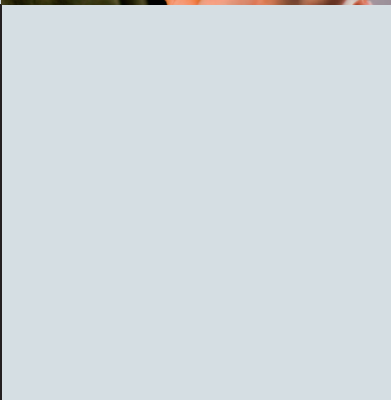


SAMSON

SAMSON

CATALOG



Components for the Food Processing and Pharmaceutical Industries

Components for the Food Processing and Pharmaceutical Industries

Catalog 2016

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Specifications subject to change without notice.

Components for the Food Processing and Pharmaceutical Industries

Overview

The SAMSON product range includes valves designed for the food processing and pharmaceutical industries as well as for the energy supply of production plants. The valves are manufactured in all common materials and comply with DIN and ANSI standards.

To ensure that valves are positioned exactly according to the control signal, positioners with an electric signal input or connected to common bus networks are used. Valves can be upgraded with accessories, such as limit switches or position transmitters.

This catalog provides you with an overview of SAMSON's product range designed for this specialized field. It contains background information on the special features of these valves and an extensive glossary to explain terms and abbreviations frequently used in the food processing and pharmaceutical industries.

The selection tables and tables listing the technical data include references to data sheets and other documentation, which provide detailed information on the products.



Food processing plant



Pharmaceutical plant

Application

Utility networks

V2001 and Type 3241 Valves control the supply of air, water, steam or refrigerants (utility networks) in production plants. The valves can be used with either pneumatic or electric actuators.

Hygienic valves for food processing

SAMSON has a range of valves designed to meet the specific requirements of the food processing industry. This range includes the Type 3345 Diaphragm Valve (see T 8031), Type 3347 Hygienic Angle Valve (see T 8097 and T 8097-3) and Type 3249 Aseptic Angle Valve (see T 8048, T 8048-2, and T 8048-3). The valves can be delivered with common end connections, such as flanges, hygienic couplings, Tri-Clamp® connections, and welding ends.

Materials and design are certified to comply with regulations stipulated by FDA, EHEDG, 3-A, etc.

Aseptic valves for the pharmaceutical industry

SAMSON's Type 3249 and Type 3349 Aseptic Angle Valves as well as the diaphragm valves by our partner SED Flow Control were developed specifically for aseptic applications in the food processing and pharmaceutical industries.

To meet with the stringent FDA and EHEDG requirements, the valve bodies are made of stainless steel and wetted surfaces are precision-lathed or polished. The cavity-free valve bodies are designed for CIP (cleaning-in place) or SIP (sterilization-in-place). The valves are self-draining when installed correctly.

An EPDM or PTFE diaphragm seals off the valve from the actuator and prevents any process medium from escaping to the atmosphere. The diaphragm used in diaphragm valves also functions as the throttling element.

As with the hygienic valves, these valves come with end connections designed as detachable or permanent fittings.

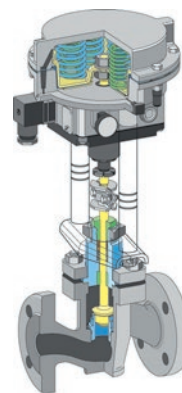
Self-operated pressure regulators

The Type 2371 Pressure Regulators are used in the food processing and pharmaceutical industries as excess pressure or pressure reducing valves.

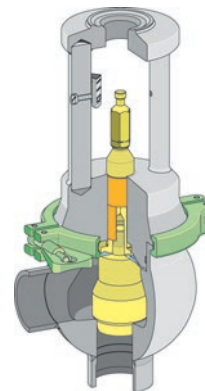
The cavity-free bodies of the regulators are made of stainless steel. Wetted surfaces are either precision-lathed or polished.

The set point can be adjusted mechanically or pneumatically.

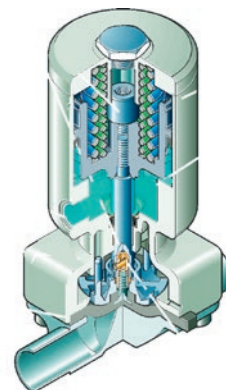
The stem of the regulator can be locked in place to keep the plug open for the CIP or SIP process.



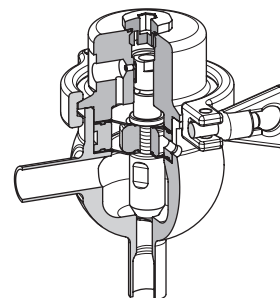
Series V2001 globe valve



Type 3249 Aseptic Valve



SED Steripur 407 Aseptic Valve



Type 2371-00 Pressure Regulator with pneumatic set point adjustment

Valve Features

Valve body

The valves are available in all common and specified materials. While valves intended for controlling the supply of water or steam in plants have bodies made of cast iron or cast steel, hygienic and aseptic valves are manufactured in stainless steel to meet stringent requirements. These valves have bodies made from investment castings, forged steel, or bar stock to meet specific requirements.

Surface finishes

In hygienic and, in particular, aseptic applications, the valves must be cleaned or sterilized to meet CIP or SIP requirements. The valves' surface finish must be designed to prevent the process medium from sticking to the inside of the valve and to minimize external contamination. The valve surface can be machined to achieve a surface roughness down to Ra 0.25 μm . The standard roughness is $<Ra$ 0.8 μm .

– Machining

The required quality of the surface finish is achieved by machining or manually polishing the surfaces. Favored methods include glass bead blasting and precision lathing.

– Electropolishing

The mechanically polished valve body (e.g. with 400-grit abrasives) is immersed in an electrolyte bath and a DC power supply is applied. The electrochemical process performed according to a standardized procedure removes the peaks from the roughness profile by at least 20 μm .

The valve body acquires a shiny finish and is less sensitive to medium deposits. Common terms for electropolished surfaces include satin finish and mirror finish.

Plugs and throttling elements

– Parabolic plug

Parabolic plugs are easy to manufacture and can be easily cleaned. Plugs have a tendency to vibrate as the plug stem is only guided on one side. This type of plug is best suited for on/off applications and used at low pressure drops.

– V-port plug

This special plug design is fairly complicated to manufacture and requires more care during cleaning. It is guided in the seat to prevent vibration. The V-port plug is suitable for high pressure drops.

– Diaphragm

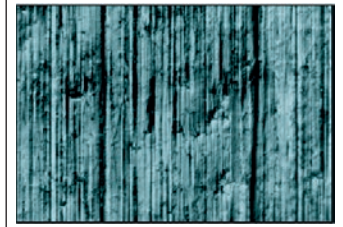
The use of a diaphragm as a throttling element ensures that the process medium does not come into contact with the actuator and cannot escape to the atmosphere. Tested and approved materials, such as EPDM and PTFE, and the specially designed bodies of SAMSON's Types 3345, 3249, and 3349 Valves as well as SED's diaphragm valves guarantee aseptic service.

Seat leakage

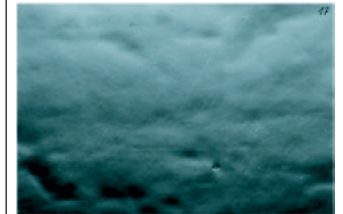
The valves are tested according to the standardized procedures and their measured seat leakage is graded in leakage classes.

DIN EN 60534-4 applies to DIN valves and ANSI/FCI 70-2 to ANSI valves.

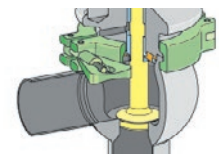
SED's diaphragm valves used as shut-off valves have zero seat leakage. The seat leakage of these valves is tested in accordance with DIN EN 12266-1.



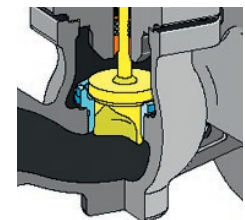
Polished body surface



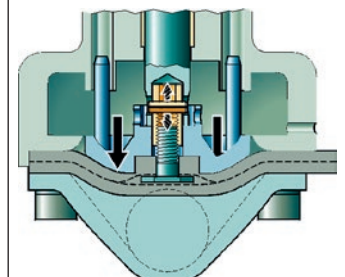
Electropolished body surface finish



Parabolic plug



V-port plug



One-piece fabric-reinforced diaphragm

End connections

The end connections to connect the valves to the pipeline are available with detachable or permanent welding ends. Detachable end connections are available as flanges, screw fittings, or clamp connections.

The end connections can be supplied to meet all common pipe standards (ISO, DIN, ASTM, BS, SMS, JIS). The inside diameters of the mating ends must be identical to ensure a flush transition between pipe and fitting as well as complete drainage.

– Socket or butt weld ends

Welding ends provide safe and maintenance-free connections.

Diverse pipe diameter and material thickness specifications exist for valves manufactured for the food processing and pharmaceutical industries due to the wide variety of existing standards. To meet hygienic or aseptic requirements, the ends of the butt weld fittings and the pipeline must be identical. Orbital welding is the most common method to weld on the ends without filler metals.

– Flanges

Flanges in all DIN versions are used in plant engineering.

Aseptic flanges according to DIN 11864-2 Form A are sealed by partly open O-rings. This reduces dead cavities and improves cleanability. Grooved and mated flanges are bolted together and have a metal-to-metal stop to ensure that the O-ring is mounted with a defined compression. Both flanges are joined to the pipe ends by orbital welding. The weld seams are polished to meet the finish quality of the valve body.

– Aseptic screwed pipe connections

The male part and liner are held together by a coupling nut.

A gasket is used for sealing in hygienic couplings according to DIN 11851.

Similar to the aseptic flanges, the aseptic screwed pipe connections are sealed by partly open O-rings. A metal-to-metal stop restricts the compression of the seal. The male part and liner are joined to the pipe ends by orbital welding and polished to meet the finish quality of the valve.

– Clamp connections

The joints are held together by a cone-shaped clamp. An EPDM or PTFE gasket is inserted between the clamp fittings. The gasket compression varies depending on how far the wing nut is tightened.



Diaphragm valve body with welding ends



Diaphragm valve body with aseptic flanges



Hygienic angle valve with threaded ends



Detachable aseptic pipe connections and clamp

Selection Criteria

Overview

Valve	Type	V2001	3241	3351	3353/ 3354	3345	3347	3249/ 3349	Steripur	KMA	KMD	2371
Valve size	DN	15 to 100	15 to 300	15 to 100	15 to 80	15 to 150	15 to 125	15 to 100	4 to 100	4 to 100	8 to 100	15 to 50
	NPS	½ to 4	½ to 12	½ to 4	½ to 3	½ to 6	½ to 5	½ to 4	¼ to 4	¼ to 4	⅜ to 4	½ to 2
Pressure rating	PN ¹⁾	10 to 40	10 to 40	10 to 40	16/40	16	16/40	10	10	10	10	10
	Class ²⁾	125 to 300	125 to 300	150/300	300	230	230/580	150	150	150	150	150
Application	Utility networks	•	•	•	•	•						
	Hygienic service					•	•	•				•
	Aseptic service							•	•	•	•	•
Type of operation	Control	•	•			•	•	•				•
	On/off	•	•	•	•	•	•	•	•	•	•	
Valve type	Globe/angle seat valve	•	•	•	•							
	Diaphragm valve					•			•	•	•	
	Angle valve						•	•				
	Three-way valve	•										
	Self-operated pressure regulators											•
End connections	Flanges DIN 11864-2				•	•	•	•	•	•	•	•
	Flanges DIN EN 1092	•	•	•		•	•					•
	Welding ends DIN 11850/11866		DIN EN 12627	DIN EN 12627	•	•	•	•	•	•	•	•
	Thread DIN 11851/11864-1		NPT	NPT	G	•	•	•	•	•	•	•
	Clamps ISO 2852 BS 4825, DIN 11864-3					•	•	•	•	•	•	•
	Special connections		•	•		•	•		•	•	•	•
Closure member	Parabolic plug	•	•	•	•		•	•				•
	V-port plug		•				•					
	Diaphragm					•		•	•	•	•	

Valve	Type	V2001	3241	3351	3353/ 3354	3345	3347	3249/ 3349	Steripur	KMA	KMD	2371	
Cleaning	CIP					•	•	•	•	•	•	•	
	SIP					•		•	•	•	•	•	
Body material	Cast iron EN-JL1040/A126B	•	•	•	•	•							
	Cast steel 1.0619/A216 WCC	•	•	•									
	Cast stainless steel 1.4408/A351 CF8M	•	•	•	•	•							
	1.4409/A351 CF3M		•				•					•	
	1.4404/316L						•					•	
	1.4435/316L					•	•	•	•	•	•	-	
	Special materials		•				•		•	•	•	•	
Internal parts (seat/plug)	1.4006/F6a Cl 2		•	•									
	1.4404/316 L	•	•	•	•		•					•	
	1.4435/316 L						•	•				•	
Stem seal	Packing	•	•	•	•			•					
	Lip seal						•						
	Diaphragm					•		•	•	•	•	•	
Surface roughness Ra	Internal finish not specified	•	•	•	•								
	Mechanically polished	≤1.9 µm					•						
		≤0.9 µm					•						
		≤0.8 µm						•	•	•	•	•	•
		≤0.6 µm					•	•	•	•	•	•	•
		≤0.4 µm						•	•	•	•	•	•
		≤0.25 µm								• ³⁾	• ³⁾	• ³⁾	
	Electropolished	≤0.9 µm					•						
		≤0.8 µm						•	•	•	•	•	•
		≤0.6 µm					•	•	•	•	•	•	•
		≤0.4 µm					•	•	•	•	•	•	•
≤0.25 µm						•	•		• ³⁾	• ³⁾	• ³⁾		
Temperature range in °C	Medium temp. -10 to +220	-196 to +450	-10 to +250	-10 to +180	0 to 130	0 to 150	0 to 160	Up to 175	Up to 175	Up to 150			
Approvals for seals	FDA CFR #21 Section 177...					•	•	•	•	•	•	•	
	USP Class VI					• ³⁾	• ³⁾	•	•	•	•		
	3-A						• ³⁾		•	•	•		
	EHEDG						• ³⁾						

Valve	Type	V2001	3241	3351	3353/ 3354	3345	3347	3249/ 3349	Steripur	KMA	KMD	2371
Options	Pressure balancing		•									
	Flow divider	•	•									
	Metal bellows seal		•	•								
	Lining					•						
	Insulating section	•	•	•				•				
	Heating jacket		•				•					
	Additional manual override		•	•		•	•	•				
	Corrosion-resistant actuator		•			•	•	•	•	•	•	
	Electric actuator	•	•			•	•	•				
Associated documentation	T	8111/ 8112	8015/ 8012	8039	8139/ 8140	8031	8097	8048- 2/-3	SED catalog			2640/ 2642

- 1) Maximum pressure in bar
2) Maximum pressure in psi
3) Options

Pneumatic Control Valves for Plant Engineering

Series V2001 and Series 240 Valves

Application

Control valves designed for mechanical and plant engineering. Suitable for liquids, gases, and steam.

Versions

Pneumatic or electropneumatic control valves in accordance with DIN or ANSI standards up to PN 40 (Class 300) for medium temperature range from -196 to $+450$ °C.

- **Type 3321-IP** · Globe valve, DN 15 to 100 (NPS ½ to 4)
- **Type 3323-IP** · Three-way valve, DN 15 to 100 (NPS ½ to 4)
- **Type 3241-1** or **Type 3241-7** · Globe valve, DN 15 to 300 (NPS ½ to 12)

SAMSON valve		Type 3321	Type 3323	Type 3241
Valve size	DN	15 to 100	15 to 100	15 to 300
	NPS	½ to 4	½ to 4	½ to 12
Body material	Cast iron	•	•	•
	Cast steel	•	•	•
	Stainless steel	•	•	•
	Forged steel			•
Pressure rating	PN	40		
	Class	300		
End connections	Flanges	•	•	•
	Welding ends			•
Leakage class		Up to VI	0.05 % K_{VS}	Up to VI
Characteristic		Inherent	Linear	Equal percentage or linear
Medium temperature		-10 to $+220$ °C		-196 to $+450$ °C
Actuator		Type 3371 Type 3372 Type 5824 Type 3374		Type 3271 Type 3277
Associated documentation		T 8111/T 8112	T 8113/T 8114	T 8012 T 8015 T 8310-X



Series V2001: Type 3321-IP
Globe Valve



Series V2001: Type 3323-IP
Three-way Valve



Series 240: Type 3241 Globe Valve

Pneumatic Control Valves for Plant Engineering

Type 3351 On/off Valve

Type 3353 Angle Seat Valve

Type 3354 Globe Valve

Application

On/off valves designed for mechanical and plant engineering. Tight shut-off. Suitable for liquids, gases, and steam.

Versions

Pneumatic control valves in accordance with DIN or ANSI standards.

- **Type 3351** · On/off valve with pneumatic actuator, optionally with bellows seal or insulating section
- **Type 3353** · Globe valve made of stainless steel with angle seat body and pneumatic piston actuator, optionally with limit switch and/or solenoid valve
- **Type 3354** · Globe valve made of stainless steel with straight-pattern body and pneumatic piston actuator, optionally with limit switch and/or solenoid valve

SAMSON valve		Type 3351	Type 3353	Type 3354
Valve size	DN	15 to 100	15 to 50	15 to 80
	NPS	½ to 4	½ to 2	½ to 3
Body material	Cast iron	•		•
	Spheroidal graphite iron	•		
	Cast steel	•		
	Stainless steel	•	•	
	Forged steel	•		
Pressure rating	PN	Up to 40	40	16
	Class	Up to 300		
End connections	Flanges	•		•
	Welding ends		•	
	Female thread		•	
Leakage class		VI		
Characteristic		On/off		
Medium temperature	Standard	-10 to +220 °C	-10 to +180 °C	-10 to +180 °C
	High-temperature version	-10 to +250 °C up to DN 50		
	Low-temperature version	-50 to +220 °C up to DN 50		
Ambient temperature		-35 to +100 °C	-10 to +60 °C	-10 to +60 °C
Actuator		Integrated	30/60 cm ²	30/60 cm ²
Associated documentation		T 8039	T 8139	T 8140



Type 3351 On/off Valve



Type 3353 Angle Seat Valve



Type 3354 Globe Valve

Pneumatic Control Valves for Hygienic and Energy Applications

Type 3345 Diaphragm Valve

Application

Pneumatic control valves for the food processing and pharmaceutical industries. Optionally with Type 3271 or Type 3277 Pneumatic Actuators for integral attachment of positioners and accessories.

Versions

Control valves in accordance with DIN or ANSI standards.

- **Type 3345** · Diaphragm valve for viscous, corrosive, and abrasive fluids conforming to BS standards

SAMSON valve		Type 3345	
Application		Hygiene	Energy
Valve size	DN	15 to 150	15 to 150
	NPS	½ to 6	½ to 6
Body material	Cast iron		•
	Spheroidal graphite iron		•
	Stainless steel	•	•
Maximum pressure	PN	10/16	10/16
	Class	125/150	125/150
End connections	Flanges	•	•
	Welding ends	•	
	Thread	•	
	Clamps	•	
Leakage class		VI	VI
Characteristic		Linear	Linear
Lining			•
Medium temperature range		-30 to +130 °C	-30 to +130 °C
Max. sterilizing temperature			
Cleaning	CIP		
	SIP		
Certificates	3-A		
	FDA	•	•
	EHEDG		
	USP-VI		
Actuator		Type 3271 Type 3277	
Associated documentation		T 8031	



Type 3345-1 Diaphragm Valve, DN 100



Type 3345-1 Diaphragm Valve, DN 50
Version for food processing industry



Type 3345 Diaphragm Valve, DN 15 and 20
Version for food processing industry

Pneumatic Control Valves for Hygienic and Aseptic Applications

Type 3347 Hygienic Angle Valve

Application

Pneumatic control valves for the food processing and pharmaceutical industries. Optionally with Type 3271 or Type 3277 Pneumatic Actuators for integral attachment of positioners and accessories or with Type 3372 or Type 3379 Actuators.

Versions

Control valves in accordance with DIN or ANSI standards.

See page 18 for examples of customized solutions

– **Type 3347** · Hygienic angle valve with Type 3271 or Type 3277 Actuator

SAMSON valve		Type 3347	
Body version		Cast	Bar stock
Valve size	DN	25 to 100	15 to 125
	NPS	1 to 4	½ to 5
Body material	1.4404/316L		•
	1.4409/CF3M	•	
	1.4435/316L		•
	Special materials		•
Bonnet	Bolted-on		Up to PN 40
	Clamped	•	Up to PN 16
Maximum pressure		16 bar/230 psi	16 bar/230 psi Option: 40 bar/580 psi
End connections	Flanges	•	•
	Welding ends	•	•
	Thread	•	•
	Clamps	•	•
Leakage class		Up to VI	Up to VI
Characteristic		Equal percentage or linear	Equal percentage or linear
Steam line connection		•	•
Medium temperature range		0 to 150 °C	0 to 150 °C
Cleaning	CIP	•	•
	SIP		
Certificates	3-A		•
	FDA	•	•
	EHEDG		•
	USP-VI	•	•
Actuator		Type 3271 Type 3277	
Associated documentation		T 8097	



Type 3347-7
Cast body with welding ends



Type 3347-7 Valve, bar stock body
with threaded connections · With
EHEDG and 3-A approval

– **Type 3347** · Hygienic angle valve with Type 3372 Actuator and as micro-flow valve

SAMSON valve		Type 3347	
Body version		For Type 3372 Actuator	Micro-flow valve ¹⁾
Valve size	DN	15 to 50	8 to 25
	NPS	½ to 2	¼ to 1
Body material	1.4404/316L	Bar stock	•
	1.4409/CFM	Cast	
	1.4435/316L		•
	Special materials	•	•
Bonnet	Bolted-on		•
	Clamped	•	
Maximum pressure		16 bar/230 psi	16 bar/230 psi Option: 40 bar/580 psi
End connections	Flanges	•	•
	Welding ends	•	•
	Thread	•	•
	Clamps	•	•
Leakage class		Up to VI	Up to IV
Characteristic		Equal percentage or linear	Equal percentage or linear
Medium temperature range		-10 to +150 °C	-10 to +150 °C
Cleaning	CIP	•	•
	SIP		
Certificates	3-A		
	USP-VI	•	•
	FDA material	•	•
	EHDG		
Actuator		Type 3372	Type 3271/Type 3277
Associated documentation		On request	TV-SK 9766

¹⁾ K_{VS} 0.01 to 0.25 · C_v 0.012 to 0.30



Type 3347/3372



Type 3347-7 Micro-flow Valve with position sensor for a positioner

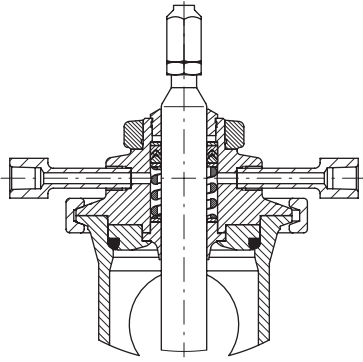
– **Type 3347** · Hygienic angle valve with Type 3379 Actuator

SAMSON valve		Type 3347		
Body version		Cast	Bar stock	Micro-flow valve
Valve size	DN	25 to 50	15 to 50	6 to 15
	NPS	1 to 2	½ to 2	¼ to ½
Body material	1.4404/316L		•	
	1.4409/CF3M	•		
	1.4435/316L			•
	Special materials	•	•	
Bonnet	Bolted-on		Up to PN 40	•
	Clamped	•	Up to PN 16	
Maximum pressure		16 bar/230 psi	16 bar/230 psi Option: 40 bar/580 psi	16 bar/230 psi
End connections	Flanges	•	•	•
	Welding ends	•	•	•
	Thread	•	•	•
	Clamps	•	•	•
Leakage class		Up to VI	Up to VI	Up to VI
Characteristic		Equal percentage or linear	Equal percentage or linear	Equal percentage or linear
Steam line connection		•	•	
Medium temperature range		0 to 150 °C	0 to 150 °C	0 to 150 °C
Cleaning	CIP	•	•	•
	SIP			
Certificates	3-A			
	FDA	•	•	•
	EHEDG		•	
	USP-VI			
Actuator		Type 3379		
Associated documentation		T 8097-3		



Compact automated unit:
Type 3347 Angle Valve with
Type 3379 Pneumatic Actuator and
Type 3724 Positioner

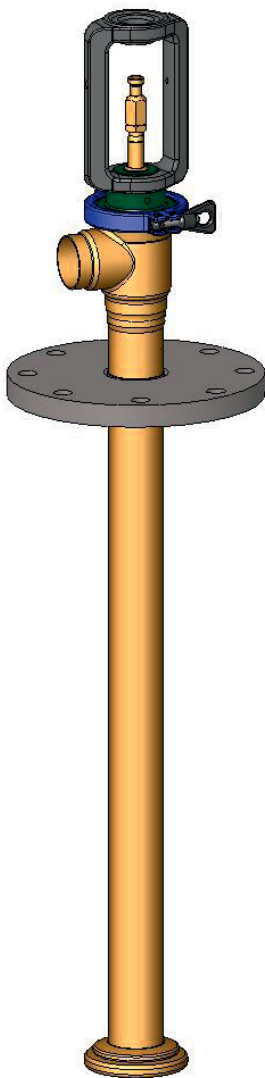
Customized solutions for Type 3347



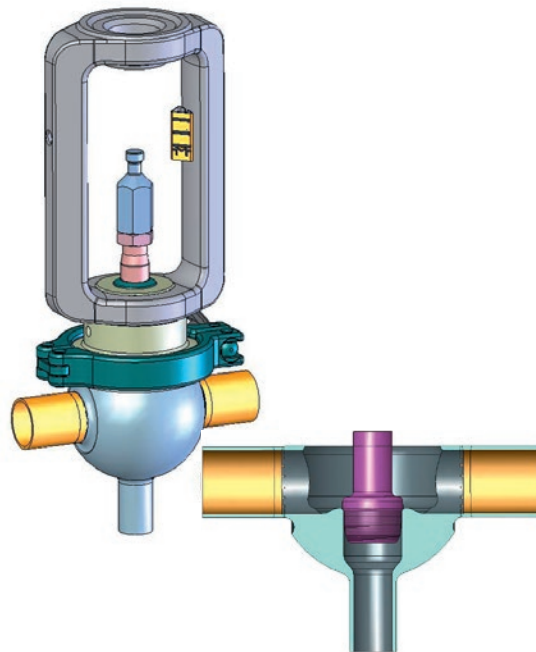
Valve bonnet with steam line to sterilize the plug stem



Type 3347 with heating jacket



Type 3347 for fruit juice production



Type 3347 as diverting valve with detailed cross-sectional diagram of valve body

Pneumatic Control Valves for Hygienic and Aseptic Applications

Type 3249 Aseptic Angle Valve

Application

Control valve for aseptic applications in the food and pharmaceutical industries according to DIN or ANSI standards.

Versions

– **Type 3249** · Aseptic angle valve with Type 3271 or Type 3277 Pneumatic Actuator

SAMSON valve		Type 3249	
Body version		Bar stock (ball body)	Bar stock with bolted-on bonnet
Valve size	DN	15 to 100	15 to 100
	NPS	½ to 4	½ to 4
Body material	1.4404/316L	•	•
	1.4435/316L	•	•
	Special materials		•
Maximum pressure		10 bar/150 psi	10 bar/150 psi
End connections	Flanges	•	•
	Welding ends	•	•
	Thread	•	•
	Clamps	•	•
Leakage class		Up to VI	Up to VI
Diaphragm		•	•
Characteristic		Equal percentage or linear	Equal percentage or linear
Medium temperature range		–10 to +160 °C	–10 to +160 °C
Max. sterilizing temperature		180 °C	180 °C
Cleaning	CIP	•	•
	SIP	•	•
Certificates	3-A		
	FDA	•	•
	EHEDG	•	
	USP-VI	•	•
Associated documentation		T 8048	



Type 3249-7 Aseptic Angle Valve
Bar stock body with welding ends



Type 3249-7 with bar stock body
Special version with backup packing

Pneumatic Control Valves for Hygienic and Aseptic Applications

Type 3349 Aseptic Angle Valve

Application

Control valve for aseptic applications in the food and pharmaceutical industries according to DIN or ANSI standards with USP-VI diaphragm.

Versions

- **Type 3349** · Aseptic angle valve with Type 3271 or Type 3277 Pneumatic Actuator
- **Type 3349** · Aseptic angle valve with Type 3379 Pneumatic Actuator

SAMSON valve		Type 3349	
Actuator		Type 3271/3277	Type 3379
Valve size	DN	8 to 100	8 to 50
	NPS	¼ to 4	⅜ to 2
Body material	1.4435/316L	•	•
	Special materials	•	•
Bonnet	Bolted-on	•	•
	Clamped		
Maximum pressure		10 bar/150 psi	10 bar/150 psi
End connections	Flanges	•	•
	Welding ends	•	•
	Thread	•	•
	Clamps	•	•
Leakage class		Up to VI	Up to VI
Characteristic		Equal percentage or linear	Equal percentage or linear
Sterilizing temperature		180 °C for up to 30 min	180 °C for up to 30 min
Operating temperature range		0 to 160 °C	0 to 160 °C
Cleaning	CIP	•	•
	SIP	•	•
Certificates	3-A		
	USP-VI	•	•
	FDA material	•	•
	EHDG	•	•
Associated documentation		T 8048-2	T 8048-3



Type 3349 Angle Valve for connection to Type 3271 and Type 3277 Pneumatic Actuators



Compact automated unit:
Type 3349 Angle Valve with
Type 3379 Pneumatic Actuator and
Type 3724 Positioner

Pneumatic Control Valves for Aseptic Applications

SED Steripur Series Diaphragm Valves



Application

Cavity-free pneumatic control valves with globe valves for aseptic applications in the food processing and pharmaceutical industries according to DIN, ANSI, or BS standards.

Versions

- **Steripur 207** · Diaphragm valve with stainless steel double piston actuator
- **Steripur 307, 407** · Diaphragm valve with stainless steel piston actuator
- **Steripur 297, 397, 997** · Diaphragm valve with stainless steel handwheel

Stainless steel piston actuator		Steripur 207	Steripur 307	Steripur 407
Stainless steel handwheel		Steripur 297	Steripur 397	Steripur 997
Valve size	DN	4 to 15	8 to 20	15 to 100
	NPS	¼ to ½	⅜ to ¾	½ to 4
Body material		Investment casting or forged steel 1.4435 · A316L ¹⁾		
Max. operating pressure	EPDM diaphragm	8 bar		10 bar ²⁾
	PTFE diaphragm	7 bar		8 bar ³⁾
	Handwheel	10 bar ⁴⁾		
End connections		Flanges · Welding ends · Thread · Clamps		
Characteristic		On/off		
Diaphragm		MA 8	MA 10	MA 25 to 100
Diaphragm material		EPDM, one-piece		
		PTFE/EPDM, one-piece	PTFE/EPDM, one-piece	PTFE/EPDM, two-piece
Max. medium temperature		160 °C	160 °C	175 °C
Medium temperature range	EPDM, one-piece	–40 to +150 °C		
	PTFE/EPDM, one-piece	–20 to +150 °C		–
	PTFE/EPDM, two-piece	–	–20 to +160 °C	
Certificates	EPDM Code 18	FDA CFR #21 Section 177.2600 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class II		
	PTFE/EPDM Code 30/34	FDA CFR #21 Section 177.1550 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class I		
Actuator		Stainless steel		
Associated documentation		SED catalog		

¹⁾ Other materials, e.g 1.4539/AISI 904L, on request

²⁾ DN 65 and 80: 7 bar; DN 100: 6 bar

³⁾ DN 65 and 80: 6 bar; DN 100: 5 bar

⁴⁾ Steripur 997 in DN 65 and larger with PTFE diaphragm: 8 bar



SED Steripur 207 Diaphragm Valve



SED Steripur 407 Diaphragm Valve



SED Steripur 397 Diaphragm Valve

Pneumatic Control Valves for Aseptic Applications

SED KMA Series Diaphragm Valves



Application

Cavity-free pneumatic control valves with globe valves for aseptic applications in the food processing and pharmaceutical industries according to DIN, ANSI, or BS standards.

Versions

- **KMA 190, KMA 195, KMA 495** · Diaphragm valve with thermoplastic piston actuator and stainless steel valve bonnet
- **KMA 290, KMA 295, KMA 995** · Diaphragm valve with thermoplastic handwheel and stainless steel valve bonnet

Thermoplastic piston actuator		KMA 190	KMA 195	KMA 495
Thermoplastic handwheel		KMA 290	KMA 295	KMA 995
Valve size	DN	4 to 15	8 to 20	15 to 100
	NPS	¼ to ½	⅜ to ¾	½ to 4
Body material		Investment casting or forged steel 1.4435 · A316L ¹⁾		
Max. operating pressure	EPDM diaphragm	8 bar		10 bar ≤DN 50 ²⁾
	PTFE diaphragm	7 bar		8 bar ≤DN 50 ³⁾
	Handwheel	10 bar ⁴⁾		
End connections		Flanges · Welding ends · Thread · Clamps		
Characteristic		On/off		
Diaphragm		MA 8	MA 10	MA 25 to 100
Diaphragm material		EPDM, one-piece		
		PTFE/EPDM, one-piece	PTFE/EPDM, one-piece	PTFE/EPDM, two-piece
Max. medium temperature		160 °C	160 °C	175 °C
Medium temperature range	EPDM, one-piece	-40 to +150 °C		
	PTFE/EPDM, one-piece	-20 to +150 °C		–
	PTFE/EPDM, two-piece	–		-20 to +160 °C
Certificates	EPDM Code 18	FDA CFR #21 Section 177.2600 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class II		
	PTFE/EPDM Code 30/34	FDA CFR #21 Section 177.1550 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class I		
Actuator		Thermoplastic		
Associated documentation		SED catalog		

¹⁾ Other materials, e.g 1.4539/AISI 904L, on request

²⁾ DN 65 and 80: 7 bar; DN 100: 6 bar

³⁾ DN 65 and 80: 6 bar; DN 100: 5 bar

⁴⁾ DN 65 and larger with PTFE diaphragm: 8 bar



SED KMA 190 Diaphragm Valve



SED KMA 495 Diaphragm Valve



SED KMA 295 Diaphragm Valve

Pneumatic Control Valves for Aseptic Applications

SED KMD Series Diaphragm Valves



Application

Cavity-free pneumatic control valves with globe valves for aseptic applications in the food processing and pharmaceutical industries according to DIN, ANSI, or BS standards.

Versions

- **KMD 188, KMD 385, KMD 402** · Diaphragm valve with thermoplastic bonnet and thermoplastic piston actuator
- **KMD 289, KMD 985** · Diaphragm valve with thermoplastic bonnet and thermoplastic handwheel

Thermoplastic piston actuator		KMD 188	KMD 385	KMD 402	KMD 985
Thermoplastic handwheel		KMD 289			
Valve size	DN	8 to 20	15 to 80	15 to 50	15 to 100
	NPS	3/8 to 3/4	1/2 to 3	1/2 to 2	1/2 to 4
Body material		Investment casting or forged steel 1.4435 · A316L ¹⁾			
Max. operating pressure with diaphragm	EPDM	8 bar ⁴⁾	10 bar ²⁾	10 bar	10 bar
	PTFE	7 bar ⁴⁾	8 bar ³⁾	8 bar	10 bar ⁵⁾
End connections		Flanges · Welding ends · Thread · Clamps			
Characteristic		On/off			
Diaphragm		MA 8	MA 25 to 100		
Diaphragm material		EPDM, one-piece			
		PTFE/EPDM, one-piece	PTFE/EPDM, two-piece		
Max. medium temperature		80 °C · 150 °C with HS version			
Medium temperature range	EPDM, one-piece	-40 to +150 °C			
	PTFE/EPDM, one-piece	-20 to +150 °C	-		
	PTFE/EPDM, two-piece	-	-20 to +160 °C		
Certificates	EPDM Code 18	FDA CFR #21 Section 177.2600 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class II			
	PTFE/EPDM Code 30/34	FDA CFR #21 Section 177.1550 · USP Class VI Test Section #87 + 88, 3-A Sanitary Class I			
Actuator		Thermoplastic			
Associated documentation		SED catalog			

¹⁾ Other materials, e.g 1.4539/AISI 904L, on request

²⁾ DN 65 and 80: 7 bar

³⁾ DN 65 and 80: 6 bar

⁴⁾ Handwheel: 10 bar

⁵⁾ DN 65 and larger: 8 bar



SED KMD 188 Diaphragm Valve



SED KMD 385 Diaphragm Valve



SED KMD 985 Diaphragm Valve

Self-operated Pressure Regulators for the Food Processing Industry

Type 2371-00 and Type 2371-01 Excess Pressure Valves

Type 2371-10 and Type 2371-11 Pressure Reducing Valves

Application

Pressure reducing valves or excess pressure valves for the food and pharmaceutical industries for liquids and gases.

Features

- Proportional pressure regulators with cavity-free valve bodies made of stainless steel
- Wetted inside surfaces with a precision-lathed or polished finish
- FDA-approved materials
- Diaphragms monitored for leakage over a test connection

Versions

Excess pressure valve with diaphragm to control the inlet pressure to the adjusted set point

- **Type 2371-00** · Excess pressure valve with pneumatic set point adjustment
- **Type 2371-01** · Excess pressure valve with mechanical set point adjustment

Pressure reducing valve with diaphragm to control the outlet pressure to the set point adjusted by a spring

- **Type 2371-10** · Pressure reducing valve with pneumatic set point adjustment
- **Type 2371-11** · Pressure reducing valve with mechanical set point adjustment

Pressure regulators		Type 2371-00/-01	Type 2371-10/-11
Function		Excess pressure valve	Pressure reducing valve
Valve size	DN	15 to 50	15 to 50
	NPS	½ to 2	½ to 2
Body material	Stainless steel	•	•
Maximum pressure		10 bar/150 psi	10 bar/150 psi
Set point ranges	bar	0.3 to 1.2 through 4 to 6	0.4 to 1.2 through 4 to 6
End connections	Flanges	•	•
	Welding ends	•	–
	Thread	•	•
	Clamps	•	•
Leakage, based on K_{VS} coefficient		Metal seal: $\leq 0.05\%$ Soft seal: $\leq 0.01\%$	
Medium temperature range		0 to 160 °C	
Max. sterilizing temperature ¹⁾		180 °C	
Cleaning	CIP	•	•
	SIP	•	•
FDA approval		•	•
Associated documentation		T 2642	T 2640

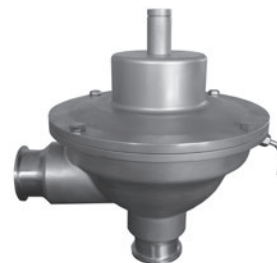
¹⁾ Up to 30 minutes



Type 2371-00 Excess Pressure Valve with pneumatic set point adjustment



Type 2371-00 Excess Pressure Valve with mechanical set point adjustment and with stem locking



Type 2371-10 Pressure Reducing Valve



Type 2371-11 Pressure Reducing Valve

Steam Conditioning

Type 3994-0001 Desuperheater

Type 3281 Steam-converting Valve

Application

Steam conditioning systems ensure gentle heating or steaming of products.

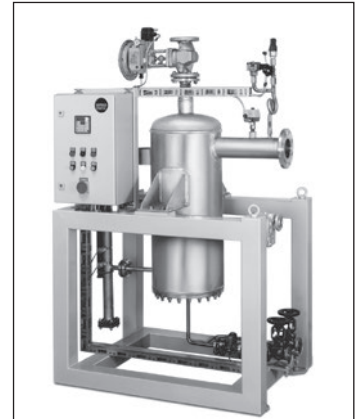
Versions

- **Type 3994-0001** · Water bath desuperheater for conversion of superheated steam into saturated steam including liquid level control, pressure control, and process temperature control. Supplied as separate components or as a complete system, ready for connection, in a skid-mounted unit

Desuperheaters	Type 3994-0001
Control range	0 to 100 %
Operating gauge pressure	Max. 11 bar
Saturated steam pressure	Max. 11 bar (absolute pressure), higher pressures on request
Saturated steam temperature	Max. 187 °C
Steam flow rate	Max. 40 t/h
Data sheet	B 016

- **Type 3281** · Pneumatic steam-converting valve (globe valve)

Type 3281 Steam-converting Valve	DIN		ANSI		
Body material	Cast steel	1.6019	1.7357	A216 WCC	A217 WC6
Valve size	DN 50 to 500		NPS 2 to 20		
Pressure rating	PN 16 to 160		Class 150 to 900		
End connections	Flanges · Welding ends				
Seat/plug seal and leakage class	Metal seal: IV High-performance metal seal: V				
Characteristic	Equal percentage or linear				
Rangeability	50 : 1				
Temperature range in °C	-10 to +220		-10 to +220		
With high-temperature packing	Up to 350		Up to 350		
With insulating section	-10 to +400	-10 to +500	-29 to +427	-29 to +500	
Data sheet	T 8251		T 8252		



Type 3994-0001 Desuperheater



Type 3281 Steam-converting Valve with Type 3271 Pneumatic Actuator

Transmitters and Temperature Sensors

Type 3994-0050/-0051/-0102 Transmitter

Application

Transmitters are used to measure the pressure, differential pressure, and temperature and to convert the measured value into an electric output signal.

Versions

- **Type 3994-0051-CV31XX** · Digital modular pressure transmitter in stainless steel housing, attachable functional modules for display, switching, and communication, optionally with HART® protocol, PROFIBUS®-PA
- **Type 3994-0050-CBXX** · Analog universal pressure transmitter in stainless steel housing, also in type of protection intrinsic safety Ex ia (others on request)
- **Type 3994-0102-6** · Digital differential pressure transmitter type of protection intrinsic safety Ex ia (others on request), optional with attachable LC display

Pressure transmitters	Type 3994-0050-CV31XX	Type 3994-0050-CBXX	Type 3994-0102-6
Measuring ranges	0.4 to 100 bar relative and absolute, configurable with 1:5 turndown	0.25 to 400 bar relative and absolute, fixed point adjustment according to specification	0.00134 to 160 bar, adjustable, 1:30 turndown
Process connection	G ½ B, various pressure seals e.g. flanges, Tri-Clamp® connections, etc.		Oval flange adapter made of stainless steel
Output	4 to 20 mA two-wire system with HART® protocol, PROFIBUS®-PA	4 to 20 mA two-wire system	4 to 20 mA two-wire system with HART® protocol, PROFIBUS®-PA
Power supply	12 to 40 V DC	14 to 30 V DC	9 to 32 V DC
Accuracy	<0.25 %	<0.3 % for linearity and hysteresis	<±0.075 % of adjusted measuring span
Degree of protection	IP 66	IP 65 (standard housing with angle connector) IP 67 (field housing with threaded cover)	IP 67 (barrel housing for electronics, powder-coated aluminum)
Safety function	SIL 2 acc. to IEC 61508	–	–
Process temperature	–20 to +90 °C, higher temperatures with thermal decoupler	–25 to +70 °C, –25 to +275 °C with thermal decoupler	–25 to +85 °C, other on request
Special wetted materials	–	–	Hastelloy®, Monel®, and tantalum on request
Application	Utility networks and hygienic service		Utility networks
Data sheet	T 994-0051-CV31X	T 994-0050	T 994-0102-6



Type 3994-0051-CV31XX Transmitter



Type 3994-0050-CBXX Pressure Transmitter



Type 3994-0102-6 Pressure Transmitter

Transmitters and Temperature Sensors

Type 3994-0020 Fast-response Temperature Sensor

Types 5207-61/-64 and -65 Fast-response Temperature Sensors

Application

Temperature sensors are used to measure the temperature.

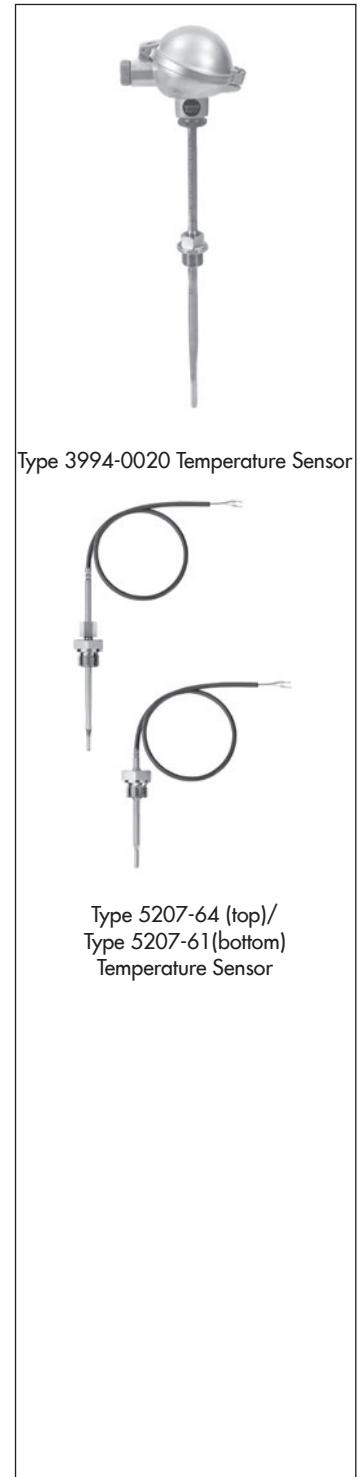
Versions

- **Type 3994-0020** · Fast-response temperature sensor designed as duct sensor, immersion sensor, or weld-in sensor for precise measurement of process temperatures

Temperature sensor	Type 3994-0020
Process connection	G ½ protection tube, stop flange, G ½ screw gland or weld-on plate (cavity-free)
Immersion depths	100 to 400 mm, other on request
Measuring inserts	Single or double resistance thermometer Pt 100 or single or double thermocouple
Connection heads	Aluminum, plastic, stainless steel
Electrical connection	Three-wire or four-wire circuit over screw terminals
Options	Head transmitter Also in type of protection intrinsic safety Ex ia
Special version	Other immersion depths, versions, materials available on request
Data sheet	T 994-0020

- **Types 5207-61/-64 and -65** · Temperature sensors with short response times for measuring rapid temperature changes in heat exchangers

Type		5207-61	5207-64	5207-65
Resistor		Pt 1000	Pt 1000	Pt 1000
Number of resistors		1	1	1
Immersion tube length	mm	110	170	250
Immersion depth	mm	80	40 to 120	120 to 190
Connecting cable length	mm	2500	2500	2500
Pressure rating		PN 40	PN 40	PN 40
Permissible temperature [°C]	Medium	-50 to +180	-15 to +180	-15 to +180
	Ambient	-50 to +180	-15 to +180	-15 to +180
Data sheet		T 5221	T 5221	T 5221



Type 3994-0020 Temperature Sensor

Type 5207-64 (top)/
Type 5207-61 (bottom)
Temperature Sensor

Pneumatic Actuators

Types 3271 and 3277 Pneumatic Actuators

Application

Actuators convert the control signal supplied by automation equipment (controller, control station, process control system) into a linear or rotary motion used to position the final control element (e.g. valve plug) in direct proportion to the control signal received.

The actuators can be equipped with peripheral devices, such as positioners, converters, solenoid valves, pneumatic remote adjusters, and/or limit switches, to adapt the pneumatic control valves to the requirements of the process plant.

See Information Sheet T 8350 for more details on the selection of additional devices.

Features

The pneumatic actuators are diaphragm actuators with rolling diaphragm and internal compression springs. They have the following benefits:

- Designed for signal pressures up to 6 bar (90 psi)
- Low overall height
- Powerful thrust and high response speed
- Minimum friction
- Various bench ranges (adapted to local conditions)
- No special tools required to change the bench range or to reverse the direction of action

Fail-safe action

Depending on the version, the actuators have two different fail-safe actions which become effective when the pressure is relieved from the diaphragm or the air supply fails:

- **Actuator stem extends (FA):** the spring force moves the actuator stem to the lower end position.
- **Actuator stem retracts (FE):** the spring force causes the actuator stem to retract.

Versions

- **Type 3271** · Pneumatic actuator for 7.5 to 120 mm travel and actuator areas of 120 to 2 x 2800 cm². Optionally with handwheel.
 - Thrust range (120 to 150,000 N) depending on operating range
 - 175, 240, 350, 355, 700, and 750 cm² actuator areas available as stainless steel version
 - Data sheets T 8310-1, T 8310-2, and T 8310-3
- **Type 3277** · Pneumatic actuator for 7.5 to 30 mm travel and actuator areas of 120 to 750 cm². For integral positioner attachment, allowing the positioner to be attached completely protected in the yoke under the bottom diaphragm case. Optionally with handwheel.
 - Thrust range (480 to 24,000 N) depending on operating range
 - 175, 240, 350, 355, 700, and 750 cm² actuator areas available as stainless steel version
 - Data sheet T 8310-1



Type 3271 Pneumatic Actuator



Type 3277 Pneumatic actuator for direct attachment of a positioner and limit switch

Pneumatic Actuators

Type 3379 Pneumatic Actuator

Application

The Type 3379 Pneumatic Actuator (with spring-return mechanism) is used in conjunction with a valve suitable for the food and pharmaceutical industries.

Features

- Can be combined with Type 3347 Hygienic Valve or Type 3349 Aseptic Valve
- Smooth stainless steel surfaces for easy cleaning
- All moving parts located inside the housing to improve safety
- Visual indicator for the valve position
- Internal air routing to prevent air or water from entering the device

Versions

- **Type 3379-00** · Type 3379 Pneumatic Actuator with Type 3724 Electropneumatic Positioner
- **Type 3379-01** · Type 3379 Pneumatic Actuator for on/off service
- **Type 3379-02** · Type 3379 Pneumatic Actuator combined with Type 4740 Electric Limit Switch

Type	3379											
Piston diameter	63 mm				90 mm							
Actuator area	31 cm ²				63 cm ²							
Rated travel	15 mm				15 mm							
Permissible ambient temperature	0 to 60 °C				0 to 60 °C							
Max. supply pressure	8 bar				8 bar							
Hysteresis	0.4 bar				0.3, 0.5 or 0.6 bar							
Fail-safe action	Stem extends (FA)		Stem retracts (FE)		Stem extends (FA)				Stem retracts (FE)			
Number of springs	1		1		2		1		1		1	
Travel [mm]	15	7.5	15	7.5	15	7.5	15	7.5	15	7.5	15	7.5
Thrust [N]	720	930	720	930	2090	2670	1590	2030	2580	2830	1320	1570
Data sheet	T 8048-3/T 8097-3/T 8395											



Type 3379



Type 3379 with Type 3724 Positioner

Positioners

Pneumatic, Electropneumatic, Analog, and Digital Positioners

Ex
certified

Application

Positioners ensure a predetermined assignment of the valve position (controlled variable x) to the input signal (reference variable w). They compare the control signal issued by pneumatic or electric automation equipment (controller, control station, process control system) to the position or opening angle of the control valve and supply a corresponding output signal pressure (output variable y).

Versions

Pneumatic and electropneumatic positioners

– Pneumatic positioners

Pneumatic positioners accept an input signal of 0.2 to 1 bar (3 to 15 psi) and issue an output signal pressure (p_{st}) of maximum 6 bar (90 psi).

– Electropneumatic positioners

Electropneumatic positioners use an analog DC signal of 0/4 to 20 mA or 1 to 5 mA as the input variable and issue an output signal pressure (p_{st}) up to 6 bar (90 psi).

Analog positioners

- **Type 3730-0** · Electropneumatic positioner · T 8384-0
- **Type 3766** · Pneumatic positioner · T 8355
- **Type 3767** · Electropneumatic positioner · T 8355
- **Type 4763** · Electropneumatic positioner · T 8359
- **Type 4765** · Pneumatic positioner · T 8359

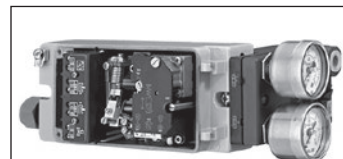
Digital positioners

SAMSON digital positioners are single-acting or double-acting positioners for attachment to pneumatic linear or rotary actuators. Due to their digital signal processing technology, these positioners have the following advantages over conventional positioners:

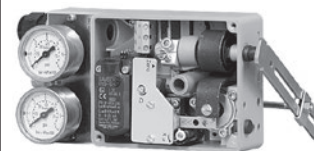
- Simple operation
- LCD with rotatable reading direction
- Automatic adjustment of zero and span during the initialization procedure
- Automatic error detection
- Direction of action independent of mounting position
- Monitoring of zero point
- Low air consumption
- Permanent storage of all parameters in EEPROM (protected against power failure)

- **Type 3725** · Electropneumatic positioner · T 8394
- **Types 3730-1 to 3730-6** · Electropneumatic positioner · T 8384-1 to T 8384-6

The Type 3730-3 and 3730-6 Positioners allow HART® communication between the field and process control level. The Types 3730-4 and 3730-5 Positioners allow the integration of the final control elements into a PROFIBUS® PA and FOUNDATION™ fieldbus network respectively.



Type 3767



Type 4763



Type 3725



Type 3730-3



Type 3730 Electropneumatic Positioner, integral attachment to Type 3277 Pneumatic Actuator

Positioners

Electropneumatic positioner · Type 3724 combined with Type 3379 Pneumatic Actuator

Application

Single-acting positioner combined with Type 3379 Pneumatic Actuator. Self-calibrating, automatic adaptation to valve and actuator.

Features

- Compact unit by combining it with Type 3379 Pneumatic Actuator
- Can be combined with Type 3347 Hygienic Valve or Type 3349 Aseptic Valve
- Smooth, robust stainless steel surfaces
- Valve position reading easy to read
- Internal air routing with automatic purging of the spring chamber
- Modified PID controller for high control accuracy
- Easy, intuitive operation using keys and an LCD
- Two software limit contacts

Version

- **Type 3724** · Electropneumatic positioner with on-site operation and LCD

Type	3724
Rated travel	4 to 16 mm, adjustable in steps of 0.5 mm
Reference variable	4 to 20 mA
Supply air Air quality acc. to ISO 8573-1	Supply pressures: 1.4 to 7 bar (20 to 105 psi) Max. particle size and density: Class 4, oil content: Class 3 Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected
Signal pressure (output)	0 bar up to the capacity of the supply pressure minus 0.4 bar Can be limited to approx. 2.3 bar by software
Characteristic	Adjustable
Ambient temperature	-20 to +80 °C
Degree of protection	IP 65 ¹⁾
Additional electrical equipment	
Limit contact	Two software limit contacts (min., max.), reverse polarity protection, galvanic isolation
Data sheet	T 8395

¹⁾ In preparation



Type 3724 (cover removed)



Type 3724 with Type 3379 Actuator

Valve Accessories

Application

Together with valve accessories, control valves serve as engineered solutions for special applications adapted to the requirements of industrial plants.

Electropneumatic converters

Electropneumatic converters accept a direct-current input signal from measuring and control equipment and convert it into a pneumatic output signal for measuring or control tasks. They are particularly suitable as intermediate element between electric measuring devices and pneumatic controllers or between electric control devices and pneumatic control valves.

- **Type 6111** · Electropneumatic converter · T 6111
- **Type 6126** · Electropneumatic converter · T 6126
- **Type 6116** · Electropneumatic converter · T 6116

Limit switches

Limit switches are fitted with two inductive, electric, or pneumatic limit contacts, optionally with a solenoid valve. They issue a signal when an adjusted limit value is exceeded or not reached.

- **Type 4740** · Electric limit switch · T 8357
- **Type 4746** · Electric or pneumatic limit switch · T 8365
- **Type 3776** · Electric limit switch · T 3776

Solenoid valves

Solenoid valves convert binary signals issued by electric control equipment into binary pneumatic control signals.

See solenoid valves on page 34

Lock-up valve

Pneumatic lock-up valves shut 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.

- **Type 3709** · Pneumatic lock-up valve · T 8391

Potentiometer

The pneumatic remote adjuster is a precision pressure regulator which can be adjusted manually.

- **Type 3759** · Pneumatic remote adjuster · T 8510

Supply pressure regulator

Supply pressure regulators provide pneumatic measuring and control equipment with a constant supply pressure. They reduce and regulate the air network pressure of maximum 12 bar (180 psi) to the pressure adjusted at the set point adjuster.

- **Type 4708** · Supply pressure regulator · T 8546



Type 6111



Type 6126



Type 4746



Type 3709



Type 4708

Service unit

The service unit is used to supply compressed air to pneumatic transmitters, controllers, and positioners. It cleans the compressed air, removing any dirt particles, water, and oil.

In addition, it regulates the air pressure to a constant pressure.

- **Type 3999-009X** · Service unit · T 3999-6

Filter regulator

The filter regulator is used to supply compressed air to pneumatic volume boosters for large actuators. It cleans the compressed air, removing any dirt particles, water, and oil.

In addition, it regulates the air pressure to a constant output pressure.

- **Type 3999-0096** · Filter regulator · T 3999-8

Instrument air tank

Instrument air tanks guarantee the supply of compressed air. Including shut-off valve, check valve, or pneumatic lock-up valve at the supply air connection as well as pressure gauge, pressure switch for monitoring the supply pressure, and safety valve for pressure safeguarding

Delivered as turnkey system



Type 3999-009X



Type 3999-0096

Solenoid Valves

Type 3963 and Type 3967 Solenoid Valves

Application

Solenoid valves are the interfaces between the electric control level and the pneumatic actuator. Due to their minimal power consumption, they can even be controlled using intrinsically safe fieldbus systems.

The solenoid valves are subjected to high quality demands and various versions are certified for safety-instrumented systems according to IEC 61508.

Different switching functions, flow rates, and connection types allow the solenoid valve to be tailor-made for the specific task.

The solenoid valves are used to control pneumatic linear actuators with NAMUR rib according to IEC 60534 or pneumatic rotary actuators with NAMUR interface according to VDI/VDE 3845.

Versions

- **Type 3963** · Solenoid valve in type of protection intrinsic safety Ex ia
- **Type 3967** · Solenoid valve in type of protection intrinsic safety Ex ia

Solenoid valve	Type 3963	Type 3967
Nominal signal	6, 12, 24 V DC or 24, 48, 115, 230 V AC	6, 12, 24 V DC
Power consumption	6 to 27 mW or 0.04 to 0.46 VA	6 to 27 mW
Switching function	3/2-, 5/2-, 5/3 or 6/2-way function	3/2, 5/2 or 5/3-way function
K_{VS} coefficient	0.16 to 4.3	0.32 to 4.3
Degree of protection	IP 54 or IP 65	IP 65
Ambient temperature	-45 to +80 °C	-45 to +80 °C
Data sheet	T 3963	T 3967



Type 3963 Solenoid Valve



Type 3967 Solenoid Valve

Solenoid Valve Islands

Type 3965 Solenoid Valve Island

Solenoid valve island with bus connection as on-site station

Application

Solenoid valve islands are the interfaces between the electric control level and the pneumatic actuator. Due to their minimal power consumption, they can even be controlled using intrinsically safe fieldbus systems.

Different switching functions and connection types allow the solenoid valve island to be tailor-made for the specific task.

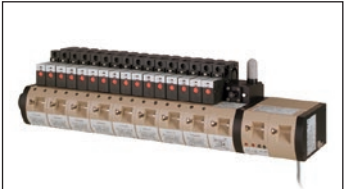
The solenoid valve island is a compact solution for the centralized control of pneumatic on/off valves.

Versions

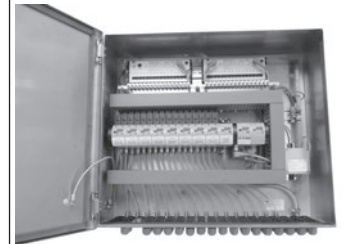
- **Type 3965** · Solenoid valve island in type of protection intrinsic safety Ex ia with max. 16 switching functions, optionally with pressure reducer, bus connection for PROFIBUS®-DP (Ex ia) and separate input modules for max. 32 NAMUR sensors (Ex ia)

Solenoid valve island	Type 3965
Nominal signal	6, 12, 24 V DC
Power consumption	6 to 27 mW
Switching function	2/2, 3/2 or 5/2-way function (can be combined)
Number of switching functions	Max. 16
K _{Vs} coefficient	0.13
Degree of protection	IP 40
Ambient temperature	-25 to +80 °C
Data sheet	T 3965

- **Solenoid valve island with bus connection as on-site station** for the centralized control and monitoring of pneumatic on/off valves, consisting of a control cabinet (Ex ia) with bus connection for PROFIBUS®-PA-IS (optionally PROFIBUS®-PA or FOUNDATION™ fieldbus H1) as well as function monitoring of sensors and final control elements



Type 3965 Solenoid Valve Island



Solenoid valve island ready for connection, mounted on a plate

Control Cabinets and Automation Solutions

TROVIS 6493 and TROVIS 6495-2 Industrial Controllers

Application

Digital controllers to automate industrial and process plants for general and more complex control tasks.

Versions

- **TROVIS 6493** · Compact controller for panel mounting
- **TROVIS 6495-2** · Industrial controller for panel mounting

Industrial controllers	TROVIS 6493	TROVIS 6495-2
Degree of protection (front)	IP 65	IP 65
Functions		
Control circuits	1	2
P, PI, PD, PID control	•	•
Fixed set point and follow-up control	•	•
Ratio control		•
Cascade control		•
Override control		•
Linking of input variables	•	•
Input		
Analog inputs	2	4
0/4 to 20 mA	•	•
0/2 to 10 V	•	•
Resistance thermometer	Pt 100/Pt 1000	Pt 100/Pt 1000
Resistance transmitters	•	•
Transmitter supply	•	•
Binary inputs	1	4
Output		
Analog outputs	1	3
0/4 to 20 mA	•	•
0/2 to 10 V	•	•
Relay	2	4
Transistor outputs	1	3
On/off and three-step	1	2
Limit	2	4
Interface – Configuration/communication		
Infrared	•	•
RS-485		• ¹⁾
RS-232		• ¹⁾
USB		• ¹⁾
Memory pen		• ¹⁾
TROVIS-VIEW Software	•	•
Modbus RTU		• ¹⁾
Data sheet	T 6493	T 6495-2

¹⁾ Optional



TROVIS 6493 Industrial Controller



TROVIS 6495-2 Industrial Controller

Control Cabinets and Automation Solutions

Type 3992-1 Measuring and Control Station

Application

The enclosures are used as ready-to-connect pneumatic, electropneumatic, or electric measuring and control stations for protection against rough ambient temperatures.

Version

- **Type 3992-1** · Measuring and control station

Measuring and control station	Type 3992-1
Switching cabinet	Polycarbonate, gray, degree of protection IP 65 Other versions available on request
Instrument configuration	Panel-mounted instruments 96 x 96 mm or 64 x 96 mm 19" rack-mounted instruments 3 HE, max. 24 HP
Version	Wiring to terminal strip, tubing, and function check
Data sheet	T 992-1

Switching cabinet containing operator controls and control equipment according to customer specifications.



Switching cabinet containing operator controls and control equipment

Compliance overview

CE

EAC

Type	CE compliance	EAC compliance
2371	–	•
3241	•	•
3249	–	•
3271	–	•
3277	–	•
3281	•	•
3321-IP	•	•
3323-IP	•	•
3345	–	•
3347	–	•
3349	•	•
3351	–	•
3353	•	•
3354	–	•
3379	–	–
3709	–	•
3724	•	–
3725	•	•
3730-0	•	•
3730-1 to -6	•	•
3759	–	•
3766	•	•
3767	•	•
3776	•	•
3963	•	•
3965	•	•
3967	•	•
3992-1	•	–
3994-0001	•	–
3994-0020	•	•

Type	CE compliance	EAC compliance
3994-0050-CBXX	•	1)
3994-0051-CV31XX	•	1)
3994-0102-6	•	–
3999-009X	–	–
3999-0096	–	–
4708	–	•
4740	•	•
4746	•	•
4763	•	•
4765	–	•
5207	•	•
6111	•	•
6116	•	•
6126	•	•
KMA 190	•	–
KMA 195	•	–
KMA 290	•	–
KMA 295	•	–
KMA 495	•	–
KMA 995	•	–
KMD 188	•	–
KMD 289	•	–
KMD 385	•	–
KMD 402	•	–
KMD 985	•	–
Steripur 207	•	–
Steripur 297	•	–
Steripur 307	•	–
Steripur 397	•	–
Steripur 407	•	–
Steripur 997	•	–
TROVIS 6493	•	•
TROVIS 6495-2	•	•

1) Letter of exemption available for EAC

Valve sizing

Calculation of the K_V coefficient

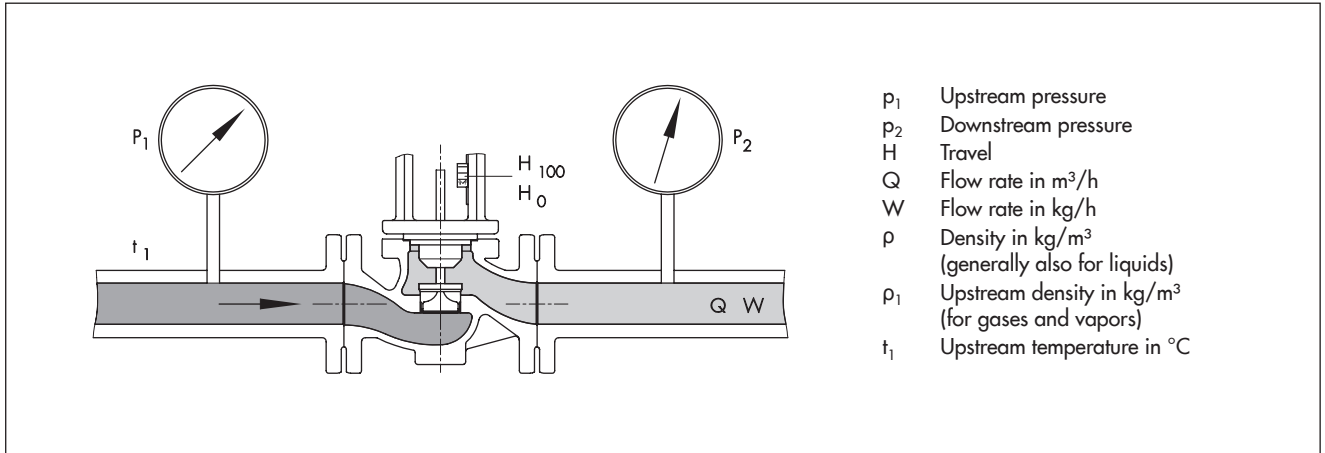
The K_V coefficient is calculated according to IEC 60534. The data sheets contain the necessary device-specific terms.

A preliminary, simplified calculation may be made with the help of the working equations listed below. They do not take into account the influence of the connecting fittings or choked flow at critical flow velocities.

Valve selection

After calculating the K_V coefficient, the corresponding K_{VS} coefficient of the valve model is to be selected from the data sheet.

In case, real operating data are used in the calculation, the following generally applies: $K_{Vmax} \approx 0.7$ to $0.8 \cdot K_{VS}$.



Pressure drops	Medium				
	Liquids		Gases		Steam
	m^3/h	kg/h	m^3/h	kg/h	kg/h
$p_2 > \frac{p_1}{2}$	$K_V = Q \sqrt{\frac{\rho}{1000 \Delta p}}$	$K_V = \frac{W}{\sqrt{1000 \rho \Delta p}}$	$K_V = \frac{Q_G}{519} \sqrt{\frac{\rho_G T_1}{\Delta p p_2}}$	$K_V = \frac{W}{519} \sqrt{\frac{T_1}{\rho_G \Delta p p_2}}$	$K_V = \frac{W}{31.62} \cdot \sqrt{\frac{v_2}{\Delta p}}$
$\Delta p < \frac{p_1}{2}$			$K_V = \frac{Q_G}{259.5 \cdot p_1} \cdot \sqrt{\rho_G \cdot T_1}$	$K_V = \frac{W}{259.5 \cdot p_1} \cdot \sqrt{\frac{T_1}{\rho_G}}$	$K_V = \frac{W}{31.62} \cdot \sqrt{\frac{2 \cdot v^*}{p_1}}$
$p_2 < \frac{p_1}{2}$					
$\Delta p > \frac{p_1}{2}$					
p_1	[bar]	Absolute pressure p_{obs}	ρ	[kg/m^3]	Density of liquids
p_2	[bar]	Absolute pressure p_{obs}	ρ_G	[kg/m^3]	Density of gases at $0^{\circ}C$ and 1013 mbar
Δp	[bar]	Differential pressure	v_1	[m^3/kg]	Specific volume (v' from steam table) at p_1 and t_1
T_1	[K]	$273 + t_1$	v_2	[m^3/kg]	Specific volume (v' from steam table) at p_2 and t_1
Q_G	[m^3/h]	Flow rate of gases based on $0^{\circ}C$ and 1013 mbar	v^*	[m^3/kg]	Specific volume (v' from steam table) at $\frac{p_1}{2}$ and t_1

Glossary

Abbreviations and terms as well as European and US organizations and standards

3-A conformity

Confirmation that 3-A standards have been observed.

3-A Sanitary Standards Inc.

An independent, not-for-profit US corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries. Similar to FDA, their specifications are internationally observed.

3-A sanitary class

Classification of resistance properties of seal materials, e.g. EPDM. Tests include changes in volume and hardness under different pressure and temperature conditions and depending on the medium.

ANSI – American National Standards Institute

Creates engineering standards for the United States.

Aseptic design

Design of equipment to meet specifications for sterile applications and for products such as pharmaceuticals.

Aseptic process

Processes include production of chemical-pharmaceutical active substances (sterile BPC), biopharmaceutical substances, pharmaceuticals, pure water and steam systems, biochemistry, genetic engineering.

ASME – American Society of Mechanical Engineers

Creates consensus standards for mechanical engineering.

ASME-BPE – American Society of Mechanical Engineering – Bioprocessing Equipment

Specifications for plant components, such as pipes and fittings, whose wetted surfaces must be polished to meet hygienic regulations concerning surface finish.

ASTM – American Society for Testing and Materials

Creates consensus standards for material quality and material quality testing methods.

BN II – Basler Norm (guideline of the Swiss chemical and pharmaceutical industries)

According to this standard, stainless steels with very low ferrite content, e.g. 1.4435, are tested and defined to achieve the best possible corrosion resistance.

BPC – Bulk Pharmaceutical Chemicals

White biotechnology substances with an annual output of more than 10,000 tonnes. Such substances include amino acids, biopolymers, vitamins, solvents, and antibiotics.

BPEC – Bio Processing Equipment Committee

A sub-committee of ASME. It creates engineering standards for the design, specification, manufacture, and documentation of equipment used for biopharmaceutical processes.

BS – British Standard

Creates engineering standards for the United Kingdom.

CEN – Comité Européen de Normalisation

Committee for European Standardization. Creates standards that reflect the best practices in each industry (except for electroengineering and telecommunications). Currently supports 30 member states.

CFR – Code of Federal Regulation

Codification of the general and permanent rules of the US federal government. It is divided into 50 titles that represent broad areas subject to federal regulation. Each volume of the CFR is updated once each calendar year and is issued on a quarterly basis.

cGMP – Current Good Manufacturing Practices

Current design and operating practices developed by the pharmaceutical industry to meet FDA requirements as published in the Code of Federal Regulations.

CIP – Clean in Place

The technique of cleaning process line components using liquid cleaning agents without the need for relocation or disassembly.

CS/PS – Clean steam/Pure steam

Cleaning and sterilization using clean steam or pure steam.

PED – Pressure Equipment Directive 97/23/EC

European directive stipulates the requirements for pressure equipment, such as vessels, steam boilers, and pipes. It was established to harmonize the national legislation of the EU member states.

DIN – German Institute for Standardization

Creates engineering standards for Germany and is a contributing body to CEN and ISO.

DIW – DI water – Deionized water

Fully demineralized water through deionization.

DVGW – Deutsche Vereinigung des Gas- und Wasserfachs

The German Technical and Scientific Association for Gas and Water establishes technical standards for the safe and reliable supply of gas and water.

EHEDG – European Hygienic Engineering and Design Group

The group's objective is to provide standardization organizations (CEN and ISO) with specialist views on hygienic and aseptic design by publishing requirements and test methods.

Glossary

Abbreviations and terms as well as European and US organizations and standards

EP – European Pharmacopoeia

European counterpart to USP. Private, not-for-profit corporation for creating standards for the medical industry.

EP or E/P – Electropolish

Electrochemical polishing process for metal components where metal ions are removed from the surface of the metal.

EPA – Environmental Protection Agency

US governmental organization for protection of the environment and health.

EPDM – Ethylene propylene diene rubber

An elastomer used for primarily for seals due to its mechanical, thermal, and chemical resistance. It is not resistant to mineral oil products.

FDA – Food and Drug Administration

Enforcement agency of the US Government for food, drug, and cosmetics manufacturing. Author of the US cGMPs. Responsible for new product approvals, plant inspections, and product recalls. Even though the authority's scope is limited to the US, these regulations are used on an international basis.

FDA CFR – Code for Regulations

Title 21 CFR Part 11 of the Code of Federal Regulations deals with the Food and Drug Administration (FDA) guidelines on electronic records and electronic signatures in the United States.

GAMP – Good Automated Manufacturing Practice

The guide describes a set of principles and procedures that help ensure that pharmaceutical products have the required quality.

GMP – Good Manufacturing Practice

Practices conforming with requirements stipulated by ISO, EN, DIN, FDA, WHO, etc.

GMP media – Pure media

Media that are produced in accordance of the standards of the GMP guidelines.

Hygienic procedure

Procedure to keep hygiene standards, minimizing hygienic risks, e.g. in the food processing and pharmaceutical industries.

IQ – Installation Qualification

Verifies that the equipment, and its ancillary systems or subsystems have been installed in accordance with installation drawings and/or specifications.

OQ – Operation Qualification

Establishes that process equipment and subsystems are capable of consistently operating within established limits and tolerances. Operational Qualification should follow on from the Installation Qualification (IQ).

PQ – Performance Qualification

The demonstration and documentation that the various units and procedures of a process operate as they should.

ISO – International Standards Organization

ISO is a network of the national standards institutes with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISPE – International Society for Pharmaceutical Engineering

Society for improving and researching production standards for the pharmaceutical industry.

KTW – Kunststoffe im Trinkwasserbereich (German guideline for the hygienic assessment of organic materials in contact with drinking water)

Recommendations for plastics and elastomers made by the German Federal Environment Agency (BGA).

MTR – Certified Mill Test Report or Material Test Report

Traceability material analysis. Similar to the inspection certificate according to EN 10204.

NPDWR – National Primary Drinking Water Regulations

US regulations for public drinking water supply systems that include health-based standards for various contaminants, and monitoring and analysis requirements.

P&ID – Piping and Instrumentation Diagram

P&ID is a schematic illustration of functional relationship of piping, instrumentation, and system equipment components.

POU – Point of Use

A valve outlet in a recirculation utility system (typically a water system).

PS – Pure steam

Pure steam produced by steam generators in the food processing and pharmaceutical industries.

PTFE – Polytetrafluorethylene

Material used for seals and linings with excellent anti-adhesive properties and an almost universal chemical resistance.

PW – Purified water

Ingredient water (not for injection) or rinse water for pharmaceutical products conforming to USP.

Glossary

Abbreviations and terms as well as European and US organizations and standards

Sanitary design

Design of equipment to meet specifications for hygienic applications, e.g. in the beverage industry.

SIP – Sterilize-(steam)-in-place

Sanitization of process line components by the use of steam without the need for relocation or disassembly.

TFM™PTFE

The modified PTFE has an improved surface, a wider temperature range, chemical resistance, and weldability.

TOC – Total Oxidizable Carbon or Total Organic Carbon

A measure of the amount of organic compounds in a water sample. Carbon is oxidized and the level of CO₂ is measured. The proposed USP water standards are based on TOC analysis.

Traceability

Traceability of production process and the assignment of measurements to specimens, e.g. inspection certificate 3.1 – EN 10204-3.1.

TrinkwV (TVO) – German Drinking Water Ordinance

Rules and limit values for the quality for portable water. It is based on an EU directive.

USP – United States Pharmacopoeia

A private, non-profit organization that sets standards for drugs, drug ingredients, medical devices, and diagnostics. The FDA enforces the established standards.

USP Class I to VI certification

Tests classified by the FDA performed on medical applications. Six classes are defined. The most tests are performed in Class VI.

Validation

Establishing by objective evidence that a process consistently produces a result meeting its predetermined requirements.

Wfi – Water for injections

Water for use as a solvent for the preparation of parenteral products conforming to USP guidelines.

Appendix II

SAMSON product range

Control valves for process engineering	Control valves Butterfly valves Steam converters Actuators Positioners Limit switches, solenoid valves, converters, etc.
Self-operated regulators and pipeline fittings	Temperature regulators Pressure regulators Differential pressure and flow regulators Boiler controllers Steam traps Strainers Air vents
Control valves for heating, ventilation, and air-conditioning systems	Electric actuators (with process controllers) Control valves Control valves with jet pump Combined self-operated regulators with electric actuators
Controllers and sensors for heating, ventilation, and air-conditioning systems	Electronic controllers and control stations Sensors
Automation systems	TROVIS · Process control systems for Windows® TROVIS 6600 · Automation system with native BACnet
Pneumatic and electric measuring and control equipment for process automation	Series 430 · Pneumatic indicating controllers Series 420 · Pneumatic control system Media · Differential pressure, flow, and liquid level meters Sensors Converters TROVIS 6400 · Automation system
SAMSOMATIC product range	Logic elements and accessories for pneumatic controls Design and supply of turnkey automation equipment

SAMSON Subsidiaries, Agencies and Service Facilities Worldwide

- Argentina** VALTROL-SAMSON S.A.
Brasil 2523
B1667HFC Parque Industrial Tortuguitas, Buenos Aires
Phone: +54 2320 550326
Fax: +54 2320 550326-102
E-mail: valtrolsamson@valtrolsamson.com.ar
Internet: www.valtrolsamson.com.ar
- Australia** SAMSON CONTROLS PTY LTD
Units 13-15 · Port Botany Industrial Park
61-71 Beauchamp Road · **Matraville, NSW 2036**
Phone: +61 2 93167800 · Fax: +61 2 96665963
E-mail: sales@samsoncontrols.com.au
Internet: www.samsoncontrols.com.au
- Austria** SAMSON MESS- UND REGELGERÄTE
GESELLSCHAFT M.B.H.
Amalienstraße 57 · **1130 Wien**
Phone: +43 1 8772674-0 · Fax: +43 1 8772674-96
E-mail: office@samson.at · Internet: www.samson.at
- Belgium** SAMSON N.V.
Baarbeek 6 · **2070 Zwijndrecht (Antwerpen)**
Phone: +32 3 5415363 · Fax: +32 3 5419692
E-mail: infobe@samson-sanv.be
Internet: www.samson-sanv.be
- Brazil** SAMSON CONTROL LTDA.
Rua Matrix, 159 · Centro Empresarial Capuava
Bairro Moinho Velho · **06714-360 Cotia / SP**
Phone: +55 11 46178181, +55 11 47027867
Fax: +55 11 46178187
E-mail: info@samsoncontrol.com.br
Internet: www.samsoncontrol.com.br
- Bulgaria** BJB LTD.
25 Hristo Belchev · **1000 Sofia**
Phone: +359 2 9867289 · Fax: +359 2 9867467
E-mail: office@bjbgroup.com
Internet: www.bjbgroup.com
- Canada** SAMSON CONTROLS INC.
1-105 Riviera Drive · **Markham, Ontario L3R 5J7**
Phone: +1 905 474-0354 · Fax: +1 905 474-0998
E-mail: samson.ca@samsongroupna.com
Internet: www.samsoncontrols.com
- Chile** SAMSON CONTROLS S.A.
Lo Boza 107, Módulo B-8, Flex Center · **Pudahuel, Santiago**
Phone: +56 2 22405100 · Fax: +56 2 29493390
E-mail: info@samson.cl · Internet: www.samson.cl
- China** SAMSON CONTROLS (CHINA) CO., LTD.
No. 11, Yong Chang Nan Lu, BDA
Beijing 100176
Phone: +86 10 67803011
Fax: +86 10 67803196
E-mail: info@samsonchina.com
Internet: www.samsonchina.com
- Colombia** *Food and Beverage, textiles, pharmaceuticals, mining:*
STEAMCONTROL S.A.
Carrera 27, No. 17-80, Paloquemao
Santafé de Bogotá, D.C.
Phone: +57 1 3750033 · Fax: +57 1 3710452
E-mail: importaciones@steamcontrol.com
Internet: www.steamcontrol.com
- Colombia** *Oil and Gas, steel, pulp and paper, power:*
CONTROVAL COLOMBIA S.A.S.
Carrera 18, No. 86A-14
Santafé de Bogotá, D.C.
Phone: +57 1 6386148 · Fax: +57 1 6163030
E-mail: ventascolumbia@controval.com
Internet: www.controval.com
- Croatia** FASEK ENGINEERING AND TRADING D.O.O.
Zvonigradska 43 · **10000 Zagreb**
Phone: +385 1 3695-525, +385 1 3695-546
Fax: +385 1 3695-525, +385 1 3695-546
E-mail: croatia@fasek.com · Internet: www.fasek.hr
- Cuba** P.A.S.I. PUMPEN UND ARMATUREN
SERVICE INTERNATIONAL GMBH
Edificio Santiago · Oficina 302 · Miramar Trade Center
5ta Avenida e/76 y 78 · **Playa, Ciudad de la Habana**
Phone: +53 7 2044400 · Fax: +53 7 2042359
E-mail: info@pasi-caribe.com
Internet: www.pasi-caribe.com
- Czech Republic** DLOUHÝ I.T.A. CZ S.R.O.
Jinonická 805/57 · **150 00 Praha 5**
Phone: +420 257216955, +420 257216956
Fax: +420 257216957
E-mail: info@dlouchy-ita.eu · Internet: www.dlouchy-ita.eu
- Denmark** SAMSON REGULERINGSTEKNIK A/S
Blokken 55 · **3460 Birkerød**
Phone: +45 45819301 · Fax: +45 45819530
E-mail: adm@samson-reg.dk
Internet: www.samson-reg.dk
- Ecuador** ENERGYPETROL S.A.
Calle José Puerta N39-155 y Eloy Alfaro · **Quito**
Phone: +593 2 2923-064, +593 2 2923-115,
+593 2 2922-187
Fax: +593 2 2457-347
E-mail: energypetrol@energypetrol.net
Internet: www.energypetrol.net
- Egypt** SAMSON CONTROLS
FOR ASSEMBLING & MANUFACTURING S.A.E.
Plot No. 128, First Industrial Zone · **Badr City, Cairo 11829**
Phone: +20 2 28607142, +20 2 28607148
Fax: +20 2 28607143
E-mail: info@samsoncontrols.com.eg
Internet: www.samsoncontrols.com.eg
- Finland** OY SAMSON AB
Kaakelikaari 2A · **01720 Vantaa**
Phone: +358 10 4207060 · Fax: +358 9 535556
E-mail: samson@samson.fi · Internet: www.samson.fi

SAMSON Subsidiaries, Agencies and Service Facilities Worldwide

France	SAMSON REGULATION S.A. 1-3, rue Jean Corona · 69512 Vaulx en Velin Phone: +33 4 72047500 · Fax: +33 4 72047575 E-mail: samson@samson.fr · Internet: www.samson.fr	Jordan	RAMALLAH ENGINEERING & CHEMICAL EST. Areej Commercial Complex, 210 Wasfi Al – Tal Street Office No. 301 · P.O. Box 925 682 · Amman 11190 Phone: +962 6 5538256 · Fax: +962 6 5518257 E-mail: info@ramallahengineering.com Internet: www.ramallahengineering.com
Germany	SAMSON AKTIENGESELLSCHAFT MESS- UND REGELTECHNIK Weismüllerstraße 3 · 60314 Frankfurt am Main Postfach 10 19 01 · 60019 Frankfurt am Main Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 E-mail: samson@samson.de · Internet: www.samson.de	Kazakhstan	"EUROSPECARMATURA" GMBH Gaydara Str 196 · 050046 Almaty Phone: +7 727 3929464, +7 727 3929465, +7 727 3929466 Fax: +7 727 3929463 E-mail: samson@samson.kz · Internet: www.samson.kz
Greece	EXAKM ABETE INDUSTRIAL COMMERCIAL & TECHNICAL CO. Kallirrois Ave. 39 · 11743 Athen Phone: +30 21 09215332, +30 21 09218441 Fax: +30 21 09218761 E-mail: sales@exakm.gr · Internet: www.exakm.gr	Korea (South)	SAMSON CONTROLS LTD., CO. #119-82, Sasa-Dong, Sangrok-Gu Ansan-Si, Gyeonggi-Do 426-220 Phone: +82 31 4190464 · Fax: +82 31 4190465 E-mail: sales@samsonekorea.kr Internet: www.samsonekorea.kr
Hungary	SAMSON MÉRÉS- ÉS SZABÁLYOZÁSTECHNIKAI KFT. Óradna utca 3/A · 1044 Budapest Phone: +36 1 231-8080 · Fax: +36 1 230-0036 E-mail: info@samson.hu · Internet: www.samson.hu	Kuwait	RAMI TRADING CORP. P.O. Box 18 22 · Safat 13019 Phone: +965 2400566, +965 2400577 Fax: +965 2400588 E-mail: ramitrdg@qualitynet.net Internet: www.ramitrdg.com
India	SAMSON CONTROLS PVT. LTD. 604, P3, Pentagon Building, Magarpatta City, Hadapsar Pune 411028, Maharashtra Phone: +91 20 67246600 · Fax: +91 20 67246666 E-mail: info@samsoncontrols.net Internet: www.samsoncontrols.net	Latvia	SIA "INDUSTRIAL PROJEKTS" Kalnciema iela 17a-3 · Riga 1046 Phone: +371 67480150 · Fax: +371 67605227 E-mail: samson.lv@gmail.com
Iran	TECH. CONTROL · INDUSTRIAL CONSULTANTS CO. Unit 607, 6th floor, Sarve Saee Tower, Mostowfi Street Yussefabad 1433894593 (Tehran) P.O. Box 14155/5516 · Yussefabad (Tehran) Phone: +98 21 88701112 · Fax: +98 21 88724924 E-mail: info@techcontrolcc.com	Lithuania	UAB "AGAVA" Gedimino/K. Donelaicio street 47/24 · 44242 Kaunas Phone: +370 37 202410 · Fax: +370 37 207414 E-mail: agava@agava.lt · Internet: www.agava.lt
Ireland	VALVE SERVICES LTD. Euro Business Park, Little Island · Co. Cork Phone: +353 21 4510588 · Fax: +353 21 4351100 E-mail: sales@valve.ie · Internet: www.valve.ie	Malaysia	SAMSOMATIC (M) SDN BHD No 9 Jalan TP 3/3, Taman Perindustrian Sime UEP 47620 Subang Jaya, Selangor Darul Ehsan Phone: +60 3 80216698 · Fax: +60 3 80216866 E-mail: enquiry@samson-mal.com.my Internet: www.samson-sea.com
Israel	KAMA LTD. 20 Hametsuda St. · P.O. Box 1 10 · 58190 Azor Phone: +972 3 556-7747 · Fax: +972 3 556-7548 E-mail: kama@kama.org.il · Internet: www.kama.org.il	Mexico	SAMSON CONTROL S.A. DE C.V. Calle San Carlos No. 9 · Corredor Industrial Toluca Lerma C.P. 52004, Estado de México, México Phone: +52 728 2852001 · Fax: +52 728 2852028 E-mail: samson.mx@samsongroupna.com Internet: www.samson.com.mx
Italy	SAMSON S.R.L. Via Figino 109 · 20016 Pero (Milano) Phone: +39 02 33911159 · Fax: +39 02 38103085 E-mail: info@samson.it · Internet: www.samson.it	Netherlands	SAMSON REGELTECHNIEK B.V. Signaalrood 10 · 2718 SH Zoetermeer Postbus 2 90 · 2700 AG Zoetermeer Phone: +31 79 3610501 · Fax: +31 79 3615930 E-mail: info@samson-regeltechnik.nl Internet: www.samson-regeltechnik.nl
Japan	SAMSON K.K. 6-38-28 Kamiasao, Asao-ku Kawasaki, Kanagawa 215-0021 Phone: +81 44 988-3931 · Fax: +81 44 988-3861 E-mail: sales@samsonkk.co.jp · Internet: samsonkk.co.jp	Nigeria	HORIZON SHORES NIGERIA LTD 20 Oguntona Crescent · Gbagada Phase 1, Lagos Phone: +234 1 2955207 E-mail: seun@horizon-shores.com Internet: www.horizon-shores.com

SAMSON Subsidiaries, Agencies and Service Facilities Worldwide

Norway	MATEK-SAMSON REGULERING A/S Porsgrunnsvn. 4 · 3730 Skien Phone: +47 35900870 · Fax: +47 35900880 E-mail: post@matek.no · Internet: www.matek.no	Singapore	SAMSON CONTROLS PTE LTD 27 Kaki Bukit View · Kaki Bukit Techpark II Singapore 415962 Phone: +65 67488810 · Fax: +65 67451418 E-mail: samsonsp@singnet.com.sg Internet: www.samson-sea.com
Oman	MIDDLE EAST OILFIELD SERVICES L.L.C. P.O. Box 35 00 · 112 Ruwi (Muscat) Phone: +968 24487152, +968 24487153 Fax: +968 24483832 E-mail: midoil@midoiloman.com Internet: www.midoiloman.com	Slovakia	DLOUHÝ I.T.A. S.R.O. Starkova 7 · 01001 Zilina Phone: +421 41 7234370 · E-mail: info@dlouhy-ita.eu Internet: www.dlouhy-ita.eu
Peru	SAMSON CONTROLS S.A. Av. Los Gorriones 130 · Urb. La Campiña Chorrillos, Lima 9 Phone: +51 1 6371313 · Fax: +51 1 6371314 E-mail: info@samson.pe · Internet: www.samson.pe	Slovenia	GIA-S INDUSTRIJSKA OPREMA D.O.O. Industrijska cesta 5 · 1290 Grosuplje Phone: +386 1 7865-300 · Fax: +386 1 7863-568 E-mail: info@gia.si · Internet: www.samson-slo.com
Poland	SAMSON SP. Z O.O. AUTOMATYKA I TECHNIKA POMIAROWA al. Krakowska 197 · 02-180 Warszawa Phone: +48 22 5739-777 · Fax: +48 22 5739-776 E-mail: samson@samson.com.pl Internet: www.samson.com.pl	Spain	SAMSON S.A. TÉCNICA DE MEDICIÓN Y REGULACIÓN Pol. Ind. Cova Solera · Avda. Can Sucarrats, 104 Apartado 311 · 08191 Rubí (Barcelona) Phone: +34 93 5861070 · Fax: +34 93 6994300 E-mail: samson@samson.es · Internet: www.samson.es
Portugal	SAMSON, S.A. · MEDIDA E REGULAÇÃO Zona Industrial Ligeira 2, Lote 112 · Apartado 346 7520-309 Sines Phone: +351 269 634100 · Fax: +351 269 636104 E-mail: samson@samson.pt · Internet: www.samson.pt	Sweden	SAMSON MÄT- OCH REGLERTEKNIK AB Kungspporten 1A · 427 50 Billdal Box 67 · 427 22 Billdal Phone: +46 31 939130 · Fax: +46 31 914019 E-mail: info@samson.se · Internet: www.samson.se
Qatar	QATAR MODERN INSTRUMENTS & CONTROLS CO. (Q.M. CONTROLS) No 324, Zone 40, Street 250 · New Salata, D-Ring Road P.O. Box 64 29 · Doha Phone: +974 44432326 · Fax: +974 44432460 E-mail: info@qmcontrols.com Internet: www.qmcontrols.com	Switzerland	SAMSON AG · MESS- UND REGELTECHNIK Weismüllerstraße 3 · DE-60314 Frankfurt am Main Repräsentanz Schweiz Tödistrasse 60 · CH-8002 Zürich Phone: +41 44 2836142 · Fax: +41 44 2836143 E-mail: vb-loerrach@samson.de Internet: www.samsongroup.de
South Africa	SAMSON CONTROLS (PTY) LTD. 15 Kunene Circle, Omuramba Business Park Milnerton 7441, Cape Town P.O. Box 3 05 · Milnerton 7435, Cape Town Phone: +27 21 5526088, +27 21 5526089, +27 21 5526510 Fax: +27 21 5512515 E-mail: sales@samson-sa.com Internet: www.samson-sa.com	Taiwan	SAMSON CONTROLS CO., LTD. 3F, 132, Hsin-Hu Third Road · Taipei 114 Phone: +886 2 8792-1230 · Fax: +886 2 8792-1270 E-mail: samson@sctw.com.tw Internet: www.samson-taiwan.com
Romania	SAMSON CONTROL S.R.L. Intr. Sulfinei nr. 96 · 077125 Magurele, Ilfov Phone: +40 373 550192, +40 373 550194 Fax: +40 372 250229 E-mail: samson@samson.ro · Internet: www.samson.ro	Thailand	SAMSON CONTROLS LTD. 267/233-4 Sukhumvit Road Map Ta Phut, Muang · Rayong 21150 Phone: +66 38 608939 · Fax: +66 38 608943 E-mail: info@samson.co.th · Internet: www.samson.co.th
Russian Federation	OOO SAMSON CONTROLS Business Center "MOSALARKO", 4th floor Marksistskaya Str. 16 · 109147 Moskau Phone: +7 495 6474545 · Fax: +7 495 7373949 E-mail: samson@samson.ru Internet: www.samson.ru	Turkey	SAMSON ÖLÇÜ VE OTOMATİK KONTROL SİSTEMLERİ SANAYİ VE TİCARET A.Ş. Hadimköy Mahallesi, Alparslan Caddesi Niyaz Sokak, No. 16-18 · 34555 Arnavutköy (İstanbul) Phone: +90 212 6518746 · Fax: +90 212 6518750 E-mail: samson@samson.com.tr Internet: www.samson.com.tr
		Ukraine	"SAMSON-ENGINEERING GMBH" E. Sverstjuk Str. 19 · Floor 10, Office 4 · 02002 Kiev Phone: +380 44 4905305 · Fax: +380 44 4941517 E-mail: samson@samsoneng.kiev.ua Internet: www.samsoneng.kiev.ua

SAMSON Subsidiaries, Agencies and Service Facilities Worldwide

- United Arab Emirates** SAMSON CONTROLS FZE
P.O. Box 262793 · PBU YC01 (near R/A 08)
Jebel Ali Free Zone, Dubai
Phone: +971 4 8834933
Fax: +971 4 8834944
E-mail: info@samson.ae
Internet: www.samson.ae
- United Kingdom** SAMSON CONTROLS LTD
Perrywood Business Park · Honeycrook Lane
Redhill, Surrey RH1 5JQ
Phone: +44 1737 766391 · Fax: +44 1737 765472
E-mail: sales@samsoncontrols.co.uk
Internet: www.samsoncontrols.co.uk
- United States** SAMSON CONTROLS INC.
4111 Cedar Boulevard · **Baytown, Texas 77523-8588**
Phone: +1 281 383-3677 · Fax: +1 281 383-3690
E-mail: samson.us@samsongroupna.com
Internet: www.samson-usa.com
- Venezuela** CONTROVAL, C.A.
Calle San Rafael con Luis de Camoens
Edificio Controval N° 446-A, Piso 2, Zona Ind. La Trinidad
Caracas, Edo. Miranda
Phone: +58 212 9490500 · Fax: +58 212 9444554
E-mail: mimaggio@controval.com
Internet: www.controval.com
- Vietnam** SAMSON VIETNAM CO., LTD.
7th Floor, ATIC Office Building · 4 Nguyen Thi Minh Khai
Dakao Ward, District 1, Ho Chi Minh City
Phone: +84 839 106533 · Fax: +84 839 106583
E-mail: samson-vn@samsongroup.org

All addresses, including e-mail and Internet addresses, can be found at:
► www.samson.de

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Components for
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SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
E-mail: samson@samson.de · Internet: www.samson.de