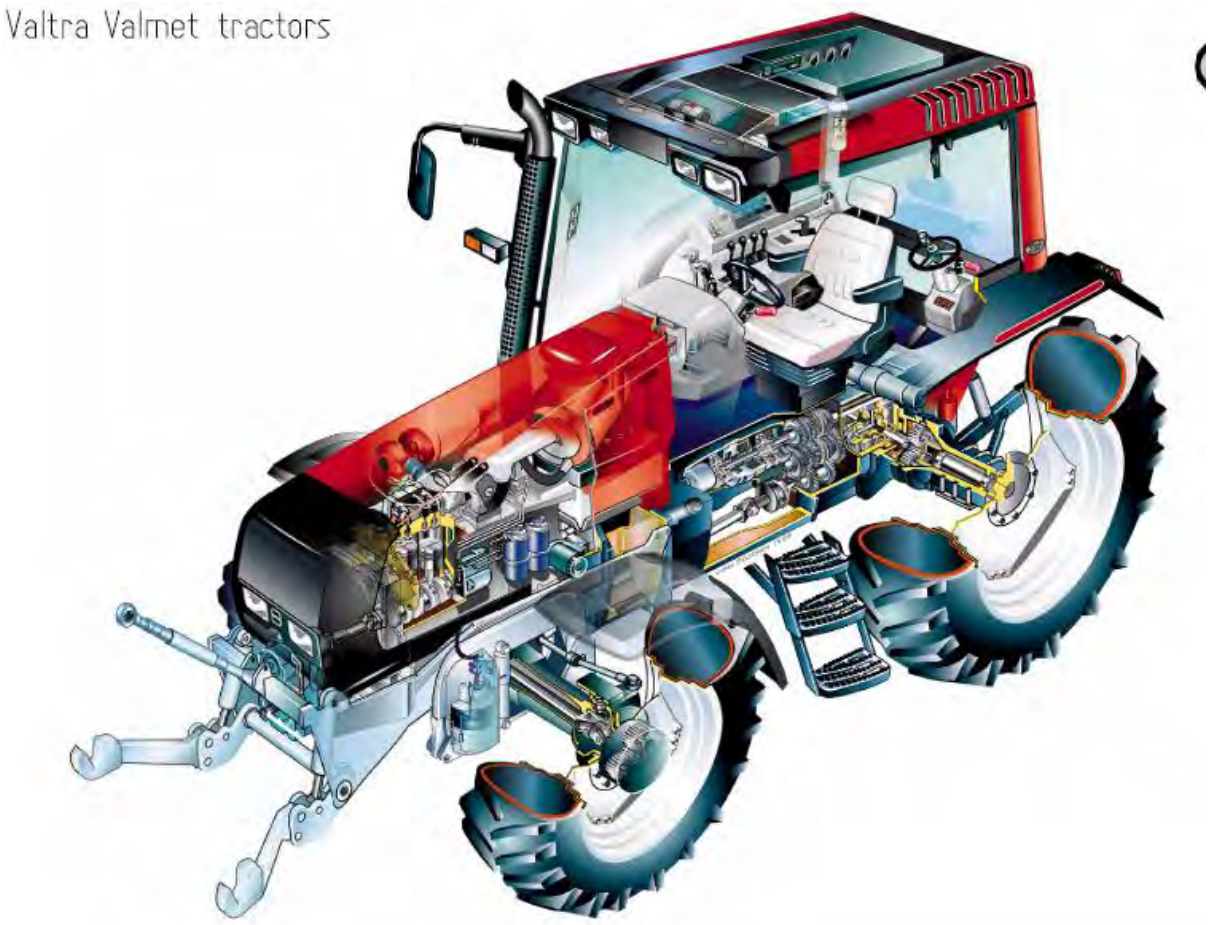
VALTRA – VALMET

MEGA MEZZO HI-TEC



WORKSHOP MANUAL

VALTRA

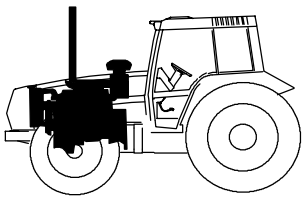
Service Manual

Tractors

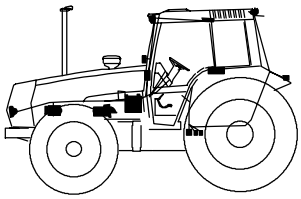
Groups 10–100

Valtra Inc.
44200 Suolahti, Finland

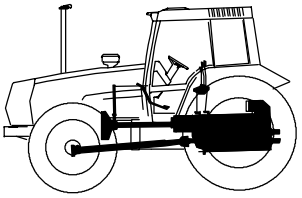
10 General



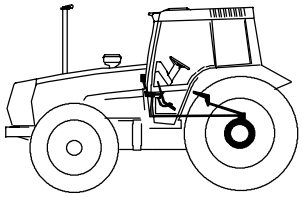
20 Engine



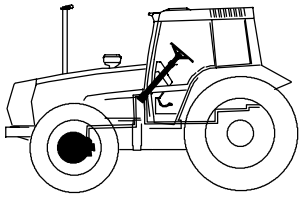
30 Electrical system



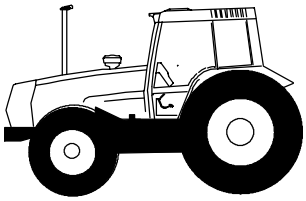
40 Power transmission



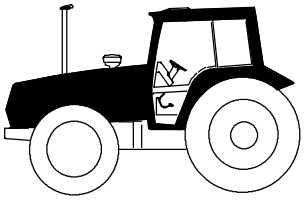
50 Brake system



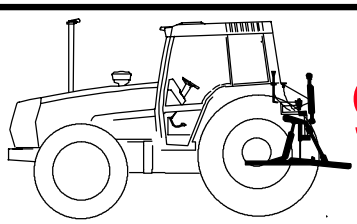
60 Steering system and Front axle



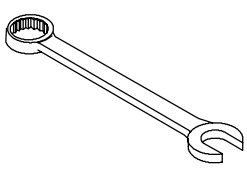
70 Frame and Wheels



80 Cab and Shields



90 Hydraulics



100 Tools

50. Brake system

51. Service brakes

52. Parking brake

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Pressure air brakes (option) 6

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B. Adjusting brakes 2
C. Bleeding brake system 2
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Reconditioning parking brake (Op. no. 521):
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B. Parking brake on tractors equipped with HiTech Shuttle 2

Technical data

Service brakes hydraulically controlled disc brakes running in oil.
Parking brake mechanically controlled, acting on the foot brakes. In HiTech–models the parking brake is controlled electro–hydraulically.

Tractors 6000–6400 and 8000 (–657975):
– number of brake discs per brake (ceramic linings) . . . . . 4 pcs
– number of brake balls per brake . . . . . 6 pcs
– friction surface per brake . . . . . 880 cm^2
– brake disc, diameter . . . . . ø 222 mm

Tractors 6600, 6800, 8100–8400, 8050–8750, 6250Hi–8950Hi (also on 6000–6400 and 8000 from ser. no. 657976):
– number of brake discs per brake (organic linings, 665437–) . . . . . 5 pcs
– number of balls per brake . . . . . 6 pcs
– friction surface per brake . . . . . 3690 cm^2/org (2650 cm^2/sint)
– brake disc, diameter . . . . . ø 224 mm/org (ø 222 mm/sint)

Tractors 6600–8750, 6650Hi–8950Hi: 50 km/h:
On traffic tractors (50 km/h) the splines of the inner drive shaft have been lenghtened, after which the brake dics number can be increased to 6 pcs per brake (3+3). The disc linings are then of sinter type.

Tractors 8350–8950Hi (L32106–):
– brake discs, 9,5" (243 mm)x7" (178 mm) . . . . . 5 pcs
– intermediate discs (s=5 mm) . . . . . 3 pcs
– friction surface/brake . . . . . 2150 cm^2/org

Tightening torques
Brake disc attaching flange:
– 6000–8950Hi . . . . . 80 Nm
– 8350–8950Hi, L32106– . . . . . 45 Nm
Brake housing–final gear housing:
– 6100–6400 and 8000 (8.8) . . . . . 80 Nm
– 6600, 6800, 8100–8400 and 8050–8750 (10.9) . . . . . 125 Nm
Brake housing–gearbox . . . . . 270–330 Nm
Rear wheel nuts . . . . . 550 Nm
Cab attaching bolts . . . . . 200 Nm
Brake pipe–master cylinder . . . . . 20 Nm

Settings
Brake pedal free travel (latched together) . . . . . 70–80 mm
Parking brake free travel (at lever end) . . . . . about 50 mm
Parking brake cable adjusting value, Power Shuttle tractors . . . . . 1–2 mm

Brake fluid . . . . . SAE J1703
Brake fluid reservoir . . . . . 0,3 litres

Brakes, description

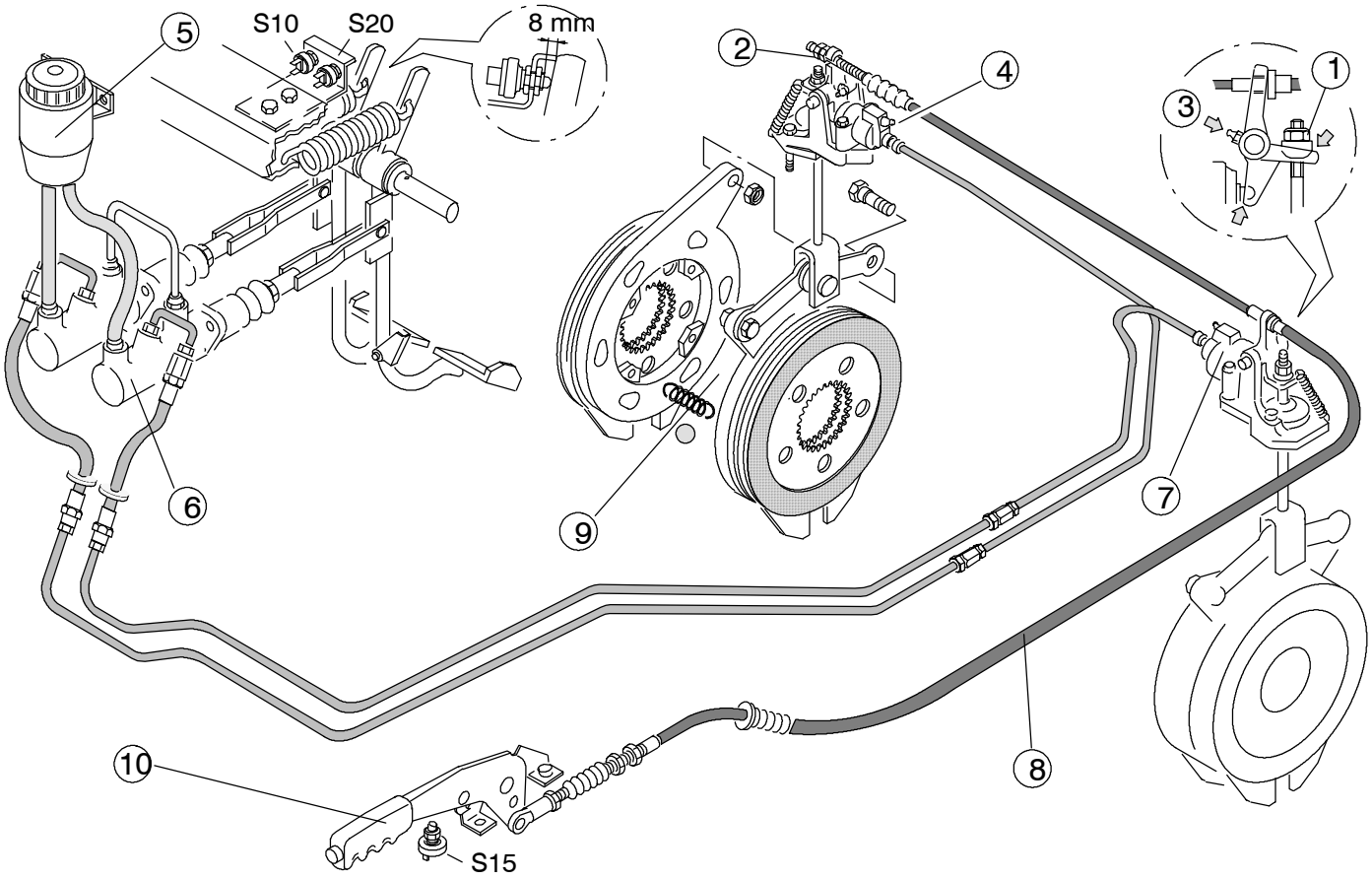


***Figure 1**. Brake mechanism.*

1. Service brakes adjusting nut.
2. Parking brake adjusting nut.
3. Grease nipple.
4. Bleeding nipple.
5. Brake fluid reservoir.
6. Master cylinders (2 pcs).
7. Brake cylinder (2 pcs).
8. Parking brake cable.
*9. Brake mechanism (in rear axle housing). In 8350–8950Hi from chassis no. **L32106–** the mechanism is different.*
10. Parking brake lever. In HiTech–models the parking brake mechanism is different, see pages 521/2–3.
S10 = switch for RH side brake light.
S20 = switch for LH side brake light.
S15 = switch for parking brake warning light (different in HiTech–models).

Service brakes are wet multi–disc brakes fitted in the rear axle housing. Service brakes are controlled hydraulically by means of the brake pedals. When the brake pedals are pressed, the 4WD engages causing brake action also on the front wheels.

Brake pedals can be used separately as steering brakes or they can be latched together.

Parking brake hand lever acts mechanically on the foot brakes (not HiTech–models). The brakes can be adjusted by means of the adjusting nuts. In HiTech–models the parking brake is controlled electro–hydraulically (see pages **521/2–3**).

As an optional equipment, the brake valve for a trailer is available. Also pressure–air brakes for trailer is available as an option.

The brake master cylinders and the brake fluid reservoir are positioned to the right on the cab front wall. The brake system has two brake cylinder with in – built equalising valves, which ensure even braking action when the brake pedals are latched together.

The brake discs are fitted on splines on the inner drive shaft in the brake housing. The brake system and the gearbox use the same oil.

The bleeder nipples are positioned on top of the brake cylinders

During brake application the force from the brake cylinders is transferred, via levers, to the brake discs. The thrust plates turn in opposite direction and the balls between the plates force them against the brake discs and brake action is obtained.

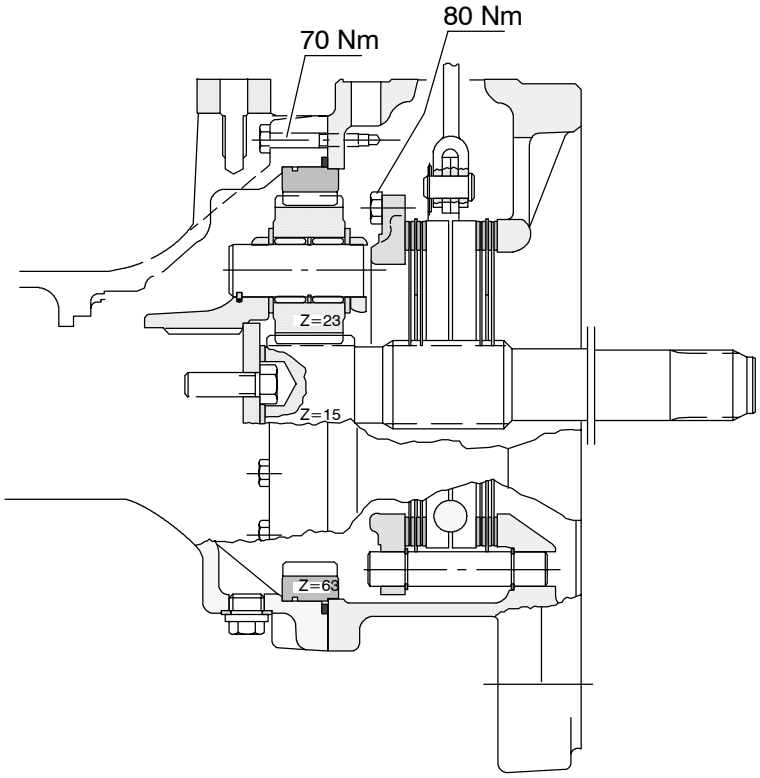
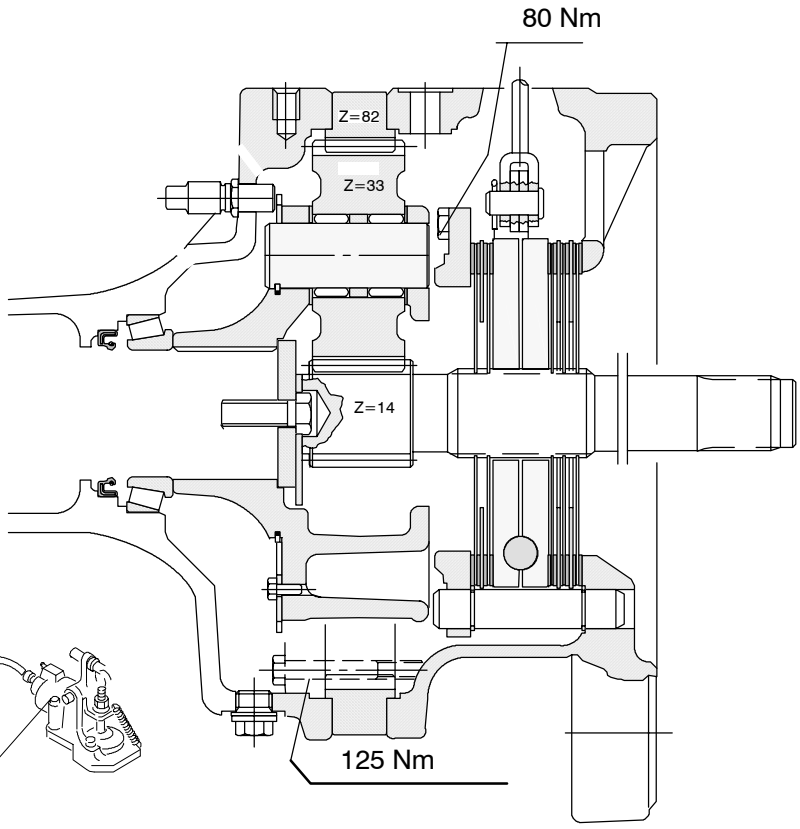
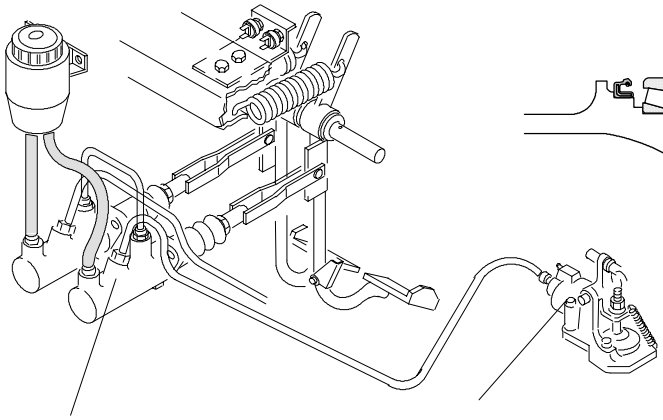


Figure 2. *Brake housing with final drives 300*





Master cylinder

Brake cylinder

Figure 3. *Brake housing with final drives 450 and 650.*

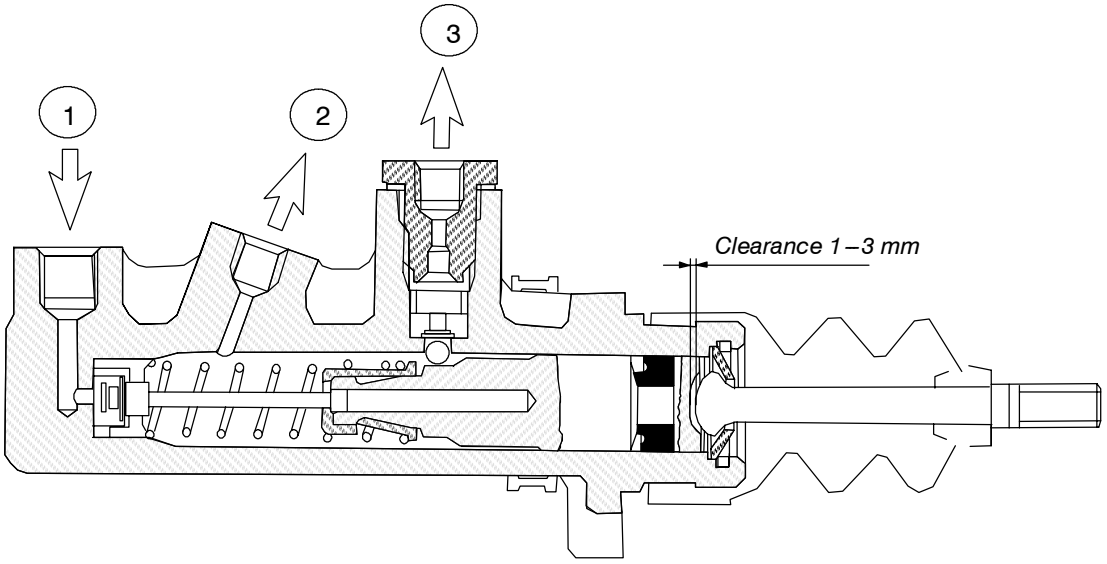


Figure 4. *Master cylinder*

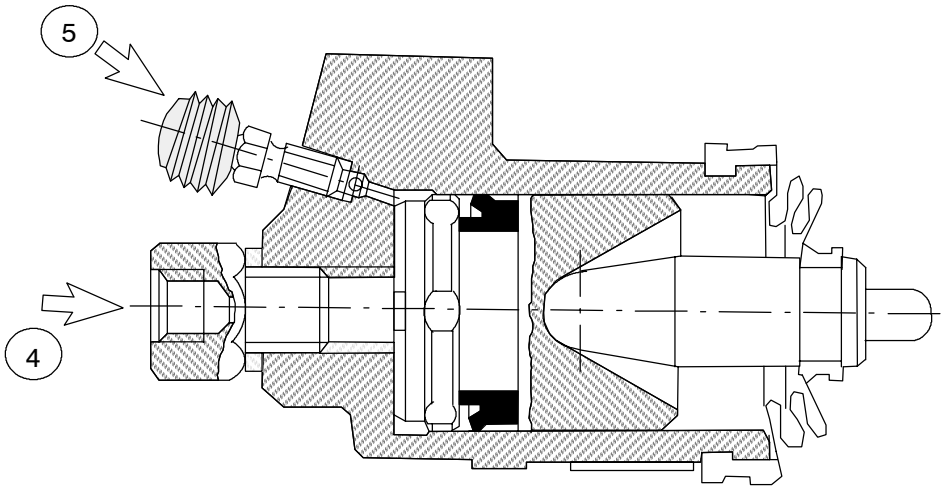


Figure 5*. Brake cylinder*

The brake fluid flows from the reservoir through pipe (1) into the master cylinder. When the pedals are depressed, the non–return valve at the front end of the master cylinder closes preventing oil from returning to the reservoir. The fluid, now under pressure in the cylinder, flows through pipe (2) to hole (4) at the front end of the brake cylinder behind the piston and forces out the thrust rod.

The valves and the intermediate pipe (3) in the master cylinders serve as an equalising mechanism, if the mechanical setting of the two brakes differs. When the pedals are depressed, the pistons actuate the valves so that they open and any pressure differences in the brake circuits are equalised through the intermediate pipe (3).

If only one of the brakes is applied, the valve is opened by the piston, thus pressurising the intermediate pipe (3). This causes the valve in the other (not actuated) master cylinder to close. Oil under pressure now flows from the master cylinder which is being applied to the corresponding brake cylinder.

The brake system bleeder nipples (5) are placed on top of the respective brake cylinders.

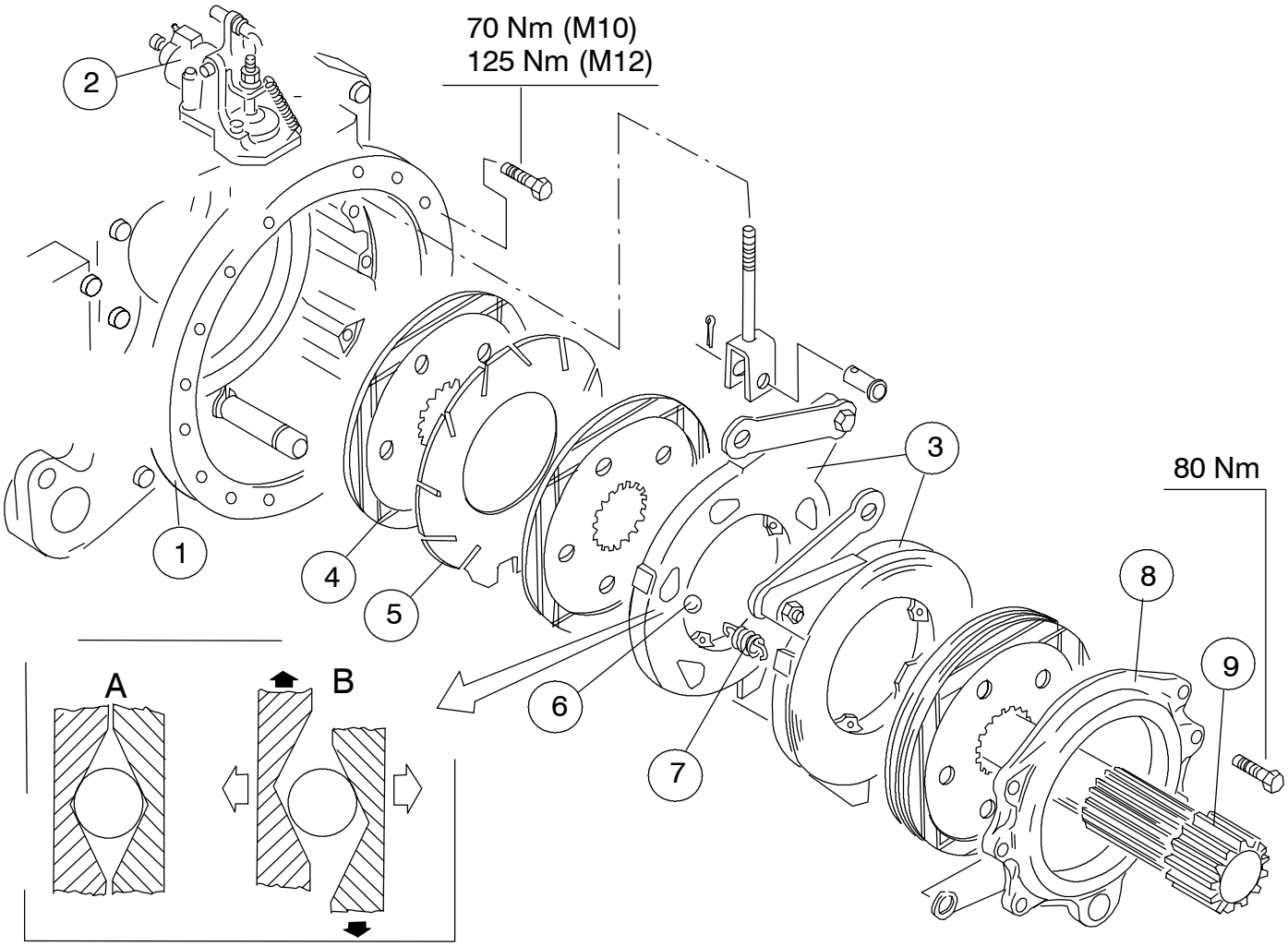
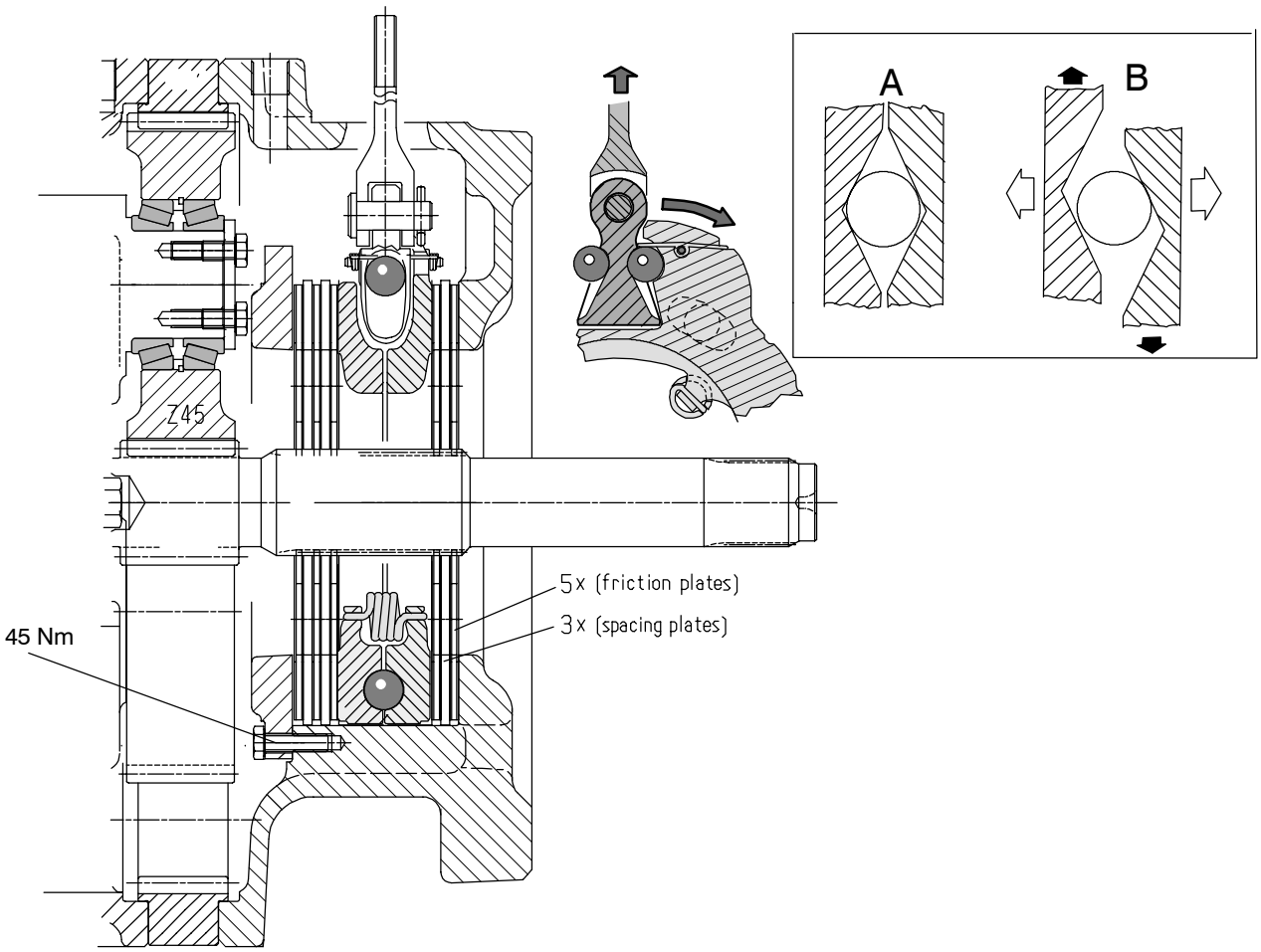


Figure 6. *Brake mechanism when final drives 300, 450 and 650 (not 8350– 8950Hi, L32106–).*

1. Brake housing
2. Brake cylinder
3. Application plates
4. Brake discs
5. Intermediate discs
6. Brake balls
7. Return spring (4 pcs per brake)
8. Support brake
9. Inner drive shaft
A) Application plates and balls in neutral position
B) Movement of application plates when braking

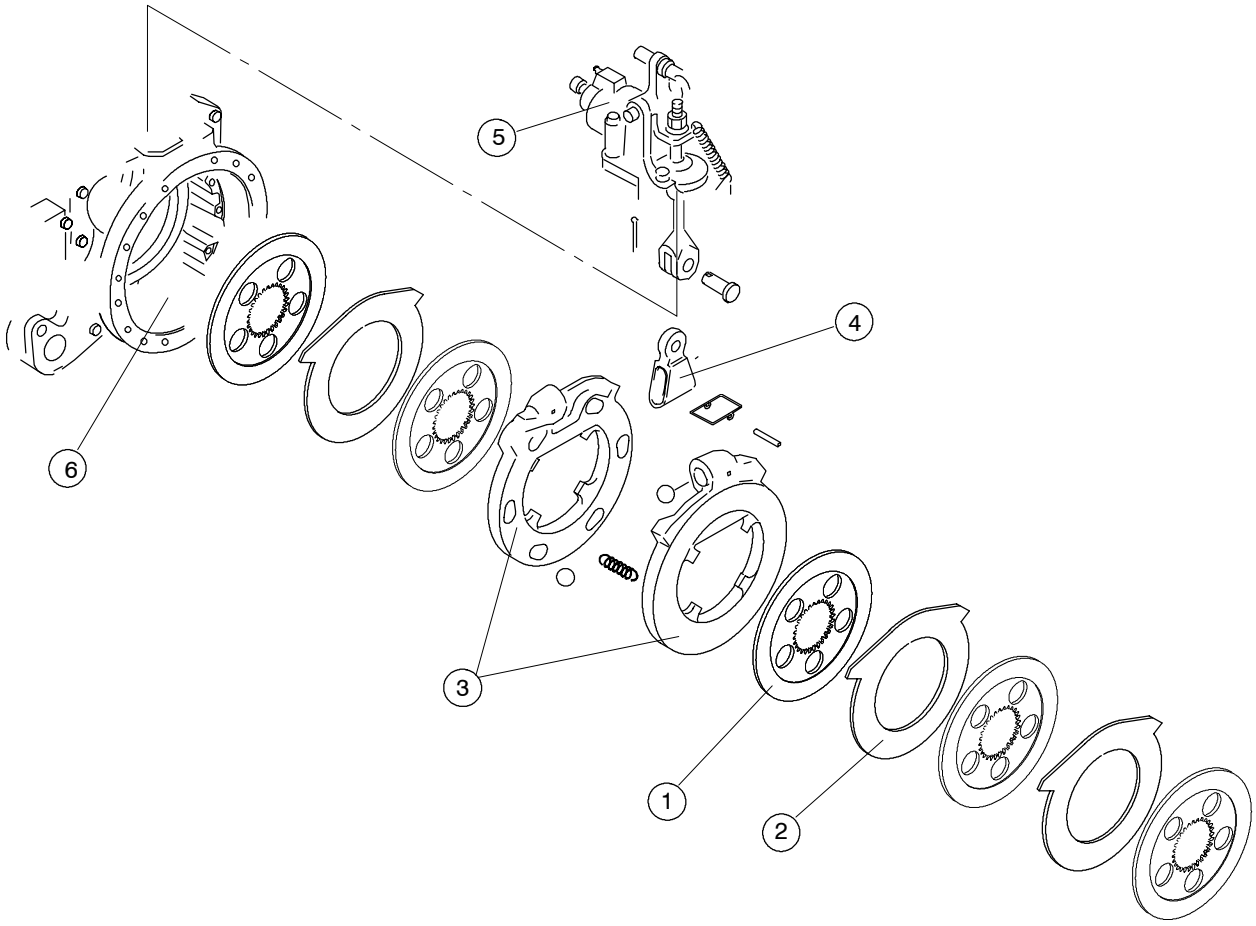


Picture 6A. Brake mechanism in 8350–8950Hi tractors, which has final drives 700 (**L32106–**).

In connection with final drives 700 the brake mechanism is different. In this system the application plate pressing force agains the brake discs is obtained by the tapered part, sides of which press the steel balls which turns the application plates causing the brake force.

There is not an anchor bolt in the lower part of the brakes, as in connection with final drives 300–650. In final drives 700 there are sholders in the intermediate discs and in the application plates which engage in the notches casted in the rear axle housing.

The brake discs are fitted on the drive shaft splines so that the holes in the discs are tried to place almost in the same line in order to facilitate free oil flow.

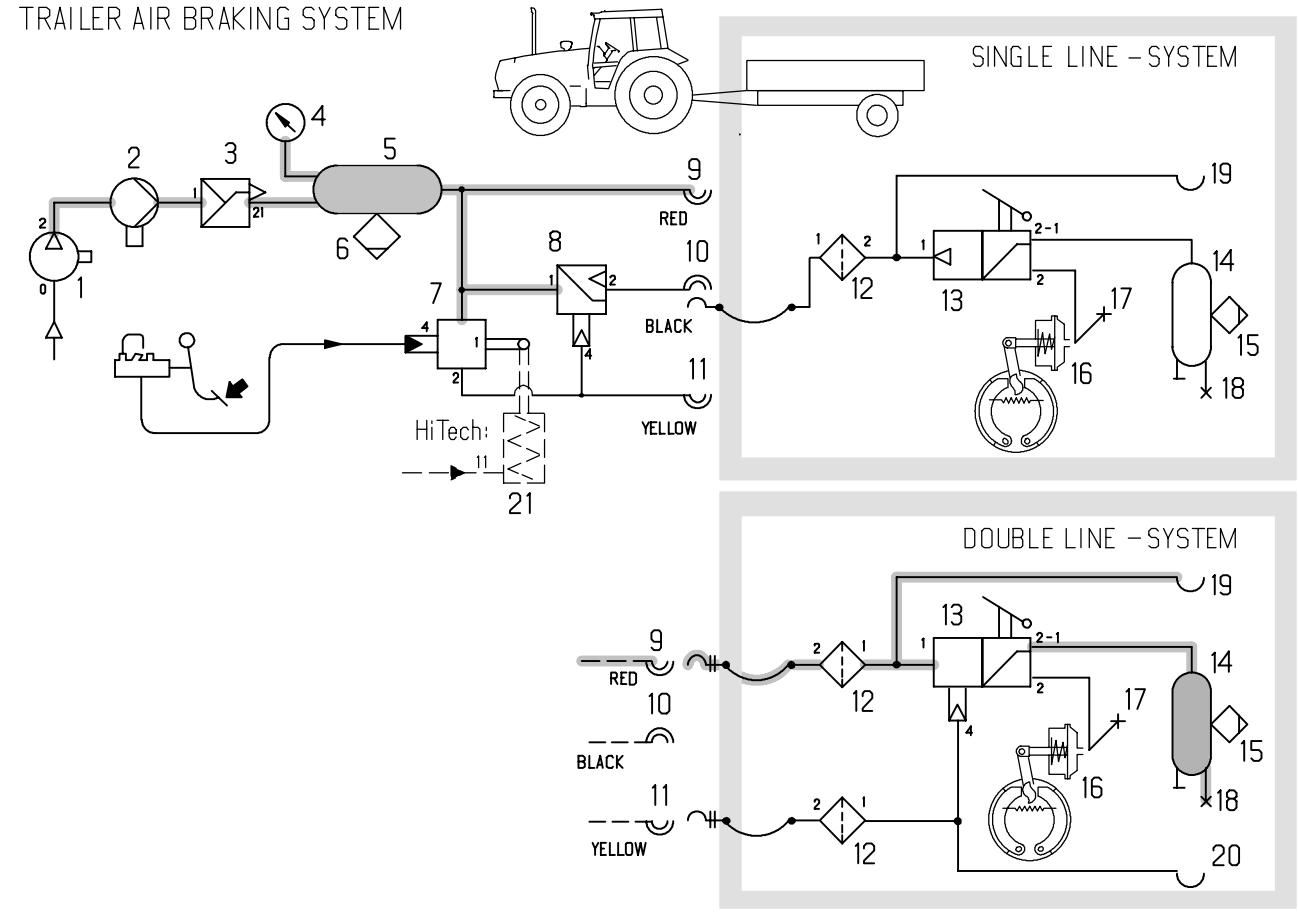


Picture 6B. Brake mechanism in 8350–8950Hi tractors with final drives 700 (L32106–).

1. Brake discs (5 pcs). Holes almost in the same line.
2. Intermediate discs (3 pcs).
3. Application plates (6 pcs balls between the plates).
4. Taperd part to expand the application plates.
5. Brake working cylinder.
6. Brake housing.

Pressure air brakes for trailer

Note! Pressure air brakes are available as an optional equipment for 6200–8950 tractors.

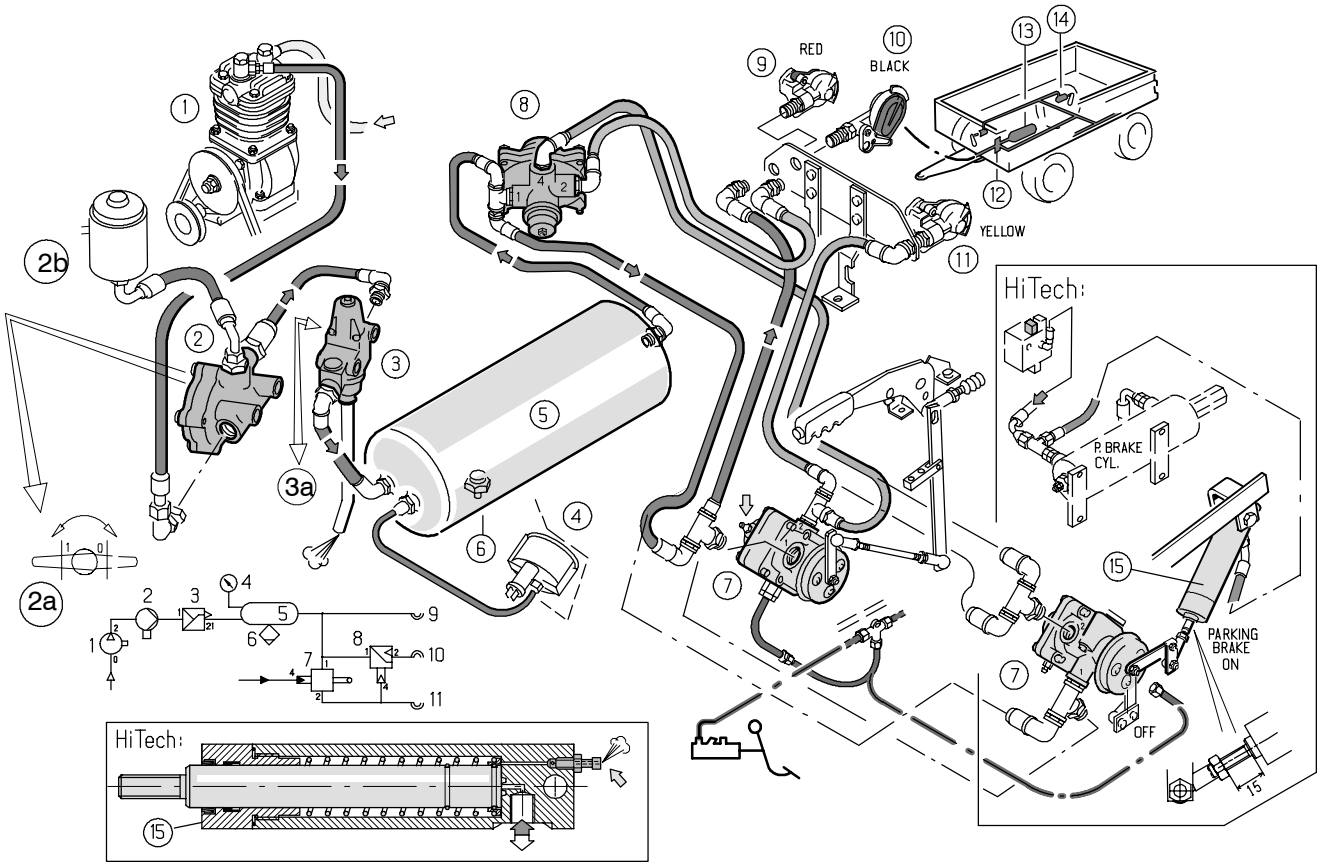


Picture 7. *Components of pressure air brakes*

1. Compressor
2. Deicer
3. Pressure regulator (incl. filter and relief valve).
4. Pressure gauge
5. Pressure air reservoir
6. Drain cock
7. Trailer brake control valve
8. Trailer brake control valve
9. Two–line system; reservoir line (red)
10. One–line coupling (black)
11. Two–line system; brake line (yellow)
12. Filter
13. Trailer brake valve+brake power regulator
14. Pressure air reservoir
15. Water draining tap
16. Cylinder
17. Pressure–test point
18. Pressure–test point
19. Coupling for second trailer, reservoir line (red)
20. Coupling for second trailer, brake line (yellow)

Note! Valve (7) controls combined two–line and one–line trailer brake system according to the pilot pressure from the tractor brake pedal.
The valve has additionally a lever, which has been connected to the hand brake mechanism. When the hand brake lever is pulled up, the valve lever turns and causes braking effect in the trailer brakes.

Note! Valve (8) is intended to control the one–line system. The valve is controlled by pilot pressure from valve 7.
Valve (8) also limits pressure to the trailer brakes to 5,2 bar. During braking the valve (8) lowers (in one–line system) the trailer brake pressure. When the braking is stopped air can flow via valve (8) to refill the air reservoir of the trailer brake.



Picture 8. *Pressure air brakes for trailer on 6000–8950*

1. Compressor
2. Deicer
2a. Flow valve lever
2b. Deicer reservoir
3. Pressure regulator
4. Pressure gauge
5. Pressure reservoir
6. Water draining plug
7. Control valve (one– and two–line systens)
8. Control valve (one–line system)

General

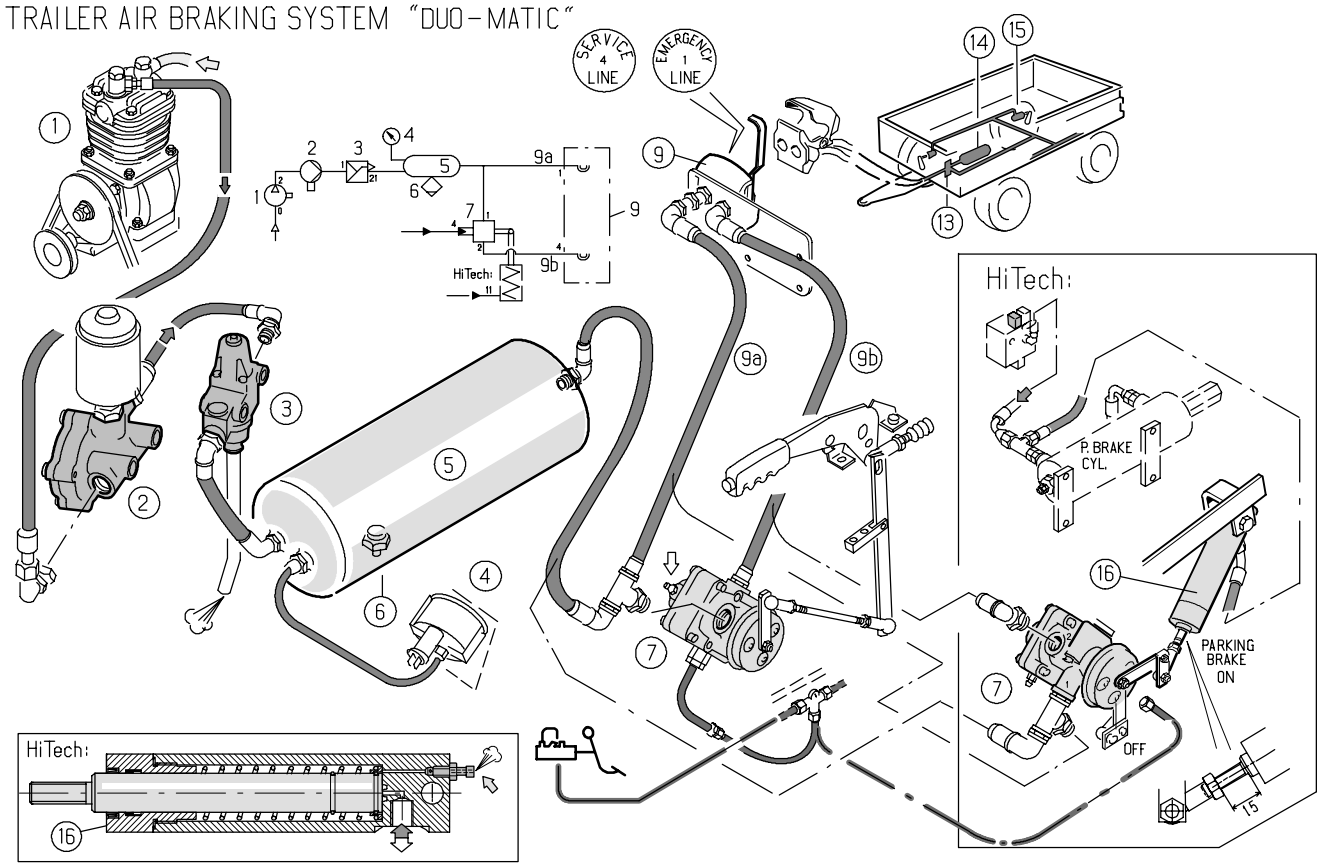
The trailer is connected in the two–line system to two couplings. The couplings (9 and 11) have been marked as follows:
– Reservoir line – **red** protecting cover
– Brake line – **yellow** protecting cover
– In the one–line system the trailer is connected to the **black** (brake line) coupling (in certain marketing areas).

By turning connection (3a) on the pressure regulator to the bottom, compressed air can be taken off for auxiliary purposes (pressure about 8 bar, e.g. for tyre inflation). Through this connection the system can also be filled with auxiliary compressed air, e.g. if the tractor compressor does not function. In this case the connection need not be screwed fully into the bottom.

If the outdoor temperature is **below +5°C**, eythol alcohol or methanol must be used in the deicer (2b) . Antifreeze agent flow valve lever (2a) must then be open (position 1). Reservoir and lever are placed under the cab RH side front edge. When filling the reservoir it must be removed from its holder.

NOTE! In the system there must be full pressure, about 7–8 bar, before driving the tractor. Pressure gauge (**4**) is placed in the cab beside the dashboard.

When connecting in the two–line system trailer to tractor, connect first the trailer yellow coupling (without pressure). When disconnecting the trailer, disconnect first the red coupling (reservoir line).

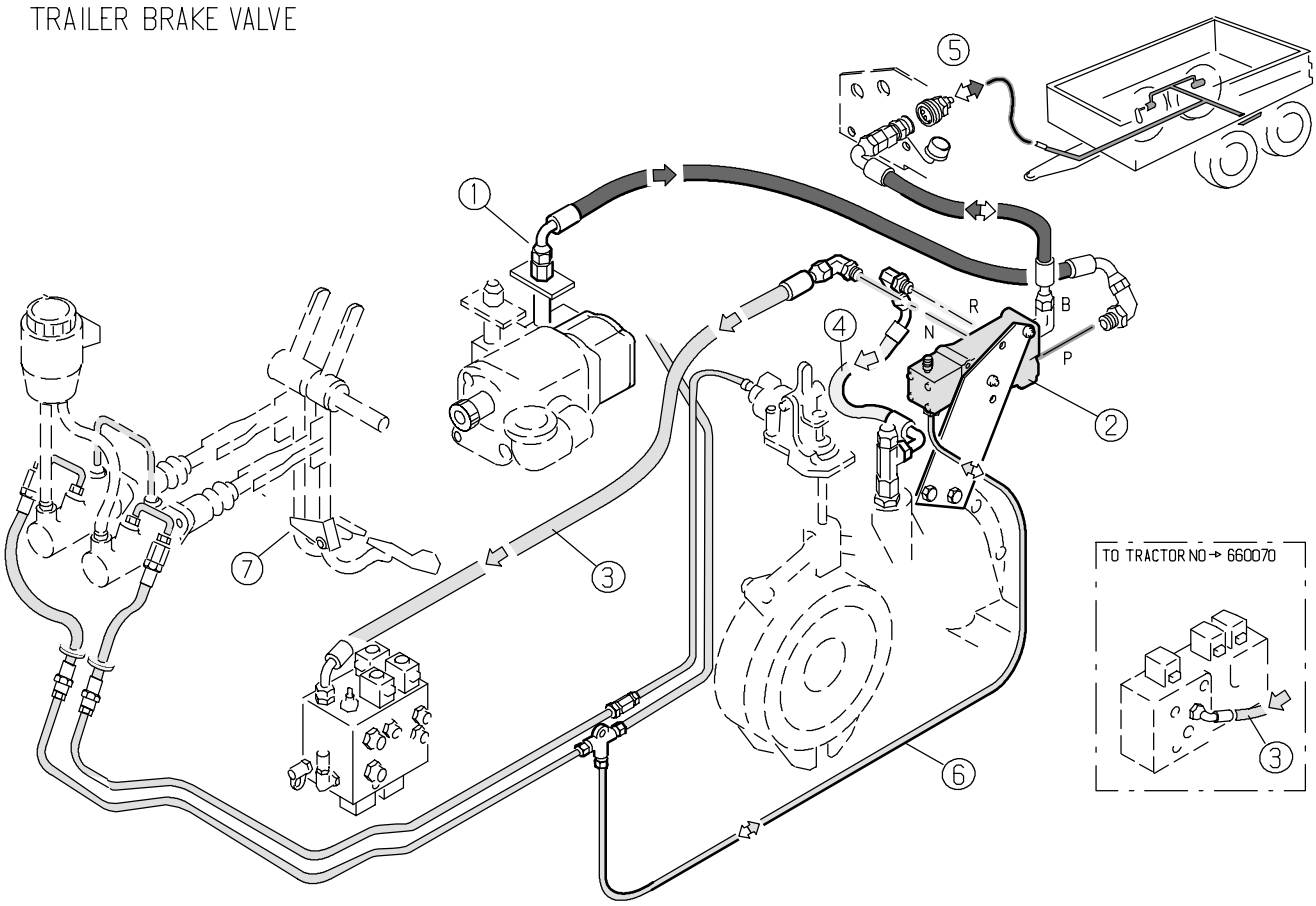


Picture 9. *Duo–Matic pressure air brakes.*

– Brake system with "Duo–Matic" –couplings is an alternative equipment for customers who have trailers equipped with these couplings (e.g. trailers like in lorries).

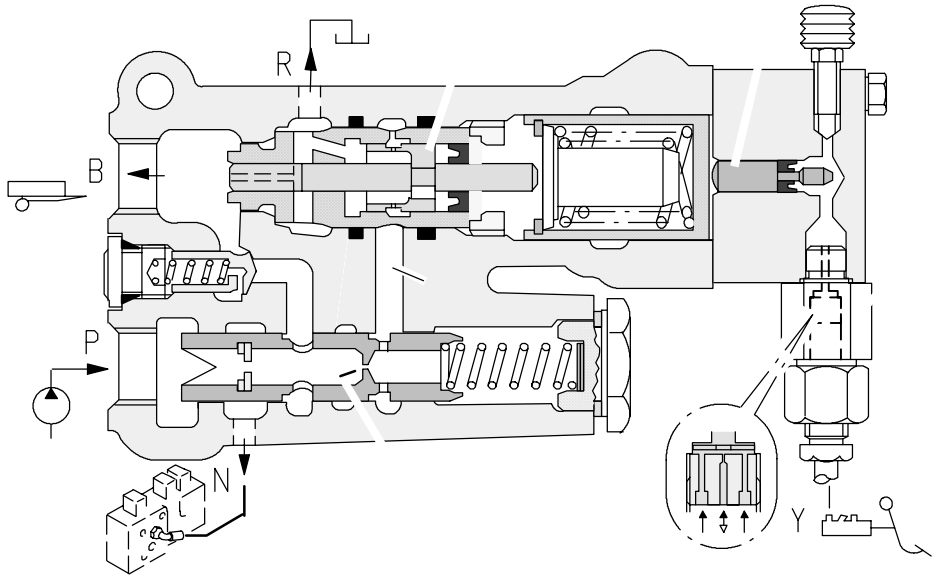
– "Duo–Matic" –has only two–line system. Function (pressures etc.) corresponds the two–line system shown on page 510/6.
"Duo–Matic"– couplings have not colour codes, because faulty connection is not possible.

1) Compressor
2) Deicer
3) Pressure regulator
4) Pressure gauge
5) Pressure reservoir
6) Water draining tap
7) Trailer brake control valve
9) Trailer coupling ,"Duo–Matic"
9a) Two–line system; reservoir line
9b) Two–line system; brake line
13) Trailer brake valve + brake power regulator
14) Trailer pressure air reservoir
15) Trailer brake cylinder
16) Servo cylinder (HiTech). Greasing the cylinder lever joint at every 250 running hours



Picture 9. Brake valve for trailer

1. Pressure line from pump
2. Brake valve
3. Pipe from low pressure citcuit
4. Pipe
5. Coupling for trailer
6. Pilot pressure from brake circuit
7. Brake pedals



Kuva 10. Perävaunun jarruventtiilin halkileikkauskuva

Reconditioning brakes (Op. no. 511)

1. Service brakes

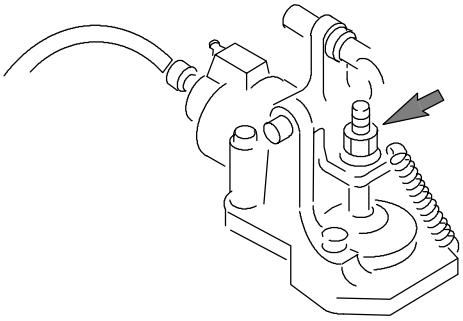
A. Changing brake discs

Note! There are oil grooves on the friction surface of the brake discs. On new discs the grooves are 0,3 mm deep. If the grooves are worn away, the braking efficiency will be impaired and the discs should be replaced.

1. Remove the final drives (**see Op. 451 1A**).

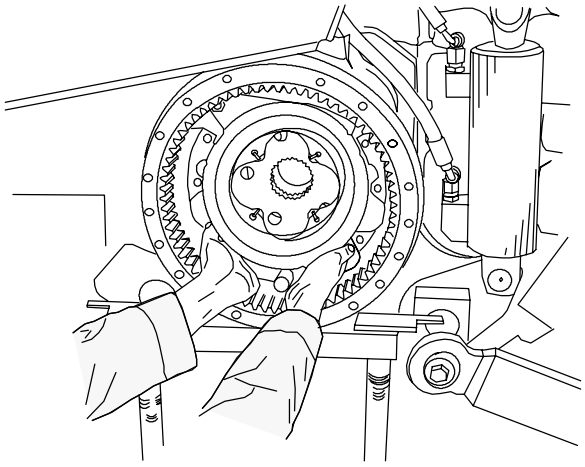
2. Pull out the inner drive shaft. Remove the outer support plate in front of the discs.

3. Remove the outer brake discs.



4. Slacken the adjusting nut (see arrow) until the brake mechanism is loose.

5. Take out the cotter pin and the link pin at the lower end of the stay. Pull the stay up until it is free from the application plate.



5a. Final drives 300, 450, 650: Remove the application plates by simultaneously pulling out the anchor bolt, fitted under the plate, and loosening the lower end of the plate from its position.

Note! The removal of the application plates is easier if the outermost circlip is removed from the anchor bolt.

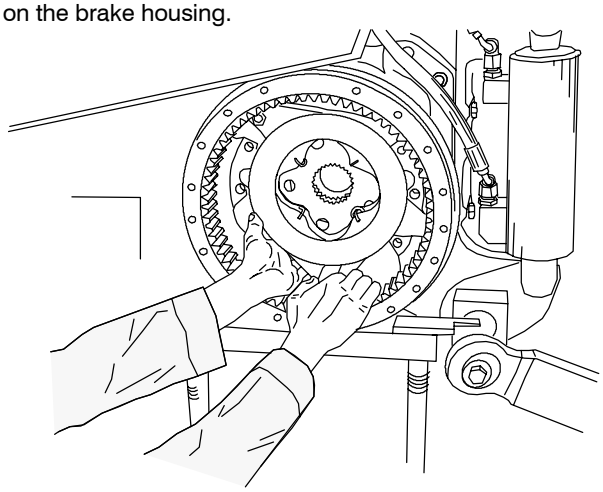
5b. 8350–8950Hi with final drives 700 has not an anchor bolt. Pull the application rings out of the housing.

6. Remove the inner brake discs.

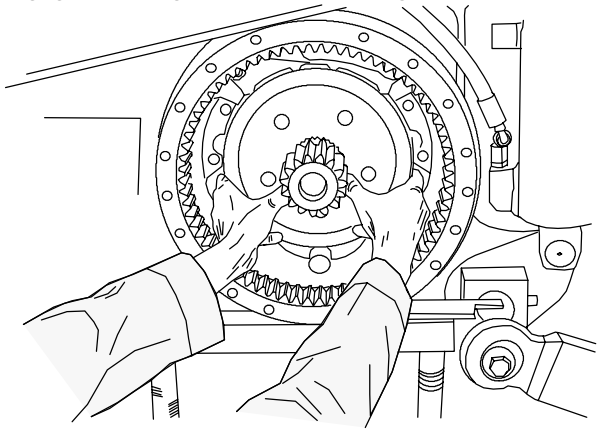
7. Check the friction surfaces in the brake housing and polish with an emery cloth.

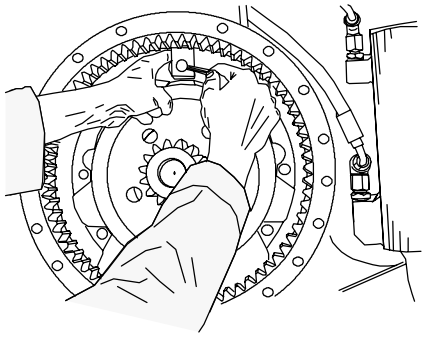
8a. Final drives 300, 450, 650: Push the anchor bolt in through the hole in the brake housing, but do not press it right home. Fit the inner brake discs on the anchor bolt. Check that the discs remain located in front of the inner circlip.

8b. In connection with final drives 700 there is not the anchor bolt. Place the inner brake discs and the intermediate discs in position so that the lugs engage into the grooves on the brake housing.

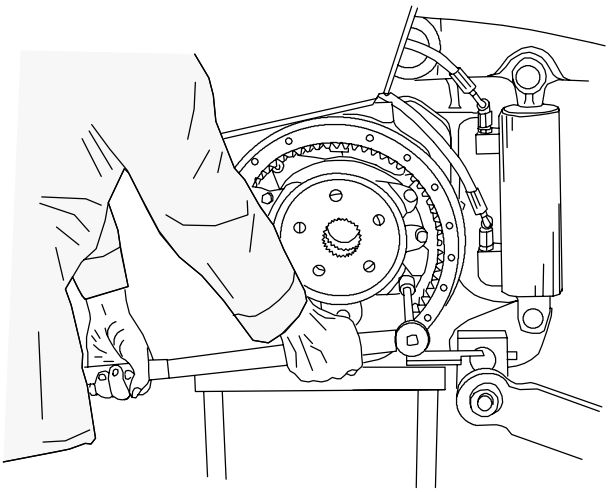


9. Final drives 300, 450, 650: Insert the application plate into the housing with the upper edge first locating the lower edge of the plate on the pulled–out anchor bolt. Press the bolt and the application plate into position. Fit the outer circlip on the anchor bolt. In connection with final drives 700, pass the application plate into place so that lugs on it engage into the grooves in the housing.





11. Using the link pin connect the brake stay to the link arms of the application plate and secure with the cotter pin. Tighten the adjusting nut at the upper end of the stay.



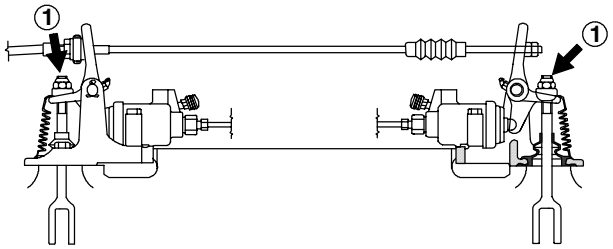
12. Fit the support and tighten it to **80 Nm** (8350–8950Hi, L32106–: **45 Nm**).

11. Fit the final drives (**see Op. 451 1E**) and adjust brakes (**see next instr. B**).

B. Adjusting foot brakes

Note! The pedal free travel should be **70–80 mm** with the pedals latched together. Adjust as follows:

1. Fit blocks in front of the front wheels to prevent the tractor from moving. When adjusting the service brakes, the parking brake must not be engaged. In HiTech–models the engine must be in running and the shuttle lever must **not** be in the P–position.



Final drives 300, 450 and 650:

2a. Raise the rear wheels off the ground and adjust both brakes separately with adjusting nuts (1) until the wheels cannot be turned by hand any further.
Slacken the adjusting nuts two turns and check that the wheels can rotate freely.

Final drives 700 (8350–8950Hi, L32106–):

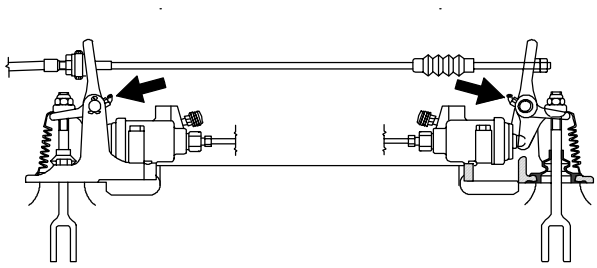
2b. Tighten the adjusting nuts (1) to **15 Nm** and unscrew them **one and a half turn**.

3. Check that the brake action is the same on both wheels while driving with the pedals latched together. Adjust if necessary.

5. Check the pedal free travel.

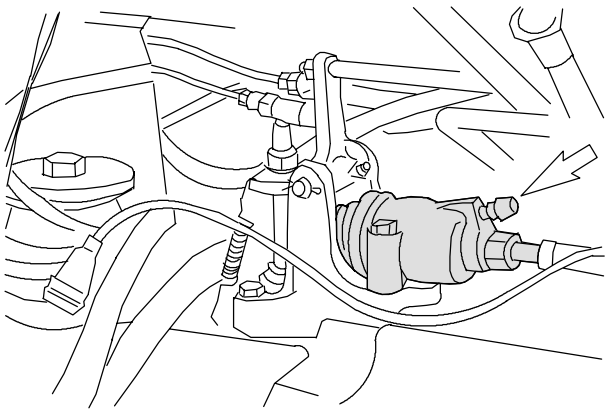
Note! Tractors equipped with the reverse drive controls: Adjust first the front pedals according to the instruction above. After this is adjusted the rear brake pedal by adjusting the lenght of the cable so that the rear brake pedal free travel becomes **20 mm**, see instruction on page 511/3.

Maintenance



Note! Grease brake lever nipples (see arrows) weekly (or every 50 running hours). It is recommended, that the brake fluid is changed every other year.

C. Bleeding brake system



Note! Both brake cylinders have a bleeding nipple (see arrow). Bleed both brakes individually (pedals not latched together).

1. Check thet the brake fluid reservoir is full.

2. Pump several times with the pedal in order to built up the pressure in the system.

3. Depress one of the brake pedals and at the same time open the bleed nipple on the brake which is being actuated by the pedal. Close the nipple and slowly let the brake pedal up again.

4. Repeat the pumping action with the brake pedal until the brake fluid which runs out at the bleeding nipple is completely free of air.

5. The procedure for bleeding the brakes is the same on both sides.