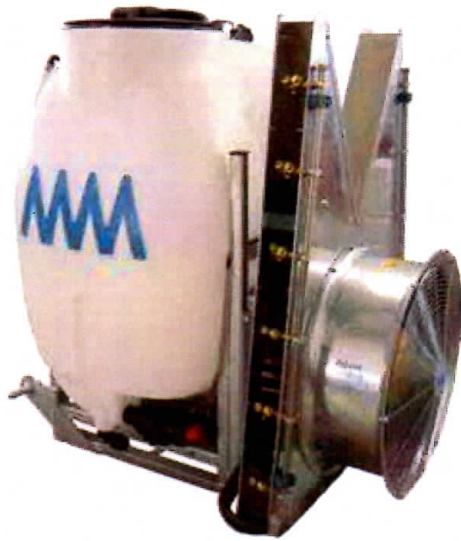




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USE AND MAINTENANCE MANUAL

**MOUNTED AIR-BLAST SPRAYERS:
ATP ATP/LN ATP/C series**

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Thank you for having chosen M.M.

The product you purchased has been designed and built with the greatest attention to the safety of the operator and the environment; however there is still some residual risk due to the nature of the product used.

For this reason we recommend reading this entire manual to prevent mistakes in the first period of use and prolong the life of the air-blast sprayer with a scheduled maintenance.

1 USE AND CONSERVATION OF THE USE AND MAINTENANCE MANUAL



The manual is to be considered an integral part of the machine, and must be kept in a safe location where it can be easily accessed for consultation.



1A COMPOSITION OF THE MANUAL

This manual consists of multiple handbooks in order to facilitate consultation by topic and avoid unnecessary repetitions; the following are part of the manual:

- a) pump handbook
- b) pressure regulation handbook (manual or electric version)
- c) spraying computer handbook (if applicable)
- d) handbooks for optional accessories (cardan shaft, etc.)



M.M. S.r.l. reserves the right to make changes without notice and the normal cycles of print may vary slightly.

1B WARRANTY

The MM warranty covers the repair or replacement of parts deemed defecting from the factory at the discretion of MM, only after the authorised agent for that zone has checked the defect.

The labour costs for repairs and shipping costs are not included in the warranty.

In no event shall the Company M.M. S.r.l. be liable for expenses or losses or damages of any kind arising from the failure or misuse or for partial or total malfunction of the machine.

Warranty declination

The warranty does not cover cases of normal wear, negligent use, poor maintenance and/or misuse.

The following materials subject to normal wear are not cover by the warranty:

gaskets and seals, diaphragms, seal rings, tubes and pipes, nozzles, pressure gauges, oil, tyres, friction material of clutches.

Evident cases of negligence include:

operating speeds greater than the values indicated in the spraying tables published in the handbook (or too high in relation to the soil conditions), PTO speeds greater than 540 RPM, and anything else indicated in this Use and Maintenance Manual.

Maintenance:

The warranty is void if you do not comply with the maintenance schedules given in this manual regarding the timing of interventions, the washing of the machine and the circuit at the end of the treatment.

Misuse:

The use for which the MM machines were designed is indicated in this manual; any other use is forbidden and it is not recognized by the warranty.

1C PRODUCT LIABILITY

M.M. S.r.l. is not responsible if:

- During the working life of the machine the normal maintenance operations aren't performed and documented as indicated in this handbook, in the enclosed handbooks of the pump, motors, regulators etc and in any case in use for the normal maintenance of mechanical parts.
- The machine is equipped with non original accessories or components or parts that are not recognized by MM as their own.
- The machine is equipped with original accessories or components but not applicable for measurements, weight or version to the machine itself. Please consult the page of available and recommended fittings.
- Total or partial non-observance of the instructions contained in the manual.
- Changes made to the machine without the permission of M.M. S.r.l.

1D WARNING SIGNS IN THE USER MANUAL AND ON THE MACHINE



Composite handbook; consult the specific sections for the various components

Below you will find all the pictograms applied to the machine (see Fig.1 pag.5 for their locations), in order to illustrate the warnings, the prohibitions, and the proper operating methods.

The operations that require special attention, are highlighted by images beside the text.



Key to the symbols

- 1 - Read the Use and Maintenance Manual.
- 2 - Stop the machine and read the manual before performing any intervention.
- 3 - Do not lubricate while in function.
- 4 - Do not drink.
- 5 - Do not discharge residual liquids into the environment.
- 6 - Do not smoke.
- 7 - Risk of injury; do not approach the machine until its moving parts have come to a complete stop.
- 8 - Crushing hazard; keep hands away from moving parts.
- 9 - Risk of injury caused by pressurised fluids.
- 10 - Do not climb on the machine during work operations or transfers.
- 11 - Do not climb on the tank.
- 12 - Do not enter the tank.
- 13 - Obligation to wear earmuffs.
- 14 - Obligation to wear a face mask.
- 15 - Obligation to wear safety shoes.
- 16 - Obligation to wear protective gloves.
- 17 - Obligation to wear protective coveralls.
- 18 - Use an operating pressure less than that indicated in red on the pressure gauge.
- 19 - Keep your hands at a safe distance from the cardan shaft.
- 20 - Make sure that the speed and direction of rotation of the tractor's PTO are correct.
- 21 - Do not remove the protection device while the fan is in motion.
- 22 - Expulsion of material from the machine; keep at a safe distance.
- 23 - Prohibition to stand between the tractor and the machine.

2 SAFETY STANDARDS AND RESIDUAL RISKS

In relation to safety, the following terms will be used: **Danger zone:** each zone within and/or around the machine in which the presence of an exposed person constitutes a risk for the safety and health of that person;

Exposed person: any person who has his body or part of it in a danger zone.

Before starting the machine, the operator must check the presence of any visible defects in the safety devices and the machine itself.

Never start the machine before you have removed all people within range of the machine.

The protection devices must not be removed or disabled while the machine is running.

It is obligatory to keep all the plates with the warning and safety signs in perfect conditions. If they get damaged or deteriorated, replace them immediately.

Replace the parts believed to be faulty with others indicated by M.M. S.r.l.

Never try hazardous solutions.

Don't wear clothing, jewellery, accessories or anything else that may get caught in moving parts.

Pay special attention to all the warning and danger signs on the machine.

Don't use the machine for any other purpose other than that indicated in the manual.

The machine has been designed and built with the appropriate measures to ensure the safety of the user. There are, however, some residual risks associated with the improper use of the machine by the operator; for this purpose signs and symbols of danger are applied in the vicinity and on some parts of the machine (see previous pictograms).

2.1 INTENDED USES

The sprayer of this series is built for agricultural use. The materials used are resistant to normal chemicals for spraying (or weeding) at the time of construction.

Any other use is not allowed and the manufacturer is not responsible for any damage caused by aggressive, dense or sticky chemicals.

THE USE OF THE MACHINE BY PERSONS UNDER 18 YEARS OF AGE IS STRICTLY PROHIBITED.

The use of liquid fertilizers in suspension is not allowed, while the use of the same in a solution is possible on request to M.M. S.r.l. at the time of the order and in any case by replacing some parts described in the handbooks as the pressure gauge (stainless steel), the nozzles (ceramic large diameter) and eliminating the filters with fine mesh to avoid a rapid clogging of the nozzles.

2.2 PROHIBITED USES

The use of the machine with the following products is strictly forbidden:

- paints of any kind;
- solvents or paint thinners of any kind;
- fuels and lubricants of any kind;
- LPG or gases of any kind;
- flammable liquids of any kind;
- liquid foods, whether for animals or humans;
- liquids containing consistent solids or granules;
- mixtures containing multiple chemicals not compatible with one another;
- black liquid fertilizers or fertilizers in suspension with lumps and/or particularly dense consistencies;
- liquids with temperatures greater than 40°C
- All products that do not fall within the scope of the machine's intended use.

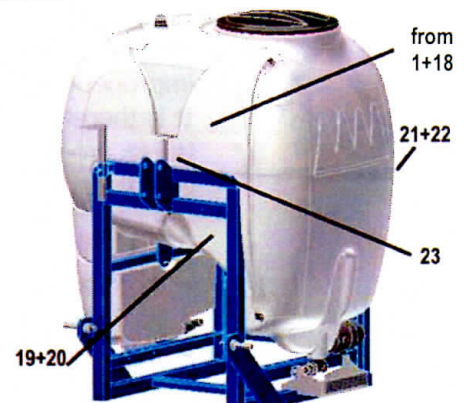


FIG. 1

INDICATIVE POSITION OF THE WARNING SIGNS ON THE AIR-BLAST SPRAYER

Note: the position may vary according to the characteristics of the model



2.3 USE OF CHEMICALS

All pesticides or herbicides can be harmful to humans and environment if used improperly or inadvertently.

It is therefore advisable that only properly trained persons (license) should use these products and only after having carefully read the instructions on the container.

2.3.1 RULES TO BE FOLLOWED FOR THE USE OF CHEMICALS

- Accurately measure the dosages of the plant protection products to be introduced into the main tank.
- Make sure that the chemicals utilized are compatible with the air-blast sprayer system's construction materials.
- The plant protection products must be stored in dedicated and adequately-ventilated rooms, inaccessible to children, animals and unqualified personnel, and bearing clear indications of the hazards associated with the substances stored therein. These premises shall not be used for the storage of food.
- Carefully read the safety instructions contained on the plant protection products' packaging prior to use. Take precautions appropriate to the hazards of the product. Do not exceed the recommended maximum concentrations.
- Do not mix different products if you are unsure of their compatibility.
- In the event of contact with skin, eyes, or mucous membranes, wash immediately with clean water and seek immediate medical attention, bringing the product packaging with you.
- Avoid inhaling the vapours of plant protection products; always use a protective mask.
- Do not eat, drink or smoke while handling hazardous plant protection products.
- Wear acid resistant rubber gloves, goggles, masks, or purification helmets, coveralls made of water-repellent fabrics or TIVEK, rubber boots or similar, and work with the plant protection products at a safe distance from any children, animals, and/or personnel without adequate protective clothing.
- Thoroughly wash any clothes that may have come into contact with the chemical mixture, whether pure or diluted, before reusing them.
- Thoroughly wash the plant protection products' containers using the appropriate accessories, and rinse them several times with clean water. The liquids used for washing can be used for treatment.
- Dispose of the washed containers by sending them to appropriate recycling facilities; never abandon them in the environment or reuse them again for any other purpose. It is good practice to make a hole in the bottom of the tin so it can't be used again.
- It is recommended to clean the air-blast sprayer in the same place where the filling operations are performed or in a yard where the water is collected in a disposal well.
- Avoid the uncontrolled discharge of residual mixtures into waterways, sewers, or public areas.



2.3.2 ENVIRONMENTAL PROTECTION



Products for agricultural spraying are generally deleterious to the environment in the event of misuse therefore the operator must observe the following rules of conduct.

- Only fill the tank with running water from pipelines. Do not come in contact with the dispenser element.
- **DO NOT ENTER THE TANK:** chemical residues may be present and can cause poisoning and suffocation.
- Use maximum caution during the preparation and transfer of the product mixture in order to avoid contaminating the soil or water.
- Stop treatment at the end of each row, and only start again when positioned on the next row.
- Never allow the liquid sprayed during treatment (even by drift) to reach public or private buildings, housing, public or private gardens, public or private watercourses or ponds, food storage places, or places frequented by people or animals.
- Avoid performing treatments in windy weather. The drift caused by the wind could contaminate areas far away from the area treated with the products.
- After spraying, thoroughly wash the sprayer, dilute the residues with a quantity of water at least 10 times greater than the residue itself, and redistribute the resulting mixture on the treated field.

2.4 RECOMMENDATIONS



- a) Follow the instructions in this manual for the use and maintenance of the frame, tank, gearbox, fan unit.
 - b) Refer to the enclosed handbooks for the use and maintenance of the pump, the pressure regulator, and any accessories or motors.
 - c) Consult your dealer or the nearest authorized workshop or M.M. S.r.l. directly for any repairs that you can not perform yourself.
 - d) Given the complexity of the equipment and the variety of technologies utilized (mechanical, hydraulic, and electro technical), it is prohibited for the operators to disassemble or modify the equipment.
- All operations must be carried out by specialized personnel authorized by M.M. S.r.l.

2.4.1 PRECAUTIONS AGAINST FIRE

Keep flames or heat sources away from the machine.

The air-blast sprayers are built with extensive use of materials derived from petroleum: plastic tanks, tubes and components; also the presence of various kinds of oils and residues of chemical products make them potentially flammable.

2.5 WEATHER CONDITIONS

It is advisable to treat in the early morning or late afternoon to avoid the hottest hours of the day. Never treat if it rains or if rain is forecast.

Do not treat in the presence of strong wind or at least more than 3/5 meters per second.

Do not treat with poor lighting and/or visibility.

If you have to spray in windy conditions, use relatively low pressures to get quite large drops less sensitive to drift (transportable by wind).

There are special anti-drift nozzles available in M.M. S.r.l.; for information, please contact us.

2.6 MACHINES DESIGNED EXCLUSIVELY FOR USE WITH CLEAN WATER

There are versions of machines designed for use only with hose reel for washing with cold clean water. These machines can not be used with chemicals as they don't have some of the devices or accessories essential for a safe use.

These machines can be identified by the word "washing" on the EC plate.

2.7 ROAD USE

Normally the machines are not specifically designed for road use.

However, many of them can be used on the road if fitted with appropriate accessories (reflective signs, beacon lights, rear lights, etc.) and if connected to tractors compliant with the current regulations. It is necessary to check with your local dealer the correct couplings.

For road traffic strictly follow the standards in force.

3 CHARACTERISTICS AND TECHNICAL INFORMATION

This handbook is valid for mounted air-blast sprayers with axial/tangential fans for plant protection treatments in orchards and vineyards, and for tree crops in rows of various kinds.

The axial air-blast sprayers produce a mixed spray with crushing of the droplets due to the pressure and speed of the air produced by the fan.

These air-blast sprayers manufactured by M.M. S.r.l. are identified by a EC identification plate (FIG. 2), upon which one of the symbols contained in the tables of available trim levels is stamped (see the following section).

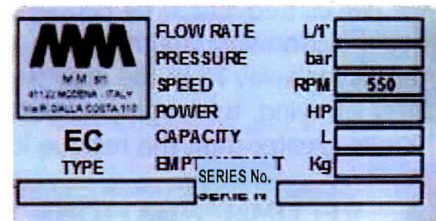


FIG. 2

3.1 TABLES OF AVAILABLE TRIM LEVELS

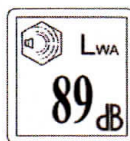
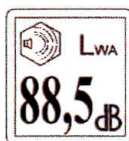
The tables on pages 40 and 41 allow the identification of the purchased version, indicating the basic trim level and all the higher trim levels available (optional). You can also find other available trim levels or other versions that in the future may respond to your changing needs.

THE TRIM LEVEL SHOWN ON THE TABLES CONTAINED IN THIS HANDBOOK (tables on pages 40 and 41) IS TO BE CONSIDERED BINDING FOR THE PURPOSES OF THE DECLARATION OF CONFORMITY'S VALIDITY.

Different fittings of base components and/or optional are to be considered unsafe and therefore out of warranty or liability of M.M. S.r.l.

The same applies to installations made with non-original components or accessories.

3.2 NOISE LEVEL OF THE MACHINE



Use earmuffs to protect your hearing when using the machine; below are the data on the maximum noise level during work.



Air-blast sprayers with axial/linear fan impeller

The SOUND POWER LEVEL emitted by the machine with an axial/linear fan impeller is **113** and **118 dB** respectively in 1st and 2nd speed

The SOUND PRESSURE LEVEL AT THE OPERATOR'S STATION emitted by the machine with an axial/linear fan impeller is **88.5** and **89 dB** respectively in 1st and 2nd speed

Data collected in accordance with the following standards: Machinery Directive 2006/42/EC.

Leg. Dec. No. 292 dtd. 4th September 2002 concerning the environmental acoustic emission of machines and equipment for use outdoors.

UNI EN ISO 3744.

3.3 REFERENCE STANDARD:

- MACHINERY DIRECTIVE 2006/42/EC.
- Leg.Dec. 81/08 Unique text for safety and hygiene in the workplace.
- UNI EN ISO 12100:2010 - Safety of machinery - General principles for design - Risk assessment and risk reduction
- UNI EN ISO 13857:2008 - Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.
- UNI EN 349:2008 - Safety of machinery. Minimum gaps to avoid crushing of parts of the human body.
- UNI EN ISO 4254-6:2010 - Agricultural machinery - Safety - Part 6: Sprayers and liquid fertilizer distributors.
- UNI EN ISO 13849-1:2016 - Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design.
- UNI EN ISO 4413:2012 - Hydraulic fluid power - General rules and safety requirements for systems and their components.
- UNI EN ISO 4254-1:2015 - Agricultural machinery - Safety - Part 1: General requirements
- ISO 11684:1995 - Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Safety signs and hazard pictorials - General principles.

4 INSTRUCTIONS FOR USE

4.1 DESCRIPTION OF THE MACHINE

The air-blast sprayers consist of a frame in profiled steel and a high density polyethylene tank. The frame is hot galvanized or painted with epoxy paint for exteriors.

The tank is easy to empty and this makes it possible to use even in the slopes. Under the tank is a compartment in which the pump is placed.

The pumps are generally diaphragm pumps and in some cases piston pumps. The pump is controlled by the tractor's Power Take-Off (henceforth referred to as the PTO), via the cardan shaft.

The pump is connected via a coupling to the axial fan group with rear suction. The pump sucks the product of the tank and sends it under pressure to the nozzles.

The axial fan through the air carriers the flow of product produced from the spray jets to the crops that are to be treated.

All the other accessories such as anti-drip nozzles and ceramic nozzles make the MM air-blast sprayer a highly qualified and efficient equipment.

4.1.1 WORK STATIONS

The use of this machine does not require the constant stationing of the operator near the machine, the operator normally seats in the cab of the tractor. For calibration and maintenance the operator acts near the machine at ground level. (for all operations please refer to the relevant chapters).



In the case of operations that require access to parts of the machine placed at a height greater than 1.5 m, it is necessary to use a proper stable ladder positioned on firm and flat ground with the machine stationary and the parking brake engaged.

In some special models with controls above 1.5 metres there is a platform to make these operations easier.

This platform must only be used with the machine stopped.

4.1.2 HAND WASH TANK

The air-blast sprayers are provided with an auxiliary tank with clean water for washing hands with a hand tap.

This tank must always be replenished and the inside must be clean to allow the washing of any parts of the body that may come into contact with the chemical product used. Never drink the liquid contained.




4.2 PRELIMINARY CHECKS

Upon receipt of the machine, check that it is intact in every part.

If there are any damaged parts, immediately inform your local dealer or directly M.M. S.r.l.

When the machine is delivered, check the following:

- a) that the machine is delivered complete in all of its parts, and that the trim level corresponds to that which is indicated in the tables on pages 40 and 41. This procedure is necessary because, for reasons of space during transport, the machine is often delivered partially disassembled. For example, it can be supplied with the pressure regulator disconnected from the supply pipes, drain, and outlet pipe.

 **Usually the regulator is disassembled and placed inside the tank for reasons of space.**

- b) that it is tested with clean water by checking in particular:
- that the suction filter and the inside of the tank are clean and free of any processing residues.
 - that the connections are properly assembled.
 - that the hose clamps have been properly tightened, as have all the fittings and connections.
 - that all the protection devices are present and properly secured to the machine, especially the pump's PTO protection.
 - that the gearbox is properly filled with lubricating oil.
 - that the area where the fan turns is not deformed as a result of jolts received during transport.



This symbol identifies the hand wash tank on the machine

4.3 SHIPPING AND HANDLING THE MACHINE

Before each movement always make sure that the lifting equipment with their tools (cables, hooks etc.) are suitable for lifting the load to be moved and check the stability.

It is forbidden to unhook and move the machine with the tank full.

The machine's empty weight at the highest available trim level is stamped on the identification plate; Use slings and lifting equipment with an adequate lifting capacity (FIG.3 on page 13).

Never lift or move the air-blast sprayers by hand if there is liquid in the tank. The weight is greater and the displacement of the liquid could change the centre of gravity, thus resulting in uncontrolled movements.

It is recommended to apply the sling as indicated in FIG. 3 on page 13; the points to be utilized are indicated on the machine with an appropriate symbol (FIG. 4 page 13).

Don't lift the machine with the forks of forklift to prevent the tipping over of the machine due to the weight of the fan unit.

It is forbidden to stand under the machine when it is raised.



This symbol identifies the coupling points of the machine

4.3.1 MOUNTED AIR-BLAST SPRAYERS

STATIONING

Do not place the air-blast sprayer on soft or excessively sloping ground; the machine is designed to be parked safely on solid ground with a slope of up to 8.5°.

HANDLING THE MACHINE

To lift the machine follows the instructions above.

4.4 COUPLING WITH THE TRACTOR

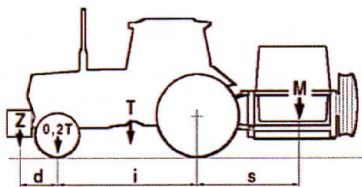
The tractor must be equipped with a 1 3/8 ASAE DIN 9611/A PTO at 550 RPM.

It must have a three-point linkage suitable for safely supporting the weight of the air-blast sprayer. This can be verified by consulting the tables of available trim levels on pages 40 and 41.



CAUTION: make sure that there are no persons or things near the sprayer before putting the machine into operation and during use. .

4.4.1 THREE-POINT LINKAGE



$$M \times s < 0,2 T \times i + Z \times (d + i)$$

i = tractor wheelbase

d = distance of the front axle from the ballasts

s = overhang of the machine from the rear axle

T = mass of the tractor + operator (75 kg)

Z = mass of the ballast

M = mass of the machine

- a) We recommend checking carefully that the tractor is capable of safely bearing the weight of the sprayer at full load.

The total weight of the sprayer with the highest trim level is indicated on the identification plate, as shown in FIG. 2, and can be found (in the highest available trim level version) in the tables on pages 40 and 41.

For the verification use the formula shown at right.

Failure to follow these instructions will result in a dangerous situation because the tractor loses sensibility to the steering and in the presence of climb or bumps may overturn.



FIG. 3

- b) Check the diameter of the lift's coupling pins. If necessary, properly orient the double diameter pins; there are also appropriate adapter bushes.
- c) Adjust the length of the tie rod of the third point allowing the sprayer to be perfectly vertical in the normal operating position.
- d) Verify the presence of the safety pins that prevent the arms of the tractor to come out from the connecting pins.

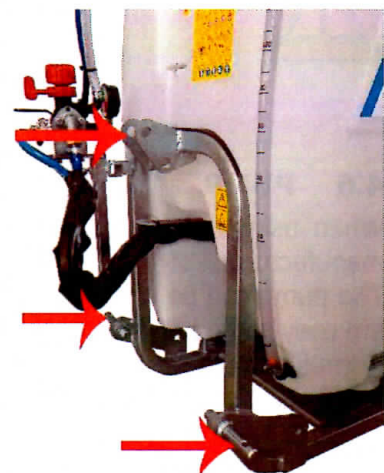


FIG. 4 - Connection to the tractor

4.5 CARDAN SHAFT

This is provided upon request for some models.

The cardan shaft must bear the EC mark.

It must always have its own instructions that must be followed scrupulously and it should come with a cover bearing the mark, integrated in every part.

Check the length beforehand to avoid:

- if too long: HARMFUL THRUST ON THE PUMP SHAFT
- if too short: POSSIBILITY OF DANGEROUS BREAKS

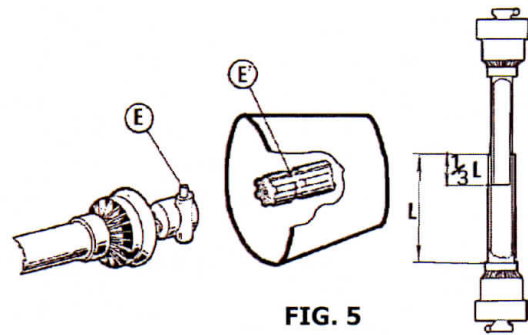


FIG. 5



The minimum overlap of the two telescopic pipes must never be less than 1/3 of the length of the pipes themselves

The power transmitted by the PTO must be at least equal to that necessary for the air-blast sprayer's functionality.

These power levels are indicated in the tables on pages 40 and 41.

- Hook the safety chains to sturdy anchor points.
- Make sure the button or ring nut "E" (FIG. 5) is correctly inserted and locked on both the pump and tractor sides.
- Never exceed an inclination of 30° in any direction for any reason (see FIG. 6).
- With the machine stopped, periodically grease the spiders and the pipes, keeping the connecting zone particularly clean.
- Avoid contact of the terminal part of the cardan shaft with the round when the machine is stopped; to do this use the appropriate support provided in some versions. Where there is no such support, hook the external safety chain to a part of the frame of the machine (ex. Control unit support).

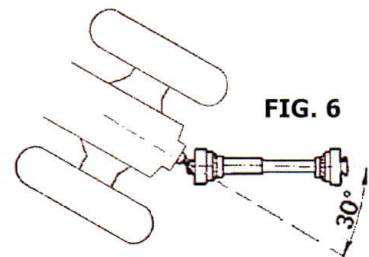


FIG. 6



Do not operate the cardan transmission if the following protective covers are missing:

- tractor pto cover;
- cardan shaft cover;
- fixed pump shaft cover.

4.6 PUMP

When using the pump strictly follow the instructions in the enclosed handbook supplies by the manufacturer.

The pump can be identified by the nameplate applied on it; The main data of pressure and flow rate are easy to find on this plate.

Normally the pump should not exceed 550 RPM; while a greater speed will not improve performance, it will risk compromising the durability and safety.

There is a safety valve on the pump, which is calibrated to prevent overpressure.

Do not tamper with the valve for any reason and don't obstruct the pipes connected to it in any way.



Always follow the instructions contained in the enclosed handbook when using the pump.

4.7 SUCTION FILTER

The air-blast sprayer is equipped with a suction filter with filter cartridges of about 50 mesh, with holes of 0.4 to 0.35 mm. An efficient filter allows the air-blast sprayer working properly. You need to check periodically the cleaning of the filter cartridge; this check should be done more often if there are impurities in the liquid introduced.



Wear rubber acid-proof gloves to inspect the filter cartridge, as the liquid inside the filter can come into contact with your hands when you open the filter.

Handle chemicals and all components that contain them using personal protective equipment (re. section 2.3.1)

Don't perform this operation with the pump running as the depression produced locks the cover preventing the removal.

Before removing the filter's cover, make sure that it's isolated from the pipe by unscrewing the rear valve (FIG. N°7).

After washing the cartridge, reassemble the cover remembering to reconnect the circuit acting on the valves described above in reverse order.



Verify the correct positioning of the O-Ring on the cover.

Do not discharge the washing residues into the environment! (Ref. sec. 2.3.1 page 8)



4.8 PRESSURE REGULATOR

To use the pressure regulator, follow the instructions in the enclosed handbook. The pressure regulator controls all the most important spraying functions; a good knowledge of its functions makes the job easier and more precise.

The sprayer's operating pressure and maximum pressure are determined by the pressure regulator, which also protects the circuit against overpressure under any working conditions. (In serious but very rare cases, if the connecting pipes get blocked, the safety valve would operate).

Some trim levels may have a pump capable of reaching 50 bar that's controlled by a regulator built for 20/30 bar. In this case the maximum attainable pressure will be 20/30 bar.

The regulators can be manual, mounted on the sprayer or remote mounted to facilitate the use of the controls; or electrical with control panel in the cab.

If the tractor has a waterproof cabin the use of electrical controls is obligatory.

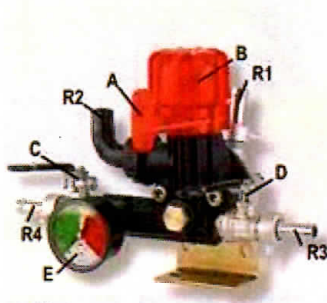
4.8.1 COMPONENTS OF THE PRESSURE REGULATOR

Below you will find the indications for the main models fitted on M.M. products.

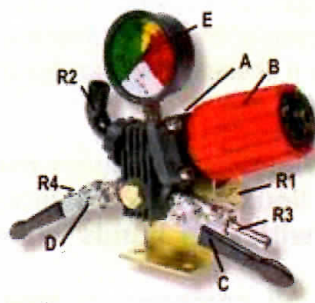
A general control ON-OFF: "open" sends the fluid to the circuit of use; "closed/BY-PASS" discharge the fluid in the tank.

B pressure relief valve:: manually adjustable with knob (drains the excess liquid when the set pressure is reached).

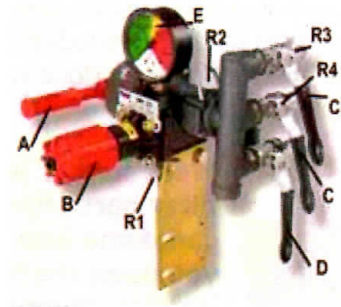
C nozzle section tap: opens the corresponding nozzle boom.
 D auxiliary tap: can be used for various accessories (always manual).
 E pressure gauge: it indicates the working pressure.



GR30



RM40



VDR50

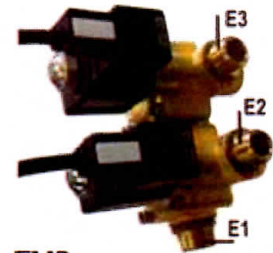
*Connections:*

- R1 inlet coupling
- R2 drain coupling
- R3 delivery coupling to nozzle section
- R4 auxiliary delivery coupling

CONNECTION TO SOLENOID VALVES EV2

12V membrane solenoid normally closed servo operated.

E1 solenoid inlet coupling connected to R3.
 E2 coupling for the supply of nozzles in the right section
 E3 coupling for the supply of nozzles in the left section

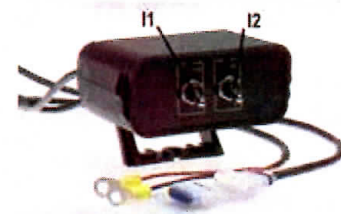


EV2

CONTROL UNIT

Controls the opening/closing of the solenoid.

I1 valve switch for right nozzle section
 I2 valve switch for left nozzle section



CONTROL UNIT

4.8.2 GENERAL INSTRUCTIONS

When using the pressure regulator strictly follow the instructions in the enclosed handbook; below you will find general guidelines for the main models fitted by M.M. S.r.l.

All tests of adjustment must be made with clean water.

Pressure regulators

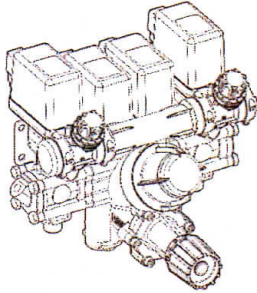
Adjusting the pressure relief valve

- set the general control **A** to the drain position ("OFF").
- completely loosen the hand wheel of the pressure relief valve **B** (anti-clockwise).
- activate the pump by engaging the tractor's PTO at 540 RPM
- open the main control **A** ("ON" position); the pressure gauge will be activated.
- open all the section valves **C** ("ON" position)
- adjust the maximum pressure valve **B** to its operating value (always less than the maximum safety pressure that the system can reach).

Pressure regulators with solenoid valve EV2

The regulators mentioned above can be connected to a 2-way solenoid valve that allows the opening and closing of the two sections of the nozzles (right and left) acting on the switches I1 and I2 in the cabin.

ELECTRIC PRESSURE REGULATORS



For more details on the electric regulator, refer to the relative instruction manual supplied.

4.9 LINE FILTERS (EQUIPPED MODELS ONLY)

This is particularly useful when using small nozzles (medium/low volume). They are normally mounted on the nozzle holder rods and have a 40 mesh filter cartridge (the equivalent of 0.4 mm holes). At the end of each treatment cycle it is necessary to clean the cartridge: turn the nozzles to the closed position, put the command under pressure and open the tap under the filter to drain the tank for a few minutes.

The cartridge must be manually cleaned periodically, based on the product used. Stop the pump to clean and wear rubber gloves and the other personal protective equipment when cleaning.



40 mesh



Don't disperse the washing residual by the filter but follow the instructions in par. 2.3

4.10 FILLING THE TANK

The machines for pest control, in consideration of the safety of persons, animals and the protection of the environment, must only be filled indirectly from open water courses and only by free-falling water from the water mains.

The filling hose must never come into contact with the liquid inside the tank, and the water must therefore fall above the upper edge of the fill opening and through the filter installed on it.

The tank is equipped with a transparent graduated band that shows the exact quantity of liquid inside. This reading is precise if the tank is on flat ground; the total effective capacity coincides with the highest number. All the filling systems fitted by M.M. S.r.l. on their machines or on request are anti-pollution and prevent the liquid overflow from the tank.



It is prohibited fill the tank up to the overflow

a) FILLING WITH THE SUCTION FILTER (FIG. 8 - FIG. 9).

You can also fill the tank using the coupling on the cover of the suction filter. Loosen the rear wing of the filter **F** and, using a G1"1/2 threaded coupling, connect pipe **T** with the floating filter to the coupling. Make sure that the general command of the pressure regulator **R** is in the OFF position and that all boom sectors R1->4 are closed.

Activate the diaphragm pump by engaging the PTO. Visually check the level of liquid inside the tank.

Once the tank is filled, stop the diaphragm pump by disengaging the PTO, disconnect the hose **T** from the ejector and reapply the wing nut **F**.

In this case the filling speed in litres/minute is equal to the pump's flow rate.



FIG. 8

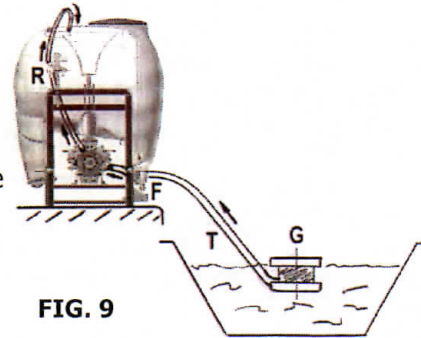


FIG. 9

b) FILLING WITH THE ANTI-POLLUTION EJECTOR (FIG. 10)

If filling with the anti-pollution ejector (standard on some models), do the following:

- fill the tank with about 20-30 litres of water and start the pump.
- remove the ejector's cap **E** and insert the filler pipe **T** using the joint supplied.
- place the other end of the hose, upon which the filter **G** is installed, into the channel or at the point from which the water is to be drawn.
- make sure that the pressure regulator's general command **R** is ON
- open the tap R4 that supplies the ejector (on the pressure regulator **R**).
- increase the pressure until a value sufficient for suctioning the liquid is obtained.
- visually check the level of the liquid inside the tank and, after filling, close the tap R4, disconnect the pipe **T** from the ejector, and reapply the cap.

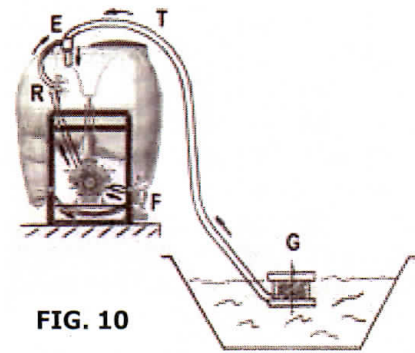


FIG. 10



In order to use the taps on the pump or on the front of the machine, the operator must position him/herself near the cardan shaft. Despite the presence of protections at EC rules, it is compulsory to switch off the engine and to take the key off.

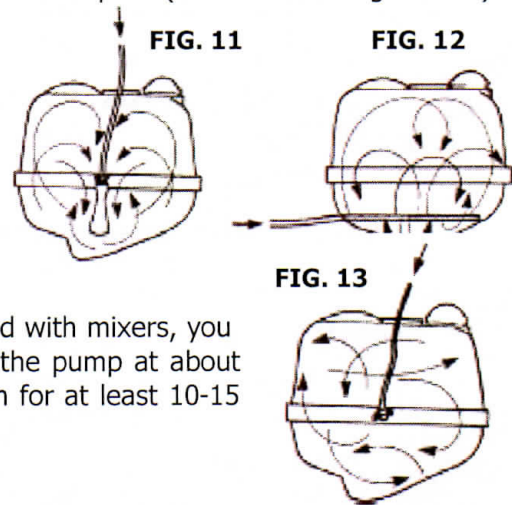
4.11 TEST WITH CLEAN WATER

It is good practice to do a test with clean water (without chemical product in the tank) before the first treatment to verify the correct operation of the air-blast sprayer and to become familiar with the controls. For instructions on how to proceed see the chapter SPRAYING.

4.12 MIXING

The mixing of the active ingredient can be carried out using the special stirrers before and during treatment. A good mixing and stirring is the basis of a proper distribution on the crop. We recommend some useful accessories such as the pre-mixer for powders and liquids (see the following section). To mix the product in the tank proceed as follows:

machines with ejector or hydraulic stirrer (optional) on a delivery flow (R4), operate the pump to power the stirrer (or ejector) with the maximum pressure available for at least 10-15 minutes.
See FIG. 11 and FIG. 12



Some models with very small tanks (120L) aren't equipped with mixers, you should use the discharge of the pressure regulator: run the pump at about 540 RPM with the pressure regulator in the drain position for at least 10-15 minutes. (FIG. 13)

4.12.1 MANUAL PRE-MIXING

Dilute the active ingredient by hand before introducing it into the tank.



It is mandatory to use proper protection devices, such as rubber gloves, a protective mask or goggles, coveralls, etc. (see Sec. 2.3.1)

4.12.2 COVER PRE-MIXER (OPTIONAL):

Open the cover and pour the chemical powder into the filter, close the cover and open the supply tap until all the powder has dissolved.

4.12.3 HOPPER-STYLE PRE-MIXER WITH CANISTER WASHER (OPTIONAL)



Shut off the tractor's engine and remove the key before performing the pre-mixing operations.

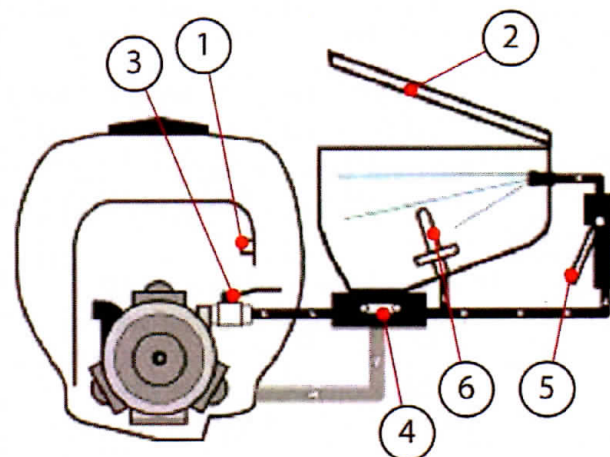
After having released the hook (1), extract the pre-mixer and lift the cover (2). Open the intake tap (3) on the pump and allow the liquid to reach a maximum pressure of 8 bar, then open the gate valve (4) that allows it to be discharged into the tank.

Insert the product to be mixed and, after having closed the cover (2) again, press the grip (5) to mix the product inside the hopper, taking care not to allow the liquid to overflow.

In order to avoid overflows and better dissolve the powdered products, always keep the gate valve open (4).

To wash the canister, do the following:

- a. Raise the cover (2).
- b. Open the tap (3), supplying it with a pressure no greater than 8 bar.



- c. Insert the canister into the hopper, and insert the wash hose (6) into the canister.
- d. Press the same canister onto the wash hose (6) until it has been completely washed.
- e. Discharge the liquid into the tank by opening the gate valve (4).
- f. If the canister washer is not supplied with clean water via the optional electric pump, an additional manual rinsing operation must be performed with clean water.



The rinsing liquids must be inserted into the tank in order to be distributed in the field.

Once the operations have been completed, close the gate valve (4), then close the tap (3), reinsert the pre-mixer into its housing, and lock the hook (1).

4.13 WASHING THE AIR-BLAST SPRAYER

After every treatment, thoroughly clean the equipment, washing with water inside and out. Dirty equipment is very dangerous to people, especially for children.



It is forbidden to discharge the washing residues into the environment without taking appropriate precautions as it can pollute the groundwater. Distribute the residues on the field or the crops where they won't cause any damage.

4.13.1 CIRCUIT WASHER AND TANK WASHER

Some machine models are equipped with a circuit washing tank, as shown in FIG. 14 and FIG. 15.

This tank must be filled with clean water and used to rinse the entire suction circuit, delivery, pump, pressure regulator, nozzles. Thanks to the practical rotating nozzle it also rinses the inside surface of the tank.

Note: In order to completely clean the residues of the various active substances from the tank and pipelines, it is recommended to add a product specifically designed for cleaning dispenser tanks to the washing liquid, diluted as recommended by the manufacturer, and in compliance with the instructions for use and disposal. At the end of the treatment, wash the circuit and the tank.

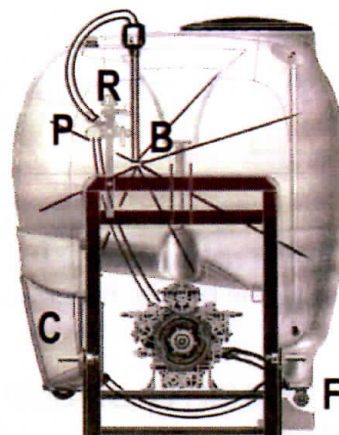


FIG. 14



Handle chemicals and all the components that contain them using suitable personal protective equipment. Sec. 2.3.1

- a) Drain the main tank from any unused residual product using the anti-pollution drain valve F.



Recover or dispose of the residual products in accordance with the current regulations. See section 2.3.

- b) Stop the diaphragm pump disengaging the PTO.
- c) Check to make sure that the circuit wash tank C has been filled.
- d) Make sure that the main control of the pressure regulator R is OFF and that all the boom sections are closed.
- e) Turn the suction diverter A to the circuit wash position (H2O to the right).
- f) Start the diaphragm pump inserting the PTO.
- g) Increase the engine speed to suck up all the liquid present in the circuit wash tank C.



FIG. 15

- h) Turn off the diaphragm pump and turn the diverter **A** to its working position (TANK to the left).
 i) Turn the main control **R** to ON position to have pressure in the circuit.
 j) Start the pump again and use the tank washing tap R4 on the regulator **R** that supplies the nozzle **B**.
 k) After a few minutes you can close the tank washing tap.
 l) Distribute the washing residues over a portion of the field where it won't cause damage letting it coming out from the boom sections (right and left); in this way you will also get a cleaning of the nozzles themselves.
 m) After you have finished washing, stop the diaphragm pump.

Note: if there is the risk of frost, insert about 500 grams of normal antifreeze for cars at the end of the washing cycle, and run the pump for a few minutes, repeating steps d and f.



In order to use the taps on the pump or on the front of the machine, the operator must position him/herself near the cardan shaft. Despite the presence of protections at EC rules, it is compulsory to switch off the engine and to take the key off.



This symbol identifies the clean water tank for the circuit washing system on the machine

5 FAN UNIT

All the air-blast sprayers have a rotating impeller at high speed.



You must pay attention to the effects that this may cause such as the intake and projection of foreign bodies which, although small, can be especially dangerous for the eyes and face.



FIG. 16

5.1 AXIAL FAN UNIT WITH GEARBOX

The transmission of the motion from the pump to the fan is obtained with a gearbox equipped with one or two gears and a neutral position. The fan's rotation speed is normally 1950 RPM in first gear and 2500 RPM in second in the gearbox with 2 gear ratios (multiplied ratio 1:3.6 - 1:4.6) and 2500 RPM in the gearbox with one gear ratio (1:4.6) with the PTO at 540 RPM.

The transition from one speed to another is achieved by operating the lever on the gearbox and made accessible through the opening in the rear left side of the machine or at a distance on the right side. The lever has 2 or 3 positions depending on the number of gears and the central position is neutral (to use the pump without the fan).

There are two models of fan units with rear suction:

- **Axial conveyor** (FIG 16): used for treatments with gearbox fan units, with air supply in a circular crown.
- **Linear conveyor** (FIG 17): for uses in small and medium-sized espalier rows, operated with gearbox.

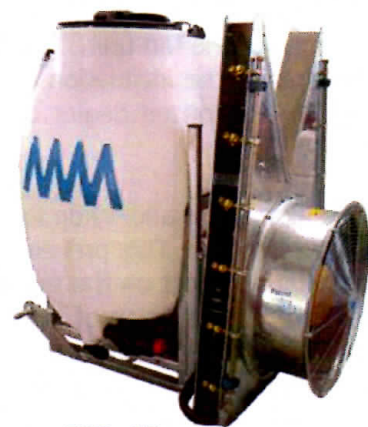


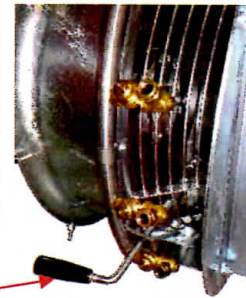
FIG. 17



The gear change lever must only be used with the PTO disengaged and the fan stopped. If it is difficult to engage, turn the cardan shaft slightly in order to allow the desired lever position to be obtained.

MAKE SURE THAT THE TRACTOR IS OFF

There are two deflectors on the lower part of the delivery outlet of the fan unit (one on the right and one on the left - FIG. 19 on page 22), which determine the direction of the airflow; lower if the deflector is lowered, and higher if the deflector is raised. For proper operation it is necessary to have the deflector of the left (looking from behind the air-blast sprayer) raised and the right one lowered in machines with gearbox. For the maintenance of the gearbox, see point 8.2.4 GEARBOX LUBRICATION on page 30.



Lever to the gearbox and/or fan disengagement

TEMPERATURE RANGE

The heat generated by the friction between the various components in relative motion depends on the transmitted power. The temperature of the gearbox or disengaging box depends on the capacity to transfer heat to the outside and then from its exchange surface and the environmental conditions. The technical data shown refer to an environment temperature ranging from -10° to $+50^{\circ}\text{C}$ (14°C to 122°F).

The temperature limit of the box is 90°C (200°F), which has been established to prevent the ageing of the sealing elements and ensure sufficient oil viscosity. The heat causes the expansion of the air contained in the box and then the increase of the internal pressure. The proper functionality of the oil seals is guaranteed up to an internal pressure of 0.5 bars. The boxes intended for heavy-duty applications are equipped with a breather cap that can be fitted on any cast iron/aluminium box.

5.2 AXIAL-FLOW PROPELLER

Generally the new models of propellers are fitted with 8/9 aluminium or nylon+fibreglass blades that have a variable inclination from 25° to 40° with 5° adjustment increments (FIG. 18).

The angular displacement of all the blades, if done correctly, does not alter the dynamic balance of the fan unit.

To change the inclination of the blades, contact an MM authorized dealer or a specialized repair shop.

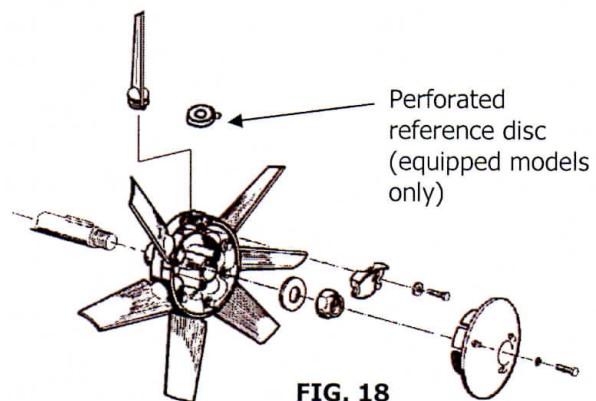


FIG. 18

The aluminium and nylon fans have a centrifugal type clutch that allows for the gradual engagement of the impeller. This prevents tearing at the start, due to the inertia of the fan rotor, which can have a negative effect on the transmission.

For proper operation of the centrifugal clutch the speed of the PTO must not be less than 450 rpm, especially if you use the first gear of the gearbox.

Generally rubber clutches are fitted.

5.3 DEFLECTORS AND OPTIONAL ACCESSORIES

The air-blast sprayers are equipped with underneath deflectors for an optimal regulation of the airflow towards the zone to be treated. In order to adjust them, simply loosen the fastening bolt B (FIG. 19) and push or pull

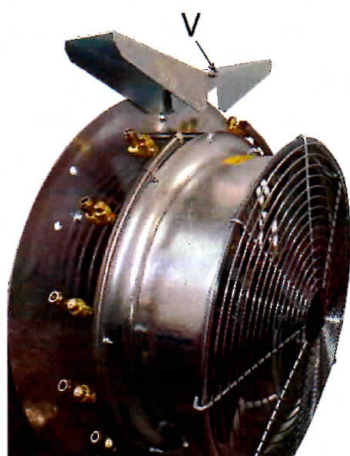


FIG. 20

the deflector to the desired position; the airflow direction will be downward if the deflector lowered and more upward if the deflector is raised. For proper operation it is necessary to have: the left-hand deflector raised and the right one lowered (looking at the air-blast sprayer from behind).

Upper deflectors can be provided upon request, which ensure better airflow adjustment towards the lateral areas, without any upward product dispersion. In order to adjust them, simply loosen the screw V (FIG. 20), position the deflectors, and tighten the screw V again.

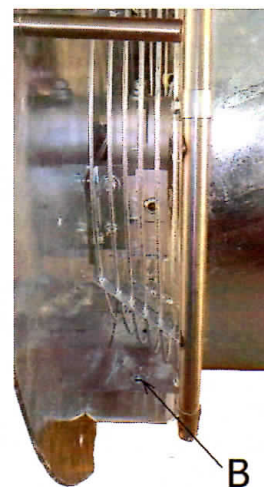


FIG. 19

5.4 CANNON FAN UNIT

The cannon fan unit is equipped with a gearbox similar to the normal axial fan units, which has all the same functionality characteristics.

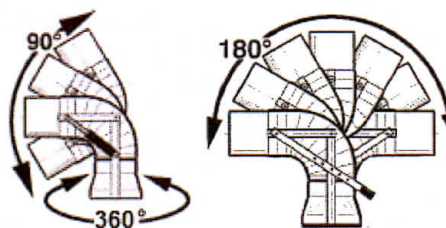
The main difference with respect to the axial fan units is the centrifuge-type impeller in galvanized steel; these types of impellers have non-adjustable fixed blades (for the clutch, see the previous section). This impeller can generate much greater delivery heads, thus resulting in an extremely high airflow speed.



The cannon conveyor is mounted on a fifth wheel, the standard version of which can be manually adjusted by unscrewing the relative stopper screw. This adjustment must only be performed while the impeller is stationary, as the high airspeed makes the conveyor's movement dangerous.

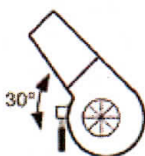
5.4.1 MOTORIZED HYDRAULIC HEADS

Upon request, hydraulic articulated heads are available with a piston-action tilting movement (approx. 90° inclination) and a motor pinion rotary movement (max. rotation 360°).



5.4.2 MANUAL MOVEMENTS

The cannon conveyors can be equipped with manual movements: (approx. 30° inclination).



5.4.3 OIL SUPPLY FROM TRACTOR

(for hydraulic systems)

Connect the delivery and discharge quick connectors to their respective lodgings, respecting the directions of flow.

Fixed restrictors are present in order to prevent the cylinders/motors from reaching dangerous speeds. The restrictors are positioned on the discharge line of the movement to be slowed.

Any presence of impurities in the oil could cause the restrictors to become clogged, thus resulting in the blockage of the relative cylinders; eliminate dirt whenever necessary.

In order to prevent the oil from overheating, it is recommended to only feed the sprayer's distributor during the cylinder engagement operations.



It is recommended to have the adjustments performed by qualified personnel. Perform regular checks in order to ensure the integrity and proper functionality of all the hydraulic components, especially the hoses, in order to prevent the risk of them bursting. Perform a complete check of the hoses and components at least once a year; it is recommended to replace the hydraulic hoses every 3-4 years.

6 SPRAYING

6.1 DESCRIPTION OF THE TYPE OF JETS

The jets are of various types; single or double head (FIG. 21). They are equipped with anti-drip diaphragms and are made of brass designed for pressure values of up to 40 bar; some models are nickel plated.

The jets can be equipped with different types of nozzles by changing the locking ring nuts. The jets normally used have Ø18 high volume ceramic plates and low volume conical spray nozzles (Albuz ATR or Albuz CVI).

The jets for the cannons have a nozzle holder with an adjustable spray and flow rate, which uses Ø15 high-volume ceramic plates rather than Ø18.

The jets normally used have three positions (FIG. 22):

- spray** – if the nozzle is pointing outwards, away from the fan unit, parallel with the anti-drip valve
- closed** – if the nozzle is positioned at 90° with respect to the anti-drip valve or, for the single jet, if it is facing inwards towards the fan unit.
- second nozzle spray** – when they are pointing towards the outside of the fan unit parallel with the anti-drip valve.



Double

Single

Long

FIG. 21

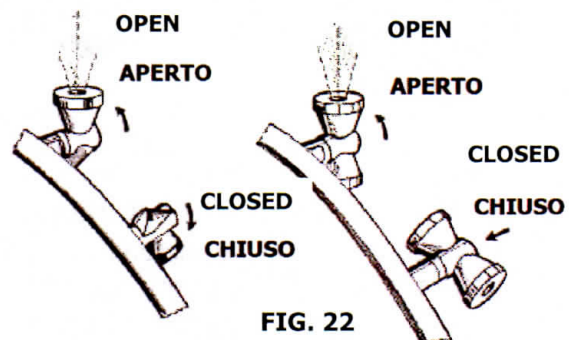


FIG. 22

6.2 DESCRIPTION OF NOZZLE TYPES

The nozzles are extremely important to obtain a correct distribution on the vegetation to be treated. Poor quality or worn nozzles have a tendency to create unevenly treated strips.

The nozzles are produced in various sizes to operate in a specific pressure range to achieve certain types of larger or smaller drops; using nozzles for a purpose they are not envisaged for prejudices the precision and duration of the nozzles.

6.2.1 NORMAL VOLUME CONICAL SPRAY NOZZLES (OVER 500L/HA)



Generally made of ceramics, these nozzles consist of various parts: the actual nozzles, the stainless steel centrifuge and a series of seals. They are particularly resistant to wear and are designed to work also at high pressure (25-45 bars) producing drops of medium size with strong turbulence. This turbulence makes them suitable for penetrating lush vegetation and so they are suitable for fungicides and insecticides. There are various sizes and the flow rates are indicated in the table on page 40.

6.2.2 LOW/MEDIUM VOLUME CONICAL SPRAY NOZZLES (150-500L/HA)



These are made of two pieces of ceramic with colour-coded plastic inserts, and are available in various sizes identified by the colour (see the table on page 41). They have been specifically designed to obtain a large number of small drops with strong turbulence even at low pressures (2-3 bars). This turbulence makes them suitable for penetrating lush vegetation and so they are suitable for fungicides and insecticides. The nozzles of the Albus ATR series belong to this category.

6.2.3 ANTI-DRIFT NOZZLES



There are specific anti-drift nozzles available from M.M. srl (see the table of CVI nozzles on page 40). The main characteristic of these nozzles is that they eliminate the fog effect caused by the presence of drops that are too small and are particularly sensitive to drifting. For further information please contact M.M. S.r.l. for the relevant instruction handbook.

6.3 AIR-BLAST SPRAYER CALIBRATION

The tables on pages 35 through 37 let you easily calculate the distribution in litres/hectare of the air blast sprayers with the standard fittings, proceeding as indicated below:

- a) Choose the relative table for the Fan Unit on the sprayer in question (the main reference is the number of the jets)
- b) Find the distance between the rows of the vegetation and the diameter of the nozzles used (ceramic plates or ATR and CVI).
- c) In the horizontal strip, choose the working speed and the distribution in litres/hectare and on the vertical scale find the pressure to use.
- d) Adjust the pressure to obtain the treatment required. If the distance between the rows is different from that in the table you can easily calculate the distribution in proportion: for example with a distance between the rows 8 m, divide the figure for the litres/hectare of the distance between the 4m rows by half, with a distance between the rows of 2.5 m double the figure for the distance between the 5 m rows.

The last line of the table indicates the conveyor's overall flow rate.

If the air-blast sprayer is fitted with non-standard nozzles, the spraying tables of the single nozzles per sprayer are on page 40.

To calculate the distribution in litres/hectare, use the following formula:

$$Vd = \frac{600 \times Q}{I \times V}$$

where: Vd = volume to distribute (L/ha)
 Q = sum of the nozzles delivery (L/min)
 I = distance between the rows (m)
 V = tractor speed (Km/h)

EXAMPLE:

Distance between the rows: 5 m

Speed: 6 Km/h

Working pressure 30 bar

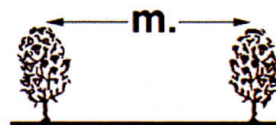
Fan Ø 620 with 10 high volume nozzles standard (Ø 1.0)

Q total flow rate of the nozzles (Tab. on page 40)

$2.96 \times 14 = 41.44$ L/min

$Vd = \frac{600 \times 29.6}{5 \times 6} = 592$ L/ha

Note: depending on the season, the vegetation may be more or less lush; bear this in mind before starting the treatment. If the plants don't have much foliage, you should reduce the number of litres per hectare by using lower pressure values or closing one or more of the fan's jets.



Note: in order to calculate different distances between rows, simply multiply the Litres/hectare value by the corresponding width indicated in the table, and divide it by the new width.

EXAMPLE:

in the table : 592 Lt/ha with a distance between rows of 5m

$$\frac{592 \times 5}{2.8} = 616,6 \text{ L/ha}$$

with a distance between rows of 2.8m



to check the exact delivery of the conveyor perform tests with clean water.

6.4 CALIBRATING CANNON AIR-BLAST SPRAYERS (See the tables on page 41)

The air-blast sprayers equipped with cannon fan units are mainly built to treat trees with tall trunks or crops that cannot be accessed with traditional sprayers (e.g. tobacco or other similar crops). They are also frequently used on crops under mobile greenhouses. When projecting the spray chemical mixture over distances sometimes greater than the 20m, it isn't always possible to control the product's precise distribution over the treated area. As this precision can be compromised by wind, turbulence, and the obstacles posed by the plants to be treated themselves, it is not recommended to use cannons with chemical products that require extremely precise distribution.



Do not use herbicides or other similar products.

6.4.1 TREATING TREES WITH TALL TRUNKS

- Based on the type of cannon to be utilized and the number of jets, choose the appropriate table on page 41.
- choose the overall flow rate at the desired operating pressure in L/minutes from the last line.
- spray the plant with the number of litres desired in order to determine the necessary treatment time.

6.4.2 TREATING HERBACEOUS CROPS

- Based on the type of cannon to be used and the number of jets, choose the appropriate table on page 41.
- Determine the spray distance and of the diameter of the nozzles used (ceramic plates or TR nozzles).
- In the horizontal strip, choose the working speed and the distribution in litres/hectare and on the vertical scale find the pressure to use.
- Adjust the pressure to obtain the treatment required.

Note: to check the exact flow-rate of the conveyor perform tests with clean water.

7 HAND LANCES

When using hand lances pay attention to the following notes:



- Don't direct the jet of liquid towards electric power lines or zones where there is electrical current, houses or where people might pass.
- Don't point the jet at people or animals. The jet can cause serious injuries simply due to the mechanical force of the liquid under pressure.
- Never block the spraying lever of the lance in the open position because if the lance falls it will be uncontrollable.
- After having stopped the pump at the end of the work activities, make sure that any residual pressure in the pipes has been drained in order to avoid unexpected jets when putting the lance away.

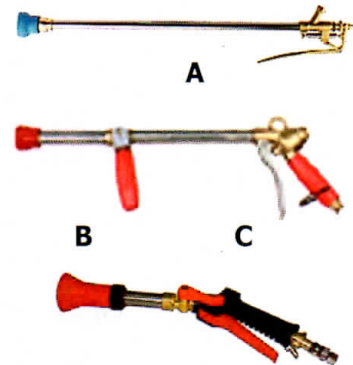
There are various types of lances; **lever** type, **spray gun** type, and **gun** type.

For further information please refer to the handbook in the package. The lever lance is controlled by opening lever **A** which, depending on how much it's pressed, produces a conical spray or direct jet. The standard nozzle is Ø 2.0.

Spray gun lance can produce a direct jet or a conical spray, and the type of spray is selected by pushing the lever **B** forwards or backwards.

Use the lever **C** to open the jet. The standard nozzle is Ø 2.0.

Replacement nozzles are available for all lances, and the flow rates are indicated in the tables on page 41.



8 MAINTENANCE



All the maintenance operations and repairs must be carried out with the machine and cardan shaft stopped and the tank and circuit clean of any residues of chemical products.



The maintenance of the air-blast sprayer is essential for maintaining a high level of safety.



Also consult the single handbooks of the main components of the air-blast sprayer.

8.1 SCHEDULED MAINTENANCE (See tables on page 44)

It is recommended to create a scheduled maintenance table to be followed over time in order to keep the air-blast sprayer in good working condition.

For major and important maintenance jobs, we recommend using the normal M.M. S.r.l. assistance service available from your dealer, using original spare parts only (if necessary).

8.2 ROUTINE MAINTENANCE

- After every treatment wash the inside of the tank and the entire circuit as indicated in sec. 4.13
- Periodically check that the suction and delivery filters are clean
- Check the oil level in the pump's oil tank and in the gear multiplier
- The use of chemical products that are particularly harmful to nitrile rubber mixtures can cause the diaphragm to break prematurely.

In these conditions check the state of the components more often. There are diaphragms made of special materials (viton and desmopan) that are available on request.

- When performing treatments with copper hydroxide, the system should be cleaned thoroughly after each treatment, as hydroxides attack the parts that aren't protected by paint or galvanization.
To prevent chemical attacks we recommend spraying transparent paint on the parts most exposed to the product and equipping the air-blast sprayer with stainless steel pressure gauges.



Always use appropriate personal protective equipment - see Sec. 2.3.1

8.2.1 CLEANING THE NOZZLES



Handle chemicals and all components that contain them using personal protective equipment (re. section 2.3.1)

Check the wear status of the nozzles and replace them whenever the flow rate exceeds the nominal value by 30%. If you notice even a partial blockage of the nozzle proceed as follows:

- drain the pressure and stop the machine
- remove the screw or bayonet ring-nuts holding the nozzles
- clean with a small brush or compressed air; **don't use nails, punches or awls**
- reassemble the nozzles and the ring-nuts, replacing the filters and seals.

8.2.2 LUBRICATION

The mechanical components in relative motion must be lubricated to prevent wear and overheating. The lubrication must be done with grease or oil: oil allows significantly higher speeds, in general grease is used to lubricate bearings with a vertical or inclined axis as it stays in the zone for longer.



8.2.3 GEARBOX LUBRICATION

The gearbox and disengaging boxes are normally lubricated in an "oil bath". Viscosity is an essential characteristic of lubricant oil, and this is indicated by the SAE (SOCIETY OF AUTOMOTIVE ENGINEERS) classification of the oils for gearboxes and differentials.

Special additives improve the capacity of the oil to maintain a lubricant film also at high pressures and temperatures. We recommend using SAE 90 oil for the gearbox and disengagement boxes. The quantity of oil is established by the level cap. A greater quantity of oil doesn't improve the conditions of lubrication and can cause overheating in the box. Changing the oil protect the parts from the dangers associated with wear and the presence of metallic particles that can be present, especially in the first period of use. We recommend replacing the oil after the first 50 hours of operation, and every 500 hours thereafter.



The oil used mustn't be dispersed in the environment and must be collected the in the relevant containers.



8.2.4 OBLIGATION TO INSPECT THE EQUIPMENT FOR THE DISTRIBUTION OF PLANT PROTECTION PRODUCTS (for professional use)

“**professional user**” = An individual who uses plant protection products during the course of a professional business activity, including operators and technicians, business owners, and freelance professionals, whether in the agricultural industry or other sectors.

Inspection of the equipment for the distribution of plant protection products

Directive 2009/128/EC, concerning the sustainable use of Plant Protection Products, includes measures aimed at reducing the public health and environmental risks associated with the use of such products.

The aspects regarding the functionality of the sprayers in use are of particular importance; the proposed measures regard user training, **functionality inspections, adjustments, and maintenance.**

Directive 128 was implemented with Italian Legislative Decree no. 150 of 14 August 2012 and the operational provisions issued with the subsequent Decree adopting the National Action Plan - NAP - (in the Official Gazette No. 35 of 12/02/2014).

Obligation to perform functionality inspections

The aforementioned standards have made it obligatory to perform functionality inspections upon all equipment used for the distribution of plant protection products, in accordance with the following deadlines:

- all equipment used for professional purposes must be inspected by 26/11/2016;
- the interval between the inspections must not exceed 5 years up until 31 December 2020, and three years for equipment checked after that date;
- new equipment purchased after 26 November 2011 must undergo its first functionality inspection within five years of the date of purchase (to be understood as a “first purchase” of new equipment);
- equipment used by contractors must be inspected every two years, and within two years of the date of purchase. The deadline for the first inspection for contractors has been moved ahead to 26 November 2014.

The NAP lists the equipment subject to obligatory inspection; this list is generally made up of sprayers used for performing treatments upon tree crops, herbaceous plants, greenhouses, and for non-agricultural use.

The inspection service

There are Testing Centres in every region with qualified personnel and suitable equipment, where mechanical interventions can be carried out. These centres are required to respect the official procedures. Most of them have mobile equipment, and are therefore capable of providing the service within any suitable areas rendered available by individual or associated companies upon request.

Description of the functionality inspection

The functionality inspection serves the same purpose as a periodic vehicle overhaul, which is to verify the vehicle's functionality.

The Testing Centre checks the integrity and proper functionality of the equipment's various components by conducting visual inspections, functionality tests, and measurements using appropriate instrumentation. In short, the inspections are performed upon the following: the transmission elements; the pump; the tank; the mixer; the measuring, control and adjustment systems; the pressure gauge; the pipes and hoses; the filters; the distribution boom; the nozzles; correct distribution; the fan and protection devices.

*For more information, please contact the **representatives in charge of sprayer functionality inspections for the regions and autonomous provinces***

Adjustment (or calibration) of spraying machines

The adjustment or calibration of the spraying machines is carried out in order to adapt the equipment to the specific characteristics of the area to be treated, and to determine the correct mixture volume to be distributed, taking into account the indications shown on the plant protection products' labels.

This operation should preferably be performed at the same time as, or upon completing, the functionality inspection (never upon sprayers that are not functioning properly), and should be repeated whenever the sprayer's operating conditions, or the conditions of the target area, change. With regard to Adjustments, the National Action Plan distinguishes between two levels: one voluntary, and the other mandatory for professional users.

The periodic adjustment of the spraying machine based on the characteristics of the area to be treated **MUST** be carried out by the user using the instruments furnished along with the spraying machine (whenever present), after having received adequate training.

The mandatory adjustment requires the user to record every year the adjustment date and the spraying volumes utilized for the main types of crops on an appropriate sheet (see page 45) attached to the treatment log, or else within the treatment log itself.

The periodic and maintenance inspections cover at least the following aspects:

- checks for any damaged or leaking machine components
- verification of the proper functionality of the hydraulic circuit and pressure gauge
- verification of the proper functionality of the nozzles and the anti-drip devices
- cleaning of the filters and nozzles
- verification of the integrity of the machine's protection devices, such as that of the universal joint, and the fan's protective grille (whenever present)

Upon completing the functionality inspection, the authorized Testing Centres can conduct the voluntary instrumental adjustment of the sprayer using suitable equipment (testing benches). Like in the case of the functionality inspection, the Testing Centre must carry out the adjustment in accordance with specific protocols and standards established by the national and regional legislation. Once the adjustment operations have been completed, the Testing Centre issues a relative certificate to the spraying machine's owner.

8.3 EXTRAORDINARY MAINTENANCE

It is recommended to arrange for a general inspection to be performed by a specialized technician from the support network.

- at the end of each season, in case of heavy use
- every two years, in case of normal use.

8.4 REPAIRS

We recommend having the normal M.M. assistance service available from your dealer perform any repairs or to contact a specialized workshop. During all of the repairs, in particular when welding, the machine and the circuit must be clean of any residues of chemical product. If the machine has to be lifted follow the instructions in point 4.3 of this handbook.

Also make sure the machine is stopped, connected to the tractor. If you are using a jack (manual or hydraulic) pay attention to use a jack that mates to the frame so as to prevent sliding of the same and put it in the right position. Make sure the ground is compact: if necessary use wooden beams or other sufficiently resistant material to broaden the supporting base of the jack.



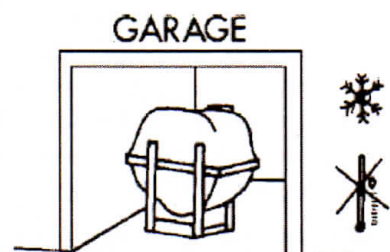
8.5 WAREHOUSE STORAGE AND TRANSPORTATION

The sprayer must be kept in a closed place away from excessive humidity and protected from frost. Especially if electrical pressure regulators, electrical motors are fitted.

Before storing the machine, after you have washed it, apply a light coat of oil.

If the temperature might drop to below zero, drain any residual liquid or add roughly 0.5L of normal antifreeze for cars performing the procedure as per sec. 4.13.1.

To transport the machine follow the instructions in point 4.3 of this handbook.



8.6 RECOMMISSIONING AFTER WINTER STORAGE

Before using the machine again after a long period of inactivity you should perform some general checks, following the instructions in sec. 4.2, and drain any antifreeze.



Never start the shaft of the pump if you think there may be ice inside. To check this, make sure you can turn the shaft by hand without connecting it to the tractor.



After you have connected the machine to the tractor (see sec. 4.4) follow the instructions in this user's handbook and in the annexes regarding the pump, the pressure regulator and the accessories.

8.7 DEMOLITION AND DISPOSAL



it is necessary to adopt appropriate Individual Protection Devices in manipulating waste.

When the sprayer will be put out of service you should wash it with great care to remove any residues of chemical products, following the instructions in sec. 4.13 of this handbook.



The disposal of waste deriving from the demolition of the machine must be carried out respecting the environment, avoiding soil, air and water pollution.

Local legislation in force in the matter must be respected in any case.

Remember that waste is understood as any substance or object that enters into the categories shown in attachment A in part IV of Legislative Decree 152/2006, that the holders has destroyed, has decided or is obliged to destroy.

Waste deriving from the demolition of the machine is classifiable as special waste.

8.7.1 DEMOLITION MATERIALS

Non-hazardous special waste that can be recovered, according to the February, 5th 1998 Ministerial Decree are:

- Iron, aluminium stainless steel and copper materials
- Plastic materials
- Electronic cards
- Hydraulic oil
- Electrical plant

8.7.2 INDICATIONS FOR PROPER WASTE MANAGEMENT

The correct management of hazardous waste includes:

- Storage in suitable places, avoiding the mixing of hazardous waste with non-hazardous waste.
- make sure that authorized carriers and receivers carry out its transport and disposal/recovery.

Transport of one's waste to authorized collection centres is allowed exclusively if you are enrolled in the Environmental Management Register.

8.7.3 WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

With Italian Legislative Decree no. 151 of July 25 2005, the Italian government adopted the directives of the European Parliament concerning the disposal of waste electrical and electronic equipment (WEEE) (Directives 2002/95/EC and 2003/108/EC).

MEASURES - In particular, the decree establishes measures and procedures aimed at:

- a) preventing the production of WEEE;
- b) promoting the re-use, recycling and other forms of WEEE recovery, in order to reduce the quantity to send for disposal;
- c) improving, in terms of the environment, the actions of the subjects who participate in the life-cycle of these apparatuses (producers, distributors, consumers and operators directly involved in the treatment of WEEE);
- d) Reducing the use of dangerous substances in electrical and electronic apparatus. The decree imposes the limitation and elimination of several substances present in WEEE; lead, mercury, cadmium, chrome, equivalent chrome, and polybrominated biphenyl and polybrominated biphenyl ethers.



The machine has been designed and created in conformity with this directive. Follow the indications shown below.

The symbol to the side, showing a barred garbage can on wheels, indicates the separate collection of the electrical and electronic apparatuses of the machine.

The user of this machine can contact the collection centres instituted by the Local Authorities or the M.M. Company directly, or request withdrawal by the dealer, in order to carry out correct disposal of the waste.

EC CONFORMITY DECLARATION

EN

We hereby declare that the following machine:

Product type: MOUNTED AIR-BLAST SPRAYER
type 120 – 200 – 300 – 400 – 600 L
CANNON HEAD DIFFUSER AIR-BLAST SPRAYER
type 200 – 300 – 400 L

BATCH OF PRODUCTION:

Conforms to the relevant and applicable rules of:
2006/42/EC (« Machine » Directive)

Harmonised standards applied:

UNI EN ISO 12100-2010
UNI EN ISO 4254-1:2015
UNI EN ISO 4254-6:2010
UNI EN ISO 16119-1:2013
UNI EN ISO 16119-2:2013
UNI EN ISO 16119-3:2013
UNI EN ISO 16119-4:2015

*THE MANUFACTURER:***M.M. S.r.l.**


Via Raimondo Dalla Costa 110
41122 Modena - IT

*Person authorized to prepare
the technical file:*









Montanini Andrea

Modena, 7 February 2018

*Signature of the Legal Representative
Montanini Rino*


M.M. SRL - Via R. Dalla Costa 110
41122 Modena - Italy
Tel: (+39)059-2511654
Fax: (+39)059-251711
PI - C.F. 02330550969

COMMON SPARE PARTS

part	description		code
	single Ø18 jet for air-blast sprayer with diaphragm-type anti-drip system (1/4" connector) without nozzles		M2001612
	double Ø18 jet for air-blast sprayer with diaphragm-type anti-drip system (1/4" connector) without nozzles		M2001622
	double Ø15 + Ø18 jet for Cannon air-blast sprayer with diaphragm-type anti-drip system (1/4" connector) without nozzles		M2001623
	high volume cone spray ceramic nozzle for Ø18 air-blast sprayer jet	Ø0.8 Ø1.0 Ø1.2 Ø1.5 Ø1.8 Ø2.0 Ø2.3	M2101602
	Ø18 mm diffuser for air-blast sprayer jet	blank Ø1.0 Ø1.2 Ø1.5 Ø1.8	M2101702
	filter for Ø18 jet	Ø 0.8 holes	M2001821
	cone spray ceramic nozzle with centrifuge + OR	ATR 60 Lilac ATR 60 Brown ATR 60 Yellow ATR 60 Orange ATR 60 Red ATR 60 Grey ATR 60 Green ATR 60 Black ATR 60 Blue	M2093111
	ISO anti-drift flat spray nozzle	CVI 80 Orange CVI 80 Green CVI 80 Yellow CVI 80 Lilac CVI 80 Blue CVI 80 Red	M2113010

AIR-BLAST SPRAY CALIBRATION TABLES

Ø500 AIR-BLAST SPRAYER CALIBRATION TABLES

Dispensing table in Litres/hectare Ø500 Fan 10 jets 														Working width working width		
Dispensing table in L/ha Ø500 Fan 10 Jets 																
PRESSURE bar	Ceramic plate Ø1.0							Ceramic plate Ø1.2								
	10	15	20	25	30	40	50	10	15	20	25	30	40	50		
Speed Km/h speed	3,5	857	983	1120	1246	1354	1543	1691	1154	1417	1623	1806	1989	2286	2514	Litres/ha 3 m.
	4	750	860	980	1090	1185	1350	1480	1010	1240	1420	1580	1740	2000	2200	
	5	600	688	784	872	948	1080	1184	808	992	1136	1264	1392	1600	1760	
	6	500	573	653	727	790	900	987	673	827	947	1053	1160	1333	1467	
	7	429	491	560	623	677	771	846	577	709	811	903	994	1143	1257	
Speed Km/h speed	3,5	643	737	840	934	1016	1157	1269	866	1063	1217	1354	1491	1714	1886	Litres/ha 4 m.
	4	563	645	735	818	889	1013	1110	758	930	1065	1185	1305	1500	1650	
	5	450	516	588	654	711	810	888	606	744	852	948	1044	1200	1320	
	6	375	430	490	545	593	675	740	505	620	710	790	870	1000	1100	
	7	321	369	420	467	508	579	634	433	531	609	677	746	857	943	
Speed Km/h speed	3,5	514	590	672	747	813	926	1015	693	850	974	1083	1193	1371	1509	Litres/ha 5 m.
	4	450	516	588	654	711	810	888	606	744	852	948	1044	1200	1320	
	5	360	413	470	523	569	648	710	485	595	682	758	835	960	1056	
	6	300	344	392	436	474	540	592	404	496	568	632	696	800	880	
	7	257	295	336	374	406	463	507	346	425	487	542	597	686	754	

Litres/min.	15,0	17,2	19,6	21,8	23,7	27,0	29,6	20,2	24,8	28,4	31,6	34,8	40,0	44,0
Litres/min.	1,88	2,15	2,45	2,72	2,96	3,37	3,70	2,53	3,10	3,55	3,95	4,35	5,00	5,50

Note: in order to calculate different distances between rows, multiply the Litres/hectare value by the corresponding width indicated in the table, and divide it by the new width (see sec. 6.3 on page 25).

Dispensing table in Litres/hectare Ø500 Fan 10 jets 														Working width working width		
Dispensing table in L/ha Ø500 Fan 10 Jets 																
PRESSURE bar	ATI 60 ORANGE							ATI 60 GREEN								
	5	7	10	12	15	18	20	5	7	10	12	15	18	20		
Speed Km/h speed	3,5	234	274	331	354	400	440	463	349	411	491	537	600	657	697	Litres/ha 3 m.
	4	205	240	290	310	350	385	405	305	360	430	470	525	575	610	
	5	164	192	232	248	280	308	324	244	288	344	376	420	460	488	
	6	137	160	193	207	233	257	270	203	240	287	313	350	383	407	
	7	117	137	166	177	200	220	231	174	206	246	269	300	329	349	
Speed Km/h speed	3,5	176	206	249	266	300	330	347	261	309	369	403	450	493	523	Litres/ha 4 m.
	4	154	180	218	233	263	289	304	229	270	323	353	394	431	458	
	5	123	144	174	186	210	231	243	183	216	258	282	315	345	366	
	6	103	120	145	155	175	193	203	153	180	215	235	263	288	305	
	7	88	103	124	133	150	165	174	131	154	184	201	225	246	261	
Speed Km/h speed	3,5	141	165	199	213	240	264	278	209	247	295	322	360	394	418	Litres/ha 5 m.
	4	123	144	174	186	210	231	243	183	216	258	282	315	345	366	
	5	98	115	139	149	168	185	194	146	173	206	226	252	276	293	
	6	82	96	116	124	140	154	162	122	144	172	188	210	230	244	
	7	70	82	99	106	120	132	139	105	123	147	161	180	197	209	

Litres/min.	4,1	4,8	5,8	6,2	7,0	7,7	8,1	6,1	7,2	8,6	9,4	10,5	11,5	12,2
sing. noz.	0,51	0,60	0,72	0,78	0,88	0,96	1,01	0,76	0,90	1,07	1,18	1,31	1,44	1,52

AIR-BLAST SPRAYER CALIBRATION TABLES

Ø620 AIR-BLAST SPRAYER CALIBRATION TABLES

Dispensing table in Litres/hectare Ø620 Fan													10 jets		Working width working width			
Dispensing table in L/ha Ø620													Fan 10 Jets					
PRESSURE bar	Ceramic plate Ø1.0							Ceramic plate Ø1.2							Litres/ha			
	10	15	20	25	30	40	50	10	15	20	25	30	40	50				
Speed Km/h speed	3,5	1074	1229	1400	1554	1691	1926	2114	1446	1771	2029	2257	2486	2857	3143	Litres/ha		3 m.
	4	940	1075	1225	1360	1480	1685	1850	1265	1550	1775	1975	2175	2500	2750			
	5	752	860	980	1088	1184	1348	1480	1012	1240	1420	1580	1740	2000	2200			
	6	627	717	817	907	987	1123	1233	843	1033	1183	1317	1450	1667	1833			
	7	537	614	700	777	846	963	1057	723	886	1014	1129	1243	1429	1571			
Speed Km/h speed	3,5	806	921	1050	1166	1269	1444	1586	1084	1329	1521	1693	1864	2143	2357	Litres/ha		4 m.
	4	705	806	919	1020	1110	1264	1388	949	1163	1331	1481	1631	1875	2063			
	5	564	645	735	816	888	1011	1110	759	930	1065	1185	1305	1500	1650			
	6	470	538	613	680	740	843	925	633	775	888	988	1088	1250	1375			
	7	403	461	525	583	634	722	793	542	664	761	846	932	1071	1179			
Speed Km/h speed	3,5	645	737	840	933	1015	1155	1269	867	1063	1217	1354	1491	1714	1886	Litres/ha		5 m.
	4	564	645	735	816	888	1011	1110	759	930	1065	1185	1305	1500	1650			
	5	451	516	588	653	710	809	888	607	744	852	948	1044	1200	1320			
	6	376	430	490	544	592	674	740	506	620	710	790	870	1000	1100			
	7	322	369	420	466	507	578	634	434	531	609	677	746	857	943			

Litres/min.	18,8	21,5	24,5	27,2	29,6	33,7	37,0	25,3	31,0	35,5	39,5	43,5	50,0	55,0
Litres/min.	1,88	2,15	2,45	2,72	2,96	3,37	3,70	2,53	3,10	3,55	3,95	4,35	5,00	5,50

Note: in order to calculate different distances between rows, multiply the Litres/hectare value by the corresponding width indicated in the table, and divide it by the new width (see sec. 6.3 on page 25).

Dispensing table in Litres/hectare Ø620 Fan													10 jets		Working width working width			
Dispensing table in L/ha Ø620													Fan 10 Jets					
PRESSURE bar	ATI 60 ORANGE							ATI 60 GREEN							Litres/ha			
	5	7	10	12	15	18	20	5	7	10	12	15	18	20				
Speed Km/h speed	3,5	291	343	411	446	503	549	577	434	514	611	674	749	823	869	Litres/ha		3 m.
	4	255	300	360	390	440	480	505	380	450	535	590	655	720	760			
	5	204	240	288	312	352	384	404	304	360	428	472	524	576	608			
	6	170	200	240	260	293	320	337	253	300	357	393	437	480	507			
	7	146	171	206	223	251	274	289	217	257	306	337	374	411	434			
Speed Km/h speed	3,5	219	257	309	334	377	411	433	326	386	459	506	561	617	651	Litres/ha		4 m.
	4	191	225	270	293	330	360	379	285	338	401	443	491	540	570			
	5	153	180	216	234	264	288	303	228	270	321	354	393	432	456			
	6	128	150	180	195	220	240	253	190	225	268	295	328	360	380			
	7	109	129	154	167	189	206	216	163	193	229	253	281	309	326			
Speed Km/h speed	3,5	175	206	247	267	302	329	346	261	309	367	405	449	494	521	Litres/ha		5 m.
	4	153	180	216	234	264	288	303	228	270	321	354	393	432	456			
	5	122	144	173	187	211	230	242	182	216	257	283	314	346	365			
	6	102	120	144	156	176	192	202	152	180	214	236	262	288	304			
	7	87	103	123	134	151	165	173	130	154	183	202	225	247	261			

Litres/min.	5,1	6,0	7,2	7,8	8,8	9,6	10,1	7,6	9,0	10,7	11,8	13,1	14,4	15,2
sing. noz.	0,51	0,60	0,72	0,78	0,88	0,96	1,01	0,76	0,90	1,07	1,18	1,31	1,44	1,52

AIR-BLAST SPRAYER CALIBRATION TABLES

Ø720 AIR-BLAST SPRAYER CALIBRATION TABLES

Dispensing table in Litres/hectare Ø720 Fan														12 jets		Working width working width	
Dispensing table in L/ha Ø720														Fan 12 Jets			
Ceramic plate Ø1.0							Ceramic plate Ø1.2										
PRESSURE bar	10	15	20	25	30	40	50	10	15	20	25	30	40	50			
Speed Km/h speed	3,5	1291	1474	1680	1863	2029	2309	2537	1737	2126	2434	2709	2983	3429	3771	Litres/ha	 3 m.
	4	1130	1290	1470	1630	1775	2020	2220	1520	1860	2130	2370	2610	3000	3300		
	5	904	1032	1176	1304	1420	1616	1776	1216	1488	1704	1896	2088	2400	2640		
	6	753	860	980	1087	1183	1347	1480	1013	1240	1420	1580	1740	2000	2200		
	7	646	737	840	931	1014	1154	1269	869	1063	1217	1354	1491	1714	1886		
Speed Km/h speed	3,5	969	1106	1260	1397	1521	1731	1903	1303	1594	1826	2031	2237	2571	2829	Litres/ha	 4 m.
	4	848	968	1103	1223	1331	1515	1665	1140	1395	1598	1778	1958	2250	2475		
	5	678	774	882	978	1065	1212	1332	912	1116	1278	1422	1566	1800	1980		
	6	565	645	735	815	888	1010	1110	760	930	1065	1185	1305	1500	1650		
	7	484	553	630	699	761	866	951	651	797	913	1016	1119	1286	1414		
Speed Km/h speed	3,5	775	885	1008	1118	1217	1385	1522	1042	1275	1461	1625	1790	2057	2263	Litres/ha	 5 m.
	4	678	774	882	978	1065	1212	1332	912	1116	1278	1422	1566	1800	1980		
	5	542	619	706	782	852	970	1066	730	893	1022	1138	1253	1440	1584		
	6	452	516	588	652	710	808	888	608	744	852	948	1044	1200	1320		
	7	387	442	504	559	609	693	761	521	638	730	813	895	1029	1131		

Litres/min.	22,6	25,8	29,4	32,6	35,5	40,4	44,4	30,4	37,2	42,6	47,4	52,2	60,0	66,0
Litres/min.	1,88	2,15	2,45	2,72	2,96	3,37	3,70	2,53	3,10	3,55	3,95	4,35	5,00	5,50

Note: in order to calculate different distances between rows, multiply the Litres/hectare value by the corresponding width indicated in the table, and divide it by the new width (see sec. 6.3 on page 25).

Dispensing table in Litres/hectare Ø720 Fan														12 jets		Working width working width	
Dispensing table in L/ha Ø720														Fan 12 Jets			
ATI 60 ORANGE							ATI 60 GREEN										
PRESSURE bar	5	7	10	12	15	18	20	5	7	10	12	15	18	20			
Speed Km/h speed	3,5	349	411	491	537	606	657	691	520	617	731	811	897	989	1040	Litres/ha	 3 m.
	4	305	360	430	470	530	575	605	455	540	640	710	785	865	910		
	5	244	288	344	376	424	460	484	364	432	512	568	628	692	728		
	6	203	240	287	313	353	383	403	303	360	427	473	523	577	607		
	7	174	206	246	269	303	329	346	260	309	366	406	449	494	520		
Speed Km/h speed	3,5	261	309	369	403	454	493	519	390	463	549	609	673	741	780	Litres/ha	 4 m.
	4	229	270	323	353	398	431	454	341	405	480	533	589	649	683		
	5	183	216	258	282	318	345	363	273	324	384	426	471	519	546		
	6	153	180	215	235	265	288	303	228	270	320	355	393	433	455		
	7	131	154	184	201	227	246	259	195	231	274	304	336	371	390		
Speed Km/h speed	3,5	209	247	295	322	363	394	415	312	370	439	487	538	593	624	Litres/ha	 5 m.
	4	183	216	258	282	318	345	363	273	324	384	426	471	519	546		
	5	146	173	206	226	254	276	290	218	259	307	341	377	415	437		
	6	122	144	172	188	212	230	242	182	216	256	284	314	346	364		
	7	105	123	147	161	182	197	207	156	185	219	243	269	297	312		

Litres/min.	6,1	7,2	8,6	9,4	10,6	11,5	12,1	9,1	10,8	12,8	14,2	15,7	17,3	18,2
sing. noz.	0,51	0,60	0,72	0,78	0,88	0,96	1,01	0,76	0,90	1,07	1,18	1,31	1,44	1,52

LINEAR FANS CALIBRATION TABLES

Ø550 LINEAR AIR-BLAST SPRAYER CALIBRATION TABLE

Dispensing table in Litres/hectare fan unit Ø550 12 jets																
<i>Dispensing table in L/ha Ø550 Fan 12 Jets</i>																
	ATI 60 ORANGE						ATI 60 GREEN						Working width working width			
PRESSURE bar	5	7	10	12	15	18	20	5	7	10	12	15	18	20		
Speed Km/h speed	3,5	349	411	491	537	608	657	691	520	617	731	811	897	989	1040	 3 m.
	4	305	360	430	470	530	575	605	455	540	640	710	785	865	910	
	5	244	288	344	378	424	460	484	364	432	512	568	628	692	728	
	6	203	240	287	313	353	383	403	303	360	427	473	523	577	607	
	7	174	208	248	269	303	329	346	260	309	366	406	449	494	520	
Speed Km/h speed	3,5	281	309	369	403	454	493	519	390	463	549	609	673	741	780	 4 m.
	4	229	270	323	353	398	431	454	341	405	480	533	589	649	683	
	5	183	216	258	282	318	345	363	273	324	384	426	471	519	548	
	6	153	180	215	235	265	288	303	228	270	320	355	393	433	455	
	7	131	154	184	201	227	246	259	195	231	274	304	336	371	390	
Speed Km/h speed	3,5	209	247	295	322	363	394	415	312	370	439	487	538	593	624	 5 m.
	4	183	216	258	282	318	345	363	273	324	384	426	471	519	548	
	5	146	173	206	226	254	276	290	218	259	307	341	377	415	437	
	6	122	144	172	188	212	230	242	182	216	256	284	314	346	364	
	7	105	123	147	161	182	197	207	158	185	219	243	269	297	312	

Litres/min.	6,1	7,2	8,6	9,4	10,8	11,5	12,1	9,1	10,8	12,8	14,2	15,7	17,3	18,2
sing. noz.	0,51	0,60	0,72	0,78	0,88	0,96	1,01	0,76	0,90	1,07	1,18	1,31	1,44	1,52

Ø620 LINEAR AIR-BLAST SPRAYER CALIBRATION TABLE

Dispensing table in Litres/hectare Ø620 12 jets																
<i>Dispensing table in L/ha Ø620 Fan 12 Jets</i>																
	ATI 60 ORANGE						ATI 60 GREEN						Working width working width			
PRESSURE bar	5	7	10	12	15	18	20	5	7	10	12	15	18	20		
Speed Km/h speed	3,5	349	411	491	537	608	657	691	520	617	731	811	897	989	1040	 3 m.
	4	305	360	430	470	530	575	605	455	540	640	710	785	865	910	
	5	244	288	344	378	424	460	484	364	432	512	568	628	692	728	
	6	203	240	287	313	353	383	403	303	360	427	473	523	577	607	
	7	174	208	248	269	303	329	346	260	309	366	406	449	494	520	
Speed Km/h speed	3,5	281	309	369	403	454	493	519	390	463	549	609	673	741	780	 4 m.
	4	229	270	323	353	398	431	454	341	405	480	533	589	649	683	
	5	183	216	258	282	318	345	363	273	324	384	426	471	519	548	
	6	153	180	215	235	265	288	303	228	270	320	355	393	433	455	
	7	131	154	184	201	227	246	259	195	231	274	304	336	371	390	
Speed Km/h speed	3,5	209	247	295	322	363	394	415	312	370	439	487	538	593	624	 5 m.
	4	183	216	258	282	318	345	363	273	324	384	426	471	519	548	
	5	146	173	206	226	254	276	290	218	259	307	341	377	415	437	
	6	122	144	172	188	212	230	242	182	216	256	284	314	346	364	
	7	105	123	147	161	182	197	207	158	185	219	243	269	297	312	

Litres/min.	6,1	7,2	8,6	9,4	10,8	11,5	12,1	9,1	10,8	12,8	14,2	15,7	17,3	18,2
sing. noz.	0,51	0,60	0,72	0,78	0,88	0,96	1,01	0,76	0,90	1,07	1,18	1,31	1,44	1,52

CANNON HEAD DIFFUSER CALIBRATION TABLES

Ø400 CANNON HEAD DIFFUSER CALIBRATION TABLES

		Dispersing table in Litres/hectare Ø400 Cannon 6 jets + 2 lateral jets														Spray Distance spray distance
		Ceramic plate Ø1.8							Ceramic plate Ø2							
PRESSURE bar		10	15	20	25	30	40	50	10	15	20	25	30	40	50	
Speed Km/h speed	3,5	294	359	416	466	507	585	658	320	393	453	507	553	640	798	Litres/ha
	4	258	314	364	408	444	512	576	280	344	396	444	484	560	698	
	5	206	251	291	326	355	410	461	224	275	317	355	387	448	558	
	6	172	209	243	272	296	341	384	187	229	264	296	323	373	465	
	7	147	179	208	233	254	293	329	160	197	226	254	277	320	399	
Speed Km/h speed	3,5	252	308	357	400	435	502	564	274	337	388	435	474	549	684	Litres/ha
	4	221	269	312	350	381	439	494	240	295	339	381	415	480	598	
	5	177	215	250	280	304	351	395	192	236	272	304	332	384	479	
	6	147	179	208	233	254	293	329	160	197	226	254	277	320	399	
	7	126	154	178	200	217	251	282	137	168	194	217	237	274	342	
Speed Km/h speed	3,5	221	269	312	350	381	439	494	240	295	339	381	415	480	598	Litres/ha
	4	193	236	273	306	333	384	432	210	258	297	333	363	420	524	
	5	155	188	218	245	266	307	346	168	206	238	266	290	336	419	
	6	129	157	182	204	222	256	288	140	172	198	222	242	280	349	
	7	110	135	156	175	190	219	247	120	147	170	190	207	240	299	
Litres/min.		52	63	73	82	89	102	115	56	69	79	89	97	112	140	
sing. noz.		6,44	7,85	9,10	10,20	11,10	12,80	14,40	7,00	8,60	9,90	11,10	12,10	14,00	17,45	

Note: In order to obtain better mixing in the tank, check to make sure that the total dispensing flow rate (in Litres/min.) does not exceed 75% of the pump's flow rate (e.g. with the AR503, select a max. calibration of 40 L/min).

Note: in order to calculate different distances between rows, multiply the Litres/hectare value by the corresponding width indicated in the table, and divide it by the new width (see sec. 6.3 on page 25).

Ø400 ARTICULATED HEAD CANNON CALIBRATION TABLES

		Dispersing table in Litres/hectare Ø400 Cannon 6 jets Articulated Head														Spray Distance spray distance
		Ceramic plate Ø1.8							Ceramic plate Ø2							
PRESSURE bar		10	15	20	25	30	40	50	10	15	20	25	30	40	50	
Speed Km/h speed	3,5	441	538	624	699	761	878	987	480	590	679	761	830	960	1197	Litres/ha
	4	386	471	546	612	666	768	864	420	516	594	666	726	840	1047	
	5	309	377	437	490	533	614	691	336	413	475	533	581	672	838	
	6	257	314	364	408	444	512	576	280	344	396	444	484	560	698	
	7	221	269	312	350	381	439	494	240	295	339	381	415	480	598	
Speed Km/h speed	3,5	368	449	520	583	634	731	823	400	491	566	634	691	800	997	Litres/ha
	4	322	393	455	510	555	640	720	350	430	495	555	605	700	873	
	5	257	314	364	408	444	512	576	280	344	396	444	484	560	698	
	6	214	262	303	340	370	427	480	233	287	330	370	403	467	582	
	7	184	224	260	291	317	366	411	200	246	283	317	346	400	499	
Speed Km/h speed	3,5	288	351	407	456	496	572	644	313	385	443	496	541	626	780	Litres/ha
	4	252	307	356	399	434	501	563	274	337	387	434	473	548	683	
	5	201	246	285	319	347	401	451	219	269	310	347	379	438	546	
	6	168	205	237	266	290	334	376	183	224	258	290	316	365	455	
	7	144	176	203	228	248	286	322	157	192	221	248	271	313	390	
Litres/min.		39	47	55	61	67	77	86	42	52	59	67	73	84	105	
sing. noz.		6,44	7,85	9,10	10,20	11,10	12,80	14,40	7,00	8,60	9,90	11,10	12,10	14,00	17,45	

TABLES OF AVAILABLE TRIM LEVELS

		POLYETHYLENE TANK (LT)				
		120	200	300	400	600
PUMP	AR 503	X	X	X	X	
	AR 813				X	X
	AR 1064				X	X
STANDARD FAN UNIT	Ø 500 with 6 blades	X	X			
	Ø 620 with 8 blades	O	O	X	X	
	Ø 720 with 8 blades			O	O	X
	Ø 720 with 8 adjustable aluminium blades			O	O	O
	Ø 720 with 8 blades, with clutch and 2 speed gearbox			O	O	O
LINEAR FAN UNIT	Ø 550 with 9 blades 1 speed 6+6 jets	O	O			
	Ø 620 with 9 blades 1 speed 6+6 jets			O	O	O
PRESSURE REGULATORS	GR 30	X	X	X	X	X
	RM 40	X	X	X	X	X
	VDR 50			X	X	X
	Electrical closure kit with 2 EV2 + Control Panel	O	O	O	O	O
	DIS 2E + Control Panel	O	O	O	O	O
	DIS 2E REG + Control Panel	O	O	O	O	O
NOZZLE HOLDER RODS	Anti-Drip Singles	X	X	X	X	X
	Anti-Drip Doubles	O	O	O	O	O
	Cannon Doubles	O	O	O	O	O
NOZZLES	Ø18 Ceramic Cone Spray	X	X	X	X	X
	ATI - ISO Ceramic Cone Spray	O	O	O	O	O
TOTAL MASS	Empty mass (Kg)	90	120	140	160	195
	Mass at full load (Kg)	250	360	490	610	845
POWER (HP)	Power required	14	18	30	40-50	50
CARDAN SHAFT	A. C. Protected CAT.2 CM 60	O	O			
	A. C. Protected CAT.2 CM 80	O	O	O	O	
	A. C. Protected CAT.2 CM 100					O
	Hand Wash Tank	X	X	X	X	X
	20 L Circuit Wash Tank	X	X			
	35 L Circuit Wash Tank			X	X	X
	Upper deflectors (NOT for Linear Air-Blast Sprayers)	O	O	O	O	O
	2 self-cleaning brass filters	O	O	O	O	O
	Suction kit with 5 m Ø25 pipe and bottom filter	O	O	O	O	O
	Leaf Shield	O	O	O	O	O

O=optional

X=standard

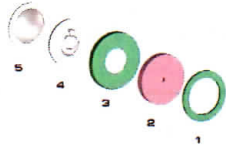
ATP AIR-BLAST SPRAYERS WITH CANNON HEAD DIFFUSER

		MANUAL CANNON			HYDRAULIC CANNON		
		200	300	400	200	300	400
PUMP	AR 503	X	X	X	X	X	X
	AR 813	X	X	X	X	X	X
PRESSURE REGULATORS	GR 30	X	X	X	X	X	X
	RM 40	X	X	X	X	X	X
	Electrical closure kit with 2 EV2 + Control Panel	O	O	O	O	O	O
	DIS 2E + Control Panel	O	O	O	O	O	O
NOZZLE HOLDER RODS	Anti-Drip Doubles	X	X	X	X	X	X
NOZZLES	Ø18 Ceramic Cone Spray	X	X	X	X	X	X
	ATI - ISO Ceramic Cone Spray	O	O	O	O	O	O
TOTAL MASS	Empty mass (Kg)	130	165	175-185	130	165	175-180
	Mass at full load (Kg)	350	500	610-620	350	500	610-615
POWER (HP)	Power required	25	25	25	22	22	22
CARDAN SHAFT	A. C. Protected CAT.2 CM 60	O			O		
	A. C. Protected CAT.2 CM 80		O	O		O	O
	Hand Wash Tank	X	X	X	X	X	X
	20 L Circuit Wash Tank	X			X		
	35 L Circuit Wash Tank		X	X		X	X
	2 self-cleaning brass filters	O	O	O	O	O	O
	Suction kit with 5 m Ø25 pipe and bottom filter	O	O	O	O	O	O

O=optional

X=standard

AIR-BLAST SPRAYER NOZZLE FLOW RATE TABLE



Spare parts	Hole mm
1 M2021602	-
2 M2101602	Ø 0.8
	Ø 1.0
	Ø 1.2
	Ø 1.5
	Ø 1.8
	Ø 2.0
3 M2041602	-
	Blank
	Ø 1.0
4 M2101702	Ø 1.0
	Ø 1.5
	Ø 1.8
5 M2001821	-

40 MESH	Nozzle Mm Spray tip mm	Conveyor hole mm Core bore mm	Pressure bar	Flow rate l/min.	Spray angle Spray angle	Pressure psi	Flow rate USGal/min				
			Ø 0.8	cienco blank	10 0.89 15 1.09 20 1.26 30 1.54 40 1.78	45° 45° 45° 45°	150 0.24 220 0.29 300 0.34 450 0.41 600 0.46				
Ø 0.8	Ø 10		10 1.08 15 1.32 20 1.52 30 1.87 40 2.16	35° 35° 35° 35° 47°	150 0.29 220 0.35 300 0.41 450 0.50 600 0.58						
			Ø 10	cienco blank	10 1.27 15 1.56 20 1.80 30 2.21 40 2.53	45° 45° 45° 45° 45°	150 0.34 220 0.41 300 0.46 450 0.59 600 0.68				
					Ø 10	Ø 10	10 1.75 15 2.14 20 2.47 30 3.03 40 3.49	45° 45° 45° 50° 50°	150 0.47 220 0.57 300 0.66 450 0.81 600 0.94		
							Ø 12	cienco blank	10 1.49 15 1.82 20 2.10 30 2.57 40 2.97	50° 50° 55° 55° 60°	150 0.40 220 0.48 300 0.56 450 0.69 600 0.80
									Ø 12	Ø 10	10 2.37 15 2.90 20 3.35 30 4.10 40 4.74
Ø 12	Ø 12	10 2.41 15 2.95 20 3.41 30 4.17 40 4.82	45° 45° 45° 45° 40°	150 0.85 220 0.78 300 0.92 450 1.12 600 1.29							
		Ø 15	cienco blank	10 2.25 15 2.75 20 3.16 30 3.89 40 4.49	60° 60° 60° 60° 60°	150 0.60 220 0.73 300 0.85 450 1.05 600 1.21					

40 MESH	Nozzle Mm Spray tip mm	Conveyor hole mm Core bore mm	Pressure bar	Flow rate l/min.	Spray angle Spray angle	Pressure psi	Flow rate USGal/min		
			Ø 15	Ø 10	10 3.55 15 4.35 20 5.02 30 6.15 40 7.10	60° 60° 65° 65° 65°	150 0.95 220 1.16 300 1.35 450 1.65 600 1.91		
Ø 15	Ø 12		10 3.63 15 4.44 20 5.13 30 6.28 40 7.25	60° 60° 60° 60° 60°	150 0.97 220 1.18 300 1.36 450 1.69 600 1.95				
			Ø 15	Ø 15	10 3.76 15 4.61 20 5.32 30 6.52 40 7.53	45° 50° 50° 50° 50°	150 1.01 220 1.23 300 1.43 450 1.75 600 2.02		
					Ø 18	cienco blank	10 2.74 15 3.35 20 3.87 30 4.74 40 5.47	55° 60° 60° 65° 65°	150 0.74 220 0.89 300 1.04 450 1.27 600 1.47
							Ø 18	Ø 15	10 4.90 15 6.00 20 6.93 30 8.48 40 9.60
Ø 18	Ø 18	10 5.14 15 6.30 20 7.27 30 8.91 40 10.29							50° 50° 55° 55° 55°
		Ø 20	cienco blank	10 3.05 15 3.73 20 4.31 30 5.28 40 6.09					65° 65° 65° 70° 70°

CVI NOZZLE FLOW RATE TABLE

PRESSURE bar	PRESSURE psi	FLOW RATE / FLOW RATE (±5%)											
		HOW TO ORDER / HOW TO ORDER											
		236.1814.8 (8001) ORANGE ORANGE		236.1814.9 (80015) GREEN GREEN		236.1814.10 (8002) YELLOW YELLOW		236.1814.11 (80025) LILAC LILAC		236.1814.12 (8003) BLUE BLUE		236.1814.20 (8004) RED RED	
		100 MESH		100 MESH		100 MESH		50 MESH		50 MESH		50 MESH	
		l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min
10	150	0.73	0.194	1.10	0.290	1.46	0.397	1.93	0.494	2.19	0.581	2.92	0.774
11	160	0.77	0.202	1.15	0.300	1.53	0.400	1.91	0.500	2.30	0.600	3.06	0.800
12	175	0.80	0.210	1.20	0.314	1.60	0.418	2.00	0.523	2.40	0.627	3.20	0.836
13	190	0.83	0.218	1.25	0.327	1.67	0.436	2.08	0.545	2.50	0.654	3.33	0.871
14	205	0.86	0.228	1.30	0.340	1.73	0.453	2.16	0.566	2.59	0.679	3.46	0.905
15	215	0.89	0.232	1.34	0.348	1.79	0.464	2.24	0.580	2.68	0.696	3.58	0.927
16	235	0.92	0.244	1.39	0.364	1.85	0.485	2.31	0.606	2.77	0.727	3.70	0.969
17	245	0.95	0.250	1.43	0.371	1.90	0.495	2.38	0.619	2.86	0.742	3.81	0.989
18	260	0.98	0.255	1.47	0.382	1.96	0.510	2.45	0.637	2.94	0.765	3.92	1.020
19	275	1.01	0.263	1.51	0.393	2.01	0.524	2.52	0.656	3.02	0.787	4.03	1.048
20	300	1.03	0.274	1.55	0.411	2.07	0.548	2.58	0.685	3.10	0.822	4.13	1.095
21	310	1.06	0.281	1.59	0.418	2.12	0.557	2.65	0.696	3.17	0.835	4.23	1.114
22	320	1.08	0.287	1.62	0.424	2.17	0.566	2.71	0.707	3.25	0.849	4.33	1.131
23	330	1.11	0.294	1.66	0.431	2.22	0.574	2.77	0.718	3.32	0.862	4.43	1.149
24	350	1.13	0.300	1.70	0.444	2.26	0.592	2.83	0.740	3.39	0.887	4.53	1.182
25	365	1.15	0.306	1.73	0.453	2.31	0.604	2.89	0.755	3.46	0.906	4.62	1.207

ATR NOZZLE FLOW RATE TABLE


PRESSURE bar PSI		FLOW RATE / FLOW RATE (±5%)																					
		HOW TO ORDER / HOW TO ORDER																					
		60°																					
		75.1816.4 LILAC LILAC	75.1816.1 BROWN BROWN	75.1816.2 YELLOW YELLOW	75.1816.3 ORANGE ORANGE	75.1816.5 RED RED	75.1816.6 GREY GREY	75.1816.7 GREEN GREEN	75.1816.8 BLACK BLACK	75.1816.9 BLUE BLUE													
80°																							
75.1802.91 WHITE WHITE	75.1802.92 LILAC LILAC	75.1802.93 BROWN BROWN	75.1802.94 YELLOW YELLOW	75.1802.95 ORANGE ORANGE	75.1802.96 RED RED	75.1802.99 GREY GREY	75.1802.97 GREEN GREEN	75.1802.100 BLACK BLACK	75.1802.98 BLUE BLUE	75.1802.119 PURPLE PURPLE													
l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min	l/min	USGal/min		
5	70	0.27	0.070	0.36	0.093	0.48	0.125	0.73	0.199	0.99	0.257	1.38	0.359	1.50	0.390	1.78	0.463	2.00	0.520	2.45	0.636	3.05	0.792
5	85	0.30	0.076	0.39	0.102	0.52	0.136	0.80	0.213	1.08	0.283	1.51	0.393	1.63	0.430	1.94	0.510	2.18	0.573	2.67	0.701	3.32	0.857
7	100	0.32	0.083	0.42	0.111	0.56	0.148	0.86	0.226	1.17	0.306	1.62	0.425	1.76	0.461	2.09	0.547	2.35	0.615	2.87	0.753	3.57	0.938
8	115	0.34	0.089	0.45	0.119	0.60	0.156	0.92	0.241	1.24	0.326	1.73	0.453	1.87	0.494	2.22	0.587	2.50	0.660	3.06	0.808	3.81	1.002
9	130	0.36	0.094	0.48	0.125	0.64	0.166	0.97	0.256	1.32	0.346	1.83	0.482	1.98	0.528	2.35	0.624	2.64	0.701	3.24	0.856	4.03	1.063
10	150	0.37	0.101	0.50	0.134	0.67	0.180	1.03	0.275	1.39	0.372	1.92	0.515	2.08	0.558	2.47	0.662	2.78	0.745	3.40	0.919	4.23	1.137
11	160	0.39	0.104	0.52	0.138	0.70	0.186	1.07	0.284	1.45	0.384	2.01	0.532	2.17	0.576	2.58	0.684	2.90	0.769	3.56	0.943	4.43	1.172
12	175	0.41	0.109	0.55	0.145	0.73	0.194	1.12	0.297	1.51	0.402	2.09	0.556	2.26	0.603	2.69	0.715	3.03	0.805	3.71	0.966	4.61	1.221
13	190	0.42	0.114	0.57	0.151	0.76	0.203	1.17	0.310	1.57	0.419	2.17	0.576	2.35	0.628	2.79	0.745	3.14	0.839	3.85	1.028	4.79	1.270
14	205	0.44	0.118	0.59	0.157	0.79	0.210	1.21	0.322	1.63	0.435	2.25	0.598	2.43	0.648	2.89	0.767	3.26	0.865	3.99	1.059	4.96	1.317
15	215	0.45	0.121	0.61	0.160	0.81	0.216	1.25	0.329	1.69	0.445	2.33	0.613	2.51	0.662	2.99	0.786	3.36	0.886	4.12	1.085	5.12	1.345
16	235	0.47	0.126	0.63	0.168	0.84	0.225	1.29	0.344	1.74	0.466	2.40	0.634	2.59	0.692	3.08	0.822	3.47	0.926	4.25	1.123	5.28	1.404
17	245	0.48	0.129	0.64	0.171	0.86	0.230	1.33	0.352	1.79	0.475	2.47	0.650	2.67	0.708	3.17	0.834	3.57	0.945	4.37	1.158	5.43	1.430
18	260	0.50	0.133	0.66	0.178	0.89	0.237	1.37	0.362	1.84	0.490	2.54	0.670	2.74	0.723	3.25	0.859	3.67	0.968	4.49	1.186	5.58	1.471
19	275	0.51	0.137	0.68	0.181	0.91	0.244	1.40	0.372	1.89	0.504	2.60	0.683	2.81	0.744	3.34	0.883	3.76	0.995	4.61	1.220	5.73	1.512
20	300	0.52	0.141	0.70	0.187	0.93	0.250	1.44	0.387	1.94	0.521	2.67	0.716	2.88	0.773	3.42	0.919	3.85	1.034	4.72	1.268	5.87	1.577
21	310	0.54	0.145	0.71	0.190	0.95	0.254	1.48	0.393	1.99	0.530	2.73	0.728	2.95	0.788	3.50	0.933	3.94	1.051	4.84	1.289	6.00	1.599
22	320	0.55	0.148	0.73	0.193	0.98	0.259	1.51	0.399	2.03	0.538	2.79	0.740	3.01	0.798	3.57	0.948	4.03	1.088	4.94	1.310	6.14	1.625
23	330	0.56	0.150	0.74	0.198	1.00	0.262	1.54	0.406	2.07	0.546	2.85	0.751	3.07	0.811	3.65	0.963	4.12	1.095	5.05	1.330	6.27	1.648
24	350	0.57	0.152	0.76	0.201	1.02	0.270	1.56	0.417	2.12	0.561	2.91	0.771	3.14	0.831	3.72	0.987	4.20	1.113	5.15	1.364	6.40	1.688
25	365	0.58	0.156	0.77	0.208	1.04	0.276	1.61	0.428	2.16	0.573	2.97	0.787	3.20	0.847	3.80	1.008	4.28	1.137	5.25	1.393	6.53	1.731

COLOUR MATCHING ATR 60° - ATR 80° WITH ATI 60° / COLOUR MATCHING ATR 60° - ATR 80° WITH ATI 60°										
ATI 60° ATI 80°	75.1817.8 PURPLE PURPLE	75.1817.1 PINK PINK	75.1817.2 ORANGE ORANGE	75.1817.3 GREEN GREEN	75.1817.4 YELLOW YELLOW	75.1817.5 LILAC LILAC	75.1817.6 BLUE BLUE	75.1817.7 BORDEAUX BORDEAUX	75.1817.9 RED RED	75.1817.10 BROWN BROWN

NOZZLE FLOW RATE TABLES FOR HAND LANCES


FLOW RATE TABLE IN LITRES / MIN. FOR THE CONE SPRAY NOZZLES FOR THE LEVER TYPE LANCE

Note: standard nozzle $\phi 1.5$

NOZZLE DIAMETER		FLOW RATE (L/min)							
PRESSURE (BAR)		JET	$\phi 1.0$	$\phi 1.2$	$\phi 1.5$	$\phi 1.75$	$\phi 2.0$	$\phi 2.2$	$\phi 2.5$
	5	conical	1,16	1,40	1,90	2,25	2,65	2,90	3,50
		direct	1,40	1,70	2,50	3,95	4,70	6,00	7,70
	8	conical	1,40	1,80	2,60	2,80	3,40	3,65	4,45
		direct	1,70	2,20	3,40	4,85	6,00	7,60	9,80
	10	conical	1,50	1,96	2,90	3,10	3,90	4,10	5,00
		direct	1,90	2,40	3,75	5,40	6,95	8,55	11,00
	15	conical	1,88	2,40	3,40	3,80	4,50	5,00	6,10
		direct	2,30	3,00	4,50	6,65	8,30	10,40	13,40
	30	conical	2,60	3,40	4,80	5,40	6,30	7,10	8,70
		direct	3,20	4,20	6,40	9,40	11,70	14,70	19,10
	50	conical	3,40	4,40	6,20	6,80	8,10	9,20	11,20
		direct	4,10	5,40	8,30	11,80	15,10	19,10	24,60

FLOW RATE TABLE IN LITRES / MIN. FOR THE CONE SPRAY NOZZLES FOR THE LONG GUN TYPE LANCE

Note: standard nozzle $\phi 2.5$

NOZZLE DIAMETER		FLOW RATE (L / min)								
PRESSURE (BAR)		JET	$\phi 1.0$	$\phi 1.2$	$\phi 1.5$	$\phi 1.8$	$\phi 2.0$	$\phi 2.3$	$\phi 2.5$	$\phi 3.0$
	15	conical	2,45	3,60	4,60	5,90	6,90	8,10	9,20	11,50
		direct	2,50	3,80	5,10	7,30	8,80	10,80	13,00	18,40
	25	conical	3,00	4,25	5,70	7,20	8,10	10,20	11,40	14,40
		direct	3,10	4,60	6,50	9,30	11,70	14,10	16,40	24,10
	35	conical	3,40	4,70	6,60	8,50	10,20	12,90	14,00	18,00
		direct	3,50	5,40	7,40	10,80	13,40	16,80	19,10	28,20
	40	conical	3,55	5,20	6,90	9,20	10,90	13,70	14,50	18,80
		direct	3,65	5,90	7,80	11,70	14,30	17,90	21,00	30,10
	50	conical	4,00	5,60	7,70	10,50	12,50	14,90	16,40	20,90
		direct	4,10	6,30	8,60	12,70	15,80	19,70	23,00	33,00

SCHEDULED MAINTENANCE TABLE				
OPERATION	8 h	50 h	300 h	END OF SEASON
Oil level and status check	0			
Accumulator pressure check		0		
Suction check (pipes, fittings)		0		
Suction and delivery filter check and cleaning	0			
Pump feet and general screw fastening check		0		
Membrane check and replacement (if necessary) oil change			X(1)	X(2)
Suction / delivery valve check			X	X
Pump screw tightness check				X
Nozzle and anti-drip membrane check and cleaning	0			
Nozzle wear check			0	
Hydraulic oil level check		0		
Check for any faults or cracks in the welds, especially the weeding booms				0
Lubrication of the joints and wheel hubs with grease		0		
Tyre pressure check		0		
NOTES : 0 Operation to be performed by the operator				
X Operation to be performed by a specialized technician or an authorized repair shop				
(1) First oil change				
(2) Change to be performed at the same time as the diaphragms' replacement				

TROUBLESHOOTING		
PROBLEMS	CAUSES	SOLUTIONS
The pump doesn't load	Suctioning of air	Check the suction device
	Regulation valve closed (Control units not at zero pressure)	Set the lever to the proper position
	Suction and delivery valves and/or valve seats worn or dirty	Replace or clean (*)
The pump doesn't reach the pressure value indicated on the data plate	Regulation valve and/or valve seat worn	Replace (*)
	Suction and delivery valves and/or valve seats worn or dirty	Replace or clean (*)
	Insufficient RPM	Restore the correct RPM value, remaining within the range of 350 to 550 RPM.
	Nozzles utilized worn or with excessively large holes	Replace
Irregular pressure (intermittent)	Suction obstructed	Clean the filter cartridge or eliminate the obstruction
	Suction and delivery valves and/or valve seats worn or dirty	Replace or clean (*)
Excessive vibrations at the delivery intake	Suctioning of air	Check the suction device
Noise and oil level	Pressure accumulator discharged or with incorrect air pressure	Bring the air back to the proper pressure value (See the pump's handbook) (*)
Presence of water in the oil	Suction obstructed	Check the suction device
	Rupture of one or more diaphragms	Replace (*) If the replacement is not immediate, empty the water from the pump and insert pure oil without water (even used) or diesel fuel to prevent the internal parts from rusting.
Liquid does not come out of the nozzles	Delivery filter dirty	Clean
	Anti-drip filters dirty	
	Nozzles clogged	
NOTES : (*) Only specialized technicians		

Declaration of the sprayer's periodic adjustment and maintenance

Company details

Company name _____

City _____ Prov./State _____

Address _____

The undersigned hereby declares to have arranged for the periodic adjustment and maintenance of the sprayer described hereafter, in accordance with the provisions of point A.3.6 of the NAP - National Action Plan for the sustainable use of plant protection products.

Type of sprayer _____

Mounted Trayed Self-propelled Other _____

Brand _____ Model _____

Date of adjustment _____

Specifics	Spraying volume utilized (L/ha)

The required technical and maintenance inspections were carried out upon the following components:

• **Check for any damaged or leaking machine components**

Outcome _____ Notes _____

• **Verification of the proper functionality of the hydraulic circuit and pressure gauge**

Outcome _____ Notes _____

• **Verification of the proper functionality of the nozzles and the anti-drip devices**

Outcome _____ Notes _____

• **Verification of the cleanliness of the filters and nozzles**

Outcome _____ Notes _____

• **Verification of the integrity of the machine's protection devices, if present (e.g cardan joint, the fan's protective grille, etc.)**

Outcome _____ Notes _____

.....
(stamp and signature)