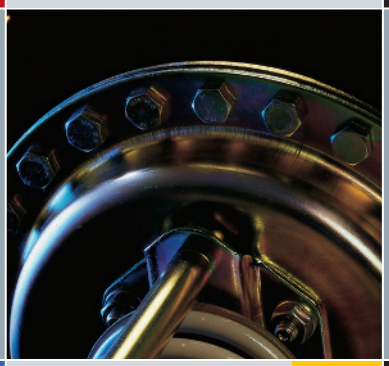
Catalog

Products



SAMSON GROUP

Products

Catalog 2013

Overview

Contents

Control Valves

Actuators

Positioners

Contents

Contents

Application

Control valves for process engineering and industrial applications according to DIN, ANSI and JIS standards

- Nominal sizes DN 15 to 300 · NPS ½ to 12 · DN 15A to 300A
- Pressure rating PN 10 to 40 · Class 125 to 300 · JIS 10K/20K
- Temperatures from –196 to 450 °C · –320 to 800 °F

Special features

- Globe valve with pneumatic or electric actuator
- Valve body optionally made of cast iron, spheroidal graphite iron, cast steel, forged steel, cold-resisting and high-alloy steels or special materials
- Valve plug with soft seal, metal seal or high-performance metal seal

Versions

– **Type 3241-7** · Valve with Type 3277 Pneumatic Actuator (see page 35)

– **Type 3241-1** · Valve with Type 3271 Pneumatic Actuator (see page 35)

Accessories · Positioners, limit switches, solenoid valves

Technical data

Nominal size		**DN 15 to 300 · NPS ½ to 12**			
Body material	DIN	Cast iron EN-JL1040	Spheroidal graphite iron EN-JS1049	Cast steel 1.0619 1.0460 [1]	Cast stainless steel 1.4408 1.4571 [1]
	ANSI	A 126 B	–	A216 WCC A 105 [1]	A351 CF8M A182 F316 [1]
Nominal pressure	PN	10, 16	16, 25	10 to 40	
	Class	125/250	–	150/300	
End connections	DIN	Flanges · Welding ends according to EN 12627			
	ANSI	ANSI B16.25/flanges FF, RF · NPT thread			
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal: VI High-performance metal seal: V			
Characteristic		Equal percentage · Linear			
Rangeability		50:1 up to DN 50 (NPS 2) 30:1 for DN 65 (NPS 2½) and larger 50:1 for DN 200 (NPS 8) and larger			
Temperature range		–10 to 220 °C · 14 to 430 °F			
With insulating section		–196 to 450 °C · –321 to 842 °F			
Data sheets		DIN/ANSI: T 8015/T 8012 · Actuators: T 8310-1/-2/-3			

[1] Forged steel version up to DN 80 (NPS 3) in PN 40 (Class 300)

Type 3241-7 Globe Valve up to DN 150 (NPS 6) with Type 3277 Pneumatic Actuator

Type 3241-7 Globe Valve in forged steel up to DN 80 (NPS 3) with Type 3277 Pneumatic Actuator

Type 3241-1 Globe Valve with Type 3271 Pneumatic Actuator

Further versions

- Welding ends for versions according to DIN and ANSI
- Adjustable packing
- Flow divider or AC-trim for noise reduction · See Data Sheets T 8081 and T 8082
- Insulating section or bellows seal · See Data Sheets T 8015 and T 8012
- Heating jacket · On request
- Actuator made of stainless steel · See Data Sheet T 8310-1
- Additional handwheel · See Data Sheets T 8310-1 and T 8310-2
- Electric actuator for plant engineering and HVAC · See T 5870, T 5871 and T 5874

Valves for special applications

Type 3241-1 and Type 3241-7 · With safety function for water and steam Tested according to DIN EN 14597 · See Data Sheet T 8016

Type 3241-4 · With safety function to protect heating systems against excess temperatures or pressures · Tested according to DIN EN 14597· See Data Sheet T 5871

Type 3241-1-Gas and Type 3241-7-Gas · Pneumatic control and quick-acting shut-off valves for gases · Typetested according to DIN EN 161 · See Data Sheet T 8020

Type 3241-1-Oil and Type 3241-7-Oil · Pneumatic control and quick-acting shut-off valves for liquid fuels and liquefied petroleum gas in the liquid phase Typetested according to DIN EN ISO 23553 · See Data Sheet T 8022

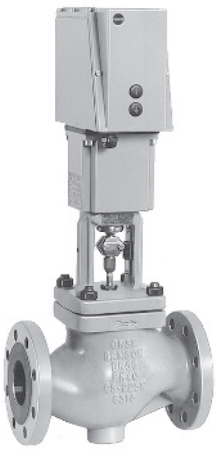
Valves for higher pressures

Series 250 according to DIN and ANSI · See page 11
Nominal pressure up to PN 400 (Class 2500) · Nominal size up to DN 500 (NPS 20)
Temperatures up to 550 °C (958 °F) · See Data Sheet T 8051 ff.

Steam-converting valves

Series 280 according to DIN and ANSI · See page 13
Nominal pressure up to PN 400 (Class 2500) · Nominal size up to DN 500 (NPS 20)
Temperatures up to 500 °C (930 °F) · Higher temperatures on request
See Data Sheets T 8251 and T 8254

Type 3241-7 Globe Valve with Type 3277 Pneumatic Actuator and heating jacket including bellows heating



Type 3241-4 Globe Valve with Type 3274 Electrohydraulic Actuator

Application

Mixing or diverting valve for process engineering and industrial applications according to DIN, ANSI and JIS standards

- Nominal size DN 15 to 150 · NPS ½ to 6
- Nominal pressure PN 10 to 40 · Class 150 to 300
- Temperatures from –196 to 450 °C · –325 to 842 °F

Special features

- Three-way valve with pneumatic or electric actuator
- Valve body optionally made of cast iron (DIN version only), cast steel or cast stainless steel
- Metal-seated valve plug

Versions

Standard version for temperatures ranging from –10 to 220 °C

– **Type 3244-7** · Valve with Type 3277 Actuator (see page 35)

– **Type 3244-1** · Valve with Type 3271 Actuator (see page 35)

Technical data

Nominal size		**DN 15 to 150 · NPS ½ to 6**		
Body material	DIN	Cast iron EN-JL1040	Cast steel 1.0619	Cast steel 1.4408
	ANSI	–	A216 WCC	A351 CF8M
Nominal pressure	PN	10 to 40		
	Class	–	150/300	
End connections	DIN	All flanges according to DIN		
	ANSI	Flanges RF		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal Class I: 0.05 % of K_V		
Characteristic		Linear		
Rangeability		50:1 up to DN 50 (NPS 2) 30:1 for DN 65 (NPS 2½) and larger		
Temperature range		–10 to 220 °C · 14 to 430 °F		
With insulating section		–196 to 450 °C · –325 to 842 °F		
Data sheets		DIN/ANSI valve: T 8026 · Actuators: T 8310-1		

Accessories · Positioners, limit switches, solenoid valves

Further versions

– Insulating section or bellows seal · See Data Sheet T 8026
– Heating jacket · On request
– Additional handwheel · See Data Sheet T 8310-1
– Electric actuator for plant engineering and HVAC

Type 3244-7 Three-way Valve with Type 3277 Pneumatic Actuator

Type 3244-1 Three-way Valve with Type 3271 Pneumatic Actuator

Pneumatic Control Valves

Micro-flow valve · Type 3510

High-pressure valve · Type 3252

Application

Control valve to control very low flow rates according to DIN and ANSI standards

Special features

- Globe or angle valve with pneumatic actuator
- Valve body and wetted parts made of stainless steel
- Metal-seated valve plug

Versions

– **Type 3510-7** · Micro-flow valve with Type 3277-5 Pneumatic Actuator

– **Type 3510-1** · Micro-flow valve with Type 3271-5 Pneumatic Actuator (120 cm²) or Type 3271-52 Pneumatic Actuator (60 cm²)

– **Type 3252-7** · High-pressure valve with Type 3277-5 Pneumatic Actuator (120 cm²) or Type 3277 Pneumatic Actuator (350 cm²)

– **Type 3252-1** · High-pressure valve with Type 3271-5 Pneumatic Actuator (120 cm²) or Type 3271 Pneumatic Actuator (350 cm²)

See page 35 for details on Types 3277 and 3271 Pneumatic Actuators

Technical data

Type		3510	3252
Nominal size	DN	10 to 25	15 to 25
	NPS	¼ · ⅜ · ½ · ¾	½ · ¾ · 1
Flow coefficient	K_{VS}	0.0001 to 1.6	0.1 to 4.0
	C_V	0.00012 to 2.0	0.12 to 5.0
Body material	DIN	1.4571	1.4404
	ANSI	A316 Ti	A 316 L
Nominal pressure	PN	40 to 400	40 to 400
	Class	150 to 2500	300 to 2500
End connections	DIN/ ANSI	G/NPT/ISO female thread Flanges, welding ends	G/NPT female thread Weld-on flanges, welding ends
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV High-perf. metal seal: V	Metal seal: IV
Characteristic		Equal percentage Linear (K_{VS} 0.01 and higher)	Equal percentage · Linear
Rangeability		Max. 50:1	Max. 50:1
Temperature range		–10 to 220 °C 14 to 430 °F	–10 to 220 °C 14 to 430 °F
With insulating section		–200 to 450 °C –328 to 842 °F	–200 to 450 °C –328 to 842 °F
Data sheets		T 8091, T 8091-1	T 8053

Accessories · Positioners, limit switches, solenoid valves

Type 3510-7 Micro-flow Valve with Type 3725 Positioner

Type 3252-7 High-pressure Valve with Type 3767 Positioner

Application

Control valve for process engineering applications with high industrial requirements according to DIN and ANSI standards

- Nominal size DN 15 to 500 · NPS ½ to 20
- Nominal pressure PN 16 to 400 · Class 150 to 2500
- Temperatures from –200 to 550 °C · –420 to 958 °F

Special features

- Globe or angle valve with pneumatic actuator

Versions

Standard version for temperatures from –10 to 220 °C (15 to 430 °F), with adjustable high-temperature packing from –10 to 350 °C (15 to 660 °F)

– **Type 3251-1** or **3256-1** · With Type 3271 Pneumatic Actuator (p. 35)

– **Type 3251-7** or **3256-7** · With Type 3277 Pneumatic Actuator (p. 35)

Technical data

Valve	Type	3251		3256
Nominal size	DN	15 to 500		15 to 300
	NPS	½ to 20		½ to 12
Body material	DIN	Cast steel 1.0619	Cast steel 1.7357	Cast stainless steel 1.4408
	ANSI	A216 WCC	A217 WC6	A351 CF8M
Nominal pressure	PN	16 to 400 (DN 15 to 150) 16 to 160 (DN 200 to 600) Up to PN 400 on request		
	Class	150 to 900 · Up to Class 2500 on request		
End connections	DIN	Flanges · Welding ends according to EN 12627		
	ANSI	Flanges RF, RTJ · Welding ends B16.25		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal: VI High-performance metal seal: V		
Characteristic		Equal percentage · Linear		
Rangeability		50:1		
Temperature range		–10 to 220 °C · 14 to 430 °F		
With high-temperature packing		220 to 350 °C · 430 to 660 °F		
With insulating section		–200 to 550 °C · –328 to 958 °F		
Data sheets	DIN	T 8051		T 8065
	ANSI	T 8052		T 8066

Accessories · Positioners, limit switches, solenoid valves

Further versions

– Flow divider or special AC-trim

Type 3251-1 Globe Valve with Type 3271 Pneumatic Actuator

Type 3256-1 Angle Valve with Type 3271 Pneumatic Actuator

Aplications

Control valve for process engineering applications with high industrial requirements according to DIN and ANSI standards

Technical data

Valve Type		3253 [1]		
Nominal size		DN 15 to 500 · NPS ½ to 20		
Body material	DIN	Cast iron EN-JL1040	Cast steel 1.0619	Cast stainless steel 1.4408
	ANSI	–	A216 WCC	A351 CF8M
Nominal pressure		PN 10 to 160 [2] · Class 150 to 900 [2]		
End connections		Flanges according to DIN EN · Raised face, ring joint		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal Class: I		
Characteristic		Linear		
Rangeability		50:1		
Temperature range		–10 to 220 °C · 14 to 428 °F		
With high-temperature packing		220 to 350 °C · 428 to 660 °F		
With insulating section		–200 to 500 °C · –328 to 932 °F		
Data sheets		DIN: T 8055 · ANSI: T 8056		

[1] Depending on plug arrangement as mixing or diverting valve
[2] Higher pressures on request

Technical data

Valve Type		3254		
Nominal size		DN 80 to 500 · NPS 3 to 20		
Body material	DIN	Cast steel 1.0619	Cast steel 1.7357	Cast stainless steel 1.4408
	ANSI	A216 WCC	A217 WC6	A351 CF8M
Nominal pressure		PN 16 to 400 · Class 150 to 2500		
End connections	DIN	Flanges · Welding ends according to EN 12627		
	ANSI	Flanges RF, RTJ · Welding ends B16.25		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal: VI High-performance metal seal: V		
Characteristic		Equal percentage · Linear		
Rangeability		50:1		
Temperature range		–10 to 220 °C · 14 to 430 °F		
With high-temperature packing		220 to 350 °C · 428 to 660 °F		
With insulating section		–200 to 500 °C · –328 to 932 °F		
Data sheets		DIN: T 8060 · ANSI: T 8061		

Type 3253-1 Three-way Valve with Type 3271 Pneumatic Actuator

Type 3254-1 Globe Valve with Type 3271 Pneumatic Actuator

Application

Steam converters (globe valve or angle valve) for process engineering applications and thermal plants

Technical data

Steam-converting valve		Type 3281 Globe Valve	Type 3286 Angle Valve
Nominal size	DN	50 to 500	
	NPS	2 to 20	
Body material	DIN	Cast steel 1.0619	Cast steel 1.7357
	ANSI	A216 WCC	A217 WC6
Nominal pressure		PN 16 to 160 · Class 150 to 900	
End connections		Flanges · Welding ends	
Seat/plug seal Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV High-performance metal seal: V Balanced: III	
Characteristic		Equal percentage · Linear	
Rangeability		50:1	
Temperature range		–10 to 220 °C · 14 to 430 °F	
With high-temperature packing up to		350 °C · 660 °F	
With insulating section up to		400 °C · 750 °F	500 °C · 930 °F
Data sheet		T 8251	

Type 3281-1 Steam-converting Valve with Type 3271 Pneumatic Actuator

Pneumatic Control Valves

Components to reduce noise and wear

Flow dividers · AC-trims · Perforated plug

Type 3381 Silencer

Application

The noise emission of control valves and attached pipeline is determined by the free jet exiting the restriction and the jet's turbulent mixing zone in applications with gases and vapors. When cavitation occurs, the noise level is influenced to a large extent by the pressure waves induced by the implosion of the cavitation bubbles.

The following components are used to reduce noise:

Flow dividers St I, St II or St III · Effective and cost-efficient components made of perforated sheet steel or hard-faced wire mesh

- Shorten the free jet in applications with gases and vapors
- Accelerate the exchange of energy in the mixing zone
- Protect the valve body

Flow dividers are suitable for SAMSON Types 3241, 3251, 3254 Globe Valves and Type 3256 Angle Valve as well as for globe valves of self-operated regulators (see Data Sheet T 8081).

AC-trims · Optimized trims for SAMSON control valves for low-noise pressure letdown of liquids (see T 8082 and T 8083)

- Double-guided plug stem to prevent vibration
- Additional attenuation plates in the seat with AC-2 Trim
- AC-3 to AC-5 Trims for multi-stage pressure reduction at high differential pressures

Versions

– **AC-1 Trim** · Noise-optimized trim, parabolic plug with double plug stem guide. Suitable for DN 50 to 300 and PN 16 to 160 (see T 8082)

– **AC-2 Trim** · Trim same as AC-1 Trim, but with fixed attenuation plates integrated into the seat on the upstream side, for DN 80 to 250 and PN 16 to 160 (see T 8082)

– **AC-3 Trim** · Multi-stage parabolic plug for nominal sizes DN 25 to 150 and nominal pressure PN 40 to 400 (see T 8083)

Control valves with perforated plug · Mainly used for valves in steam applications, particularly for operation in the wet steam region, the control of two-phase medium flow, liquid media which vaporize on the outlet side (flashing valves) or emergency relief valves (blow-off valves). The perforated plug splits up the jet stream into numerous smaller jets and ensures low-noise energy transfer to the surrounding medium. Suitable for Types 3241, 3251, 3254 and 3256 Valves (see T 8086).

Type 3381 Silencer · Fixed restrictor package connected downstream of the valve with one to five attenuation plates for use with liquids, gases and vapors. The silencer increases the backpressure downstream of the valve, reducing the outlet velocity and sound pressure level in applications with gases and vapors. The sound pressure level is reduced in applications with liquids (see T 8084).

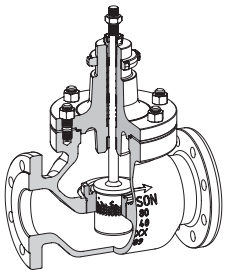
- DN 40 to 700 (NPS 1½ to 28) · PN 10 to 400 (Class 300 to 2500)

Versions

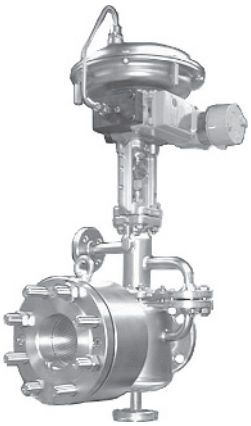
– Sandwich-style version for clamping between flanges with one attenuation plate · Body for two to five attenuation plates attachable using flanges (see T 8084)

Flow divider St I

AC-2 Trim with four attenuation plates



Type 3251 Globe Valve with perforated plug



Type 3381 Silencer, flanged to control valve with heating jacket

Type 3345 Diaphragm Valve

Control valve for viscous, corrosive and abrasive fluids according to

- DIN, BS or ANSI standards
- Version complying with FDA regulations

Technical data

Version	DIN	ANSI
Nominal size	DN 15 to 150	NPS ½ to 6
Body material	EN-JL1040 · EN-JS1025 1.4408 · 1.4435	A 126 B · A 395 A351 CF8M · A316L
Maximum pressure	16 bar	230 psi
End connections	Flanges · Threaded ends Clamps · Welding ends	
Diaphragm sealing Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2	Butyl · PTFE/EPM · EPDM Class: VI	
Characteristic	Linear	
Rangeability	30:1	
Temperature range	–30 to 160 °C	–22 to 320 °F
Data sheet	T 8031	

Type 3351 On/off Valve

Control valve, optionally with bellows seal or insulating section, with tight shut-off for

- Liquids, non-flammable gases and steam
- DIN and ANSI standards

Technical data

Nominal size		DN 15 to 100 · NPS ½ to 4		
Body material	DIN	Cast iron EN-JL1040	Cast steel 1.0619	Cast stainless steel 1.4408
	ANSI	–	A216 WCC	A351 CF8M
Nominal pressure	PN	16	16 · 40	
	Class	–	150 · 300	
End connections	DIN	Flanges B1 acc. to EN 1092		
	ANSI	Flanges RF		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		With both metal and soft seal Class: VI		
Medium temperatures		–50 to 250 °C · –58 to 482 °F		
Data sheet		DIN/ANSI: T 8039		

Type 3345-1 Diaphragm Valve

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

Type 3351-1 On/off Valve

Type 3351-1 On/off Valve with insulating section

Pneumatic Control Valves for Hygienic and Aseptic Applications

Angle valves · Type 3347, Type 3249 and Type 3349

Aplications

Cavity-free angle valves for the food processing and pharmaceutical industries

Type 3347 · Pneumatic control valve for hygienic service complying to

- DIN, ANSI or BS standards

Technical data

Body version		Cast	Bar stock	Micro-flow valve
Nominal size	DN	25 to 100	15 to 125	8 to 25
	NPS	1 to 4	½ to 5	¼ to 1
Body material		1.4404 · A316L		
Maximum pressure		16 bar · 240 psi		
End connections		Welding ends · Threaded ends · Clamps · Flanges		
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal (does not comply with 3A): VI		Up to IV
Characteristic		Equal percentage · Linear		
Rangeability		50:1 up to DN 50 (NPS 2) 30:1 for DN 65 (NPS 2½) and larger		50:1
Max. temperature range		–10 to 150 °C · 14 to 300 °F		
Data sheet		DIN/ANSI: T 8097		

Type 3249 · Pneumatic control valve for aseptic service complying to

- DIN or ANSI standards
- Stem guide sealed by a diaphragm and with test connection

Technical data

Version	DIN	ANSI
Nominal size	DN 15 to 100	NPS ½ to 4
Body material	1.4404	A 316 L
Diaphragm material	EPDM with PTFE facing	
Maximum pressure	10 bar	150 psi
End connections	Welding ends · Threaded ends Aseptic pipe fittings · Clamps · Flanges	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2	Metal seal: IV Soft seal (does not comply with 3A): VI	
Characteristic	Equal percentage · Linear	
Rangeability	50:1	
Operating temperature	0 to 160 °C	32 to 320 °F
Data sheet	DIN/ANSI: T 8048	

Refer to our **Components for the Food Processing and Pharmaceutical Industries** catalog

Type 3347-7 Control Valve
Version with bar stock body according to 3A regulations with threaded ends

Type 3347 Micro-flow Valve

Type 3249-7 Control Valve
Version with welding ends

Type 3349 · Aseptic angle valve with USP-VI diaphragm

- DIN or ANSI standards
- Stem guide sealed by a diaphragm and with test connection

Technical data

Version	DIN	ANSI
Nominal size	DN 15 to 50	NPS ½ to 2
Body material	1.4435	A 316 L
Diaphragm material	PTFE	
Maximum pressure	10 bar	150 psi
End connections	Welding ends Aseptic flanges, threaded ends and clamps	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2	Metal seal: IV Soft seal: VI	
Characteristic	Equal percentage · Linear	
Rangeability	50:1	
Operating temperature	0 to 160 °C	32 to 320 °F
Data sheet	DIN/ANSI: T 8048-2	

Type 3349 Aseptic Angle Valve

Pneumatic Control Valves

Cryogenic valves

Type 3248

Type 3246 with long insulating section and circulation inhibitor

Aplications

Control valve for applications in the low temperature range for liquids and gases

Special features

- Globe or angle valve with pneumatic actuator
- Valve body made of cold-resisting stainless steel with welding ends, angle valve also available made of aluminum
- Insulating section with integrated bellows seal to protect the stem guide from freezing up. As a result, the valve can be mounted in any desired position
- Prepared for installation in cold-box systems
- Valve trim can be exchanged without having to remove the valve

Versions

Globe or angle-style valve body with welding-neck ends and cryogenic extension bonnet, self-adjusting PTFE or PTFE/carbon V-ring packing, metal-seated or soft-seated valve plug

– **Type 3248-7** · Cryogenic valve with Type 3277 Pneumatic Actuator (page 35)

– **Type 3248-1** · Cryogenic valve with Type 3271 Pneumatic Actuator (page 35)

Technical data

Nominal size	**DN 25, 50, 80, 100, 150 · NPS 1 to 6**	
Body style	Globe valve	Angle valve
Body material	1.4308 A351 CF8	1.4571 or AlMg4, 5MnF27
Nominal pressure	PN 16 to 100 · Class 150 to 600	
End connections	Welding ends · Welding-neck ends	
Seat/plug seal Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2	Metal seal: IV Soft seal: VI High-performance metal seal: V	
Characteristic	Equal percentage · Linear · Quick opening	
Rangeability	50:1 up to DN 50 (NPS 2) 30:1 for DN 80 (NPS 3) and larger	
Temperature range	–196 to 220 °C · –320 to 428 °F Down to –273 °C (–460 °F) on request	
Data sheets	DIN: T 8093 · ANSI: T 8093-1 · Actuators: T 8310-1	

Accessories · Positioners, limit switches, solenoid valves

Type 3248-7 Cryogenic Valve, globe style, with positioner and additional handwheel

Type 3248-1 Cryogenic Valve, aluminum angle valve with positioner, supply pressure regulator, pressure gauges and additional handwheel

Type 3246 Cryogenic Valve with long insulating section and circulation inhibitor, ANSI version

Application

Globe valve for cryogenic applications

Special features

- Globe or three-way valve with pneumatic actuator
- Valve body made of cast stainless steel
- Valve plug with metal seal or high-performance metal seal
- Long insulating section
- Circulation inhibitor to prevent the flow conditions of the process medium having any effect in the insulating section

Versions

Standard version for temperatures from –200 to 220 °C (–328 to 428 °F) with long insulating section, cover plate with collar and circulation inhibitor

– **Type 3246-1** · Valve with Type 3271 Pneumatic Actuator (see page 35)

– **Type 3246-7** · Valve with Type 3277 Pneumatic Actuator (see page 35)

Technical data

Body style		Globe valve		Three-way valve
Valve size	NPS	½ to 10	½ to 8	½ to 6
Pressure rating	Class	150/300	600	150/300
Body material		A351 CF8		A351 CF8M
End connections		Welding ends/flanges [1]		ANSI flanges RF
Seat/plug seal		Metal seal		
		High-performance metal seal Stellite		–
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV High-performance metal seal for NPS 4 and larger: V		0.05 % of C_V
Characteristic		Equal percentage · Linear Quick opening		Linear
Rangeability		50:1 30:1 for NPS 3 and larger	50:1	50:1 30:1 for NPS 2½ and larger
Temperature range		–200 to 220 °C · –328 to 428 °F		
Data sheets		T 8046-1	T 8046-2	T 8046-3

[1] Flanges with special version

Type 3246-7 Globe Valve, Class 150/300

Type 3246-1 Globe Valve, Class 600

Type 3246-7 Three-way Valve, Class 150/300

Pneumatic Butterfly Valves

Butterfly valve · Type 3331

High-pressure butterfly valve · LEUSCH Type LTR 43

Control butterfly valves · Pfeiffer Type 10a, 10e and 14b/31a

Application

Control valves for process engineering and industrial applications

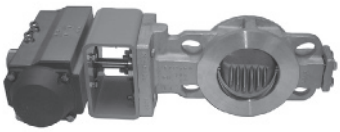
Versions

- **Type 3331** · Swing-through or angle-seated disk for liquids, vapors and gases with Type 31a Pneumatic Actuator
- **LEUSCH Type LTR 43** · Triple-eccentric, tight-closing, high-pressure butterfly valve with zero seat leakage in both directions of medium flow at full differential pressure
  Optionally TA Luft packing, fire-safe version, extension for cryogenic or high temperatures

Technical data

Type		3331	LTR 43
Nominal size	DN	50 to 400	80 to 2500
	NPS	2 to 16	3 to 100
Body material	DIN	Cast steel 1.0619 1.4408	1.4408 1.0619
	ANSI	A216 WCC A351 CF8M	A216 WCC A351 CF8M
Nominal pressure	PN	10 to 40 ISO 20, 50	10 to 420
	Class	150 · 300	150 to 2500
Body style		Wafer-type	Between flanges, lug-type, double flange
Disk material		Stainless steel	A216 WCC A351 CF8M
Gasket		Metal seal	Metal/graphite stellited PTFE
Leakage		≤ 1 %	Class VI DIN EN 1349/ ANSI/FCI 70-2
Opening angle		90° · 70°	90°
Throttling service up to		70°	–
Rangeability		50:1	–
Temperature range	°C	–10 to 400	–196 to 1000
	°F	14 to 752	–320 to 1830
Actuator		Type 31a/Type 3278	On request
Data sheet		T 8227	T 9923

Accessories · Positioners, limit switches, solenoid valves



Type 3331 Pneumatic Butterfly Valve with Type 31a Pneumatic Actuator

LEUSCH Type LTR 43 High-pressure Butterfly Valve, double flanged body in NPS 10, Class 1500 with pneumatic actuator and positioner

LEUSCH Type LTR 43 Tight-closing Butterfly Valve, lug-type body version with manual gear

– **Pfeiffer Type 10a** · Double-eccentric control butterfly valve with min. 8 to 12 mm thick PTFE lining
– **Pfeiffer Type 10e** · Centric control and shut-off butterfly valve with minimum 3 mm thick isostatic PTFE lining
– **Pfeiffer Type 14b/31a** · Double-eccentric butterfly valve with Type 31a Pneumatic Piston Actuator

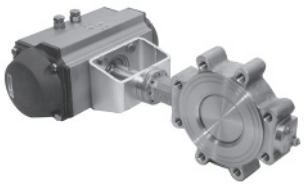
Technical data

Type		Type 10a	Type 10e	Type 14b
Nominal size	DN	100 to 800	50 to 400	50 to 500
	NPS	4 to 32	2 to 16	2 to 20
Body material	DIN	EN-JS1049 St 52-3 PTFE lining	EN-JS1049 PTFE lining	1.4408 1.0619
	ANSI	A395		A216 WCB A351 CF8M
Nominal pressure	PN	10	10/16	10 to 40
	Class	150		150 · 300
Body style		Wafer-type Lug-type	Wafer-type Lug-type	Wafer-type Lug-type
Disk material		1.4313 coated	1.4313 coated	1.4408
Gasket		PTFE		Metal or soft-seated
Leakage		A according to DIN EN 12266-1		IV/V IEC 60534-4
Opening angle		90°		
Temperature range	°C	–10 to 200	–50 to 200	–10 to 350
	°F	14 to 392	–58 to 392	14 to 482
Actuator		Type 31a/30a	Type 31a/30a	Type 31a
Pfeiffer data sheets		TB 10a	TB 10e	TB 14b

Accessories · Positioners, limit switches, solenoid valves

Pfeiffer Type 10a PTFE-lined Butterfly Valve

Pfeiffer Type 10e/31a PTFE-lined Control and Shut-off Butterfly Valve



Pfeiffer Type 14b/31a Control Butterfly Valve

PTFE or PFA-lined Control Valves

Globe valves · Pfeiffer Types 1a, 1b and 6a

Angle valve · Pfeiffer Type 8a

Application

Lined control valves to control corrosive liquids in the chemical industry

Special features

- Globe or angle valves with pneumatic actuator
- PTFE or PFA lining
- PTFE lining with min. 5 mm thickness
- PTFE bellows seal

Versions

– **Pfeiffer Type 1a** · PTFE-lined globe valve

– **Pfeiffer Type 1b** · PFA-lined globe valve

– **Pfeiffer Type 6a** · PTFE-lined micro-flow valve with K_{VS} coefficients between 0.005 and 2.5

– **Pfeiffer Type 8a** · PTFE-lined angle valve

Technical data

Type		Type 1a	Type 1b	Type 6a	Type 8a
Body style		Globe valve			Angle valve
Nominal size	DN	25 to 150	25 to 100	6 to 15	15 to 50
	NPS	1 to 6	1 to 4	–	½ to 2
Body material	DIN	EN-JS1049			
	ANSI	A395		–	
Lining		PTFE	PFA	PTFE	PTFE
Nominal pressure	PN	10/16	10/16	10	10/16
	Class	150	150	125	150
Connection		For flanges acc. to EN 1092-1			
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		PTFE VI	PFA VI	PTFE VI	
Characteristic		Equal percentage · Linear			
Rangeability		30:1	50:1	30:1	30:1
Temperatures		Up to 200 °C · 390 °F		Up to 150 °C · 300 °F	
Pfeiffer data sheets		TB 01a	TB 01b	TB 06a	TB 08a

Accessories · Positioner, limit switch, solenoid valve, resistance transmitter

Further versions

– Handwheel

Pfeiffer Type 1a PTFE-lined Globe Valve

Pfeiffer Type 1b PFA-lined Globe Valve

Pfeiffer Type 6a PTFE-lined Micro-flow Valve

Ball Valves and Pigging Valves

Lined ball valves · Pfeiffer Types 20a and 20b

Stainless steel ball valves · Pfeiffer Types 22a and 26d

Pigging valves · Pfeiffer Types 28 and 29

Sampling valve · Pfeiffer Type 27

Application

Tight-closing lined valves for process engineering and industrial applications, especially for use with corrosive media

- **Pfeiffer Type 20a** · PTFE-lined ball valve
- **Pfeiffer Type 20b** · PFA-lined ball valve

Technical data

Type		Type 20a	Type 20b
Style/end connections		Flanges	Flanges
Nominal size	DN/NPS	25 to 200/1 to 8	25 to 100/1 to 4
Body material		EN-JS1049/A395	EN-JS1049
Lining		White PTFE	PFA
Nominal pressure	PN	16	16
Closure member		PTFE-coated	PFA-coated
Leakage rate		A according to DIN EN 12266-1	
Temperature range		–10 to 200 °C · –14 to 392 °F	
Pfeiffer data sheets		TB 20a	TB 20b

Pfeiffer Type 20a PTFE-lined Ball Valve

Application

Tight-closing ball valves for process engineering and industrial applications, especially for use with corrosive media

- **Pfeiffer Type 22a** · Stainless steel tank bottom valve
- **Pfeiffer Type 26d** · Stainless steel ball valve

Technical data

Type		Type 22a	Type 26d
Nominal size	DN	50 to 150	15 to 150
	NPS	2 to 6	½ to 6
Body material	DIN	1.4408 · 1.4571 · 1.4581	1.4408 · 1.4571
	ANSI	F 316 Ti	A351 CF8M
Nominal pressure	PN	16 to 40	16 to 40
	Class	150/300	150/300
Connecting flanges		According to EN 1092	According to EN 1092
Ball seal		1.4571 with PTFE	TFM
Leakage rate		A according to DIN EN 12266-1	
Temperature range		–10 to 200 °C · –14 to 392 °F	
Pfeiffer data sheets		TB 22a	TB 26d

Pfeiffer Type 22a Stainless Steel Tank Bottom Valve

Accessories · Positioner, limit switch, solenoid valve, resistance transmitter

Further versions

- Handwheel

Pfeiffer Type 26d/31a Stainless Steel Ball Valve

Application

Pigging valves for the chemical industry used to convey gases and liquids as well as to efficiently pig the pipeline using the minimum amount of solvents

Special features

- High surface quality
- Cavity-filled seat rings
- Special precision flanges

Versions

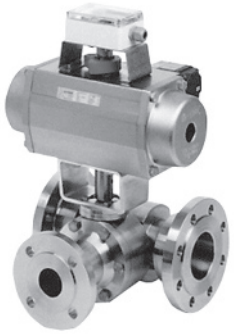
– **Pfeiffer Type 28** · Valves designed for use as launch or receiving stations, for dosing, as pig trap or pig rinsing station

– **Pfeiffer Type 29** · Multi-way valves, for example, 3/4-way or 5/4-way manifolds

Technical data

Type	Type 28	Type 29
Nominal size DN	50, 80, 100, 150	
Body material	1.4408 · 1.4571	
Nominal pressure PN	25/40	
Connection	Flanges	
Ball seal	PTFE	
Pfeiffer data sheets	TB 28a	TB 29a

Additionally available: turnkey pigging systems including pipework and control engineering



Pfeiffer Type 28a Piggable Dosing Valve

Application

Valves for continuous or intermittent sampling

– **Pfeiffer Type 27** · Sampling valve

Special features of intermittent sampling:

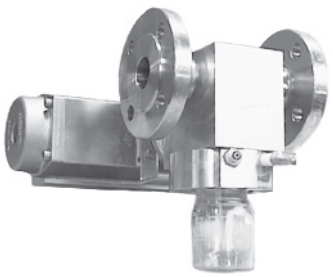
- No direct exposure to the environment
- Sealing liners allows for sampling free of dead spaces
- Representative samples due to the direct installation of the valve in the pipeline
- Pressureless sampling of liquids
- Known sample quantity per cycle

Technical data

Type	Type 27a	Type 27c	Type 27d	Type 27e	Type 27f
Nominal size DN	25 to 100 (NPS 1 to 4)		25 to 50 (NPS 1 to 2)		25 to 100
Body material	1.4408		EN-JS1049/PFA		1.4571
Sampling element	Ball		Ball		Needle
Sampling principle	Intermittent	Continuous	Intermittent	Continuous	Continuous
Pfeiffer data sheets	TB 27a		TB 27d		TB 27f

Further versions

– Dead man's control
– Protective casing
– Control or automation (except for Type 27f)
– Other nominal sizes and materials on request



Pfeiffer Type 27a Sampling Valve with Type AT Pneumatic Actuator

Application

Control valves for process engineering and industrial applications

Special features

- Valve body made of cast steel, cast stainless steel or special materials

Versions

– **Type 72.3** · Double-eccentric rotary plug valve, flanged version, DN 25 to 500

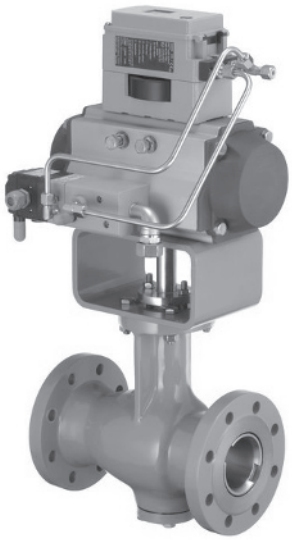
– **Type 72.4** · Double-eccentric rotary plug valve, sandwich-style version, DN 25 to 300

Technical data

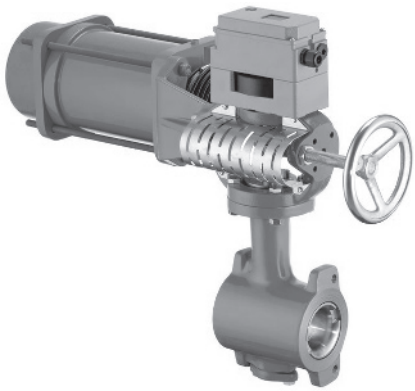
Type		72.3	72.4
Nominal size	DN	25 to 500	25 to 300
	NPS	1 to 20	1 to 12
Body material	DIN	1.0619 · 1.4408	
	ANSI	A216 WCC · A351 CF8M	
Nominal pressure	PN	10 to 40 See Type 73.x for higher pressure ratings	
	Class	150 · 300	
Body version		Flange	Wafer-type
Flange		DIN/ANSI	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV-L1 Soft seal: VI-G1	
Characteristic (cam disk in positioner)		Equal percentage · Linear	
Rangeability		≥ 200:1	
Temperature range	Metal	–100 to 400 °C · –148 to 752 °F	
	Soft	–100 to 220 °C · –148 to 430 °F	
Actuator		Type AT/R	
VETEC data sheets		72.3	72.4

Further versions

– With additional handwheel
– TA Luft packing (for VETEC Type 72)
– Noise-reducing measures
– Heating jacket



Type 72.3 Rotary Plug Valve in flanged version



VETEC Type 72.4/R Rotary Plug Valve in sandwich-style version

Application

Double-eccentric control valves for process engineering and industrial applications

Special features

- Valve body made of cast steel or cast stainless steel
- Seat with metal seal with or without hard facing or seat with soft seal

Versions

– **Type 62.7/AT** · Double-eccentric rotary plug valve with AT Pneumatic Rotary Actuator

– **Type 82.7/AT** or **Type 82.7/R** · Double-eccentric rotary plug valve with Type R or Type AT Pneumatic Rotary Actuator

Technical data

Type		62.7	82.7
Nominal size	DN	25 to 200	25 to 250
	NPS	1 to 8	1 to 10
Body material	DIN	1.0619 · 1.4408	
	ANSI	A216 WCC · A351 CF8M	
Nominal pressure	PN	10 to 40 See Type 73.x for higher pressure ratings	
	Class	150 · 300	
Flanges		EN 1092 B1/ASME B16.5	DIN EN 1591-1/ ASME B16.5/DIN 2500
Overall length	DIN	EN 558-1, Tab. 16, S 36	
	ANSI	EN 558-2, Tab. 16, S 36	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal: VI	
Characteristic (cam disk in positioner)		Equal percentage · Linear	
Rangeability		200:1	
Temperature range (medium)		–60 to 220 °C (–76 to 428 °F)	–100 to 400 °C (–148 to 752 °F)
Actuator		Type AT	Type AT/R
Data sheets		www.vetec.de	

Further versions (Type 82.7 only)

– TA Luft packing
– Special materials
– Noise-reducing measures
– Flange version with tongue/groove, male face/female face according to EN 1092-1
– Versions for higher and lower temperatures on request

VETEC Type 82.7 Rotary Plug Valve with Type R Rotary Actuator and Type 3730 Positioner

VETEC Type 82.7 Rotary Plug Valve with Type AT Rotary Actuator, manual override and Type 3730 Positioner

Application

Double-eccentric control valves for process engineering, industrial applications and refineries

Special features

- Valve body made of cast steel, cast stainless steel or special materials
- Sandwich-style or flanged version

Versions

Standard version · Double-eccentric rotary plug valve with single-acting rotary actuator

Nominal size DN 25 to 250

– **Type 73.3/x** · Rotary plug valve in DN 25 to 250 with Type R or M Rotary Actuator, flanged design with through holes in the flange, face-to-face dimensions acc. to EN 558-1 Series 2

– **Type 73.7/x** · Rotary plug valve in DN 25 to 400 (NPS 1 to 16) with Type R or M Rotary Actuator, flanged design with tapped holes in the flange, face-to-face dimensions acc. to EN 558-1 Series 15

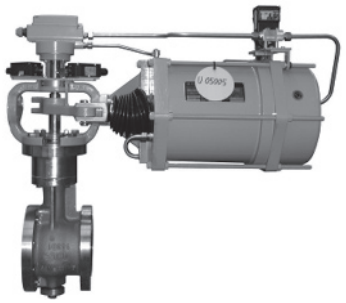
Technical data

Type		73.3/x	73.7/x
Nominal size	DN	25 to 250	25 to 500
	NPS	–	1 to 20
Body material	DIN	1.0619 · 1.4581	
	ANSI	–	A216 WCC · A351 CF8M
Nominal pressure	PN	63 to 160	
	Class	–	600 · 900
End connections		Flanges with through holes	Flanges with tapped holes
Overall length		EN 558-1, Series 2	EN 558-1, Series 15
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV-L1	
Characteristic (cam disk in positioner)		Equal percentage · Linear	
Rangeability		≥ 200:1	
Temperature range		–100 to 400 °C · –148 to 752 °F	
Actuator		Type R · Type M	
Data sheets		T 9919	T 9920

Further versions

– Double packing or TA Luft packing
– Flange version with groove or tongue
– Lens gasket acc. to DIN 2696
– Seat, plug and lining made of ceramic

VETEC Type 73.3/R Rotary Plug Valve



VETEC Type 73.7/R Rotary Plug Valve

VETEC Type 73.3/M Rotary Plug Valve

Pneumatic Control Valves

Control and quick-acting shut-off valve for gases

VETEC Type 72.x/AT DVGW and Type 72.x/MN DVGW

Aplications

Control valve for control systems subject to the special safety requirements governing gas supply
For neutral gases acc. to DVGW working paper G 260/1

Special features

- Type 72.3 Control and Quick-acting Shut-off Valve in flanged version or Type 72.4 in sandwich-style version
- Single-acting Type AT or Type MN Pneumatic Actuator
- Mounted pilot valve (3/2-way solenoid valve) and quick exhaust
- TA Luft packing
- Typetested according to DIN EN 161 by DVGW

Versions

– **Type 72.x/AT DVGW** · Double-eccentric rotary plug valve with single-acting or double-acting Type AT Pneumatic Piston Actuator

– **Type 72.x/MN DVGW** · Double-eccentric rotary plug valve with single-acting pneumatic diaphragm actuator

Technical data

Type		72.x/AT	72.x/MN
Nominal size	DN	25 to 250	25 to 200
	NPS	1 to 8	1 to 8
Body material	DIN	1.0619 · 1.4581	
	ANSI	A216 WCC · A351 CF8M	
Nominal pressure	PN	10 to 40	
	Class	150 · 300	
Body style End connections	DIN	Flange: EN 558-1, Tab. 12, S 1 Sandwich: EN 558-1, Tab. 16, S 36	
	ANSI	Flange: EN 558-2, Tab. 12, S 37/38 Sandwich: EN 558-2, Tab. 16, S 36	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Soft seal: VI-G1	
Characteristic (cam disk in positioner)		Equal percentage · Linear	
Rangeability		≥ 200:1	
Temperature range		Medium: –20 to 150 °C · –4 to 302 °F Ambient: –20 to 60 °C · –4 to 140 °F	
Actuator		Type AT	Type R
Data sheets		www.vetec.de	

Further versions

– Noise-reducing measures
– Special materials
– Flange version with tongue according to EN 1092-1/RTJ
– Strainer installed upstream of the valve

VETEC Type 72.3/AT DVGW Rotary Plug Valve in flanged version

VETEC Type 72.4/MN DVGW Rotary Plug Valve in sandwich-style version

Application

Control valves for process engineering and industrial applications

Special features

- Valve body in flanged design made of cast steel, cast stainless steel or special alloys
- Metal-seated or soft-seated segmented ball

Versions

– **Type 3310/31a** · Segmented ball valve with single-acting or double-acting Type 31a Pneumatic Piston Actuator

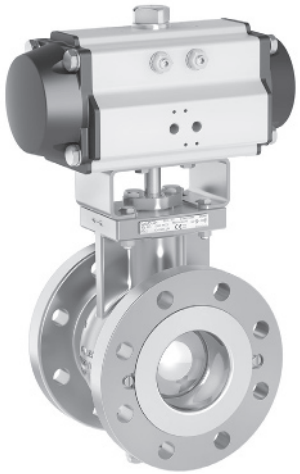
– **Type 3310/3278** · Segmented ball valve with single-acting Type 3278 Rotary Actuator

Technical data

Version	DIN	ANSI
Nominal size	DN 25 to 300	NPS 1 to 12
Body material	A216 WCC · A351 CF8M	
Nominal pressure	PN 40	Class 300
End connections	Flanges acc. to EN 1092	Flanges acc. to ASME B16.5
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2	Metal: IV · Soft: VI	
Characteristic	Equal percentage · Linear	
Rangeability	≥ 100:1	
Temperature ranges		
Standard version	–29 to 220 °C	–20 to 430 °F
With insulating section	–29 to 427 °C	–20 to 800 °F
With insulating section (with body of cast stainless steel)	–46 to 220 °C	–51 to 430 °F
Actuator	Type 31a · Type 3278	
Data sheets	T 8222 · T 9929 · T 8321	

Further versions

– Double packing with or without leak monitoring
– Reduced K_{VS} coefficients by installing upstream or downstream reducers
– Manual override or with additional manual override
– Heating jacket



Type 3310/31a Segmented Ball Valve

Series V2001 Valves

Control valves with pneumatic or electric actuator

Globe valve · Type 3321

Three-way valve · Type 3323

Application

Control valves designed for mechanical and plant engineering. Suitable for liquids, gases and steam
Optionally as globe or three-way valve according to DIN or ANSI standards

Versions

- **Type 3321/3323-IP · Electropneumatic control valve**
  Electropneumatic positioner integrated in Type 3372 Actuator or Type 3725 Positioner, tight-closing function, 4 to 20 mA reference variable, max. 6 bar supply air, fail-safe action
- **Type 3321/3323-PP · Pneumatic globe valve**
  Pneumatic actuator with fail-safe action
- **Type 3321/3323-E1 · Electric control valve**
  Type 5824 Electric Actuator for 230 and 24 V/50 Hz or 120 V/60 Hz
  Optionally with positioner and resistance transmitters
- **Type 3321/3323-E3 · Electric control valve**
  Type 3374 Electric Actuator for 230 V/50 or 60 Hz, 24 V/50 or 60 Hz, 120 V/60 Hz
  Optionally with fail-safe position, positioner and resistance transmitters

Technical data

Body style		**Globe valve Type 3321**	**Three-way valve Type 3323**
Nominal size	DN	15 to 100	15 to 100
	NPS	½ to 4	½ to 4
Body material	DIN	EN-JL1040 · 1.0619 · 1.4408	
	ANSI	A216 WCC · A351 CF8M	
Nominal pressure	PN	10 to 40	
	Class	150 · 300	
End connections	DIN	Flanges acc. to EN 1092	
	ANSI	Flanges RF	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV Soft seal: VI	Metal seal: I (0.05 % of K_{VS})
Characteristic		Equal percentage	Linear
Rangeability		Up to 50:1	
Temperature range		–10 to 300 °C · 14 to 570 °F	
Actuators		Versions for Type 3321/3323-IP, -PP, -E1, -E3	
Data sheets		T 8111 · T 8112	T 8113 · T 8114

Further versions

- Insulating section
- Actuators with limit contacts
- Globe valves in DN 65 to 100 with flow divider St I for noise reduction (on request)

Type 3321-IP Globe Valve with integrated positioner

Type 3321-IP Globe Valve with pneumatic actuator (350 cm²) and Type 3725 Positioner

Type 3323-E1 Three-way Valve with Type 5824 Electric Actuator

Series V2001 Valves

Control valves with pneumatic or electric actuator

Globe valve for heat transfer oil · Type 3531

Three-way valve for heat transfer oil · Type 3535

Application

Control valves for heat transfer applications using organic media according to DIN 4745
Optionally as globe or three-way valve according to DIN or ANSI standards

Versions

- **Type 3531/3535-IP · Electropneumatic control valve for heat transfer oil**
  Electropneumatic positioner integrated in Type 3372 Actuator or Type 3725 Positioner, tight-closing function, 4 to 20 mA reference variable, max. 6 bar supply air, fail-safe action
- **Type 3531/3535-PP · Pneumatic control valve for heat transfer oil**
  Pneumatic actuator with fail-safe action
- **Type 3531/3535-E1 · Electric control valve for heat transfer oil**
  Type 5824 Electric Actuator for 230 and 24 V/50 Hz or 120 V/60 Hz
  Optionally with positioner and resistance transmitters
- **Type 3531/3535-E3 · Electric control valve for heat transfer oil**
  Type 3374 Electric Actuator for 230 V/50 or 60 Hz, 24 V/50 or 60 Hz, 120 V/60 Hz
  Optionally with fail-safe position, positioner and resistance transmitters

Technical data

Body style		**Globe valve Type 3531**	**Three-way valve Type 3535**
Nominal size	DN	15 to 80	
	NPS	½ to 3	
Body material	DIN	EN-JS1049 · 1.0619 · 1.4408	
	ANSI	A395 · A216 WCC · A351 CF8M	
Nominal pressure	PN	16 · 25	
	Class	150	
End connections	DIN	Flanges acc. to EN 1092	
	ANSI	Flanges RF	
Leakage class acc. to IEC 60534-4 ANSI/FCI 70-2		Metal seal: IV	Metal seal: I (0.05 % of K_{VS})
Characteristic		Equal percentage	Linear
Rangeability		50:1	Up to 50:1
Temperature range		–10 to 350 °C · 14 to 660 °F Down to –70 °C (–95 °F) on request	
Recommended actuators		Versions for Type 3531/3535-IP, -PP, -E1, -E3	
Data sheets		T 8131 · T 8132	T 8135 · T 8136

Further versions

- Actuators with max. two limit contacts
- Explosion-protected version with electric actuators (on request)

Type 3531-PP Globe Valve for Heat Transfer Oil with pneumatic actuator and Type 4744-2 Electric Limit Switch

Type 3535-E3 Three-way Valve for Heat Transfer Oil with Type 3374 Electric Actuator

Application

Globe and three-way valves for heating, ventilation and air-conditioning Electric or pneumatic control valves with:

- Electric actuators
- Electric actuators with process controllers
- Pneumatic actuators

The electric actuators with process controllers have an integrated digital controller. The controlled variable is measured over a directly connected Pt 1000 sensor. The output signal is transferred to the actuator stem and used as the positioning force.

Recommended valve/electric actuator combinations

Actuator type	**5824**	**5825** [1]	**5857**	**3374**[1]	**3375**	**3274** [1]
Globe valve in nominal size DN						
Type 3213	15 to 50 [2]	15 to 50 [2]	15 to 25	–	–	–
Type 3214	15 to 50	15 to 50	–	65 to 250	300 to 400	125 to 250
Type 3222	15 to 50	15 to 50	15 to 25	–	–	–
Type 3222 N	–	–	15	–	–	–
Three-way valve in nominal size DN						
Type 3226	15 to 50	15 to 50	15 to 25	–	–	–
Type 3260	15 to 80	15 to 50	15 to 25	65 to 150	200 to 300	65 to 150

[1] Electric globe valves with Type 5825, Type 3374 or Type 3274 Actuators (for fail-safe position "actuator stem extends) tested according to DIN EN 14597 See Data Sheet T 5869
Electric control valves with Type 5825, Type 3374 or Type 3274 Actuators with fail-safe action

[2] DN 15 to 25 with PN 25 nominal pressure, DN 32 to 50 with PN 16 nominal pressure

Recommended valve/electric actuator with process controller combinations

Actuator type	**5724**	**5725** [1]	**5725-7** [1]	**5757-3**	**5757-7**
Globe valve in nominal size DN					
Type 3213	15 to 50 [2]	15 to 50 [2]	15 to 50 [2]	15 to 25	–
Type 3214	15 to 50	15 to 50	15 to 50	–	–
Type 3222	15 to 50	15 to 50	15 to 50	15 to 25	15 to 25
Type 3222 N	–	–	–	15	15
Three-way valve in nominal size DN					
Type 3226	–	–	15 to 50	–	15 to 25
Type 3260	–	–	15 to 50	–	15 to 25

[1] The Type 5725 and 5725-7 Actuators (for fail-safe position "actuator stem extends) combined with the listed valves are tested according to DIN EN 14597 See Data Sheet T 5869

[2] DN 15 to 25 with PN 25 nominal pressure, DN 32 to 50 with PN 16 nominal pressure

Type 3213 Globe Valve with
Type 5825 Electric Actuator

Type 3214 Globe Valve with
Type 3374 Electric Actuator

Type 3260 Three-way Valve with
Type 5824 Electric Actuator

Recommended valve/pneumatic actuator combinations

Actuator type	2780-1	2780-2	3271	3277	3371	3372
Globe valve in nominal size DN						
Type 3213	15 to 50 [1]	15 to 50 [1]	–	–	–	–
Type 3214	–	65 to 100	–	–	–	–
Type 3222	15 to 50	15 to 50	–	–	–	–
Type 3222 N	–	–	–	–	–	–
Three-way valve in nominal size DN						
Type 3226	15 to 50	15 to 50	–	–	–	–
Type 3260	15 to 50	15 to 50	65 to 150	65 to 150	–	65 to 80

[1] DN 15 to 25 with PN 25 nominal pressure, DN 32 to 50 with PN 16 nominal pressure

Type 3213 and Type 3214 Globe Valves

Technical data

Globe valve	Type	3213	3214
Nominal size	DN	15 to 400	
Nominal pressure	PN	16 · 25	16 to 40
Body material		EN-JL1040 EN-JS1049	EN-JL1040 EN-JS1049 1.0619
End connections	DIN	Flanges	
Seat/plug seal Leakage class acc. to IEC 60534-4		Soft seal I	I
Temperature range		Up to 200 °C	Up to 220 °C
Data sheets		T 5868 · T 5869	

Type 3222 and Type 3222 N Globe Valves

Technical data

Globe valve	Type	3222	3222 N
Nominal size	DN	15 to 50	15
Nominal pressure	PN	25	16
Body material		Red brass CC491K EN-JS1049	Brass CW602N
End connections	DIN	Welding ends, threaded ends, flanges, female thread	ISO 228/1-G ¾ B Welding ends, threaded ends, soldering ends
Leakage class acc. to IEC 60534-4		I	
Temperature range		Up to 200 °C	Up to 120 °C
Data sheets		T 5866	T 5867

Further versions

– Type 3222 Globe Valve with balanced plug

Type 3222 Globe Valve with Type 2780-2 Pneumatic Actuator

Type 3222/5825 Electric Control Valve Version with flanged valve body

Type 3226 Three-way Valve

Type 3214 Globe Valve with Type 5725 Electric Actuator

Type 3260 Globe/Three-way Valve

Type 3226 Three-way Valve

Technical data

Type	Type 3260 Globe Valve	Type 3260 Three-way Valve	Type 3226 Three-way Valve
Nominal size DN	65 to 150	15 to 300	15 to 50
Nominal pressure PN	16		25
Body material	EN-JL1040		Red brass CC491K
End connections DIN	Flanges		Welding ends Threaded ends · Flanges Female thread
Leakage class acc. to IEC 60534-4	IV		
Temperature range	Up to 150 °C		Up to 150 °C
Data sheets	T 5862	T 5861	T 5863

Further versions

– Type 3226 also available as DVGW version in PN 10

Type 3222/5757 with welding ends

Type 3222/5725 with flanged body

Type 3222 N/5757

Type 3226/5757 with female thread

Type 3226/5724 with female thread

Application

Single-acting linear actuators for control valves used in process engineering and industrial applications as well as in heating, ventilation and air-conditioning systems, especially for attachment to SAMSON Types 3213, 3222, 3321, 3531, 3226, 3260, 3323, 3535 Valves and valves of the Series 240, 250 and 280

Special features

- Diaphragm actuators with internal compression springs
- Fail-safe action "Actuator stem extends" or "Actuator stem retracts"
- Easily reversible operating direction of the actuator
- Low friction due to rolling diaphragm
- Direct attachment to Type 3277 guarantees accurate attachment of accessories as well as concealed linkage

Versions

– **Type 3277** · Pneumatic actuator for direct attachment of a positioner, limit switch or position transmitter

– **Type 3271** · Pneumatic actuator with diaphragm areas from 60 cm² used for the micro-flow valve up to 2 x 2800 cm² with tandem actuators

Technical data

Type		3277	3271
Diaphragm area	cm²	120 to 750	60 to 2 x 2800
Max. supply pressure	bar	6	6
Rated travel	mm	7.5 to 30	7.5 to 120
Fail-safe action		Reversible	
Temperature range		–35 to 90 °C	–35 to 120 °C
With special material		–35 to 120 °C	
Materials			
Housing		60 cm² - aluminum 120 cm²/1400-60 - die-cast aluminum 240 to 1400 cm² - plastic-coated sheet steel 1400-120 - spheroidal graphite iron 2800 cm² - spheroidal graphite iron	
Diaphragm		NBR · EPDM	NBR · EPDM
Data sheets		T 8310-1	T 8310-1/-2/-3

Further versions

– Additional handwheel for Types 3277 and 3271 Actuators

– Fire-lock version guarantees fail-safe action in case of fire for Types 3277 and 3271 Actuators with diaphragm areas of 240, 350 and 700 cm²

Type 3277 Pneumatic Actuator for direct attachment

Type 3271-52 Pneumatic Actuator for micro-flow valve

Type 3271 Pneumatic Actuator

Application

Pneumatic actuators for butterfly valves and other final control elements with rotating closure member. Suitable for throttling service or on/off operation.

Special features

- Various signal pressure ranges
- Attachment of positioners, limit switches or solenoid valves and other accessories according to VDI/VDE 3845
- Travel stops externally adjustable to limit the opening angle
- No special tools required for mounting and conversion

Versions

– **Type 3278** · Single-acting pneumatic rotary actuator with rolling diaphragm and internal compression springs, operating direction (fail-open or fail-close) as required

– **Pfeiffer Type 31a (AT)** · Pneumatic piston actuator with clearance-free power transmission achieved by using involute gearing and special surface finish
SRP - single acting with fail-safe action
DAP - double acting without fail-safe action

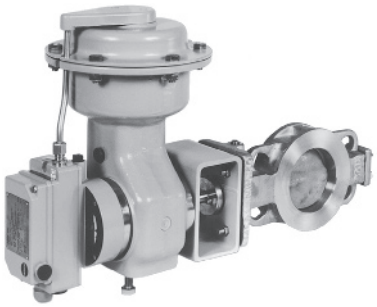
Technical data

Type	3278	31a (AT)	
Version and principle of operation	Single-acting	SRP Single-acting	DAP Double-acting
Connection	Key drive	Square drive	
Diaphragm area/size	Diaphragm area 160 cm² · 320 cm²	Size 15 to 5000	
Max. supply pressure bar	6	8	
Opening angle	90°	90°	
Fail-safe action	Reversible	Reversible	Without
Temperature range	–35 to 90 °C	–20 to 80 °C	
With special material		–20 to 150 °C · –40 to 80 °C	
Materials			
Housing	EN-JS1049	AlMgSi0.5 F25	
Diaphragm/piston	NBR	GD AlSi8Cu3	
Data sheets	T 8321	T 9929	

Accessories · The pneumatic actuators can be equipped with positioners, limit switches, resistance transmitters and solenoid valves.

Further versions

– With additional handwheel



Type 3278 Pneumatic Rotary Actuator with butterfly valve and positioner

Pfeiffer Type 31a (AT) Pneumatic Rotary Actuator

Electric actuators

Electric actuators · Types 5824, 5825, 5857, 3374 and 3375

Electrohydraulic actuator · Type 3274

Application

Electric actuators designed for attachment to valves used in HVAC, process engineering and industrial energy transfer systems

Versions

– **Type 5824** · Electric actuator
– **Type 5825** · Electric actuator with fail-safe action
– **Type 5857** · Electric actuator
– **Type 3374** · Electric actuator optionally with fail-safe action
– **Type 3375** · Electric actuator with manual override (handwheel)
– **Type 3274** · Electrohydraulic actuator, optionally with fail-safe action

Technical data for Types 5824, 5825 and 5857

Type	5824	5825	5857
Rated travel mm	6 · 12 · 15		6
Max. thrust N	700	280 · 500	300
Fail-safe action	–	•	–
Manual override	•	–	•
Power supply	230 V, 50 Hz 24 V, 50 Hz 120 V, 60 Hz		230 V, 50 Hz 24 V, 50 Hz
Permissible ambient temperature	0 to 50 °C		
Additional electrical equipment			
Positioner	Digital		Digital
Limit contacts	2		–
Resistance transmitters	1		–
Data sheets	T 5824		T 5857

Type 5824/5825 Electric Actuator

Type 5857 Electric Actuator

Technical data for Types 3374, 3375 and 3274

Type	3374	3375	3274
Rated travel mm	15 · 30	30 · 60	15 · 30
Max. thrust N	2500	12500	7700
Fail-safe action	•	– [1]	•
Manual override	•	•	•
Power supply	230 V/50 or 60 Hz 24 V/50 or 60 Hz 120 V/60 Hz	230 V/50 and 60 Hz	230 V/50 or 60 Hz 24 V/50 or 60 Hz 120 V/50 or 60 Hz
Permissible ambient temperature	5 to 60 °C	5 to 60 °C	–10 to 60 °C
Additional electrical equipment			
Positioner	Digital	– [1]	Analog
Limit contacts	2	2	Max. 3
Resistance transmitters	2	2	Max. 2
Data sheets	T 8331	T 8332	T 8340

[1] Pending

Further versions

The Types 5825, 3274 and 3374 Actuators with fail-safe action "actuator stem extends" are tested by the German technical surveillance association (TÜV) according to DIN EN 14597 in combination with various SAMSON valves.

Type 3374 Electric Actuator

Type 3375 Electric Actuator

Type 3274 Electrohydraulic Actuator

Electric Actuators with Process Controllers

Domestic hot water heating
Type 5724 · Type 5725 with fail-safe action · Type 5757-3

Heating and cooling applications
Type 5757-7 · Type 5725-7 with fail-safe action

Application

Electric actuators with integrated digital controller for heating, ventilation and air-conditioning systems

Special features

- Linear actuator with integrated digital controller
- Easy installation
- Torque-dependent limit switches
- Temperature measured by Pt 1000 sensor
- Configuration, parameterization, diagnostic function and direct connection for monitoring using TROVIS-VIEW software
- Data transmission using a memory pen

Versions for domestic hot water heating

– **Type 5724 and Type 5725** · Designed for DHW heating in instantaneous heating systems for small to medium-sized buildings connected to local supply or district heating networks.
Suitable for SAMSON Types 3213, 3214, 3260, 3222 and 3226 Valves in DN 15 to 50.
Type 5725 with fail-safe action
See Data Sheet T 5724 for more details.

– **Type 5757-3**
Suitable for SAMSON Types 3222, 3222 N, 2488, 3267, 3260 and 3226 Valves in DN 15 to 25.
See Data Sheet T 5757 for more details.

Version for heating and cooling applications

– **Type 5757-7** · Designed for installations in small to medium-sized buildings for outdoor-temperature-compensated control, fixed set point control or fixed set point control with room temperature sensors.
Suitable for SAMSON Types 3222, 3222 N, 2488, 3267, 3266 and 3260 Valves in DN 15 to 25.
See Data Sheet T 5757-7 for more details.

– **Type 5725-7** · With fail-safe action "actuator stem extends" or "actuator stem retracts"
Suitable for SAMSON Types 3213, 3214, 3260, 3222 and 3226 Valves in DN 15 to 50.
See Data Sheet T 5725-7 for more details.

Type 5724 or Type 5725 Electric Actuator with Process Controller

Type 5757-3 Electric Actuator with Process Controller

Type 5757-7 Electric Actuator with Process Controller for heating applications

Accessories for communication

- TROVIS-VIEW software
- Hardware package including memory pen, connecting cable and modular adapter (order no. 1400-9998)
- Memory pen (order no. 1400-9753)

Accessories for domestic hot water heating

- Type 5207-0060 Pt 1000 Sensor
- Sensor pocket (order no. 1400-9249)
- Flow rate sensor (order no. 1400-9246)

Accessories for heating and cooling applications

- Type 5267-2 Contact Sensor (Pt 1000)
- Type 5257-2 Room Sensor (Pt 1000) with potentiometer
- Type 5257-7 Room Panel (Pt 1000) with potentiometer and mode selector switch
- Type 5227-2 Outdoor Sensor (Pt 1000)

Application

Positioners for attachment to pneumatic control valves

Versions

- **Type 4765/4763** · Positioner for attachment according to IEC 60534
- **Type 3766/3767** · Single-acting or double-acting positioners for direct attachment to Type 3277 Actuators as well as for attachment according to IEC 60534 or for attachment to rotary actuators according to VDI/VDE 3845

See page 35 for details on Type 3277 Actuator.

Technical data

Type	4765	4763	3766	3767
Rated travel mm	7.5 to 90		7.5 to 120	
Opening angles	–		Up to 90°	
Reference variable				
0.2 to 1 bar	•	–	•	–
0/4 to 20 mA	–	•	–	•
1 to 5 mA	–	•	–	•
Supply air	1.4 to 6 bar · 20 to 90 psi			
Max. output Signal pressure	0 to 6 bar · 0 to 90 psi			
Characteristic	Linear			
Permissible ambient temperature	–35 to 80 °C	–20 to 70 °C	–20 to 80 °C	
	Extended temperature range down to –40 °C on request			
Degree of protection	IP 54 · IP 65 as special version			
Explosion protection				
Ex ia IIC T6	–	•	•	•
FM/CSA	–	•	•	•
Ex d [1]	•	–	•	–
Additional electrical equipment				
Limit contact	–	–	2 (inductive)	
Solenoid valve	–	–	•	
Position transmitter	–	–	•	
Options				
Pressure gauge	•	•	–	–
Data sheets	T 8359		T 8355	

[1] **Ex d** · Used in combination with a Type 6116 i/p Converter, the pneumatic positioners are flameproof i/p positioners.

Type 4763 Electropneumatic Positioner

Type 3766 Ex d Positioner with Type 6116 i/p Converter

Electronic and Digital Positioners

Electropneumatic positioners · Types 3725, 3730-0, 3730-1 and 3730-2

Electropneumatic positioners (HART®) · Types 3730-3, 3731-3, 3730-6

Electropneumatic positioner (PROFIBUS-PA) · Type 3730-4

Electropneumatic positioners (FOUNDATION™ fieldbus) · Types 3730-5, 3731-5

EXPERTplus valve diagnostics · Type 3770 Field Barrier

Application

Single-acting or double-acting positioners for attachment to pneumatic linear or rotary actuators. Self-calibrating, automatic adaptation to the control valve (except for Type 3730-0).

Versions

Electropneumatic positioners for SAMSON direct attachment, attachment to NAMUR rib or attachment to rod-type yoke according to IEC 60534 as well as attachment to rotary actuators according to VDI/VDE.

- **Type 3725** · Positioner for attachment to pneumatic globe and rotary valves
- **Type 3730-0** · Low-priced positioner version for all globe valves. Travel range setting over DIP switches
- **Type 3730-1** · Universal positioner with LCD and on-site operation over rotary pushbutton for globe valves and rotary valves. Start-up with automatic initialization procedure.
- **Type 3730-2** · Positioner, configuration options over serial interface and TROVIS-VIEW software
- **Type 3730-3** · Same as Type 3730-2, but with communication using HART® protocol

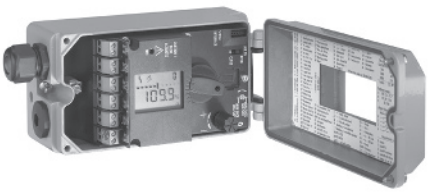
Technical data

Type	3725	3730-0	3730-1	3730-2	3730-3
Rated travel mm	3.75 to 50	5.3 to 200	3.75 to 200	3.6 to 200	
Opening angles	24 to 100°	–	24 to 100°	24 to 100°	
Reference variable	4 to 20 mA				
Communication	–				HART®
Supply air	1.4 to 7 bar · 20 to 105 psi				
Output Signal pressure	0 to 7 bar · 0 to 105 psi				
Characteristic	Adjustable	Linear	Adjustable	Adjustable	
Ambient temperature	–25 to 80 °C	–45 to 80 °C			
Degree of protection	IP 66				
Explosion protection					
ATEX Ex i or Ex nA/nL	•	•	•	•	•
FM/CSA	–	•	•	•	•
ATEX Ex d	–	With Type 3770 Field Barrier			
Additional electrical equipment					
Limit contact	–	–	•	•	•
Position transmitter	–	–	–	•	•
Solenoid valve	–	–	–	•	•
Ext. position sensor	–	–	–	•	•
Analog input	–	–	–	•	•
Binary input	–	–	–	•	•
Leakage sensor	–	–	–	•	•
Data sheets	T 8394	T 8384-0	T 8384-1	T 8384-2/-3	

Type 3725 Electropneumatic Positioner

Type 3730-0 Electropneumatic Positioner for globe valves

Type 3730-1 Electropneumatic Positioner



Type 3730-2 Electropneumatic Positioner

Type 3730-3 Electropneumatic Positioner with HART® communication

– **Type 3731-3** · Flameproof i/p positioner with HART® communication, local communication with SSP interface, operable on site with LCD
– **Type 3730-4** · Positioner with PROFIBUS-PA communication, transmission according to IEC 61158-2, profile class B version 3.0
– **Type 3730-5** · Positioner with FOUNDATION™ fieldbus communication, transmission according to IEC 61158-2
Integrated function blocks: PID Process Controller, Analog Output (AO), two Discrete Inputs (DI) and Link Master Capability
– **Type 3731-5** · Flameproof, bus-powered positioner with communication according to FOUNDATION™ fieldbus specification
– **Type 3730-6** · Positioner with pressure sensors. Communication using HART® protocol

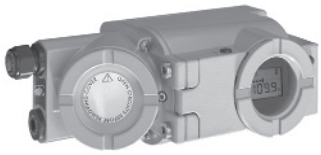
Technical data

Type	3731-3	3730-4	3730-5	3731-5	3730-6
Rated travel mm	3.6 to 200				
Opening angles	24 to 100°				
Reference variable	4 to 20 mA	–			4 to 20 mA
Communication	HART®	PROFIBUS	FF™		HART®
Max. operating current	–	15 mA	15 mA		–
Supply air [bar]/(psi)	7 (105)		1.4 to 6 (20 to 90)	7 (105)	1.4 to 7 (20 to 105)
Output Max. signal pressure [bar]/(psi)	7 (105)		0 to 6 (0 to 90)		7 (105)
Characteristic	Adjustable				
Ambient temperature	–45 to 80 °C				
Degree of protection	IP 66				
Explosion protection					
ATEX Ex i or Ex nA/nL	–	•	•	–	•
ATEX Ex d/Ex de	•	–	–	•	–
FM/CSA	•	•	•	•	–
GOST	•	•	•	•	•
Additional electrical equipment					
Limit contact	–	•	•	–	•
Position transmitter	•	–	–	–	•
Solenoid valve	–	•	•	–	•
External position sensor	–	•	•	–	•
Binary input	•	•	•	•	•
Leakage sensor	–	–	•	–	•
Data sheets	T 8387-3	T 8384-4	T 8384-5	T 8387-5	T 8384-6

TROVIS-VIEW · See T 6661

Operator interface for smart positioners:

3730-0	3730-1	3730-2	3730-3 3731-3	3730-4	3730-5 3731-5	3730-6
–	–	•	•	•	•	•



Flameproof Type 3731-3 Positioner with HART® communication

Type 3730-4 Positioner with PROFIBUS-PA communication
Attachment according to VDI/VDE 3845

Typ 3730-5 Positioner with FOUNDATION™ fieldbus communication
Attachment according to NAMUR

EXPERTplus valve diagnostics

Firmware for Series 3730 and 3731 Positioners for early recognition of valve faults, issuing recommended action for predictive maintenance. The diagnostic functions are completely integrated into the positioner (see T 8389 and T 8389-1).
The TROVIS-VIEW operator interface (see T 6661) and FDT/DTM engineering tools allow operation and compiled data to be viewed.

Type 3770 Field Barrier (Ex d/Ex i)

Field barrier with flameproof enclosure serving as an interface between intrinsically safe and non-intrinsically safe circuits in hazardous areas. The field barrier is suitable for operating positioners, smart positioners with HART® communication, i/p converters, solenoid valves or limit switches (see Data Sheet T 8379).

Type 3770 Field Barrier and positioner

TROVIS-VIEW
Universal configuration and operator interface for various smart SAMSON instruments, such as positioners, industrial and heating controllers, electric actuators, electric actuators with process controllers and differential pressure meters.

- Simple operation
- Selectable language
- Modular structure with operator interface, communications server and device-specific database modules containing characteristic properties, e.g. parameters, data points, user levels, etc.
- Data can be changed immediately in the device or saved to the PC for later on-site transmission using a memory pen
- Direct operation and monitoring in online operation. In addition to cyclical refreshment of data points, freely definable data points can also be logged. Data can be viewed both as a graph and in tables. Data can be imported and exported.
- Communication can be operated over a network

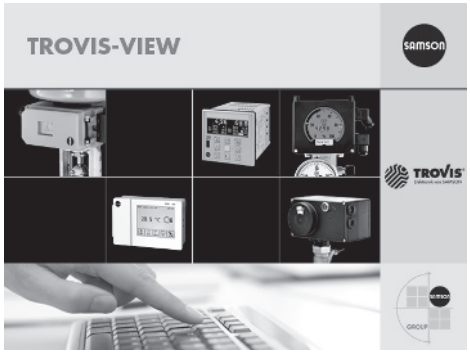
See Data Sheet T 6661 for further details.

The TROVIS-VIEW software can be loaded free of charge from our website: www.samson.de at Services > Software > TROVIS-VIEW

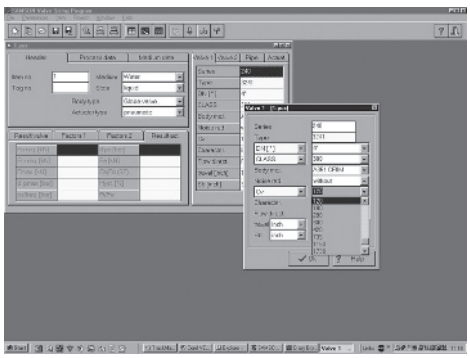
Valve sizing
The SAMSON Valve Sizing Program is a software for calculating and sizing control valves. This program calculates the valve-specific data (Kvs coefficients, required nominal size, etc.) for up to three cases using the process and medium data entered by the user. Afterwards, these data are used to determine a valve which is then suggested by the program. Finally, the sound emission and other operating data are calculated for the selected valve. The software includes many additional user-friendly functions for valve sizing.

New features included in version 4.7 of the SAMSON Valve Sizing:

- Medium database with over 1000 process media including functions to calculate the process media in relation to pressure and temperature
- Automatic assignment of media properties such as density, viscosity, vapor pressure
- Automatic assignment of enthalpy, flashing data, isentropic exponents and phases
- Missing data are estimated using approximation equations
- Graphs for valve sizing analysis:
  - Valve characteristics measured on the SAMSON test bench can be used
  - Pressure-temperature graphs for the selected valve body material and nominal pressure
  - Medium data with isobars for the maximum temperature range are displayed for all media in the media explorer
- New units for conversion as well as new noise prediction standards (IEC 60534 8-3 and 8-4) have been added.



Operating and monitoring using TROVIS-VIEW



Data acquisition for valve sizing

Valve Accessories

Limit switches · Type 4746, Type 4747, Type 3776, Ex d Type 4744, Type 3738-20/-50, Type 3768
Solenoid valves · Type 3701 and Type 3963
Pneumatic lock-up valve · Type 3709
Supply pressure regulator · Type 4708
Reversing amplifier · Type 3710
Pneumatic volume booster · Type 3755
Quick exhaust valve · Type 3711

Limit switches

Limit switches issue an electric or pneumatic signal when an adjusted limit value is exceeded or not reached.

Versions

- **Type 4746-x2** · Inductive limit switch
  Type 4746-x3 · Electric limit switch
  Type 4746-x4 · Pneumatic limit switch
- **Type 4747** · Inductive or electric limit switch Ex d
- **Type 4744** · Electric limit switch Ex ed/Ex d

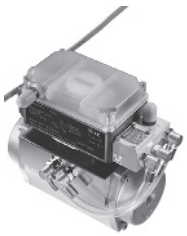
Technical data

Type	4746			4747		4744	
Version	-x2	-x3	-x4	-xxx1	-xxx2	–	-2
Rated travel mm	7.5 to 150			0 to 30/200		7.5 to 150	15
Opening angles				0 to 100			
Switching element							
Inductive	•				•		
Electric		•				•	•
Pneumatic			•				
Mechanical				•			
Explosion protection							
⟨Ex⟩ II 2G Ex ia IIC T6	•	•		Ex ed	Ex ed	Ex ed	Ex d
FM/CSA	•	•					
Permissible ambient temperature °C	–20 to 70	–20 to 85	–20 to 60	–40 to 80	–25 to 80	–55 to 70	–20 to 75
Data sheets	T 8365			T 4747		T 8367	

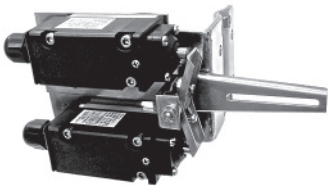
Versions

- **Type 3776-0** · Inductive or electric limit switch
  Type 3776-1 · Explosion-protected limit switch
- **Type 3738-20** · Electronic limit switch for valves used in on/off applications
- **Type 3738-50** · Electronic limit switch for valves used in on/off applications with FOUNDATION™ fieldbus communication
- **Type 3768** · Inductive limit switch

Type 4746 Limit Switch



Type 3776 Limit Switch



Type 4744 Limit Switch Ex ed (without cover)

Type 3738-20/-50 Electronic Limit Switch

Type 3768 Inductive Limit Switch

Technical data

Type	3776		3738		3768
Version	-0	-1	-20	-50	–
Rated travel mm	7.5 to 210		7.5 to 200		7.5 to 120
Opening angle	0 to 80°		0 to 30/170°		
Switching element					
Inductive	•	•			•
Electric	•	•			
Electronic			•	•	
Explosion protection					
⟨Ex⟩ II 2G Ex ia IIC T6		•	•	•	•
FM/CSA					•
Perm. ambient temperature	–45 to 80 °C		–40 to 80 °C		–45 to 80 °C
Data sheets	T 3776		T 8390	T 8390-5	T 8356

Ex d · Combined with a Type 3770 Field Barrier, Type 3776 is a flameproof limit switch.

Type 3701 and Type 3963 Solenoid Valves

Solenoid valves for high operational reliability and short actuating times for controlling pneumatic actuators also in hazardous areas.
A variety of device versions to suit individual applications are available due to the various switching functions, flow rates and different connections.

Type		3701		3963	
⟨Ex⟩ II 2G Ex ia IIC T6 FM/CSA		–	•	–	•
Nominal signal	V DC	6 · 12 · 24	6 · 12 · 24	6 · 12 · 24	6 · 12 · 24
	V AC	24 · 48 115 · 230	–	24 · 48 115 · 230	–
Power consumption		6 to 27 mW		6 to 27 mW	
Depending on nominal signal		0.04 to 0.46 VA		0.04 to 0.46 VA	
Supply air		1.4 to 6 bar			
Output signal		Max. 6 bar			
Service life		>2 x 10^7 switching cycles			
Perm. ambient temperature		–45 to 80 °C		–45 to 80 °C	
Data sheets		T 3701		T 3963	

Type 3709 Pneumatic Lock-Up Valve

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.

Type 3709-1 · Lock-up valve for direct attachment to a positioner
Type 3709-2 · Lock-up valve for installation in the signal pressure line
Type 3709-4 · Lock-up valve for installation in the signal pressure line as required with connecting thread

Type	3709-1	3709-2	3709-4
Connections	¼ NPT · G ¼	¼ NPT · G ¼	G ½ · G ¼
Supply air	Max. 12 bar		
Signal pressure	Max. 6 bar		
Set point range (adjustable)	0 to 6 bar	0 to 6 bar	1.5 to 6 bar
Perm. ambient temperature	–25 to 80 °C	–25 to 80 °C	–40 to 80 °C
Data sheet	T 8391		

Type 4747 Limit Switch

Type 3701 Solenoid Valve

Type 3963 Solenoid Valve

Type 3709 Pneumatic Lock-Up Valve

Type 4708-12 Supply Pressure Regulator with filter

Type 4708 Supply Pressure Regulator

The supply pressure regulator reduces and controls the maximum pressure of 12 bar (180 psi) in a compressed air network to the pressure adjusted at the set point adjuster. The supply pressure regulators can be directly attached to pneumatic and electropneumatic devices. The regulator includes a filter (20 µm or 15 µm) with drain plug. The air pressure reducing station consists of a supply pressure regulator and an upstream filter with condensate drain.

Type 4708-45 Supply Pressure Regulator · for increased air capacity

Type	4708	4708-45
Input pressure	1 bar (15 psi) above the adjusted set point Min. 1.6 bar (24 psi) · Max. 12 bar (180 psi)	
Set point range	0.2 to 1.6 bar (3 to 24 psi) · 0.5 to 6 bar (8 to 90 psi)	
G or NPT connections	¼	½
Data sheet	T 8546	

Type 3710 Reversing Amplifier

Reversing amplifier to operate a double-acting pneumatic actuator using a single-acting pneumatic or electropneumatic positioner (e.g. Series 3730 and 3731 Positioners). The positioner is mounted either with or without pressure gauge.

Type		3710
Perm. supply pressure		6 bar
K_V coefficient	Supply	0.11
	Exhaust	0.12
Connections		¼-18 NPT · ISO 228/1-G ¼
Degree of protection		IP 65
Perm. ambient temperature		–25 to 80 °C · –13 to 176 °F
Low-temperature version		–50 to 80 °C · –58 to 176 °F
Options		
Pressure gauge Ø 40 mm		0 to 6 bar · 0 to 90 psi
Data sheet		T 8392

Type 3755 Pneumatic Volume Booster

The booster is used together with positioners to increase the positioning speed of pneumatic actuators.

- Compact body made of cast aluminum
- Fast dynamic response due to low hysteresis
- Sintered polyethylene filter disk ensures low noise emissions

Type	3755
Flow coefficient	
K_{VS} Supply	2.5
K_{VS} Exhaust	2.5
K_{VS} Bypass	0.8
Pressure	
Supply	Max. 10 bar · Max. 150 psi
Actuator	Max. 7 bar · Max. 105 psi
Signal	Max. 7 bar · Max. 105 psi
Perm. ambient temperature	–40 to 80 °C
Service life	≥ 1 x 10^7 full strokes
Data sheet	T 8393

Type 4708-45 Supply Pressure Regulator

Type 3710 Reversing Amplifier with optional pressure gauges

Type 3755 Pneumatic Volume Booster

Quick exhaust valve · Type 3711

The Type 3711 Quick Exhaust Valve is mounted between the positioner or solenoid valve and the pneumatic actuator. It is used to vent the valve more quickly.

- Direct attachment to SAMSON Type 3271 Actuator
- Compact design
- Degree of protection IP 65

Type		**3711**
Operating pressure		0 to 10 bar
Differential pressure between supplying air and venting		50 % of control pressure
Flow coefficients		
With G ¾ connections	K_V	10.0 [1]
With G ⅜ connection	K_V	1.1
With adjustable restriction	K_V	1.0
Permissible leakage at 6 bar		≤ 25 l_n/h
Permissible ambient temperature range		–50 to +80 °C
Service life operated at room temperature and with 6 bar supply air		500,000 full strokes
Closing hysteresis of check valve		< 0.01 bar
Degree of protection		IP 65
Weight (approx.)	kg	0.5 [1]/1.4 [2]

[1] Without silencer

[2] Stainless steel version

Type 3711 Quick Exhaust Valve

Converters

i/p converters · Type 6111, Type 6116, Type 6126 and Type 6127

p/i converters · Type 6132 and Type 6134

Application

Used to convert direct current signals or pneumatic signals

Versions

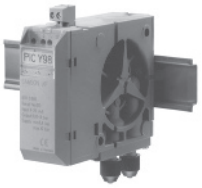
i/p converters accept a current signal from electric control equipment and convert it into a pneumatic signal for measuring or control tasks.

- **Type 6111** · i/p converter, rail-mounting unit for supply air manifold or stainless steel field unit
- **Type 6116** · i/p converter, field unit
- **Type 6126** · i/p converter, industrial unit
- **Type 6127** · i/p converter, rack-mounting unit

Technical data

Type	6111		6116		6126	6127
Explosion protection	–	Ex ia ATEX	–	Ex ia Ex d ATEX FM/CSA	–	
Input	0/4 to 20 mA		0/4 to 20 mA		0/4 to 20 mA 0/2 to 10 V	4 to 20 mA
Output	0.2 to 1 bar [1]				0.2 to 1 bar [1]	0.2 to 1 bar
Max. output signal	8 bar				5 bar	2 bar
Supply air	0.4 bar above upper range value (max. 10 bar)			(max. 6 bar for Ex d version)	0.4 bar above upper range value	
Permissible ambient temperature	–20 to 70 °C		–40 to 70 °C Special version –45 °C		–25 to 70 °C	–10 to 60 °C
Degree of protection	IP 20 IP 65		IP 54 IP 65		IP 54 IP 65	IP 00
Data sheets	T 6111		T 6116		T 6126	T 6127

[1] Other ranges specified in the data sheet

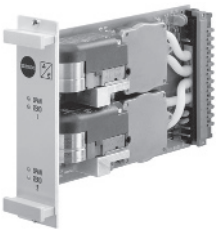


Type 6111 i/p Converter, rail-mounting unit

Type 6111 i/p Converter in stainless steel enclosure

Type 6116 i/p Converter, field unit

Type 6126 i/p Converter with pressure gauge



Type 6127-04 i/p Converter as rack-mounting unit with two Type 6112 Converter modules

p/i converters accept a pneumatic signal from control equipment and convert it into an electric signal.

- **Type 6132** · p/i converters for four-wire connection, available as rail-mounting unit
- **Type 6134** · p/i converters for two-wire connection, available as either a rail-mounting or field unit

Technical data

Type	**6132** (four-wire)	**6134** (two-wire)	
Explosion-protected version	–	–	Ex ia/Ex d
Input	0.2 to 1 bar		
Output	0/4 to 20 mA 0/2 to 10 V	4 to 20 mA	
Power supply	230, 115, 24 V AC 24 V DC	12 to 30 V DC	
Permissible ambient temperature	–20 to 65 °C	–20 to 65 °C	
Degree of protection	IP 20		IP 54 IP 65
Data sheets	T 6132	T 6134	

Type 6132-04 p/i Converter, rail-mounting unit

Type 6134-03 p/i Converter, field unit

Type 6134-04 p/i Converter, rail-mounting unit

Electronic Process Controllers

Compact controller · TROVIS 6493

Industrial controller · TROVIS 6495-2

Application

Digital controllers to automate industrial and process plants for general and more complex control tasks. The controllers are suitable for control of continuous-action, on/off or pulsing final control elements (e.g pneumatic actuators with electropneumatic positioners, motorized actuators, electric heating systems, refrigerating machines, etc.).

Versions

– **TROVIS 6493** · Compact controller for panel mounting

Special features

- Configuration and parameterization using keys or TROVIS-VIEW software
- Permanently stored function blocks
- One control circuit

– **TROVIS 6495-2** · Industrial controller for panel mounting

Special features

- Configuration using keys with plain text display or TROVIS-VIEW software
- Standard control circuits with permanently stored function blocks
- Two control circuits, operated separately or combined
- Split-range operation
- Output tracking (DDC backup)
- Optional RS-232/USB and RS-485/USB interface boards for SSP and Modbus RTU

TROVIS® Electronics from SAMSON

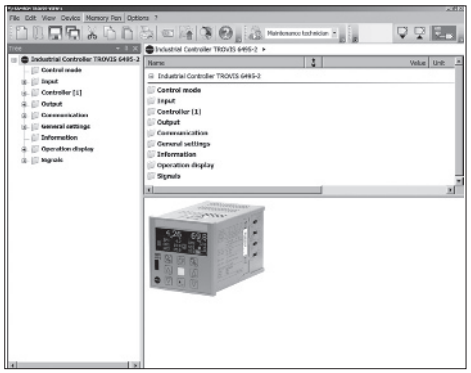
TROVIS 6493 Compact Controller

TROVIS 6495-2 Industrial Controller

Technical data

Controller TROVIS		6493	6495-2
Version	Panel-mounting unit	•	•
	Front frame W x H (mm)	48x96	96x96
	Degree of protection (front)	IP 65	IP 65
	Display	LCD	Graphics
	Keys	6	9
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	Anlog inputs	2	4
	0/4 to 20 mA	•	•
	0/2 to 10 V	•	•
	Pt 100 resistance thermometer	•	•
	Pt 1000 resistance thermometer	•	•
	Resistance transmitter	•	•
	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, three-point	1	2
	Limit	2	4
Communication	Interface		
	Infrared	•	•
	USB		• [1]
	RS-232		• [1]
	RS-485		• [1]
	Protocol		
	SSP (TROVIS-VIEW)	• [1]	• [1]
	Modbus RTU		• [1]
Power supply	85 to 264 V AC, 50/60 Hz		•
	90 to 250 V AC, 50/60 Hz	•	
	24 V AC/DC, 50/60 Hz	•	•
Further details, see data sheet		T 6493	T 6495-2

[1] Optional



TROVIS-VIEW software

TROVIS 6493 Compact Controller with connected infrared adapter

TROVIS 6495-2 Industrial Controller with connected infrared adapter

Memory pen suitable for use with TROVIS 6495-2 Controller, Types 57xx, 58xx and 3375 Electric Actuators as well as Media devices

Media Series

Differential pressure, flow and liquid level meters

Media 5 · Media 05

Application

Instruments designed to measure differential pressure and measured variables derived from it. Suitable for liquids, gases and vapors

- Liquid level meters for cryogenic service
- Liquid level measurement in pressure vessels, especially for cryogenic gases
- Differential pressure measurement between flow and return flow pipe
- Pressure drop measurement across valves and filters
- Flow rate measurement according to the differential pressure method

Special features

- Suitable for field installation and panel mounting
- Directly connected valve block
- Zero adjustment from the front
- Limit switch easily retrofitted

Versions with

– Differential pressure cell made of brass (CW617N) or CrNi steel
– Scales: linear, square, according to DIN 19204, detachable, special
– Inductive limit switch with up to three alarm contacts

Technical data

Type	Media 5	Media 05
Nominal pressure	PN 50, overloadable on one side up to 50 bar	
Measuring range	0 to 3600 mbar	
Degree of protection	IP 54	
Permissible ambient temperature	–40 to 80 °C	
Characteristic	Reading linear to the differential pressure	
Indicator Ø	160 mm	100 mm
Data sheets	T 9519	T 9520

Materials

dp-cell	CW617N (brass) or CrNi steel
Indicator housing unit	Polycarbonate
Springs, diaphragm plates and functional parts	CrNi steel
Measuring diaphragm	ECO

Special versions on request

Media 5 with limit switches, valve block and pressure gauge for operating pressure

Media 05 with limit switches, valve block and pressure gauge for operating pressure

Media Series

Indicating digital transmitters for differential pressure

Media 6 · Media 6 Z

Application

Microprocessor-controlled transmitters for measuring and indicating the differential pressure or measured variables derived from it.
Suitable for liquids, gases or vapors.

Special features

- Liquid level meters for cryogenic service
- Transmitter with digital display in two-wire connection
- Gas selection by switch
- Proportional 4 to 20 mA current signal
- LCD with 100 % bar graph and blinking alarm and warning markers
- Zero point and span adjustment activated by key without influencing each other
- On-site configuration and programming over the RS-232 interface using a memory pen or TROVIS-VIEW software
- Optional explosion protection ATEX Ex ia

Versions

– **Media 6** · Transmitter with digital display, measuring range between 100 and 3600 mbar, two software limit switches according to NAMUR
– **Media 6 Z** · Same as above, but additionally with a pulse output proportional to quantity for controlling an external counter, one software limit switch

Media 6 with limit switches, valve block and pressure gauge for operating pressure

Technical data

Type	Media 6	Media 6 Z
Nominal pressure	PN 50, overloadable on one side up to 50 bar	
Measuring range	0 to 3600 mbar	
Characteristic	Output and reading proportional to the tank content, linear or square root extraction depending on operating mode	
Limit switches	Two software limit switches or one software limit switch according to pulse output	
Display	LCD Ø 90 mm	
Degree of protection	IP 65	
Perm. ambient temperature	–40 to 70 °C	
Two-wire connection	4 to 20 mA output	
Power supply Battery operation	12 to 36 V DC 9 V DC	
Data sheet	T 9527	

Materials

dp-cell	CW617N (brass) or CrNi steel
Indicator housing unit	Polycarbonate
Springs, diaphragm plates and functional parts	CrNi steel
Measuring diaphragm	ECO

Special versions on request

Aplications

Orifice plate assemblies for flow measurement · Generation of a defined differential pressure

In combination with a differential pressure meter, for example, Media 5, the orifice plates measure the flow rates of liquids, gases and vapors.

Versions

– **Type 90** · Orifice flange with standard orifice plate and annular chamber DN 32 to DN 400 · NPS 1¼ to 16 · PN 6 to 40 · Class 150 to 300

  Differential pressure connections: compression fittings for 12 x 1 mm or 12 x 1.5 mm pipes

Technical data

Type 90 Orifice Flange	
Nominal size	DN 32 to 400 · NPS 1¼ to 16
Nominal pressure	PN 6 · 10 · 16 · 25 · 40 Class 150 to 300
Data sheet	T 9550

Materials

Standard orifice plate		1.4404
Annular chamber	Max. 300 °C	1.0566/SA 516-70
	Max. 400 °C	1.4404/316L · 1.5415
Pipe		Chromated steel or 1.4404/316L
Differential pressure connections		
Gasket		Fiber gasket (max. 300 °C) Graphite on metal core (max. 550 °C)

Special version

– Free of oil and grease for oxygen
– With groove Form D according to EN 1092-1
– Other materials
– Other sizes

Type 90 Orifice Flange

Control Valves for Cryogenic Service

Pressure build-up regulators · Type 2357-1 and Type 2357-6

Excess pressure valves · Type 2357-2 and Type 2357-7

CE

Aplications

Pressure regulators for cryogenic gases and liquids as well as other liquids, gases and vapors

Special features

The regulators consist of a valve, operating diaphragm and set point adjuster.

- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment
- Rugged design and low overall height
- Free of oil and grease

Versions

Type 2357-1 and Type 2357-6 Pressure Build-up Regulators

Principle of operation as pressure build-up regulator: the valve opens when the upstream pressure drops (direction of flow from port B to port A).

Principle of operation as pressure reducing valve: the valve closes when the downstream pressure rises.

Type	2357-1		2357-6
K_{VS} coefficient	0.25	0.8	0.8
Set point range	1 to 25 bar 10 to 36 bar	1 to 8 bar 5 to 25 bar 8 to 40 bar	1 to 8 bar 5 to 25 bar 8 to 40 bar
Perm. operating pressure	40 bar	50 bar	50 bar
Max. perm. differential pressure Δp	Gases: 30 bar · Liquids: 6 bar		
Connections	G ¾ A conical joint		Welding ends
Temperature range	–196 to 200 °C		–200 to 200 °C
Data sheet	T 2557		

Type 2357-2 and Type 2357-7 Excess Pressure Valves

The valve opens when the upstream pressure rises.

Type	2357-2		2357-7
K_{VS} coefficient	1.25	0.25	1.25
Set point range	1 to 8 bar 5 to 25 bar 8 to 40 bar	1 to 25 bar 10 to 36 bar	1 to 8 bar 5 to 25 bar 8 to 40 bar
Perm. operating pressure	50 bar	40 bar	50 bar
Max. perm. differential pressure Δp	Gases: 30 bar · Liquids: 6 bar		
Connections	Inlet: G ¾ A conical joint Outlet: G ¾ female thread		Welding ends
Temperature range	–196 to 200 °C		–200 to 200 °C
Data sheet	T 2557		

Types 2357-6 and 2357-7 Pressure Regulators

– Additional nominal size DN 40 with K_{VS} = 10
– All wetted parts are electropolished
– Version for liquid hydrogen

Type 2357-1 Pressure Reducing Valve

Type 2357-2 Excess Pressure Valve

Control Valves for Cryogenic Service

Pressure build-up regulator · Type 2357-11

Excess pressure valve · Type 2357-21

Application
Pressure regulators for cryogenic gases and liquids as well as other liquids, gases and vapors

Special features
- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment
- Rugged design and low overall height
- Suitable for oxygen service
- Wetted parts free of non-ferrous metal

Versions
The regulators consist of a valve, operating diaphragm and set point adjuster.

Type 2357-11 Pressure Build-up Regulator with safety function
Pressure regulator with globe valve · Direction of flow from port B to port A. The upstream pressure is transmitted to the operating diaphragm. The valve opens when the upstream pressure falls below the adjusted set point.
Safety function: The plug in the pressure build-up regulator operates like a safety valve and relieves the pressure chamber. The pressure acts on the plug from below. The valve opens to equalize the pressures.

Type 2357-11 Pressure Reducing Valve
Pressure regulator with globe valve · Direction of flow from port A to port B. The valve regulates the downstream pressure to the adjusted set point. The valve closes when the downstream pressure rises above the adjusted set point.

Type 2357-21 Excess Pressure Valve
Pressure regulator with globe valve · Direction of flow from port B to port A. The valve regulates the upstream pressure to the set point adjusted at the set point adjuster. The valve opens when the pressure increases until the set point is reached.
The regulator is additionally equipped with an integrated non-return unit which prevents the medium from flowing back.

Technical data

Type	2357-11	2357-21
K_{VS} coefficient	0.8	1.25
Set point ranges in bar	1 to 8 · 5 to 25 · 8 to 40	
Permissible operating pressure	50 bar	
Temperature range	–200 to 200 °C	
Data sheet	T 2560	

Special versions:
Version for liquid hydrogen · With welding ends · For flammable gases

Accessories
Filter with 270 µm or 50 µm mesh size · Coupling nut with ball-type bushing and welding nipple for 21.3x1.6 mm pipe diameter · Coupling nut with ball-type bushing and flanges

Type 2357-11 Pressure Regulator/
Type 2357-21 Excess Pressure Valve

Control Valves for Cryogenic Service

Pressure build-up regulators with safety function and integrated pressure relief valve
Type 2357-3 and Type 2357-31

CE

Application

– **Type 2357-3** · Pressure regulator for cryogenic gases as well as other liquids, gases and vapors
– **Type 2357-31** · Pressure regulator for cryogenic gases and liquids

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment
- Rugged design and low overall height
- Free of oil and grease

Versions

The pressure regulators consist of a valve with three ports (A, B, C), a spring-loaded operating bellows (Type 2357-3) or a operating diaphragm (Type 2357-31) and a set point adjuster.

Pressure build-up regulator with safety function
Operating direction from port A to port B (closing)

The tubular plug in the pressure build-up regulator operates like a safety valve and relieves the pressure chamber at port A when the pressure exceeds the set point by 5 bar. The difference in pressure at the bellows between the inside pressure at port C and outside pressure at port A creates a positioning force. This force opens the plug, opposing the force of the closing spring. As a result, the pressures are equalized and the pressure chamber upstream of port A is relieved of pressure.

Direction of flow from port B to port C (opening)

When no pressure is applied, the passage from port B to C is closed. The tubular plug does not open the valve until the pressure becomes 0.5 bar higher than the set point (pressure build-up) to relieve the pressure chamber downstream of port B of pressure. Port C can be additionally equipped with a non-return unit.

Technical data

Type	**2357-3** Process medium in gas state	**2357-31** Process medium in liquid state
K_{VS} coefficient	3.2	Pressure build-up: 0.8 Pressure reduction: 0.2
Set point range	2 to 10 bar · 8 to 26 bar 25 to 40 bar	1 to 8 bar · 5 to 25 bar 8 to 40 bar
Perm. operating pressure	40 bar	
Temperature range	–196 to 200 °C	
Data sheets	T 2559	T 2558

Accessories · Port A and B: soldering nipple with ball-type bushing for connection to Ø 28 mm pipes · Port C: for Ø 18 mm pipes · Non-return unit
Special versions · All wetted parts made of CrNiMo steel
Type 2357-3 for use with process medium in the liquid state
Type 2357-31 for use with process medium in the gas state

Type 2357-3 Pressure Build-up Regulator

Type 2357-31 Pressure Build-up Regulator

Self-operated Temperature Regulators

For cryogenic applications

Safety temperature monitor (STM) · Type 2040

Application

Pressure regulator for cryogenic gases and liquids as well as other liquids, gases and vapors

Special features

- Self-operated regulator with integrated temperature sensor
- Convenient set point adjustment
- Free of oil and grease for oxygen
- Rugged, compact design featuring small dimensions

Versions

The Type 2040 Safety Temperature Monitor consists of a body, an integrated temperature sensor with a set point adjuster and the connecting body with G 1¼ A conical joints at both the inlet and outlet.

Soldering nipples and welding ends including connection nuts are available as end connections.

Technical data

Type 2040 Safety Temperature Monitor	
Body connection	G 1¼
K_{VS} coefficient	5
Set point ranges	–30 to 10 °C –45 to –10 °C
Permissible operating pressure	40 bar
Perm. differential pressure	25 bar
Leakage class according to IEC 60534-4	≤ 0.05 % of K_{VS} at –10 °C ≤ 0.1 % of K_{VS} at –45 °C
Hysteresis	2 K
Accuracy	±1 °C
Permissible ambient temperature range	–60 to 60 °C
Temperature open/closed differential	17 K
Data sheet	T 2090

Special version

Set point adjuster with set point indication · Reading in steps of 10 °C indicated by ring marks on the set point adjuster

Accessories

Connecting parts: Connection nut with soldering nipple/welding ends with either a spherical liner or flat gasket. See T 2090 for details.

Type 2040 Safety Temperature Monitor

Electronic Controllers for Heating, District Heating and Ventilation

Heating and district heating controllers · TROVIS 5610
TROVIS 5573 · TROVIS 5575 · TROVIS 5576 · TROVIS 5579

Programmable logic controller · TROVIS 5571
TROVIS 5488 Meter Bus Gateway · TROVIS 5590 Web Module
Modbus I/O module for TROVIS 5571 · Converter or repeater CoRe01
DataMod 11 · Meter bus/Modbus gateway · Modbus/TCP gateway

Application

Outdoor-temperature-compensated flow temperature control in hot water heating systems and domestic hot water heating systems

Special features

- Easy start-up using default settings
- Connection to room panels for single heating circuits
- Heating characteristics optionally based on the gradient or based on four points
- Calculation of the best possible activation and deactivation times for the heating (optimization)
- Automatic adaptation of the heating characteristic (adaptation)
- Delayed outdoor temperature adaptation
- Demand-driven control using the set points of downstream control circuits demanded by device bus or a 0 to 10 V signal
- Annual clock for maximum four time schedules and three time-of-use periods
- TROVIS-VIEW software for configuration and parameterization of controllers

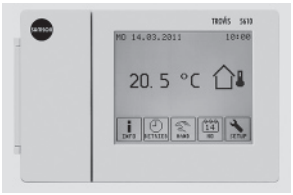
TROVIS 5610-xx · Heating and district heating controllers with large touch screen, for panel mounting
Prepared to accommodate optionally available plug-in interface boards
Wall and top-hat rail mounting possible using optional base

– **TROVIS 5610-00** · Two control circuits for controlling a primary heat exchanger or boiler and DHW circuit or one heating circuit and one DHW circuit. Flow rate system with flow switch or flow rate sensor
– **TROVIS 5610-01** · One control circuit for controlling a heating circuit and a DHW circuit

Accessories: Web module (order no. 1402-0322) for reading data (temperatures, pump states and valve positions) und changing set points and times-of-use over the TROVIS MOBILE web interface on a smartphone

TROVIS 557x · Heating and district heating controllers for wall, panel or top-hat rail mounting
Two control circuits (three with TROVIS 5579) for controlling a primary heat exchanger or boiler and a supplementary heating circuit plus a DHW heating circuit, a heating circuit and a DHW circuit or two heating circuits (three with TROVIS 5579)
Configuration of solar/buffer storage tank systems
Historical data storage and graphics analysis on a computer using data logging viewer software

– **TROVIS 5573** · Controller with plain-text readings on the graphics display (TROVIS 5573-100x) or with icon readings on the display (TROVIS 5573-000x) · Interface for optional external communications module or meter bus/Modbus gateway
– **TROVIS 5575** · Display with icon readings · Multi-circuit systems possible by interconnecting controllers over device bus



TROVIS 5610 Heating and District Heating Controller

TROVIS 5573 Heating and District Heating Controller

– **TROVIS 5576** · Display with icon readings · Multi-circuit systems possible by interconnecting controllers over device bus
RS-232 Modbus interface for modem operation or for connection to RS-232/RS-485 cable converter for bus operation
Alarm notification by text message (modem required)
Prepared for meter bus plug-in module for communication with a maximum of six heat meters

– **TROVIS 5579** · Display with icon readings · Three control circuits for controlling a primary heat exchanger or boiler and two supplementary heating circuits plus DHW heating, two heating circuits and one DHW circuit or three heating circuits
Multi-circuit systems possible by interconnecting controllers over device bus
RS-232 Modbus interface for modem operation or for connection to RS-232/RS-485 cable converter for bus operation
Alarm notification by text message (modem required)
Prepared for meter bus plug-in module for communication with a maximum of six heat meters

TROVIS 5571 Programmable Logic Controller

– Freely programmable HVAC plants and applications. Modbus and meter bus interface
- Freely programmable according to IEC 61131 using ISaGRAF®
- Fully graphic, illuminated display plain text display
- Convenient data input
- 17 universal inputs individually configurable
- Modbus communication over Modbus master and slave function
- Alarm notification by fax or text message
- Other inputs and outputs available by connecting an expansion module
- Standard applications:
  – WTF71 · Heat exchanger sequence control
  – Luft71 · Ventilation control
  – KES71 · Boiler control

Technical data (excerpt)

TROVIS	5610		5573	5575	5576	5579	5571
	-01	-02					
Control circuits, max.	1	2	2	2	2	3	Free [1]
Heating, max.	1	1	2	2	2	3	Free [1]
DHW, max.	1	1	1	1	1	1	Free [1]
Inputs							
Sensors	5	8	8	8	15	17	17
alternatively binary	•	•	1	1	14	14	•
alternatively 0 to 10 V 0/4 to 20 mA	–	–	–	1	1 and 4 x 4 to 20 mA	1 and 15 x 4 to 20 mA	•
additionally binary	–	–	2	2	–	–	–
additionally 0 to 10 V	–	2	1	–	–	–	–
Useable sensor types	Pt 1000		Pt 100/500/1000 Ni 1000, PTC, NTC				

TROVIS 5575 Heating and District Heating Controller

TROVIS 5576 Heating and District Heating Controller

TROVIS 5579 Heating and District Heating Controller

TROVIS	5610 -01	5610 -02	5573	5575	5576	5579	5571
Outputs							
Control signal							
Three-point/on-off, max.	1	2	2	2	2	3	Free [1]
Binary	1	3	3	3	4	5	12
0 to 10 V	–	2	1	–	2	3	4
Interfaces · Partly optional							
Device bus	On req.	On req.	–	•	•	•	–
Meter bus	On req.	On req.	•	–	•	•	•
Modbus slave							
RS-232	On req.	On req.	•	–	•	•	•
RS-485	On req.	On req.	•	–	•	•	•
Modbus master							
RS-485	–	–	–	–	–	–	•
Ethernet	On req.	On req.	•	–	•	•	•
Data transmission and data logging							
TROVIS-VIEW software module	•	•	•	•	•	•	–
Data transmission with							
Memory pen	•	•	–	–	–	–	–
Memory module	–	–	•	•	•	•	–
Direct	Cable		USB Converter 3				–
Data logging viewer/ module	–	–	•	•	•	•	•
Power supply	90 to 250 V~		165 to 250 V~				
Data sheets	T 5610		T 5573	T 5575	T 5576	T 5579	T 5571

[1] Freely programmable

TROVIS 5488 Meter Bus Gateway

Used in HVAC networks to integrate M-bus meters and pulse counters into a control system. See T 5488 for more details.

- 16 floating contacts (pulse counters)
- 32 meter bus meters complying with EN 1434-3
- Communication over Modbus interface

TROVIS 5590 Web Module

To connect smart heating and district heating controllers (Modbus RTU) and/ or three meter bus participants over intranet/internet.

- Visualization and operation using a web browser
- Data logging
- Alarm management including e-mail notification
- Four configurable user levels
- Ethernet interface 10/100 Mbit
- RS-232, RS-485 (two-wire/four-wire) Modbus RTU
- Processing of max. three heat meter participants
- LEDs for Power, TxD, RxD, 10 Mbit, 100 Mbit

See Data Sheet T 5590 for further details.

TROVIS 5571 Programmable Logic Controller (PLC)

TROVIS 5488 Meter Bus Gateway

TROVIS 5590 Web Module

Modbus I/O module for TROVIS 5571

Extension of inputs and outputs at the TROVIS 5571 Programmable Logic Controller (PLC)

- Maximum six inputs can optionally be used as counter input, Pt 1000 or 0 to 1000 Ω input, 0 to 10 V input
- Four binary outputs and a maximum of two 0 to 10 V outputs

Converter/repeater CoRe01

Converter (RS-232/RS-485) or repeater for RS-485 bus networks (two-wire/four-wire)

- RS-485 interfaces optionally connected over RJ-11/RJ-45 jacks or over plug-in screw terminals
- Slide switches to select the operating mode, transmission rate, termination and bus bias voltage
- LED to monitor communication

See Data Sheet T 5409 for more details.

DataMod 11

The multi-function modem is used with Modbus RTU-capable devices of the TROVIS 5500 Automation System.

- Data transmission over a long distance using public telephone networks to a computer with suitable software installed (e.g. 55Viewer)
- Error messages can be sent as text messages to a mobile phone
- Built-in line splitter for further Modbus-RTU-capable devices

See Data Sheet T 5409 for more details.

Meter bus/Modbus gateway

Used in HVAC networks to integrate M-bus meters into a control system

- Maximum six heat, electricity or water meters according to EN 1434-3
- Conversion of input data into Modbus data

See Data Sheet T 5409 for more details.

Modbus/TCP gateway

Integration of Modbus-capable controllers, such as TROVIS 5573, 5576 and 5579 Controllers as well as TROVIS 5571 PLC into Ethernet (LAN) structures

- Connection to controller optionally using RS-485, TTL or RS-232 jacks
- Connection to controller optionally using RS-485, TTL or RS-232 jacks
- Firmware updates of connected controllers

See Data Sheet T 5409 for more details.

Modbus I/O module for TROVIS 5571

Universal bus unit CoRe01

Multi-function modem DataMod 11

Meter bus/Modbus gateway

Modbus/TCP gateway

Solar Controllers and Heat Pump Controllers

Solar controllers · ZPR · ZPR-D · SOL3-1 · SOL3-7 · SOL71

Heat pump controllers · WPR3 · WPR71

Versions and special features

Solar controllers

The solar controllers are used in solar thermal systems to monitor the collector and storage tank temperatures. The applications covered by the controllers range from simple to complex solar systems.

– **ZPR** · On/off controller for simple heating and water control systems
- Microprocessor-controlled controller for simple solar thermal systems
- Differential temperature control for for solar heating systems, solar-heated swimming pools, boiler thermostats, fan control and solid fuel boilers
- Two sensor inputs and one relay contact

– **ZPR-D** · On/off controller for simple heating and water control systems
- LED temperature display
- Microprocessor-controlled controller for simple solar thermal systems
- Differential temperature control for for solar heating systems, solar-heated swimming pools, boiler thermostats, fan control and solid fuel boilers
- Two sensor inputs and one relay contact

– **SOL3-1** · Solar heating controller for simple systems
- Convenient operation with rotary pushbutton
- Graphical selection of the operating mode
- Logging of all measured data and switching states
- Interface for remote polling, configuration and visualization
- Two sensor inputs and one relay contact

– **SOL3-7** · Solar heating controller for complex systems
- Controller for solar thermal systems with maximum two collector arrays, two storage tanks, a heat exchanger, additional heating system and a heating circuit
- 117 hydraulic plant schemes
- Operation using rotary pushbutton
- Large display for operating states
- Logging of all measured data and switching states
- Interface for remote polling, configuration and visualization
- Nine sensor inputs, seven relay contacts and one analog output

ZPR and ZPR-D on/off controllers

SOL3-x solar heating controller

– **SOL71** · Freely programmable solar heating controller for complex systems

- Application used to control complex solar heating systems based on TROVIS 5571 Programmable Logic Controller
- 104 hydraulic plant schemes
- LCD for settings and displaying current operating parameters
- Icons used on the display to represent the plant
- Inputs and outputs extendable for subsequent addition of control tasks
- Interfaces for communication with other field devices
- 17 universal inputs, 12 binary outputs and four analog outputs

Heat pump controllers

The heat pump controllers are used to control heating systems with heat pumps.

– **WPR3** · Controller for complex heat pump systems

- 9 hydraulic plant schemes
- Operation using rotary pushbutton
- Large LCD for plant settings and information
- Logging of all measured data and switching states
- Interface for remote polling, configuration and visualization
- Nine sensor inputs, seven relay outputs, one pulse input for flow rate measurement, one input or output 0 to 10 V for pump speed control

– **WPR71** · Freely programmable controller for complex heat pump systems

- Application used to control complex heat pump systems based on TROVIS 5571 Programmable Logic Controller
- Convenient and simple plain-text operation
- Various applications for hydraulic plant schemes
- Inputs and outputs extendable for subsequent addition of control tasks
- Data logger function and communication interfaces
- Freely programmable using IsaGRAF® software
- 17 universal inputs, 12 relay outputs, two pulse outputs for flow rate measurement, four outputs 0 to 10 V for pump speed control

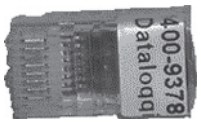
SOL71 solar heating controller with TROVIS 5571

WPR3 heat pump controller

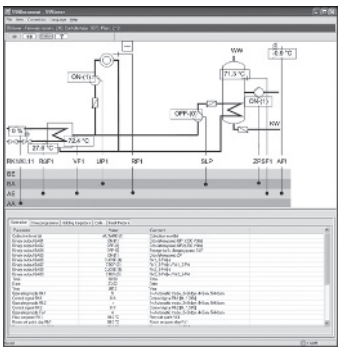
WPR71 heat pump controller with TROVIS 5571

Overview · (o = optional)

	ZPR	ZPR-D	SOL3-1	SOL3-7	SOL71	WPR3	WPR71
On/off controllers	•	•					
Solar controllers			•	•	•		
Heat pump controllers						•	•
Operation							
Rotary switch	•	•					
Menu-driven Turn and push			•	•		•	
Freely programmable					•		•
Display							
Status LEDs	•	•					
Temperature		•					
Plain text/graphics			•	•	•	•	•
Inputs							
Pt 1000	2	2		9		9	
Universal (Pt, Ni, PTC, NTC, mA, V, binary)			2		17		17
Pulse input			o	1	2	1	2
0 to 10 V				1	4	1	4
Outputs							
Relay (250 V AC, 2 A)	•	•	1	7	12	7	12
Low voltage (50 V DC, 100 mA)					2		2
0 to 10 V				o	4	o	4
Interfaces							
Jack for memory module			•	•	•	•	•
Data logger			o	•	•	o	•
Communication interface			o	o	•	o	•
Optional extension							
Universal inputs			o	o	6		6
Relay outputs					4		4
Mounting							
Wall mounting			•	•	•	•	•
Rail mounting	•	•	•	•	•	•	•
Panel mounting			•	•	•	•	•
Power supply							
165 to 230 V AC	•	•					
85 to 250 V AC			•	•	•	•	•
Power consumption, max.	0.8 W		3 VA	3 VA	8 W	3 W	8 W



Data logging module



Operator software for SOL3, WPR3 and TROVIS 55xx Controllers

TROVIS 6600 Automation System

TROVIS 6610 CPU Module
TROVIS 6620 I/O Module
TROVIS 6625 Input Module
TROVIS 6615 Web Terminal
TROVIS 6630 AO Module
TROVIS 6640 AI Module

Application

Control and monitoring of autonomous automation stations in building automation applications

Versions and special features

– **TROVIS 6610 CPU Module**

- Freely configurable automation station with 40 physical channels suitable for connection of up to 32 TROVIS 6620 I/O Modules and TROVIS 6625 Input Modules.
- Communication according to DIN EN ISO 16484-5, certification according to DIN EN ISO 16484-6
- Processing of over 20,000 physical data points
- BACnet profile B-BC and additional BIBBs (BACnet Interoperability Building Blocks)
- Modbus master or slave functions
- Integrated web server for optional graphical plant visualization, including historical data, access protection, alarm management and service
- E-mail and/or text message notification of event-triggered alarms
- Two full-speed USB 2.0 ports, 12 Mbit/s to connect modem, memory pen etc.

Common features of the modules

- Connection to TROVIS 6610 CPU Module over RS-485
- Power supply and I/O bus galvanically isolated from the module
- Inputs and outputs can be connected directly to the module's terminals
- LEDs for binary inputs and outputs
- Status LEDs indicate module operation or fault

– **TROVIS 6620 I/O Module**

- Analog inputs as Pt 1000 (two-wire), 0 to 10 V DC, 0 to 2000 Ω
- Binary inputs optionally as normally closed or normally open contacts, status indicated by LEDs, binary inputs 1 and 2 as counter inputs (1 kHz)
- Six binary outputs including 250 V AC/3 A (resistive) coupling relay, status indicated by LEDs
- Four analog outputs 0 to 10 V DC

– **TROVIS 6625 Input Module**

- Binary inputs optionally as normally closed or normally open contacts, status indicated by LEDs
- Use with internal or external power supply
  – Internal power supply: 18 to 33 V DC
  – External power supply: max. 24 V DC (+15 %)

– **TROVIS 6615 Web Terminal**

- Indication and operation of all relevant operating data in conjunction with TROVIS 6610 CPU Module
- Fully graphical display
- Operation, e.g. setting parameters or changing set points, on a touch screen

TROVIS 6610 CPU Module

TROVIS 6620 I/O Module

TROVIS 6625 Input Module

TROVIS 6615 Web Terminal

– **TROVIS 6630 AO Module**

- Eight analog outputs
  - 0/4 to 20 mA or
  - 0/2 to 10 V

– **TROVIS 6640 AI Module**

- Eight analog inputs
  - 0/4 to 20 mA or
  - Two-wire transmitter supply or
  - 0/2 to 10 V or
  - Pt 100, two/three-wire (–50 to 250 °C) or
  - Pt 1000, two/three-wire (–50 to 250 °C) or
  - 0 to 2000 Ω

TROVIS 6630 AO Module

TROVIS 6640 AI Module

Temperature Sensors

Resistors with Pt 100 · Pt 1000

Application

Sensors for measuring temperatures in heating, ventilation and air-conditioning systems as well as thermal plants

Types 5204 to 5256 · Temperature sensors with Pt 100 resistor

Type	5204 5205 5206	5215 5216	5225 5226	5255
Screw-in sensor	•			
Duct sensor		•		
Outdoor sensor			•	
Room sensor				•
Operating temperature range	–20 to 150 °C –60 to 400 °C	–35 to 200 °C	–20 to 50 °C	–35 to 85 °C
Data sheet	T 5203			

Types 5207 to 5277 · Temperature sensors with Pt 1000 resistor

Type	5207-xx	5217	5227-2	5257-x	5267-2	5277-2	5277 -3/-5
Screw-in sensor	•						
Duct sensor		•					
Immersion sensor						•	•
Contact sensor					•		
Outdoor sensor			•				
Room sensor				•			
Operating temperature range	–20 to 150 °C –60 to 400 °C	–20 to 150 °C	–35 to 85 °C	–20 to 60 °C –35 to 70 °C	–20 to 120 °C	–10 to 105 °C	–50 to 180 °C
Data sheet	T 5220						

Types 5207-60, 5207-61, 5207-64 and 5207-65 also available as fast-response versions with Pt 1000 resistor (see T 5221 and T 5222)

Type 5207-64 (top) and Type 5207-61 (bottom) Screw-in Sensors

Type 5206/5207 Screw-in Sensor

Type 5267-2 Contact Sensor

Thermostats

Type 5343 Safety Temperature Monitor
Type 5344 Temperature Regulator
Type 5345 Safety Temperature Limiter
Types 5347, 5348 and 5349 Double Thermostats
Type 5312-2 Frost Protection Thermostat

Types 5343, 5344, 5345, 5347, 5348, 5349

- Can be mounted either as a contact thermostat or as a thermostat with thermowell
- Easy to wire using spring-clamp terminals
- Switching capacity 16 A, 230 V
- Stable switching point thanks to ambient temperature compensation
- Degree of protection IP 54

Application

The thermostats are tested by the German technical surveillance association (TÜV) according to DIN EN 14597 for temperature control in heat-generating plants and for use in HVAC applications as:

– Safety temperature monitor (STM)
– Temperature regulator (TR)
– Safety temperature limiter (STL)
– Temperature regulator with safety temperature limiter (TR/STL) or
– Temperature regulator with safety temperature monitor (TR/STM)

Type 5312-2 Frost Protection Thermostat

The frost protection thermostat is used to monitor the temperature in air ducts containing non-corrosive gases.

Single thermostats

Type	5312-2	5343	5344	5345
Function	TM	STM	TR	STL
Set point range [°C]	–10 to 12	0 to 60 40 to 100 70 to 130 35 to 95	0 to 120 20 to 150	70 to 130 30 to 90
Sensor length [mm]	6000	2000		
Max. medium temperature [°C]	200	85, 125, 155, 120	145, 175	155, 115
Data sheets	T 5207	T 5206		

Double thermostats

Type	5347	5348	5349
Function	TR/STL	TR/STM	STM/STL
Set point range [°C]	0 to 120 (TR) 70 to 130 (STL) 0 to 120 (TR) 30 to 90 (STL)	0 to 120 (TR) 70 to 130 (STM) 0 to 120 (TR) 40 to 100 (STM)	70 to 130 (STM) 70 to 130 (STL)
Sensor length [mm]	2000		
Max. medium temperature [°C]	145 or 115	145 or 125	145
Data sheet	T 5206		

Type 5312-2 Frost Protection Thermostat

Types 5343, 5344 and 5345 Single Thermostats

Type 5347 Double Thermostat

Type 5348 Double Thermostat

Type 5349 Double Thermostat

Self-operated Temperature Regulators

Temperature regulators with
Globe valves · Types 1/4 · Types 1u/4u
Three-way valves · Types 8/9

Application

Temperature regulators with globe or three-way valves and Types 2231 to 2235 Control Thermostats, tested according to DIN EN 14597. Suitable for liquids, gases and vapors, especially for the heat transfer media water, oil and steam or for coolants such as cooling brine or cooling water.

Special features

Regulators consisting of a:

- Type 2111, Type 2114, Type 2118 or Type 2119 Valve and
- either a Type 2231, 2232, 2233, 2234 or Type 2235 Control Thermostat

Temperature regulator versions

– **Type 1 · Flanges**
Unbalanced globe valve
The valve **closes** when the temperature rises
Body materials according to DIN and ANSI: cast iron (EN-JL1040), spheroidal graphite iron (EN-JS1049), cast steel (1.0619), cast stainless steel (1.4408) or A126 Class B, A216 WCC, A351 CF8M

– **Type 1u** · Same as Type 1
The valve **opens** when the temperature rises

– **Type 1 · Body with screwed ends**
Unbalanced globe valve
The valve **closes** when the temperature rises
Red brass body

– **Type 4 · Flanges**
Balanced globe valve
The valve **closes** when the temperature rises
Body materials according to DIN and ANSI: cast iron (EN-JL1040), spheroidal graphite iron (EN-JS1049), cast steel (1.0619), cast stainless steel (1.4408) or A126 Class B, A216 WCC, A351 CF8M

– **Type 4u** · Same as Type 4
The valve **opens** when the temperature rises

– **Type 8 · Flanges**
Unbalanced three-way valve
Mixing or diverting service for liquids
Cast iron body

– **Type 9 · Flanges**
Balanced three-way valve
Mixing or diverting service for liquids
Body materials according to DIN and ANSI: cast iron (EN-JL1040), spheroidal graphite iron (EN-JS1049), cast steel (1.0619), cast stainless steel (1.4408) or A126 Class B, A216 WCC, A351 CF8M

Type 4 Temperature Regulator with Type 2231 Control Thermostat (cutaway model)

Type 1 Temperature Regulator with Type 2231 Control Thermostat

Type 1 Temperature Regulator (version with screwed ends) with Type 2231 Control Thermostat

Technical data

Valve Type	2111 · 2121				2114	
Pressure balancing	Without [1]				With	
Connection	DN 15 to 50	G ½ to 1	DN 15 to 50	G ½ to 1	DN 15 to 250	
	NPS ½ to 2	– [2]	NPS ½ to 2 [2]		NPS ½ to 10	
Nominal pressure	PN 16 to 40	PN 25	PN 25		PN 16 to 40	
	Class 125 to 300	Class 250	Class 125 to 300		Class 125 to 300	
Max. permissible temperature	350 °C	220 °C	150 °C		350 °C	
	660 °F	–	660 °F		660 °F	
Data sheets	T 2111 T 2115	T 2112	T 2113		T 2121 T 2025	T 2123

[1] Type 2121 in DN 32, 40 und 50 also available with balanced valve
[2] Versions also available with NPT female thread

Materials

Body according to	DIN	EN-JL1040 1.0619 Cast stainless steel (1.4408)	CC491K EN-JL1040 1.0619 Cast stainless steel	EN-JL1040 1.0619 Cast stainless steel (1.4408)
	ANSI	A126 Class B A216 A351 CF8M	B 62	A126 Class B A216 A351 CF8M

Technical data

Valve Type	2118	2119
Pressure balancing	Without	DN 32 and higher
Nominal size	DN 15 to 50	DN 15 to 150 NPS ½ to 6
Nominal pressure	PN 16	PN 16 to 40 Class 125 and 300
Max. permissible temperature	150 °C	350 °C · 660 °F
Data sheets	T 2131	T 2133 · T 2134

Materials

Body according to	DIN	EN-JL1040	EN-JL1040 1.0619 1.4581
	ANSI	ANSI versions on request	A216 A351 CF8M

Special versions

- Valve entirely of stainless steel
- Reduced K_{VS} coefficient
- Valve with flow divider I for noise reduction with steam and non-flammable gases
- Version free of non-ferrous metal

Type 4u Temperature Regulator with Type 2231 Control Thermostat

Type 8 Temperature Regulator with Type 2118 Valve and Type 2232 Control Thermostat with separate set point adjustment

Type 9 Temperature Regulator with Type 2231 Control Thermostat

Types 2231, 2232, 2233, 2234, 2235 Control Thermostats

Application

Temperature regulation for heating or cooling installations

Special features

- The control thermostats consist of a temperature sensor, a set point adjuster with temperature scale and excess temperature safety device, a capillary tube and an operating element.
- They regulate the temperature of the medium by causing the connected valve to open or close.
- The thermostats operate according to the liquid expansion principle.

Versions

– **Type 2231** · Set points from –10 to 150 °C (15 to 300 °F), set point adjustment at the sensor · Suitable for liquids and steam · Installation in pipelines, vessels, heating or cooling systems

– **Type 2232** · Set points from –10 to 250 °C (15 to 480 °F), separate set point adjustment · Application same as Type 2231

– **Type 2233** · Set points from –10 to 150 °C (15 to 300 °F), set point adjustment at the sensor · Suitable for liquids, air and gases · Liquid regulation with quick response times · Installation in air ducts, vessels, pipelines, heating or cooling systems

– **Type 2234** · Set points from –10 to 250 °C (15 to 480 °F), separate set point adjustment · Suitable for liquids, air and gases · Application same as Type 2233

– **Type 2235** · Set points from –10 to 250 °C (15 to 480 °F), separate set point adjustment · Capillary tube can be installed as required by the user to measure different temperature layers · Installation in air-heated storerooms as well as drying, climatic and heating cabinets

Technical data

Type	2231	2232	2233	2234	2235
Set point span	–10 to 90 °C, 20 to 120 °C or 50 to 150 °C For Types 2232, 2234, 2235 also 100 to 200 °C, 150 to 250 °C				
	15 to 195 °F, 70 to 250 °F or 120 to 300 °F For Types 2232, 2234, 2235 also 210 to 390 °F, 300 to 480 °F				
Permissible ambient temperature	–40 to 90 °C · –40 to 175 °F At the set point adjuster				
Permissible temperature at the sensor	100 K above the adjusted set point				
Capillary tube length	3 m · 10 ft				
Data sheets	T 2111/2115 · T 2112 · T 2113 T 2121/2025 · T 2123/2131 · T 2133/2134				

Materials

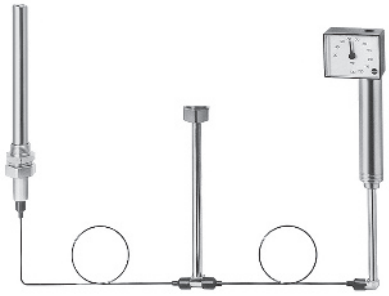
Sensor	Nickel-plated bronze [1]	Nickel-plated copper [1]	Copper
Capillary tube	Nickel-plated copper [2]		

[1] Special version: 1.4571
[2] Special version: plastic-coated copper or 1.4571

Special versions

– Sensor of CrNiMo steel
– Capillary tube made of CrNiMo steel or plastic-coated copper
– Capillary tube length: 5, 10 or 15 m (16, 33 or 50 ft)

Type 2233 Control Thermostat



Type 2232 Control Thermostat

Type 2231 Control Thermostat

Self-operated Temperature Regulators

Typetested safety devices

Type 1/..., Type 4/..., Type 8/..., Type 9/...

Safety temperature limiter (STL) · Type 2212

Application

Temperature limitation in heating and water heating installations according to DIN 4753 and DIN 4747-1 · Tested according to DIN EN 14597

Special features

- Interrupts and locks the energy supply when an adjusted limit value is reached, when the capillary tube breaks or when leakage occurs in the sensor system
- Can only be reset or started up with a tool, provided the defect has been eliminated and the temperature has fallen below the limit value

Versions

Safety temperature limiter (STL) consisting of:

– Type 2111/Type 2114 Globe Valve or
Type 2118/Type 2119 Three-way Valve and

– **Type 2212** Safety Thermostat with
temperature sensor, limit value adjuster, capillary tube and connecting element with spring mechanism

Technical data

Safety thermostat	**Type 2212 STL** (size 50 [1] · Size 150 [2])
Limit value range	10 to 95 °C · 20 to 120 °C · 30 to 170 °C
Permissible ambient temperature range at the limit value adjuster	–20 to 80 °C
Permissible temperature at sensor	Max. 20 K above the adjusted set point
Capillary tube length	5 m
Data sheet	T 2046

[1] For valves up to DN 50
[2] For valves above DN 50

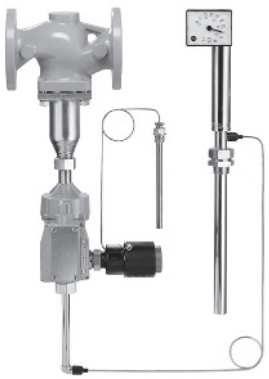
Materials

Connecting element with spring mechanism	GD AlSi12 (230) Connecting piece 1.4104
Sensor	Copper
Thermowell	Copper or CrNiMo
Capillary tube	Copper

Special versions

– Limit value range 30 to 170 °C
– Electric signal transmitter for remote transmission of the plant status and/or an electric release device to activate the safety interlock circuit
– With Type 2401 Pressure Element
– 10 or 15 m capillary tube length

Type 2212 Safety Thermostat



Safety temperature limiter with Type 2114 Valve, Type 2231 Thermostat and Type 2212 Safety Thermostat
(Type 2114/2231/2212 STL)

Safety temperature limiters (STL), consisting of a valve and safety thermostat, operate without auxiliary energy and are designed for extended safety acc. to DIN EN 14597.
Devices tested according to DIN EN 14597 are available for installations acc. to DIN 4753.

Self-operated Temperature Regulators

Typetested safety devices

Type 1/..., Type 4/..., Type 8/..., Type 9/...

Safety temperature monitor (STM) · Type 2213

Application

Temperature monitoring in heating and water heating installations according to DIN 4747-1 and DIN EN 12828 · Tested according to DIN EN 14597

Special features

- Interrupts and locks the energy supply when an adjusted limit value is reached, when the capillary tube breaks or when leakage occurs in the sensor system
- Automatic reset or start-up, provided the defect has been eliminated and the temperature has fallen below the limit value

Versions

Safety temperature monitor (STM) consisting of:

– Type 2111/Type 2114 Globe Valve or Type 2118/Type 2119 Three-way Valve and
– **Type 2213** Safety Thermostat with temperature sensor, limit value adjuster, capillary tube and connecting element with spring mechanism

Technical data

Safety thermostat	Type 2213 Safety Temperature Monitor
Limit value range	10 to 90 °C or 20 to 120 °C
Permissible ambient temperature range at the limit value adjuster	–40 to 80 °C
Permissible temperature at sensor	Max. 100 K above the adjusted set point
Capillary tube length	5 m
Data sheet	T 2043

Materials

Connecting element with spring mechanism	Nickel-plated brass
Sensor	Nickel-plated bronze
Thermowell with conductive plate	Nickel-plated bronze or CrNiMo steel
Capillary tube	Nickel-plated copper

Special versions

– Electric signal transmitter for remote transmission of the plant status
– 10 or 15 m made of copper and 5, 10 or 15 m made of plastic-coated copper (10 and 15 m not tested according to DIN EN)

Type 2213 Safety Temperature Monitor

Safety temperature monitor with Type 2114 Valve, Type 2213 Safety Thermostat and Type 2232 Control Thermostat (Type 2114/2232/2213)

Safety temperature monitors (STM), consisting of a valve and safety thermostat, operate without auxiliary energy and are designed for extended safety acc. to DIN EN 14597.
Devices tested according to DIN EN 14597 are available for installations acc. to DIN 4747 and DIN EN 12828.

Self-operated Temperature Regulators

Temperature regulators · Type 43-1 to Type 43-7

Valve closes when the temperature rises · Type 43-1 · Type 43-2 · Type 43-5 · Type 43-7
Valve opens when the temperature rises · Type 43-6
Three-way valve for mixing and diverting service · Type 43-3

Application

Regulators for district heating systems, heat generators, heat exchangers and other HVAC and industrial applications. Suitable for liquids, gases and vapors at operating pressures up to 25 bar.
For heating service: Types 43-1, 43-2, 43-5, 43-7
For cooling service: Type 43-6
For mixing or diverting service, **heating or cooling service**: Type 43-3

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Temperature sensors for any desired mounting position and high permissible ambient temperatures, especially suitable for district heating networks

Versions

The regulators consist of a valve, a Type 2430 K Control Thermostat with set point adjuster, a capillary tube and temperature sensor operating according to the adsorption principle.

Technical data

Type	43-1	43-2	43-3	43-5	43-7	43-6
Valve	2431 K	2432 K	2433 K	2435 K	2437 K	2436 K
Plug	Balanced by a piston		–	Balanced by bellows		
Connection	DN 15 to 50 · G ½ to 1 NPS ½ to 2 · ½ to 1 NPT					DN 32 to 50 G ½ to 1 NPS 1¼ to 2 ½ to 1 NPT
Flanged body	–	DN 15 to 50	–	–	DN 15 to 50	
Set point range	0 to 35 °C · 25 to 70 °C · 40 to 100 °C · 50 to 120 °C · 70 to 150 °C					
	30 to 95 °F · 75 to 160 °F · 105 to 210 °F · 160 to 300 °F					
Max. permissible temperature [°C/°F]	Liquids 150/300 Non-flammable gases 80/175		Water/oil 150/300	Liquids, steam 200/390		Liquids 150/300 Non-fl. gases 80/175
Data sheets	T 2171 · T 2175		T 2173/7	T 2172 · T 2174		

Materials

Body	Red brass · 1.4408 (Types 2431, 2436 only) · EN-JS1049 [1] · 1.4408 [2]
Sensor	
Thermowell	Copper or 1.4310
Capillary tube	Copper

[1] Flanged body · [2] Special version Type 43-1 (G ½, G ¾, G 1 and DN 15, 25)

Special versions

Tested versions according to DIN EN 14597 (see T 2181) · 5 m capillary tube
Internal parts resistant to mineral oil · Extremely fast-responding thermostats (vapor pressure principle) · Small K_{VS} coefficient for sizes DN 15 or G ½
Stainless steel body for Type 43-1

Type 43-1 Temperature Regulator

Type 43-2, special version with flanged body

Type 43-3 Temperature Regulator

Type 43-5 Temperature Regulator

Application

Temperature regulation of instantaneous water heaters in small district heating units, particularly in single or multiple-family dwellings

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Tested according to DIN EN 14597
- Regulation of small instantaneous water heaters
- Idle temperature regulation
- Fast-responding vapor pressure thermostats

Versions

Type 43-8 and **Type 43-8 N** for local heat supply networks with:

– Type 2430 K Thermostat with Type 2438 K Hydraulic Controller and

– Type 2432 K Valve

Technical data

Type 2432 K Valve	**Type 43-8**	**Type 43-8 N**
Nominal size	DN 15	
K_{VS} coefficient	2.5	
Permissible temperature (valve)	Max. 130 °C	Max. 120 °C
Control thermostat	**Type 2430 K (vapor pressure)**	
Set point range	45 to 65 °C	
Perm. temperature at sensor	Max. 30 K above the adjusted set point	
Capillary tube length	2 m	
Hydraulic controller	**Type 2438 K**	
Required differential pressure	0.4 bar with a tapping rate up to 10 l/minute 0.5 bar with a tapping rate up to 20 l/minute	
Nominal pressure	PN 16	
Max. flow rate	20 l/min	
Min. tapping rate	2 l/min	
Data sheet	T 2178	

Materials

Type	**43-8**	**43-8 N**
Body	CC491K (red brass, Rg 5)	CW602N (hot-pressed brass)
Valve seat	1.4305	
Plug	1.4104 and brass, resistant to dezincification, with EPDM soft seal	
Temperature sensor		
Capillary tube	Copper	
Sensor	CrNiMo steel	

Special versions

– With Type 2439 K Safety Temperature Limiter

Type 43-8 Temperature Regulator with Hydraulic Controller

Self-operated Temperature Regulators

Typetested safety devices

Safety temperature limiter with safety thermostat · Type 2439 K

Application

Temperature limitation in heating and water heating installations according to DIN 4747-1, DIN EN 12828, DIN EN 12953-6 and DIN 4753 · Tested according to DIN EN 14597

Special features

- Safety temperature limitation of the energy supply by closing and locking a valve using a spring mechanism
- The valve closes when the adjusted set point is reached, when the capillary tube breaks or when leakage occurs in the system
- Reset or start-up using a screwdriver, provided the defect has been eliminated and the temperature has fallen below the limit value

Versions

Safety temperature limiter (STL) consisting of:

– Type 2431 K/2432 K/2433 K/2435 K/2436 K/2437 K Valve and

– **Type 2439 K** Safety Thermostat with temperature sensor and thermowell, limit value adjuster, capillary tube, connecting element with spring mechanism

Technical data

Safety thermostat	Type 2439 K Safety Temperature Limiter (STL)
Limit value range	10 to 95 °C or 20 to 120 °C
Perm. ambient temperature	80 °C
Perm. temperature at sensor	Max. 20 K above the adjusted set point
Capillary tube length	2 m
Data sheet	T 2185

Materials

Connecting element with spring mechanism	PTFE, glass fiber reinforced
Sensor	Copper
Thermowell	Copper or CrNiMo steel
Capillary tube	Copper

Special versions with

– G ½ thermowell of CrNiMo steel

– 5 m capillary tube

– Electric signal transmitter

Combinations

– The safety temperature limiter can be combined with a Type 2430 K Thermostat (TR/STL)

– Safety temperature monitor with differential pressure/flow rate regulation

Type 2439 K Safety Temperature Limiter (STL)

Combination:
Type 2432 K Valve with Type 2439 K Safety Temperature Limiter and Do3 K double adapter with two Type 2430 K Thermostats

Self-operated Temperature Regulators

Typetested safety devices

Safety temperature monitor with safety thermostat · Type 2403 K

Application

Temperature monitoring in heating and water heating installations according to DIN 4747-1, DIN EN 12828 and DIN 4735 · Tested according to DIN EN 14597

Special features

- The valve closes when the adjusted set point is reached, when the capillary tube breaks or when leakage occurs in the system
- Automatic reset or start-up, provided the defect has been eliminated and the temperature has fallen below the limit value

Versions

Safety temperature monitor (STM) consisting of:

– Type 2431 K/2432 K/2433 K/2435 K/2436 K/2437 K Valve and

– **Type 2403 K** Safety Thermostat with temperature sensor, limit value adjuster, capillary tube and connecting element with spring mechanism

Technical data

Safety thermostat	Type 2403 K Safety Temperature Monitor
Limit value range	60 to 75 °C · 75 to 100 °C · 100 to 120 °C
Perm. ambient temperature	Max. 50 °C
Perm. temperature at sensor	Max. 25 K above the adjusted set point
Capillary tube length	2 m
Data sheet	T 2183

Materials

Connecting element	PPO with brass connection nut
Set point adjuster	PTFE, glass fiber reinforced
Sensor	1.4571
Capillary tube	Copper

Combinations

– The safety temperature monitor can be combined with a Type 2430 K Thermostat (TR/STM)

– Safety temperature monitor with differential pressure/flow rate regulation

Further self-operated temperature regulators:

– **Type 2040** · Safety temperature monitor for cryogenic applications, see page 60

Combination:
Type 2432 K Valve and Type 2403 K Safety Temperature Monitor with Type 2430 K Thermostat

Self-operated Pressure Regulators

Pressure reducing valve · Type 41-23

Excess pressure valve · Type 41-73

Application

Pressure set points from 0.05 to 28 bar (0.75 to 400 psi) · Suitable for liquids, gases and vapors up to 350 °C (600 °F)

Special features

- Low-maintenance, medium-controlled proportional regulators requiring no auxiliary energy
- Frictionless plug stem seal with stainless steel bellows
- Exchangeable actuator and positioning springs
- Single-seated valve with upstream and downstream pressure balancing

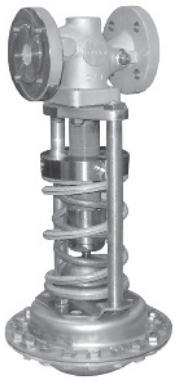
Versions

– **Type 41-23 Pressure Reducing Valve** · Type 2412 Valve and Type 2413 Actuator with EPDM rolling diaphragm

– **Type 41-73 Excess Pressure Valve** · Type 2417 Valve and Type 2413 Actuator with EPDM rolling diaphragm

Technical data

Valve	**Type**	**2412 · 2417**		
Nominal size	DN	15 to 50	65 to 80	100
	NPS	½ to 2	2½ and 3	4
Max. Δp		25 bar · 360 psi	20 bar · 290 psi	16 bar · 230 psi
Actuator	**Type**	**2413**		
Set point range		0.05 to 0.25 bar 0.1 to 0.6 bar · 0.2 to 1.2 bar · 0.8 to 2.5 bar 2 to 5 bar · 4.5 to 10 bar · 8 to 16 bar		
		0.75 to 3.5 psi 1.5 to 8.5 psi · 3 to 17 psi · 10 to 35 psi 30 to 75 psi · 65 to 145 psi · 115 to 230 psi		
Max. permissible temperature		Gases 350 °C (660 °F), at the actuator max. 80 °C (175 °F) Liquids 150 °C (300 °F), with condensation chamber 350 °C (660 °F) Steam with condensation chamber 350 °C (660 °F)		
Data sheets		T 2512/2513 · T 2517/2518		



Type 41-23 Pressure Reducing Valve

Type 41-23, stainless steel version

Materials

Valve	Type	2412 · 2417			
Nominal pressure	PN	16	25	40	40
	Class	125	150	300	300
Max. permissible temperature	°C	300	350	350	350
	°F	570	660	660	660
Body	DIN	EN-JL1040	EN-JS1049	1.0619	1.4408
	ANSI	A 126 B	A216 WCC		A351 CF8M
Seat/plug		CrNiMo steel/CrNiMo steel			CrNiMo steel
Actuator	**Type**	**2413**			
Diaphragm cases		Sheet steel DD11 [1]			
Diaphragm		EPDM with fabric reinforcement · FPM (FKM) for mineral oils · NBR · EPDM with PTFE foil			

[1] In corrosion-resistant version (CrNi steel)

Special versions

- Control line kit for tapping the pressure directly at the valve body (accessories)
- Internal parts made of FPM (FKM), e.g. for use with mineral oils
- Free of oil and grease for oxygen or for applications with high-purity requirements with FPM (FKM) diaphragm
- EPDM diaphragm with PTFE protective facing
- Actuator for remote set point adjustment (autoclave control)
- Bellows actuator for valves DN 15 to 100, set point ranges 2 to 6 bar, 5 to 10 bar, 10 to 22 bar or 20 to 28 bar
- Valve with flow divider St I or St III (DN 65 to 100) for particularly low-noise operation with gases and vapors
- Version entirely of stainless steel
- Stellited seat and plug · Plug with PTFE/EPDM soft seal
- Wetted plastic parts complying with FDA regulations (max. 60 °C)
- Lubricants for high-purity water/gas

Type 41-73 Excess Pressure Valve

Self-operated Pressure Regulators

Pressure reducing valves · Type 2405 and Type 2407

Excess pressure valves · Type 2406 and Type 2408

Application

Pressure regulation of flammable gases used as a source of energy or to control compressed air supply in process engineering applications

Special features

- Low-maintenance proportional regulators
- Compact regulator design providing excellent control accuracy
- Internal set point springs with set point adjustment using a nut on the actuator
- Fulfills stricter fugitive emission requirements (TA Luft)
- Minimum leakage class IV
- Suitable for vacuum

Versions

– **Pressure reducing valve** or **excess pressure valve** with flange or threaded connections · Soft-seated plug · DIN and ANSI versions

Technical data

Type	2405	2406	2407	2408
Pressure reducing valve	•		•	
Excess pressure valve		•		•
Set point range	5 mbar to 10 bar		5 mbar to 1 bar	
K_{VS} coefficient	0.1 to 32		0.25 to 5.0	
Nominal size	DN 15 to 50		DN 15 · DN 25 G ½ · G ¾ · G 1	
Nominal pressure	PN 16 to 40		PN 25	
Medium temp. range	–20 to 60 °C [1]		–20 to 60 °C [1]	
Data sheets	T 2520	T 2522	T 2524	T 2528

[1] 0 to 150 °C: for unbalanced version with FPM (FKM) diaphragm/soft seal

Materials

Body	EN-JL1040 · EN-JS1049 1.0619 · 1.4571 · 1.4408	1.4408 [1] EN-JS1049 [2]
Seat	1.4112 · 1.4404	1.4404 [1] · 1.4305 [2]
Plug	1.4305	1.4404
Plug seal	EPDM · FPM (FKM) · NBR	EPDM · FPM (FKM) · NBR
Operating diaphragm		
Springs	1.4310	1.4310K
Actuator housing	1.0332 · 1.4301	1.4301 [1] · 1.0039 [2]

[1] Version with screwed ends [2] Version with flanged valve body

Special versions

– FDA-compliant materials for food processing and pharmaceutical industries
– Version according to NACE (sour gas)
– Actuator with seal and leakage line connection
– With force limiter
– With directly connected control line

Type 2405 or Type 2406 with flanges

Type 2407 or Type 2408 with flanges

Type 2407 or Type 2408
with threaded connections

Self-operated Pressure Regulators

Pressure reducing valve with pilot valve · Type 2333

Excess pressure valve with pilot valve · Type 2335

Application

Pressure set points from 1 to 28 bar, suitable for liquids, gases and vapors up to 350 °C

The attached pilot valve (either a pressure reducing valve or excess pressure valve) determines the function of the regulator.

Special features

- Pressure regulator, pilot-operated by the process medium with excellent control properties
- High control accuracy
- Set point adjustment at the pilot valve

Versions

– **Type 2422 Valve** (modified) with suitable pilot valve with set point adjuster · Valve conforming with DIN, ANSI or JIS standards

– **Type 2333 Pressure Reducing Valve** · To regulate the downstream pressure p_2 to the adjusted set point
Suitable pilot valves: Type 44-1 B or Type 44-0 B (standard), Type 50 ES, Type 44-2, Type 41-23, Type 2405

– **Type 2335 Excess Pressure Valve** · To regulate the upstream pressure p_1 to the adjusted set point
Suitable pilot valves: Type 44-6 B, Type 44-7, Type 41-73, Type 2406

Technical data

Valve	Type	2422					
Nominal size	DN	125	150	200	250	300	400
K_{VS} [1]		200	360	520	620	–	–
K_{VS} [1]		150	270	400	500	–	–
K_{VS} [2]		250	380	650	800	1250	2000
Set point range		Depending on the pilot valve used					
Data sheets		T 2552 · T 2554					

[1] Balanced by a bellows

[2] Balanced by a diaphragm

Materials

Valve	Type	2422 · Balanced by a bellows or a diaphragm			
Nominal pressure	PN	16	16/25	16/25/40	
Body	DIN	EN-JL1040	EN-JS1049	1.0619	CrNiMo steel
	ANSI	A 126 B	–	A216 WCC	A351 CF8M
Valve seat		1.4006			1.4571
Plug (standard)		1.4301 with PTFE soft seal			

Special versions

With flow divider for noise reduction · Version resistant to mineral oils · For flammable gases · Free of non-ferrous metal · Reduced minimum differential pressure · Larger nominal sizes · Reduced K_{VS} · Version for deionized water Version for oxygen · With solenoid valve for emergency function

Type 2333 Pressure Reducing Valve (DN 150) with Type 50 ES Pilot Valve

Type 2335 Excess Pressure Valve (DN 150) with Type 44-7 Pilot Valve (modified)

Self-operated Pressure Regulators

Pressure reducing valves · Type 44-0 B and Type 44-1 B

Excess pressure valve · Type 44-6 B

Application

Pressure set points from 0.2 to 20 bar (3 to 290 psi) · Suitable for non-flammable gases, liquids and steam

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Stainless steel operating bellows as operating element
- Compact design with particularly low overall height
- Spring-loaded, single-seated valve with balanced plug

Versions

– **Type 44-0 B Pressure Reducing Valve** · Valve PN 25 (Class 250), for steam up to 200 °C (390 °F) · Unbalanced or balanced

– **Type 44-1 B Pressure Reducing Valve** · Valve PN 25 (Class 250) for air up to 150 °C (300 °F) · Nitrogen up to 200 °C (390 °F), other gases up to 80 °C (175 °F) · Liquids up to 150 °C (300 °F) · Unbalanced or balanced

– **Type 44-6 B Excess Pressure Valve** · Valve PN 25 (Class 250) for air up to 150 °C (300 °F) · Nitrogen up to 200 °C (390 °F), other gases up to 80 °C (175 °F) · Liquids up to 150 °C (300 °F) and steam up to 200 °C (390 °F) · Unbalanced or balanced (standard)

Technical data

Regulator		Pressure reducing valve		Excess press. valve
		Type 44-0 B	Type 44-1 B	Type 44-6 B
Connection (female thread or flanges)		G ½ · G ¾ · G 1 · DN 15 to 50 ½ NPT · ¾ NPT · 1 NPT		
Nominal pressure		PN 25 · Class 250		
Set point range	bar	0.2 to 2 · 1 to 4 · 2 to 6 · 4 to 10 · 8 to 20 (PN 16)		
	psi	3 to 30 · 15 to 60 · 30 to 90 · 60 to 150 · 120 to 290		
Data sheets		T 2626 · T 2627 · T 2628		

Kvs/Cv coefficients

Connection		G ½ · ½ NPT	G ¾ · ¾ NPT	G 1 · 1 NPT
Types 44-1 B, 44-6 B, 44-0 B	K_{VS}	1 · 3.2	1 · 4	1 · 5
	C_V	1.2 · 4	1.2 · 5	1.2 · 6

Materials

Body	Red brass CC491K/ CC499K · C 83600	Sph. graphite iron EN-JS1049	Stainless steel 1.4408
Seat	Cast stainless steel 1.4305		Stainless steel
Plug			
Type 44-1 B Type 44-6 B	Brass, resistant to dezincification, with EPDM soft seal		Stainless steel with EPDM/ FPM + PTFE interm. ring
Type 44-0 B	Brass, resistant to dezincification, with PTFE soft seal Unbalanced: metal seal 1.4305		Stainless steel with PTFE soft seal
Operating/balancing bellows	Steel 1.4571		Stainless steel

Type 44-0 B Pressure Reducing Valve

Type 44-1 B Pressure Reducing Valve, stainless steel version

Type 44-1 B Pressure Reducing Valve, DN 15 to 50, flanged body made of spheroidal graphite iron

Type 44-6 B Pressure Reducing Valve, stainless steel version with flanged body

Self-operated Pressure Regulators

Pressure reducing valve · Type 44-2

Safety shut-off valve (SSV) · Type 44-3

Excess pressure valve · Type 44-7

Safety excess pressure valve (SEV) · Type 44-8

Application

Pressure set points from 0.2 to 11 bar, suitable for liquids, air and nitrogen
SSV and SEV to protect district heating systems

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Tight-closing single-seated valve with balanced plug
- SEV and SSV: typetested for water by the German technical surveillance association (TÜV)

Versions

Series 44 Pressure Regulators with set point ranges from 0.2 to 11 bar
Nominal sizes DN 15 to 50 · With welding ends and flanged valve body

– **Type 44-2 Pressure Reducing Valve** · With one operating diaphragm
– **Type 44-3 Safety Shut-off Valve (SSV)** · With pressure reducing valve and two operating diaphragms · Typetested for water by TÜV
– **Type 44-7 Excess Pressure Valve** · With one operating diaphragm
– **Type 44-8 Safety Excess Pressure Valve (SEV)** · With two operating diaphragms · Typetested for water by TÜV

Technical data

Nominal size	**DN**	**15**	**20**	**25**	**32**	**40**	**50**
K_{VS} coefficient		1 · 2.5 · 4	6.3	8	12.5	16	20
Max. perm. temperature		150 °C					
Set point range							
Type 44-2	bar	0.5 to 2 · 1 to 4 · 2 to 4.2 · 2.4 to 6.3 · 6 to 10.5					
Type 44-3 (SSV)	bar	2 to 4.2 · 2.4 to 6.3 · 6 to 10.5 (without typetesting: 0.2 to 1 · 0.4 to 1 · 0.5 to 2 · 1 to 4)					
Type 44-7	bar	0.1 to 1 · 0.5 to 2 · 1 to 4 2 to 4.4 · 2.4 to 6.6 · 6 to 11					
Type 44-8 (SEV)	bar	2 to 4.4 · 2.4 to 6.6 · 6 to 11					
Data sheets		T 2623 · T 2723					

Materials

Body	Red brass CC491K/CC499K · EN-JS1049 [1]
Seat	Stainless steel 1.4305
Plug	Brass 2.0402 and 1.4305 with EPDM soft seal

[1] Additional version for Type 44-3, DN 32 to 50: valve with flanged body

Special version

– Internal parts resistant to mineral oils · Special K_{VS} coefficients with DN 15

Type 44-3 Safety Shut-off Valve

Type 44-8 Safety Excess Pressure Valve (SEV)

Series 2371 Self-operated Pressure Regulators for food processing and pharmaceutical industries

Pressure reducing valves · Type 2371-10 and Type 2371-11

Excess pressure valves · Type 2371-00 and Type 2371-01

Application

Pressure reducing valve or excess pressure valves for food processing and pharmaceutical industries for liquids and gases

Special features

- Proportional pressure regulators
- Wetted inside surfaces with a surface roughness $R_a \leq 0.8$ µm; outside surface glass bead blasted
- Stainless steel 1.4404 (316L) or 1.4409 (CF3M)
- FDA-approved materials
- Cavity-free angle-style body
- Test bore to monitor the diaphragm for leakage
- Optional stem locking facility to keep valve open during CIP or SIP

Versions

– **Type 2371-11 and Type 2371-11** · Pressure reducing valves with diaphragm to control the outlet pressure · Set point of Type 2371-10 adjusted pneumatically, Type 2371-11 adjusted by the set point spring

– **Type 2371-00 and Type 2371-01** · Excess pressure valves with diaphragm to control the inlet pressure
Set point of Type 2371-00 adjusted pneumatically, Type 2371-01 adjusted by the set point spring

Technical data

Regulator		Pressure reducing valve Type 2371		Excess pressure valve Type 2371	
		-10	-11	-00	-01
Nominal size		DN 15 to 50 · NPS ½ to 2			
Connection		Clamps · Threaded connections · Flanges		Clamps · Threaded connections · Flanges Welding ends	
Set point range	bar	0.3 to 1.2 · 1 to 3 · 2.5 to 4.5 · 4 to 6			
	psi	5 to 18 · 15 to 45 · 35 to 65 · 60 to 90			
Maximum pressure		10 bar · 150 psi			
Permissible temperature		–10 to 160 °C · 14 to 320 °F			
Leakage class according to DIN EN/ANSI	Metal-seated plug	≤ 0.05 % of K_{VS}/C_V			
	Soft-seated plug	≤ 0.02 % of K_{VS}/C_V			
Data sheets		T 2640		T 2642	

Special versions

– Body made of 1.4435, others on request
– Body DN 50 with DN 65 connections

Type 2371-11 Pressure Reducing Valve

Type 2371-00 Excess Pressure Valve

Type 2371-01 Excess Pressure Valve with mechanical stem locking

Type 42-10 RS Check Valve (backflow protection)

Application

For safeguarding nitrogen and compressed air networks against backflow from directly connected systems.
The regulator is open, provided the upstream pressure is at least 0.2 bar greater than the downstream pressure. It closes automatically when the downstream pressure rises to or above the value of the upstream pressure.

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Fixed set point, external adjustment not possible
- Regulators delivered ready-to-install without supplementary devices, meaning no additional installations or start-ups are necessary
- Reliable functioning even in the event of a power failure or when other instruments in the control circuit malfunction
- Diaphragm rupture indication, in the event of a diaphragm ruptures, the undamaged operating diaphragm takes over the function of the damaged diaphragm
- Backflow only leads to a minimum amount of leakage due to the soft-seated plug
- An increasing backpressure supports tight shut-off of the valve
- Valve body optionally available in cast steel, cast stainless steel or forged stainless steel
- Wetted parts free of non-ferrous metal

Versions

Check valve in supply pipelines

– **Type 42-10 RS** · Type 2421 RS Valve and Type 2420 RS Actuator with two diaphragms · Fixed set point at 0.2 bar

Technical data

Valve **Type**	**2421 RS**	
Nominal size	DN 15 to 150	
K_{VS} coefficient	4 to 280	
Nominal pressure	PN 25 or PN 40	
Max. constant operating pressure	25 bar	
Max. perm. pressure acting on one side	45 bar	
Actuator **Type**	**2420 RS**	
Diaphragm area	320 cm²	640 cm²
Δp set point, fixed	0.2 bar	
Max. perm. temperature	Air and gases up to 80 °C	
Data sheet	T 3009	

Further versions

– Diaphragm rupture indication with pressure switch (optional)
– Stainless steel version (optional)
– Version for steam (on request)

Type 42-10 RS Check Valve (backflow protection)

Self-operated Flow and Differential Pressure Regulators

Differential pressure regulator with balanced valve · Type 2422

– With closing actuator · Type 42-24 · Type 42-28
– With opening actuator · Type 42-20 · Type 42-25

Application

For district heating networks, large heating systems and industrial plants · For differential pressures from 0.05 to 10 bar (0.75 to 145 psi) · Suitable for liquids and vapors as well as air and other non-flammable gases

Special features

- Proportional regulators for district heating supply networks · Single-seated valve balanced by a stainless steel bellows or a diaphragm · Low-noise and low-maintenance
- Types 42-24 and 42-28 · Valve closes when the differential pressure rises
- Types 42-24 and 42-28 · Valve closes when the differential pressure rises

Versions

– **Type 42-20/Type 42-28 A**
Type 2422 Valve, DN 15 to 100 · NPS ½ to 4
Type 2420/Type 2428 Actuator with fixed set point

– **Type 42-25/Type 42-24 A**
Type 2422 Valve, DN 15 to 250 · NPS ½ to 10
Type 2425/Type 2424 Actuator with adjustable set point

– **Type 42-24 B**
Type 2422 Valve, DN 15 to 250 · NPS ½ to 10
Adjustable set point, sealed off between actuator and valve

– **Type 42-28 B**
Type 2422 Valve, DN 15 to 100 · NPS ½ to 4
Fixed set point, sealed off between actuator and valve

Technical data

Type	42-24	42-25	42-28	42-20
Nominal size	DN 15 to 250 · NPS ½ to 10		DN 15 to 100 · NPS ½ to 4	
Set point range Δp	0.05 to 0.25 bar through to 4.5 to 10 bar		0.2 · 0.3 · 0.4 · 0.5 bar Fixed set point	
	0.75 to 3.5 psi through to 65 to 145 psi		3 · 4 · 6 · 7 psi Fixed set point	
Data sheets	T 3003/3004 · T 3007/3008			

Materials

Valve [1]	Type	2422				
Valve body [2]	DIN	EN-JL1040	EN-JS1049	1.0619	1.4571	1.4408
	ANSI	A 126 B	–	A216 WCC	A351 CF8M	
Nominal pressure	PN	16	25	16/25/40		
	Class	125	–	125/150/300		
Actuator	**Type**	**2420/2424/2425/2428**				
Diaphragm cases		DD11			1.4301	
Diaphragm		EPDM with fabric reinforcement/PTFE				

[1] Balanced by a bellows/diaphragm
[2] Also in forged stainless steel 1.4571 for DN 15, 25, 40 and 50

Type 42-24 A Differential Pressure Regulator

Type 42-25 Differential Pressure Regulator

Type 42-28 A Differential Pressure Regulator

Application

For district heating supply networks and large heating systems. The devices regulate the flow rate of liquids to the adjusted set point.

Special features

- The valve closes when the flow rate rises
- Medium-controlled proportional regulators requiring no auxiliary energy
- Single-seated valve with a plug balanced by a stainless steel bellows or a diaphragm (DN 125 to 250)

Versions

– **Type 42-36** · Flow regulator with Type 2423 Valve and Type 2426 Actuator · Integrated restriction for adjusting the flow rate set point

Technical data

Type	42-36
Nominal size	DN 15 to 250 · NPS ½ to 10
Differential pressure at restriction	Flow rate set points, adjustable
0.2 bar · 3 psi	0.05 to 220 m³/h · 0.2 to 970 US gal/min Balanced by diaphragm: max. 350 m³/h · 1540 US gal/min
0.5 bar · 7 psi	0.15 to 300 m³/h · 0.7 to 1300 US gal/min Balanced by diaphragm: max. 520 m³/h · 2290 US gal/min
Max. permissible temperature	Steam/liquids with condensation chamber: 220 °C (430 °F) Without condensation chamber: 150 °C (300 °F) Special version: air and nitrogen up to 150 °C (300 °F) [1]
Data sheets	T 3015 · T 3016

[1] Valve with FPM (FKM) orifice stem sealing, actuator with FPM (FKM) diaphragm

Materials

Valve [1]	Type	2423			
Valve body [2]	DIN	EN-JL1040	EN-JS1049	1.0619	1.4408
	ANSI	A 126 B	–	A216 WCC	A351 CF8M
Nominal pressure	PN	16	25	16/25/40	
	Class	125	–	125/150/300	
Seat/plug					
Balanced by a bellows		Seat: 1.4104, 1.4006 Plug up to DN 100: 1.4104, 1.4112, 1.4006 Plug from DN 125: 1.4571/1.4301 with PTFE seal			
Balanced by a diaphragm (max. 150 °C)		Seat: red brass · Plug: red brass with EPDM soft seal			
Metal bellows		Stainless steel 1.4571 · DN 125 and larger: 1.4404			
Balancing diaphragm		EPDM or NBR diaphragm			
Actuator	**Type**	**2426**			
Diaphragm cases		DD11			1.4301
Diaphragm		EPDM with fabric reinforcement			

[1] Balanced by a bellows/diaphragm

[2] Also in forged stainless steel 1.4571 for DN 15, 25, 40 and 50 (balanced by a bellows)

Type 42-36 Flow Regulator

Self-operated Flow and Differential Pressure Regulators

Flow and differential pressure regulators

Type 42-37 and Type 42-39

Application

Flow rate and differential pressure regulation or flow rate and pressure regulation in district heating supply networks and extended heating systems

Special features

- The valve closes when the differential pressure or flow rate rises
- Low-noise, medium-controlled proportional regulators requiring little maintenance
- Single-seated valve with a plug balanced by a stainless steel bellows or a diaphragm (DN 125 to 250)

Versions

– **Type 42-37** · Flow and differential pressure regulator consisting of a Type 2423 Valve (DN 15 to 250) with integrated restriction and a Type 2427 Actuator. Flow rate set point adjustable at the restriction; differential pressure set point adjustable at the actuator

– **Type 42-39** · Flow and differential pressure or pressure regulator consisting of a Type 2423 Valve (DN 15 to 250) with integrated restriction and a Type 2429 Actuator. Flow rate set point adjustable at the restriction; differential pressure or pressure set point adjustable at the actuator

Technical data

Type	**42-37 · 42-39**
Nominal size DN	15 to 250
Diff. pressure or pressure set point range bar	0.1 to 0.6 · 0.2 to 1 · 0.5 to 1.5 1.0 to 2.5 · 2 to 5[1] · 4.5 to 10[1]
Max. permissible temperature	Steam/liquids with condensation chamber: 220 °C Without condensation chamber: 150 °C
K_{VS} coefficient	4 to 5
Data sheet	T 3017

[1] On request

Materials

Valve [1] **Type**	**2423**			
Valve body [2]	EN-JL1040	EN-JS1049	1.0619	1.4408
Nominal pressure PN	16	25	40	
Seat/plug				
Balanced by a bellows	Seat: 1.4104, 1.4006, 1.4571, 1.4404 Plug up to DN 100: 1.4104, 1.4112, 1.4006, 1.4571 Plug from DN 125: 1.4301/1.4301 with PTFE seal			
Balanced by a diaphragm (max. 150 °C)	Seat: Red brass Plug: Red brass with EPDM soft seal			
Metal bellows	Stainless steel 1.4571 · DN 125 and larger: 1.4404			
Balancing diaphragm	EPDM with fabric reinforcement			
Actuator Type	**2427 · 2429**			
Diaphragm cases	DD11			1.4301
Diaphragm	EPDM with fabric reinforcement · NBR			

[1] Balanced by a bellows/diaphragm

[2] Also in forged stainless steel 1.4571 for DN 15, 25, 40 and 50

Type 42-37 Flow and Differential Pressure Regulator

Type 42-39 Flow and Differential Pressure or Pressure Regulator

Self-operated Flow and Differential Pressure Regulators

Differential pressure regulators with closing actuator · Types 45-1, 45-2, 45-3, 45-4

Flow regulator · Type 45-9

Application

Differential pressure/flow regulation for district heating supply networks, large pipeline systems and industrial plants for liquids and gases

Special features

- The valve closes when the differential pressure or flow rate rises
- Low-maintenance proportional regulators requiring no auxiliary energy
- Only one control line due to fixed connection to the actuator; Type 45-9 requires no external control line

Versions

The regulators consist of a valve with integrated (closing). actuator Valve (DN 15 to 50) with connection nuts and welding ends. Also available with flanged valve body in DN 32, 40 and 50.

The valve of Type 45-9 is fitted with an adjustable restriction.

– **Type 45-1** · Differential pressure regulator with fixed set point
Installation in the high-pressure pipe
– **Type 45-2** · Differential pressure regulator with adjustable set point
Installation in the high-pressure pipe
– **Type 45-3** · Differential pressure regulator with fixed set point
For installation in the low-pressure line
– **Type 45-4** · Differential pressure regulator with adjustable set point
For installation in the low-pressure line
– **Type 45-9** · Flow regulator with restriction to adjust the flow rate set point for differential pressure at the restriction of either 0.2 or 0.3 bar

Technical data

Nominal size DN	**15**	**20**	**25**	**32**	**40**	**50**
K_{VS} coefficient	2.5	6.3	8	12.5	16	20
Flanged body	–			12.5	20	25
Differential pressure set point range						
Type 45-1/45-3 bar	0.1 · 0.2 · 0.3 · 0.4 · 0.5 fixed					
Type 45-2/45-4 bar	0.1 to 4				0.2 to 1	
Data sheet	T 3124					
Adjustable flow rate set points (for differential pressure at restriction of 0.2 bar)						
Type 45-9	0.01 to 15 m³/h					
Permissible temperature	Liquids: 130 °C · Nitrogen and air: 150 °C [1]					
Data sheet	T 3128					

[1] Diaphragm and seals made of FPM (FKM) · PN 25 version only

Materials

Body		Red brass CC491K/CC499K	EN-JS1049/395 [1]
Seat		Stainless steel 1.4305	
Plug	PN 16	Brass, resistant to dezincification, with EPDM [2] soft seal	
	PN 25	Brass, resistant to dezincification, with EPDM [2] soft seal	
Op. diaphragm		EPDM [2] with fabric reinforcement	

[1] For flanged body in DN 32 to 50
[2] Special version, e.g. for mineral oils: FPM (FKM)

Type 45-3 Differential Pressure Regulator

Type 45-4 Differential Pressure Regulator

Type 45-9 Flow Regulator

Self-operated Flow and Differential Pressure Regulators

For installation in the return flow pipe · Type 46-7 and Type 47-5

For installation in the flow pipe · Type 47-1 and Type 47-4

Application

Flow rate and differential pressure regulation or flow rate and pressure regulation in district heating supply networks and industrial plants

Special features

Regulators to control:

- Flow rate adjustable at the restriction in the valve
- Differential pressure or downstream pressure adjustable at the set point adjuster on the actuator
- Low-maintenance, medium-controlled proportional regulators requiring no auxiliary energy

The largest signal is used to actuate the valve. The valve closes when the differential pressure or flow rate rises.

Versions

Flow and differential pressure regulators with valves (DN 15 to 50) with integrated restriction to adjust the flow rate set point

Flow and differential pressure regulators for installation in the return flow pipe

– **Type 46-7** · Adjustable differential pressure set point
– **Type 47-5** · Fixed differential pressure set point

Flow and differential pressure regulators for installation in the flow pipe

– **Type 47-1** · Adjustable differential pressure or pressure set point
– **Type 47-4** · Fixed differential pressure set point

Technical data

Nominal size DN	**15**	**20**	**25**	**32**	**40**	**50**
K_{VS} coefficient	2.5	6.3	8	12.5	16	20
Flanged body	–			12.5	20	25
Differential pressure set point range						
Type 47-4/47-5 bar	0.1 · 0.2 · 0.3 · 0.4 · 0.5 fixed					
Type 46-7/47-1 bar	0.2 to 0.6 · 0.2 to 1 or 0.5 to 2 Continuously adjustable					
Flow rate set points for diff. press. at restriction 0.2 bar	0.01 to 15 m³/h					
Max. perm. temperature	Liquids: 150 °C · Nitrogen and air: 150 °C [1]					
Data sheet	T 3131					

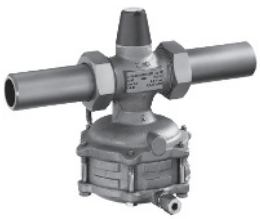
[1] Diaphragm and seals made of FPM (FKM) · PN 25 version only

Materials

Body	Red brass CC491K/CC499K	EN-JS1049/395 [1]
Seat	Stainless steel 1.4305	
Plug PN 16	Brass, resistant to dezincification, with EPDM [2] soft seal	
PN 25	Brass, resistant to dezincification, with EPDM [2] soft seal	
Op. diaphragm	EPDM [2] with fabric reinforcement	

[1] For flanged body in DN 32 to 50
[2] Special version, e.g. for mineral oils: FPM (FKM)

Type 46-7 Flow and Differential Pressure Regulator



Type 47-5 Flow and Differential Pressure Regulator

Type 46-7 Flow and Differential Pressure Regulator with flanged body (DN 32 to 50)

Combined Self-operated Regulators for flow rate with additional electric actuator

Flow regulator · Type 42-36 E

Application

Self-operated regulators for flow rate control in district heating systems or large heating networks. Combined with an electric actuator used to transmit the control signal of an electric controller.

Special features

The valve closes when the flow rate or the output signal of the electric controller increases. The largest signal closes the valve.

Combined regulators consisting of:

- Valve with flanged body
- Diaphragm actuator
- Adapter to adjust the flow rate set point and to attach the electric actuator
- Control equipment tested according to DIN EN 14597 available

Versions

Valves DN 15 to 250 · Nominal pressure PN 16 to 40 · Suitable for liquids from 5 to 150 °C · Electric actuators with or without fail-safe action to change the flow rate set point depending on the control signal issued by an electric controller

– **Type 42-36 E** · Flow regulator with restriction to adjust the flow rate set point · Installation in the flow or return flow pipe

Technical data

Type	42-36 E
Nominal size	DN 15 to 250
Nominal pressure	PN 16, 25, 40
Flow rate set point range	
Differential pressure at restriction: 0.2 bar	2 to 220 m³/h
Differential pressure at restriction: 0.5 bar	3 to 300 m³/h
Max. permissible medium temperature	150 °C
Max. permissible ambient temperature	50 °C
K_{VS} coefficient	4 to 800
Data sheet	T 3018

Type 42-36 E Flow Regulator with Type 5825 Actuator

Combined Self-operated Regulators for flow rate with additional electric actuator

Flow regulators · Type 2488/58... and Type 2489/58...

Application

Flow regulation in district heating supply networks and industrial plants. Combined with an electric actuator. A further operating parameter (e.g. temperature) can be regulated when combined with a district heating controller and electric actuator.

Special features

The valve closes when the flow rate rises. In addition, the control signal of an electric controller can be applied to influence the flow rate over the actuator.

- Low-maintenance, medium-controlled flow regulators requiring no auxiliary energy
- Single-seated valve with balanced plug
- Adapter to attach the electric actuator and to adjust the flow rate
- Control equipment tested according to DIN EN 14597 available

Versions

Combined regulators consisting of a valve, diaphragm actuator and Type 5824 or Type 5825 Electric Actuator with fail-safe action, or optionally Type 5857 or Type 5757 Electric Actuator without fail-safe action for DN 15 to 25.

For indirectly connected systems (with heat transfer medium) for installation in low-pressure pipes

– **Type 2488/58... Flow Regulator**
with Type 5824, Type 5825 or Type 5857 Electric Actuator
– **Type 2489/58... Flow Regulator**
with Type 5824, Type 5825 or Type 5857 Electric Actuator and additional Type 2430 K Control Thermostat for temperature regulation

Technical data

Nom. size DN		15	20	25	32	40	50
K_{VS} coefficient	Body with screwed ends	2.5	6.3	8	12.5	16	20
	Flanged body	–			12.5	20	25
Flow rate set points for differential pressure at restriction of 0.2 bar		0.03 to 15 m³/h					
Max. perm. temperature		150 °C					
Connections		Welding ends · Threaded ends · Flanges					
Data sheet		T 3135					

Materials

Body		Red brass CC491K/CC499K	EN-JS1049 [1]
Seat		Stainless steel 1.4305	
Plug	PN 16	Brass, resistant to dezincification, with EPDM [2] soft seal	
	PN 25	Brass, resistant to dezincification, with EPDM [2] soft seal	
Op. diaphragm		EPDM [2] with fabric reinforcement	

[1] Version in spheroidal graphite iron for flanged bodies (DN 32, 40 and 50)
[2] Special version, e.g. for mineral oils: FPM (FKM)

Type 2488/5824 or 2488/5825 Flow Regulator with Electric Actuator
(also with Type 5857 Electric Actuator for DN 15 to 25)

Pilot-operated Universal Regulators

Pressure, differential pressure, flow rate, temperature or combined regulators, optionally with additional electric actuator

Type 2334

Application

Pilot-operated pressure, differential pressure, flow rate, temperature or combined regulators, optionally with additional electric actuator
For heating and cooling plants · Suitable for liquids from 5 to 150 °C and non-flammable gases up to 80 °C

Special features

- Main valve with flanged end connections in DN 65 to 400
- Low-maintenance proportional regulators requiring no auxiliary energy
- Suitable for district heating plants conforming to DIN 4747-1
- Wide control range and high rangeability at low pressure loss
- Pilot-operated by the medium, with a maximum of three pilot valves
- Excellent stability and control accuracy even when the pressures fluctuate considerably
- Smooth opening and closing of the main valve
- Wide set point range and convenient set point adjustment at the pilot valve
- Numerous control functions and the possibility to combine several functions

Versions

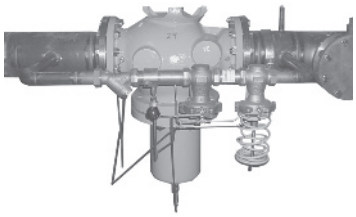
Type 2423 Valve (with integrated restriction) or Type 2422 Valve (without restriction) · Actuator (DN 65 to 100) with balancing bellows and external Type 2420 Actuator (closing) · Balancing diaphragm and internal closing spring (DN 125 to 250)
Pilot valve depending on the application

– **Basic version** · Main valve DN 65 to 250 and bypass line with strainer, Venturi nozzle and pilot valve (ready-to-install assembly)
  Bypass line DN 15 made of stainless steel
  Strainer and pilot valve depending on the application
– **Version with bypass** · Main valve DN 65 to 400
  Bypass line DN 25 or 40 with strainer, Venturi nozzle and pilot valve (assembly on site)

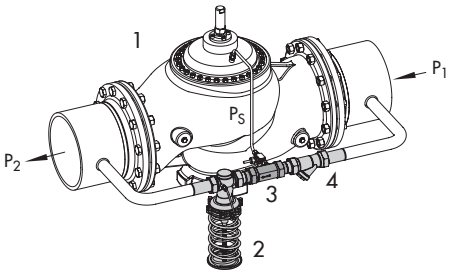
Refer to associated Information Sheet T 3000 and Data Sheet T 3210

Special versions

– Reduced K_{VS} coefficient (DN 65 to 250)
– Version for higher temperatures
– ANSI and JIS versions
– Flow divider for noise reduction (only valves balanced by a bellows)
– Oil-resistant version
– Free of non-ferrous metal
– Pilot valves connected in parallel (instead of in series)
– Balanced by a metal bellows
– Free of graphite for deionized water
– External restriction
– With downstream attenuation plate for noise reduction



Type 2334 Universal Regulator
Version as flow and differential pressure regulator with Type 2422 Valve, DN 200 with positioning bellows



Type 2334 Universal Regulator with bypass

1	Main valve	p_S	Control pressure
2	Pilot valve	p_1	Upstream pressure
3	Venturi nozzle	p_2	Downstream pressure
4	Strainer		

Application

Used to discharge condensate from steam-heated systems

Special features

- The liquid evaporation and temperature changes cause a change in the plug travel. When the valve is open, any air and condensate captured in the valve can escape.
- Operating range 0.01 to 10 bar
- Maximum temperature 200 °C

Versions

– **Type 13 E** · Combination optionally as angle or globe valve with threaded end connections

Technical data

Connection	**G ½ · G ¾ · G 1**
Operating range	0.01 to 10 bar
Max. permissible temperature	200 °C
Data sheet	T 0500

Materials

Body, screw plug	Malleable iron GTW-35-04
Seat	Stainless steel 1.4104
Plug	Stainless steel 1.4301
Operating element	Stainless steel 1.4541

Type 13 E Steam Trap

Application

For protecting downstream plants, aggregates and measuring and control devices against impurities · Straining and collecting dirt particles carried along by the medium

Special features

- Compact design
- Easy removal of the collected dirt particles
- Easy replacement of the strainer insert

Versions

Y-shaped body with flanges or threaded end connections and wide-meshed strainer insert with an additional fine-meshed internal strainer

Types 1 N · 1 NI · 1 FN		**Types 2 N · 2 NI**	
Threaded connections		Flanges	
Type 1 N	Standard strainer insert	Type 2 N	Standard strainer insert
Type 1 N	Dual strainer insert	Type 2 NI	Dual strainer insert
Type 1 FN	Standard strainer insert District heating version		

Technical data

Type	**1 N**	**1 FN**	**1 NI**	**2 N · 2 NI**			
Nominal pressure	PN 25			PN 6, 10, 16, 25, 40			
Connection	Thread			Flange			
	G ⅜ to 1	G 1¼ to 2	G ⅜ to 2	15 to 25	32 to 65	80 to 150	200 to 250
Mesh size	0.5	0.75	0.5/0.75	0.5	0.8	1.25	2
Data sheets	T 1010			T 1015			

Materials

Body	Red brass · Brass	EN-JL1040 · EN-JS1049 · 1.0619 Cast stainless steel 1.4408
Filter element	Stainless steel 1.4401	

Additional accessories for self-operated regulators (see Data Sheets T 3095 and T 2595)

– Compression-type fittings
– Needle valve
– Condensation chamber
– Orifice plate
– Welding neck flange
– Control lines etc.

Type 1 N/1 NI Strainer

Type 2 N/2 NI Strainer

Appendix

SAMSON Product Range

Control valves for industrial processes	Control valves Butterfly control valves Steam-converting valves Actuators Positioners Limit switches, solenoid valves, converters, etc.
Self-operated regulators and accessories for piping systems	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 Control valves Control valves with jet pumps Combined self-operated regulators with additional electric actuators
Controllers and sensors for heating, ventilation and air-conditioning systems	Electronic controllers Sensors, converters and controllers
Automation systems	TROVIS · Process control systems on Windows TROVIS MODULON · Distributed automation system with communication via Ethernet and LON 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 · Liquid level, differential pressure and flow meters Sensors Converters TROVIS 6400 · Automation system
SAMSOMATIC product range	Logic elements and accessories for pneumatic controls Design and supply of turnkey automation solutions

Valve sizing

Calculation of the K_V coefficient

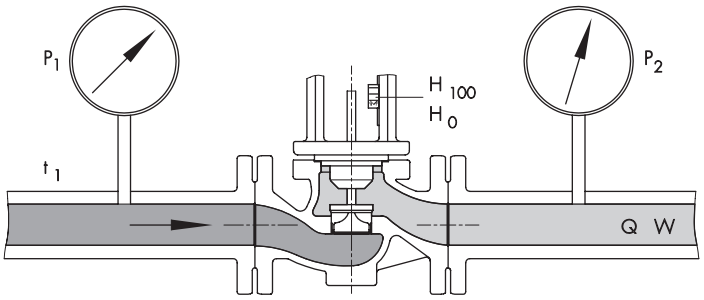
The K_V coefficient is calculated according to IEC 60534. The data sheets contain the required valve-specific data.

A preliminary simplified calculation may be made with the help of the working equations listed below. They do not take into account the influences of the attached fittings and turbulent choked flow.

Valve selection

After calculating the K_V coefficient, the K_{VS} coefficient of the valve type concerned needs to be selected from the data sheet.

If real operating data have been used for calculation, the following applies: $K_{Vmax} \approx 0.7$ to $0.8 \times K_{VS}$.



p_1	Upstream pressure
p_2	Downstream pressure
H	Travel
Q	Volumetric flow rate in m³/h
W	Mass flow rate in kg/h
ρ	Density in kg/m³ (generally also for liquids)
ρ_1	Upstream density in kg/m³ (for gases and vapors)
t_1	Temperature in °C upstream of the valve

Medium	Liquids		Gases		Steam
Pressure drop	m³/h	kg/h	m³/h	kg/h	kg/h
$p_2 > \frac{p_1}{2}$	$K_V = Q\sqrt{\frac{\rho}{1000\ \Delta p}}$	$K_V = \frac{W}{\sqrt{1000\ \rho\ \Delta p}}$	$K_V = \frac{Q_G}{519}\sqrt{\frac{\rho_G T_1}{\Delta p\ p_2}}$	$K_V = \frac{W}{519}\sqrt{\frac{T_1}{\rho_G\ \Delta p\ p_2}}$	$K_V = \frac{W}{31{,}62}\sqrt{\frac{v_2}{\Delta p}}$
$\Delta p < \frac{p_1}{2}$					
$p_2 < \frac{p_1}{2}$			$K_V = \frac{Q_G}{259{,}5\ p_1}\sqrt{\rho_G T_1}$	$K_V = \frac{W}{259{,}5 p_1}\sqrt{\frac{T_1}{\rho_G}}$	$K_V = \frac{W}{31{,}62}\sqrt{\frac{2v^*}{p_1}}$
$\Delta p > \frac{p_1}{2}$					

Symbols used:

p_1	[bar]	Absolute pressure p_{abs}
p_2	[bar]	Absolute pressure p_{abs}
Δp	[bar]	Differential pressure
T_1	[K]	273 + t_1
Q_G	[m³/h]	Flow rate of gases, at 0 °C and 1013 mbar
ρ	[kg/m³]	Density of liquids
ρ_G	[kg/m³]	Density of gases at 0 °C and 1013 mbar
v_1	[m³/kg]	Specific volume (v´ from steam table) for p_1 and t_1
v_2	[m³/kg]	Specific volume (v´ from steam table) for p_2 and t_1
v^*	[m³/kg]	Specific volume (v´ from steam table) for $\frac{p_1}{2}$ and t_1

SAMSON				**Data Sheet for Control Valves according to IEC 60534-7** · (* - Minimum details for the selection and the sizing of one valve)				
	1		Operating data	Location of valve				
	2			Service/application				
	7	*		Pipeline	DN …	PN …	Class …	
	8			Pipe material				
	12	*		Process medium				
	13	*		Physical state at inlet	☐ Liquid	☐ Vapor	☐ Gas	
	15				Min.	Normal	Max.	Unit
	16	*		Flow rate				
	17	*		Inlet pressure p_1				
	18	*		Outlet pressure p_2				
	19	*		Temperature T_1				
	20	*		Inlet density ρ_1 or M				
	21	*		Vapor pressure Pv				
	22	*		Critical pressure Pc				
	23	*		Kinematic viscosity v				
	31			Calculated max. flow coefficient K_V				
	32			Calculated min. flow coefficient K_V				
	33			Selected flow coefficient K_{VS}				
	34			Predicted sound pressure level	… dB(A)			
	35		Valve body	Type … Valve				
	36			Body type				
	38			Nominal pressure	PN …			
	39			Nominal size	DN …			
	40			Type of end connections	☐ Flanges	☐ Welding ends	☐ Weld-neck ends	☐ DIN / ☐ ANSI
	43			Type of valve bonnet	☐ Normal	☐ Insulating section	☐ Bellows seal	☐ Heating jacket
	45			Body/bonnet material				
	47			Flow characteristic	☐ Linear	☐ Equal percentage		
	48			Plug/stem material				
	49			Bushing/seat material				
	52			Hard facing	☐ None	☐ Partly stellited	☐ Fully stellited	☐ Hardened
	54			Leakage class	☐ % K_{VS}	☐ Class …		
	55			Stem packing material	☐ Standard	☐ Form …		
	57		Actuator	Actuator type	☐ Pneumatic			
	60			Effective area	… cm^2			
	62			Supply air pressure	Min. …	Max. …		
	63			Bench range				
	64			Fail-safe action	☐ Fail-close	☐ Fail-open	☐ Hold	
	66			Other actuator type	☐ Electric	☐ Electrohydraulic	☐ Manual	
	67			Fail-safe action for three-way valves				
	68			Additional manual override	☐ No	☐ Yes		
	70		Positioner	Type … Positioner				
	71			Input signal	☐ Pneumatic	☐ Electric		
	72			Valve opened at	… bar	… mA		
	73			Valve closed at	… bar	… mA		
	76			Max. air supply	… bar			
	78			Explosion protection	☐ Ex i	☐ Ex d		
	80		Limit switch	Type … Limit Switch				
	81			Limit switch	☐ Electric	☐ Inductive	☐ Pneumatic	
	82			Switching position	☐ Closed	☐ … % travel	☐ Open	
	83			Switching function	☐ Closing	☐ Opening		
	84			Explosion protection	☐ Ex i	☐ Ex d		
	86		Solenoid valve	Type … Solenoid Valve				
	87			Style	☐ 2-way	☐ 3-way		
	88			Upon power failure, the valve is to	☐ Open	☐ Close	☐ Hold	
	91			Electric data	… V	… Hz	… W	

Valve sizing

Calculation of the C_V coefficient

The C_V coefficient is calculated according to ISA-S75.01 and IEC 60534. The data sheets contain the required data. A preliminary simplified calculation may be made with the help of the working equations listed below. They do not take into account the influences of the attached fittings or the effects under non-turbulent (laminar or transitional) flow conditions.

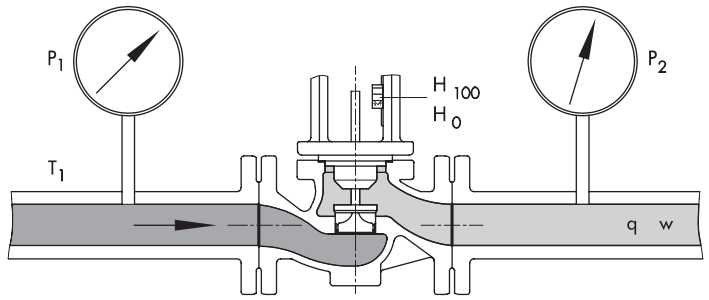
Valve selection

After calculating the C_V coefficient, the C_V coefficient of the valve type concerned needs to be selected from the data sheet.

If real operating data have been used for calculation, the following applies:

$C_{Vmax} \approx 0.7$ to $0.8 \times C_{V\ rated}$

$K_{Vmax} \approx 0.7$ to $0.8 \times K_{VS}$



p_1	Upstream pressure in psi(a), bar(a)
p_2	Downstream pressure in psi(a), bar(a)
H	Travel in inches, mm
q	Volumetric flow rate in gpm or m³/h
w	Mass flow rate in lb/h or kg/h
Gf	Specific gravity (liquid)
Gg	Specific gravity (gas or vapor)
ρ_1	Upstream density in lb_m/ft^3 or kg/m^3
T_1	Temperature upstream of the valve in °R or K

Incompressible fluids (liquids)

Pressure drop	Equations for p_{vc} determination	Flow coefficient equation, with given units…			
		gpm, psi(a)	lb/h, psi(a), lb_m/ft^3	m³/h, bar(a), κ	kg/h, bar(a), kg/m³
Subcritical $\Delta p < F_L^2(p_1 - p_{vc})$	$p_{vc} = F_F p_v$ $F_F = 0.96 - 0.28$	$C_V = q\sqrt{\frac{G_f}{p_1 - p_2}}$	$C_V = \frac{w}{63.3\sqrt{(p_1 - p_2)\rho_1}}$	$C_V = \frac{q}{0.865}\sqrt{\frac{G_f}{p_1 - p_2}}$	$C_V = \frac{w}{27.3\sqrt{(p_1 - p_2)\rho_1}}$
Critical (choked) $\Delta p \geq F_L^2(p_1 - p_{vc})$	$F_F = 0.96 - 0.28\sqrt{\frac{p_v}{p_c}}$	$C_V = \frac{q_{max}}{F_L}\sqrt{\frac{G_f}{p_1 - p_{vc}}}$	$C_V = \frac{w_{max}}{63.3F_L\sqrt{(p_1 - p_{vc})\rho_1}}$	$C_V = \frac{q_{max}}{0.865F_L}\sqrt{\frac{G_f}{p_1 - p_{vc}}}$	$C_V = \frac{w_{max}}{27.3F_L\sqrt{(p_1 - p_{vc})\rho_1}}$

Compressible fluids (gases, vapors)

Pressure drop	Equations for x, Fκ, Y determination	Flow coefficient equation, with given units…			
		Std ft³/h (scfh), psi(a), °R	lb/h, psi(a), lb_m/ft^3	m³/h, bar(a), κ	kg/h, bar(a), kg/m³
Subcritical $x < F_\kappa \times x_T$	$x = \frac{\Delta p}{p_1}$ $F_\kappa = \frac{\kappa}{1.4}$ $Y = 1 - \frac{x}{3F_\kappa x_T}$	$C_V = \frac{q}{1360 p_1 Y}\sqrt{\frac{G_g T_1 Z}{x}}$	$C_V = \frac{w}{63.3Y\sqrt{x p_1 \rho_1}}$	$C_V = \frac{q}{417 p_1 Y}\sqrt{\frac{G_g T_1 Z}{x}}$	$C_V = \frac{w}{27.3Y\sqrt{x p_1 \rho_1}}$
Critical (choked) $x \geq F_\kappa \times x_T$		$C_V = \frac{q_{max}}{907 p_1}\sqrt{\frac{G_g T_1 Z}{F_\kappa x_T}}$	$C_V = \frac{w_{max}}{42.2\sqrt{F_\kappa x_T p_1 \rho_1}}$	$C_V = \frac{q_{max}}{278 p_1}\sqrt{\frac{G_g T_1 Z}{F_\kappa x_T}}$	$C_V = \frac{w_{max}}{18.2\sqrt{F_\kappa x_T p_1 \rho_1}}$

Notes regarding the above equations:
For exact results with valves with attached fittings (pipe reductions, elbows, etc.), the piping geometry factor (FP) may be applied (Cv = Cv/FP).
For non-turbulent flow (laminar and transitional), the Reynolds number factor (FR) may be applied (Cv = Cv/FR).
Refer to the ISA standard for determination and application of these two factors.

Symbols used:

p_1	[psi, bar]	Absolute pressure p_{abs} (inlet)
p_2	[psi, bar]	Absolute pressure p_{abs} (outlet)
Δp	[psi, bar]	Differential pressure
T_1	[°R, K]	Absolute temperature (inlet) °R=°F+459.69, K=°C+273.16
q	[gpm, m³/h]	Volumetric flow rate (liquids)
q	[scfh, nm³/h]	Volumetric flow rate (gases) at 14.73 psi(a) and 60 °F or 1.013 bar(a) and 15 °C
w	[lbm/h, kg/h]	Mass flow rate
G_f		Specific gravity (liquids) (ρ/ρ_{H_2O}) at 60 °F (15.6 °C)
G_g		Specific gravity (gases) (ρ/ρ_{air}) at 60 °F (15.6 °C)
$\rho_1 1$	[lb_m/ft^3, kg/m^3]	Density of liquids
$\rho_1 1$	[lb_m/ft^3, kg/m^3]	Density of gases, 14.73 psi(a), 60 °F, 15 °C, 1.013 bar(a)
p_v	[psia, bara]	Absolute vapor pressure of liquid (inlet temperature)
p_c	[psia, bara]	Absolute critical pressure
p_{vc}	[psia, bara]	Absolute pressure at the vena contracta
κ		Ratio of specific heat, dimensionless
Y		Expansion factor, dimensionless
Z		Compressibility factor, dimensionless

Data Sheet for Control Valves according to ISA Form S20.50, Rev. 1

SAMSON	Project		Data Sheet	of	
	Unit		Date		
	P.O.		Spec		
	Item		Tag		
	Contract		Dwg		
	Mfr Serial*		Service		

1	Fluid				Crit Press Pc			
	SERVICE CONDITIONS		Units	Max Flow	Norm Flow	Min Flow	Shut-Off	
2		Flow Rate					–	
3		Inlet Pressure						
4		Outlet Pressure						
5		Inlet Temperature						
6		Density/Spec Grav/Mol Wt					–	
7		Viscosity/Spec Heat Ratio					–	
8		Vapor Pressure Pv					–	
9		* Required Cv					–	
10		* Travel	%				0	
11		Allowable/*Predicted SPL	dB(A)				–	
12								

13	LINE	Pipe Line Size	In		53	ACTUATOR	* Type	
14		& Schedule	Out		54		* Mfr & Model	
15		Pipeline Insulation			55		* Size	Eff Area
					56		On/Off	Modulating
16	VALVE BODY/BONNET	* Type			57		Spring Action Open/Close	
17		* Size	ANSI Class		58		* Max Allowable Pressure	
18		Max Press/Temp			59		* Min Required Pressure	
19		* Mfr & Model			60		Available Instr. Air	Max
20		* Body/Bonnet Matl			61		Supply Pressure	Min
21		* Liner Matl/ID			62		* Bench Range	
22		End	In		63		Actuator Orientation	
23		Connection	Out		64		Handwheel Type	
24		Flg Face Finish			65		Air Failure Valve	Set at
25		End Ext/Matl			66			
26		* Flow Direction			67		Input signal	
27		* Type of Bonnet						
28		Lub & Iso Valve	Lube		68	POSITIONER	* Type	
29		* Packing Material			69		* Mfr & Model	
30		* Packing Type			70		* On Increasing Signal Output Incr/Decr	
31					71		Gauges	Bypass
					72		* Cam Characteristic	
32	TRIM	* Type			73			
33		* Size	Rated Travel					
34		* Characteristic			74	SWITCHES	Type	Quantity
35		* Balanced/Unbalanced			75		* Mfr & Model	
36		* Rated Cv	FL	XT	76		Contacts/Rating	
37		* Plug/Ball/Disk Material			77		Actuation Points	
38		* Seat Material			78			
39		* Cage/Guide Material						
40		* Stem Material			79	AIRSET	* Mfr & Model	
41					80		* Set Pressure	
42					81		Filter	Gauges
					82			
43	SPECIALS/ACCESSORIES	NEC Class	Group	Div.				
44					83	TESTS	* Hydrostatic Pressure	
45					84		ANSI/FCI Leakage Class	
46					85			
47					86			
48								
49								
50								
51								
52								

Rev	Date	Revision	Orig	App

* Information supplied by manufacturer unless already specified.

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