Pneumatic Actuators
Type 2780-1
Type 2780-2

Fig. 1 · Type 2780-1, force-locking

Fig. 2 · Type 2780-2, form-fit

Mounting and Operating Instructions

EB 5840 EN

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1. Design and principle of operation

The pneumatic actuators are used primarily for attachment to Type 3222 and Type 3213 Control Valves.

Depending on the actuator version (Types 2780-1 and 2780-2), attachment may be force-locking or form-fit.
In the force-locking version, actuator stem and plug stem are connected by screwing the coupling nut (11) to the valve connection with a tightening torque of 20 Nm.
In the form-fit version, a stem connector establishes connection between actuator stem and plug stem. The coupling nut (11) is used to attach the actuator to the valve.

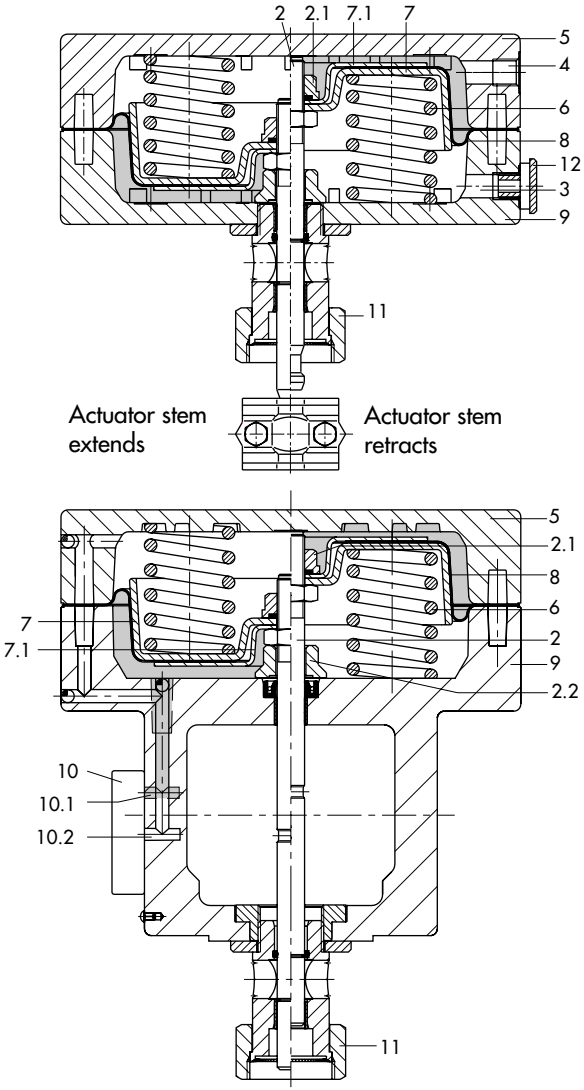
The actuators consist of the two diaphragm cases, the actuator stem, the rolling diaphragm and the springs.

The Type 2780-2 Actuator is equipped with a yoke at the bottom diaphragm chamber for attachment of a pneumatic or electropneumatic positioner.

The signal pressure produces a force acting on the diaphragm area which is balanced by the springs (6) in the actuator.
In the case of a signal pressure failure, the springs installed in the bottom or top diaphragm chamber determine the operating direction and hence the **fail-safe action** of the valve.

Actuator stem extends
When the signal pressure is reduced or in case of a supply air failure, the springs move the actuator stem downwards and close the valve. The valve is opened against the spring force when the signal pressure increases.

- *The device may only be mounted, started up or operated by trained and experienced personnel familiar with the product.*
  According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience, as well as their knowledge of the applicable standards.
- *Any hazards which could be caused at the connected control valve by the process medium, the operating pressure, the signal pressure or by moving parts are to be prevented by means of the appropriate measures.*
  In addition, it is necessary to make sure that actuator and valve are only used in areas where the operating pressure and temperatures do not exceed the operating values which are based on the valve sizing data submitted in the order.
- *Proper shipping and appropriate storage are assumed.*



Type 2780-1
Form-fit version

Type 2780-2
Force-locking version

2 Actuator stem
2.1 Nut
2.2 Bushing
3 Signal pressure connection for actuator stem extends
4 Signal pressure conenction for actuator stem retracts
5 Top diaphragm case
6 Springs
7 Diaphragm plate
7.1 Plate
8 Diaphragm
9 Bottom diaphragm case
10 Switchover or connecting plate
10.1 Signal pressure route for actuator stem extends
10.2 for actuator stem retracts
11 Coupling nut
12 Vent plug

Fig. 3 · Sectional drawings

Actuator stem retracts
When the signal pressure is reduced or in case of a supply air failure, the springs move the actuator stem upwards and open the valve. The valve is closed against the spring force when the signal pressure increases.

Type 2780-1x
In the "actuator stem extends" version, the signal pressure passes through the signal pressure connection (3) to the bottom diaphragm chamber. In the "actuator stem retracts" version, the signal pressure is transmitted through the signal pressure connection (4) to the top diaphragm chamber.

Type 2780-2x
With this actuator version, intended for standard attachment of a positioner, the signal pressure passes through a **switchover plate** and bores (3 and 4) at the left and right side of the yoke to the diaphragm chamber.

The required fail-safe action determines the mounting position of the positioner and the position of the switchover plate. Turn the switchover plate until the appropriate symbol (1) is assigned to the mark (2) so that the signal pressure is transmitted to the appropriate diaphragm chamber (see Fig. 4, left).

If the Type 2780-2x Actuator is operated without positioner, a **connecting plate** (in-

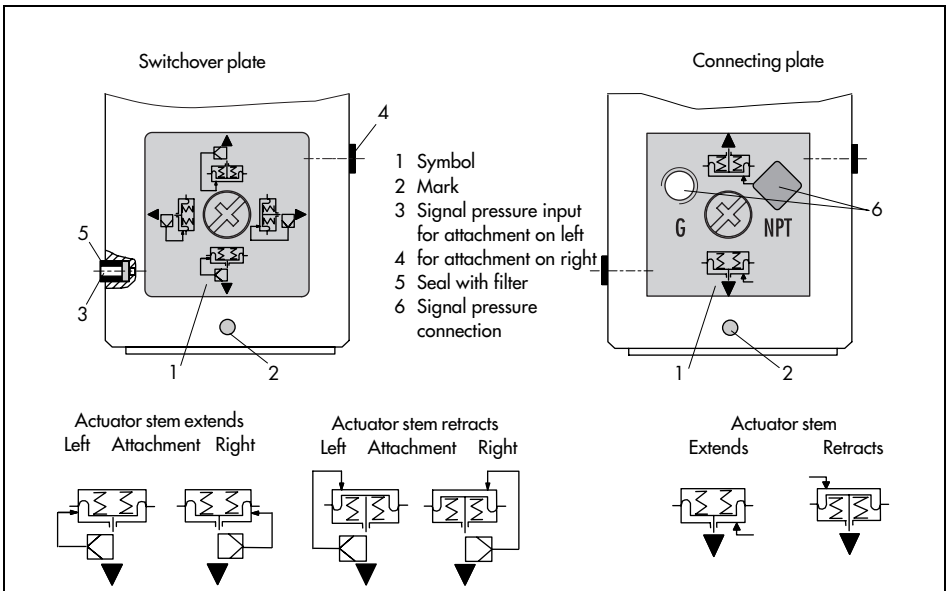


Fig. 4 · Signal pressure connection for Type 2780-2x

stead of a switchover plate) must be mounted to the side of the yoke.
The signal pressure is transmitted directly through the signal pressure connection of the connecting plate to the diaphragm chamber. A 90° turn in line with the symbol (Fig. 4, right) determines whether the actuator's fail-safe action is "actuator stem extends" or "actuator stem retracts".

Accessories: Switchover or connecting plate must be ordered as accessories. Note that actuators with device index **01**, e.g. 2780-2011 5231. **01** (old = **00**) are equipped with new plates.
Old and new plates are not interchangeable.

Switchover plate	new	Order no. 1400-6822
	old	Order no. 1400-6819
Connecting plate	new	Order no. 1400-6823
	old G thread	Order no. 1400-6820
	old NPT connection	Order no. 1400-6821

NOTE
To mount and demount the actuator from the control valve, follow the mounting and operating instructions of the respective valve.

2. Operation

CAUTION
Air pressure should only be applied to the chamber not occupied by the springs. To ensure a trouble-free operation of the actuator, it is important to check that the vent plug (12) in Type 2780-1x is not blocked.

2.1 Changing the operating direction (fail-safe action)

In pneumatic actuators, the operating direction and the fail-safe action can be changed. This is only possible when the actuator is separated from the valve.

The fail-safe action "actuator stem extends" or "actuator stem retracts" is indicated by a symbol on the nameplate of the actuator.

Changing the operating direction from "actuator stem extends" to "actuator stem retracts"

1. Unscrew the hexagon nuts and bolts on the diaphragm cases. Lift off the top diaphragm case. Remove the springs (6).
2. Pull out the actuator stem (2) with attached diaphragm plate (7), diaphragm (8), plate (7.1) and bushing (2.2) from the bottom diaphragm case (9).
3. Unscrew the nut (2.1), while holding down the actuator stem (2) with an appropriate tool.
   Caution: Do not damage the sealing area of the stem.
4. Turn over the diaphragm plate with the attached diaphragm and plate. Screw the nut (2.1) back on.
5. Apply sealant and lubricant (order no. 8150-0111) to the actuator stem.
   Turn over the top diaphragm case (5) and insert the actuator stem with the attached diaphragm parts. Push the bushing (2.2) over the actuator stem.
6. Place the springs (6) in the bottom diaphragm case and push the case over

the actuator stem. Screw the two diaphragm cases back together.

7. For Type 2780-1x, remove the vent plug (12) and screw it into the bottom signal pressure connection (3).
   The spring force now acting from underneath the diaphragm plate, causes the actuator stem to retract (fail-safe action). Only when the signal pressure increases against the spring force the actuator stem extends.
8. Mark the changed fail-safe action on the nameplate!

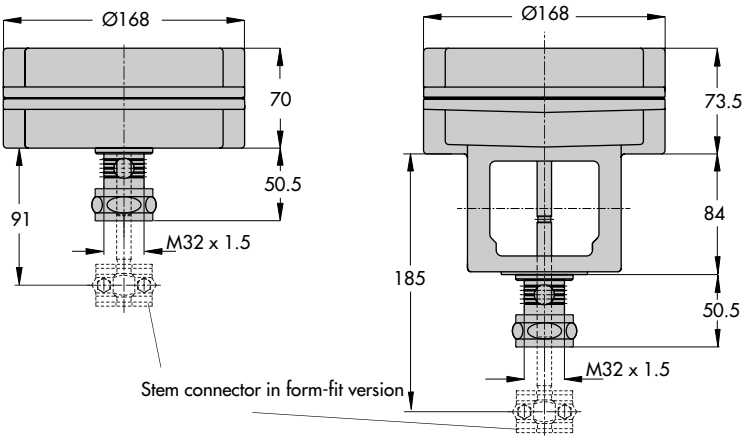
Changing the operating direction from "actuator stem retracts" to "actuator stem extends"

1. Unscrew the hexagon nuts and bolts on the diaphragm cases and lift off the top diaphragm case (5).
2. Remove the actuator stem with the attached diaphragm plate, the diaphragm and the plate from the bottom diaphragm case.
3. Unscrew the nut (2.1), while holding tight the actuator stem (2) with an appropriate tool.
   Caution: Do not damage the stem!
4. Turn over the diaphragm plate with the diaphragm and the plate. Screw the nut (2.1) back on.
5. Apply sealant and lubricant (order no. 8150-0111) to the actuator stem.
   Put on the bushing (2.2) and push the actuator stem with the diaphragm parts into the lower diaphragm case.
6. Insert the springs (6), put on the top diaphragm case and tighten with the bolts, nuts and washers.
7. For Type 2780-1 screw the vent plug (12) into the top signal pressure connection (4).
   The springs force now acting from the top onto the diaphragm plate, causes the actuator stem to extend (fail-safe action). Only when the signal pressure increases against the spring force the actuator stem retracts.
8. Mark the changed fail-safe action on the nameplate!

2.2 Exchanging the diaphragm

1. Remove the diaphragm plate (7) with the diaphragm (8), plate (7.1) and actuator stem (2) from the diaphragm case as described in section 2.1.
2. Mount the new diaphragm on the diaphragm plate. Place the other plate on top of the diaphragm.
3. To reassemble the actuator, see section 2.1.

3. Dimensions in mm



4. Customer inquiries

If you have any inquiries about the pneumatic actuators, please submit the following details:

1. Type and product number
2. Effective actuator area
3. Bench range (signal pressure range) in bar
4. Actuator version — operating direction

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