FARM MACHINERY GROUP

EQUIPMENT

OPERATORS MANUAL
ST16 AND ST18

ORIGINAL

LLP FARM MACHINERY GROUP OY
LEVYTIE 4 ● 74510 IISALMI
PUH. 020 1984 020 ● FAX 020 1984 029

ORIGINAL

EY-VAATIMUSTENMUKAISUUSVAKUUTUS KONEESTA

LLP Farm Machinery Group Oy vakuuttaa, että markkinoille saatettu kone täyttää direktiivin 2006/42/EY ja standardit SFS-EN ISO 12100 ja SFS-ISO730:2020.

FÖRSÄKRAN OM ÖVERENSSTÄMMELSE

LLP Farm Machinery Group Oy försäkrar härmed till marknader tillförda maskin uppfyller maskindirektivet 2006/42/EY och standard SFS-EN ISO 12100 och SFS-ISO730:2020.

CERTIFICATE OF CONFORMITY FOR A MACHINE

LLP Farm Machinery Group Oy certifies that the following machine, which has been brought into the market, conforms to directives 2006/42/EY and standards SFS-EN ISO 12100 and SFS-ISO730:2020.

SAMSVARSERKLÆRING FOR MASKIN

LLP Farm Machinery Group Oy bekrefter herved at følgende maskin, som er sendt ut på markedet, er i samsvar med direktivene 2006/42/EF, SFS-EN ISO 12100 og SFS-ISO730:2020.

Tuote / Produkt / Product / Produkt:	
Valmistusnumero / Tillverkningsnummer / Serial number / Serienummer:	
Teknisen tiedoston kokoaja / Teknisk dokumentation samlare / Technical file collector:	Sakari Ruotanen
Valmistaja / Tillverkare / Manufacturer / Produsent:	LLP Farm Machinery Group Oy
Osoite / Adress / Address / Adresse:	Levytie 4, FIN-74510 Iisalmi
Puhelin / Telefon / Telephone:	+358 (0) 201 984 020
Paikka / Ort / Place / Sted:	Iisalmi
Aika / Datum / Date Dato:	
Allekirjoitus / Underskrift / Signature / Signatur:	
Nimenselvennys / Namnförtydligande / Clarification of signature / Tydeliggjøring av signatur:	Jarkko Hyyrönmäki

WARRANTY

- All the products produced by LLP Farm Machinery Group Oy have twenty four (24) months warranty.
- During the warranty period all the defects in material and in workmanship will be covered, in practical life FMG will replace defected parts with the new parts. Travelling expenses and freight of parts are not included in warranty.
- Warranty will start in the beginning of usage of the product, if nothing else has been agreed.
- Warranty is not covering damages due to misuse of product or use in the purposes where it has not been designed, lack of services or product has been modified without the permission of FMG.
- Wearing of the normal usage is not covered by the warranty.
- Losses in income, costs and loosen working hours caused by the defected part is not covered by the warranty.
- Warranty repairs should be done by the FMG service dealer or service dealer appointed by the manufacturer.
- In case the defects shown in reclamation is not valid or if case otherwise is not in the warranty area FMG has right to reject from the compensation.
- Warranty reclamation should be done in written form by the FMG seller within one (1) month after notifying the defect. All the reclamations will be handled and answered by FMG within one (1) month after receiving reclamation.

PROCEDURE IN CASE OF DEFECT:

- Clarify the defect and defected area
- Be prepared to deliver defected parts to the manufacturer
- Contact FMG seller and make reclamation as follows:
    - type of the product and serial number
    - delivery date of the product (invoicing date)
    - date of the damage
    - description of the damage and pictures
    - description of the working conditions and the type of base machine
- Ask from FMG seller or manufacturer repair instructions

TO THE OPERATOR

- The purpose of this is manual is to provide support and instructions to hook lift trailer users. Manual contains detailed instructions for driving, operating and maintaining the hook lift trailer. Make sure that your new hook lift trailer is always handled and maintained in the correct way in order to ensure reliability and economical operation for many years.

- We recommend that you read the manual thoroughly. Follow the maintenance and service program carefully and include the daily maintenance in your normal routine. This is for both you and your hook lift trailer's best interest.

- Maintenance, repairs and adjustments which are not described in this Operator Manual require the use of special tools and exact technical data. In case of that kind of need please contact your FMG seller or factory.

- Use only genuine FMG spare parts for optimum performance from your tractor and hook lift trailer. Spares are sold through the FMG sellers.

TABLE OF CONTENTS

1. SAFETY INSRUCTIONS

This section summarizes the regulations that must always be followed when working with the hook lift trailer. However, these regulations do not exempt the driver from statutory and other national regulations regarding traffic safety and occupational health and safety. Safety regulations that apply to different types of working sites and existing road traffic laws must always be observed. Tractor safety regulations accepted by the Finnish occupational safety and health administration have already been taken into account in the equipment design. The following section describes general safety precautions that must be observed regarding the use of the hook lift trailer.

IMPORTANT

Use hook lift trailer only for the trailer and hook lift trailer purposes. Before use read this manual properly.

IMPORTANT

Check always before use that all the functions work properly.

IMPORTANT

In case of other driver teach him/her to use trailer and ask them to read operators manual.

DANGER

Don´t drive with the damaged trailer.

DANGER

Take care that there is not anyone close to trailer when testing different functions. Security zoon 10 m.

IMPORTANT

When using trailer please follow the operator's manual instructions.

IMPORTANT

When using trailer take care of others on the road.

IMPORTANT

When driving skip on the trailer take care that full loaded skip tries to lift tractor.

IMPORTANT

Before drive take care that brakes work properly, and tyres have correct air pressure.

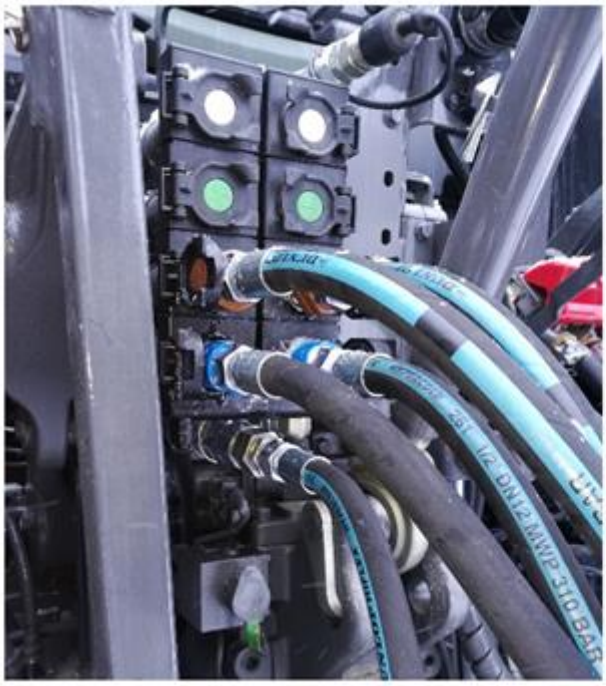
IMPORTANT

Take care that tractor hitch and locks work properly before engaging trailer.

DANGER

When driving skip forward/reverse take care of the changing drawbar weight.

1. QUICK START GUIDE

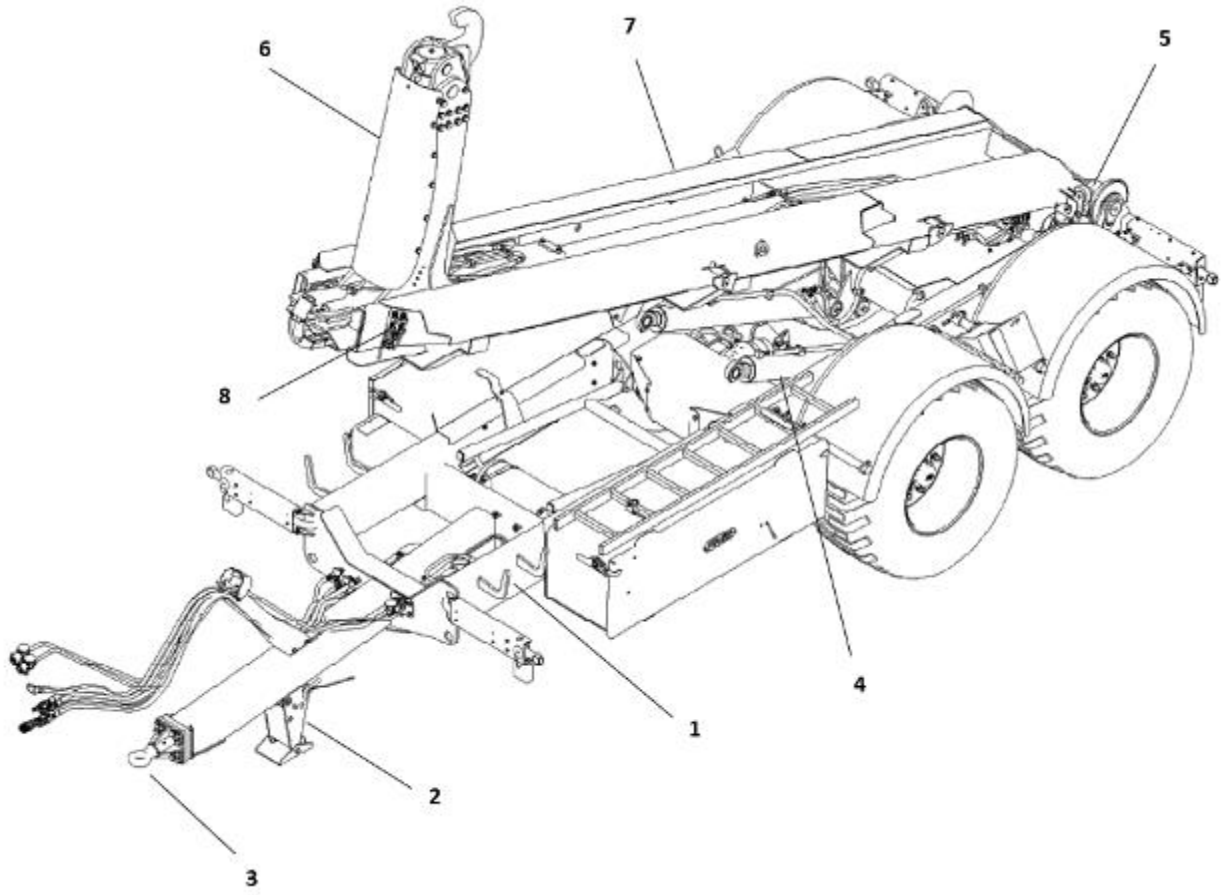


2. TECHNICAL SPECIFICATIONS

MODEL	**ST16**	**ST18**
Capacity (tons)	16	18
Width (m)	2,55	2,55
Max. skip length (m)	4 - 6	4 - 6
Weight (kg)	4 500	4 700
Tipping cylinders (mm/units)	125/2	140/2
Max. tipping angle (graders)	55	55
Min. hook height from the ground (m)	1,2	1,3
Max. oil need for tipping (l)	10	10
Tyres (standard)	550/45 -22,5	550/60 -22,5
Max. tyres	600/50 -22,5	600/50 -22,5
Wheel base (m)	1,36	1,36
Brakes front axle (hydr. operated)	Standard	Standard
4-wheel brakes	Extra equipment	Extra equipment
Air brakes	Option	Option
Emergency brake	Extra equipment	Extra equipment
Automatic skip change	Standard	Standard
Tail board hydraulic	Standard	Standard
Separate suspension 4-wheels	Standard	Standard
Mudguards	Extra equipment	Extra equipment
LED-driving lights	Standard	Standard
Reversing light + daytime running lights	Extra equipment	Extra equipment
Tool box	Extra equipment	Extra equipment
Tool box MIL	Extra equipment	Extra equipment
Ball hitch drawbar, dia 80 mm	Option	Option
Automatic load sensing brakes, ALB	Standard	Standard
Skip lock	Standard	Standard
Additional hydraulics	Extra equipment	Extra equipment
Hose rack	Extra equipment	Extra equipment
Hydraulic rear axle lift	Extra equipment	Extra equipment

Sound level is less than 70 dB (A).

HOOK LIFT TRAILER CONSTRUCTION



1. Lower chassis
2. Support
3. Draw link
4. Tipping cylinders
5. Skip locks
6. Hook tower
7. Upper chassis
8. Hose rack

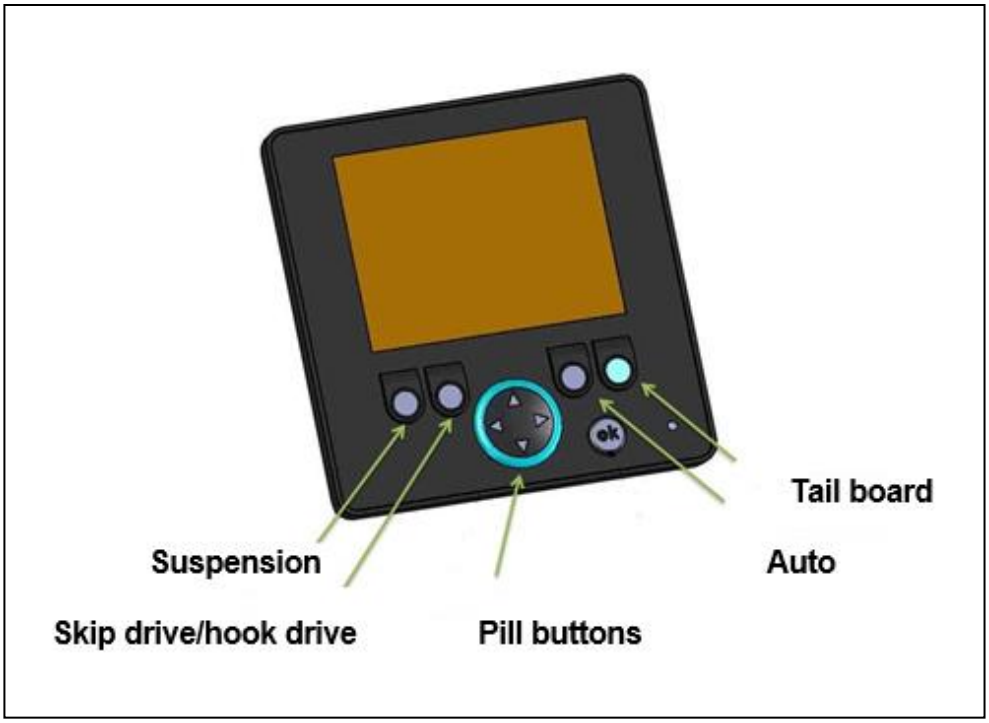
4. HOOK LIFT TRAILER CONTROL (AUTOMATIC SKIP CHANGE)

4.1. INTERFACE

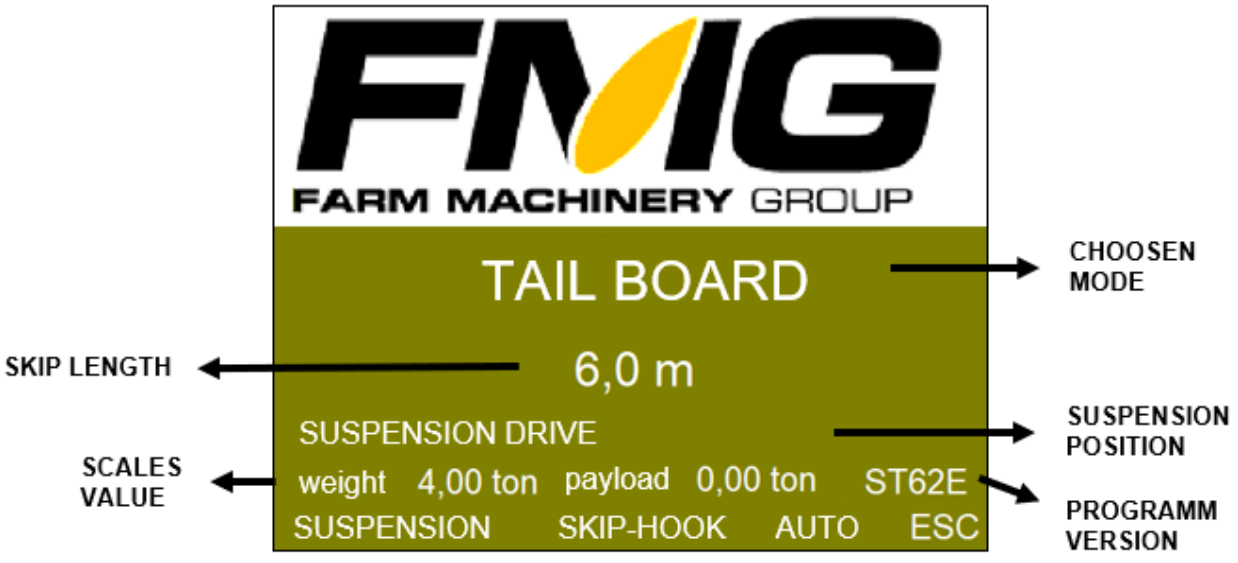
Skip trailer will be steered with the 4 selection buttons and pill button (Picture 1).

All movements will happen by selecting correct mode from the screen and driving with the selected hydraulic lever.

Hydraulic lever usage is mandatory because of the security reasons. When releasing hand grip from the lever all movements will stop.



Picture 1. Screen



FUNCTIONS OF THE SELECTION BUTTONS

- **SUSPENSION**

  - height level adjustment of the suspension: down, drive and up position.
  - when adjusting suspension will stop automatically in the driving position, by pressing over again suspension will go totally up

DANGER

Don't move trailer, then suspension is on upper position. Swing and suspension function are not in use.

NB!

There is not mark on the screen about upper position of suspension.

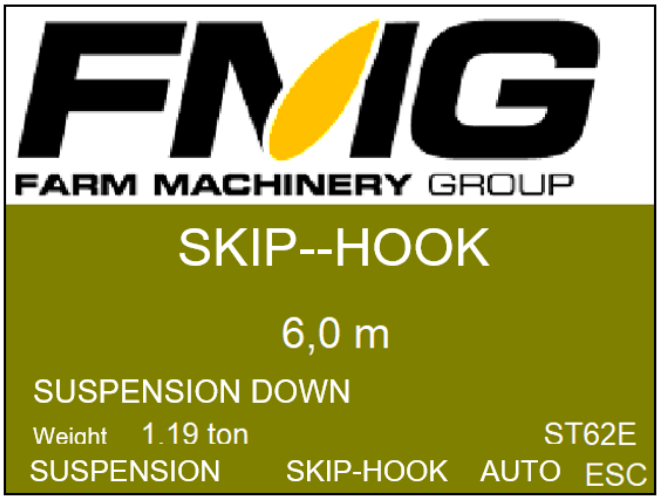
Lower the suspension at first on down position and then raise it to driving position, then trailer will be back in drive position.

NB!

While driving TAIL BOARD mode should be displayed

Suspension is on drive position

Suspension is on down position



SKIP--HOOK

Manual drive for suspension, skip drive and hook drive

All functions move in chain with 2 sec. delay

AUTOMATIC SKIP CHANGE

All functions move automatically in chain: suspension down, skip locks, tipping, skip and hook drive, tipping down and suspension to drive position

SKIP LENGTH

Use the pill buttons to select skip length. Skip length effects on tipping angle and position where skip stops during automatic skip change.

TAIL BOARD

Tail board hydraulics in the rear end

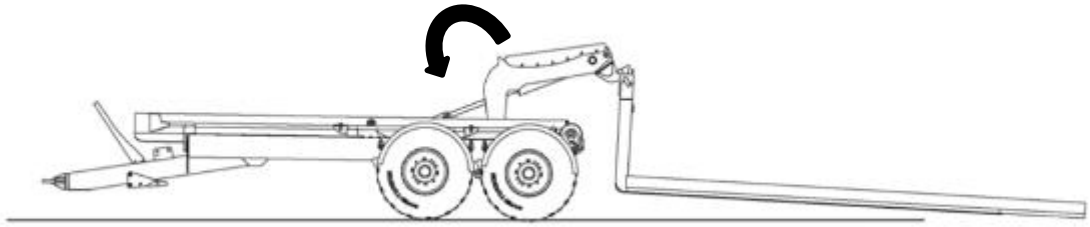
USE OF THE SCALE

Screen shows the total weight of the trailer and weight of payload. The total weight of the trailer without skip is 4,0 ton.

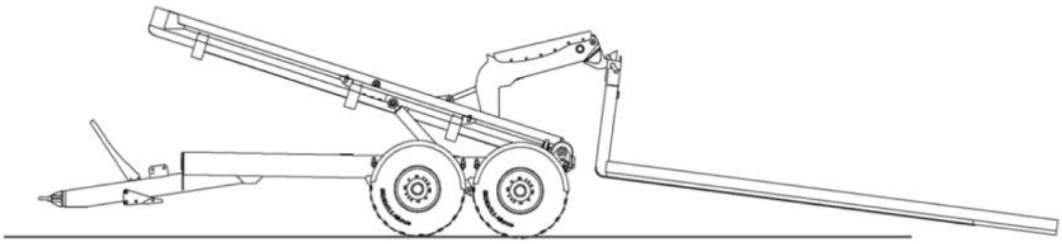
To reset the payload, press OK and AUTO button at the same time.

4.2. USE OF HYDRAULIC LEVERS

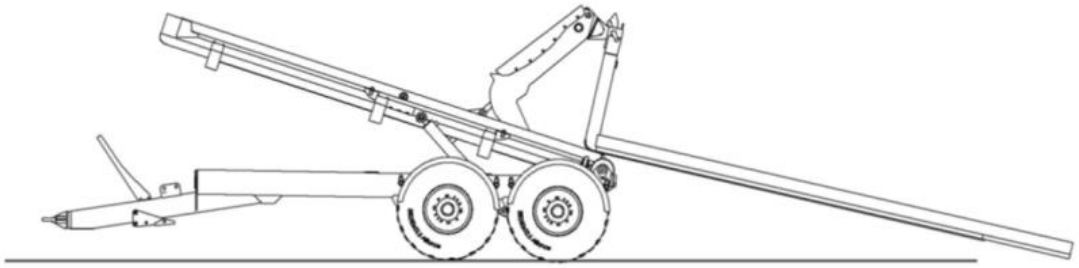
4.3. SKIP LIFT



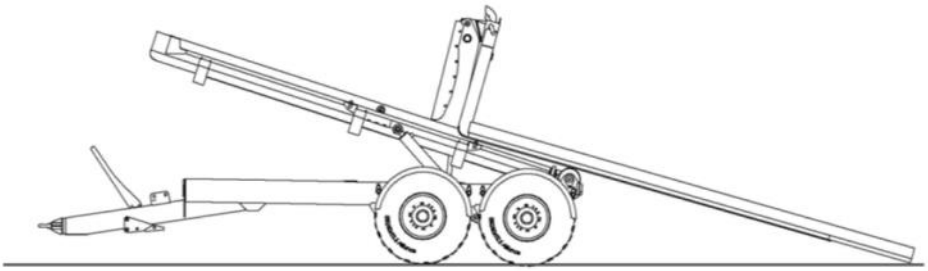
Picture 2. Hook tower lifting skip on



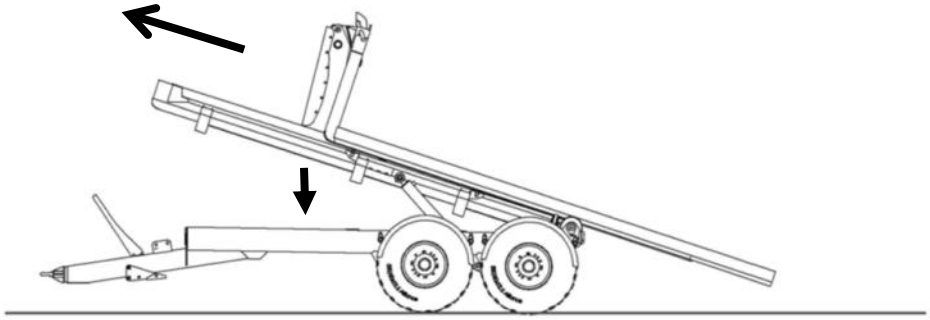
Picture 3. Automatic lift tipping drives to the correct angle to get skip on



Picture 4. Hook tower drives skip on

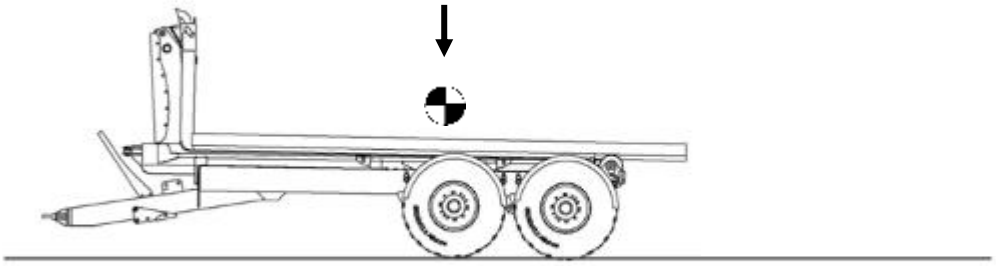


Picture 5.Skip moves to correct tip angel (according to the skip length)



Picture 6. Tip moves down

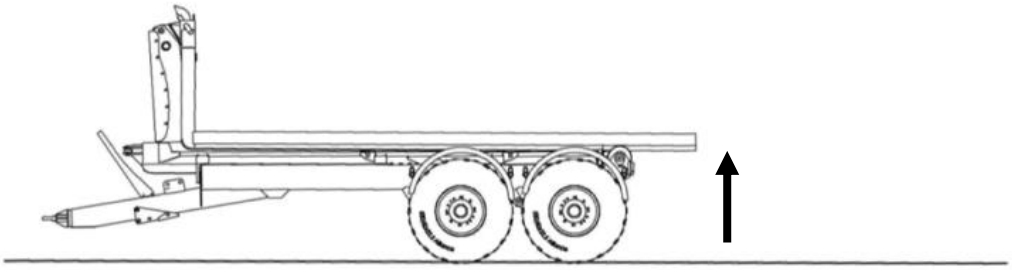
Center of gravity 16T, 18T



Picture 7. Hook tower moves skip to the correct position

NB!

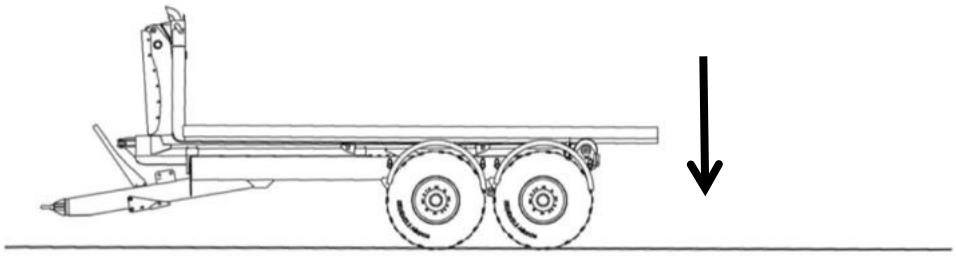
Take care of the centre of gravity



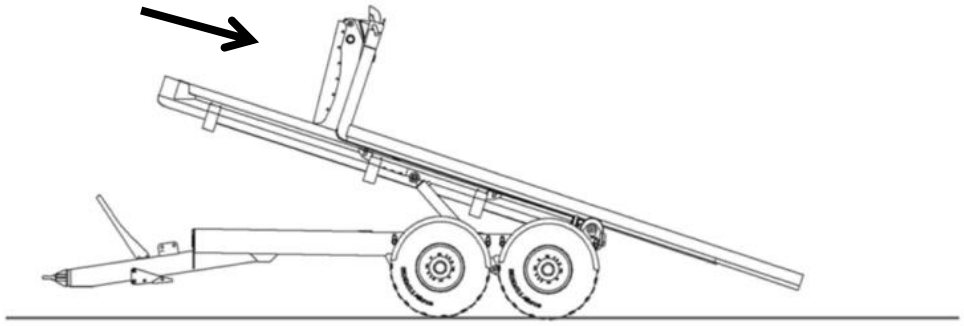
Picture 8. Suspension gets up to the drive position

4.4. SKIP DOWN

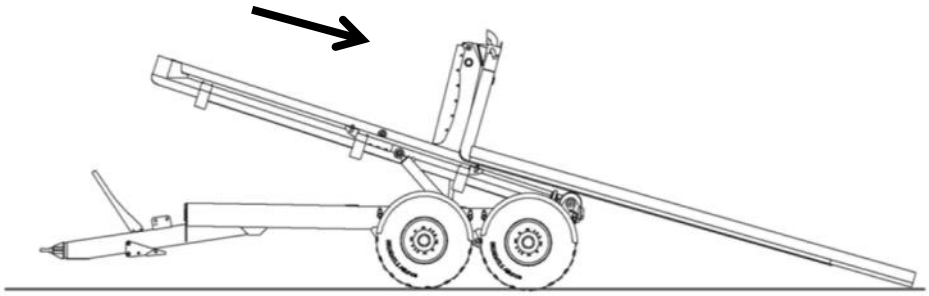
When selecting **AUTO** function all the movements will happen in chain.



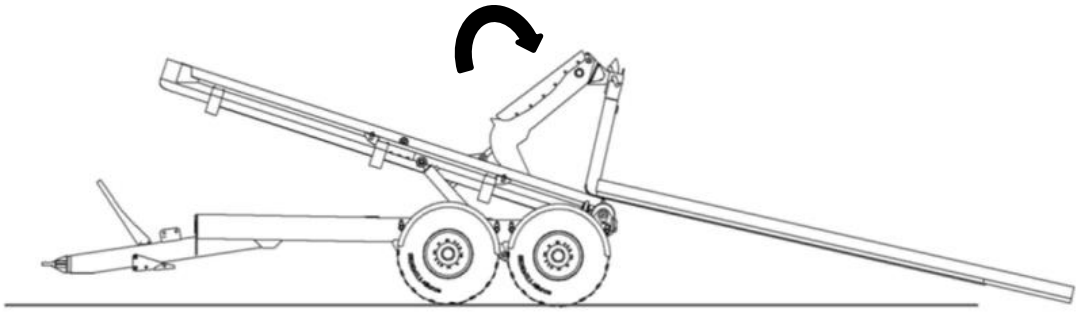
Picture 9. Suspension goes down



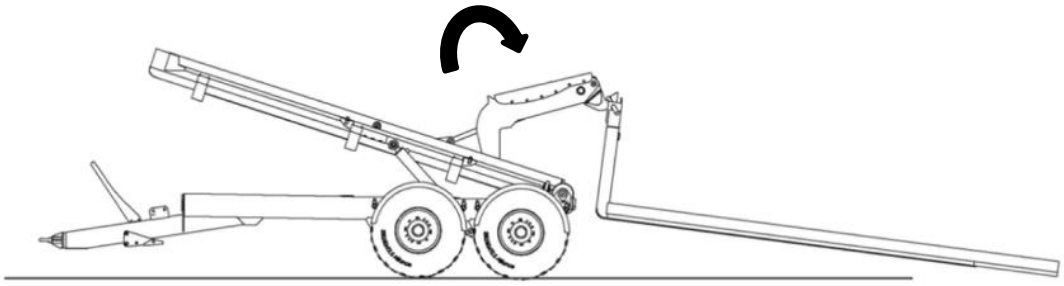
Picture 10. Skip moves back at same time then tip gets up in correct angle (according to the skip length)



Picture 11. Hook tower push skip off



Picture 12. Hook tower turns down



Picture 13. Skip lowers to the ground

NB!

During lowering, skip tries to move tractor/trailer assembly forward. (Picture 12, Picture 13)

NB!

Take care that all the couplings and connections are well connected.

IMPORTANT!

Take care that the boom weight of the trailer will change according to skip position.

DANGER!

Use skip trailer with special caution and check that there is no-one near trailer in safety distance. Safety distance is 10 m.

IMPORTANT!

When driving skip on the trailer take care the full loaded skip tries to lift the tractor.

4.5. VALVES MANUAL CONTROL

1) Lift the tip up and take cover out from left side trailer (Picture 14)

Picture 14. Cover

2) There are valves under the cover, which control skip drive and hook tower (Picture 15)

Picture 15. Valves under the cover

3) Valve controls skip drive (Picture 16)

Picture 16. Skip drive use

4) Valve controls hook tower use (Picture 17)

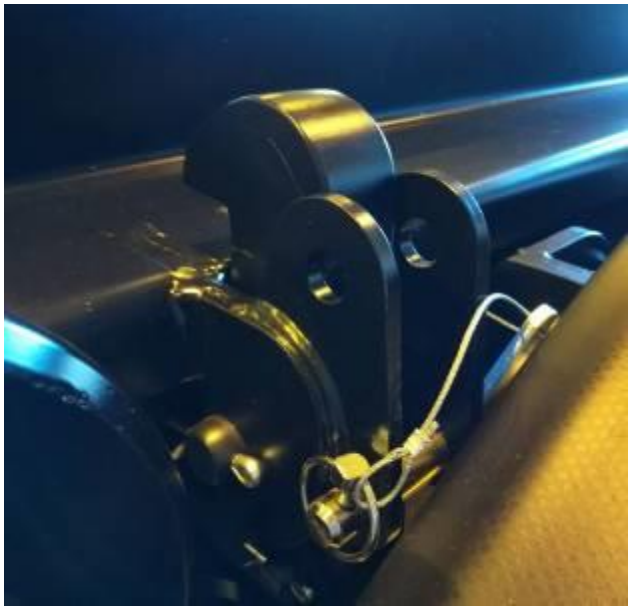
Picture 17. Hook tower use

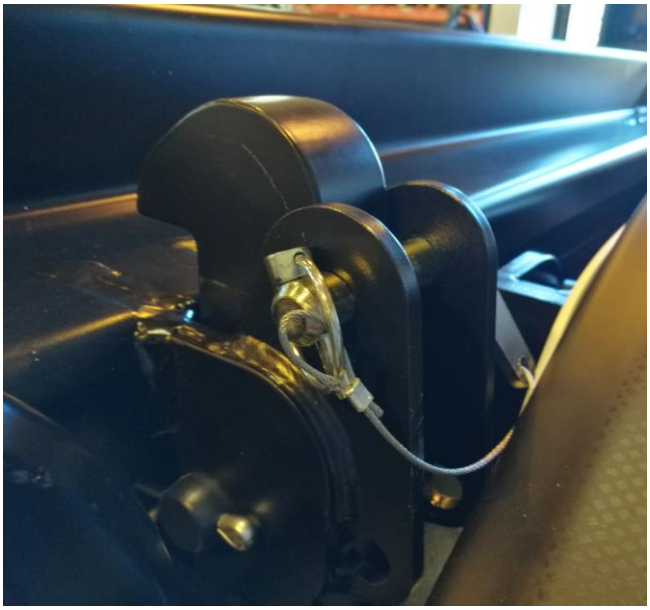
5) If tip doesn't lift up for some reason, valves could be adjusted manually by taking off the hatch on below left side of trailer (Picture 18 and Picture 19)

Picture 18. Hatch place

Picture 19. Hatch is open

4.6. USE OF MECHANICAL SKIP LOCKS





5. LASHING POINTS

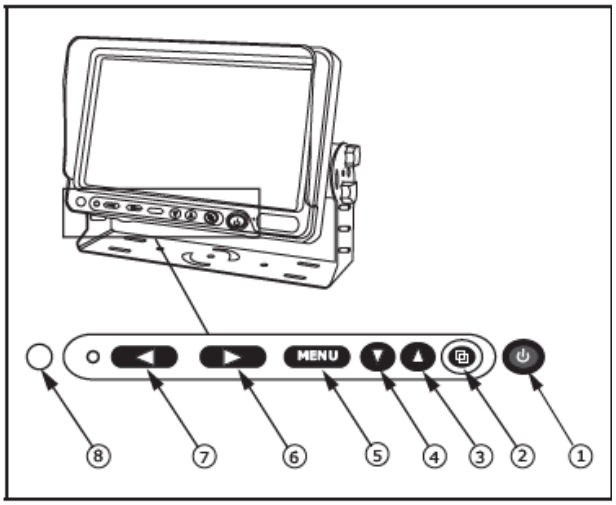
There are four orange painted lashing points (Picture 20) for binding trailer. If the trailer is transported on a platform or other equivalent, the trailer must be attached to each lashing point by two binding belts with a minimum of 2000 kg to the transport platform.

Picture 20. Lashing points

6. USE OF REVERSING CAMERA

It is recommended to keep camera power ON only when the camera is in use.

Before trailer cable disengagement, you need to switch off the camera (on/off bottom) then camera turns down (Picture 21)



1. Power switch ON/OFF
2. Camera change button
3. Arrow up
4. Arrow down
5. Menu (ESC), open or close menu
6. Arrow right (VOL +). Increse volume and move forward in menu
7. Arrow left (VOL -). Decrese volume and move backward in menu.
8. Remote control resiver of monitor

Picture 21. The screen of backup camera

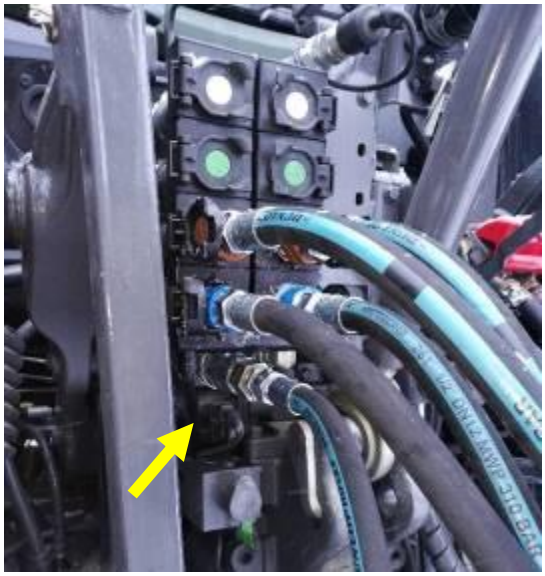
7. CONNECTING COUPLINGS

8.1. Connection to N4-serial tractors

1) Connect brown marked hoses to the brown colour hydraulic block (Valtra).
   It controls automatic function.
   Take care about plus and minus marks on hoses.

2) Connect blue marked hoses to the blue colour hydraulic blocks (Valtra).
It controls tip cylinders.
Take care about plus and minus marks on hoses.

3) Connect free return hoses to the free return tank line of the tractor.

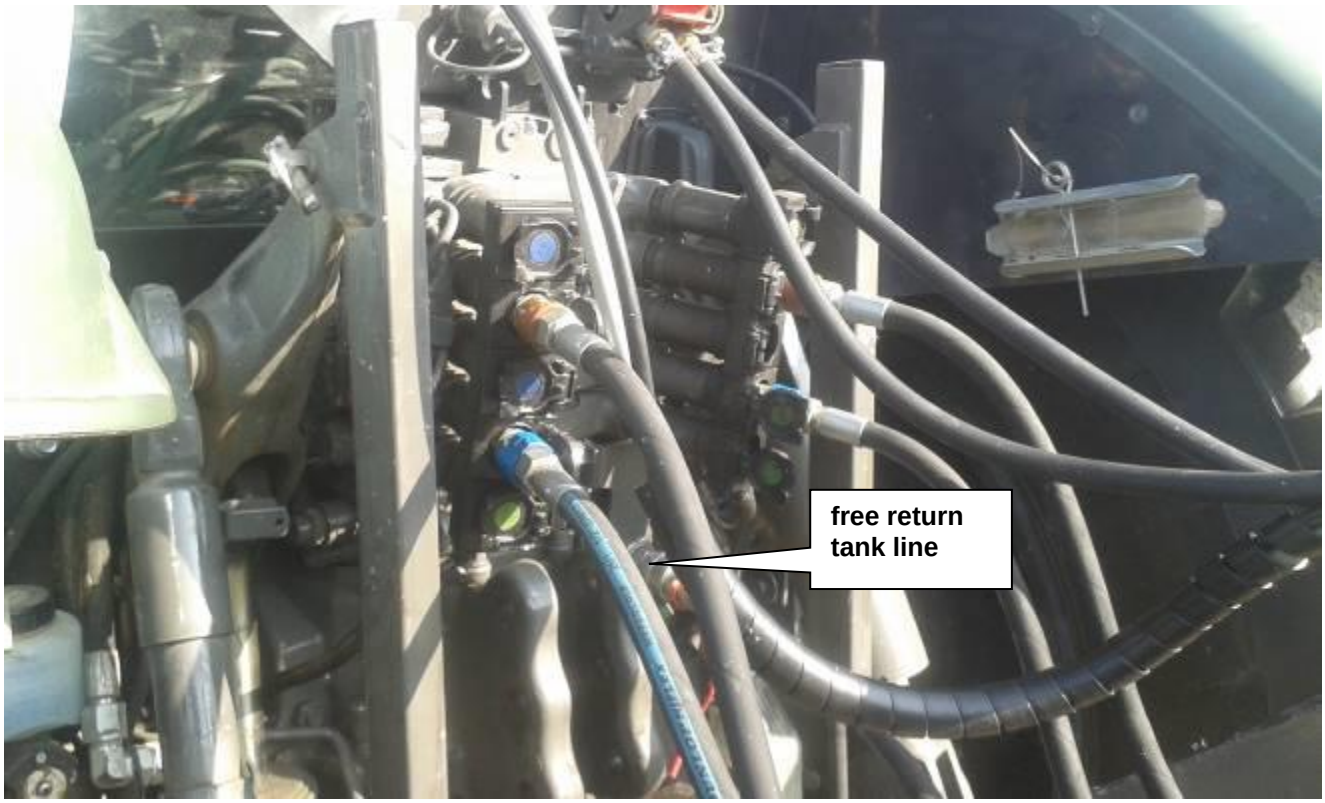


4) Connect DuoMatic coupling, EBS/ABS- and electrical cable follow:

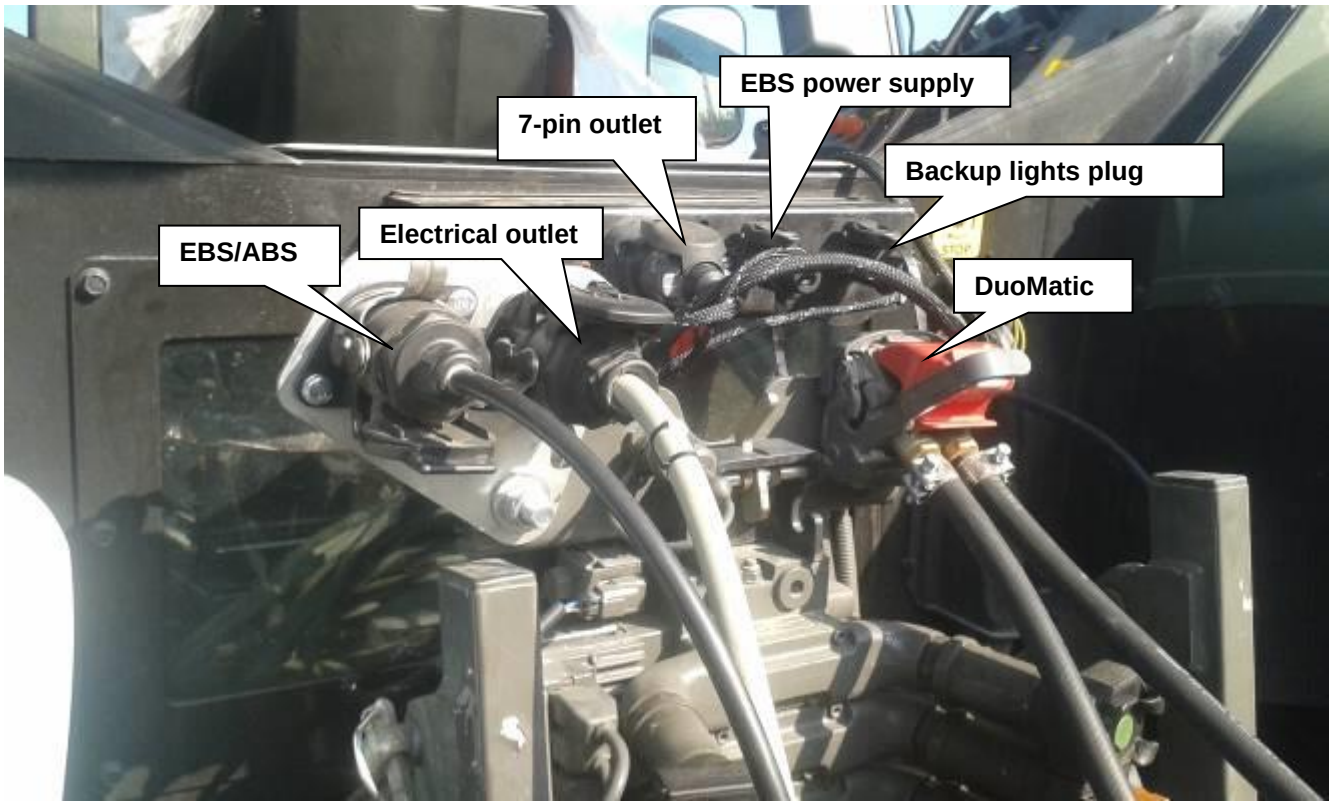
- DuoMatic -1
- EBS/ABS - 2
- Electrical cable - 3

5) All couplings are connected.

8.2. Connection to N3-serial tractors



Picture 22. Connection of hydraulic hoses to N3-serial tractors



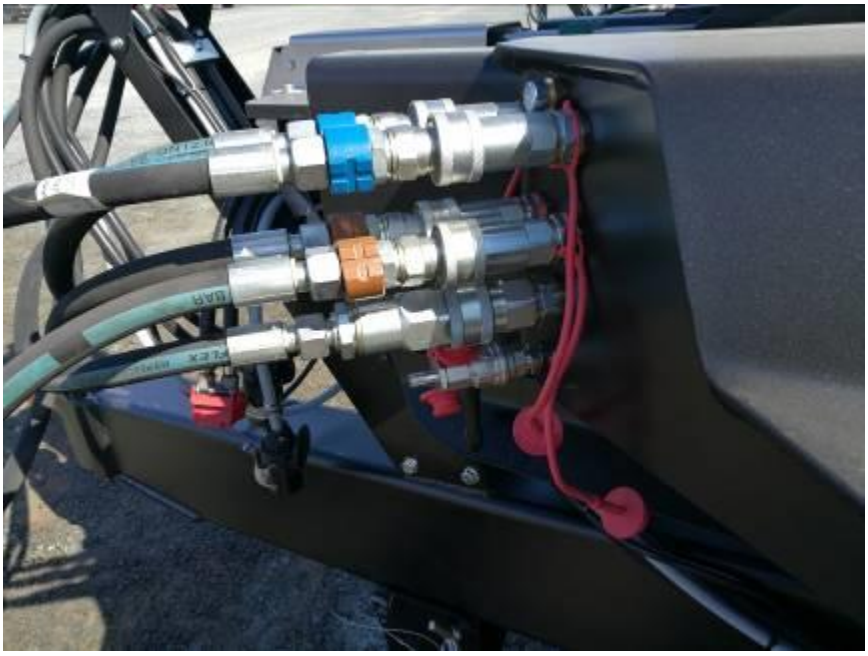
Picture 23. Connection of cables to N3-serial tractors

8. DISENGAGEMENT OF TRAILER FROM TRAILER

Before trailer detachment, drive the hook tower to the middle position (Picture 24) and suspension down.

Picture 24. Hook tower in middle position

Disconnect hydraulic couplings from tractor and connect to hose rack of trailer (Picture 25).



Picture 25. Hydraulic couplings are connected to hose rack

Disconnect electrical cable, EBS/ABS- and DuoMatc couplings. Switch on parking brake by pulling the red action button and set the wheel chocks. Disconnect the trailer from tractor.

9. STORAGE OF THE TRAILER

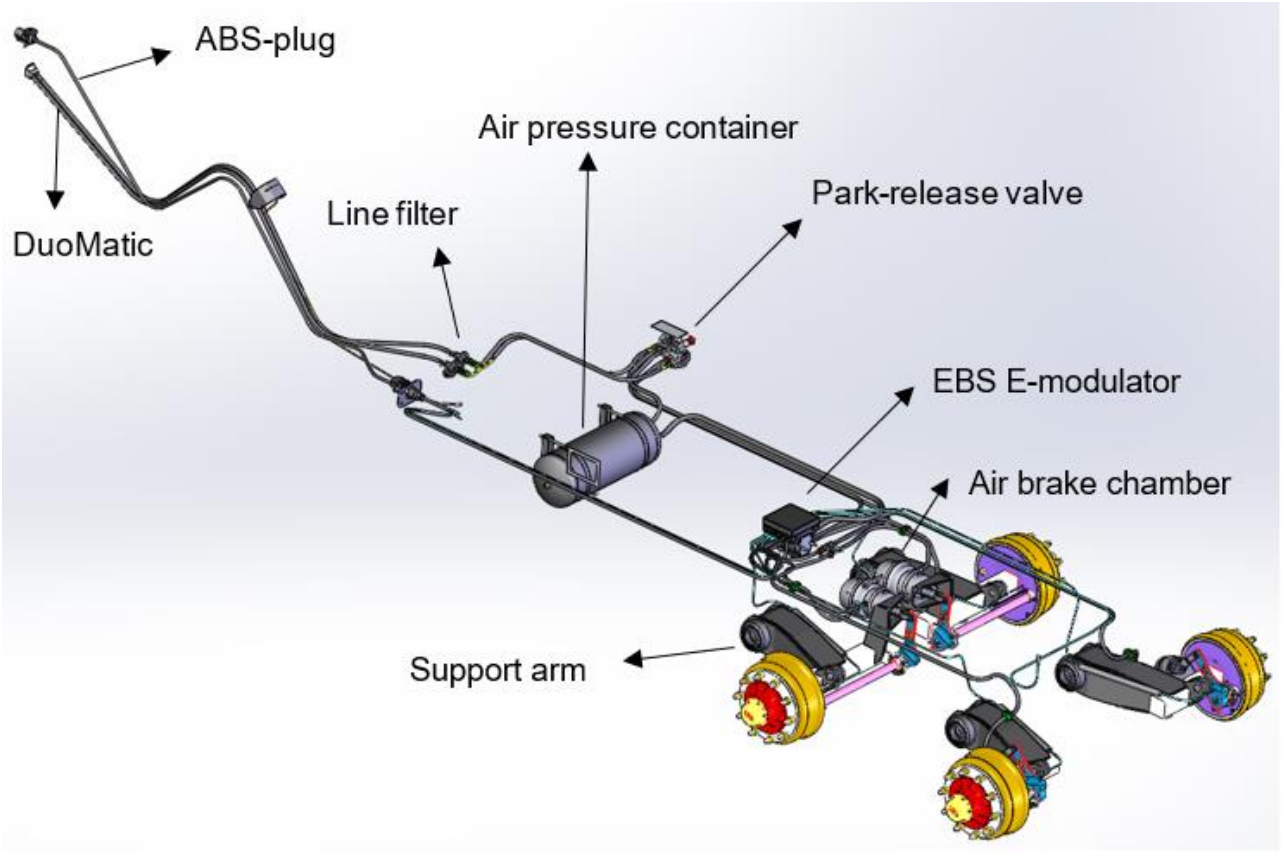
If trailer will stay longer period without usage, lubricate piston rods with CORRSHIELD VPCI-369 corrosion shield or with storage oil to avoid corrosion.

Picture 26. The storage position of the trailer

10. EBS BRAKES

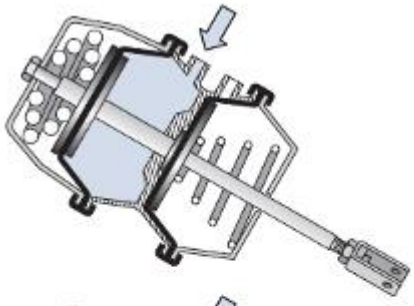
NB!

EBS brakes always must be programmed and adjusted by an authorized and licensed person.

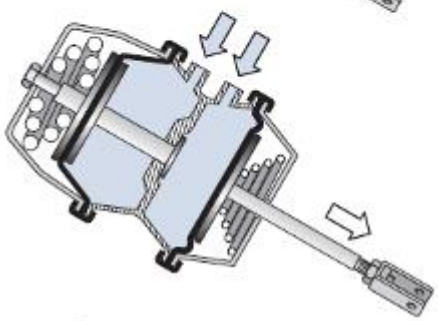


Picture 27. EBS brakes

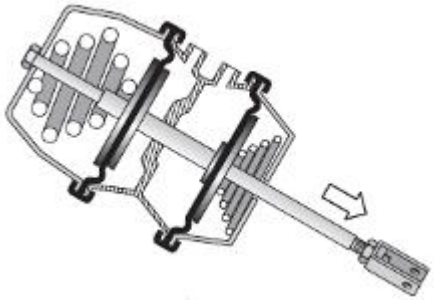
Brakes are not activated when return spring of service brake diaphragm is keeping the pushrod inside while the air pressure in parking brake diaphragm squeezes large coil spring of parking brake.



When Service brake is activated, the air pressure pushes pushrod out. Air pressure in parking brake diaphragm keeps large coil spring of parking brake compressed.



The parking brake is activated when service brake diaphragm is empty. In this case large coil spring of parking brake pushes the pushrod out.



Parking brake turns on automatically when air pressure suddenly comes down, for example, if brake hose is broken or Duo Matic is disconnected. When there is air pressure in container less than 2 bar, parking brake turns on. The power of the service brake depends on level of pressure. Don't leave trailer with parking brake without wheel chocks.

11.1 Operation of EBS-light

- EBS-light comes on after connection of the ABS plug and turns off after 3 seconds. The extinction of light is a sign that the system is in order.
- Light indicator is situated on the drawbar of the trailer (and there is also light indicator of EBS in the dashboard of the latest tractors)
- light is on, when air pressure in container is less than 4.5 bar and turns off, when pressure rises above the limit.
- light comes on, if air pressure in container is over 9.0 bar
- light is on, if there is fault in system, for example, the cable of sensor is disconnected. After the fault has been fixed, the light will only turn off when the power is turned off once
- light comes on, if there is anomalous sensor from one of the individual sensors. e.g.1 off-road driving one wheel has been in the air and stopped. e.g 2 some wheel is stuck (bearing damage or brake stuck). The light will turn off after 5 minutes after a fault.
- There is EBS fault light on instrument panel of the tractor N4- series and on info field see error message (picture 28)

Picture 28. EBS-light on tractor instrument panel

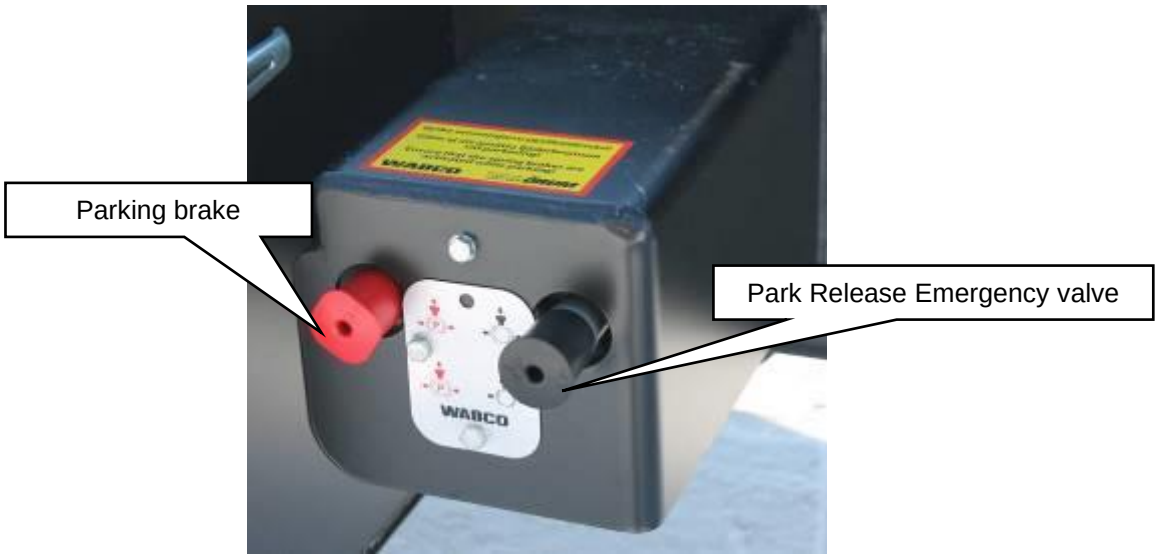
Picture 29. EBS-light on drawbar

11.2 Operation of stability control

The EBS brake system of trailer includes anti-lock brakes and stability control. When trailer is tilting, system on basis of the acceleration and the driving speed determines the situation in which the trailer is in danger to fall. In such situation, the system pays attention to the speed of tires rotation and detests if any tire rises in air or becomes heavier considerably. The system concludes that the risk of tipping over is immediate and brakes automatically.

11.3 Operation of Park Release Emergency valve

When moving the trailer without connecting the DuoMatic to the tractor, use the park release emergency valve (Picture 30). When the black button is pushed in, the parking brake is deactivated. When the black button is pulled out, the parking brake is activated. When DuoMatic is connected to the tractor, park release emergency valve returns to the neutral position automatically.



Picture 30. Black button of park release emergency valve and red button of parking brake

11.4 Parking brake

Whenever the trailer is disconnected from tractor, the parking brake must be engaged. The brakes are turned on by pulling out the red button of parking brake, then service brake is on. Parking brake turns on when air pressure in system decreases less than 2.5 bar. The parking brakes are only on the front axle, so **disconnected trailer must always be secured with wheel chocks.**

11.5 NO additional antifreeze agents

It is strictly forbidden to use additives in the air pressure system. Anti-freeze agents and lubricating chemicals may endanger the operation of the brakes. If there are traces of chemicals in the system, the warranty does not cover damaged air pressure system and its components.

11. ELECTRICAL CONNECTIONS

12.1 Work light connection and usage

Work and reversing lights turn on by pressing the switch in tractor cabin (Picture 31)

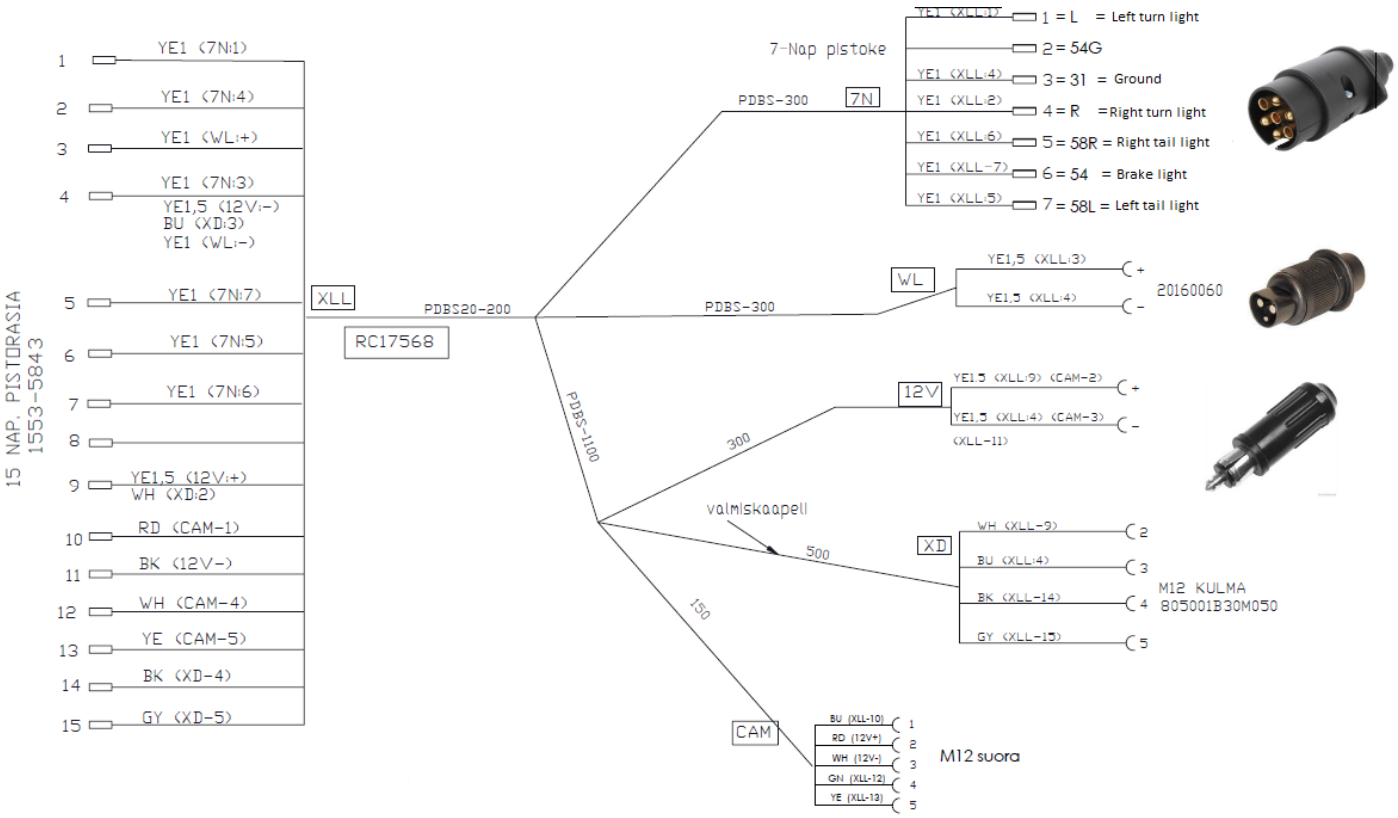
Picture 31. Connection of work- and reversing lights and connection of control system to the tractor

12.2 Connection of control system

Control system is on when power plug is connected to the power socket of tractor (Picture 31).

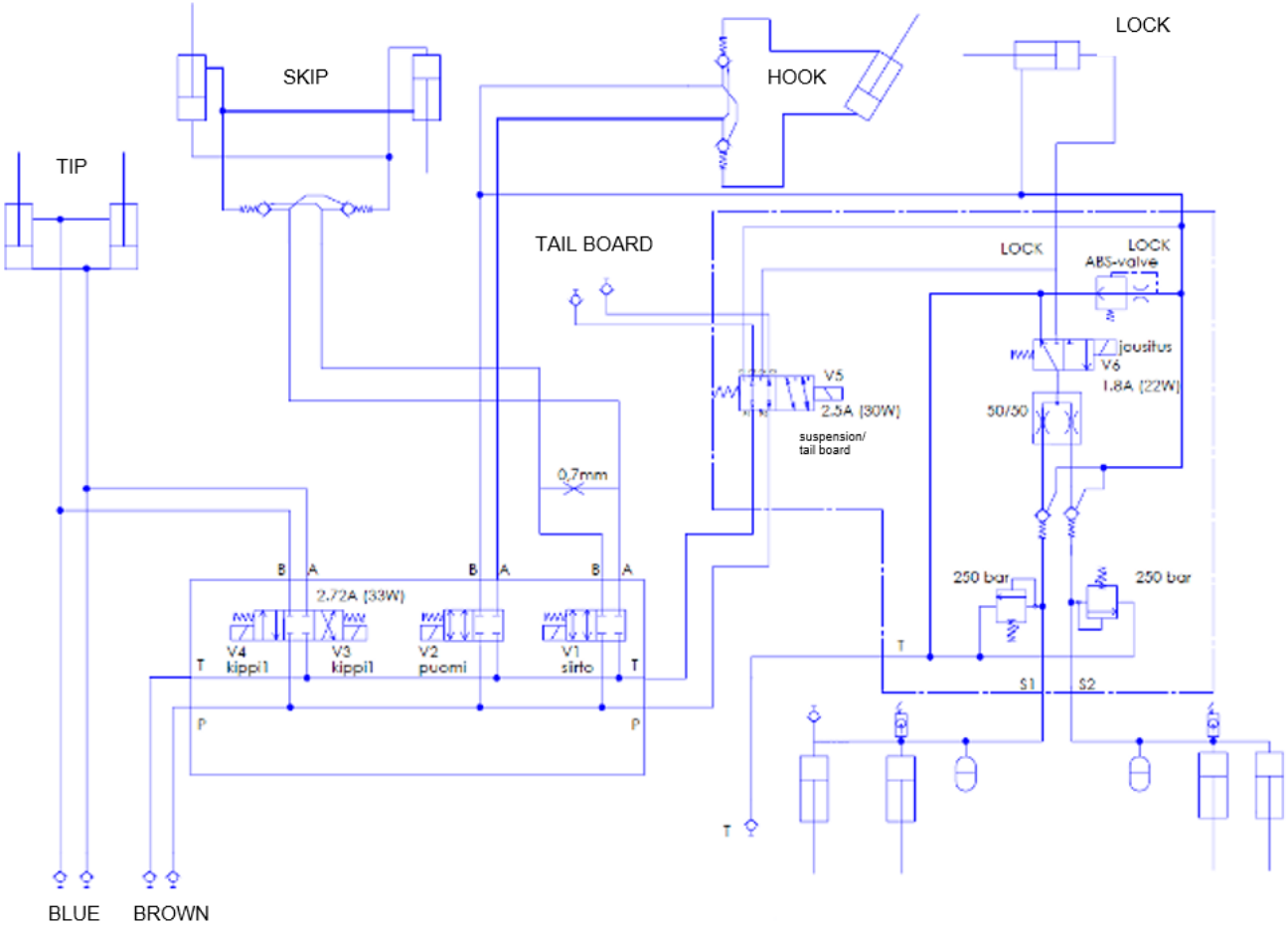
12. DIAGRAMS

13.1 Control cable diagram



1	L	Left turn light
2	R	Right turn light
3		Work light
4	31	Ground
5	58L	Left tail light
6	58R	Right tail light
7	54	Brake light
8		Empty
9	30	Power to trailer
10		Camera1
11		Camera-
12		Camera4
13		Camera5
14		CAN H
15		CAN L

13.2 Hydraulic diagram



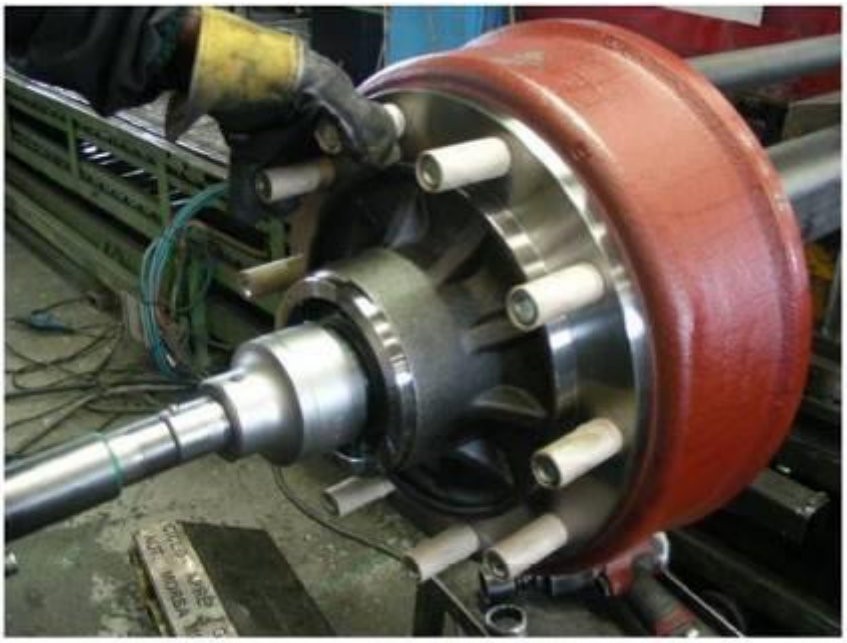
13. TIRES REPLACEMENT

Drive the replaceable tire on some high platform. There is jackscrew and plywood in the toolbox. Set the jackscrew at the closest to replaceable tire lifting place (picture 32 and picture 33), which is marked with yellow colour, and lift the trailer with crank until wheel is just on ground. **The tire pressure must be 4.0 bar**

Picture 32. Lift place on left side

Picture 33. Lift place on right side

14. TIGHTENING OF HUBS



Tighten the castle nut at 195 NM during this operation rotate the hub to allow the settlement of the bearings

Loosen the castle nut until it is free to rotate

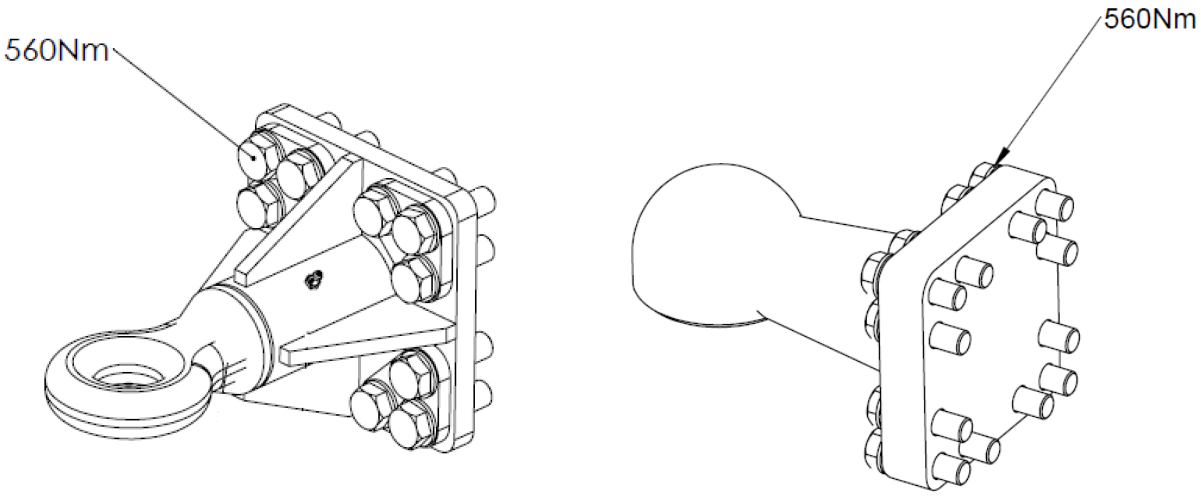
Tighten the castle nut to the final torque of 95 NM. During this operation rotate the hub to allow the settlement of the bearings

If there is no possibility to fit the pin, the castle nut must be screwed, up to align the split on the nut with the hole on the spindle

Test the free rotation of the hub in both directions.

15. DRAWBAR REPLACEMENT

1) Remove fixed on trailer drawbar. There are needed tools in the tool box: T-handle, extension bar and socket 3/4 " 30 mm
2) Set the other drawbar on the place. The tightening torque is 560 Nm.
   Screws change interval is 1000 h.



16. CHECKS

	1 DAY	40 H	500 H
Visual checks: - Condition of tires: tire attachment and pressure(4.0 bar) - Tightness of hydraulic system - Locking of pins - Operation of movements: locks, tipping cylinders, suspensions, hook tower - Condition of electrical cables - Tightness of screws: drawbar - Operation of lights - cleaning of equipment - Removal of condensation water from air pressure container - Checking brakes from freezing - Checking engagement	**X**		
Checking wheel hubs			**X**
Lubrication		**X**	

Tightening torque for the tire nut is 550 Nm.

Drain the condensation water daily after work by pulling the ring of drain valve from air pressure container (Picture 34).

Picture 34. Condensation water removal from air pressure container

17. LUBRICATION POINTS

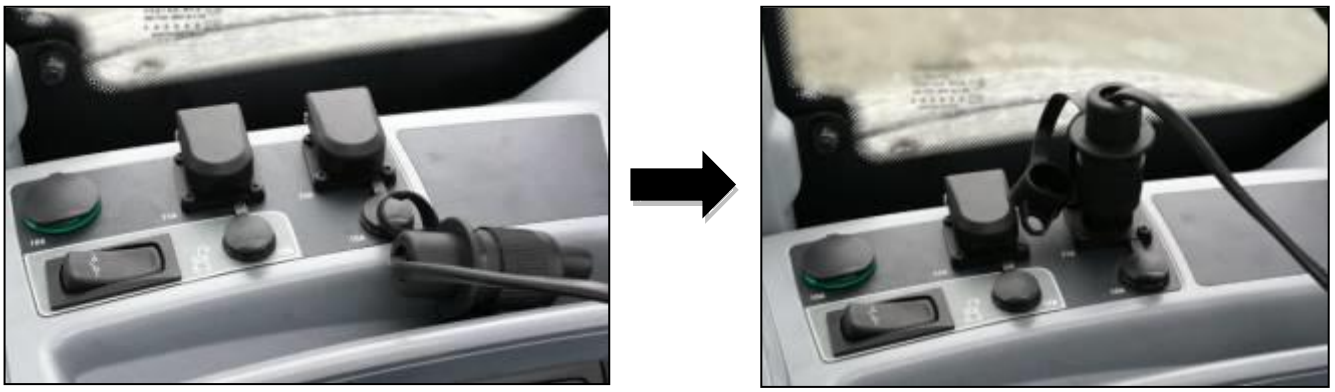
Lubricate nipples shown in the picture. Clean the top of the nipple before lubrication.

18. TROUBLESHOOTING

1) If there is error message on the screen (Picture 35) → connection is lost due to undervoltage

Picture 35. Error message

a. Turn off and on the power (Picture 36)



Picture 36. Power plug in cabin of tractor

b. Check the connection of power cable to the tractor (Picture 37)

Picture 37. Power cable plug

2) If during skip down, tip is moving, but skip doesn't move →

   a. Check are the mechanic locks locked. Open locks if they are closed.

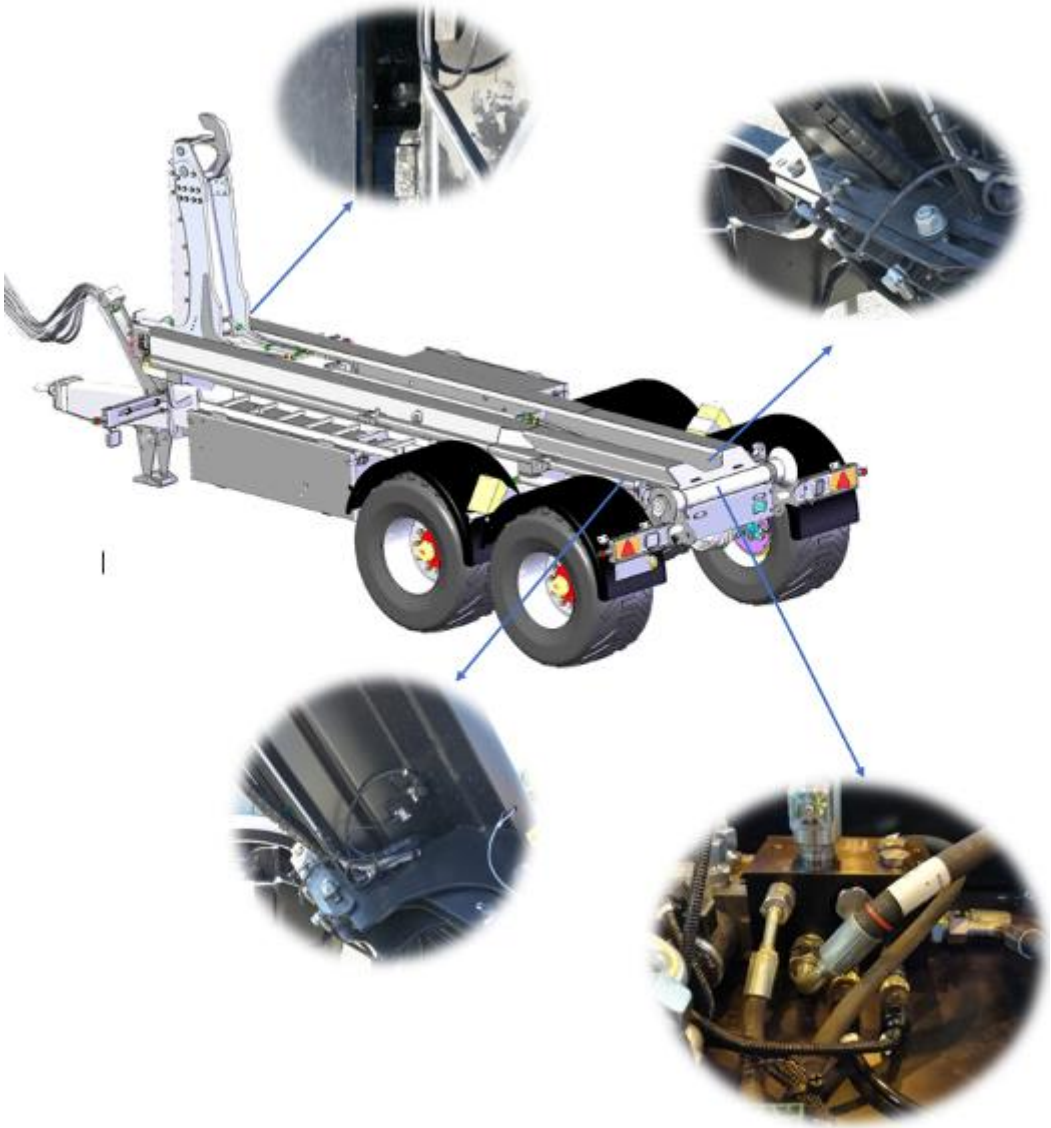
3) Cargo scale shows 0 value → Pressure sensor or cable is broken

19. DIAGNOSTICS

22.1 Sensor adjustment value

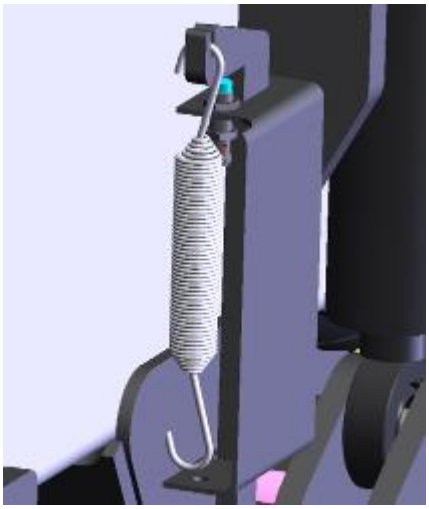
The positions of the sensors are adjusted to distance 6 mm (+/- 2 mm).

22.2 Sensors positions



22.3 Hight sensor of suspension

Hight sensor of suspension is situated on left front axle (Picture 38).

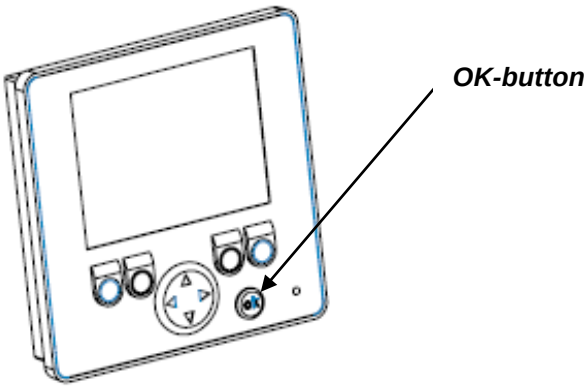


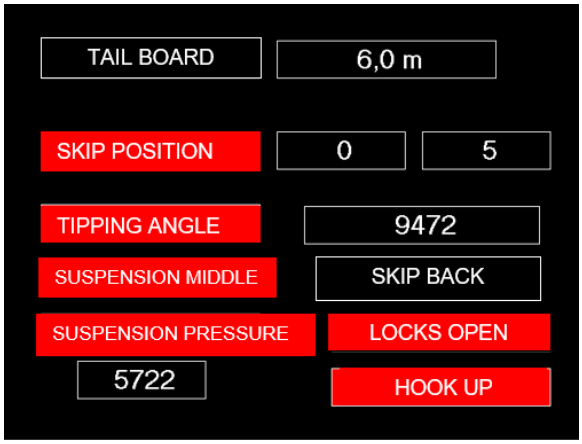
Picture 38. High sensor of suspension

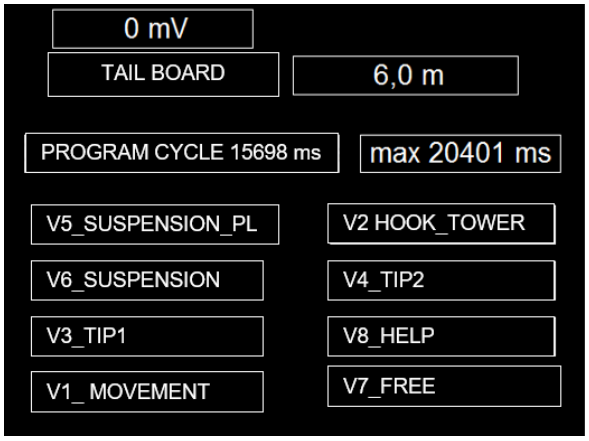
High sensor recognises when suspension is down, then suspension cylinder is short. The position of suspension cylinder then suspension is in drive position.

22.4 Checking the sensors through diagnostics on the screen

Press the OK-button for 5 seconds to get in diagnostic mode, there you can check the valves control and operation of sensors. By pressing left/ right pill button change the valve and sensor menu.







Activated sensors and valves are red colour on screen.

LLP FARM MACHINERY GROUP OY

LEVYTIE 4
74510 IISALMI

PUH. 020 198 4020
FAX 020 198 4029

www.fmg.fi