



AIR TORQUE[®]



4th GENERATION PNEUMATIC ACTUATOR



I N D E X

Title	Page
▶ Design and construction.....	2 & 3
▶ Range of options.....	3
▶ Quality manufacturing.....	3
▶ Accessories available	3
▶ Multifunction-Indicator.....	4
▶ Ancillaries installation without Multi-function indicator.....	4
▶ 100% Travel stop adjustment.....	4
▶ Lock-Out option.....	4
▶ Operating conditions.....	5
▶ Operating function.....	5
▶ Fast acting operation.....	5
▶ Parts and materials.....	6
▶ ATB0 dimensions material and technical data.....	7
▶ Metric dimensions and technical data.....	8
▶ Imperial Dimensions and technical data.....	9
▶ Metric torque outputs.....	10 & 11
▶ Imperial torque outputs.....	12 & 13
▶ 120° and 180° Actuators.....	14
▶ 3 Position Actuators.....	15
▶ Sizing Information.....	15 & 16
▶ Protection levels available.....	17
▶ Full compliance with worldwide specifications.....	18
▶ How to order.....	19
▶ Quality product.....	19
▶ Standard documentation available.....	19
▶ Air Torque Sales Organization.....	20

DESIGN

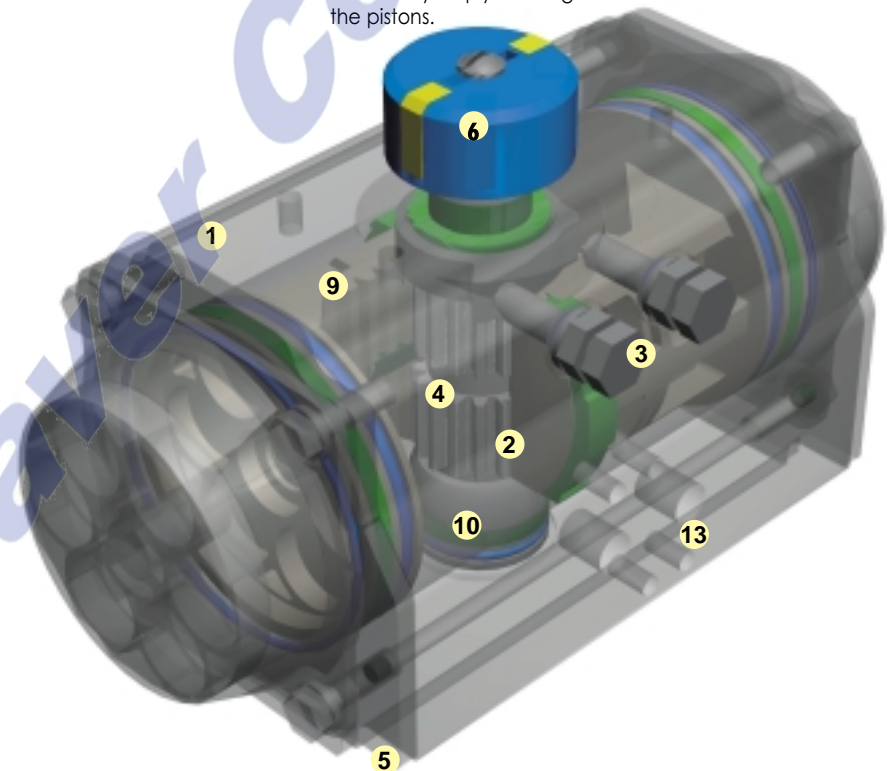
The new 4th Generation rack and pinion pneumatic actuator has been designed, developed and tested incorporating the latest technology and materials available, with some innovative design features.

As a result of this product research we have obtained a high grade product with the following characteristics:

- ◆ Reliability
- ◆ High performance
- ◆ Wider product range permitting a more economical sizing selection
- ◆ Innovative and patented universal drive shaft and multifunction position indicator
- ◆ Full compliance with latest worldwide specifications
- ◆ A wide selection of highest levels of corrosion protection technology
- ◆ Aesthetically compact and modern style with no external cavities to avoid deposit build up

CONSTRUCTION

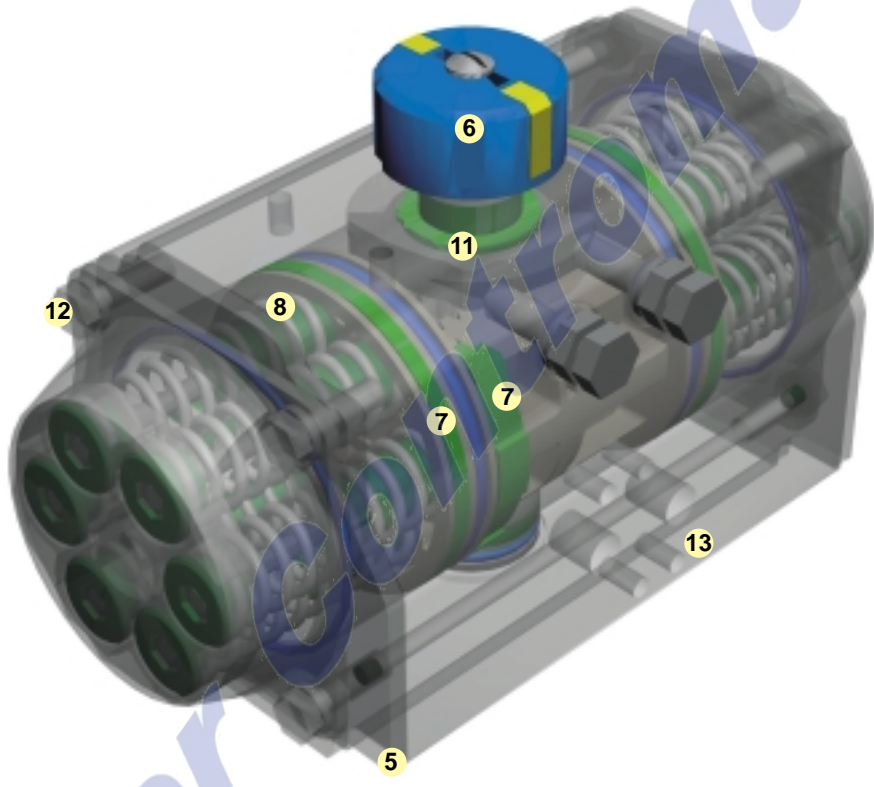
1. Extruded aluminium body, with both internal and external corrosion protection having honed cylinder surface for longer life and lower coefficient of friction.
2. Dual piston rack and pinion design for compact construction, symmetric mounting position, high-cycle life and fast operation, reverse rotation can be accomplished in the field by simply inverting the pistons.
3. Two independent external travel stop adjustments. Permits an easy and precise adjustment of +/- 4° in both directions, in the open and close positions for an accurate valve alignment.



4. Universal and anti-blowout patented drive shaft for an easy conversion from parallel to diagonal square and vice versa. This feature permits a lower and more flexible stock.
5. One compact design with identical body and end caps for double acting and spring return models reducing inventory and allowing field conversion, by adding or removing modular spring cartridge.
6. Multifunction position indicator with Namur slot to allow: visual position indication, to fit and drive all accessories, to fit easily and economically the most popular sensors.



CONSTRUCTION

7. Multiple bearings and guides on racks and pistons for precise operation, low friction, high cycle life and prevent shaft blowout.
 8. Modular preloaded spring cartridge design. With coated spring for simple versatile range, greater safety and corrosion resistance.
 9. Fully machined teeth on piston rack and pinion for accurate low backlash rack and pinion engagement and maximum efficiency.
 10. Electroless nickel-plated blowout resistant, bearing guided one-piece pinion for improved safety and maximum cycle life.
 11. Selected high quality bearings and seal for low friction, high cycle life and a wide operating temperature range.
 12. Internal and external stainless steel fasteners for long term corrosion resistance.
 13. Full conformance to the latest specifications: ISO 5211, DIN 3337 and VDI/VDE 3845 NAMUR for product interchangeability and easy mounting of solenoids, limit switches and other accessories.
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RANGE OF OPTIONS, ACCESSORIES AND QUALITY MANUFACTURING

RANGE OF OPTIONS

- A. With the 4th generation actuator we are able to offer 6 different levels of protections A, B, C, D, E, P. Please see table of protection levels available N° P01/99.
- B. Stainless steel 303 or 316 drive shaft is available on request on all sizes and all different protection levels .
- C. For high and low temperature applications FPM or Silicon O rings combined with a suitable lubricant are available for all models.
- D. 100% Adjustable travel stop.
- E. Economical Lock out capability in the fully-open or the fully-closed position.
- F. Multifunction Position indicator with S.S. metal inserts for proximity sensing.
- G. S.S. drive shaft Cover with namur slot for high temperature application and manual override.
- H. Other than the standard Parallel or Diagonal bottom drive shaft connection, we can supply Keyed drive connection, Flat head connection or special customized connections.
- I. 120° and 180° Actuator rotation and intermediate rotations like 135°.
- J. 3 position Actuators.

QUALITY MANUFACTURING

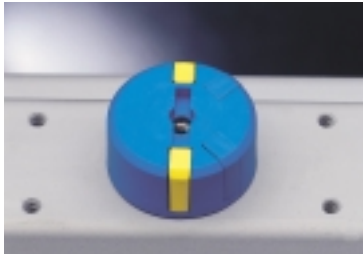
- ◆ The AIR TORQUE actuators are manufactured under a quality system independently assessed and approved to ISO 9001.
- ◆ Every single actuator is factory tested and provided with a unique serial number for traceability.
- ◆ Each individual actuator is packed in a special proper cardboard carton with a clear and full description of the product for protection and easy identification.

ACCESSORIES AVAILABLE

- ◆ Square drive reduction pieces for all drive shafts
- ◆ Centering/location ring for all sizes
- ◆ Brackets
- ◆ Couplings
- ◆ Solenoid valves
- ◆ Switch boxes
- ◆ Proximity sensors
- ◆ Gear boxes
- ◆ Positioners

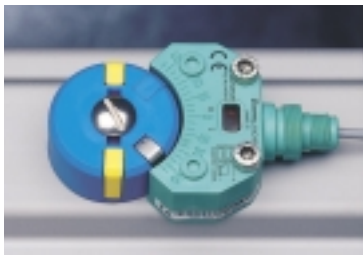
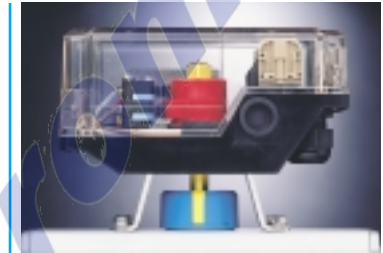


The multi-function indicator which is supplied as standard on 4th Generation Actuator and manufactured in composite material is suitable for:



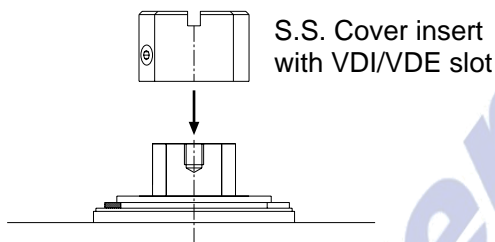
1. Position indication
Visual indication of the Actuator/Valve position is shown via a color coded insert and Namur slot. The indicator is suitable for all types of drive shaft and either direction of actuator rotation.

2. Actuator ancillary drive
The Namur drive slot in the position indicator permits direct drive engagement of switchboxes and positioners.



3. Direct mounting of sensors
The indicator can be supplied with metal inserts to permit easy and economical installation of many types of sensors: P+F, IFM, TURK, etc.

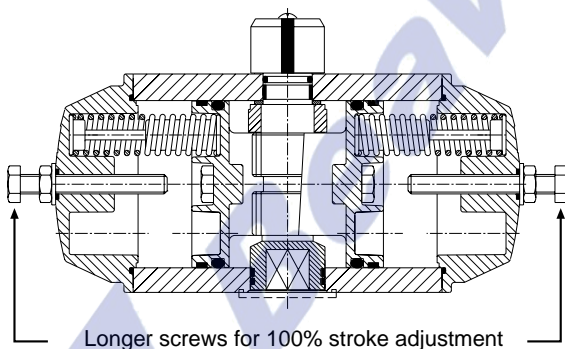
ANCILLARIES INSTALLATION WITHOUT MULTI-FUNCTION INDICATOR



The 4th Generation actuator can be supplied upon request with a S.S. Cover that replaces the standard indicator and has the Namur drive slot permitting:

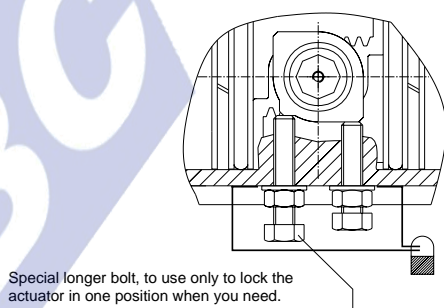
1. Fitment of ancillaries such as switchboxes and positioners
2. Indication of actuator position via the Namur slot
3. Operate at high temperature
4. Manual operation of the actuator in cases of emergency.

100% TRAVEL STOP ADJUSTMENT ON 4TH GENERATION ACTUATOR



The 4th Generation standard actuator provides stroke adjustment of + or - 4° in both directions 0° and 90°. When a stroke of less than 90° is required e.g. 1°, 5°, 10°, 25°, 50°, 80°, etc. the actuator can be supplied with special bolts in both End-Caps to allow stroke adjustment or limitation, from 0° to 90° according to customer requirements. The 100% TRAVEL STOP ADJUSTMENT is available on all of the 4th Generation actuator range.

LOCK-OUT CAPABILITY IN FULLY-OPEN OR FULLY-CLOSED POSITION



The 4th generation actuator offers an economical solution when is requested to locking the actuator in the fully-open (90°) or fully-closed (0°) position. The actuator can be supplied with a special bolt and locking device to permanently lock the actuator in position by using a padlock and preventing unwanted operation.



1. Operating media:

Dry or lubricated air or inert/non-corrosive gases on condition that they are compatible with internal actuator parts and lubricant. The operating media must have a dew point equal to -20°C (-40°F) or at least 10°C below the ambient temperature. The maximum particle size must not exceed 30 µ.

2. Supply pressure:

For Double Acting and Spring Return actuators the maximum supply pressure is: 8 Bar (116 PSI). Minimum supply pressure is 2.5 Bar (36 PSI).

3. Operating Temperature:

* Standard product from -20°C (-4°F) to +80°C (+176°F)

* Low temperature LT actuator with silicon "O" rings from -40°C (-40°F) to +80°C (+176°F)

* High temperature HT actuator with FPM "O" rings from -15°C (+5°F) to +150°C (+300°F)

Caution: For low and high temperature service, special grease is required. Please contact AIR TORQUE for each application. High and low temperature will vary the output torque of the actuator.

4. Stroke:

The stroke for AIR TORQUE actuators is as follows (See technical data):

* Standard construction: 90° rotation with stroke adjustment at 0° and 90° + or - 4°

* Type Y 120° stroke: 120° rotation with stroke adjustment at 0° and 120° + or - 4°

* Type X 180° stroke: 180° rotation with stroke adjustment at 0° and 180° + or - 4°.

5. Operating Time:

See Technical Data Sheet

6. Lubrication:

Actuators are factory lubricated for the life under normal operating conditions.

The standard lubricant is suitable for use from -20°C (-40°F) to +80°C (+176°F).

For low (LT) and high (HT) temperature service, where special grease is required please contact AIR TORQUE.

7. Construction:

Twin piston rack and pinion actuator design suitable for both indoor and outdoor installation.

8. Protection and Corrosion resistance:

Actuators are supplied with corrosion protections for normal environments. For severe duties select from the protection level table or contact AIR TORQUE.

9. Actuator designation and Marking:

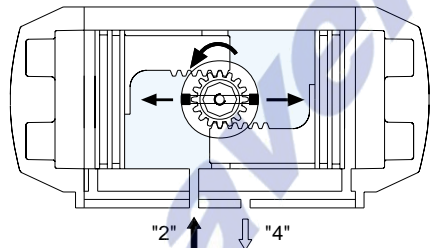
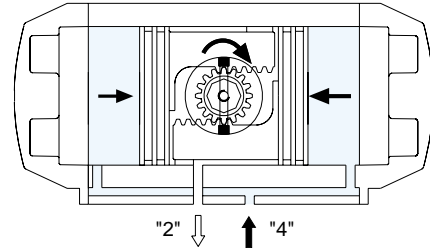
The actuator type, size, operating pressure, output torque, direction of rotation, orientation of failure mode, operating temperature and drive type are determined by actuator designation. AIR TORQUE actuators are supplied with a label showing all this informations: type, model (including protection and if applicable the LT or HT for operating temperature), stroke, maximum permissible supply pressure, direction of rotation, output torque, ancillary mounting detail, pressure connection, actuator/valve mounting detail and serial number.

OPERATING FUNCTION AND DIRECTION OF ROTATION

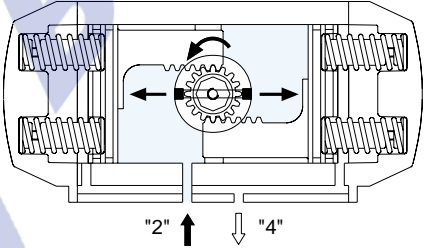
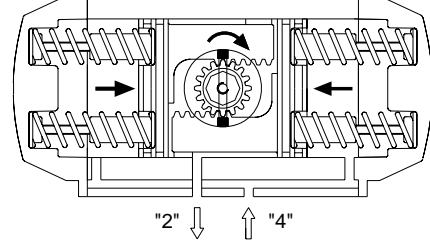
The standard rotation is clockwise to close, counter-clockwise rotation is achieved when port 2 is pressurised.

For actuator marked LF the rotation is counter-clockwise to close, clockwise rotation is obtained when port 2 is pressurised

Double Acting operation function (standard rotation) TOP View:

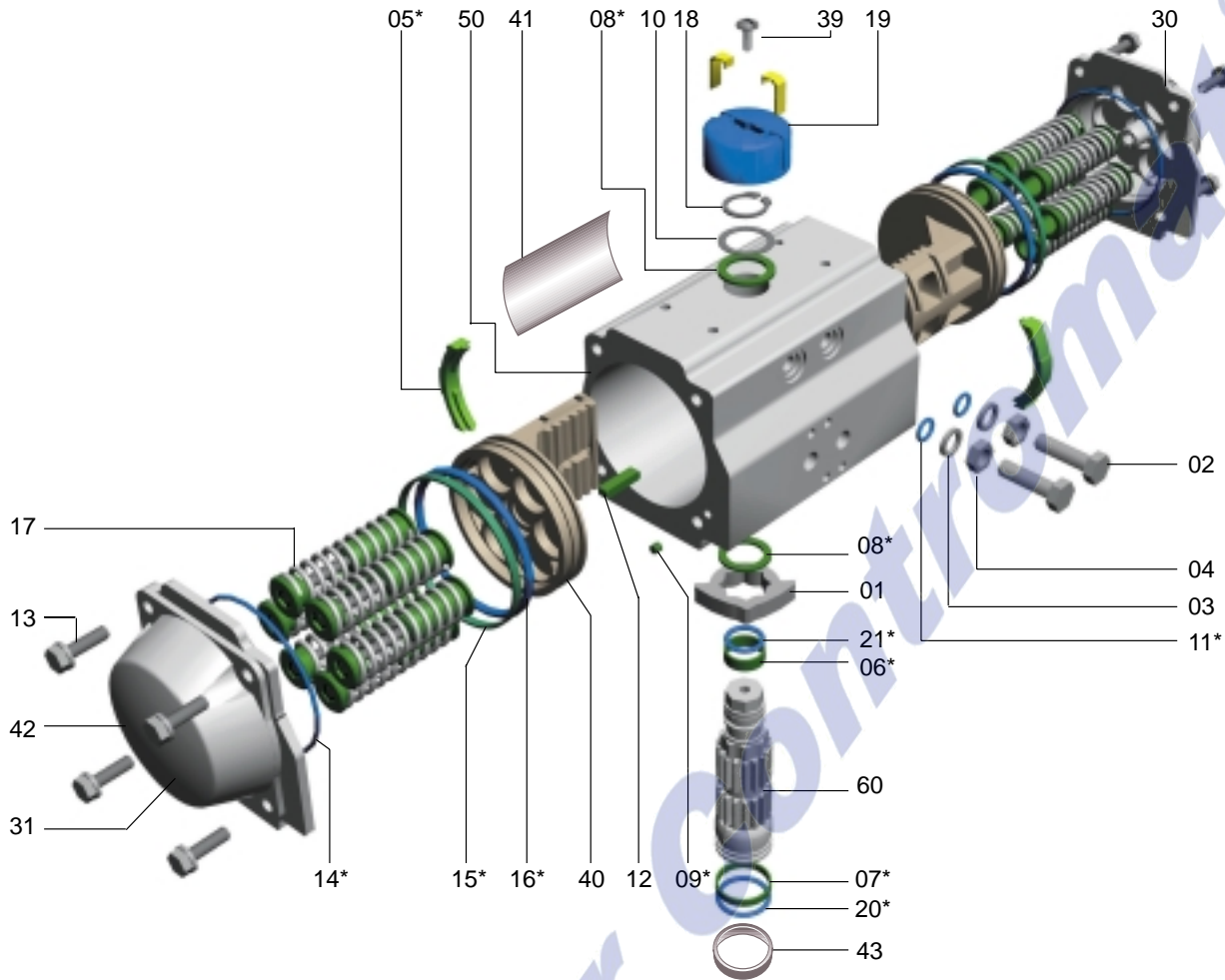
<p>Air supplied to Port 2 forces the pistons apart and towards the actuators end caps, with the exhaust air exiting at Port 4, a counter-clockwise rotation is achieved.</p>  <p>"2" ↑ ↓ "4"</p>	<p>Air supplied to Port 4 forces the pistons together with exhaust air exiting at Port 2, a clockwise rotation is achieved.</p>  <p>"2" ↓ ↑ "4"</p>
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Single Acting operation function (standard rotation) TOP View:

<p>Air supplied to Port 2 forces the pistons apart and toward the actuator end caps, compressing the springs with the exhaust air existing at Port 4, a counter clockwise rotation is achieved.</p>  <p>"2" ↑ ↓ "4"</p>	<p>On loss of air pressure (air or electric failure) at Port 2 allows the springs to force the pistons together with the exhaust air exiting at Port 2, a clockwise rotation is achieved.</p>  <p>"2" ↓ ↑ "4"</p>
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FAST ACTING ACTUATORS

Upon request AIR TORQUE actuators can be specially manufactured for fast acting operations. The normal life span of the actuators is associated with the normal operating time.



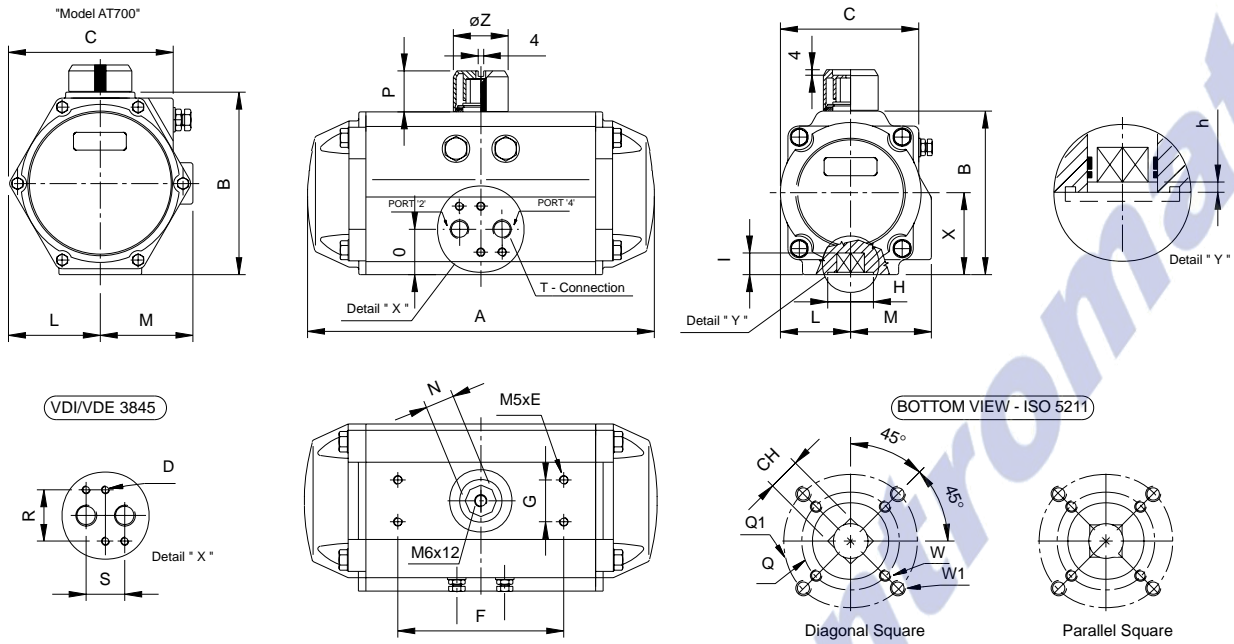
PART N°	Spare Parts	UNIT Q.TY	PART DESCRIPTION	STANDARD MATERIAL	CORROSION PROTECTION "A" (A)	OPTIONAL MATERIAL
01		1	OCTI-CAM (Stop arrangement)	Stainless Steel (B)	-----	-----
02		2	STOP CAP SCREW	Stainless Steel	-----	-----
03		2	WASHER	Stainless Steel	-----	-----
04		2	NUT (Stop screw)	Stainless Steel	-----	-----
05*	○	2	BEARING (Piston back)	Polyphthalamide	-----	-----
06*	○	1	BEARING (Pinion top)	Nylon 46	-----	-----
07*	○	1	BEARING (Pinion bottom)	Nylon 46	-----	-----
08*	○	2	THRUST BEARING (Pinion)	Polyphthalamide	-----	-----
09*	○ □	2	PLUG	Nitrile (NBR)	-----	FPM --- Silicon
10		1	THRUST WASHER (Pinion)	Stainless Steel	-----	-----
11*	○ □	2	"O" RING (Stop screw)	Nitrile (NBR)	-----	FPM --- Silicon
12		2	PISTON GUIDE	*Polyphthalamide + GF	-----	-----
13		8 (c)	CAP SCREW (End cap)	Stainless Steel	-----	-----
14*	○ □	2	"O" RING (End cap)	Nitrile (NBR)	-----	FPM --- Silicon
15*	○	2	BEARING (Piston head)	Polyphthalamide	-----	-----
16*	○ □	2	"O" RING (Piston)	Nitrile (NBR)	-----	FPM --- Silicon
17		min.5 max.12	SPRING (Cartridge)	High alloy Spring Steel	Epoxy coated	-----
18		1	SPRING CLIP (Pinion)	Spring Steel	Nickel plated	Stainless Steel
19		1	POSITION INDICATOR	Polypropylene +GF	-----	-----
20*	○ □	1	"O" RING (Pinion bottom)	Nitrile (NBR)	-----	FPM --- Silicon
21*	○ □	1	"O" RING (Pinion top)	Nitrile (NBR)	-----	FPM --- Silicon
30 (D)		1	RIGHT END CAP	Die Cast Aluminium alloy	Polyester coated	-----
31 (D)		1	LEFT END CAP	Die Cast Aluminium alloy	Polyester coated	-----
39		1	CAP SCREW (Indicator)	Stainless Steel	-----	-----
40		2	PISTON	Die Cast Aluminium alloy	Anodized	-----
41		1	ACTUATOR IDENTIFICATION LABEL	Polyester-Aluminium	-----	-----
42		2	END CAP LABEL	Polyester-Aluminium	-----	-----
43		1	SPIGOT (Only on request)	Extruded Aluminium alloy	ALODUR	-----
50		1	BODY	Extruded Aluminium alloy	ALODUR	-----
60		1	DRIVE SHAFT	Steel alloy	Nickel plated	Stainless Steel

* Suggested SPARE PARTS For maintenance

- Parts included in spare parts kit
- Parts included in "O" ring kit

Notes: (A) For other protection levels available see page 17

- (B) For models AT350 and bigger the OCTI-CAM material is cast iron.
- (C) For model AT700 and model AT800 the Cap screws are 12 pcs.
- (D) For models AT550 and bigger the 2 End Caps are symmetric



	ACTUATOR MODEL	AT050	AT100	AT200	AT250	AT300	AT350	AT400	AT450	AT500	AT550	AT600	AT650	AT700	AT800
	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S	D/S
Dimensions in mm	A	140,5	158,5	210,5	247,5	268,5	315	345	408,5	437,5	487	543	621	684	-
	B	69	85	102	115	127	145	157	177	196	220,5	245	298,5	330	-
	C	59	72	84,5	97,5	111	127	136	156,5	169	190,7	213	251	298,5	-
	D	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10	M6x10	-
	E	4	8	8	8	8	8	8	8	8	8	8	8	8	-
	F	80	80	80	80	80	80	80	80	80	130	130	130	130	-
	G	30	30	30	30	30	30	30	30	30	30	30	30	30	-
	H	30	35	35	55	55	70	70	85	85	100	100	130	130	-
	I min.	12	16	16	19	19	24	24	29	29	38	38	48	48	-
	L	29	36	42,5	49,5	56	64	69,5	80	88	99	110	131	163,5	-
	M	41,5	47	52	56,8	67	77	82	91,5	99	105	112	131	166	-
	N	11	11	19	19	19	27	27	27	27	42	42	42	42	-
	O	26,5	30	30,5	32,5	37,5	42,5	45	47	52	58	62	78,5	165	-
	P	20	20	20	20	20	30	30	30	30	50	50	50	50	-
	Q	42	50	50	70	70	102	102	125	125	140	140	165	165	-
	Q1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	R	32	32	32	32	32	32	32	32	32	32	32	45	45	-
	S	24	24	24	24	24	24	24	24	24	24	24	40	40	-
W	M5	M6	M6	M8	M8	M10	M10	M12	M12	M12	M16	M20	M20	-	
W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T - ISO 228	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	1/2"	-	
ISO Flange	F04	F05	F05	F07	F07	F10	F10	F10	F12	F12	F14	F14	F16	F16	
CH	11	14	14	17	17	22	22	27	27	36	36	46	46	-	
h min.	0,5	0,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	2	2	2,5	2,5	-	
X	34,5	42,5	51	57,5	63,5	72,5	78,5	88,5	98	111,5	122	150,5	165	-	
Z	40	40	40	40	40	56/65	56/65	65	65	80/115	80/115	115	115	-	
Options	ISO Flange	F03	F04	F05-F07	F05-F07	F05 F07 F10	F07-F10	F07-F10	F10-F12	F10-F12	F12	F12	F14	F14	-
	Q	36	42	50	50	50	70	70	102	102	125	125	140	140	-
	Q1	-	-	70	70	70	102	102	125	125	-	-	-	-	-
	W	M5	M5	M6	M6	M6	M8	M8	M8	M10	M10	M12	M12	M16	M16
	W1	-	-	M8	M8	M8	M10	M10	M12	M12	-	-	-	-	-
	H	25	30	35	40	40	55	55	70	70	85	85	100	112	-
	CH	9	11	17	17	17	22	22	27	27	27	27	36	36	-
	I min.	10	12	19	19	19	24	24	29	29	29	29	38	38	-

METRIC	MODEL TYPE	AT 050		AT 100		AT 200		AT 250		AT 300		AT 350		AT 400		AT 450		AT 500		AT 550		AT 600		AT 650		AT 700		AT 800			
		D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S		
Chamber	φ (mm)	50		63		75		88		100		115		125		145		160		180		200		240		265					
Screw stroke Adjustment	For 1° adj.need	1/6 turn		1/6 turn		1/6 turn		1/5 turn		1/5 turn		1/5 turn		1/4 turn		1/5 turn		1/4 turn		1/4 turn		1/4 turn		1/4 turn		1/4 turn					
Air Volume Opening	(L)	0,09		0,16		0,31		0,51		0,71		1,19		1,54		2,41		3,14		4,26		5,94		10		14,5					
Air Volume Closing	(L)	0,15		0,26		0,49		0,78		1,11		1,8		2,34		3,78		4,92		6,89		9,46		15,2		21,38					
Opening Time (A)	(Sec.)	0,2	0,25	0,25	0,3	0,3	0,35	0,4	0,5	0,5	0,6	0,7	0,8	0,9	1,1	1,2	1,4	1,5	1,7	2	2,2	2,7	3,2	3,5	4	4	4,5				
Closing Time (A)	(Sec.)	0,25	0,3	0,3	0,35	0,4	0,5	0,5	0,6	0,7	0,9	0,9	1,1	1,2	1,4	1,5	1,8	1,8	2,1	2,4	2,8	3,5	4	4,1	4,6	4,5	5				
Approximate weight	(Kg)	0,96		1,06		1,7		3,8		4,4		5,4		6,51		8,4		9,84		10,2		12,6		14,5		18,1		19,8		24	

Notes: (A) The above indicated moving time of the actuator, are obtained in the following test conditions: (1) Room Temperature, (2) Actuator Stroke 90°, (3) Solenoid Valve with Orifice Of 4 mm and a flow capacity Qn 400 L/min., (4) Inside pipe diameter 8 mm, (5) Medium clean air, (8) Air supply pressure 5,5 bar (79,75Psi), (7) Actuator without external resistance load.

Cautions: obviously on the field applications when one or more of the above parameter are different, the moving time will be different.