

KOSAPLUS
Pneumatic actuator
User Manual

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1. Summary

KOSA+ Actuator allows to conveniently open & close the Valve fast in any places wherever the pneumatic pressure are connected & available. The Valve is designed to thoroughly assure the safety & convenience of users, however, please make sure to operate after reading & digesting the User Manual completely. Please check the homepage of KOSA+ or inquire with the Customer Service Centers of KOSA+ & authorized Agents for those items & subjects not described in the Manual.

- **Data contained in the User Manual may be subject to change without advance notice for improvement of performance & safety of Product.**

-You can download newest information from Website.

※ Did you receive KOSAPLUS pneumatic actuator?

Please check the followings before you operate it.

- 1) Check if the label is attached well and if the specification specified in the label is same as you ordered.
- 2) Check if port is sealed with sticker well.
- 3) Check if there is any scratches or dent.

1-1. Model System

This is the A/R integrated user manual and each model is as follows.

AD65
 (a) (b) (c)

(a)		(b)		(c)
A	Scotch-yoke	D	Double acting	Model Number
R	Rack&pinion	S	Spring return	

<Pneumatic actuator model>

	A series	R series	
Drive method	Scotch-yoke	Rack&pinion	
Angle adjustment direction	open/close - Simultaneous adjustment		
Angle adjustment range (Standard)	90° +5° -10°	90° +5° -10°	
Temperature range	-20℃~80℃ (option -40℃~200℃) *Above operating temperature is for the sealing and the temperature for actuator varies according to the operating condition.		
	Caution Explosion Proof Product	Standard (T6)	-20℃≤Ta≤75℃
		For low temp. (T6)	-40℃≤Ta≤75℃
		For high temp. (T5)	-20℃≤Ta≤90℃
	For high temp. (T4)	-20℃≤Ta≤125℃	

<Difference between models>

***Caution* Explosion Proof Product**

KOSAPLUS pneumatic actuator subdivided T class into 4 stages as above, and you can place order selecting one out of four according to the condition like surrounding temperature of explosion hazardous area. Temperature rating of explosion proof product is indicated in product label. (Refer to 1- 3. Label)

1-2. Code System

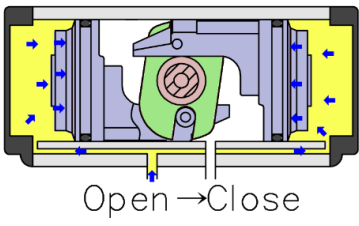
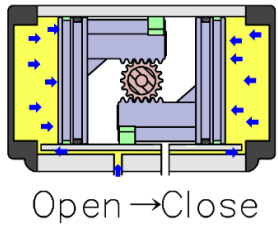

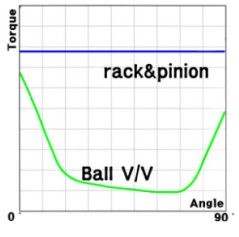
KOSAPLUS pneumatic actuator has separate code for order receiving in addition to the model name specified in the label as below.

A6ND-KOLB-1012C27-OP
 (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k)

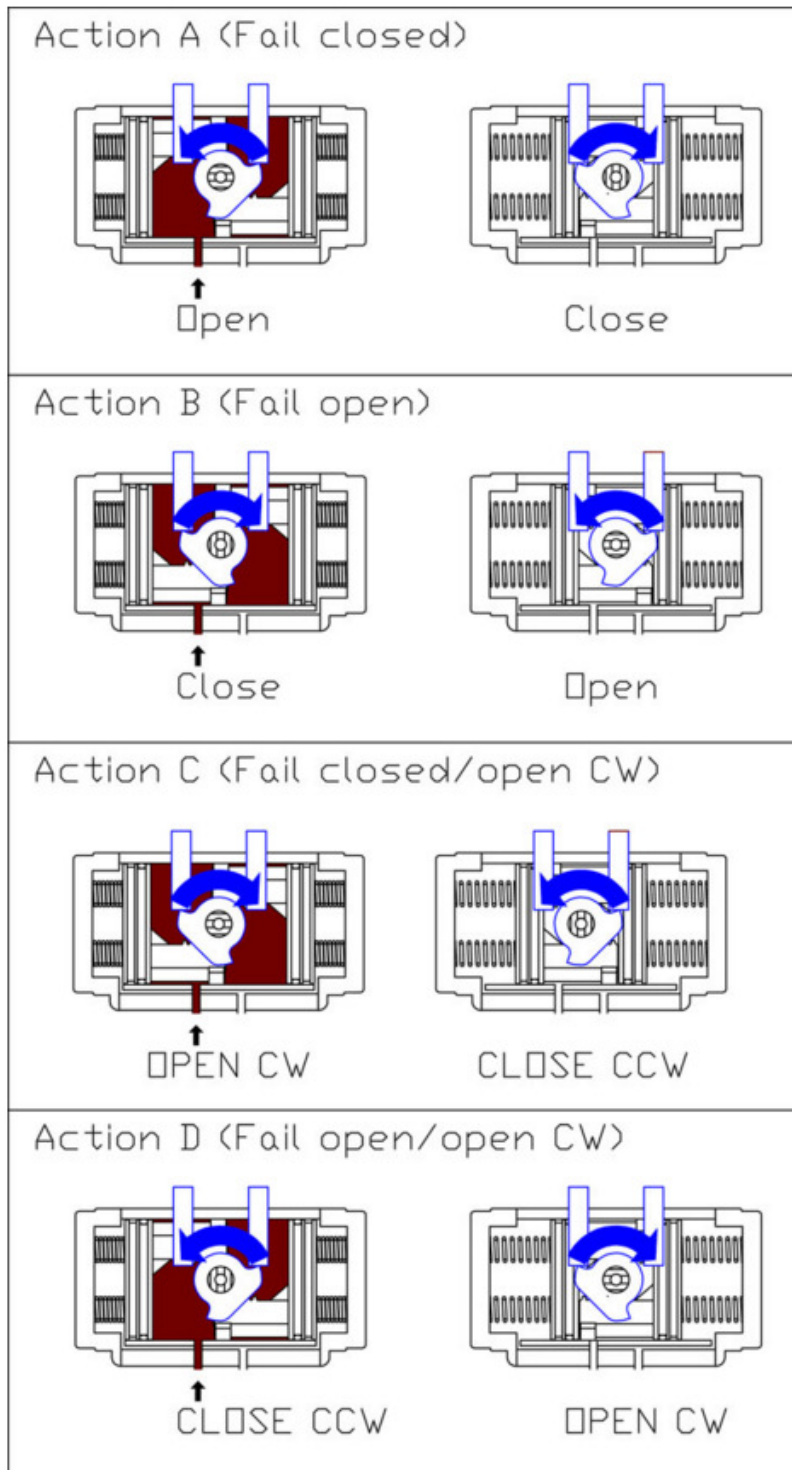
OB:Order based

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Mechanism	Diameter	O-RING	SPRING	Action	Body color	Cover color	Indicator	ISO5211	STEM	OPTION
A:scotch yoke	3:32	N:Standard	D:Double acting	A:Action A (Fail closed)	K:Black	K:Black	A:A type	3:F03	C11:11*11	T4:PT1/4
R:rack pinion	4:40	L:Low temp.	W:Weak spring	B:Action B (Fail open)	L:Blue	L:Blue	B:B type	5:F05	C14:14*14	T8:PT3/8
	5:50	H:High temp.	M:Middle spring	C:Action C (Fail closed/ Open CW)	W:White	W:White	C:C type	7:F07	C17:17*17	T2:PT1/2
	6:65		S:Strong spring	D:Action B (Fail open/ Open CW)	Y:Yellow	Y:Yellow	D:D type	10:F10	C19:19*19	N4:NPT1/4
	8:80		H:Hand wheel		R:Red	R:Red		12:F12	C22:22*22	N8:NPT3/8
	9:90		No.:R's spring q'ty		O:OB	O:OB		14:F14	C27:27*27	N2:NPT1/2
	10:100		O:OB					16:F16	C36:36*36	O45:Open -45° (Stopper on the body)
	11:115							O:OB	C46:46*46	C45:Open -45° (Stopper on the body)
	12:125								O:OB	SE1:Stopper on end cap (one side)
	14:140									SE2:Stopper on end cap (both side)
	16:160									EH:Extra hole & tap
	18:185									HW:Hand wheel
	21:210									
	25:250									
	30:300									

*<Remark-1> SCOTCH-YOKE / RACK&PINION

	Scotch-yoke (A series)	Rack&pinion (R series)
Operational principle	<p>- Upon air supply, pistons move horizontally, turning the shaft by the arm connected to the pistons.</p> 	<p>- Upon air supply, pistons move vertically, turning the shaft that is linked to the piston gear.</p> 
Major parts	piston/crank/shaft	piston/shaft
Benefits	<p>-Smooth on/off with the torque curve synchronized with valves</p> <p>- Relatively higher torque than the same model in Rack&Pinion type</p> 	<p>- Short body length makes it easier to fit in small spaces.</p> <p>- The multi-spring structure enables adjustment of number of springs to suit the site requirements.</p>
Weakness	<p>- long length due to the piston stroke</p> <p>- Multi-spring disabled and therefore a jig is required for spring adjustment</p>	<p>-Rigid torque (not flexible)</p> <p>-It requires the bigger cylinder inner-dia to achieve the same torque as the Scotch-yoke type</p> 
KOSAPLUS Model	A seires (ADx, ASx) x=50,65,80,100,125,140,160,185,210,250,300	R series (RD32, RDy,RSy) y=40,50,65,80,90,100,115,125,140,160,185,210

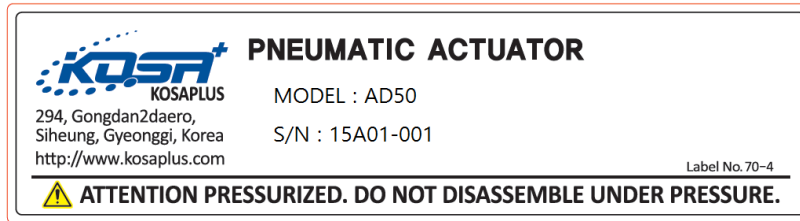
*<Remark-2> Drive method (Action A,B,C,D) -Based on R series



1-3. Label

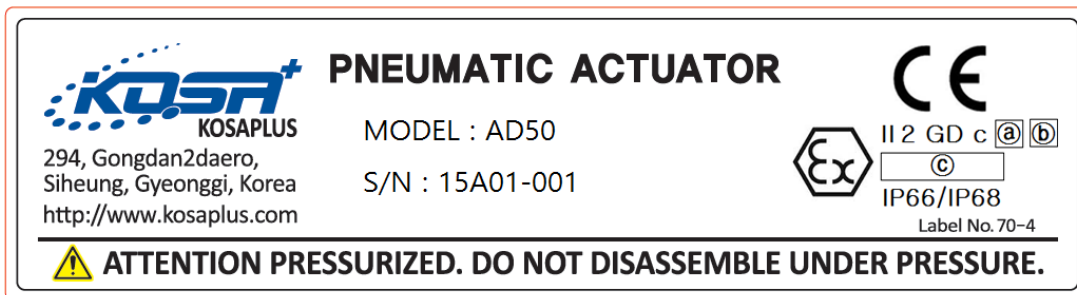
KOSAPLUS product can be identified by following model names and the label containing product serial number (S/N).



▶ General Product



▶ ※ Caution ※ Explosion Proof Product

Related content is written on right side of the label for explosion proof product.



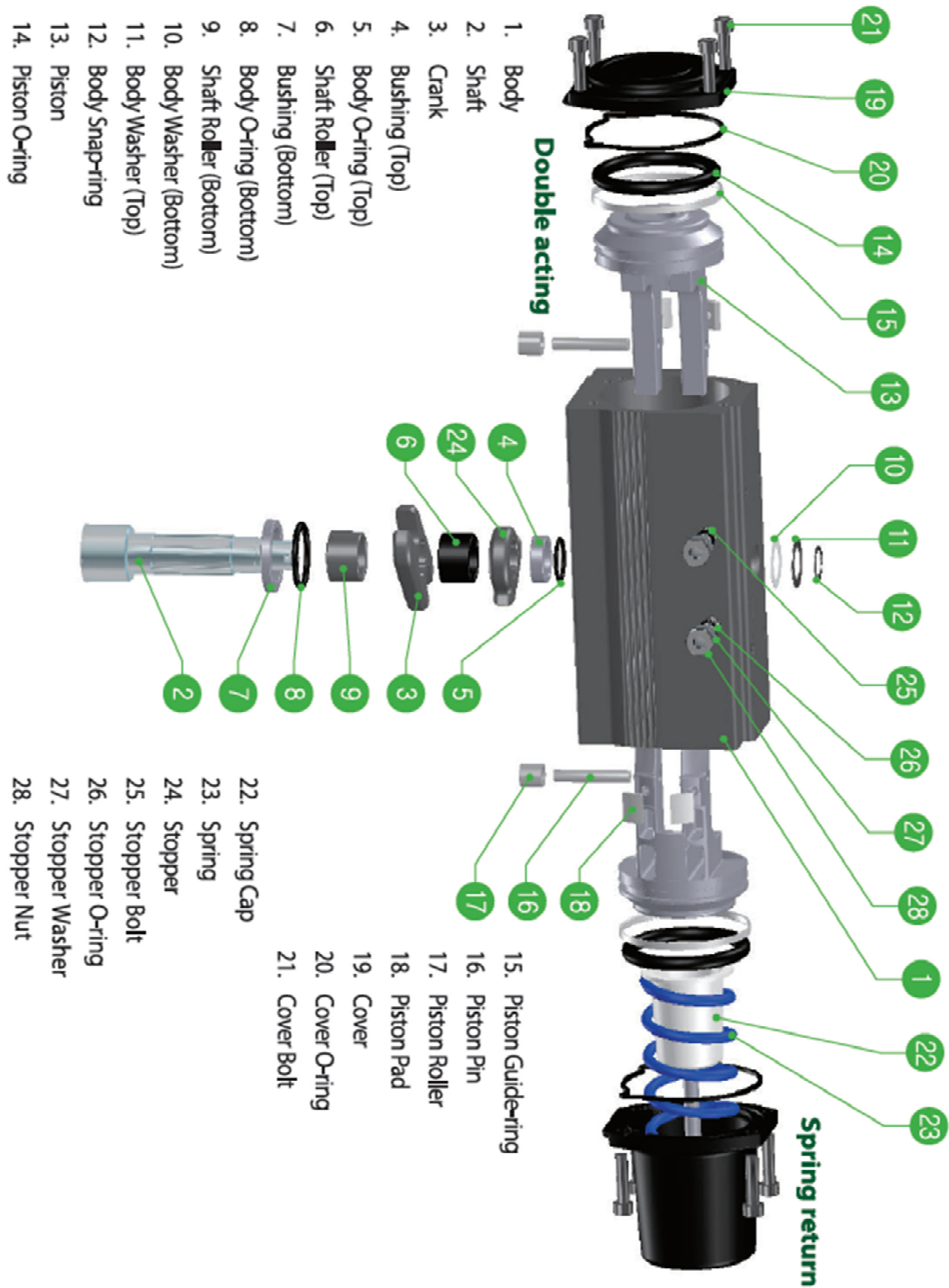
	is the CE Mark. It stands for Conformité Européenn. The distinctive CE mark on a product signifies that the product complies with the requirements contained within one or more of the applicable European Directives.
	is the symbol for the ATEX certification and it stands for Atmospheres Explosibles, which is French for potentially explosive atmospheres.
II 2	Equipment Group I of hazardous area condition is for underground facility like coal mine and Equipment Group II is for ground equipment. Category 2 corresponds to zone 1 and this group should not beyond work variable range, and also the products that are designed to raise protection degree in order to use them at the area where there is a risk of explosion by the mixture of air and gas, steam, air/ dusts.
GD	signifies that the concerned equipment is deemed safe for operations in an environment in which Gas&Dust are present.
c	signifies that “constructional safety” has been incorporated into the design of the concerned equipment.

<p>Ⓐ</p>	<p>※This is the area that you can select when you order explosion proof product.※</p> <table border="1" data-bbox="343 331 869 526"> <tr> <td style="text-align: center;">II A</td> <td>propane</td> <td>With indicator</td> </tr> <tr> <td style="text-align: center;">II B</td> <td>ethylene</td> <td></td> </tr> <tr> <td style="text-align: center;">II C</td> <td>acetylene, hydrogen</td> <td>Without indicator</td> </tr> </table> <p>It is the classification of places for use, and I is for coal mine and II is for the group of gas or steam for general industrial site. A is classified as left side according to the gas or steam.</p> <p>KOSAPLUS pneumatic actuator is classified into 2 kinds according to the plastic indicator attached to upper actuator, and attached product satisfies IIA and unattached product satisfies IIC. (If there is no separate mark, the product satisfying IIA will be shipped.).</p>	II A	propane	With indicator	II B	ethylene		II C	acetylene, hydrogen	Without indicator					
II A	propane	With indicator													
II B	ethylene														
II C	acetylene, hydrogen	Without indicator													
<p>Ⓑ</p>	<p>Any surface of the product has maximum surface temperature that can rise. It varies according to the surrounding temperature. Please refer to Ⓒ for the details.</p> <table border="1" data-bbox="742 734 1406 1034"> <thead> <tr> <th style="text-align: center;">Temperature class</th> <th style="text-align: center;">Max. surface temperature</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">T1</td> <td style="text-align: center;">≤450℃</td> </tr> <tr> <td style="text-align: center;">T2</td> <td style="text-align: center;">≤300℃</td> </tr> <tr> <td style="text-align: center;">T3</td> <td style="text-align: center;">≤200℃</td> </tr> <tr> <td style="text-align: center;">T4</td> <td style="text-align: center;">≤135℃</td> </tr> <tr> <td style="text-align: center;">T5</td> <td style="text-align: center;">≤100℃</td> </tr> <tr> <td style="text-align: center;">T6</td> <td style="text-align: center;">≤85℃</td> </tr> </tbody> </table>	Temperature class	Max. surface temperature	T1	≤450℃	T2	≤300℃	T3	≤200℃	T4	≤135℃	T5	≤100℃	T6	≤85℃
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<p>Ⓒ</p>	<p>※This is the area that you can select when you order explosion proof product.※</p> <table border="1" data-bbox="858 1106 1414 1245"> <tr> <td style="text-align: center;">Standard (T6)</td> <td style="text-align: center;">- 20℃≤Ta≤75℃</td> </tr> <tr> <td style="text-align: center;">For low temp. (T6)</td> <td style="text-align: center;">- 40℃≤Ta≤75℃</td> </tr> <tr> <td style="text-align: center;">For high temp. (T5)</td> <td style="text-align: center;">- 20℃≤Ta≤90℃</td> </tr> <tr> <td style="text-align: center;">For high temp. (T4)</td> <td style="text-align: center;">- 20℃≤Ta≤125℃</td> </tr> </table> <p>It is usable surrounding temperature, and it means that relevant product was designed to be installed within relevant range of temperature, and you need to mark this when you order the product since T[Ⓑ] value changes accordingly. (If there is no separate mark, the product satisfying T6 will be shipped.).</p>	Standard (T6)	- 20℃≤Ta≤75℃	For low temp. (T6)	- 40℃≤Ta≤75℃	For high temp. (T5)	- 20℃≤Ta≤90℃	For high temp. (T4)	- 20℃≤Ta≤125℃						
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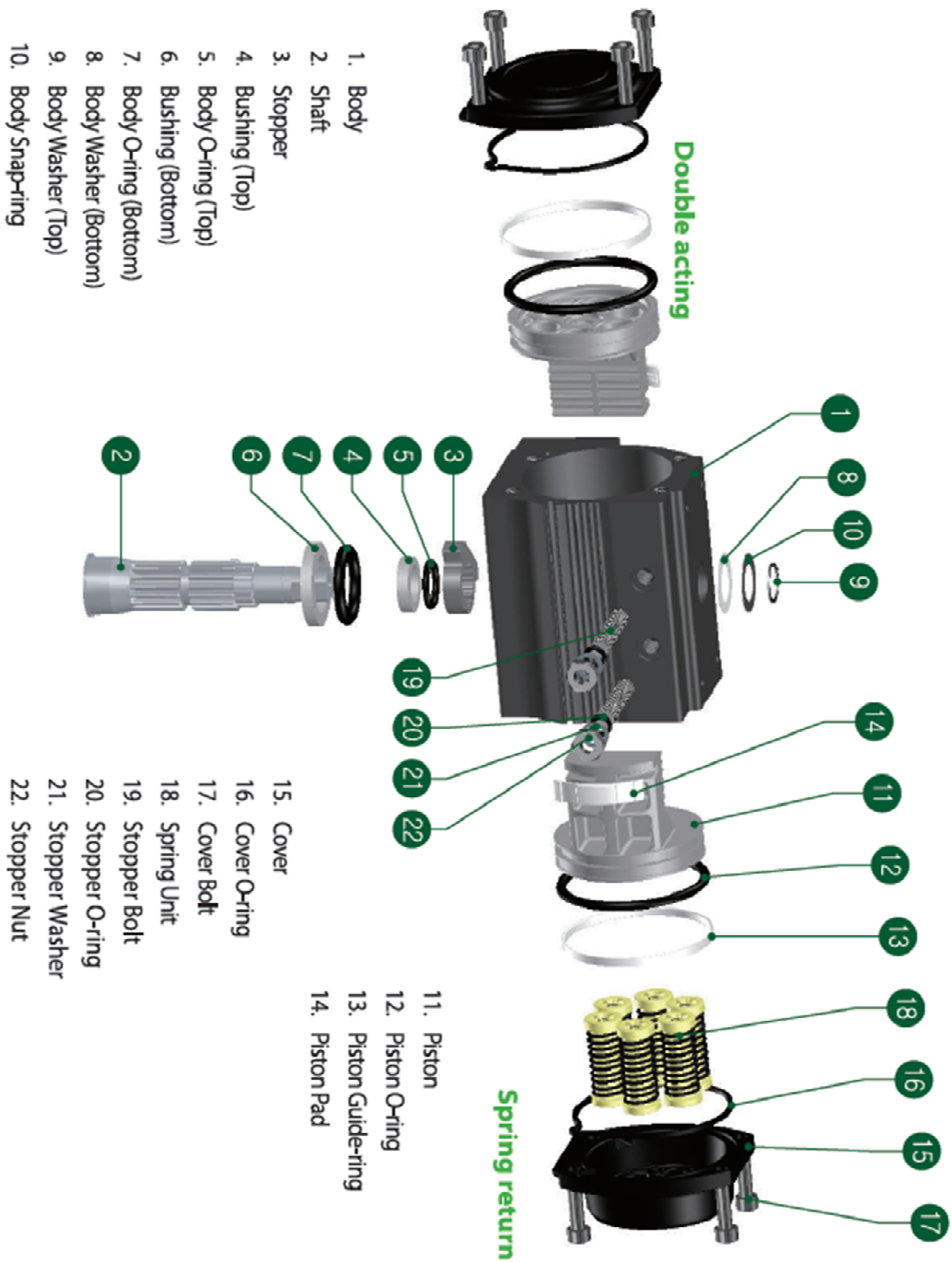
2. Products

2-1. Internal Construction of Product

Internal construction of the Product is illustrated as following.



<A series (based on A65)>



<R series (Based on R65)>

3. Installation

User should execute the product installation after thoroughly digesting the following content.

3-1. Attachable Valve

The KOSAPLUS product can be applied to all the Rotary Type Valve executing opening & closing actions rotating 90°.





- a. Major Component ; Ball Valve (2 way, 3 way), Butterfly Valve





3-2. Selection of Actuator

Check the following items in advance when selecting the model of Actuator.

- a. Required torque to open & close the Valve
- b. Air pressure flowing into the Actuator
- c. Fluid Characteristic
- d. Operating Condition (Extremely Low Temperature, Extremely High Temperature)
- e. Other items to consider to operate the Actuator

※Reference※ User can refer to below data when selecting the product.


▷Dimension table			
AD	AS	RD	RS
			
http://goo.gl/NSMimu	http://goo.gl/rrOyIH	http://goo.gl/PD9dp9	http://goo.gl/RIIjwa





▷Torque table			
AD	AS	RD	RS
			
http://goo.gl/IQ8F7P	http://goo.gl/32bB3u	http://goo.gl/IYHU3o	http://goo.gl/AoW6LR

▷ Selection guide	▷ Air volume	▷ Operating time
		
http://goo.gl/37f5y6	http://goo.gl/tHFfHG	http://goo.gl/R5KG01

- ▷ User may attach the following Valve accessories as required.
- solenoid valve
 - valve positioner (positioner indicator)
 - limit switch box
 - quick valve
 - declutch gear box
 - Other accessories that may be used to control the Valve.

3-3. Caution during Installation

- When installing the Product, execute the installation after either removing the potentially hazardous elements or mounting the safety devices considering the accidents & danger that may be happen during the installation works.
- KOSAPLUS Product can be used in any indoor & outdoor places except with the explosive environments, while the rust may be processed a little fast in case of installation in sea shore locations.
-  As for the Products weighing over 20Kg, the Label of below shown flowing may be attached, either lifting by two persons or utilizing the appropriate device to move the product.



-  Do not inject air until the Product is completely mounted on the Valve during the installation process.
- Ample space allowing the free movement of installation tools is required when installing the Product.
- When attaching the Accessories, install after checking the Jointing Method & Joint Section.
-  **If there is no separate mark, non-explosion proof product will be shipped**

and you should not operate or store the product under the environment that uses hazardous materials. Hazardous materials mean environmentally harmful materials such as materials that cause explosion or fire, flammable materials, corrosive materials, etc. If you operate or store the product at such environment, you need to order the product that satisfies such environment.

4. Operation

User of Product should operate upon fully recognizing the potential danger caused by the inappropriate management.

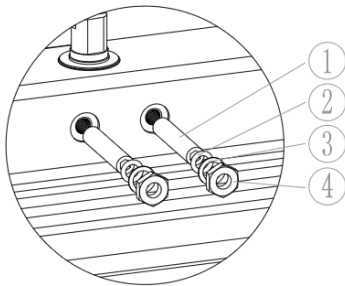
4-1. Operation

▷ Operating medium: Compressed dry air

- **CAUTION** It is recommended to use separate dehumidified filter since the water inside the product may cause corrosion or failure of the product.
 - It is recommended to use purified air after filtering foreign substances up to less than 40μ in order to prolong the life of the product.
 - Do not use anything except the designated medium since they were not verified.
- ▷ Pressure for use: 3~8Bar / Recommended Pressure: 4~6Bar

4-2. Angle adjustment

In case of the A/R models, there is an adjusting bolt which adjusts the open/close angle at the back of the products.



①	Headless wrench bolt
②	O-ring
③	Washer
④	Nut

▷ Angle adjustment method (In case of standard-fail close)

- When you want to adjust the open position, put air in the left port or, if air is not available, rotate the shaft counterclockwise with a spanner to make it open. (when you want to adjust the close position, do it the other way round) ⇒ If you omit this process, you can not adjust a correct angle and therefore it cannot be assembled correctly, thus causing a breakdown as the headless wrench bolt becomes bent.
- The left bolt is used to adjust the open position and the right bolt is used to adjust the close position. (When it is in the fail-open position, do it the other way round.)
- Using a spanner or monkey wrench, unfasten the ④ nut slightly which you want to adjust.
- If you want to open or close it less, use a wrench to fasten the ① bolt clockwise as required while checking the position of the valve.
- If you want to open or close it more, use a wrench to unfasten the ① bolt slightly counterclockwise and check the angle while turning the shaft with a spanner from time to

time. ⇒ Even in case you want to make this product closed completely to the maximum, it is safe to insert the bolt 1~2 threads more when the bolt touches the stopper. (Do not pull the bolt out completely.)

- If you get the angle you want, fasten the ④ nut tightly by turning it clockwise.
- Put air in the left port and check if air leaks by pouring soapy water at the washer part before using it.

4-3. Caution during Operation

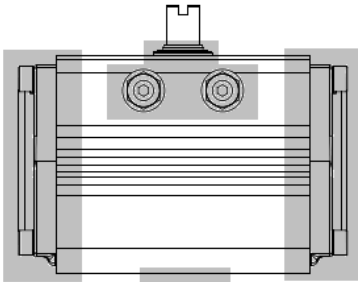
- a. KOSAPLUS Product is designed to open & closed the Valve. Do not use the Product on the purposes other than specified applications.
- b. Ensure not to have the unskilled labors user the Product at own discretion.
- c. Ensure to approach after completely securing the safety when the access to the Product under operation is desired.
- d. When not using the Product over the long period of time, conceal the Air Injection Inlet in order to prevent the infiltration of moisture.

5. Maintenance & Repair

5-1. Self Diagnosis

All the KOSAPLUS Actuators, going through the high pressure test from the development stage, are to be individually & fully tested prior to the shipment from factory. However, in the event the Product oftentimes does not operate with normal condition, execute the Self Diagnosis referring the below table. Nevertheless, if the trouble occurred is not still resolved, contact the KOSAPLUS or authorized Agents for customer service support.

▷ Valve Not Working At All

Check	Result	Cause of Trouble	Troubleshooting	
Remove Actuator & inject air.	Working.	Torque of Valve is higher than that of Actuator.	Install higher capacity model Actuator.	
		Injection air pressure too low.	Increase the Injection air pressure.	
	Not working.	Check Actuator; 1. Paste the soapy water with brush on the shadowy area of the following, and check the presence of air leakage to outside. 2. Paste the soapy water on Section B of flowing injecting air into Inlet A, and check the presence of bubble..		If the air is leaked or bubble is generated, contact the Customer Service Center of KOSAPLUS to replace the O-Ring or receive the Post Order Service.
		Check the Air Injecting Pipe; Possibility of clogging with foreign substances or leaks.		
		Check the Solenoid Valve or electrical devices; Possibility of disconnect or unsuitable voltage.	Contact the Customer Service Center of corresponding manufacturer for service.	

▷ When Valve is Closed Stopping the Opening Process.

Check Item	Cause of Trouble	Troubleshooting
Check the Actuator.	Angle Adjusting Bolt turned inside too excessively.	Use by properly adjusting the Bolt per User's need.
	Injecting Air Pressure too low.	Increase the Injecting Air Pressure.
	Torque of Valve is higher than that of Actuator.	Install higher capacity model Actuator.
	Force of Spring too weak for Spring Return Model.	Contact the Customer Service Center of KOSA ⁺ or authorized Agents.
	Actuator Check; Refer to page 10.	In case of Air Leakage or presence of bubble, contact the Customer Service Center of KOSAPLUS to receive the Post Order Service.
Check Other Connecting Sections.	Check the Air Injecting Pipe.; Possibility of clogging with foreign substances or leaks.	Remove the foreign substances or contact the Customer Service Center of corresponding manufacturer for service.
	Check the Solenoid Valve or electrical devices; Possibility of disconnect or unsuitable voltage.	Contact the Customer Service Center of corresponding manufacturer for service.

5-2. Assembling & Disassembling

The assembling & disassembling of Product should be executed by the Skilled Labors of KOSA+ or authorized Agents to secure the safety of Users and life cycle of Product in principle. However, in the event the indispensable assembling & disassembling of Product at site is desired due to unavoidable reasons, make sure to execute the works only after consulting with the persons in charge of Product of KOSAPLUS or authorized Agents to receive sufficient instructions through e-mail or telephone communications.

▷ Skilled Labor ; Persons who have received the professional trainings of KOSA+ or authorized Agents and recognizes all the potentially dangerous situations. Further, the Skilled Labor must possess all the required knowledge on app applicable laws & regulations with regard to the occurrence of unexpected accidents and other special job site conditions.

※ In the event the addition or variation from the original design of Product are to be desired, make sure to execute the works after consulting with KOSAPLUS or authorized Agents to receive sufficient instructions. KOSA+ does not assume the responsibility for any property damages or personal injuries caused by the User's operating faults or arbitrary design change & improper maintenance works.

6. Customer Service Support Contact

KOSAPLUS Head Office Address: 294, Gongdan2daero, Siheung, Gyeonggi, 15115, Korea

KOSAPLUS Head Office Telephone: + 82-31-433-3159

KOSAPLUS Head Office Fax: + 82-31-433-3151

KOSAPLUS Head Office e-mail: oversea@kosaplus.com // kosaplus@hanmail.net

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