

AP DUBEX

Operating manual & safety regulations

AP Dubex trailed sprayers



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EC DECLARATION OF CONFORMITY FOR MACHINERY

(Annex I to directive 2006/42/EG / Annex II under A)

Manufacturer : AP Dubex BV
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Country : The Netherlands

Herewith declares that the

AP Dubex trailed sprayers

comply with the provisions of the Machinery Directive

(Annex I to directive 2006/42/EG / Annex II under A)

Foreword

Dear customer,

You have decided to purchase an AP Dubex trailed sprayer, a high-quality machine for optimal protection of your crops. We appreciate that and thank you for your confidence in us.

User rating

AP Dubex B.V. aims to provide a manual of her sprayers that is as clear and complete as possible. Ease and simplicity for you as a user are leading in this. If you have any ideas for improvement of this manual, please let us know. Your suggestion can help us to make this manual even more user-friendly.

Please send your suggestion to :

info@apdubex.com

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Table of contents

Foreword	3
User rating	3
1. To the user	7
1.1 Introduction.....	7
1.2 Safety regulations and warnings	8
1.2.1 Safety regulations.....	8
1.2.2 Details rating plate	10
1.3 Explanation symbols and warnings	11
1.4 Liability.....	13
1.5 Warranty provision	13
2 Product description	14
2.1 Water part.....	14
2.1.1 Suction hose.....	14
2.1.2 Suction unit.....	14
2.1.3 Suction filters	17
2.1.4 Pumps.....	17
2.1.5 Pressure filter insert	19
2.1.6 Pressure unit	19
2.1.7 Pressure regulator	19
2.1.8 Agitation	20
2.1.9 Main tank.....	21
2.1.10 Clean water tank	21
2.1.11 Induction hopper	21
2.1.12 Canister flushing.....	22
2.1.13 Rinsing nozzles	22
2.1.14 Nozzle holders	23
2.1.15 Circulation line	24
2.1.16 Numbering and naming valves	25
2.2 Hydraulics.....	26
2.2.1 Drawbar steering.....	26
2.2.2 Axle steering	26
2.2.3 Hydraulics spray booms.....	26
2.2.4 Hydraulics up - down	27



2.2.5	Balance adjustment	27
2.2.6	Load sensing	28
2.3	Air parts	29
2.3.1	Air sealed nozzle holders	29
2.3.2	Compressor	29
2.3.3	Air reservoir	30
2.3.4	Air dryer	30
2.3.5	Air brakes	30
2.3.6	Air suspension	33
2.4	Construction	34
2.4.1	Spray booms	34
2.4.2	Rear frame	34
2.4.3	Middle frame	34
2.4.4	Main frame	34
2.5	Main parts AP Dubex trailed sprayer	35
3	Using the AP Dubex trailed sprayer	36
3.1	Installation	36
3.1.1	Transport instructions	36
3.1.2	Coupling	37
3.2	Filling of the main tank	38
3.3	Filling of the clean water tank and hand wash can	38
3.4	Addition of plant protection products	39
3.5	Canister flushing	40
3.6	Folding out of the booms	42
3.7	Spraying	43
3.8	Folding in of the booms	44
3.9	Agitation	45
3.10	Cleaning	46
3.10.1	Manually cleaning of the tank	46
3.10.2	Cleaning of the tank with Ecoflush	47
3.10.3	Cleaning of the lines	50
3.10.4	Draining	50
3.11	DCS Dubex Cleaning System (automatic cleaning program) Touch800 and Touch1200	51
3.11.1	DCS Dubex Cleaning System (automatic cleaning program) Basic Terminal	55
3.11.2	DBL+ Dubex Boom Leveling (automatic boom height control) Touch800 and Touch1200	58

3.11.2.1 Setting of the boom height	59
3.11.2.2 Explanation work screen.....	60
3.11.2.3 DBL+ Joystick control	61
4 Maintenance	62
4.1 Maintenance.....	62
4.1.1 Greasing points	62
4.1.2 Wear parts	65
4.1.3 Check	65
4.1.4 Maintenance of the hydraulic system.....	66
4.1.5 Malfunction and damages	66
4.1.6 Cleaning of the machine	67
4.1.7 Winterize	67
4.1.8 Guidelines testing AP Dubex trailed sprayer	68
4.1.8.1 Testing articles AP Dubex trailed sprayer	68
4.1.8.2 Testing pump capacity.....	69
4.1.8.3 Testing flow meter	71
4.1.8.4 Testing manometer	72
5 Failures	72
6 Notes	74

1. To the user


1.1 Introduction

The objective of this manual is to inform you about the commissioning, safety and maintenance of the AP Dubex trailed sprayer. The trailed sprayers of AP Dubex can be easily controlled. They are characterized by user-friendliness, a solid construction and outstanding innovations. The control is logical and simple. Nevertheless, it is important to thoroughly observe this manual before you start working with the trailed sprayer.

It is recommended to get acquainted with the regulations. Operating a machine you are not acquainted with can result in accidents.


For the purposes of safety AP Dubex strictly recommend the machine only to be operated by skilled personnel.

In addition to this aspect the following regulations must be observed :

	<p>A youthful person, younger than 18 years, cannot perform any labor consisting of:</p> <p>Art. 14b the coupling or uncoupling of trailers or attachments to a towing vehicle.</p> <p>Follow the relevant instructions of the national law.</p>
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In case you have, after reading this manual, questions considering safety, operating or maintenance instructions, please contact your AP Dubex dealer.

This manual should be available to everyone who operates the machine.

	<p>NOTE:</p> <p>Thoroughly read this manual and follow all instructions before using the AP Dubex trailed sprayer to guarantee a safe, fault-free operation.</p>
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AP Dubex B.V. reserves the right to carry out adjustments in design and implementation to any of the by AP Dubex to produce machine, without any obligation to adjustment regarding formerly delivered machines.



AP Dubex B.V.

Dealer:



1.2 Safety regulations and warnings






This manual uses icons in case of highly important instructions.

	You will find this icon at all important safety regulations in this manual. Strictly observe the instruction and use caution in these cases.
	You will find this icon at all actions that are strictly forbidden. Observe this prohibition.

All persons who operate the machine must read this manual thoroughly and observe the instructions.

1.2.1 Safety regulations

When using the AP Dubex trailed sprayer, please observe the following regulations for your own and other persons' safety.

	Never transport persons or animals with the AP Dubex trailed sprayer and never climb into the machine.
	Always make sure there is no one underneath the AP Dubex trailed sprayer.
	AP Dubex trailed sprayers are developed and constructed for a controlled dosing and dispensing of plant protection products and liquid fertilizer. The use for any other purpose is not allowed.
	AP Dubex trailed sprayers are developed and constructed for the use in crops where the plant protection product is supplied from above. Regarding air turbulence it is not allowed to spray at wind speeds over 5m/s and temperatures over 25°C.
	The AP Dubex trailed sprayer is suitable for spray pressures between 1 and 8 bar.


	The user of the AP Dubex trailed sprayer must keep all bystanders out of the working area of the combination. Furthermore, the user shall assure there are no bystanders on the concerning plot.
	The <u>owner</u> of the AP Dubex trailed sprayer is responsible for the tractor and the trailed sprayer to meet the standing regulations during transport on public roads.
	The user must be familiar with and comply with all applicable rules and regulations of the country in which the trailed sprayer is used.
	Follow all regulations and instructions in the manual of your tractor.
	Only use a tractor that is equipped with a closed cabin provided with cabin air filters.
	Before leaving the tractor always make sure it is in neutral position with the parking brake engaged.
	Never leave the driving seat of the tractor while spraying with the AP Dubex trailed sprayer.
	It is not allowed to bring or consume food while spraying with the AP Dubex trailed sprayer.
	When using plant protection products with a AP Dubex trailed sprayer, it is obligated to have a plant protection certificate of competence.
	If oil leakage in the hydraulic system appears the oil can penetrate the skin and cause severe injuries. Never attempt to close a leak by hand. In case of injury by oil leakage immediately contact a physician.
	It is strictly forbidden to alter the settings of the relief / safety valve. Among other things this can cause damage to the system and / or personal injury.
	Make sure that, if present, all coupling pins are provided with original and undamaged locking pins.

1.2.2 Details rating plate

You can find the rating plate of the AP Dubex trailed sprayer on the main frame, to the right of the drawbar. If desired you can collect the details from the rating plate and complete them on this manual.

AP DUBEX		CE	
Category :	<input type="text"/>		
Type approval :	<input type="text"/>		
Model/type :	<input type="text"/>		
VIN :	<input type="text"/>		
Laden mass :	<input type="text"/> Kg	A-0 :	<input type="text"/> Kg
Empty weight :	<input type="text"/> Kg	A-1 :	<input type="text"/> Kg
Year of construction :	<input type="text"/>	A-2 :	<input type="text"/> Kg
STADSKANAAL (NL)		T +31 (0)599 696 000	WWW.APDUBEX.COM

1.3 Explanation symbols and warnings

	<p>Replace loose or illegible/unreadable stickers.</p>
---	--

There are several safety stickers on the machine. The stickers used on this machine have the following meaning:

<p>①</p> 	<p>WARNING: Before operating the AP Dubex trailed sprayer first read the operating and safety regulations in this manual and observe these.</p>
<p>②</p> 	<p>WARNING: Keep at a safe distance from / out of the reach of the spray booms.</p>
<p>③</p> 	<p>WARNING: Keep at a safe distance from the swivel area of the machine to avoid crushing hazards.</p>
<p>④</p> 	<p>Position ball valve LS-connection.</p>
<p>⑤</p> 	<p>Lubrication points.</p>
<p>⑥</p> 	<p>Tightening torque wheel nuts.</p>

<p>⑦</p> 	<p>WARNING: No drinking water!</p>
<p>⑧</p> 	<p>Rating plate.</p>

Location stickers on the machine:



1.4 Liability

1. Only operate according to the instructions and within the functional limitations as specified in the regulations.
2. Only original AP Dubex spare parts should be used. When using other spare parts the EC declaration and the warranty will expire.
3. The local applicable regulations concerning accident prevention, safety, traffic and transport must always be observed.
4. Only persons who know the machine and/or are educated by the dealer and who are aware of the possible dangers are allowed to operate and/or maintain the machine.
5. Modifications to the machine not expressly approved (in writing) by AP Dubex, exclude any liability of AP Dubex.
6. Without a written permission of AP Dubex B.V., it is not allowed to use the AP Dubex trailed sprayer in combination with other equipment.

1.5 Warranty provision

AP Dubex warrant the soundness of the delivered products for material and/or construction defects. In all cases however this warranty is limited to the free replacement or repair of the defect article or part of it. We cannot be held responsible for any damage or cost resulting from a defective delivery and/or the malfunction of the articles delivered by us within the term of warranty. Nor can a customer claim any compensation for damage caused by a wrong or a (too) late delivery by us or a (too) long time of transport to the customer. The warranty period is 1 year from the invoice date.

2 Product description

This chapter gives you a comprehensive overview of the different parts of the AP Dubex trailed sprayer. It is divided in several sections: the water part, the hydraulics, the air part, the construction and a summary of the several assemblies of the AP Dubex trailed sprayer. In some cases, the images shown in this document may not exactly match your sprayer; your machine is f.i. equipped with extra options and the location of the options may differ per type sprayer.

When working with the AP Dubex trailed sprayer, all controls required are within easy reach from the driving seat of the tractor.

2.1 Water part

The water part of the AP Dubex trailed sprayer consists of several parts, from suction hose to nozzle. In this paragraph the functioning of these several parts is explained with the use of images.

2.1.1 Suction hose

Water suction from open waters is not allowed in many places. AP Dubex recommends the use of mains water due to the risks of germs and pollution. When you use hydrants, specially adapted hydrant fills are available that exclude the risk of flowing back.

The suction hose (water suction) is equipped with a strainer. Thanks to the strainer, large contaminant particles in the surface water cannot get access to the trailed sprayer. The floater, attached to the strainer, makes sure the strainer (in deep water) does not touch the soil to prevent it from suctioning soil pollutants.

A special strainer with one side closed is available for water suction from shallow water. The suction hose can also be provided with a coupling if water is obtained from a well or another water supply.

AP Dubex can deliver Storz or Camlock couplings; 2", 2,5" or 3", depending on the pump type.

2.1.2 Suction unit

The suction unit of the AP Dubex trailed sprayer contains the coupling for the suction hose and valves. It is located on the left side of the machine. The suction valves are used to determine where the pumps generate the water from. The AP Dubex trailed sprayer is delivered as standard with manually controlled valves, optionally electrically controlled valves are available.

Suction unit manually controlled

The direction to which the handle points, is the direction of which the liquid is generated from.

Valve 1 : the valve for the mixing pump (agitator pump); this valve determines whether water is generated from the suction hose or liquid is generated from the main tank.

Valve 2 : the valve for the spray pump; this valve determines whether water is generated from the suction hose or liquid is generated from the main tank or the clean water tank.

Valve 3 : valve 3 determines whether liquid is generated from the main tank or water is generated from the clean water tank.

Valve 3 is only used during spraying and the cleaning process. In the picture below the liquid is generated from the main tank. The valves are located behind the door (left front).



Suction unit electrically controlled

The electrically controlled suction unit offers the same options as the manually controlled unit, with the difference that it is controlled from the spray computer.

Valve 1 : the valve for the mixing pump (agitator pump), you can choose between generating water from the suction hose or generating fluid from the main tank.

Valve 2 : the valve for the spray pump, you can choose between generating water from the suction hose or generating fluid from the main tank or clean water tank.

Valve 3 : the choice between generating liquid from the main tank or generating clean water from the clean water tank can be made by valve 3. Valve 3 is only used during spraying and the cleaning process. The valves are located behind the door (left front).



2.1.3 Suction filters

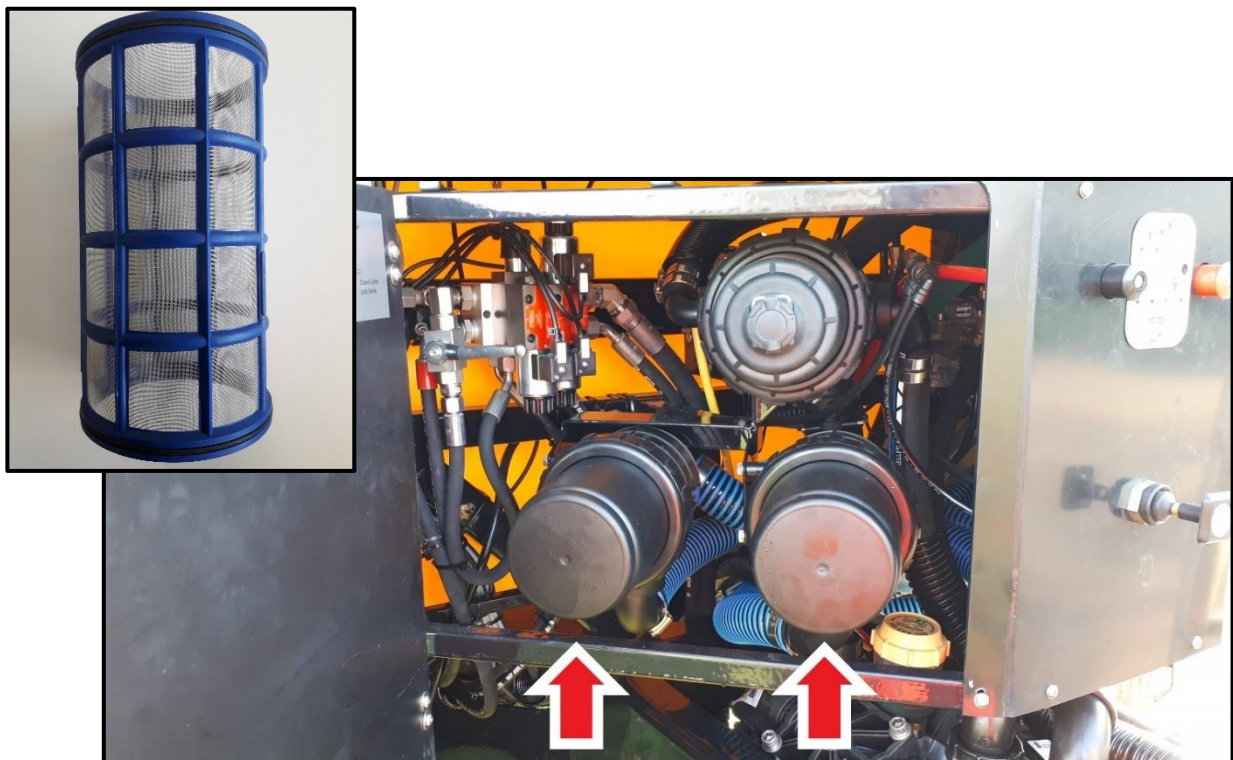
The suction filters are located underneath the platform, behind the metal door. The suction filters filter the water before it reaches the pump. They protect the system from contamination that can cause wear or blockages.

Regularly check the suction filters. The frequency of cleaning depends on the quality of the water and the solubility of the plant protection products. The suction filters are available in several types:

Type	Category	Color	Size
Mesh 80	Fine	Yellow	Ø 110 x 287 L
Mesh 50**	Average	Blue	Ø 110 x 287 L
Mesh 32*	Rough	Red	Ø 110 x 287 L

* Not recommended. There is a risk that other parts must be replaced more often.

** Delivered as standard. Recommended by AP Dubex for optimum functioning.



2.1.4 Pumps

Depending on the model, it gives 1 or 2 pumps in the drawbar. When it gives 2 pumps, the front one is used for filling, spraying and mixing, the rear one for filling and mixing.

The mixing pump generates the liquid as follows:

Suction hose => valve 1 => suction filter

ór

Main tank => valve 1 => suction filter.

The spray pump generates the liquid as follows:

Suction hose => valve 2 => suction filter

ór

main tank => valve 3 => valve 2 => suction filter

ór

clean water tank => valve 3 => valve 2 => suction filter.

Available pumps



Capacity	Speed
300 liters/min	540 rpm
260 liters/min	540 rpm
210 liters/min	540 rpm



The maximum admissible speed of the pumps is 550 rpm. The pump capacity is given at a certain pressure and speed.

The pump capacity of a proper functioning pump is little depending on the pressure. The pump capacity however is strongly dependent on the speed at which the pump runs.



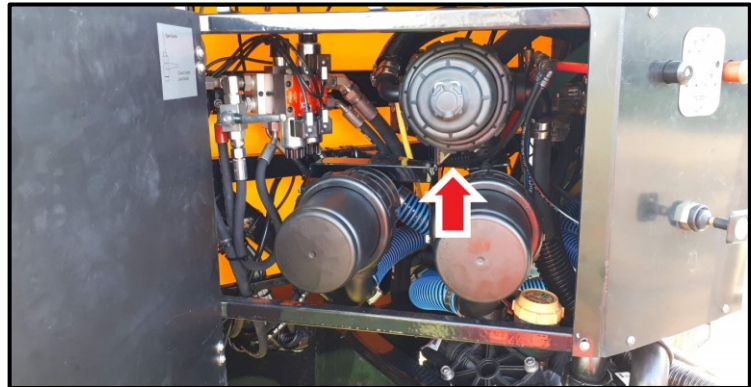
	Regularly check the oil level of the pumps and top up if necessary.
	If the oil gets grey or watery, then a membrane is broken. Immediately stop spraying, switch off the pump and replace the membrane. In this case a running pump can cause severe damage.

2.1.5 Pressure filter insert

The pressure filter insert of the AP Dubex trailed sprayer is a “self-cleaning” filter. Cleaning of this filter is required only occasionally. Generally a green filter insert of 100 mesh is applied for the pressure line filter.

Article nr.	Type	Category	Color	Size
X00023796**	Mesh 100	Fine	Green	Ø 66 x 220 L

** Delivered as standard. Recommended by AP Dubex for optimum functioning.

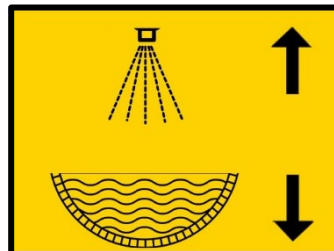
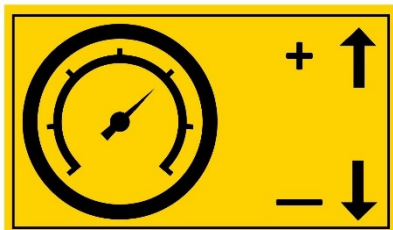


2.1.6 Pressure unit

The pressure unit of the AP Dubex trailed sprayer contains the pressure supply, the pressure filter insert, the breather valve, the pressure regulator and the pressure outlet to the rear frame. The pressure supply comes from the spray pump to the pressure unit and goes to one large pressure insert. The liquid that is used for spraying goes through the pressure filter insert. Subsequently the liquid is divided through the outlet to the rear frame and the outlet to a valve block for a canister flushing, rinsing nozzles or induction hopper. The remaining liquid flows through the filter to the pressure regulator. From there, the liquid goes via a selection valve for agitation to the main tank or back into the suction filter.

2.1.7 Pressure regulator

The pressure regulator on the AP Dubex trailed sprayer has a combined function: it sets the spray pressure and functions as a pressure safety device for the trailed sprayer. You can set the spray pressure with the + and – switch on the pressure regulator box and in the spray computer. The buffer function in the pressure regulator ensures an even spray pressure.



2.1.8 Agitation

Trailed sprayer with 1 pump:

The pump output that is not necessary for the spraying is used for agitation in the spray tank. The agitation is actuated by the agitator tube that is located on the bottom of the tank, over the entire length. The agitation can be switched on and off by valve 4.

Valve 4 in position C => agitation on, in position B => agitation off.



Please note: if agitation is switched off, the liquid in the tank will not be mixed. Plant protection products can settle out with possible spray damage as a result.

To prevent foaming, agitation can be switched off. Furthermore, it saves water during the cleaning process of the trailed sprayer. During filling the agitation must be switched on.

Trailed sprayer with 2 pumps:

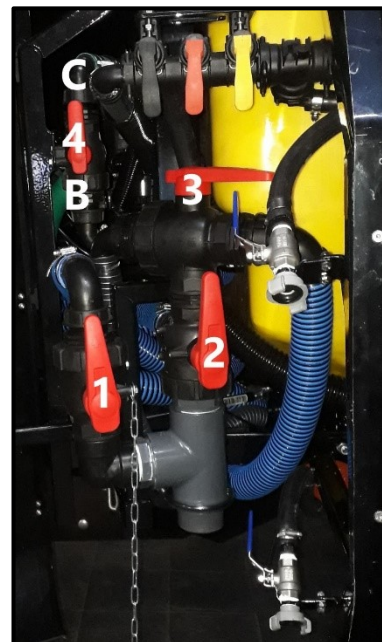
The agitation is actuated by the agitator tube that is located on the bottom of the tank, over the entire length. The second pump (mixing pump) is permanently in connection with the agitator tube. When the tank is almost empty, the suction position surpasses the fill level so the agitation stops.

The pump output that is not necessary for the spraying is used for extra agitation in the main tank.

The extra agitation can be switched on and off by valve 4.

Valve 4 in position C => agitation on, position B => agitation off.

To prevent foaming, agitation can be switched off. Furthermore, it saves water during the cleaning process of the trailed sprayer. During filling the agitation must be switched on.



2.1.9 Main tank

The main tanks of the AP Dubex trailed sprayers are made of polyethylene. The range trailed sprayers of AP Dubex contains tanks with the following capacities: 2300l, 3200l, 4000l, 5000l and 6000l. A clean water tank is integrated in the main tank. Because this tank is situated in the middle of the main tank, it also functions as a liquid damper. The clean water tank on model Junior is placed on the top, at the front.

Model Maxtor is equipped as standard with a 16000 liters stainless steel tank. The tank outlet is always shaped in such a way that all fluid can be sprayed.



2.1.10 Clean water tank

The clean water tank of the AP Dubex trailed sprayer is, like the main tank, made of polyethylene. It comes with a capacity of 350 L (Vector, Maxtor and Junior), 450 L (Stentor) or 250 L (Junior). The clean water tank is shaped in such a way that all fluid can be generated from the tank.

2.1.11 Induction hopper

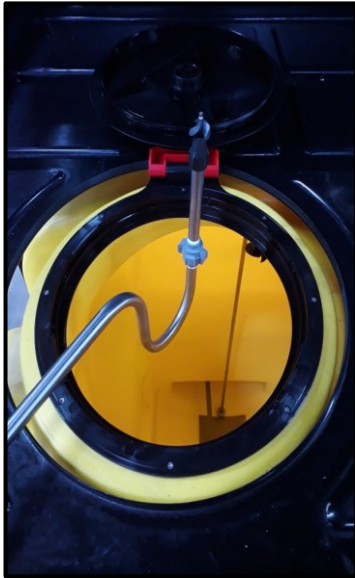
The induction hopper¹ of the AP Dubex trailed sprayer is made of stainless steel and can be used to mix plant protection products with water and then inject it into the main tank. The induction hopper is emptied by a vacuum. You can use the valves on the filling and rinsing device to control the different rinsing options and the combined canister flushing in the induction hopper.



¹Option

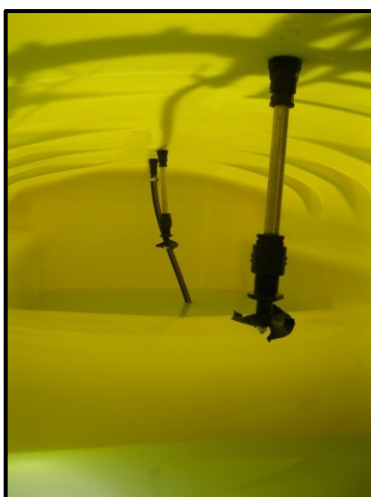
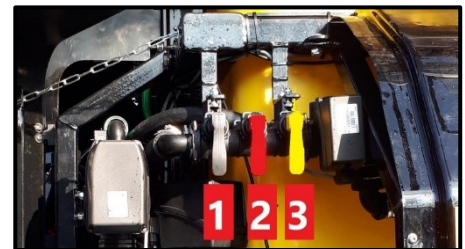
2.1.12 Canister flushing

The canister flushing is located near the tank cap of the main tank and can be moved above the opening of the tank. It is operated by a valve at the canister flushing. If the AP Dubex trailed sprayer is equipped with an induction hopper, then it is combined with the canister flushing; the canister flushing then is located inside the induction hopper.



2.1.13 Rinsing nozzles

Depending on the model, the spray tank contains 1, 2 or 3 rinsing nozzles. They thoroughly clean the inside of the tank and can be switched on and off by the yellow handle (valve 3) on the side of the machine. If the trailed sprayer is equipped with the option Ecoflush¹ or DCS¹, the rinsing nozzles are electrically controlled from the spray computer. When the rinsing nozzles are used, the tank cap must be closed.



¹ Option

2.1.14 Nozzle holders

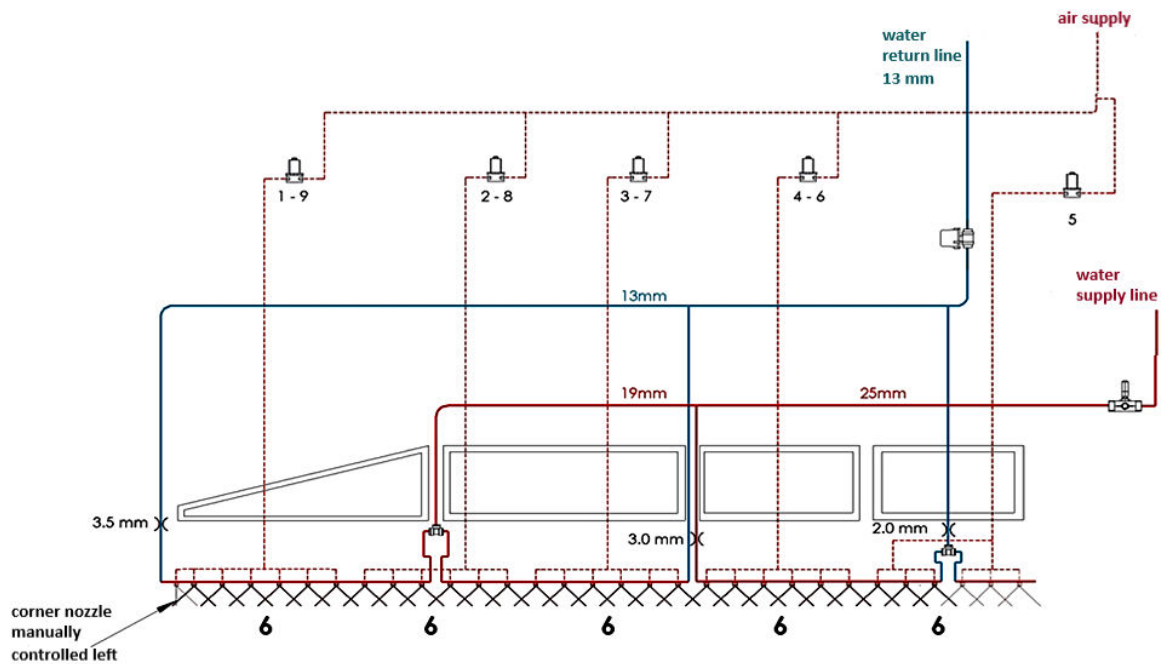
Depending on the design, the AP Dubex trailed sprayer is equipped with single, triple or quadruple nozzle holders. As standard, the nozzle holders are switched pneumatically. The nozzle holders are closed when there is no compressed air on the flow stop. The trailed sprayer will start spraying from 3,5 bar air pressure. Optionally an A-B-selection between the nozzles is available; the nozzle holders have 25 cm spacing and are switched alternately. The trailed sprayer can also be optionally provided with the Müller EDS-modules for individual section control.



2.1.15 Circulation line

The AP Dubex trailed sprayers are equipped with a circulation line combined with a rinsing valve. The pressure supply to the spray booms is, after passing the flow meter, divided on the rear frame over the left and the right side of the trailed sprayer. The pressure supply is divided over the different sections in the spray booms.

At the end of these sections there is a throttle valve, attached to the return line. The return line runs back to the rear frame and is connected to a rinsing valve. When spraying, the rinsing valve closes, which enables the trailed sprayer to build up pressure in the spray lines. When you stop spraying, the rinsing valve will open and the liquid that runs through the return line will be pressed back into the main tank. The picture below shows the water scheme in a spray boom, the red and blue lines are the circulation line.



2.1.16 Numbering and naming valves

Valve 1 = suction valve mixing pump

Valve 2 = suction valve spray pump

Valve 3 = tank selection valve
(main tank or clean water tank)

Valve 4 = valve extra agitation on/off

Valve 5 = pressure release valve

Valve 6 = drain valve

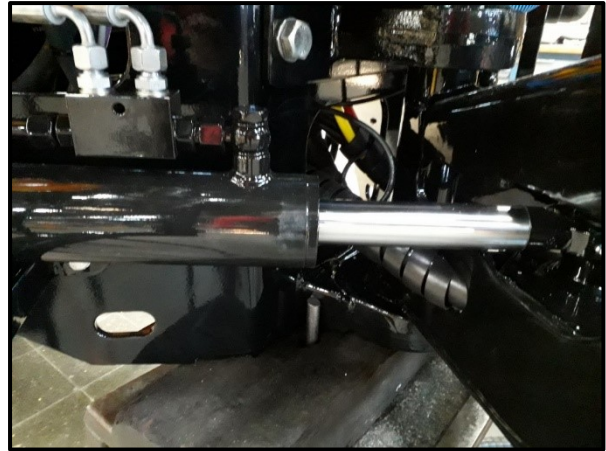


2.2 Hydraulics

In this section the different hydraulic parts are named and explained.

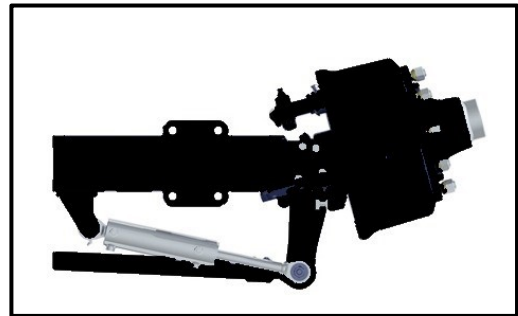
2.2.1 Drawbar steering

Thanks to the drawbar steering, the AP Dubex trailed sprayer is able to follow the track of the tractor. It is controlled by 2 cylinders that are placed between the drawbar and the frame. The track following device can be manually controlled with the computer and automatically with the help of a gyroscope on the rear frame of the tractor. The control is proportionally controlled.



2.2.2 Axle steering

Thanks to the axle steering, the AP Dubex trailed sprayer is able to exactly follow the track of the tractor. This axle steering is realized by 1 or 2 steering cylinders. The control of the axle steering is initiated by a gyroscope that is placed on the rear frame of the tractor. Furthermore it can be controlled manually. The steering is proportionally controlled.



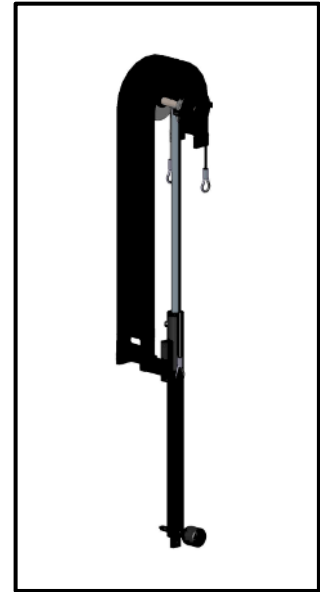
2.2.3 Hydraulics spray booms

With the hydraulics in the spray booms the trailed sprayer can be folded in and out. Furthermore, they set the tension to ensure the spray booms remain secured during spraying. Also during transport the cylinders, in combination with the non-return valve, make sure the spray booms remain in the supports. The hydraulics for folding and unfolding are controlled by the spray computer.



2.2.4 Hydraulics up - down

The lifting cylinder on the rear frame of the AP Dubex trailed sprayer controls the upward and downward movement of the middle frame, the rear frame and the spray booms. The lifting cylinder is single acting and provided with an accumulator to absorb shocks. This lifting cylinder is controlled by the spray computer.



2.2.5 Balance adjustment

The balance system of the AP Dubex trailed sprayer is constructed in such a way that the spray booms always keep their balance. On flat terrain adjustment will be required only occasionally. If the trailed sprayer is used on a slope, the balance can be adjusted to make sure the distance of the spray boom to the crop is equal on both sides of the machine.

The adjustment of the balance is done with the use of a hydraulic cylinder that shifts the centre of gravity, to the left or to the right. When adjusting the balance system, the centre of the spray boom is slightly offset. Because of this, the spray boom finds a new balance and the distance to the surface is kept perpendicularly.

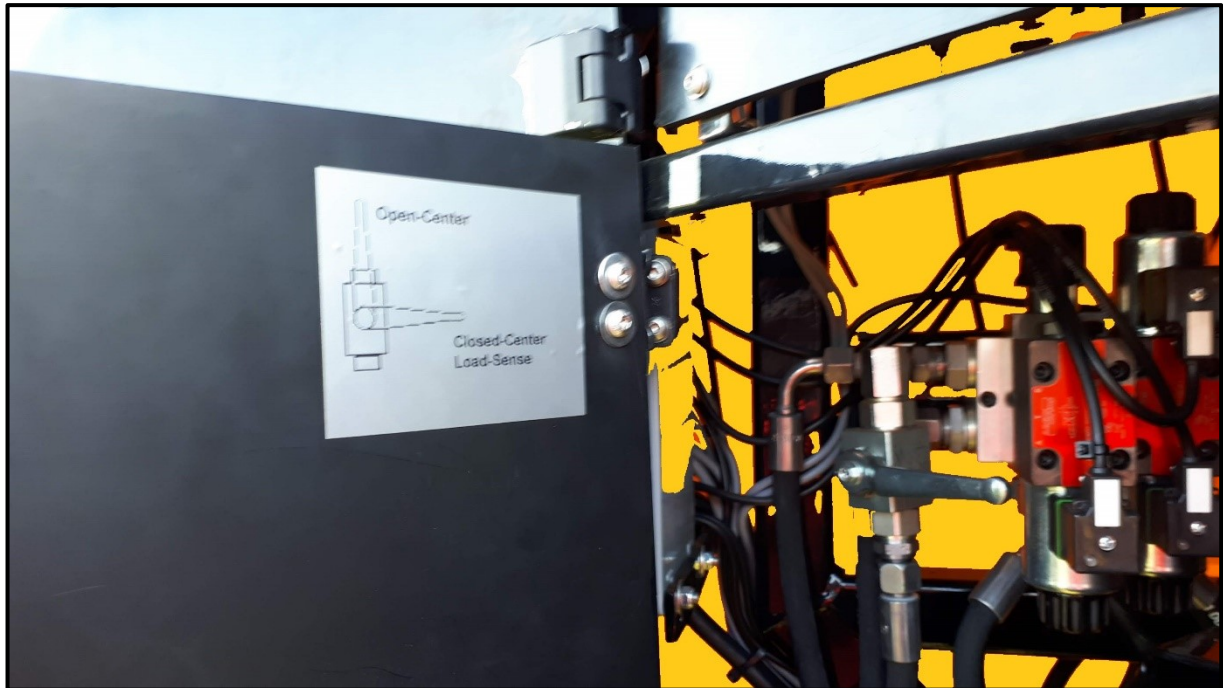


2.2.6 Load sensing

If the AP Dubex trailed sprayer is equipped with a LS connection, there is a ball valve behind the metal door underneath the platform. With this valve you can switch between LS and OS (open center).



Always make sure that the ball valve is in the correct position!



2.3 Air parts

In this paragraph the several air parts are described and explained.

2.3.1 Air sealed nozzle holders

The air sealed nozzle holders are controlled by air pressure that is built-up or decreased after the electronic section valve. When the flow stop has no air pressure, the nozzle holder is closed and no liquid is sprayed. From 3,5 bar air pressure on the flow stop the nozzle holders open and spray liquid can be sprayed.



2.3.2 Compressor

Generally, the tractor supplies compressed air to the AP Dubex trailed sprayer. If this is not available, the optional “compressor” is necessary. The compressor supplies the compressed air that is necessary for opening the nozzle holders.



2.3.3 Air reservoir

The trailed sprayer is provided with an air reservoir, in most cases located on the right side of the machine. The air reservoir must be drained daily with the help of the drain valve: pull the valve by its ring to the side until no more water escapes the air reservoir.




2.3.4 Air dryer

When the machine is equipped with the EDS system, the trailed sprayer is provided with an air dryer. You can find this behind the storage box, on the right side of the machine.

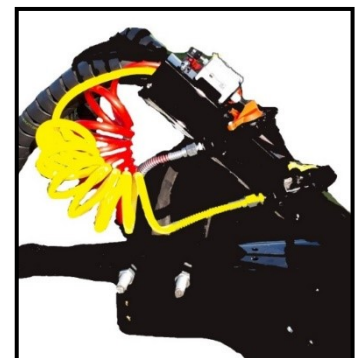
Note : the filter element must be replaced every 2 years.



	<p>The air dryer is provided with an own air reservoir of 5 liters, this may never contain water! If this does occur: immediately replace the filter element and check all air lines for water.</p>
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2.3.5 Air brakes

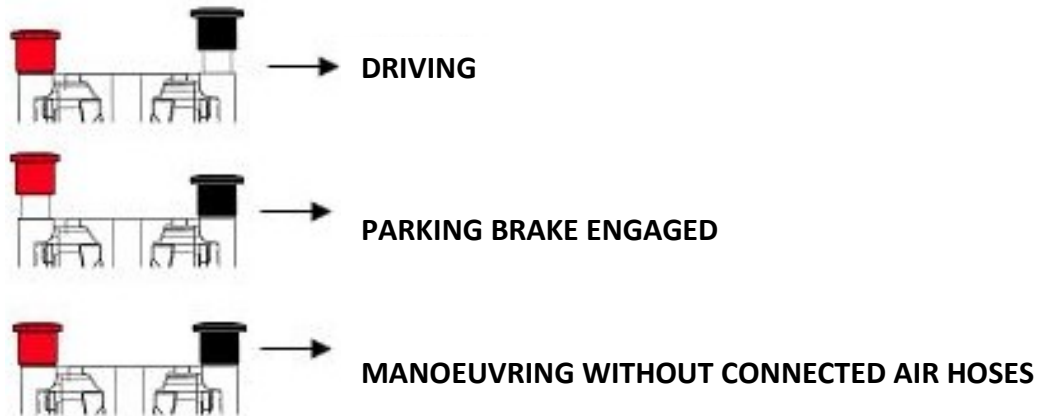
The AP Dubex trailed sprayer is equipped with a dual circuit air brake system. For control of this air brake system the tractor must also be provided with a dual circuit air brake system.



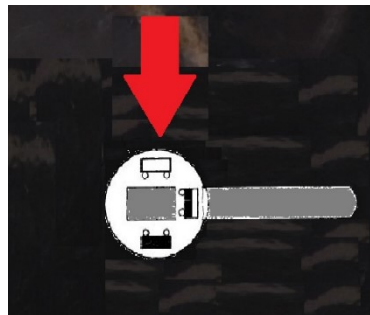
Underneath the platform of the trailed sprayer you find the service brake (provided it is not connected with the dual circuit air brake system of the tractor). With the red knob you can engage the pneumatic parking brake of the trailed sprayer.



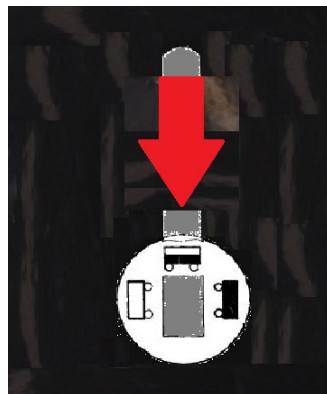
Instruction knobs



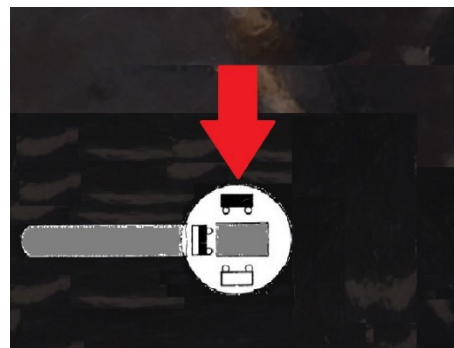
If the trailed sprayer is equipped without air suspension, there is also a manually controlled brake pressure regulator installed, underneath the platform. Before you start driving on public roads, this brake pressure regulator must be set in the proper position. You can choose between 3 positions:



Tank empty



Tank half-full



Tank full

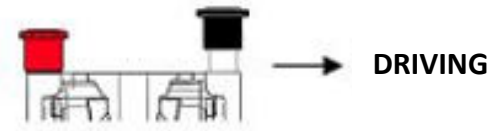
If the trailed sprayer is equipped with air suspension, the brake pressure will automatically set to the correct value.

Connection of the air brakes

When the trailed sprayer is mechanically connected with the tractor, you can connect the air brakes.

- Make sure that the connector couplings (red and yellow) are clean
- Make sure that the rubber seal is clean
- Connect the yellow coupling to the tractor
- Check for air leakages, solve it if present
- Check if the control knobs are in the right position.

If you have connected the red coupling, the black knob will be pushed outside by the air pressure of the tractor.
Push in the red knob.



Disconnection of the air brakes



Make sure the trailed sprayer cannot roll away during the mechanical disconnection. Use wheel chocks on sloping surfaces.

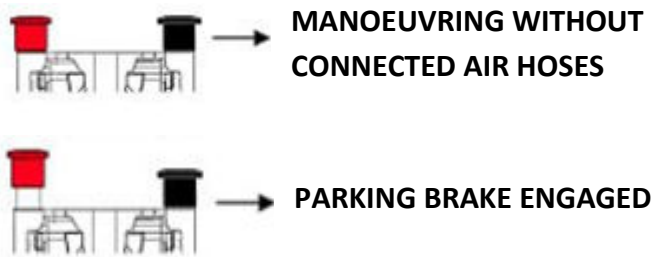
- Engage the parking brake (pull out the red knob)
- Disconnect the red coupling from the tractor
- Disconnect the yellow coupling from the tractor



Manoeuvring without connected air hoses

If you want to manoeuvre the trailed sprayer without the air hoses connected, be aware you then have no control over the behaviour of the machine. The trailed sprayer does not brake by itself because the brake is disconnected. In this case, make sure there is enough air in the air reservoir. Furthermore, make sure the trailed sprayer is coupled properly to the vehicle with which you want to move it and cannot come off.

- Disengage the service brake (push in black knob)
- Disengage the parking brake (push in red knob)
- Manoeuvre the machine
- Engage the parking brake (pull out red knob) before you mechanically disconnect the machine, use wheel chocks on sloping surfaces



2.3.6 Air suspension

The air suspension of the AP Dubex trailed sprayer is provided by an air spring that is assembled between the support frame and the main frame.

The air buffer provides the spring effect.



With the help of the five-position valve you can manually lower the suspension to automatic height control or increase the suspension. Between “lowering” and “automatic height control” you can stop the suspension at the correct height; this is also possible between “automatic suspension” and “increasing”.



The automatic height control is set with the metal rod. The height is set correctly when there is 4 cm clearance between the shaft and the frame beam.



Secure the support frame of the air suspension when the trailed sprayer is being lifted by a hoisting device.



2.4 Construction

In this paragraph the different construction parts of the AP Dubex trailed sprayer are described.

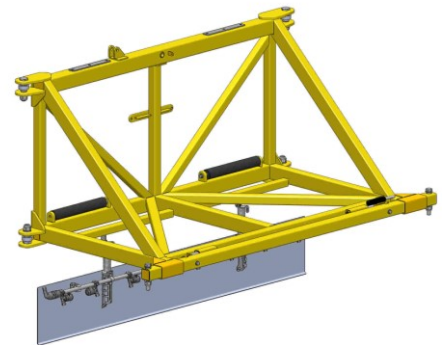
2.4.1 Spray booms

The spray booms of the AP Dubex trailed sprayer are available in several versions. The basic range contains spray booms with working widths from 21 to 52 meters, deviating widths are available on request.



2.4.2 Rear frame

The rear frame of the AP Dubex trailed sprayer provides space for several technical components, like the flow meter and the valve block. Furthermore, the spray booms are assembled to the rear frame.

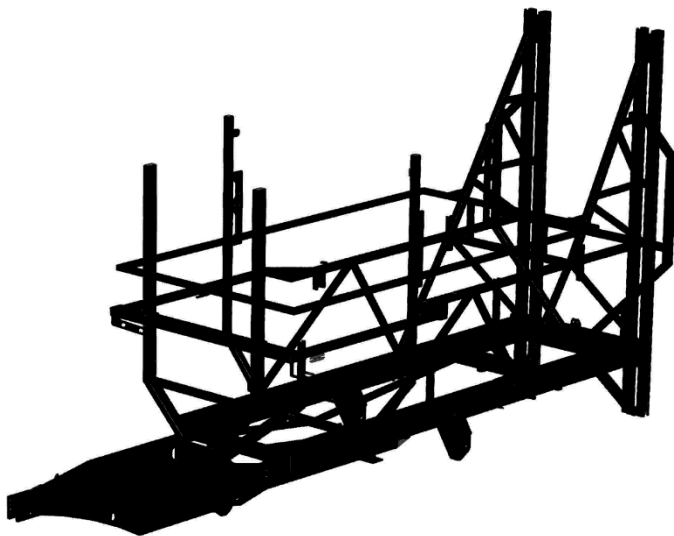


2.4.3 Middle frame

The middle frame is located between the main and the rear frame. It is the connection between the guide rails (on the rear of the main frame) and the rear frame. The middle frame ensures the rear frame to balance and to move up and down.

2.4.4 Main frame

The main frame offers space for the tank, the rear frame, the axle(s) and drawbar.



2.5 Main parts AP Dubex trailed sprayer

- 1 Suction unit
- 2 Spray pump
- 3 Mixing pump
- 4 Main tank
- 5 Clean water tank
- 6 Spray boom
- 7 Rear frame
- 8 Pressure unit
- 9 Suction filters
- 10 Drawbar control



- 1 Hydraulic cylinder high – low
- 2 Truncated triangle
- 3 Rear lights
- 4 Reflector
- 5 Valve block
- 6 Balance
- 7 Circulation line, supply and return spray booms

- 1 Protective housing hydraulics and electronics
- 2 Air reservoir
- 3 Hydraulic cylinder spray booms
- 4 Support leg



3 Using the AP Dubex trailed sprayer

This paragraph describes the use of the AP Dubex trailed sprayer, using pictures. Furthermore, it provides a description of all actions necessary, to ensure a safe and effective use of the AP Dubex trailed sprayer.

3.1 Installation




3.1.1 Transport instructions

- If the AP Dubex trailed sprayer is transported behind the tractor, connect the hydraulic hoses, the air lines, the PTO and the lighting plug. Furthermore, connect the cables for the electronic control of the trailed sprayer.



- The spray booms must be locked in the supports during transport of the AP Dubex trailed sprayer, both behind a tractor and on a trailer or flat-bed truck. The supports lighten the load on the rear frame and make sure the spray booms cannot unfold.



	If the AP Dubex trailed sprayer is transported detached from the tractor, make sure that the parts of the hydraulic system (including the hoses) cannot be damaged during transport.
	During transport and when you drive onto or off a plot, make sure the control is switched off.
	Make sure the lighting of the AP Dubex trailed sprayer is working properly during transport on public roads.

3.1.2 Coupling




For the coupling of the AP Dubex trailed sprayer we refer to the manual of your tractor. Only couple the machine using the recommended means and make sure the trailed sprayer cannot come loose during use (can lead to accidents).

- Make sure the trailed sprayer stands horizontally, this can be achieved by screwing in or out the support leg.
- The hitch coupling must be at the same height as the drawbar eye. After that, the trailed sprayer can be coupled behind the tractor.



- When the trailed sprayer is attached behind the tractor, check if the attachment is locked by a drawbar eye or ball coupling.
- Next, the hydraulic hoses, the air lines and PTO can be connected. Furthermore, connect the power supply cables and the cables for the electronic control.



	Never place yourself between the trailed sprayer and the tractor, without having switched off the motor and having engaged the parking brake.
	Make sure there are no bystanders in the working area of the combination.
	Always check if the quick attachment is fully locked and secured.

a. Connection of the hydraulic hoses

Make sure that the hydraulic hoses are free of dust and sand so no dirt can enter the hydraulic system of the device. The hydraulic system must be completely depressurized. Thereafter the quick couplers can be connected to the tractor.

3.2 Filling of the main tank

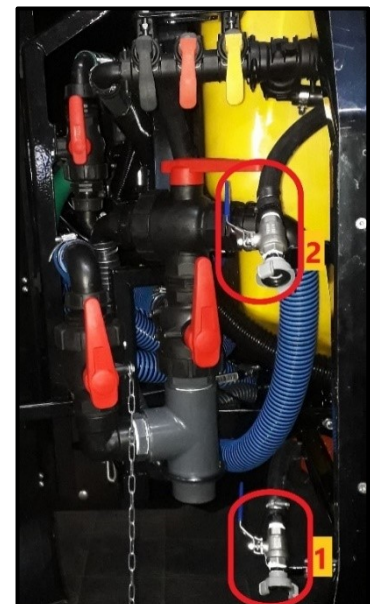
When filling the main tank, several valves must be put in a certain position:

- Valve 1 and 2 must be put in the direction of the suction hose (position A).
- Valve 3 is of no interest, because this only functions when valve 2 is put in the direction of valve 3.
- At the start of the filling, valve 5 must be put open in direction B; this way the system will be vented.
- If the system stops 'flapping', the valve can be put in position A.
- Valve 4 is the valve for the extra agitation. By putting valve 4 in position A, the tank is filled quicker because the pressure of valve 4 then runs to the tank instead of directly back into the suction filter.
- When the valves are in the right position, the PTO can be set adjusted to 540 rpm.



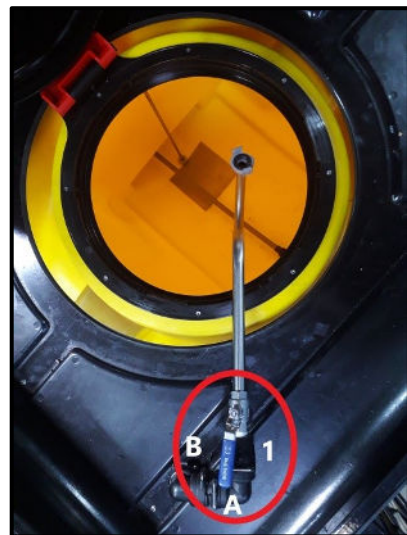
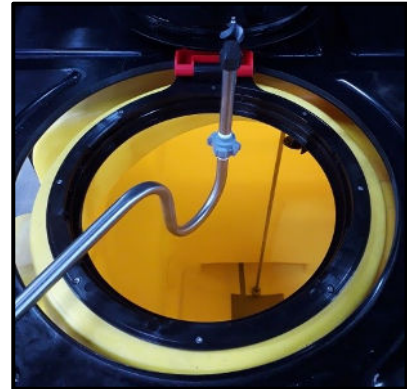
3.3 Filling of the clean water tank and hand wash can

- Use the small ball valve (1) next to the suction unit to fill the clean water tank. Only use mains water to fill this tank. Couple a hose to this valve, open the valve and the clean water tank will be filled.
- The other filling point (2) is used to fill the hand wash can.



3.4 Addition of plant protection products

- The addition of plant protection products in the main tank can be done through the tank cap.
- When a machine is equipped with an induction hopper, the liquids can be added through this.
- When the products are added, the packaging can be cleaned with the canister flushing. It gives attachments for both jerry cans and sacks.
- The canister flushing is controlled by valve 1 on the control panel.
- The canister flushing is switched off in position B, in position A it is switched on.
- When using the canister flushing, the pumps of the sprayer must be switched on and the valves of the suction unit must be set to “vullen” (filling).



When working with an AP Dubex trailed sprayer, chemicals are used in most cases. Incorrect use of chemicals can result in damage to human health and the environment. Make sure that the prescribed safety regulations and the use of appropriate personal protective equipment are observed.

3.5 Canister flushing

The canister flushing is positioned as standard above the tank opening and can be controlled by a valve in the control panel.



attachment for the cleaning of jerry cans



attachment for the cleaning of sacks

- An induction hopper with integrated canister flushing on the left side of the AP Dubex trailed sprayer is optionally available. In this case, the canister flushing is located in the induction hopper.

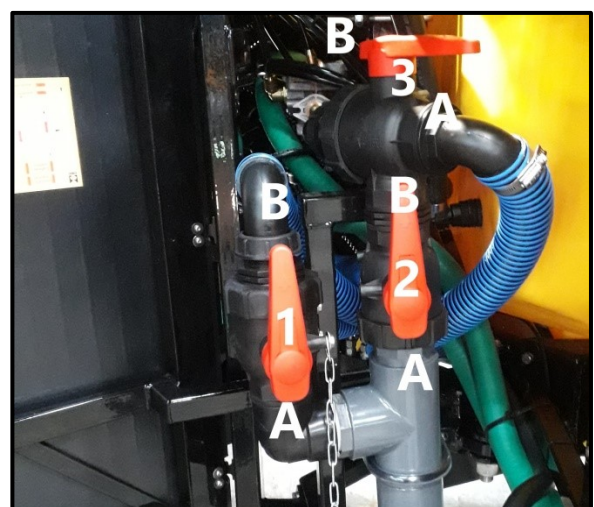
Yellow : Injector on/off

Black : Wall cleaning on/off

Red : Tank mixer on/off



- When using the canister flushing, put the valves of the suction unit in the positions as shown on the picture:
Valve 1 : in position A
Valve 2 : in position A
Valve 3 : in position A



- To use the induction hopper, first unlock it from the transport position. Pull out the black knob on the right side and pull the induction hopper, with the help of the lever, toward you.

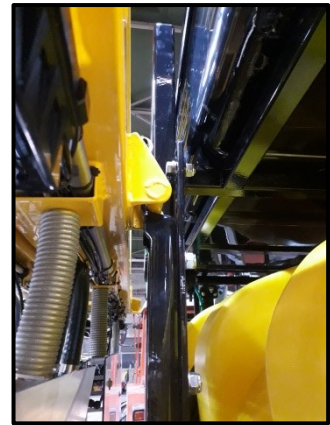


- Switch on the PTO and have the pumps pump clean water. The induction hopper only functions when water is primed and a minimum water pressure of 5 bar is set.
- Open the **yellow** lever (pull up) : the injector is now engaged and the injector completely empties the induction hopper.
- For direct dilution of the product, the wall cleaners can be switched on by opening the **black** lever.
- If you use powders that increasingly accumulate, open the **red** lever. The tank mixer is now engaged.
- After the canister is cleaned, the inside can be cleaned by the spray head in the canister flushing. Open the **red** lever and push the canister on the spray head: the canister will now be cleaned.

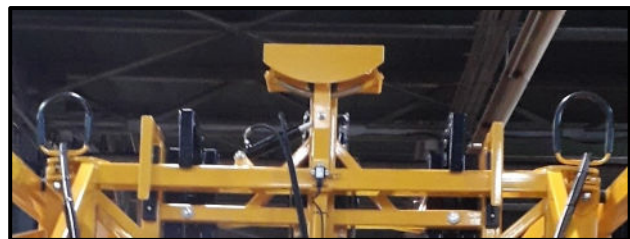


3.6 Folding out of the booms

- Only fold out the booms in stationary position.
- Lift the spray booms out of the supports.



- Make sure the spray booms are in the highest position, and the rear frame locks against the stops above the rear frame.



- Fold out the booms. Make sure that there is sufficient room and that there are no bystanders in the area of the trailed sprayer.



3.7 Spraying

- To spray with the AP Dubex machine, the pumps must be switched on.
- Set the valves of the suction unit as shown on the picture:

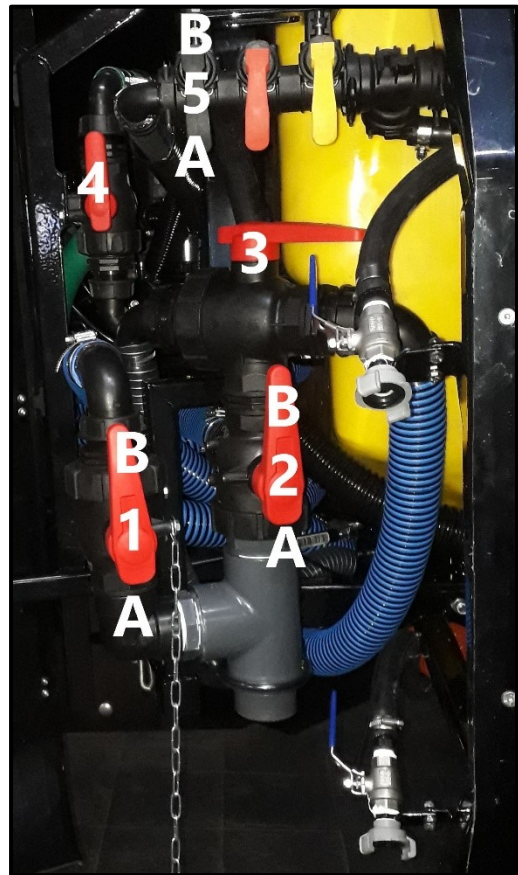
Valve 1 => position B

Valve 2 => position B

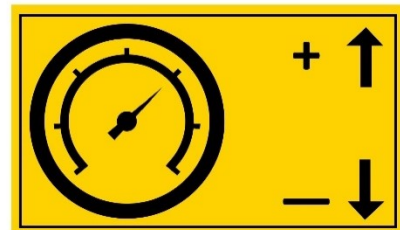
Valve 3 => position A or B* right

Valve 5 => position A*

- With valve 3 you can choose between spraying with liquid from the main tank or from the clean water tank.
- When the vent valve 5 is in position B, little pressure is provided, the liquid then can return to the main tank through this valve. During spraying this valve must be closed.
- On trailed sprayers that are equipped with one pump, valve 1 is not present.

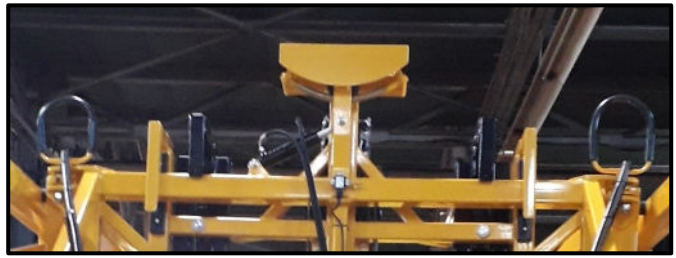


- The spray pressure can be set with the pressure regulator. Use the + and – switch on the pressure control box of the trailed sprayer (manually) or use the spray computer (automatically).



3.8 Folding in of the booms

- Only fold in the booms in stationary position.
- Make sure the spray booms are in the highest position, and the rear frame locks against the stops above the rear frame.
- Leave the knob, to lift the booms, switched on for a while to fill the pressure accumulator extra for stability.



- Fold in the booms. Make sure the spray booms are completely folded against the frame.
- Lower the spray booms in the supports. Leave the knob, to lower the booms, switched on for a while to remove the pressure from the pressure accumulator.
- Make sure the booms are positioned properly in the supports.



Make sure the spray booms are positioned properly in the supports.

3.9 Agitation

Trailed sprayers with 1 pump:

- Excess liquid that is not used for spraying, functions as hydraulic agitation. The agitation is actuated by an agitator tube that is located on the bottom of the tank.
- The agitation can be switched on and off with valve 4:
Position C => agitation on
Position B => agitation off.
- To prevent foaming or to facilitate the cleaning, agitation is usually switched off.

During filling the agitation must be switched on (valve 4 => position C).



Please note: if agitation is switched off, the liquid in the tank will not be mixed. Plant protection products can settle out with possible spray damage as a result.

Trailed sprayers with 2 pumps:

- Excess liquid of the spray pump that is not used for spraying, functions as hydraulic agitation. Furthermore, the mixing pump permanently pumps liquids through the agitator tube.
- When the tank is almost empty, the suction position surpasses the fill level so the agitation stops. This way, foaming is avoided as much as possible.
- The agitation of the spray pump can be switched on and off with valve 4:
Position C => agitation on
Position B => agitation off.
- To prevent foaming or to facilitate the cleaning, agitation is usually switched off.

During filling the agitation must be switched on (valve 4 => position C).

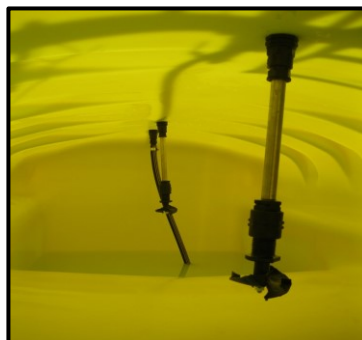


3.10 Cleaning

The internal cleaning of the AP Dubex trailed sprayer involves several steps. The following paragraphs describes how to clean the tank of the AP Dubex trailed sprayer.

3.10.1 Manually cleaning of the tank

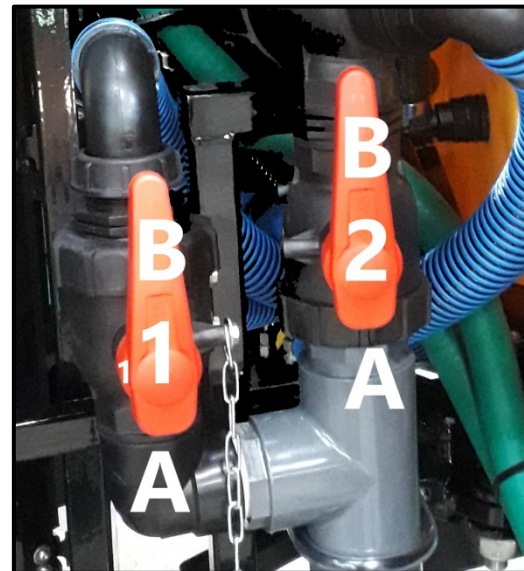
- Cleaning of the tank with clear water with the help of the rinsing nozzles:
Valve 1 => position B
Valve 2 => position B
Valve 3 => position B
Valve 5 => position B
- Valve 4 => position B, the extra agitation is now switched off to save clear water.
- The valves are now set correctly, the pumps can be switched on.
- The rinsing nozzles can be controlled by valve 6; in position B the valve is closed, in position A the rinsing nozzles are switched on.
- The sequence of controlling the valves:
 - Selection valve spray tank / clean water tank (3)
 - Agitator (4)
 - Rinsing nozzles switched on (6)



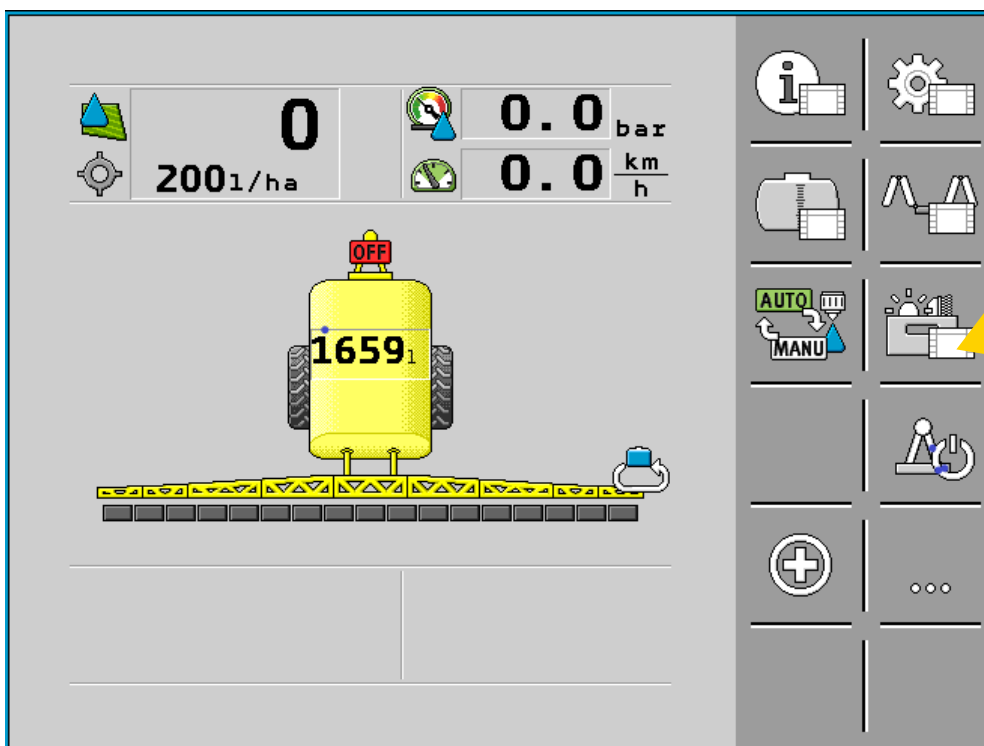
3.10.2 Cleaning of the tank with Ecoflush

AP Dubex Ecoflush is the cleaning program with (partially) electric valves. Below you find the steps that are necessary to completely clean the machine.





- Manually controlled suction valves => position B



- In the main menu you select the following:



You then see the following symbols:

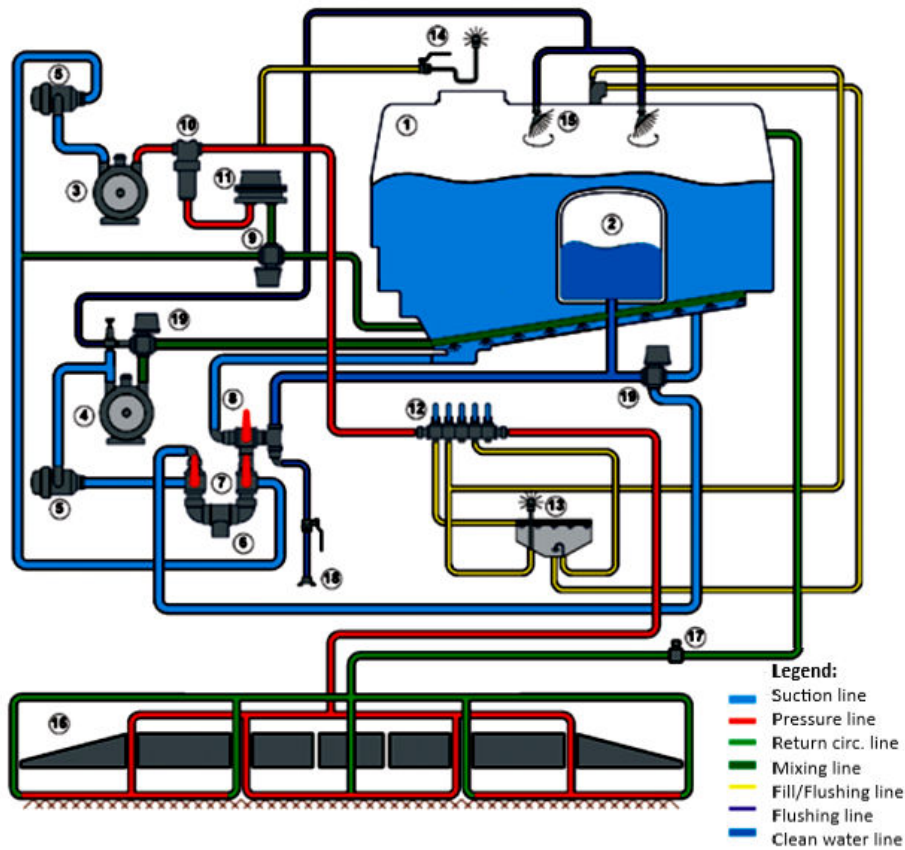
		Standard position	Switch position
	Valve A Agitator	Agitation activated	Agitation switched off
	Valve B Rinsing nozzles tank cleaning	Closed	Rinsing nozzles activated
	Valve C Tank selection valve spray tank / clean water tank	Spray tank	Clean water tank
	Valve D Circulation line spray boom	Circulation line closed for spraying, open when there is not being sprayed	Circulation line is closed

When starting the spray computer, valves A, B, C and D will be in the standard position. These are the positions for spraying.

Follow the next steps for a proper cleaning of the trailed sprayer. Make sure the clean water tank is filled.

1. Generate clear water, **switch valve C.**
2. After approximately 10 sec., the agitator line is rinsed, **switch valve A.**
3. Switch on the rinsing nozzles, **switch valve B.**
4. The rinsing nozzles provide the spray tank with clear water.
5. When the spray tank is filled with 100L, the tank selection valve must return to the standard position: **switch valve C.**
6. Close the circulation line of the spray boom, **switch valve D.**
7. After 2 minutes of rinsing, switch off the rinsing nozzles, **switch valve B.**
8. Completely empty the spray tank; when the nozzles only spray air (and no more water), the tank is empty.
9. When the spray tank is empty, return all valves to the standard position.
10. Repeat all steps twice.

The water system



- | | |
|--|--|
| 1. Main tank | 11. Self-cleaning pressure line filter |
| 2. Clean water tank | 12. Pneumatic pressure regulator |
| 3. Spray pump | 13. Set of valves filling and rinsing device |
| 4. Mixing pump | 14. Filling and rinsing device (option) |
| 5. Suction filters | 15. Canister flushing |
| 6. Connection suction hose | 16. Tank cleaning |
| 7. Suction valves | 17. Flow meter |
| 8. Tank selection valve Valve C
(Main tank/Clean water tank) | 18. Spray boom |
| 9. Agitation valve Valve A | 19. Non-return valve circulation line Valve D |
| 10. Valve rinsing nozzles (Ecoflush) Valve B | 20. Filling connection clean water |
| | 21. Drain valve main tank |

3.10.3 Cleaning of the lines

- Cleaning of the lines of the AP Dubex trailed sprayer:

Valve 1 => position B

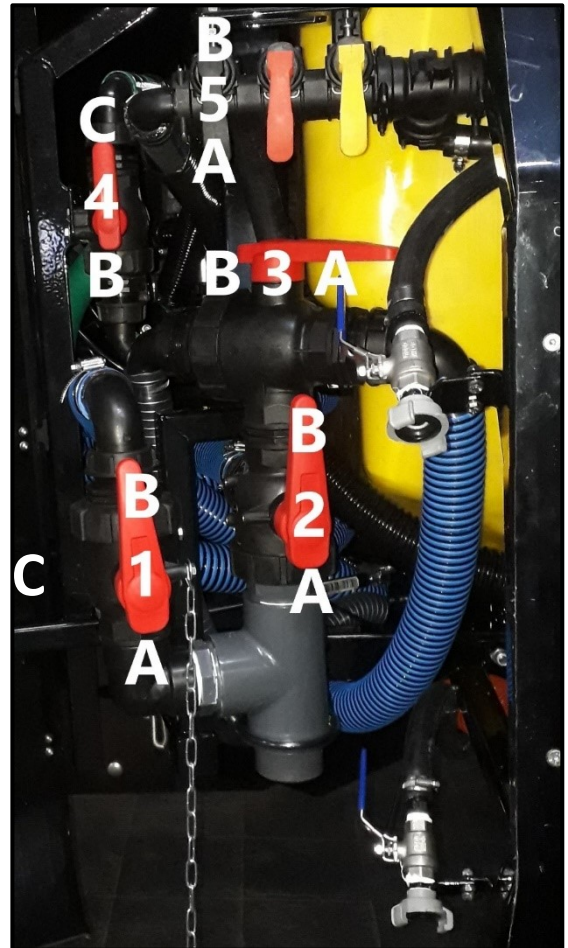
Valve 2 => position B

Valve 3 => position B

Valve 4 => position C

Valve 5 => position A

- Switch on the pumps and have all boom sections sprayed.



3.10.4 Draining

- Drain valve 6 is closed



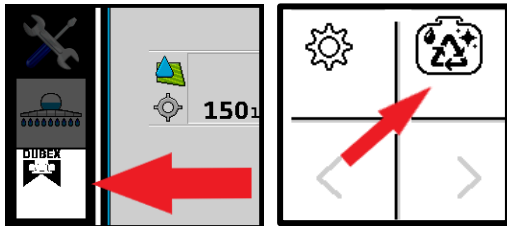
- Draining main tank of the AP Dubex trailed sprayer:
Valve 6 in position A



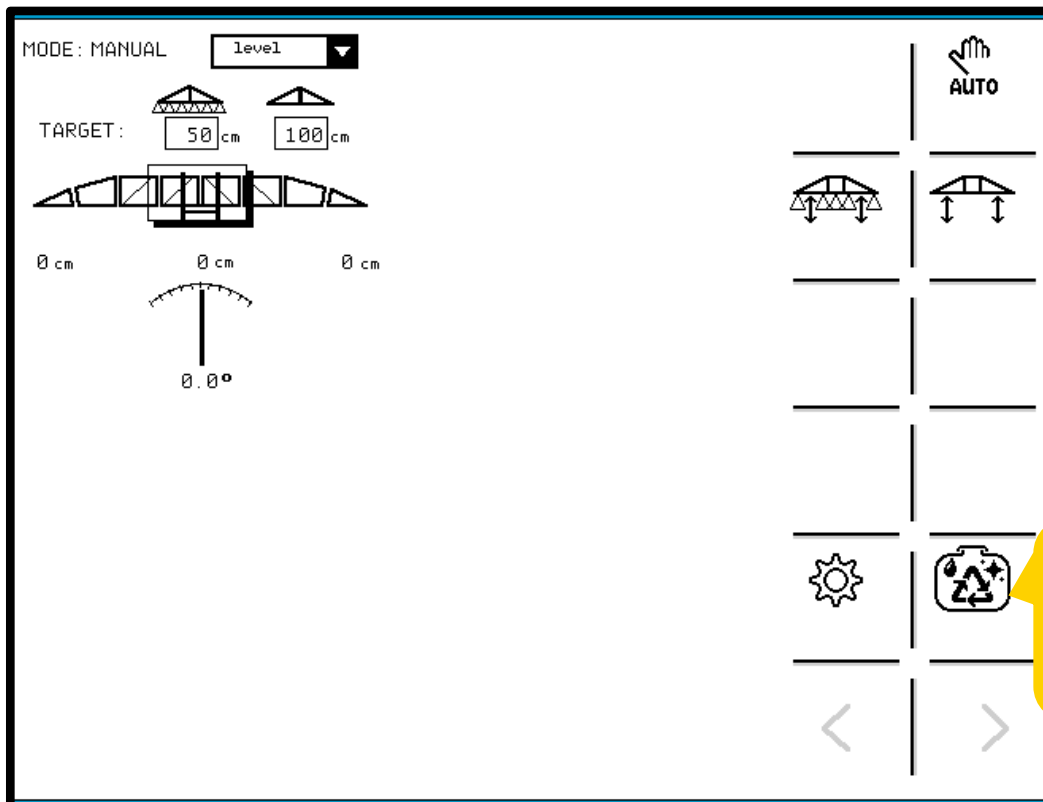
3.11 DCS Dubex Cleaning System (automatic cleaning program) Touch800 and Touch1200

DCS is exclusively available at AP Dubex and is the perfect solution to automate the cleaning process. You can control DCS from the tractor. The clean water tank must (preferably) be full. If there is too little water in the clean water tank, it will be indicated by the program. Manually put the pressure of the sprayer at 6 bar.

First select the AP Dubex logo in the menu, then select the menu cleaning program:



Menu
Cleaning program



Menu
cleaning
program



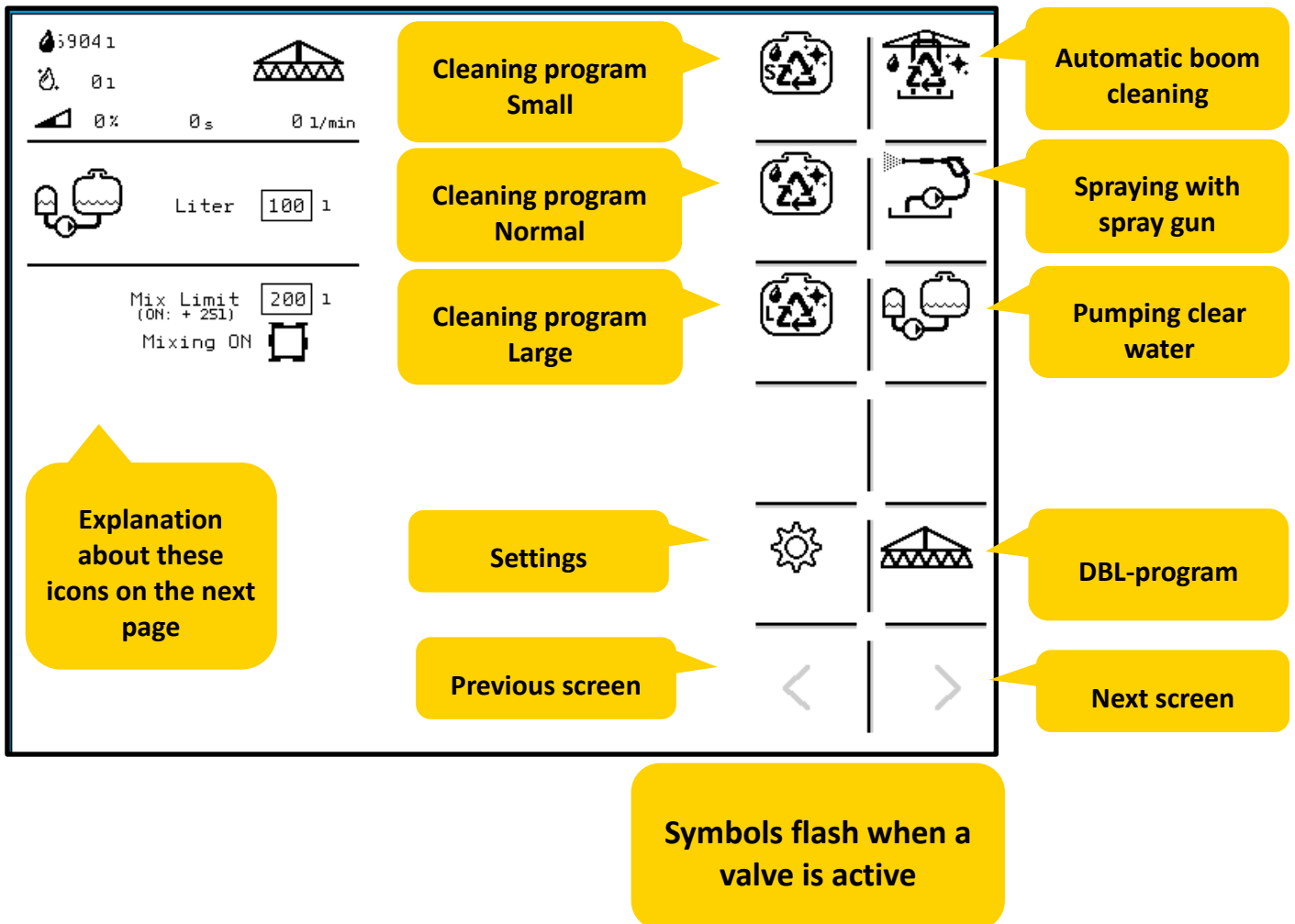
In the screen below you press the button . The cleaning process starts and is carried out completely automatically.

Note : The PTO speed must be the same as set during spraying

Note : Put the pressure at 5 bar!

In this system you can also select the options “only boom cleaning”, “use of the spray gun”, or “pumping clear water to the main tank”. When the program runs, you see the symbols flash, that are active at that moment.

Screen 1:



The screenshot shows a control interface with several sections:

- Top Left:** Displays a tank level icon with the number 59041, a spray gun icon with 01, a boom icon with 0s, and a flow rate icon with 0 l/min.
- Top Right:** A grid of icons for cleaning programs: 'S' (Small), 'N' (Normal), 'L' (Large), 'DBL' (DBL-program), and a spray gun icon.
- Middle Left:** A tank icon with 'Liter' and a value of 100.
- Middle Right:** A tank icon with 'Mix Limit (ON: + 25l)' and a value of 200, and a 'Mixing ON' icon.
- Bottom Left:** A callout box: 'Explanation about these icons on the next page'.
- Bottom Center:** 'Settings' and 'Previous screen' callouts.
- Bottom Right:** 'Automatic boom cleaning', 'Spraying with spray gun', 'Pumping clear water', 'DBL-program', and 'Next screen' callouts.
- Bottom Center (Large):** A callout box: 'Symbols flash when a valve is active'.

You can choose from 4 cleaning programs:

1. Only cleaning of the spray boom
2. Cleaning program Small (S): once flushing of the boom and the tank
3. Cleaning program Normal: triple cleaning of the boom and the tank
4. Cleaning program Large (L): triple cleaning of the boom and the tank, the fourth time the remaining contents of the clean water will be used.



Screen 2:

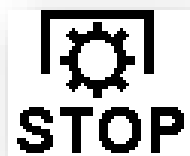
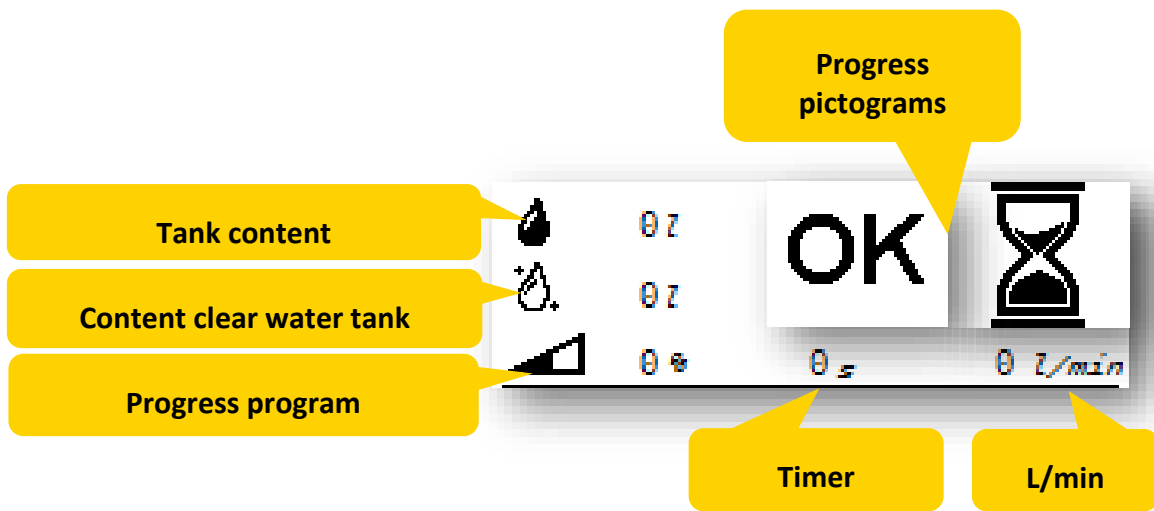
The screenshot shows a control interface with the following elements:

- Top Left:** A water drop icon with the number 9041, a tank icon, a percentage icon with 0%, a speed icon with 0 s, and a flow rate icon with 0 l/min.
- Top Right:** A tank selection icon and an electric drain valve icon.
- Middle Left:** An agitation valve icon, the unit "Liter", and a numeric input field showing "100".
- Middle Right:** A return valve circulation line icon.
- Bottom Left:** "Mix Limit (ON: + 25l)" with a numeric input field showing "200" and a "Mixing ON" indicator.
- Bottom Center:** A "Rinsing nozzles" icon.
- Bottom:** "Previous screen" and "Next screen" navigation buttons represented by left and right arrows.

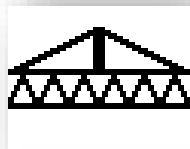
Yellow callout boxes point to the following icons:

- Tank selection valve
- Agitation valve
- Rinsing nozzles
- Electric drain valve
- Return valve circulation line
- Previous screen
- Next screen

Symbols flash when a valve is active



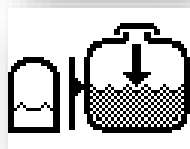
Switch off PTO



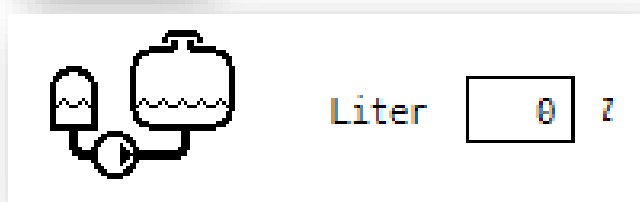
Trailed sprayer is switched off



Content clear water tank is too low

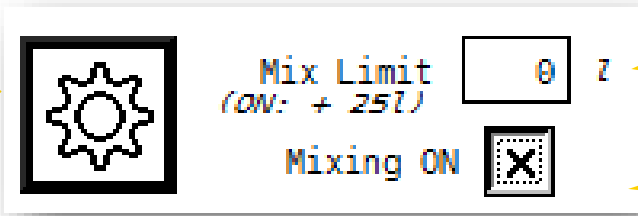


Content spray tank is too high



Enter liters pumping clean water

Settings cleaning program



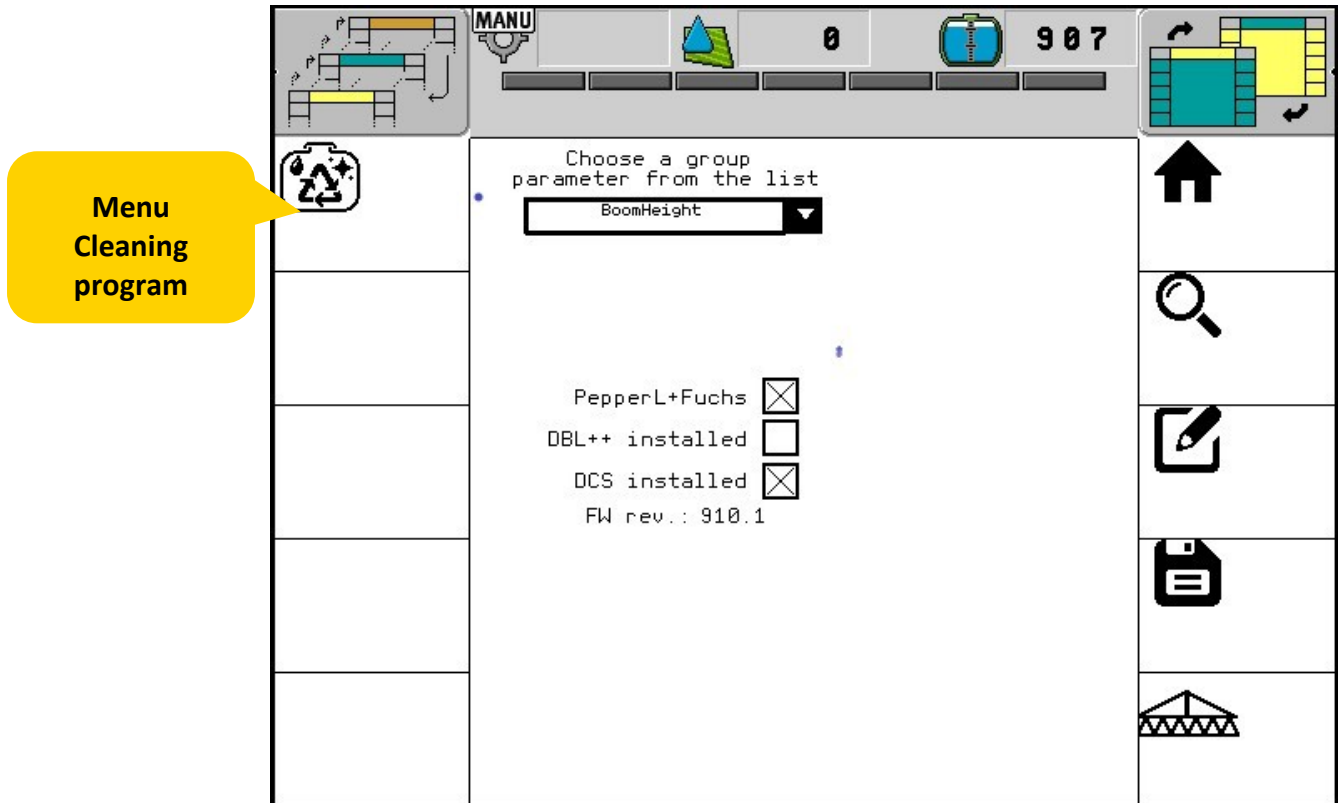
Agitation below the set litres


Agitation on/off

3.11.1 DCS Dubex Cleaning System (automatic cleaning program) Basic Terminal

DCS is exclusively available at AP Dubex and is the perfect solution to automate the cleaning process.

You can control DCS from the tractor. The clean water tank must (preferably) be full. If there is too little water in the clean water tank, it will be indicated by the program. Manually put the pressure of the sprayer at 6 bar.

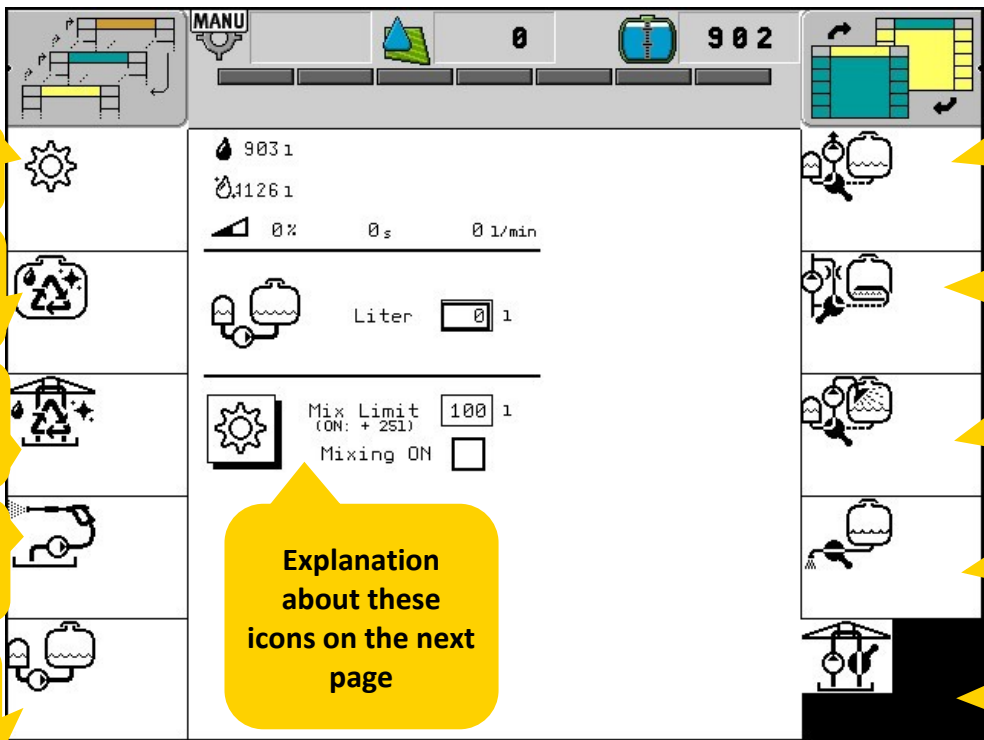


In the screen below you press the button . The cleaning process starts and is carried out completely automatically.

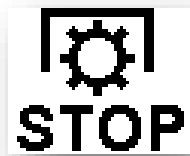
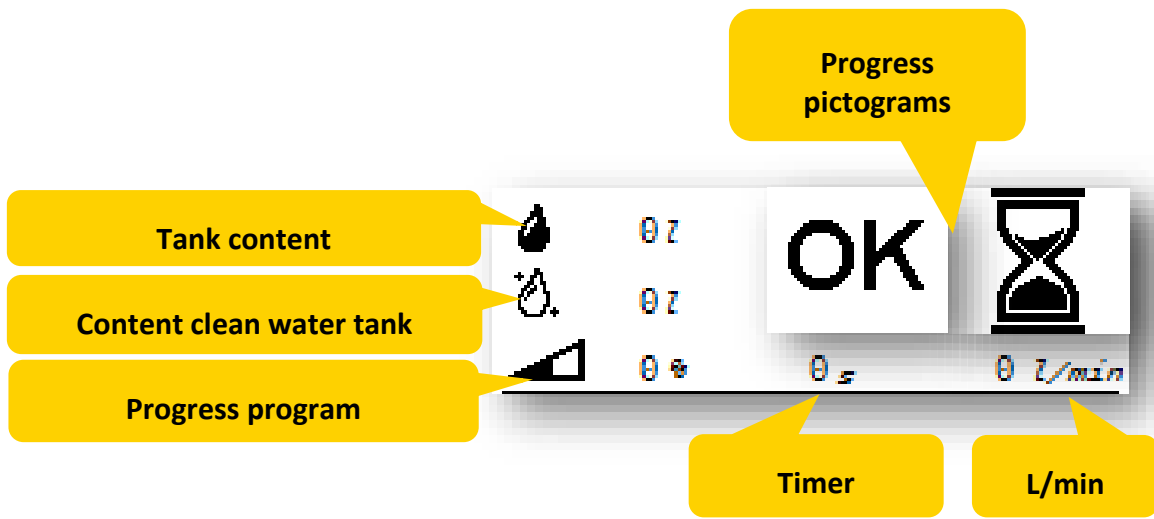
Note : The PTO speed must be the same as set during spraying

Note : Put the pressure at 5 bar!

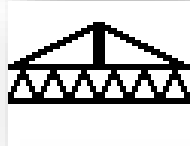
In this system you can also select the options “only boom cleaning”, “use of the spray gun”, or “pumping clear water to the main tank”. When the program runs, you see the symbols flash, that are active at that moment.



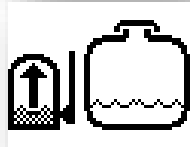
The screenshot shows the control interface for a manual trailed sprayer. At the top, there is a 'MANU' indicator, a pressure gauge showing 0, and a tank level indicator showing 902. Below this, there are several rows of icons and controls. On the left side, there are five yellow callout boxes with the following labels: 'Settings', 'Automatic tank cleaning', 'Automatic boom cleaning', 'Use the spray gun', and 'Pumping clean water'. On the right side, there are five yellow callout boxes with the following labels: 'Tank selection valve', 'Agitation valve', 'Rinsing nozzles', 'Electric drain valve', and 'Return valve circulation'. In the center of the interface, there is a yellow callout box that says 'Explanation about these icons on the next page'. The interface also displays various numerical values and settings, such as '9031', '11261', '0%', '0s', '0 l/min', 'Liter', '0', '1', 'Mix Limit (ON: + 25l) 100', and 'Mixing ON'.



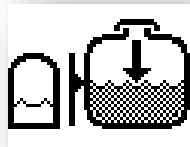
Switch off PTO



Trailed sprayer is switched off



Content clean water tank too low

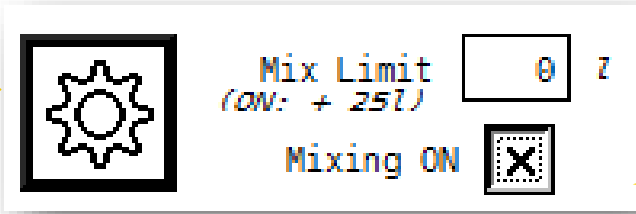


Content spray tank is too high



Enter litres pumping clean water

Settings cleaning program



Agitation below the set litres

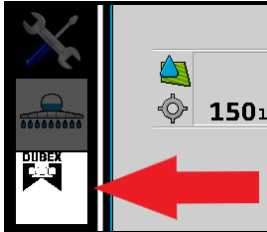
Agitation on/off

3.11.2 DBL+ Dubex Boom Leveling (automatic boom height control) Touch800 and Touch1200

The automatic boom height control of AP Dubex ensures the AP Dubex trailed sprayer to accurately follow ground contours and to remain balance.

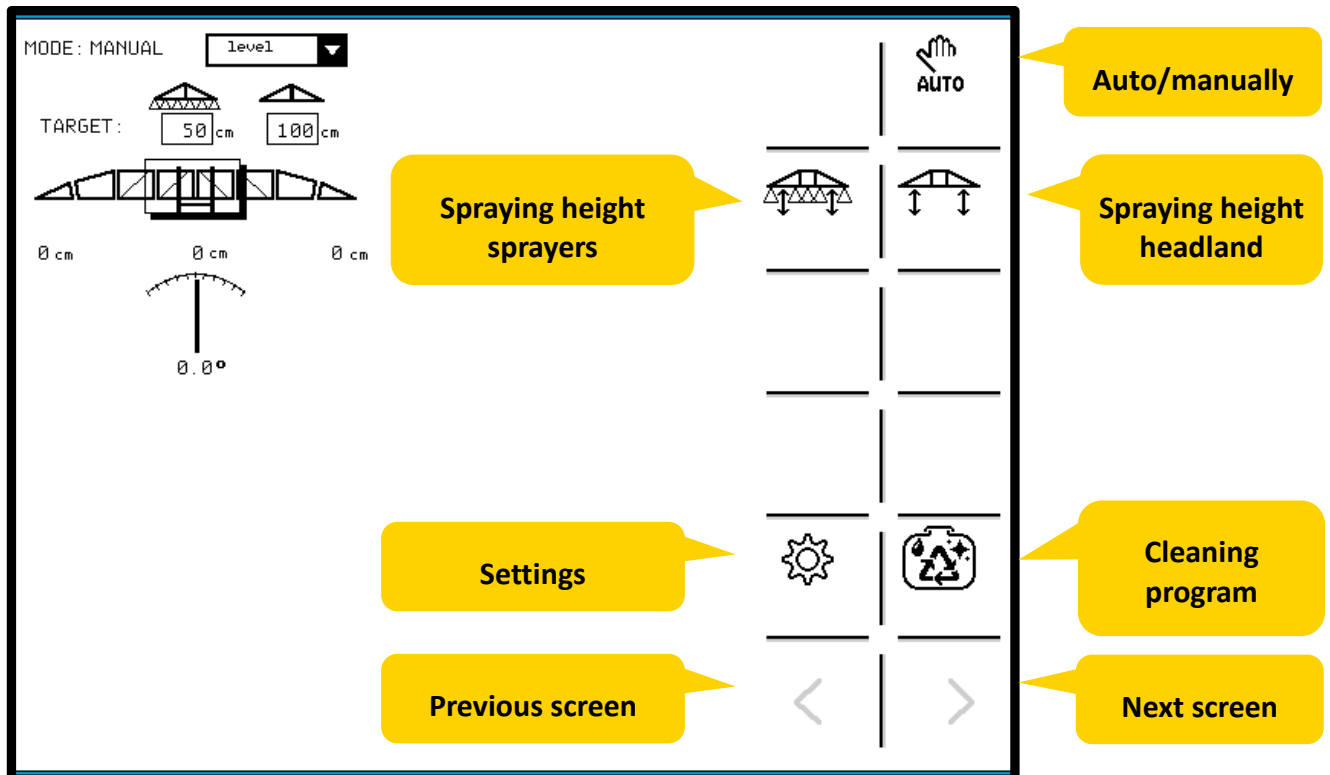
Before you start working in the DBL+ menu, to alter or adjust settings, make sure the booms are completely folded out.

Choose the AP Dubex logo in the spraying menu to enter the DBL+ menu.



The DBL+ screen below appears.

Screen 1

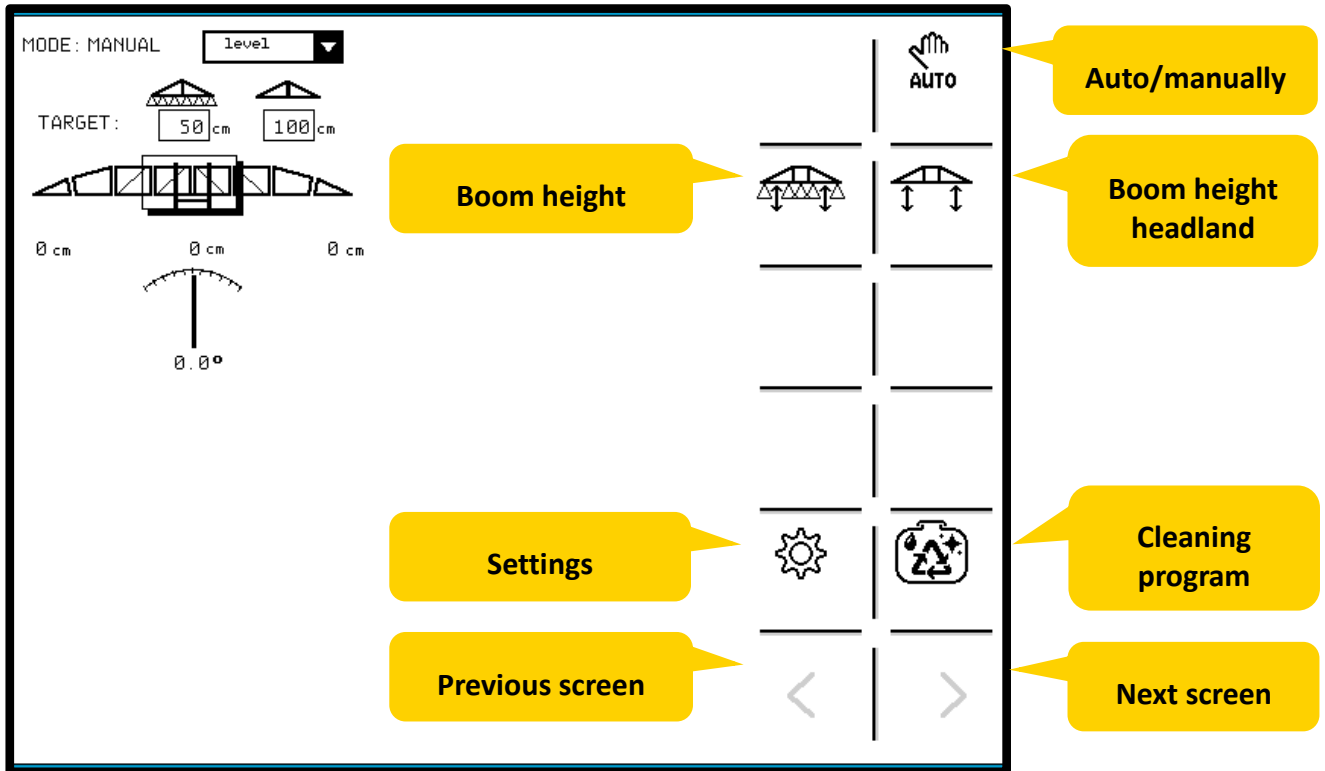


When you start the DBL+ screen, the screen is in altitude mode (height). Make sure this setting is active.

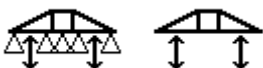



In most cases you select the automatic mode. The spray boom will then be kept at the height according to the set values. When the main valve is closed, the boom will change to the set value of the headland height. Furthermore, the balance will be adjusted automatically. In automatic mode, the screen shows a small lock symbol.

3.11.2.1 Setting of the boom height



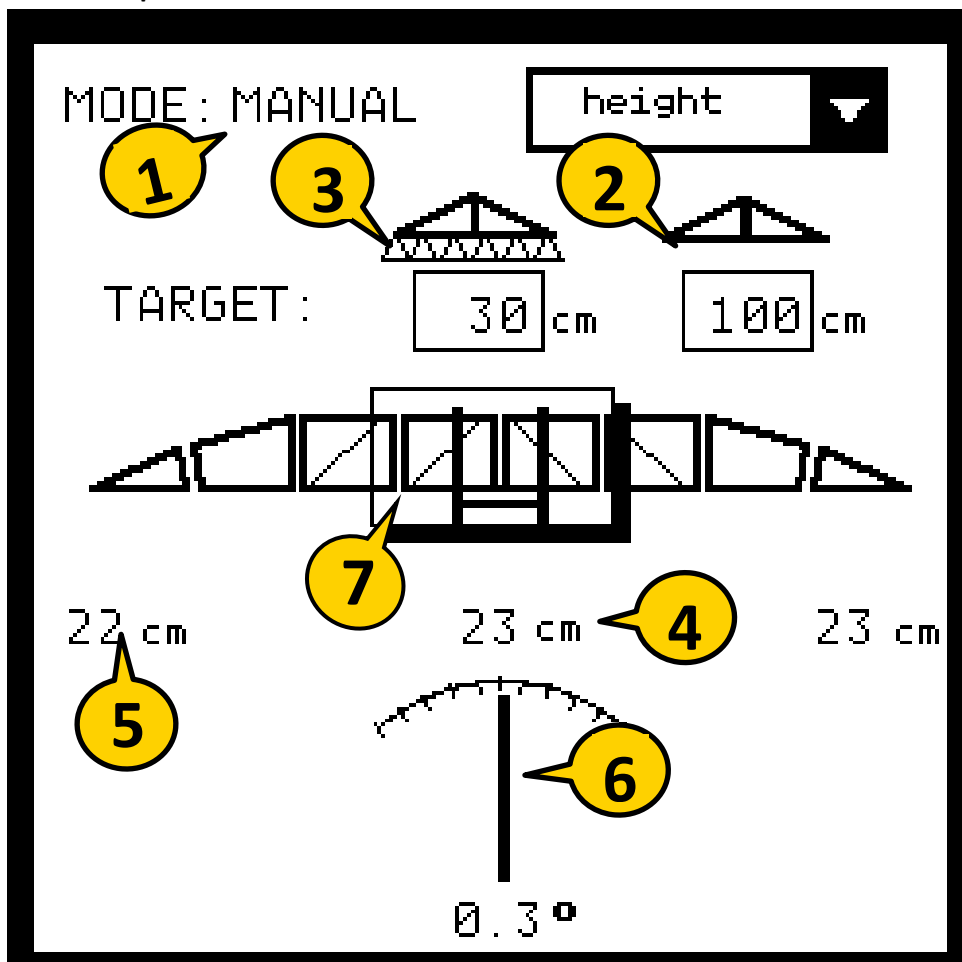
You can set the spraying height / headland height in 3 ways:

1: With the knobs 

2: With the numeric keypads after Target 

3: By defining and saving the height of the boom with the help of the joystick (see 3.11.2.3)

3.11.2.2 Explanation work screen



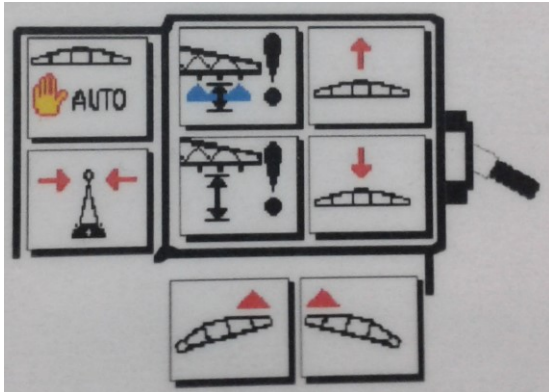
Work screen:

- 1: Display automatic or manual
- 2: Boom height not spraying (headland)
- 3: Boom height sprayers
- 4: Current spraying height
- 5: Display of the lowest spray boom height (left or right)
- 6: Tipping angle
- 7: Centring of the boom



3.11.2.3 DBL+ Joystick control

At the Müller joystick, the third function group is used (selector switch downward).



Knob Auto/Manual

Knob Auto/Manual : switches between automatic and manual mode. Only functions when the spray boom is not situated in the upper section of the mast (in transport mode).



Knob working height

Selector switch to the mode automatic spraying height.

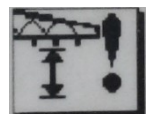
- | | |
|--------------------|---|
| In manual mode: | Define the working height during spraying |
| In automatic mode: | Increase set height per cm |



Knob height headland

Selector switch to the mode automatic spraying height.

- | | |
|--------------------|--|
| In manual mode: | Define the working height during driving on the headland |
| In automatic mode: | Decrease set height per cm |




4 Maintenance

4.1 Maintenance

Just like every other machine, your AP Dubex trailed sprayer requires regular maintenance. Proper cleaning and timely maintenance prolong the life-span of the AP Dubex trailed sprayer.

Maintenance should however always be done by skilled personnel and always observe the following safety measures.

	<p>Make sure the AP Dubex trailed sprayer is switched off during maintenance work. Also make sure there is no pressure on the hydraulic system and remember to remove the ignition key from the tractor.</p>
---	---

4.1.1 Greasing points

All greasing points of the AP Dubex trailed sprayer are indicated by the sticker below.



Greasing general:

- Before the beginning of each season
- Every 50 hours during the season

Greasing spray booms:

- Before the beginning of each season
- Every 25 hours during the season

Greasing PTO:

- Before the beginning of each season
- Every 8 hours during the season



Position greasing points (sticker) AP Dubex trailed sprayer



Position greasing points (sticker) AP Dubex trailed sprayer



4.1.2 Wear parts

The AP Dubex trailed sprayer is a low maintenance machine. Only a few parts are liable to wear. Regularly check these parts and replace them, if necessary:

- Steel cables lifting cylinder (to be replaced at least every 3 years or immediately when damaged)
- Balls and seats in valves
- Valves in pump
- Membranes in pump
- Membrane in pressure regulator
- Brake lining
- Nylon rollers in guide rail of the lifting mast
- Belt pulley (groove and bearing), when worn out immediately replace it to avoid damage to the machine

4.1.3 Check

To ensure the proper functioning of the AP Dubex trailed sprayer, perform the checks mentioned below at regular intervals. When a machine is not checked regularly, it may occur that damages are not detected in time. This not only dangerous for the user but also essential for the correct functioning of the trailed sprayer.

Periodic maintenance before the beginning of the season and then after each use:

- Cleaning of the trailed sprayer, possible defects can be noticed quickly during cleaning. Always observe the statutory regulations when cleaning the machine.
- Check for damages in general.
- Check for damages in the paint work. Repair them as soon as possible to prevent oxidation.
- Check the general condition of the machine, check if a safe and responsible operation is still ensured, also check the lighting.
- Check the hydraulic system for damages.
- Lubricate all bearings and hinged parts (see “greasing points”).
- Check the oil level of the pumps (oil SAE30).
- Check the spray pattern, clean, and if necessary, replace the nozzles.
- Check the brake lining (on braked trailed sprayers).



The air reservoir must be drained daily with the help of the drain valves.



Periodic maintenance each quarter and/or every 100 hours of operation:


- All handlings mentioned above
- Check all bearing and hinged parts for play and replace them, if necessary, to avoid damages of the machine.
- Regularly retighten the wheel nuts, especially after you replaced the wheels, but at least every 100 hours of operation.

Tightening torques:	<u>M18</u>	<u>M22</u>
TVZ	360Nm	650Nm
ADR/Colaert	280Nm	370Nm
BPW	290Nm	510Nm

- Check if the steel cables are taut and not damaged; replace them if damaged and preventively replace them after three years at the latest.
- Clean the suction filter and pressure line filter at least once a year.

4.1.4 Maintenance of the hydraulic system


The hydraulic system of the AP Dubex trailed sprayer is as good as maintenance-free. It is however recommended to regularly clean the couplings and check them for defects. Furthermore, check the hydraulic system for leaks. Always follow the regulations in the manual of your tractor concerning the hydraulic system and lubrication (if applicable).

	In case of leakage of the hydraulic system: stop immediately and contact the AP Dubex dealer.
---	--

4.1.5 Malfunction and damages

Also check the coupling pins with which the machine is attached to the tractor. Check these pins periodically (once per quarter, depending on usage) for damages. Although the entire machine is a solid construction, the rest of the machine should also periodically be checked for damages and possible loose coming bolts and nuts.

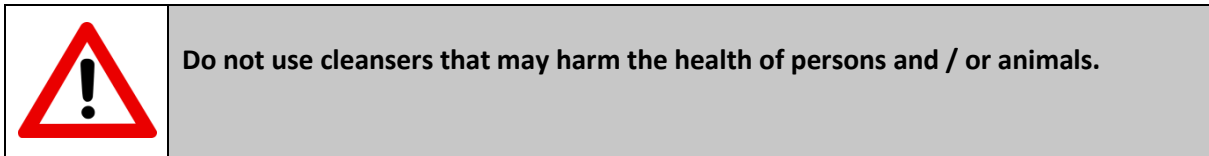
Repair of damaged parts or of the AP Dubex trailed sprayer must be done by the AP Dubex dealer and should only be done with the use of AP Dubex spare parts.

	Always wear personal protective equipment during the replacement of broken parts.
---	--



4.1.6 Cleaning of the machine

It is recommended to properly clean the entire machine after use, extending the service life. When using a high-pressure cleaner, you need to ensure it does not spray on the control valve, if present, on the electronics and on other parts of the hydraulic system.



If you will not use the AP Dubex trailed sprayer a longer period, then lubricate the parts that turned blank with a protective oil.

4.1.7 Winterize

To make the AP Dubex trailed sprayer ready for the winter, please observe the following points:

- Make sure the trailed sprayer is properly clean: intensively rinse the tank, the pipes and nozzles with clean water.
- Subsequently fill the clean water tank of the trailed sprayer with antifreeze and water until the required frost protection level.
 - Make sure the non-return valve of the circulation line is open.
 - Have the sprayer mix the antifreeze and the water intensively.
 - Subsequently have the trailed sprayer spray briefly.
 - Then activate the rinsing nozzles for a short while so the antifreeze will also reach them.
 - Furthermore, flush the pipes to the manometer. Remove the hose of the manometer and have the pumps run for a short time.
 - When the machine is equipped with an induction hopper, activate it until the antifreeze has reached all present hoses.
 - The surplus antifreeze can remain in the main tank during the winter.
- It is recommended to pump back the antifreeze into a storage and to thoroughly flush the trailed sprayer. The antifreeze can be used at a later time.



4.1.8 Guidelines testing AP Dubex trailed sprayer

All AP Dubex trailed sprayers are SKL tested according to directive NEN-EN-ISO 16122:2 (2015).

Testing of the AP Dubex trailed sprayer may only be performed by the concerned authorized authorities. The legal criteria and time intervals differ per country, have yourself informed by the concerned authorities. AP Dubex recommends to have your machine tested at least every 3 years.









4.1.8.1 Testing articles AP Dubex trailed sprayer

The articles mentioned below can be used for an inspection of the AP Dubex trailed sprayer.

Article nr.	Description	Image
X00023895	Male Camlock 3" <-> Female Camlock 2"	
X00023896	Male Camlock 2" <-> Female Camlock 1 1/2"	
X00023898	Male Camlock 1 1/2" <-> Female Camlock 2"	
X00023899	Male Camlock 2" <-> Female Camlock 3"	
X00023900	Stortz 75B cam 89mm <-> Female Camlock 1 1/2"	
X00023901	Male Camlock 1 1/2" <-> Stortz 75B cam 89mm	
X00023902	Female T5 <-> Female Camlock 1 1/2"	
X00023903	Male Camlock 1 1/2" <Flow meter 20-400 L/min.> Female Camlock 1 1/2"	
X00023904	Male Camlock 1 1/2" <-> Male T5	



- continuation testing articles -

Article nr.	Description	Image
X00023905	Female T5 <-> cap nut 1 ¼"	
X00023906	Male 1 ¼" thread <-> Female Camlock 1 ½"	
X00023907	Testing set Manometer 6mm hose <-> Female ½" thread connection for manometer	
X00023908	Extension hose 1 m Male Camlock 1 ½" <-> Female Camlock 1 ½"	
X00023909	Extension hose 2,5 m Male Camlock 1 ½" <-> Female Camlock 1 ½"	
X00023910	Extension hose 5 m Male Camlock 1 ½" <-> Female Camlock 1 ½"	
X00023911	Extension hose 7,5 m Male Camlock 1 ½" <-> Female Camlock 1 ½"	
X00023912	Extension hose 10 m Male Camlock 1 ½" <-> Female Camlock 1 ½"	



4.1.8.2 Testing pump capacity

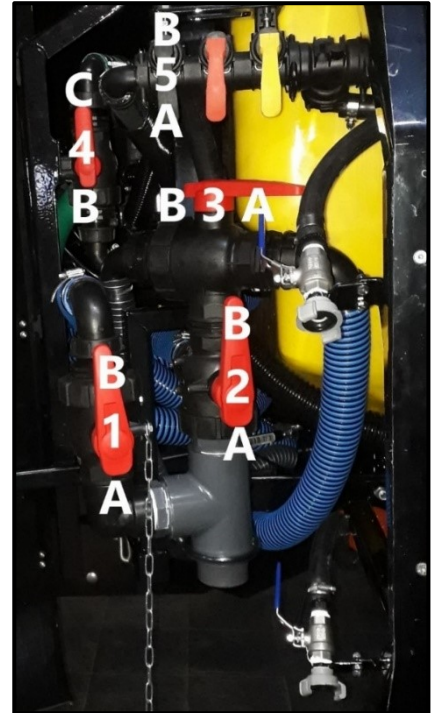
The flow meter is used to test the capacity of the water pumps. This must be placed, with the help of reducers, between the suction hose and the suction connection point. If the AP Dubex trailed sprayer is equipped with a valve to switch off the agitation, agitation must be switched on (valve 4, position B).

Testing pump capacity trailed sprayer with 1 pump (manually / electrically controlled valve)

- Manually: turn the suction valve to position “vullen” (filling) (valve 2, position A).
- Electrically : set the switch to “vullen” (filling).
- Switch on the PTO and have the pump run at 540 rpm/min.
- The value (capacity) of the spray pump can be read in l/min on the test flow meter.

Testing pump capacity trailed sprayer with 2 pumps (manually controlled valves)

- Turn suction valve 2 to position “vullen” (filling) (valve 2, position A).
- Switch on the PTO and have the pump run at 540 rpm/min.
- The value (capacity) of the **spray** pump can be read in l/min on the test flow meter.
- Turn valve 2 back to position B.
- Then turn valve 1 to position A.
- The value (capacity) of the **mixing** pump can now be read in l/min on the test flow meter.



Testing pump capacity trailed sprayer with 2 pumps (electrically controlled valves)

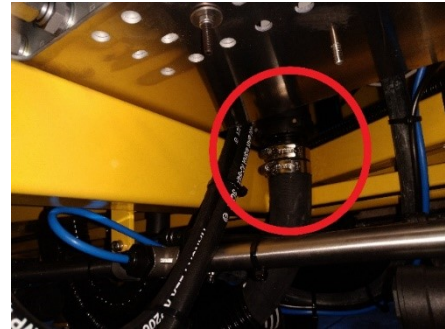
- If the suction valves are electrically controlled : set the switch to “spuiten” (spraying).
- Remove the connector of valve 1, then set the switch to “vullen” (filling).
- Switch on the PTO and have the pump run at 540 rpm/min.
- The value (capacity) of the **spray** pump can be read in l/min on the test flow meter.
- Set the switch back to “spuiten” (spraying).
- Plug the connector back in valve 1.
- Remove the connector of valve 2, then set the switch to “vullen” (filling).



- The value (capacity) of the **mixing** pump can now be read in l/min on the test flow meter.

4.1.8.3 Testing flow meter

- Put the test flow meter, with the help of reducers, on the trailed sprayer before the flow meter (attached on the rear frame).
- Set the water pressure of the trailed sprayer at 4 bar.
- Have the nozzles spray (entire boom).
- Read the l/min on the computer and check if this value matches the value of the test flow meter.
- Switch off half of the nozzles on the boom.
- Read the l/min on the computer and check if this value matches the value of the test flow meter.



Calculation correction flow meter

If the value on the spray computer does not match the value on the test flow meter, the value must be adjusted. This value is calculated as follows:

$$L/min \text{ test flow meter} \div L/min \text{ computer sprayer} = \text{adjustment factor}$$

$$\text{Entered imp/L} \div \text{adjustment factor} = \text{new value imp/L}$$

For example:

Test flow meter indicates a value of 50 L/min

Flow meter spray computer indicates a value of 45 L/min

Impulses per liter is set on 700 imp/L

$$50 \div 45 = 1,11$$

$$700 \div 1,11 = 630$$

The new set value for the flow meter must then be 630 imp/L.

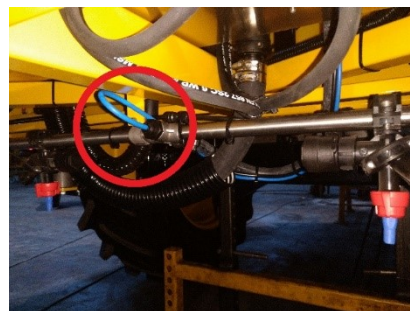


Always repeat the flow meter test after the value is adjusted.

4.1.8.4 Testing manometer

The manometer measures the pressure in the rear frame spray line. Follow the next steps to test the manometer:

- Between the spray line and the manometer, a 6mm hose is attached by a plug-in coupling. Remove the hose from the plug-in coupling.
- Place testing article X00023907 between the 6mm hose and the plug-in coupling.
- Switch on the PTO and set the pressure at 1 bar, compare the manometer of the trailed sprayer with the test manometer.
- Subsequently increase the pressure in steps from 1 to 8 bar, compare the manometers by every step.
- Decrease the pressure in steps from 1 bar to the minimum pressure and compare the manometers by every step.



5 Failures

If failures of unknown cause occur, please contact your AP Dubex dealer.

Insufficient pump capacity	
<i>Cause:</i>	<i>Solution:</i>
Blockage in suction filter(s)	Clean suction filters and, if necessary, replace it/them
Pump sucks in air	Check suction lines pump suction unit, suction valves suction unit, coupling suction hose or suction hose for leakages.
Suction height too large	Choose other filling location
Blockage in suction connection in main tank	Hang the suction hose in the main tank and set the spray to "spuiten" (spraying), now try to spray. Is the result now good? The suction connection in the main tank is blocked. Solution: remove blockage, clean suction connection.
Leaking or jammed valves	Replace the valves
Defective valve springs	Replace the valve springs
Defective valve bodies	Replace the valve bodies

No pressure on spray line	
<i>Cause:</i>	<i>Solution:</i>
Rinsing valve remains open	Check and, if necessary, replace it
Pressure release valve (5) pressure unit is still open (§2.1.6 Pressure unit)	Close the pressure release valve
Defective pressure regulator	Check the membrane of the pressure regulator, replace the pressure regulator
Valve springs pump do not properly close	Check them, remove possible dirt, replace valves, valve springs and/or valve bodies



No compressed air available	Connect the hoses, connect plug of the compressor
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Irregular spray pattern	
<i>Cause:</i>	<i>Solution:</i>
Worn out nozzle holders	Replace all nozzle holders
Nozzles do not hang straight	Hang the nozzles straight by turning the spray line
Spray boom does not hang straight	Adjust the concerned sections
Blocked nozzle holder	Loosen and clean the nozzle holder

Valve difficult to turn	
<i>Cause:</i>	<i>Solution:</i>
Plant protection product or dirt in / on valve	Clean the valve
Enlarged O-ring(s)	Replace the O-ring(s)
Damaged ball in valve	Replace the ball

Oil in pump is grey/white	
<i>Cause:</i>	<i>Solution:</i>
Leaking membrane(s)	Replace all membranes

Malfunction electric pressure regulator	
<i>Cause:</i>	<i>Solution:</i>
Air leakage	Tighten the hose clamps or replace defective parts
Valve still in the pressure regulator (only applies to new installed pressure regulator)	Remove the valve from the pressure regulator and reattach the hose
Control cap pressure regulator contaminated	Dismount the cap, clean and reattach





Maximum crop protection

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