HV Linear Motion Pneumatic Piston Actuator

The **HV** [1] Linear Motion Pneumatic Piston Actuator is the driving mechanism of the control valve. It is characterized by relatively high air supply pressure and output force, as well as a firm structure, and is commonly used in high-pressure and high-pressure-difference scenarios..

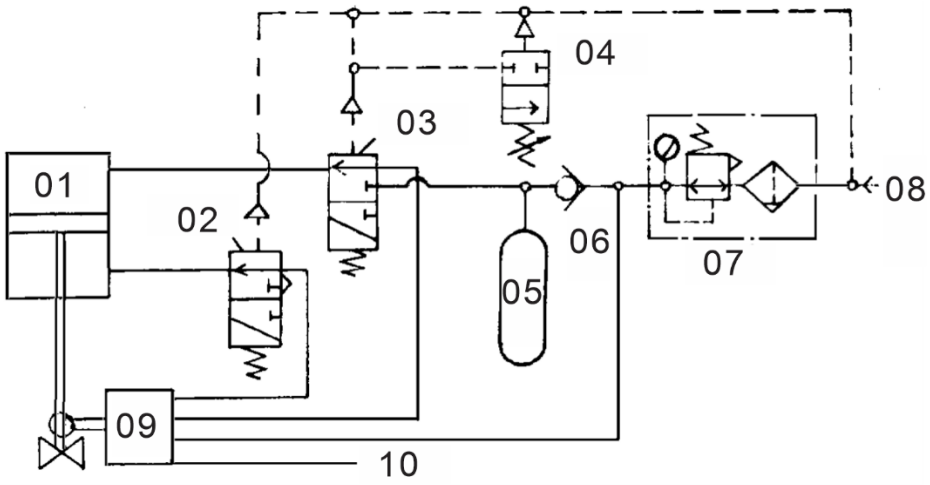
Standard Specifications

Series	HV
Type	Linear Motion Pneumatic Piston Actuator
Model	Double acting: HV21D00, HV31D00, HV41D00, HV51D00, HV61D00, HV71D00, HV81D00，HV91D00,HV101D00 Single acting, reverse action: HV21SR5, HV31SR5, HV4SR5, HV51SR5, HV61SR5, HV71SR5, HV81SR5、HV91SR5、HV101SR5; Single acting, direct action: HV21SD5, HV31SD5, HV4SD5, HV51SD5, HV61SD5, HV71SD5, HV81SD5、HV91SD5、HV101SD5;
Output force	Please refer to Table 1 & Table 2
Stroke	Please refer to Table 1 & Table 2
Air source pressure	500kPa
Spring range	190～300kPa
Air cconnection	NPT1/4" (HV21、HV31)，NPT 3/8"（HV41、HV51），NPT 1/2"（HV61、HV71），NPT 3/4"(HV81)，NPT 3/4"（HV91），NPT 1"（HV101）
Performance	Basic error　With positioner: less than ± 1.5% of full stroke Hysteresis error　With positioner: less than 1.5% of full stroke Deadband　With positioner: less than 0.8% of full stroke
Ambient temperature	Standard type:-20 ~ + 80 ℃ High-temperature type:-15 ~ + 120 ℃ Low-temperature type:-40 ~ + 80 ℃ Ultra-low temperature type:52～+70℃
Material	Cylinder..... 20 # hot-rolled seamless steel pipe Piston ····· 20# Stem..... SUS420 Bracket ····· SCPH2 Sealing ring ····· NBR, FKM, low-temperature NBR
Surface coating	Painting, RAL7035 light gray
Accessories	Positioner, air filter pressure relief valve, travel switch, handwheel mechanism, etc

Note [1]: HV corresponds to the former models VA and VP, and the specific model comparison table is shown in Appendix 1 at the end

Figure 1 Control Schematic Diagram of Double Acting Air Failure Reset

When the air supply pressure decreases, the upper and lower three-way valves activate. In this case, the air source from the air tank enters the upper part of the cylinder, while the air pressure beneath the cylinder is exhausted.



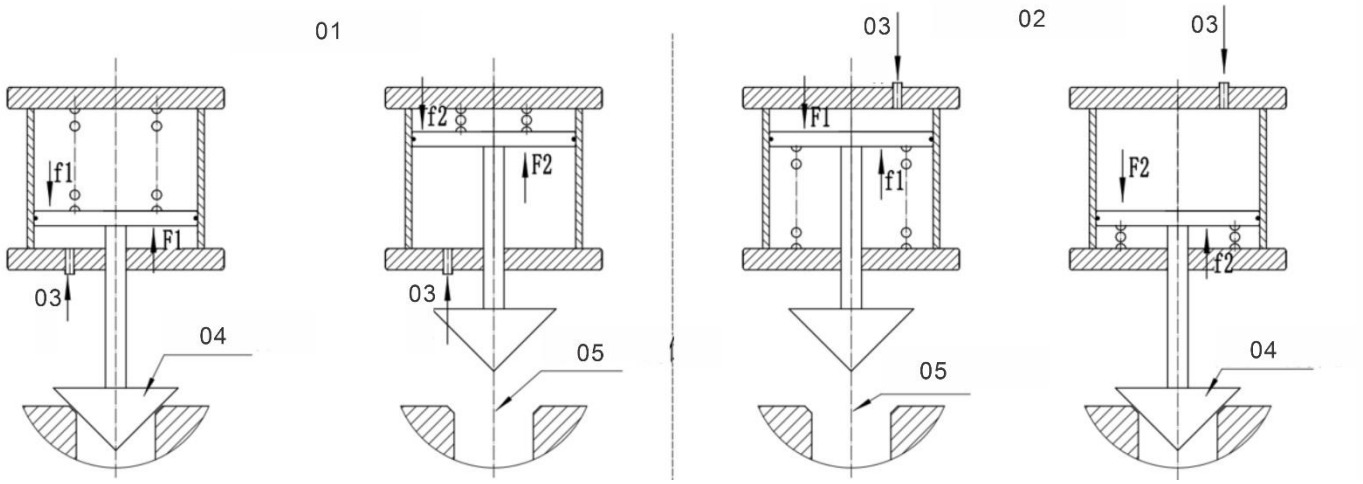
01 气缸	Cylinder
02 三通阀 B	Three-way valve B
03 三通阀 A	Three-way valve A
04 继动器	Relay
05 储气罐	Air tank
06 截止阀	Lock-up valve
07 减压阀	Pressure relief valve
08 供气压力	Air supply pressure
09 定位器	Positioner
10 输出信号	Output signal

Output Force, Stroke Range, and Cylinder Diameter of the Actuator

Table 1: Double Acting:

Actuator	Stroke（mm）	Output thrust (KN)						
		Nominal diameter (mm)	Air supply pressure (100kPa)					
			2	3	4	5	6	7
HV21D00	14.3、25	150	2.8	4.2	5.6	7.0	8.5	9.9
HV31D00	14.3、25、38、50	200	5.0	7.5	10.0	12.5	15.0	17.6
HV41D00	38、50、75、100	250	7.8	11.8	15.7	19.6	23.5	27.5
HV51D00	38、50、75、100	300	11	17	22	28	34	39
HV61D00	38、50、75、100、120	390	19	29	38	48	57	67
HV71D00	75、100、120、150	490	30	45	60	75	90	105
HV81D00	120、150	595	44	65	87	109	131	153
HV91D00	150、200	700	65	98	131	164	196	229
HV101D00	200、500	800	85	128	171	214	256	299

Table 2: Single Acting



01	Thrust Schematic Diagram of Reverse Action R
02	Thrust Schematic Diagram of Direct Action D
03	Air source
04	Valve plug at 0% opening position
05	Valve plug at 100% opening position

Actuator	Stroke（mm）	Output thrust of air source (KN)			**Spring return thrust** (KN)	
		（mm）Nominal diameter (mm)	Air supply pressure (100kPa)			
			5			
			F1	F2	f1	f2
HV21SR5	14.3、25、38	150	4.5	2.8	**2.8**	4.5
HV21SD5			4.5	**2.8**	2.8	4.5
HV31SR5	14.3、25、38、50	200	8	5	**5**	8
HV31SD5			8	**5**	5	8
HV41SR5	14.3、25、38、50、75	250	12.5	7.9	**7.9**	12.5
HV41SD5			12.5	**7.9**	7.9	12.5
HV51SR5	14.3、25、38、50、75	300	18	11.4	**11.4**	18
HV51SD5			18	**11.4**	11.4	18
HV61SR5	38、50、75、100	390	30	19.2	**19.2**	30
HV61SD5			30	**19.2**	19.2	30
HV71SR5	75、100、120	490	48	30	**30**	48
HV71SD5			48	**30**	30	48
HV81SR5	120、150	595	70	44	**44**	70
HV81SD5			70	**44**	44	70
HV91SR5	150、200	700	100	63	**63**	100
HV91SD5			100	**63**	63	100
HV101SR5	150、200、300	800	130	82	**82**	130
HV101SD5			130	**82**	82	130

Note:
1.F1 represents the pre-tightening output force of the spring, and f2 represents the spring output force when the spring is compressed to its maximum working strokewhen the maximum working stroke of the spring is compressed;
2.F1 represents the output force of the air source when overcoming the pre-tightening force of the spring, and F2 represents the output force of the air source when overcoming the compression force of the spring at its maximum working stroke.
3.For the linear stem motion valve mounted on the top, the output force generally refers to the force applied to close the valve plug, namely, the positive action F2 and the reverse actionF1.

Table 3 Handwheel Mechanism Configuration

Actuator model (single acting)	**HV21S**	**HV31S**	**HV41S**	**HV51S**	**HV61S**	**HV71S**	**HV81S**
Side mounted handwheel mechanism	SVM-2	SVM-3	SVM-4	SVM-5	SVM-6	—	—
Top mounted handwheel mechanism	TVM-2	TVM-3	—	—	—	—	—
Hydraulic handwheel mechanism	—	—	—	—	—	YHM-7	YHM-8
Actuator model (double acting)	**HV21D**	**HV31D**	**HV41D**	**HV51D**	**HV61D**	**HV71D**	**HV81D**
Side mounted handwheel mechanism	SVM-2	SVM-3	SVM-4	SVM-5	SVM-6	SVM-7	SVM-8

Table 4 Overall Dimensions and Weight

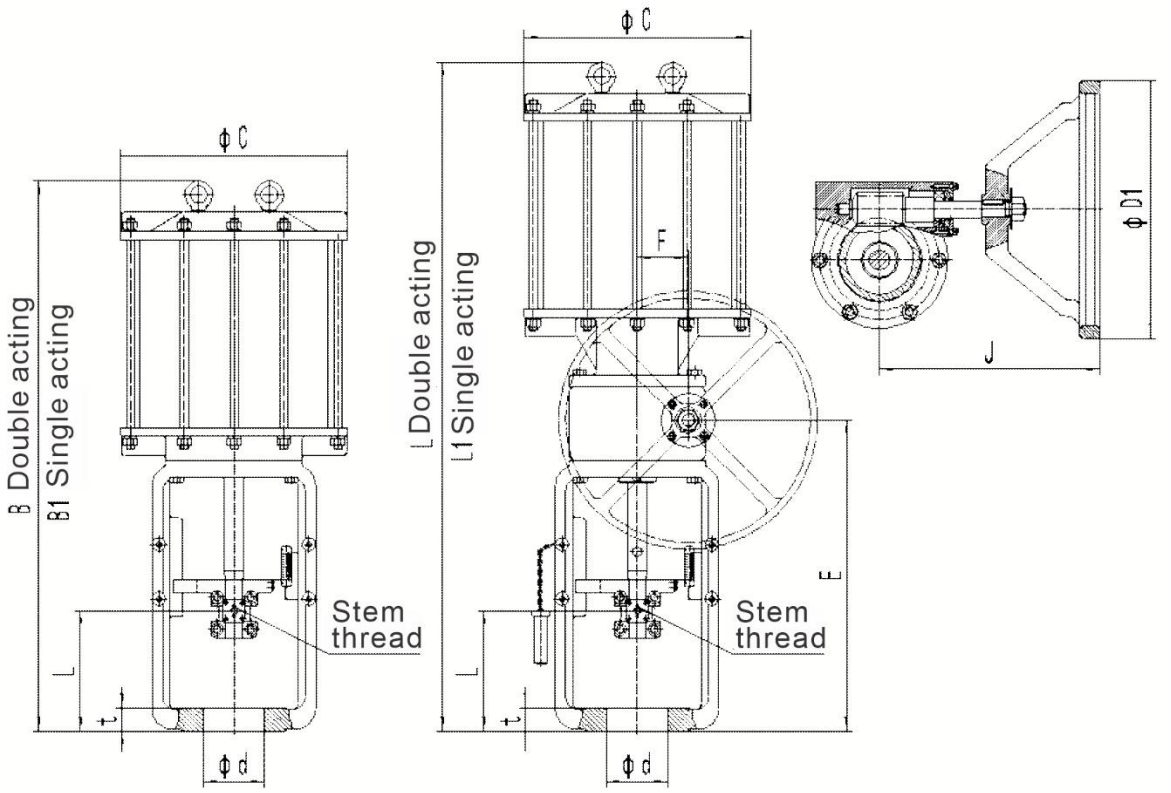
Actuator	Stroke	**L**	Valve stem thread	**t**	**Φd**	ΦC	ΦD1 (ΦD2)	E	F	J	B (B1)	L (L1) (L2)	Connection size code
HV21SR5 HV21SD5 HV21D00	L=14.3 L=25 L=38	116	M12X1.25	26	Φ65	200	200 (200)	320	50	180	500 （650 ）	640 (800) (1000)	B2
HV31SR5 HV31SD5 HV31D00	L=14.3 L=25 L=38	116	M12X1.25	26	Φ65	254	200 (350)	320	50	180	560 （750 ）	700 (900) (1100)	B2
	L=14.3 L=25 L=38 L=50	172	M15X1.5	35	Φ90			365					C3
	L=14.3 L=25 L=38 L=50	172	M18X1.5										C4
HV41SR5 HV41SD5 HV41D00	L=14.3 L=25 L=38 L=50 L=75	172	M15X1.5	35	Φ90	334	380	460	75	324	700 (1000)	900 (1200)	C3
	L=14.3 L=25 L=38 L=50	172	M18X1.5										C4

	L=75												
HV51SR5 HV51SD5 HV51D00	L=14.3	172	M15X1.5	35	Φ90	382	380	460	75	324	700 (1150)	900 (1350)	C3
	L=25												
	L=38												
	L=50												
	L=75												
	L=14.3	172	M18X1.5										C4
	L=25												
	L=38												
	L=50												
	L=75												
HV51D00	L=75	190	M27X1.5	38	Φ100								D5
	L=100	190											
HV61SR5 HV61SD5 HV61D00	L=38	190	M27X1.5	38	Φ100	480	380	540	100	384	900 (1200)	1150 (1450)	D5
	L=50	190											
	L=75	190											
	L=100	190											
	L=75	205	M39X2	45	Φ130			540	100	384			E6
	L=100	205											
	L=120	205											
HV71SR5 HV71SD5 HV71D00	L=75	205	M39X2	45	Φ130	580	380	500	1300	384	1000 (1250)	1250 (1600)	E6
	L=100	205											
	L=120	205											
HV71D00	L=150	205											
HV81SR5 HV81SD5 HV81D00	L=120	260	M45X3	45	Φ130	715	380	600	1400	440	1150 (1550)	1450 (1950)	E7
	L=150	260											
	L=120	260	M56X3	50	Φ160								F8
	L=120	260											

◦

Note: Dimension(L) is the dimension when the piston is in its lowest position. D. E, F, and J are only available with handwheels. Single acting dimensions are shown in parentheses.

Figure 1 HV Outline Drawing



Figures 1-1 Outline Drawing of HV21~41SR/SD5 and HV21~81D00 (without Handwheel)
Figures 1-2 Outline Drawing of HV21~41SR/SD5 and HV21~81D00 (with Side Mounted Handwheel)

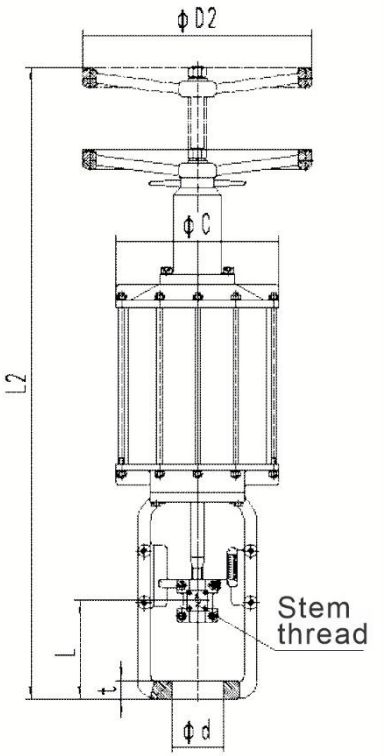


Figure 1-3 Outline Drawing of HV21~HV31SR/D5（with Top Mounted Handwheel）

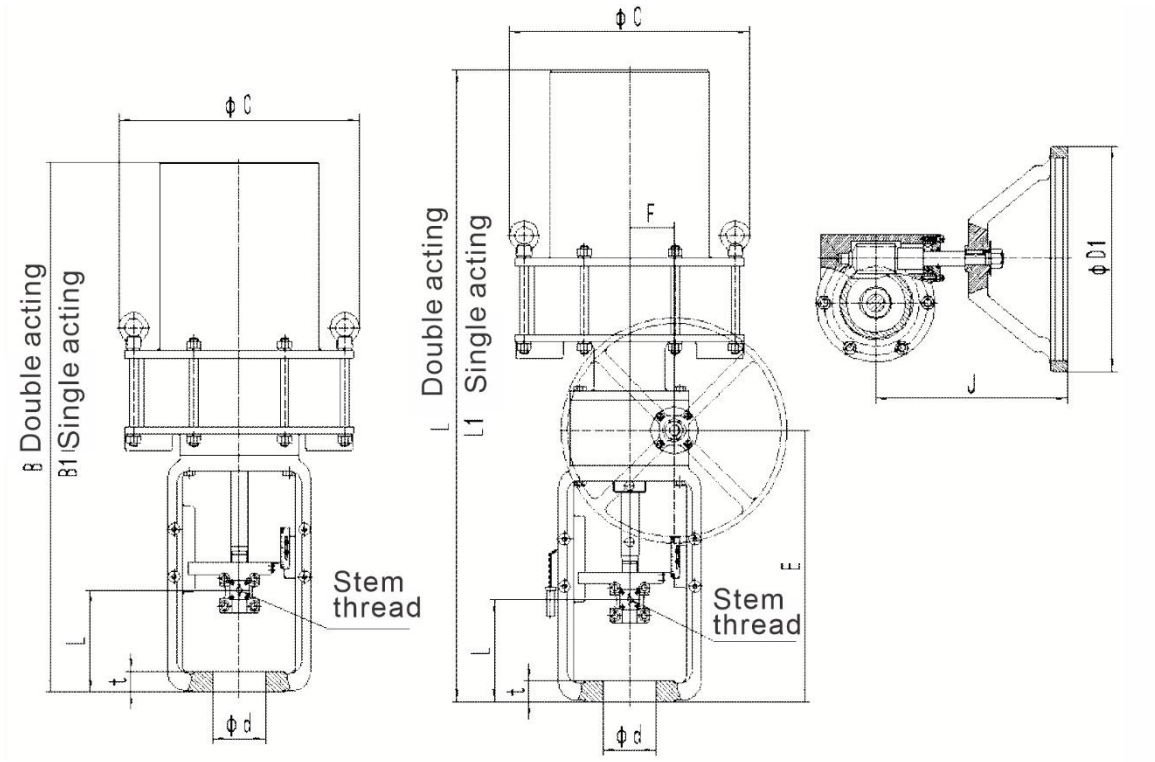


Figure 1-4 Outline Drawing of HV51SR5~HV81SR5 (without Handwheel)

Figure 1-5 Outline Drawing of HV51SR5~HV61SR5 (with Side Mounted Handwheel)

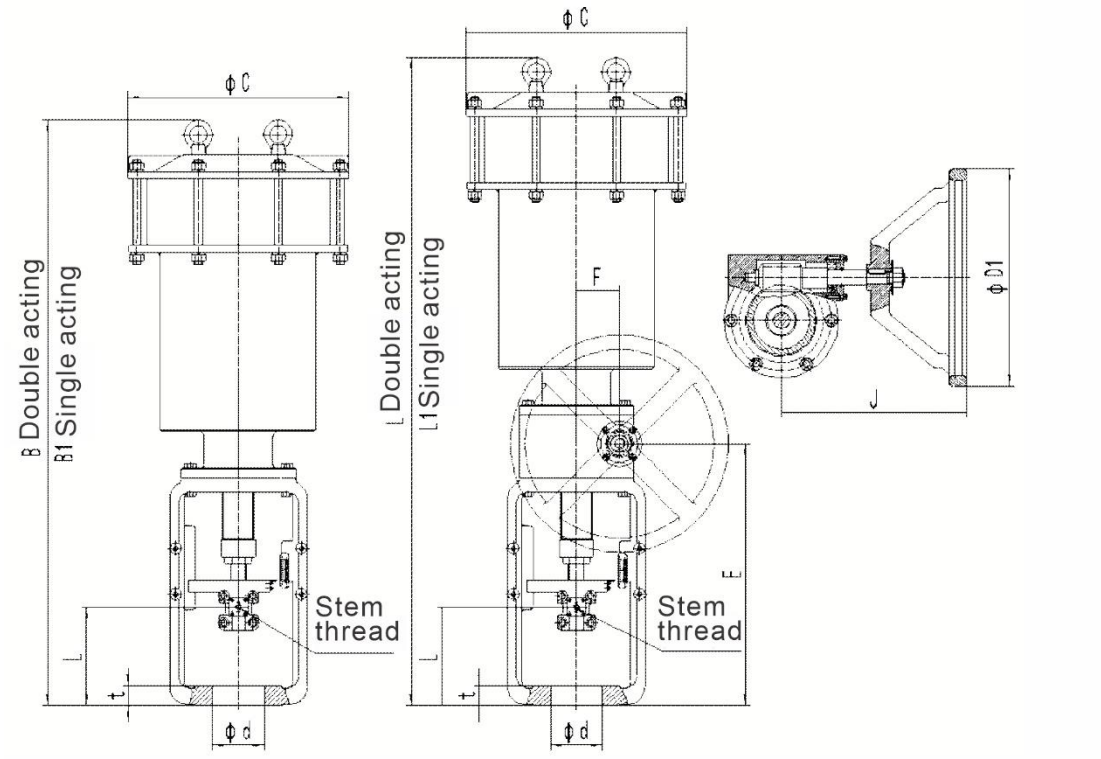


Figure 1-6 Outline Drawing of HV51SD5~HV81SD5 (without Handwheel)
Figure 1-7 Outline Drawing of HV51SD5~HV81SD5 (with Side Mounted Handwheel)

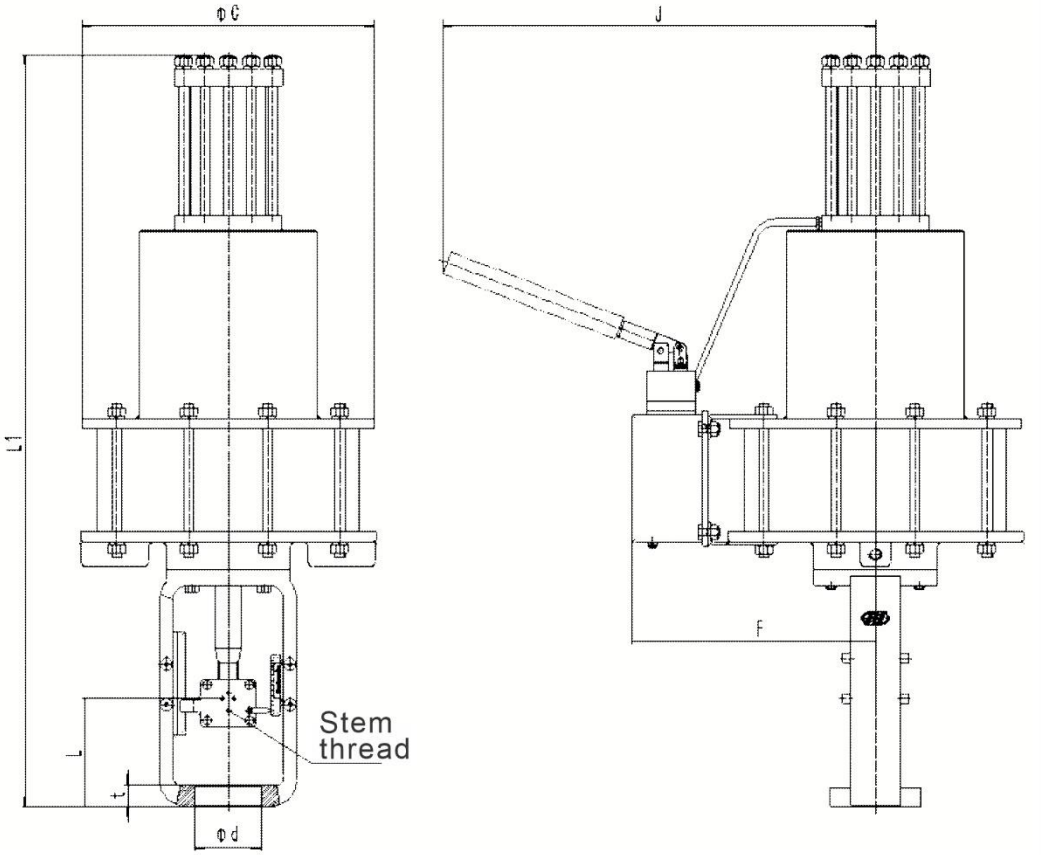


Figure 1-8 Outline Drawing of HV71~81SR5 (with Hydraulic Handwheel)

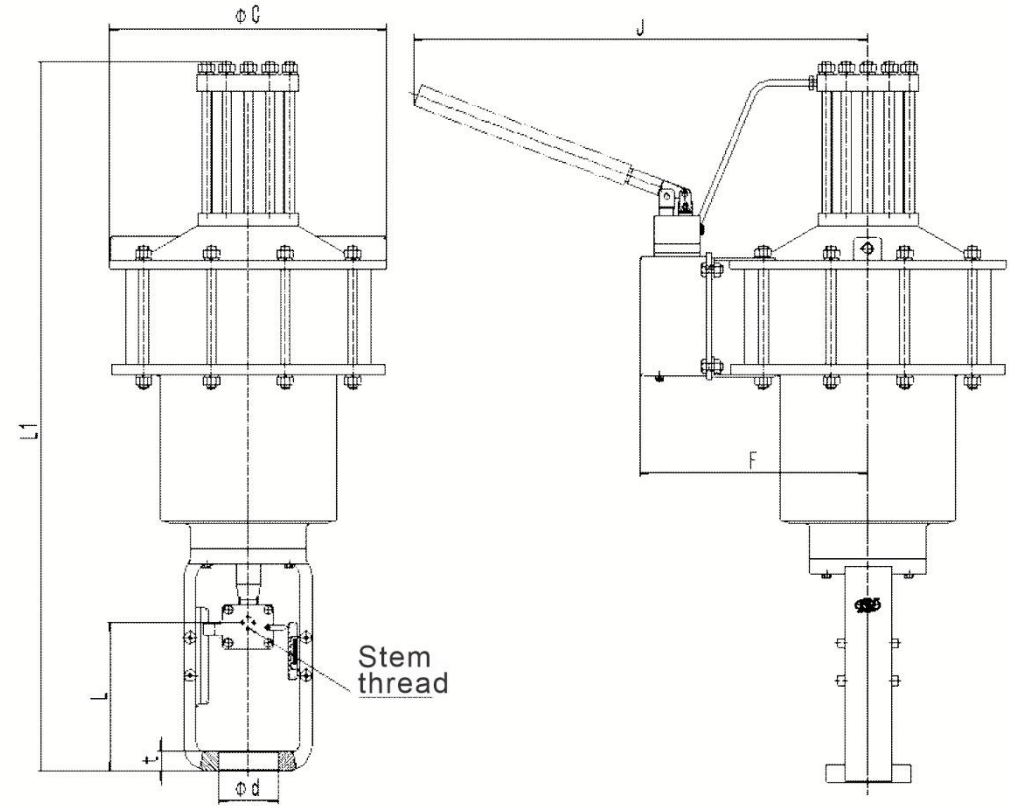


Figure 1-9 Outline Drawing of HV71~81SD5 (with Hydraulic Handwheel)

Type Spectrum										
Series	HV						-		-	Linear Motion Pneumatic Diaphragm Actuator
Specification and size		2	1							Cylinder diameter 150mm
		3	1							Cylinder diameter 200mm
		4	1							Cylinder diameter 250mm
		5	1							Cylinder diameter 300mm
		6	1							Cylinder diameter 390mm
		7	1							Cylinder diameter 490mm
		8	1							Cylinder diameter 595mm
		9	1							Cylinder diameter 700mm
		10	1							Cylinder diameter 800mm
Action form				D						Double acting
				S						Single acting
Mode of action					0					Double acting
					R					Reverse action
					D					Direct action
Spring range						0				Double acting
						5				
Material							None			Standard
							B			Shell-304 material
Ultra-low temperature environment									None	Standard（-40°~120℃）
									-	-52~70℃

Instructions for Ordering

Please specify the following when ordering:

1.The model of the actuator (including specifications, size, action form, action mode, and spring range);

2.Air supply pressure

3.Please indicate the standard stroke in Table 2; Other strokes not included in Table 2 are special stokes, and need to be noted.

4.For the standard bracket and slit nut (connected to the valve stem), the connection size code needs to be selected according to Table 4; Others not included in Table 4 are special codes and need to be re-selected according to the type spectrum (followed by - TS), and a connection size diagram should be provided.

5.The standard ambient temperature is room temperature (-20~+80 ° C); Order of low temperature (-40~80° C) and high temperature (-15~120° C) belong to special orders and need to be noted;Ultra-low temperature needs special selection according to type spectrum.

6.Standard product does include a handwheel. If a handwheel is required, please note;

7.The standard does not include mechanical limits. If mechanical limits are required, please indicate the limit opening (valve is not fully opened), limit closing (valve is not fully closed), and limit value

8. The standard protection level is C3; if higher is required, please note it;

9. The standard color is water blue, with color code RAL5021. If there are any special circumstances, please note. (If there are any changes to the standard colors, please refer to the latest version)

Appendix 1: Detailed Comparison Table between New HV Models and Former VA and VP Models

New model	Former model	New model	Former model
HV21D00	VP2L	HV51SR5+SVM-5	VA5RS
HV21D00+SVM-2	VP2S	HV51SD5	VA5D
HV21SR5	VA2R	HV51SD5+SVM-5	VA5DS
HV21SR5+SVM-2	VA2RS	HV61D00	VP6L
HV21SD5	VA2D	HV61D00+SVM-6	VP6S
HV21SD5+SVM-2	VA2DS	HV61SR5	VA6R
HV31D00	VP3L	HV61SR5+SVM-6	VA6RS
HV31D00+SVM-3	VP3S	HV61SD5	VA6D
HV31SR5	VA3R	HV61SD5+SVM-6	VA6DS
HV31SR5+SVM-3	VA3RS	HV71D00	VP7L
HV31SD5	VA3D	HV71D00+SVM-7	VP7S
HV31SD5+SVM-3	VA3DS	HV71SR5	VA7R
HV41D00	VP4L	HV71SR5+YHM-7	VA7RY
HV41D00+SVM-4	VP4S	HV71SD5	VA7D
HV41SR5	VA4R	HV71SD5+YHM-7	VA7DY
HV41SR5+SVM-4	VA4RS	HV81D00	VP8L
HV41SD5	VA4D	HV81D00+SVM-8	VP8S
HV41SD5+SVM-4	VA4DS	HV81SR5	VA8R
HV51D00	VP5L	HV81SR5+YHM-8	VA8RY
HV51D00+SVM-5	VP5S	HV81SD5	VA8D
HV51SR5	VA5R	HV81SD5+YHM-8	VA8DY