Electric Control Valves

Types 3226/5857, 3226/5824, 3226/5825, 3226/5757-7, 3226/5724-8, 3226/5725-7, 3226/5725-8

Pneumatic Control Valve

Type 3226/2780

Type 3226/5857
Type 3226/5757-7

Type 3226/5824

Type 3226/2780-2,
version with Type 3760
Positioner

Mounting and Operating Instructions

EB 5863 EN

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Definition of signal words

DANGER!
Hazardous situations which, if not avoided, will result in death or serious injury

WARNING!
Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE
Property damage message or malfunction

Note:
Additional information

Tip:
Recommended action

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1 General safety instructions

Follow these instructions concerning the mounting, start up and operation of the control valve:

- The control valves must be mounted, started up or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third persons are not exposed to any danger. All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly observed.
- To ensure appropriate use, only use the control valve in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the valve at the ordering stage. The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors. Any hazards that could be caused in the valve by the process medium, the operating pressure, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.
- For installation and maintenance, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. Depending on the field of application, allow the valve to cool down or heat up to reach ambient temperature before starting any work on it.
- The electric 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.
- Be careful while performing adjustment work on live parts. Never remove any covers!

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

- Proper shipping and storage are assumed.

2 Design and principle of operation

The three-way valve in the version with male thread connection and welding ends or threaded ends can be used for both mixing or diverting valves. The valves vary in the plug arrangement and must be installed accordingly. The version with female thread connection can only be used for mixing valves.
The process medium flows through the three-way valve in the direction indicated by the arrow. The position of the plug (3) determines the cross-sectional area of flow between the plug and the seat (2). The plug follows the actuator stem, which is changed by the control signal acting on the actuator (8), owing to the force of the valve spring (5). The valve (1) and actuator (8) have a force-locking connection.

An intermediate insulating piece is available for insulated pipes.

Fail-safe action

For three-way 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
– Port B of the mixing valve closes upon power supply failure.
– Port A of the diverting valve closes upon power supply failure.

Actuator stem retracts
– Port A of the mixing valve closes upon power supply failure.
– Port B of the diverting valve closes upon power supply failure.

Electric actuators

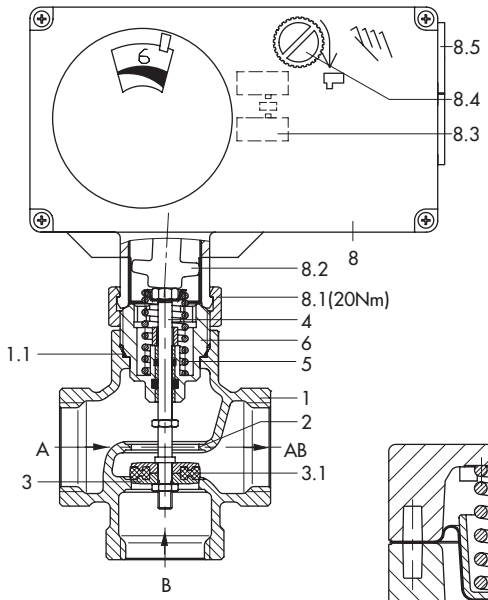
The Types 5857, 5824 and 5825 Electric Actuators can either be controlled using a three-step signal or, in the version with positioner, with continuous signals which can be adjusted in ranges from 0 to 20 mA or 0 to 10 V. Various electrical accessories can be optionally installed. Type 5825 Actuator is able to perform a fail-safe action. Refer to Table 4.

Electric actuators with process controllers

The electric actuator with process controller consists of a **linear actuator with an integrated digital controller**. The TROVIS 5757-7, TROVIS 5724-8, TROVIS 5725-7, and TROVIS 5725-8 Electric Actuators with Process Controller are suitable for heating and cooling applications. TROVIS 5724-8 and TROVIS 5725-8 have two PID control modules and are ready-wired.
TROVIS 5725-7 and TROVIS 5725-8 Actuators are able to perform a fail-safe action. Refer to section Table 4.

Pneumatic actuators

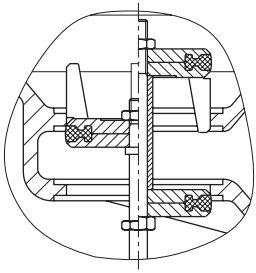
The Type 2780-1 Pneumatic Actuator uses a control signal from 0.4 to 1 bar and Type 2780-2 uses a control signal from 0.4 to 2 bar which is applied to the signal pressure connection. The pneumatic actuators require a supply pressure of at least 0.2 bar above the maximum bench range. All actuators are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

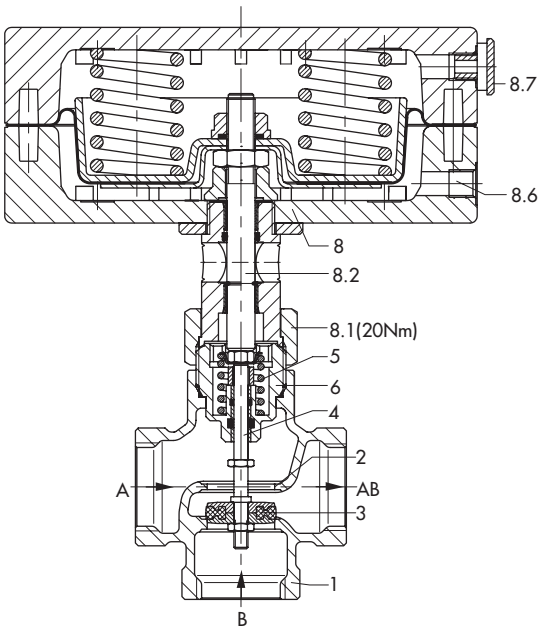


Type 3226/5824

Plug arrangement of version with male thread, DN 15 to 50

Mixing valve · Diverting valve





Type 3226/2780-1

1	Valve body
1.1	Body gasket
2	Seat
3	Plug
3.1	Plug with soft seal
4	Plug stem
5	Valve spring
6	Adapter
8	Actuator
8.1	Coupling nut
8.2	Actuator stem
8.3	Torque switch
8.4	Handwheel (Type 5824, TROVIS 5724-8)
8.5	Cable entry
8.6	Signal pressure connection
8.7	Vent plug

Fig. 1: *Functional diagrams of the control valves*

Special versions

– Tested by DVGW as mixing or diverting valve

2.1 Technical data

Table 1: *Type 3226 Three-way Valve · All pressures in bar (gauge)*

Nominal size	Mixing or diverting valve with male thread connection	DN	15	20	25	32	40	50
Thread size	Mixing valve with female thread	G	½	¾	1	–	–	–
Nominal pressure		PN	25					
DVGW version		PN	10					
Permissible temperature range		°C	+5 (–15) to 150 [1]					
DVGW version		°C	+5 to 90					
Permissible differential pressure for actuators								
Type 5857, TROVIS 5757-7		bar	4	2.6	1.8	–	–	–
Type 5824, Type 5825, TROVIS 5724-8, TROVIS 5725-7, TROVIS 5725-8, Type 2780		bar	4	4	4	1.7	1.1	1.1
Rated travel		mm	6	6	6	12	12	12
Seat-plug seal			Soft seal					
Leakage class according to IEC 60534-4			Class IV (≤0.01 % of K_{VS} coefficient)					
Compliance			EAC					

[1] Use an intermediate insulating piece (1990-1712).
– for medium temperatures between –15 to +5 °C (actuators according to Table 4)
– in networks with constant medium temperatures >135 °C (TROVIS 5724-8, TROVIS 5725-7, TROVIS 5725-8 or Types 5824 and 5825 Actuators)
– for liquids up to 120 °C (TROVIS 5757-7 and Type 5857 Actuators)

Table 2: *Materials: Type 3226 Three-way Valve*

Valve body	CC499K (CuSn5Zn5Pb2-C)
Plug	CW617N (CuZn40Pb2zh) with EPDM
Packing	O-rings made of EPDM
Welding ends	St 37
Threaded ends	Red brass

Table 3: *Nominal sizes and K_{VS} coefficients: Type 3226 Three-way Valve*

Nominal size	Mixing or diverting valve with male thread connection	DN	15				20	25	32	40	50
Thread size	Mixing valve with female thread	G	½				¾	1	–	–	–
K_{VS} coefficient			1.0	1.6	2.5	4	6.3	10	16	25	40
Rated travel		mm	6	6	6	6	6	6	12	12	12

2.2 Possible combinations (valve/actuator)

Table 4: *Possible combinations: Type 3226 Three-way Valve/actuator*

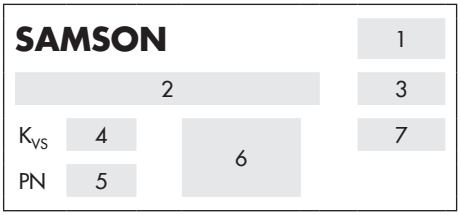
Type/ TROVIS	Fail-safe action: actuator stem		Nominal size DN						Thread size G		
	extends	retracts	15	20	25	32	40	50	½	¾	1
Electric actuators											
5857 [1]	–	–	•	•	•	–			•	•	•
5824-10	–	–	•	•	•	–			•	•	•
5824-13 [2]	–	–	•	•	•	–			•	•	•
5825-10	•	–	•	•	•	–			•	•	•
5825-13 [2]	•	–	•	•	•	–			•	•	•
5825-15	–	•	•	•	•	–			•	•	•
5824-20	–	–	–			•	•	•	–		
5824-23 [2]	–	–	–			•	•	•	–		
5825-20	•	–	–			•	•	•	–		
5825-23 [2]	•	–	–			•	•	•	–		
5825-25	–	•	–			•	•	•	–		
Electric actuators with process controller for heating and cooling applications											
5757-7 [1]	–	–	•	•	•	–			•	•	•
5724-810	–	–	•	•	•	–			•	•	•
5724-820	–	–	–			•	•	•	–		
5725-710	•	–	•	•	•	–			•	•	•
5725-715	–	•	•	•	•	–			•	•	•
5725-720	•	–	–			•	•	•	–		
5725-725	–	•	–			•	•	•	–		
5725-810	•	–	•	•	•	–			•	•	•

Type/ TROVIS	Fail-safe action: actuator stem		Nominal size DN						Thread size G		
	extends	retracts	15	20	25	32	40	50	½	¾	1
5725-820	•	–	–			•	•	•	–		
Pneumatic actuators											
2780-1	•	•	•	•	•	•	•	•	•	•	•
2780-2	•	•	•	•	•	•	•	•	•	•	•

1) The valve spring in the Type 3226 Valve intended for mounting on the Types 5857 and TROVIS 5757-7 Actuators is different from that of the Type 3226 intended for mounting on other actuators. Basically, actuators with a larger nominal thrust (e.g. Type 5824) may also be combined with valves for Types 5857 and TROVIS 5757-7 Actuators, however, not vice versa.

2) Version with half the transit time

2.3 Nameplate



1 Type designation
2 Configuration ID (Var.-ID)
3 Date of manufacture
4 K_{VS} coefficient
5 Nominal pressure
6 Version
Mixing valve → Diverting valve
7 Max. permissible temperature

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.

3.1 Mounting position

The control valves can be mounted in any position. However, the electric actuators must not be suspended downwards.

- 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 valve even after the entire plant has been completed.
- Flush the pipeline thoroughly before installation.
- Make sure that the inlet and outlet flows of the plant are correctly assigned to ports **A**, **B** and **AB** (Fig. 2).
- Install a strainer (e.g. SAMSON Type 2 NI) upstream of the valve to prevent any sealing parts, weld spatter, and other impurities carried along by the process medium impairing the proper functioning of the valve, above all the tight shut-off.
- Make sure the valve body is installed free of stress. If necessary, support the pipelines near the connections.
- If the control valve is to be insulated, the actuator and the coupling nut must not be insulated as well. Additionally, it must be ensured that the temperature does not exceed the maximum permissible ambient temperature. If necessary, an intermediate insulating piece must be used. Do not insulate it over 25 mm.

3.2 Strainer

– Install the strainer with the filter element facing downwards upstream of the valve.
– 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 mounting instructions

We recommend installing a hand-operated shut-off valve 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.

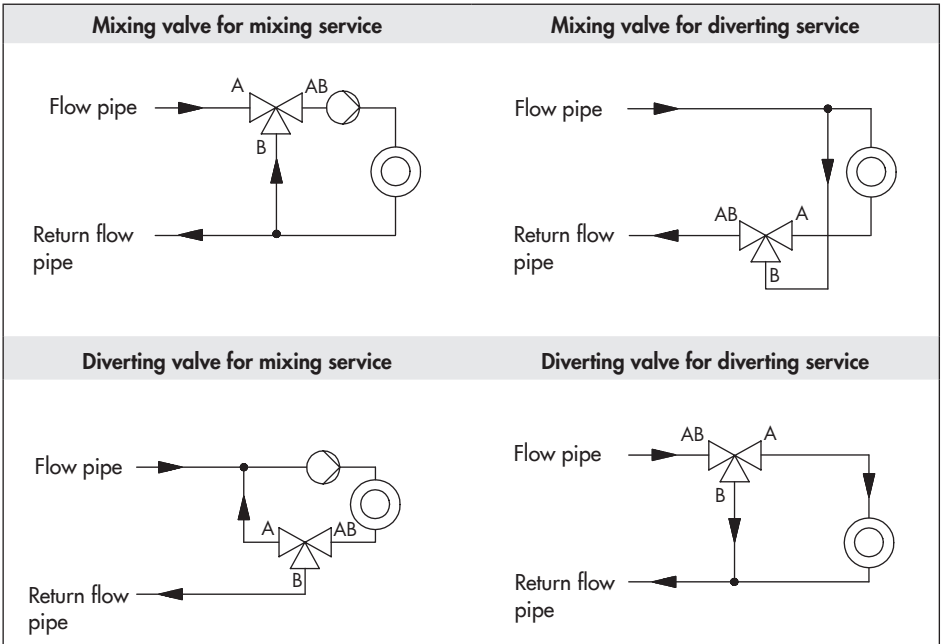


Fig. 2: *Typical installations*

4 Mounting, connecting and configuring the actuator

NOTICE

The instructions on how to mount the valve onto the actuator, perform electrical or pneumatic connection as well as configure the actuator are described in detail in the mounting and operating instructions (EB) of the actuator. ***Read the actuator's mounting and operating instructions!***

Associated actuator documentation

Electric actuators

Type 5857	▶ EB 5857
Type 5824	▶ EB 5824-1 (version with three-step signal) ▶ EB 5824-2 (version with positioner)
Type 5825	▶ EB 5824-1 (version with three-step signal) ▶ EB 5824-2 (version with positioner)

Electric actuators with process controllers

TROVIS 5757-7	▶ EB 5757-7
TROVIS 5724-8	▶ EB 5724-8
TROVIS 5725-7	▶ EB 5725-7
TROVIS 5725-8	▶ EB 5724-8

Pneumatic actuator

Type 2780	▶ EB 5840

4.1 Attachment

Perform the electrical or pneumatic connections of the actuator as described in the corresponding mounting and operating instructions.

4.2 Connection

Perform the electrical or pneumatic connection of the actuator as described in the corresponding mounting and operating instructions.

4.3 Configuration

The electric actuator versions with positioner as well as electric actuators with process controllers can be adapted to the control task.

Configure the actuator as described in the corresponding mounting and operating instructions.

Note:

When electric control valves are fitted with a positioner, this positioner must be initialized before the first start-up. See the associated documentation.

5 Maintenance

The control valve is subject to natural wear. Depending on the operating conditions, check the valve at regular intervals.

If leakage to the atmosphere occurs, disassemble the valve and replace damaged parts.

WARNING!

– *Before performing any work on the control valve, make sure the relevant plant section has been depressurized and, depending on the process medium, drained as well.*
– *When used at high temperatures, allow the plant section to cool down to ambient temperature.*
– *Make sure the control signal for the actuator is switched off and the signal pressure line of a pneumatic actuator is removed.*

6 Dimensions and weights

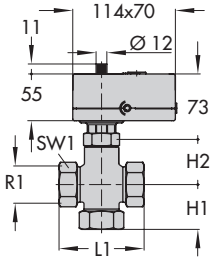
Table 5: *Type 3226 Three-way Valve*

Valves with male thread connection							
Nominal size	DN	15	20	25	32	40	50
Length L	mm	65	70	75	100	110	130
Height H2	mm	51			61		
Height H3	mm	40	40	40	60	65	65
… with welding ends							
Thread size R	G	¾	1	1¼	1¾	2	2½
Pipe d	mm	21.3	26.8	33.7	42	48	60
Width across flats SW		30	36	46	59	65	82
Length L2	mm	210	234	244	268	294	330
Height H4	mm	112	122	124	149	162	175
Weight without actuator	kg	3.2	3.6	4.0	6.1	7.0	8.0
… with threaded ends							
Male thread A	G	½	¾	1	1¼	1½	2
Width across flats SW		30	36	46	59	65	82
Length L3	mm	128	143	158	179	195	227
Height H5	mm	71.5	76.5	81.5	99	108	114
Weight without actuator	kg	3.2	3.6	4.0	6.1	7.0	8.0
Valves with female thread							
Thread size	G	½	¾	1	–		
Length L1	mm	65	75	90	–		
Height H1	mm	40	40	40	–		
Height H2	mm	51			–		
AF1		27	34	46	–		
Weight without actuator	kg	0.9	1.1	1.3	–		

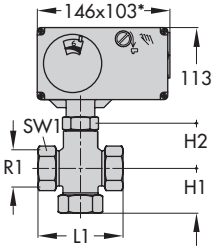
Table 6: *Electric actuators*

Type		*5857*	*5824*	*5825*
Weight	kg (approx.)	0.7	0.75	1.0

Electric control valves



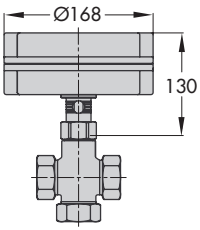
Types 3226/5857, 3226/5757-7 only up to DN 25, version with female thread



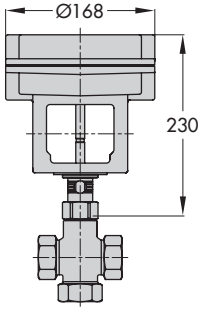
Types 3226/5824-xx
Types 3226/5825-xx
Types 3226/5724-8xx
Types 3226/5725-7xx
Types 3226/5725-8xx

* Dimensions for Types 5824-x3 and 5824-x3 Actuators: 146 x 136 mm

Pneumatic control valves

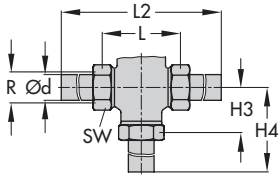


Type 3226/2780-1

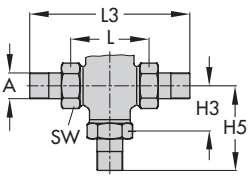


Type 3226/2780-2

Versions



Version with male thread connection and welding ends



Version with male thread connection and threaded ends

Table 7: *Electric actuators with process controllers*

	TROVIS	5757-7	5724-8	5725-7/-8
Weight	kg (approx.)	0.7	1.1	1.3

Table 8: *Pneumatic actuators*

	Type	2780-1	2780-2
Weight	kg (approx.)	2	3.2

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