

## **PNEUMATIC DIAPHRAGM LINEAR ACTUATOR**

### **SINGLE ACTING TYPE**

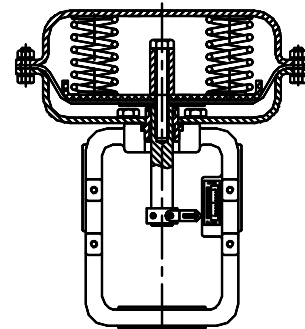
#### **GENERAL**

The **PROVAL** diaphragm actuator spring opposed diaphragm actuator provides precise, high thrust performance in a lightweight, compact format. The diaphragm actuators are designed afresh applying multi-spring type, so that these actuators are materialized to be miniaturized and light weighted as a new style. The **PROVAL** diaphragm actuators provide the operation to control the valve travel balancing between the force on the diaphragm by the signal air pressure, and the spring force.

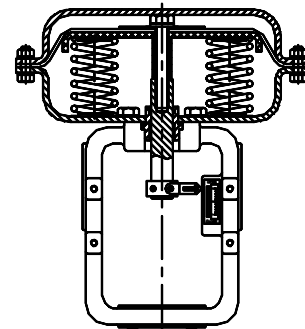
By combining **PROVAL** positioner, the series brings about high accuracy of positioning.

#### **FEATURES**

- **Low overall height**
  - Design of leg posts and diaphragm casing allows for maximum strength with minimum overall height.
- **Long service life**
  - Diaphragm casing are rugged, thick-walled, internally coated steel construction providing stability and corrosion protection.
- **High thrust capability**
  - Molded and reinforced diaphragm permits higher pressure to provide maximum thrust for a given diaphragm size.
- **High dynamic stability and frequency response**
  - Shallow casing means reduced volume, thereby minimizing response time.
- **Reduced hysteresis**
  - Multi-spring design provides diaphragm stability and improves operational repeatability.



RA type(A-270M)



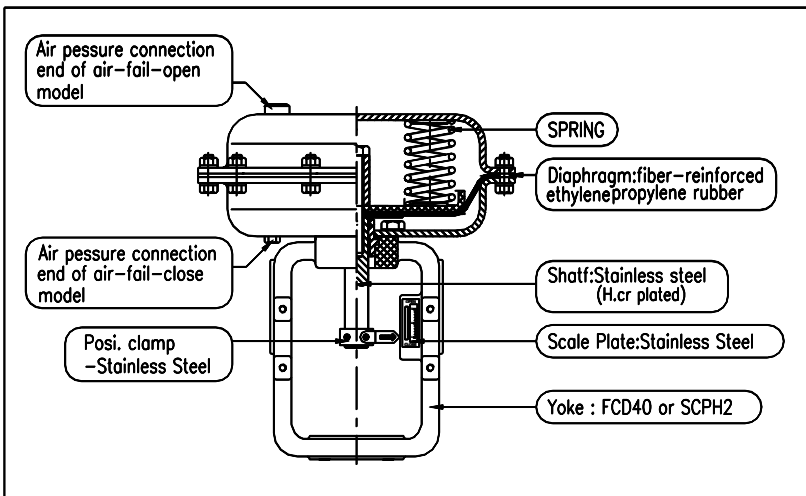
DA type(A-270M)

## STANDARD SPECIFICATION

Type		Single acting (Multi-spring)			
Action		Reverse action (RA), Direct action (DA)			
Actuator Model		A-270M	A-360M	A-430M	A-520M
Effective Diaphragm Area (cm <sup>2</sup> )		310	630	970	1320
Max. Stroke (mm)		30	40	60	100
Materials	Case	SS (press)			
	Diaphragm	※EPDM			
	Shaft (output rod)	SUS304 (H.Cr plated)			
	Yoke	A216-WCB			
Supply Air Pressure kPa (kgf/cm <sup>2</sup> G)		160 (1.6), 240 (2.4), 320 (3.2)			
Spring Range kPa (kgf/cm <sup>2</sup> G)		20-98 (0.2-1.0), 80-240 (0.8-2.4), 120-240 (1.2-2.4)			
Air Connection		Rc 1/4			Rc 3/8"
Ambient Temperature		-20°C ~ 80°C			
Additional Options	Mechanisms	Top-mounted H/W, Side worm-mounted H/W, Travel stopper.			
	Accessories	E/P Positioner, P/P Positioner, Air set, Limit S/W, Solenoid valve, Booster relay, Speed controller, Lock-up valve, etc.			

- [Notes] (1) ※ : Manufactured and attached as according to customer's order.  
 (2) Please consent in advance that approval drawing and other documents may represent with old material designation.  
 (3) For ambient temperature, denoted the extended temperature range as option.

## ACTUATOR STRUCTURE



### • Actuator and valve actions

Selection of actuator actions determines valve actions (in response to input signals).

**Air-fail-close:** actuator where the valve opens as the input signal increases.

**Air-fail-open:** actuator where the valve closes as the input signal increases

With the Alpha plus, the valve closes as the plug lowers. The valve action depends, in turn, on whether an air-fail-close or air-fail-open actuator is chosen.

## PERFORMANCE

### 1. Hysteresis

Spring range	With Positioner	Without Positioner
0.2 ~ 1.0 kgf/cm <sup>2</sup>	Less than 0.8% of F.S.	Less than 5% of F.S.
0.4 ~ 1.2 kgf/cm <sup>2</sup>	Less than 0.8% of F.S.	Less than 5% of F.S.
0.4 ~ 2.0 kgf/cm <sup>2</sup>	Less than 1% of F.S.	Less than 5% of F.S.
0.8 ~ 2.4 kgf/cm <sup>2</sup>	Less than 1% of F.S.	Less than 5% of F.S.
1.2 ~ 2.4 kgf/cm <sup>2</sup>	Less than 1.5% of F.S.	Less than 5% of F.S.

### 2. Linearity

Spring range	With Positioner	Without Positioner
0.2 ~ 1.0 kgf/cm <sup>2</sup>	Less than 1% of F.S.	Less than 5% of F.S.
0.4 ~ 1.2 kgf/cm <sup>2</sup>	Less than 1% of F.S.	Less than 5% of F.S.
0.4 ~ 2.0 kgf/cm <sup>2</sup>	Less than 1% of F.S.	Less than 5% of F.S.
0.8 ~ 2.4 kgf/cm <sup>2</sup>	Less than 1.5% of F.S.	Less than 5% of F.S.
1.2 ~ 2.4 kgf/cm <sup>2</sup>	Less than 1.5% of F.S.	Less than 5% of F.S.

[Notes] Without positioner, the performance may vary according to the combination with valve body and kind of packing.

### 3. Air consumption

-Max, stroke

[Unit: N. ℓ]

Air Supply (kgf/cm <sup>2</sup> G)	Actuator Model			
	A-270M	A-360M	A-430M	A-520M
1.4	1.9	4.6	12.6	25.7
1.6	2.2	5.2	14.4	29.4
2.0	2.8	6.5	18	36.7
2.4	3.3	7.8	21.6	44.1
3.2	4.4	10.4	28.9	58.7

### 4. Output force

4-1 Reverse action (RA)

[Unit: kgf]

Off Balance (kgf/cm <sup>2</sup> )	Spring Range (kgf/cm <sup>2</sup> )	Air Supply (kgf/cm <sup>2</sup> G)	Actuator Model			
			A-270M	A-360M	A-430M	A-520M
0.2	0.2 ~ 1.0	1.4	62	126	195	264
0.4	0.4 ~ 1.2	1.6	124	252	388	528
	0.4 ~ 2.0	2.4				
0.8	0.8 ~ 2.4	3.2	248	504	780	1056
1.2	1.2 ~ 2.4	3.2	372	756	1165	1584

## 4-2 Direct action (DA)

[ Unit: kgf ]

Off Balance (kgf/cm <sup>2</sup> )	Spring Range (kgf/cm <sup>2</sup> )	Air Supply (kgf/cm <sup>2</sup> G)	Actuator Model			
			A-270M	A-360M	A-430M	A-520M
0.2	0.2 ~ 1.0	1.4	124	252	388	528
0.4	0.4 ~ 1.2	2.0	248	504	780	1056
0.8	0.4 ~ 1.2	2.4	372	756	1165	1584
1.2	0.4 ~ 2.0	3.2	372	756	1165	1584

### WEIGHT

#### - Actuator weight

[ Unit: kg ]

Off Balance (kgf/cm <sup>2</sup> )	Actuator Model			
	A-270M	A-360M	A-430M	A-520M
Without Manual H/W	15	25	75	110
With Manual H/W	RA	20	20	93
	DA	18	18	85

[Note] For Drawing numbers, See page 5-6.

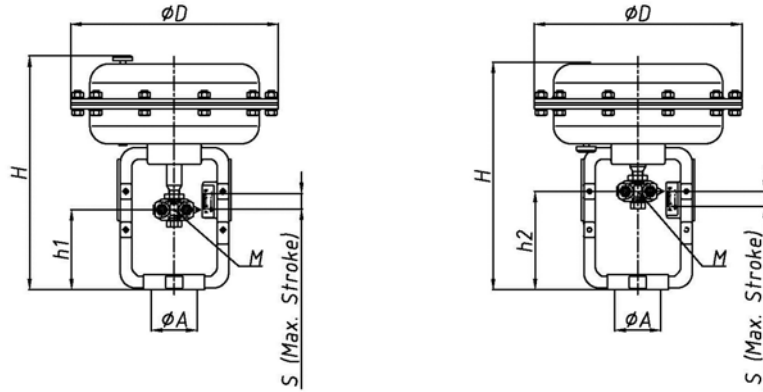
#### - Accessory weight

[ Unit: kg ]

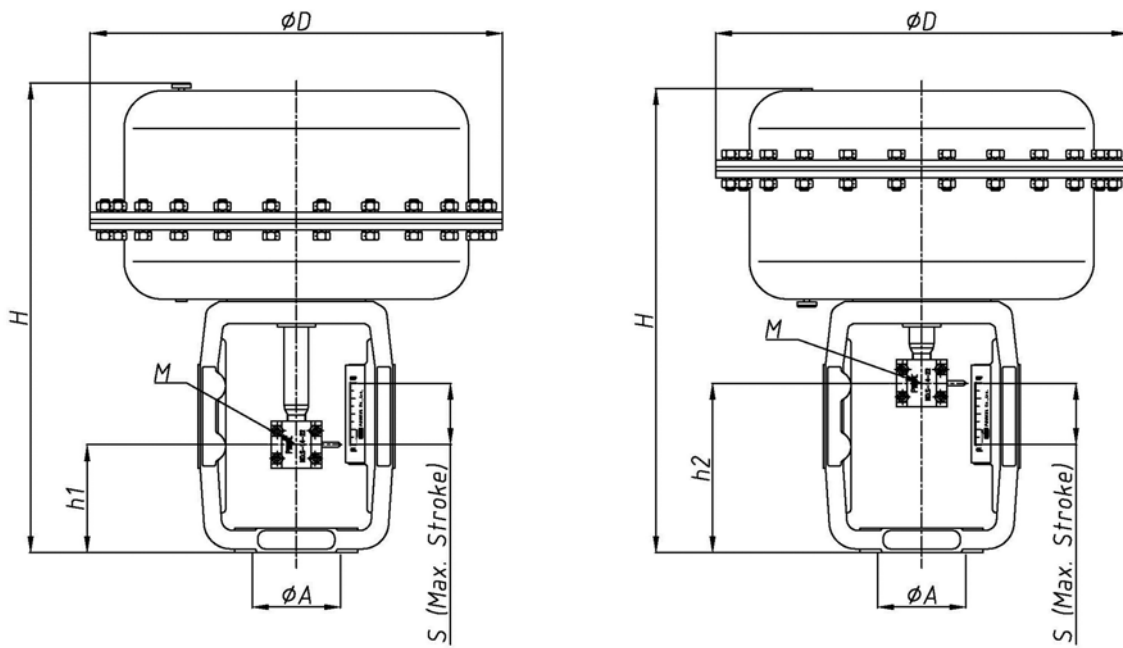
Accessory Name	Weight
E/P Positioner	2.5
P/P Positioner	2.5
Air-set	0.6

## DIMENSION DRAWING

### DIAPHRAGM TYPE ACTUATOR (No Handle Type)



<A-270M / A-360M>



<A-430M / A-520M>

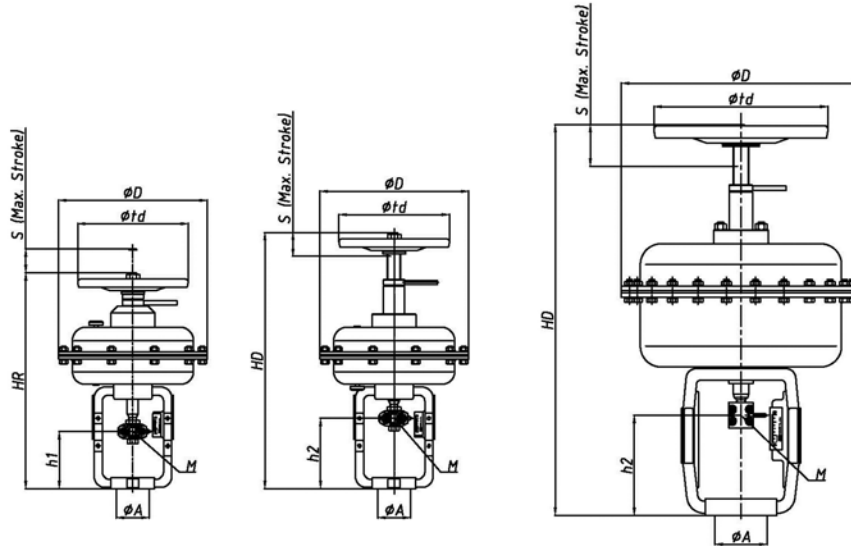
#### DIMENSIONS

[ Unit: mm ]

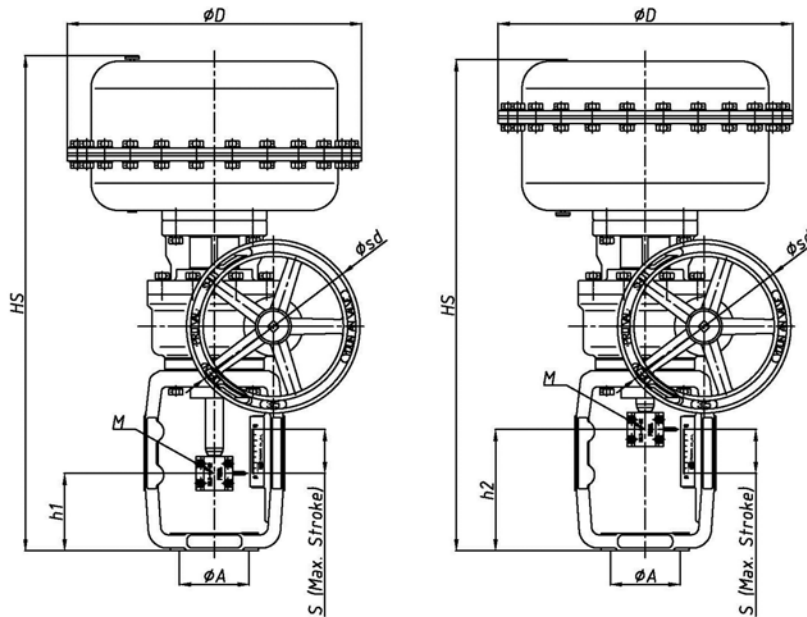
Model No.	H	h1	h2	ØD	ØA	S	M	Air Connection
A-270M	300	98	120	270	60.5	20	M14 x 1.5P	PT 1/4"
A-360M	355	80	140	365	60.5	40	M14 x 1.5P	PT 1/4"
A-430M	500	125	195	430	75.5	55	M16 x 2P	PT 1/4"
A-520M	600	140	225	520	100.5	85	M24 x 2P	PT 1/4"

## DIMENSION DRAWING

### DIAPHRAGM TYPE ACTUATOR (Handle Type)



<A-270M / A-360M>



<A-430M / A-520M>

#### DIMENSIONS

[ Unit: mm ]

Model No.	HR	HD	HS	h1	h2	ØD	Øtd	Øsd	ØA	S	M	Air Connection
A-270M	400	470	-	98	120	270	200	-	60.5	20	M14 x 1.5P	PT 1/4"
A-360M	465	545	-	80	140	365	315	-	60.5	40	M14 x 1.5P	PT 1/4"
A-430M	-	720	710	125	195	430	315	200	75.5	55	M16 x 2P	PT 1/4"
A-520M	-	-	900	140	225	520	-	315	100.5	85	M24 x 2P	PT 1/4"