

Valmet Kappa Samplers SD501, SD502, SD505

Installation & Owner's manual

K06635 V1.1 EN



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Technical specifications

Spare parts

Safety information and warnings



Always check input voltage & frequency before making any connections. Incorrect connections will damage the equipment! Always follow the applicable electric safety regulations in all installation work!



During installation, maintenance and service operations, remember that the sample line may contain hot sample or water – be careful!



Only trained, authorized service personnel may service the analyzer.



The device contains moving parts. Be careful during installation, servicing and testing, to avoid injury.

1. Choosing sampler type

1.1. Principle of sampling

Up to 16 samplers supply sample to the analyzer for Kappa and/or Brightness measurement. The samplers are installed to the process pipeline to extract pulp from the process.

Samples are diluted with water and transported to the analyzer along a sample line, aided by water pressure. Samples can be taken from all post-digester process stages.

1.2. Valmet Kappa Sampler 501

Valmet Kappa Sampler 501 (Valmet SD501) is a piston-type sampler that takes about 0.2 L (0.4 pt) of sample at a time from the process pipeline.

This sampler type is best suited for screened pulps in the consistency range 6 - 15%. Valmet SD501 is an approved pressure vessel up to the pressure of 25 bar (363 psi). See Technical specification for more detailed information of the applications.

1.3. Valmet Kappa Sampler 502/505

The Valmet Kappa Sampler 502 (Valmet SD502) is a flow-type sampler for low consistency pulps, especially for unscreened pulps that may contain shives or chips. It is also well suited for blowline sampling.

The Valmet Kappa Sampler 505 (Valmet SD505) is a flow-type sampler for low consistency processes. It is made of Titanium and is therefore suited for use with pulps that contain chlorine compounds.

Always use the Valmet SD502 when the sample contains chips or shives. Use the Valmet SD505 for pulps containing chlorine compounds, for process consistencies 0.5 - 6% and pressure over 2 bar (29 psi).

When the sampler's piston closes, the sharp edge of the closing part breaks any flocs in the pulp. This ensures that there are no bits and pieces left between the sealing surfaces, and the piston is always able to close completely. The closing part contains no wearing rubber or plastic parts, all its sealing surfaces are made of metal.

Sample flow can be adjusted by changing the stroke length of the piston. The position of the flow opening can be adjusted at 90° steps.



Fig. 1. Valmet SD501 sampler.



Fig. 2. Valmet SD502 sampler.

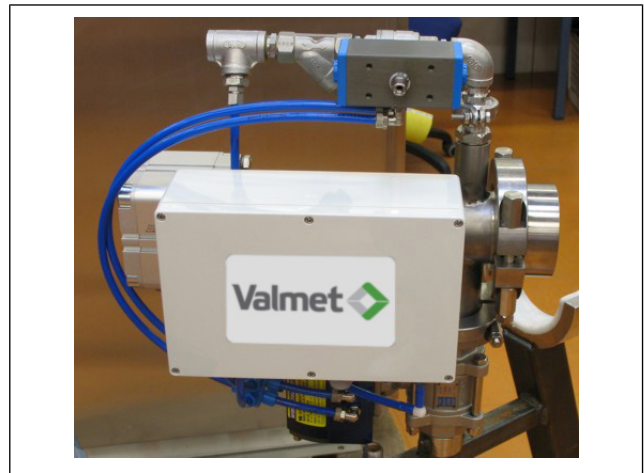


Fig. 3. Valmet SD505 sampler.

Notes

2. Installation site and dimensions

2.1. Required installation space

Choose the installation site so that the sampler can be installed as easily as possible. When necessary, build a service platform in accordance with applicable safety regulations.

NOTE: When choosing the installation site, pay attention to pressure: the process pressure at the installation point must be higher than the pressure of sample transport water!

The installation space required for each sampler type is shown in Fig. 1.

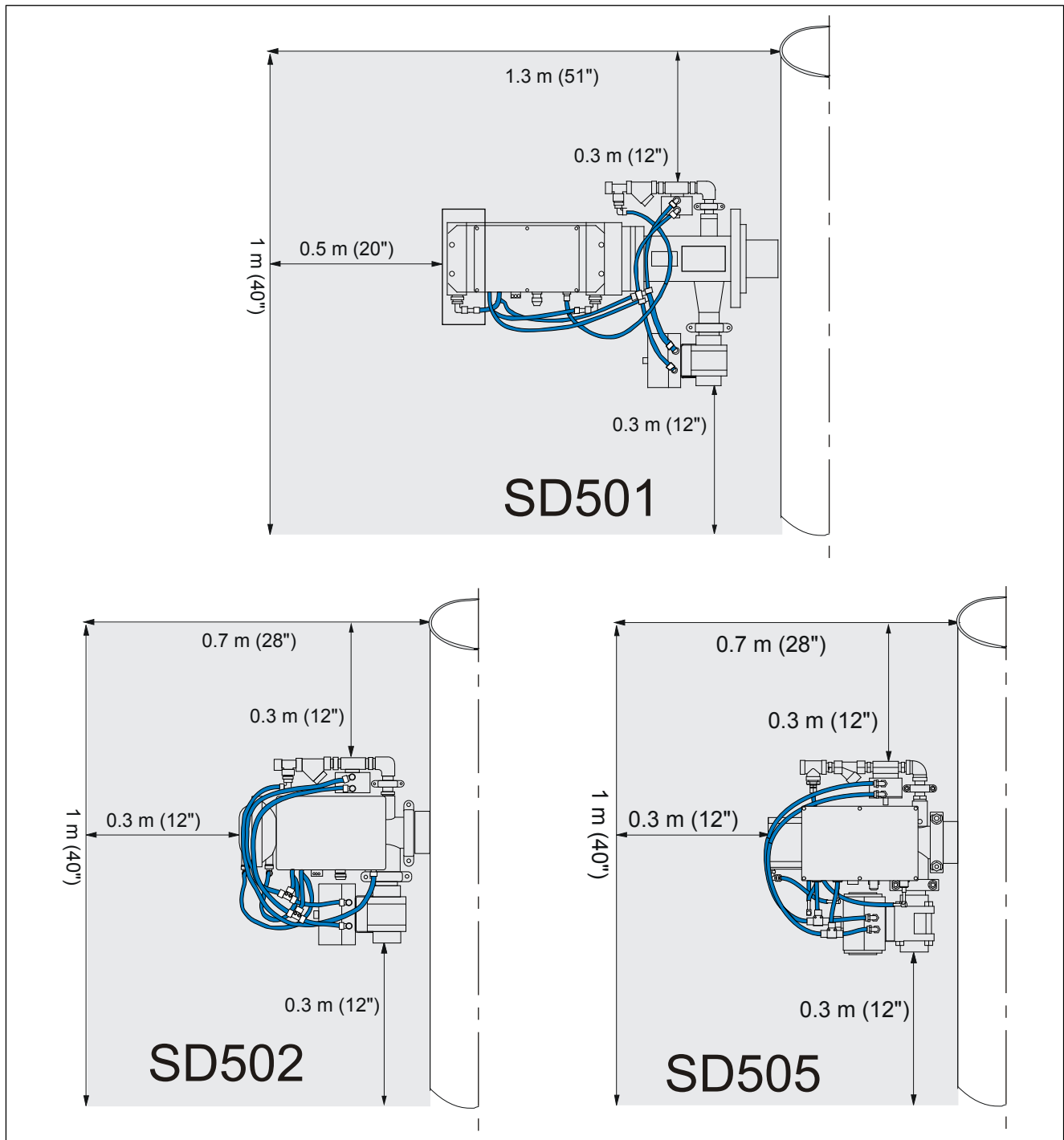


Fig. 1. Installation dimensions.

2.2. Pipeline expansion

If a pipeline expansion is needed, see Fig. 2 for the dimensions. Technical specifications list the applications where a pipe expansion is required.

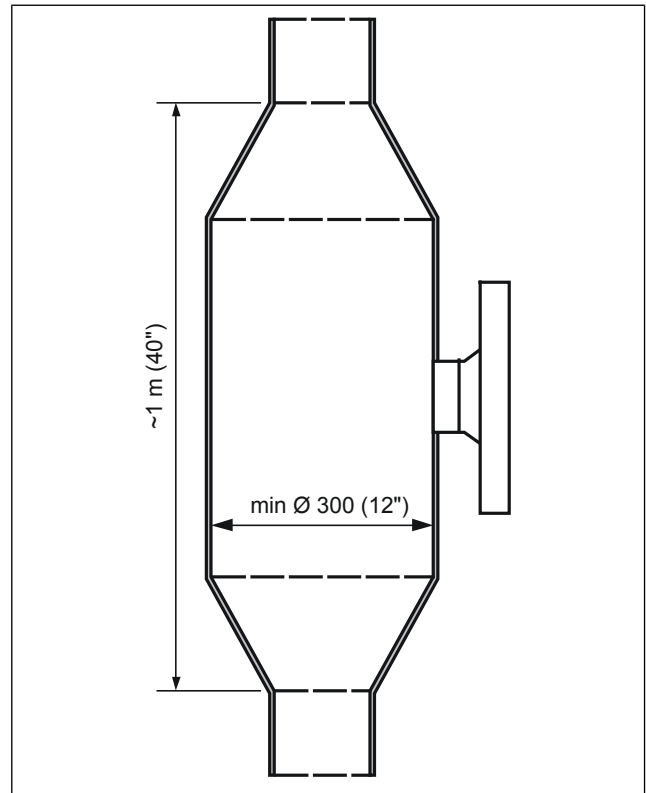


Fig. 2. Pipe expansion to the process pipeline.

3. Process couplings and installation

3.1. Installation of SD501

Process coupling

Make a hole to the process pipe, diam. 114.3 mm (4.5"), and prepare it for welding. Then weld the process coupling firmly to the hole, making sure that the weld reaches all the way through the pipe wall.

The neck flange is shown in Fig. 1, welding instruction in Fig. 2.

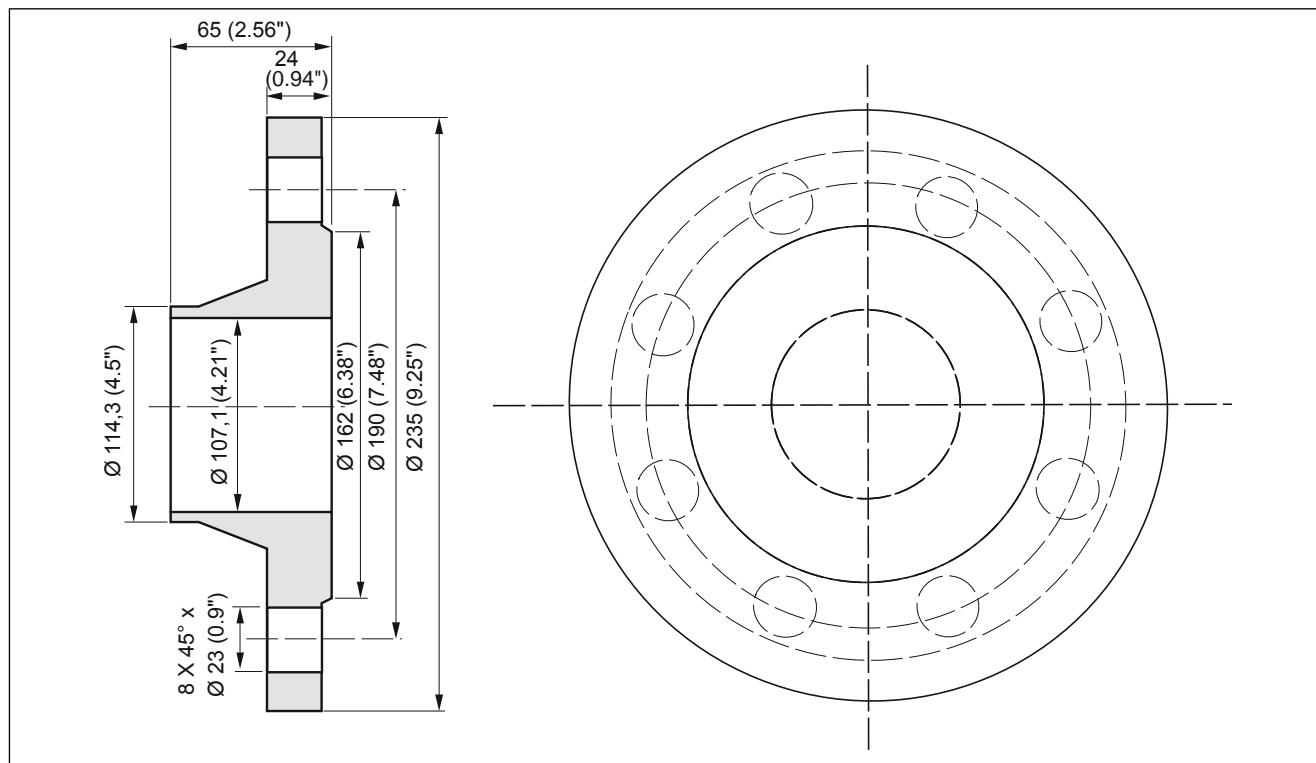


Fig. 1. Valmet SD501 neck flange, DN100, PN40, DIN2635, AISI 316L.

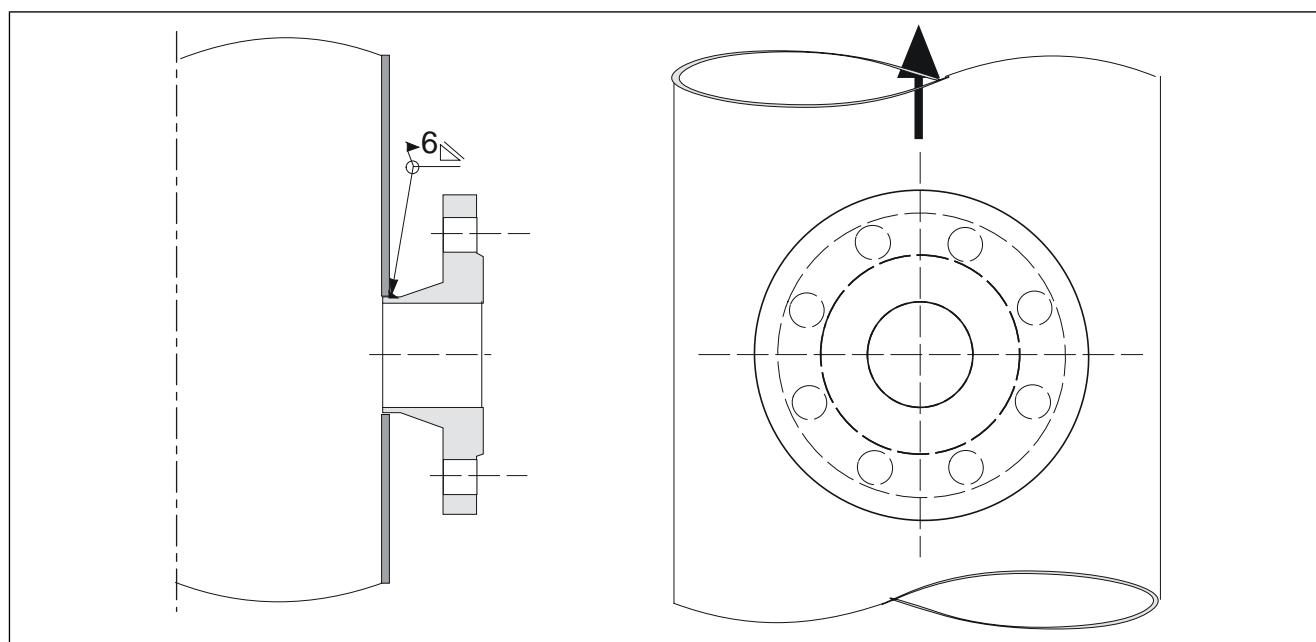


Fig. 2. Welding the neck flange to the process pipe.

Installing

NOTE: Always install the sampler so that its sample delivery valve points down (Fig. 5, part B).

NOTE: The sampler weighs 55 kg (121 lbs). It must always be supported as shown in Fig. 5!

Fig. 4 shows the installation principle of the sampler. Fig. 5 and 6 show installation to vertical and horizontal pipelines.

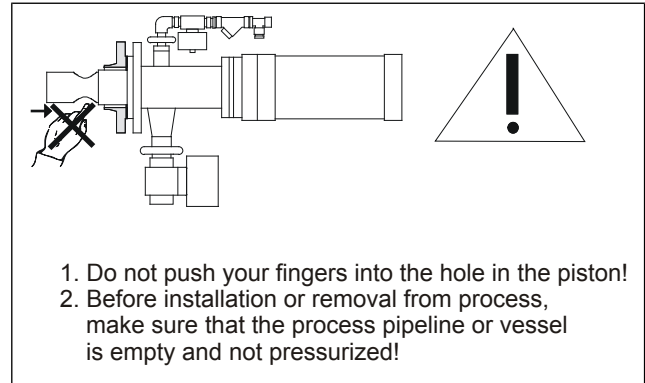


Fig. 3. Valmet SD501 warnings.

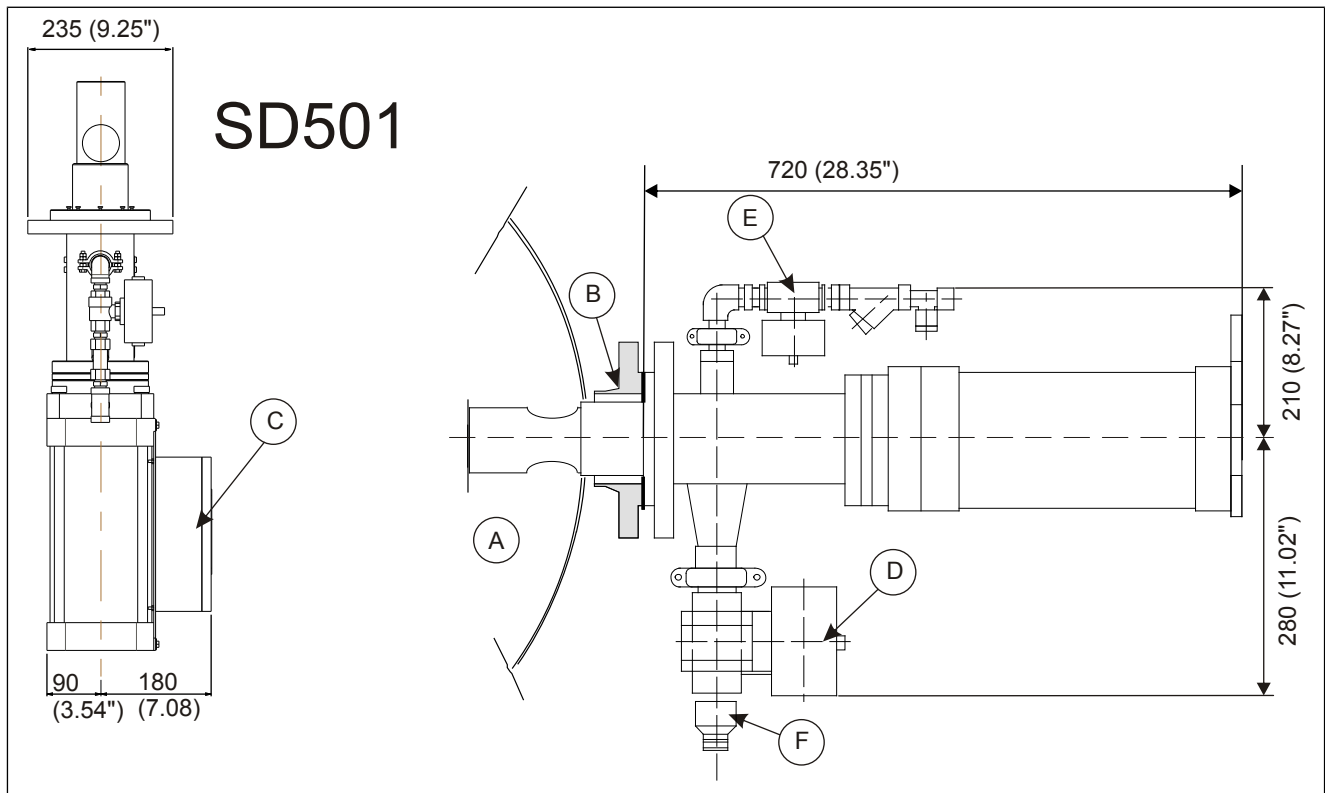


Fig. 4. Valmet SD501 installation principle: A - process pipeline, B - process coupling, C - connection box, D - sample delivery valve, E - transport water valve, F - hose connector of sampler.

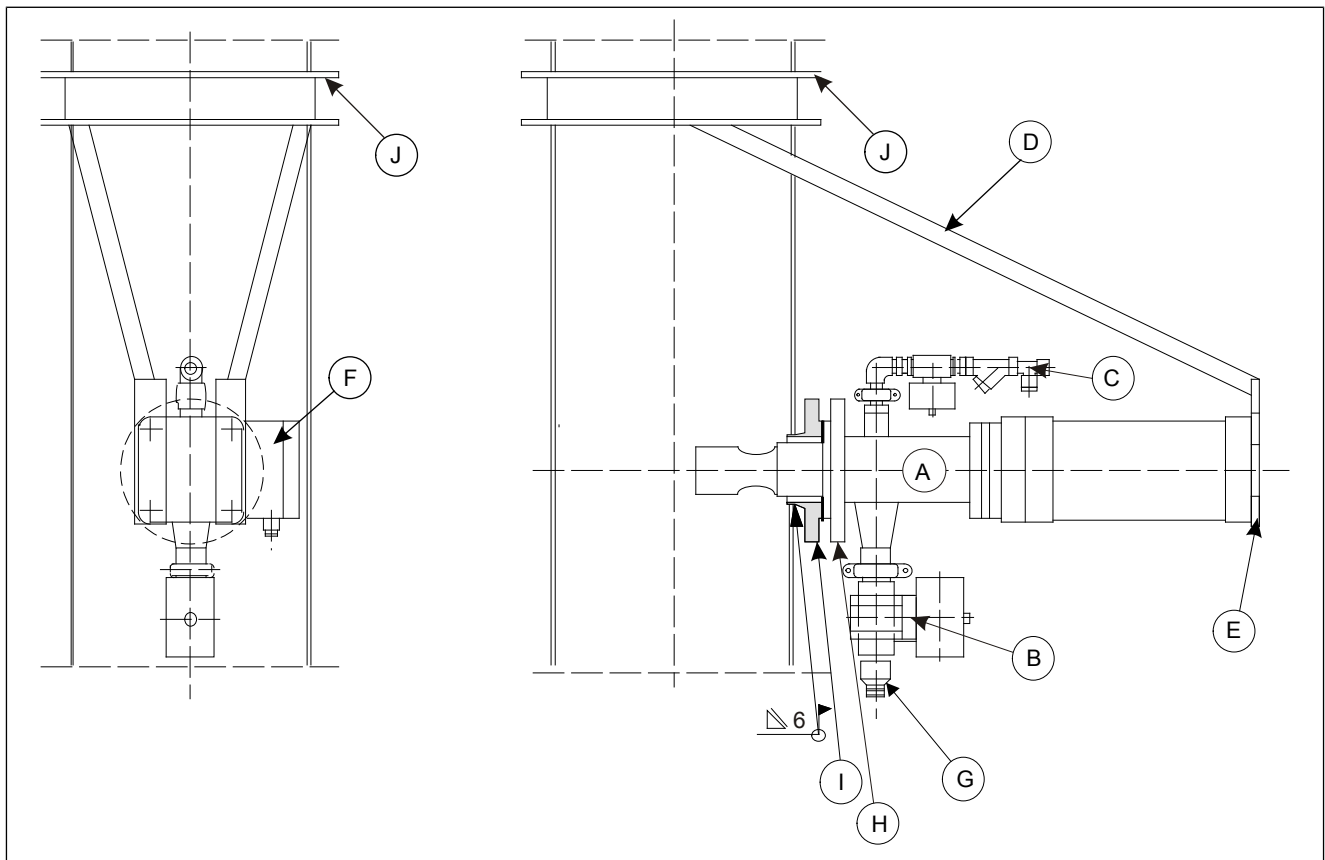


Fig. 5. Installation of Valmet SD501 to a vertical pipeline: A - sampler, B - sample delivery valve, C - water valve, D - support pipe, E - support piece, F - connection box, G - hose connector, H - gasket, I - neck flange, J - pipe clamp.

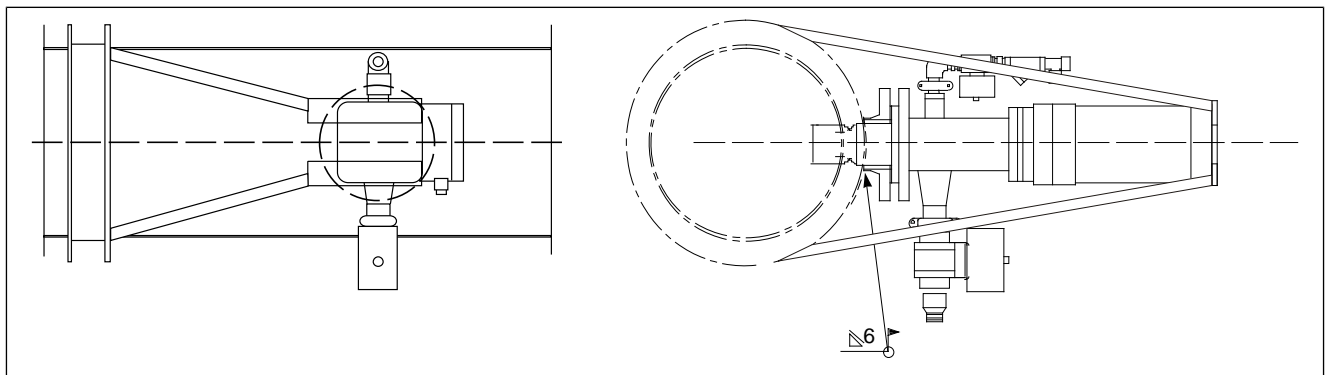


Fig. 6. Installation of Valmet SD501 to a horizontal pipeline.

3.2. Installation of SD502/SD505

Process coupling

Make a hole to the process pipe, diam. 92 mm (3.62"), and prepare it for welding. Then weld the process coupling firmly to the hole, making sure that the weld reaches all the way through the pipe wall.

The process coupling and its welding are shown in Fig. 7. The end of the coupling must be at the same level as the inside of the process pipe.

Installing

NOTE: Always install the sampler so that its sample delivery valve points down (Fig. 9, part E).

Fasten the sampler to the coupling with a mounting clamp (Fig. 9, part A). The process coupling (**Valmet SD502**, AISI 316; **Valmet SD505**, Titan) and mounting clamp are delivered with the sampler.

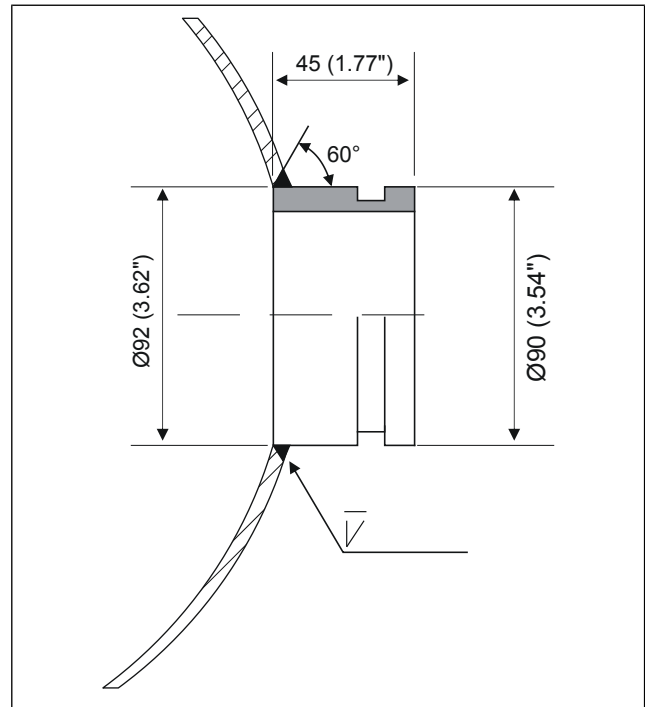


Fig. 7. Process coupling Valmet SD502: Aisi 316L H4500594, process coupling Valmet SD505: Titan GRD2 H4500867.

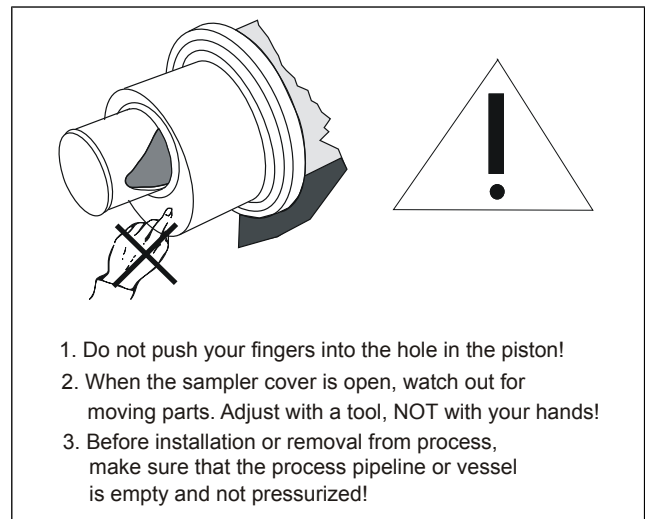


Fig. 8. Valmet SD502/SD505 warnings.

Supporting the sampler

NOTE: SD502 weighs 15 kg (33 lbs), SD505 weighs 12 kg (26.5 lbs). The sampler must be supported against the process pipeline with a clamp (Fig. 9, part A) and support pipes (B). Diameter of the support pipes e.g. 40 mm (1.5").

Replace the actuator mounting screws with longer ones, and attach the support pieces with the same screws. See Fig. 9.

- SD502: M10x20 → M10x40
- SD505: M6x100 → M6x120

Fig. 10 and 11 show the installation principle of samplers SD502 and SD505.

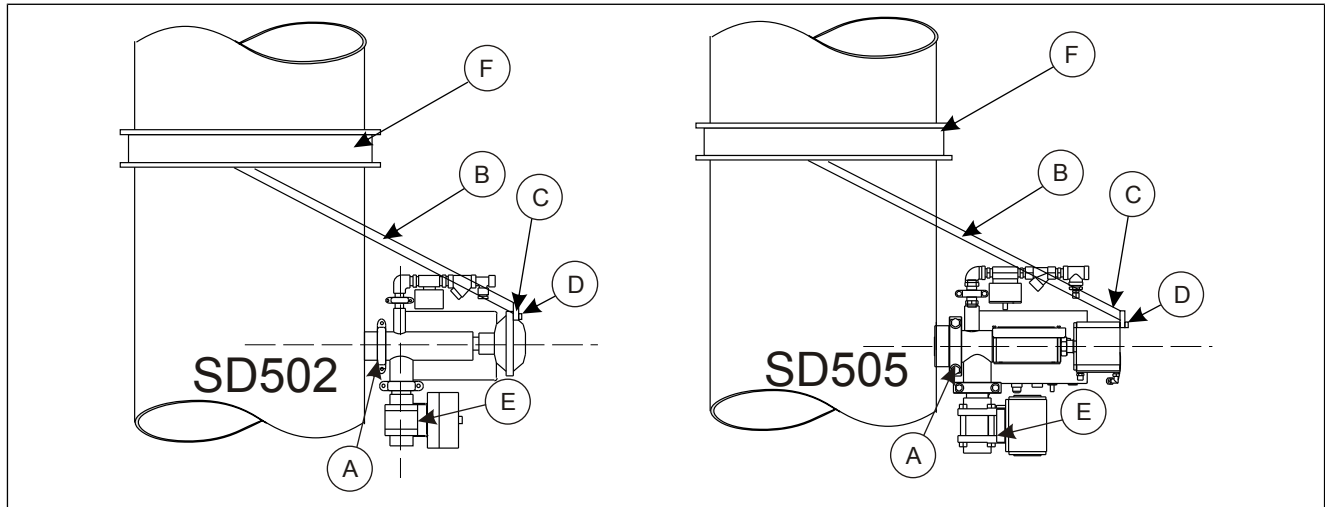


Fig. 9. Supporting the Valmet SD502/SD505 sampler to the process pipeline: A - mounting clamp, B - support pipe, C - support piece, D - mounting screws, E - sample delivery valve, F - pipe clamp.

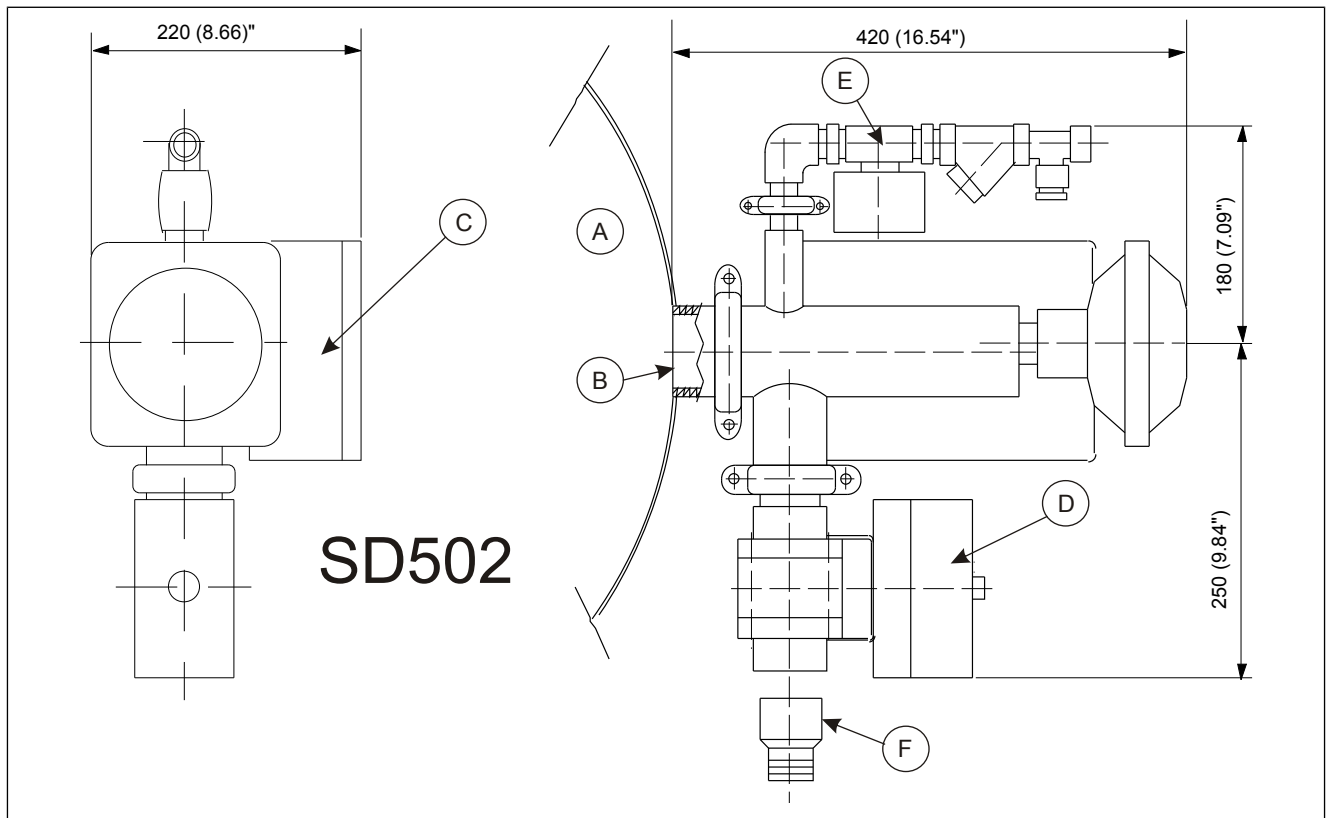


Fig. 10. Valmet SD502 installation principle: A - process pipeline, B - process coupling, C - connection box, D - sample delivery valve, E - transport water valve, F - hose connector of sampler.

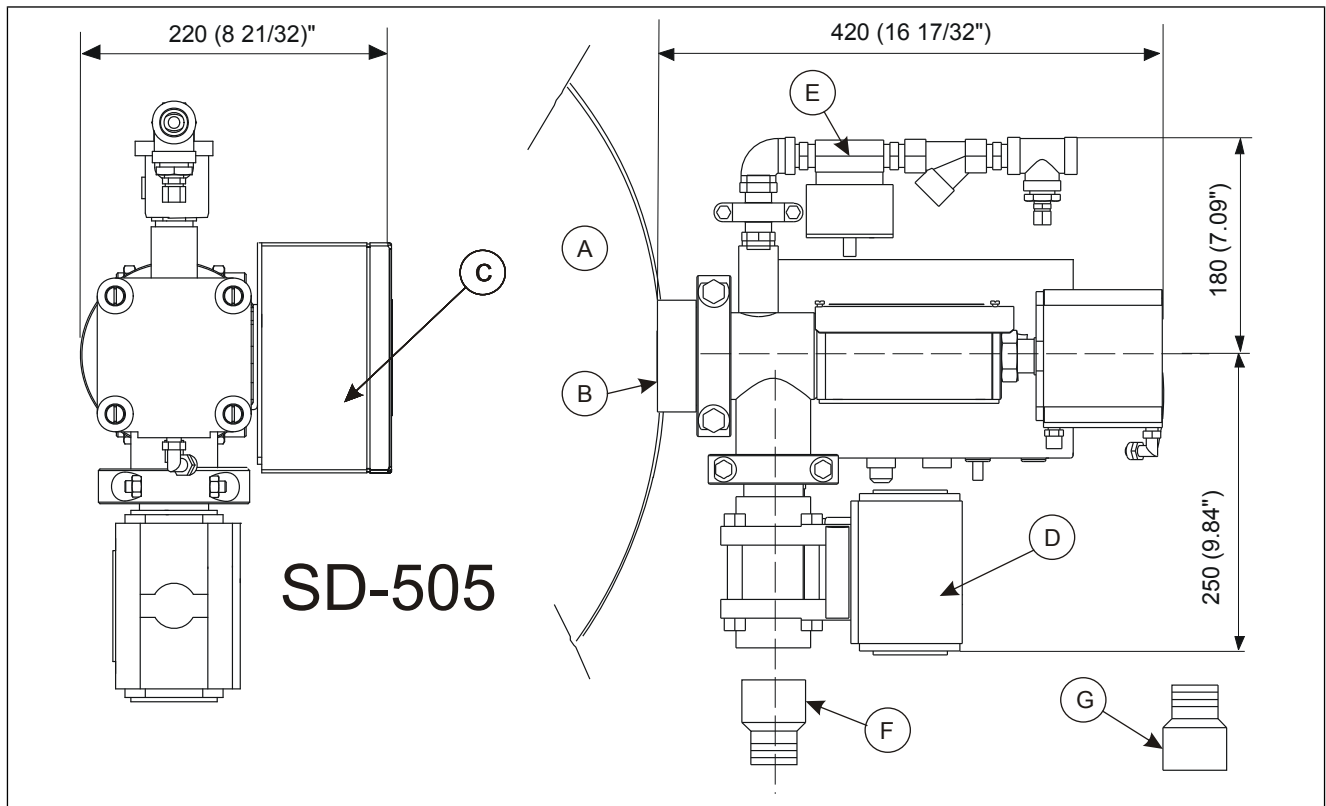


Fig. 11. Valmet SD505 installation principle: A - process pipeline, B - process coupling, C - connection box, D - sample delivery valve, E - transport water valve, F - hose connector of sampler.

3.3. Adjusting sample flow rate with SD502/SD505

Positioning the flow inlet opening

1. Open the cover on the sampler body.
2. Loosen the locking screw (hex socket screw M6, Fig. 12, part 7).
3. Push the rotation guard (8) along the piston shaft (5) as far left as it goes.
4. Turn the shaft (5) by the 13 mm spanner gap to the required direction. Flow inlet position can be changed at 90° steps. Replace the rotation guard.
5. Tighten the hex socket screw properly.
6. Fasten the cover back to the sampling device body.

Recommendation: Set the flow inlet opening at an angle of 90° to pulp flow.

Adjusting sample flow rate

Sample flow rate from the sampler is dependent on process pressure and on the size of the flow opening.

The suitable flow rate is determined and set during start-up.

1. Open the cover on the sampler body.
2. Turn the regulator nut (Fig. 12, 3)
 - clockwise => weaker flow,
 - anti-clockwise => stronger flow.

If the nut cannot be turned by hand, insert a screwdriver to the holes on the nut to increase torque. The flow opening (2) of the piston opens more when the piston moves a longer distance. Recommendation: 17 - 19 mm (0.669" - 0.748"), measured as shown in Fig. 12.

NOTE: Distance l , must not be more than 19 mm (0.748")! If the opening is very large, the sample flow rate may be too strong and the sample line gets blocked more easily.

NOTE: Watch out for the moving parts when testing operation - do not push your fingers between them!

3. After adjustment, close the cover carefully. Make sure that the rotation guard (8) on the cover is pressed against the regulator nut (3) when the cover is closed.

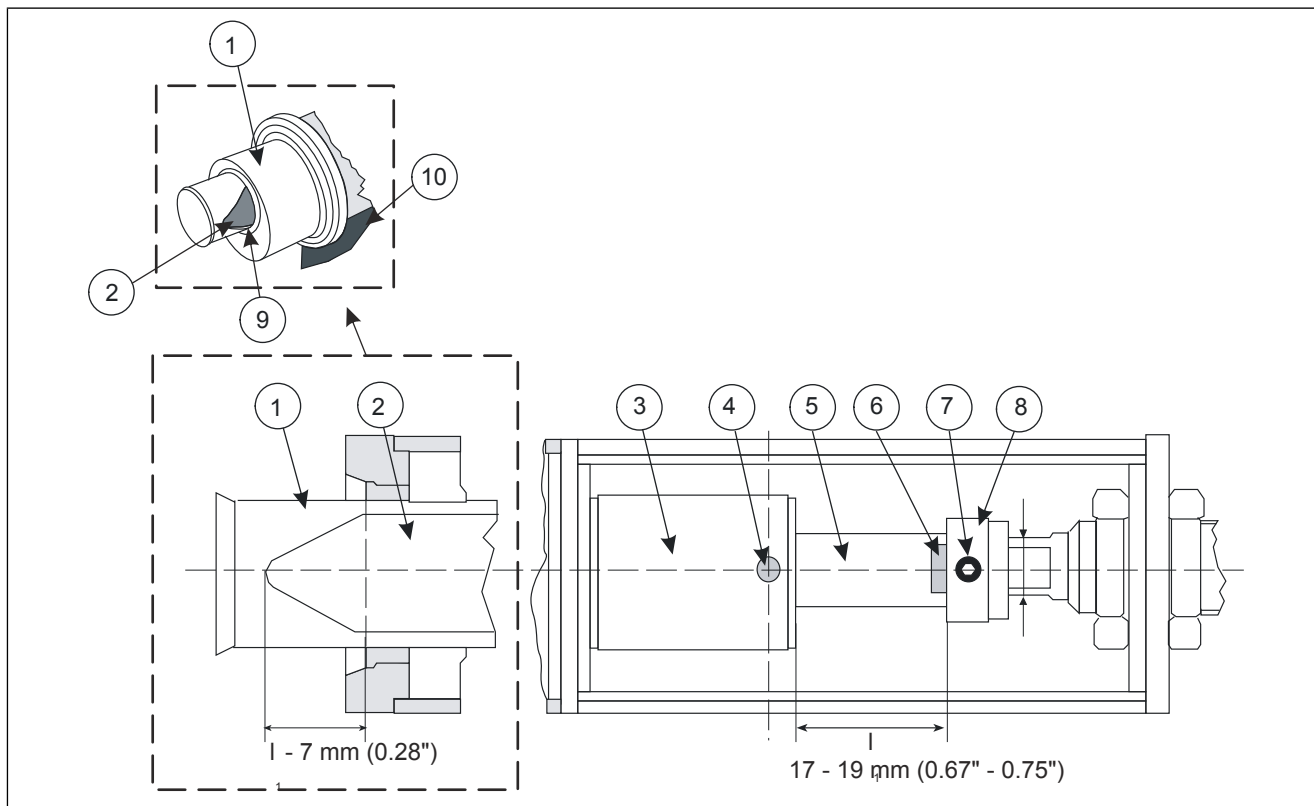


Fig. 12. Adjusting sample flow rate, and positioning the sample inlet opening: 1 - closing piston, 2 - flow inlet opening, 3 - sample flow rate regulator nut, 4 - hole for regulator nut (4 pcs), 5 - piston shaft, 6 - flat surface that indicates the position of flow inlet opening, 7 - locking screw, 8 - piston rotation guard, 9 - cutting edge, 10 - sample outlet coupling.

Notes

4. Connections

4.1. Sample lines

NOTE: Always use only plastic or acidproof steel pipe for the sample lines. The line must NOT contain components made of any other metals (e.g. brass)!

NOTE: Always lead batch samples from a batch digester to Defibrator with metal pipes, and connect the line to analyzer using a flexible hose and 19 mm hose couplings!

If the sample lines are made of metal pipe, remember that the connections to both analyzer and sampler must always be made with flexible hose (about 0.5 - 1 m / 1.5 - 3 ft) to eliminate vibration.

Screw the hose coupling (Fig. 1) to the connector on the sampler and fasten the hose to the coupling with a clamp. Attach the tube coming from the sampler to analyzer's trunk line with a Y-coupling.

4.2. Water supply to sampler

NOTE: Always use only plastic or acidproof steel pipe for the sample lines. The line must NOT contain components made of any other metals (e.g. brass)!

Connect a water supply line to the sampler for sample delivery (Fig. 2, A). Blowline samples must not cool down before they are washed. Therefore always use hot transport water for blowline samples; see Technical specification for more detailed information. In other cases the water can be cold. Pressure and temperature requirements: see Technical specification.

NOTE: Always use DEIONIZED water for brightness samples!

A pressure regulator and manometer (0...10 bar) must be installed to the water supply line, as variations in water pressure will change the sample transfer time. Also install a manual shut-off valve to the line.

4.3. Air supply to sampler

Connect an instrument air supply line for solenoid valve controls to the sampler (Fig. 2, B). Pressure and temperature requirements: see Technical specification. Install a manual shut-off valve to the air supply line. Fig. 3 shows the solenoid valve controls of the sampler.

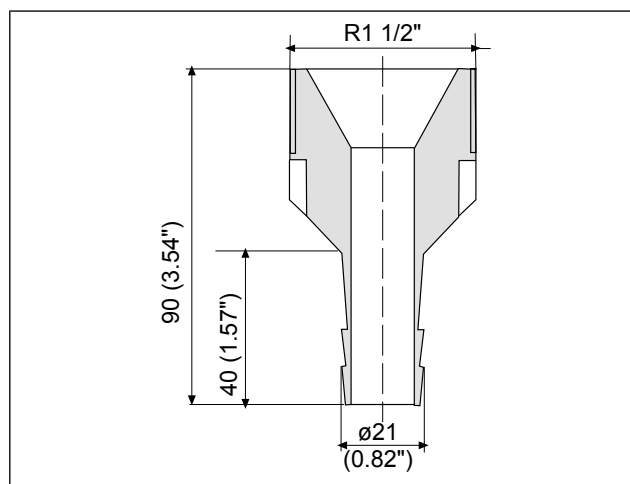


Fig. 1. 19 mm sample line connector for the sampler (H4500058).

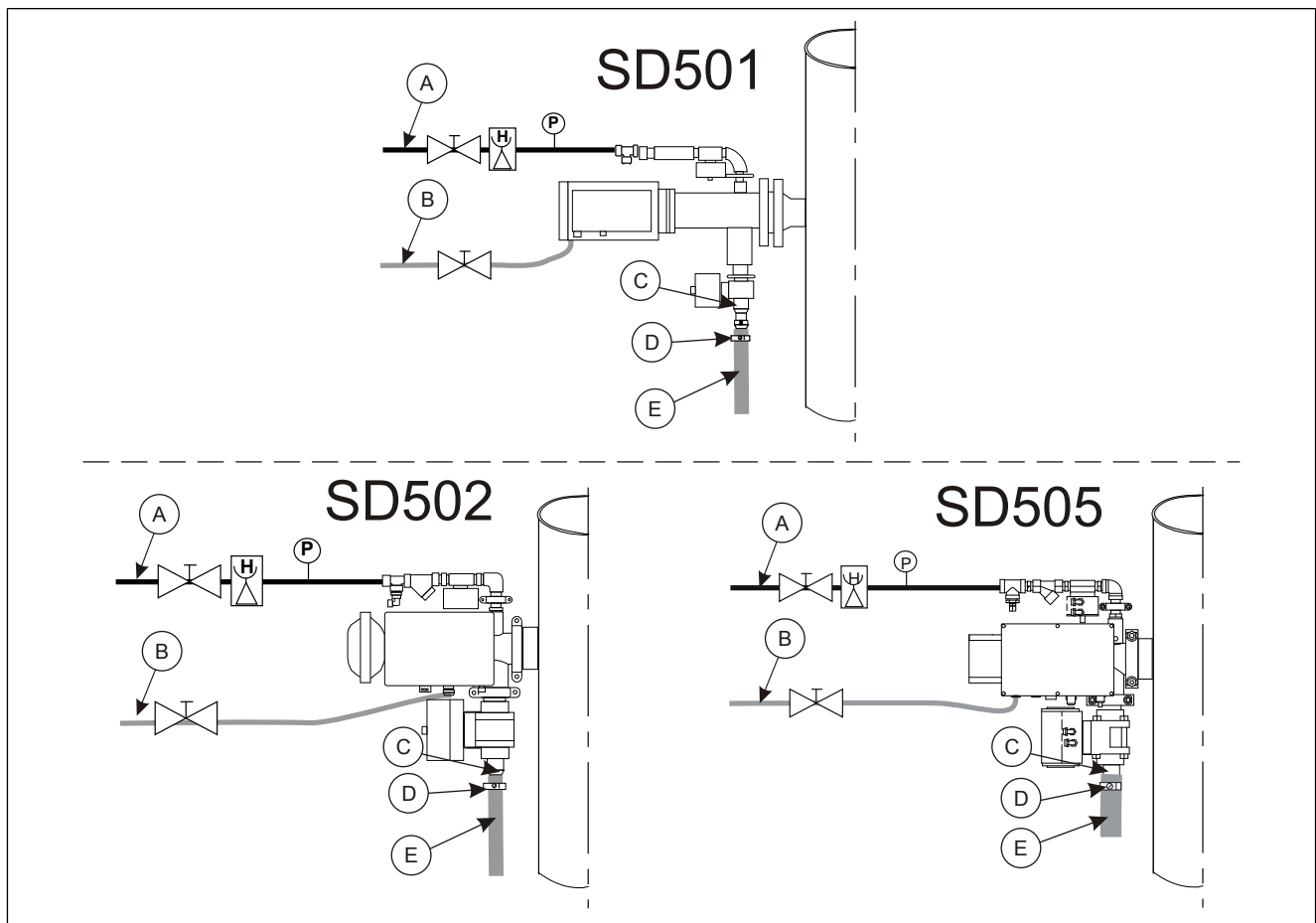


Fig. 2. Water and air supply connections of the sampler. A - transport water, B - instrument air, C - hose connector, D - hose clamp, E - sample line.

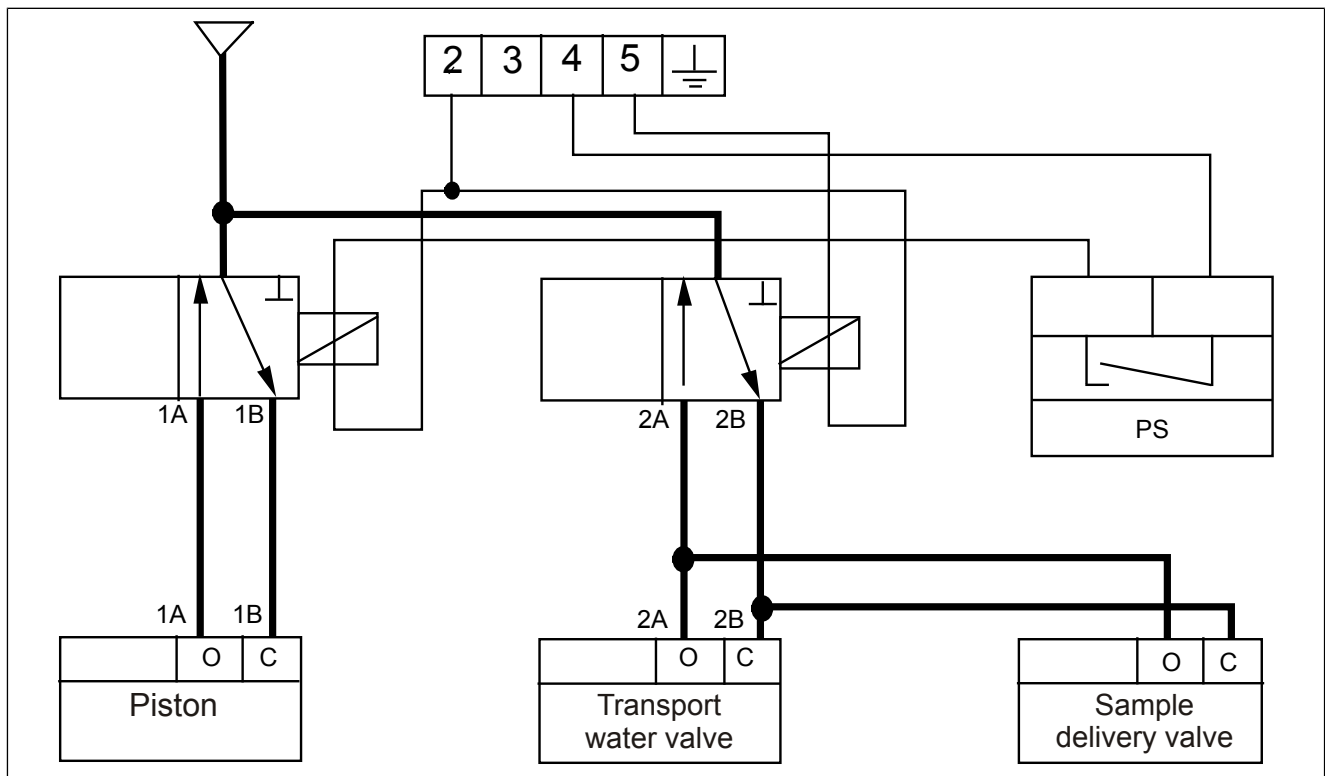


Fig. 3. Solenoid valve controls.

4.4. Electric connections

All electric connections are made in the analyzer's and sampler's connection boxes; analyzer's connection box is located on its left side. See analyzer's manual for more detailed information.

NOTE: Lead the cables into the connection box through the bushings.

Connect the samplers to analyzer's terminals using the order of the sample lines. The connections are shown in Fig. 5. The control cable is made using two-pair instrumentation cable. Connect the cable mantle to a grounding connector either at the sampler or at analyzer - **do NOT ground at both ends!**

Measurement status (0 = measuring, 1 = ready) and grade signal (0 = HW, 1 = SW) are connected from a separate terminal strip to each sampler. Signal connections to the mill's DCS are explained in the analyzer's manual.

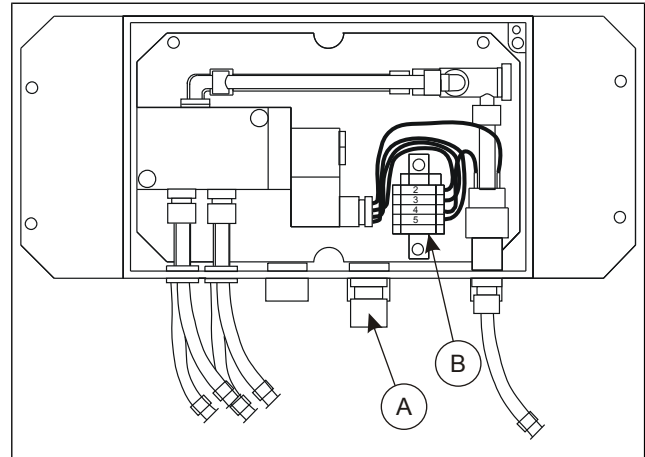


Fig. 4. Sampler's connection box: A - bushing for control cable, B - terminal strip for control cable.

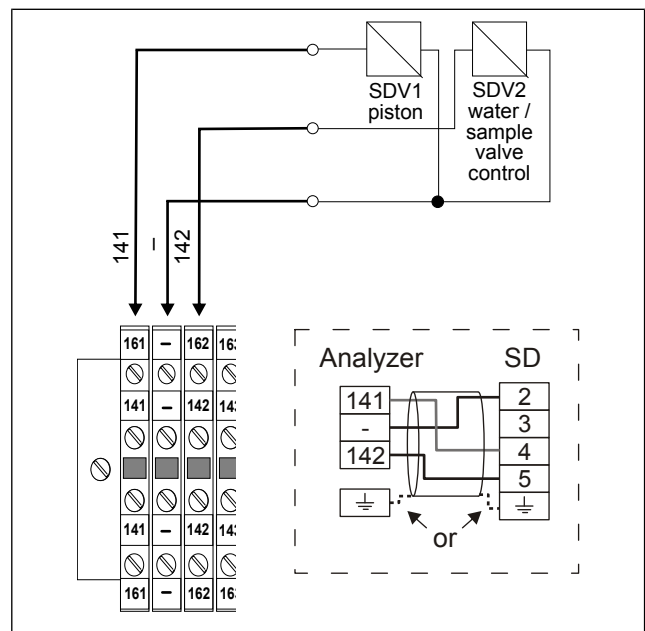


Fig. 5. Cabling between sampling device and analyzer.

Notes

5. Maintenance

5.1. Service every 2 weeks

- Inspect visually the condition of the sampler and its process coupling.
- Check all welds to make sure there are no cracks or fractures.
- Make sure that all connections are tight.

5.2. SD501 service every 12 months

Analyzer stopped, normal process pressure

NOTE: You will need to detach the sampler from the process to inspect certain parts!

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water supply to sampler by the manual shut-off valve.
3. Disconnect the water supply hose and sample line from the sampler (Fig. 1).
4. Using manual control, open the solenoid valve on top (in connection box) to position 1, and the sample delivery valve and water valve will open (Fig. 2).
5. Measure the leakage from sampler (L/minute). If it is > 0.5 L/minute (~ 1 pint/minute), check the condition of the sampling piston and cylinder. This check requires a process stop, as the sampler must be detached from the process coupling.
6. Close the sample line/water valve with manual control.
7. See if process fluid leaks out between the actuator and sampler body (Fig. 3). If there is a leak, replace the piston shaft gaskets (see chapter 6.9).
8. Check and clean the water nozzle (see chapter 6.6).
9. Connect the water and sample hoses, and open the water shut-off valve.
10. Set the measuring channel ON at the analyzer.

With the sampler removed from process

Check the surfaces of the sample piston and cylinder. If these surfaces are visibly scratched or grooved, replace the piston and cylinder (see chapter 6.8).

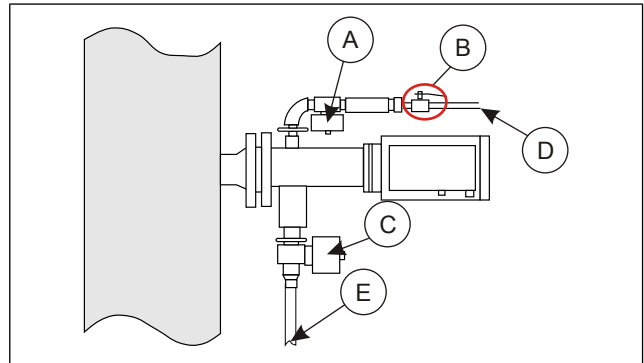


Fig. 1. Connections of Valmet SD501: A - water valve, B - closing valve, C - sample delivery valve, D - water in, E - sample line.

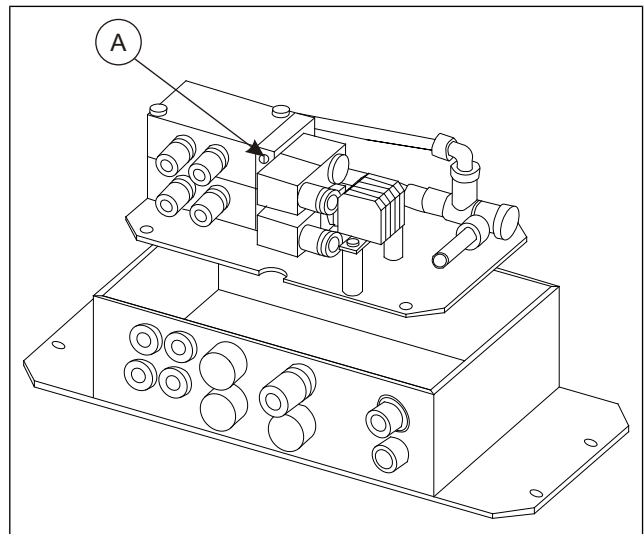


Fig. 2. Manual control of solenoid valve: A - manual control screw.

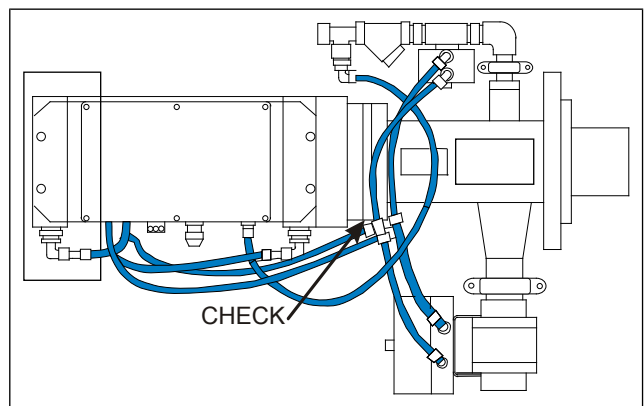


Fig. 3. Valmet SD501, checking the piston shaft.

5.3. SD502/SD505 service every 12 months

Analyzer stopped, normal process pressure

NOTE: You will need to detach the sampler from the process to inspect certain parts!

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water supply to sampler by the manual shut-off valve.
3. Disconnect the water supply hose and sample line from the sampler (Fig. 4).
4. Using manual control, open the solenoid valve on top (in connection box) to position 1, and the sample delivery valve and water valve will open (Fig. 2).
5. Measure the leakage from sampler (L/minute). If it is > 0.5 L/minute (~ 1 pint/minute), check the condition of the sampling piston and cylinder. This requires a process stop, as the sampler must be removed from process.
6. Close the sample line/water valve with manual control.
7. Open the top cover of the sampler and make sure that the piston shaft gasket does not leak. If there is a leak, replace the gasket (see chapter 6.13). This check requires a process stop, as the sampler must be detached from the process coupling.
8. Check the condition of the actuator diaphragm (Valmet SD502) / actuator (Valmet SD505): detach the instrument air tube as shown in Fig. 5 or Fig. 6. No air must leak from the connector. If you detect an air flow, replace the diaphragm; see chapter 6.11. / 6.12. Connect the instrument air tube. This requires a process stop, as the sampler must be removed from process.
9. Connect the water and sample tubes, and open the water shut-off valve.
10. Check the water flow to sampler. If the water flow is not correct, check the valve in the water inlet coupling.
11. Set the measuring channel ON at the analyzer.

With the sampler detached from the process coupling

Check the surfaces of closing piston and piston shaft. If these surfaces are visibly scratched and grooved, replace the piston; see chapter 6.15.

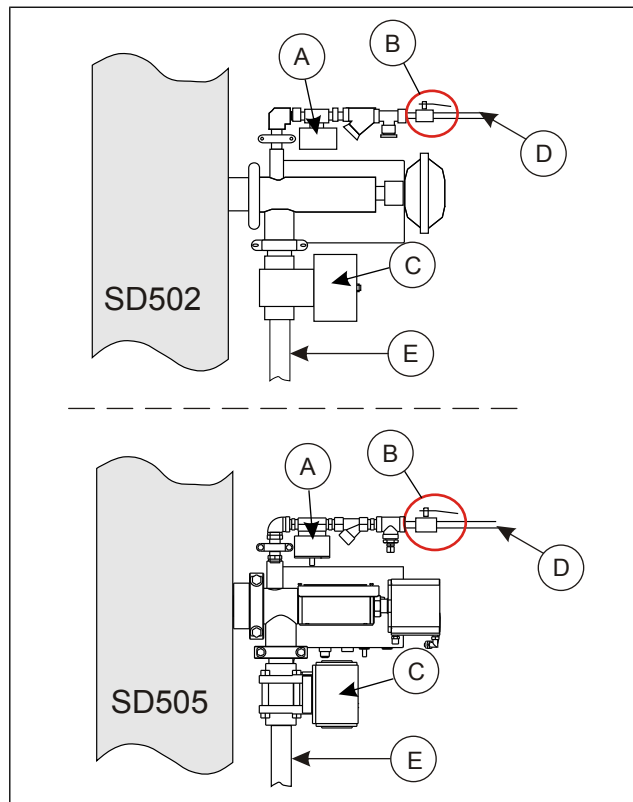


Fig. 4. Connections of Valmet SD502/SD505: A - water valve, B - closing valve, C - sample delivery valve, D - water in, E - sample line.

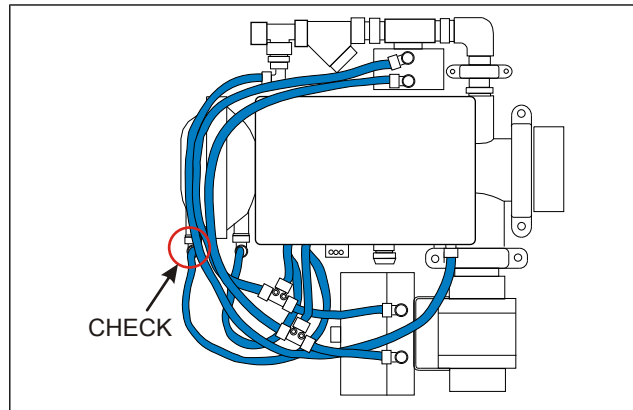


Fig. 5. Valmet SD502, checking the actuator diaphragm.

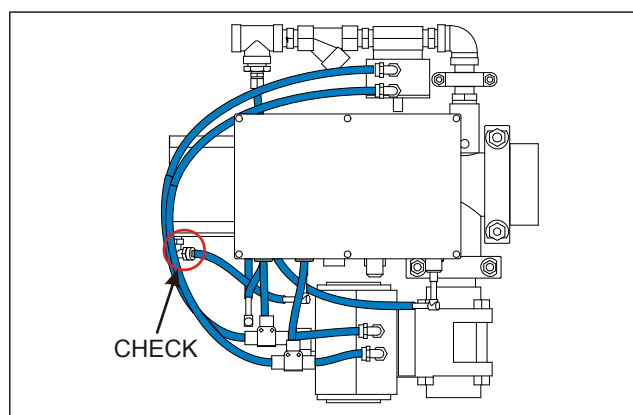


Fig. 6. Valmet SD505, checking the actuator.

6. Part replacement

6.1. Sample delivery valve (239632)

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Disconnect the sample tube from sampler.
4. Detach air tubes 6 and 7 from valve actuator (see Fig. 1 and 2).
5. Detach the clamp (A). Be careful not to misplace the seals!
6. Detach the actuator + ball valve (B).
7. Install a new sample delivery valve.
8. Reassemble the removed parts in reverse order.
9. Open the water and air supply lines and set the channel ON at the analyzer.



Fig. 1. Valmet SD501 sampler: A - clamp, B - ball valve.

6.2. Gasket set of sample delivery valve (243931)

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Disconnect the sample tube from sampler.
4. Detach air tubes 6 and 7 from valve actuator (see Fig. 1 and 2).
5. Detach the clamp (A). Be careful not to misplace the seals!
6. Remove the 4 Allen screws that hold the ball valve together, and the actuator will come loose.
7. Replace the gaskets (see Fig. 3) and reassemble the valve.

NOTE: Set the valve to position CLOSED!

8. Reassemble the removed parts in reverse order.
9. Test the operation of the actuator and ball valve with instrument air. You may need to open and close the valve several times before it begins to operate smoothly.
10. Install the sample delivery valve back. Reassemble the removed parts in reverse order.
11. Open the water and air supply lines and set the channel ON at the analyzer.

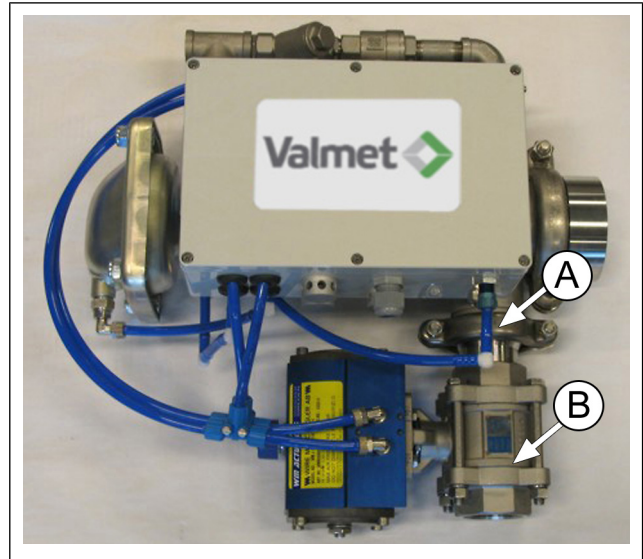


Fig. 2. Valmet SD502 sampler: A - clamp, B - ball valve.

Construction of sample delivery valve

- | | |
|-------------------------|--------------------------|
| 1. Secondary body seal* | 11. Secondary body seal* |
| 2. Body seal* | 12. Body seal* |
| 3. Ball seat seal* | 13. Ball seat seal* |
| 4. Ball | 14. Valve body |
| 5. Shaft seal* | 15. O-ring* |
| 6. Seal ring* | 16. Gate ring* |
| 7. Spring washer | 17. Antistatic stem |
| 8. Locking nut | 18. Stem springs |
| 9. End piece | 19. Body bolt (4 pcs) |
| 10. Nut (4 pcs) | |

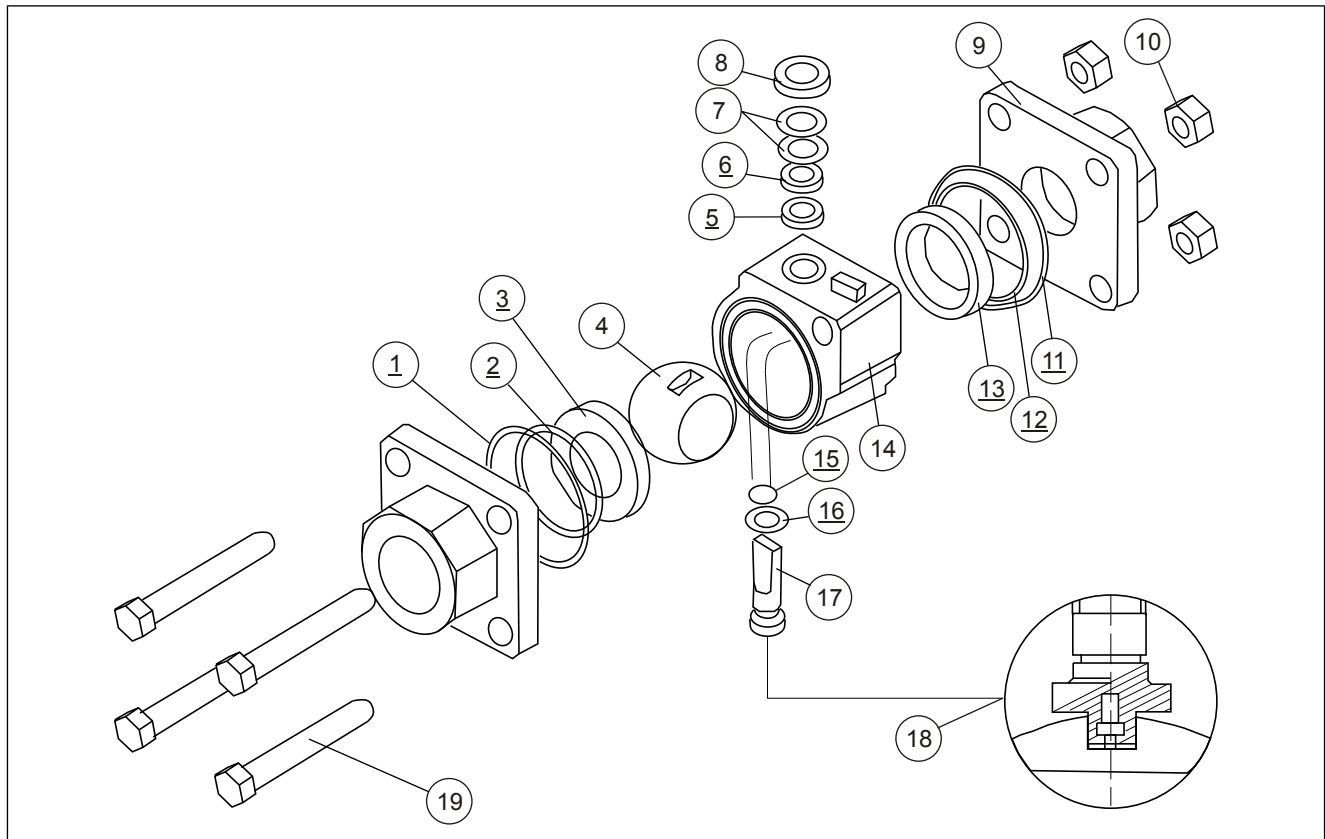


Fig. 3. Construction of sample delivery valve: underlined parts are included in gasket set 243931.

6.3. Transport water valve (K01180)

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Disconnect the water inlet tube from the sampler.
4. Disconnect air tubes (5 & 8 & 9) from actuator.
5. Detach the clamp. Be careful not to misplace the seals!
6. Detach the actuator + ball valve (Fig. 4 parts A and B).
7. Install a new ball valve + actuator.
8. Reassemble the removed parts in reverse order.
9. Open the water and air supply lines and set the channel ON at the analyzer.

6.4. Air valve (212613)

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the air supply to the sampler by the manual valve.
3. Remove the screws (Fig. 5, part A).
4. Disconnect air tubes (B) from the actuator as necessary.
5. Detach the socket (C) from the side of the solenoid.
6. Replace the valve.
7. Reassemble the removed parts in reverse order.
8. Open the air supply and set the channel ON at the analyzer.

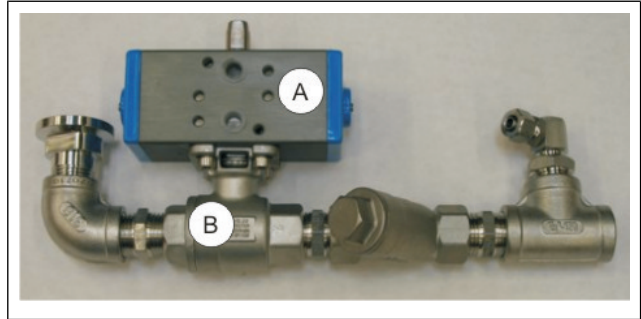


Fig. 4. Transport water valve.

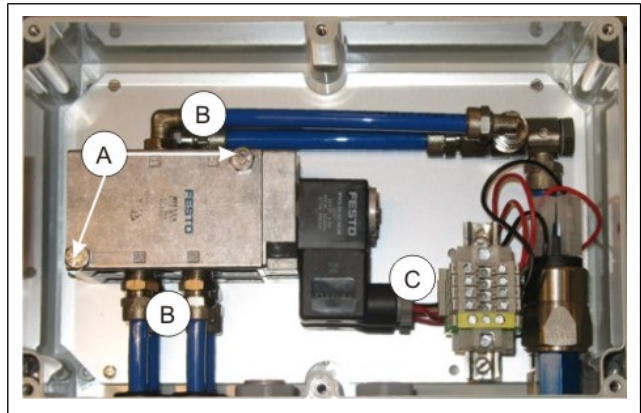


Fig. 5. Replacing the air valve.

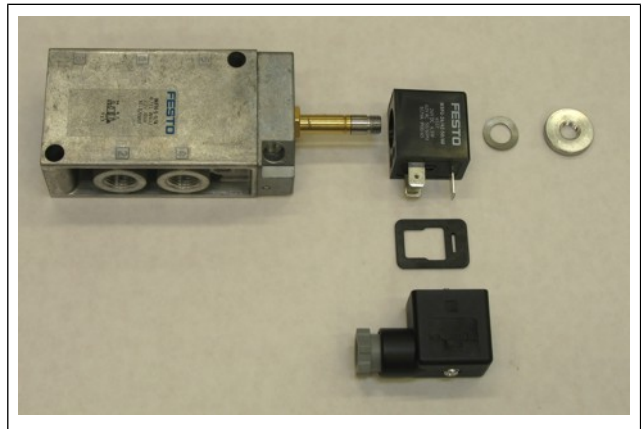


Fig. 6. Parts of the air valve.

6.5. Pressure switch (242750)

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Detach the wires from the pressure switch (Fig. 7, part A).
4. Unscrew the pressure switch from the lead-through bushing (B).
5. Screw a new pressure switch to the bushing.
6. Connect the wires to the pressure switch. The order of the wires is not important.
7. Open the water shut-off valve. Check the operation of the pressure switch with a multimeter. When the pressure switch contact is closed ($< 1 \Omega$), water pressure is high enough (see Fig. 9).
8. Open the air supply and set the channel ON at the analyzer.

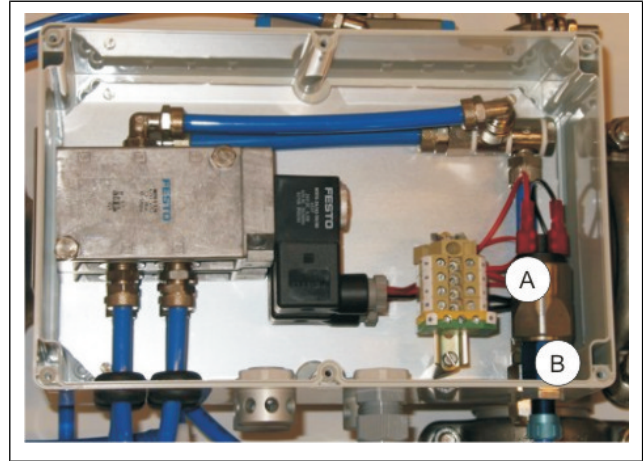


Fig. 7. Replacing the pressure switch.



Fig. 8. Pressure switch.

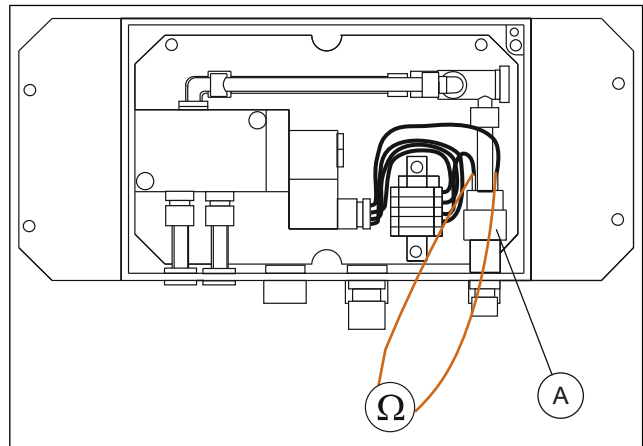


Fig. 9. Adjusting the pressure switch: A - adjust with screwdriver, check with multimeter.

6.6. SD501: Checking & cleaning the water nozzle

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Open the sample delivery valve manually.
4. Detach the clamp. Be careful not to misplace the seals!
5. Remove the water nozzle (Fig. 10, part A). If there are fibers stuck to the nozzle, clean it.
6. Reassemble the removed parts in reverse order.
7. Close the sample delivery valve manually.
8. Open the water and air supply lines and set the channel ON at the analyzer.



Fig. 10. Water nozzle.



Fig. 11. Water nozzle and gasket.

6.7. SD501: Piston actuator (239244)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Check which measuring channel you will be working with, and set it OFF at the analyzer.
2. Close the water and air supply lines to the sampler with the manual valves.
3. Disconnect the water inlet tube and sample line from the sampler.
4. Remove the sampler from the process pipeline.
5. Drive the piston into the sampler using instrument air.
6. Close the air supply to the sampler by the manual valve.
7. Remove the screws (Fig. 16, part A, 8 pcs), then remove first the retainer ring (B) and after it the cylinder pipe (C). The cylinder (L) may sit tight; be careful when removing it. Do not use any tools that may damage the cylinder.
8. Drive the piston out of the sampler using instrument air.
9. Close the air supply line to the sampler by the manual valve. Disconnect the air tubes. Pull the piston shaft completely out of the cylinder, and close the air holes with plugs.
10. Detach the piston locking screw (D) and spring washer (E).
11. Unscrew the piston from the cylinder piston.
12. Remove the Allen screws (F) that hold the actuator in place.
13. Pull the actuator loose from parts G, H & I (these parts are assembled together).
14. Install the new actuator: push it through parts G, H & I, be careful not to damage the seals (J & K).
15. Reassemble the removed parts in reverse order. NOTE: Apply some locking glue (Loctite 270) on the screws holding the retainer ring (B).
16. Open the water and air supply lines and set the channel ON at the analyzer.

6.8. SD501: Piston and cylinder pipe

Piston (K01541)

Cylinder pipe (K01540)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Follow steps 1 - 11 as instructed above in chapter 6.7.
2. Install the new piston: screw it in until the end of the thread, and then unscrew it slightly, until you can lock it in position with an Allen screw (Fig. 16, part D) and spring washer (E).
3. Drive the piston into the sampler using instrument air.
4. Close the air supply line to the sampler by the manual valve.
5. Clean the new cylinder and install it to the sampler body; make sure to push it in as far as it goes. If necessary, use the retainer ring (B) and tightening screws (A) to get it completely in. NOTE: Apply some locking glue (Loctite 270) on the screws holding the retainer ring.
6. Reassemble the removed parts in reverse order.
7. Open the water and air supply lines and set the channel ON at the analyzer.

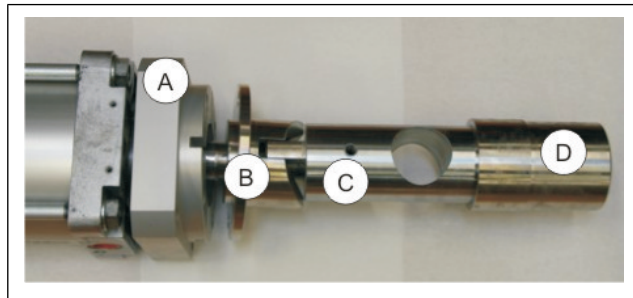


Fig. 12. SD501 sampler body: A - cylinder fitting, B - sealing element, C - piston, D - cylinder pipe.

6.9. SD501: Wiper and piston shaft gaskets

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Follow steps 1 - 11 as instructed above in chapter 6.7.
2. Remove the Allen screws that fasten the actuator (Fig. 16, part F).
3. Pull the actuator loose from parts G, H & I (these parts are assembled together).
4. Remove the Allen screws (F) that fasten parts H & I, and detach these parts from each other.
5. Remove the old gaskets and wiper from the sealing element, use e.g. a flat-head screwdriver.
6. Clean the grooves on the gaskets carefully to remove all dirt.
7. Install O-rings into the grooves in the sealing element. The gaskets are hard, so be very careful when installing the wiper and gaskets into the grooves in the sealing element! When installing, use a round rod (diameter about 10mm / 0.4") to push the gasket from one side (see Fig. 14). When a gasket is compressed as shown in the picture, it can be inserted into its groove in the sealing element, on the O-ring. If necessary, press the seal carefully so that it goes properly into the groove.
8. Push the sealing element carefully on the actuator piston shaft, and wait for 10 minutes to let the gaskets return to their original shape. Then pull the sealing element off from the piston shaft.
9. Reassemble the removed parts in reverse order. When pushing the actuator through parts G, H & I, be careful not to damage the gaskets (J & K). NOTE: Apply some locking glue (Loctite 270) on the screws holding the retainer ring (B).
10. Open the water and air supply lines and set the channel ON at the analyzer.

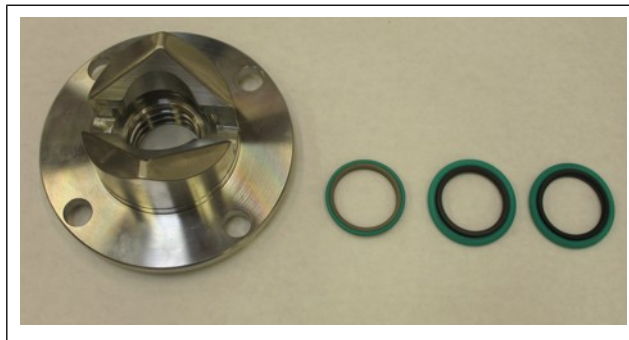


Fig. 13. Wiper and piston shaft gaskets.

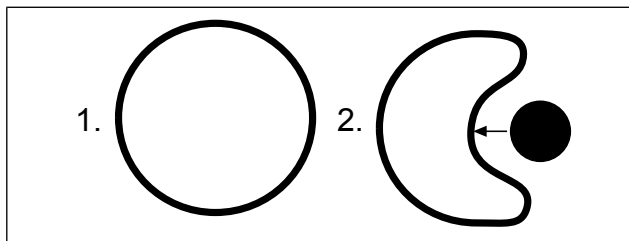


Fig. 14. Installing the gaskets.

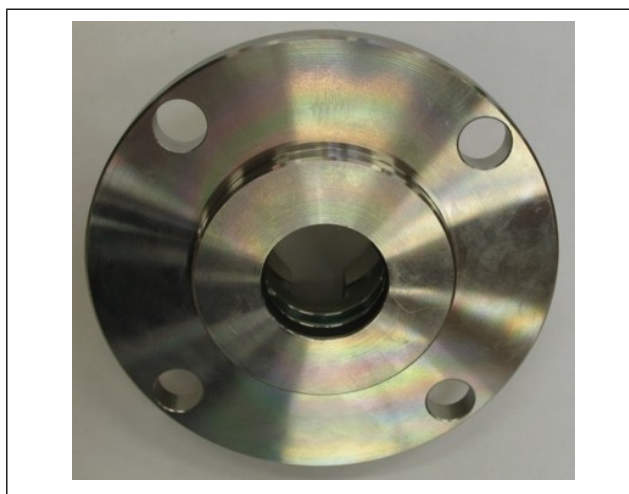


Fig. 15. Sealing element.

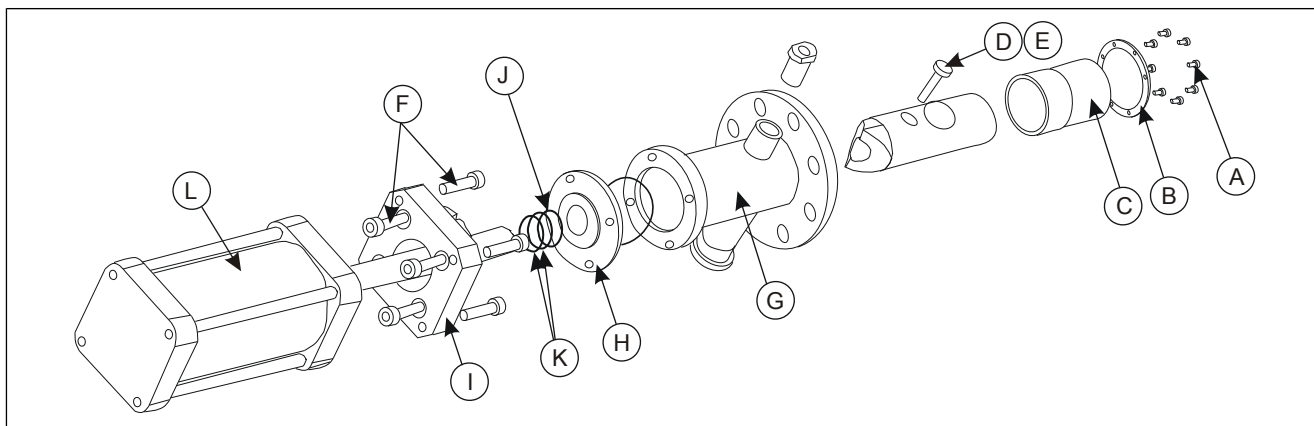


Fig. 16. Valmet SD501 sampler body, parts: A - fastening screw, B - retainer ring, C - cylinder pipe, D - piston locking screw, E - spring washer, F - Allen screw, G - sampler body, H - sealing element, I - cylinder fitting, J - wiper, K - piston shaft gasket, L - cylinder.

6.10. SD502: Actuator (240077)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Detach the actuator by opening the mounting nuts (Fig. 17, parts A & B). Unscrew the piston shaft (C) from the actuator using two wrenches (spanner gaps: a = 13mm, b = 16mm). If the parts sit very tight, heat the joint to about 120 °C (248 °F) to soften the locking glue applied to the thread.
2. Install the new actuator loosely in position, so that the fastening nuts (A and B) are on that end of the thread that is facing the piston.
3. Make sure that the support ring (D) is wound as far as it goes.
4. Apply some easily removable locking glue (e.g. Loctite 222) to the thread connecting the closing piston shaft to the actuator piston shaft.
5. Push the closing piston into position, and also place the rotation guard (E) on the shaft. Tighten the screw connection with two wrenches, spanner gaps a = 13 mm, b = 16 mm.

Aligning the actuator:

1. Mount the sampler on a vise, with the actuator end pointing upwards.
2. Connect instrument air (pressure about 6 bar, 87 psi) to the actuator (Fig. 17, coupling d).

NOTE: Look out for the cutting blade!

3. Turn the nut (B) to the left, until the end of the thread.
4. Turn the other nut (A) to the left, as far as it goes without using force. When you reach a point where the friction increases, turn the nut still about 1/2 turn more and then stop.
5. Switch off the air supply.
6. Turn the nut (B) back towards the other nut, leave it rather loose at this point.
7. Loosen the nut (A) slightly to make sure that the actuator is accurately aligned with the closing piston shaft.
8. Tighten the nut (A) properly, make sure that the connection does not move sideways when tightening it!
9. Move the closing piston back and forth by pushing it manually by part E.

6.11. SD502: Actuator diaphragm (243998)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Open the actuator cover (4 screws).
2. Remove the defective diaphragm.
3. Install a new diaphragm.
4. Close the actuator cover.

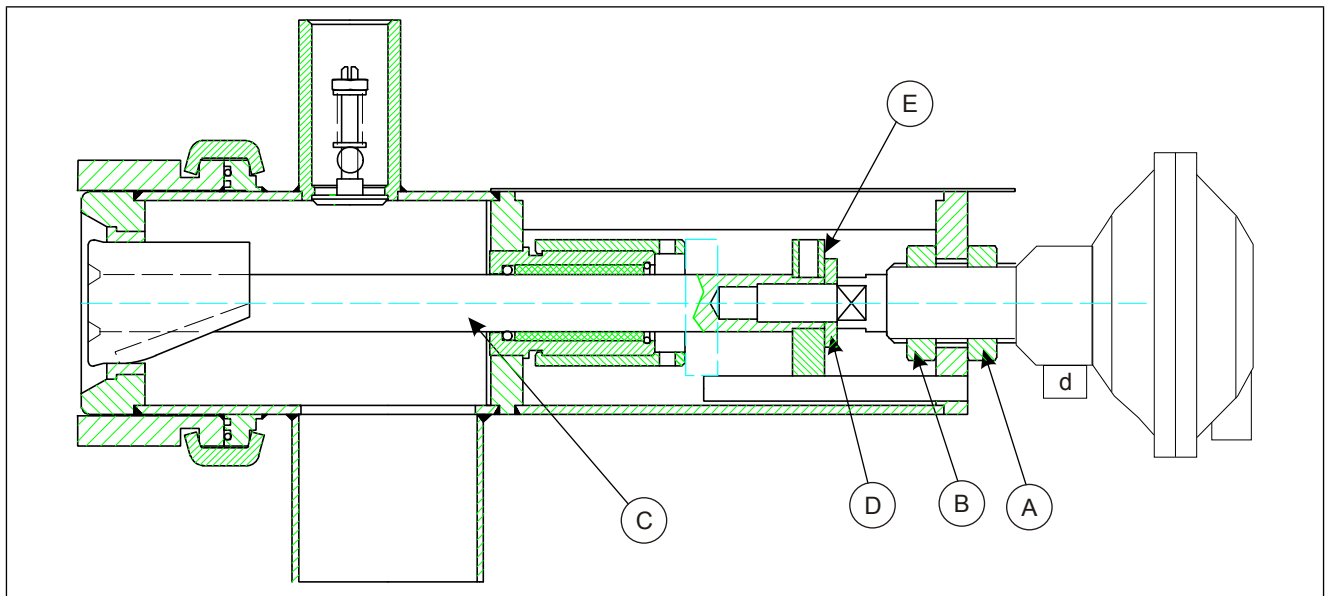


Fig. 17. Valmet SD502 sampler body: A & B - fastening nuts, C - piston shaft, D - support ring, E - piston rotation guard.

6.12. SD505: Actuator (245217)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Detach the actuator by opening the mounting nuts (parts A & B). Unscrew the piston shaft (C) from the actuator using two wrenches (spanner gaps: a = 13mm, b = 16mm). If the parts sit very tight, heat the joint to about 120 °C (248 °F) to soften the locking glue applied to the thread.
2. Install the new actuator loosely in position, so that the fastening nuts (A) are on that end of the thread that is facing the piston.
3. Make sure that the support ring (D) is wound as far as it goes.
4. Apply some easily removable locking glue (e.g. Loctite 222) to the thread connecting the closing piston shaft (C) to the actuator piston shaft.
5. Push the closing piston into position, and also place the rotation guard (E) on the shaft. Tighten the screw connection with two wrenches, spanner gaps a = 13 mm, b = 16 mm.

Aligning the actuator

1. Mount the sampler on a vise, with the actuator end pointing upwards.
2. Lead instrument air (pressure about 6 bar, 87 psi) to the actuator (closing pressure).

NOTE: Look out for the cutting blade!

3. Turn the nut (B) to the left, until the end of the thread.
4. Turn the other nut (A) to the left, as far as it goes without using force. When you reach a point where the friction increases, turn the nut still about 1/2 turn more and then stop.
5. Switch off the air supply.
6. Turn the nut (B) back towards the other nut, leave it rather loose at this point.
7. Loosen the nut (A) on the right slightly to make sure that the actuator is accurately aligned with the closing piston shaft.
8. Tighten the nut (A) properly, make sure that the connection does not move sideways when tightening it!
9. Move the closing piston back and forth by pushing it manually by part E.

6.13. SD505: Piston shaft wiper (251157)

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

1. Detach the actuator. See chapter 6.12.
2. Detach the closing piston. See chapter 6.15.
3. Turn the regulator nut (Fig. 19, part F) loose.
4. Unscrew the sealing element (G) from its thread.
5. Fasten the sealing element e.g. to a vise.
6. Remove the mounting screws (H, 4 pcs).
7. Remove the plate (I).
8. Detach the piston shaft wiper (J).
9. Check the condition of the piston shaft gasket (K). Replace it if necessary.
10. Install a new piston shaft wiper.
11. Reassemble the removed parts in reverse order.

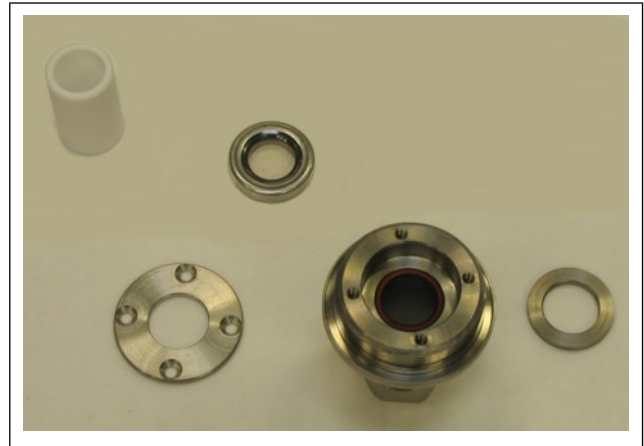


Fig. 18. Piston shaft wiper, parts.

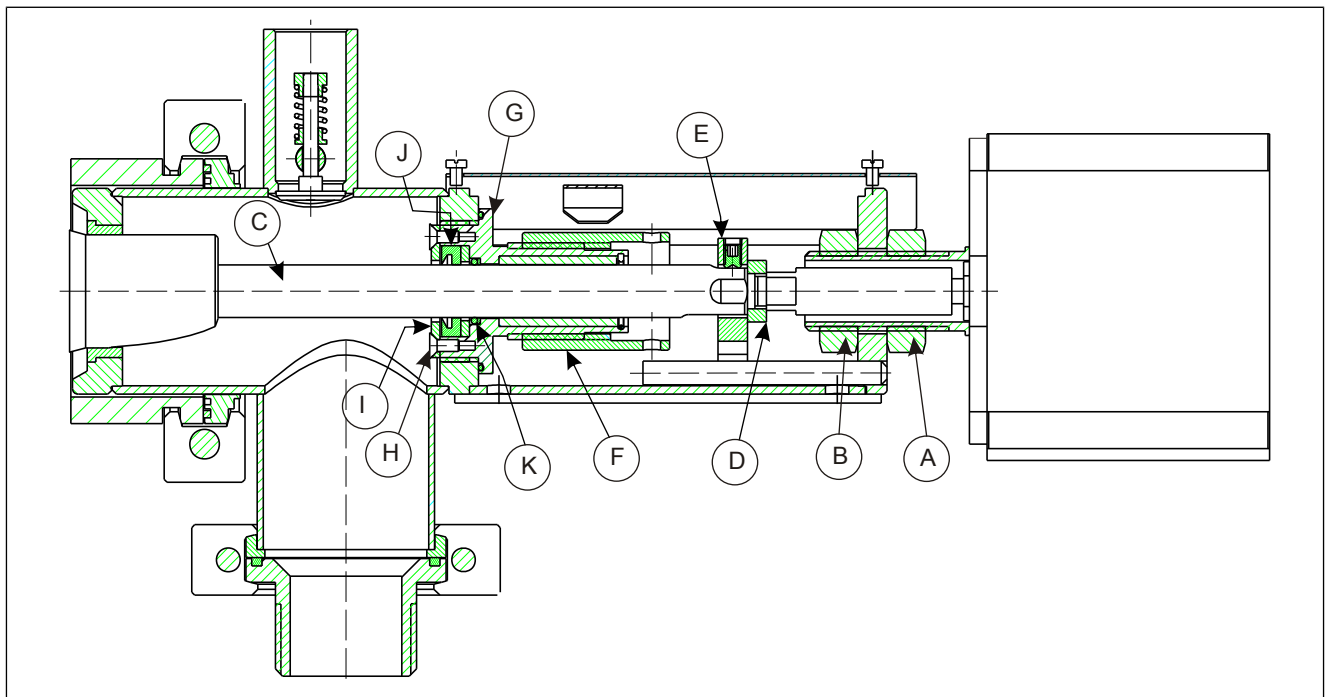


Fig. 19. SD505 sampler body: A & B - mounting nuts, C - closing piston shaft, D - support ring, E - piston rotation guard, F - sample flow rate regulator nut, G - sealing element, H - fastening screw, I - bushing plate, J - piston shaft wiper, K - piston shaft gasket.

6.14. Bearing bushing and piston shaft gasket

SD502: bearing bushing (240127) and piston shaft gasket (240119)

SD505: bearing bushing (H4500854) and piston shaft gasket (251165)

NOTE: This operation requires a process shut-down, as the sampler must be removed from the process.

If the bearing bushing shows considerable slack, it must be replaced. First detach the actuator.

- SD502, see under point "SD502: Actuator" (240077).
 - SD505, see under point "SD505: Actuator" (245217).
1. Unscrew the sample flow rate adjustment nut (Fig. 21, part C).
 2. Remove the packing socket (Fig. 20, part 3) with a screwdriver.
 3. Detach the actuator: open the nut (Fig. 21, part A) and then remove the support ring (E) and nut (B).
 4. Mount the sampler on a vise, with the actuator end pointing upwards.
 5. Remove the PTFE bearing bushing (F) with the extracting tool, as shown in Fig. 20. Before removing, make sure that the nut on the tool is screwed fully down. The end of the tool contains a screw pin. Using the arms on the tool, screw it into the bearing bushing as shown in Fig. 20. Then pull the bushing out of its casing by turning the nut (Fig. 20, part 1).

6. Check the condition of the gasket (G) and replace it if necessary.
7. Using the push bar (Fig. 20, B), press the new bearing bushing (F) in so that the packing socket goes into the bottom.

NOTE: Be careful not to press the bearing bushing with too much force and too deep; it must not exert pressure on the gasket!

8. Screw the flow rate adjustment nut (C) back in.
9. Install the new actuator loosely in position, so that the fastening nuts (A and B) are on that end of the thread that is facing the piston. When working with sampler model
 - SD502, continue from point "SD502: Actuator (240077)", step 2.
 - SD505, continue from point "SD505: Actuator (245217)", step 2.

NOTE: Before using the sampler again, readjust the sample flow rate and the position of the sample outlet opening. See instructions in chapter 3.3.

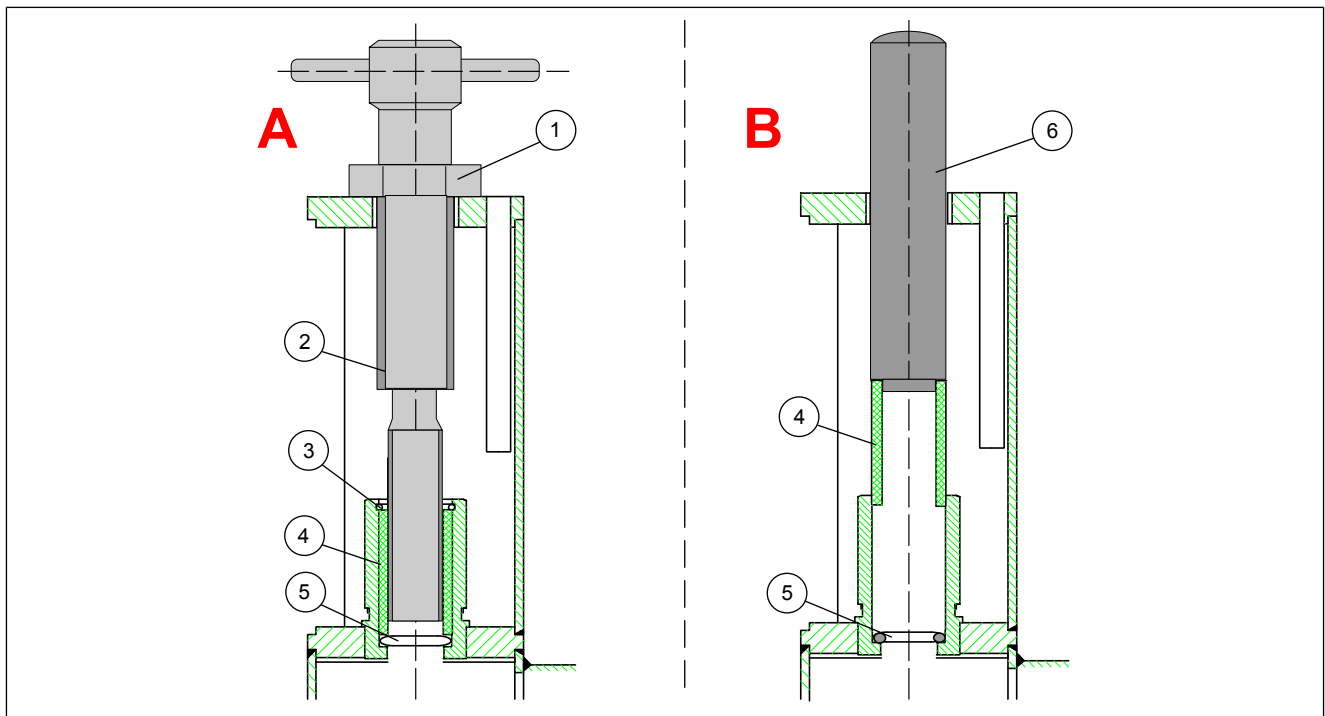


Fig. 20. Installing the bearing bushing and O-ring: 1 - nut, 2 - tool, 3 - packing socket, 4 - bearing bushing, 5 - O-ring, 6 - push bar.

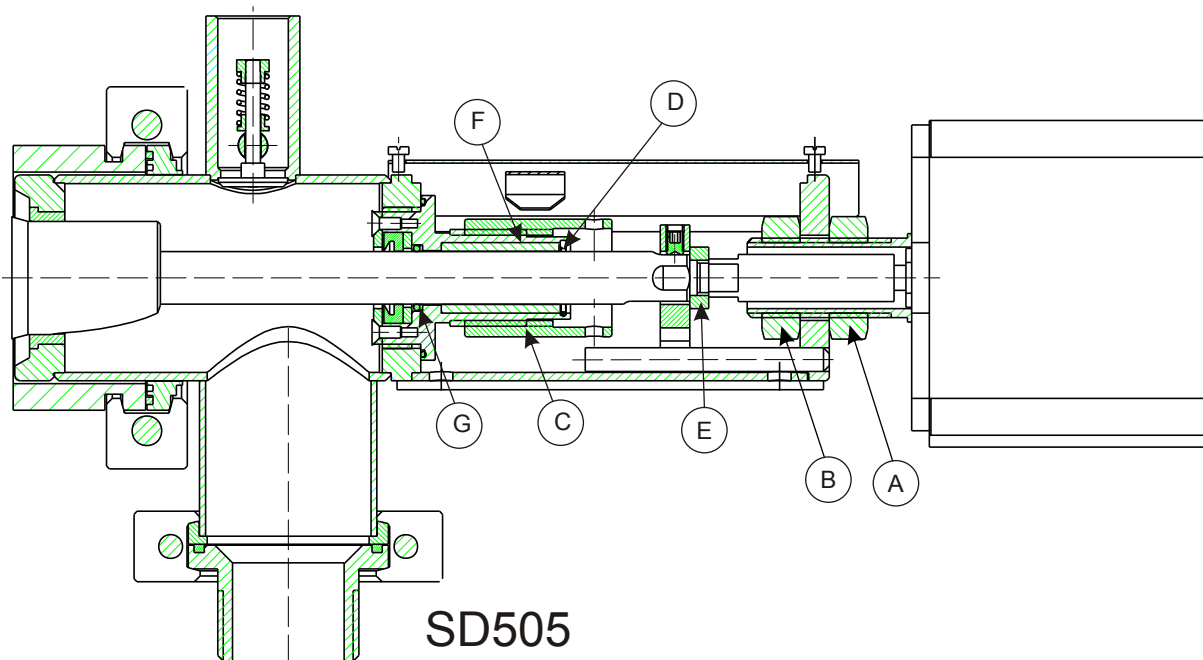
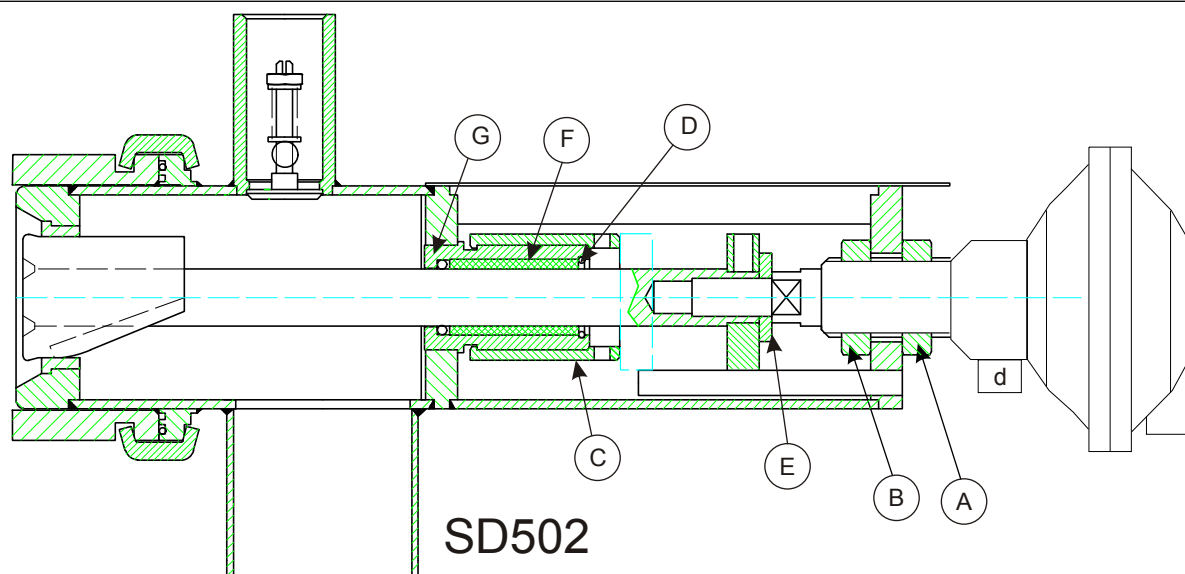


Fig. 21. Valmet SD502/SD505: A & B - mounting screws, C - flow rate adjustment nut, D - locking ring, E - support ring, F - bearing bushing, G - piston shaft gasket.

6.15. SD502/SD505: Closing piston and seat ring

SD502: closing piston (240085) and seat ring (K09772).
SD505: closing piston (A4500839) and seat ring (H4500851).

NOTE: This operation requires a process shut-down, as the sampler must first be detached from the process coupling.

Removing the closing piston:

1. Loosen the Allen screw (Fig. 23, part F) until you can move the piston rotation guard (F) to the left, as far as it goes.
2. Unscrew the piston shaft (D) from the actuator using two wrenches (spanner gaps: a = 13mm, b = 16mm). If the parts sit very tight, heat the joint to about 120 °C (248 °F) to soften the locking glue applied to the thread.
3. Pull the piston out.

Removing the seat ring:

1. Mount the sampler e.g. on a vise, in the position shown in Fig. 22 A.
2. Push the support tool (included in the special tool set) into position, as shown in Fig. 22 A.
3. Pull the seat ring out using the extracting tool (in the special tool set).

Installing the seat ring:

The ring is secured in position with a press-on fit.

1. Place the seat ring (part G), preferably attached to the installation tool, in a freezer and allow it to cool to at least -10 °C (14 °F).
2. Heat the sampling device tip section to about 100 °C (212 °F), for example in boiling water.
3. Mount the sampler on a vise, in the position shown in Fig. 22 B.
4. Take the seat ring and installation tool from the freezer. Drive the ring in using a hammer and the installation tool.

Installing the closing piston:

1. If the actuator was detached earlier, fasten it loosely in position, so that the fastening nuts (A and B) are at the actuator piston end of the threaded part.
2. Make sure that the support ring (E) is wound as far as it goes.
3. Apply some easily removable locking glue (e.g. Loctite 222) to the thread connecting the closing piston shaft (D) to the actuator piston shaft.
4. Push the closing piston into position, and also place the rotation guard (E) on the shaft (C). Tighten the screw connection with two wrenches, spanner gaps a = 13 mm, b = 16 mm.
5. Align the actuators, see chapters SD502: Actuator (240077), SD505: Actuator (245217).

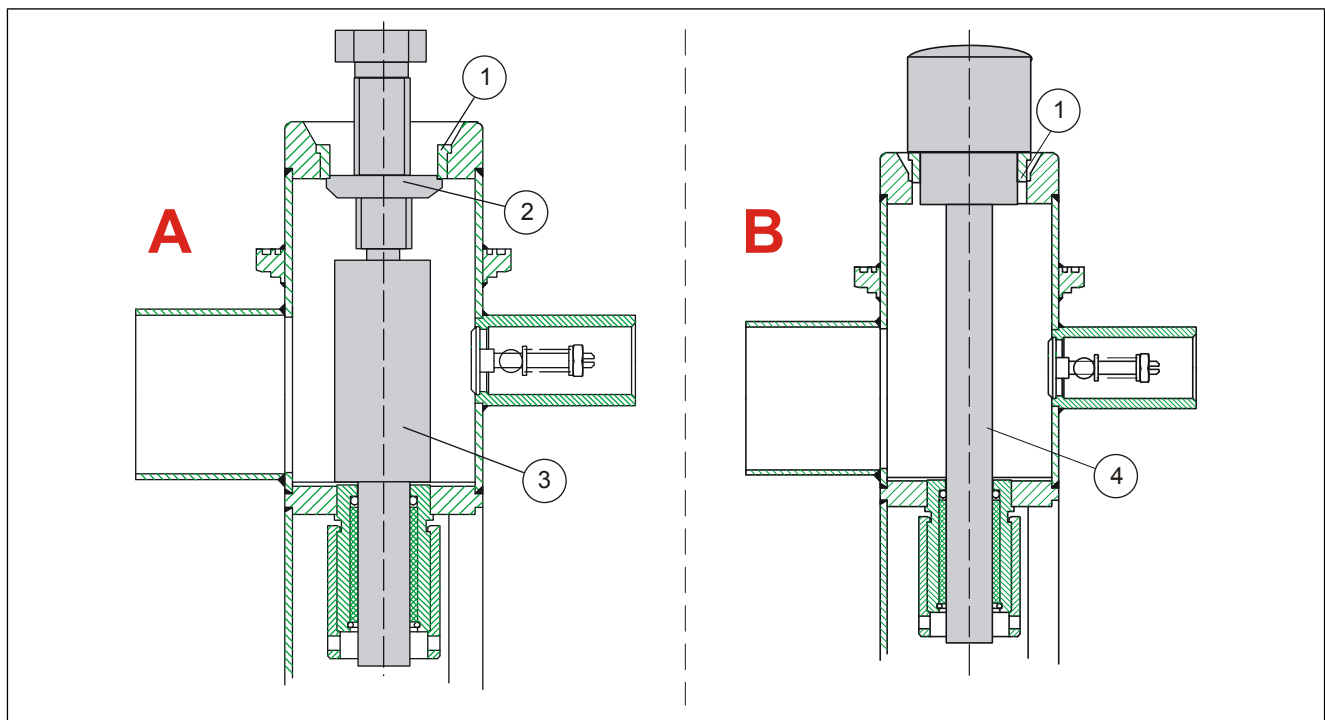


Fig. 22. Removing (A) and installing (B) the seat ring: 1 - seat ring, 2 - extracting tool, 3 - support tool, 4 - installation tool.

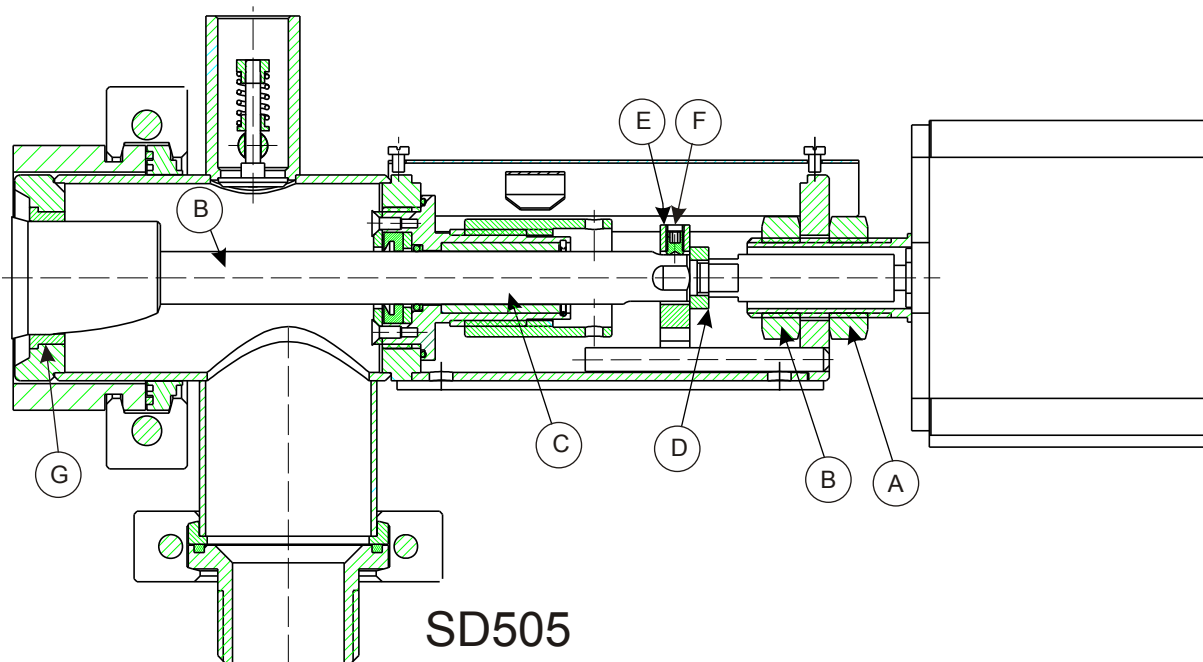
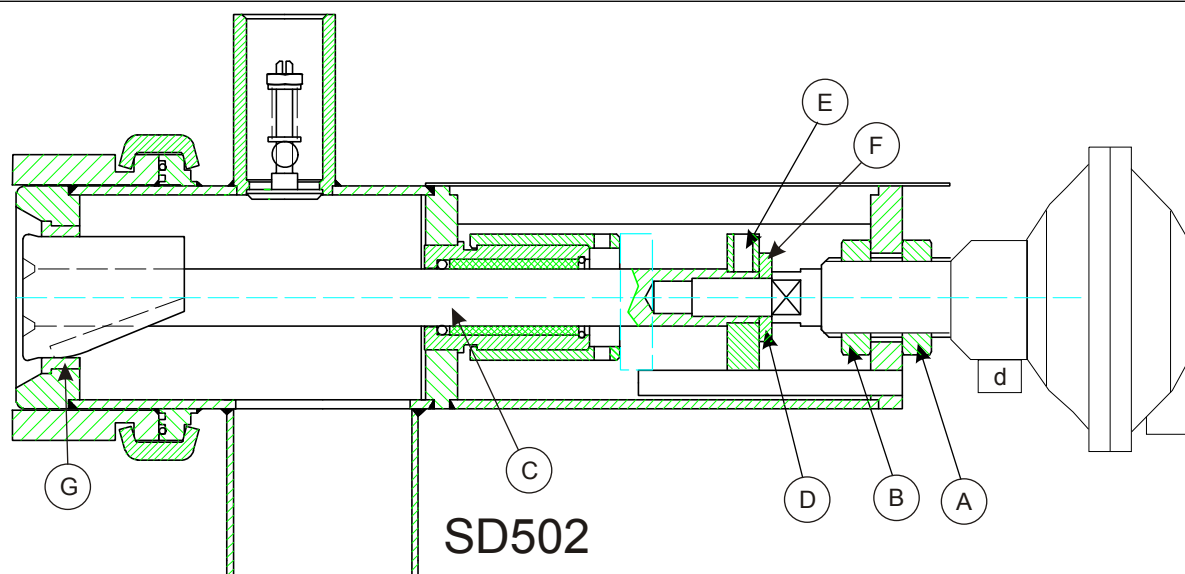


Fig. 23. SD502/SD505: A & B - fastening nuts, C - piston shaft, D - support ring, E - retainer screw, F - piston rotation guard, G - seat ring.

Valmet SD501 / 502 / 505 Technical specifications

Choosing the correct sampler type:

Pipe diameter	Cs %	Process pressure	Sampler	NOTES
≤ 200 mm (8")	0.6–6 %	0–4 bar (0–58 psi)	SD501 + pipe extension to 300 mm (12")	1
		4–25 bar (58–363 psi)	SD502	2
	6–15 %	0–2 bar (0–29 psi)	SD501 + pipe extension to 300 mm (12")	1
		2–25 bar (29–363 psi)	SD501 + pipe extension to 300 mm (12")	1
> 200 mm (8")	0.6–6 %	0–4 bar (0–58 psi)	SD501	1
		4–25 bar (58–363 psi)	SD502	2
	6–15 %	0–2 bar (0–29 psi)	SD501	1
		2–25 bar (29–363 psi)	SD502	1

Valmet Kappa Sampler SD501

- Piston-type sampler
- Sample volume 2 dl/sampling
- Approved pressure vessel
- For screened pulps

Material AISI 316L
 Weight 55 kg (121 lbs)
 Consistency range 6–15 % Cs
 Process pressure max. 25 bar (363 psi)
 Process coupling Mounting flange DIN100,
 PN40m DIN 2635, AISI 316L

Valmet Kappa Sampler SD502

- Flow-type sampler
- For pipelines < 200 mm (8") in diameter
- Especially for unscreened pulps

Material AISI 316L
 Weight 15 kg (33 lbs)
 Consistency range 0.5–15 % Cs
 Process pressure 2–25 bar (29–363 psi), allowed
 variation from target pressure
 at installation point max. ± 20%
 Process coupling included in delivery

Valmet Kappa Sampler SD505

- Flow-type sampler
- For pipelines < 200 mm (8") in diameter
- Especially for unscreened pulps that contain chlorine chemical residues

Material:
 - Body, parts in contact
 with pulp Titan Grade 2
 - Piston ceramic-coated Titan
 Grade 2
 Weight 12 kg (26.5 lbs)
 Consistency range 0.5–15 % Cs
 Process pressure 2–25 bar (29–363 psi),
 allowed variation from target
 pressure at installation point
 max. ± 20%
 Process coupling included in delivery

Notes to the table above:

- 1 – Also SD502 can be used; for pulps containing chlorine chemicals SD505
- 2 – Also SD501 can be used, but the number of samples per analysis must then be increased; sampling time is about 15 sec. longer per sample.

For all types (SD501/502/505)

Sample line

Tube diameter 19 mm (3/4") tube recom-
 mended. If 25 mm (1") tube
 is used, water consumption
 and sample transfer times
 will increase.

Minimum bending radius 250 mm (10")

Instrument air Filtered instrument air
 Pressure 4–6 bar (58–87 psi)
 Connection ISO 7/1–Rp 1/2" inside
 thread
 Recommended pipeline DN15

Water

Pressure 4–8 bar (58–116 psi), al-
 lowed variation ±0.25 bar
 (3.6 psi)
 Connection ISO 7/1–Rp 1/2" inside
 thread

Consumption max.

- 19 mm sample line 40 L (10.6 US gal) / min.
 - 25 mm sample line 50 L (13.2 US gal) / min.
 Recommended inlet line
 - 19 mm sample line DN15
 - 25 mm sample line DN20

Environment

Temperature 5–50°C (41–122°F)
 Humidity 10–100%

Protection class. IP55

Valmet SD501 / 502 / 505

Spare parts

Valmet SD501 Spare parts A4500246

Order code	Item	Qty
239244	Piston actuator (cylinder) 160-200-31213 PIMATIC	1
K01541	Piston	1
K01540	Cylinder pipe	1
K01180	Ball valve + actuator R1/2" (water)	1
239632	Ball valve + actuator R11/2 DN40 (sample)	1
212613	Solenoid valve MFH-5-1/4	1
242750	Pressure switch 18645 803-1-006 1...10 bar AISI 316, R1/4"	1
243931	Gasket set for sample delivery valve	1 *)
239749	Wiper	1 *)
239756	Piston shaft gasket	2 *)

Valmet SD502 Spare parts A4500247

Order code	Item	Qty
240077	Diaphragm actuator (cylinder) MD300-40	1
240085	Closing piston	1
K09772	Seat insert	1
K01180	Ball valve + actuator R1/2" (water)	1
239632	Ball valve + actuator R11/2 DN40 (sample)	1
240127	Bearing bush	1
K05339	Tool set	1
212613	Solenoid valve MFH-5-1/4	1
242750	Pressure switch 18645 803-1-006 1...10 bar AISI 316, R1/4"	1
243998	Actuator membrane ME-300	1
243931	Gasket set for sample delivery valve	1 *)
240119	Piston shaft O-ring 18 x 3	1 *)

Valmet SD505 Spare parts A4500807

Order code	Item	Qty
245217	Actuator (cylinder) ADVU-80-40-P-A Festo	1
A4500839	Piston assembly, Titan	1
H4500851	Seat ring, Titan	1
K01180	Ball valve + actuator R1/2" (water)	1
239632	Ball valve + actuator R11/2 DN40 (sample)	1
H4500854	Bearing bush PTFE	1
241851	Tool set	1
242750	Pressure switch 18645 803-1-006 1...10 bar AISI 316 R1/4"	1
212613	Solenoid valve MFH-5-1/4	1
243931	Gasket set for sample delivery valve	1 *)
251157	Wiper	1 *)
251165	Back-up ring	1 *)

*) Wearing parts; not covered by warranty

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