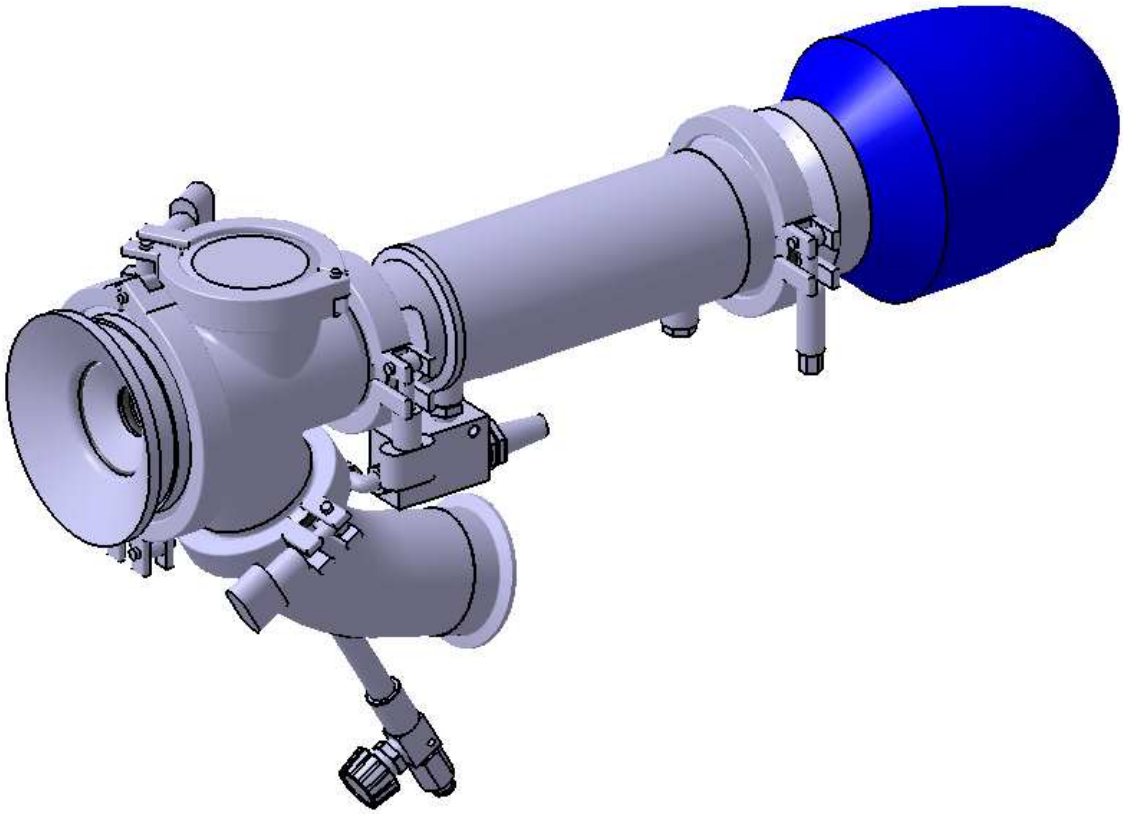
Tetra Pak

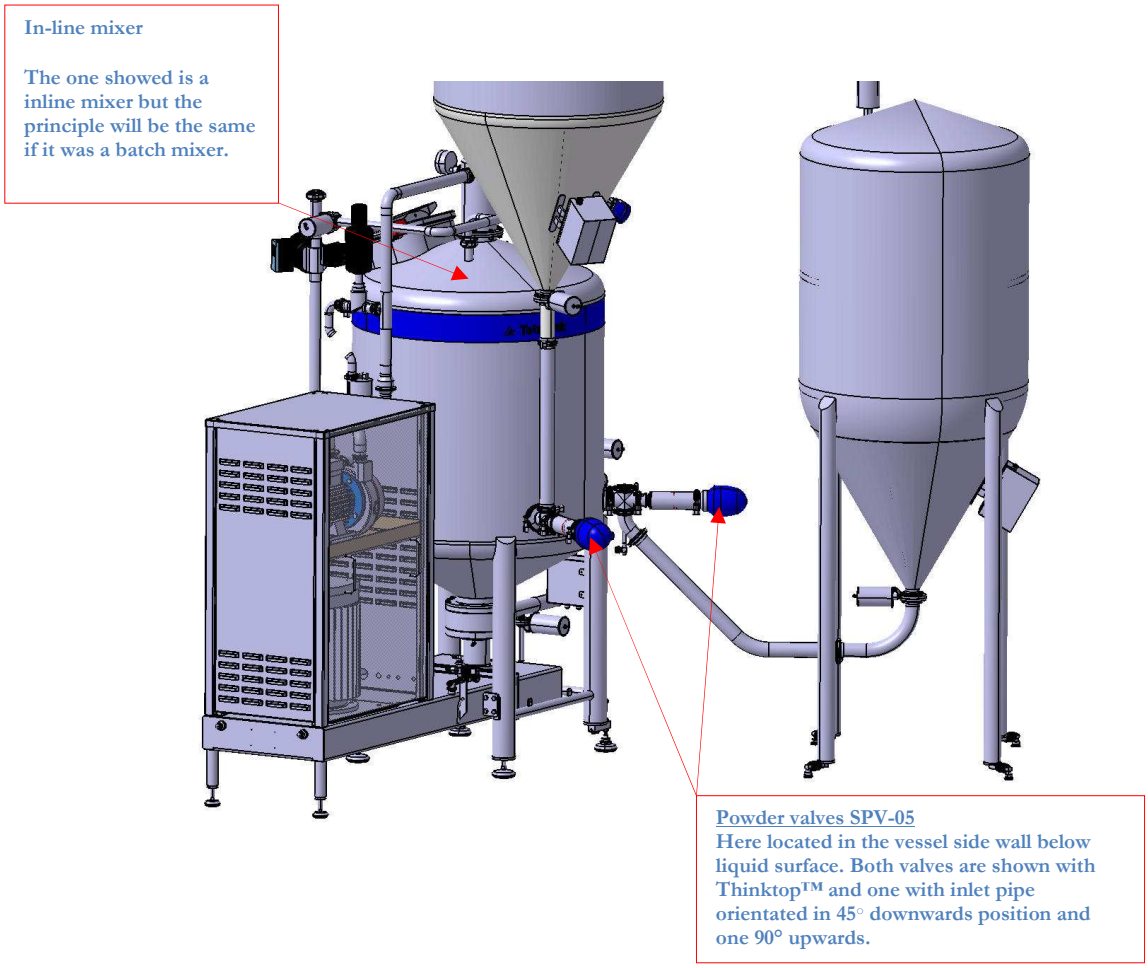
POWDER VALVE SPV-05-2

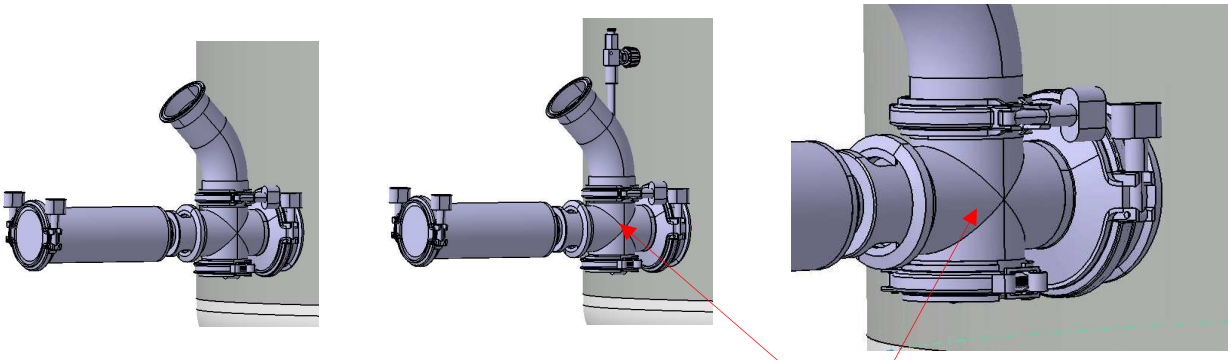


Description

The powder valve SPV-05 is specially designed to work as a separation valve between liquid and powder when feeding powder into a process vessel below the liquid surface. The valve is designed for use in food or pharmaceutical applications. All metal parts in contact with product are made in AISI316L and other metal parts are made in AISI304. Primary seal material is NBR.

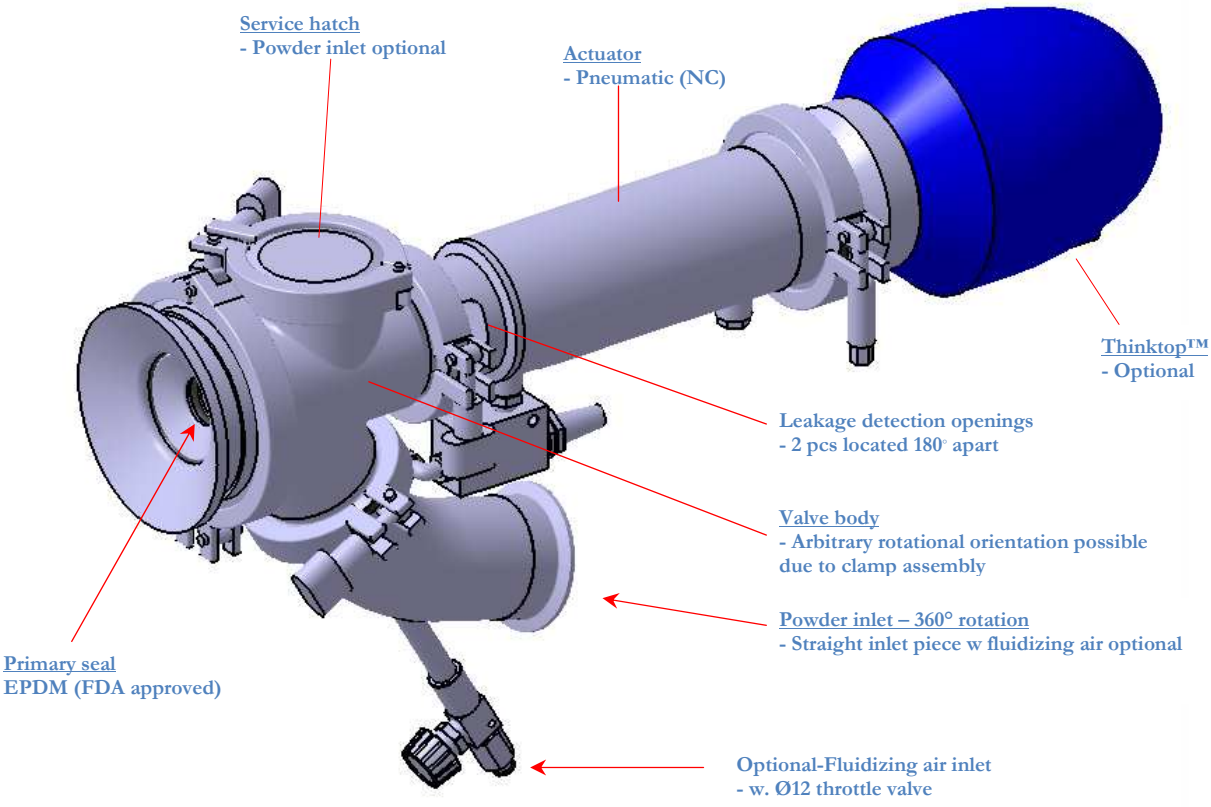
By sucking vacuum in the mixing vessel, powders and additives can be drawn into the system through the powder valve. Normally this valve is located below the liquid surface to ensure immediately mixing of powder and liquid and to avoid that powder escape through the vacuum pump or settling on the inside of the tank walls. The powder valve SPV-05 is designed to handle the sensitive interface between powder and liquid. The valve is able to dose small and large amounts of powders without liquid running back into the powder line and thereby clog up the system. Also the SPV-05 is able to handle powders, which tends to get sticky and harden when coming into contact with liquid or moisture.





The valve housing and thereby powder inlet and service hatch can be rotated 360° for optimum installation flexibility.

The powder valve SPV-05 is a single seat valve with large opening area designed for little pressure drop and minimum restriction of powder flow. All main parts are clamped together to ensure easy and fast maintenance. A large service hatch (Tri-clamp blind plate) allows inspection and/or cleaning of valve body - even during operation. The valve housing and thereby powder inlet and service hatch can be rotated arbitrary for optimum installation flexibility. A fluidizing air inlet valve is incorporated into the powder inlet piece.



Depending on the required powder capacity, the powder valve can be equipped with different piston and primary seal sizes. However the powder capacity depends on several other factors such as powder type, pressure drop in the powder convey line, vacuum level in the mixing vessel, air fluidization etc. Therefore it is necessary to contact Scanima in order to determine the number and configuration of the powder valves required for a specific application.

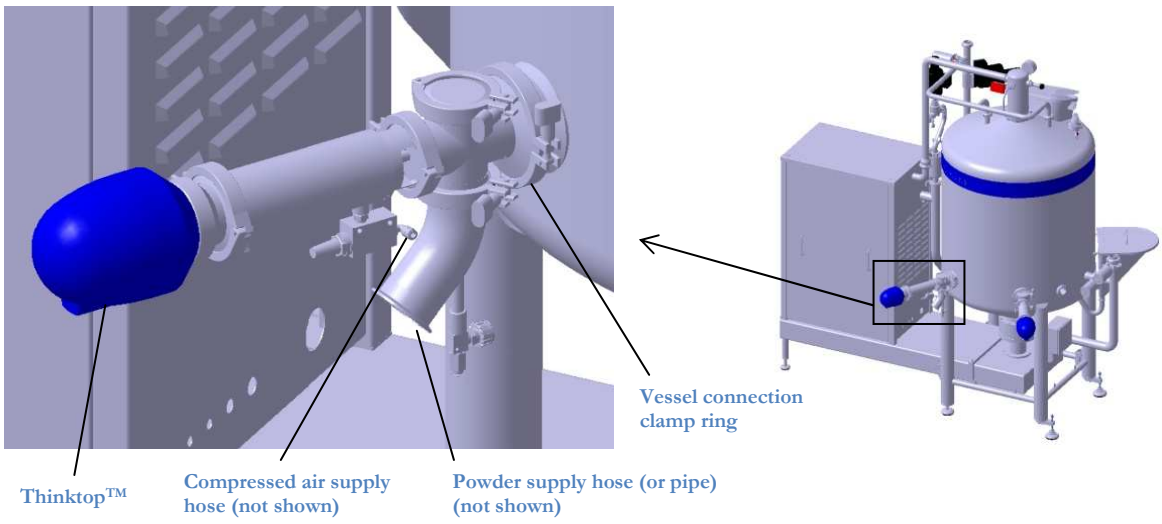
Powder and powder flows are abrasive and therefore maintenance and replacement of product contact seals are more frequent than for a normal liquid process valves. This also means that the time between services varies between all Scanima Powder Valves on the market.

Maintenance and spare parts

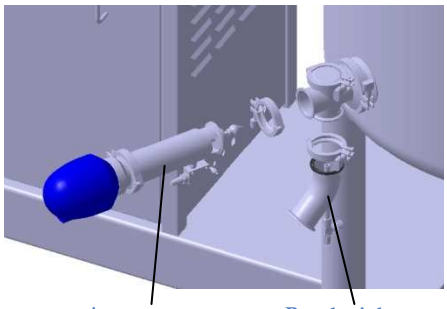
This section describes how to disassemble the powder valve and renew wear parts.

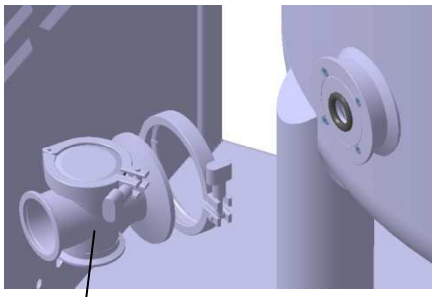
Primary and secondary seal renewal:

Remove the compressed air supply hose. Remove the powder supply hose (or pipe). Remove the vessel connection clamp ring and take away the powder valve. NOTE: If the electrical cable installation it very tight or if the valve is going to be taken away to a workshop, it is necessary to remove the Thinktop™ unit or the electrical connection cables before removing the powder valve. To remove the Thinktop™ unit, turn it counter-clockwise and pull back.



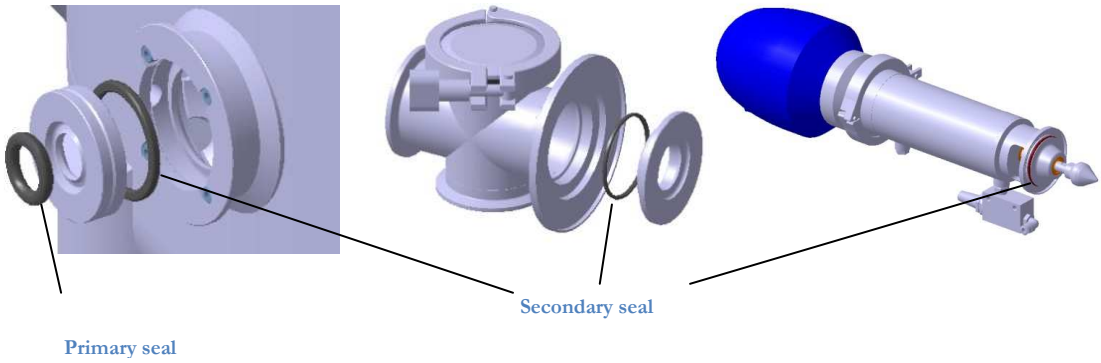
Remove the actuator and the powder inlet. Remove the valve housing.





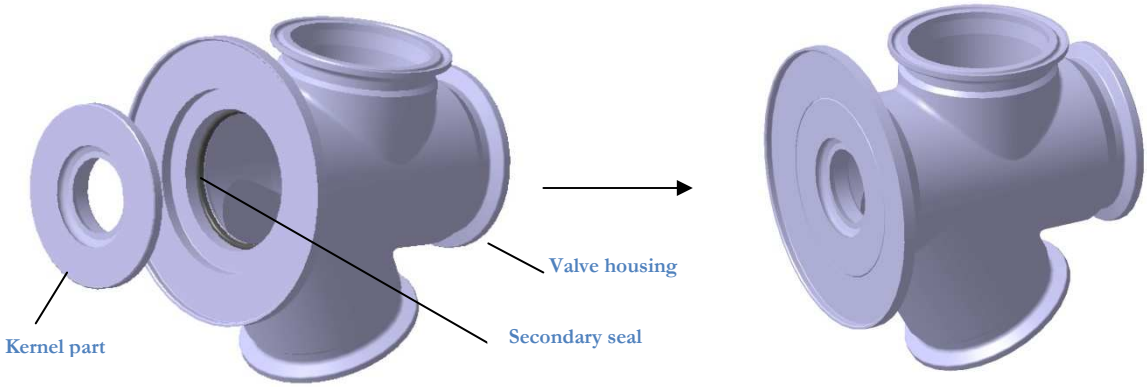
Renew the primary seal. Check the secondary seals and renew if needed.

First place the primary seal onto the vessel.

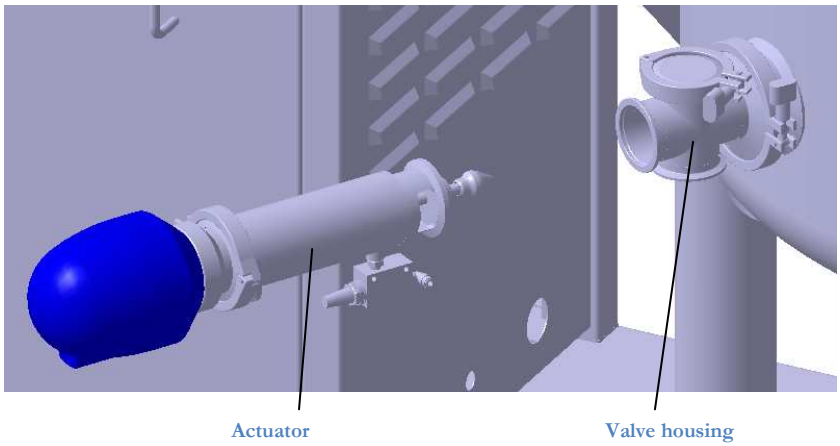


Place the secondary o-ring seal inside the valve housing and fit the kernel part.

NOTE: It can be a good idea to stretch the o-ring before placing it into the valve housing in order to place it correct.



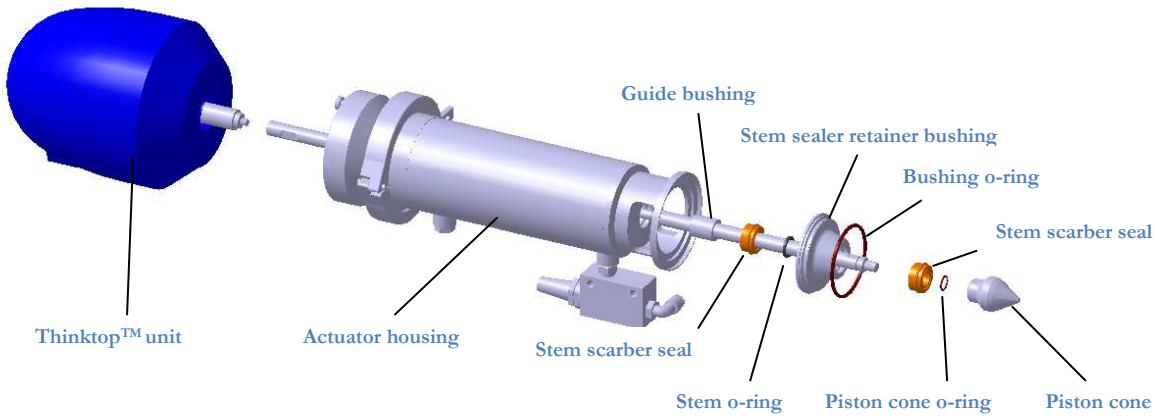
Remount the valve housing on the vessel connection clamp. Remount the actuator on the valve housing.
NOTE: Remounting the actuator might be easier with the valve piston is retracted. To retract the valve piston supply compressed air to the actuator. Remount the powder supply hose (or pipe).



Actuator Seals and Bushing renewal:

Remove the actuator from the valve housing as previously described.

Unscrew and remove the Piston cone and Piston cone o-ring. Remove the Stem seal retainer bushing and renew the Stem scraper seal, Stem o-ring and Bushing o-ring.

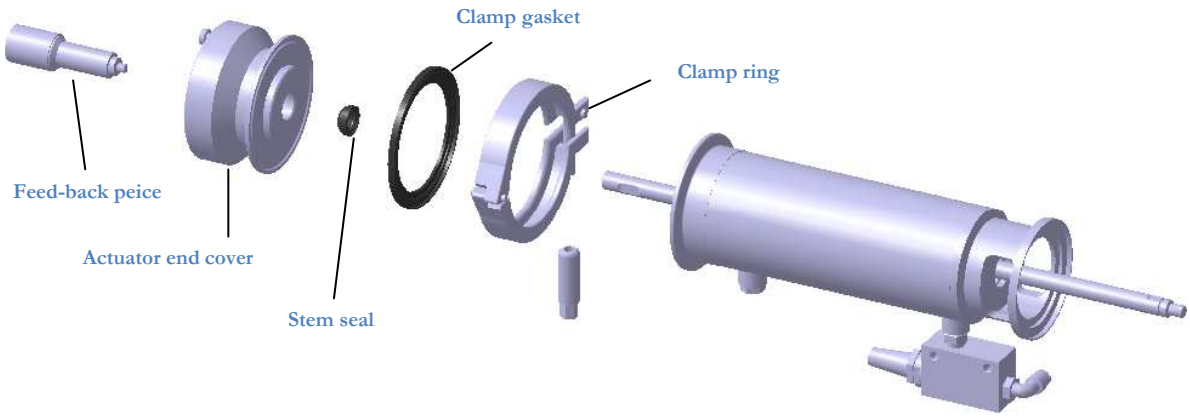


On above picture the disassembly of the actuator and powder seals can be seen.

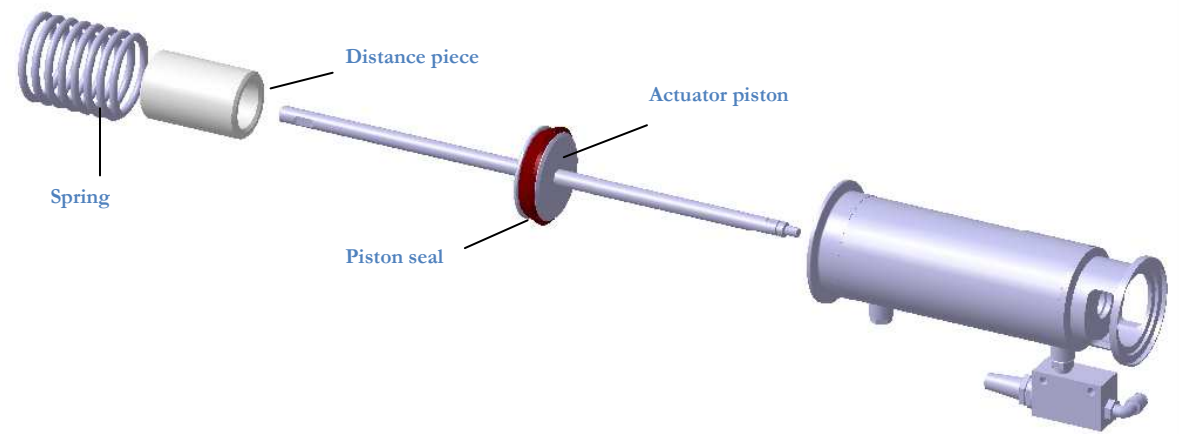
Renew Stem scraper seal and Guide bushing. NOTE: Use a screwdriver or similar to remove the worn Stem scraper seal. The new Stem scraper seal is pushed (clicked) into the recess.

Remove the Thinktop™ unit (turn it counter-clockwise and pull back). Note that the Thinktop™ unit is optional and not always present.

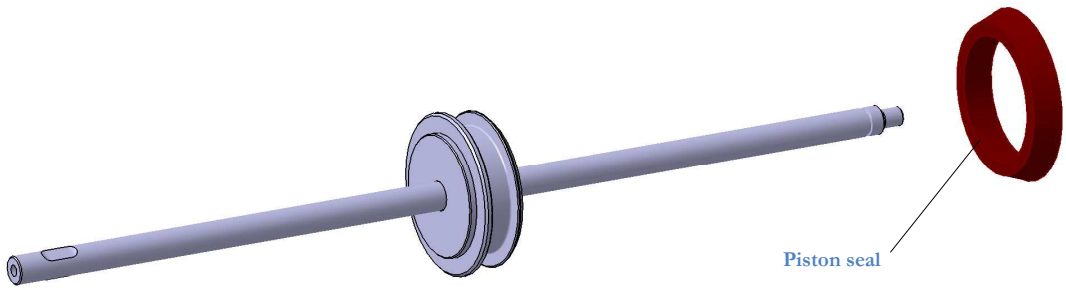
Unscrew and remove the Feedback piece. Remove Clamp ring and Clamp gasket. Remove Actuator end cover and renew Stem seal.



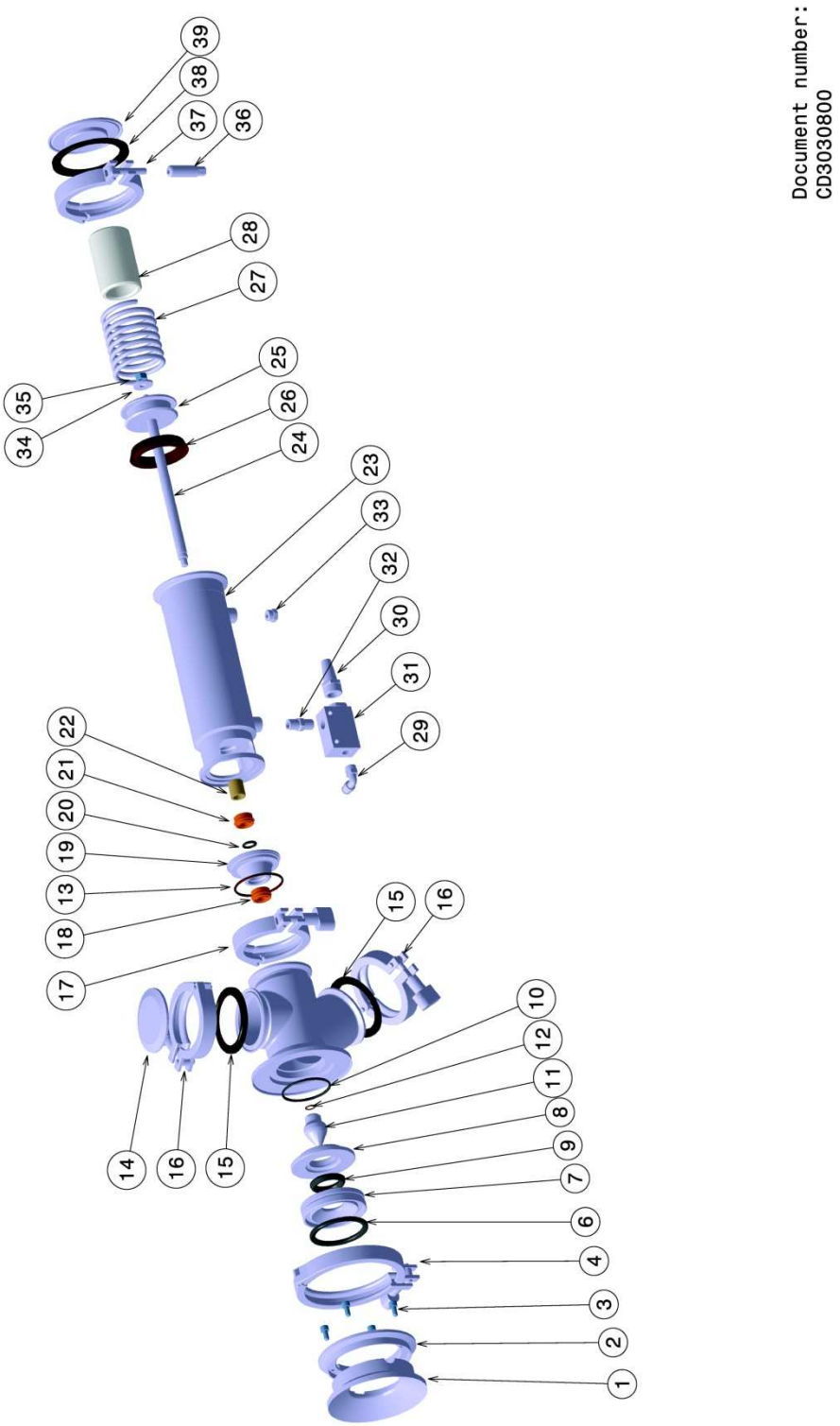
Remove the spring and Distance piece. Pull out the Actuator piston and the Piston seal.



Remove and renew the Piston seal. Note correct orientation before removal.



Spare parts: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Powder valve complete SPV-05-02 Ø26 seat
316, EPDM, 60°connection, No feedback
Connect for fluidizing air not included
TPS Part no: 36000
TP Part no: 90513-2271

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
01		12007	90513-4013	1	Weld in valve type butterfly Ø63,5
02		27761	90512-4972	1	Adapter flange for vessel
03		11144		4	Allen screw A2 M6x12 DIN 912 CHI
04		12141	6-0021105700	1	Clamp Ring 304 Ø101,6
06	Yes	34904	90513-3174	1	O-ring EPDM FDA 3A
10	Yes	34905	90513-3175	1	O-ring EPDM FDA 3A
11		33884	90513-3201	1	Piston cone Ø26
12	Yes	34936	90513-3177	1	O-ring EPDM FDA 3A
13	Yes	34938	90513-3178	1	O-ring EPDM FDA 3A
14		11622	6-9611340602	1	Blind plate Clamp 316 Ø63,5
15		11610	6-9611991361	1	Gasket Clamp EPDM Ø 63,5
16		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
17		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
18	Yes	28413	90503-9642	1	Scraper ring Ø12
19		28405	90513-3197	1	Bursing for housing
20	Yes	13635	90503-9644	1	O-ring NBR
21	Yes	28413	90503-9642	1	Scraper ring Ø12
22		28537	90503-9686	1	Glide bearing
23		30656	90512-4446	1	Actuator housing
24		27757	90512-4435	1	Shaft for powder valve
25		27838	90513-4014	1	Piston for actuator
26	Yes	27650	90503-9647	1	Manchet gasket
27		31545	90510-7872	1	Spring for SPV-05
28		27839		1	Distance for spring
29		11776		1	Super Rapid angel nickleplated Ø6X1/4"
30		25021	90512-5162	1	Silencer
31		24586	90512-5157	1	Quick reliefe 1/4"
32		11492		1	Thread fitting 1/4"-1/4"
33		13505		1	Silencer Half Round
34		11123		1	Washer M8
35		11104		1	Nut A2 M8 DIN 985 6-kt
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
39		27842	90512-4440	1	Cover for cylinder top
5b		34009	90513-4012	1	Housing SPV-05-2 60°connection
7a		33882	90513-3199	1	Kernel for primary seal Ø26
8a		33883	90513-3200	1	Kernel for primary seal Ø26 counterpart
9a	Yes	34906	90513-3176	1	O-ring EPDM FDA 3A

Sparepart kit SPV-05-02 ø26 seat
EPDM, No feedback
(Sparepart kit for 36000)
TPS Part no: **36001**
TP Part no: **90513-2272**

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
09		34906	90513-3176	1	O-ring EPDM FDA 3A
10		34905	90513-3175	1	O-ring EPDM FDA 3A
12		34936	90513-3177	1	O-ring EPDM FDA 3A
13		34938	90513-3178	1	O-ring EPDM FDA 3A
18		28413	90503-9642	1	Scraper ring Ø12
20		13635	90503-9644	1	O-ring NBR
21		28413	90503-9642	1	Scraper ring Ø12
26		27650	90503-9647	1	Manchet gasket
6		34904	90513-3174	1	O-ring EPDM FDA 3A

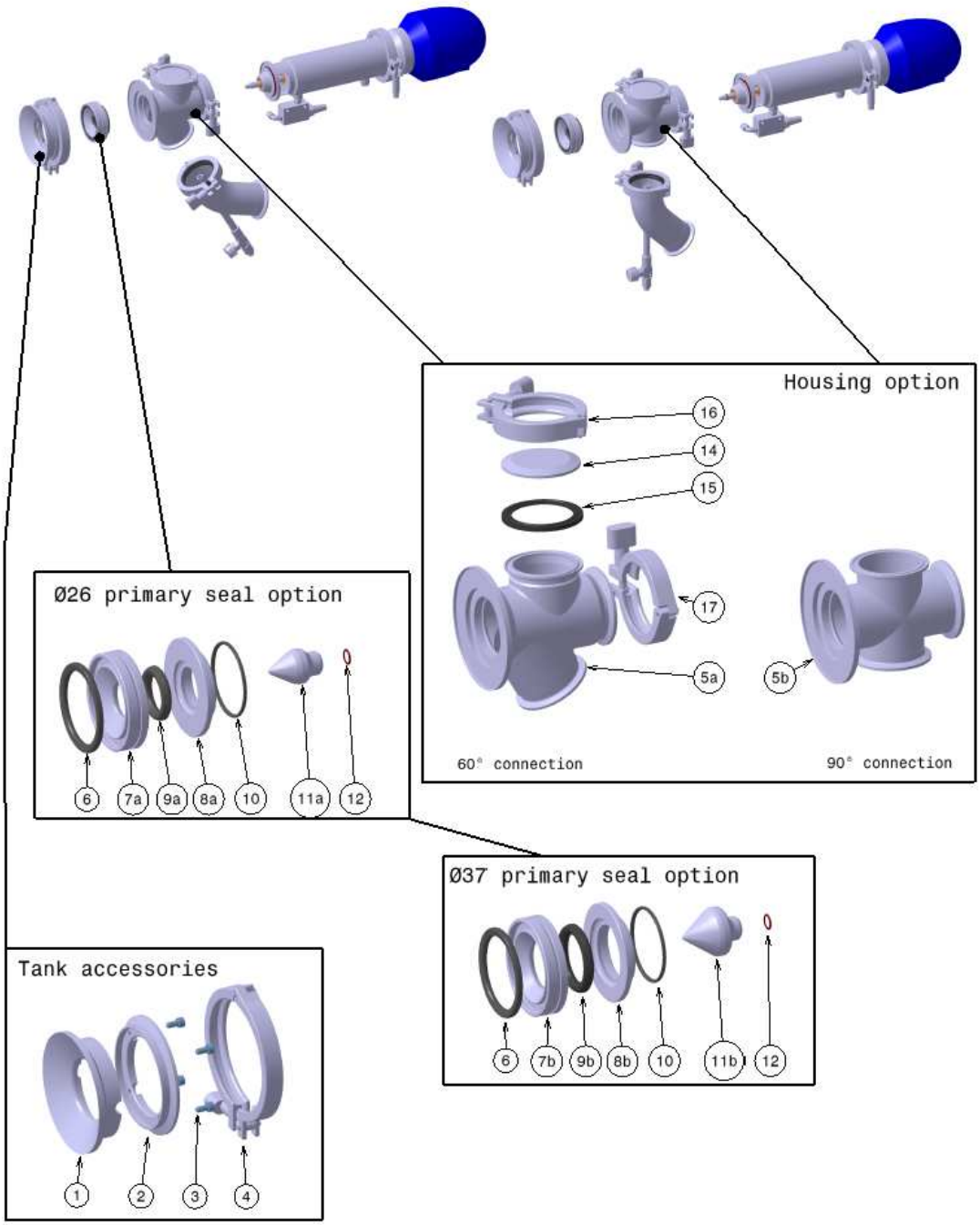
Powder valve complete SPV-05-02 Ø37 seat
316, EPDM, 60° connection, No feedback
Connect for fluidizing air not included
TPS Part no: 36002
TP Part no: 90513-2273

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
01		12007	90513-4013	1	Weld in valve type butterfly Ø63,5
02		27761	90512-4972	1	Adapter flange for vessel
03		11144		4	Allen screw A2 M6x12 DIN 912 CHI
04		12141	6-0021105700	1	Clamp Ring 304 Ø101,6
10	Yes	34905	90513-3175	1	O-ring EPDM FDA 3A
11		34262	90513-3202	1	Piston cone Ø37
12	Yes	34936	90513-3177	1	O-ring EPDM FDA 3A
13	Yes	34938	90513-3178	1	O-ring EPDM FDA 3A
14		11622	6-9611340602	1	Blind plate Clamp 316 Ø63,5
15		11610	6-9611991361	1	Gasket Clamp EPDM Ø 63,5
16		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
17		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
18	Yes	28413	90503-9642	1	Scraper ring Ø12
19		28405	90513-3197	1	Bursing for housing
20	Yes	13635	90503-9644	1	O-ring NBR
21	Yes	28413	90503-9642	1	Scraper ring Ø12
22		28537	90503-9686	1	Glide bearing
23		30656	90512-4446	1	Actuator housing
24		27757	90512-4435	1	Shaft for powder valve
25		27838	90513-4014	1	Piston for actuator
26	Yes	27650	90503-9647	1	Manchet gasket
27		31545	90510-7872	1	Spring for SPV-05
28		27839		1	Distance for spring
29		11776		1	Super Rapid angel nickleplated Ø6X1/4"
30		25021	90512-5162	1	Silencer
31		24586	90512-5157	1	Quick reliefe 1/4"
32		11492		1	Thread fitting 1/4"-1/4"
33		13505		1	Silencer Half Round
34		11123		1	Washer M8
35		11104		1	Nut A2 M8 DIN 985 6-kt
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
39		27842	90512-4440	1	Cover for cylinder top
5b		34009	90513-4012	1	Housing SPV-05-2 60° connection
6	Yes	34904	90513-3174	1	O-ring EPDM FDA 3A
7b		34263	90513-4009	1	Kernel for primary seal Ø37
8b		34264	90513-4010	1	Kernel for primary seal Ø37 counterpart
9b	Yes	34907	90513-4011	1	O-ring EPDM FDA 3A

Sparepart kit SPV-05-02 ø37 seat
EPDM, No feedback
(Sparepart kit for 36002)
TPS Part no: **36003**
TP Part no: **90513-2274**

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
06		34904	90513-3174	1	O-ring EPDM FDA 3A
09		34907	90513-4011	1	O-ring EPDM FDA 3A
10		34905	90513-3175	1	O-ring EPDM FDA 3A
11		34936	90513-3177	1	O-ring EPDM FDA 3A
13		34938	90513-3178	1	O-ring EPDM FDA 3A
18		28413	90503-9642	1	Scraper ring Ø12
20		13635	90503-9644	1	O-ring NBR
21		28413	90503-9642	1	Scraper ring Ø12
26		27650	90503-9647	1	Manchet gasket

SPV-05-02
Housing and primary seal option



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Housing 60°SPV-05-02
TPS Part no: 35133
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
14		11622	6-9611340602	1	Blind plate Clamp 316 Ø63,5
15		11610	6-9611991361	1	Gasket Clamp EPDM Ø 63,5
16		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
17		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
5b		34009	90513-4012	1	Housing SPV-05-2 60°connection

Housing 90°SPV-05-02
TPS Part no: 35134
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
14		11622	6-9611340602	1	Blind plate Clamp 316 Ø63,5
15		11610	6-9611991361	1	Gasket Clamp EPDM Ø 63,5
16		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
17		12139	6-0021105500	1	Clamp Ring 304 Ø63,5
5a		33881	90513-3198	1	Housing SPV-05-2 90°connection

Primary seal Ø26 EPDM SPV-05-2
TPS Part no: 34971
TP Part no: 90513-3206

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
06	Yes	34904	90513-3174	1	O-ring EPDM FDA 3A
10	Yes	34905	90513-3175	1	O-ring EPDM FDA 3A
11		33884	90513-3201	1	Piston cone Ø26
12	Yes	34936	90513-3177	1	O-ring EPDM FDA 3A
7a		33882	90513-3199	1	Kernel for primary seal Ø26
8a		33883	90513-3200	1	Kernel for primary seal Ø26 counterpart
9a	Yes	34906	90513-3176	1	O-ring EPDM FDA 3A

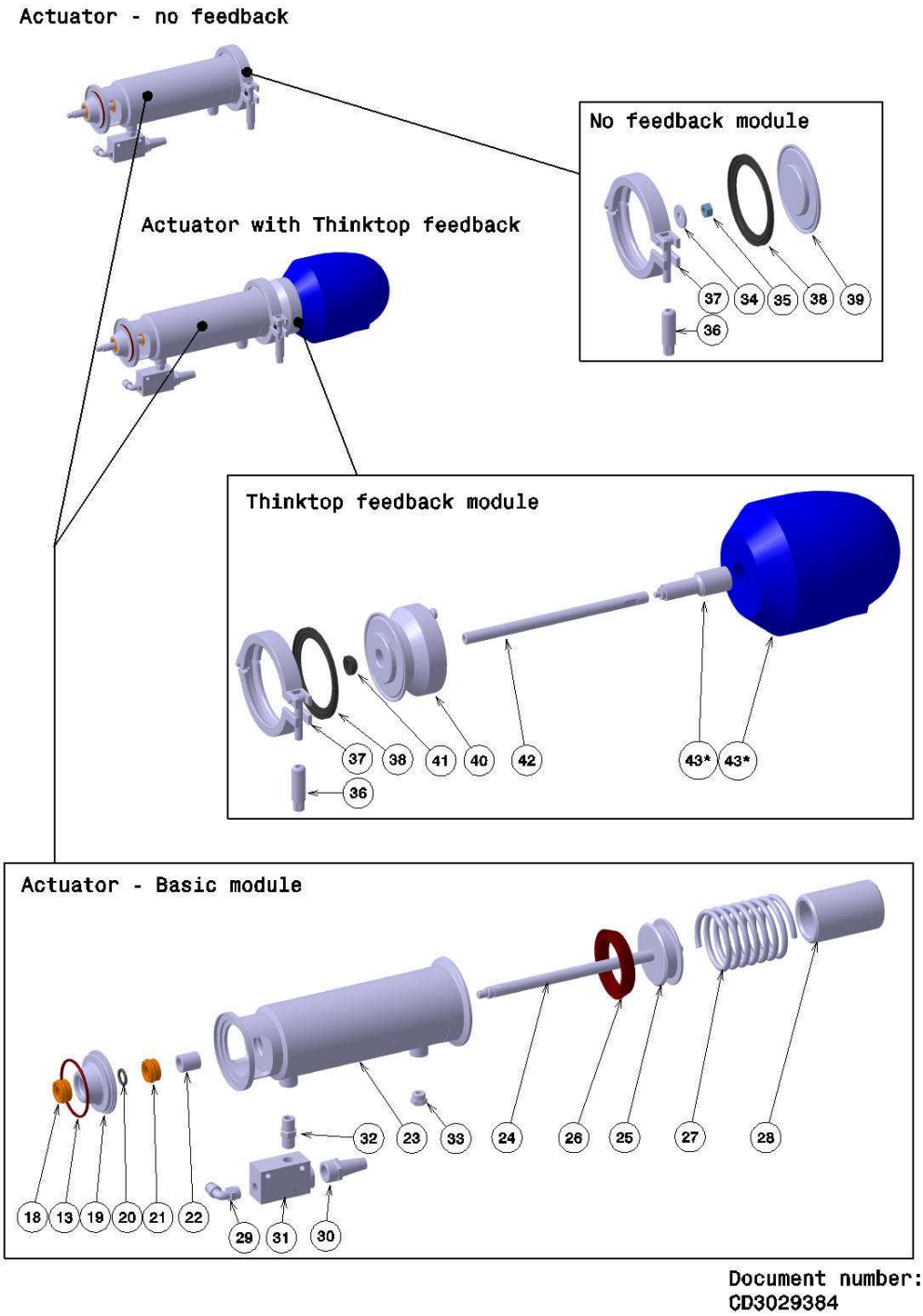
Primary seal Ø37 EPDM SPV-valve
TPS Part no: 34972
TP Part no: 90513-3207

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
10	Yes	34905	90513-3175	1	O-ring EPDM FDA 3A
11		34262	90513-3202	1	Piston cone Ø37
12	Yes	34936	90513-3177	1	O-ring EPDM FDA 3A
6	Yes	34904	90513-3174	1	O-ring EPDM FDA 3A
7b		34263	90513-4009	1	Kernel for primary seal Ø37
8b		34264	90513-4010	1	Kernel for primary seal Ø37 counterpart
9b	Yes	34907	90513-4011	1	O-ring EPDM FDA 3A

Tank Weld in Module SPV-05
TPS Part no: 36343
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
01		12007	90513-4013	1	Weld in valve type butterfly Ø63,5
02		27761	90512-4972	1	Adapter flange for vessel
03		11144		4	Allen screw A2 M6x12 DIN 912 CHI
04		12141	6-0021105700	1	Clamp Ring 304 Ø101,6

SPV-05-2
Actuator with feedback option



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* Optional

SPV-05-2 Actuator - Basic module
TPS Part no: 34624
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
13	Yes	34938	90513-3178	1	O-ring EPDM FDA 3A
18	Yes	28413	90503-9642	1	Scraper ring Ø12
19		28405	90513-3197	1	Bursing for housing
20	Yes	13635	90503-9644	1	O-ring NBR
21	Yes	28413	90503-9642	1	Scraper ring Ø12
22		28537	90503-9686	1	Glide bearing
23		30656	90512-4446	1	Actuator housing
24		27757	90512-4435	1	Shaft for powder valve
25		27838	90513-4014	1	Piston for actuator
26	Yes	27650	90503-9647	1	Manchet gasket
27		31545	90510-7872	1	Spring for SPV-05
28		27839		1	Distance for spring
29		11776		1	Super Rapid angel nickleplated Ø6X1/4"
30		25021	90512-5162	1	Silencer
31		24586	90512-5157	1	Quick reliefe 1/4"
32		11492		1	Thread fitting 1/4"-1/4"
33		13505		1	Silencer Half Round

SPV-05-2 No feed-back module
TPS Part no: 34984
TP Part no: 90513-3208

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
34		11123		1	Washer M8
35		11104		1	Nut A2 M8 DIN 985 6-kt
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
39		27842	90512-4440	1	Cover for cylinder top

Feed-back modoule LKM Thinktop/Basictop
TPS Part no: 34985
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
40		28311	90511-3275	1	Top cover for SPV-05 LKM actuator
41	Yes	27638	90503-9646	1	Scraper ring 12x20x6/8
42		28313	90511-3276	1	Adaptor shaft for Think-top

Feed-back module for GEA T.Vis top
TPS Part no: 34986
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
40		28315	90512-4445	1	Top cover
41	Yes	27638	90503-9646	1	Scraper ring 12x20x6/8
42		28314	90512-4960	1	Adabtor bursing for shaft GEA TVIS

Feed-back module for GEA Ecovent top
TPS Part no: 34987
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
40		27841		1	End cover for SPV-05 GEA Ecovent top
42		28324		1	Adapter shaft for GEA Ecovent top
42-1		27868		1	Part of adapter shaft

Feed-back module for APV Direct connect
TPS Part no: 34988
TP Part no:

Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
36		34272	6-9613023201	1	Hexnut for clamp ring
37		12140	6-0021105600	1	Clamp Ring 304 Ø76,1
38		11611	6-9611991362	1	Gasket Clamp EPDM Ø 76,1
40		28318		1	End cover for SPV-05 APV Direct Connect
41		27638	90503-9646	1	Scraper ring 12x20x6/8
42		28319		1	Adapter shaft APV Direct Connect

Installation and powder convey line

The valve is mounted on a special flange welded into the shell of the mixing vessel below the minimum liquid level. The valve housing and thereby powder inlet and service hatch can be rotated arbitrary for optimum installation flexibility. The powder convey line is connected to the powder inlet piece on the valve housing. As standard the powder inlet piece ends with a 2½" Tri-clamp.

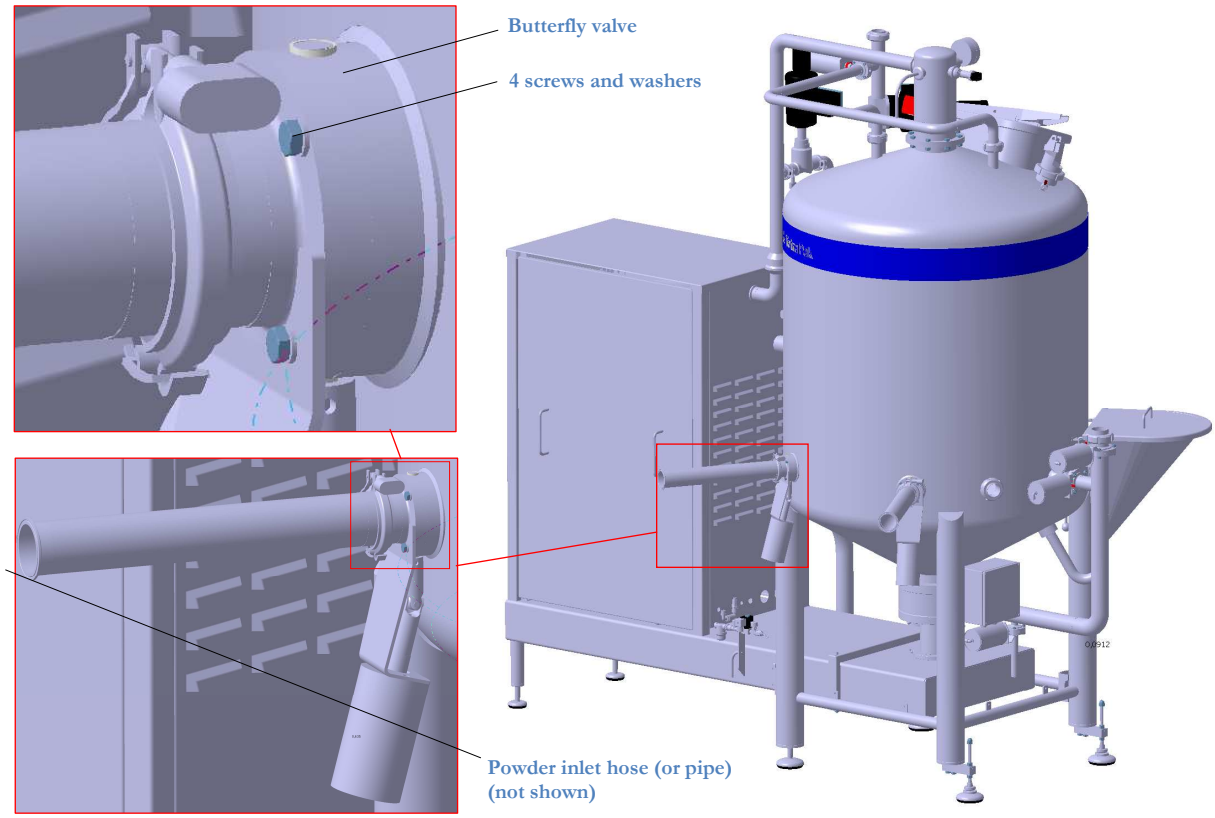
It is very important that the pressure drop in the powder convey line is as low as possible. Therefore the line must be as short as possible with few obstacles and little vertical lift. It is recommended to use a 2½" steel pipe with 1 m transparent flexible hose just before the powder valve. Minimum radius of bends is 400 mm. A free flow of the powder must be secured. If flow stops for whatever reason the product in the mixer can go back in the powder convey line.

Make sure that powder convey line is tight. Air leaks can cause foaming in the mixer. For some powders it is necessary though to bleed in air in order to fluidize the powder and establish a constant flow. But always bleed in as little air as possible due to foaming. Make sure that powder supply is constant. Try to avoid rat holes in the powder funnel e.g. by vibrating the powder silo.

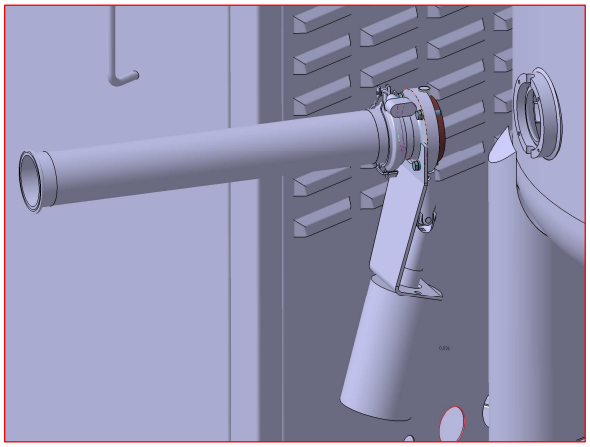
Connect compressed air (6 bar) to the actuator rapid fittings through a 3/2 way solenoid valve or directly to the Thinktop™ unit (if present)

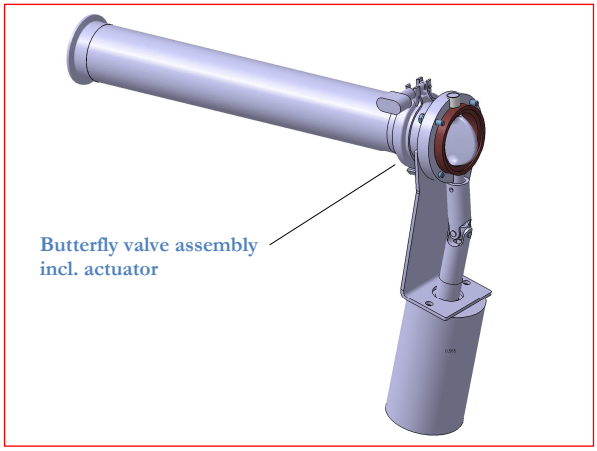
Replacement of butterfly powder valve with SPV-05

This section describes how to replace existing butterfly powder valve with the SPV-05 powder valve. Disconnect the powder inlet hose (or pipe). Remove the four screws and washers holding the butterfly valve

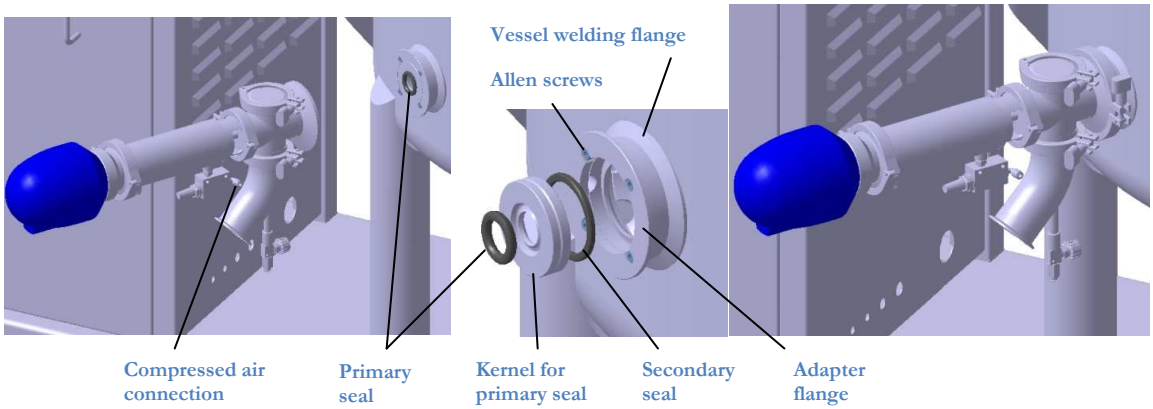


Pull away the Butterfly valve assembly incl. actuator





Mount the Adapter flange on the vessel welding flange using four Allen screws. Fit the Primary seal into the groove in the Adapter flange and Vessel welding flange. Mount the SPV-05 valve on the vessel connection clamp. NOTE: Mounting is easier if the valve piston is retracted. To retract the valve piston supply compressed air to the actuator. Refit the powder supply hose (or pipe). NOTE: The original inlet hose or pipe cannot be used.



Controlling

Basically the SPV-05 valve is an on/off (NC, normally closed) valve. Controlling the powder flow is normally done by pulsing between open and closed position. If a more steady powder flow is required a special control valve must be mounted upstream the powder convey line. IMPORTANT: In order to avoid that product go back into the powder convey line the SPV-05 valve must not be opened unless the minimum vacuum level in the mixing vessel is 0,6 bar(a). If the pressure comes above 0,6 bar(a) the valve must be closed. Also for some powders it is necessary to have a maximum vacuum level setpoint in order to avoid boiling and foaming. The is typical 0,4 bar(a).

Cleaning

Power line and powder valve must be sucked empty after each production in order to avoid residue powder to harden (due to air moisture ect). Also the powder valve must be cleaned manually or by a CIP procedure after each production. It is very important to dry out the powder feed line and powder valve after cleaning!!

CIP-liquids may be sucked through the valve and into the mixing vessel using the vacuum pump on the mixing plant. Alternatively the CIP liquid must be pumped through the powder valve. In this case it is important that the powder valve is open at all time into tank because it is not designed to operate with pressure on the backside of the piston. If using pressurized CIP media to clean the powder valve the pressure must not exceed 3 bars and temperature must be below 90°

Safety instructions

- Always disconnect air supply to valve actuator before doing any service, maintenance or disassembly work on the valve.
- Always disconnect air supply to valve actuator before removing the clamp-on blind cover or sight glass on the valve housing.
- Always disconnect air supply to valve actuator before removing the clamp-on powder inlet feed pipe
- Be aware of spring loaded actuator (normally closed) when doing any service, maintenance or disassembly work on the valve
- Depressurize the process vessel and powder feed line before doing any service, maintenance or disassembly work on the valve.
- IMPORTANT: The powder valve does NOT conform to ATEX directive. Explosion risk analysis of powder must be done prior to using the valve.
- IMPORTANT: When using flexible hoses on the powder feed line the electrical potential must be equalized between inlet and outlet of the flexible hose in order to avoid spark generation from powder flow.
- IMPORTANT: The powder valve must be earthed properly according to local rules in order to avoid spark generation from powder flow.
- In case of damage on the powder valve there is risk of emissions of powder