

Series 3600 Pneumatically Operated Multi-Spring Diaphragm Actuators

Series 3600 Features

General

The AO-3600 Diaphragm actuator has been designed to control accurately the flow and pressure of fluid in response to demand of fine process control as well as various plant systems. Its robust design allows powerful and high performance pneumatic actuation of linear motion valves as well as rotating valves.

Performance:

- Simple cost effective design
- Long stroke and wide application
- Strong seating force
- Compact and light weight

Features:

Easy Maintenance

- Easy to assemble and disassemble. Reduce the maintenance cost by simplified the design of components.

Good Performance

- Provide the maximum strength and reliable high performance.

Flexibility

Wide selection of optional accessories available including override.

Compact Design

- More compact and lighter than other existing actuators. Designed for easy installation and convenient maintenance on site.

Multiple Spring Design

- Available to insert three springs to six springs maximum. Suitable for various working pressure from low to high instrument air pressure.

Separate Handwheel

- Adapting independent spindle, it does not damage the connected parts between handle spindle and worm gear

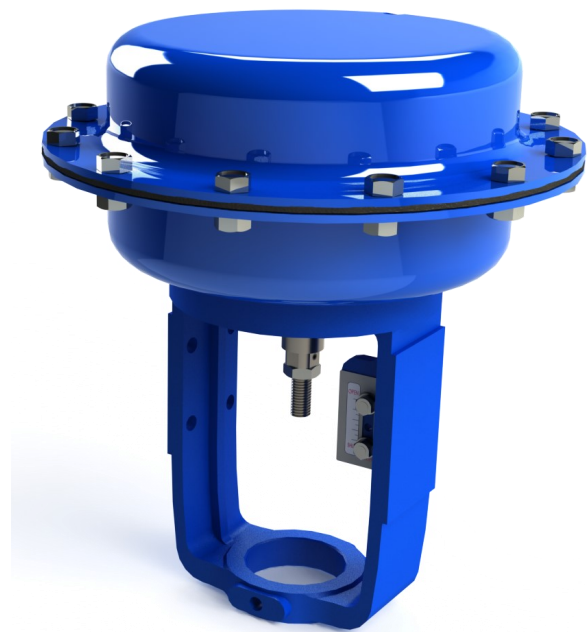


Figure 1.
AO-3600 Multi-Spring Diaphragm Actuator

Diaphragm Actuator Specifications

Actuator Type	Multi-spring Diaphragm Actuator						
Actuator Size	T-1	T-2	T-3S	T-3	T-4	T-5	T-5L
Stroke (mm)	20	25	38	50	50	100	130
Eff. Area (cm ²)	270	350	515	515	725	1210	1210
Thrust (kgf)	256	332	489	489	688	1149	1149
Max. Operating Pressure to Diaphragm (Barg)	6						
Max. Allowable Casing Burst Out Pressure (Barg)	15 * Over Max. operating pressure, internal parts can be permanently deformed.						
Spring Range (Barg)	0.8 ~ 2.7, 1.0 ~ 3.0,						
Max. Working Temperature (°C)	-40 ~ 90						
Action	Reverse or Direct						
Movement	Reciprocate, Rotary (with rotary box)						
Option	Hand-wheel, Positioner, Filter regulator, Solenoid valve, Limit switches, Speed controller, etc.						

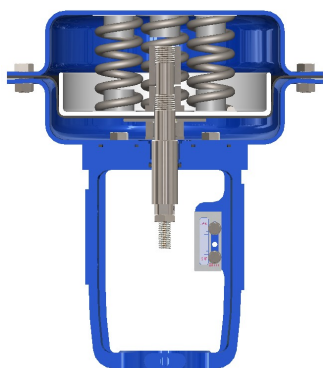


Figure 2. Cross Sectional Drawing AO-3600 Diaphragm Actuator (Direct Acting)



Figure 3. Cross Sectional Drawing AO-3600 Diaphragm Actuator (Reverse Acting)

Table 1. Standard Materials of Construction

Part Description	Material
Yoke	Ductile Iron / Carbon Steel
Diaphragm Cover	Carbon Steel
Spring Case	Carbon Steel
Diaphragm	NBR / EPDM
Seals	NBR / EPDM
Stem	Stainless Steel

Alternately material combinations suitable for offshore and extremely corrosive duties are available. Consult factory for details.

Table 2. Actuator Working conditions.

Max. Working Pressure	6	Barg
Max. Working Temperature	90	°C
Min. Working Temperature	-40	°C
Min. Storage Temperature	-55	°C

Standard Actuators are suitable of air operation. Actuators for low temperature or high temperature applications are available on request.

Handwheel Options

Handwheels are designed to allow manual intervention in the control system by bypassing the control signal that is controlling the valve. Handwheels are commonly used during facility start-up or emergency situation.

With the handwheel in the neutral position, automatic operation is possible throughout full valve travel. In any other position, valve travel will be restricted.

Clockwise rotation of the handwheel moves the actuator stem downward and counterclockwise rotation moves the stem upward.

Top / Top-side Mounted Handwheel (Fig. 4 and 5)

Top handwheel is mounted at the top of the actuator and operated from top position. Top handwheel is available from T-1 to T-3 sizes.

Top-side handwheel is mounted at the top of the actuator but operated from side position. Top handwheel is available for all size of diaphragm actuators.

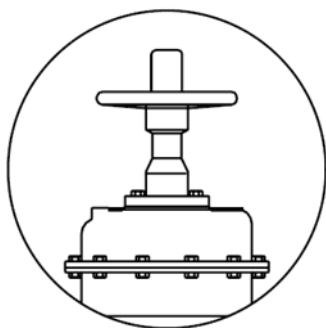


Figure 4. Top Mounted Manual Handwheel Unit (T-1 ~ T-3)

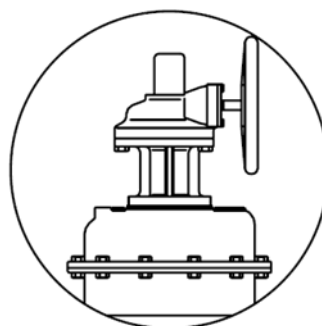


Figure 5. Top-side Mounted Manual Handwheel Unit (T-1 ~ T-5)

Side Mounted Handwheel (Fig. 6)

Side mounted handwheel is mounted between diaphragm actuator and yoke and operated from side position. Declutchable gear option is available.

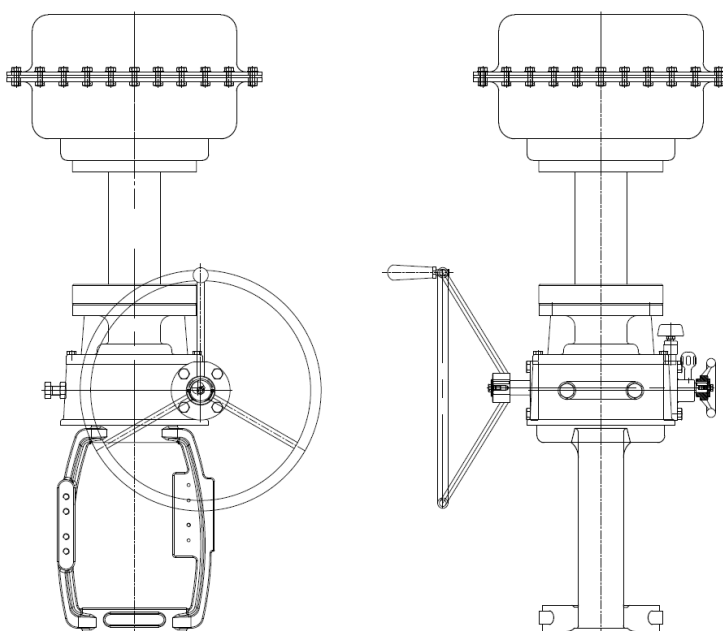
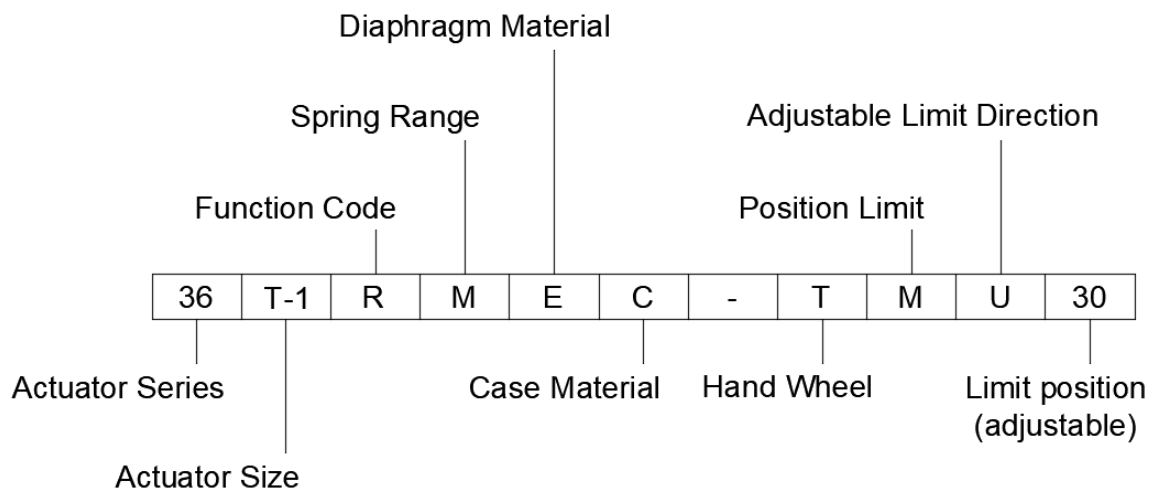


Figure 6. Side Mounted Manual Handwheel Unit (T-1 ~ T-5)

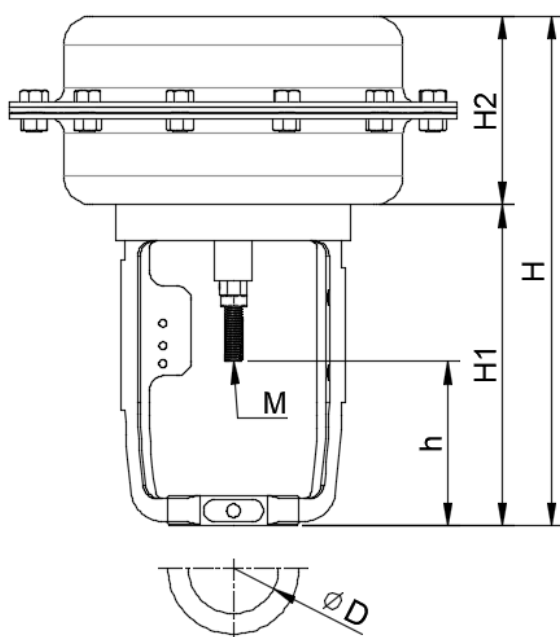
How to Order



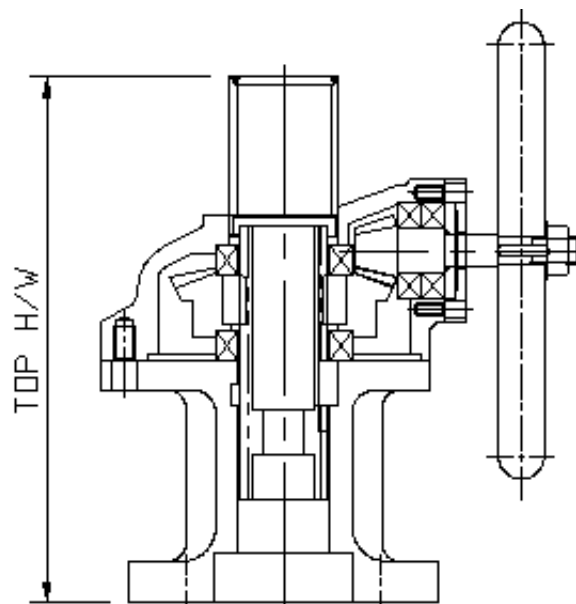
1 Actuator Series		6 Materials	
36	Pneumatic Diaphragm Actuator, Linear Type	C	Carbon Steel (ASTM A36 / JIS SS400)
		Z	Special
2 Actuator Size		7 Hand Wheel	
	Max. Stroke (mm)	X	None
T-1	20	T	Top (up to T-3)
T-2	25	P	Top Side
T-3S	38	S	Side
T-3	50	Z	Special
T-4	50		
T-5	100	8 Position Limit	
T-5L	130	X	None
3 Function Code		M	Mechanical Stopper
	Direction	Z	Special
	Fail		
	Air to		
R	Reverse	Close	Open
D	Direct	Open	Close
4 Spring Range		9 Adjustable Limit Direction	
	Description	X	N/A
	Bar	U	Up Stop
	Min. Air supply	D	Down Stop
M	Standard	1.0 ~ 3.0	4 BarG (58 psiG)
W	Weak	0.8 ~ 2.2	3.5 BarG (51 psiG)
Z	Special		
5 Diaphragm Material		10 Limit position (adjustable)	
	Material	XX	N/A
	Description	OO	Stroke %
E	EPDM	Temp. Range	-40 ~ 90 DegC
N	NBR	Temp. Range	-20 ~ 85 DegC
Z	Special		

AO-3600 Dimension Table (Linear)

Standard Diaphragm Actuator from T-1 to T-5



Standard Handwheel



AO-3600 Dimension

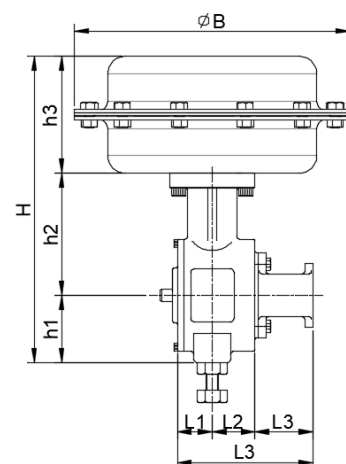
(Unit: mm)

Size	H	H1	H2	h	M	ØD	Stroke	H/W(D)	H/W(R)
T-1	322.4	214	118.4	132.2	M12xP1.75	61.5	20	250	250
T-2	340	214	126	133	M12xP1.75	61.5	25	250	250
T-3S	473	281	192	122	M12xP1.75	61.5	38	286	355
T-3	492.5	300.5	192	140	M18xP1.5	101.5	50	286	355
T-4	633	347	286	140	M18xP1.5	101.5	50	320	355
T-5	691	391	300	180	M27xP3.0	101.5	100	524	595
T-5L	738.5	391	347.5	150	M27xP3.0	101.5	100	524	595

AO-3600 Dimension Table (Rotary)

(Unit: mm)

Size	B	h1	h2	h3	H	L1	L2	L3	L
T-3	348	110	200	192	502	85	75	90	250
T-5	526	160	300	300	760	107	95	110	312



AO-3600 Actuator Power

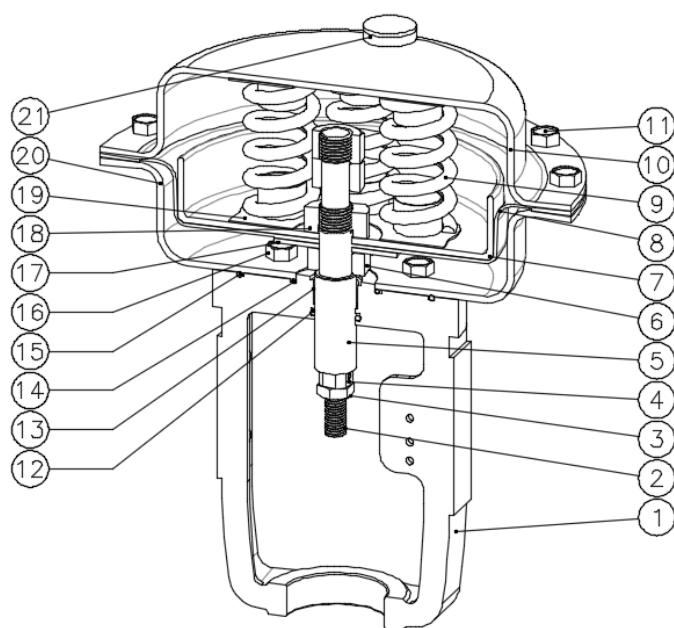
Linear
Spring Range 1~3kgf/cm²G

Size	T-1	T-2	T-3S	T-3	T-4	T-5	T-5L
Max. Stroke (mm)	20	25	38	50	50	100	130
Eff. Area (cm ²)	270	350	515	515	725	1210	1210
Thrust (kgf)	256	332	489	489	688	1149	1149

Rotary

Size		T-3	T-5
Max. Stroke (mm)		50	100/130
Eff. Area (cm ²)		515	1210
Thrust (kgf)	Max.	38.1	178.9
	Non Air	12.7	59.6

AO-3600 Actuator Assembly Drawing (Parts List)



No.	Name of Parts	Material	Q'ty
1	Yoke	Ductile Iron	1
2	Set Bolt	Stainless Steel	1
3	Hex. Nut	Stainless Steel	1
4	Set Screw	Stainless Steel	1
5	Stem	Stainless Steel	1
6	Spacer	Stainless Steel	1
7	Diaphragm Plate	Carbon Steel	1
8	Diaphragm	Rubber	1
9	Spring	Carbon Steel	6
10	Spring case	Carbon Steel	1
11	Hex. Bolt + Washer	Stainless Steel	-
12	O-ring	Rubber	1
13	Du-Bush	Carbon Steel	1
14	O-ring	Rubber	1
15	O-ring	Rubber	1
16	Hex. Bolt + Spring Washer	Stainless Steel	6
17	Back Plate	Carbon Steel	1
18	Spacer Nut	Stainless Steel	1
19	Spring Seat Plate	Carbon Steel	2
20	Diaphragm Case	Carbon Steel	1
21	Vent Cap	Plastic	1

Warranty / Remedy

Korea Motoyama Inc. warrants goods of its manufacture as being free of defective materials and faulty workmanship for 12 months from the date of shipment, unless otherwise specified. In this period, all of our products claimed by original defects may be returned to our factory after notice and authorization by us. If warranted goods are returned to Korea Motoyama Inc. during the period of coverage, it will be repaired or replaced without charge for those items it finds defective. Such defects shall be exclusive of the effects of corrosion, erosion, normal wear or improper handling and storage. In case our engineers have field service, the user shall detach and install valves by his cost. Determination of the suitability of the Products for the use contemplated by the buyer or buyer's customer(s) is the sole responsibility of the buyer in connection therewith. The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

Specifications are subject to change without notices.

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