Type 3709 Pneumatic Lock-Up Valve

Application

Lock-up valve used to shut off the signal pressure line of pneumatic actuators

The pneumatic lock-up valve shuts off the signal pressure line either when the air supply falls below an adjusted value or upon complete air supply failure. This causes the actuator to remain in its last position.

Versions

- **Type 3709-1** (Fig. 1)
  - Lock-up valve for direct attachment to the following positioners:

Type 4763/4765	▶ T 8359
Type 3760	▶ T 8385
Type 3766/3767	▶ T 8355
Type 3730-0	▶ T 8384-0
Type 3730-1	▶ T 8384-1
Type 3730-2	▶ T 8384-2
Type 3730-3	▶ T 8384-3
Type 3730-4	▶ T 8384-4
Type 3730-5	▶ T 8384-5
Type 3730-6	▶ T 8384-6
Type 3731-3	▶ T 8387-3
Type 3731-5	▶ T 8387-5

  - Connecting thread G ¼ or ¼ NPT
  - K_{VS} 0.2
  - Designed for linear actuators and rotary actuators according to VDI/VDE 3845, fixing level 1 (not in combination with Types 4708-53/-54/-63 Supply Pressure Regulators)
- **Type 3709-2** (Fig. 2)
  - Lock-up valve for installation in the signal pressure line in any position as required
  - Connecting thread G ¼ or ¼ NPT
  - K_{VS} 0.2
- **Type 3709-4** (Fig. 3)
  - Lock-up valve with booster for installation in the signal pressure line in any position as required
  - G ½ or ½ NPT connecting thread
  - K_{VS} 4.3

Fig. 1: *Type 3709-1 Pneumatic Lock-up Valve*

Fig. 2: *Type 3709-2 Pneumatic Lock-up Valve*

Fig. 3: *Type 3709-4 Pneumatic Lock-up Valve*

- **Type 3709-5** (Fig. 4)
  - Lock-up valve with booster
  - Input hooked-up as required
  - G ¼ or ¼ NPT thread
  - Mounting on single-acting rotary actuators according to VDI/VDE 3845
  - K_{VS} 2.0
- **Type 3709-6** [1] (Fig. 5)
  - Lock-up valve with booster
  - Input hooked-up as required
  - G ½ or ½ NPT thread
  - Mounting on single-acting rotary actuators according to VDI/VDE 3845
  - K_{VS} 4.3
- **Type 3709-7**
  - Lock-up valve with booster
  - Input and output connections without thread (¼")
  - Mounting on single-acting rotary actuators according to VDI/VDE 3845
  - Sandwich-style solenoid valve
  - K_{VS} 2.0
- **Type 3709-8** [1]
  - Lock-up valve with booster
  - Input and output connections without thread (½")
  - Mounting on single-acting rotary actuators according to VDI/VDE 3845
  - Sandwich-style solenoid valve
  - K_{VS} 4.3

Principle of operation (Fig. 6)

The pneumatic lock-up valve shuts off the signal pressure line either when the air supply falls below an adjusted value or upon complete air supply failure. This causes the pneumatic actuator to remain in its last position.

The supply air produces a force on the diaphragm (4) which is balanced by the spring (6). When the force produced on the diaphragm is greater than the spring force, input and output are connected, i.e. the signal pressure supplied by the positioner is transmitted unobstructed to the pneumatic actuator. When the supply air pressure falls below the adjusted value, the spring force dominates, and the spring (6) moves the plug (3) fully into the seat (9). As a result, the pressure in the pneumatic actuator is blocked.

Types 3709-4 to 3709-8 are also fitted with a booster to generate higher air capacities. An internal control pressure activates the booster.

Legend for Fig. 6

1	Body	7	Lock nut
2	Cover	8	Cap
3	Plug	9	Seat
4	Diaphragm	p_z	Supply air
5	Screw for set point adjustment	p_e	Input
6	Spring	p_a	Output

[1] On request

Fig. 4: *Type 3709-5 Pneumatic Lock-Up Valve, stainless steel version*

Fig. 5: *Type 3709-6 Pneumatic Lock-up Valve*

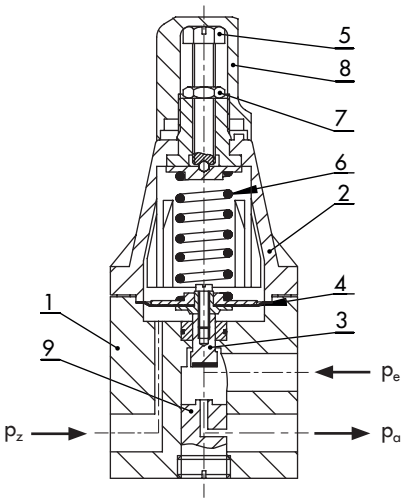


Fig. 6: *Schematic diagram of Type 3709*

Typical applications

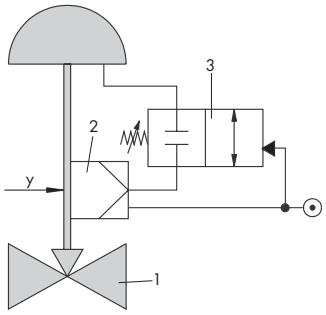


Fig. 7: *Closed loop control and fail-in-place*

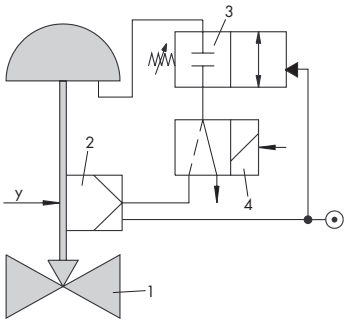


Fig. 8: *Closed loop control with fail-safe action and fail-in-place, lock-up valve has priority over the solenoid valve*

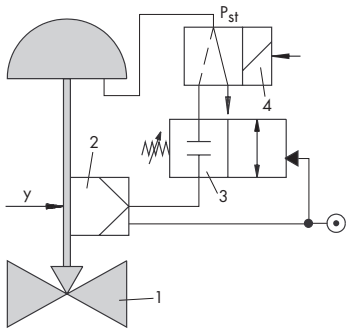


Fig. 9: *Closed loop control with fail-safe action and fail-in-place, solenoid valve has priority over the lock-up valve*

1 Pneumatic control valve
2 Positioner
3 Lock-up valve
4 Solenoid valve

Table 1: *Technical data for Type 3709-1 and Type 3709-2*

Type 3709	**-1**	**-2**
Attachment	Positioner	Hooked-up as required
Supply air	Max. 12 bar	Max. 12 bar
Signal pressure	Max. 6 bar	Max. 6 bar
K_{VS} coefficient approx.	0.2	0.2
Set point range (continuously adjustable)	0.5 to 6 bar	0.5 to 6 bar
Switching accuracy	Approx. 0.2 bar → For a set point of 2 bar Approx. 0.3 bar → For a set point of 4 bar Approx. 0.4 bar → For a set point of 6 bar	
Permissible ambient temperature range	–25 to +80 °C	–25 to +80 °C
	Extended range on request	
Paint compatibility	On request	
Connections		
Signal pressure output p_a	G/NPT ¼	G/NPT ¼
Signal pressure input p_e	G/NPT ¼	G/NPT ¼
Supply air p_z	G/NPT ¼	G/NPT ¼
Weight		
Aluminum approx.	0.4 kg	0.4 kg
Stainless steel approx.	1 kg	1 kg

Table 2: *Technical data for Type 3709-4 to Type 3709-8 (lock-up valve with booster)*

Type 3709	-4	-5	-6	-7	-8
Attachment	Hooked-up as required	Actuators according to VDI/VDE 3845			
		Input hooked-up as required		Sandwich-style solenoid valve	
Supply air	Max. 6 bar	Max. 6 bar	Max. 6 bar	Max. 6 bar	Max. 6 bar
Signal pressure	Max. 6 bar	Max. 6 bar	Max. 6 bar	Max. 6 bar	Max. 6 bar
K_{VS} coefficient approx.	4.3	2.0	4.3	2.0	4.3
Set point range (continuously adjustable)	1.5 to 6 bar	1.5 to 6 bar	1.5 to 6 bar	1.5 to 6 bar	1.5 to 6 bar
Switching accuracy	Approx. 0.2 bar → For a set point of 2 bar Approx. 0.3 bar → For a set point of 4 bar Approx. 0.4 bar → For a set point of 6 bar				
Permissible ambient temperature range	–40 to +80 °C				
Paint compatibility	On request				
Connections					
Signal pressure output p_a	G/NPT ½ [1]	NAMUR ¼	NAMUR ½	NAMUR ¼	NAMUR ½
Signal pressure input p_e	G/NPT ½ [1]	G/NPT ¼ [2]	G/NPT ½ [2]	NAMUR ¼	NAMUR ½
Venting	–	G ⅜	G ¾	–	–
Supply air p_z	G/NPT ¼ [1]	G/NPT ¼ [1]	G/NPT ¼ [1]	G/NPT ¼ [1]	G/NPT ¼ [1]
Weight					
Aluminum approx.	1.2 kg	1.5 kg	1.5 kg	1.5 kg	1.5 kg
Stainless steel approx.	3.1 kg	4 kg	4 kg	4 kg	4 kg

[1] Double nipple for G/NPT thread. Refer to Accessories on page 5
[2] G or NPT nipple. Refer to Accessories on page 5

Table 3: *Materials*

Version		Type 3709-1/-2		Type 3709-4/-5/-6/-7/-8	
		Aluminum	Stainless steel	Aluminum	Stainless steel
Control head	Body	3.3547	1.4404	3.2315	1.4404
	Cover	PA B3WG5 and 3.2315	PA B3WG5 and 1.4404	3.2382	1.4404
	Diaphragm plate	3.1325 and 3.3547		3.2315 and 3.3547	
	Diaphragm	NBR/PVC (745N Yg290) or VMQ		VMQ	
	Plug	3.1325 and NBR or VMQ		Delrin®/POM	
	Bushing	–		Delrin®/POM	
	Seat	3.1325		–	
	Ball	–		1.4034	
	O-rings	NBR or VMQ		VMQ	
	Spring	1.4310		1.4310	
	Cap	PA 66		PA 66	
Booster	Body	–		3.2315	1.4404
	Booster section			POM, VMQ and stainless steel	
	Separator			1.0338 (DC04-A)	
	Diaphragm			VMQ	
	O-rings			VMQ	

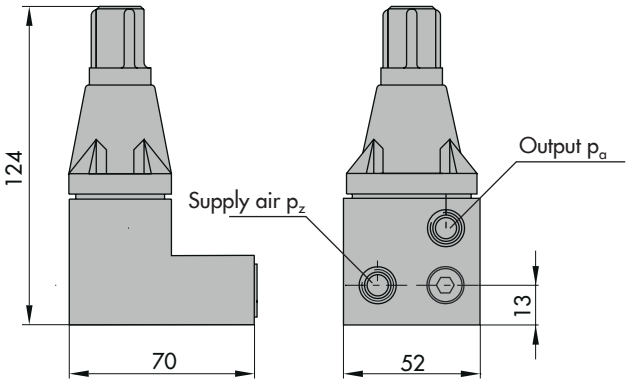
Article code

Lock-up valve	Type 3709-	x	x	x	x	x	x	0	0	0	0
Version											
Positioner attachment · K_{VS} = 0.2		1									
Hooked-up as required · K_{VS} = 0.2		2									
Hooked-up as required · K_{VS} = 4.3		4									
Attachment according to VDI/VDE 3845 · K_{VS} = 2.0		5									
Attachment according to VDI/VDE 3845 · K_{VS} = 4.3		6									
Attachment according to VDI/VDE 3845, without thread (¼") Sandwich-style solenoid valve · K_{VS} = 2.0		7									
Attachment according to VDI/VDE 3845, without thread (½") Sandwich-style solenoid valve · K_{VS} = 4.3		8									
Connecting thread											
¼-18 NPT		1/2/5	1								
ISO-228/1 - G ¼		1/2/5	2								
Input and output ½-14 NPT, supply air ¼-18 NPT		4/6	3								
Input and output ISO-228/1 - G ½, supply air ISO-228/1 - G ¼		4/6	4								
Input and output without thread, supply air ¼-18 NPT		7/8	5								
Input and output without thread, supply air ISO-228/1 - G ¼		7/8	6								
Adjustment range											
0.5 to 6 bar		1/2		1							
1.5 to 6 bar		4/5/6/7/8		2							
Ambient temperature											
–25 to 80 °C		1/2			0						
–40 to 80 °C		4/5/6/7/8			1						
–45 to 80 °C		1/2			2						
Body material											
Aluminum						0					
Stainless steel						1					
Paint compatibility											
Without							0				
Free of substances that impair paint adhesion							1				

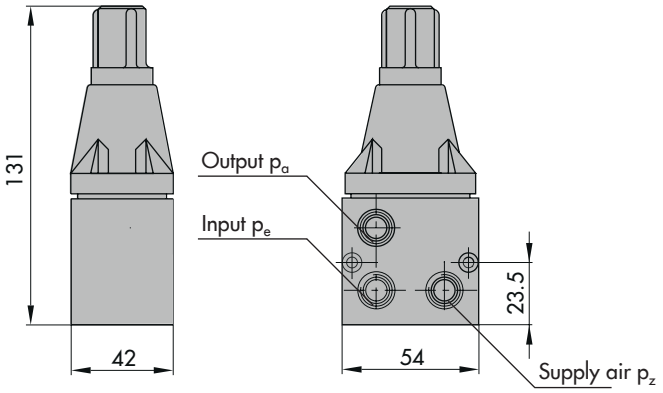
Accessories

Accessories	Order no.	Type 3709-x Pneumatic Lock-up Valve						
		1	2	4	5	6	7	8
Silencer	8504-0066			•	•	•	•	•
Silencer G ⅜ (venting)	8504-0067				•			
Silencer G ¾ (venting)	8504-0069					•		
Double nipple G ¼ → ¼ NPT (supply air)	0239-0165			•	•	•	•	•
Double nipple G ½ → ½ NPT (input and output)	0239-0166			•				
Nipple G ¼	0239-0148				•			
Nipple ¼ NPT	0239-0163				•			
Nipple G ½	0239-0149					•		
Nipple ½ NPT	0239-0164					•		

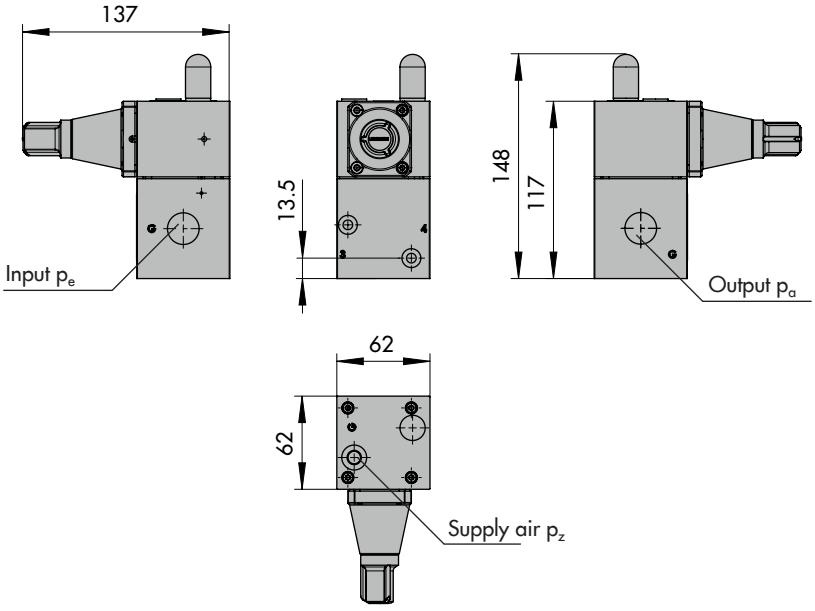
Type 3709-1



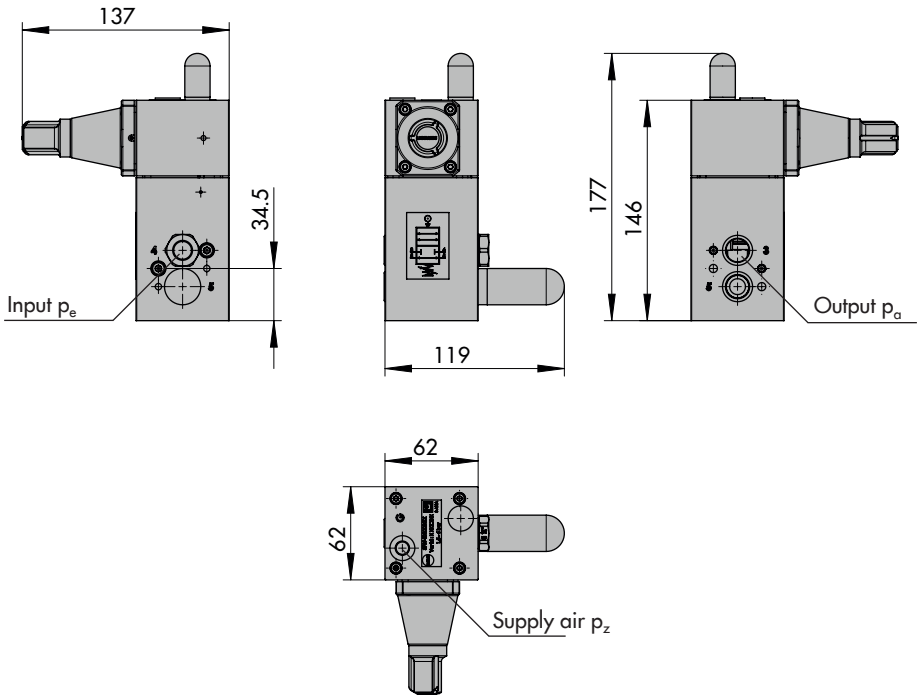
Type 3709-2



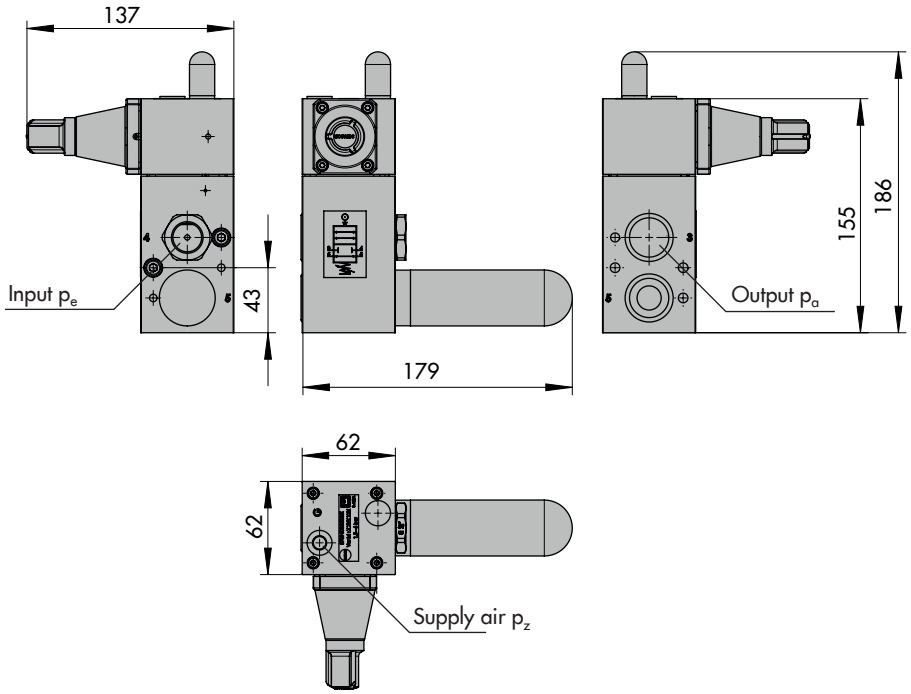
Type 3709-4



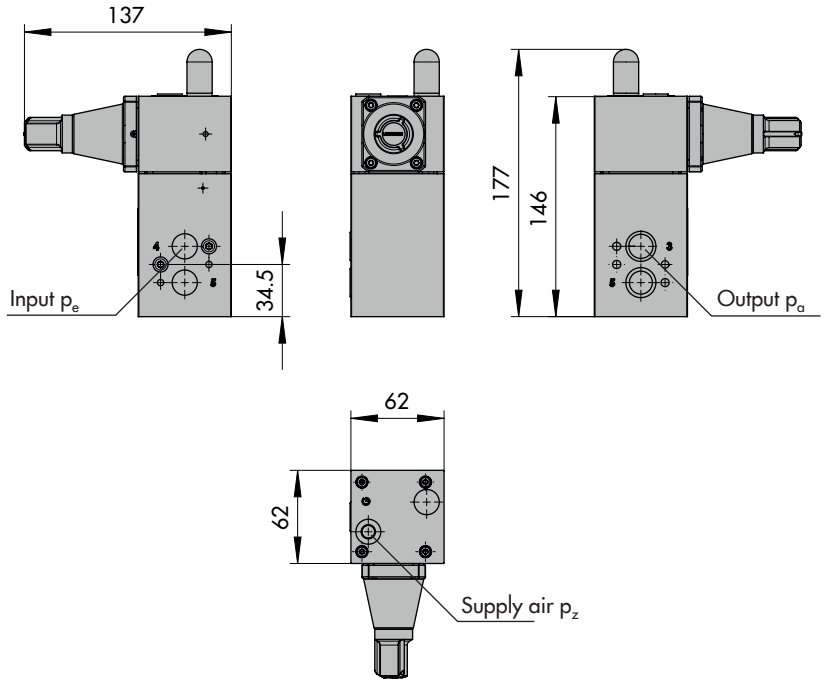
Type 3709-5



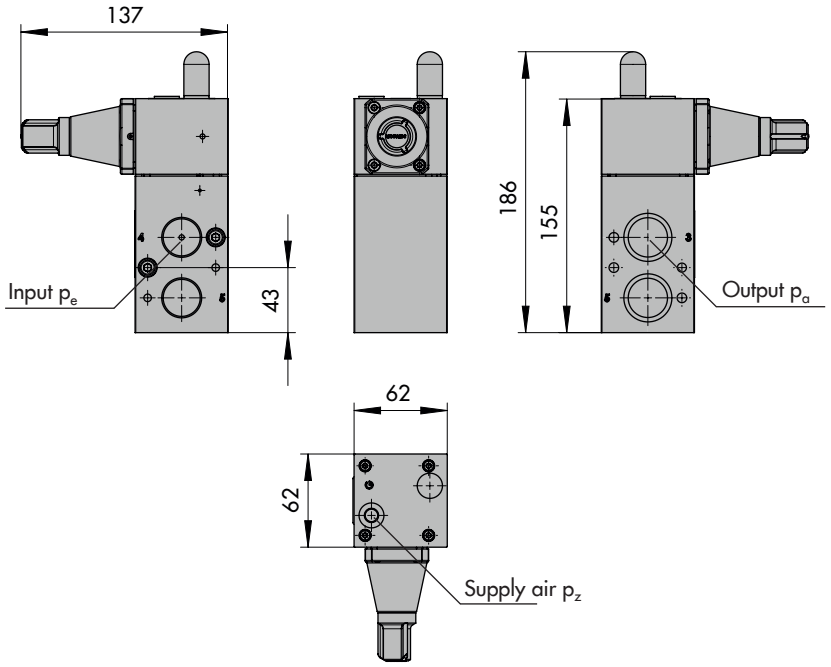
Type 3709-6



Type 3709-7



Type 3709-8



Specifications subject to change without notice

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de