



INSTRUCTION MANUAL

MAXIMIZING VALVE LIFE IN EXCESS OF 3 MILLION CYCLES

SAUNDERS[®] ANGLE SEAT VALVES
APU/AKU SERIES (ASME BPE)
Normally Closed/Normally Open/Double Acting

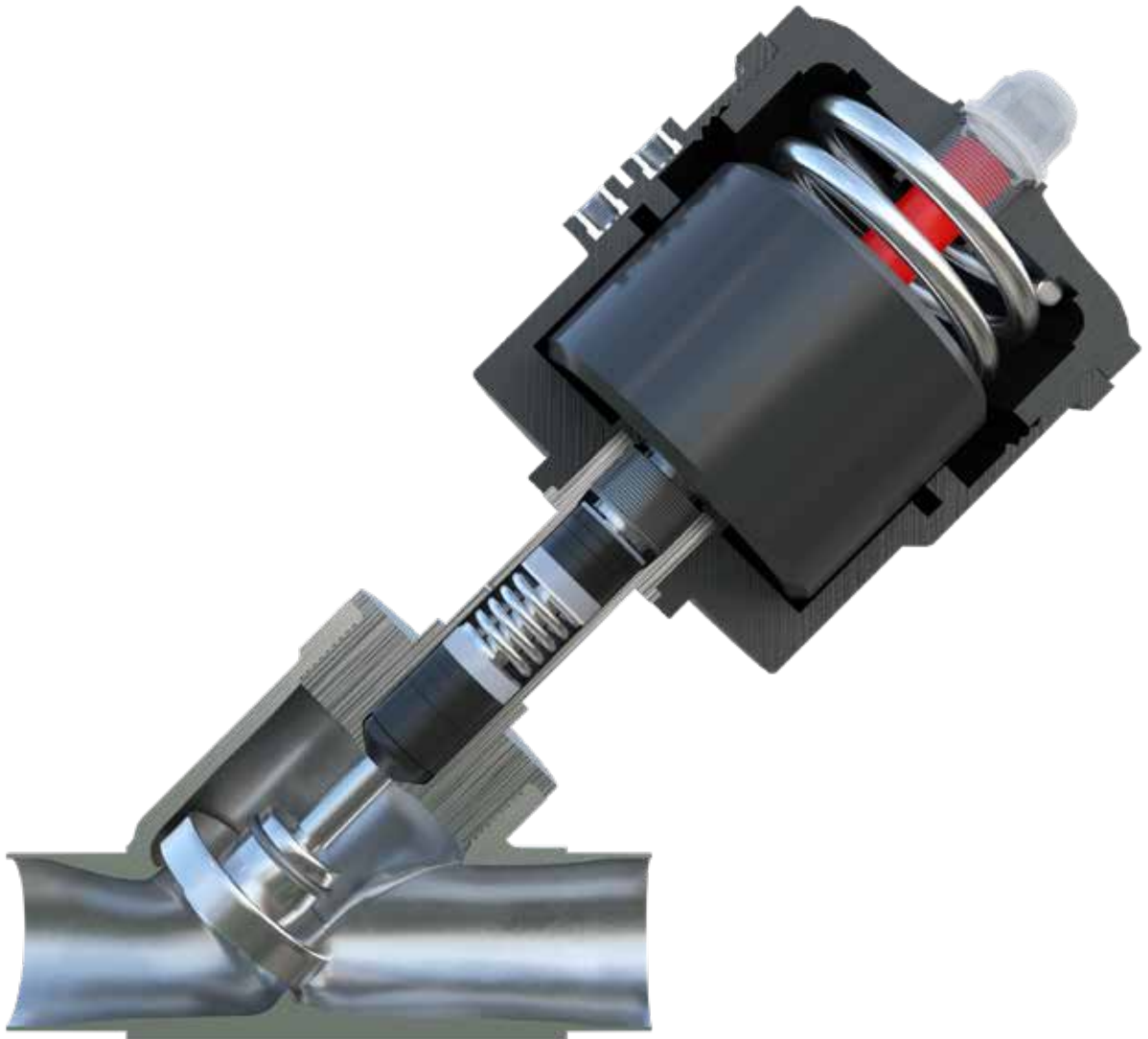
CRANE

v in www.cranecpe.com

Contents

1.	Overview.....	1
1.1.	Product Breakdown.....	1
1.2.	Operating Principle.....	2-3
1.3.	Valve Identification/Marking.....	4
1.4.	Dimensions APU Butt Weld (ASME BPE).....	5
1.5.	Dimensions AKU Clamp End (ASME BPE).....	6
2.	Installation.....	7
2.1.	Storage, Handling & Shelf Life.....	7
2.2.	Installation/Mounting procedure.....	7-8
3.	Pressure Temperature Compatibility.....	8
3.1.	Pressure Temperature Compatibility (APU&AKU).....	8
3.2.	Pressure Temperature Compatibility (PTFE/PEEK).....	9
4.	General Maintenance.....	10
4.1.	Torque Specification.....	11
4.2.	Parts Lists.....	11-12
4.3.	Replace Actuator Assembly.....	13
4.4.	Replace Piston Seal & O-Rings.....	14
4.5.	Replace Repair Kit.....	14-15
4.6.	Replace Seat Assembly.....	15
4.7.	Disposal of Parts.....	15

1.1 Product Breakdown



Components

Serial Number	Description	Material
1	Body	CF3M (SS316L)
2	Indicator Dome	Polycarbonate
3	Operator Cover	Glass filled Nylon
4	Open Indicator	ABS
5	Piston Seal	NBR
6	Insert	SS316L
7	Piston	Aluminium Anodised
8	Piston Spring	Carbon Steel (IS4454 GR II)
9	Piston Inner Spring	Carbon Steel (IS4454 GR II)
10	Operator	Glass filled Nylon
11	Shaft Seal	NBR
12	Hex Assembly	Aluminium hard Anodised
13	Shaft bearing	PTFE/PEEK
14	Gland Packing	PTFE/PEEK
15	Gland Spring	SS 302
16	Sleeve	CF3M (SS316L Cast- 1.4435)
17	Body Seal	PTFE
18	Shaft	SS316L (1.4404)
19	Washer	SS 304
20	Gland Packing Retainer	PTFE
21	Operator Seal	NBR
22	Dome Nut Seal	NBR/Viton
23	Operator Cover Seal	NBR/Viton
24	Hex Flange Nut	Zinc
25	Seal	NBR/Viton
26	Bush	PTFE
27	Bush Seal	NBR/Viton
28	Sleeve Seal	NBR/Viton
29	Seat holder assembly	SS 316L
30	Retaining Ring	SS 302
31	Body Seal	PTFE
32	Shaft Seal	NBR
33	Operator Seal	NBR
34	Dome Nut Seal	NBR/Viton
35	Operator Cover Seal	NBR/Viton
36	Seal	NBR/Viton
37	Bush Seal	NBR/Viton
38	Sleeve Seal	NBR/Viton

Operating Principle

1.2. Operating Principle

F1/F6 Single Acting, Normally Closed

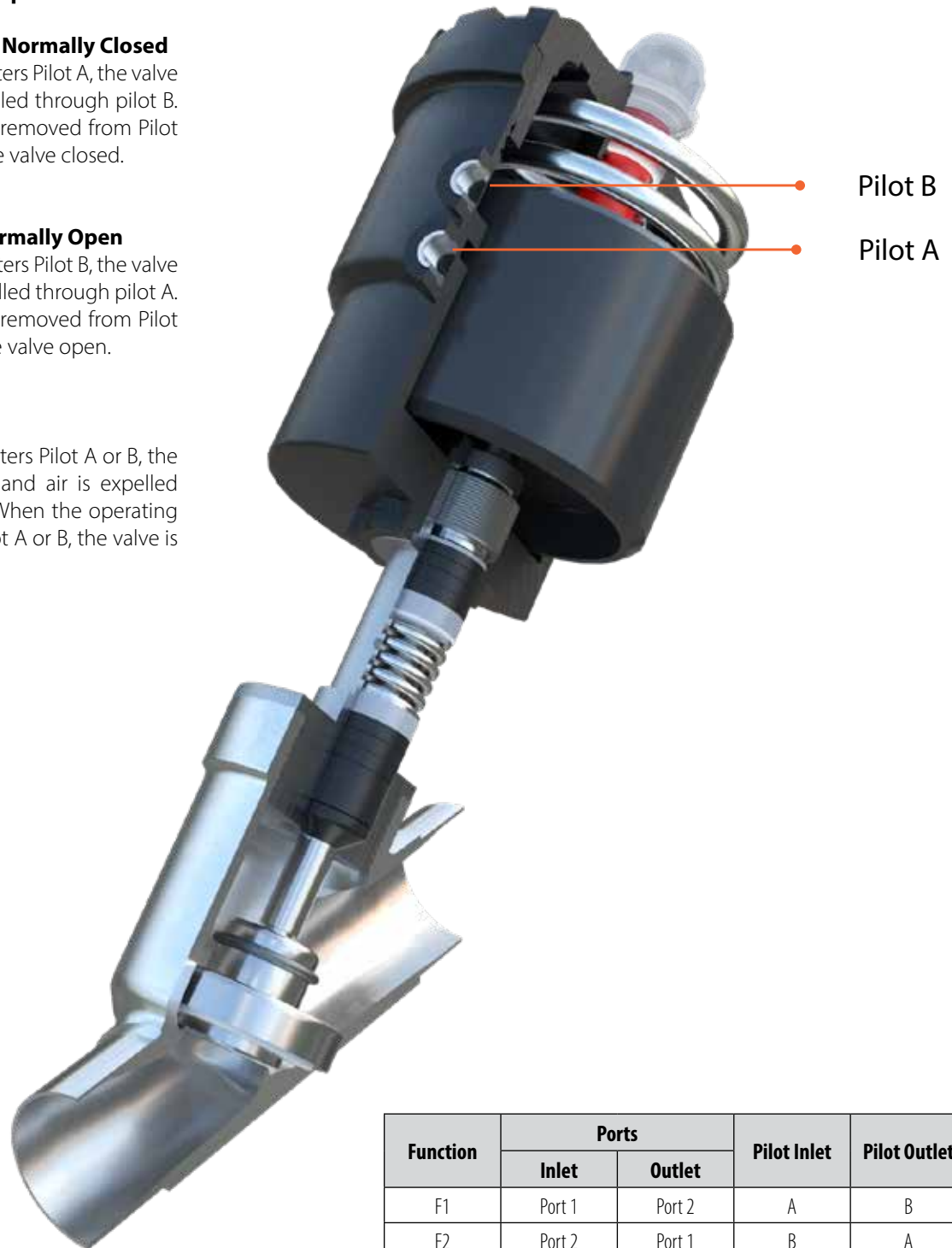
When operating air enters Pilot A, the valve OPENS and air is expelled through pilot B. When operating air is removed from Pilot A, the spring forces the valve closed.

F2 Single Acting, Normally Open

When operating air enters Pilot B, the valve CLOSES and air is expelled through pilot A. When operating air is removed from Pilot B, the spring forces the valve open.

F4 Double Acting

When operating air enters Pilot A or B, the valve OPENS/CLOSES and air is expelled through pilot A or B. When the operating air is transferred to Pilot A or B, the valve is forced open or closed.



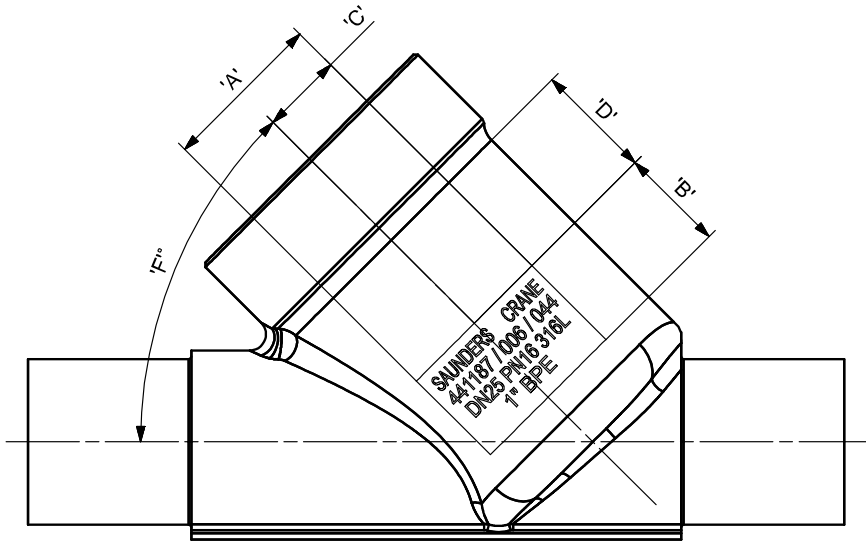
Function	Ports		Pilot Inlet	Pilot Outlet
	Inlet	Outlet		
F1	Port 1	Port 2	A	B
F2	Port 2	Port 1	B	A
F4	Port 1 or 2	Port 1 or 2	A or B	A or B
F6	Port 2	Port 1	A	B

Valve Identification

1.3 Valve Identification

Port Connection

SAUNDERS[®] Angle Seat Valves are available with ASME BPE Weld ends (Code APU) or ASME BPE Clamp (Code AKU).

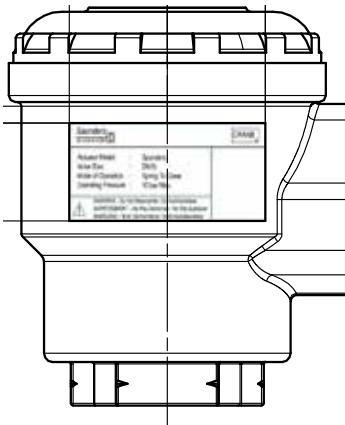





SAUNDERS CRANE
441187 / 006 / 044
DN25 PN16 316L
1" BPE

Body Marking

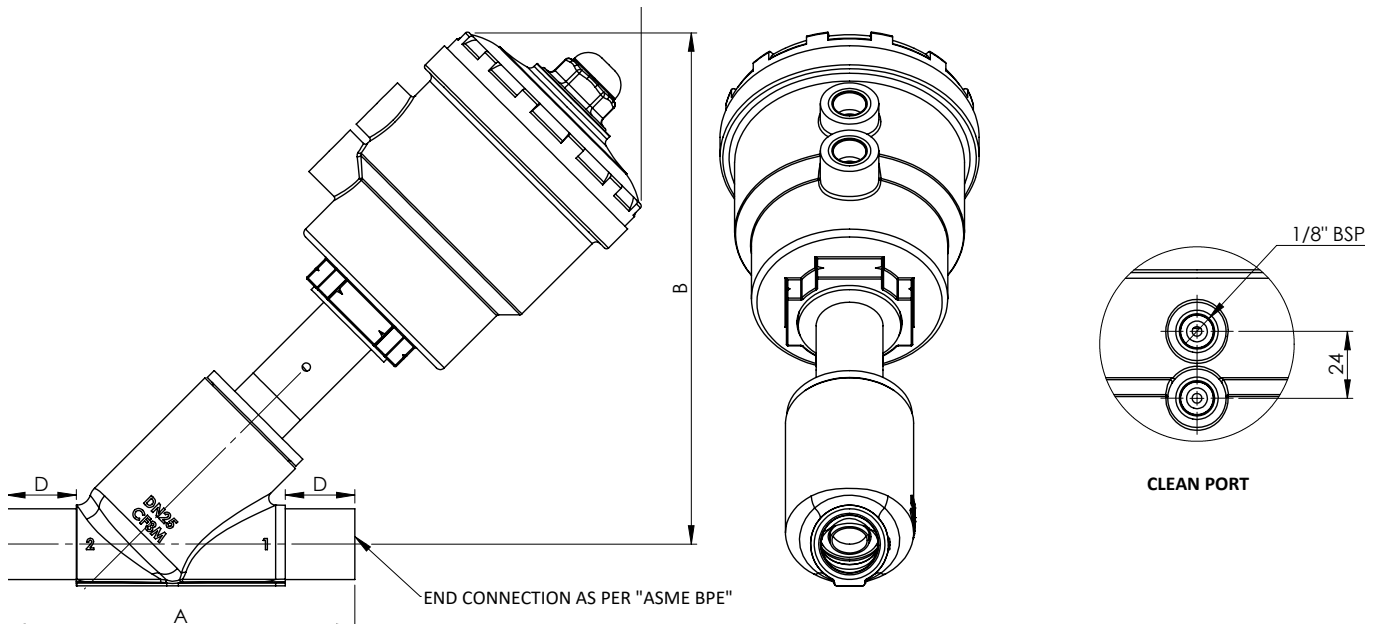
Spring to Close (NC), Spring to Open (NO), Double Acting (DA) modes of operation

Example: Spring to Close Mode DN15



		
Actuator Model	:	Saunders
Valve Size	:	DN15
Mode of Operation	:	Double Acting
Operating Pressure	:	10 bar Max.
 WARNING - Do Not Dissmantle / Do Not Autoclave AVERTISSEMENT - Ne Pas Demonter / Ne Pas Autolaver WARNUNG - Nicht Demontieren / Nicht Autoklavierbar		

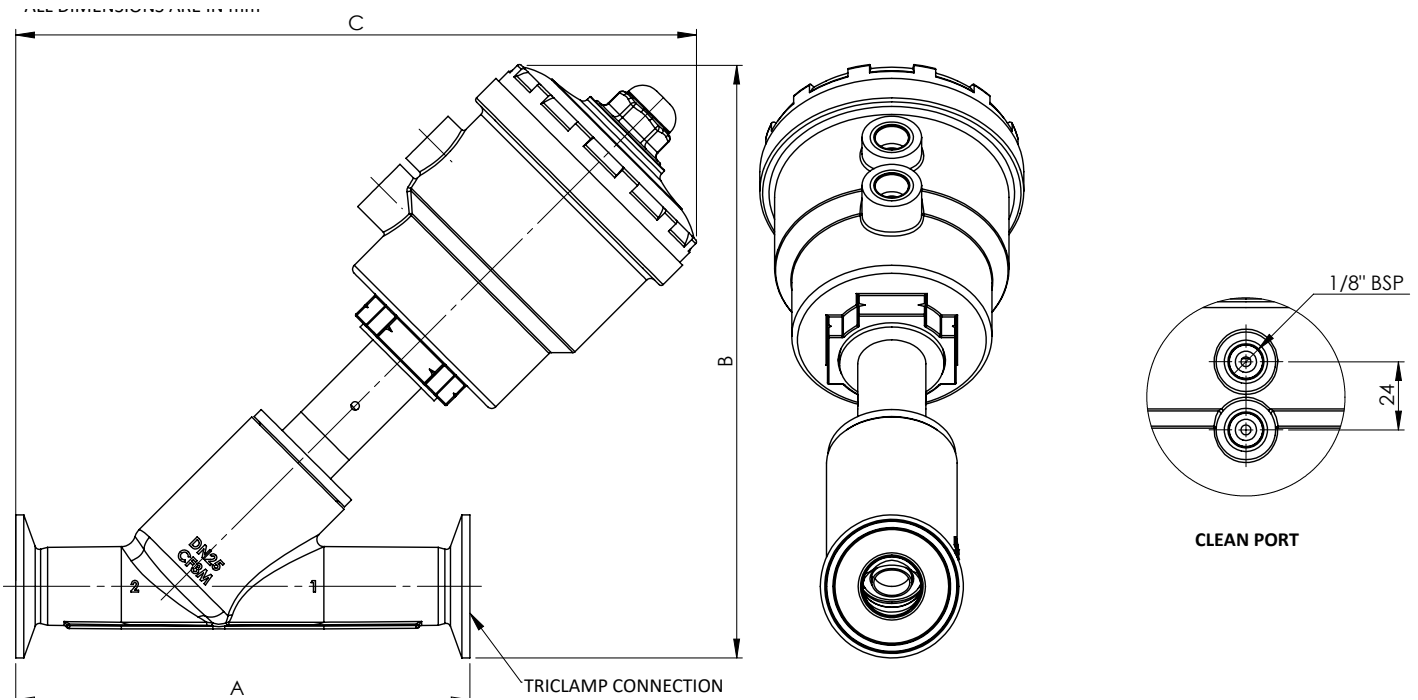
1.4 Dimensions - APU Series (Butt Weld)



Series Number	Valve Size	Dimensions in mm			
		A	B	C	D
1	DN15	113	168	206	25
2	DN20	123	167	209	
3	DN25	125	184	228	
4	DN40	160	221	268	
5	DN50	180	271	325	

Dimensions

1.5 Dimensions - AKU Series (ASME BPE Hygienic Clamp)



Series Number	Valve Size	Dimensions in mm		
		A	B	C
1	DN15	130	180	215
2	DN20	150	179	220
3	DN25	160	209	238
4	DN40	200	247	289
5	DN50	230	303	343

2 Installation

2.1. Storage, Handling & Shelf Life

- Shelf life of the angle seat valve is 3 years from date of manufacture.
- Shelf life of seal kit is 4 years from date of manufacture.
- In storage, keep valve in a cool, dry, dust free environment, and within its protective packaging until installation is required.

2.2. Installation/Mounting procedure

Ensure that:

- Correct handling methods are adopted when lifting product to avoid physical injury and damage to product.
 - The valve is only removed from its protective packaging immediately prior to installation.
 - The valve is supported adequately during and after installation to avoid damage.
 - Both main line and pilot air lines are flushed prior to installation.
 - Airline fitting is of correct material and size with suitable thread type. (Thread type is stated on valve body), to avoid damage to thread.
 - Both inlet and outlet ports are correctly identified to ensure no damage to internal components occurs.
 - The valve is only installed for the line media that it is intended to avoid damage and faulty operation of the valve. In addition, check the compatibility of the media to valve body, seal material and grease used (Molykote 111). If in doubt, consult SAUNDERS[®] for clarification.
 - Never carry out remedial work on valve once installed. i.e. machining of valve body etc. to avoid damage to the pressurised valve.
 - Pressure applied to the valve in service does not exceed the specified limit. This is stated on the valve label/data sheet/catalogue.
 - The temperature of the product does not exceed that stated in datasheet/catalogue to avoid damage to internal seals.
 - The maximum operating pressure of the actuator does not exceed 10 bar.
 - For line media, temperature and seal compatibility contact SAUNDERS[®].
 - Dust caps are fitted to all ports.
 - That body, sleeve and actuator materials are compatible with atmospheric conditions.
- Internal components (wetted) are compatible with the line media passing through the valve.
 - The valve is not stepped on during installation or for the handling of other equipment.

Pressure and Temperature Ratings

3. Pressure Temperature Compatibility

3.1 Pressure Temperature Compatibility (AP/AK Type)

If the valve is to be installed in an area where PED is applicable, the following pressure/temperatures should be followed. For actual operating parameters please refer to technical data sheet and apply lowest value.

Pressure and Temperature Chart								
DN	CLASS	MAXIMUM PRESSURE (bar)						PED Applicable
		-29° C to 38° C	50 °C	100 °C	150 °C	180 °C	200 °C	
15	B40	≤25	≤25	≤25	≤25	≤25	≤25	Not applicable
20	B40	≤25	≤25	≤25	≤25	≤25	≤25	Not applicable
25	B40	≤25	≤25	≤25	≤25	≤25	≤25	Not applicable
32	B25	≤24.5	≤23	≤20	≤19	≤18	≤17	Yes
40	B20	≤19.6	≤19	≤16	≤15	≤14	≤14	Yes
50	B25	≤24.5	≤23	≤20	≤19	≤18	≤17	Yes
65	B40	≤25	≤25	≤25	≤25	≤25	≤25	Yes
80	B40	≤15	≤15	≤15	≤15	≤15	≤15	Yes

Pressure Temperature Compatibility Chart (for AKU)								
DN	CLASS	MAXIMUM PRESSURE (bar)						PED Applicable
		-29° C to 38° C	50 °C	100 °C	121 °C	--	--	
15	B40	13.7	13.4	11.9	11.3	--	--	Not applicable
20	B40	13.7	13.4	11.9	11.3	--	--	Not applicable
25	B40	13.7	13.4	11.9	11.3	--	--	Not applicable
32	B25	13.7	13.4	11.9	11.3	--	--	Yes
40	B20	13.7	13.4	11.9	11.3	--	--	Yes
50	B25	13.7	13.4	11.9	11.3	--	--	Yes
65	B40	13.7	13.4	11.9	11.3	--	--	Yes
80	B40	13.7	13.3	11.2	10.3	--	--	Yes

3.2 Pressure Temperature Compatibility (PTFE/PEEK)

Pressure Temperature Compatibility Chart (for PTFE & PEEK material)								
DN (mm)	MATERIAL	MAXIMUM PRESSURE (bar)						
		-29° C to 38° C	50 °C	100 °C	150 °C	180 °C	200 °C	
15 to 80	PTFE	68	67	48	30	18	---	
65 to 80	PTFE	48	48	48	30	18	---	
12 to 50	PEEK	102	102	102	102	102	68	
65 to 80	PEEK	48	48	48	48	48	48	

General Maintenance

Notes:

1. If valves are to be operated at a higher pressure, or reduced ambient/fluid temperature, refer to following tables or contact SAUNDERS[®], stating the temperature limit at which the valve will operate.
2. Pressure temperature Compatibility chart derived from Table 30 of EN 12516-1. Operating Parameters are in accordance with Table 30 of EN 12516-1.

3. Pressure Temperature Compatibility Chart derived from Table DT-2 Hygienic unions of ASME BPE. Operating Parameters for (AK series) is in accordance with Table DT-2 Hygienic unions of ASME BPE.
4. For temperatures up to 180°C select PTFE (White) seat/seal. For temperatures above 180°C select PEEK (Virgin).

4. General Maintenance

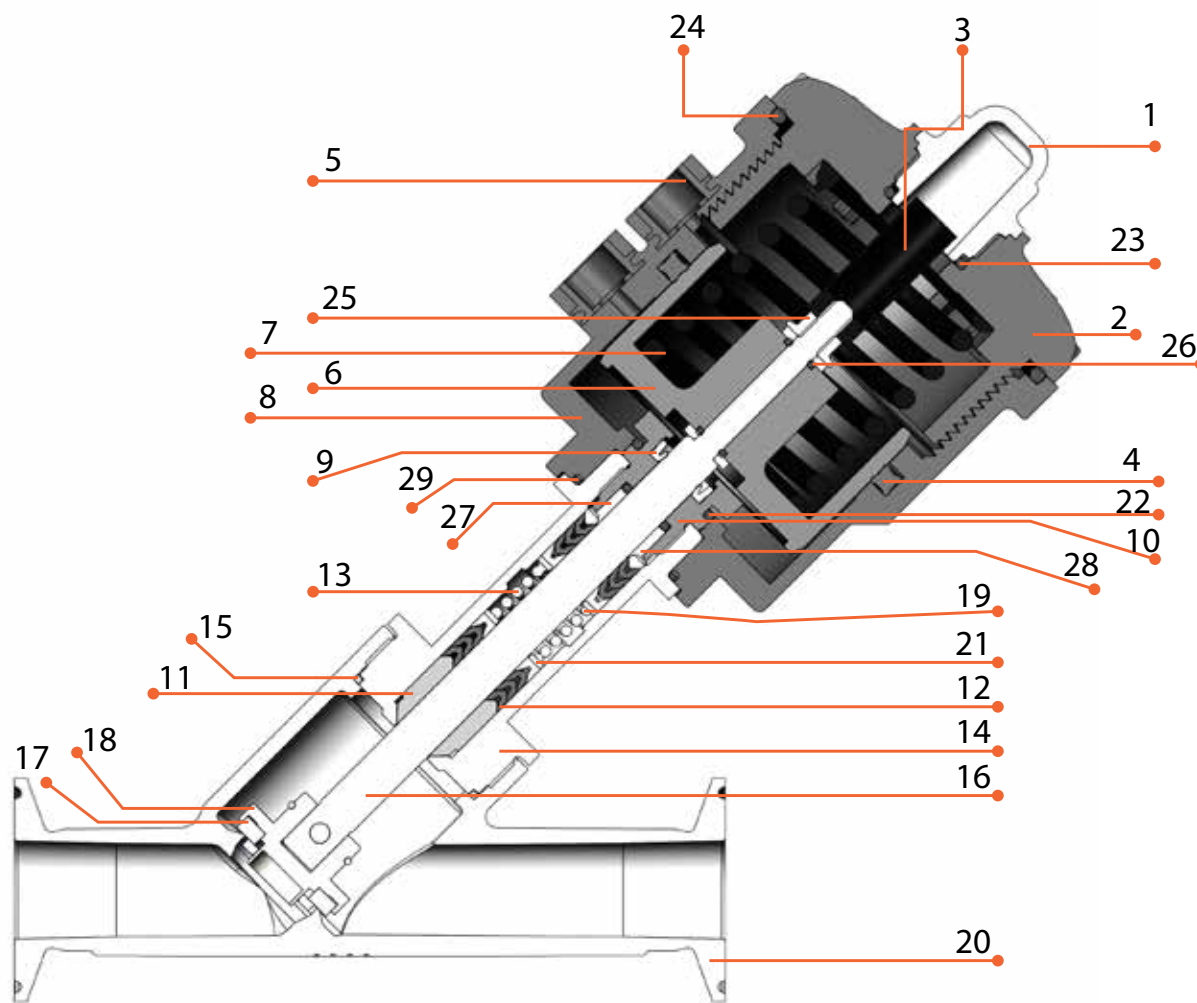
- Do not dismantle or loosen any valve components during service and always ensure that pressure is removed prior to any maintenance taking place to avoid damage to the valve or maintenance personnel.
- Do not perform maintenance on any valve in place. Remove valve from service and undertake maintenance under safe working conditions.
- Always ensure operating air supply is removed prior to removal of the valve from service.
- It is recommended that all seals are replaced in the event of a single seal failure. This will ensure trouble free operation and avoid premature failure.
- It is recommended that only Molykote 111 is used in seal lubrication. The use of any other form of grease will lead to premature failure of the seals.
- The use of a light soap detergent is recommended when cleaning of the valve is required. Do not use kerosene, diesel or petrol to clean.
- Always ensure all components are free from dust, dirt, lint or metal burrs.
- When fitting O-Rings ensure that they are free from twisting and pinching when assembling mating components to avoid damage and failure during service.
- Ensure during assembly that mating parts are pushed together without a twisting motion being applied. This will ensure no damage occurs.
- Genuine Saunders spare parts will ensure trouble free operation and avoid premature failure.
- Always follow the correct mounting/installation procedures when re-assembling valves.
- Use only recommended or specified line media during the operation of the valve to avoid damage to internal valve components and valve body.
- Avoid contact of the valve with excessive external heat, such as those associated with fire, to prevent damage to internal rubber components.

4.1. Torque Specification

Part no.	Part (NW)	Size	Torque (Nm)
16	15/20/25	M6 x 1.0	≤5
	32/40/50/65/80	M10 x 1.5	≤15
14	15	M28 x 1.5	≤90
	20	M32 x 1.5	≤100
	25	M40 x 1.5	≤120
	32/65/80	M48 x 1.5	≤135
	40	M58 x 1.5	≤150
	50	M70 x 2	≤200
	Flange nut-bolt (class-150/300) (NOTE-Stainless Steel having tensile strength greater than 52kg/mm ² or steel fastener grade 8.8 Or better.)	M14 x 2	≤40
		M18 x 2.5	≤90
		M20 x 2.5	≤140

Components

4.2. Parts Lists



Cross section view

Components and Repair Kits

	DESCRIPTION	MATERIAL	Pos. No.	Qty.
Body (Internals)		CF3M (SS316L)	20	1
REPAIR KIT (97)	Consists of Operator, Sleeve, Seat and Seal Kit assembly (Assembled Condi-tion)			
	Indicator Dome	Polycarbonate	1	1
	Operator Cover	Glass filled Nylon	2	1
	Open Indicator	ABS	3	1
	Piston Seal	NBR	4	1
	Insert	SS316L	5	2
	Piston	Aluminium Anodised	6	1
	Piston Spring	Carbon Steel (IS4454 GR II)	7	1
	Piston Inner Spring	Carbon Steel (IS4454 GR II)	7A	1
	Operator	Glass filled Nylon	8	1
	Shaft Seal (#)	NBR	9	1
	Hex Assembly	Aluminium hard Anodised	10	1
	Shaft bearing	PTFE/PEEK	11	1
	Gland Packing	PTFE/PEEK	12	6
	Gland Spring	SS 302	13	1
	Sleeve	CF3M (SS316L Cast- 1.4435)	14	1
	Body Seal	PTFE	15	1
	Shaft	SS316L (1.4404)	16	1
	Washer	SS 304	21	2
	Gland Packing Retainer	PTFE	19	1
	Operator Seal	NBR	22	1
	Dome Nut Seal	NBR/Viton	23	1
	Operator Cover Seal	NBR/Viton	24	1
	Hex Flange Nut	Zinc	25	1
	Seal	NBR/Viton	26	2
	Bush	PTFE	27	1
	Bush Seal	NBR/Viton	28	1
	Sleeve Seal	NBR/Viton	29	1

Maintenance

Seat + Seal Kit (96)	Consists of Seat assembly and seal kit			
Seat holder assembly	SS 316L	17	1	
Retaining Ring	SS 302	18	1	
Body Seal	PTFE	15	2	
Shaft Seal(#)	NBR	9	1	
Operator Seal	NBR	22	1	
Dome Nut Seal	NBR/Viton	23	1	
Operator Cover Seal	NBR/Viton	24	1	
Seal	NBR/Viton	26	2	
Bush Seal	NBR/Viton	28	1	
Sleeve Seal	NBR/Viton	29	1	

4.3. Replace Piston Seal & O-Rings (Kit 96)

1. Remove operator cover (2) at operator (8) from valve assembly by special operator cover opening tool (photo-1)
2. Replace operator cover seal (24) O ring between operator cover (2) and Operator (8).
3. Remove indicator Dome (1) from operator cover (2) by ring spanner.
4. Replace indicator dome (1) O-ring.
5. Remove open indicator (3), hexagonal nut, piston (6), and washer from shaft (16). Replace 2 Orings (26) at piston (6).
6. Replace piston seal (4).
7. Open body (20) from valve assembly. Replace body seal (15).
8. Remove the retainer ring (18) & pin from seat holder assembly (17) and shaft (16).
9. Remove seat holder assembly (17) from shaft (16).
10. Remove hex assembly (10), which assembled with sleeve (14). Dismantle hex assembly (10) by ring spanner. Replace shaft seal (9), O ring inside Hex assembly (10) & O ring between hex assembly (10) & Operator (8).
11. Replace operator seal (22) O ring between Operator (8) and Sleeve (14).

4.4. Replace Seat Assembly (Kit 96)

1. Open body (20) from valve assembly.
2. Remove retainer ring (18) and pin from seat holder assembly (17) & shaft (16).
3. Remove seat holder assembly (17) from shaft (16).
4. Replace new seat holder assembly(17)
5. Assemble seat holder assembly (17) on shaft (16) with Pin and clamp retainer ring (18).
6. Assemble Body (20) in valve assembly.

4.5. Replace Repair Kit (Kit 97 – Operator, Seat and Seal Kit Assembly)

1. Remove the body (20) from valve assembly.
2. Replace the PTFE body seal (15) and attach the body to new valve assembly having all parts except the body.

4.6. Disposal of Parts

1. Please follow the local regulation when disposing the Non-Metallic / Metallic parts like seat seal, O-ring, operator etc.



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