Content

CONDOR

Instruction book

674101-GB-98/9

EC Declaration of Conformity

Manufacturer,

ILEMO-HARDI S.A.
Pol. Ind. El Segre
E 25080 Lleida
SPAIN

Importer,

declare that the following product;

. . . . . .

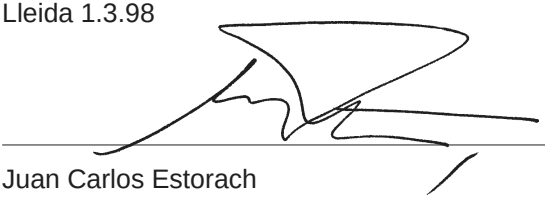
. . . . . .

Adhere extra shipping package labels to inside cover.

A. was manufactured in conformity with the provisions in the COUNCIL DIRECTIVE of 14 June 1989 on mutual approximation of the laws of the Member States on the safety of machines (89/392/EEC as amended by directives 91/368/EEC and 93/368/EEC) with special reference to Annex 1 of the Directive on essential safety and health requirements in relation to the construction and manufacture of machines.

B. was manufactured in conformity with the standards current at that time that implements a harmonised standard in accordance with Article 5 (2) and other relevant standards.

Lleida 1.3.98



Juan Carlos Estorach
Managing Director
ILEMO-HARDI S.A.

Operator safety

Watch for this symbol ⚠. It means WARNING, CAUTION, NOTE. Your safety is involved so be alert!
Note the following recommended precautions and safe operating practices.

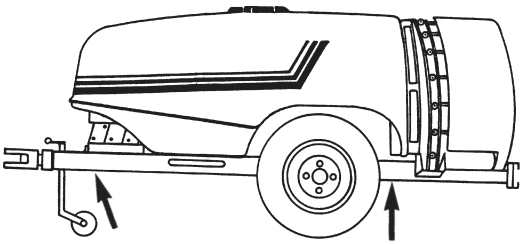
- ⚠ Read and understand this instruction book before using the equipment. It is equally important that other operators of this equipment read and understand this book.
- ⚠ Local law may demand that the operator be certified to use spray equipment. Adhere to the law.
- ⚠ Pressure test with clean water prior to filling with chemicals.
- ⚠ Wear protective clothing.
- ⚠ Rinse and wash equipment after use and before servicing.
- ⚠ Depressurize equipment after use and before servicing.
- ⚠ Never service or repair the equipment whilst it is operating.
- ⚠ Disconnect electrical power before servicing.
- ⚠ Always replace all safety devices or shields immediately after servicing.
- ⚠ If an arc welder is used on the equipment or anything connected to the equipment, disconnect power leads before welding. Remove all inflammable or explosive material from the area.
- ⚠ Do not eat, drink or smoke whilst spraying or working with contaminated equipment.
- ⚠ Wash and change clothes after spraying.
- ⚠ Wash tools if they have become contaminated.
- ⚠ In case of poisoning, seek doctor or ambulance. Remember to identify chemicals used.
- ⚠ Keep children away from the equipment.
- ⚠ Do not attempt to enter the tank.
- ⚠ Stay clear of the air inlet and outlet whilst the fan is operating. Objects (small stones etc.) can be expelled from the outlet
- ⚠ If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.

We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depend on your care. **Read and pay attention** to this instruction book. It contains information for the efficient use and long life of this quality product.

As the book covers all HARDI CONDOR models, please pay attention to the paragraphs dealing precisely with your model. This book is to be read in conjunction with the “Mistblowing Technique” book.

Lifting points

When loading or unloading the sprayer from a truck or lorry with a crane, use the lifting points as shown.



Description

HARDI CONDOR trailed sprayers are designed for the spraying of agricultural plant protection products in orchards with medium to large trees. They feature piston pumps, easy to use operating units and adjustable fan with clutch and gearbox.

The power is transferred from the tractor via the transmission shaft to the pump. The HARDI oil bath piston pump is of a robust design for agricultural usage. The simple mechanical design allows for easy maintenance. The pump has a through going crankshaft which is connected to the gearbox located at the blower unit.

A manual M/2 or S/2 operating unit or remote controlled CB/2 operating unit is supplied.

The polyethylene tanks for spray liquid and rinsing have no sharp edges for easy cleaning. A liquid level indicator is moulded into the side of tanks and an easily read indicator is fitted to the front of the main tank. A suction filter and the HARDI MANIFOLD SYSTEM valves are located at the front of the tank. Hydraulic venturi nozzles in the tank maintain a homogeneous mixture of the spray liquid. A centrifugal pump located at the rear of the 1500 and 2000 litre sprayers further improve agitation.

CONDOR has a 750 mm or 820 mm patented eight-blade axial fan with centrifugal clutch and two speed gearbox. The angle of the blades can easily be varied to suit various orchard tasks and match tractor power output. The centrifugal clutch ensures a smooth engagement and disengagement of the fan minimising stress on the sprayer and tractor.

CONDOR has inlet air guides that eliminate the aerodynamic effect of the rotation of the fan. This ensures a uniform distribution of air to both sides of the blower. Deflector plates under the blower permit the air and spray liquid to be directed towards the base of the target.

CR-B has a single set of 14 ceramic adjustable nozzles. CR-V has a single set of 14 ceramic nozzles. CR-C has a double set of 16 ceramic nozzles which are fitted on double nozzle holders for medium or low volume application rates. Both can be turned off so that only the nozzles pointing towards the foliage are utilised.

The CR-C also has air channels at the air outlet, TURBO SPOUT system and V-deflector plates. The air channels increase the air output by reducing the air turbulence in the blower housing. The TURBO SPOUT system on the side of the blower provides more air to certain parts of the trees thereby increasing the efficiency of the blower

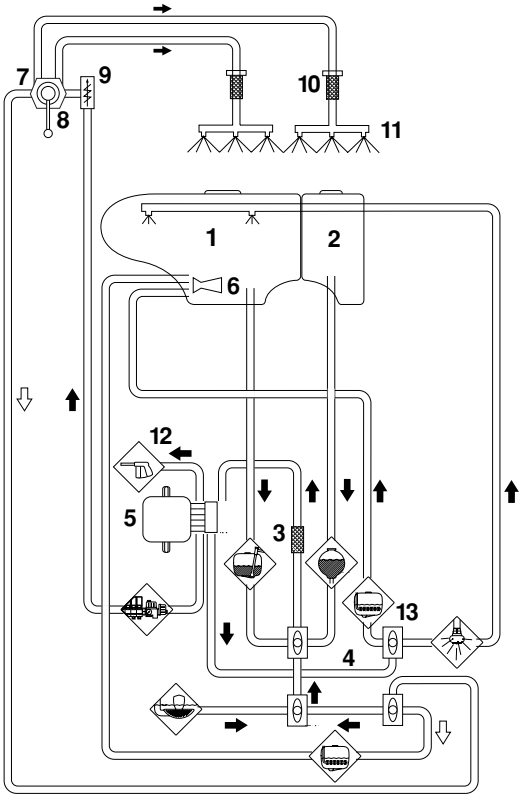
Identification plates

An identification plate fitted on the frame and pump is to indicate model, year of production with serial number and country of origin. If ordering spare parts, inform your dealer of these so the right model and version are described.

Function diagram

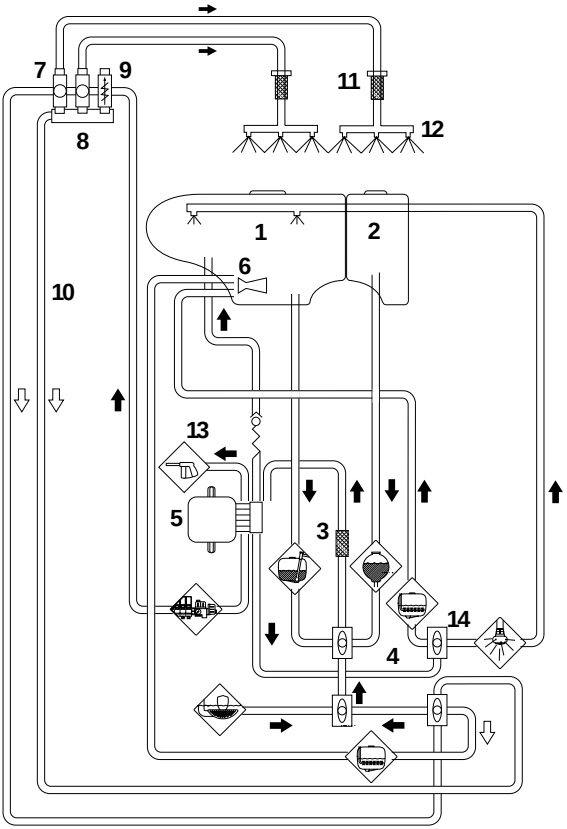
M/2 and S/2 operating unit

1. Main tank
2. Rinsing tank
3. Suction filter
4. MANIFOLD SYSTEM
5. Pump
6. Pressure agitation
7. Operating unit
8. Pressure gauge
9. Pressure regulation bypass
10. Pressure filter (if fitted)
11. Blower with distribution pipes
12. Valve for spray gun (if fitted)
13. Tank Flushing nozzles (if fitted)



CB/2 operating unit

1. Main tank
2. Rinsing tank
3. Suction filter
4. MANIFOLD SYSTEM
5. Pump
6. Pressure agitation
7. Operating unit
8. Pressure gauge
9. Pressure regulation bypass
10. Pressure equalisation return
11. Pressure filter (if fitted)
12. Blower with distribution pipes
13. Valve for spray gun (if fitted)
14. Tank Flushing nozzles (if fitted)



Connecting the sprayer

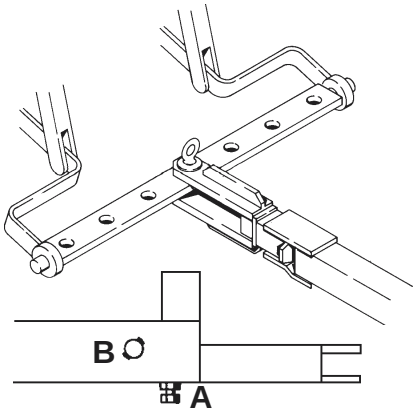
WARNING: The following adjustments must only be carried out when the sprayer is secured to prevent falling or rolling.

Drawbar

The ring drawbar is designed for attachment to the tractor drawbar clevis.

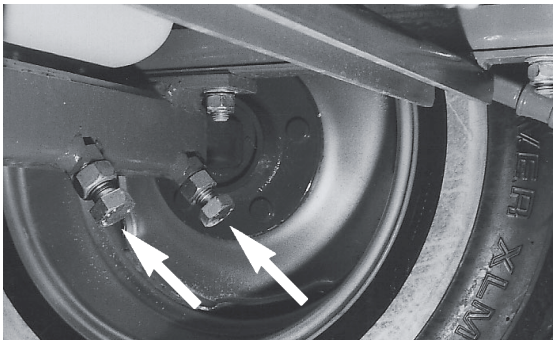
The forked drawbar is designed for attachment to the cross boom mounted in the tractor linkage.

The drawbar length can be regulated by loosening the counter nut and bolt **A** under the drawbar and removing the pin **B**. After the drawbar is connected to the tractor, the jockey wheel is placed in the holders above the drawbar.



CR-V and CR-C:
Track gauge

The track gauge can be varied. The nuts and bolts under the axle are loosened, and thereafter the axle can be drawn out or pushed in until required track gauge is obtained.
See section on Technical specifications for minimum to maximum track width.



CAUTION: Secure sprayer before adjustment. Tighten bolts and nuts after adjustment.

Weight transfer

The axle can be moved back or forward 14 cm to increase or reduce the weight on the tractor drawbar. In hilly areas it is best to place the axle to the back.

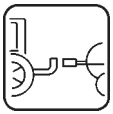
Transmission shaft

Operator safety

To avoid accidents and personal injuries, note the following recommended precautions and safe operation practices.

Always STOP ENGINE before attaching the transmission shaft to tractor P.T.O. - most tractor P.T.O. shafts can be rotated by hand to facilitate spline alignment, when engine is stopped.

When attaching the shaft, make sure that the snap lock is FULLY ENGAGED - push and pull shaft until it locks.



WARNING: ROTATING TRANSMISSION SHAFTS WITHOUT PROTECTION GUARDS ARE FATAL

Always keep protection guards and chains intact and make sure that it covers all rotating parts, including cross journals at each end of the shaft. Do not use without protection guard.

Do not touch or stand on the transmission shaft when it is rotating - safety distance: 1.5 metre.

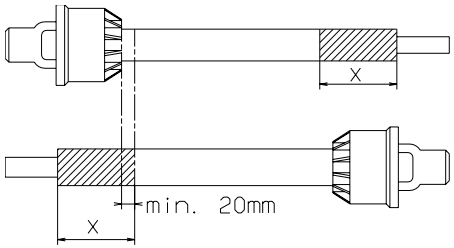
Prevent protection guards from rotating by attaching the chains allowing sufficient slack for turns.

Make sure that protection guards around tractor P.T.O. and implement shaft is intact.

Always STOP ENGINE and remove the ignition key before carrying out maintenance or repairs to the transmission shaft or implement.

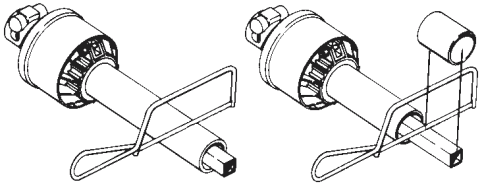
Installation of transmission shaft

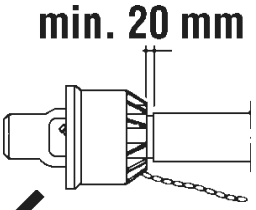
1. Attach sprayer to tractor and set sprayer in the position with shortest distance between the tractor and sprayer pump P.T.O. shafts.
2. Stop engine and remove ignition key.
3. If transmission shaft must be shortened, the shaft is pulled apart. Fit the two shaft parts at tractor and sprayer pump and measure how much it is necessary to shorten the shaft. Mark the protection guards.

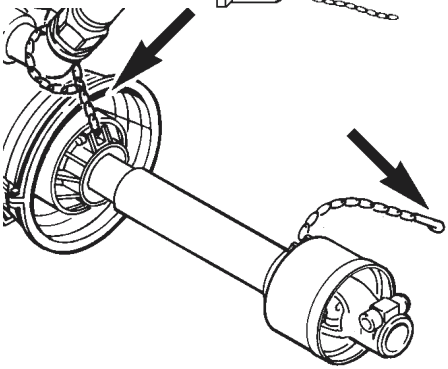


NOTE: The telescoping profiles must overlap at least by 1/3 of their length while in use.

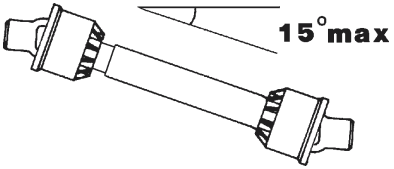
4. The two parts are shortened equally. Use a saw, and file the profiles afterwards to remove burrs.
5. Grease the profiles, and assemble male and female parts again.



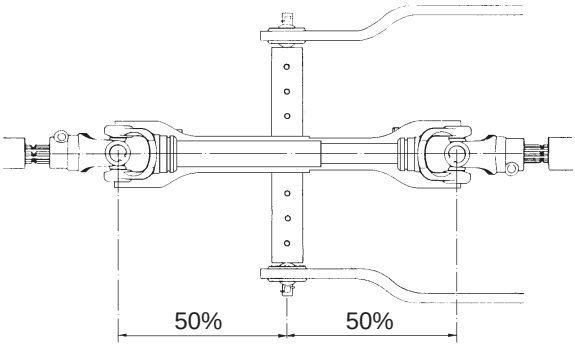




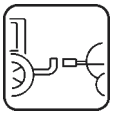
6. Fit the shaft to tractor and sprayer pump. **NOTE:** female part is towards tractor.
7. Fit the chains to prevent the protection guards to rotate with the shaft.
8. To ensure long life of the transmission shaft, try to avoid working angles greater than 15^0.
9. Adjust the drawbar so the connection point is midway along the transmission shaft.



10. Disengage P.T.O. if turning at angles greater than 30^0.
11. Use an articulated drawbar and transmission shaft with CV joint for narrow rowed plantations.

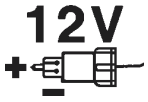


Rear lights (if fitted)



Connect plug for rear lights to tractors 7-poled socket, loosen the lights assembly knob, extend assembly and tighten the knob. Check that rear lights, stop lights and turning indicators function properly.
NOTE: Remember to retract lights assembly when not needed.

CB/2 control box (if fitted)



Power requirement is 12 V DC. Note polarity!
Brown pos. (+), Blue neg. (-).

The control box is fitted in the tractor cabin at a convenient place. The wires must have a cross-sectional area of at least 1.0 mm2 to ensure sufficient power supply.

Use the HARDI Electric distribution box (Ref. no. 817925) if the tractor has a doubtful power supply.

Roadworthyness

When driving on public roads and other areas where the highway code applies, or areas where there are special rules and regulations for marking and lights on implements, you should observe and equip the implement accordingly.

Operating instructions

Filling the main tank

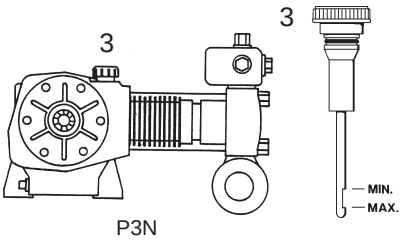
Water is filled into the tank by removing the tank lid located at right hand side of sprayer tank. It is recommended to use as clean water as possible for spraying purposes. Always fill water through the strainer basket to prevent foreign particles from entering the tank. An overhead tank can be used in order to obtain high filling capacity.

WARNING: Do not let the filling hose enter the tank. Keep it outside the tank, pointing towards the filling hole.
If the hose is lead into the tank and the water pressure drops at the water supply plant, chemicals may be siphoned back and contaminate the water supply lines, plant and well.

Filling rinse tank and hand wash tank

The tanks are located at the rear of the sprayer. Use only clean water.

Before starting



P3N

- Check that suction filter is clean.
- Check that arrow on the MANIFOLD valves are set correctly.
- Check oil level of pump. Level must be between minimum and maximum mark on dipstick **3**.
- Piston pumps need to be run in. To prolong the life of the pump; Do not operate the pump at maximum pressure for the first 40 hours.

Pump	0 - 40 h	40 h +
P3N-102	40 bar	60 bar
P3N-123	50 bar	60 bar

WARNING: Do NOT operate pump over 540 r/min. Do not run pump dry for more than 60 seconds.

Adjustment of controls

Please see section dealing with your operating unit. Initial adjustment and calibration is done with clean water. See also “Mistblowing Technique” book.

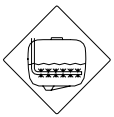
MANIFOLD SYSTEM

The MANIFOLD SYSTEM is located at the right side of the sprayer and permits operation of most HARDI optional extras from this one position.

Symbols

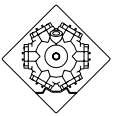
Main tank (suction filter)

Pressure agitator

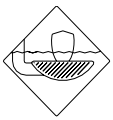


Rinse tank

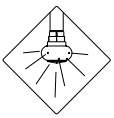
Pump



Filling Device



Tank Flushing Nozzle



Operating instructions

The black suction valves have 4 positions. Two positions are for options. The other two are marked “O” indicating the valve is closed. The green and blue valve only has 2 positions. The arrow on the handle indicates which position is selected.

Black suction valves

Turn the handle so the arrow points towards the selected optional equipment. The handle is turned back when you want to aspirate from the main tank.
Turn the other valve to “O” (closed). To resume aspiration from the main tank, the arrow must point towards the main tank.
Remaining valve must be closed.

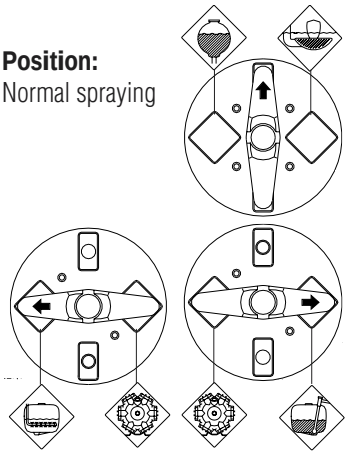
Blue return valve

Normally the liquid is directed to the pressure agitator. When the tank is nearly empty, the handle is turned so the liquid is directed to the suction side of the pump instead of the pressure agitator so the tank can be emptied.

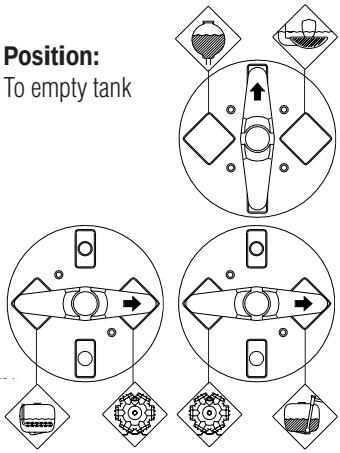
Green pressure valves

To select the optional equipment, the handle is turned so the arrow and thereby liquid is directed to the optional extra.

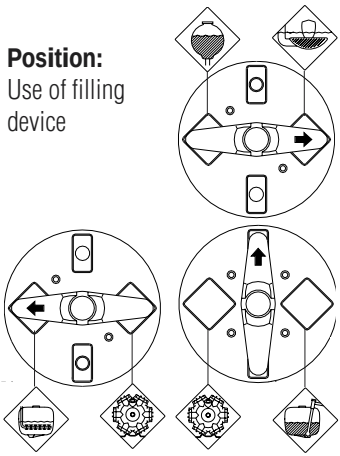
Position:
Normal spraying



Position:
To empty tank



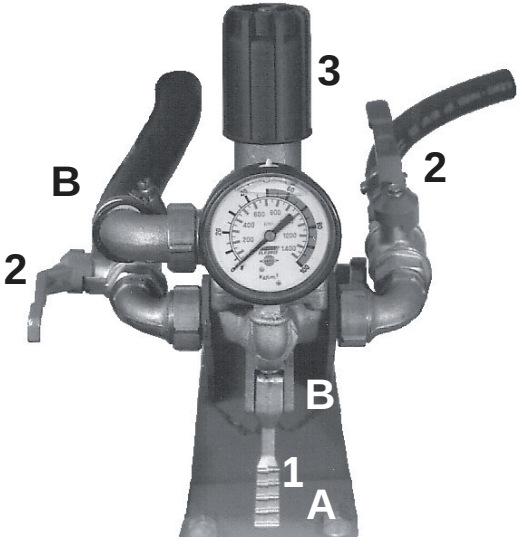
Position:
Use of filling device



Pressure recommendations

When using the blower system, the recommended spraying pressure is between 3 to 30 bar.
When using spray guns, the recommended spraying pressure is between 10 to 30 bar.

M/2 operating unit



1. Push handle **1** to ON position **B**.
2. The two handles **2** are set at ON position **A**.
3. Put the tractor in neutral and set the P.T.O. revolutions to 540 r/min.
   (If maximum blower output is not necessary the revolutions may be set at less than 540 P.T.O. r/min).
4. From a given forward speed in a gear and the nozzles chosen, the desired pressure on the pressure gauge is set by means of the pressure adjustment handle **3**.

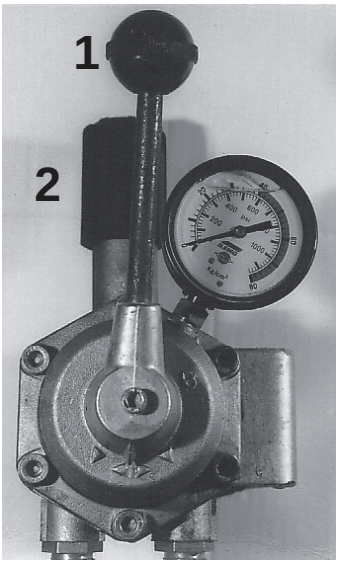
NOTE: Maximum pressure is 60 bar. Do not operate over the maximum pressure.

Operating the unit whilst spraying

To stop the liquid flow on both sides of the blower, set handles 2 to OFF position B or set handle 1 to OFF position. If you only want to spray on one side only, turn handle 2 to OFF position B on the side you want to close off. Note that the pressure will rise and readjustment will be necessary.

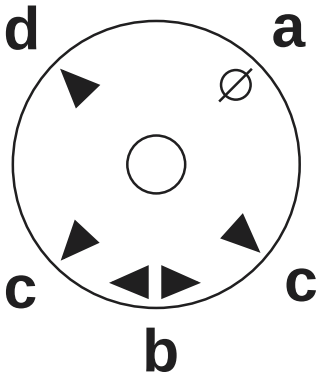
S/2 operating unit

1. Turn handle **1** to neutral position **A**. This permits pressure adjustment before spraying.
2. Put the tractor in neutral and set the P.T.O. revolutions to 540 r/min. (If maximum blower output is not necessary the revolutions may be set at less than 540 P.T.O. r/min).
3. From a given forward speed in a gear and the nozzles chosen, the desired pressure on the pressure gauge is set by means of the pressure adjustment handle **2**. Fine adjustment may be necessary when nozzles are turned on.



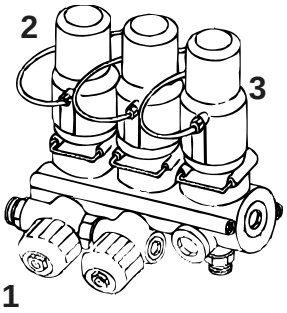
NOTE: Maximum pressure is 60 bar. Do not operate over the maximum pressure.

Operating the unit whilst spraying
To turn liquid flow on to both sides turn handle **1** to ON position **B**. If you want to spray on one side only, turn handle **1** to position **C** on the side you want to open. To stop the liquid flow to both sides of the blower, turn handle **1** to position **D**. Note that the pressure will rise and readjustment will be necessary.



CB/2 operating unit

1. Adjust screw for pressure equalisation
2. ON/OFF valves
3. Pressure control valve

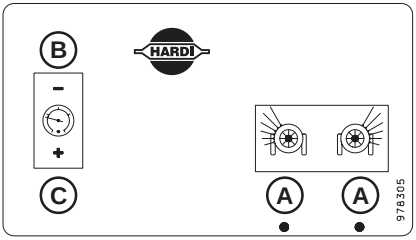


CB/2 control box

(A) Operating switch for ON/OFF valves

(B) Pressure regulation switch (to lower)

(C) Pressure regulation switch (to raise)



1. ON/OFF switches A are set to ON position.
2. Pressure regulation switch B is activated until valve is at the minimum setting.
3. Put the tractor in neutral and set the P.T.O. revolutions to 540 r/min. (If maximum blower output is not necessary the revolutions may be set at less than 540 P.T.O. r/min)
4. From a given forward speed in a gear and the nozzles chosen, the desired pressure on the pressure gauge is set by means of the pressure regulation switch C.
   NOTE: Maximum pressure is 40 bar. Do not operate over 40 bar.

Adjustment of pressure equalisation

5. Close the first distribution valve switch A.
6. Turn the adjusting screw 1 until the pressure gauge again shows the same pressure.
7. Adjust the other section in the same manner.
   NOTE: Hereafter adjustment of pressure equalisation will only be needed if you change to nozzles of other capacities.

Operating the unit whilst spraying

To stop the liquid flow to both sides of the blower, switch ON/OFF A to OFF position. This returns the pump output to the tank through the return system.

If you want to spray on one side only, switch the relevant distribution valve A to OFF position for the section to be closed. The pressure equalisation ensures that the pressure does not rise in the section which remains open.

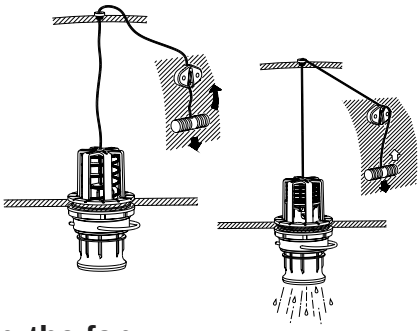
When the sprayer is put aside, the control box must be protected against moisture and dirt.

Powder mixer (if fitted)

1. Fill at least half the tank with water.
2. Disengage the fan.
3. Turn ON/OFF valves for blower to off and valve to Powder mixer on.
4. Engage the tractor P.T.O. and set the pressure to approx. 5 bar.
5. Now the powder can be poured into the tank basket filter. The liquid will wash the powder into the tank.
6. When all the powder has been washed into the tank, reset the valves.

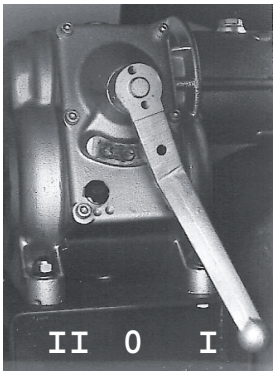
Tank drain valve

Pull the red handle on the top of the tank to open the drain valve. The valve is spring-loaded, but can be kept open by pulling the string out and upwards in the V-shaped slit. To release, pull the string downward and the valve will close automatically.



Engaging and disengaging the fan

Calibration, spraying with guns or agitation under transport only needs the operation of the pump and it is therefore practical to disengage the fan.



On the gearbox behind the tank the handle is set at position **O** to disengage the fan and position **I** or **II** to engage the fan.

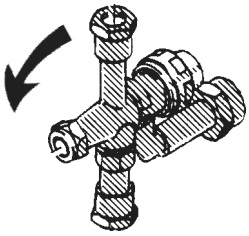
O = neutral
I = low gear
II = high gear

IMPORTANT: P.T.O. must be disengaged and both pump and fan must be stationary when engaging/disengaging the fan.

CR-B: Adjustable nozzles

They are equipped with adjustable nozzles. To turn a nozzle off, screw the nozzle cap until the flow is completely cut off.

Nozzle ON/OFF and selection



Individual nozzles can be turned off if the target is not in the spray direction of the nozzle.

To turn nozzle off, rotate 90°

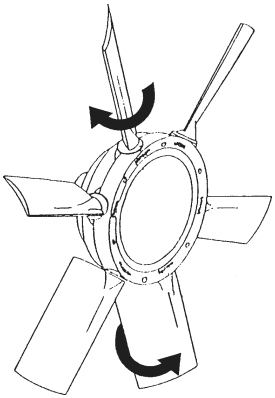
To select the other set of nozzles, rotate a further 90°.

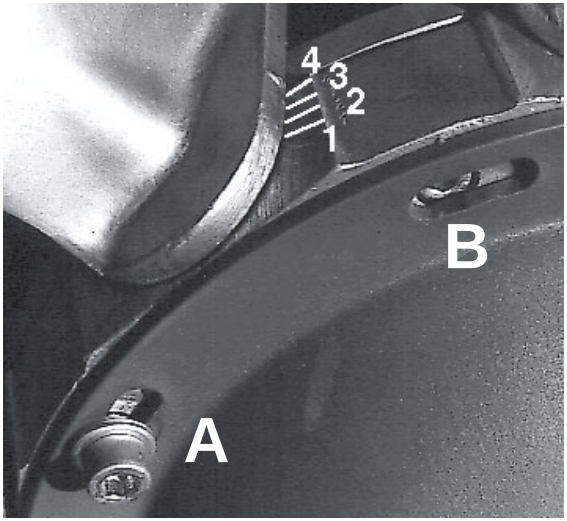
Adjustment of blower

Fan blades

The angle of the fan blades is variable between position 1 to 4. The blades are factory set at position 3.
The air volume (and to a lesser magnitude air speed) can be raised by increasing the angle of the blades. The power consumption of the fan can be reduced by decreasing the angle of the blades. This permits the sprayer to be matched to the tractor and to the spray task.
See section on Technical specifications for power consumption.

Fan adjustment





1. Remove the large guard at rear of blower.
2. Loosen the Allen screws A holding the red cover. Remember to only loosen.

3. Loosen the Allen screws **B** in the slots. It may be necessary to hold the nut at the back of the fan.
4. Using both hands on opposite blades, turn blades to desired position (from 1 to 4). All blades should turn together.
5. Check all blades are at same position. Tighten Allen screws **A** and **B** and replace guard.

Deflector plates

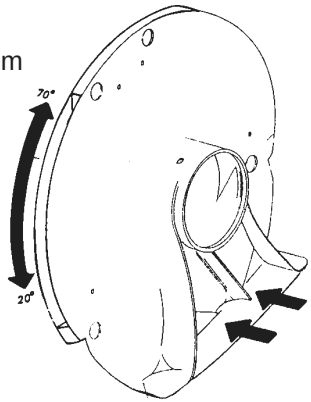
The deflector plates below the blower unit can be angled to suit the various canopy shapes.
Loosen nut and adjust the plates down if the base of the bush/tree must also be sprayed.

CR-V and CR-C: V-deflector

The V-deflector can be angled to suit the various canopy shapes.
Loosen nut and adjust the plates to suit the tree canopy to be sprayed.

CR-C: TURBO SPOUT

The TURBO SPOUT system retrieves air from the lower part of the blower and channels it up to a spout on each side of the blower. Inside the spout there is an adjustable air guide which is used to direct the air to the zone where it is most needed. This is usually the tree tops if spraying high trees or the tree centre if spraying wide trees. The air guide can be adjusted from 20° to 70° with 10° increments.



Calibration

A standard set of nozzles is supplied with the sprayer. Other nozzles and combination of nozzles can be used so the output and drop size suits the intended spray task.

Standard Spraying examples and Nozzle set tables are given in the “Mistblowing Technique” book and on the back of the Mistblower Calibrator disc.

Maintenance

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

Cleaning the sprayer

Guidelines

Read the whole label of the chemical. Take note of any particular instructions regarding recommended protective clothing, deactivating agents, etc. Read the detergent and deactivating agent labels. If cleaning procedures are given, follow them closely.

Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. Contact the appropriate body, e.g. Dept of Agriculture.

Pesticide washings can usually be sprayed out on a soakaway. This is an area of ground that is not used for cropping. You must avoid seepage or run-off of residues into streams, water courses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Drainage must lead to a soakaway.

Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.
It is good practice to clean the sprayer immediately after use thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components.

It is sometimes necessary to leave spray liquid in the tank for short periods, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorised persons and animals must not have access to the sprayer under these circumstances.

If the product applied is corrosive, it is recommended to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor.

Remember: Clean sprayers are safe sprayers.
Clean sprayers are ready for action.
Clean sprayers can not be damaged by pesticides and their solvents.

Cleaning

1. Dilute remaining spray liquid in the tank with at least 10 parts water and spray the liquid out in the orchard you have just sprayed.
   NOTE: It is advisable to increase the forward speed (double if possible) and reduce the pressure.
2. Select and use the appropriate protective clothing. Select detergent suitable for cleaning and suitable deactivating agents if necessary.
3. Rinse and clean sprayer and tractor externally. Use detergent if necessary.
4. Remove suction filter and clean. Be careful not to damage the mesh. Reassemble the filter housing without the filter. Replace filter when the sprayer is completely clean.
   5. With the pump running, rinse the inside of the tank. Remember the tank roof. Rinse and operate all components and any equipment that has been in contact with the chemical.
   Before opening the distribution valves and spraying the liquid out, decide whether this should be done in the orchard again or on the soakaway.
   If pressure filters are fitted with a drain valve, open valve and flush filter.
   6. After spraying the liquid out, stop the pump and fill at least 1/5 of the tank with clean water. Note that some chemicals require the tank to be completely filled. Add appropriate detergent and/or deactivating agent, e.g. Washing soda or Triple ammonia.
   NOTE: If a cleaning procedure is given on the chemical label, follow it closely.
7. Start the pump and operate all controls enabling the liquid to come in contact with all the components. Leave the distribution valves until last. Some detergents and deactivating agents work best if left in the tank for a short period. Check the label.
   8. Drain the tank and let pump run dry. Rinse inside of tank, again letting the pump run dry. Remember that piston pumps must not run dry for more than a minute.
9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them now.
10. Replace all the filters and nozzles and store the sprayer. If, from previous experiences, it is noted that the solvents in the pesticide are particularly aggressive, store the sprayer with the tank lid open.
    NOTE: If the sprayer is cleaned with a high pressure cleaner we recommend lubrication of the entire machine.

Filters

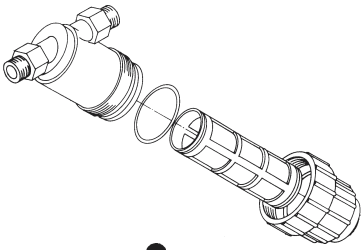
Clean filters ensure;

- Sprayer components such as pump valves and operating unit are not hindered or damaged during operation.
- Nozzle blockages do not occur whilst spraying.
- Long life of pump. A blocked suction filter will result in pump cavitation.

The main filter protecting sprayer components is the suction filter. Check it daily when spraying. For models with 3-way valve at suction filter, ensure the O-ring on filter housing is in good condition and lubricated. See section on Operating instructions-Before starting.

Line filters (if fitted)

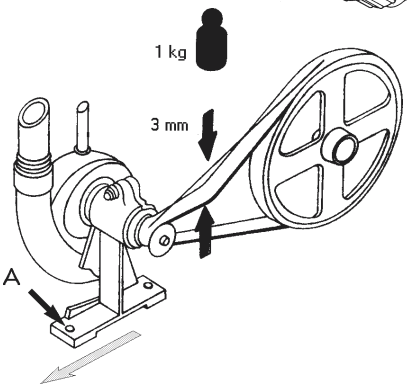
The sprayer may be equipped with brass line filters. Unscrew the filter bowl A to inspect and clean the filter B. If bowl leaks, check O-ring C.



CR-V and CR-C: Agitation pump

The belt driving the pump must deflect no more than 3 mm with 1 kg force. A spring scale can be used to check this. To alter tension, remove guard plate, loosen nuts A and slide pump.

Tighten all counter nuts and replace guards after adjustment.

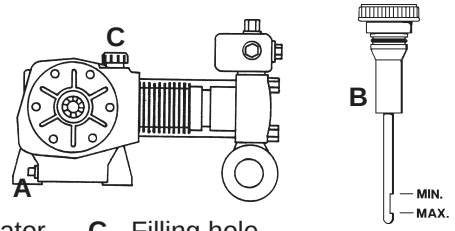


Lubrication

It is recommended to use ball bearing grease (lithium grease No. 2)
NOTE: If the sprayer is cleaned with a high pressure cleaner or it has been used to spray fertiliser, we recommend lubrication of the entire machine.

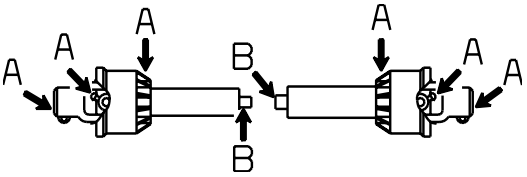
Piston pump
Check oil daily when spraying. Level must be visible between the minimum and maximum mark of the indicator.

The pump is filled with oil from the factory. Change the oil after the first 50 hours of work. Thereafter as described in following table or once a year.



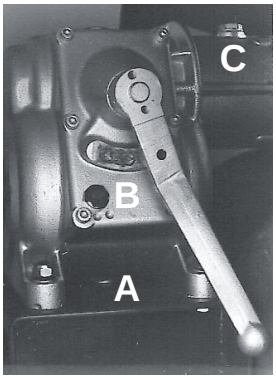
A - Drain plug **B** - Level indicator **C** - Filling hole

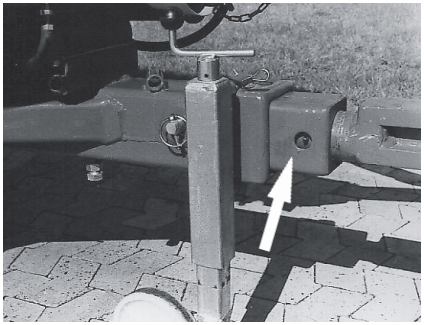
Transmission shaft
Lubricate the cross journals and bearings with ball bearing grease A every 8th working hour and tubes and pins B every 20th working hour.



This includes the power transmission shaft and bearings connecting the pump and the blower unit.

Gear box
The gear box is filled with oil from the factory. Regularly check oil level. The oil level must come to the indicator glass.
A - Drain plug
B - Level indicator
C - Filling hole





Drawbar and wheels
The swivel of the drawbar and axles should be greased at least once a year.

	Oil capacity litre	Oil type SAE	Initial change hours	There after hours
Pump P3N	2.5	20/40 HD	50	150
Gearbox	1.3	20/40 HD	150	250

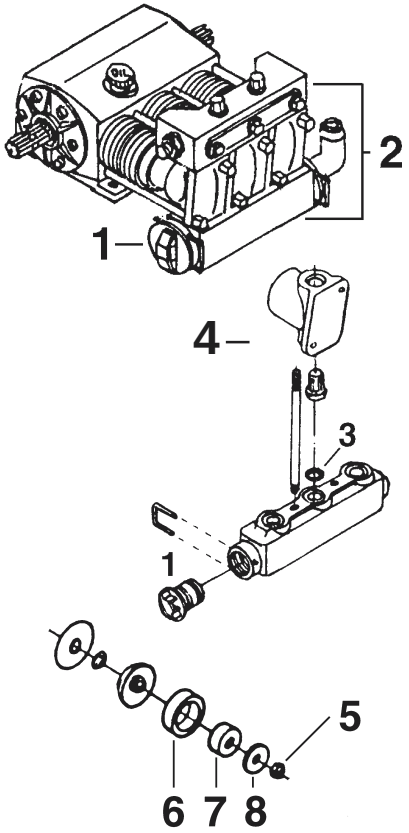
Servicing valves and plungers

Valves

1. Remove suction cover 1 so that the liquid is drained from the pump.
2. Remove valve chamber 2. Note orientation of the valves. It is recommended to use new O-rings 3 when checking or changing the valves.
   NOTE: For valves with ball seat, the valve seat can be rotated.

Plunger cups

1. The valve chamber must be removed first.
2. Remove cylinder head 4.
3. Use spanner to loosen nut 5.
4. Cylinder can now be removed so the cups 6 can be removed.
5. At re-assembly, grease cups and inside of cylinder.
6. Assemble cup 6, rubber expander 7, washer 8 and self-locking nut 5.
7. Tighten nut (35 Nm). Do NOT over tighten. If it is too tight, the cups will wear rapidly. If it is too loose, liquid will leak from the drain port of the cylinder.
8. Finish the assembly and run the pump for 1/2 hour. If liquid leaks from the drain ports, it is necessary to tighten nut 5. Only tighten 1/4 of a turn. This may also be necessary if the cups have dried out after off-season storage.



Off-season storage

When the spraying season is over you should devote some extra time to the sprayer before it is stored.

Frost precautions
If your sprayer is not stored in a frost-proof place you should take the following precautions:
Put 10 litters of anti-freeze mixture in the tank and let the pump run a few minutes, so that the entire spray system including the spray lines are filled. The anti-freeze solution also hinders the O-rings, plunger cups and gaskets from drying out.
Furthermore, all filters can be drained. The agitation pump can be drained by opening the drain valve at the bottom of the pump.
Remove the pressure gauge and store it frost free in a vertical position.

Hoses
Check that none of the hoses are pinched or have sharp bends.
A leaky hose causes annoying delays in the middle of spraying.
Check all the hoses and replace if there is any doubt of their durability.

Paint
Some chemicals are very destructive to paint. It is therefore advisable to remove rust, if any, and touch up the paint.

M/2 and S/2 operating unit
Ensure the pressure regulating handle is turned anti-clockwise to its end point. This relieves the pressure on the spring.

CB/2 operating unit
The control box must be protected against moisture and dirt.

Tanks
Ensure that all chemical residues are removed from the tanks and rest of the sprayer.

Transmission shaft
It is important that the push pins are clean and well lubricated, to ensure safe function.

Every 40 hours:
Inspection of protection guards, function and condition. Replace possible damaged parts.

Every 1000 hours:
Check condition of protection guards and replace nylon bearings.
Check general condition of cross journals and push-pin/quick release - replace if necessary.

Operational problems

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

Minor leaks on the suction side of the pump will reduce the pump capacity or stop the suction completely.

A clogged suction filter will hinder or prevent suction so that the pump does not operate satisfactorily.

Clogged up pressure filters will result in increasing pressure at the pressure gauge but lower pressure at the nozzles.

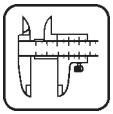
Foreign bodies stuck in the pump valves with the result that these cannot close tightly against the valve seat. This reduces pump efficiency.

Poorly reassembled pumps will allow the pump to suck air resulting in reduced or no capacity.

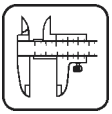
Electrical components that are contaminated with dirt result in poor connections.

Therefore ALWAYS check:

1. Suction and pressure filters are clean.
2. Hoses for leaks and cracks, paying particular attention to suction hoses.
3. Gaskets and O-rings are present and in good condition.
4. Pressure gauge is in good working order.
   Correct dosage depends on it.
5. Operating unit functions properly. Use clean water to check.
6. Electrical components are maintained clean.



Fault	Probable cause	Control / remedy
No liquid flow from pump	Suction obstructed	Check filters
	Suction valve open	Missing O-rings
	Valves obstructed or worn	Replace
No pressure	Air leak on suction	Defect hoses
	Worn control unit	Check spring strength
	Valves obstructed or worn Worn plungers	Replace
Fluctuating pressure	Suction obstructed	
	Air leak on suction	Check hoses and seals
Pump noisy	Worn bearings	Replace
	Valves worn	Replace
	Air leak on suction	Check hoses
	Cylinder seals defect	Replace
Water in oil	High air humidity	Change oil twice as often Piston seals worn
Liquid leaks at cylinder seals	Worn plungers	Replace
	Cylinder barrel worn	Replace



Technical Specifications

Pump power consumption and capacity

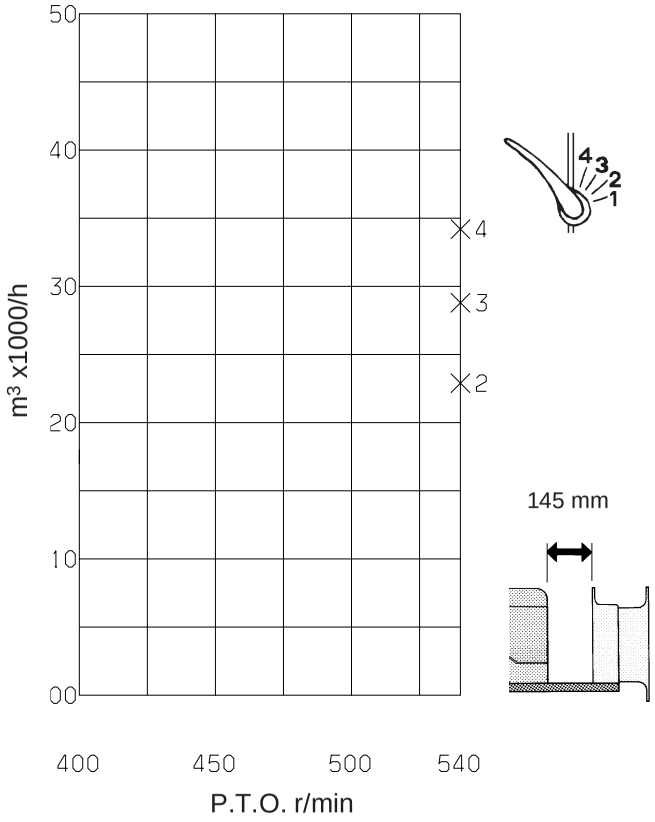
P3N-102	r/min									
	300		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	57	0.01	75	0.01	94	0.01	102	0.02		
10	57	0.98	75	1.31	94	1.64	102	1.78		
20	57	1.99	75	2.57	94	3.16	102	3.53		
30	57	2.87	75	3.90	94	4.85	102	5.22		
40	57	3.90	75	5.22	94	6.47	102	7.06		
50	57	4.84	75	6.47	94	8.16	102	8.82		
60	57	5.88	75	7.87	94	9.78	102	10.59		
Rotation per min.		r/min	Capacity			l/min	Suction height			0,0 m
Power consumption		kW	Max. pressure			60 bar	Weight			57,5 kg

P3N-123	r/min									
	300		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	68	0.01	91	0.01	114	0.02	123	0.02		
10	68	0.59	91	1.54	114	1.91	123	2.13		
20	68	2.35	91	3.16	114	3.97	123	4.26		
30	68	3.53	91	4.78	114	5.96	123	6.40		
40	68	4.71	91	6.32	114	7.94	123	8.60		
50	68	5.96	91	7.94	114	10.00	123	10.74		
60	68	7.21	91	9.56	114	11.99	123	12.94		
Rotation per min.		r/min	Capacity			l/min	Suction height			0,0 m
Power consumption		kW	Max. pressure			60 bar	Weight			67,2 kg

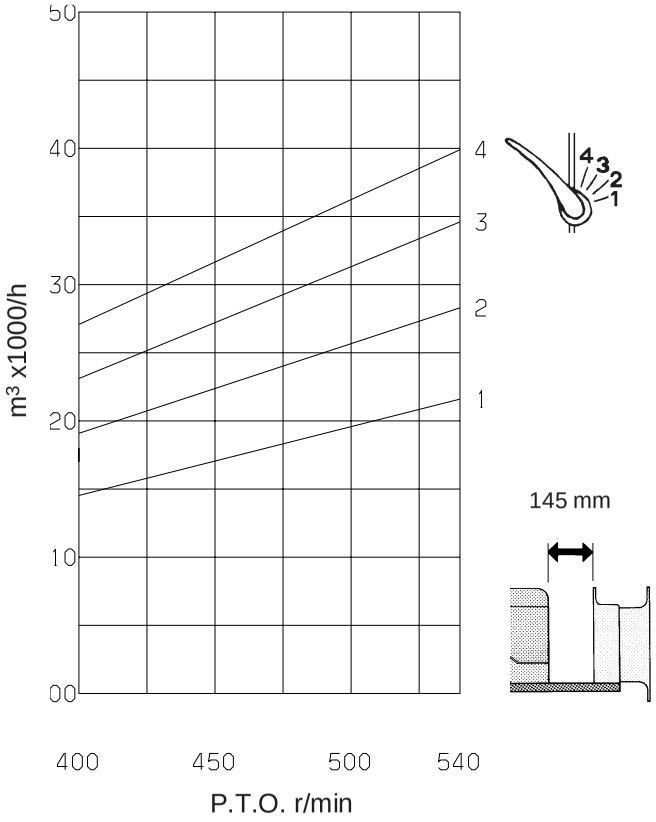
M-300	r/min									
	2850									
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	300	0.01								
0.5	266	0.28								
1.0	185	0.45								
1.5	83	0.55								

Air volume

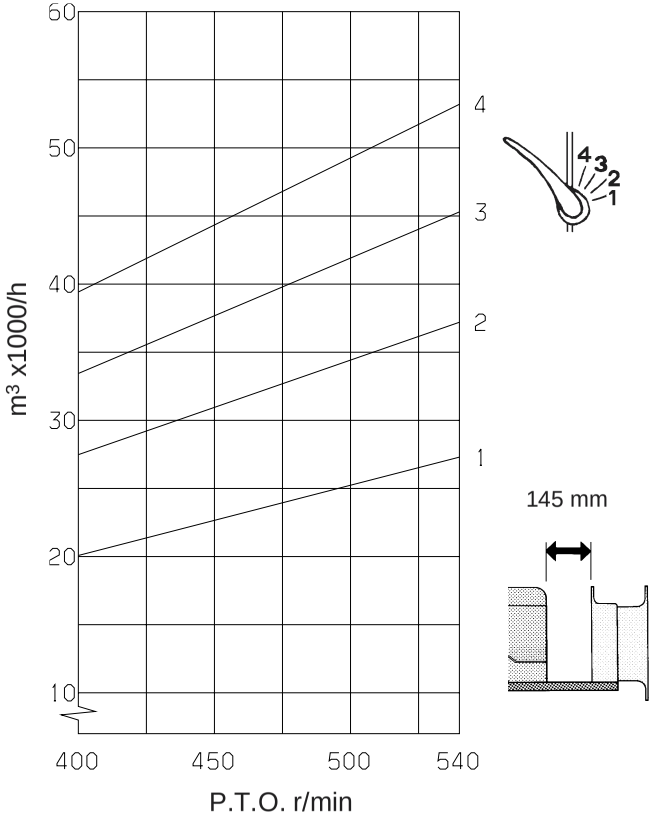
F-750 (CR-B) Gear 1, ratio 1:3.92



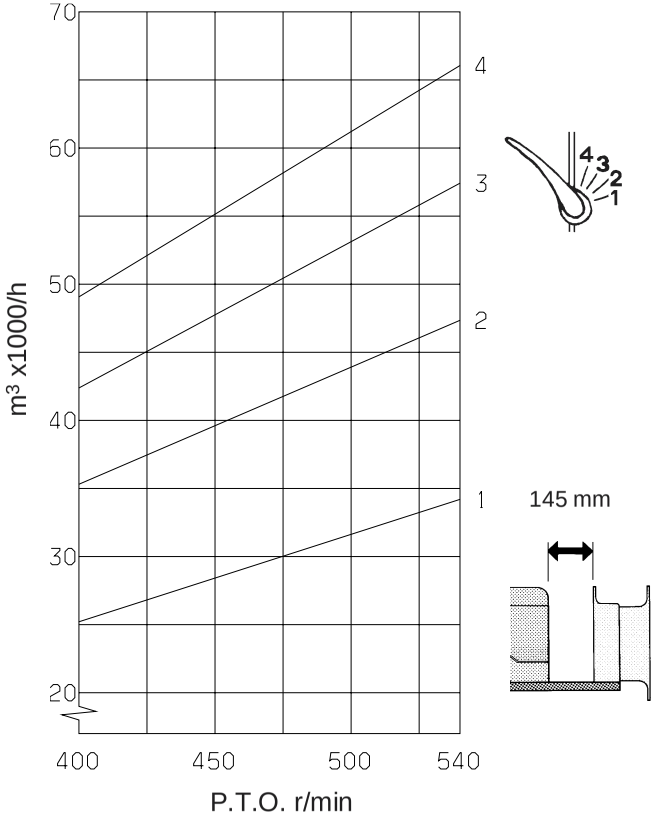
F-750 (CR-B) Gear 2, ratio 1:4.00



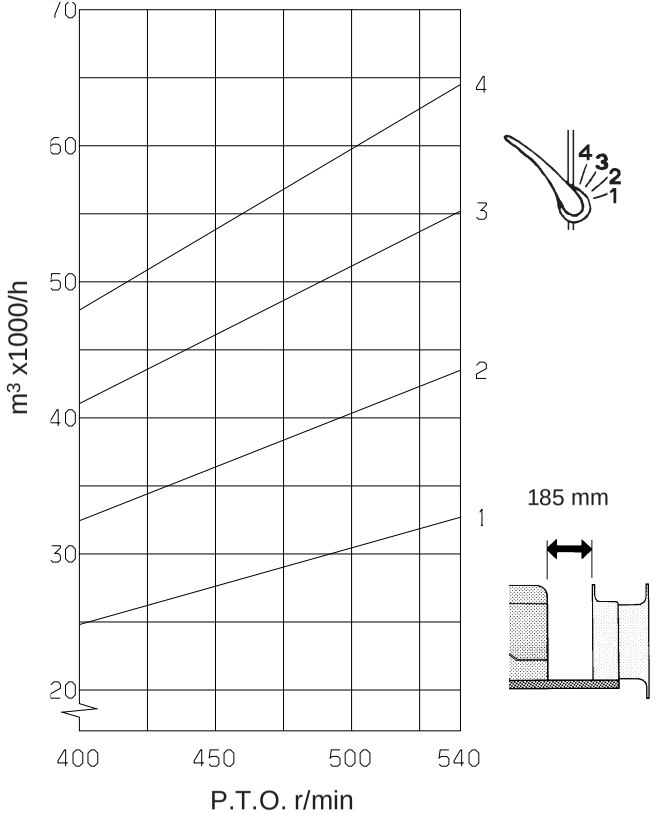
F-820 (CR-C) Gear 1.



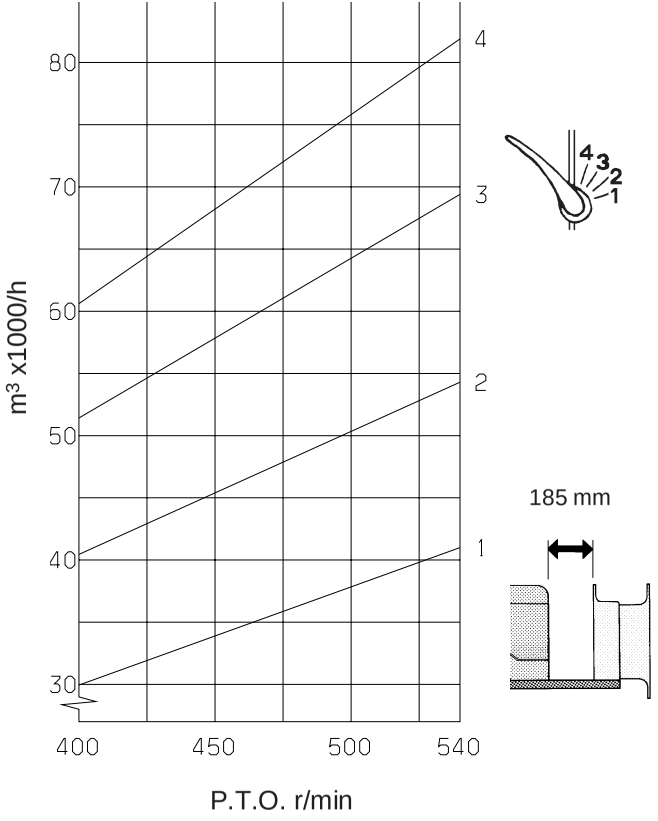
F-820 (CR-C) Gear 2.



F-820 (CR-C) Gear 1, ratio 1:3.50



F-820 (CR-C) Gear 2, ratio 1:4.50



Materials and recycling

Tank:	HDPE
Hoses:	PVC or rubber
Valves:	mainly glass-filled PA.
Fittings:	PA

Disposal of the equipment

When the HARDI equipment has completed its working life, it must be thoroughly cleaned. The tank, hose and synthetic fittings can be incinerated at an authorised plant. The metallic parts can be scrapped. Always follow local legislation regarding disposal.

Pictorial symbols


Description


Service/adjust-ment


Winter storage


Function


Liquid flow


Operational problems


Connection

Pressure


Technical specifications

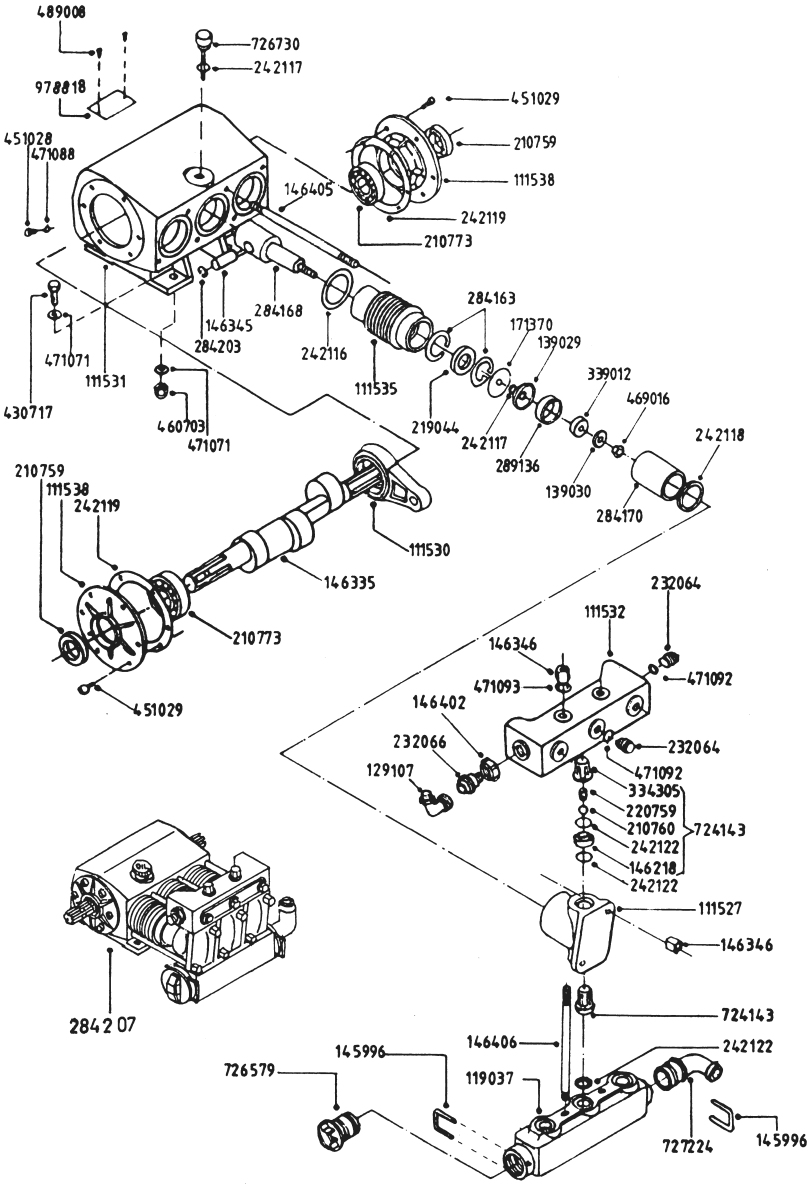

Warning


Cleaning


EU Declaration of Conformity


Operating


Lubrication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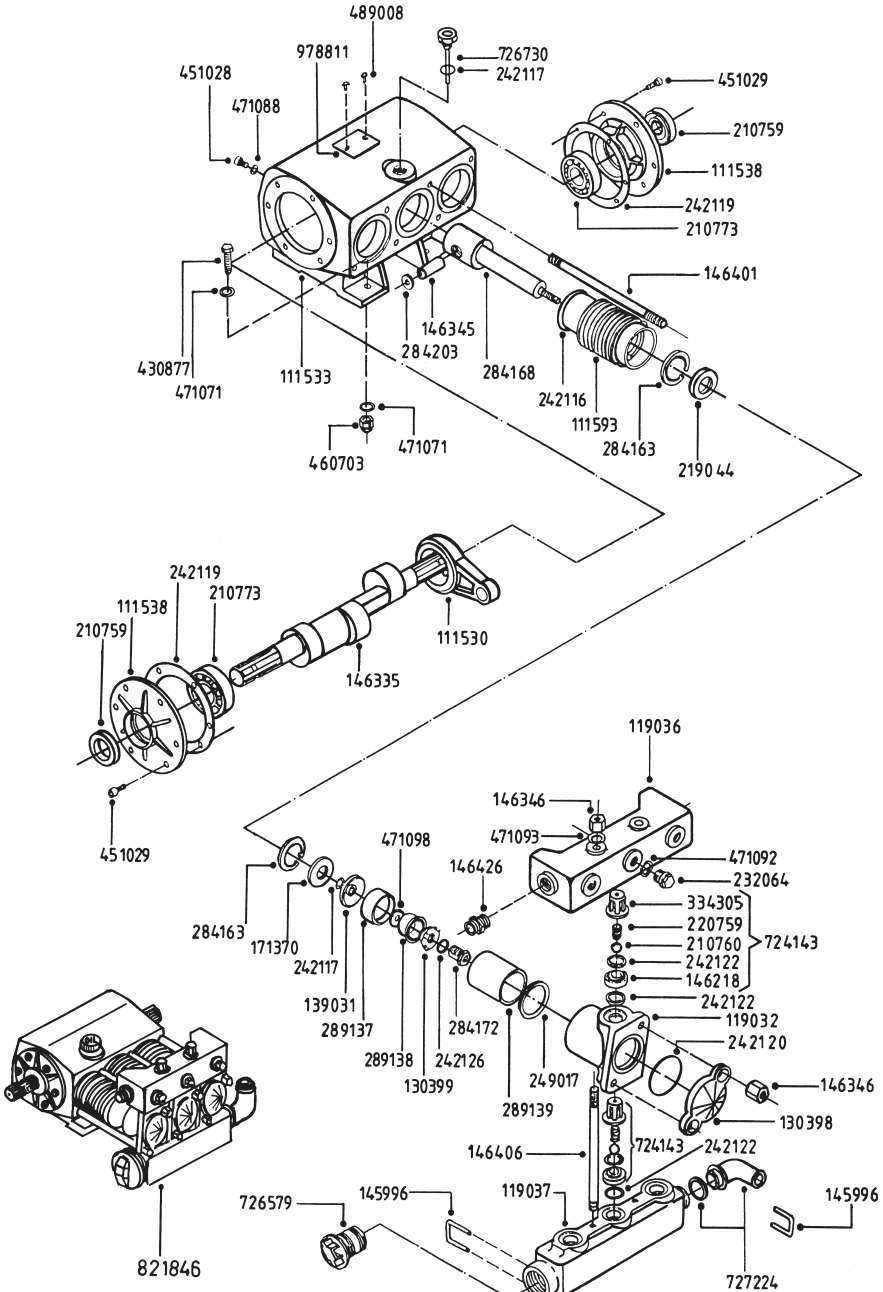
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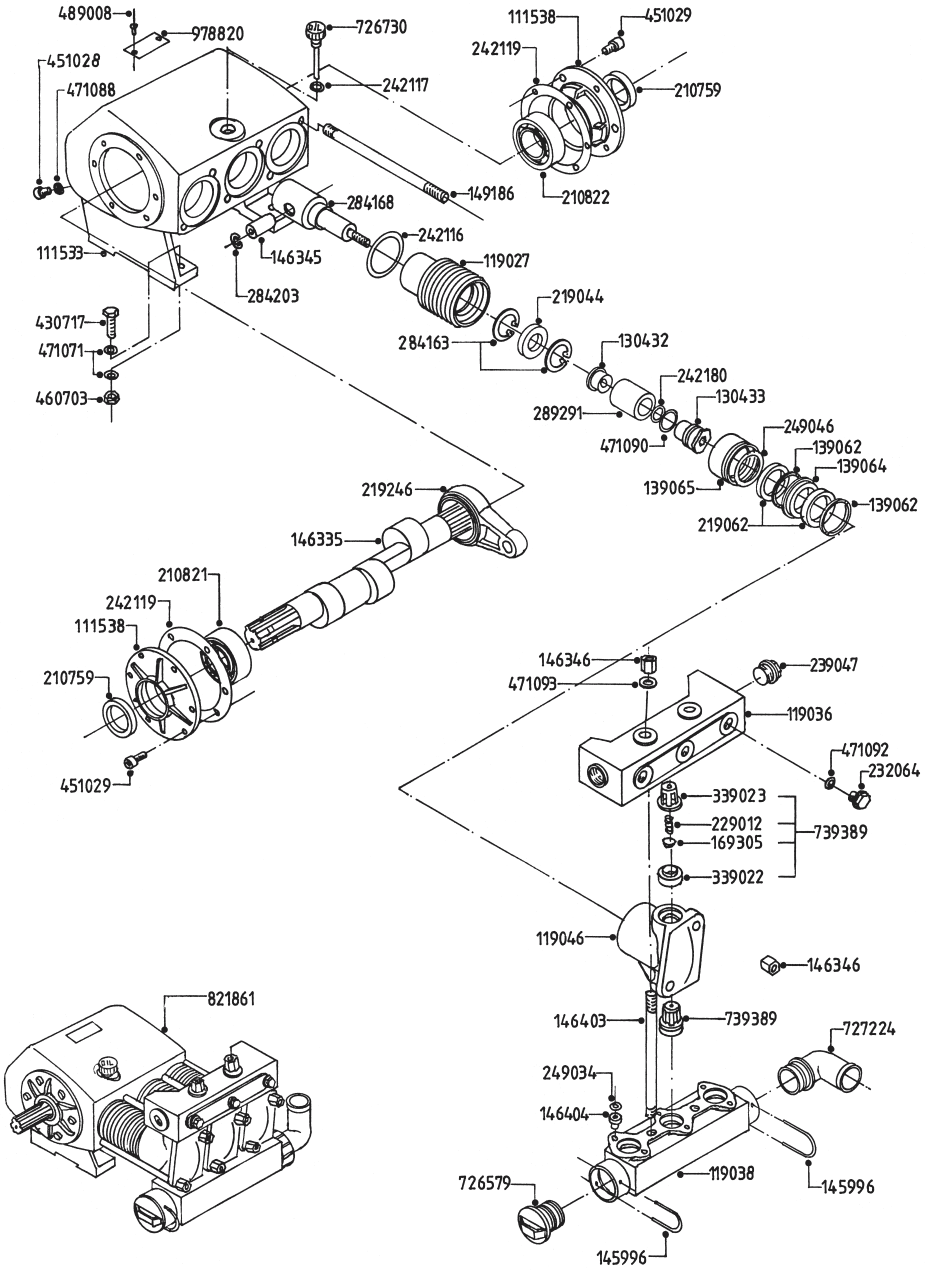
A105 P3N-123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111533
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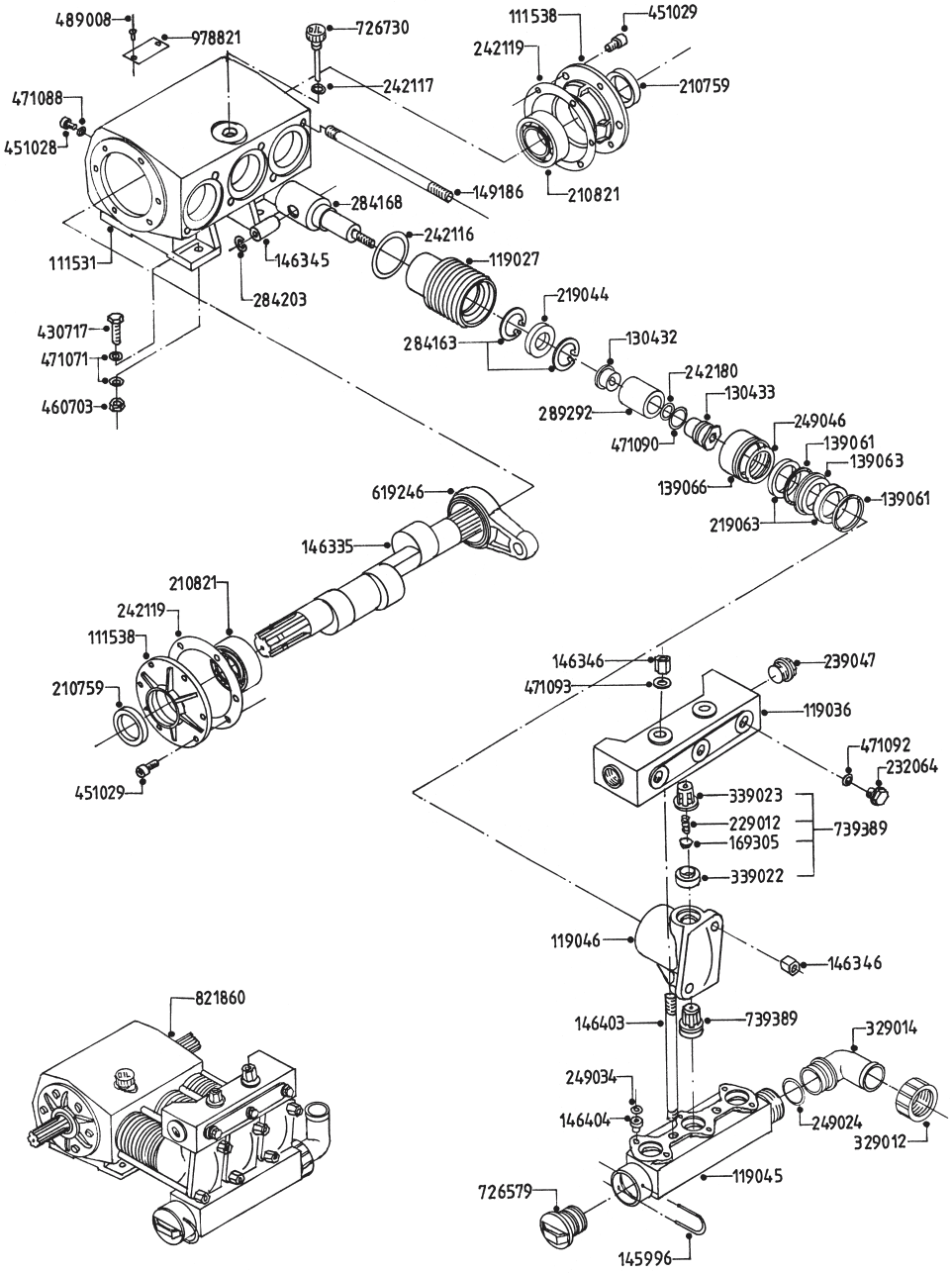
145996

P3E-123 **A113**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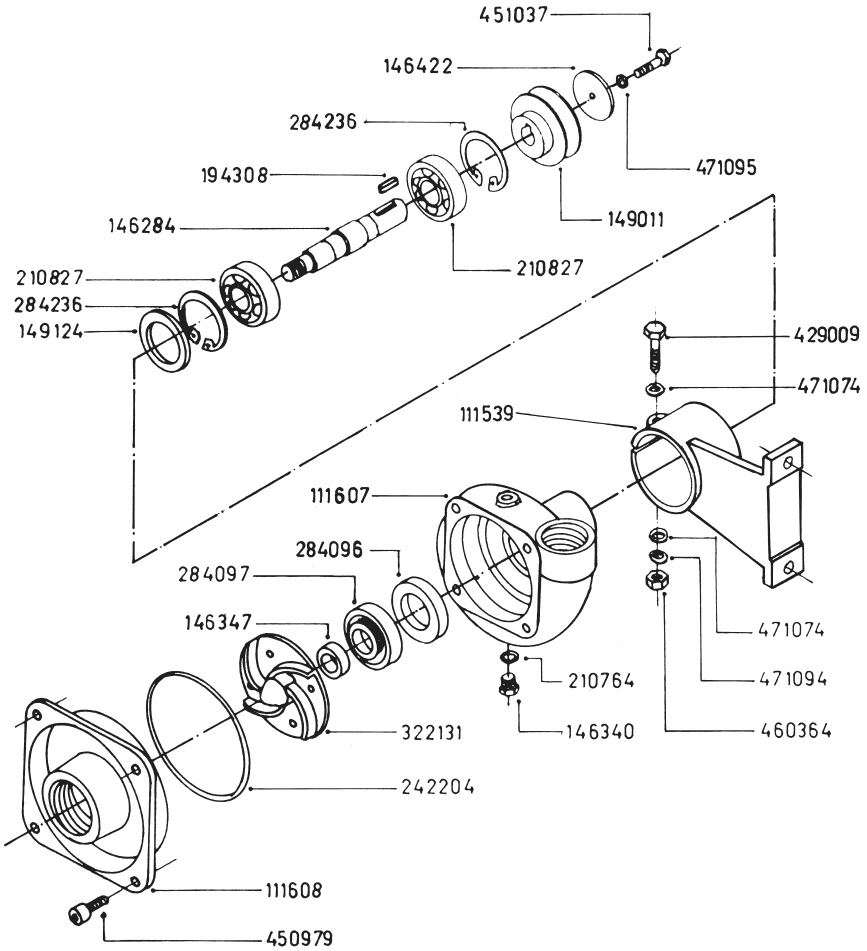
A114 P3N-147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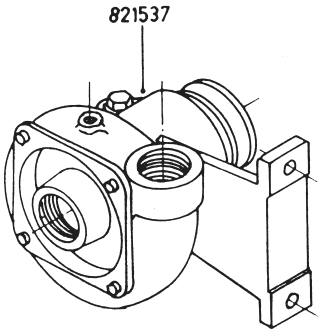
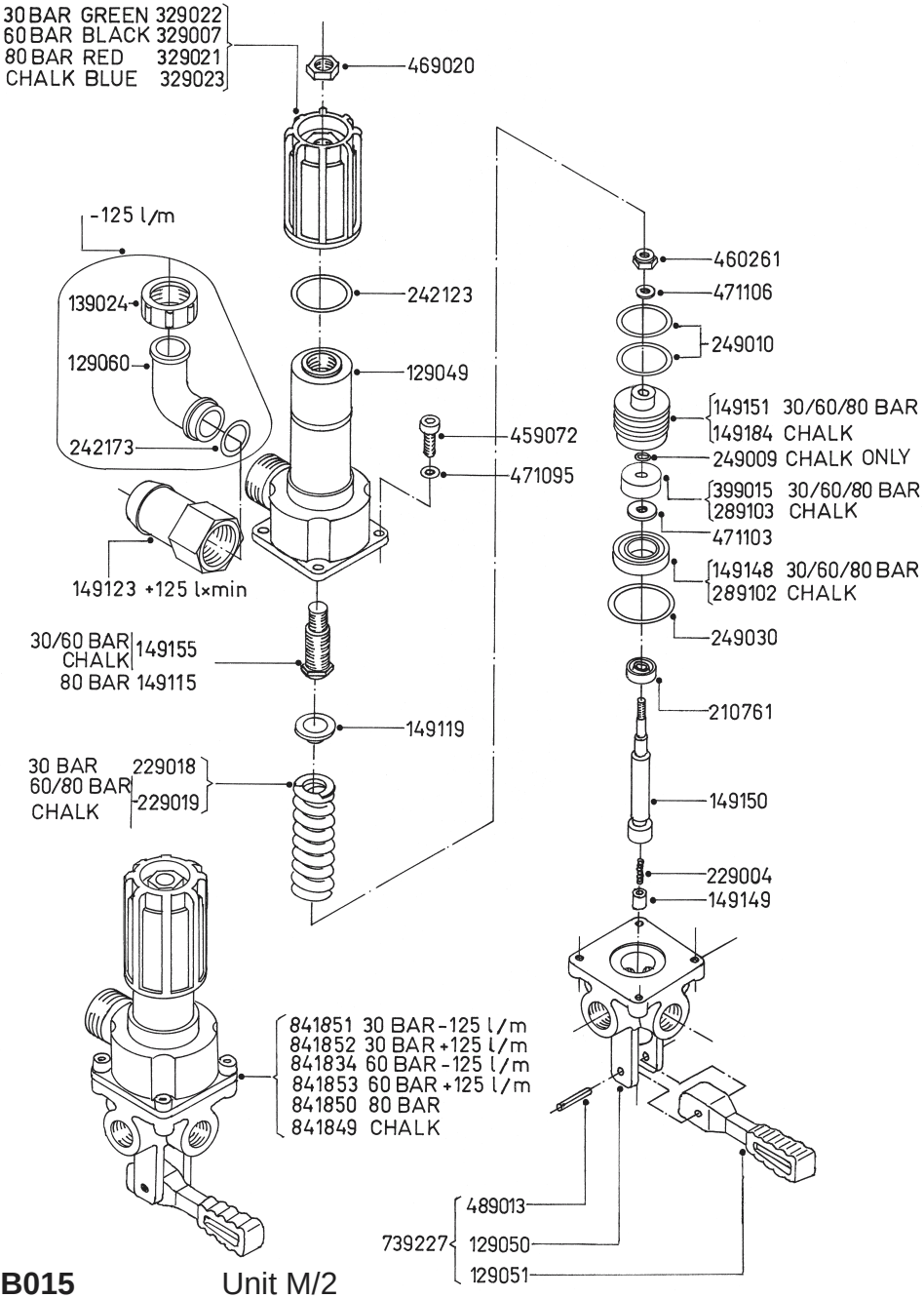
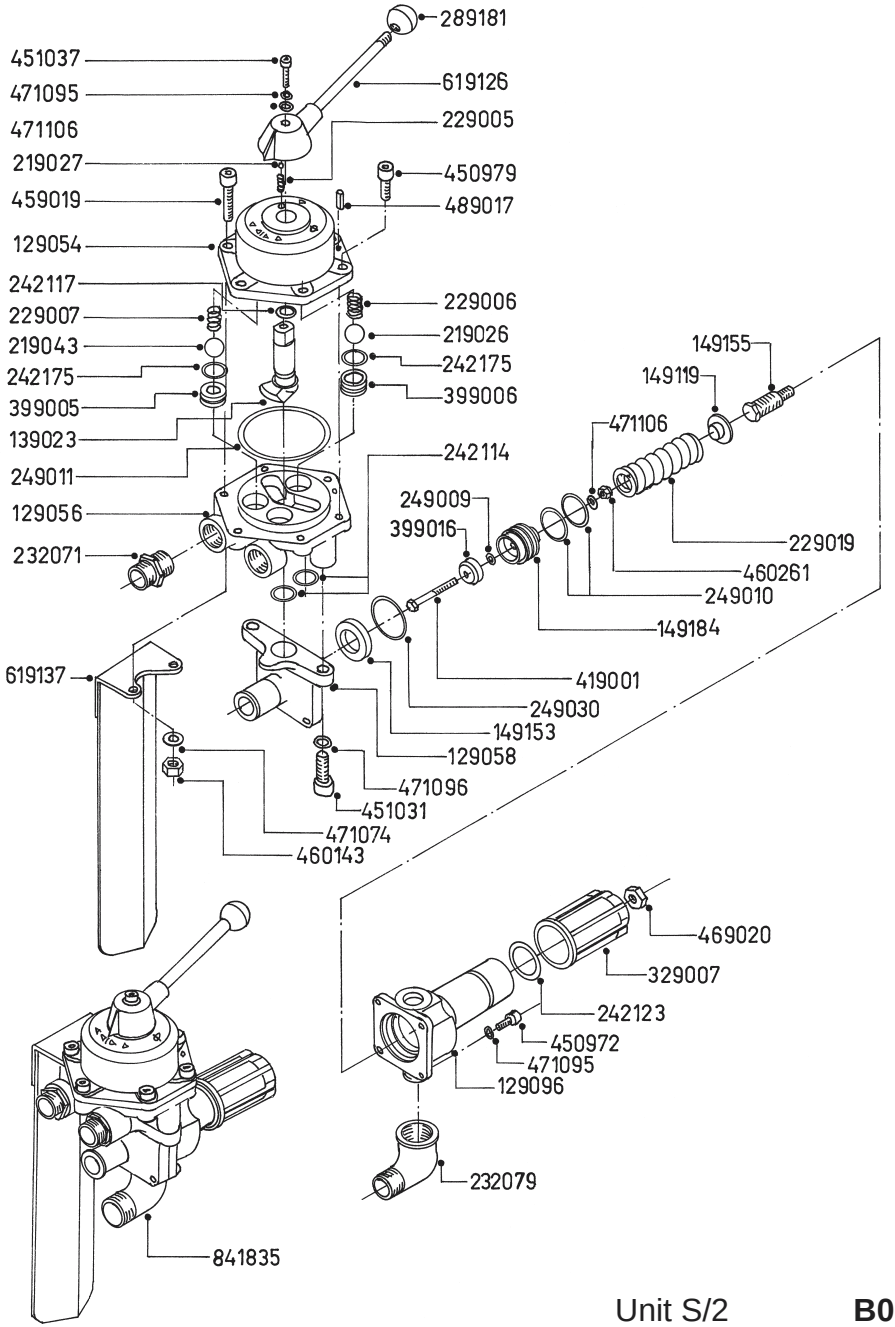

821537

M-300 **A200**


30 BAR GREEN 329022
60 BAR BLACK 329007
80 BAR RED 329021
CHALK BLUE 329023
469020
-125 l/m
139024
129060
242173
242123
129049
459072
471095
149123 +125 l×min
30/60 BAR CHALK 149155
80 BAR 149115
149119
30 BAR 229018
60/80 BAR CHALK 229019
460261
471106
249010
149151 30/60/80 BAR
149184 CHALK
249009 CHALK ONLY
399015 30/60/80 BAR
289103 CHALK
471103
149148 30/60/80 BAR
289102 CHALK
249030
210761
149150
229004
149149
841851 30 BAR-125 l/m
841852 30 BAR +125 l/m
841834 60 BAR -125 l/m
841853 60 BAR +125 l/m
841850 80 BAR
841849 CHALK
489013
739227
129050
129051

B015 Unit M/2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229006
229007
219026
219043
242175
242175
399005
399006
139023
242114
249011
129056
249009
399016
232071
149155
149119
471106
229019
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249010
149184
419001
619137
249030
149153
129058
471096
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469020
329007
242123
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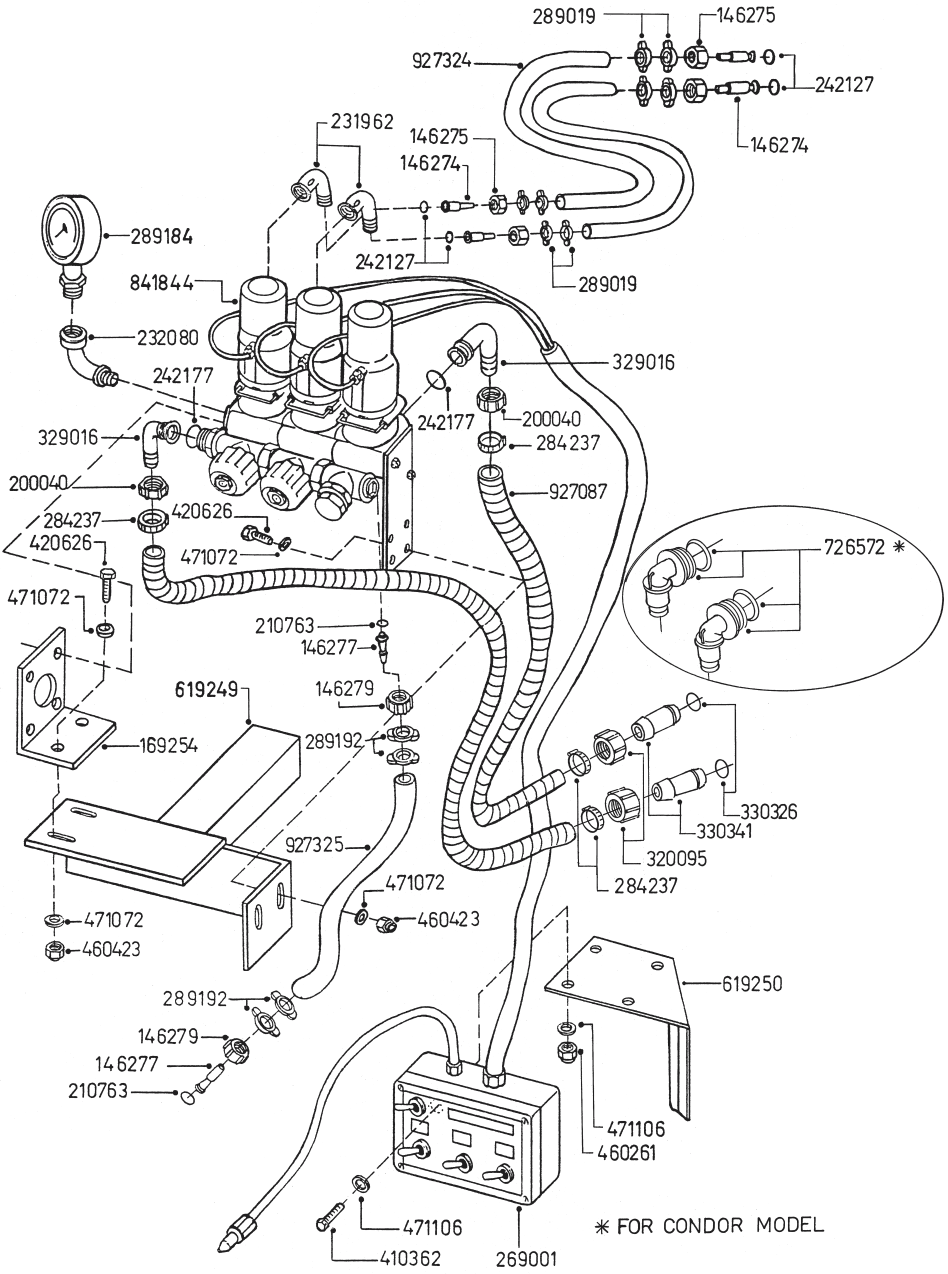
471095
129096
232079
841835

Unit S/2 **B016**


289019
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146274
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146274
289184
242127
289019
841844
232080
329016
242177
242177
200040
284237
329016
200040
927087
284237
420626
420626
471072
726572 *
471072
210763
146277
619249
146279
169254
289192
330326
330341
927325
320095
284237
471072
471072
460423
460423
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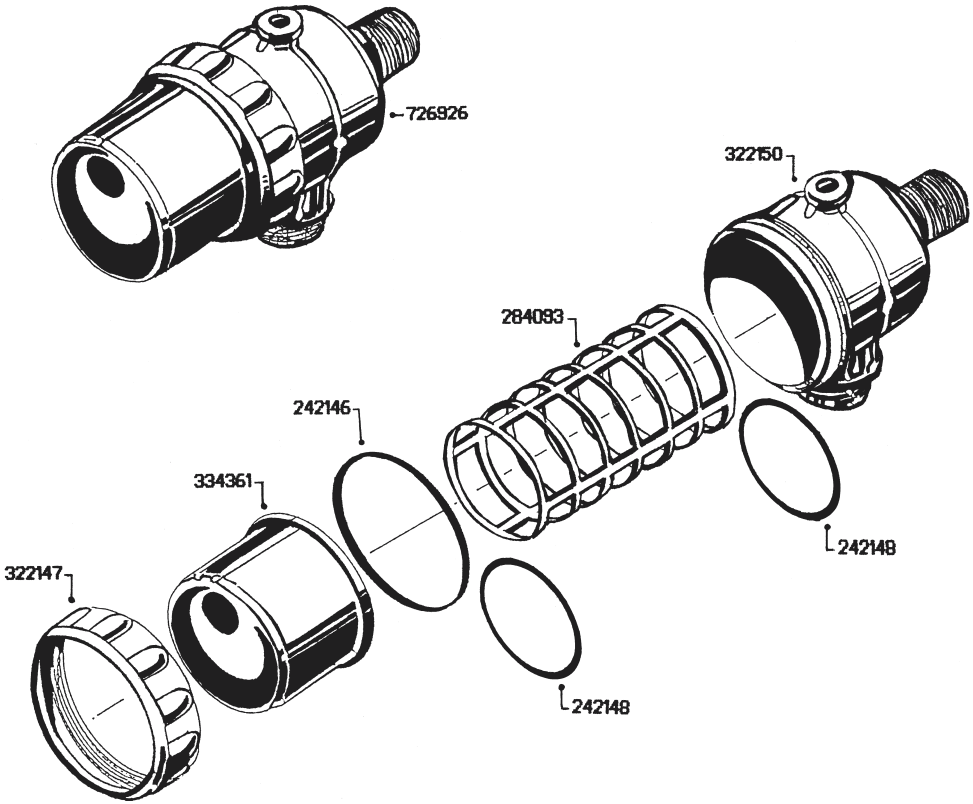
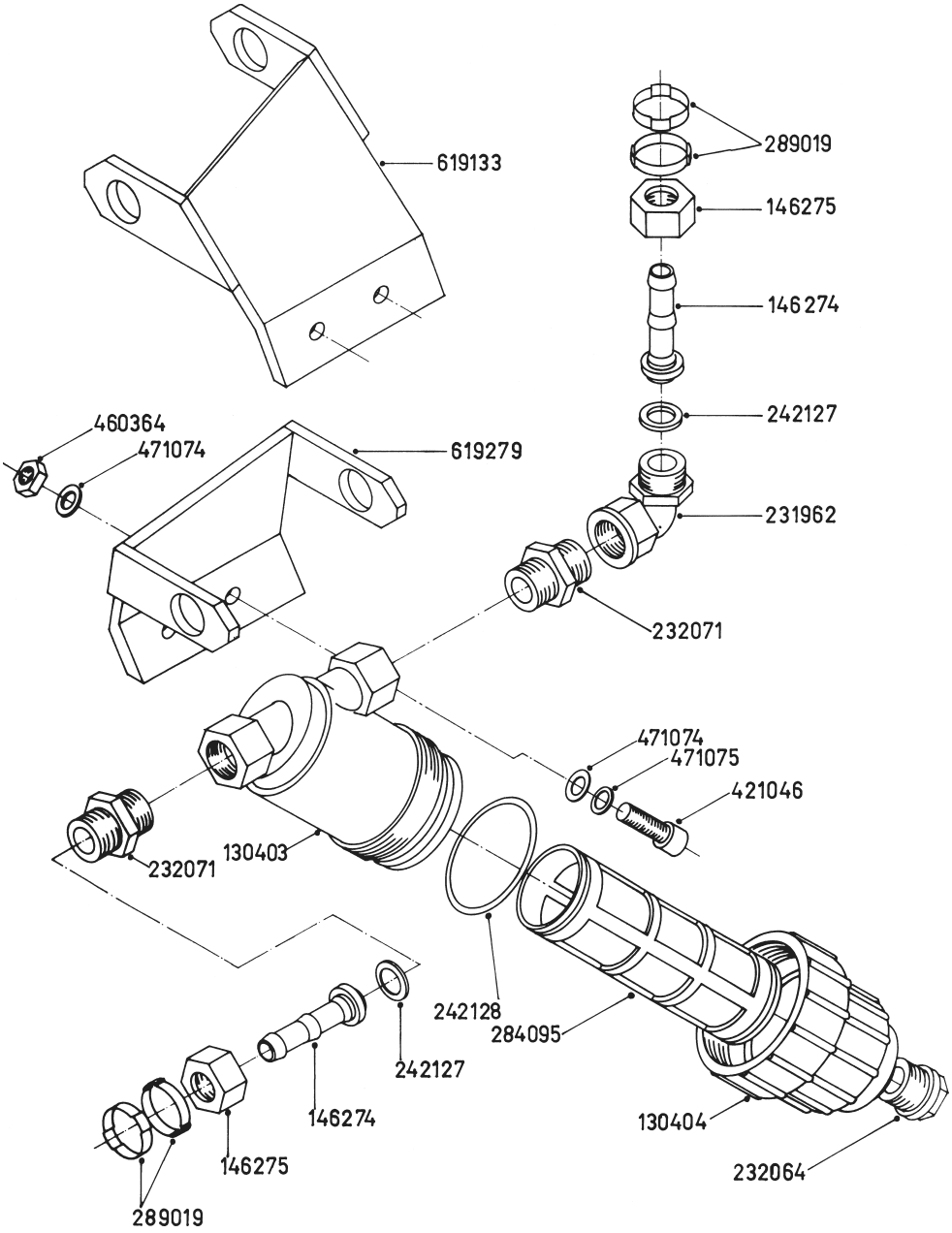
146279
146277
210763
471106
460261
471106
410362
269001
* FOR CONDOR MODEL

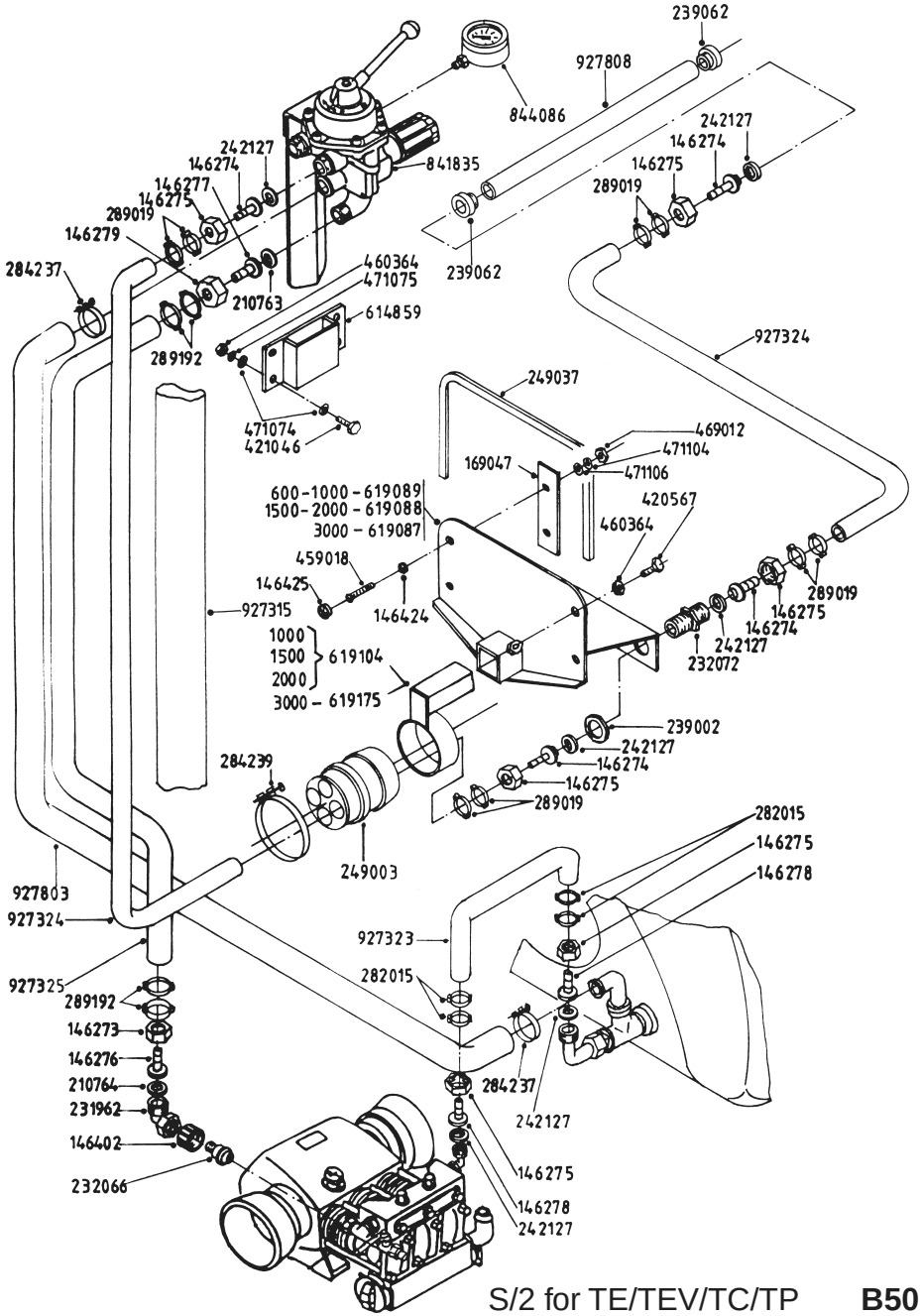
B106 CB/2



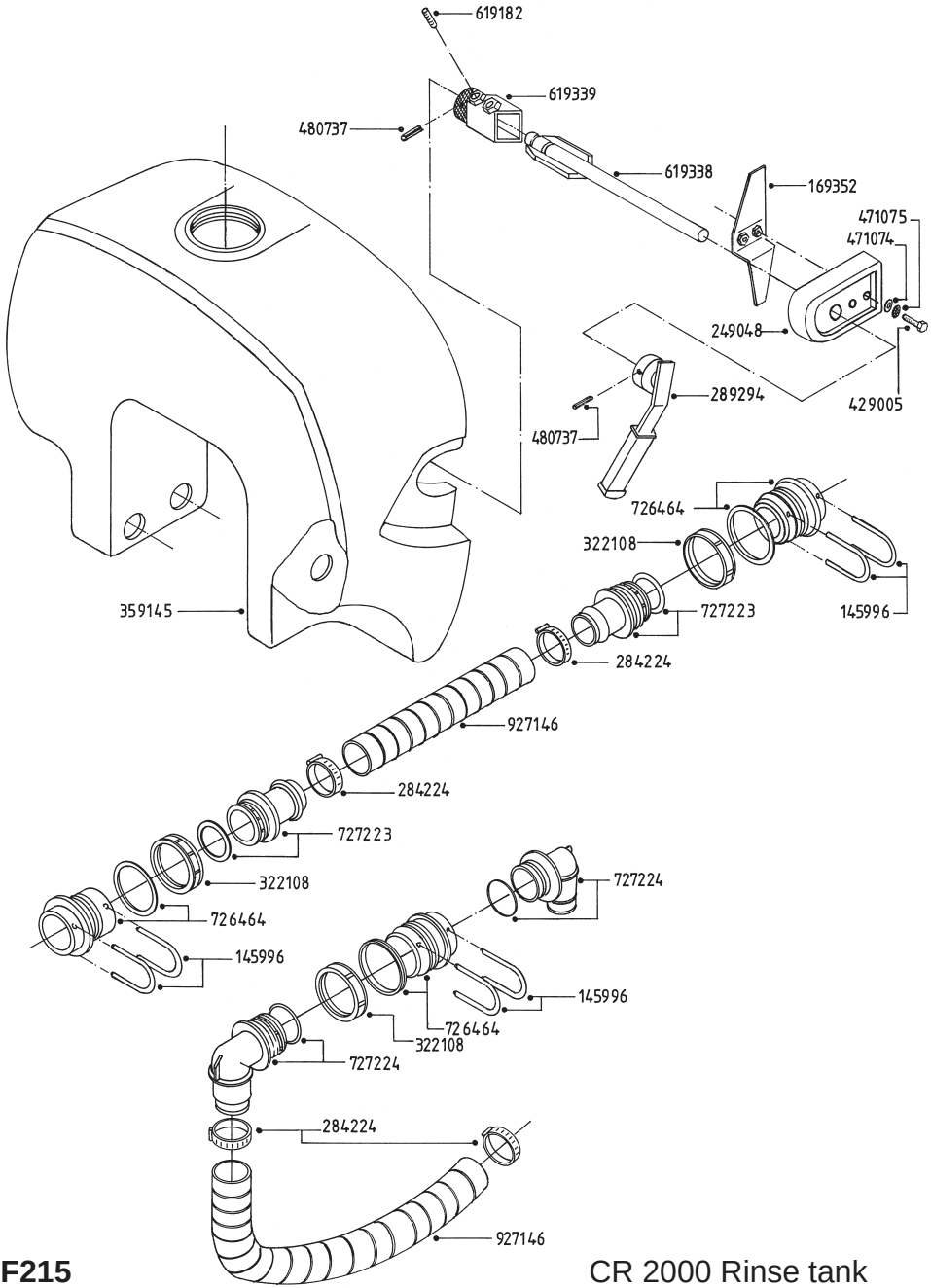
Suction filter 200 mm **B202**



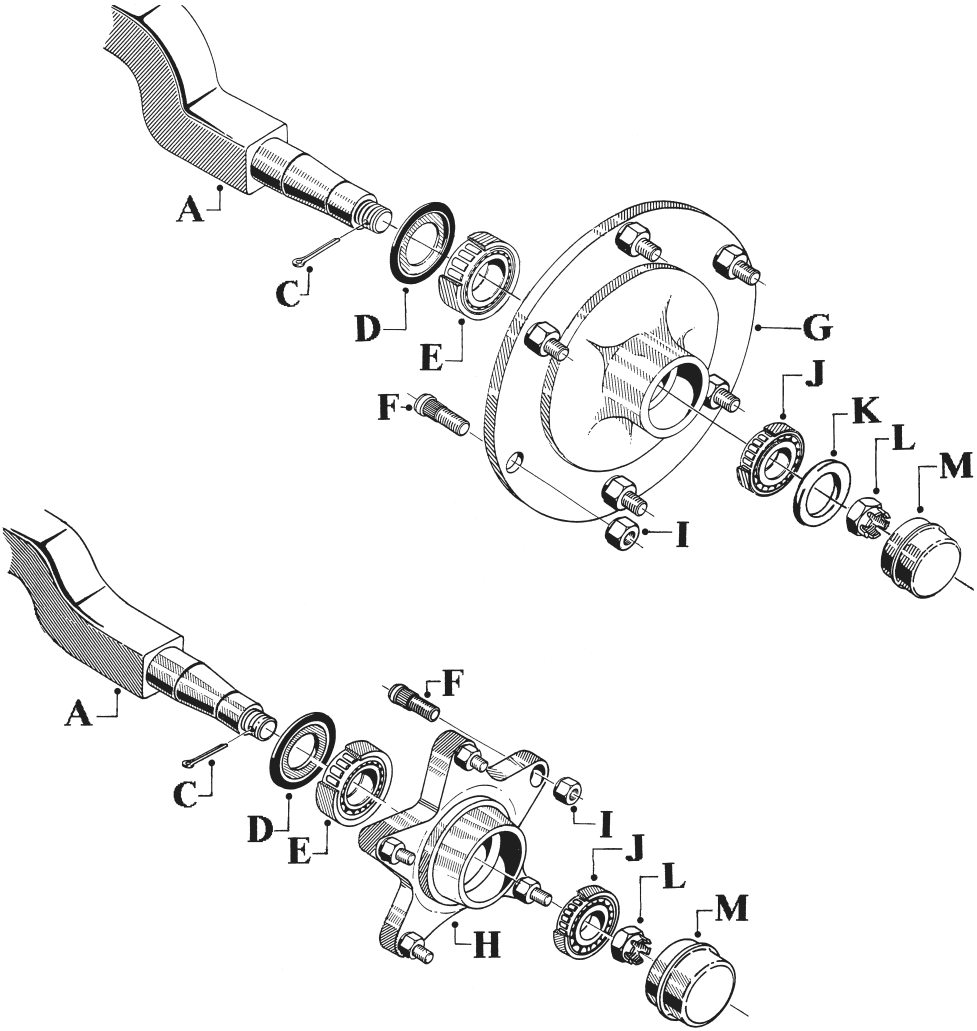
B203 Pressure filter 125 mm



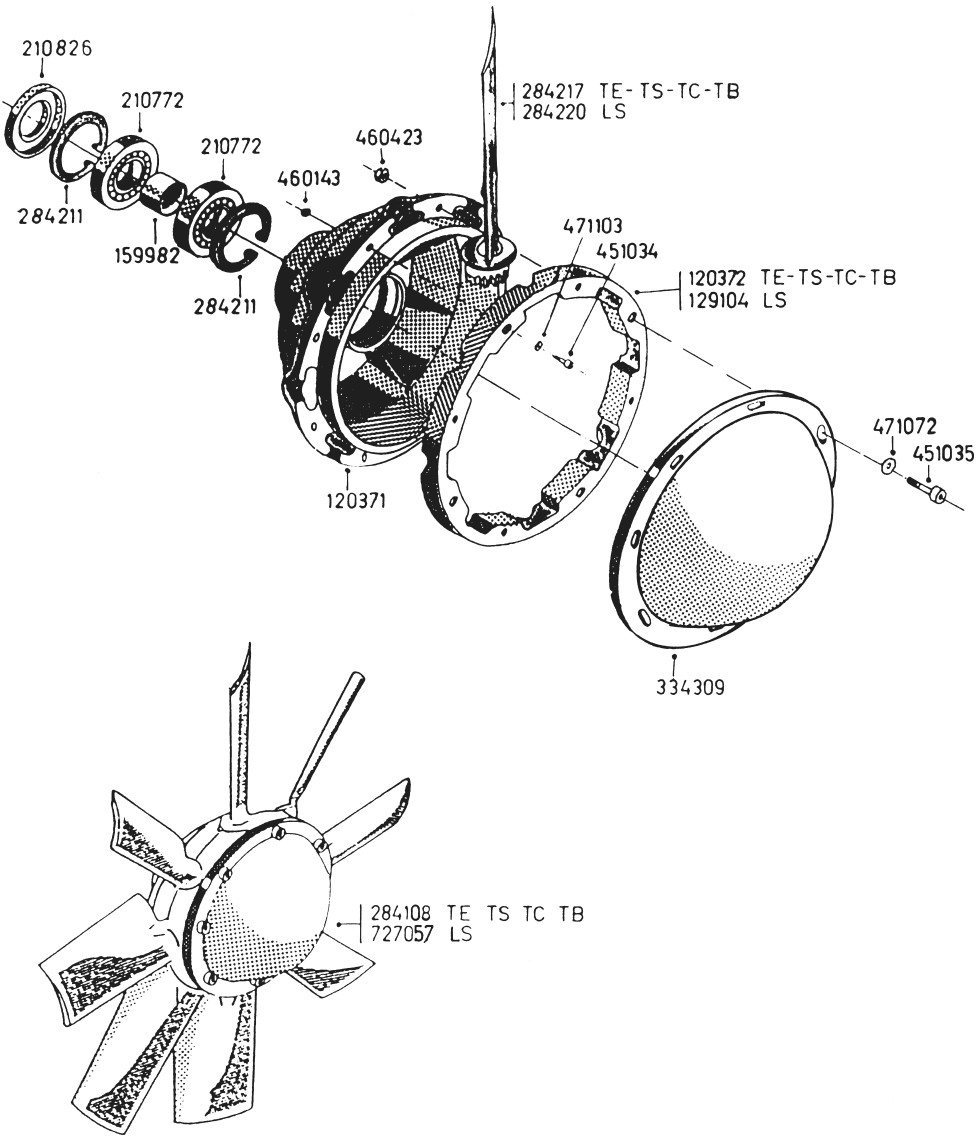
S/2 for TE/TEV/TC/TP **B509**



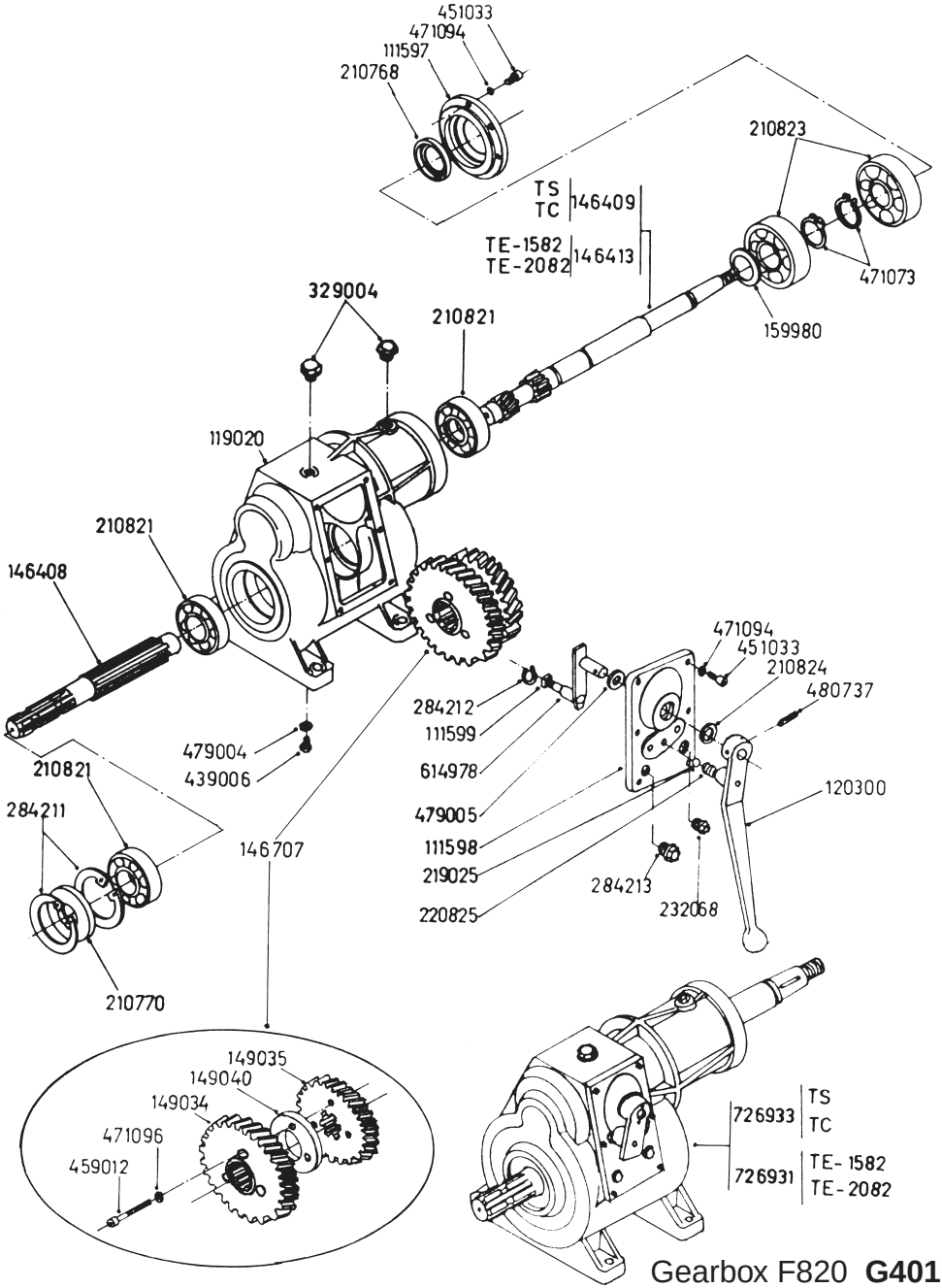
F215 CR 2000 Rinse tank



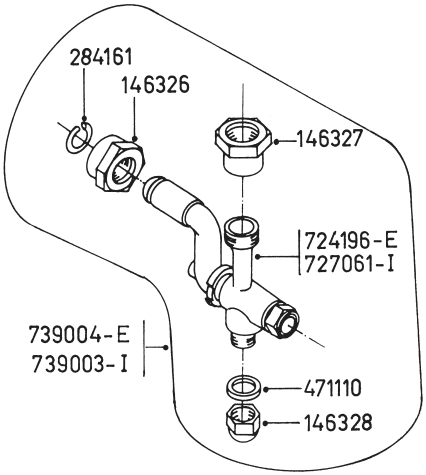
Trailer hub **F400**

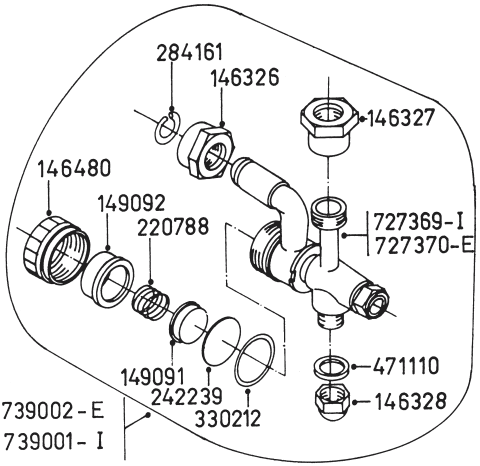


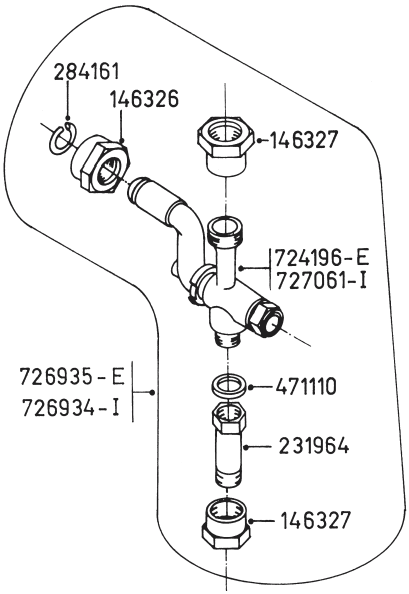
G201 Fan F820

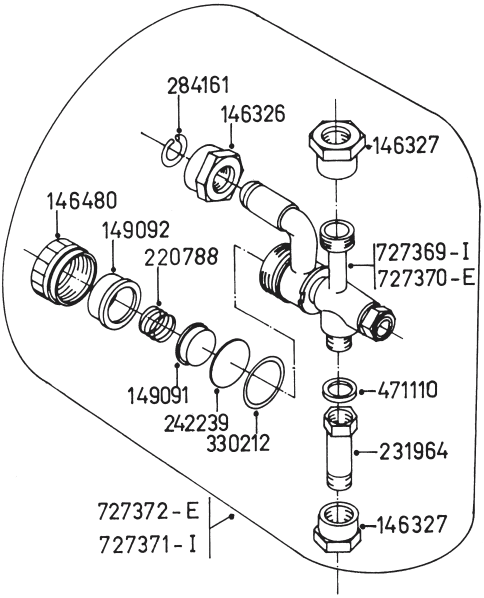


Gearbox F820 **G401**

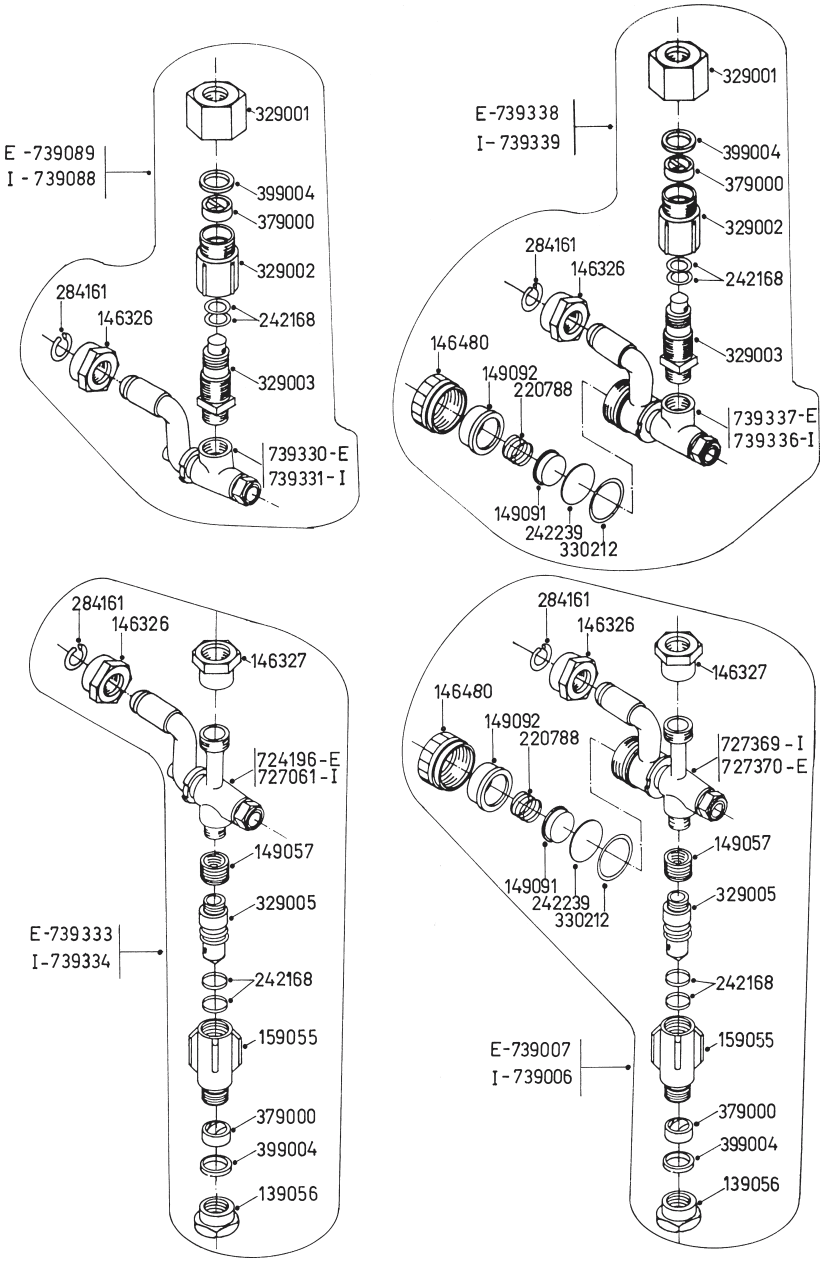




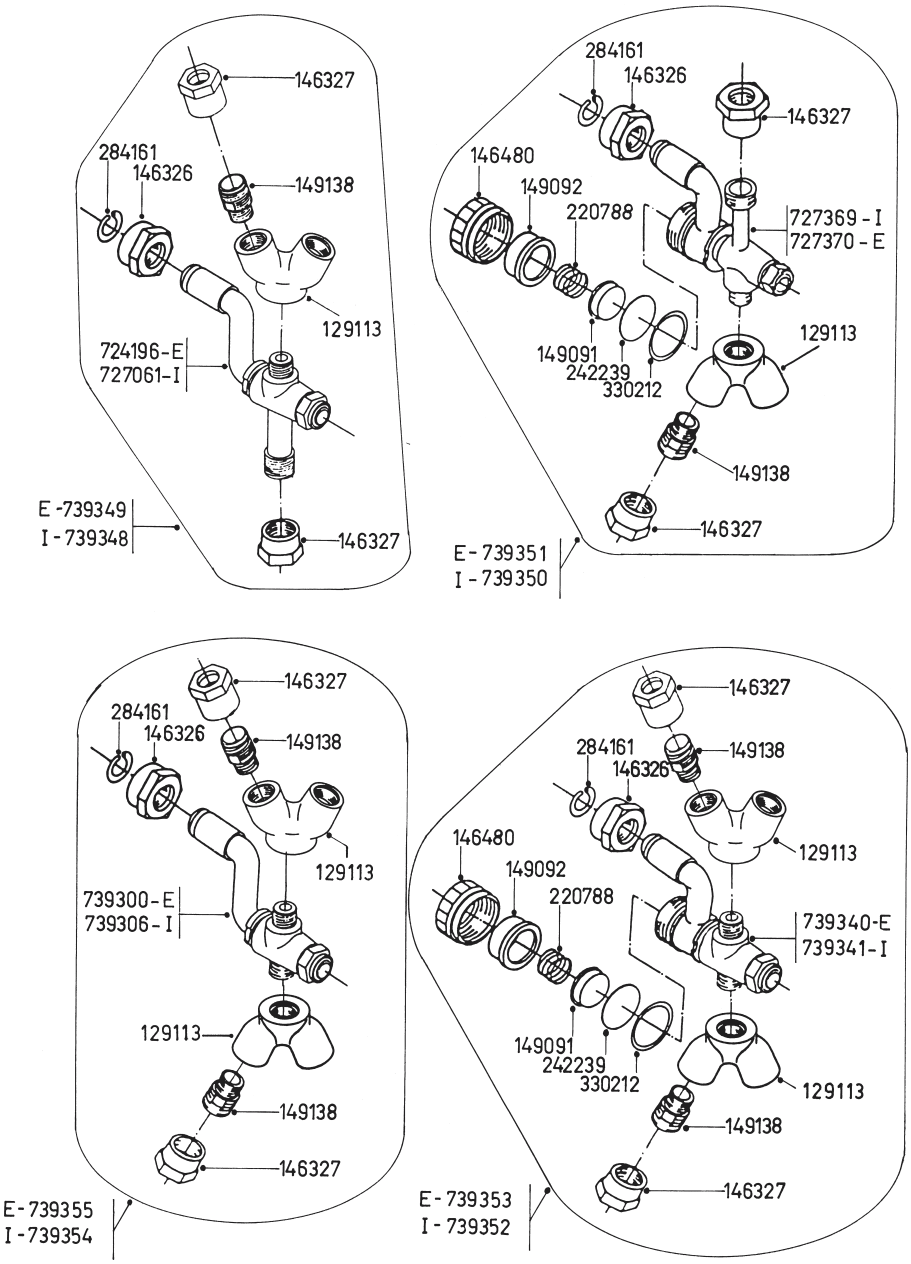




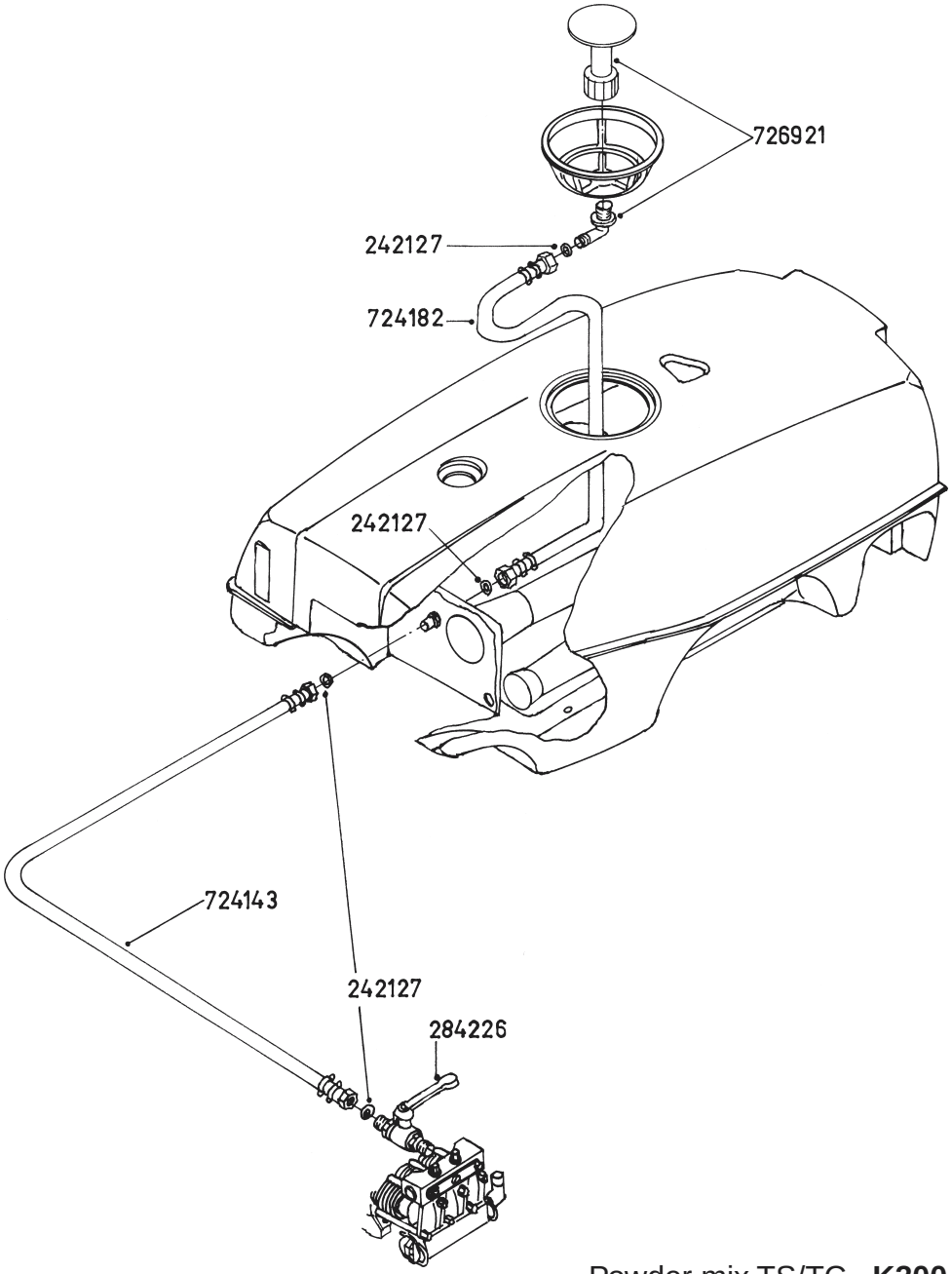
G500 P3N-102Single and double for TE/TEV/TC



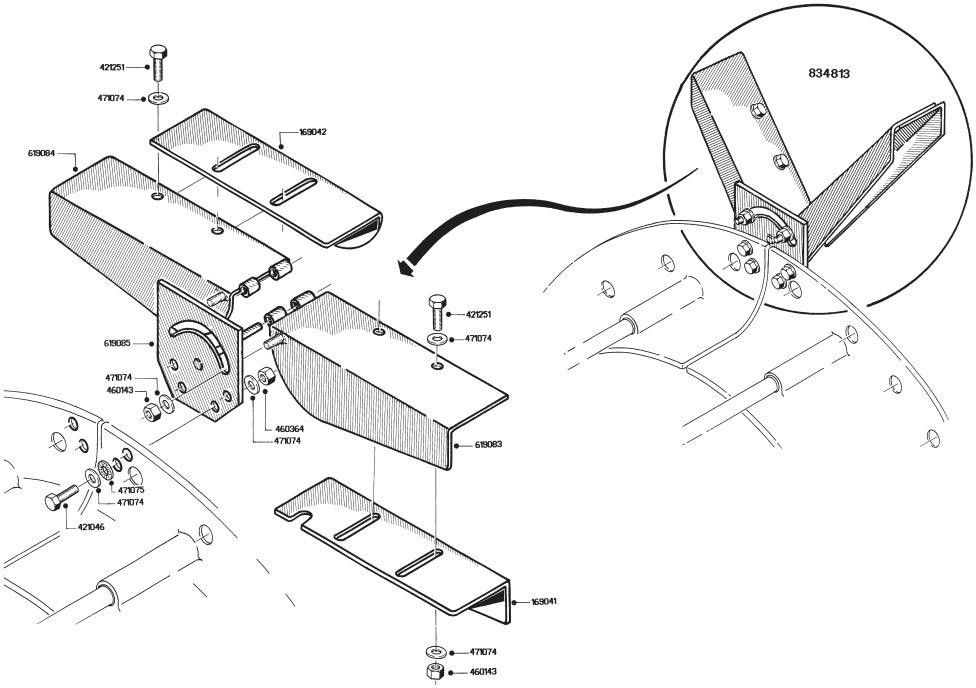
Single and double, adjustable **G501**



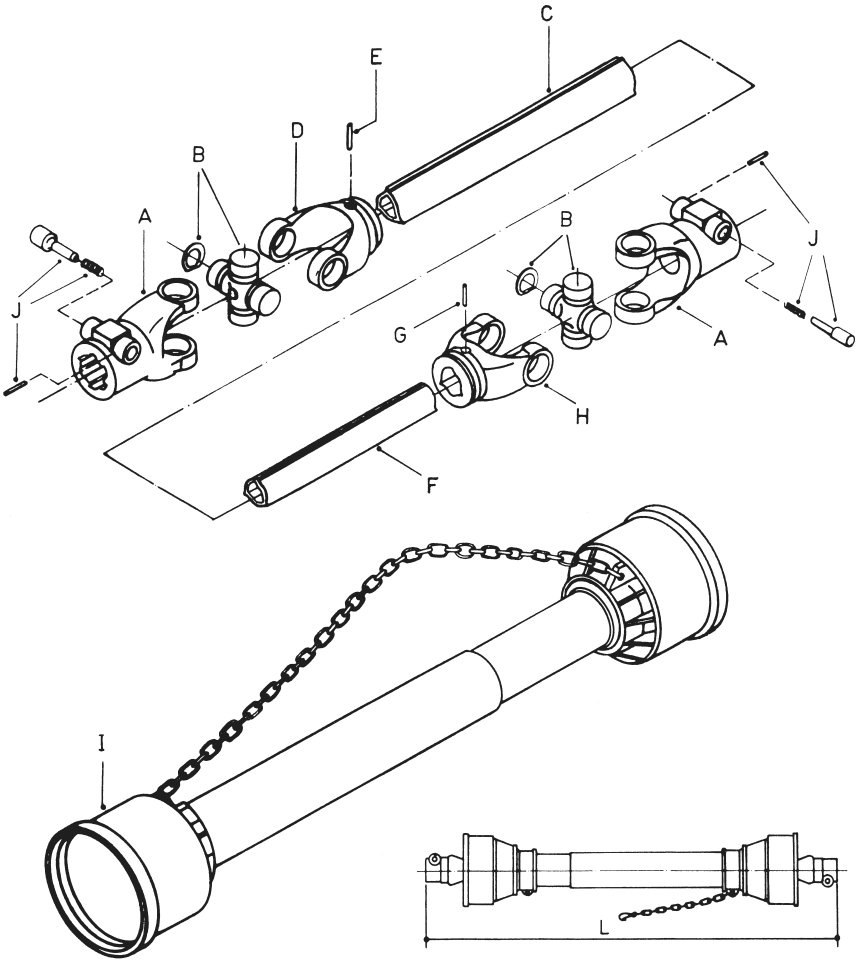
G504 Single and double, Bi-jet



Powder mix TS/TC **K300**

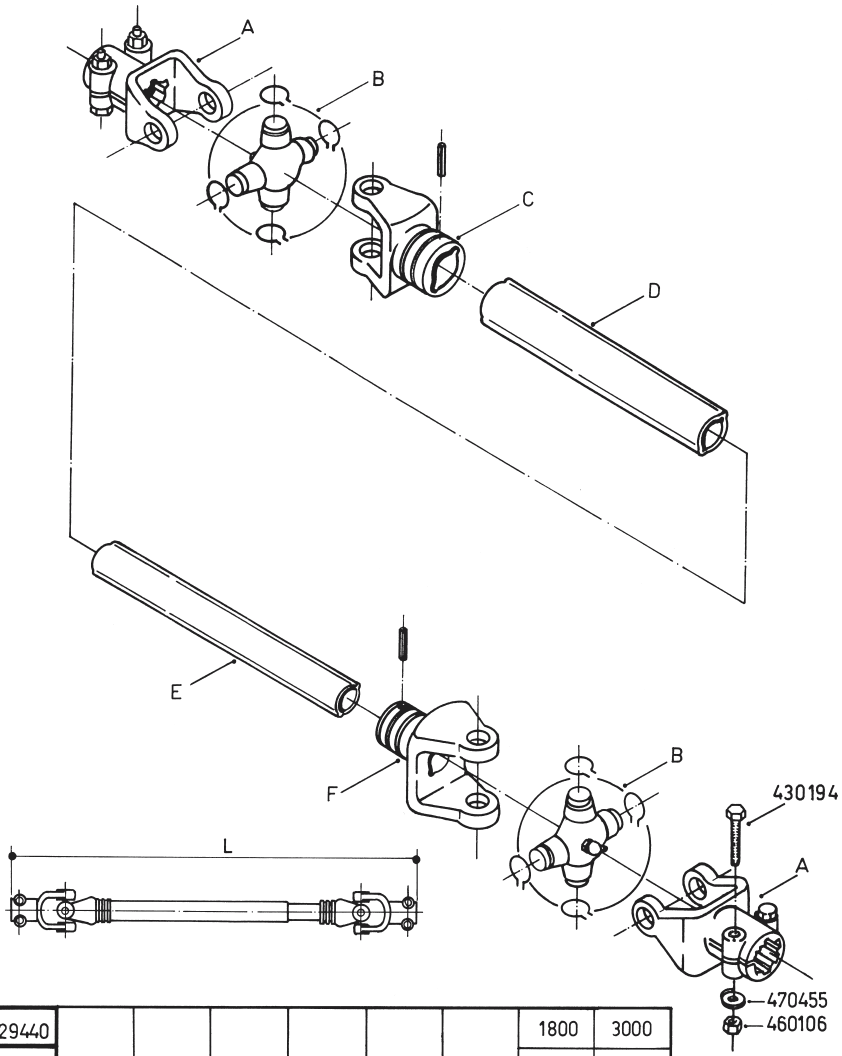


K303 V-Deflector



829445	289041	289045	289025	289037	489007	289029	480740	289033	289050	739052	1000
829446	289040	289044	289024	289036	489005	289028	489004	289032	289049		
829447									289048		850
829448	289039	289043	289023	289035	489004	289027	489003	289031	289047		
829800	289038	289042	289022	289034	489003	289026	489006	289030	289046		750
	A	B	C	D	E	F	G	H	I	J	L (mm)

Heavy-duty shaft **K605**



829440	111543	284159	111541	194276	194277	111542	1800	3000
829438							1500	2000
829437							1250	1500
829436							1050	1000
829435	111540	284160	111545	194278	194279	111544	1000	600/800
	A	B	C	D	E	F	L (mm)	TANK SIZE

K606 Heavy-duty shaft