pa in pressure converter D is higher than the threshold value set by compression springs V1 and V2, diaphragm C is pressed down and handle H turns around pivoting point O1. Pin N is pushed upwards, so that balance jaw P turns to the right past pivoting point O2. Because of this, the balance jaw will no longer support the downward pointing switch rod M of the switch handle, so that it rotates around its axle. This axle partly has a crescent-shaped section. This is the point of support of the valve, and for HON HSVS the point of support of rod L, which releases the "second-stage handle" H2. When the switch handle (K) has made a quarter-turn, valve (S) closes by means of handle arm (R) fitted in the valve body. Because of the pressure exchange at the outlet side of the installation, a pressure difference usually occurs at valve (S), so that it is pushed further into the valve seat.

Continued for 16” and larger.
When switch handle K has made a quarter-turn, handle H2 can move downwards (due to the force executed by the valve). This will switch on the valve or the second stage. Switching on the second stage: see chapter 4.1.
The safety device is now locked. Even when pressure Pa drops below the threshold value, valve (S) remains shut.

2.2.2 Underpressure protection

When pressure Pa of pressure converter D is lower than the set threshold value of spring V1, diaphragm C moves upwards. The top of V2, by means of the spring seat, now presses against the housing of the control and switch mechanism and no longer against the diaphragm disc of the pressure converter. Because of this, the threshold value is determined by spring V1 only. Handle H is now going to push down pin Q, so that balance jaw P (just as with overpressure) turns to the right.
The working principle of switch handle K, valve (S) and valve shaft L, which releases the valve or the "second-stage handle" H2, is identical to the one of overpressure.

2.2.3 Operation of the emergency button

When the emergency button (red button) is pressed (not indicated in figure 2), balance jaw P turns to the right. This will make switch handle K turn at least a quarter.

For 16” and larger, shaft L of the "second-stage handle" H2 touches on the crescent-shaped point of support and the second stage is switched on. The position of handle H, diaphragm C and the minimum and maximum springs is not changed. The valve shaft passes the crescent-shaped point of support and the valve is shut.

© 2017 Honeywell International Inc

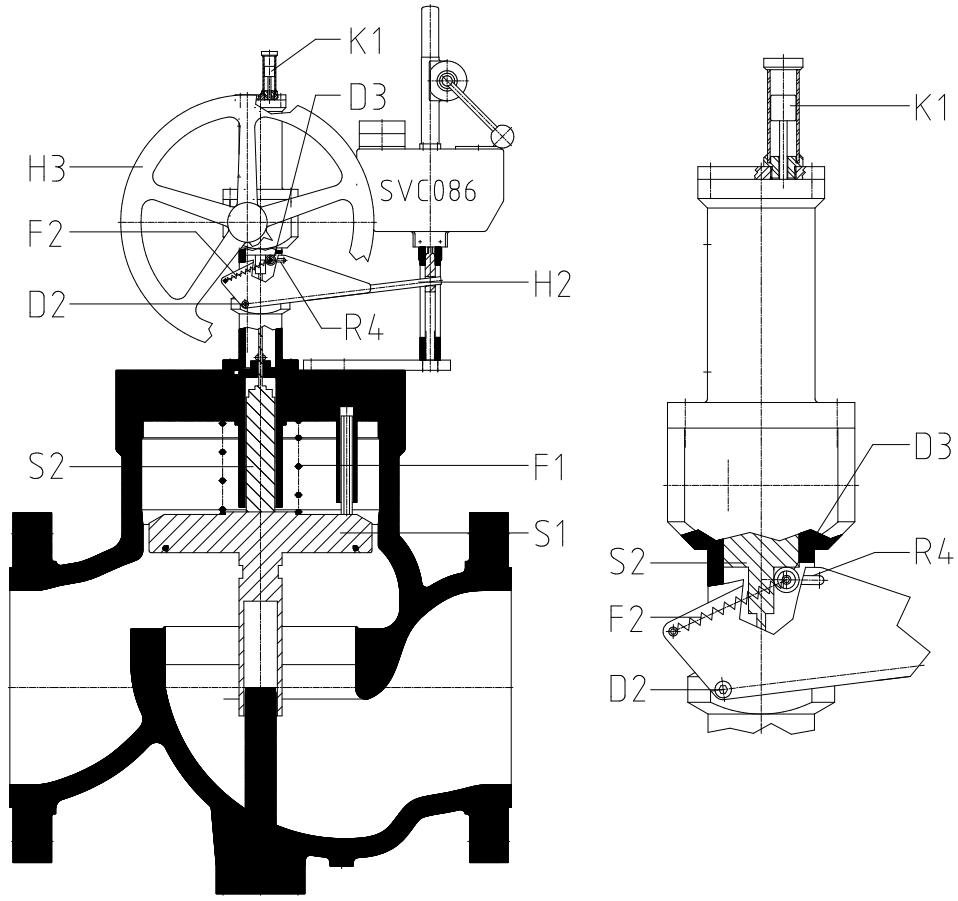


Figure 3: Working principle second stage HON HSVS

2.3 Releasing and opening HON HSV / HON HSVS

(see figures 2 and 3)

After having solved the failure, the pressure to be protected returns to a value between the lower and higher threshold value. Handle H returns to its initial position. Due to gravity, balance jaw P follows this movement.
In order to make the HON HSV ready-for-operation again, the switch and reset mechanism must first be reset and then the second stage (if 16” and larger).
Here follows a short description of the actions for releasing and opening the HON HSV.

- Solve the failure;
- Bring the pressure to be protected to a normal value between the higher and lower threshold values;
- Ensure that no gas is taken off at the outlet side and that the pressure above and below the valve is in equilibrium, using a bypass;
- First press and then turn clockwise handle arm R of the lifting component of the SVC086;

© 2017 Honeywell International Inc

- Press reset button A when valve shaft L is kept in its highest position. This makes that switch rod M falls into balance jaw P;
- Again slightly turn handle arm R back. Switch rod M is now locked by the balance jaw. Let go of handle arm R. This can turn freely again;

The following steps for an HON HSVS

- Handle arm H2 has now moved upwards. This moved support D3 against the force of the two draw springs F2 into groove R4;
- Push in hand wheel H3 and turn anti-clockwise;
- When hand wheel H3 has been turned sufficiently a notch in valve rod S2 automatically snaps shut into support D3 (clearly audible);
- Let go of hand wheel H3, so that it is disconnected from valve rod S2;
- Check the open position of the valve (valve position indication K1), the closed position of the bypass valve and the free turning of hand wheel H3, handle arm R of the lifting component.

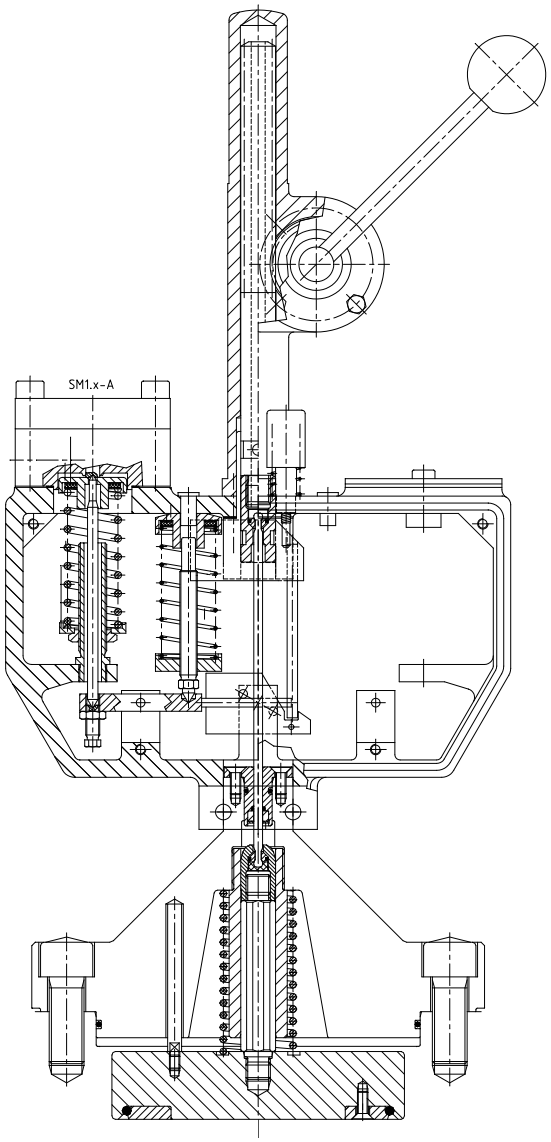


Figure 4: SVC 086 (HON HSV)

© 2017 Honeywell International Inc

3 Installation Instructions

3.1 Connection of signal lines

Connect the signal lines of the pressure converters of the safety shut-off valve as shown in figure 5.
See figure 2 (chapter 2.2), connection B, for connection to the pressure converter.

The signal lines of the pressure converters should have a minimum diameter of 10 mm. Sometimes it is desirable (and in certain countries obligatory) that the vent opening (see figure 2 (chapter 2.2), connection D) of the diaphragm of the pressure converter is installed to outside. In this way no gas can get into the installation space when a diaphragm fractures. The vent pipeline should be no longer than 40 m.

3.2 Some remarks

Mind the following when mounting the HON HSV:

- When there is a possibility that filth detach from the pipeline between dust filter and safety valve, it is advisable to fit a simple wire-mesh filter right before the HON HSV during the first operational period. This filter may be removed later;
- Mount the safety shut-off device in such a way that the arrow on the valve body points into the flow direction.

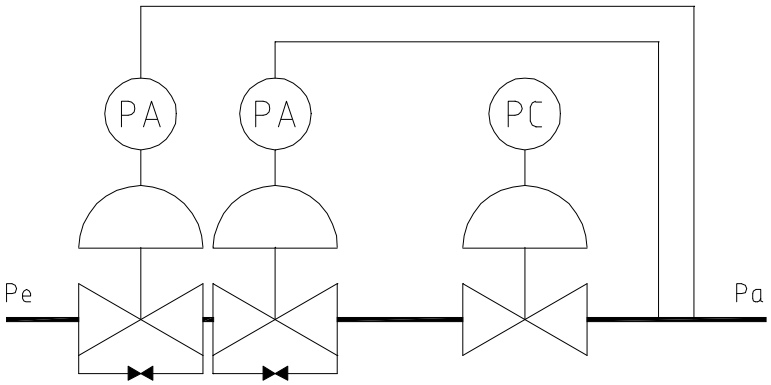


Figure 5: Example with two safety shut-off valves

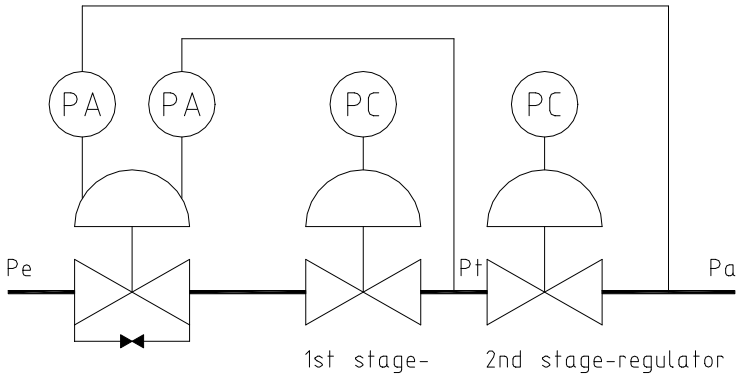


Figure 6: Example of a safety shut-off valve in dual execution ("one-of-the-two" redundancy).

© 2017 Honeywell International Inc

4 Operational guidelines

4.1 Replacing the setpoint springs

(see figure 2 chapter 2.2)

a) Completely release the maximum and minimum springs (V2 and V1) by turning the spring seats (G and I) of the springs all the way down.
b) Remove pressure converter after loosening the corresponding screw connection U (top and bottom of the pressure converter need not be disconnected).
c) Replace setpoint springs.
d) Re-mount pressure converter.
e) Set the pressure as described in chapters 4.4 and 4.5.

4.2 Setting the lower threshold value

a) Screw the minimum spring seat I all the way down (minimum spring is fully released).
b) Screw maximum spring seat G all the way up (maximum spring is fully compressed, don't block).
c) Set the pressure in the pressure converter between lower and higher threshold value, at approx. half the value of the higher threshold value.
d) Screw in set screw S until the balance handle H is horizontal. The balance handle should not have any play now at the points of support N and Q and at the balance jaw P. Fix the set screw with lock nut T.
e) Lift valve shaft L with handle arm R and lock switch pin M with balance jaw P.
f) Lift the valve by pushing in hand wheel H3 and turning it anti-clockwise.
g) Now set the lower threshold value of the pressure converter.
h) Turn the minimum spring seat I up until the SVC086 disconnects.
i) Place balance handle H horizontally again by adjusting the pressure in the pressure converter as described in point c).
j) Repeat steps e) to j), resp. steps e), h), i), and j) a number of times and adjust minimum spring seat I if necessary.
Check that the SVC086 disconnects at the right threshold value.

© 2017 Honeywell International Inc

4.3 Setting the higher threshold value

a) The lower threshold value has already been set.
b) If not, turn maximum spring seat G all the way up (maximum spring is completely compressed, don't block).
c) Set the pressure in pressure converter D between the lower and higher threshold value, at approx. half the value of the higher threshold value.
d) Screw in set screw S until the balance handle H is horizontal. The balance handle should not have any play now at the points of support N and Q and at the balance jaw P. Fix the set screw with lock nut T.
e) Lift the valve shaft L with handle arm R and lock switch pin M with balance jaw P.

The following steps for an HON HSVS
f) Lift the valve by pushing in hand wheel H3 and turning it anti-clockwise (this may already have been done when setting the lower threshold value).
g) If necessary, fit accessory A9 in SVC086 to prevent complete disconnection.
h) Set the higher threshold value of the pressure converter.
i) Turn maximum spring seat G down until SVC086 disconnects.
j) Place balance handle H horizontally again by adjusting the pressure in the pressure converter as described in point c).
k) Repeat steps e) to j), resp. steps e), h), i), and j) when accessory A9 is used, a number of times and adjust maximum spring seat G if necessary.
Check that the SVC086 disconnects at the right higher threshold value.

Remark

When the lower threshold value is altered, the higher threshold value also has to be reset (because of the lever action in the SVC086).

4.4 Operational test

At the works, the device was equipped with the correct springs for the threshold value as specified in the order. In principle, a normal operational test should therefore suffice.
However, when this test shows that the set pressure is not set correctly, you'll have to alter it. Consult chapters 4.4 and 4.5 for this.

As a safety valve is seldom activated in normal operation, it is advisable to carry out an operational test regularly. Don't forget to test the emergency button, either. This operational test should be carried out with a complete system. Because of the forces exercised and carried over at the current pressure, it is advisable and useful for the system to be pressurised during the operational test.

© 2017 Honeywell International Inc

Checking the lower threshold value

The setting for underpressure, resp. diaphragm fracture protection, has to be checked as follows.

- Pressurise the pressure converter. Choose a pressure value between the lower and higher threshold values.
- Let the pressure in the pressure converter decrease slowly.
- When the lower threshold value has been reached, the system has to switch.
- Bring the pressure in the pressure converter back to a value between the lower and the higher threshold values.
- Bring the pressure above and below the valve in equilibrium, by means of the bypass.
- Lock the HON HSV (see chapter 4.4).
- Run this check several times.

Checking the higher threshold value

- Bring the pressure in the pressure converter to a value between the lower and higher threshold values.
- Let the pressure in the pressure converter increase slowly.
- When the higher threshold value has been reached, the system has to switch.
- Bring the pressure in the pressure converter back to a value between the lower and the higher threshold values.
- Bring the pressure above and below the valve in equilibrium, by means of the bypass.
- Lock the HON HSV (see chapter 4.4).
- Run this check several times.

Checking the emergency button

- Build up the normal initial pressure in the pressure converter.
- Press the emergency button of the SVC086 (red button at the top of the SVC086)
- The system should now switch.
- Bring the pressure above and below the valve in equilibrium, by means of the bypass.
- Release the HON HSV (see chapter 4.4).
- Run this check several times.

© 2017 Honeywell International Inc

4.5 Commissioning

- Before commissioning the HON HSV is de-pressurised. The valve is closed.
- The threshold values should be correctly set and checked.
- Slowly open the inlet valve of the installation.
- When the full inlet pressure has built up before the still closed safety shut-off device, the bypass valve may be opened. This enables equilibration of the pressure above and below the valve.
- The pressure has now also built up before the gas pressure regulator, so that it can be taken into operation.
- When the gas pressure regulator produces an outlet pressure higher than the set minimum threshold value of the HON HSV, the control and switch mechanism can be locked and the safety shut-off device can be opened using the lifting component.
  Close the bypass valve if it doesn't close automatically.
  We would advise to use a self-closing bypass valve, so that you can't fail to close the valve (an automatic bypass valve is supplied standard).
- When the required outlet pressure has been reached, the outlet valve can slowly be opened
- The installation is now operational.

When commissioning the installation, the bypass valve of the HON HSV bypass must be closed.

Remark

Before first commissioning an installation, the threshold values of the HON HSVs should be checked.

4.6 Taking out of operation

- Slowly close the inlet valve of the regulating line.
- Then slowly close the outlet valve. When gas still has to be transported, the stand-by line or a second installation takes over regulating.
- Unpressurise the line at the outlet side using the manual blow-off.
- Close the HON HSV when the minimum threshold value has been reached.
- In order to unpressurise the chamber before the HON HSV also, the bypass valve of the bypass has to be opened. The gas now flows via the bypass to the outlet of the regulating line and can be blown off there.
- After the line has been completely unpressurised, you can (if required) carry out maintenance work.

Consult chapter 4.1 when you wish to take the installation back in operation.

© 2017 Honeywell International Inc

5 Maintenance

5.1 General

Maintenance work is limited to replacing the O-rings and diaphragms.
To all dynamic O-rings (seals between the moving parts) and the diaphragms applies, for optimal working, a recommended maximum life of 4 years. For static O-rings (seals between fixed, non-moving parts) Honeywell advises a useful life of 6 to 7 years.
You can find all required parts for maintenance work in the parts list added.

5.2 Lubricants

Mind the following during all maintenance work:

- Unless otherwise indicated, all screw connections and the gear rack are to be greased with a suitable grease (Honeywell advises weicon anti-seize).
- All O-rings are to be greased with a suitable grease (Honeywell advises krytox GPL 309 or Klueber unisilikon TK44 N2).
- All guiding surfaces are to be greased with a suitable grease (Honeywell advises Krytox GPL 309 or Klueber unisilikon TK44 N2).

CAUTION !!!

De-pressurise the line before starting maintenance work!

© 2017 Honeywell International Inc

5.3 Pressure converters

SM 1.x-A (see figure 6a)
SM90 (see figure 6b) (to be certified)
SM2/2500 (see figure 6c) (to be certified)

SM 1.x-A
The following parts have to be replaced in this component.

- Diaphragm 02
- O-ring 16
- O-ring 18

To replace these parts, the following steps are to be taken.

- Disconnect impulse line 21
- Unscrew screw connections 15
- Remove cover 01
- Remove diaphragm 02
- Remove bottom seat 05 to replace O-ring 18
- Replace O-ring 18
- Replace O-ring 16
- Fit bottom seat 05, new diaphragm 02 and cover 01 with O-ring 16
- Tighten screw connection 15 (even and diagonally)
- Connect impulse line.

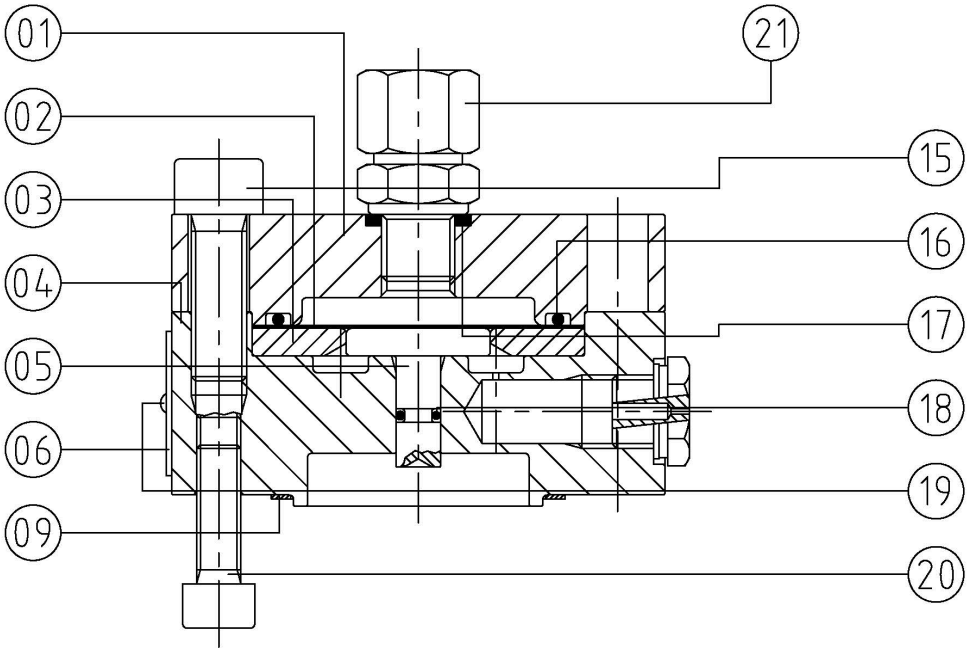


Figure 6a: Pressure converter SM1.x-A

SM 2/2500 (see drawing 6b)
The following parts have to be replaced in this component.

- O-ring 16
- O-ring 18

To replace these parts, the following steps are to be taken.

- Disconnect impulse line 21
- Unscrew screw connections 15
- Remove cover 01
- Remove cylinder 03 to replace O-ring 16
- Remove plunger 05 to replace O-ring 18
- Replace O-ring 18
- Replace O-ring 16
- Fit plunger 05, cylinder 03 and cover 01
- Tighten screw connection 15 (even and diagonally)
- Connect impulse line.

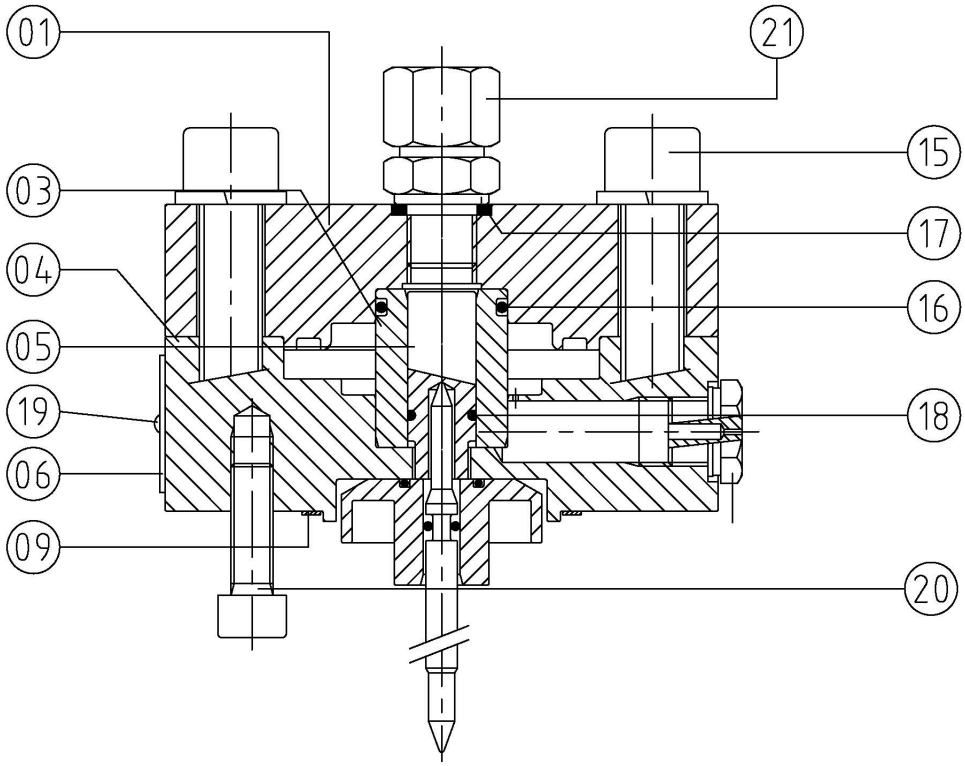


Figure 6b: Pressure converter SM2/2500

SM 90 (see drawing 6c)
The following part has to be replaced in this component.

- Diaphragm 02

To replace these parts, the following steps are to be taken.

- Disconnect impulse line 21
- Unscrew screw connections 15
- Remove cover 01
- Remove diaphragm 02
- Remove diaphragm plates 05 and 07 with diaphragm 02 and nuts
- Remove nut 03
- Remove disk 05
- Replace the diaphragm 02, disk 05 and nut 03 use Loctite 243 (blue)
- Place the complete diaphragm assembly back
- Place cover 01
- Tighten screw connection 15 (even and diagonally)
- Connect impulse line.

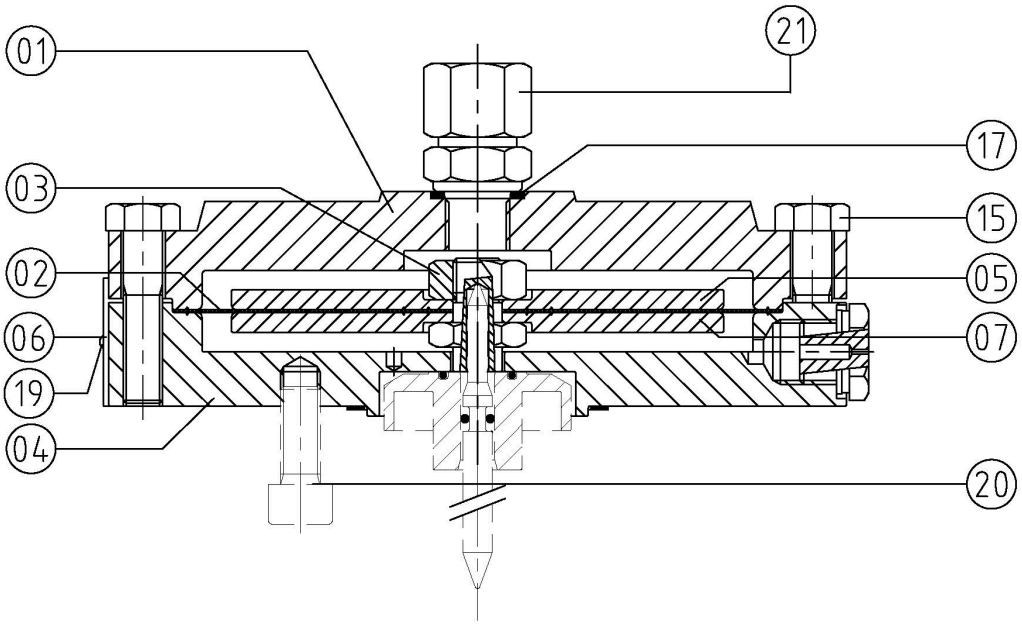


Figure 6c: Pressure converter SM90

© 2017 Honeywell International Inc

5.4 Valve and body HON HSV

(see figures 7a, 8)

The following parts should be replaced in this component during maintenance:

- 2x O-ring retainer set 21 (no seal, must be replaced during assembly, however)
- O-ring rod 22
- O-ring guide 23
- O-ring cover 26
- O-ring valve 30
- O-ring valve seat 32
- O-ring 40

Work as follows to replace these parts:

- The valve should be closed.
- Disconnect impulse line (pos. 21 in fig. 6).
- Unscrew screw connection 47 and dismount the complete SVC086.
- Unscrew screw connection 27.
- Lift cover 09 from body 16 by load frame 37 provided for this purpose (not shown in figure 7a). For easier removal of cover 09 from body 16 you may use lock screws 55 (after loosening plug 56 (only for 12").
- When you have used lock screws 55, you should tighten them again and fit plug 56 (only for 12").
- Valve 12 is now underneath cover 09.
- Place cover 09 with valve 12 on a surface which guarantees that valve 12 with cover 09 lies horizontally.
- Remove retainer set 02 from connection rod 04.
- Replace O-ring of retainer set 21.
- Slowly lift cover 09 with guide from valve rod above 08 by the load frame 37 provided for this purpose (not shown in figure 7a) and lift over connection rod 04.
- Place cover 09 on the same surface as the valve.
- Remove flat-headed screws 24.
- Remove rod guide top 06 from cover 09 and replace O-rings 22 and 23.
- Fit rod guide top 06 in cover 09 and tighten flat-headed screw 24.
- Remove compression spring 29.
- Re-fit retainer set 02 on connection rod 04.
- Re-mount connection rod 04 with retainer set 02 and suspension screws 03 to valve rod top 14 (fix suspension screw 03 with LOCTITE 243).
- Unscrew screw connection 31 and disconnect securing plate 13.
- Replace O-ring 30.
- Fit screw connection 31 (use new screws) and securing plate 13.
- Re-fit compression spring on valve.
- Slowly and carefully lower cover 09 with guide of valve rod top 08 over connection rod 04. Work very carefully to prevent damage.

© 2017 Honeywell International Inc

- Slide filler block 01 over connection rod 04 and fit retainer set 02 (with new O-ring 21).
- Unscrew the screws from the seat of valve 15.
- Remove valve seat 15.
- Check valve seat 15 for damage to the top sealing edge.
- Replace O-ring 32 and slowly and carefully mount valve seat 15 in the body of valve 16.
- Slowly lower cover 09 with valve 12 hanging underneath it into body 16.
- Fit screw connection 28.
- Mount the complete SVC086 on cover 09 by means of screw connection 47.
- Connect impulse line of the pressure converter.
- Recommission the line (if no other maintenance work is necessary).

Remark

Check the threshold values of the HON HSV after each maintenance!

CAUTION !!!

Always carry out an operational and tightness test after maintenance work!

5.5 Valve and body HON HSVS

(see figures 7a and 7b)

The following parts should be replaced in this component during maintenance:

- 2x O-ring retainer set 21 (no seal, must be replaced during fitting, however)
- O-ring rod 22
- O-ring guide 23
- 4x socket screw 24
- O-ring cover 26
- O-ring valve 30
- 12x socket screw 31
- O-ring valve seat 32
- O-ring guide 39
- O-ring 40 (only fig. 7b)
- O-ring guide of valve stem guide 41
- O-ring guide of valve stem seat 42
- O-ring bottom cover 48
- Filler block 01 (no seal, must be replaced during fitting)

Work as follows to replace these parts:

- The valve should be closed.
- Disconnect impulse line of the pressure converter (pos. 21 in fig. 6).
- Remove protective cap 25 (see figure 7a).
- Unscrew screw connection 47 and dismount the complete SVC086.
- Unscrew screw connections 38, 40 (figure 7a) and dismount the complete second stage.
- Detach connection rod 04 (figure 7a) from top coupling section 07a.
- Unscrew screw couplings 38, 53, 28.
- Lift cover 09 from body 16 by load frame 37 provided for this purpose (not shown in figure 7a). To simplify detachment of the cover 09 from body 16 you may use lock screws 55 (having released plug 56).
- When you have used the lock screws 55, you should tighten them again and fit plug 56.
- Valve 12 is now underneath cover 09.
- Place cover 09 with valve 12 on a surface which guarantees that valve rod below 19 sticks through the surface and that valve 12 with cover 09 lies horizontally (when putting it down on the surface, cover 09 slides over the valve rod top 14).
- Loosen the connections between coupling top 07a and coupling bottom 07b and disconnect coupling top.
- Disconnect retainer set 02 from connection rod 04.
- Replace O-ring retainer set 21.
- Slowly lift cover 09 with guide of valve rod top 08 by the load frame 37 provided for this purpose (not shown in figure 7a) and lift over connection rod 04.
- Place cover 09 on a similar surface as the valve.
- Remove lock ring 40

© 2017 Honeywell International Inc

Take care that the guide of valve rod top 08 should not fall out of cover 09 unchecked.

- Remove guide of valve rod top 08 from cover 09 and replace O-ring 39.
- Fit guide of valve rod top 08 in cover 09 and fit lock ring 40.
- Unscrew screw connection 24 and fit rod guide 05.
- Replace O-ring guide 23.
- Remove lock ring 25 and fit ring 06.
- Replace O-ring rod 22, remove ring 06 and fit lock ring 25.
- Fit rod guide 05 in guide valve rod top 08.
- Connect screw connection 24
- Remove compression spring 29.
- Remove suspension screw 03 from valve rod top 14;
- Remove retainer set 02 from bottom of connection rod 04.;
- Replace O-ring retainer set 21 and fit retainer set 02 to connection rod 04.
- Remove valve rod bottom 19 from valve rod top 14.
- Pull valve rod top 14 from valve 12 and replace O-ring 41.
- Re-insert valve rod top 14 in valve 12 and fix valve rod bottom 19 to valve rod top 14 (fix connection with LOCTITE 243).
- Replace filler block 01 of valve rod top 14.
- Fit connection rod 04 with retainer set 02 and suspension screw 03 back to valve rod top 14 (fix suspension screw 03 with LOCTITE 243).
- Unscrew screw connection 31 and disconnect securing plate 13.
- Replace O-ring 30.
- Connect screw connection 31 (use new screws) and securing plate 13.
- Re-fit compression spring on valve.
- Slowly and carefully lower cover 09 with guide of valve rod top 08 over connection rod 04. Work very carefully to prevent damage.
- Completely lower cover 09 with guide of valve rod top 08 over valve rod top 14.
- Slide coupling bottom 07b over connection rod 04 and fit retainer set 02 (with new O-ring 21).
- Connect coupling bottom 07b to coupling top 07a (fix with a drop of LOCTITE 243) and fit new filler block.
- Tighten connection rod 04 (figure 7a) and top of coupling 07a (fix connection with a drop of LOCTITE 243).
- Unscrew screws 33 approx. 15 mm from valve seat 15.
- Screw load frame for M10 into tap thread holes of valve seat 15 provided for this purpose.
- Slowly lift valve seat 15 from valve body 16 (with a suitable lifting tool).
- Check valve seat 15 for damage to the top sealing edge.
- Replace O-ring 32 and slowly and carefully mount valve seat 15 in the body of valve 16.
- Again tighten screws 33 and remove load frame from valve seat 15.

© 2017 Honeywell International Inc

– To replace O-rings 42 and 48 there are two possibilities:

  If there is any free space of 370 mm or more underneath the valve body:
  ◊ Unscrew screw connections 49, 50 (2x).
  ◊ Remove nut 43 (guide valve rod bottom 20 may be safeguarded against turning at the bottom or the jaw).
  ◊ Disconnect bottom cover 46 and guide valve rod bottom 20 and replace O-ring 42.
  ◊ Connect bottom cover 46 and guide valve rod bottom 20 by means of nut 43 (lock nut 43 with LOCTITE 243).
  ◊ Fit bottom cover completely to valve body by means of screw connections 49, 50.

  If there is any free space of less than 370 mm underneath the valve body:
  ◊ Remove nut 43 (guide valve rod bottom 20 may be safeguarded against turning at the bottom).
  ◊ Lift guide of valve rod bottom 20 upwards from bottom cover 46.
  ◊ Replace O-ring 42.
  ◊ Fit guide of valve rod bottom 20 back in bottom cover 46.
  ◊ Fit bottom cover 46 and guide valve rod bottom 20 by means of nut 43 (lock nut 43 with LOCTITE 243).

– Slowly lower cover 09 with valve 12 hanging below it into body 16. In doing so, slowly lower valve rod bottom 19 over the guide of valve rod bottom 20.
– Tighten screw connections 38, 53, 28.
– Mount the complete SVC086 on cover 09 by means of screw connection 47. Mind that handle 15 does not touch the mounting of O-ring guide 23 (see figure 7a).
– Fit protective cap 25 (see figure 7a).
– Connect impulse line of the pressure converter.
– Take the line back in operation (if no other maintenance work is necessary).

Remark

Check the threshold values of the HON HSV after each maintenance!

CAUTION !!!

Always carry out an operational and tightness test after maintenance work!

© 2017 Honeywell International Inc

5.6 Spare-part sets

Pressure converter SM 1.x-A (see figure 6a and partslist page 37)
This spare-part set consists of:
- 1x diaphragm 02
- 1x O-ring 16
- 1x O-ring 18
- 1x seal 09

Pressure converter SM2/2500 (see figure 6b and partslist page 37)
This spare-part set consists of:
- 1x O-ring 16
- 1x O-ring 18
- 1x seal 09

Pressure converter SM90 (see figure 6c and partslist page 37)
This spare-part set consists of:
- 1x diaphragm 02
- 1x seal 09

Valve and valve body HON HSV086 (see figure 7a and partslist page 30)
This spare-part set consists of:
- 2x O-ring retainer set 21
- 1x O-ring rod 22
- 1x O-ring guide 23
- 1x O-ring top cover 26
- 1x O-ring valve 30
- 1x O-ring valve seat 32
- 2x O-ring 40
- 1x Safety nut 41

Valve and valve body HON HSVS086 (see figures 7b and 7c and partslist page 31)
This spare-part set consists of:
- 2x O-ring retainer set 21
- 1x O-ring rod 22
- 1x O-ring guide 23
- 1x O-ring top cover 26
- 1x O-ring valve 30
- 1x O-ring valve seat 32
- 1x O-ring guide 39
- 1x O-ring valve stem guide 41
- 1x O-ring valve stem seat 42
- 1x O-ring bottom cover 48
- 1x O-ring 40

© 2017 Honeywell International Inc

These parts may be ordered as a complete set:

NAME	ARTICLE NUMBER
HON HSV086 1" ANSI 300/600	939403S116970
2" ANSI 300/600	939403S116980
3" ANSI 300/600	939403S116990
4" ANSI 300/600	939403S117000
6" ANSI 300/600	939403S117010
8" ANSI 300/600	939403S117020
10" ANSI 300/600	939403S117030
12" ANSI 300/600	939403S117040
HON HSV***S***086 16“ ANSI 300/600	939403S117050
HON HSV***S***086 16“ ANSI 900/1500	939403S206400
SM 1.x-A	939405S125370
SM 2/2500	939405S189660
SM90	939405S125360

20" up to 24" on request

Table V: Spare-part sets

5.7 Parts list valve and valve body HON HSV

(see also figure 7a)

PARTS LIST VALVE AND VALVE BODY			
Pos	**Name**	**Pos**	**Name**
01	Filler block	21 *	O-ring retainer set (2x)
02	Retainer set	22 *	O-ring connection rod
03	Coupling	23 *	O-ring guide
04	Connection rod	24	Countersunk screw
05	Connection rod guide	25	Retaining ring
06	Ring	26 *	O-ring top cover
07	Retainer holder	27	Plug
09	Top cover	28	Socket screw
10	Locking pin	29	Compression spring
11	Name plate	30 *	O-ring valve
12	Valve	31	Countersunk screw
13	Retaining plate	32 *	O-ring valve seat
14	Valve stem	33	Set screw with tap
15	Valve seat	34	Ring
16	Valve body	35	Collar plug
17 **	By-pass line	40 *	O-ring (only 8“ - 10“ - 12“)
		41 *	Safety nut (only 8“ - 10“ - 12“)

Table VI: Parts list shut-off device

* Recommended spare parts

** Standard, a by-pass line with by-pass valve in the form of a spring closed ball valve or a spring-closed push-button valve is supplied. This is used to equalise the pressure upstream and downstream of the shut-off valve to open the valve.

© 2017 Honeywell International Inc

5.8 Parts list valve and valve body HON HSVS (see also figures 7b and 7c)

PARTS LIST VALVE AND VALVE BODY			
Pos	**Name**	**Pos**	**Name**
01	Filler block (2x)	21 *	O-ring retainer set (2x)
02	Retainer set	22 *	O-ring rod
03	Suspension screw	23 *	O-ring guide
04	Connection rod	24	Socket screw (4x)
05	Connection rod guide	25	Retaining ring
06	Ring	26 *	O-ring top cover
07a	Retainer holder top	28	Stud bolt
07b	Retainer holder bottom	30 *	O-ring valve
08	Valve stem guide top	31	Socket screw (12x)
09	Cover	32 *	O-ring valve seat
10	Set screw	33	Set screw with tap
11	Name plate	34	Seal
12	Valve	35	Sealing screw
13	Retaining plate	36	Hammer-drive screw
14	Valve rod top	37	Load frame
15	Valve seat	38	Hexagon nut
16	Valve body	39 *	O-ring guide
17 [1)]	By-pass line	40 *	Circlip
19	Valve stem bottom	41 *	O-ring valve stem guide
20	Valve stem guide bottom	42 *	O-ring valve stem seat
29	Compression spring	43	Blind nut
44	Support plate	45	Locking disc
46	Bottom cover	47	Socket screw
52	Cover plate	48 *	O-ring bottom cover
56	Plug	49	Socket screw
		50	Locking disc
		51	Load frame
		53	Locking disc
		54	Socket screw
		55	Lock screw
		57	Plug

* Recommended spare parts

Table VII: Parts list valve and valve body

1) Not included in figure 7a

© 2017 Honeywell International Inc

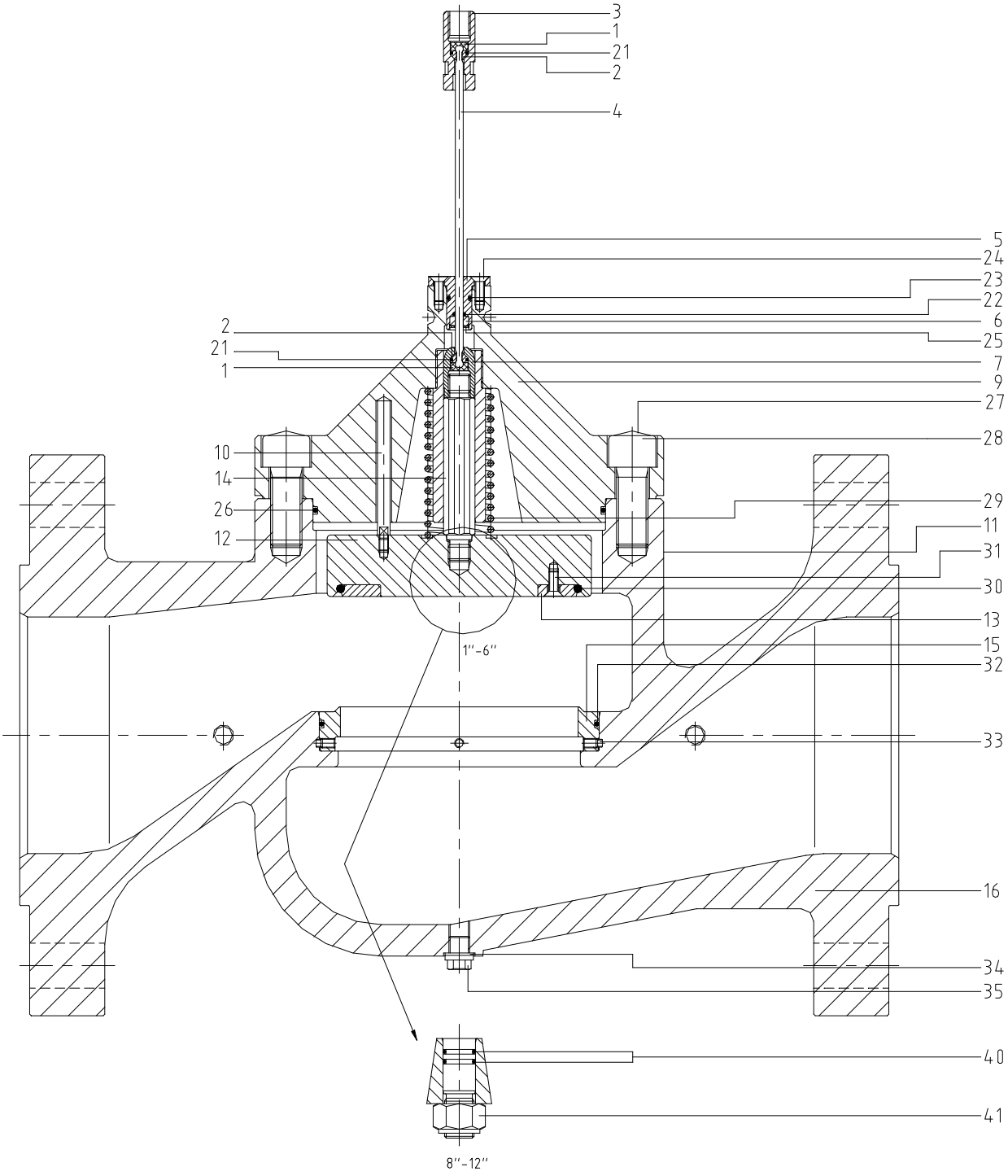


Figure 7a: Valve and valve body HON HSV086

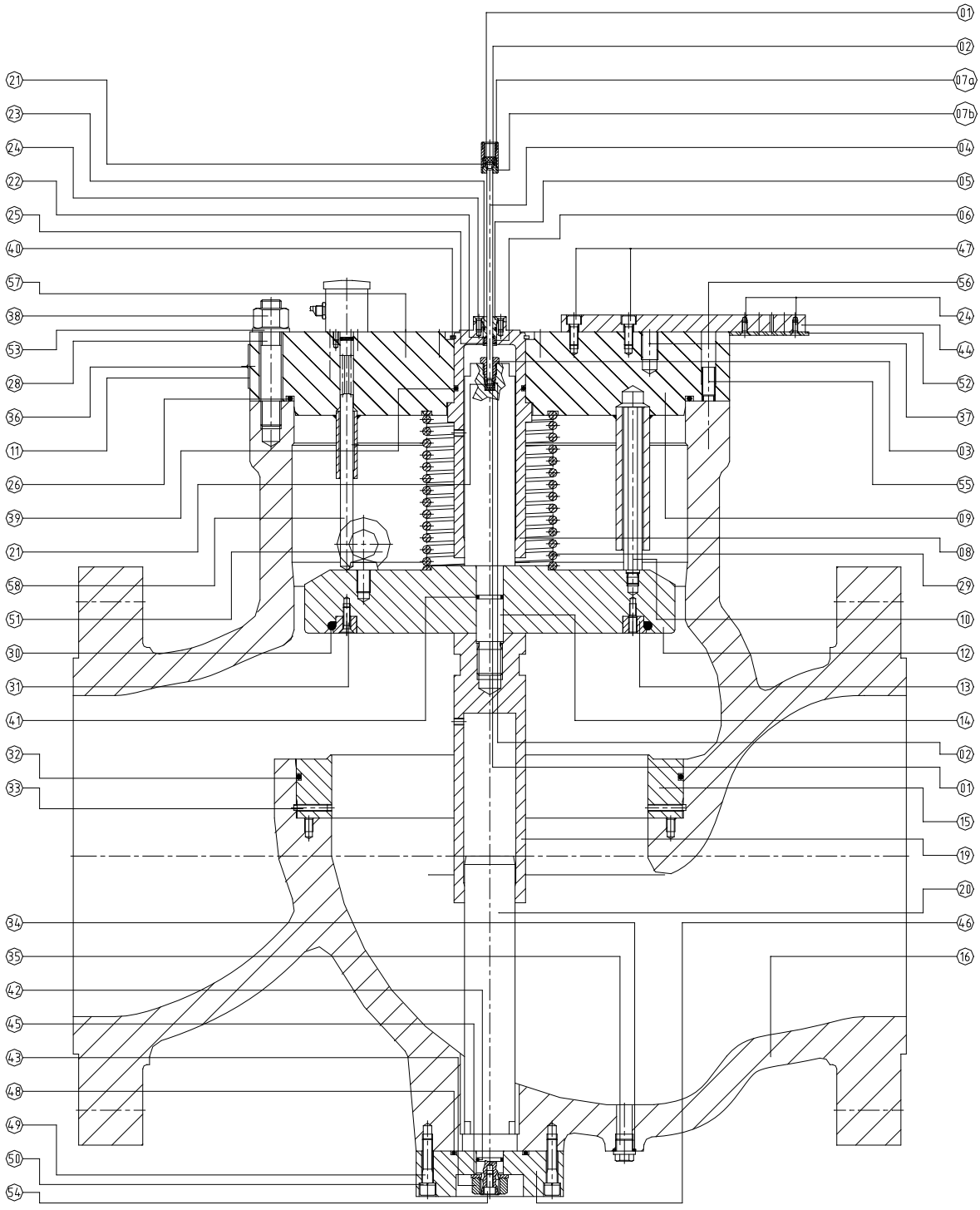


Figure 7b: valve and valve body HON HSVS086

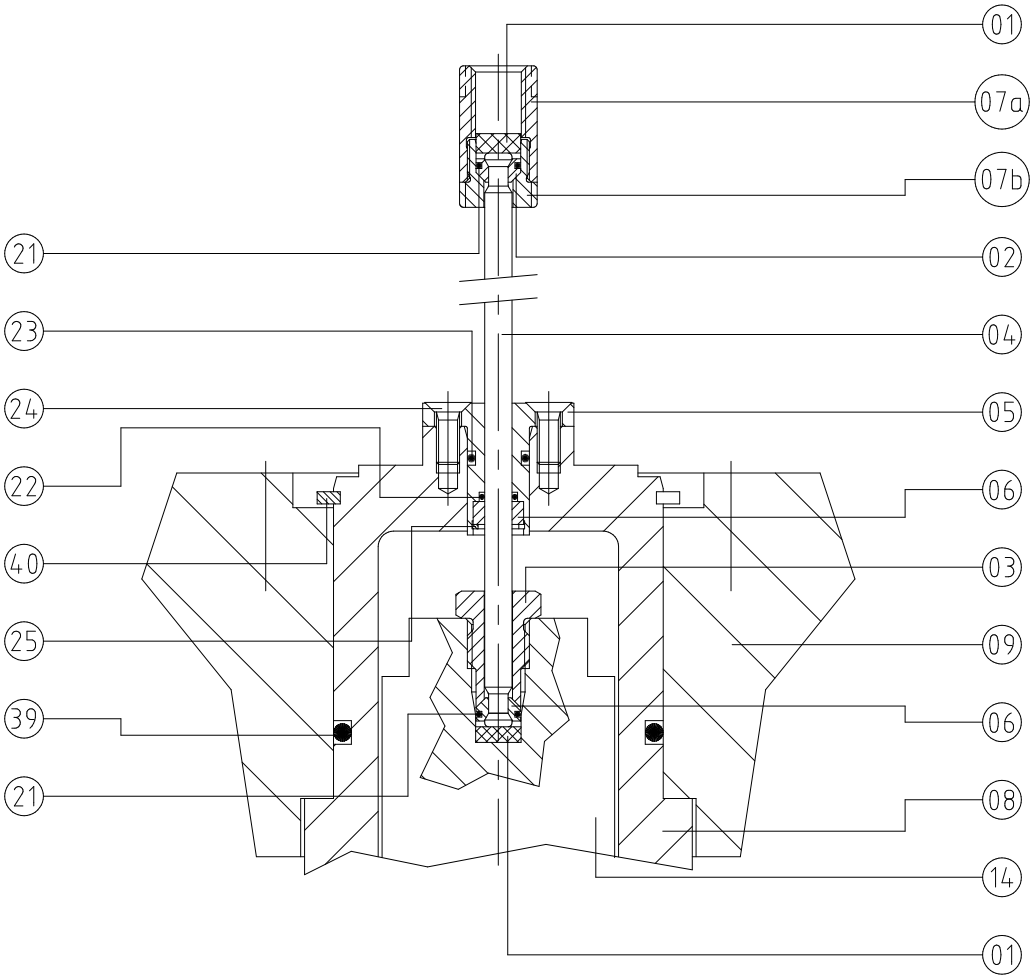


Figure 7c: Detail of connection rod and connection rod guide

Remark

Check the set pressures of the safety device after each maintenance!

5.9 Parts list switch and reset mechanism SVC086 (see also figure 8)

PARTS LIST CONTROL AND SWITCH MECHANISM SVC 086			
Pos	**Name**	**Pos**	**Name**
01	Emergency button	34	Compression spring
02	Nut	35	Gear wheel
03	Compression spring	36	Reducer nut
04	Emergency button housing	37	Reset button
05	Retaining ring	38	Socket screw
06	Emergency button pin	39	Compression spring
07	Housing valve gear	40	Reset pin
08	Gear rack	41	Spring clip
09	Needle bearing	42	Socket screw
10	Spring seat max.	43	Cover plate
11	Spring seat min.	44	Gasket
12	Needle bearing	45	Stop collar
13	Compression spring max.	46	Pin
14	Spring seat max.	47	Guide
15	Adjusting nut	48	Gasket
16	Column max.	49	Countersunk screw
17	Pressure pin	50	Switch pin unit
18	Assy. handle max.-min.	51	Compression spring min.
19	Nut	52	Column min.
20	Set screw	53	Spring seat min.
21	Cover plate	54	Relay housing
22	Retaining sleeve	55	Balance unit
23	Shaft handle	56	Clamping bush
24	Split pin	57	Switch shaft
25	Bolt	58	Needle bearing
26	Cover plate	59	Clamping bush
27	Gasket	60	Eccentric
28	Button	61	Lock nut
29	Lifting arm	62	Bearing bush
30	Gear shaft	63	Axial-flow disc
31	Dirt scraper	68	Socket screw
32	Hexagon bolt	97	Locking disc
33	Cover plate		

Table VIII: Parts list control and switch mechanism SVC 086

© 2017 Honeywell International Inc

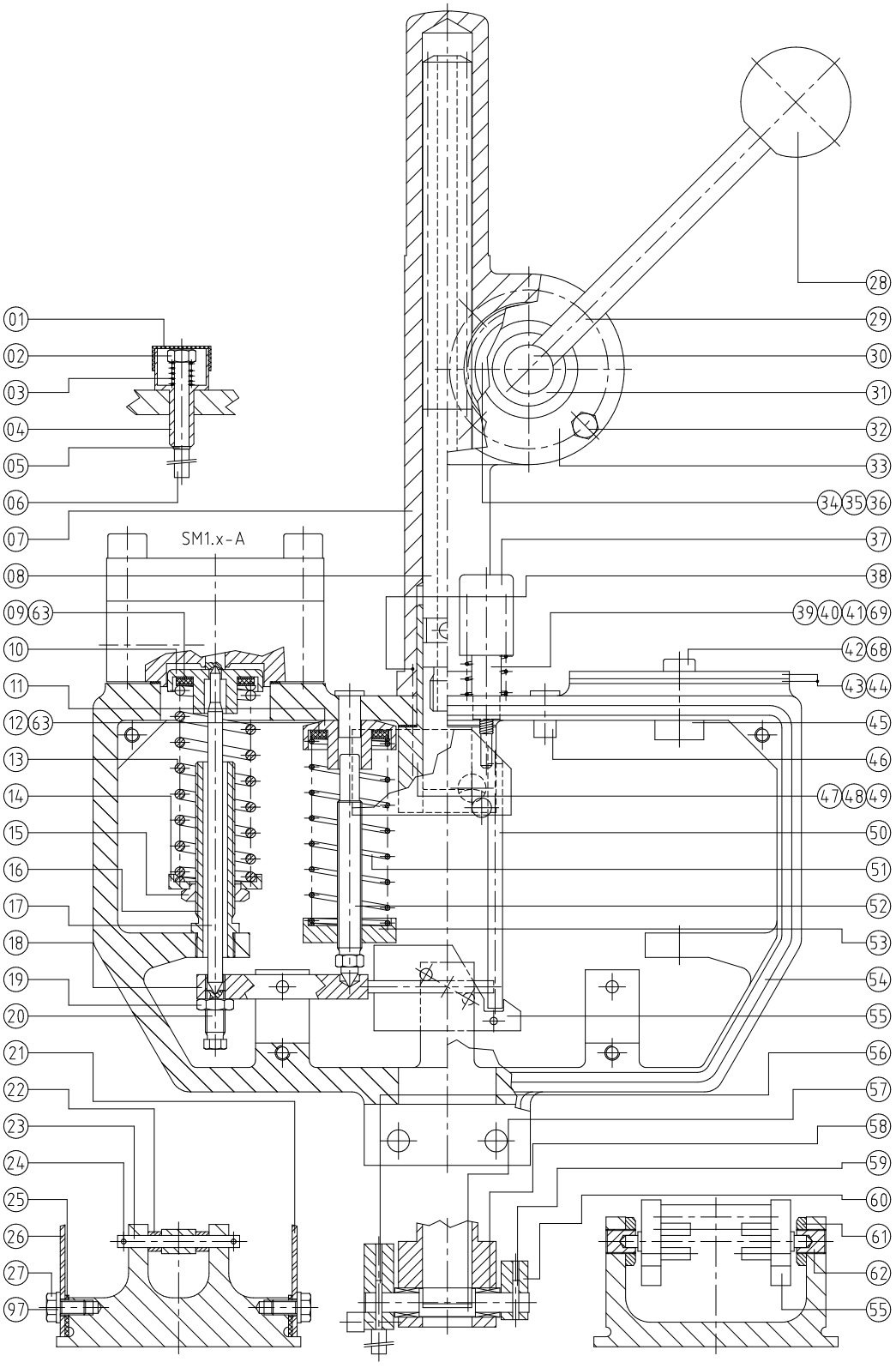


Figure 8: Control and switch mechanism SVC 086

5.10 Parts list pressure converters SM

(see also figure 6a, b, c)

PARTS LIST PRESSURE CONVERTER SM1.2-A; SM1.4-A; SM1.9-A	
Pos	**Name**
01	Cover
02 *	Diaphragm
03	Bottom seat
04	Housing
05	Bottom seat
06	Name plate
09	Gasket
15	Fillister-head screw
16 *	O-ring
17	Sealing rings
18 *	O-ring
19	Hammer-drive screw
20	Fillister-head screw
21	Straight screw connection

* Recommended spare parts

Tables IXa: parts list pressure converter SM

PARTS LIST PRESSURE CONVERTER SM2/2500	
Pos	**Name**
01	Cover
03	Bush
04	Bottom cover
05	Plunger
06	Name plate
09	Gasket
15	Fillister-head screw
16 *	O-ring
18 *	O-ring
19	Hammer-drive screw
20	Fillister-head screw
21	Straight screw connection
22	Plug

* Recommended spare parts

Tables IXb: parts list pressure converter SM

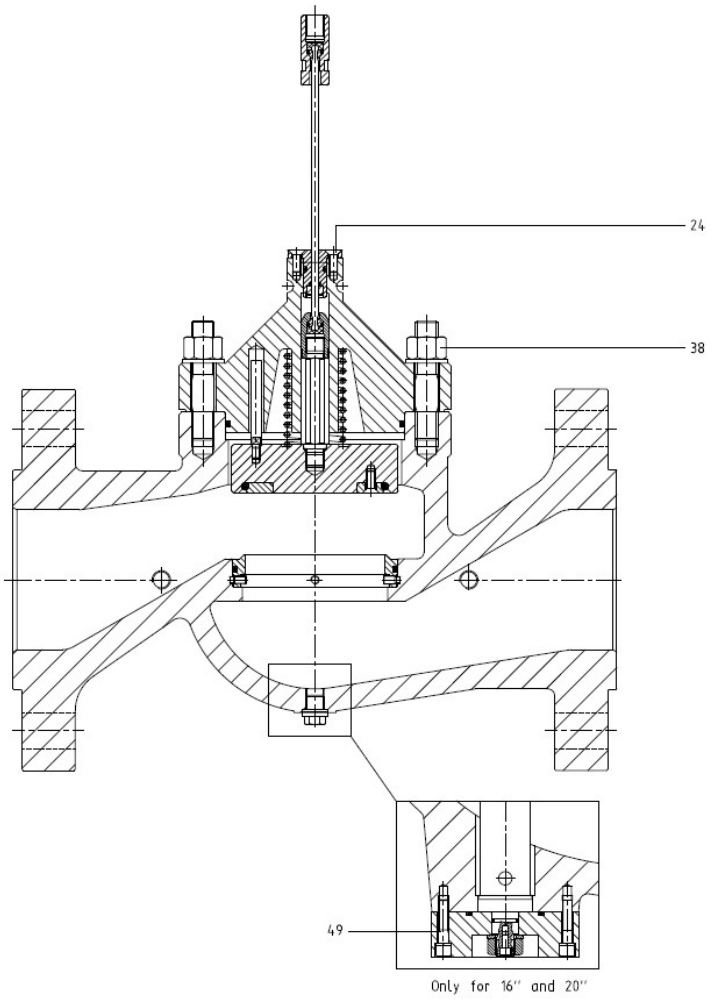
© 2017 Honeywell International Inc

PARTS LIST PRESSURE CONVERTER SM90	
Pos	**Name**
01	Cover
02 *	Diapragm
03	Nut
04	Bottom cover
05	Top diaphragm plate
06	Name plate
09	Gasket
15	Bolt
19	Hammer-drive screw
20	Fillister-head screw
21	Straight screw connector
22	Plug

* Recommended spare parts

Tables IXc: parts list pressure converter SM

5.11 Bolt preload for assembly



Recommended bolt preload for pressure retaining part is shown in table below.

HSV086 and HSVS086 bolt torque(Nm)				
SIZE	Rating	Pos.		
		24	38	49
1''	CL150/600	1.5	20	
	CL900/1500	2.5	80	
2''	CL150/600	1.5	85	
	CL900/1500	4	400	
3''	CL150/600	1.5	85	
	CL900/1500	4	400	
4''	CL150/600	1.5	180	
	CL900/1500	4	220	
6''	CL150/600	1.5	450	
	CL900/1500	4	1170	
8''	CL150/600	1.5	430	
	CL900/1500	4	2050	
10''	CL150/600	1.5	430	
	CL900/1500	4	2050	
12''	CL150/600	1.5	600	
	CL900/1500	4	1100	
16''	CL150/600	1.5	760	25
	CL900/1500	8	2600	75
20''	CL150/600	2.5	1590	25

Table X: Recommended bolt preload for pressure retaining part

© 2017 Honeywell International Inc

6 Failures

Failure	Possible cause	Solution
Switching device does not or wrongly respond at too low a pressure	Setpoint spring for under-pressure incorrectly set	Repeat adjustment and check threshold value
	Handle H (figure 2) is not horizontal at average value of threshold value	Place handle H horizontally
Switching device does not or wrongly respond at too high a pressure	Setpoint spring for over-pressure has been set incorrectly	Repeat adjustment and check threshold value
	Handle H (figuur 2) is not horizontal at average value of threshold value	Place handle H horizontally
Switching device does not respond without the lower switch-on pressure having been reached	Diaphragm in pressure converter is fractured	Check diaphragm in pressure converter and replace, if necessary
Valve cannot go up	Pressure upstream and downstream of the valve is not yet or not fully in equilibrium	Equilibrate pressure using the by-pass line
Control and switch mechanism cannot be reset	Handle H (figure 2) is not horizontal, so that switch pin M cannot be locked	Check that the pressure in the pressure converter is below the higher, resp. above the lower threshold value. If necessary, place handle H horizontally.
After the valve has dropped, the outlet pressure increases	Pressure converter seal is leaking	Inspect seal and seat of the valve and, if necessary, replace seal or seat
For HON HSVs equipped with accessories only		
Switch in SVC086 and K1 indication valve position indicate valve open. Indication valve position on body cover indicates valve closed.	Proximity switch in valve position indicator does not function properly.	Check locally whether valve has dropped (check indication position valve K1). If necessary replace proximity switch
	Breaking of a cable	Replace cable
Indication valve position K1 and indication on body cover indicate valve open, but valve position indicator in SVC086 indicates valve closed	(Proximity) switch valve position indicator in SVC086 does not function properly	Check locally whether valve has dropped (check indication position valve K1). If necessary replace proximity switch
	Breaking of a cable	Replace cable

© 2017 Honeywell International Inc

Failure	Possible cause of failure	Solution
Indication valve position K1 and indication on body cover indicate valve closed, but valve position indication in SVC086 indicates valve open.	Mechanical problem to the valve.	Check locally whether the valve has dropped (second stage handle H2 has dropped) and, if necessary, carry out extensive maintenance work.

Table VII: Summary of possible failures

7 Accessories

7.1 Accessories, general

In this table you find a summary of all accessories. On request special accessories are, of course, available.

	NAME	
A1	Cover plate plexiglas front	
A2	Cover plate plexiglas front and back	
A3	End switch in SVC086	
A4	End switch with connector in SVC086	
A5	Cover plate front with single proximity switch	
A6	Cover plate front with double proximity switch	

Table X: Accessories general

7.2 By-pass pipeline

In addition to the optional accessories, the by-pass line can also be adapted to the requirements of the customer.

By-pass tubing is available in 10mm, 12mm and 1/2“.
It can be Parker or Swagelock.

Standard up to 600# rating the spring return push button valve ZVC is mounted.

Other possibilities are spring return ball valves for higher pressures.

© 2017 Honeywell International Inc