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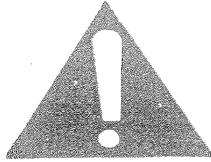
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MISTBLOWER MINI/MAXI OPERATORS MANUAL

1987 EDITION

HI100810

WARNING



ALWAYS READ OPERATORS MANUAL
BEFORE USING EQUIPMENT

DO NOT REMOVE
ANY SAFETY DEVICES OR SHIELDS.
NEVER SERVICE, CLEAN OR REPAIR
A MACHINE WHILE IT IS OPERATING.



ALWAYS WATCH FOR THIS SYMBOL
TO POINT OUT IMPORTANT SAFETY PRECAUTIONS.

IT MEANS ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

HARDI INC.
477 Exeter Road
London, Ont. N6E 2Z3
519-685-6730

HARDI NORTHEAST
108 S. Railroad Ave.
New Holland, PA 17557
717-354-8929

HARDI MIDWEST
302 1st Ave. North
Altoona, IA 50009
515-967-5152

HARDI NORTH CENTRAL
200 West 8th Street
West Fargo, ND 58078
701-282-4381



Dear Owner:

Thank you sincerely for purchasing one of our products and welcome to the ever increasing family of HARDI sprayer owners.

Our sprayers are rapidly becoming a familiar sight on North American farms. We believe that this results from growers becoming increasingly conscious of chemical input costs and the vital need for cost effective chemical application equipment.

Please take the time to thoroughly read the Operator's Manual before using your sprayer. You will find many helpful hints as well as important safety and calibration information.

Some of the features on your HARDI sprayer were suggested by growers. There is no substitute for "on-farm" experience and we invite your comments and suggestions.

Please address your correspondence to:

Product Service Manager
Hardi Inc.
477 Exeter Road
London, Ontario, Canada, N6E 2Z3
(519) 685-6730

Yours truly,

HARDI INC.

A handwritten signature in cursive script that reads "Peter Clausen".

Peter Clausen
President

1. SAFETY INFORMATION



All agricultural chemicals should be handled with care.



We urge you to wear protective clothing such as rubber gloves, goggles, coveralls and respirator. All protective clothing should be kept in excellent condition and cleaned regularly or discarded.



Keep a generous sized container of clean water on or near the sprayer for rinsing hands or face and cleaning nozzles.



Always read the label on the chemical container carefully before use.



Extreme care should be taken in measuring chemicals. Powders should be used in suitable sized packages or accurately weighed. Liquids should be poured into a suitable graduated container.



Empty chemical containers should be rinsed thoroughly. The rinse water should be added to the sprayer tank and the empty container disposed of in accordance with local regulations or bylaws.



To clean spray nozzles, use a soft brush such as a toothbrush. Never attempt to clean by placing nozzle on the lips and blowing.



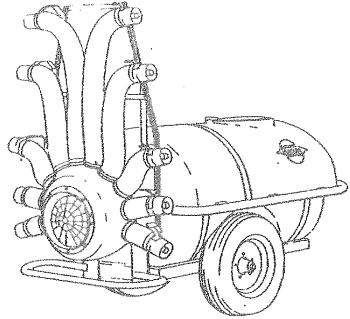
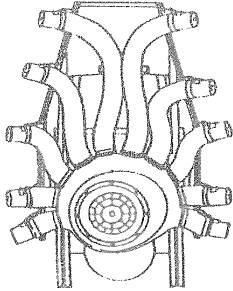
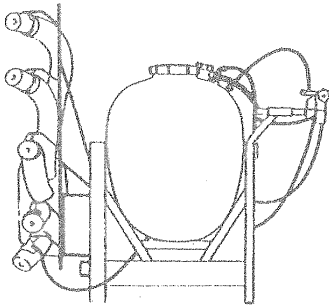
Know the telephone number of your nearest poison control center. Keep a list of all chemicals in use.



Always keep children away from your spraying.

GENERAL INFORMATION - HARDI MISTBLOWERS

MINI 80 AND 105 SPECIAL
MAXI 105, 155 & TR210 SPECIAL



MODEL	TANK CAPACITY	HP	PUMP MODEL	MAX. PSI	MAX. GPM	HITCH
MINI 80	80 US GAL.	20	320	355	13	CAT. I/II
MINI 105	105 US GAL.	20	320	355	13	CAT. I/II
MAXI 105	105 US GAL.	30	1301	210	31	CAT. I/II
MAXI 155	155 US GAL.	35	1301	210	31	CAT. I/II
MAXI TR210	210 US GAL.	35	1301	210	31	TRAILER

COMMON SPECIFICATIONS

1. Four stage fluid filtration.
2. Hydraulic venturi agitation

The HARDI Mini and Maxi range of vineyard and orchard sprayers are designed especially for accurate, economical, efficient chemical application to bush type crops and orchards.

All models feature a unique fan design and turbo fan blower housing with 10 air spout outlets.

The fans are offset to one side of the blower housing to ensure an absolute even discharge of air around the complete circumference of the fan.

GENERAL INFORMATION - HARDI MISTBLOWERS (CONTD.)

Adjustable flexible hoses are connected to the fan housing to ensure accurate direction of the chemical into the crop without wastage.

The ability to accurately control chemical placement combined with proper nozzle selection has led many growers to reduce the number of gallons per acre used versus conventional air blast sprayers. However, due to widely varying factors beyond the control of the manufacturer, it must be clearly understood that SUCH REDUCTIONS ARE SOLELY AT THE DISCRETION OF THE OPERATOR, and Hardi Inc. will accept no responsibility for actual results.

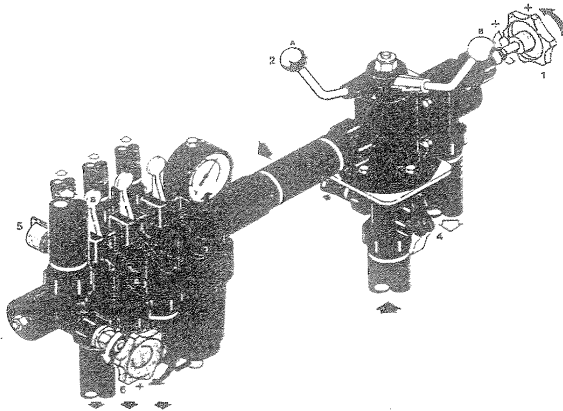
OPERATION AND ADJUSTMENTS - Hookup

1. Attach tractor lower lift arms to sprayer.
2. Attach PTO shaft to tractor.
3. Attach tractor top link.



MAKE ABSOLUTELY CERTAIN THAT ALL CONNECTIONS ARE MADE CORRECTLY AND THAT ALL SAFETY PINS ARE PROPERLY IN PLACE.

4. Raise sprayer with tractor 3 point linkage to normal working height. Check that tank is level both fore and aft and left to right.
5. Half fill tank with water.



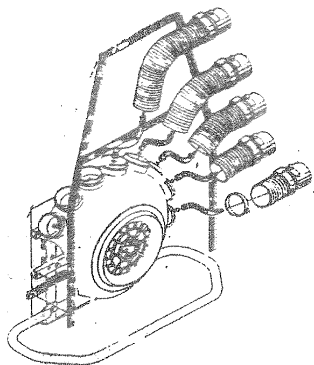
- a) Open agitator tap (4).
- b) Turn main ON/OFF control handle (a) to position (2) ON.
- c) Place the 2 boom control levers (b) in the horizontal position (a) ON.
- d) Start the tractor engine, make sure the transmission is in neutral, adjust engine speed to desired spraying speed.
- e) Turn pressure adjusting knob (1) in or out to give desired pressure gauge reading.

f) Adjust constant pressure valves as follows (note that Mini & Maxi sprayers have only 2 constant pressure valves, not 3 as shown).

- Place one of the two boom control levers (b) in the vertical position (b) OFF.
- Turn the small red adjusting knob (5) in or out to bring the pressure gauge reading back to the original setting.
- Place that same boom control level (b) in the horizontal position (a) ON and adjust the second constant pressure valve using the same procedure outlined above.

Note that this operation will result in the sprayer maintaining the original pressure setting regardless of the fact that you might shut off the chemical to one side of the blower. Constant pressure adjustment should be repeated if spray tips or pressure setting is changed.

6. Nozzle spout adjustment:

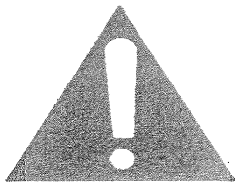


1. Drive into the rows of the orchard/vineyard to be sprayed. Stop and ensure the sprayer is set correctly on the tractor 3 point hitch.
2. Take note of the spray target area. Adjust the flexible hoses in the location track so that even penetration of the target area is accomplished.

Some chemical suppliers and educational institutions will recommend a greater concentration of air/chemical mix into specific portions of the target area. This is easily accomplished by further adjustment of the flexible hoses. Start the sprayer and check that material distribution is as desired.

IT IS VERY IMPORTANT THAT:

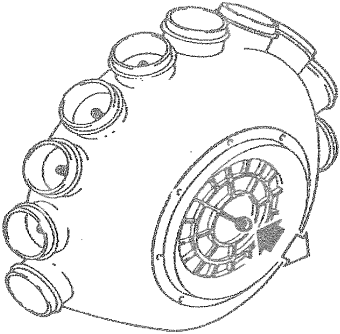
- A) YOU USE WATER WHEN ADJUSTING SPRAYER.
- B) FINAL FLEXIBLE HOSE SETTING RESULTS IN CHEMICAL ONLY BEING DIRECTED AT TARGET AREA.



ALWAYS WEAR APPROVED PROTECTIVE CLOTHING WHEN HANDLING CHEMICALS OR OPERATING SPRAYER.

OPERATION AND ADJUSTMENTS - Hookup (contd.)

7. Fan-clutch engagement/disengagement:



The fan drive may be disengaged for handgun operation or in transit agitation by pulling the black knob out.

Re-engagement by pushing the black knob in.

UNDER NO CIRCUMSTANCES SHOULD YOU ENGAGE OR DISENGAGE THE BLOWER FAN WITH THE SPRAYER RUNNING.



OPERATION AND ADJUSTMENTS - Nozzle Selection

One of the most important aspects of any spraying program is CORRECT NOZZLE SELECTION. Thousands of dollars can be saved by correct nozzle selection, or lost by not taking time or making the effort to ensure that the correct nozzles are used.

Sprayers are supplied with the following nozzles as standard from the factory:

Mini Special 80 & 105 - 1999-10 ceramic nozzles (Order No. 370985) and grey swirls, which will provide an application rate in the range of 60 GPA based on 12' row spacing at 2 MPH and 85 PSI.

Maxi Special 105, 155 & TR210 - 1999-16 ceramic nozzles (Order No. 371011) and grey swirls, which will provide an application rate in the range of 60 GPA based on 16' row spacing at 3 MPH and 140 PSI.

ACTUAL NOZZLE SELECTION

1. Know your row spacing - example 12'.
2. Know your desired gallons per acre (GPA) application rate - example 60 GPA.
3. Know your desired forward speed - example 2 MPH.
4. Multiply GPA x MPH x row spacing and divide by 495 = total GPM required.

$$\text{EXAMPLE: } 60 \text{ GPA} \times 2 \text{ MPH} \times 12' = .29 \text{ GPM}$$

495

5. Each Mini & Maxi sprayer has a 10 nozzle manifold. PROVIDED all 10 nozzles are to be used in this example, you will require 10 of .29 GPM nozzles.
6. Turn to the Nozzle Selection Chart and identify the nozzle/swirl combination which will give you .29 GPM at the lowest available pressure setting. Obviously, if your requirements differ from our example, you would simply change the factors noted in 1, 2, and 3 accordingly. After completing this exercise, IT IS MOST IMPORTANT THAT YOU PROPERLY CALIBRATE YOUR SPRAYER BEFORE APPLYING CHEMICAL as described in the calibration section of the manual.

HARDI DISC - SWIRL NOZZLES

(Orifice disc is made of ceramic material. Swirl is made of long life acetal.)

All gallons per minute and litres per minute application rates shown are based on using WATER. Please note "weight of solution chart" in calibration section for other material weight conversion factors.

APPLICATION RATES WITH 370156 - BLUE SWIRL

LPM = Litres per Minute

GPM = US Gallons per Minute

NOZZLE		14.5	29	43.5	72.5	87	145	218	362
		PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
1999-08	GPM	0.06	0.08	0.10	0.13	0.14	0.18	0.22	0.29
370974	LPM	0.22	0.31	0.38	0.49	0.54	0.70	0.85	1.09
1999-10	GPM	0.07	0.09	0.12	0.15	0.16	0.21	0.26	0.33
370985	LPM	0.25	0.36	0.44	0.57	0.62	0.81	0.99	1.27
1999-12	GPM	0.08	0.11	0.13	0.17	0.18	0.23	0.29	0.37
370996	LPM	0.28	0.40	0.49	0.63	0.69	0.89	1.09	1.41
1999-14	GPM	0.08	0.11	0.14	0.18	0.20	0.25	0.31	0.40
371007	LPM	0.30	0.43	0.53	0.68	0.74	0.96	1.18	1.52
1999-16	GPM	0.09	0.12	0.15	0.19	0.21	0.27	0.34	0.43
371011	LPM	0.32	0.46	0.56	0.73	0.80	1.03	1.26	1.63
1999-18	GPM	0.09	0.13	0.16	0.21	0.22	0.29	0.36	0.46
371022	LPM	0.35	0.49	0.60	0.77	0.85	1.10	1.34	1.73
1999-20	GPM	0.10	0.14	0.18	0.23	0.25	0.32	0.39	0.51
371033	LPM	0.39	0.54	0.66	0.85	0.93	1.21	1.48	1.91

HARDI DISC - SWIRL NOZZLES

(Orifice disc is made of ceramic material. Swirl is made of long life acetal.)

All gallons per minute and litres per minute application rates shown are based on using WATER. Please note "weight of solution chart" in calibration section for other material weight conversion factors.

APPLICATION RATES WITH 370145 - BLACK SWIRL

LPM = Litres per Minute

GPM = US Gallons per Minute

NOZZLE		14.5 PSI	29 PSI	43.5 PSI	72.5 PSI	87 PSI	145 PSI	218 PSI	362 PSI
1999-08	GPM	-	0.14	0.17	0.22	0.24	0.31	0.37	0.48
370974	LPM	-	0.52	0.63	0.82	0.90	1.16	1.42	1.84
1999-10	GPM	-	0.17	0.21	0.27	0.30	0.38	0.47	0.60
370985	LPM	-	0.65	0.80	1.03	1.12	1.45	1.78	2.30
1999-12	GPM	0.16	0.22	0.28	0.36	0.39	0.50	0.62	0.80
370996	LPM	0.60	0.85	1.04	1.35	1.47	1.90	2.33	3.01
1999-14	GPM	0.19	0.27	0.33	0.43	0.47	0.61	0.75	0.97
371007	LPM	0.73	1.04	1.28	1.65	1.80	2.33	2.85	3.68
1999-16	GPM	0.22	0.32	0.39	0.50	0.55	0.70	0.86	1.12
371011	LPM	0.85	1.20	1.47	1.89	2.08	2.68	3.28	4.24
1999-18	GPM	0.27	0.38	0.46	0.60	0.65	0.84	1.03	1.33
371022	LPM	1.01	1.43	1.75	2.27	2.48	3.20	3.92	5.06
1999-20	GPM	0.30	0.42	0.52	0.66	0.73	0.94	1.15	1.49
371033	LPM	1.13	1.60	1.96	2.53	2.77	3.57	4.38	5.65
1999-24	GPM	0.35	0.50	0.61	0.79	0.87	1.12	1.37	1.77
371044	LPM	1.34	1.90	2.32	3.00	3.28	4.24	5.19	6.69
1999-30	GPM	0.45	0.63	0.77	1.00	1.09	1.41	1.73	2.33
371055	LPM	1.69	2.40	2.94	3.79	4.16	5.38	6.57	8.48
1999-35	GPM	0.49	0.70	0.85	1.10	1.20	1.55	1.91	2.46
371066	LPM	1.87	2.65	3.24	4.17	4.58	5.90	7.24	9.37

HARDI DISC - SWIRL NOZZLES

(Orifice disc is made of ceramic material. Swirl is made of long life acetal.)

All gallons per minute and litres per minute application rates shown are based on using WATER. Please note "weight of solution chart" in calibration section for other material weight conversion factors.

APPLICATION RATES WITH 370134 - GREY SWIRL

LPM = Litres per Minute

GPM = US Gallons per Minute

NOZZLE		14.5 PSI	29 PSI	43.5 PSI	72.5 PSI	87 PSI	145 PSI	218 PSI	362 PSI
1999-08	GPM	-	0.13	0.16	0.21	0.22	0.29	0.36	0.46
370974	LPM	-	0.49	0.60	0.77	0.85	1.10	1.34	1.73
1999-10	GPM	-	0.16	0.20	0.25	0.28	0.36	0.44	0.57
370985	LPM	-	0.61	0.75	0.96	1.06	1.36	1.67	2.16
1999-12	GPM	0.14	0.20	0.25	0.32	0.35	0.45	0.56	0.72
370996	LPM	0.54	0.77	0.94	1.22	1.33	1.72	2.11	2.72
1999-14	GPM	0.17	0.24	0.30	0.38	0.42	0.54	0.66	0.85
371007	LPM	0.65	0.92	1.12	1.45	1.59	2.06	2.52	3.26
1999-16	GPM	0.19	0.27	0.33	0.43	0.47	0.61	0.75	0.97
371011	LPM	0.73	1.04	1.28	1.65	1.80	2.33	2.85	3.68
1999-18	GPM	0.23	0.33	0.40	0.52	0.57	0.74	0.90	1.17
371022	LPM	0.88	1.25	1.53	1.98	2.16	2.80	3.42	4.42
1999-20	GPM	0.25	0.35	0.43	0.56	0.61	0.79	0.97	1.25
371033	LPM	0.95	1.34	1.64	2.12	2.32	3.00	3.67	4.74
1999-24	GPM	0.30	0.42	0.52	0.66	0.73	0.94	1.15	1.49
371044	LPM	1.13	1.60	1.96	2.53	2.77	3.57	4.38	5.65
1999-30	GPM	0.37	0.53	0.65	0.84	0.92	1.18	1.45	1.87
371055	LPM	1.41	2.00	2.45	3.16	3.46	4.48	5.48	7.07
1999-35	GPM	0.40	0.57	0.69	0.89	0.98	1.26	1.55	2.00
371066	LPM	1.52	2.15	2.63	3.40	3.72	4.80	5.88	7.60

HARDI DISC - SWIRL NOZZLES

(Orifice disc is made of ceramic material. Swirl is made of long life acetel.)

All gallons per minute and litres per minute application rates shown are based on using WATER. Please note "weight of solution chart" in calibration section for other material weight conversion factors.

APPLICATION RATES WITH 370167 - WHITE SWIRL

LPM = Litres per Minute

GPM = US Gallons per Minute

NOZZLE		14.5	29	43.5	72.5	87	145	218	362
		PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
1999-08	GPM	0.13	0.19	0.23	0.30	0.33	0.42	0.52	0.67
370974	LPM	0.51	0.72	0.88	1.14	1.25	1.61	1.97	2.54
1999-10	GPM	0.17	0.23	0.29	0.37	0.40	0.52	0.64	0.83
370985	LPM	0.62	0.88	1.08	1.39	1.52	1.97	2.41	3.11
1999-12	GPM	0.27	0.38	0.46	0.60	0.65	0.84	1.03	1.33
370996	LPM	1.01	1.43	1.75	2.27	2.48	3.20	3.92	5.06
1999-14	GPM	0.35	0.50	0.61	0.78	0.86	1.11	1.36	1.75
371007	LPM	1.33	1.88	2.30	2.97	3.25	4.20	5.15	6.64
1999-16	GPM	0.40	0.57	0.69	0.89	0.98	1.26	1.55	2.00
371011	LPM	1.52	2.15	2.63	3.40	3.72	4.80	5.88	7.60
1999-18	GPM	0.45	0.63	0.77	1.00	1.09	1.41	1.73	2.23
371022	LPM	1.69	2.40	2.94	3.79	4.16	5.38	6.57	8.48
1999-20	GPM	0.48	0.68	0.83	1.07	1.17	1.51	1.85	2.40
371033	LPM	1.82	2.57	3.15	4.06	4.45	5.75	7.04	9.08
1999-24	GPM	0.54	0.76	0.94	1.21	1.32	1.71	2.09	2.70
371044	LPM	2.05	2.90	3.55	4.59	5.02	6.48	7.94	10.30

OPERATION AND ADJUSTMENTS - Calibration

After the proper size nozzles have been selected and installed, the actual output of the sprayer should be verified by calibration. Calibration should be repeated periodically, especially at the beginning of each season, even though no changes in the setup or operating procedures have been made.

Make a pre-calibration check to be sure that all sprayer parts are free of foreign material and functioning properly. Inspect nozzle tips and internal parts for obvious wear, defects, and proper size and type, and make replacements as necessary. Nozzles of the same number and type which vary more than 10% from the average flow rate for that size should be replaced.

Fill the sprayer tank to overflowing with water, set the pressure and speed you plan to use, and operate the sprayer over a distance which is equivalent to an acre for the swath width you are carrying (half the row width for one side spraying). The distance is 43560 divided by swath width (feet). It may be more practical to use only a fraction of an acre where application rates are high.

After spraying the measured acre with water, return the sprayer to the original position and refill the tank to overflowing, measuring the amount of water required.

If the amount applied is different from the intended rate, make adjustments by changing speed, changing the pressure, or changing nozzles. Generally, if changes in spray volume greater than 50% are necessary, nozzle tips should be changed. Pressure changes to regulate volume should generally be limited to 25% volume change (56% increase or 55% decrease in pressure) due to the effects on drop size and pattern. Repeat the calibration check to make sure that adjustments accomplished the desired results.

BEFORE SPRAYING:

The decision to spray should be made after considering:

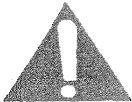
- the degree of infestation;
- official warnings given on radio, television, television information services, and in the press;
- control measures available;
- correct timing;
- any previous experience;
- the possible risk of the pest developing resistance;
- the probable cost benefit of applying the chemical;
- is it safe to spray.

CHECK THE FOLLOWING:

- OPERATOR SAFETY - can a less toxic alternative pesticide be used?
- CONSUMER SAFETY - can the chemical be applied in time to leave the necessary interval before harvest?
- ENVIRONMENTAL SAFETY - can a chemical less likely to affect livestock, bees and wildlife be used?
- SAFETY TO CROPS ON THE TREATED AREA - Is the variety of crop suitable? Is the time of application correct and is the crop healthy and not under stress due to conditions prior to or at the time of spraying?
- SAFETY OF NEIGHBOURING CROPS - Is the chemical one that is least likely to damage crops in neighbouring fields, greenhouses, and private gardens if it should drift?



AFTER SPRAYING



- dispose of empty containers
- dispose of any spray liquid in the tank
- dispose of the tank washings in a safe location away from any possible health or safety hazard

The sprayer should be cleaned immediately after the job is finished and before changing to a different chemical. Leaving the sprayer overnight without washing may cause damage.

Allow the sprayer to drain completely, not forgetting the pump, especially if frost is likely.

A full decontamination procedure must be used when changing from one chemical to another.

OPERATION AND ADJUSTMENT - General Hints and Tips

DECONTAMINATION

A sprayer used for herbicides should not be used to apply an insecticide or fungicide to a crop that is sensitive to herbicides. Minute traces of a herbicide that remain in the tank and hoses after ordinary cleaning can cause damage. If, in an emergency, the herbicide sprayer must be used for apply insecticides or fungicides, decontamination of the equipment will provide some assurance against crop damage. Furthermore, because some fungicides and insecticides are highly poisonous, decontamination is a wise safety precaution.

If a pesticide in emulsion form has been used, flush out the tank and system with clean water. Fill the tank and system with a mixture of household ammonia and hot water (1 gallon to 100 gallons or 1:100). Recirculate the solution throughout the pump for several minutes. Leave the solution in the machine overnight.

Again recirculate the cleaning solution, completely drain the tank and system, rinse thoroughly with clean water, and dry out the tank and other parts of the sprayer.

Alternative Cleaning Solutions Are:

- 2 pounds of baking soda per 100 gallons of water (1 kg per 500 litres). Clean the sprayer in the same manner as described for ammonia.
- 1% solution of commercial activated charcoal. Wash the sprayer for about 2 minutes and rinse thoroughly. This method is fast but expensive.

If a water-soluble herbicide or a wettable powder has been used in the sprayer, flush out the tank and system with clean water. Scrub the tank thoroughly with a detergent solution and run it through the system. Rinse out this solution and use the ammonia or soda treatment previously mentioned.

Hoses can become so saturated with chemicals that they cannot be decontaminated. Use separate handgun hoses for herbicides and for other chemicals and never use these hoses for conveying drinking water.

ON THE DAY OF SPRAYING, The Operator Should:

- Read and understand the safety precautions.
- Wear appropriate protective clothing.
- Ensure correct dose and dilution is used.
- Ensure the correct amount of chemical required for a full tank load is used.
- Check to see that the timing is correct to spray for pests, disease, or weeds.
- Ensure crop stage of growth is correct.
- Ensure ground conditions are satisfactory.
- Ensure washing equipment is available.

FIELD TECHNIQUES

Keep a regular check on nozzle spray patterns throughout spraying. If any fault is seen to be developing, attend to this at the headland.

- a) Always carry spare nozzles of the correct size.
- b) Whenever changing nozzles, wear the protective clothing as shown on the product label.
- c) Never put a nozzle to your lips. Never prod with a wire or pin to clean a blocked nozzle. Faulty nozzle parts should be placed in a watertight container and attended to at the farm.
- d) If there is any delay, agitate the tank contents thoroughly before recommencing spraying.

During spraying, the operator should constantly check and, if necessary, rectify:

- spray pressure
- forward speed / engine speed
- nozzle performance
- drift
- swath matching
- level of spray liquid in the tank



OPERATION AND ADJUSTMENT - General Hints and Tips

PROTECTIVE CLOTHING

Wash impermeable protective clothing, include the inside of rubber gloves, at the end of each day's work and overalls and hoods at least once in every six days of use or more frequently if they become badly contaminated. Respirators and dust masks should be carefully cleaned and dried after each day's work, but water must not be allowed to run into the respirator canister or connecting tube.



Check the condition of protective clothing after use; replace any which is damaged. Rubber gloves in particular should be discarded whenever even very minor damage is evident.

The filter of any respirator/dust mask which has been used for the maximum period recommended by the manufacturer, or which, after careful checking of the facial fit of the mask, permits the operator to smell the chemical, should be replaced.

Store the protective clothing in its own ventilated locker.

ADDING CHEMICAL:

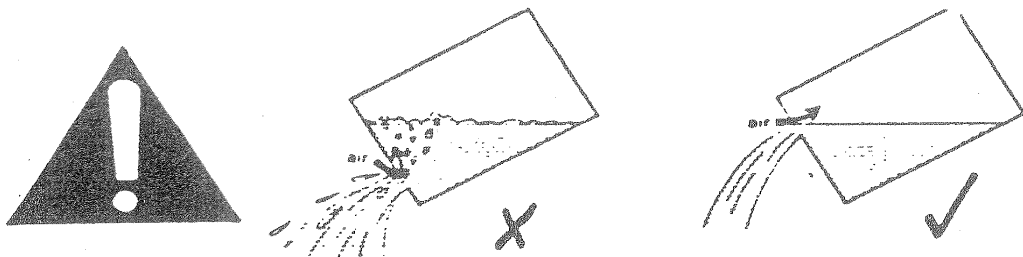
Follow the recommended procedure for mixing. This is important to ensure correct mixing, minimum foaming and avoiding damage to the pump.

Fill part of the tank with clean water through the tank filter to prime the pump before adding any chemical. Never add chemical concentrate to an empty sprayer tank. Take care not to make any direct connections between a domestic water supply and the spray tank, to ensure that there can be no run-back of chemical into the water supply. Start the pump and check that the agitation is working correctly.

ADDING CHEMICAL (contd.)

Measure the calculated amount of chemical. Do not guess the amount. If using more than one material, or adding trace elements or extra wetting agents, do not mix the concentrate together, but add them separately to the water in the tank in the recommended order. Check that they are compatible. With chemicals which are known to foam, fill the tank $\frac{3}{4}$ full with clean water before adding the chemical and adjust agitation for gentle mixing until filling is completed.

Use a chemical filling attachment if fitted to your sprayer. WETT-ABLE POWDERS must be weighed unless in a suitable size pre-weighed pack. The manufacturer's mixing instructions must be followed. LIQUID FORMULATIONS must be measured out unless in containers of appropriate volume. Care should be taken when opening and pouring from cans or bottles that the outlet is in a position to avoid splashing - see illustration.



Wash out used containers and put the washings into the tank.

Fill the tank with water to the required level while agitating the contents. Continue agitating until spraying is finished unless otherwise stated in the instructions. If there is any delay between mixing and spraying, ensure that the tank contents are agitated regularly and especially just prior to use.

Wash any spilt chemicals off sprayer and containers. Any container or tank in which any chemical is stored should be closed or covered over between use. Ensure that children and livestock are unable to reach them.

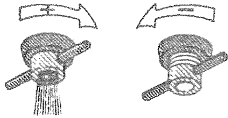
OPERATION AND ADJUSTMENT - General Hints and Tips (Contd)

Wash down any impermeable protective clothing such as rubber boots, gloves, apron or face shields.

Before entering the tractor cab, remove any protective clothing not required by law (other than overalls and rubber boots) and place it in the tractor locker, not in the tractor cab.



1. TANK DRAINAGE:



Accomplished by turning the valve on the bottom of the tank in a CLOCKWISE direction. Do not forget to close after drainage.

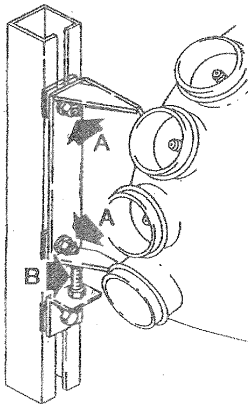
2. FILTER MAINTENANCE:

Every Mini and Maxi sprayer has a 4 stage filtration system.

- a) Tank fill opening filter basket - located under tank lid.
- b) Suction line filter - located in tank under large red cap immediately adjacent to tank fill opening.
- c) Pressure line filter - located immediately under pressure gauge on control unit.
- d) Nozzle body filters - located in each nozzle body next to spray tip.

These filters will require regular attention if the sprayer is to keep operating at optimum performance levels and should be inspected at least once daily and cleaned if necessary. DO NOT USE SHARP OBJECTS TO CLEAN FILTERS. As a general rule, when any variation is noticed to sprayer pressure during operation, partially or totally blocked filters are the most likely cause.

3. FAN DRIVE BELT TENSION

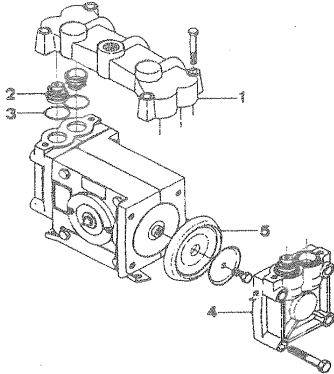


1. Loosen bolts (A).
2. Adjust tension with push bolt (B).
3. Retighten location bolts (A). Belt tension should be just tight enough so that belts are not slipping. To check, stop tractor engine, place hand on belt pulleys. If extremely warm, tighten belts. This check should be made daily.

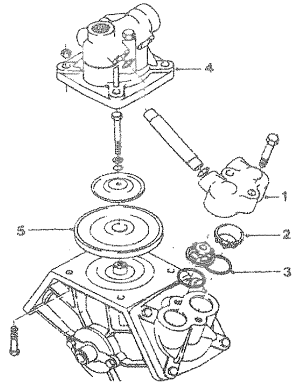
MAINTENANCE

4. PUMP OVERHAUL

320 Pump used on Mini Special 80 and 105



1301 Pump used on Maxi Special 105, 155 and TR210



1. Remove valve chamber (1).
2. Check and note location of valves (2) in order to ensure correct replacement during reassembly.
3. Remove diaphragm cover (4).
4. If liquid has entered the pump crankcase below the diaphragm, be sure to clean all components carefully with a suitable cleaning solvent, then repack bearings with a No. 2 consistency lithium based grease.
5. Reassemble in reverse order making sure to install new O-rings (3) as well as other new parts required.

Pre-Packaged pump overhaul kits containing diaphragms, O-rings and valves are available under the following part numbers. Contact your HARDI dealer for availability.

1301 Pump - 750175

5. PULSATION DAMPER ADJUSTMENT

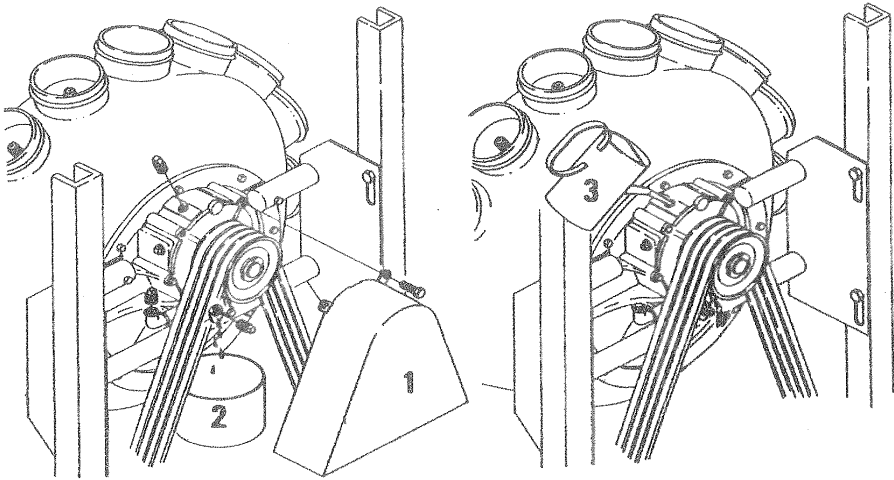
To ensure the smoothest possible diaphragm pump operation, it is very important that the air pressure inside the pulsation damper of the pump is adjusted within the following limits.

This adjustment is very simple and only requires a regular tire inflation air line and hand-operated tire pump according to the following chart.

5. PULSATION DAMPER ADJUSTMENT (contd.)

OPERATING SPRAYER PRESSURE (PSI)	REQUIRED PULSATION DAMPER PRESSURE (PSI)
20-40	0-14
40-210	14-42
210-350	42-56

6. TRANSMISSION OIL



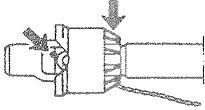
1. Remove safety shield (1).
2. To check oil level, remove oil plug (4).
3. To change oil, remove drain plug (5) and drain into suitable receptacle. (2).
4. When finished draining, reinstall drain plug (5), remove level plug (4), and fill plug (6).

Fill transmission with SAE90 gear oil until oil begins to run out of level plug (4). Replace fill plug and level plug. Oil should be changed once each year and level should be checked weekly.

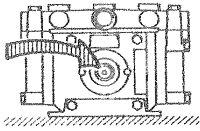
MAINTENANCE

LUBRICATION CHART

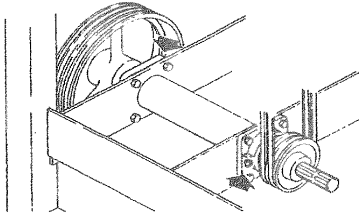
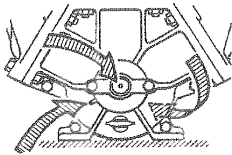
After every 12 hours of operation, grease the following with a good quality lithium grease:



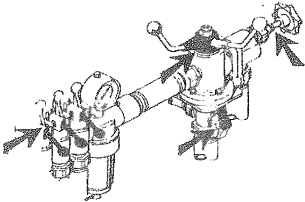
PTO SHAFT YOKE BEARINGS AND SHIELD
Be careful not to overgrease and ruin bearing seals.



PUMPS
Grease once every 100 hours. Again, be careful not to overgrease.



FAN DRIVE SHAFT - As PTO shaft



BK180 CONTROLS - Lubricate all moving parts with oil once weekly.

5. TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REPAIR
Less output from some nozzles	<ul style="list-style-type: none"> - Nozzle filters starting to plug - Mismatched nozzles - Nozzles worn 	<ul style="list-style-type: none"> - Clean filters. - Check nozzle numbers. - Check output from each nozzle. Replace if worn.
Poor agitation	<ul style="list-style-type: none"> - Agitator valve off - Inadequate pump size - Nozzle size too large - Agitator nozzles plugged 	<ul style="list-style-type: none"> - Ensure valve fully on. - Fit larger pump. - Fit smaller nozzles. - Clear nozzles.
Pressure gradually increasing	<ul style="list-style-type: none"> - Nozzle filters plugging 	<ul style="list-style-type: none"> - Clean filters
Spray angle too narrow	<ul style="list-style-type: none"> - Pressure too low - Nozzle partially plugged 	<ul style="list-style-type: none"> - Increase pressure and recalibrate. - Clear nozzles
Too much wind drift	<ul style="list-style-type: none"> - Pressure too high - Boom too high 	<ul style="list-style-type: none"> - Decrease pressure and recalibrate. - See boom height, page

5. TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REPAIR
No spray when spray is turned on	- Air leaks	- Check top draw suction hose for loose clamps, etc.
	- Air in system	- Remove hose between pump & control - fill with water to prime.
	- Suction or nozzle filter plugged	- Clean filters.
	- Tank outlet plugged	- Clear outlet
	- Faulty pump system	- See pump repair, page
Pressure dropping	- Filter beginning to plug	- Clean filters.
	- Nozzles wearing out	- Replace nozzles.
	- Dirty water supply	- Use clean water. - Ensure there is a screen on suction hose of filling pump.
	- Tank is airtight	- Clean tank vent.
	- Faulty pump	- See pump repair, page

5. TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REPAIR
Excessive vibration in hoses	<ul style="list-style-type: none"> - Pulsation damper not pressurized - Valve installed incorrectly - Valve leaking 	<ul style="list-style-type: none"> - See pulsation damper, page - See pump repair, page - See pump repair, page
Liquid leaks from bottom of pump	- Damaged diaphragm	- STOP immediately and replace diaphragm. See pump repair, page
Coarse foam in tank	<ul style="list-style-type: none"> - Return pipe above level of liquid. - Over-vigorous agitation during filling 	<ul style="list-style-type: none"> - Extend return pipe down to bottom of tank. - Fill sprayer with care.
Fine foam in tank,	- Air leading into suction side of pump or into pump itself.	-Locate and stop air leak.

WINTER STORAGE

1. Thoroughly clean sprayer system.
2. Wash off outside of sprayer.
3. Lubricate sprayer.
4. Carefully inspect sprayer for any damaged components or worn hoses.
5. Apply touch-up paint where necessary.
6. Drain as much water as possible from sprayer. Pour in a mixture of ethylene glycol base anti-freeze and water at the ratio for the desired temperature protection. (Volume of anti-freeze should be about 1% of tank volume.) Run the sprayer and circulate the anti-freeze. Briefly turn on the boom until anti-freeze begins to spray through the nozzles. Shut off sprayer leaving anti-freeze in the pump, controls and boom lines.



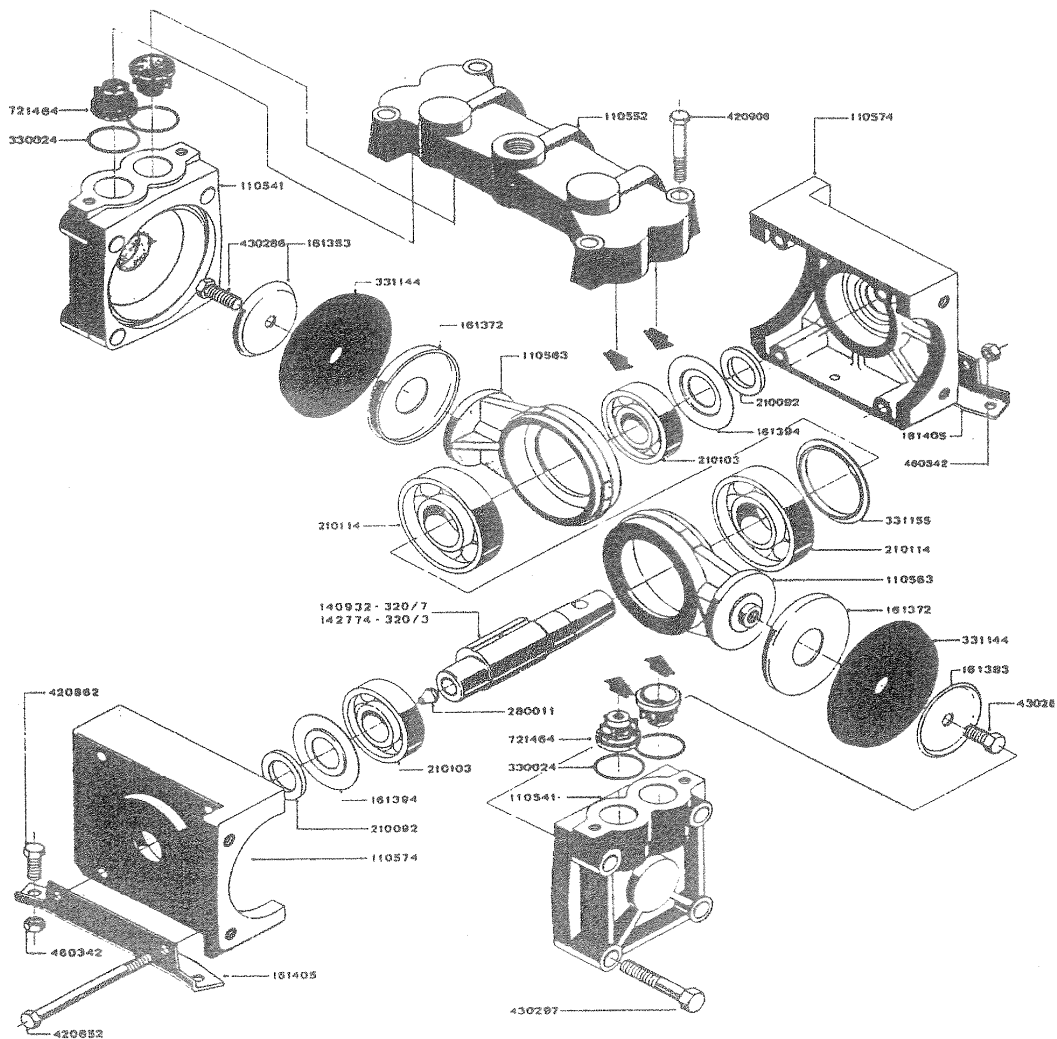
Never use oil, diesel fuel or alcohol based anti-freeze in a sprayer.

7. Remove nozzles and screens. Clean and store in a safe, dry location.
8. Turn pressure regulator valve counter-clockwise until all spring tension is released. Turn boom section valves OFF.
9. Store sprayer in safe, dry location, away from children and animals. Protect from direct sunlight.

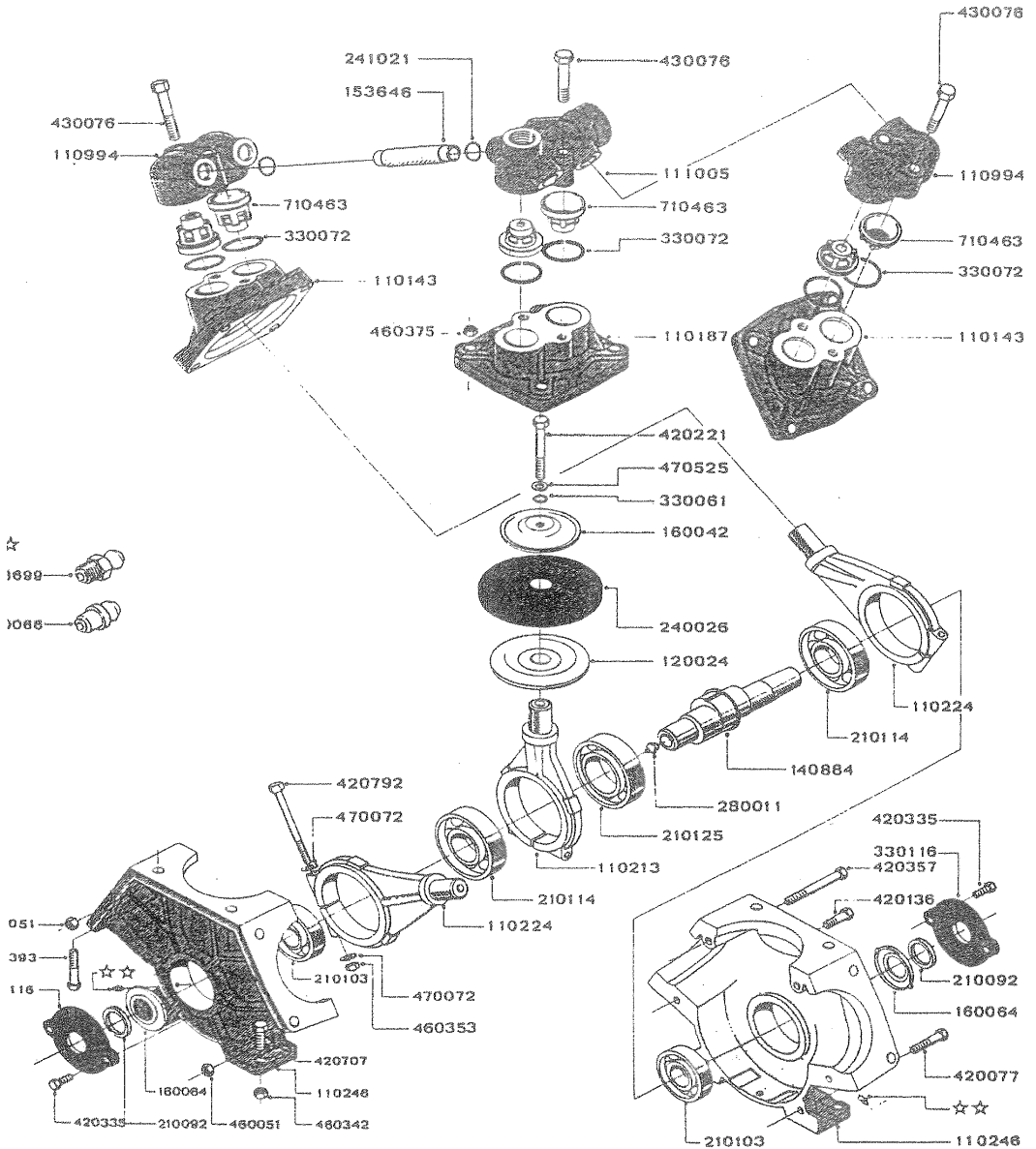
MISTBLOWER ACCESSORIES

ACCESSORY	DESCRIPTION	WEIGHT	ORDER NO.
HOSE WRAP	Capacity: 25' of 3/8" hose	5	101790
HANDGUN	Trigger operated handgun c/w 25' of 3/8" hose and connectors.	14	18090
CABLE OPERATED REMOTE CONTROL	Main on/off for in cab convenience.	5	833567
CLEAN WATER DISPENSER	For rinsing hands and nozzles	15 +	722072 + mtg brk
		10	722057
RAPID REFILL	Use sprayer pump to refill tank from pond or other water source C/W 16' suction hose.	43	841689
SELF CLEANING FILTER	Practically eliminates nozzle plugging.	20	845187

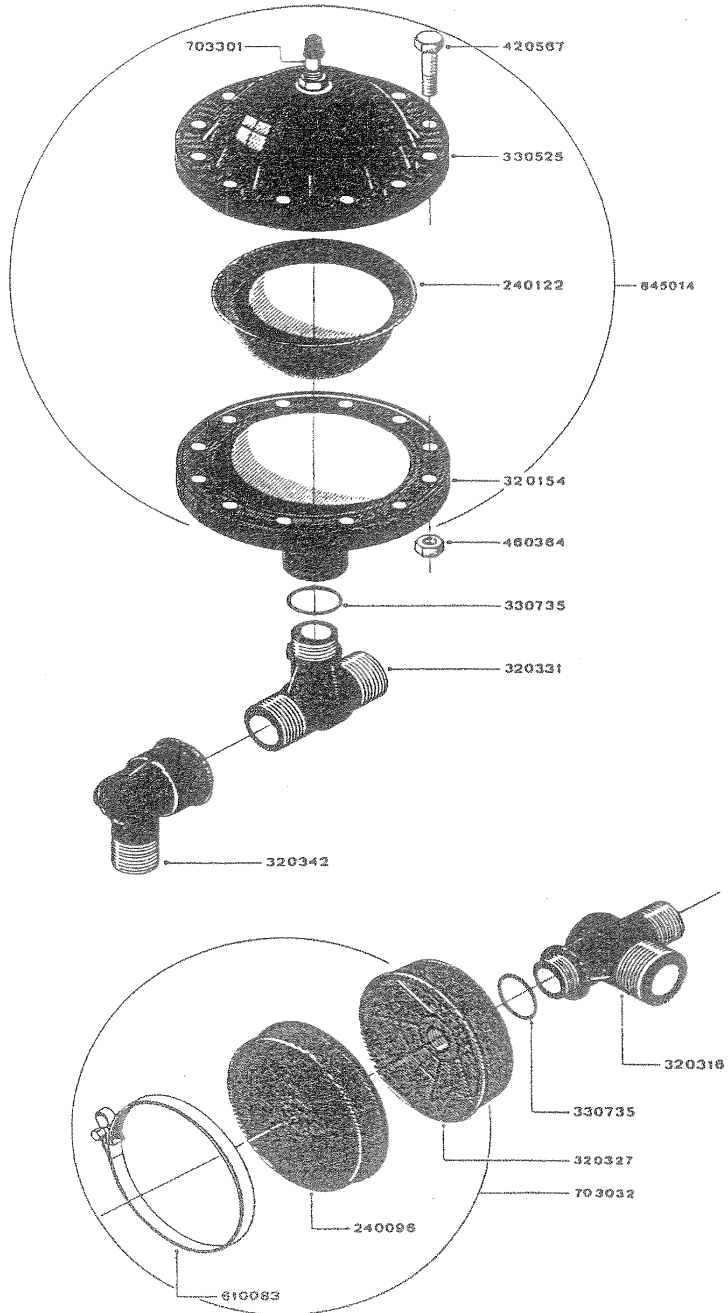
320 PUMP



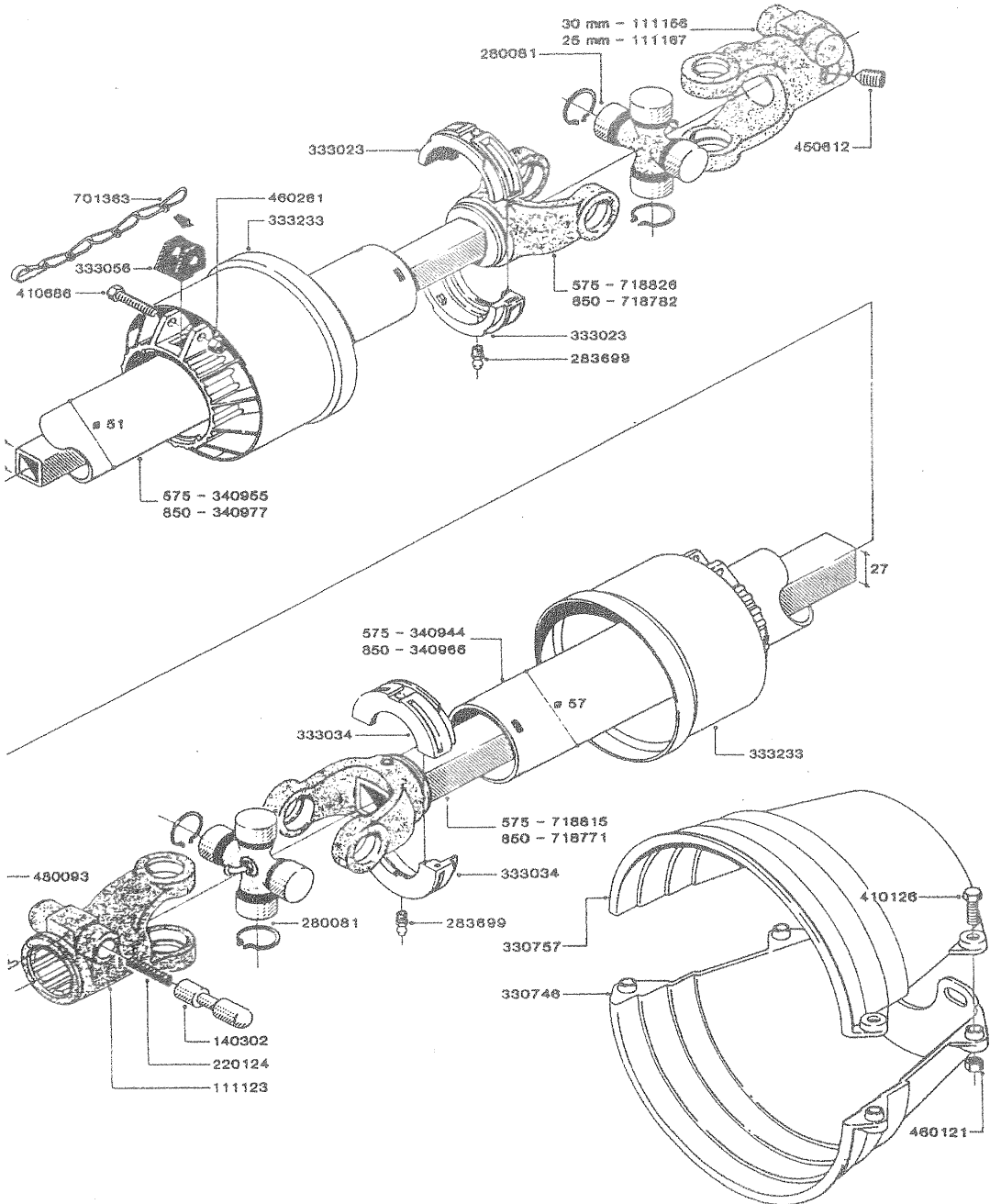
1301 PUMP ASSEMBLY



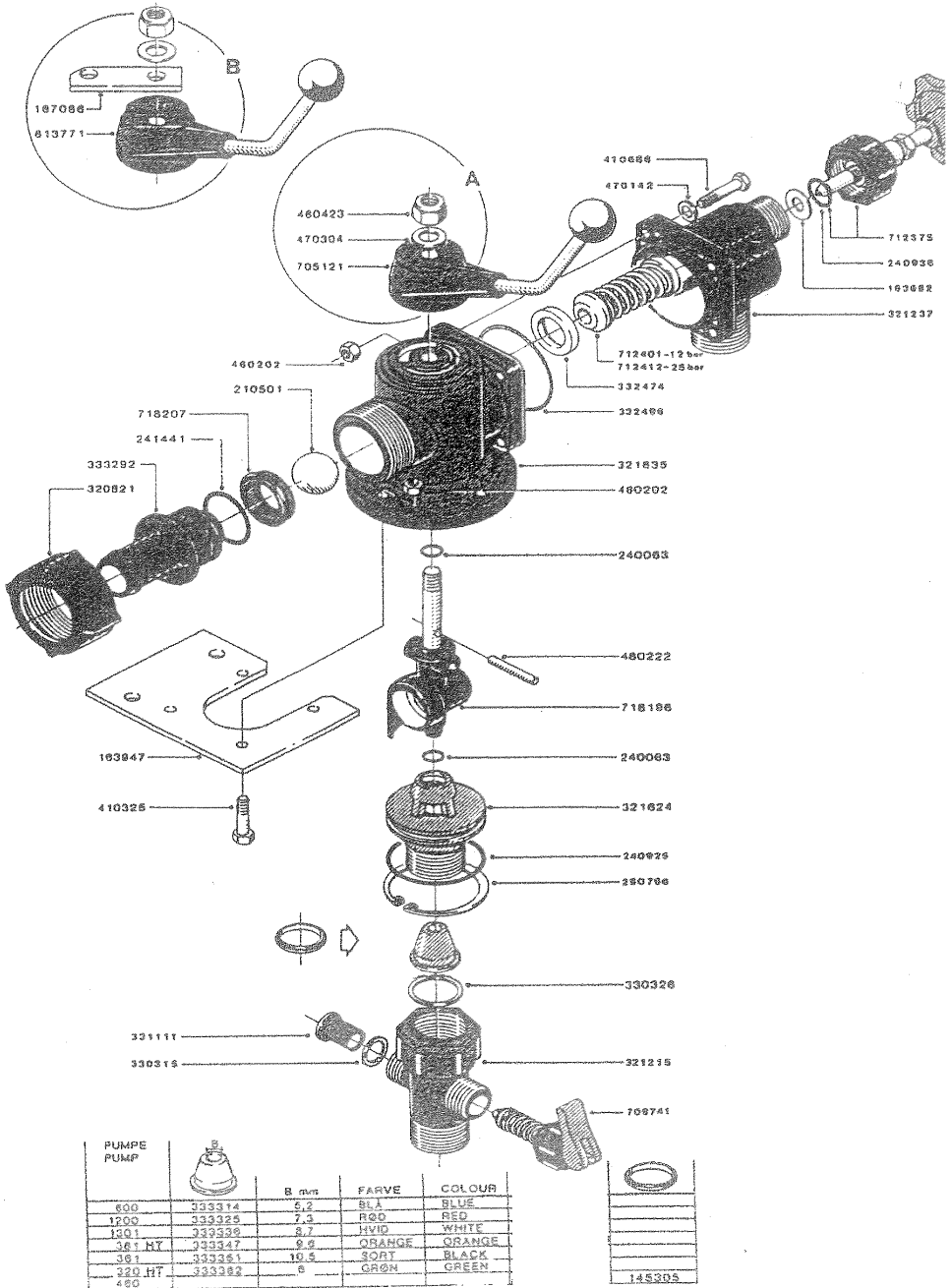
PULSATION DAMPER ASSEMBLY (PRESSURE AND SUCTION)




PTO SHAFT ASSEMBLY

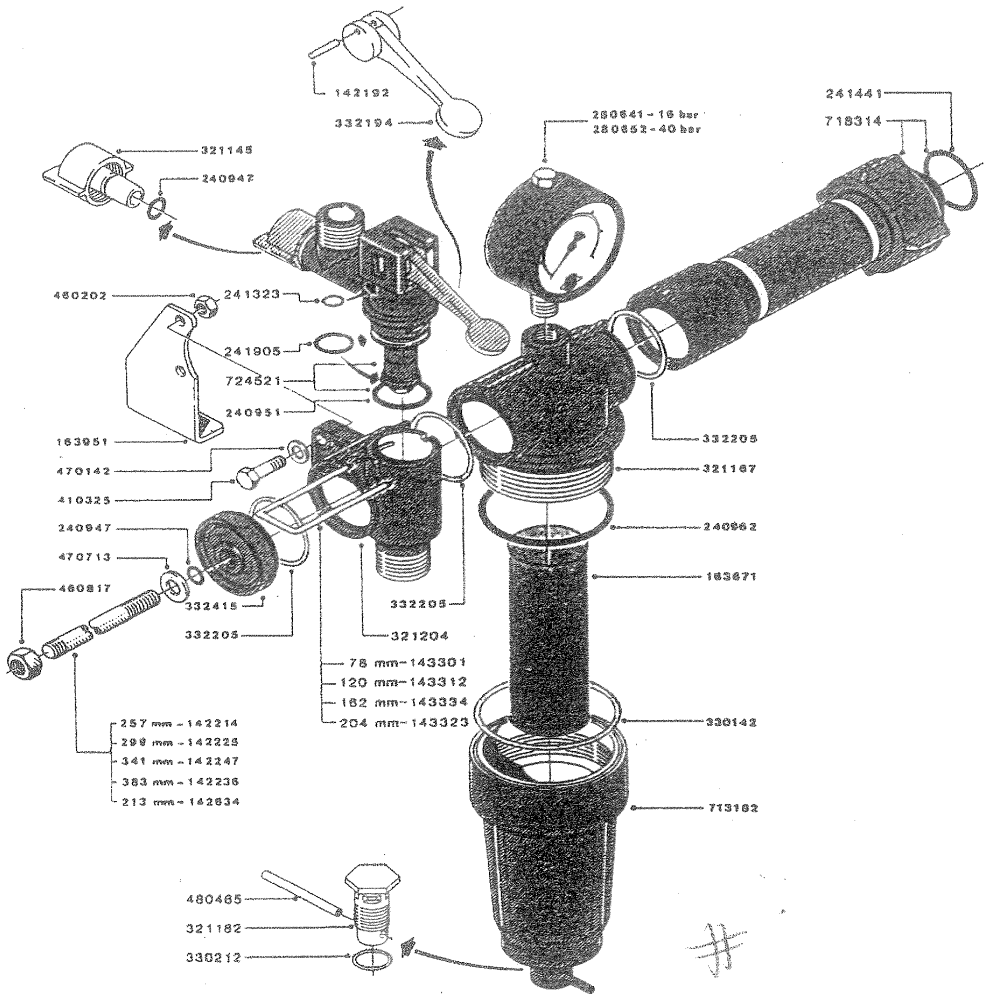


BK 180 CONTROL ASSEMBLY



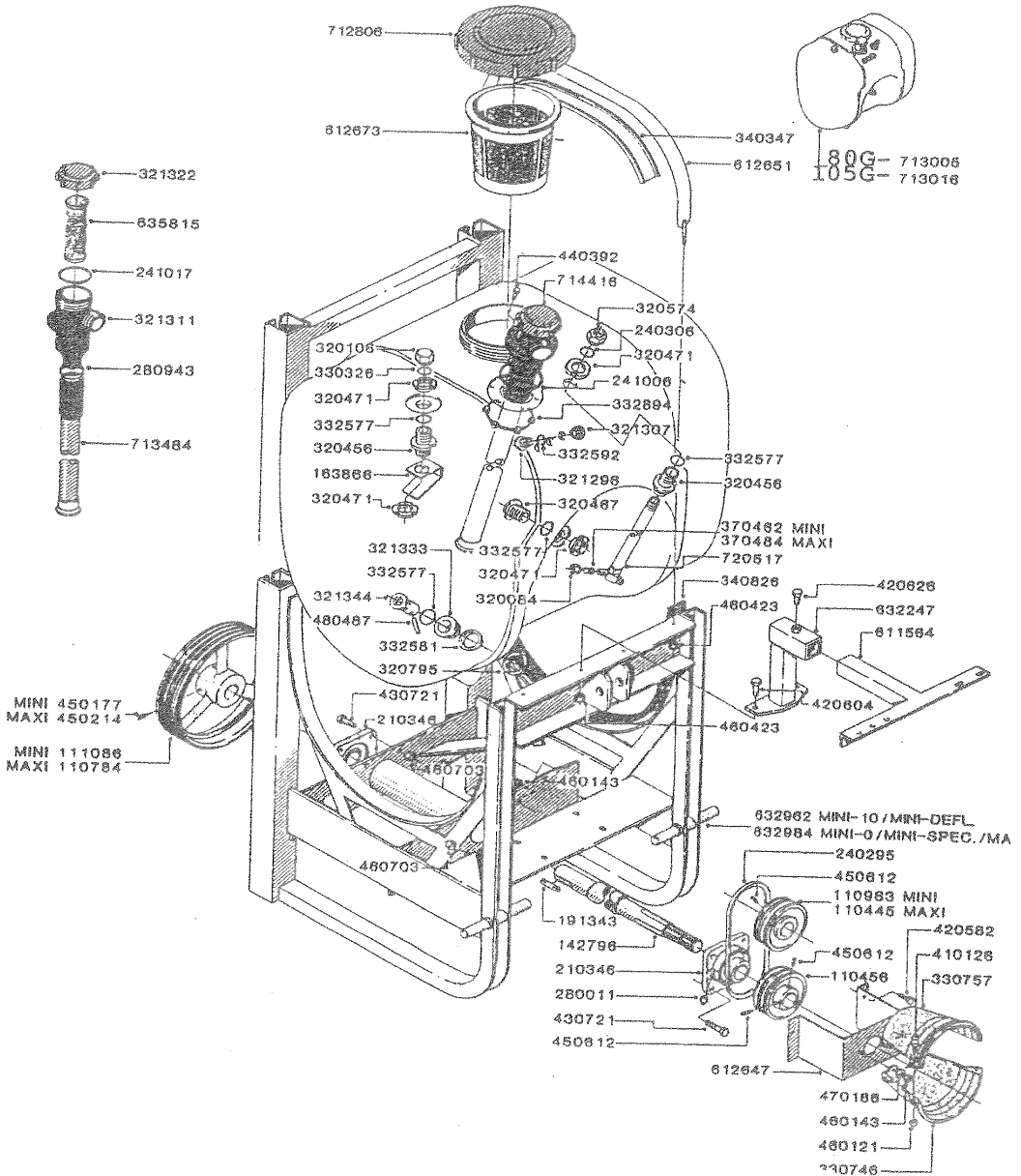
PUMPE PUMP		B mm	FARVE	COLOUR
600	333314	5,2	BLÅ	BLUE
1200	333325	7,5	RØD	RED
1501	333328	8,7	HVID	WHITE
361 HT	333347	9,9	ORANGE	ORANGE
361	333351	10,5	SORT	BLACK
320 HT	333382	6	GRØN	GREEN
450				

DISTRIBUTION VALVE & PRESSURE FILTER ASSEMBLY with CONSTANT PRESSURE DEVICE



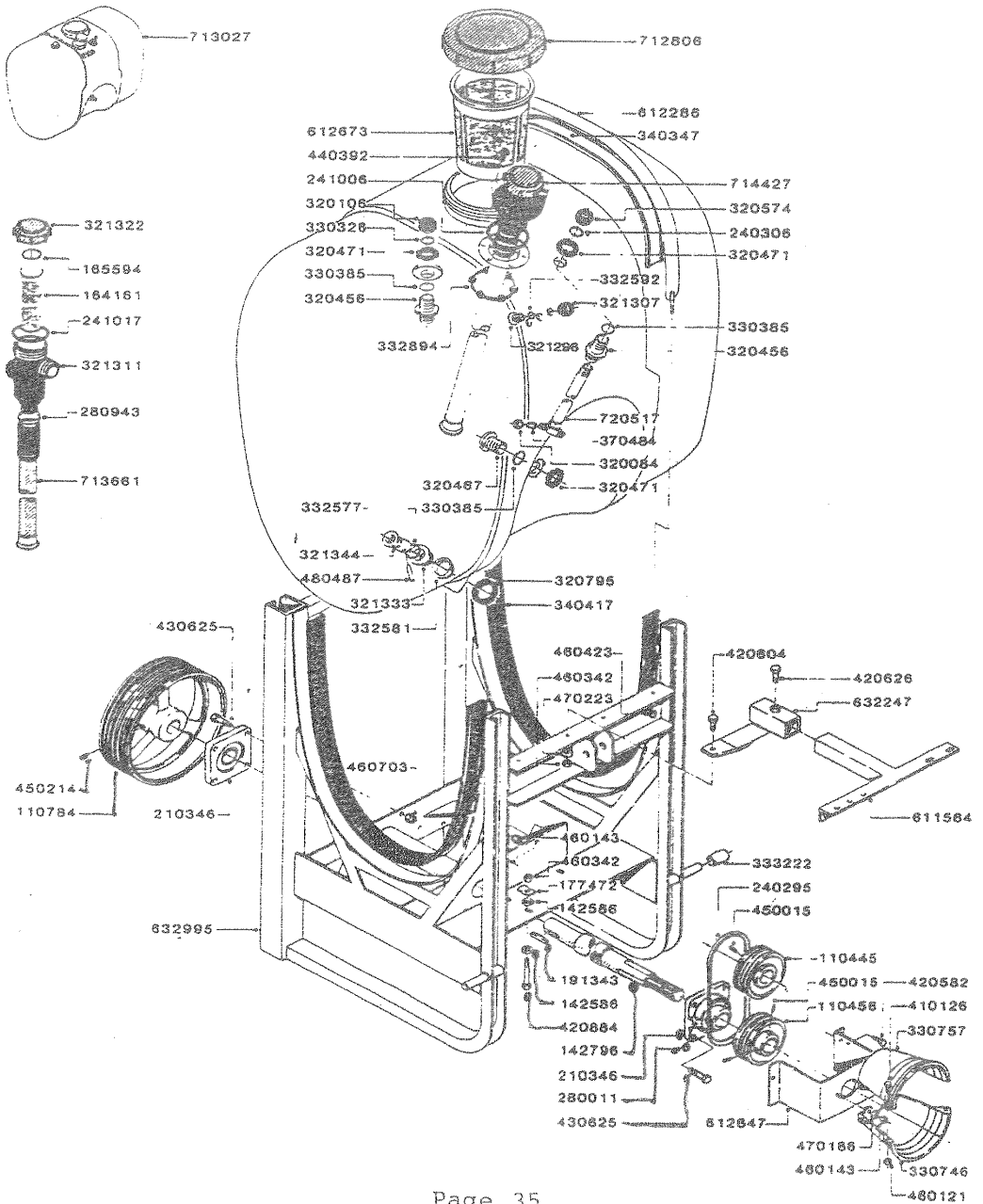
MINI 80/105

TANK & FRAME ASS'Y

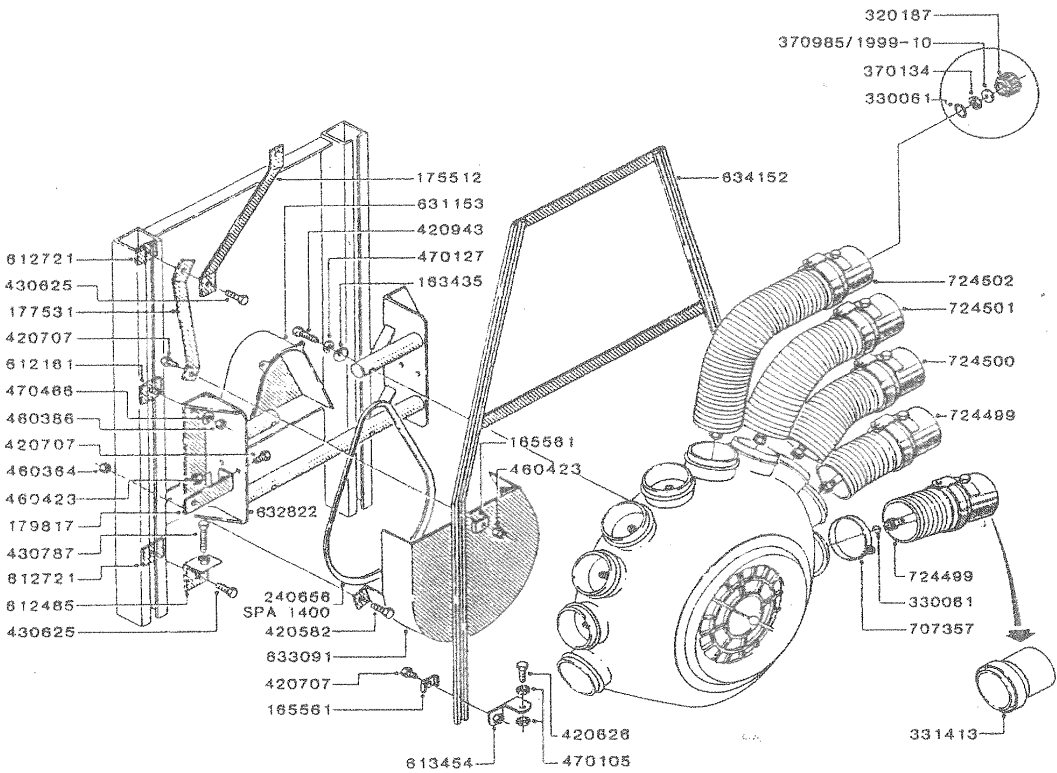


MAXI 155

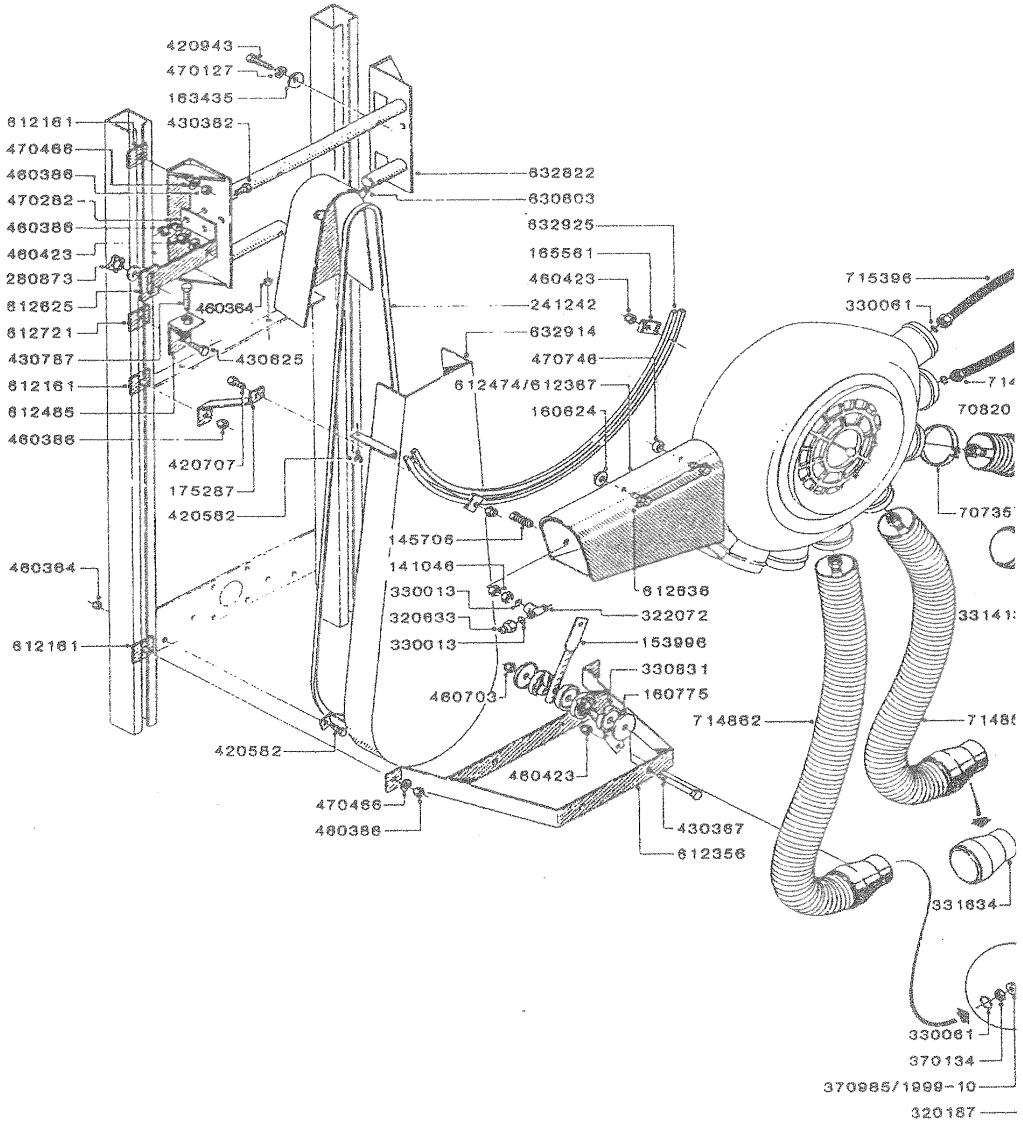
TANK & FRAME ASS'Y



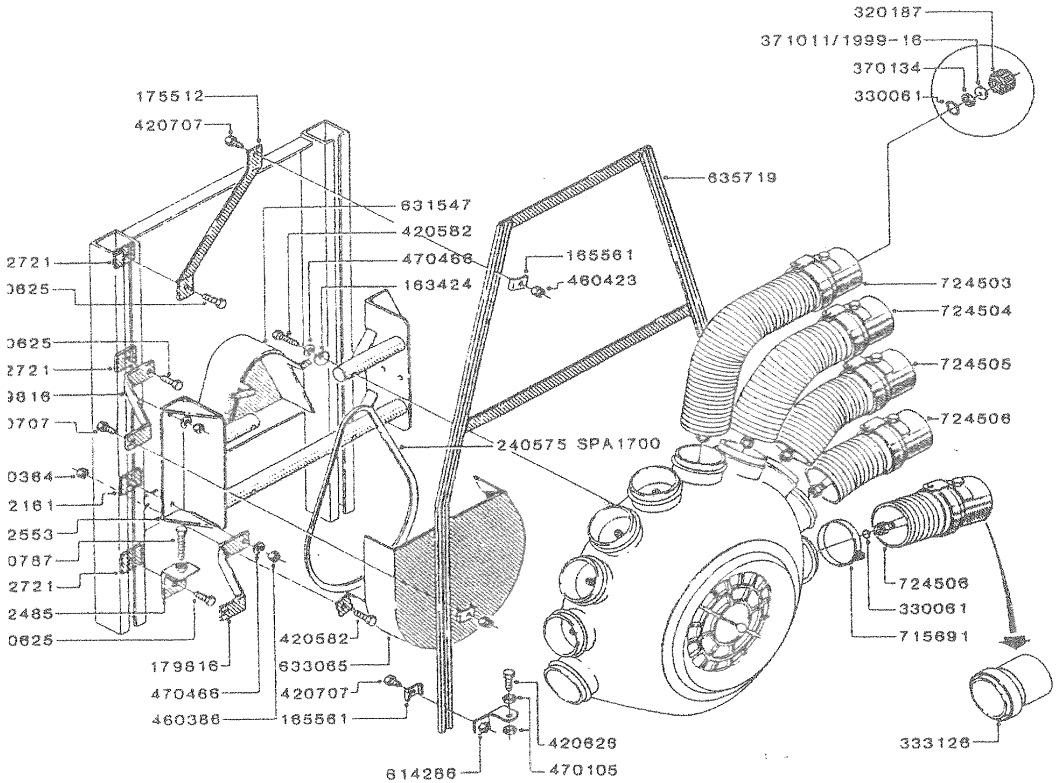
EQUIPMENT FOR MINI - SPV



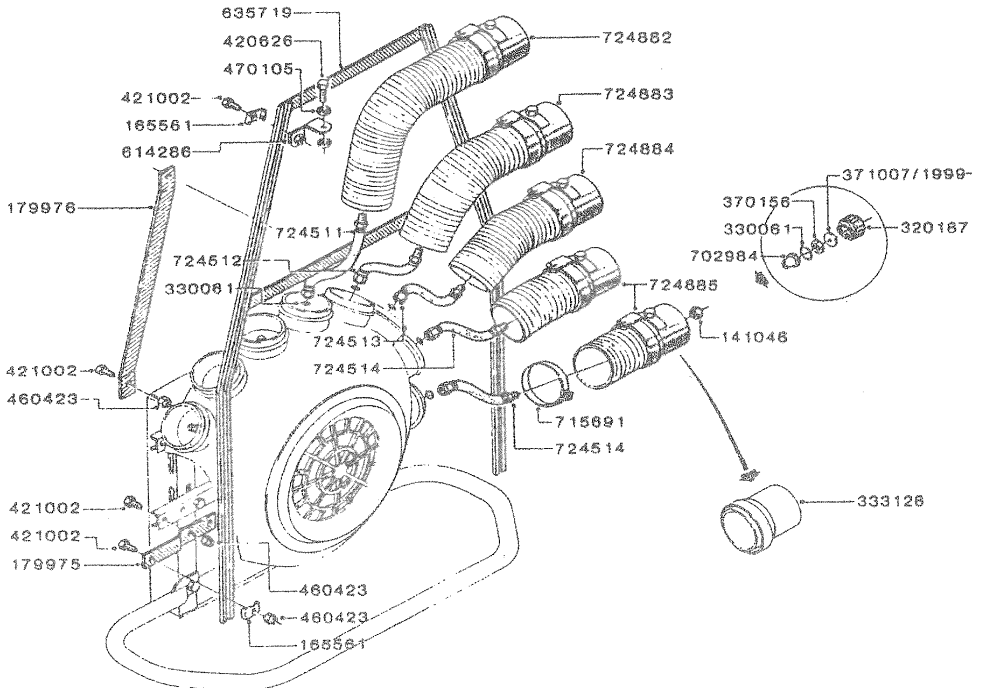
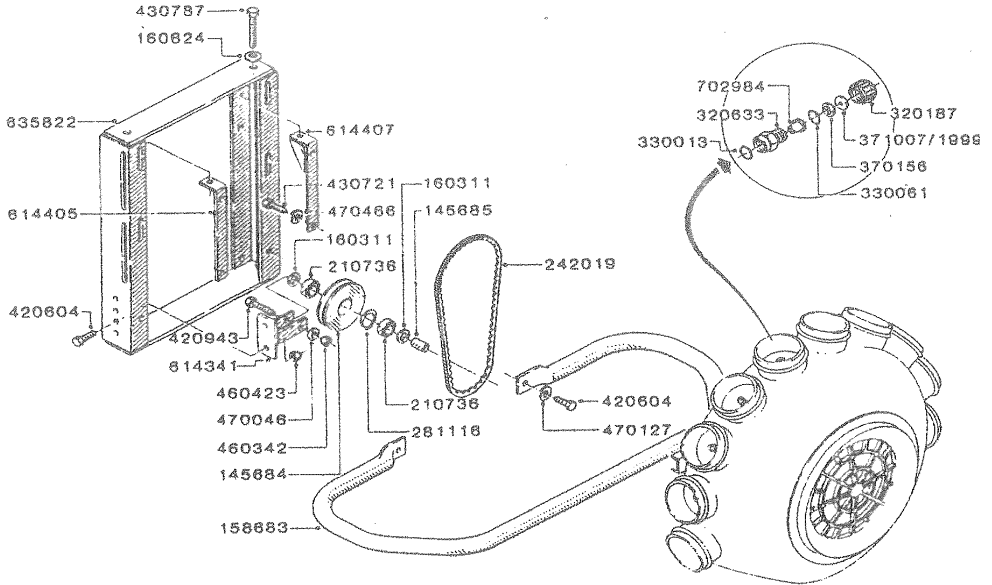
EQUIPMENT FOR MINI - DEFLECTOR



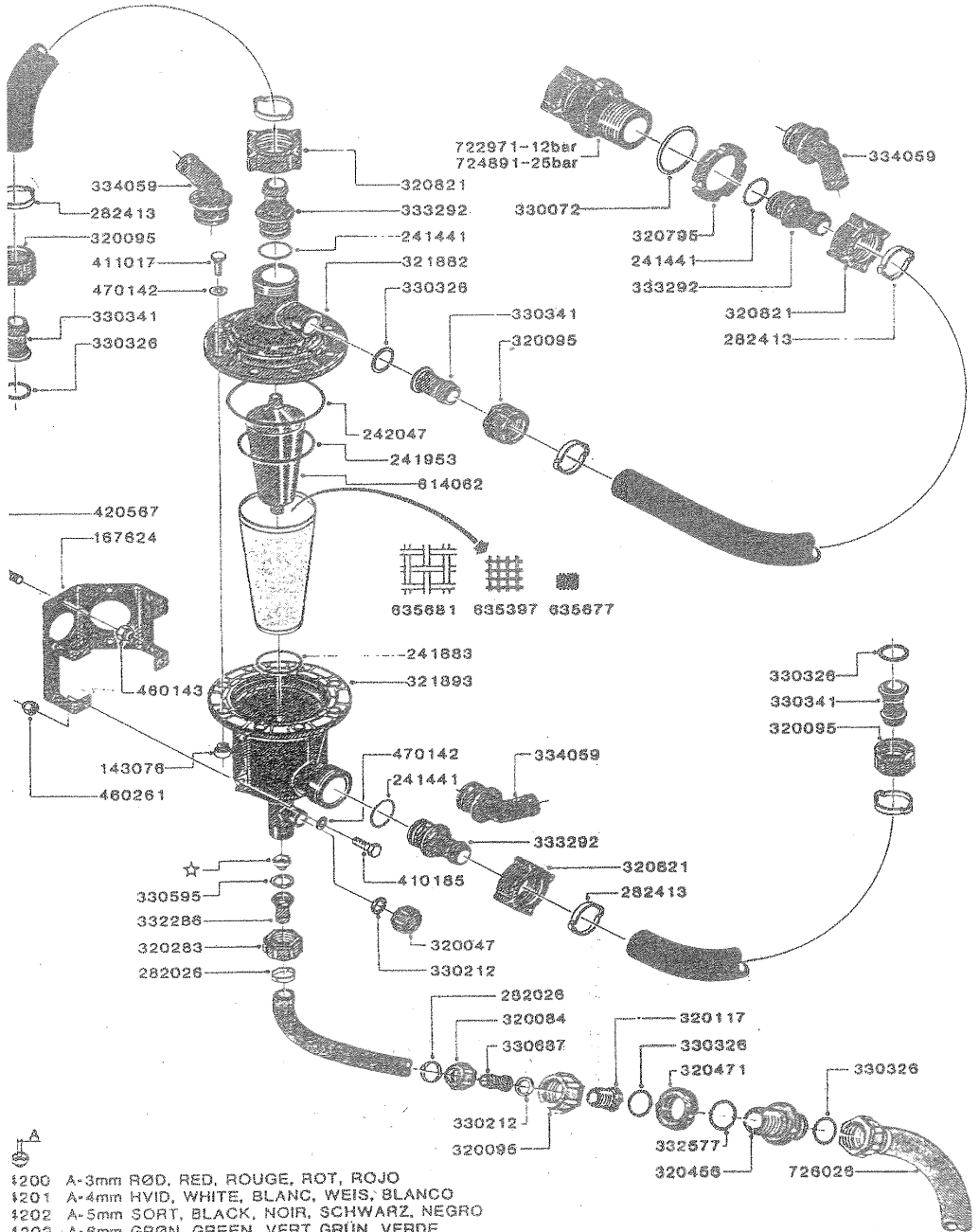
EQUIPMENT FOR MAXI - SPV



MAXI SPV EQUIPMENT FOR TR 210



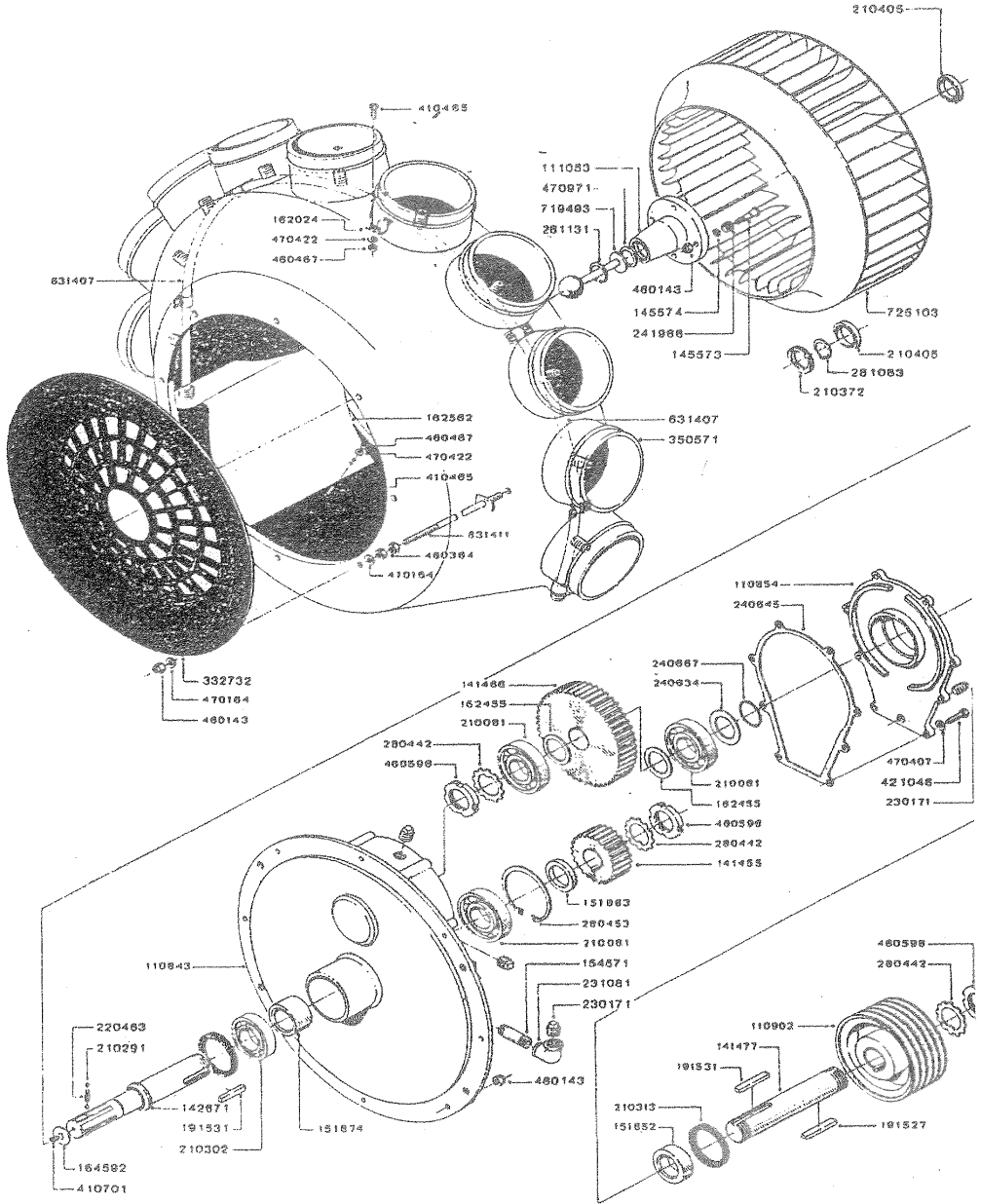
SELF CLEANING FILTER ASSEMBLY



A

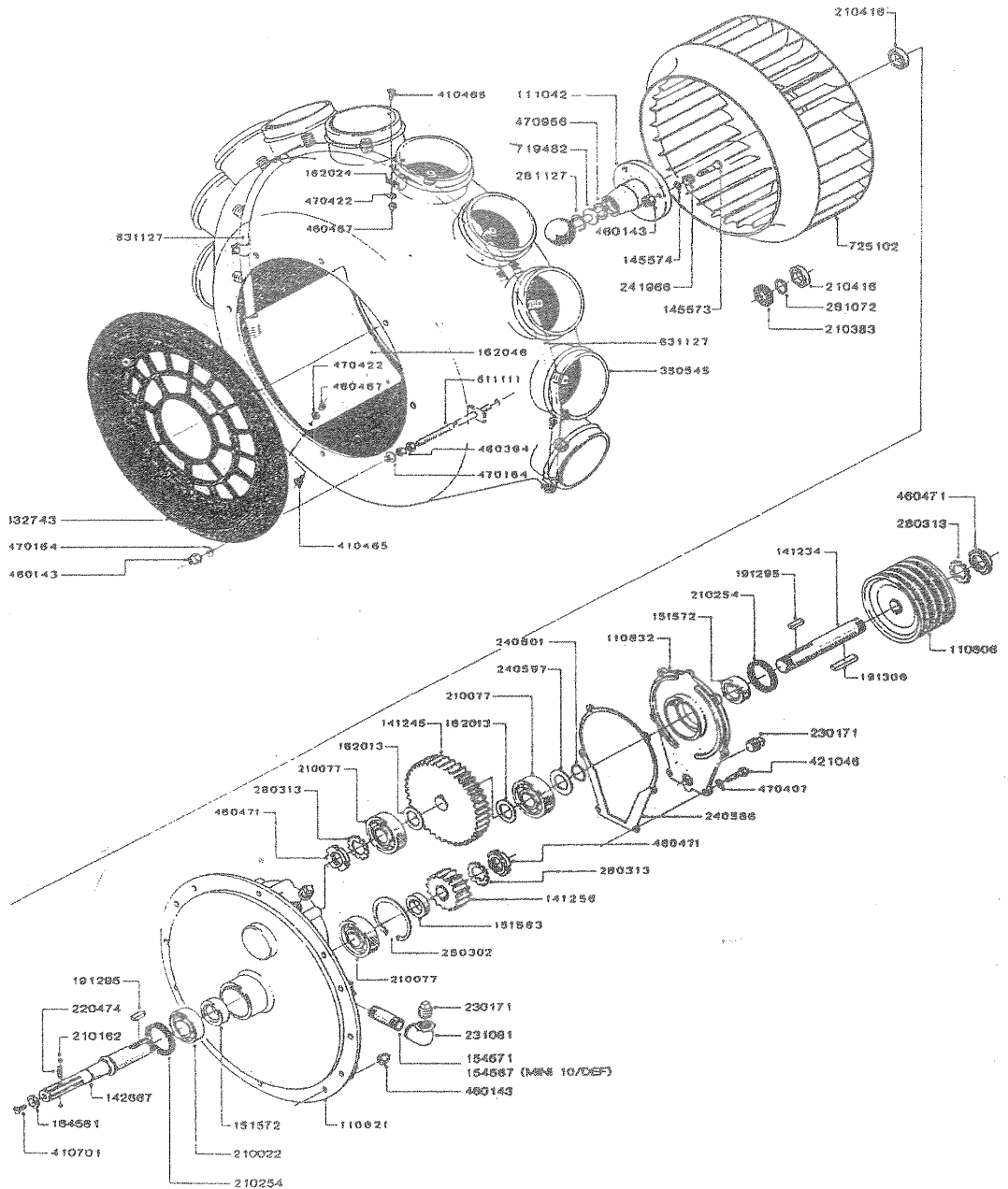
- ‡200 A-3mm RØD, RED, ROUGE, ROT, ROJO
- ‡201 A-4mm HVID, WHITE, BLANC, WEIS, BLANCO
- ‡202 A-5mm SORT, BLACK, NOIR, SCHWARZ, NEGRO
- ‡203 A-6mm GRØN, GREEN, VERT GRÜN, VERDE

MAXI-BLOWER UNIT W/COUPLER & GEAR BOX

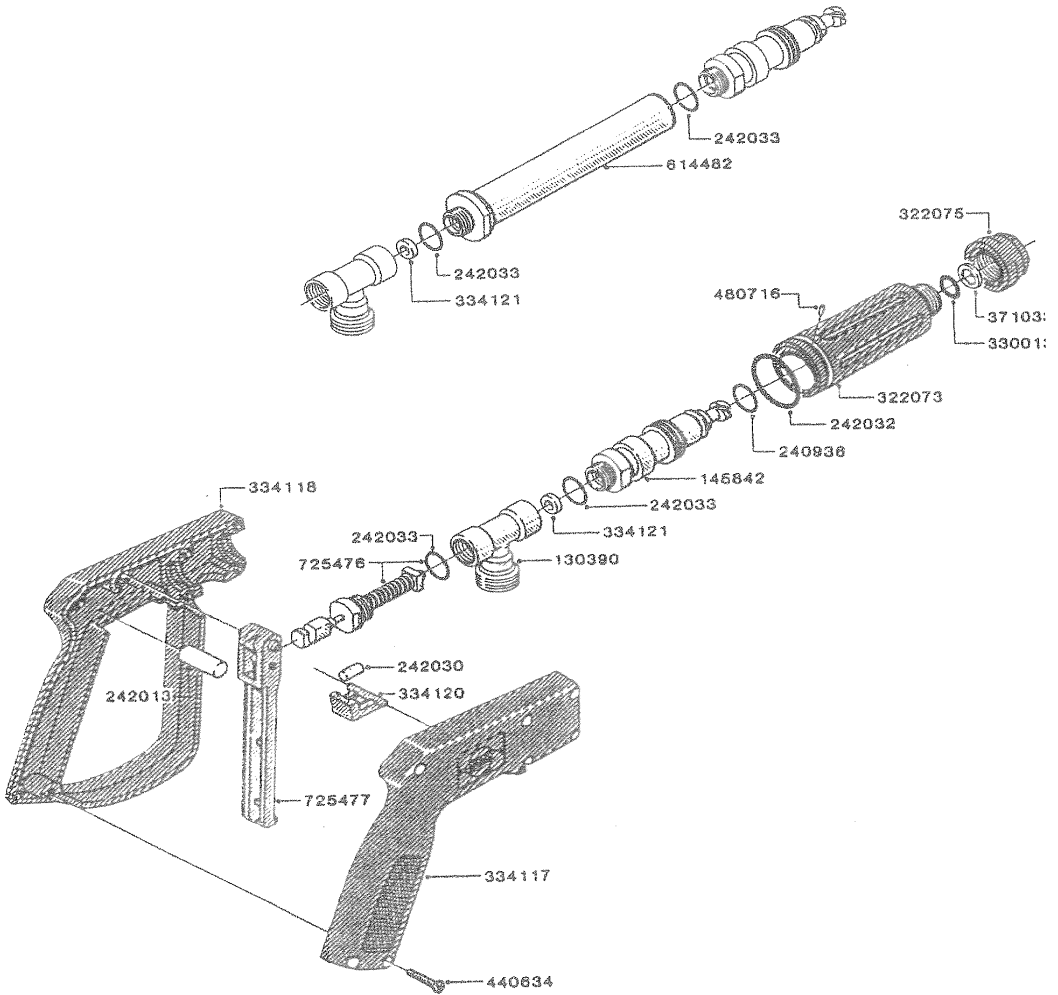


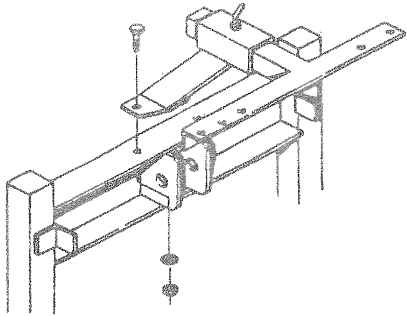
MINI BLOWER UNIT

W/COUPLING & GEAR BOX

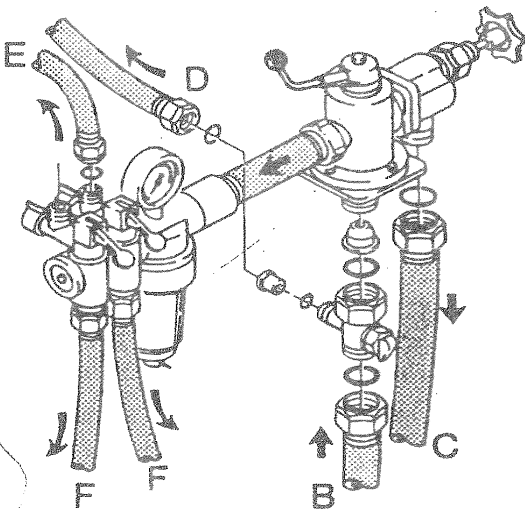


HANDGUN ASSEMBLY





1. Operating unit support assembly fitted to frame
2. Operating unit fitted to the bracket.

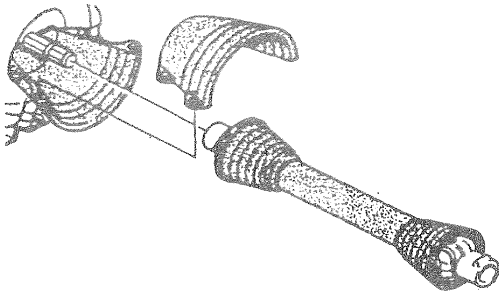


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complete

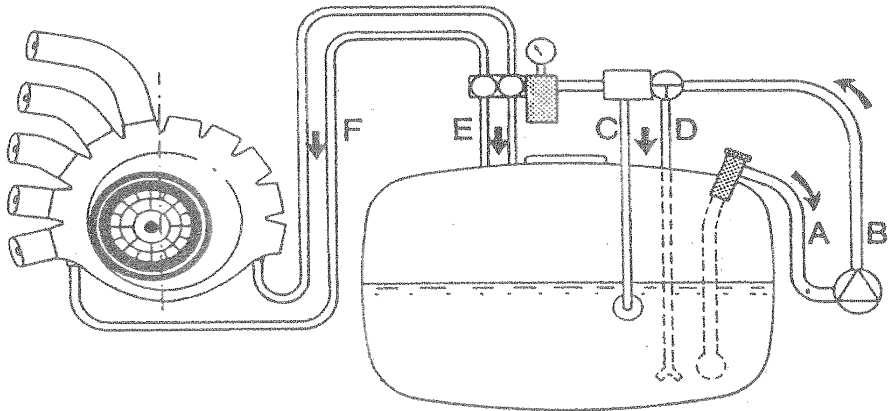


Remember!
Lubricate O-rings
before mounting.

3. Mount pressure agitation valve.
4. PRESSURE HOSE B is mounted from the pump outlet to the unit inlet.
5. RETURN HOSE C is mounted from the by pass of the unit to the tank.
6. Hose D for PRESSURE AGITATION is mounted from the unit to the tank.
7. PRESSURE EQUALIZATION HOSES E are mounted.

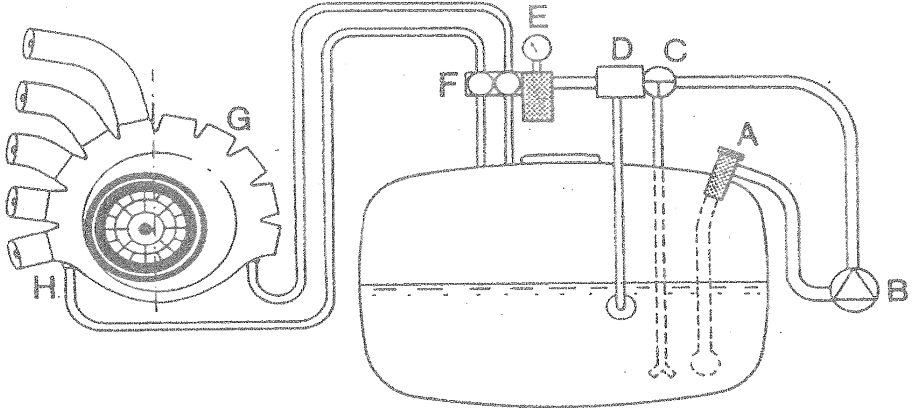


8. Protective screen and P.T.O. are mounted on the pump.



Check that all hose connections are mounted in accordance to the diagram.

OPERATING DIAGRAM:



- A. Suction Filter
- B. Pump
- C. Pressure Agitation
- D. Operating Unit
- E. Pressure Filter with Pressure Gauge
- F. Distribution Valve with Pressure Equalization
- G. Blower with Distribution tube (MINI/MAXI)
- H. Blower with Air Hoses (MINI/MAXI SPECIAL)

HARDI MISTBLOWER - PRE-DELIVERY CHECKLIST

MODEL NO. _____ SERIAL NO. _____

DEALER NAME & ADDRESS _____

OWNER NAME & ADDRESS _____

DEALER SIGNATURE _____ OWNER SIGNATURE _____

DATE OF INSPECTION _____

- Locate operators manual.
- Assemble any pieces removed for shipment.
- Check that all hoses are tight and no broken fittings on control or pump.
- Check all levers and pressure regulators will operate.
- Check agitation nozzles installed
- Check feed hoses for blower unit are not rubbing on moving parts.
- Check tension of pump drive belts and blower drive belts.
- Check that blower fan engages and disengages properly.
- Check all outlets have nozzles installed.
- Check tank drain closed.
- Fill sprayer with WATER. Run at high pressure and at low pressure for 1/2 hour.
- Repair all leaks.
- Oil levers on BK180 control unit.
- Check pressure in pulsation damper.
- Check fittings, leaks and operation adjustments.

WARRANTY POLICY AND CONDITIONS

HARDI INC., 477 Exeter Road, London, Ontario, Canada (hereinafter called "HARDI", offers the following limited warranty in accordance with the provisions below to each original retail purchaser of HARDI new equipment of its own manufacture, from an authorized HARDI dealer, that such equipment is at the time of delivery to such purchaser, free from defects in material and workmanship and that such equipment will be warranted for a period of one year from the date of delivery to the end user providing the machine is used and serviced in accordance with the recommendations in the Operators Manual and is operated under normal farm conditions.

1. This limited warranty is subject to the following exceptions:

a) Parts of the machine which are not manufactured by HARDI, i.e. engines, tires, tubes, electronic controls, and other components or trade accessories, etc. are not covered by this warranty but are subject to the warranty of the original manufacturer. Any claim falling into this category will be taken up with the manufacturer concerned.

b) This warranty will be withdrawn if any equipment has been used for purposes other than for which it was intended or if it has been misused, neglected or damaged by accident, let out on hire or furnished by a rental agency. Nor can claims be accepted if parts other than those manufactured by HARDI have been incorporated in any of our equipment. Further, HARDI shall not be responsible for damage in transit or handling by any common carrier and under no circumstances within or without the warranty period will HARDI be liable for damages for loss of use, or damages resulting from delay or any consequential damage.

2. We cannot be held responsible for loss of livestock, loss of crops, loss because of delays in harvesting, or any expense or loss incurred for labour, supplies, substitute machinery, rental for any other reason, or for injuries either to the owner or to a third party, nor can we be called upon to be responsible for labour charges, other than originally agreed, incurred in the removal or replacement of components.

3. The customer will be responsible for and bear the costs of:

- a) Normal maintenance such as greasing, maintenance of oil levels, minor adjustments, etc.
- b) Transportation of any HARDI product to and from where the warranty work is performed.
- c) Dealer travel time to and from the machine or to deliver and return the machine from the service workshop for repair.
- d) Dealer travelling costs.

4. Parts defined as normal wearing items, i.e. tires and V-belts are not in any way covered under this warranty.

5. This warranty will not apply to any product which is altered or modified without the express written permission of HARDI and/or repaired by anyone other than Authorized Service Distributors or Authorized Service Dealers.

6. Warranty is dependent upon the strict observance by the purchaser of the following provisions:

- a) That this warranty may not be assigned or transferred to anyone.
- b) That the Warranty Registration Certificate has been correctly completed by dealer and purchaser with their names and addresses, dated, signed and returned to the appropriate address as given on the Warranty Registration Certificate.
- c) That all safety instructions in the operators manual shall be followed and all safety guards regularly inspected and replaced where necessary.

7. No warranty is given on second-hand products and none is to be implied.

8. Subject to the following terms, conditions and contributions, HARDI extends the warranty on polyethylene tanks (excluding fittings, lids and gaskets) to FIVE YEARS. To qualify for this extended warranty, the tank must be drained and flushed with fresh water after each day of use. HARDI's liability is limited to replacement of the tank, FOB our plant at no cost to the purchaser during the first twelve months; at 20% of the then current price during the second year; at 40% during the third year; at 60% during the fourth year; and at 80% during the fifth year. This five year extended warranty is subject, in each instance, to the tank being inspected and approved for replacement or repair by HARDI personnel before HARDI will accept any liability hereunder.

9. Subject to the following terms, conditions and contributions, HARDI extends the warranty on HARDI diaphragm pumps (excluding wearing parts such as diaphragms, valves, etc.) to FIVE YEARS. To qualify for this extended warranty, the pump must be drained and flushed with fresh water after each day of use. HARDI's liability is limited to replacement of defective parts, FOB our plant in London, Ontario, Canada at no cost to the purchaser during the first twelve months after date of purchase, at 20% of the then current retail price during the second year; at 40% during the third year; at 60% during the fourth year; and at 80% during the fifth year. This five year extended warranty is subject, in each instance, to the tank being inspected and approved for replacement or repair by HARDI personnel before HARDI will accept any liability hereunder.

WARRANTY POLICY AND CONDITIONS

10. HARDI reserves the right to incorporate any change in design in its products without obligation and to make such changes on units previously manufactured.

11. The judgement of HARDI in all cases of claims under this warranty shall be final and conclusive and the purchaser agrees to accept its decisions on all questions as to defect and to the exchange of any part or parts.

12. No employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of HARDI at its head office.

DISCLAIMER OF FURTHER WARRANTY

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, EXCEPT AS SET FORTH ABOVE. THERE IS NO WARRANTY OR MERCHANTABILITY. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCT CONTAINED HEREIN. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES (SUCH AS LOSS OF ANTICIPATED PROFITS) IN CONNECTION WITH THE RETAIL PURCHASER'S USE OF THE PRODUCT.

In order to qualify for any HARDI warranty, this certificate MUST be completely filled in, signed and mailed to HARDI INC. within 30 days of delivery of the sprayer.

SPRAYER MODEL: _____
(full description)

SPRAYER ORDER NO: _____ MACHINE SERIAL NO: _____

We, the undersigned dealer and purchaser, hereby certify the above machine was purchased on the date indicated below.

DEALER NAME & _____
ADDRESS: _____

_____ PHONE: _____

PURCHASER NAME & _____
ADDRESS: _____

_____ PHONE: _____

NO. OF ACRES FARMED _____ MAJOR CROPS _____

PURCHASER _____ DEALER _____
SIGNATURE _____ SIGNATURE _____

.....

FOR OFFICE USE

REGISTRATION DATE: _____ CERTIFICATE NO. _____



HARDI INC.

477 EXETER ROAD

LONDON, CANADA N6E2Z3

