



## MAINTENANCE & USE OPERATOR'S MANUAL



### **TRAILED SPRAYERS**

Compact Control, Compact Air Control,  
Compact AirSystem, Compact Turbo,  
Compact Bicontrol



### **MOUNTED SPRAYER**

Starmix Control, Star Mixer, Turbo Mix ,Turbo Mixer

**LOW VOLUME SPRAYERS mod. : "PNEUS"**

**SPRAYERS WITH DIRECTIONAL CANNON HEAD mod. : "FLEX"**

**WEED KILLING AND SPRAY GROUP :mod: MIX,MIXER for weed killing booms,spray booms , electric sprayers**

**📖 CAREFULLY READ THE INSTRUCTIONS BEFORE START USING THE EQUIPMENT 📖**



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## DIMENSIONS AND WEIGHTS TABLE

MODEL	CAPACITY LT	WIDTH MM	LENGHT MM	HEIGHT MM	WEIGHT KG
COMPACT CONTROL 660	600	1100	2350	1100	550
COMPACT CONTROL 880	800	1100	2350	1150	620
COMPACT CONTROL 1100	1000	1300	2550	1200	690
COMPACT CONTROL 1650	1500	1400	3100	1300	750
COMPACT CONTROL 2200	2000	1400	3100	1450	780
COMPACT CONTROL 3300	3000	1900	3800	2000	930
COMPACT TURBO 1100	1000	1300	2850	1850	700
COMPACT TURBO 1650	1500	1400	3400	1950	820
COMPACT TURBO 2200	2000	1400	3400	1950	910
COMPACT TURBO 3300	3000	1900	3950	2000	1060
COMPACT BICONTROL 1100	1000	1300	3000	1200	600
COMPACT BICONTROL 1650	1500	1400	3550	1300	740
COMPACT BICONTROL 2200	2000	1400	3550	1450	800
COMPACT BICONTROL 3300	3000	1900	3950	2000	980
COMPACT AIRSYSTEM 1100	1000	2400	1300	2750	600
COMPACT AIRSYSTEM 1650	1500	2600	1400	2750	740
COMPACT AIRSYSTEM 2200	2000	3150	1400	2850	830
COMPACT AIRSYSTEM 3300	3000	3850	1900	2850	980
COMPACT AIRCONTROL 660	600	1100	2500	1100	550
COMPACT AIRCONTROL 880	800	1150	2500	1150	620
COMPACT AIRCONTROL 1100	1000	1300	2750	1200	710
COMPACT AIRCONTROL 1650	1500	1400	3300	1300	780
COMPACT AIRCONTROL 2200	2000	1400	3200	1450	930
STARMIX CONTROL 330	300	1300	1000	1100	180
STARMIX CONTROL 440	400	1300	1000	1300	212
STARMIX CONTROL 440	400	1300	1300	1150	216
STARMIX CONTROL 660	600	1750	1400	1300	268
STARMIX CONTROL 660	600	1750	1400	1300	308
STARMIX CONTROL 880	800	1750	1400	1450	313
STARMIX CONTROL 1100	1000	1750	1400	1650	336
STAR MIXER 220	200	1300	1000	1100	207
STAR MIXER 330	300	1300	1000	1100	227
STAR MIXER 440	400	1300	1000	1300	237
STAR MIXER 440	400	1300	1000	1150	237
TURBO MIX 440	400	1600	1000	1650	341
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TURBOMIX FLEX 660	600	1800	1400	1950	526
TURBOMIX FLEX 880	800	1800	1400	1950	538
TURBOMIX FLEX 1100	1000	1800	1400	1950	546
COMPACT PNEUS 660	600	1400	2550	1140	440
COMPACT PNEUS 880	800	1400	2550	1170	445
COMPACT PNEUS 1100	1000	1400	2750	1200	550
COMPACT PNEUS 1650	1500	1400	3300	1300	690
COMPACT PNEUS 2200	2000	1400	3300	1300	780
MIX PNEUS 330	300	1700	1400	1100	207
MIX PNEUS 440	400	1700	1400	1300	227
MIX PNEUS 660	600	1900	1400	1300	247

## **INTRODUCTION**

*This manual describes the performances and the operations with necessary instructions for proper use and periodic maintenance of the equipment.*

*This manual is divided into chapters for an easy consultancy.*

*The information contained in this manual is intended for a professional user, who must have specific knowledge about how to use the machine and must be authorized and trained.*

*We recommend the use of original spare parts and accessories. Not original parts could invalidate the warranty, might be dangerous and might reduce the life duration and the performance of the machine.*

*In case of transfer or sale this manual must always be delivered with the machine. If it is damaged or lost, a copy can be asked the supplier or previous owner. The manual is considered as part of the equipment.*

## **GENERAL WARRANTY CONDITIONS:**

*a) To the extent the following provisions, the Seller warrants solely to Buyer that the goods sold are free from defects on material, design, manufacture and assembly in relation to the level of technical development at the time of construction. This undertaking is limited to defects that occur during the period of 12 months from the date of the delivery .*

*b) Ending the standard warranty (12 months), the term of the same effect may be delayed up to a maximum of six months by IMA.IT Srl to the Buyer , if the produced goods are not immediately sold. In this case, the warranty starts from the moment that the Buyer delivers the equipment to the third parts (Purchaser). The Buyer must inform IMA.IT Srl that the equipment was sold to the end-users .This obligation is considered fulfilled when the Buyer sends to IMA.IT Srl the warranty draft that can be found on the web site "[www.progroup.it](http://www.progroup.it)" completed in any part. In any case, the guarantee provided by IMA.IT Srl is valid and effective ever and only for the Buyer and cannot be relied on by the latest.*

*c) IMA.IT Srl does not guarantee services and / or workmanship of engines mechanisms and diesel equipment, electrical and thermal (but not limited to tires, fuel injection system, engine, differential axle, bearings, hydraulic shares, ...) sold individually or simply assembled by the Seller. In this case the warranty is limited to the warranty period given by the OEM and contained in the technical documentation provided by IMA.IT Srl to the Buyer upon delivery. Buyer declares his acknowledge and acceptance of the guarantees issued by these manufacturers.*

*d) The warranty will be valid if the claims and / or defect will be sent within 8 days in writing form to the manufacturer .*

*e) The Purchaser shall be waived in any case by the warranty:*

*-If the vices and / or defects depend on normal wear and tear of the property;*

*-If the goods delivered is subjected to improper use or use higher than expected from the contract and the documentation provided with the products;*

*-If the defects are derived from an assemblage made by the Purchaser that is not in accordance with the instructions contained onto the manual "Instructions for Use";*

*-If it does not perform periodic maintenance procedures and strictly in accordance with the schedule proposed by the Seller;  
-If, in the event of any faults and defects, repair and / or replacement of defective parts is not addressed to the Seller;  
-If it does not meet the deadlines of payments.*

*f) The guarantee provided by IMA.IT SRL consists solely of the repair and / or free replacement of parts and / or parts that present defects and / or defects, with the express exclusion of the guarantees contained in Articles. 1490, 1492, 1497, 1512 of the Italian Collection of rules and, as well as the aliud pro alio and the obligation to indemnify any direct or indirect, immediate or mediate, resulting from defects and / or defects themselves. No other recognition will be made as security for labour, transportation, various interventions, etc., insofar as they are considered part of the trade discount granted.*

*g) The Buyer must send back the defective goods to the IMA.IT Srl and the latter may choose whether the repairing or replacement thereof options. The bonds are considered the IMA.IT Srl fulfilled by delivery to Purchaser of the repaired or replaced goods.*

*h) In the event that the IMA.IT Srl send products to replace the defective ones before the receipt of the latter, the buyer must return the tainted products to the Producer within 15 days of receipt of those substitutes. The goods become the property of the producer itself. If the Purchaser, except as writing authorized by IMA.IT Srl, does not return the defective products within the mentioned period shall be required to pay the replacing of the products*

*i)The costs and risks of shipping the defective product from Buyer's premises to the headquarters of the IMA.IT Srl and the cost of repairs made outside of establishments IMA.IT Srl, will be borne by Buyer. Similarly, even the return cost and the risks of transporting the goods repaired or replaced from the IMA.IT Srl will be at purchaser costs.*

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## 1 ABOUT THIS MANUAL



***This manual is an integral part of the machine and must accompany it in case of resale and until its demolition.***

In case of loss or damage of this Manual please request a copy to the manufacturer (IMA. IT Srl via Gambellara 10 Imola BO ) or retailer ( \_\_\_\_\_ ) insert name and address of the retailer

This manual should be translated into the language of the country where the machine is sold .

On equipment are suitable some pictograms which have to be maintained in a perfect condition and replaced when they are no longer legible by the operator.



***The presence of this symbol means to pay close attention to the item described***

It would be possible that some devices described in this manual are missing on your machine, depending on fittings and/or market features based on machine destination.

### 1.1 UPDATING THE MANUAL

The information, descriptions and illustrations in this manual reflect the state of the art when machine has been commercialised .

The manufacturer reserves the right to make, at any time, any changes to the machines for technical or commercial reasons. These changes do not require at manufacturer to act on sold equipment to update it or to consider it inadequate.

Any additions that the manufacturer deems appropriate to provide, it need to be stored together with the manual and has to be considered an integral part of it.

### 1.2 COPYRIGHT


The copyright of this manual belongs to the manufacturer. This manual contains text, drawings and technical illustrations that cannot be disclosed to third parties or transmitted, in whole or in part, without the written permission of the manufacturer of the machine.

### 1.3 CE PLATE

The CE plate is positioned in front of the machine near the drawbar (if trailed model) or positioned to the 3 Point Hitch (if mounted model)

It indicates:

- Brand of the manufacturer
- Company name and address of manufacturer
- Type and model of equipment
- Weight
- Serial identification number
- Year of construction

			
IMA.IT SRL C.F. / P.IVA 02862780737 S.S. 7 Ter Z.I. MANDURIA (TA) ITALY			
Designazione <i>Designation</i>	<input type="text"/>		
Tipo <i>Type</i>	<input type="text"/>	Anno <i>Year</i>	<input type="text"/>
Numero di identificazione <i>Serial identification number</i>	<input type="text"/>	Pressione massima <i>Max pressure</i>	<input type="text"/> bar
Massa limite complessiva <i>Max total load weight</i>	<input type="text"/> Kg	Massa limite a vuoto <i>Max loadless weight</i>	<input type="text"/> Kg

## 1.4 INFORMATION ON THE MACHINE

### 1.4.1 INTENDED USES

The machine "sprayers " is designed exclusively for the distribution of pesticides . The sprayers are machines intended for pesticide, fungicides and others phytochemical treatments.

Their function is to spray the mixture in aqueous solution and conveys it to the crop , made by nozzles and air flow, produced by a fan, that brings the drops on the leaves.

The machine should be operated by a single operator inside the cab of the tractor.

The operator using the machine must be familiar with all the instructions contained in this manual.

The machine has been designed and built to operate outdoors, because its performance is affected by the weather conditions.

The machine "sprayer" described in this manual complies with the European directive 200642CE and subsequent modifications and integrations and therefor it is equipped with CE mark.



***Every different use of the machine is considered unauthorized and dangerous.***

### 1.4.2 DESCRIPTION

The Fan air sprayers are popular: the liquid is brought out of the tank, using a pump to the nozzle where it is hit by a strong air current speed produced by a fan (centrifugal or axial). For optimal spraying the air flow should be smoothed e.g. against-propellers or conveyors. The quantity of product depends on the number and extent of the nozzles. In this way it will reach a diameter of droplets between 100 and 300 microns.

The machine consists of:

- Mounted Frame to connecting to the tractor rear lifting arms (for mounted unit models ).
- Frame with drawbar to connecting the rear hitch of the tractor (for trailed models).
- Main polyethylene Tank (4.1.1)
- Polyethylene system washing tank (4.1.2)
- Polyethylene hand-washing tank (4.1.3)
- Suction Filter (4.1.4)
- Pump (4.1.5)
- High pressure Filter (only trailed Models) (4.1.6)
- Control unit (Par 4.1.9)
- Nozzles (Par 4.1.10)
- Axial or centrifugal impeller (4.2)



## 1.5 STORAGE

If the machine is stored for long periods it is necessary to store it in a place protected against atmospheric agents and protect it to avoid damage.

Verify that the storage temperature is between 0°C and 50°C.

Do not place the machine on the ground sloped or excessively saggy.

The machine is designed to be parked safely on compact soil with slopes of up to 8.5°.

In order to prepare the machine for the storage it is necessary to proceed to a thorough cleaning of the tank and hydraulic circuit with the same procedure used at the end of treatment..

In addition , it's necessary to:

- completely empty the water circuit to avoid damage caused by frost.
- Mix with clean water a liquid anti-freeze to protect not only the pump but also all components in contact with the liquid (command groups, Jet holder and filters).
- Remove and clean the filters and nozzles which must be kept in a secure environment by weathering.
- cancel the pressure inside the hydro-pneumatic compensator of the pump
- Grease the moving metal parts.
- Repaint all surfaces that could rust, where necessary..
- place the machine in a ventilated place sheltered from rain and Sun..

## 1.6 START UP OR RESTART AFTER LONG PERIOD OF INACTIVITY

Before using the machine for the first time or after a long period of inactivity you must do the following:

- check that the machine does not present any damage.
- Check that the machine is correctly mounted in its entirety.
- Check the mechanical parts, which must be in good condition and not rusted..
- Check that the suction filter and tank inside are clean and free of residues.
- Check that the connections are mounted correctly by following the basic schema.
- check that the tube straps are tight correctly as all fittings and connections..
- ensure that the gear box is suitably replenished of lubricant
- check that the fan is free to rotate and that the box is not deformed by blows received during transport..
- check and, if necessary, restore the oil level of the pump.
- Grease transmissions and mechanical joints.
- Ensure the presence and functionality of protective devices.
- check the status of the pump and the hydraulic compensating.
- make sure that all the nozzles are in good condition, with no obvious signs of wear and fouling.
- check the status of all hoses and replace them if necessary.
- check tightness of all bolts of the machine.
- Remove the cardan shaft from the machine and lubricate it.

## 1.7 SCRAPPING

In case of scrapping the machine must be disposed in adapted landfills according to the current legislation.

Before scrapping it is necessary to separate the plastic or rubber parts, electrical and electronic material.

Before scrapping the equipment thoroughly washing inside and out. Unloading of washing compounds in the environment without precautions is banned due to groundwater pollution.

Recover any waste oil and dispose of it in the special collection centers.



***used oil must be properly recovered and must not be dispersed in the environment, because, according to the current regulations, is classified as hazardous waste and it should be awarded to special collection centers.***

For the collection of waste oil, it is mandatory to consult the local norms of Oils residual. The parties constituted only by plastic, aluminum, steel, can be recycled.

## 1.8 SAFETY AND ACCIDENT PREVENTION REGULATIONS



A correct use of the machine, a scrupulous compliance with the rules listed here and the strict enforcement of all precautions to prevent dangerous situations, will prevent risks of accidents or injury, a better and longer work of machine and minimise failures.

The IMA.IT Srl declines all and every responsibility objective and subjective when the behavioral norms described on this manual are not applied

- Machine is not suitable to be used in sectors other than agriculture.
- Machine must be used by a single operator inside the cab of the tractor.
- A different use from the one specified is considered improper.
- Machine must only be used by authorized, trained and properly trained operator. The operator after reading and assimilating the instructions contained in this manual must get adequate preparation on the proper use of the machine and must be in possession of driving license. Please remember to contact the manufacturer in case of doubt about the use of the machine and on the interpretation of this manual.
- The manual must be always closed to be easily consulted to verify the operating cycle. If it is lost or damaged you must request to IMA.IT Srl a copy.
- The operator must be ensured that, during the operation no person or animals are within working range. Never operates the machine near any people standing closed or transiting within the working area of machine.
- Do not use the machine if you are tired, ill or under the influence of alcohol, medicines or drugs..
- This machine is usually used during the day, if it is requested, exceptionally, to use it at night or in reduced visibility condition it should be used with lighting system of the tractor or an auxiliary lighting system mounted onto equipment .
- Any arbitrary modification made at this machine indemnifies and keep indemnified IMA.IT Srl from any liability for damages or injury which may result to operators, third parties and things.
- Verify carefully the machine before each start up.
- IMA.IT Srl cannot cover any improper use which can cause a potential danger
- The signs applied to the machine provides important notices, their full compliance are important for your safety.
- Be sure all safety pictograms are legible. Clean and replace them if necessary with new labels.
- before using the machine make sure that all safety devices are placed correctly in place and in good condition; If you experience failures or damages to replace them immediately..
- Before go down from the tractor and before every maintenance operation actuate the parking brake, stop the engine and remove the ignition key from the dashboard
- Staff should use the safety equipment and personal protective equipment during the use and maintenance of the machine.
- It is recommended that the machine operator not to wear clothing that can give rise to snagging.
- It is necessary that the operator is equipped with suitable dust mask for respiratory protection.

- During working operations the operator must have sufficient visibility on areas deemed dangerous so it makes sense to keep clean and in very good condition mirrors that is equipped with the tractor..
- Machine must not be left unattended with the engine of the tractor in motion or ignition key inserted.
- keep the machine clean from foreign matter (debris, tools, miscellaneous items) that could damage the functioning or cause damage to the operator.
- When the machine is stopped on sloping ground, use the parking brake and locking wedges supplied with the machine.
- do not operate on muddy soil, sandy or saggy..
- check the state of art of the hydraulic hoses. In case of deterioration (or at least every year) is recommended to replace them.
- Do not use controls unit or hydraulic hoses as handholds. These components are mobile and do not offer stable support.
- Any modification of the machine art may cause security issues. In this case the user will be solely responsible for any accidents.
- It is strictly prohibited to remove or tamper with the safety devices..
- Be sure of the good condition of the pictograms. If the pictograms are damaged must be replaced with other to require to the original manufacturer and replaced in the position indicated by the use and maintenance manual (section 1.9.1)
- Normally, the machines are not designed for road use. Road traffic is allowed if the machine is equipped with special accessories (e.g. self-reflective signs, flashing lights, rear lights, etc ...) and when connected to tractors which comply with country regulations.
- In case of circulation on public roads, be sure you the tank is free of any chemical inside it.
- Before travelling on public roads, put the machine in transport position, in accordance with the manufacturer's indications.
- It is strictly prohibited the transport of persons on the machine.
- The coupling of the machine to the tractor, shall be exclusively performed on attachment points provided for this purpose in accordance with the safety regulations in force.
- Before connecting the machine make sure the weight of the front axle of the tractor is sufficient. The laying of the ballast masses must be made on the supports provided for this purpose in accordance with the rules of the manufacturer of the tractor. The load on the front axle of the tractor, must not be less than 20% of the sum of the kerb weight of the tractor and the operator.
- pay attention to the risk of unintentional contact of parts of the machine with the high voltage airlines.
- Perform the turns prudently, taking into account the overhang, the length, the height and weight of the machine.
- Do not use a PTO shaft without adequate protections in accordance with legal requirements.
- Do not transit, stay or work between the tractor and the machine.
- before starting the tractor's engine, make sure all controls are in neutral position
- before you engage the PTO, check that the fan protection network is present and well fixed and that the gearbox is in neutral position.
- Keep always clean the area of movement of the impeller, removing foreign objects both outside and inside the security network.
- do not commute with the impeller running outside of those necessary for spraying
- pay attention for any person or animal is closer to the fan when this is running.

- After the PTO disengagement, moving elements can still turn a few seconds. Do not approach until it stops.

### **1.8.1 PLANT PROTECTION PRODUCTS**

Spraying is a delicate operation and involves substantial risk of contamination of people, animals and the environment. It is very important to treat the functionality of all the parts of sprayer;

The operator is always the subject more exposed to chemicals used and must work using all measures necessary for his safety;

It is important to operate under the right weather conditions and inquire about the weather for the entire period of application;

measure accurately the doses of pesticides to enter in the main tank;

Make sure that the chemicals used are compatible with the materials of construction of the atomizer;

Never leave chemicals in the tank for more than a few hours;

Carefully follow the rules of detention and use of plant protection products on the market and ensure that people and animals cannot touch them;

Before each treatment, thoroughly wash the containers of chemical liquid/powders

Do not use the machine without water tank for hand washing or if the same is not completely fill up;

It is advisable to clean the machine at the same place in which you perform the fills or in a square where the waters are collected in a pit for disposal;

Avoid uncontrolled discharge of mixing waste on streams, sewers and public areas;

### **1.8.2 FIRE-FIGHTING MEASURES**

The machine is built with wide use of materials derived from petroleum, moreover, the presence of various types of oil and chemical residues make them potentially flammable

Keep on the tractor's -board an extinguisher of adequate capacity and provide periodic recharge. The hand fire extinguisher use is reserved to staff able to use it.

It is recommended that the operators staff is aware of the major technics of operations in case of fire;

All fuels and most of the lubricants and hydraulic fluids are flammable;

Do not smoke when refuelling or restore fluid level, do not make supplies near an open flame, do not transfer the fuel;;

Never use gasoline, solvents or other flammable or toxic fluids for cleaning mechanical parts: use approved commercial solvents that are non-toxic and non-flammable;

Do not perform welding operations near reservoirs, pipes, tanks, electrical wires or inflammable materials;

In case of welding protect with suitable screens flammable parts.

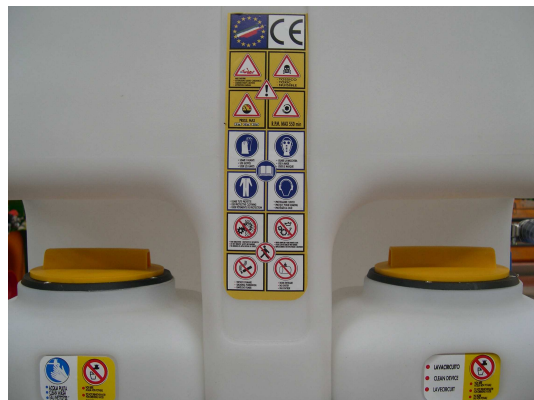
## 1.9 SAFETY SIGNS

Make sure of the good condition of the pictograms. If the pictograms are damaged must be replaced with other required by the original manufacturer and placed in the position indicated by the use and maintenance manual.

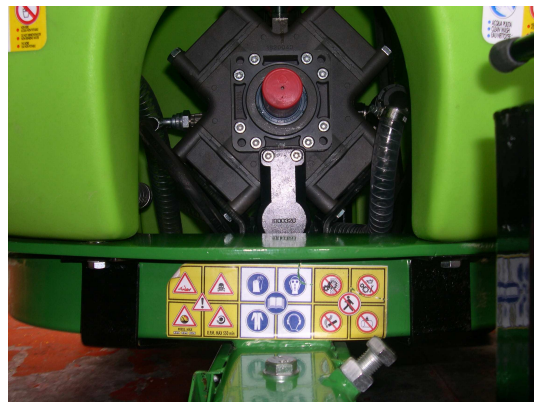
Make sure the safety pictograms are legible. Clean it using a cloth, soap and water.

### 1.9.1 LOCATION OF PICTOGRAMS ON THE MACHINE

On mounted sprayers, safety pictograms are located laterally on main tank



On trailed sprayers, the adhesives are placed near the drawbar.



## 1.9.2 DESCRIPTION OF PICTOGRAMS



**1 CAUTION** : adjustment operations and maintenance must be carried out after reading the user's manual, with the machine stopped and off key.

**2. CAUTION -DANGER** of fluids under pressure. Read the manual before intervening and in case of injury, seek medical advice.

**3. CAUTION-DANGER** this machine must be used by a single operator.

**4. CAUTION**-do not climb or get carried by the machine.

**5. WARNING** -danger of shearing..

**6. WARNING -DANGER** poisonous products to touch and aspirate..

**7. WARNING -DANGER** maximum working pressure.

**8. ATTENTION-DANGER** do not introduce yourself in the tank.

**9. CAUTION** – danger -tube pressure, refer to the owner's manual



**10. WARNING** -danger of entanglement and dragging. Do not bring your hands to the transmission shaft in motion.



**11. WARNING** -DANGER rotating parts.



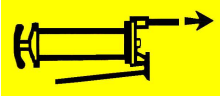
**12 CAUTION**-danger of electrocution. During use of the machine pay maximum attention to overhead power lines.



**13. WARNING** – crushing hazard -do not stand below the machine arms



**14.** Use required personal protective equipment ..



**15. GREASING POINTS**



**16. OIL TANK**



**17. LIFTING POINT**



## 2 HANDLING AND TRANSPORT

Place the maximum attention to safety during the loading and unloading operations which must be carried out by qualified personnel ( truck operators, etc.).

When lifting the machine it is important to use the appropriate lifting eyes indicated by pictograms..

The presence of this sticker on the machine indicates a:



**ATTACHMENT POINT FOR LIFTING HOOK**

To transport the machine, it's important to use a means crafted in power and size,

## 3 TRANSIT ON HIGHWAY (only for homologated machines )



***case you need to follow a highway ,it's necessary to abide yourself strictly to the rules of the road taking particular care with any requirement noted in the booklet of the machine and the choice of appropriate speed.***

***The first step during the circulation is to install any optional light bars, self-reflecting signs etc ....***

***It is mandatory to provide the machine of flashing yellow light..***

The weight of the modified machine changes the stability of the whole tractor-atomizer, influencing the ability of steering and braking, for this reason it is necessary to proceed at moderate speed.

## 4 MACHINE OPERATION



***Make sure that during the work, all parts of the machine work regularly. Point out that most of the accidents and damages that may occur during use of the machine are caused by the loosening of the fastening elements.***

As in the first phase of the life of the machine is produced an overall settlement of all mechanical and hydraulic connections, it is essential to carry out the controls of the machine with maximum accuracy.

Before using the machine make sure that within the range of the machine there are no people or animals.

Make sure that no person or animal are in near of ventilators when this is running.

The machine must be used by a single operator inside the cab of the tractor.

It is absolutely forbidden to remove and/or change the protections on the machine..

Do not use the machine when tired, ill or under the influence of medication, drugs or alcohol..

Before using the machine it is necessary to learn the layout of controls and operation..

Pay attention to the risk of unintentional contact of parts of the machine with the high voltage airlines.

## **4.1 PLUMBING**

### **4.1.1 MAIN TANK**

The main tank has various capacities. To fill the water tank use only indirectly open waters or just free-fall from water conductor.  
You can fill the tank through the pump using the pick-up filter (p. 4.1.4)  
The tank is equipped with a graduated band that brings transparency to the exact quantity of liquid inside. The detection has to be made in flat area .  
All filling systems provided by IMA.IT SRL are preventing pollution and regurgitation of liquid inside the tank

### **4.1.2 WASHING- SYSTEM CIRCUIT TANK**

All mounted and trailed sprayers are equipped as per CE directive n°2004/108 of circuit-washing tank to cleaning the whole machine (suction pump delivery, nozzles).  
The tank must be filled only by clean water.  
To use the circuit-washing tank for cleaning it is enough to turn the 3-way gate valve on CIRCUIT-WASHING TANK position and operate the pump for 10 min.  
When done, it's necessary to eliminate waste in defined places where they cannot cause harm to people or to the environment.  
Use different active ingredients on various crops to avoid damage .We recommend to add to each washing liquid 2 kg of soda for every 100 liters of water.

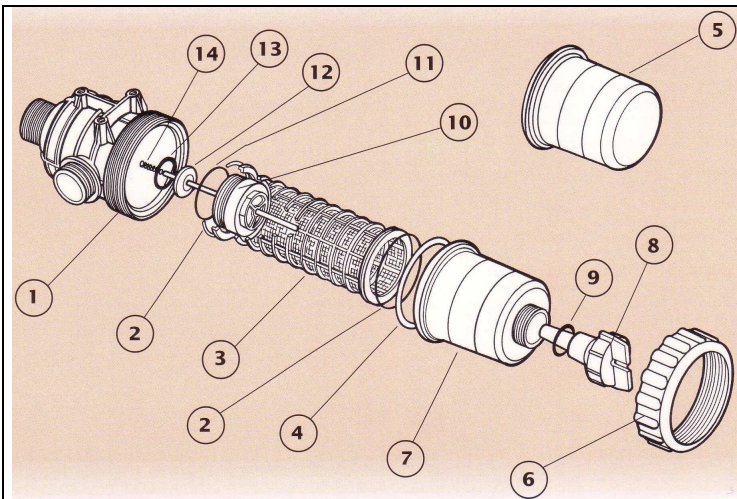
### **4.1.3 HAND-WASHING TANK**

For the cleaning of the operator, when using the machine or when it is necessary, is installed a tank of variable capacity according to the main tank. The clean water tank for hand washing has to be filled only by clean water.

Do not drink for any reason the liquid inside!

### **4.1.4 SUCTION GATE AND 3 WAYS VALVE**

The inlet filter allow to fill the tank from external sources (wells, streams, etc..).Filters assembled on equipment have 50 mesh cartridges of 0.3 – 0.4 mm (pos. 3).  
The filter must be frequently checked while with a good cleaning of these you get a smooth operation of the machine.(§:7.7)  
If the liquid used in the treatment has many impurities, it is good practice to clean them each tank's filling. Always remember do not clean the filter with the pump on and to wear appropriate safety clothing.



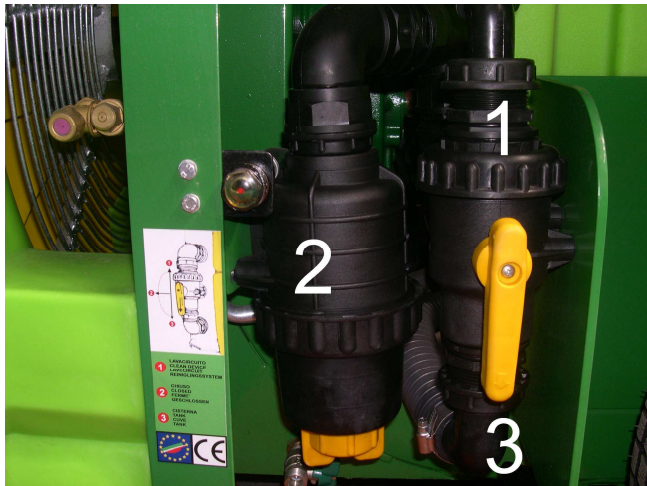
Before removing the filter cap (POS. 7) make sure that the same is isolated from the pipe by turning the appropriate gate valve or the 3-way diverter. After washing the cartridge replace the cover reconnecting it to the circuit.

To use the suction filter:

- remove the throttle valve on the bottom of the suction strainer (POS. 8)
- tighten the rubber door fitting the bottom filter thread (POS. 7)
- connect the rubber pipe from 6 yards with floating filter on
- place the pressure regulator on exhaust position
- action the pump
- check the water level in the tank
- switch off the pump and disconnect the tube from the suction filter

## “3 WAY GATE VALVE

The 3-way gate valve permits to direct, inside the loop, the liquid in various directions



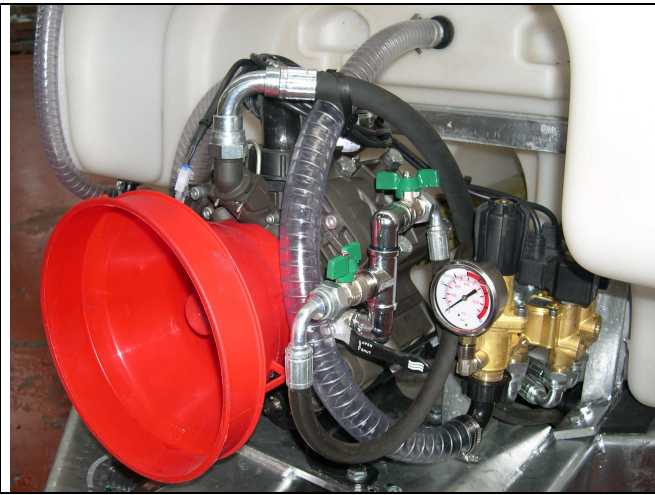
- During spraying in the field the level should be placed in position 1.

- During the filling phase from wells or from the external tanks, it can take any position.

- During the tank and circuit washing (at the end of each treatment, chemical liquid change or when it has required for the periodic maintenance), the lever must be placed in position 3.

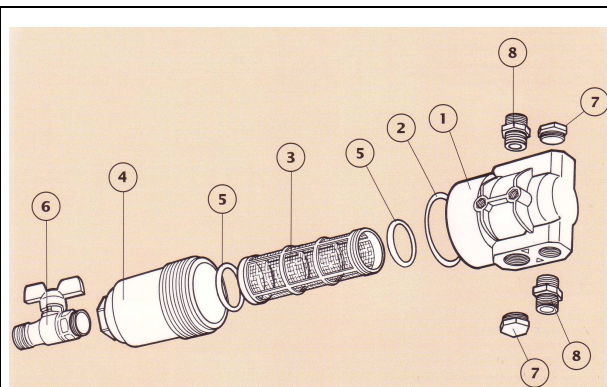
## 4.1.5 PUMP

A pump is installed on the machine according to the models. The pump manual is enclosed to this manual. We recommend to read both carefully. Be very careful with the data reported by the manufacturer.



The pump can be identified from the data plate applied on it; the main data of pressure and flow are easy to find. Normally the pump must not exceed 550 rpm; a number of major tours does not improve performance but compromise the life and safety of the equipment. On the pump there is a safety valve calibrated to prevent the over pressure . Do not tamper with this valve for any reason and do not block the hose connected to it.

#### 4.1.6 HIGH PRESSURE FILTER ( ONLY TRAILED MODELS)

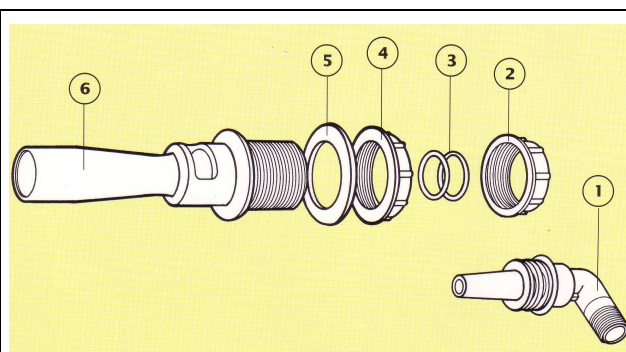


The high pressure filter consists of a PVC body (Det. 1.4) with two inputs and two outputs (item 8) (38 ".1/2").It also has a drain valve (POS. 6). Inside there is a filter cartridge (POS. 3) which has the task of collect any impurities presented inside the circuit.

The high pressure filter should be cleaned following the procedures outlined in

chapter: routine maintenance. (See § 7.7)

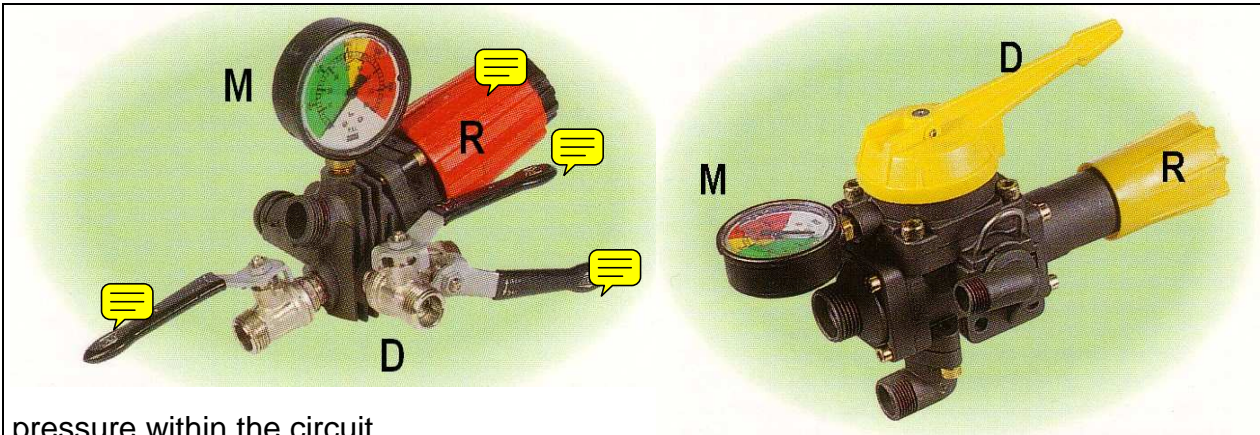
#### 4.1.7 AGITATORS



Agitators are Venturi tubes supplied by the pump through a manual valve that must be always opened to allow the wave of product before, during and after treatment. The agitators valve shall be closed only during system washing with clean water from holding tank maintenance

#### 4.1.8 CONTROL UNIT

The control unit consists of a pressure regulator (R), and a distributor (D). At the pressure regulator is installed a manometer (M) which allows to view the



pressure within the circuit.

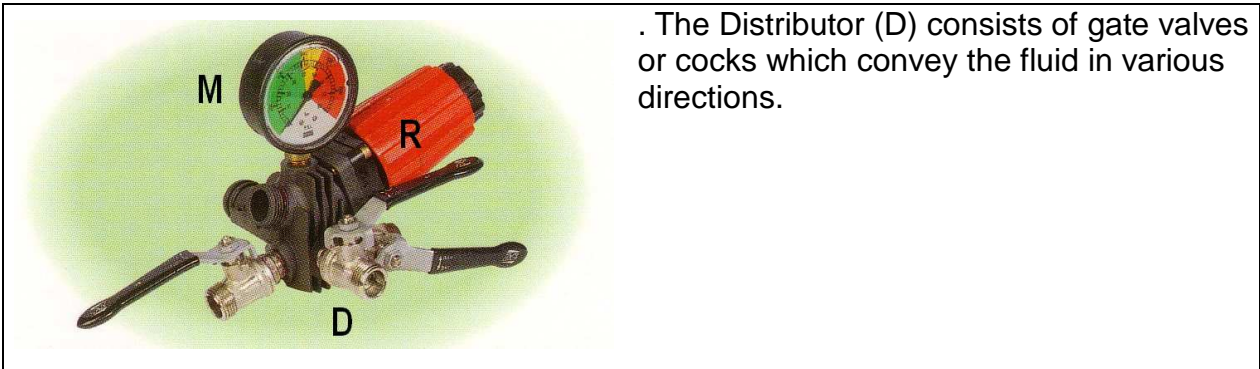
Using the regulator it is possible to adjust (depending on the number, the type of nozzles, processing speed and other parameters), on pressure operation of the machine .

In case of anomalies in the circuit, which can generate strong pressure safety, it intervenes a safety valve calibrated according to models.

Pressure regulators may be manual (mounted on the atomizer fig 1, or tractors (model BYMATIC fig 2) or electric (with control panel placed in the cabin), in the latter case it is provided a distance gauge fitted with a separator because for security reasons it's not possible to bring liquids in pressure in the signal box. If the tractor is equipped with a sealed cabin it is compulsory to use electric controls.

Also for this device is attached related manual.

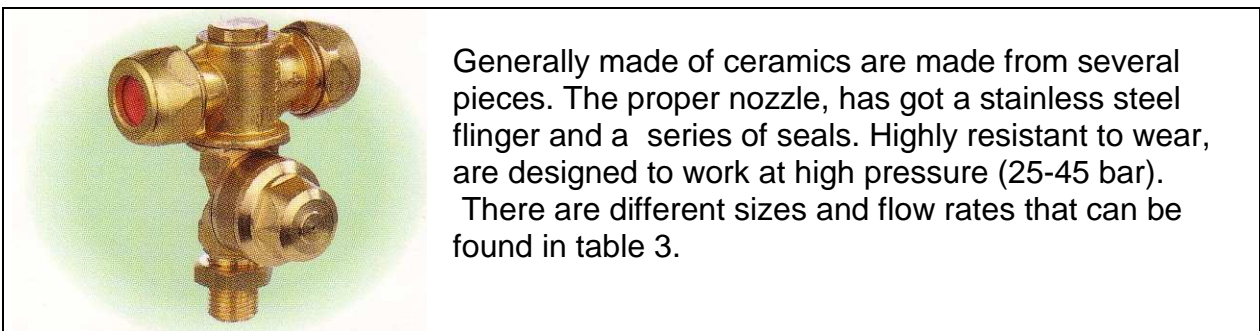
#### 4.1.9 DISTRIBUTORS



. The Distributor (D) consists of gate valves or cocks which convey the fluid in various directions.

#### 4.1.10 NOZZLES

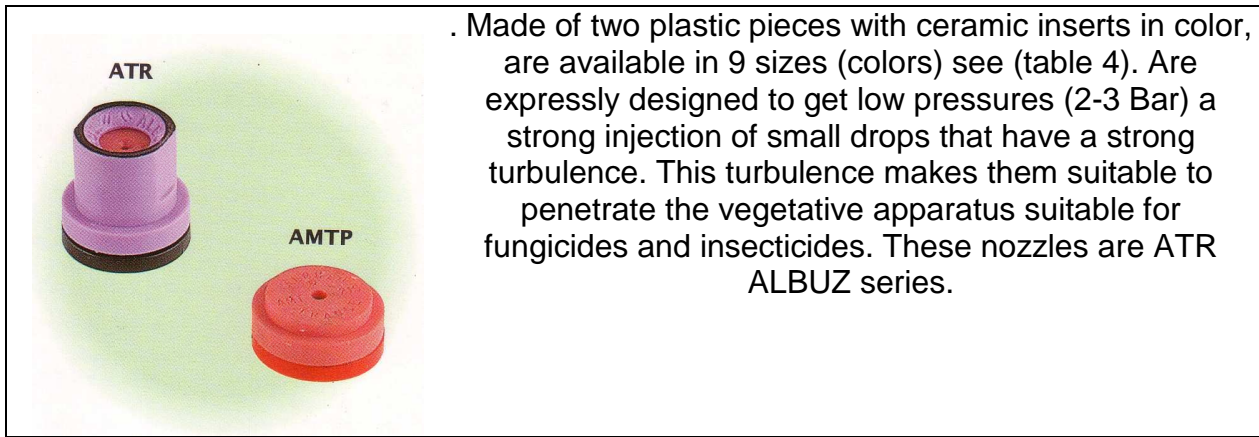
CONE NOZZLES AT NORMAL VOLUME (over 500 lt/ha):



Generally made of ceramics are made from several pieces. The proper nozzle, has got a stainless steel flinger and a series of seals. Highly resistant to wear, are designed to work at high pressure (25-45 bar).

There are different sizes and flow rates that can be found in table 3.

LOW VOLUME CONE NOZZLES (150-500 l/ha):



RANGE FOR REGULAR VOLUME NOZZLES (over 500 lt/ha)-table 3

Hole Nozzle	Hole CONVOGL.	Bar									
		5	10	15	20	25	30	35	40	45	50
		L/min									
0,8	-	0,70	0,98	1,08	1,26	1,42	1,54	1,66	1,76	1,94	1,92
1,0	-	0,65	1,02	1,18	1,40	1,58	1,74	1,88	2,04	2,16	2,68
	1,0	1,02	1,38	1,72	1,96	2,22	2,56	2,64	2,84	3,08	3,21
1,2	-	0,78	1,32	1,53	1,86	2,04	2,19	2,37	2,55	2,76	2,88
	1,0	1,44	1,62	2,16	2,61	3,03	3,30	3,54	3,84	3,93	4,20
	1,2	1,40	2,00	2,48	2,88	3,64	3,88	4,12	4,48	4,72	4,96
1,5	-	1,02	1,65	1,92	2,40	2,56	2,88	2,92	3,06	3,10	3,35
	1,0	1,89	3,39	3,99	4,83	5,48	5,96	6,32	6,52	6,67	6,85
	1,2	2,19	3,30	4,08	4,60	5,22	5,88	6,48	6,90	7,20	7,82
	1,5	2,37	3,48	4,32	5,16	5,88	6,30	7,08	7,56	8,16	8,88
1,8	-	1,56	2,36	3,04	3,36	3,84	4,32	4,74	5,04	5,28	5,64
	1,0	2,36	3,96	5,12	6,06	7,02	7,80	8,28	9,00	9,30	10,20
	1,2	2,76	4,26	5,52	6,12	7,06	7,92	8,40	9,12	10,32	11,04
	1,5	3,18	5,10	6,54	7,44	8,16	8,52	9,24	10,44	11,76	12,72
	1,8	3,00	4,68	5,88	6,96	8,16	8,76	10,08	10,92	12,24	12,96
2,0	-	1,40	2,28	2,94	3,42	3,78	4,20	4,32	4,92	5,16	6,12
	1,0	2,72	3,60	4,32	5,58	5,82	6,72	8,16	8,88	9,96	10,44
	1,2	3,00	4,20	5,52	6,96	7,20	8,16	9,60	10,44	11,52	11,88
	1,5	2,94	5,04	5,76	6,90	7,80	8,76	10,20	11,04	11,64	13,08
	1,8	3,12	5,16	6,18	7,38	8,16	9,36	10,92	11,88	12,96	16,80

RANGE FOR LOW VOLUME ATR CONE NOZZLES (150-500 l/min ) table 4

PRESSURE	LILY	BROWN	JELLOW	ORANGE	RED
5,00	0,37	0,48	0,75	0,98	1,40
5,50	0,39	0,50	0,79	1,03	1,47
6,00	0,40	0,53	0,82	1,08	1,53
7,00	0,44	0,57	0,89	1,16	1,65
8,00	0,47	0,61	0,95	1,24	1,77
9,00	0,49	0,64	1,00	1,32	1,87
10,00	0,52	0,68	1,06	1,39	1,98
11,00	0,55	0,71	1,11	1,46	2,07
12,00	0,57	0,74	1,16	1,52	2,16
13,00	0,59	0,77	1,21	1,59	2,25
14,00	0,62	0,80	1,25	1,65	2,34
16,00	0,66	0,86	1,34	1,76	2,50
18,00	0,70	0,91	1,42	1,87	2,65
20,00	0,74	0,96	1,50	1,97	2,80

## 4.2 PNEUMATIC SYSTEM

The pneumatic system consists of:

REAR END PLATE and GEAR BOX SUPPORT  
 CENTRIFUGAL or FAN AXIAL FAN  
 POLYETHYLENE RING (axial fan)  
 LAUNCH HEAD MADE of POLYETHYLENE (for Cannon fan)  
 GEAR BOX  
 NOZZLES  
 INTAKE HUGES



## 4.2.1 AXIAL FAN ASSEMBLY



Depending on model, the transmission of motion to the possible pump fan is manufactured with 1 or 2 gearbox speed and disengagement (crowds) . (§. 4.2.2).

It is to get the gearshift through the operation of lever on the gearbox and made accessible from the opening cut laterally at the rear of the machine. The lever has two or three positions according to the number of gears. The central position is insane.



***the gear lever must be operated only with the PTO off and the fan stopped***  
**In case that the insertion of the speed gear would be difficult, you have to rotate slightly the PTO shaft (tractor must be switched off).**

In the COMPACT model is fitted on outlet a fix counter fan that stabilizes the airflow.  
In BITURBO and AIR CONTROL models there is a mobile counter fan rotating in the opposite direction.

## 4.2.1 CANNON FAN GROUP

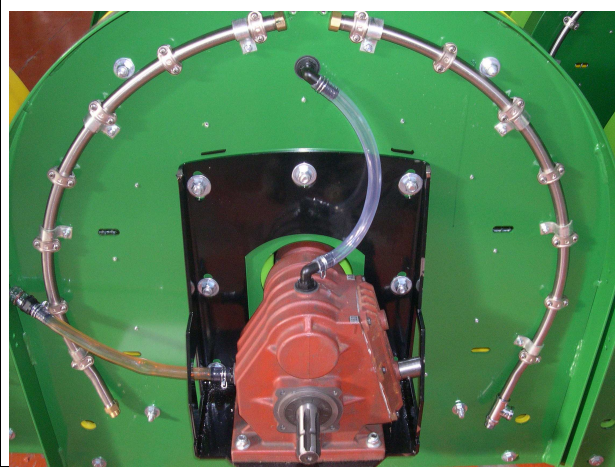


The cannon fan group has similar gear box like normal axial fan groups and the characteristics are similar too. The impeller has a centrifugal fan type capable to producing an air flow at high speed, guaranteeing a high spraying.

The spray head is mounted on a standard thrust block manually adjustable (unscrewing the stop screw) or, on demand, with hydraulic adjustment that can be powered by tractor's hydraulic pump or by an independent system.

The adjustment of the spray head should be executed only when the impeller is stopped while the high wind speed makes it dangerous.

## 4.2.2 GEAR BOX



The gear box is made by a gear body with a gearing inside that increases the input power from the pump (supplied from the output joining shaft or keyed depending on the models) transmitting it to the impeller and consequently the operation using the output shaft.

On the gear box there is a level to change the speed ratio or secure (neutral position) of the impeller by the disengage of the connection shaft

All the models are described on the table FEATURING SET UP at the end of the manual.



**Periodically check the oil level in the gearbox!**

**The changing of the impeller 'speed must be carried out with all rotating parts stopped and with the PTO switched off**

## 4.3 WORKING REGULATIONS



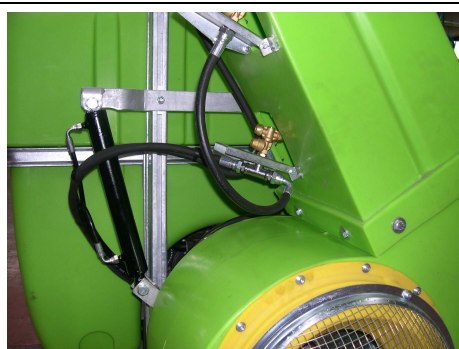
***Pay attention to the risk of unintentional contact of parts of the machine with the high voltage cables !!***

### 4.3.1 AIRFLOW OR FAN ORIENTATION

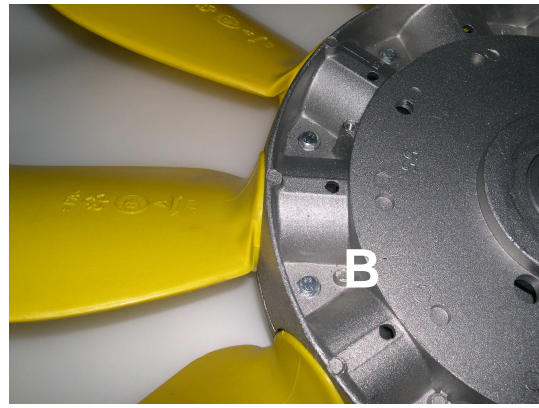
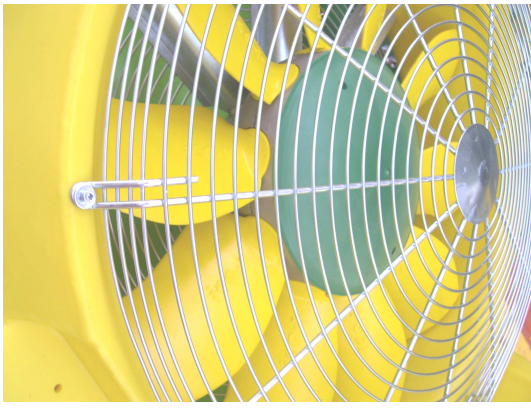
The airflow should be adjusted depending on the type of atomizer:

***1)Sprayer with cannon fan group with manual or hydraulic adjustment (optional):  
HEAD DIRECTION***

***2)Sprayer with axial fan: FAN ANGLE***



- Unscrew the locking screw (A) placed on the control rod;
  - manually rotate the head by throwing to the desired position;
  - screw again the locking screw.
- Or
- in case of hydraulic devices operate the lever located on the dashboard of the tractor;



- Remove the protective grating;
- remove the protection cover of the fan
- unscrew the central screw of the propeller and remove propeller;
- unscrew bolts coupling side (B);
- replace the plugs depending on the desired inclination
- Tighten the bolts.
- Insert and tighten the propeller
- Tighten the grating be sure that both integrates and secures the polyethylene ring.

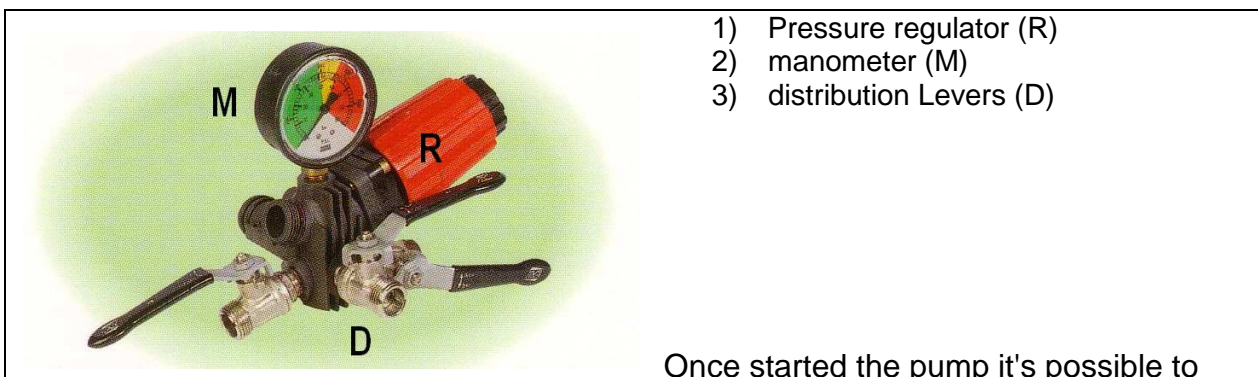
In addition to orient the flow rate (adjustment of nozzles) within the airflow you need to:

- position yourself at the start of the row to be treated;
- taking care not to come into contact with body parts the plant protection product, slightly rotate the nozzles until you reach the best spraying on crops.
- Insert the desired speed gear.
- operate the pump;



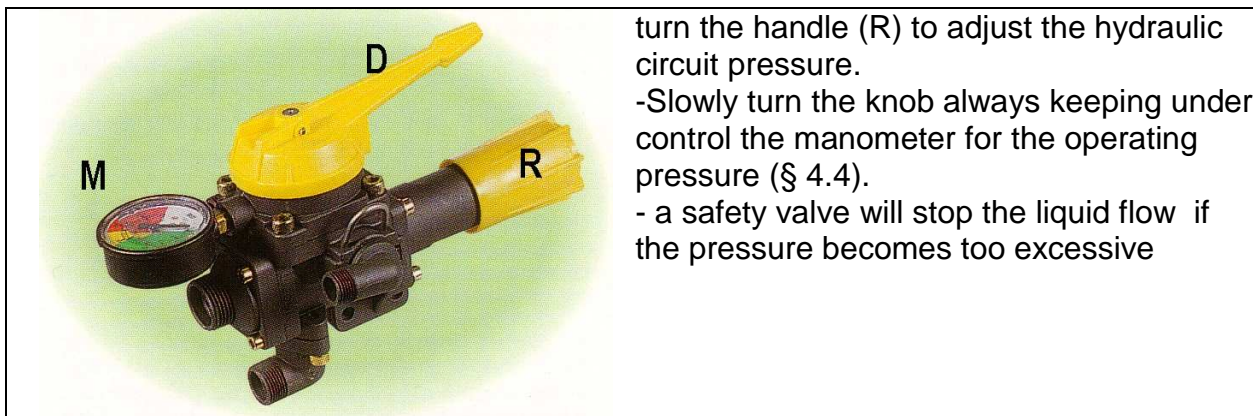
***All operations must be done with impeller switched off !  
Also be sure to place the paddles to avoid fan eccentricity and strong vibrations causing breakage of loaders!***

#### 4.3.2 ADJUSTMENT THE WORKING PRESSURE OF THE HYDRAULIC SYSTEM



- 1) Pressure regulator (R)
- 2) manometer (M)
- 3) distribution Levers (D)

Once started the pump it's possible to



## ADJUSTMENTS AND CHOISE OF WATER VOLUMES

### 4.4.1 Sprayers with axial fan

Based on some parameters that are relate to cultures ,tractor and sprayer, it' s possible with the help of the tables hereunder, to determine the operation speed, the flow rate and the time needed for treatment.

From table no. 1: you get the timing to spray an hectare of land intersecting the tractor 'speed and the inter row distance

TRACTOR' SPEED	2	2,5	3	3,5	4	4,5	5	5,5	6	6,5	7	8	9	10
INTERROW DISTANCE	MIN/ha.													
2,0	150	120	100	86	75	67	60	55	50	46	43	38	33	30
2,5	120	96	80	69	60	53	48	44	40	37	34	30	27	24
3,0	100	80	67	57	50	44	40	36	33	31	29	25	22	20
3,5	86	69	57	49	43	38	34	31	29	26	24	21	19	17
4,0	75	60	50	43	38	33	30	27	25	23	21	19	17	15
4,5	67	53	44	38	33	30	27	24	22	21	19	17	15	13
5,0	60	48	40	34	30	27	24	22	20	18	17	15	13	12
5,5	55	44	36	31	27	24	22	20	18	17	16	7	12	11
6,0	50	40	33	29	25	22	20	18	17	15	14	7	11	10
6,5	46	37	31	26	23	21	18	5	15	14	13	14	10	9
7,0	43	34	29	24	21	19	17	5	14	13	12	13	10	9
8,0	38	30	25	21	19	17	15	16	13	12	11	5	8	8
9,0	33	27	22	19	17	15	13	14	11	10	10	5	7	7
10,0	30	24	20	17	15	13	12	11	10	9	9	11	7	6

Got the working time min/ha, using the table 2 you can get the lt/min to spray on the culture based on lt/ha that you have to spray .

i.e.: working time min/ha 53 ,lt/ha 700 = lt/min 12,7

TABLE A N°2														
LITRES PER HECTARE	100	150	200	250	300	400	500	600	700	800	900	1000	1200	1400
WORK TIME	LT/MIN													
10,0	10,0	15,0	20,0	25,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0	100,0	120,0	140,0
15,0	6,7	10,0	13,3	16,7	20,0	26,7	33,3	40,0	46,7	53,3	60,0	66,7	80,0	93,3
20,0	5,0	7,5	10,0	12,5	15,0	20,0	25,0	30,0	35,0	40,0	45,0	50,0	60,0	70,0
25,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0	24,0	28,0	32,0	36,0	40,0	48,0	56,0
30,0	3,3	5,0	6,7	8,3	10,0	13,3	16,7	20,0	23,3	26,7	30,0	33,3	40,0	46,7
35,0	2,9	4,3	5,7	7,1	8,6	11,4	14,3	17,1	20,0	22,9	25,7	28,6	34,3	40,0
40,0	2,5	3,8	5,0	6,3	7,5	10,0	12,5	15,0	17,5	20,0	22,5	25,0	30,0	35,0
45,0	2,2	3,3	4,4	5,6	6,7	8,9	11,1	13,3	15,6	17,8	20,0	22,2	26,7	31,1
50,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	24,0	28,0
55,0	1,8	2,7	3,6	4,5	5,5	7,3	9,1	10,9	12,7	14,5	16,4	18,2	21,8	25,5
60,0	1,7	2,5	3,3	4,2	5,0	6,7	8,3	10,0	11,7	13,3	15,0	16,7	20,0	23,3
65,0	1,5	2,3	3,1	3,8	4,6	6,2	7,7	9,2	10,8	12,3	13,8	15,4	18,5	21,5
70,0	1,4	2,1	2,9	3,6	4,3	5,7	7,1	8,6	10,0	11,4	12,9	14,3	17,1	20,0
80,0	1,3	1,9	2,5	3,1	3,8	5,0	6,3	7,5	8,8	10,0	11,3	12,5	15,0	17,5
90,0	1,1	1,7	2,2	2,8	3,3	4,4	5,6	6,7	7,8	8,9	10,0	11,1	13,3	15,6

The overall flow is obtained, we divide this value by the number of nozzles mounted on the machine finding out the nozzles dimension we need from table 3 and 4

i.e.: to spray 700lt/ha in 53 min the lt/min are 12,7 divided 6 nozzles = 2,11 lt/min each nozzle @ 15 bars the nozzles to mount on the fan must have a hole of 1,2.

### CONE NOZZLES NORMAL VOLUME (over 500 LT/imin) – table 3

HOLE NOZZLE	HOLE CONVEYOR	Bar									
		5	10	15	20	25	30	35	40	45	50
		L/min									
0,8	-	0,70	0,98	1,08	1,26	1,42	1,54	1,66	1,76	1,94	1,92
1,0	-	0,65	1,02	1,18	1,40	1,58	1,74	1,88	2,04	2,16	2,68
	1,0	1,02	1,38	1,72	1,96	2,22	2,56	2,64	2,84	3,08	3,21
1,2	-	0,78	1,32	1,53	1,86	2,04	2,19	2,37	2,55	2,76	2,88
	1,0	1,44	1,62	2,16	2,61	3,03	3,30	3,54	3,84	3,93	4,20
	1,2	1,40	2,00	2,48	2,88	3,64	3,88	4,12	4,48	4,72	4,96
1,5	-	1,02	1,65	1,92	2,40	2,56	2,88	2,92	3,06	3,10	3,35
	1,0	1,89	3,39	3,99	4,83	5,48	5,96	6,32	6,52	6,67	6,85
	1,2	2,19	3,30	4,08	4,60	5,22	5,88	6,48	6,90	7,20	7,82
	1,5	2,37	3,48	4,32	5,16	5,88	6,30	7,08	7,56	8,16	8,88
1,8	-	1,56	2,36	3,04	3,36	3,84	4,32	4,74	5,04	5,28	5,64
	1,0	2,36	3,96	5,12	6,06	7,02	7,80	8,28	9,00	9,30	10,20
	1,2	2,76	4,26	5,52	6,12	7,06	7,92	8,40	9,12	10,32	11,04
	1,5	3,18	5,10	6,54	7,44	8,16	8,52	9,24	10,44	11,76	12,72
	1,8	3,00	4,68	5,88	6,96	8,16	8,76	10,08	10,92	12,24	12,96
2,0	-	1,40	2,28	2,94	3,42	3,78	4,20	4,32	4,92	5,16	6,12
	1,0	2,72	3,60	4,32	5,58	5,82	6,72	8,16	8,88	9,96	10,44

	1,2	3,00	4,20	5,52	6,96	7,20	8,16	9,60	10,44	11,52	11,88
	1,5	2,94	5,04	5,76	6,90	7,80	8,76	10,20	11,04	11,64	13,08
	1,8	3,12	5,16	6,18	7,38	8,16	9,36	10,92	11,88	12,96	16,80

#### ATR CONE NOZZLES FLOW AT LOW VOLUME (150-500 LT/MIN) table 4

PRESSURE	LILY	BROWN	JELLOW	ORANGE	RED
5,00	0,37	0,48	0,75	0,98	1,40
5,50	0,39	0,50	0,79	1,03	1,47
6,00	0,40	0,53	0,82	1,08	1,53
7,00	0,44	0,57	0,89	1,16	1,65
8,00	0,47	0,61	0,95	1,24	1,77
9,00	0,49	0,64	1,00	1,32	1,87
10,00	0,52	0,68	1,06	1,39	1,98
11,00	0,55	0,71	1,11	1,46	2,07
12,00	0,57	0,74	1,16	1,52	2,16
13,00	0,59	0,77	1,21	1,59	2,25
14,00	0,62	0,80	1,25	1,65	2,34
16,00	0,66	0,86	1,34	1,76	2,50
18,00	0,70	0,91	1,42	1,87	2,65
20,00	0,74	0,96	1,50	1,97	2,80

For the calibration of the machine follow §4.5.

#### 4.4.2 Sprayer with sprayhead and swivels cannon

Sprayers with spray head Cannon ("TURBO") and/or a swivel gun ("FLEX" and FLEX PIRALIDE") are mainly designed to be used on open field, tall trees, or crops where is not possible to go inside with a normal axial fan sprayer (as tobacco, crops or similar). Being, the spray head of Cannon, able to spray the chemical mixture at distances sometimes over 40 meters, it is not possible to determine with precision the exact distribution of the product along the area that has to be sprayed, while is not possible to determine accurately the inter rows distance .

You can try to determine the inter row distance based on experience and weather factors. Once the inter-row distance is determined , proceed as indicated in the previous paragraph (§ 4.4.1.)

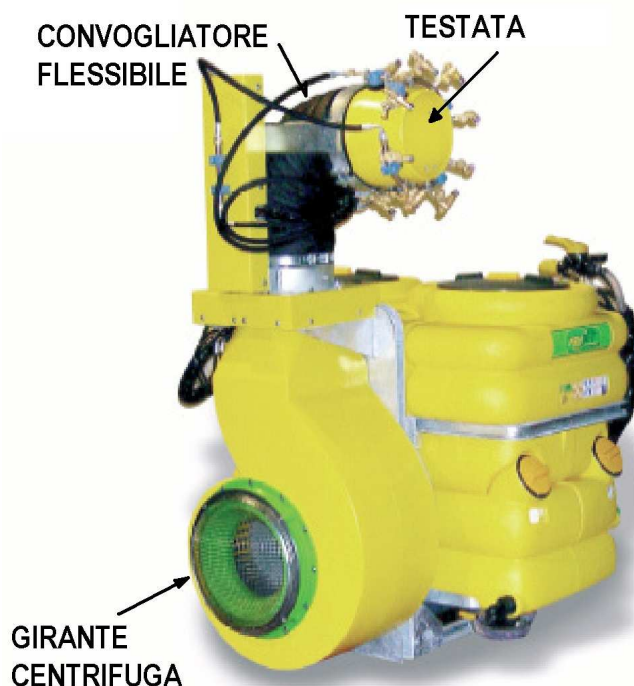
##### 4.4.2.1 DESCRIPTION OF ADJUSTABLE SPRAYHEAD GUN GROUP "FLEX"

The fan group "FLEX" is composed of:

- **CENTRIFUGAL IMPELLER:**  
Body made by polyethylene, inside there is a steel impeller, that coupled with the gearbox raises the air volume needed to spray.

- **DIFFUSER BODY:**  
composed of a rubber conveyor to allowing the rotation made by hydraulic motor of 180° of the head, on which are mounted brass Air-Injector Jets to spray the chemical mixture.

- **EXTENSION TUBE**  
("PIRALIDE" MODELS ONLY):  
telescopic height-adjustable polyethylene tube using hydraulic cylinder .



#### 4.4.3 Low-Volume Sprayers: SPRAYERS "PNEUS"

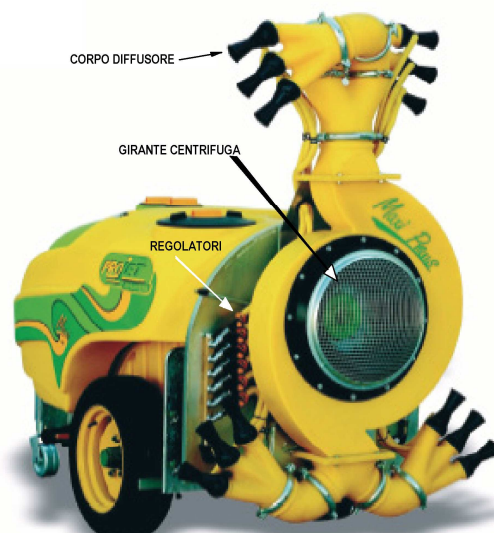
##### 4.4.3.1 Description FAN of the LOW VOLUME "PNEUS"

The fan group "PNEUS" consists of:

- **CENTRIFUGAL IMPELLER :**  
made of polyethylene, it has inside the steel impeller, that coupled with the gearbox raises the air volume needed to spray.

- **DIFFUSERS:**  
composed by a 3 ways flow divider, it use the "venture" nozzles system to spray the mixture

- **REGULATORS:**





Taps to adjust the flow rate. Upstream of these taps are located the interchangeable nozzles.

## **Introduction to "LOW VOLUME**

In the "low Volume" sprayer a strong air flow coming from a horizontal fan run over the liquid by a specially shaped tubes named VENTURI.

The mixture, that is coming out at low pressure, is pulverized by high speed air; the obtained droplets sizes are from 50 to 100 microns compared to a 250/300 microns on a high pressure axial fan sprayer.

This drop size ensures the formation of a "Cloud" of water that settles on the leaf surface more homogeneous. Moreover using the equal volume of water as the axial fan sprayer, the spraying surface with the low volume is about 3 times higher.

### Example:

The amount of the plant protection products to use per hectare are noticed on the chemical package and are always the same quantity, regardless of the machine model that is used. Considering that to spray one hectare it needs 3 kg of product melted in 1000 liters of water; in both high pressure axial fan sprayer and low volume sprayer it will be 300 gr in 100 liters water.

In case of spraying on 2 hectares:

High pressure axial fan sprayer : 6 kg in 2000 liters

low-volume sprayer: 6 kg (2000/3) liters = 700 lt ( against 2000 liters of high pressure fan sprayer). The result is saving water and a best treatment given by more uniform distribution of the product on the leaves.

To adjust the spray proceed as described on §. 4.4.1 and §4.4.2 keeping in mind that the low-volume sprayer requires a lesser quantity of water and the nozzles mounted are low volume-specific (see tab. 5)

How to determinate the distance between the rows that have to be treated (in meters) or the width of land which includes the number of rows sprayed at each step taking into account of the sides of the rows. Each plant has two sides, and then you have to consider whether treating them together in one time or more.

Looking in the drawing here under it would be more understandable:

"a " the distance is equal to half of "D" having to spray only half row.

"b" the distance is equal to "D" having to spray half row on the right and half row on the left.









"c" it's possible to spray 2 complete rows in one time, and then the distance would be 2D ( doubled).



once getting the distance (in meters) proceed as in § 4.4.1 using the table about nozzle flow (. tab. 5)

TABLE 5.ATOMIZER NOZZLES "PNEUS" AT LOW VOLUME

Hole nozzle	Mounting verse	Bar								
		1 BAR	1,5 BAR	2 BAR	2,5 BAR	3 BAR	3,5 BAR	4 BAR	4,5 BAR	5 BAR
		L/min	L/min	L/min	L/min	L/min	L/min	L/min	L/min	L/min
0,8		0,42	0,47	0,57	0,62	0,67	0,72	0,75	0,77	0,82
		0,32	0,37	0,44	0,49	0,54	0,58	0,61	0,63	0,66
1		0,72	0,80	0,95	1,15	1,20	1,25	1,30	1,36	1,42
		0,45	0,51	0,62	0,68	0,75	0,81	0,86	0,92	0,96
1,2		1,00	1,15	1,35	1,45	1,60	1,70	1,80	1,84	1,91
		0,62	0,70	0,86	0,96	1,04	1,13	1,20	1,27	1,34

1,5		1,45	1,65	1,85	2,15	2,35	2,50	2,65	2,75	2,85
		1,10	1,20	1,45	1,65	1,80	1,90	2,00	2,10	2,21
1,8		1,95	2,20	2,70	2,90	3,20	3,40	3,60	3,75	3,90
		1,50	1,70	2,10	2,35	2,50	2,70	2,90	3,00	3,15
2		2,55	2,85	3,50	3,85	4,20	4,50	4,80	5,05	5,32
		1,80	2,00	2,45	2,75	2,95	3,20	3,40	3,60	3,70
2,3		3,20	3,50	4,25	4,70	5,20	5,50	5,80	6,10	6,40
		2,35	2,65	3,25	3,60	3,90	4,20	4,50	4,75	5,00

## 4.5 CALIBRATION OF MACHINE

To get a correct choice of product volume that has to be used, the user must know, in addition to the amount of fuel supplied per hectare, the extent of the following important parameters:

### 4.5.1 MAXIMUM CONCENTRATION OF PLANT PROTECTION PRODUCT USED

This value is indicated on the packaging of a plant protection product in drops on cm<sup>2</sup>

### 4.5.2 INTENSITY OF COVERAGE

The intensity of coverage is the optimal number of drops on a cm<sup>2</sup> and it can be evaluated with good approximation by placing inside the water sensitive papers and maps vegetation by spraying the leaves only with water .  
The water sensitive papers have a yellow surface film that turns blue when wet, allowing to estimate the size of drops

### 4.5.3 FOLIAR COVER INDEX

The LAI (Leaf Area Index) is the relationship between the leaf surface and the surface of the soil.

### 4.5.4 DEGREE OF PULVERIZATION

The degree of pulverization is the size of the droplets produced from sprayer nozzles. It is important to know this parameter because, in order to cover the leaves on both sides inside the canopy ,are necessary small droplets ,suspended in the air, capable to change their direction. Small droplets are synonymous of low volume mixture per hectare and of a wider, smooth and persistent treatment.

Fine drops (100-200  $\mu\text{m}$ ) adhere well to a tilted surface, and rough (400-500  $\mu\text{m}$ ) tend to come off by removing the product causing casualties on the ground.

Ultra-fine droplets (50  $\mu\text{m}$ ) tend to be repelled with slight air movements.

The size of the droplets is reduced with:

Aspersion angle bigger

Smaller nozzles (bottom)

More pressure

Adopting so fine spray nozzles can greatly increase the leaf surface covered by the plant protection product.

#### **4.5.5 MINIMISE DISTURBANCES**

The dispersion of the plant protection product are due to:

Loss in the atmosphere to drift and evaporation of drops below 100  $\mu\text{m}$

Ground for drip losses

Not homogeny treatment caused by incorrect position of the nozzles and conveyors or their incorrect adjustment.

Treatment for in homogeneities due to the variation of concentration during the emptying of the tank when using paste or wet powders

Differences in treatment related to the lack of proportionality between the forward speed and scope of regulators

Dosing errors in the preparation of the mixture

Sprayer uncleaning after use

#### **4.5.6 EFFECTIVENESS AND NOZZLE ORIENTATION**

Always guarantee the presence of nozzles on the machine able to produce a fine spray and homogeneous if kept in the best conditions.

The orientation of the flow of the mixture inside of the air flow is achieved by rotating the nozzle to get always a complete penetration of liquid in the canopy (see section 4.3.1).

#### **4.5.7 EFFECTIVENESS AND AIR VOLUME ORIENTATION**

The machine must have an air flow delivered on the area to be treated.

It is also necessary that the air goes through the canopy without removing the product already settled.

It is suggested to sway the leaves of the outside furthest of the canopy. If the leaves are closed, the air flow is insufficient, if the leaves are arranged in a flag, the air flow is too high and there is too much chemical dispersion.

### **4.6 MIXING**

The mixing of the active ingredient can be made using a shakers before and during treatment. A good mixing and agitation mean successful delivery on culture. It is recommended the use of premixer for powders and liquids.

Caution: wear gloves and protection mask!

The mixing can be done with:

LID's Premixer (optional):

- Open the lid and put the chemical powder in the filter bag, close the lid and turn the knob counterclockwise until the total dust disposal.
- Feed the stirrer for 15 minutes at maximum pressure (for 30 to 50 Bar) or operate the pump at 500 rpm with the pressure regulator on exhaust position for at least 10 minutes (for small capacity machines).

Premixer for powders and liquids with washing -jars (optional):

- Remove cover
- Open the faucet with a pressure not exceeding 3-4 Bars
- Enter the jar into the hopper and washing tube inside the jar.
- Press the same jar on the tube until thoroughly washing
- If the washing -jars is not supplied with clean water, it requires an additional rinsing with clean water. (Rinsing liquids must be filled in the tank to be delivered in the field).

In case of momentary interruptions of spray work do not interrupt the agitation of the mixture until the restart of spray work

Check the intake filter cartridge and shake the mixture remained in the tank for at least 10 minutes in the case of prolonged interruption of treatment.

## **4.7 ACCESSORIES FOR SPRAYERS AND WEED KILLING GROUPS**

Sprayers and weed killing groups differ from atomizers because , instead of centrifugal impeller, they use booms (manual or hydraulic opening) to deliver the product. These booms can be of various sizes. Moreover on these sprayers it's possible to fit a variety of applications such as lances, electric sprayers, hose reel, kit trace-file, hydraulic or manual lifting.

#### 4.7.1 WEED KILLING BOOMS

The weed killing booms are made of painted steel. They mounted nozzles that allow the distribution of the weed killing product on crops.

They can have horizontal arms (closing folding inward), "X" or "U" or closing vertically.

The booms have inlet hoses to plug directly on the machine (see section 4.1.8 and 4.1.9)

The flow adjustment is carried out like on a axial fan sprayer keeping in mind the scope of mounted nozzles (see section 4.4.1)

The opening of the bars can be::

-manual :opening totally the arms until the vertical position

-hydraulics: opening is regulated by hydraulic cylinders using a control unit in the tractor cabin or .

##### **Mechanical :**

Those booms are made of painted steel with nozzles mounted at 50 cm distance to each other.

The booms are bent in the central part and the outer arms are fitted with hinges to avoid breakage in case of impact against obstacles that may be in their radius.

However it is recommended to avoid collisions with any object.



Do not get your fingers caught in the hinges!

It 'also important not to forget to drop and hang up all the devices on the right place .

##### **Hydraulics:**

In these model the movement of opening and closing are made by a hydraulic control unit with switches located in the tractor cabin.

Externally they are very similar to those mechanics and their use is recommended for the most demanding treatments.

Pay attention when opening and closing so that no one is within the area of the operation The hydraulic system can be both independent and powered by the hydraulic pump of the tractor. If the feeding is made by independent oil circuit join the quick couplings to the oil delivery and drained on the designated locations..

Make sure that the delivery line at the control unit is connected to the aluminium valve of flow division.

Adjust the flow divider that onto control units arrive no more than 4-5 liters per minute.

Adjust the flow valves placed near the cylinders in order to avoid too abrupt movements.

Where there aren't the regulators there are valves fixed on the discharge of the movements to slow them down.

If the shutters on the above mentioned valves are dirty it may cause malfunctions.

Clean these parts with a certain frequency.

It is suggested to start the control unit only during re-orientation of the cylinders to prevent overheating of the oil.

#### 4.7.2 SELF LEVELLING :

The self-leveling is an accessory that allows you to adjust the boom to keep it parallel to the ground.

There are two types of leveling: manual (recommended for flat terrain) and hydraulic (for sloping ground).

The mechanical models are equipped with adjustable rod while the hydraulic replace the connecting rod with a piston.

It is recommended to always lubricate the moving parts (connecting rod or piston) and install the leveling device centrally respect to the boom in order to distribute uniformly the weight.

#### **4.7.3 LIFTING :**

They are useful to properly adjust the height of the boom depending on the vegetation to be treated.

They can be mechanical and hydraulic.

On the mechanical version the adjustment is obtained by turning the winch handle always verifying that the rod is taut.

In the hydraulic version there is a double-acting cylinder driven by a special valve.

The rails should always be kept greased

#### **4.7.4 NOZZLES HOLDERS:**

The nozzles can be one or multiple heads.

They are provided by anti-drops ( diaphragm or filter) made by reinforced plastic to be used with pressures up to 15-20 bar and nickel-plated brass for pressures up to 40 bar.

In some versions the diaphragm is replaced by a anti drops filter installed inside the nozzle.

#### **4.7.5 NOZZLES :**

They have a lot of importance for chemical distribution on the soil that has to be treated. If they are wear the distribution of the product could be not uniform .

They are of different types and sizes depending on the particular use (droplet size or pressure).

Improper use gives rise to ineffective treatments.

"FAN" type in example can work with pressures 1-16 bar and it generates medium- large droplets. It is made of: plastic, brass, ceramic, stainless steel.

It's recommended for weed control of pre-emergence and post-emergence.

The "CONE" type can work with pressures from 1-16 bar and generates drops of small size. Typically is made of ceramic and is composed of two pieces: the nozzle and the slinger, and it's recommended for very dense vegetation.

There is also a "mirror" type recommended for liquid fertilizer.

Useful tips for the distribution of product

Here are some rules to follow in order to make a correct and uniform distribution of the product on the vegetation to be treated.

The nozzles have an important role in this operation: they must be well cleaned and oriented in a correct manner on the ground .

Do not forget to check that both filter pressure and suction are free of impurities.

Verify that the speed and the working pressure are appropriate and that the total flow rate of the nozzles is lower of 20-25% than the flow rate of the pump.

Properly adjust the height of the boom at about 50-60 cm from the culture.

#### **4.7.6 FOAM MARKER KIT:**

It is assembled only on request.

It is very useful to highlight the portion of ground that has already been treated.

Further explanations and clarifications can be found in the booklet enclosed with this manual.

#### **4.7.7 INTERROW BOOMS :**

They are particularly suitable for weed control in orchards and are applied to a rear mounted sprayer. They are equipped with a special joint that allows to keep the boom on the right position even if it knocks against some obstacles.

Furthermore, the nozzles have a protection bell that avoids any contact between the leaves and the chemical.

#### **4.7.8 VERTICAL BARS :**

Are particularly suitable for crop-spraying on orchards or vineyards for high volume spray. They are of two types: STRAIGHT or ARCHED.

#### **4.7.8 HOSE REEL :**

This component can contain up to 100 meters of hose and it is available only on mechanical version.

#### **4.7.9 LANCES:**

They are different models: gun, knob, lever and mitra. Different kinds of nozzles having different flow rates are available.

Their use is easy but we suggest to follow these simple rules to avoid problems:

-do not lock the aperture lever cause, in the event of a fall, this would continue to release the liquid making it uncontrollable.

-do not direct the flow directly on people or animals or to areas where there is electricity.

-Remember to depressurize it after pump switch off .

#### **4.7.10 ELECTRIC SPRAYER:**

Are of our production and suggested to replace the booms and the lances. For their use we recommend to carefully read the user's manual provided with the electric sprayer.



## **5 CORRECT OPERATION ON THE MACHINE**

### **5.1 CLEANING FILTERS**

The filters are an essential part of the sprayer, as they are able to stop particles that could damage the pump and/ or settled in the latter valves. Frequently clean the suction filter after each treatment and the high pressure filter every four treatment . (§7.7)

### **5.2 CHECKING OF PROGRESS SPEED**

The forward speed of the tractor must always be kept under control during treatment, because the volume of product dispensed per hectare depends from it.

### **5.3 OPERATE IN THE CORRECT ENVIRONMENTAL CONDITIONS**

The fundamental rule is to operate in the correct environmental conditions to avoid losses to derive and evaporation:

Wind not exceeding 5 km/h

Light breeze

Too high Temperatures

Right humidity level (not low)

### **5.4 CHECKING OF THE GEARBOX OIL LEVEL**

Check regularly the oil on the gearbox. Follow the procedure as specified in the maintenance paragraph . (§7.3)

## **5.5 CHECKING OF THE RESERVOIR LEVEL**

Verify that the water tank for hand washing and maintenance are filled with clean water before start up any treatment

## **5.6 CHECKING OF THE PRESSURE GAUGE**

Verify the operation of the pressure gauge on the control unit, since from the right pressure on hydraulic circuit depends the flow rate of the nozzle and the quality of delivery.

# **6 CONNECTION OF THE MACHINE**

## **6.1 TO THE TRACTOR**

The machine must be coupled to the tractor with power outlet 1" 38 ASAE DIN 9611A at 550 RPM considering the right weight and power, in conformity with the requirements of the law in force in the country of use.

### **6.1.1 MOUNTED SPRAYERS MODELS PROCEDURE**

To coupling the tractor to the machine, the operator must bring the tractor in reverse and positioning it in front of the sprayer to be able to lift it up with the rear lifting arm  
Operate the tractor parking brake, stop the engine, remove the ignition key on and go down to inserting the bolts and the safety pins of the sprayers on the lifting arm of the tractor.

Connect the third point hitch of the machine to the tractor, lift the machine until the coupling plugs of the machine and tractor are at the same height and adjust the 3PH bar.  
Attach the PTO SHAFT to the PTO of the tractor.

Lock up the lifting arms of the tractor, in order to avoid any swing sideways.

### **6.1.2 TRAILES MODELS PROCEDURE**

To coupling the sprayer to the tractor the operator has to :

- bring the tractor in reverse until placing the towbar direct to the drawbar of the sprayer(see Figure) Operate the tractor parking brake, stop the engine, remove the ignition key on and go down .



- Connect the towbar to the drawbar of the sprayer by adjusting the height to maintain the tank in horizontal way.
- Take off the parking wheel to prevent damages on it during operation.
- Connect the PTO SHAFT to the PTO of the tractor.

## PTO SHAFT ON THE MACHINE



- Insert the PTO shaft onto the splined shaft of the machine while holding down the safety plug
- release the safety Plug and pull with the PTO shaft until the plug engages with an audible "clack" in its seat.
- If you do not hear the click of the plug, repeat the procedure.



***Do not use a PTO shaft without adequate protections in accordance with legal requirements.!***



***Absolutely avoid to overstep the lifting arms area during the work operation.***

If the machine is connected for the first time to the tractor, please ensure that: in maximum steering conditions the PTO shaft is completely closed do not cause damage to the gearbox. In the event that the PTO shaft is too long it must be cut shorten MINIMUM OVERLAP OF THE TWO TELESCOPIC TUBES SHOULD NEVER BE LESS THAN 1/3 OF THE LENGTH OF THE HOSES SELF.



Before using the machine please familiarize yourself with the controls The safety of the operator and those nearby depends on its judgment and prudence in the use of the machine.

Therefor it is necessary to know the location and function of all controls.

The equipment has to be always in perfect working conditions and has to be repaired only using original spare parts

## UNCOUPLING THE MACHINE FROM THE TRACTOR

### 6.2.1 MOUNTED MODELS

When parking the equipment , the operation to do are follows:

- actuate the parking brake of the tractor,

- stretch/open/lower/place the feet of the machine (if any),
- disengage the PTO of the tractor,
- stop the engine of the tractor,
- remove the ignition key from the dashboard and keep it,
- exit from the driver's seat,
- disconnect the PTO shaft
- put the PTO shaft on its stand,
- remove the pin and disconnect the tie rod (third point hitch),
- fix the third point on holder located on the tractor
- remove the plug anti-extension and connection pins from the lifting arms

## 6.2.1 TRAILED MODELS

When parking the equipment , the operation to do are follows

- actuate the parking brake of the tractor,
- relaxes/open/lower/place the feet of the machine (if any),
- disengage the PTO of the tractor,
- stop the engine of the tractor,
- remove the ignition key from the dashboard and keep it,
- exit from the driver's seat,
- disconnect the PTO shaft, acting on anti-extension, triggers
- put the PTO shaft on its stand,
- lower the front wheel to lift the machine to allow the disengage of the hook of the tractor,
- engage the parking brake,
- disconnect the electrical coupling for lights (only approved the circulation patterns on the highway),
- back on the tractor,



***It is necessary to get a protected and flat parking area, to prevent entrance of unauthorized personnel***

## 7 MAINTENANCE



***In case of malfunction the operator must turn the tractor off, remove the ignition key, get off from the tractor to see the the problem and carry out replacing operations on the machine.***

Please note that all maintenance operations must be performed by qualified and trained operators and the equipment /tractor must be off .

It is necessary that maintenance and repairing operations are carried out outdoors and by suitably equipped workshop.

Used Oil must be properly recovered and must not be dispersed in the environment, because, according to the current regulations, is classified as hazardous waste, and as such it should be awarded to special collection centers.

Contact local service for waste oils.

the following operations must be carried out before starting any maintenance operations :

- the machine during maintenance operations must be positioned on flat ground and with a maximum slope of 3°;
- stop the tractor engine and disconnect the equipment .
- always use appropriate personal protective equipment (safety shoes, work gloves, dust mask);
- prepare all forms of safety prevention for the type of operation being performed.
- the maximum pressure of the compressed air used for blowing and cleaning operations must be 2 bar
- Carry out maintenance operations at least four hours after the arrest of the driver of the tractor, in order to avoid contact with hot parts of the machine.
- If you use compressed air to clean the machine you need to protect yourself with appropriate glasses.
- When maintenance involves access to machine parts which cannot be reached according to the ground, and in any case points higher than 1.50 m from the ground, use a ladder or a platform compliant with current regulations.
- do not perform repairs that unknown. Always follow the instructions and in the absence of these contact your supplier or experienced personnel.
- Note: Replace hydraulic hoses whenever damage and not later than 1 year.
- before performing maintenance operations and repairs under elevated parts of the machine make sure that the locking devices are correctly positioned;
- Avoid prolonged and repeated skin contact with lubricating fluid fuels, as they may create skin disorders or other syndromes;
- do not ingest lubricating fluid fuels. In case of accidental contact with eyes rinse well with water the part affected by contact;
- During all cleaning or replacing the filters make sure there is adequate ventilation to prevent the accumulation of toxic fumes;
- do not perform welding in closed or poorly ventilated areas;
- do not perform welding on varnished surfaces or close to avoid the development of toxic vapors. Remove the paint with suitable products, then wash the surfaces and allow to dry.
- do not make welds without having previously emptied and cleaned the spraying circuit;
- When using compressed air for cleaning the filters carry safety glasses with side shields and a mask in order to avoid the risk of personal injury due to dust particles. It is suggested to clean the equipment in ventilated areas;
- pay special attention before removing the caps or lids of tanks, radiators or cylinders: rotate them carefully to download any remaining pressure;
- During bleeding, defiladed position stand and always use protective eyewear. Loosen the bleed screw a few turns slowly to allow the condensation or fluid to escape..
- release pressure from the channels before making speeches;
- do not use hands to locate leaks of fluids under pressure;
- fluid leaks under pressure can penetrate the skin and eyes with very serious consequences;
- carefully wash the machine after use, making it work with clean water;
- absolutely avoid to enter the tank to perform any cleaning or maintenance work;
- Check daily the condition of pipes and fittings, if they show signs of ageing (cracks, cuts) or mechanical damage (deformation, crushing) replace them immediately;
- before beginning the repair work of the tank must be cleaned and emptied the spraying circuit;
- keep the nozzles in good condition, regularly checking that there are no cracks, worn parts or fillings..

## 7.1 MAINTENANCE OPERATIONS THAT CAN BE PERFORMED BY THE OPERATOR

The interventions described in the following items do not require any specialization. The operator must know and follow the indications and must have made the decommissioning of the machine.

The periodic checks and maintenance operations must be performed within the time and in the manner established and shall be borne by the operator.

Failure to comply with the standards and maintenance affect the proper functioning of the machine, its duration, cause the onset of abnormalities that may damage parts of the machine and consequently invalidate the warranty.

Intensify the frequency of maintenance in heavy conditions of operation..

## 7.2 GREASING

Lubricate periodically using a special greased pump .

Use only a manual for greased pump in order to avoid the breakage of seals and bearings of the hydraulic hoses.

## 7.3 CHECK OIL LEVEL ON GEARBOX

The control should be carried out visually



at the rear right side of the fan unit is installed a light indicating the oil level. If the oil level is not visible please top up by inserting the top of the fan where there is a priming plug.

## 7.4 CHANGE OIL ON THE GEARBOX



***Observe replacement intervals under scheduled maintenance table.***



Proceed as follow to replace the total oil of the gearbox :

- unscrew the bottom cap of the multiplier and let Leach used oil in a suitable container (preferably with closing cap).
- Close the lower cap and insert the new oil from the top of the fan, until the side indicator light does not appear.
- Close the refilling cap

*N.B.: check after the first work hour if the indicator indicates sufficient oil and refill it if required.*



**Used Oil must be properly recovered and must not be dispersed in the environment, because, according to the current regulations, is classified as hazardous waste, and as such it should be awarded to special collection centers.**

**Contact local service for waste oils.**

## 7.5 CHECKING IMPELLER STATUS



**controls are made on moving parts of the machine and must always be performed with the engine off.**

Check the status of the impeller every day, removing the deposits that may form on the blades and causing deterioration of the balancing of the resulting vibration..



To check the status of the impeller:


- remove the grille by unscrewing the fixing screws.
- Manually check that impeller rotation is not forced or present a strong friction at rotation.
  - Once you have finished the cleaning or the control setting carefully protect and make sure that all screws are properly tightened and that the same are not grey unsolder parts.

**N.B.: cleaning the blades only with clean water and using a soft sponge to avoid scratching the surface of the same!**

## 7.6 NOZZLE CHECK

Daily the nozzles must be checked and the clogged ones must be cleaned and those damaged replaced. Remove the nozzle hole fillings using just a brush of nylon or an

pressured air jet . Change them if the nozzles are not regular and if the flow rate is higher of 10% compared to values reported in the tables of the manufacturer.



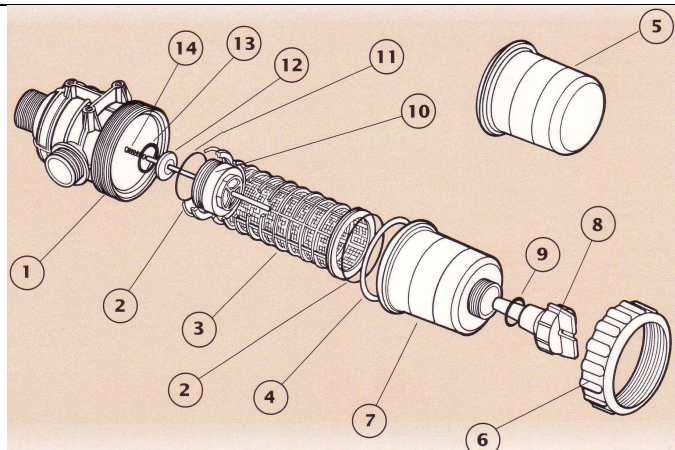
To clean the nozzles:

- Remove them using suitable keys.
- clean them using a jet of water from air impurities accumulated inside.
- Clean the hole of the plate, taking care not to damage it.
- check if the O-rings are in perfect condition and replace them if necessary, to avoid inefficiency of the machine due to loss of circuit loading.
  - Insert the diffuser.

Be careful not to damage the threads on the nozzles!

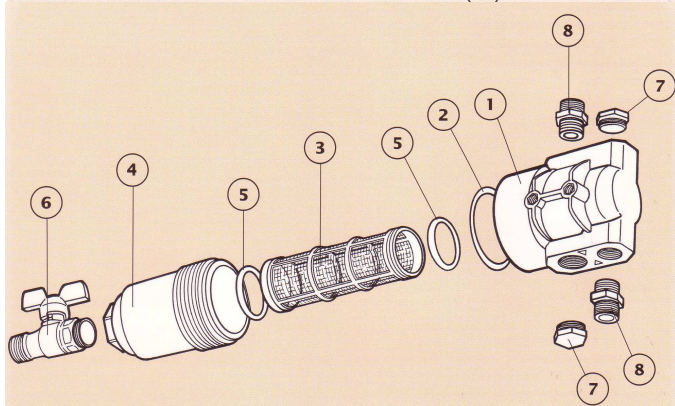
## 7.7 CHECKING STATUS OF FILTERS

Clean the filters every four flushes of the main tank, replacing the filter cartridge where necessary



Suction filter:

- unscrew the nut (POS. 6)
- remove the filter (POS. 3)
- clean the body internally with clean water
- clean with compressed air the filter and replace it if it is damaged.



For the high pressure filter (TRAILED MODELS ONLY):

- unscrew the body (POS. 4)
- remove the filter (POS. 3)
- clean the body internally with clean water
- clean with compressed air the filter and replace it if it is damaged..



## 8 SCHEDULED MAINTENANCE TABLE

INTERVENTION	10/H	60/H	250/H	END OF THE SEASON
control nozzles wearing			X	
Check and clean nozzles, drip membranes	X			
Weld failure in particular control of weeding bars				X
Tyre pressure control (lubricate with grease bearings and wheel hubs)	X X			
Pressure accumulator control		X		
Circ control. (pipes and fittings)		X		
Suction valves, discharge control				X
Clamping screw pump control				X
Cleaning filters and wear State	X			
Fixing screws and pins control		X		
Oil control (and State)	X			
Membranes and replacement oil control			X	X
Hydraulic oil level control		X		



## 9 TROUBLESHOOTING TABLE

<b>ANOMALY</b>	<b>CAUSE</b>	<b>REMEDY</b>
The manometer indicates a different pressure from that set	-Breaking pressure gauge -Pressure relief valve seals worn out -Suction Filter clogged -Etc. ..	Replace -Replace  -Clean or replace
Decrease the speed of impeller	Worn clutch -Clutch contaminated with oil	--Clean -replace
The pump does not reach pressure indicated	Valve adjustment and/or valve seat worn. -Valves or valve inlet and outlet worn or dirty. -Insufficient number of rpm 1' -Worn or used Nozzles with holes too big. -Choked Inlet	Replace (*)  -Replace or clean (*)  -Restore correct RPM. -Replace.  -Clean the filter cartridge or remove the constriction.
The pump does not go under pressure	- Air intake.  -Valve closed. valves suction and discharge valves worn or dirty..	- Check the suction apparatus. -Position the lever correctly. -Replace or clean
Irregular delivery vibration	--Exhaust pressure accumulator or with incorrect air pressure	- Return air at the correct pressure (see the pump Handbook) (*)
The pressure is not regular	- valves suction and discharge valves are worn or dirty. -Air Intake	Replace or clean (*)  -Check the suction system.
Liquid does not come out from the nozzles	Inlet filter dirty, dirty drip filter, clogged nozzles	Clean
Water in oil	- Rupture of one or more membranes	-Replace (*)
Noise and oil level lowered	- Low suction	Check the suction system.

(\*)ONLY SPECIALIZED TECHNICIAN

## 10 SPARE PARTS

Repairs and replacements must be carried out with the use of original spare parts, which must be required from the dealer. Please note that the request for spare parts must be corrected with the following indications:

Type of machine;

Chassis number;

Replacement code detectable from the spare Parts Catalogue ([www.progroup.it](http://www.progroup.it))

Being a particular part of a core group should also specify the model and serial number of the equipment .

### NOTES

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## LAYOUT TABLE

MODEL	CAPACITY* LT	FUN GROUP - Ø	FUN GROUP . - Ø	SPEED
COMPACT CONTROL 660	600	700		2 + FOLLE
COMPACT CONTROL 880	800	700		2 + FOLLE
COMPACT CONTROL 1100	1000	800		2 + FOLLE
COMPACT CONTROL 1650	1500	800		2 + FOLLE
COMPACT CONTROL 2200	2000	900		2 + FOLLE
COMPACT CONTROL 3300	3000	900		2 + FOLLE
COMPACT TURBO 1100	1000		450	2 + FOLLE
COMPACT TURBO 1650	1500		450	2 + FOLLE
COMPACT TURBO 2200	2000		450	2 + FOLLE
COMPACT TURBO 3300	3000		450	2 + FOLLE
COMPACT BICONTROL 1100	1000	800		2 + FOLLE
COMPACT BICONTROL 1650	1500	800		2 + FOLLE
COMPACT BICONTROL 2200	2000	900		2 + FOLLE
COMPACT BICONTROL 3300	3000	900		2 + FOLLE
COMPACT AIRSYSTEM 1100	1000	800		
COMPACT AIRSYSTEM 1650	1500	800		
COMPACT AIRSYSTEM 2200	2000	800		
COMPACT AIRSYSTEM 3300	3000	800		
COMPACT AIRCONTROL 660	600	700		2 + FOLLE
COMPACT AIRCONTROL 880	800	700		2 + FOLLE
COMPACT AIRCONTROL 1100	1000	700		2 + FOLLE
COMPACT AIRCONTROL 1650	1500	800		2 + FOLLE
COMPACT AIRCONTROL 2200	2000	800		2 + FOLLE
STARMIX CONTROL 330	300	700		1 + FOLLE
STARMIX CONTROL 440	400	700		2 + FOLLE
STARMIX CONTROL 440	400	700		2 + FOLLE
STARMIX CONTROL 660	600	700		2 + FOLLE
STARMIX CONTROL 660	600	800		2 + FOLLE
STARMIX CONTROL 880	800	800		2 + FOLLE
STARMIX CONTROL 1100	1000	900		2 + FOLLE
STAR MIXER 220	200	500		1 + FOLLE
STAR MIXER 330	300	500		1 + FOLLE
STAR MIXER 440	400	500		1 + FOLLE
STAR MIXER 440	400	500		1 + FOLLE
TURBO MIX 440	400		450	2 + FOLLE
TURBO MIX 660	600		450	2 + FOLLE
TURBO MIX 880	800		450	2 + FOLLE
TURBO MIX 1100	1000		450	2 + FOLLE
TURBO MIXER 330	300		350	1 + FOLLE
TURBO MIXER 440	400		350	1 + FOLLE
TURBO MIXER 660	600		350	1 + FOLLE
TURBOMIX FLEX 660	600		450	2 + FOLLE
TURBOMIX FLEX 880	800		450	2 + FOLLE
TURBOMIX FLEX 1100	1000		450	2 + FOLLE
COMPACT PNEUS 660	600		500	2 + FOLLE
COMPACT PNEUS 880	800		500	2 + FOLLE
COMPACT PNEUS 1100	1000		500	2 + FOLLE
COMPACT PNEUS 1650	1500		500	2 + FOLLE
COMPACT PNEUS 2200	2000		500	2 + FOLLE
MIX PNEUS 330	300		500	2 + FOLLE
MIX PNEUS 440	400		500	2 + FOLLE
MIX PNEUS 660	600		500	2 + FOLLE



**MEMBER**



**MEMBER**

## **IMA.IT SRL.**

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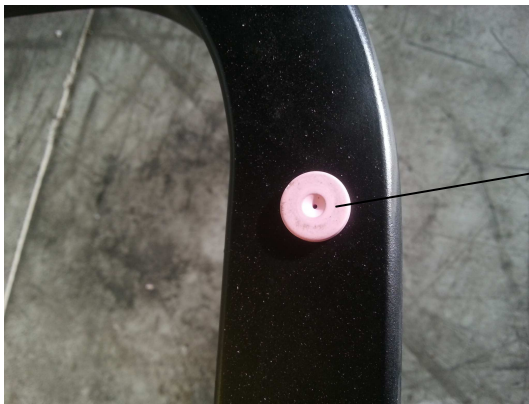


## HOW TO KNOW THE FLOW RATE ON THE PNEUS SYSTEM (VENTURI)

As we well know the CIMA sprayers have the flow rate calibration but after a discussion with our technical department and the check on the caliber of CIMA, we consider our solution the best and precise one.

In fact the flow rate on our sprayers are determined from the hole on the nozzle and it allows to the operator a uniform spray at the flow rate he desire.

Picture of the hole of the ceramic nozzle mounted on PNEUS SYSTEM



Hole of 1,00

i.e. this is a standard 1,00 hole . to know how much water we spray on field you consider the spray label hereby

HOLE Ø (mm)	DISC Ø (mm)	COD		l/min (Portata) l/min (Flow rate)											
				1 bar	2 bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar	9 bar	10 bar	15 bar	20 bar
0,8	15	HP15008		0,48	0,67	0,83	0,95	1,07	1,17	1,26	1,35	1,43	1,51	1,84	2,13
	18	HP18008													
	30	HP30008		0,38	0,53	0,65	0,75	0,84	0,92	0,99	1,06	1,13	1,19	1,46	1,68
1,0	15	HP15010		0,62	0,88	1,08	1,24	1,39	1,52	1,65	1,76	1,87	1,97	2,41	2,78
	18	HP18010													
	30	HP30010		0,48	0,68	0,84	0,97	1,08	1,18	1,28	1,37	1,45	1,53	1,87	2,16
1,2	15	HP15012		1,02	1,45	1,77	2,04	2,29	2,50	2,71	2,89	3,07	3,23	3,96	4,57
	18	HP18012													
	30	HP30012		0,80	1,13	1,39	1,60	1,79	1,96	2,12	2,27	2,41	2,54	3,11	3,59
1,5	15	HP15015		1,46	2,07	2,54	2,93	3,27	3,59	3,87	4,14	4,39	4,63	5,67	6,55
	18	HP18015													
	30	HP30015		1,01	1,43	1,75	2,03	2,26	2,48	2,68	2,86	3,04	3,20	3,92	4,53
1,8	15	HP15018		2,20	3,11	3,82	4,41	4,93	5,40	5,83	6,23	6,61	6,97	8,53	9,85
	18	HP18018													
	30	HP30018		1,57	2,22	2,73	3,15	3,52	3,85	4,16	4,45	4,72	4,98	6,09	7,04
2,0	15	HP15020		2,57	3,64	4,46	5,14	5,75	6,30	6,81	7,27	7,72	8,13	9,96	11,50
	18	HP18020													
	30	HP30020		1,76	2,49	3,05	3,52	3,94	4,31	4,66	4,98	5,28	5,57	6,82	7,88



As you can see the flow rate 1l/min that a nozzle, of 1,00 hole dimension at 4 bar, sprays is constantly 1,24 lt/min. This is only possibility to be sure about the flow rate. Even CIMA is using the nozzle inside and the flow rate is determined by the hole of the nozzles.

### HOW TO CHANGE THE NOZZLES INSIDE

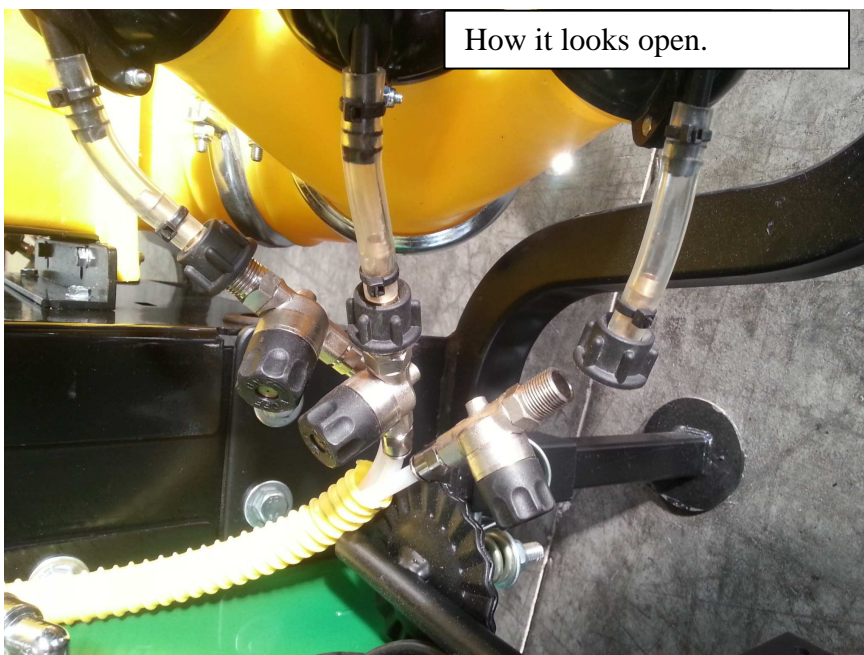
1<sup>st</sup> step



Taps to open and close the spray nozzles. Not water is coming out when closed

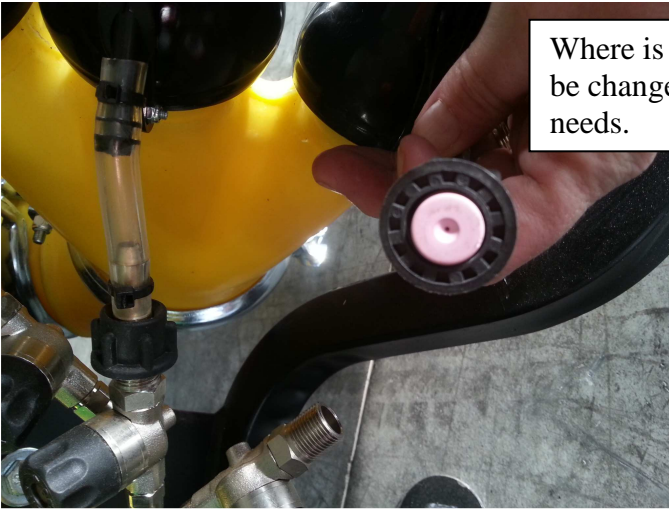
Place where is located the ceramic nozzles.

2 step



How it looks open.





Where is located the nozzle that can be changed based on customer needs.