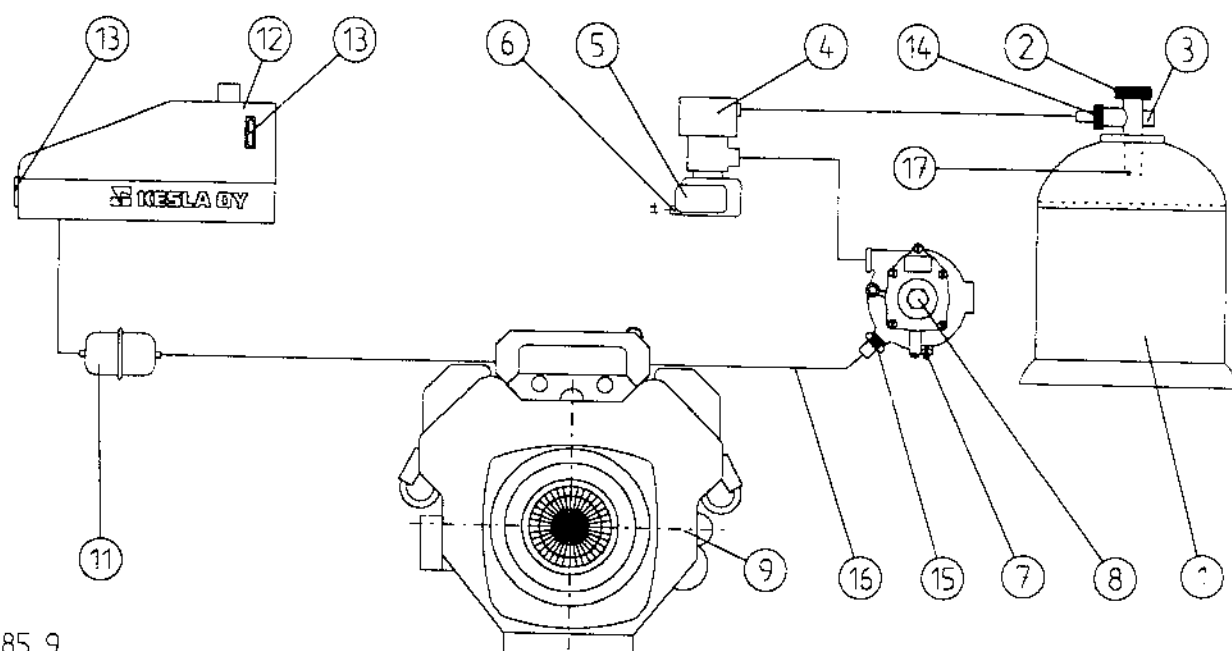


27.0 OPERATING THE GAS DEVICE



185.9

- | | |
|--|--|
| 1. Standard LPG holder 11 kg (24.25 lb) | 7. Idling regulator screw |
| 2. Turnable closing cock | 8. LPG device |
| 3. Relief guard (always with the holder) | 9. Combustion engine (petrol) |
| 4. Fine filter | 11. Petrol filter |
| 5. Solenoid valve for gas | 12. Petrol tank |
| 6. Solenoid valve 12 V, guided from platform with control switch and together from the motor oil pressure with relay | 13. Glass gauge for fuel quantity |
| | 14. Holder adapter VMT9/16-18JIC |
| | 15. Power regulator screw |
| | 16. Feeding hose for gas |
| | 17. Equipment for LPG gas holder (gas is taken vaporous from holder) |

27.1 Starting with gas

Petrol drive has been used previously.

1. Connect gas holder hose 14 and open cock 2

2. Turn the gas/petrol selector switch from position 2 (petrol) to position 1 (gas). In the middle position 0 the engine will get no fuel.

- The engine might run irregularly for a while after engaging the gas drive. Wait until the engine runs smoothly before you load it.

27.2 Stopping

Shut off the power. If the engine will be out of operation for a longer period, close the closing cock 2 of the gas holder.

27.3 Principle of operation

The LPG is taken from a gas holder which is in a vertical position. The gas is taken vaporous, but with a holder pressure for the gas device. Check the tightness of the adapters. When opening the closing cock 2 of the LPG holder and turning the selector switch for gas drive on the platform into position GAS 1 and when the engine oil pressure has risen, vaporous LPG will flow to the fine filter 4 and from there via the power regulator 15 to the gas device 8.

When starting the engine, a vacuum will occur in the inlet manifold sucking gas into the engine via the feeding hose for gas 16. Behind the big membrane of the secondary side the air pressure is normal and inside a vacuum occurs, which corresponds to that of the running motor. Consequently the membrane moves inwards and opens the secondary valve. When the carburetor flap is further opened (when the engine output is increased), the vacuum on the secondary side increases. This increases the movement of the membrane, the secondary valve opens up more and the flowing gas quantity increases.

The power range of the gas quantity feeded into the engine is regulated with screw 15 and the idling analogously with screw 7. The easiest and most precise way of regulating is the use of an exhaust gas analyzer. For the ratings refer to the table below. According to the information of the Kohler engine manufacturer the CO-values of the exhaust gases are about 8%, when loaded with different rpms. In gas drive the power drop is about 10% compared with petrol drive.

Engine outlet of the gas device - deliverer's recommendation

Reading	Full power	Partial power	Idling
in petrol scale	13,0	14,0-14,5	13,2
in LPG scale	14,4	15,1-15,6	14,4
in power scale	84,0	90,0-94,0	85,0

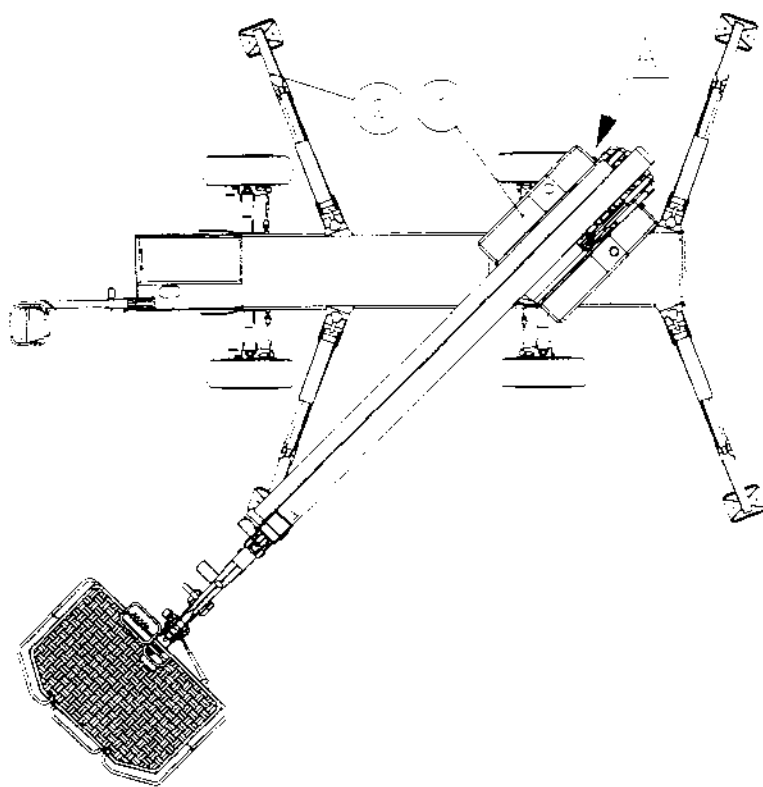
If an analyzer like this is not available, the regulation can be carried out as follows: First run the engine warm. The engine is loaded with the hydraulic pump mentioned above and at full throttle. The power regulator screw is tightened until the revs drop. Open the screw carefully until the engine reaches full revs and then lock the regulator screw. The idling mixture can analogously be regulated with the idling regulator screw. Regulate for idling and without loading the engine. The screw is tightened until the engine rpms drop. Then the regulator screw is opened until the engine runs cleanly, which means that the regulation is in order.

27.4 Service (engine used max. 8 h per day)

Fine filter, part 4, should be cleaned every 6 months. Every 12 months clean the evaporator, check the condition of membranes and replace them if needed, clean the carburetor and check the condition and tightness of tubing.

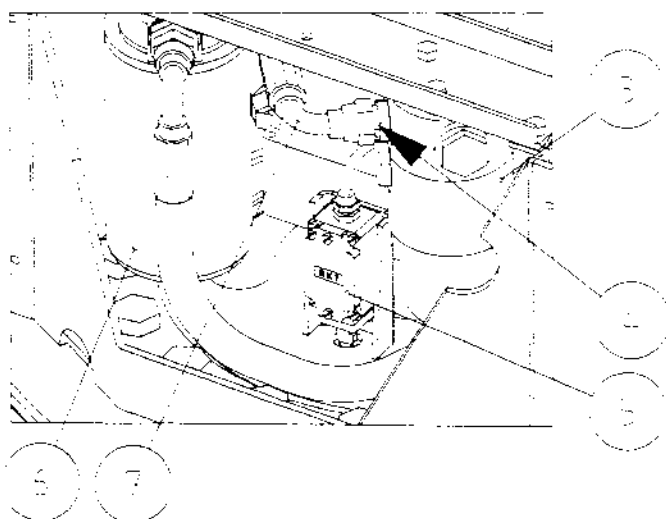
28.0 ADJUSTING THE HYDRAULIC PUMP

1. Check that the oil level of the hydraulic tank (1) is in the middle of the measuring glass, when the MEWP is in transport position. (= all hydraulic cylinders are in .
2. Position the MEWP according to the drawing. The hydraulic pump is adjusted from direction A, under the turntable.



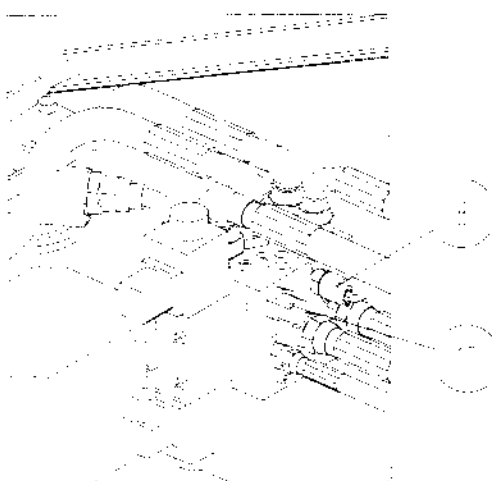
1	Hydraulic oil tank
2	Stabilizer (refer to item 12)

3. Connect flow meter between outlet hose of pressure filter (point 4), and remove limit switch RK7.



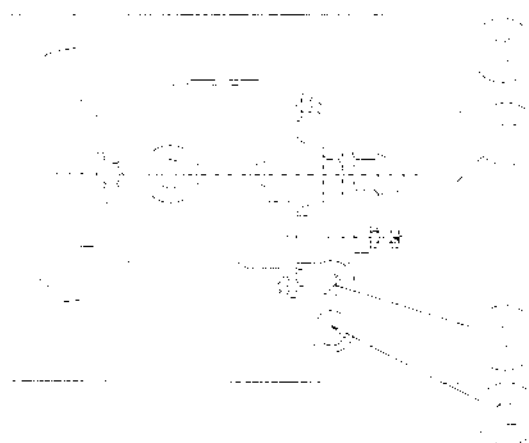
3	Pressure filter
4	Flow meter here
5	Limit switch RK7
6	Return filter
7	Outlet hose of pressure filter

4. Connect pressure gauge to measuring point M1.



8	Measuring point M1
13	Pressure relief cartridge

5. Raise the rpm of the combustion engine to 3000 r/min.
6. Use the pedal switch on the platform to switch the pump output for the booms, that is, keep the pedal down.
7. Remove plug 9 and use the screw under the plug to adjust output to 9-10 l/min (2.38 - 2.64 gal./min). Output is adjusted with the hydraulics unloaded.



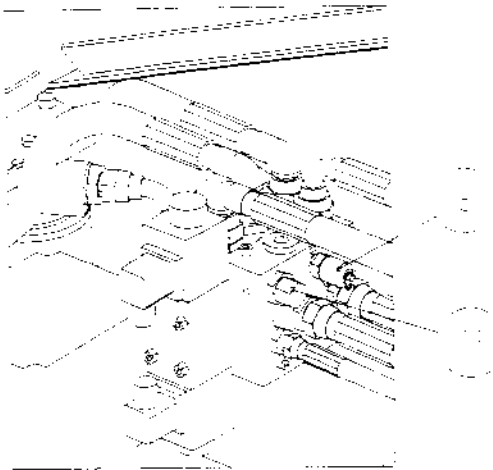
9	Plug 9. Adjustment of output to booms
10	Locking nut
11	Adjustment screw: output to drive
12	Adjustment of pressure to drive

8. Release the pedal switch on the platform, thus switching the pump output to drive.
9. Loosen locking screw 10.
10. Adjust output with the adjusting screw 11 to 23 l/min in MEWPs equipped with Kohler petrol engine or Hatz diesel engine, and to 25 l/min in MEWPs with Kubota diesel engine. Output is adjusted with the hydraulics unloaded. Reduce output by tightening the screw.
11. Tighten locking nut 10 while holding the adjusting screw 11.
12. Raise stabilizer 2 fully up, keep the spindle open, the pressure in measuring point M1 should be 248-250 bar (3597 - 3626 psi).

13. Adjust pressure with screw 12, to 248 - 250 bar (3597 - 3626 psi). NOTE! DO NOT TURN THE ADJUSTING SCREW WHILE UNDER PRESSURE. MAX. 15 bar (217 psi). PRESSURE IS INCREASED BY TIGHTENING THE SCREW.

14. Use the pedal switch on the platform to switch the pump output for the booms, that is, keep the pedal down.

15. Remove shield plug from pressure relief cartridge 13.



8	Measuring point M1
13	Pressure relief cartridge

16. Retract the booms, keep the spindle open, in which case the pressure in the pressure measuring point M1 should be 235 bar (3408 psi).

17. Adjust pressure with the pressure relief cartridge to 235 bar (3408 psi). NOTE! DO NOT ADJUST WHILE UNDER PRESSURE. MAX. 15 bar (217 psi). PRESSURE INCREASES BY TURNING CLOCKWISE.

18. Raise the temperature of hydraulic oil to +30°C (+86°F).

19. Check output and pressures, for drive and for booms, according to items 5-16.

20. Install shield plug as well as plug 9 and limit switch RK7.

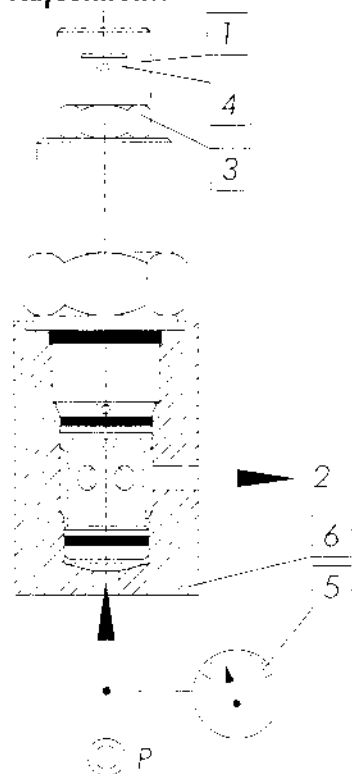
21. Seal targets 10 and 11 with sealing paint marked "KESLA"

29.0 ADJUSTING THE LOAD LOWERING VALVE

Adjustment values:

1. Load lowering valve of lifting cylinder $345 \pm 5 / -0$ bar ($5004 \pm 73 / -0$ psi)
2. Load lowering valve of boom extension cylinder $345 \pm 5 / -0$ bar ($5004 \pm 73 / -0$ psi)
3. Load lowering valve of jib cylinder $345 \pm 5 / -0$ bar ($5004 \pm 73 / -0$ psi)

Adjustment:



- 1 Protecting cap
- 3 Nut
- 4 Adjusting screw
- 5 Pressure gauge
- 6 Adjustment block

1. Install the valve to the adjustment block according to the drawing.
2. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
3. Remove protecting cap 1 and loosen nut 3.
4. Connect pressure 350 bar (5076 psi) to point P. Output 10-15 l/min.
5. Loosen adjusting screw 4, until pressure increases to 350 bar (5076 psi), in which case the oil flow ceases from gate 2.
6. Tighten adjusting screw 4, until the pressure gauge shows the desired value, and oil starts to flow from gate 2.
7. Check the adjustment value by dropping pressure in point P to eg. 250 bar (3636 psi), then start to raise the pressure of point P; watch the pressure gauge and gate 2. Oil will flow from gate 2 when the adjusted pressure value has been reached.
8. Lock nut 3 and protecting cap 1. Seal with sealing point marked "KESLA".

30.0 ADJUSTING THE LOAD CONTROL VALVE LEVERS, STAGE 1

General

The pipelines on the bottom side of the boom lifting and extension cylinder have as load control valves a roller guide 2/3 directional control valve.

The diaphragm spring pack between the upper and lower part of the turntable is compressed according to the boom loading. This compression of the spring pack is directed by means of a

lever to the roller guide 2/3 valve, which closes before the limit of the lifting moment. Thus the flow to boom lowering and extension is prevented.

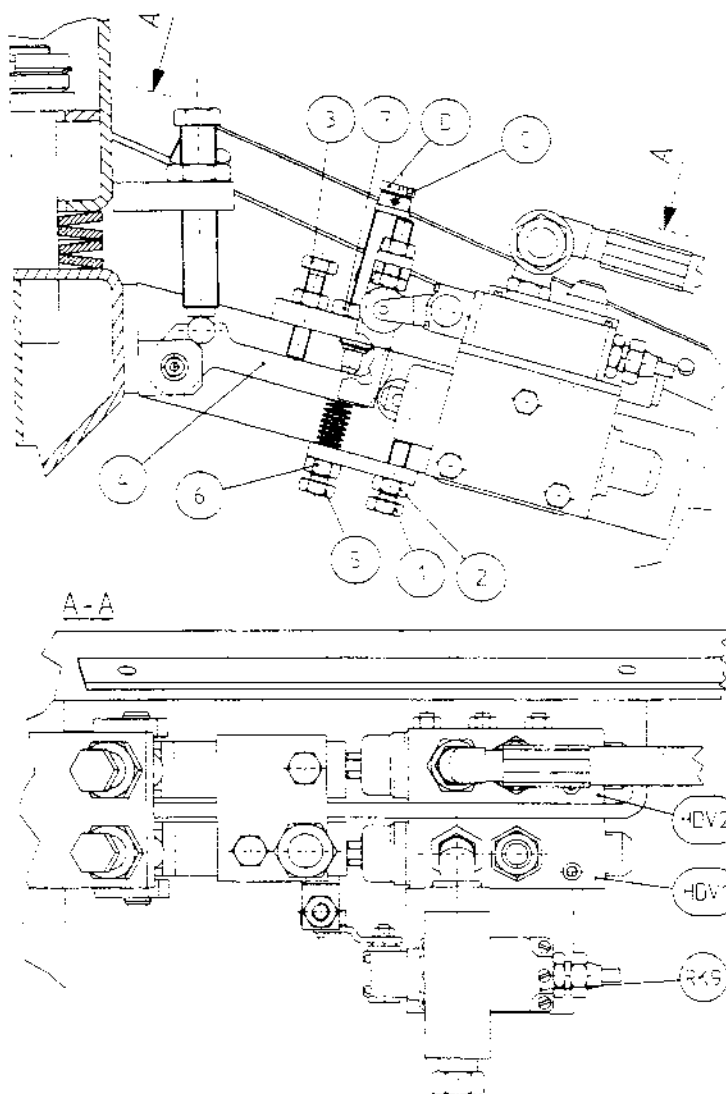
There is a check valve in connection with the load control valve, which allows opposite function, that is lifting the boom and retracting the extension.

There is also a limit switch at the levers of the load control valve, preventing by means of an electrical control valve the furthering of the load with the jib boom as well, if the boom lowering and extension are prevented.

The lever of the boom lowering control valve is connected to the shock absorber, which returns the movement of the lever (valve stem) slowly, preventing thus the platform from bouncing. In addition to load control, there is also a limit switch, in case the load limit should be exceeded due to e.g. malfunction of load control or external overload.

Pre-adjustment of load control

1. Drive the booms on the transport support.
2. Check that screws 1 support lightly valves HDV1 and HDV2.



HDV1	Load control of boom lowering
HDV2	Load control of boom extension
RK9	Limit switch of jib load control

3. Tighten nuts 2.

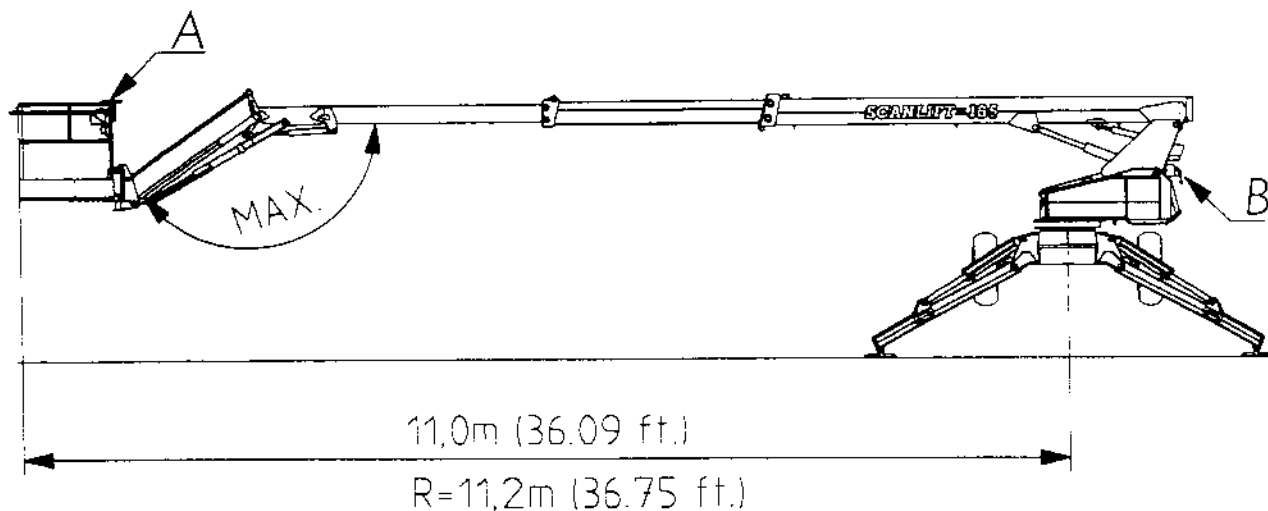
4. Turn screw 3, until part 4 lightly touches the roller of HDV1.
5. Press lever 4 so that the return spring of the lever compresses fully. At the same time tighten screw 5, until lever 4 rises 0,5 mm (0.02 in).
6. Lock screw 5 with nut 6.
7. Adjust the lever of HDV2 according to items 3-5.

Adjustment of shock absorber

1. Loosen the locking screw C of shock absorber adjustment.
2. Turn adjustment screw D into position where the shock absorber stem most easily retracts.
3. Turn the body of the shock absorber towards the closed position, in which case the stem retracts, and part 4 does not move. Turn the body until part 4 moves, then turn one turn backwards. Lock by tightening nut 7.
4. Turn adjusting screw D towards 0. Push part 4 all the way down. Adjust free reset time to 12 +2 / -1 seconds. Lock screw C and seal with sealing paint. Adjustment temperature should be about -20°C (68°F).
5. *Note!* Check that there is no paint or dirt in rollers of valves HDV1 and HDV2 and stop faces of parts 4.

31.0 ADJUSTING THE LOAD CONTROL VALVE LEVERS, STAGE 2

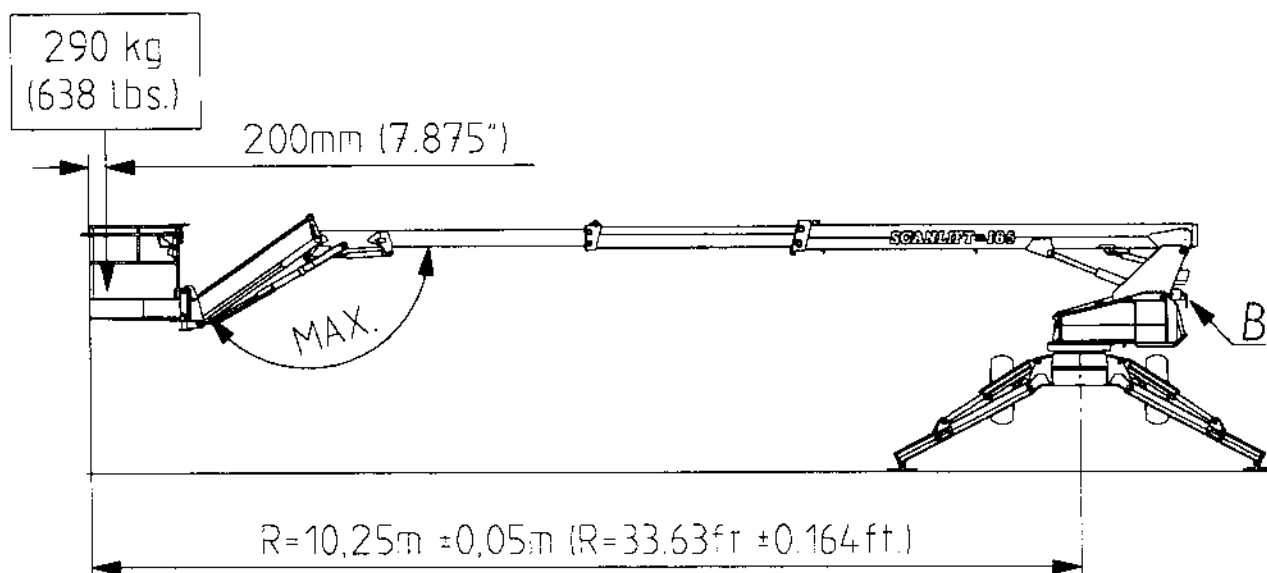
1. Support the MEWP on stabilizers.
2. Extend the jib fully with empty platform from the platform guiding place (A). Drive other boom movements from the turntable guiding place B.



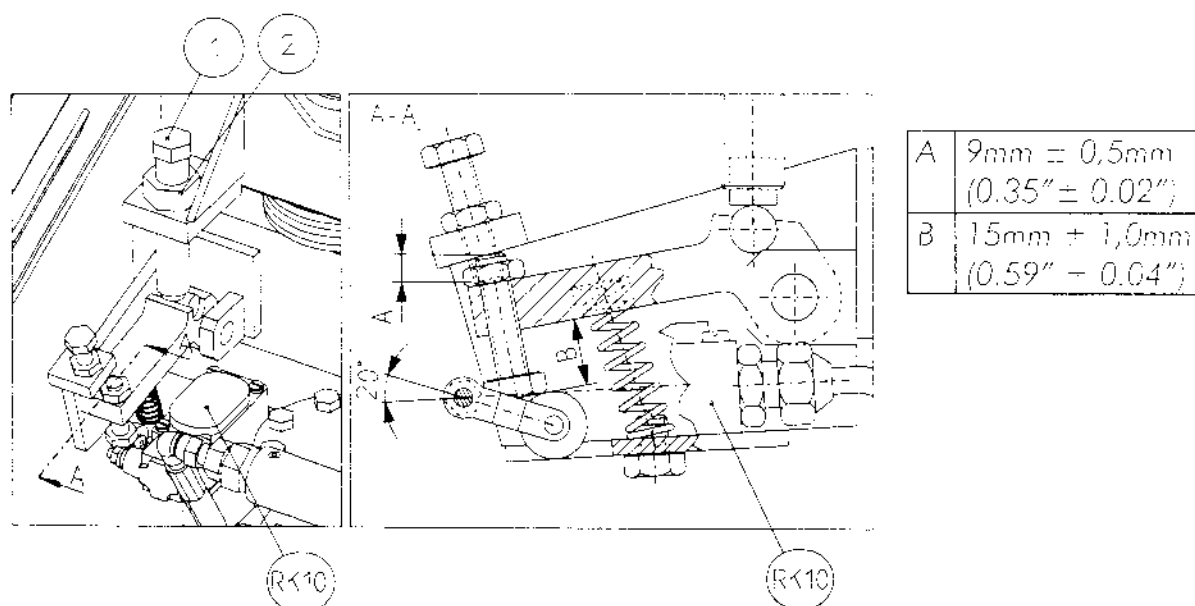
3. Use the adjusting screw 1 of the boom extension load control lever so that the extension stops when the distance of the platform edge from the tipping centre is 11,0 m (36.1 ft). Tighten screw 2.
4. Leave the booms to length given in item 3.
5. Raise the booms from horizontal level to 30° - 50° angle.
6. Extend the booms to length R=11,2m (36.75 ft) (empty platform).
7. Use the adjusting screw 3 of the boom lowering load control lever so that the lowering of the booms stops to 11,0m (36.1 ft). Note! Platform height from ground is over 1,0m (3.28 ft).
8. Tighten nut 4.
9. During adjustment the booms are guided from the turntable control device B.
10. Hydraulic oil temperature -30°C (-86°F).

32.0 CHECK / ADJUSTMENT OF LOAD CONTROL SAFETY LIMIT RK10

1. Support the MEWP on stabilizers (platform empty). Boom horizontal. Jib totally out (refer to picture).



2. Check length $A=9,0\text{mm} \pm 0,5\text{mm}$ ($0.35\text{ in} \pm 0.02\text{ in}$) and length $B=15\text{mm} \pm 1,0\text{mm}$ ($0.59\text{ in} \pm 0.04\text{ in}$), and the roller shaft angle -20° downwards from horizontal level of limit switch.



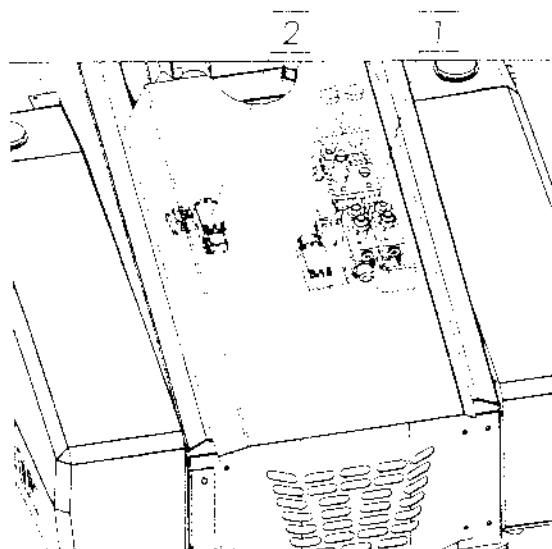
3. Extend the booms to length $R=10,25\text{m}$ (33.63 ft.). Boom guidance from turntable guiding place B.
4. Cautiously add a 290 kg (639.3 lb) load on platform (refer to picture)
5. Tighten cautiously screw 1 thus triggering limit switch RK10 and stopping the combustion engine.

6. Lock nut 2.
7. Unload the platform.
8. Trim limit switch RK10 (refer to instructions: TRIMMING SAFETY LIMIT RK 10), then you can start the combustion engine.
9. Seal targets 1 and 2 with sealing paint.

33.0 TRIMMING SAFETY LIMIT RK10

Location in MEWP

The actual safety limit switches for lifting, telescope and jib are located on the right side of the turntable (ref. 1). The standby safety limit is on the left side of the turntable (ref. 2).



Operating principle of the standby safety limit switch

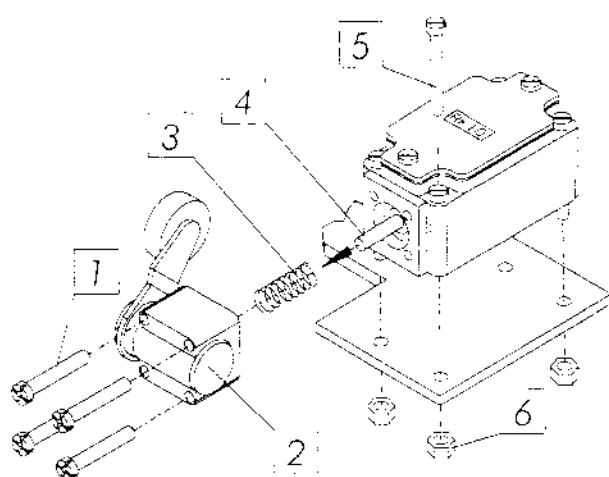
When the actual safety limit switches get out of order or the safe loading of the booms, that is the safe lifting radius, is exceeded because of a swing of the boom due to an external overload, the standby safety limit will release and cut the combustion engine. Only the emergency lowering system will work.

In a state of overload the spindle 4 of the standby safety limit switch RK10 will retract. Please observe that the MEWP can be equipped with either a Schmersal or Telemecanique switch.

Repairing measures of a released standby safety limit - Schmersal switch

1. Lower the platform to the ground by using the auxiliary lowering system.
2. Annul the state of overload (empty the platform).
3. Investigate the reason for the release of the standby safety limit switch. If the standby safety limit RK10 engages because of any other reason than due to a deliberate external overload, you must call for an expert to examine and repair the MEWP before its next use.

Re-trimming of the switch (RK 10, Schmersal)



1. Open screws 5 (4pcs) and lift the switch up.
2. Open screws 1 (4pcs) and pull out cover 2.
3. Pull spindle 4 carefully outwards so that it clicks slightly. If the spindle becomes detached, reassemble it properly and make sure that spindle 4 will stay in its outer position.
4. Put spring 3 back and press cover 2 in its place.

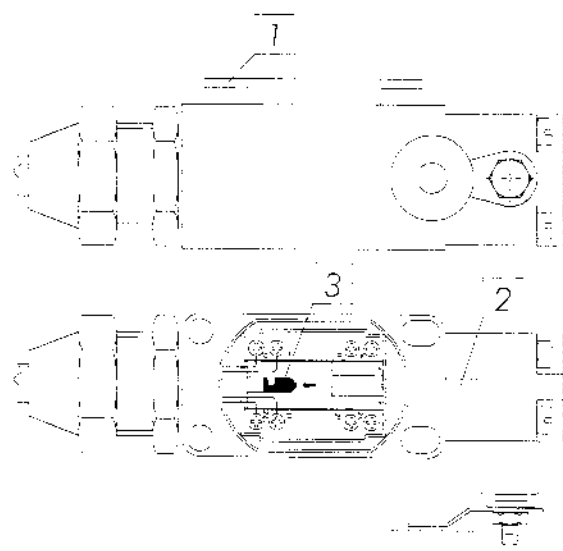
5. Attach cover 2 with screws 1.

6. Fix the standby safety limit switch in its place with screws 5 and nuts 6.

Repairing measures of a released standby safety limit switch -Telemeganique switch

1. Use the auxiliary lowering system to lower the platform to the ground.
2. Annul the state of overload (empty the platform).
3. Investigate the reason for the release of the standby safety limit switch.
4. Repair or have repaired the malfunction which has caused the release of the standby safety limit.

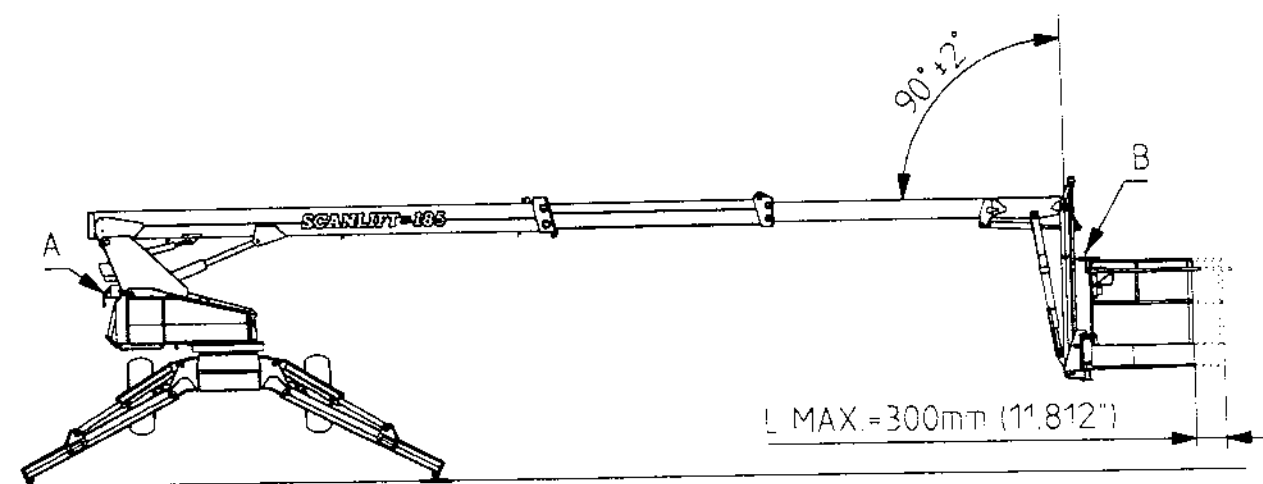
Re-trimming the switch (RK 10 , Telemeganique)



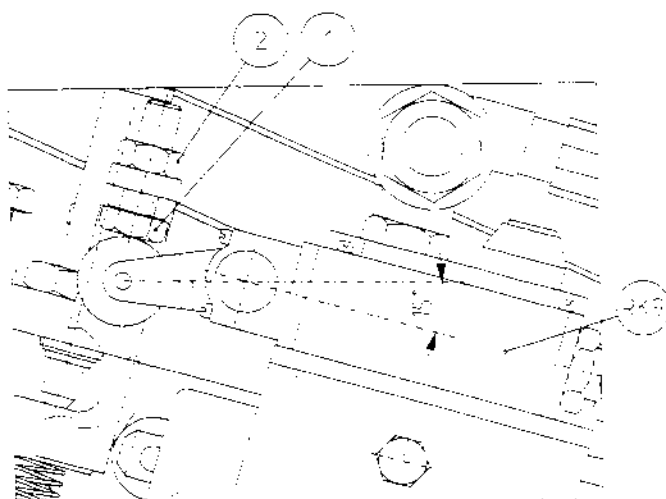
1. Open the cover of the turntable.
2. Open cover 1 of the standby safety limit switch.
3. Trim spindle 2 into operating state by pushing the spindle in the direction of the arrow from hole 3 so that it clicks.
4. Close the cover 1 of the switch.

34.0 CHECKING AND ADJUSTING JIB LOAD CONTROL

1. Support the MEWP on the stabilizers. Boom horizontal. Jib in vertical position (refer to drawing) with empty platform.



2. Check that the roller lever of limit switch RK9 is in an angle of 15 degrees below horizontal plane, while the roller is free (refer to drawing).



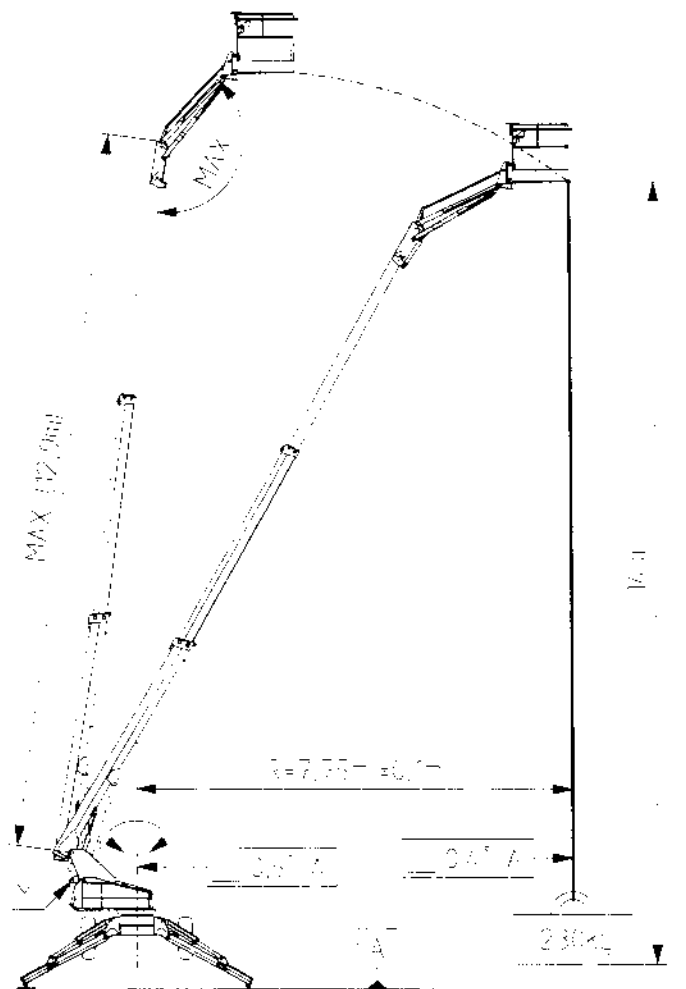
3. Extend the booms until load control stops the movement. Guide the boom with the turntable control valve (A).
4. Change boom guidance to platform valve (B).
5. Use the jib boom to guide the platform, and at the same time adjust with screw 1 the platform to stop at L max. = 300mm (0.98 ft).
6. Repeat item 5 at least three times.

Note! The operator must be outside the platform, platform empty. Do not lift or push down the platform while operating.

7. Tighten screw 2. Seal screw 1 and nut 2 with sealing paint.
8. Seal lever / nut of the limit switch.

35.0 LOAD CONTROL OF BOOM LOWERING - CHECKING AND ADJUSTING

1. Retract the booms totally.
2. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
3. Attach a chain or cable + weight (length about 14m (45.9 ft) with weight) to the edge of the platform. Total weight of chain and weight $230\text{ kg} \pm 2\text{ kg}$ ($507\text{ lb} \pm 4.4\text{ lb}$).



4. Raise the booms fully and extend to full length. Guide the boom from the turntable control valve (Y).

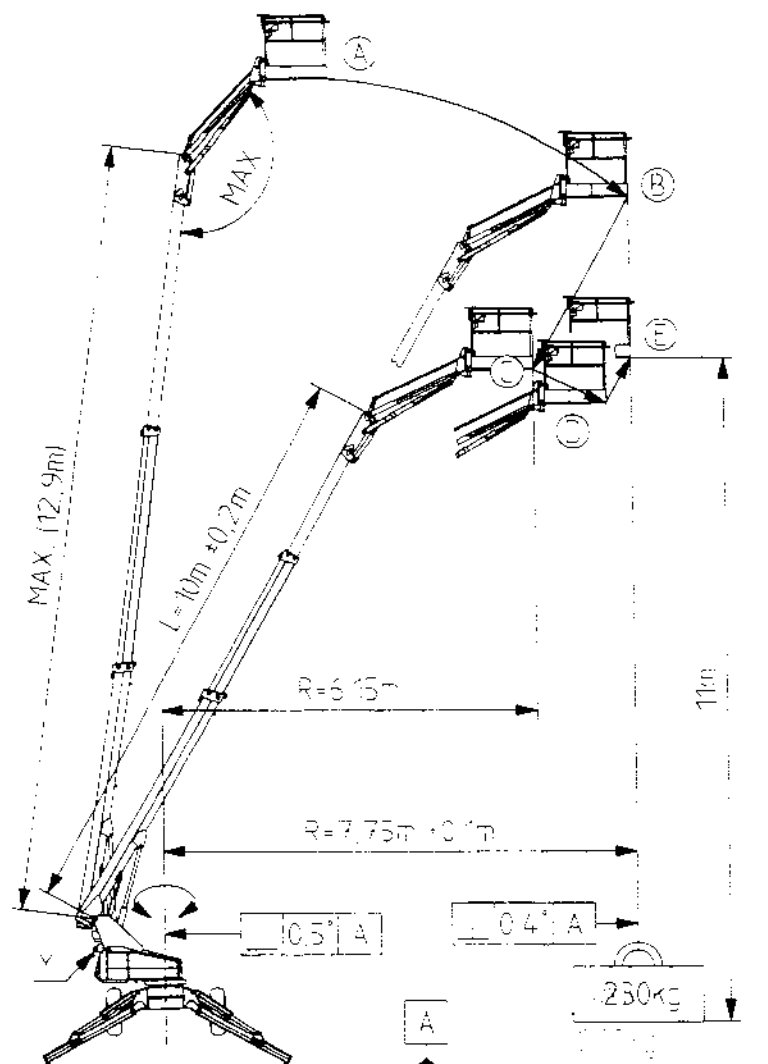
5. Lower the booms, keep the lowering spindle fully open. Lowering should stop to $R=7.75\text{m} \pm 0.1\text{m}$ ($25.4\text{ft} \pm 0.33\text{ft}$).



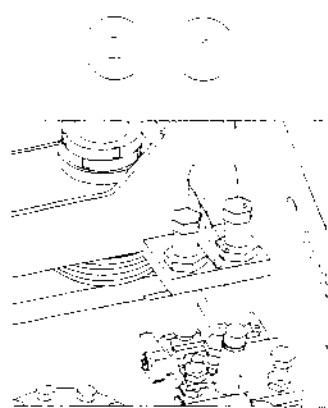
If needed, adjust with the load control lever adjusting screw 1 of boom lowering.

6. Repeat lowering at least three times. Measure radius R each time.
7. Tighten nut 2.
8. Seal screw 1 and nut 2 with sealing paint.

36.0 BOOM EXTENSION LOAD CONTROL - CHECKING AND ADJUSTING

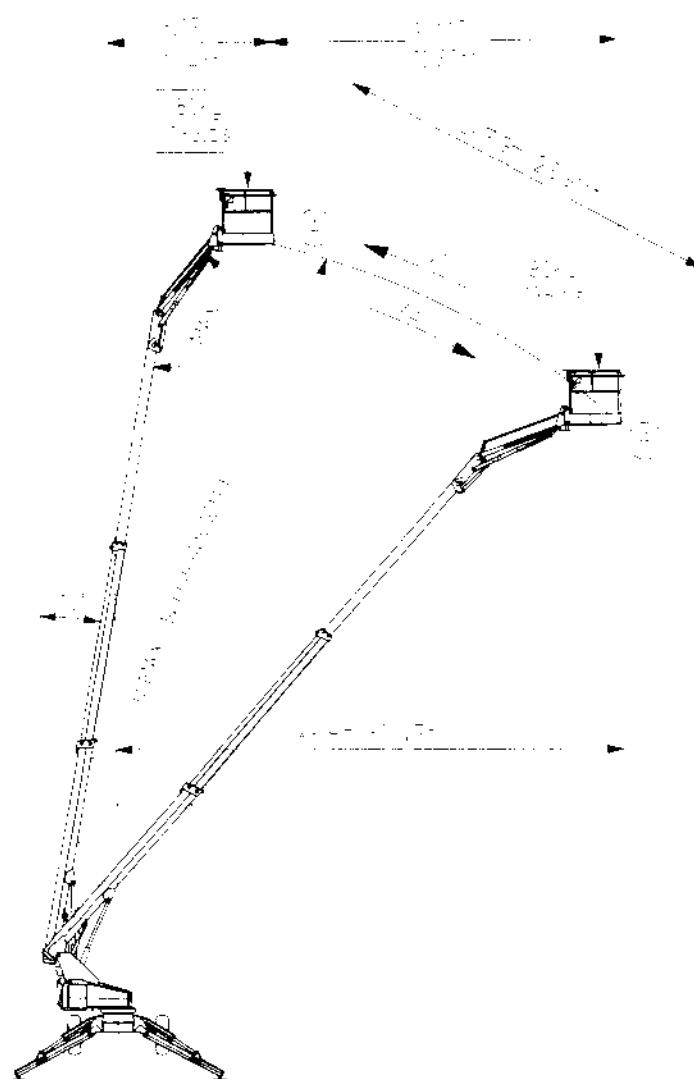


1. Retract the booms fully.
2. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ (86°F).
3. Attach a chain or cable + weight (length about 11m with weight) to the edge of the platform. Total weight of chain and weight $230\text{ kg} \pm 2\text{ kg}$ ($507\text{ lb} \pm 4.4\text{ lb}$).
4. Lift the booms fully and extend to full length. Guide the boom from the turntable control valve (Y).
5. Lower the booms, they will stop at point B.
6. Retract booms about 2,9 m (9,5 ft) to point C.
7. Lower the booms to point D so that the weight will slightly touch the ground.



8. Extend the booms towards point E, holding the boom extension spindle fully open. The platform should stop to measurement $R=7,75\text{ m}$ (25,4 ft).
If needed, adjust with adjustment screw 1.
9. Repeat item 8 at least three times. Always measure radius R.
10. Tighten nut 2.
11. Seal screw 1 and nut 2 with sealing point.

37.0 MEASURING THE RAISING AND LOWERING SPEED OF BOOMS



- V1 = Raising
- V2 = Lowering
- Min. raising and lowering time = 20s
- L = max. radius with 80 kg (176 lb) platform load.
- V1 max. = 0,4 m/s (1.31 ft/s) (prEN 280)
- V2 max. = 0,4 m/s (1.31 ft/s) (prEN 280)
- Hydraulic oil temperature -30°C (+86°F)

Lowering speed

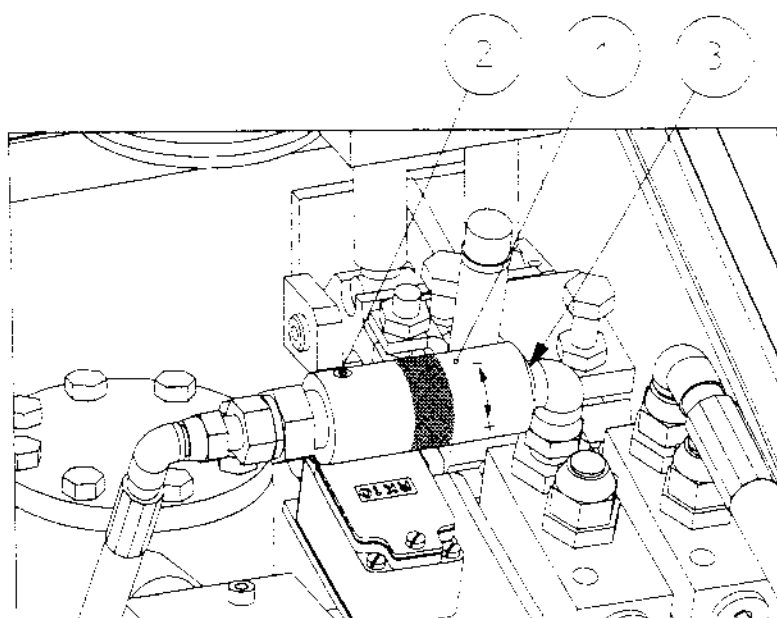
1. From platform, drive booms and jib fully up with platform load of 80 - 90 kg (176 - 198 lb).
2. Pull the boom lowering spindle fully open, and start the watch. Stop the watch when the boom movement starts to slow at point B.

Raising speed

1. The booms are stopped at point B.
2. Push the boom raising spindle fully open, and start the watch. Stop the watch when the boom movement starts to slow at point A.

IF LOWERING OR RAISING SPEED IS LESS THAN 20 S, REFER TO ADJUSTING INSTRUCTIONS.

38.0 ADJUSTING THE RAISING SPEED OF THE BOOMS



1.	Adjustment valve of raising speed
2.	Locking screw
3.	Sealing point

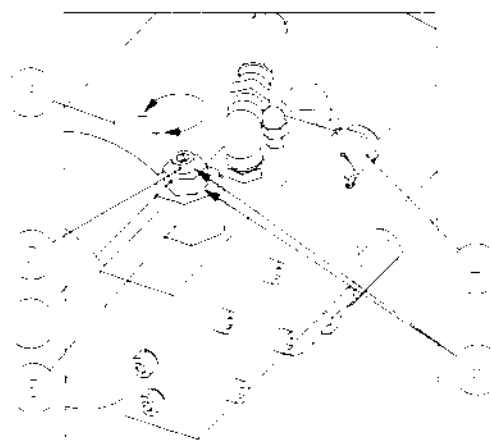
1. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
2. Open the locking screw.
3. When the adjusting screw is turned to $+$ direction, the

boom raising becomes faster.

When it is turned to $-$ direction, the raising becomes slower.

4. Tighten the locking screws.
5. Seal locking with sealing paint.

39.0 ADJUSTING THE LOWERING SPEED OF THE BOOMS

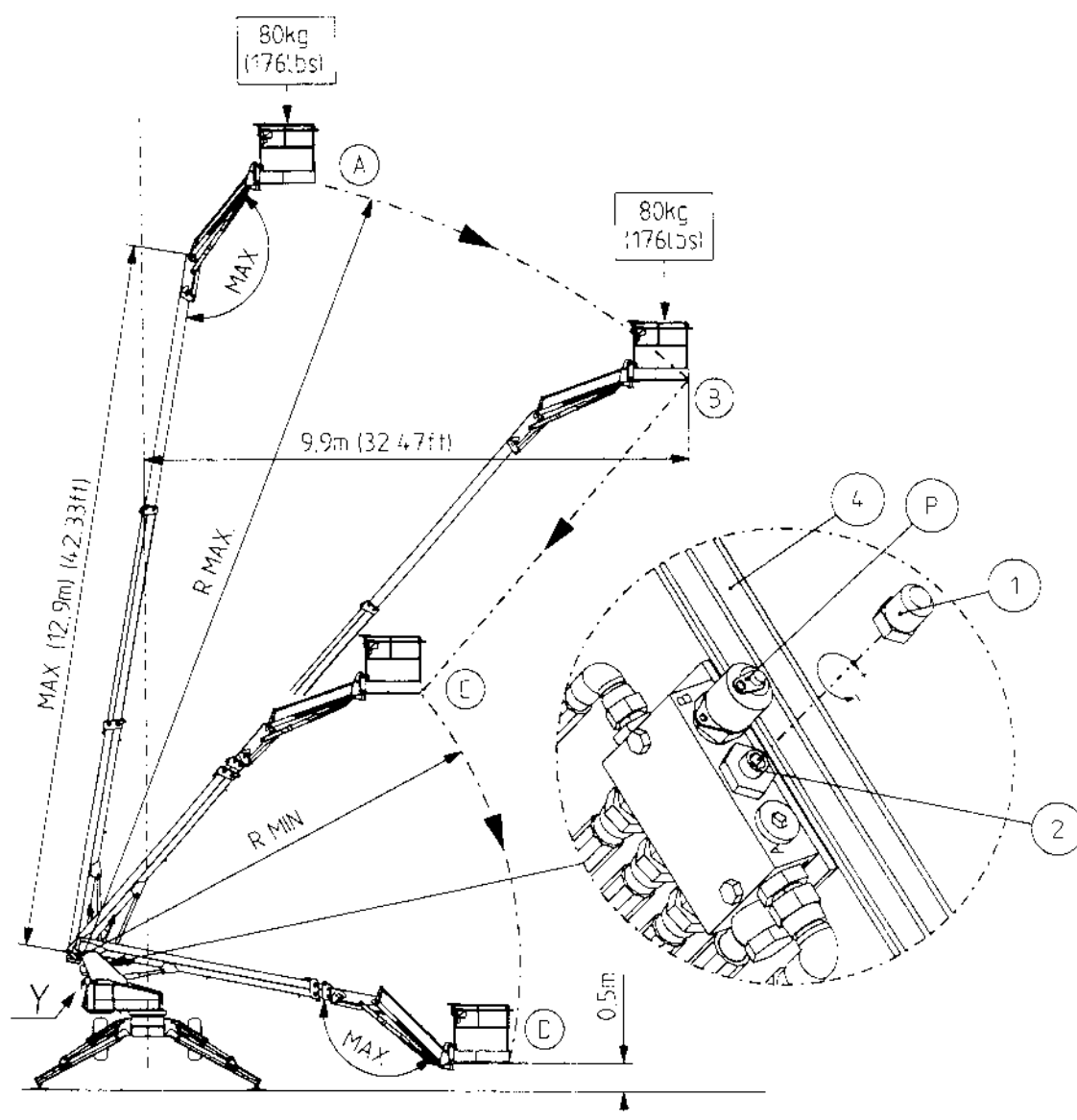


1.	Locking screw
2.	Adjusting screw
3.	Lifting cylinder
4.	Load lowering valve
5.	Adjustment valve of lowering speed
6.	Sealing point

1. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
2. Open locking nut 1.

3. Lowering speed is adjusted by turning the hexagon screw:
When adjusting screw is turned to $+$ direction, the boom lowering becomes faster. When it is turned to $-$ direction, the lowering becomes slower.
4. Tighten locking nut 1, while holding the hexagon screw 2.
5. Seal with sealing paint.

40.0 LOWERING THE BOOMS - ADJUSTING THE START OFF

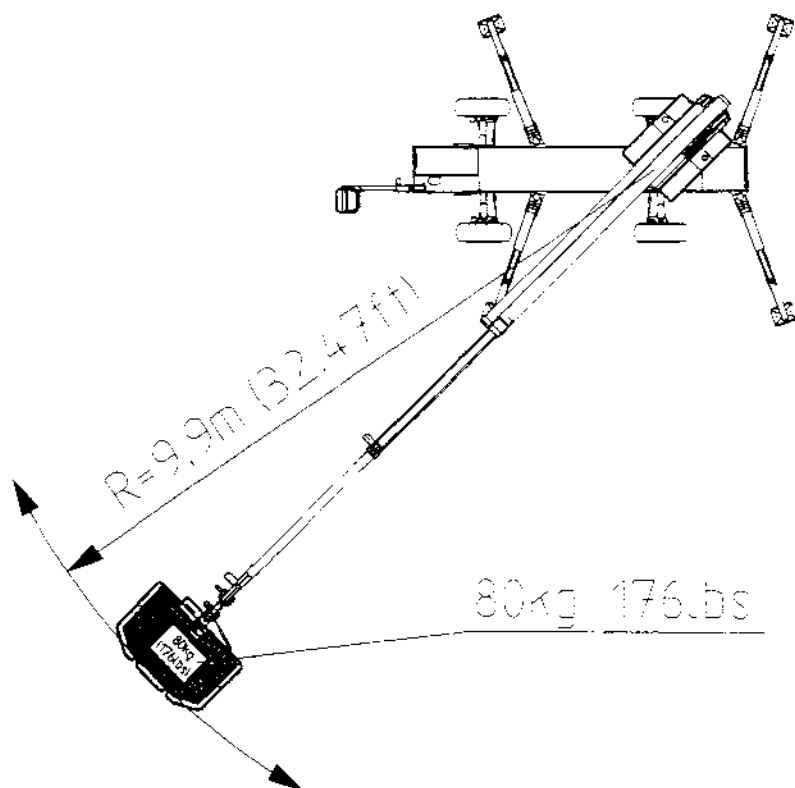


1	Protecting plug
2	Adjustment screw
P	Pressure measuring point
4	Turntable

1. Adjustment is necessary, if start off from position A is too quick, or if the booms do not come down from position C with cold oil.
2. Remove protecting plug 1 and attach pressure gauge to point P.
3. Raise the temperature of hydraulic oil to -30°C ($+86^{\circ}\text{F}$).
4. Raise booms to position A, fully up.

5. Pull the lowering spindle of turntable control valve Y fully open, in which case the pressure gauge should indicate $68 \text{ bar} \pm 3 \text{ bar}$ ($968 \pm 43 \text{ psi}$).
6. Lower the booms to position B, where the pressure is appr. 66 bar (957 psi).
7. Retract the booms to point C, where the pressure is appr. 69 bar (1001 psi).
8. Lower the booms to position D, where the pressure is appr. 65 bar (943 psi).
9. When adjustment 2 is turned to direction — the pressure is raised. Turning to direction - reduces the pressure.
10. Tighten protecting plug 1.
11. Seal with sealing paint.

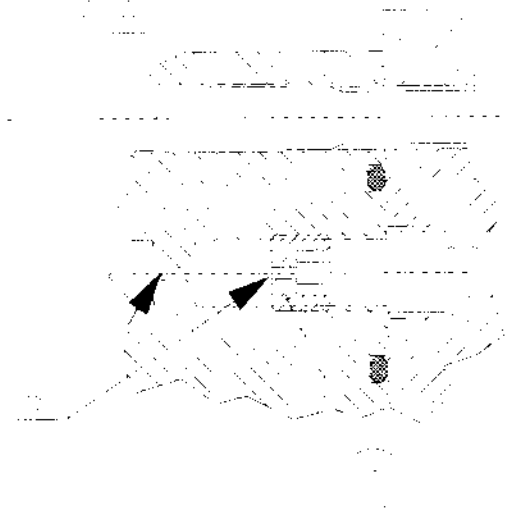
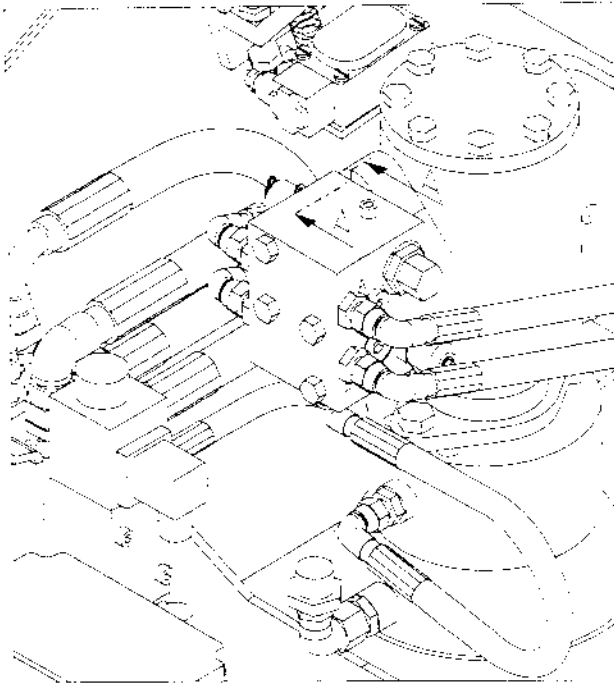
41.0 MEASURING AND ADJUSTING SLEWING SPEED



– Max. speed = $0,7 \text{ m/s}$

– Speed of a full circle = $\frac{9,9\text{m} \times 2 \times \pi}{0,7\text{m/s}} = 89 \text{ s/circle}$

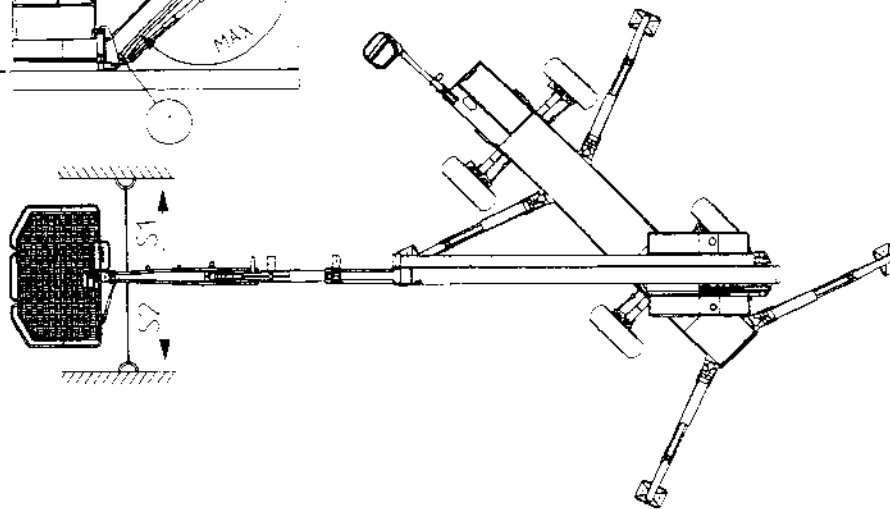
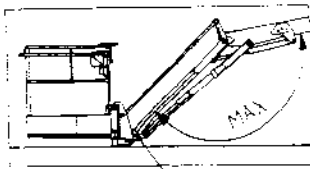
– Hydraulic oil temperature -30°C



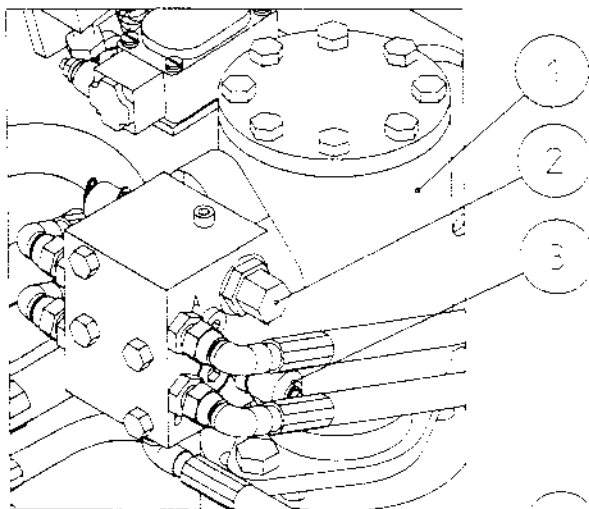
B = Throttles that determine the slewing speed. Constant Ø1,5mm (0.059 in)

The slewing speed can be reduced by making the hole in part 1 smaller.

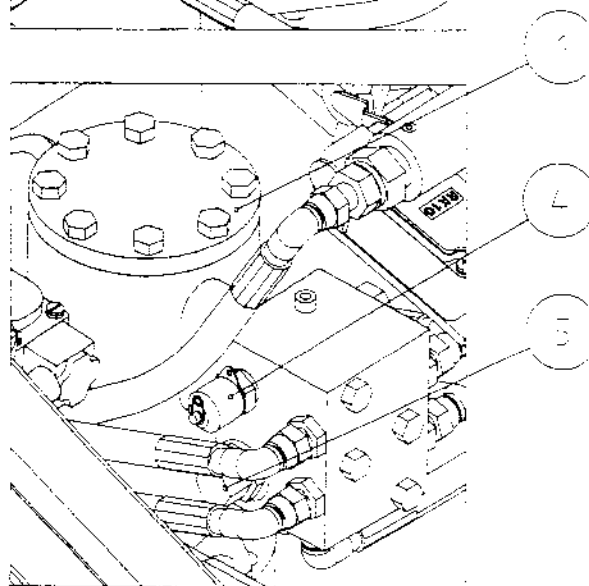
42.0 MEASURING AND ADJUSTING SLEWING PRESSURE



1 - Point of binding



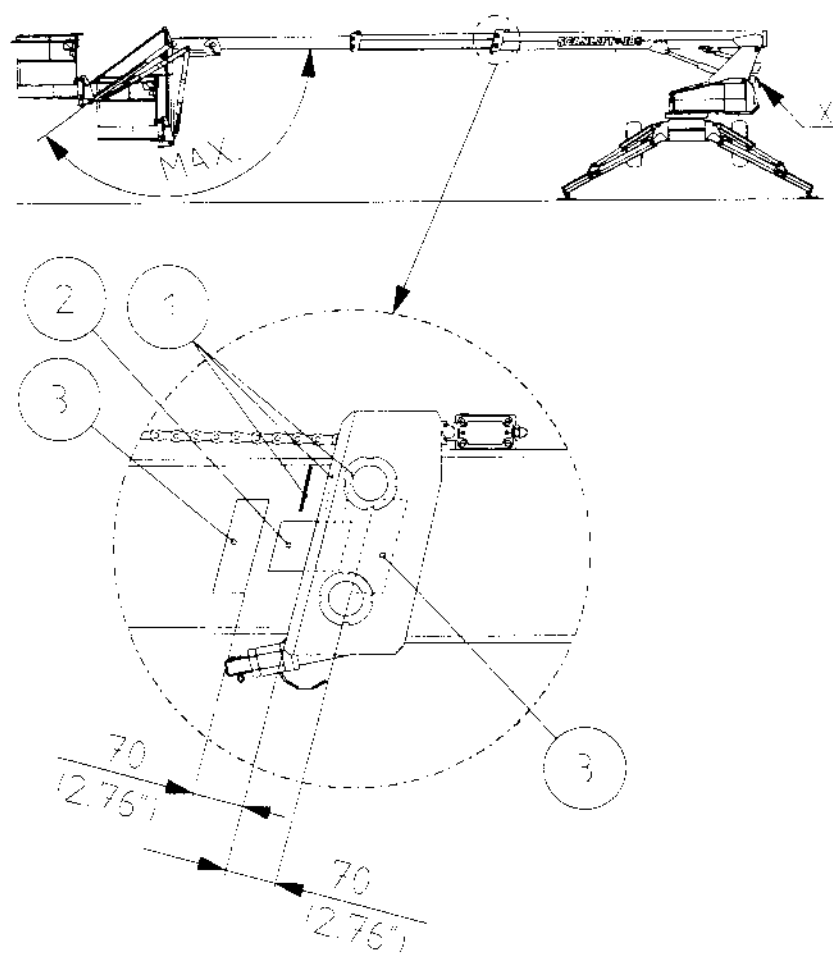
1	Slewing motor
2	Pressure adjustment of direction S2
3	Measuring point MP3 of direction S2
4	Measuring point MP2 of direction S2
5	Pressure control of direction S1



1. Bind the booms according to the drawing.
2. Attach pressure gauge to measuring point MP2.
3. Remove protecting cap of pressure regulating cartridge S1.
4. Slew the booms in direction S1, and adjust pressure to 150 bar (2176 psi). Output 9-10 l/min.
5. Adjust S2 according to items 1-4.
6. Attach protecting caps and seal with sealing paint.

NOTE! DO NOT ADJUST CARTRIDGES S1 AND S2 WHILE UNDER PRESSURE!

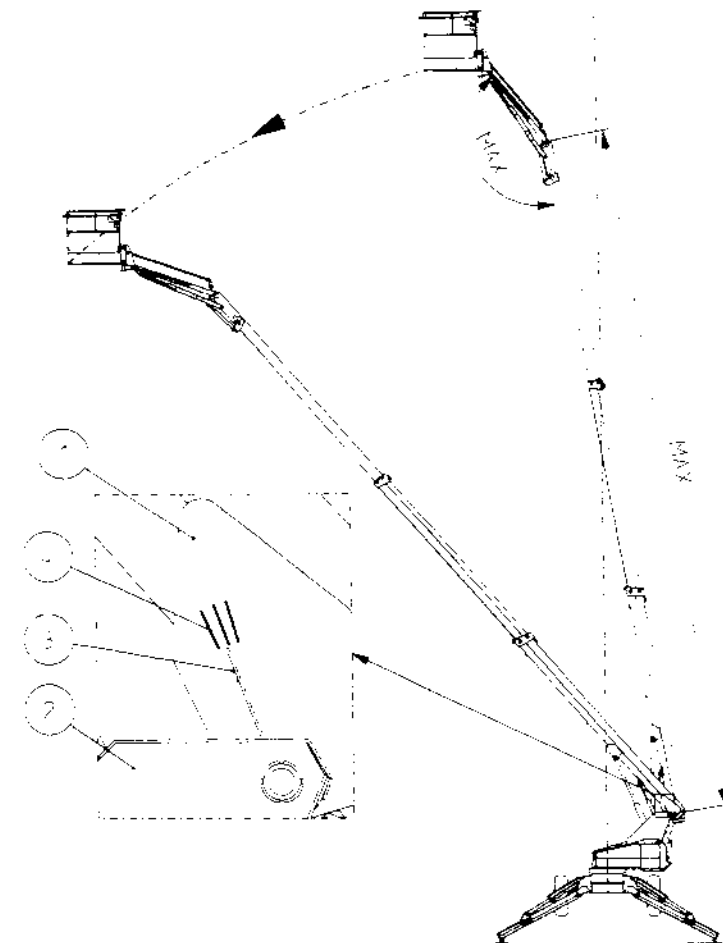
43.0 CHECK MARK OF SAFE LIFTING RADIUS



X	Guidance of booms
1	Marks
2	Black tape: 50 x 100mm (1.97" x 3.94")
3	Red paint: 20 x 50mm (0.97" x 1.97")

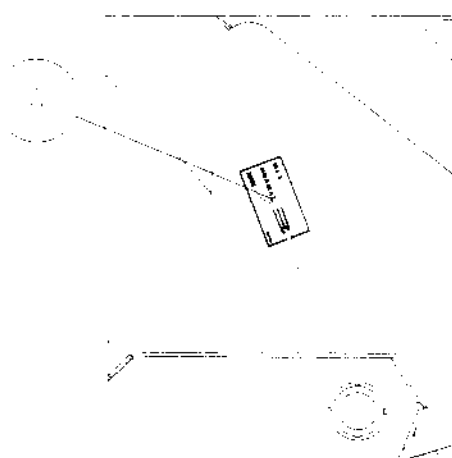
1. Support the MEWP on the stabilizers with boom horizontal and jib fully out. Platform empty.
2. Raise the temperature of hydraulic oil to -30°C (-86°F).
3. Drive booms with the turntable control valve until they stop. Make a mark on the middle boom at the mouth of the lifting boom (see drawing).
4. Retract the booms. Repeat item 3 three times.
5. Retract the booms, lower the jib down to vertical position, extend the booms.
6. Take the average of the three marks, and dimension the marks so that the side slide pads of the lifting boom do not rub them.

44.0 CHECK MARK OF BOOM LOWERING



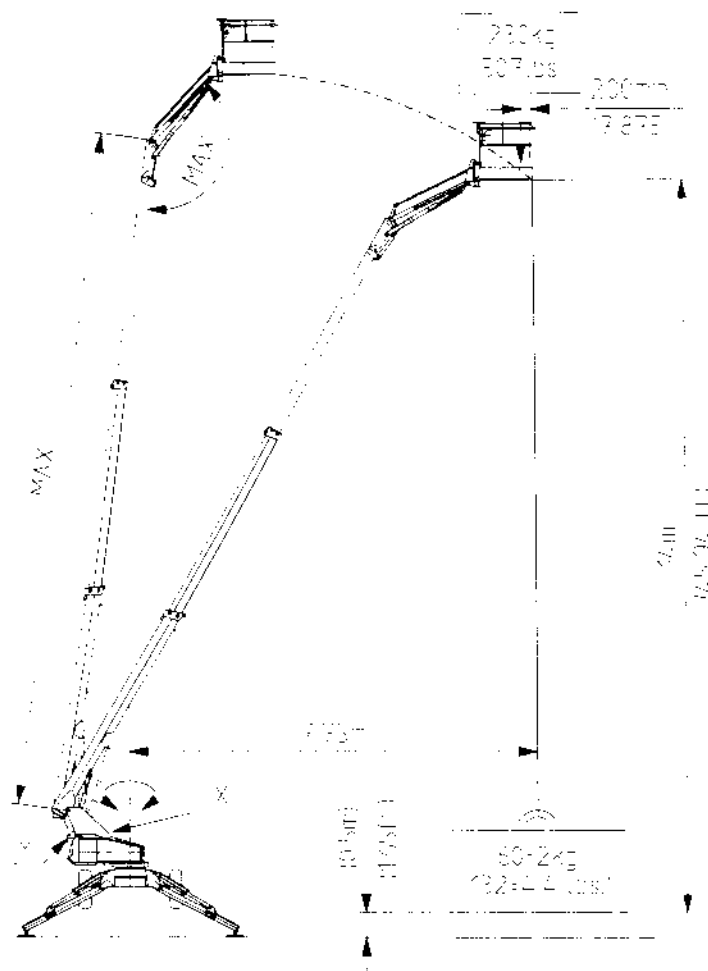
1	Lifting boom
2	Turntable
3	Indicator
4	Marks

1. Support the MEWP on stabilizers with boom in upper position. Telescope out, platform empty and jib boom in line with the boom.
2. Raise the temperature of hydraulic oil to -30°C -86°F .
3. From the turntable guiding place, drive the booms downwards with the lifting cylinder until they stop. Make a mark on the lifting boom by indicator 3.
4. Raise the booms. Repeat item 3 three times.
5. Retract the booms, lower jib and lower the booms.



6. Take the average of the three marks. Attach check decal A (item No.: 3280521) to the lifting boom so that the line NORMAL of the decal is by the average mark.

45.0 TEST LOADING



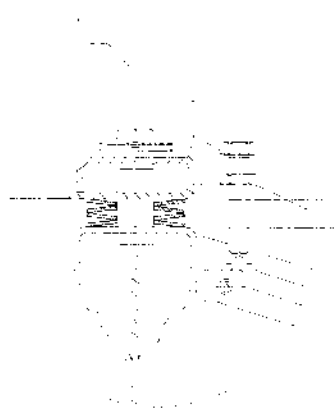
1. Support the MEWP on the stabilizers, jib fully extended and the booms retracted.
2. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ (-86°F).
3. Load the platform with 230 kg (507 lbs), 200mm (7.87 in) from the gate side of the platform.
4. Erect the booms with the turntable control valve (Y).
5. Extend the booms fully.
6. Lower the booms to the safe limit $R=7,75\text{m}$ (25.4 ft).

7. Slew the booms around the tipping centre, full circle in both directions.

8. Erect the booms fully.

9. Retract the booms fully.

10. Lower the platform to the ground.



11. Add a support piece $\varnothing 60-80\text{ mm}$ ($\varnothing 2.4-3.1\text{ in}$) ,thickness 25mm $\pm 0,5\text{mm}$ ($0.98\text{in} \pm 0.02\text{in}$) to space L (point X).

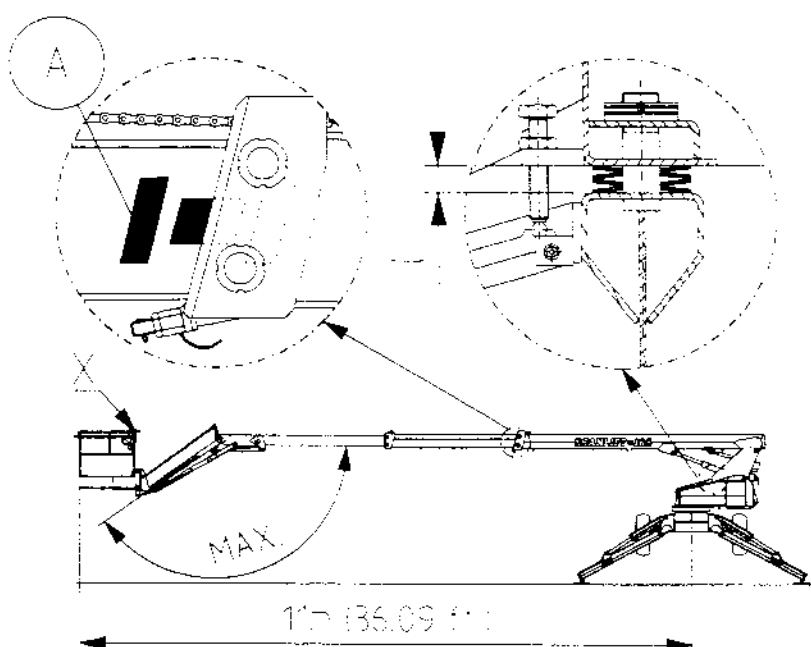
12. Attach a chain or wire to the platform.

13. Erect and extend the booms fully, and lower to safe limit $R=7,75\text{m}$ (25.4 ft). **NOTE! LOAD GUARDS ARE NOT FUNCTIONING!**

14. Attach 60 kg (132 lb) of extra weight to the chain or wire so that the weight does not touch the ground.

15. Slew the booms carefully around the tipping centre, full circle in both directions.
16. Remove extra load, as well as platform load.
17. REMOVE SUPPORT PIECE FROM POINT X
18. Check carefully for any tears in the MEWP, or permanent deformations.
19. Fill in the test loading record.
20. After test loading, check that the safety limit adjustments have not changed. Adjust, if needed.

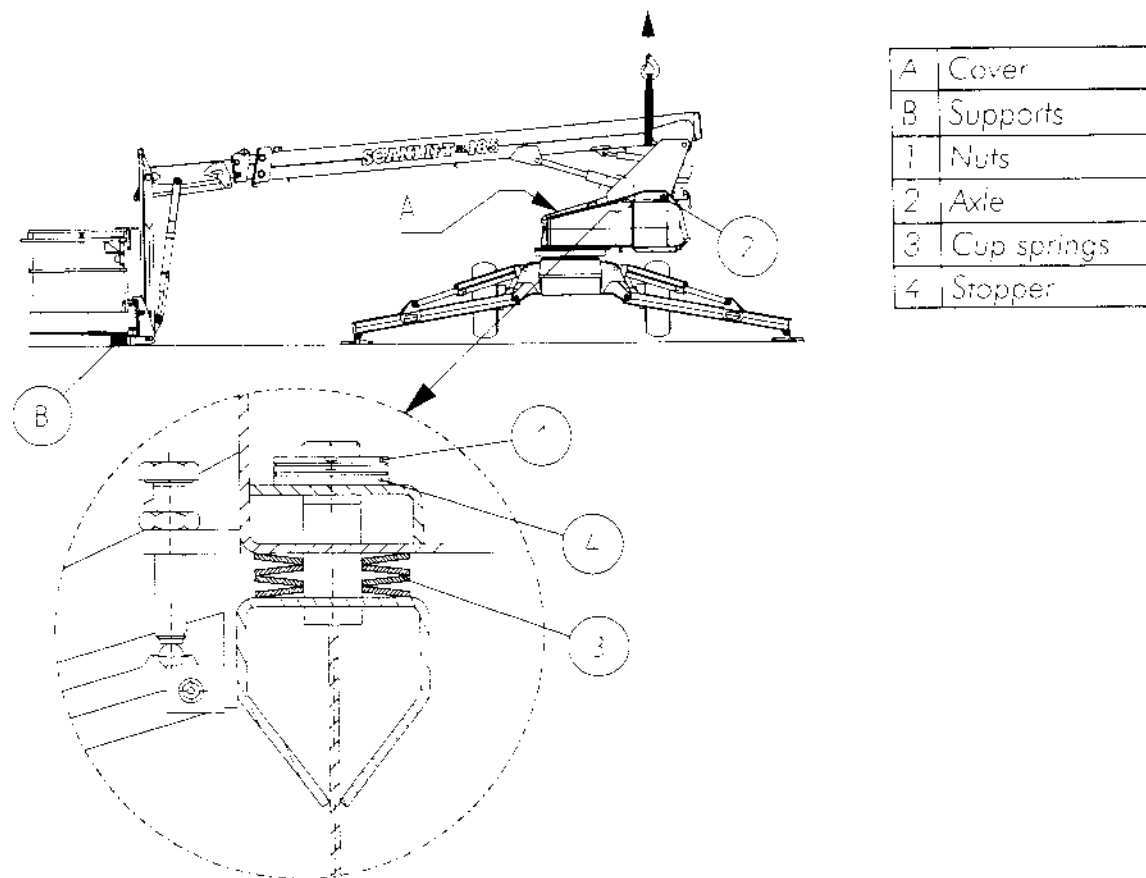
46.0 CHECKING THE SPRING PACK OF LOAD CONTROL



1. Support the MEWP on the stabilizers, boom horizontal and jib fully extended, platform empty.
2. Drive the booms out to mark A, guiding from the platform (X), if needed lift the platform.
3. Stop the motor and leave the booms in the position shown in the drawing.

4. Measure the height L of the spring pack, if it is less than 22mm (0.87 in), replace spring packs according to 46.0.
5. The spring packs need to be changed also, if the safe lifting radius becomes considerably shorter. If you attempt to check the lifting radius with mark A, the mark does not come into sight.

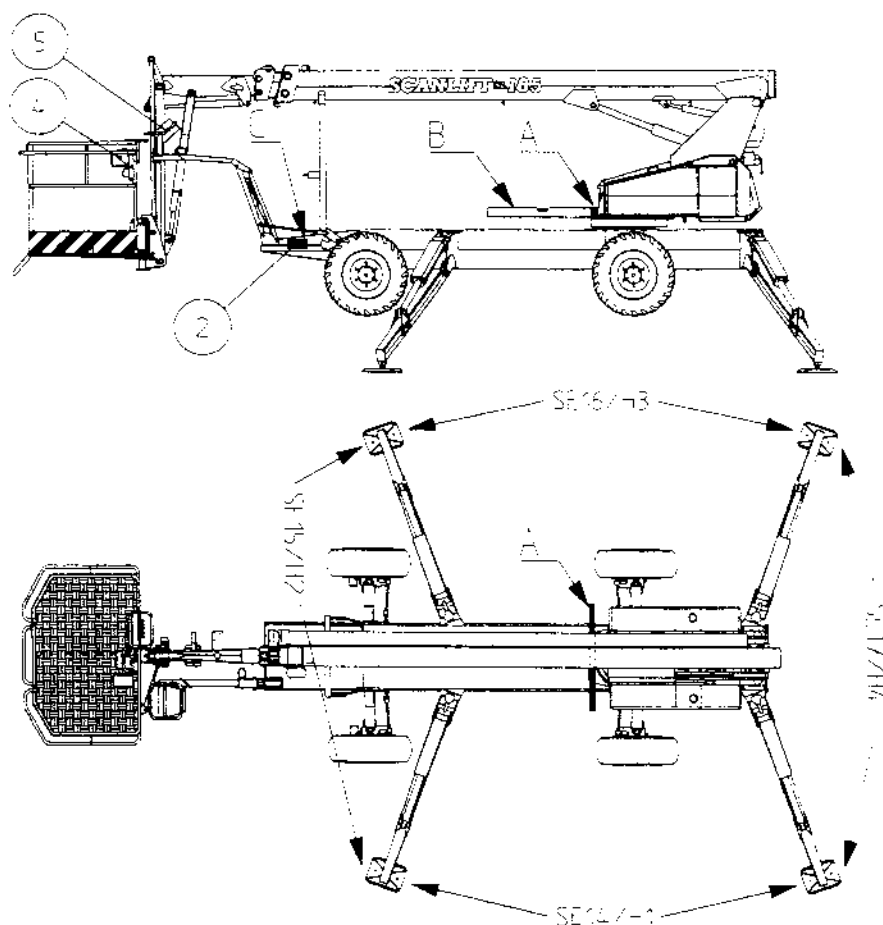
47.0 REPLACING THE SPRING PACK OF LOAD CONTROL



1. Support the MEWP on the stabilizers, wheels slightly off the ground, booms retracted, platform on the ground, supported from the sides (see drawing).
2. Remove cover A.
3. Remove nuts 1 (4pcs).
4. Remove axle 2, while raising the booms.
5. Raise the booms carefully. If needed, disconnect hydraulic hoses. Watch the electric wires while raising.
6. Replace cup springs. Use only springs listed in the spare parts list. Install springs according to the drawing.
7. Lower the booms. Fit axle 2, and stopper 4. Tighten screws to 1 50-70 Nm. Lock nuts with claw rings, also the nut of axle 2.
8. Adjust the load control equipment according to instructions.
9. Perform a test drive. Enter the repairs done in the following places of the examination record: notices, target of repair, date and the repairer's signature.

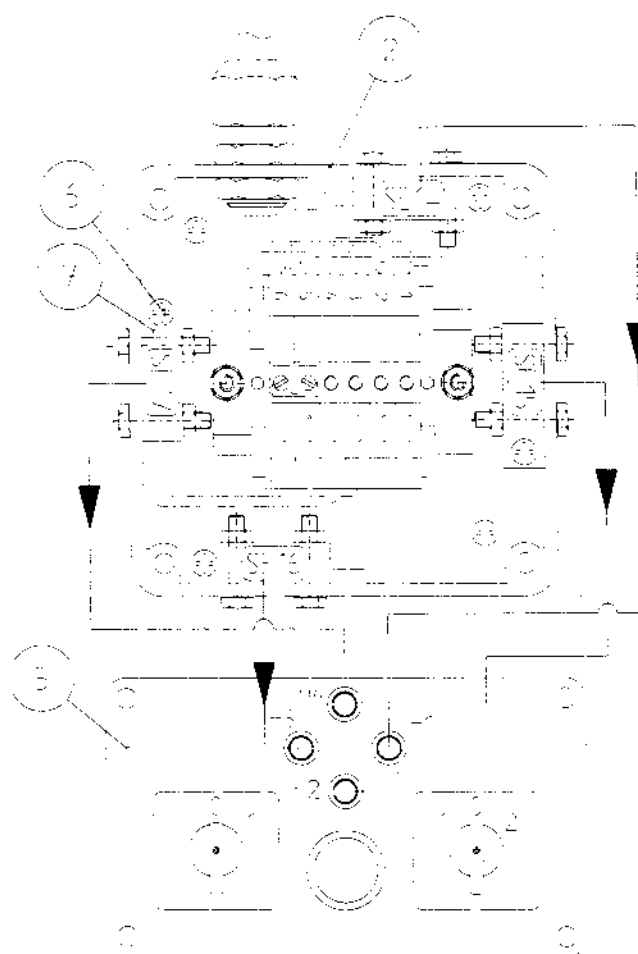
48.0 ADJUSTING THE HORIZONTAL LEVEL INDICATOR

1. Support the MEWP on the stabilizers.
2. Set a water level at point A, and bring MEWP to level in crosswise direction with an accuracy of $\pm 1,0^\circ$.
3. Set a water level at point B, and bring MEWP to level in lengthwise direction with an accuracy of $\pm 1,0^\circ$.



2	Box 2
4	Box 4
5	Box 5
A, B	Water level
C	Cover

4. Leave the combustion engine running.
5. Open cover C, and cover of box 2.



2	Box 2
5	Box 5
6	Screw 6
SE14-SF16	Mercury switches

6. Open screws 6 and press switch in point 7 down (box 2), which causes lamp H4 to go out (box 5). Repeat this with all switches SE14-SE17.

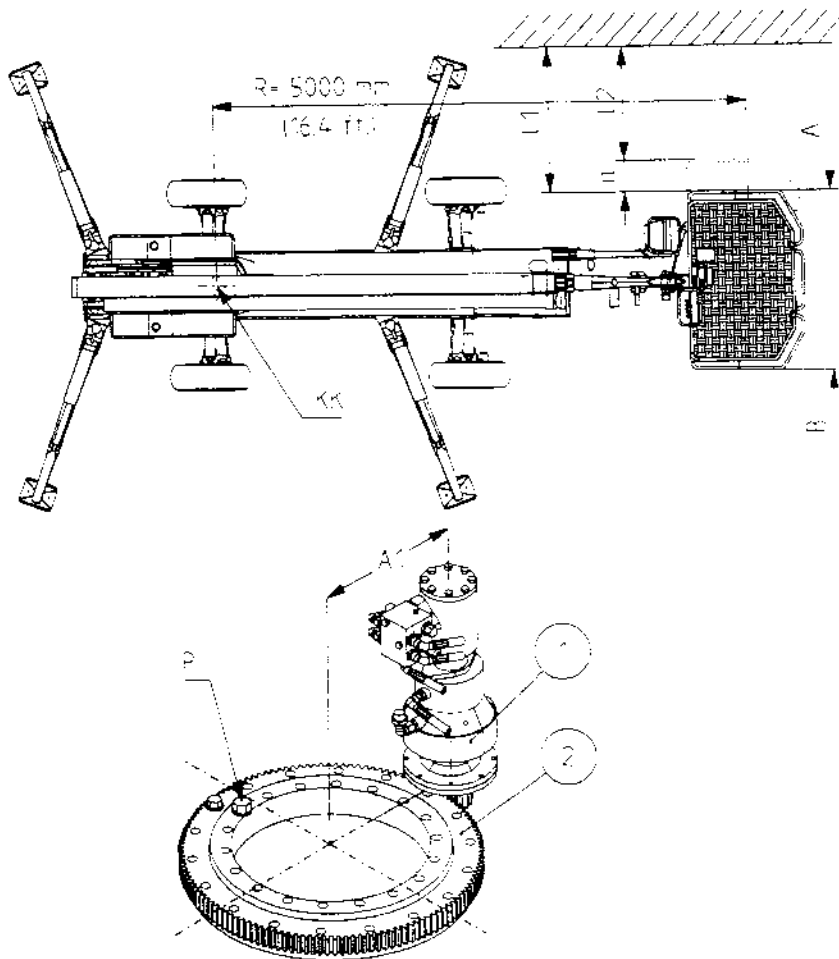
7. Carefully tighten screw 1, which causes lamp H4 to light up. Tighten the screw further 1 1/2 turns. Repeat this with all switches SE14-SE17.

8. Support the MEWP on the wheels with stabilizers off the ground.

9. Level the MEWP with the help of the indicator lamps. Check the

position of the MEWP with water level at points A and B. Max. permissible inclination $\pm 1^\circ$. Adjust according to item 7, if needed.

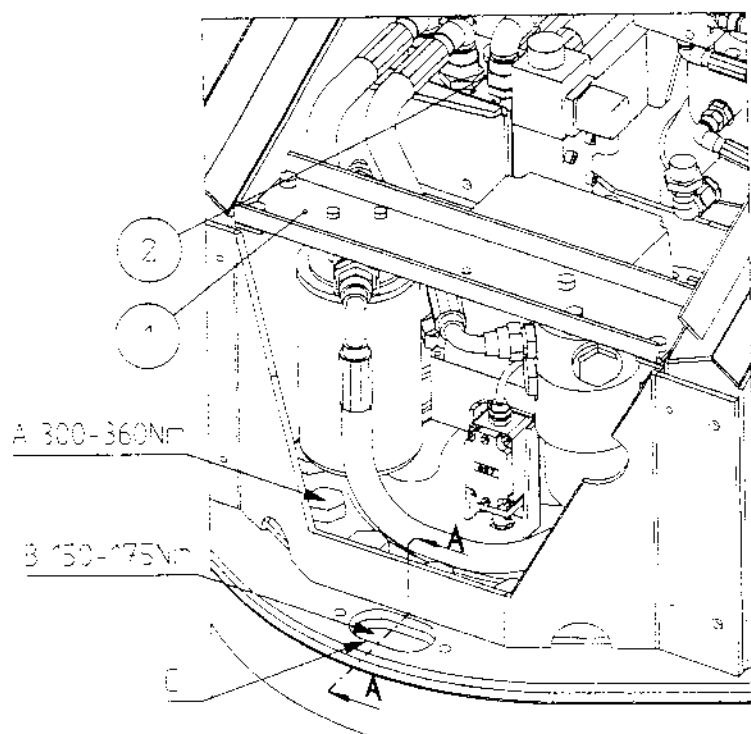
49.0 GAP MEASURING OF SLEW MECHANISM



1	Planet gear
2	Gear ring
KK	Slewing centre

1. Retract the booms fully and lower the jib.
2. Lower the transport support, leave the boom at horizontal.
3. Push the platform lightly from direction A, removing any slackness. Measure L1.
4. Push the platform analogously from direction B and measure L2.
5. L1 - L2 may not exceed 40mm (1.57 in).
 - When fitting, the gear ring and the gear set are pushed against each other. The axle distance A1 is 328mm $\pm 0,02$ mm / -0mm before tightening bolts B.
 - The inspection measure of the gear ring toothring over 15 teeth is 200,757mm. Always replace, when the measure is less than 200,0mm.
 - The inspection measure of the slewing gear cogwheel Z17 over 3 teeth is 34,098mm. Always replace, when the measure is less than 33,35mm.
6. Also check the wear of the planet gear.

50.0 TIGHTNESS OF GEAR RING BOLTS

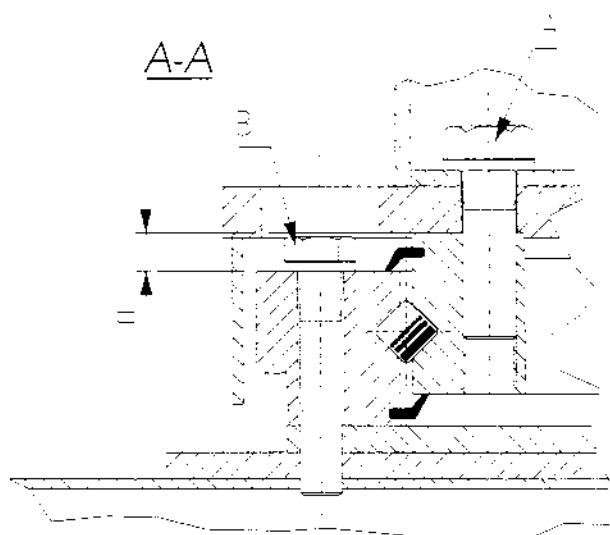


Bolts A of inner frame:

1. Remove filter group 1 and valve segment 2 from their fastenings. The hydraulic hoses need not be removed. Tighten bolts to 300 - 360 Nm with a torque wrench.

Bolts B of outer frame:

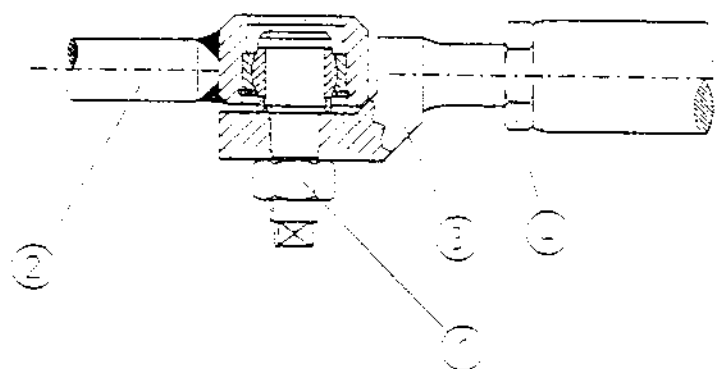
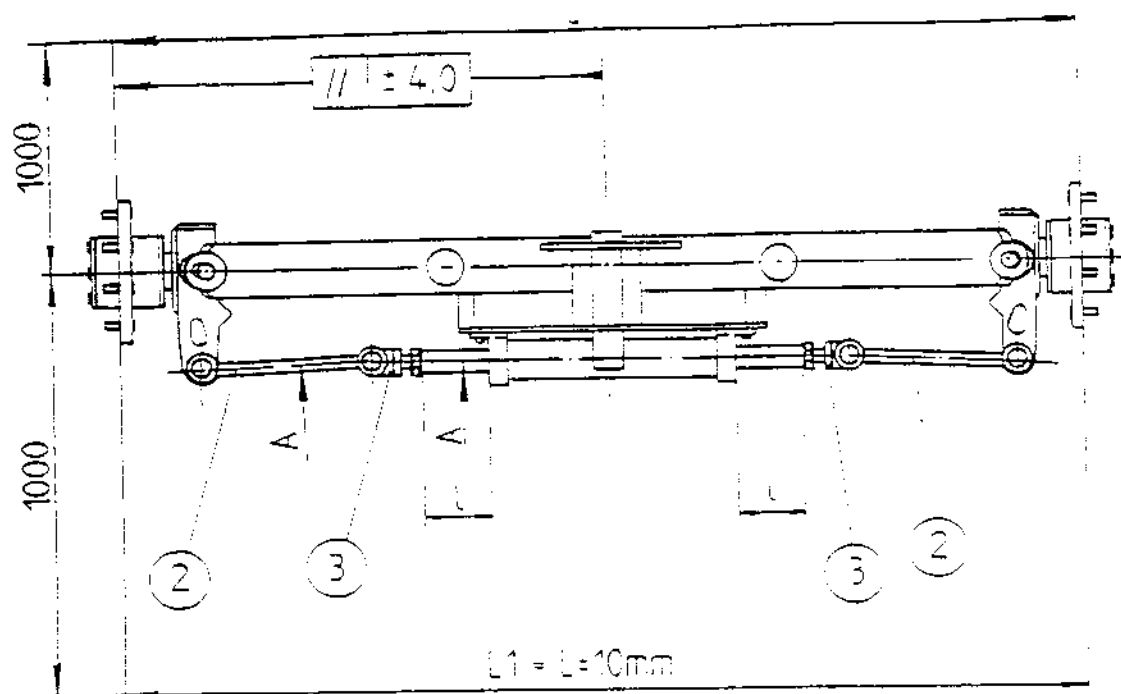
1. The bolts of the outer frame are tightened through opening C, by turning the opening to where the bolts are located. Tension torque 150 - 175 Nm.



51.0 MEASURING THE WEAR OF GEAR RING

If the measure *a* (profile A-A) is less than 13 mm the gear ring must be replaced.

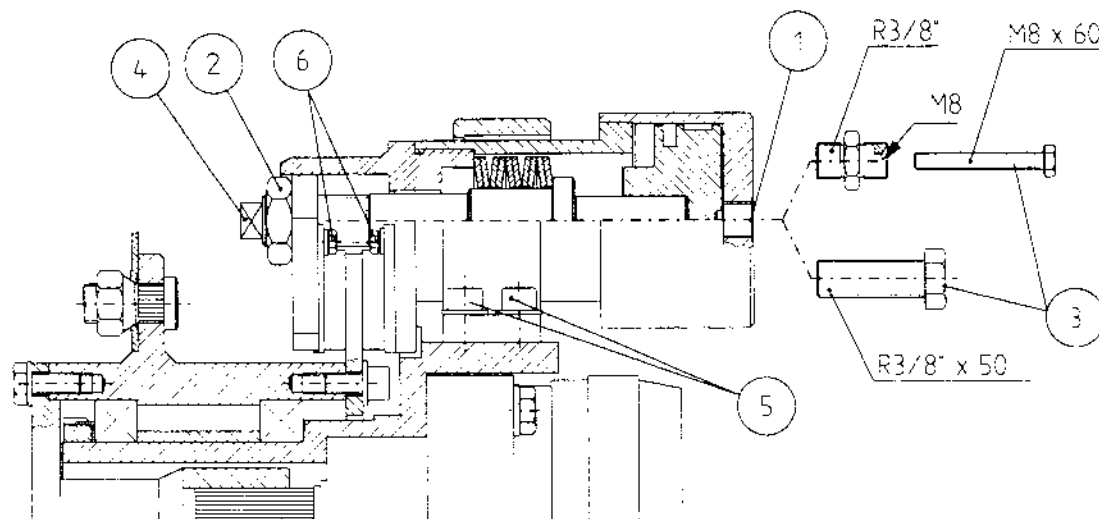
52.0 ADJUSTING THE PARALLEL POSITION OF THE WHEELS



1. Remove nuts 1 and lift tie rods 2 off connecting pieces 3.
2. Loosen nuts 4.
3. Guide cylinder stems so that measure L is the same on the right and on the left side, with an accuracy of $\pm 1,5\text{mm}$ ($\pm 0.059\text{ in.}$).
4. Line hubs with an accuracy of $\pm 4,0\text{mm}$ ($\pm 0.157\text{ in.}$).
5. Turn parts 3 to the closest suitable position. Note measure $L_1 = L \pm 10\text{mm}$ ($\pm 0.394\text{ in.}$).
6. Reassemble tie rods 2 with connecting pieces 3. Tighten nuts 1 (196 Nm) and nuts 2 (380 Nm).

53.0 REPLACING AND ADJUSTING BRAKE PADS

1. Drive MEWP on even and secure surface.
2. Use stabilizers to raise the wheels slightly off the ground and turn off the engine.
3. Remove the wheels from hubs with brakes.
4. Disconnect brake hose from point 1 and plug the hose.



5. Remove nut 2.
6. Fit R3/8" x 50 screw or R3/8" double nipple, with M8 thread inside, as well as M8 x 60 screw at point 1.
7. Tighten screw 3, so that the brake pads become detached from the brake disc.
8. Tighten spindle 4, so that the brake pad becomes detached from the brake disc.
9. Remove screws 5 and set the brake cylinder aside.
10. Remove screws 6 and the brake pads.
11. Fit the brake pads in the opposite order. Items 5-10.

Adjustment of brake pads

1. Drive MEWP on even and steady surface.
2. Use stabilizers to raise wheels slightly off the ground. Leave the engine running.
3. Remove the wheels from hubs with brakes.

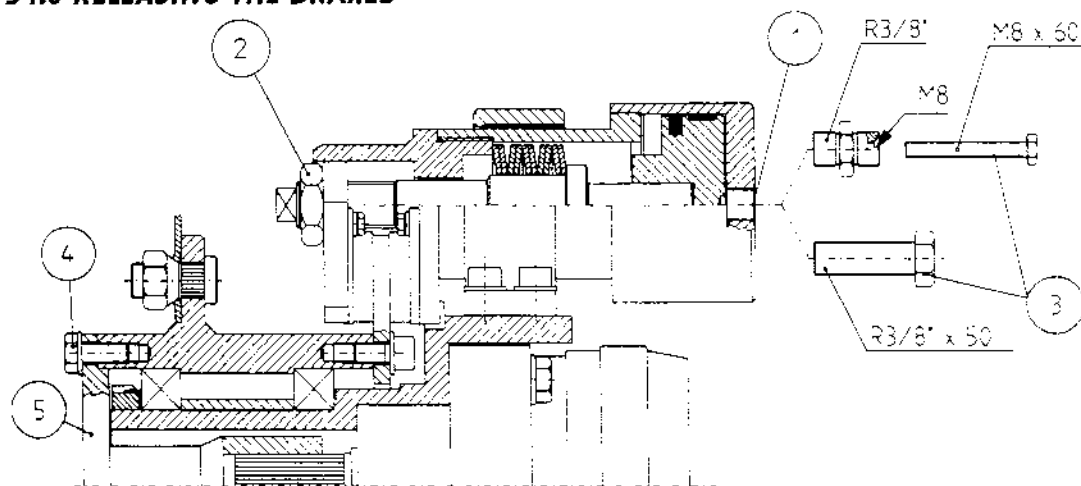
4. Turn the selector switch at the chassis steering arms to position FAST DRIVE.
5. Remove nut 2.
6. Pull the drive lever to the extreme position, towards the platform, so that the wheels start to turn. Keep lever in extreme position.
7. Adjust the gap between brake pad and disc from spindle 4 by turning to measurement 0,8 - 1,0mm. Note that when the gap is measured the other brake pad is touching the disc. Adjust the gap between the brake pad and the disc to be the same in both wheels, to ensure smooth braking.



EXERCISE EXTREME CAUTION WHEN WORKING CLOSE TO ROTATING BRAKE HUB. RISK OF ACCIDENT !

8. Release drive lever and tighten nut 2.

54.0 RELEASING THE BRAKES



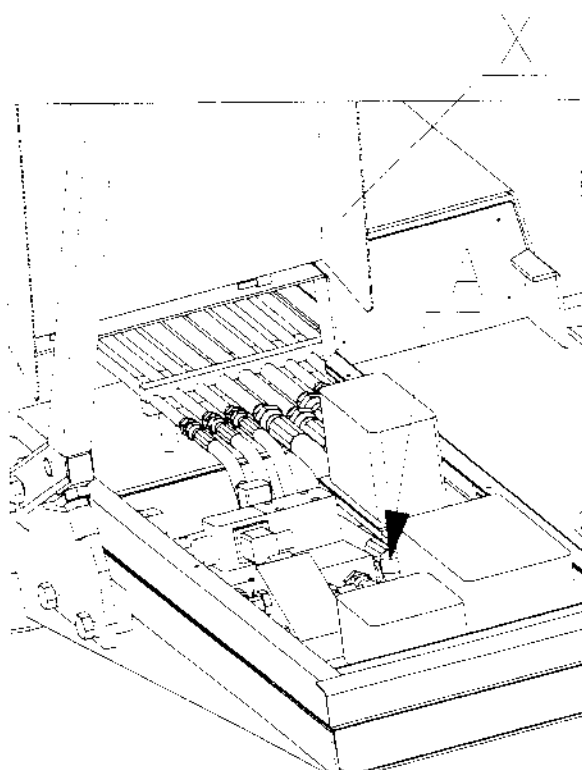
1. Disconnect the hydraulic hose from point 1 and plug the hose.
2. Fit R3/8" x 50 screw or R3/8" double nipple, with M8 thread inside, as well as M8 x 60 screw at point 1.
3. Tighten screw 3 so that the brake pads become detached from the brake disc.

55.0 RELEASING THE HYDRAULIC MOTOR

1. Remove screws 4.
2. Pull axle 5 out, turn the splined shaft outwards and attach with screws 4.

NOTE! IF THE BRAKES AND THE HYDRAULIC MOTORS ARE RELEASED THE PARKING BRAKES OF THE MEWP DO NOT FUNCTION.

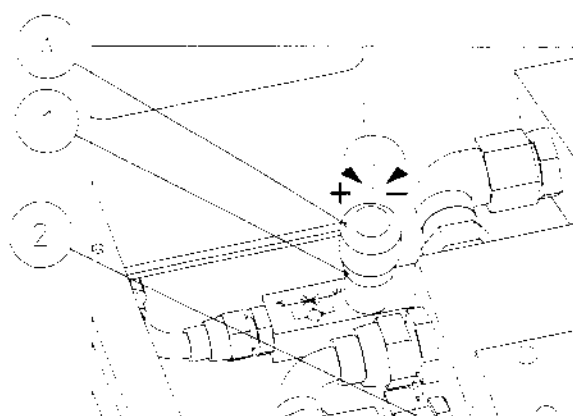
56.0 ADJUSTING THE CLOSING TIME OF BRAKES



X	Cover
A	Valve

1. Put the MEWP in transport position.
2. Open cover X.
3. Turn the speed selector switch to position FAST DRIVING.

4. Adjust the combustion engine RPM to max. speed (3000 r/min).
5. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
6. Check tyre pressure (310 kpa).
7. Select a level surface (concrete, tarmac etc.) for driving.



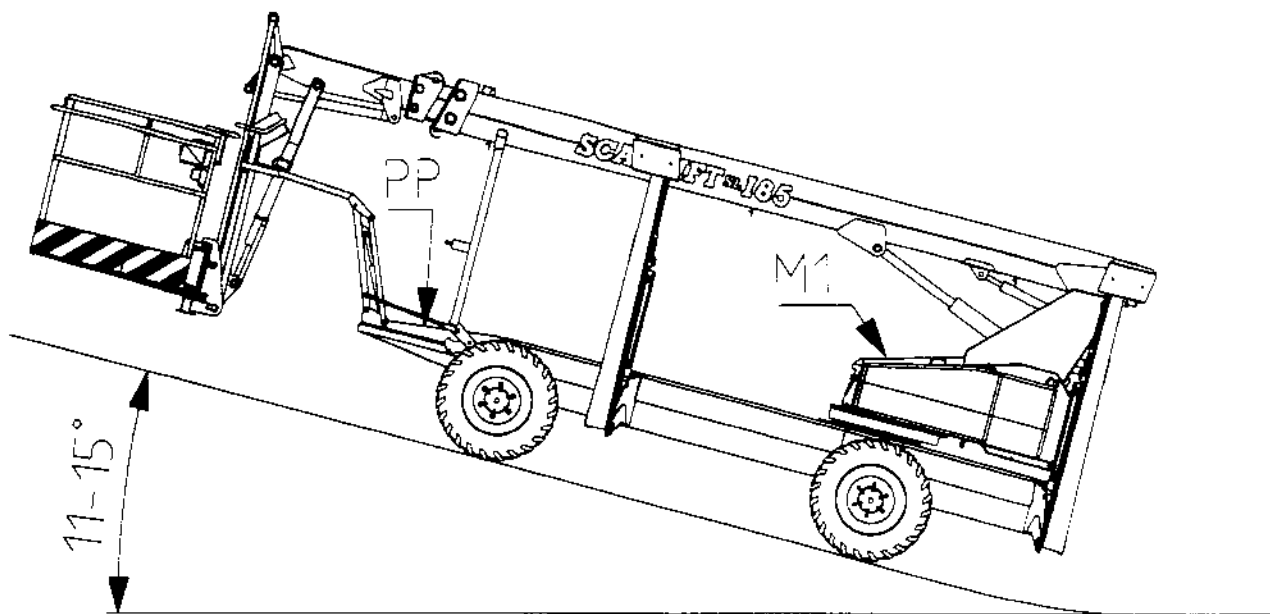
A	Valve
1	Locking screw
2	Pressure regulating cartridge

8. Drive the MEWP at maximum speed (3,6 km/h (2.2 mph)) and let the drive valve spindle move rapidly to middle position. Use valve A to adjust the stopping distance to 0,3m - 0,5m.

9. When the adjusting knob is turned to + direction the stopping distance becomes shorter.

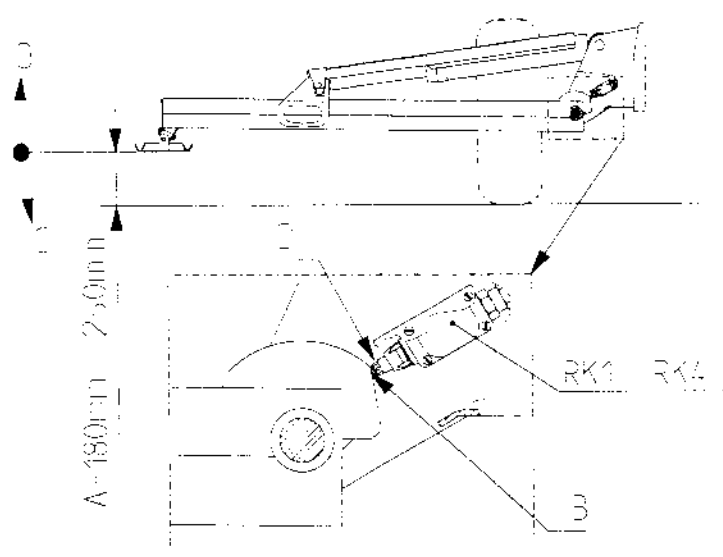
NOTE! IF YOU TURN THE ADJUSTING KNOB TO A FULLY CLOSED POSITION, THE BRAKES DO NOT CLOSE.

57.0 HILL CLIMBING CAPACITY AND TEST OF PARKING BRAKES



1. Raise the temperature of hydraulic oil to $+30^{\circ}\text{C}$ ($+86^{\circ}\text{F}$).
2. Select a 11° - 15° hill with even and hard surface (wheels should not sink more than 5mm (0.2 in)).
3. Turn the speed selector to SLOW DRIVING.
4. Drive the MEWP on the hill and stop there. The MEWP should not slide more than 0,5 metres (1.64 ft).
5. Continue climbing the hill. If the MEWP does not move, shift the drive lever to the middle position and back, and try again.
6. Try three times according to item 5.
7. Repeat items 4-6 with motor in front.
8. If hill climbing capacity is poor, check pressure from measuring point M1. Pressure should be 248bar - 250bar (3597 - 3626 psi) in a position shown in the drawing. If pressure is lower, check pressure regulating cartridges PP and adjust opening pressure to 260 bar (3771 psi).
Check also the through-flow of hydraulic motors, which should not be more than 2 l/min per motor, at the pressure of 250 bar (3597 psi).
9. When driving downhill at the speed of 3,6 km/h (2.2 mph) the stopping distance of the MEWP should be 2 metres (6.6 ft).
10. The tractive power of the MEWP on even and level ground is 1270 kg (2800 lb), at the pressure of 250 bar (3636 psi), and roll radius offset of wheels $r=355\text{mm}$ (13.98 in).

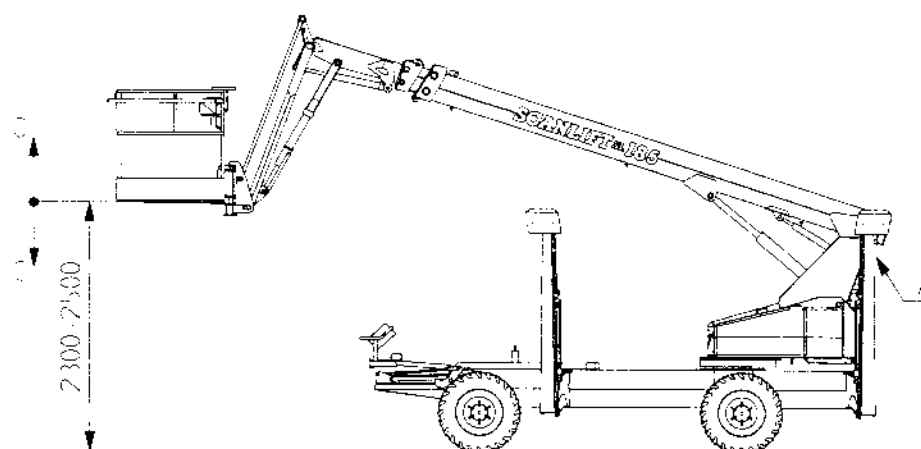
58.0 OPERATION OF THE STABILIZER LIMIT SWITCH (4pcs)



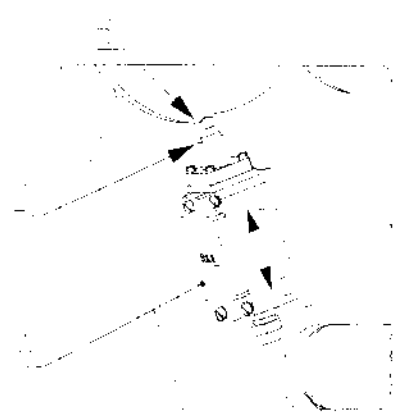
B	Opening point of limit switch
D	Spindle of limit switch
O	Limit switch opens
C	Limit switch closes

1. The limit switch opens when the stabilizer sole rises 180mm - 250mm (7.1-9.8 in) above ground, and MEWP is supported by the wheels. When opened, the limit switch prevents the use of the booms.
2. In humid and freezing conditions the limit switches RK1 - RK4 may freeze in the open position. Grease the limit switch spindle (point D) with e.g. Molykote separator spray.
3. If gap A is more than 250mm (9.8 in), check the condition of the limit switch.

59.0 OPERATION OF THE LIMIT SWITCH RK 6 FOR HORIZONTAL BOOM POSITION



A	Limit switch RK6
O	Limit switch opens
C	Limit switch closes

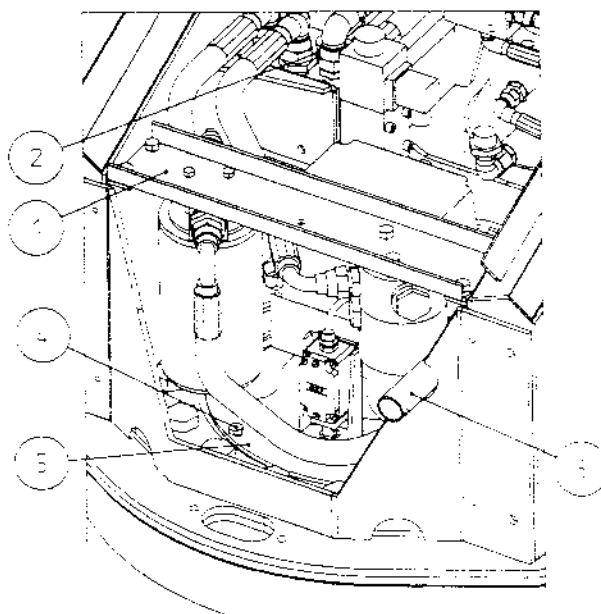


A	Limit switch RK6
B	Point of opening of limit switch
D	Spindle of limit switch

1. Limit switch opens when the platform raises from the ground 2,3m - 2,5m (7.5-8.2 ft), with MEWP supported on the wheels. When open, the limit switch prevents the use of drive, steering and stabilizers.

2. In humid and freezing conditions the limit switch RK6 may freeze in the open position.
Grease the limit switch spindle (point D) with e.g. Molykote separator spray.
3. If platform rises higher than 2500 mm (8.2 ft), check the condition of the limit switch. Adjust switch by moving it in C-C direction.

60.0 REPLACING THE HOSES OF THE HD-SPLITTER



1. Stop the engine.
2. Disconnect filter assy 1, valve assy 2 and selector valve 3. It is not necessary to disconnect the hydraulic hoses.
3. Remove the splitter retaining screws 4 (6 pcs).
4. Lift the splitter so much that you are able to replace also the lower hoses.

61.0 FILTER LIST

Hydraulics:		
Filter	Type	Spare part No.
Return filter	Finn-Filter FF PAVL 3-1003-10 R3/4"	3090195
Return filter cartridge	FFPAVL 1-1003-10	3090420
Pressure filter	FHP 65 1B A10 NAGS	3090488
Pressure filter cartridge	HP-65-1-A10-NA	3090721
Combustion engines:		
Filter	Type	Spare part No.
KOHLER COMMAND		
Air filter	KOHLER 47 083 03	
Air prefilter	KOHLER 24 083 02	
Air filter + prefilter		3090804
Oil filter	KOHLER 12 050 01	3090702
Fuel filter	KOHLER 25 050 02	3090667
HATZ 1D 80C		
Air filter	HATZ 01078500	3090752
Oil filter	HATZ 03795700	3090750
Fuel filter	HATZ 40089401	3090751
KUBOTA D722		
Air filter	KUBOTA 15372-8745-2	3090830
Oil filter	KUBOTA 15841-3243-0	3090831
Fuel filter	KUBOTA 15231 4356-0	3090832

* Spare part number of KESLA OY

62.0 LIST OF COMPONENTS ACCORDING TO ELECTRIC SCHEME**1. Platform:**

Position	Name	Function	Type
KOT4	El. box		
SH2	EMERGENCY STOP switch		SQUARE D9001D3C1R-B-DA11
SK2	Chopper	LPG/petrol	
SP1	Push-button switch	Sound signal	
SP2	Push-button switch	For use of steering arms	
SP4	Pedal switch	Control switch, USA	
SP6	Push-button switch	To operate auxiliary lowering	
SVL2	Ignition lock		HATZ or KOHLER
H8,H9	Function of load control		
R10	Relay	Signal light of load control	
Y4	Solenoid valve	Jib cylinder	
D4	Diode		
D5	Diode		
D6	Diode		
D7	Diode		
A	Sound signal		
Contact box 220V/16A (110V, 16A USA)			

2. Booms:

Position	Name	Function	Type
KOT8	El. box	Connector box for 220V	
RK5	Limit switch for chain of boom extension		Telemecanique XCX-5351H29

3. Turntable:

Position	Name	Function	Type
KOT7	El. box		
SVL1	Ignition lock		HATZ DIESEL
SH1	EMERGENCY STOP switch		SQUARE D9001D3C1R-B-DA11
SP7	Push-button switch	Use of auxil. lowering pump	
SPK1	Main current switch		

3. Turntable:

Position	Name	Function	Type
RK6	Limit switch for horizontal position of boom		Telemecanique XCX-9502H29
RK7	Limit switch of slewing		Telemecanique XCX-9502H29
RK9	Limit switch for load control of jib		Telemecanique XCX-5351H29
RK10	Standby limit switch for load control of booms		Telemecanique XCX-5351H29
R1	Relay	Use of hour meter	
R2	Relay	Control of booms	
R3	Relay	Drive control	
R4	Relay	Prevents double starting, only diesel	
R5	Relay	Prevents double starting	
R6	Relay	Starting motor	
R8	Relay	EMERGENCY STOP/motor starting	
R11	Relay	Auxiliary lowering pump	
R12	Relay	Auxiliary lowering pump	
VR	Flashing relay		
Y1	Solenoid valve	HD oil for booms	
Y2	Solenoid valve	HD oil for chassis	
HH	Ignition glow signal light, only diesel		
H5	Flashing light	Oil pressure/Temperature of coolant	
H6	Oil pressure signal light	only diesel	
H7	Charging signal light, only diesel		
H10	Signal light for coolant	Only Kubota Diesel	
H(i)	Hour meter	While motor is running	
D1	Diode		
D2	Diode		
D9	Diode		
D10	Diode		
D11	Diode		

3. Turntable:

Position	Name	Function	Type
D3	Diode	Only diesel	
F2	Fuse 10 A	For booms and chassis	
F3	Fuse 10 A	For ignition lock on platform	
F4	Fuse 10 A	For use of steering arms	
F5	Fuse 5 A	For sound signal	
KOT6	El. box	Cylinder distributor	
LR1-7	Cylinder distributor		Behne A4-657-05 6 – PE
B	Battery		12V 55Ah

4. Chassis

Position	Name	Function	Type
KOT1	El. box		
RK3	Limit switch for stabilizer		Telemecanique XCK-S502H29
RK4	Limit switch for stabilizer		Telemecanique XCK-S502H29
Y7	Solenoid valve	Steering	
Y8	Solenoid valve	Steering	
KOT3	El. box	Base, platform side	
RK1	Limit switch for stabilizer		Telemecanique XCK-S502H29
RK2	Limit switch for stabilizer		Telemecanique XCK-S502H29
Y5	Solenoid valve	Cylinder for steering arms	
Y6	Solenoid valve	Cylinder for steering arms	
Y9	Solenoid valve	Travelling speed	
R7	Relay	Guiding of steering arms	
KOT5	El box	Steering arms	
SK3	Chopper	Drive selecting	
SK4	Chopper	Travelling speed selecting	
SP3	Pushbutton switch	Shunting stabilizers	

4. Chassis

H1-H4	Signal light	Horizontal level indicator	
KOT2	El. box	Base, platform side	
SE14-17	Mercury switch	Horizontal level indicator	
VVK	Fault current switch		Neptun 2000 Austria 220 V 1N25 A NO 03 SIF25/2/0,03 (Note! not the USA)

5. Hatz diesel

Position	Name
159	Diode
121	Glow plug
124	Charging adjuster
126	Generator
127	Starting motor
157	Diesel stopper
162	Oil pressure probe

6. Kohler Command

Position	Name	Function	Type
G	Generator		
M	Starting motor		
SP5	Oil pressure probe		
SP6	Pressure probe	Control of gas solenoid	
Y11	Solenoid valve	for LPG	
Y12	Solenoid valve	for petrol (in Kohler carburetor)	

7. Kubota D722-E

Position	Name	Function	Type
M	Starting motor	12 V	12 V/ 40 A
G	Charging generator	12V	
SOL1	Starting solenoid	12V	
GP	Glow plug		
S	Stopper	Solenoid	12V
T1	Timer	Control of glow indicator	

7. Kubota D722-E

T2	Timer	Control of stopping solenoid	
FB	Fuse		12 V / 15 A
P	Oil pressure probe		
H	Temperature probe		
HH	Glow indicator	box 7, turntable	
H6	Oil pressure signal light	box 7, turntable	
H7	Charging signal light	box 7, turntable	
H10	Overheating signal light	box 7, turntable	