Pfeiffer
Chemie-Armaturenbau GmbH

Pfeiffer AT - Quarter-Turn Actuator

Series 31a

Type SRP and DAP

Application:

Single- or double-acting piston actuator for control and shut-off valves with rotating flow restrictors, especially with high process demand in chemical plants:

- quarter turn 90°
- air supply to 10 bar
- temperatures -20°C to 80°C

The pneumatic quarter-turn actuators type **SRP** and **DAP** are piston actuators for control or OPEN / CLOSED operation. The actuators distinguish themselves by:

- externally adjustable end stops (±4°),
- square position diagonal (Europ. Standard) or parallel,
- freely-adjustable position indicator (in 45° steps),
- assembly and modification **without** special tools,
- encapsulated spring assembly,
- transmission through involute gearing,
- direction of rotation reversible **without** additional components,
- proven surface refinement by means of Kesternich and salt spray test,
- connection of additional equipment according to VDI VDE 3845,
- attachments according to DIN ISO 5211,

Fig. 1 - Pfeiffer AT-Quarter Turn Actuator Series 31a, Type SRP 220

Fig. 2 - Pfeiffer AT-Quarter Turn Actuator Series 31a, Type SRP 5000

Versions:

- **Type SRP**
  Pneumatic quarter-turn actuator, single-acting with spring-return mechanism in the sizes 15 to 10000
- **Type DAP**
  Pneumatic quarter-turn actuator, double-acting without spring-return mechanism in the sizes 6 to 10000

Special designs:

- with emergency manual actuation
- for continuous operation at temperatures from -20° to 150°C through use of Viton O-rings
- for continuous operation at temperatures from -40° to 80°C with silicon seals
- actuators with extended turning range 120° and 180°
- dosage actuator with adjustable central position
- 3-position actuator
- actuator with hydraulic adjustment of rotating speed
- stainless steel AT quarter-turn actuator

Additional equipment and add-on pieces:

For the actuators, the following accessories are available either individually or in combination:

- positioner
- limit switch
- solenoid valves
- air supply stations
- pressure gauge set
- throttling device

Further accessories are available on request for customer specifications. Details on request.

Principle of operation:

The regulating pressure pst generates a force at the piston surface which, in the single-acting version, can be compensated by the springs arranged in the actuator, and in the double-acting version, by an appropriate back pressure. The force generated at the pistons is converted into rotation by means of the pinion shaft. Adjustable end stops for OPEN and CLOSED operation permit a fine setting of the end positions by ±4°.
In the case of the single-acting version, the number of springs determines the spring return torque and the required air supply pressure.

Safety position:

- For the actuator type **SRP** two different directions of rotation are possible, becoming effective by release pressure on the pistons or in the case of air supply failure. The viewing direction is from the actuator to the valve.

  Springs rotating to the right
  In case of pressure loss, rotation to the right.

  Springs rotating to the left
  In case of pressure loss, rotation to the left.

- The actuator type **DAP** is designed without springs.
  A defined final position is not achieved in the case of air supply failure.

General technical data:

Operation		single-acting	double-acting
Max. perm. air supply pressure		10 bar	
Sizes		6 • 15 • 30 • 60 • 100 • 150 • 220 300 • 450 • 600 • 900 • 1200 2000 • 3000 • 5000 • 10000	
Perm. temperature range		continuous operation -20°C to 80°C	
Connection to valve		DIN ISO 5211	
Connection for positioner or signal equipment	Type 15 to 150	VDI VDE 3845, size 1	
	Type 220 to 600	VDI VDE 3845, size 2	
	Type 900 to 5000	VDI VDE 3845, size 4	
	Type 10000	VDI VDE 3845, size 5	
Connection for solenoid valve		VDI VDE 3845	

Table 1 – Technical Data

Materials:

Body	EN AW 6063
Cap	GD-AlSi8.5Cu3.5Fe
Shaft	C22
Spring-cartridge	SiCr spring steel
Pistons	GD-AlSi8.5Cu3.5Fe

Table 2 - Materials

Air drive torque:

Fig. 3 shows the available air drive torque

- MdLE for the single-acting version
- MdLD for the double-acting version

and the available spring drive moment MdF in relation to the angle of rotation. The course of the operating torque is valid for the correct combination of the respective air supply pressure with the wright number of springs (values in the data sheet underlined and printed bold).

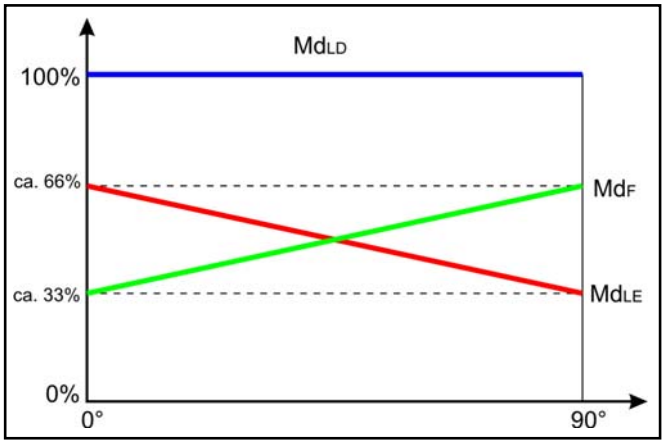

Fig. 3 – Course of operating torque at recommended air inlet pressure

Operating torques:

The operating torques for double- and single-acting actuators are available in the data sheet <**DB 31a_EN**>.

Note:
Breakaway torques for Δp 10 bar on request.

Interesting innovations in this generation of actuators:

The quarter-turn actuators are characterized by a number of technical improvements and interesting innovations, and were developed with an eye on the latest amendments to the ISO 5211.

- **The end stop position with a safe guard for incorrect handling**
  The adjustment for both end positions can be set with external adjusting screws through a cam system.
  The adjusting screws are mounted inside as blow out prood, to avoid injury when unscrewing the under pressure screws,
  Before leaving our factory, the screws are marked with a sealing wax, in order to notice any visible displacement.

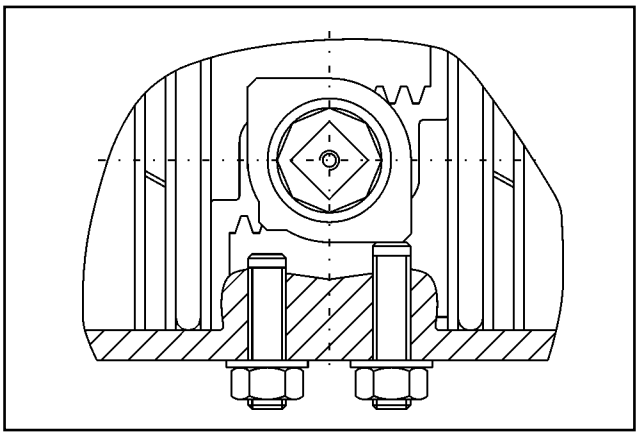

Fig. 4 – Positioning of the end stops

- **Setting of the square end**

  A more flexible installation is achieved through the 45°-step setting of the square in the shaft drive.

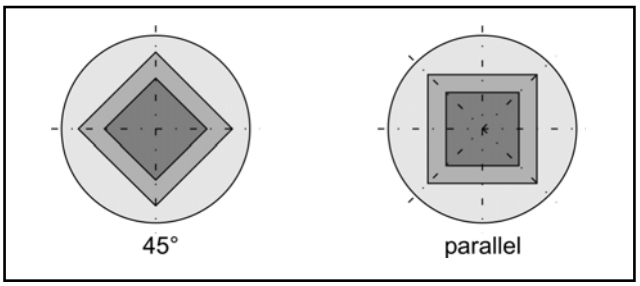

Fig. 5 – Setting of the square

The required settings can be achieved through a rotation of the shaft. In order to obtain the correct display of position, the seat of the position indicator (upper end of shaft) has been octagonally finished, therefore permitting the position indicator also to be mounted in 90°- steps.

- **Multifunctional position indicator**

The new position indicator may be employed for a 45° or 90° position (Fig. 6).

An optical display is realized by means of inserts in the position indicator.
These may be variably installed.
The position indicator has a VDI VDE – interface.
This permits practically all standard accessories to be mounted without difficulty.

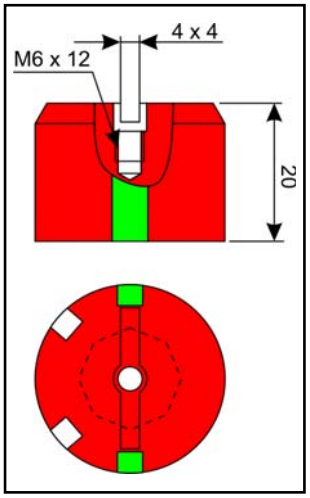

Fig. 6 – Position indicator

- **Direct assembly**

  By exchanging the standard inserts by metal inserts, the multifunctional position indicator can be quickly and simply prepared for the direct attachment of special limit switches.

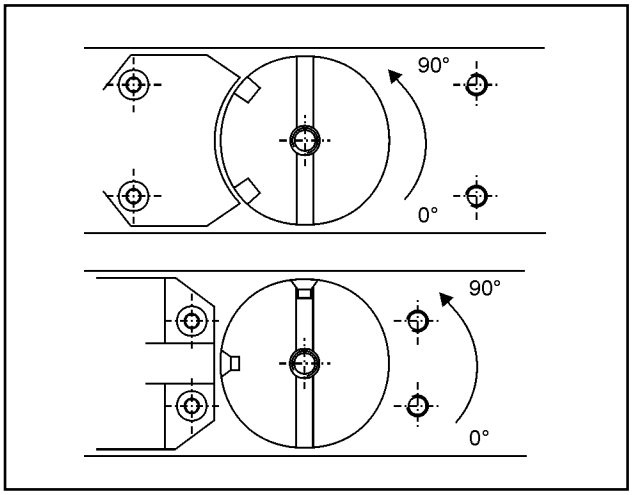

Fig. 7 – Multifunctional position indicator

- **Technical details**

  The tooth profile and therefore the force transmission of the toothed rack - shaft principle were consequently optimised by employing involute gearing.

  A further technical measure is the strengthening of the shaft diameter and bearing shells. This permits an even greater force absorption by the newly developed body.

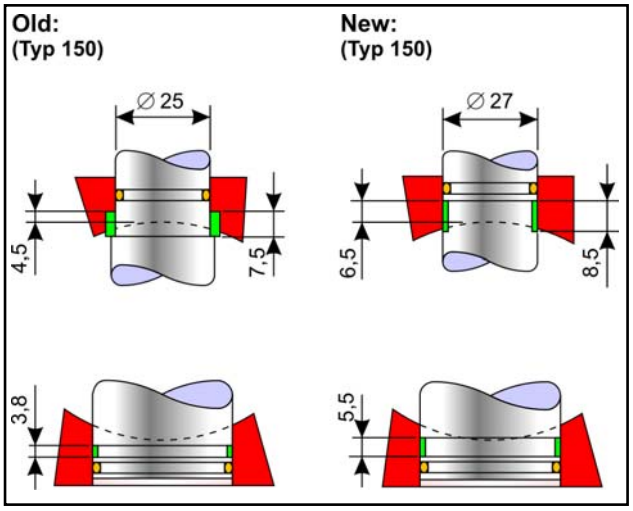

Fig. 8 - Bearing

Dimensions and weights

The dimensions and weights for the actuators type **SRP** and **DAP** are available in the data sheet <**DB 31a_EN**>.

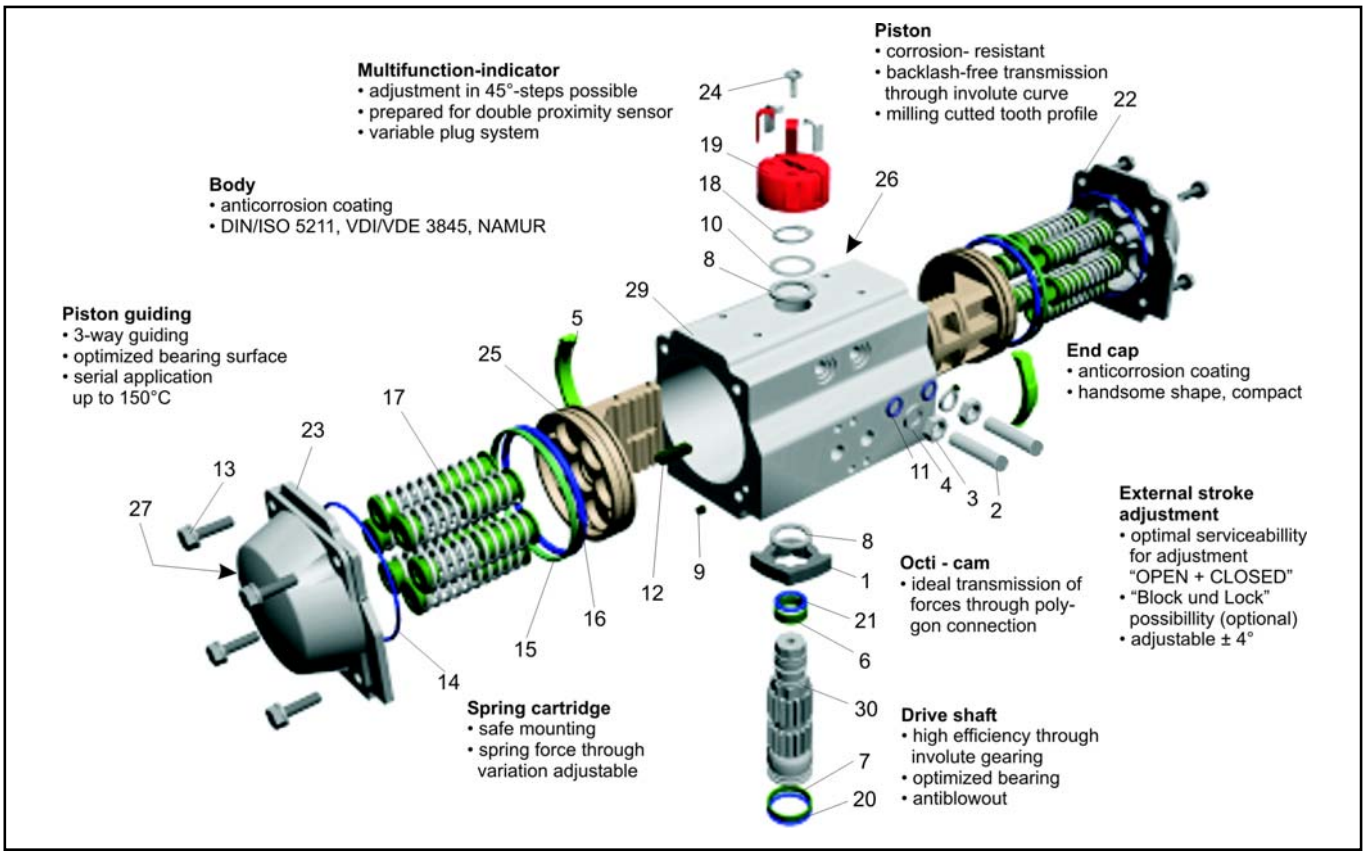

Fig. 9 – Cross-sectional drawing

Item	Description	Item	Description
1	Octi-cam (Stop arrangement)	16	O-ring
2	End stop screw	17	Spring cartridge
3	Nut	18	Spring clip
4	Washer	19	Position indicator
5	Bearing (Piston back)	20	O-ring
6	Bearing (Pinion top)	21	O-ring
7	Bearing (Pinion bottom)	22	Right end cap
8	Thrust bearing	23	Left end cap
9	Plug	24	Cap screw (Indicator)
10	Thrust washer	25	Pistons
11	O-ring	26	Identification label
12	Piston guide	27	Identification label (Cap)
13	Cap screw	28	Centering
14	O-ring	29	Body
15	Bearing (Piston head)	30	Shaft

Table 3 – Parts List

Required data for your order:

Actuator type:	Series 31a Type DAP or SRP
Size:	6, 15, 30, 60, 100, 150, 220, 300, 450, 600, 900, 1200 2000, 3000, 5000 or 10000
Number of springs:	only for single-acting type SRP
Safety position:	springs left- or right-rotating (only for single-acting type SRP)
Air supply:	.... bar
Operative range:	number of springs or nominal signal range
VDI VDE bracket:	for connection of positioner or signal equipment

For your special requirements please contact our technical sales department

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Specifications subject to change without notice

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