

INSTALLATION INSTRUCTIONS FOR WELDERS FILTER PRESSES.

1. Lifting the filters.

The filter should never be lifted on flanges or on hydraulic parts.

This will definitely damage certain parts. This damage is not covered by our mechanical guarantee. Lifting eyes are provided on both press ends.

2. Mounting the filters.

The filter press should only be bolted to the support structure on one press end. The other end should be free to move in slots.

The support legs are drilled accordingly.

The filter shall be mounted completely level. There should be no excessive vibration present in the support structure caused by centrifuges, mills compressors, etc.

3. Piping.

It is an absolute must that the feed piping to a filter press is large diameter pipe and shall be of NP 16 rating for 7 bar presses and NP 25 for 16 bar presses.

Never use short radius elbows.

It is better to use 2 long radius 45° elbows than one 90° elbow.

It shall be possible to clean the feed piping when required. Therefore blind flanges shall be installed around piping obstructions.

Regarding valves, it is recommended to use full bore valves such as ball valves, knife gate valves, etc.

4. Safety devices.

A pressure relief device is necessary in the feed piping, if the press is fed by a positive displacement pump.

The relief valve should be a spring loaded piston type and not a rupture disc type, since the disc type can not take shocks.

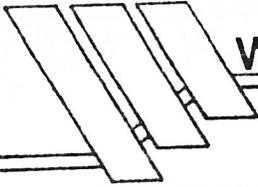
When filtering saturated solutions, the feed piping shall be insulated and trace-heated or jacketed to prevent cristal growth.

5. Installation of the filterplates.

For a manual filterpress the plates are simply placed in the 2 side bars with both polypropylene handles, one on each side.

The handles shall be centered.

In case of cake washing, each plate shall be 180° turned around the vertical



The head and tailplate shall be installed properly. The filtercloth shall be very well installed, flat no folds-stretched.

When recessed plates are installed, the connecting sleeve shall be cylindrical and well stretched.

In the case of membrane plates, the gaskets around the air inlet parts shall be completely free.

All ports shall be completely free - no obstruction of filtercloth can be accepted.

In the case of fully automatic filters with overhead transport system, the plates shall be suspended in the profiles with the center handle. The plates are tilted by 2 operators.

One side of the plate is lifted somewhat higher than the other side. One handle arm is put on the adjacent beam after swinging the plate approx. 30° lifting it a few centimeters and drop it on the lower lip of the beam.

Again all plates should be turned around 180° over the vertical centerline, in case of pressure and wash plates. This is not required when the plates are drilled for filtration. (4 corners have filtrate discharge connections).

6. Installation of filterbags.

a. Plate and Frame Press.

This filter press is usually equiped with throw over bags. One bag has the size of both surfaces of one plate. The bag is folded in the middle and hanged over the plate. The plate is on top equiped with clothpegs. The clothpegs shall hold the bag in position.

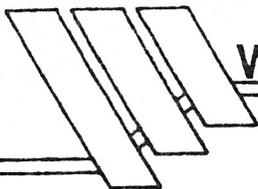
The other 3 sides of the bag are spanned with our special removable spanners. The spanners have a little lip. When lifting or pressing this lip, the binding can be opened. The openings (round holes burned out or pressed copper rings).

The bags shall fit perfectly and well stretched without folds.

b. Gasketed filter plates.

Since this plate type is only used when filtering hazardous products, no filter cloth hanging out the plates is acceptable.

A special groove is machined in the plate where the cloth shall be pushed.



c. Recessed Chamber Plates Membrane Plates.

1. Throw over cloths :

This filter cloth is similar to type A cloths used on plate and frame presses.

However, the feed channel (corner or centerfeed system) is of course cut out, sealed and connected with the other plate side, by means of special cloth snam rings (polypropylene).

2. Pull through cloths.

This cloth type is the most popular one for recessed and membrane plates. This cloth is composed of 2 single sheets connected with a sleeve at the feed inlet position (center or corner).

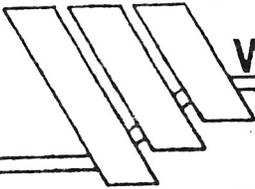
When installing this cloth type, one side of the cloth shall be rolled as a saucisse and pulled through the feed channel, and unfolded again.

The cloths are changed on the upper side over the cloth pegs. Suitable holes should be provided in the cloth, by the cloth manufacturer. The cloth is closed on the 3 other sides in the way as type A cloths for plates and frames.

Some care and attention shall be given to get well stretched filter cloths.

Do not forget that once a folded cloth get pressed between the frames, this fold is really formed in the cloth structure.

The only good decision that can be taken is to replace this cloth by a new one.



OPERATING INSTRUCTIONS FOR WELDERS FILTER PRESSES.

I. Opening and closing the filter.

A. Manual filters - HAND PUMP.

Small filter presses (max. size 470 x 470) can be equipped with a single acting hydraulic cylinder and an hydraulic handpump.

The movable head in this case can be rolled backwards as soon as the ram is retracted. The ram will retract simply by bleeding of the pressure in the hydraulic ram.

To close the valve, the bleed valve is closed and the hydraulic oil is pumped in by an hydraulic handpump.

The hydraulic ram usually has only 100 mm to 200 mm length.

B. Manual filters - electrically driven pump (size 470 - 630).

In this simple version, the hydraulic ram is double acting.

The hydraulic pump is electrically driven, but the oil flow is manually controlled. An handle shall be pushed to extend the ram or pulled to retract the ram.

All hydraulic systems are equipped with a pressure gauge.

A conversion table pressure versus total load in tons is added to each filter press.

The sealing pressure can be surveyed by a pressure switch, cabled to a central control room.

This will warn an operator to check the oil pressure in the system.

C. Manual filters with pressure compensation system.

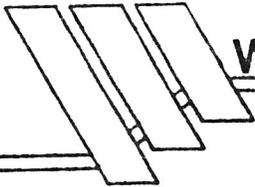
The filterpresses are usually larger manual side bar presses size 630 - 800 - 1000.

In order to keep the sealing pressure as constant as possible, a pressure compensating system has been developed by Welders.

The hydraulic system has now all hydraulic valves automated with solenoids.

The pressure is controlled by a safety valve and a combination of two pressure switches. One switch will be set just above the optimal sealing pressure before the relief valve shall bleed of pressure.

The other switch is set just under the optimal sealing pressure.



For instance :

- optimal sealing pressure : 350 bar
- relief valve set at : 365 bar
- high pressure switch : 360 bar
- low pressure switch : 340 bar

When closing the press, the motor will automatically stop when the high pressure is reached.

If for any reason the pressure in the system is reduced to the low pressure level, the motor will be started again, the 4/2 way valve energized until the automatic stop of the high pressure switch is reached.

To open the press, on the local control panel, the push button - open - is pushed in. This button is spring loaded for safety reasons.

The hydraulic motor stops automatically as soon as the proximity switch behind the side bar for detection of the open position is energized.

Before the opening, the high pressure in the cylinder is bled off over a needle valve.

It is also possible to do this with a special decompression valve. This involves an extra cost, but is certainly justified when filtering at higher temperatures.

The sealing pressure decreases in a controlled way. Eventual vapors captured in the filterpress will expand slowly without blowing out and causing accidents.

Fully automatic presses are standard equipped with this safety feature.

D. Fully and Semi-Automatic Filter Presses.

The press opens and closes completely automatically via the software in the microprocessor.

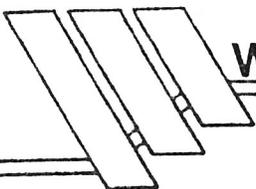
The compensation mechanism works exactly as under para C.

A decompression valve is standard included in the hydraulic system.

In addition to safety advantages, the decompression valve will prevent and avoid the development of excessive noise and vibration.

IMPORTANT :

We can include in the control panel of type C and type D, a contact coming from a limit switch on a valve, or pressure switch, to prevent the opening of the press under pressure.



II. Filtration.

It is very important that the filter press is first filled completely and any remaining air or gas is removed.

This can be done by keeping the bottom filtrate valves closed and open only the top filtrate valves.

It is also very important to respect very carefully the pressure - temperature curve, when working with polypropylene filter plates.

The same applies for the squeezing pressure when using membrane plates.

In order to get good or optimal results, the filtration should take place without too many pulsations and at the highest possible pressure for the given physical condition.

As a rule of thumb, we can say that the end of the cycle, flow rate should be as low as possible and the maximum allowable pressure should remain in the plate stack during 30 - 60 seconds before a decrease in pressure is noticeable.

This applies of course NOT for membrane plate stacks.

Note that for a filter press NOT the differential pressure (as in all other filtration systems), but the actual feed pressure is the limiting factor.

In order to get maximum result, the backpressure in the filtrate flow shall be reduced in a minimum. When large solids could be present, it is recommended to install a trap filter, suction strainer to avoid problems with the feed pump and with the filter press.

As a rule of thumb, the maximum particle size should not be more than 1/4 of the maximum cake thickness.

III. Cake washing.

In most cases the cake has to be washed.

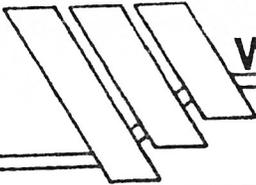
This can only be done with a well filled press. A sludge in a cake compartment can not be washed effectively.

Wash liquor enters usually in one of the lower filtrate headers, goes between the cloth and the filtrate plate and is forced to go through the cake and leaves the press in the upper opposite corner.

This is normally done in 2 directions :

- a. IN lower left - OUT upper right
- b. IN lower right - OUT upper left.

There are several classes or grades of washing.



If we take the washwater volume versus cake volume :

- 1 - 3 : filtrate displacement.
- 4 - 6 : decontamination - light wash.
- 8 - 12 : good wash.
- 12 - 16 : very deep wash.

IV. Core blowing.

The feed channel in a filterpress remains always filled with unfiltered liquid or sludge.

Though the volume of this channel is only approx. 3 - 4 % of the entire cake volume, the contamination caused by this header is not always to be neglected.

This header volume or core volume can be reduced (never removed 100 %) by blowing air or gas in the press from the movable head downwards at 7 or 16 bar. (depending in the design pressure).

Once the center core is pressurized, the filter feed valve is suddenly - quickly opened.

The core blow will NEVER work if the blow-out piping gives a lot of obstructions.
(see : manual "piping").

V. Cake removal.

a. Manual filter presses.

Most of the manual shifted filter presses have plate and frame plates.

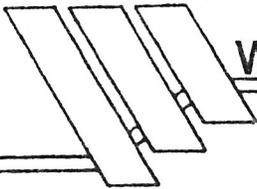
There should be 2 operators available : one on each side.

Plate by plate is moved over the side bars. With a cake scraper, the cake shall be pushed out of the frame.

Special attention shall always be given to the sealing faces. Trained operators form a real team. Whilst one operator pushes out the filter cake, the other one cleans the bottom sealing surface with a scraper.

The shifting goes rather fast : one plate in 5 to 10 seconds.

The scraper should be made of plastic or wood, in no case use metal scraper NEVER. Plastic scrapers are available thru our Company.



b. Automatic Plate Support.

In the Welders fully automatic filter press, no operator assistance is required.

The plates are transported overhead. Where several filter presses are installed, usually there is someone around to watch and observe the operation.

If there is a problem, he stops the shifting mechanism and corrects the situation.

This man is warned by an audible signal of the hydraulic system available prior to plate shifting.

If a cake is not completely discharged, this does not form a direct problem for the next cycle. It means of course a loss of capacity.

If we are aware of greasy or sticky cakes we can build-in a system : shock and drop system.

During the travelling of the plate, the handle will be pulled over obstructions on his path. These obstructions are 1 - 10 millimeters high.

VI. Special steps.

a. Membrane compression.

When using membrane plates (Hansen - Lenser - Klinkau), the cake in the chamber can be compressed.

This has many advantages. The squeezing force shall be handled carefully. The membrane shall be inflated only slowly at a rate of 1,5 bar per minute.

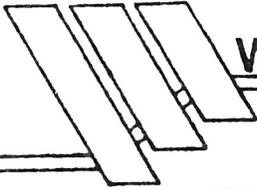
When the cake must be washed, the cake is only compressed at 3 to 4 bar. A final squeeze to obtain the driest possible cake is 7 or 16 bar. (depending on the design pressure of the press).

When the max. pressure is reached, this pressure is kept in the membranes for several minutes, allowing remaining liquid coming out of the cake to evacuate.

The filter press is also vented in the same way as inflated. The gradual inflation and deflation is very important when using polypropylene membranes plates. Rubber membranes are not as fragile as polypropylene.

b. Sterilizing of the platestack.

Even a polypropylene plate stack can be sterilized with steam. Of course the steam temperature shall not exceed 120° C. DO NOT use 6 bar boiler steam (saturated) to sterilize a filter press. This will turn out in a disaster.



If no 120° C steam is available, 6 bar steam has to be used anyway, but in the steam outlet, water shall be sprayed in order to reduce the temperature.

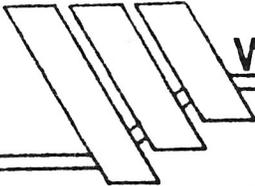
The water feed line to the spray nozzle should have minimum 6 bar pressure, should have sight glass with flow indicator, check valve and electric flow switch.

The steam flow shall be cut if no water is sprayed in the steam.

Sterilizing time should be not longer than 15 minutes.

c. Cake air blow.

To complete the dewatering of filtercake pressurized air is blown through the cake to remove any intercrystalline or free water (or any liquid).



MAINTENANCE INSTRUCTIONS FOR WELDERS FILTER PRESSES.

1. Shutting down a filter for some time.

- a. Flush the filter with a product which can easily dissolve or remove any deposits of solids in the plates, piping connections.

In many cases, hot water combined with industrial detergents or caustics can be used.

The cleaning is followed by a final washing with clean water or a clean product.

- b. After washing the closed press.

The filter cloths can be washed with a high pressure spray gun.

- c. After cloth washing.

The filter bags have to be inspected visually.

- d. Complete inspection.

A complete inspection of the plates and cloths shall be done every 3 months.

- e. Replacement of filter bags.

Filter bags in poor condition should be replaced without any hesitation.

2. Lubrication.

- a. Lubrication, weekly, is required for the bearings in the plate transport mechanism.

- b. In a separate section, you find the maintenance instructions for the hydraulic system.

- c. Hydraulic oil level should never reach the lower level.

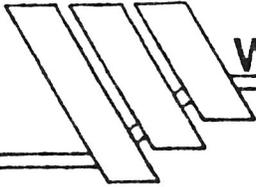
- d. The hydraulic system is equipped with an oil filter.

- e. This filter should be cleaned after start-up : 3 - 4 weeks.
after start-up : 3 months.
furtheron every: 6 months. ✓

The filter is washed out with chlorothene or gasoline and a soft to medium hard brush.

The filterelement is given a final rinse with water free alcohol and dried with clean compressed air.

A hydraulic oil filter should be replaced every 2 year.



f. Connections in the hydraulic system.

These do not require any special maintenance.

High pressure tubes have welded connecting and O-ring seals.
O-ring seals should be replaced after 2 years of operation.
Flexible hydraulic tubing should be replaced after 2 years of operation.

g. The chains in the plate transport mechanism are to be adjusted for tension, every month during the first three months, later on, only once every 6 months.

The tension should be such that the chain, in the middle of the press can be lifted 40 - 50 mm.

The tension on both sides of the press should be the same. Both sides shall be tensioned simultaneously. The tension devices are installed at the rear of the press in the center of the 2 upper beams.

3. Start-up inspections.

a. Check all hydraulic connections.

b. All levels should be max. level.

c. Check rotation of the electric pump if rotation arrow is indicated on the motor fan cover.

d. System pressure is preset in the factory - do not touch.

e. Pump noise and crackle is caused by air entering the pump suction.

This can happen only in the first runs. (the cylinders are not completely vented).

f. After a few weeks, not only the filter will be cleaned, but the oil in the tank shall be drained. Also the tank shall be cleaned. The oil should not contain any water.

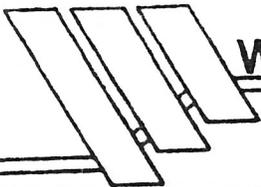
g. In the level glass a thermometer is built in. The oil temperature should never exceed 65 - 70° C.

h. Hydraulic cylinders.

The large press cylinder is equipped with an air bleed valve. During initial start-up, this valve shall be opened (screw turned loose) to allow any air to escape.

This operation will be repeated every 3 months. The cylinder rods are hardened. No hard objects should fall in the rams.

A set of spare gaskets should always be in your possession (rod and piston seal kits).



4. Annual Inspection.

1. Check bearings in the chain drive mechanism.
2. Check chains for signs of wear.
3. Inspect feed inlet - filtrate discharge lines.
4. Inspect eventual gaskets between the air connections (membrane plates only).
5. Repaint eventually the external carbon steel parts, where no sufficient protection of these parts is available.

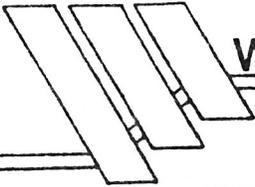
5. Cleaning polypropylene plates.

If the plates are working - handling material with melting points below 100° C, they can simply be dipped in a water tank with boiling water for 15 - 45 minutes.

If mineral deposits are present, dissolve them by adding 1 % HCl or 1 % HNO₃ to the liquid, followed by a water washing and drying with compressed air.

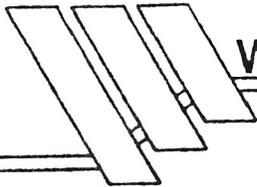
If membrane plates are used, no liquid should be in the membrane chamber.

Regarding solvents : only aliphatic solvents and alcohol, acetone can be used. Do not use chlorinated solvents such as carbontetrachloride.



RECOMMENDED SPARE PART LIST.

1. Filter plate.
2. Filter head plate.
3. Filter tail plate.
4. Filter handle.
5. Filter cloth-plate.
6. Filter cloth-head plate.
7. Filter cloth-tail plate.
8. Membrane plate and gasket.
9. Bearings front.
10. Bearings adjustable.
11. Main hydraulic ram seal kit-rod.
12. Main hydraulic ram seal kit piston.
13. Door hydraulic ram seal kit rod.
14. Door hydraulic ram seal kit piston
15. Oil filter.
16. Hydraulic shifter motor.
17. O-rings hydraulic tubing.
18. Flexible hydraulic hoses.
19. Hydraulic oil.
20. Pressure switch. ✓
21. Solenoids. ✓
22. 4/2 Valves low pressure ND6. ✓
23. 4/3 Valves high pressure ND6. ✓
24. Press gauge 0 - 160 bar. ✓
25. Press gauge 0 - 350 bar. ✓
26. Relief valve 50 bar. ✓
27. Relief valve 75 bar. ✓
28. Relief valve 350 bar. ✓
29. Check valves. ✓
30. Isolation valves.
31. Decompression valve.
32. Flow control valve. ✓



INSTRUCTIONS FOR USE OF THE ELECTRIC PANEL IN FULLY AUTOMATED FILTERS.

1. The selector switch automatic, semi-auto, shall be normally in automatic position.
2. If for any reason the cycle shall be shortened, or cut, switch over to semi auto with the jog push button.

The programme will go on for one step only and stay in this step until the jog button is pushed again.

3. Normal operation-inspection.
In the semi auto mode normal operation, the plate transport will work complete standard (automatic).

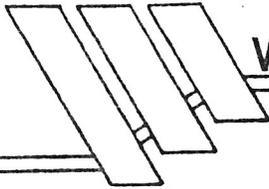
If the plates or cloths or the cake needs inspection, the operator shall select the inspection mode. He now can move one plate at one time. The plate mechanism will move another plate only after pressing the button shift plate by plate.

4. Close doors - 0 - open doors.
In the semi auto mode, the doors can be opened and closed by operating this switch.
5. Retract ram - extend ram.
In the semi-auto mode, the movable head can be opened and closed by operating this switch.
6. Audiable alarm.
During the movement of the cake doors, and the movable head, operators and workman around the equipment will be warned with this tone.
7. EMERGENCY Clear.
If a safety cable is touched by the operator, the hydraulic movement of the head door or shifter will stop at once. The emergency situation is cleared until an operator pushes the alarm clear button.

8. Alarm.
The dip trays will bring any leaks to the driptrough.

If the leaks are excessive (piece of cake between the sealing surfaces) the liquid level in the trough will raise and energize a level switch.

This contact shall be wired to the central control panel.



WELDERS NV

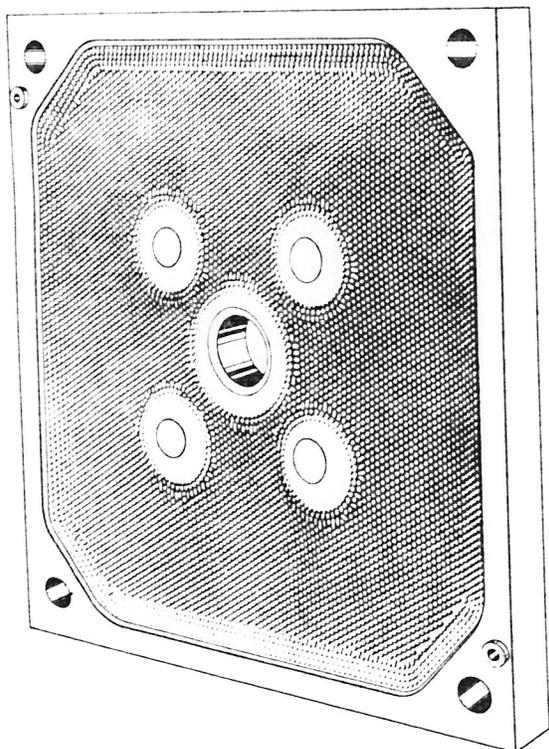
WIJNGAARDVELD 5 - 9300 AALST - BELGIUM
TX. : 12352 - TEL. : 0(53) 77 76 77 - 77 77 09

MEMBRANE PLATES OPERATION MANUAL

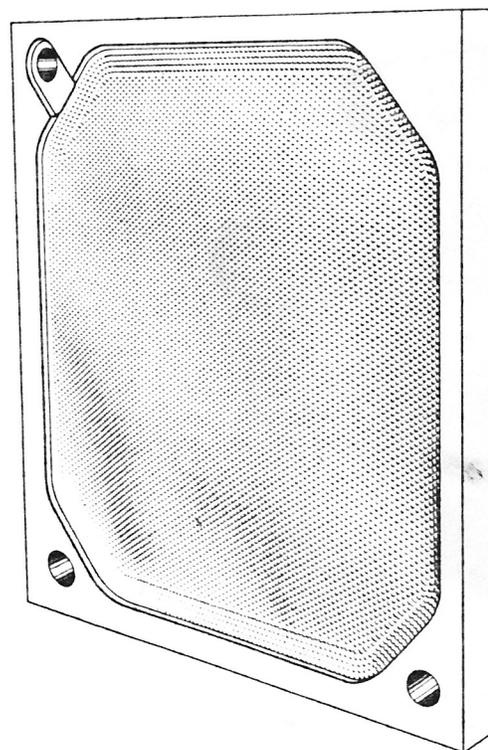
Lenser® PP-Membranbloc

Operation manual

MZ



ME



ATTENTION!
IMPORTANT FOR PLANT ENGINEER



The LENSER-PP-MEMBRANBLOC as high-grade process equipment solves your filtration problems in an optimum way. His advantages unknown so far you should use as long as possible.

The service life of filterelements — especially of membrane filterelements — depends essentially on the pertinent operation.

That is why we ask you — for your own sake — to strictly follow the present operation manual.

A. Inspection before 1st operation (Checklist)

1. Plates are fitted parallel in skeleton?
2. Plate sequence is correct?
(Pressure plate / wash plate respectively, two button / three button)
3. Each plate installed the right way round?
(Outlet holes / spigots on same side)
4. Centering lugs of handles in correct position?
5. Headplate, tailplate (and, if present, adapterplate) fixed correctly to the skeleton?
(Heat expansion must be considered)
6. Are the sealing grommets fitted to the squeeze ports seating correctly?
(The grommet should stand proud of the sealing face of the filterplate by 4 mm) *
- * Assessed in conjunction with filter cloths of 0,75 – 1,25 mm thickness.
7. Filtercloth in the area of the corner eyes / ports stamped out correctly?
(The cut out must be larger than the diameter of the eyes and sealing grommet, to allow for cloth stretching under pressure of filtration).
8. Filter cloth fitting correctly?
The filter cloth must under no circumstances foul the grommet.
9. Filter cloth must be tautened to keep free of filtrate outlet holes.
10. In the case of individual squeeze pressure supply to each plate, is length of hose sufficient to allow for plate movement?
Check hose connection to plates are tight.
11. Is a squeeze pressure limitation device installed?
(Maximum pressure for squeezing pls. see diagram No. 2)
When using LENSER MACU Unit, feed pressure to unit must be limited to 10 bar.
12. Does cross section of pressure line correspond to the max. permissible flowrate / build-up time?
(Is installation of orifice plate necessary? Do not forget to take into account the number of chambers.)
13. Closing force calculation correctly?
We recommend:
closing force = filtration pressure or maximum squeeze
 pressure x filter area (of plate) x 1,3
(The reduction of the calculated closing force during filtration at lower pressure is not necessary).



B. General Operating Instructions

1. Squeezing into empty or nearly empty chambers is not permitted!
2. Maximum pressure for filtration, washing and squeeze depends on operating temperatures. (The limiting values are shown on diagrams No. 1 and No. 3)
3. The required minimum time for build-up to maximum squeeze pressure is shown on diagram No. 2.
4. The LENSER Guarantee is valid only if the LENSER MACU Control Unit is used or a similar operation of the membrane plates can be proved (see diagram No. 2).
5. The time of squeezing with maximum pressure is limited to 15 minutes!
6. Shock temperatures must be avoided (e. g. filtration or washwater temperature = 80° C, squeezing with cold water).
In this case a cooling down period is necessary. A max. difference of 50° C must not be exceeded.
7. If you have to squeeze at temperatures below +10° C please ask for further information.
8. For proof of proper operation the use of a pressure and – if necessary – a temperature recorder is suitable.
9. In case of individual squeeze pressure supply it is important that under no circumstances whatsoever, the filter press can be opened whilst the membrane is under any load. (Furthermore, not only the pressure line must be closed but also the outlet must be open to atmosphere.)

C. Filtration

1. For equal filling of all chambers the feed pump must have sufficient capacity.
2. The optimum filtration pressure depends on the product and must be found in practice.
According to present experience values between 30 and 50 pct. of squeeze pressure give good results.
3. Filtration pressure and time as well as squeeze pressure and time should be determined to achieve thickness of squeezed filter cake of min. 20 mm for 40 mm chamber and min. 25 mm for 50 mm chamber.
4. For limiting values of filtration pressure at given operating temperature see diagram No. 1. They are fixed according to present experience. *
5. The filtration time has to be determined to prevent overflowing of chambers; thus you avoid undue differential pressures which cause bowing of the membranbloc – and what is more, you save energy!
6. During filtration the squeeze pressure connection has to be vented.

D. Washing

1. The optimum values for washing pressure, temperature and time as well as the type of washing liquid depend on the product and must be found in practice.
2. For limiting values of washing pressure at given operating temperature see diagram No. 1. They are fixed according to present experience. *



E. Squeeze

1. Experience shows lower residual moisture if squeeze pressure rise is gentle.
2. For max. pressure rise see diagram No. 2.
3. In practice approximation to the ideal curve can be done by an orifice in the pressure feed line – consider compressibility of filter cake –.
4. SUDDEN PRESSURE LOADING OF MEMBRANES IS ABSOLUTELY NOT PERMITTED!
5. As ancillary equipment the membrane pressure control unit LENSER-MACU is offered. The squeeze pressure can be controlled in three steps with adjustable time sequence.
6. For limiting values of squeeze pressure at given operating temperature see diagram No. 3. They are fixed according to present experience. *
7. Max. squeeze pressure is permissible only for a period of 15 mins. If, for process reasons, extended squeeze is required, pressure rise must be accordingly slower.

F. Discharge

1. RELEASE SQUEEZE PRESSURE SLOWLY!
Opening of filter press with membranes still under pressure inevitably destroys the Membranbloc!
2. During cake discharge check proper fit of squeeze grommets and filter cloth.
3. Check cleaning of feed port and sealing edges!
Insufficiently cleaning of feed ports leads to unequal chamber filling or even to total blockage of feed channel with subsequent differential pressures which can damage the filter elements.

G. A friendly hint

Experience tells: damages and resulting claims almost only happen during night shift or periods of reduced supervision. That is why we recommend:

1. install sufficient control recorders
2. look for sufficient operator training according to the operation manual

It appears that in plants, where these points are observed, operation is trouble-free.

If in any case, you must assume that the LENSER-PP-MEMBRANBLOC causes trouble, please, check if our operation manual has been observed.

Senden, October 1982

* Besides pressure and temperature other influences are possible which we cannot influence or control. Therefore, all data are given without responsibility.

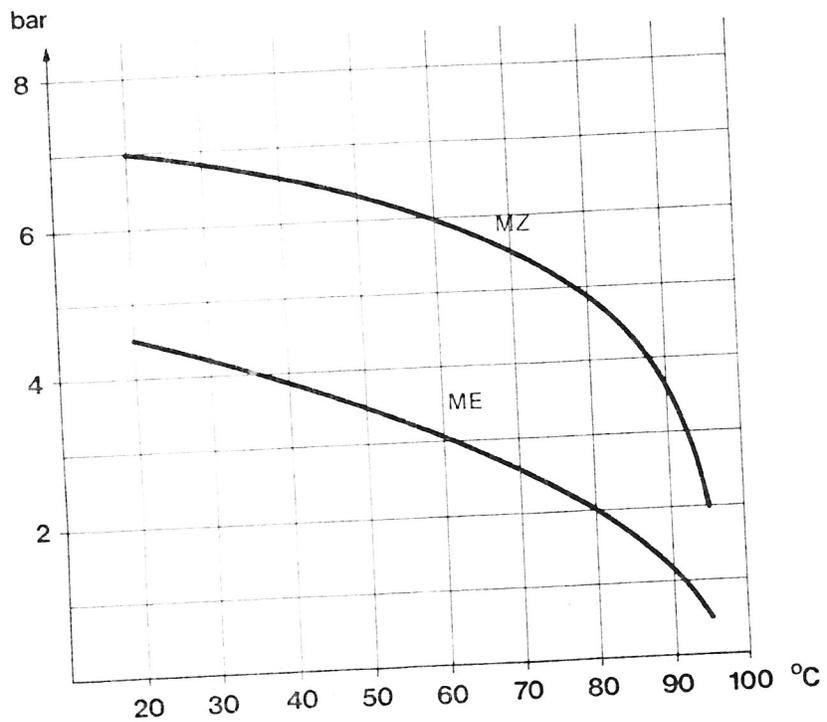


diagram 1
filtration pressure
washing pressure
vs. operation temperature

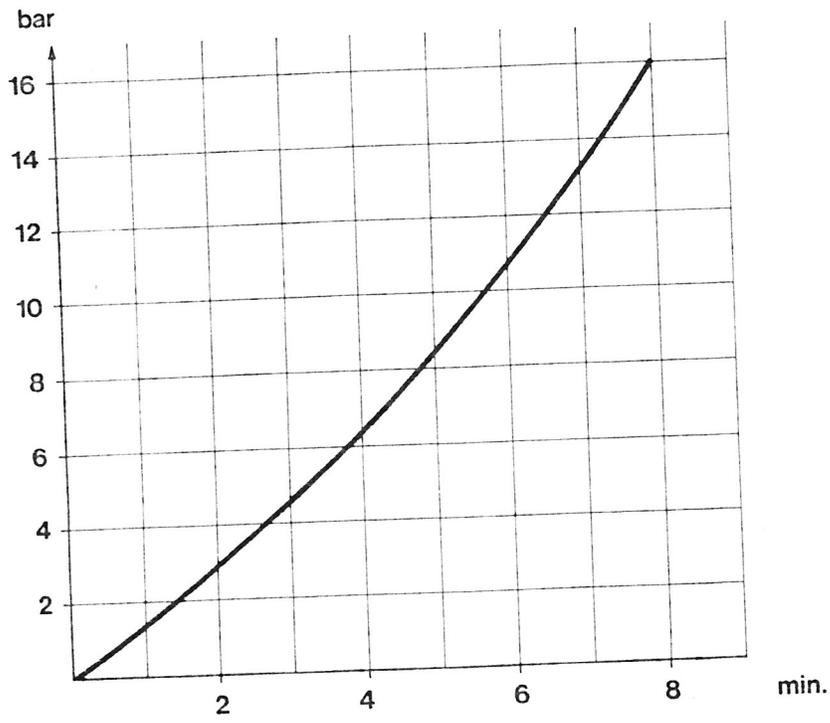


diagram 2
squeeze pressure rise

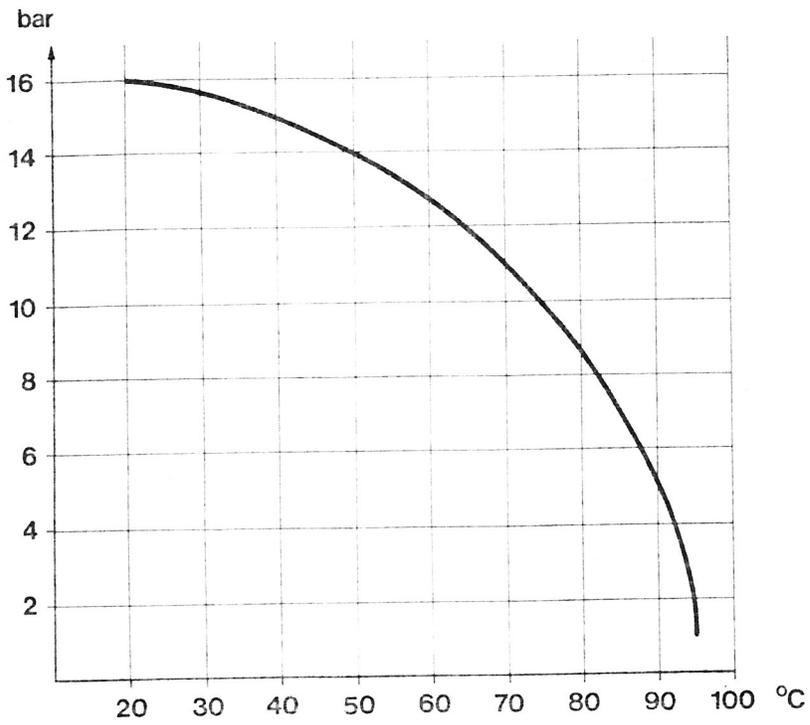


diagram 3
squeeze pressure
vs. membrane temperature

1. General

In order to guarantee efficient operation of valves it is essential, if repairs become necessary, to adhere to the operating instructions supplied with the component or the information given in the catalogue sheet. Whether assembling or dismantling, it is important that the internal parts of the valve be kept clean. The operating fluid should be of a type indicated in our Oil Recommendation Sheet, and must be maintained at a suitable degree of cleanliness. Maintenance and operation are dependent on the conditions under which the equipment is working.

The VDI regulations (VDI 3027) and appropriate CETOP recommendations must also be taken as a guideline and it is assumed that these are known to you.

2. Installation

2.1 Mounting Position

Generally speaking, directional control valves can be mounted in any position. Vertically mounted solenoid valves, where the solenoids are hanging down from the valve, are subject to slow response and horizontal mounting is therefore recommended.

Solenoid operated directional control valves provided with a drain connection to reduce response times must always be mounted horizontally.

Relief valves should be mounted either vertically with the operating device pointing upwards, or horizontally. The mounting of hydro-electric pressure switches with leakage connection is optional; pressure switches without leakage connection should be mounted so that the pressure port is not situated at a higher level than the drain port.

For all other control and regulating equipment the mounting is optional.

2.2 Assembly

An essential factor here is cleanliness.

The mounting surface for all components must be machined and absolutely smooth to avoid mounting stress, as this could cause the control spool to stick. Care should be taken that the fixing screws are tightened evenly

Pipe connections and thread depths are suitable for all conventional pipe couplings. The spot faces on the housings are designed to take pipe couplings with bite ring and O-ring seal.

The thread must not extend to the bottom of the hole.

Sealing matter such as hemp or putty must not be used, as they can cause contamination and consequently lead to malfunction.

Pipes must be cleaned and all dirt, swarf, sand, chippings, etc. removed. It is recommended that pipes be pickled. Rags must not be used for cleaning.

All pipes must be laid free of stress.

The drain lines of solenoid valves and hydro-electric pressure switches must be returned to tank under negative head conditions and end above the oil level. They must not be connected to the pressure and return lines, as this could result in slow response of solenoid valves or in pressure variations.

Care should be taken that the correct current and voltage supply and the proper connection are provided. Where the valves are used in continuous operation (100% energised), voltage fluctuations must not exceed $\pm 5\%$ of the operating voltage.

3. Commissioning

In addition to mineral oils, fire-resistant fluids such as water-glycol emulsions can be used. Please consult us before using any other fluids. A viscosity range of 10-200 cSt is permissible.

The valves should be tested for correct function and possible leakage by first operating at a very low pressure (approx. 10 kp/cm²). These tests should be continued until the required working pressure is reached.

4. Maintenance

Particularly after commissioning of a plant, valves should be checked at regular short intervals for correct operation and

The importance of cleanliness of the hydraulic oil cannot be emphasised too greatly. When filling the system, it is recommended to use a filter with a mesh width of less than 0.06 mm. Built-in oil filters should at first be cleaned after every 100 working hours, later monthly and at every oil change.

The first oil change should be carried out – depending on operating conditions and the condition of the oil – after every 50 to 100 working hours on small plants and after every 2000 to 2500 working hours on plants using a larger volume of oil. Subsequent oil changes will last in many cases for 3000 to 5000 working hours and sometimes longer, particularly when regular maintenance of the oil is being carried out.

Old and contaminated oil cannot be improved by topping up with fresh oil. It is more practical to drain the system while the oil is still at working temperature and replace with fresh oil.

A check should be made on the oil level and oil temperature from time to time. Oil temperatures of up to 60°C are normal; the temperature should preferably not be allowed to reach 70°C and should certainly never exceed this figure.

Provided the hydraulic plant is kept clean, periodic inspection of the control equipment should not be necessary.

5. Storage

The valves should be stored in a dry place, free of corrosive matter and/or fumes.

A regular check should be kept on storage conditions.

Should it be necessary to store the valves for a period exceeding 3 months the valves must be filled with hydraulic oil and sealed.

**MANNESMANN
REXROTH****Installation, Commissioning and Service
of Hydraulic Cylinders****RE
07 100/1.83****1. General**

For efficient cylinder function note additionally:

- the technical data contained in the data sheet
- the general instructions for the commissioning of oil hydraulic systems
- the VDI (3027) Guidelines
- the relevant CETOP recommendations

2. Installation**2.1 Mounting position optional****2.2 During installation, have regard to cleanliness:**

- of the environment
- of cylinders, pipe couplings, pipe connections (is pickling or flushing necessary?)
- is there any build-up of resin (can occur on parts taken from stock) If so, this must be removed and the lubricating film renewed
- hemp and putty are unsuitable as sealing materials as they can lead to contamination and malfunctions
- rags are unsuitable for cleaning

2.3 Radial forces, which can arise from mounting and load, should be avoided, since they lead to malfunctions and wear.**2.4 Use fittings with flexible seals.****3. Commissioning**

3.1 Use only suitable hydraulic fluids.
Mineral oils to DIN 24 318, 51 524, 51 525, ISO VG DIN 51 519
For fire-resistant fluids: DIN 24 317
Please note: fluid and seals must be compatible.
If in doubt, please consult us.
Note: our cylinders are tested with anti-corrosion oil which is compatible with all operating fluids.
Unless otherwise instructed, all our cylinders are delivered empty.

3.2 When filling with hydraulic fluid, use filter mesh of ≤ 0.08 mm.

3.3 Flush system for approx. 30 min. by short-circuiting the cylinder connections.

3.4 Connect cylinder to the pipe system.

3.5 Bleed cylinder
loosen fittings at base and rod ends and/or bleed screws, allow air to escape, do not close fittings until oil is free of air bubbles.

4. Servicing

4.1 Generally speaking, cylinders require no servicing, but for cylinders subject to heavy shocks care should be taken that adequate lubrication of the bearing points, such as clevis eyes and trunnions is maintained.

4.2 Check for leakage at frequent intervals.

4.3 Built-in oil filters should be cleaned or replaced - every 10 operating hours during the first week, thereafter monthly or at least at every oil change.

4.4 Oil changes are dependent on:

- operating conditions
- ageing of the oil
- volumetric capacity of the system

4.5 Check oil level, oil volume and oil temperature.

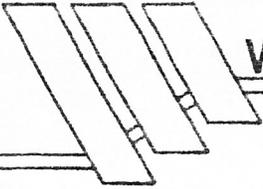
4.6 Replacement of seals:

- Mechanical seals are wear parts.
Should internal or external leakage reach an unacceptable high level, we recommend that
- if possible the cylinders be returned to the factory so that guides, etc, be also be checked when replacing the seals
 - if seal replacement is to take place on site, proceed in line with the information given on page 2.

5. Storage

5.1 In dry rooms without air humidity, free of corrosive materials and vapours.

5.2 If cylinders are to be stored for very long periods, we recommend that they be filled with anti-corrosion oil.



HYDRAULIC SYSTEM

- Hydraulic diagram
- Hydraulic unit
- Commissioning and maintenance instructions
- Part list
- Parts descriptions