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PNEUMATIC ACTUATOR

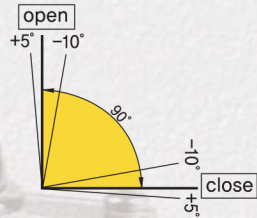


Design and Construction

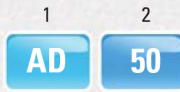
- AUTOMA Actuator is designed for rotary type valve.
- AUTOMA provides various size of actuator, including heavy-duty actuator, to meet the customer's needs.
- AUTOMA is in accordance with NAMUR and ISO Standard which enable us to fit with valves & accessories easily & simply.
- AUTOMA is specialized in providing a wide range of industrial solutions such as petrochemical, power generation, atomic power plant, steel mill, shipyard, refining, wastewater disposal, automation facilities and building air conditioner.

Specification

- **Operating Pressure Range**
Double Acting : 4~7kg/cm²
Single Acting : 4.5~7kg/cm²
- **Operating Temperature Range**
Standard : -20°C ~ 80°C
Option : -40°C ~ 200°C
- **Cycle Life**
1,300,000 Operating
- **Rotating angle range**



Model Selection Guide



- 1 **AD Actuator Type**
AD : Double Acting (Scotch-Yoke Type)
AS : Single Acting (Scotch-Yoke Type)
ADR : Double Acting (Rack&Pinion Type)
ASR : Single Acting (Rack&Pinion Type)

- 2 **50 Actuator Size**
AD : 50/65/80/100/125/140/160/185/200/250/300
AS : 50/65/80/100/125/140/160/185/200/250/300
ADR : 32/40/50/65/80/90/100/115/125/140/160/185/200
ASR : 40/50/65/80/90/100/115/125/140/160/185/200

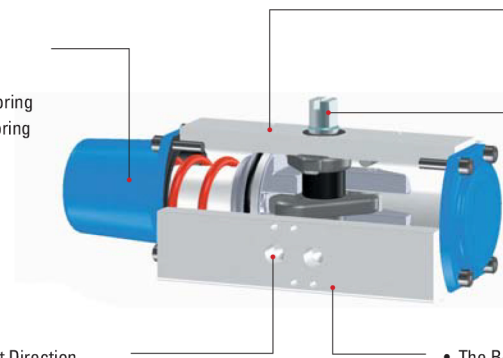
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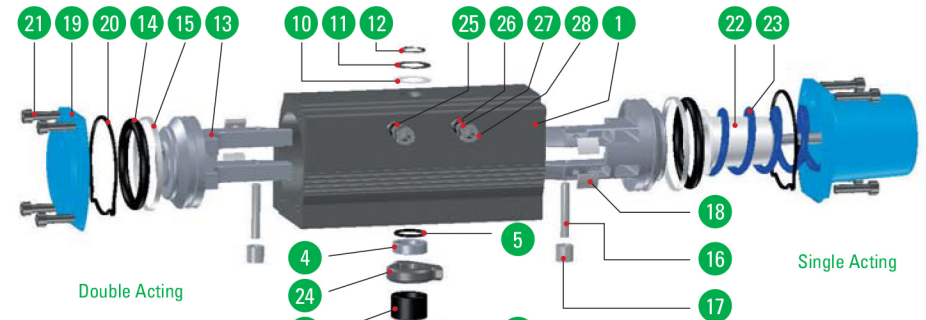
SCOTCH YOKE TYPE ACTUATOR

Features

- The Side Direction
- Side Handle
- Middle Torque Spring
- Strong Torque Spring
- The Back Direction
- Stopper Bolt
- 5° ~ 95° Stopper
- The Top Direction
- Position Indicator
- Limit Switch Box
- Proximity Sensor
- E/P Positioner
- Position Transmitter
- Manual Lever
- The Front Direction
- Solenoid Valve (NAMUR)
- Lock Up Valve
- Volume Booster
- Direct Fitting Assembler
- The Bottom Direction
- Valve Mounting
- Manual Handle
- ISO 5211 DIN 3337 Square & Holes

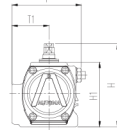
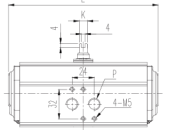
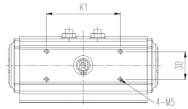


Part List

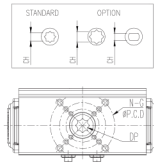


- | | |
|-------------------------|-----------------------|
| 1. Body | 15. Piston Guide-ring |
| 2. Shaft | 16. Piston Pin |
| 3. Crank | 17. Piston Roller |
| 4. Bushing(Top) | 18. Piston Pad |
| 5. Body O-ring(Top) | 19. Cover |
| 6. Shaft Roller(Top) | 20. Cover O-ring |
| 7. Bushing(Bottom) | 21. Cover Bolt |
| 8. Body O-ring(Bottom) | 22. Spring Cap |
| 9. Shaft Roller(Bottom) | 23. Spring |
| 10. Body Washer(Bottom) | 24. Stopper |
| 11. Body Washer(Top) | 25. Stopper Bolt |
| 12. Body Snap-ring | 26. Stopper O-ring |
| 13. Piston | 27. Stopper Washer |
| 14. Piston O-ring | 28. Stopper Nut |

AD SERIES (DOUBLE ACTING)



P	
AD50-AD200	PT 1/4"
	PT 1/4"
AD250, AD300	#PT 3/8"
	#PT 1/2"



Dimension Table

MODEL	K1	ISO	Φ P.C.D	N-G	DP2(TAP)	K	L	T	T1	H	H1	CH	DP	Weight (Kg)							
AD50	80	F03/F05/F07	36/50/70	4-M5/M6/M8	10/12/12.5	9	162	75	40	90	70	11x11	13	1.4							
												#14x14	14								
												#9.7xØ15	14								
AD65	80	F05/F07	50/70	4-M6/M8	14/14	13	202	89	46	107	87	14x14	17	2.3							
												#11.7xØ17	19								
												#9.7xØ15	14								
AD80	80	F07	70	4-M8	15	13	253	101	49.5	126	106	17x17	20	3.9							
												#14.7xØ19	20								
												#17x17	20								
AD100	80	F07/F10	70/102	4-M8/M10	16/21	19	311	129	61.5	148	128	22x22	26	6.7							
												#17.7xØ22	26								
												#22x22	26								
AD125	80	F07/F10	70/102	4-M8/M10	16/19	19	390	151	71.5	174	154	22x22	26	11.3							
												#22x22	26								
												#27x27	30								
AD140	80	F10/F12	102/125	4-M10/M12	18/26	24	431	164	77	192	172	27x27	30	16.4							
												#22x22	30								
												#27x27	30								
AD160	80	F14	140	4-M16	27	24	506	188	89	216	196	36x36	30	23.7							
		#F10/F12	#102/125	#4-M10/M12	18/25							#27x27	30								
		F14	140	4-M16	26							30	578		217	102	254	224	36x36	30	34.8
AD185	80/130	F16	165	4-M20	30	36	605	231	115	284	254	46x46	60	45.5							
		#F14	140	4-M16	26							30	578		217	102	254	224	36x36	30	34.8
		F16	165	4-M20	30							36	605		231	115	284	254	46x46	60	45.5
AD200	130	F16	165	4-M20	30	36	605	231	115	284	254	46x46	60	45.5							
		#F14	140	4-M16	26							30	578		217	102	254	224	36x36	30	34.8
		F16	165	4-M20	30							36	605		231	115	284	254	46x46	60	45.5
AD250	130	F16	165	4-M20	29	36	755	301	152	335	305	46x46	60	65.8							
		#F14	140	4-M16	26							30	578		217	102	254	224	36x36	30	34.8
		F16	165	4-M20	29							36	755		301	152	335	305	46x46	60	65.8
AD300	130	F16/F25	165/254	4-M20/8-M16	30/23	36	889	360	170	408	378	55x55	60	78.0							
		#F14	140	4-M16	26							30	578		217	102	254	224	36x36	30	34.8
		F16	165	4-M20	29							36	889		360	170	408	378	55x55	60	78.0

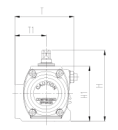
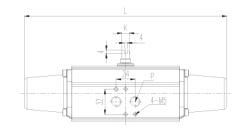
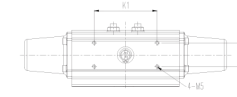
Option

Torque Table

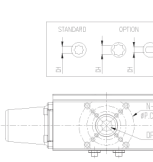
Model	Angle	Supply Air					Model	Angle	Supply Air				
		4bar	4.5bar	5bar	6bar	7bar			4bar	4.5bar	5bar	6bar	7bar
AD50	0°	32.3	36.1	39.9	47.5	54.2	AD160	0°	1,187.5	1,330.0	1,472.5	1,748.0	2,033.0
	45°	20.0	22.8	24.7	29.5	34.2		45°	674.5	760.0	845.5	1,011.8	1,182.8
	90°	39.9	45.6	48.5	59.9	71.3		90°	1,363.3	1,581.8	1,805.0	2,123.3	2,503.3
AD65	0°	69.4	77.9	84.6	99.8	115.0	AD185	0°	1,520.0	1,719.5	1,900.0	2,251.5	2,584.0
	45°	43.7	49.4	55.1	66.6	76.0		45°	1,092.5	1,225.5	1,349.0	1,615.0	1,890.5
	90°	88.4	100.7	111.2	134.0	156.8		90°	1,919.0	2,175.5	2,441.5	3,021.0	3,581.5
AD80	0°	133.0	152.0	166.3	199.5	228.0	AD200	0°	2,612.5	2,888.0	3,163.5	3,676.5	4,218.0
	45°	76.0	85.5	95.0	114.0	137.8		45°	1,491.5	1,662.5	1,852.5	2,223.0	2,593.5
	90°	166.3	190.0	218.5	266.0	318.3		90°	2,432.0	2,755.0	3,068.5	3,705.0	4,322.5
AD100	0°	247.0	275.5	304.0	365.8	418.0	AD250	0°	4,275.0	4,750.0	5,272.5	6,222.5	7,125.0
	45°	147.3	166.3	185.3	223.3	266.0		45°	2,498.5	2,812.0	3,097.0	3,743.0	4,389.0
	90°	266.0	304.0	342.0	418.0	494.0		90°	4,617.0	5,177.5	5,776.0	6,944.5	8,189.0
AD125	0°	508.3	574.8	631.8	745.8	855.0	AD300	0°	6,732.0	8,416.0	10,099.0	11,193.1	12,118.8
	45°	323.0	361.0	399.0	475.0	555.8		45°	3,960.0	4,950.0	5,940.0	6,583.5	7,128.0
	90°	612.8	698.3	821.8	983.3	1,144.8		90°	9,415.0	12,019.0	14,422.0	15,984.4	17,306.4
AD140	0°	779.0	874.0	969.0	1,159.0	1,339.5							
	45°	427.5	479.8	532.0	641.3	750.5							
	90°	788.5	893.0	1,007.0	1,263.5	1,539.0							

(Nm)

AS SERIES (SINGLE ACTING)



P	
AS50-AS200	PT 1/4"
	PT 1/4"
AS250, AS300	#PT 3/8"
	#PT 1/2"



Dimension Table

MODEL	K1	ISO	Φ P.C.D	N-G	DP2(TAP)	K	L	T	T1	H	H1	CH	DP	Weight (Kg)							
AS50	80	F03/F05/F07	36/50/70	4-M5/M6/M8	10/12/12.5	9	257	75	40	90	70	11x11	13	1.6							
												#14x14	14								
												#9.7xØ15	14								
AS65	80	F05/F07	50/70	4-M6/M8	14/14	13	314	89	46	107	87	14x14	17	3.0							
												#11.7xØ17	19								
												#9.7xØ15	14								
AS80	80	F07	70	4-M8	15	13	421	101	49.5	126	106	17x17	20	5.3							
												#14.7xØ19	20								
												#17x17	20								
AS100	80	F07/F10	70/102	4-M8/M10	16/21	19	500	129	61.5	148	128	22x22	26	9.5							
												#17.7xØ22	26								
												#22x22	26								
AS125	80	F07/F10	70/102	4-M8/M10	16/19	19	606	151	71.5	174	154	22x22	26	17.6							
												#22x22	26								
												#27x27	30								
AS140	80	F10/F12	102/125	4-M10/M12	18/26	24	682	164	77	192	172	27x27	30	23.9							
												#22x22	30								
												#27x27	30								
AS160	80	F14	140	4-M16	27	24	781	188	89	216	196	36x36	30	36.6							
		#F10/F12	#102/125	#4-M10/M12	18/25							#27x27	30								
		F14	140	4-M16	26							30	894		217	102	254	224	36x36	30	56.9
AS185	80/130	F16	165	4-M20	30	36	982	231	115	284	254	46x46	60	77.2							
		#F14	140	4-M16	26							30	894		217	102	254	224	36x36	30	56.9
		F16	165	4-M20	30							36	982		231	115	284	254	46x46	60	77.2
AS200	130	F16	165	4-M20	29	36	1108	301	152	335	305	46x46	60	119.6							
		#F14	140	4-M16	26							30	1108		301	152	335	305	46x46	60	119.6
		F16	165	4-M20	29							36	1108		301	152	335	305	46x46	60	119.6
AS300	130	F16/F25	165/254	4-M20/8-M16	30/23	36	1345	372	170	408	378	55x55	60	145.0							
		#F14	140	4-M16	26							30	1345		372	170	408	378	55x55	60	145.0
		F16	165	4-M20	29							36	1345		372	170	408	378	55x55	60	145.0

Option

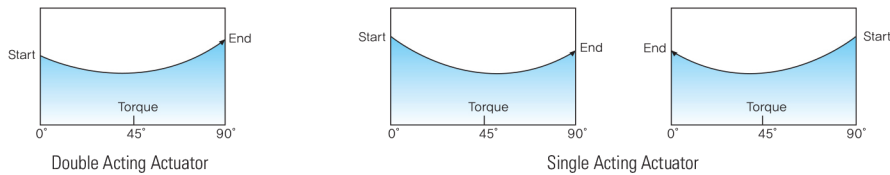
Torque Table

Model	Angle	Spring Torque Middle		Spring Torque Strong		Model	Angle	Spring Torque Middle		Spring Torque Strong	
		Spring	AIR to 4.5bar	Spring	AIR to 6bar			Spring	AIR to 4.5bar	Spring	AIR to 6bar
AS50	0°	16.2	22.8	23.0	28.3	AS160	0°	503.5	902.5	888.3	1,059.3
	45°	12.0	10.8	16.5	14.3		45°	289.8	465.5	498.8	508.3
	90°	24.2	11.4	33.3	14.0		90°	536.8	789.5	940.5	731.5
AS65	0°	43.7	49.4	56.6	64.9	AS185	0°	1,035.5	1,111.5	1,548.5	1,292.0
	45°	24.9	23.3	34.4	32.3		45°	579.5	598.5	874.0	703.0
	90°	47.2	30.6	65.2	39.9		90°	1,140.0	855.0	1,681.5	931.0
AS80	0°	76.0	95.0	114.0	123.5	AS200	0°	1,206.5	1,833.5	1,681.5	2,375.0
	45°	42.8	42.8	61.8	61.8		45°	674.5	921.5	1,035.5	1,092.5
	90°	85.5	61.8	118.8	85.5</						

Scotch-Yoke Type

- Upon air supply, pistons move horizontally, turning the shaft by the arm connected to the pistons.
- Smooth On/Off with the torque curve synchronized with valves.
- Relatively higher torque than the same model in Rack&Pinion Type.

Torque Diagram

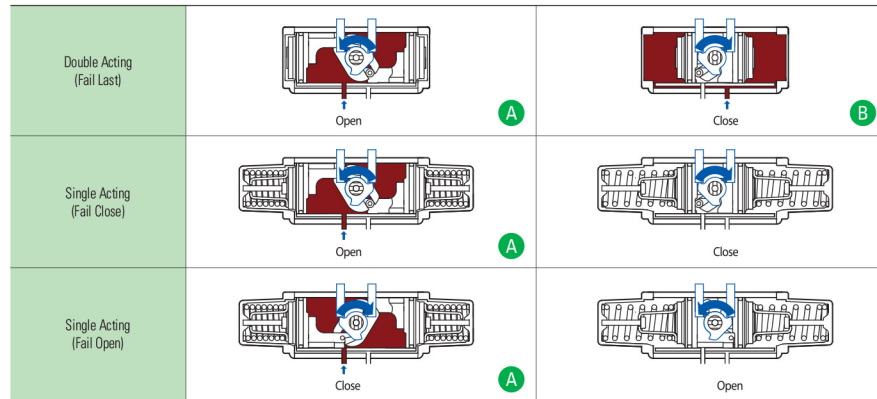


Air Consumption

- The air consumption of actuator is calculated by below.
- The air consumption is based on 1 action of used valve and do calculate the consumption per an hour.

Double Acting Actuator (AD Series)	$V = \text{Air Consumption (Liter)}$ $A = \text{Volume "A" (Liter)}$ $B = \text{Volume "B" (Liter)}$ $P = \text{Supply Air Pressure (Bar)}$ $N = \text{Number of Operating}$
$V = (A+B)(P+1.013) \times N$	
Single Acting Actuator (AS Series)	
$V = A \times (P+1.013) \times N$	

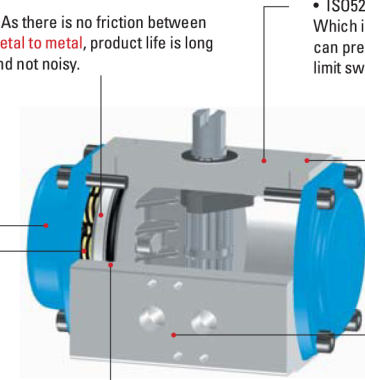
Operating Mechanism



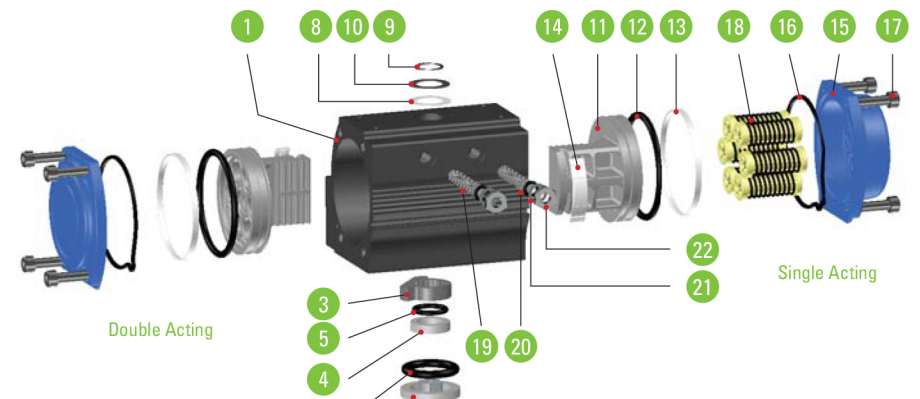
Double Acting			Single Acting		
Model	A	B	Model	A (Fail Close)	A (Fail Open)
AD50	0.2	0.2	AS50	0.2	0.2
AD65	0.3	0.3	AS65	0.3	0.3
AD80	0.6	0.5	AS80	0.6	0.5
AD100	1.2	1.1	AS100	1.2	1.0
AD125	2.5	2.2	AS125	2.5	2.1
AD140	3.9	3.5	AS140	3.9	3.3
AD160	4.8	4.3	AS160	4.8	4.0
AD185	5.8	7.5	AS185	5.8	6.1
AD200	6.2	9.9	AS200	6.2	7.6
AD250	8.0	12.8	AS250	8.0	9.9

Features

- Aluminum Cover Which is not easily peeled off, and its polish can last long as it is power coated upon special surface treatment.
- Spring Cap Which can enable it to assemble or disassemble safely.
- NBR The products can be used at **Low/High temperature** as the products are available in EPDM and/or VITON in addition to the standard NBR.
- ISO5211/DIN3337 Which is the international standards and thus it can precisely be fitted with accessories such as limit switch box and so on.
- Aluminum Body **anodized** to prevent internal/external scratches and thus securing long term durability.
- NAMUR Which is the international standards and thus the products can be precisely fitted with solenoid valves.

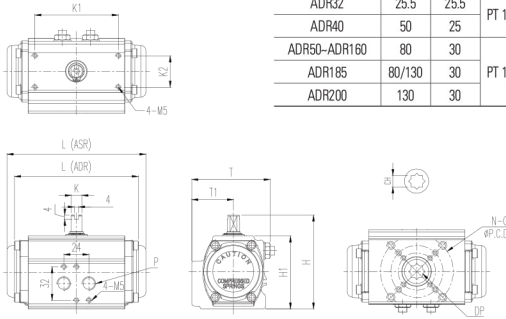


Part List



1. Body
2. Shaft
3. Stopper
4. Bushing(Top)
5. Body O-ring(Top)
6. Bushing(Bottom)
7. Body O-ring(Bottom)
8. Body Washer(Bottom)
9. Body Washer(Top)
10. Body Snap-ring
11. Piston
12. Piston O-ring
13. Piston Guide-ring
14. Piston Pad
15. Cover
16. Cover O-ring
17. Cover Bolt
18. Spring Unit
19. Stopper Bolt
20. Stopper O-ring
21. Stopper Washer
22. Stopper Nut

ADR/ASR SERIES (DOUBLE ACTING/SINGLE ACTING)



	K1	K2	P
ADR32	25.5	25.5	PT 1/8"
ADR40	50	25	
ADR50-ADR160	80	30	
ADR185	80/130	30	PT 1/4"
ADR200	130	30	

Dimension Table

MODEL	ISO	Ø P.C.D	N-G	DP2(TAP)	K	L		T	T1	H	H1	CH	DP	Weight (Kg)	
						ADR	ASR							ADR	ASR
ADR32	F03	36	4-M5	7	7	66	-	45	25	55	45	9x9	9	0.3	-
ADR40	F03/F05	36/50	4-M5/M6	8/12	9	97	97	63	32	75	55	9x9	9	0.5	0.6
ADR50	F03/F05/F07	36/50/70	4-M5/M6/M8	10/12/12.5	9	119	133	75	40	90	70	11x11	13	1.0	1.1
ADR65	F05/F07	50/70	4-M6/M8	11/11	13	131	154	89	46	106.5	86.5	14x14	16	1.4	1.5
ADR80	F07	70	4-M8	15	19	189	220	101	49.5	126	106	17x17	19	2.9	3.3
ADR90	F07	70	4-M8	17	19	188	223	104	54.5	136	116	17x17	19	3.4	3.8
ADR100	F07/F10	70/102	4-M8/M10	16/21	19	229	256	132	61.5	148	128	22x22 #17x17	26 19	4.7	5.4
ADR115	F07/F10	70/102	4-M8/M10	16/19	19	265	302	142	67.5	163	143	22x22	26	6.7	7.5
ADR125	F07/F10	70/102	4-M8/M10	16/19	19	299	330	151	71.5	174	154	22x22	26	8.6	9.9
ADR140	F10/F12	102/125	4-M10/M12	18/26	24	332	389	164	77	192	172	27x27 #22x22	30 26	12.4	14.5
ADR160	F10/F12	102/125	4-M10/M12	18/25	24	364	416	188	89	216	196	27x27	30	16.9	19.5
ADR185	F14	140	4-M16	23	30	434	465	217	103	254	224	36x36	30	24.2	29.0
ADR200	F14	140	4-M16	23	36	444	527	231	115	284	254	36x36	30	32.3	37.9

* ADR32, 40 Have not angle stopper.

Option

Torque Table - ADR Series

Model	Supply Air						
	3bar	4bar	4.5bar	5bar	6bar	7bar	
ADR32	2.4	3.1	3.5	3.9	4.8	5.7	
ADR40	5.5	7.4	8.4	9.2	11.1	13.0	
ADR50	9.4	12.5	14.3	15.9	19.1	22.5	
ADR65	18.3	24.7	27.8	30.8	36.8	42.9	
ADR80	44.5	58.9	66.5	74.4	89.3	104.3	
ADR90	57.2	76.2	85.7	95.2	114.2	133.2	
ADR100	79.5	105.5	118.8	132.1	158.7	185.3	
ADR115	123.5	166.3	187.2	209.0	251.8	294.5	
ADR125	161.5	218.5	247.0	270.8	327.8	384.8	
ADR140	237.5	318.3	361.0	399.0	479.8	560.5	
ADR160	327.8	441.8	494.0	551.0	669.8	779.0	
ADR185	475.0	641.3	722.0	802.8	964.3	1,125.8	
ADR200	679.3	912.0	1,030.8	1,144.8	1,382.3	1,615.0	

ASR SERIES (SINGLE ACTING)

Torque Table - ASR Series

Model	Spring Unit	Supply Air													
		3bar		4bar		4.5bar		5bar		6bar		7bar		Spring	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
ASR40	S	1.0	-	2.9	0.5	3.8	1.2	4.8	2.1	6.7	3.8	8.6	5.1	3.9	5.9
	MS	1.9	-	3.7	1.0	4.6	1.8	5.4	2.5	7.3	4.2	9.1	5.6	3.0	4.9
	M	2.6	0.8	4.6	2.4	5.4	3.2	6.3	4.1	8.1	5.9	10.0	7.7	2.8	4.1
	WS	2.7	0.7	4.6	1.7	5.4	2.3	6.4	2.9	8.2	4.1	10.1	5.2	2.1	3.0
	WM	3.2	1.5	5.0	3.1	5.0	3.8	6.0	4.6	6.9	5.9	8.8	7.1	1.6	2.4
ASR50	8	4.1	1.2	7.4	4.4	9.0	6.1	10.7	7.6	14.2	11.1	17.3	14.5	5.2	8.1
	9	3.6	-	6.9	3.4	8.6	5.2	10.3	6.9	13.6	10.2	16.9	13.6	6.0	9.1
	10	2.9	-	6.1	2.7	7.8	4.3	9.5	5.9	12.8	9.3	16.2	12.6	6.5	10.1
	11	2.3	-	5.6	1.5	7.3	3.1	8.9	4.8	12.4	8.2	15.7	11.5	7.0	11.0
ASR65	12	1.8	-	5.2	0.6	6.8	2.2	8.5	3.9	11.9	7.3	15.2	10.5	7.6	11.8
	8	4.1	1.2	8.7	3.6	14.7	9.5	17.9	12.5	21.1	15.7	27.2	22.0	8.4	13.7
	9	3.6	-	7.6	1.3	14.0	7.5	17.1	10.7	20.0	13.8	26.3	20.0	9.7	15.2
	10	2.9	-	6.1	-	12.3	5.3	15.4	8.6	18.5	11.8	24.7	18.1	11.0	17.4
ASR80	11	2.3	-	5.4	-	11.4	3.8	14.4	7.6	17.6	10.4	23.8	16.7	12.2	18.6
	12	1.8	-	4.8	-	10.8	1.9	13.6	5.0	16.6	8.2	23.1	14.5	12.5	20.2
	8	21.1	6.1	35.3	21.0	42.9	29.1	50.5	35.7	65.6	51.3	80.8	66.4	21.7	33.7
	9	17.6	-	32.4	15.7	39.9	23.8	47.4	30.4	62.4	45.3	77.7	60.1	24.8	38.3
ASR90	10	14.3	-	29.5	11.0	37.1	19.0	44.3	25.7	59.8	40.4	74.5	55.5	28.2	43.7
	11	11.4	-	26.2	5.7	33.4	12.9	40.5	20.4	56.1	35.3	70.8	49.9	30.3	47.7
	12	9.1	-	23.7	1.0	32.2	8.6	38.5	16.2	53.9	30.7	68.9	44.8	33.5	51.6
	8	27.7	6.7	47.3	25.7	56.6	35.2	65.8	44.7	85.1	63.7	104.1	82.7	27.2	43.9
ASR100	9	23.1	-	42.5	18.8	51.6	28.9	61.4	38.0	80.8	57.4	100.0	77.0	30.7	49.8
	10	19.2	-	38.0	12.7	47.5	21.9	57.0	31.4	76.0	50.8	95.0	69.8	34.5	56.5
	11	16.9	-	35.0	6.5	44.4	16.2	54.0	25.7	73.2	44.7	92.2	63.7	37.8	61.8
ASR115	12	12.8	-	31.5	-	41.5	9.5	50.0	19.2	69.4	38.0	88.6	57.0	40.7	67.5
	8	34.9	4.8	60.8	29.6	74.1	43.7	86.7	56.1	113.1	81.9	139.7	108.3	40.9	67.6
	9	30.6	-	57.0	20.9	70.3	33.7	83.1	46.6	109.3	74.1	135.9	100.2	45.6	76.4
	10	25.2	-	52.7	11.8	66.9	24.1	79.3	36.9	105.5	64.1	132.1	90.0	50.4	87.2
ASR125	11	20.5	-	46.4	1.9	59.5	14.3	72.4	28.0	98.6	53.8	125.4	79.3	55.7	93.8
	12	13.8	-	40.3	-	52.9	4.8	65.6	19.0	92.6	45.8	119.2	71.2	60.6	102.0
	8	61.8	23.8	104.5	66.5	128.3	85.5	147.3	109.3	190.0	152.0	232.8	190.0	52.3	85.5
ASR140	9	52.3	9.5	95.0	52.3	118.8	71.3	137.8	95.0	165.3	142.5	228.0	180.5	61.8	99.8
	10	42.8	-	85.5	42.8	109.3	61.8	128.3	80.8	175.8	123.5	218.5	166.3	66.5	114.0
	11	38.0	-	80.8	28.5	104.5	47.5	123.5	71.3	166.3	114.0	209.0	156.8	76.0	123.5
ASR150	12	33.3	-	71.3	14.3	95.0	38.0	114.0	57.0	156.8	99.8	199.5	142.5	80.8	133.0
	8	76.0	28.5	128.3	80.8	156.8	109.3	180.5	137.8	237.5	194.8	289.8	247.0	71.3	114.0
	9	66.5	9.5	118.8	66.5	147.3	95.0	175.8	123.5	228.0	175.8	280.3	232.8	85.5	133.0
	10	52.3	-	109.3	47.5	137.8	76.0	161.5	104.5	218.5	161.5	270.8	213.8	95.0	147.3
ASR160	11	42.8	-	99.8	33.3	128.3	61.8	152.0	85.5	209.0	142.5	261.3	199.5	104.5	161.5
	12	33.3	-	90.3	19.0	114.0	42.8	142.5	71.3	194.8	123.5	251.8	180.5	114.0	175.8
	8	114.0	42.8	194.8	123.5	237.5	166.3	275.5	204.3	356.3	289.8	437.0	370.5	104.5	175.8
	9	95.0	14.3	175.8	99.8	218.5	142.5	256.5	180.5	337.3	266.0	418.0	346.8	118.8	194.8
ASR185	10	85.5	-	166.3	76.0	204.3	118.8	242.3	156.8	323.0	242.3	408.5	323.0	137.8	218.5
	11	66.5	-	147.3	47.5	190.0	90.3	228.0	133.0	308.8	213.8	389.5	299.3	152.0	242.3
	12	52.3	-	133.0	28.5	175.8	66.5	213.8	109.3	294.5	194.8	375.3	275.5	166.3	266.0
	8	147.3	52.3	261.3	166.3	318.3	218.5	375.3	289.3	499.3	394.3	603.3	508.3	161.5	242.3
ASR200	9	123.5	14.3	242.3	128.3	299.3	185.3	356.3	242.3	470.3	356.3	584.3	470.3	185.3	275.5
	10	104.5	-	218.5	99.8	270.8	152.0	327.8	209.0	446.5	323.0	560.5	437.0	204.3	313.5
	11	80.8	-	194.8	61.8	251.8	114.0	308.8	175.8	422.8	289.8	532.0	403.0	228.0	337.3
	12	66.5	-	175.8	28.5	232.8	85.5	289.9	142.5	403.8	256.5	513.0	365.8	247	

