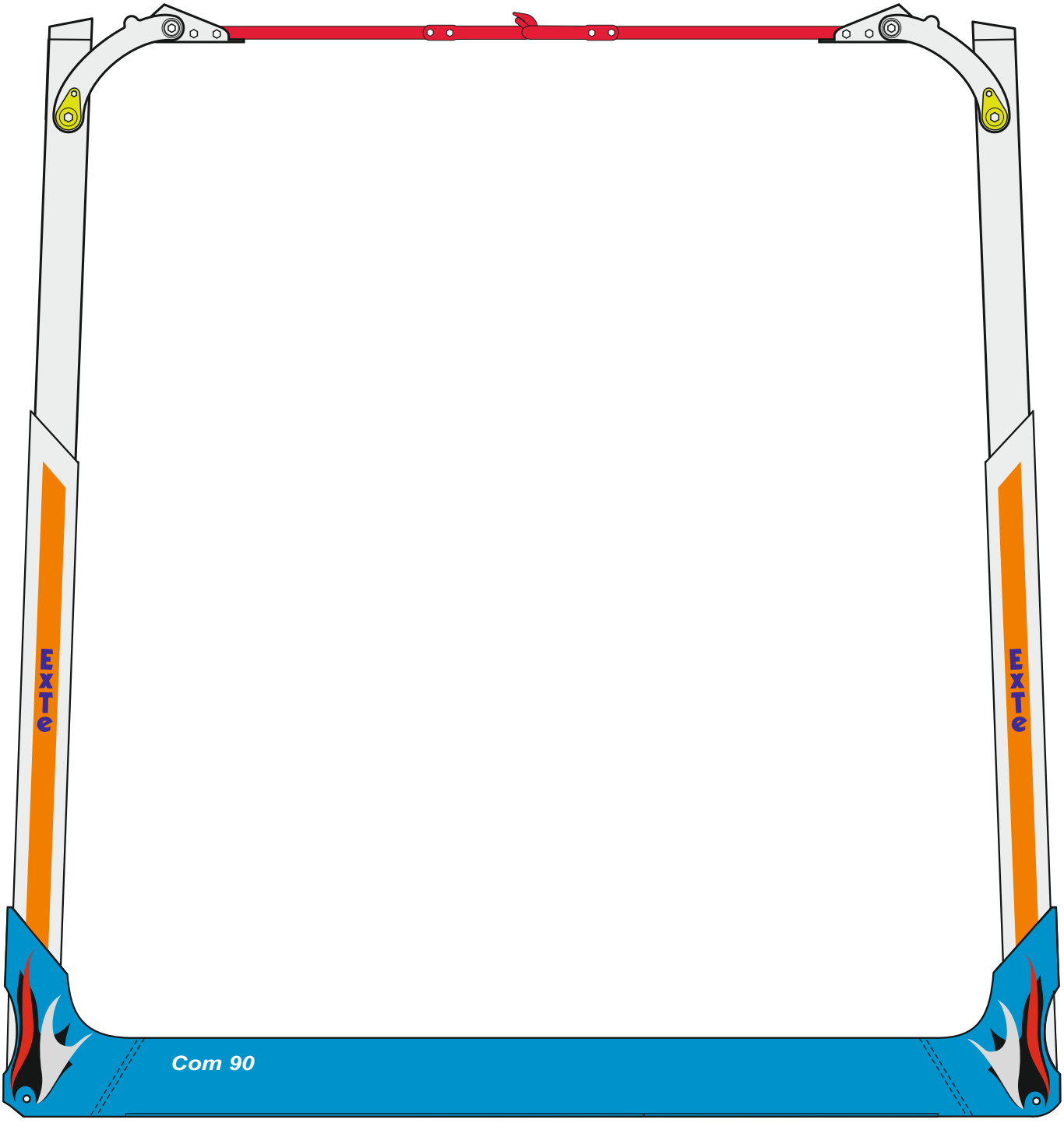
Com 90

User Manual

AD00234 Eng

2021-06-16

CC-PILOT

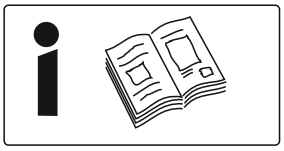


Manual

Translation from original manual.

Com 90

Can bus system



Read through the entire manual and fully understand the content before using the system!
Bad or faulty mounting and handling can cause interruptions, **damages** and **personal injury.**

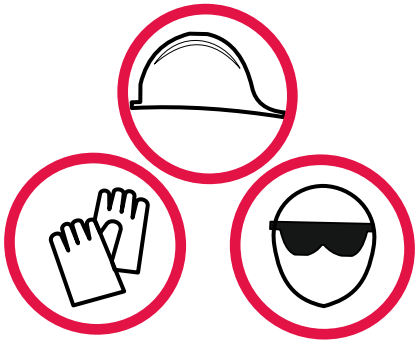
CE

Content: **Page**

ExTe

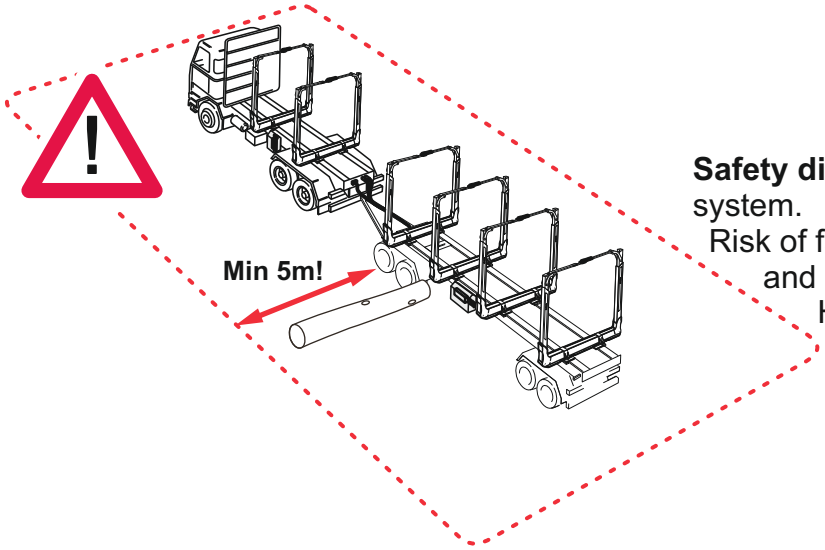
Fabriks AB, Gundbergsvägen 6, 827 28 FÄRILA, SWEDEN
Tel: + 46(0)651-175 00
E-mail: info@exte.se
www.exte.se

Risks and warnings.



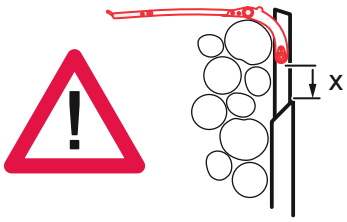
Always wear a **HELMET** when maneuvering and staying close to the Com 90 system!

Always wear **PROTECTIVE GLOVES** and **EYE PROTECTION** when maintaining and repairing the Com 90 system!

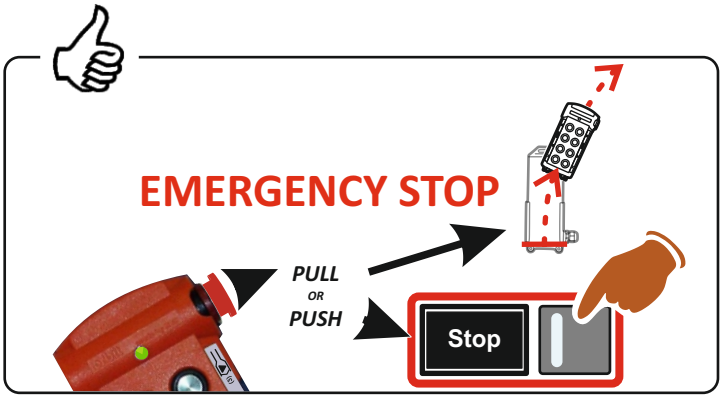


Safety distance min. 5m when operating the system.
Risk of falling load when maneuvering stakes and lashing arms.
Hidden tree parts and other debrie can get in motion!

Even maneuvering an empty vehicle can lead to **risks and surprising situations** if you are too close to the system!

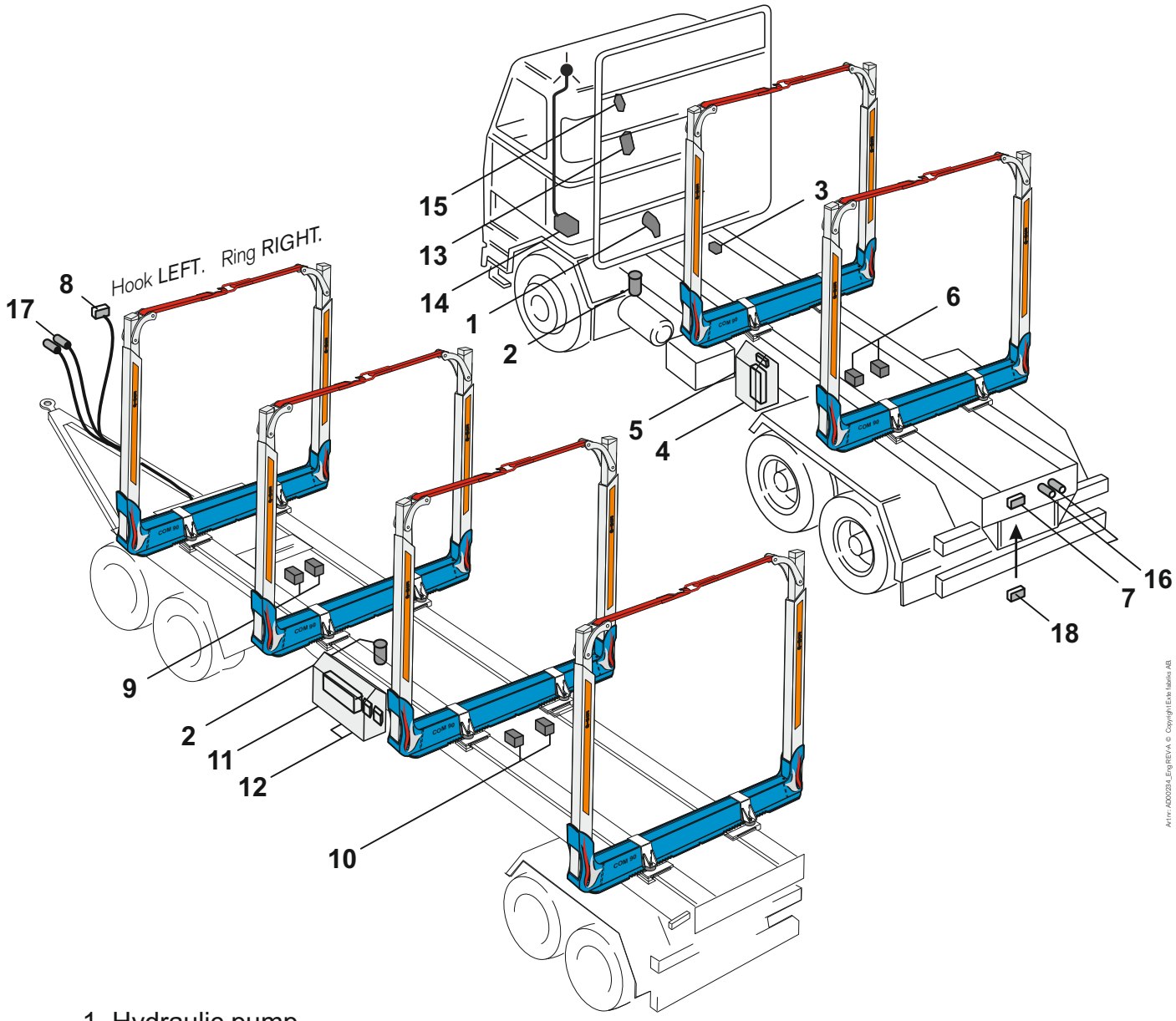


ALWAYS load so that there is a **motion reserve** for compression and settling of the load to avoid the stakes reaching end of stroke.



More information about emergency stop functions on **page 30.**

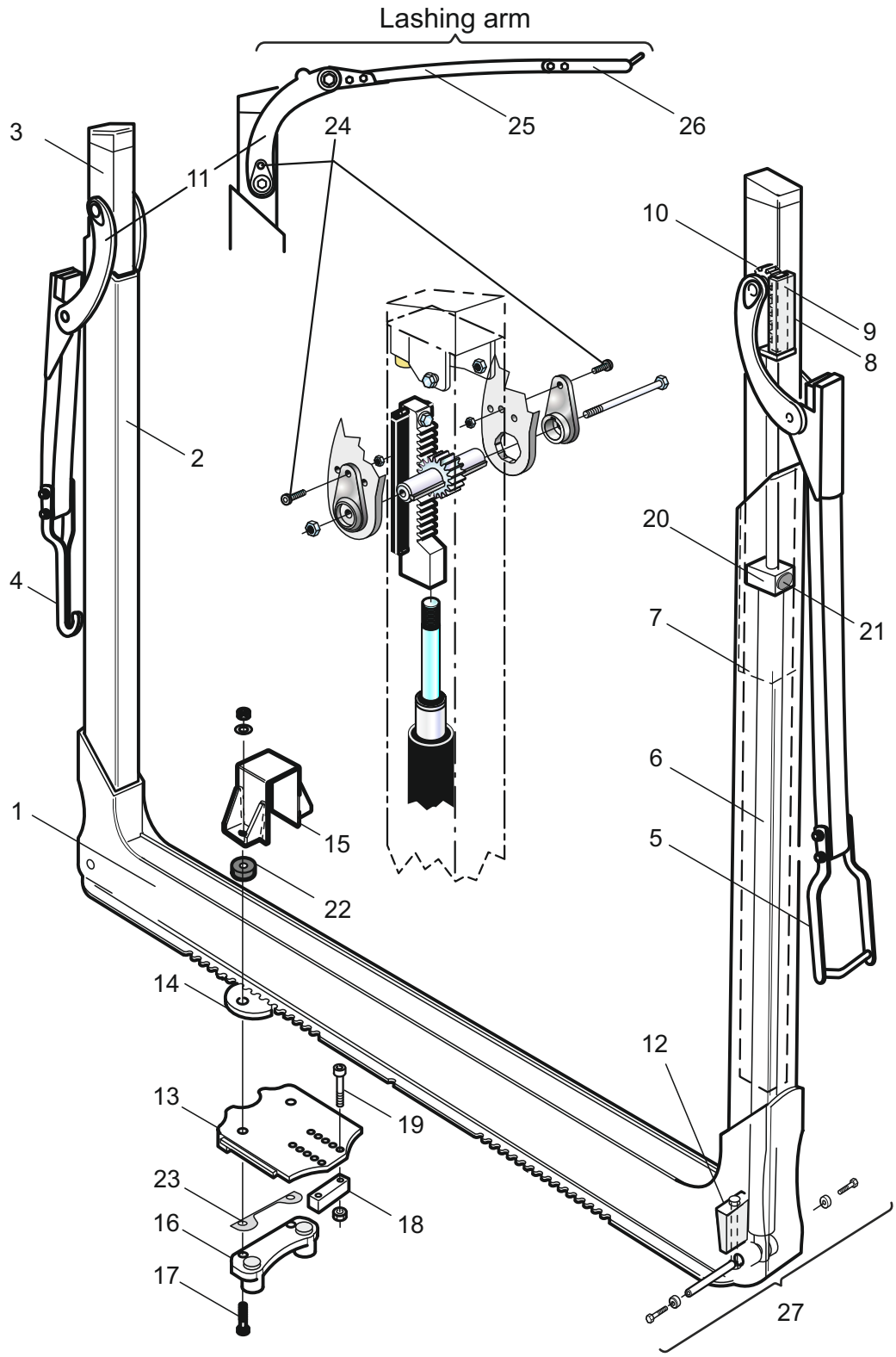
Component locations and designations



1. Hydraulic pump.
2. High pressure filter.
3. Main pressure valve (150 Bar).
4. Direction valve block for single stack (truck).
5. Electrical terminal, I/O unit.
6. Distribution blocks with flow divider.
7. Electrical cable connector, **female** part.
8. Electrical cable connector, **male** part on cable.
9. Distribution blocks with flow divider (forward bunk pair).
10. -"- (rear bunk pair).
11. Direction valve block for dubble stack (trailer).
12. Electrical terminals, I/O units.
13. Control panel located in cabin.
14. Radio receiver.
15. Radio transmitter.
16. Quick couplings pressure and return.
17. Quick couplings pressure and return.
18. Termination connector (120 Ohm resistor, used only when driving without trailer if not auto-termination is used).

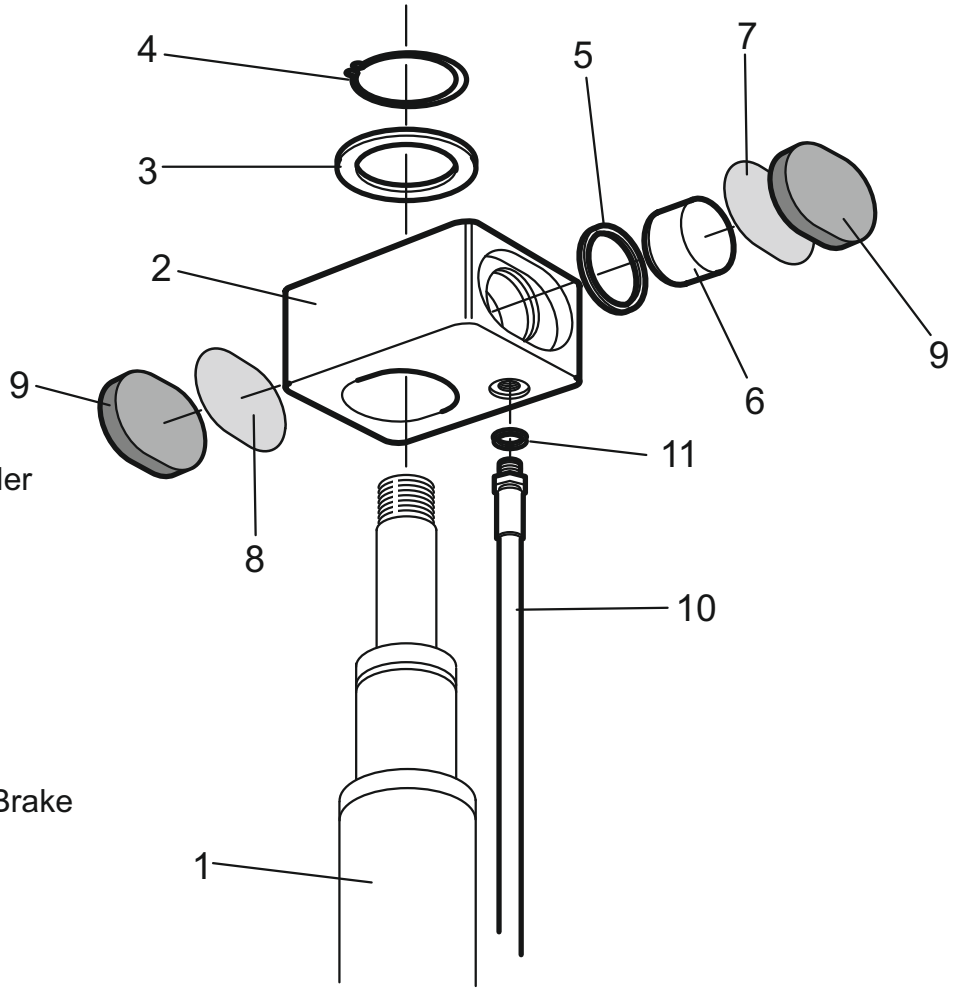
Description of bunks

The drawing shows Com 90 complete bunk with its different components.



1. Bolster
2. Lower stake
3. Upper stake
4. Hook-rib
5. Ring-rib
6. Hydraulic cylinder
7. Sliding sleeve
8. Slide bearing plate
9. Rack
10. Pinion
11. Lashing arm
12. Locking element
13. Mounting plate
14. Securing plate
15. Clamp
16. Fastening plate
17. Screw w. nut
18. Inner frame stop
19. Screw w. nut
20. Brake housing
21. Friction pads
22. Rubber puck
23. Shim
24. Break pin
25. Rib
26. Hook / Ring
27. Locking Pin

Brake



Included parts

1. Hydraulic cylinder
2. Brake housing
3. Washer
4. Snap-lock ring
5. Piston seal
6. Piston
7. Support plate
8. Support plate
9. Friction pad
10. Hydraulic line, Brake
11. Seal

Working principle:

Built-in to the upper stake is a brake device that brakes the stake thus enabeling lashing arm maneuvering instead of stake movement.

When up or down movement is wanted on the stake, the “High speed” function is activated.
The hydraulic pressure to the brakes then significantly reduces to lower the friction against the stake and enabeling the higher speed but **still maintain a secure connection** between hook and ring.

NEVER use the high speed function when moving the lashing arms!!
ONLY when moving the upper stake UP or DOWN.

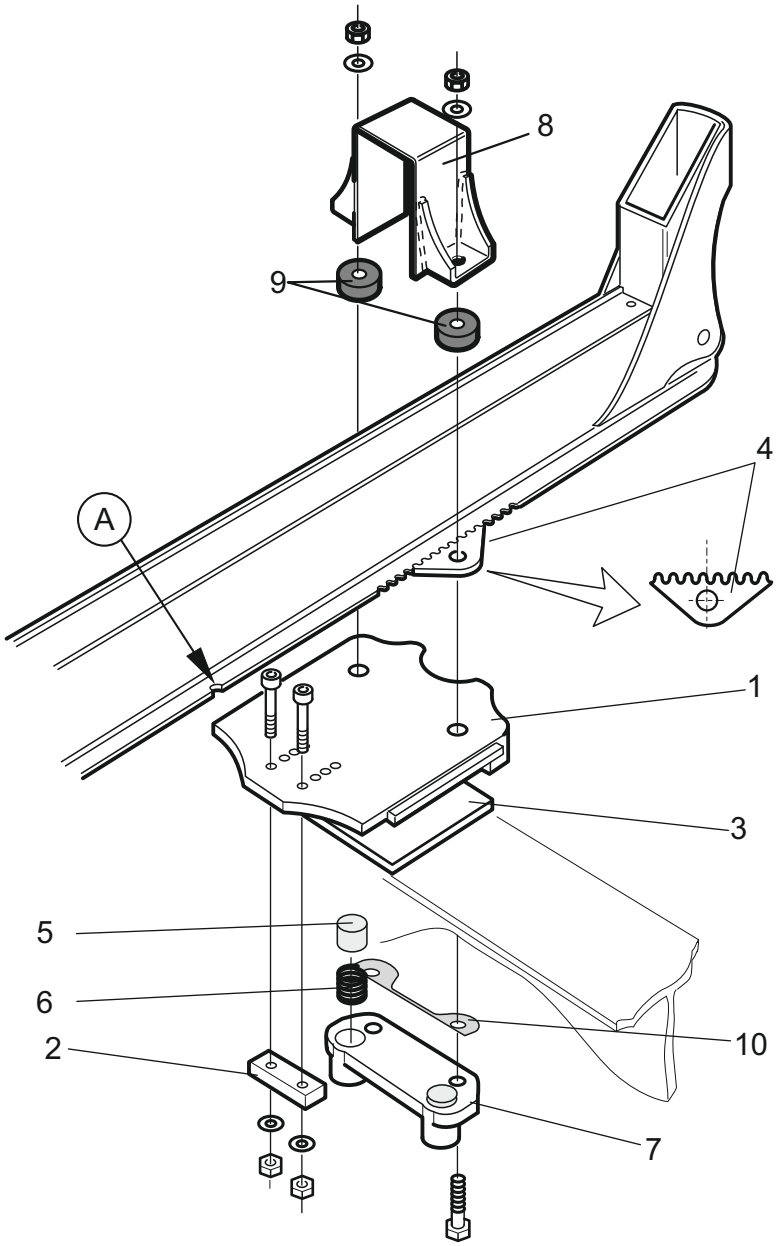
Mounting of bunks

The bunks must always be mounted to the chassis´ frame with a friction attachment (**1**) Mounting plate. The friction attachment has a bolted inner stop (**2**) which must be adjusted to the correct frame width. It is **vital** that the inner stop is adjusted correctly.
A slide plate (**3**) must be placed between the mounting plate and chassis´ frame.

There is a notch in the lower part of the bolster for centering on the chassi **(A)**.

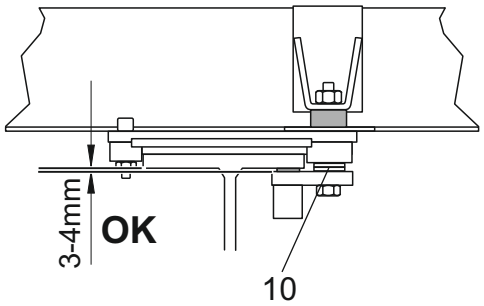
The bunk is fixed by a toothed securing plate (**4**) against the corresponding teeth in the bolster frame. **Please note** that the plate is **reversible**, which makes it possible to flip the plate for a half step adjustment.

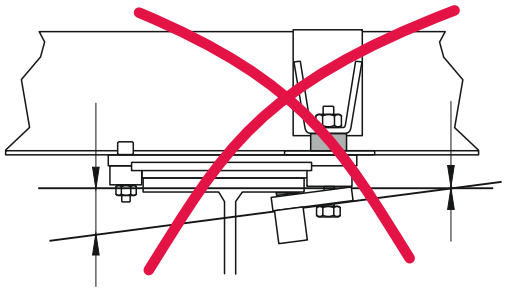
Slide plunge (**5**) and spring (**6**) must be mounted in the fastening plate (**7**). The bunk is fixated with the clamp (**8**) and the rubber puck (**9**) shall fix the toothed securing plate.



Important

In relation to the chassis´ frame thickness, shim (**10**) must be used in appropriate number to achieve a flat contact surface between the mounting plate (**1**) and fastening plate (**7**). Gap between frame and fastening plate, 3-4mm.
See fig. below.





NOTE! The bolster and stakes are relatively heavy, so when mounting, you need some type of lifting equipment (crane or equal) to avoid body injuries.

Mounting of complete or only upper stake.

The stakes are delivered from factory pre-mounted with hydraulic cylinder and brake function.
N.B. Remove tape (**1**) that holds a transport security device (pin), that in its turn holds the hydraulic cylinder in place.
Place the stake in the bolster.

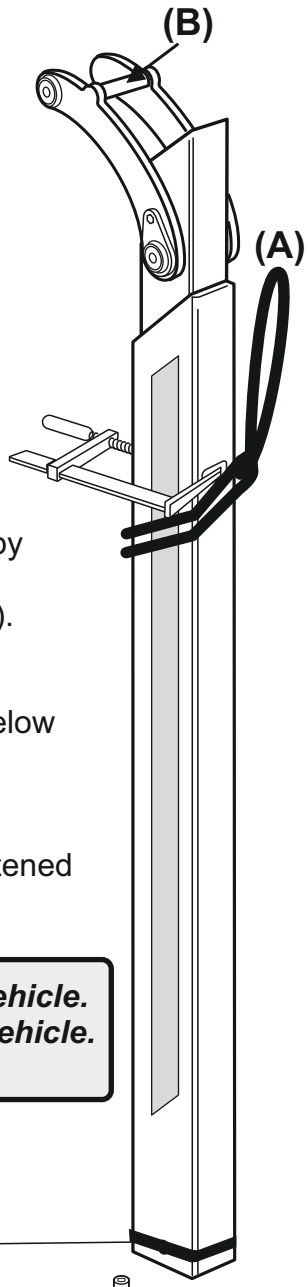
USE LIFTING DEVISE TO AVOID INJURY!

When lifting the complete stakes, it's advantageous to use a strap (**A**) that is stopped from sliding by using a clamp as shown in the figure.

When mounting or removing only the upper stake, it can be lifted in the lashing arm at (**B**).

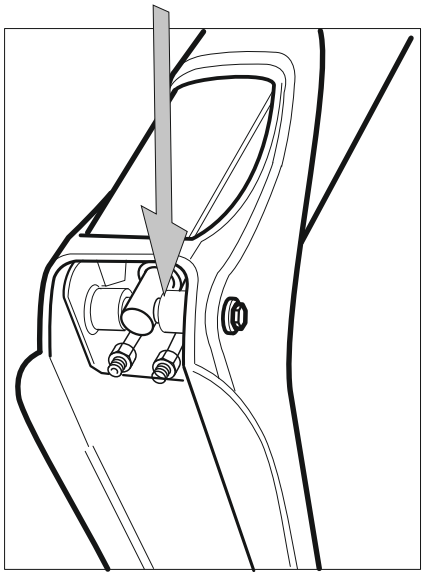
When the stake is seated in the bolster, the pin (**2**) should be mounted by using it to slide the transport security device away until the pin is all the way through and in its place. Mount the screws (**3**) with the washers (**4**).
Use thread lock.

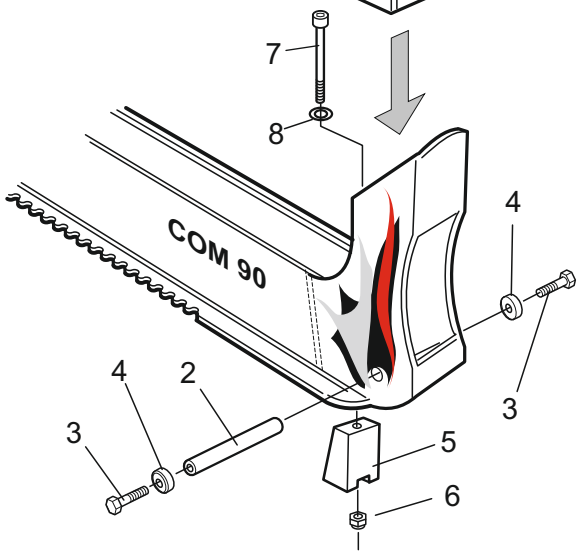
The locking device (**5**) shall together with the nut (**6**) be inserted from below into the bolster and the screw (**7**) and washer (**8**) inserted from the top.
Tighten the screw so the locking device is compressed and therefore secures the stake in the bolster.
After using the equipment for a while the locking device must be re-tightened to avoid the stakes vibrating loose.



! ***Lashing arm with <u>hook</u> shall be mounted on the left side of the vehicle. Lashing arm with <u>ring</u> shall be mounted on the right side of the vehicle.*** ***See image on pg.4.***

Make sure the pin (**2**) runs through both the bolster, stake and hydraulic cylinder.



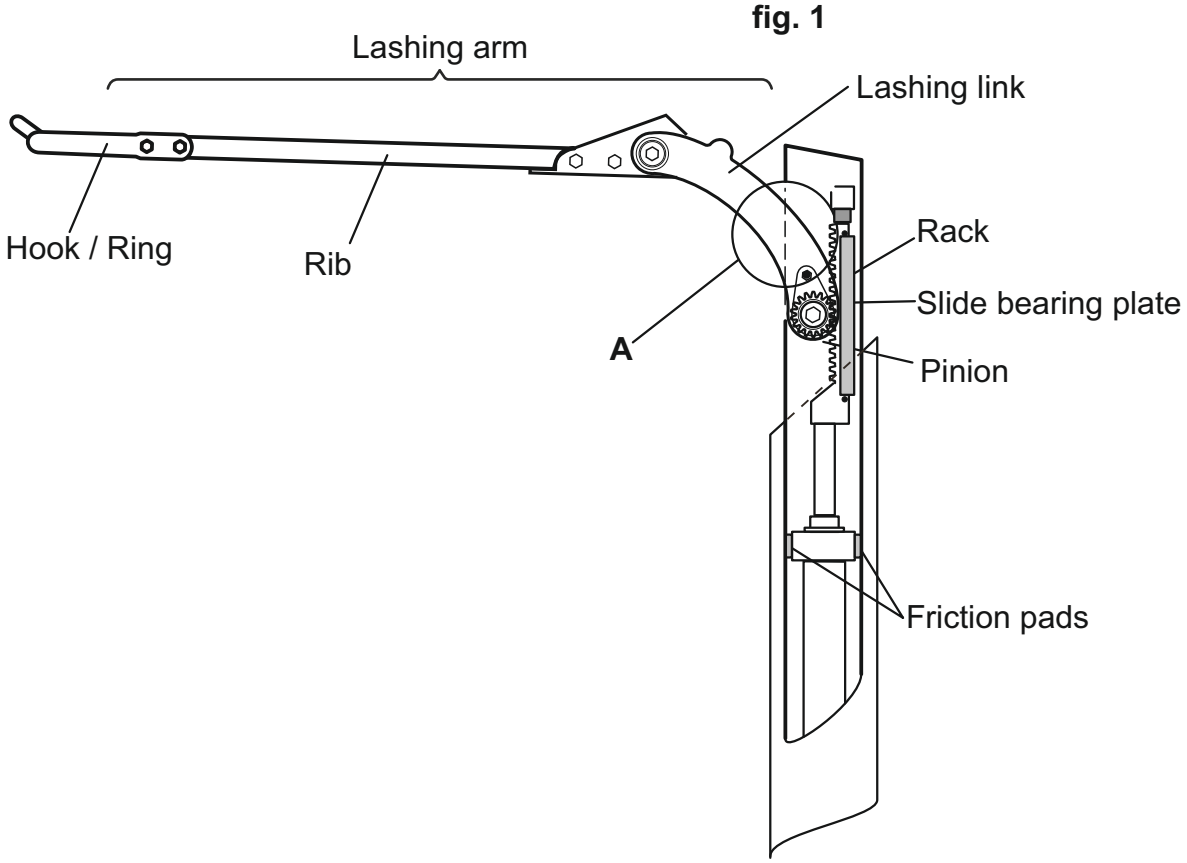


NOTE! The bunks and stakes are relatively heavy, so when mounting, you need some type of lifting equipment (crane or equal) to avoid body injuries.

Assembling the stakes and lashing arms.

At delivery of stakes the lashing arm is normally mounted.
Mounting and removing of lashing arm is described in the following images and describes the order that is proven and works well.

fig. 1



1. Place the upper stake horizontally in a vice.

2. Insert the pinion from the top side of the stake and direct the axle with mounted keyway from the side and direct it through the pinion.

Be careful not to damage the keyway or pinion if the fit is not perfect.

Normally hand power should be enough to push the shaft through the pinion's hole.

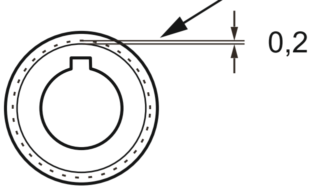
If necessary a **rubber mallet** can be used to lightly tap the shaft**.**

Light greasing of the shaft is suitable before mounting. Wood tar can also be used.

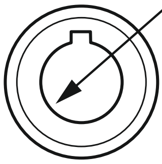
Assembling the stakes and lashing arms.
Continued.

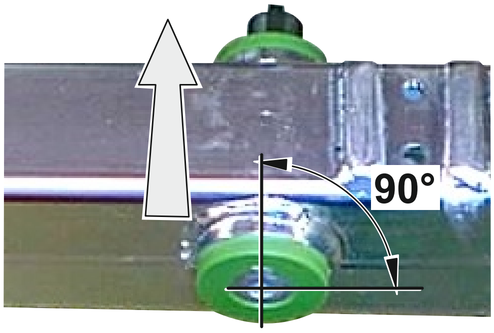
3. Mount slide bushings from both sides.

There must be a play of min 0.2 mm. between the stake's bearing guide and the bushing.



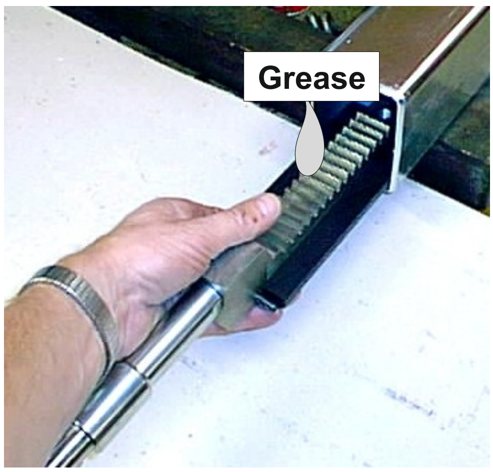
The bushing’s hole against the shaft should have press-fitting and a light tap with a rubber mallet might be used for mounting.





4. With the rubber mallet, hit the shaft over to the rear side as in the image and turn it so the keyway has a 90° angle to the stake pipe.

This is necessary to get a correct mounting of the hydraulic cylinder to the rack.

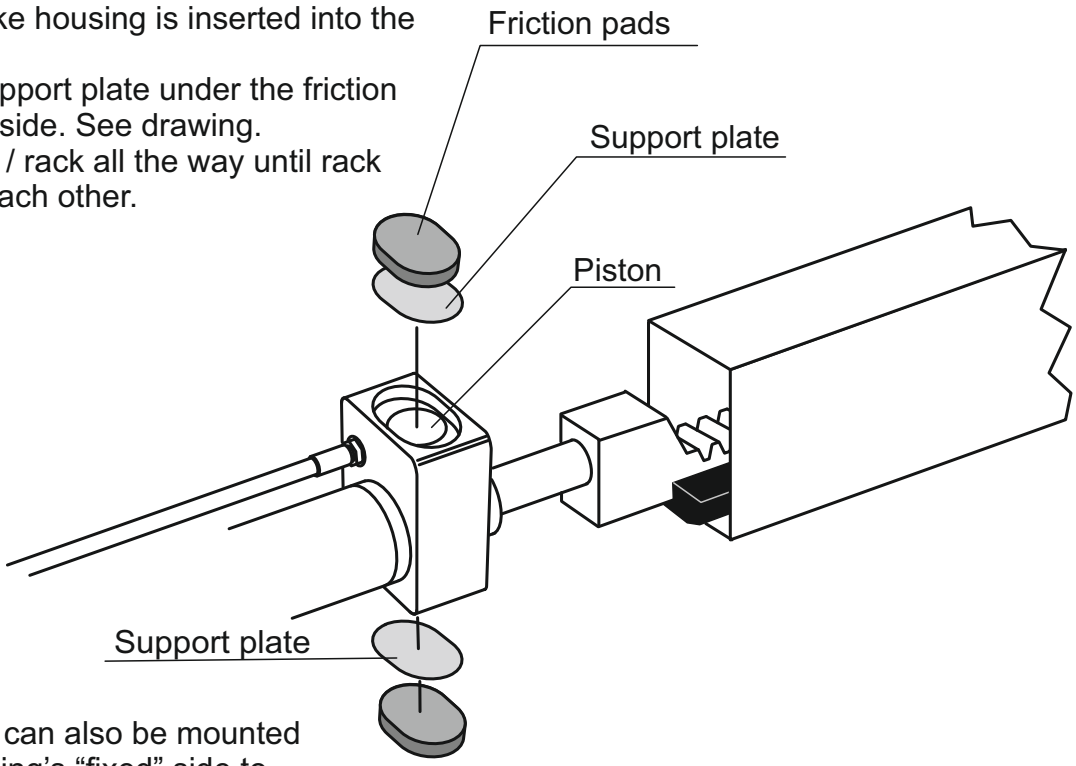


Grease the rack with rack grease before mounting it in the stake.

5. With the slide bearing plate mounted on the cylinder rack, slide it into the stake pipe’s bottom end as in figure.

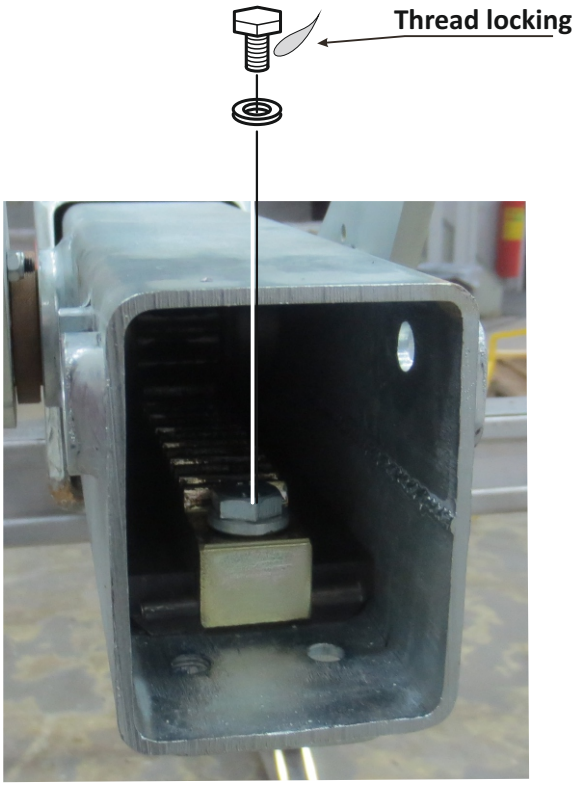
Assembling the stakes and lashing arms. Continued.

6. Mount the friction pads on both sides of the brake housing and hold them in place with the hand until the brake housing is inserted into the stake.
Remember the support plate under the friction pad on the piston side. See drawing.
Insert the cylinder / rack all the way until rack and pinion grips each other.



7. A support plate can also be mounted on the brake housing's "fixed" side to reduce the stroke of the piston and increasing the usable depth of the friction pads, but this has to be decided on a case by case basis since the measurements of the stake profile can vary slightly.

Don´t forget the stop screw!



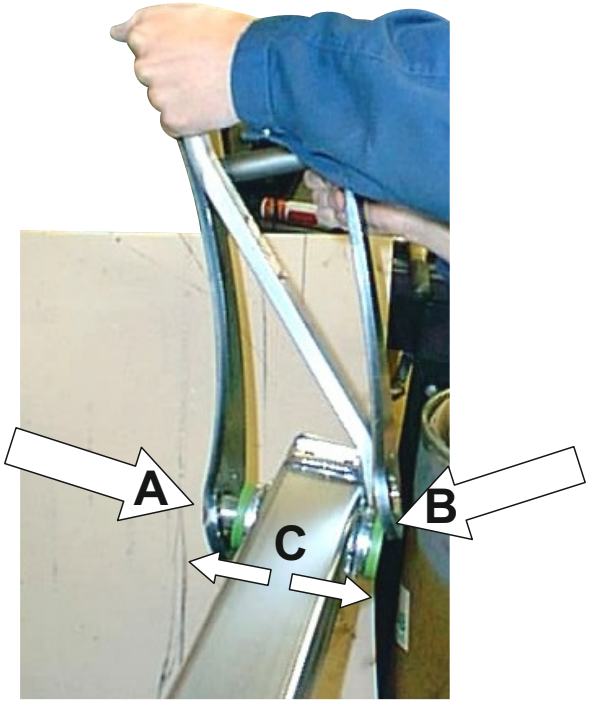
8. With the rack in position as shown in the image, mount a stop screw with a few drops of **Thread locking**, M10 x 20 and a thick washer (10.5 x 22 x 4).

Assembling the stakes and lashing arms. Continued.

9. Mounting the lashing link.
This is done by first putting the link on the protruding part of the shaft at (**A**).

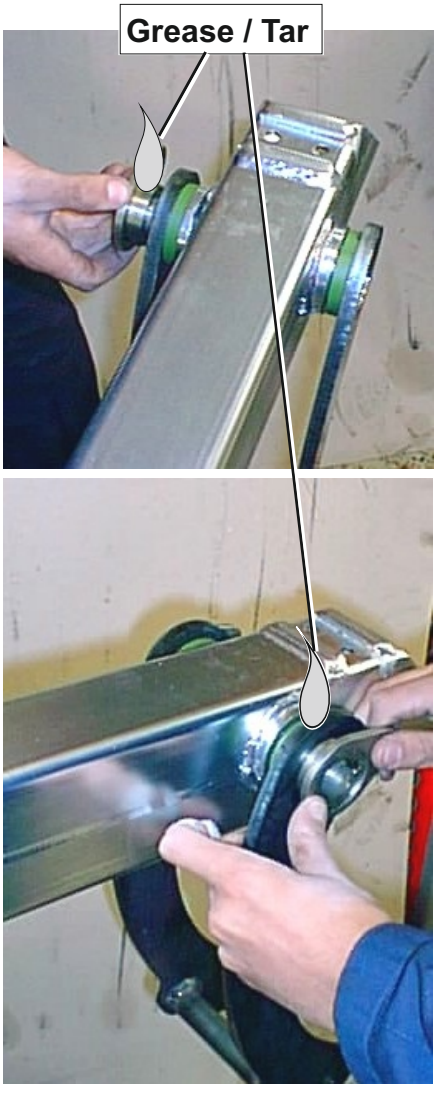
Then, the lashing link is bent over the shaft's other end with a breaking bar at (**B**).

Lightly beat the shaft with a rubber mallet to center the shaft on both sides (**C**).
N.B. **Do not use a steel hammer** to prevent damage to the shaft ends!



10. Mount the lashing link drivers on both sides.
The driver's contact surface against the lashing link must be protected against corrosion with either grease or wood tar.

Be careful when the driver is fitted against the lashing link to **prevent damage** to the surfaces. The driver shall be fitted on the keyway at the same time as the lashing link's holes shall be centered on the driver.
A light tap with the rubber mallet could be needed to get the parts in place.



Chassis grease can also be replaced with wood tar.

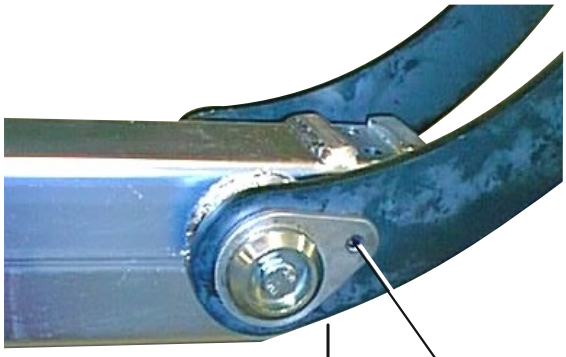
The purpose of the tar or grease is to protect against corrosion.

Assembling the stakes and lashing arms. Continued.

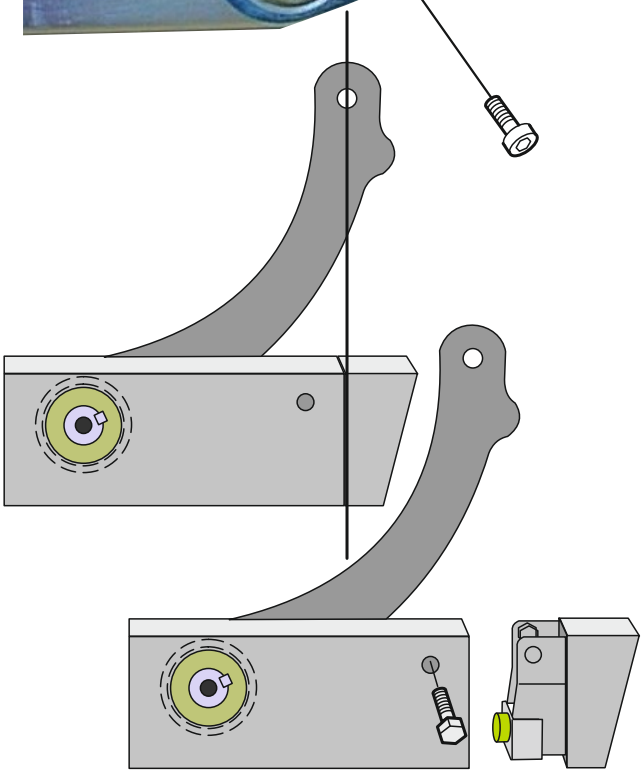
11. Mount screw M10 x 170 together with the nut protection.

12. Mount overload screw with lock nut on both sides.

The screw should shear off at excess load or harsh handling before the pinion or rack gets damaged.



13. Check that the lashing link has the position shown in the image, when the rack is run to its top, end position.

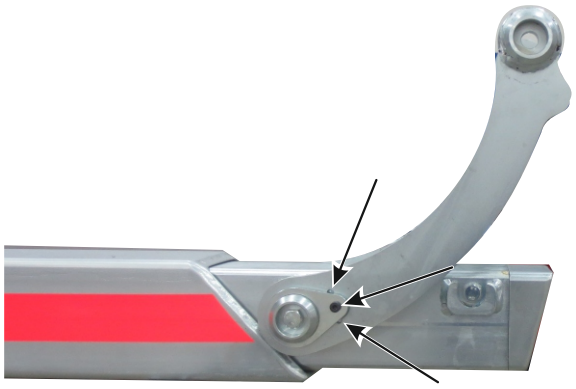


14. Mount stake lid with 4 pcs. M10 x 20

Use your fingers to tighten the screws to make sure the threads are gripping.

Then tighten them with a spanner.

15. Readjustment of the lashing arm position can be done by choosing one of the three holes available for the break pin.

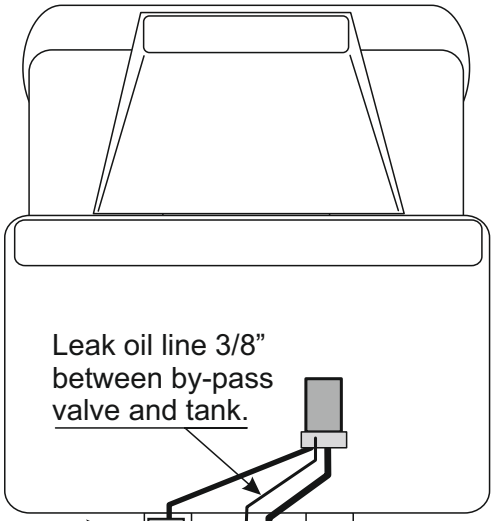


Mounting of hydraulic components TRUCK
Principle sketch

Truck.
This sketch should be seen as a general placement sketch.

Location of parts is free, but please remember to build so that the equipment is well protected and easily accessible.

Hose routing shall be done so that the hoses are located in the frame and get a natural protection.



Leak oil line 3/8" between by-pass valve and tank.

From pump

Pressure filter mounts with its own attachement

To valves.

Main pressure valve 150 Bar

TANK

Hose dimensions:
Suction line = 2"
Press. line, pump - filter - valve = ½"
-"- valve - dist. block = 3/8"
-"- dist. block - stakes = 1/4"
Return line = 3/4"
Brake line = 1/4"

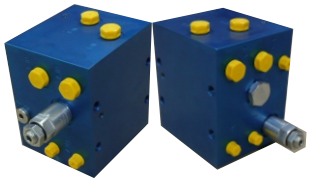
Main distribution valve

Return to tank 3/4"
Brake 1/4"

½" from pump
½" to trailer valve

See desc. of connection on pg. 16.

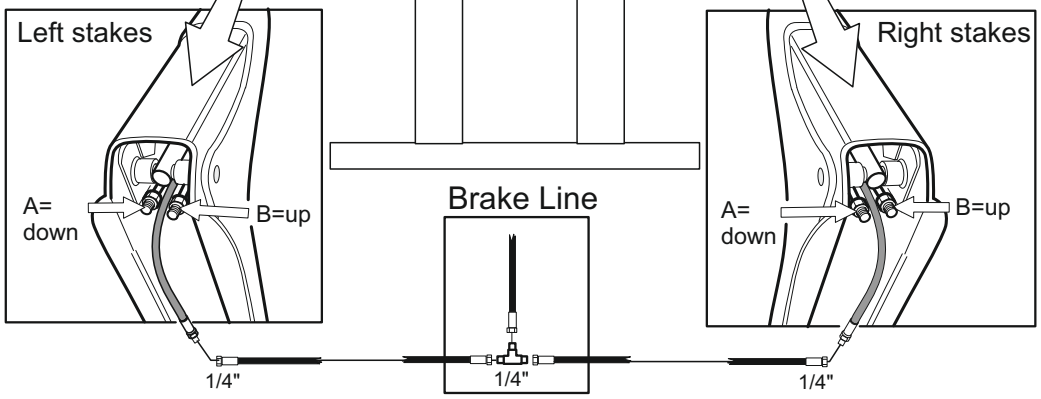
Distr.block
front and rearside



Distribution block is marked **A in** and **B in** for connection with 3/8" hose from main valve Use the connection hole that fit and plug all the others.

Placement of the distribution block is free, but watch out for crossbars and other equipment in the frame.

Distribution block is marked **A out** and **B out** for connection to resp A and B connection on stake cylinder.



Mounting of hydraulic components TRUCK
Hydraulik tank.

The tank shall be mounted on the front protection wall on the truck.

Lower tank bracket (1) and
Upper tank bracket (5) is delivered in a cut off length so it can be adjusted to different type of wallbars.

The upper brackets must be placed under the tank lid.

Rubber protection (2) to protect the tank from damage by abrasion
.
Front bar (8) fixes the tank with use of a screw **(7)** and a rubber hose **(6)** as an abration protection.

The tank is compl. with a suction hose connection 2” **(3)** and a 1/2” connection **(4)** in the bottom to use for an outlet hose in case of need to empty the tank.

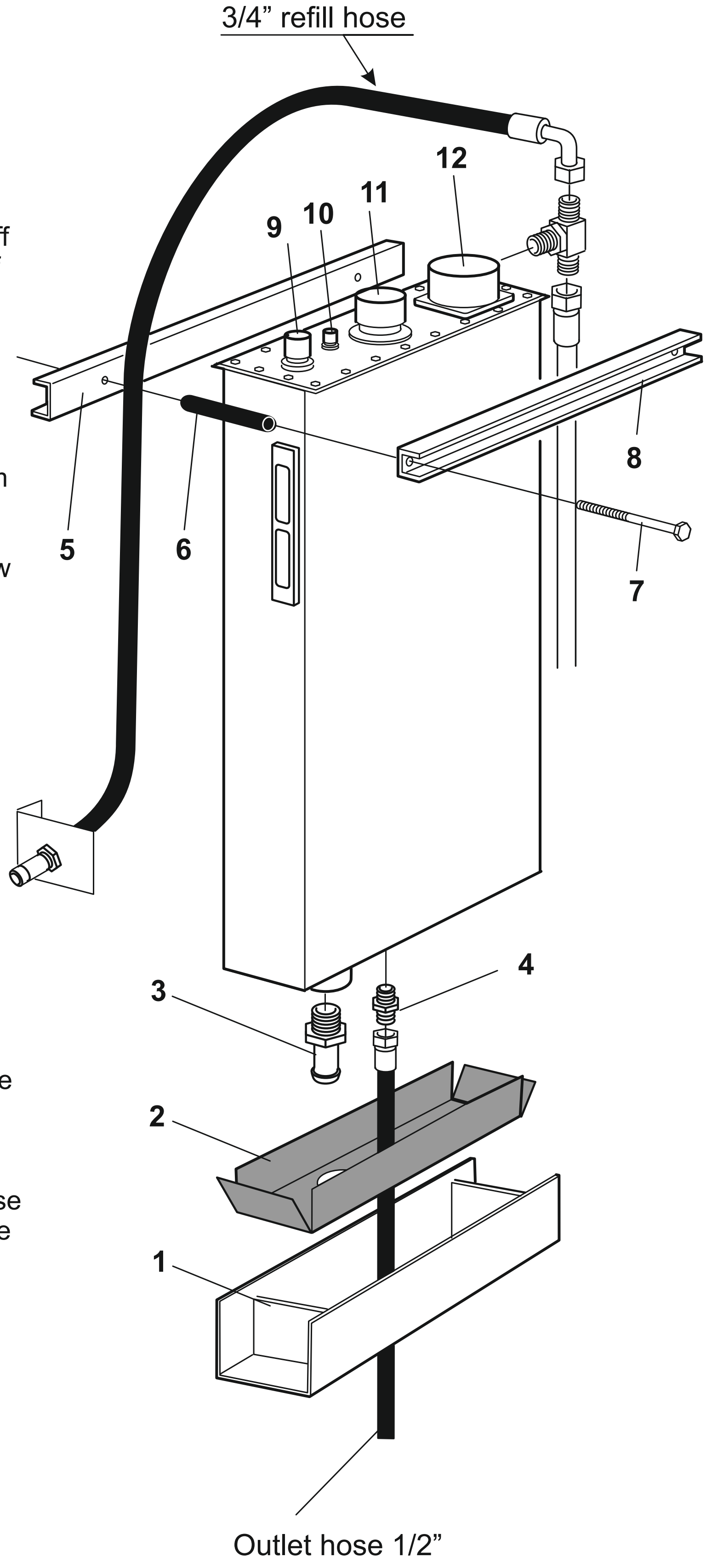
Oil low level sensor **(9)**

Connection **(10)** 3/8” for the hose from the bypass valve on the pump.

Fillercap incl. air filter **(11).**

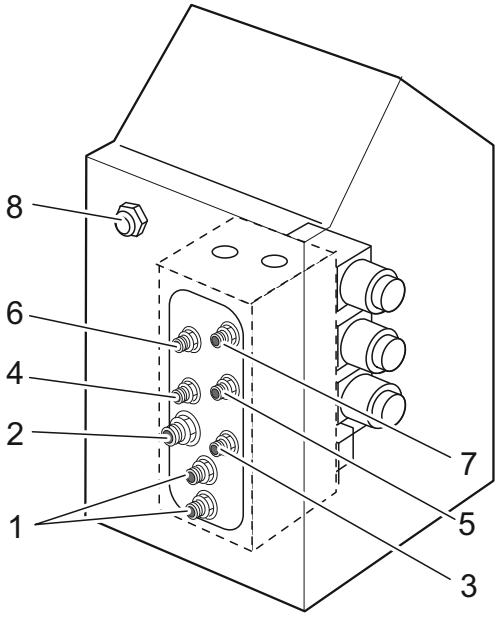
Returnfilter **(12)** incl. connection for return hose 3/4” from the main hydraulic valves.

A refill connection can be fitted on the filter in combination with a quick connection and a hose so the tank can be refilled by pump through the filter.



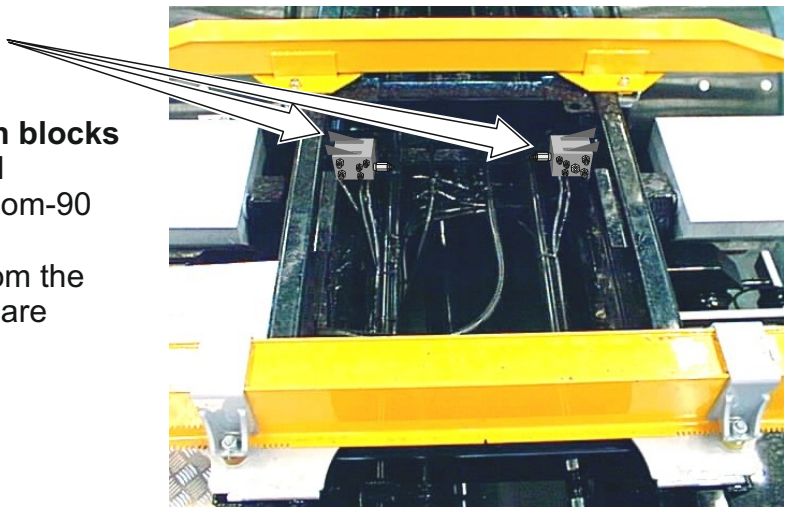
Mounting of hydraulic components TRUCK
Hydraulic block.

Single stack block (Truck)
Hydraulic connections are accessible from the back of the housing.



1.	1/2”	2 pcs. connection inputs for pressure line, one from pressurefilter and one for further hose routing to the trailer valve’s pressure connection.
2.	3/4”	Return line to tank / return filter
3.	1/4”	Output for brake line for further extension to all stakes.
4.	3/8"	Left stakes **UP**
5.	3/8"	Left stakes **DOWN**
6.	3/8"	Right stakes **UP**
7.	3/8"	Right stakes **DOWN**
8.	Cable entry.	

Location of distribution blocks.



Preferably locate the the distribution blocks under, or close to protection banks and approximately centered between the Com-90 banks.
It is **preferred** that the hose lengths from the distribution blocks out to all the stakes are approximately the same.

Always have serviceability in mind!

Connecting the hydraulic pump.

Each pump brand has their own manual for how installation should be done which **MUST** be followed.
Make sure that the installation is done **correctly.** Regardless of manufacturer the hydraulic **pump must be bled** before start-up to avoid damage to the pump.

The bleeding is done by loosening plug (**5**), see below.

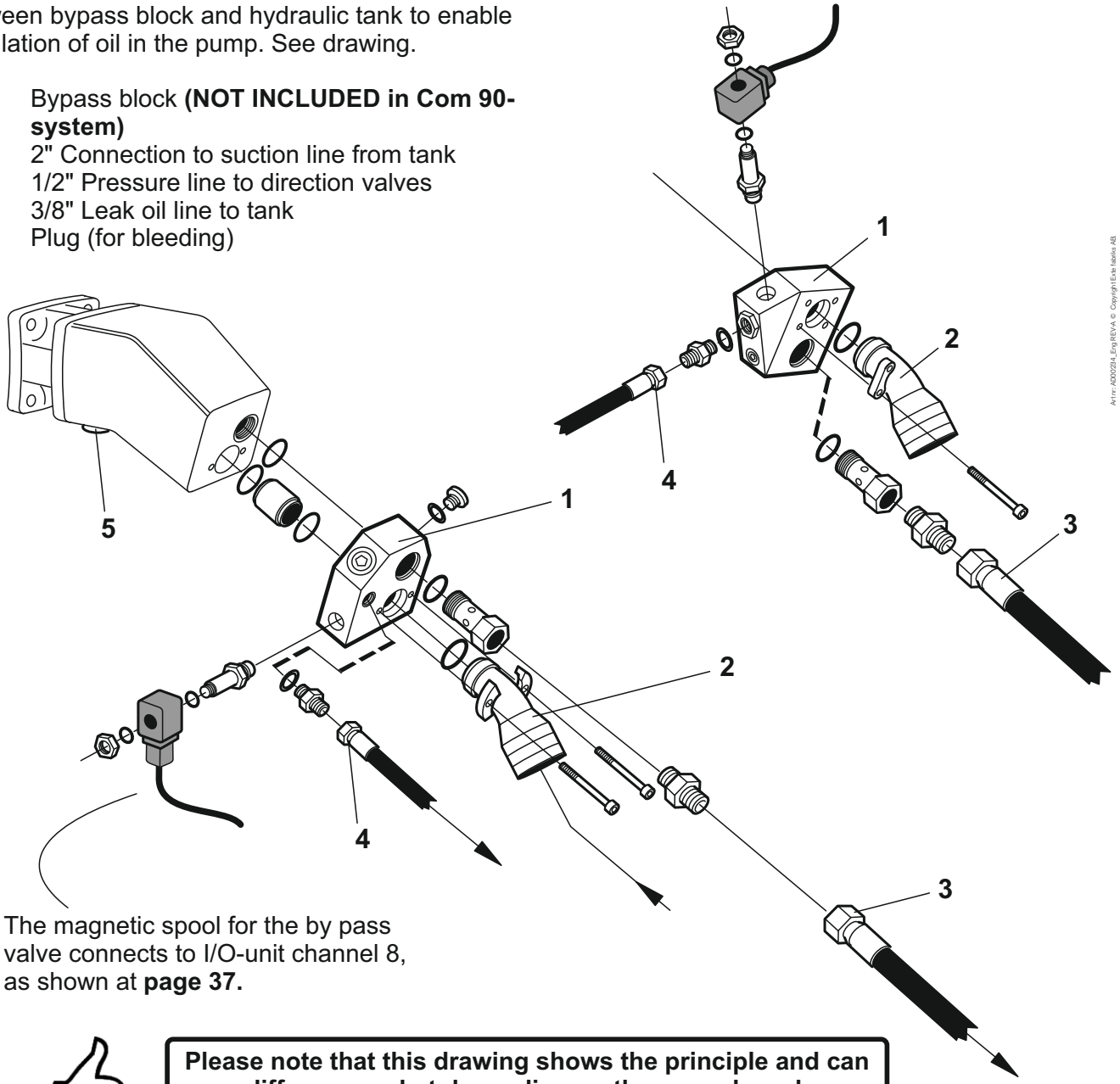
We recommend a shut-off valve between the hydraulic tank and pump, for serviceability and easier pump replacement in the future.

To avoid overheating the hydraulic pump when the system is not activated, a leak line **must** be installed between bypass block and hydraulic tank to enable circulation of oil in the pump. See drawing.

1. Bypass block **(NOT INCLUDED in Com 90-system)**
2. 2" Connection to suction line from tank
3. 1/2" Pressure line to direction valves
4. 3/8" Leak oil line to tank
5. Plug (for bleeding)

NOTE!
Pump or by-pass valve
NOT INCLUDED
in the Com 90-system!

NOTE!
The system is dimensioned for **MAX flow 50 lit/min!**
We recommend 40 lit/min.



The magnetic spool for the by pass valve connects to I/O-unit channel 8, as shown at **page 37.**

**Please note that this drawing shows the principle and can differ somewhat depending on the pump brand.
Always check the pump manufacturer's recommendations!
Bypass valve is not included in the Com 90-system.**

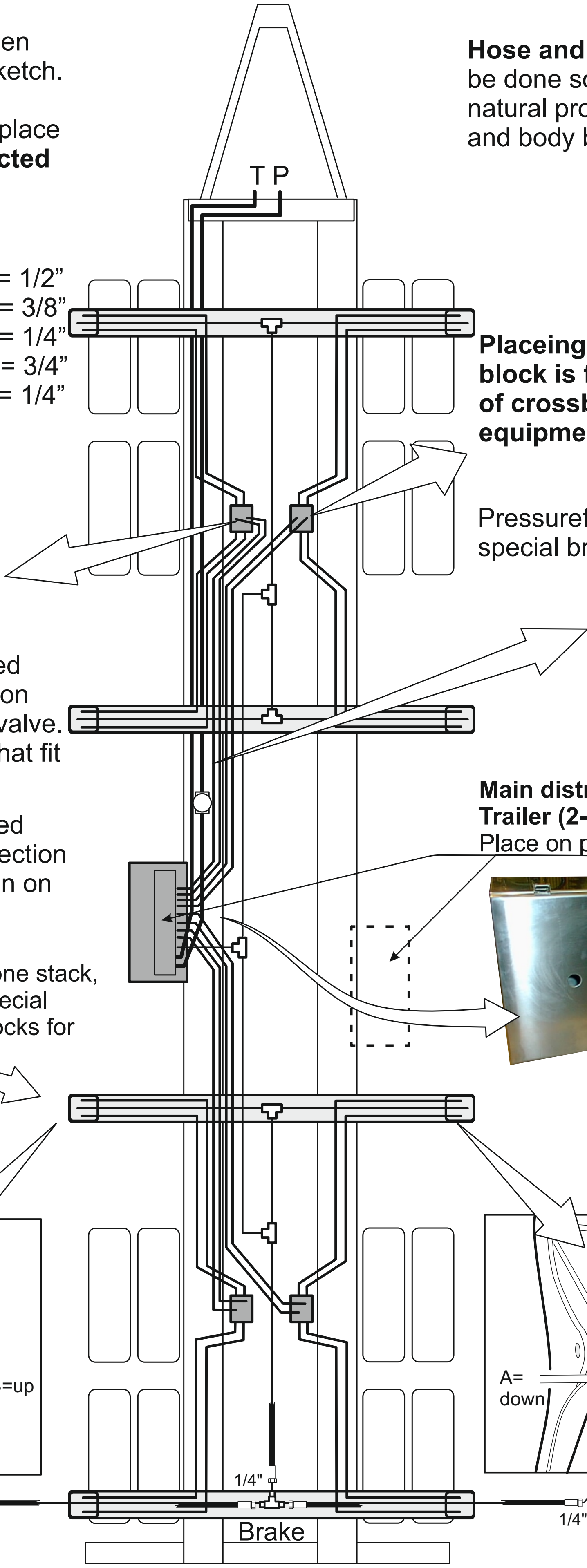
Mounting of hydraulic components TRAILER
Principle sketch.

Trailer.
This sketch should be seen as a general placement sketch.

Location of parts is free, place the equipment **well protected** and **easily accessible**.

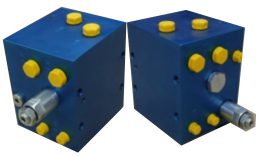
Hose dimensions:
Pr.hose,pump-filter-valve = 1/2”
-”- valve-distr. block = 3/8”
-”- distr. block-stakes = 1/4”
Return line = 3/4”
Brake line = 1/4”

Hose and pipe routing shall be done so that they get a natural protection from frame and body build.

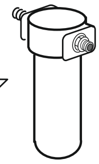


Placeing the distribution block is free, but take care of crossbars and other equipment in the frame

Distr.blocks
Front and rearside.



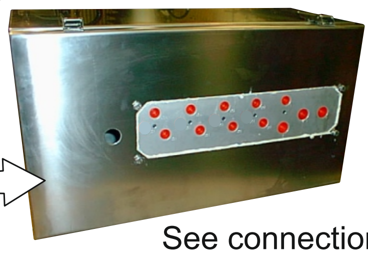
Pressurefilter mounts with a special bracket to the frame.



Distribution block is marked **A in** and **B in** for connection with 3/8” hose from main valve. Use the connection hole that fit and plug all the others.

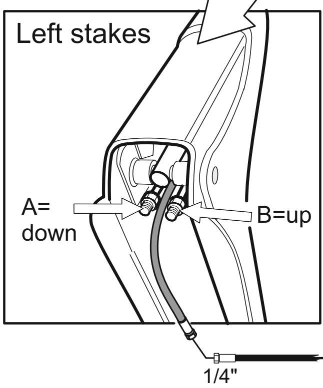
Distribution block is marked **A out** and **B out** for connection to resp A and B connection on stake cylinder.

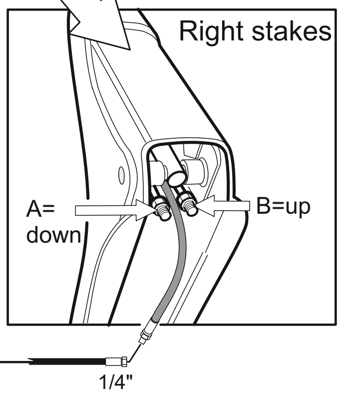
Main distribution valve Trailer (2-stacks)
Place on preferred side.



See connection description on next page.

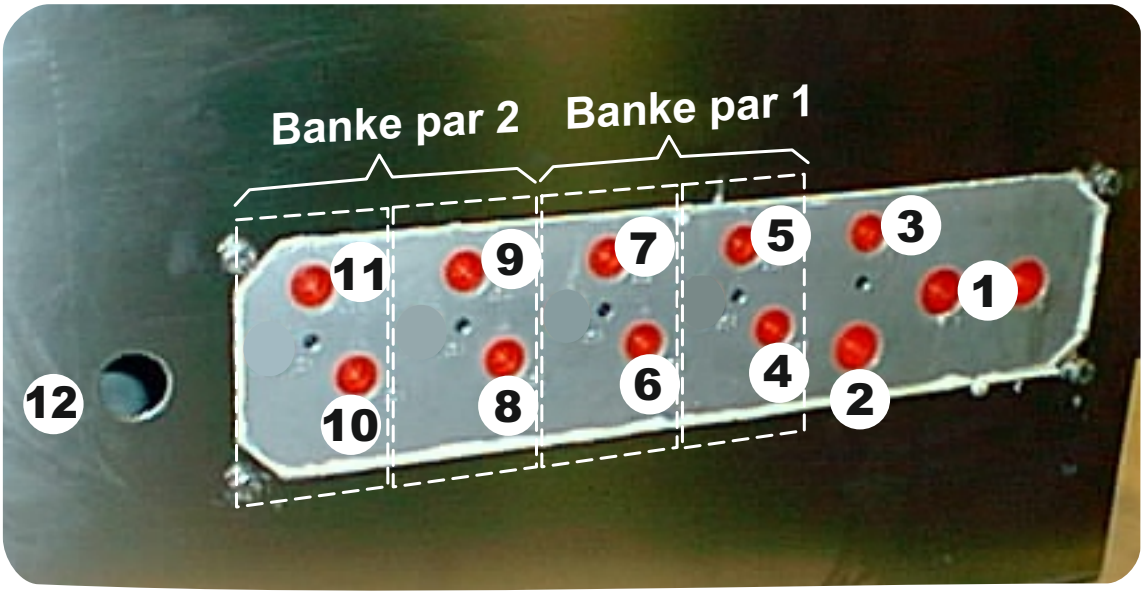
If sliding table are used for one stack, it is advantageous to use special attachement for the distr. blocks for one of the banks.





Mounting of hydraulic components TRAILER
The valve block.

Two stack block (Standard trailer).
The connections are accessible
from the backside of the box.



1. 2 pcs. ½” connection inputs for pressure line, one from pressure filter and one for further routing if needed.

2. 3/4" Return line to tank / return filter.

3. 1/4” Connection for brake pressure line for further extension to all stakes.

4. 3/8" Left stakes **UP**
5. 3/8" Left stakes **DOWN**
6. 3/8" Right stakes **UP**
7. 3/8" Right stakes **DOWN**

Section (Stack)1

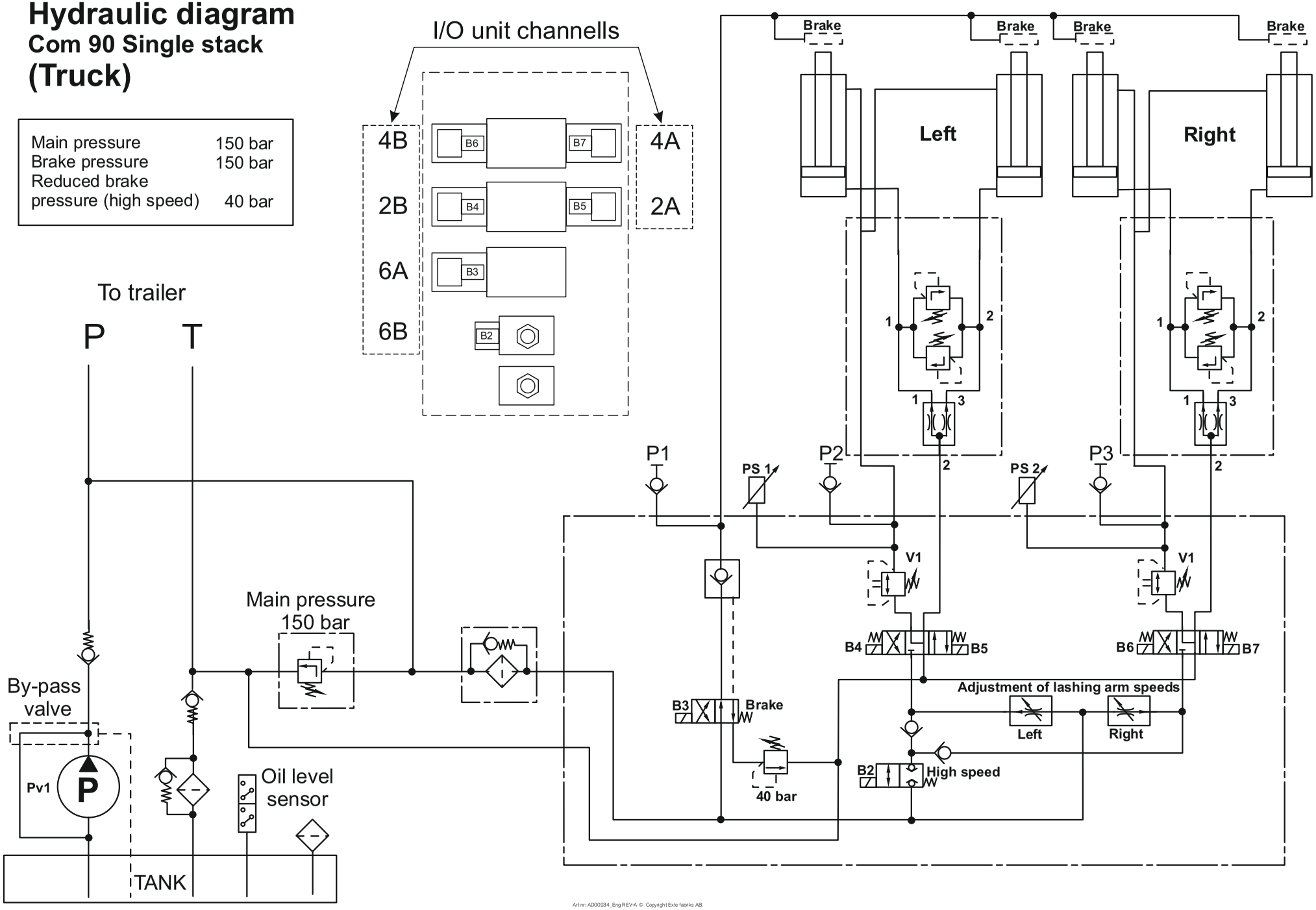
8. 3/8" Left stakes **UP**
9. 3/8" Left stakes **DOWN**
10. 3/8" Right stakse **UP**
11. 3/8" Right stakes **DOWN**

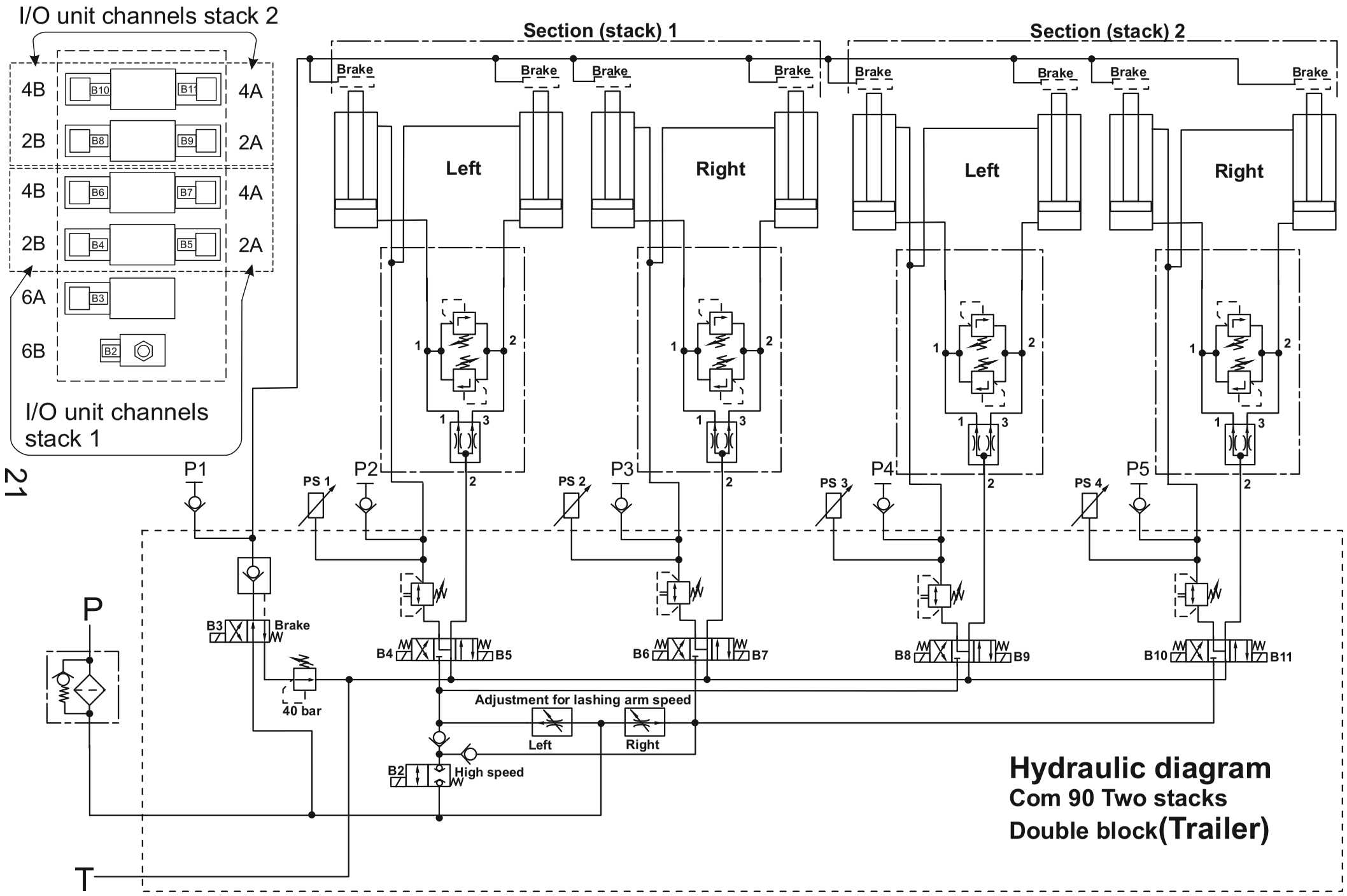
Section (stack) 2

12. Cable entry.

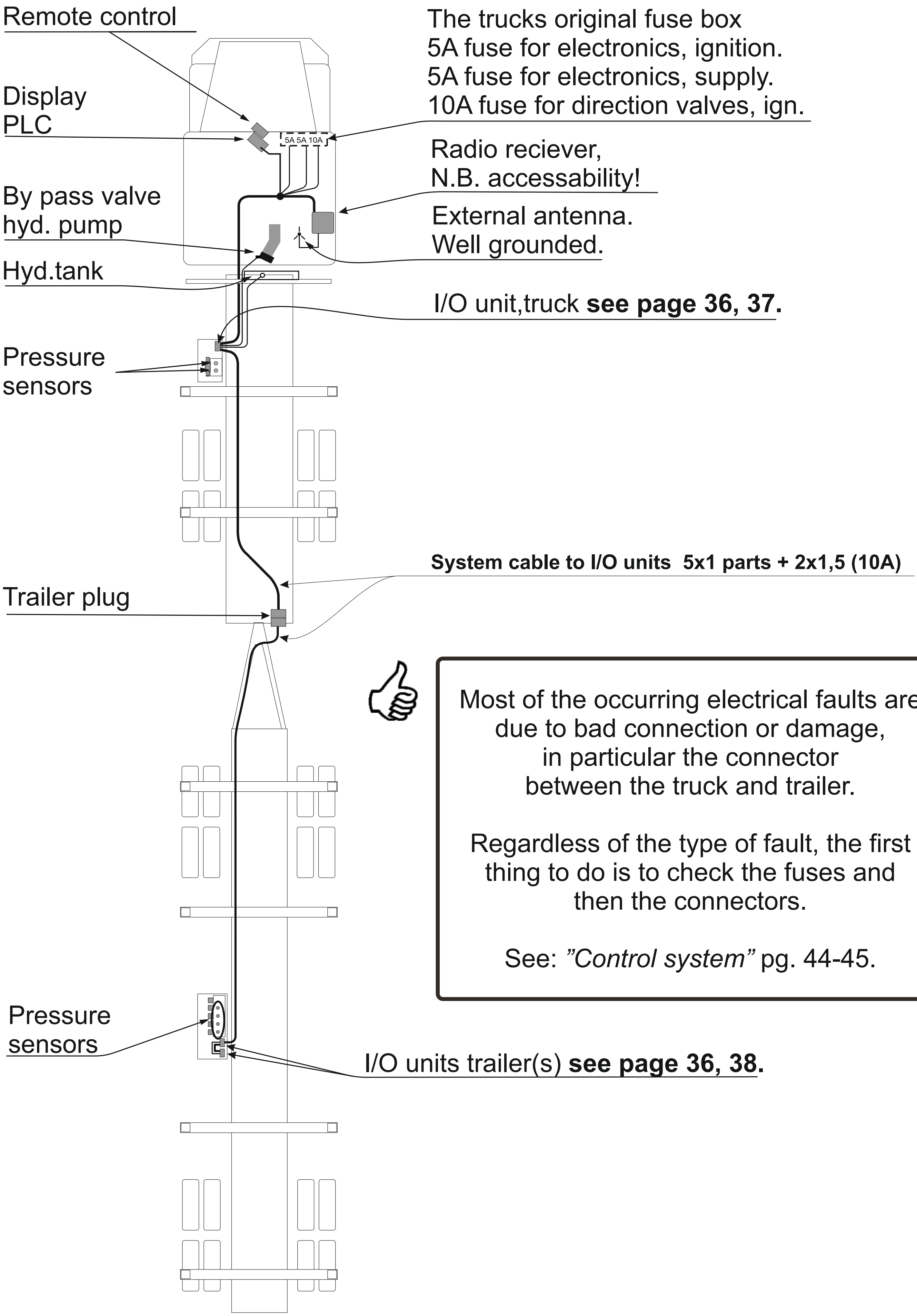
Hydraulic diagram
Com 90 Single stack
(Truck)

Main pressure	150 bar
Brake pressure	150 bar
Reduced brake pressure (high speed)	40 bar





Schematic overview
Control system

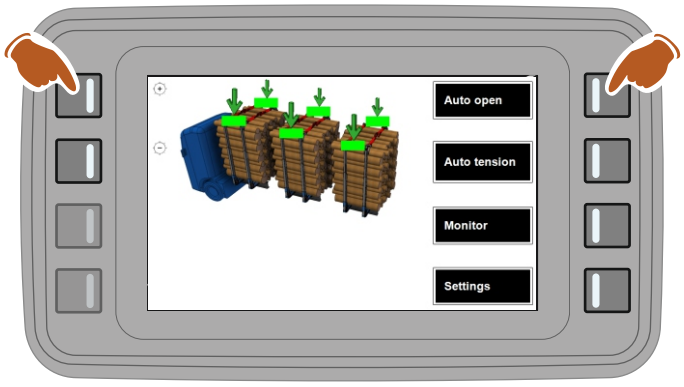


Most of the occurring electrical faults are due to bad connection or damage, in particular the connector between the truck and trailer.

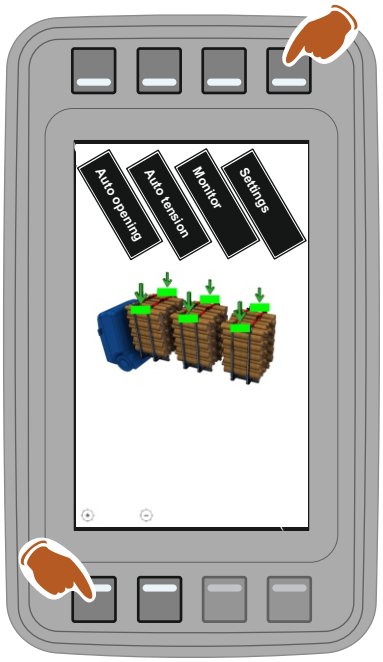
Regardless of the type of fault, the first thing to do is to check the fuses and then the connectors.

See: *"Control system"* pg. 44-45.

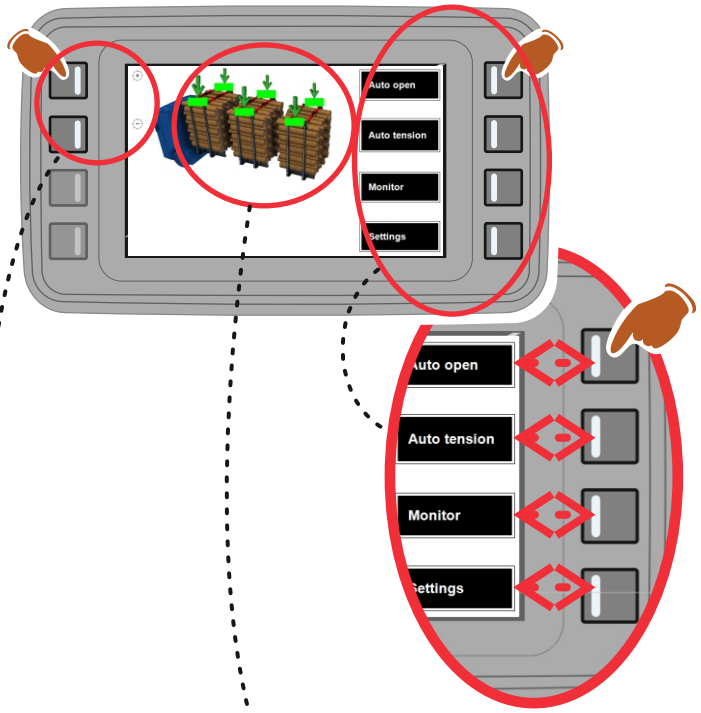
Landscape mode



Portrait mode



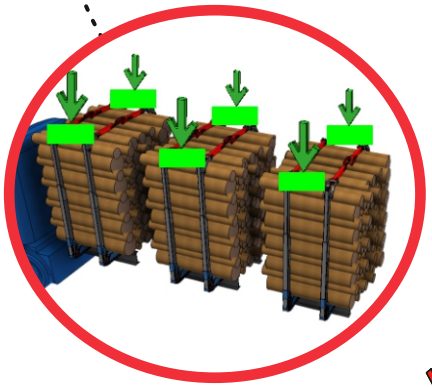
Menu and functions
Home screen



Each menu box or function symbol has a button next to it that executes the selection.

Here you can select the main functions:
- **Auto open** (Automatic opening)
- **Auto tension** (Automatic tensoning)
- **Monitoring** (For manual tensioning)

and
- **Settings.**



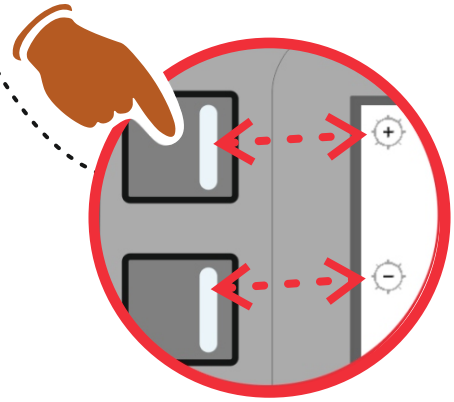
The home screen shows the number of stacks that are connected to the system, 0 - 5 pcs.

Each stack has force arrows for the right and left sides which show the status / tensioning force for each stake.

Green arrow = OK

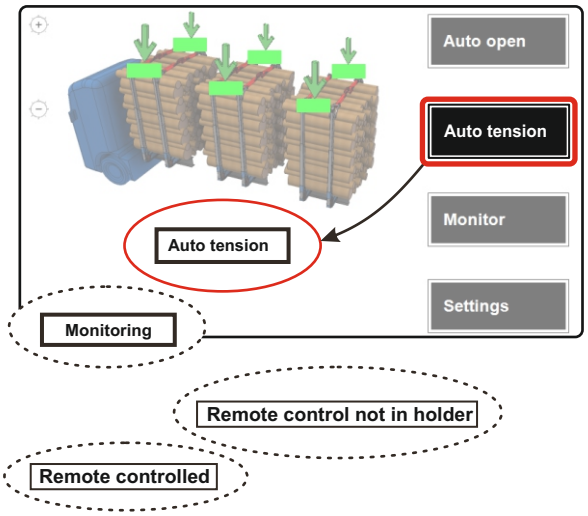
Red arrow = Tensioning force below 1200kg, the force is shown in the box.
With the display set to **Kg** the value is only displayed when the force is lower than 1200kg.

With the display set to **Bar** (hydraulic pressure) the value is displayed continuously.



The **brightness** of the screen is adjusted with these buttons.

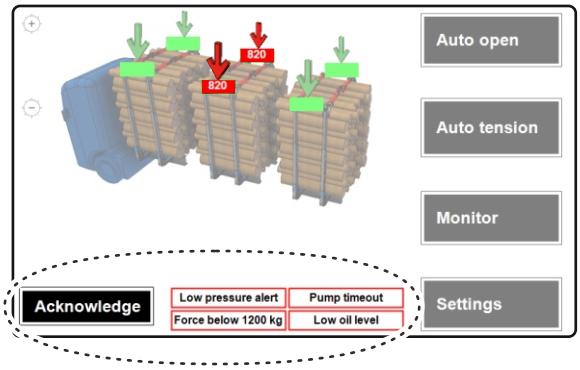
Menu and functions
Home screen



The selected function is always clearly shown in the middle of the display.

”Auto tension” and ”**Monitor”** can be activated directly from the home screen.

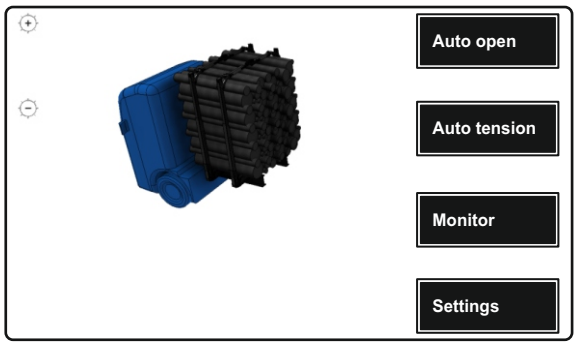
It is also shown here if the remote control is not in its holder and if it is activated for remote control.



Active alarms are displayed at the bottom of the screen flashing with a red frame, at the same time the screen buzzer beeps.

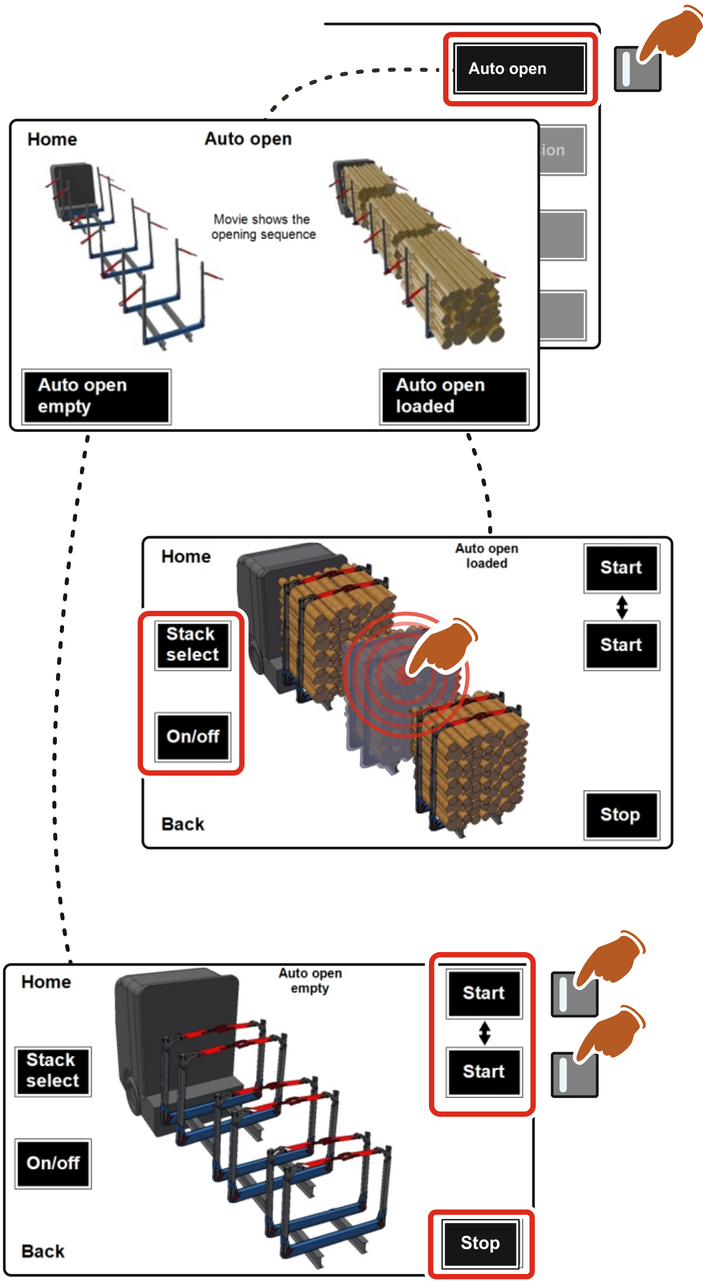
At the same time, the **"Acknowledge”** button is displayed, which allows you to mute the alarm for three minutes.

More about alarms and warnings on **pg. 30.**



If only a dimmed **GRAY** stack is displayed, it means that the screen is not in contact with the system, e.g. when the ignition is turned off.

Menu and functions
Auto opening menu.



In the **Auto opening** menu, you select the opening of either empty or loaded truck.

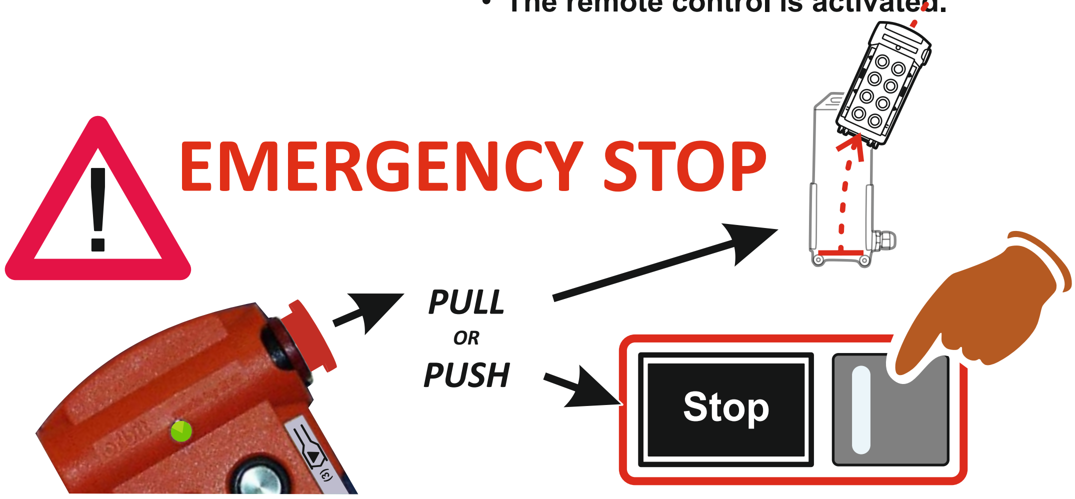
In the **Auto-open empty** and **loaded** submenus, the stacks can be **activated or deactivated** as desired with the **"Select stack"** and **"On / Off"** buttons.
You can also tap directly on the screen.

The disabled stack is "grayed out" and will not open when the sequence is started.

Both "Start" buttons must be pressed simultaneously to start the opening sequence.

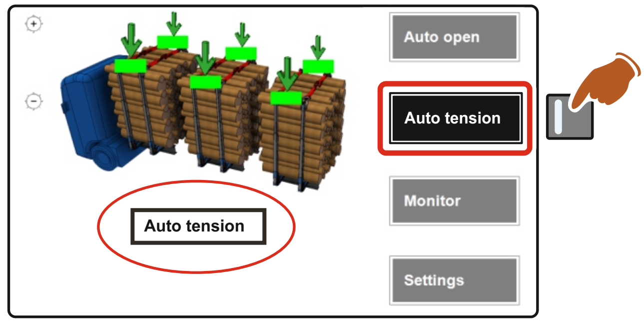
At any time, the sequence can be **STOPPED** by any of the following options:

- **Press the "Stop" button,**
  or
- **The remote control lifted out of its bracket,**
  or
- **The remote control is activated.**



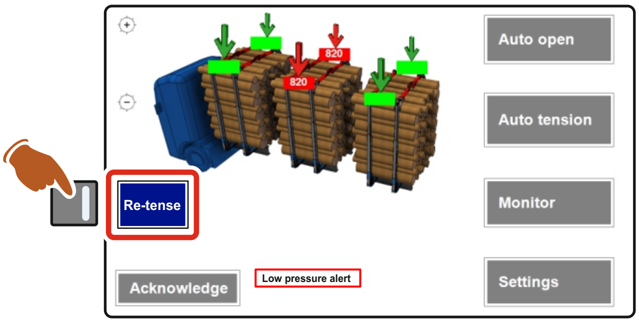
Menu and functions
Re-tensioning

Retightening must always be activated when driving, both empty and loaded.
The monitoring functions are **fundamental** for safe operation of the Com 90, both empty and loaded.



"Auto tension" automatically monitor and retighten the load when activated. Status is displayed with a text box in the middle of the screen.

The function can only be activated if all stacks first have been tightened enough manually with the remote control.

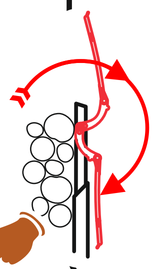


If the pressure / force drops too low too fast, an alarm is activated and no auto tension occurs. The alarm can activate due to damage to the equipment or a sudden shift in the load.

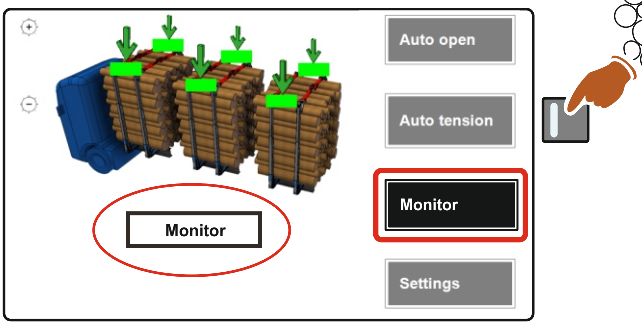
When this happens, a button, **"Re-tense"**, is presented on the screen, which enables manual re-tensioning directly on the screen.
Re-tense is only active while the button is continually pushed in.

MONITOR THE STAKES CAREFULLY

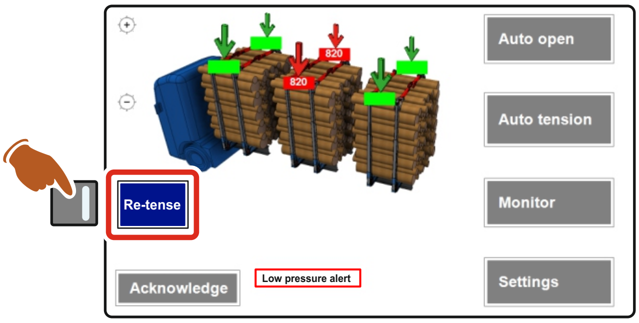
when using the re-tense button to build up pressure again! If the pressure builds up again, the alarm goes silent and the system goes back to monitoring.



Abort immediately if you see any lashing arm moving!



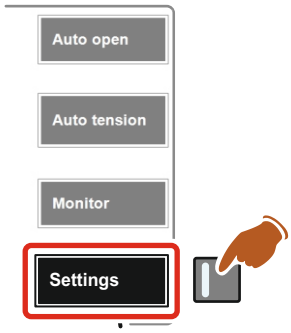
"Monitor" allows the driver to decide when it is appropriate to tighten the load.

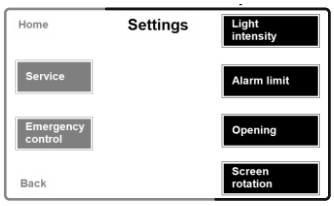


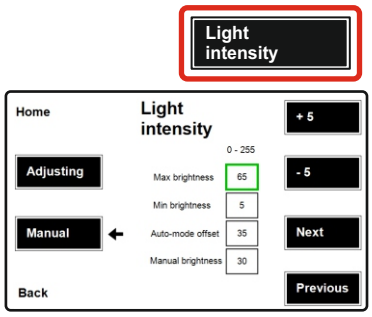
When the pressure / force drops, an alarm is activated to alert the driver that re-tensioning is needed.
When this happens, a button, **"Re-tense"**, is presented on the screen, which enables manual re-tensioning directly on the screen.
Re-tense is only active while the button is continually pushed in.

The option "Monitor" is useful when driving in steep terrain and where all the engine power is needed to cope with eg. a hilltop.
The system alerts the driver but never activates the hydraulic pump.

Menu and functions
Settings







Light intensity.

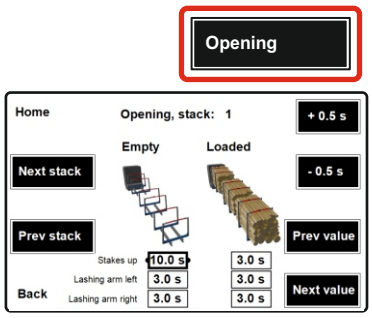
"Adjusting" means that the screen follows the ambient light within the min / max values.
"Auto mode offset" adjusts how bright you want the screen to be in relation to the surroundings. It is this value that the home screen buttons change when the **Adjusting** mode is selected.

"Manual" causes the screen to follow the value in the lower box. It is this value that the home screen buttons change when the **Manual mode** is selected.

Alarm limit.

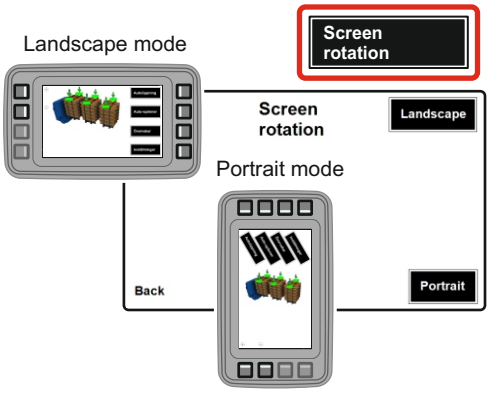
Here you can adjust the limit for "Low pressure alert" to your liking in the range 660-960kg (61.2-89 bar).

TOO LONG LASHING ARM TIMES AT OPENING WITH LOAD MAKES THE STAKES LOWER SUCH
THAT THE LOAD FALLS OFF!



Opening.

The time settings for **"Auto open"** are set and adjusted under "Opening".
Each stack, 1 to 5, can be set individually for both empty and loaded truck. The number of the current stack is displayed at the top of the window, stack 1 is closest to the cab.



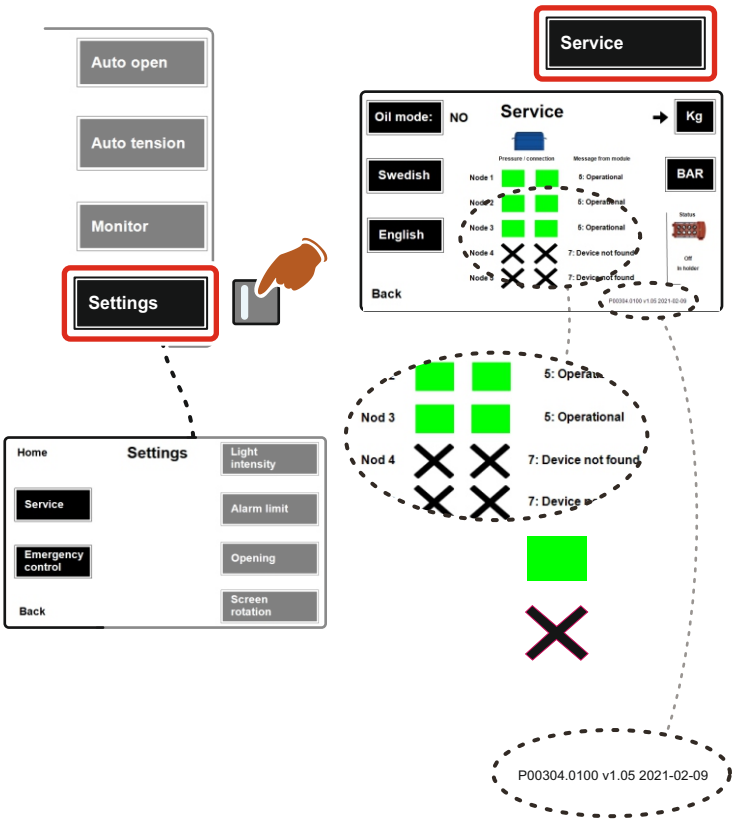
Screen rotation.

The screen can be mounted both upright, "Portrait" and horizontal, "Landscape" to best fit into the cabin environment. Here you can choose how the menus are to be presented.

We recommend "Landscape" for the best presentation.

We recommend that the screen is mounted horizontally when the position "Landscape" gives the best presentation and experience of the graphics.

Menu and functions
Settings



Service.

Oil mode selects the type of oil level sensor connected to the system,
"Closing" (normaly open, NO) or
"Breaking" (normaly closed, NC).

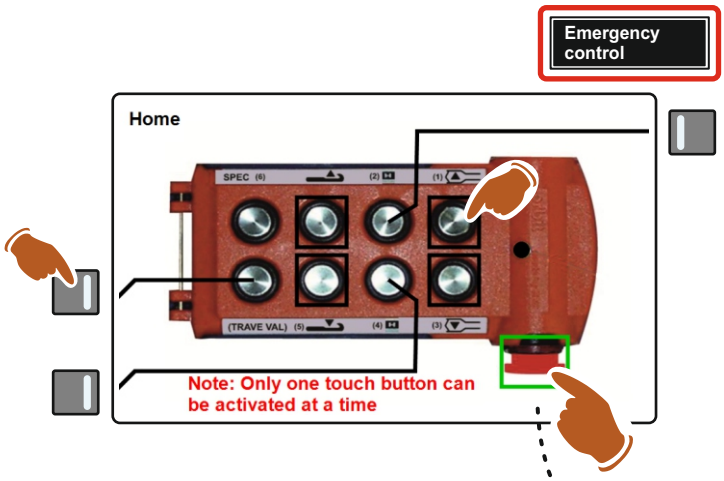
Swedish and **English** selects menu language.

Kg or **BAR** gives the opportunity to choose which you prefer is displayed on the "home screen".
If **kg** is selected, only values below the alarm limit are displayed.
If **BAR** is selected, the pressure is displayed continuously for all stacks.

In the middle, one stack (Node) is displayed per row with two status boxes, one for each side.
X means that there is no communication with the node (not connected).

The text to the right of each row shows the status. The status of the radio control is shown on the far right.

Version information is located in the lower right corner.



Emergency control.

If the remote control should be lost or broken, there is now the possibility of emergency control.

The Com 90-system can be completely controlled via the display under this menu.

All buttons on the screen has the same functions as the "real" remote control.

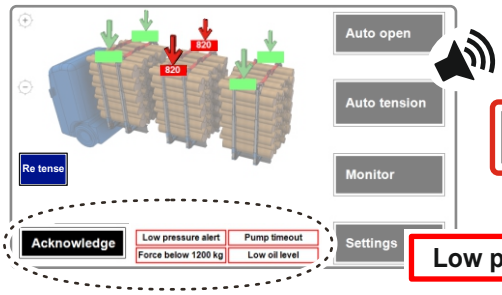
The **touch function of the display** can only handle one button press at a time. Therefore, the functions "stack selection" and "high speed" have been extended to physical buttons that the black lines lead to.

Activation and deactivation are done as usual with the on / off button (green box).

Emergency control is also deactivated when exiting the emergency control menu.

Pay extra attention when using "Emergency control" of the system as supervision is made more difficult when the operator needs to be in the cab!

Menu and functions
Alarms and warnings.



Alarms are displayed at the bottom of the screen. An explanatory text with a red flashing frame is displayed while the screen buzzer beeps.

Acknowledge

3min

The **"Acknowledge"** button that is displayed at the same time allows you to mute the alarm for three minutes, after which the alarm starts again until the cause is remedied.

Low pressure alert

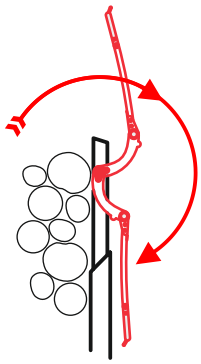
Low pressure alert means that the pressure has fallen below the set alarm limit, due to damage to the equipment or a sudden load shift.

Force below 1200 kg

Force below 1200 kg is displayed when it is time for re-tensioning of the load during manual monitoring.

Re tense

Re-tense button can be used in both cases above.



MONITOR THE STAKES CAREFULLY
when using the re-tense button to build up pressure again! If the pressure builds up again, the alarm goes silent and the system goes back to monitoring.

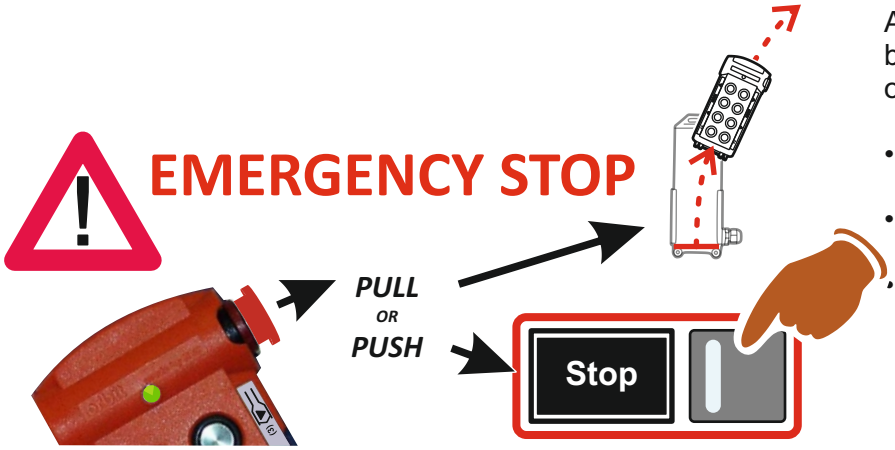
Abort immediately if you see any lashing arm moving!

Pump timeout

Pump time out means that the hydraulic pump has not been able to build up the expected pressure within a given time.
The function prevents overheating of the hydraulics.

Low oil level

Low oil level is displayed when the oil level is **CRITICALLY LOW** and it is close to damaging the pump



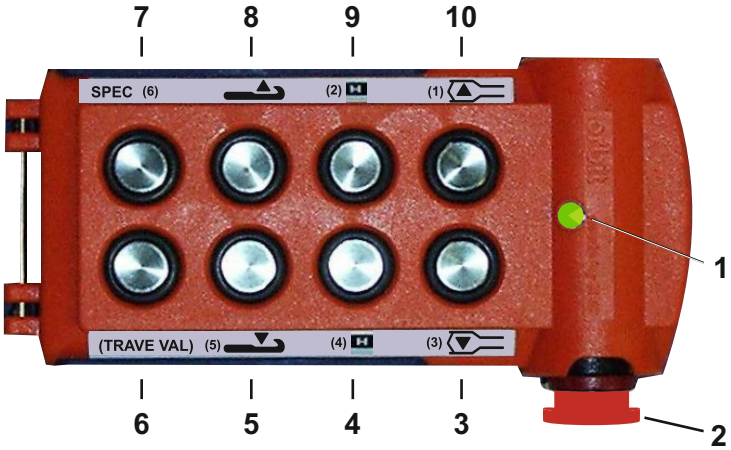
At any time, automatic sequences can be **STOPPED** by any of the following options:

- **"Stop"button is pressed.**
  or
- **Remote control lifted from bracket.**
  or
- **Remote control is activated.**

Remote control Functions.

With the transmitter in position according to fig,

Buttons **8 - 10** = Stakes **UP OPERATION**.



Buttons **3 -** 5 = Stakes **DOWN OPERATION**

ON

OFF

High speed marked **H** may be used similarly in both directions, **BUT NEVER WHEN LASHING!**

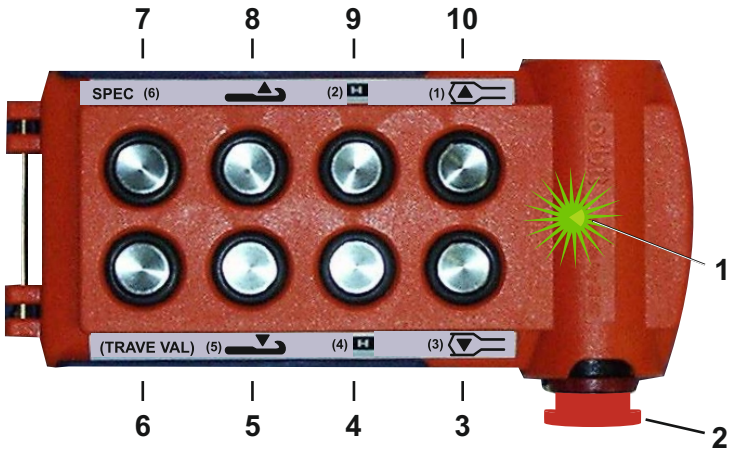
1. **Control lamp,** Flashing **green** when connected to receiver, **Red** when battery needs to be charged.
2. **Start and stop funktion**, Pull the red button out to **activate** the system, push it in to **deactivate**.

3. **Ring side,** stakes down (lashing arm outwards).
4. **High speed,** Only when moving stakes UP or DOWN!
5. **Hook side,** stakes down (lashing arm outwards).

6. **ALT key,** Hold to choose stack (1) to (5) (Numbered on side lables on remote control).
7. **Extra function**, (Not used)

8. **Hook side,** stakes up (lashing arms inwards).
9. **High speed**, Only when moving stakes UP or DOWN!
10. **Ring side,** stakes up (lashing arms inwards).

Remote control Operation.



Start system by **pulling out** red button no:2, LED no:1 flashes green. Stack (1) are selected as default.

Selection of the stack to be operated. Counting front (1) to rear, (2),(3),(4),(5).

Press 6 ALT key, simultaneously as wanted stack number ex. (3) button no: 3.
You now have selected stack no: (3).

Operating the stakes upwards.
Push buttons 8,9,10 simultaneously. 9 is high speed.
Hook and the ring side can be operated separately.

Operating the stakes downwards.
Push buttons 3,4,5 simultaneously. 4 is high speed.
Hook and the ring side can be operated separately.

NOTE that buttons 4 and 9 both are high speed [H]

Positioning the ring lashing arm outside the stakes.
Press button no: 3 until the ring arm passes vertical position, then it slowly decends by itself.

Positioning the hook lashing arm outside the stakes.
Press button no: 5 until the hook arm passes vertical position, then it slowly decends by itself.

Positioning the ring lashing arm inside the stakes.
Press button no: 10 to move the ring arm to desired position.

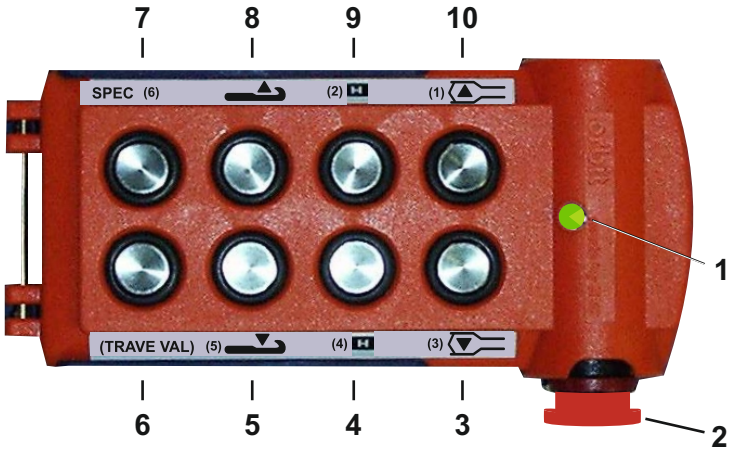
Positioning the hook lashing arm inside the stakes.
Press button no: 8 to move the hook arm to desired position.

NOTE!
Operating all stakes upwards releases the locked state of the lashing arms that is in transport position regardless if loaded or not.

NEVER change direktion with high speed activated without securing lashing arms either re locked together or positioned, fully inside for up motion or fully outside for down motion.

ALLWAYS repossition / manouver lashing arms at low speed!

Get the Com 90-system ready for loading / unloading.



At loading site, ALT 1, manual operation

1. Take the remote control out of its holder and activate it by pulling button 2.

2. Select the stack to be controlled. (ALT 6 and stack no (1) to (5) simultaneously)

3. Rise the stakes to desired hight, the lashing arms releases automatically, (buttons 8,9,10).

4. Maneuver the ring lashing arms to a position outside of the stakes button 3.

6. Maneuver the hook lashing arms to a position outside of the stakes button 5.

Loading / Unloading can start.

When loading / unloading is complete, the lashing must be reconnected on all stakes.

1. Maneuver the hook lashing arms to a horizontal position inside the loading area, (button 8).

2. Maneuver the ring lashing arms to a horizontal position on top of the hooks, (button 10).

3. Connect the lashing arms by rising the hooks (button 5).

4. Lower the stakes (buttons 3,4,5) until they stop moving.
   If empty they are now in transport pos.
   If loaded the load are now compressed.

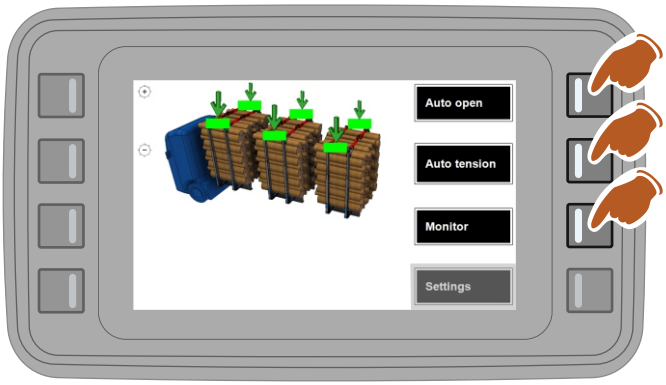
When complete, turn off the remote control and place it in its holder!
If its not in its holder you are warned by a box on the screen: Remote not in holder
If its not in its holder it is not possible to activate automatc monitoring!

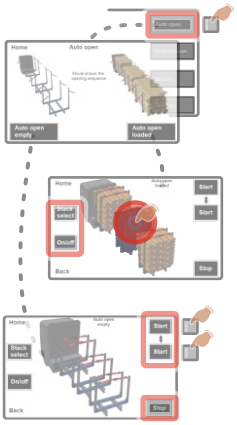
5. Select Auto tension on the screen for **monitoring AND auto tensioning** the lashings. STANDARD

Select Monitor on the screen for **monitoring only,** then manually tighten the lashings when alerted by a beeping sound by pressing: Re tense See **pg.27**

The option "Monitor" is useful when driving in steep terrain and where all the engine power is needed to cope with eg. a hilltop.
The system alerts the driver but never activates the hydraulic pump.

Loading and Unloading
Geting the COM-90 system ready.





At loading / unloading site **ALT 2**, automatic operation.

1. Deactivate tension monitoring, ”Auto tension” or ”Monitor”.

2. Press **"Auto-open"** to proceed and select empty or loaded. Here you also have the ability to deselect stacks from the opening sequence. (see **page 26**)

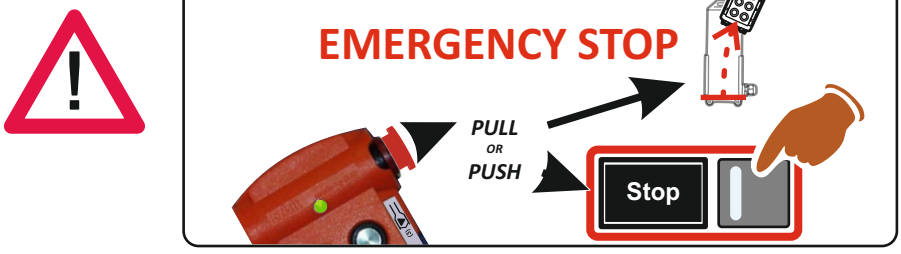
After pressing **start,** the stakes are raised to the time set in the menu, (see page 28), to desired height and folds out the lashing arms.

3. Now you are ready to **load / unload.**

4. When **Truck** is selected, only stack no (1) opens.
When **Trailer** is selcted stack (2) to (5) opens in sequense.

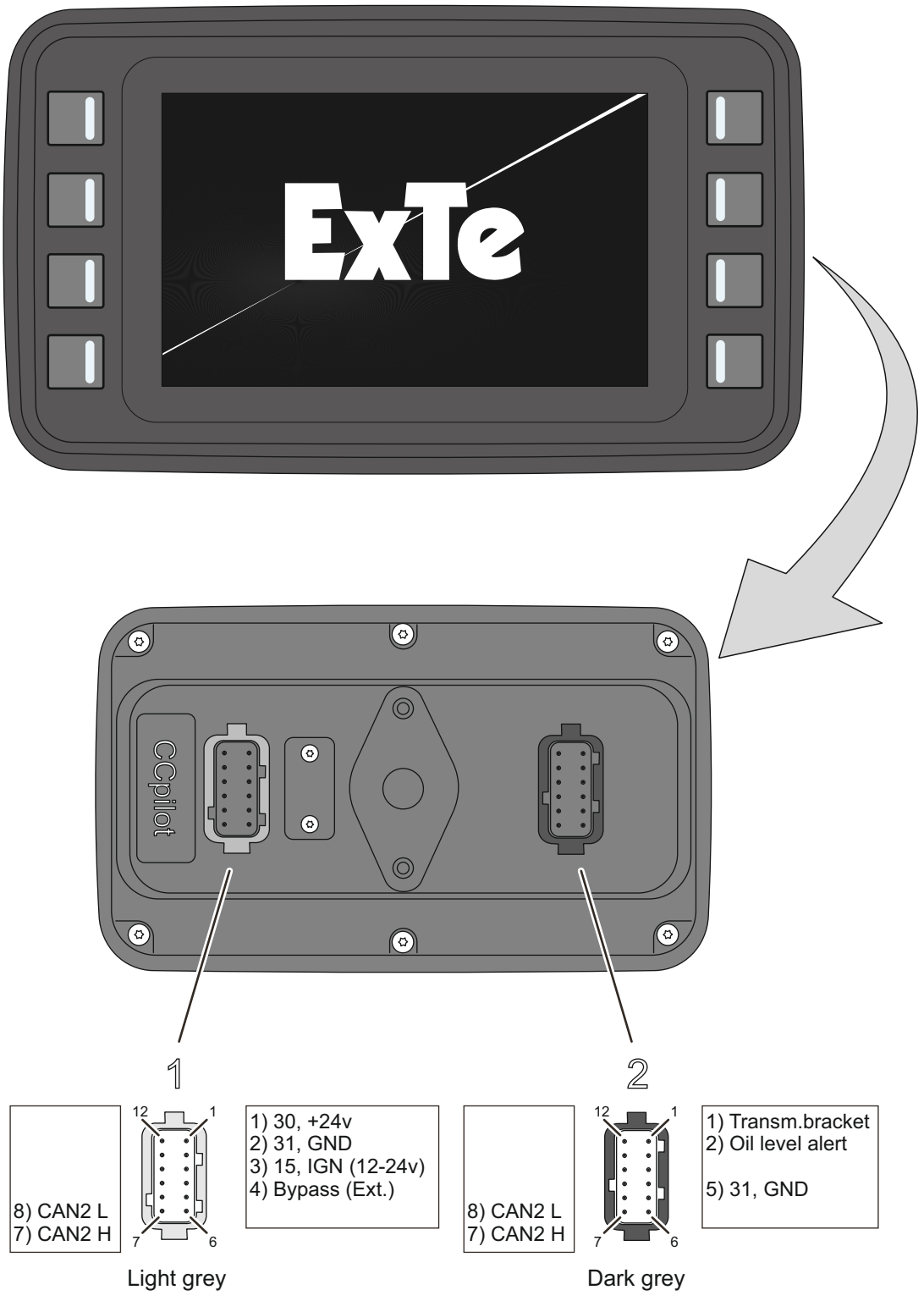
When loading / unloading is complete, the lashing arms must be reconnected, see page **33.**

4. Activate the monitoring. See pg. **33**
.

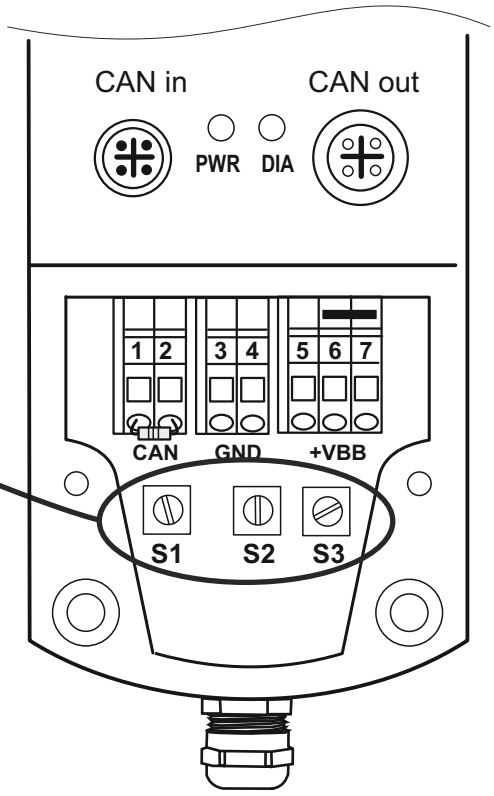


For safety reasons there is no automated closing sequense available. We believe the operator to be the best supervisor when reconnecting the lashing arms.

Control system, components and connections
Back side of the CCpilot.



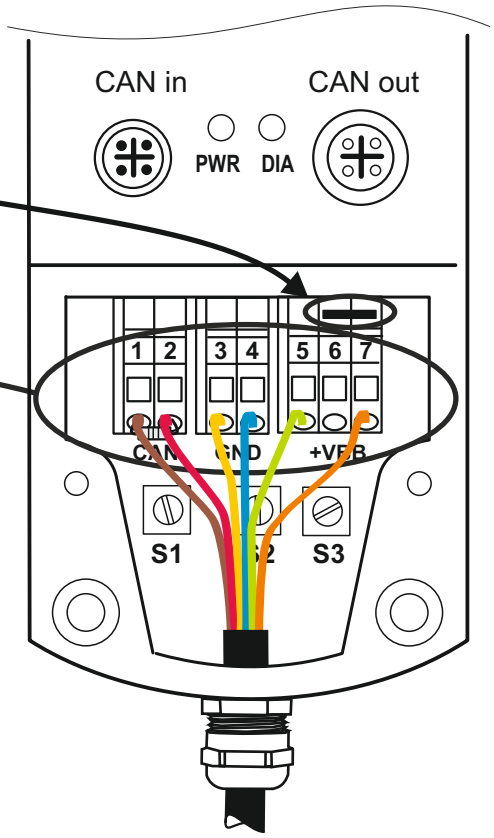
Control system, components and connections
Configuration of I/O units.



I/O CAN Adresses
(Usally factory set)

	S1	S2	S3
Stack 1 (Truck)	F	0	2
Stack 2 (Trailer)	F	0	3
Stack 3 (Trailer)	F	0	4
Stack 4 (Trailer)	F	0	5
Stack 5 (Trailer)	F	0	6

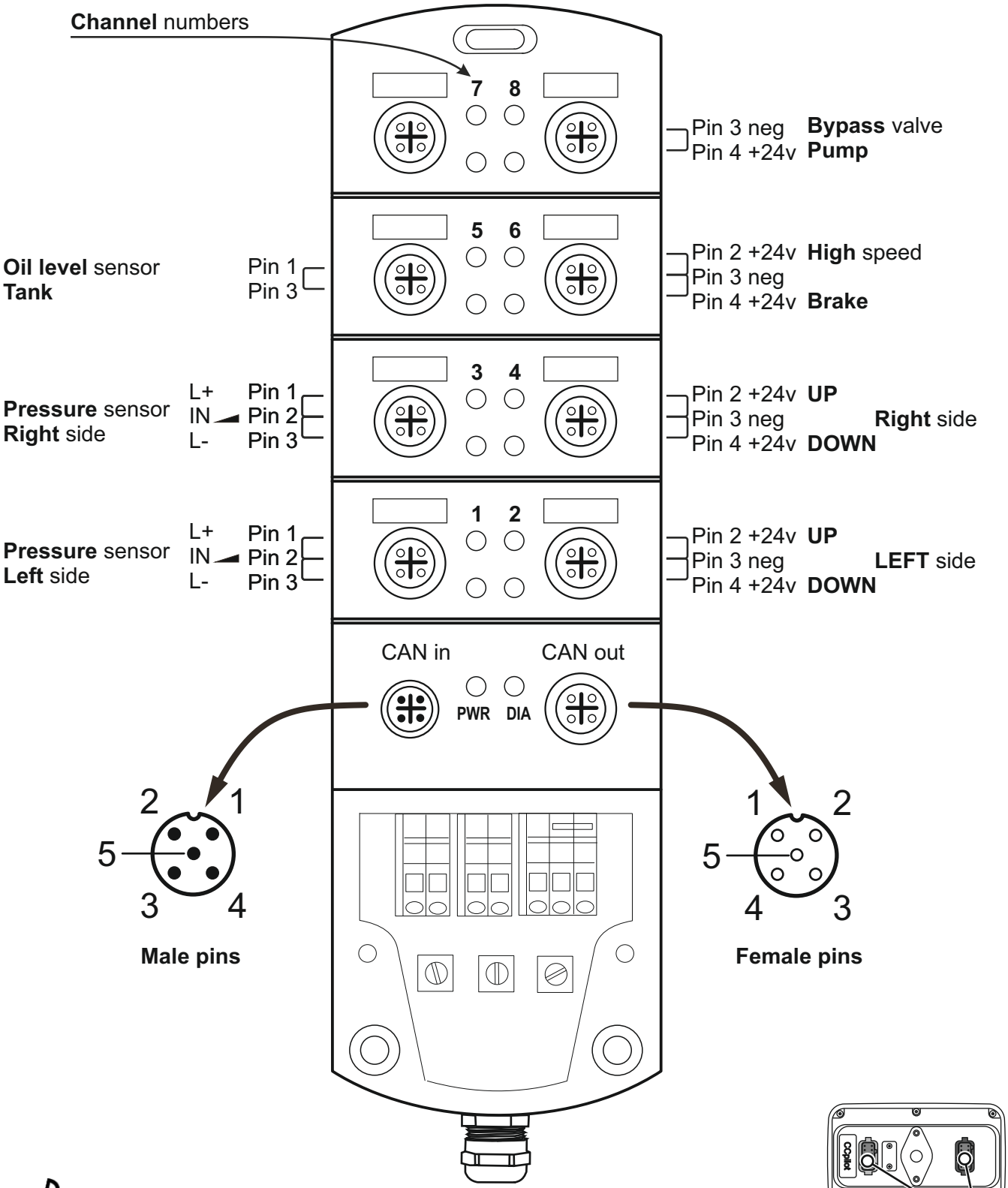
Jumper
(All units)
(Factory mounted)



Connection 1/0	Color	Cable no	Funktion
1	Brown	1	Can high
2	Red	2	Can low
3	Yellow	4	-24v 0,5mm²
4	Blue	6	-24v 1,5mm²
5	Green	5	+24v (10A fuse)
6	-	-	-
7	Orange	3	+24v (5A fuse)
-	Lila	7	Ext

Allways use end caps to reinforce cable connections!

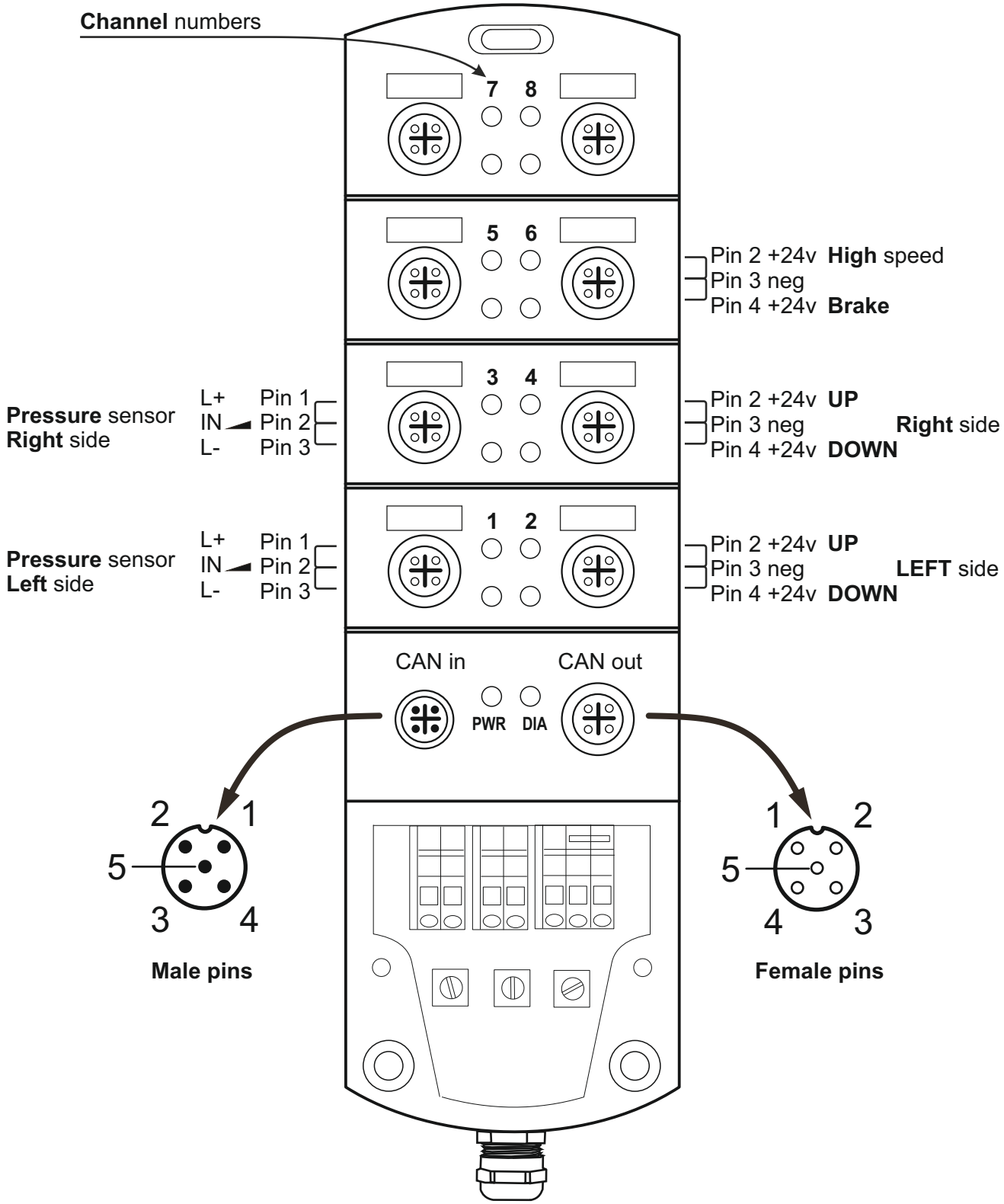
Control system, components and connections
Stack 1 (truck).



OPTION for Semi Truck

BYPASS / PUMP *signal is also available at back of the screen,* ***connector 1, pin 4*** *+24V*
OIL LEVEL *varning can also be connected at back of the screen,* ***connector 2****,* ***pin 2*** *+24V*

Control system, components and connections
Stack 2 - 5 (trailer).



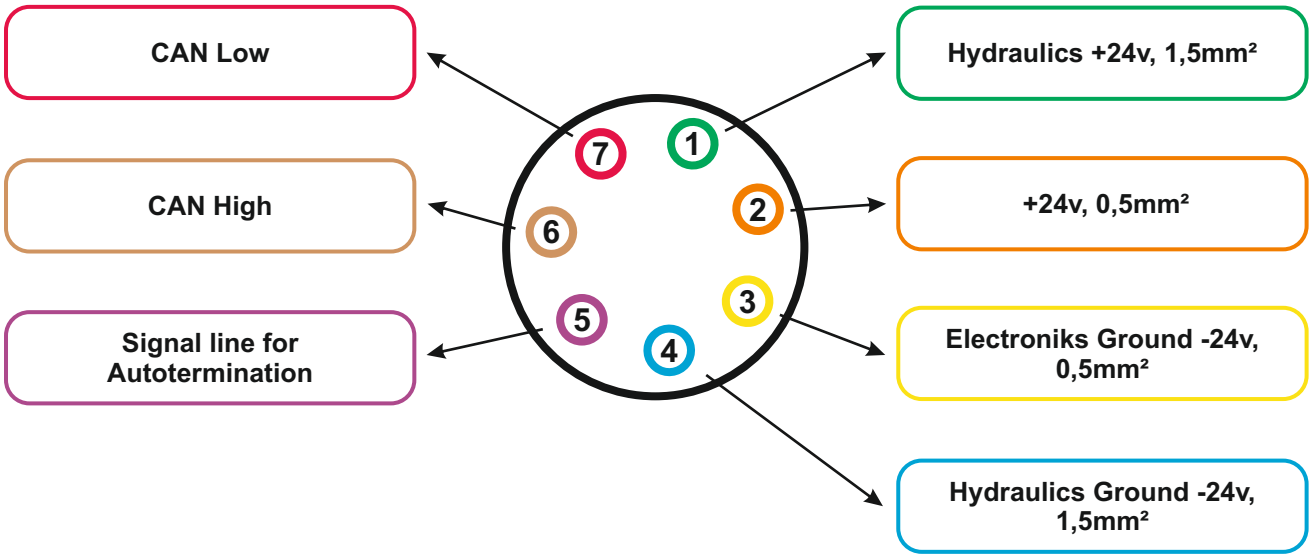
Control system, components and connections
Trailer contact.

7-Pole Trailer Contakt (typ EBS)

According to: ISO 7638, CAN ISO 11992-1, 11992-2

The pin layout is the same as **ABS / EBS.**
This means that **NO DAMAGE OCCURS** in either of the EBS or COM 90 systems if plugged in to **wrong outlet.**

CONNECT THE PINS AS THE PICTURE SHOWS!
(According to. ISO 7638, CAN ISO 11992-1, 11992-2)



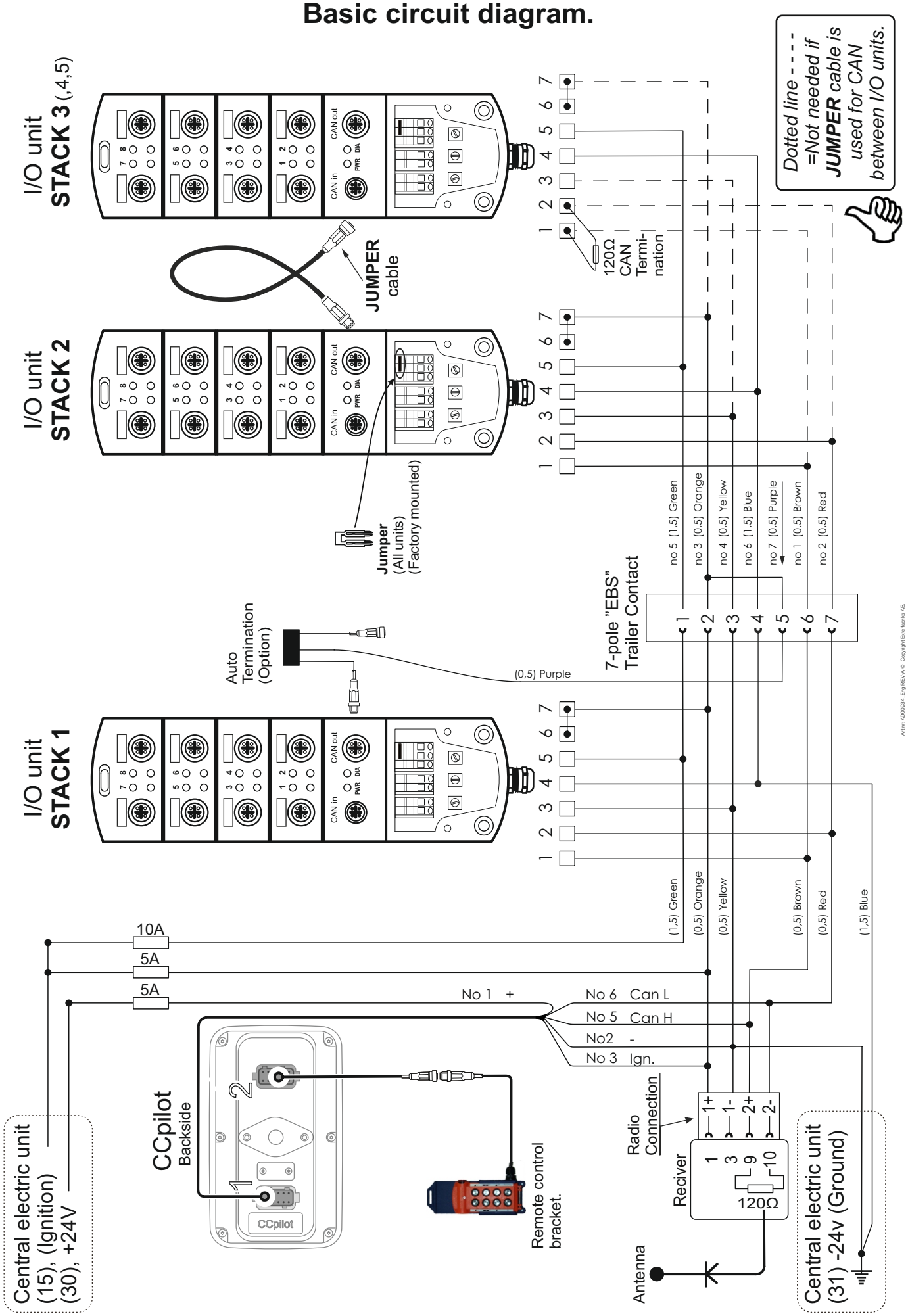
Pin no	Function	Area	Color	Cable no
1	Magnetic valves Hudraulics +24V 10A	1,5mm²	Green	5
2	Elektronics +24V 5A	0,5mm²	Orange	3
3	Elektronics -24V	0,5mm²	Yellow	4
4	Magnetic valves Hudraulics -24V	1,5mm²	Blue	6
5	Signal line for Autotermination	0,5mm²	Purple	7
6	CAN High	0,5mm²	Brown	1
7	CAN Low	0,5mm²	Red	2

The pin layout is the same as **ABS / EBS.**
This means that **NO DAMAGE OCCURS** in either of the EBS or COM 90 systems if plugged in to **wrong outlet.**

CONNECT THE PINS AS THE PICTURE SHOWS!

(According to. ISO 7638, CAN ISO 11992-1, 11992-2)

Basic circuit diagram.



Oil recommendations and pre check.

Oil recommendations

For ExTe Com 90 to work safely in all climates we recommend a low viscosity hydraulic oil.

Viscosity acc. **ISO VG 22.**

Variants that are approved for each oil type are:

Mineral oil:	**HL, HLP, HVLP**	-30 - +110°C
Bio oil:	**HEES**	-30 - +80°C
	HEPG	-30 - +50°C

Hydraulic oil level.

The oil level warning should go out when ”Low oil level” is reached.
Fill to ”**Normal**”.

Bleed the pump. (see **pg.17**)

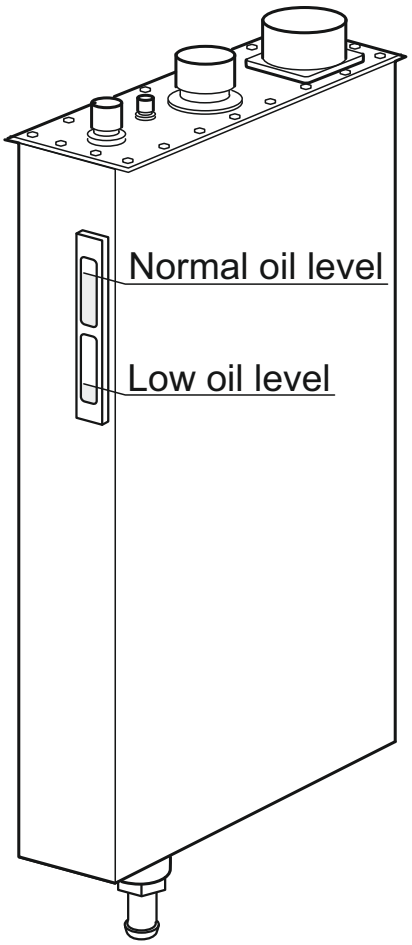
Start the engine.

Activate the radio transmitter (see **pg.31**).

Carefully check / bleed the system by **initially** only manouver the **stakes downwards** for a while, then gently alternat**e** between up and down until the stakes start moving.

Run each bunk section's stakes up and down a few times to the end positions. **Check for leaks**.

Check oil level again!
Refill if needed.



Careful!

**At the first test run, a thorough leak control MUST be done, before pressure controls can start.
Oil jet from leaking hydraulic system can cause personal injurys.**

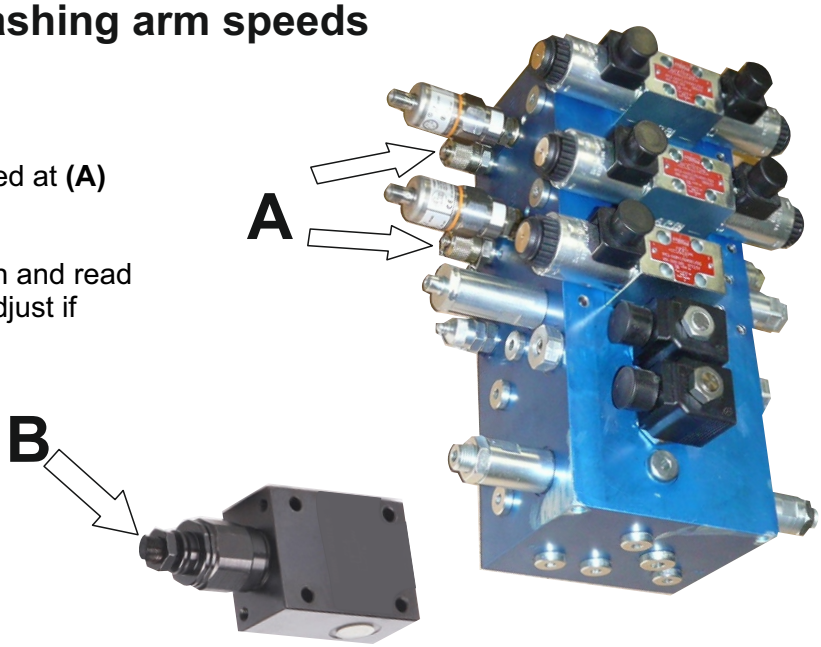
Adjusting pressure and lashing arm speeds

Main pressure test / adjustment

The system pressure **(150 bar)** is measured at **(A)** see fig.

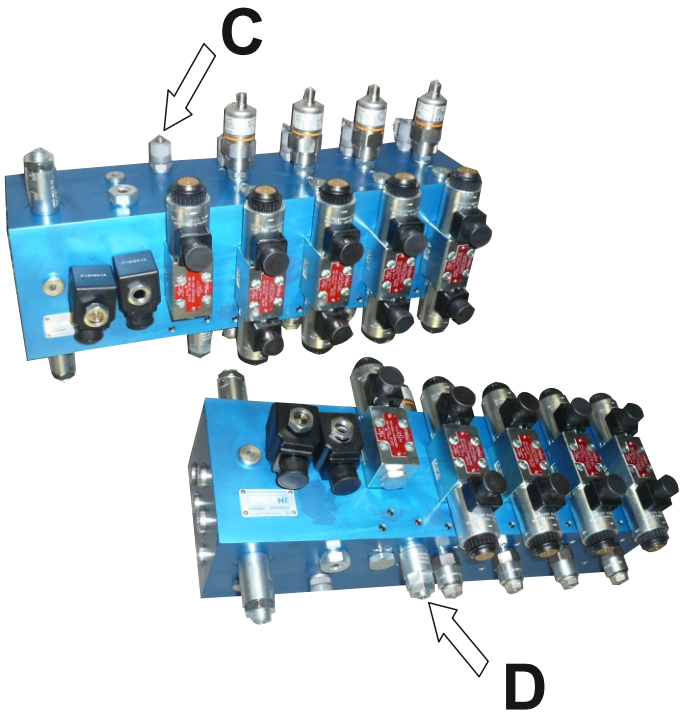
Move the stakes to their lower end position and read the pressure when **still pushing down**, adjust if needed, **(B)**.

DO NOT EXEED 150 bar!



Reduced brake pressure 40 bar,
(High speed).
Brake pressure is messured at **C**, and adjusted at **D.**

Move the stakes to their lower end position and read the pressure when **still pushing down**, **HIGH SPEED ACTIVATED,**
adjust if needed **(D)** TO 40 BAR.



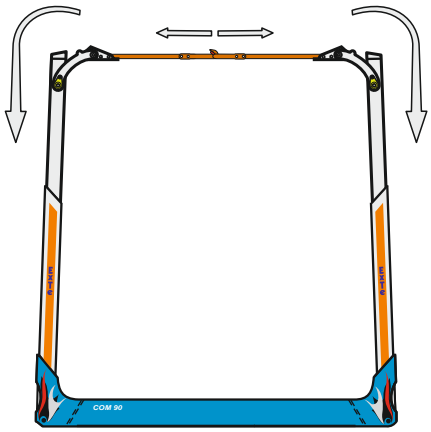
Why reduced brake pressure?

The brakes are allways activated at max system pressure 150 bar,
EXCEPT when **high speed** is activated (40bar).

Too **low** pressure makes the lashing arms disconnect when lowering the stakes at high speed.

Too **high** pressure makes the friction pads wear out unnecessarily quick.

The reduced brake force creates a certain inertia in the stake that secures the connection between the lashing arms.



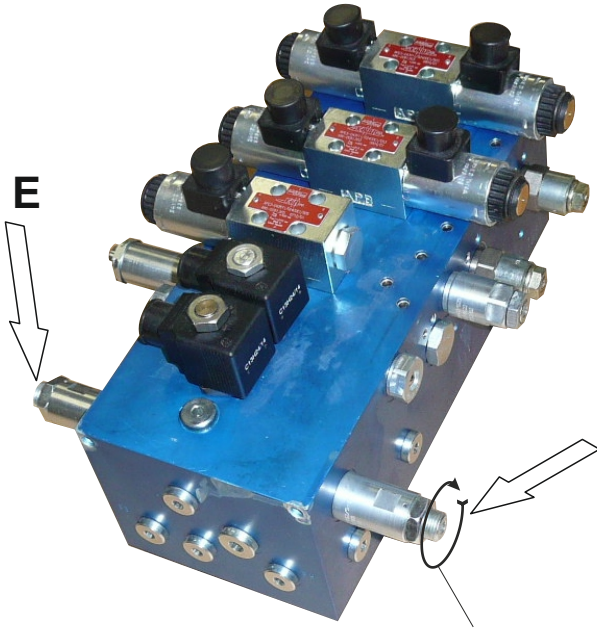
Speed adjustments

Adjustment of lashing arm speeds on truck and trailer.
Separate adjustment for each direction.

Move **HOOK** lashing arms back and forth and adjust speed with **E.**

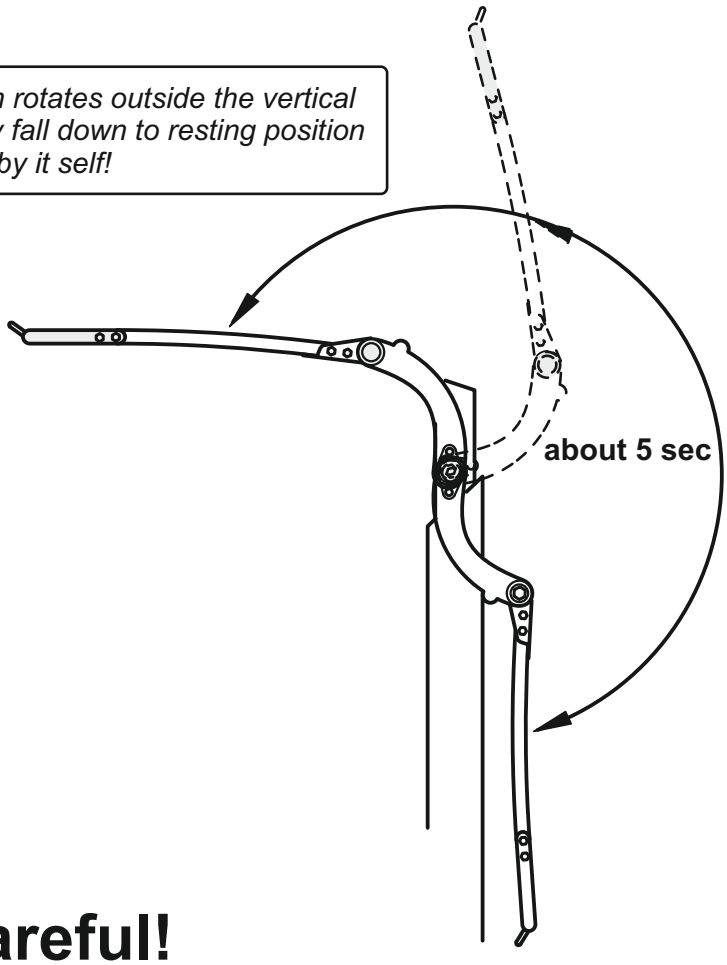
Move **RING** lashing arms back and forth and adjust speed with **F.**

Adjust the lashing speed to **approx. 5 sec**. from outer to inner position.



Clockwise to increase speed of lashing arm.

As soon as the arm rotates outside the vertical position it will slowly fall down to resting position by it self!



Careful!

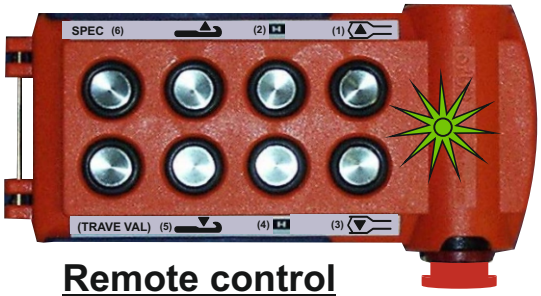
Too high lashing speeds will shear off the break pins and can CAUSE DAMAGE to the mechanism!

Control system check

Turn on the ignition,

Make sure the **battery** is fully-charged.

Flashing green LED on the remote control = OK



Remote control

Activate

LED light color combinations on the receiver and what it means.

Receiver LED:
A Yellow
B Red
C -
D -
} Ignition ON

Receiver LED:
A Yellow
B -
C Green
D -
} Transmitter ON

Receiver LED:
A Yellow
B -
C Green
D Green
} Button pushed on transmitter

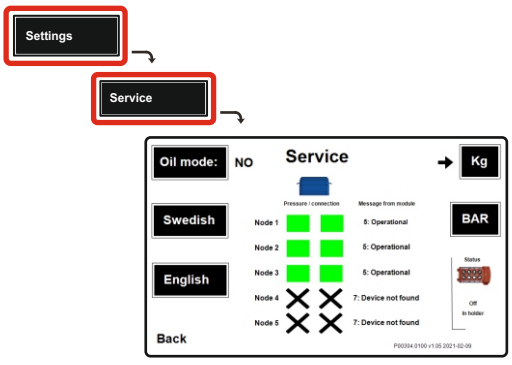
Receiver

If the system is **"black"**, check fuse **5A**, located in the control panel and marked by the bodybuilder.

If the screen works, it is possible to check the status of the system through Settings / Service /.

The status of the radio control is also shown here.

More information about the service page on **pg. 29.**



Control system check Continued.

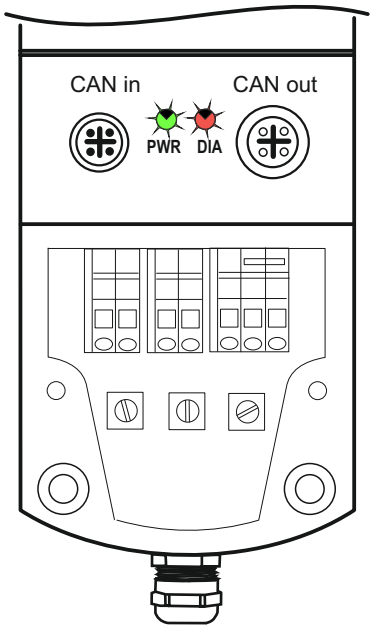
PWR solid GREEN = Power OK CAN disconnected

PWR flashing GREEN 1Hz = Power OK CAN OK

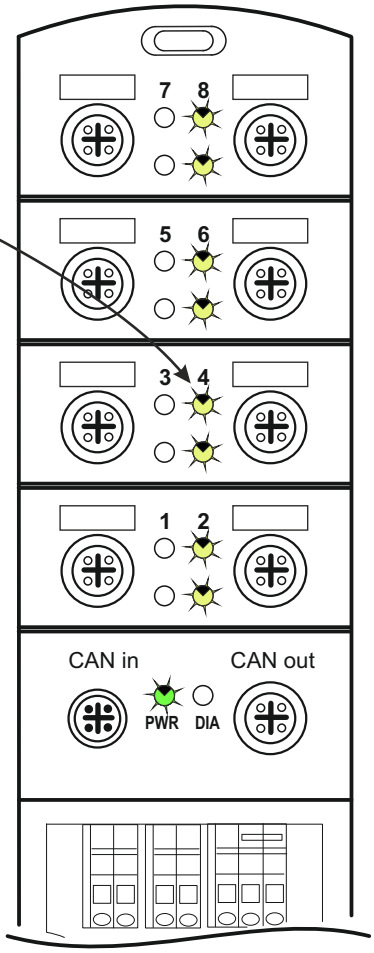
PWR solid GREEN
DIA flashing RED 1Hz =Power OK CAN broken

PWR flashing GREEN 2Hz
DIA flashing RED 2Hz = Power OK CAN phase reversed

(HZ = times / second)

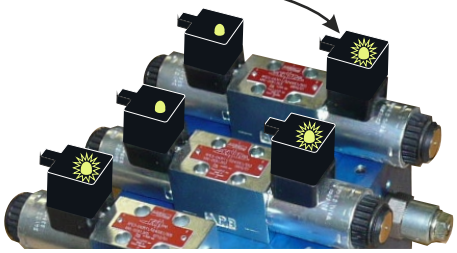


If the YELLOW LED:s on the chosen I/O unit (stack) lights up at chosen function when using the remote control the communication system works OK. (**Channel LED:s**)



If the LED:s on the solenoid valves are "black" when using the remote control as above check the fuse, **10A** placed and marked in fuse panel by bodybuilder.

When the LED:s on the solenoid valves lights up the same as the **channel LED:s** the system works OK.



If chosen funktion still does not move as expected it may be because the "speed" valves are almost closed. See ***pg. 43.***

Notes, hose length protocol.

Hose length protocol **TRUCK** ☐ **TRAILER** ☐

Make notes of all hoses' dimensions, lengths, and types of connections.
The protocol can be useful for producing duplicates and spare parts.

example:
Dist. block right *Str. int.* *Right stake, rear* *90º* *2400 mm 1/4”*

From	**Con.**	**To**	**Con.**	**L= Dim.**