博恩
THEOBORN

浙江博恩自控阀门有限公司
Theoborn auto-control valves co.,ltd

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中国气动阀龙头企业
The leading pneumatic valve enterprise of china

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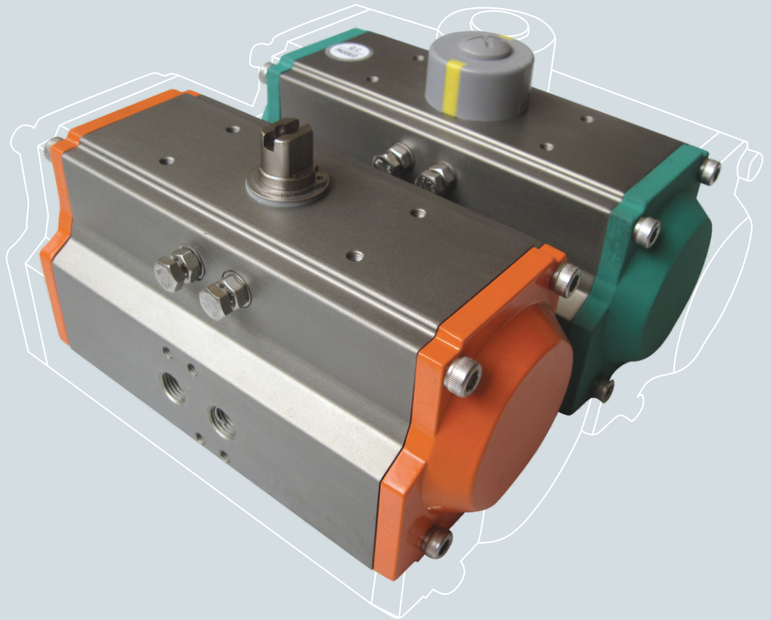
CE 44725-2008　Ex ATEX081125　DNV

[以人为舟，以严肃为舵，以智慧为帆]

Consider people as a boat,consider seriousness as her helm, and consider wisdom as her sail.



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Brief Introdction
企业简介

博恩自控阀门有限公司专门制造气动执行器及各类阀门。公司生产的自动化装置从根本上改变了传统上烦琐、复杂的阀门使用方法，将高科技融于阀门控制过程中，大大提高了阀门使用的效益，节省了大量的控制成本，给企业带来了可观的效益。

博恩公司座落在国内具有最悠久泵阀业制造历史的温州，公司借助本地悠久的泵阀制造经验，结合精湛的生产工艺，加上博恩人独特的创新意识和严肃精神，努力将智慧发挥至极点，立志制造出最好的产品，以之造福于人类。

博恩人坚持以人为舟，以严肃为舵，以智慧为帆。博恩人相信：凭借自己专业的技术，加上真诚的服务会征服客户，赢得客户，感动客户。

Theoborn Auto-control Valves Co., Ltd. is dedicated to manufacture pneumatic, electric, and hydraulic auto-driving equipment as well as all kinds of valves. Our products fundamentally transform the complex process of valves, greatly improving the efficient usage of valves, largely diminishing the controlling cost, and obtaining considerable profits for enterprises.

Theoborn Auto-control Valves Co., Ltd. is located in Wenzhou city which possess a long history of manufacturing valves and pumps. Inspired by centuries-old experience of manufacturing valves and pumps, supported by exquisite manufacturing technique, and enveloped with the special innovative consciousness and serious spirit, Theoborn endeavors to culminate the wisdom, aspires to make the best products, and desires to benefit human beings.

Theoborn people believe that we should: consider people as a boat, consider wisdom as her helm, and consider seriousness as her sail. Theoborn believes that: professional technology, along with the sincere service, will obtain customer's heart, win custom's credits, and move customers.

THEOBORN

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气动执行器
Pneumatic Actuator

型号编制
Model preparation

TBN 190 D (K12) 60 L C

1、博恩气动执行器 TBN Series

2、执行器规格 Actuator model
032、052、063、075、083、092、105、125、140、
160、190、210、240、270、300、350、400

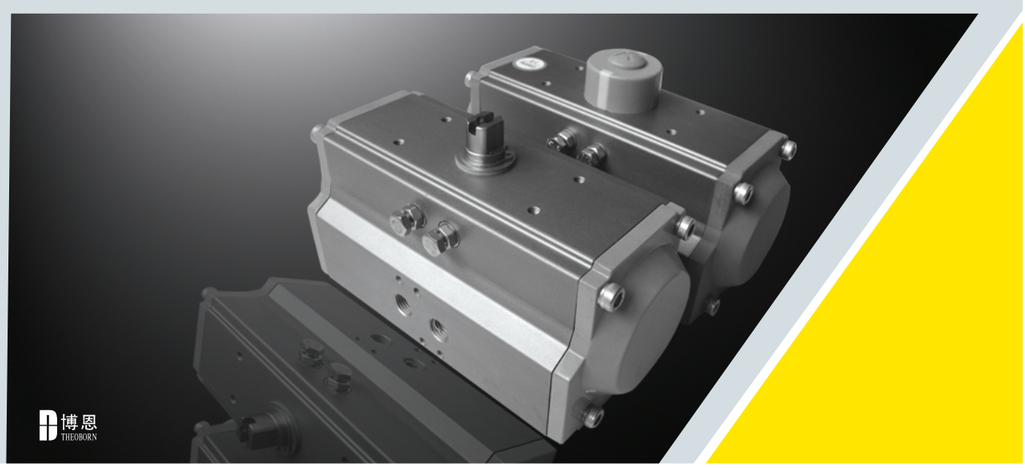
3、作用形式 Action type
D = 双作用 Double acting
SC = 单作用常闭 Single acting (normal close)
SO = 单作用常开 Single acting (normal open)

4、弹簧数量 Spring quantity
K4–K12 = 两端弹簧总数为4–12根 Spring quantity 4–12pcs

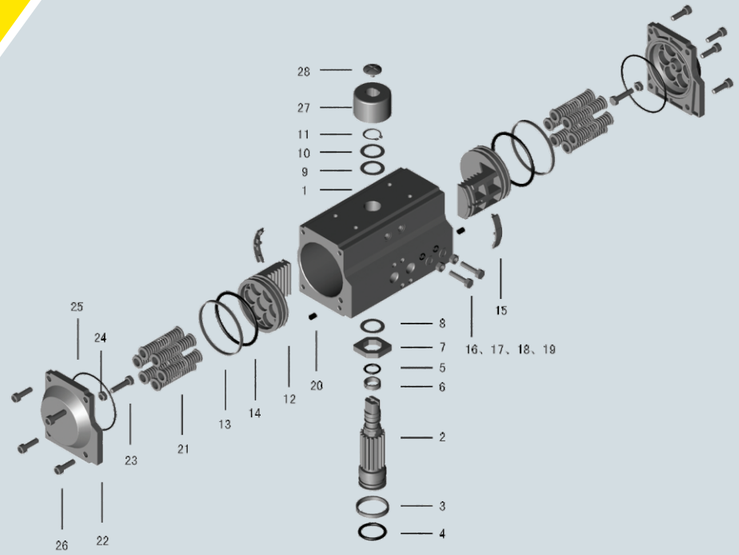
5、行程角度 Travel
None = 90° 旋转 90° Rotation
60 = 60° 旋转 60° Rotation
120 = 120° 旋转 120° Rotation
135 = 135° 旋转 135° Rotation
180 = 180° 旋转 180° Rotation

6、操作温度 Working temperature
None = 标准操作温度丁腈橡胶O形圈 Standard temp: Nitrile rubber o–rings –20℃~+80℃
H = 高温氟橡胶O形圈 High temp: fluorine rubber o–rings –20℃~+160℃
L = 低温硅橡胶O形圈 Low temp: silicon rubber –40℃~+80℃

7、其它要求 Others
None = 标准型 Standard
P = 三段式结构 Three Position
C = 客户定制 Custom design



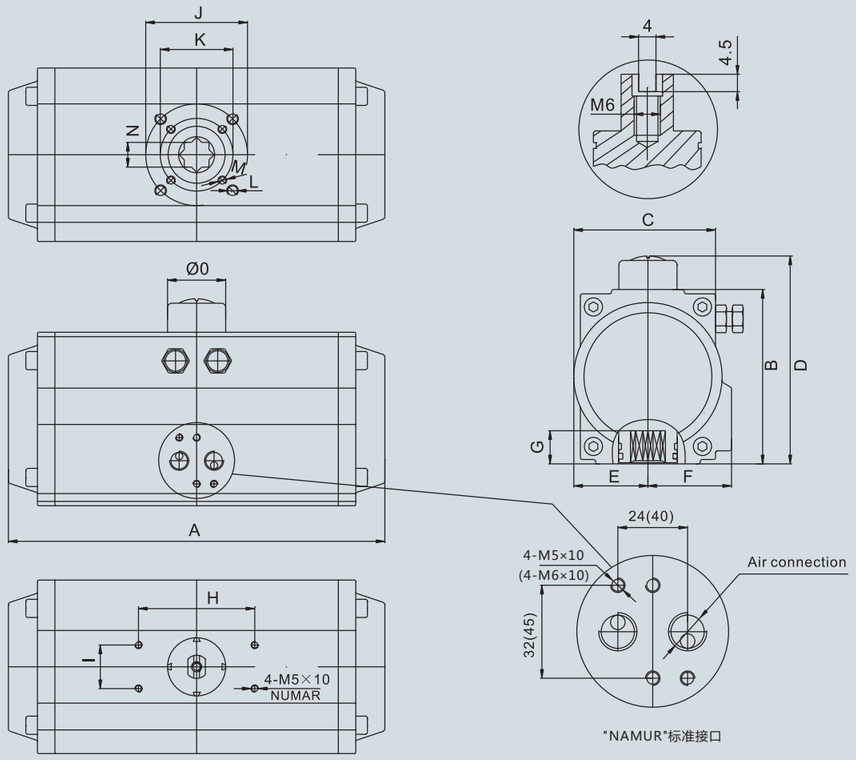
零部件及材料
Parts and materials



NO.	名称	Description	数量Qty	材料	Material	防腐处理 Protection
1	缸体	Cylinder	1	铝合金	Aluminum Alloy	硬质氧化 Anodized Oxygenation
2	转轴	Pinion	1	碳钢	Carbon steel	镀镍 Nickel Plated
3	下轴支承环	Bearing(Lower Pinion)	1	聚甲醛	POM	
4	下轴O形圈	O-Ring(Lower Pinion)	1	丁腈橡胶	NBR	
5	上轴O形圈	O-Ring(Top Pinion)	1	丁腈橡胶	NBR	
6	上轴支承环	Bearing(Top Pinion)	1	聚甲醛	POM	
7	定位片	Spacer	1	碳钢	Carbon steel	磷化/镀锌 phosphatized /galvanized
8	内垫圈	Thrust Bearing Pinion	1	合金钢	Alloy Steel	
9	外垫圈	Thrust Bearing Pinion	1	聚甲醛	POM	
10	垫圈	Thrust Washer(Pinion)	1	不锈钢	Stainless Steel	
11	卡簧	Spring Clip	1	不锈钢	Stainless Steel	
12	活塞	Piston	2	铝合金	Aluminum Alloy	硬质氧化 Anodized Oxygenation
13	活塞导向环	Guide Ring(Piston)	2	聚甲醛	POM	
14	活塞O形圈	O-Ring(Piston)	2	丁腈橡胶	NBR	
15	活塞支承环	Bearing Ring(Piston)	2	聚甲醛	POM	
16	调节螺钉	Adjusting Screw	2	不锈钢	Stainless Steel	
17	调节螺母	Adjusting Nut	2	不锈钢	Stainless Steel	
18	调节螺钉垫圈	Washer(Adjusting Screw)	2	不锈钢	Stainless Steel	
19	调节螺钉O形圈	O-Ring(Adjusting Screw)	2	丁腈橡胶	NBR	
20	堵头	Plug	2	丁腈橡胶	NBR	
21	弹簧	Spring	4~12	弹簧钢	Spring Steel	电泳漆 喷塑 Electrophoresis painted Epoxy coated
22	端盖	End Cap	2	铝合金	Aluminum Alloy	喷塑 Polyester coated
23	端盖调节螺钉	Adjusting Screw(End Cap)	2	不锈钢	Stainless Steel	
24	端盖调节螺母	Adjusting Nut(End Cap)	2	不锈钢	Stainless Steel	
25	端盖O形圈	O-Ring(End Cap)	2	丁腈橡胶	NBR	
26	端盖螺栓	Bolts(End Cap)	8	不锈钢	Stainless Steel	
27	指示器	Indicator	1	工程塑料	Engineering Plastics	
28	指示器螺钉	Nut(Indicator)	1	工程塑料	Engineering Plastics	

注：高温型采用氟橡胶O形圈；低温型采用硅橡胶O形圈
Note:Viton O-ring for high temperature application,and silicone rubber O-ring for low temperature application.

外形及连接尺寸
External Connection Dimension



"NAMUR"标准接口

型号 Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Φ0	Air
TBN032	114	46	47	70	23.5	23.5	11	50	25		F03 Φ36		M5×8	9	30	G1/8
TBN052	158	74	60	99	30	41	14	80	30	F05 Φ50	F03 Φ36	M6×11	M5×10	11	40	G1/4
TBN063	190	88	69	113	36	45	18	80	30	F07 Φ70	F05 Φ50	M8×15	M6×12	14	40	G1/4
TBN075	206	100	79	125	42	52	20	80	30	F07 Φ70	F05 Φ50	M8×13	M6×11	14	40	G1/4
TBN083	213	109	88	134	46	52.5	20	80	30	F07 Φ70	F05 Φ50	M8×15	M6×12	17	40	G1/4
TBN092	259	120	97.5	145	51	57.5	22	80	30	F07 Φ70	F05 Φ50	M8×13	M6×12	17	40	G1/4
TBN105	284	133	105.5	158	57.5	64	24	80	30	F10 Φ102	F07 Φ70	M10×18	M8×14	22	40	G1/4
TBN125	340	155	120.5	182	67.5	70	27.5	80	30	F10 Φ102	F07 Φ70	M10×18	M8×14	22	65	G1/4
TBN140	414	171.5	137	198	76	77	32	80	30	F12 Φ125	F10 Φ102	M12×22	M10×18	27	65	G1/4
TBN160	476	197	159.5	224	86.5	87.5	34	80	30	F12 Φ125	F10 Φ102	M12×22	M10×18	27	65	G1/4
TBN190	524	230	186	269	103	103	40	130	30	F14 Φ140		M16×23		36	78	G1/4
TBN210	559	255	202	294	113	113	40	130	30	F14 Φ140		M16×25		36	78	G1/4
TBN240	668	291	233	330	129	129	50	130	30	16 Φ165		M20×28		46	78	G3/8 (1/4)
TBN270	744	320	264	359	146	146	57	130	30	F16 Φ165		M20×28		46	78	G1/2 (1/4)
TBN300	782	352	308	385	160	170	50	130	30	F16 Φ165		M20×25		46	80	G1/2
TBN350	920	410	362	440	190	195	50	130	30	F25 Φ254	F16 Φ165	M16×24	M20×25	46	80	G1/2
TBN400	935	460	446	494	260	260	60	130	30	F25 Φ254	F16 Φ165	M16×24	M20×25	55	80	G1/2

TBN单作用执行器输出力矩
Output torque of single acting actuator

Unit:Nm

型号Model	弹簧数量	气源克服弹簧输出力矩 Output Torque of Air supply 气源压力(bar) 3 0° 起点	3 90° 终点	4 0° 起点	4 90° 终点	5 0° 起点	5 90° 终点	6 0° 起点	6 90° 终点	7 0° 起点	7 90° 终点	弹簧输出力矩 Output Torque of spring 0° 终点	弹簧输出力矩 Output Torque of spring 90° 起点
TBN052S	5	7.8	5.3	11.6	8.9							3.8	6.1
	6	7.1	4.2	10.9	7.8							4.6	7.4
	7	6.4	3.2	10.2	6.7							5.2	8.5
	8			9.5	5.7	13.3	9.3					6.0	9.7
	9			8.8	4.6	12.6	8.2					6.7	11.0
	10			8.0	3.5	11.9	7.1	15.7	10.7			7.5	12.2
	11					11.1	6.0	15.0	9.6	18.8	13.1	8.3	13.4
	12					10.4	5.0	14.2	8.6	18.1	12.1	9.0	14.6
TBN063S	5	14.6	9.3	21.6	15.4	28.7	21.4					6.2	11.0
	6	13.1	7.5	20.2	13.5	27.3	19.7					7.6	13.1
	7	11.6	5.7	18.8	11.8	25.9	17.8					8.8	15.3
	8			17.5	10.0	24.5	16.0	31.6	22.1			10.1	17.6
	9			16.0	8.2	23.2	14.3	30.3	20.4			11.3	19.7
	10			14.8	6.4	21.9	12.5	29.0	18.5	36.1	24.6	12.5	21.9
	11			13.4	4.6	20.5	10.7	27.5	16.8	34.6	22.8	13.8	24.1
	12					19.1	8.9	26.2	14.9	33.3	21.0	15.0	26.3
TBN075S	5	22.7	16.0	34.0	26.6							11.3	17.5
	6	20.5	12.9	31.8	23.4							13.5	21.0
	7	18.1	9.7	29.5	20.3							15.8	24.5
	8			27.2	17.1	38.6	27.7					18.1	28.0
	9			24.9	14.0	36.4	24.6					20.2	31.5
	10			22.6	10.8	34.0	21.4	45.4	32.0	56.8	42.6	22.5	35.0
	11					31.7	18.3	43.1	28.8	54.5	39.4	24.8	38.5
	12					29.5	15.1	40.8	25.7	52.3	36.3	27.0	42.0
TBN083S	5	28.7	20.9	42.9	34.2							13.8	21.3
	6	26.1	17.2	40.3	30.4							16.5	25.5
	7	23.4	13.3	37.5	26.6							19.3	29.8
	8			34.8	22.8	48.9	36.2					22.0	34.0
	9			32.1	18.9	46.2	32.3					24.8	38.3
	10			29.4	15.1	43.5	28.5	57.7	41.9	71.7	55.2	27.6	42.5
	11					40.8	24.7	55.0	38.1	69.0	51.4	30.3	46.7
	12					38.1	20.9	52.3	34.1	66.3	47.5	33.1	51.1
TBN092S	5	43.2	32.5	65.0	54.2							21.9	32.7
	6	38.9	26.0	60.6	47.7							26.3	39.2
	7	34.5	19.4	56.2	41.1							30.7	45.8
	8			51.8	34.6	73.5	56.3					35.1	52.3
	9			47.4	28.1	69.1	49.8					39.5	58.8
	10			43.0	21.5	64.8	43.3	86.5	65.0	108.2	86.7	43.9	65.4
	11					60.4	36.7	82.1	58.4	103.8	80.2	48.2	71.9
	12					56.0	30.2	77.7	51.9	99.4	73.6	52.6	78.4
TBN105S	5	64.7	44.2	97.7	74.0							29.9	48.8
	6	58.4	35.7	91.4	65.5							35.9	58.6
	7	52.1	27.3	85.2	57.0							41.9	68.3
	8			78.9	48.5	110.0	76.5					47.8	78.1
	9			72.6	40.3	103.6	68.3					53.8	87.6
	10			66.4	31.6	97.4	59.6	129.5	88.4	161.4	117.3	59.8	97.6
	11					91.2	51.1	123.2	79.9	155.0	108.8	65.7	107.4
	12					84.9	42.7	116.8	71.5	148.9	100.4	71.7	117.1
TBN125S	5	110.9	45.8	166.8	128.7							52.3	83.4
	6	99.5	37.0	155.4	113.4							62.7	100.1
	7	88.1	28.2	144.1	98.2							73.1	116.7
	8			132.7	82.9	188.6	134.2					83.6	133.4
	9			121.2	67.6	177.2	118.9					94.1	150.1
	10			109.8	52.3	165.8	103.6	221.8	154.9			104.5	166.8
	11					154.5	88.4	210.4	139.7	218.4	191.0	114.9	183.5
	12					143.0	73.0	199.0	124.3	254.9	175.6	125.4	200.2
TBN140S	5	166.0	118.1	249.4	197.1							79.7	125.4
	6	149.2	94.3	232.6	173.3							95.6	150.5
	7	127.2	70.6	215.7	149.6							111.5	175.6
	8			198.9	125.8	282.2	204.8					127.4	200.6
	9			182.1	102.1	265.4	181.0					143.4	225.7
	10			165.3	78.3	248.6	157.2	331.9	236.2	415.9	315.1	159.3	250.8
	11					231.8	133.5	315.1	212.4	398.5	291.4	175.2	275.9
	12					215.0	109.7	298.3	188.6	381.7	267.7	191.2	301.0

TBN单作用执行器输出力矩
Output torque of single acting actuator

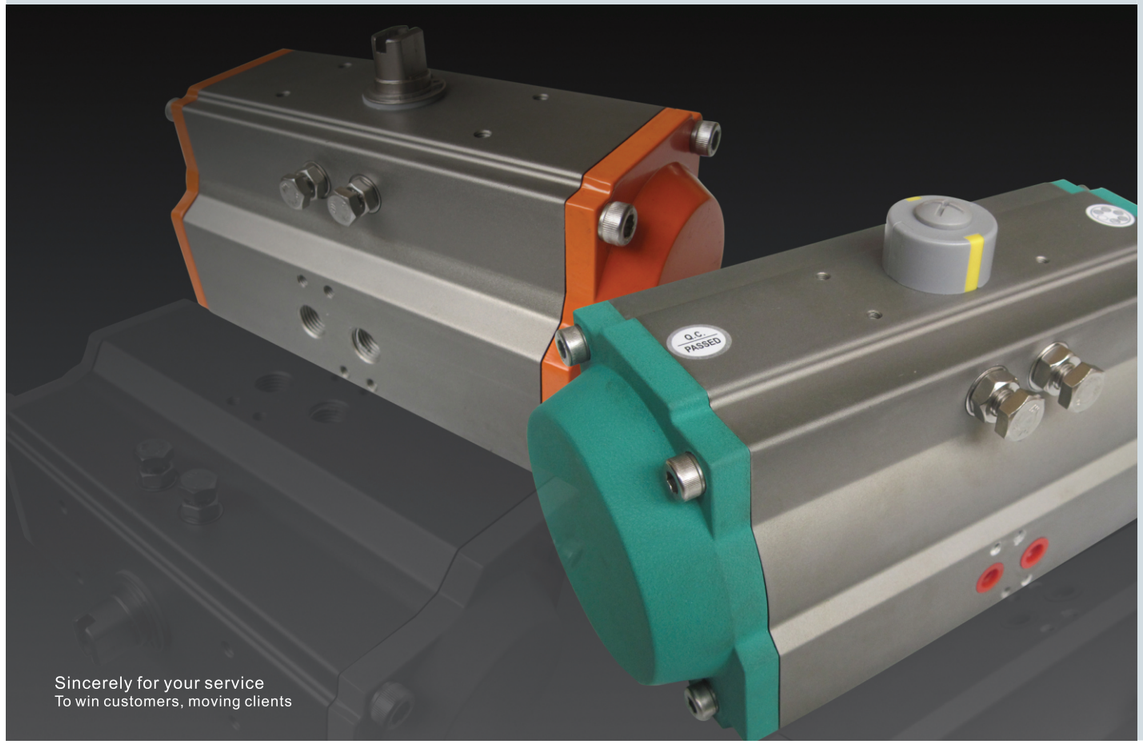
Unit:Nm

型号Model	弹簧数量	气源克服弹簧输出力矩 Output Torque of Air supply 气源压力(bar) 3 0° 起点	3 90° 终点	4 0° 起点	4 90° 终点	5 0° 起点	5 90° 终点	6 0° 起点	6 90° 终点	7 0° 起点	7 90° 终点	弹簧输出力矩 Output Torque of spring 0° 终点	弹簧输出力矩 Output Torque of spring 90° 起点
TBN160S	5	254.0	185.3	382.4	311.0							124.2	191.8
	6	227.8	146.8	356.2	272.5							149.1	230.2
	7	201.6	108.5	330.0	234.2							173.9	268.6
	8	175.4	71.8	303.7	195.8	432.1	321.4					198.7	306.9
	9			277.5	157.5	405.9	283.1					223.6	345.3
	10			251.3	119.1	379.7	244.8	508.0	370.5			248.4	383.6
	11					353.5	206.4	481.8	332.1	610.2	457.8	273.3	422.0
	12					327.3	168.1	455.6	293.8	584.0	419.4	298.1	460.3
TBN190S	5	411.8	288.4	618.7	482.3							195.7	309.7
	6	370.1	229.7	577.0	423.6							234.8	371.6
	7	328.3	171.0	535.2	365.0							274.0	433.6
	8			493.4	306.3	700.3	500.2					313.1	495.5
	9			451.8	247.6	658.7	441.5					352.2	557.5
	10			410.0	188.9	616.9	382.9	823.8	576.8	1030.7	770.8	391.3	619.4
	11					575.1	324.2	782.0	518.1	988.9	712.1	430.5	681.3
	12					533.4	265.5	740.3	459.5	947.1	653.4	469.6	743.3
TBN210S	5	566.0	409.8	850.3	685.1							268.9	420.9
	6	508.6	326.5	792.9	602.4							322.7	505.1
	7	451.3	243.2	735.6	518.6							376.5	589.3
	8			678.1	435.3	962.4	694.0					430.3	673.4
	9			620.8	349.2	905.1	624.6					484.0	760.5
	10			563.4	268.8	847.7	544.1	1131.9	819.5	1416.2	1094.9	537.8	841.8
	11					790.3	460.8	1074.5	736.2	1358.8	1011.6	591.7	926.0
	12					733.0	377.6	1017.2	653.0	1301.5	928.3	645.3	1010.1
TBN240S	5	878	656	1414	1097							431	653
	6	788	523	1229	963							518	783
	7	700	389	1141	830							603	914
	8			1052	697	1493	1138					690	1045
	9			963	563	1404	1004					776	1175
	10			874	430	1315	871	1756	1312	2197	1753	862	1306
	11					1226	738	1667	1179	2108	1619	948	1436
	12					1137	604	1578	1045	2019	1486	1034	1567
TBN270S	5	1235	932	1855	1559							612	918
	6	1110	743	1730	1369							735	1101
	7	984	553	1605	1180							857	1285
	8			1479	990	2100	1617					980	1469
	9			1354	801	1974	1428					1102	1652
	10			1324	611	1849	1238	2469	1865	3089	2491	1225	1836
	11					1724	1049	2344	1675	2964	2302	1347	2019
	12					1599	859	2219	1486	2839	2112	1470	2203
TBN300S	6	1316	875									876	1273
	7	1153	639	1916	1402							1022	1485
	8	991	403	1754	1166	2517	1929					1168	1697
	9			1592	930	2355	1693	3118	2456			1314	1909
	10			1430	695	2193	1458	2956	2221	3719	2984	1460	2122
	11					2030	1222	2793	1985	3556	2748	1606	2334
	12					1868	986	2631	1749	3394	2512	1752	2546
TBN350S	6	1863	1157									1408	2043
	7	1602	779	2745	1922							1642	2383
	8	1341	401	2484	1544	3626	2686					1877	2724
	9			2224	1165	3336	2307	4508	3449			2112	3064
	10			1963	787	3105	1929	4247	3071	5390	4214	2346	3405
	11					2844	1551	3986	2693	5129	3836	2581	3745
	12					2584	1172	3726	2314	4869	3457	2816	4086
TBN400S	8	2550	1225									2100	3292
	9	2259	768	3887	2396							2362	3703
	10	1967	311	3595	1939	5223	3567					2624	4115
	11			3303	1482	4931	3110	6559	4738			2887	4526
	12			3012	1025	4640	2653	6268	4281	7895	5908	3149	4938
	13					4348	2195	5976	3823	7603	5450	3412	5349
	14					4057	1738	5685	3366	7312	4993	3674	5761
	15					3765	1281	5393	2909	7020	4536	3937	6172
	16							5101	2452	6728	4079	4199	6584

TBN双作用执行器输出力矩
Output torque of double acting actuator

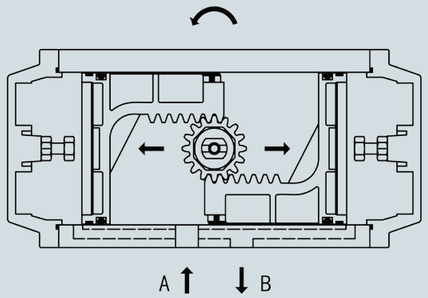
Unit:Nm

型号 Model	气源压力 Air pressure (Bar)						
	2	3	4	5	6	7	8
TBN032D	2.7	4.1	5.9	7.4	8.8	9.8	11.3
TBN052D	7.7	11.6	15.5	19.3	23.2	27.1	31.0
TBN063D	13.8	20.6	27.5	34.4	41.3	48.2	55.0
TBN075D	22.3	33.7	44.7	55.9	67.0	78.2	89.3
TBN083D	28.2	42.3	56.4	70.5	84.6	98.7	112.9
TBN092D	43.2	64.8	86.5	108.0	129.6	151.2	172.8
TBN105D	63.1	94.7	127.2	157.8	189.4	220.9	252.5
TBN125D	108.4	162.7	216.9	271.1	325.3	379.5	433.8
TBN140D	163.2	244.8	326.4	408.0	489.6	571.2	652.8
TBN160D	251.4	377.0	502.7	628.4	754.1	879.7	1005.4
TBN190D	405.1	607.7	810.2	1012.8	1215.3	1417.9	1620.4
TBN210D	557	835	1113	1392	1670	1948	2227
TBN240D	873	1309	1745	2182	2618	3054	3491
TBN270D	1227	1841	2454	3068	3681	4295	4908
TBN300D	1526	2289	3052	3815	4578	5341	6104
TBN350D	2285	3427	4570	5712	6854	7997	9139
TBN400D	3256	4884	6512	8140	9768	11396	13024



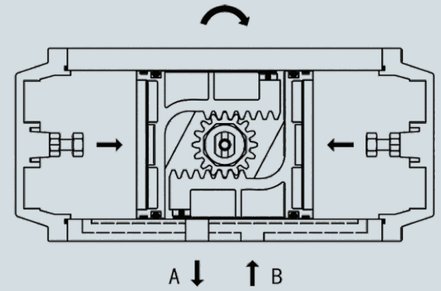
工作原理 (标准动作)
Operating function and direction of rotation

■ 双作用式 Double acting



1、压缩空气由A口输入，使左右活塞向相反方向运动，输出轴逆时针方向转动，打开阀门，两活塞侧面的空气由B口排出。

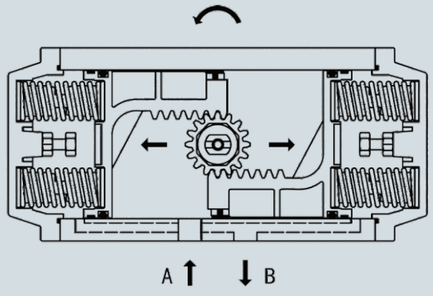
Air from Port A forces the pistons outwards,causing the springs to compress, the pinion turns counter-clockwise to open the valve while air is being exhausted from Port B.



2、压缩空气由B口输入，使左右活塞向中心移动，输出轴顺时针方向转动，关闭阀门，两活塞中间的空气由A口排出。

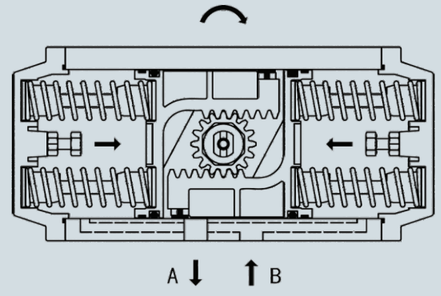
Air from Port B forces the pistons inwards, causing the springs to compress, the pinion turns clockwise to close the valve while air is being exhausted from Port A.

■单作用式 (常闭式) Single acting(FC)



3、压缩空气由A口输入，使左右活塞向相反方向运动，输出轴逆时针方向转动，打开阀门，两活塞侧面的空气由B口排出。

Air from Port A forces the pistons outwards, causing the springs to compress, the pinion turns counter-clockwise to open the valve while air is being exhausted from Port B.



4、失气或失电时，由于弹簧的作用使两活塞向中心移动，输出轴顺时针方向转动，关闭阀门，空气由A口排出，B口进气可加速关闭阀门。

In case of air or power disruption, the rebound of springs forces the pistons inwards, the pinion turns clockwise to close the valve while air is being exhausted from Port A. Air from Port B can accelerate the close of the valve.

注：1. 双作用执行器标准动作的旋转方向为顺时针关闭阀门，逆时针为打开阀门。颠倒活塞装配的旋转方向为逆时针关闭阀门，顺时针为打开阀门。
2. 单作用执行器如图所示为常闭式，颠倒活塞装配则为常开式。

Note: 1.For double acting actuator,the standard rotation is clockwise for closing and counterclockwise for opening.If the assembly direction of the piston is reversed,then the rotation will be counter clockwise for closing and clockwise for opening.
2.For single acting actuator,the standard is fail close type(FC),as shown above. If the assembly direction of the piston is reversed,then it will be fail open type (FO).