



Fig. 1 · Type 3278 Pneumatic Rotary Actuator

1. Design and principle of operation

The single-acting rotary actuator incorporating spring return mechanism can be attached to butterfly and other valves employing a closure member that rotates. This rotary actuator can be used for both control and on-off operation.

The rotary actuator basically consists of a diaphragm actuator incorporating a diaphragm (2) and springs (4) plus a lever system (6) with actuator stem (5) and actuator shaft (7), all of which are integrated in the body.

The signal pressure produces a force acting on the diaphragm surface which is balanced by the springs (4) integrated in the actuator. In this case, the lifting motion of the actuator stem (5) which is proportional to the signal pressure is transmitted to the lever system (6) and converted into a linear motion.

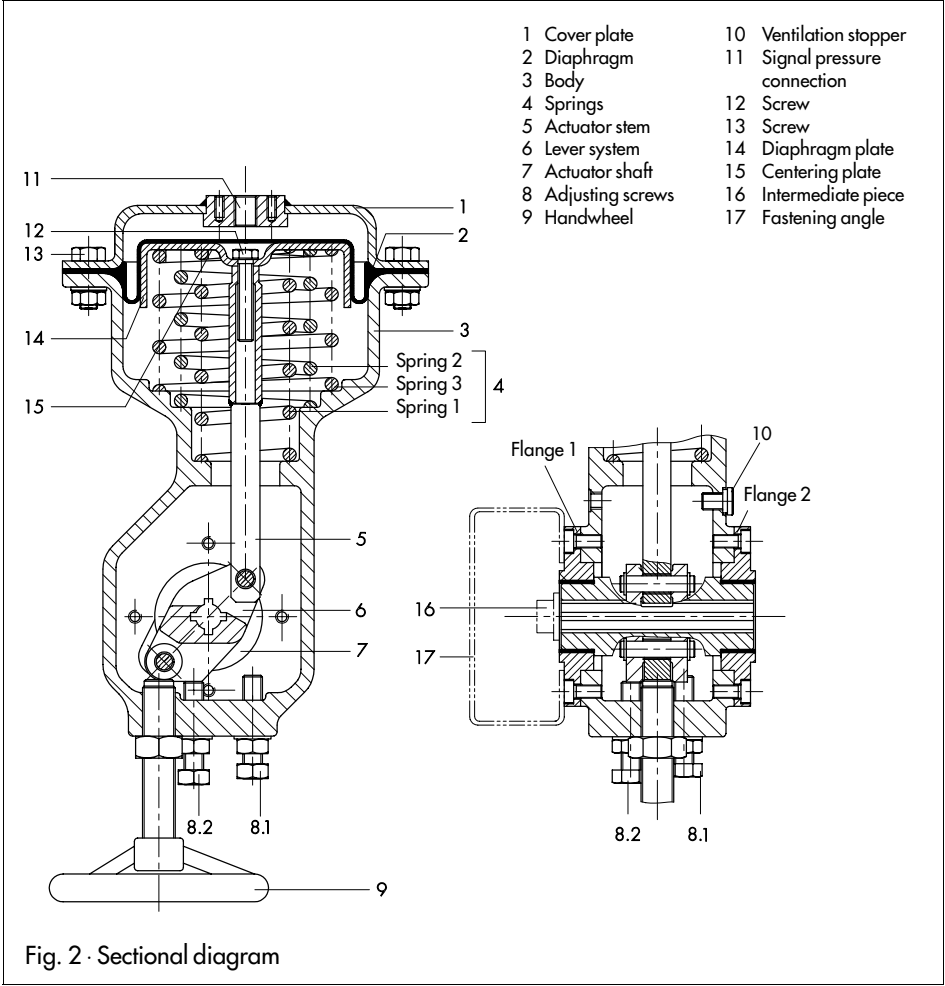
The number and pre-tensioning of springs determine the signal pressure range and the usable driving torque of the actuator. Two adjusting screws (8) which can be externally accessed can be used to determine the lower and upper limit value for the angle of rotation.

If the signal pressure fails, the built-on valve moves to a pre-selected fail-safe position. In response, the springs either open or close the valve, depending on whether attached to flange 2 or 1 of the body.

The numeric designation, i.e., 1 or 2, is casted on the corresponding side of the body.

Failure action: "fail-close" (Attachment of valve to flange 2 of the body)

The springs close the built-on valve when pressure acting on the diaphragm is relieved or upon supply failure. The valve is opened with increasing signal pressure against the force of the springs.



Fail action: "fail-open" (Attachment of valve to flange 1 of the body)

The springs open the built-on valve when pressure acting on the diaphragm is relieved or upon supply failure. The valve is closed with increasing signal pressure against the force of the springs.

2. Assembling the rotary actuator

When assembling the rotary actuator to the valve, note its direction of rotation and the resulting fail-safe position.

With increasing signal pressure, the direction of rotation corresponding to the actuator shaft is counter-clockwise at flange 1, clockwise at flange 2.

Thus, for example, a valve which opens counter-clockwise is to be attached at flange 2 whenever the required actuator action is to be "fail-close".

The method of connection complies with DIN ISO 5211.

2.1 Signal pressure connection

The signal pressure connection is designed as a tapped hole with G 1/4 female thread. This connection also enables direct attachment (VDI/VDE 3845) of a solenoid valve, eliminating additional pipework.

Combined with the SAMSON Type 3766 and Type 3767 Positioners, a prefabricated pipe-joint connection containing a connecting plate is available as accessories for the connection above.

2.2 Adjusting the screws

Depending on the version of the built-on valve, the adjusting screws (8) can be used to li-

mit the angle of rotation of the rotary actuator. The maximum angle of rotation without limit comprises 90°. If the attached butterfly valve is to be adjusted to a 70° angle of rotation for control operation, proceed as indicated in the next section:

Failure action: "fail-close"

Procedure:

1. Loosen the two adjusting screws (8.1 and 8.2), and apply the signal pressure which corresponds to the lower-limit value of the spring range (see nameplate) to the signal pressure connection (11).
2. Use the adjusting screw (8.2) to set a 0° angle of rotation so that the butterfly valve is completely closed.
3. Apply the upper-limit value of the spring range to the signal pressure connection (11), and tighten the other adjusting screw (8.1) until the butterfly valve stops at a 70° angle of rotation.
If necessary, observe the angle indicator on the vane or positioner.
4. Secure the position of the two adjusting screws using the matching lock nuts.
5. Make note of the adjusted angle of rotation on the actuator's nameplate.

Failure action: "fail-open"

Procedure:

1. Loosen the two adjusting screws (8.1 and 8.2) and apply the signal pressure which corresponds to the upper-limit value of the spring range (see nameplate) to the signal pressure connection (11).
2. Use the adjusting screw (8.1) to set the closing position so that the butterfly valve is completely closed.
3. Apply the lower-limit value of the spring range to the signal pressure connection (11), and tighten the other adjusting screw (8.2) until the butterfly valve stops

Spring range	0.4...0.8	0.5...1.0	0.8...1.6	0.9...1.8	1.2...2.4	1.3...2.6	1.7...3.4
Spring	3	2	1	2 and 3	1 and 3	1 and 2	1, 2 and 3

Order no.	Actuator 160 cm ² 320 cm ²	Spring 1	Spring 2	Spring 3
		0270-2055 0270-2234	0270-2056 0270-2235	0270-2057 0270-2236

at a 70° angle of rotation.

If necessary, note the angle indicator on the vane or positioner.

4. Secure the position of the two adjusting screws using the matching lock nuts.
5. Make note of the adjusted angle of rotation on the actuator's name plate.

3. Operation

3.1 Change the failure action (fail-close to fail-open)

Reversed actuator action refers to the built-on valve whenever the following is applicable: 1) its direction of rotation is to be altered or 2) failure action of the entire control valve is to be changed.

For this purpose, separate the valve from the body and mount it to the opposite flange end. Subsequently, re-adjust the two screws (8.1 and 8.2) for the angle of rotation limit (section 2.2).

3.2 Changing the spring range

The driving torques which can be used are dependent on three factors: 1) diaphragm surface, 2) maximum signal pressure and 3) actuator's spring range.

Another driving torque is easily facilitated by changing the spring range later; i.e., remove or add spring 1, 2 or 3 resp. in the body.

The table below contains the assignment of spring range to spring(s).

1. Loosen screws (13) and lift off cover in order to remove the diaphragm (2).
2. Slowly unfasten screw (12).

Caution: Springs are pre-tensioned!

3. Lift off diaphragm plate (14) and centering plate (15), then add or remove the corresponding springs: 1, 2 or 3 resp.
4. Repeat the assembly steps in reverse order.

3.3 Rotary actuator with handwheel

If the actuator is not pre-assembled with a handwheel at the factory, one can be added later.

For this purpose, remove the screwed plugs adjacent to the two adjusting screws on the lower side of the body and screw in the spindle of the handwheel.

The spindle acts on the actuator's lever system, enabling movement of the built-on valve to the desired position.

Handwheel, compl.

For actuator effective area 160 cm²

Order no.: 1690-3394

For actuator effective area 320 cm²

Order no.: 1690-6699

4. Accessories

At the opposite side of the valve where a flange is available, the attachment (according to VDI/VDE 3845) of another make positioner than a SAMSON model requires an adapter kit. This adapter kit contains a fastening angle, an intermediate piece plus associated mounting screws.

Adapter kit

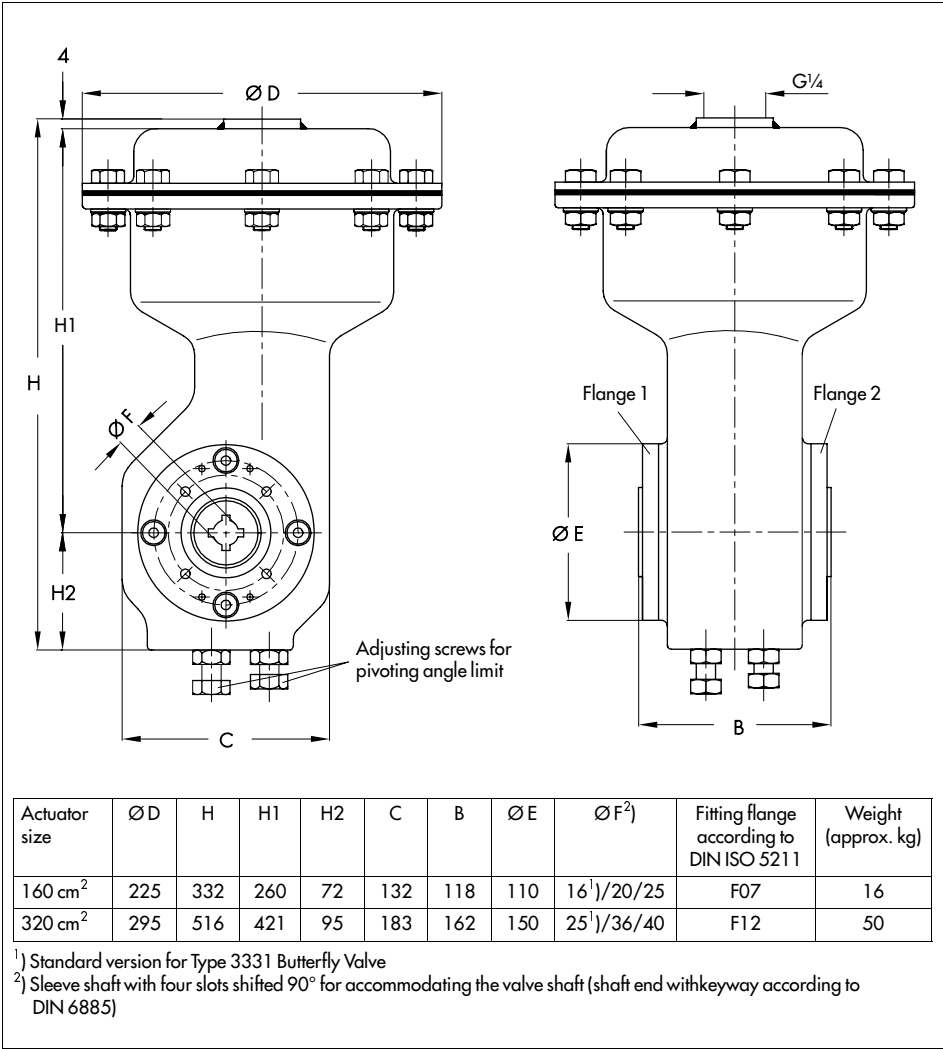
For actuator effective area 160 cm²

Order no.: 1400-5890

For actuator effective area 320 cm²

Order no.: 1400-5891

Dimensions in mm and weights





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