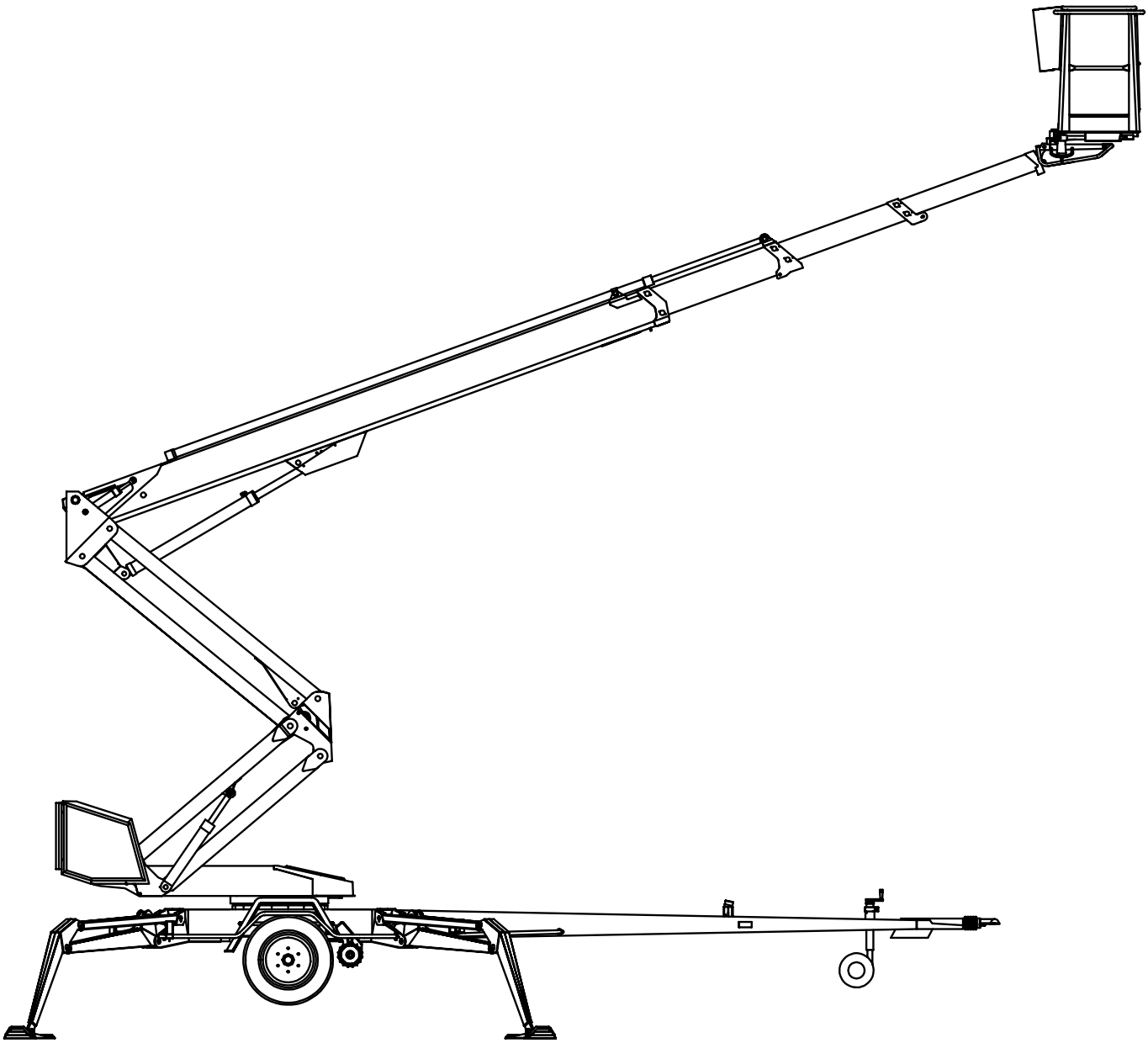
DINO® 260XT

OPERATION INSTRUCTIONS



DINO Lift®

Raikkolantie 145
FI-32210 LOIMAA
T. +358 2 762 5900
F. +358 2 762 7160
dino@dinolift.com
www.dinolift.com

OPERATION INSTRUCTIONS

Valid from serial number 26063

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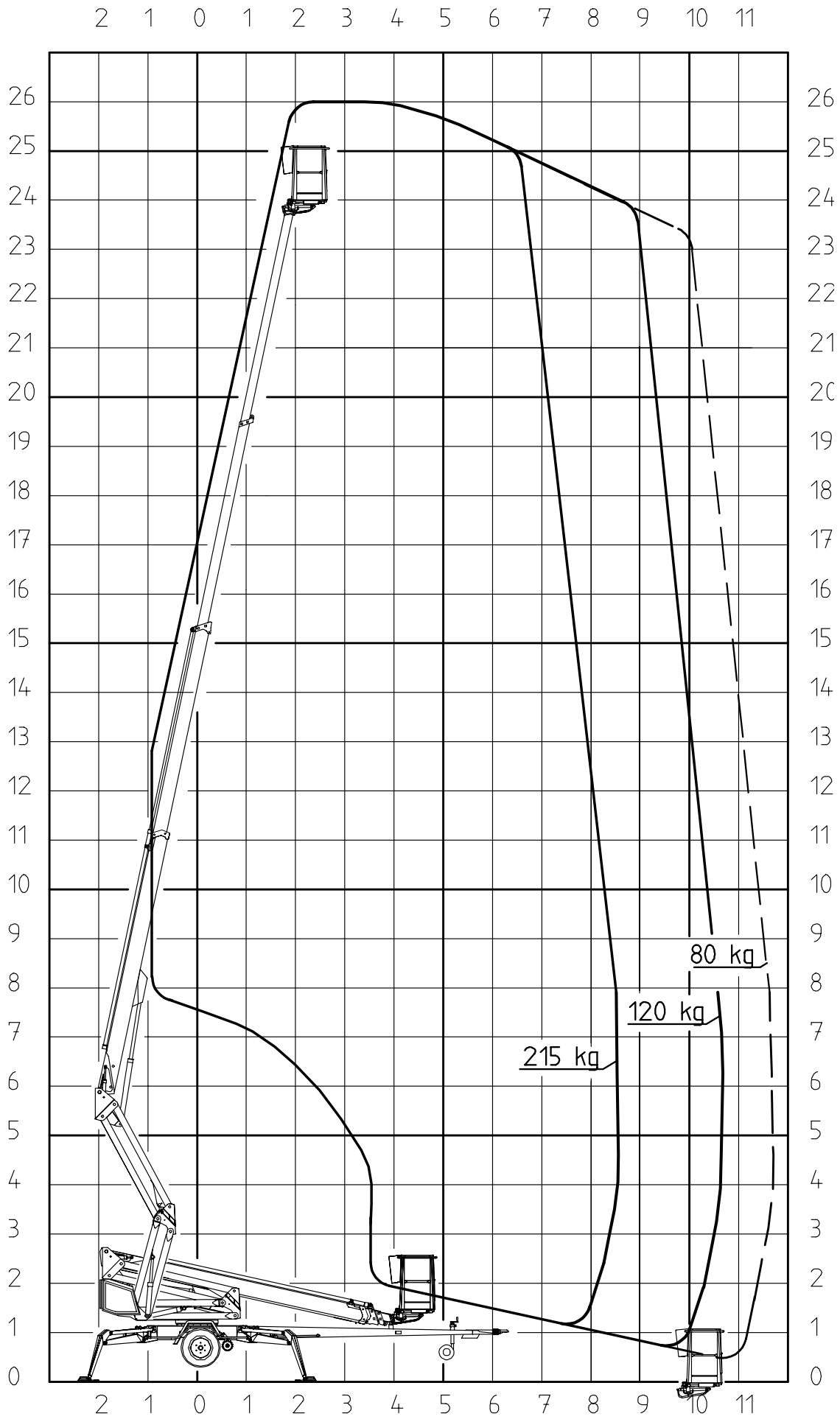
REACH DIAGRAM



TECHNICAL SPECIFICATION

Max. working height	26,0 m
Max. platform height	24,0 m
Max. outreach	11,7 m
Boom rotation	continuous
Platform rotation	90°
Reach when turned	refer to reach diagram
Support width	4,40 m
Transport width	2,04 m
Transport length	8,25 m
Transport height	2,33 m
Weight	3450 kg (7600 lbs)
Lifting capacity	215 kg
Max. number of persons + load	2 persons + 55 kg
Max. allowed sideways load (caused by persons)	400 N
Max. sideways inclination (chassis)	±0,3°
Max. wind force when working	12,5 m/s
Min. ambient temperature when working	- 20 °C
Max. support force on the outriggers	22800 N
Platform size	0,65 x 1,45 m
Gradeability	25%
Power supply:	
- internal combustion engine (gasoline, petrol)	9,6 kW (13 hp)/ 3600 r/min
- internal combustion engine (diesel)	6,6 kW (9 hp)/ 2800 r/min
- mains current	230V/ 50Hz/ 16A
Socket outlets on the platform	230V/ 50Hz / 10A

GENERAL SAFETY DIRECTIVES

Make yourself familiar with the operators manual before using the lift!

The operator's manual should be stored in the space reserved for it.
Make sure that all persons working with the lift are familiar with the operator's manual.Inform new users about the operation of the lift and the manual.
All the manufacturers directions and recommendations should be followed strictly.

Make sure you know well all directions that deal with the operating safety of the lift.

Always use the brake beams when leaving the lift from the tow vehicle.

Only personnel who have received training in the use of the lift and are at least 18 years of age is allowed to use the lift.

AT LEAST 18 YEARS + TRAINING

No more than two persons and max. additional load of 55 kg (120 lbs) or max. total load of 215 kg (474 lbs) are allowed on the platform.

When the chassis is supported by the outriggers, the carrying capacity of the ground and any possible inclination of the support area must always be considered.

On soft ground the outriggers should be additionally supported by adequately sized support plates. When choosing additional support plates or other aids, always make sure that the outrigger feet cannot slip when resting on them.

The lift may be moved only when it is in transport position. When moving the lift no persons or workloads are allowed on the platform.

Weather factors, ie. wind, visibility, outdoor temperature, rain and so on, must always be taken into consideration when using the lift, so that the necessary precautions to eliminate dangers caused by these are always taken.

It is not allowed to use the lift under following conditions:
- **temperatures below -20 °C (-4 °F)**
- **wind speed over 12,5 m/s (41’/s)**

No ladders, steps or other similar equipment may be used on the platform.

Objects may under no circumstances be thrown out from the platform.
8
The lift must not be used to move persons or objects between floors or different work levels.

The safety devices must not in any circumstances be put out of function.

Before lowering the platform, always make sure that there are no obstacles on the chassis. The platform must not be lowered onto the ground, or brought in contact with other objects, as this will constitute a risk for damages.

If the lift is used in areas where there is other traffic, the working area must be equipped with warning lights and, if necessary, fenced in.
All regulations concerning road traffic and working safety must always be respected.

Always be especially careful when working in the vicinity of open-wire power lines.
Do not forget the stipulated minimum safety distances (refer to table).

Voltage	**Min. under distance m (ft)**	**Min. sideways distance m (ft)**
100 – 400 V hanging cable	0,5 (2)	0,5 (2)
100 – 400 V open-wire cable	2 (7)	2 (7)
6 – 45 kV	2 (7)	3 (10)
110 kV	3 (10)	5 (17)
220 kV	4 (13)	5 (17)
400 kV	5 (17)	5 (17)

The lift must be regularly cleaned, so that dirt does not influence the operational safety, or make regular inspections inconvenient and unreliable.

The lift must be inspected and serviced regularly. Service and repairs may be performed only by trained personnel, who are familiar with the operating-, service- and repair manuals.

The lift may never be used if it is not in faultless condition.

No technical, constructional or other changes may be made to the unit without written permission from the manufacturer.

REGULAR INSPECTION

A thorough inspection must be made at least once every twelve (12) months.
The inspection should be made by a person who is technically trained and is familiar with the function, use and construction of the lift.

Inspections should be recorded in a protocol that should always follow the unit and be stored in the space reserved for it.

The inspections must be made regularly throughout the operative life of the lift.
The inspections must be made within twelve (12) months from the first or the previous inspection.

If the lift is used in especially severe conditions, inspection intervals should be shorter than mentioned above.

The general operating conditions of the lift, and safety- and control devices should be established through regular inspections. Special attention should be paid to factors that influence the operating safety.
It should also be established if the findings of the previous inspection, or the experiences gained when using the unit could give cause to further improve the operational safety of the unit.

ATTENTION! Primarily the national legislation must be followed!

Regular inspections and service measures are described more thoroughly in the chapter "Service- and maintenance".

INSPECTION ON THE WORKSITE

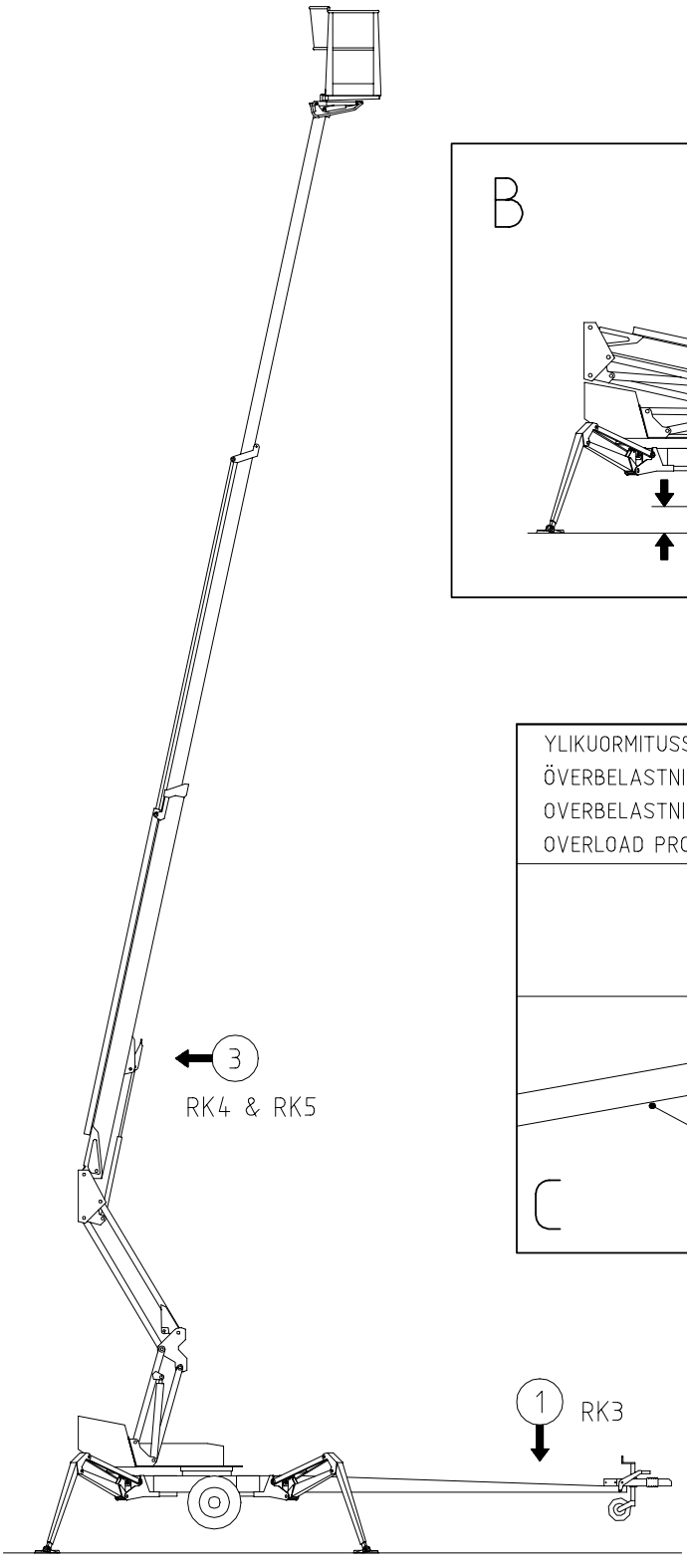
1. **General**
   - Is the lift suited for the job at hand?
   - Is the performance of the lift sufficient for the job (reach, loadability etc.)?
   - Is the lift located safely on a site so that no negative influence on work safety is possible?
   - Is there enough illumination for safe working?

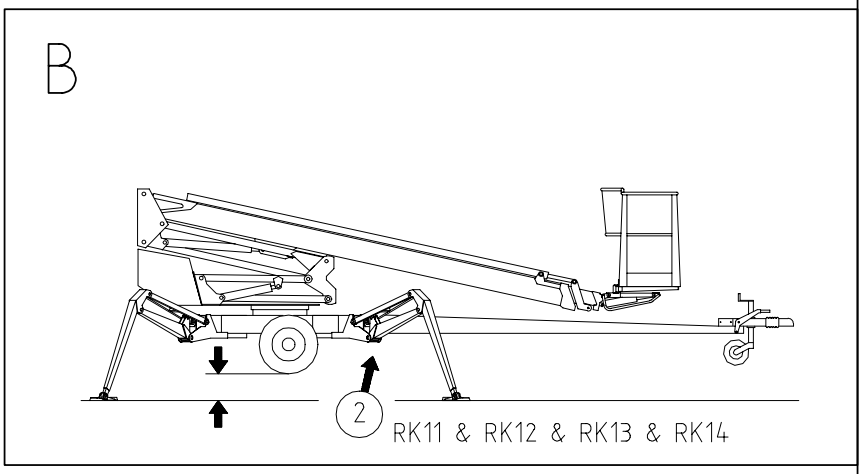
2. **Documents**
   - Are the operating and service instructions for this particular lift present? (Manufacturers manual)
   - Have the inspections and service measures mentioned in the instructions been made and defects that could influence safety been repaired? (Inspection protocols)

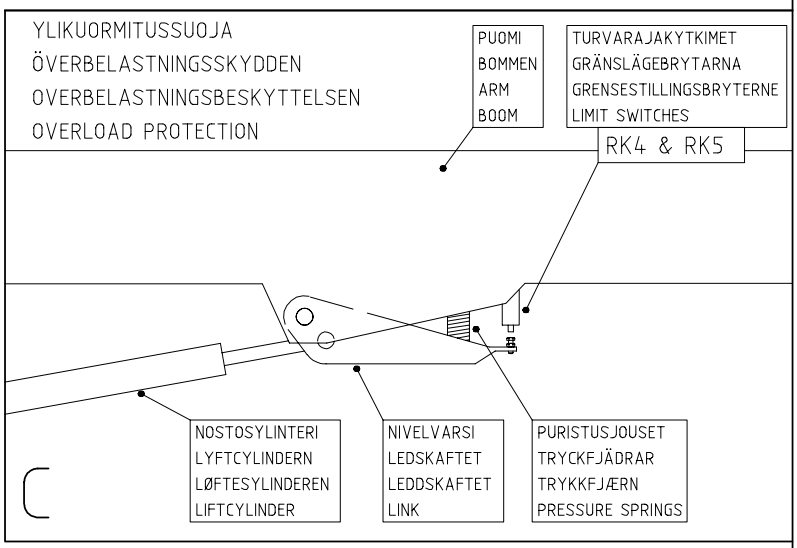
3. **Structures and construction (Optical inspection and functional test)**
   - General condition of the lift
   - Functioning and protection of controls
   - Emergency stop, signal horn and limit switches
   - Electrical devices and cables
   - Oil leaks
   - Load markings and signs

4. **Operator**
   - Is the lift operator old enough?
   - Has the operator recieved the necessary training?

5. **Special circumstances on the work site**
   - Are there factors connected with the work site or work task that demand special attention or additional instructions / directives?


3
RK4 & RK5
1
RK3
A


B
2
RK11 & RK12 & RK13 & RK14


YLIKUORMITUSSUOJA
ÖVERBELASTNINGSSKYDDEN
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OVERLOAD PROTECTION
PUOMI
BOMMEN
ARM
BOOM
TURVARAJAKYTKIMET
GRÄNSLÄGEBRYTARNA
GRENSESTILLINGSBRYTERNE
LIMIT SWITCHES
RK4 & RK5
NOSTOSYLINTERI
LYFTCYLINDERN
LØFTESYLINDEREN
LIFTCYLINDER
NIVELVARSI
LEDSKAFTET
LEDDSKAFTET
LINK
PURISTUSJOUSET
TRYCKFJÄDRAR
TRYKKFJÆRN
PRESSURE SPRINGS
C

SAFETY DEVICES

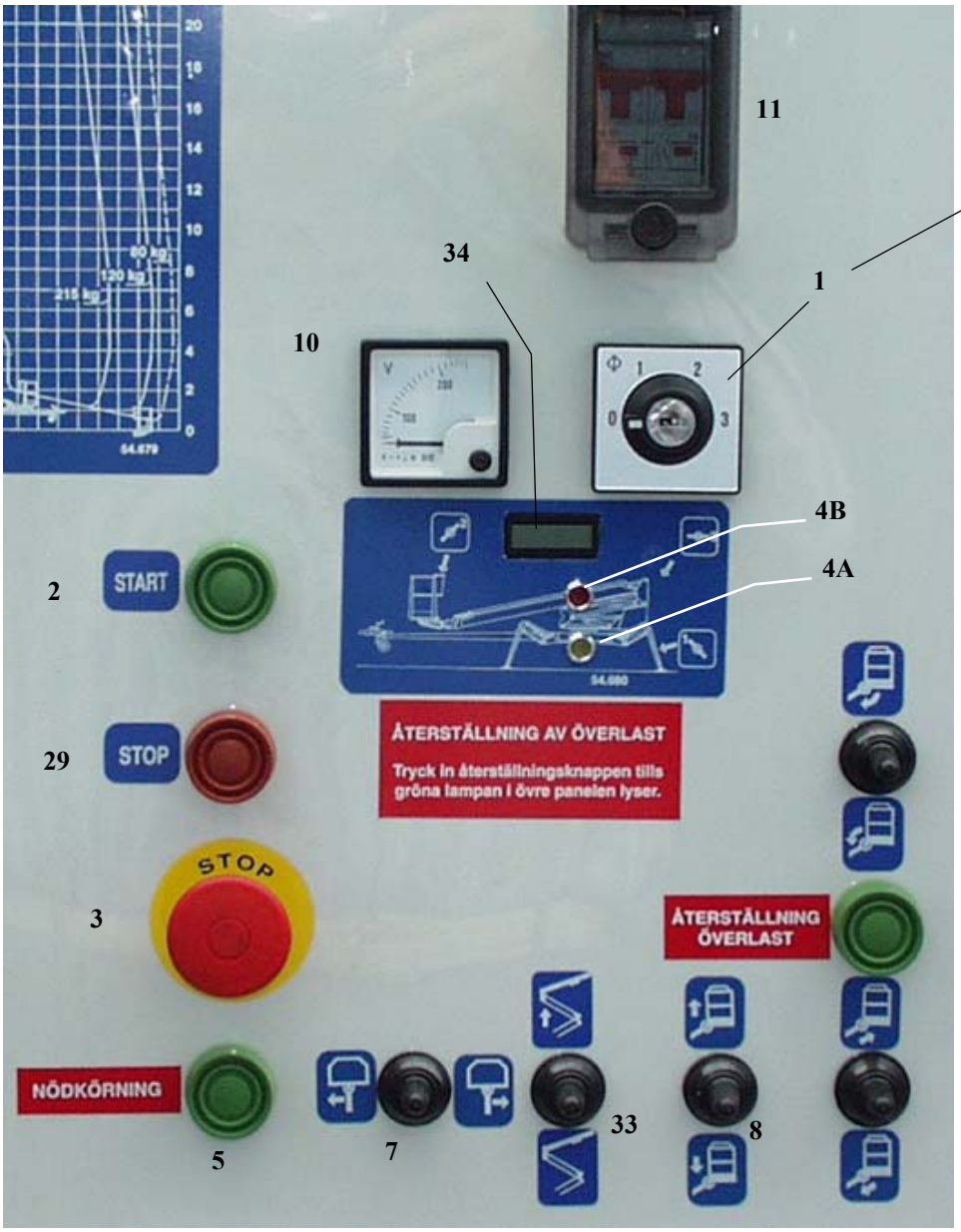
1. Support outriggers (fig A)
A safety limit switch **RK3** prevents use of the outriggers and the drive mechanism when the boom is lifted off the transport support.
The limit switch is mounted on the tow bar boom support point.

2. Lifting the boom (fig B)
Lifting of the boom is prevented by safety limit switches when the wheels are not lifted off the ground, ie. when the lift is not supported by the supporting outriggers.
The limit switches **RK11, RK12, RK13** and **RK14** are in the outriggers.

3. Reach area and overload protection (fig A and C)
The safety limit switches prevent overloading the lift. When arriving at a certain preset reach, the limit switch **RK4** stops extending or lowering the telescopic boom.
The overload switch **RK5** has a back-up function, for the case that the overload switch RK4 is not working.
When the lift is working within the permissible reach zone the green light in the control panel is lit. If the movement is stopped by the limit switches, a red light is lit. When the red light is lit the boom can be moved in the direction where it stays within the allowed reach zone.
The overload switch RK5 backs up the RK4 and switches the platform alarm horn on.

4. The EMERGENCY STOP pushbutton immediately stops the movement and shuts off the power unit. The power unit can not be restarted before the EMERGENCY STOP pushbutton is lifted (fig D and E, buttons 3 and 22).

Do not prevent the function of safety devices - the cover of the chassis control panel must not be locked with key when using the lift.


11
34
1
10
4B
4A
2
START
29
STOP
ÅTERSTÄLLNING AV ÖVERLAST
Tryck in återställningsknappen tills gröna lampan i övre panelen lyser.
32
STOP
3
ÅTERSTÄLLNING ÖVERLAST
31
NÖDKÖRNING
5
7
33
8
9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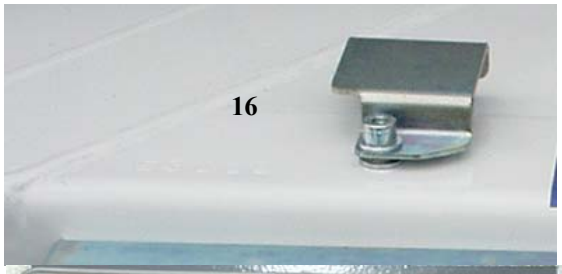
3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28R
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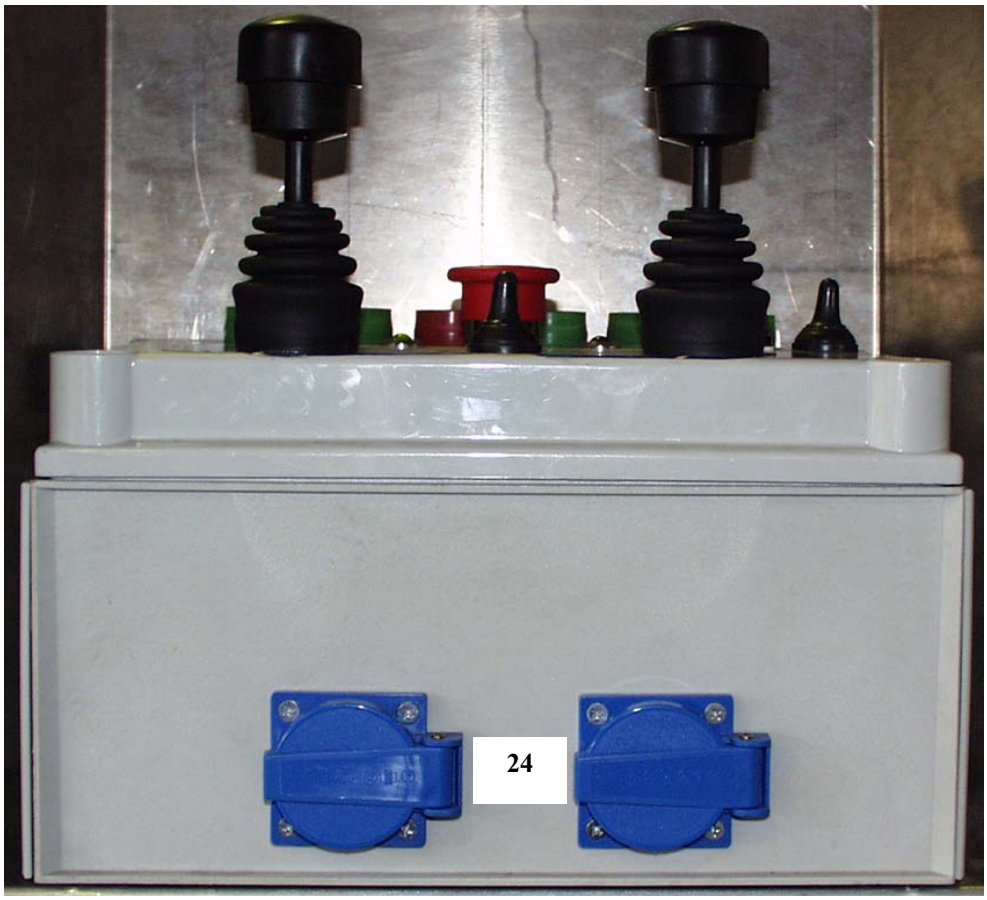
OPERATING CONTROLS

CONTROLS MOUNTED ON THE CHASSIS

1. Operating switch
   0 = Off
   1 = Operation of support outriggers and moving the lift by hydraulic power (driving device)
   2 = Controlling the boom from the platform
   3 = Controlling the boom from the chassis
2. Start -pushbutton
3. Emergency stop
   - stop by pushing
   - release by lifting

4A. Yellow signal light, outrigger limit switches
4B. Red signal light, safety device (RK4)
5. Start -pushbutton, emergency descent
6. Hydraulic movement, connecting/disconnecting pulleys against/ from the wheels
7. Turning lever
8. Boom movement lever
9. Telescopic movement lever
10. Voltage meter
11.
12. Right rear support outrigger
13. Left rear support outrigger
14. Left front support outrigger
15. Right front support outrigger
16. Levelling gauge (chassis)
28. Hydraulic movement, forwards – backwards
28L. Hydraulic movement, to the left (28L + 28)
28R. Hydraulic movement, to the right (28R + 28)
29. Stop -pushbutton
31. Telescope in -pushbutton
32. Platform inclination, operating lever
33. Lifting arms movement lever
34. Hour meter



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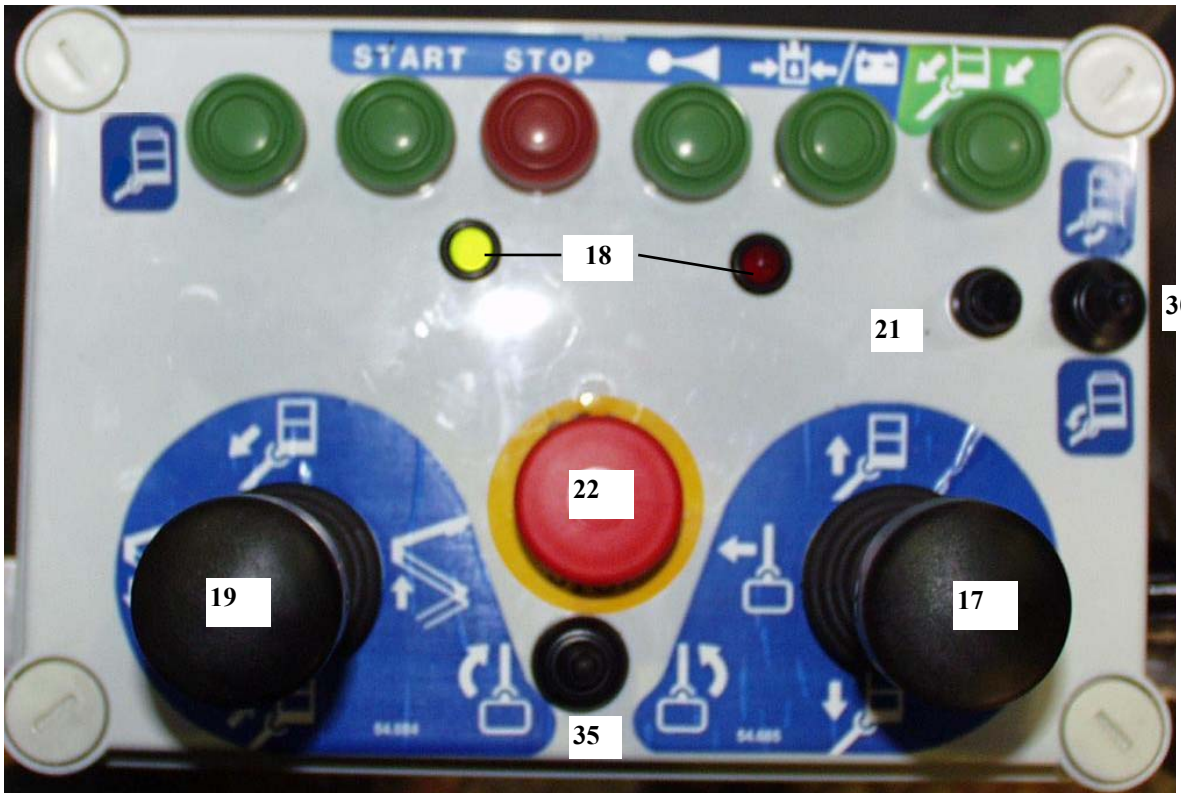
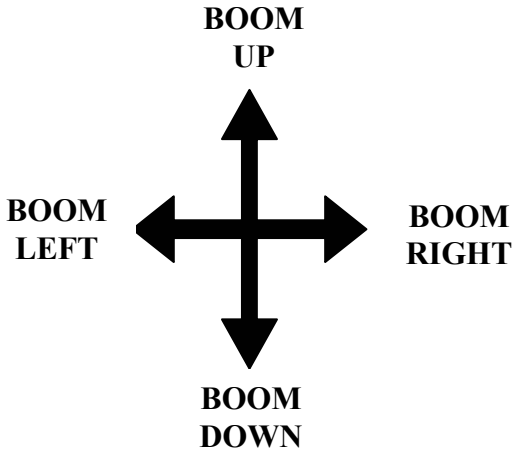


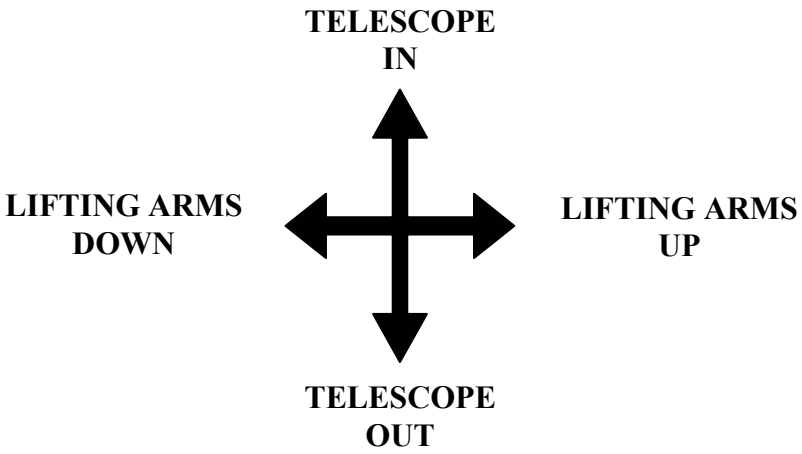
PLATFORM PANEL CONTROLS

Close the chassis control panel cover before using the platform controls (the cover must not be locked when using the lift).

17. Operating lever (right)



19. Operating lever (left)



18. Signal lights
    green = inside the reach limits
    red = at the reach limit
20. Start -pushbutton, emergency descent
21. Fuse
22. Emergency stop -stop by pushing
    -release by lifting
23. Signal horn
24. Socket 2 pcs. (230VAC)
25. Motor OFF
26. Motor START

30A. Platform inclination, pushbutton
30B. Platform inclination, operating lever (simultaneous use with pushbutton 30A)
35. Platform turning lever
36. Telescope in -pushbutton

MEASURES TO BE TAKEN IF STABILITY IS THREATENED

The following factors can lead to loss of standing stability:

- a technical fault in the lift
- wind or other factors that can create sideways forces
- a decrease in ground firmness
- negligence when positioning and raising the lift

A decrease in standing stability is mostly perceived as an increase in the inclination of the lift and boom.

1. If there is enough time, you should try to find out the cause of the instability and ascertain in which direction the destabilizing forces are working.
Warn persons in the vicinity by using the alarm horn.

2. Retract the telescope, so that the sideways reach is reduced.
Carefully avoid all sudden movements.

3. Turn the boom away from the dangerous zone/direction, that is, in the direction where it acts towards increased stability.

4. Lower the boom.

If the destabilization is caused by a technical fault in the lift, the fault must be rectified immediately.

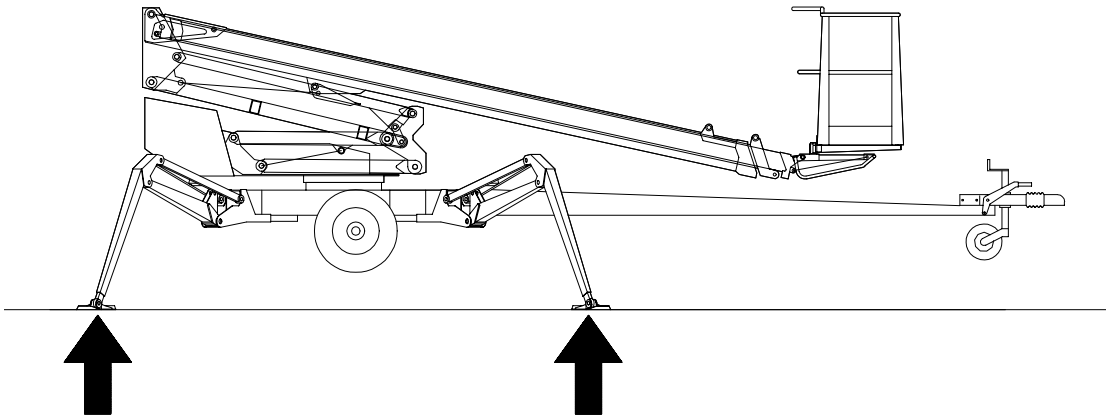
The lift must not be used before the fault has been rectified and the lift properly inspected.

STARTING UP THE LIFT

1. Ground stability
- Make sure that the ground is even and level, and hard enough to support the lift in a steady, level position (see table below).

Ground material	Density	Max. ground pressure P kg/cm²
Gravel	High density	6
	Medium density	4
	Loose	2
Sand	High density	5
	Medium density	3
	Loose	1,5
Fine sand	High density	4
	Medium density	2
	Loose	1
Sand/ mud	High density (very hard to work)	1,00
	Medium density (hard to work)	0,50
	Loose (easily worked)	0,25

- On soft ground, support plates that are large and stable enough should be placed under the support outriggers.



- Always make sure that the support feet cannot slip because of ice, rain or ground inclination.
- It is prohibited to use the lift, if it is not properly supported and completely level.

2. The lift should be driven or pushed onto the area where it is to be used.
- Apply the parking brake
- Disconnect the towing vehicle

3. Power connection

A. AC power
- Connect the mains cable
- Voltage should be 230VAC (-10%/ +6%), frequency 50Hz and mains fuse 16A, when electric motor is loaded with max. load (using a long cable may cause a voltage drop)

B. Internal combustion engine power (petrol/ gasoline aggregate)
- Do not connect the mains cable
- Check that the fuel tank is full enough
- Open the fuel cock
- Turn on the choke for starting time

  Starting the engine when the battery is flat:
  Press the push button located in the bed of the aggregate and pull the starter grip at the same time. Pull the starter grip lightly until you feel resistance, then pull briskly.
  Caution! Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.
- Adjust the motor running speed to middle position

Keep the aggregate running between movements too, because the battery will only be charged when the aggregate is running.

Close the fuel cock after using the aggregate.

Attention! The fuel cock must be closed when the lift is towed!

Read the aggregate manual for further information.

C. Internal combustion engine power (diesel aggregate)
- Do not connect the mains cable
- Check that the fuel tank is full enough

Starting the engine when the battery is flat; follow the instructions on the separate diesel engine manual.
Keep the aggregate running between movements too, because the battery will only be charged when the aggregate is running.

4. Open the chassis control panel cover

Check that the battery voltage is adequate to make sure that the emergency descent system is in working condition.

The charging level of the battery is indicated by two leds. When charging the battery the red led is on and the green one is off.

- when the battery is charged to 80%, both leds are on
- when the battery is fully charged, the green led is on and the red one blinks
- if both leds are on after full charging, the battery is flat

5. Turn the operating switch (1) into position 1

6. Start the motor with push button 2 (green)

Petrol/ gasoline engine - switch off the choke
- adjust the motor running speed

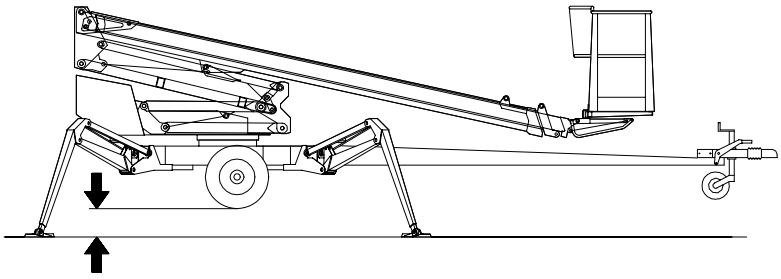
Diesel engine - motor running speed raises automatically by operating any movement switch

7. Lower the front support outriggers (towbar)

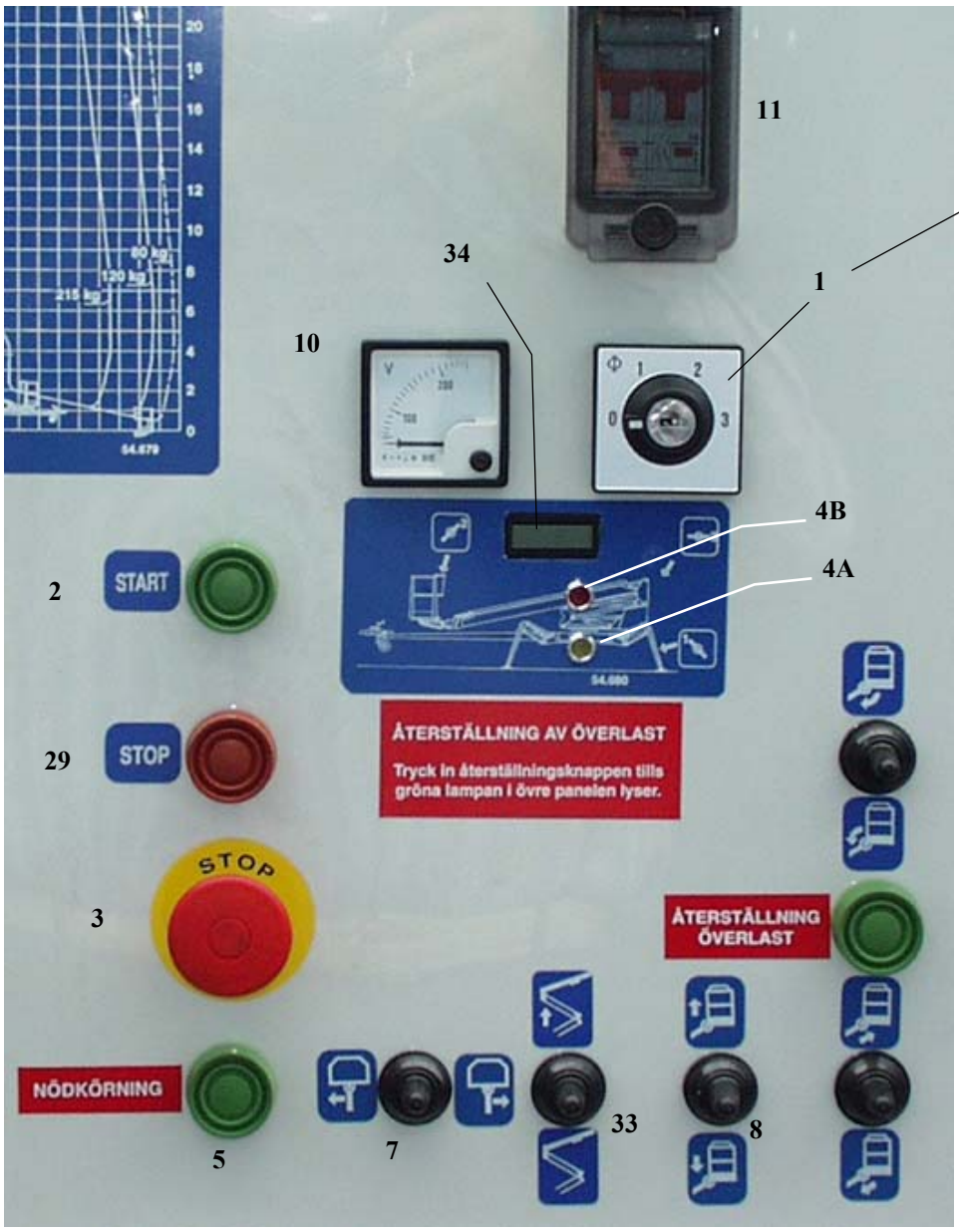
8. Lower the rear support outriggers

9. Use the outriggers to adjust the chassis so that it stands level

Make sure that the wheels are clearly off the ground



- when the wheels are off the ground, the signal light 4A on the chassis control panel is lit.
- make sure that all support outriggers are against the ground


11
34
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4B
4A
2
START
29
STOP
ÅTERSTÄLLNING AV ÖVERLAST
Tryck in återställningsknappen tills gröna lampan i övre panelen lyser.
32
3
STOP
ÅTERSTÄLLNING ÖVERLAST
31
NÖDKÖRNING
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OPERATING THE UNIT FROM THE CHASSIS CONTROL PANEL

10. Turn the operating switch (1) into position 3

- The boom can be operated using the levers 7, 8, 9 and 33

- Test the emergency descent function as follows:

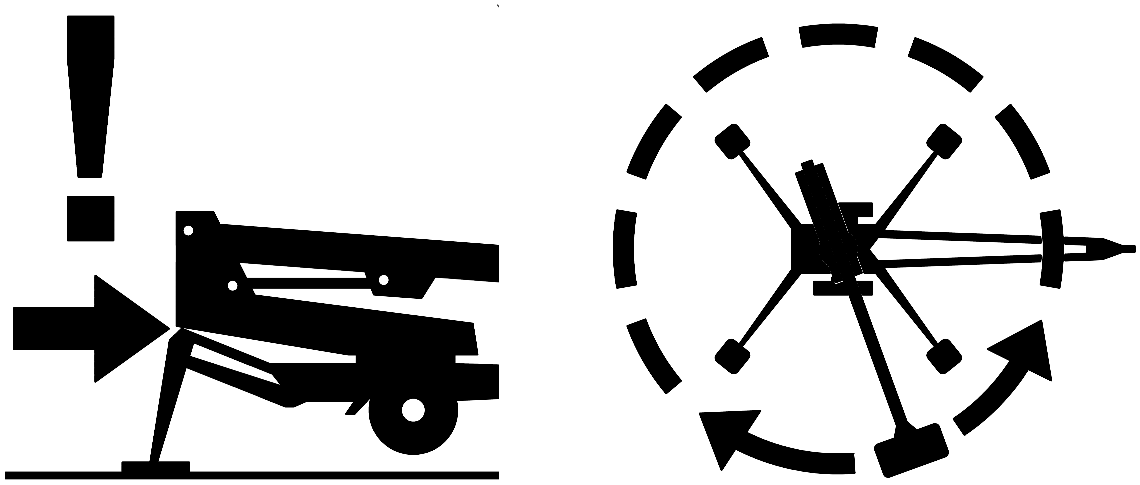
    1. Lift the boom about 1-2 m (4-7 ft) (lever 8) and extend the telescope about 1-2 m (4-7 ft) and press down the emergency stop button simultaneously. The motor (and movement) must now stop.

    2. Start the emergency descent power unit (pushbutton 5), retract the telescope (lever 9 or pushbutton 31) and lower the boom (lever 8).

    3. Lift up the emergency stop -push button.

- Start the electric motor (pushbutton 2, green)

NB: If you have levelled the chassis of the lift to a horizontal position ON A SLOPING SURFACE, turn the boom around carefully to ensure that the turning device will not touch the support feet.



- Lift up the platform from the tow bar and turn it to the side, so that it can be lowered.

- Extend the telescope enough to make it possible to enter the platform safely.

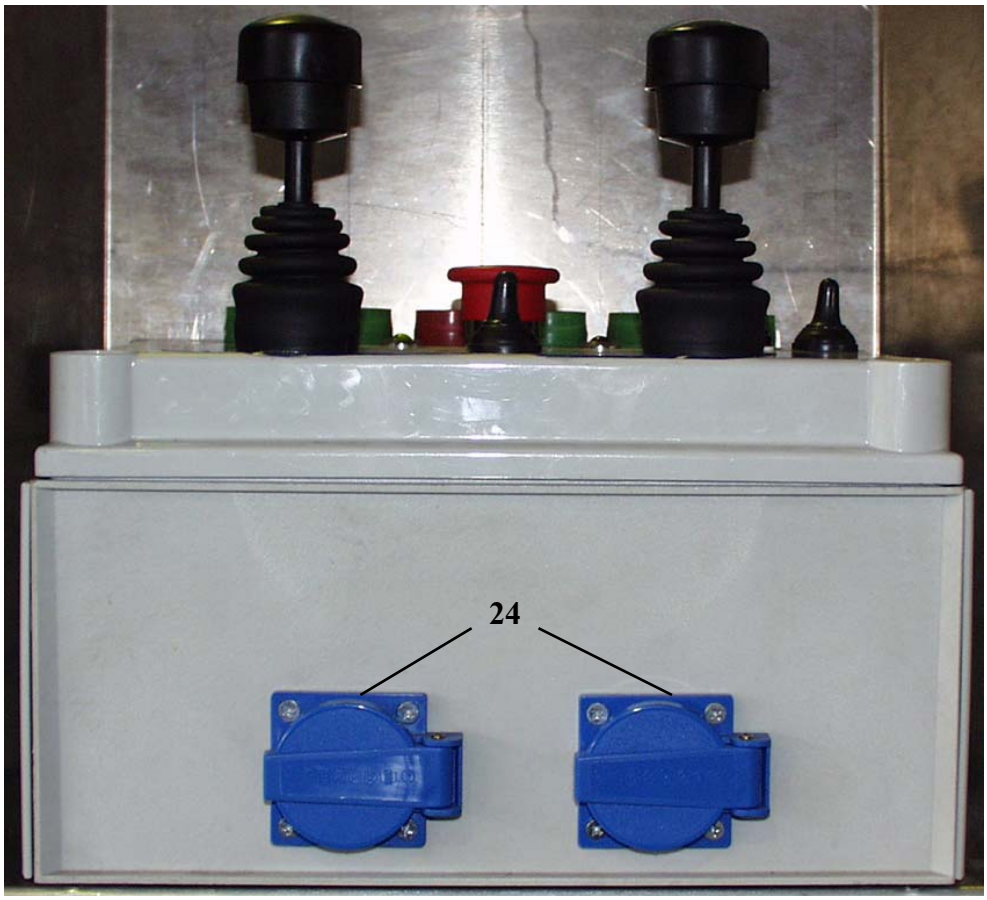
Do not damage the tow bar jockey wheel!

Movements are noticeably slower when using the emergency descent function.

When using the chassis control panel the speed of the boom movements cannot be adjusted continually with the control lever.

Lock the operating switch (1) into position 1 (support outriggers) and stop the electric motor (red pushbutton 29) when you work beneath the boom.

Make sure that there is no person or load in the platform.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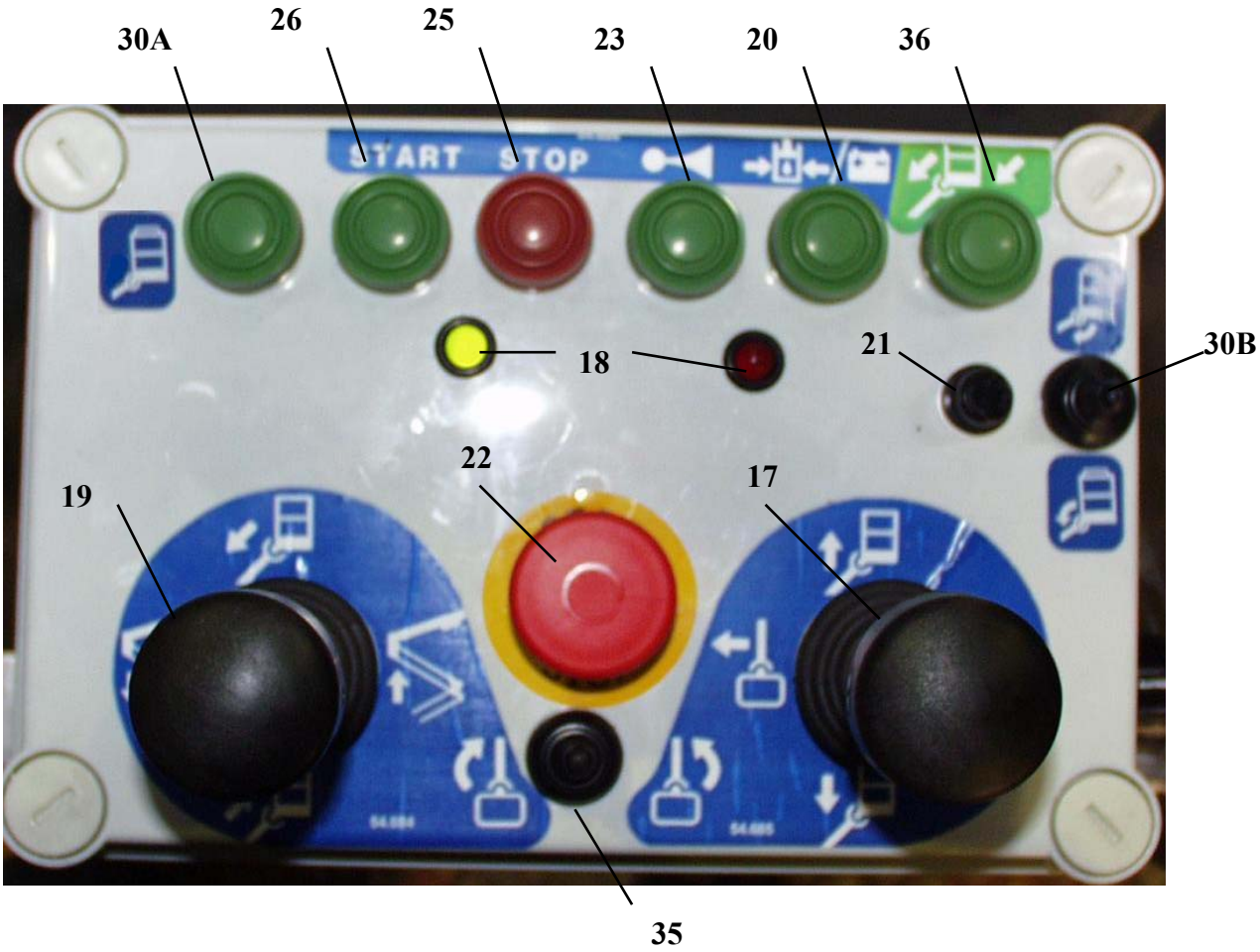
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36
START
STOP
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30B
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OPERATING THE UNIT FROM THE WORK PLATFORM

NB: If you have levelled the chassis of the lift to a horizontal position ON A SLOPING SURFACE, proceed as instructed on page 23.

11. Turn the operating switch (1) into position 2 and take away the key.
The cover of the chassis control panel must not be locked with key.

- now you can operate the lift from the work platform levers 17 and 19, carefully move the lever in the desired direction of movement.

The platform movement speed is continually adjusted.

- test the emergency descent function as follows:

1. Lift the boom about 1-2 m (4-7 ft) (lever 17) and extend the telescope about 1-2 m (4-7 ft) (lever 19) and press down the emergency stop button simultaneously. The motor (and movement) must now stop.

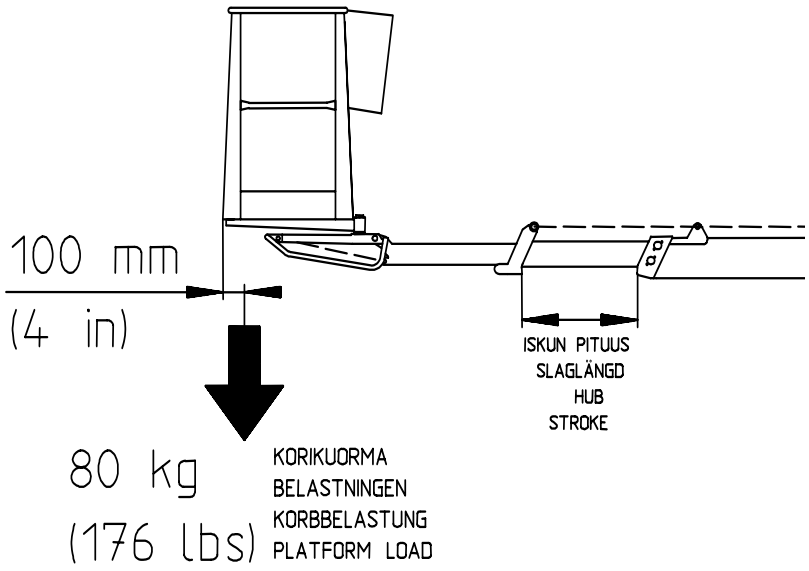
- Start the emergency descent power unit (pushbutton 20), retract the telescope (lever 19) and lower the boom (lever 17).

- Lift up the emergency stop -button.

Do not damage the towbar jockey wheel!

12. Test function of the overload limit switch RK4.

- Platform load about 80 kg (177 lbs)
- Move the boom to horizontal position and extend the telescope.



When the movement stops the red light (18) should light up.
- Compare the actual reach to the figures in the reach diagrams (page 6) Front edge of the platform = reach - 0,5 m (20 in.)

12A. Measures to be taken after overload situation. (Overload limit switch RK5 disconnects the electric circuit from the controls and the platform alarm horn on.)
- retract the telescope by pressing ”telescope in” -pushbutton (36 or 31) until the platform reaches the permissible reach zone (the green light in the upper control panel is lit)
- after this the lift can be used normally
Telescope in –pushbutton (36 tai 31) always works when the electric motor is running or when pressing the emergency descent start –pushbutton (5 tai 20).

Warning!
When the red reach area light (18) is lit, no additional weight may be placed on the platform (e.g. a second person, tools or the like). Example: A single person on the platform extends the telescope, or alternatively somebody operating the chassis control panel extends it as far as it will go low above the ground. When the reach area limit light lits no load may be added to the platform. The telescope should be retracted.

If the emergency descent system or other safety devices are not functioning properly, they must be repaired before using the unit.

13. Check the daily inspections list in the operators manual and make all the inspections mentioned therein.

14. With the boom slightly raised and the telescope slightly extended, check that the platform does not lower itself when no operating controls are used.

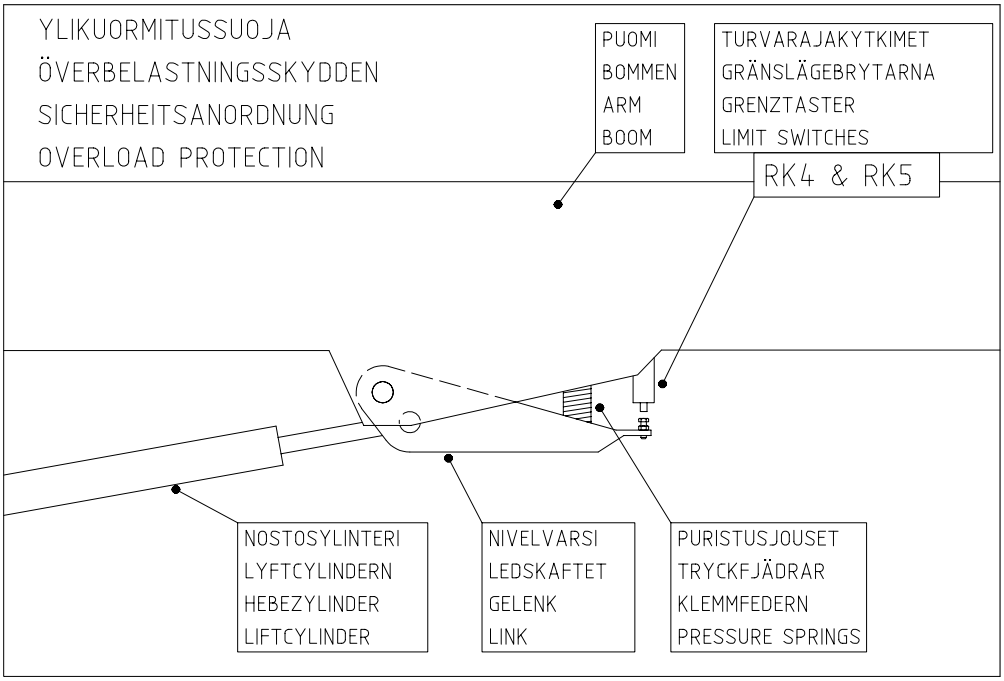
15. In cold environments, the engine should be run for a short time to raise the oil temperature. Start operating the unit carefully making the movements slowly back and forth without platform load from the lower control panel.

16. Move the work platform to the working area.
The platform can be driven with continually adjustable speed from the platform controls (not from the lower control panel). It is not possible to make more than one movement at a time. If more than one of the operating levers is used simultaneously, the movement demanding the least effort (power) will be executed.

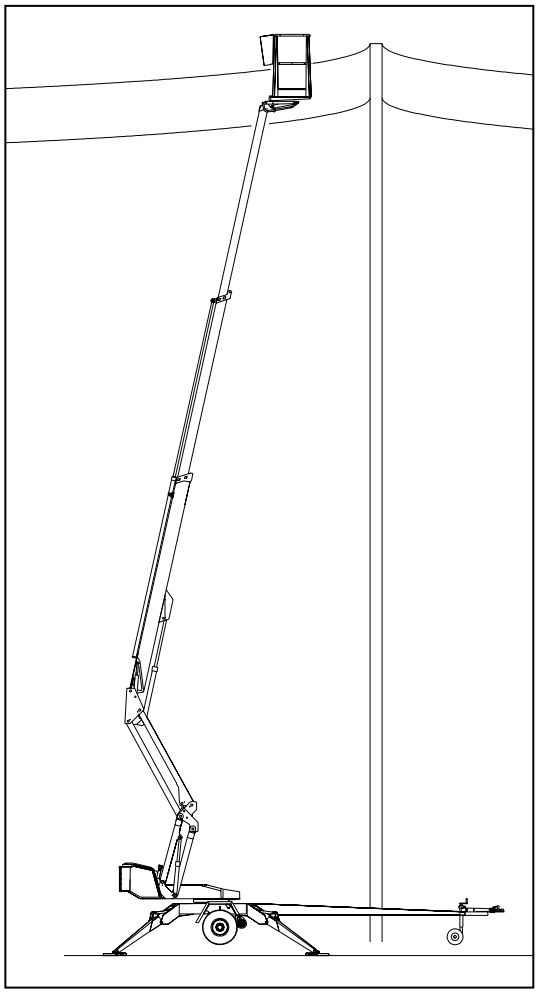
Take care not to damage the jockey wheel!
When working do not take additional load onto the platform!

Note!
When lowering the platform into transport position always retract the telescope fully first and place the platform at right angle to the boom, before lowering onto the transport supports.

17. Important when raising the platform.
The possible platform movements (reach) depend on the platform load (refer to technical data). The movements are controlled by two safety limit switches, RK4 and RK5 mounted beneath a cover. The switches must not be adjusted or tampered with in any way. Inspections and adjustments may be made only by an authorized service mechanic.



18. Working at the same site for longer durations.
There are stop- and start -pushbuttons both in the upper and the lower control panel. In warm ambient temperatures it is not necessary to run the engine for longer durations if no platform movements should be made.
In cold weather it is recommended that the engine is kept running to keep the hydraulic oil warm.
We recommend that you keep the aggregate running between movements too, so that the battery will keep it’s charging current.
The standing stability should be checked regularly (support area condition etc.) when working, taking notice of effects of weather or other ambient conditions



19. When moving the platform, remember the following

- special care should be taken in the vicinity of high voltage cables

- do not exceed the max. allowed sideways load (400N) (88 lbs)

- make sure that no part of the platform or the operator can come into contact with open-wire cables

- objects may under no circumstances be thrown out of the platform

- avoid damaging the unit

- when working do not take additional load onto the platform

- avoid damaging external objects or constructions

- do not overload the platform from working area

20. When the lift is left alone

- move the unit into a safe, steady position, preferably into transport position

- switch off the power unit

- prevent unauthorized use of the unit by locking the main operating panel cover

21. Adjusting the position of the work platform

The platform angle (horizontal) can be adjusted from the lower control panel as follows:
- Put the operating switch (1) into position 3 (page 22).
- Choose the direction with the operating lever (32)
No persons are allowed on the platform when adjusting.

The platform angle (horizontal) can be adjusted from the lower control panel as follows:
- Put the operating switch (1) into position 2 (page 22).
- Push the platform operating switch 30A and choose the direction with the operating lever 30B (page 24).
Activate the controls simultaneously.

Use the platform positioning control when the boom is horizontal.
Use the positioning adjustment when the lift is supported (outriggers lowered)

GET READY FOR PLATFORM MOVEMENTS.

EMERGENCY DESCENT SYSTEM

As a precaution for a possible power failure, the lift is equipped with a battery operated emergency descent system.

1. Emergency descent system
   - Battery, 12V 44Ah
   - Charger
   - 12 VDC hydraulic unit

2. Servicing the battery
   - The system is equipped with an automatical, thermal and short circuit protected charging system
     - rated power 72VA
     - function voltage 0…14,4V
     - charging 6A
   - If necessary, fill up water so that the cells are covered

3. The hydraulic unit is made up of the following parts:
   - pressure limiting valve, pressure setting 16 MPa (160 bar)
   - hold valve
   - 800W DC motor

The emergency descent system is started from the pushbutton 20 (page 24) on the platform or 5 (page 22) on the chassis control panel. The system is activated only when the button is pressed.
Starting the emergency descent system stops the 230VAC –motor.

Note!

When using the emergency descent system, always first retract the telescope and then lower and turn (if necessary) the boom.

The system can also be used to lift up the outriggers.

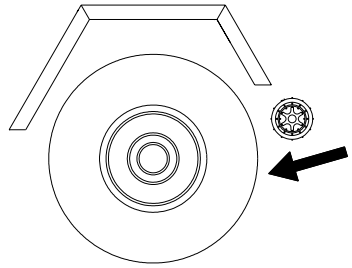
If the emergency descent system does not work, try to get the attention of other persons on the site. They should try and supply the power needed for normal operation, or alternatively try and get the emergency descent system working e.g. by changing to a well-charged battery.

Always make sure that the battery of the emergency descent system is in good condition before using the lift (see page 21).

DRIVING DEVICE

The hydraulic driving device should be used for those short moves on the working site for which the towing vehicle cannot be used.

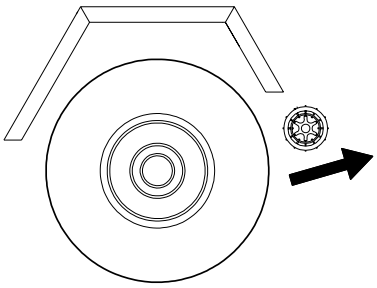
- Start up the aggregate
  Adjust the running speed to ¾ of the maximum (gasoline/ petrol)
  (The speed of the driving device depends on the aggregate running speed.)
  Motor running speed raises automatically by operating any movement switch (diesel)
- Turn the operating switch (1) into position 1 "support outriggers" (page 22).
- Make sure that the platform is in transport position and that the support outriggers are completely raised
- Make sure that the mains cable is long enough for moving the lift (by using AC power)
- Connect the driving device against the wheel (lever 6 to the left)



- Release the parking brake
- Drive with press buttons 28L and 28R and also lever 28 (page 22) as follows:

forwards	lever 28 right
backwards	lever 28 left
left-forwards	pushbutton 28L + lever 28 right
right-forwards	pushbutton 28R + lever 28 right
left-backwards	pushbutton 28L + lever 28 left
right-backwards	pushbutton 28R + lever 28 left

- Do not drive the jockey wheel onto obstacles or into potholes
- When finishing driving, pull the parking brake
- Disconnect the driving device from the wheel



When using the remote control of the driving device (extra equipment), the cable of the remote control is connected to the plug socket of the outrigger control box.

Warning!
Do not extend the jockey wheel too far, as this considerably increases the risk of damaging the wheel. We recommend that there should be 1-3 cm (½ - 1 in.) free height between the upper edge of the tire and the lower edge of the towbar/brake rod, so that the wheel can turn freely.

SPECIAL INSTRUCTIONS FOR WINTER USE

- The lift must not be used in temperatures below -20°C (-4°F)

- When the lift is used in cold conditions the power unit should be run for a couple of minutes before attempting hydraulically actuated movements

- Start by making short warm-up movements to force warmed-up oil into the cylinders, which improves the functioning of the valves.

- Make sure that the limit switches and emergency descent devices work.
They must not be clogged by dirt, snow or ice.

- The operating panel and platform should be covered up and protected from snow and ice when not in use.

Always keep the lift clean from dirt, snow and ice!

ENDING THE DAYS WORK

1. Retract the telescoping boom fully.

2. Check that the platform is perpendicular to the boom.

3. Lower the boom and platform onto the towbar
- The limit switch mounted on the transport support prevents operating the support outriggers if the platform is not lowered completely

4. Close the cover on the platform operating panel

5. Turn the operating switch into position 0 (page 22)

6. If you want that the battery will be charged, keep the mains cable connected, otherwise disconnect the lift from the mains cable.

7. Do not forget to lock the lower control panel covers

PREPARING THE LIFT FOR TRANSPORT

1. Retract the telescoping boom fully.

2. Check that the platform is perpendicular to the boom.

3. Lower the boom and platform onto the towbar
- The limit switch mounted on the transport support prevents operating the support outriggers if the platform is not lowered completely

4. Close the cover on the platform operating panel

5. Turn the operating switch into position 1 (support outriggers)

6. Raise the support outriggers
- start with the rear outriggers (do not damage the rear lights)
- after that, raise the front outriggers (do not damage the jockey wheel)

7. Pull the parking brake

8. Make sure that the drive unit is switched off

9. Turn the operating switch into position 0 and disconnect the power supply from the unit

10. Do not forget to lock the lower control panel covers.

CONNECTING TO THE TOWING VEHICLE

1. Lift the handle of the ball coupling at the same time as you push it forwards. This opens the ball coupling.

2. Place the ball coupling onto the towing ball and push lightly downwards. The coupling automatically locks into place.

Make sure that the ball coupling locks itself correctly onto the ball when releasing the handle.

The ball coupling must be regularly cleaned and greased.

3. Connect the electric plug and attach the safety brake wires to the towing vehicle.
- Make sure that the cable does not rub against other parts, and that the safety wires are connected so that they can perform their functions.

4. Make sure the lights work.

5. Release the parking brake accurately and make sure that the locking works and the parking brake lever stays down there.

6. Lift the jockey wheel all the way up to the transport position

Having any kind of load inside the basket during transportation of the lift is totally forbidden!

Especially when parking and uncoupling the lift on a sloping surface the handbrake should be applied by pulling strongly so that the spring cylinder is drawn. With the handbrake correctly applied the lift should be pushed backwards to let the automatic reversing function release the brakes slightly. As this happens the spring cylinder pulls the brakes tighter thus eliminating the function of the automatic reversing function.
Remember brake adjustment according to ”service and maintenance”.
Secure the lift with wedge blocks under the wheels.
If the lift is left standing for longer periods, for example in winter storage, we recommend lifting it up to rest on supports relieving the load from the wheels and tyres.

Warning! Check that:
- The support outriggers are correctly locked into transport position
- The ball coupling is correctly locked onto the ball
- The lights work properly
- The tires are undamaged and the tire pressures correct (700 kPa, jockey wheel 250 kPa)
- The safety wires are correctly attached
- When leaving the lift, always ensure that the parking brake functions reliably
- Jockey wheel attachment
- Driving device loose from the wheel

SERVICE AND MAINTENANCE

GENERAL

- Inspections and service should always be performed as described in this manual.

- More complicated repairs and service measures should be performed by specially trained personnel (the manufacturer, or manufacturers representative).

- No changes or additions may be made to the lift without written consent from the manufacturer.

- Faults and wear that might influence the operational safety of the unit must be repaired and corrected immediately.

- Oil must not be let out onto the floor or ground.

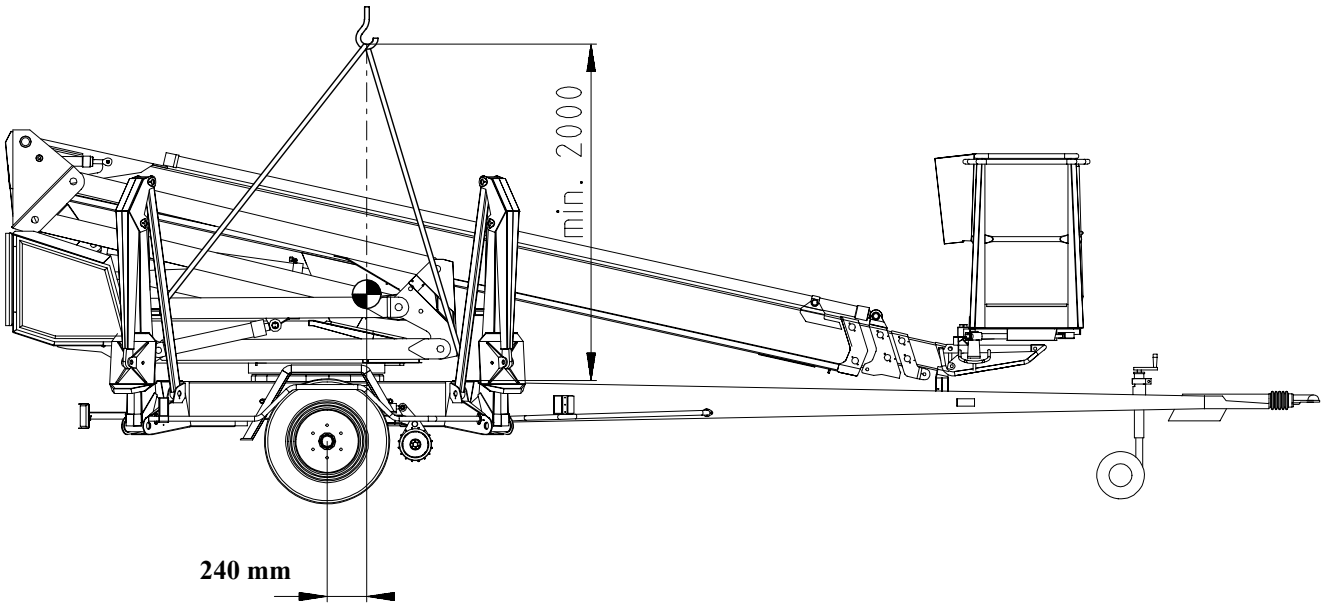
- Always keep the lift clean, especially the platform.

- Always clean the lift before service or maintenance work.

- Use original spare parts

- When making repairs platform, boom, lifting arms and outriggers should be supported in a way that prevents loading of the structure to be repaired or other causes of danger. (e.g. transport position or separate supporting structures)

- The machine can be lifted with two slings attached to the four lugs (see picture). The loading capacity of each sling has to be at least 3500 kg.
Be careful when lifting the unit!



INSPECTIONS AND SERVICE

1. The first service inspection should be made after 20 hours of use:
- Change the pressure filter and the return filter cartridges.
- Adjust the braking system, refer to page 37.
- Check the tightness of the wheel bolts after about 100 km (60 miles) driving.
The tightness should be 325 Nm (240 lbxft).

2. Daily inspections and service
- Check the hydraulic oil level, and fill if required.
- Check the hydraulic pipes/hoses and connections.
- Make a thorough visual check of the unit.
- Check the emergency descent and emergency stop -functions.
- Check the safety devices.

3. Weekly inspections and service

- Check that the tire pressures are correct	axle	700 kPa = 7,0 bar
	jockey wheel	250 kPa = 2,5 bar

- Grease the fulcrum pins (refer to lubrication plan)
- Check the sliding surfaces of the telescope and lubricate with silicon when necessary.
- Check the clearance between the sliding pads and the surface and adjust if necessary.
- Load the platform with about 80 kg (177 lbs) and turn the boom horizontally.
Now extend the telescope until the red light lights up and the movement stops. Measure the stroke achieved as described on page 49 and compare it with the reach area limit (page 50) values for RK4. If the achieved stroke exceeds the correct values, please contact authorized service personnel.

4. Service, every six months
- Change the hydraulic oil and the filter cartridges.
- Check the brakes.
- Check the tightness of the wheel bolts (325 Nm) (240 lbxft)
- Grease the turning bearing and gear ring.

5. Annual service is described separately further on in this manual.

If the lift is used in demanding ambient conditions (extremely moist, dusty, corrosive or equivalent) oil change and other service intervals should be shorter to ensure that the operating safety and reliability standards offered by the unit are maintained.

Inspections and service must be made with care to avoid deterioration of the reliability. Carelessly made service might also lead to deterioration in work safety and reliability.

The guarantee expires if the service and maintenance measures have not been carefully and thoroughly carried out.

WHEEL BRAKES AND BEARINGS

Adjusting the brakes

Jack up the lift so that the wheels will rise off the ground and support it in this position. Make sure that the wheels can rotate freely.

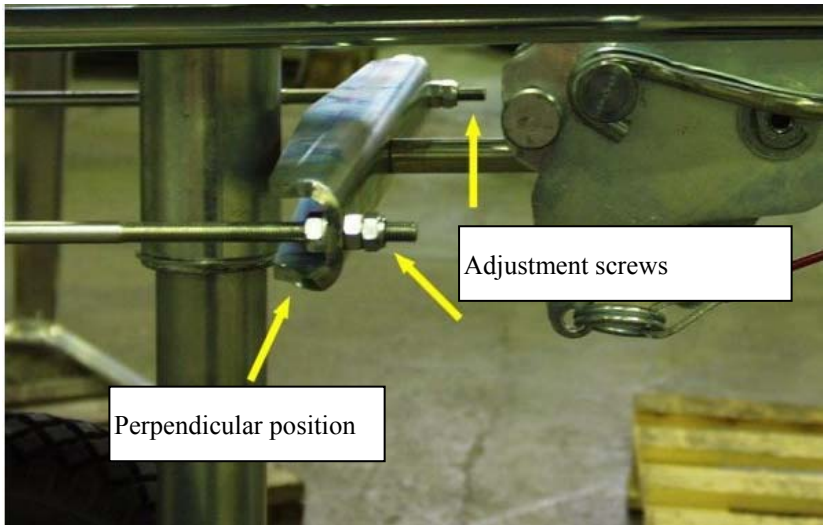
The brake rods must be slack (with the handbrake released).

Check the attachment of the brake rods.

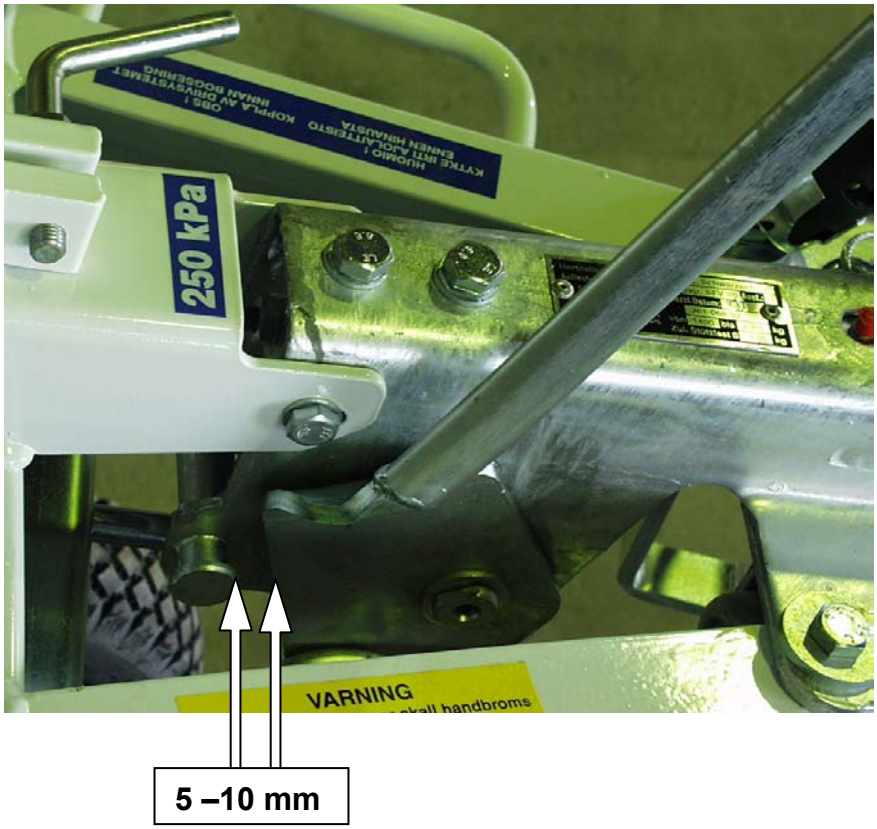
Tighten the bolt shown by the arrow by turning it clockwise until the wheel can no longer be turned by hand.

Open the bolt by turning it counterclockwise until the wheel starts turning again but still feels "sticky".

Adjust the braking force with the nuts keeping the brake balancer perpendicular to the towbar so that both wheels will brake

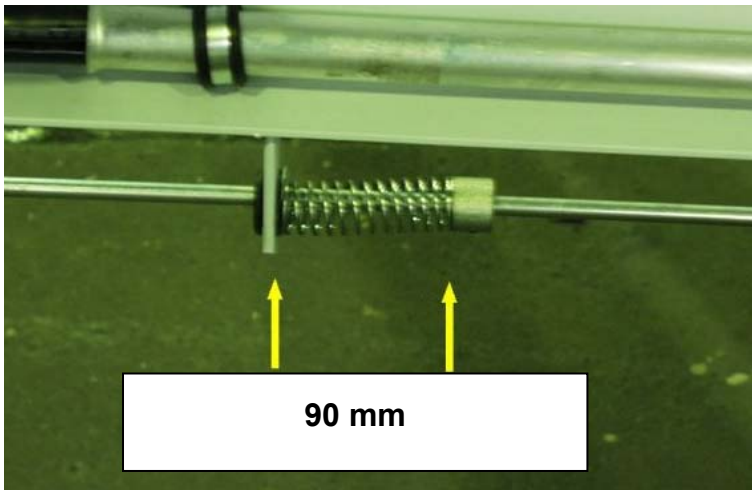


Apply the handbrake and push the lift backwards until both its wheels lock; when doing so the handbrake lever should rise up and move 5-10 mm backwards from the limiter.



Release the handbrake.

Adjust the length of the return springs to 90 mm.



Apply the parking brake and check that the return springs do not prevent the brakes from functioning. Tightening the brake system too much will cause overheating of the brakes during transportation and increase the required towing force.

We recommend performing a braking test after the adjustment. Check the flawless operation by braking 2-3 times in the course of the test run.

Adjusting the bearings

The wheel bearings are lubricated for life and do not need any service.
(they do not need additional lubrication and they cannot be adjusted).

Service intervals

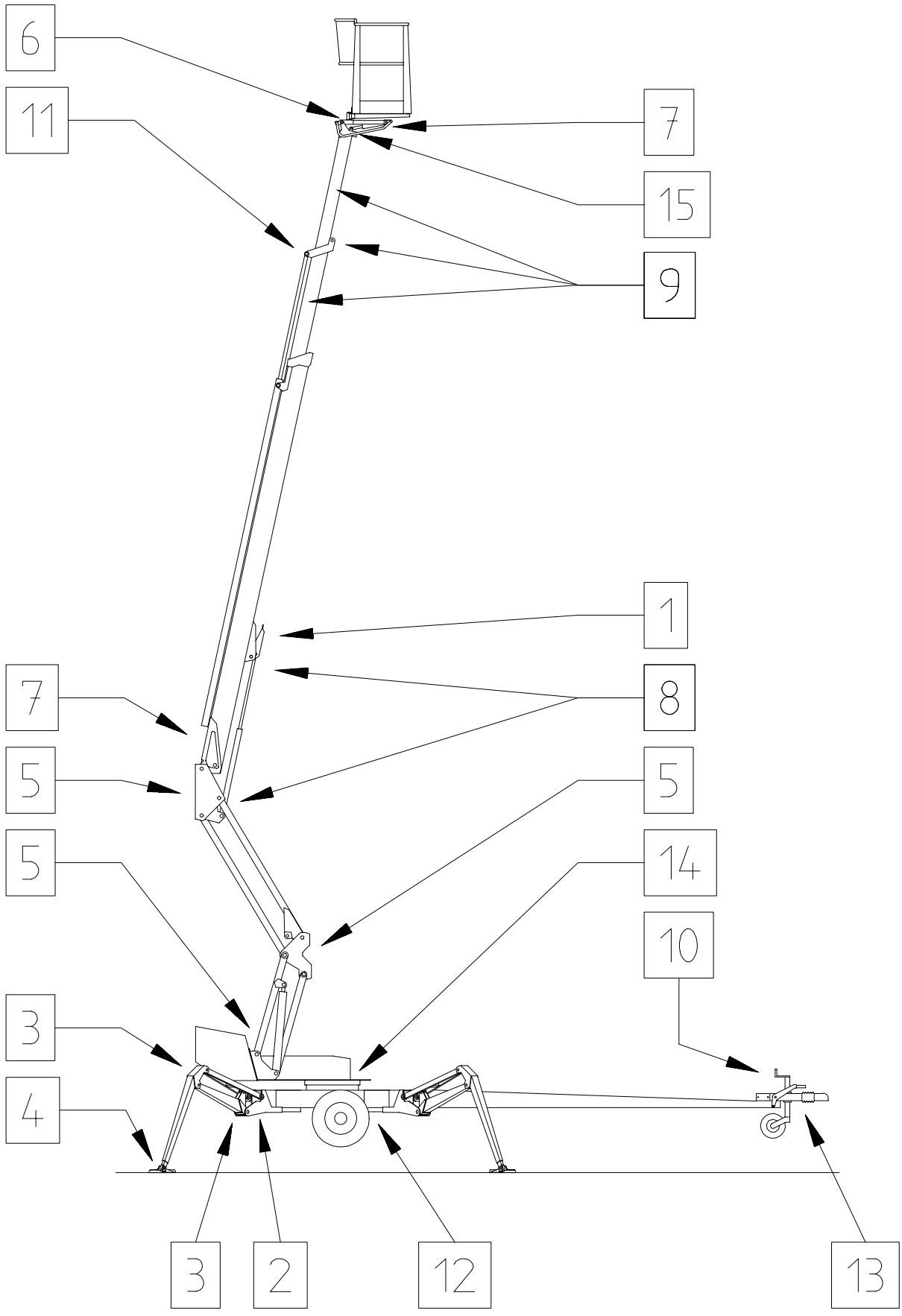
500 km (300 miles)	Running in
5000 km (3000 miles)	Brake adjustment, lubricate the moving parts in the overrun device.
13 000 - 15 000 km (8 000 - 9 000 miles) or every 6 month:	a) Check brake linings for wear, and renew if necessary. b) Check the overrun device. c) Lubricate the sliding parts of the overrun brake.

The high durability and maintenance-free operation of double row angular contact compact bearings makes the occurence of bearing breakdowns in extremely rare in normal conditions. If , because of exceptional operating conditions a bearing failure should occur, it is mandatory to replace the complete brake drum unit with pressed-in bearings and locking nut.

Warning!
Service work should be done by a trained service repair shop.

The wheels should be turned at least once every 3 months, so that the lubricating film on the bearings does not crack.

LUBRICATION PLAN



Every 50 hours

1. Overload protection (articulated shaft) bearings
2. Outrigger cylinder joint bearing surfaces
3. Outrigger joint bearing surfaces
4. Outrigger footplate joint bearing surfaces
5. Boom and lifting arms bearing surfaces
6. Platform bearing surfaces
7. Stabilization cylinder bearing (except for the joint bearing on the upper stabilization cylinder piston rod side)
8. Lift cylinder bearing
9. Gliding surfaces/telescope rolls
10. Gliding surface/jockey wheel spindle

Every six months

11. Telescope cylinder bearing
12. Driving unit
13. Overrun device
14. Turning bearing* and gear ring
15. Joint bearing on the upper stabilization cylinder piston rod side

Recommended lubricant Esso Beacon EP2 (or corresp.)

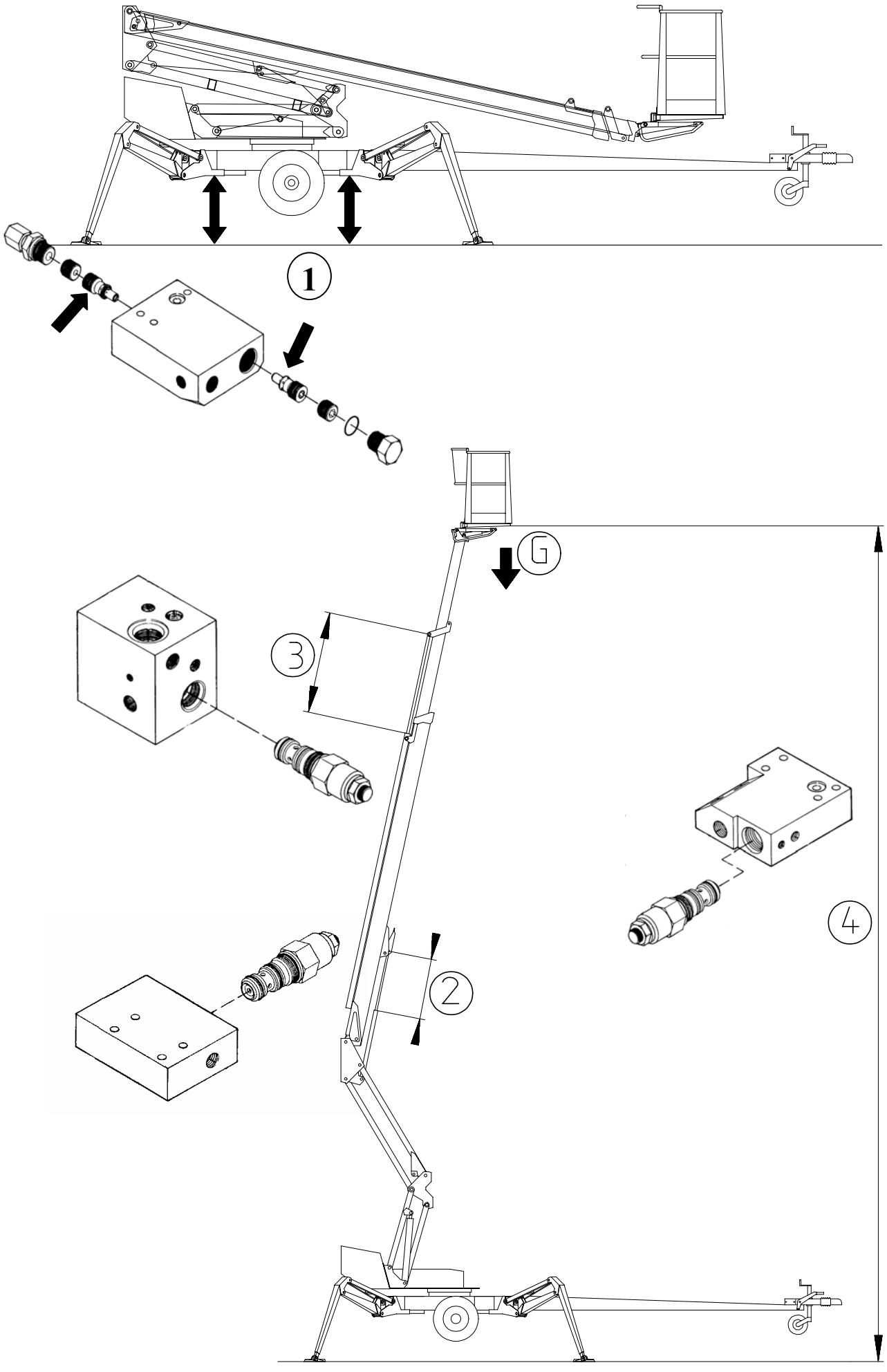
The overload protection device joint must be lubricated regularly and **always after washing the machine**.

Moving parts of the mechanism of the outrigger limit switch system must be lubricated every 50 hours.

When necessary, lubricate lightly all the moving parts of the ball coupling.

After washing the lift, always lubricate the lift to ensure a protective film.

*Remove the crescent covers below the chassis, that you can lubricate turning bearing nipples (4 pieces).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HOLD- AND LOAD REGULATING VALVES

Functional check

1. Checking the outrigger cylinder holding valves with respect to leaks is made by lifting the unit up with the outriggers and measuring, separately at each outrigger, chassis height from the ground. After a few minutes, measure the height again. If the chassis has lowered itself the valves are leaking.

2. Check the tightness of the boom and the lifting arms holding valve. Drive the boom into a position where it can be easily measured. After a few minutes, measure again to see if the boom has moved.

3. Check the tightness of the telescope cylinder load regulating valve. Extend the telescope and measure the stroke. Wait for a few minutes, and check if the telescope has retracted. (**Note**: The boom should be almost vertical).

4. Check the tightness of the platform stabilizing system. Load 100 - 200 kg (200-400 lbs) onto the platform and measure the height between platform rear edge and the ground. After a few minutes, check that the height remains unchanged.

Service instructions

1. Dismantle the valve and clean it.

2. Check condition of O-rings and replace if necessary.

3. Reassemble the valves carefully

4. If necessary, completely renew the valve.

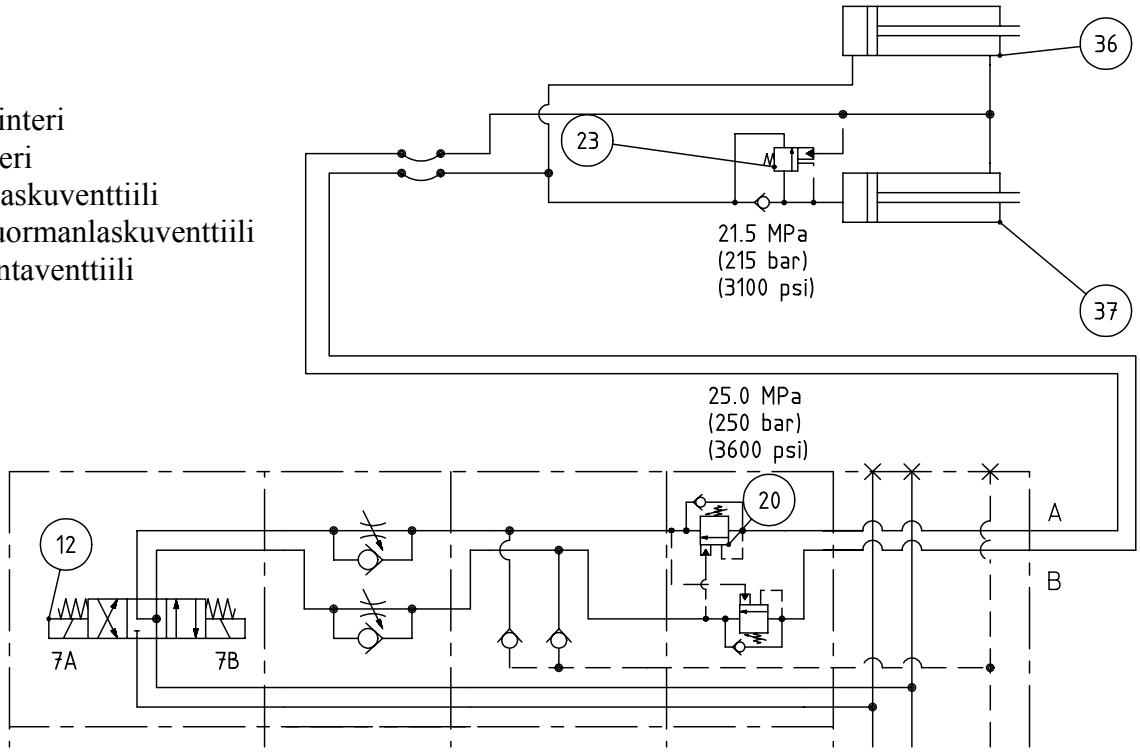
5. Do not change the valve adjustment settings

Support platform, boom, lifting arms and outriggers in a position, where load is not
directed so that it influences the structure or parts that should be repaired. Make sure that no cylinder is pressurized.

PLATFORM STABILIZATION SYSTEM

- The stabilization is effected with a slave cylinder:
  - mounted under the platform and controlled by the master cylinder
  - the levelling of the platform depends on the tightness of the stabilization system valves
  - the system consists of the following parts:

36. Mastersylinteri
37. Orjasylinteri
23. Kuormanlaskuventtiili
20. Kaksoiskuormanlaskuventtiili
12. Sähkösuuntaventtiili



- If the platform lowers itself at the front edge, the reasons can be:
1. a leak in the slave cylinder load regulating valve (at piston rod), leaking in the direction of the electrically actuated directional valve (which valve is not conceived to be tight)
2. an internal leakage in the cylinder

-If the platform lowers itself at the rear edge, the reasons can be:
1. a leaking double load regulating valve (20) on the piston (lower) side of the slave cylinder, letting through in the direction of the electrically actuated directional valve (12) (which valve is not conceived to be tight)
2. an internal leakage in the cylinder.

A leak leads to a lowering of the platform until the load regulating valve (23) under the platform closes. The closing is caused by a reduction of piston rod side pressure, reaching the opening ratio 5:1.

Air in the stabilization system causes inaccuracy when stabilize the platform.

If the valves are leaking, please refer page ”hold- and load regulating valves”

Recommended settings, load regulating valves:
- Double load regulating valve (20), opening pressure 25 MPa (250 bar) (3600 psi)
- Load regulating valve (23) beneath the platform, opening pressure 21,5 MPa (215 bar) (3100 psi)
Do not change the valve adjustment settings.

REGULAR SERVICING

The lift should be serviced regularly at 11 - 12 month intervals.
If it is used in corrosive and demanding ambient conditions (Moist, corrosive chemicals etc.), the technical devices and structure are subjected to harder stresses. In these conditions it is recommended that the servicing and checks be made at shorter intervals. In corrosive conditions it is also recommended to use protective chemicals.
Service and maintenance must be performed only by trained personnel well familiar with the construction and functioning of the lift.
Please refer to your distributors service personnel.

Regular servicing:

1. Always clean the lift thoroughly before starting service and maintenance work.
- Never disassemble hydraulic or electrical equipment without cleaning it first. Dirt and moisture might cause malfunctions in the equipment, and lead to a deterioration of the operating safety.
- Washing (externally).

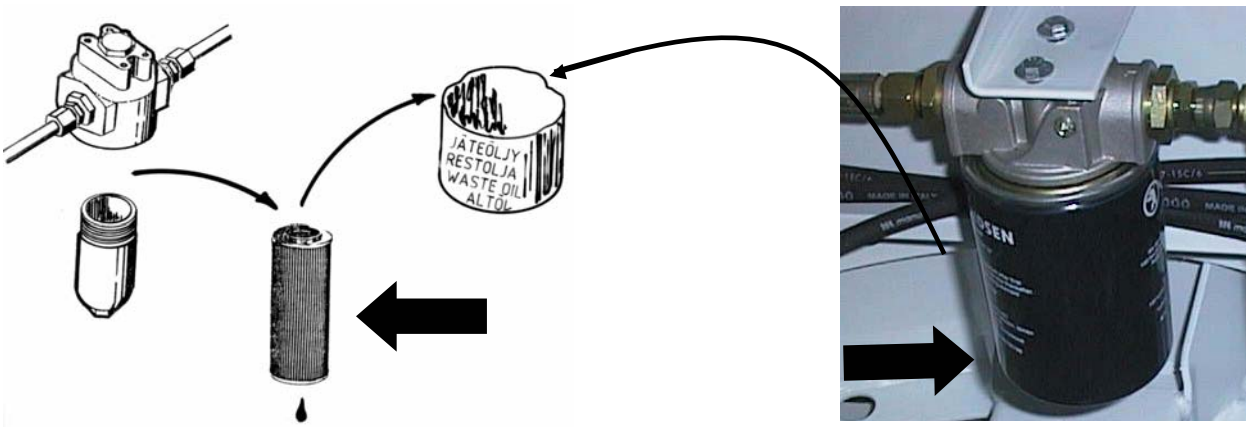
Warning! Do not direct the spray from a high-pressure washer directly at electric parts or connections, ie. upper and lower control panels, relays, solenoid valves and limit switches.
- Electrical equipment and hydraulic connections should be blown dry with compressed air.
- When the electrical equipment and connections have dried, protect them with moisture repellent chemicals.
- Piston drivers must protect always after solvent washing with for example CRC3-36 antirust compound.

Remember cleanliness!

2. Change the hydraulic oil and filter cartridge
(protect your skin against hydraulic oil)

- Drain the oil tank through the draining plug, with all cylinders in retracted position, except lifting arms, which has to be raised ~0,5 m (20")
- Clean the tank with a suitable solvent and then rinse it.

- Renew the pressure side filter and return side filter



- Reassemble the draining plug
- Refill tank with fresh oil. Capacity about 30 l.
Factory filling, **Neste Hydrauli 28 Super** or **Esso Univis J26**.
- If necessary, add the hydraulic fluid so that the level reaches the upper edge of the gauge eye. (The lift must be on transport position.)

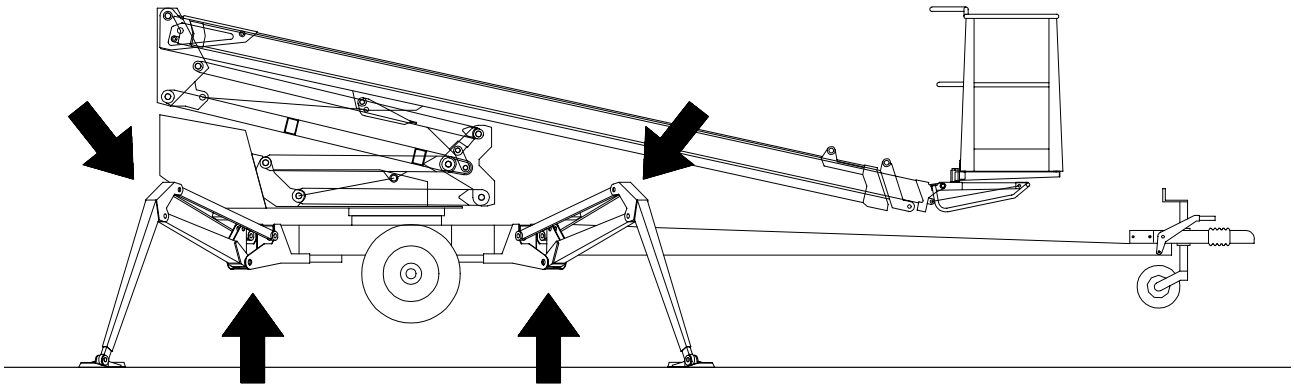
3. Check the hydraulic hoses and tubes.

Damaged hoses or tubes should be replaced. Also check the connections.

4. Inspect the support outrigger joints.

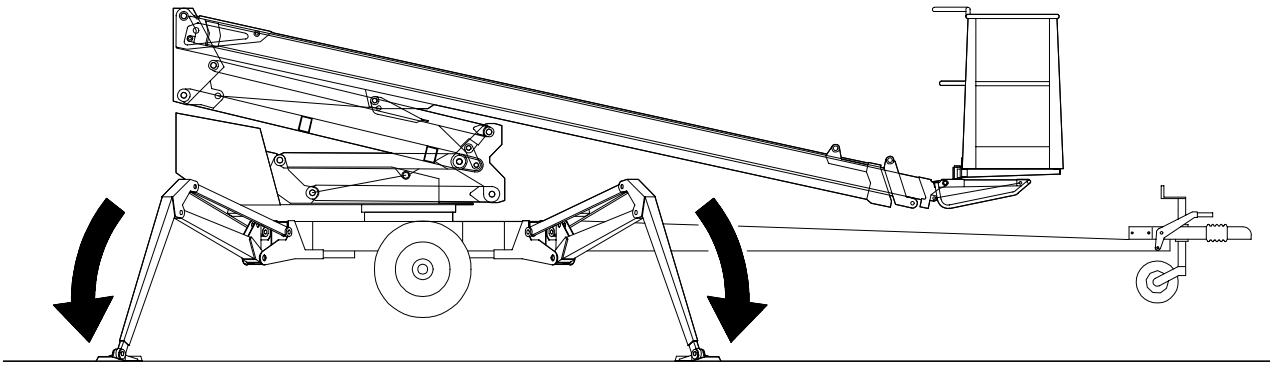
- Lower the outriggers slightly.

- Turn the outriggers back and forth horizontally and check for play in the joints.



- If necessary, renew the joints and pins.
- Lubricate the joints (refer to lubrication plan).

Lower the outriggers into supporting position.



5. Inspect the cylinders, and lubricate the joint bearings (refer to lubrication plan).

- Operating from the lower (chassis) control panel, raise the lift cylinder and inspect the piston rod and joints.
- Operating from the lower panel, move the lift cylinder into its lowest possible position and inspect the joints.
- Continue by retracting the telescope cylinder and immediately extending it again. Check the working condition and tightness of the cylinder.
- Lubricate the lift-, telescope- and stabilizing cylinder joints.
- Operating from the lower panel, extend the lifting arm cylinders out and inspect them.
- Inspect and lubricate the outrigger cylinders.

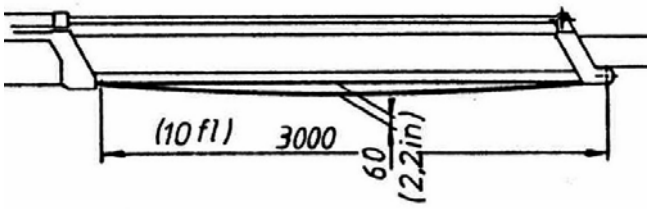
6. Inspecting the boom and the frame.

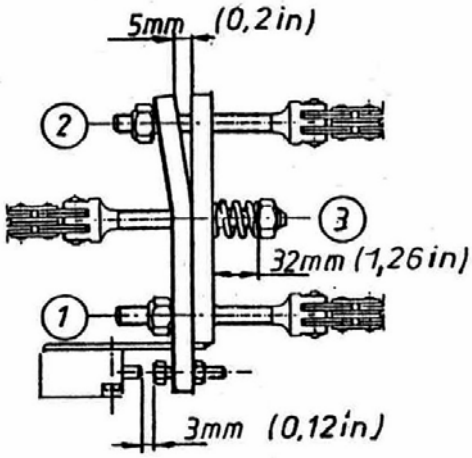
- Inspect the platform, its attachment, the lifting arms and the boom, with the telescope extended.

- Check boom joints and gliding surfaces and adjust if necessary. Lubricate the gliding surfaces.

- Check the condition of the Flyer-chains, fixations and adjustment

- Check the fixation of the unloaded Flyer-chain to the boom by pulling the Flyer-chain by hand when the boom is in its maximum length.





- Inspect the turning device and its fixation and lubricate the bearing and turning gear ring. Remove two half-moon shaped covers below the chassis to lubricate turning bearing nipples (4 pieces)

Warning! Using too high pressure when lubricating might press the turning bearing seal out of its position.

- Measure play in the turning bearing, max. allowed axial play is about 1 mm (0,05").

- Measure the tightening torque of the mounting bolts: 280 Nm (210 lbxft) for M16
150 Nm (110 lbxft) for M12.

If you loosen or tighten screws and bolts, remember to put some locking liquid on them when tightening. "Cross-tighten" the bolts.

- Inspect the chassis, and all welds. The turning system area and the outrigger attachment points should be inspected with special care.

- Inspect the condition of the support outriggers.

- Inspect the tow bar and pay special attention to the bar - chassis attachment.

- Lubricate the boom and outrigger joint bearings.

7. Inspect the towbar/overrun device

- Fastening, bolt and nut condition and tightness

- Play

- Ball coupling condition

- Locking mechanism condition

- Check that the overrun brake mechanism moves freely:
  - stop the lift, as described on page 33
  - push in the ball coupling and towbar
  - the ball coupling/towbar should automatically return to the original extended position, powered by the gas-filled hydraulic shock absorber

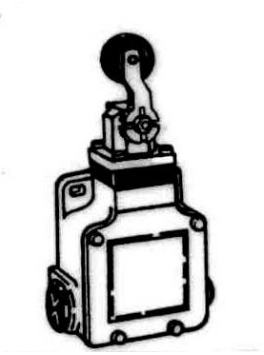
8. Inspect the axle system

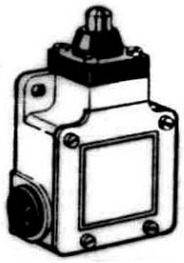
- Attachment

- Condition of rubber suspension and trailing arms

9. Inspect all the safety devices

- Make sure that the limit switches are securely fastened and able to function correctly.





- Tow bar limit switch (transport position)

- Safety switches (2 pcs)

- Outriggers (4 pcs)

- Boom (5 pcs)

10. Inspect safety device functions, operating from chassis control panel.

- Lift the platform slightly off transport position.

- the outriggers must not function in any position of the operating switch

- Lift the arm and check the following
    1. Emergency stop
    2. Emergency descent, telescope retraction
    3. Emergency descent, lowering the boom

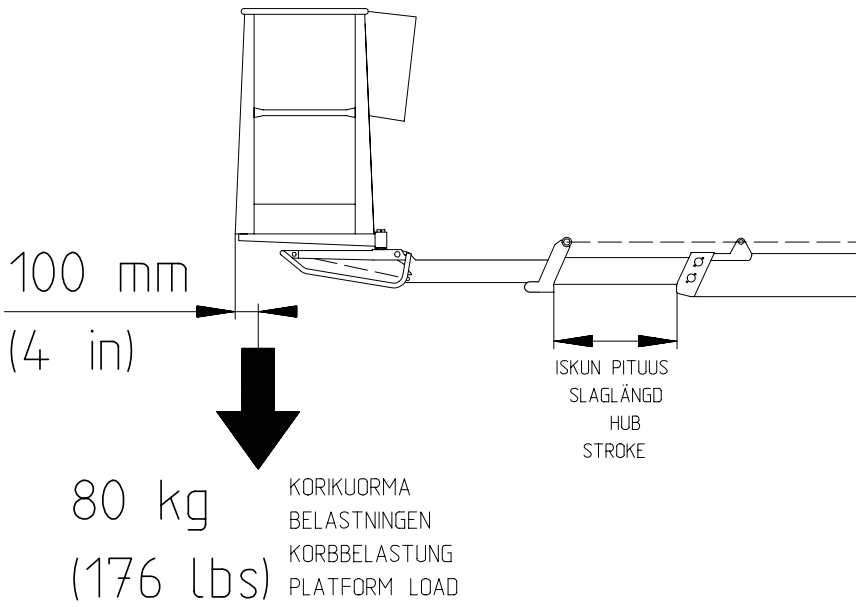
- Lower the boom into transport position, raise the support outriggers and switch on "driving".

- the boom must not function in any position of the operating switch

- Switch off the "driving" -function, lower the support outriggers and level the lift.

- Load about 80 kg (177 lbs) onto the platform

- raise the boom and extend the telescope. The platform stops, when the red signal light lights up (max. reach).

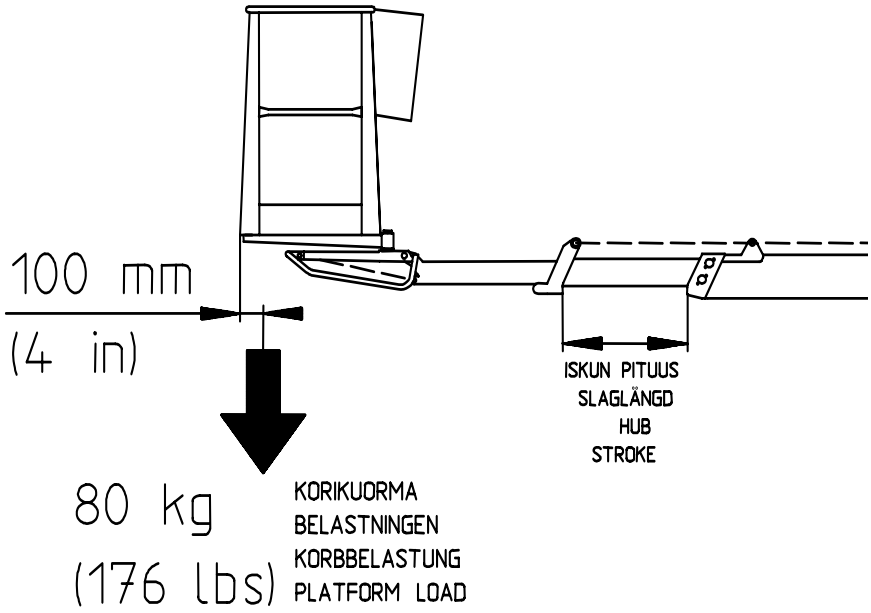


Now:

- The lifting -function should be functional.
- Telescope retraction should be functional.

TESTING THE REACH AREA LIMIT

- Load the platform with exactly 80 kg (177 lbs) 100 mm (4 ") from the trail edge of the platform bottom



- Operating from the lower control panel, move boom to horizontal position.

- Extend the telescope as far as possible.

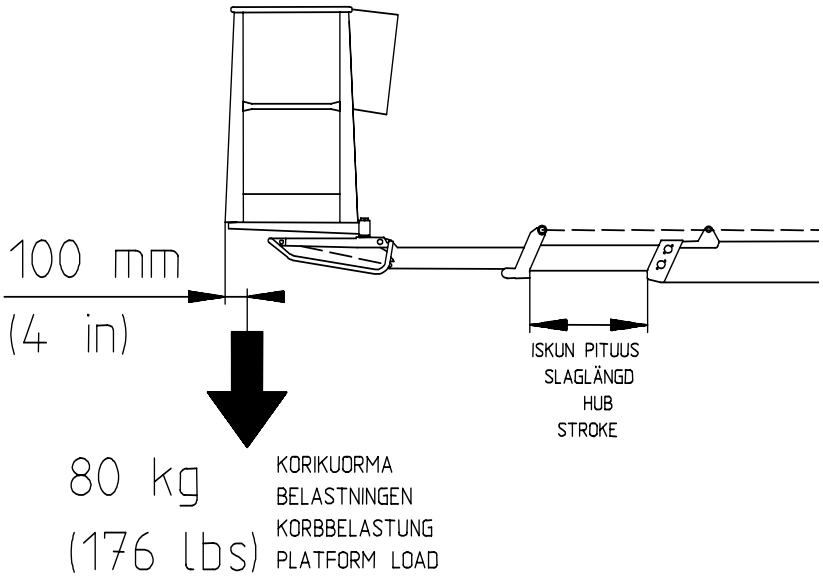
- Measure the length of one part of the telescope arm; the length should be 2050 ± 50 mm

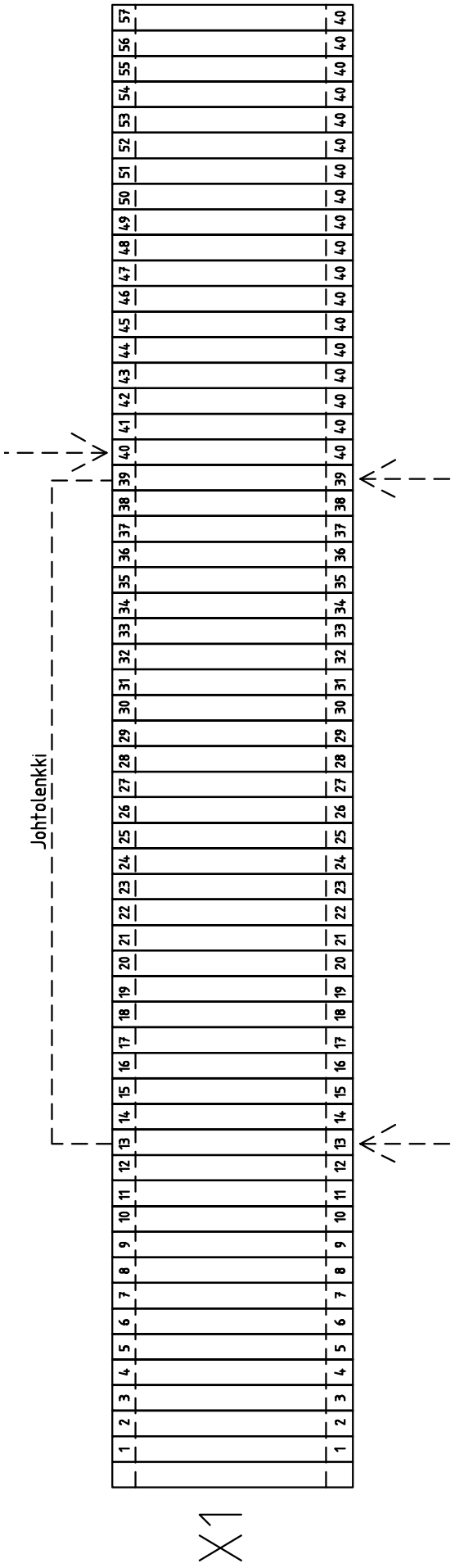
- Make sure that the platform red signal light 18 (page 24) is lit.

TESTING THE OVERLOAD PROTECTION LIMIT

- In case the first switch (RK4) should fail, overload is also monitored by 2:nd limit switch (RK5)

- Disable RK4 by disconnecting lead 40 and using a jumper lead to connect leads 13 and 39 together (lower operating panel) for the duration of the test.



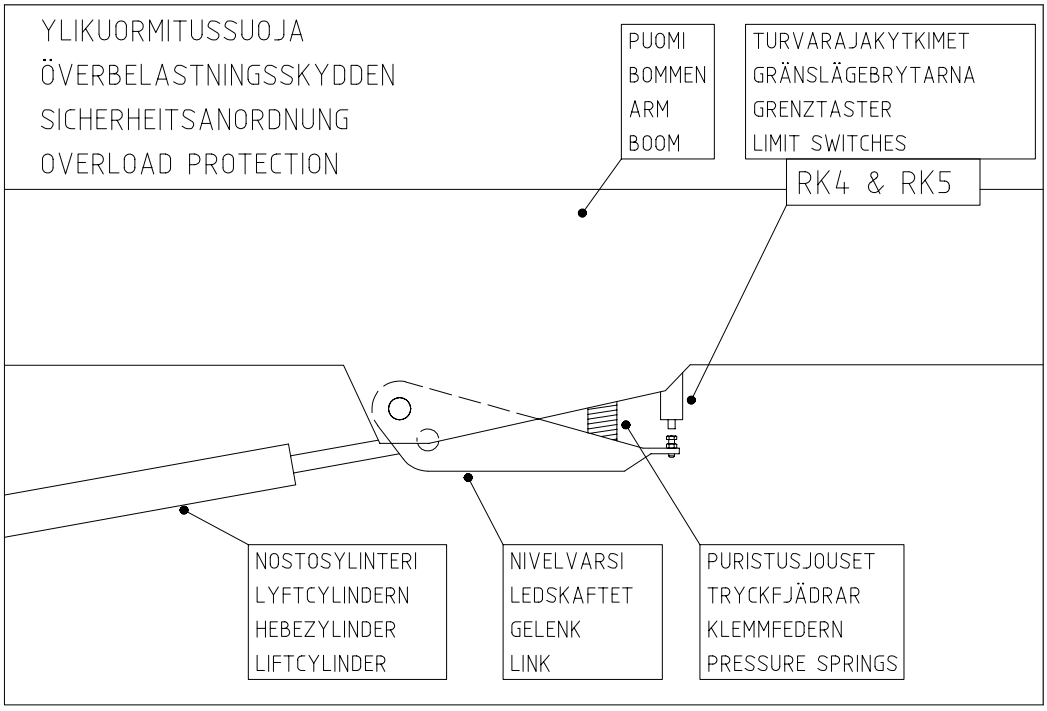


- Retract the boom and extend it again, measuring the extending part of the telescope. The length should be 2350 ± 50 mm

- If the extending part is too long, adjust the limit switches and secure them by applying a seal.

- Warning! Do not forget to make the limit switch RK4 functional by connecting lead 40 back and by removing the jumper lead from terminal block.

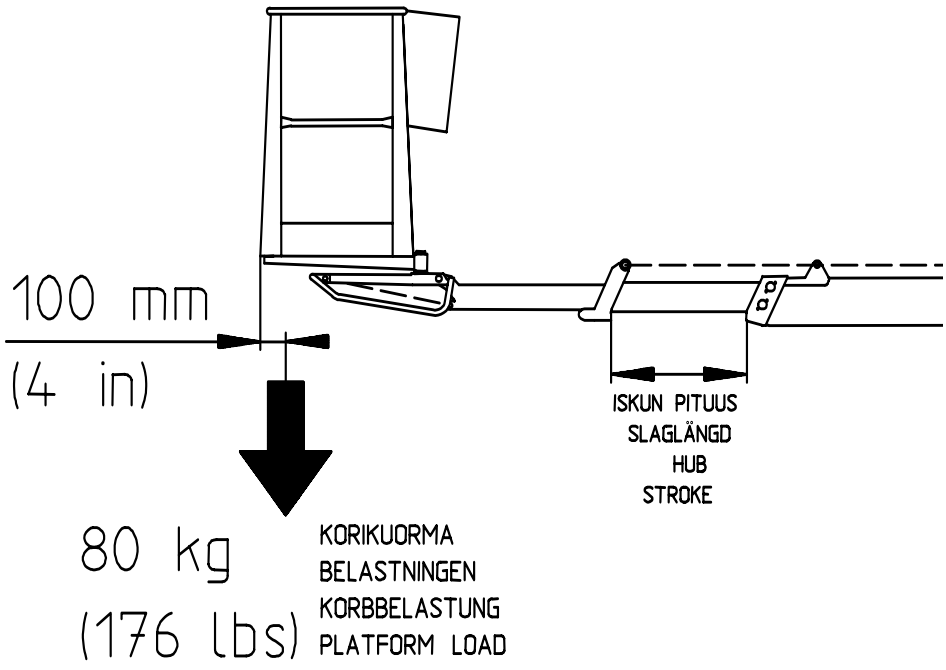
SETTING THE REACH AREA LIMIT AND THE OVERLOAD PROTECTION LIMIT



When servicing, always test both overload limit switches

- Load the platform with for example 80 kg (177 lbs)

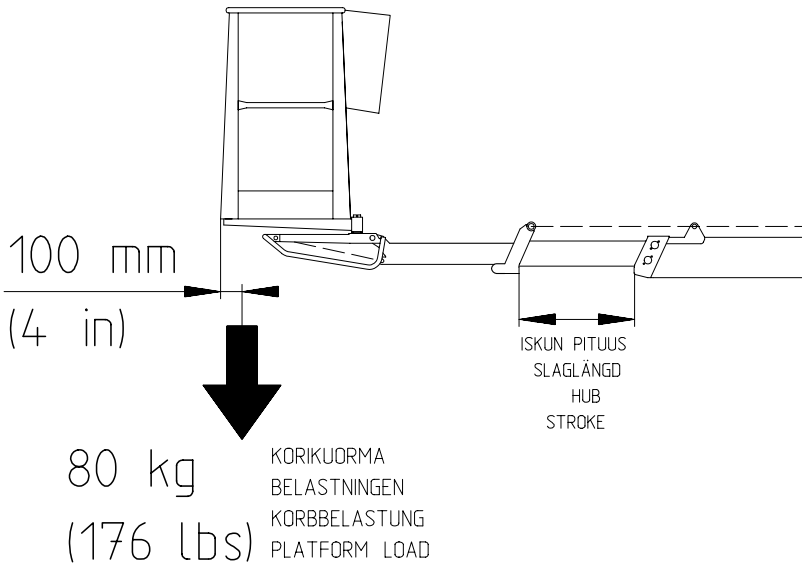
- Move the boom into horizontal position



Setting procedure, alternative 1:

- Set the actuating point of RK4 far enough to ensure that RK5 is actuated before RK4

- Extend the boom, and measure one part of it (stroke)



- The stroke should be 2350 ± 50 mm

- Tighten the adjustment locking nut and test the actual values once more

- RK4 should be set to actuate before RK5

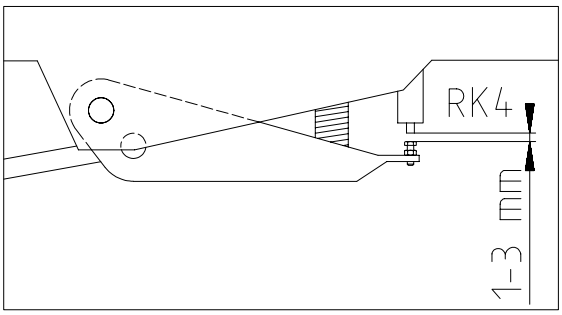
- Extend the boom and measure the stroke

- The length should be 2050 ± 50 mm

- Tighten the adjusting screw and test the actual values once more

- Attach a securing wire onto the adjusting screw in a way that excludes every possibility to unscrew the adjusting screw, and attach a seal to the wire

- the distance between adjusting screw and limit switch RK4 contacting surfaces must be 1 – 3 mm.

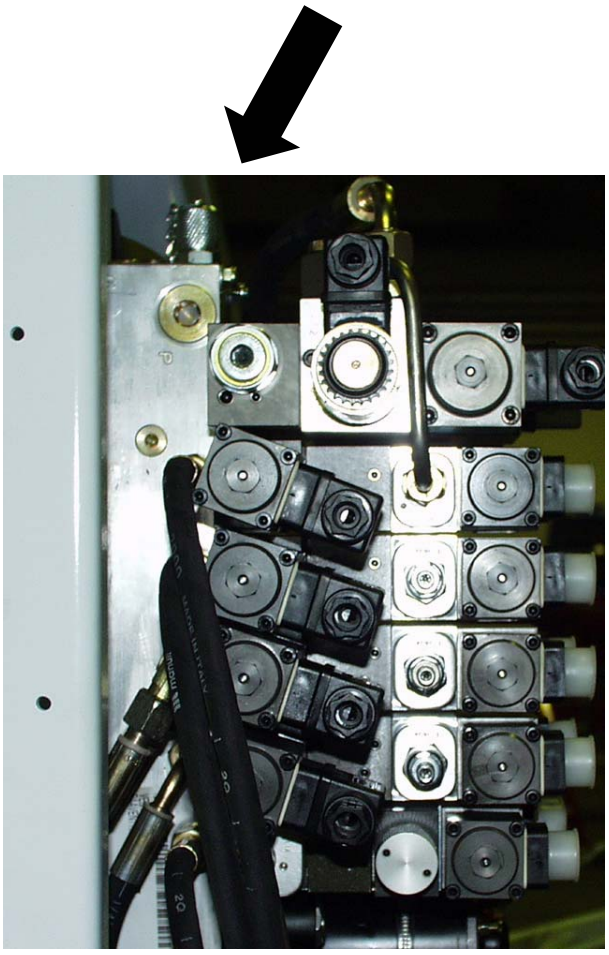


- Fasten the protective panel

Elsewhere in this manual **alternative 2** of securing the RK5 is described, in the case that the securing wire is already attached.

11. Pressure measurements

- Connect the pressure gauge to the measuring point



- Max. pressure, oil at working temperature 40 - 60 °C (105 - 140 ˚F)
20 - 20,5 MPa (200 - 205 bar)

- When turning, max. pressure 6 MPa (60 bar)

- If new settings are demanded, do not forget apply a seal after adjustment

12. Testing the platform operating controls

- Check the general condition of the electrical devices on the platform.
If necessary, spray with moisture repellant

- Check that the cables are well and properly fastened

- Test the alarm horm (23), emergency stop (22) and emergency descent function (20)

- Make a trial run with all movements

- Before raising the boom, test the functioning of the overload protection and the reach area limit switches

13. Warning signs

- Make sure that all warning signs are in good condition and can be easily read. Replace damaged signs.

14. Inspect the brakes and driving device

- Remove the wheels

- Clean the brake system and check the adjustment, the brake shoes should be able to move freely and the return springs should be in order

- Renew the brake linings if necessary

- Adjust the brakes

- Check the driving device and lubricate the joints

- Fasten the wheels and tighten the wheel bolts. Do not forged to check the tightness 325 Nm (240 lbxft) of the bolts after driving of 100 km (60 miles).

- Check the tire pressures: 700 kPa (7,0 bar) rear axle
250 kPa (2,5 bar) jockey wheel

- Check the overrun device and parking brake mechanism

- Check the emergency brake wire

15. Inspect the condition of the running lights and reflectors

16. If necessary, renew/replenish the corrosion protection coating (for ex. with Tectyl 210R)

17. Pay attention to the loading instructions and make load test with 80 kg (177 lbs).
Inspect the structure after you have made the load tests.

18. Make a test report. Save a copy and give the other to the customer/owner.

INSPECTING THE LIFT

Lifting and hoisting equipment used at construction sites should always be inspected before use. The lift should be inspected periodically, at least once a week during the work period. If defects are discovered, they should be noted in a logbook and reported to the foreman.

FIRST INSPECTION

The Dino lifts are subjected to a first inspection and load test at the manufacturer.
The results are noted in a protocol that accompanies the lift.

DAILY INSPECTIONS

At the beginning of every work shift, or after the lift has been moved to another work site, the user maust always make the following inspections:

- Ascertain the carrying capacity of the ground where the lift is to be used (refer to table on page 19)

- Check the standing stability and outriggers

- Check that the unit stands level

- Check the functioning of the emergency stop -button in both platform and chassis operating panels

- Check the functioning of the emergency descent function from both platform and chassis operating panels

- Test alarm horn

- Inspect warning- and signal lights

- Cleanliness and function of lights and reflectors

- The condition of the operating controls and execution of the platform movements

- Check condition of the passages, platform door and side rails

- Check the function of the reach area limit switch (refer to service manual)

- Check the function of the boom movement limit switches (refer to service manual)

- Check the function of the limit switches preventing use of the outriggers (refer to service manual)

- Inspect for oil leaks

- Check the functioning of the brakes

- Make a comprehensive visual check of the structures and equipment

- Always check for power cables close to the working area, and observe the minimum distances for open-wire cables (refer to table on page 9)

INSPECTIONS ONCE A MONTH (MAINTENANCE INSPECTION)

These inspections must be performed by a trained mechanic familiar with the lift.
Inspection list:

- All the above mentioned daily inspections

- Boom and platform attachment

- Platform stabilization unit, condition and function

- Optical inspection of the following supporting structures:
    - Frame
    - Turning device
    - Telescope (extended)
    - Support outriggers and joints
    - All welds, there should be no cracks or corroded spots
    - The quality and condition of repairs and welds that might have been made

- Make sure that the platform retains its position (refer to service manual)

- Check that the outriggers keep their position (refer to service manual)

- Hydraulic fluid level

- Inspect the slipring/hydr. swivel unit (tightness, turning system)

- Tires and tire pressures

- Wheel bolts and rims

- Turning gear play

- Make sure the driving device functions impeccably

- Condition of electrical leads and connections

- Battery condition, connections and fastening

- Condition of overrun device and towbar

- Ascertain that all signs, warnings and operating control identification markings are in good condition and legible.

- Make sure the lift is clean

REGULAR INSPECTION (ANNUAL)

This inspection must be made by a technically trained mechanic who is familiar with the specifications and use of the equipment.
Steel structures, safety devices and operating controls should be inspected with special care.

Clean the unit thoroughly.

Inspection list:

- All the above mentioned monthly inspections

- Inspect the hydraulic system thoroughly

    - Power unit
        - Connect a pressure gauge to the hydraulic system manometer connection
        - Execute one function so that it is driven as far as possible, until oil is squeezed out of the safety relief valve
        - Note the pressure gauge reading.
        The oil should be warmed to working temperature,
        correct reading 20 - 20,5 MPa (200 - 205 bar)

    - Hold valves, support outriggers
        - Raise the lift with the support outriggers. Measure the height above the ground at each outrigger
        - Step onto the platform and extend the telescope keeping the boom horizontal. Make some turning movements and check if the height has changed
        - Raise the outriggers off the ground. Leave them so for 10 minutes and make sure they have not lowered themselves

    - Hold valves, lifting cylinder
        - Operating from the lower control panel, raise the boom to an angle of about 45° and extend the telescope. Watch the boom for about 10 min. and make sure that it does not lower itself

    - Load regulation valves, telescope cylinder
        - Operating from the lower control panel, raise the boom and extend the telescope slightly.
        Leave it in this position for about 5 min.
        - Make sure that the telescope does not retract.

    - Load regulation valves, stabilizing system
        - Load about 80 kg (177 lbs) onto the platform
        - Raise and lower the arm 4 - 5 times
        - Check that the platform position does not change

    - Electrically actuated directional valves
        - Operate all boom and turning functions. Check that all functions work correctly and that the movement stops when the lever is released.

- Manually operated directional valves
  - Check that the support outrigger and driving device valves work correctly and that there are no movements when the spindle is in mid-position

- Slipring-hydraulical swivel
  - Check that there are no oil leaks
  - Check that the turning lever is well attached and does not stick

- Cylinders
  - Move the outriggers into support position and inspect the condition of the piston rod and wiping surfaces.
    Inspect for visible leaks
  - Raise the boom as high as possible and inspect the condition of the piston rod and wiping surfaces
  - Raise the lifting arms as high as possible and inspect the condition of the piston rod and wiping surfaces
  - Make the same checks on the slave cylinder system main cylinder
  - Lower the boom and make the same checks on the slave cylinder situated under the platform

- Hoses
  - Inspect the hoses for leaks or wear

- Tubes
  - Make sure that the tubes are not damaged (outer surface, leaks, corrosion). Inspect the connections and fixing points

- Connections
  - Check that the hose and tube connections are tight

- Thoroughly inspect the electric system
  - The control panels should be clean, dry and the cover tight
  - The cable connections, and their protection jackets should be faultless
  - Check the condition and fixation of the limit switches
  - Check tightness of limit switch lead-throughs
  - Check condition of electrically actuated valve connections
  - Check the solenoid valve connections
  - Visually inspect all electrical cables
  - Check condition of the power plug
  - Check condition of the electric motor

- Inspect the cylinder fixing points
  - Check the condition of the outrigger cylinder pivot bearingsand pins as well as securing pins
  - Check the condition of the boom cylinder pivot bearings and pins as well as the fastening
  - Check the condition of the articulating arm cylinder pivot bearings and pins as well as the fastening
  - Check the condition of the boom cylinder pivot bearings and pins as well as the fastening and the gas spring
  - Check the condition of the main and slave cylinder pivot bearings and pins as well as their fastening

- Inspect the boom pivot joints
    - Check that the boom joint spindle, bearings and spindle fixations are in good condition
    - Check that the articulating arm joint spindle, bearings and spindle fixations are in good condition

- Inspect the support outriggers and support plates
    - Inspect the mechanical structure and welds. The outriggers must not be deformed or damaged. Make sure there are no cracks or fractures in the welds.
    - Also check that the support plates are not deformed, cracked or bent, and that they move freely on their joints.

- Inspect the boom
    - Extend the telescope and inspect it with respect to deformations, surface damages and signs of wear.
    - Inspect all welds. The welds should be undamaged, and there must not be any cracks or fractures.
    - Check the boom attachment points. Make sure that there are no cracks or fractures in the fastening brackets.
    - Check the condition of the platform fastening brackets
    - Check the locking of the platform fulcrum pin
    - Check the condition and fastenings of the flyer-chain as well as the pin lockings and screw connections, verify tightness of attachments and spring tightness
    - Check the condition/tightness of the cable chain, fastening eyes and screw connections
    - Establish the play and correct fastening of the gliding surfaces/parts of the boom

- Inspecting the work platform
    - General condition
    - Make sure that there are no deformations, substantial wear or other damage in the platform structure/floor area
    - Check all railing, step and platform gate attachments
    - Make sure that the gate lock and the gas spring are in good operating condition
    - Inspect the condition of the platform floor
    - Inspect the platform frame on the underside. The frame must not have major deformations or other damage

- Inspecting the protective covers
    - Condition of support outrigger cylinder covers
    - Condition of the slave cylinder cover
    - Condition of the boom end, turning device, lower operating panel, safety devices and upper operating panel

- Visually inspect all screw connections

- Inspect the turning device
    - General condition
    - Angle drive play and fastening
    - Gear ring condition
    - Establish the play in the turning bearing
    - Check the tightness of turning bearing attachment screws M16 280 Nm (210 lbxft)
M12 150 Nm (110 lbxft)
    - Check the condition of the turning motor fixation

- Inspecting the chassis
    - General condition
    - Inspect the tow-bar/frame fastening
    - Check the condition and fastening of the overrun device
    - Inspect the axle and its fixation
    - Inspect brake wires and rods.
    - Inspect the wheel rims, bolts, tires and tire pressures
    - Check the driving device, with respect to the fastening of the separate parts and condition of the covers of the electrical parts
    - Check the condition of the boom transport support

- Make a trial run. The working order of all operating controls should thereby be established. Also make a load test with 80 kg (177 lbs) platform load, as described on page 50.

- During the trial run, also check the functioning of the limit switches (refer to service manual)
    - Safety devices, load sensing limit switches
    - Limit switches on the outriggers preventing boom movements
    - Limit switches in the tow bar boom preventing use of the outriggers

- After having made the trial run, inspect that the load tests and other movements have not caused any cracks or damages to the steel structures

- The regular inspection should be recorded in a protocol, wherein the following data can be found:

1. Inspection form
2. Notes on repairs made by welding
    a) Time of repair
    b) Made by whom
    c) What was repaired

    - When the annual inspection is ready, and the machine may be put to work a marking must be made on the inspection plate

EXTRAORDINARY INSPECTION (INSPECTION AFTER EXCEPTIONAL SITUATION)

If the lift has been damaged, or faults that might influence the technical reliability, operation or working safety have occured, an extraordinary inspection must always be performed.

- The extraordinary inspection should be made in the same way, and consist of the same checks as the annual inspection
- Loading and stability tests must always be included
- The inspection must be recorded in a protocol

TEST LOADING IN CONJUNCTION WITH THE REGULAR SERVICE

1. Place the lift on an even surface with good carrying capacity, and lift it up with the supporting outriggers. Lift it as high as possible with the support outriggers
(the support area is as small as possible)

2. Turn the boom off the towbar and lower it.

3. Load the platform with 215 kg (474 lbs) **Case I**

4. Turn the boom as high as possible and extend the telescope as far as possible
(max. elevation)

5. Lower the boom until the safety device stops the movement.

6. Turn the boom more than a full circle

7. Retract the telescope and lower the boom to horizontal direction.

8. Extend the telescope until the limit switch RK4 stops the movement. Establish the standing stability at this extension length by turning the boom more than 360°

9. Go through the same procedure with a platform load of 80 kg (177 lbs) **Case II**

10. Compare the sideways reach with the data in the reach diagram. If necessary, adjust as described on page 52 " setting the reach area limit and the overload protection limit
"

When the abovementioned test loadings (case I and case II) as well as the subsequent inspection have been made without any defects in the structure or stability of the lift being found, the lift may be used on the condition that the reach and platform load restrictions (see p. 6) are observed.

The max. allowed platform load is 215 kg (474 lbs).

- In the first inspection a test loading is made with an overload of 25 % after which the supporting structures are carefully inspected.
- In conjunction with the annual inspections, a test run with the highest allowed load should be made, after which the supporting structures must be carefully inspected.
- The data from the first inspection are recorded in the inspection protocol. The test runs should be recorded in the annual inspection protocols and in the regular inspection protocol.

FAULT FINDING

CAUSE	REMEDY

1. The electric motor does not start when the operating switch is in position 1, 2 or 3 and the start button is pressed.

- Emergency push button jammed on	- Lift up the emergency push button and press the start button
- Fuse F1 broken	- Renew the fuse (10A)
- No power at the operating controls (230V)	- Check the supply lines and cables as well as fuses and distribution box
- The earth fault protective switch has actuated	- Reset the switch
- The operating control power supply ok, but further power feed broken.	- Replace the operating switch
- The operating control power supply ok, and further power feed ok	- Check condition of start and stop buttons. Check if the STOP button sticks, or the START button contacts are weak. Also check the corresponding buttonsin the platform control panel. Replace the buttons if necessary.
The telescope chain limit switch RK7 has actuated	- Check the working of RK7 and adjust according instruction on page 47.
The telescope chain limit switch RK15 has actuated	- Check the working of RK15 and adjust according instruction on page 47.

2. Electric motor starts when the start button is pressed, but stops as soon as it is released.

- One or both stop buttons are stuck, their contact points are open.	- Open cabinet cover and repair by resetting points with the tip of a screwdriver - Spray with moisture repellant andtry again - Close the cover carefully

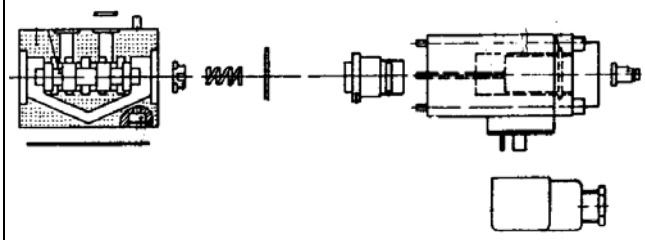
3. The electric motor runs and the operating switch is in position 2 or 3, but no platform movement is possible.

- The green signal light on outriggers is not lit	- Check functioning of the outriggers safety switches (RK11, RK12, RK13 and RK14)

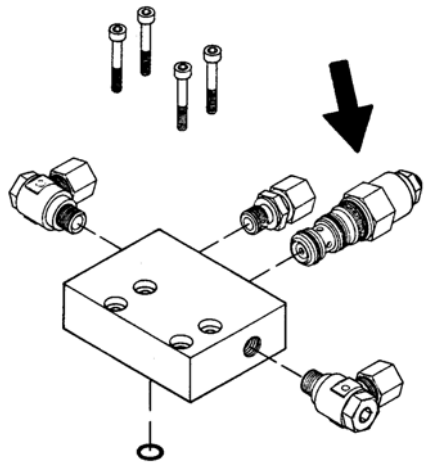
- check if the fault is in the electric or in the hydraulic system.

CAUSE	REMEDY

4. Platform movement problems. Only one movement can be executed.

- Irregular and undefined malfunctions 	- Check that the hydraulic fluid and filter have been replaced on time - thoroughly clean the solenoid valve spindles and housings. Observe utmost cleanliness, malfunctions can be caused by invisible polluting particles - The malfunction can also be caused by contact irregularities in the control joysticks - Spray the contact points with moisture repellant
- Raise, descend and telescope extending do not work, red signal light is lit (on the platform's and on the chassis' controlpanel) and audible signal switched on	- The boom has been overloaded. Retract the telescope and try again (automatic resetting)

5. The boom lowers itself slowly

- The load regulating valve leaks 	- Remove the valve and clean it - Check condition of O-rings - Install the valve carefully, tightening torque 60 Nm (45 lbxft) - Replace the valve if necessary

6. The aggregate does not start

- battery empty	- charge the battery
- the mains cable connected	- disconnect the mains cable

7. The aggregate starts, but goes off

- the fuel tank is empty	- fill the fuel tank
- the choke is off	- switch the choke on (cold motor)
- the motor runs idle	- increase the running speed

CAUSE	REMEDY

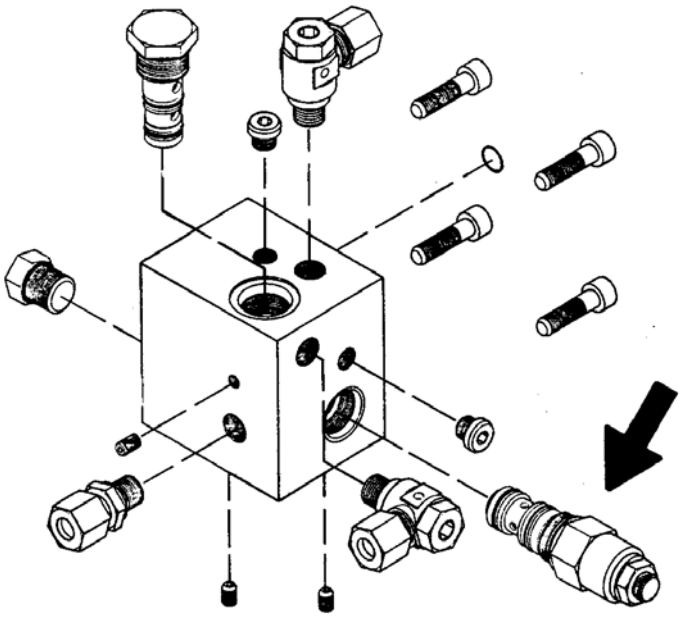
8. The boom cannot be raised

	- refer to item 4 - the solenioid valve is open - other causes, ref. solenoid valve sticking
- Turning function activated when using raise control	- turning solenoid valve stuck in position "turning" - clean spindle and housing thoroughly

9. Telescope does not work

	- Refer to item 4 - Check that telescope solenoid valve is not in central or sink position

10. Telescope retracts slowly



- load regulating valve leaks	- as in item 5

11. Platform moves rearwards

- platform floor load regulating (two-way) valve leaks	- as in item 5
- load regulating valve below platform leaks	- as in item 5

CAUSE	REMEDY

12. Platform moves forwards

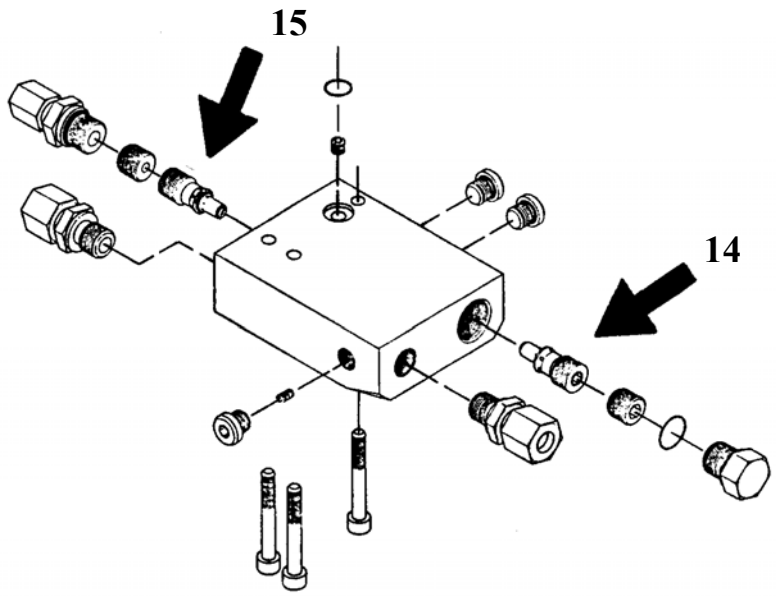
- boom load regulating (2-way) valve leaks	- as above

13. The support outriggers do not work, although the switch is in position 1

- boom does not rest on the support	- move boom onto support
- Boom/support outrigger solenoid valve malfunction (sticks in mid-position)	- ref. to 4 above

14. Support outrigger does not hold supporting position (fig.)

- Lower hold valve leaks	- as in item 5 (hold valve), tightening torque 55 Nm (40 lbxft)



15. Support outrigger does not hold transport position (fig.)

- The arm hold valve leaks	- as above

16. The driving device does not work, though the switch is in position 1

- boom does not rest on the support	- move boom onto support
- Boom/support outrigger solenoid valve malfunction (sticks in mid-position)	- ref. to 4

CAUSE	REMEDY

17. Braking power too weak

- braking system adjustment too loose, (also check linkage)	- adjust the braking system (ref.to page 37)
- brake linings not run-in	- apply the handbrake very lightly and drive slowly about 1-2 miles
- brake linings "glazed", dirty or polluted by oil	- replace the brake shoes (complete set) - clean the friction surfaces on the brake drum
- overrun device drawbar does not move freely, sticks	- lubricate
- brake rod bent or sticking	- repair
- brake bowden cables rusted or jammed	- replace bowden cables

18. Braking uneven and jerky

- braking system too loosely adjusted	- readjust the complete braking system (refer to page 37)
-overrun device shock absorber defective	- replace shock absorber
- The automatic reversing relieving brake shoe sticks in its support	- replace the brake shoe

19. One-sided braking (only one wheel brake actuates)

- Brakes wrongly adjusted	- readjust the brake units as described in the installation manual - Cause might also be found under part 17

20. Lift brakes already when rolling (reducing speed)

- overrun device shock absorber defective	- replace shock absorber

21. Reversing heavy or impossible

- Too tightly adjusted brake system	- braking system should be adjusted according to instruction on page 37

22. Brake units overheat

- braking system wrongly adjusted (too tight)	- braking system should be adjusted according to instruction on page 37
- dirt in brake unit	- clean brake unit
- Overrun device transmission lever sticking	- remove lever, clean and lubricate it
- hand brake lever not completely released	- push lever in running position

CAUSE	REMEDY

23. Ball coupling does not lock itself onto the ball

- ball bearing cup dirty	- clean and lubricate
- ball on towing vehicle too big	- measure the ball. According to DIN74058 the ball diameter should be between 50 mm and 49,5 mm. If dimension differs or the ball is not perfectly round it should be renewed

When replacing brake shoes, always replace all shoes on one axle.
When assembling the brakes make sure that all springs, brake shoes and the shoe expander mechanism are mounted correctly.
When adjusting the brakes, always turn the wheels in the FORWARD driving direction!

The reasons for malfunctions can be various.
Generally, though, the malfunctions are caused by one of the following things:

- Too low operating voltage (power cable too long or leads with too small diameter).

- The battery is empty (low voltage)

- Dirt in the hydraulic system

- Loose electrical connections and/or bad contact caused by moisture.

Keep your lift clean and protect it against moisture!

ELECTRIC COMPONENTS' FUNCTION

CHASSIS CONTROL PANEL (PK), RELAYS

K1: START CONTACTOR OF ENGINE (M1).

K2: EMERGENCY STOP –AUXILIARY RELAY.
SWITCHES OFF THE POWER SUPPLY (230VAC).

K3: BOOM DOWN – AUXILIARY SWITCH OFF RELAY
THE RELAY CONTROLS THE LIMIT SWITCH RK4 (DELAY 0,6 SECONDS).

K4: EXTENSION OF TELESCOPE - AUXILIARY SWITCH OFF RELAY
THE RELAY IS CONTROLLED BY THE CLOSING POINT OF THE LIMIT SWITCH RK4 (DELAY N. 1,2 SECONDS).

AFTER THE RK4 HAS TRIPPED (THE RED SIGNAL LIGHT H2 IS LIT), THE LOWERING OF THE BOOM IS PREVENTED WITH THE RETARDATION CAPACITORS C_{10} AND C_{11} OF K2 BY JUMPING ABOUT ON THE PLATFORM. DELAY ABOUT. 2,5 S.

K5 AND K6: AUXILIARY RELAYS FOR TURNING. THE SUPPLY FUSES F7 10A (PK) AND THE CONTROL FUSES OF RELAYS F5 1,6A (OK) (RIGHT JOYSTICK)

K7: BOOM DOWN – AUXILIARY RELAY
THE CONTROL FUSE OF THE RELAYS F7 10A (PK) (RIGHT JOYSTICK)

K8: BOOM UP – AUXILIARY RELAY
THE CONTROL FUSE OF THE RELAYS F7 10A (RIGHT JOYSTICK).

K9: RETRACTION OF TELESCOPE - AUXILIARY RELAY
THE CONTROL FUSE OF THE RELAYS F7 10A (LEFT JOYSTICK)

K10: EXTENSION OF TELESCOPE - AUXILIARY RELAY
THE CONTROL FUSE OF THE RELAYS F7 10A (LEFT JOYSTICK)

K12: CONTROL RELAY OF RETARDATION RESISTOR FOR LOWERING OF ARMS

K18: SWITCHES OFF THE CONTROL VOLTAGE FROM THE CONTROL CONTACTOR (K1) OF MOTOR (M1), IF THE MAINS VOLTAGE (230VAC) IS DISCONNECTED. ALSO PREVENTS THE PARALLEL OPERATION OF THE HYDRAULIC POWER UNIT (K18 SPOOL 230VAC). ALSO PREVENTS THE ACCELERATION SOLENOID OF THE HYDRAULIC POWER UNIT FROM ”PULLING”, IF THE MAINS VOLTAGE IS ON.

K19: FUNCTIONAL RELAY FOR REACH LIMIT RK4. SWITCHES OFF THE EXTENSION MOVEMENT OF THE TELESCOPE AFTER THE RK4 HAS TRIPPED. DELAY 1,2 SEC.

K24: AUXILIARY RELAY FOR SWITCHING OFF THE HYDRAULIC POWER UNIT.

K26: AUXILIARY RELAY FOR LOWERING OF ARMS.

K27: AUXILIARY RELAY FOR RAISING OF ARMS.

K30: AUXILIARY RELAY FOR POWER SUPPLY TO THE DRIVING SYSTEM
FUSE F2 10A. THE RELAY IS CONTROLLED BY LIMIT SWITCH RK3.

K42: CONTROL RELAY FOR STABILIZATION OF VOLTAGE. THE RELAY IS CONTROLLED BY SWITCH Q_1

K44: CONTROL RELAY FOR EXCITING THE ALTERNATOR OF THE INTERNAL COMBUSTION ENGINE.

K45: CONTROL RELAY FOR ACCELERATOR SOLENOID OF THE INTERNAL COMBUSTION ENGINE.

K46: CONTROL RELAY FOR PROPO CARD´S CONTROL VOLTAGE. SWITCHES ON THE VOLTAGE TO THE PROPO CARD DURING EXECUTION OF MOVEMENT.

K48 AND K49: AUXILIARY RELAYS FOR STABILIZATION OF THE PLATFORM

K50: AUXILIARY RELAY FOR CONTROL OF LS-VALVE AND ”DEAD MAN SWITCH”

K51: CONTROL RELAY FOR SELECTOR VALVE OF BOOM. IS SWITCHED ON WHEN THE CONTROL LEVER IS ACTUATED.

K52: BYPASS RELAY FOR RETARDATION RESISTOR OF BOOM LOWERING.
PASSES BY THE RESISTOR WHEN THE BOOM IS RAISED.

K53: SWITCH RELAY FOR RETARDATION RESISTORS, WHICH ARE SWITCHED ON THE EXTENSION OF THE TELESCOPE. RELAY IS CONTROLLED BY LIMIT SWITCH RK16

K54: SWITCH RELAY FOR RETARDATION RESISTORS, WHICH ARE SWITCHED ON BY THE EXTENSION OF THE TELESCOPE. RELAY IS CONTROLLED BY LIMIT SWITCH RK17.

K56 AND K57: CONTROL RELAY FOR POWER SUPPLY.
PREVENTS THE USE OF POWER UNIT DURING THE OPERATION OF THE EMERGENCY DESCENT SYSTEM.

SR2: SAFETY RELAY FOR CONTROL OF SUPPORT OUTRIGGER OPERATION
THE SAFETY RELAY WILL BE RESET AS SOON AS ALL LIMIT SWITCHES ON THE SUPPORT OUTRIGGERS (RK11, RK12, RK13 AND RK14) HAVE CLOSED. THE BOOM OPERATION WILL BE POSSIBLE AFTER THIS.

SR3: SAFETY RELAY FOR OVERLOAD CONTROL OF THE BOOM
THE LIMIT SWITCH RK5 CONTROLS THE OPERATION OF THE SAFETY RELAY.
IN CASE OF OVERLOAD: SR3 SWITCHES OFF. THE SAFETY RELAY WILL RESET AUTOMATICALLY AFTER RETURN TO THE NORMAL OPERATING RANGE. THE DELAY OF THE SR3´S TRIPPING MOMENT CAN BE ADJUSTED WITH THE CAPACITORS.

IF THE RK5 FAILS: SR3 SWITCHES OFF. THE SAFETY RELAY DOES NOT RESET AUTOMATICALLY, AND THE OPERATION OF THE ELECTRIC COMPONENTS HAS TO BE CHECKED. THE DELAY OF THE SR3 ´S TRIPPING MOMENT CAN BE ADJUSTED WITH THE CAPACITORS.

CHASSIS CONTROL PANEL (PK), SWITCHES

S1: SELF LOCKING EMERGENCY STOP -SWITCH.
SWITCHES OFF ALL OPERATIONS EXCEPT THE EMERGENCY DESCENT AND SIGNAL HORN.

S2: START SWITCH
NON-LOCKING PUSHBUTTON

S3: STOP SWITCH
NON-LOCKING PUSHBUTTON

S13: START SWITCH OF EMERGENCY DESCENT
NON-LOCKING PUSHBUTTON.

S16: TURNING OF BOOM, RIGHT - LEFT
NON-LOCKING LEVER SWITCH (CHASSIS CONTROL PANEL)

S17: BOOM, UP - DOWN
NON-LOCKING (CHASSIS CONTROL PANEL)

S18: TELESCOPE, EXTENSION-RETRACTION
NON-LOCKING SWITCH (CHASSIS CONTROL PANEL)

S20: LEVELLING OF PLATFORM
NON-LOCKING SWITCH.

S22: ARMS UP –
NON-LOCKING SWITCH

S32: RETRACTION OF TELESCOPE
AFTER THE SR3 HAS TRIPPED, IT IS POSSIBLE TO RETRACT THE TELESCOPE BY PUSHING THE BUTTON,

PLATFORM CONTROL PANEL (OK), RELAYS

K13: CONTROL RELAY FOR GREEN (H1) AND RED (H2) LED SIGNAL LIGHTS.
RELAY IS CONTROLLED BY LIMIT SWITCH RK4.

K14 AND K15: CONTROL RELAY FOR PLATFORM SWING (RIGHT- LEFT)
THE RELAYS ARE CONTROLLED BY INDUCTIVE LIMIT SWITCHES RK9 AND RK10 OF THE LINEAR ACTUATOR

PLATFORM CONTROL PANEL (OK), RELAYS

JSO: JOYSTICK, RIGHT
(MOVEMENTS: BOOM UP-DOWN AND TURN RIGHT-LEFT

JSV: JOYSTICK LEFT
(MOVEMENTS: TELESCOPE IN-OUT AND ARM UP - DOWN)

S4: LOCKING EMERGENCY STOP SWITCH
STOPS ALL OPERATIONS EXCEPT THE EMERGENCY DESCENT AND SIGNAL HORN.

S5: STOP SWITCH
NON-LOCKING PUSHBUTTON

S6: START SWITCH
NON-LOCKING PUSHBUTTON

S10: SIGNAL HORN
NON-LOCKING PUSHBUTTON

S11: EMERGENCY STOP SWITCH
NON-LOCKING PUSHBUTTON

S12: CONTROL SWITCH FOR SWINGING OF PLATFORM

S29: SWITCH FOR STABILIZATION OF PLATFORM, NON-LOCKING PUSHBUTTON.

S30: NON-LOCKING LEVER SWITCH FOR STABILIZATION OF PLATFORM
IS ACTIVE WHEN THE BUTTON S29 IS PRESSED AND THE LEVER SWITCH S30 IS ACTUATED.

S31: RETRACTION OF TELESCOPE
AFTER THE SR3 HAS TRIPPED, THE TELESCOPE CAN BE RETRACTED BY PUSHING THIS BUTTON.

LIMIT SWITCHES

RK3: PREVENTS THE OPERATION OF THE OUTRIGGERS AND DRIVING DEVICE, IF THE BOOM DOES NOT REST ON THE SUPPORT (TRANSPORT POSITION). (CONTROLS THE RELAY K30).

RK4: LIMIT SWITCH FOR PERMISSIBLE OPERATING RANGE

RK5: LIMIT SWITCH FOR BACKING UP THE OPERATION OF RK4.
TRIPS THE SAFETY RELAY SR3, WHICH CONTROLS THE SIGNAL HORN ÄM2, AFTER PRESET DELAY (2.4 SECONDS)

RK7 AND RK15: SAFETY SWITCH FOR FLYER CHAIN OF THE TELESCOPE
THE OPERATION OF THIS LIMIT SWITCH TURNS OFF THE AGGREGATE OR THE HYDRAULIC POWER UNIT (THE HOLDING VOLTAGE OF THE CONTACTOR K1 IS SWITCHED OFF). AFTER THIS ONLY THE EMERGENCY DESCENT WILL REMAIN OPERATIONAL.

RK8: AFTER EITHER RK4 OR RK5 HAS TRIPPED, THE BOOM CANNOT BE LOWERED BEFORE COMPLETE RETRACTION OF THE TELESCOPE (I.E. THE POINTS OF RK8 HAVE CLOSED).

RK9: INDUCTIVE LIMIT SWITCH.
LIMITS THE TURNING OF THE PLATFORM TO THE LEFT.

RK10: INDUCTIVE LIMIT SWITCH.
LIMITS THE TURNING OF THE PLATFORM TO THE RIGHT.

RK11-RK14 : LIMIT SWITCHES ON THE SUPPORT OUTRIGGERS
PREVENT THE OPERATION OF THE BOOM, IF THE OUTRIGGERS ARE NOT FIRMLY SUPPORTED ON THE GROUND (CLOSING OF THE LIMIT SWITCH REQUIRES THAT A THRUST OF 300N IS EXERTED ON THE SUPPORT OUTRIGGER)

RK16: INDUCTIVE SENSOR
CONTROLS THE CONTROL RELAY OF THE RETARDATION RESISTORS OF THE BOOM SPEED WHEN THE BOOM LENGTH IS ~16M

RK17: INDUCTIVE SENSOR
SWITCHES ON THE CONTROL RELAY OF THE RETARDATION RESISTORS OF THE BOOM SPEED WHEN THE BOOM LENGTH IS ~20M

DRIVING DEVICE CONTROL CABINET

S24: NON-LOCKING LEVER SWITCH.
DRIVING, FORWARDS AND BACKWARDS.

S25: NON-LOCKING LEVER SWITCH.
DRIVING, TURN LEFT.

S26: NON-LOCKING LEVER SWITCH.
DRIVING, TURN RIGHT.

DRIVING DEVICE REMOTE-CONTROL CABINET

S24B: NON-LOCKING LEVER SWITCH.
DRIVING, FORWARDS AND BACKWARDS.

S25B: NON-LOCKING LEVER SWITCH.
DRIVING, TURN LEFT.

S26B: NON-LOCKING LEVER SWITCH.
DRIVING, TURN RIGHT.

SUPPORT OUTRIGGER CONTROL CABINET

S27: NON-LOCKING LEVER SWITCH.
ROLLERS ON-OFF (PRESSING).

S33: NON-LOCKING LEVER SWITCH.
CONTROL SWITCH, OUTRIGGER 1.

S34: NON-LOCKING LEVER SWITCH.
CONTROL SWITCH, OUTRIGGER 2.

S35: NON-LOCKING LEVER SWITCH.
CONTROL SWITCH, OUTRIGGER 3.

S36: NON-LOCKING LEVER SWITCH.
CONTROL SWITCH, OUTRIGGER 4.

OTHER POSITIONS

F1: FUSE, POWER SUPPLY TO START-UP DEVICE (10A)
F2: CONTROL FUSE FOR DRIVING DEVICE AND SUPPORT OUTRIGGERS (10A)
F3: CONTROL FUSE FOR EMERGENCY DESCENT (10A)
F4: CONTROL FUSE FOR PROPO CARDS (5A)
F5: CONTROL FUSE FOR RIGHT JOYSTICK (1,6A)
F6: FUSE FOR PLATFORM SWING (8A)
F7: CONTROL FUSE FOR SOLENOID VALVE (10A)
F8: CONTROL FUSE FOR LEFT JOYSTICK (1,6A)
F9: POWER SUPPLY FUSE FOR CONTROL VALVES (10A)
F10: AUTOMATIC PROTECTION SWITCH FOR SOCKET OUTLET ON THE PLATFORM (10A C-CURVE)

Q1: SELECTOR SWITCH. I = SUPPORT OUTRIGGERS, II = CONTROLS ON PLATFORM AND III = CONTROLS ON CHASSIS.

ÄM1: SIGNAL HORN

ÄM2: PIEZO –ELECTRIC BUZZER
INDICATES THE OPERATION OF THE RK5 LIMIT SWITCH AND THE OPERATION OF THE S1 AND S4 EMERGENCY STOP DEVICES.

HM1: HOUR METER
RECORDS THE TRUE OPERATING HOURS OF THE MACHINE.

H1: GREEN LED-LIGHT
THE PLATFORM WITHIN THE OPERATING RANGE

H2: RED LED-LIGHT
THE PLATFORM ON THE LIMIT OF THE OPERATING RANGE

H4: RED LED-LIGHT
INDICATES THE TRIPPING OF THE SAFETY RELAY SR3.

H5: YELLOW LED -LIGHT
INDICATES THE TRIPPING OF THE LIMIT SWITCHES RK11-14 OF THE SUPPORT OUTRIGGERS

B1: BATTERY 12VDC 44AH

SR1: SOLENOID OF EMERGENCY DESCENT UNIT

M2: EMERGENCY DESCENT MOTOR 12VDC
MAX. ALLOWED OPERATING TIME 10 MIN.

E1: THERMO RELAY (M1) OF ENGINE

S37: PUSHBUTTON, WHICH ENABLES THE STARTING OF POWER UNIT WITH STRING., IS USED, WHEN THE BATTERY IS EMPTY.

ADJUSTMENT OF MOVEMENT SPEEDS

POWER SUPPLY U_{OUT}=14,5 V

ADJUSTMENT VALUES FOR PROPO-VALVES

TELESCOPE	I_{MIN}=180mA	FROM CARD	
	I_{MAX}= 1250mA	FROM CARD	
BOOM	$I_{MIN=}$300mA	FROM CARD	
	I_{MAX}=1250mA	FROM CARD	
	$I_{DESCENT}$=900mA	TR3	
	$I_{DESCENT}$=660mA	TR4	RK16
	$I_{DESCENT}$=560mA	TR5	RK17
ARM SYSTEM	I_{MIN}=300Ma	FROM CARD	
	I_{MAX}=1250mA	FROM CARD	
	$I_{DESCENT}$=1000mA	TR6	
	$I_{DESCENT}$=850mA	TR7	RK16
	$I_{DESCENT}$=850mA	TR8 (0Ω)	RK17
TURNING	I_{MIN}=300mA	FROM CARD	
	I_{MAX}=1150mA	FROM CARD	
	I_{IND}=950mA	TR1	
	I_{IND}=850Ma	TR2	
LOWER CONTROL PANEL		TR9	

ADJUSTING PROPO-VALVES

ADJUSTING VALUES BY CONNECTING AN AMMETER BETWEEN CONNECTOR 2 OF THE PROPO-CARD AND WIRE CONNECTED TO IT.

1. FIRST ADJUST THE UNDERCURRENT FROM THE PROPO-CARD, BY PRESSING THE DEADMAN- SWITCH ON THE CONTROL LEVER AND SIMULTANEOUSLY TURNING THE MINIMAL CURRENT ADJUSTMENT SCREW AND SETTING 300 mA AS MINIMAL CURRENT VALUE.

2. THEN ADJUST THE MAXIMAL CURRENT BY TURNING THE CONTROL LEVER AS FAR AS POSSIBLE IN THE DIRECTION OF THE ADJUSTED MOVEMENT WHILE KEEPING THE DEAD-MAN'S SWITCH PRESSED AND SIMULTANEOUSLY TURN THE MAXIMAL CURRENT ADJUSTMENT SCREW AND SET THE CURRENT AT FOR EXAMPLE 1250 mA.

3. PERFORM POINTS 1 AND 2 IN THE ABOVE MENTIONED ORDER FOR EACH PROPO-CARD.

MOVEMENT SPEEDS FOR LOWERING THE BOOM ARE ADJUSTED AS FOLLOWS:

$I_{DESCENT}$:

TURN THE CONTROL LEVER AS FAR AS POSSIBLE IN DIRECTION DESCENT, AND ADJUST THE CURRENT TO 900 mA WITH TR3.

BOOM LOWERING SPEED CAN NOT BE SEPARATELY ADJUSTED IN THE RANGE WHERE INDUCTIVE SWITCHES ARE ACTIVATED.

MOVEMENT SPEEDS FOR LIFTING THE BOOM ARE ADJUSTED AS FOLLOWS:

1. DRIVE THE TELESCOPE FAR ENOUGH OUT (EXTENDING THE TELECOPE) TO MAKE THE SIGNAL LIGHT FOR INDUCTIVE LIMIT SWITCH RK16 GO OUT. TURN THE CONTROL LEVER AS FAR AS POSSIBLE IN DIRECTION DESCENT, AND ADJUST THE CURRENT TO 800 mA WITH TR4.

2. THE CABLE TO CONNECTION A1 ON RELAY K54 IS DISCONNECTED AND THE TELESCOPE KEPT FAR ENOUGH EXTENDED TO KEEP THE RK16 SIGNAL LIGHT EXTINGUISHED. TURN THE CONTROL LEVER AS FAR AS POSSIBLE IN DIRECTION DESCENT, WITH THE DEADMAN –SWITCH PRESSED, AND ADJUST THE CURRENT TO 650 mA WITH TR5.

3. RECONNECT THE CABLE TO THE K54:A1 CONNECTOR.

THE MOVEMENT SPEEDS FOR THE ARTICULATED ARM SYSTEM ARE ADJUSTED IN THE SAME WAY AS THE BOOM DESCENT SPEEDS.

$I_{DESCENT}$:

1. TURN THE CONTROL LEVER AS FAR AS POSSIBLE IN DIRECTION DESCENT, AND ADJUST THE CURRENT TO 1000 mA WITH TR6.

2. EXTEND THE TELSCOPE FAR ENOUGH TO PUT OUT THE SIGNAL LIGHT RK16. TURN THE CONTROL LEVER AS FAR AS POSSIBLE IN DIRECTION DESCENT AND ADJUST THE CURRENT 850 mA WITH TR7.

3. TR8- IS SET OFF (0Ω)

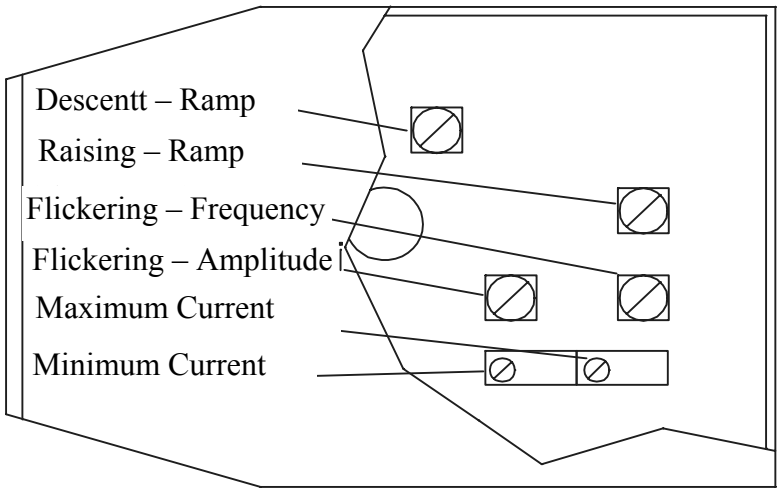
BOOM SWING SPEED ADJUSTMENT:

1. DRIVE TELESCOPE OUT UNTIL THE SIGNAL LIGHT OF RK16 WILL SWITCH OFF. DEFLECT THE CONTROL LEVER AS FAR AS IT GOES TO THE SWING POSITION, THEN ADJUST THE CURRENT TO 780Ma BY TURNING POTENTIOMETER TR1.

2. DISCONNECT THE WIRE FROM CONNECTOR A1 ON RELAY K54 AND WITH THE TELSESCOPE SO MUCH OUT THAT THE RK16 SIGNAL LIGHT STAYS OFF, DEFLECT THE CONTROL LEVER AS FAR AS IT GOES TO SWING POSITION WHILE KEEPING THE DEAD MAN'S SWITCH PRESSED ADJUST THE CURRENT TO 850Ma BY TURNING POTENTIOMETER TR2.

THE GENERAL SPEED FOR THE LOWER CONTROL PANEL CAN BE SET WITH TR9. THE VALUE CAN BE SET AS DESIRED.

THE Imin VALUE, ADJUSTABLE FROM THE PROPO-CARD, MAY VARIATE FROM MACHINE TO MACHINE AND EVEN BE LOWER THAN THE GIVEN REFERENCE VALUE



Picture. Settings on Propo-card

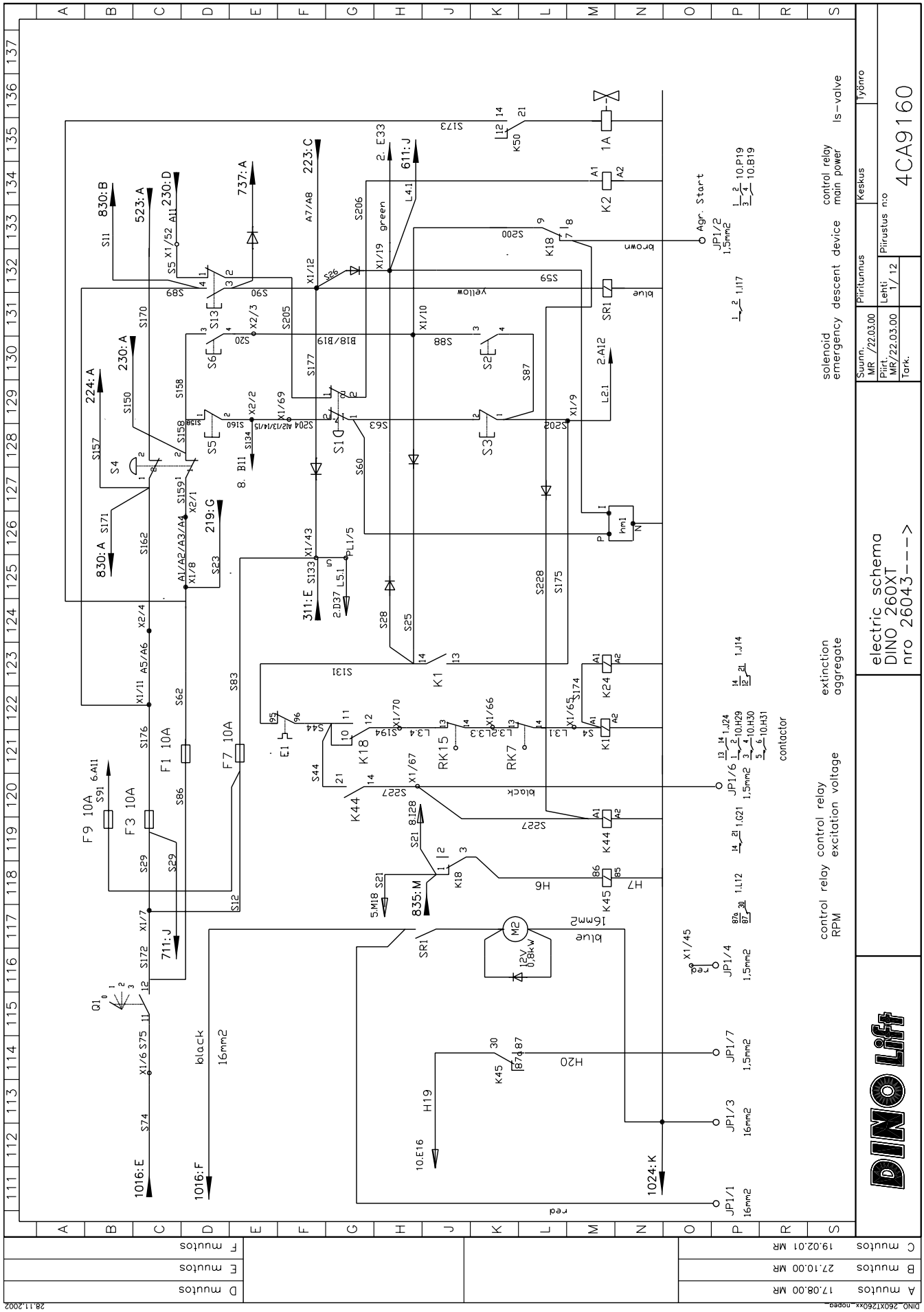
ELECTRIC COMPONENTS

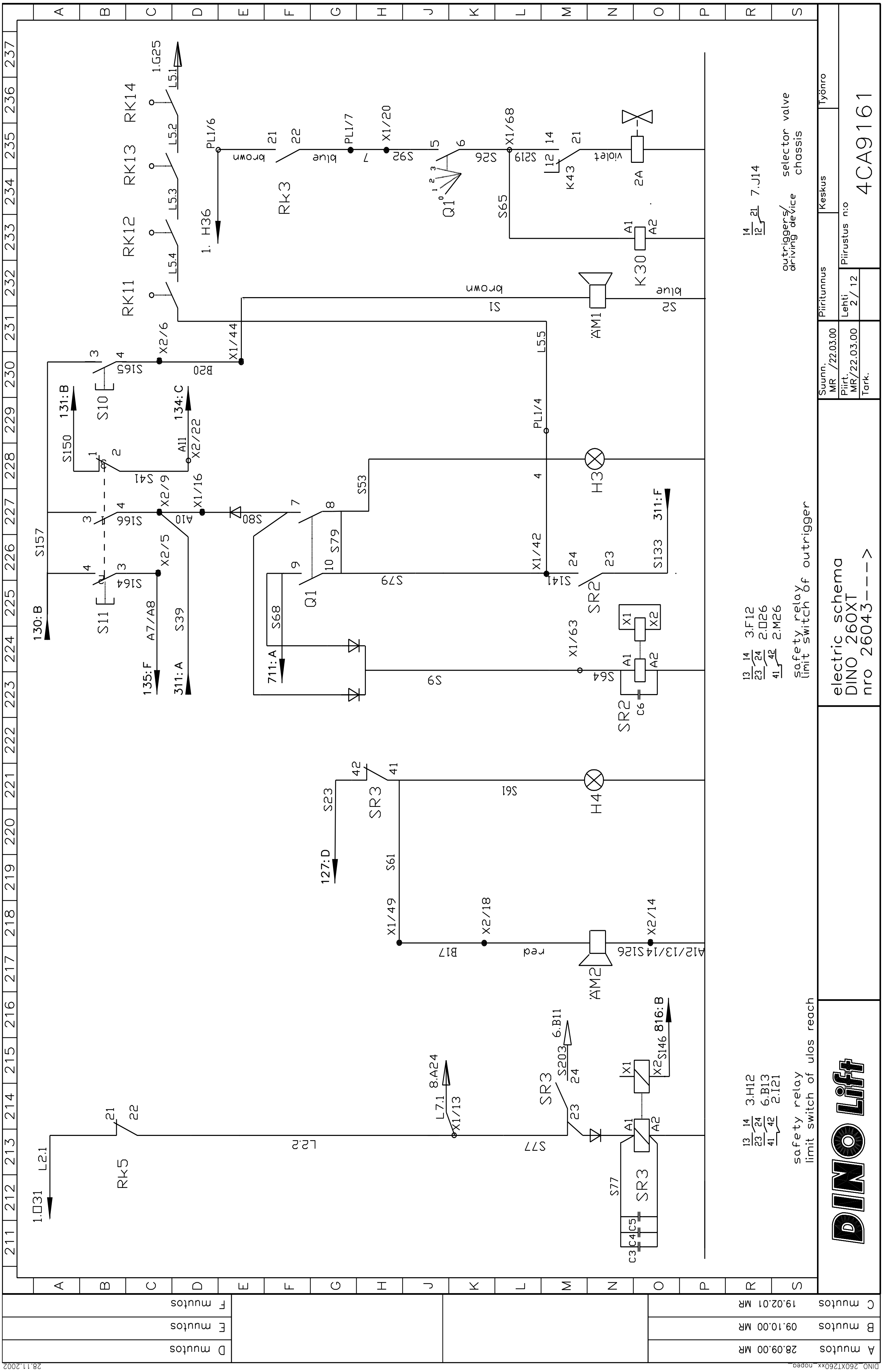
26063 →

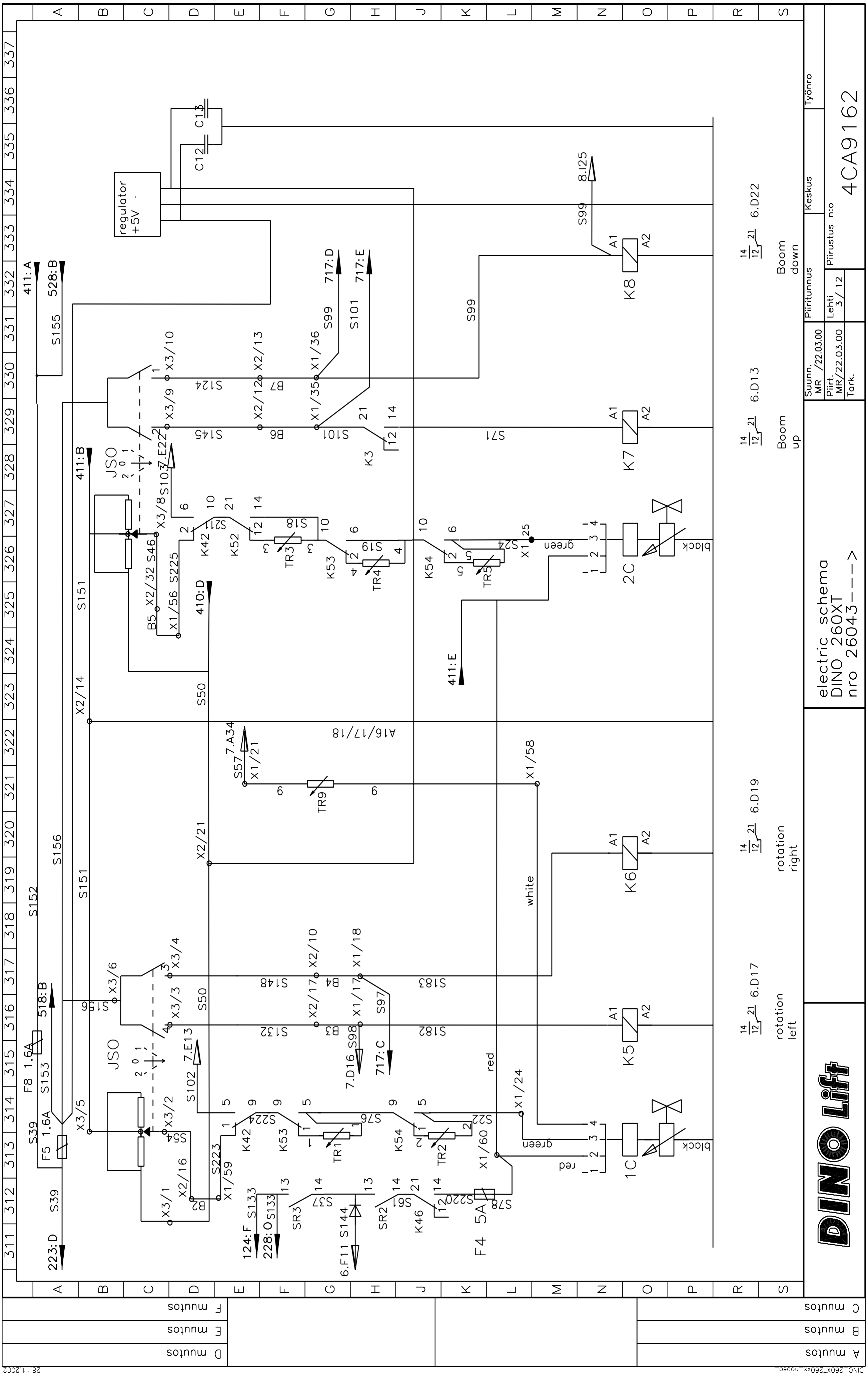
REF.	PART NR.	DESCRIPTION
B1	48.2276	BATTERY
E1	48.2169	THERMAL RELAIS
F1, F2, F3, F7, F9	48.640	10A FUSE
F10	48.3395	10A FUSE (AUTOMATIC)
F4	48.3035	5A FUSE
F5, F8	48.3030	1,6A FUSE
F6	48.3036 + 48.1034	4A FUSE (AUTOMATIC)
H1	48.2204	GREEN LED -SIGNAL LAMP
H2	48.2203	RED LED -SIGNAL LAMP
H3	48.2152	YELLOW LED -SIGNAL LAMP
H4	48.2207	RED LED -SIGNAL LAMP
HM1	48.0111	HOUR METER
J1	48.2085	CONTACT PLUG
JSO, JSV	48.2250	JOYSTICK
K1	48.2168	CONTACTOR
K18	48.2284+48.2285	RELAY
K2	48.2216	RELAY 12V DC
K3, K5-K10, K12, K15, K19, K24, K26, K27, K30, K43, K44, K46, K48, K49, K50, K51, K52, K56, K57	48.2271+48.2273	RELAY
K4	48.2272+48.2273	RELAY
K42, K53, K54	48.2282+48.2283	RELAY
K45	48.2277	RELAY
M1	47.828	ELECTRIC MOTOR, POWER UNIT
M2	47.2317	ELECTRIC MOTOR, AUX. POWER UNIT
M3	47.2167	LINEAR ACTUATOR
PL1	48.3424	ROTATING ADAPTER
PR	48.2145	CONTACT BOX (IN PLATFORM)
Q1	48.2316	TURN SWITCH
RK11, RK12, RK13, RK14	48.2248	LIMIT SWITCH
RK16, RK17	48.2241	LIMIT SWITCH
RK3, RK8	48.1936+48.2142	LIMIT SWITCH
RK4, RK5	48.2068+48.2142	LIMIT SWITCH
RK7, RK15	48.2116	LIMIT SWITCH
RK9, RK10	48.2170	HIT BLOCK STOP
S1, S4	48.2311+48.2313+48.2303	EMERGENCY STOP -BUTTON
S11, S13	48.2302+48.2309+48.2312+48.2303	BUTTON, GREEN
S12, S16, S17, S18, S20, S22, S24, S24B. S27, S30, S33, S34, S35, S36	48.1007+48.616	LEVER SWITCH
S2, S6, S10, S29, S31, S32	48.2309+48.2312	BUTTON, GREEN
S25, S25B, S26, S26B	48.2313+48.2309	BUTTON, GREEN
S3, S5	48.2313+48.2310	BUTTON, RED
S37		BUTTON, GREEN
SR2, SR3	48.2264	RELAY (EMERGENCY STOP)
T1	47.862	POWER SUPPLY
T2	48.2130	BATTERY CHARGER, AUTOMATIC
TR1-TR9	48.2269	RESISTOR, ADJUSTABLE
VM1	48.2063	VOLT METER
VVK	48.2287	FAULT CURRENT SAFETY SWITCH
ÄM1	48.049	SIGNAL HORN
ÄM2	48.0108	SIGNAL HORN

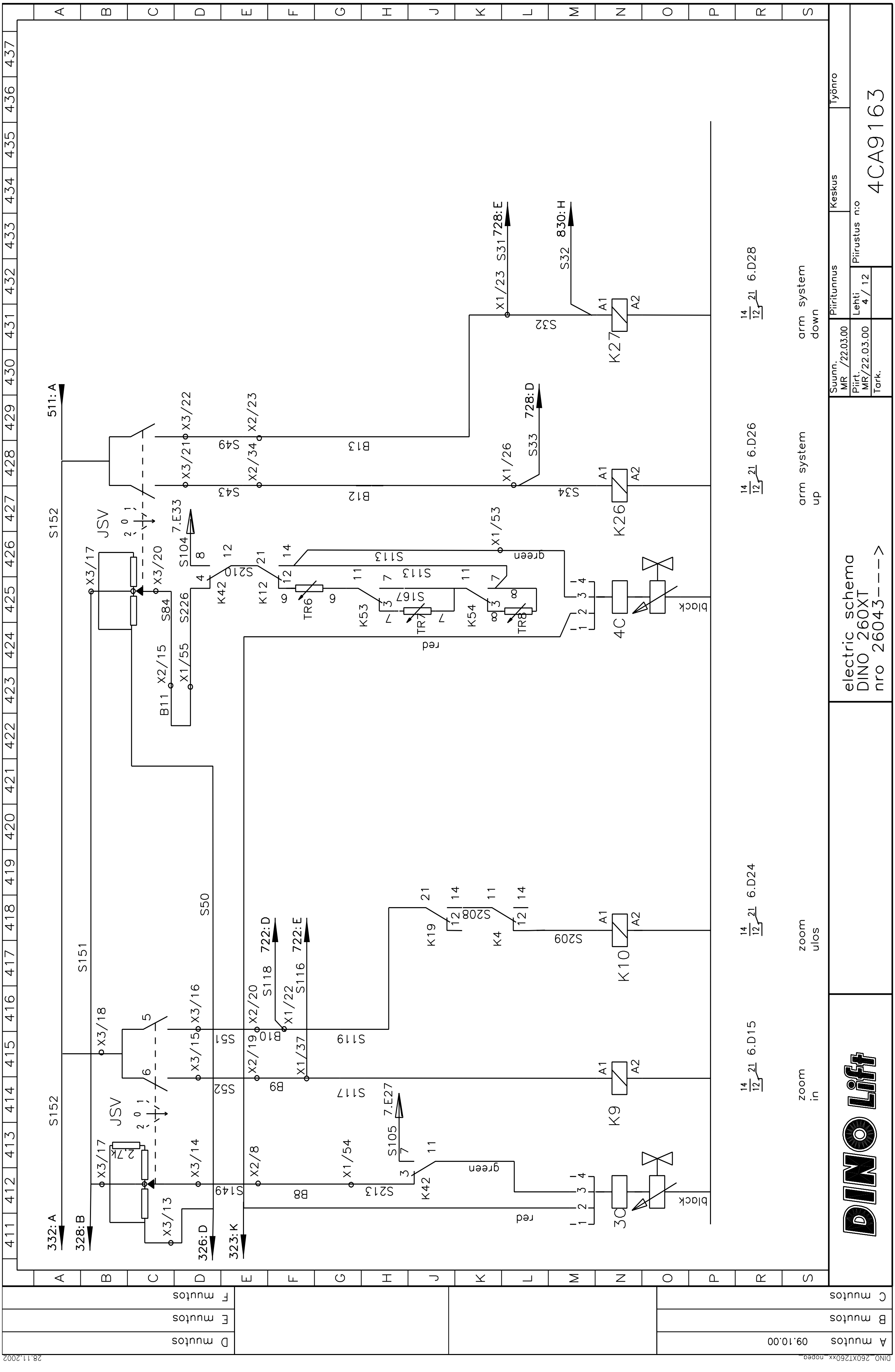
ELECTRIC SCHEMA

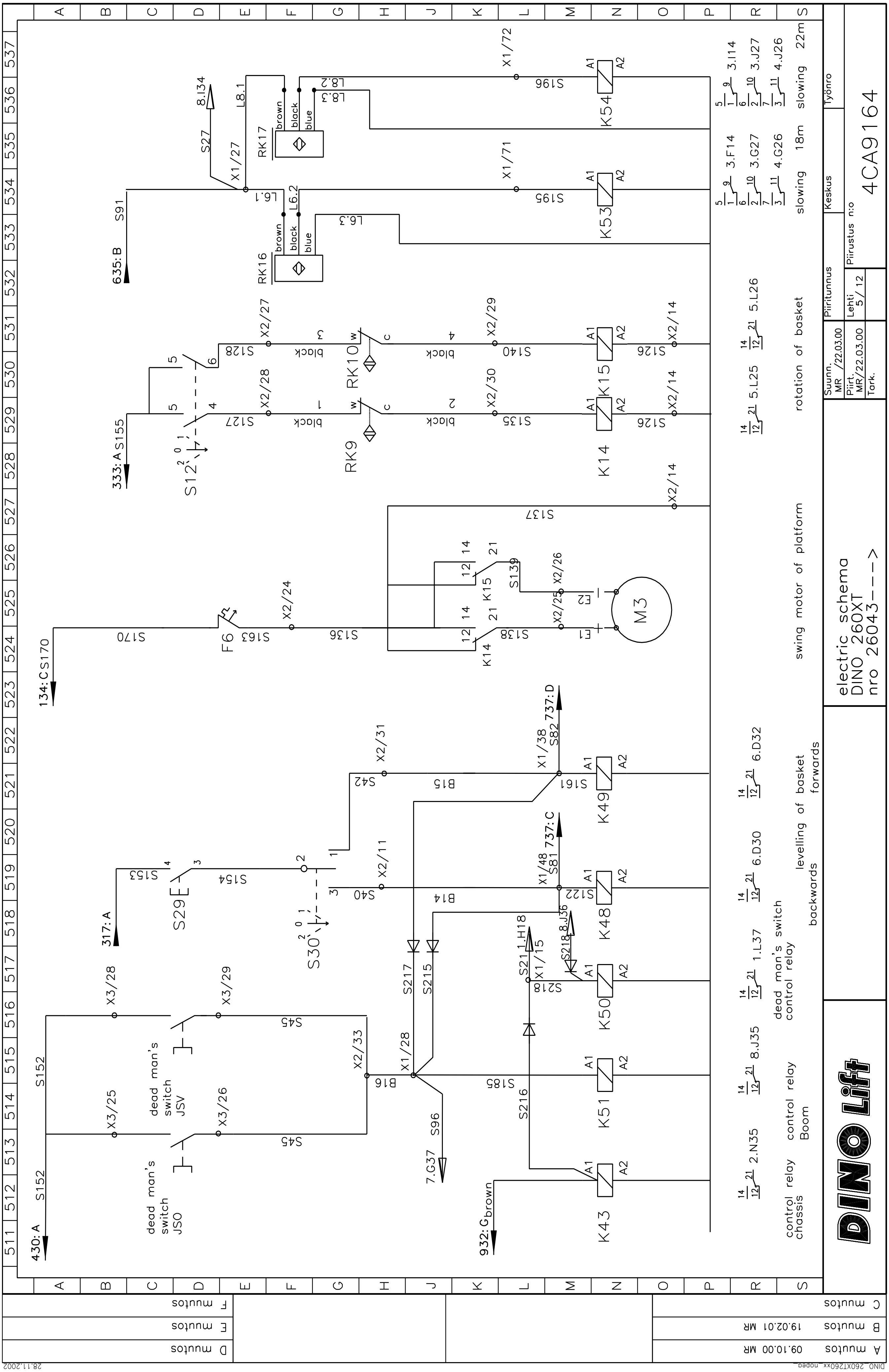
26043 →

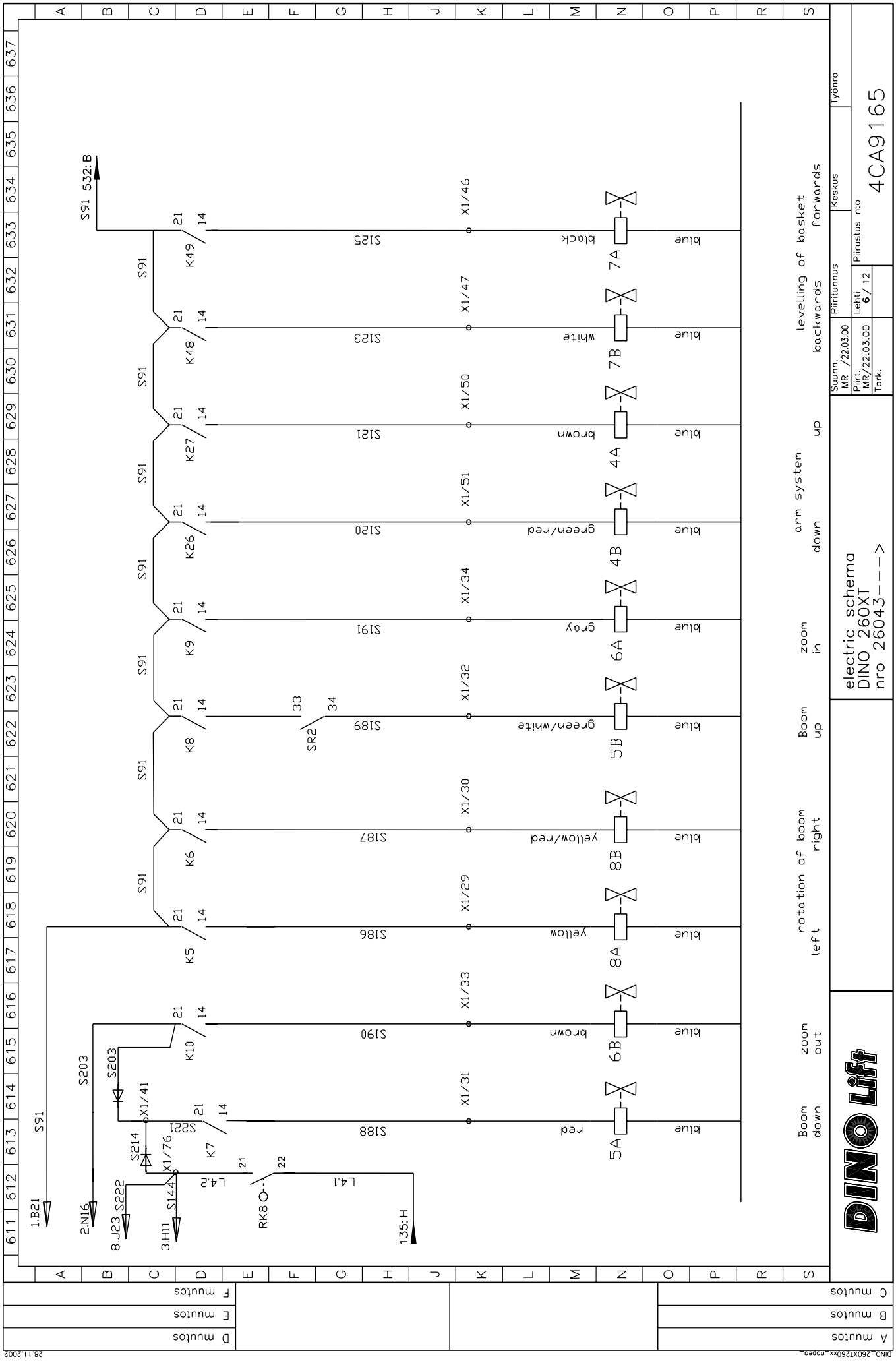



electric schema
DINO 260XT
nro 26043--->
4CA9161
safety relay
limit switch of outrigger
safety relay
limit switch of ulos reach
selector valve
chassis
outriggers/
driving device


electric schema
DINO 260XT
nro 26043--->
4CA9162
Boom down
Boom up
rotation right
rotation left
regulator +5V
K8
K7
K6
K5
2C
1C
JSO
A muutos
B muutos
C muutos
D muutos
E muutos
F muutos


electric schema
DINO 260XT
nro 26043--->
4CA9163
arm system down
arm system up
zoom ulos
zoom in
K27
K26
K10
K9
4C
3C
JSV
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
Piiritunnus
Lehti 4 / 12
Keskus
Työnro
Piirustus n:o
A muutos 09.10.00
B muutos
C muutos
D muutos
E muutos
F muutos

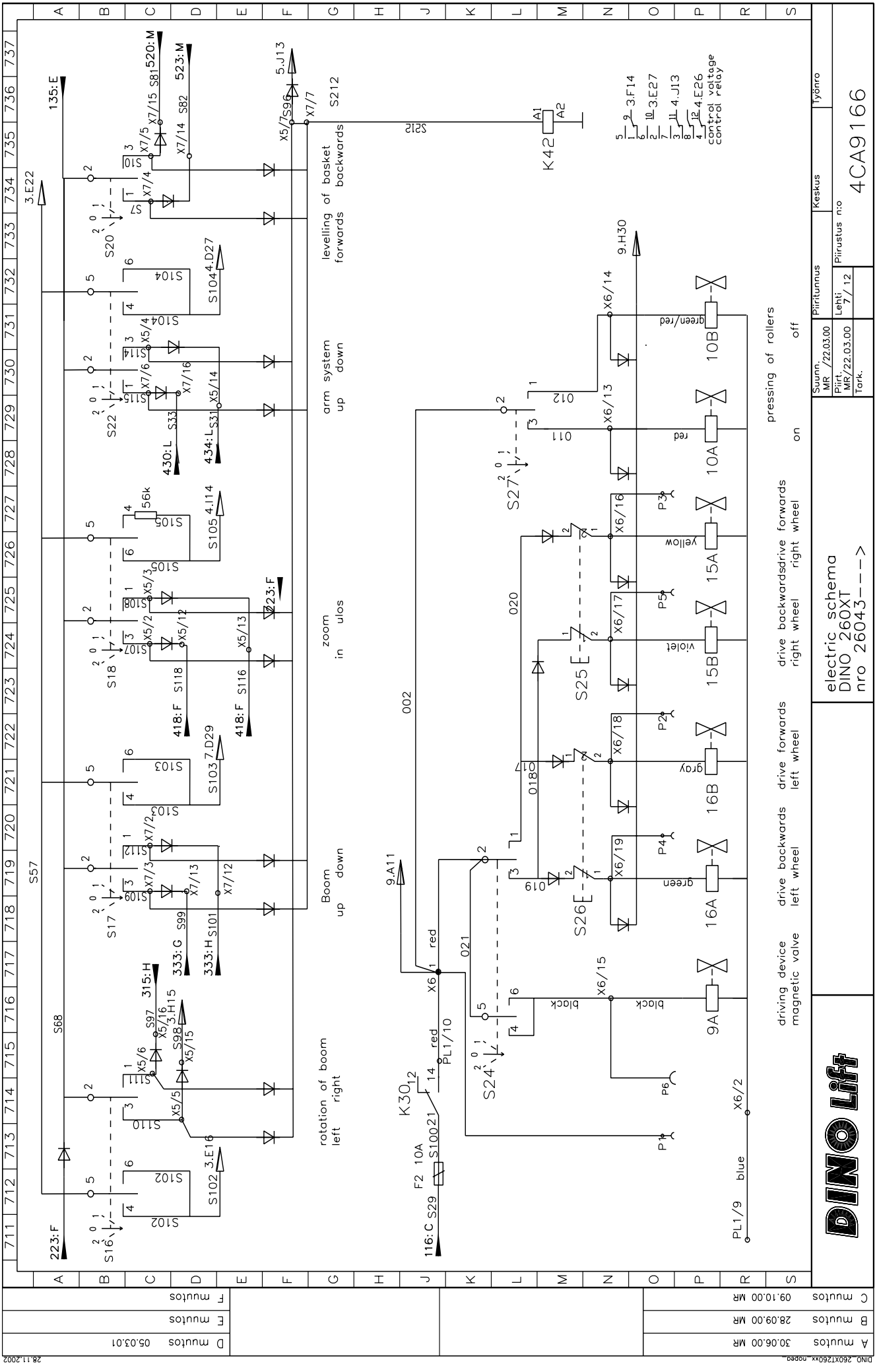

electric schema
DINO 260XT
nro 26043--->
4CA9164
swing motor of platform
rotation of basket
slowing 18m
slowing 22m
levelling of basket forwards
levelling of basket backwards
dead man's switch control relay
control relay Boom
control relay chassis
dead man's switch JSV
dead man's switch JSO
M3
A muutos 09.10.00 MR
B muutos 19.02.01 MR
C muutos
D muutos
E muutos
F muutos

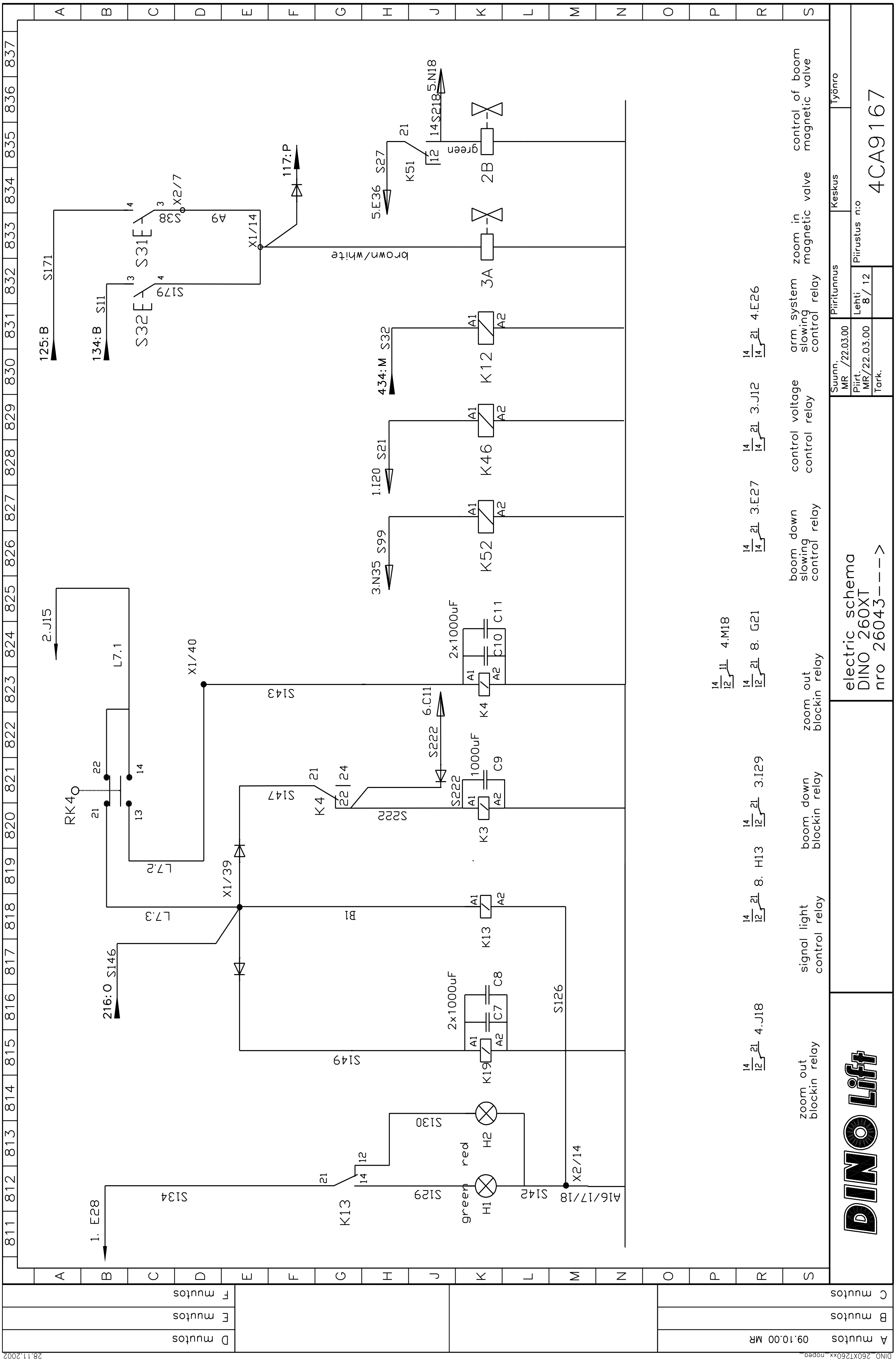


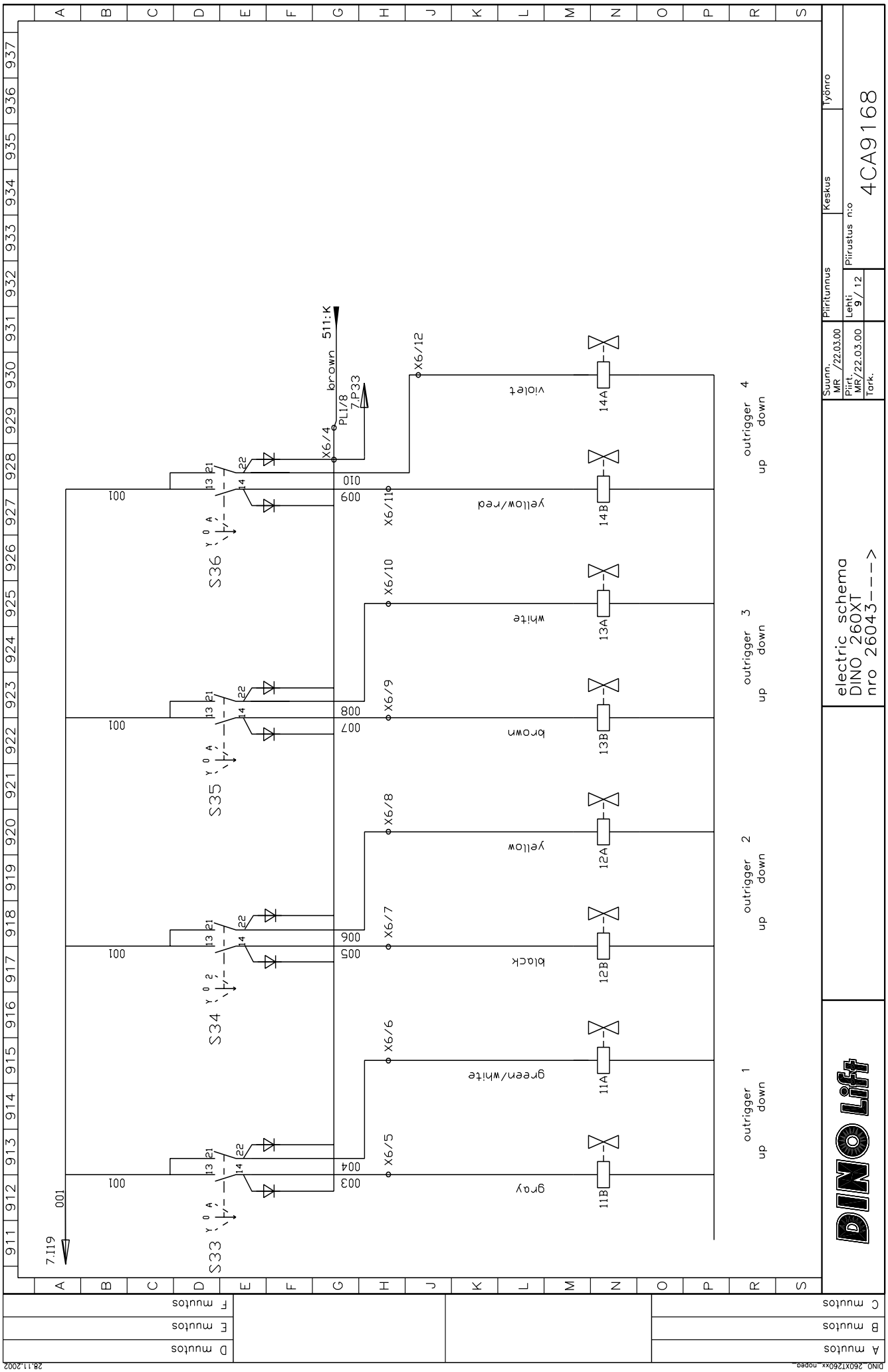
A muutos	B muutos	C muutos	D muutos
E muutos	F muutos		

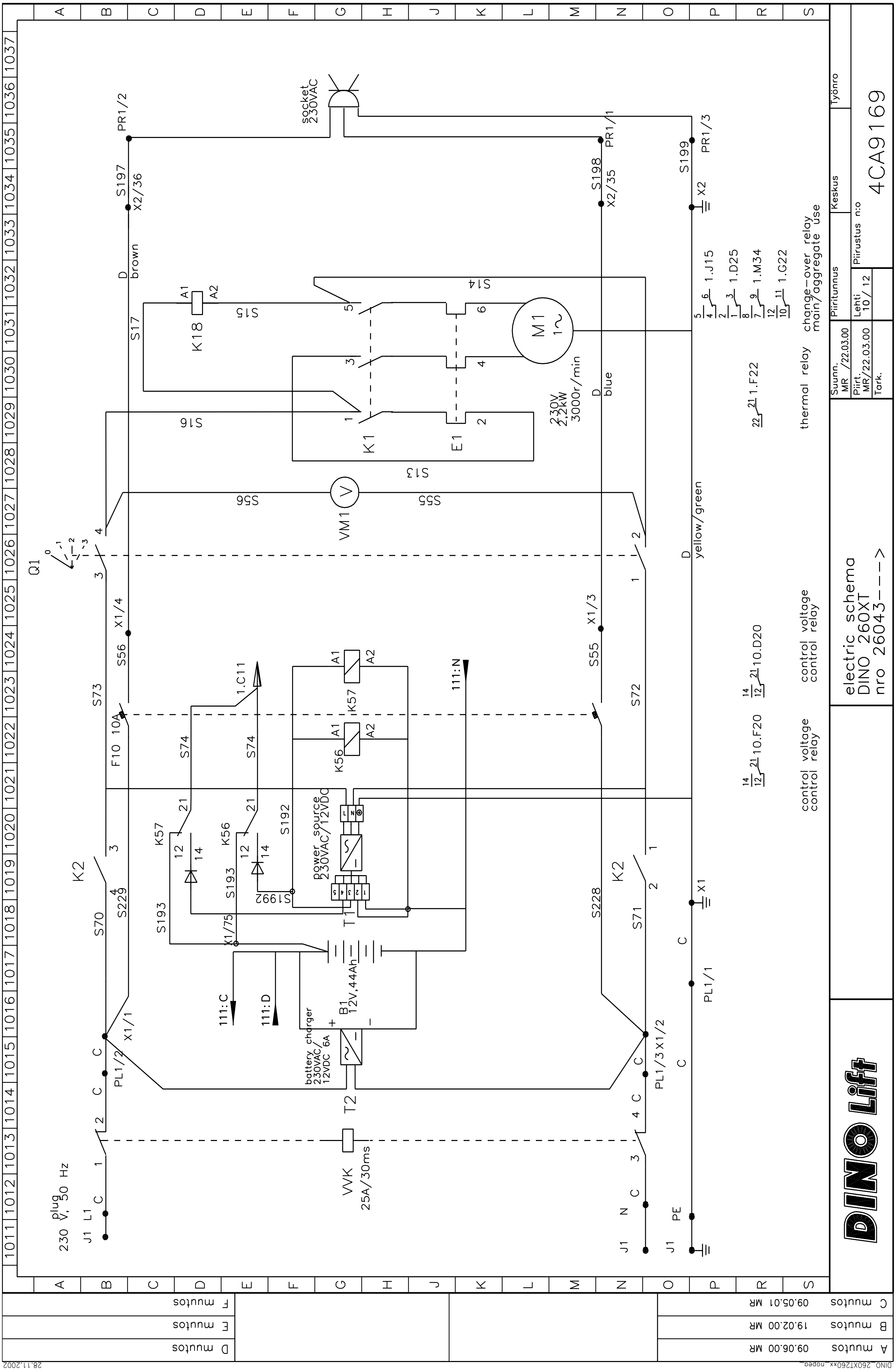
28.11.2002

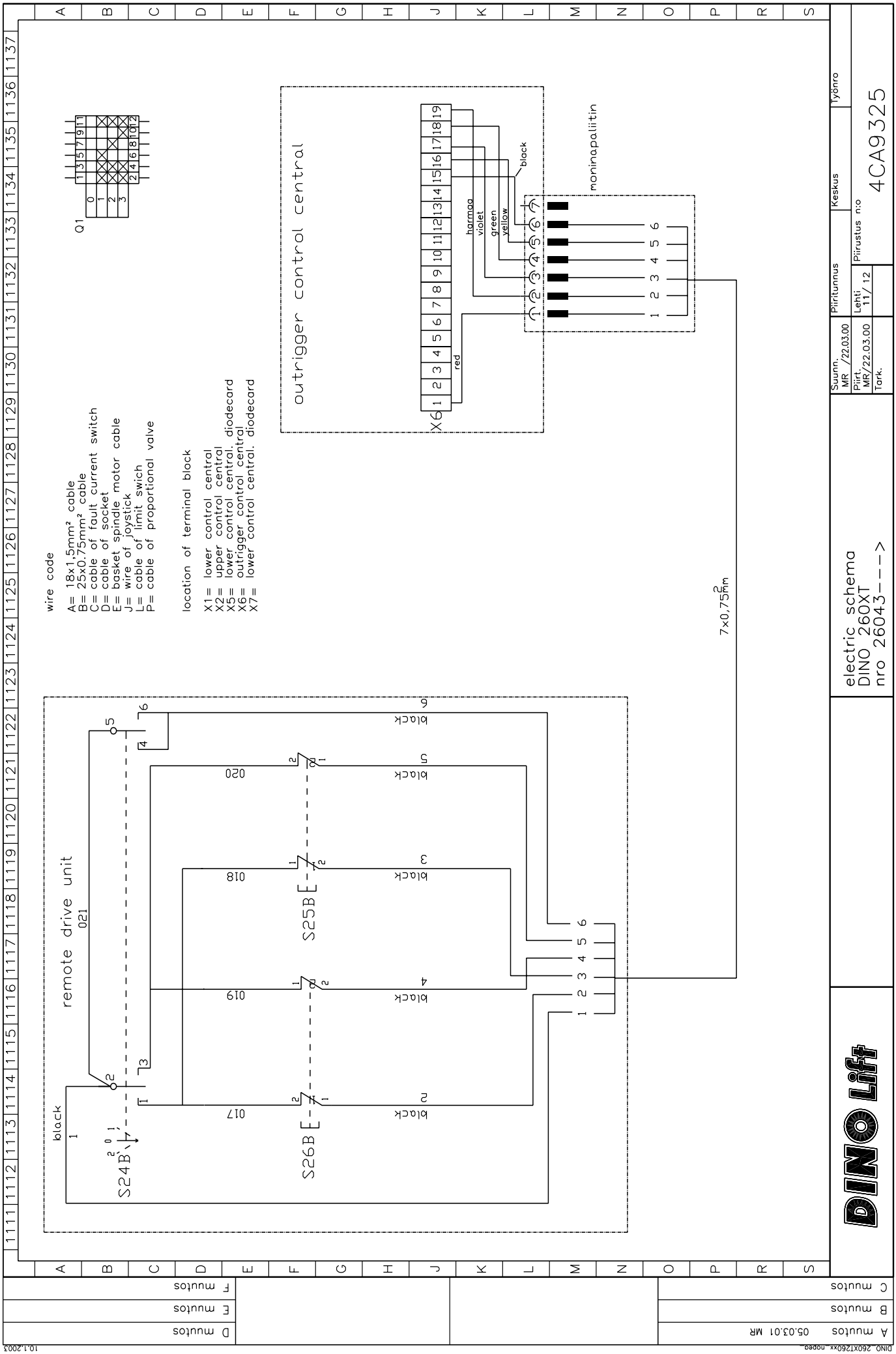
DINO_260XT260xx_nopea_


electric schema
DINO 260XT
nro 26043---->
4CA9166
Piirtunnus
Keskus
Työnro
Piirustus n:o
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
Lehti 7/12
DINO Liftt
levelling of basket forwards backwards
arm system up down
zoom in ulos
Boom up down
rotation of boom left right
pressing of rollers
drive backwards drive forwards right wheel
drive forwards left wheel
drive backwards left wheel
driving device magnetic valve
A muutos 30.06.00 MR
B muutos 28.09.00 MR
C muutos 09.10.00 MR
D muutos 05.03.01
E muutos
F muutos
28.11.2002
DINO_260XT260xx_nopea_

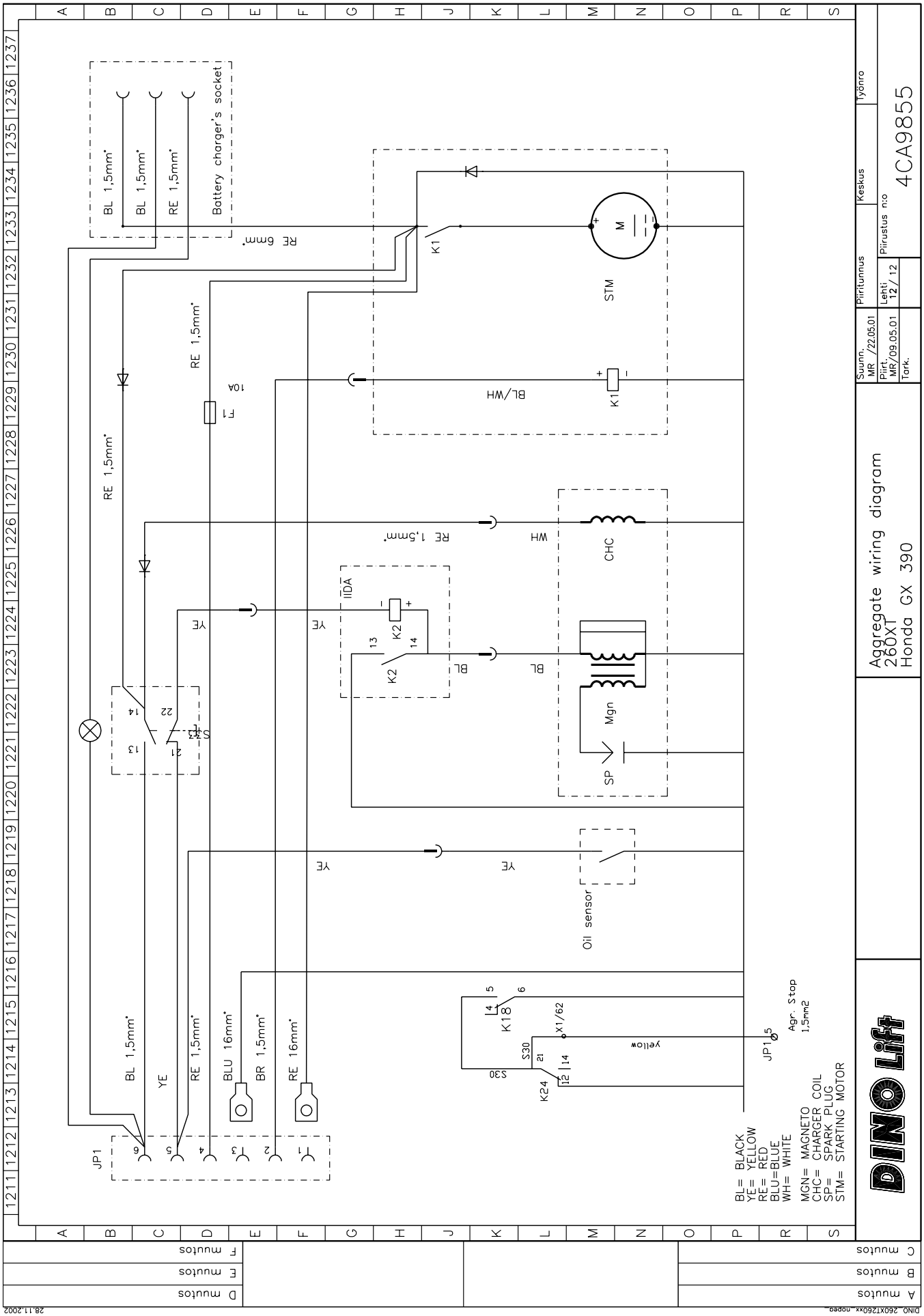

electric schema
DINO 260XT
nro 26043--->
4CA9167
zoom out blockin relay
signal light control relay
boom down blockin relay
zoom out blockin relay
boom down slowing control relay
control voltage control relay
arm system slowing control relay
zoom in magnetic valve
control of boom magnetic valve
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
Piirtunnus
Lehti 8/12
Keskus
Työnro
Piirustus n:o
A muutos 09.10.00 MR
B muutos
C muutos
D muutos
E muutos
F muutos
DINO Lift


electric schema
DINO 260XT
nro 26043---->
4CA9168
Piirtunnus
Keskus
Työnro
Piirustus n:o
Lehti 9/12
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
DINO Lift
outrigger 1 up down
outrigger 2 up down
outrigger 3 up down
outrigger 4 up down
green/white
gray
black
yellow
brown
white
yellow/red
violet
S33
S34
S35
S36
X6/4
X6/5
X6/6
X6/7
X6/8
X6/9
X6/10
X6/11
X6/12
PL1/8
511:K
7.119
A muutos
B muutos
C muutos
D muutos
E muutos
F muutos
28.11.2002


electric schema
DINO 260XT
nro 26043--->
4CA9169
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
Lehti 10/ 12
Piirustus n:o
Piiritunnus
Keskus
Työnro
A muutos 09.06.00 MR
B muutos 19.02.00 MR
C muutos 09.05.01 MR
D muutos
E muutos
F muutos
plug 230 V, 50 Hz
VVK 25A/30ms
battery charger 230VAC/12VDC 6A
B1 12V,44Ah
power source 230VAC/12VDC
230V 2,2kW 3000r/min
control voltage control relay
thermal relay
change-over relay main/aggregate use
socket 230VAC


wire code
A= 18x1,5mm² cable
B= 25x0,75mm² cable
C= cable of fault current switch
D= cable of socket
E= basket spindle motor cable
J= wire of joystick
L= cable of limit swich
P= cable of proportional valve
location of terminal block
X1= lower control central
X2= upper control central
X5= lower control central. diodecard
X6= outrigger control central
X7= lower control central. diodecard
outrigger control central
X6
red
black
yellow
green
violet
harmaa
moninapaliitin
7×0,75mm²
remote drive unit
S24B
S25B
S26B
black
Suunn. MR /22.03.00
Piirt. MR/22.03.00
Tark.
Piirtunnus
Lehti 11/ 12
Keskus
Piirustus n:o
Työnro
4CA9325
electric schema
DINO 260XT
nro 26043---->
DINO Lift
A muutos 05.03.01 MR
B muutos
C muutos
D muutos
E muutos
F muutos
DINO_260XT260xx_nopea
10.1.2003

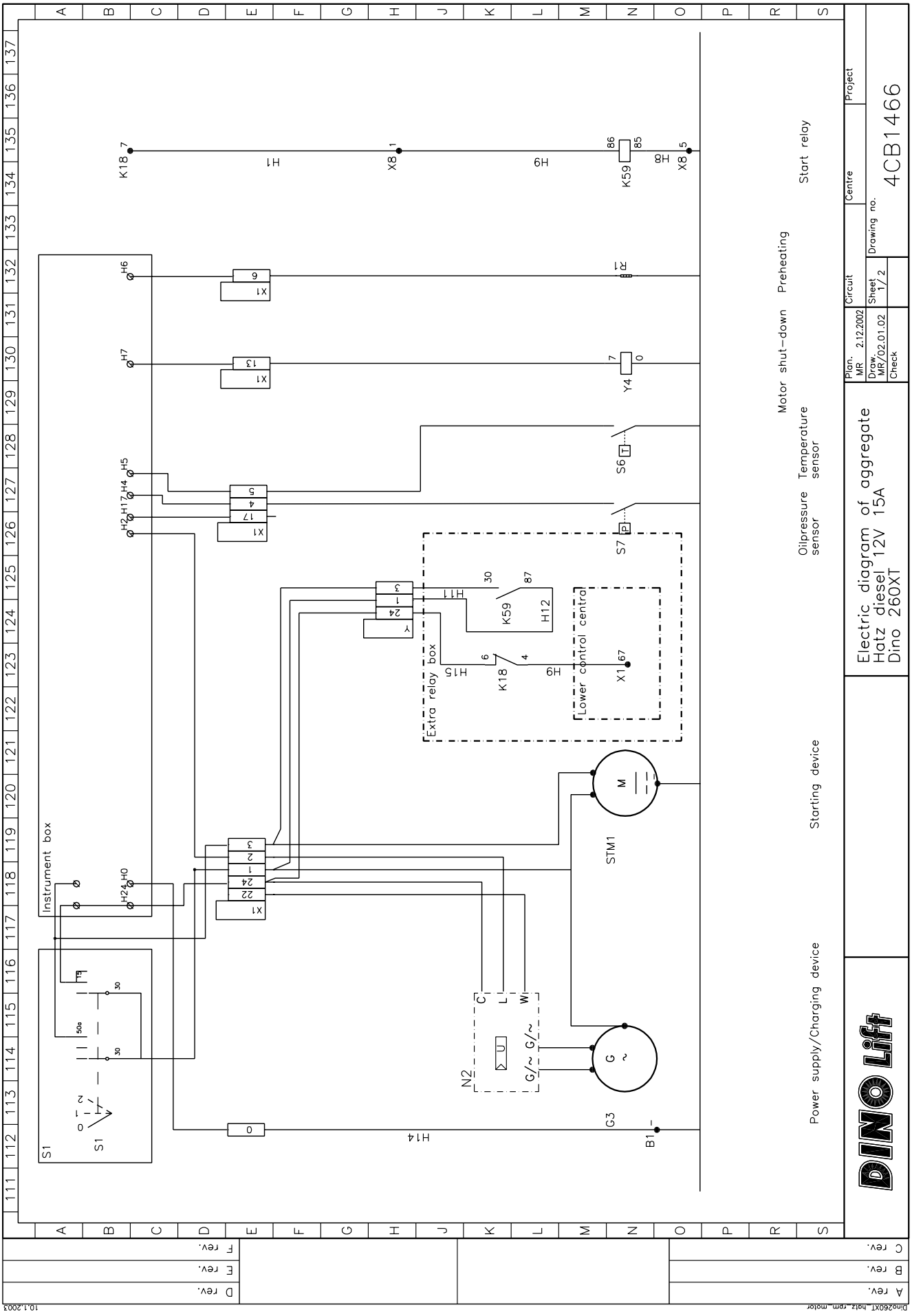
ELECTRIC SCHEMA, (PETROL/GASOLINE AGGREGATE)

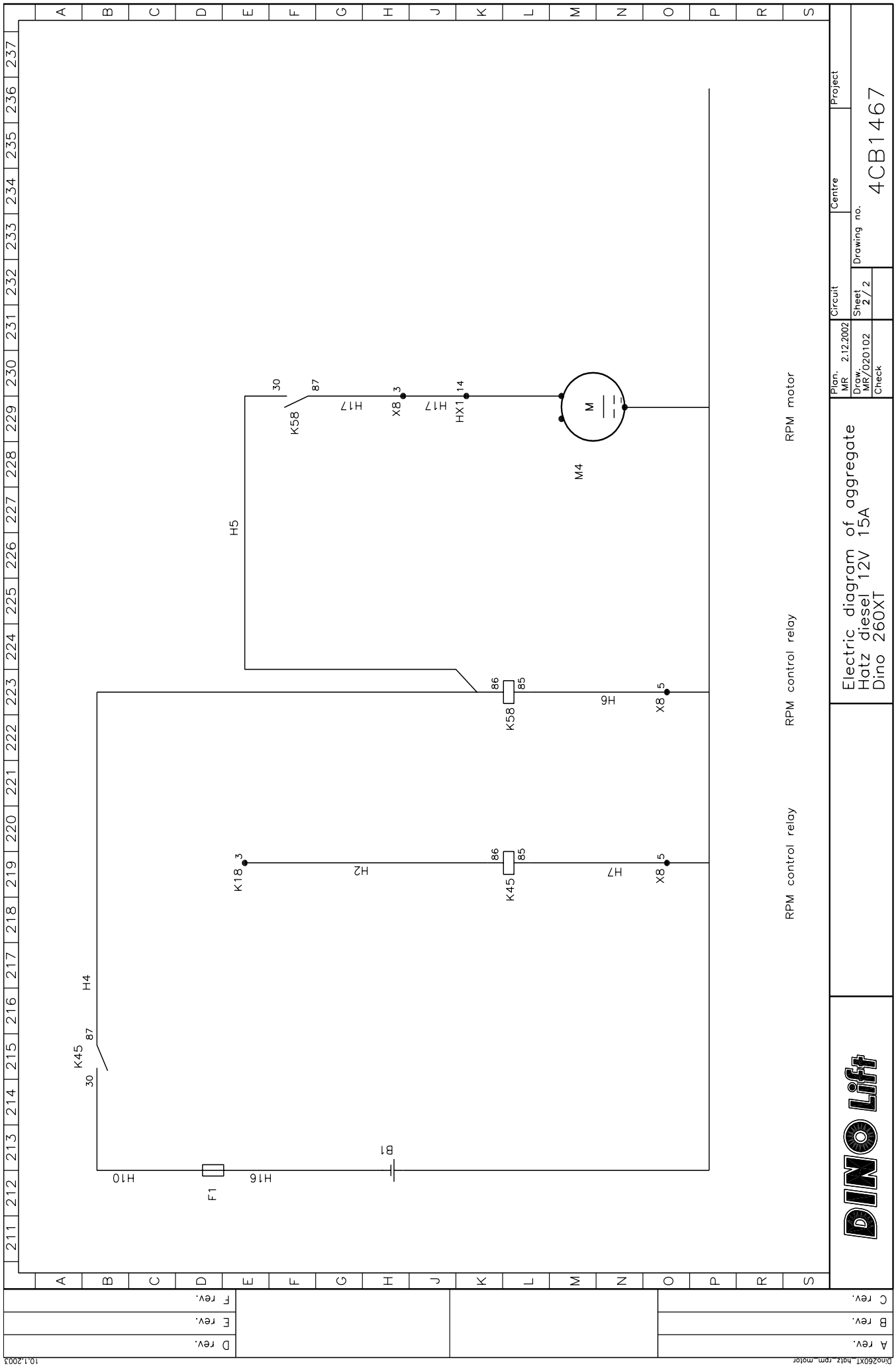


Notes

ELECTRIC SCHEMA, (DIESEL AGGREGATE)

26069 →




Electric diagram of aggregate
Hatz diesel 12V 15A
Dino 260XT
4CB1467
RPM motor
RPM control relay
RPM control relay
M4
K58
K45
K18
F1
B1
H4
H5
H2
H6
H7
H10
H16
H17
HX1
X8
Plan. MR 2.12.2002
Draw. MR/020102
Check
Circuit
Sheet 2/2
Drawing no.
Project
Centre
A rev.
B rev.
C rev.
D rev.
E rev.
F rev.
Dino260XT_hatz_rpm_motor
10.1.2003

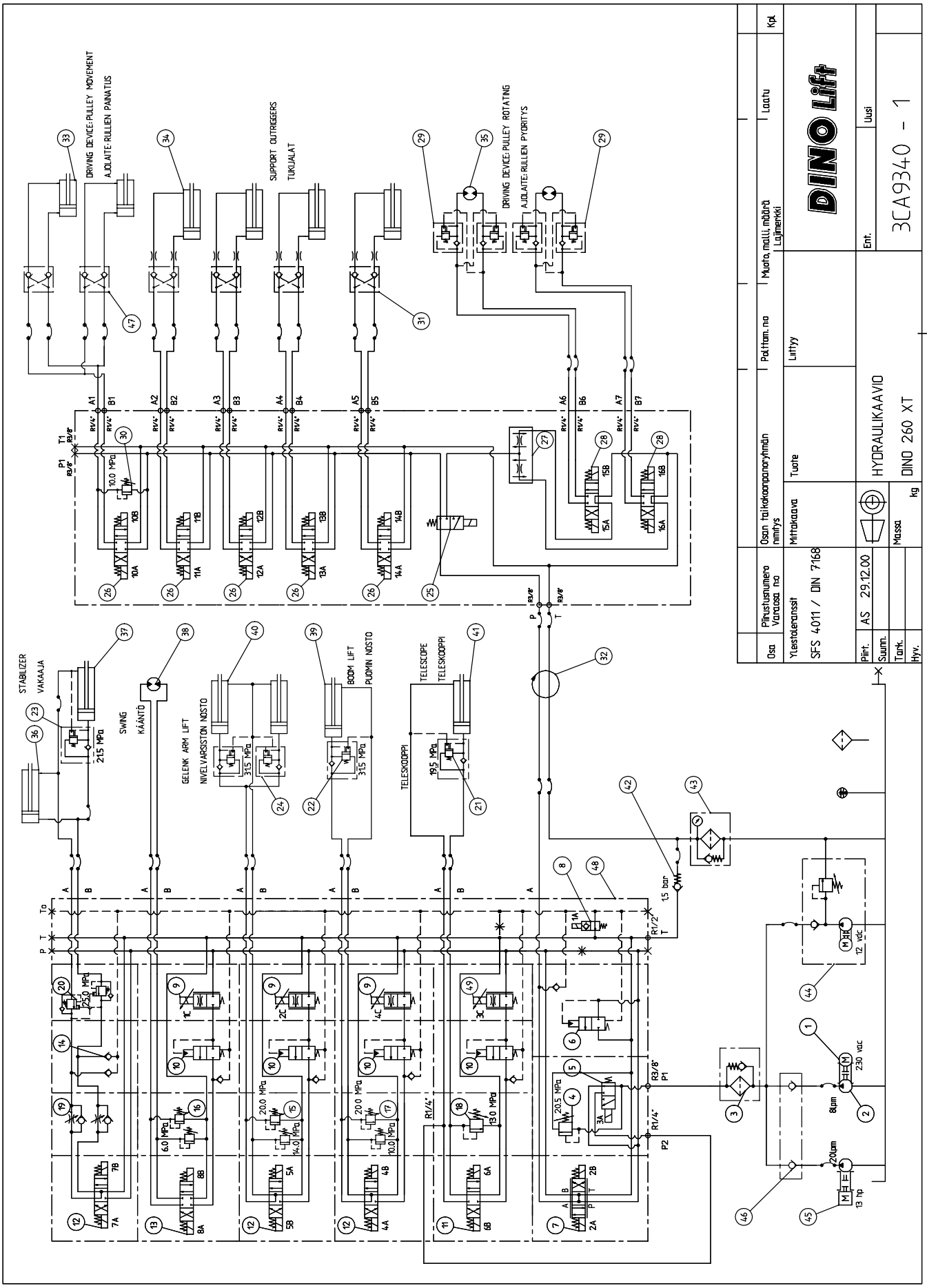
HYDRAULIC COMPONENTS

26043 →

Ref.	Part nr.	Description	Qty
1	47.828	ELECTRIC MOTOR	1
2	47.2068	HYDRAULIC PUMP	1
3	47.195	PRESSURE FILTER	1
4		FLOW RESISTANCE VALVE	1
5		3/2 SOLENOID VALVE	1
6	47.2831	COMPENSATOR	1
7	47.2833	SOLENOID VALVE	1
8		SOLENOID VALVE	1
9	47.2835	PROPORTIONAL VENTIL (10,0 L)	4
10	47.2832	COMPENSATOR	4
11	47.2713	SOLENOID VALVE	1
12	47.2630	SOLENOID VALVE	3
13	47.378	SOLENOID VALVE	1
14	47.2837	CHECK VALVE	2
15	47.2749	DOUBLE PRESSURE LIMITING VALVE	1
16	47.2749	DOUBLE PRESSURE LIMITING VALVE	1
17	47.2749	DOUBLE PRESSURE LIMITING VALVE	1
18	47.2808	PRESSURE LIMITING VALVE	1
19	47.2836	DOUBLE LOAD REGULATING VALVE	1
20	47.2769	DOUBLE LOAD REGULATING VALVE	1
21	47.2722	LOAD REGULATING VALVE	1
22	47.2766	LOAD REGULATING VALVE	1
23	47.2722	LOAD REGULATING VALVE	1
24	47.2766	LOAD REGULATING VALVE	2
25	47.2829	SOLENOID VALVE	1
26	47.2825	SOLENOID VALVE	5
27	47.2828	FLOW DIVIDER VALVE	1
28	47.2824	SOLENOID VALVE	2
29	47.2813	LOAD REGULATING VALVE	2
30	47.2742	PRESSURE LIMITING VALVE	1
31	DL7.026	PRESSURE ACTUATED HOLD VALVE	4
32	48.3424	ROTATING ADAPTER	1
33	50.101	CYLINDER (DRIVING DEVICE)	2
34	DL7.025	CYLINDER (OUTRIGGER)	4
35	47.2315	HYDRAULIC MOTOR (DRIVING DEVICE)	2
36	DL10.007	CYLINDER (MASTER)	1
37	DL10.005	CYLINDER (SLAVE)	1
38	47.2273	HYDRAULIC MOTOR (TURNING)	1
39	DL6.031	CYLINDER (LIFT)	1
40	DL6.032	CYLINDER (LIFTING ARMS)	2
41	DL5.037	CYLINDER (TELESCOPE)	1
42	47.2781	CHECK VALVE	1
43	47.196	RETURN FILTER	1
44	47.2317	POWER UNIT (AUXILIARY)	1
45	47.882	INTERNAL COMBUSTION ENGINE (PETROL/ GASOLINE AGGREGATE)	1
45	47.915A	INTERNAL COMBUSTION ENGINE (DIESEL AGGREGATE)	1
46	47.2815	CHECK VALVE	1
47	47.2816	CHECK VALVE	2
48	47.2838	HAUSE	1
49	47.2887	PROPORTIONAL VENTIL (25,0 L)	1

HYDRAULIC SCHEME

26001 →



Notes