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KTN
Kara Technology News

FIG. RSE/RDE

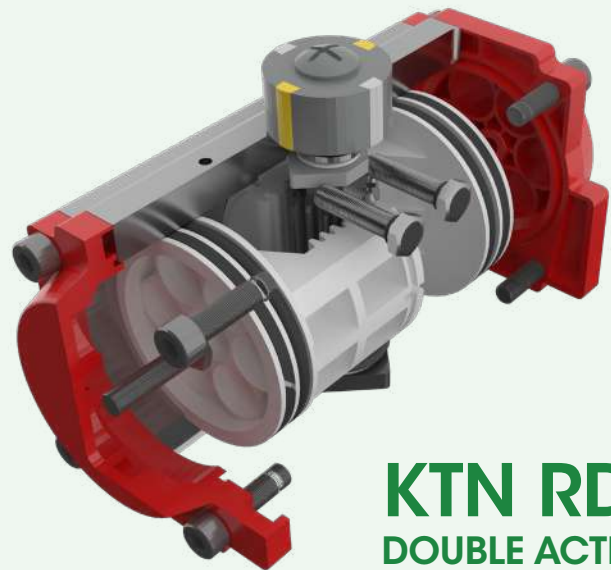
SINGLE/DOUBLE ACTING PNEUMATIC ACTUATOR

HIGH QUALITY ALUMINUM ALLOY

KTN RSE/RDE PNEUMATIC ACTUATOR:



KTN RSE
SINGLE ACTING



KTN RDE
DOUBLE ACTING

Our **single acting and double acting pneumatic actuators** have been designed under high advanced technology and made with high quality material, conform to the latest international standards **such as ISO5211, DIN337, VD/VDE3845 and NAMUR. ATEX certification II 2GD c T* (T*=T3 or T5).**

The **KTN RSE/RDE** design is an excellent choice due to its compact and modernized design, both models share the **same external structure**, which makes installation of accessories easier and allows to install **solenoid valves without connecting flange**.

All acting surfaces are specially made with **high quality bearings** that results in **low friction, no noise and life cycle service increase**. **Pistons and end caps** are made from die-casting aluminium giving them **hardness and lightness** at the same time. In

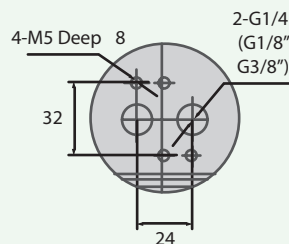
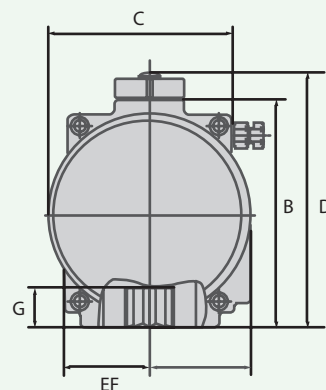
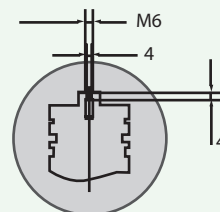
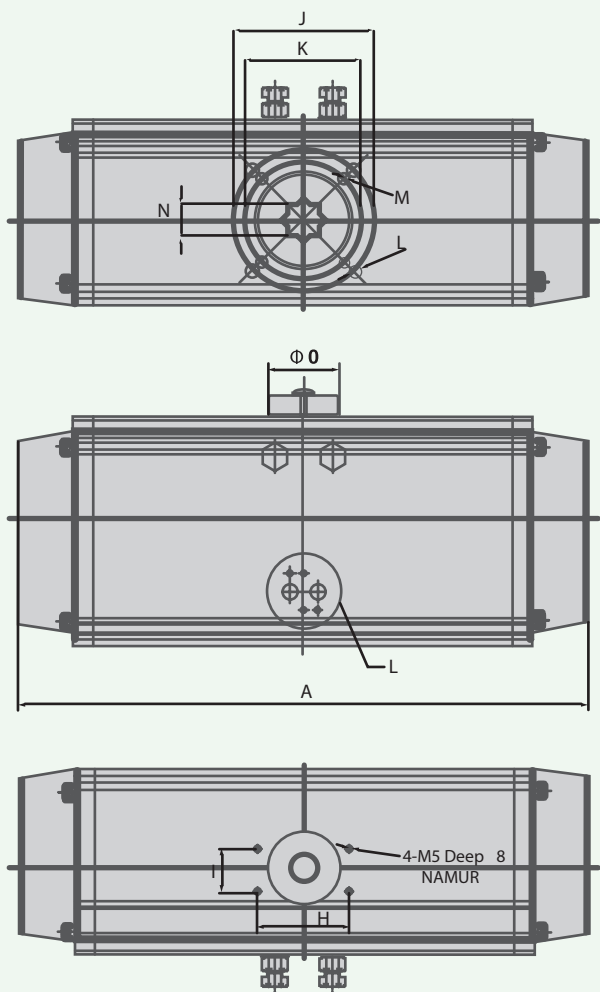
addition, KTN RSE **preloaded springs** are designed for a safe mounting and **teardown procedures**.

Actuators can be adjusted at **at $\pm 5^\circ$** on open or close position thanks to the **two independent stroke adjusting devices**. NAMUR standard multifunction positioner works as a visual indicator of the valve position.

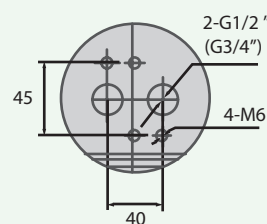
Apart of our on stock products we offer solutions for **special requirements**, we can manufacture KTN actuators with **different seals for high or low temperature processes**, we can add **multi-travel rotations**, for example, **120°, 135° and 180°** and **three position actuators**.

KTN RSE/RDE | DIMENSIONS

ALUMINUM PNEUMATIC ACTUATOR



RDE052 - RDE240
RSE052 - RSE240



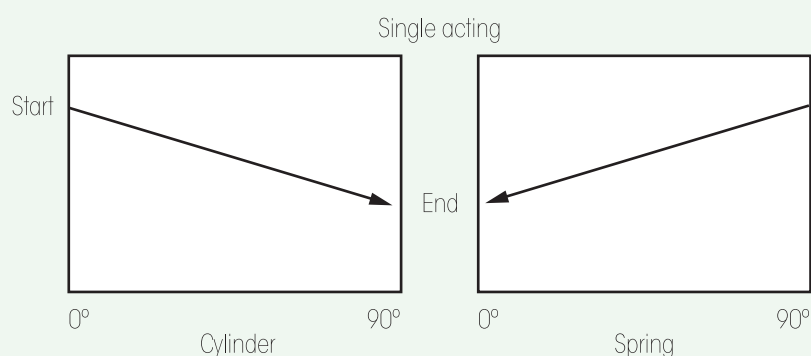
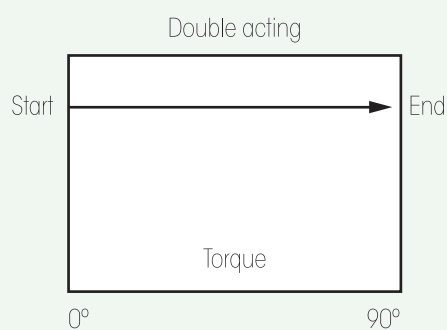
RDE270 - RDE350
RSE052 - RSE240

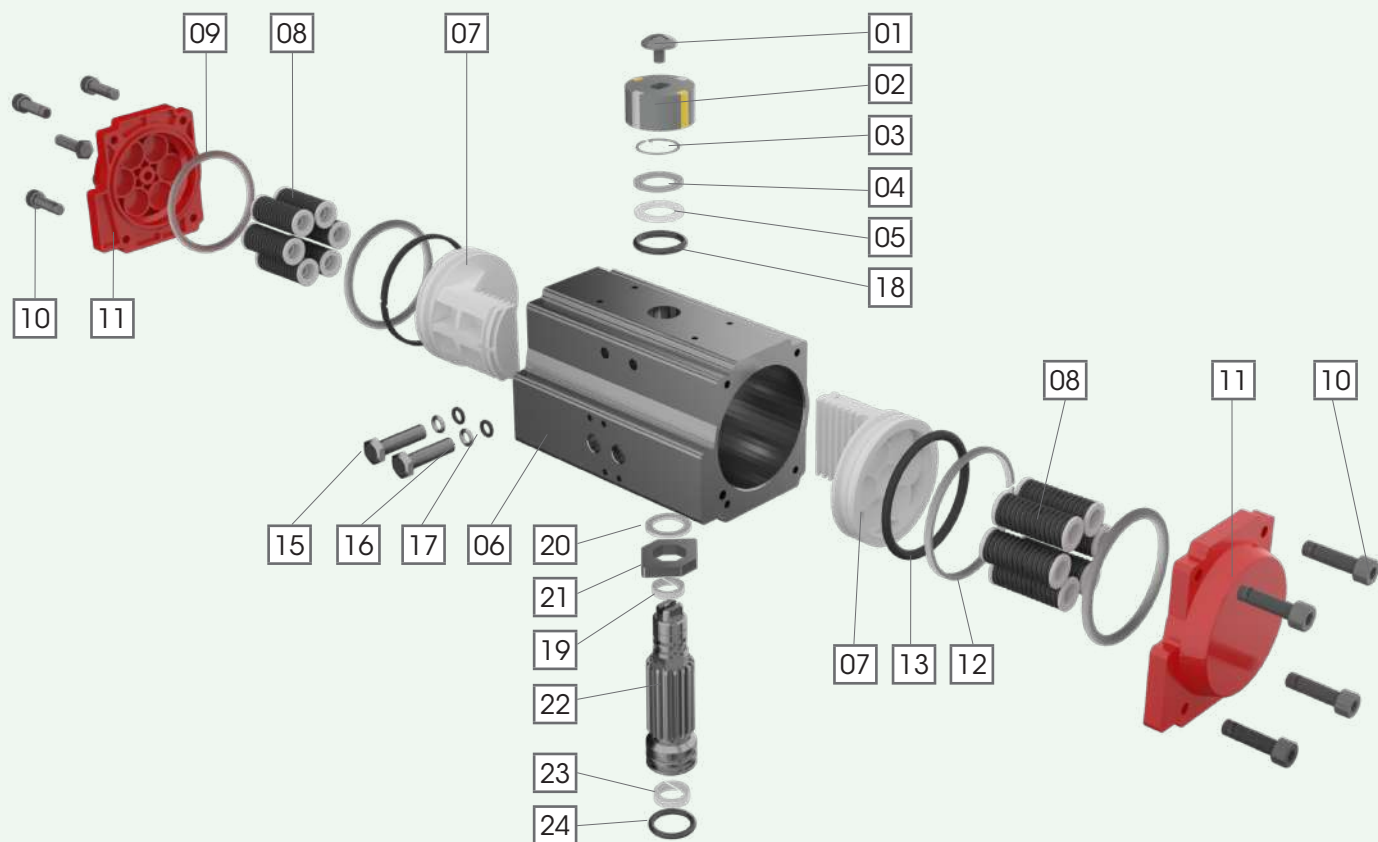
Model RSE/RDE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Air connection
052-00	163.5	72	65	98	26	42	14	80	30	F05/Φ50	F03/Φ36	M6x9	M5x8	11	Φ40	G 1/4"
063-50	181	87.6	71	113	33	47	18	80	30	F07/Φ70	F05/Φ50	M8x12	M6x9	14	Φ40	G 1/4"
075-01	207	99.4	80.2	125	38.7	52.5	20	80	30	F07/Φ70	F05/Φ50	M8x12	M6x9	14	Φ40	G 1/4"
092-51	258	117	98.3	143	44	59	21	80	30	F07/Φ70	F05/Φ50	M8x12	M6x10	17	Φ40	G 1/4"
0105-02	287	133	109.5	158.5	52	64	24.5	80	30	F10/Φ102	F07/ Φ70	M10x15	M8x12	22	Φ40	G 1/4"
0125-52	342.5	154.4	127.2	180.5	59.7	74	29	80	30	F10/Φ102	F07/ Φ70	M10x15	M8x12	22	Φ50	G 1/4"
0140-03	411	173.7	138	200	65	77	32	80	30	F12/Φ125	F10/ Φ102	M12x20	M10x15	27	Φ60	G 1/4"
0190-04	544	232.3	188.7	258	85.3	102.8	40	130	30	F14/Φ140	-	M16x22	-	36	Φ80	G 1/4"
0240-05	622	291	245	317	115	130	50	130	30	F16/Φ165	-	M20x26	-	46	Φ80	G 3/8"
0270-06	766	330	273	356	126	147	50	130	30	F16/Φ165	-	M20x26	-	46	Φ80	G 1/2"
0300-56	794	354	312	380	140	173	57	130	30	F16/Φ165	-	M20x26	-	46	Φ80	G 1/2"
0350-07	880	410	362	436	164	195	60	130	30	F16/Φ165	-	M20x26	-	46	Φ80	G 1/2"

OUTPUT TORQUE OF AIR SUPPLY								Spring stroke	
Air pressure (bar)		5		6		7			
Model RSE	Spring qty	0°	90°	0°	90°	0°	90°	0°	90°
		Start	End	Start	End	Start	End	Start	End
052-00	12	11.3	5.9	15.46	10.06	19.62	14.22	9.5	14.9
063-50	12	19.7	10.7	27	18	34.3	25.3	16.9	25.9
075-01	12	30.4	16.8	42.1	28.5	53.9	40.3	28.4	42
092-51	12	59.7	33.5	82.4	56.2	105.2	79	54	80.2
0105-02	12	90	50.2	123.9	64.1	157.9	118.1	79.7	119.5
0125-52	12	149	83	207.3	141.3	265.6	199.6	142.5	208.5
0140-03	12	226.3	121.9	314	209.6	401.8	297.4	212.4	316.8
0190-04	12	555.6	295	771.1	510.5	986.6	726	521.8	782.4
0240-05	12	1196.5	636	1660.7	1100.2	2124.8	1564.3	1124.3	1684.8
0270-06	12	1683.2	894.8	2335.9	2547.5	2988.6	2200.2	1580.4	2368.8
0300-56	12	2014	1077	2815	1878	3686	2679	1922	2929
0350-07	12	3120	1537	4319	2736	5519	3936	2878	4461

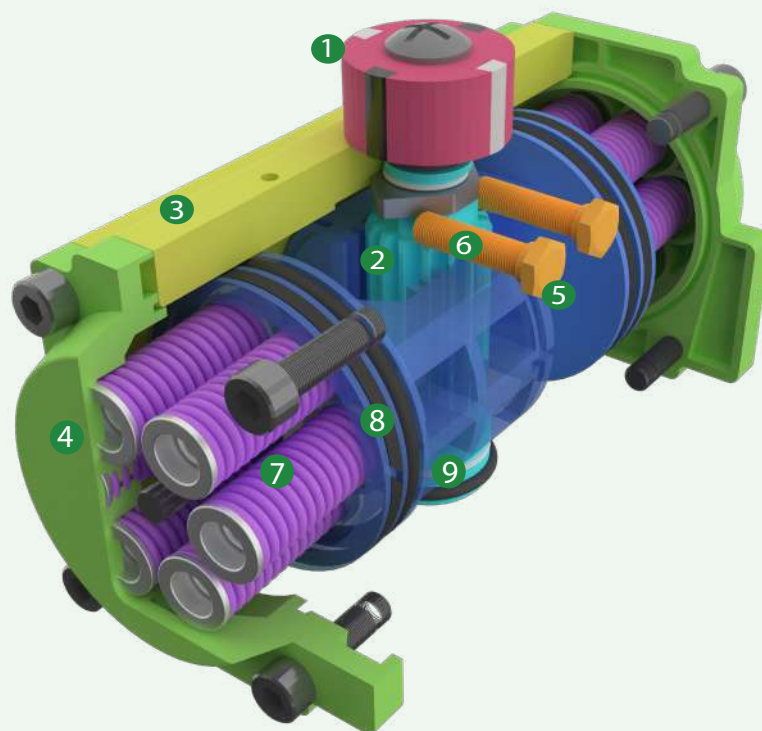
Model RDE	Air pressure (bar)						
	2	3	4	5	6	7	8
052-00	8.32	12.48	16.64	20.8	27.96	29.12	33.28
063-50	14.64	21.96	29.28	36.6	43.92	51.24	58.56
075-01	23.5	35.3	47	58.8	70.5	82.3	94
092-51	45.5	68.2	91.1	113.7	136.4	159.2	181.9
0105-02	67.88	101.82	136.76	169.7	203.64	237.58	271.52
0125-52	116.6	174.9	233.2	291.5	349.8	408.1	466.4
0140-03	175.48	263.22	350.96	438.7	526.44	614.18	701.92
0190-04	430.96	646.44	861.9	1077.4	1292.9	1508.4	1723.8
0240-05	831.9	1220.8	1627.8	2030.7	2444.6	2848.6	3255.5
0270-06	1305.4	1958.2	2610.9	3263.6	3916.3	4569	5221.8
0300-56	1602	2403	3205	4006	4807	5608	6409
0350-07	2399	3598	4798	5998	7197	8397	9596

Torque diagram of actuator





No	Description	Qty	Material	Anti-corrode treatment	Option material	Wearing parts
1	Indicator screw	1	PA66+SS			
2	Indicator	1	POM			
3	Spring clip	1	Circlip			
4	Washer	1	Stainless steel			
5	Outside washer	1	PTFE			
6	Body	1	Aluminum alloy	Hard anodized etc		
7	Piston	2	Cast aluminum	Hard anodized	Stainless steel	
8	Spring assembly	*	60Si2Mn2+PA66	Dip coating		
9	End cap O-ring	2	NBR/HNBR/FKM		Viton / Silicone	X
10	Cap screw	8	Stainless steel			
11	End cap	2	Cast aluminum	Powder spraying etc		
12	Bearing (Piston)	2	PTFE			
13	O-ring (Piston)	2	NBR/HNBR/FKM		Viton / Silicone	X
14	Guide (Piston)	2	POM		PTFE	
15	Adjusting bolt	2	Stainless steel			
16	Adjusting screw nut	2	Stainless steel			
17	O-ring (Adjusting nut)	2	NBR/HNBR/FKM		Viton / Silicone	
18	O-Ring (Pinion top)	1	NBR/HNBR/FKM		Viton / Silicone	X
19	Bearing (Piston top)	1	PTFE			X
20	Inside washer	1	PTFE			
21	Cam	1	Stainless iron			
22	Pinion	1	Alloy steel	Nickel plated	Stainless steel	
23	Bearing (Pinion bottom)	1	PTFE			
24	O-ring (Pinion bottom)	1	NBR/HNBR/FKM		Viton / Silicone	X



1 Indicator:

NAMUR standard indicator is convenient for mounting accessories such as Limit switch box, positioner and so on.

2 Actuator shaft:

Nickel plated alloy steel and high-precision shaft according to NAMUR, ISO5211 and DIN3337 standard. The dimensions and stainless steel alloy can be customized *under special request*.

3 Actuator body:

According to the different requirements, the extruded aluminum alloy ASTM6005 body can be treated with hard anodized powder polyester, PTFE or nickel plated, *under special request*.

4 End caps:

Die-casting aluminum powder polyester can be painted in different colours, PTFE coated or Nickel plated. Stock standard is in red.

5 Pistons:

The twin rack pistons are made from Die-casting aluminum treated with hard anodized cast steel with galvanization. In a symmetric mounting position, to expand life cycle and increase speed operation, the operation is inverted when the pistons are inverted.

6 Stroke adjustment:

The two independent external stroke adjustment bolts can be adjusted \pm at both open and close directions easily and precisely.

7 High performance springs:

Preloaded coating springs are made from high quality material for resistance to corrosion and long life service. They can be demounted safely and conveniently to satisfy different requirements of torque by changing the quantity of springs.

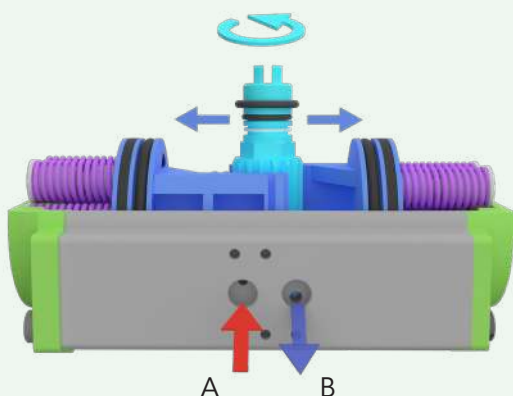
8 Bearings and guides:

Designed to avoid abrasion with metal and made with high quality low friction materials to increase even more de life service cycle, they are also made to easier cleaning maintenance.

9 O-rings:

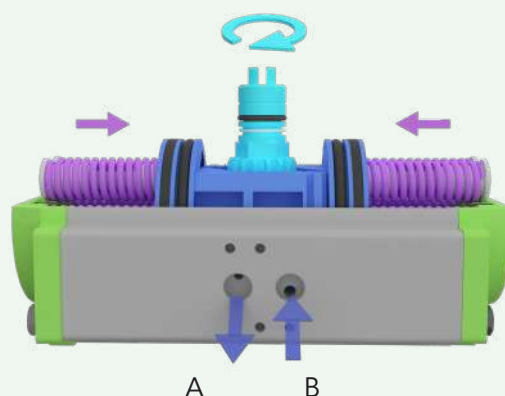
Designed to preserve air tightness, they are made in NBR. Can be made for high temperature and low temperature service in viton or silicone, *under special request*.

SINGLE ACTING



Opening:

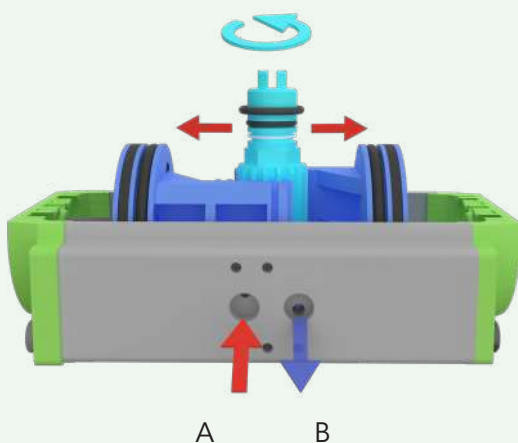
Input the air into Port A forcing the pistons to move outwards, the pinion will turn counterclockwise opening the valve, then the air will be exhausted from Port B.



Closing:

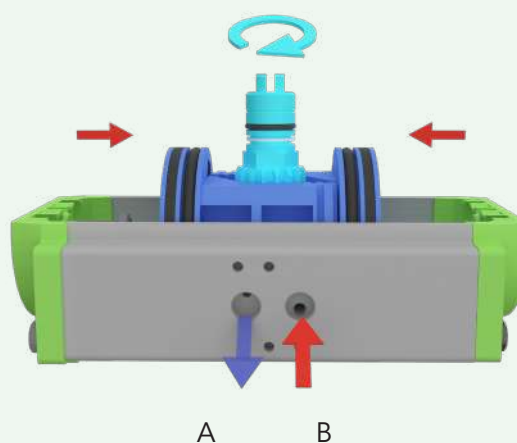
When the source of power stops, the stored energy forces the pistons to move inwards, causing the pinion to turn clockwise while air is exhausted from Ports.

DOUBLE ACTING



Opening:

Input the air into Port A forcing the pistons to move outwards, the pinion will turn counterclockwise opening the valve, then the air will be exhausted from Port B.



Closing:

Input the air into Port B forcing the pistons to move inwards, the pinion will turn clockwise closing the valve, while the air will be exhausted from Port A.

Note 1: The standard rotation is clockwise for closing the valve and counterclockwise for opening.

Note 2: If the direction of the piston is assembled reversely, then the standard rotation is counterclockwise for closing the valve and clockwise for opening.

FUNCTION AND USAGE OF THE ACTUATOR PARTS

- Double acting actuator: open and close the valve.
- Single acting actuator (spring return): when the air is cut off, it will close (normal close type).
- Double control solenoid valve: the valve opens when one solenoid coil power is on and closes when another coil powers on, it has memory function. (Ex-proof type is available).
- Single control solenoid valve: the valve open or close when power is on, and closes or opens when power is off. (Ex-proof type is available).
- Limit switch box: transmit the signal open or close of the valve remotely. (Ex-proof type is available).
- Pneumatic positioner: control the medium flow rate of the valve according to electric current (4-20mA). (Ex-proof type is available).
- Electric positioner: control the medium flow rate of the valve according to electric current (4-20mA). (Ex-proof type is available).
- Electric-pneumatic transducer: transduce current signal to air pressure signal for compatibility with positioner.
- FRL: includes filter, regulation and lubrication which can clean and lubricate the connection parts
- Manual equipments: Manual operatibity on the valve in case of the cut off or stoppage of the air or source of power.

HOW TO CHOOSE DOUBLE ACTING ACTUATOR

Firstly, confirm the torque required during the open and close service. Normally the safety factor is 15~20%. If the medium is steam or non-lubricated liquid, then consider setting it to 25%. The safety factor for non-lubricated slurry liquid is 40% and for non-lubricated granule powder is 80%. Then check output torque table form of double action or single action to get the right model choice. On the output torque table of single acting actuator, the torque on the springs stroke column is the torque required for closing the valve.

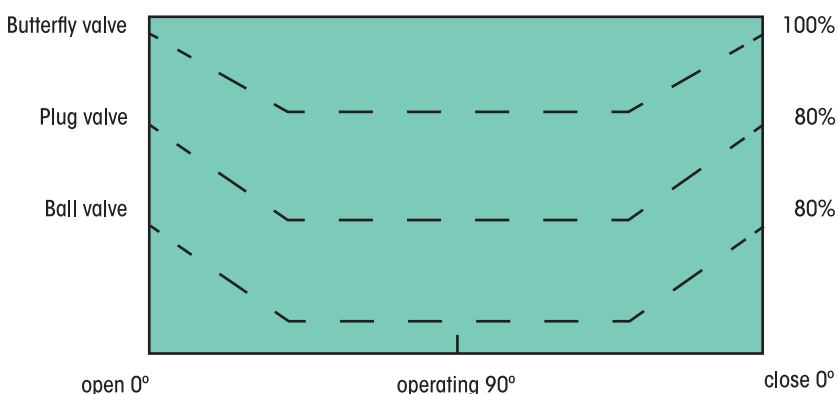
EXAMPLE

- A ball valve that needs torque = 280N.m
- Medium = Water
- Safety factor (20%) = $280 (1+20\%) = 336 \text{ N.m}$
- Air pressure = 4 bar
- According to the output table of double action actuator, the right model is RDE0140-03, because the output torque is 350.96 on a 4 bar pressure.



HOW TO CHOOSE SINGLE ACTING ACTUATOR

When we are looking for a single acting actuator. We can choose a more reasonable and economical actuator if we know how to calculate the torque required for opening and closing service.



EXAMPLE

- A butterfly valve that needs torque = 80N.m
- The max torque needed by the butterfly valve $80(1+30\%) = 104\text{N.m}$
- the torque after opened (operating) $104 \times 30\% = 32\text{N.m}$
- Air supply = 4bar
- We can select RAT125.
- Air stroke 0° = $114.4\text{N.m} > 104\text{N.m}$
- Air stroke 90° = $59.4\text{N.m} > 32\text{N.m}$
- Spring stroke 90° = $173.8\text{N.m} > 32\text{N.m}$
- Spring stroke 0° = $118.8\text{N.m} > 104\text{N.m}$
- The above data shows that the actuator's torque can satisfy the requirement of the butterfly valve.

Attention: During the restoration, the spring return actuator's torque will not be affected by inputting air from port B. On the contrary, it will help the restoration of springs.

Air volume opening & closing					
Model RSE/RDE	Air volume opening	Air volume closing	Model RSE/RDE	Air volume opening	Air volume closing
052-00	0.09 L	0.12 L	0140-03	1.7 L	2.4 L
063-50	0.14 L	0.2 L	0190-04	4.2 L	5.9 L
075-01	0.21 L	0.3 L	0240-05	9 L	12.8 L
092-51	0.49 L	0.71 L	0270-06	12.6 L	17.9 L
0105-02	0.7 L	0.99 L	0300-56	21.4 L	30 L
0125-52	1.4 L	1.6 L	0350-07	31.2 L	43.7 L

Air consumption of double action actuator (L/min) = air volume (air volume opening + air volume closing) x (air supply (kpa) + 101.3) ÷ 101.3 x action cycle time (/min).

Air consumption of single action actuator (L/min) = air volume opening x (air supply (kpa) + 101.3) ÷ 101.3 x action cycle time (/min).

ACTUATOR WEIGHT					
Model RSE/RDE	Weight (kgs)	Spring weight (kgs)	Model RSE/RDE	Weight (kgs)	Spring weight (kgs)
052-00	1.52	0.104	0140-03	14.88	0.24
063-50	2.28	0.198	0190-04	40.5	0.5
075-01	3.12	0.02	0240-05	65.5	1.3
092-51	5	0.06	0270-06	91	1.6
0105-02	6.52	0.08	0300-56	114.5	2.25
0125-52	10.12	0.15	0350-07	160.5	4

OPERATING CONDITIONS

WORKING MEDIUM

- Dry or lubricated air or inert gas, as long as the medium is compatible with the inside parts and lubricant of the actuator.
- The dew-point temperature of the operating media is -20°C. The dimension of impurity particle cannot be larger than 30μ.
- If the positioner is needed, the dimension of impurity particle cannot be larger than 5μ.

AIR PRESSURE

- 3 bar to 8 bar

WORKING TEMPERATURE

- Standard: -5°C ~ 80°C
- Low temperature: -40°C ~ 80°C
- High temperature: -10°C ~ 150°C

LUBRICATION

- Usually the standard types doesn't require lubricant. However in low temperature or high temperature service it will require special lubrication.