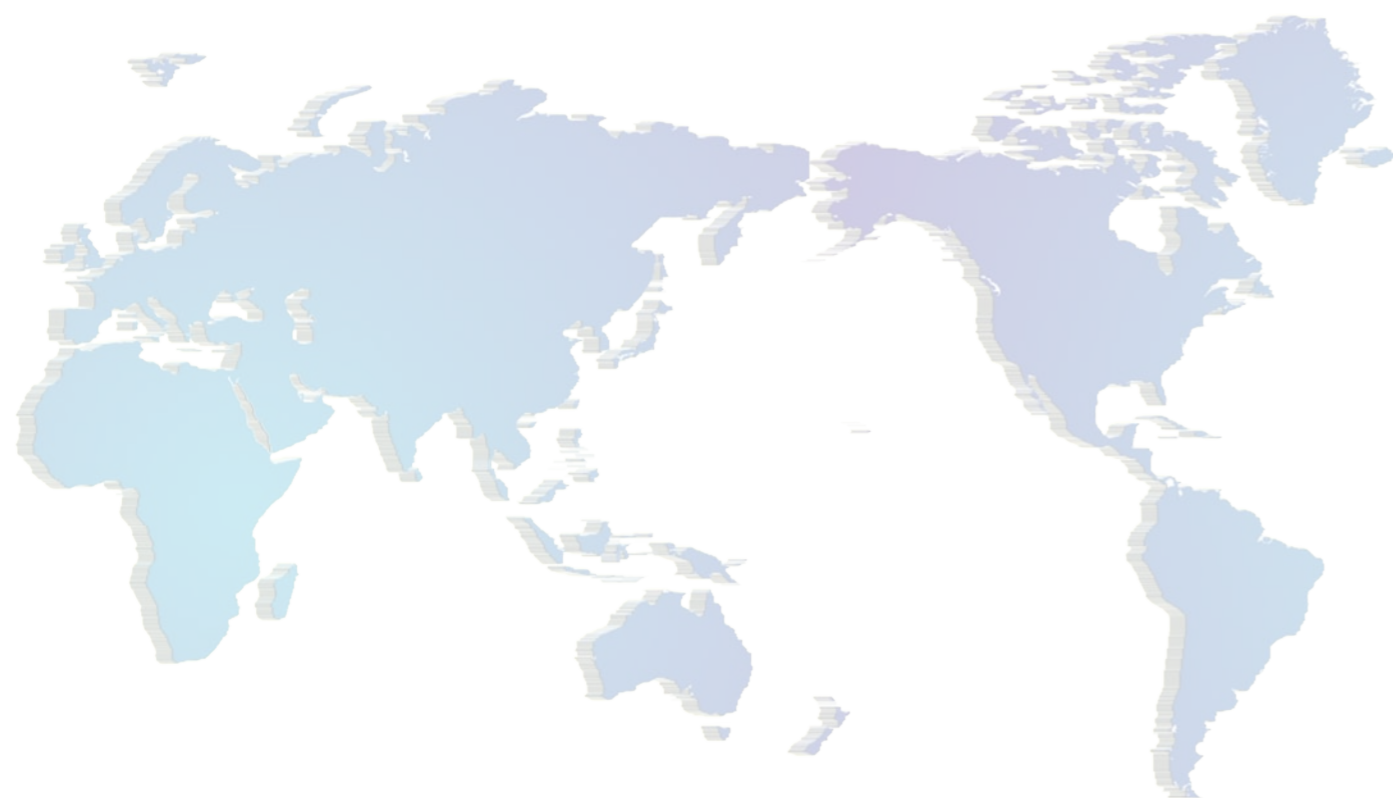


以人为舟，以严肃为舵，以智慧为帆

Consider People As Boat,
Consider Seriousness As Her Helm
And Consider Wisdom As Her Sail.



浙江博恩自控阀门有限公司

Zhejiang Theoborn Auto-control Valves Co.,Ltd

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TBNS系列不锈钢气动执行器机构
TBNS Series Stainless Steel
Pneumatic Actuator



高新技术企业

浙江博恩自控阀门有限公司

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产品简介

TBNS系列不锈钢气动执行器是以压缩空气为动力,通过活塞齿条的直线运动带动输出轴的齿轮传动,以转角行程输出的气动执行器。有双作用及单作用型,广泛适用于球阀、蝶阀、旋塞阀等角行程阀门的开关和调节,也可适用于其他回转场合,是实现工业管道自动化控制的理想装置。

Product Introduction

TBNS Series stainless steel pneumatic actuator is powered by compressed air, through the linear motion of the piston rack drives the gear output shaft, to angle stroke output pneumatic actuators. A double action and single action type, widely applicable to ball valve, butterfly valve switch, plug valve isometric stroke of the valve and adjusting, can also be used in other rotary occasions, is to realize the ideal device for industrial pipeline automation control.



TBNS 系列不锈钢气动执行器的设计特点

1. 316、304不锈钢材质执行器,外表电解抛光,光洁美观,抗腐蚀性能强,适合于抗腐蚀要求极高的工程环境。
2. 双活塞齿轮齿条式设计,结构紧凑、安装位置对称、改变输出轴转向方便,使用寿命长、动作迅速。
3. 活塞齿条背面装有复合轴承及导向环,动作精确、摩擦系数小、使用寿命延长。
4. 组合式预负荷镀层弹簧,工作寿命长、抗腐蚀性能强。
5. 高精度齿轮和齿条,啮合间隙小、精度高,输出功率大。
6. 两个独立的行程调节螺钉可以进行方便、精确 $\pm 5^\circ$ 度调节开、关位置。
7. 不锈钢紧固件,安全美观,抗腐蚀性强。
8. 采用国际规范尺寸:输出轴槽、螺孔;顶部安装孔尺寸符合NAMUR标准;气源接口尺寸符合NAMUR标准;
9. 底部安装孔尺寸符合ISO5211、DIN3337标准,方便安装电磁阀限位开关等附件。

TBNS Series stainless steel pneumatic actuator design features

- ◆ ASTM316L、316、304、303 stainless steel pneumatic actuator with electro-polish finish offer excellent resistance to most corrosive chemicals as well as industrial atmospheres.
- ◆ 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.
- ◆ Multiple bearings and guides on racks and pistons, low friction, high cycle life and prevent shaft blowout.
- ◆ Modular preloaded spring cartridge design, with coated spring for simple versatile range, greater safety and corrosion resistance, longer cycle life.
- ◆ Fully machined teeth on piston and pinion for accurate low backlash rack and pinion engagement, maximum efficiency.
- ◆ The two independent external travel stop adjustment bolts can adjust $\pm 5^\circ$ at both open and close directions easily and precisely.
- ◆ Stainless steel fasteners for long term corrosion resistance.
- ◆ Full conformance to the latest specifications: ISO5211, DIN3337 and Namur or product interchangeability and easy mounting of solenoids, limit switches and other accessories.

企业概况

浙江博恩自控阀门有限公司专业制造电动执行器、气动执行器及各类成套自控阀门。公司生产的自动化装置从根本上改变了传统上繁琐、复杂的阀门使用方法,将高科技融入阀门控制中,大大提高阀门使用效益,节省了大量的控制成本,给企业带来客观的效益。

浙江博恩自控阀门有限公司坐落在国内最具悠久泵阀制造历史的温州,公司借助当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,立志制造最好的产品,以之造福人类。

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

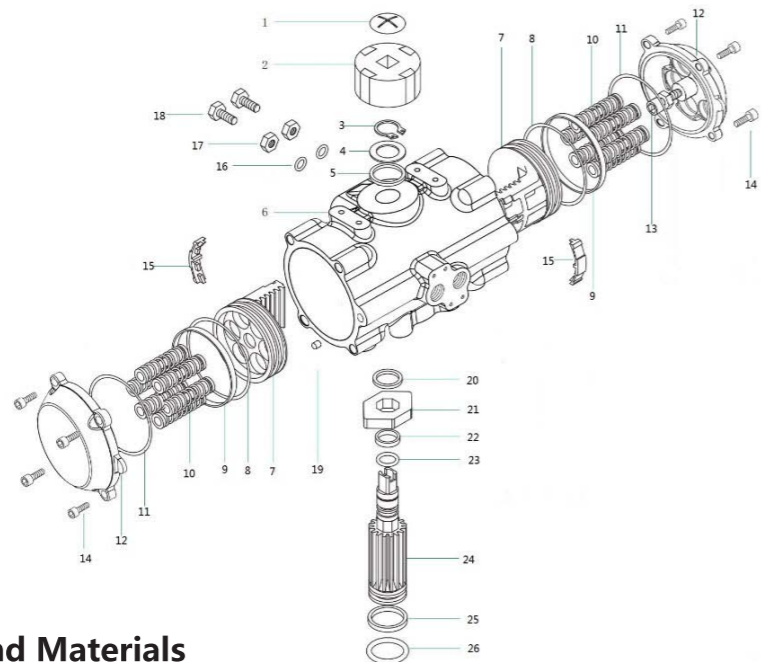


Company Profile

Zhejiang Theoborn Auto-Control Valves Co., Ltd. is dedicated to manufacture pneumatic actuators, electric actuators. Our products fundamentally transform the complex traditional usage of valves, incorporating high technology with the control process of valves, greatly improving the efficient usage of valves, largely diminishing the controlling cost, and obtaining considerable profits for enterprises.

Theoborn company is located in wenzhou city which possesses a long history of manufacturing valves and pumps. Inspired by our 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 boat, consider wisdom as helm and consider seriousness as sail. Theoborn believes that professional technology, along with the sincere service, will obtain customers' hearts, win customers' credits, and move customers.

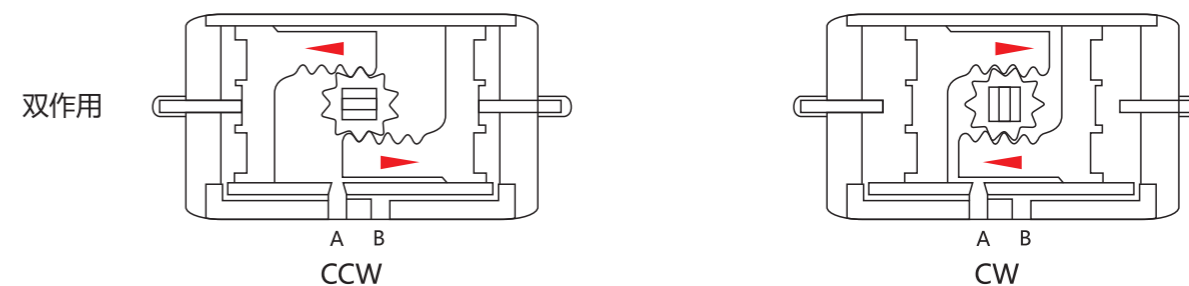


零件和材料 Parts and Materials

序号NO	名称 Description	数量Qty	材料 Standards Material
1	指示器螺钉 Indicator Screw	1	塑料 Plastic
2	指示器 Indicator	1	塑料 Plastic
3	弹性挡圈 Snap Ring	1	不锈钢 Stainless steel
4	垫片 Washer	1	不锈钢 Stainless steel
5	外垫片 Outside Washer	1	工程塑料 Engineering Plastics
6	缸体 Body	1	不锈钢 Stainless steel
7	活塞 Piston	2	不锈钢 Stainless steel
8	活塞"O"型圈 Piston O-ring	2	氟橡胶、丁腈橡胶 Viton/NBR
9	活塞支承圈 Piston Bearing	2	工程塑料 Engineering Plastics
10	弹簧 Spring 弹簧左右套 Spring Retainer(L,R) 弹簧套连杆 Retainer Connector	0-12	弹簧钢 Spring Steel 尼龙66 Nylon 66 铜 Brass
11	端盖"O"型圈 End-Cap O-ring	2	氟橡胶、丁腈橡胶 Viton/NBR
12	端盖 End-Cap	2	不锈钢 Stainless steel
13	限位螺栓 Stop screw	2	不锈钢 Stainless steel
14	端盖紧固螺杆 End-Cap Stop Screw	8	不锈钢 Stainless steel
15	活塞导板 Guide Piston	2	尼龙66 Nylon 66
16	调节螺钉"O"型圈 O-ring(Adjust screw)	2	橡胶 NBR
17	调节螺钉螺母 Nut(Adjust screw)	2	不锈钢 Stainless steel
18	调节螺栓 Adjust screw	2	不锈钢 Stainless steel
19	塞头 Plug	2	橡胶 NBR
20	内垫片 Inside Washer	1	工程塑料 Engineering Plastics
21	凸轮 Cam	1	不锈钢 Stainless steel
22	上轴轴承 Bearing Top	1	工程塑料 Engineering Plastics
23	上轴"O"型圈 O-ring(Top)	1	氟橡胶、丁腈橡胶 Viton/NBR
24	轴 Pinion	1	不锈钢 Stainless steel
25	下轴轴承 Bearing Bottom	1	工程塑料 Engineering Plastics
26	下轴"O"型圈 O-ring Bottom	1	氟橡胶、丁腈橡胶 Viton/NBR

工作原理和输出扭矩 Operating Principle and Out Torque

工作原理 Operating Principle



CCW (逆时针方向)

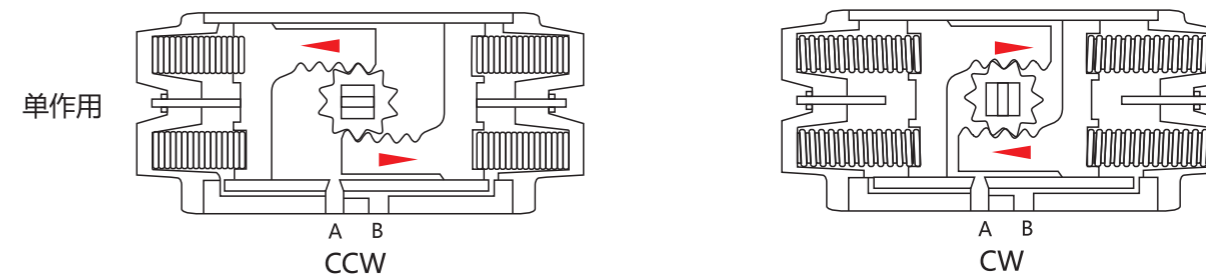
CW (顺时针方向)

压缩空气有A口输入，使左右活塞向相反方向运动，输出轴逆时针方向运转，两活塞侧面的空气由B口排出。

Air to Port A forces the pistons outwards, causing the pinion to turn counterclockwise while the air is being exhausted from Port B.

压缩空气有B口输入，使左右活塞向中心移动，输出轴顺时针方向运转，两活塞中间的空气由A口排出。

Air to Port B forces the pistons inwards, causing the pinion to turn clockwise while the air is being exhausted from Port A.



CCW (逆时针方向)

CW (顺时针方向)

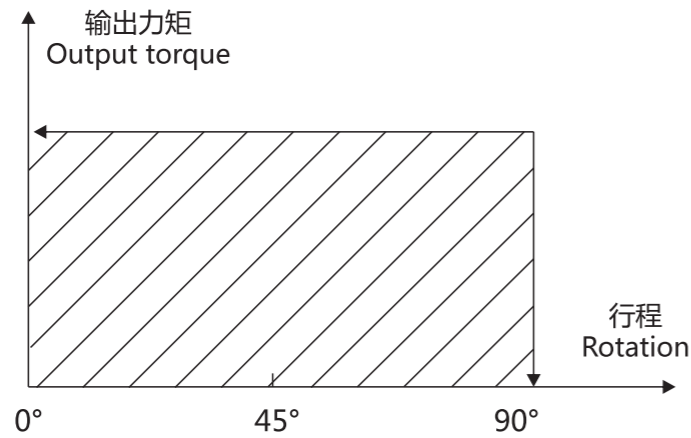
压缩空气有A口输入，使左右活塞向相反方向运动，输出轴逆时针方向运转，两活塞侧面空气由B口排出。

Air to Port A forces the pistons outwards, causing the springs to compress. The pinion turns counterclockwise while air is being exhausted from Port B.

失气时，由于弹簧的作用使两活塞向中心移动，输出轴顺时针方向运转，空气由A口排出。

Loss of air pressure, the stored energy in the springs forces the pistons inwards, the pinion turns clockwise while air is being exhausted from Port A.

双作用扭矩 Output Torque With Double Acting



TBNS双作用式执行器出力矩表 Output Torque Table of SK Series Pneumatic Actuators with Double Acting

型号 Model	气源克服弹簧输出扭矩 Nm					
	3.0	4.0	5.0	6.0	7.0	8.0
TBNS-052DA	11.6	15.4	19.2	23.0	26.8	30.6
TBNS-063DA	20.9	28.1	35.3	42.4	49.6	56.8
TBNS-083DA	44.0	58.7	73.5	88.2	102.9	117.6
TBNS-105DA	95.6	127.2	158.8	190.4	222.0	253.6
TBNS-125DA	145.3	193.9	242.5	291.1	339.6	388.2
TBNS-140DA	245.4	328.0	410.5	493.1	575.6	658.2
TBNS-160DA	369.9	496.6	623.3	750.0	876.7	1003.4

双作用执行器的选型

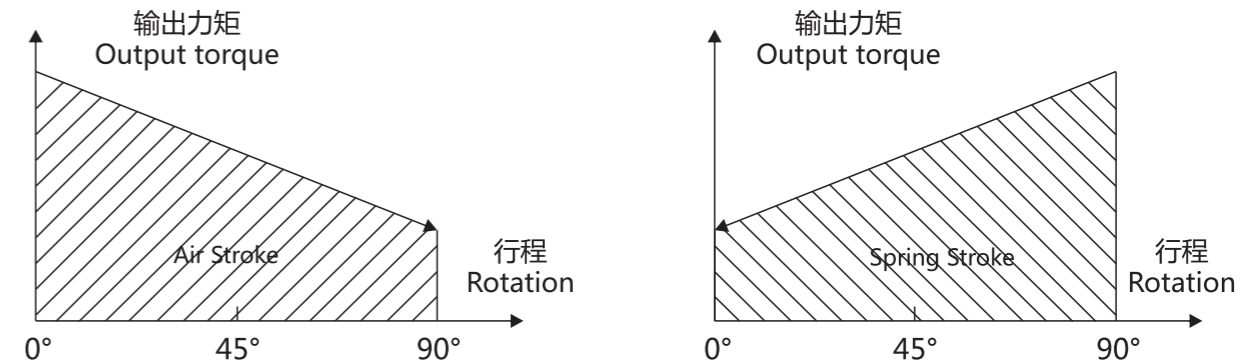
在正常操作条件下，双作用执行器考虑的安全系数为20%-30%。
示例：
阀门力矩=100Nm
安全力矩=100×(1+30%)=130Nm
气源压力=5Bar
对照双作用力矩表，选配双作用执行器最小规格为TBNS-105DA。

Sizing: Spring Return Actuators

The suggested safety factor for double acting actuators under normal working conditions is 20%-30%.
Example:
The torque needed by valve=100N.m
The torque considered safety factor (1+30%)=130N.m
Air Supply=5Bar
According to the above table, we can choose the minimum model is TBNS-105DA.

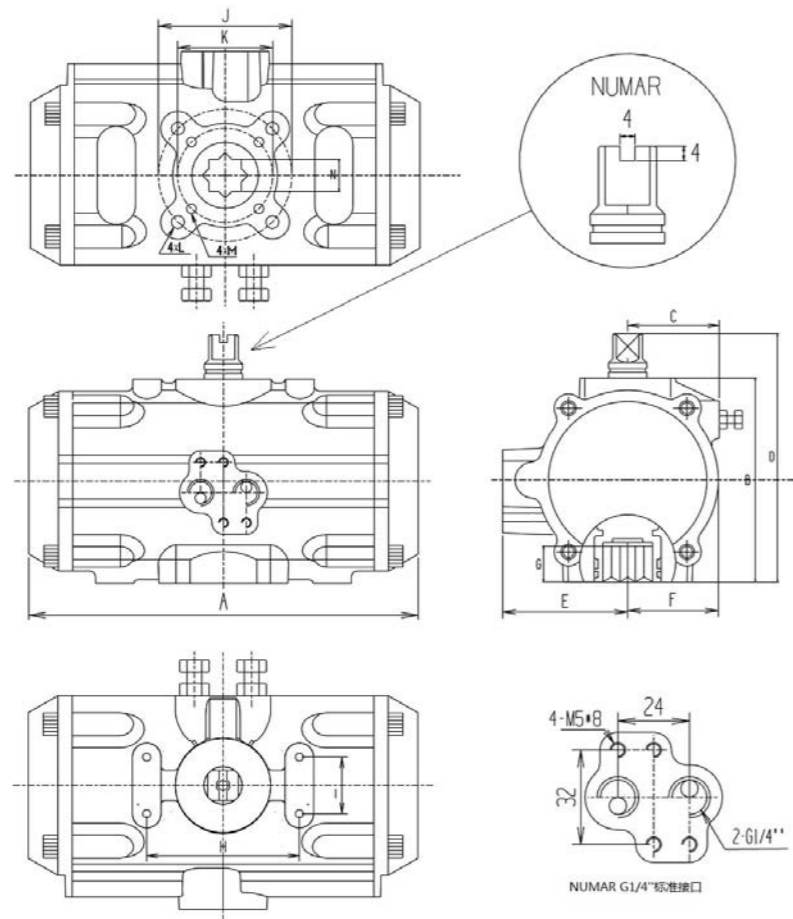
单作用扭矩 Output Torque with Spring Return

单作用气动执行器输出扭矩
Output Torque of Pneumatic Actuator with Spring Return



SK单作用式执行器出力矩表 Output Torque of ST Series Pneumatic Actuator with Spring Return													
型号 Model	弹簧数量 Spring Qty	弹簧输出扭矩 Springs' output		气源克服弹簧输出扭矩 Nm									
				3		4		5		6		7	
				0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
气源输出扭矩 Output Torque of Air to Springs (Nm)													
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
TBNS-052SK	5	3.6	5.4	6.5	4.6	10.8	8.6						
	6	4.3	6.7	6	3.3	10.2	7.3						
	7	5.1	7.9			9.6	6.1	13.7	10.1				
	8	5.8	9.2			9	4.8	13	8.8				
	9	6.6	10.4			8.4	3.6	12.4	7.6	16.4	11.6		
	10	7.3	11.7			7.8	2.3	11.8	6.3	15.7	10.3	19.6	14.3
	11	8.1	12.9					11.1	5.1	15	9.1	18.8	13.1
TBNS-063SK	5	6.1	12	16.3	10.6	23.2	17.7						
	6	7.3	13.7	14.5	7.9	21.4	15						
	7	8.6	15.5			19.7	12.4	26.6	19.5				
	8	9.8	17.2			17.9	9.8	25	17				
	9	11.1	19			16.2	7.2	23.3	14.4	30.4	21.7		
	10	12.3	20.7			14.4	4.5	21.6	11.9	28.8	19.2	35.9	26.5
	11	13.6	22.5					19.9	9.3	27.1	16.7	34.4	24.1
TBNS-083SK	5	15	20.4	30.2	22.8	45.3	39.2						
	6	18	24.6	26.9	17.6	41.9	33.9						
	7	21	28.7			38.5	28.6	53.4	44.8				
	8	24	32.9			35.1	23.2	49.9	39.3				
	9	27	37.1			31.6	17.9	46.5	33.8	61.3	49.8		
	10	30	41.2			28.2	12.6	43	28.4	57.7	44.2	72.5	60.1
	11	33	45.4					39.5	22.9	54.2	38.6	68.9	54.3
12	36	49.6					36	17.5	50.6	33.1	65.3	48.6	

安装尺寸 Mounting Connection and Dimension



TBNS系列执行器安装尺寸表 TBNS Series Actuator Dimension Table

型号 Model	A	B	C	D	E	F	G	H	I	N	J	K	L	M	气源接口 Air Connection
TBNS-052	146	72	30	92	47	32	14	80	30	11	Φ50	Φ36	M6*10 (1/4"-20UNC)	M5*7.5(#10-24UNF)	G1/4"
TBNS-063	173	88	36	108	54	38	18	80	30	14	Φ70	Φ50	M8*13(5/16"-18UNC)	M6*10(1/4"-20UNC)	G1/4"
TBNS-083	204	108	48	128	65.5	48	21	80	30	17	Φ70	Φ50	M8*13(5/16"-18UNC)	M6*10(1/4"-20UNC)	G1/4"
TBNS-105	270	133	50	153	77	60	26	80	30	22	Φ102	Φ70	M10*16(3/8"-16UNC)	M8*13(5/16"-18UNC)	G1/4"
TBNS-125	302	155	58	175	87	69.5	27.5	80	30	22	Φ102	Φ70	M10*16(3/8"-16UNC)	M8*13(5/16"-18UNC)	G1/4"
TBNS-140	394	172	69	192	95.5	77	32	80	30	27	Φ125	Φ102	M12*20(1/2"-12UNC)	M10*16(3/8"-16UNC)	G1/4"
TBNS-160	456	198	75	218	106	87	34	80	30	27	Φ125	Φ102	M12*20(1/2"-12UNC)	M10*16(3/8"-16UNC)	G1/4"
TBNS-210	568	257	90	287	133	113	40	130	30	36	Φ140		M16*24(5/8"-11UNC)		G1/4"

安装标准 Mounting Standard



气源接口符合NAMUR标准，可简单方便地安装电磁阀。

Air supply connection is designed in accordance with NAMUR Standard to install solenoid valves.



输出轴的NAMUR标准槽和缸体上部标准安装孔，可使限位开关、定位器直接啮合和安装。

The Namur drive pinion and the Namur top mounting connection permit direct installation of accessories such as limit switch box and positioner.



底部安装孔设计符合ISO5211、DIN3337标准，可以直接安装离合器(气动手轮机构)或安装支架。

Bottom mounting connection is designed in accordance with ISO5211 and DIN3337 standards for direct mounting with valve gear boxes or mounting brackets.