

## Electric Control Valves

Types 3222/5857, 3222/5824, 3222/5825, 3222/5757,  
3222/5757-7, 3222/5724, 3222/5725, 3222/5725-7

**SAMSON**

## Pneumatic Control Valves

Type 3222/2780



Type 3222/5857  
Type 3222/5757 · Type 3222/5757-7



Type 3222/5825 · Type 3222/5725-7



Type 3222/2780-1



Type 3222/2780-2 · Version with  
Type 3760 Positioner

Fig. 1 · Control valves

## Mounting and Operating Instructions

**EB 5866 EN**

Edition April 2011



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Definitions of the signal words used in these instructions

**WARNING!**

*indicates a hazardous situation which, if not avoided, could result in death or serious injury.*

**NOTICE**

*indicates a property damage message.*

**Note:** *Supplementary explanations, information and tips*

## 1 General safety instructions

For your own safety, follow these instructions concerning the mounting, start up and operation of the control valve:

- ▶ The control valves must be installed, started up and serviced by fully trained and qualified personnel only, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger. All safety instructions and warnings in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be observed.
- ▶ For appropriate operation, make sure that the control valve is only used in applications where the operating pressure and temperatures do not exceed the operating values based on the sizing data submitted in the order.  
Note that the manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.  
Any hazards which could be caused in the control valve by the process medium or operating pressure are to be prevented by means of appropriate measures.
- ▶ For installation and maintenance, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. If necessary, allow the control valve to cool down or warm up to reach ambient temperature prior to starting any work on the valve.
- ▶ The actuators are designed for use in low voltage installations.  
For wiring and maintenance, you are required to observe the relevant safety regulations.
- ▶ Take necessary measures to ensure that the power supply cannot be reconnected inadvertently.
- ▶ Take care while performing adjustment work on live parts. Never remove any covers!

To avoid damage to any equipment, the following also applies:

- ▶ Proper shipping and appropriate storage are assumed.

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**Note:** The control valves fulfill the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity which includes information about the applied conformity assessment procedure.  
The declaration of conformity is available on request.

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## 2 Design and principle of operation

The medium flows through the single-seated globe valve in the direction indicated by the arrow. The position of the plug determines the flow rate across the area released between plug (3) and valve seat (2). The valve is opened by the valve spring (5) when the actuator stem retracts. A special version is required for water with temperatures above 150 °C and for steam. The plug is positioned by control signal changes which act on the actuator.

The valve (1) and actuator (10) have a force-locking connection.

### Fail-safe position

For globe valves mounted to an actuator with fail-safe action, the control valve has two different positions which become effective upon power supply failure:

Actuator stem extends

- ▶ The globe valve closes upon power supply failure

Actuator stem retracts

- ▶ The globe valve opens upon power supply failure

### Electric actuators

The electric actuators can be controlled either using a three-stepping point signal or, in the version with positioner, with continuous signals adjustable in the range from 0 to 20 mA or from 0 to 10 V. Various optional electric accessories can be mounted onto the control valve.

Type 5825 Electric Actuator is able to perform a fail-safe action. Refer to Table 4.

### Controllers with electric actuators

The actuator consists of a digital controller which is integrated into the electric actuator housing. The Types 5757, 5724 and 5725 Controller with Electric Actuator are suited for domestic hot water heating, whereas Types 5757-7 and 5725-7 are suited for heating and cooling applications. They are controlled by continuous signals which can be adjusted in ranges from 0 to 20 mA or 0 to 10 V.

Types 5725 and 5725-7 are able to perform a fail-safe action. Refer to Table 4.

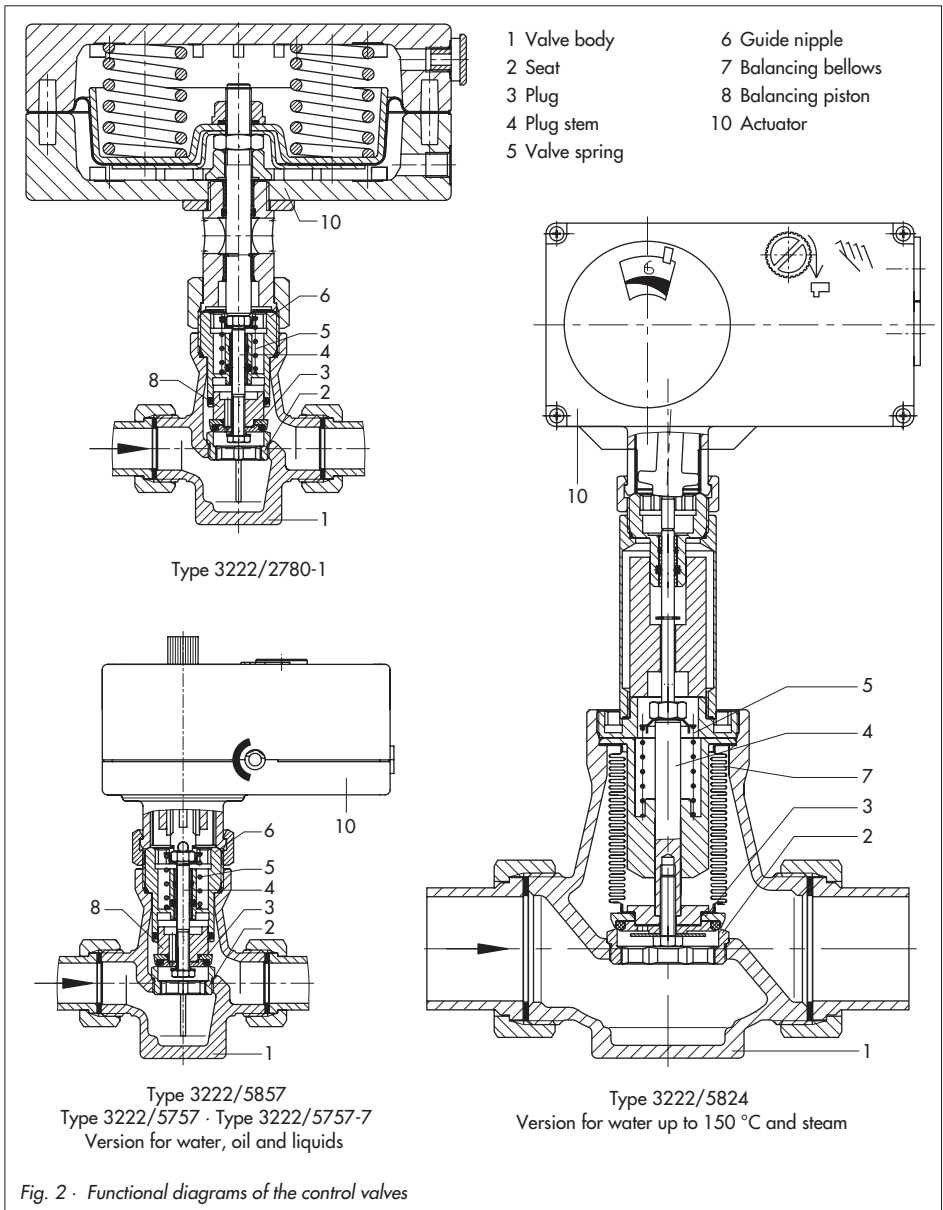
### Pneumatic actuators

The Type 2780-1 Pneumatic Actuator uses a control signal from 0.4 to 1 bar and Type 2780-2 uses a control signal from 0.4 to 2 bar which is applied to the loading pressure connection. The pneumatic actuators require a supply pressure of at least 0.2 bar above the maximum bench range. They are available for fail-safe action "Actuator stem extends (FA)" or "Actuator stem retracts (FE)".

### Typetesting



The Type 5825 Electric Actuators with fail-safe action and Types 5725 and 5725-7 Controllers with Electric Actuator used in conjunction with Type 3222 Valves are typetested according to DIN EN 14597 by the German technical inspectorate TÜV. The register number is available on request.



## 2.1 Technical data

<b>Table 1 · Technical data:</b> Type 3222 Globe Valve								
Nominal size	Globe valve with male thread connection or with flanged body	DN	15	20	25	32	40	50
Connection	Globe valve with female thread connection	G	½	¾	1	–	–	–
Nominal pressure		PN	25					
Seat/plug sealing	Metal sealing for $K_{VS} \leq 2.5$ · Soft sealing for $K_{VS} \geq 3.6$							
Rated travel		mm	6			12		
Rangeability	50:1							
Leakage rate acc. to DIN EN 60534-4	Class I (< 0.05 % of the $K_{VS}$ coefficient)							
<b>Version for water, oil and other liquids</b>								
Max. permissible temperature	150 °C <sup>1, 2)</sup>							
Max. perm. differential pressure $\Delta p$								
	Types 5824, 5825, 5724, 5725, 5725-7, 2780	bar	20	20	20	12/16 <sup>5)</sup>	12	12
	Types 5857, 5757, 5757-7	bar	20	20	20	–	–	–
<b>Versions for water above 150 °C and steam</b>								
Max. permissible temperature	200 °C							
Max. perm. differential pressure $\Delta p$								
	Types 5824, 5825, 5724, 5725, 5725-7, 2780	bar	20 · 10 for $3.6 \leq K_{VS} \leq 8$			8	8	8
	Types 5857, 5757, 5757-7	bar	20 <sup>3)</sup> · 5 <sup>4)</sup>	5	5	–	–	–

1) Use an intermediate insulating piece (1990-1712) or temperatures > 130 °C to protect the actuator

2) DN 15 to 25 with Type 5857 Actuator for liquids up to 120 °C

3) Differential pressure for  $K_{VS} = 1$  and 1.6

4) Differential pressure for  $K_{VS} = 2.5$  and 4

5) Applies to  $K_{VS} = 10$

**Table 2 · Materials:** Type 3222 Globe Valve

Valve body	Red brass CC491K (G-CuSn5ZnPb)
Version with flanged body	EN-JS1049 (GGG-40.3)
Seat	Stainless steel 1.4104
Plug	1.4104/CW509L (CuZn40) with soft sealing 1.4104 with $0.1 \leq K_{VS} \leq 2.5$
Valve spring	Stainless steel 1.4310 K
Packing	EPDM/FPM (FKM) · Oil-resistant version: FPM
Welding ends	St 37
Threaded ends	CC491K (red brass)
Screwed-on flanges	St 37.2

**Table 3 · Nominal sizes and  $K_{VS}$  coefficients:** Type 3222 Globe Valve

Nominal size	Globe valve with male thread connection or flanged body	DN	15	20	25	32	40	50
Connection size	Globe valve with female thread	G	1/2	3/4	1	–	–	–
$K_{VS}$ coefficient			4 <sup>1)</sup> · 3.6 <sup>2)</sup>	6.3 <sup>1)</sup> · 5.7 <sup>2)</sup>	8 <sup>1)</sup> · 7.2 <sup>2)</sup>	16 <sup>1)</sup>	20 <sup>1)</sup>	25 <sup>1)</sup>
Reduced $K_{VS}$ coefficients			0.1 · 0.16 · 0.25 · 0.4 0.63 · 1.0 · 1.6 · 2.5	1.0 · 1.6 · 2.5 · 4 <sup>1)</sup> · 3.6 <sup>2)</sup>	10 <sup>3)</sup>	–	–	–
Rated travel		mm	6	6	6	12	12	12

1) Version with male thread connection or flanged valve body version

2) Version with female thread

3) 6 mm rated travel

## 2.2 Possible combinations

Table 4 · Possible combinations: Type 3222 Globe Valve/actuator											
Type	Fail-safe action: Actuator stem		Nominal size DN						Connection G		
	extends	retracts	15	20	25	32	40	50	½	¾	1
<b>Electric actuators</b>											
5857	–	–	•	•	•	–	–	–	•	•	•
5824-10	–	–	•	•	•	–	–	–	•	•	•
5824-13 <sup>1)</sup>	–	–	•	•	•	–	–	–	•	•	•
5825-10	•	–	•	•	•	–	–	–	•	•	•
5825-13 <sup>1)</sup>	•	–	•	•	•	–	–	–	•	•	•
5825-15	–	•	•	•	•	–	–	–	•	•	•
5824-20	–	–	–	–	–	•	•	•	–	–	–
5824-23	–	–	–	–	–	•	•	•	–	–	–
5825-20	•	–	–	–	–	•	•	•	–	–	–
5825-23	•	–	–	–	–	•	•	•	–	–	–
5825-25	–	•	–	–	–	•	•	•	–	–	–
<b>Controller with electric actuator for domestic hot water heating</b>											
5757	–	–	•	•	•	–	–	–	•	•	•
5724-10	–	–	•	•	•	–	–	–	•	•	•
5725-10	•	–	•	•	•	–	–	–	•	•	•
5724-20	–	–	–	–	–	•	•	•	–	–	–
5725-20	•	–	–	–	–	•	•	•	–	–	–
<b>Controller with electric actuator for heating and cooling applications</b>											
5757-7	–	–	•	•	•	–	–	–	•	•	•
5725-710	•	–	•	•	•	–	–	–	•	•	•
5725-715	–	•	•	•	•	–	–	–	•	•	•
5725-720	•	–	–	–	–	•	•	•	–	–	–
5725-725	–	•	–	–	–	•	•	•	–	–	–
<b>Pneumatic actuators</b>											
2780-1	•	•	•	•	•	•	•	•	•	•	•
2780-2	•	•	•	•	•	•	•	•	•	•	•

<sup>1)</sup> Version with half transit time

## 2.3 Nameplate

<b>SAMSON</b>	1
2	3
4	5
K <sub>vs</sub> 6	$\Delta p$ 7

- 1 Type designation
- 2 Configuration ID (Var.-ID)
- 3 Date of manufacture
- 4 Model number
- 5 Max. permissible temperature
- 6 K<sub>vs</sub> coefficient
- 7 Max. permissible differential pressure

## 2.4 Customer inquiries

Please submit the following details:

- ▶ Type designation
- ▶ Configuration ID (Var.-ID)
- ▶ Date of manufacture

## 3 Installation

If the valve and actuator are delivered separately, first install the valve into the pipeline before mounting the actuator.

### NOTICE

*For medium temperatures above 150 °C only the dark gray graphite seals supplied with the valve are to be used. Do not use the UDP seals available as accessories as they are only suitable for temperatures up to 150 °C.*

### 3.1 Mounting position

- ▶ Choose the place of installation where the ambient temperature does not exceed or fall below the permissible limits specified for the actuator and that allows you to freely access the control valve even after the entire plant has been completed.
- ▶ Flush the pipeline thoroughly before installation.
- ▶ Do not install the valve with the actuator suspended downwards.  
Install versions for water above 150 °C and for steam with the actuator installed upright in a horizontal pipeline.
- ▶ If you wish to insulate the control valve, install an intermediate insulating piece between valve and actuator. Make sure the insulation ends 25 mm above the valve body. Do not insulate the actuator and coupling nut as well.
- ▶ Install a strainer (SAMSON Type 2 NI) upstream of the control valve to prevent any sealing parts, weld spatter or other foreign matter carried along by the process medium from impairing the proper

functioning of the valve, in particular, the tight shut-off.

- ▶ The valve must be installed free of stress. If necessary, support the piping near the connections.

### 3.2 Strainer

- ▶ Install the strainer with the filter element facing downwards upstream of the valve inlet.
- ▶ Choose the place of installation to allow enough space to remove the filter.
- ▶ Install the strainer with the flow direction as indicated by the arrow on the body.

### 3.3 Additional installation instructions

We recommend to install a hand-operated shut-off valve both upstream of the strainer and downstream of the control valve to be able to shut down the plant for cleaning and maintenance, and when the plant is not used for longer periods of time.

## 4 Mounting, connecting and configuring the actuator

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### NOTICE

*The instructions to mount the valve onto the actuator, to perform electrical or pneumatic connections as well as to configure the actuator are described in detail in the Mounting and Operating Instructions (EB) of the actuator:*

- Refer to EB 5857 EN for Type 5857 Electric Actuator
- Refer to EB 5824-1 EN for Type 5824 Electric Actuator (three-stepping point signal) or EB 5824-2 EN for Type 5824 Electric Actuator (version with positioner)
- Refer to EB 5824-1 EN for Type 5825 Electric Actuator (three-stepping point signal) or EB 5824-2 EN for Type 5825 Electric Actuator (version with positioner)
- Refer to EB 5757 EN for Type 5757 Controller with Electric Actuator
- Refer to EB 5724 EN for Type 5724 Controller with Electric Actuator
- Refer to EB 5725 EN for Type 5725 Controller with Electric Actuator
- Refer to EB 5757-7 EN for Type 5757-7 Controller with Electric Actuator
- Refer to EB 5725-7 EN for Type 5725-7 Controller with Electric Actuator
- Refer to EB 5840 EN for Type 2780 Pneumatic Actuator

***It is essential to read the Mounting and Operating Instructions of the corresponding actuator.***

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## 4.1 Mounting

Mount the actuator on the valve connection/intermediate insulating piece as described in the corresponding Mounting and Operating Instructions.

## 4.2 Connection

Perform the electrical or pneumatic connections of the actuator as described in the corresponding Mounting and Operating Instructions.

## 4.3 Configuration

The electric actuator versions with positioner and the controllers with electric actuator can be adapted to the control task.

Configure the actuator as described in the corresponding Mounting and Operating Instructions.

## 5 Maintenance

The control valve is subject to natural wear. Depending on the conditions the valve is operated in, it needs to be checked at regular intervals. If leakage to the atmosphere occurs, disassemble the valve and replace damaged parts.

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### **NOTICE**

*When working on the control valve, make sure the relevant section of the plant has been depressurized and, depending on the process medium, drained as well.*

*For high medium temperatures, allow the section of the plant to cool down to ambient before starting any work.*

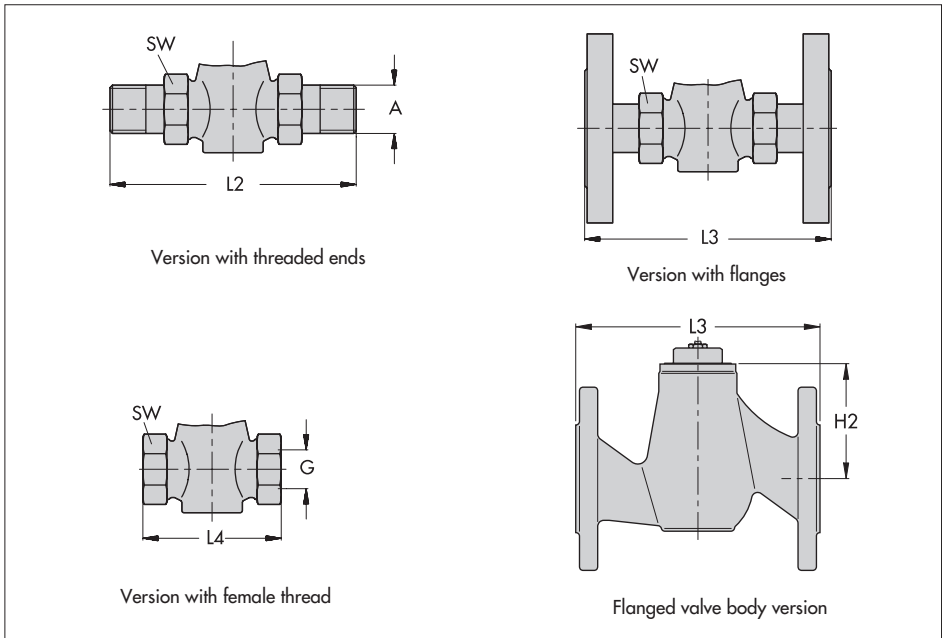
*Make sure the control signal for the actuator is switched off and the signal pressure line of a pneumatic actuator is removed.*

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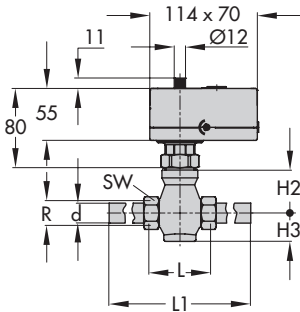
## 6 Dimensions and weights

Table 5.1 · Type 3222 Globe Valve							
<b>Valves with male thread connection</b>							
Nominal size	DN	15	20	25	32	40	50
Length L	mm	65	70	75	100	110	130
Height H2	mm	45.5	45.5	45.5	94	94	94
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		140	140	140	185	185	185
Height H3	mm	30	30	30	55	55	55
<b>... with welding ends</b>							
Connection size R	G	¾	1	1¼	1¾	2	2½
Pipe Ød	mm	21.3	26.8	33.7	42	48	60
Width across flats SW		30	36	46	59	65	82
Length L1	mm	210	234	244	268	294	330
Weight without actuator	kg	1.4	1.8	2.3	4.0	4.4	6.8
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		1.9	2.3	2.8	4.5	4.9	7.3
<b>... with threaded ends</b>							
Length L2	mm	129	144	159	180	196	228
Male thread A	G	½	¾	1	1¼	1½	2
Width across flats SW		30	36	46	59	65	82
Weight without actuator	kg	1.4	1.8	2.3	4.0	4.4	6.8
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		1.9	2.3	2.8	4.5	4.9	7.3
<b>... with flanges</b>							
Width across flats SW		30	36	46	59	65	82
Length L3	mm	130	150	160	180	200	230
Weight without actuator	kg	2.5	3.4	4.1	6.9	7.7	10.7
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		3.0	3.9	4.6	7.4	8.2	11.2

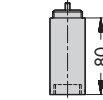
Valves with female thread							
Connection size	G	½	¾	1	-		
Width across flats SW		30	36	46	-		
Length L4	mm	65	75	90	-		
Female thread	G	½	¾	1	-		
Weight without actuator	kg	1.2	1.4	1.5	-		
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		1.7	1.9	2.0	-		
Flanged body version							
Nominal size	DN	15	20	25	32	40	50
Height H2	mm	45.5	45.5	45.5	94	94	92
Length L3	mm	130	150	160	180	200	230
Weight without actuator	kg	2.5	3.4	4.1	6.9	8.4	11.6
Version for water above 150 °C and steam or version with intermediate insulating piece (1990-1712)		3.0	3.9	4.6	7.4	8.9	12.1



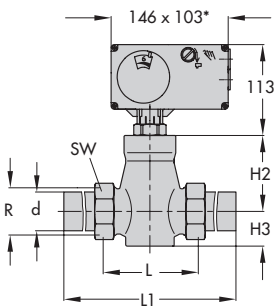
Electric control valves



Type 3222/5857: DN 15 to 25  
 Type 3222/5757: DN 15 to 25  
 Type 3222/5757-7: DN 15 to 25

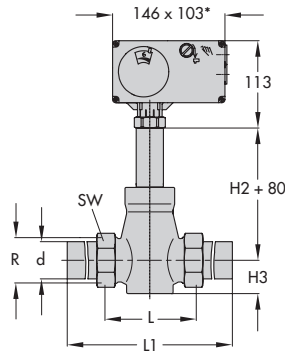


Intermediate  
 insulating piece  
 (1990-1712)



Type 3222/5824: DN 15 to 50  
 Type 3222/5825: DN 15 to 50  
 Type 3222/5724: DN 15 to 50  
 Type 3222/5725: DN 15 to 50  
 Type 3222/5725-7: DN 15 to 50

\* Dimensions for Types 5824-x3, 5825-x3,  
 5724-x3, 5725-x3 Actuators: 146 x 136



Version for water above 150 °C and steam

Type 3222/5824: DN 15 to 50  
 Type 3222/5825: DN 15 to 50  
 Type 3222/5724: DN 15 to 50  
 Type 3222/5725: DN 15 to 50  
 Type 3222/5725-7: DN 15 to 50

\* Dimensions for Types 5824-x3, 5825-x3,  
 5724-x3, 5725-x3 Actuators: 146 x 136

Fig. 3 · Electric control valves (versions with welding ends)

Pneumatic control valves

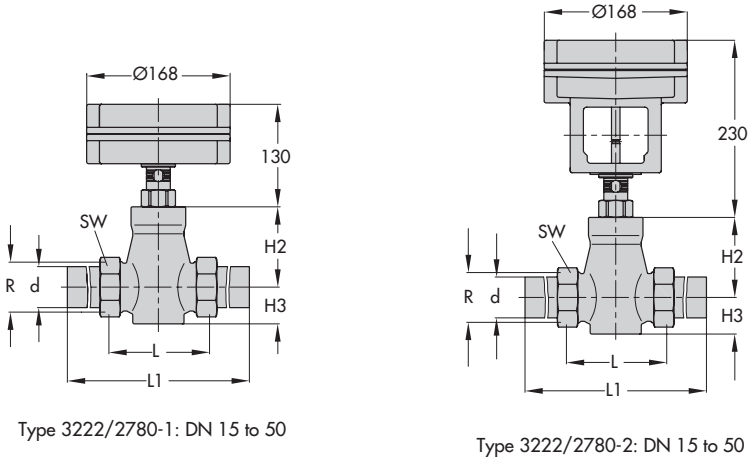


Fig. 4 - Pneumatic control valves (versions with welding ends)

Table 5.2 - Electric actuators

	Type	5857	5824	5825
Weight	approx. kg	0.7	1.0	1.25

Table 5.3 - Controllers with electric actuators

	Type	5757/-7	5724	5725/-7
Weight	approx. kg	0.7	1.1	1.3

Table 5.4 - Pneumatic actuators

	Type	2780-1	2780-2
Effective area	cm <sup>2</sup>		120
Diaphragm ØD	mm		170
Loading pressure connection a			G 1/8
Weight	approx. kg	2	3.2



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