

ARBUS SAPPHIRE

English version - MI_USA-0365



WARNING

Read Operator's Manual before setting up, operating, or maintaining sprayer. Failure to follow safety precautions in this manual and in labels on the product could result in serious injury or death to the operator or bystanders.

Keep manual nearby for further reference. If manual is damaged or illegible, contact your Jacto dealer or Jacto at the address below for a replacement.



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Operator's Manual

INTRODUCTION

The agrochemicals application is necessary to achieve higher and economical production.

Since applying agrochemicals can present risks to humans, the environment and to crops, Jacto wants to ensure the operator uses it in a proper, efficient, and safe manner.

Thoroughly read and understand this manual before operating this sprayer. Always keeps this manual on or near the sprayer at all times for quick reference for the proper operation, maintenance and adjustments to the sprayer.

If you have any questions, contact your Jacto dealer.



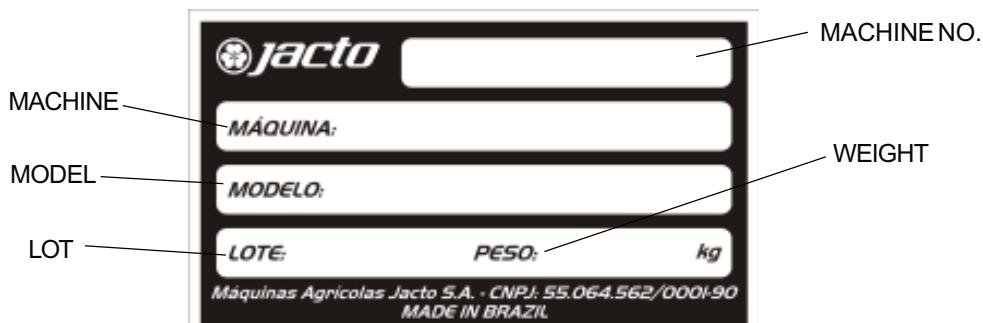
This equipment was developed exclusively for chemical spray application. The sprayer manual refers only to instructions of use and maintenance of parts and components manufactured by Jacto. Read it carefully and follow strictly the instructions. If you have any questions, please contact your Jacto dealer.

IDENTIFICATION PLATE

Your sprayer has a plate showing the model, serial number of the machine and lot (month and year of manufacture).

This information is very important so that Jacto can keep records of eventual modifications made on the material used and on its construction characteristics.

In requesting replacement parts or maintenance, always specify the model, serial number and lot of your sprayer for prompt and efficient service.



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WITHOUT PRIOR NOTICE.**

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SAFETY

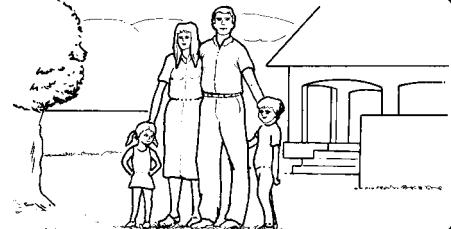
This sprayer was carefully designed and built so as to give you the maximum production, saving, easy operation and safety.

Therefore, you or anyone else who is going to operate, maintain and work around this sprayer must read and understand this manual thoroughly in order to be familiar with all the operating and maintenance procedures and safety information related to this sprayer. All accidents can be prevented if all the safety instructions are correctly followed.

Moreover, always keep this manual close at hand for quick review in case of doubt.



**ATTENTION
FAILURE TO FOLLOW THE SAFETY
INSTRUCTIONS PROPERLY WILL RISK YOUR
OWN LIFE AS WELL AS THE LIFE OF PEOPLE
WORKING AND LIVING AROUND YOU.**



**ATTENTION: THIS SAFETY ALERT SYMBOL IDENTIFIES
IMPORTANT SAFETY MESSAGES. WHEN YOU SEE IT, BE ALERT
TO ANY POSSIBILITY OF PERSONAL INJURY OR DEATH.**

OPERATOR AND OWNER'S RESPONSABILITIES

According to the standard NR31 - Safety and Healthy Regulation Standard in the Agriculture Work, it is responsibility of the equipment's owner and operator to follow the chemical application safety guidelines.

OPERATOR'S RESPONSABILITIES

- Always follow the safety procedures when operating the equipment.
- Always operate the equipment within the limits and restrictions indicated in this manual.
- Thoroughly read and understand this manual prior to using the equipment.

OWNER'S RESPONSABILITIES

- The equipment's owner must keep the owner's manual on or near the equipment at all times for the operator's reference.
- It's the employer responsibility to provide, properly maintain and train the operator regarding the use and requirements for adequate IPE (Individual Protection Equipment).
- The employer must to replace or repair the equipment's components in the event of failure to ensure the safe operation of the sprayer.
- The employer will be responsible for the operator's training to ensure a safe application.

SAFETY

CAUTIONS WHEN OPERATING AGRICULTURAL SPRAYER

- Before operating this sprayer, read carefully and understand thoroughly this manual.
- Only qualified operators that have thoroughly read and understood the owner's manual should operate this sprayer.
- Do not ingest alcohol or drugs before or during the operation of this sprayer.
- Make sure that all the guards are in place before running the sprayer.
- Do not climb on or come down the sprayer when it is in motion.
- Turn the engine off before leaving the operator's place.
- **This sprayer was designed and manufactured to support operations in the crops and on roads, tracks, trails or paths inside farms within the speed limit recommended by Jacto (limit of 18 mph in the routes inside the farm and 4 mph when spraying). The use of the sprayer above the limits mentioned is not approved by Jacto.**
- This sprayer must be maneuvered in safe places, away from people, animals or any other situation that offers risks of personal injuries or material damages. Make sure there are no people near the sprayer before starting the engine.
- Do not make maneuvers or brake abruptly.
- The transportation of people and any loads whatsoever in the sprayer is strictly prohibited in any circumstances.

ATTENTION: Do not touch PTO shafts, belts, fans or any other moving part while the sprayer is running.



Keep away from moving parts and be very careful with hands, feet, loose clothes, long hair, etc.

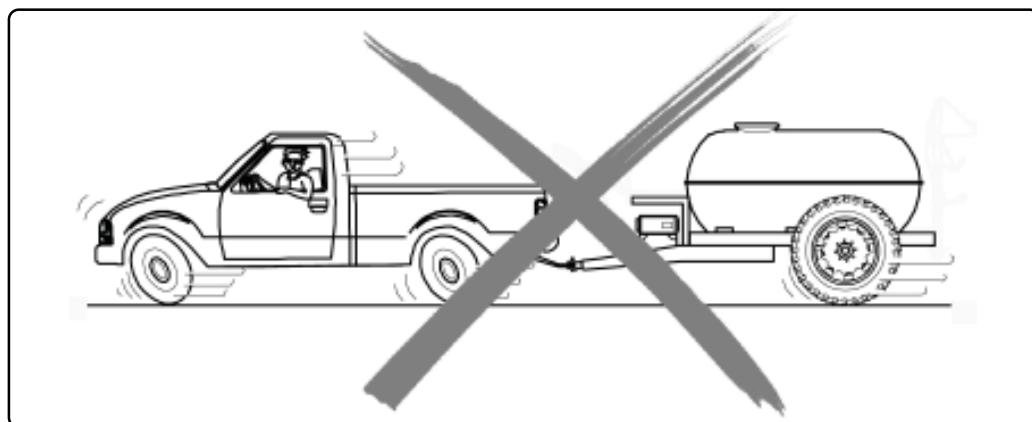
If you have any doubts/questions, please request Jacto Technical Assistance.

- Keep away children, aged people and animals while operating, servicing this sprayer and even when the sprayer is stored.
- Do not run the pump dry.
- Do not exceed 540 rpm at the PTO.
- The PTO shaft ends must be securely locked to the PTO of the tractor and to the sprayer tongue.
- The PTO shaft guard must always remain in good repair and fastened by the safety chains. The PTO shaft must work freely in its interior.
- Make sure the drawbar and the sprayer end are properly connected/fastened.
- Check and change the worn or broken parts.
- Only unhitch the sprayer on firm and level ground.
- Remove the controls installed on the tractor before disconnecting the sprayer.

SAFETY

CAUTIONS IN THE MAINTENANCE AND TRANSPORTATION

- Activities of cleaning, lubrication, repair and adjustment should only be performed by qualified and trained professionals duly protected with the approved and proper PPE (Personal Protective Equipment) such as gloves, masks, goggles, safety boots, etc.
- **Before performing any type of service, adjustment or maintenance in your sprayer, always disengage the PTO shaft and turn off the tractor engine.**
- **It is prohibited to make cleaning, lubrication and maintenance services with the sprayer in operation, except if its very operation is essential to make these services. In this case, all the special protection and signalization measures must be taken in order to prevent accidents.**
- **The removable guards can only be removed for maintenance. Then, they must be obligatorily placed back in their original position.**
- Do not modify this sprayer in any way because this can impair its function and risk your safety.
- Keep your sprayer in thorough repair.
- **Failure to comply with these warnings may result in personal injuries or death.**
- **Jacto neither recommends nor approves the towing or trailing of the sprayer by vehicles, except by recommended tractors mentioned previously in the section "Cautions when operating agricultural sprayer".**
- **The employ in adverse and not recommended conditions can cause damage to the sprayer and components and will make void the warranty as well as exempt the manufacturer from any obligation to any accident or consequences.**
- **For the displacement and transport of the sprayer, the use of trucks or flatbeds are recommended as long as measures for its perfect immobilization are taken in order to avoid accidents as result of improper accommodation.**



- Require from the JACTO representative during the technical delivery of the sprayer that the proper instructions on assembly, maintenance, warranty be carefully explained.

SAFETY INSTRUCTIONS

HANDLING CHEMICALS

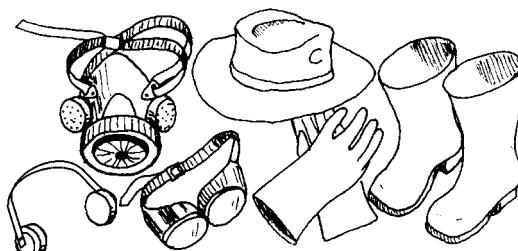
Chemical products are classified in four categories of toxicity. According to their toxicity level, there is a special recommendation of appropriate protective equipment.

As your safety concerns first, we list below all the protective equipment recommended for handling chemical products of the category 1 which includes high toxicity level chemicals.

This way, all the possibilities of serious illness and death are eliminated.

Obligatory individual protective equipment for handling and spraying chemicals:

- Long-sleeved working clothes
- Impermeable apron or coverall
- Impermeable gloves
- Impermeable wide-brimmed hat
- Boots
- Special protective masks equipped with appropriate filters for each type of product



CHEMICAL PRODUCTS CLASSIFICATION

	TOXICITY LEVEL		LABEL COLOR ON CHEMICALS CONTAINER
	I	HIGH	
	II	MODERATE	YELLOW
	III	LOW	BLUE
	IV	LIGHT	GREEN

DIRECTIONS

- Read and follow all instructions on the chemicals manufacturer's label.
- Keep the chemical products closed and in a dry and ventilated place.
- Use the chemical products in agriculture only.
- Keep away children, untrained people and animals.
- Handle the chemicals following recommendations of a technician.
- Always handle chemicals in a ventilated place and equipped with individual protective equipment.
- Use the application rate as per instructions on the labels.
- Do not make spray applications in the wind or hot weather.
- Do not drink, eat or smoke while spraying or handling chemicals.
- Keep children, untrained people and animals away from the application areas.
- Never blow through nozzles strainers, valves or pipelines by mouth.
- Do not store or transport chemical products together with food, medicines, people, animals.
- Make sure rivers, lakes, etc. will not be contaminated when washing out the sprayer.
- After spraying, take off all protective clothing and take a shower.
- In case of intoxication, go see a doctor immediately and show him the chemical products label.
- Never medicate an unconscious person through mouth.
- **Do not re-use the chemical products containers for other purposes. Consult an agronomist on how to discard empty containers of chemical products.**

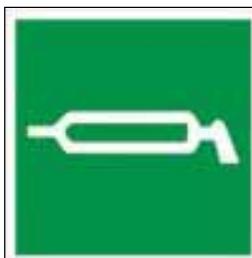
SAFETY INSTRUCTIONS

DECALS

Safety decals are placed on the equipment to reduce the risk of damages or accidents to the operator or to the equipment during the use.

Before operating the equipment, identify and understand the mean of all decals, through this page.

Keep them in good repair, clean and legible. Replace them immediately in case of damage by ordering them through the part numbers specified below.



P/N: 279220

ATTENTION: Lubrication point with grease.



ATTENTION: Read the operator's manual before operating the sprayer.



P/N: 276238

ATTENTION: Area where the jack must be placed to lift the equipment.



ATTENTION: Caution when opening the lid of the main tank.

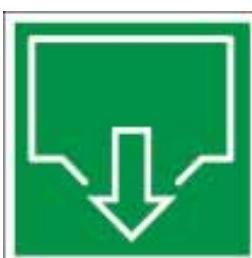


P/N: 395061

ATTENTION: Lubrication point with oil.



ATTENTION: Risk of injuries. Keep away from the sprayer when it is operating.



P/N: 389387

ATTENTION: Drain point.



ATTENTION: Risk of serious injuries. Keep away and do not make any kind of maintenance while the fan is in motion and the PTO is turned on.



P/N: 379230

ATTENTION: Read the operator's manual before operating the sprayer.

P/N: 379057

SAFETY INSTRUCTIONS



P/N: 379065



P/N: 379131



P/N: 379107



P/N: 379214



P/N: 379115



P/N: 379222



P/N: 379123



P/N: 380014

ATTENTION: Risk of serious injuries. Keep all protection devices in its places.

ATTENTION: Obligatory use of protective clothes.

ATTENTION: Hydraulic oil level indicator.

ATTENTION: Maximum speed allowed for the machine is 18.5 mph .

ATTENTION: Obligatory use of protective mask.

ATTENTION: Prohibited traffic of this machine on the highway.

ATTENTION: Obligatory use of protector against noise.

ATTENTION: Do not get into the main tank of the sprayer.

SAFETY INSTRUCTIONS



P/N: 279220

ATTENTION: Risk of serious injuries. Do not make any operation on the PTO shaft if the PTO is turned on.

	1M/yard ²	kg/m ²	
Arbus 200	175-70	22	2,25
Arbus 200	7,35-14	26	1,65
Arbus 1900	7,35-14	36	2,05
Arbus 1500/725	7,35-16	36	2,05
Arbus 1500/650	110-15	44	2,10
Arbus 2000/725	110-15	44	2,10
Arbus 2000/650	110-15	44	2,10
Arbus 2000/650	7,35-16	56	2,50
Arbus 4000/650	11,5-18	66	3,10
Arbus 4000/1050	14,0-20	91	2,20
Jacto 3600	110-15	44	2,10
Jacto 3600	7,35-16	44	2,05
Jacto 3600	12,40-20	56	2,82
Corral 39 e 50	7,35-16	56	2,05

P/N: 391631

ATTENTION: Pressure table for the tires.



Suction filter valve position (right).

	Kgf.m	N.m	lbf.ft
M16	19,3 - 25,2	190 - 247	140 - 182
M20	39 - 50	383 - 490	282 - 362
M22	10,3 - 11,7	100 - 115	75 - 85
5/8"	18 - 23,5	176 - 230	130 - 169

P/N: 379164

ATTENTION: Torque table for the nuts.



Suction filter valve position (left).



Designer sticker -
Logotype Jacto
P/N: 280727

P/N: 378794



P/N: 391276



P/N: 391292

Designer sticker - left and right

Sprayer description - left and right



P/N: 286930



P/N: 293449



Identification plate

P/N: 047035



Final test of the equipment.

P/N: 013169

PRESENTATION OF SPRAYER

ARBUS SAPPHIRE



TECHNICAL SPECIFICATIONS

Model	Arbus 2000 SAPPHIRE
Length (in)	170
Height (in)	
- minimum	73
- maximum	79
Weight (lb)	2,072
Main tank	
- Capacity (gallons)	530
- Material	Fiberglass
Filter	
- Model	FVS-200
- Mesh	24/40
Pump	
- Model	JP-150
- Capacity (gpm) at 540 rpm	40
- Maximum pressure (kgf/cm ² / psi)	35/500
- Power consumption (HP) at 400 psi	10.7
Nozzles	
- Nozzle holder quantity	12
- Nozzle holder model	nozzle valve
- Nozzles quantity	24
Tires	
- Type	11 L - 15
- Nominal width (in)	10.60
- Pressure (kgf/cm ² / psi)	3.1 / 44
Ground clearance (in)	16
Track Width (in)	
- Minimum	49
- Maximum	61
Agitator	Mechanical
Chemical control	VDC
Pressure gauge (scale of 0 to 70 kgf/cm ² / 0 to 1000 psi)	Glycerin-filled
PTO shaft	Wide-angle
Recommended working speed (mph)	1.5 to 4

PRESENTATION OF SPRAYER

FAN FEATURES

DESCRIPTION	ARBUS SAPPHIRE
Fan diameter (in)	33.46
Pulley diameter (in)	3.35
Rotation (rpm)	1720

FAN PERFORMANCE WITH ONE-WAY DEFLECTOR ON THE HORIZONTAL	PLASTIC BLADES POSITION	
	*A	B
Air speed (mph)	78	73
Air volume (ft ³ /min)	30,299.02	28,181.10
Power consumption (HP)	35.0	11.0

* This sprayer comes off the assembly line with the blades set in the position A.

POWER CONSUMPTION

Mechanical agitator	1 HP
Pump	7 HP
Fan (position A)	17.7 HP
TOTAL	25.7 HP

FAN PERFORMANCE WITH ONE-WAY DEFLECTOR (OPTIONAL)	PLASTIC BLADES POSITION	
	*A	B
Air speed (mph)	70	69.5
Air volume (ft ³ /min)	20,765.02	20,341.25
Power consumption (HP)	15.1	11.8

* This sprayer comes off the assembly line with the blades set in the position A.

POWER CONSUMPTION

Mechanical agitator	1 HP
Pump	7 HP
Fan (position A)	15.1 HP
TOTAL	23.1 HP

ATTENTION: If the blades are changed to position B, it is necessary to balance the fan again.

PRESENTATION OF SPRAYER

OPTIONAL

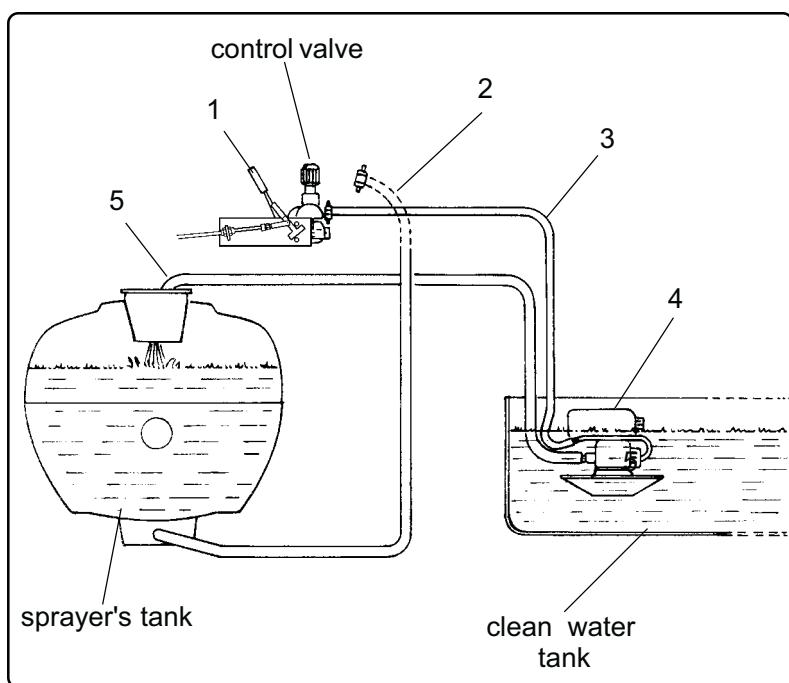
Nozzle holders	9 double nozzle holders with 36 nozzles
	9 bijet nozzle holders with anti-drip with 36 nozzles
	13 bijet nozzle holders with anti-drip with 52 nozzles
	13 double nozzle holders to deflector 3P
	13 nozzle valve to deflector 3P
	with anti-drip
Filler unit	Fonte limpa (with quick fitting)
Spray lance	
Spray gun	
PTO Shaft	wide angle
Comando elétrico	EC 4400
Line filters	
Pump	JP 190 Citrus
Deflector	3P
Hitch	plan
SensorFlow	

MAIN COMPONENTS OF SPRAYER

FILLER UNIT (OPTIONAL)

For filling, proceed as follows:

- Set the lever (1) to turn off the chemical flow.
- Pour 13.20 gallons of water into the sprayer tank.
- Remove the return hose (2) from the chemical control.
- Connect the filler hose (3) to the chemical control in the place of the return hose.
- Put the filler unit (4) in the water tank and put the end of the discharge hose (5) in the tank opening.
- Run the sprayer with 540 rpm at PTO.



ATTENTION

- THE SPRAYER FILLING OPERATION MUST BE DONE IN PLACES APPROPRIATE FOR THIS PURPOSE OR THROUGH APPROPRIATE VEHICLES (TRUCKS, TRAILERS, ETC).
- NEVER COLLECT WATER FROM RIVERS, LAKES, DAMS, STREAMS, BROOKS, ETC. BY USING THE SPRAYER'S RETURN SYSTEM.

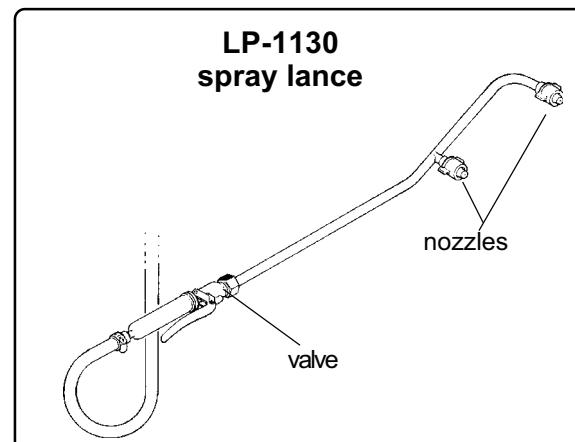
SPRAY LANCE (OPTIONAL)

The spray lance is an accessory to be used for localized spot spraying and also for spraying in places of difficult access.

It has two ceramic cone nozzles (JA-2) and a valve to turn on and off the spray, thus avoiding wastage of chemical products.

Nozzle	Pressure (psi)	Flow rate (gpm)	
		Nozzle	Lance
JA-2	150	0.26	0.52
	200	0.30	0.61
	300	0.37	0.75
	400	0.43	0.86

Pressure band not recommended.

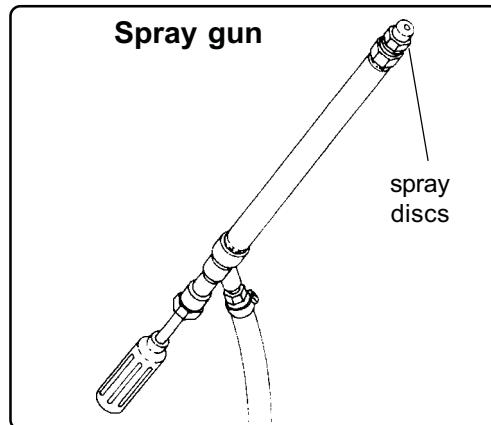


MAIN COMPONENTS OF SPRAYER

SPRAY GUN (*OPTIONAL*)

The spray gun is an accessory for localized spot spraying in tall trees which requires a high spraying volume.

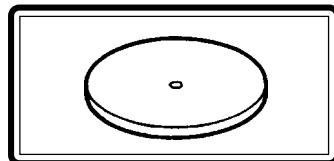
It is possible to increase the gun flow rate from 1.31 to 11.88 gpm by replacing the spray discs.



STAINLESS STEEL SPRAY DISCS - *SERIES D*

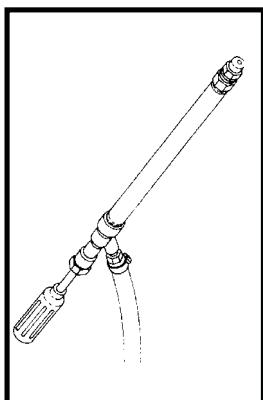
The spray discs are recommended for localized spot spraying in fruit crops in general due to its long reach spray. They are made of stainless steel and have flow rates ranging from 1.31 to 11.88 gpm.

These discs must be used with the Jacto spray gun, specially designed for this type of spray application.



SPRAY DISCS FLOW RATE TABLE - *SERIES D*

FLOW RATE TABLE



DISC PART #	DISC MODEL	PRESSURE (psi)					Spray Disc
		100	150	200	300	400	
		SPRAY GUN FLOW RATE (gpm)					
202275	D - 5	1.31	1.58	1.84	2.11	2.50	
202267	D - 6	1.80	2.24	2.64	3.17	3.56	
202811	D - 7	2.47	2.87	3.30	3.79	4.49	
202259	D - 8	3.39	3.96	4.49	5.28	6.24	
622829	D - 9	3.75	4.65	5.47	6.70	7.76	
114686	D - 10	4.88	5.81	6.73	7.92	9.42	
622837	D - 11	5.54	6.53	7.75	9.77	11.88	

OPERATIONAL PROCEDURES

Stage	Procedure	Sprayertype	
		Trailer	3 point
Spraying	Use individual protective clothing	X	X
	Do not work at high speeds	X	X
	Do not spray against the wind	X	X
	Do not travel with boom lifted or unlocked	X	X
	Take care with electricity supply cables	X	X
	Do not eat, drink or smoke while spraying	X	X
	After spraying, dispose of all protective clothing and take a shower	X	X
Receiving the sprayer	Check if all components are intact	X	X
	Check the components of accessories box	X	X
	Require trained person to instruct about assembling, operating and servicing components and accessories ...	X	X
Using the sprayer for the first time	Clean and lubricate every point of the PTO shaft	X	X
	Check if the hitch pin is original	X	-
	Check if the three-point hitch pins are original	-	X
	Check if the hitch pins have cotter pins		
	Check the overlaps of the PTO shaft	X	X
	Remove the tractor's drawbar	X	X
	Raise to the highest the tractor's hydraulic arms	-	X
	Adjust the control valve position to avoid impacts while turning	X	X
	Check if the grease fittings are filled	X	-
	Check if the oil is on the level on the components	X	X
	Calibrate the tires	X	X
Whenever filling the tank	Retighten the tank nuts and lug nuts	X	-
	Clean the suction or line filters	X	X
Every day or every 10 hours	Clean nozzles and their strainers	X	X
	Clean nozzles, strainers and filters	X	X
	Check the grease fittings and joint pins	X	X
	Check the oil level on the pumps and gear box	X	X
	Wash the inside and outside of the sprayer	X	X
	Check for damage on the paint and repaint	X	X
	Check for oil leakage and stop it	X	X
First 30 hours	Store the sprayer in a dry, ventilated and indoor place ...	X	X
	Change for the first time the pump oil.....	X	X
	Retighten the bolts on the tank, axle and wheels.....	X	-
Every 100 hours	Change the oil of the pump and gearbox	X	X
	Tighten the belts	X	X
	Clean and check the pressure regulator components	X	X
	Clean the inside and outside of the sprayer, and paint the parts subject to corrosion with lubricating oil	X	X
Every 500 hours or annually	Service the pump	X	X
	Change hydraulic oil	X	-
	Change the oil of the gearbox	X	X
	Retighten the bolts of tank, wheels, axle, etc.	X	-
	Change the grease of the wheel hub	X	-

CHOOSING THE TRACTOR

PROCEDURES

Different working conditions lead us to adopt the following criterion for choosing the tractor that will drive the Arbus line sprayers with tank capacity of 528.34 gallons.

- Check the sprayer weight on the identification plate.
- Check the tank capacity.
- Check in the specifications table the total power consumption of the sprayer at the PTO.

Example:

Sprayer weight = 2,072.34 lb

Tank capacity = 528.34 gallons

Total power consumption = 25.7 HP

CHOOSING THE TRACTOR CONSIDERING THE POWER CONSUMPTION AND THE LOAD TO BE TRANSPORTED

1st - POWER CONSUMPTION

The tractor should have power (HP) at least 90% higher than the power required to run the sprayer.

Ex.: Power required by the sprayer = 25.7 HP
Minimum tractor nominal power = 52 HP

2nd - LOAD TO BE TRANSPORTED

The tractor gross weight should be at least equal to the sprayer gross weight (sprayer net weight plus full tank weight).

Ex: Sprayer net weight = 2,072 lb
Full tank weight = approximately 4,409 lb (528.34 gallons)
Sprayer gross weight = 6,481 lb
Tractor gross weight = 6,481 lb or more



ATTENTION

In this case the recommended tractor should have minimal nominal power of 52 HP and weigh at least gross 6,481 lb.

SETTING UP THE TRACTOR

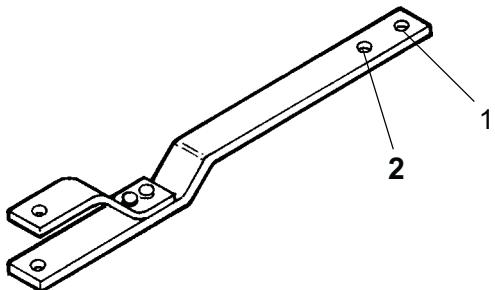
- Adjusting the drawbar

Fit the drawbar pin into the proper hole (1 or 2) to vary the distance between the PTO shaft and the hitch point (see figure A).

NOTE:
For heavy load, the hole no. 2 is recommended (see figure A).

Hole	Distance between the PTO shaft and the hitch point	Maximum (static) load in lift
1	13.77 in	992.07 lb
2	9.84 in	1,300.72 lb

A



ATTENTION

The figures shown in above table were obtained on a 63 HP tractor.

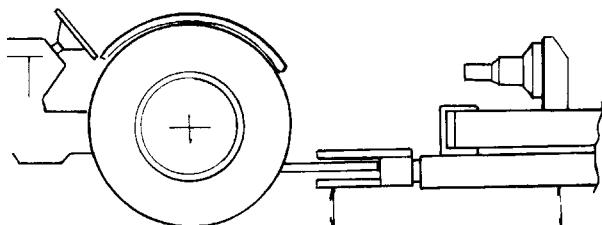
For explanation in detail, please consult the operator's manual of your tractor.

- Adjusting the sprayer height and the tractor's drawbar

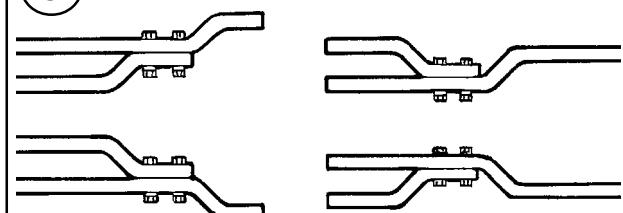
Set the tractor's drawbar so as to allow the sprayer to work on level after being hitched (see figure B).

Invert the drawbar to vary the height of the hitching point (see figure C).

B



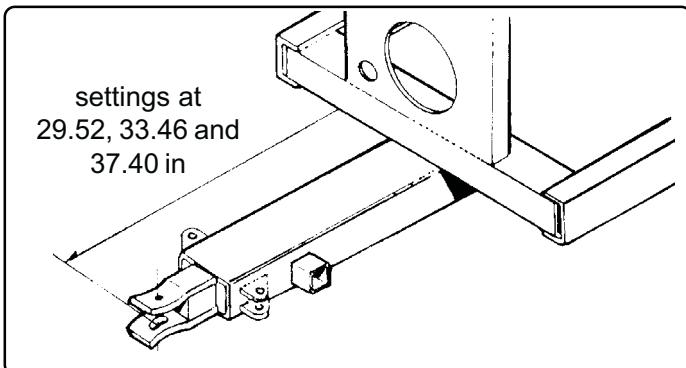
C



- Adjusting the sprayer's tongue

The sprayer's tongue can be adjusted from 29.52 to 37.40 in, as shown in the figure beside.

settings at
29.52, 33.46 and
37.40 in



CONNECTING THE PTO

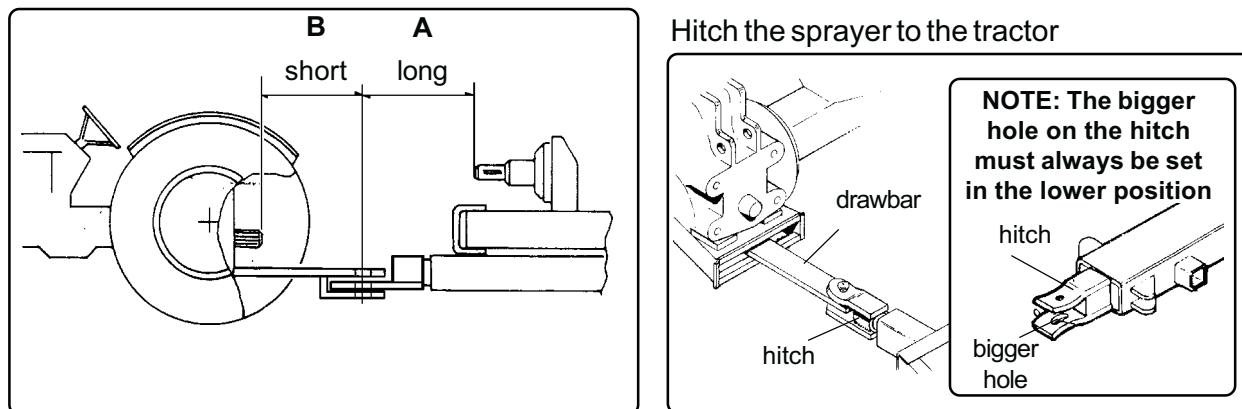
CONVENTIONAL PTO SHAFT (WITHOUT CV JOINT)

- ADJUST THE DRAWBAR LENGTH IN RELATION TO THE PTO AS SHOWN IN THE FIGURE BESIDE.

IDEAL CONNECTION

Distance A = B or as close as possible.

Ex.: If A = 15.74 in, then B should be somewhere between 13.77 and 17.71 in.

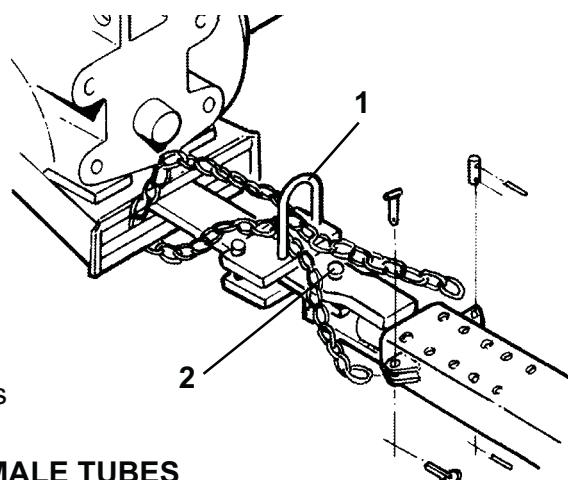


INSTALLING THE SAFETY CHAIN

- Install the safety chain as shown in the figure below and give heed to the following:

- Leave some slack on the chain so that it is not stretched when maneuvering.

- The chain holder (1) must be mounted as close to the hitch pin (2) as possible.



NOTE: Replace the safety chain if one or more links are damaged.

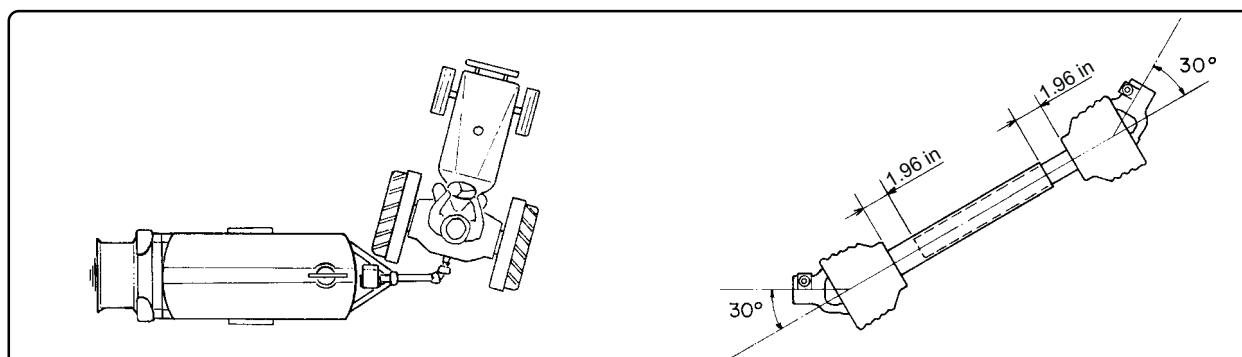
ADJUSTING THE PTO SHAFT MALE AND FEMALE TUBES

- Position the tractor until its rear tire gets close to the sprayer's tongue.

- Connect the PTO shaft.

- Adjust the male and female tubes lengths (recommended overlap: 1.96 in).

ATTENTION: When maneuvering, disengage the PTO and keep the tire from touching the sprayer's tongue, otherwise this will damage the sprayer's transmission.



NOTE: Before cutting the PTO shaft tubes, check for all the possible adjustments of both tractor's drawbar and sprayer's tongue. Make sure the hitch pin is installed with cotter pin.

CONNECTING THE PTO

WIDE-ANGLE CV PTO SHAFT (WITH CV JOINT)

- Adjust the drawbar length in relation to the PTO as shown in the figure beside.

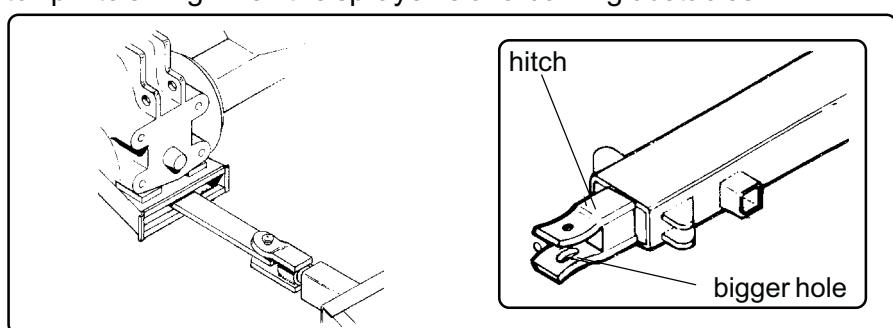
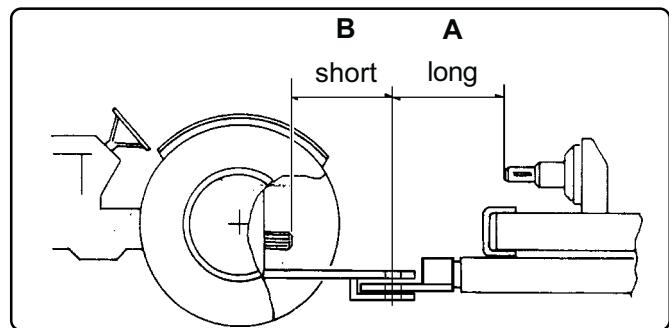
IDEAL CONNECTION

- The distance A must be as long as possible and the B as short as possible. This provides a wider angle to the CV joint.

The ideal is to have A = two times B.

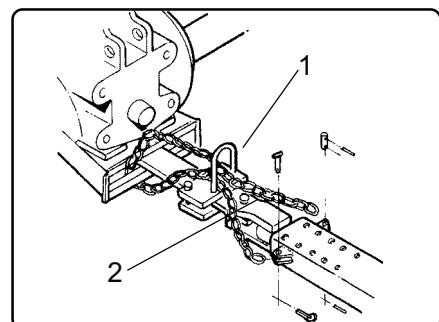
- Hitch the sprayer to the tractor as shown in the figures below.

NOTE: The bigger hole on the hitch must always be set in the lower position since it is designed to allow the hitch pin to swing when the sprayer is overcoming obstacles.



- Install the safety chain as shown in the figure below and give heed to the following:
- Leave some slack on the chain so that it is not stretched when maneuvering.
- The chain holder (1) must be mounted as close to the hitch pin (2) as possible.

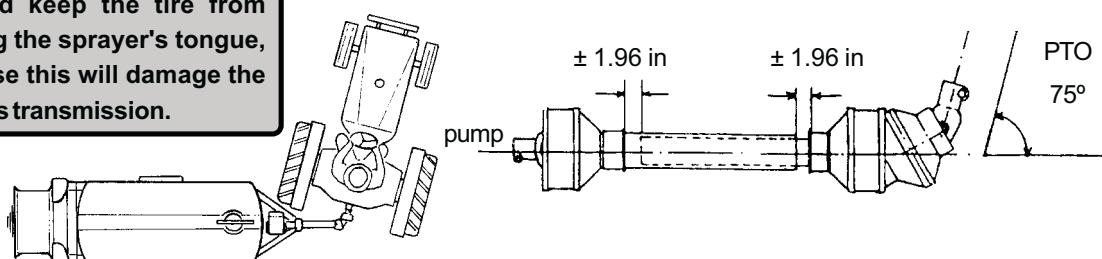
ATTENTION
Replace the safety chain if one or more links are damaged.



ADJUSTING THE PTO SHAFT MALE AND FEMALE TUBES

- Position the tractor until its rear tire gets close to the sprayer's tongue.
- Connect the PTO shaft.
- Adjust the male and female tubes lengths (recommended overlap: 1.96 in).

ATTENTION : W h e n
maneuvering, disengage the
PTO and keep the tire from
touching the sprayer's tongue,
otherwise this will damage the
sprayer's transmission.



ATTENTION: Before cutting the PTO shaft tubes, check for all the possible adjustments of both tractor's drawbar and sprayer's tongue. Make sure the hitch pin is installed with cotter pin.

OPERATION AND ADJUSTMENTS

SPRAY APPLICATION TECHNOLOGY

A successful spray application does not depend only on a good sprayer or correct use of the chemicals but also on factors to be determined in the field under specialized orientation.

Among these factors, some concepts should be part of a criterion of evaluation so that positive results may be attained within the pest control program.

- Ideal time
- Safety
- Application rate
- Good coverage

IDEAL TIME

The ideal time for spraying should be chosen according to the chemical product characteristics, as well as to the field conditions:

- Infestation level of pests, diseases and weeds;
- Infection level of diseases;
- Growing stage of weeds;
- Weather conditions.

SAFETY

When spraying your crops, you must make sure there will be no risk to people, animals and environment. Avoid spraying at hotter times, with humidity below 55% or under windy conditions. **Do not allow the operator to handle chemicals and spraying machinery without the proper individual protective clothing.**

CORRECT APPLICATION RATE

Any type of application requires that the rate be maintained during the whole spraying work. This will be possible when you have a good sprayer properly calibrated.

This calibration can be obtained through practical methods or formulas. Please refer to the section **OPERATION AND ADJUSTMENTS - CALIBRATING THE SPRAYER**.

GOOD COVERAGE

You have a good coverage when the whole target is sprayed with uniform distribution, with no risk to the environment and with good results in the pest control.

The application rate does not have influence on the treatment results. Therefore good coverages can be attained even with different rates, which may vary according to operational and regional factors.

IMPORTANT!

READ CAREFULLY AND FOLLOW STRICTLY THE INSTRUCTIONS ON THE CHEMICALS MANUFACTURER'S LABEL.

ALWAYS FOLLOW DIRECTIONS OF A TECHNICIAN WHEN HANDLING AND APPLYING CHEMICALS.

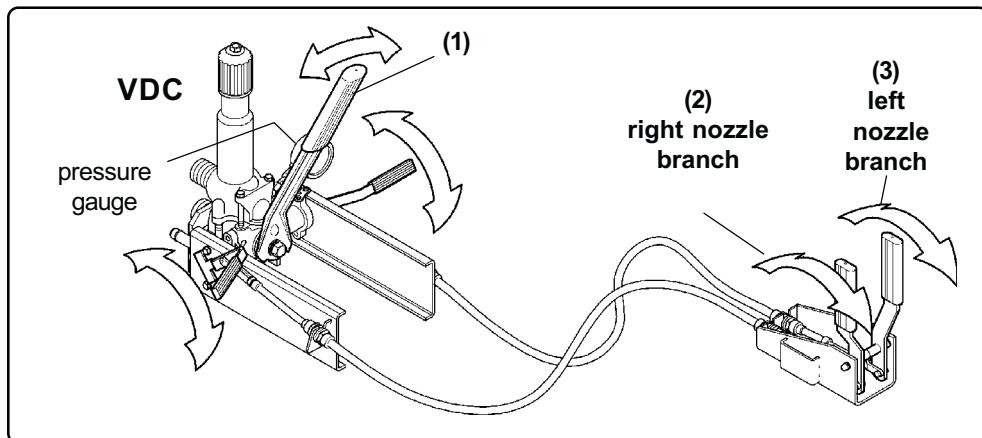
ALWAYS MAKE SURE THE SPRAYER IS IN GOOD OPERATIONAL CONDITIONS BEFORE STARTING THE SPRAYING JOB AND EMPLOY A WELL TRAINED OPERATOR.

OPERATION AND ADJUSTMENTS

CHEMICAL CONTROL

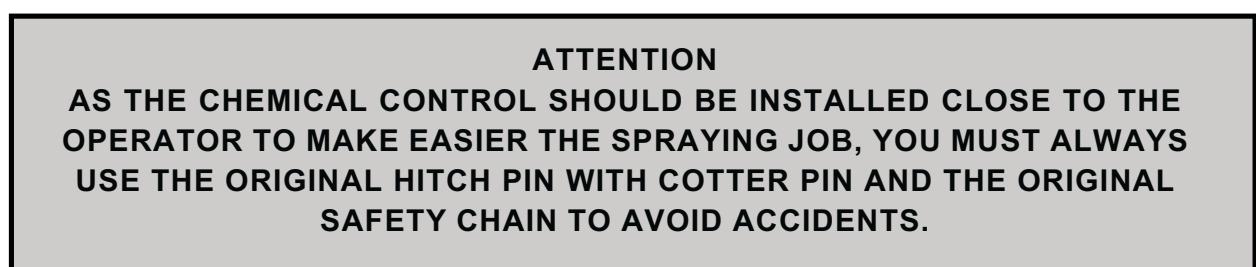
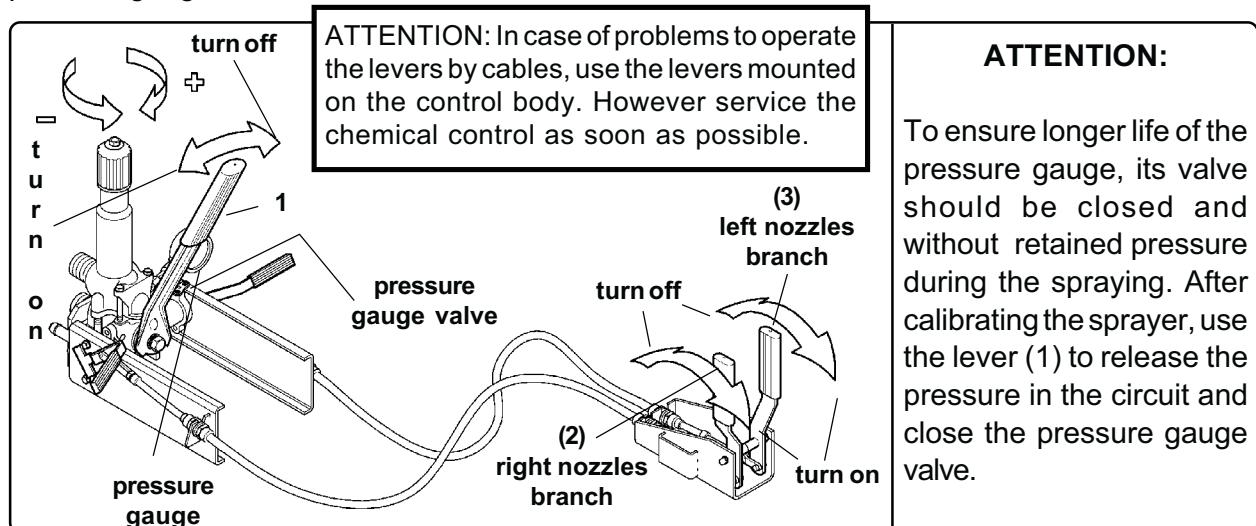
The pressure regulator control provides adjustments that ranges from 2 to 35 kgf/cm² (30 to 500 psi), shown in the pressure gauge.

The levers (1), (2), and (3) have different functions: lever (1) turns the chemical flow on and off, and levers (2) and (3) distribute the chemical flow to the left and right nozzle branches, making the spraying easier and more economical.



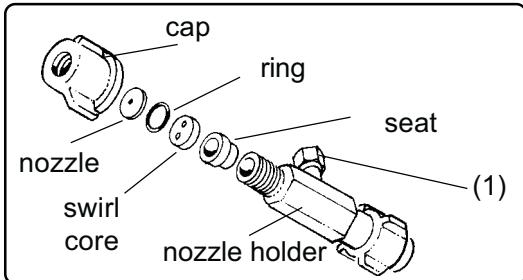
REGULATION THE PRESSURE

- Run the tractor PTO and accelerate it gradually until reaching 540 rpm.
- Set the lever (1) to turn on the chemical flow.
- Set the lever (2) and (3) to turn on the chemical flow to both nozzles branches.
- Turn the knob (clockwise to increase the pressure - counterclockwise to decrease the pressure) until obtaining the desired pressure.
- After readjusting the pressure, set the lever (1) back to turn off the chemical flow, and close the pressure gauge valve.



OPERATION AND ADJUSTMENTS

NOZZLE HOLDER WITH VALVE



The nozzles holders with valve can be adjusted to desired angle and can be shut off individually.

NOTE: To adjust the nozzle, loosen the nut (1), set it in the desired position and retighten the nut.

ATTENTION: Do not overtighten the nut.

DOUBLE NOZZLE HOLDER (OPTIONAL)

DIRECTING THE NOZZLE

Loosen the nut (1) and set the desired nozzle at the mark (A) existing on the nozzle holder.

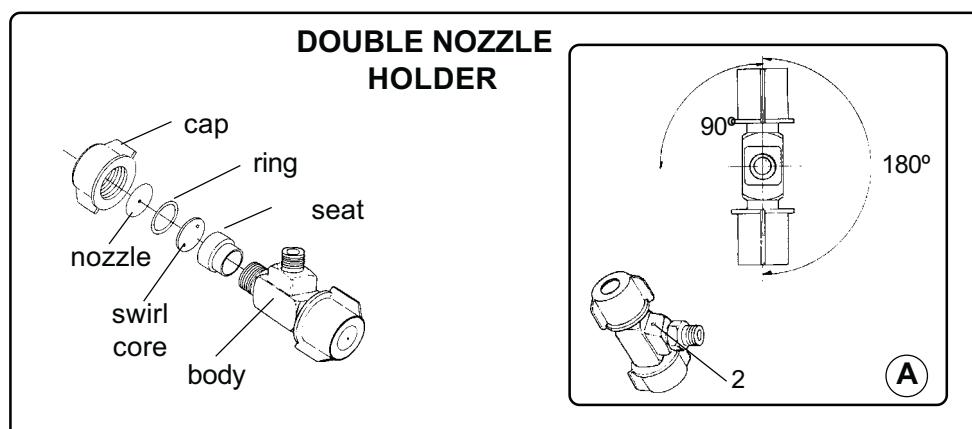
NOTE: This mark indicates the spray direction. So the nozzle at this mark is turned on.

CHANGING THE SPRAYING VOLUME

With a simple 180° turn of the nozzle holder it is possible to turn off one nozzle and turn on the other.

SHUTTING THE FLOW

Just give the nozzle holder a 90° turn in relation to the mark (A) and the flow will be turned off.



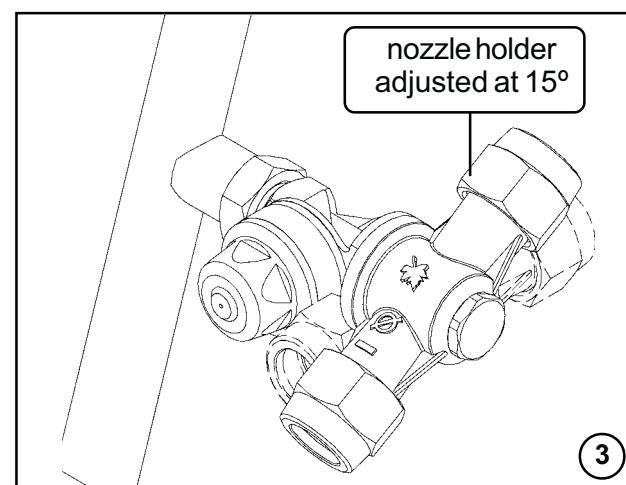
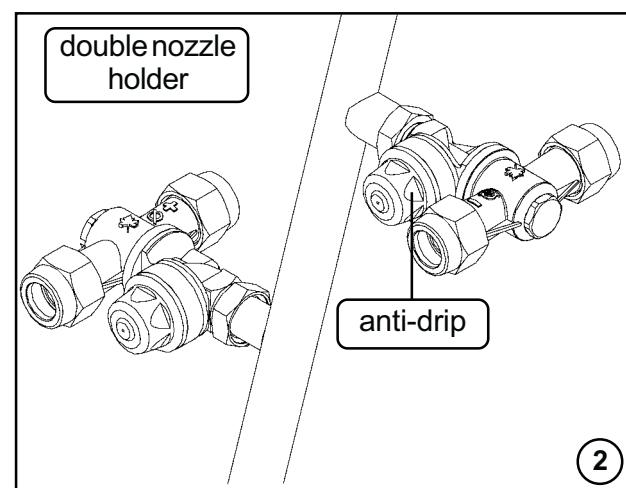
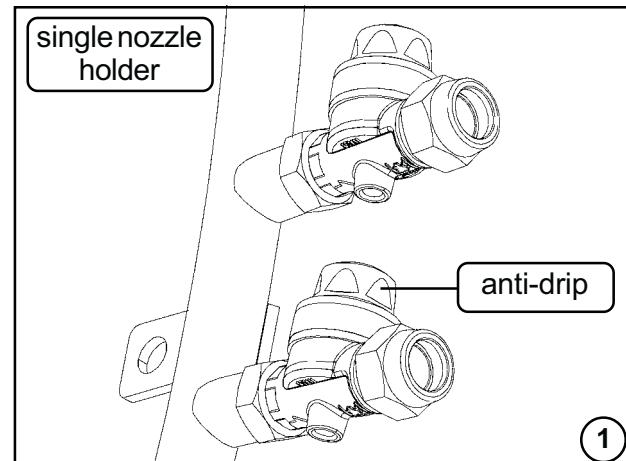
OPERATION AND ADJUSTMENTS

ANTI-DRIP NOZZLE HOLDERS (OPTIONAL: SUPPLIED UPON REQUEST AT THE TIME OF PURCHASE)

With our anti-drip nozzle holders, operators can use spray nozzles more easily and practically while preventing chemical waste through our anti-drip system. This system prevents chemicals from dripping and contaminating the soil after shut-off.

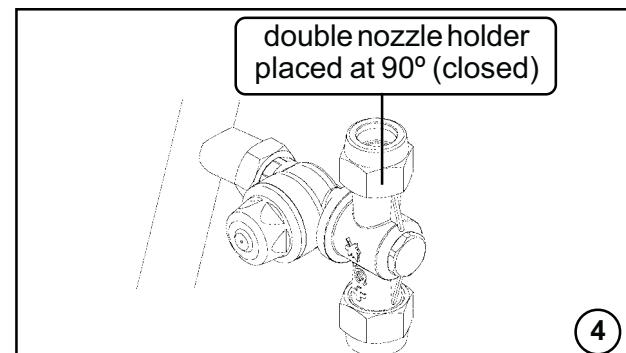
Single nozzle-holder: designed to prevent waste after chemical is depressurized at the segment (segment shut-off/spraying shut-off).

Double nozzle-holder: two types of nozzles can be used in the same nozzle-holder. That makes changing the nozzles easier and more practical. To do so, just turn the nozzle-holder 180°. Nozzle spray direction can also be adjusted up to 15° according to fig. 3. When shutting-off spraying, hold nozzle at 90° (fig. 4). Our double nozzle-holder was designed to prevent chemical waste after it is depressurized at the segment (segment shut-off/spraying shut-off).



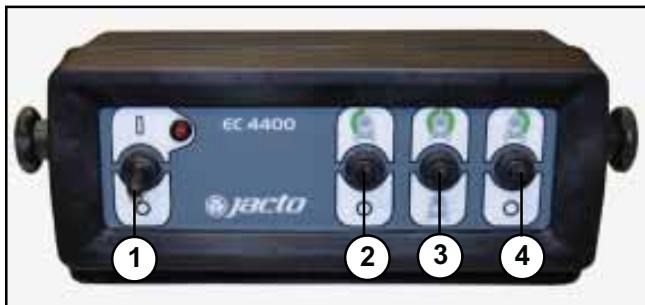
ATTENTION

The anti-drip system closes spraying when pressure inside spraying circuit if below 15 lbf/pol².



OPERATION AND ADJUSTMENTS

ELECTRICAL CONTROL EC 4400 (OPTIONAL: SUPPLIED UPON REQUEST AT THE TIME OF PURCHASE)



ATTENTION

Turn switch 3 on before starting spraying from left to right segments.

NOTE

In case the electrical unit does not work, the spraying segments will remain opened. In this case, the VAR command may be used to open or close them manually.

With the electrical unit it is possible to control the opening and closing of spraying segments (left and right sides).

Switch 1: Turns on and off the electrical unit;

Switch 2: Opens left spraying segment;

Switch 3: Opens both left and right spraying segments;

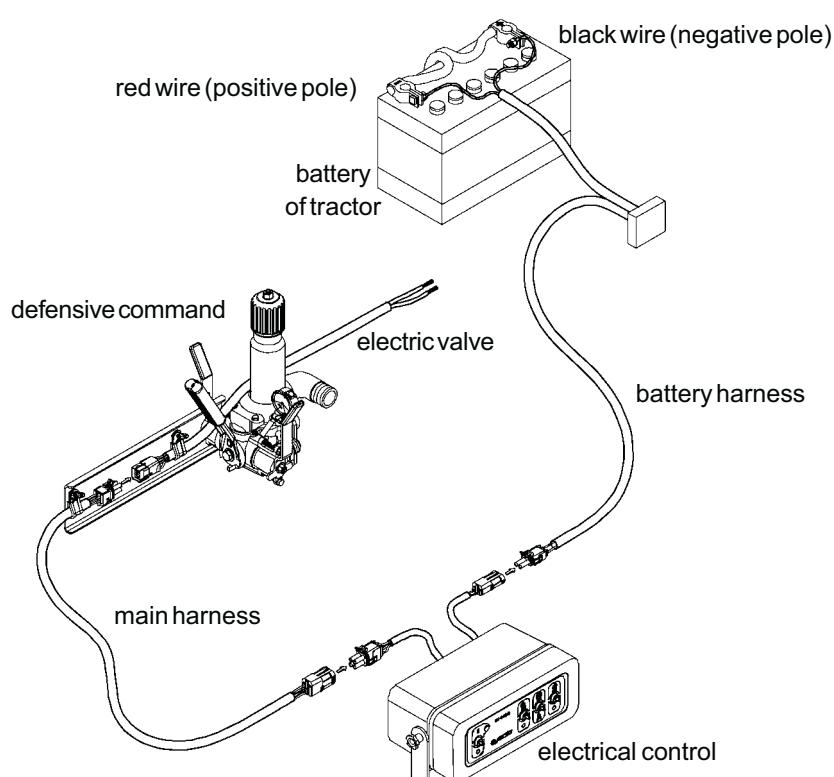
Switch 4: Opens right spraying segment.

The electrical control EC 4400 should be placed within easy access over its mobile base which can be adjusted longitudinally according to the type of tractor or even to the need of the operator.

ASSEMBLY DIAGRAM FOR ELECTRICAL CONTROL

ATTENTION

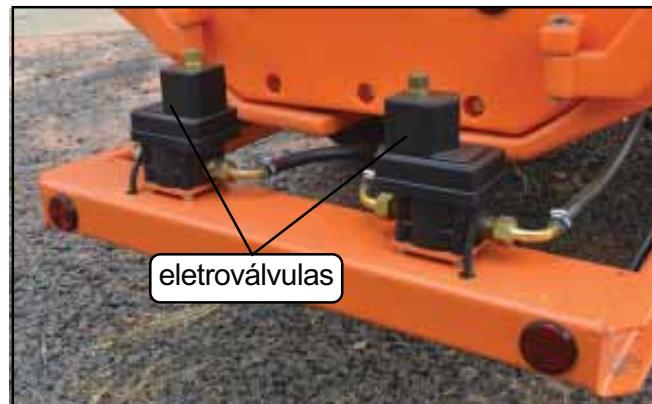
Pay close attention to the position of harness connectors to avoid damaging the circuits.



OPERATION AND ADJUSTMENTS

LINE FILTERS (OPTIONAL: SUPPLIED WHEN THE MACHINE IS EQUIPPED WITH ELECTRICAL UNIT EC 4400)

The line filters retain impurities of chemicals, which damage the spraying, before they reach the electric valves, segments and nozzle holders. There is a line filter installed in the pressure line before each electric valve.



TECNICAL SPECIFICATIONS FOR LINE FILTERS

Maximum work pressure	300 lbf/pol ²
Filter mesh	80 ou 50
Hose nozzle	ø 3/4"

OPERATION AND ADJUSTMENTS

FAN

The fan has a locking device designed to be used during the tank filling, agitation of chemical mixture while spraying, as well as for spray lance application. The use of this device reduces power consumption in any of said operations.

In order to reach the fan locking device, it is necessary to use a universal key ø3 (provided together with the machine in the accessories box) which will open the access door.

To turn the fan off, pull the lock and give it a quarter turn. To turn it on, set the lock back. After these procedures, close the access door.

For tractors with independent PTO, the following is recommended:

- Do not engage the PTO with the engine accelerated.
- With the engine idling, engage the PTO and gradually accelerate until reaching the recommended rpm.



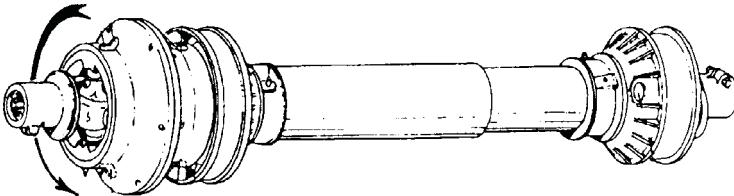
ATTENTION

- Always disengage the PTO and wait for the fan to stop completely before handling the lock or unlock.
- The equipment shall never be used with the fan locking device access door opened. The access door shall never be opened with the tractor on and the PTO shaft engaged.

OPERATION AND ADJUSTMENTS

WIDE-ANGLE CV PTO SHAFT

- The WIDE-ANGLE CV PTO SHAFT is a component whose advantage in relation to standard PTO shafts is to allow turns at angles up to 75° with no need to disengage the PTO.
- The sprayer's PTO shaft is equipped with plastic protection guards to prevent the operator and his clothes from touching the PTO shaft and avoid damage to the crops.



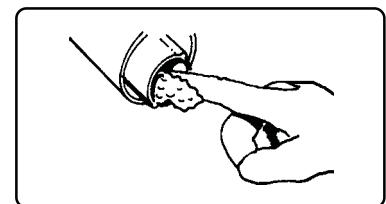
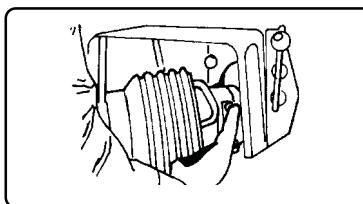
NOTE:

For instruction in detail, please refer to the section MAINTENANCE - PTO SHAFT.

ATTENTION: ALWAYS STOP THE SPRAYER AND TURN OFF THE TRACTOR'S ENGINE BEFORE SERVICING THE PTO SHAFT.
ALWAYS USE THE RECOMMENDED PROTECTIVE CLOTHING, SUCH AS, GLOVES, BOOTS, GOGGLES, ETC., BEFORE ANY KIND OF MAINTENANCE ON THE PTO SHAFT

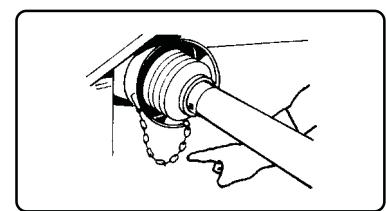
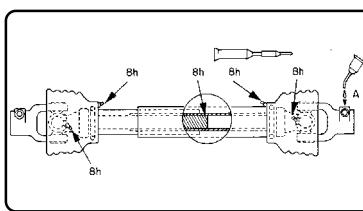
USING AND MAINTAINING

- Check the PTO shaft length.
- Adjust the length by cutting the tubes and protection guards proportionately.



NOTE: File and remove all burrs.

- Lubricate the male and female tubes and further points as figure beside.



- Connect the PTO shaft and install the safety chain.

NOTE: Leave some slack on the chain considering angular movements.

- Disengage the PTO when making sharp turns.

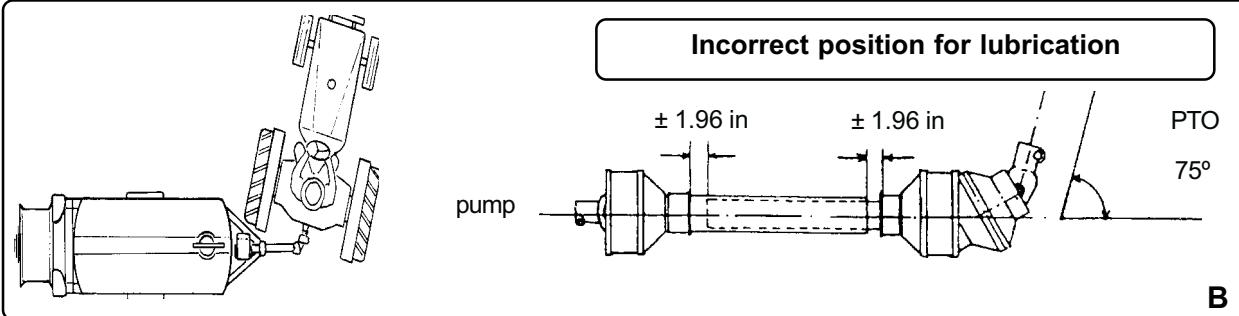
ATTENTION:

ONLY OPERATE WITH PTO SHAFT EQUIPPED WITH PROTECTION GUARDS.

CONNECTING THE PTO

- Adjust the sprayer's tongue and the tractor's drawbar so that there is an overlap of approximately 1.96 in when the tractor is making a sharp turn (that is, when the tractor's tire is touching the sprayer's frame head).

OPERATION AND ADJUSTMENTS

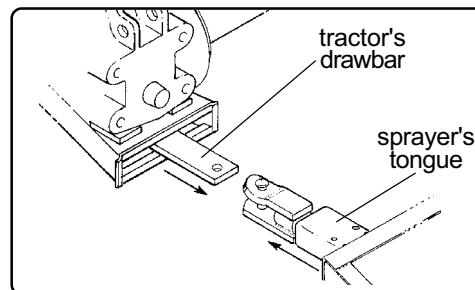


ADJUSTING THE PTO SHAFT LENGTH

a) Before cutting the PTO shaft, **check if it is possible to use it without reducing its length.**

Check:

- The position on the tractor's drawbar.
- If the sprayer's tongue can be adjusted for longer.

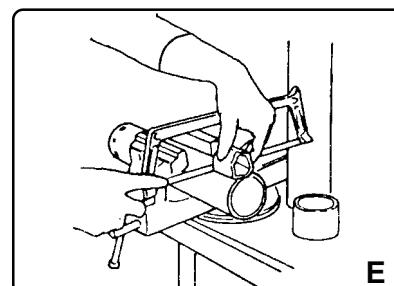
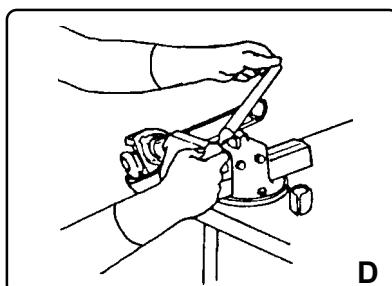
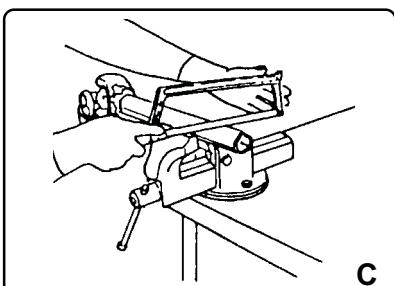
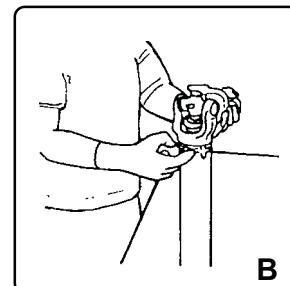
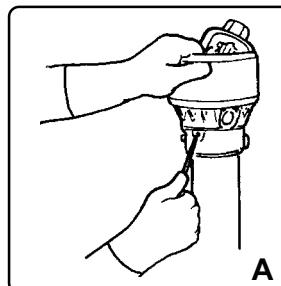


b) Cutting the shaft

- Dismantle the protection guards as shown in the figures **A** and **B**.
- Cut the two tubes (male and female) at the desired dimensions (figure **C**).
- Remove the burrs resulting from the cutting operation as well as the filings resulting from the burrs removal (figure **D**).
- Cut the guard tubes length using as measure reference the pieces of the tubes cutted (figure **E**).
- Clean the residues of cutting.

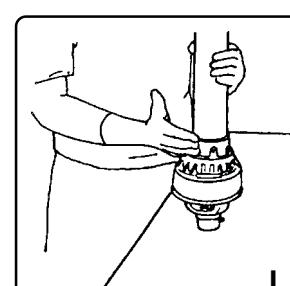
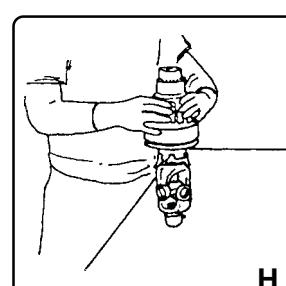
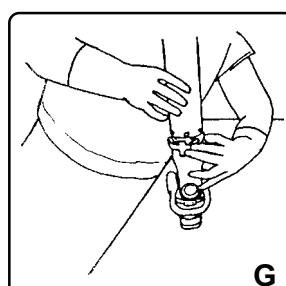
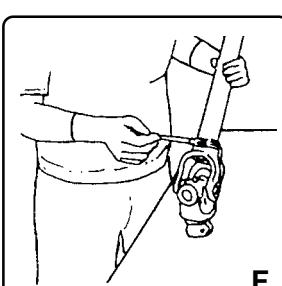
ATTENTION

ONLY OPERATE WITH PTO SHAFT EQUIPPED WITH PROTECTION GUARDS. ALWAYS USE THE INDIVIDUAL PROTECTIVE EQUIPMENT DURING THE MAINTENANCE OF THE PTO SHAFT.



c) Assembling

- Assemble the PTO shaft as shown in the figures **F,G,H,I** and lubricate it if necessary.



OPERATION AND ADJUSTMENTS

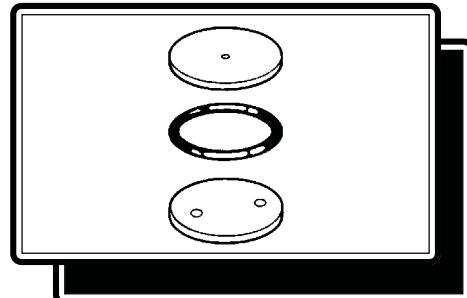
HOLLOW AND FULL CONE NOZZLES - SERIES J

HIGH QUALITY CERAMIC HIGH RESISTANCE TO WEAR

The alumina-sintered nozzles are almost as hard as diamond and resist yet the most corrosive chemicals. This ensures perfect stability for long time besides meeting the requirements for flow, coverage and droplet size.

These nozzles are recommended for fruit trees because of their excellent performance in high volume spraying.

NOTE: As there are many options for row spacing and number of nozzles per branch, we do not list any table showing the spraying volume as it can be obtained through the formula specified in the section OPERATION AND ADJUSTMENTS - CALIBRATING THE SPRAYER.



FLOW RATE TABLE

Nozzle model	Pressure (psi)							
	75	100	150	200	250	300	350	400
Flow rate (gpm)								
*J4-2 hollow cone	0,28	0,32	0,40	0,45	0,50	0,54	0,59	0,63
J4 - 3 full cone	0,41	0,48	0,58	0,67	0,75	0,83	0,89	0,95
*J5 - 2 hollow cone	0,41	0,48	0,58	0,67	0,69	0,81	0,88	0,94
J5 - 3 full cone	0,70	0,80	0,97	1,13	1,26	1,38	1,49	1,60
J6 - 2 hollow cone	0,60	0,70	0,84	0,97	1,08	1,19	1,28	1,36
J6 - 3 full cone	1,17	1,34	1,63	1,89	2,11	2,30	2,48	2,66

Pressure band not recommended because it will cause premature wear to nozzles.

*

Nozzles mounted to the equipment (J4-2 = 52 nozzles / J5-2 = 52 nozzles)

ORDERING

Nozzle model	J4 - 2	J4 - 3	J5 - 2	J5 - 3	J6 - 2	J6 - 3	Ring
Part #	325423	819607	325431	327486	325449	327494	913335

Specify nozzle model and part #. Ex: J5-2, part # 325431.

OPERATION AND ADJUSTMENTS

CALIBRATING THE SPRAYER

The safety of people, animals and environment depends on correct spray applications. Therefore, we list below some operational procedures.

WHEN HANDLING THE CHEMICALS

- Follow strictly the instructions on the labels.
- Use individual protective equipment.
- Do not eat, drink or smoke.
- Choose a ventilated place.
- Wash with water and soap the parts of the body touched by chemicals.

WHEN HANDLING THE SPRAYER

- Check for the proper working conditions of the sprayer.
- Do not blow by mouth nozzles, valves or tubes.
- Do not spray against the wind.
- Do not spray in hotter times.
- Use individual protective clothing recommended.
- Do not eat, drink or smoke.

REMEMBER

You are responsible for the success of the application.

PROCEDURE

The sprayer can be calibrated by obtaining the spraying volume through the following formula:

$$GPA = \frac{GPM \times 495}{MPH \times S}$$

Where:

GPA : Application volume in gallons per acre

GPM : Application volume in gallons per minute

MPH : Tractor speed in miles per hour

S : Row spacing width in feet

495 : Conversion factor

EXAMPLE:

Row spacing: 16.40 x 22.96 ft (115 trees/acre)

$$GPA = \frac{GPM \times 495}{MPH \times S} \quad GPA = \frac{33.55 \times 495}{2.5 \times 22.96} \quad GPA = 289 \text{ gallons per acre}$$

$$\text{SPRAYING VOLUME PER TREE: } \frac{289}{115} = 2.51 \text{ (gallons/tree)}$$

OPERATION AND ADJUSTMENTS

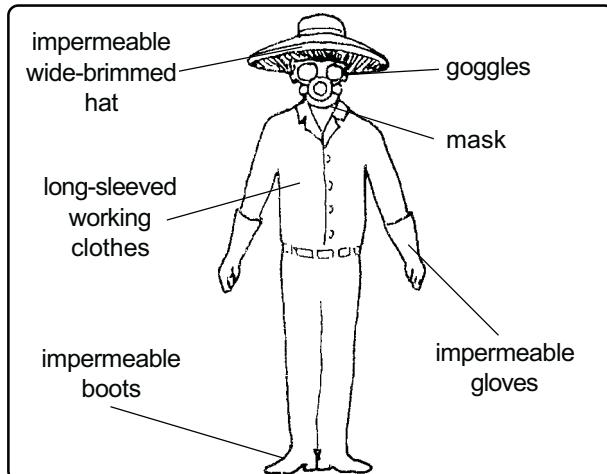
DILUTING THE CHEMICALS

ATTENTION

NEVER run the sprayer for with less than 13.20 gallons of water in the tank to avoid damage to the pump.

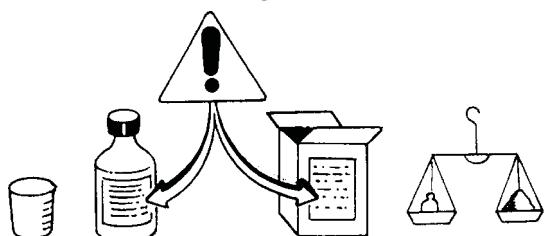
Always use the following individual protective clothing when handling chemicals:

- Impermeable wide-brimmed hat
- Goggles
- Mask
- Long-sleeved working clothes
- Impermeable gloves
- Impermeable boots

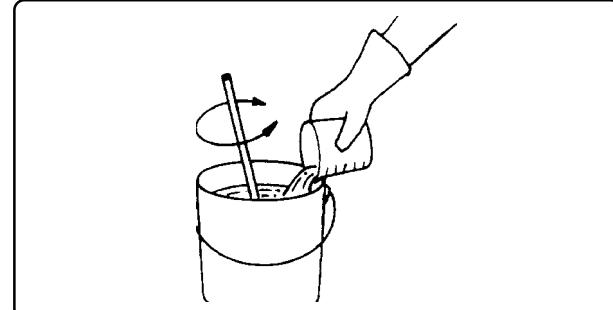


PREPARING THE CHEMICAL MIXTURE

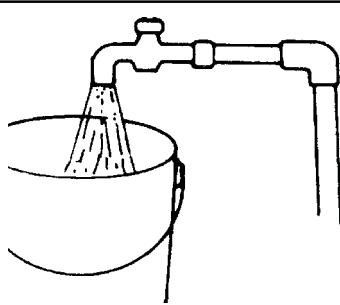
ATTENTION



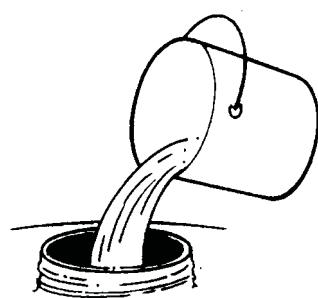
- Read carefully the chemicals manufacturer's label.



- Pour the chemicals into a bucket with little water and stir.



- Add water until filling the bucket up.
- Stir until the mixture is homogeneous.



- Pour the solution into the sprayer's tank.
- Install the tank lid and make sure there is no leakage.

ATTENTION
ALWAYS FOLLOW TECHNICAL RECOMMENDATIONS
WHEN HANDLING CHEMICALS.

OPERATION AND ADJUSTMENTS

CLEAN WATER TANK - SUCTION FILTER VALVE

With the purpose of maintaining the sprayer and providing safety when discarding chemical containers, the Arbus Sapphire has a 23.77 gallons clean water tank that allows to clean the sprayer chemical circuit and the chemical containers.



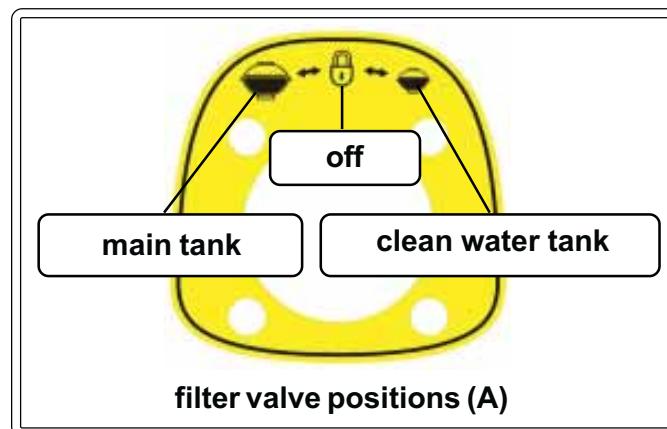
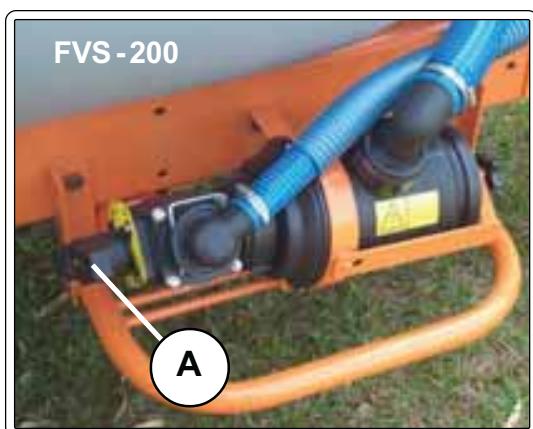
ATTENTION:

The water from this tank is not fit for drinking, or even washing hands, faces, tools, etc. It must be used only to clean the chemical circuit and to fill the chemical containers for the final rinse.

Cleaning the chemical circuit:

- Complete the clean water tank and then set the filter valve turned to the clean water tank.
- Engage the tractor's PTO and keep the chemicals control setting to turn on the flow to the nozzles.
- Attention to this operation because the tank will be drained in approximately 2 minutes and the lack of water on the pump can cause damage to its components.
- Then set the filter valve back, leaving it turned to the main tank once this position is used to spray.

NOTE: To turn off the water flow to the filter and allow its cleaning, set the valve on off position.



USE THE RECOMMENDED PROTECTIVE CLOTHING FOR THIS OPERATION.

OPERATION AND ADJUSTMENTS

INSTRUCTIONS TO EMPTY AND REMOVE THE CLEAN WATER TANK

ATTENTION: USE THE RECOMMENDED PROTECTIVE CLOTHING FOR THIS OPERATION.

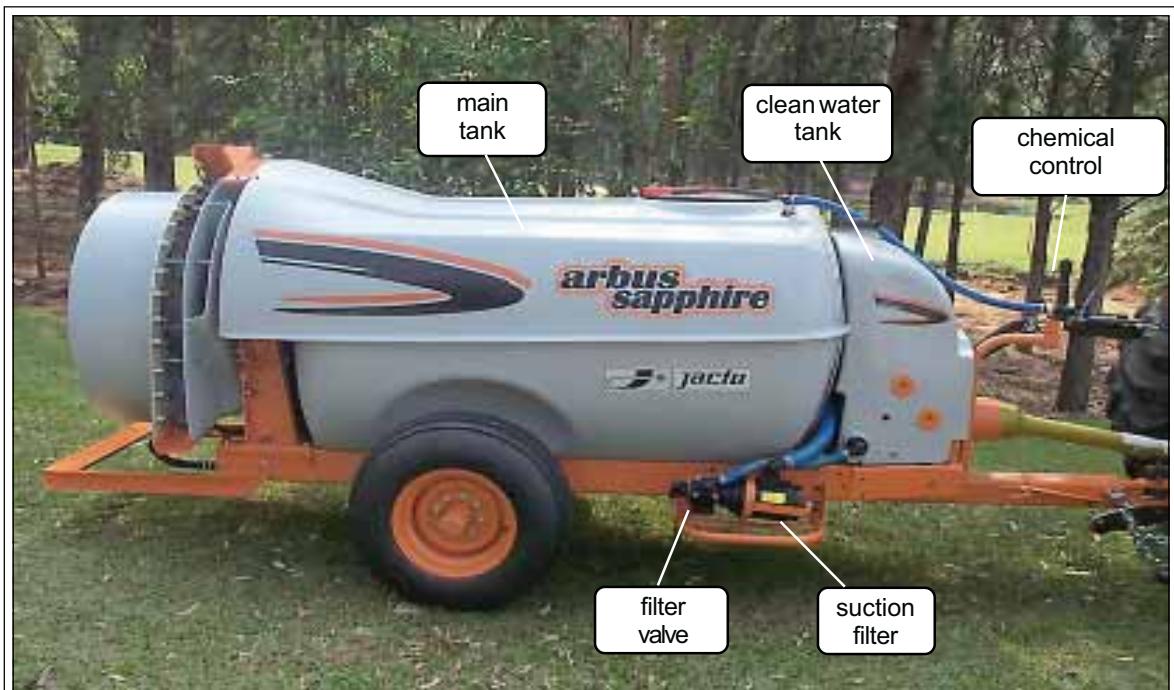
To empty the clean water tank, proceed as follows:

- Remove the fastening clamp of the suction hose using a tool and then the suction hose of the tank.



When maintaining the pump, remove the clean water tank as follows:

- Empty it by removing the suction hose;
- Loose the bolts of the two sides that fasten the tank to the chassis and the upper bolt that fasten this tank to the main tank;
- Remove the tank lid;
- With one hand on the tank opening and other hand on the tank base, pull it up.



OPERATION AND ADJUSTMENTS

CHEMICAL CONTAINER PRESSURE WASH

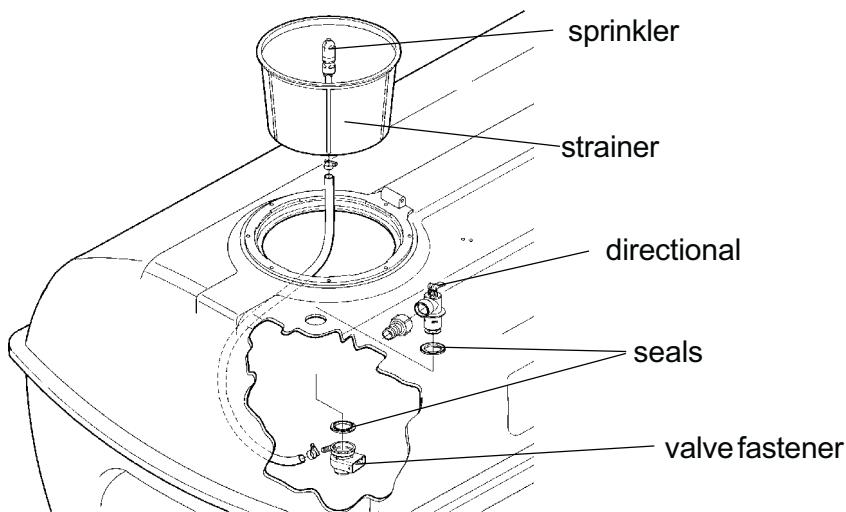
The chemicals are packaged in appropriate containers for each type of product.

After emptying the containers, they must be discarded in a safety way, in order not to poison the man and the environment.

It is very important, before any discard of empty containers, to remove the residues of the product that are stucked inside it and make it useless by piercing it.

Metal, plastic and glass containers must be rinsed for decontamination.

To facilitate this important operation, Jacto has installed on its trailede sprayers a suitable device that rinses internally the containers with pressurized water, eliminating most of the residues.

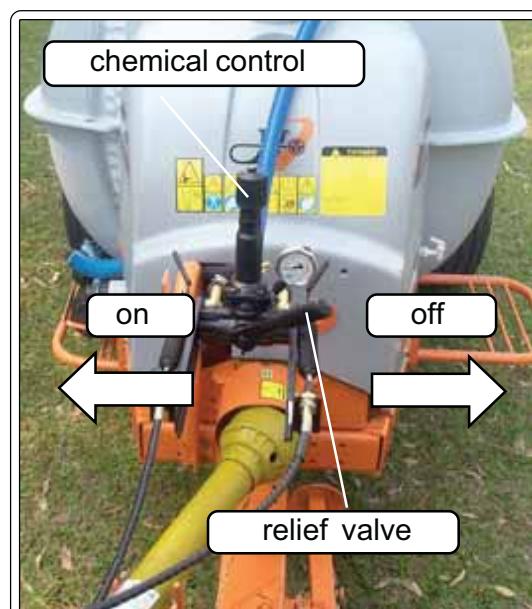


PROCEDURES TO USE THE CONTAINER RINSE NOZZLE.

- Fill the chemical tank up to approximately 50% of its capacity.
- Pour the chemical into the tank.
- Engage the tractor PTO.

NOTE: The relief lever of the chemical control must be set to allow the chemical return to the tank (off) and the suction filter valve must be with the arrow turned to the main tank.

ATTENTION: USE THE RECOMMENDED PROTECTIVE CLOTHING FOR THIS OPERATION.

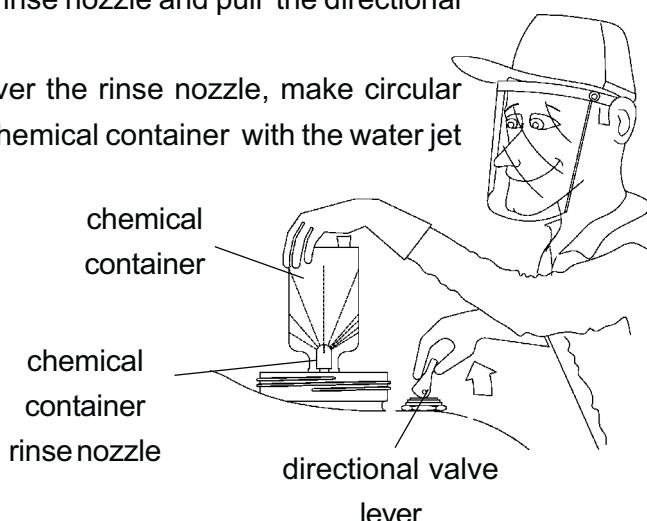


MAINTENANCE

- Hold the chemical container over the rinse nozzle and pull the directional valve lever to wash inside the container.

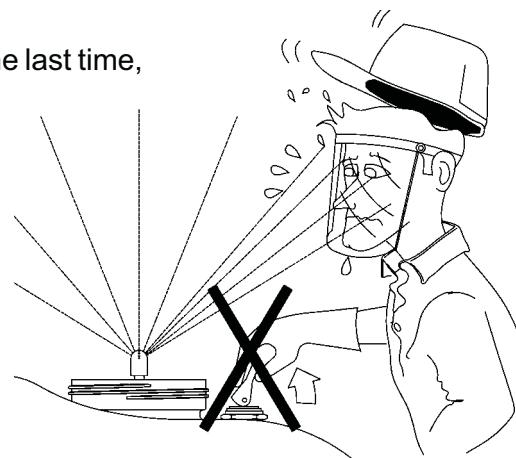
NOTE: With the chemical container over the rinse nozzle, make circular movements to reach all internal walls of the chemical container with the water jet for around 30 seconds.

- Fill up the sprayer tank with water.

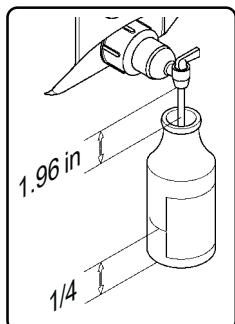


ATTENTION: Never pull the directional valve without the chemical container over the container rinse nozzle.

- After rinsing the chemical container, wash it for the last time, using clean water from the 23.77 gallons tank.



WASHING THE CHEMICAL CONTAINER



NOTE: To keep from contaminating the water and the clean water tank tap during the filling of the chemical container, hold the container at least 1.96 in away from the tap and fill the chemical container with water up to 1/4, as shown.

- Fit the container cap and tight it very well to avoid leakage during the agitation.

- Agitate the container strongly in all ways (horizontal and vertical), during approximately 30 seconds to remove the residues that are sticked to the container internal walls.

- Take the container cap off and carefully pour the rinse water into the spray tank.

- Keep holding the container over the spray tank opening until the last drop.

- Repeat this operation twice more, thus completing the triple wash.

- Next, make the container useless by piercing it. Make sure their labels are not damaged for identification purposes.



ATTENTION: USE THE RECOMMENDED PROTECTIVE CLOTHING FOR THIS OPERATION.

MAINTENANCE

GUIDELINES

After the first working hours, check if the bolts, nuts, clamps on the tanks, wheel and axle are well installed. Retighten them if necessary.

Daily, after finishing the spray application, put clean water in the tank, remove the nozzles and run the sprayer till empty.

Clean and reinstall the nozzles.

Clean the main filter.

Rinse off the inside and outside of the sprayer.

ATTENTION

**NEVER WASH SPRAYERS OR INDIVIDUAL PROTECTIVE EQUIPMENT
IN OR CLOSE TO RIVERS, LAKES, STREAMS, BROOKS, DAMS, ETC.**

Take off and wash the individual protective clothing separated from other clothes.

Take a shower with plenty of water and soap and change your clothes.

These procedures will avoid future problems caused by strainer, nozzle and tube obstructions and prolong the sprayer's life, as well as protect yourself.

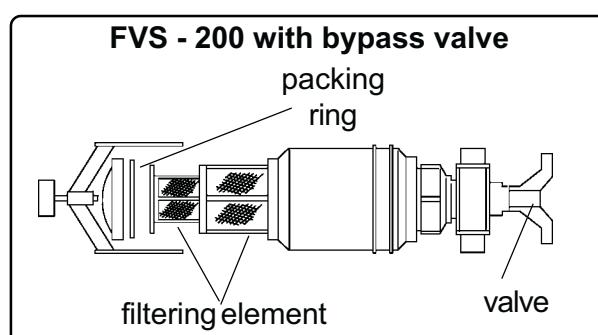
COMPONENTS

**ATTENTION: USE THE RECOMMENDED PROTECTIVE CLOTHING DURING
THE MAINTENANCE OF THE COMPONENTS.**

MAIN FILTER

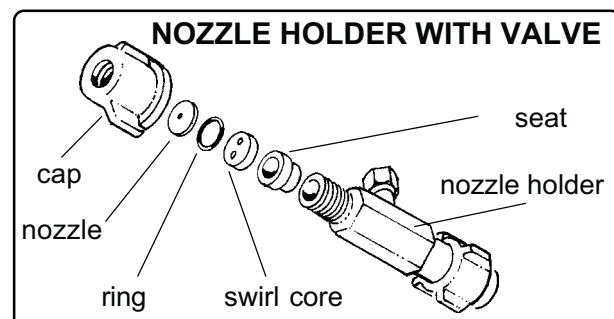
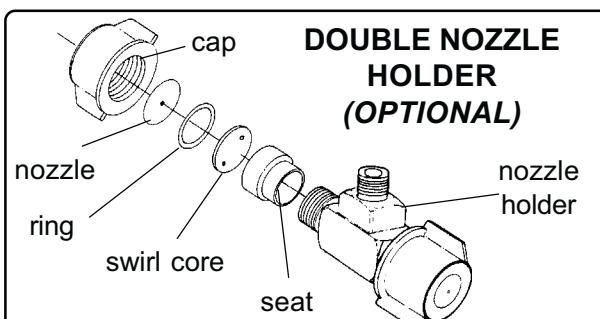
The frequency of filter cleaning will depend on the quality of water and type of agrochemicals applied.

Clean the filter when filling the tank or whenever necessary.



NOZZLE HOLDER

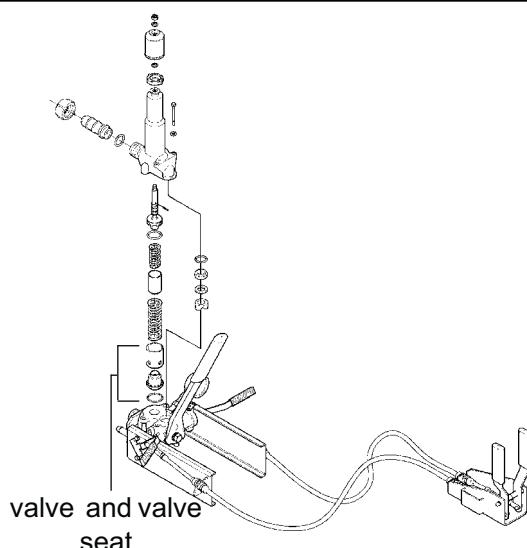
- Clean the nozzle holders daily or whenever necessary.



MAINTENANCE

PRESSURE REGULATOR (VDC)

- Disassemble the pressure regulator every 100 working hours.
- Check for wear on the valve and valve seat.
- Replace the parts if necessary.



LUBRICATION TABLE

PRODUCT	LOCATION	QTY.	FREQUENCY	SPECIFICATIONS	RECOMMENDED PRODUCTS
LUBRICATING OIL	JP - 75 PUMP	0.39 gallon	1st CHANGE: AFTER 30 HOURS FURTHER CHANGES: EVERY 100 HOURS	API - SB OR SUPERIOR SAE - 30	ALL INTERNAL COMBUSTION ENGINES WITHIN THIS SPECIFICATION
	JP - 100 PUMP	0.53 gallon			
	JP - 150 PUMP JP - 190 PUMP	0.66 gallon			
GREASE	PTO SHAFT, TRAILER'S HITCH, REAR AND FRONT BEARINGS, MECHANICAL AGITATOR, AND JACK	-	DAILY	LITHIUM BASE NGLI - 2	MULTIFAKEP - 2 MOBILGREASE 77 LUBRAX GMA - 2 BEACON EP - 2 AND SIMILAR PRODUCTS
	WHEEL HUB		500 HOURS		

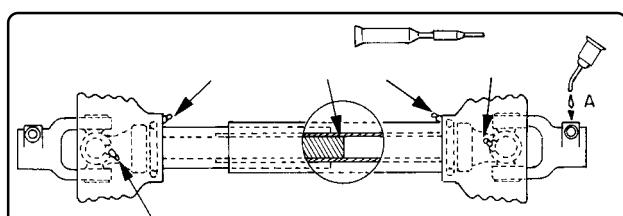
NOTE: The presentation order of the recommended products does not imply preference for any brand or product.

COMPONENTS LUBRICATION

PTO SHAFT

- Lubricate daily.

For instruction in detail, please refer to the section MAINTENANCE - PTO SHAFT.



ATTENTION

Before using the equipment for the first time, clean and lubricate every point of the PTO shaft, as shown in the picture above, with Lithium-based grease NGLI-2 (for further information about the greases, refer to the lubrication table).

MAINTENANCE

COMPONENTS LUBRICATION

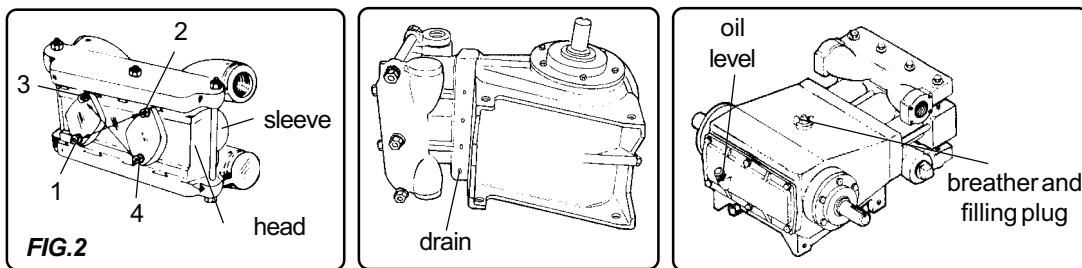
JP-150 PUMP

CHECK DAILY:

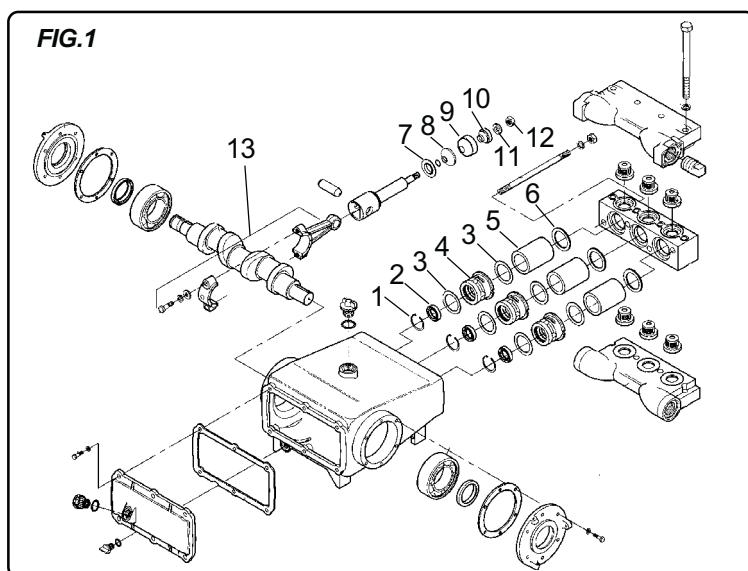
- 1 - The oil level of the pump and complete it if necessary.
- 2 - If there is excessive leak of oil through the drain hole, it can be caused by:
 - a- breather obstruction
 - b- rod retainer deficiency (fig. 1 - no.2)
 - c- sleeve guide seal (fig. 1 - no. 3)
 - d- tightness lack of the head fastening nuts.
- 3 - If there is excessive water leak through the drain hole, it can be caused by:
 - a- piston cup damaged (fig. 1- no. 8)
 - b- packing ring damaged (fig.1 - no. 10)
 - c- tightness lack of the piston cup fastening nuts (fig. 1 - no.12).
- 4 - If there is chemical leak between the sleeve and the head, it can be solved by:
 - a- retightening the head fastening nuts in "X" (fig. 2).
 - b- if the leak persists, replace the seals washer (fig. 1 - no. 6).
- 5 - The presence of internal noises in the pump.
 - a- The pump presents internal noises as a result of the connecting rod neck wear.

ATTENTION: Check the noises closely, because a filter obstruction or a deficiency valve can also cause noises thus providing wrong diagnostic. In this case **NEVER RUN THE PUMP WITHOUT WATER IN THE TANK.**

Always contact your dealer when assembling/disassembling the pump during the warranty period.



- 1- Lock ring
- 2- Rod retainer
- 3- Packing
- 4- Sleeve guide
- 5- Ceramic sleeve
- 6 - Seals washers
- 7 - Scraper ring
- 8 - Piston cup base
- 9 - Piston cup
- 10 - Piston
- 11- Washer
- 12 - Nut
- 13 - Connecting rod

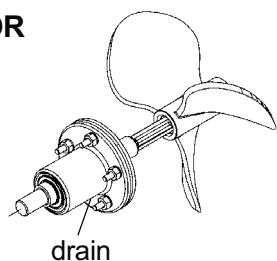


MAINTENANCE

MECHANICAL AGITATOR

- At any sign of the drain leak, replace the mechanical seal. Contact your nearest Jacto dealer.

AGITATOR

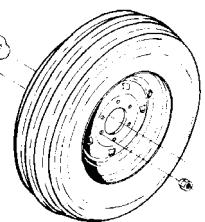


WHEEL HUB

Replace the grease every 500 working hours according to specifications in the lubrication table.

ATTENTION: PLACE THE SPRAYER ON A FIRM AND LEVEL GROUND AND SCOTCH ITS WHEELS BEFORE LUBRICATING THE WHEEL HUB.

WHEEL HUB



LUBRICATION POINTS

- 1 -PTO shaft cross and tubes (Refer to the section MAINTENANCE - PTO SHAFT)
- 2 -Jack
- 3 -Trailer's hitch
- 4 -Mechanical agitator
- 5 -Front and rear bearings



ATTENTION
ALWAYS STOP THE SPRAYER AND TURN OFF THE TRACTOR ENGINE
BEFORE ANY KIND OF MAINTENANCE.

MAINTENANCE

TRACK WIDTH AND GROUND CLEARANCE

TRACK WIDTH

TIRES	TRACK WIDTH (in)	
	MINIMUM	MAXIMUM
11 L 15 / 7.5 x 16	48.36	61.02

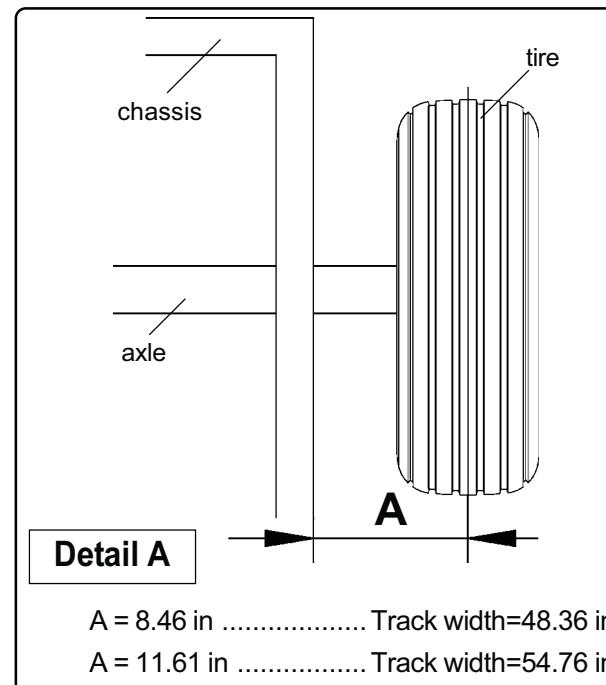
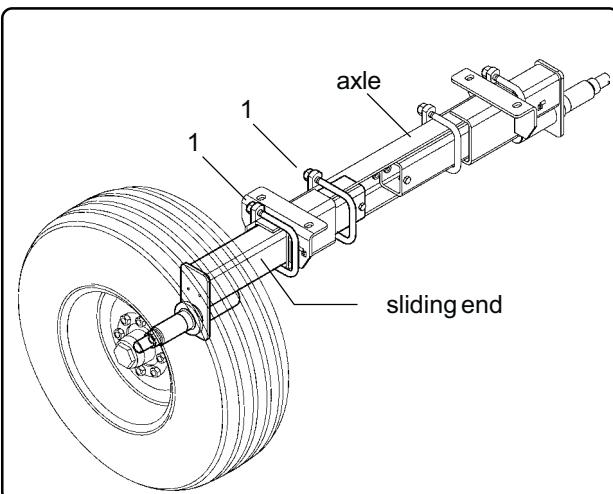
GROUND CLEARANCE

TIRES	GROUND CLEARANCE (in)	
	MINIMUM	MAXIMUM
11 L 15 / 7.5 x 16	8.28	14.52

ADJUSTING THE TRACK WIDTH

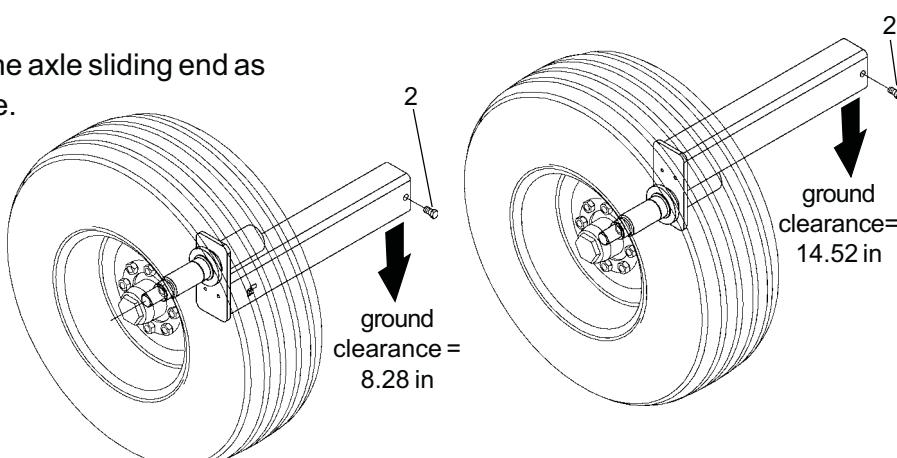
- Raise the trailer back enough enough to suspend the wheels over the ground.
- Loosen the 4 nuts (1) that fasten the sliding end to the axle.
- Slide the axle end measuring the distance from the tire center to the chassis outer face. (example in the detail A).

NOTE: Depending on the sprayer and on the track width desired, it may be necessary to adjust the locking bolt for the high axle. Then you should adjust according to the recommendations in the table "Recommended Minimum Track Width (mm)".



ADJUSTING THE GROUND CLEARANCE

- Raise the trailer back enough to suspend the tires over the ground.
- Loosen the 4 nuts (1) that fasten the sliding end to the axle.
- Remove the bolt (2) that stops the movement of the sliding end.
- Invert the assembly of the axle sliding end as shown in the figures beside.
- Fit the sliding end in the desired position.
- Loosen the 4 nuts (1).
- Fit the bolt (2).



MAINTENANCE

TRACK WIDTH ADJUSTMENT

SAFETY INSTRUCTIONS

- The maximum working speed for the ARBUS Sapphire airblast sprayers must not exceed 4 mph.
- The maximum speed for moving around the ARBUS Sapphire airblast sprayers must not exceed 6.5 mph.

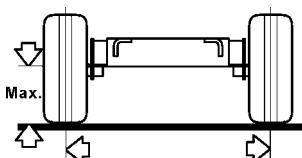
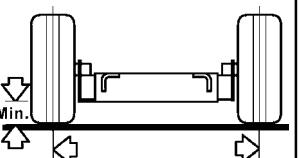
NOTE: For both moving around and working with the sprayer, it is important to have the axle assembled according to the recommendations in the table below. Preferably, for moving around the sprayer at speeds above 5 mph, set the axle with the maximum track width and minimum ground clearance.

- Avoid moving on irregular ground. If it is necessary and the axle is set in the minimum recommended assembly, you must take double care.

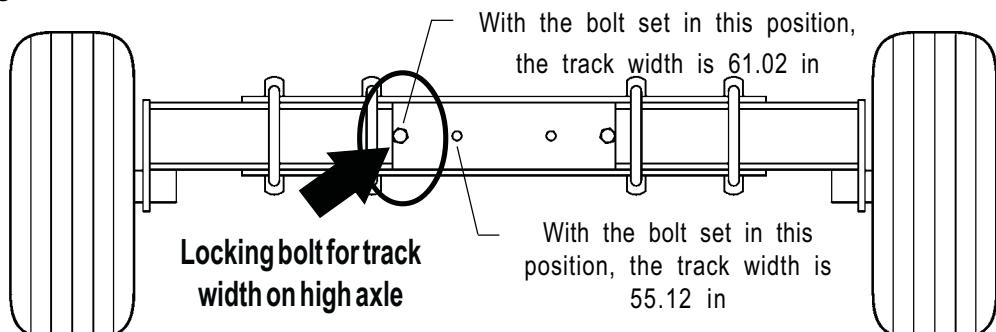
ATTENTION: Irregular ground risks operator's safety and sprayer.

- The axle on the ARBUS Sapphire airblast sprayers are assembled with bolts to block the track width adjustment way when set to high axle. The position of these bolts varies according to the sprayer type.

To adjust the track width and ground clearance, proceed as follows:

		BITOLA (mm/in) MÍNIMA RECOMENDADA	RECOMMENDED MIN. TRACKWIDTH (mm/in)
		TROCHA (mm/in) MÍNIMA RECOMENDADA	
ARBUS 2000 VALÊNCIA	Max.		
ARBUS 2000 EXPORT/USA ARBUSSUPEREXPORT J-2600	1550/61.02	*	*
ARBUS 1500-2000 GOLDEN ARBUS 1500 DIAMOND ARBUS 2000 CAFÉ	1400/55.11	1230/48.42	
ARBUS 2000 CERRADO	1550/61.02	1400/55.11	
* NÃO É POSSÍVEL - NOT ALLOWED - NO ES POSIBLE			

ATTENTION: To adjust the track width, be alert to the position of the locking bolt, and adjust according to the dimensions recommended in above table.



MAINTENANCE

CONVENTIONAL PTO SHAFT

ATTENTION: ALWAYS STOP THE SPRAYER AND TURN OFF THE TRACTOR'S ENGINE BEFORE SERVICING THE PTO SHAFT. ALWAYS USE THE INDIVIDUAL PROTECTIVE EQUIPMENT DURING THE MAINTENANCE OF THE PTO SHAFT

01-CONNECTING

- Check the PTO shaft length.
- Adjust the length by cutting the tubes and protection guards proportionately.

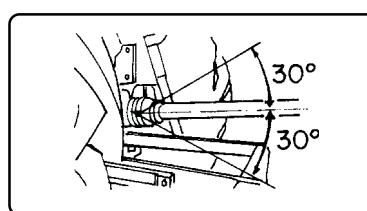
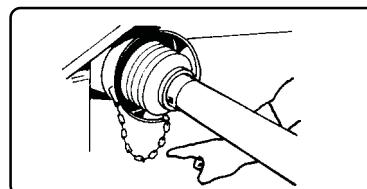
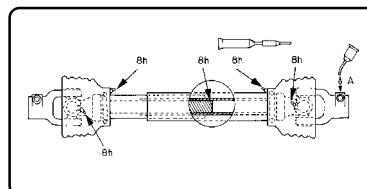
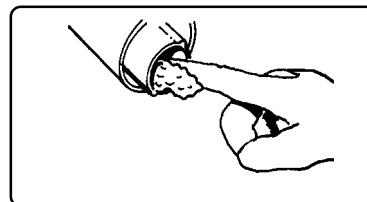
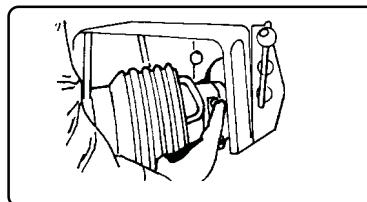
Note: File and remove all burrs.

- Lubricate the male and female tubes.

- Connect the PTO shaft and install the safety chain.

Note: Leave some slack on the chain considering angular movements.

- Disengage the PTO when making sharp turns.

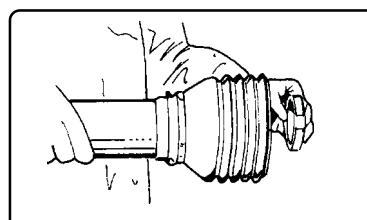
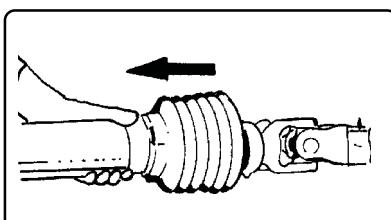
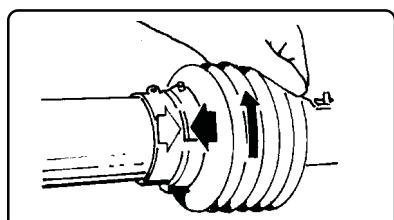
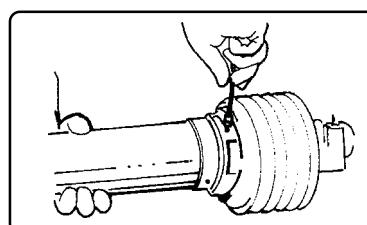


ATTENTION
ONLY OPERATE WITH
PTO SHAFT EQUIPPED
WITH PROTECTION
GUARDS.

02-SERVICING

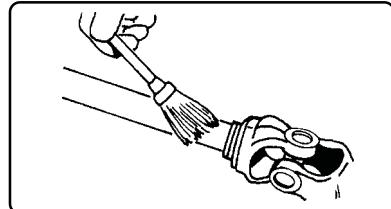
a) DISASSEMBLING

- 1- Remove the lock screw.
- 2- Turn the guard cone until the indicated position.
- 3- Pull the guard cone.
- 4- Remove the sliding ring.

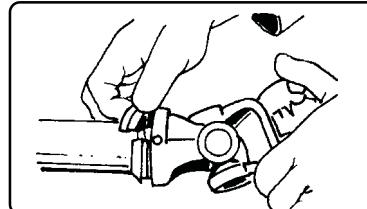


b) ASSEMBLING

- 5-Clean and lubricate the male and female tubes.



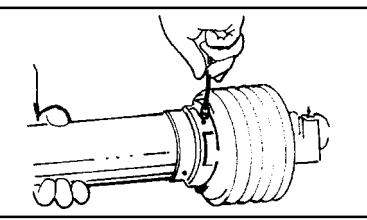
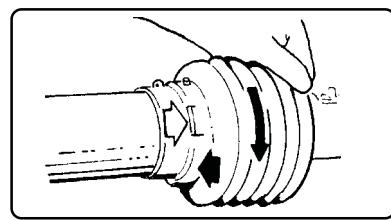
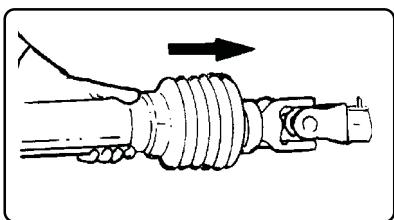
- 6-Install the sliding ring into the fitting with the grooves pointing toward the tube.



- 7-Install the protection guards.

- 8- Turn the guard cone until the indicated position.

- 9- Install the lock screw.



MAINTENANCE

WIDE-ANGLE C.V. PTO SHAFT

ATTENTION: ALWAYS STOP THE SPRAYER AND TURN OFF THE TRACTOR'S ENGINE BEFORE SERVICING THE PTO SHAFT.

The **WIDE-ANGLE CV PTO SHAFT** is a component whose advantage in relation to standard PTO shafts is to allow turns at angles up to 75° with no need to disengage the PTO.

ATTENTION: ONLY OPERATE WITH PTO SHAFT EQUIPPED WITH PROTECTION GUARDS. ALWAYS USE THE INDIVIDUAL PROTECTIVE EQUIPMENT DURING THE MAINTENANCE OF THE PTO SHAFT.

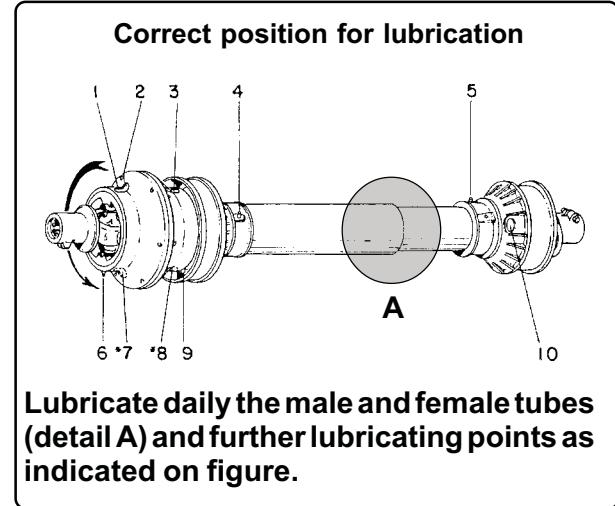
INSTRUCTIONS

1 - LUBRICATION

- Lubricate the points indicated in the figure **A** every 8 working hours.

NOTE: The points (7) and (8) are opposite the points (1) and (3), so turn the guard cone as shown in the figure **A**.

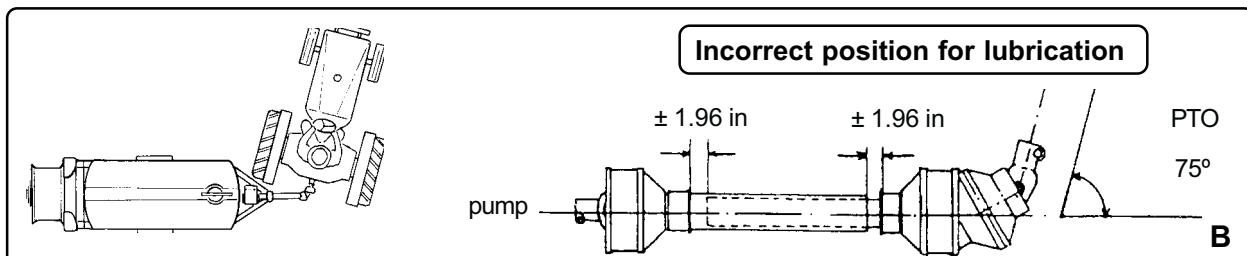
NOTE: Every thirty/fifty working hours dismantle the protection guards, clean and wash the parts, lubricate and assemble the PTO shaft.



ATTENTION: Only lubricate the PTO shaft with the CV joint aligned to the male and female tubes; otherwise, the lubrication will not be appropriate and the PTO shaft can be damaged.

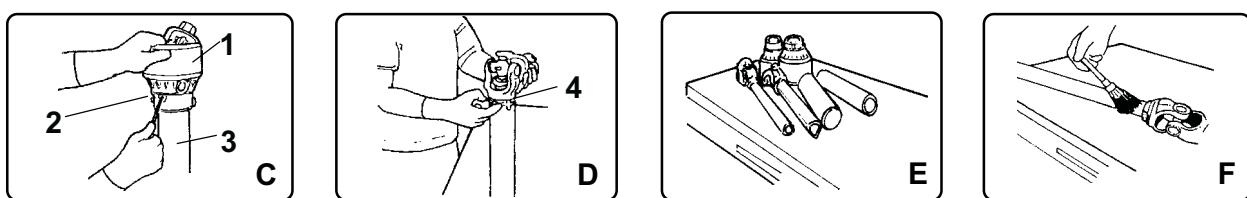
2 - CONNECTING THE PTO

- Adjust the sprayer's tongue and the tractor's drawbar so that there is an overlap from 1.18 to 1.96 in when the tractor is making a sharp turn (that is, when the tractor's tire is touching the sprayer's frame head).



3 - DISASSEMBLING THE PTO SHAFT FOR LUBRICATION

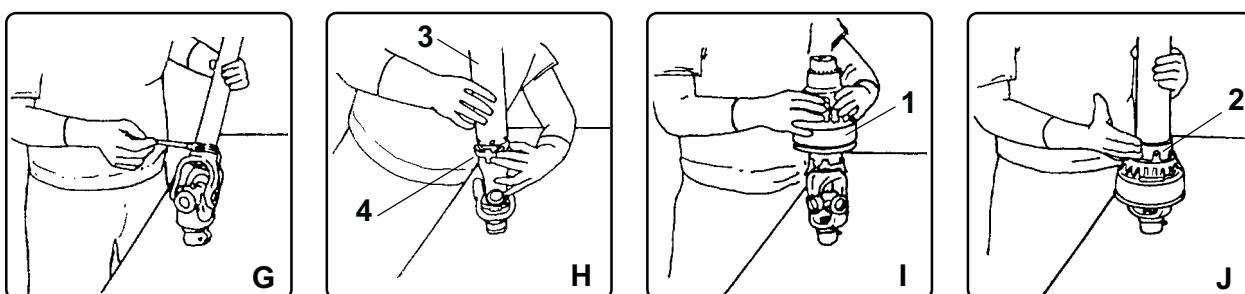
- Hold the shaft as shown in the figure **C**, push the guard cone (1) down and simultaneously press the three locks (2) with a point or screw-driver. Thus the guard cone (1) will slip on the guard tube (3) and can be removed.
- Remove the locking collar (4) and disconnect the guard tube (3) from the shaft.
- Do the same shown in the figures **C** and **D** with the C.V. joint end and set apart its components.
- Clean all parts with a brush by using kerosene or gas oil and water and dry them next.



MAINTENANCE

4 - REASSEMBLING THE PTO SHAFT BEFORE LUBRICATION.

- Grease the locking collar groove (figure **G**).
- Install the guard tube (3) and fasten it with the locking collar (4) (figure **H**).
- Hold the shaft as shown in the figure **H** and slip the guard cone (1) on. Align the grease cup of the guard cone (1) with the bearing tab on the locking collar (4) (figure **J**).
- Push the guard cone (3) so that it is engaged by the locks (2).
- Make sure the 3 locks (2) are firmly engaged. If necessary, force close to the locks (2) as shown in the figure **J**.
- Do the same with the other end of the shaft and lubricate the whole assembly as shown in the figure **A**.

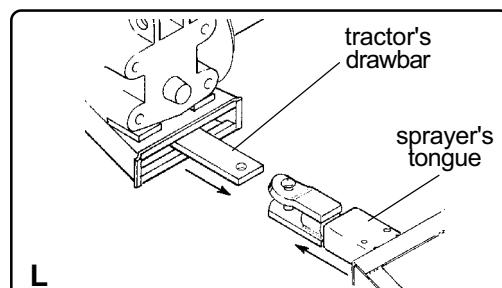


5 - ADJUSTING THE PTO SHAFT LENGTH

- a) Before cutting the PTO shaft, **check if it is possible to use it without reducing its length.**

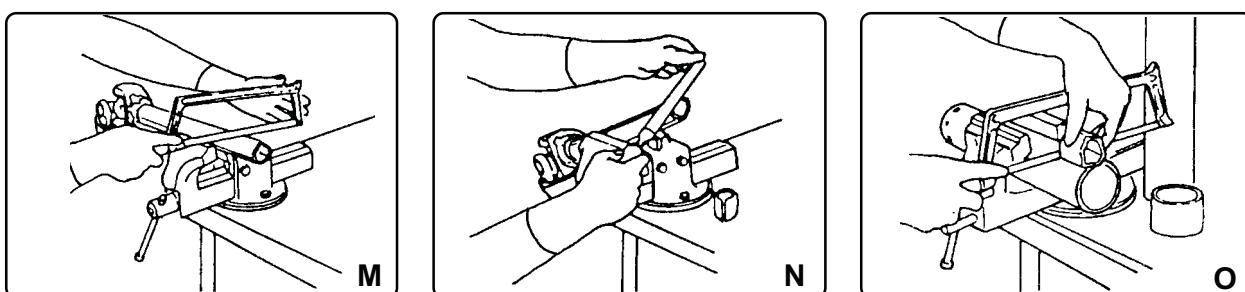
Check:

- The position on the tractor's drawbar.
- If the sprayer's tongue can be adjusted for longer.



- b) Cutting the shaft

- Dismantle the protection guards as shown in the figures **C** and **D**.
- Cut the two tubes (male and female) at the desired dimensions (figure **M**).
- Remove the burrs resulting from the cutting operation as well as the filings resulting from the burrs removal (figure **N**).
- Cut the guard tubes length using as measure reference the pieces of the tubes cutted (figure **O**).
- Clean the residues of cutting.



- c) Assembling

- Assemble the PTO shaft as shown in the figures **G**, **H**, **I**, and **J** and lubricate it if necessary.

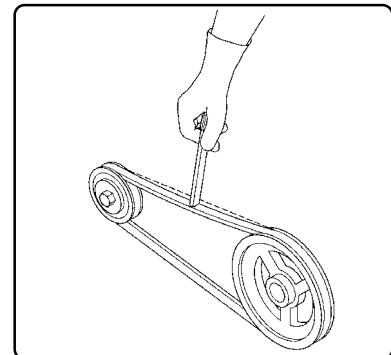
MAINTENANCE

BELTS TENSION

ATTENTION:

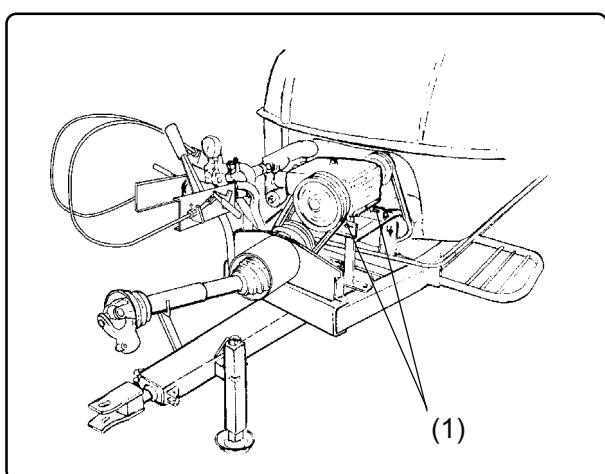
ALWAYS STOP THE SPRAYER AND TURN OFF THE TRACTOR'S ENGINE BEFORE ANY KIND OF MAINTENANCE. ALWAYS USE THE INDIVIDUAL PROTECTIVE EQUIPMENT DURING THE MAINTENANCE OF THE PTO SHAFT

- Check the belts tension periodically.
- Press the agitator belts as shown in the figure beside. When pressed it should slack 3.94 to 5.91 in. NEVER USE CUTTING OR SHARP TOOLS.



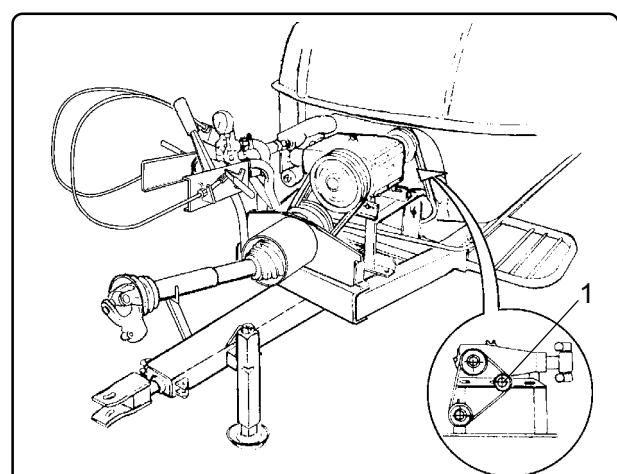
PUMP BELT

- Loosen the 4 bolts (1) that fasten the pump mounting base.
- Then use lever to slide the pump to obtain the recommended tension for the belts.
- Retighten the 4 bolts (1).



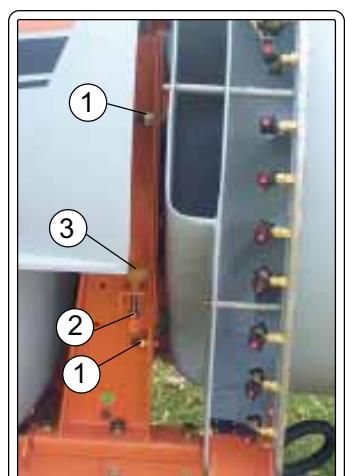
AGITATOR BELT

- Loosen the nut that fastens the tension pulley (1) of the agitator belt.
- Then use a lever to slide the pulley until obtaining the required tension for the proper operation of the agitator.
- Retighten the nut.



FAN BELT

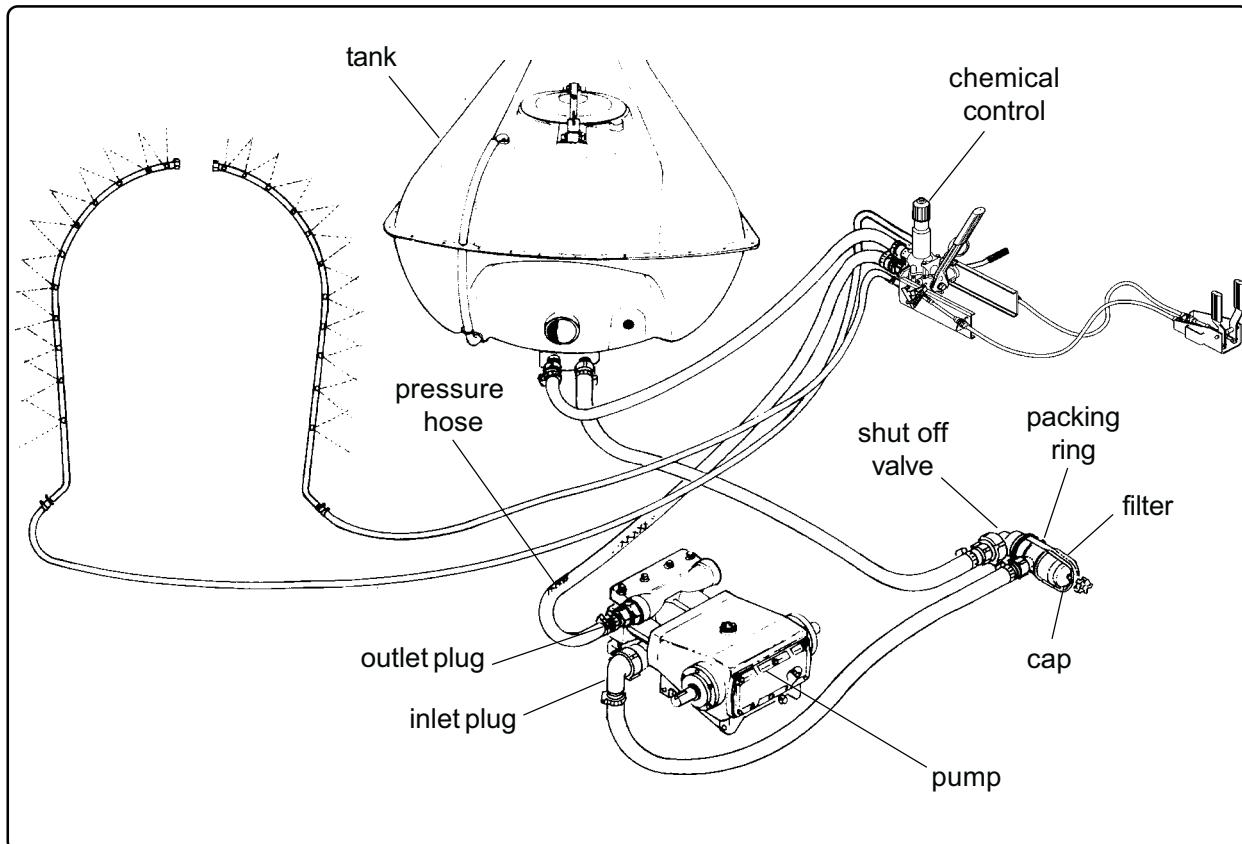
- Loosen the four bolts (1) enough to allow the frame to be moved.
- Loosen the two nuts (2).
- Hand-tighten the two knobs (3) equally until obtaining the recommended tension for the belts.
- Retighten the two nuts (2).
- Retighten the four bolts (1).



MAINTENANCE

WINTER STORAGE

ATTENTION: In regions where temperatures drop to 32 Fahrenheit or less, the water accumulated in the pump can freeze and cause serious damage.



PROCEDURES

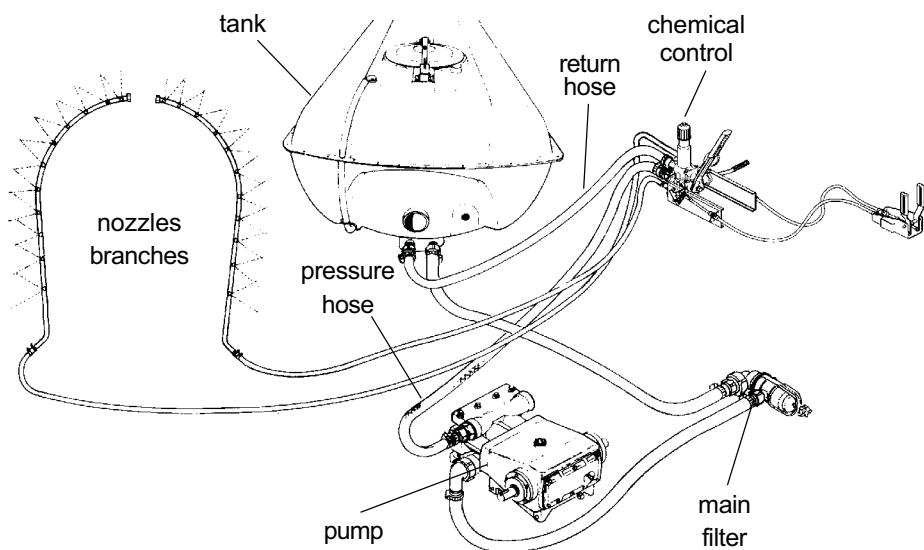
- Empty the tank completely by removing the filter cap and opening the filter shut off valve.
 - Disconnect the pressure hose from the pump or remove the outlet plug from the valve cover.
 - Run the sprayer for about 30 seconds at half speed.
- NOTE: To avoid damage, do not run the sprayer over the recommended time.
- Assemble the components again in their correct place.
 - Repeat this operation at the end of each daily spraying job during the winter to avoid problems in future applications.

MAINTENANCE

TROUBLE-SHOOTING

COMPONENTS:

- Tank
- Main filter
- Control valve
- Pump
- Pressure hose
- Return hose
- Nozzles branches



PROBLEMS - CAUSES - SOLUTIONS

Whenever Jacto sprayers equipped with piston pumps present problems, try to classify them in one of the following four groups.

a) LACK OF SUCTION AND PUMPING CAPACITY

No liquid flow through the nozzles.

No return to the tank.

Pressure gauge does not indicate pressure.

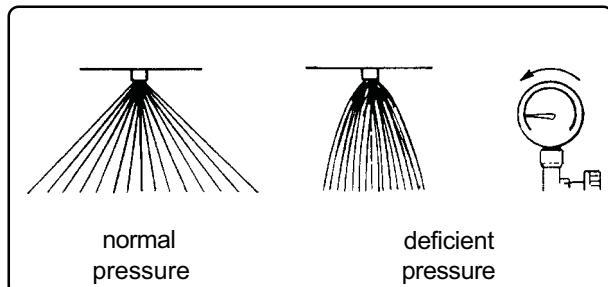
b) PRESSURE DEFICIENCY

(PARTIAL LACK OF PRESSURE)

Desired pressure is not attained.

Specified nozzle spraying angle is not attained.

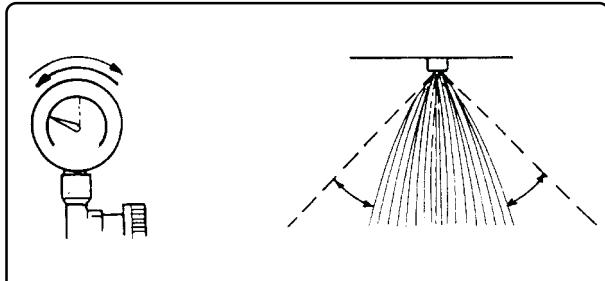
Pressure gauge shows lower pressure.



c) PRESSURE OSCILLATION

The pressure gauge needle oscillates.

The nozzle spray angle oscillates.

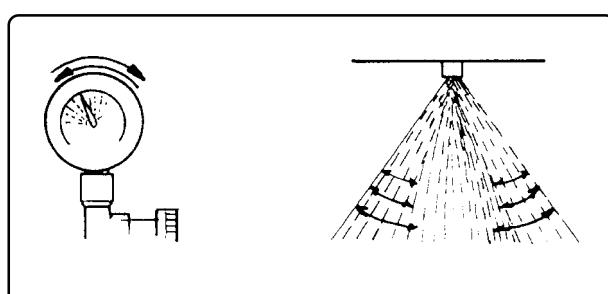


d) INTERMITTENT PRESSURE

The pressure gauge needle vibrates with intensity.

The pressure hoses vibrate with intensity.

The nozzles spray angle varies.



MAINTENANCE

TROUBLE-SHOOTING

a - LACK OF SUCTION AND PUMPING CAPACITY

PROBABLE CAUSES	SOLUTIONS
1- PTO not turning.	The sprayer should be run with 540 rpm at PTO. Check visually whether the pump is being run.
2- Lack of water in the tank.	To run the hydraulic system, it is necessary to contain a minimum quantity of liquid, otherwise there will be no pressure.
3- Filter shut off valve closed.	When the pump runs, liquid will pass through the valve even in the closed position, however it will be insufficient. Open it.
4- Dirty filter.	Impurities in the filter prevent a free liquid flow. Clean the filter whenever filling the tank, or with more frequency depending on the quality of the water and the type of product applied.
5- Obstruction in the intake hoses.	Check whether the hose connecting the filter to the pump is twisted. Check whether there is any obstruction in the hoses from tank to filter. Fill up the tank with water, open the valve and verify if it flows freely.
6- Air in the system.	Check the filter packing ring. The filter should not leak.
7- Insufficient pump suction.	Remove the cover of the suction valves. Check the condition of the valves and replace them if necessary.

b - PRESSURE DEFICIENCY

PROBABLE CAUSES	SOLUTIONS
1- Low PTO rpm.	The proper PTO rotation is 540 rpm.
2- Filter shut off valve closed.	When the pumps runs, liquid will pass through the valve even in the closed position, however flow will be insufficient.
3- Filter partially obstructed.	The filter should be clean to allow free liquid flow.
4- Intake hose partially obstructed.	A deficient pump will cause depressurization. Check whether the hose connecting the filter to the pump is twisted.
	Verify whether there is any obstruction in the hoses connecting the tank to the filter. Fill the tank with water, open the valve and observe if it flows freely.
5- Air in the system.	Check the connections and the o'rings of the tank outlet and the pump inlet.
6- Pressure regulator.	Check the valve and valve seat.
7- Worn nozzles.	Check whether the nozzle flow is within the recommended guidelines.
	Replace the nozzles when the flow rate exceeds 10% of the specified.
	Use only nozzles recommended by the sprayer manufacturer.
8- Pump with lower flow rate.	Disconnect the pressure hose from the control valve.
	Run the sprayer at 540 rpm.
	Collect water for one minute and measure. The volume collected should approximate this shown below for each pump model:
	JP - 402 = 10.04 gpm
	JP - 100 = 26.41 gpm
	JP - 42 = 11.09 gpm
	JP - 150 = 39.62 gpm
	JP - 75 = 19.81 gpm
	JP - 300 = 79.25 gpm

MAINTENANCE

TROUBLE-SHOOTING

c - PRESSURE OSCILLATION

PROBABLE CAUSES	SOLUTIONS
1- Loose belts.	Check belt tension and tighten if necessary.
2- Air in the intake system.	Check for damaged hoses, filter packing rings, etc., and repair if necessary.
3- Pressure regulator.	Check the regulator components and clean or replace them if necessary.

d - INTERMITTENT PRESSURE

PROBABLE CAUSES	SOLUTIONS
1- Filter shut off valve closed.	When the pumps runs, liquid will pass through the valve even in the closed position, however flow will be insufficient.
2- Pump valve deficiency.	Valve with sealing deficiency or stuck due to impurities.
3- Pump head perforated internally.	Replace it.

GENERAL CARE

HANDLING SPRAYERS AND AGROCHEMICALS

We warn the owners and users that the UNREASONABLE USE of this sprayer and chemicals it applies may cause damage to people, properties, animals and environment.

Read carefully and understand thoroughly this manual and the recommendations of the chemicals manufacturers.

Follow strictly the instructions for proper use of this sprayer and chemicals to ensure more safety and efficiency when spraying your crops.

AFTER SPRAYING

ATTENTION: Avoid leaving chemical mixture residues in the tank. For the last pass, prepare the chemical solution in enough quantity to spray the remaining of the crop.

- Empty completely the tank and wash thoroughly the sprayer in a proper decontamination place.
- Wash the inside and outside of the sprayer with clean water and detergent.
- Disassemble and clean each nozzle assembly with fine brush, water jet or compressed air.
- Dry, lubricate and store the sprayer in a dry and covered place.
- Repaint the damaged metallic parts to prevent corrosion.
- Spray the metallic parts with a mixture of lubricating oil to prevent corrosion.
- Take off the individual protective clothing and wash it separately from other clothes.

DANGER

SAFETY OBSERVATION

**OPERATING THIS SPRAYER WITHOUT FOLLOWING THE INSTRUCTIONS
MAY RESULT IN SERIOUS INJURY OR DEATH.**

STATEMENT OF LIMITED WARRANTY

MÁQUINAS AGRÍCOLAS JACTO S.A. warrants the equipment described herein and agrees to repair or replace parts and components which, under normal operation and wear, following the technical recommendations, show DEFECTS IN MATERIAL OR WORKMANSHIP.

WARRANTY PERIOD:

- One (1) year from the purchase date by the original retail purchaser.

WARRANTY APPLICATION:

Jacto or its authorized representative shall honor this warranty, if any part or component shows confirmed defect in workmanship.

IT SHALL BE UNDERSTOOD THAT THE REPLACEMENT OF COMPLETE COMPONENTS SUCH AS PUMPS, CONTROL VALVES, ENGINES, TRANSMISSIONS, HYDRAULIC PISTONS AND SIMILAR ONES SHALL ONLY BE PERFORMED IN CASE THAT THE DEFECT CANNOT BE REPAIRED BY REPLACING PARTS AND/OR PIECES OF THE COMPONENT.

THIS WARRANTY IS NULL AND VOID IF:

- Equipment is not used in accordance with the INSTRUCTION MANUAL, overwork or accidents.
- Improper preventive maintenance or performed by unauthorized people.
- Modification of the equipment in any way from the original design.
- Change, damage, or loss of the product identification plate.
- Utilization of parts and components not supplied by JACTO.

PRODUCT REGISTRATION CARD MUST BE COMPLETED BY THE ORIGINAL RETAIL PURCHASER, AND RETURNED TO JACTO DEALER WITHIN 30 DAYS OF PURCHASE DATE.

WARRANTY EXCLUSIONS:

- Parts considered as normal maintenance such as: filtering elements, belts, hoses, nozzles, pistons, pressure gauges, as well as usual maintenance, adjustments, retightening, lubrication and painting.
- Parts which show wear or tear due to use, UNLESS THEY SHOW DEFECTS IN WORKMANSHIP, ASSEMBLY OR MATERIAL.
- Hydraulic, lubricating oils and grease.
- Injuries of personal or material nature to the user, owner, or third parties.
- Additional charges resulting from paralyzation and repair of the equipment.
- Freight charges, pick up and delivery charges.
- Damages of any nature resulting from action of gases or liquids used in the equipment.

GENERAL INFORMATION:

- Defective parts replaced under warranty period shall be property of JACTO.
- Eventual delays in performing services do not confer to the owner the right to indemnity or to extension of the warranty period.
- JACTO reserves the right to change its products or to interrupt manufacturing the equipment.
- THIS LIMITED WARRANTY shall be understood by its expressed terms, and no one in anyway subject to JACTO shall be authorized to modify or amplify the conditions prescribed herein.
- In case of need for warranty request, call for the authorized dealer supplying all information required for a prompt compliance. Do not forget the identification of the equipment, total hours of work, and the noticed defect.

FOR THIS WARRANTY TO BECOME EFFECTIVE THE PRODUCT REGISTRATION CARD FOUND IN THE INSTRUCTION MANUAL MUST BE FILLED IN AND RETURNED TO YOUR JACTO DEALER. THIS CARD MUST BE SIGNED BY THE ORIGINAL RETAIL PURCHASER, INDICATING THAT HE HAS READ AND UNDERSTOOD ALL SAFETY AND OPERATIONAL INSTRUCTIONS IN THE MANUAL. FURTHER THE RETAILING DEALER HAS EXPLAINED TO THE ORIGINAL RETAIL PURCHASER ALL SAFETY INSTRUCTIONS. IN NO CASE WILL WARRANTY BE SUPPLIED UNTIL THIS CARD, PROPERLY COMPLETED AND SIGNED, IS ON FILE WITH JACTO RETAILING DEALER.



PRODUCT REGISTRATION CARD

Invoice number: _____ Date: ____ / ____ / ____

Retailing dealer: _____

Phone: _____ City: _____ State: _____

Sprayer: _____ Model: _____

Series: _____ Sprayer No.: _____ Pump No.: _____

Original retail purchaser: _____

Address: _____ Phone: _____

City: _____ State: _____

Purchase date by the original retail purchaser: ____ / ____ / ____

The warranty is in force as of this date: ____ / ____ / ____

Retail purchaser signature: _____

Copy Máquinas Agrícolas Jacto S. A. - Urgent respond with in 30 days first class postage required



PRODUCT REGISTRATION CARD

Invoice number: _____ Date: ____ / ____ / ____

Retailing dealer: _____

Phone: _____ City: _____ State: _____

Sprayer: _____ Model: _____

Series: _____ Sprayer No.: _____ Pump No.: _____

Original retail purchaser: _____

Address: _____ Phone: _____

City: _____ State: _____

Purchase date by the original retail purchaser: ____ / ____ / ____

The warranty is in force as of this date: ____ / ____ / ____

Retail purchaser signature: _____

Original retail purchaser's copy