Actuators

Pneumatic, electric and electrohydraulic actuators for control valves and butterfly valves

- Diaphragm actuators up to 2800 cm²
- Electric actuators up to 12.5 kN
- Electrohydraulic actuator up to 7.7 kN
- Hand-operated actuator
Selection and application

Actuators convert the control signal supplied by automation equipment (controller, control station, process control system) into a linear or rotary motion used to position the final control element (e.g. valve plug) in direct proportion to the control signal received. For control valves, this converted motion is a linear motion (upward or downward). For butterfly valves, ball valves and rotary plug valves, this is a rotary motion up to 70° opening angle for throttling applications. For on/off service, this is a rotary motion up to 90°. The actuator together with the valve constitute the entire control valve assembly, commonly referred to as the control valve.

To meet plant requirements, the actuators can be equipped with a wide range of transfer elements, such as positioners, converters, solenoid valves, position transmitters and limit switches. For details on selecting the additional equipment, refer to Information Sheet T 8350 EN.

### Instrumentation

Pneumatic actuators are field-proven, require little maintenance, and are inexpensive.

Accessories, such as positioners and converters, also act as servo-boosters because they convert the low-volume output signal $y$ (0.2 to 1 bar) received from a controller into a powerful signal pressure $p_{st}$ up to 6 bar (90 psi).

Electric and electrohydraulic actuators are primarily used in applications where compressed air is not available. A series of modules can also be added to these actuators, permitting them to be adapted to the specific control task.

#### A Pneumatic instrumentation

- **A1** Instrumentation without positioner
  - Signal pressure range 0.2 to 1 bar (3 to 15 psi)

- **A2** Instrumentation with pneumatic positioner
  - Signal pressure $p_s \leq 6$ bar (90 psi)

#### B Electropneumatic instrumentation

- **B1** Instrumentation with electropneumatic positioner
  - Signal pressure $p_{st} \leq 6$ bar (90 psi)

- **B2** Instrumentation with electroneumatic positioner
  - Signal pressure $p_s \leq 6$ bar (90 psi)

#### C Electric instrumentation

- **C1** Instrumentation with AC motor 230 V AC

- **C2** Instrumentation with reversing contactor and three-phase AC motor 380 V AC

- **C3** Electrohydraulic actuator with three-step control

- **C4** Electrohydraulic actuator with continuous electric control signal

### Legend for A1 to C4

1. Pneumatic controller
2. Electric controller or automation system with mA output
3. Electric controller or automation system with three-step output
4. Pneumatic control valve
5. Electric control valve
6. Electrohydraulic control valve
7. Pneumatic positioner
8. Electropneumatic converter
9. Electropneumatic positioner
10. Electric positioner
11. Reversing contactor
Pneumatic actuators
The pneumatic actuators are diaphragm actuators with rolling diaphragm and internal compression springs.
Benefits of pneumatic actuators:
• Designed for signal pressures up to 6 bar (90 psi)
• Low overall height
• Powerful thrust and high response speed
• Minimum friction
• Various bench ranges
• No special tools required to change the bench range or to reverse the operating direction of the actuator

Fail-safe action
Depending on the version, the actuators have two different fail-safe actions which become effective when the pressure is relieved from the diaphragm or the air supply fails:

**Actuator stem extends (FA):**
The spring force moves the actuator stem to the lower end position.

**Actuator stem retracts (FE):**
The spring force causes the actuator stem to retract.

**Type 3271 Pneumatic Actuator** (Fig. 1 and Fig. 2)
- For rated travels of 7.5 to 160 mm and diaphragm areas of 120, 175, 240, 350, 355, 700, 750, 1000, 1400 and 2800 cm²
- Tandem actuator with effective area of 2 x 2800 cm²
- Optional version fitted with handwheel on the diaphragm case for actuators with 120 to 700 cm² diaphragm areas (Fig. 1)
- 1400 to 2800 cm² diaphragm areas with side-mounted handwheel
- For more details, refer to Data Sheets ► T 8310-1 EN, ► T 8310-2 EN and ► T 8310-3 EN

**Type 3277 Pneumatic Actuator** (Fig. 3)
- Suitable for integral positioner attachment
- Diaphragm areas of 120, 175, 240, 350, 355, 700 or 750 cm²
- Rated travels from 7.5 to 30 mm
- Optionally with handwheel
- Refer to Data Sheet ► T 8310-1 EN

**Type 3204-1 and Type 3204-7 Pneumatic Actuator with Rotary Lever** (Fig. 4)
- Pneumatic diaphragm actuators for final control elements with rotary closure members, particularly for butterfly valves and louvers (shutters)
- 350 or 700 cm² diaphragm areas
- Optionally with manual override
- Type 3204-7 Actuator suitable for integral positioner attachment
- Refer to Data Sheet ► T 8316 EN

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![Fig. 1: Type 3271 Pneumatic Actuator with additional handwheel and Type 3241 Valve](image1)

![Fig. 2: Type 3271 Pneumatic Actuator and Type 3241 Valve](image2)

![Fig. 3: Type 3277 Pneumatic Actuator and Type 3241 Valve](image3)

![Fig. 4: Type 3204-1 Pneumatic Actuator with Rotary Lever](image4)
Type 3278 Pneumatic Rotary Actuator (Fig. 5)
- Single-acting rotary actuator with spring-return mechanism used for butterfly valves and other final control elements with rotary closure members
- 70° or 90° nominal opening angle
- 160 or 320 cm² diaphragm areas
- Optionally with manual override
- Refer to Data Sheet ▶ T 8321 EN

Pfeiffer Type 31a Pneumatic Rotary Actuator (Fig. 6)
- Single-acting or double-acting piston actuator for final control elements with rotary closure members
- 90° opening angle
- Optionally with additional manual override
- Suitable for throttling or on/off service
- Refer to Data Sheet ▶ T 9929 EN

Electric and electrohydraulic actuators

Type 3274-11 to -23 Electrohydraulic Actuator (Fig. 7)
- Thrust up to 7.7 kN and 15 or 30 mm rated travel
- Transit times of 60 s and higher for three-step control or with positioners for input signals from 0/4 to 20 mA or 0/2 to 10 V
- Optionally with electric or mechanical override
- Version with fail-safe action available
- Refer to Data Sheet ▶ T 8340 EN

Type SAM Electric Actuator (Fig. 8)
- Linear actuator with reversible motor with thrusts of 2 to 25 kN for rated travels from 15 to 120 mm
- Transit times of 30 s and higher for three-step control or with positioners for input signals from 0/4 to 20 mA or 0/2 to 10 V
- With mechanical override, two torque-dependent and three travel-dependent limit contacts
- Refer to Data Sheet ▶ T 8330 EN
**Type 3374 Electric Actuator** (Fig. 9)
- Electric actuator for plant engineering and HVAC
- Thrust up to 2.5 kN
- Version:
  - With or without fail-safe action
  - For three-step control
  - With digital positioner
- Refer to Data Sheet ▶ T 8331 EN

**Type 3375 Electric Actuator** (Fig. 10)
- Electric actuator for plant engineering and HVAC
- Thrust up to 12.5 kN
- Version:
  - For three-step control
  - With digital positioner
  - Version with fail-safe action (in preparation)
- Refer to Data Sheet ▶ T 8332 EN

**Hand-operated actuator**

**Type 3273 Hand-operated Actuator** (Fig. 11)
- For attachment to valves used as hand-operated control valves
- Particularly suitable for attachment to Series 240, 250 and 260 Valves
- 15 to 30 mm rated travel · Nominal thrusts up to 32 kN
- Refer to Data Sheet ▶ T 8312 EN