



# U500

■ ■ ■ S E R I E S

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## TECHNICAL MANUAL

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# 1. Instructions

## 1.1. Instructions

### General

This manual is the user guide for handling, using and maintaining the machine.

Read this manual carefully and keep it handy for future reference.

Carry out specified maintenance to keep the machine in perfect working order and to ensure sustained reliability.

### Washing



**CAUTION:** Never direct high-pressure sprays towards electrical components ( housings, wire kits, connectors, etc.).

The electrical/electronic components may fail if they are subjected to water at high pressure.

### Safety

Before using the machine:

— read the safety rules and follow all recommendations and instructions.

For more information, please refer to the loader user manual.

### Spare parts



**DANGER:** Failure to respect these guidelines may make your machine unsafe. The manufacturer cannot be held liable in the event of damage or injury.

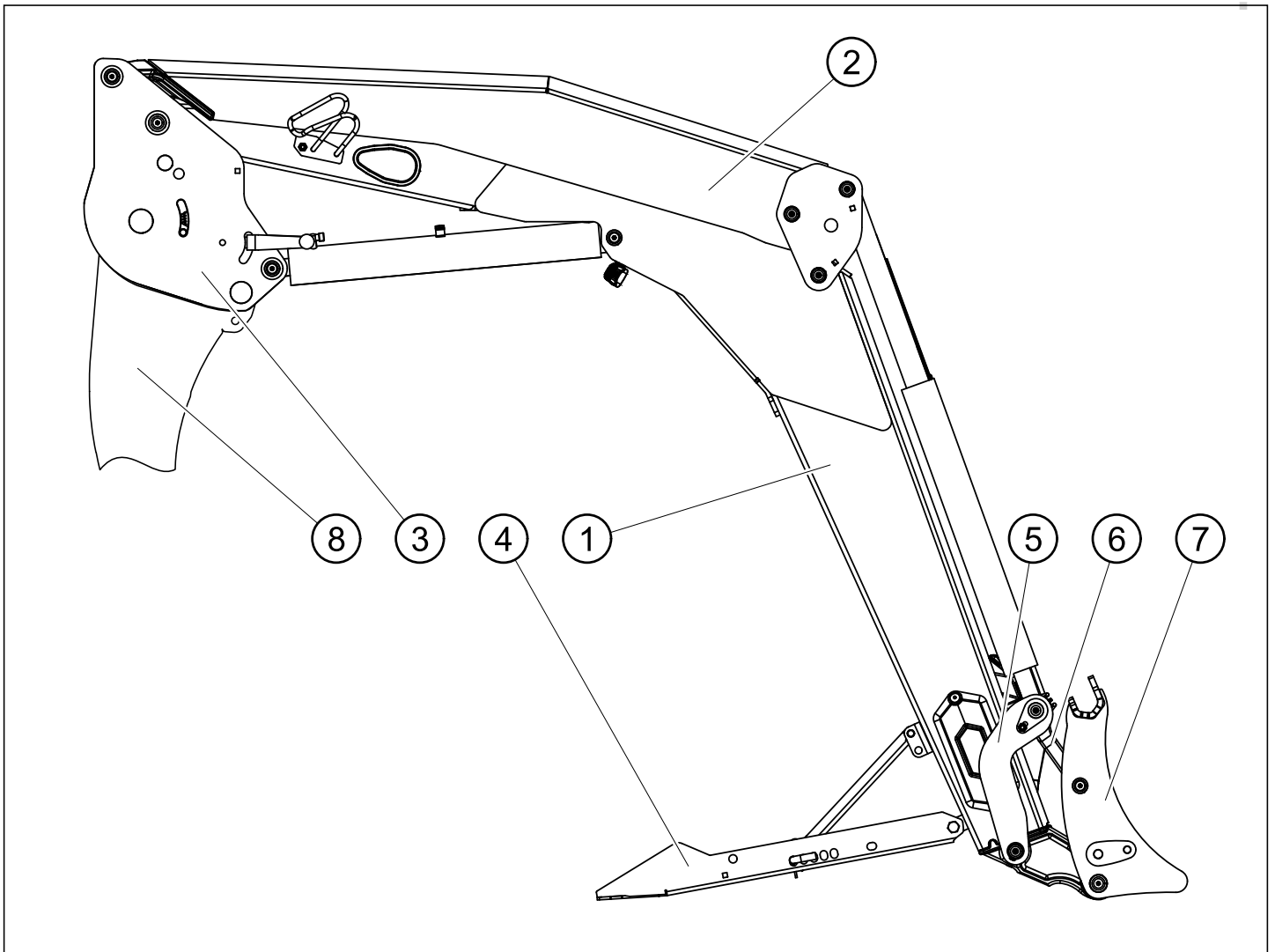
Only use spare parts and accessories that comply with the manufacturer's recommendations.

Do not carry out any modifications, whether yourself or anyone else, on the machine and its attachments (mechanical, electrical, hydraulic or pneumatic) without first requesting express approval from the manufacturer.

### Warranty

Warranty cover will cease immediately in the event of failure to observe the standards and instructions for use and maintenance of the machine as given in this manual.







## 2. Description



Number	Description
1	Boom
2	Parallelogram tie rod
3	FITLOCK 2+ hitching half-frame
4	Parking stand
5	Crank
6	Connecting rod
7	Implement carrier
8	Bracket

### 3. Safety rules

#### 3.1. PPE Table (Personal Protective Equipment)

Symbol	Meaning	Example of risk
	Protective gloves must be worn.	Cuts, trapped fingers, when unlocking the implement on the loader.
	Hearing protection must be worn.	Bucket shaking in a tractor without a cab.
	Eye protection must be worn.	Splashes during high-pressure cleaning.
	Safety helmets must be worn.	Impacts to the head from the loader during tractor maintenance.
	Protective clothing must be worn.	Splashes during high-pressure cleaning.
	Safety footwear must be worn.	Crushing when positioning parking stands.

#### 3.2. Non-compliance with safety and use rules

- Only use genuine MX spare parts. Do not carry out any modifications yourself or have anyone else do so on your MX loader and its implements (mechanical, electrical, hydraulic or pneumatic specifications) without obtaining MX's prior written approval.

**IMPORTANT:** Failure to comply with these rules may make your MX loader unsafe; in the event of damage or injury, MX will not be held liable in any way.

- Warranty cover will cease immediately in the event of failure to observe the standards and instructions for use and maintenance of the MX loader as stipulated in the user manual. MX may not be held liable for any accident resulting from actions contrary to these restrictions.

## 4. Recycling MX products

Disposal: please contact your dealer or a company specialising in materials recycling.

### Hydraulic system

- End-of-life MX products must have their hydraulic oil drained by an authorised technician.
- The hydraulic hoses must be removed before the equipment can be recycled.
- All MX product owners are required to comply with these environmentally-friendly precautions if they decide to dismantle their end-of-life products themselves.

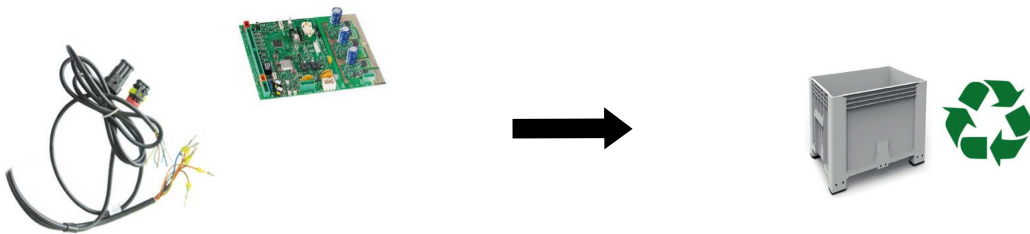
### Disposal of hazardous waste (oils and hoses)

- Hydraulic oils must be stored in containers or drums provided for this purpose and sent to approved disposal facilities.
- For hydraulic hoses, the steel connectors can be separated from the rubber hoses.
- The steel end caps must be recycled as scrap by approved facilities.
- The rubber hoses must be placed in watertight containers and sent for processing by approved facilities.



### High-tech MX product components and electrical and electronic equipment

- Waste electrical and electronic equipment (WEEE) present in MX products must be removed and disposed of by authorised services for recovery.



### Recycling of decontaminated MX products

- Decontaminated MX products must be sent to authorised services for iron and metal recycling.

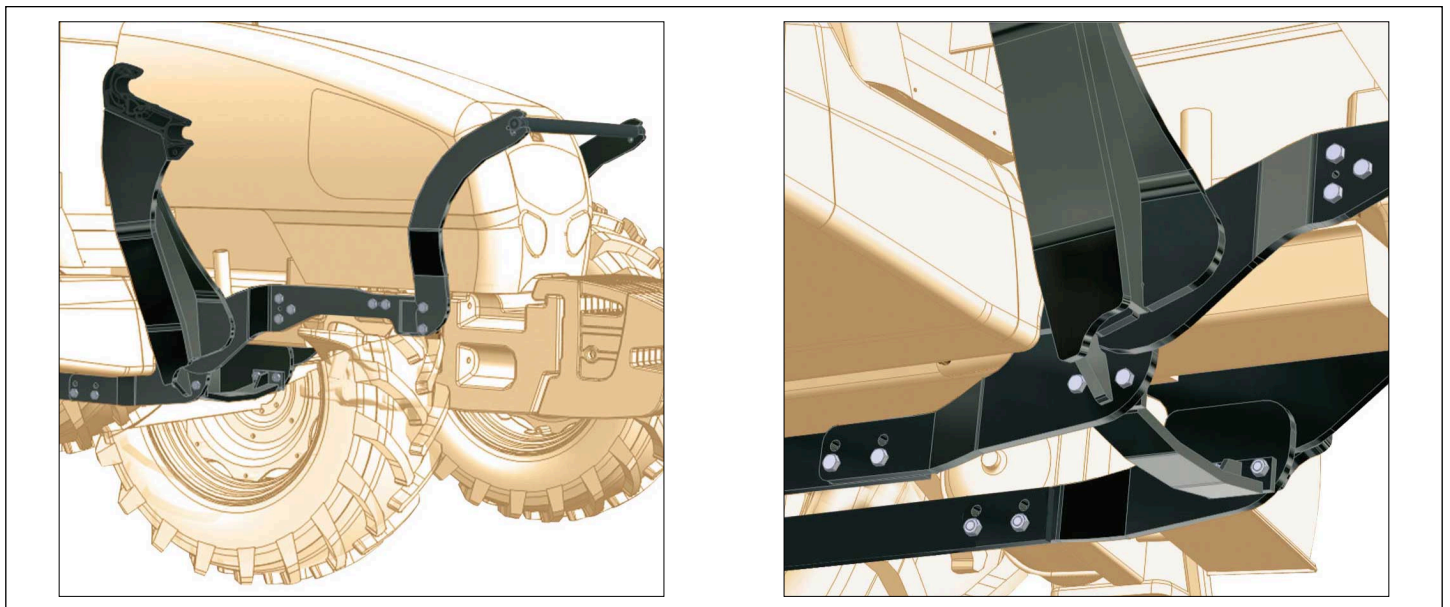
## 5. Maintenance

**⚠ WARNING:** Drain the tractor's hydraulic circuit regularly and change the filters in accordance with the manufacturer's recommendation.

Contaminated oil no longer lubricates and can cause damage to all hydraulic components (pumps, control valves, rams, etc.); even clear-looking oil may be worn out.

### 5.1. Bracket maintenance checks and instructions

- To ensure effective tightening of the screws on the tractor, check that the threads of the tractor's fixing points are clean. Running a suitable tap through the threads will eliminate paint, rust, impurities and other contamination. This also applies to new tractors.
- Remove any paint from the contact areas between our supplied product and the tractor, as well as from the other areas listed in the instructions, to ensure the tightening torque is effective.
- Impact wrenches must not be used to screw or tighten the fasteners used on the tractor or between the parts of our supplied product.
- Warranty cover will immediately cease if the machinery assembly recommendations in this document are not complied with.
- All fasteners must be fitted using either lock, Belleville or Nord-Lock washers. When fitting with an oblong hole, position the washer (flat or spring) along the oblong side.
- When assembling moving parts, such as the motor pulley interface, fasteners must be fitted using a locking compound.
- Position everything before any blocking, unless otherwise specified in the fitting instructions.
- Once all the bolts and screws are in place, tighten the unit to the torque recommended for cast iron and steel, as detailed in the table below.
- After tightening to the recommended torque, make a mark on the fasteners.



Tightening torque

Class of bolt	stud marking (ISO 898)	Thread											
		M5	M6	M7	M10	M12	M14	M16	M18	M20	M22	M24	M27
8.8	○	5.2	9	21.6	43	73	117	180	259	363	495	625	915
10.9	□	7.6	13.2	31.8	63	108	172	264	369	517	704*	890	1304
12.9	△	8.9	15.4	37.2	73	126	201	309	432	605	824	1041	1526

For cast steel (Nm) ±15%

\* Unless otherwise specified

## 5.2. Bracket maintenance specifics



**DANGER:**

To avoid any risk of serious or fatal accidents:

- Regularly check that the fasteners and screws are properly tightened; refer to the checking table below.
- All fasteners requiring retightening must be inspected and, if necessary, replaced.
- Impact wrenches must not be used to screw or tighten the fasteners used on the tractor or on the parts of our supplied product.

Bolted linkage	Inspection schedule			
	Indication on the tractor hour counter			Interval
	100 hrs or first tractor service from new*	600 hrs or second tractor service *	3000h	
Check that the fasteners between the tractor and our supplied product, and on our parts, are tightened to the recommended torque.	x	x		Then every 600 hrs
Check that bracket fasteners are tightened to the recommended torque.	x		x	Then every 3,000 hrs

\*Whichever is the sooner.

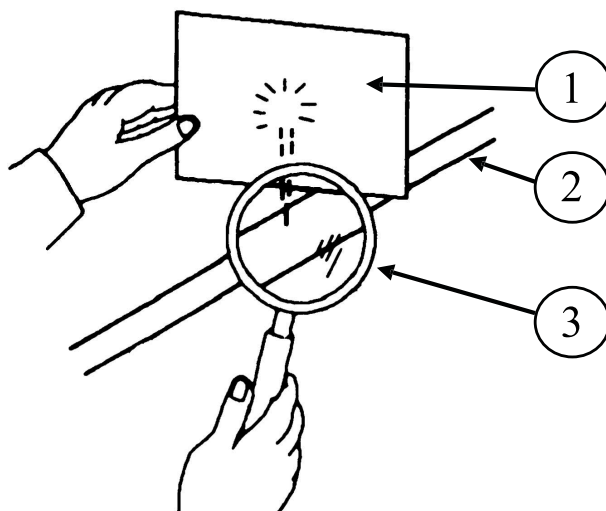
## 5.3. Maintenance instructions

- Maintenance operations must be performed by qualified people, authorised by the dealer. If not, these operations come under the sole responsibility of the person carrying out the work.
- The PPE (personal protective equipment) listed in the [PPE Table](#) must be worn for all maintenance operations.
- Switch off the tractor engine before carrying out any maintenance work on the loader and/or its implements.
- For loader maintenance operations, never work on mechanical parts under stress, a pressurised hydraulic circuit or part, or an electrical circuit that is switched on.
- For tractor maintenance operations, it is strongly recommended that you unhitch the loader. Unhitching is a simple, quick operation that provides the best guarantees of safety and efficiency for tractor maintenance.
- For any work with the loader lifted, the loader must be locked in position.
- Unlocking the MACH System, or closing the lifting rams supply valve for a loader without MACH System.
- For any maintenance operation on a loader and/or its implements:

- Switch off the tractor's engine.
- It is mandatory to wear PPE.
- The loader must be on the ground with the implement and any accessories (grab, rotor, etc.) at rest.
- Decompress the hydraulic circuit.


**!** **DANGER:** Oil escaping under pressure can have sufficient force to penetrate the skin and cause serious injury. Before disconnecting the hoses, ensure that you have released all the pressure. Before pressurising the system, check that all fittings are tight and that the hoses and hydraulic circuit are not damaged.

**!** **DANGER:** Oil escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than your hands, to detect suspected leaks. If you are injured by a pressurised leak, seek immediate medical attention. An infection or serious reaction may develop if appropriate medical treatment is not immediately provided.



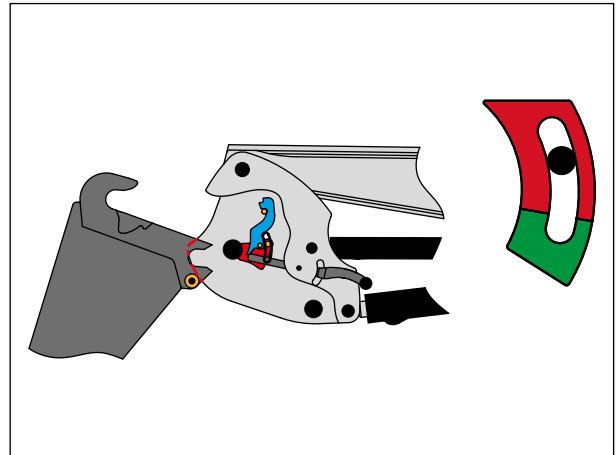
(1) Cardboard / (2) Hydraulic circuit / (3) Magnifying glass

## 6. Loader hitching

 **WARNING:** This operation must be carried out by the driver, who must leave the cab and not perform any manoeuvres while working on the loader.

### 1 - The tractor approaches

The locking indicator is in the red zone.

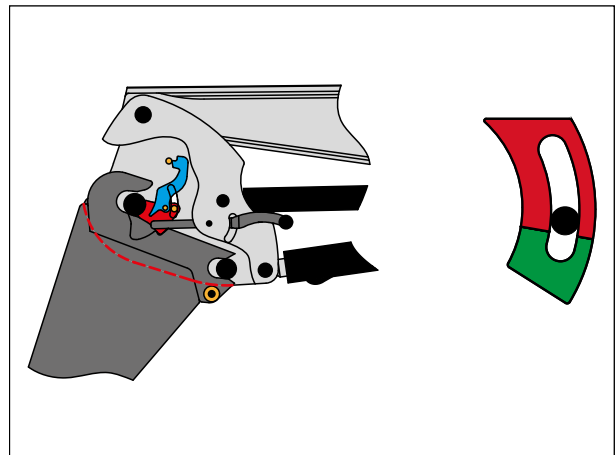


### 2 – The tractor engages

The unlocking indicator moves down but remains in the red zone.

Note: The loader is in the pre-locked position.

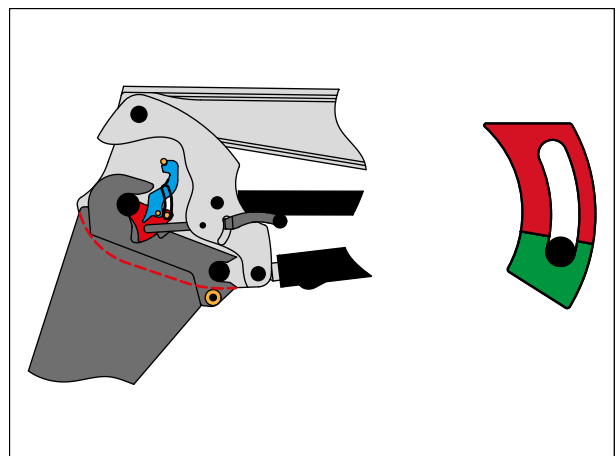
This position will, if necessary, enable the operator to manoeuvre with the loader on the ground, to better position the tractor/loader unit to achieve full and secure locking. To do this, the operator will have to connect the hydraulics.



### 3 - The tractor is engaged

The handle is in the high position, the locking indicator is in the green zone.

Note: The loader is locked.



## 6.1. Two-step hitching

- Connect the hydraulics and the electrics:

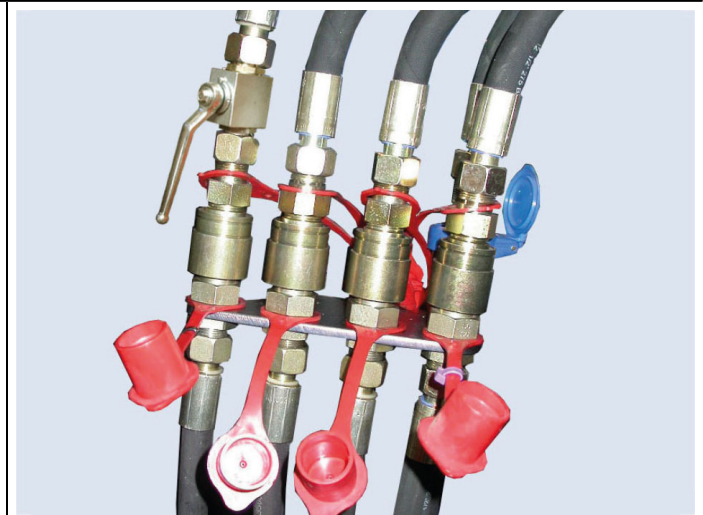
### Loader with MACH System:

- Ensure that the male and female couplings are clean before hitching. If necessary, clean them.
- Take the housing in both hands.
- With the back of the housing facing away, lift the control valve cover.
- Then engage the guide bars vertically.
- Pull down the handle.



### Loader without MACH System

- Remove the caps.
- Connect the hydraulic couplings.
- Open the valve.



- Move the lever forwards to the notched floating position while moving the tractor forwards, turning the wheels if necessary.



- Gently activate lifting. The loader is locked when the indicator is in the green zone.



- Raise and lock the right and left parking stands.



- Apply ground force to the implement.




### 6.1.1. Recommendations to make hitching easier

To hitch the loader more easily, it needs to have been unhitched correctly:

- To ensure that the Fitlock 2+ frames do not change angle position, they must be immobilised. This can only be done hydraulically, by pressurising the lift rams in the lowering circuit. Lower the loader in double action mode, then activate it in notched floating position and return to neutral.
- The user should extend the parking stands once the loader is on the ground and select the adjustment hole with the pin to ensure that there is always a gap between the ground and the parking stands (10 to 30 mm).

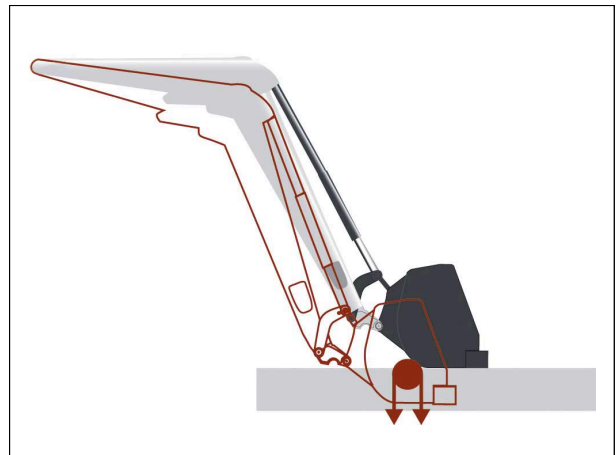
## 7. Loader unhitching

 **WARNING:** This operation must be carried out by the driver, who must leave the cab and not perform any manoeuvres while working on the loader.

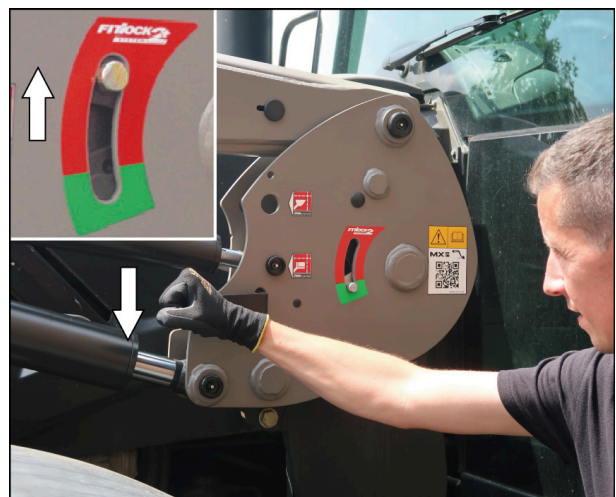
**IMPORTANT:** The loader must always be hitched to an implement weighing at least 100 kg to unhitch it.



- Lower the loader in double-action mode until the front axle is slightly raised, with the implement flat on the ground.
- Then actuate in notched floating position.
- Return to neutral.



- Release the FITLOCK 2+ hitching frames.

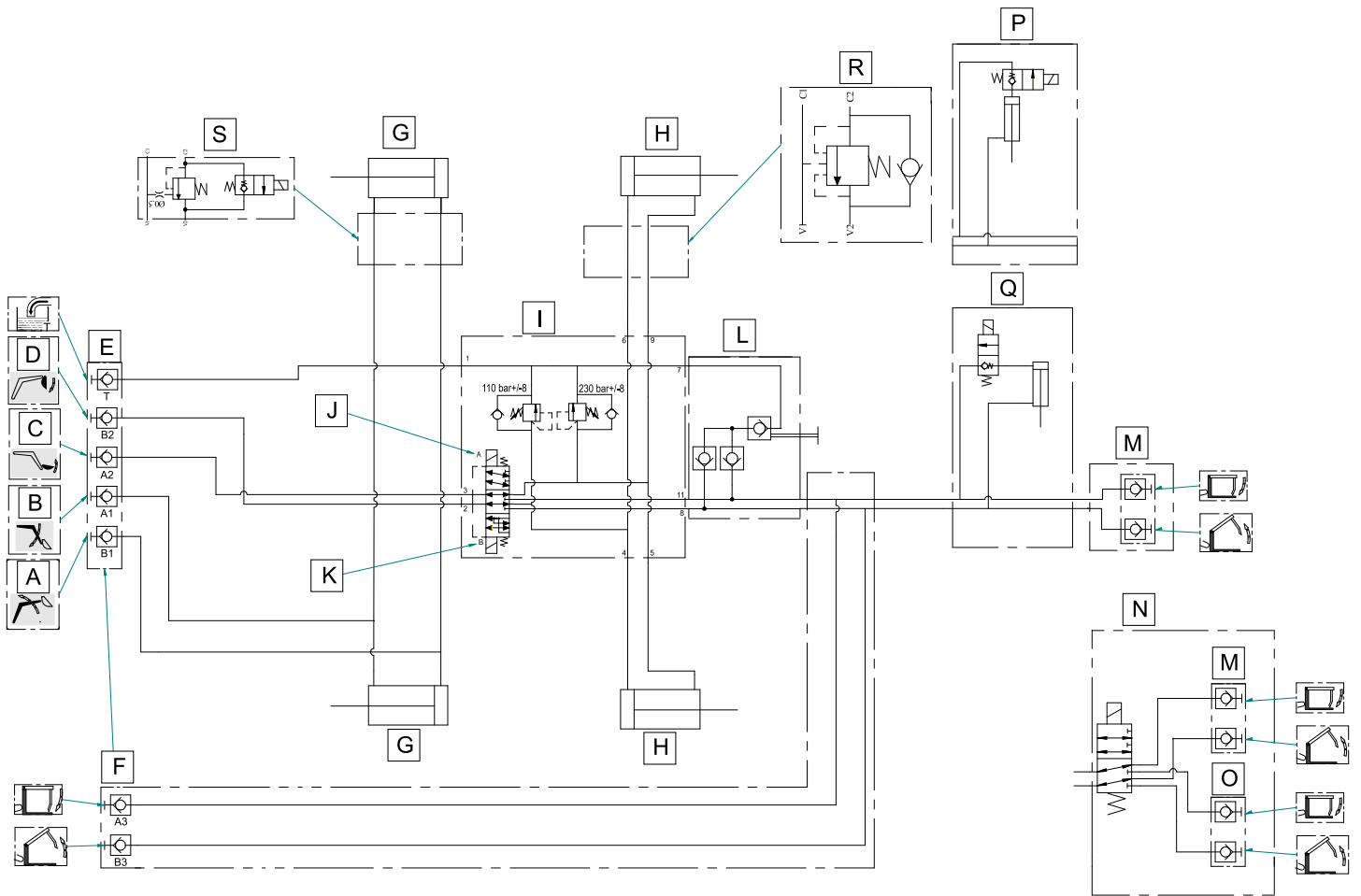


— Lower the left and right parking stands.



# 8. Loader hydraulics

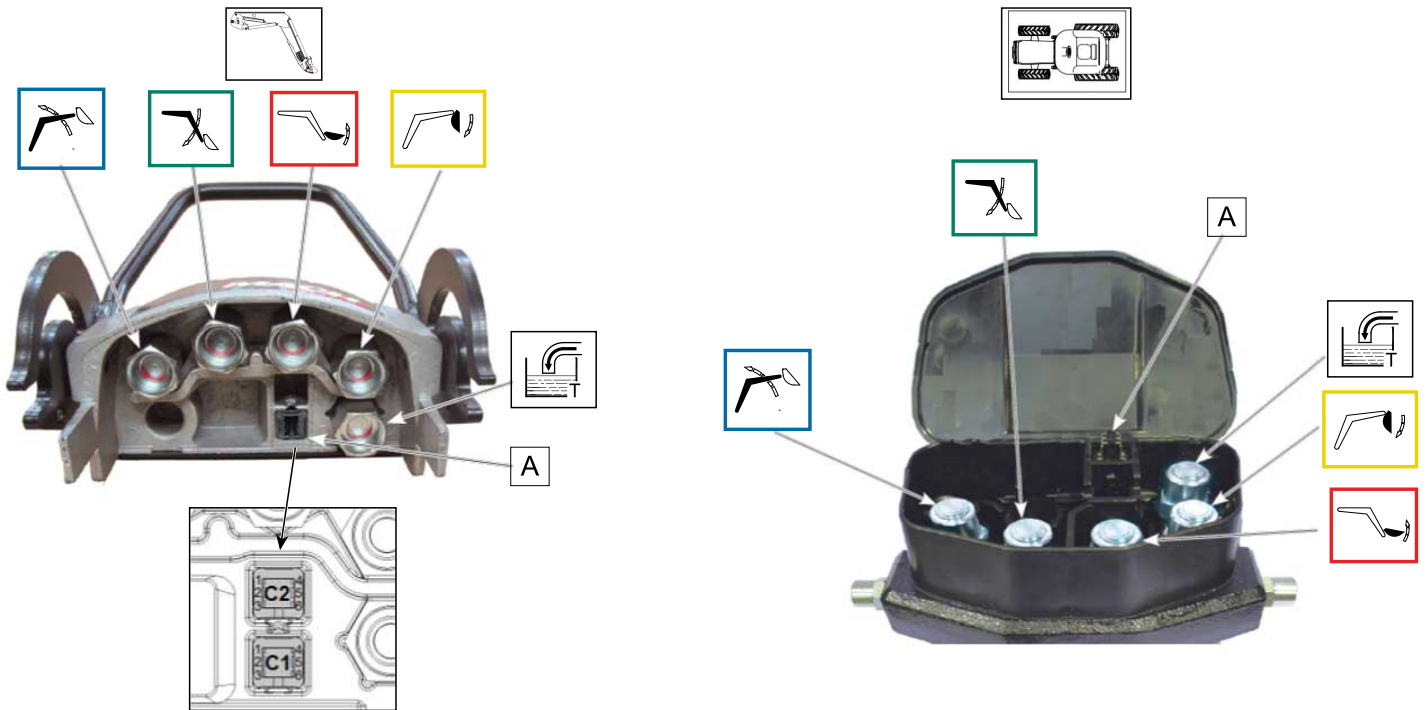
## 8.1. Loader hydraulics diagram



Marking	Description
A	Blue
B	Green
C	Red
D	Yellow
E	Mach System
F	MACH System 7 couplings
G	Lift ram
H	Crowding ram
I	Pressure limiter unit
J	3rd function (coil)
K	AutoUnload (coil)
L	Decompression of 3rd function
M	3rd function
N	3rd + 4th function
O	4th function
P	FAST-LOCK with 3rd function on MX-EURO implement carrier
Q	FAST-LOCK with 3rd function, MX or EURO implement carrier
R	Counterbalance valve
S	Disengageable counterbalance valve

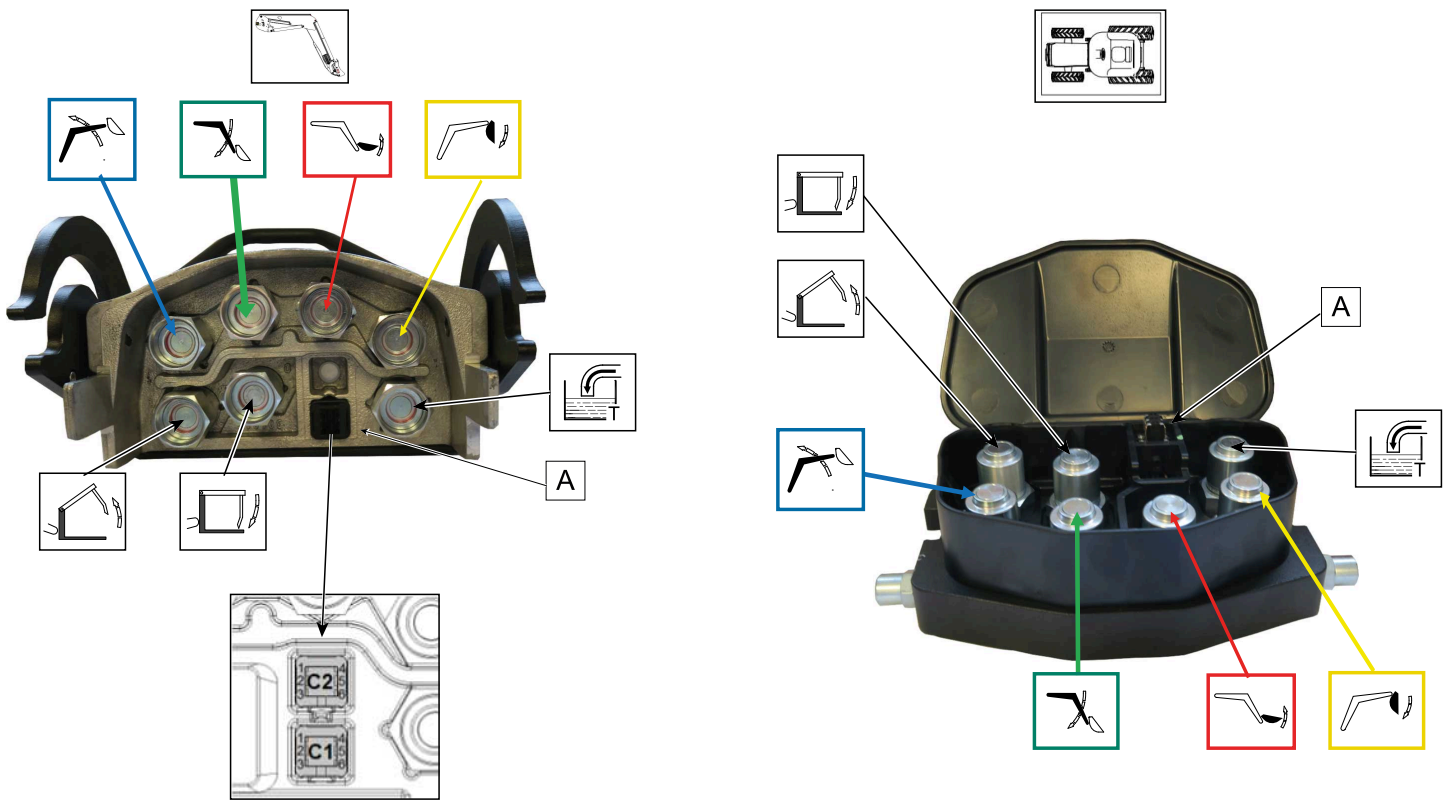
## 8.2. MACH System

### 8.2.1. MACH System 5-coupling



Marking	Description
A	Electrical connector
C1-1	Blue (- Ground)
C1-2	Black (AUTO-LEVEL)
C1-3	Orange (FAST-LOCK)
C1-4	Brown (3rd function)
C1-5	Red (+ 12 V)
C1-6	Yellow/Green (4th function)
C2-1	Blue (- Ground)
C2-2	N/A
C2-3	Brown (AUTO-UNLOAD)
C2-4	Yellow/Green or Brown (Lifting/dumping safety)
C2-5	N/A
C2-6	N/A

### 8.2.2. MACH System 7-coupling



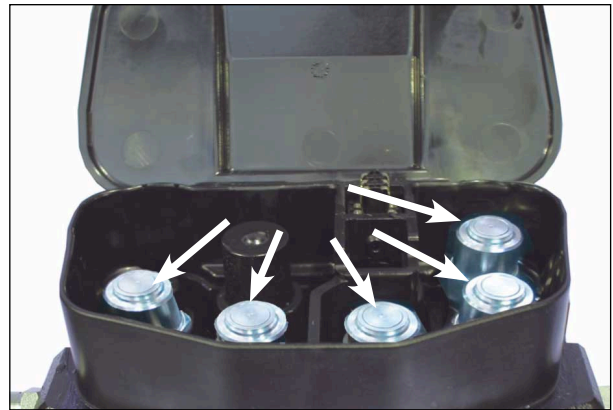
Marking	Description
A	Electrical connector
C1-1	Blue (- Ground)
C1-2	Black (AUTO-LEVEL)
C1-3	Orange (FAST-LOCK)
C1-4	N/A
C1-5	Red (+ 12 V)
C1-6	Yellow/Green (4th function)
C2-1	Blue (- Ground)
C2-2	White (Recognition wire)
C2-3	Brown (AUTO-UNLOAD)
C2-4	Yellow/Green or Brown (Lifting/dumping safety)
C2-5	N/A
C2-6	N/A

### 8.3. Maintenance: oil leaks

#### MACH System housing checks

- Disconnect the MACH System housing.
- Pressurise the control valve and check for oil leaks in the couplings.
- If a leak is found, switch off the engine and decompress the hydraulic circuit.
- The male coupling cannot be repaired.

Note: To replace it, loosen using a 27 mm spanner.



#### MACH System housing checks

Check the condition of the O-ring seal inside the female coupling:

- If the seal is in good condition, check the coupling assembly.



- Damaged seals should be replaced.
- Extract the seal using a small screwdriver.

Note: when replacing 16.4 x 2 seals, check their hardness, which should be 90 Shore (seal ref. MX 305408).



#### Replacing the female coupling

- Connect the MACH System housing, switch off the engine and decompress the hydraulic circuit.
- Loosen the hose (1) and remove the circlips (2).



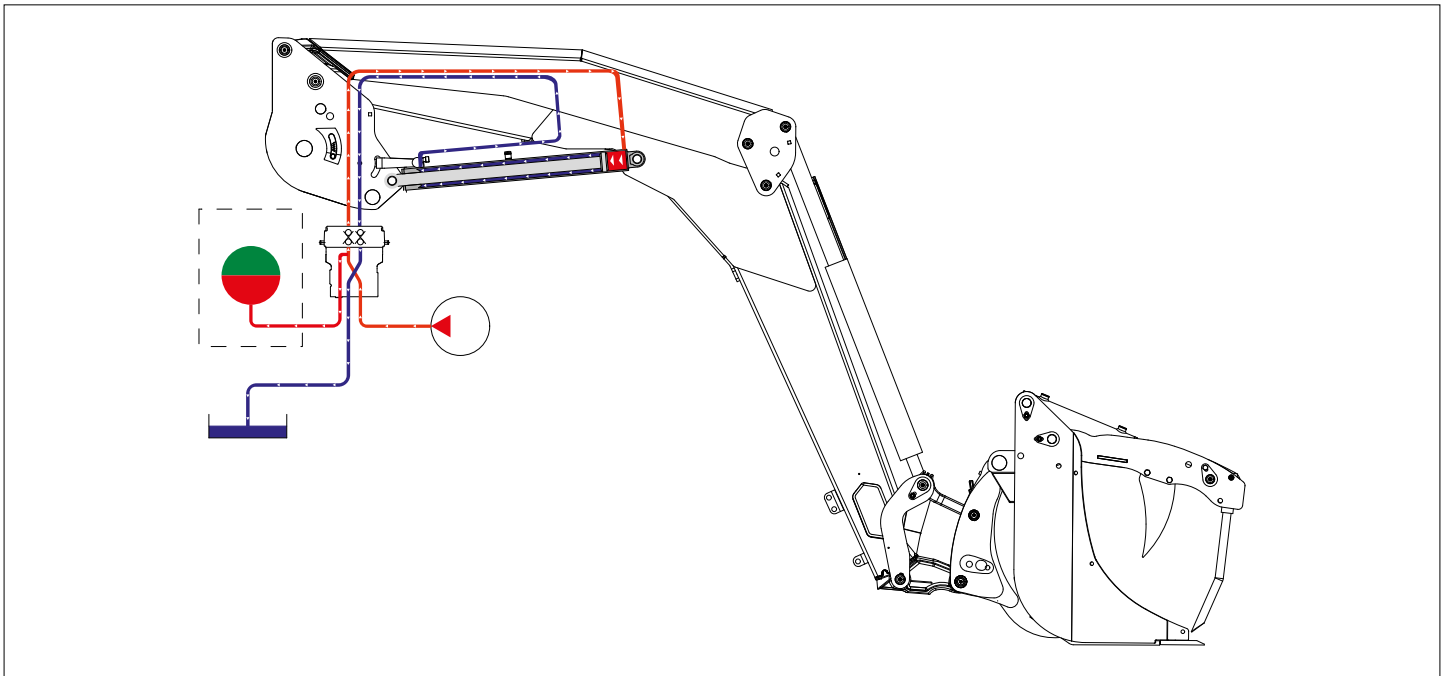
## 8.4. Lifting circuit

The lifting circuit comprises two double acting rams fitted in parallel.

When the base end chamber of the ram is pressurised, the loader lifts. The ram chamber is opened to the return circuit.

With the lifted loader, when the control lever is pushed halfway, just before the notch, the ram chamber is pressurised and the other base end is opened to return.

When the lever is fully pushed, it switches to floating position (MX control), meaning that the ram chamber and base end chamber are opened to tank.



## 8.5. Lifting circuit check

- Check that the control valve neutral setting is correct, then load the implement.
- Lower the loader in double action mode, so that the lift ram chamber is correctly filled.
- To work safely, position the implement at height on a solid surface in the floating position.
- Switch off the tractor engine.



- Remove the right and left lift ram rod-side supply hoses.



- After disconnecting the hoses, restart the tractor.
- Disengage the floating position, then back the tractor away from the solid surface.
- Switch off the tractor engine.
- If oil leaks from one of the rams, replace the seals of the affected ram.



### 8.5.1. Maintenance: ram seal replacement kit

— Unscrew the ram head.



— Unscrew the piston locking nut.



— Unscrew the piston locking nut (other model).



### 8.5.2. Maintenance: snap-ring ram seal replacement kit

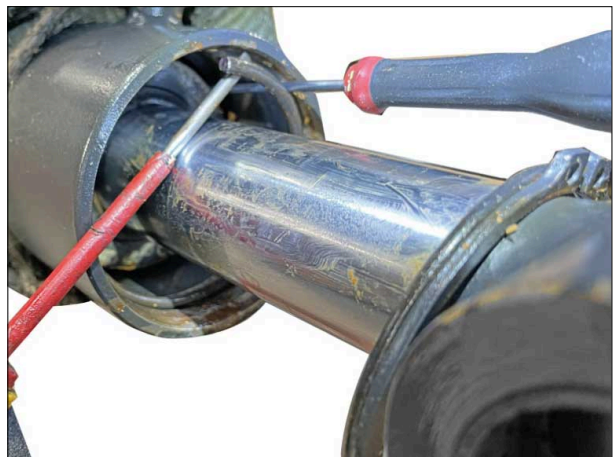
— Unscrew the ram head.

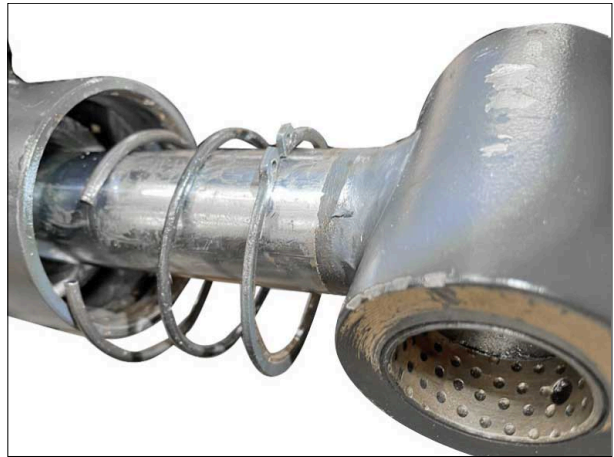


— Move the piston back to expose the snap ring.



— Extract the snap ring from its location.





- Unscrew the piston locking nut.

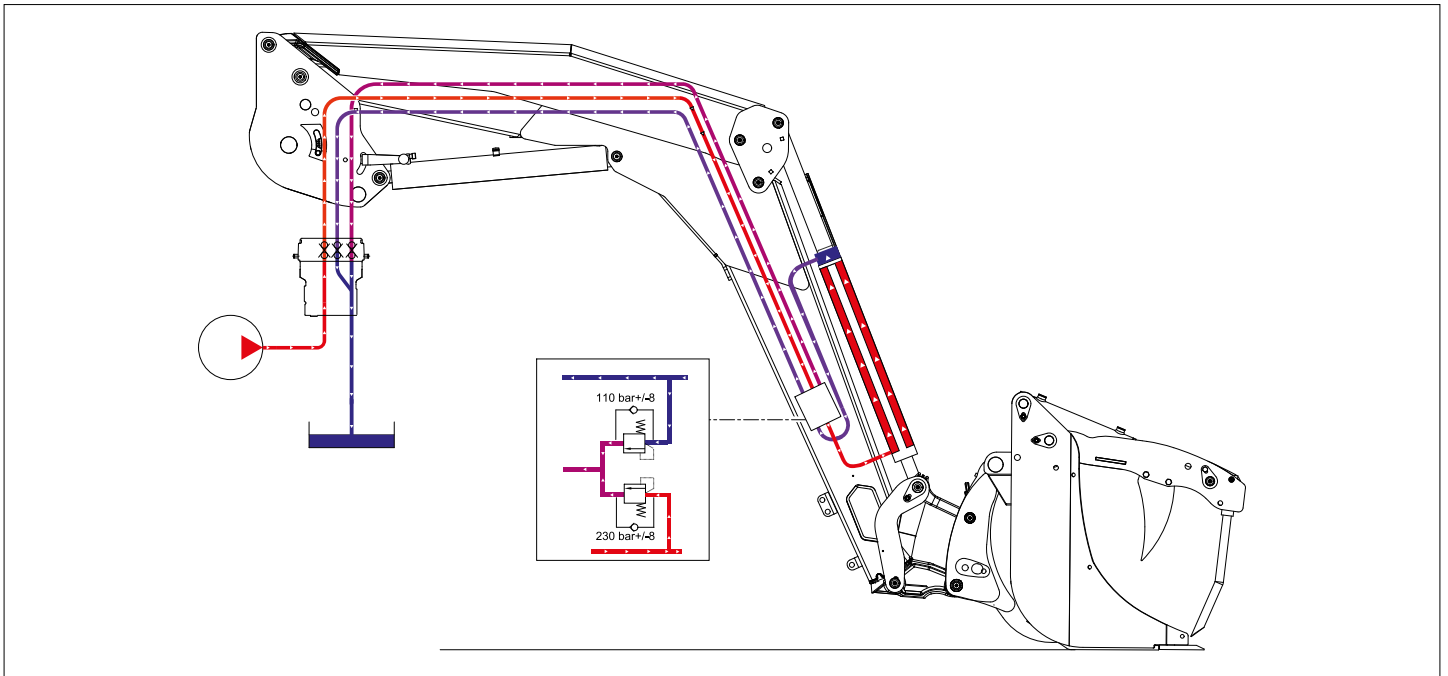


## 8.6. Dumping circuit

The dumping function comprises two movements:

- Crowding is achieved by moving the joystick to the left, and tilts the bucket towards the tractor. This movement is used for filling the bucket.
- Dumping is achieved by moving the joystick to the right, and tilts the bucket forwards. This movement is used for emptying the bucket.

Note: This circuit comprises two dumping rams and a pressure limiter unit, which acts as a shock valve.



### 8.7. Dumping circuit check

- Check that the control valve neutral setting is correct.
- Lower the loader in double action mode.
- Stop the loader approximately 1 m from the ground, then crowd fully.



- Disconnect the left and right hoses at the base-end of the dumping rams.
- Maintain pressure by crowding fully.
- If non-stop dripping or a continuous stream is observed coming from the rams, fit this ram with new seals.



#### 8.7.1. Maintenance: ram seal replacement kit

- Unscrew the ram head.



- Unscrew the piston locking nut.



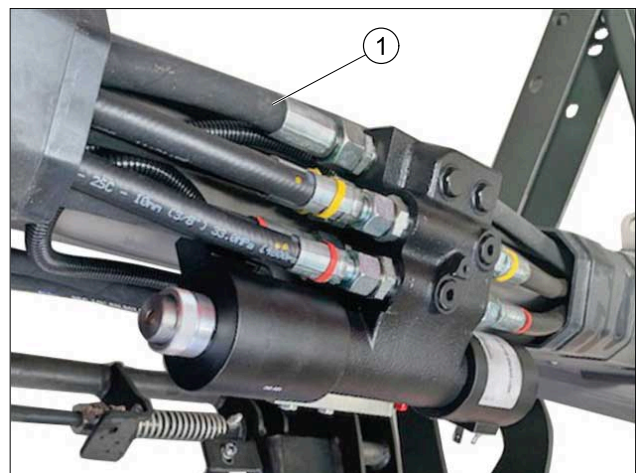
- Unscrew the piston locking nut (other model).



## 8.8. Pressure limiter check

### 8.8.1. Pressure limiter sealing check

- Disconnect the return hose (1) from the pressure limiter.
- If non-stop dripping or a continuous stream is observed coming from the limiter block, replace the limiter block.



### 8.8.2. Checking the dumping pressure limiter

- Fit a pressure gauge with a tee-fitting on the dumping line of the MACH System housing.
- Dump the implement fully, then raise the loader.
- Read the pressure on the pressure gauge as the loader is lifting. This pressure should be between 100 and 120 bar, if not, replace the pressure limiter.



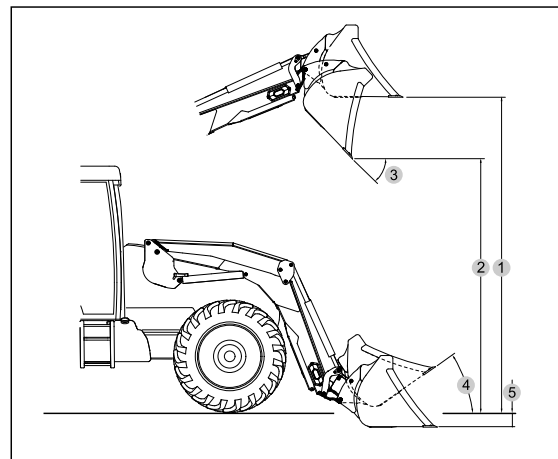
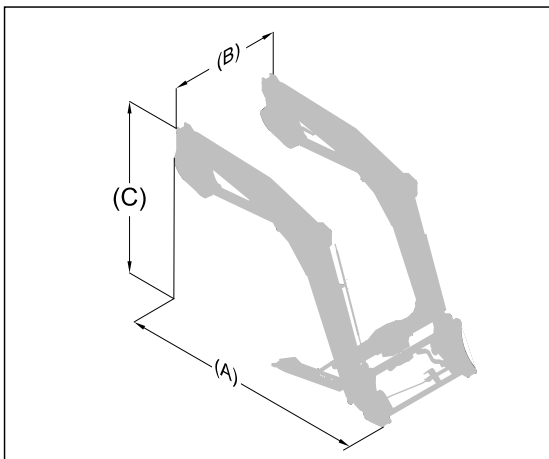
### 8.8.3. Checking the crowding pressure limiter

- Fit a pressure gauge with a tee-fitting on the crowding line of the MACH System housing.
- Crowd the implement until it stops and raise the loader fully.
- Lower the loader in double action mode.
- Read the pressure on the pressure gauge while lowering. This pressure should be between 220 and 240 bar; if not, replace the limiter block.



### 8.9. Loader performance

Check the values measured against the loader specifications listed below:



	U503	U504	U505	U506	U506+	U507	U508	U508+	U509	U510	U510+
<b>Tractor power</b>	40 - 100	40 - 100	50 - 120	50 - 120	50 - 120	80 - 130	80 - 130	80 - 130	90 - 180	90 - 180	90 - 180
<b>Parallelogram</b>	NO	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
<b>Dimensions</b>											
Footprint (A)	2.32 m	2.31 m	2.43 m	2.43 m	2.44 m	2.52 m	2.52 m	2.53 m	2.60 m	2.61 m	2.61 m
Footprint (B)	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m
Height (C)	1.63 m	1.72 m	1.75 m	1.84 m	1.84 m	1.80 m	1.89 m	1.89 m	1.86 m	1.95 m	1.95 m
<b>Lifting range</b>											
<b>Maximum height at implement pivot*</b>	3.50 m	3.50 m	3.70 m	3.70 m	3.70 m	3.85 m	3.85 m	3.85 m	4.00 m	4.00 m	4.00 m
Maximum height under horizontal bucket (1) #	3.25 m	3.25 m	3.45 m	3.45 m	3.45 m	3.60 m	3.60 m	3.60 m	3.75 m	3.75 m	3.75 m
Maximum height under dumped bucket (2) #	2.70 m	2.70 m	2.90 m	2.90 m	2.90 m	3.05 m	3.05 m	3.05 m	3.20 m	3.20 m	3.20 m
<b>Working angles</b>											
Dumping angle at full height (3) #	50°	50°	52°	52°	52°	52°	52°	52°	52°	52°	52°
Crowding angle (4) #	47°	47°	47°	47°	47°	47°	47°	47°	47°	47°	47°
<b>Digging depth (5) #</b>	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m
<b>Lifting force at implement pivot*</b>	1,820 kg	1,790 kg	2,390 kg	1,860 kg	2,360 kg	2,740 kg	2,320 kg	2,700 kg	2,620 kg	2,570 kg	2,970 kg
<b>Lifting capacity at implement pivot over entire height*</b>	1,620 kg	1,600 kg	2,180 kg	1,700 kg	2,160 kg	2,410 kg	2,050 kg	2,380 kg	2,310 kg	2,280 kg	2,630 kg
<b>Payload at 0.80 m from implement pivot**</b>											
On the ground	1,100 kg	1,350 kg	1,535 kg	1,390 kg	1,815 kg	1,800 kg	1,785 kg	2,115 kg	1,725 kg	2,015 kg	2,355 kg
2 m from ground	1,035 kg	1,365 kg	1,485 kg	1,430 kg	1,865 kg	1,600 kg	1,785 kg	2,110 kg	1,550 kg	2,010 kg	2,325 kg
3 m from ground	965 kg	1,365 kg	1,405 kg	1,430 kg	1,865 kg	1,600 kg	1,785 kg	2,110 kg	1,550 kg	2,010 kg	2,325 kg
<b>At max. height</b>	940 kg	1,365 kg	1,370 kg	1,430 kg	1,865 kg	1,535 kg	1,785 kg	2,100 kg	1,490 kg	1,985 kg	2,275 kg
<b>Lifting time</b>	3.1 s	3.1 s	4.3 s	3.5 s	4.3 s	5 s	4.3 s	5 s	5 s	5 s	5.7 s
<b>Dumping time</b>	1.4 s	1.4 s	1.4 s	1.4 s	1.9 s	1.6 s	1.9 s	2.2 s	1.6 s	1.9 s	2.2 s
<b>Max. weight</b>	518 kg	573 kg	543 kg	613 kg	620 kg	566 kg	641 kg	650 kg	607 kg	694 kg	698 kg

	<b>U511</b>	<b>U512</b>	<b>U512+</b>	<b>U514</b>	<b>U514+</b>
<b>Tractor power</b>	110 - 230	110 - 230	110 - 230	120 - 260	120 - 260
<b>Parallelogram</b>	NO	YES	YES	YES	YES
<b>Dimensions</b>					
Footprint (A)	2.75 m	2.75 m	2.75 m	2.80 m	2.80 m
Footprint (B)	1.24 m	1.24 m	1.24 m	1.24 m	1.24 m
Height (C)	1.93 m	2.02 m	2.02 m	2.16 m	2.16 m
<b>Lifting range</b>					
<b>Maximum height at implement pivot*</b>	4.20 m	4.20 m	4.20 m	4.50 m	4.50 m
Maximum height under horizontal bucket (1) #	3.95 m	3.95 m	3.95 m	4.25 m	4.25 m
Maximum height under dumped bucket (2) #	3.40 m	3.40 m	3.40 m	3.70 m	3.70 m
<b>Working angles</b>					
Dumping angle at full height (3) #	50°	51°	51°	50°	50°
Crowding angle (4) #	47°	47°	47°	47°	47°
<b>Digging depth (5) #</b>	0.20 m	0.20 m	0.20 m	0.20 m	0.20 m
<b>Lifting force at implement pivot*</b>	2,410 kg	2,370 kg	2,750 kg	2,700 kg	3,120 kg
<b>Lifting capacity at implement pivot over entire height*</b>	2,170 kg	2,140 kg	2,470 kg	2,360 kg	2,720 kg
<b>Payload at 0.80 m from implement pivot**</b>					
On the ground	1,620 kg	1,880 kg	2,235 kg	2,180 kg	2,555 kg
2 m from ground	1,555 kg	1,890 kg	2,200 kg	2,150 kg	2,515 kg
3 m from ground	1,480 kg	1,880 kg	2,200 kg	2,125 kg	2,490 kg
<b>At max. height</b>	1,430 kg	1,880 kg	2,200 kg	2,090 kg	2,490 kg
<b>Lifting time</b>	5 s	5 s	5.7 s	6 s	6.8 s
<b>Dumping time</b>	1.6 s	1.9 s	2.2 s	2.3 s	2.3 s
<b>Max. weight</b>	633 kg	751 kg	755 kg	802 kg	804 kg

Specifications determined at 195 bar and a flow rate of 60 litres/min. Data may vary depending on the type of tractor being equipped.

# Values given for an earth bucket.

\* Only payloads are counted. The values at ground level and at the implement pivot cannot be used.

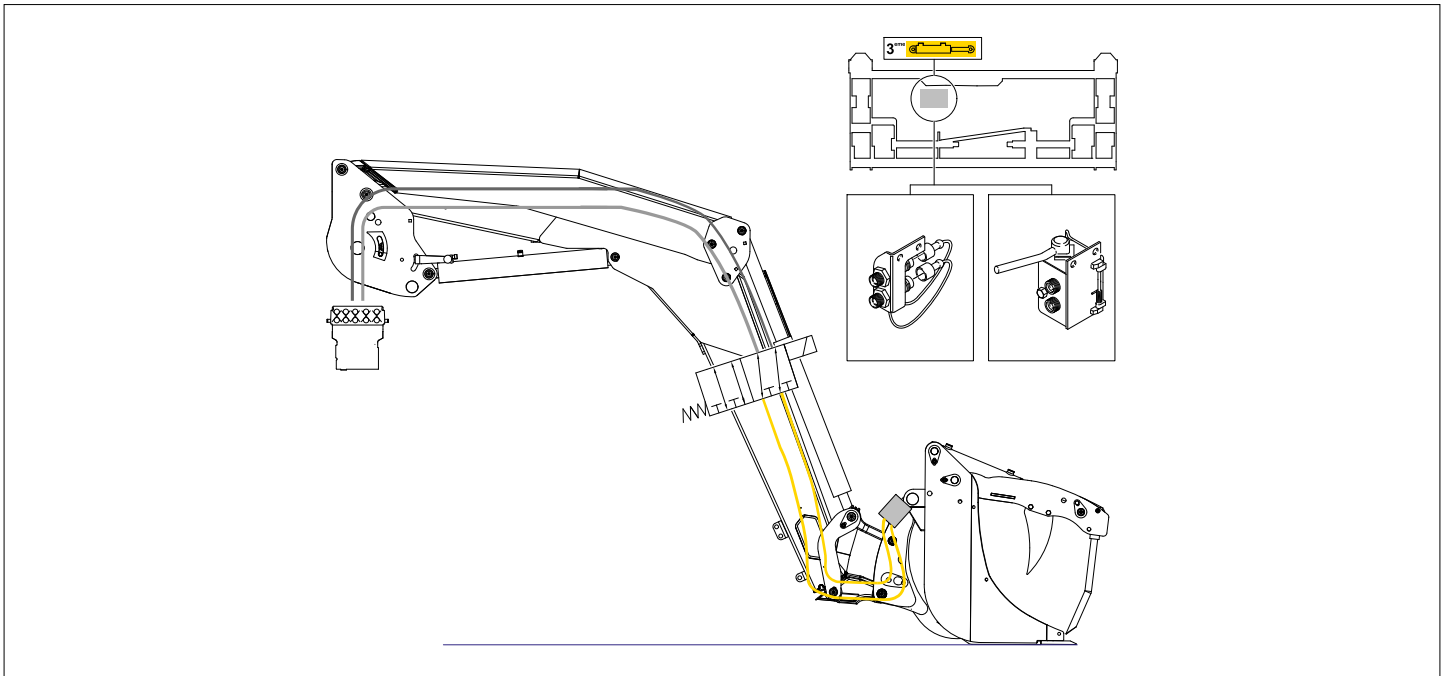
\*\* The payload is calculated using a 180 kg implement.

## 8.10. 3rd function circuit

### Operating principle

This is used for implements requiring hydraulic function (grab), this circuit consists of a solenoid valve built into the pressure limiter.

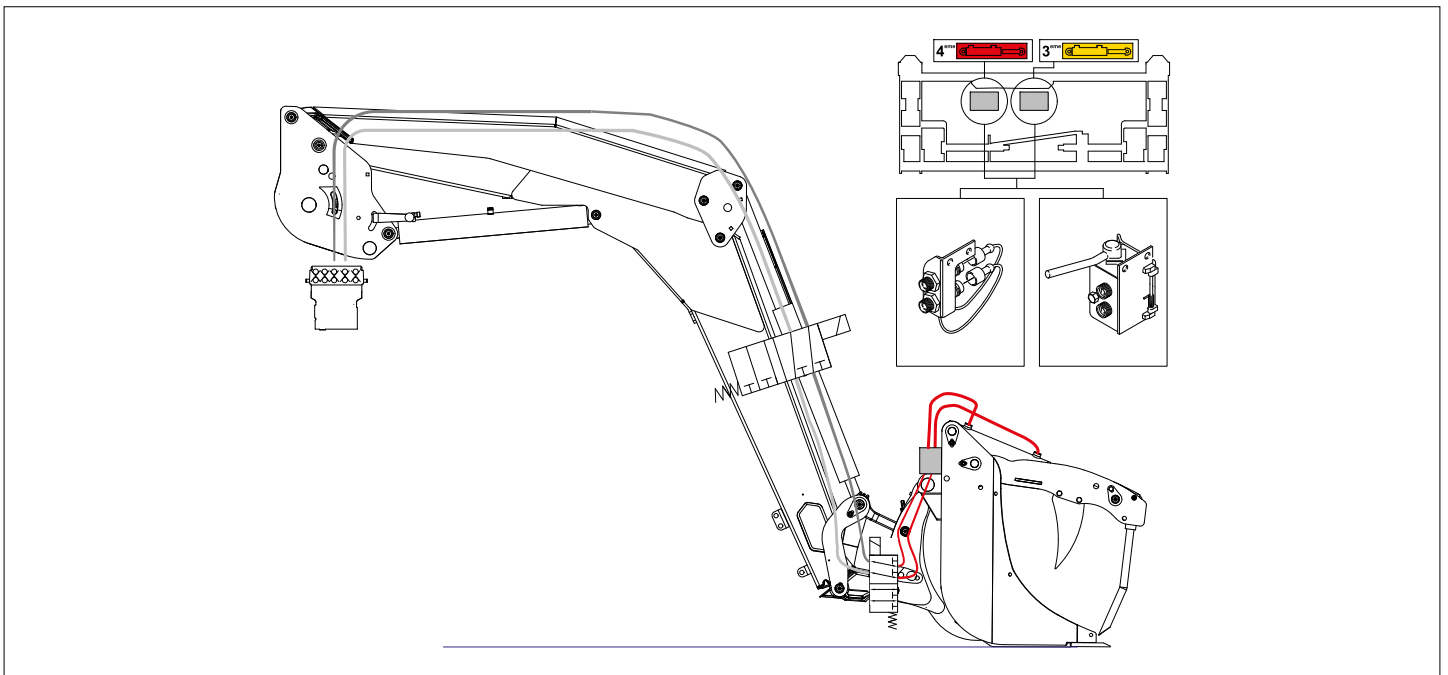
This solenoid valve uses the oil supplied by the dumping control valve to divert it to the loader's front-end in order, for instance, to power the grab on an implement.



### 8.11. 4th function circuit

#### Operating principle

Additional solenoid valve for operating implements with two hydraulic functions. E.g. feeding bucket, high-lift bale handler.



### 8.12. FAST-LOCK System circuit

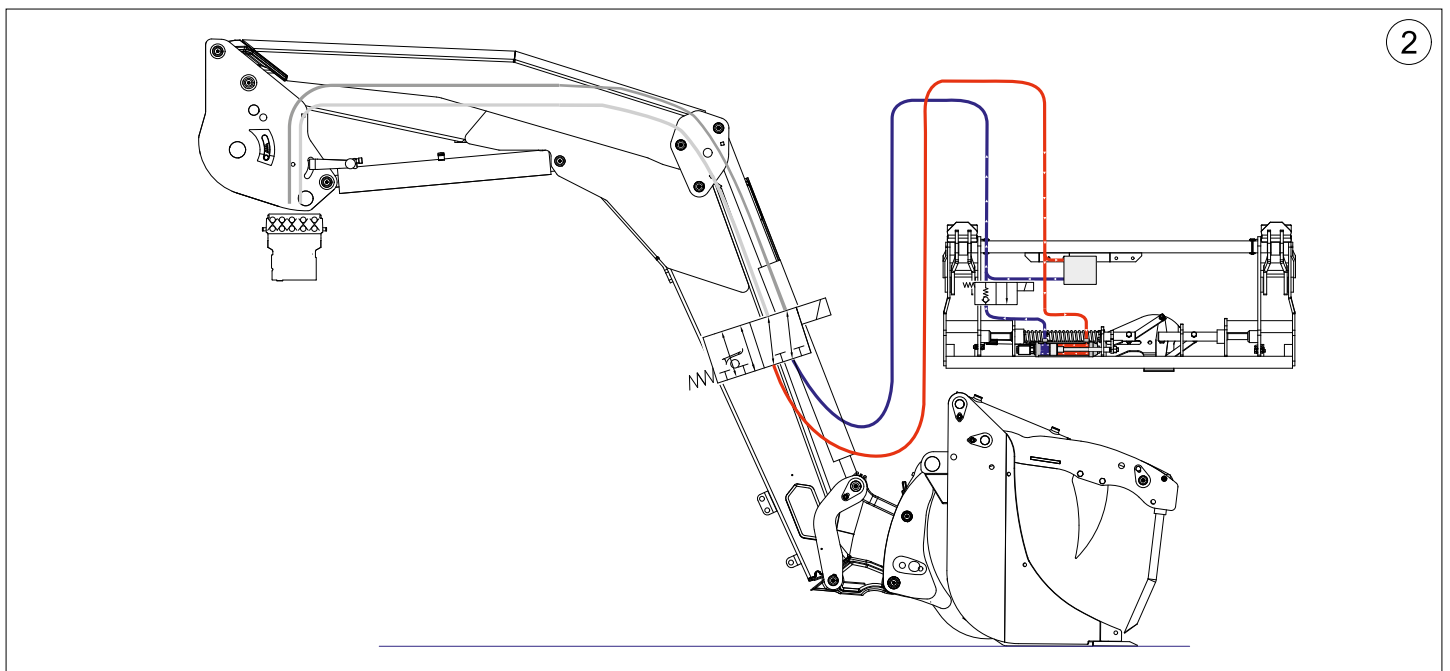
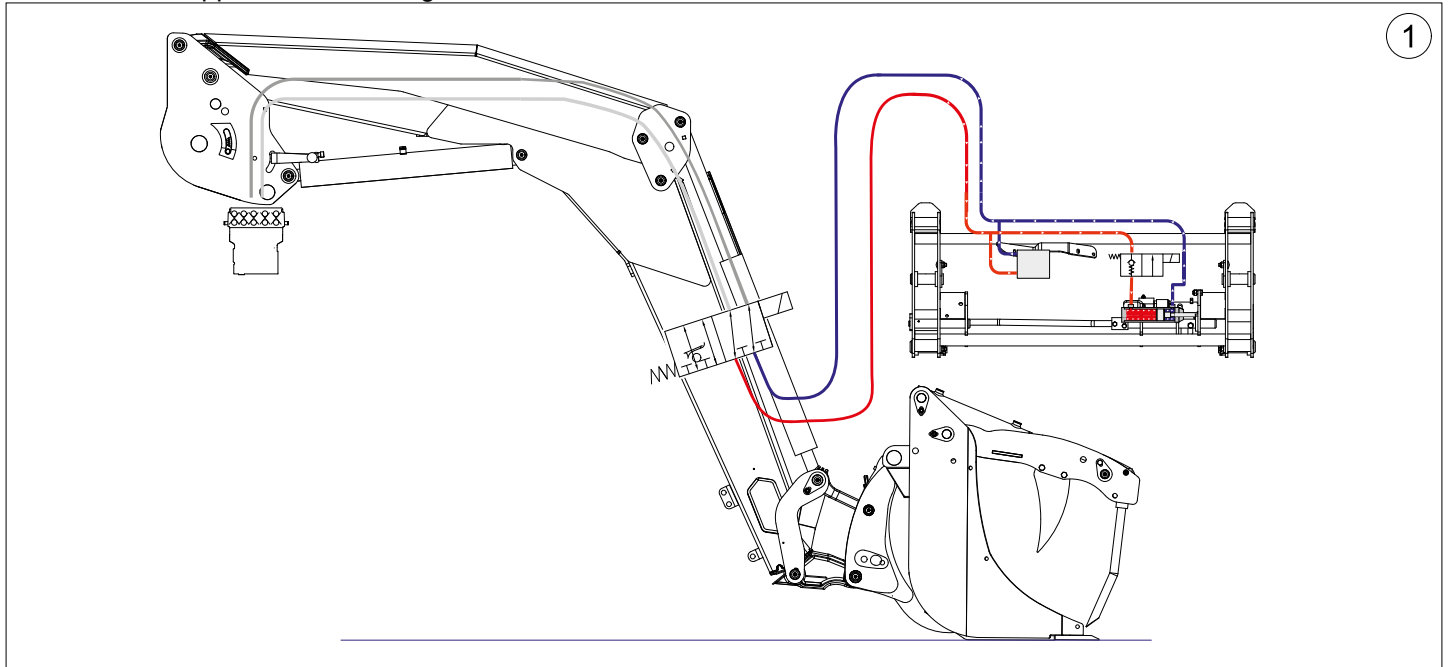
#### Operating principle

This function enables implements without hydraulic function to be unhitched from the cab (earth bucket, manure fork).

To prevent any inadvertent unlocking, three operations must be performed simultaneously to release the implement:

- Press the 3rd function button.
- Press the FAST-LOCK System button.
- Pull the monolever to the left.

The oil from the dumping circuit is thereby diverted by the 3rd function solenoid valve to the FAST-LOCK System solenoid valve which supplies the unlocking ram.



(1) MX/EURO implement carrier frame

(2) Combined MX/EURO implement carrier

## 8.13. AUTO-LEVEL System

### Operating principle

Automatic implement level reset, using the AUTO-LEVEL System (optional), is available for loaders controlled with MX "e-PILOT S" control valves.

The AUTO-LEVEL System operates both ways: crowding and dumping.

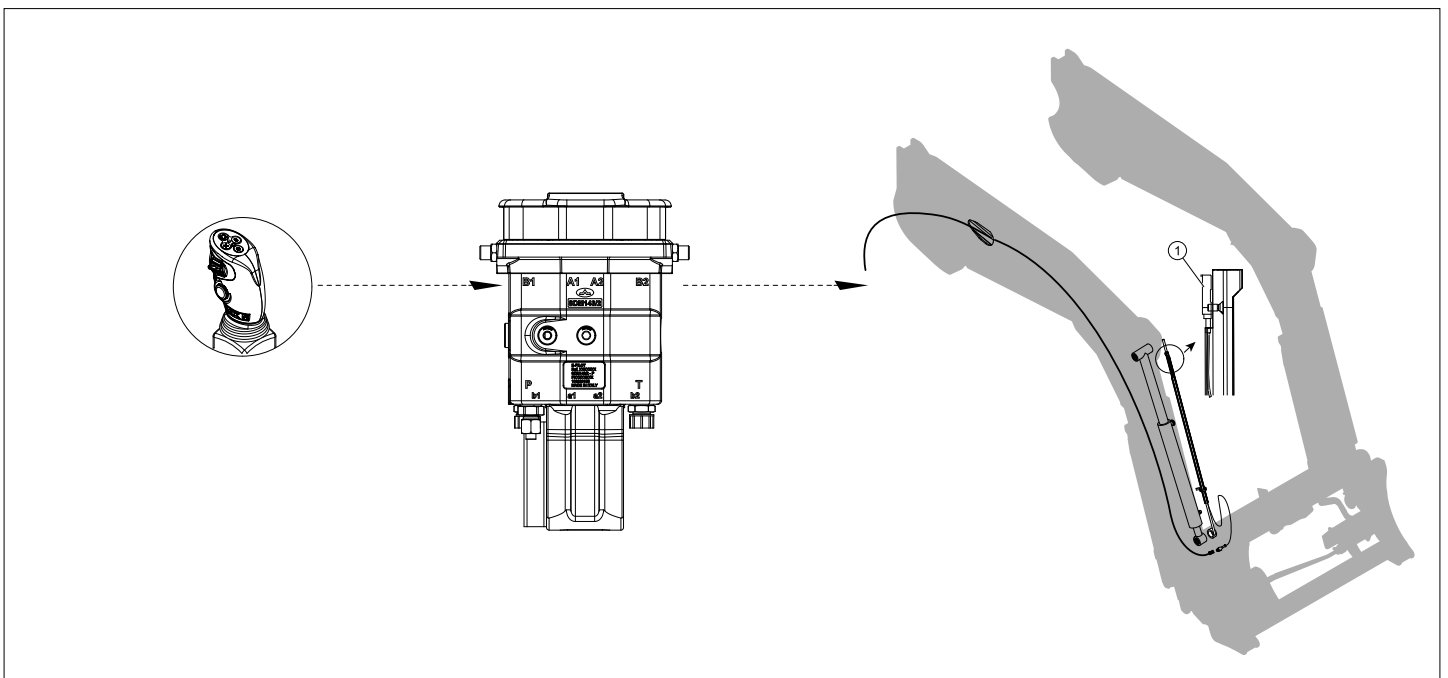
If the implement is dumped when the AUTO-LEVEL System is activated, the loader crowds. If the implement is crowded, the loader dumps.

The operator sets the position to which they wish the implement to return. Once this position has been established, they set the level indicator to place it in front of the electronic sensor.

When the implement is dumped, if the user activates the AUTO-LEVEL System, a current is sent to a solenoid valve which controls the dumping spool in the crowding function.

The electrical circuit stops being powered once the sensor detects the arrival of the rod on the instruction.

The system works on the same principle when the implement is crowded.



(1) Sensor

## 8.14. AUTO-UNLOAD System

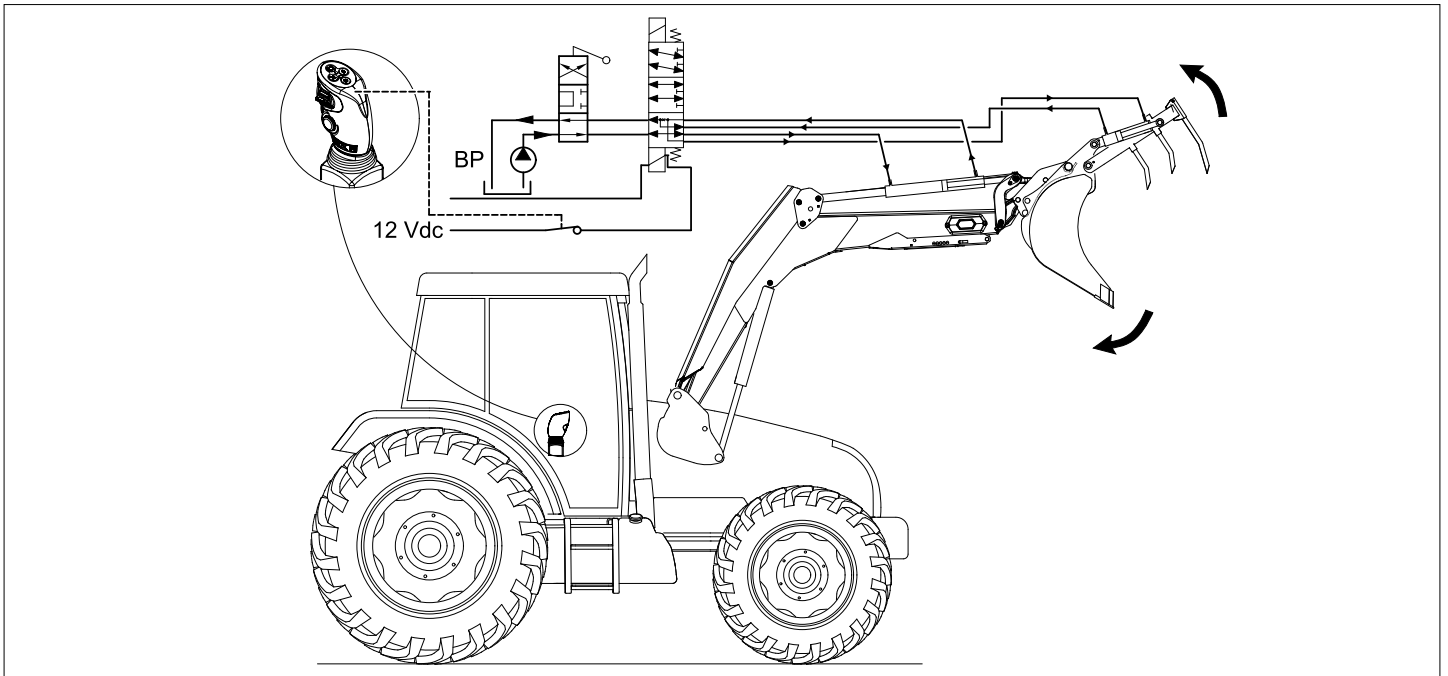
### Operating principle

This option enables an automatic grab operating mode relative to the dumping circuit movements to be selected.

It is often used for repetitive operations, such as moving manure, etc.

In hydraulic terms, the AUTO-UNLOAD System circuit consists of a double solenoid valve. The neutral position corresponds to the conventional use of the dumping circuit, the second position corresponds to the conventional use of the 3rd function mode and the third position corresponds to the AUTO-UNLOAD System operating mode.

In this third position, the oil coming from the control valve is sent to the loader dumping circuit and recycled to the grab opening circuit. The other way round, the oil is directed to the crowding and grab closing circuits.

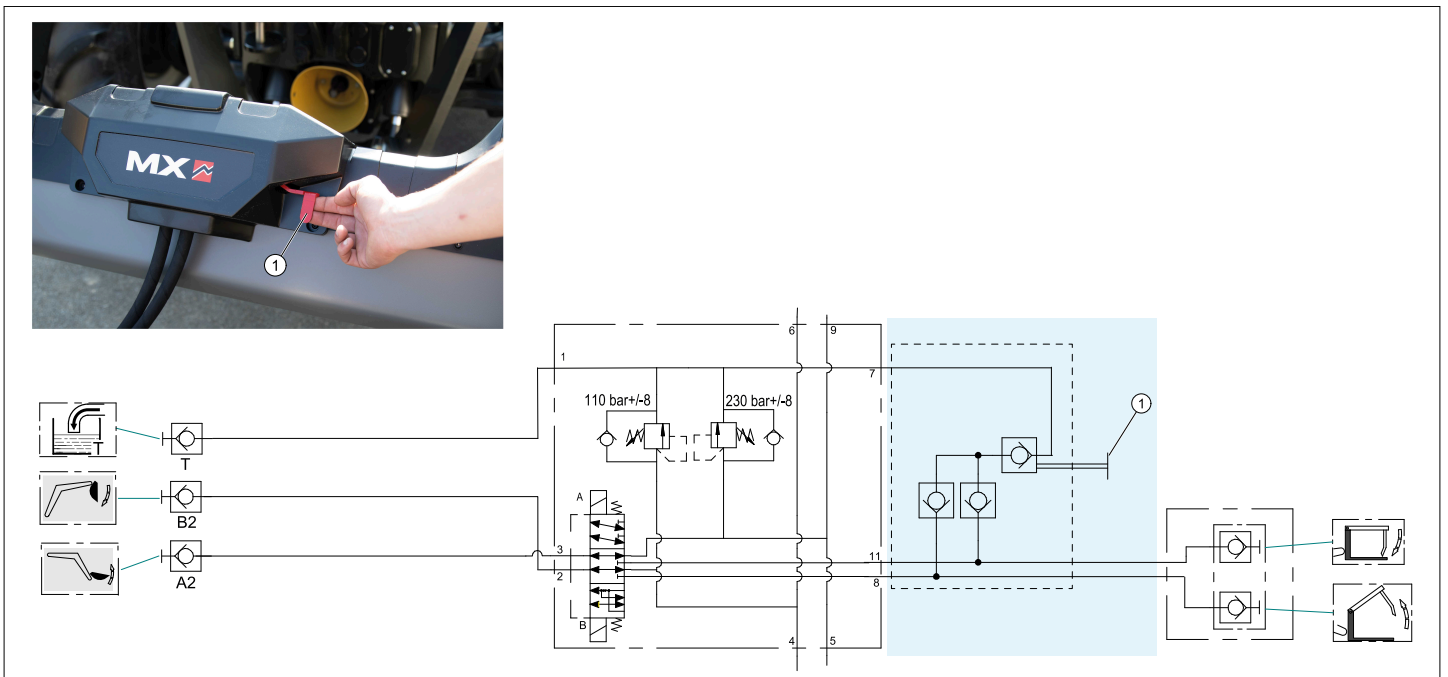


## 8.15. EASY PLUG

### Operating principle

The decompression function (optional) releases the pressure in the implement carrier's hoses, to facilitate the connection/disconnection of the MACH 2 housing or the couplings.

Pulling on the decompression handle causes the pressurised oil to return to the couplings.



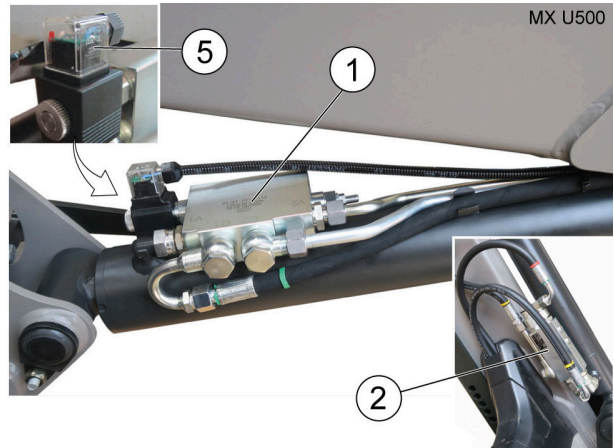
## 8.16. Use of the lifting and dumping safety device

The hydraulic circuit of the lifting and dumping rams is fitted with a safety device (1) and (2).

**NOTE:** By default, the safety device is activated.

When the user presses the button in the cab (3) (secure button), the safety device is deactivated and the red indicator lights are illuminated on:

- the button in the cab (3).
- the external button (4).
- the 2 solenoid valve connectors of the lifting rams (5).



Button function (3):

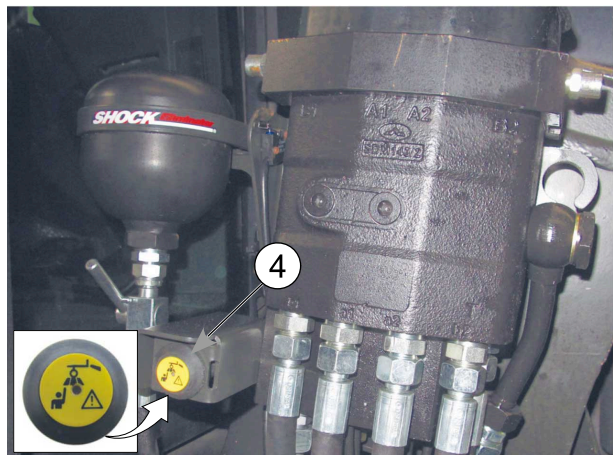
- Press (A): deactivates the safety device.
- Press (B): activates the safety device.

**NOTE:** As soon as the tractor is switched off, the safety device is automatically activated.

**⚠ DANGER:** The safety device should only be deactivated if there is nobody in the vicinity of the load. In this case, the maintained floating position and the Shock Eliminator are compatible. By pressing buttons (3) or (4), the safety device is re-activated (red indicator lights off).



Button (4) is only used to reactivate the safety device from outside the cab. In this case, the red indicator lights go off.



## 8.17. Checking the control valve for internal leaks

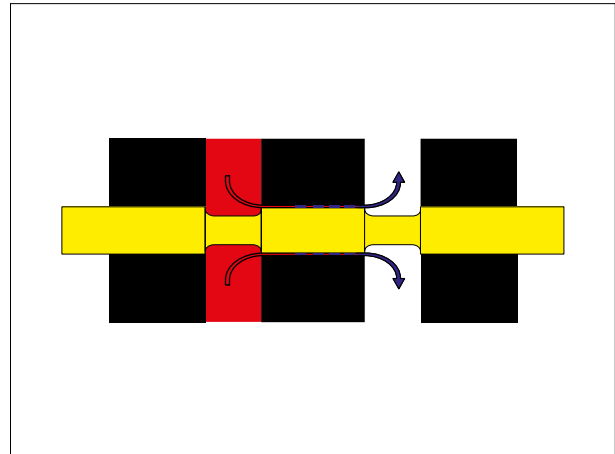
### 8.17.1. Control valve spools

Control devices consist of spool valves with metal-to-metal sealing.

The fit between the control valve body and the spool provides for a smooth and progressive sliding action:

- Clearance of less than 4 microns will result in the spool seizing in the control valve.
- Clearance in excess of 10 microns prevents comfortable use of the loader by the operator.

Notice: It is entirely normal for a loader to lower slightly without any action by the operator when the monolever handle is in neutral.



### 8.17.2. Checking the control valve for internal leaks

**IMPORTANT:** Check the rams for leaks before performing the following checks.

- Check that the control valve neutral setting is correct and that the oil temperature is constant, then load the implement.
- Raise the loader to at least 50 cm above the ground, then stop the tractor's engine.
- Measure the rod extension, wait for 15 mins, then repeat the measurement. Then calculate the difference between the two measurements.
- Measure the rod extension, wait for 15 mins, then repeat the measurement. Then calculate the difference between the two measurements.

$Q = (S \times L) / t$	
Unit	Description
Q	Leak flow rate
S	Active ram surface area
L	Length of rod displacement
t	Time of reading

**IMPORTANT:** The leak value must remain between 4 cm<sup>3</sup>/min and 10 cm<sup>3</sup>/min for normal operation.

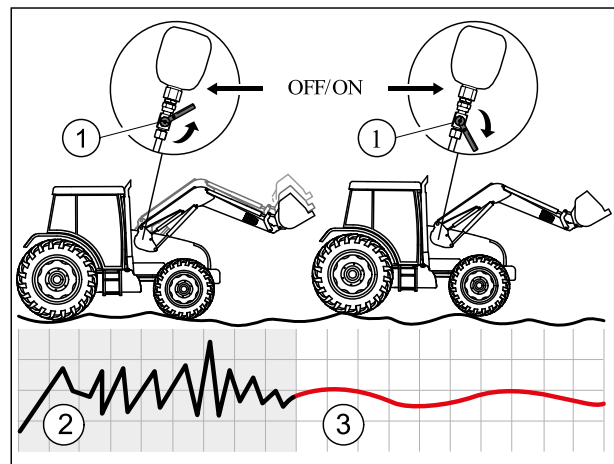
## ACTIVE RAM SURFACE AREA

Loaders	Lifting rams	Dumping rams
MX U514+	100.53 cm <sup>2</sup>	75.40 cm <sup>2</sup>
MX U514	88.36 cm <sup>2</sup>	75.40 cm <sup>2</sup>
MX U512+	100.53 cm <sup>2</sup>	63.22 cm <sup>2</sup>
MX U512	88.36 cm <sup>2</sup>	51.84 cm <sup>2</sup>
MX U511	88.36 cm <sup>2</sup>	47.12 cm <sup>2</sup>
MX U510+	100.53 cm <sup>2</sup>	63.22 cm <sup>2</sup>
MX U510	88.36 cm <sup>2</sup>	51.84 cm <sup>2</sup>
MX U509	88.36 cm <sup>2</sup>	47.12 cm <sup>2</sup>
MX U508+	88.36 cm <sup>2</sup>	63.22 cm <sup>2</sup>
MX U508	76.97 cm <sup>2</sup>	51.84 cm <sup>2</sup>
MX U507	88.36 cm <sup>2</sup>	47.12 cm <sup>2</sup>
MX U506+	76.97 cm <sup>2</sup>	51.84 cm <sup>2</sup>
MX U506	62.34 cm <sup>2</sup>	37.31 cm <sup>2</sup>
MX U505	76.97 cm <sup>2</sup>	37.31 cm <sup>2</sup>
MX U504	66.37 cm <sup>2</sup>	37.31 cm <sup>2</sup>
MX U503	66.37 cm <sup>2</sup>	37.31 cm <sup>2</sup>

### 8.18. SHOCK ELIMINATOR System

Shocks are eliminated during movement or when stopping the loader suddenly when lowering (optional). This system softens impacts on the tractor and jolting in the cab. The Shock Eliminator can be isolated using the valve (1).

**NOTE:** The SHOCK ELIMINATOR can be activated or deactivated directly from the cab (electrical isolation option).



(2) Without the SHOCK ELIMINATOR system

(3) With the SHOCK ELIMINATOR system

### 8.18.1. Checking the SHOCK ELIMINATOR system

Test 1 - Testing conditions	
Valve open test	Valve closed test
<ol style="list-style-type: none"> <li>1. Set the valve to the open position.</li> <li>2. Stop the tractor engine.</li> <li>3. Lower the loader, stopping it approximately 1 m from the ground.</li> <li>4. Observe the loader's behaviour as it is stopping.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set the valve to the closed position.</li> <li>2. Stop the tractor engine.</li> <li>3. Lower the loader, stopping it approximately 1 m from the ground.</li> <li>4. Observe the loader's behaviour as it is stopping.</li> </ol>

Test 1 - Test analysis	
Valve open test	Valve closed test
<p>It should come to a stop smoothly:</p> <ul style="list-style-type: none"> <li>— If so, the Shock Eliminator accumulator is working correctly and the suspension is functioning.</li> <li>— If not, proceed to test 2 and compare.</li> </ul>	<p>The stop should be sharp and immediate.</p>

If both tests result in the same behaviour, this means that the Shock Eliminator accumulator is not working effectively. It should be replaced.

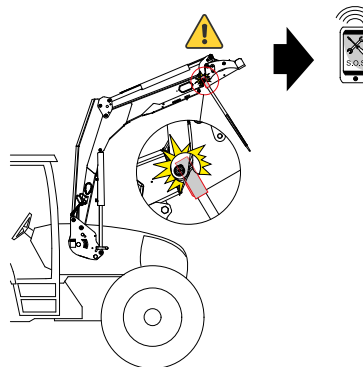
Test 2 - Testing conditions
<ol style="list-style-type: none"> <li>1. Lower the loader to the ground in the floating position.</li> <li>2. Set the valve to the closed position.</li> <li>3. Load the implement with a heavy load.</li> <li>4. Lower the loader to 1 m from the ground.</li> <li>5. Set the valve to the open position.</li> </ol>

Test 2 - Test Analysis
<ul style="list-style-type: none"> <li>— The loader descends slightly: the Shock Eliminator accumulator is working effectively.</li> <li>— The loader does not move: the Shock Eliminator accumulator is no longer effective. It should be replaced.</li> </ul>

### 8.19. L40 - BR15 interference

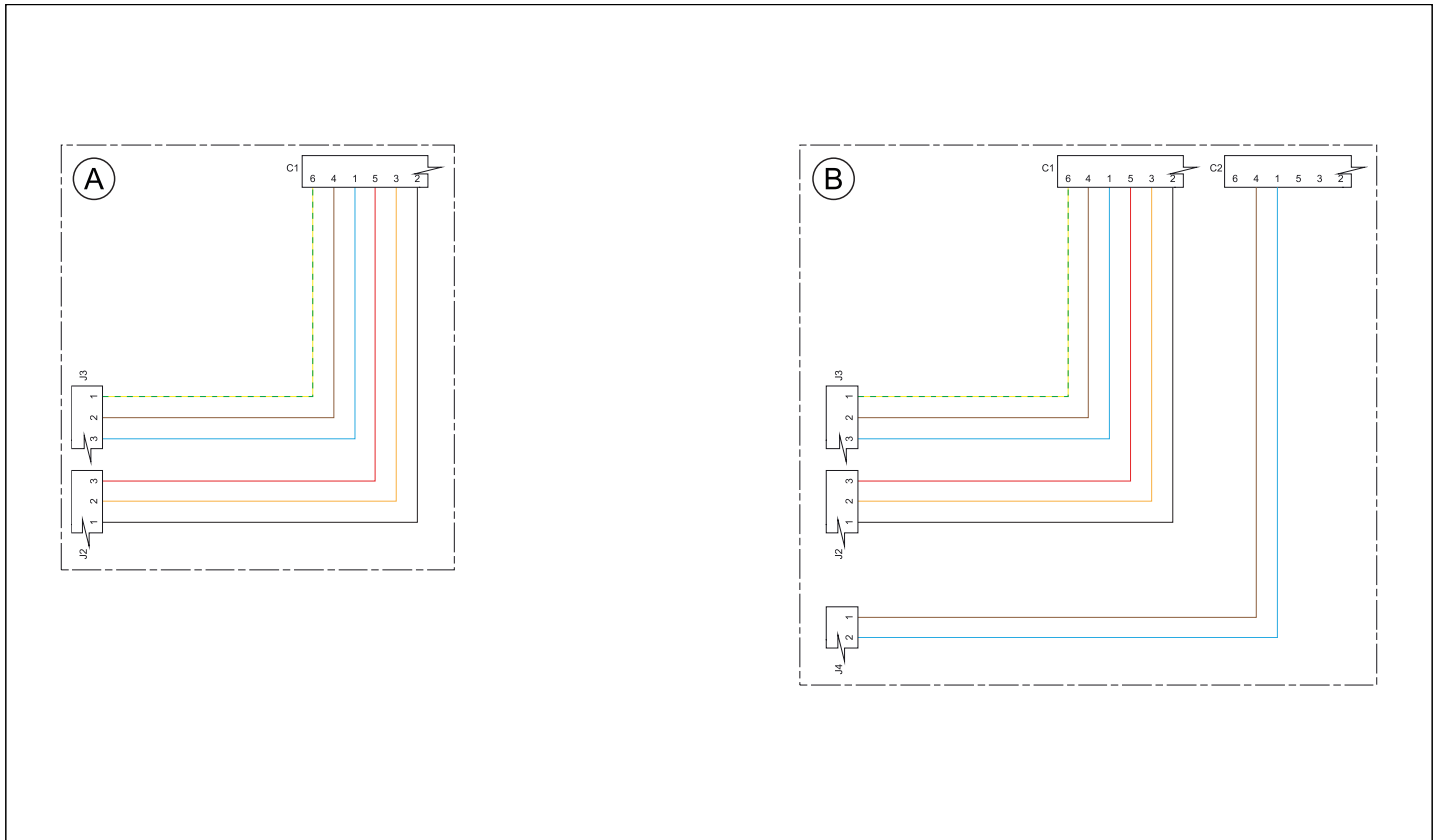
If your loader is hitched to an L40 or BR15 implement, check that there is no interference at the lower crank when dumping.

Note: In there is any interference, please contact the After-Sales Service.



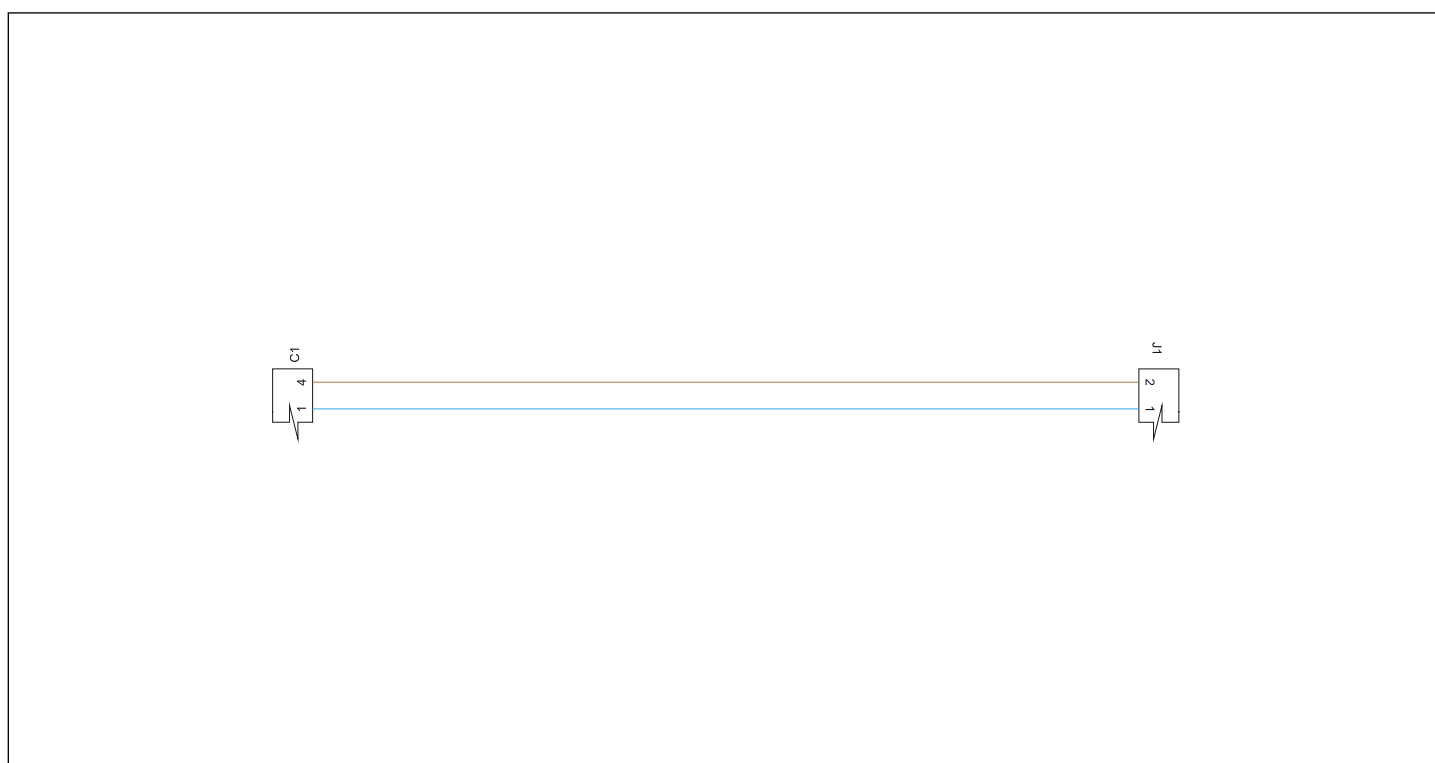
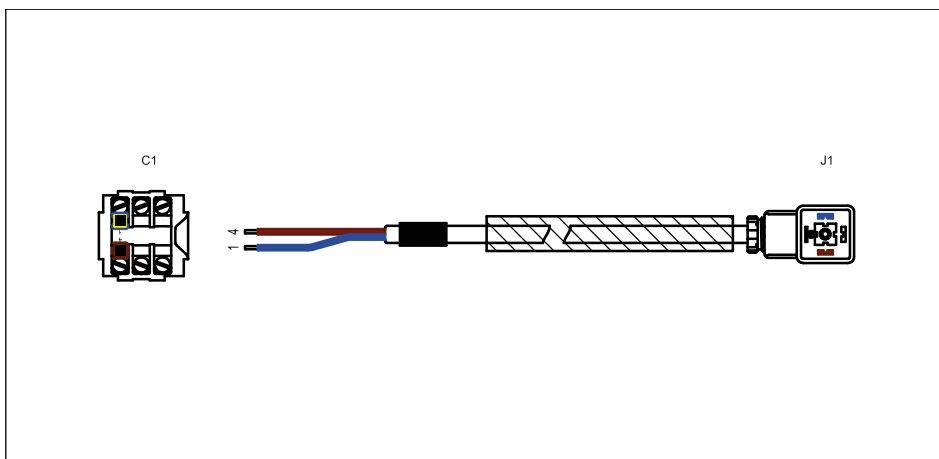
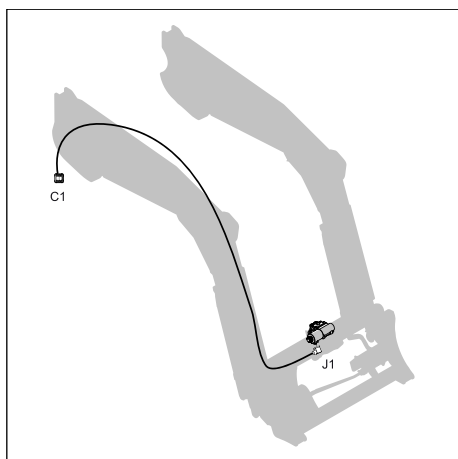
## 9. Loader electrics

### 9.1. MACH System wiring loom



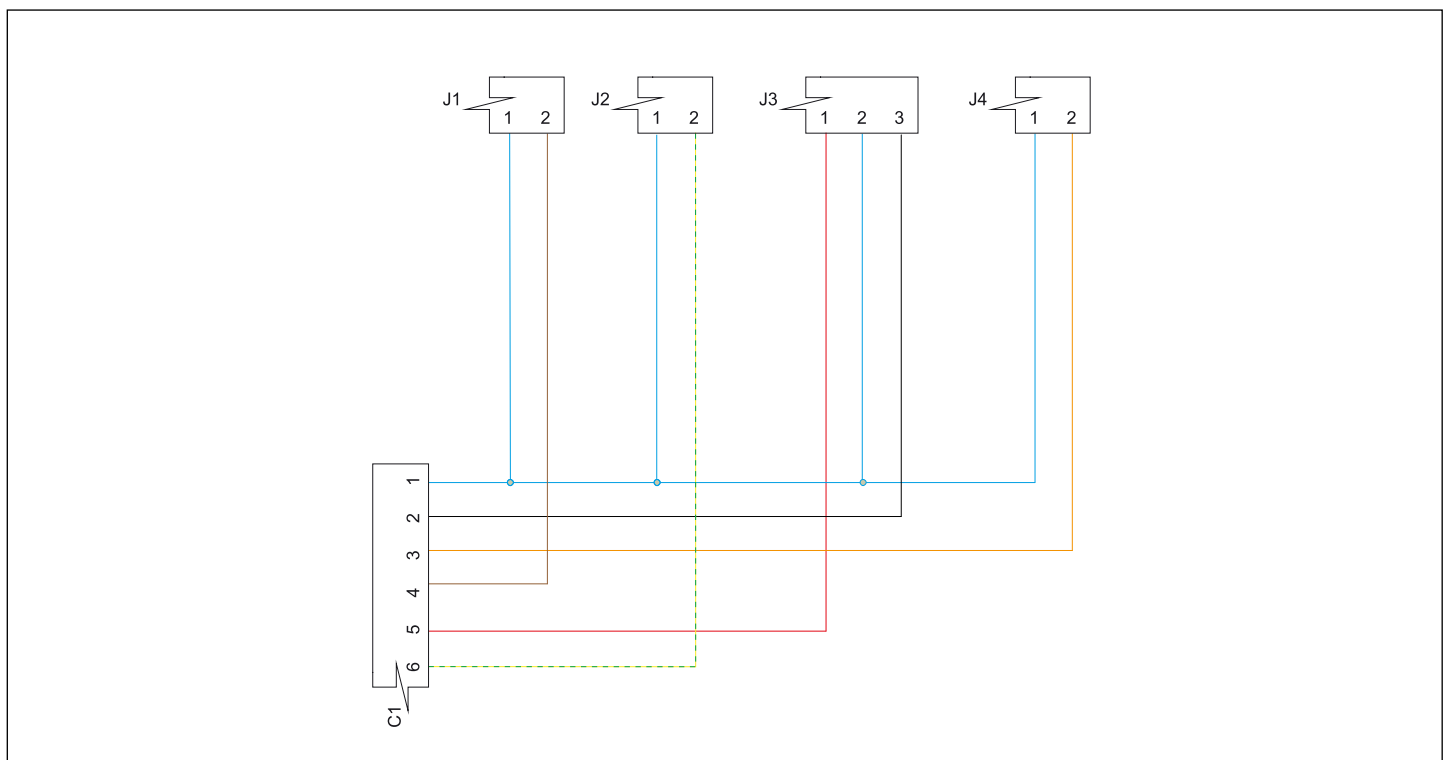
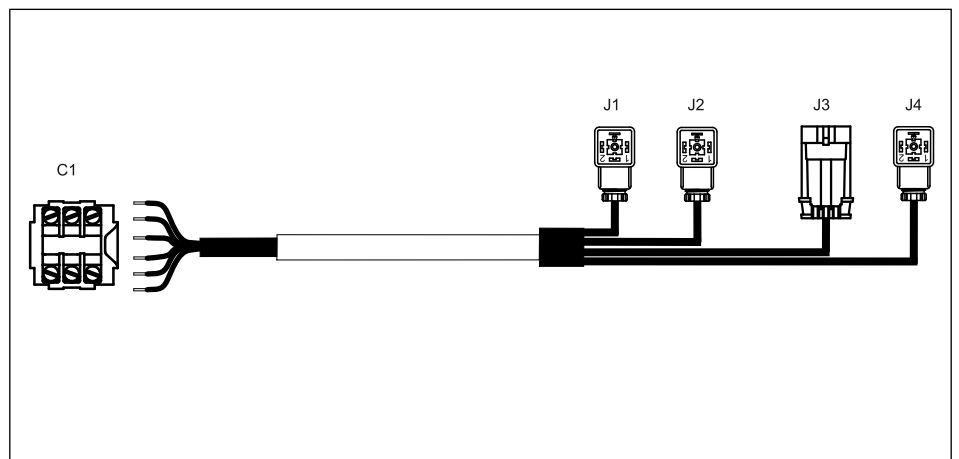
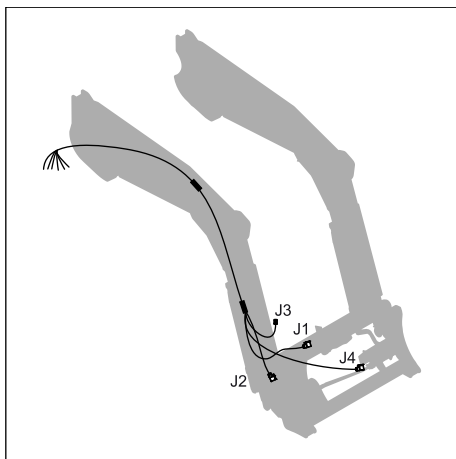
Marking	Description
A	Mach System wiring loom without lifting and dumping safety
B	Mach System wiring loom with lifting and dumping safety
J2	MACH System/tractor connector
J3	MACH System/tractor connector
J4	Lifting and dumping safety wiring loom/MACH System connector
C1	MACH System connector
C2	MACH System connector
J3-1, C1-6	Yellow/green (4th function)
J3-2, C1-4	Brown (3rd function)
J3-3, C1-1	Blue (- Ground)
J2-1, C1-2	Black (AUTO-LEVEL)
J2-2, C1-3	Orange (FAST-LOCK)
J2-3, C1-5	Red (+ 12 V)
J4-1, C2-4	Brown (Lifting/dumping safety or work headlights)
J4-2, C2-1	Blue (- Ground)

## 9.2. 3rd function wiring loom - 545772



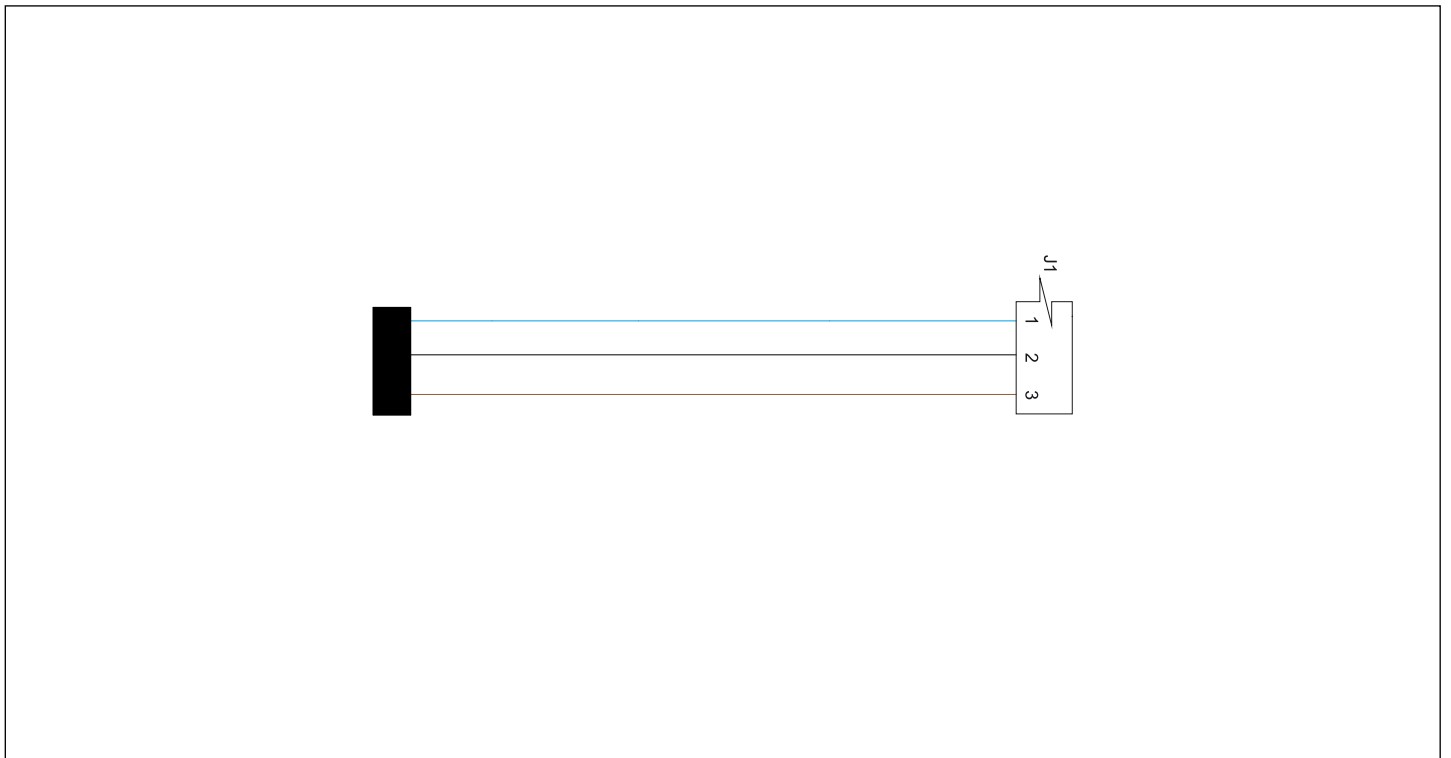
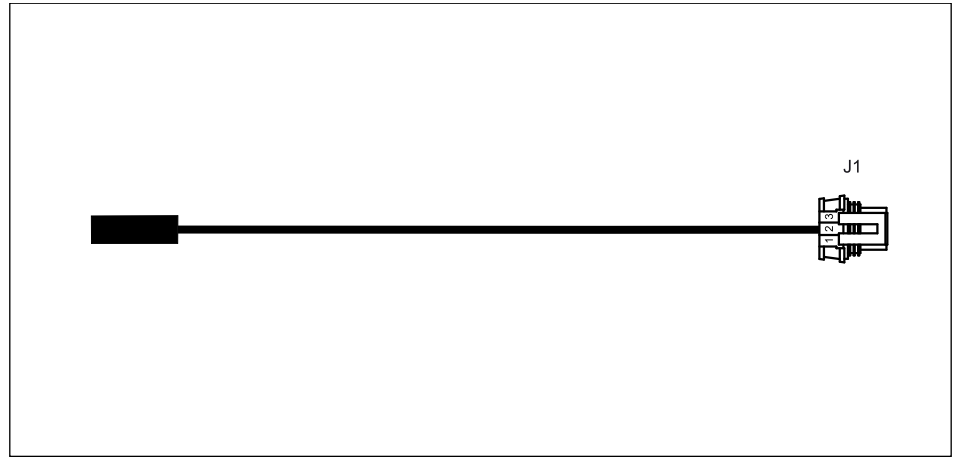
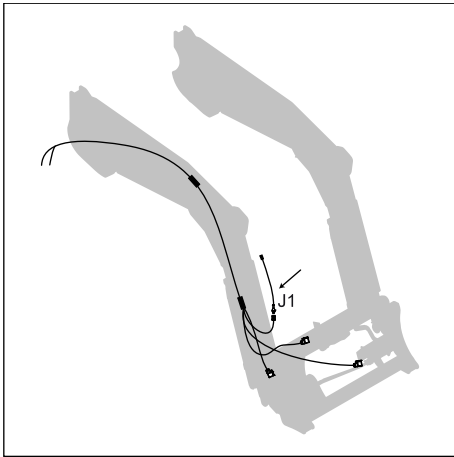
Marking	Description
C1	MACH System connector
J1	3rd function solenoid valve connector
C1-4, J1-2	Brown (3rd function)
C1-1, J1-1	Blue (- Ground)

### 9.3. 3rd function, 4th function, FAST-LOCK and AUTO-LEVEL wiring loom - 578034



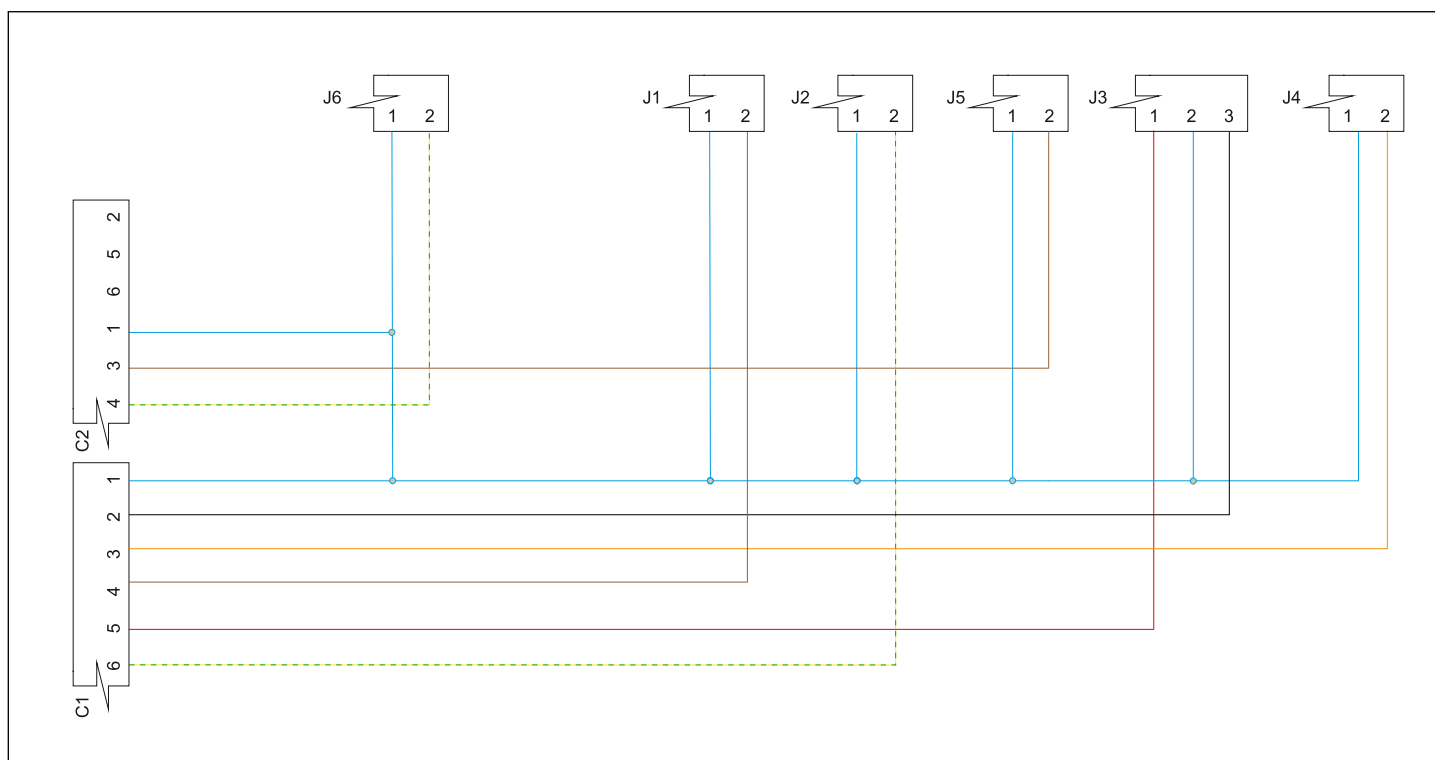
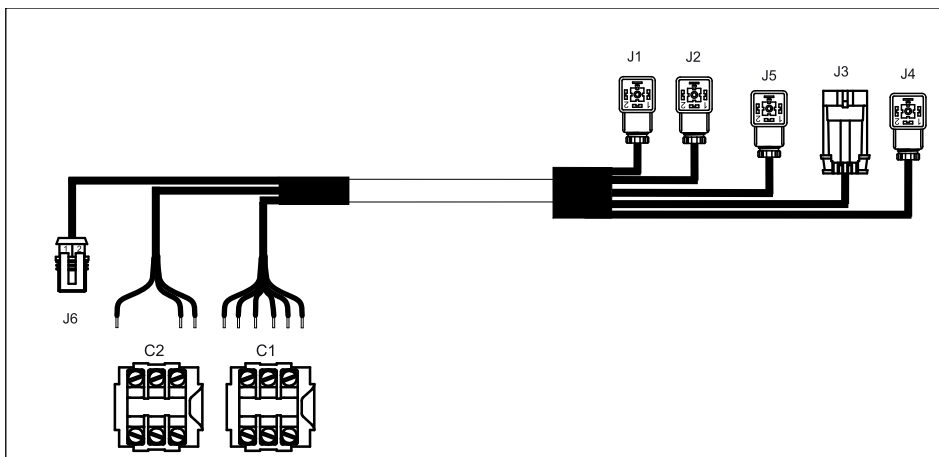
Marking	Description
C1	MACH System connector
J1	3rd function solenoid valve connector
J2	4th function solenoid valve connector
J3	AUTO-LEVEL connector
J4	FAST-LOCK connector
C1-1, J1-1, J2-1, J3-2, J4-1	Blue (- Ground)
C1-2, J3-3	Black (AUTO-LEVEL)
C1-4, J1-2	Brown (3rd function)
C1-5, J3-1	Red (+ 12 V)
C1-6, J2-2	Yellow/green (4th function)

## 9.4. AUTO-LEVEL sensor wiring loom 579310



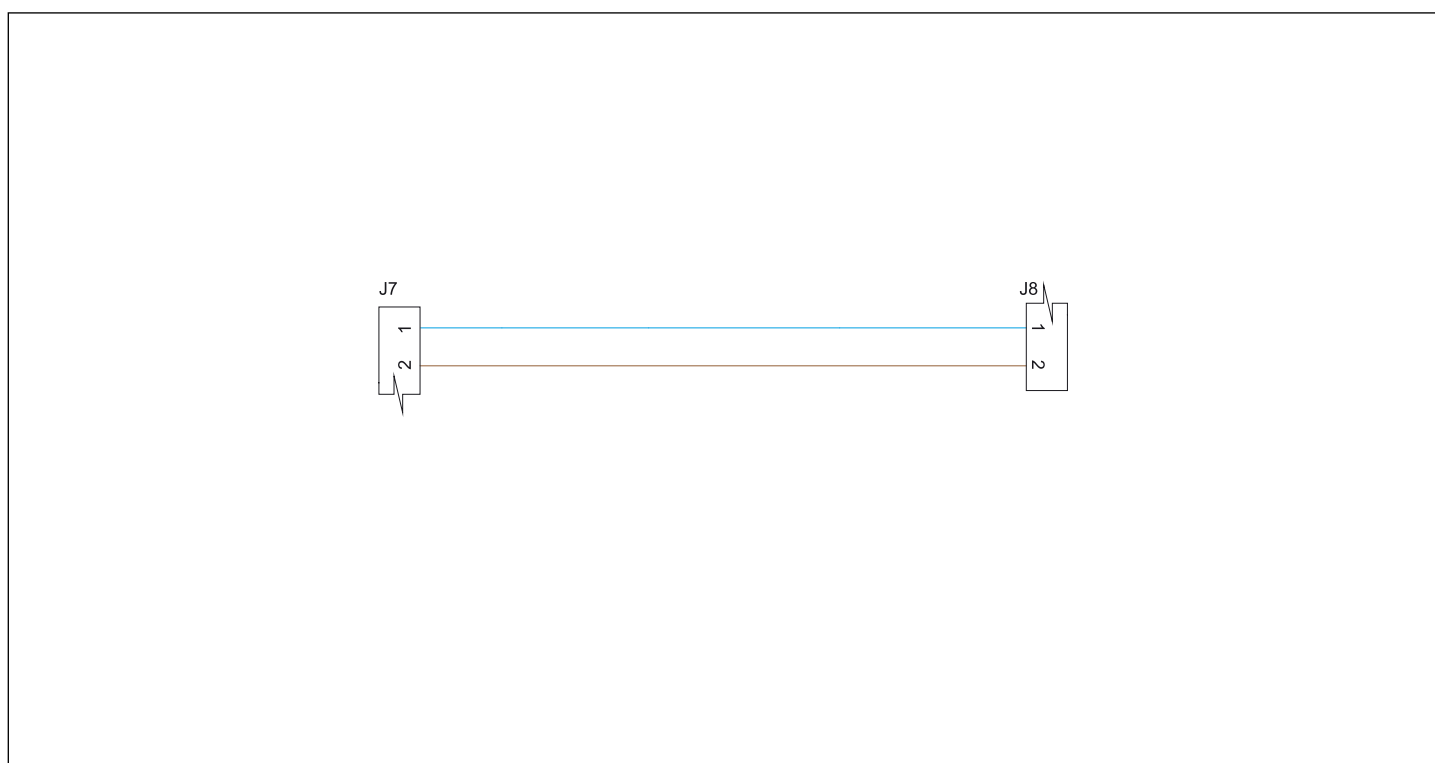
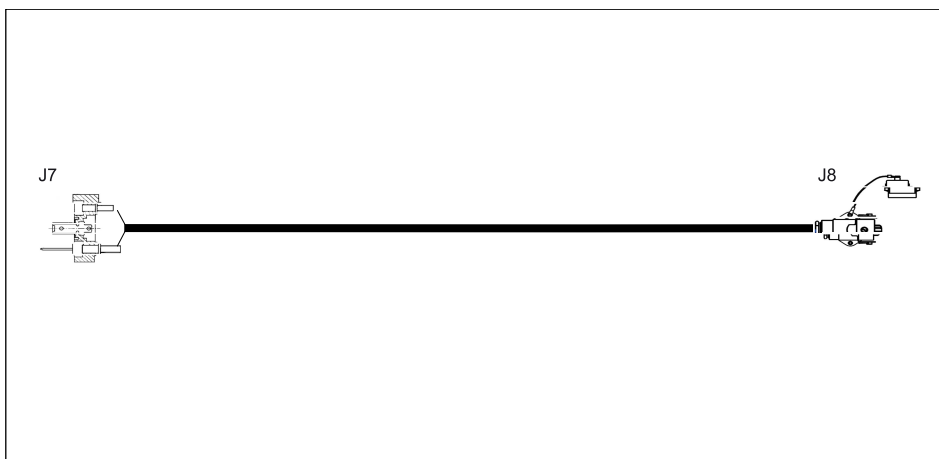
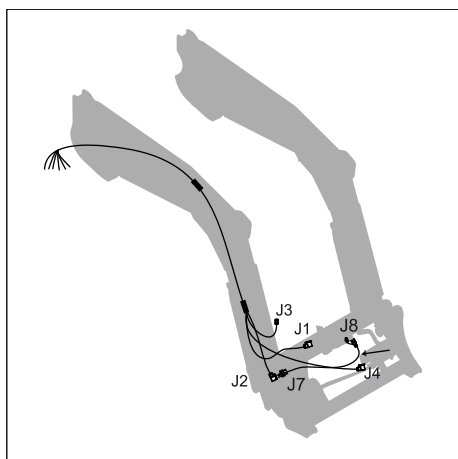
Marking	Description
J1	AUTO-LEVEL sensor connector

### 9.5. 3rd function, 4th function, FAST-LOCK, AUTO-LEVEL and AUTO-UNLOAD wiring loom - 578036



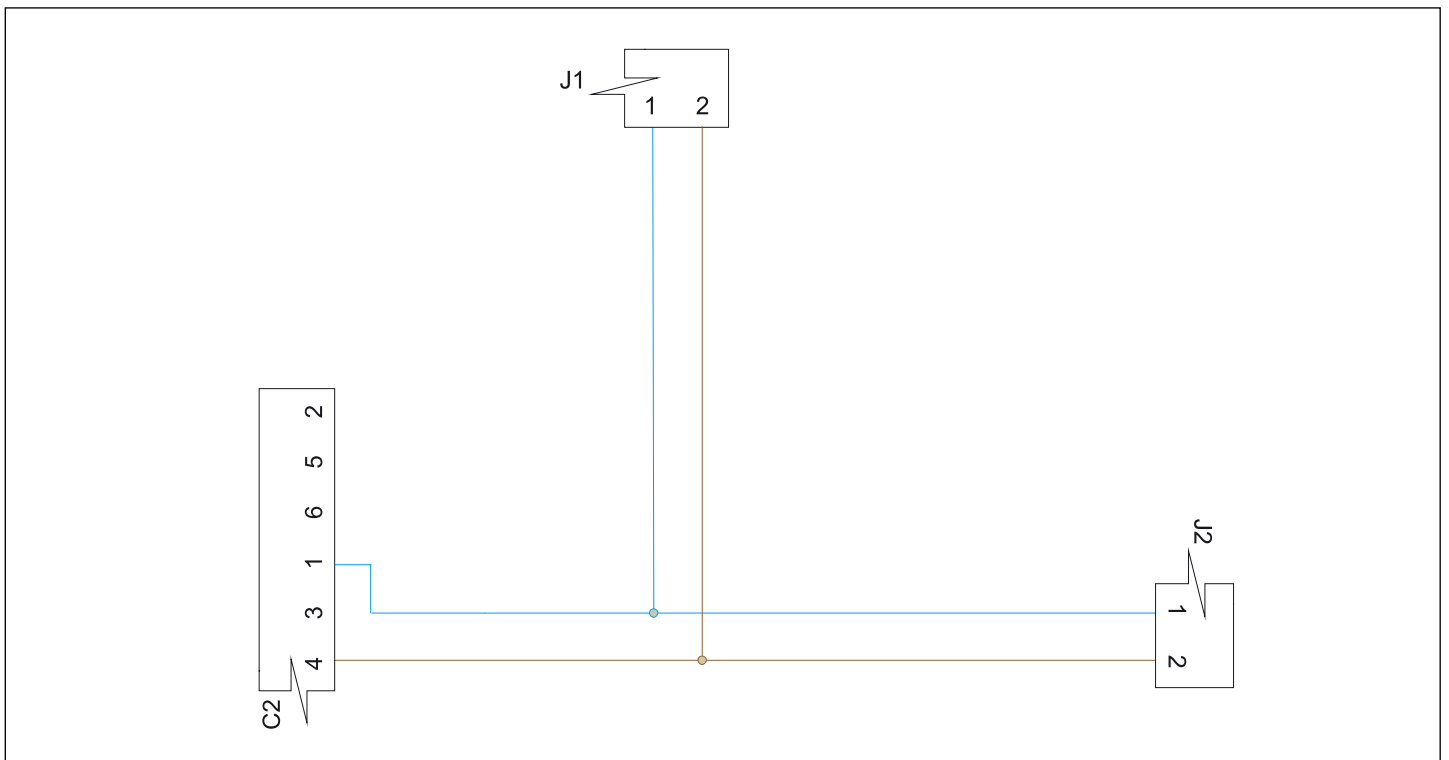
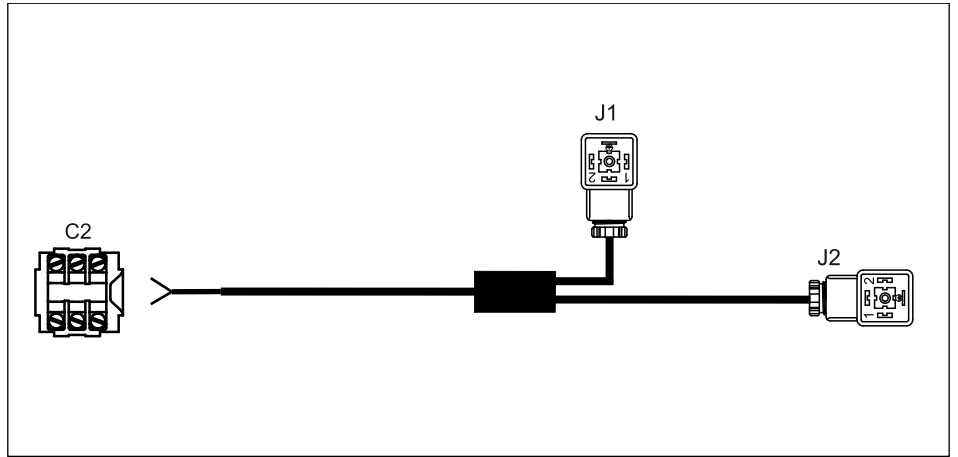
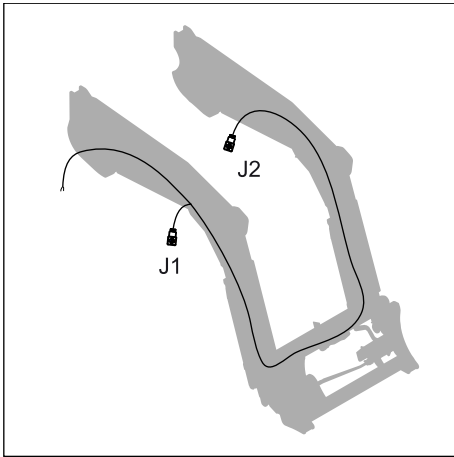
Marking	Description
C1	MACH System connector
C2	MACH System connector
J1	3rd function solenoid valve connector
J2	4th function solenoid valve connector
J3	AUTO-LEVEL connector
J4	FAST-LOCK connector
J5	AUTO-UNLOAD connector
J6	Lifting/dumping safety connector
C1-1, C2-1 J1-1, J2-1, J3-2, J4-1, J5-1, J6-1	Blue (- Ground)
C1-2, J3-3	Black (AUTO-LEVEL)
C1-3, J4-2	Orange (FAST-LOCK)
C1-4, J1-2	Brown (3rd function)
C1-5, J3-1	Red (+ 12 V)
C1-6, J2-2	Yellow/green (4th function)
C2-4, J6-2	Yellow/green (Lifting/dumping safety)

## 9.6. 4th function wiring loom on implement - 581327



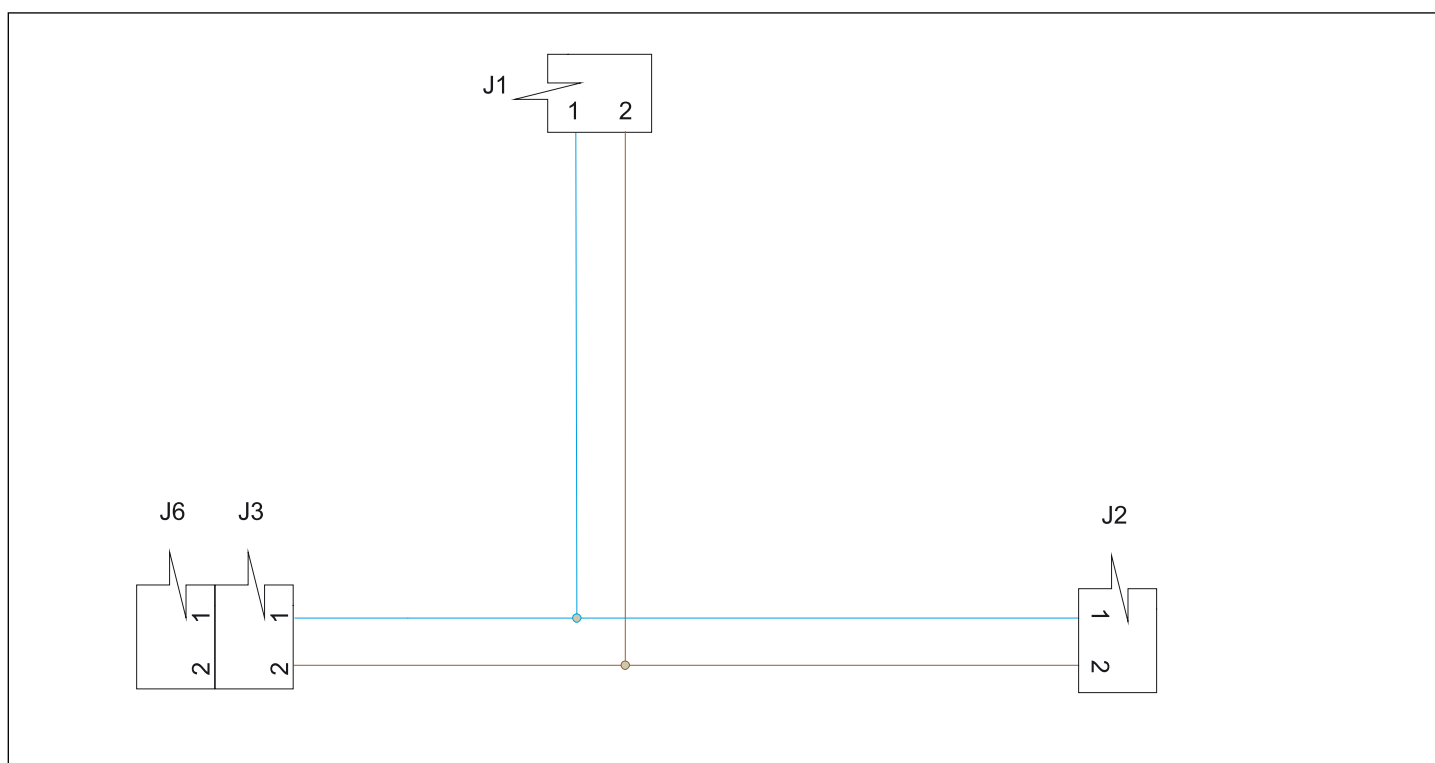
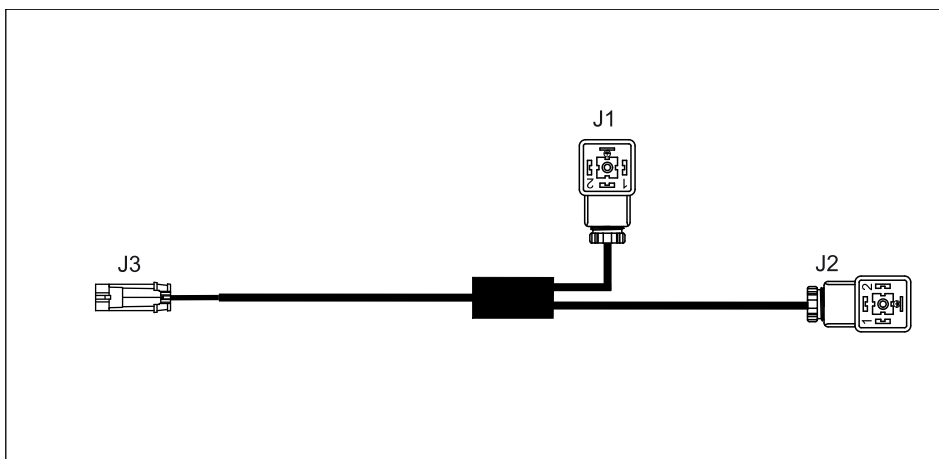
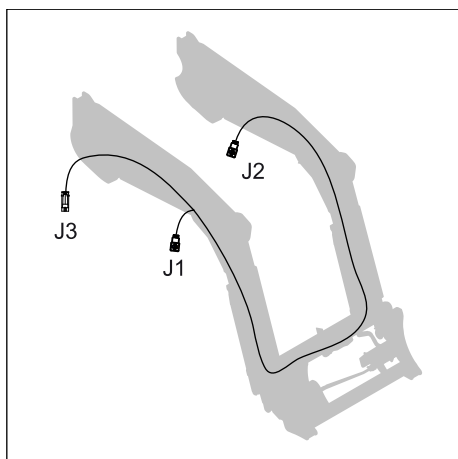
Marking	Description
J7, J8	4th function connector on implement
J7-1, J8-1	Blue (- Ground)
J7-2, J8-6	Brown (4th function)

## 9.7. Safety wiring loom - 525760 (without AUTO-UNLOAD option)



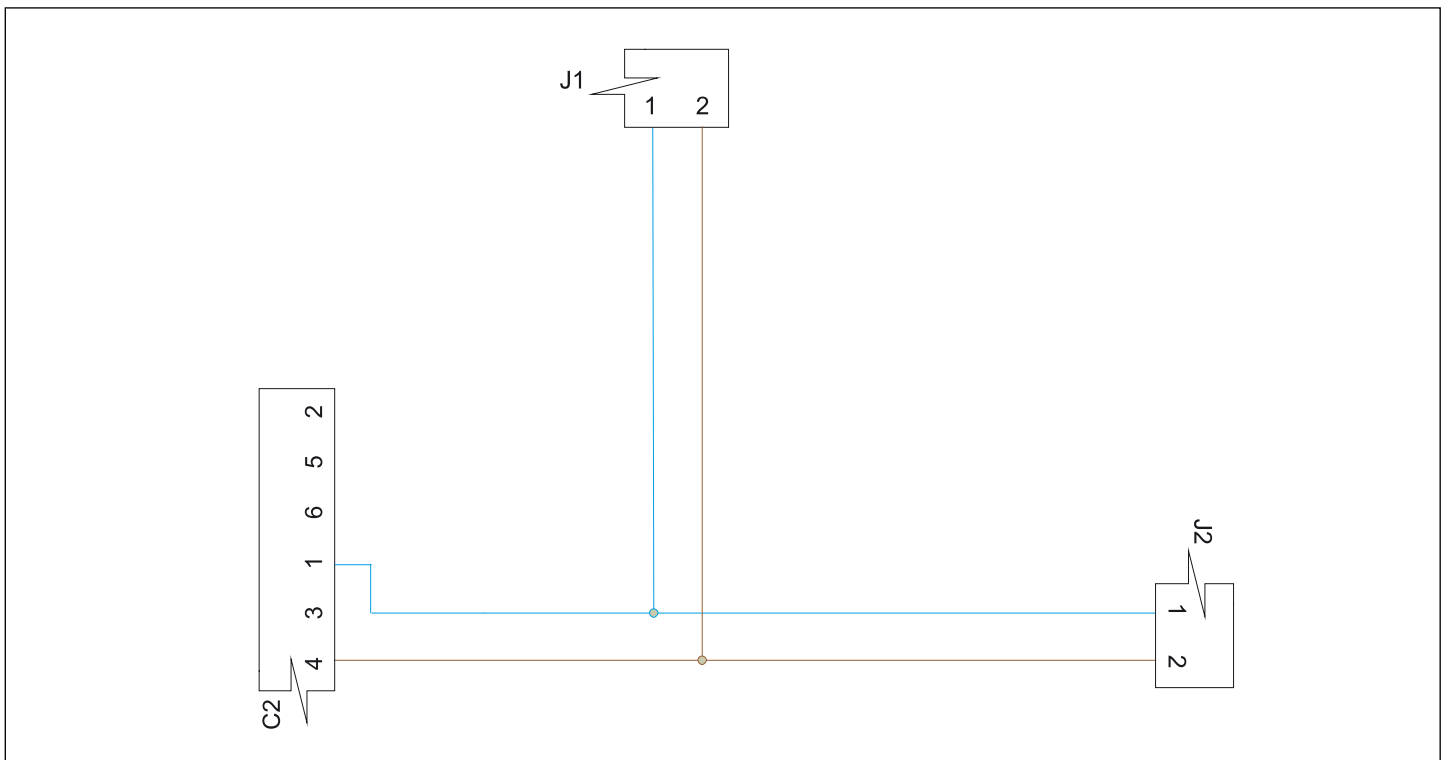
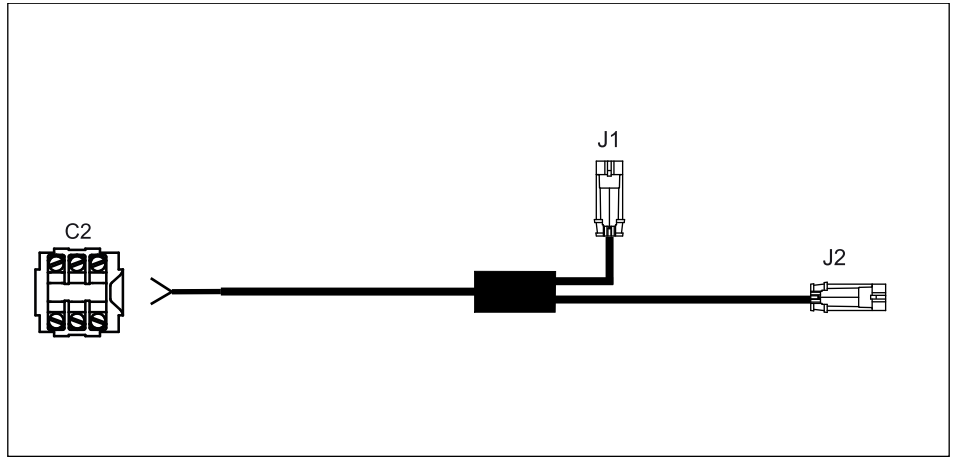
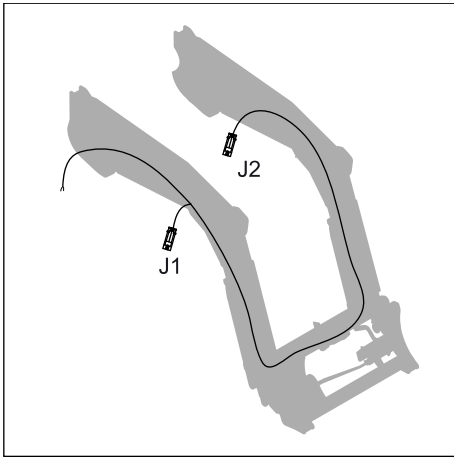
Marking	Description
J1, J2	Lifting/dumping safety connector
J1-1, J2-1, C2-1	Blue (- Ground)
J1-2, J2-2, C2-4	Brown (Lifting/dumping safety)

### 9.8. Safety wiring loom - 546591 (with AUTO-UNLOAD option)



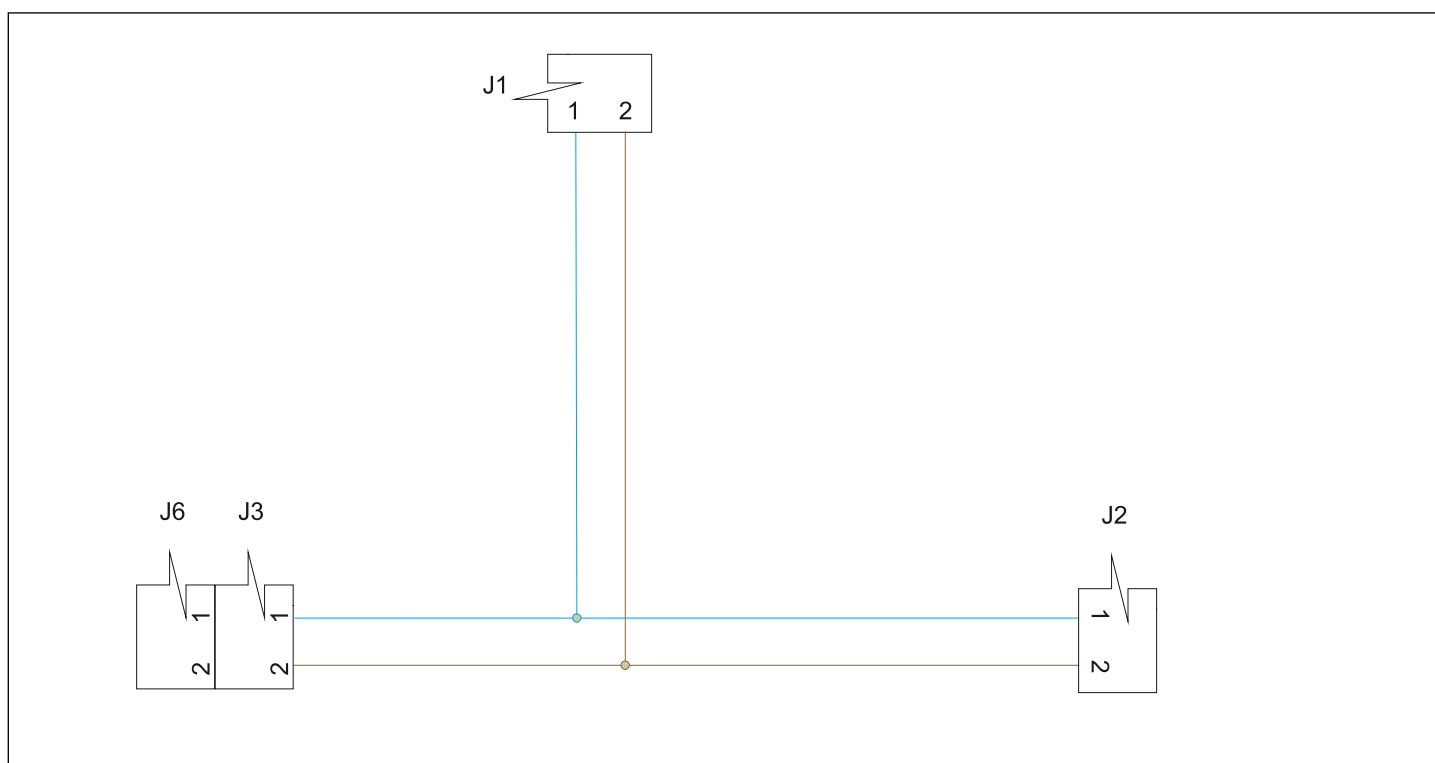
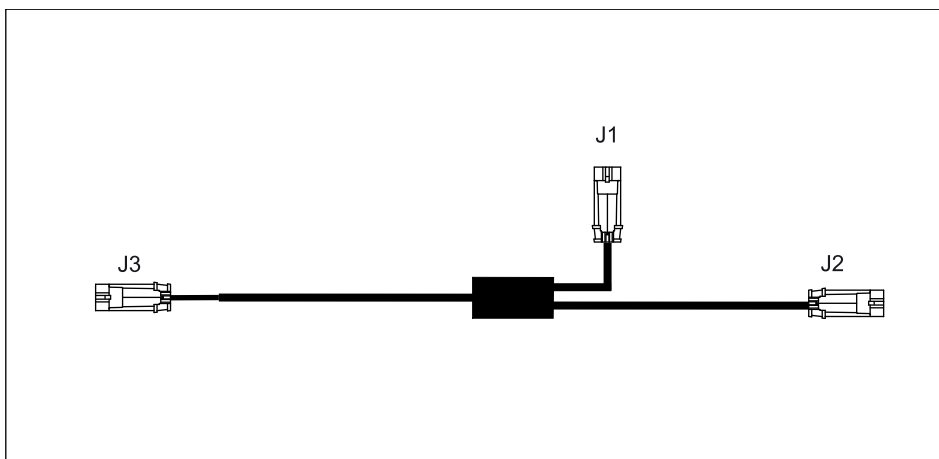
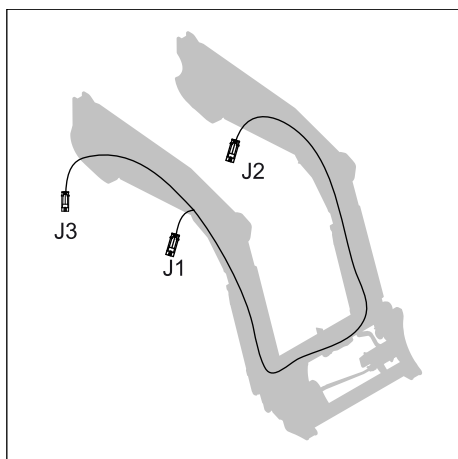
Marking	Description
J1, J2, J3	Lifting/dumping safety connector
J1-1, J2-1, C2-1	Blue (- Ground)
J1-2, J2-2, C2-4	Brown (Lifting/dumping safety)

## 9.9. Lighting wiring loom - 578038 (without AUTO-UNLOAD option)



Marking	Description
J1, J2	Lighting connector
J1-1, J2-1, C2-1	Blue (- Ground)
J1-2, J2-2, C2-4	Brown (Lighting)

## 9.10. Lighting wiring loom - 578039 (with AUTO-UNLOAD option)



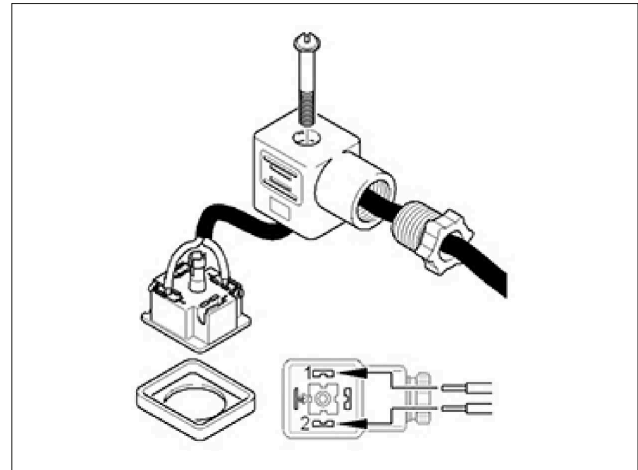
Marking	Description
J1, J2	Lighting connector
J1-1, J2-1	Blue (- Ground)
J1-2, J2-2	Brown (Lighting)

## 9.11. Solenoid checking procedure

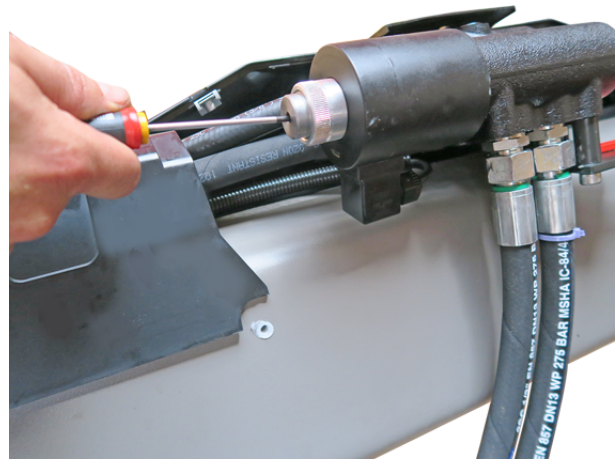
- Power the solenoid with a cable directly from the battery to the solenoid's two opposing terminals.

**NOTE:** Solenoids are not polarity sensitive.

- If the solenoid valve is working, look for the fault in the control circuit.



- If the solenoid valve is not working, activate the emergency control.

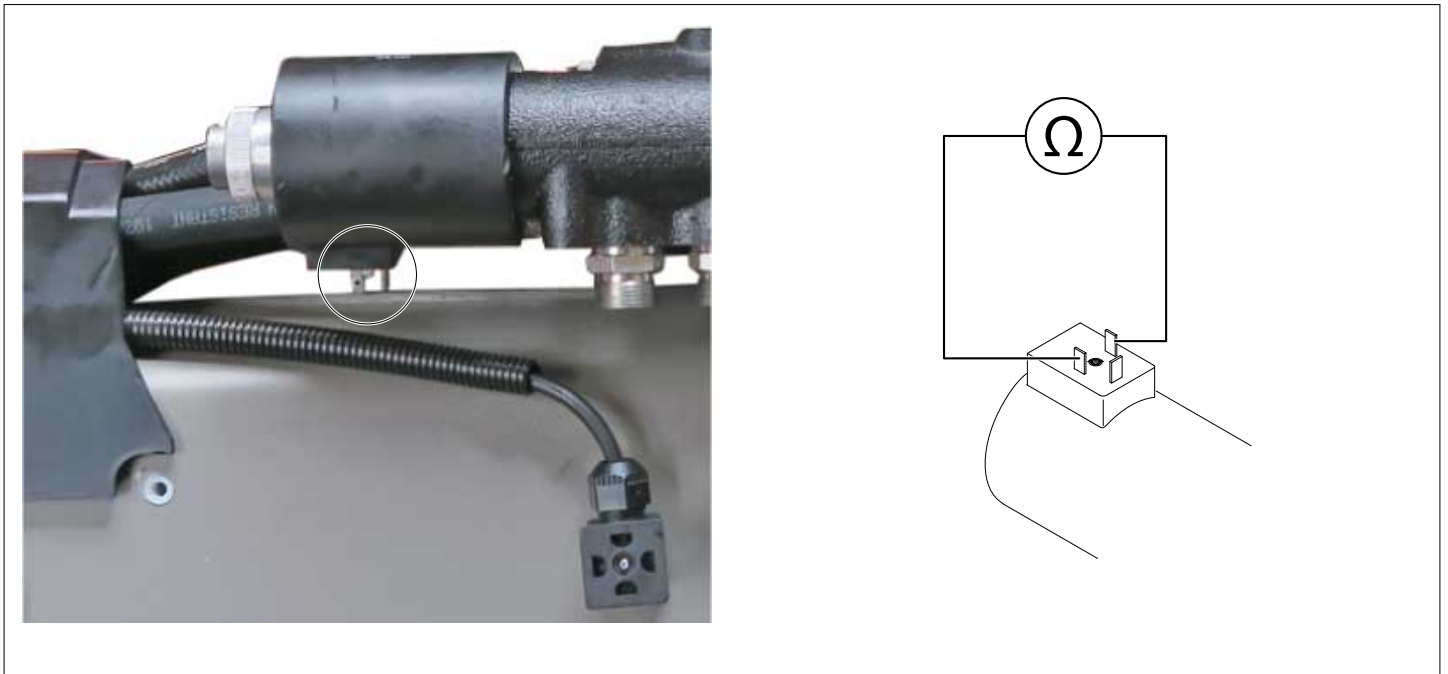


Activating the emergency control lever on the 3rd function solenoid valve.

### Resistance measurement

Disconnect the solenoid valve before measuring resistance.

- Connect the ohmmeter to the solenoid valve's terminals.



3rd function solenoid valve on the loader

Option	Power	Resistance
3rd function	44 W or 60 W* max with 12 V	3.3 Ohm or 2.4 Ohm
4th function	44 W or 60 W* max with 12 V	3.3 Ohm or 2.4 Ohm
AUTO-UNLOAD System	60 W max with 12 V	2.4 Ohm
FAST-LOCK	18 W max with 12 V	8 Ohm
SHOCK ELIMINATOR isolation	18 W max with 12 V	8 Ohm

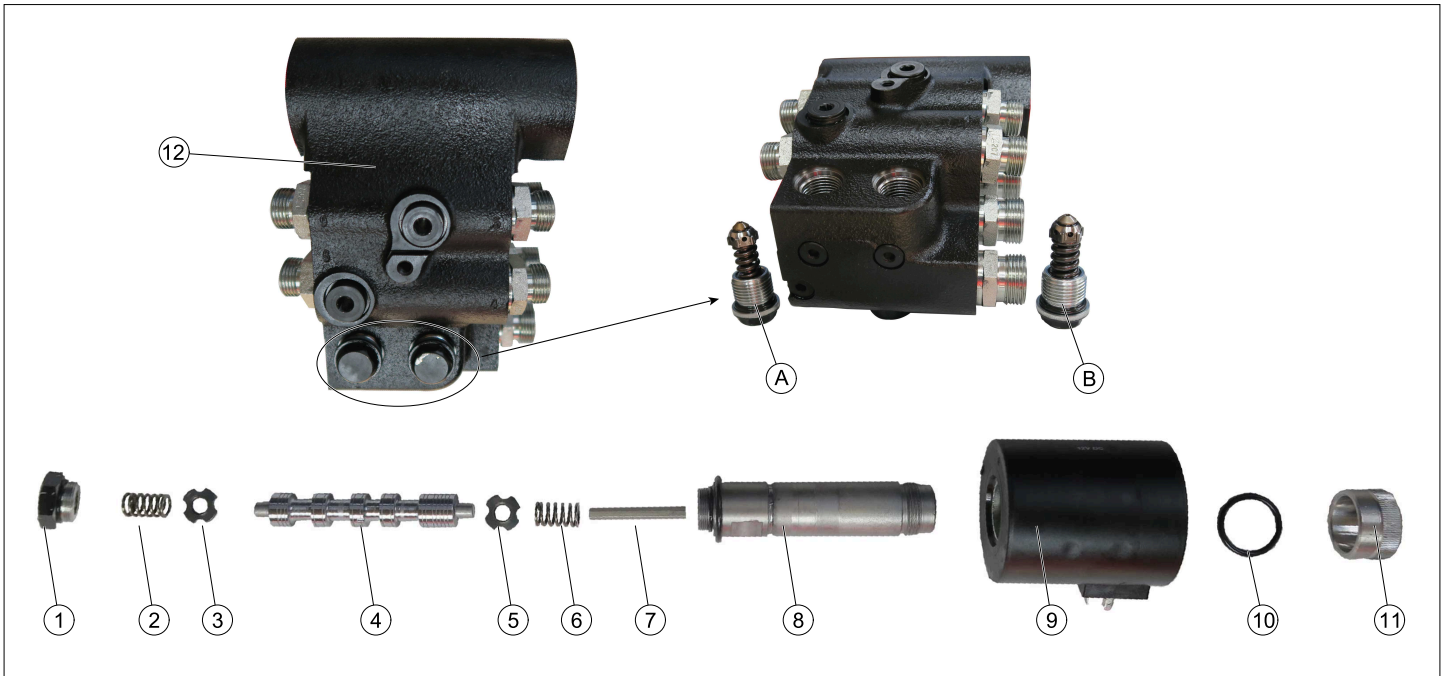
\*depending on solenoid valve version

## 9.12. Solenoid valve cleaning

If the resistance value is good and the emergency mechanical action is not enough to operate the solenoid valve normally, the valve should be cleaned:

- Remove the cap (1) on top of the solenoid valve.
- Retrieve the spring (2) and the washer (3).
- Remove the nut (11) and the seal (10).
- Pull the solenoid (9).
- Using a 22 mm spanner, remove the armature (8).
- Carefully remove the armature (8) in order to retrieve the spring (6), the washer (5) and the spool (4). The pusher (7) often remains inside the armature (8).
- Clean everything, including the body (12).
- Re-assemble it in reverse order.

For other solenoid valves (loader options), the removal principle is identical.



(A) Pressure limiter rated at 110 bar (dumping)/(B) Pressure limiter rated at 230 bar (crowding)

**Recommendations for use to avoid solenoid valve clogging:**

Clean the couplings on the loader side and the implement side before each hitching.

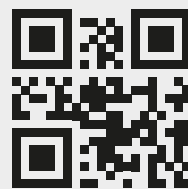
Note: The **MACH 2** option is recommended, because this connection unit's cover protects the female couplings.







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