

HARDI

TRX



Instruction book

673827

GB - 06/1982

www.hardi-international.com



We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depend upon your care. The first step is to carefully read and pay attention to this instruction book. It contains essential information for the efficient use and long life of this quality product. As this instruction book covers all versions of the equipment, including all hydraulic boom versions, and all operating units, please pay attention to the paragraphs dealing with precisely your model. This book is to be read in conjunction with the "Spray Technique" book.

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing. As it is HARDI INTERNATIONAL A/S policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

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As this instruction book covers more models and features or equipment, which are available in certain countries only, please pay attention to paragraphs dealing with precisely your model.

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TRX

Instructionbook

673827-GB-82-6



DESCRIPTION

HARDI model TRX consists of a pump, strong frame with tank, continuously variable adjustment of wheel distance, operating unit, spray boom, and P.T.O. shaft.

The construction of the diaphragm pump is simple, with easily accessible diaphragms and valves. The construction ensures that the spray does not get in contact with the vital parts of the pump.

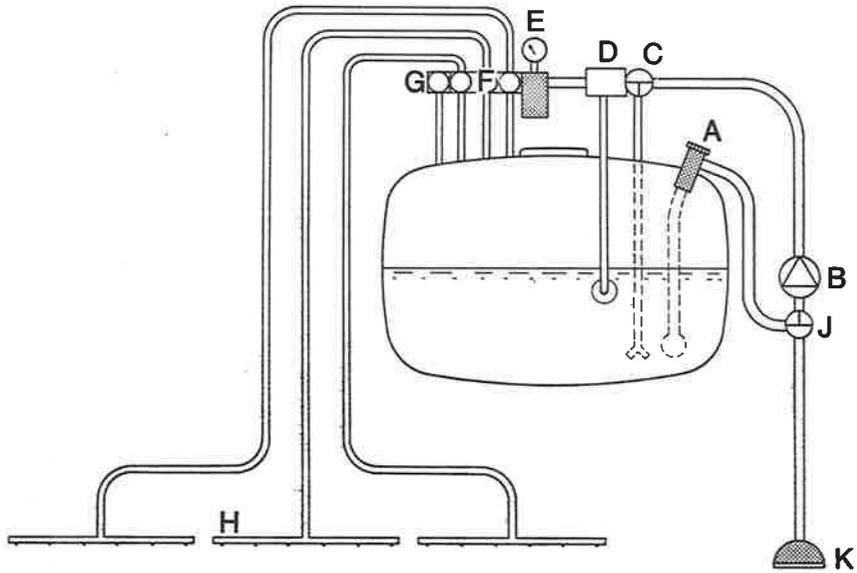
The tank is made of highly impact-proof and chemical resistant polyethylene and has an appropriate design with no sharp edges. This means an easy cleaning.

The BK 180 K operating unit consists of units; pressure agitator, safety valve, on/off function, pressure filter with pressure gauge, distribution valves with constant pressure regulation and HARDI-MATIC. The latter ensures a uniform distribution of the liquid at varying speed in the same gear.

The spray boom is equipped with trapeze suspension on the tank frame and is equipped with spring loaded clutches, which is released when running over, at which damage is avoided.

The sprayer is equipped with boom lift for easy adjustment of height.

OPERATING DIAGRAM:



- A. Suction Filter
- B. Pump
- C. Pressure Agitation
- D. Fittings
- E. Pressure Filter with Pressure Gauge
- F. Distribution Valve with constant Pressure Regulation
- G. HARDI-MATIC
- H. Spray Boom
- J. Filling Valve
- K. Filling Filter



CONNECTING THE SPRAYER

To facilitate cleaning after use it is advantageous to apply a thin layer of diesel oil all over.

When mounting the sprayer on the tractor the length of the P.T.O. shaft should be checked and, if necessary, shortened.

The sprayer is constructed for towage. The draw bar is equipped with (40 mm) hitch and can be mounted in different positions.



OPERATING INSTRUCTIONS

Operating the spray boom:

In spraying position intermediate joint is locked to centre gate with locking split pins

After adjusting the height of the spray boom it is important to FASTEN supporting arm on the carriage and after that slacken the wire, the wire **MUST** be loose during the spray task.

The trapeze can be locked when driving on strong broken ground.

Use pure water when adjusting and calibrating the control unit, distribution valves, and HARDI-MATIC.



Choose l/ha, the type and size of nozzles. The travelling speed of the tractor and the working pressure to be applied will then appear from the table.

Spraying is recommended at

- 3 bar when flat nozzles are used.
- 5 bar when cone nozzles are used.

This ensures the most correct distribution of the spray liquid.

Higher working pressure means smaller drops thus risk of wind drift.

Adjustement of the air Pressure in the Pulsation Damper:

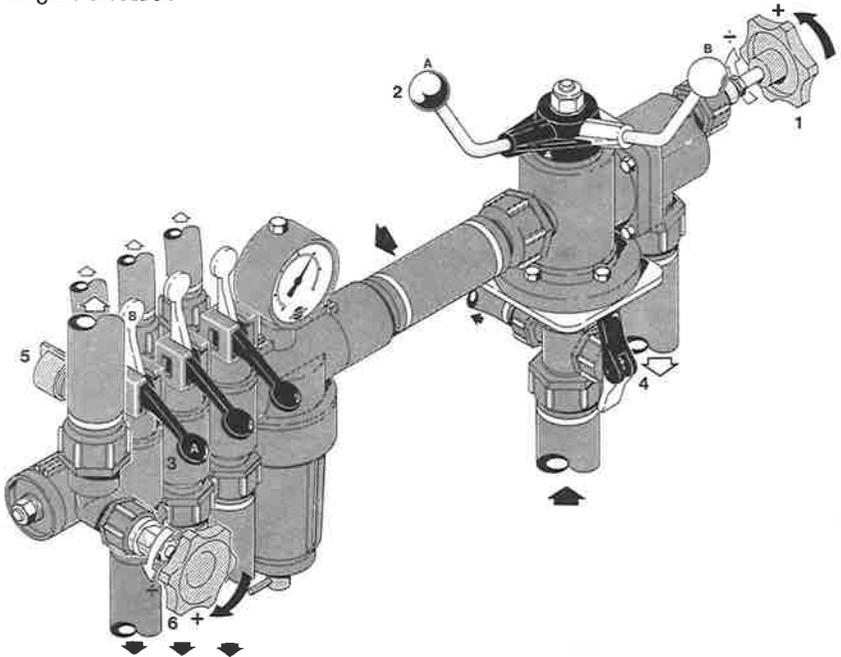


The air pressure in the pulsation damper is at delivery from the factory adjusted for 2 bar, this is the case for all spraying tasks where a working pressure between 3 and 15 bar is used. By use of another working pressure you have to adjust the air pressure according to the drawing.

	
bar	bar
15 - 3	0 - 1
3 - 15	1 - 3
15-25	3 - 4



Adjustment:



1. Open or shut lever (4) for pressure agitation according to whether pressure agitation is wanted or not.
2. Set grip (2) in position (spraying position).
3. Set all hand levers (3) on the distribution valve in position A (spraying position).
4. Turn the calibrating valve HARDI-MATIC (6) counter-clockwise to its extreme position.
5. Turn the pressure regulating handle (1) clockwise to maximum pressure. After this the pressure control functions as escape pressure valve only.
6. Put the tractor in neutral position and regulate the P.T.O. and thus the pump's number of revolutions corresponding to the travelling speed wanted.

Adjust the HARDI-MATIC valve (6) so that the pressure gauge indicates the recommended pressure.



Adjust the distribution valve's constant pressure regulation in sections as follows:

7. Place the first lever on the distribution valve in position B (off position).
8. Turn the adjusting screw (5) until the pressure gauge again shows the required pressure (turn the screw right for higher pressure, left for lower pressure).
9. Adjust the other sections of the distribution valve in the same way.

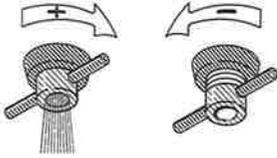
NB! HEREAFTER ADJUSTMENT OF CONSTANT PRESSURE REGULATION WILL ONLY BE NEEDED IF YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES.

10. Controlling the operating unit while driving:

In order to close the entire boom twist the grip (2) to position B. This takes the pressure off the pump. The whole capacity of the pump will then return to the tank through the return system and the diaphragm anti-drip valves ensures instantaneous closing of all nozzles. In order to close part of the boom turn lever (3) of the distribution valve to position B (off position) for the part or parts to be closed. The constant pressure regulation ensures that the pressure does not rise in the parts which are to remain open.



Operating the drain valve on tank and pressure filter:

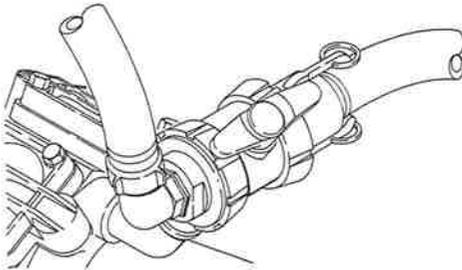


To open: turn right.

To close: turn left.

Operating the filling equipment:

When filling water, the arrow on the red handle should point on the filling hose with filter.

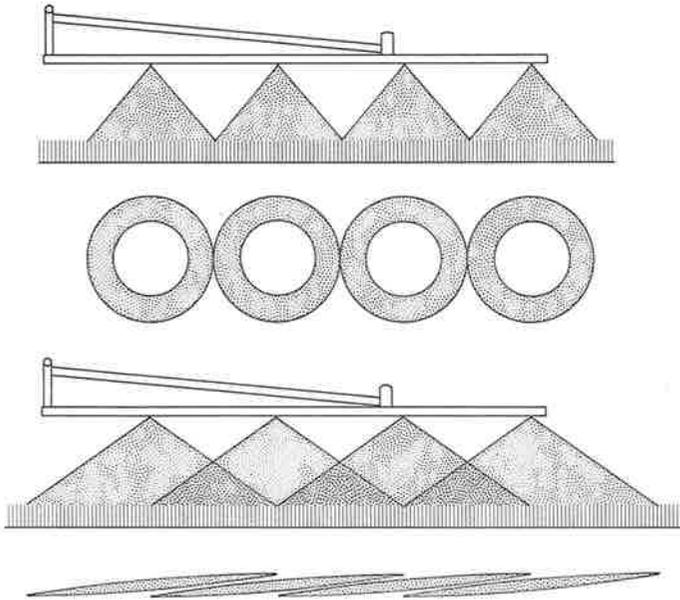


THE HEIGHT OF THE SPRAY BOOM

To ensure the correct distribution of the spray liquid it is important to adjust the height of the boom accurately.

If the boom is equipped with cone nozzles the height should be set so that the distance between nozzles and the top of the crop is approx. 60 cm.

When using flat spray nozzles the height of the boom should be set so that the distance between nozzles and crop is approx. 50 cm.



DETERMINING THE SIZE OF NOZZLES

If you want to change the boom's standard nozzles to other nozzles it is of decisive importance that the pump is able to feed the nozzles wanted.

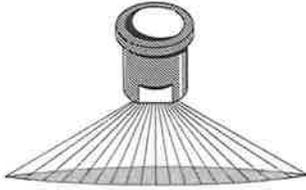


It should be remembered when choosing the nozzles that the pressure agitation uses 5 to 10 per cent of the pump capacity.

Your HARDI dealer can supply you with application sheets for special nozzle types.

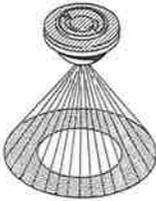
NOZZLE TYPES

1. The flat spray nozzle gives an elliptical spray pattern. Special orifice of this nozzle makes it sensitive to



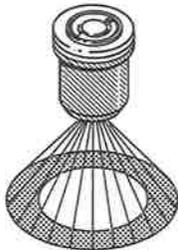
impurities in the spray liquid. The use of the cleanest possible water and keeping the nozzles clean is therefore recommended. Flat spray nozzles are especially used for weed killers and may be used for fungicides and insecticides

2. The cone nozzle is fitted with a swirl and gives a conical spray pattern with almost no drops in the centre of the circle.

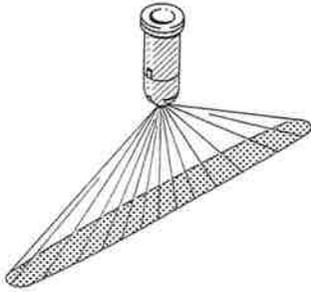


The cone nozzle is mainly used for insecticides and fungicides.

3. The large drop nozzle is fitted in conjunction with cone nozzles and gives the same spray pattern. Larger drops are produced with unaltered pressure. This makes spraying possible in windy weather without the risk of drift. The large drops reduce the coverage and it is therefore recommended to use a little more spray, for instance by travelling slower.

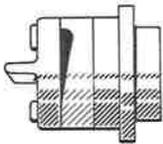


4. The foam nozzle is fitted together with the cone nozzle without the use of swirl and provides the same advantages as the large drop nozzle. The spray pattern of the foam nozzle is like that of the



flat spray nozzle, but with a considerably wider spreading angle. This nozzle is largely used for the spreading of soil herbicides where drift must not occur and for some liquid fertilizers where the large drops reduce the risk of searing the crop. A foaming agent may be added if wanted, but this is no condition of the use of this nozzle.

5. The giant-end nozzle is fitted on the outert end of the boom and doubles the spray width of 10, 12, and 16 metres wide booms. This type of nozzle is particularly well suited for late spraying of corn fields as it halves the number of wheel tracks. The nozzle is well suited for insecticides and certain fungicides but cannot be used for combating weeds.



It is, of course, a condition for the use of these nozzles that the pump has the requisite capacity.

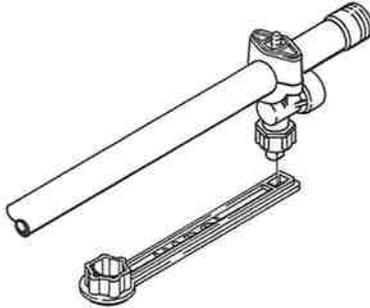
Nozzles for other purposes:

Apart from the nozzles mentioned above HARDI offers you a wide range of special-purpose nozzles: for instance for bandspraying in connection with the sowing of beets, etc., for row spraying with very small quantities of spray, reflex nozzles for spraying with liquid fertilizers and nozzles for many other purposes

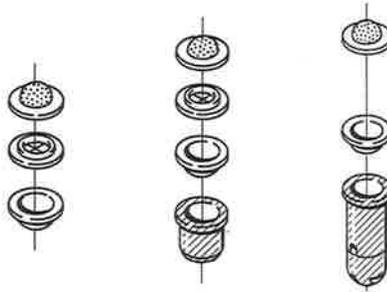


The Fitting of Nozzles:

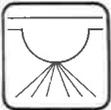
Flat spray nozzles should be set in the correct angle (5 degrees) by using the supplied nozzle key.



Cone nozzles, large drop nozzles and foam nozzles should be fitted as illustrated.



Please note that swirls are not used in connection with foam nozzles. The ordinary nozzle tables may therefore not be used.



DISTRIBUTION OF SPRAY

The below tables indicate the quantity of liquid that may be distributed with each nozzle size at various travelling speeds.

Flat spray nozzle 110°



Nozzle no	l/min at 3 bar	Quantity of liquid l/ha						
		150	200	250	300	400	500	600
		Travelling speed km/h						
370672/4110-14	0.91	7.3	5.5	4.4	3.6	2.7	2.2	1.8
370683/4110-16	1.11	8.9	6.7	5.3	4.4	3.3	2.7	2.2
370694/4110-20	1.59		9.5	7.6	6.4	4.8	3.8	3.2
370705/4110-24	2.08		12.5	10.0	8.3	6.2	5.0	4.2
370716/4110-30	2.94				11.8	8.8	7.1	5.9
370727/4110-36	4.05					12.1	9.7	8.1

The above figures for the distributed quantity of liquid are only correct when the working pressure is 3 bar. If another working pressure is wanted the correct travelling speed may be calculated by using the below conversion factors.

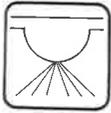
Choice of another pressure	2	4	5	6
Speed multiplied with	0,82	1,16	1,30	1,42



Cone spray nozzle with grey swirl 1554



Nozzle no	l/min at 5 bar	Quantity of liquid l/ha						
		150	200	250	300	400	500	600
		Travelling speed km/h						
370031/1553-12	1.06	8.5	6.4	5.1	4.2	3.2	2.5	2.1
370042/1553-14	1.34	10.7	8.0	6.4	5.4	4.0	3.2	2.7
370053/1553-16	1.65		9.9	7.9	6.6	5.0	4.0	3.3
370064/1553-18	1.85		11.1	8.9	7.4	5.5	4.4	3.7
370075/1553-20	2.12			10.2	8.5	6.4	5.1	4.2
370086/1553-22	2.26			10.8	9.0	6.8	5.4	4.5
370097/1553-24	2.53			12.1	10.1	7.6	6.1	5.1
370101/1553-30	2.97				11.9	8.9	7.1	5.9



The above figures indicating the quantity of liquid distributed are only correct when the working pressure is 5 bar and grey swirl is used. If another working pressure is wanted the correct travelling speed may be calculated by means of the below conversion factors.



Choice of another pressure	2	3	4	6	7	8	9	10
speed multiplied with	0,63	0,77	0,90	1,10	1,19	1,27	1,34	1.42

To keep the quantities of liquid (l/ha) found in these tables it is very important to know the travelling speed of the tractor. Special wheels or worn tires may have the result that the speed indicated by the tractor meter is not correct.

The EXACT quantity of liquid distributed may be calculated as follows:

Let the pump work with water. See to it that the pressure gauge indicates the spraying pressure wanted, then measure the quantity coming from one nozzle per minute (in litres). Multiply this figure by the figure found in the below table under the travelling speed wanted. The result is the exact quantity of liquid distributed per ha.



km/h	2	3	4	5	6	7	8	9	10
Factor	600	400	300	240	200	170	150	133	120

Example: The nozzle used has been measured to spray 1.40 litre per minute and the travelling speed wanted is 8 km/h. The quantity of liquid distributed per ha is then:

$$1.40 \times 150 = 210 \text{ litres/ha.}$$

MAINTENANCE

In order to derive full pleasure and benefit from the sprayer for many years the following few but important rules should be kept:

RECOMMENDED TYRE PRESSURE

Tyre size: Pressure:

7 x 16"	3,0 bar (43 psi)
9,5 x 20"	2,4 bar (34 psi)
9,5 x 36"	3,8 bar (54 psi)
9,5 x 44"	3,0 bar (43 psi)

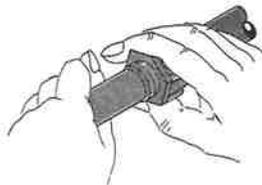


The pressure is specified for a full loaded trailer.

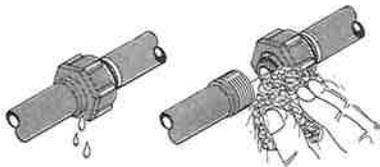
FITTING OF HOSE TO NOZZLES



The O-shaped ring should be **greased ALL THE WAY ROUND** before fitting it to the hose/nozzle.



In the case of leakage **DO NOT** tighten. Remove dirt.





CLEANING THE SPRAYER

The sprayer should also be maintained during the spraying season. First of all cleaning is important. When changing from one chemical to another it is recommended to fill the tank half up with water, add 1.5 kilos of soda per 100 litres of water or 1 litre triple ammonia water per 100 litres of water. Start the pump and wash out the entire sprayer, including boom and nozzles. Then wash out the sprayer thoroughly with pure water.

After use sprayer, as well as tractor should be washed.

NB! Take care not to do this washing where it entails risk of contaminating wells, streams, etc.

REMEMBER:

UNCLEANED SPRAYERS ENTAIL GREAT DANGER FOR CHILDREN.

Filters:

Remember that cleaning also entails the cleaning of all filters.

Clean the filters thoroughly on both suction and pressure side. Renew them if necessary.

Nozzles:

It is a good rule to renew all nozzles once a year as some wear and tear is unavoidable.

The user should always have extra nozzles in store so that waste of time may be avoided when spraying time and weather conditions are ideal.

Check and carefully clean all nozzles. Do they have the same size and number?

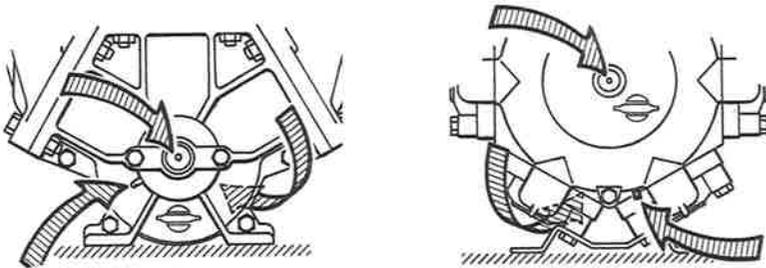
Damaged nozzles dose incorrectly and should be changed immediately.



LUBRICATION

Pump:

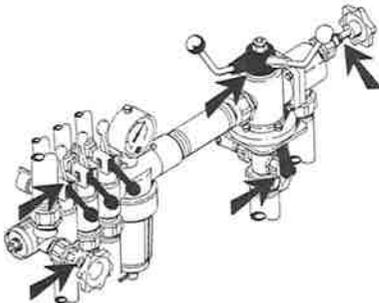
Once or twice during the season, depending on how often the sprayer is used, it is recommended to lubricate the whole of the pump with a lithium grease of consistency No. 2. This quality is used in the pump on delivery from the factory.



Lubrication points on the pump

Operating Unit

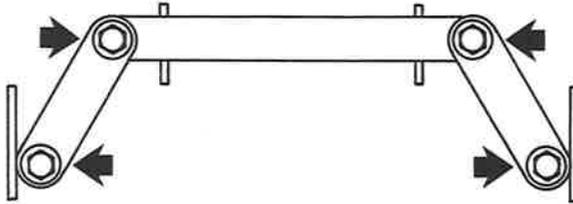
Regularly lubricate all moving parts on the control unit, distributing valves and possibly the filling valve.





The trapeze suspension:

Lubricate and adjust the four bearings. Check the tightening of the bolts so that the trapeze suspension works unhindered without being too loose.



Lubrication points on trapeze suspension.

P.T.O. shaft:

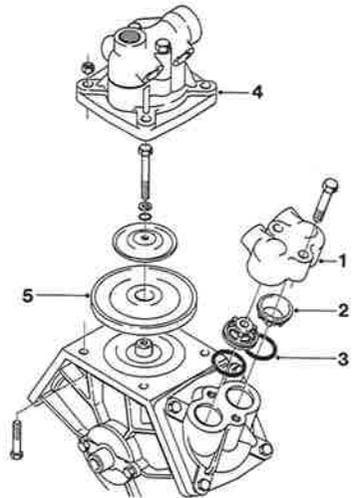
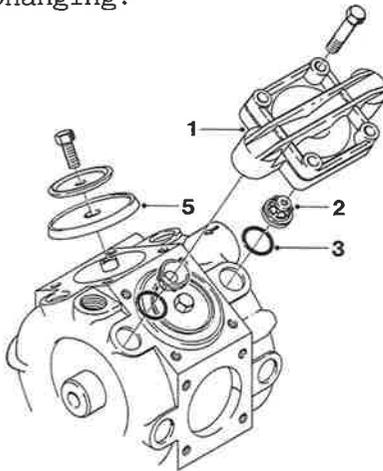
Lubricate the universal joints with lithium grease of consistency No. 2.



REMEMBER ALSO TO LUBRICATE HITCH AND SUPPORTING LEGS REGULARLY



Changing:



Changing valves

Dismantle valve compartment (1). Before changing the valves (2) note the orientation of the valves so that they may be replaced correctly. It is recommended to use new gaskets (3) when changing or checking the valves.



Changing the diaphragm

Remove the diaphragm cover (4) after having dismantled the valve compartment as indicated above. The diaphragm (5) may then be changed. If fluids have reached the crankcase it is strongly recommended to lubricate the entire pump with plenty of grease.

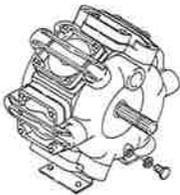
WINTER STORAGE

When the spraying season is over you should devote some extra time to the sprayer before it is put away for the winter.



Anti-freeze precautions

If the sprayer is not stored in a frost-proof place you should take the following precautions: fill 10 litres of 33 per cent anti-freeze mixture in the tank and let the pump run a few minutes so that the entire system is filled. Pump model 361 may further be secured by opening the draining valve.





Hoses:

Check that none of the hoses are caught or have sharp bends.

A leaky hose gives an annoying stop in the middle of the spraying task. Therefore control all the hoses and change if there is any doubt about the durability.

Painting:

Some chemicals are very rough on paints. It is therefore well advised to remove rust, if any, and then touch up the paint.

Operating unit

Make sure that the pressure regulating handle is screwed quite up, and that the handles on the distribution valves etc. are closed. In this way the springs are relieved, and you avoid operation difficulties when starting.



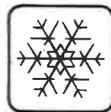
The tank:

Control that no chemical remainders are left from last spraying.

Chemical remainders must not be left in the tank throughout a long time. It will reduce the life of the tank.

Power take-off:

Control that the power take-off shaft fullfills its security purpose, e.g. that shields and protective tubes are intact.



BREAKDOWNS

The sprayer is unusually reliable in operation and it will only break down very rarely if the necessary maintenance work is carried out.



In cases where breakdowns have occurred the same factors always seem to come into play:

1. Even a minor leak on the suction side of the pump will reduce the pump capacity or stop any suction at all.

The reason may often be found in joints, defective hoses or lacking gaskets. Therefore check all joints on the suction side.

2. A clogged up suction filter will prevent aspiration so that the pump does not operate satisfactorily.

A clogged up pressure filter will result in falling pressure at the nozzles.

It is therefore important to keep all filters clean.

3. Foreign bodies stuck in the pump valves with the effect that these cannot close tightly against the valve seat will cause the pump to work unsatisfactorily.

Therefore always take care that the filters are whole so that the pump cannot suck in impurities.

4. Valves turning the wrong way will keep the pump from operating.



If all valves are turned so that the spring is into the pump some of the pump parts will blast - usually the diaphragm cover, but also in several cases the pump housing.

If all valves are turned so that the spring is turned away from the diaphragm cover no blast will occur - nor any pumping.

5. Insufficiently closed diaphragm cover will allow the pump to suck air with the resulting reduced or no capacity.

Therefore take care always to tighten diaphragm covers and valve compartments when these have been dismantled.

6. Worn diaphragm will reduce the pump capacity but it is only necessary to change the diaphragms when they are worn through. When this happens the fluid will run out through the draining hole in the bottom of the pump.
7. When the pump cannot suck in water it cannot supply water on the pressure side.

The reason for reduced pressure or capacity on the pressure side may, therefore, just as often be found on the suction side of the pump.

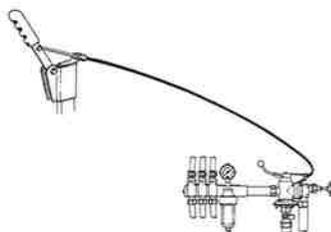
8. Reduced or lack of pressure may be caused by insufficient spring tension or worn valve cone on the pressure compensation of the control unit.
9. Insufficient fixing of the P.T.O shaft when fitting this to the pump may result in a damaged transmission shaft or pump shaft.

EXTRA EQUIPMENT

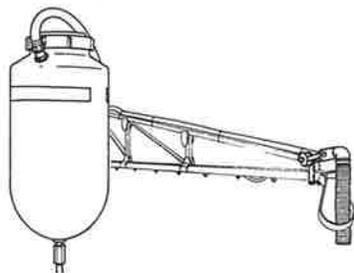


REMOTE CONTROL:

The remote control is a wire connection from the driving seat to the on/off function of the control unit.



FOAM MARKER:



When using the foam marker field spraying may be done without unnecessary overlap and the resulting wrong dosing. The foam concentrate leaves white dots as easily discernable marks in the field.

PURE WATER TANKS:

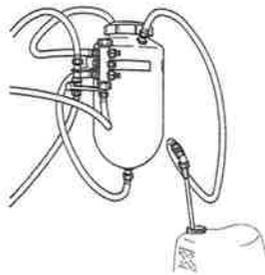
For cleaning purposes after having been in contact with chemicals. The tank holds 15 litres and is equipped with a draw-off tap.





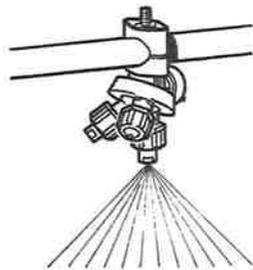
CHEMICAL FILLING DEVICE

Well functioning filling equipment for chemicals. Ensures minimum wastage, no contact with chemicals and - not least - it makes your work easier.



HARDI TRIPLET:

For mounting of up to 3 different nozzle types or sizes with the purpose that changing of nozzle can happen fast and precisely.



ASK YOUR HARDI DEALER TO SHOW YOU OUR EXTRA EQUIPMENT.

HARDI PUMPE TYPE 361

Ved bestilling af de fremhævede numre (membrandæksel og membran) angiv da venligst, om det er til pumpe type 361 eller type 360 (A 14).

HARDI PUMP TYPE 361

When ordering the framed parts (diaphragm cover and diaphragm) please indicate whether these parts are for pump type 361 or type 360 (A14).

POMPE HARDI TYPE 361

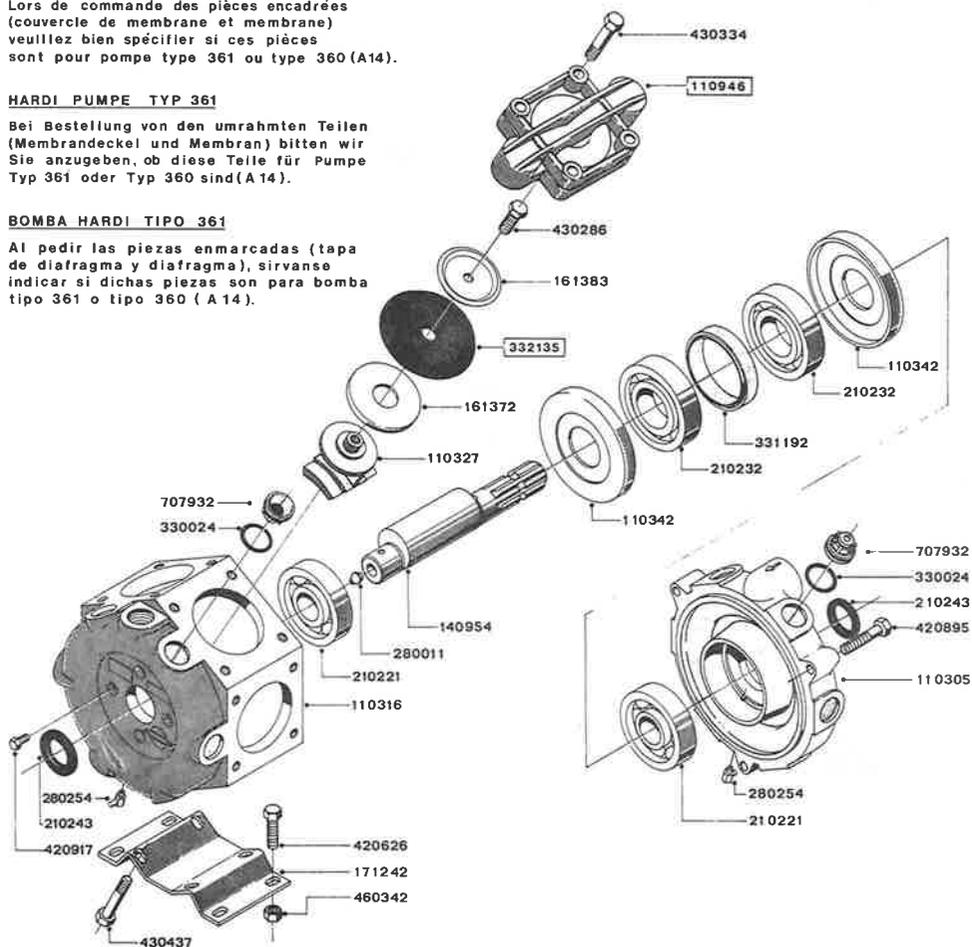
Lors de commande des pièces encadrées (couvercle de membrane et membrane) veuillez bien spécifier si ces pièces sont pour pompe type 361 ou type 360 (A14).

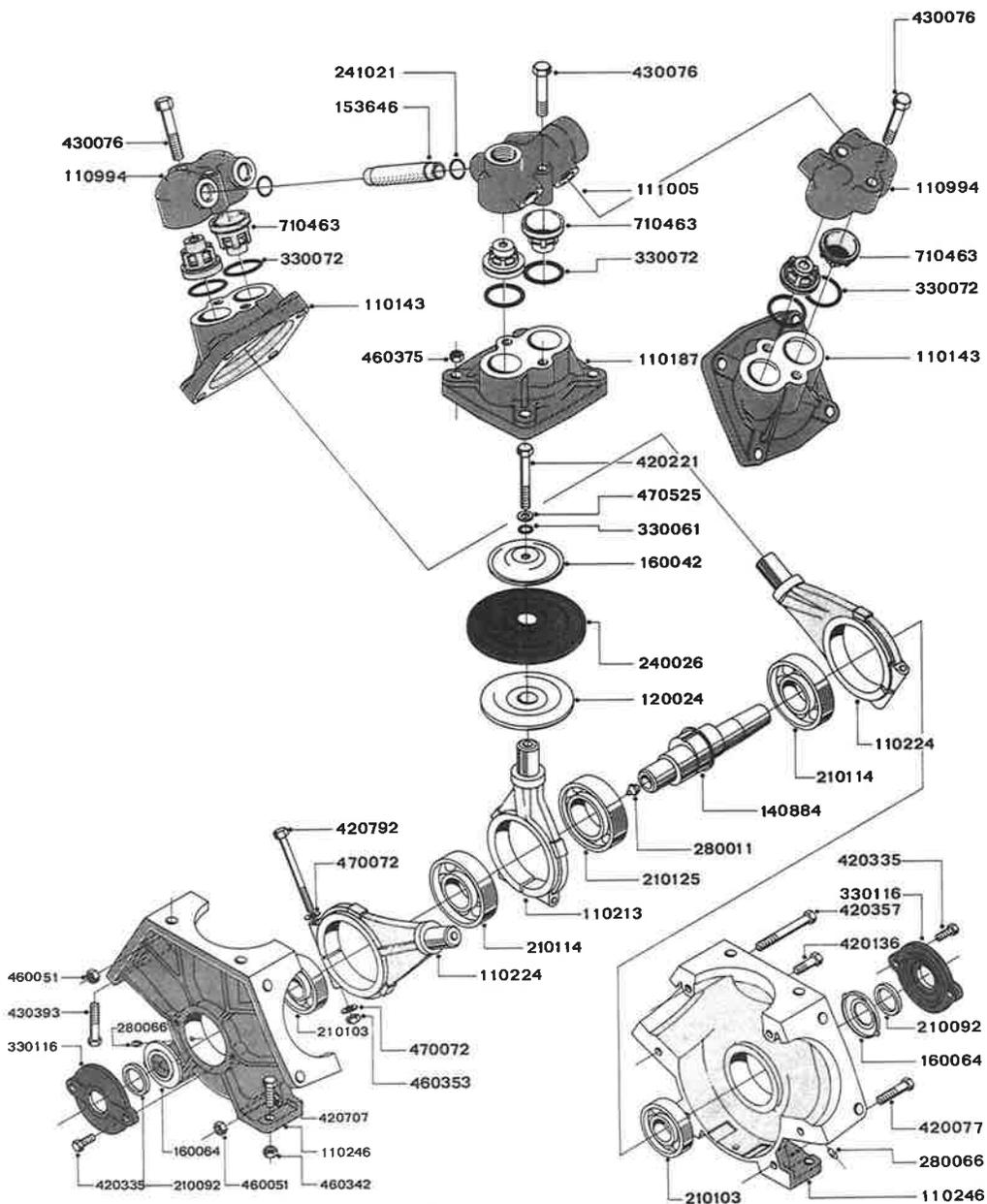
HARDI PUMPE TYP 361

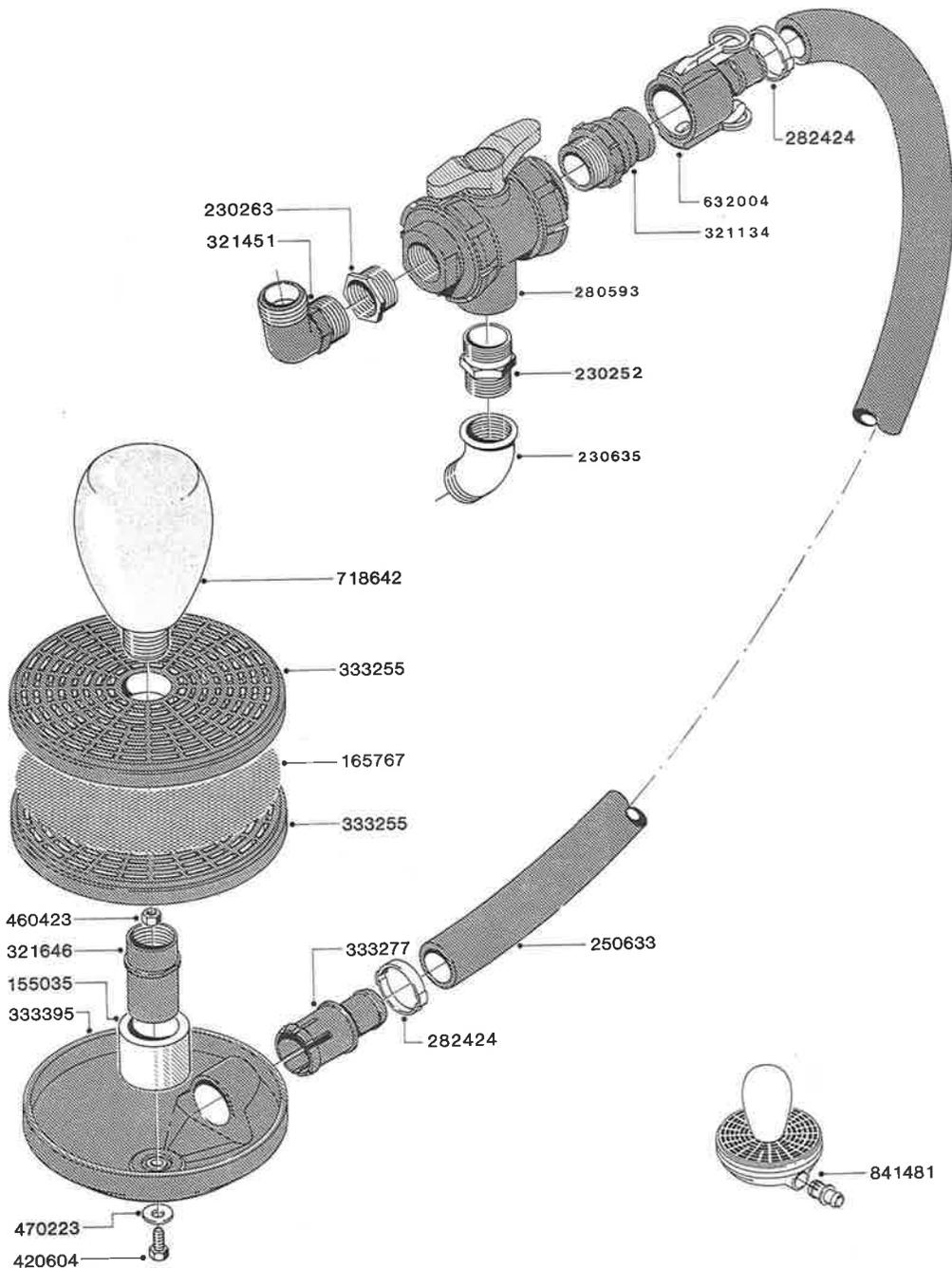
Bei Bestellung von den umrahmten Teilen (Membrandeckel und Membran) bitten wir Sie anzugeben, ob diese Teile für Pumpe Typ 361 oder Typ 360 sind (A 14).

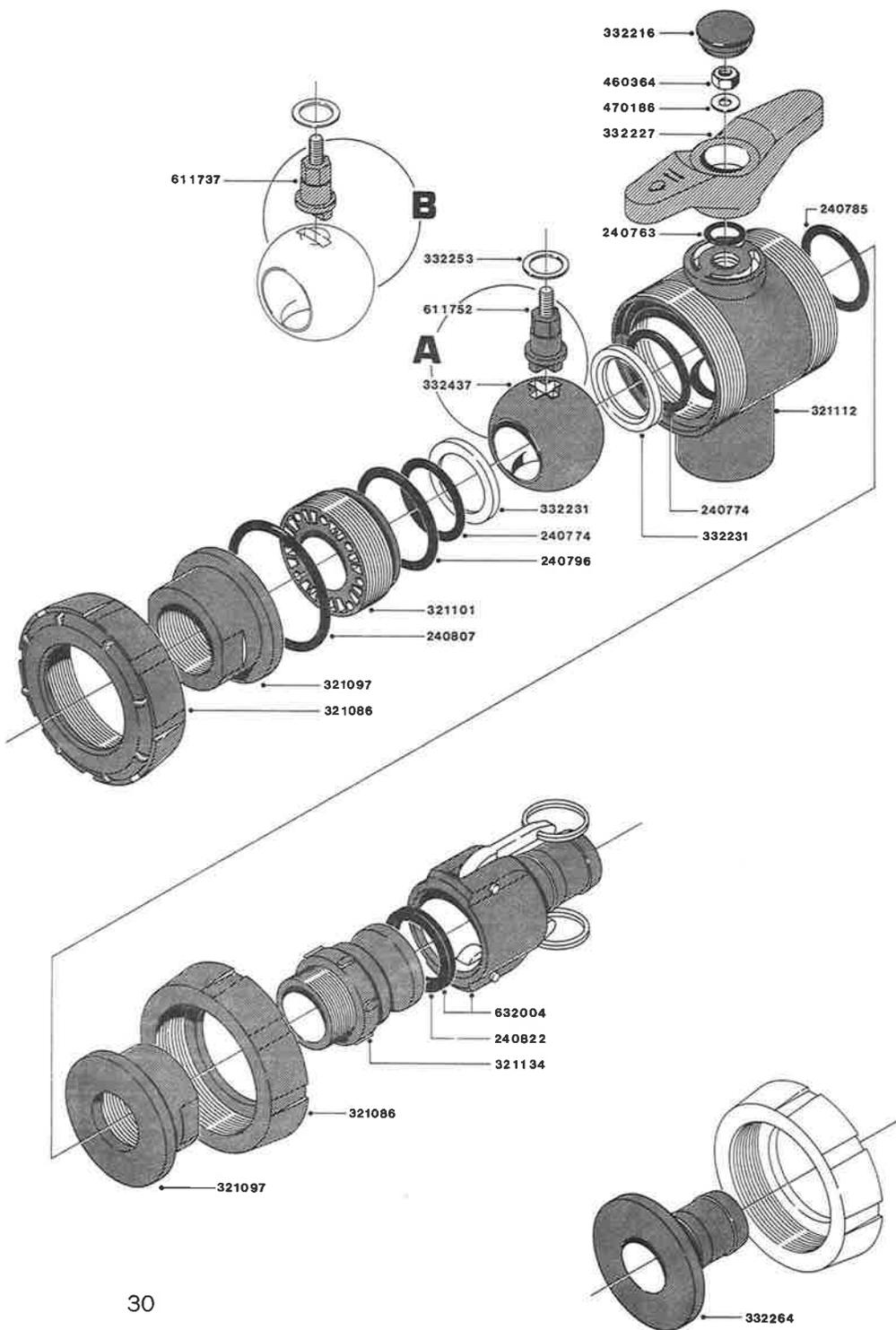
BOMBA HARDI TIPO 361

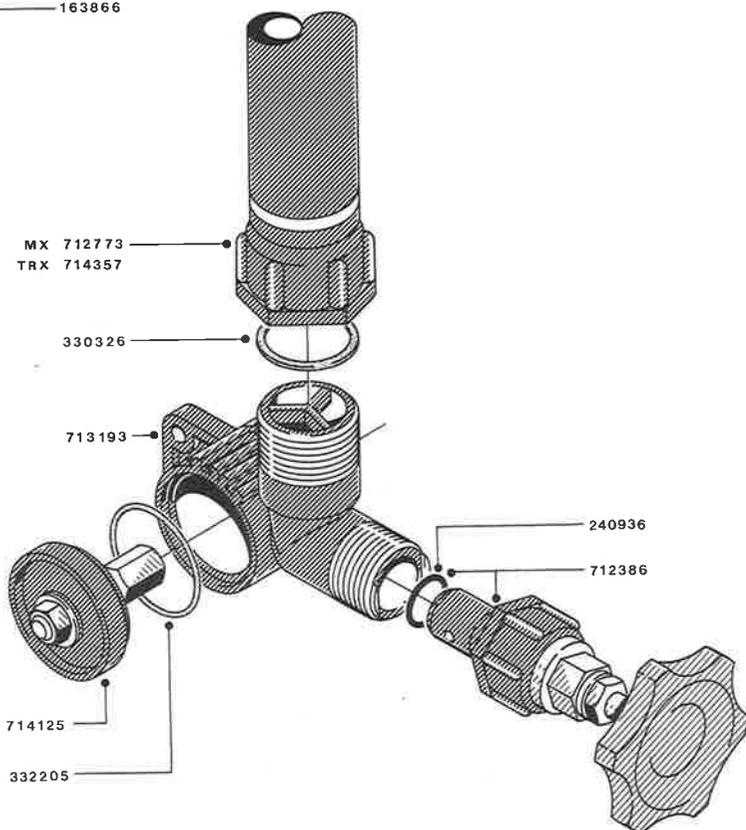
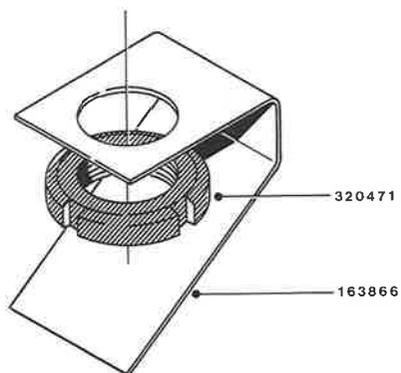
Al pedir las piezas enmarcadas (tapa de diafragma y diafragma), sirvanse indicar si dichas piezas son para bomba tipo 361 o tipo 360 (A 14).

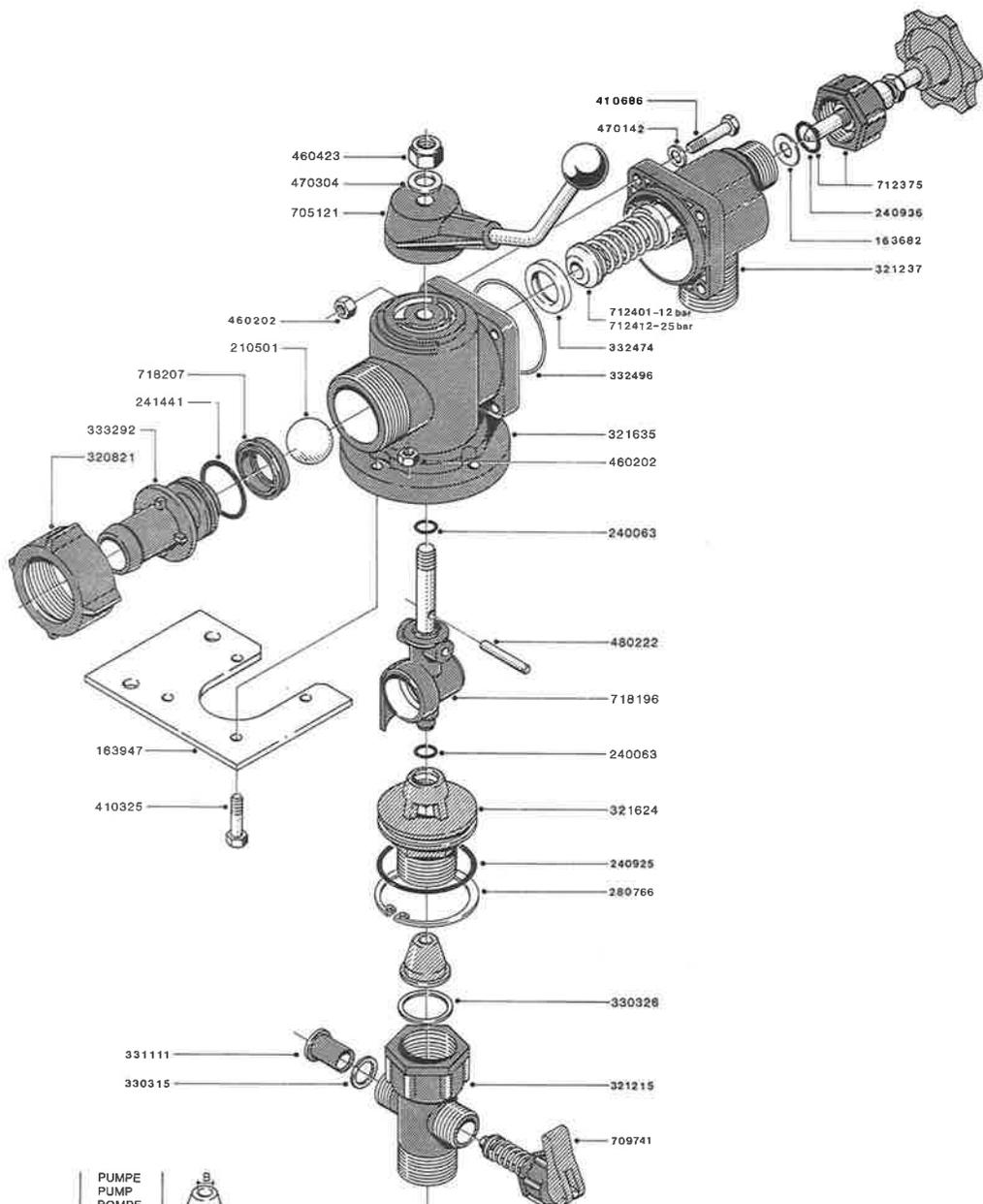




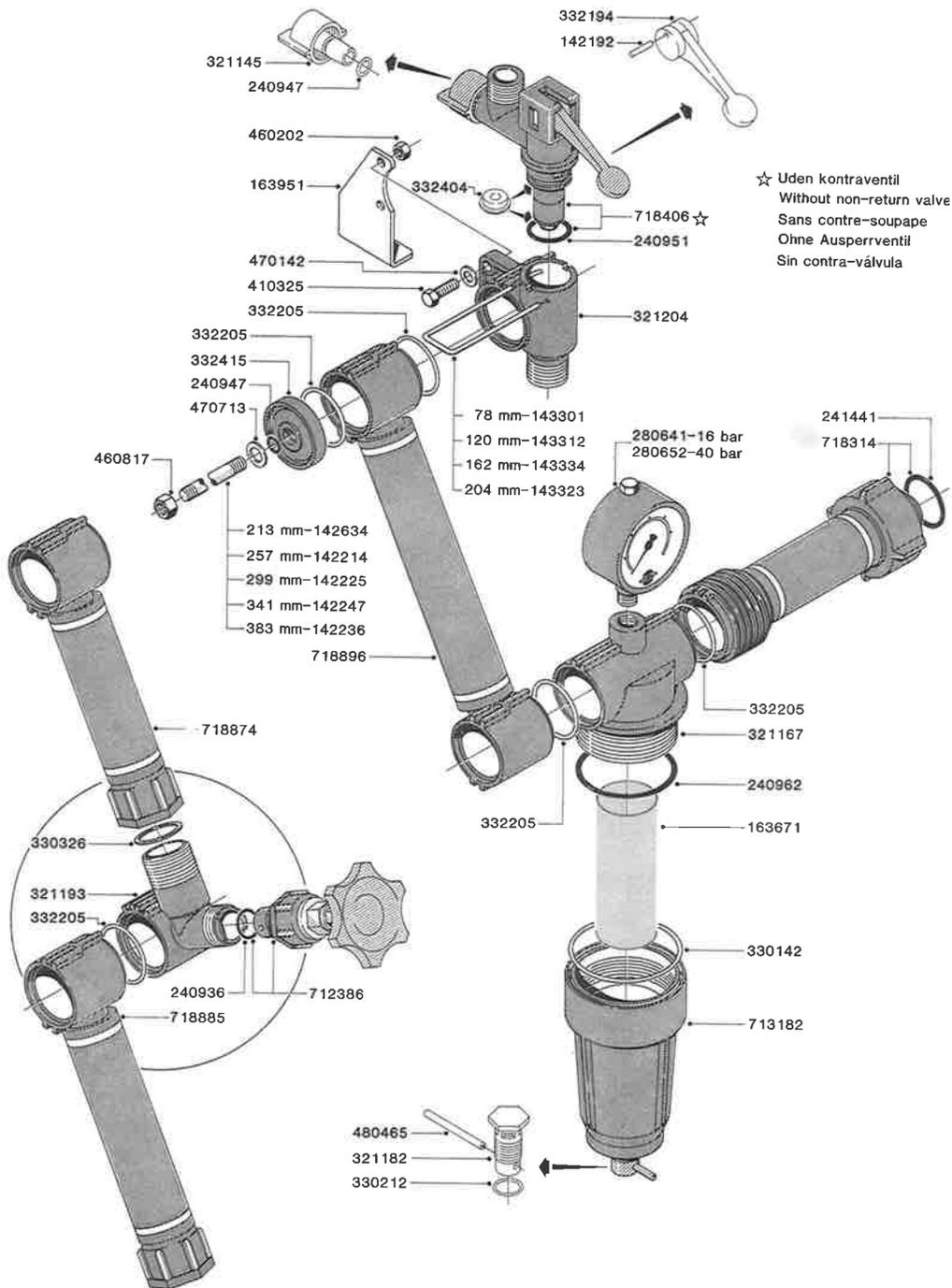


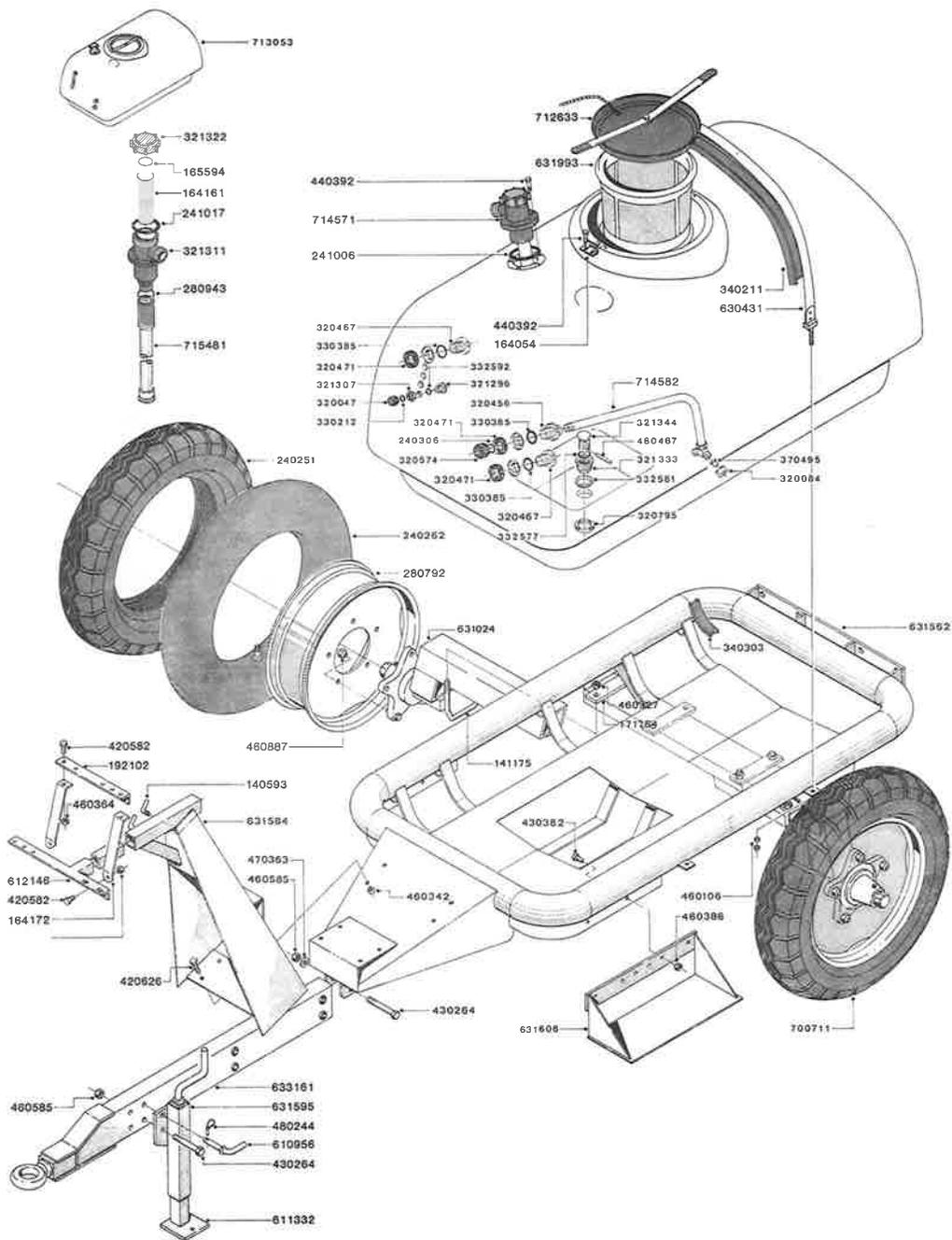


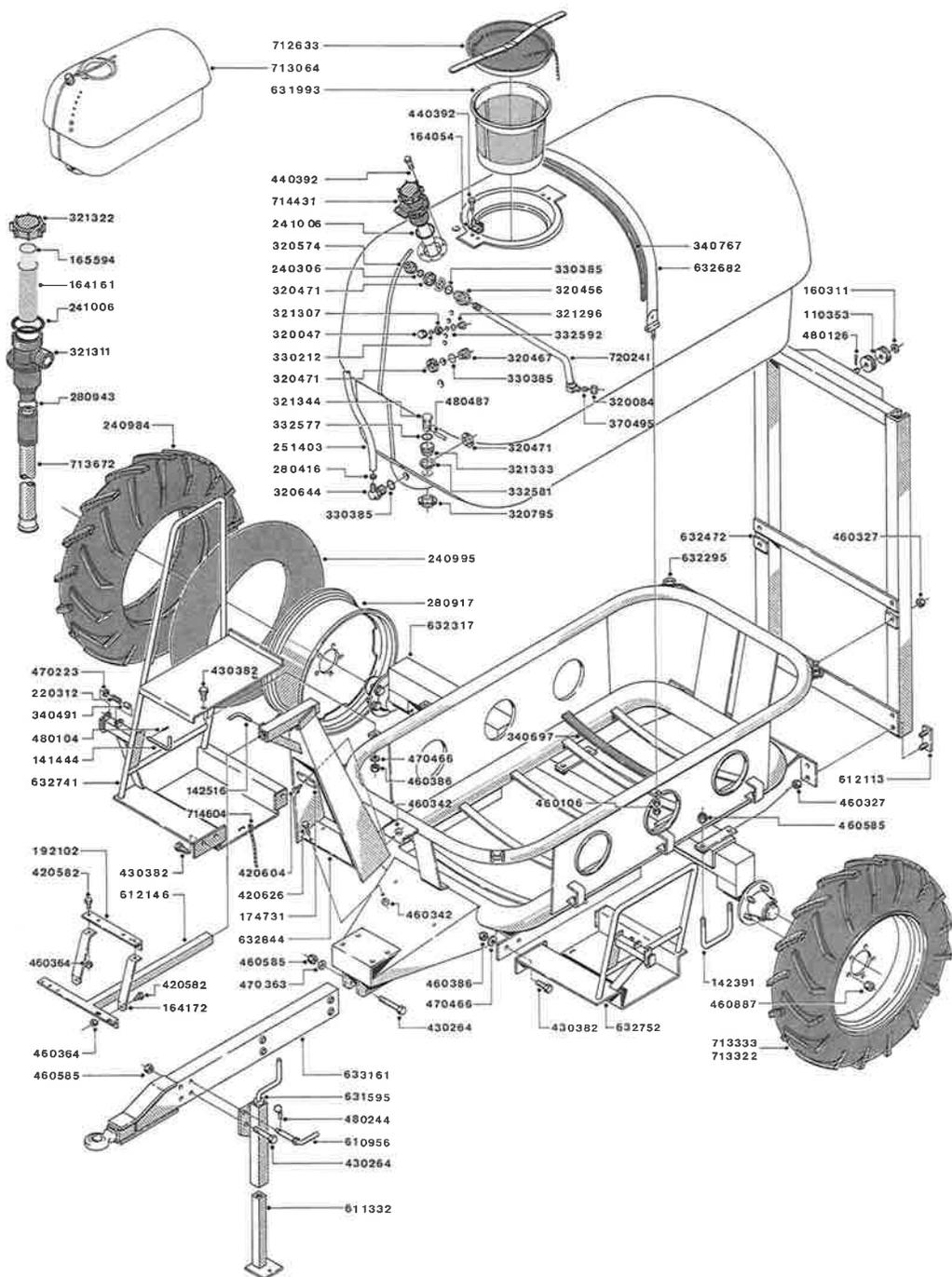


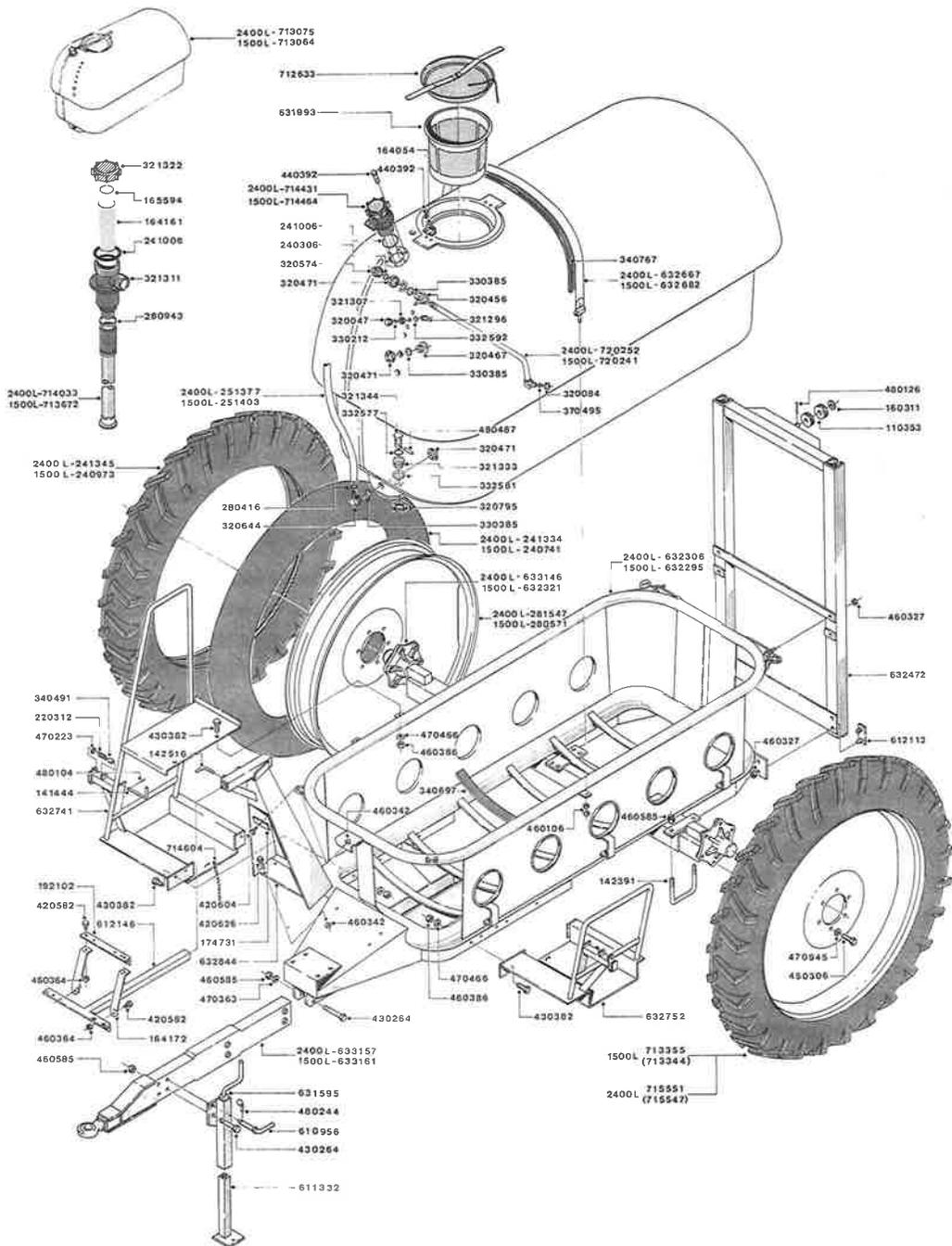


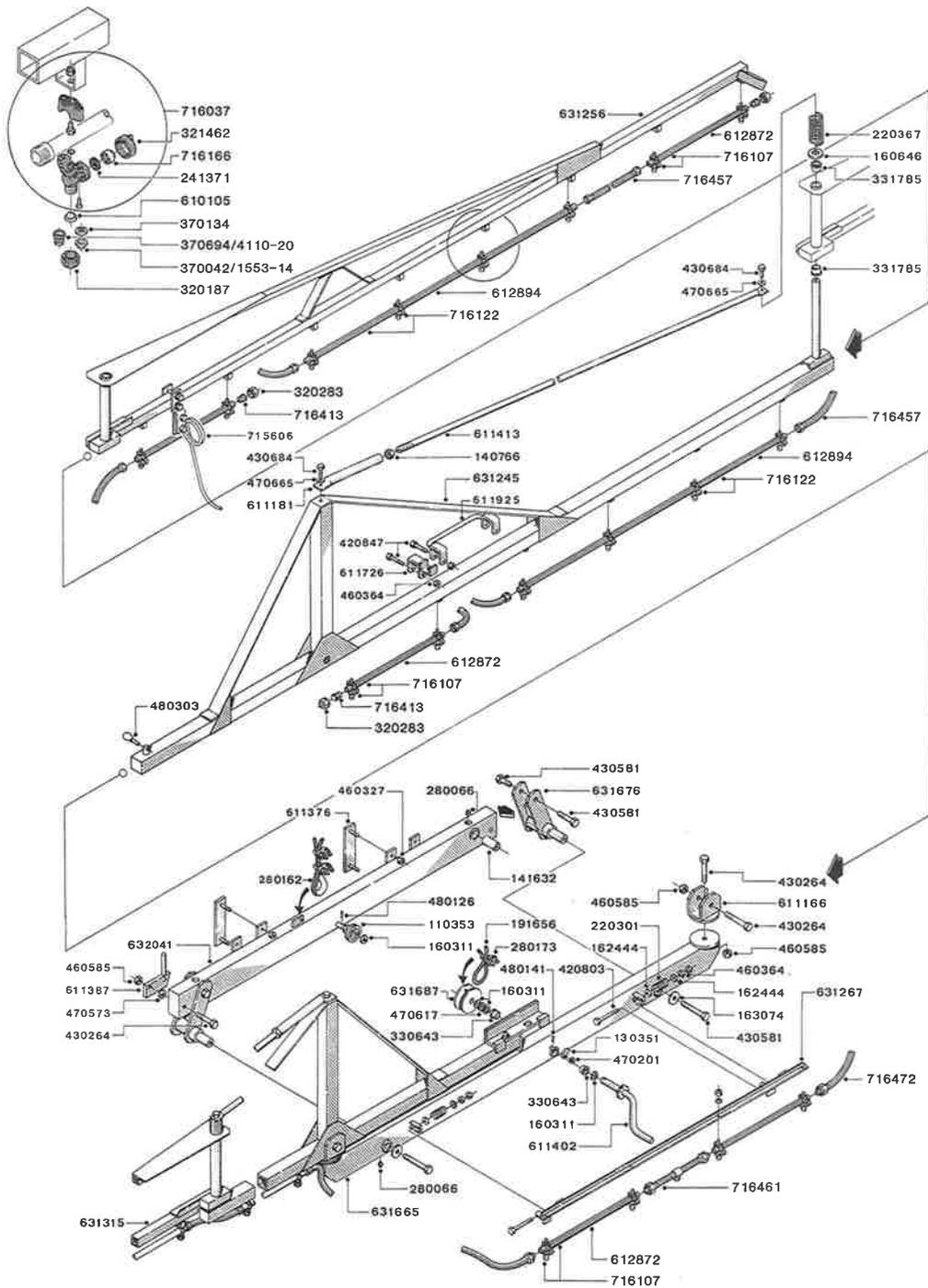
BK 180 No.	PUMPE PUMP POMPE POMPA		B mm	FARVE	COLOUR	COULEUR	FARBE	COLOR
841411	800	333314	5,2	BLA	BLUE	BLEU	BLAU	AZUL
841422	1200	333325	7,3	ROD	RED	ROUGE	ROT	ROJO
841433	1301	333336	8,7	HVID	WHITE	BLANC	WEISS	BLANCO
841444	361 HT	333347	9,6	ORANGE	ORANGE	ORANGE	ORANGE	ANARANJADO
841455	361	333351	10,5	SORT	BLACK	NOIR	SCHWARZ	NEGRO
841466	320 HT	333362	6	GRØN	GREEN	VERT	GRÜN	VERDE

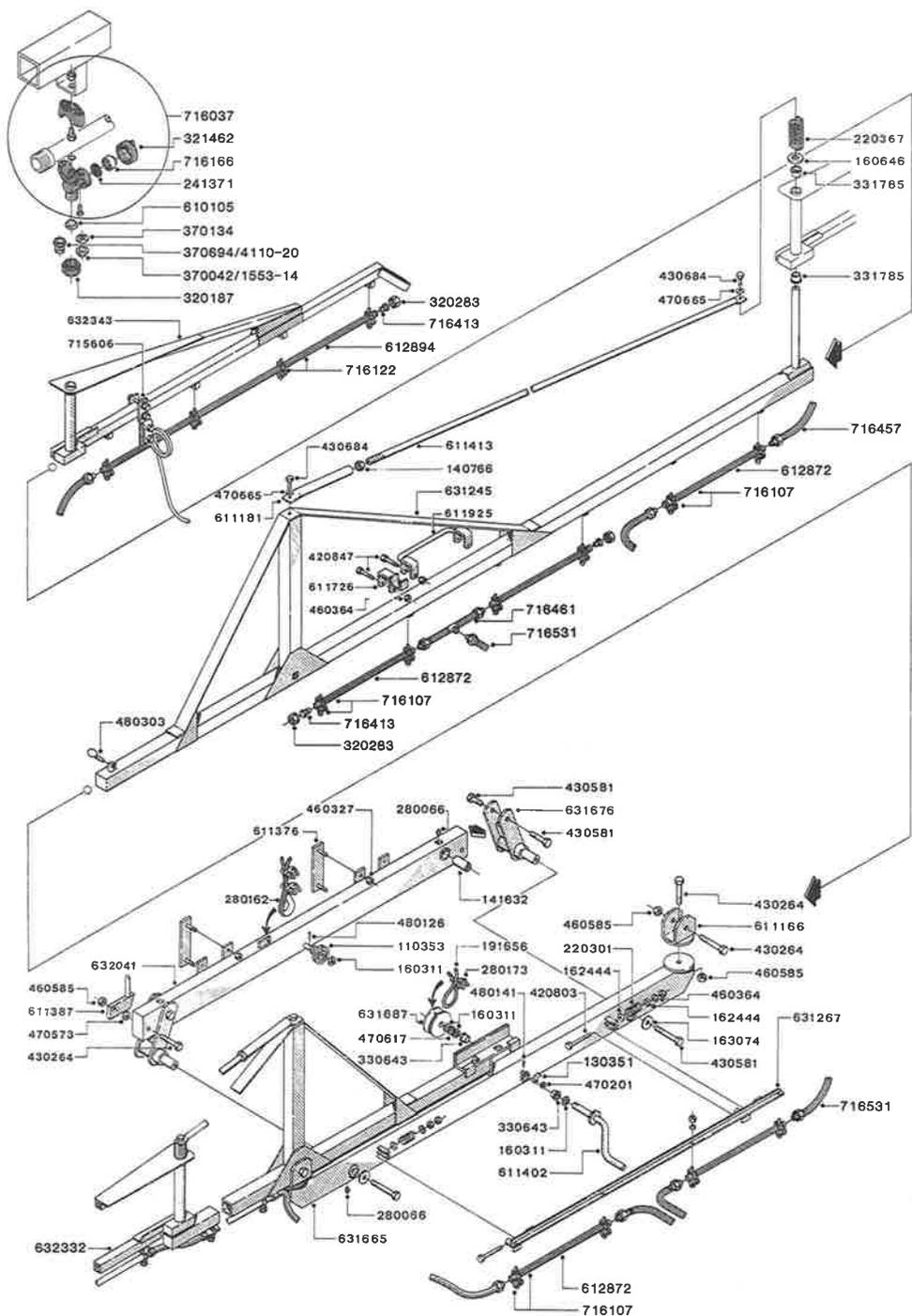


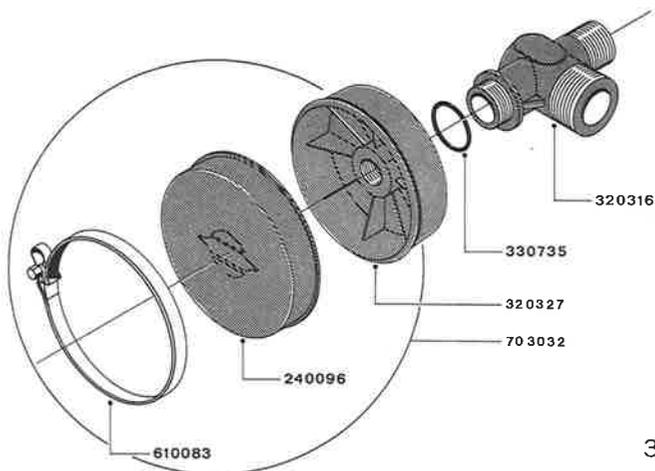
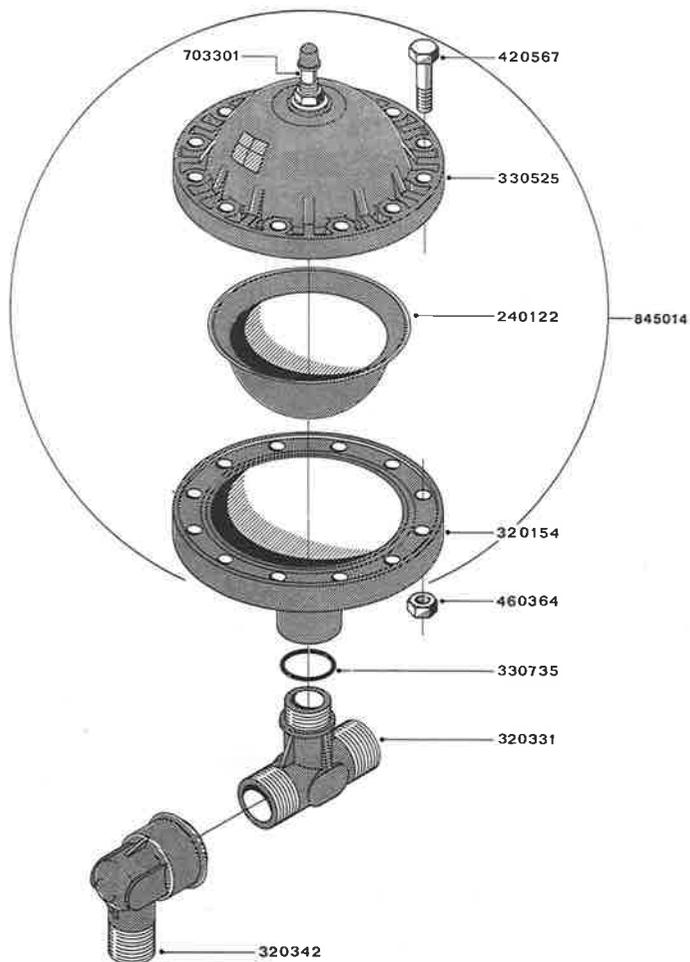


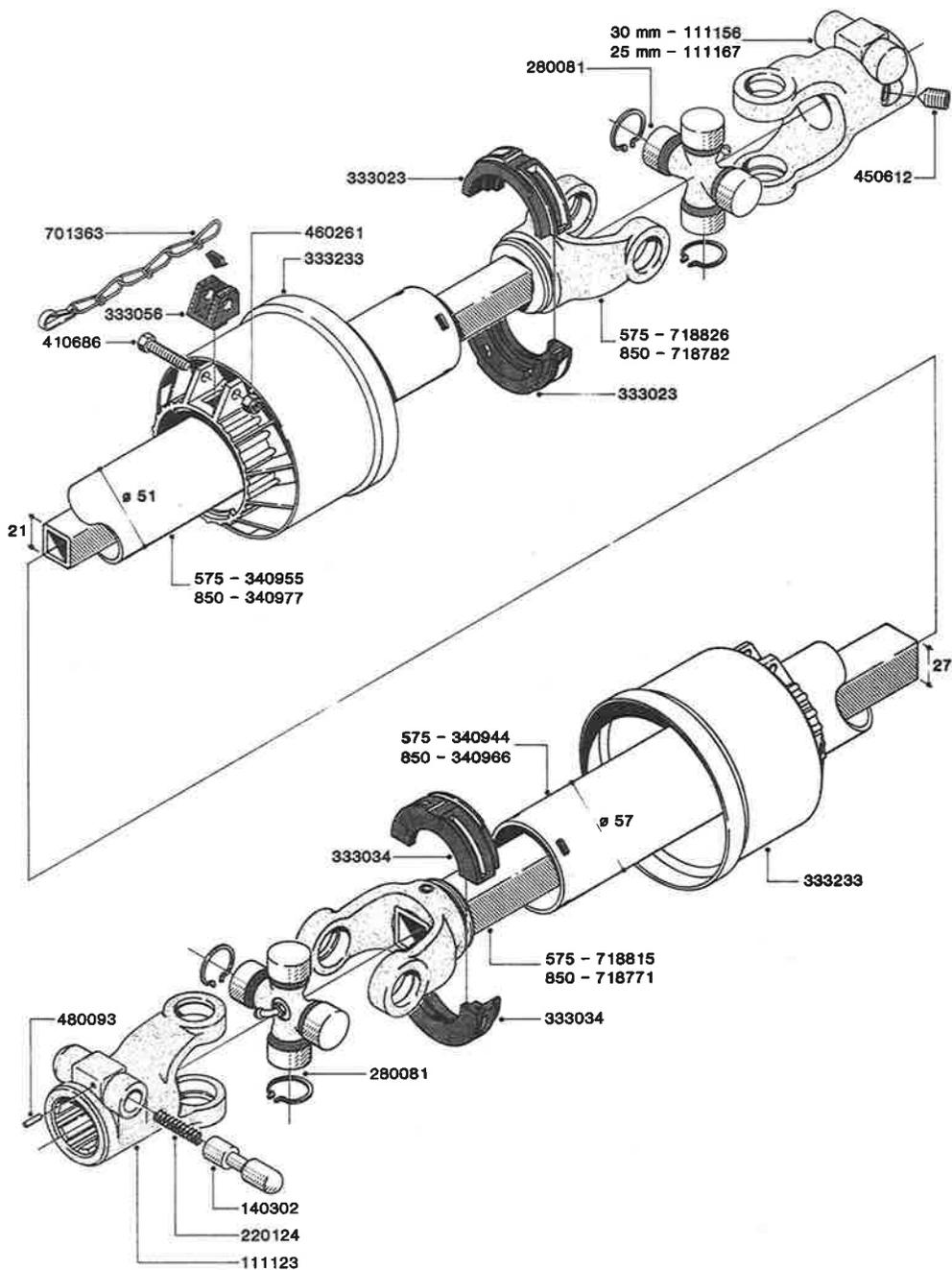












Notes:

Notes:

Spare parts

To see updated spare part information the website www.agroparts.com can be visited. Here all parts information can be accessed when free registration has been made.



HARDI INTERNATIONAL A/S

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