



调节阀配件 Control Valve Accessories

HA 气动直行程薄膜式执行机构

HA Pneumatic Straight-Stroke Diaphragm Actuator

HA^[1] 气动直行程薄膜式执行机构是一种采用多弹簧结构，体积小、重量轻、性能高、输出力大的直行程气动薄膜执行机构。

HA^[1] **pneumatic straight-stroke diaphragm actuator**, a kind of straight-stroke pneumatic diaphragm actuator, has multi-spring structure, small volume, light weight, high performance and high output force.

HA 气动直行程薄膜式执行机构，它把气动调节仪表的输出压力转换成推杆位移的变化。因此，只要它与调节阀的阀体部分相应连接就可把阀芯移到与输入信号相对应的位置。

HA pneumatic straight-stroke diaphragm actuator transfers the output pressure of the pneumatic control instrument to changes of the rod displacement. Therefore, the valve core can be moved to the position corresponding to input signal as long as it is connected with the body of the control valve.

该执行机构与本公司的定位器配合使用可实现高精度的位置控制

High accuracy position control can be realized by matching the actuator with the positioner of the company.

标准规格

Standard specification

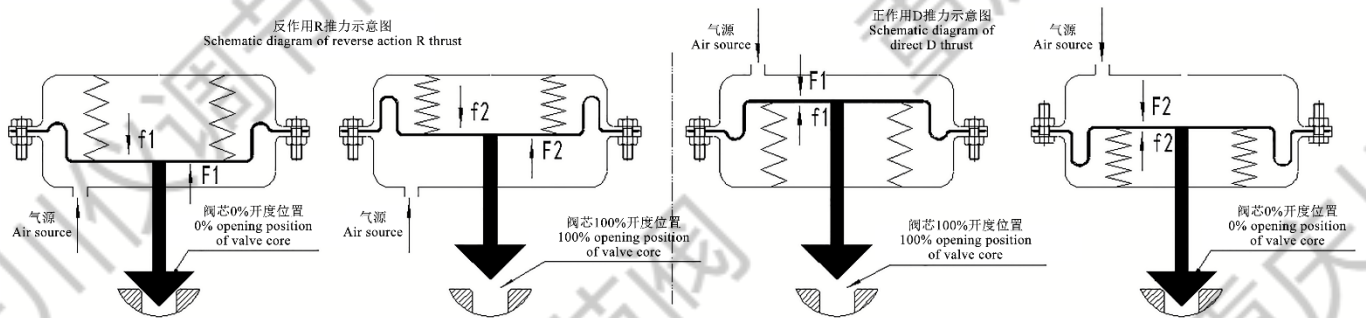
系 列 Series	HA
型 式 Type	多弹簧薄膜式 Multi-spring diaphragm type
型 号 Model	HA11, HA21, HA31, HA41, HA42, HA51
尺 寸 Size	请参见表 4、5、6 及图 1 See Table 4, 5, 6 and Fig. 1
作用型式 Action type	正作用型: HA11D, HA21D, HA31D, HA41D, HA42D, HA51D Direct action: HA11D, HA21D, HA31D, HA41D, HA42D and HA51D 反作用型: HA11R, HA21R, HA31R, HA41R, HA42R, HA51R Reverse action: HA11R, HA21R, HA31R, HA41R, HA42R, HA51R 正作用型: 薄膜气室供气压力增加，执行机构推杆向下运动 Direct action: air supply pressure of the diaphragm air chamber increases and the actuator rod goes down 反作用型: 薄膜气室供气压力增加，执行机构推杆向上运动 Reverse action: air supply pressure of the diaphragm air chamber increases and the actuator rod goes up

输出力 Output force	请参见表 1 、 2 Please see Table 1 and 2
行程 Stroke	请参见表 1 、 2 Please see Table 1 and 2
气源压力 Air source pressure	400~550kPa
弹簧范围 Spring range	请参见表 1 、 2 Please see Table 1 and 2
气源接口 Air source interface	HA11~42: NPT1/4"; HA51: NPT1/2"
性能 Performance	基本误差 带定位器: 小于全行程的±1.5% Intrinsic error With positioner: less than ±1.5% of full stroke 回差 带定位器: 小于全行程的 1.5% Hysteresis error With positioner: less than 1.5% of full stroke 死区 带定位器: 小于全行程的 0.8% Dead zone With positioner: less than 0.8% of full stroke
环境温度 Ambient temperature	标准型-30~+70℃ Standard type -30~+70℃ 高温型-15° ~+120℃ High temperature type -15℃~+120℃ 低温型-40~+70℃ Low temperature type -40~+70℃
材质 Material	膜盖 Q235B Diaphragm case Q235B 膜片 丁腈橡胶夹尼龙布 NBR Diaphragm Nitrile rubber-clamped nylon cloth NBR 低温丁腈橡胶夹尼龙布 NBR Low-temperature nitrile rubber clamp nylon cloth NBR 氟橡胶 FKM Viton FKM 推杆 SUS304、SUS420 Rod SUS304, SUS420 支架 SCPH2 Yoke SCPH2
表面涂层 Surface coating	喷塑, 色标RAL7035浅灰色 Powder spraying, color code RAL7035, light grey
附件 Accessories	定位器、空气过滤减压阀、保位阀、行程开关、手轮机构等 Positioner, air filtration reducer, lock-up valve, stroke switch, hand wheel, etc.

注[1]: HA 对应旧型号 HA, 具体型号对照表见最后附录 1

Note [1]: HA corresponds to the old model HA. See Appendix 1 at the end for the comparison table of

表 1 HA11~42 执行机构行程范围及输出力
Table 1 HA11-41 actuator stroke range and output force



执行机构 Actuator	弹簧范围 Spring range Kpa	行程 Stroke (mm)	气源克服弹簧输出推力（KN） Output thrust (KN) of air source to overcome spring			弹簧复位推力（KN） Spring reset thrust (KN)	
			薄膜有效面积 （cm^2） Effective area (cm²) of diaphragm	供气压力(100kPa) Air supply pressure (100kPa)			
				4			
				F1	F2	f1	f2
HA11R8	80~240	14.3	160	4.8	2.24	1.28	3.84
HA11D8				4.8	2.24	1.28	3.84
HA21R8		14.3、25、38	310	9.3	4.34	2.48	7.44
HA21D8				9.3	4.34	2.48	7.44
HA31R8		14.3、25、38、50	550	16.5	7.7	4.4	13.2
HA31D8				16.5	7.7	4.4	13.2
HA41R8		14.3、25、38、50、75	950	28.5	13.3	7.6	22.8
HA41D8				28.5	13.3	7.6	22.8
HA42R8		14.3、25、38、50、75	1900	57	26.6	15.2	45.6
HA42D8				57	26.6	15.2	45.6

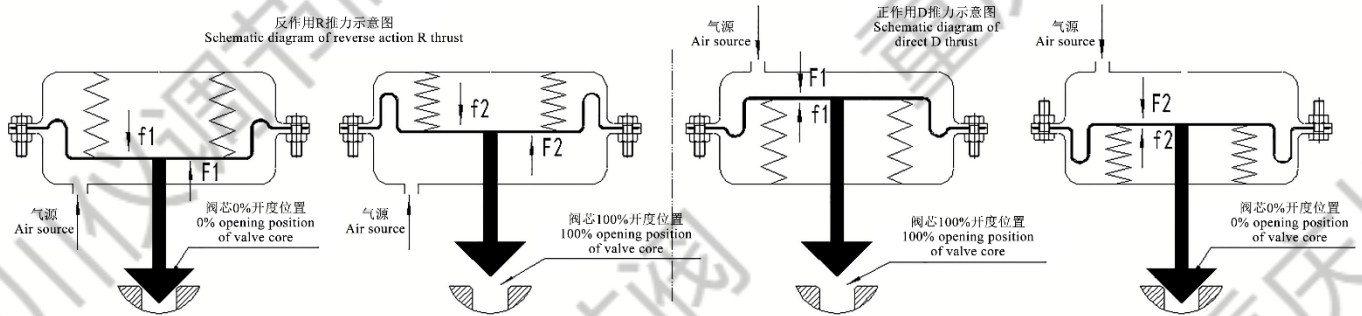
注：
Notes:

1.f1 表示弹簧预紧输出力，f2 表示弹簧最大工作行程压缩时的弹簧输出力；
1. f1 indicates the pre-tightening output force of spring, and f2 indicates the spring output force when the maximum working stroke of spring compresses;

2.F1 表示气源克服弹簧预紧力时的输出力，F2 表示气源克服弹簧最大工作行程压缩力时的输出力；
2. F1 indicates the output force when the air source overcomes the pre-tightening force of the spring, and F2 indicates the output force when the air source overcomes the compressive force of the maximum working stroke of the spring;

3. “推力示意图”只是借用一种常用阀芯结构进行执行机构输出推力的位置表达，不能作为通用阀门模板使用。
3. The "Thrust Schematic Diagram" is just a position expression of the actuator output thrust that takes a common valve core structure instead of using as a general valve pattern.

表 2 HA51 执行机构行程范围及输出力
Table 2 HA51 actuator stroke range and output force



执行机构 型号 Actuator model	弹簧数量 Quantity of springs	行程 Stroke	弹簧范围 Spring range KPa	气源克服弹簧输出推力 KN The air source overcomes the spring output thrust KN						弹簧复位推力 (KN) Spring reset thrust (KN)	
				供气压力(100kPa) Air supply pressure (100kPa)							
				4		5		5.5			
				F1	F2	F1	F2	F1	F2	f1	f2
HA51D1	4	75	106-206	44	29	59	44	66.5	51.5	16	31
HA51D2	6		160-310	36	13.5	51	28.5	58.5	36	24	46.5
HA51D4	4	100	106-240	44	24	59	39	66.5	46.5	16	36
HA51D5	6		160-360	-	-	51	21	58.5	28.5	24	54
HA51D8	4	120	80-240	48	24	63	39	70.5	46.5	12	36
HA51D7	6		120-360	-	-	57	21	64.5	28.5	18	54
HA51R2	6	75	160-310	36	13.5	51	28.5	58.5	36	24	46.5
HA51R3	8		212-412	-	-	43	13	50.5	20.5	32	61.8
HA51R5	6	100	160-360	-	-	51	21	58.5	28.5	24	54
HA51R6	8		212-480	-	-	-	-	50.5	10.5	32	72
HA51R7	6	120	120-360	-	-	57	21	64.5	28.5	18	54
HA51R9	8		160-480	-	-	-	-	58.5	10.5	24	72

注：
Notes:
1.f1 表示弹簧预紧输出力，f2 表示弹簧最大工作行程压缩时的弹簧输出力；
1. f1 indicates the spring pre-tightening output force, and f2 indicates the spring output force when the maximum working stroke of the spring compresses;
2.F1 表示气源克服弹簧预紧力时的输出力，F2 表示气源克服弹簧最大工作行程压缩力时的输出力；
2. F1 indicates the output force when the air source overcomes the pre-tightening force of the spring, and F2 indicates the output force when the air source overcomes the compressive force of the maximum working stroke of the spring;
3. “推力示意图”只是借用一种常用阀芯结构进行执行机构输出推力的位置表达，不能作为通用阀门模板使用
3. The "Schematic Diagram of Thrust" is just a position expression of the actuator output thrust that takes a common valve core structure instead of using as a general valve pattern.

表 3 手轮机构配置

Table 3 Configuration of handwheel mechanism

执行机构型号 Actuator model	HA11D、R8	HA21D、R8	HA31D、R8	HA41D、R8	HA42D、R8	HA51D、R
侧装手轮机构 Side-mounted handwheel mechanism	—	SHM-2	SHM-3	SHM-4	SHM-4X2	—
顶装手轮机构 Top-mounted handwheel mechanism	THM-1	THM-2	THM-3	THM-4	—	SHM-5

表 4 外形尺寸及重量mm

Table 4 Overall size and weight

mm

执行机构 Actuator	行程 Stroke	L	H(H1)	Φd	t	阀杆螺纹 Stem thread	ΦB	C	薄膜有效 面积 cm^2 Effective area (cm²) of diaphragm	气室容积 Volume of air chamber cm3	重量 Weight Kg	连接尺寸代 码 Connection size code
HA11D、 R8	14.3	119(105)	260	56	22	M9×1	218	230	160	850	8	A1
HA21D、 R8	14.3	134(116)	370	65	26	M12×1.25	267	281	310	1500	18	B2
	25	145(116)										
	38	158(116)										
HA31D 、 R8	14.3	134(116)	437	65	26	M12×1.25	350	363	550	3400	35	B2
	25	145(116)										
	38	158(116)										
	14.3	188(170)	492	90	35	M15×1.5						C3
	25	199(170)										
	38	212(170)										
	50	227(170)				M18×1.5						C4
	14.3	188(170)										
	25	199(170)										
	38	212(170)										
50	227(170)											
HA41D、 R8	14.3	191(172)	612	90	35	M15×1.5	470	520	950	10000	75	C3
	25	201(172)										
	38	214(172)										
	50	226(172)				M18×1.5						C4
	75	251(172)										
	14.3	191(172)										
	25	201(172)										
	38	214(172)										
	50	226(172)										
	75	251(172)										

HA42D、 R8	14.3	191(172)	860(1178)	90	35	M15×1.5	470	520	1900	20000	120 (180)	C3
	25	201(172)				M18×1.5						C4
	38	214(172)										
	50	226(172)										
	75	251(172)										
	14.3	191(172)										
	25	201(172)										
	38	214(172)										
	50	226(172)										
	75	251(172)										
HA51D、R	75	251(172)	850(1180)	90	35	M18×1.5	605	605	1500	30500	220 (300)	C4
	75	266(190)		100	38	M27X1.5						D5
	100	293(190)	910(1240)	130	45	M39X2						E6
	120	325(205)	920(1250)									

注：尺寸 L 是供气压力为零时的尺寸，括号内数字是反作用执行机构的尺寸，括号外数字是正作用执行机构的尺寸；H1 表示带手轮尺寸，重量括号内参数表示带手轮时重量

Note: L is the size when the air supply pressure is zero, the figure in the brackets is the size of reverse action actuator, and the figure outside the brackets is the size of direct action actuator; H1 indicates the size with handwheel, and the parameter in weight brackets indicates the weight with handwheel.

表 5 附件安装尺寸

Table 5 Accessory installation size

型号 Model	连接尺寸代码 Connection size code	行程, mm Stroke, mm	a1, mm a1, mm	a2, mm a2, mm	a3, mm a3, mm	M1
HA11D、R8	A1	14.3	57	100	72	M8
HA21D、R8	B2	14.3~38	80	136	125	
HA31D、R8	B2	14.3~50		190	144	
	C3、C4				198	
HA41D、R8 HA42D、R8	C3、C4	14.3~75		260	235	
HA51D、R8	C4、D5	75		264	163	
	D5	100			211	
	E6	120			218	

图 1 HA 外形图
Fig. 1 HA overall view

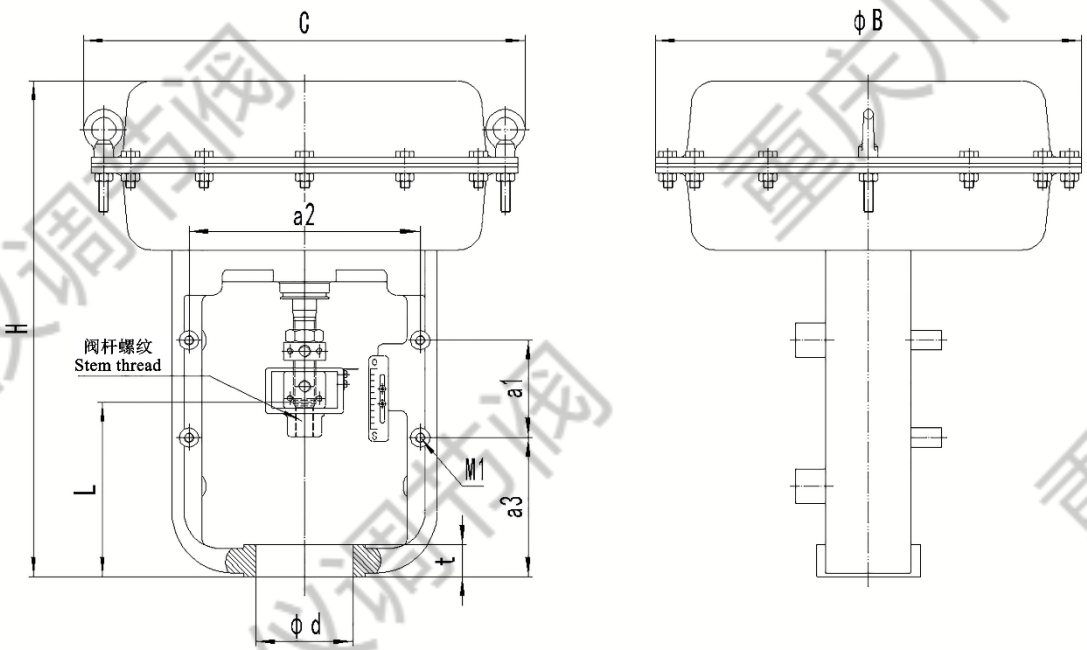


图 1-1 HA11~41 外形图 (不带手轮)
Fig. 1-1 HA11~41 (without Handwheel) overall view

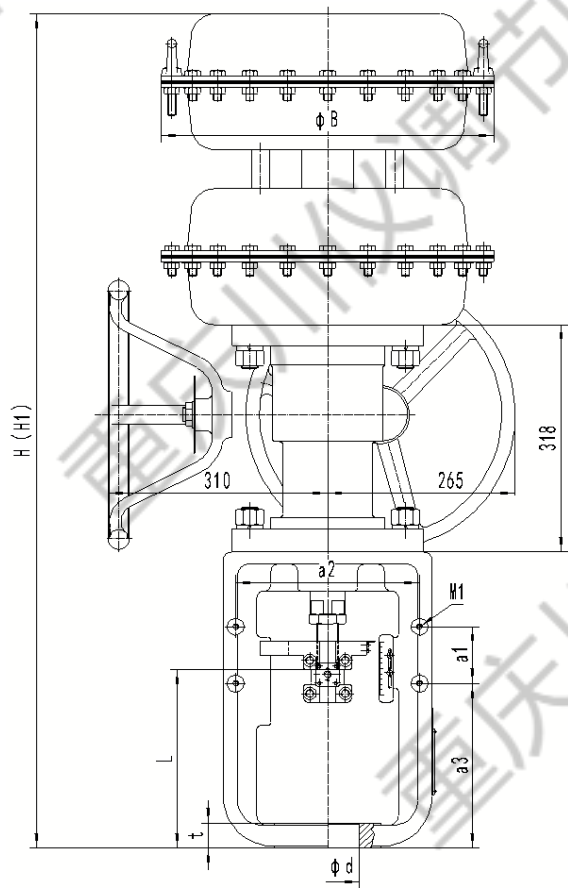


图 1-2 HA42 外形图
Fig. 1-2 HA42 overall view

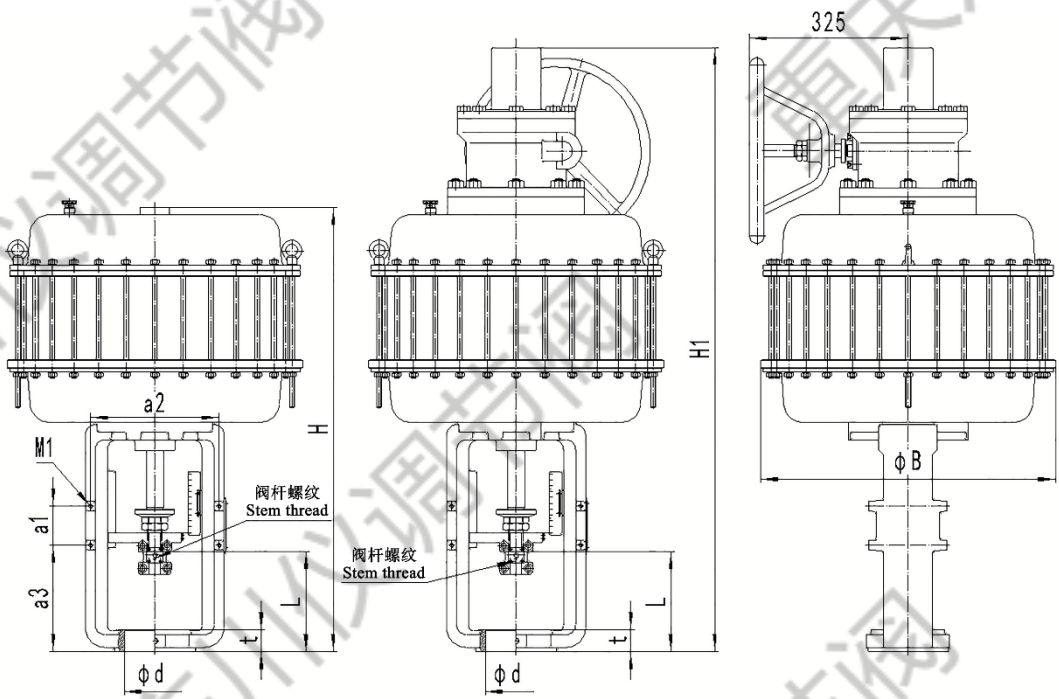


图 1-3 HA51 外形图
Fig. 1-3 HA51 overall view

表 6 HA11~41 带顶装手轮 THM-1~4 外形尺寸及重量

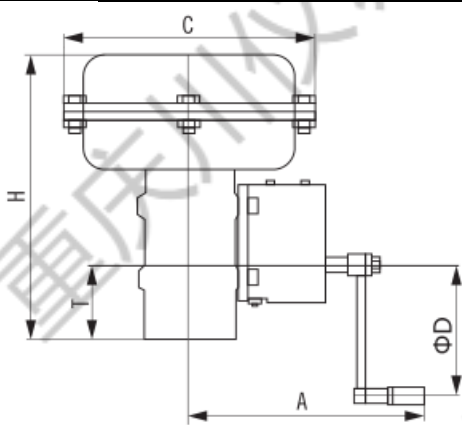
Table 6 HA11-41 with top-mounted handwheel THM-1-4X overall size and weight

执行机构 Actuator	最大行程 Maximum stroke	ΦB	C	ΦD	H	操作力 (kg) Operating force (kg)	重量 (kg) Weight (kg) (带手轮) (with handwheel)	连接尺寸代 码 Connection size code	
HA11D、R8	14.3	218	230	140	440	16	11	A1	
HA21D、R8	38	267	281	200	610	19	25	B2	
HA31D、R8	38	350	363	355	740	26	50	B2	
	50				790		55	C3	
HA41D、R8	75	470	520	570	1025	41	110	C3/C4	

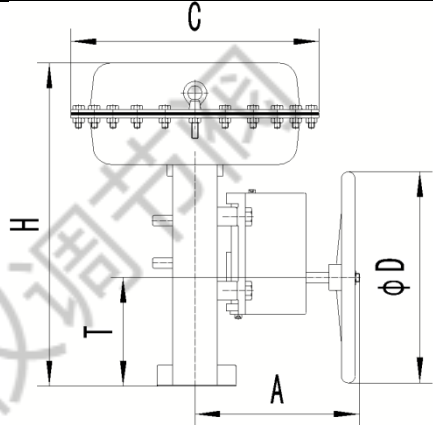
表 7 HA21~41 带侧装手轮 SHM-2~4 外形尺寸及重量

Table 7 HA21-41 with side-mounted handwheel SHM-2-4X overall size and weight

执行机构 Actuator	最大行程 Maximum stroke	A	C	T	φD	H	操作力 (kg) Operating force (kg)	重量 (kg) Weight (kg) (带手轮) (with handwheel)	连接尺寸代码 Connection size code
HA21D、R8	38	280	267	110	175	370	14	29	B2
HA31D、R8	38	280	350	163	175	492	29	46	B2
	50								C3/C4
HA41D、R8	75	320	470	200	400	612	46	108	C3/C4



适用于 HA21 和 HA31
Applicable to HA21 and HA31



适用于 HA41
Applicable to HA41

图 2 HA 结构图
Fig. 2 HA structure view

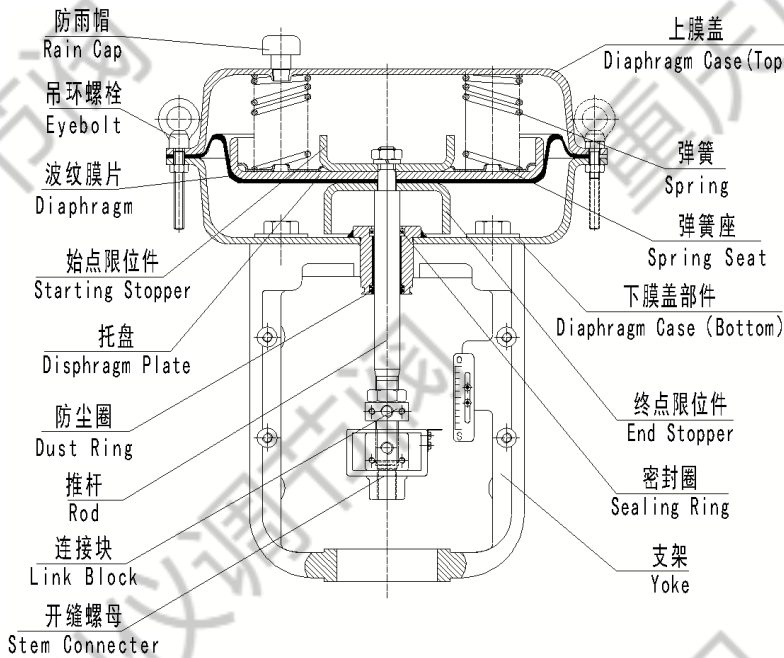


图 2-1 HA 反作用结构图
Fig. 2-1 HA reverse action structure view

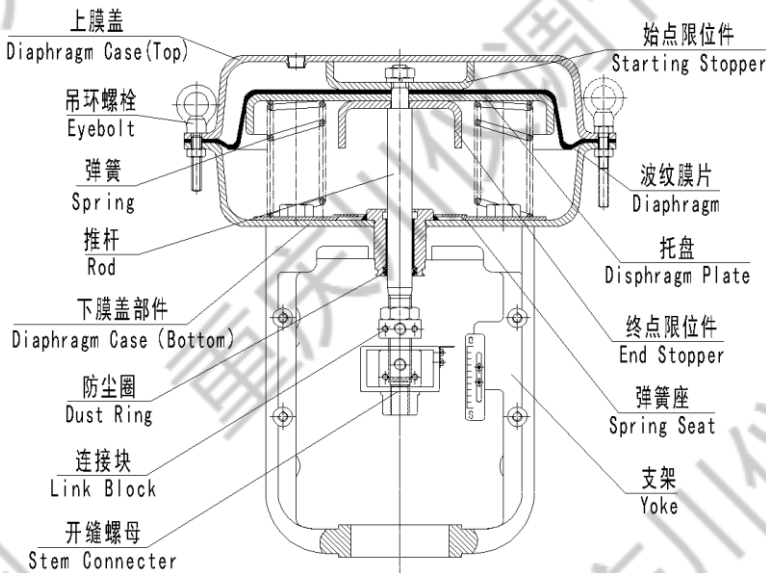


图 2-2 HA 正作用结构图
Fig. 2-2 HA direct action structure view

型谱 Type spectrum										气动多弹簧薄膜执行机构 Pneumatic multi-spring diaphragm actuator
系列 Series	HA				-		-			
规格尺寸 Specification and size		1	1							HA1
		2	1							HA2
		3	1							HA3
		4	1							HA4
		4	2							HA4X2

	5	1							HA5Y
作用方式 Action mode	D								正作用 Direct action
	R								反作用 Reverse action
弹簧范围 Spring range	1								106~206Kpa (仅限 HA51) 106~206Kpa (for HA51 only)
	2								160~310Kpa (仅限 HA51) 160~310Kpa (for HA51 only)
	3								212~412Kpa (仅限 HA51) 212~412Kpa (for HA51 only)
	4								106~240Kpa (仅限 HA51) 106~240Kpa (for HA51 only)
	5								160~360Kpa (仅限 HA51) 160~360Kpa (for HA51 only)
	6								212~480Kpa (仅限 HA51) 212~480Kpa (for HA51 only)
	7								120~360Kpa (仅限 HA51) 120~360Kpa (for HA51 only)
	8								80~240Kpa (所有都适用) 80~240Kpa (for all)
	9								160~480Kpa (仅限 HA51) 160~480Kpa (for HA51 only)
材质 Material	无 None								标准 Standard
	B								整机 304 材质 (仅限 HA21~41) Overall 304 material (for HA21~41 only)
其他 Others	无 None								标准 Standard
	TS								特殊连接尺寸 (不在此样本之内) Special connection size (not included in this sample)

订货须知

Ordering Notice

订货时，请写明：

Please specify the following items during ordering:

1. 执行机构型号 (包括规格大小、作用形式、弹簧规格)

1. Actuator model (including size, action mode and spring specification)

2. 供气压力；

2. Air supply pressure;

3. 请注明表 1 和 2 中的标准行程；其他为特殊行程，请备注

3. Please indicate the standard strokes in tables 1 and 2; please remark other strokes

4. 标准自带支架和开缝螺母 (与阀杆连接部分)，需按表 4 中选取连接尺寸代码；其他为特殊，需重新按型谱选型号 (后面跟-TS)，并提供连接尺寸图。

4. The standard is equipped with yoke and stem connector (i.e. the connecting part with the body part), select the connecting size code based on Table 4; others are special, and the model (followed by -TS) shall be re-selected according to the type spectrum and the connection size drawing shall be provided.

- 5.环境温度标准为常温（-30~+70°），低温（-40~+70°）和高温（-15~+120°），属于特殊订货，需备注；
5. Ambient temperature standard is normal temperature (-30~+70°), low temperature (-40~+70°) and high temperature (-15~+120°). It belongs to special order and requires remark;
6.标准不带手轮，如需带手轮，请备注；
6. The standard is not equipped with handwheel. Please remark if a handwheel is needed;
7.标准不带机械限位，如有机械限位请注明限开（阀门不开完），限关(阀门不关死)和限位值
7. The standard is not equipped with mechanical limit; please indicate limit open (valve not totally opened) and limit close (valve not totally closed) and limit value for the mechanical limit.
8.标准防护等级为 C3，如需更高，需备注；
8. The standard protection rating is C3; please remark if higher rating is needed;
9.标准颜色为水蓝色，色标 RAL5021（标准颜色如有变化，请以最新为准），如有特殊，需备注
9. The standard color is water blue, color code RAL5021 (**in case of any change in the standard color, the latest version shall prevail**). Please remark for special requirement

附录 1：HA 新型号与旧型号 HA 详细对照表

Appendix 1: Detailed Comparison Table of HA New Model and Old Model

新型号 New model	旧型号 Old model	新型号 New model	旧型号 Old model
HA11R8	HA1R	HA51D1	HA5YD 106~206kpa
HA11D8	HA1D	HA51D2	HA5YD 160~310kpa
HA21R8	HA2R	HA51R2	HA5YR 160~310kpa
HA21D8	HA2D	HA51R3	HA5YR 212~412kpa
HA31R8	HA3R	HA51D4	HA5YD 106~240kpa
HA31D8	HA3D	HA51D5	HA5YD 160~360kpa
HA41R8	HA4R	HA51R5	HA5YR 160~360kpa
HA41D8	HA4D	HA51R6	HA5YR 212~480kpa
HA42R8	HA4RX2	HA51D8	HA5YD 80~240kpa
HA42D8	HA4DX2	HA51D7	HA5YD 120~360kpa
HA42R8+SHM-4X2	HA4RSX2	HA51R7	HA5YR 120~360kpa
HA42D8+SHM-4X2	HA4DSX2	HA51R9	HA5YR 160~480kpa