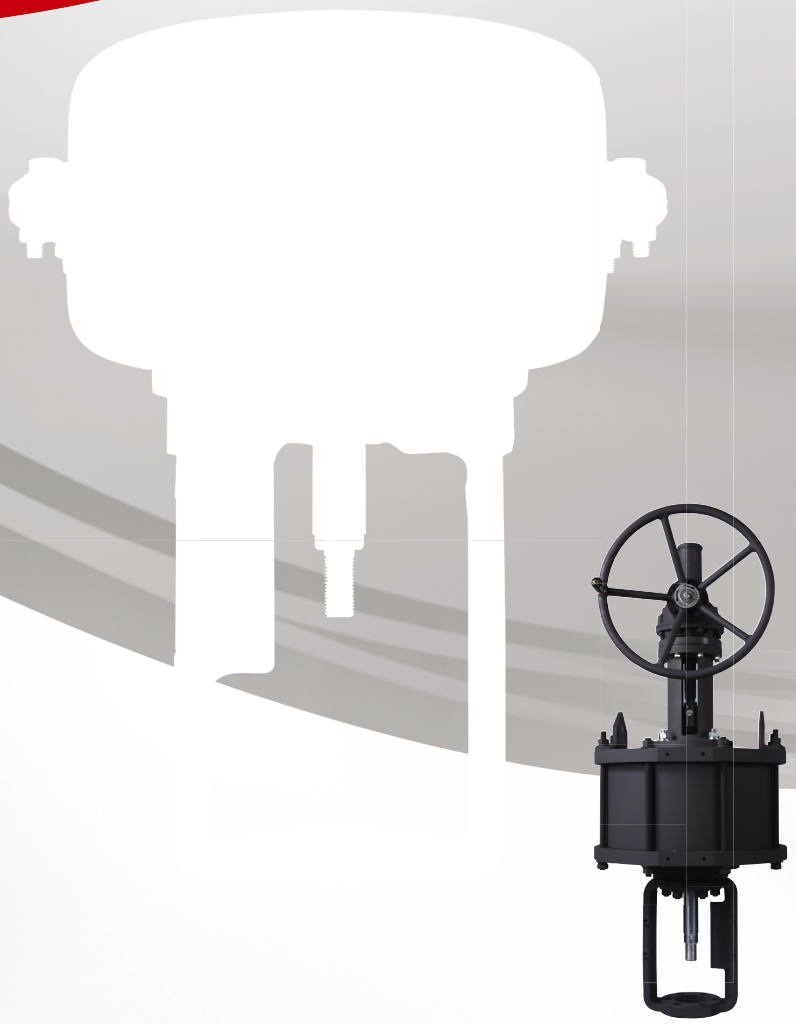
SPECIFICATION DATA
A100/200/300-2016-R0

DIAPHRAGM ACTUATOR & PNEUMATIC CYLINDER ACTUATOR

SERIES
A100
A200
A300



UNICON

CONTENTS

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LICENCE HOLDER

UNICON SYSTEM Co., Ltd.
21 Block 13 Lot, 72, Gangchon-ro,
139 Beon-gil,Danwon-gu,
Ansan-si, Gyunggi-do, Korea/

MANUFACTURING PLANT

UNICON SYSTEM Co., Ltd.
21 Block 13 Lot, 72, Gangchon-ro,
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Ansan-si, Gyunggi-do, Korea/

PROJECT NO/-ID: H2XY

LICENSED TEST MARK: FUNCTIONALE SICHERHEIT GEPRÜFT / FUNCTIONAL SAFETY APPROVED

CERT. REPORT NO.: H2XY0001

Tested according to: IEC 61508:2010 Ed.2

Certified product(s): Diaphragm Actuator A100 Series

Model(s): Direct Acting, Reverse Acting (details refer to H2XY0001)

Technical Data and Parameter: The products fulfill the requirements of functional safety acc. to IEC 61508. The products can be used with a hardware fault tolerance HFT = 0, e.g. in a 1oo1- architecture up to SIL 2 and with HFT ≥ 1, e.g. in an 1oo2 architecture up to SIL 3.

Specific Requirements: This certificate confirms the achievement of the requirements of functional safety based on the following proofs:
- Proof of systematic safety integrity for defined phases of the life cycle
- Proof of the required safety-related parameters (failure rate, PFD and SFF by means of FMEDA)
- Proofs that processes and methode are established at the manufacturer guaranteeing that unexceptionable processes in terms of risk analysis, design, production, validation, change management and quality management comply with the safety-related standard (see H2XY0001).

Certification Body for Functional Safety SGS-TÜV Saar GmbH
Munich, 2015-03-16
Robert Sassmann

CERTIFICATE

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PROJECT NO/-ID: H2XY

LICENSED TEST MARK: FUNCTIONALE SICHERHEIT GEPRÜFT / FUNCTIONAL SAFETY APPROVED

CERT. REPORT NO.: H2XY0001

Tested according to: IEC 61508:2010 Ed.2

Certified product(s): Pneumatic Cylinder Actuator A300 Series

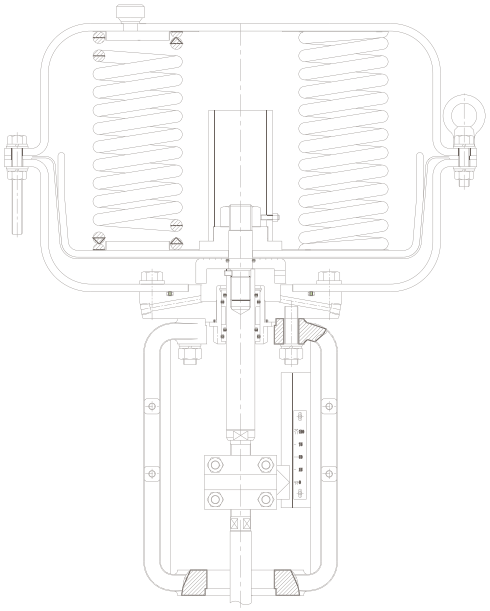
Model(s): Size 12", 16" and 20" (Double Acting, Spring Return) (details refer to H2XY0001)

Technical Data and Parameter: The products fulfill the requirements of functional safety acc. to IEC 61508. The products can be used with a hardware fault tolerance HFT = 0, e.g. in a 1oo1- architecture up to SIL 2 and with HFT ≥ 1, e.g. in an 1oo2 architecture up to SIL 3.

Specific Requirements: This certificate confirms the achievement of the requirements of functional safety based on the following proofs:
- Proof of systematic safety integrity for defined phases of the life cycle
- Proof of the required safety-related parameters (failure rate, PFD and SFF by means of FMEDA)
- Proofs that processes and methods are established at the manufacturer guaranteeing that unexceptionable processes in terms of risk analysis, design, production, validation, change management and quality management comply with the safety-related standard (see H2XY0001).

Certification Body for Functional Safety SGS-TÜV Saar GmbH
Munich, 2018-03-16
Robert Sassmann

CERTIFICATE



A100 / 200 SERIES DIAPHRAGM ACTUATORS

Features

- Economical design
- High stability
- Low hysteresis
- Simply top and top side mounted hand-wheels
- Height strength actuator case with rugged design
- Low volume between diaphragm
- Compact design with reduced height
- Application flexibility
- Excellent linearity between loading pressure and travel
- Long service life

The A100 / 200 Series multi-spring diaphragm actuator is of non reversible type. The actuator can be assembled as either direct-acting or reverse-acting and provides dependable and on-off or throttling operation of automatic control valves.
The actuator is a compact spring opposed pneumatic diaphragm actuator incorporating a cast yoke mounting and is suitable for general purpose actuation of globe valves.

It will position the valve plug in response to varying controller or valve positioner pneumatic output signals applied to the actuator diaphragm. This has been designed with an improved mechanical structure which makes the product extremely competitive in price as well as suitable for application with critical operating conditions.

The stroke times for the multi-spring A100/A200 Series diaphragm actuator depend on the application. The factor which influences this characteristic are the stroke, air supply pressure, size of pipework connection, spring rate, operation action(air to open, air to close) and type of the possible associated positioner. Actuator stroking time of less than one second can be obtained by using booster.

TOP HANDLE WHEEL TYPE

- Diaphragm 250, 290, 370 size can use the top handle wheel of diameter 250mm.
- Top handle has been designed to decompose.
- The handle yoke is fixed with screws that you can Decomposition the screw, a handle is removable.
- Top handle wheel type actuator provides a pin which can be fixed so as not to rotate by others.

250, 290, 370 Size
Diaphragm With Top Handle Wheel Type

SIDE HANDLE WHEEL TYPE

- Diaphragm 480 & 550 size can use the side handle wheel of diameter 500mm.
- Side handle gear box is used in common with the cylinder actuator(12", 16" ,20" size) and diaphragm actuator(480, 550 size).
- Side handle wheel type actuator provides a pin which can be fixed so as not to rotate by others.
- The biggest advantage of the side handle wheel type is that you do not have to operate to climb to high places.
- Within a small force, the stem can move up and down. Therefore, it can open and close the passage of the fluid and gas with handle gearbox easily.
- Removing the bearing shaft by hand, it is possible to separate the handle gearbox. That it does not require excessive strong force is an advantage.

480,550 Size
Diaphragm With Side Handle Wheel Type

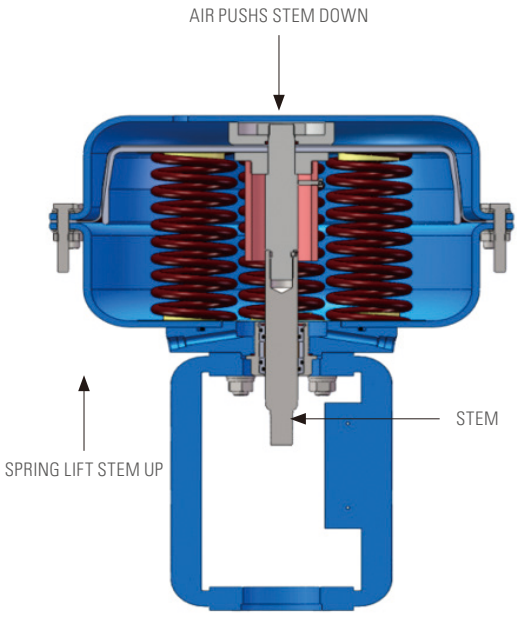
A100 / 200 Series Actuator Spring Arrangement

Actuator Size 250, 290 and 370
4 Springs

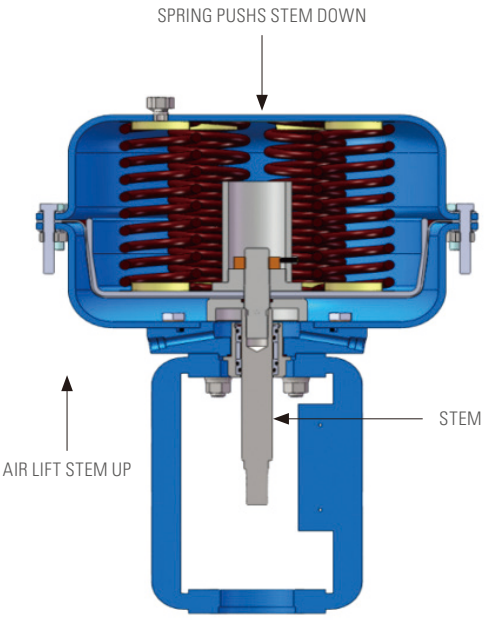
Actuator Size 480, 550
6 Springs

Standard Specifications – Linear Motion Style (A100)

Specification		A100 Series Actuator Size							
		250 RA/DA	290 RA/DA	370 RA/DA	370L RA	480H RA	480 RA/DA	550 RA/DA	550L RA
Nominal Effective Area		See tables 3 and 4.							
Air Supply	kgf/cm²	2.8 to 4							
	Psi	40 to 57							
Affective Area	Cm²	270 to 1520							
Maximum Stroke	mm	20	30	40	50	50	70	90	120
	inch	0.79	1.18	1.57	1.97	1.97	2.75	3.54	4.72
Valve Stem Connector Thread	mm	M14 x 1.5P				M24 x 1.5P			
Temperature Range	˚C	diaphragm and steel studs and nuts : -30 to +80 Option : -40 to +120							
	˚F	diaphragm and steel studs and nuts : -20 to +180 Option : -40 to +248							
Pressure Connections	inch	1/4" NPT				3/8" NPT			
Option		Top Handle Wheel Type, Side Handle Wheel Type							
Applications		Globe Valves							



A100 - Direct Acting (Air to Close Type)



A100 - Reverse Acting (Air to Open Type)

Additional Specifications (Reverse Acting)

Size	Spring Quantity	Stroke		Effective Diaphragm Area (1)		Maximum Output Thrust (Maximum Actuator Stem Force) (2)		
		mm	Inch	cm²	Inches²	Kgf	N	lbf
250	4	10	0.39	270	41.85	357.2	3502.9	787.5
		20	0.79			169.2	1659.2	373
290	4	20	0.79	390	60.45	380	3726.5	837.8
		30	1.18			190	1863.2	418.9
370	4	20	0.79	650	100.75	644.6	6321.3	1421.1
		30	1.18			644.6	6921.3	1421.1
		40	1.57			351.6	3448	775.1
370L	4	20	0.79	650	100.75	1289.2	12642.7	2842.2
		30	1.18			1289.2	12642.7	2842.2
		40	1.57			996.2	9769.4	2196.2
		50	1.97			703.2	6896	1550.3
480	6	40	1.57	1130	175.15	1447.6	14196.1	3191.4
		50	1.97			1139.6	11175.7	2512.4
		60	2.36			831.6	8155.2	1833.4
		70	2.75			523.6	5134.8	1154.3
480H	6	30	1.18	1130	175.15	1150	11277.7	2535.3
		40	1.57			1150	11277.7	2535.3
		50	1.97			650	6374.3	1433
550	6	50	1.97	1520	235.6	1752.4	17185.2	3863.4
		60	2.36			1415.4	13880.3	3120.4
		70	2.75			1078.4	10575.5	2377.5
		80	3.15			1078.4	10575.5	2377.5
		90	3.54			741.4	7270.7	1634.5
550L	6	60	2.36	1520	235.6	2488.8	24406.8	5486.9
		70	2.75			2122.8	20817.6	4680
		80	3.15			2122.8	20817.6	4680
		90	3.54			1756.8	17228.3	3873.1
		100	3.94			1390.8	13639.1	3066.2
		110	4.33			1024.8	10049.9	2259.3
		120	4.72			658.8	6460.6	1452.4

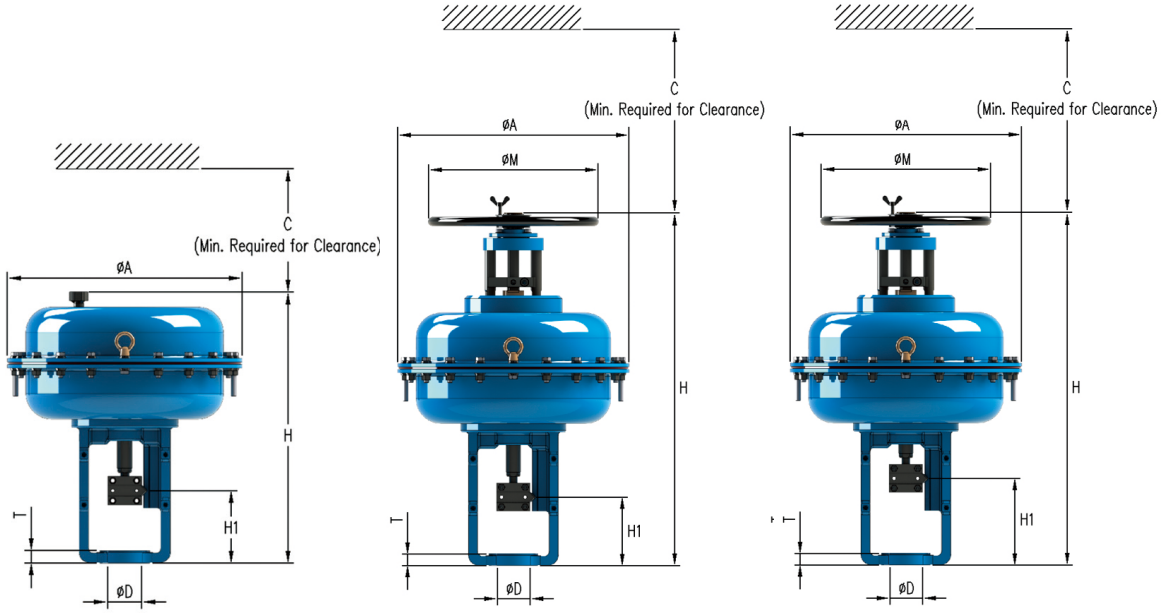
Additional Specifications (Direct Acting)

Size	Spring Quantity	Stroke		Effective Diaphragm Area (1)		Maximum Output Thrust (Maximum Actuator Stem Force) (2)		
		mm	Inch	cm²	Inches²	Kgf	N	lbf
250	4	10	0.39	270	41.85	723.6	7096.1	1595.3
		20	0.79			536	5256.4	1181.7
290	4	20	0.79	390	60.45	989.9	9707.6	2182.4
		30	1.18			799.9	7844.3	1763.5
370	4	20	0.79	650	46.97	1662.7	16305.5	3665.6
		30	1.18			1369.6	13431.2	3019.5
		40	1.57			1076.4	10555.9	2373.1
480	6	40	1.57	1130	61.38	2759.5	27061.5	6083.7
		50	1.97			2452.1	24046.9	5406
		60	2.36			2144.7	21032.3	4728.3
		70	2.75			1837.4	18018.7	4050.8
550	6	50	1.97	1520	70.68	3654.1	35834.5	8055.9
		60	2.36			3316.6	32524.7	7311.9
		70	2.75			2979.2	29216	6568
		80	3.15			2641.8	25907.2	5824.2
		90	3.54			2303.3	22587.7	5077.9

Note!

(1) Effective diaphragm area at 0% valve travel from seat.

(2) Based upon 4 kgf/cm² operating pressure to the diaphragm and valve travel at 0% from seat.



Without Handle Wheel Type

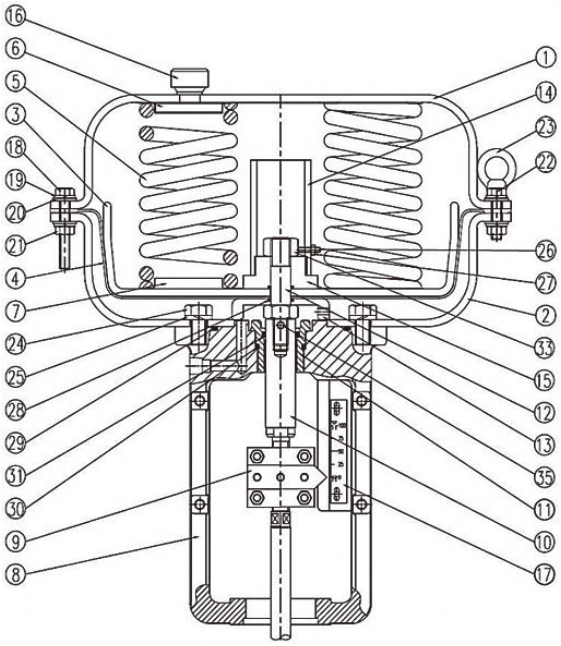
250, 290, 370
Top Handle Wheel Type

480, 550
Side Handle Wheel Type

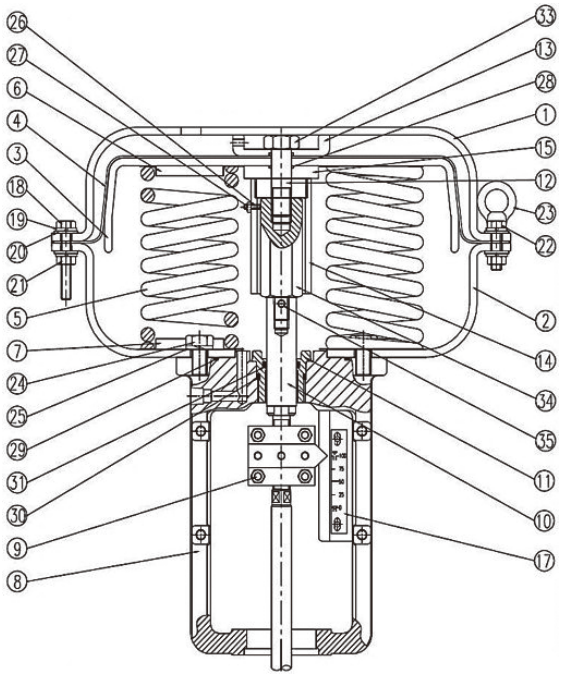
Diaphragm Actuator Dimensions

Actuator Size	Millimeters (mm)					
	A	H	H1	D	T	C
250 DA	252	332	135	56	20	200
250 RA		352	114			
290 DA	294	369	145			
290 RA		389	114			
370 DA	374	410	155			
370 RA		430	114			
370L RA		480	104			
480 DA	482	629	206	80	30	300
480 RA		649	134			
480H RA						
550 DA	560	678	223			
550 RA		698	134			
550L RA		756	126			

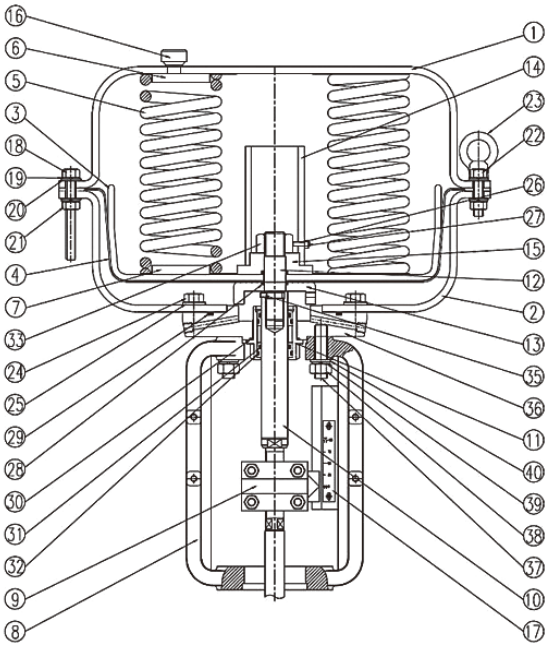
PARTS REFERENCE FOR ACTUATOR



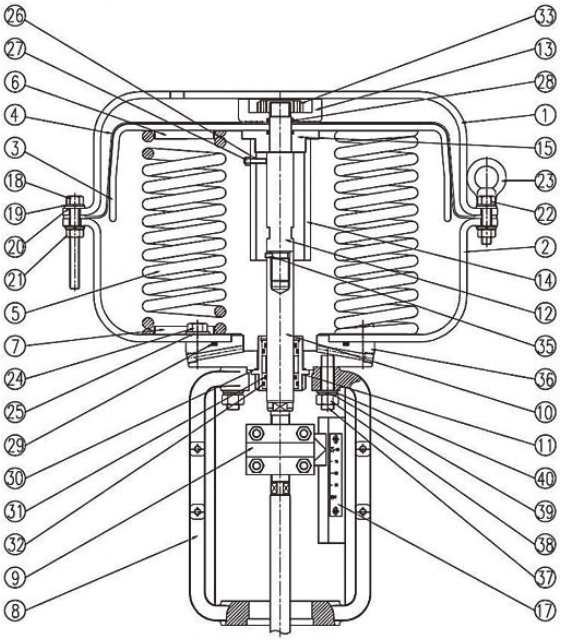
Reverse Acting 250, 290, 370 Type



Direct Acting 250, 290, 370 Type



Reverse Acting 480, 550 TYPE



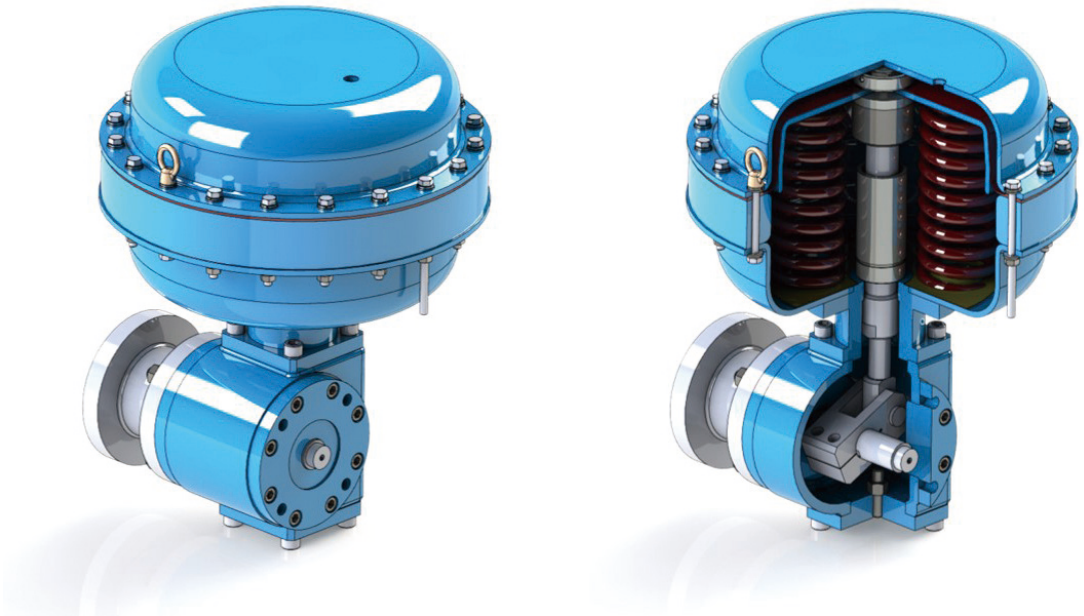
Direct Acting 480, 550 TYPE

Parts Reference for Actuator

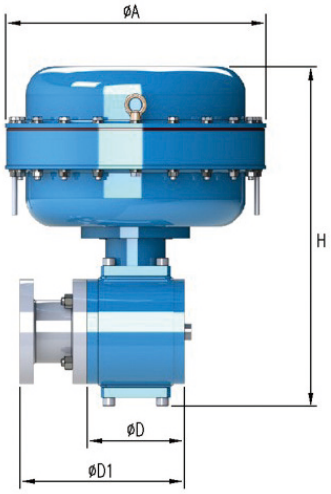
Ref No.	Description	Material
1	Upper Diaphragm Case	Carbon Steel
2	Lower Diaphragm Case	Carbon Steel
3	Diaphragm Plate	Carbon Steel
4	Diaphragm	EPDM + Nylon
5	Spring	Spring Steel
6	Upper Spring Guide	Stainless Steel
7	Lower Spring Guide	Stainless Steel
8	Yoke	Carbon Steel
9	Stem Clamp	Stainless Steel
10	Actuator Stem	Stainless Steel
11	Stem Guide Bush	Carbon Steel
12	Diaphragm Connector	Stainless Steel
13	Diaphragm Holder	Carbon Steel
14	Spacer	Carbon Steel
15	Spacer Holder	Aluminum steel
16	Air Vent Cap	Carbon Steel
17	Scale - Travel	Stainless Steel
18	Compression Cap Screw	Carbon Steel
19	Spring Washer	Carbon Steel
20	Plain Washer	Carbon Steel
21	Hex Nut	Carbon Steel
22	Hex Head Cap Screw	Carbon Steel
23	Eye Bolt	Carbon Steel
24	Hex Head Cap Screw	Carbon Steel
25	Copper Washer	copper
26	Set Screw	Carbon Steel
27	Hex Nut	Carbon Steel
28	O-Ring (Diaphragm Holder)	Viton
29	O-Ring	Viton
30	O-Ring	Viton
31	O-Ring (Stem Bush)	Viton
32	O-Ring (Stem Bush)	Viton
33	Lock Nut	Carbon Steel
34	Stem Connector	Carbon Steel
35	Set Screw	Carbon Steel
36	Case Adapter Flange	Carbon Steel
37	Stud Bolt	Carbon Steel
38	Hex Nut	Carbon Steel
39	Spring Washer	Carbon Steel
40	Plain Washer	Carbon Steel

Standard Specifications – Rotary Turn Type (A200)

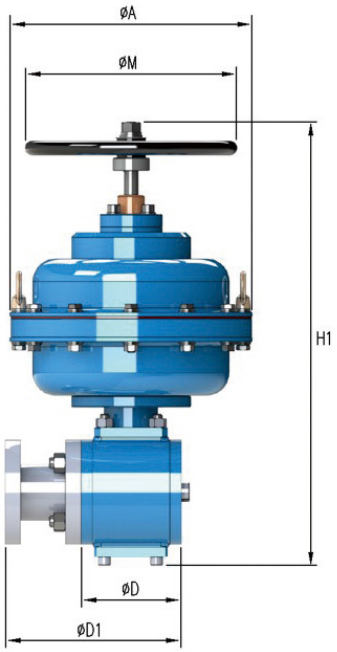
Specification		A200 Series			
		Actuator Size			
		250BT	370BT	480BT	550BT
Air Supply	kgf/cm²	2.8 to 4			
	Psi	40 to 57			
Affective Area	Cm²	270 to 1520			
Maximum Stroke	Deg.	70			
Temperature Range	˚C	diaphragm and steel studs and nuts : -30 to +80 Option : -40 to +120			
	˚F	diaphragm and steel studs and nuts : -20 to +180 Option : -40 to +248			
Pressure Connections	inch	1/4" NPT		3/8" NPT	
Option		Top Handle Wheel Type, Side Handle Wheel Type			
Applications		Rotary Turn Valves, Ball Valve, Butterfly Valve			



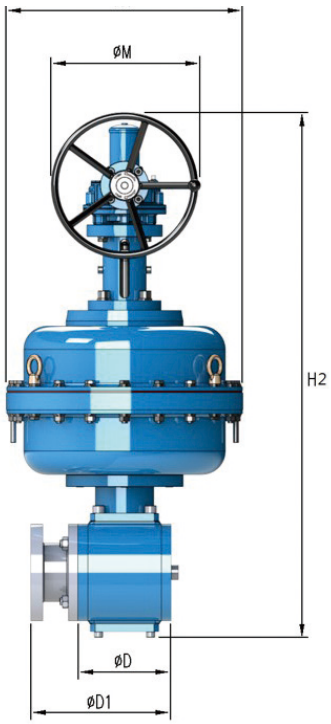
A200 - Rotary Turn Style



Without Handle Wheel Type



250BT
Top Handle Wheel Type

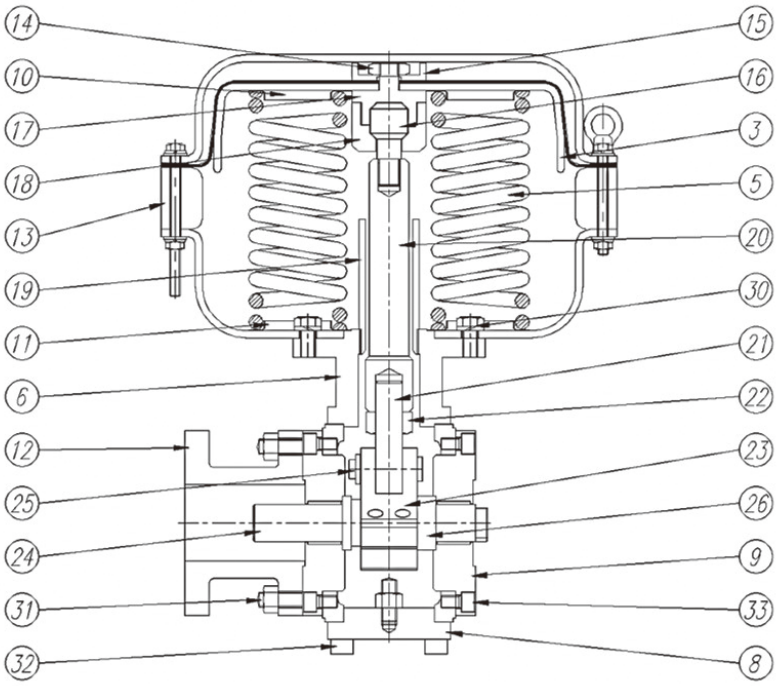


480BT, 550BT
Side Handle Wheel Type

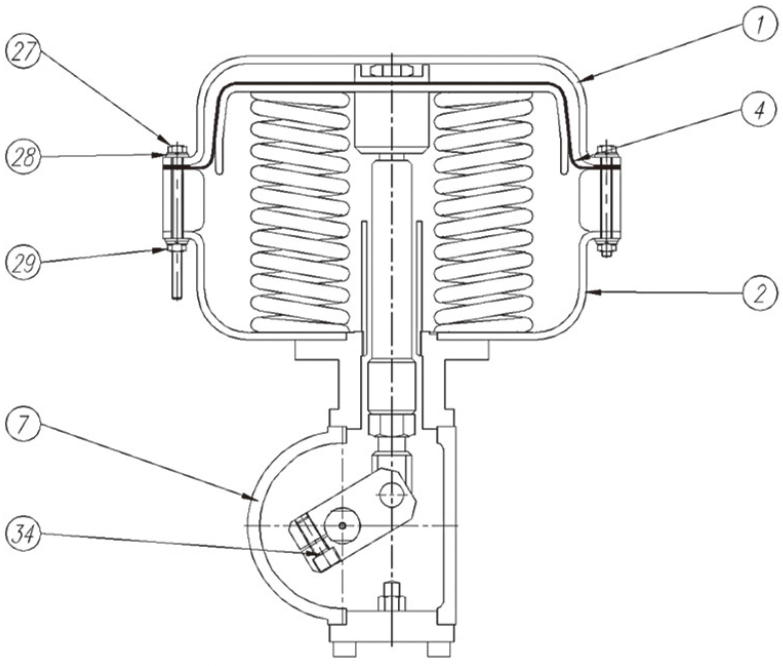
Side Handle Wheel Type Dimensions

Actuator Size	Millimeters (mm)						
	A	H	H1	H2	D	D1	M
250 BT	252	325	465	-	104	190	200
370 BT	374	490	-	-	140	245	
480 BT	482	640	-	1010	190	300	500
550 BT	560	680	-	1065	190	300	

PARTS REFERENCE FOR ACTUATOR



FRONT SECTION VIEW



SIDE SECTION VIEW

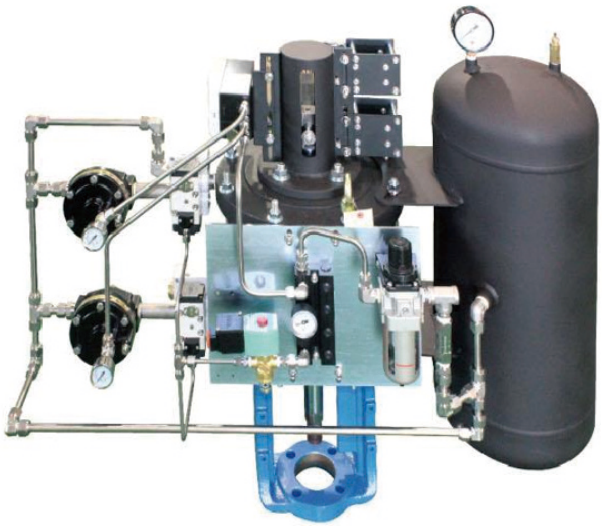
A200 Series Actuator Part List

Ref No.	Description	Material
1	Upper Diaphragm Case	Carbon Steel
2	Lower Diaphragm Case	Carbon Steel
3	Diaphragm Plate	Carbon Steel
4	Diaphragm	EPDM + Nylon
5	Spring	Spring Steel
6	Diaphragm Yoke	Carbon Steel
7	Diaphragm Yoke Housing	Carbon Steel
8	Bottom Flange	Carbon Steel
9	End Flange	Carbon Steel
10	Upper Spring Guide	Stainless Steel
11	Lower Spring Guide	Stainless Steel
12	Valve Connector (Option)	Carbon Steel
13	Spacer Ring	Carbon Steel
14	Lock Nut (Diaphragm Holder)	Carbon Steel
15	Diaphragm Holder	Carbon Steel
16	Moving Shaft	Carbon Steel
17	Moving Shaft Guide	Carbon Steel
18	Moving Shaft Guide Plate	Carbon Steel
19	Spacer	Carbon Steel
20	Shaft	Carbon Steel
21	Shaft Connector	Carbon Steel
22	Lock Nut (Shaft Connector)	Carbon Steel
23	Clamp	Carbon Steel
24	Body Shaft	Carbon Steel
25	Shaft Fin & Ring	Carbon Steel
26	Body Shaft Guide	Carbon Steel
27	Compression Cap Screw	Carbon Steel
28	Spring Washer & Plain Washer	Carbon Steel
29	Hex Nut	Carbon Steel
30	Hex Head Cap Screw & Copper Washer	Carbon Steel &Copper
31	Stud & Nut	Carbon Steel
32	Hex Socket Flat Head Cap Screw	Carbon Steel
33	Hex Socket Flat Head Cap Screw	Carbon Steel
34	Hex Socket Flat Head Cap Screw	Carbon Steel

A300 SERIES PNEUMATIC CYLINDER VALVE ACTUATOR

Features

- Economical Design.
- High stability.
- Simply top and top side mounted hand-wheels.
- Height strength actuator case with rugged design.
- Compact design with reduced height.
- High resolution.
- Dynamic response.
- Very fast stroking speed.
- Very low dead band, hysteresis, linearity.



A300 is a complete line of linear pneumatic actuators purposely designed for the operation of control valves.
The product range includes both double acting and spring return units available in several sizes which can deliver a force up to 30,000 daN.
These actuators can assure an extremely smooth valve operation and do not require any maintenance.

General Purpose

These A300 actuators, double acting or spring return type, deliver small to medium thrusts and are designed to satisfy the most common applications. Manufactured with a corrosion resistant cast aluminum body, they are suitable for service in harsh environments such as desert areas, power stations, petrochemical plants and steel industries. Their light, compact and functional design ensures an easy installation. Thanks to the patented built-in lubrication system common to all the A300 range, they are virtually maintenance free. General purpose A300 actuators are integrated by a complete line of pneumatic and electro-pneumatic positioner and accessorize. The shaft as well as the connection flange to the valve can be manufactured according to the various applications to meet all the customers specific needs.

Specification

A300 Cylinder Actuator				
Cylinder Series		Double Cylinder		Spring Cylinder
Spring Quantity		N/A		1~2
Size		12"	16"	20"
Maximum Operating Pressure To Cylinder	BarG	4~7		
	PsiG	58~101		
Valve Stem Connector Thread	mm	M30x2.5P		M36x2.5P
Pressure Connections	inch	PT 1/2" inch		

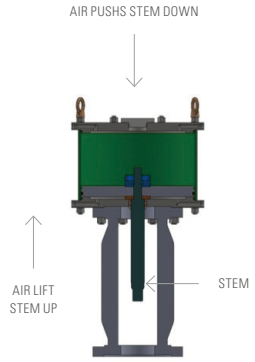
Double Cylinder

Size	Spring Quantity	Travel		Effective Cylinder Area		Maximum Output Thrust	
		Mm	Inch	mm	Inches²	Application	Kg/cm2
12"	N/A	100-120	3.9-4.7	728.5	28.6	Cylinder Area*4kg/cm2	2914
16"	N/A	100-150	3.9-5.9	1295	50.9		5183
20"	N/A	100-200	3.9-7.9	2025	79.7		8100

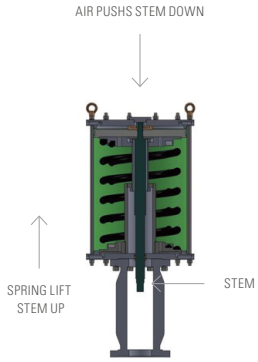
Spring Cylinder

Size	Spring Quantity	Travel		Effective Cylinder Area		Spring rate
		mm	Inch	mm	Inches²	Kg/mm
12" RA/DA	1~2	120	4.7	728.5	41.85	6.325
16" RA/DA	1~2	150	5.9	1295	60.45	6.47
20" RA/DA	1~2	100-200	3.9-7.9	2025	46.97	8.296

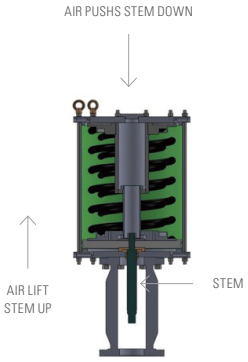
Operation Principle (Section View)



A300 DOUBLE SERIES
CYILINDER (WITH AIRTANK)

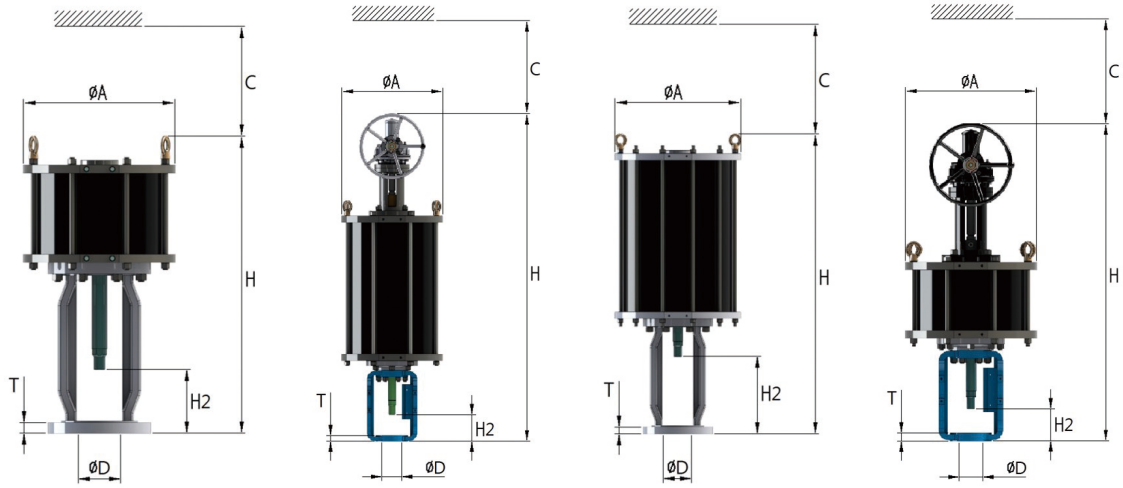


A300 DOUBLE SERIES
CYLINDER – (DIRECT ACTION)



A300 DOUBLE SERIES
CYILINDER (REVERSE ACTION)

DIMENSIONS



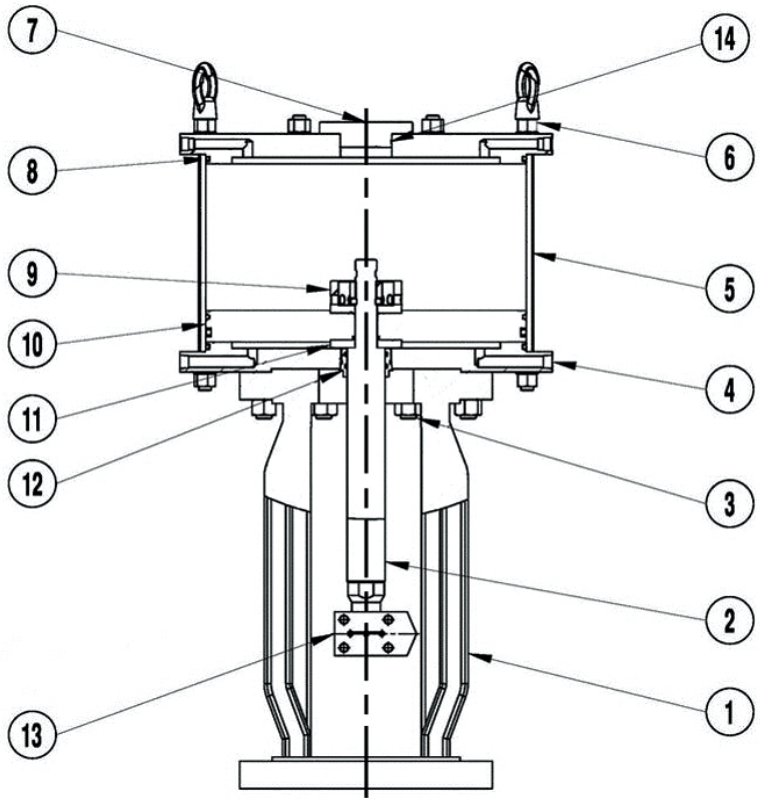
Double Cylinder

Spring Cylinder(RA · DA)

Side Handle Wheel Type Dimensions

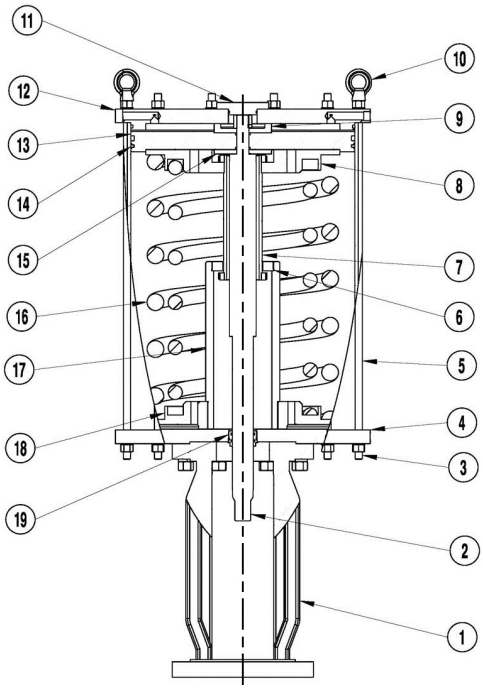
Actuator Size	Millimeters (mm)						
	A	H	H1	H2	D	T	C
12" Double	370	710~820	1130~1270	100~120	80, 107	30	500
12" Spring RA		1030~1080	1440	120			
12" Spring DA		1060~1110	1470	120			
16" Double	472	660~920	1140~1490	100~150	80, 107, 120	30, 35	
16" Spring RA		1060~1150	1540~1670	120~150			
16" Spring DA		1090	1570	120~150			
20" Double	578	870~920	1390~1870	180	120	35	
20" Spring RA		1320~1360	1800~1880	160~180			
20" Spring DA				170~360			

PARTS REFERENCE FOR ACTUATOR

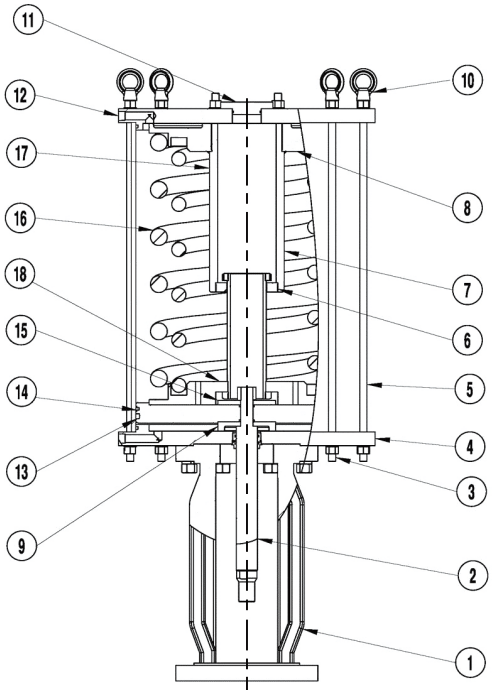


Double Cylinder Part List

Ref No.	Description	Material
1	YOKE	Carbon Steel
2	ACTUATOR STEM	Stainless Steel
3	BOLT & NUT	Carbon Steel
4	LOWER END CAP	Carbon Steel
5	CYLINDER	Amalgam
6	EYE NUT	Carbon Steel
7	UPPER CASE CAP	Carbon Steel
8	UPPER END CAP	Carbon Steel
9	STROKE LIMITER	Carbon Steel
10	PISTON	Carbon Steel
11	PISTON PROTECTOR	Carbon Steel
12	STEM GUIDE BUSH	Carbon Steel
13	STEM CLAMP	Carbon Steel
14	O-RING	Viton



Spring Cylinder Direct Action Type



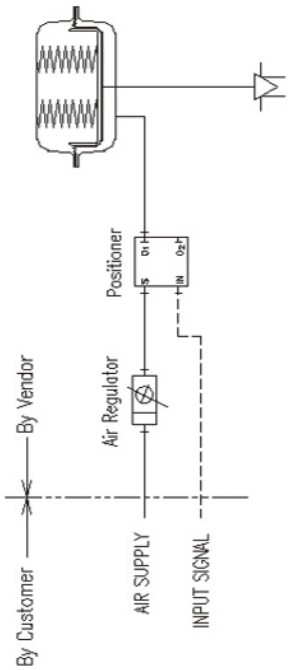
Spring Cylinder Reverse Action Type

Spring Return Cylinder (Direct & Reverse) Part List

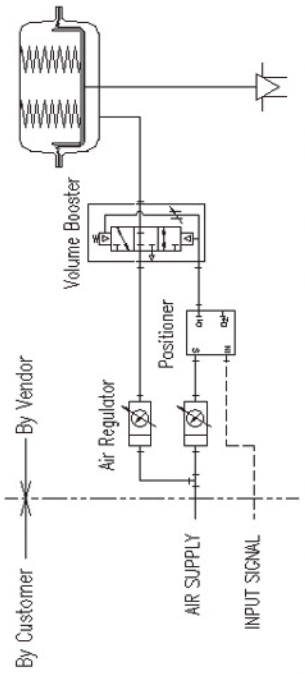
Ref No.	Description	Material
1	YOKE	Carbon Steel
2	ACTUATOR STEM	Stainless Steel
3	BOLT & NUT	Carbon Steel
4	LOWER END CAP	Carbon Steel
5	CYLINDER	Amalgam
6	STOPPER GUIDE	Carbon Steel
7	STOPPER	Carbon Steel
8	UPPER SEAT	Carbon Steel
9	STROKE LIMITER	Carbon Steel
10	EYE NUT	Carbon Steel
11	UPPER CASE CAP	Carbon Steel
12	UPPER END CAP	Carbon Steel
13	PISTON	Carbon Steel
14	O-RING	Viton
15	PISTON PROTECTOR	Carbon Steel
16	SPRING	Spring Steel
17	SPRING GUIDE	Carbon Steel
18	LOWER SEAT	Carbon Steel
19	STEM GUIDE BUSH	Carbon Steel

A100 / 200 /300 SERIES UNICON BASIC SCHEMATIC

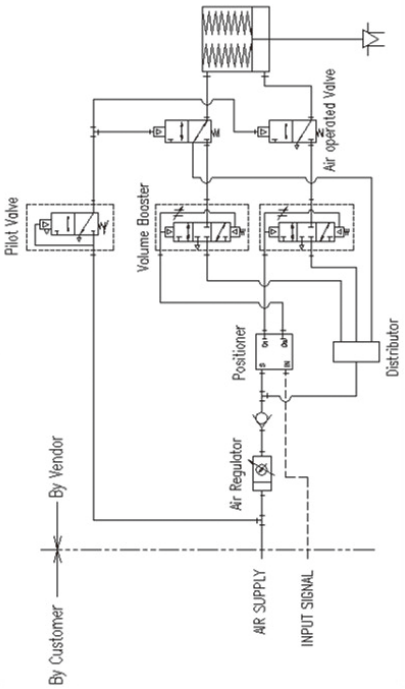
250, 290, 370
Diaphragm Basic Schematic



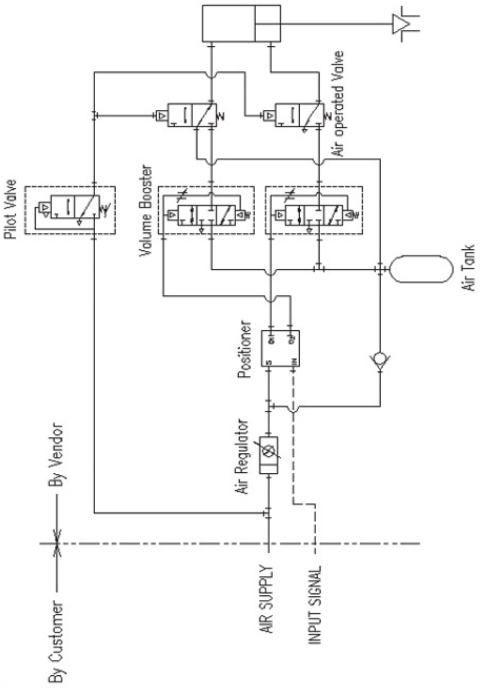
480, 550
Diaphragm Basic Schematic



Spring Cylinder Basic Schematic



Double Cylinder Basic Schematic



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