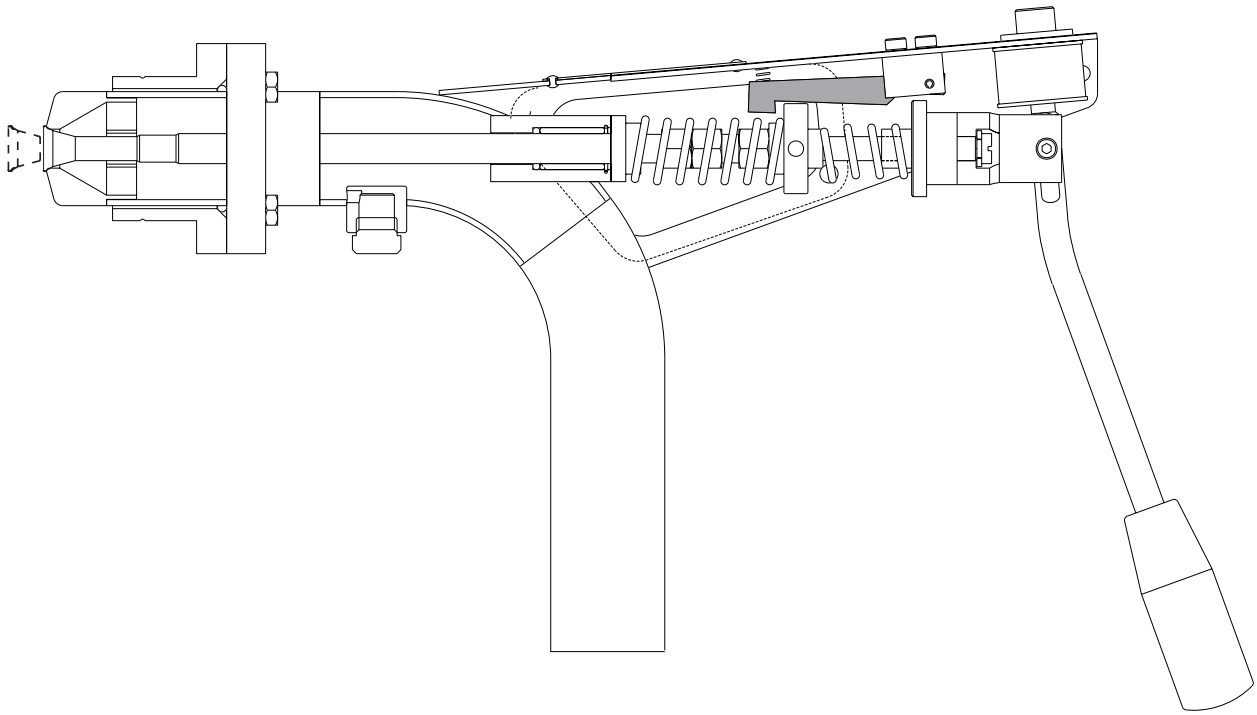
Pulptec™ MPS-1000, PPS-1000, and APS-1000

Pulp Samplers



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1 Product introduction

1.1 MPS-1000, PPS-1000 and APS-1000 Pulp samplers

- **Simple and reliable design.**
- **Mechanism provides consistent samples, independent of operator skill.**
- **Representative sampling, as the sample is extracted away from the water layer around the pipe wall.**
- **Water flushing available for cleaning.**
- **Simple installation through a weld-in stud, FRP-stud or thread connection.**
- **Highly serviceable – few moving parts.**

The sampler is used for the extraction of representative screened pulp samples from pressurized pipes.

There are three different models of the sampler.
Each model can be connected by flange (xPS-1000) or thread (xPS-1010):

- MPS-1000/1010, hand operated.
  For manual sampling.
- PPS-1000/1010, pneumatic push button control.
  For manual sampling.
- APS-1000/1010, pneumatic and electric control.
  For automatic sampling.

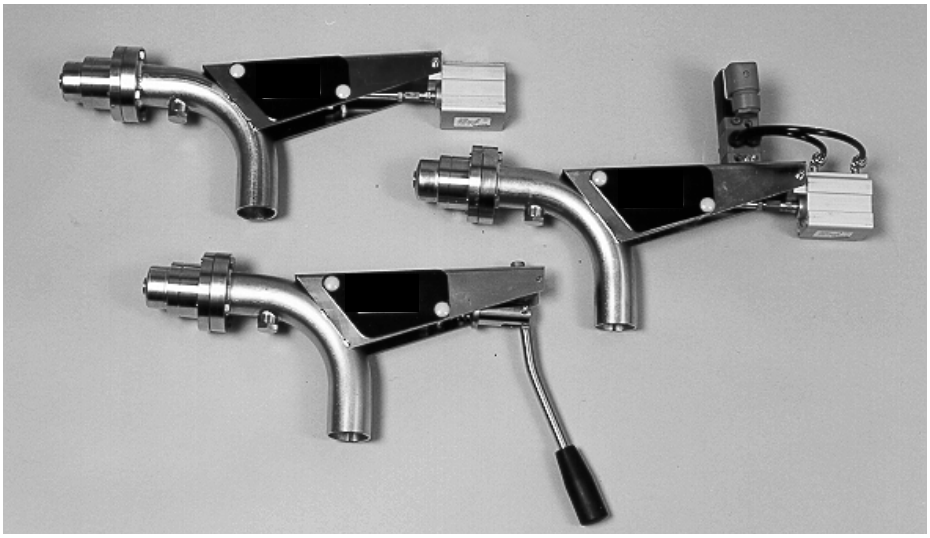
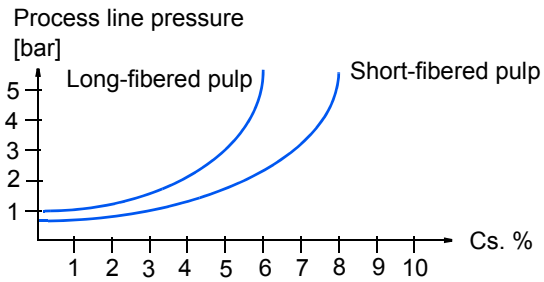


Fig 1 Pulp samplers – PPS-1000, MPS-1000 and APS-1000

1.2 Technical data

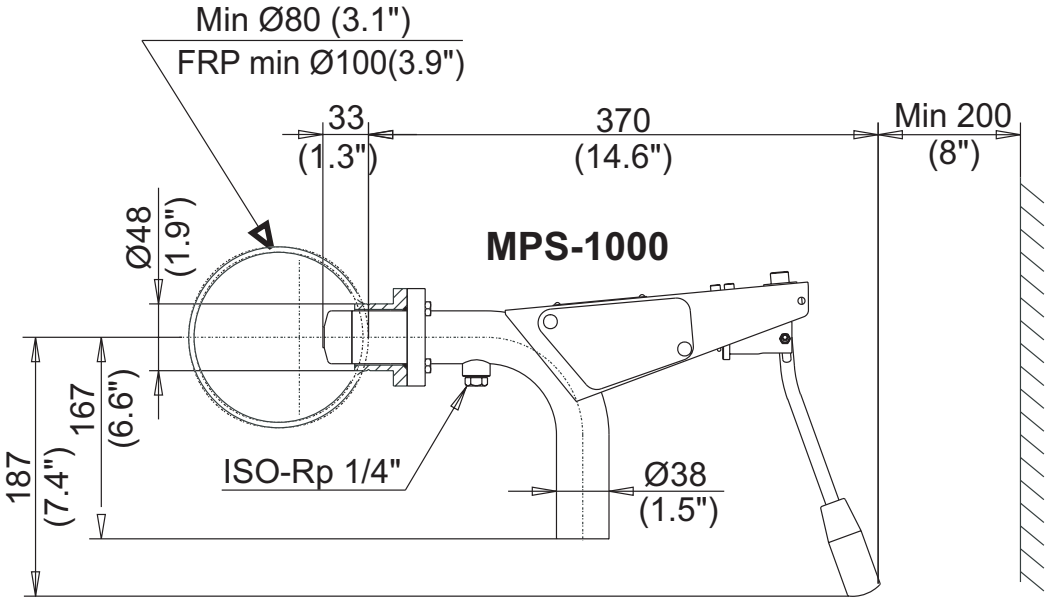
Type	MPS-1000, PPS-1000 and APS-1000
Manufacturer	BTG, Säffle, Sweden

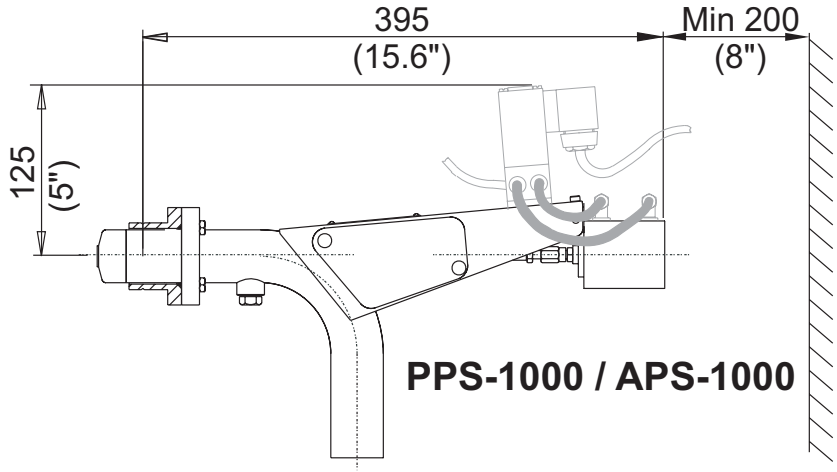
Process conditions	
Operating range	0 – 8% pulp. Suspended liquids must be pumpable
Max calculating pressure	16 bar (230 psi)
Max media pressure	10 bar (145 psi)
Min media pressure	 Minimum pressure in process line at different consistencies (Note! These values are only approximate)
Max media temperature	90ºC (194ºF)
Material	All wetted parts made of stainless steel quality SS 2343 or 254 SMO.

Connections	
Connection to process line (-1000)	Flanged weld-in stud or FRP-stud (only with 254 SMO)
Connection to process line (-1010)	NPT 1½" thread connection (only in SS2343)
Connection for flushing water	ISO–Rp 1/4
Air connections PPS- and APS-1000	ISO–G 1/8
Air pressure, PPS- and APS-1000	4–8 bar (58–100 psi)
Voltage APS-1000	24/48/110/220/240 V AC 50-60 Hz, 24 V DC

1.3 Dimensions

Fig 2 Dimensions and mounting





1.4 Working principle

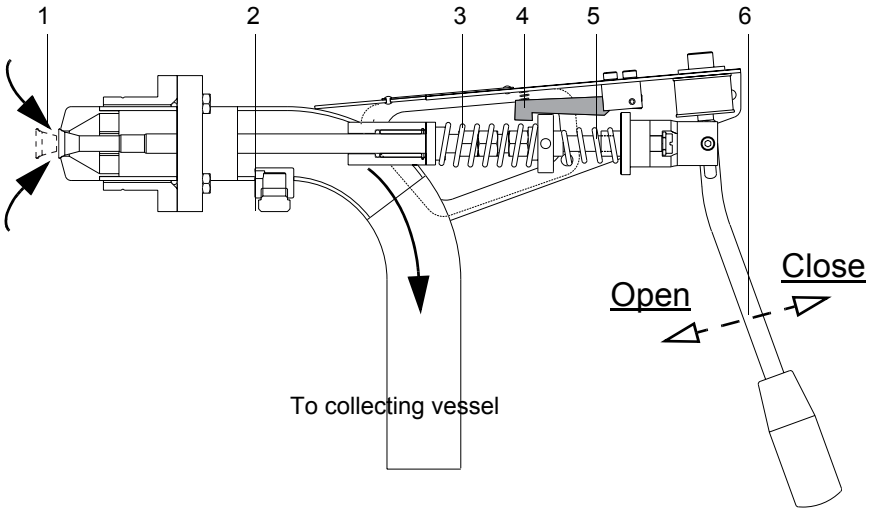
Solid arrows indicate the pulp's path through the sampler.

(2) Flushing water connection.
On the outlet a tube of max. 5 m can be connected.

1.4.1 MPS-1000

Fig 3 MPS-1000

1 Plug
2 Flushing water connection
3 Return spring
4 Lock latch
5 Opening spring
6 Lever arm



In fig. 3, the plug (1) is kept closed by return spring (3) in closed position.

Move lever arm (6) towards the pulp line during sampling. At first the opening spring (5) is compressed, whereupon the lock latch (4) is released. The plug will now open entirely, which prevents de-watering during sampling.

Move the lever arm backwards after sampling. The return spring will now close the plug. A better seal can be achieved by pulling the lever arm firmly backwards.

1.4.2 PPS-1000

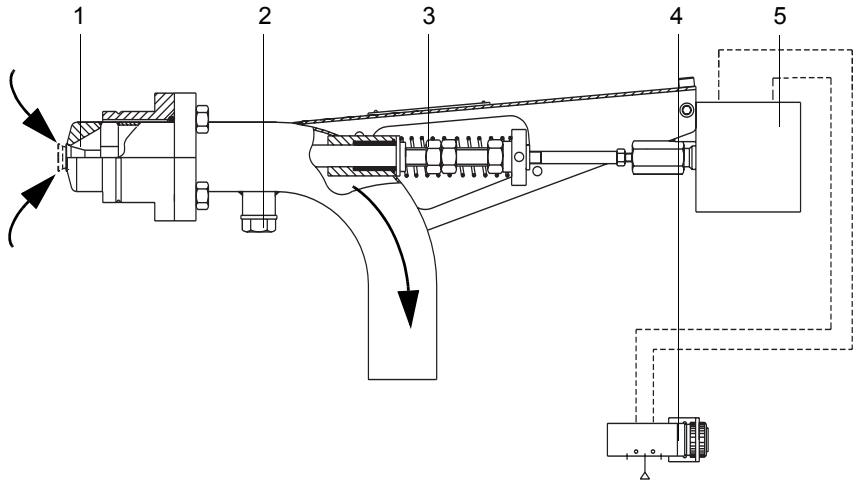
In fig. 4, the pneumatic version controlled by a push button is adapted for installation in difficult to access locations.
Otherwise it is the same design and function as the MPS-1000.

The plug (1) is kept in closed position by the return spring (3) and the air cylinder (5).

Sampling takes place when the push button (4) of the manual air valve is pushed. The air cylinder will then open the plug. Sampling is finished when the push button is released.

Fig 4 PPS-1000

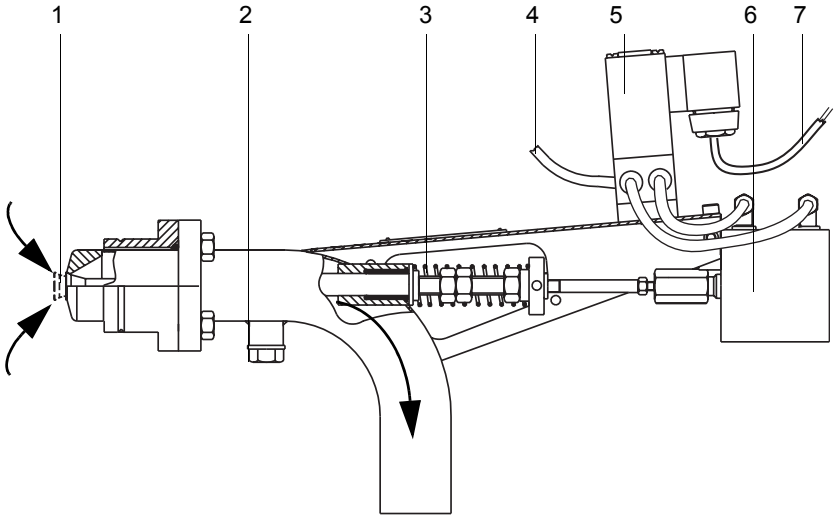
1 Plug
2 Flushing water connection
3 Return spring
4 Push button
5 Air cylinder



1.4.3 APS-1000

Fig 5 APS-1000

1 Plug
2 Flushing water connection
3 Return spring
4 Air inlet
5 Solenoid valve
6 Air cylinder
7 Cable



Electric version, see fig. 5, is automatically controlled by a programmable control system. Otherwise it is the same design and function as the MPS-1000 and PPS-1000.

Sampling takes place when the solenoid valve (5) receives an impulse from the programmable control system/DCS. The air cylinder (6) will then open the plug.

2 Safety recommendations

2.1 General safety recommendations

Read the manual for detailed information.

Installation, handling and service must only be carried out by trained and authorized personnel and according to valid standard.

- The product is designed for industrial use.
- Installation category: III
- IP Code: IP65 / NEMA 4X
- Take precautions when handling equipment in pressurized/hot lines.

2.2 Safety recommendations for the pulp samplers MPS/PPS/APS-1000.

These safety regulations are based on a risk analysis carried out in accordance with the requirements of relevant EU-directives and in order to comply with EN safety standards.

Read these safety regulations before installing the sampler. Follow the regulations when installing, operating and servicing the sampler.
Use warning signs for safety information!

Mounting parts, such as the weld-in stud, are dealt with in accordance with the pressure vessel standards of the countries in question.

⇨ **For good personal and functional safety: Use only parts which have been manufactured or approved by BTG.**

Assure yourself that the pipe is empty before opening it up!

2.3 Selecting a sampler model

Select a material for the wetted parts in order to avoid corrosion – see section 1.2: *Technical data*.

2.4 Installing mounting details

Welding and subsequent inspection should take place in accordance with current standards and regulations.

2.5 Installing the sampler

Check that the screws/nuts holding the sampler together are mounted and properly tightened.

- Construct a platform or use safe and approved ladders if the sampler is located high up. This platform will make it easier and safer to fit and use sampler and carry out service in the future.
- Before the installed sampler is put in operation make sure that all bolted joints are properly tightened to the flange.
- When the sampler has been installed, test pressurization should be carried out using water in the pipeline. The test pressure is adapted to standards and regulations in each country. In some lines for which inspection is required, pressure test must be carried out before the product can be commissioned.
- If there are vibrations, we recommend dampening the vibrations of the pipe line and supporting the sampler in order to avoid material exhaustion and mechanical wear out.

2.6 Starting up and servicing the sampler

Read through the following points before using and servicing the sampler. Bear also in mind that the points mentioned above contain important information for these operations.

- To prevent electrical shock connect the protective ground ⏚ PG properly (when applicable).
- Before removing the sampler from the weld-in stud, check carefully that the line is empty. **Hot or corrosive liquid flowing out under pressure may cause serious chemical burn injuries!**
- When the sampler is exposed to dangerous basic or acidic corrosive media, it should be removed from the pipeline regularly for inspection. Replace any damaged parts. If the pressurized parts of the sampler or weld-in stud have corroded, check that the material is correct for the application. **Leakages may cause personal injury or damage to equipment due to corrosion or burning!**

3 Installation instructions

3.1 Planning the installation

When installed in lines over 3 bar (44 psi), the outlet should be provided with a pipe of at least 0.5 m (1.6 ft.) to avoid splashing.

Read the section 2: *Safety recommendations* carefully before installation. The pulp sampler works more efficient if the following rules are taken into consideration.

- The pipe diameter must not be less than 80 mm (3.15 inch). When using an FRP-stud the pipe diameter should be at least 100 mm (4 inch).
- Don't install the sampler where it can be exposed to mechanical damage or heavy vibrations.
- Install the sampler in a vertical pipe with upward flow.

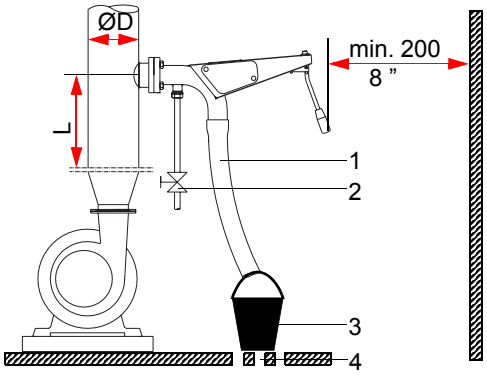


Fig 6 Typical installation of MPS-1000

1 Sampling outlet
2 Water connection, ISO–Rp 1/4
3 Sampling vessel
4 Drain

ØD = 200 mm/8"
L = Min. 1 m/3.3 ft. or (3x D)

- If the sampler must be installed in a horizontal or sloping pipe position it according to Fig 7..

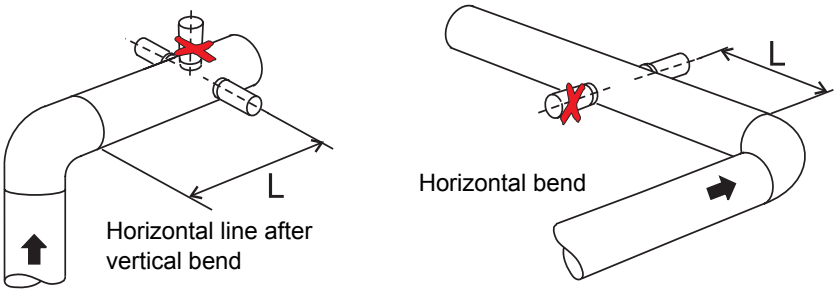


Fig 7 Installations after bends

⇨ **Do not install the sampler in a downward slope flow due to the risk for air bounds in the pipe.**

- Find a place close to the surface of a floor for easy handling of sampling procedure.
- Choose a site close to the transmitter and where the pulp is well mixed. The distance between the sampler and pump flange (L) must be at least 1000 mm (40 inch) or 3 times the pipe diameter.
- Make sure drain and water for flushing is available.

3.2 Installation of stud

Make sure the line is empty and pressure-less before drilling the hole and installing the welded stud! Leaking pulp can cause personal injury.

Find a place to mount the sampler according to section 3.1: *Planning the installation*. The distance between the sampler and pump flange must be at least 1000 mm (40") or 3 times the pipe diameter.

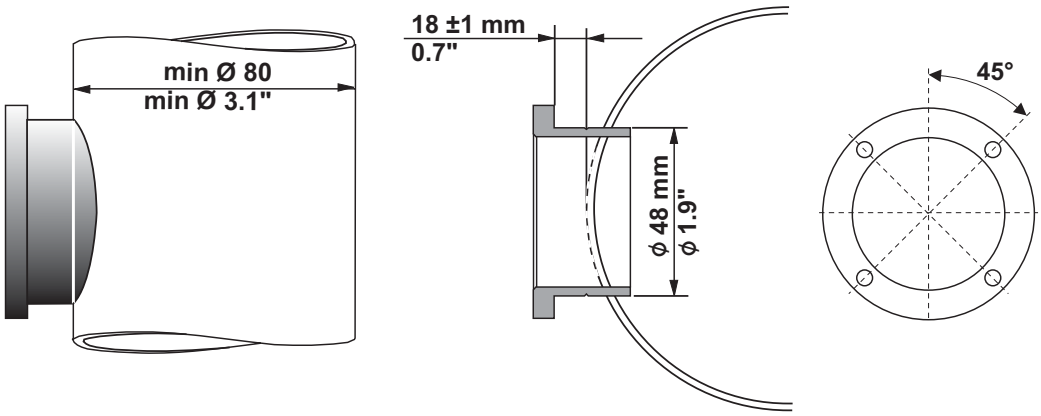
3.2.1 Weld-in stud

When mounting the pulp sampler with a weld-in stud, the diameter of the pipe must be at least 80 mm (3.15 inch).

Drill a whole, Ø 48 mm (1.9 inch), where the sampler shall be inserted in the pipe. Insert the stud so that the mounting groove is in line with the pipe wall.

Note the location of the screw holes, see fig 8. Weld the stud to the pipe.

Fig 8 Installation of weld-in stud



3.2.2 FRP-stud

When using an FRP-stud the pipe diameter should be at least 100 mm (4 inch).

Adapt the stud to the pipe wherein the sampler shall be inserted, so as much of the stud as possible protrudes on the outside. Then fasten the stud to the pipe by a plastic agent. Note the location of the screw holes, see fig 8.

3.2.3 Threaded socket

When mounting the pulp sampler with a weld-in screwed socket, the diameter of the pipe must be at least 80 mm (3.15 inch).

Drill a whole, Ø 60 mm (2.4 inch), where the sampler shall be inserted in the pipe. Insert the socket so that the mounting groove is in line with the pipe wall. Weld the socket to the pipe

3.3 Mounting the sampler

1. Position the sampler with the outlet downwards.
2. Fit the sampler to the stud with four M6 screws (M8 screws are used on the SMO and FRP versions). Remember to install the O-ring!
3. Connect water to the sampler so it can be flushed after sampling – ISO–Rp 1/4.
4. Connect the bypacked 0.5 m long tube to the sampler outlet. Max tube length 5 m (16.4 ft), Ø 38 mm (1.5 inch).

3.3.1 PPS-1000, additional measures

Install the control air valve and connect compressed air – ISO–G 1/8.

3.3.2 APS-1000, additional measures

1. Connect compressed air to the solenoid valve– ISO–G 1/8. Make sure that the feeding voltage corresponds to the nominal voltage – see section 1.2: *Technical data*.
2. Program the control system to the adequate sampling sequence.

3.3.3 MPS/PPS/APS-1010, additional measures

For the threaded models, tighten the thread with thread sealing before mounting. Make sure the outlet is positioned downwards.

4 Operating Instructions

4.1 Sampling

Always use safety glasses and gloves during work with caustic and hot media.

Before sampling starts, make sure the sampler is clean by flushing it with water. Any remaining fibers from previous samples will decrease the accuracy of the new sample.

4.1.1 MPS-1000/1010

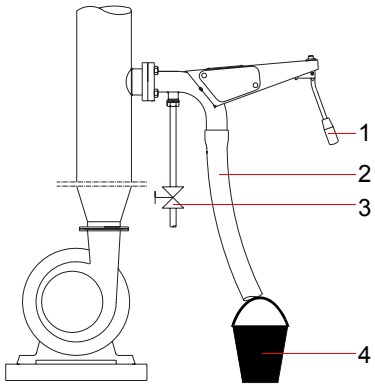


Fig 9 Sampling with the MPS-1000

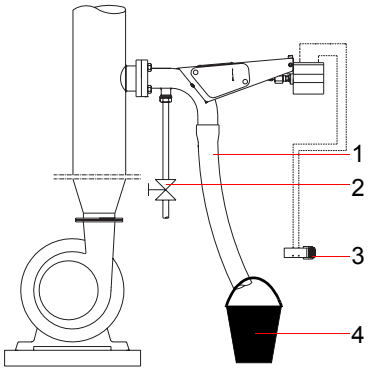
1 Lever arm
2 Sampling outlet
3 Water flushing
4 Sampling vessel

1. Place a vessel (4) with a volume of min. 5 l (1.3 US gallon) under the sampler outlet (2).
2. Push the lever arm (1) forward. Extract a sample of approx. 3 l (0.8 US gallon.)
3. Release the lever arm and the sampler will close. Pulling the lever arm firmly backwards will ensure a solid closure by the plug.
4. After sampling, flush the sampler with water (3).

4.1.2 PPS-1000/1010

Fig 10 Sampling with the PPS-1000

1 Sampling outlet
2 Water flushing
3 Air valve button
4 Sampling vessel



1. Place a vessel (4) with a volume of min. 10 l (2.6 US gallons) under the sampler outlet (1).
2. Start sampling by pushing and holding the air valve button (3) . During sampling the sampler is completely open. Sampling time should be between 2 and 10 seconds.
3. Release the push button so the sampler closes.
4. After sampling, flush the sampler with water (2) .

4.1.3 APS-1000/1010

1. Place a vessel with a volume of min. 10 l (2.6 US gallons) under the sampler outlet.
2. The APS takes samples automatically. The solenoid valve is activated by a programmable control system. Sampling time should be between 2 and 10 seconds.
3. After sampling, make sure the sampler is flushed with water.

⇨ **Always clean the sampler after sample collecting, by water flushing.**

5 Service instructions

5.1 Maintenance

If the sampler leaks during the resting phase, push and pull the lever arm a few times to clean the nozzle from dried pulp or foreign matters.

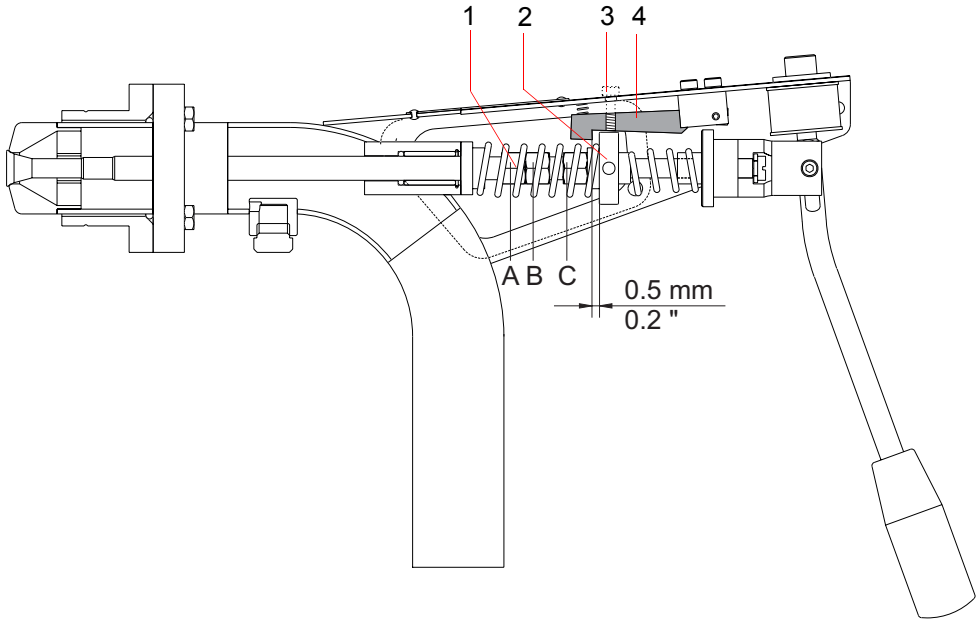
The most common cause for a leaking sampler is insufficient cleaning after sampling - see section 4: *Operating Instructions*.

5.1.1 Adjusting sampling volume

Depending on pressure and consistency, the nuts A and B shall be adjusted so that the pulp flow is 0.5 – 1.0 l/s (0.15 – 0.25 US gallon/s) at normal pressure. See fig 11

Fig 11 Adjusting of sampler

1 Nut, A,B and C
2 Washer
3 M4 Screw (not included)
4 Lock Latch



5.1.2 Adjusting locking device, MPS-1000

Adjust the gap between lock latch (4) and washer (2) to 0.5 mm as in fig 11.

Loosen nut C by inserting a pin, Ø 5 mm, in one of the holes on the washer. If necessary, the lock device can be disconnected by means of an M4 screw from above (3). The latch is then blocked in open position.

5.2 Dismantling and assembling the sampler

5.2.1 MPS-1000/1010

Make sure the line is empty and pressure-less before opening it up.

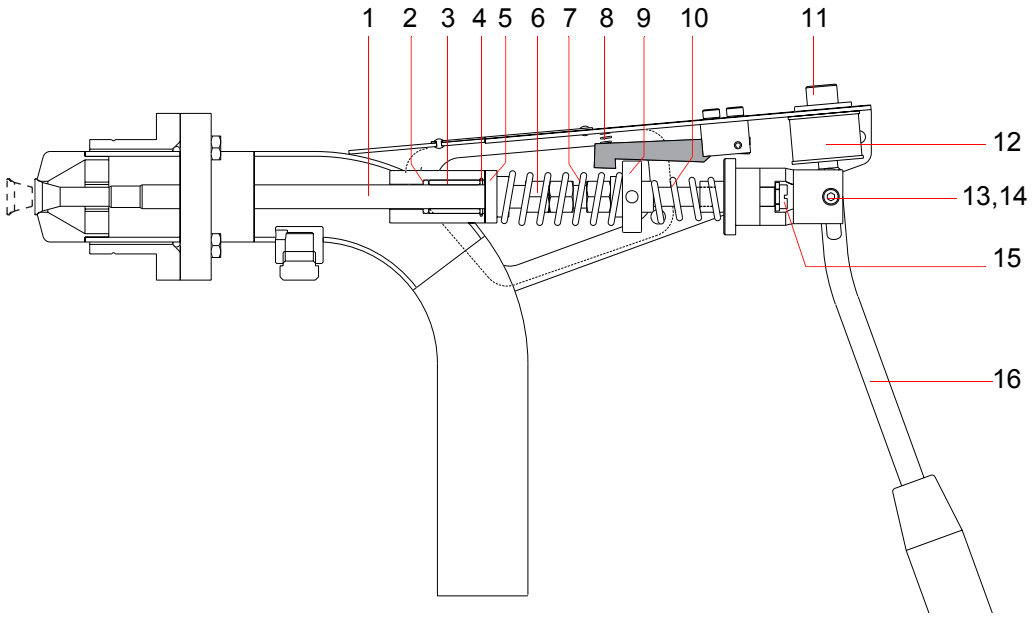
Disconnect water connection. Remove the sampler from the pipe and clean it. If necessary mount the blind flange or 1½" NPT plug. Bring the sampler to the work shop.

Numbers in bracket refer to fig 12.

1. Remove screw (11).
2. Remove screw (13) and lock-nut (14).
3. Remove lever arm (16) with the rubber damper (12).
4. Remove screw (15).
5. Remove spring (10) and washer (9). Remove spring (7) with lock nuts (6) and spring support (5).
6. Pull out the spindle (1) and replace worn parts. Take care that the spring (8) isn't lost.
7. First remove safety ring (4) and slide bushing (3) when fitting new O-ring (2). A renovation set for sampler is available – see section 6.6
8. Reassemble the sampler in reverse order.
9. Mount the sampler to the process line.
10. Readjust the opening so pulp flow is 0.5 – 1 l/s, see section 5.1.1: *Adjusting sampling volume*.
11. If necessary, adjust the lock device, see section 5.1.2: *Adjusting locking device, MPS-1000*.

Fig 12 MPS-1000

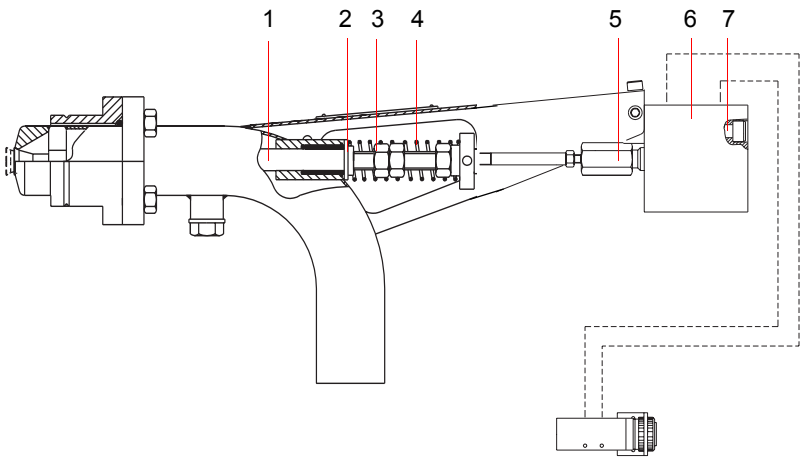
1 Spindle
2 O-ring
3 Slide bushing
4 Safety ring
5 Spring support
6 Lock nuts
7 Return spring
8 Spring
9 Washer
10 Spring
11 Screw
12 Rubber damper
13 Screw
14 Lock washer
15 Screw
16 Lever arm



5.2.2 PPS-1000/1010 and APS-1000/1010

Fig 13 PPS-1000

1 Spindle
2 Spring support
3 Lock nuts
4 Return spring
5 Adjustment screw
6 Air cylinder
7 Screws



Make sure the line is empty and pressure-less before opening it up.

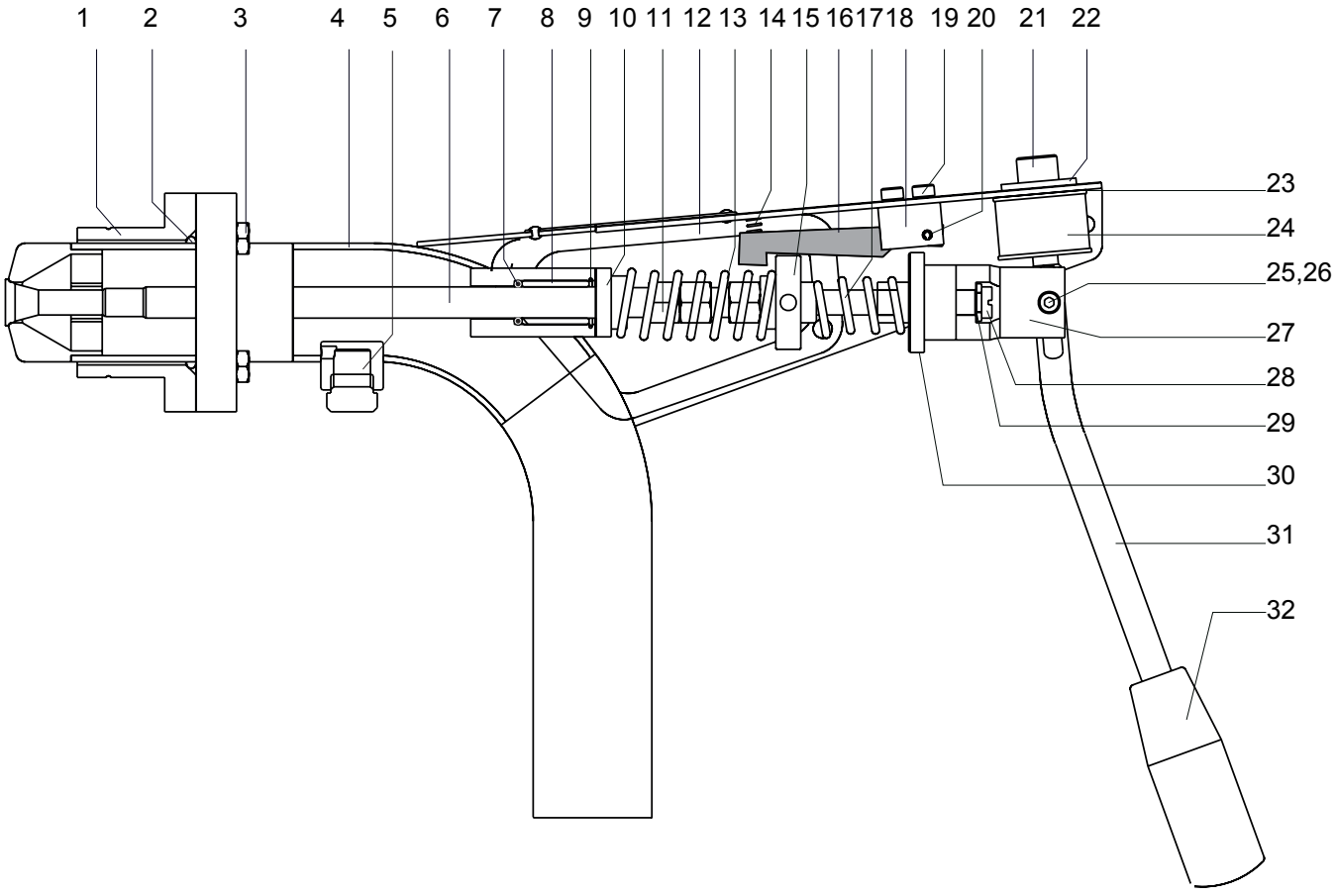
Disconnect water connection, air connection and electrical connection (if any). Remove the sampler from the pipe and clean it. If necessary mount the blind flange or 1½" NPT plug. Bring the sampler to the work shop.

1. Remove the screws (7), the adjustment screw (5) and remove the air cylinder (6).
2. Remove spring support (2), spring (3) and lock nuts (4).
3. Pull out the spindle (1) and replace worn parts.
4. Reassemble the sampler in reverse order.
5. Mount the sampler to the process line and adjust the opening, see section 5.1.1: *Adjusting sampling volume*.

6 Spare parts

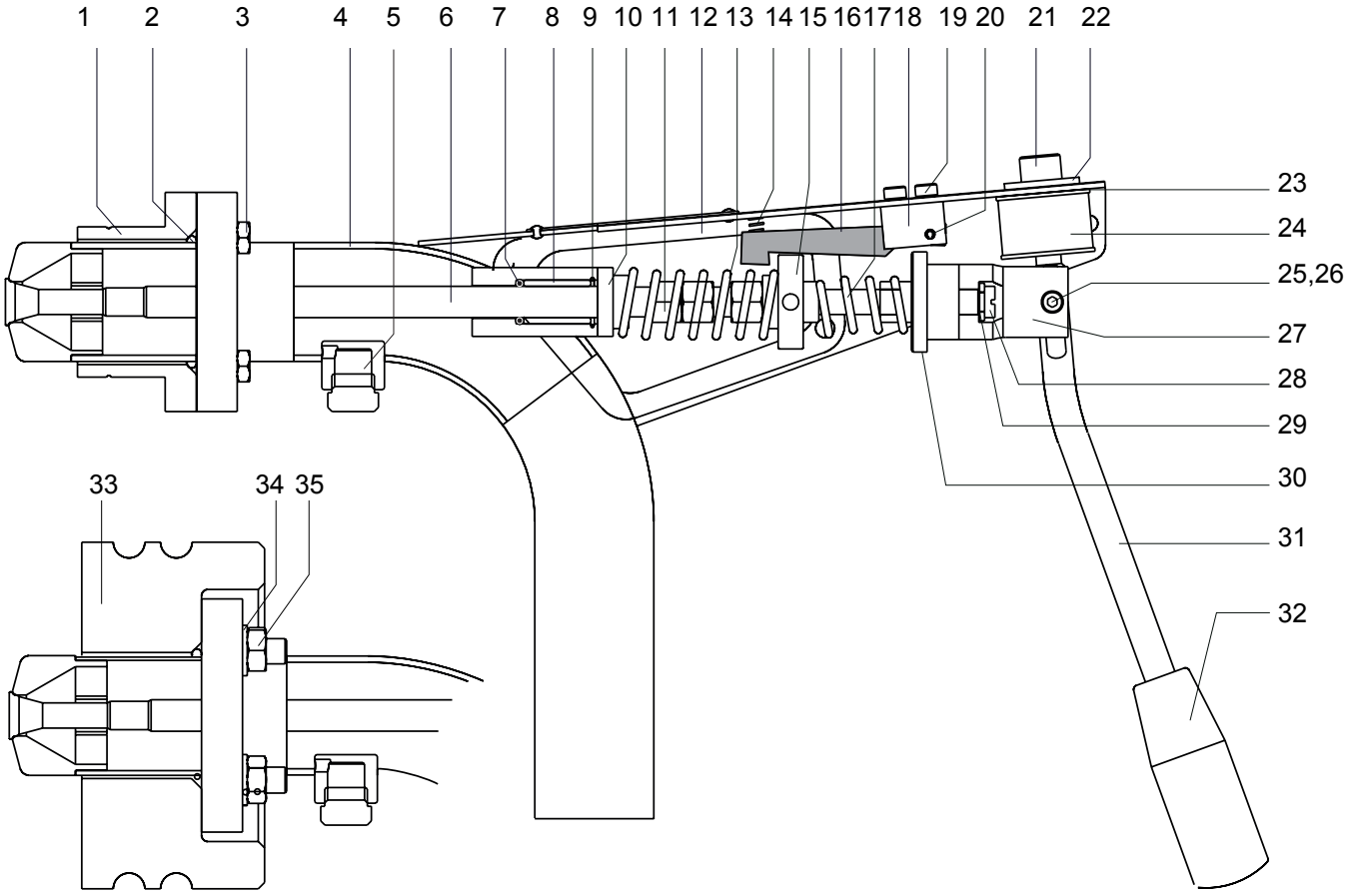
Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
		1	93312718	Sampler, complete MPS-1000	SS2343
		1	A0002477	Sampler, complete MPS-1000	254 SMO
		1	A0004341	Sampler, complete MPS-1000	254 SMO/FRP
		1	A0016238	Sampler, complete MPS-1010	SS2343, threaded version
		1	92126612	Sampler, complete APS-1000	SS2343
		1	A0004374	Sampler, complete APS-1000	254 SMO
		1	A0004382	Sampler, complete APS-1000	254 SMO/FRP
		1	A0016246	Sampler, complete APS-1010	SS2343, threaded version
		1	92126622	Sampler, complete PPS-1000	SS2343
		1	A0004358	Sampler, complete PPS-1000	254 SMO
		1	A0004366	Sampler, complete PPS-1000	254 SMO/FRP
		1	A0016253	Sampler, complete PPS-1010	SS2343, threaded version

6.1 MPS-1000



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	14449623	Weld-in stud	SS2343
2		1	27000835	O-ring, Ø 36,2 x 3	
3		4	15012156	Screw M6 x 25	SS2343
4		1	73312720	Housing	SS2343
5		1	37007507	Plug	SS2343
6		1	14444889	Spindle unit	SS2343
7		1	27013853	O-ring, Ø 9,3 x 2,4	
8		2	14444897	Slide bushing	SS2343
9		1	14444905	Safety ring	
10		1	14444913	Spring support	
11		3	14444939	Nut	
12		2	84447622	Cover	
13		1	14449516	Spring	
14		1	19001189	Spring	
15		1	14444947	Washer	
16		1	14444954	Lock latch	
17		1	14449508	Spring 16 x 2, 5 x 4	
18		1	14444962	Latch holder	
19		2	15013485	Screw MC6S M4 x 6	
20		3	18001024	Clamping pin	
21		1	15020449	Screw, MC6S 8 x 10	
22		1	17002700	Washer	
23		1	A0004283	Gasket	
24		1	29003944	Rubber damper	
25		1	15019813	Screw	
26		1	16001406	Lock nut	
27		1	14444988	Fork	
28		1	15015233	Screw	
29		1	17000563	Washer 6.4 x 12.5	
30		1	14445001	Washer	
31		1	14444970	Lever arm	
32		1	29003225	Handle	

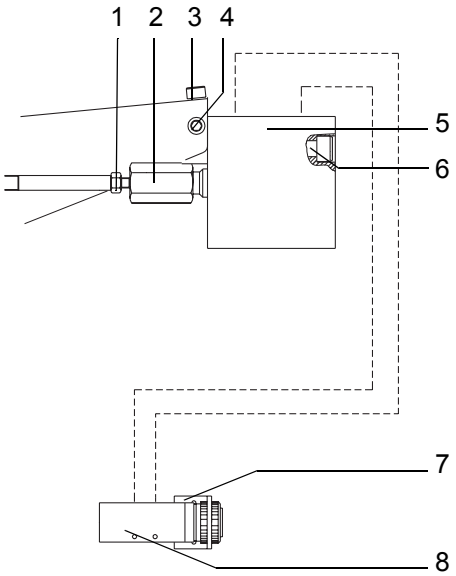
6.2 MPS-1000 SMO/FRP versions



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	A0002592	Weld-in stud	254 SMO
2		1	27000835	O-ring, Ø 36,2 x 3	
3		4	15012248	Screw M8 x 25	254 SMO
4		1	A0002667	Housing	254 SMO
5		1	37008885	Plug	254 SMO
6		1	A0002519	Spindle unit	254 SMO
7		1	27013853	O-ring, Ø 9,3 x 2,4	
8		2	A0002642	Slide bushing	254 SMO
9		1	14444905	Safety ring	
10		1	14444913	Spring support	
11		3	14444939	Nut	
12		2	84447622	Cover	
13		1	14449516	Spring	
14		1	19001189	Spring	
15		1	14444947	Washer	
16		1	14444954	Lock latch	
17		1	14449508	Spring 16 x 2, 5 x 4	
18		1	14444962	Latch holder	
19		2	15013485	Screw MC6S M4 x 6	
20		3	18001024	Clamping pin	
21		1	15020449	Screw, MC6S 8 x 10	
22		1	17002700	Washer	
23		1	A0004283	Gasket	
24		1	29003944	Rubber damper	
25		1	15019813	Screw	
26		1	16001406	Lock nut	
27		1	14444988	Fork	
28		1	15015233	Screw	
29		1	17000563	Washer 6.4 x 12.5	
30		1	14445001	Washer	
31		1	14444970	Lever arm	
32		1	29003225	Handle	
33		1	A0004309	FRP-stud, for samplers of 254 SMO quality only	FRP-version
34		4	16000135	Nut M6M 8	FRP-version
35		4	17001926	Washer	FRP-version

6.3 PPS-1000

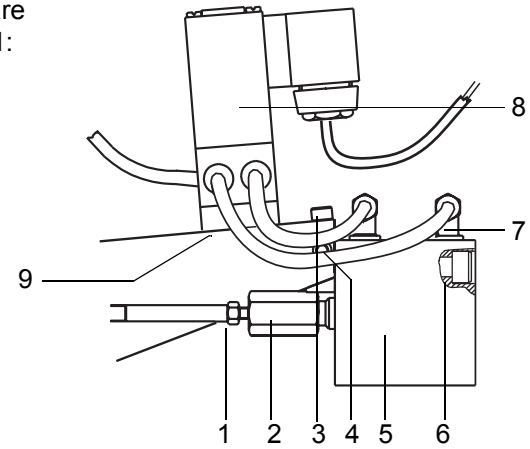
Parts common for all samplers are shown in the table in section 6.1: *MPS-1000*.



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	16000119	Nut	
2		1	14456321	Adjusting screw	
3		3	15007586	Screw, MC6S M4 x 8	
4		1	14456339	Cylinder holder	
5		1	35005602	Air cylinder	
6		2	15018690	Screw, MC6S M5 x 60	
7		1	35005628	Wall bracket	
8		1	35005610	Air valve, manually controlled	

6.4 APS-1000

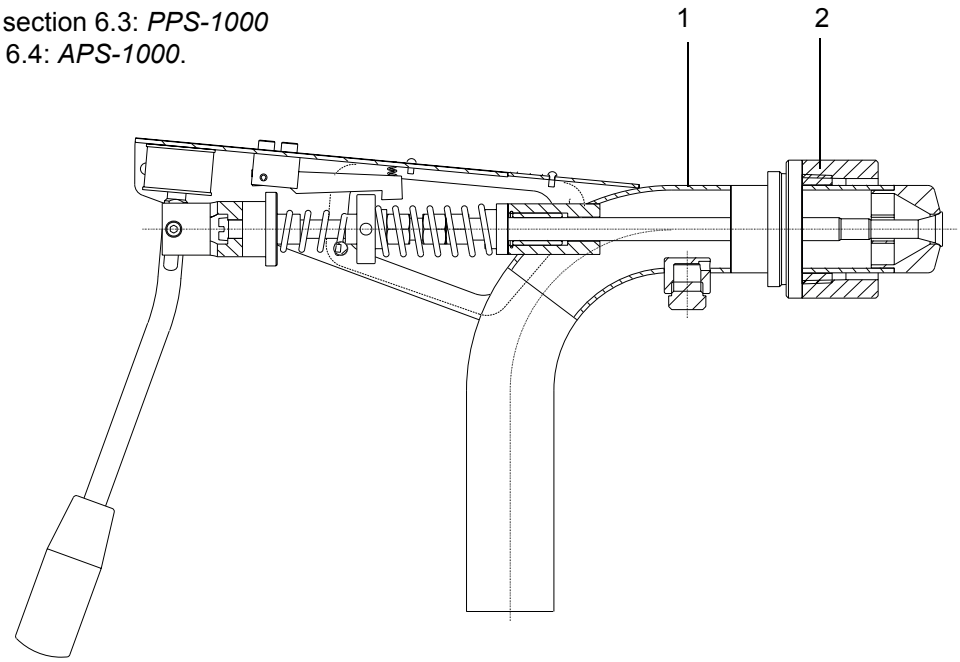
Parts common for all samplers are shown in the table in section 6.1: *MPS-1000*.



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	16000119	Nut	
2		1	14456321	Adjusting screw	
3		3	15007586	Screw, MC6S M4 x 8	
4		1	14456339	Cylinder holder	
5		1	35005602	Air cylinder	
6		2	15018690	Screw, MC6S M5 x 60	
7		1	35001650	Angular coupling	
8		1	46020186	Solenoid valve, 24V 50-60 Hz	
			46023677	Solenoid valve, 42 V 50-60 Hz	
			46019220	Solenoid valve, 48 V 50-60 Hz	
			46017141	Solenoid valve 110 V 50-60 Hz	
			46017158	Solenoid valve 220 V 50-60 Hz	
			46023685	Solenoid valve 240 V 50-60 Hz	
			46025300	Solenoid valve, 24V DC	
9		2	15013485	Screw, MC6S M4 x 6	

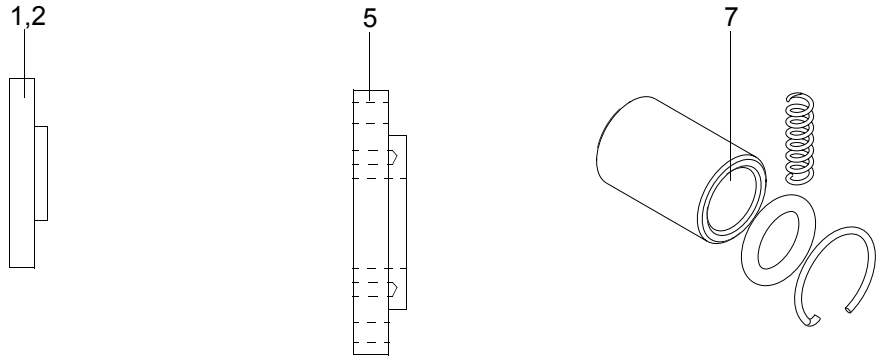
6.5 MPS/PPS/APS-1010

Parts common for all samplers are shown in the table in section 6.1: *MPS-1000*, section 6.3: *PPS-1000* and section 6.4: *APS-1000*.



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	A0016303	Housing	
2		1	A0016295	Weld-in screwed socket	

6.6 Accessories



Item No.	Rec. spare parts	Qty	Part No.	Spare Part	Description
1		1	14449946	Blind flange	SS 2343
2		1	A0002675	Blind flange	254 SMO
3		1	32002461	Tube Ø 38 mm (1.5") inside, length 0.5 m.	Included in delivery for all samplers
4		1	35003185	Clamp for do.	Included in delivery for all samplers
5		1	24444788	Adapter flange	For mounting on the VXK/ LDS/FVS welding stud
6		1	27011691	O-ring for do.	67.1x1.6
7	*		A0011387	Renovation set for sampler	Item no. 7,8,9 and 14 in section 6.1

Remarks

Screws, nuts, etc.:
Symbol **SS** states stainless steel to SS 2343.
Strength 8.8 is standard.

All symbols are according to Swedish standards.

Notes:

Recommended spare parts marked * are typical for two years operation. Recommended spare parts marked (*) are less likely to fail but are recommended when a large number of units are to be maintained.