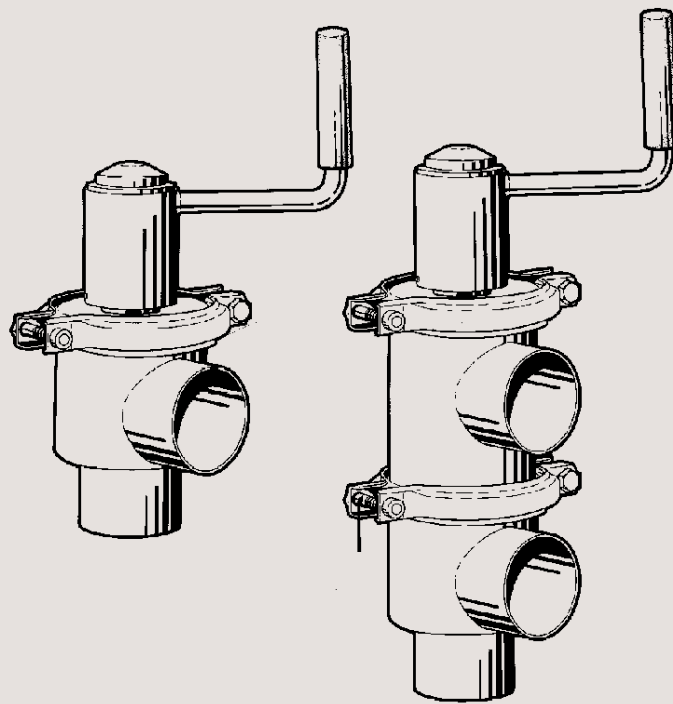




Instruction Manual

SMO Sanitary Manual Valve



Description.....2
Pressure drop diagrams3
Rubber materials 4-5
Dismantling and assembly6
Maintenance7
Dimensions8
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SMO Sanitary Manual Operated Valve

General

The SMO valve is a manual version of the remote controlled SRC valve.

The SMO valve is also available in an aseptic version with a diaphragm type stem seal or a steel-bellow type stem seal.

Valve body parts

The valve body part is designed as a stop valve or as a change-over valve and can have 2 to 5 ports.

The stop valve can have 2 or 3 ports and the change-over valve 3 to 5 ports.

The ports can be fitted with the required type of fittings for food tubing.

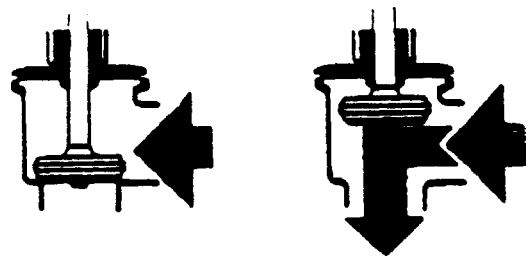
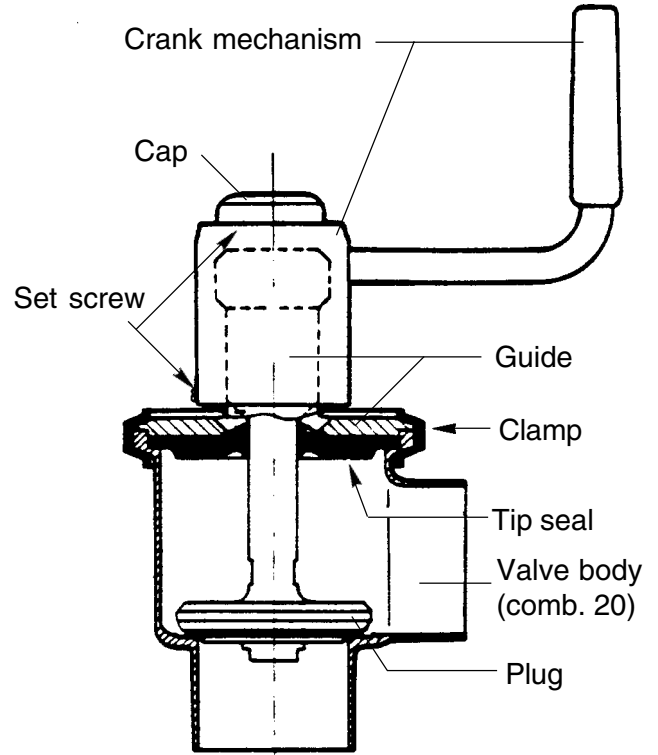
Clamp, lip seal and valve plug are included in the valve body part.

Crank mechanism

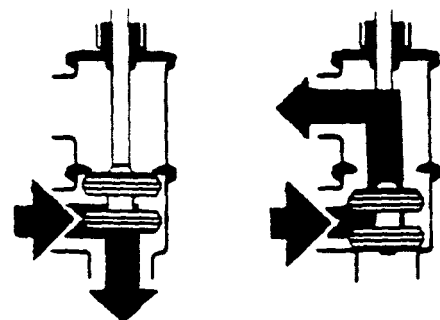
The valve is operated by means of a crank mechanism. about seven turns of the crank result in full stroke of the valve plug.

Rings on the outside of the guide show 4 mm of the stroke. One turn of the crank corresponds to 4 mm of the stroke.

All parts with the exception of the guide are common for all valve sizes and versions. There are two guide sizes, one for 38-63.5 mm (1½"-2½") and one for 70-101.6 mm (3"-4").

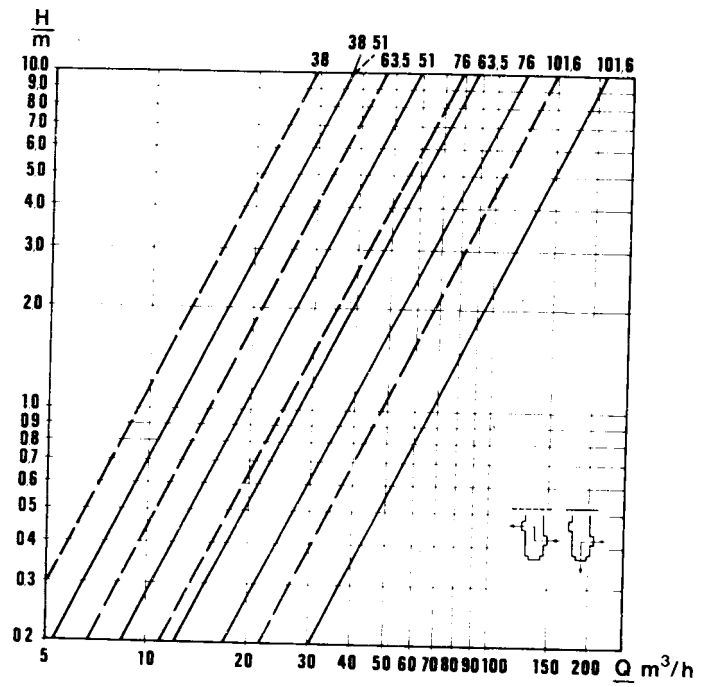
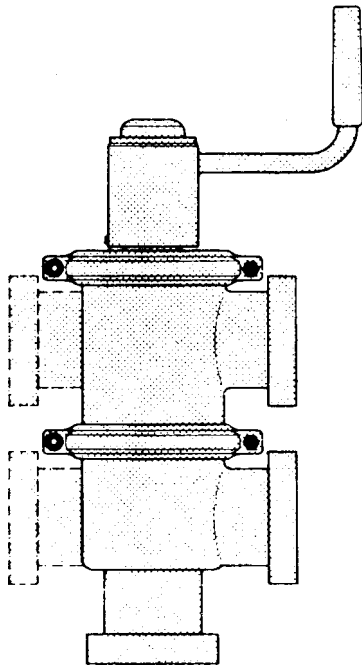


Change-over valve

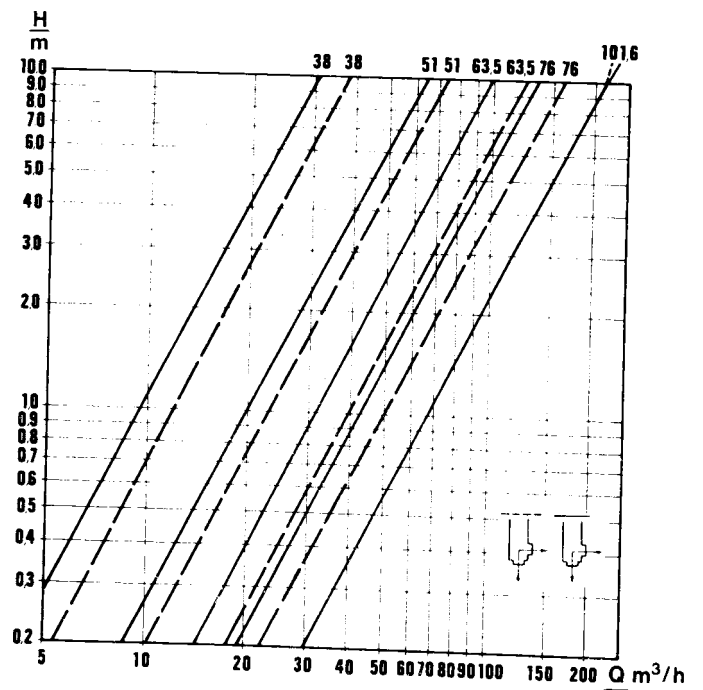
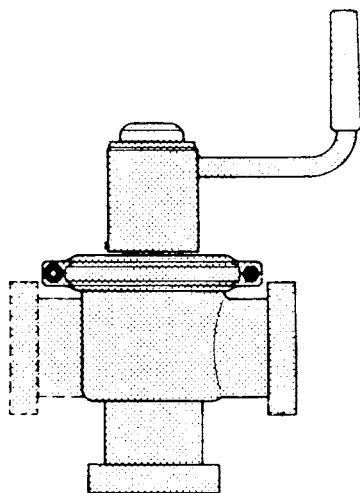


Stop valve

Change-over valve



Stop valve



Rubber grades, application

Rubber seals in contact with the liquid are available in three grades:

1. EPDM rubber (standard)
This grade is temperature resistant up to 140°C but is sensitive to oil and fat. The lip seal must not be lubricated!
2. NBR rubber
This grade is oil resistant and should replace EPDM rubber when the valves are used for margarine and butter-oil production for example and for other products containing oil and fat in high concentrations.
At high temperatures the rubber ages rapidly and become brittle. Max. temperature should be approx. 90-95°C in order that the life of the rubber does not become too short.
3. FPM rubber
FPM is resistant to aggressive liquids. The rubber grades above can be used for many liquids, both in the food industry and in other industries.
Contact us in doubtful cases.

Marking

1. EPDM rubber
Marked "1" (corresponds with the last figure in the part No).
2. NBR rubber
Marked "2" (corresponds with the last figure in the part No).
3. FPM rubber
Marked "3" (corresponds with the last figure in the part No).

Storing

The rubber parts should be stored indoors and the max temperature should not exceed 30°C. (Low temperature does not damage the parts if they are warmed to room temperature before being used.)

The air humidity should not be so high that condensate is formed on the parts and packages.

The rubber parts should be protected from sunlight and the ozone in the air, particularly in rooms with electric motors, fluorescent lamps or if welding is carried out in the vicinity. Cardboard boxes or black plastic bags are suitable packaging materials. The above is particularly important for nitrile rubber.

Store the parts so that they do not become deformed. Permanent deformation may occur if seal rings hang on nails or if a lip seal is provided with a tag so that the lip becomes deformed.

Rubber materials should not be stored for more than five years without being checked before being fitted.

Rubber materials

The table below indicates the ranges of application for the packing materials.

Concentration, temperature etc. can affect the rubber considerably. The table only states guide values.

When in doubt, contact us.

| Rubber-grade | Weather ozon | Milk cream | Hot water steam, weak acids, alkali | Strong and oxidizing | Petrol oil, fats, (not milk and cream) | Solvent |
|---------------|------------------|------------|-------------------------------------|----------------------|--|------------------------------------|
| NBR. std. | Not satisfactory | Good | Good | Not Satisfactory | Good | Bad |
| EPDM | Excellent | Good | Excellent | Good | Bad | Bad |
| FPM | Excellent | - | Excellent | Good | Bad | Good (EPDM for acetone & alcohols) |
| PTFE (teflon) | Excellent | Excellent | Excellent* | Excellent | Excellent | Excellent |

* not steam and sodium hydroxide (NaOH)

Stop valve

The entire crank mechanism together with the plug and lip seal can be removed when clamp 9 is loosened.

1. Pry off cap 3. Remove upper set screw 7a and washer 4. Remove the washer by sliding it side ways.
2. Unscrew set screw 7b and then the crank until it comes off completely.
3. Push up the plug so that stem holder 5 comes up above the thread. Slide off the stem holder sideways.
4. Remove clamp 9.
5. Lift off guide 6, lip seal 8 and the plug.
6. Remove the screw at the bottom of the plug if the latter is to be dismantled.

When assembling the plug: **Tighten the screw so that the parts have metallic contact.** This is simplified by applying a thin layer of silicone oil on the packing. Use a cloth or a spray bottle. Wipe off any silicone oil from visible surfaces after assembly. Lock the screw with Loctite, Pliobond or something similar.

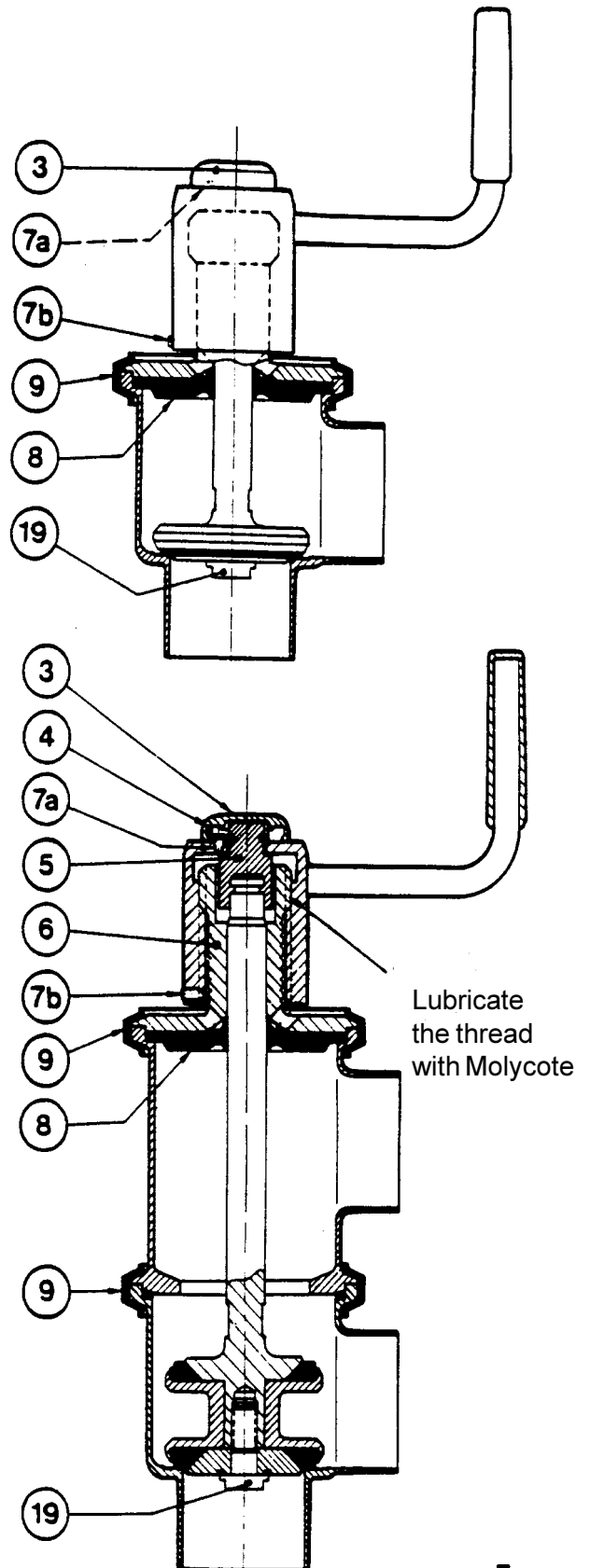
Assembly takes place in reverse order.

Note!

Do not forget to screw in set screw 7b when assembling the valve. It acts as a stroke stop. Without this screw the valve can be opened so far that the crank comes off. In some valve sizes the flats on the plug stem may enter into the lip seal, which will then leak.

Change-over valve

Dismantling and assembly take place nearly as for the stop valve, but the crank mechanism, together with plug and stem cannot be removed as a unit without the upper valve body also being removed.



Water hammer

Water hammer may occur, particularly in the stop valve, if the liquid flows into the valve through the side connection and if the valve is closed quickly.

Preventive maintenance

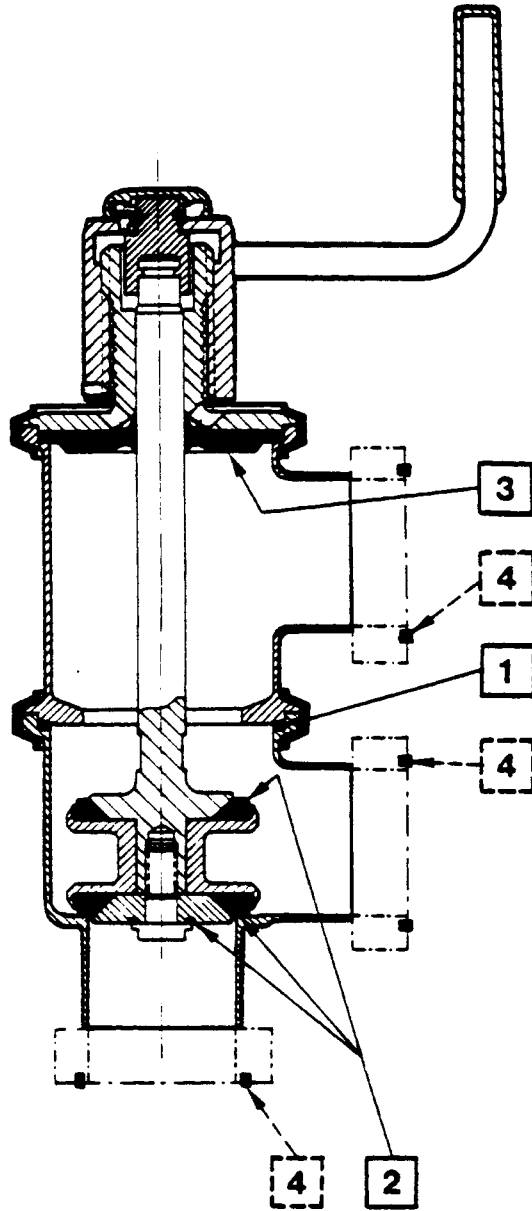
we recommend that preventive maintenance is carried out after one year's operation in one shift.

Valve body part

The following measures should be taken when dismantling the valve body part:

1. Check the packing for the valve body (only change-over valve).
Replace if necessary.
2. Replace packing(s) and O-ring in the valve plug.
3. Check that the lip seal is not worn or has leaked.
Replace if necessary.
4. Check the packings in the fittings.
Replace if necessary.

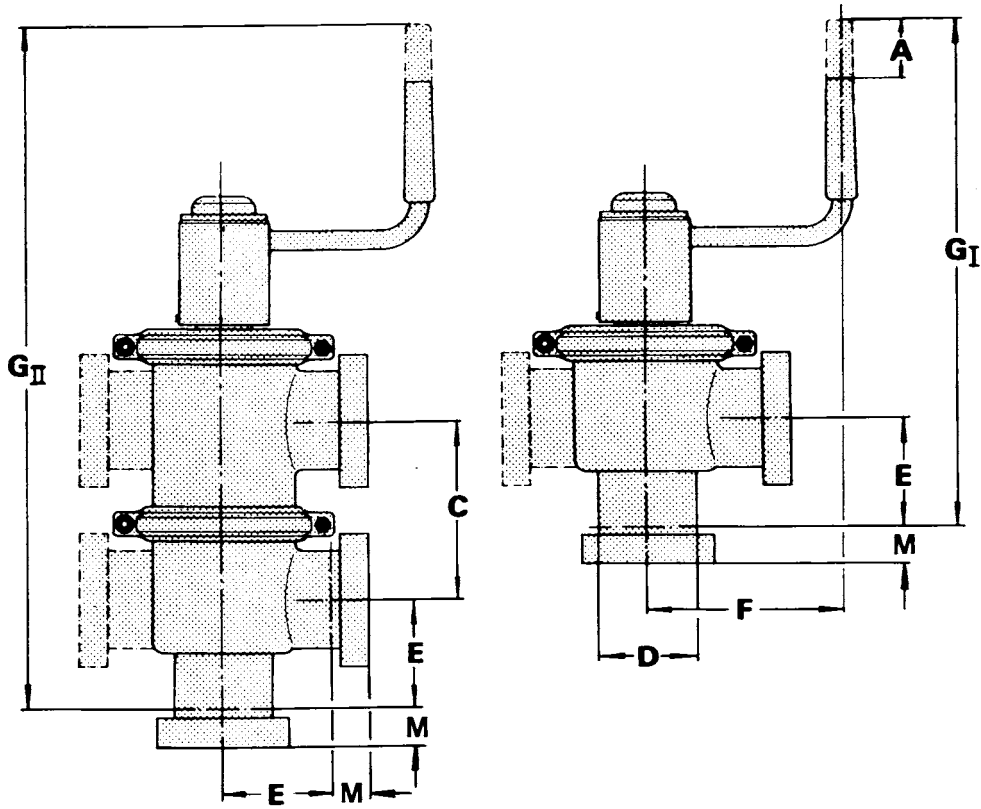
For dismantling and assembly of the valve, please refer to "**Dismantling and Assembly**".



Dimensions

8

Dimensions

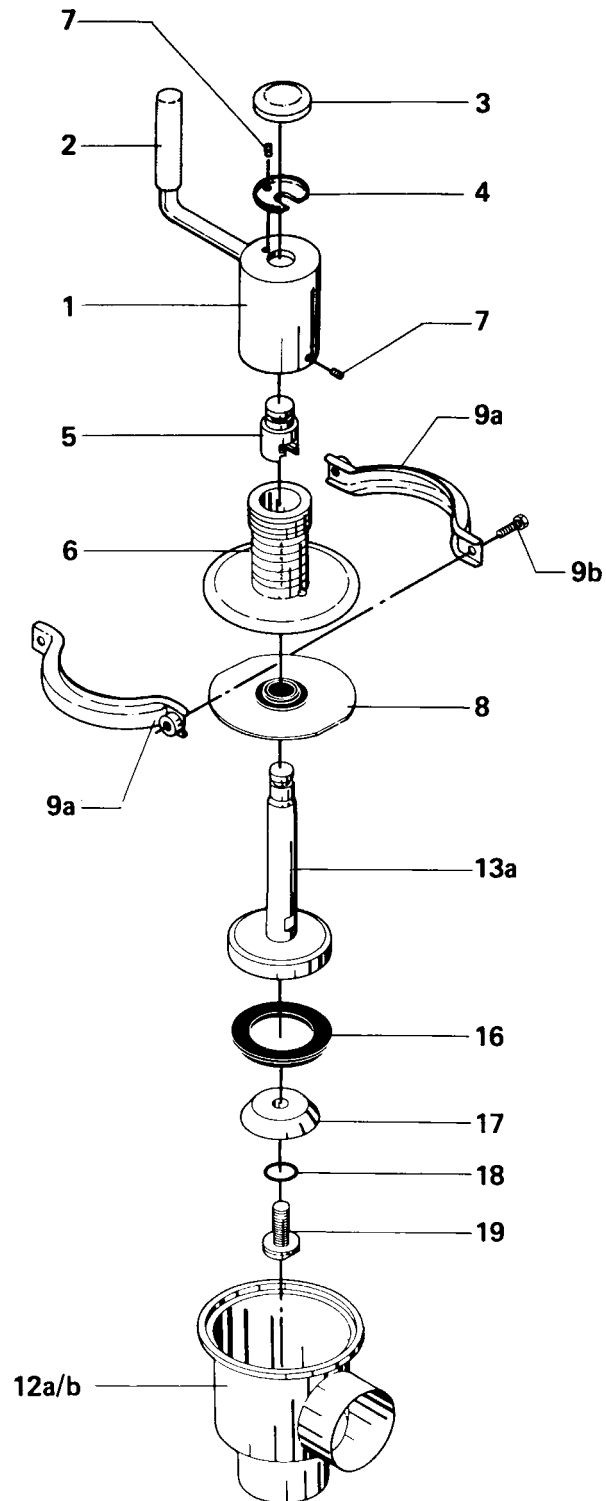


| D (Dim in mm) | 38 | 51 | 63.5 | 76 | 101.6 |
|---------------|-----|-----|------|-----|-------|
| A | 31 | 31 | 31 | 31 | 31 |
| C | 79 | 94 | 113 | 129 | 163 |
| E/W | 50 | 62 | 82 | 87 | 134 |
| F | 105 | 105 | 105 | 105 | 105 |
| G I | 168 | 278 | 312 | 329 | 401 |
| G II | 347 | 372 | 425 | 458 | 564 |
| M/SMS | 20 | 20 | 24 | 24 | 25 |
| M/ISO clamp | 21 | 21 | 21 | 21 | 21 |
| M/ISO male | 21 | 21 | 21 | 21 | 21 |
| M/DIN | 22 | 22 | 25 | 30 | 30 |
| M/BS | 22 | 22 | 22 | 22 | 22 |
| M/GC clamp | 12 | 12 | 12 | 12 | 15 |
| M/Bevel seat | 18 | 19 | 22 | 23 | 26 |
| M/H-line | 25 | 25 | 25 | 25 | 25 |



Stop Valve type SMO

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| |
|------------------------------|
| Reg. 4.1.12 - SP70156/1 9202 |
| Intro. 8301 |

OPERATING MECHANISM

| Pos. | Qty | Denomination | NW 40 38 mm | NW 50 51 mm | NW 65 63.5 mm | 76 mm | NW 80 | NW 100 101.6 mm |
|------|-----|-----------------------------|----------------|----------------|------------------|--------------|--------------|--------------------|
| | 1 | Crank mechanism compl | 31353-0530-1 | 31353-0530-1 | 31353-0530-1 | 31353-0530-2 | 31353-0530-2 | 31353-0530-2 |
| 1 | 1 | Crank | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 |
| 2 | 1 | Handle | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 |
| 3 | 1 | Cap | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 |
| 4 | 1 | Washer | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 |
| 5 | 1 | Stem holder | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 |
| 6 | 1 | Guide | 31353-0459-1 | 31353-0459-1 | 31353-0459-1 | 31353-0460-1 | 31353-0460-1 | 31353-0460-1 |
| 7 | 2 | Set screw | 221581-92 | 221581-92 | 221581-92 | 221581-92 | 221581-92 | 221581-92 |

Valve Body Part

| Pos. | Qty | Denomination | NW 40 38 mm | NW 50 51 mm | NW 65 63.5 mm | 76 mm | NW 80 | NW 100 101.6 mm |
|------------------|-----|----------------------|----------------|----------------|------------------|--------------|--------------|--------------------|
| Stem Seal | | | | | | | | |
| 8 ^Δ | 1 | Lip seal, EPDM | 31353-0155-1 | 31353-0155-1 | 31353-0155-1 | 31353-0188-1 | 31353-0188-1 | 31353-0188-1 |
| | 1 | Lip seal, NBR | 31353-0155-2 | 31353-0155-2 | 31353-0155-2 | 31353-0188-2 | 31353-0188-2 | 31353-0188-2 |
| | 1 | Lip seal, FPM | 31353-0155-3 | 31353-0155-3 | 31353-0155-3 | 31353-0188-3 | 31353-0188-3 | 31353-0188-3 |
| Clamp | | | | | | | | |
| 9a | 2 | Clamp half | 31320-0022-1 | 31320-0022-1 | 31320-0022-1 | 31320-0021-1 | 31320-0021-1 | 31320-0021-1 |
| 9b | 2 | Screw | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 |

Valve Body

| | | | | | | | | |
|-----|---|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 12a | 1 | Valve body, 2 ports ISO | 31353-0375-1 | 31353-0376-1 | 31353-0380-1 | 31353-0381-1 | | 31353-0026-1 |
| | 1 | Valve body, 2 ports NW | 9612-0940-01 | 9612-0941-01 | 9612-0942-01 | | 9612-0943-01 | 9612-0944-01 |
| 12b | 1 | Valve body, 3 ports ISO | 31353-0375-6 | 31353-0376-6 | 31353-0380-6 | 31353-0381-6 | | 31353-0026-6 |
| | 1 | Valve body, 3 ports NW | 9612-0940-02 | 9612-0941-02 | 9612-0942-02 | | 9612-0943-02 | 9612-0944-02 |

Valve Plug

| | | | | | | | | |
|-----------------|---|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1 | Plug, single, compl. EPDM | 31353-0330-1 | 31353-0331-1 | 31353-0332-1 | 31353-0333-1 | 31353-0333-4 | 31353-0334-1 |
| | 1 | Plug, single, compl. NBR | 31353-0330-2 | 31353-0331-2 | 31353-0332-2 | 31353-0333-2 | 31353-0333-5 | 31353-0334-2 |
| | 1 | Plug, single, compl. FPM | 31353-0330-3 | 31353-0331-3 | 31353-0332-3 | 31353-0333-3 | 31353-0333-6 | 31353-0334-3 |
| 13a | 1 | Stem | 31353-0340-1 | 31353-0377-1 | 31353-0378-1 | 31353-0341-1 | 31353-0341-2 | 31353-0379-1 |
| 16 ^Δ | 1 | Packing, EPDM | 31353-0320-1 | 31353-0321-1 | 31353-0322-1 | 31353-0324-1 | 9612-0950-01 | 31353-0325-1 |
| | 1 | Packing, NBR | 31353-0320-2 | 31353-0321-2 | 31353-0322-2 | 31353-0324-2 | 9612-0950-02 | 31353-0325-2 |
| | 1 | Packing, FPM | 31353-0320-3 | 31353-0321-3 | 31353-0322-3 | 31353-0324-3 | 9612-0950-03 | 31353-0325-3 |
| 17 | 1 | Washer | 31353-0357-1 | 31353-0358-1 | 31353-0359-1 | 31353-0360-1 | 31353-0360-2 | 31353-0361-1 |
| 18 ^Δ | 1 | O-ring, EPDM | 990034-01 | 990034-01 | 990034-01 | 990034-01 | 990034-01 | 990034-01 |
| | 1 | O-ring, NBR | 223404-21 | 223404-21 | 223404-21 | 223404-21 | 223404-21 | 223404-21 |
| | 1 | O-ring, FPM | 223404-35 | 223404-35 | 223404-35 | 223404-35 | 223404-35 | 223404-35 |
| 19 | 1 | Screw | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 |

| | | | | | | | | |
|---|--|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Δ | | Service Kit EPDM | 9611-92-0010 | 9611-92-0013 | 9611-92-0016 | 9611-92-0019 | 9611-92-0105 | 9611-92-0022 |
| Δ | | Service Kit NBR | 9611-92-0011 | 9611-92-0014 | 9611-92-0017 | 9611-92-0020 | 9611-92-0106 | 9611-92-0023 |
| Δ | | Service Kit FPM | 9611-92-0012 | 9611-92-0015 | 9611-92-0018 | 9611-92-0021 | 9611-92-0107 | 9611-92-0024 |

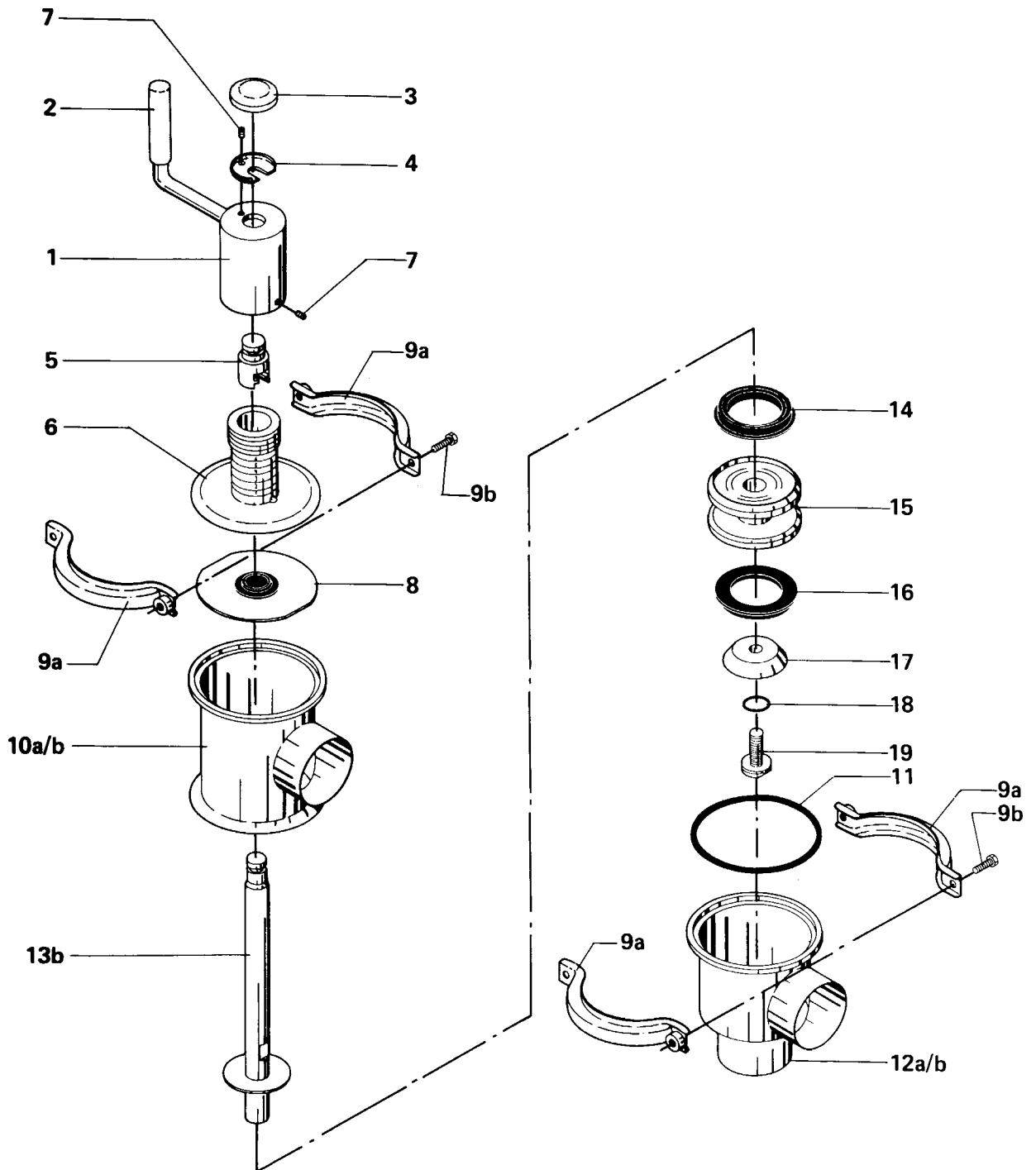
Parts marked with ^Δ are included in the service kits.

Recommended spare parts: Pos. 3,7 and Service Kit.

| | |
|-------------------------|------|
| Reg. 4.1.12 - SP70156/1 | 9202 |
| Intro. | 8301 |

Change-over Valve type SMO

12



| | |
|-------------------------|------|
| Reg. 4.1.13 - SP70156/2 | 9202 |
| Intro. | 8301 |

OPERATING MECHANISM

| Pos. | Qty | Denomination | NW 40 38 mm | NW 50 51 mm | NW 65 63.5 mm | 76 mm | NW80 | NW 100 101.6 mm |
|------|-----|-----------------------------|----------------|----------------|------------------|--------------|--------------|--------------------|
| | 1 | Crank mechanism compl | 31353-0530-1 | 31353-0530-1 | 31353-0530-1 | 31353-0530-2 | 31353-0530-2 | 31353-0530-2 |
| 1 | 1 | Crank | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 | 31353-0462-1 |
| 2 | 1 | Handle | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 | 31353-0495-1 |
| 3 | 1 | Cap | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 | 31353-0468-1 |
| 4 | 1 | Washer | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 | 31353-0467-1 |
| 5 | 1 | Stem holder | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 | 31353-0466-1 |
| 6 | 1 | Guide | 31353-0459-1 | 31353-0459-1 | 31353-0459-1 | 31353-0460-1 | 31353-0460-1 | 31353-0460-1 |
| 7 | 2 | Set screw | 221581-92 | 221581-92 | 221581-92 | 221581-92 | 221581-92 | 221581-92 |

Valve Body Part

| Pos. | Qty | Denomination | NW 40 38 mm | NW 50 51 mm | NW 65 63.5 mm | 76 mm | NW80 | NW 100 101.6 mm |
|------------------|-----|----------------------|----------------|----------------|------------------|--------------|--------------|--------------------|
| Stem Seal | | | | | | | | |
| 8 ^Δ | 1 | Lip seal, EPDM | 31353-0155-1 | 31353-0155-1 | 31353-0155-1 | 31353-0188-1 | 31353-0188-1 | 31353-0188-1 |
| | 1 | Lip seal, NBR | 31353-0155-2 | 31353-0155-2 | 31353-0155-2 | 31353-0188-2 | 31353-0188-2 | 31353-0188-2 |
| | 1 | Lip seal, FPM | 31353-0155-3 | 31353-0155-3 | 31353-0155-3 | 31353-0188-3 | 31353-0188-3 | 31353-0188-3 |
| Clamp | | | | | | | | |
| 9a | 4 | Clamp half | 31320-0022-1 | 31320-0022-1 | 31320-0022-1 | 31320-0021-1 | 31320-0021-1 | 31320-0021-1 |
| 9b | 4 | Screw | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 | 2210936-18 |

Valve Body

| | | | | | | | | |
|-----|---|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 10a | 1 | Valve body, upper, 1 port ISO ... | 31353-0053-1 | 31353-0054-1 | 31353-0055-1 | 31353-0056-1 | | 31353-0058-1 |
| | 1 | Valve body, upper, 1 port NW ... | 9612-0945-01 | 9612-0946-01 | 9612-0947-01 | | 9612-0948-01 | 9612-0949-01 |
| 10b | 1 | Valve body, upper, 2 ports ISO | 31353-0053-6 | 31353-0054-6 | 31353-0055-6 | 31353-0056-6 | | 31353-0058-6 |
| | 1 | Valve body, upper, 2 ports NW | 9612-0945-02 | 9612-0946-02 | 9612-0947-02 | | 9612-0948-02 | 9612-0949-02 |
| 11 | 1 | Valve body packing, EPDM | 31353-0128-1 | 31353-0128-1 | 31353-0128-1 | 31353-0205-1 | 31353-0205-1 | 31353-0205-1 |
| | 1 | Valve body packing, NBR | 31353-0128-2 | 31353-0128-2 | 31353-0128-2 | 31353-0205-2 | 31353-0205-2 | 31353-0205-2 |
| | 1 | Valve body packing, FPM | 31353-0128-3 | 31353-0128-3 | 31353-0128-3 | 31353-0205-3 | 31353-0205-3 | 31353-0205-3 |
| 12a | 1 | Valve body, lower, 2 ports ISO | 31353-0375-1 | 31353-0376-1 | 31353-0380-1 | 31353-0381-1 | | 31353-0026-1 |
| | 1 | Valve body, lower, 2 ports NW | 9612-0940-01 | 9612-0941-01 | 9612-0942-01 | | 9612-0943-01 | 9612-0944-01 |
| 12b | 1 | Valve body, lower, 3 ports ISO | 31353-0375-6 | 31353-0376-6 | 31353-0380-6 | 31353-0381-6 | | 31353-0026-6 |
| | 1 | Valve body, lower, 3 ports NW | 9612-0940-02 | 9612-0941-02 | 9612-0942-02 | | 9612-0943-02 | 9612-0944-02 |

Valve Plug

| | | | | | | | | |
|-----------------|---|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1 | Plug,double, compl. EPDM | 31353-0335-1 | 31353-0336-1 | 31353-0337-1 | 31353-0338-1 | 31353-0338-4 | 31353-0339-1 |
| | 1 | Plug,double, compl. NBR | 31353-0335-2 | 31353-0336-2 | 31353-0337-2 | 31353-0338-2 | 31353-0338-5 | 31353-0339-2 |
| | 1 | Plug, double, compl. FPM | 31353-0335-3 | 31353-0336-3 | 31353-0337-3 | 31353-0338-3 | 31353-0338-6 | 31353-0339-3 |
| 13a | 1 | Stem | 31353-0349-1 | 31353-0349-2 | 31353-0349-3 | 31353-0350-1 | 31353-0350-3 | 31353-0350-2 |
| 14 ^Δ | 1 | Packing, upper, EPDM | 31353-0321-1 | 31353-0321-1 | 31353-0323-1 | 31353-0324-1 | 31353-0324-1 | 31353-0325-1 |
| | 1 | Packing, upper, NBR | 31353-0321-2 | 31353-0321-2 | 31353-0323-2 | 31353-0324-2 | 31353-0324-2 | 31353-0325-2 |
| | 1 | Packing, upper, FPM | 31353-0321-3 | 31353-0321-3 | 31353-0323-3 | 31353-0324-3 | 31353-0324-3 | 31353-0325-3 |
| 15 | 1 | Middle piece | 31353-0363-1 | 31353-0364-1 | 31353-0365-1 | 31353-0366-1 | 9612-0984-01 | 31353-0367-1 |
| 16 ^Δ | 1 | Packing, lower, EPDM | 31353-0320-1 | 31353-0321-1 | 31353-0322-1 | 31353-0324-1 | 9612-0950-01 | 31353-0325-1 |
| | 1 | Packing, lower, NBR | 31353-0320-2 | 31353-0321-2 | 31353-0322-2 | 31353-0324-2 | 9612-0950-02 | 31353-0325-2 |
| | 1 | Packing, lower, FPM | 31353-0320-3 | 31353-0321-3 | 31353-0322-3 | 31353-0324-3 | 9612-0950-03 | 31353-0325-3 |
| 17 | 1 | Washer | 31353-0357-1 | 31353-0358-1 | 31353-0359-1 | 31353-0360-1 | 31353-0360-2 | 31353-0361-1 |
| 18 ^Δ | 1 | O-ring, EPDM | 990034-01 | 990034-01 | 990034-01 | 990034-01 | 990034-01 | 990034-01 |
| | 1 | O-ring, NBR | 223404-21 | 223404-21 | 223404-21 | 223404-21 | 223404-21 | 223404-21 |
| | 1 | O-ring, FPM | 223404-35 | 223404-35 | 223404-35 | 223404-35 | 223404-35 | 223404-35 |
| 19 | 1 | Screw | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 | 31353-0362-1 |
| Δ | | Service Kit EPDM | 9611-92-0025 | 9611-92-0028 | 9611-92-0031 | 9611-92-0034 | 9611-92-0108 | 9611-92-0037 |
| Δ | | Service Kit NBR | 9611-92-0026 | 9611-92-0029 | 9611-92-0032 | 9611-92-0035 | 9611-92-0109 | 9611-92-0038 |
| Δ | | Service Kit FPM | 9611-92-0027 | 9611-92-0030 | 9611-92-0033 | 9611-92-0036 | 9611-92-0110 | 9611-92-0039 |

Parts marked with Δ are included in the service kits.

| | |
|-------------------------|------|
| Reg. 4.1.13 - SP70156/2 | 9202 |
| Intro. | 8301 |

Recommended spare parts: Pos. 3,7 and Service Kit.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.