

Control Valves

Single-seated Globe Valve Type 3222



Type 3222/2780-1 and Type 3222/2780-2 · with pneumatic actuators
Type 3222/5821 and Type 3222/5822 · with electric actuators

Application

Control valves for light industrial and HVAC requirements.
Sizes $\frac{1}{2}$ " to 2" · Nominal pressure **ANSI Class 250**
Temperatures **up to 390 °F (200 °C)** for water and steam
or **up to 300 °F (150 °C)** for water, oil and other liquids

The control valves consist of a globe valve and either a pneumatic actuator or electric actuator, and optional positioner

Features

- Single-seated globe valves
- Pressure-balanced valve plugs
- Low height and weight
- Available with female/male threaded ends, welding ends, or flanges
- Quick-exchange actuator connection

Versions

Type 3222 · Globe Valve

Type 3222/2780-1 · Pneumatic Control Valve with Type 2780-1 Pneumatic Actuator.

Type 3222/2780-2 · Pneumatic Control Valve (Fig. 1) with Type 2780-2 Pneumatic Actuator for integral positioner attachment.

Type 3222/5821 · Electric Control Valve (Fig. 2) with Type 5821 Electric Actuator.

Type 3222/5822 · Electric Control Valve with Type 5822 Electric Actuator valve closed in fail-safe position.

Special Versions

- Reduced C_{vs} (K_{vs}) values
- Oil-resistant stuffing box

Accessories and combinations

- **Type 2780-1 or Type 2780-2 Pneumatic Actuators;** for details see Technical Data Sheet T 5840 E
- **Type 3760 Pneumatic or Electropneumatic Positioners;** for details see Technical Data Sheet T 8385 E
- **Type 5821 or Type 5822 Electric Actuators;** for details see Technical Data Sheet T 5822 E

For DIN versions see Technical Data Sheet T 5866 E.



Fig. 1 · Type 3222/2780-2 Pneumatic Control Valve with Type 3222 Globe Valve, Type 2780-2 Pneumatic Actuator and Type 3760 Positioner

Fig. 2 · Type 3222/5821 Electric Control Valve with Type 3222 Globe Valve and Type 5821 Electric Actuator

Principle of operation (Figs. 3 and 4)

The process medium flows through the single-seated globe valve in the direction indicated by the arrow. The valve plug position determines the cross-sectional area of flow between the plug (3) and the valve seat (2). The plug stem (4) with the attached plug is positively pressed to the connecting rod of the actuator (10) (force-locking connection). The valve is opened by the valve spring (5) when the actuator stem is retracted.

For **water with temperatures above 300 °F (150 °C)** and **steam**, a version with extension piece is required (Fig. 4).

Pneumatic actuators

Pneumatic actuators are available with two fail-safe actions, "spring force extends actuator stem" and "spring force retracts actuator stem". In the version "spring force **extends** actuator stem", the actuator springs **close** the valve on loss of air supply, whereas in the version "spring force **retracts** actuator stem" they **open** the valve.

Accessories for pneumatic actuators

- Positioners are used generally when a pneumatic controller or i/p transducer output alone is not sufficient for satisfactory valve operation. They provide the advantages of ability to adjust the valve stroking speed, the sensitivity of response (gain), the valve travel range, and boost the signal to the actuator as required for higher actuator spring ranges, counteraction of increasing valve friction or providing tight shutoff with fail open actuators. Positioners are also used to reverse the valve action without changing the failure action, or for split range operation (e.g. two valves operating in tandem with a common input signal).

Electric actuators

Type 5821 and Type 5822 Electric Actuators can be equipped with the additional optional electrical equipment listed in the section "Technical data", Table 3.

Electric actuators with fail-safe action

Type 5822 are fitted with an electromagnet and spring assembly which can be connected in a safety interlock circuit. Whenever the control circuit is interrupted or failure of supply power occurs, the electromagnet disengages the gear reduction from the self-locking motor and the spring assembly forces the valve to the fail position.

Accessories for electric actuators:

- Limit switches can be used to indicate whenever a set limit value is exceeded in either direction.
- A potentiometer serves for the remote indication of the valve stem position.
- The electric positioner is designed for standardized input control signals from 4 to 20 mA, 0 to 20 mA, 0 to 10 V dc and associated split-range operation.

Legend to Figs. 3 and 4

- | | |
|----------------|---------------------|
| 1 Valve body | 6 Guide nipple |
| 2 Seat | 7 Balancing bellows |
| 3 Plug | 8 Balancing piston |
| 4 Plug stem | 10 Actuator |
| 5 Valve spring | |

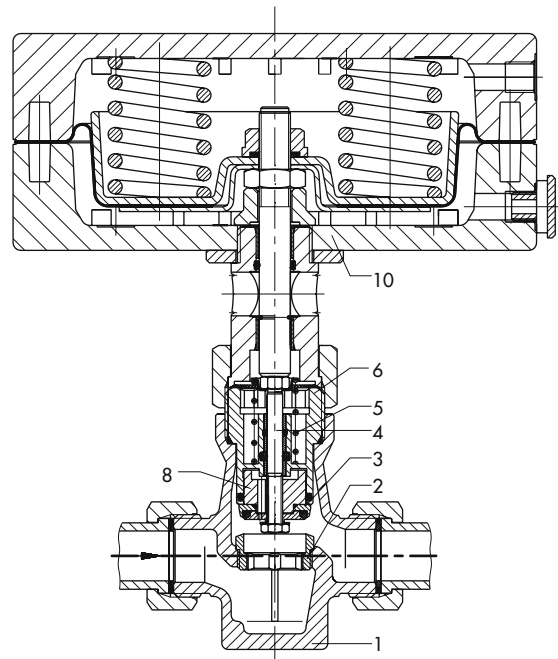


Fig. 3 · Type 3222/2780-1 Pneumatic Control Valve, version for temperatures up to 300 °F (150 °C) with balancing piston

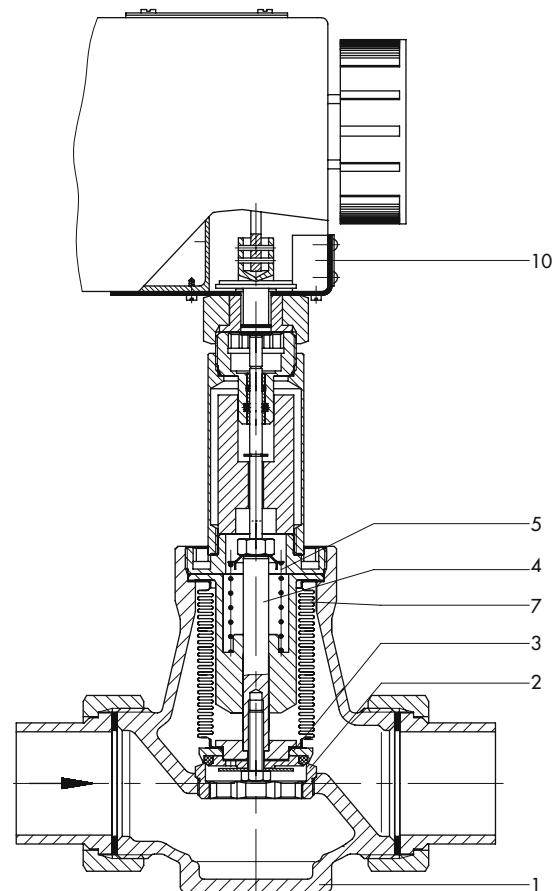


Fig. 4 · Type 3222/5821 Electric Control Valve, version with extension piece for temperatures up to 390 °F (200 °C), with balancing bellows

Table 1a · Technical data · All pressures in psi (gauge)

Nominal size	in	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Nom.pressure	ANSI Class 250						
End connections ¹⁾	male/female NPT, welding ends, flanges						
C _v values	4.2	6.7	8.4	20	23	30	
Reduced C _v values	0.12; 0.2; 0.3; 0.5; 0.75; 1.2; 2.0; 3.0	1.2; 2.0; 3.0; 4.2	1.2; 2.0; 3.0; 4.2; 6.7				
Plug sealing	Metal sealing for C _v 3.0; Soft sealing for C _v 4.0						
Leakage rate	< Class III acc. to ANSI/FCI F70-2 (< 0.05 % of C _v value)						
Characteristic	Equal percentage						
Rangeability	25 : 1						
Version for water, oil and other liquids							
Max. perm. temp.	300 °F						
Max. perm. diff. pressure Δp	290 psi 175 psi for C _v 3.0			175 psi			
Version for water and steam							
Max. perm. temp.	390 °F ²⁾						
Max. permissible diff. pressure Δp	290 psi 175 psi for C _v 2.5 90 psi for C _v 4.2; 6.7; and 8.4			115 psi			

¹⁾ End connections female NPT for sizes 1 1/4" to 2" or flanges according to ANSI, information available on request

²⁾ Provide an intermediate insulating piece for protection of the actuator at temperatures > 230 °F if necessary

Table 1b · Technical data · All pressures in bar (gauge)

Nominal size	mm	15	20	25	32	40	50
Nom.pressure	ANSI Class 250						
End connections ¹⁾	male/female NPT, welding ends, flanges						
K _{vs} values	3.6	5.7	7.2	16	20	25	
Reduced K _{vs} values	0.1; 0.16; 0.25; 0.4; 0.63; 1.0; 1.6; 2.5	1.0; 1.6; 2.5; 3.6	1.0; 1.6; 2.5; 3.6; 5.7				
Plug sealing	Metal sealing for K _{vs} 2.5; Soft sealing for K _{vs} 3.6						
Leakage rate	< Class III acc. to DIN IEC 534 (< 0.05 % of K _{vs} value)						
Characteristic	Equal percentage						
Rangeability	25 : 1						
Version for water, oil and other liquids							
Max. perm. temp.	150 °C						
Max. perm. diff. pressure Δp	20 bar 12 bar for K _{vs} 2.5			12 bar			
Version for water and steam							
Max. perm. temp.	200 °C ²⁾						
Max. permissible diff. pressure Δp	20 bar 12 bar for K _{vs} 2.5 6 bar for K _{vs} 3.6; 5.7; and 7.2			8 bar			

¹⁾ End connections female NPT for sizes 1 1/4" to 2" or flanges according to ANSI, information available on request

²⁾ Provide an intermediate insulating piece for protection of the actuator at temperatures > 110 °C if necessary

Table 1c · Technical data · Materials

Body	Red brass	ASTM B62	G – CuSn 5 Zn Pb (WN 2.1096)
Seat	Stainless steel	AISI 430F	WN 1.4104
Plug	Stainless steel/brass with soft sealing; for C _v values 0.12 to 3.0: Stainl. steel	AISI 430F/brass with soft sealing; for C _v values 0.12 to 3.0: AISI 430F	WN 1.4104/Cu Zn 40with soft sealing; for K _{vs} values 0.1 to 2.5: WN 1.4104
Valve spring	Stainless steel	AISI 301	WN 1.4310 K
Stuffing box	EPDM/FKM; oil-resistant version FKM		

Pressure-Temperature Ratings

According to ANSI/ASME B16.15-1994, ANSI Class 250

Temperature, °F	Maximum Pressure, psi (gauge)
-20 to 150	400
200	385
250	365
300	335
350	300
400	250

Maximum operating pressure

Maximum operating pressures must be within the limits stated in the applicable ANSI standard but Δp must not exceed the maximum permissible differential pressure specified in Table 1 "Technical data".

Installation

For liquids up to 300 °F (150 °C), the actuator may be installed at any position. However, make sure that the electric actuator is not suspended vertically downwards. The motor must be upright when steam is used.

If the control valve is to be insulated, the actuator and union nut of the coupling must not also be insulated. Moreover, ensure that the permissible ambient temperature is not exceeded. If necessary, an intermediate insulating piece must be used. The insulating limit is then extended 1" (25 mm) above the top edge of the valve body.

Table 2a · Technical data relating to pneumatic actuators

Nominal valve size	½" to 2"		
Effective diaphragm area	in ²	18.6	
Maximum air supply	psi	60	
Fail-safe action (open/closed)	Reversible		
Rated valve travel	½" to 1"	in	0.25
	1½" to 2"	in	0.5
Bench range	Type 2780-1	psi	6 to 15
	Type 2780-2	psi	6 to 30
Required supply air pressure	psi	36	
Number of installed springs	3 ¹⁾		
Leakage rate	Scfm	< 21	
Signal pressure connection Type 2780-1	ISO 288/1, G½; NPT½		
Ambient temperature	°F	15 to 175	

Table 2b · Technical data relating to pneumatic actuators

Nominal valve size	15 to 50 mm		
Effective diaphragm area	cm ²	120	
Maximum air supply	bar	4	
Fail-safe action (open/closed)	Reversible		
Rated valve travel	15 to 25 mm	mm	6
	32 to 50 mm	mm	12
Bench range	Type 2780-1	bar	0.4 to 1
	Type 2780-2	bar	0.4 to 2
Required supply air pressure	bar	2.4	
Number of installed springs	3 ¹⁾		
Leakage rate	l _n /h	< 10	
Signal pressure connection Type 2780-1	ISO 288/1, G½; NPT½		
Ambient temperature	°C	-10 to 80	

Table 2c · Technical data relating to pneumatic actuators - Materials

Body ²⁾	Aluminium GD-ALSi12		
Diaphragm	NBR		
Springs ²⁾	Spring wire C		
External bolts	Chromized steel		
Bushing	Brass CuZn40Pb		
Weight	Type 2780-1	lb/kg	4.4 lb / 2.0 kg
	Type 2780-2	lb/kg	7.0 lb / 3.2 kg

¹⁾ 6 springs for a bench range from 6 to 30 psi (0.4 to 2 bar) and 0.5" (12 mm) travel

²⁾ Not painted and surface-treated

Table 3 · Technical data relating to the electric actuators

Actuator	Without fail-safe action		With fail-safe action	
	5821-5	5821-6 ²⁾	5822-60	5822-70 ²⁾
Type			¹⁾	¹⁾
Nominal thrust	135 (0.6)	67 (0.3)		
Closing force of the safety spring	-		94 (0.42)	63 (0.28)
Valve travel	½" to 1" (15 to 25 mm) : 0.2" (5.0 mm); 1¼" to 2" (32 to 50 mm): 0.3" (7.5 mm)			
Transit time for rated travel	90 (60)	40 (30)	90 (60)	40 (30)
Transit time in case of failure	-		8	5
Handwheel	With		Without	
Power supply	24, 110 or 230		24, 110 or 230	
Frequency	50 to 60		50 or 60	
Power consumption	Motor	4 VA		4 VA
	Electromagnet	-		5 VA
Permissible ambient temperature	30 to 120 °F (0 to 50 °C); at point of connection between motor and valve max. 230 °F (110 °C)			
Enclosure protection rating	IP 44			
Additional electric equipment				
Limit switches	2			
Potentiometer	1			
Electric positioner ³⁾	1			
For further details, see Technical Data Sheet	T 5822 E			

¹⁾ Depending on the spring in the globe valve used

²⁾ Only up to nominal sizes 1" (25 mm)

³⁾ Only for power supply 24 V ac and version with potentiometer

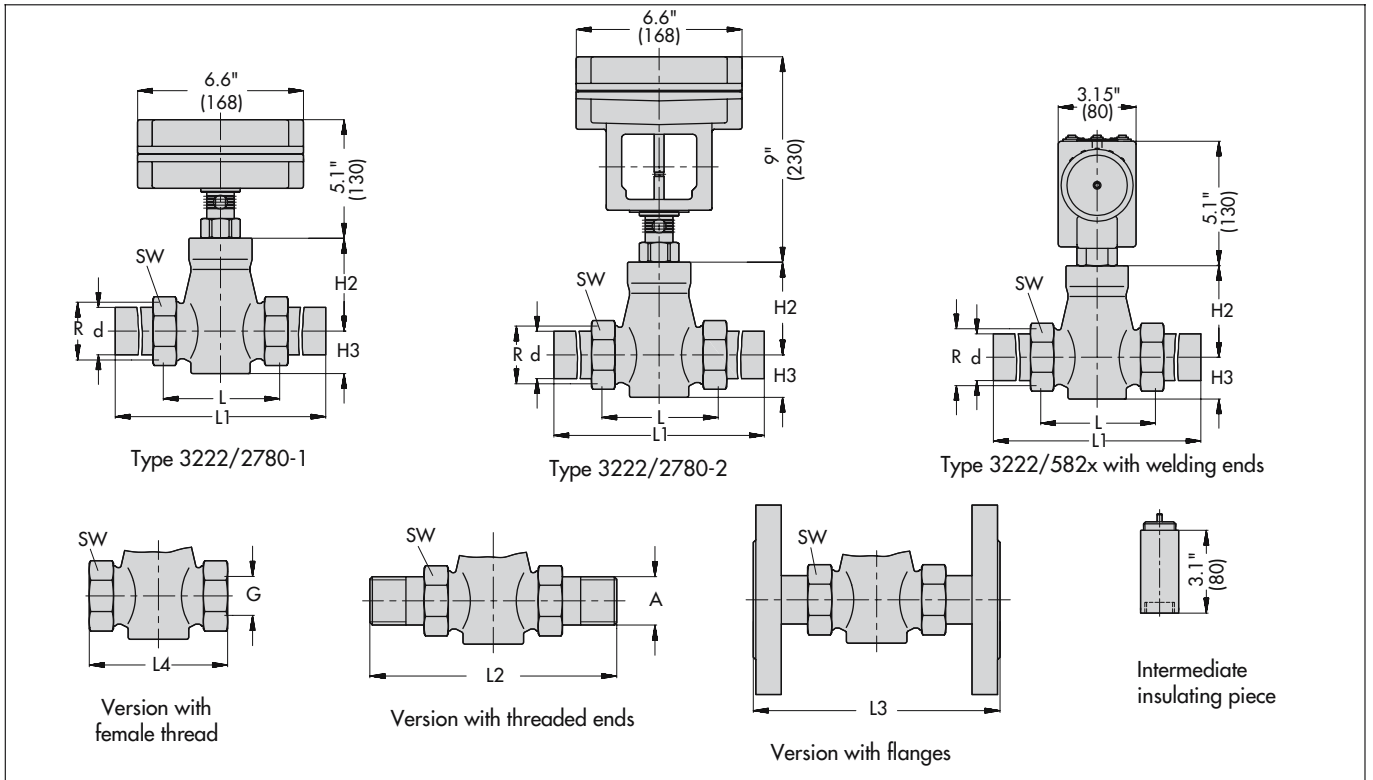


Table 4a · Dimensions in inches and weights in lb

Nominal size	in	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Female thread	NPT	1/2"	3/4"	1"	-	-	-
Pipe Ø d		0.84	1.1	1.3	1.6	1.9	2.4
Connection	R	3/4"	1"	1 1/4"	1 3/4"	2"	2 1/2"
Wrench width	SW	1.2	1.4	1.8	2.3	2.6	3.2
Length L		2.6	2.8	2.9	4	4.3	5.1
Length L1 with welding ends		8.3	9.2	9.6	10.6	11.6	13.0
Height H2 ¹⁾			7.5			9.2	
Height H3			1.2			2.2	
Weight ^{2), 3)}	lb	4.8	5.7	6.8	10.6	11.4	16.7
Version with threaded ends (male thread)							
L2		5.1	5.7	6.2	7.1	7.7	9.0
Male thread	A	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Weight ^{2), 3)}	lb	4.8	5.7	6.8	10.6	11.4	16.7
Version with flanges (acc. to DIN)⁴⁾							
L3		5.1	6.0	6.3	7.1	8.0	9.1
Weight ^{2), 3)}	lb	7.3	9.2	10.8	16.9	18.7	25.3
Version with female thread⁴⁾							
L4		2.6	3.0	3.5		-	
Female thread	NPT	1/2"	3/4"	1"		-	
Weight ^{2), 3)}	lb	4.4	4.8	5.1		-	

- 1) For versions with intermediate insulating piece, add 3.1"
- 2) For versions with intermediate insulating piece, add 1 lb
- 3) For versions with pneumatic actuators, add 1 lb for Type 2780-1 and 3.7 lb for Type 2780-2
- 4) For versions with female NPT ends 1 1/4" and larger, and flange dimensions according to ANSI, information available on request

Table 4b · Dimensions in mm and weights in kg

Nominal size	mm	15	20	25	32	40	50
Female thread	NPT	1/2"	3/4"	1"	-	-	-
Pipe Ø d		21.3	26.8	33.7	42	48	60
Connection	R	3/4"	1"	1 1/4"	1 3/4"	2"	2 1/2"
Wrench width	SW	30	36	46	59	65	82
Length L		65	70	75	100	110	130
Length L1 with welding ends		210	234	244	268	294	330
Height H2 ¹⁾			190			235	
Height H3			30			55	
Weight ^{2), 3)}	kg	2.2	2.6	3.1	4.8	5.2	7.6
Version with threaded ends (male thread)							
L2		129	144	159	180	196	228
Male thread	A	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Weight ^{2), 3)}	kg	2.2	2.6	3.1	4.8	5.2	7.6
Version with flanges (acc. to DIN)⁴⁾							
L3		130	150	160	180	200	230
Weight ^{2), 3)}	kg	3.3	4.2	4.9	7.7	8.5	11.5
Version with female thread⁴⁾							
L4		65	75	90		-	
Female thread	NPT	1/2"	3/4"	1"		-	
Weight ^{2), 3)}	kg	2	2.2	2.3		-	

- 1) For versions with intermediate insulating piece, add 80 mm
- 2) For versions with intermediate insulating piece, add 0.5
- 3) For versions with pneumatic actuators, add 0.5 kg for Type 2780-1 and 1.7 kg for Type 2780-2
- 4) For versions with female NPT ends 1 1/4" and larger, and flange dimensions according to ANSI, information available on request

Ordering text - Valves with Pneumatic actuators

Pneumatic Control Valve **Type 3222/2780-1** or **3222/2780-2**

Size ... /NPT ..., ANSI 250,

Max. 300 °F (150 °C), version for water, oil and other liquids/

Max. 390 °F (200 °C), version for water and steam

NPT male/NPT female threaded ends/welding ends/flanges

C_v (K_{vs}) ..., with/without intermediate insulating extension

Pneumatic Actuator **Type 2780-1** or **2780-2**

Operating direction: Actuator stem "extends"/"retracts"

Rated travel 0.25/0.5" (6/12 mm), bench range ... psi (bar),

Signal pressure connection NPT 1/8", Positioner Type ...

Ordering text - Valves with Electric actuators

Electric Control Valve **Type 3222/5821** or **3222/5822**

Size .../ NPT ..., ANSI 250,

Max. 300 °F (150 °C), version for water, oil and other liquids/

Max. 390 °F (200 °C), version for water and steam

NPT male/NPT female threaded ends/welding ends/flanges

C_v (K_{vs}) ..., with/without intermediate insulating extension

Electric Actuators **Type 5821-.../Type 5822-...**

for 230/110/24 V ac, 50 or 60 Hz

Additional electric equipment ..., optional special version

Specifications subject to change without notice.



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