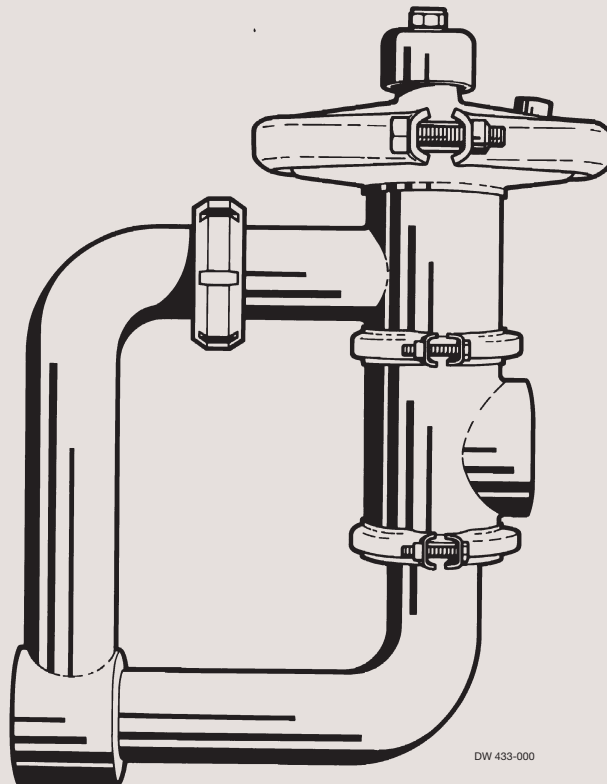




Instruction Manual

CPM-I-D60 Constant-Pressure Modulating Inlet Valve



ESE01834-EN4 2015-04

Original manual

The information herein is correct at the time of issue but may be subject to change without prior notice

1. EC Declaration of Conformity	4
2. Safety	5
2.1. Important information	5
2.2. Warning signs	5
2.3. Safety precautions	6
3. Installation	7
3.1. Unpacking/delivery	7
3.2. General installation	8
3.3. Welding	10
3.4. Fitting of Booster (optional extra)	11
3.5. Recycling information	13
4. Operation	14
4.1. Operation	14
4.2. Fault finding	16
4.3. Recommended cleaning	17
5. Maintenance	19
5.1. General maintenance	19
5.2. Dismantling	20
5.3. Assembly	23
6. Technical data	27
6.1. Technical data	27
6.2. Selection / Pressure drop - capacity diagram	28
7. Parts lists and service kit	29
7.1. CPM-I-D60	29
7.2. Booster	33

1 EC Declaration of Conformity

Revision of Declaration of Conformity 2009-12-29

The Designated Company

Alfa Laval Kolding A/S

Company Name

Albuen 31, DK-6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone No.

hereby declare that

Valve

Designation

CPM-i-d60

Type

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC
- Regulation (EC) No 1935/2004

The person authorised to compile the technical file is the signer of this document

QHSE Manager, Quality, Health and safety & Environment

Title

Annie Dahl

Name

Kolding

Place

1982-09-01

Date



Signature



*Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs.*

2.1 Important information

Always read the manual before using the valve!

WARNING

Indicates that special procedures must be followed to avoid severe personal injury.

CAUTION

Indicates that special procedures must be followed to avoid damage to the valve.

NOTE

Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:



Caustic agents:



2 Safety

*Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs.*

2.3 Safety precautions

Installation

Always read the technical data thoroughly (See chapter 6 Technical data)
Always release compressed air after use.
Never touch the valve top if compressed air is supplied to the valve.
The valve and the pipelines **must** never be pressurised when dismantling the valve.



Operation

Always read the technical data thoroughly (See chapter 6 Technical data).
Always release compressed air after use.
Never touch the valve or the pipelines when processing hot liquids or when sterilizing.
Never touch the valve top if compressed air is supplied to the valve.
Always handle lye and acid with great care.



Maintenance

Always observe the technical data thoroughly (See chapter 6 Technical data).
Always release compressed air after use.
Never service the valve when it is hot.
Never service the valve with valve and pipelines under pressure.



Transportation

Always secure that compressed air is released .
Always secure that all connections is disconnected before attempt to remove the valve from the installation.
Always drain liquid out of valves before transportation.
Always used predesigned lifting points if defined.
Always secure sufficient fixing of the valve during transportation - if special designed packaging material is available it must be used.

The instruction manual is part of the delivery.
Study the instructions carefully.

3.1 Unpacking/delivery

Step 1

CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

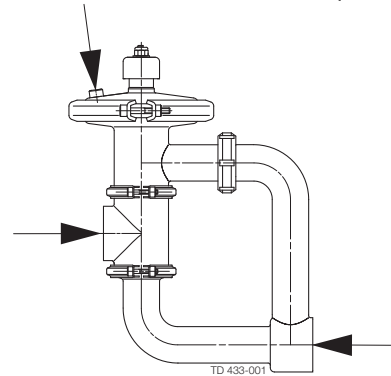
Check the delivery:

1. Complete valve.
2. Delivery note.
3. Instruction manual.

Step 2

Remove possible packing materials from the valve ports.

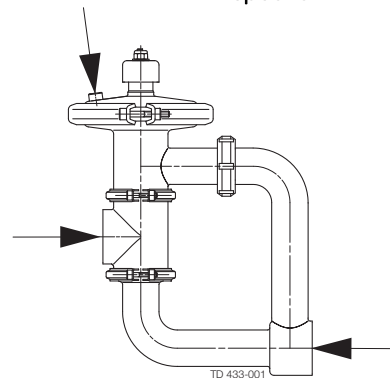
Remove packing materials!



Step 3

1. Inspect the valve for visible transport damage.

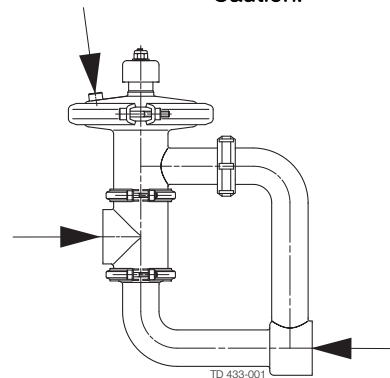
Inspection!



Step 4

Avoid damaging the air connection and the valve ports.

Caution!



3 Installation

Study the instructions carefully and pay special attention to the warnings!

The valve has welding ends as standard but can also be supplied with fittings.

The required product pressure is preset by means of an air pressure regulating valve (optional extra).

3.2 General installation

Step 1



Always read the technical data thoroughly.



Always release compressed air after use.

Never touch the valve top if compressed air is supplied to the valve.

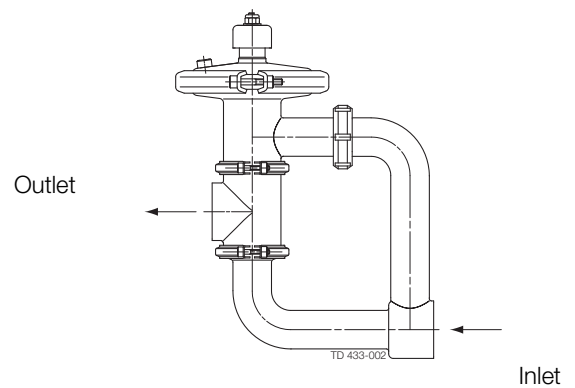
CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

Step 2

Ensure that the flow direction is correct.

Correct



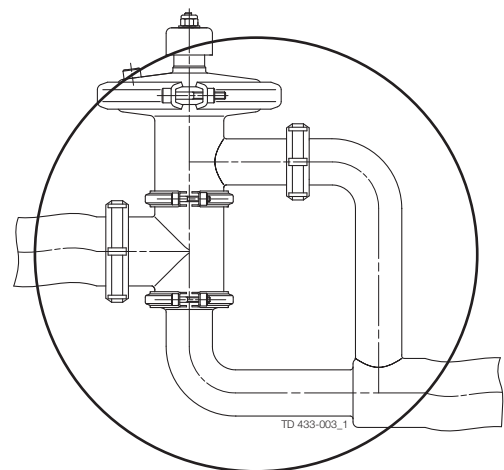
Step 3

Avoid stressing the valve.

Pay special attention to:

- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.

Risk of damage!



3 Installation

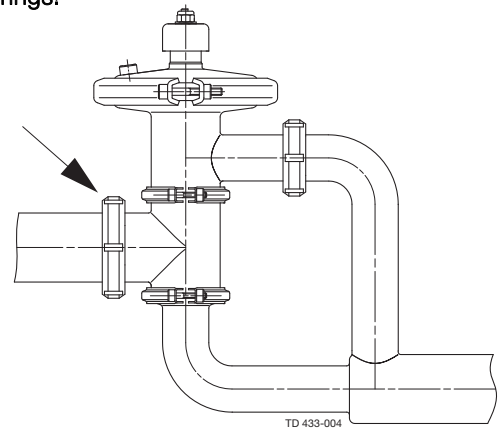
Study the instructions carefully and pay special attention to the warnings!
The valve has welding ends as standard but can also be supplied with fittings.
The required product pressure is preset by means of an air pressure regulating valve (optional extra).

Step 4

Fittings:

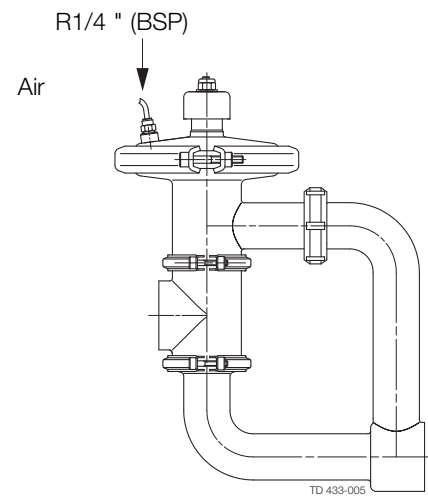
Ensure that the connections are tight.

Remember
seal rings!



Step 5

Air connection:



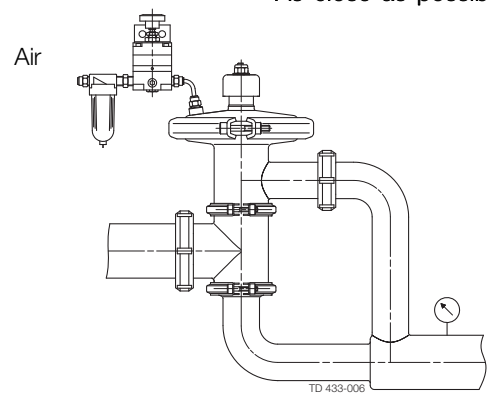
Step 6

Air pressure regulating valve (optional extra):

It is recommended to install the air pressure regulating valve as close as possible to the valve.

Pressure regulating valve

As close as possible



3 Installation

Study the instructions carefully.

The valve has welding ends as standard. Weld carefully.

3.3 Welding

Step 1

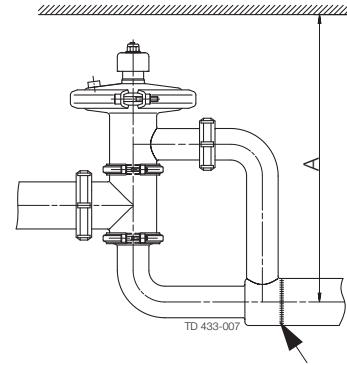
NOTE!

Never weld both the inlet and outlet connections. If so, it will be impossible to service the lower valve body seal ring (16)

Step 2

Welding the inlet connection

1. Weld the valve body into the pipelines.
2. Maintain the minimum clearance so that the internal valve parts can be removed.



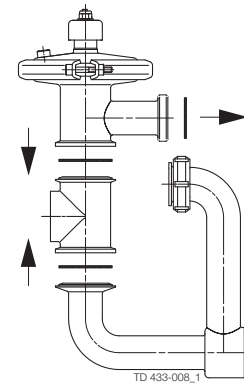
Caution!

A= 440 mm (without booster) / 540 mm (with booster)

Step 3

Welding the outlet connection

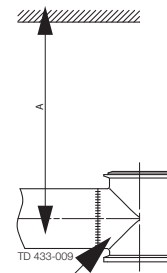
Dismantle the valve in accordance with section 5.2 Dismantling, Step 1 and Step 2.



Step 4

Welding the outlet connection:

1. Weld the lower body (10) into the pipelines.
2. Maintain the minimum clearance so that the internal valve parts can be removed.



Caution!

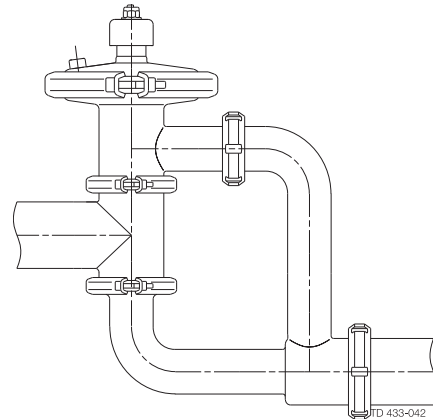
A= 284 mm (without booster) / 384 mm (with booster)

Study the instructions carefully and pay special attention to the warnings!
 The items refer to the parts list and service kits section.
 The valve can be fitted with a Booster to increase the permitted product pressure.

Step 5

Welding the outlet connection:

Assemble the valve in accordance with section 5.3 Assembly, Step 10 and Step 11.



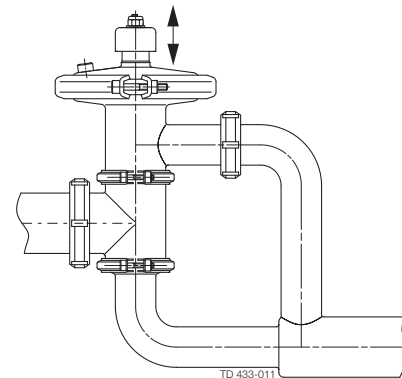
Step 6

Pre-use check:

Lift and lower the valve top several times to ensure that the valve operates smoothly.

Pay special attention to the warning!

Lift and lower by hand!



3.4 Fitting of Booster (optional extra)

Step 1



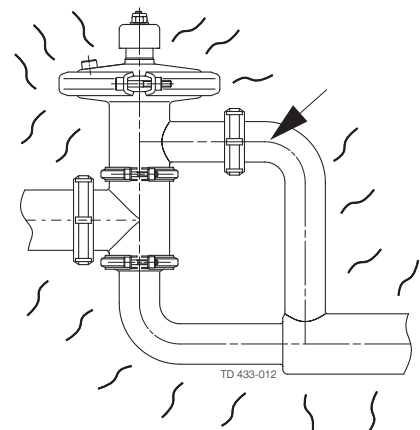
Never touch the valve or the pipelines when processing hot liquids or when sterilizing.

The valve and the pipelines must never be pressurised when dismantling the valve.

Burning danger!



Atmospheric pressure required!



3 Installation

Study the instructions carefully and pay special attention to the warnings!

The items refer to the parts list and service kits section.

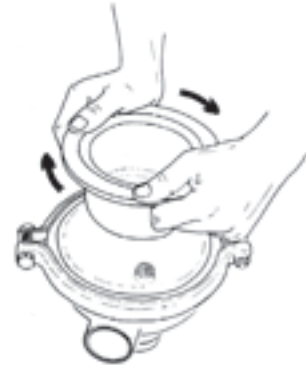
The valve can be fitted with a Booster to increase the permitted product pressure.

Step 2

1. Remove the valve top in accordance with section 5.2 Dismantling, Step 5.

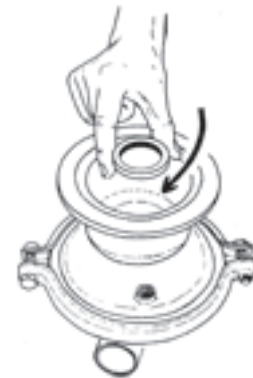
Pay special attention to the warnings!

2. Fit Booster housing (1) on the cover.
3. Fit and tighten lock nut (2).



Step 3

1. Fit washer (3).
2. Refit the washer and the top nut on the valve plug.



Step 4

1. Turn diaphragm (7) inside out.
2. Place piston (6) in the diaphragm so that the hole is visible.



Step 5

1. Roll diaphragm (7) down half its length.
2. Fit the diaphragm with piston (6) in Booster housing (1).



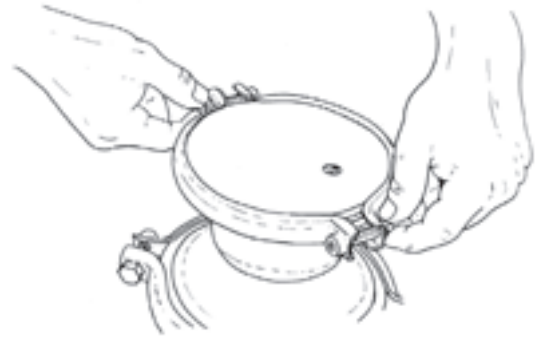
Study the instructions carefully and pay special attention to the warnings!

The items refer to the parts list and service kits section.

The valve can be fitted with a Booster to increase the permitted product pressure.

Step 6

1. Fit cover (8) on Booster housing (1).
2. Fit and tighten clamp (9).
3. The valve and the Booster are now ready for operation.



3.5 Recycling information

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps
- Wood and cardboard boxes can be reused, recycled or used for energy recovery
- Plastics should be recycled or burnt at a licensed waste incineration plant
- Metal straps should be sent for material recycling

• Maintenance

- During maintenance oil and wear parts in the machine are replaced
- All metal parts should be sent for material recycling
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling
- Oil and all non metal wear parts must be taken care of in agreement with local regulations

• Scrapping

- At end of use, the equipment shall be recycled according to relevant, local regulations. Beside the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact the local Alfa Laval sales company
-

4 Operation

The valve is lubricated, adjusted and tested before delivery.
Study the instructions carefully and pay special attention to the warnings!

4.1 Operation

Step 1



Always read the technical data thoroughly.



Always release compressed air after use.

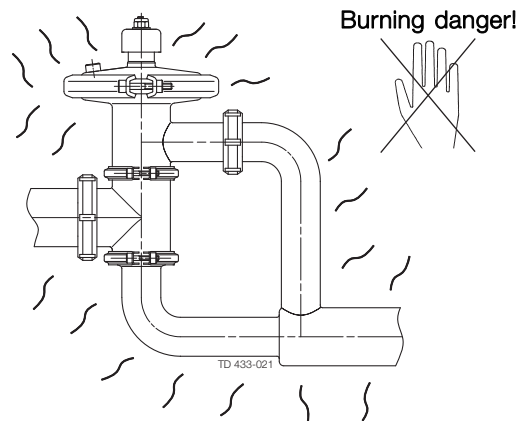
Step 2



Never touch the valve or the pipelines when processing hot liquids or when sterilizing.

CAUTION

Alfa Laval cannot be held responsible for incorrect operation.



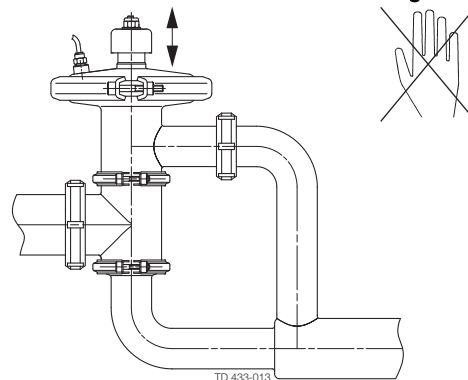
Step 3



Never touch the valve top if compressed air is supplied to the valve.

Air

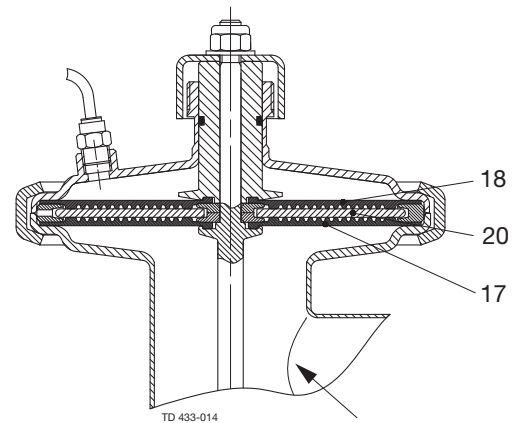
Cutting danger!



Step 4

CAUTION!

There must not be vacuum in the valve as air can be drawn into the product and diaphragms (17) can then be pulled out from support sectors (20).



No vacuum!

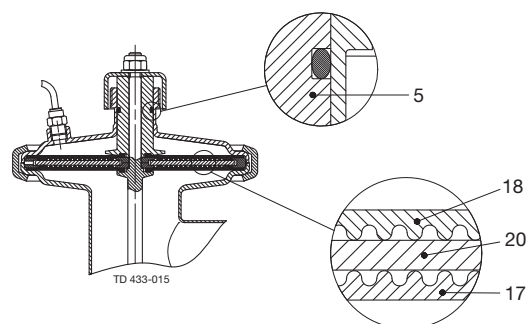
*The valve is lubricated, adjusted and tested before delivery.
Study the instructions carefully and pay special attention to the warnings!*

Step 5

Lubrication:

1. Ensure smooth movement between diaphragms (17,18) and support sectors (20).
2. Ensure smooth movement of guide (5).

Lubricate if necessary!
(See 5.1 General maintenance).



4 Operation

Pay attention to possible break-down.

Study the instructions carefully.

The items refer to the parts list and service kits section.

4.2 Fault finding

NOTE!

Study the maintenance instructions carefully before replacing worn parts - see chapter 5.1 General maintenance

Problem	Cause/result	Repair
The valve does not maintain the preset pressure	Faulty diaphragm	Replace the diaphragm
	Guide (9) seizes	Lubricate the guide (see 4.1 Operation, Step 5)
	Incorrect operating range	Check the pressure drop over the valve and check the flow rate (see chapter 6.2 Selection / Pressure drop - capacity diagram)
	The available air pressure is lower than the product pressure	Increase the air pressure eg. by using a Booster (see chapter 3.4 Fitting of Booster (optional extra)).
	The air pressure is not correctly adjusted	Readjust the air pressure
	Faulty air pressure regulating valve or incorrect type	Repair the valve or check that it is pressure compensating
Product leakage	Worn diaphragm Product affected diaphragm	Replace the diaphragm
Air leakage	Worn O-ring	Replace the O-ring
	Worn diaphragm (10)	Replace the diaphragm
	Worn and hard diaphragm (10)	Replace by a diaphragm of a different grade for higher temperature (see chapter 6.1 Technical data)
Valve plug moving too fast up and down (unstable)	Pressure pulsations because of fast changes in process conditions	Use an air throttling valve (optional extra between the air pressure regulating valve and the CPM-I-D 60 valve.

The valve is designed for cleaning in place (CIP).

CIP = Cleaning In Place.

Study the instructions carefully and pay special attention to the warnings!

NaOH = Caustic Soda. HNO₃ = Nitric acid.

4.3 Recommended cleaning

Step 1



Always handle lye and acid with great care.

Caustic danger!



Always use
rubber gloves!

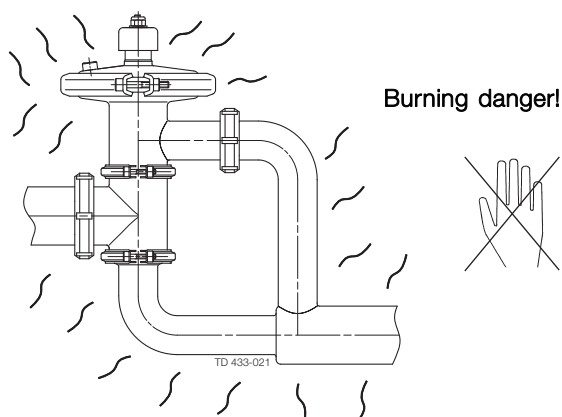


Always use
protective goggles!

Step 2



Never touch the valve or the pipelines when sterilizing.



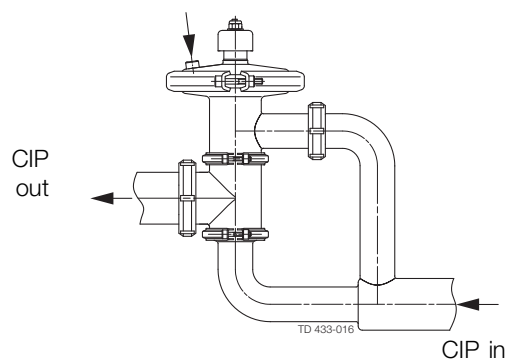
Burning danger!

Step 3

CPMI-2

Ensure that the valve is fully open to allow for maximum CIP flow.

No air pressure!



Step 4

Examples of cleaning agents:

Use clean water, free from chlorides.

1. 1% by weight NaOH at 70° C (158° F)

1 kg (2.2 lbs) NaOH	+	100 l (26.4 gal) water	=	Cleaning agent.
------------------------	---	---------------------------	---	-----------------

2. 0.5% by weight HNO₃ at 70° C (158° F)

0.7 l (0.2 gal) 53% HNO ₃	+	100 l (26.4 gal) water	=	Cleaning agent.
---	---	---------------------------	---	-----------------

2.2 l (0.6 gal) 33% NaOH	+	100 l (26.4 gal) water	=	Cleaning agent.
-----------------------------	---	---------------------------	---	-----------------

4 Operation

The valve is designed for cleaning in place (CIP).

CIP = Cleaning In Place.

Study the instructions carefully and pay special attention to the warnings!

NaOH = Caustic Soda. HNO₃ = Nitric acid.

Step 5

1. Avoid excessive concentration of the cleaning agent.
 - Dose gradually.
 2. Adjust the cleaning flow to the process.
 - Sterilization of milk/viscous liquids.
 - Increase the cleaning flow.
 3. **Always** rinse well with clean water after the cleaning.
-

Step 6

NOTE

The cleaning agents must be stored/disposed of in accordance with current rules/directives.

Maintain the valve carefully.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare diaphragms and o-rings in stock.

5.1 General maintenance

Step 1



Always read the technical data thoroughly.
See chapter 6.1 Technical data



Always disconnect the compressed air before service.

Step 2



Never service the valve when it is hot.



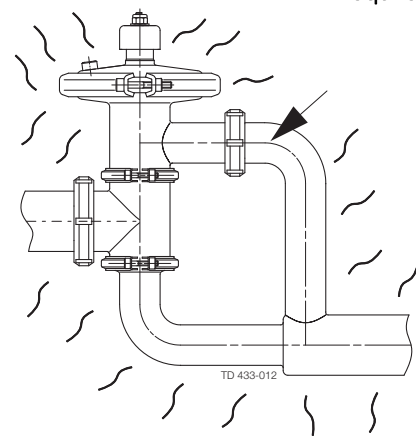
Never service the valve with valve and pipelines under pressure.

NOTE

All scrap must be stored/discharged in accordance with current rules/directives.

Atmospheric
pressure
required!

Burning
danger!



Recommended spare parts: Service kits

Order service kits from the service kits list.

Ordering spare parts

Contact the Sales Department.

	Diaphragms	O-ring
Preventive maintenance	Replace after 12 months	Replace when replacing the diaphragms
Maintenance after leakage (leakage normally starts slowly)	Replace by the end of the day	Replace when replacing the diaphragms
Planned maintenance	<ul style="list-style-type: none"> - Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for planning of inspections Replace after leakage	Replace when replacing diaphragms

Lubrication (before assembly)

Guide: Molycote longterm 2 Plus

Sectors: Molycote 111.

Threads: Molycote TP42.

5 Maintenance

Study the instructions carefully.

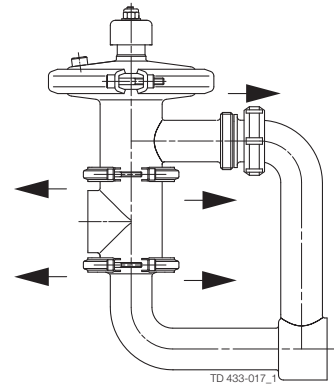
The items refer to the parts list and service kits section.

Handle scrap correctly.

5.2 Dismantling

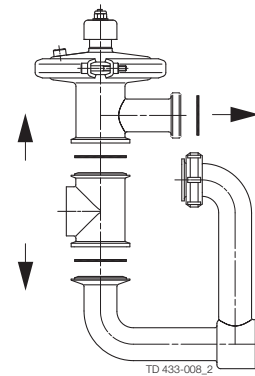
Step 1

1. Remove clamps (14,15).
2. Loosen the connection between valve body (12) and inlet tube (9).



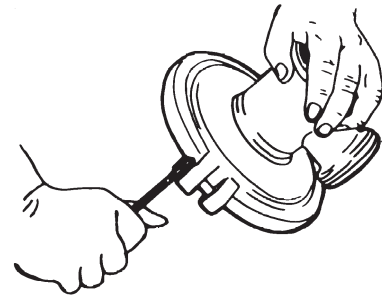
Step 2

1. Remove inlet tube (9) and lower valve body (10).
2. Remove seal rings (8, 16).



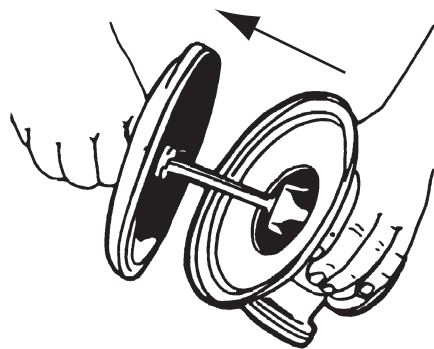
Step 3

Remove clamp (22, 23)



Step 4

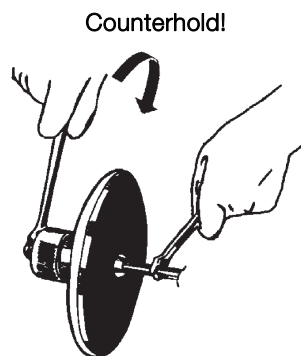
Remove cover (19) together with the internal parts of the valve.



*Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.*

Step 5

Remove top nut (1), washer (2) and top (3).

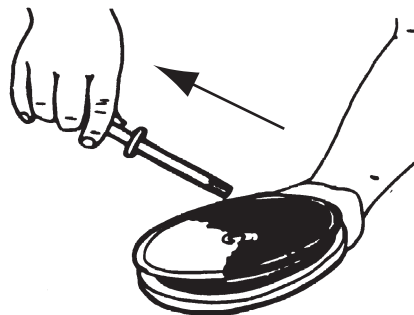


Step 6

Remove plug (7) from the diaphragm unit and guide (5).

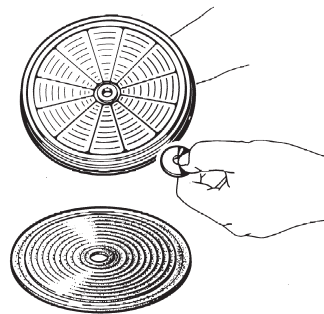
CAUTION!

Ensure that cover (19) is turned downwards and plug (7) is pulled upwards so that sectors (20) are not separated from diaphragms (17, 18).



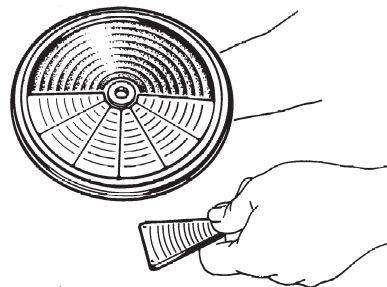
Step 7

Remove lower inner ring (13) and lower diaphragm (17).



Step 8

Remove sectors (20).



5 Maintenance

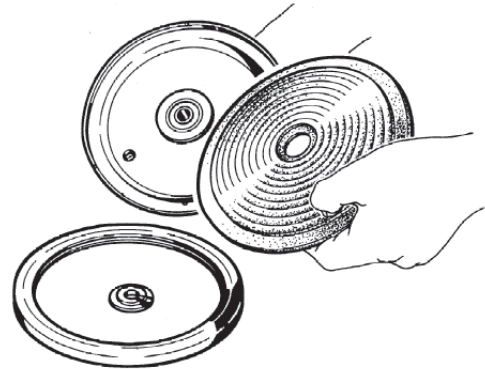
Study the instructions carefully.

The items refer to the parts list and service kits section.

Handle scrap correctly.

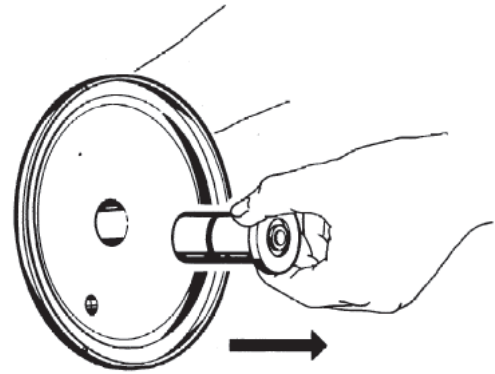
Step 9

Remove outer ring (21), upper inner ring (13) and upper diaphragm (18)



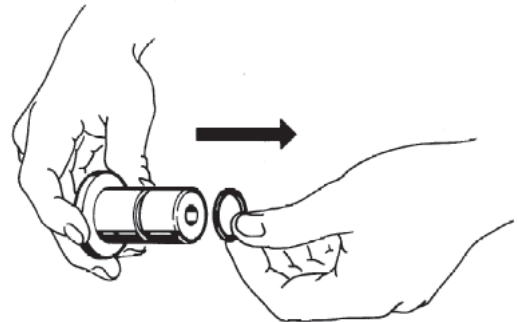
Step 10

Remove guide (5)



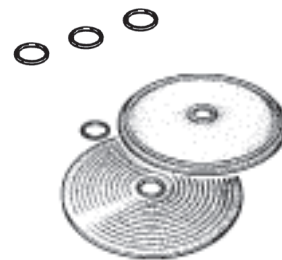
Step 11

Remove o-ring (6)



Step 12

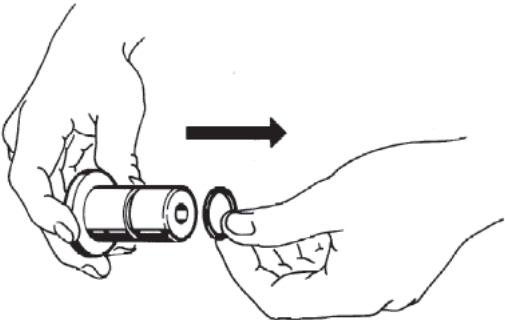
Replace the o-ring, the seal rings and the diaphragms.



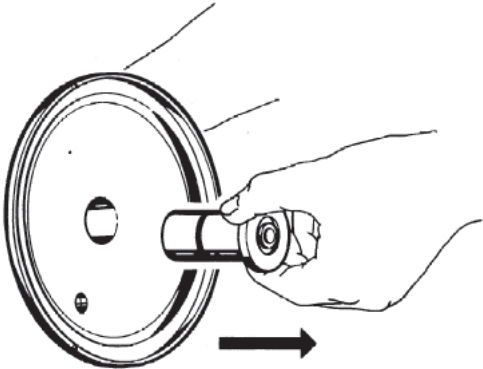
Study the instructions carefully.
Lubricate the guide, the sectors and the threads before assembly.
The items refer to the parts list and service kits section.

5.3 Assembly

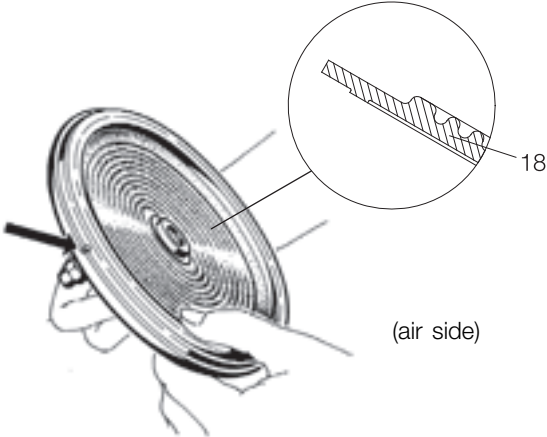
Step 1
Fit O-ring (6)



Step 2
Lubricate guide (5), and fit it.
NOTE!
Turn cover (19) downwards before continuing.



Step 3
Fit upper diaphragm (18), upper inner ring (13) and outer ring (21)
on guide (5) and cover (19).
Note!
The outer ring must be turned so that the indication hole is fixed to
the indication hole in the cover.



Fit the correct
diaphragm!

5 Maintenance

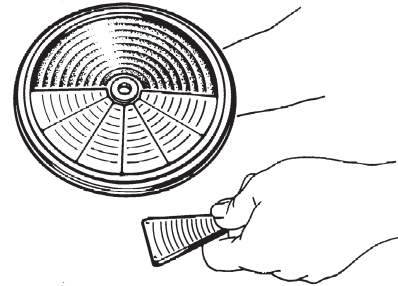
Study the instructions carefully.

Lubricate the guide, the sectors and the threads before assembly.

The items refer to the parts list and service kits section.

Step 4

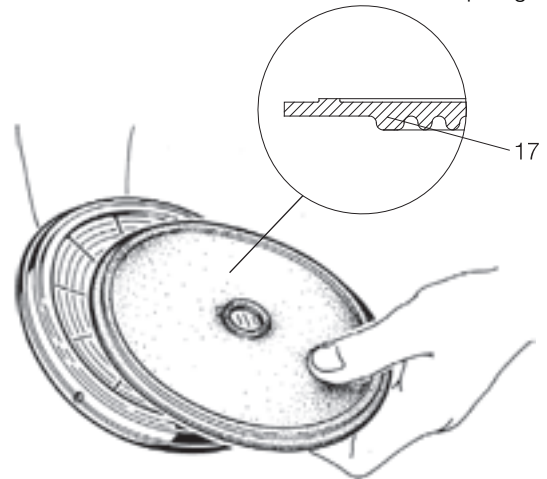
Fit sectors (20) between upper inner ring (13) and outer ring (21).



Step 5

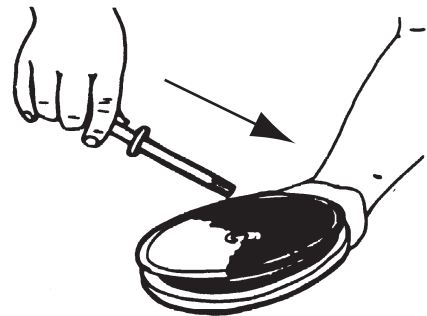
Fit lower inner ring (13) and lower diaphragm (17).

Fit the correct diaphragm!



Step 6

Fit plug (7) in the diaphragm unit and guide (5) until the flange of the plug contacts lower diaphragm (17).

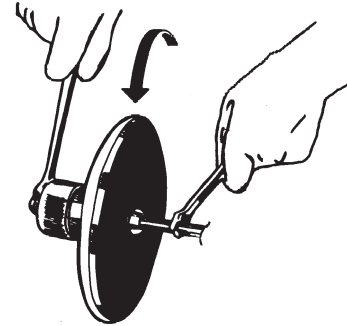


*Study the instructions carefully.
Lubricate the guide, the sectors and the threads before assembly.
The items refer to the parts list and service kits section.*

Step 7

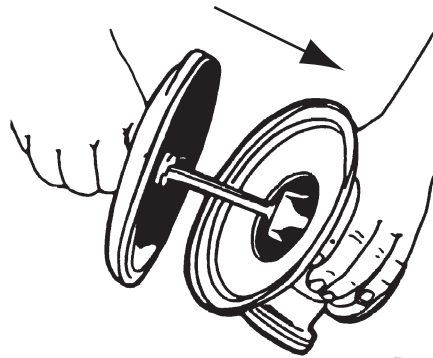
Fit top (3), washer (2) and top nut (1).

Counterhold!



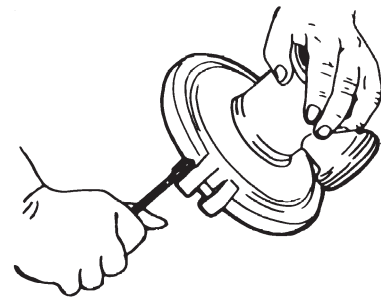
Step 8

Fit cover (19) together with the internal parts of the valve.



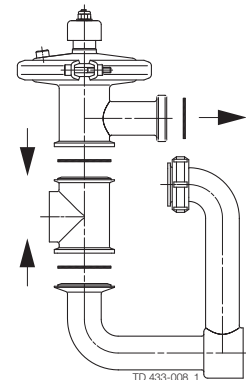
Step 9

Fit and tighten clamp (22, 23).



Step 10

1. Fit seal rings (8, 16).
2. Fit lower valve body (10) and inlet tube (9)



5 Maintenance

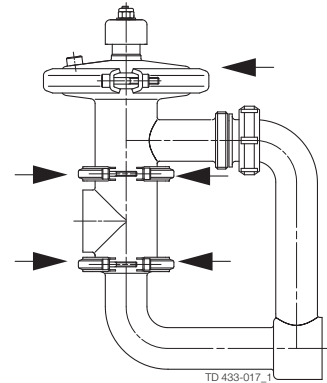
Study the instructions carefully.

Lubricate the guide, the sectors and the threads before assembly.

The items refer to the parts list and service kits section.

Step 11

1. Tighten the connection between valve body (12) and inlet tube (9).
2. Fit and tighten clamps (14,15).



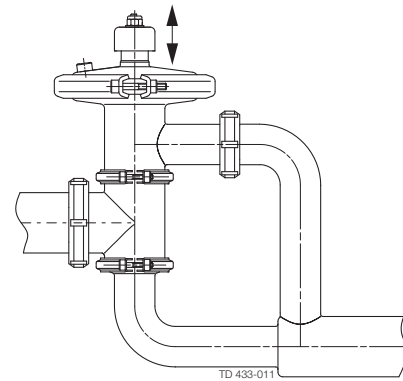
Step 12

Pre-use check:

Lift and lower the valve top a few times to ensure that the valve operates smoothly.

Pay special attention to the warning!

Lift and lower by hand!



*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

6.1 Technical data

The valves are remote-controlled by means of compressed air. A diaphragm/valve plug system reacts immediately to any alteration of the product pressure and changes position so that the preset pressure is maintained.

Standard design The CPMI-2 and CPMO-2 consist of a valve body with valve seat, cover, a valve plug with a diaphragm unit and a clamp.

The cover and the valve body are clamped together.

The valve body and the seat are welded together. The CPM-I-D60 consists of upper and lower valve bodies, an inlet tube, a cover, a valve plug with diaphragm unit and clamps. The cover and the valve bodies are clamped together.

Valve - data	
Max. product pressure	1000 kPa (10 bar) (145 psi)
Min. product pressure	0 kPa (0 bar = Atmospheric)
Temperature range	-10 °C to +95 °C (14 °F to 203 °F)
Temperature range (with upper diaphragm in PTFE/EPDM)	-10 °C to +140 °C (14 °F to 284 °F)
Air pressure	0 to 600 kPa (0 to 6 bar) (0 to 87 psi)
Flow range Kv (Lv), fully open ($\Delta p = 1\text{bar} / 14.5\text{psi}$)	Approx. 60 m ³ /h (264 gal/m)
Valve - materials	
Product wetted steel parts	AISI 316L/1.4404
Other steel parts	AISI 304
Upper diaphragm	Nitrile (NBR), (standard)
Lower diaphragm	PTFE covered EPDM rubber, (standard)
Alternative upper diaphragm	EPDM/PTFE, (for temperatures 95-140 °C) (203°F to 284 °F)
O-ring	Nitrile (NBR), (standard)
Alternative lower diaphragm	Solid Teflon (PTFE), (for temperatures above 140 °C) (284 °F) O-ring Nitrile (NBR), (standard)
Alternative O-ring	Flourinated rubber (FPM), (for temperatures above 95 °C) (203 °F)
Finish	Semi bright

Weight (kg)

Size	CPMI - 2			CPMO - 2			CPM-I-D60
	Kv 23	Kv 7	Kv 2/15	Kv 23	Kv 9	Kv 2/15	76 mm
Weight (kg)	5.5	5.5	5.5	5.5	5.5	5.5	10

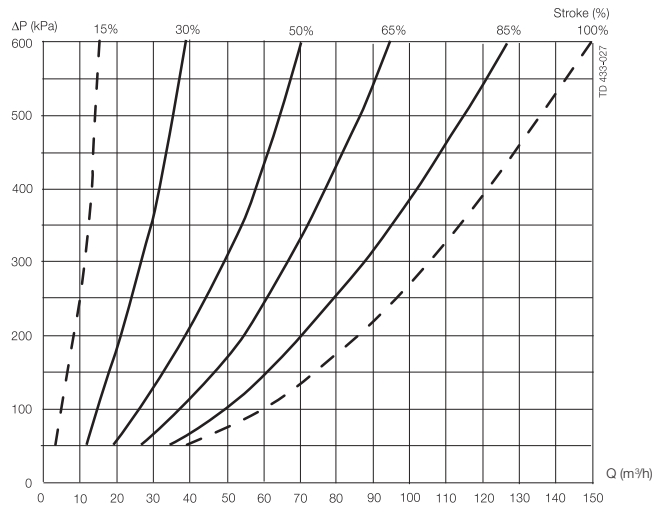
Noise

One meter away from - and 1.6 meter above the exhaust the noise level of a valve actuator will be approximately 77dB(A) without noise damper and approximately 72 dB(A) with noise damper - Measured at 7 bars air-pressure.

6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

6.2 Selection / Pressure drop - capacity diagram



NOTE!

For the diagrams the following applies:

Medium: Water (20°C) (68°F).

Measurement: In accordance with VDI 2173.

Example of using the diagram:

Pressure drop $\Delta p = 300$ kPa.

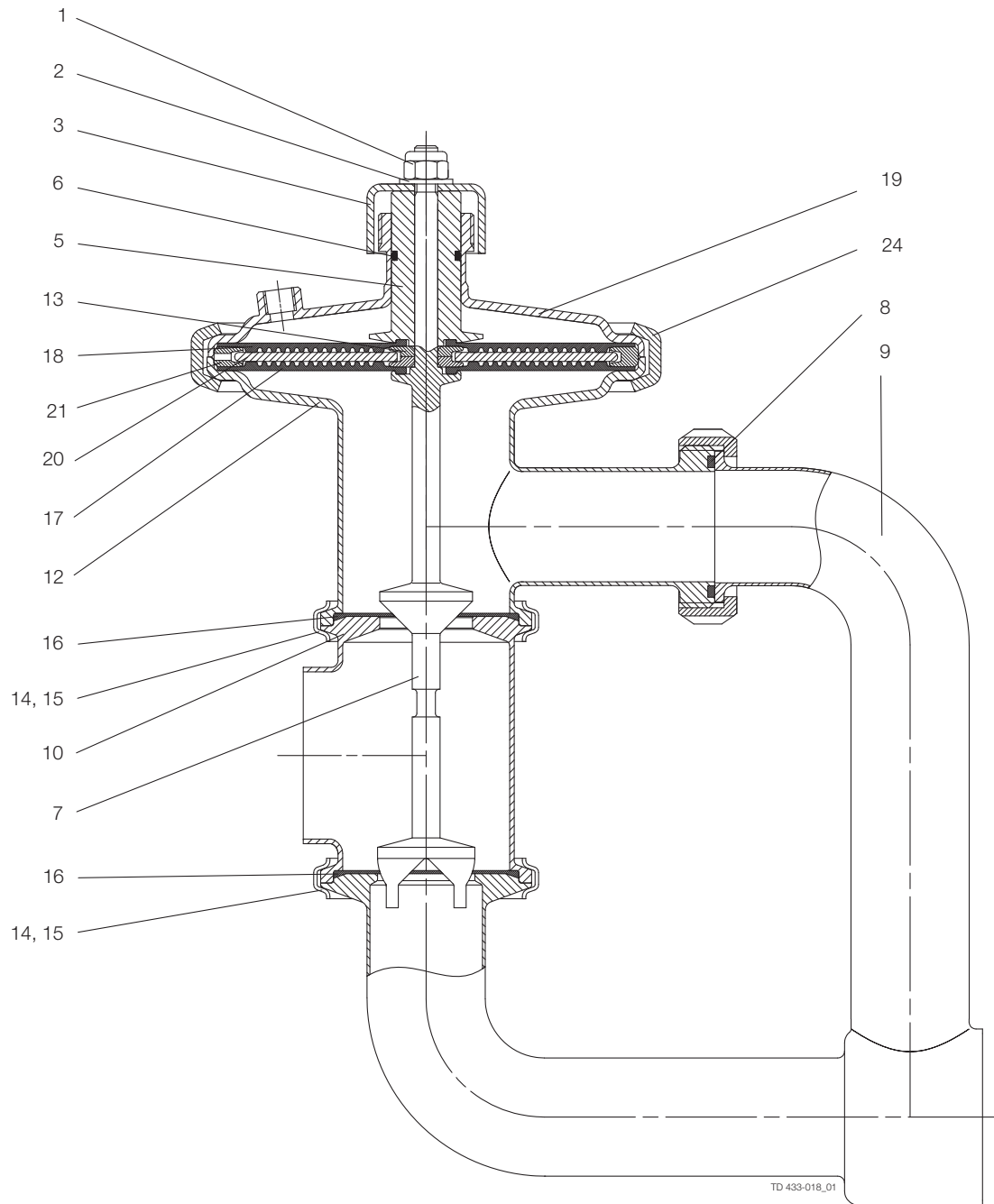
Flow = 50 m³/h.

The intersection is on the 50% curve

7 Parts lists and service kit

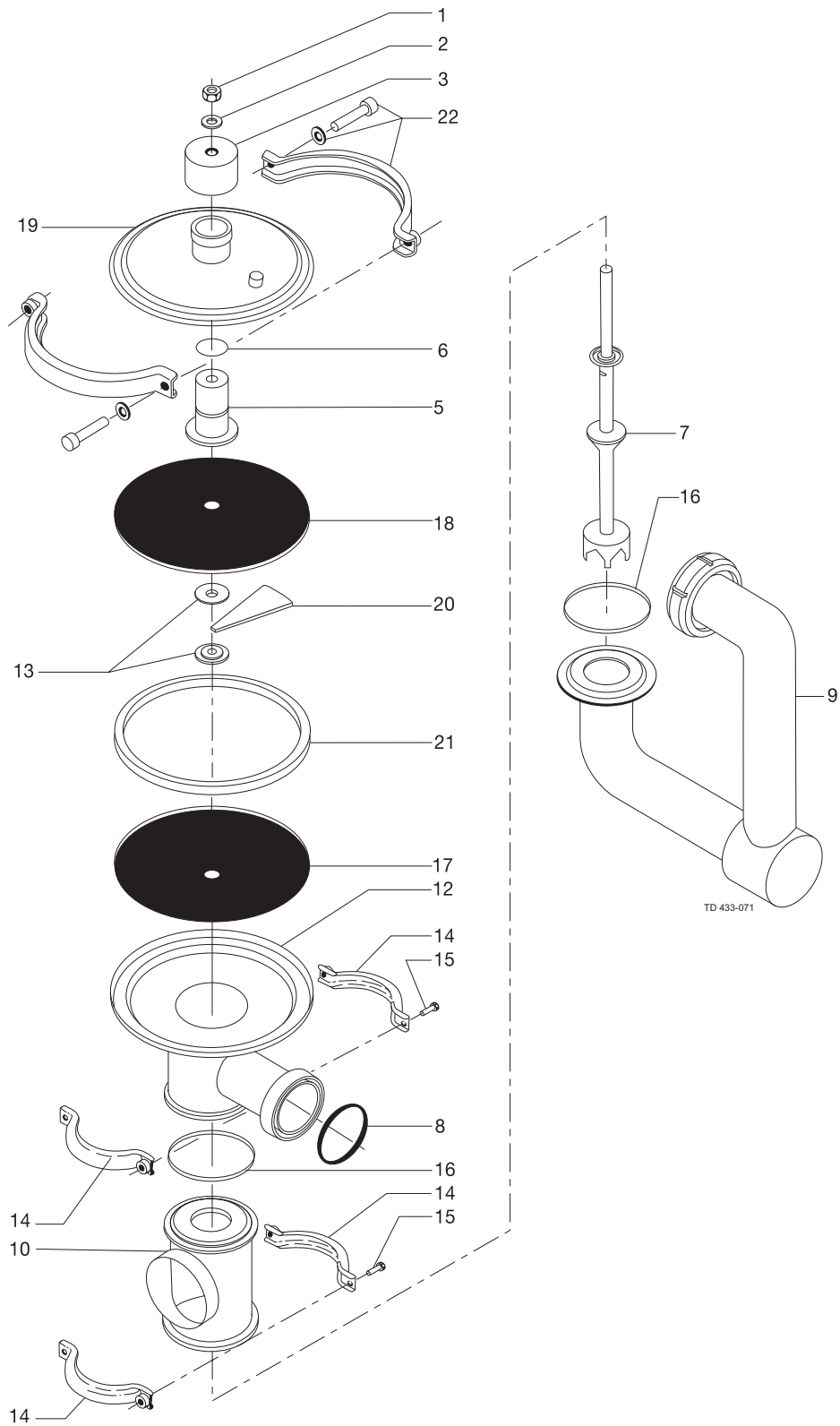
*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

7.1 CPM-I-D60



7 Parts lists and service kit

*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*



7 Parts lists and service kit

*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

Parts list

Pos.	Qty	Denomination
	2	Screw (Period 8209-9310)
1	1	Nut
2	1	Washer
3	1	Top
5	1	Guide
6 <input type="checkbox"/>	1	O-ring
7	1	Plug
8 <input type="checkbox"/>	1	Seal ring
9	1	Inlet tube
10	1	Valve body, lower
12	1	Valve body
13	2	Inner ring
14+15	2	Clamps and screws (Period 9209-)
14	4	Clamp half (Period -9209)
15	4	Screw (Period -9209)
16 <input type="checkbox"/>	2	Valve body seal ring
17 <input type="checkbox"/>	1	Diaphragm, PTFE covered EPDM (std.) (product side)
18 <input type="checkbox"/>	1	Diaphragm
19	1	Cover
20	12	Support sector
21	1	Outer ring
22	1	Clamp

Service kits

Denomination

Product wetted parts

Service kit 9611920119

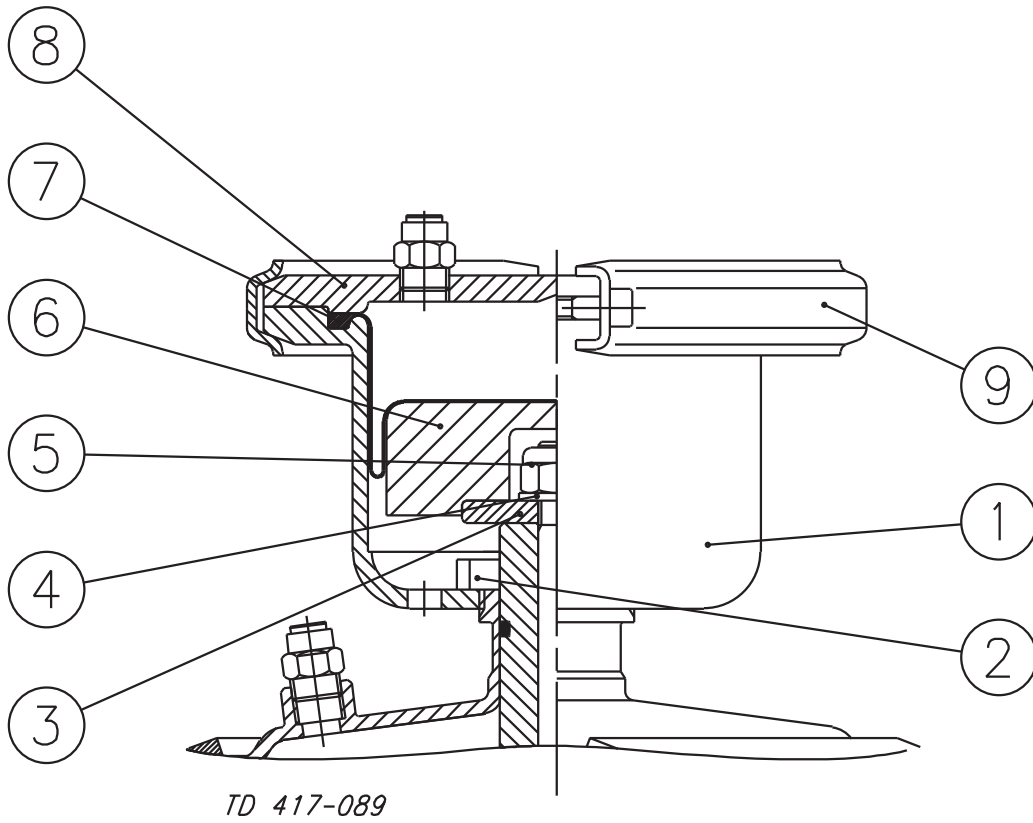
Parts marked with are included in Service kit.

Recommended spare parts: Service kit.

900-126/0

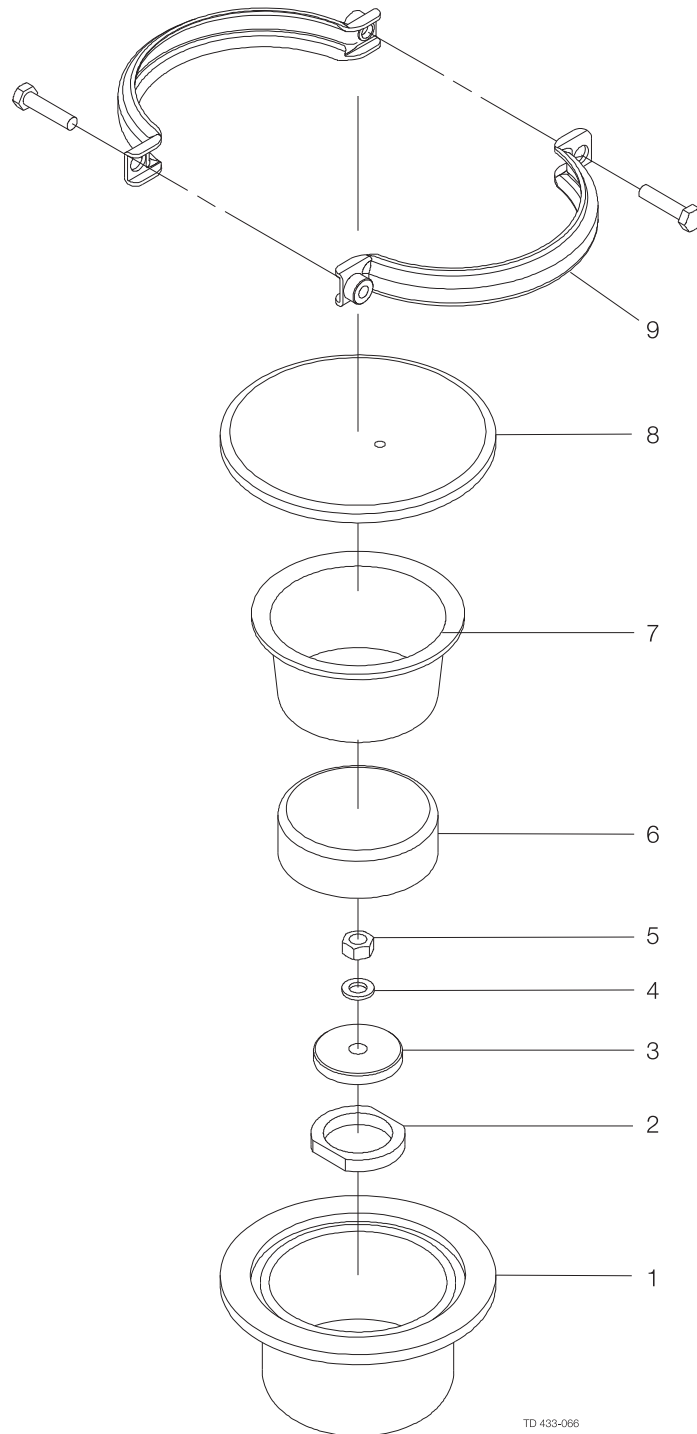
*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

7.2 Booster



7 Parts lists and service kit

*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*



7 Parts lists and service kit

*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

Parts list

Pos.	Qty	Denomination
1	1	Booster housing
2	1	Lock nut
3	1	Washer
4	1	Spring washer
5	1	Nut
6	1	Booster piston
7	1	Diaphragm
8	1	Booster cover
9	1	Clamps and screws

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 directly.

© Alfa Laval Corporate AB

This document and its contents is owned by Alfa Laval Corporate AB and protected by laws governing intellectual property and thereto related rights. It is the responsibility of the user of this document to comply with all applicable intellectual property laws. Without limiting any rights related to this document, no part of this document may be copied, reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the expressed permission of Alfa Laval Corporate AB. Alfa Laval Corporate AB will enforce its rights related to this document to the fullest extent of the law, including the seeking of criminal prosecution.