Table 1: *Technical data*

Max. Pressure	Standard Rotation	Stroke Adjustment Screw	Ø Chamber (in)	Air volume (in³)		Approx. Stroking time (sec.) [1] Double acting		Spring return		Operating temperature range (°F) [2]		
				opening	closing	opening	closing	opening	closing	ST	HT	LLT2
116 Psi	0° - 90°	For 1° adj. 1/5 Turn needed	3,46	31,12	47,59	0,40	0,50	0,50	0,60	-40 to +176	-5 to +302	-76 to +176

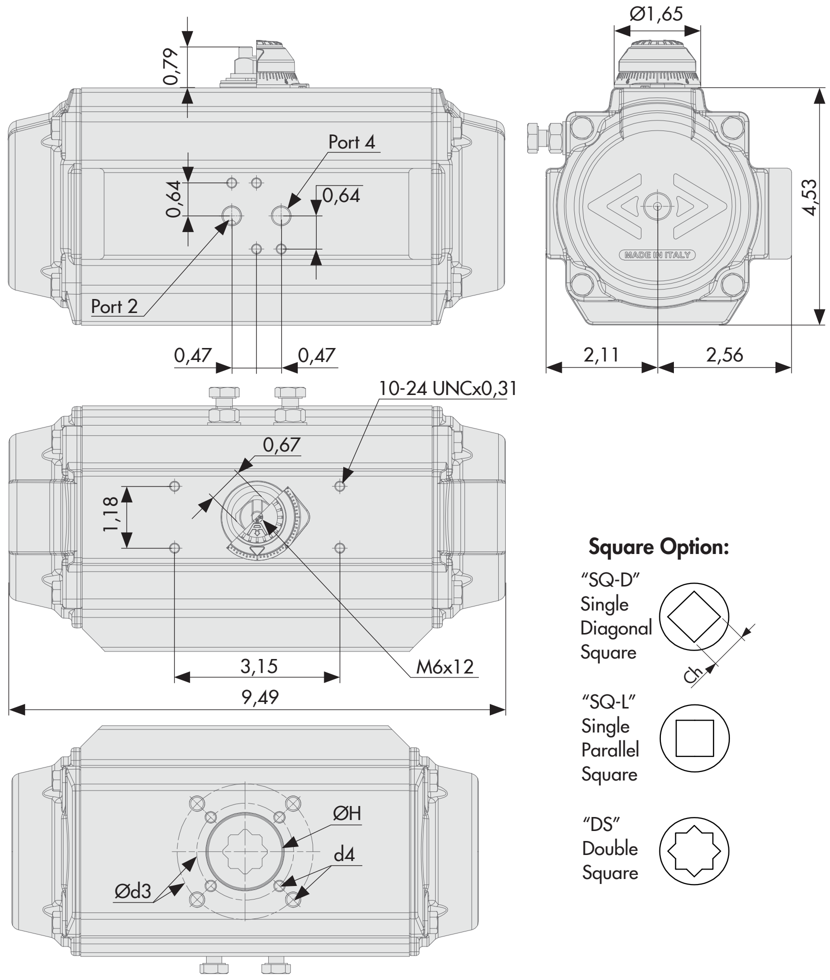
1) The values refer to specific test conditions; please contact AIR TORQUE for detailed information.
2) Every temperature range option requires proper components and lubricant. please contact AIR TORQUE for detailed information.

Table 2: *Nominal output torque for Double acting actuators (Lb-In)*

Pressure	40 Psi	50 Psi	60 Psi	70 Psi	80 Psi	90 Psi	100 Psi	110 Psi	116 Psi	Approx. weight (lb)
	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	0° 90°	9,20
D	447	559	670	782	894	1005	1117	1229	1296	

Table 3: *Nominal output torque for Single acting actuators (Lb-In)*

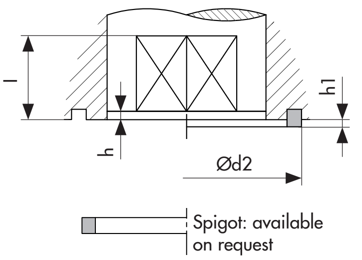
Pressure	40 Psi		50 Psi		60 Psi		70 Psi		80 Psi		90 Psi		100 Psi		110 Psi		116 Psi		Spring Stroke		Approx. weight (lb)
Spring Set	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
S 05	285	191	396	303	508	415	620	526	731	638	843	750	955	862					256	162	9,85
S 06	252	140	476	252	476	364	587	475	699	587	811	699	922	810	1034	922			307	195	
S 07	220	89	331	201	443	313	555	424	667	536	778	648	890	759	1002	871	1069	938	358	227	10,05
S 08			299	150	411	261	522	373	634	485	746	597	858	708	969	820	1036	887	409	260	
S 09					378	210	490	322	602	434	713	545	825	657	937	769	1004	836	460	292	10,30
S 10							457	271	569	383	681	494	793	606	904	718	971	785	511	325	
S 11									537	331	648	443	760	555	872	667	939	734	562	357	10,55
S 12													728	504	839	616	906	683	613	389	



ISO 5211 Interface:

		STANDARD	
ISO 5211		F05 + F07	
Ø d2		1,38	NA
Ø d3		1,97	2,76
d4		1/4-20 UNC x0,35	5/16-18 UNC x0,47
Ø H		1,57	
Ch x l min. (*)	SQ	0,55x0,75 - 0,67x0,79	
	DS	0,67x0,79	
h min.		0,06	0,06
h1		0,06	NA

(*) Other type and sizes of shaft connection available on request.



Connection / Attachment:

Pressure connection Port 2 and 4	1/8" NPT
Ancillary Attachment	AA1

Fig. 9: *Dimensions in inch*

DATA SHEET

T PTU-I EN

Power Technology Upgrade series

Pneumatic rack and pinion actuators
PT045 U → PT1000 U models

Application

Rotary pneumatic actuators for automation (on/off or modulating duties) of industrial valves such as ball valves, butterfly valves and plug valves as used in process industries like chemical, petrolchemical, pharmaceutical, water treatment, oil & gas.

The Power Technology Upgrade series actuators are available in two configurations: double acting and single acting.

Mechanical Spring Return is for fail-safe applications and can be supplied for "Fail Close" or "Fail Open" safety function.

Double acting actuators can be used for a "Fail Last" Position safety function.

Special features

- Alodur hard anodized extruded aluminum body for corrosion protection, low friction and wearing resistance
- Dual piston rack and pinion design for compact construction and symmetric mounting.
- Fully machined teeth on piston racks and pinion shaft for accurate positioning, low backlash and maximum engagement.
- Two indipendent external travel stop adjustments.
- Universal and anti-blowout drive shaft with multiple valve connection options.
- Identical body and end caps for double acting and spring return configuration to allow field conversion.
- Stainless steel fasteners for high corrosion resistance.
- Multiple bearings and giudes for high cycles and low friction
- Modular preloaded springs.
- Extended working temperature range as standard.

Versions

- Spring return:
  - 90°, 120°, 135° and 180° rotation.
- Double acting:
  - 90°, 120°, 135° and 180° rotation,

Fig. 1: *Power Technology Upgrade series actuator*

Further versions

- Actuator with extra travel stop limitations (R100; R50; RC100),
- Fast acting,
- Low working temperature LLT2,
- High working temperature HT,
- Special painting according to ISO 12944,
- Water operated actuator,
- Natural gas operated actuator.

Complementary parts

- Lock out system on adjustment screws,
- Block and safety lock-out system,
- Gearbox.

Principle of operation

1. DOUBLE ACTING

Refer to Fig. 2.

In case of the double acting configuration air pressure is necessary for both strokes (A and B).

2. SINGLE ACTING

Refer to Fig. 3.

When air pressure is supplied through port “2” (A‘) into the actuator body, the linear force applied on the piston surface generates the pinion rotation, driving the valve to a defined position. At the same time the actuator springs are compressed.

When air pressure is discharged (B‘), the springs are automatically released, driving the rack and pistons back to the original position and thus the valve to the fail-safe position.

Direction of action and stroke adjustment

The standard rotating direction for the PTU Series actuators is clockwise to close.

Standard PTU Series actuators are designed for 90° rotating angle, with travel stop allowing adjustment for -5° up to +15° on the close position and for +5° up to -15° on the open position as per Fig. 4. For PT045 U stroke adjustment is only available on request.

For spring return actuator in case of pressure, power or signal failure the springs drive the actuator in the fail position that can be FAIL OPEN or FAIL CLOSE.

Power operating media

Use dry or lubricated air or inert gas.

– Make sure the operating media is compatible with the actuator internal parts and lubricant.
– In case of pressure medium different than Group 2 fluids according to the PED 2014/68/EU, contact AIR TORQUE.
– The operating media must have a dew point equal to 20°C (-4°F) or at least 10°C (18°F) below the ambient temperature.
– The maximum particle size contained into the operating media must not exceed 30 µm.

Further information

The actuators can be operated in different ways:

– direct mounting of control devices (for example a solenoid valve or a manifold) with NAMUR interface,
– threaded connections (to pressurize port “2” and “4”) with air lines from separate electro-pneumatic control system.

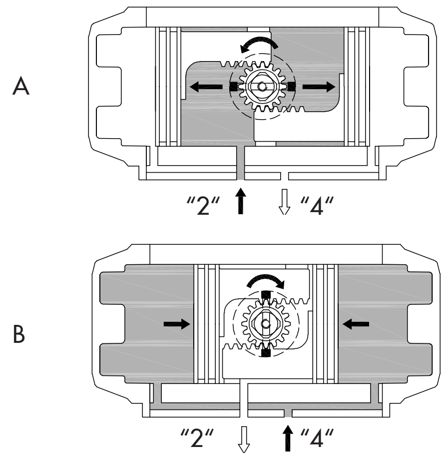


Fig. 2: *Double acting operation*

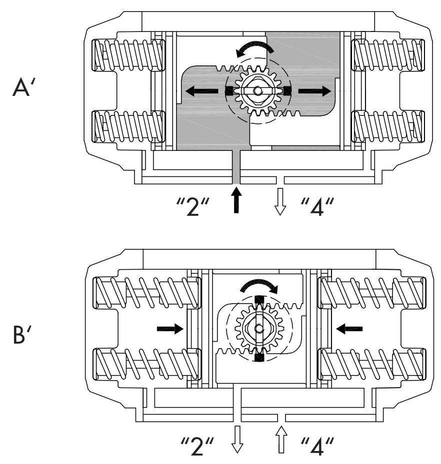


Fig. 3: *Single acting operation*

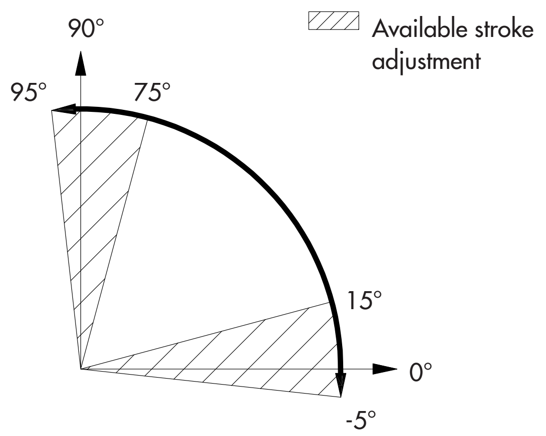


Fig. 4: *Stroke adjustment range*

Installation

Refer to the EB AT-RP-PTU mounting and operating instructions.

Ordering text

Refer to the Catalogue PTU-E-XX for actuators available options and ordering codes.

Further versions

- **Extra travel stop limitations (R100/R50/RC100)**

R50/R100

Actuator travel stop limitations are available in both opening or closing directions for standard assembly (clockwise to close) in order to provide maximum flexibility.

the R50 and R100 allows to limit the actuator stroke in opening direction (from 90° to 0°).

The R50 allow to limit the 45% of the stroke (from 90° to 45° stroke range).

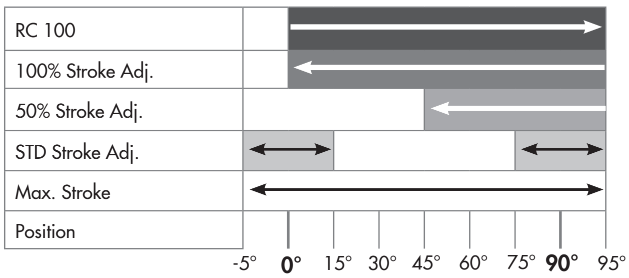
The R100 allow to llimit the 100% of the stroke (from 90° to 0° stroke range).

both R50 and R100 extra travel stop adjustments are equipped with protective plugs at the two adjustment screws ends in order to protect the two ends and to avoid potential cut due to screws sharp edges.

The R50 and R100 can be directly supplied mounted on the actuators or supplied as kits to retrofit sold actuators.

RC100

The RC100 allows to limit the 100% of the stroke in closing direction (from 90° to 0° stroke range).



TYPICAL APPLICATION: any application where an extra travel stop opening or closing position is required.

- **Fast acting**

The Fast Acting (FA) actuators are special actuators able to stroke faster respect the standard actuators. They are available both in double acting and in spring return configutations.

This type of actuators has enlarged ports and internal canalization which allows an higher flow rate of the the actuator and so a quicker operation in closing and/or opening direction.

TYPICAL APPLICATION: any application where actuator quick action is required

- **Low and high working temperature configurations**

In case minimum working temperature up to -60°C or maximum working temperature up to +150°C are required, the following special product configation are available:

- LLT2 version for extreme low operating temperature range:
  -60° C (-76° F) → +80° C (+176° F);
  LLT2 version actuators have stainless steel drive shaft. Aluminium drive shaft actuator version (LLT2A) can be supplied on request in order to achieve a more competitive price.
  LLT2 and LLT2A version actuators have the same technical features except for the drive shaft material and extra bushings for LLT2A.
- HT version for high operating temperature range:
  - 15° C (+5° F) → +150° C (+302° F).

TYPICAL APPLICATION: where the required working temperature exceeds the actuator standard working temperature range (-40°C / +80°C)

- **Special painting according to ISO 12944-2**

Different protection levels available in order to meet the field corrosion resistance requirements.

the protection levels are different combination of materials and painting cycles/types.

According to the ISO 12944-2 the standard available protection levels with single layer painting go approx. from the C3 level up to C5 level.

Special paint systems are available according to customer specification, including multilayer painting.

- **Water operated actuator**

Standard PTU actuators are operated with dry air or inert gas. Special actuator configutations are availble to operate with water as supply media.

Contact Air Torque for further detailed information.

- **Natural gas operated actuator**

Standard PTU actuators are operated with dry aie or inert gas. Special actuator configutations are availble to operate with natural gas (sweet and dry or sour) as supply media.

Contact Air Torque for further detailed information.

Complementary parts

- **Actuator with lock out system on adjustment screws**

In order to permanently lock the actuator in position, the actuator can be supplied with a special locking device by using a padlock and therefore preventing unwanted operation.

The lock out system on adjustment screws can be directly supplied mounted on the actuators or supplied as kits to retrofit sold actuators.

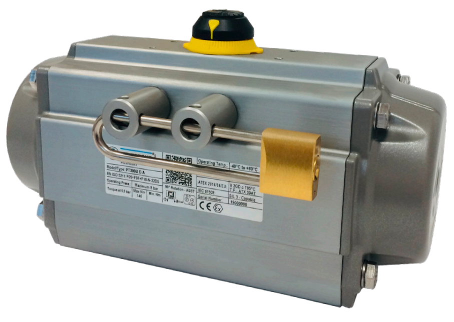


Fig. 24: *Actuator with lock out system on adjustment screws*

- **Actuator with block and safety lock-out system**

The block and safety lock-out system permits to lock the actuator and the valve in specific cases, despite the fail action of the actuator.

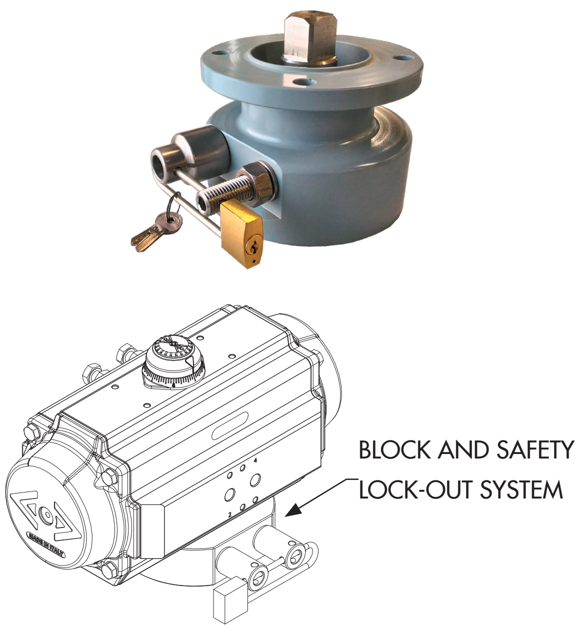


Fig. 23: *Actuator with Block and safety lock-out system*

- **Actuator with declutchable gearbox**

It is a manual override system designed to provide manual operation to stroke the actuator and the valve. The gearbox can have a vital role to stroke the actuator and the valve in the safe position when the supply pressure is not available in case of any emergency situation. The actuator and the valve are operated rotating a handwheel.

AIR TORQUE can provide the actuator packed with the declutchable gear box (buyout item).

The gearbox valve interface and connection (ISO flange and/ or valve stem adaption) are defined in the purchase order.

Fig. 22: *Actuator with gearbox*