

Spraying boom

user manual

Serial number

Edition 1
11 - 2006

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IMPORTANT SAFETY NOTE

The information published in this booklet regards the pointed out with relevant symbols in order to safeguard operational aspects of the operator unit installed on the people from risks. Remember that prudence is irreplaceable. machine. It is however

necessary that you carefully read the Safety is also in the hands of all the operators who interact general safety regulations published in Booklet 1 and those with the machine.

TECHNICAL INFORMATION

EQUIPMENT GENERAL DESCRIPTION

The spraying boom, from now on called equipment, was designed and built to be installed on a machine for spraying chemical products on tilled land and/or products.

It is to be put on the height adjustment device and on the self-levelling device so that it remains perfectly

parallel with the ground, even in the event the ground is uneven.

The equipment is divided into folding boom sections in order to adapt it to the spraying width and so as to reduce the space occupied during transfer.

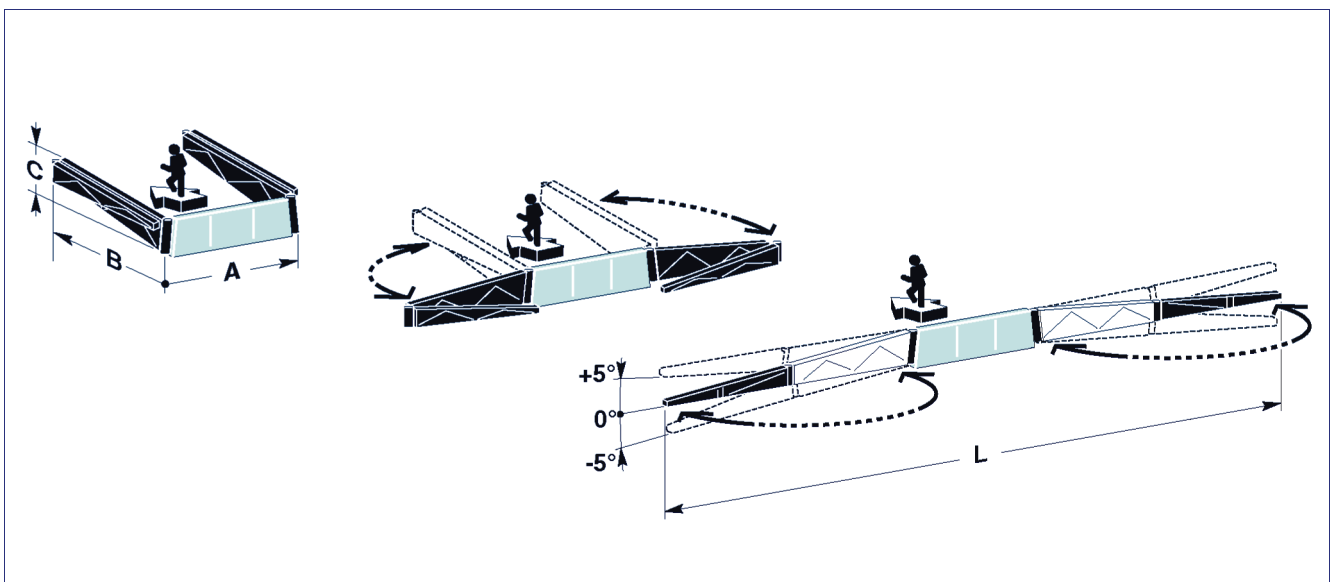
TECHNICAL SPECIFICATIONS

Width (m) W	Size			(*) Weight (kg)	(**) Weight (kg)	Qty. Jets (500 mm)
	A mm	B mm	C mm			
12	2480	2330	1730	341	336	24
12,5	2480	2330	1730	342	337	25
14	2480	2830	1980	295	390	28
15	2480	3330	2230	401	396	30
16	2480	3330	2230	402	397	32
16,5	2480	3330	2230	403	398	33
18	2480	3800	2530	429	424	36
18,5	2480	3800	2530	430	425	37
20	2480	4500	2880	525	520	40
21	2480	4500	2880	526	521	42

(*) Boom with NEW EL self-levelling device (can be installed on trailed tanks, self-propelled sprayers and mounted units with pivoting wheels).

(**) Boom with NEW E self-levelling device (can be installed on mounted units).

Technical specification diagram



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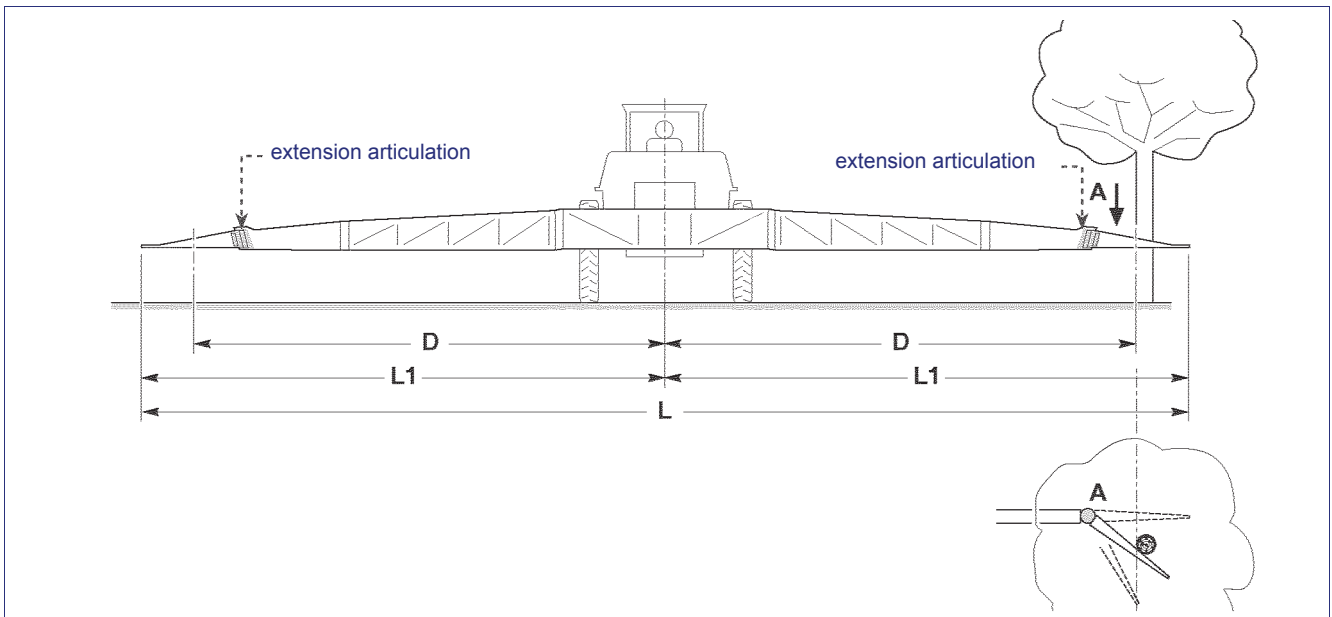
SAFETY DEVICES

- **Extension articulation:** to allow the end of the extension to turn so as to get past obstacles. In order to get past the obstacle without damaging the equipment, it is necessary to keep a distance higher than the value (**D**) given in the table.
- **Stop valve:** it allows to stop movements of the various boom sections during use and/or transport of the equipment and to prevent accidental movements in the event of an hydraulic hose failure.

Safety distance table

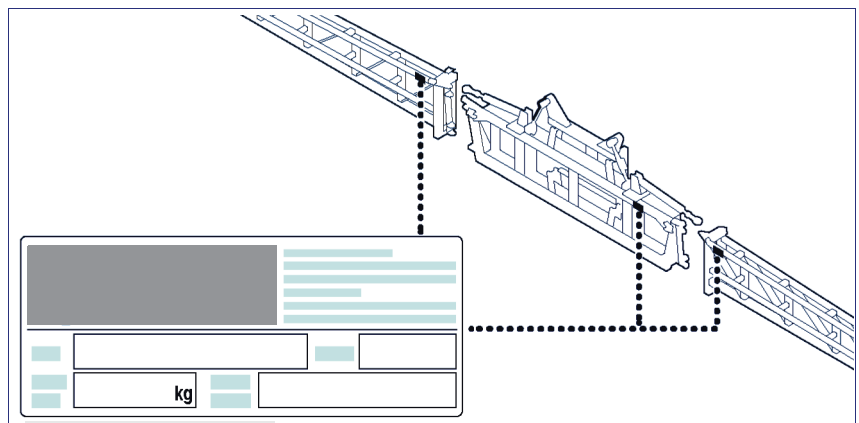
Width <i>W</i>	Width <i>W1</i>	Safety distance <i>D</i>
12	6	5,4
12,5	7,5	5,7
14	7	6,3
15	7,5	6,8
16	8	7,2
16,5	8,25	7,4
18	9	8,1
18,5	9,25	8,4
20	10	9
21	10,5	9,5

Safety distance diagram



IDENTIFICATION PLATE POSITION

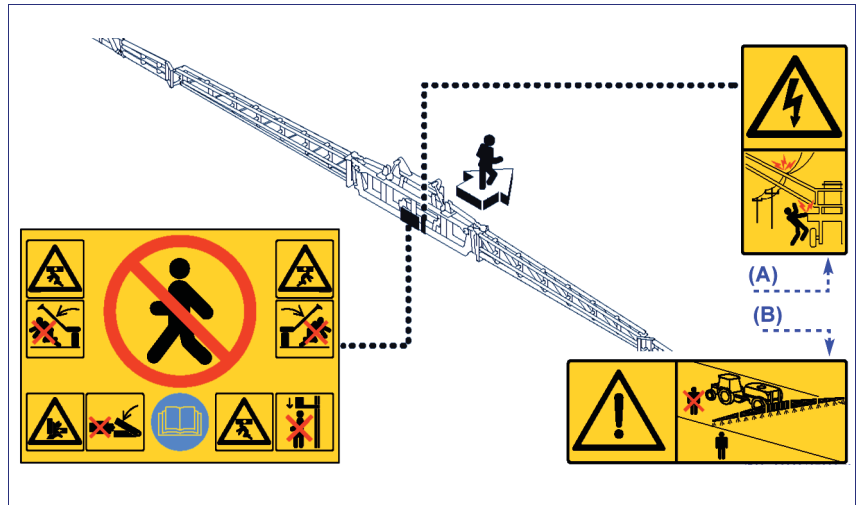
The figure points out the positions of the identification plates of the components.



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POSITION OF SIGNALS

The figure shows the location of all safety plates, while their meaning is explained in booklet 1. The plates (A and B) supplied with the manual have to be placed inside the tractor cab, in a visible position.



INFORMATION ABOUT HANDLING AND INSTALLATION

HANDLING INSTRUCTIONS

Comply with the information provided by the manufacturer, found on the equipment and in the instruction

manual, when carrying out handling and loading operations.

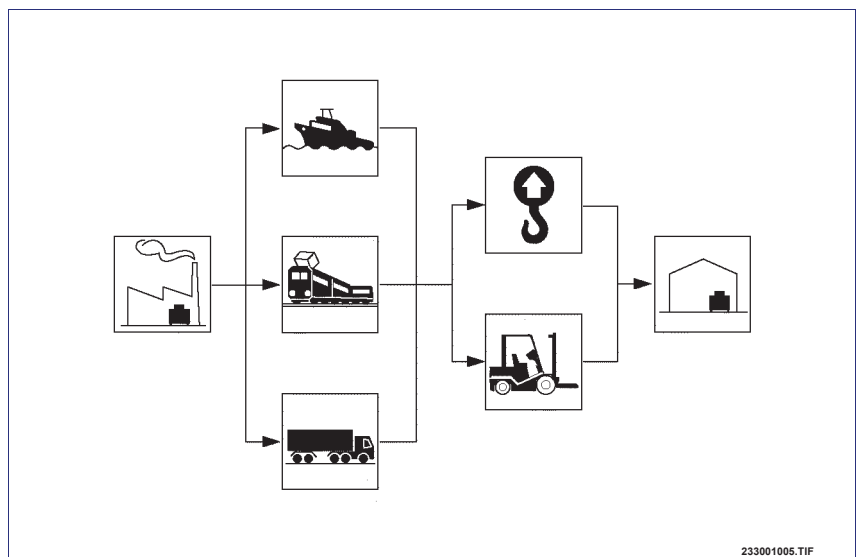
PACKING AND UNPACKING

- The equipment is to be placed on a loading platform, protected and adequately secured. To make transport easier, it can be shipped with several components disassembled.

- When unpacking, check that all the components are intact and in the exact quantities.
- The packing material is to be disposed of properly, in observance of the laws in force.

LOADING AND TRANSPORTATION

Depending on the destination, loading and transport can be carried out with different means. The diagram shows the most commonly used solutions. Secure the means properly during transportation in order to prevent untimely shifting.



HANDLING AND LIFTING

The equipment can be handled with a lifting device with forks or hooks having a sufficient capacity.

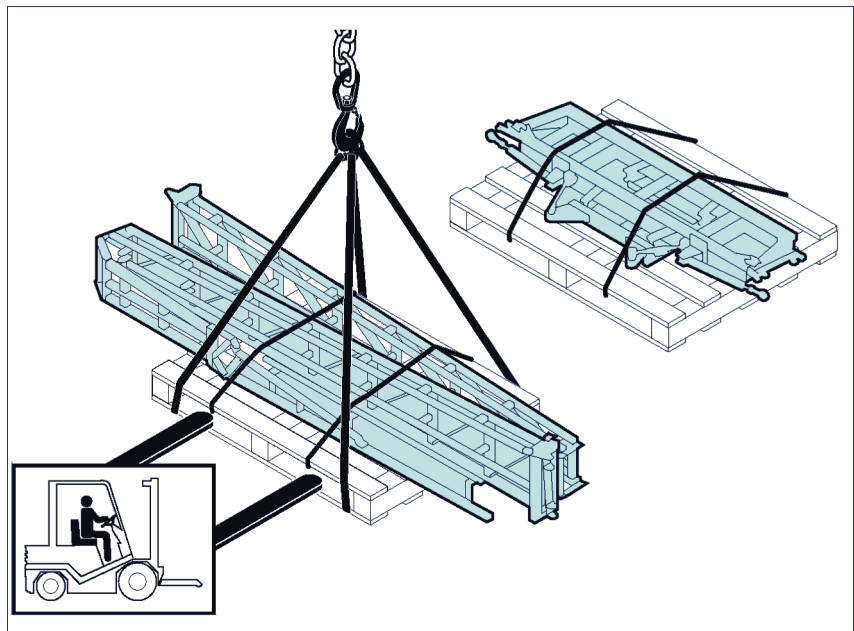
Position the lifting device as shown in the figure.

Avoid sudden manoeuvres.



Danger - Warning

Lifting and handling operations must be carried out by using appropriate means and by skilled staff specialized in this kind of manoeuvres.



INSTALLATION INSTRUCTIONS

Whoever performs the installation must prepare satisfactory safety conditions in advance in order to ensure their own safety and that of the operators involved.

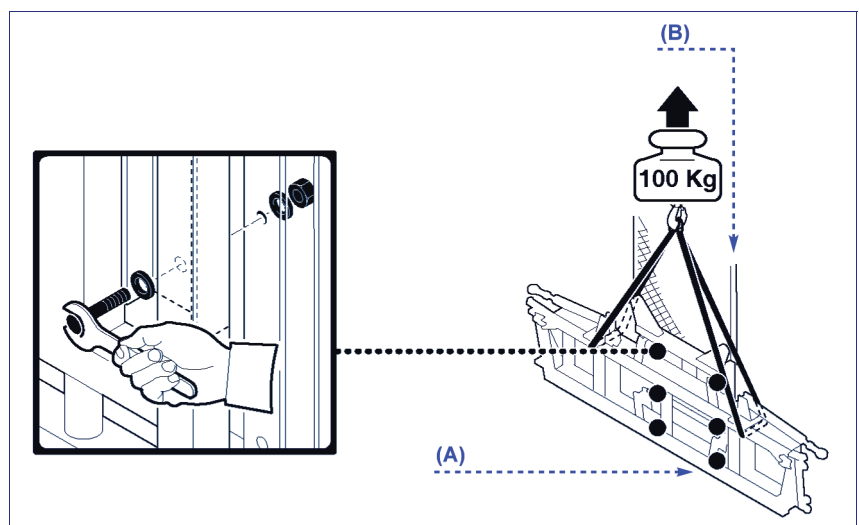
INSTALLATION OF DISASSEMBLED PARTS

Follow the instructions given below so as to install and assemble the spraying boom properly.

INSTALLATION OF MIDDLE FRAME (NEW EL SELF-LEVELLING DEVICE)

Proceed in the way indicated.

- 1 - Lift the middle frame (A) of the boom already mounted on the self-levelling device (see "Self-levelling Device" booklet) and fasten it to the sliding frame of the lifting device (B) or to the shock absorber, if required.



INSTALLATION OF ARM

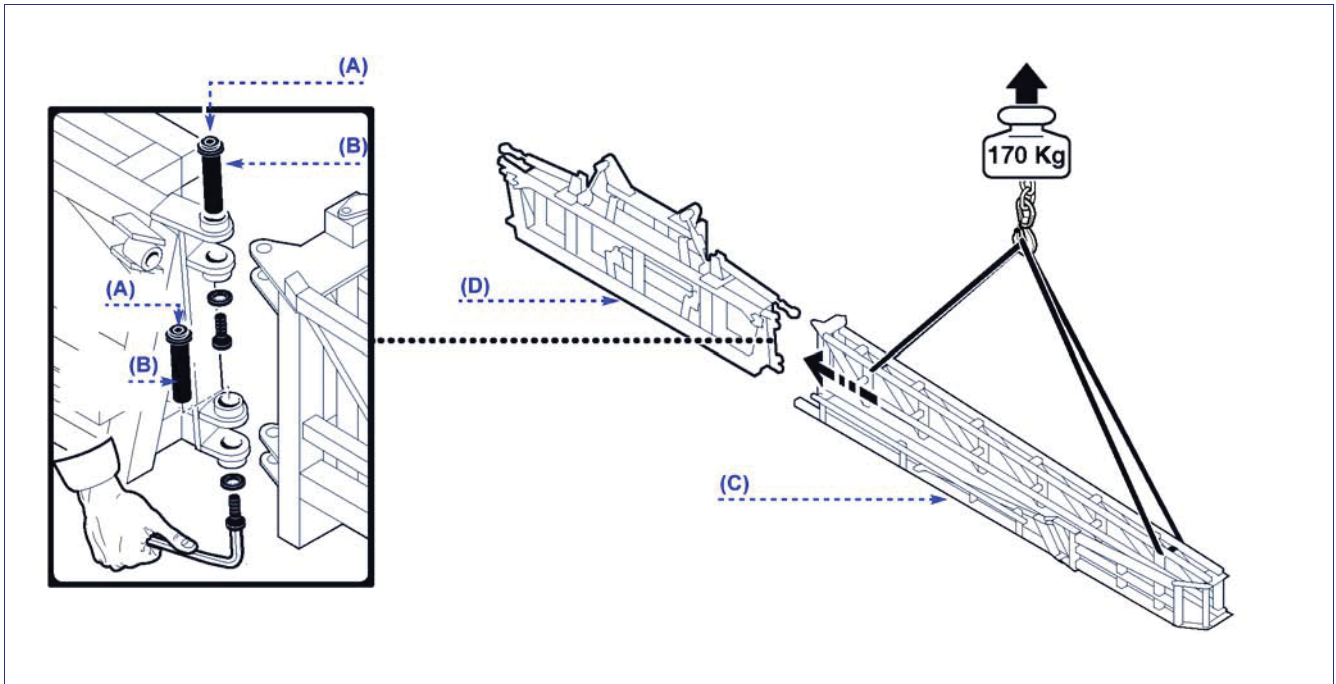


Caution - Warning

Screws (A) are tightened and locked using LOCTITE in order to prevent them from coming loose, which could cause the pins (B) to accidentally become extracted. Therefore, these pins have to be adjusted as shown in the figure and have to be assembled and di-

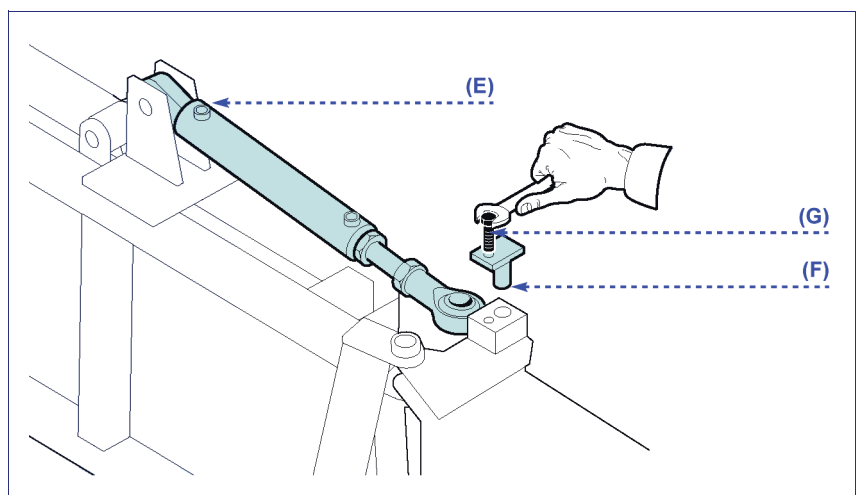
assembled through the lower screws.

- 1 - Lift the arm (C) and fasten it to the middle frame (D) with the respective pins after having greased the parts and their seats.



- 2 - Extract the cylinder stem (E) and fasten it to the arm with the pin (F) and the locking screw (G).

- 3 - Assemble the opposite arm in the same way.



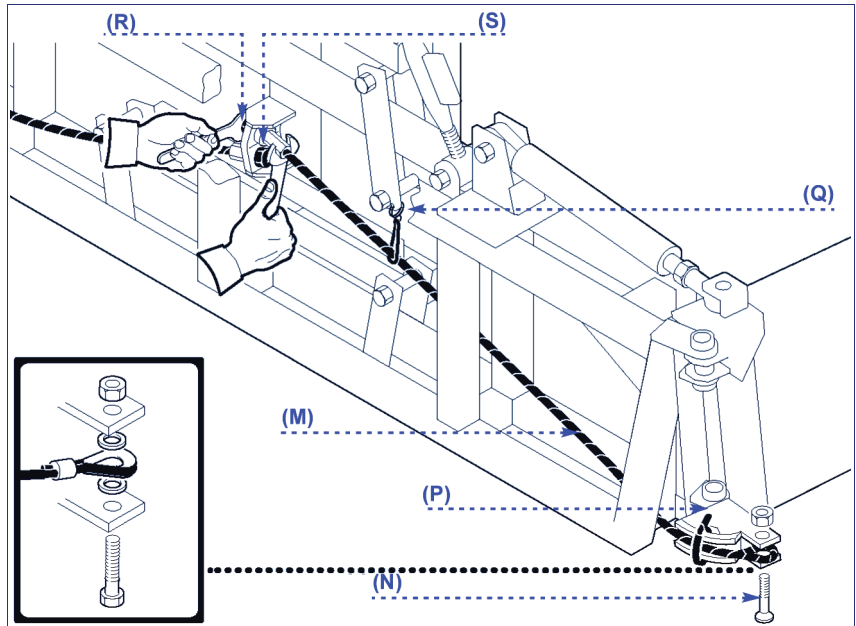
- 4 - Slightly unfold primary arms.
- 5 - Connect the ropes (M) to the arms with the relative screws, as shown in the figure.



Important

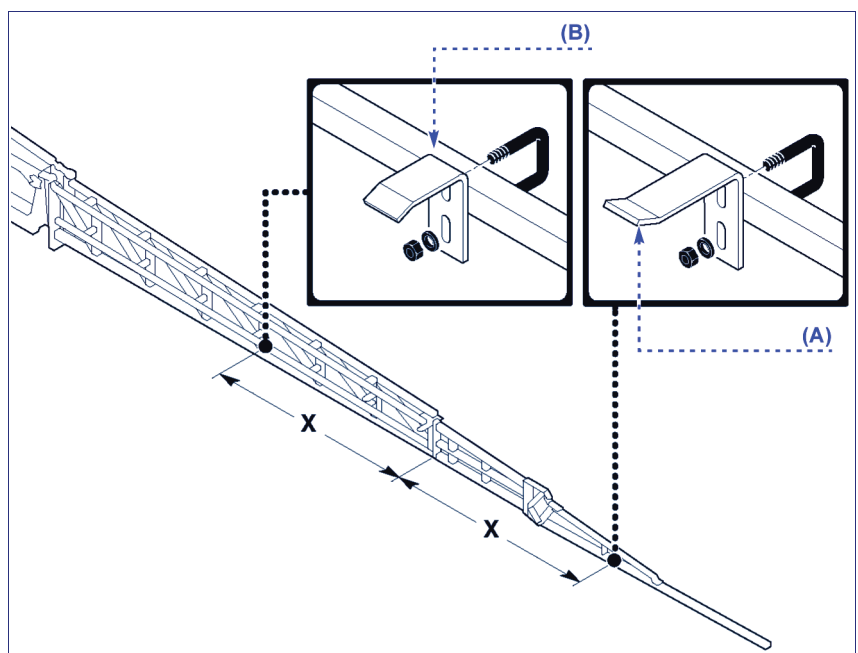
The screws (N) must always be mounted turned upwards, as shown in the figure.

- 6 - Fold boom arms.
- 7 - Use nuts (R) to tighten ropes (M)
- 8 - Bring stop (S) closer and lock it.
- 9 - Lock the ropes (M) to the support using the clamp (P).
- 10- Use tie-rod (Q) to support the ropes and prevent them from being damaged while the boom is moving (see figure).



INSTALLATION OF EXTENSION LOCKS

- 1 - Fix stop (A) on the extension.
- 2 - Mount support (B) on the primary arm at the distance shown in the figure.
- 3 - Make sure that support (B) engages properly during folding.
- 4 - Adjust the boom swinging by means of brackets (E) (see booklet 12).



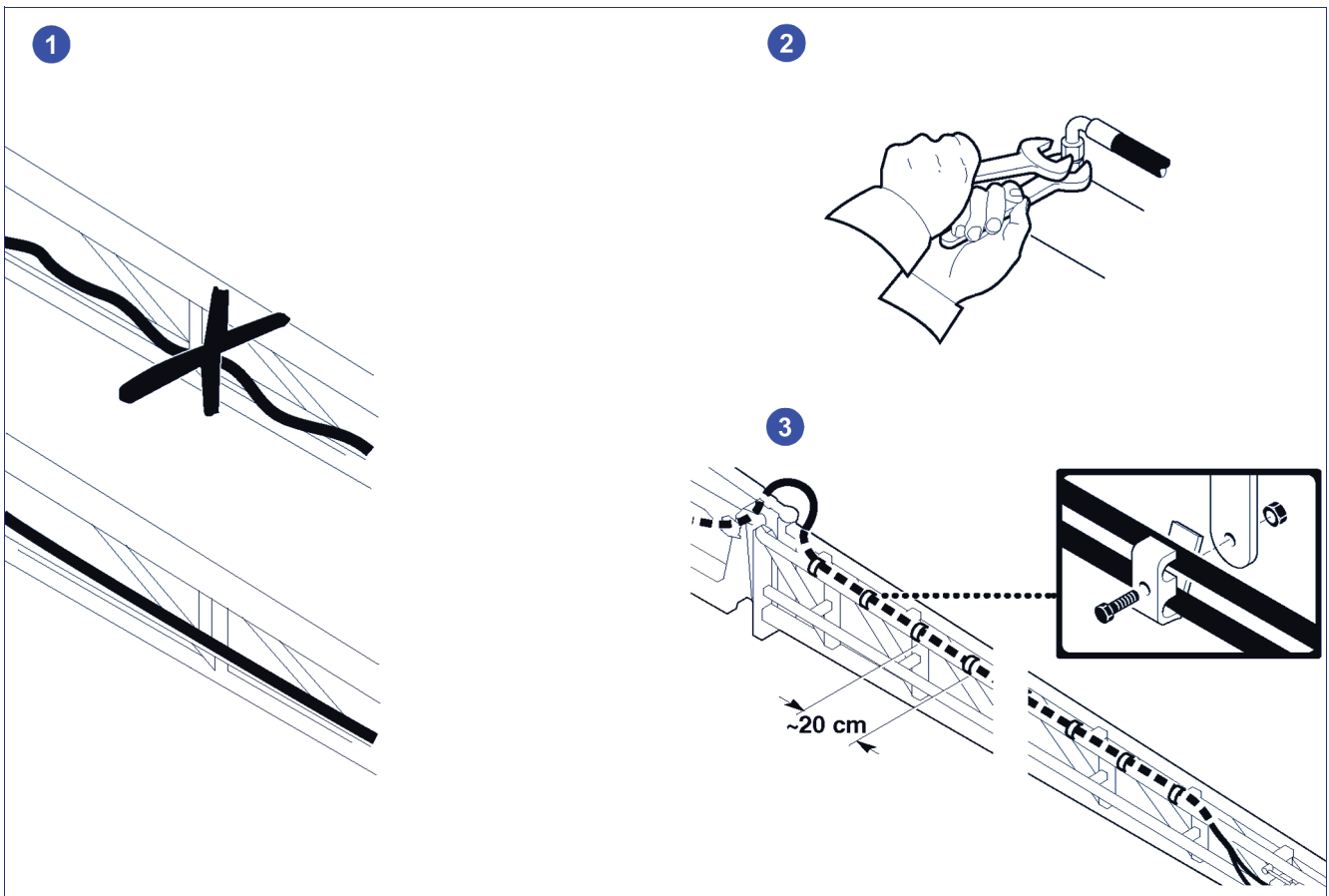
INSTALLATION OF THE HYDRAULIC SYSTEM

Proceed in the way indicated.

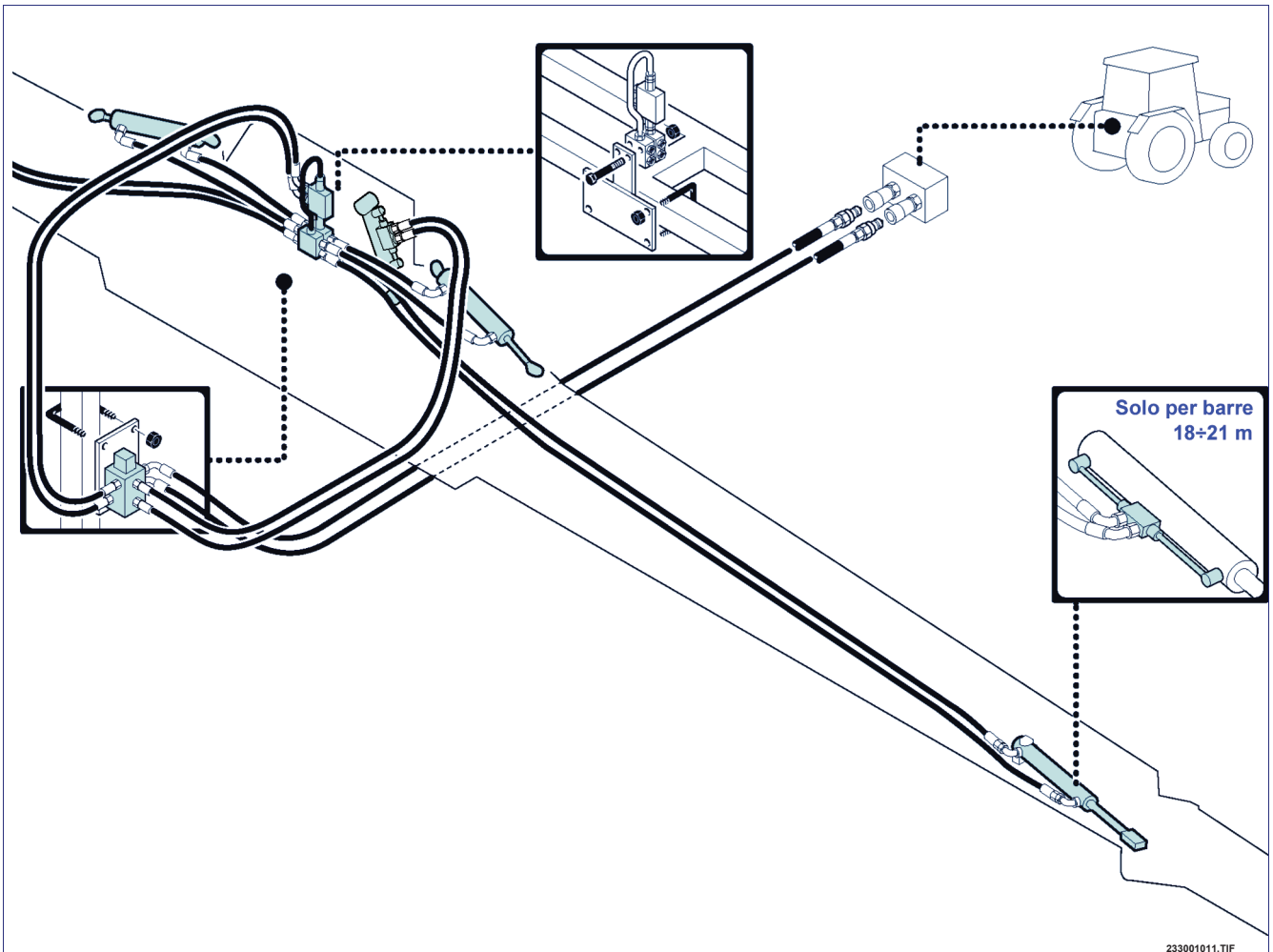
- 1 - Lay the hoses down on the boom linearly (see the figure). Leave sufficient length so as to not impede the movements at the articulation points of the boom.
- 2 - Connect the hoses to the cylinders (see the hydraulic diagram).

 **Important**
Do not tighten the unions too much so as to damage the sealing taper fit.

- 3 - Fasten the hoses to the frame by means of the hose clamps provided on the boom and with clamps at a distance of ~20 cm.



2 - function hydraulic system (with electric switch and control panel)



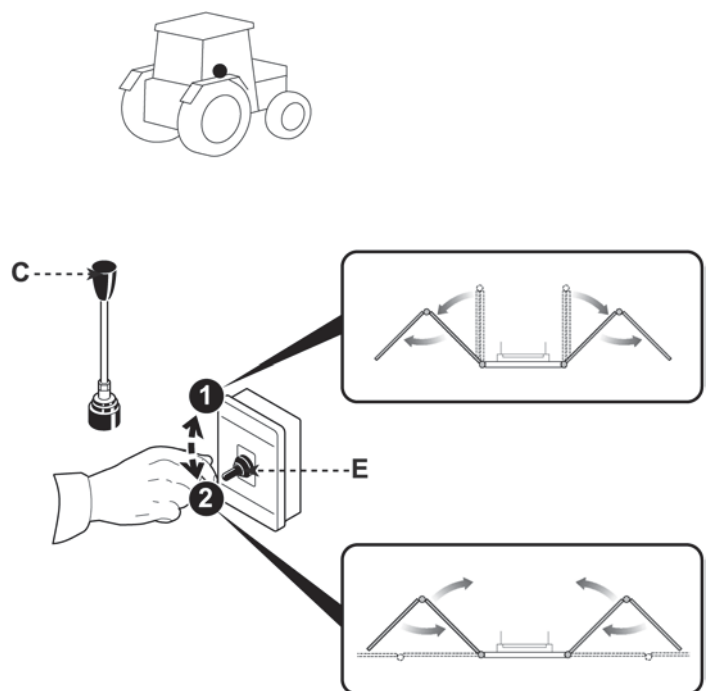
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The control is performed from the control panel and is activated from the tractor's driver's seat. The control panel is installed so that the driver can easily activate it.

Electric switch with control panel

How to use the controls

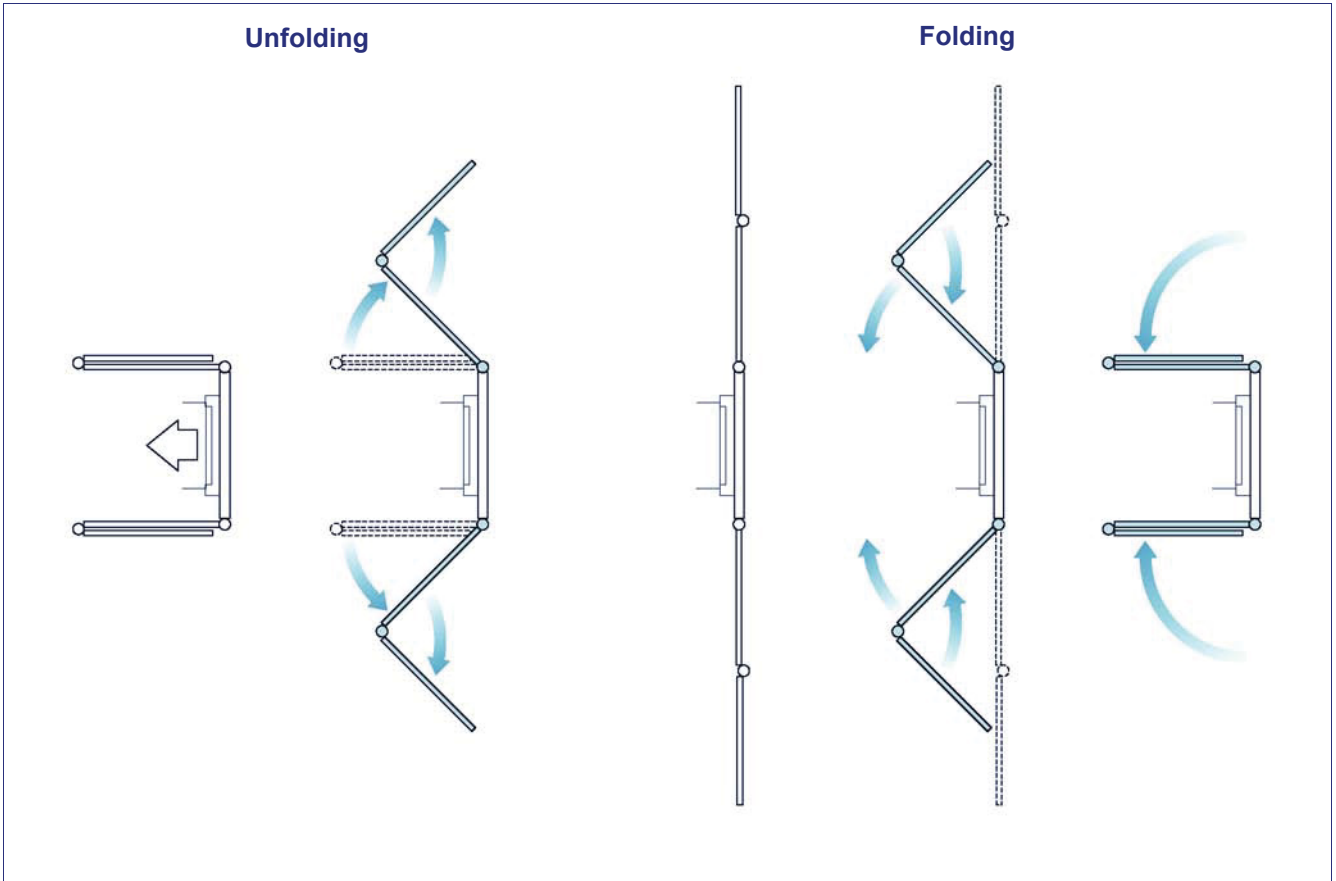
- 1 - Select the function by means of switches (E).
Activate the selected function by means of lever (C) of the tractor's control unit



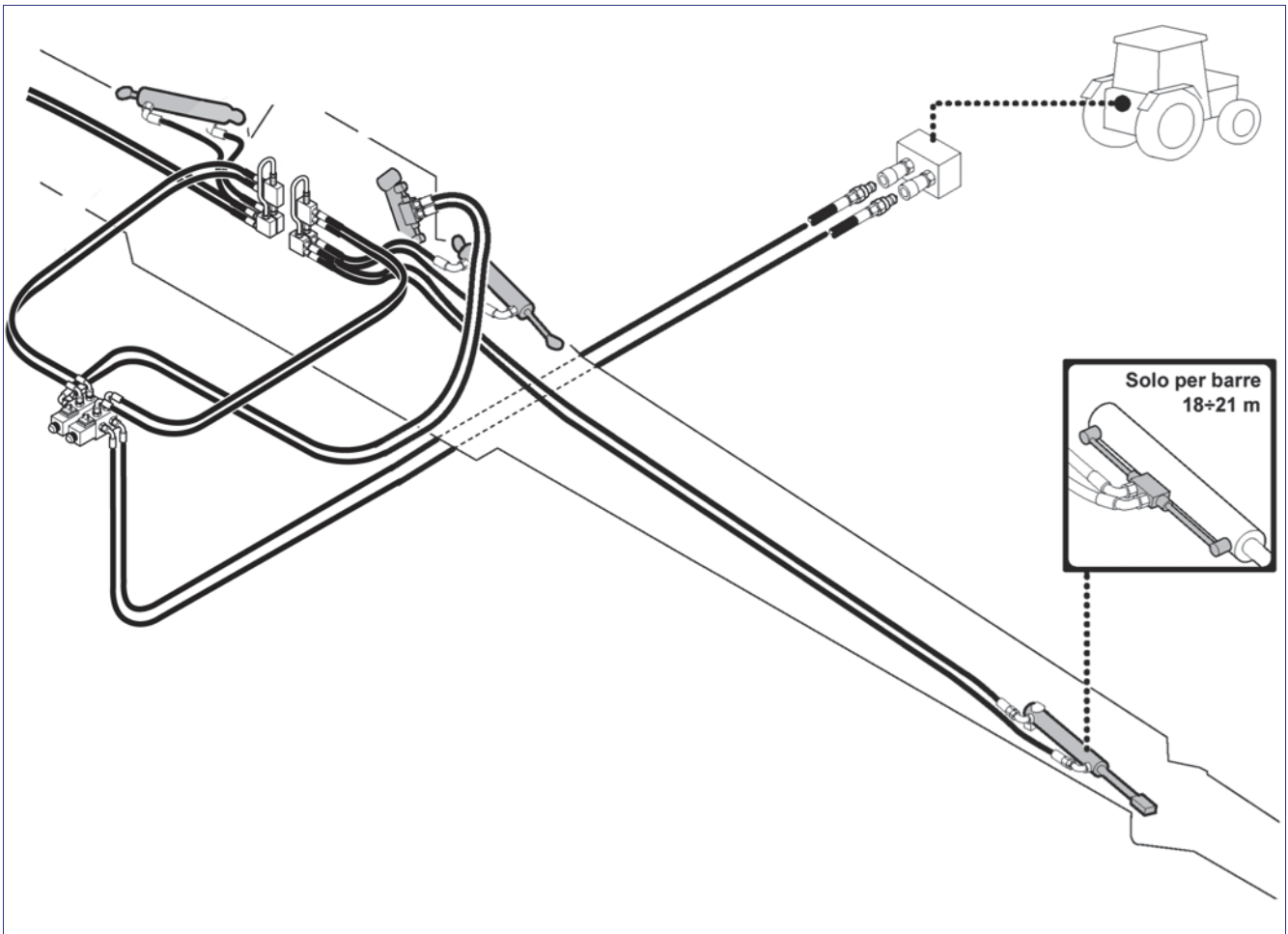
Boom unfolding and folding

The figure indicates the procedure to follow when unfolding and folding the boom.

Please note: the two arms can be folded or unfolded independently of each other.



3 - function hydraulic system (with electric switch and control panel)

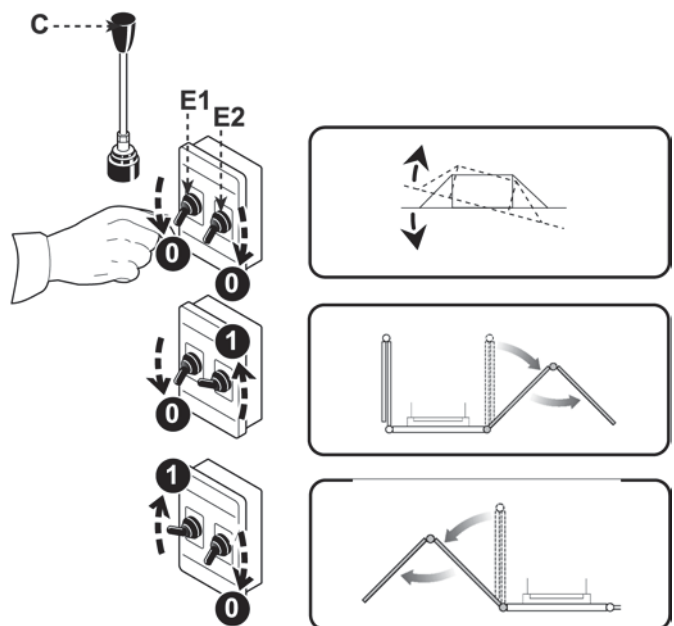


The control is performed from the control panel and is activated from the tractor's driver's seat. The control panel is installed so that the driver can easily activate it.

Electric switch with control panel

How to use the controls

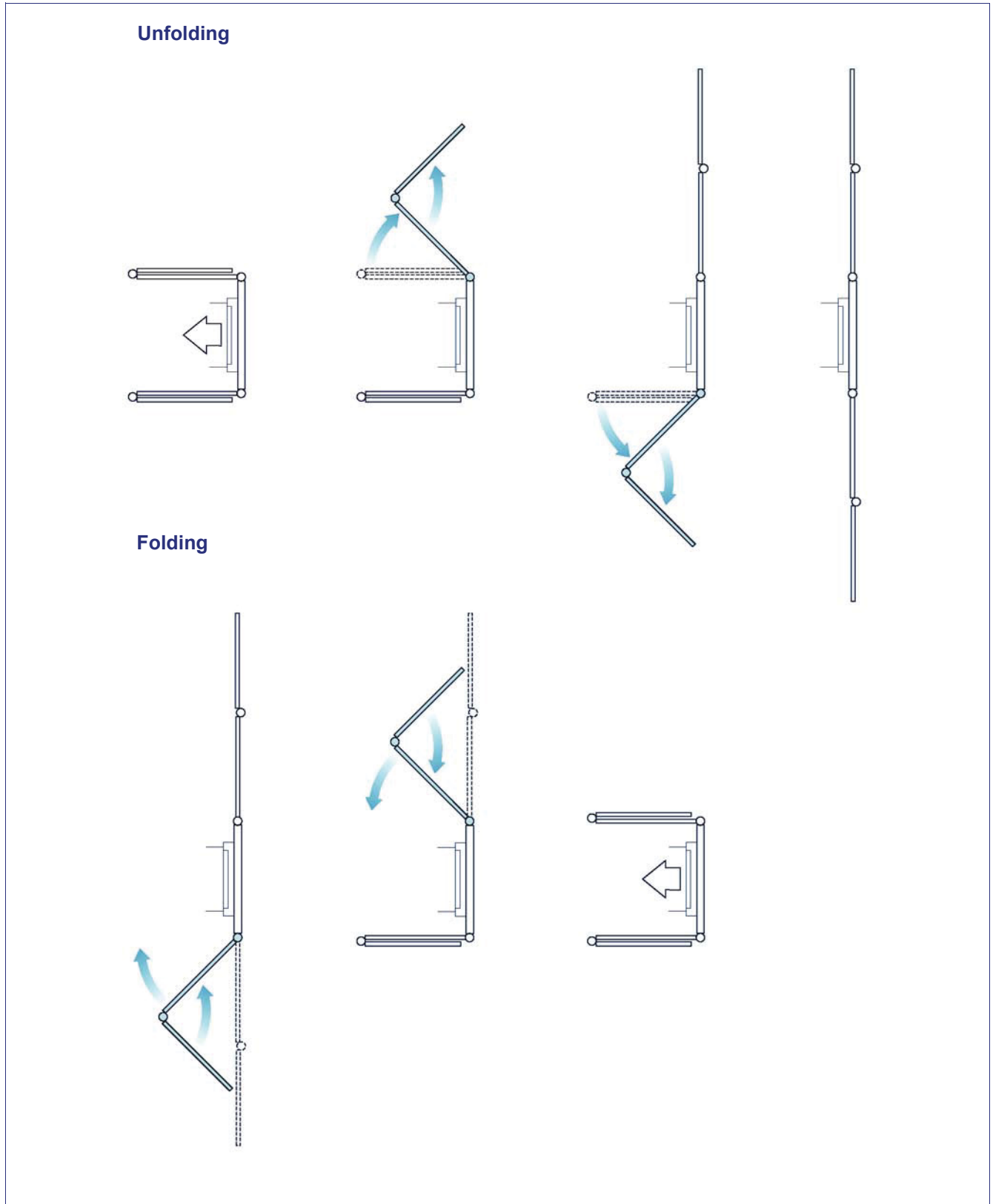
- 1 - Select the function by means of switches (E).
- Activate the selected function by means of lever (C) of the tractor's control unit
- E1 Pos. 0 / E2 Pos. 0** = Correction of position
- E1 Pos. 1 / E2 Pos. 0** = Unfolding / folding of left arm
- E1 Pos. 0 / E2 Pos. 1** = Unfolding / folding of right arm



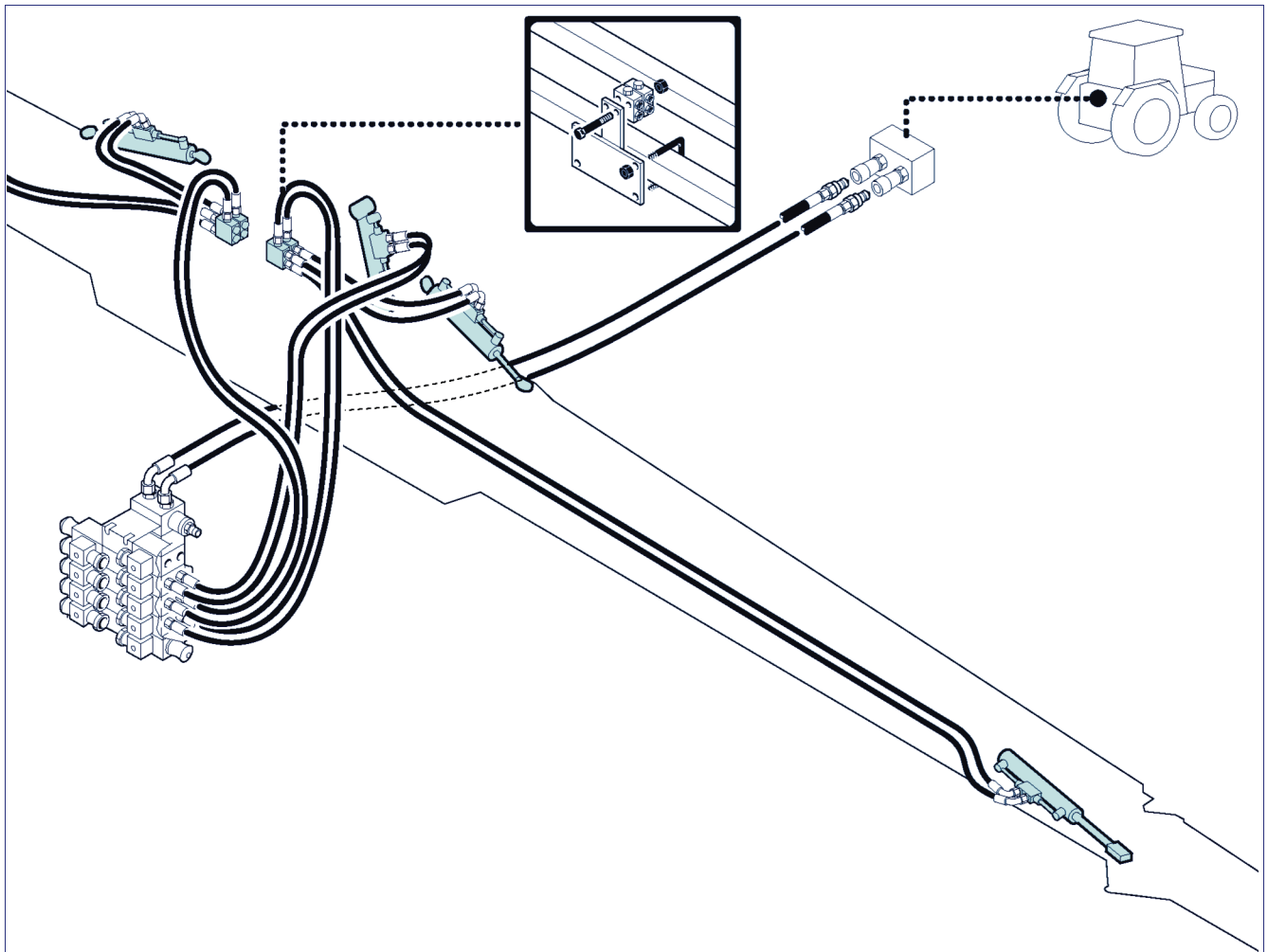
Boom unfolding and folding

The figure indicates the procedure to follow when unfolding and folding the boom.

Please note: the two arms can be folded or unfolded independently of each other.

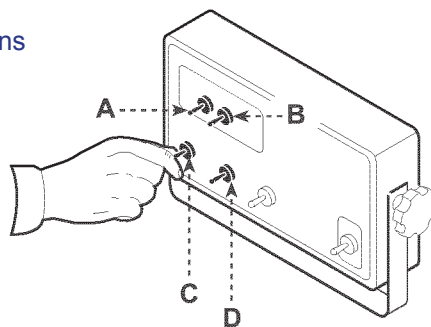


4 - function hydraulic system (operated with electric control unit)



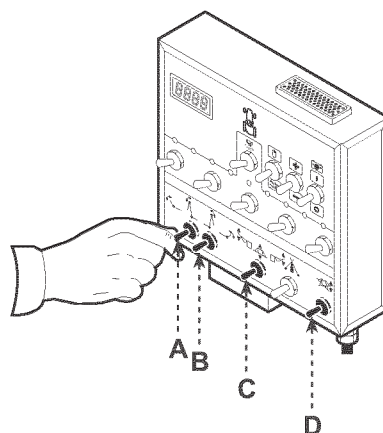
CGA CONTROL PANEL

- A) Simultaneous unfolding of extensions
- B) Simultaneous unfolding of arms
- C) Lifting
- D) Correction of hydraulic tilt



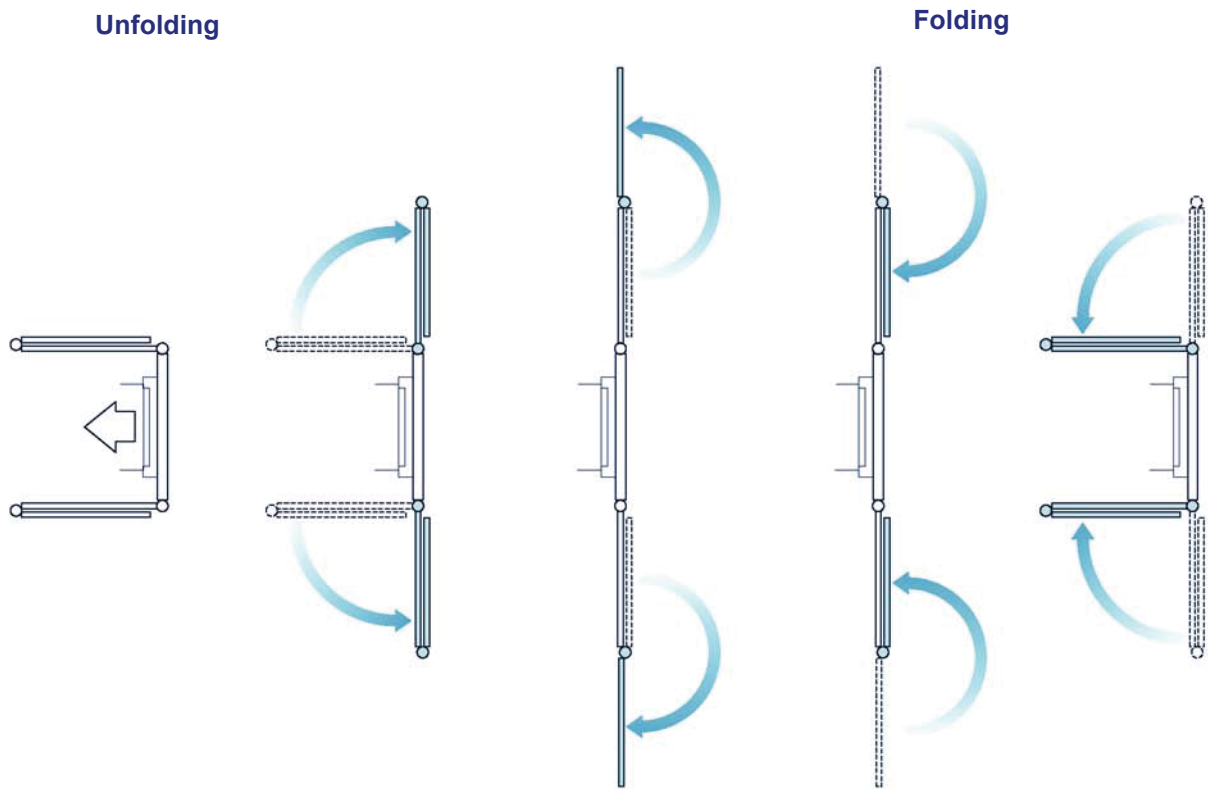
MÜLLER CONTROL PANEL

- A) Simultaneous unfolding of extensions
- B) Simultaneous unfolding of arms
- C) Lifting
- D) Correction of hydraulic tilt

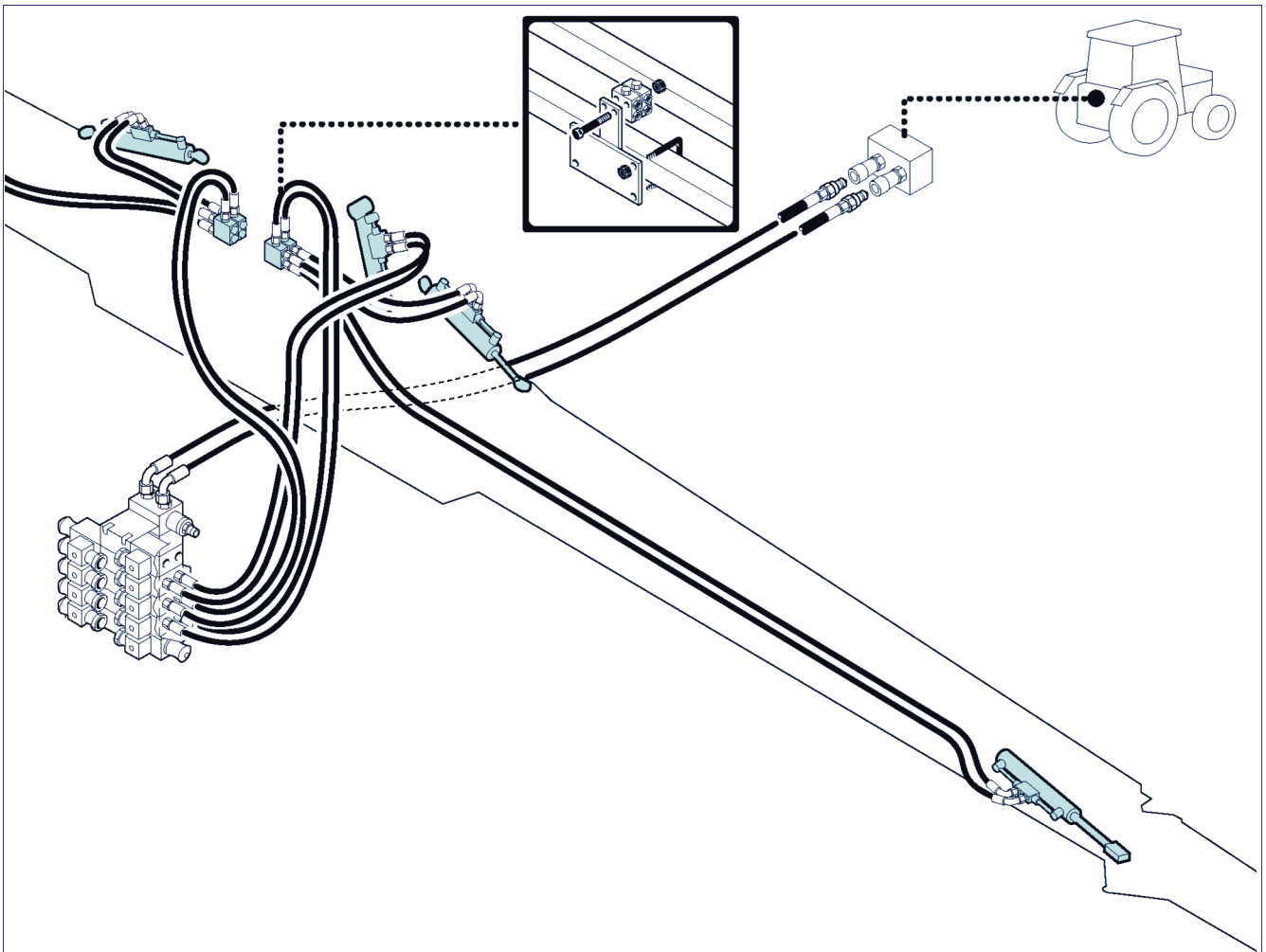


Boom unfolding and folding

The figure indicates the procedure to follow when unfolding and folding the boom. **Please note: the two arms can be folded or unfolded independently of each other.**

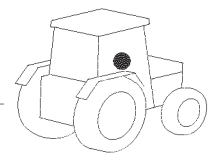
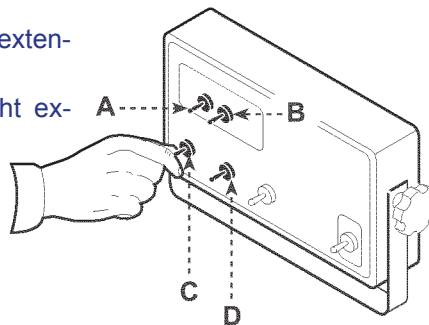


4 - function hydraulic system (operated with electric control unit)



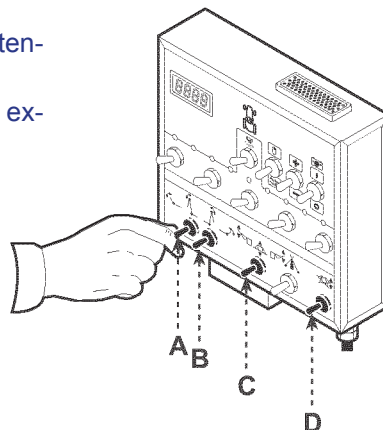
CGA CONTROL PANEL

- A) Simultaneous unfolding of arm/left extension
- B) Simultaneous unfolding of arm/right extension
- C) Lifting
- D) Correction of hydraulic tilt



MÜLLER CONTROL PANEL

- A) Simultaneous unfolding of arm/left extension
- B) Simultaneous unfolding of arm/right extension
- C) Lifting
- D) Correction of hydraulic tilt



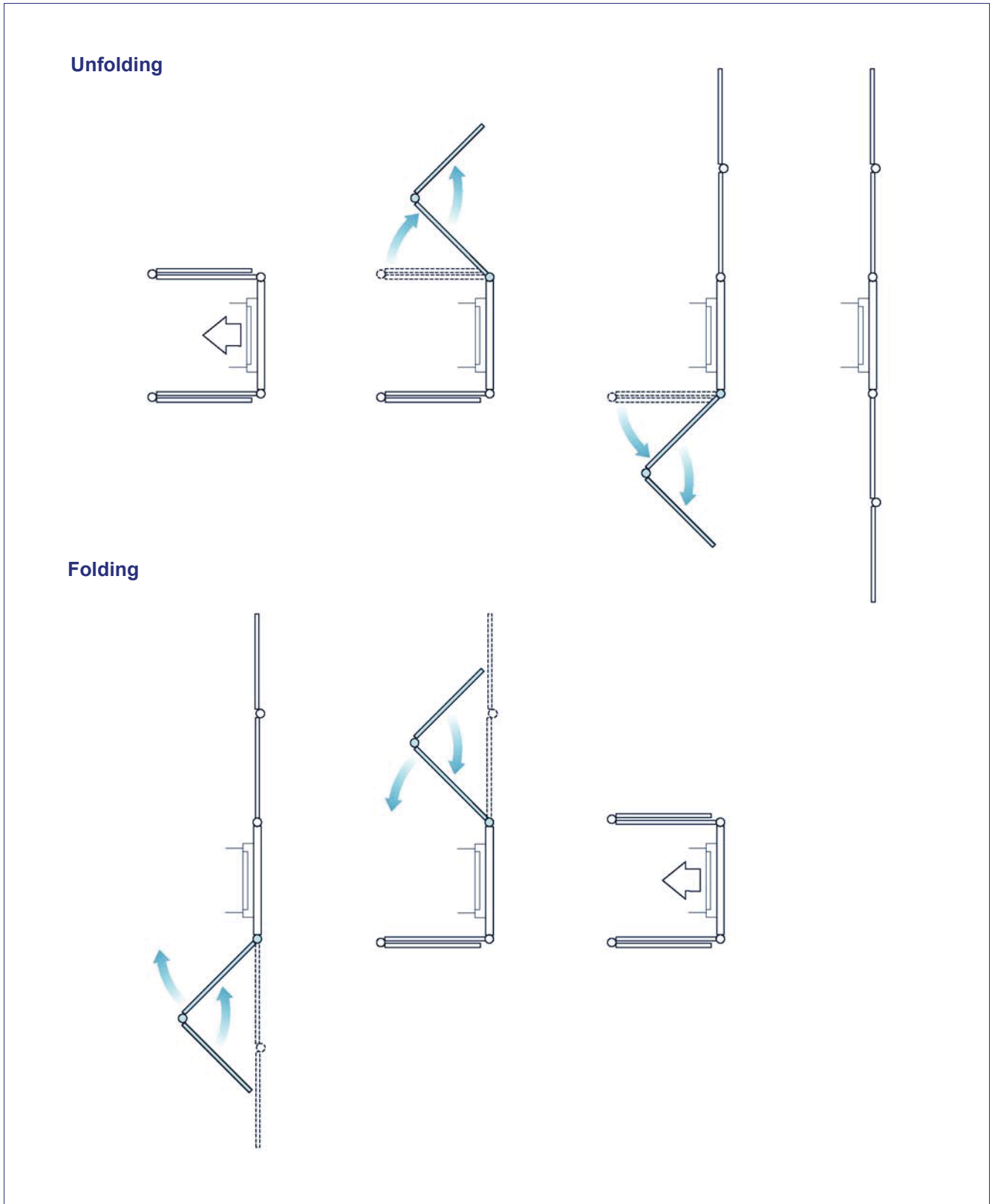
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Boom unfolding and folding

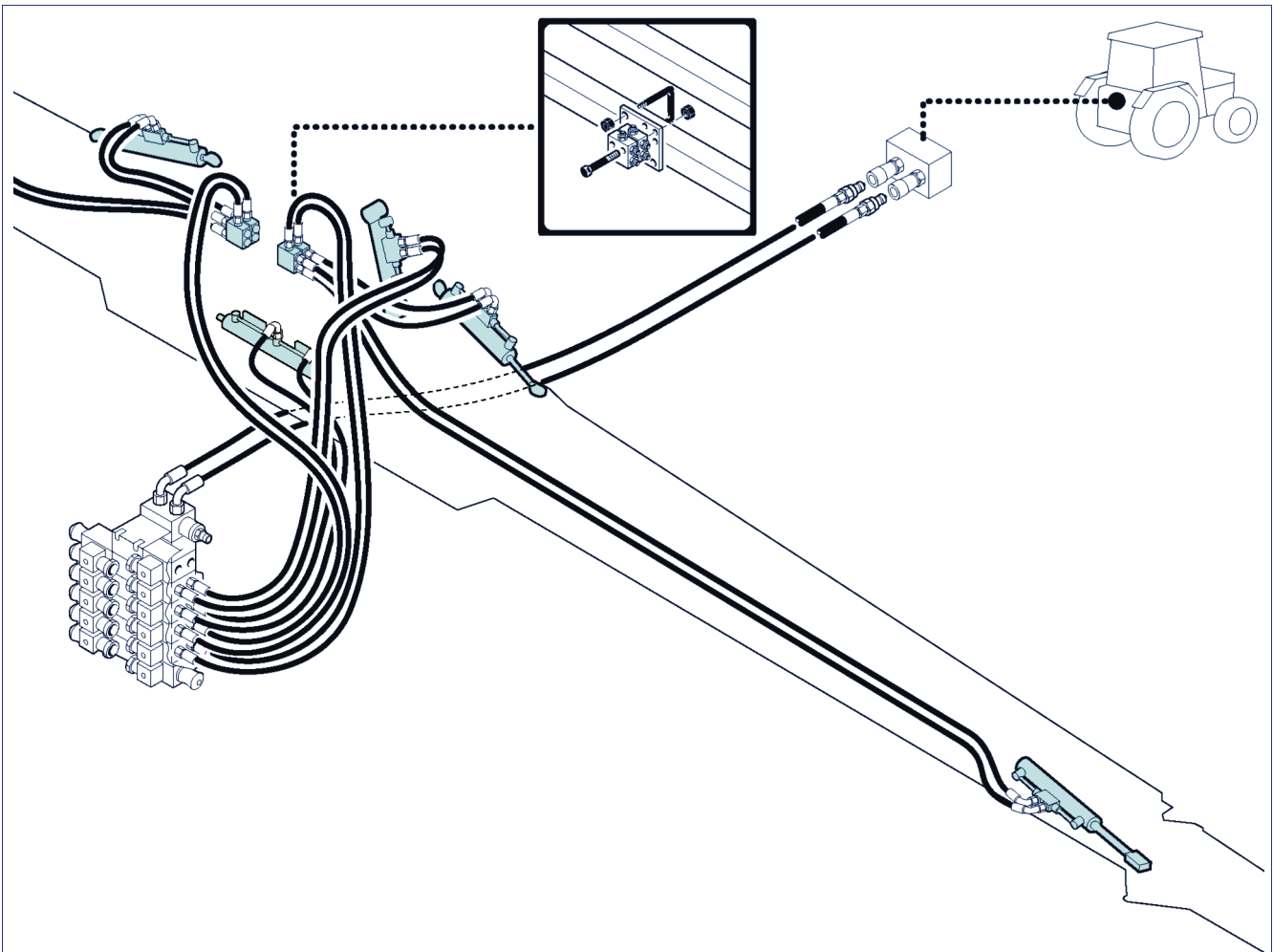
The figure indicates the procedure to follow when unfolding and folding the boom.

Please note: the two arms can be folded or unfolded independently of each other.



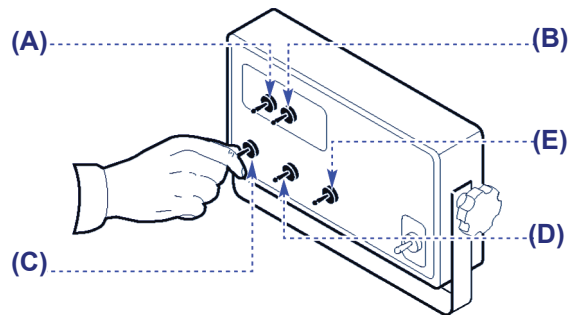
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5 - function hydraulic system (operated with electric control unit)



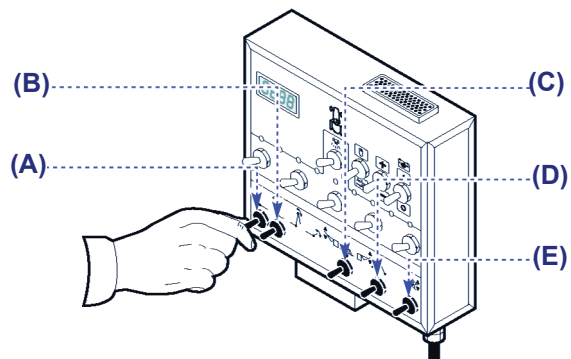
CGA CONTROL PANEL

- A) Simultaneous unfolding of arm/left extension
- B) Simultaneous unfolding of arm/right extension
- C) Lifting
- D) Correction of hydraulic tilt
- E) Hydraulic locking



MÜLLER CONTROL PANEL

- A) Simultaneous unfolding of arm/left extension
- B) Simultaneous unfolding of arm/right extension
- C) Lifting
- D) Correction of hydraulic tilt
- E) Hydraulic locking

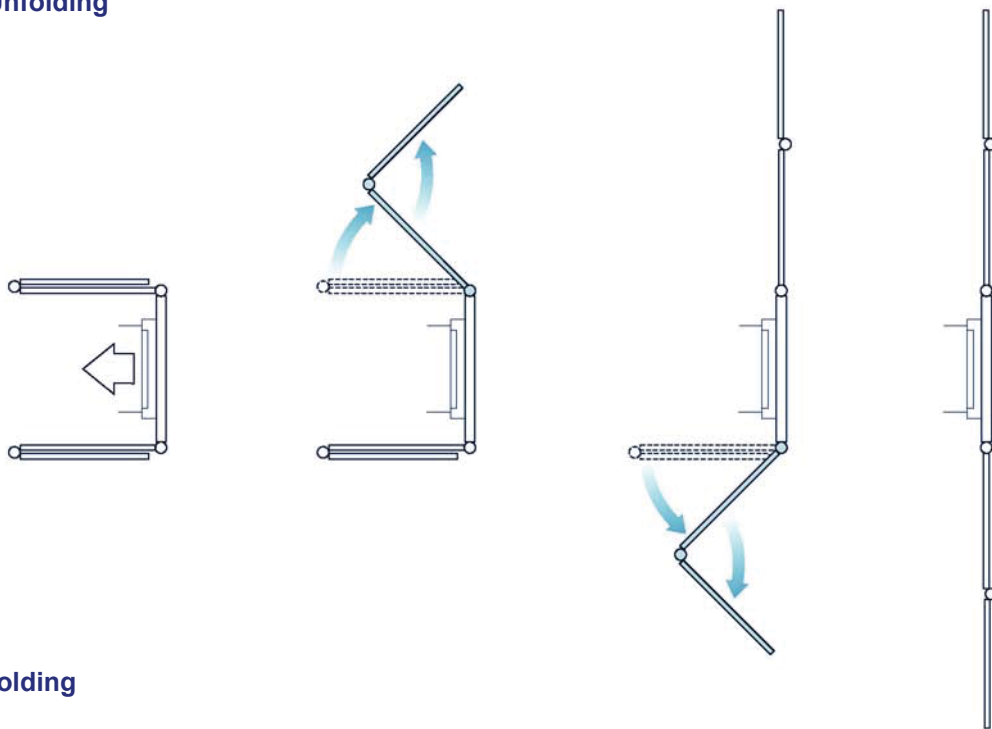


Boom unfolding and folding

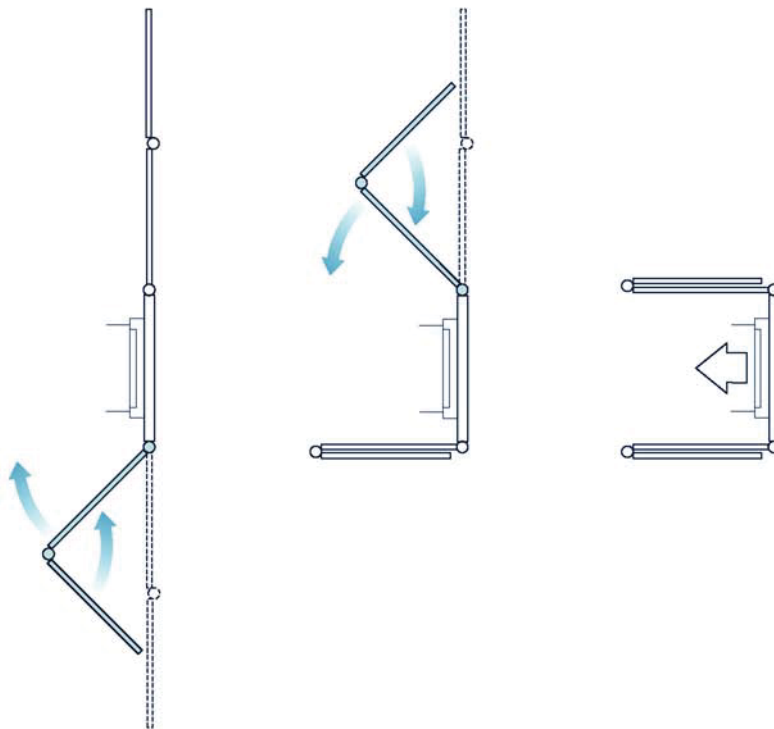
The figure indicates the procedure to follow when unfolding and folding the boom.

Please note: the two arms can be folded or unfolded independently of each other.

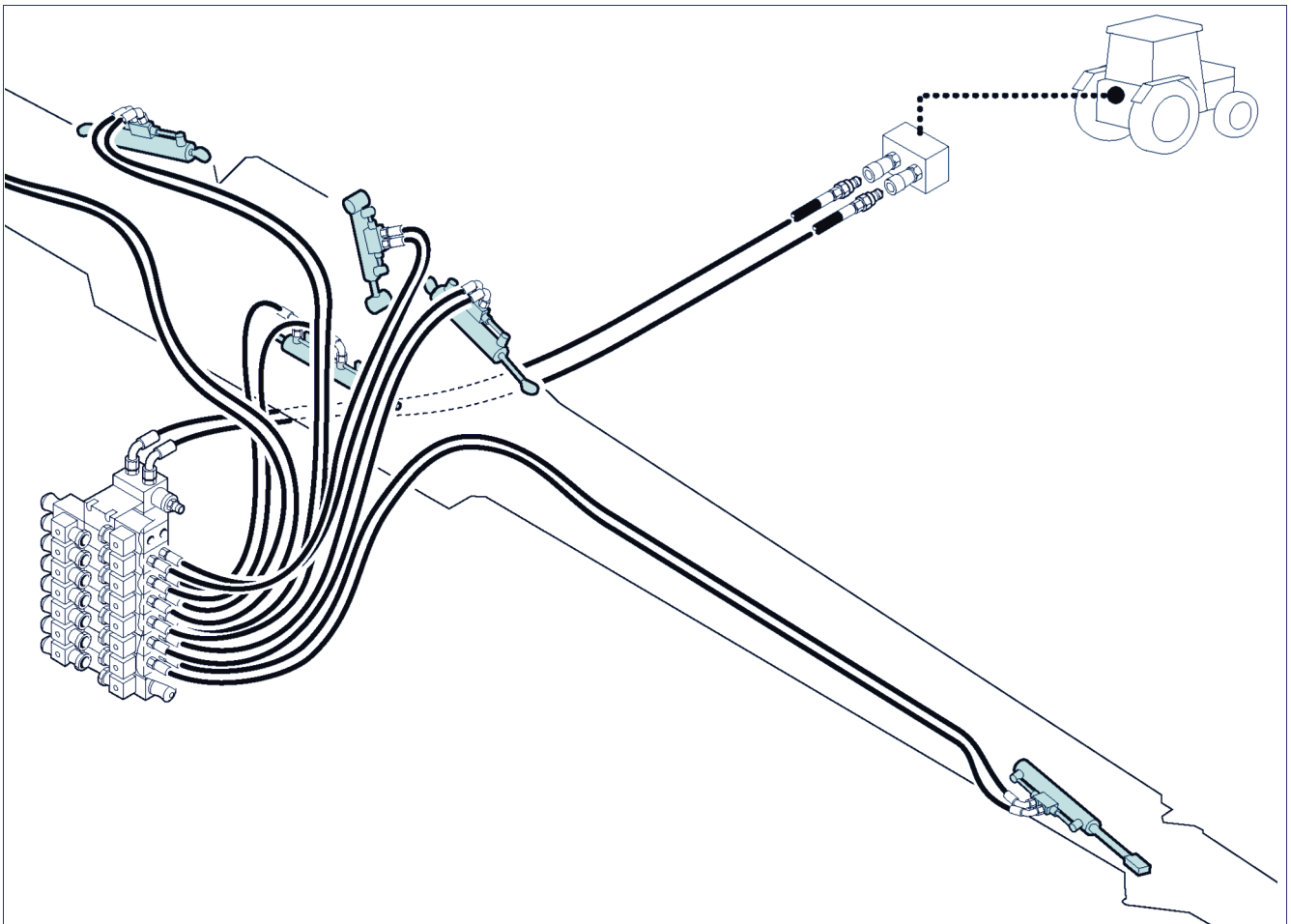
Unfolding



Folding

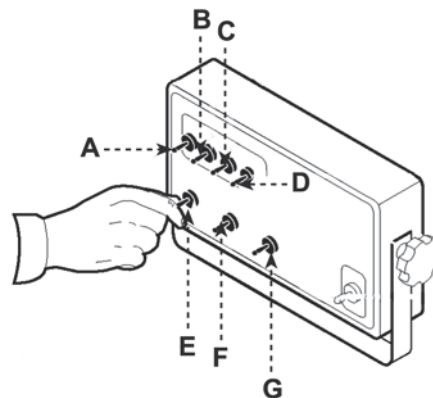


7 - function hydraulic system (operated with electric control unit)



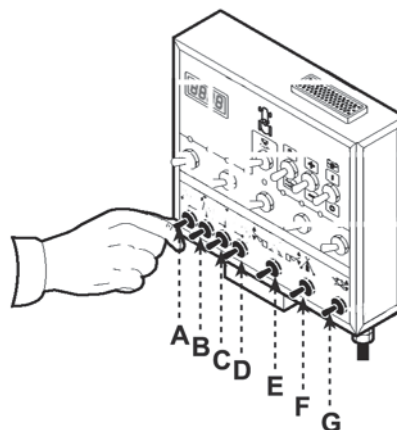
CGA CONTROL PANEL

- A) Unfolding of left extension
- B) Unfolding of left arm
- C) Unfolding of right arm
- D) Unfolding of right extension
- E) Lifting
- F) Hydraulic tilt adjustment
- G) hydraulic locking



MÜLLER CONTROL PANEL

- A) Unfolding of left extension
- B) Unfolding of left arm
- C) Unfolding of right arm
- D) Unfolding of right extension
- E) Lifting
- F) Hydraulic tilt adjustment
- G) hydraulic locking

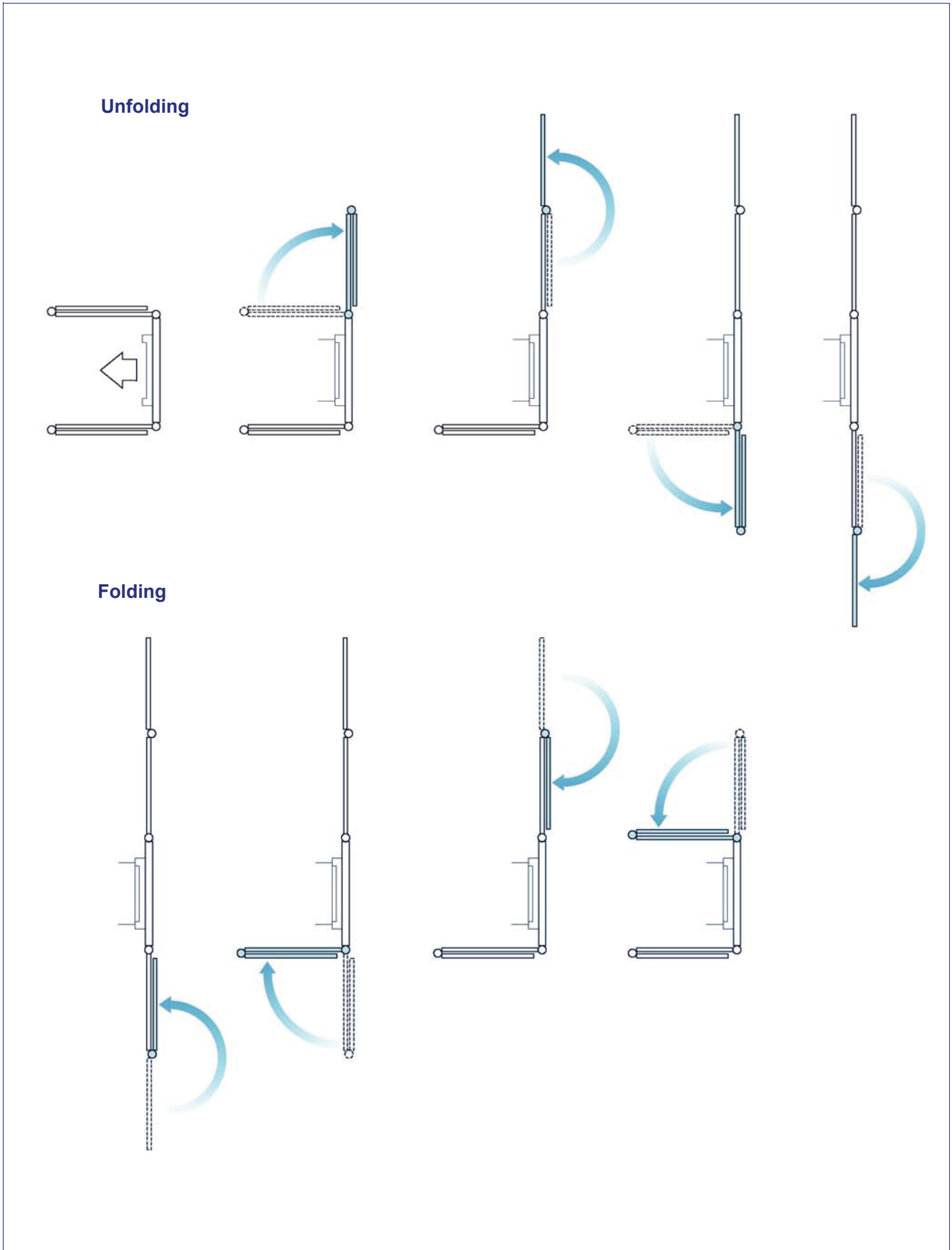


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Boom unfolding and folding

The figure indicates the procedure to follow when unfolding and folding the boom.

Please note: the two arms can be folded or unfolded independently of each other.



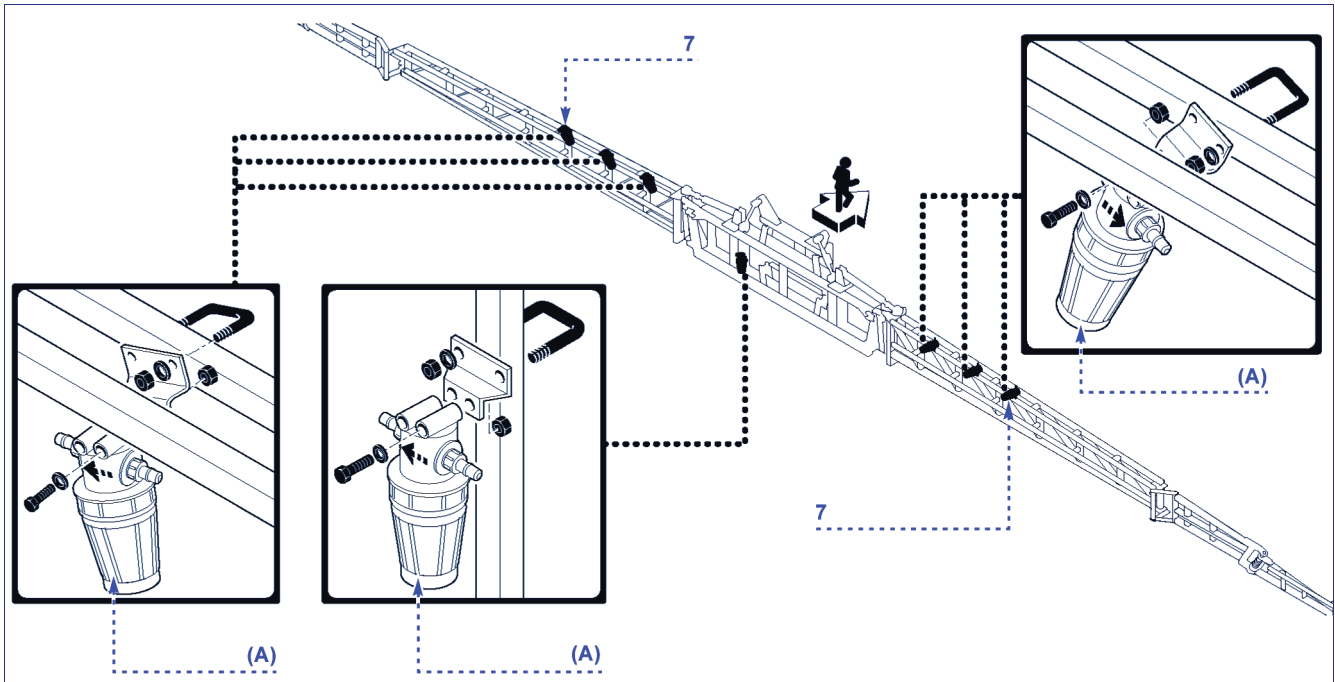
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INSTALLATION OF LINE FILTERS (IF REQUIRED) AND JETS

Proceed in the way indicated.

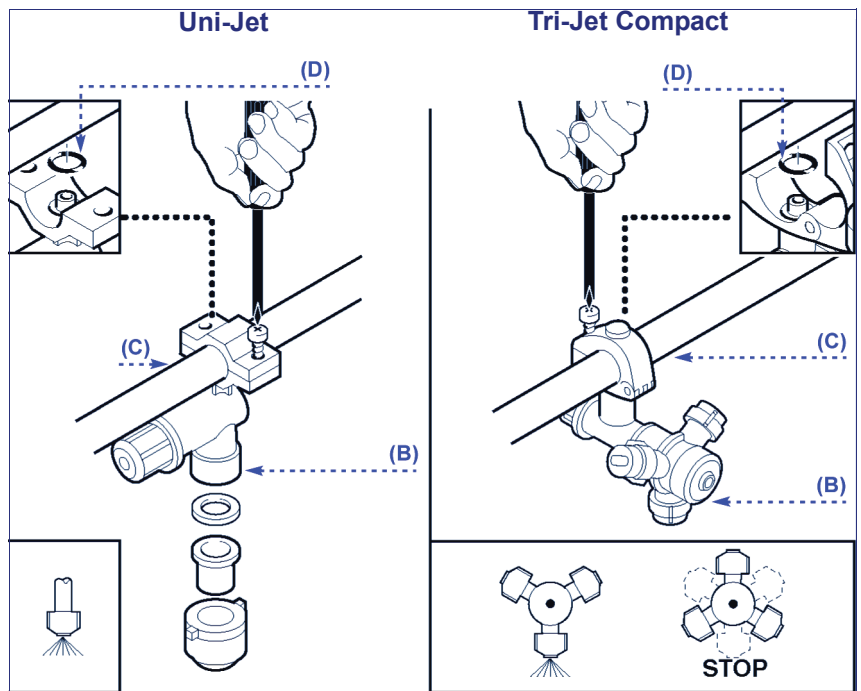
1 - Install the line filters (A) as shown in the figure.

i Important
 If the equipment is fitted with the "air assisted" kit, see paragraph 10 before performing this operation.



2 - Mount the jets (B) next to the outlet holes of the stainless steel pipes (C) (see the "Jet Layout" diagram, page 15).

i Important
 Properly mount the seals (D).



3 - Mount the jet support (E) using the U bolts (F).



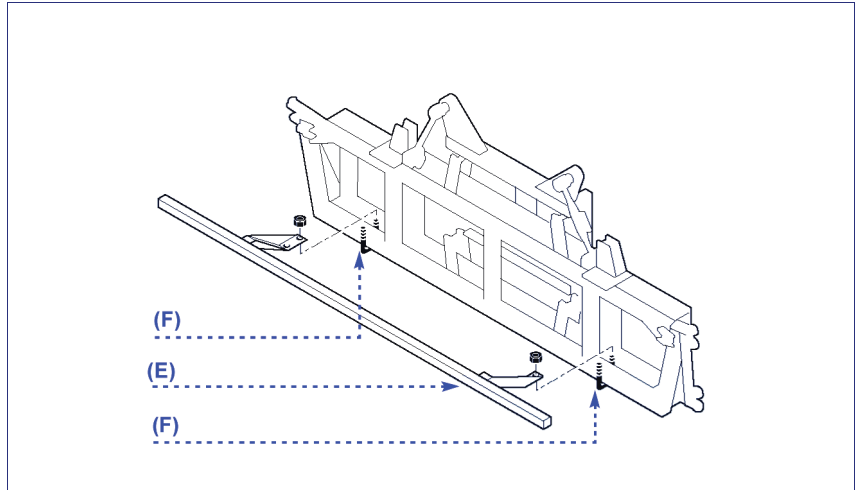
Caution - Warning

Make sure the support is positioned centred with the frame



Important

If the equipment is fitted with the "air assisted" kit do not install support (E).

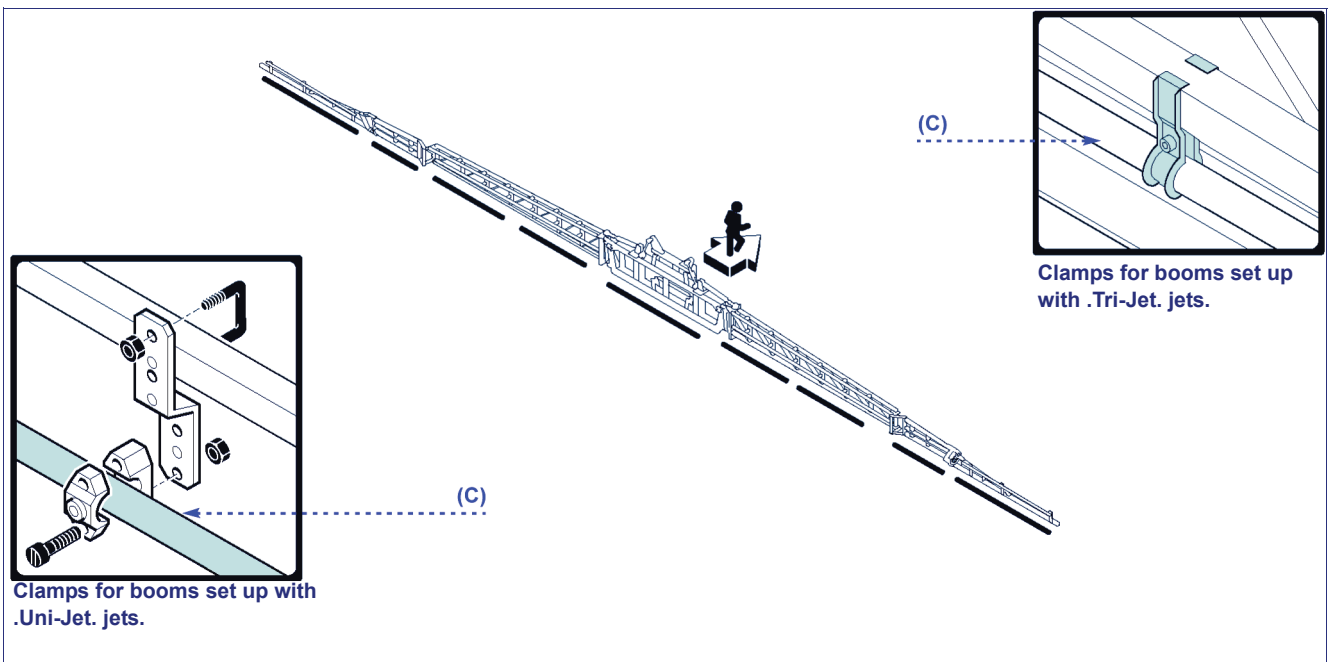


4 - Fasten the stainless steel pipes (C) to the spraying boom using the relative supports, depending on the type of jets installed (see figure).



Important

If the equipment is fitted with the -air assisted" kit, see paragraph 10 before performing this operation.



NUMBER OF JETS ON EACH BOOM SECTION

Position the nozzle holder hoses depending on the boom length (see diagram).

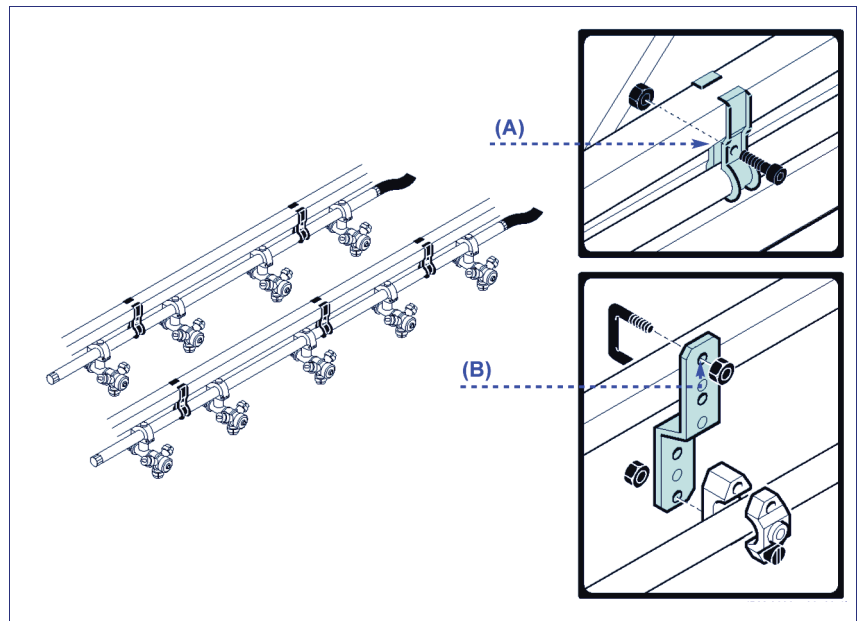
The diagram shows as well position and number of supports on each hose and installation instructions, depending on the number of supplies.

If the equipment is supplied disassembled, the diagram is enclosed with the small items of the boom.



Important

For hoses with up to four jets use two pairs of clamps (A); for hoses with more than four jets use three pairs of clamps (B).



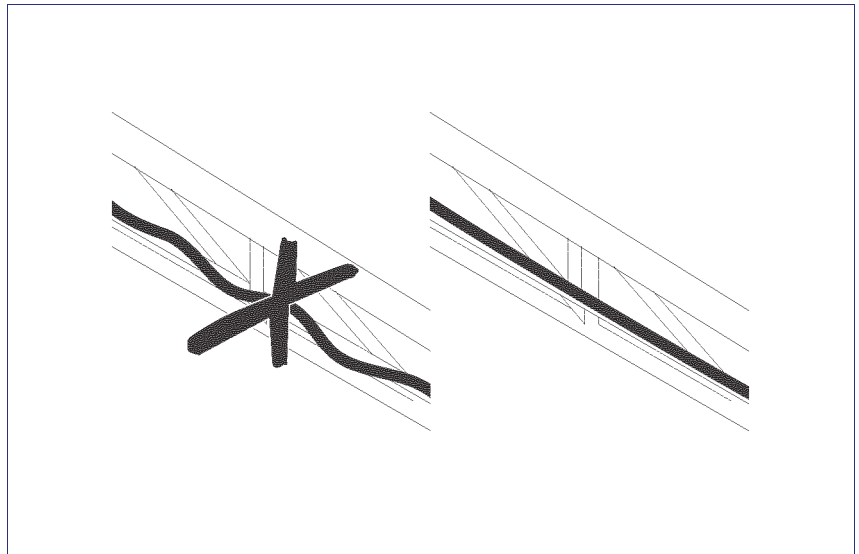
Jet number diagram for each boom section (500 mm pitch)



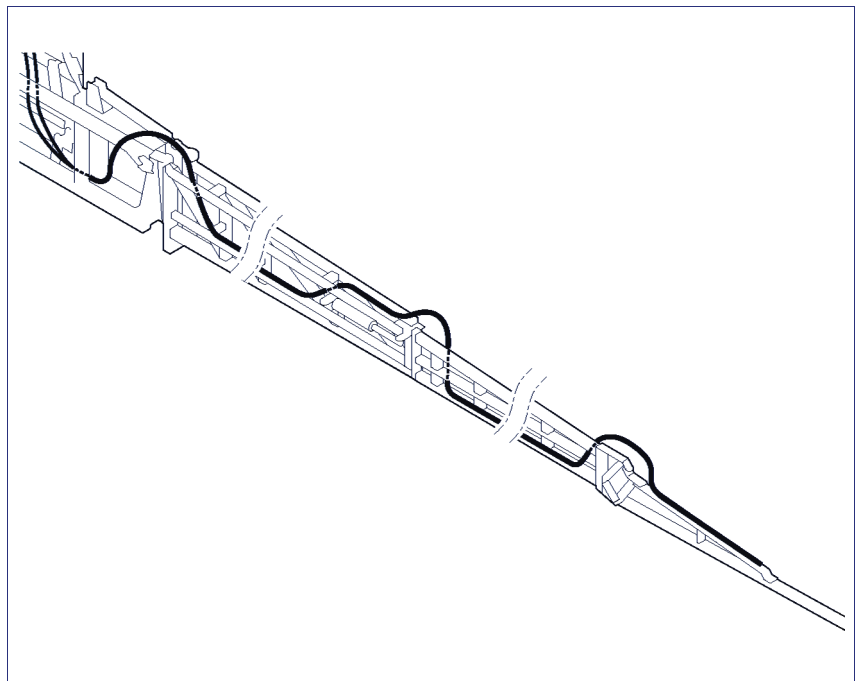
INSTALLATION OF WATER HOSES

Proceed in the way indicated.

- 1 - Lay the hoses down on the boom linearly (see the figure).



- 2 - Leave sufficient length so as to not impede the movements at the articulation points of the boom.
- 3 - Connect the hoses (see "water connection diagram").

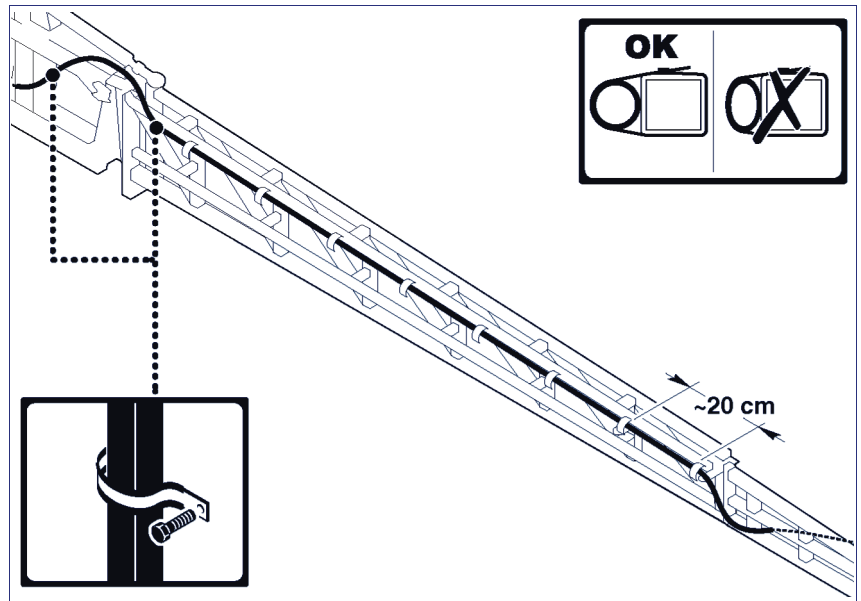


- 4 - Secure the hoses to the boom with clamps spaced out ~ 20 cm.

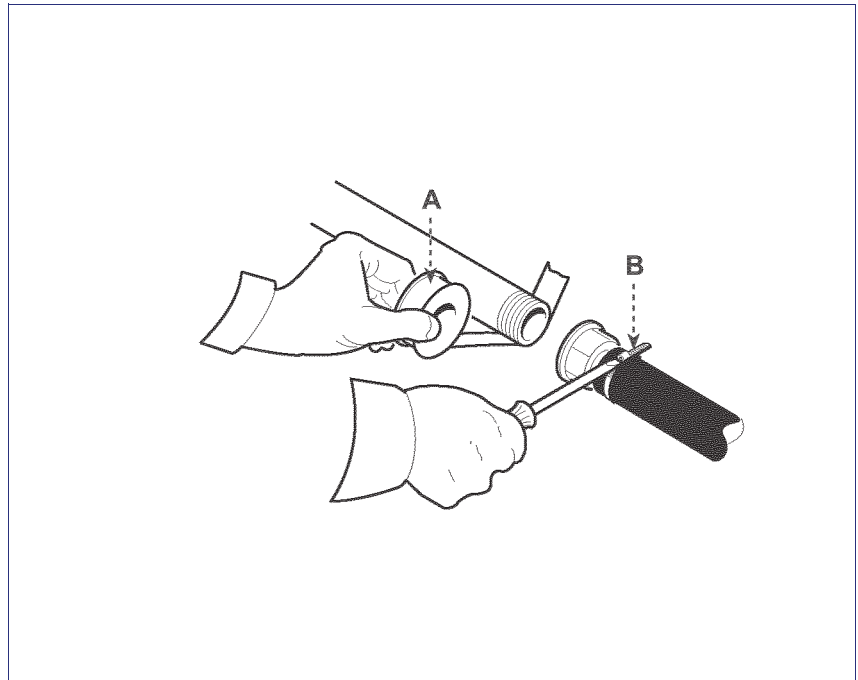


Important

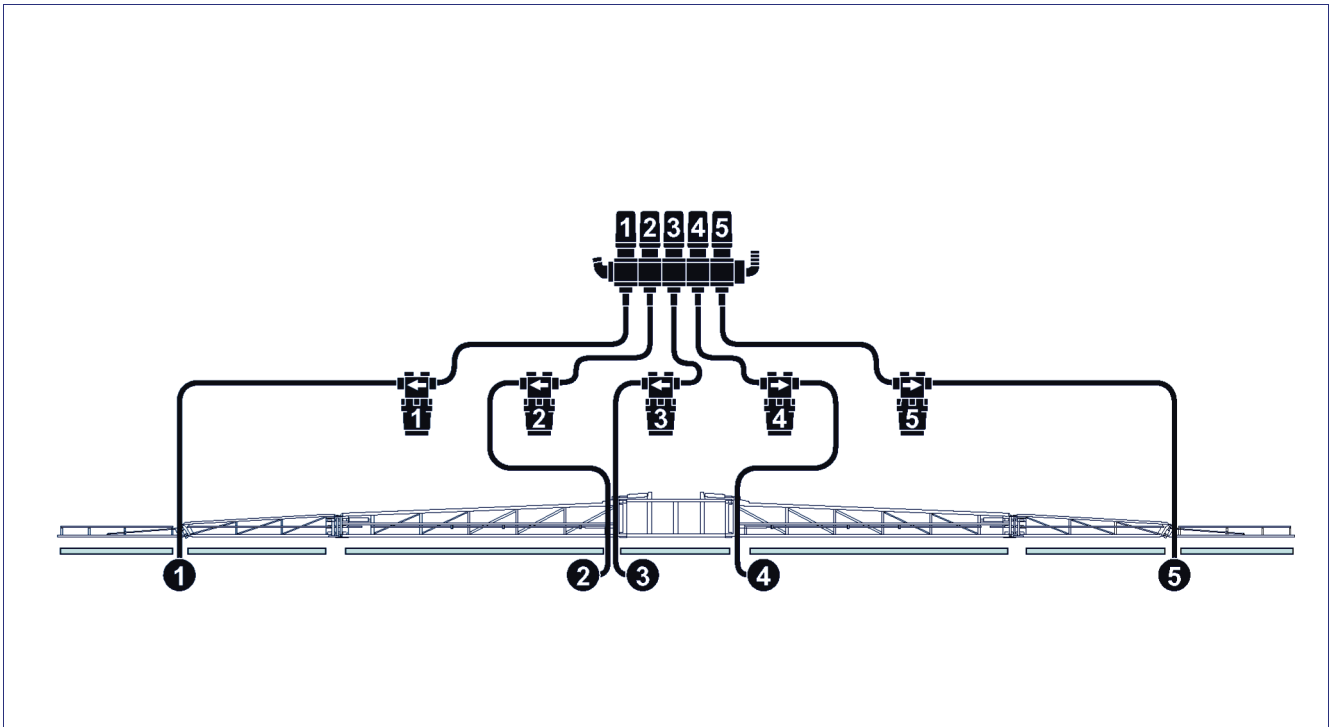
Do not tighten the clamps too much so as to avoid throttling.



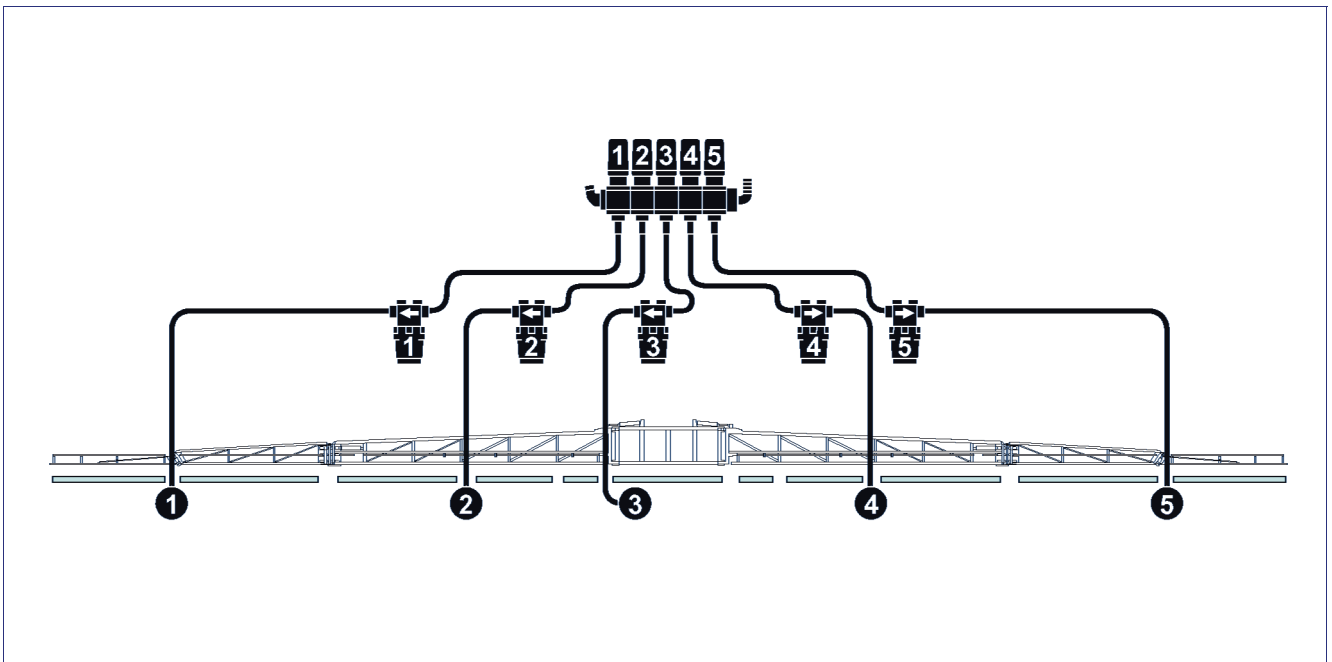
- 5 - Use the Teflon seal (A) and tighten the stainless steel clamps (B) in order to ensure tightness in the joints.



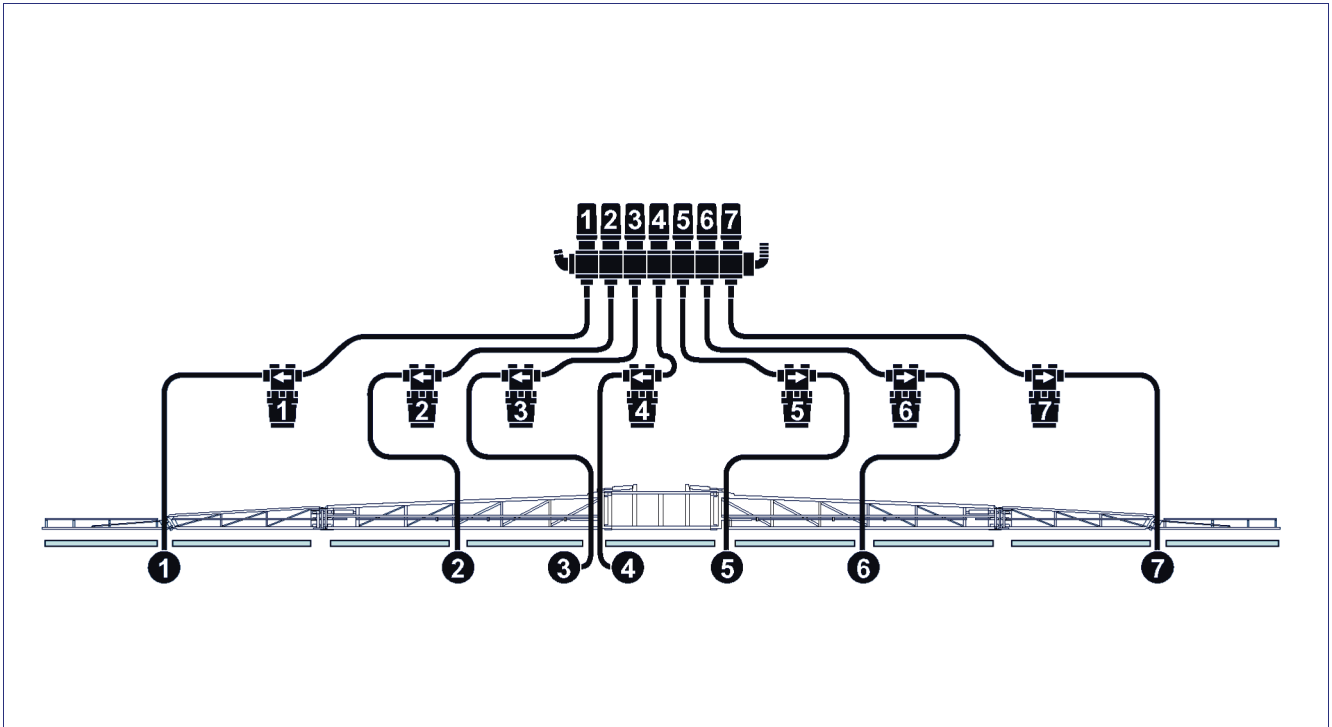
5-supply water connection diagram(12÷18,5 m boom)



5-supply water connection diagram(20÷21 m boom)



7-supply water connection diagram(20÷21 m boom)

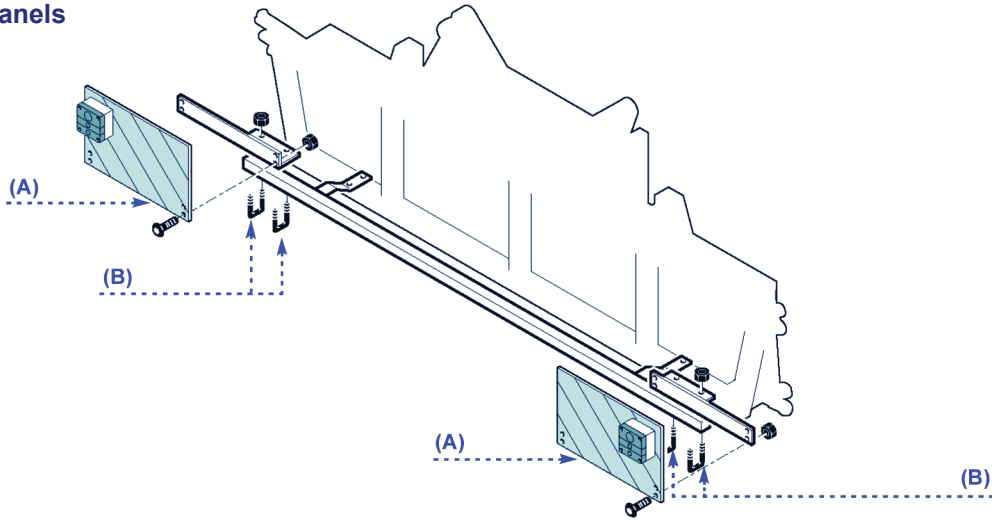


INSTALLATION OF REAR LIGHT KIT

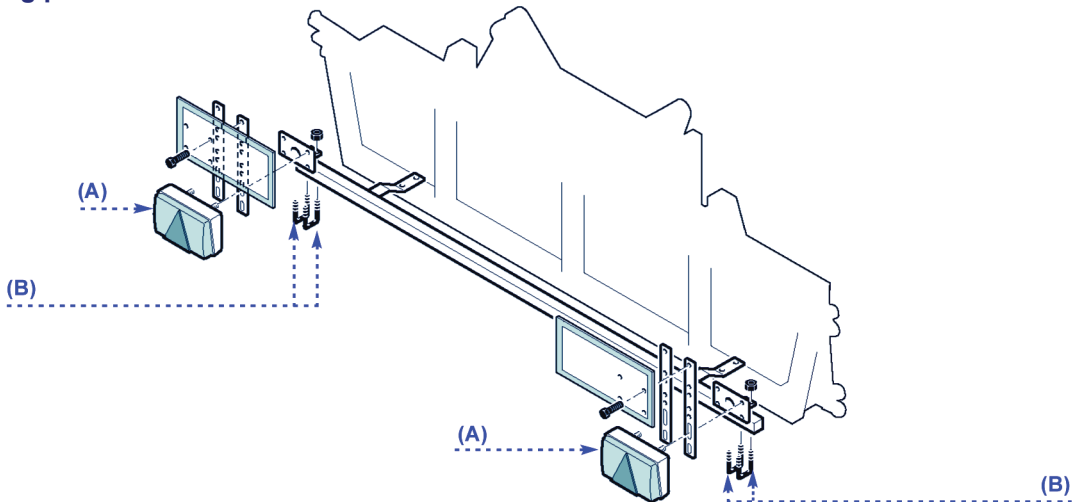
Install the rear light kit (A) and fasten it with U bolts (B).

i Important
If the equipment is fitted with the "air assisted" kit, see paragraph 10 before performing this operation.

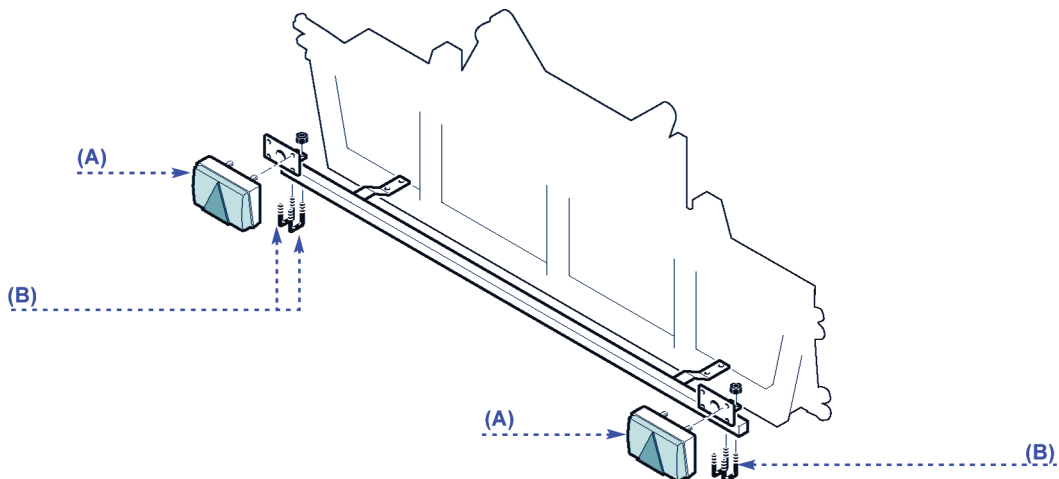
Rear light kits for mounted units with rear-reflecting panels



Rear light kits for trailed tanks with rear-reflecting panels



Rear light kits for trailed tanks with rear-reflecting panels

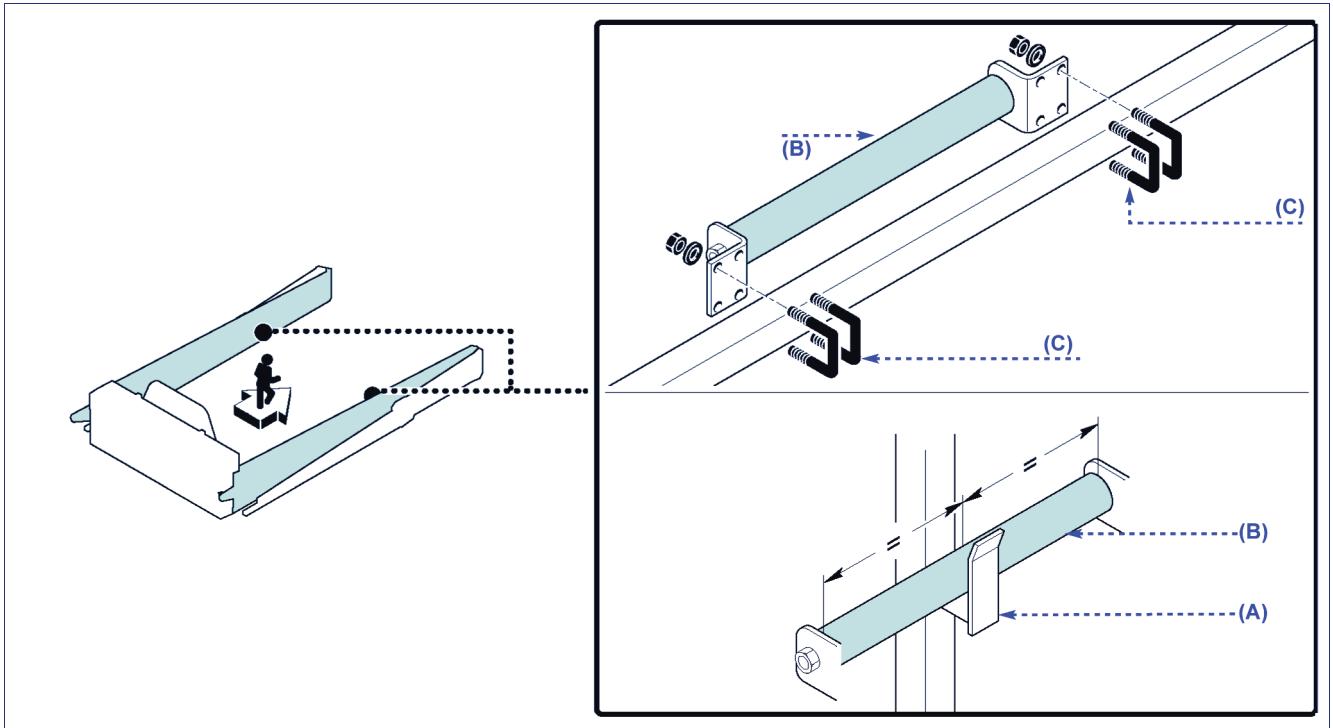


INSTALLATION OF SUPPORT ROLLER

Proceed in the way indicated.

1 - Bring boom arms closer to supports (A).

2 - Assemble and fix support rollers (B) by means of U-bolts (C), so that they be centred with respect to supports (A).



INFORMATION ABOUT ADJUSTMENTS

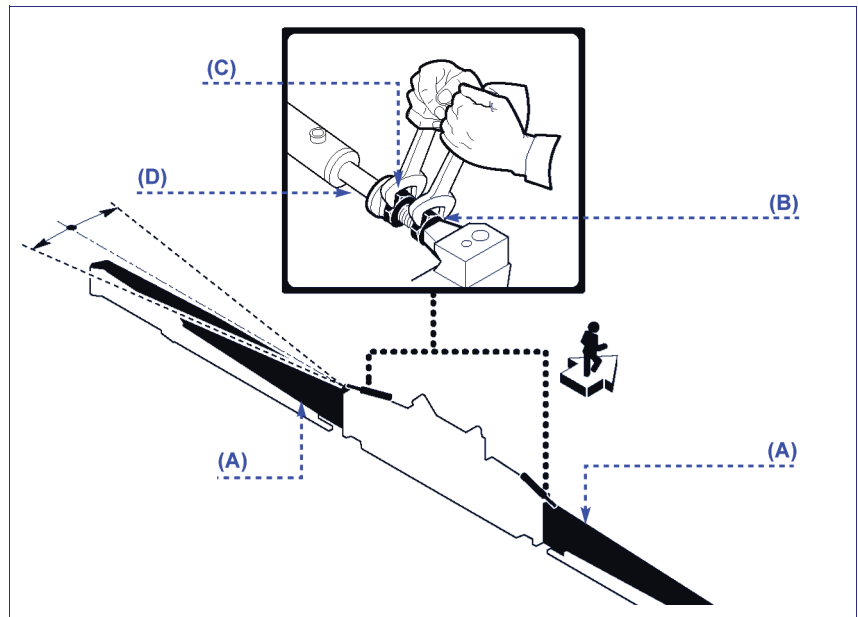
INSTRUCTIONS FOR ADJUSTMENTS

Whoever makes the adjustments must prepare satisfactory safety conditions in advance in order to ensure their own safety and that of the operators involved.

ADJUSTMENT OF ARM ALIGNMENT

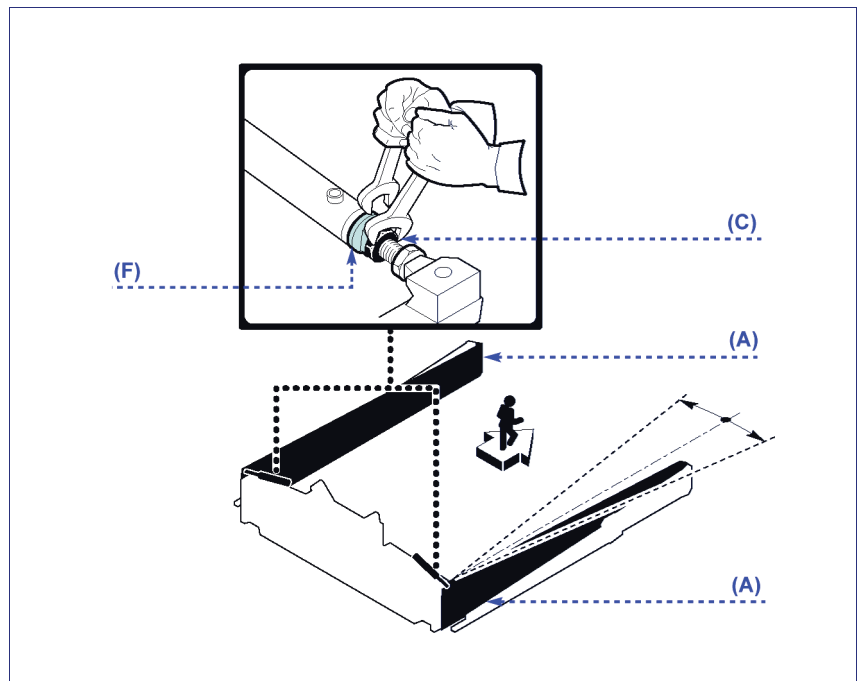
Unfolding stage: proceed in the way indicated.

- 1 - Start up the controls to completely unfold the primary arms **(A)** of the boom and slightly fold them to reduce the thrust pressure on the cylinder.
- 2 - Loosen the lock nuts **(B-C)**, bring them close together and lock one against the other.
- 3 - Work on the lock nuts **(B-C)** to adjust the extension of the stem **(D)**.
- 4 - Completely unfold the primary arm **(A)** again and check that it is aligned with the middle frame.
- 5 - Put the lock nuts **(B-C)** back into their original position and lock them when adjustment is completed.
- 6 - Make the same adjustment on the other arm.



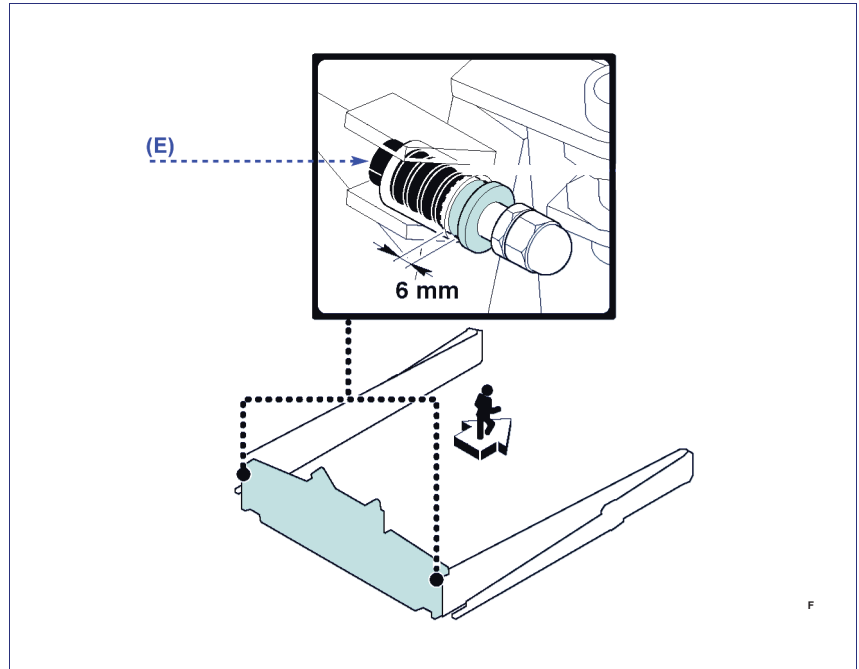
Folding stage: proceed in the way indicated.

- 1 - Start up the controls to completely fold the primary arms **(A)** of the boom and slightly unfold them to reduce the thrust pressure on the cylinder.
- 2 - Loosen the lock nut **(C)** and adjust on the ring nut **(F)**.
- 3 - Completely fold the primary arm **(A)** again and check that it is properly resting on the support.
- 4 - Lock the lock nut **(C)** onto the ring nut **(F)** when adjustment is completed.
- 5 - Make the same adjustment on the other arm.

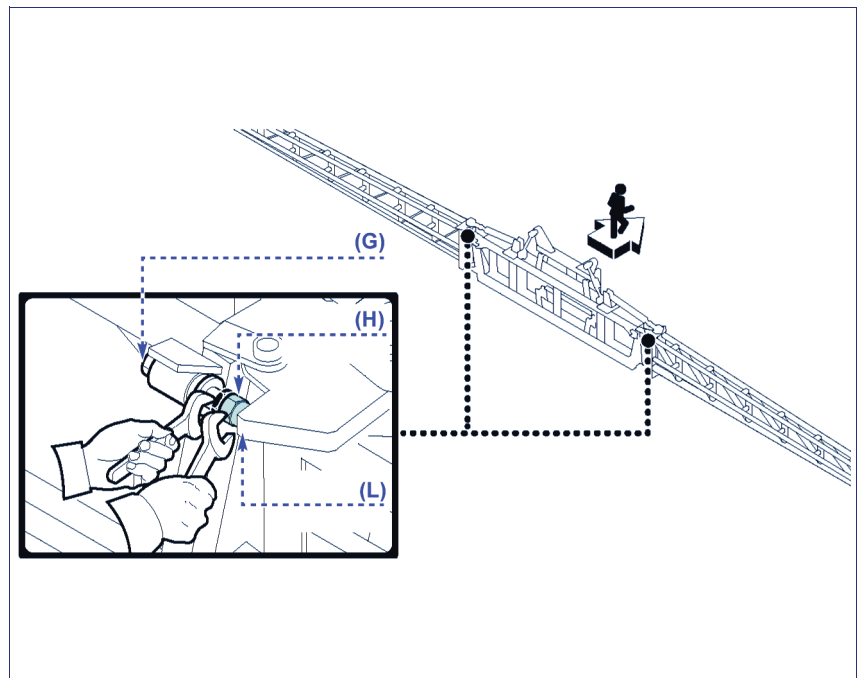


Shock absorber **(G)** adjustment:
 proceed in the way indicated.

- 1 - Start up the controls to completely fold the primary arms of the boom.
- 2 - Check that the distance indicated in the figure corresponds. If it does not, adjust it by means of nut **(E)**.



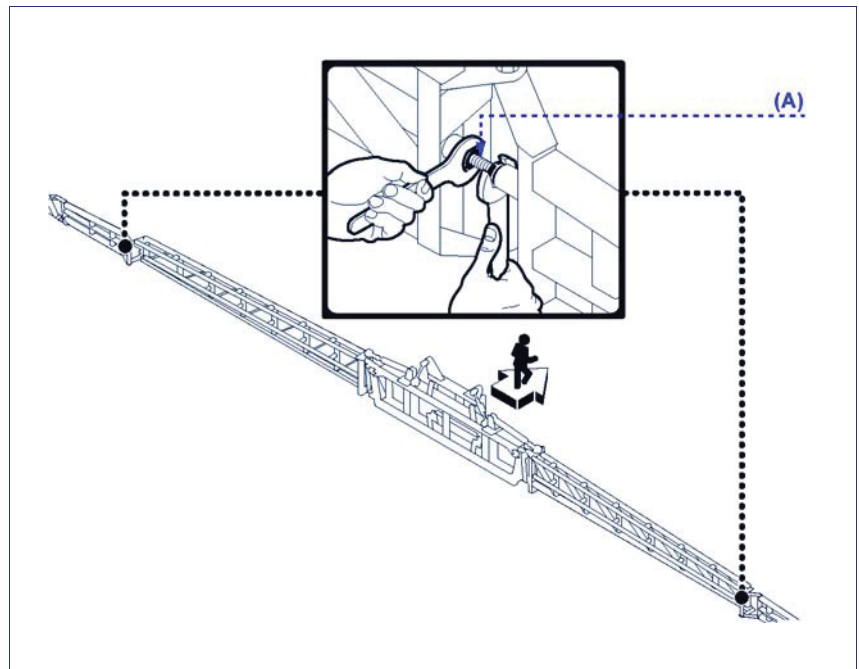
- 3 - Completely unfold the primary arm again and check that the nut **(H)** is resting on the limit stop **(L)** and slightly compresses the washers. Otherwise, complete the adjustment by means of nut **(H)** and lock nut.
- 4 - Lock the nut and lock nut **(H)** when adjustment is completed.
- 5 - Make the same adjustment on the other shock absorber.



ADJUSTMENT OF EXTENSION ALIGNMENT

Proceed in the way indicated.

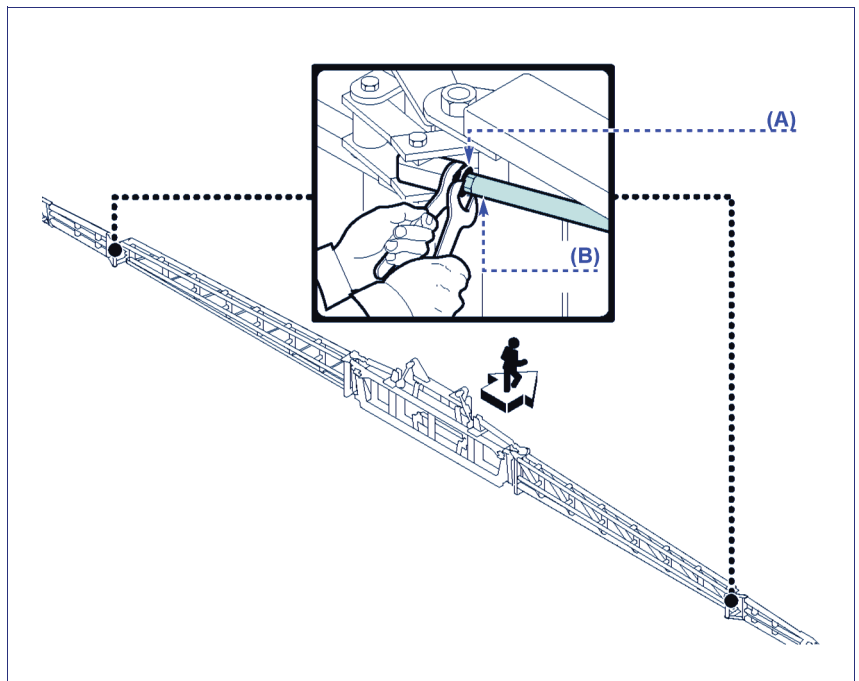
- 1 - Loosen the lock nuts **(A)** and act on the screws **(B)** so that the extensions are aligned with the primary arms.
- 2 - Tighten the lock nut **(A)** when the operation is completed.



ADJUSTMENT OF EXTENSION OPENING AND CLOSING CYLINDER

Unfolding stage: proceed in the way indicated.

- 1 - Start up the controls to completely unfold the extensions of the boom and slightly fold them to reduce the thrust pressure on the cylinder.
- 2 - Loosen lock nut **(A)**.
- 3 - Use the cylinder stem **(B)** to adjust the extension.
- 4 - Completely unfold the extension again.
- 5 - Check that the thrust force of the cylinder prevents the articulation between the primary arm and the extension from moving.



Important

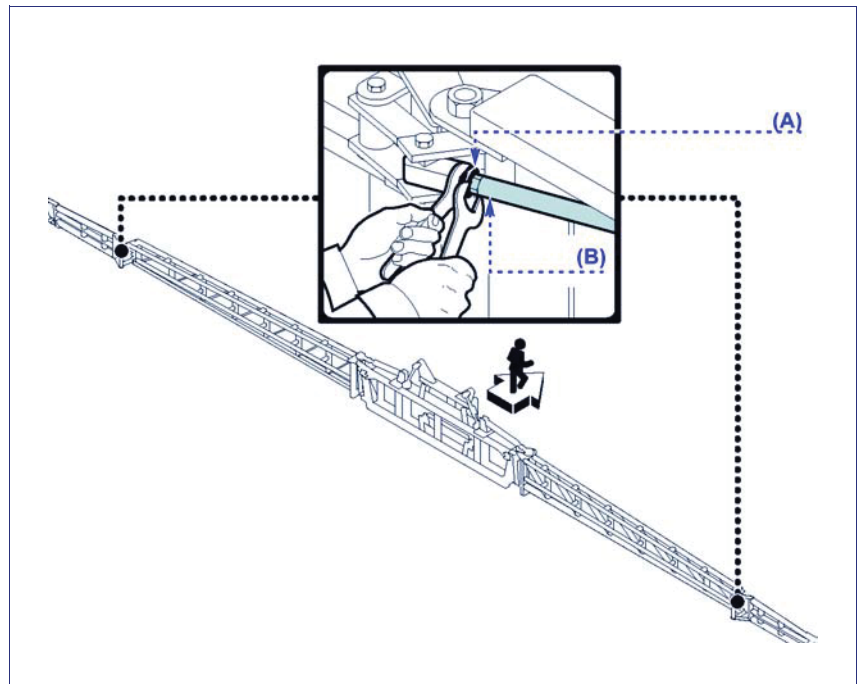
If the thrust force increases during unfolding, it will decrease during folding. Therefore try to choose the mean between the two extremes.

- 6 - Tighten the lock nut **(A)** when the operation is completed.

Folding stage: proceed in the way indicated.

8 -

- 1 - Start up the controls to completely fold the extensions of the boom and slightly unfold them to reduce the thrust pressure on the cylinder.
- 2 - Loosen lock nut **(A)**.
- 3 - Use the cylinder stem **(B)** to adjust the extension.
- 4 - Completely fold the extension again.
- 5 - Check that the thrust force of the cylinder prevents the articulation between the primary arm and the extension from moving.
- 6 - Tighten the lock nut **(A)** when the operation is completed.
- 7 - Make the same adjustment on the other extension.



INFORMATION ABOUT USE

OPERATING ADVICE

While in use, disengage the self-levelling devices locking device so as to allow the spraying boom to swing and keep it parallel to the ground also on slopes and uneven ground.

The self-levelling device.s locking device should be engaged when using the equipment with the boom not symmetrically folded and while transporting the equipment itself.



Important

Information on hydraulic connections is to be found in the "Hydraulic system" diagram. The boom unfolding and folding procedure, variable depending on the type of control installed, is described in "Boom Unfolding and Folding".

The information mentioned is not published in the manual if the equipment is installed on units belonging to other manufacturers.

BOOM FOLDING AND UNFOLDING



Important

The environmental and territorial conditions of the area where you plan to operate have to be checked every time the equipment is set up for spraying.

Evaluate the following requirements.

- Check whether or not there are electric lines and assess the risks of contact with the spraying boom.
- Check the gradient of the land so as to evaluate the most suitable conditions for operating in safety. Always bear in mind the maximum gradient limits allowed.

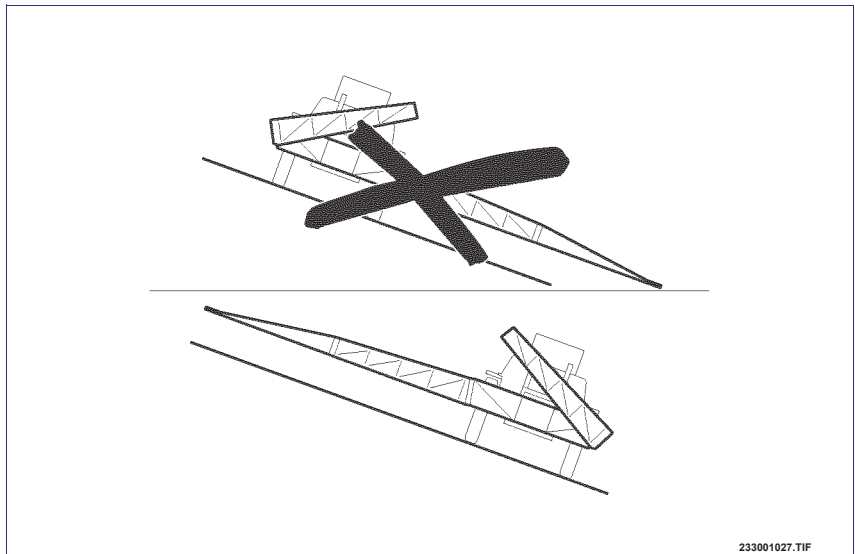
- In the event of spraying with progress transversal to the gradient, carefully follow the instructions given:
 - 1) Boom unfolding stage:** always unfold the one uphill first, and then the one downhill.
 - 2) Boom folding stage:** always fold the one downhill first, and then the one uphill.



Important

Lock the self-levelling device (if present) before you unfold and fold the arms.

- Never work if just the downhill arm is open.
- Keep the forward speed moderate (8-10 km/h max) so as to prevent the boom from swinging and getting uneven spraying.



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Important

If it is windy, also stay below the maximum allowed limits (5 m/sec) so as to prevent the product from being dispersed in the surrounding environment. Keep the boom at a lower height and increase the volume of the droplets.



Caution - Warning

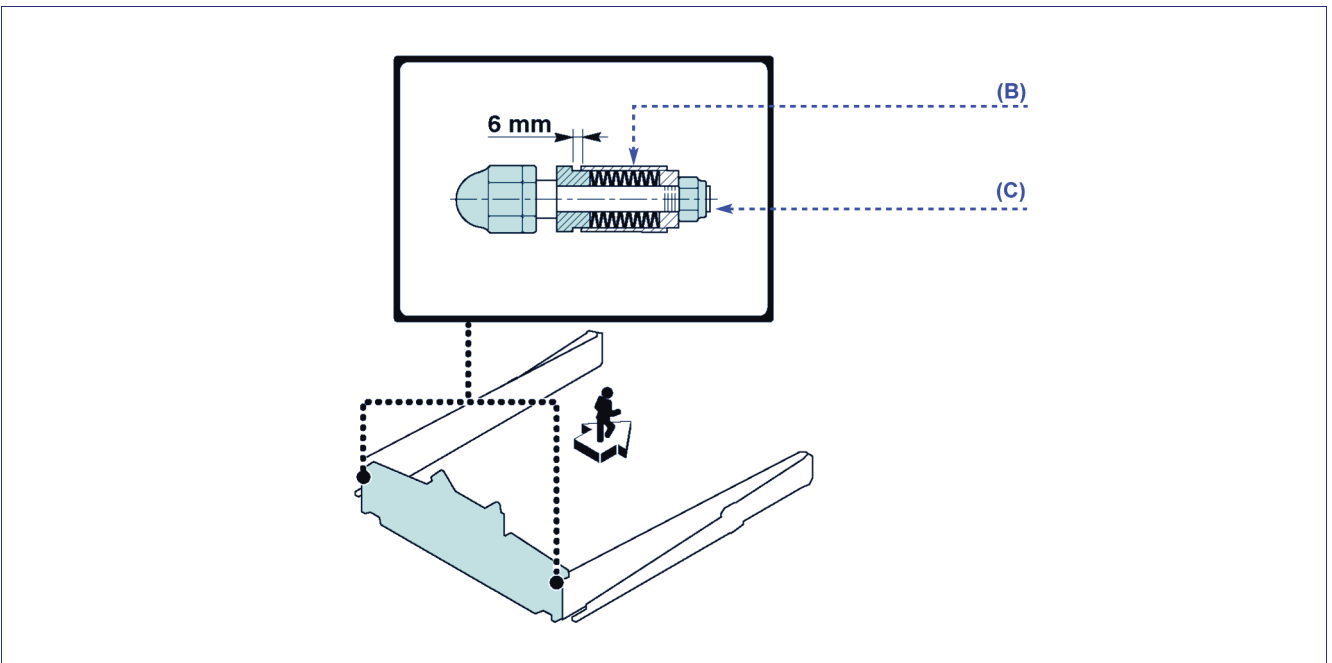
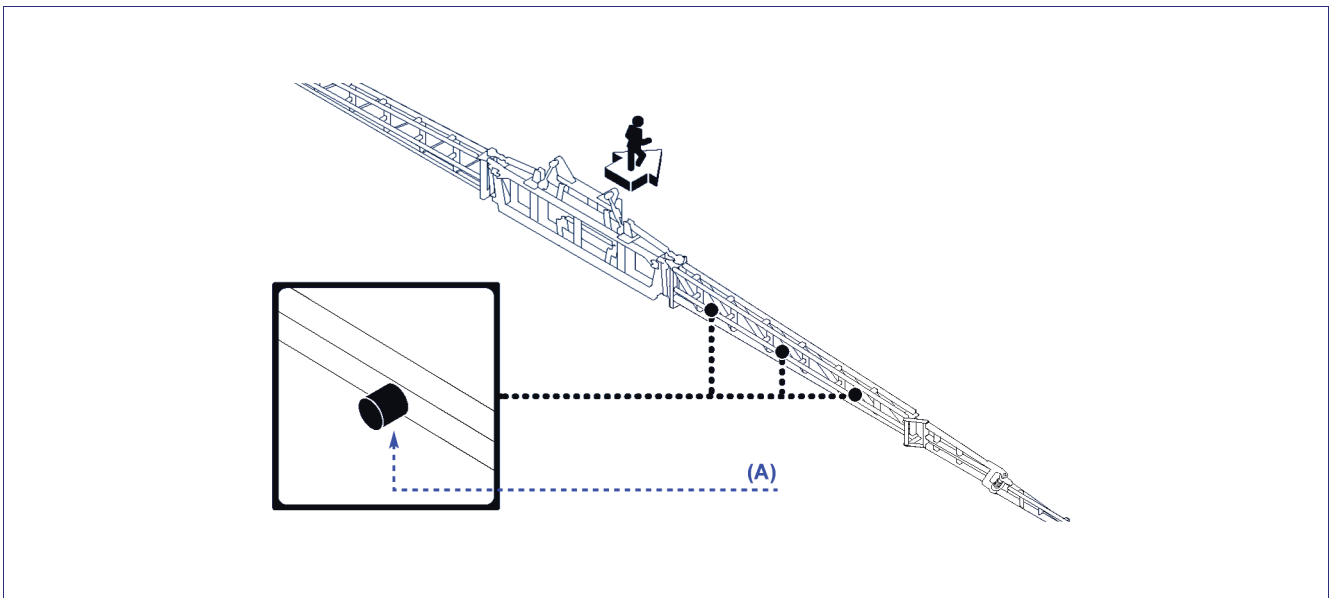
Prevent strangers from approaching the working area when the machine is in use. Should it become necessary, stop it immediately and make the people found in the risk area move away.

INFORMATION ABOUT MAINTENANCE

MAINTENANCE SCHEDULE TABLE

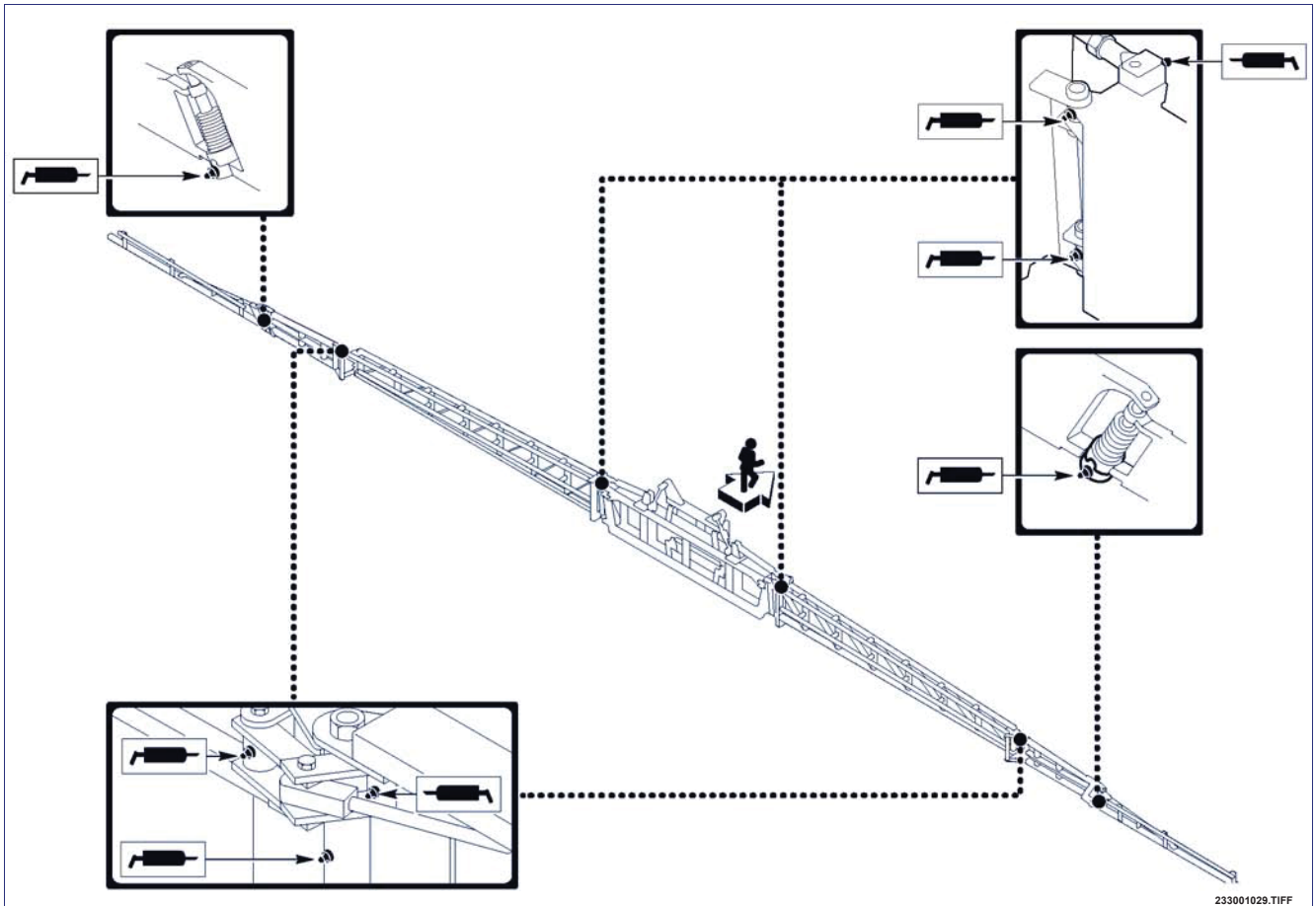
Interval	Component	Type of intervention	Operation	Page
Each working day and with each interval higher than one hour	Jets and nozzles	Clean and rinse the water supply	Make the clean water come out of the nozzles	
Each working day	Jets and nozzles	Check operation	Clean and replace if necessary	See "nozzle cleaning", page 37
	Jets, nozzles antidrip valve	Check installation	Install properly	
	Complete equipment	Clean and wash	Use a clean jet of water	

Every 40 hours of work	Complete equipment	Check the greased parts	Grease if necessary	See "Lubrication points diagram" page 37
		Check the condition and tightness of the screws	Tighten and replace if necessary	
		Check the painted surfaces	Touch up the parts the paint has come off of if necessary	
	Boom limit stop bumper (A) (see figure below)	Check its condition	Replace if necessary	
	Endpiece articulation springs	Check its effectiveness	Replace if necessary	
	Arm shock absorber Belleville washers	Check its effectiveness	Replace if necessary.	



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LUBRICATION POINTS DIAGRAM

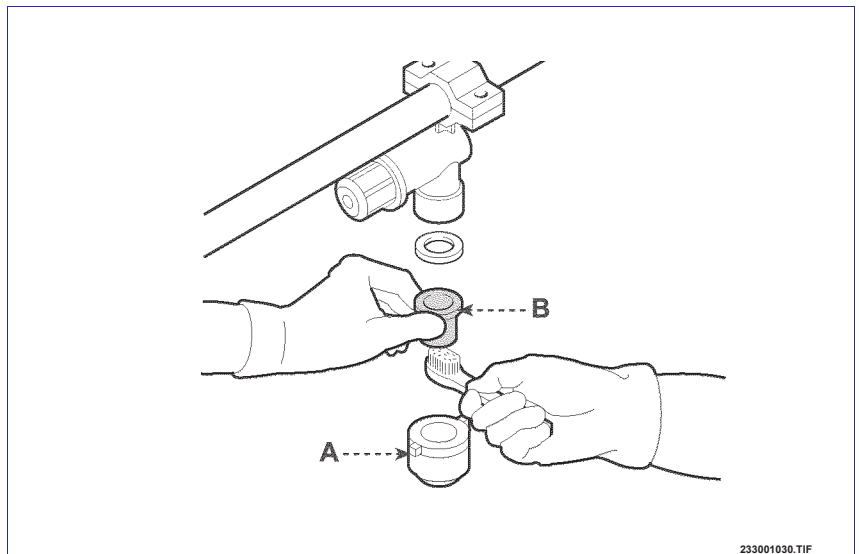


Use *PERSIAN POLIGREASE 2* grease

CLEANING NOZZLES

- 1 - Wear protective gloves for this operation. Disassemble the bayonet (A) and nozzle (B).
- 2 - Clean the nozzle with a jet of air and a small soft-bristle brush.

 Important
Do not use pointed or sharp objects so as to not damage the hole of the nozzle.



PROLONGED INACTIVITY

If the equipment is not used for a long time, adopt the procedures given below.

- 1 - Perform the scheduled maintenance (see page 27).
- 2 - Perform the general cleaning (see page 29).
- 3 - Put in antifreeze fluid or completely empty the hoses in order to prevent the components (pump, control unit, filters, hoses, etc.) from breaking in the case of severe temperatures.

- 4 - Disconnect the hoses from the pressure gauges.
- 5 - Grease all the components provided with a grease nipple.
- 6 - Place the equipment in a sheltered place accessible only to the operators.

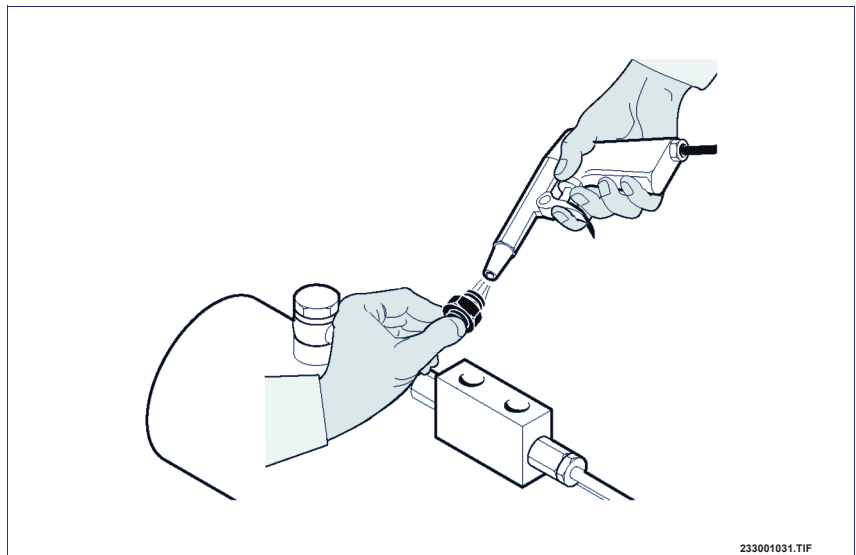
TROUBLESHOOTING

TROUBLES, CAUSES, REMEDIES

Trouble: the boom unfolds halfway and then stops.

Cause: impurities in the calibrated joints of the jacks.

Cures: disassemble the joints and clean them.

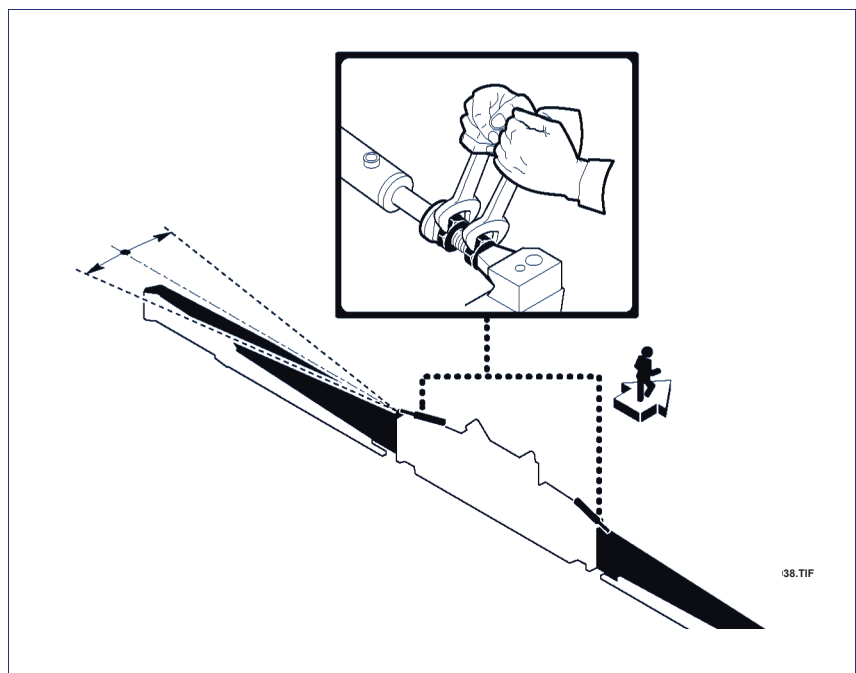


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Trouble: the boom is not aligned when unfolded.

Cause: unfolding cylinder not adjusted.

Cures: adjust the alignment of the arms (see .Arm alignment adjustment.)



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Trouble: the extensions are not aligned when unfolded.

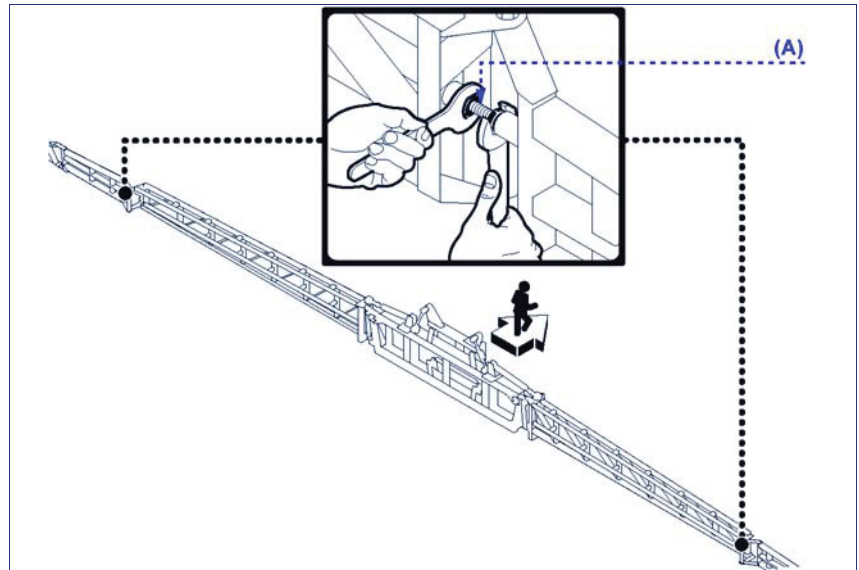
Cause: stop bolt not adjusted.

Cures: work on the screw **(A)** to adjust the alignment of the extensions (see "extension alignment adjustment").

Trouble: the complete extension moves as to the primary arm with the boom unfolded and/or folded.

Cause: extension unfolding cylinder not adjusted.

Cures: (see "extension unfolding and folding cylinder adjustment").



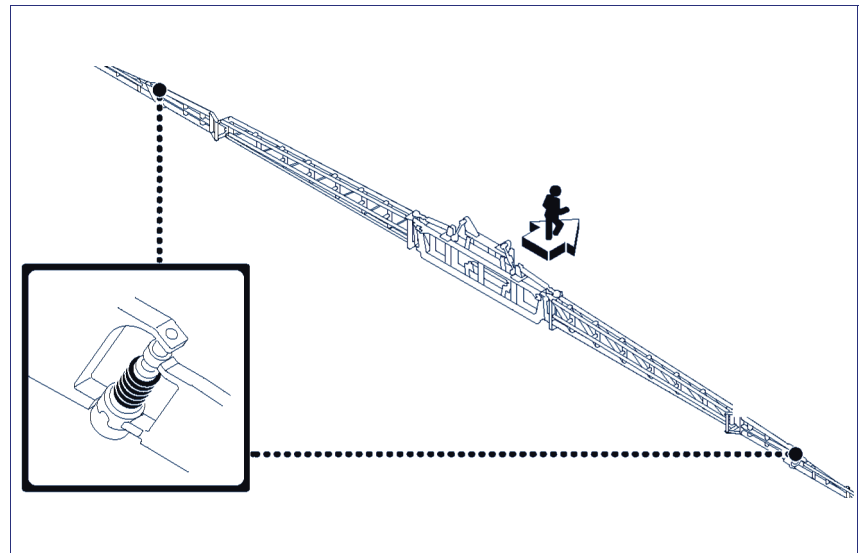
Trouble: the endpiece extension is not steady enough with the boom unfolded.

Cause: the articulation is loose.

Cures: compress the spring or replace it if it is no longer effective (see .Articulation spring replacement.).

Cause: the self-lubricating bushing of the endpiece extension is worn.

Cures: replace the bushing (see "spring and articulation bushing replacement").



INFORMATION ABOUT REPLACEMENTS

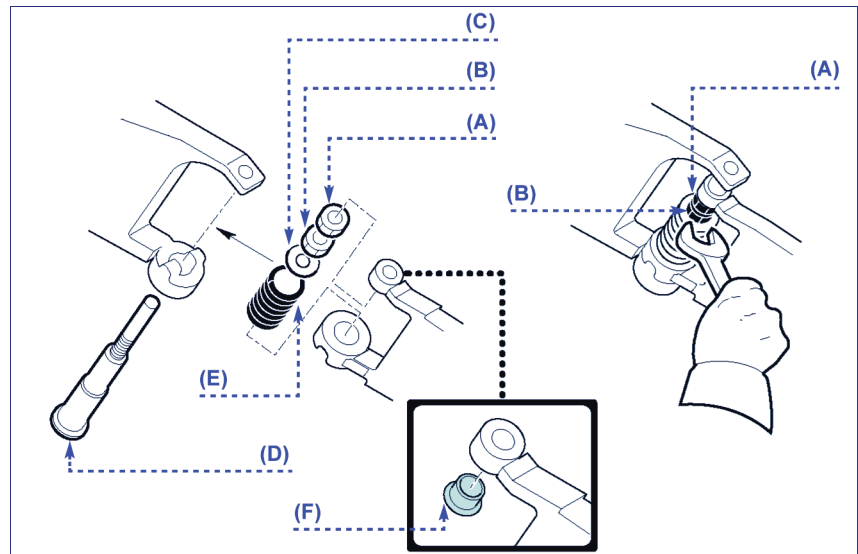
REPLACEMENT OF ARTICULATION SPRING AND BUSHING

Proceed in the way indicated.

- 1 - Unscrew the nuts (A - B) and extract the washer (C).
- 2 - Remove the pin (D) and the spring (E).
- 3 - Check the efficiency of the spring (E) and the wear of the bushing (F) and, if necessary, replace them.

Important

The self-lubricating bushing (F) is to be inserted by apply pressure with the limit stop facing downwards and locked with LOCTITE in order to ensure it is secure.



- 4 - Reassemble the parts (D - E - C - B - A) as shown in the figure.
- 5 - Tighten the nut (B) until you get the right compression of the spring (E).
- 6 - Tighten the lock nut (A) when the operation is completed.

DISPOSING OF THE EQUIPMENT

Important

This intervention has to be carried out by skilled technicians and in accordance with the current safety regulations. Do not disperse in the environment non-biodegradable products, lubricating oils and non-ferrous components (rubber, PVC, resins, etc.).

Dispose of them according to the local regulations in force.