

WE MAKE IT



AIR TORQUE Pneumatic Actuator

THE RIGHT WAY.

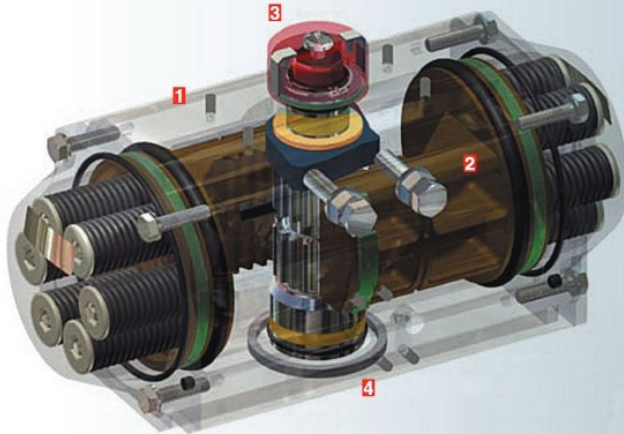


<http://www.autovalve.tw>



AIR TORQUE

Innovations for The Future with New and Intelligent Technology ■
採用最新的智慧技術 · 迎向未來的創新產品



1. Body 本體

The aluminum body with the appealing 'New Edge Design'. Inside and outside surface are completely coated with ALODUR. Advantages of ALODUR coating: extremely abrasion resistant, low surface roughness, optimal resistance.

新造型的鋁製本體。內外完全採用ALODUR表面處理。
ALODUR塗層優點：高耐磨性，低表面粗糙度，理想的阻抗性能。

2. External Stroke Adjustment 外部行程調整

A great saving of time is achieved. When mounting the actuator on the valve, the rotation angle is easily and friendly adjustable with the precise cam system.

It is also changeable with a special cam for 0°-15° and 75°-90°.

This feature can be used by simply changing the screw with a longer one.

All adjustments of the end positions are possible without disassembling.

充分節省時間。驅動器裝在閥門之後，通過精密凸輪結構可簡易調整旋轉角度（通過特定的凸輪結構對0°-15°及75°-90°的角度範圍也可進行改變）。

行程調整時只需改變螺栓長度，不需拆卸驅動器便可完成。

3. Multifunction Indicator 多功能指示器

The position of the multifunction indicator is adapted easily for a parallel or 45° position of the square as well as for along or the actuator positions.

Direct mounting-Through exchanging of the white inserts, the multifunction indicator is suitable as 'Puck' for the direct mounting(mechanic, inductive).

透過改變嵌入裝置，直接安裝型的多功能指示器可以是機械式或感應式的。

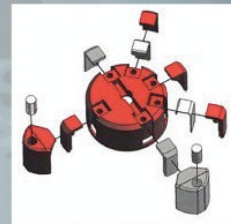
指示器的指示位置可以與管路平行或呈45°。

4. The Connections 連接裝置

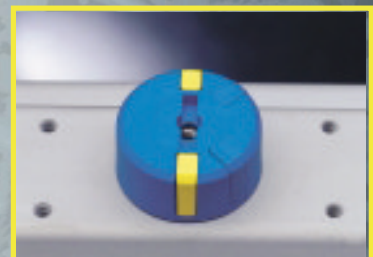
ISO 5211, DIN 3337 (F03-F25), VDI/VDE 3845 (Size 0 to 4) ISO 1 (CNOMO) and NAMUR for flexible usability and exchangeability.

驅動連接裝置具有通用性與可更換性，符合 ISO 5211，DIN 3337(F03-F25)，

VDI/VDE 3845(Size 0 to 4) ISO 1(CNOMO) 及 NAMUR 等標準。



Position Indication



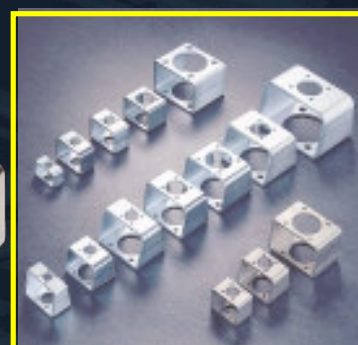
Condition of Usage 執行環境

Air supply 供氣	Temperature range 溫度範圍 acc. to design	max. press. 最大使用壓力	Turning range 旋轉角度範圍 ±4° adjustable
filtered, lubricated or dry air, non-corrosive media, Dp-20°C(Dew point) (Dp min. 10°C < Tarea), particulate size < 30µm	Standard -20°C to +80°C Low temperature -40°C to +80°C High temperature -15°C to +150°C	8 bar	90° 120°-135°-180°a.A.

4th Generation Pneumatic Actuator 第四代氣動驅動器

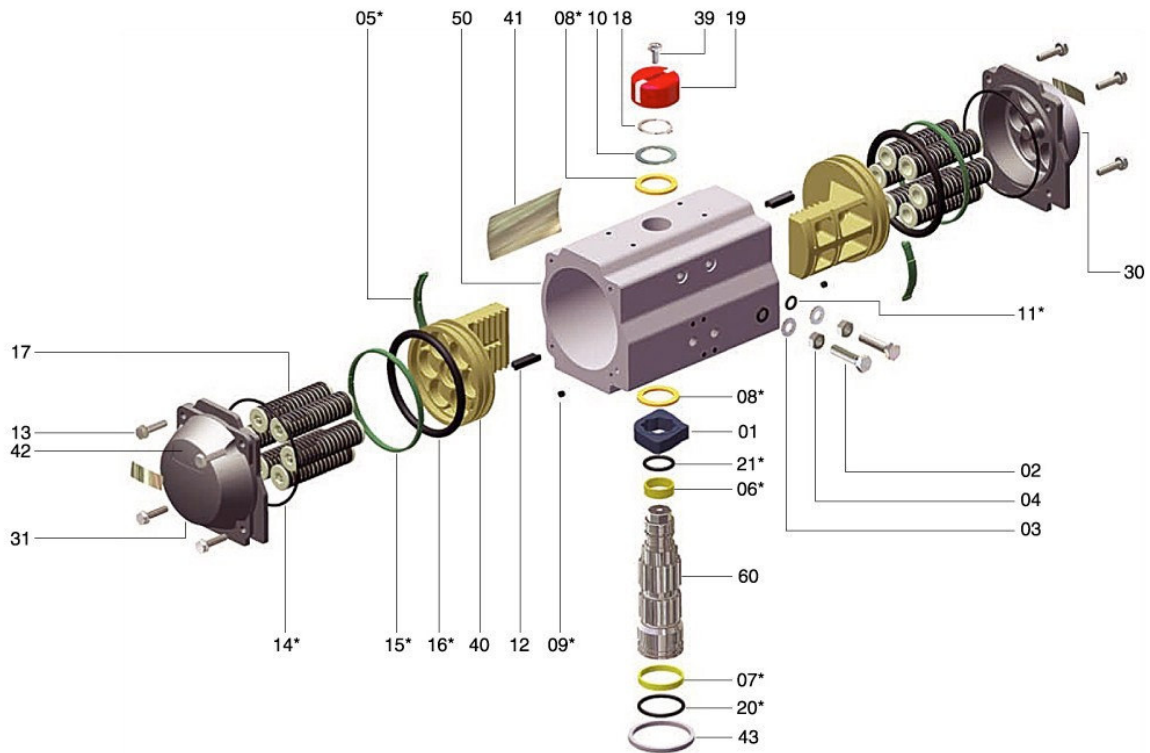


Available Accessories 配件



<http://www.autovalve.tw>

PARTS & MATERIALS 部品及材質



Suggested SPARE PARTS For maintenance

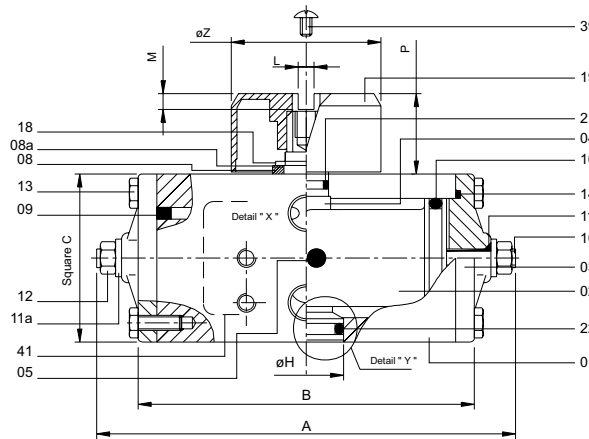
PART N°	UNIT Q.TY	PART DESCRIPTION	STANDARD MATERIAL
01	1	OCTI-CAM (Stop arrangement)	Stainless Steel (A)
02	2	STOP CAP SCREW	Stainless Steel
03	2	WASHER	Stainless Steel
04	2	NUT (Stop screw)	Stainless Steel
05*	2	BEARING (Piston back)	Polyphthalamide
06*	1	BEARING (Pinion top)	Nylon 46
07*	1	BEARING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

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

ATBO DIMENSIONS, MATERIAL AND TECHNICAL DATA

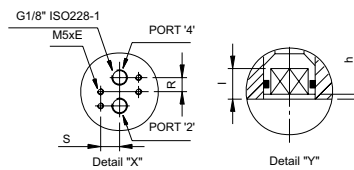
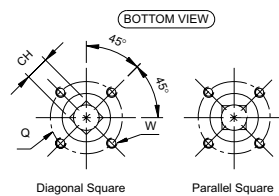
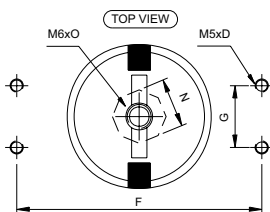


AIR TORQUE



DIMENSIONS IN mm AND inches

Dimensions:	mm	Inch
A	115	4.53
B	94	3.70
Square C	45	1.77
D	7	0.28
E	4,5	0,18
F	50	1,97
G	25	0,98
H	20	0,79
I min.	10	0,39
L	4	0,16
M	4,5	0,18
N	11	0,43
O	12	0,47
P	20	0,79
Q	36	1,42
R	12	0,47
S	16	0,63
W	M5x8	M5x0,31
Z	40	1,57
CH	9	0,35
h min.	0,5	0,02
ISO Flange	F03	F03



PART N°	Spare Parts	UNIT Q.TY	PART DESCRIPTION	STANDARD MATERIAL	CORROSION PROTECTION "A" (A)	OPTIONAL MATERIAL
01		1	BODY	Extruded Aluminium alloy	ALODUR	-----
02		2	PISTON	'Polyphthalamide + GF	-----	-----
03		2	END CAP	'Polyphthalamide + GF	-----	-----
04		1	DRIVE SHAFT	Steel alloy	Nickel plated	Stainless Steel
05*	○	2	BEARING (Piston back)	Nylon 46	-----	-----
08*	○	1	THRUST BEARING (Pinion)	Nylon 46	-----	-----
08a	○	1	THRUST WASHER (Pinion)	Stainless Steel	-----	-----
09*	○ □	2	PLUG	Nitrile (NBR)	-----	FPM --- Silicon
10		2	SCREW (Ext. stroke adjustment)	Stainless Steel	-----	-----
11*	○ □	2	"O" RING (Screw seal))	Nitrile (NBR)	-----	FPM --- Silicon
11a		2	WASHER	Stainless Steel	-----	-----
12		2	NUT (Stop adjustment)	Stainless Steel	-----	-----
13		8	CAP SCREW (End cap)	Stainless Steel	-----	-----
14*	○ □	2	"O" RING (End cap)	Nitrile (NBR)	-----	FPM --- Silicon
16*	○ □	2	"O" RING (Piston)	Nitrile (NBR)	-----	FPM --- Silicon
18		1	SPRING CLIP (Pinion)	Spring Steel	Nickel plated	Stainless Steel
19		1	POSITION INDICATOR	Polypropylene +GF	-----	-----
21*	○ □	1	"O" RING (Pinion top)	Nitrile (NBR)	-----	FPM --- Silicon
22*	○ □	1	"O" RING (Pinion bottom)	Nitrile (NBR)	-----	FPM --- Silicon
39		1	CAP SCREW (Indicator)	Stainless Steel	-----	-----
41		1	ACTUATOR IDENTIFICATION LABEL	Polyester-Aluminium	-----	-----

* Suggested SPARE PARTS For maintenance

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

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

DOUBLE ACTING TORQUE RATINGS IN Nm											
Supply Pressure	2,5 Bar	3 Bar	3,5 Bar	4 Bar	4,2 Bar	4,5 Bar	5 Bar	5,5 Bar	6 Bar	7 Bar	8 Bar
AT BO D	3,0	3,6	4,2	4,8	5,1	5,4	6,1	6,7	7,3	8,5	9,7

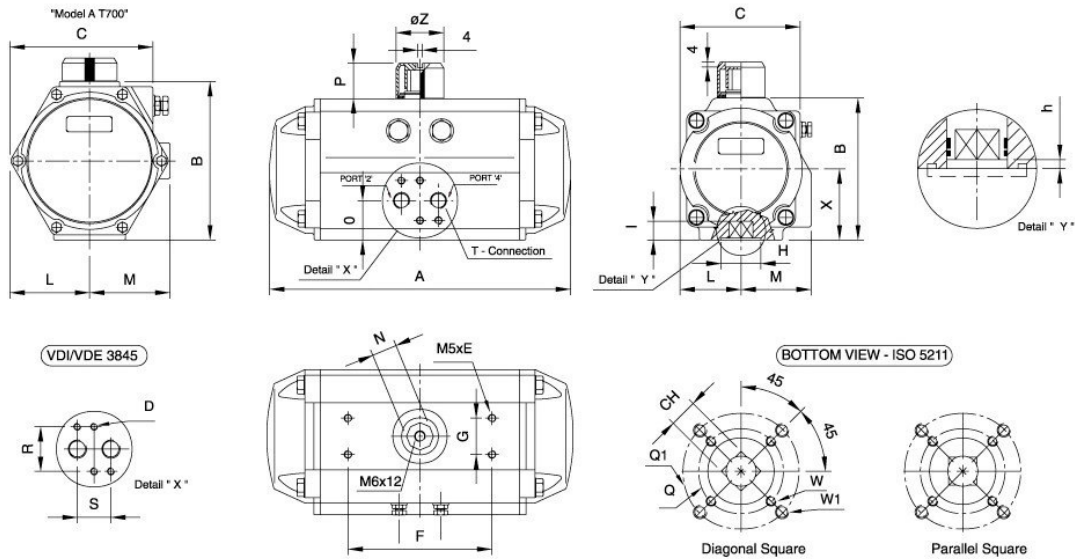
DOUBLE ACTING TORQUE RATINGS IN LB-IN									
Supply Pressure	40 Psi	50 Psi	60 Psi	70 Psi	80 Psi	90 Psi	100 Psi	110 Psi	116 Psi
AT BO D	29,5	36,9	44,3	51,7	59,1	66,5	73,9	81,2	85,7

	Metrics		Imperial	
	φ mm		φ inch	
Chamber	32		1,257	
Air volume opening	L	0,04	Cu. In.	2,4
Air volume closing	L	0,04	Cu. In.	2,4
Opening Time (A)	Sec.	0,15	Sec.	0,15
Closing Time (A)	Sec.	0,15	Sec.	0,15
Approximate Weight	Kg	0,45	Lbs	0,98

Notes: The indicated moving time of the actuator is 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, (6)Air supply pressure 5,5 bar (79,75 Psi), (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.

METRIC DIMENSIONS & TECHNICAL DATA 外部尺寸及規格



ACTUATOR MODEL	AT051	AT101	AT201	AT251	AT301	AT351	AT401	AT451	AT501	AT551	AT601	AT651	AT701	AT751	
	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	
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	M16	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	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	70	102	102	125	125	140	140	-
	Q1	-	-	70	70	70 102	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	M10	M12	M12	-	-	-	-	-
	H	25	30	35	40	40 55	55	55	70	70	85	85	100	112	-
	CH	9	11	17	17	17 22	22	22	27	27	27	27	36	36	-
	I min.	10	12	19	19	19 24	24	24	29	29	29	29	38	38	-

METRIC	MODEL TYPE	AT051 D S	AT101 D S	AT201 D S	AT251 D S	AT301 D S	AT351 D S	AT401 D S	AT451 D S	AT501 D S	AT551 D S	AT601 D S	AT651 D S	AT701 D S	AT751 D S												
Chamber	ø (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	1.58	1.7	2.7	3.15	3.8	4.4	5.4	6.51	8.4	9.84	10.2	12.6	14.5	18.1	19.8	24	25	31.6	35.5	45.1	53	64	83	102

Notes: 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, (6) 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.

單動型 (彈簧回復) 扭力值

Supply Pressure	2.5 Bar	3 Bar		3.5 Bar		4 Bar		4.2 Bar		4.5 Bar		5 Bar		5.5 Bar		6 Bar		7 Bar		8 Bar		Spring stroke		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°	
Actuator Model	Spring Set	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	
AT601	S 05	319	217	426	323	532	430	638	536	681	578	745	642	851	749									315 213
	S 06	277	154	383	260	489	367	596	473	638	515	702	579	808	686	915	792							378 255
	S 07			341	197	447	304	553	410	596	453	660	516	766	623	872	729	979	835					441 298
	S 08					404	241	511	347	553	390	617	453	723	560	830	666	936	772	1149	985			504 340
	S 09							468	284	511	327	575	390	681	497	787	603	894	709	1106	922	1319	1135	567 383
	S 10											532	327	638	434	745	540	851	646	1064	859	1277	1072	630 425
	S 11													596	371	702	477	809	583	1021	796	1234	1009	693 468
	S 12															660	414	766	520	979	733	1192	946	756 510
	S 05	533	372	712	9.2	890	730	1069	908	1141	980	1248	1087	1426	1266									521 360
	S 06	461	268	640	447	818	625	997	804	1068	876	1176	983	1354	1162	1533	1340							625 433
	S 07			568	343	746	521	925	700	996	771	1104	879	1282	1057	1461	1236	1640	1415					730 505
	S 08					674	417	853	596	924	667	1032	774	1210	953	1389	1132	1568	1310	1925	1668			834 577
S 09							781	491	852	563	959	670	1138	849	1317	1028	1495	1206	1853	1564	2210	1921	938 649	
S 10											887	566	1066	745	1245	923	1423	1102	1781	1459	2138	1817	1042 721	
S 11													994	640	1173	819	1351	998	1709	1355	2066	1713	1146 793	
S 12															1101	715	1279	894	1637	1251	1994	1608	1251 865	
S 05	751	496	1011	755	1270	1015	1529	1274	1633	1378	1789	1533	2048	1793									801 546	
S 06	642	336	902	595	1161	854	1420	1114	1524	1217	1680	1373	1939	1632	2198	1892							961 655	
S 07			792	435	1052	694	1311	954	1415	1057	1570	1213	1830	1472	2089	1732	2349	1991					1121 764	
S 08					943	534	1202	793	1306	897	1461	1053	1721	1312	1980	1571	2239	1831	2758	2350			1281 873	
S 09							1093	633	1197	737	1352	893	1612	1152	1871	1411	2130	1671	2649	2189	3166	2708	1442 982	
S 10											1243	732	1503	992	1762	1251	2021	1510	2540	2029	3059	2548	1602 1091	
S 11													1393	832	1653	1091	1912	1350	2431	1869	2950	2388	1762 1200	
S 12															1544	931	1803	1190	2322	1709	2840	2228	1922 1309	
AT801	S 05																							
	S 06																							
	S 07																							
	S 08																							
	S 09																							
	S 10																							

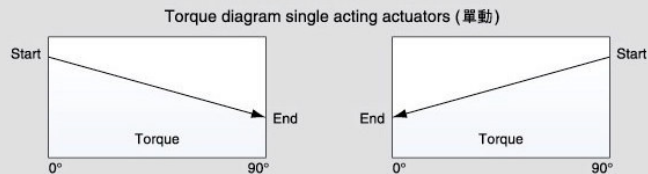
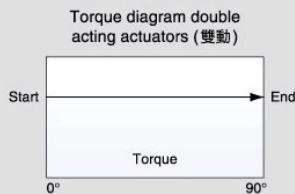
N° of Springs

The above value are the out-put torque that remain available to operate the valve when the port '2' is pressurized.

Out-put torque available when air supply fails

DOUBLE ACTING TORQUE RATINGS IN Nm 雙動型扭力值

Supply Pressure	2.5 Bar	3 Bar	3.5 Bar	4 Bar	4.2 Bar	4.5 Bar	5 Bar	5.5 Bar	6 Bar	7 Bar	8 Bar
Model											
AT051 D	8.3	10.0	11.6	13.3	14.0	15.0	16.6	18.3	19.9	23.3	26.6
AT101 D	14.7	17.6	20.5	23.5	24.6	26.4	29.3	32.2	35.2	41.0	46.9
AT201 D	29.1	34.9	40.7	46.5	48.9	52.4	58.2	64.0	69.8	81.4	93.1
AT251 D	45.8	54.9	64.1	73.2	76.9	82.4	91.5	101	110	128	146
AT301 D	66.5	79.8	93.1	106	112	120	133	146	160	186	213
AT351 D	107	129	150	172	181	193	215	236	258	301	344
AT401 D	138	166	194	222	233	249	277	305	332	388	443
AT451 D	217	261	304	348	365	391	435	478	522	609	696
AT501 D	284	340	397	454	477	511	567	624	681	794	908
AT551 D	383	459	536	613	643	689	766	842	919	1072	1225
AT601 D	532	638	745	851	893	957	1064	1170	1276	1489	1702
AT651 D	893	1072	1251	1430	1501	1608	1787	1966	2144	2502	2859
AT701 D	1297	1556	1815	2075	2179	2334	2594	2853	3112	3631	4150
AT801 D											



DOUBLE ACTING ACTUATOR 雙動驅動器 ■

With rack and pinion construction the output torque of an actuator is obtained by multiplying the piston force (given by air supply pressure) by the pitch shaft radius (lever arm) as shown in fig.1 less the force lost for friction (efficiency).

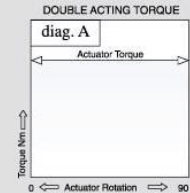
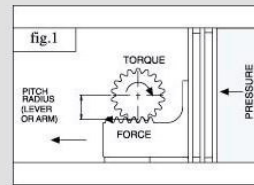
Because of this concept, the output torque is linear as shown in the diag. A in both clockwise and counterclockwise rotation.

The suggested safety factor for double acting actuators in normal working conditions is 15~20%.

活塞驅動力（通過的氣體壓力）乘以驅動軸間距（力臂）即為雙動驅動器的輸出扭距（忽略摩擦所造成的力損失）。圖fig.1

因此，正向與逆向旋轉所得的輸出扭距都是線性的。圖diag. A

正常情況下，雙動驅動器的安全係數建議為15%~20%。



SPRING RETURN ACTUATOR 單動（彈簧回復）驅動器 ■

In spring return applications the output torque is obtained in two different operations as shown in fig.2 and 3.

Each operation produces two different values in relation to the stroke position (0° or 90°).

For spring return actuators the output torque is produced by multiplying the force (air or springs acting on the pistons) by the lever arm.

氣壓或彈簧在活塞上的作用力乘以力臂即為單動驅動器的輸出扭距。扭距係由兩個不同的行程所產生，圖fig.2和圖fig.3因不同的行程位置，故而兩個扭距值亦不相同。

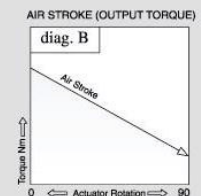
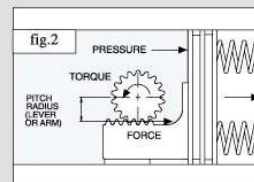
First condition: (fig.2)

Output torque is generated by air supply pressure at Port 2 after compressing the springs, called "OUTPUT TORQUE AIR STROKE". In this case air forces the pistons from the 0° to the 90° position and consequently the torque starts from a high value and during the stroke it constantly decreases until 90° due to the natural force that springs generate (oppose) when they are compressed (diag. B).

行程一：圖fig.2

由壓縮的氣體去擠壓彈簧，產生"氣壓作用行程輸出扭距"

此時，由於彈簧被壓縮的反作用力，氣壓力在0°~90°位置產生的扭距由高至低遞減。圖diag. B

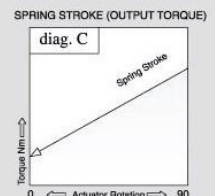
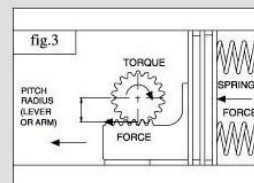


Second condition: (fig.3)

Output torque is generated by the force that springs release onto the pistons when air fails, called "OUTPUT TORQUE SPRING STROKE". In this case the torque, starting from the 90° position, constantly decreases until 0° because of springs extending (diag. C).

行程二：圖fig.3

不供氣時，輸出扭距是由彈簧作用在活塞上的釋放手所產生，是謂"彈簧作用行程輸出扭距"。此時，由彈簧釋放產生的輸出扭距在90°~0°逐漸遞減。圖diag. C



At spring return actuator are designed to produce a balanced torque in the two conditions explained above when the number of springs per side is equal to the air pressure supply (4 bar - 4 springs each side) as shown in diag. D.

For certain applications it is possible to achieve (where desired), the unbalanced torque, as shown in diag. E, by changing the relation between the number of springs per side and air pressure supply in bar (for example 6 springs and 5.5 bar or vice versa).

In spring return applications two conditions can be achieved: air failure to close or failure to open.

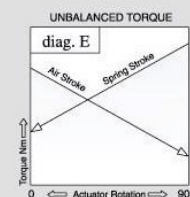
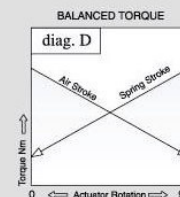
The suggested safety factor for spring return actuator in normal working conditions is 20~25%.

單動驅動器在上述兩種行程下都能得到平衡力距，亦即每邊一定數量彈簧產生的力等於氣壓供給的力（壓力 4 bar，每邊4個彈簧）。圖diag. D

特殊的情況下也能得到所需的平衡力距，亦即改變每邊彈簧數量和供給壓力的關係

（例如每邊6個彈簧，5.5 bar 的供給壓力，反之亦然）。圖diag. E

單動驅動器於開啟或關閉時若設定不當，可能產生氣壓供給失效；正常情況下的安全係數建議為20%~25%。



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