6 Gearbox Distributor (Group 190)

6.1 Description

The gearbox distributor is situated on the right-hand side of the gearbox behind the fuel tank. The distributor controls the inlet of the pressure oil into the clutch of the rear output shaft and torque multiplier control in the gearbox.

On the side wall there are electromagnetic valves to control the distributor function.

Location for the main control electromagnetic valve is marked 2 (R1) on the distributor.

Location for the control valve of the rear output shaft clutch is marked (5.1 R4) on the distributor.

Location for the multiplier control valve is marked (5.2 R2) on the distributor.

On the same side of the distributor there is also a threaded connection marked P, i.e. the oil input from pump into distributor.

The threaded connection marked C is the oil discharge output into a brakes space.

The figure shows the types of the used gearbox distributor control valves.

A illustrates the main electromagnetic control valve.

B illustrates the multiplier electromagnetic control valve mounted in the test series of the Proxima Plus gearbox only (it has big holes in the upper part of the gate valve and one small hole in the lower part) – this electromagnetic control valve can be fully replaced by the valve C.

C illustrates the multiplier control valve mounted in the series production (it has big holes in both parts of the gate valve).

D illustrates the electromagnetic valve of the rear output shaft clutch (it has one small hole in the upper part of the gate valve and big holes in the lower part).
On the front side of the distributor the screwed connections are marked as follows:

PCH – output of the part of the discharge oil from distributor into the gearbox oil cooler

VH – discharge oil output into hydraulic clutch of the rear output shaft

TCH – oil gate from the gearbox cooler

BN – pressure oil output from distributor into the brake roller of the multiplier band

and plug marked 4, behind which there is a relief by-pass valve set to 4 bars as a protection of the gearbox cooler.

On the upper side of the distributor the plugs are marked as follows:

8 – under the plug there is a main multiplier check valve set to 25 bars (2.5 MPa)

3 – under the plug there is a relief valve maintaining the working pressure in the distributor on the value ranging from 15 to 17 bars.

On the bottom side of the distributor there are two plugs of check holes stated for the diagnostics and marked as follows:

DVH – check hole to measure the oil pressure in the clutch of the rear output shaft;

DE – check hole to measure the multiplier control oil pressure

5 – circulation filter body
On the rear side of the distributor, which is to be fitted onto gearbox, there are holes for the oil supply marked as follows:

D – discharge oil from distributor determined for lubrication of the multiplier drum bearings and constant mesh double-gear in gearbox.

T – residue control oil discharge to gearbox after disengagement of the multiplier or the rear output shaft.

E – pressure oil output from distributor to the multiplier drum.
6.2 Functions

Basic diagram of the distributor is given in the following illustration

Legend:

1 – pressure oil output from distributor via the gearbox into the multiplier drum

2 – main electromagnetic control valve

3 – relief valve set to the working pressure of 15 to 17 bars

4 – by-pass relief valve set to the pressure of 4 bars as protection of the gearbox oil cooler

5 – pressure oil circulation filter for the distributor and the whole control system

6 – by-pass relief valve when the circulation filter is full

7 – control electromagnetic valve of the rear output shaft clutch

8 – master check valve (set to 25 bars) as an overall distributor protection

9 – check hole to measure the control oil pressure of the torque multiplier brake band

10 – pressure oil output from distributor to control the multiplier brake band

11 – pressure oil output from distributor to control the hydraulic clutch of the rear output shaft

12 – check hole to measure the control oil pressure in the clutch of the rear output shaft

13 – pressure oil inlet to distributor (at the oil temperature of 60 °C and the engine speed of 2,200 rpm the oil pressure amounts to 15 to 17 bars and the oil capacity makes 25 liters)

14 – discharge oil from distributor via gearbox (to lubricate the multiplier drum bearings and constant mesh double-gear)

15 – output of the part of the discharge oil from distributor to brakes

16 – gate of the part of the discharge oil from cooler to gearbox

17 – output of the part of the discharge oil from distributor to the gearbox oil cooler

18 – oil discharge from distributor to gearbox after disengagement of the multiplier or the rear output shaft

19 – control electromagnetic valve of the multiplier
If the distributor is in the position "NEUTRAL", i.e. when neither multiplier nor the rear output shaft are engaged, the oil flows in the distributor as illustrated below (the main control valve is not switched on and is open!)

2.
If the rear output shaft drive is engaged, the oil flows as illustrated below (the main control valve is shut).

This is for regular Zetor service network only.
After the multiplier is engaged, the oil flows in the distributor as illustrated below:

4.  

9 (DE)  

1 (E)  

10 (BN)  

(2.5 MPa)  

(1.5+0.2 MPa)  

17 (PCH)  

16 (TCH)  

15 (C)  

14 (D)  

This is for regular Zetor service network only.
When the rear output shaft and the multiplier work simultaneously, the oil flows in the distributor as illustrated below:
6.3 Diagnostics

6.3.1 Preparation to Measure the Distributor

Note:

When detecting the faults on the clutch of the rear output shaft or torque multiplier, first it is necessary to carry out the diagnostics of the gearbox hydraulic distributor. In case that the distributor function is found out OK, continue to look up for mechanical defects in the clutch proper of the rear output shaft or in the torque multiplier.

Prior to start the measurement:

1 – Check whether all connectors are plugged into electromagnetic valves of the distributor and whether the inlet cables are not damaged. Make sure whether the control push-buttons are not damaged.

2 – Check the oil level in gearbox.

3 – Visually check the connections in the gearbox hydraulic circuit for leaks.

4 – Drive the tractor to heat up the oil in gearbox to about 60 °C.

5 – Carry out all mentioned measurements at the engine idle speed of about 750 rpm.

6 – Unscrew plugs from the bottom side of the distributor for connection of pressure gauges.

7 – Prepare the diagnostic set to measure pressures in the gearbox distributor out of the diagnostics case 78.942.015.
8 - Attach the inlet pipes to pressure gauges to check holes in the distributor.

The pressure gauge marked A is connected to the screwed connection marked DVH. It measures the oil pressure entering the rear output shaft clutch.

The pressure gauge marked B is connected to the screwed connection marked DE. It measures the oil pressure entering the torque multiplier control.
6.3.2 Test 1 (Rear Output Shaft Clutch)

1. When the push-button on the right driver's cab post is turned off, the rear output shaft clutch is disengaged.

2. Both check pressure gauges indicate the zero (0 MPa) pressure.

3. After pressing the right bottom push-button on the cab's post, the function illustrated in the diagram "3" starts.

Caution! The switch is blocked against the self-switching-on.

4. The pressure gauge connected in a hole in the distributor marked 12(DVH), i.e. to the left in the figure, should indicate the pressure ranging between 1.5 and 1.7 MPa at a correct function.

After the push-button is switched-off, the button illumination goes out and the pressure gauge indicates the zero value.

5. Conclusion of the test:

If the pressure gauge indicates the zero pressure, there is probably a fault in the control electric wiring.

If the pressure gauge does not indicate the prescribed pressure, it can be caused by:

- a defect on the distributor relief valve,
- a defect on the hydraulic pump
- leakage in the hydraulic circuit of the rear output shaft clutch.

Zetor
6.3.3 Test 2 (Torque Multiplier)

1. After pushing the button "L" on the gearshift lever, the multiplier in gearbox turns on.

2. The signal lamp marked with the "turtle" symbol on the instrument board comes on.

3. The right-hand pressure gauge indicates the value of 1.5 to 1.7 MPa.

4. After pressing the button "H", the multiplier turns off, and the pressure gauge shows 0 MPa. The signal lamp marked with the "turtle" symbol on the instrument board goes out.
5 - Conclusion of the test:

If the pressure gauge indicates the zero pressure, there is probably a fault in the control electric wiring.

If the pressure gauge does not indicate the prescribed pressure, it can be caused by:

- a defect on the distributor relief valve,
- a defect on the hydraulic pump,
- leakage in the hydraulic circuit of the torque multiplier.

This is for regular Zetor service network only.
6.3.4 Test 3 (Rear Output Shaft Clutch + Torque Multiplier)

1. When buttons on the driver’s cab pillar and button “L” on the gearshift lever are pressed simultaneously, both pressure gauges should indicate the value of 1.5 to 1.7 MPa.

2. **Conclusion of the test:**

   In case that the pressure values in preceding tests were within the prescribed ranges and now these values are not indicated, it can be presumed that there is a fault on the pump of gearbox hydraulic circuits (insufficient pressure oil delivery for both circuits).
6.4 Methods of the Faults Detection and Troubleshooting

1 – Faults in the electric wiring control:

1 - First check whether the inlet leads to electromagnetic valves connectors are not damaged (interrupted). Connect the test gauge to the contact of the corresponding connector when the switch is turned on.

2 – A fault in the electromagnet proper can be found out when you dismount all individual electromagnetic valves step-by-step and check them for a correct function.

3 – Removal can be performed only after loosening the fastening screw of the electromagnetic valve.

4 - Slide the valve out of the distributor and leave the current inlet to the electromagnetic valve connected.

5 - Press the button of the respective valve and watch whether the gate valve moves.

6 - If the gate valve does not move after the current supply, there is a fault in the electric wiring of the control unit or there is a fault in the electromagnetic valve.

7 – Remember to make sure simultaneously that the sealing rubber rings of gate valves are not damaged.

2 – Relief Valve Malfunction

1 - The fault can be detected so that you dismount the pressure oil output from the distributor to the rear output shaft clutch.

2 – Install a ball to make the hole tight and attach the ball with nut.
3 - After the rear output shaft clutch is engaged, the left-hand pressure gauge indicates the pressure value on the distributor reducing valve.

4 - The zero or too low pressure value signals a defect on the pump or a faulty function of the relief valve of the operating pressure (a correct value should range between 15 and 17 bars).

3 – Fault on the pump

To detect a fault on the pump only, proceed as follows:

1 - At the engine idle speed of about 750 rpm and the transmission oil temperature of about 60°C, engage simultaneously the rear output shaft clutch and the torque multiplier and watch both pressure gauges.

2 – If the initial oil pressure is below 1.5 MPa and if with the continuously increasing engine speed the pressures on both pressure gauges increase simultaneously, the gearbox pump wear can be a cause.

3 – If the pressure does not increase, there may be a fault in the relief valve of the working pressure.

4 – Conclusion

When a low pressure in hydraulic circuits remains even after the fault remedy in the distributor and on the pump, it is necessary to look for the cause in the respective hydraulic circuit of the clutch or multiplier.

If no defects during diagnostic measurements were found out, it can be presumed that there are mechanical faults on the clutch or multiplier.

These faults can be repaired only after removal of the rear output shaft clutch or after removal of the multiplier from gearbox.
This is for regular Zetor service network only
Axle Final Drive Housing (Group 153)

7 Axle Final Drive Housing (Group 153)

7.1 Removal of the Axle Final Drive Housing

1 – Dismount the cabin (Group 369) if the workshop space possibilities allow it.

2 – If it is difficult to dismount the cabin, dismount:
   - Driver's seat (Group 342)
   - Bridge connection (Group 368, item 82)
   - Carrying rear wall (Group 369-6, item 106)

3 – Secure the front axle and wheels against a spontaneous move.

4 – Support the gearbox and place the axle final drive housing on an assembly truck.

5 – Dismount the lifting mechanism on the axle final drive housing (Group 400, item 16).

6 – Dismount the upper cover from gearbox and push the dowel into the input shaft of the axle final drive housing.

7 – Dismount rear wheels.

8 – Dismount the control unit (13) of the disc foot-operated brake (Group 227).

9 – Loosen the bolts connecting the axle shafts to the axle final drive housing. Hang up the axle shaft using chains on the lifting device.
10 – Move the axle shaft away from the axle final drive housing.

11 – Disconnect the lock release lever (68) from the tie-rod (52) by removing the pin (41) (Group 153).

12 – Loosen bolts (54) of the lock cover (56).

13 – Attach the suspension tool to the crown gear and slightly lift the gear.

14 – Remove the cover complete with the lock from the axle final drive housing.
15 – Unscrew bolts (53) and dismount the flange (62) c/w adjusting nut (61).

16 – Leave the bearing inner ring c/w rollers in the crown gear. Dismount the bearing on the other side in a similar manner.

17 – Use a lifting device to remove the differential body c/w crown gear from the axle final drive housing.

18 – Loosen and unscrew bolts (9). Slide the sleeve (1) c/w pinion and bearings out towards the axle final drive housing.
19 - Keep the spacers (28, 29, 30, 31) in a full number for the later assembly.

20 - Loosen lock sheets (74) before removal of satellites (70) and planet wheels (72).

21 - After unscrewing the bolts (75) the differential body can be dismantled.

22 - If worn, replace individual components: self-aligning seats (69), satellites (70), planet wheels (72) and washer (73).
Axle Final Drive Housing (Group 153)

23 - Unscrew the locking screw (5) and remove the lock piece (4).

24 - Withdraw the thrust ring (2).

25 - Use a special wrench to dismount the adjusting screw (3).

26 - Press the pinion out of the sleeve (1) and check both roller bearings.
27 - If the bearing (26) is worn, press the bearing outer ring out and replace the bearing.
7.2 Removal of the Output Shaft (Group 131)

**Note:** To dismount the output shaft only, dismount only the lifting mechanism and it is not necessary to disconnect the axle final drive housing from the tractor.

1 – Start the removal of the output shaft drive by removing the pin (33) of the double gear. Loosen and remove the lock ring (35).

![Image 1](image1)

2 – Use a puller to shift the pin (33) out.

![Image 2](image2)

3 – After shifting-out of the pin (33) remove the double gear (31, 32) from the housing. Check the sealing ring (34) on the pin.

**Note:** The double gears vary according to a kind of the output shaft mounted – 540/1000, 540/540E.

![Image 3](image3)
4 - Loosen and unscrew the bolts (45) fixing the cover (42, 43).

5 - Shift the cover (43) out of the axle final drive housing complete with the wheel (62).

6 - There are two produced types of covers in the figure:

- cover (43) has the so-called fixed output without possibility of the end piece replacement

- cover (42) allows to replace two end pieces (51) having 6 or 21 (50) splines.

7 - The hub (68) of the gearshift sleeve and the gear (62, 63) can be dismounted after removal of the lock ring (77).
8 - After dismounting of two needle bearing, withdraw the bush (64) and the locking wire from the output shaft.

9 - Unscrew eight bolts (49) and withdraw the cap.

10 - Press the output shaft (53, 54) complete with the bearing (57, 58) out of the cover.

11 - Dismount bearings (57, 58) from the shaft using a press.
Axle Final Drive Housing (Group 153)

12 – Check and/or replace the shaft seal (55 or 56 as per version) on the cover (42 or 43 as per version).

13 – Remove the gearshift sleeve (67) from the axle final drive housing.

14 – Use a screwdriver to slacken and unscrew the bush (21).

15 – Dismount the tie-rod (20).
16 – After removal of the tie-rod and unscrewing the bush (21), removal of sleeve (67), partially shift out the shaft (22) and dismount the fork (23). Remove the split pin (19) and move the shaft (22) more inside the housing and remove the lever (10). Now the shaft (22) can be slid out of the housing.

17 – Unscrew the lock piece (13).

18 – By loosening the screw (25) the plate (14) on the shaft is released too.

19 – After unscrewing the threaded through-bush (15) it is possible to remove the complete gearshift shaft.
20 – The set of the gearshift shaft is illustrated in the figure.

21 – To slacken the output shaft, withdraw the lock ring (69) and washer (76).

22 – Press the output shaft (73) out of the axle final drive housing.

23 – Check the bearing (75, 78) for condition and dismount it if need be.
### 7.3 Installation of the Output Shaft (Group 131)

1. Slide the output shaft (73) into the axle final drive housing.

2. Press the shaft (73) to the bearing in the axle final drive housing.

3. Fit the washer (76) to the bearing and secure it with the lock ring in the axle final drive housing.

4. Prepare the gearshift shaft (18) complete with accessories as illustrated to continue the assembly.
5 – Slide the threaded bush (15) on the gearshift shaft (18). Slide the shaft into the axle final drive housing and fit the plate (14).

6 – Press the key into the shaft and fit the lever (10). Using the screw (25) fix the plate (14) to the shaft.

7 – The lever (10) should be tilted from a hole in the axle final drive housing after installation of the plate on the shaft (18). The tie-rod (20) can be connected to the lever.

8 – To install the engagement mechanism of the output shaft in the lower part of the axle final drive housing, prepare the shaft (22) c/w accessories – bush (21), lever (10), split pin (19), key (17) and fork (23).
9 - Slide the shaft (22) into the axle final drive housing as far as it goes and slide the lever (10) onto the shaft in the axle final drive housing. Then slide the shaft out so that the lever strikes the housing.

10 - Slide the fork (23) on the shaft (22) c/w key (17) and secure it with the split pin.

11 - Connect the tie-rod (20) to the lever (10) and secure it with the split pin.

12 - Secure the shaft (22) with the bush (21) in the housing. Smear the bush thread with sealant Loctite 243 and tighten by the screwdriver.
13 – Attach the shaft (18) using the threaded through-bush (15) in the upper part of the axle final drive housing. Smear the thread with sealant Loctite 243 and tighten the thread.

14 – Slide the gearshift sleeve (67) into the shifter fork.

15 – Prepare the cover (42 or 43) according to a type of the output shaft. Replace the shaft seal (55 or 56).

16 – Press the output shaft (53 or 54) complete with bearing (57 or 58) into the cover.
17 - Smear the screws (49) threads with sealant Loctite 243. Use screws to attach the bearing c/w output shaft in the cover.

18 - Slide the spacer and bush (64) on the output shaft. Secure the bush in position with a wire inserted into shaft splines.

19 - Slide two needle bearings and gear (62 or 63) on the bush. Fit the hub to the gear and secure it with the lock ring (77) in position.

20 - Install the output shaft cover (42 or 43) into the axle final drive housing. Apply sealant Rhodoseal 5662 to contact surfaces of the cover and housing.
Axle Final Drive Housing (Group 153)

21 - Use bolts (45) to attach the cover in the axle final drive housing. Smear the bolt threads with sealant Loctite 243.

22 - Fit the double gear (31 or 32) into the axle final drive housing. Fix the double gear in the housing with the pin (33). Replace the sealing ring before installation of the pin.

23 - Use a driver to press the pin (33) in.

24 - Secure the pin (33) with the lock ring (35) in the housing.
25 - Move the lever (7) to marginal positions to check the engagement for a proper function and/or correct the position of the plate (14). Screw the lock piece (13) into the housing.

This is for regular Zetor service network only
7.4 Assembly of the Axle Final Drive Housing

1 - Press the outer ring of the bearing (26) into the sleeve (1).

2 - To mount the crown gear and bevel gear, prepare the differential body complete with the crown gear, pinion and bolts (35) marked in the same manner.

3 - Slide the pinion c/w bearings (26 and 7) into the sleeve (1) and press the outer ring of the bearing (7).

4 - Fit the thrust ring (2) on the pinion shaft.
5 – Tighten the nut (3) to adjust the clearance in pinion bearings to 0.0 to 0.05 mm.

**Note**: Check the pinion in the sleeve bearings for a free rotation.

6 – Lock the nut with shim (4) and screw (5).

7 – Prior to install the differential into the axle final drive housing, first check the pipe (23) to find out whether it is not damaged. If damaged, replace it.

A procedure of the pipe replacement is mentioned in further description.

8 – Cut out the pipe and remove the pressed-out ends in the housing for example using a screw tap and take care not to damage holes in the housing. Remove the pipe from the housing.

9 – Insert a new pipe (23) into housing and push it towards the housing wall. Use an aid to expand the hydraulic pipe 78.942.625 to attach the pipe in the housing.

Expand the pipe at the bottom of the housing too.
10 – Use drivers to make the pipe tight, first one with a beveled end and the other with a cylindrical end.

11 – Check the accuracy of the countersinking depth as illustrated.

12 – The pinion c/w bush is installed only after calculation of the washer, which is to be mounted under the bush.

Use the below mentioned formula to calculate the thickness of the washer $S$:

$$ S = H - (A + O) $$

where

- $A$ – measured value on the subgroup of the pinion seat
- $H$ – stamped value on the axle final drive housing
- $O$ – dimension given by the manufacturer, i.e. 106 mm

Note: The allowable tolerance of the washer $S$ dimension is 0.1 mm.
Axle Final Drive Housing (Group 153)

13 - The dimension H is written on the upper part of the axle final drive housing.

14 - Fit the washer (28, 29, 30, 31) out of the set on the bush (1).

15 - Mount the complete pinion shaft (1) into the housing and use screws (9) to attach it.

Note: Apply sealant Loctite 243 to screw threads.

16 - Check whether the crown gear is riveted in a correct manner to the differential body using rivets (64). Further on, make sure that the original pair of the crown gear and pinion (80) is used for the installation. Install the planet wheel (72), satellites pins (71), satellites (70) and self-aligning seats (69) into the body.
17 – Fit the other planet wheel (72) and washer (73).

18 – Assemble the differential so that both parts of the body have the same manufacturer's designation and numerals face each other.

19 – Tighten the screws (75) and secure with lock sheets (74).

20 – Install the complete differential (82) c/w inner rings of bearings (63) into the axle final drive housing.
21 – Mount the flange (62) complete with the cover cap (76) and bearing outer ring (63).

**Note:** The flange has only one mounting position. In the flange there is a hole which should be in the lower position so that to secure a correct oil through-flow between the differential and the axle shaft.

22 - Install the right-hand flange in a similar manner.

23 - If the pinion was not installed in accordance with the "calculation of spacer thickness", smear the crown gear teeth with the Berlin blue and check whether the mesh curves on teeth of both gears are in the same place as after a run-out from the manufacturer.

24 - Before finding-out of the teeth clearance between the pinion and the crown gear (80), move round the differential body (81) by the X mark towards the pinion.

**Caution!** The mark is situated in the place of the biggest crown-gear run-out!
25 - Use an indicator with the measuring point situated perpendicularly to the pinion teeth to find out the teeth clearance. The prescribed value is 0.2 to 0.3 mm.

26 - Use adjusting nuts (61) to set the clearance — use the nuts to move the crown gear in or out of mesh with the pinion.

27 - Before every shifting of the differential body using nuts, tap the crown gear using a mallet made of the soft metal to slacken rollers in bearings.

Note: Make sure that the bevel gearings may rotate freely within the whole range. The prescribed clearance in tapered roller bearings is 0.0 to 0.05 mm.

28 - Secure the adjusting nuts in the final position with the lock piece (77).
29 - Attach the suspension tool to the crown gear and slightly lift the gear.

30 - Mount the cover c/w lock into the axle final drive housing.

31 - Use bolts (54) to attach the lock cover (56).

32 - Use the pin (41) (Group 153) to attach the lock release lever (68) to the tie-rod (52).

33 - Hang up the axle shaft on chains of the lifting device. Use bolts to attach the axle shaft to the axle final drive housing.
This is for regular Zetor service network only
8 Rear Axle Shafts (Groups 161, 227)

8.1 Removal

1 – Prior to start the removal of the axle shaft from tractor, first support the final drive housing on a jack.

2 – Dismount the rear wheel.

3 – Drain the oil from gearbox and axle final drive housing.
4 – Drain the oil from the axle shaft which is to be removed. Unscrew the plug from the check hole (17) and plug from the drain hole.

5 – Release the brakes hydraulic control (13).

6 – If the axle shaft is fitted with the speed sensor, dismount it.
7 – According to the workshop possibilities, hang up or support the axle shaft and unscrew bolts (7, 8).

8 – Put the axle shaft into a place of disassembly.

9 – Loosen and unscrew bolts (48).

10 – Use a screwdriver to shift out and remove flexible clamps (52) and dismount the clamps (51).

11 – Withdraw the base plate (54) from the dowel (56).
12 – Remove the disc brake (58) including plates from the brake basket (53).

13 – If a defect occurs on the thrust plate (65), release springs (62) and now you can remove the balls.

14 – Remove the brake plate (60) complete with the blade wheel (49) for the left-hand brake and (50) right-hand brake and dowel (56) from the brake basket.

15 – Slide the washer (57) and rollers (59) out of the brake basket (53).
16 – Loosen and unscrew bolts (9) and remove the portal cover (27).

17 – Loosen and unscrew bolts (39) and withdraw the cover (23).

18 – Remove the lock ring (67) from the differential shaft, withdraw the plates' hub (55) and remove the lock ring (66).

19 – Release the lock washer (22).
20 - Loosen and unscrew nuts (32).

21 - Withdraw the ring (20) from the wheel shaft (28).

22 - Use two bolts M16x1.5 resting on the portal cover (4) to partially slide out the wheel shaft (28).

Note: Support the bolts on a hard plate not to deform the cover.

23 - Withdraw the bearing (34) from the wheel shaft.
24 - Remove the spacer ring (21) complete with spring (19) from the wheel shaft.

25 - Loosen and unscrew bolts (38) of the front cover (30).

26 - After sliding-out of the wheel shaft (28) c/w front cover (30), bearing (33) and lock ring (31), remove the gear wheel (12) from the axle shaft.

27 - After removal of the lock ring (31) it is possible to dismount the bearing (33) and if need be, replace the shaft seal (24) in the front cover (30).
28. Loosen and unscrew bolts (37) and withdraw the upper cap (28).

29. Fit the portal into a press and press the differential shaft (14, 15) out.
8.2 Installation

1. Check and if replaced, use a tool to press the shaft seal (36) into the portal.

2. Turn the portal upside down and press the differential shaft (14 or 15) with one bearing (35) and another bearing (35) prepared.

   **Note:** Based on the requirements for the maximum tractor's speed, use always the couples of gears and differential shaft on the tractor as follows:

   - 30 km/h - gear 61 teeth / differential shaft 12 teeth
   - 40 km/h - gear 59 teeth / differential shaft 14 teeth.

3. Use a tool to press the outer ring of the other bearing (35).

4. Smear the contact surfaces of the portal and upper cap (29) and portals (2, 3) with sealant Rhodoseal 5662 and use bolts (37) to attach the cap to the portal.
5 – Check and/or replace the shaft seal (24) in the front cover (30) and slide it on the wheel shaft (28).

6 – Press the inner ring of the bearing (33) on the wheel shaft and fix the lock ring (31).

7 – Install the gear wheel (12 or 13) into portal (2 or 4) and fit the assembled wheel shaft (20). Smear the contact surfaces of the front cover and portal with sealant Rhodoseal 5662.

8 – Use bolts (38) to attach the front cover (30) to the portal.
9 – Fit the retaining ring (21) c/w spring (18) onto the wheel shaft carefully.

10 – Slide and press the bearing (34) on the retaining ring.

11 – After fitting the bearing (34) mount the ring (20) on the wheel shaft.

12 – Fit the nut (32) on the ring – tighten the nut thoroughly and then slacken by 1/3 turn in order to obtain the bearing clearance of 0.05 mm.
13 - Fit the locking washer and another nut (32) and tighten it thoroughly. Then lock the washer by bending it off into nuts slot.

14 - Smear the contact surfaces of the rear cover (23) and portal (2, 4) with sealant Rhodoseal 5662 and use bolts (39) to attach the cover.

15 - Smear the contact surfaces of the cover (27) and portal with sealant Rhodoseal 5662. Fit the portal cover (27) and use bolts (9) to attach it.

Note: Follow the location of check holes, LH and RH when mounting covers onto a tractor.

16 - If the locking ring (66) was dismounted, slide it on the differential shaft. Insert a dowel (56) into the bush of the rear axle so that its smaller diameter is ready for the base plate.
17 – Slide the plates' hub (55) onto the differential shaft and lock it with the locking ring (67) in position.

18 – Fit the brake basket (53) on the bush of the rear axle. Insert per two rollers (59) and washer (57) into each of bored holes in the brake basket (53).

19 – On the plates' hub (55) fit the brake plate cowling (60) to which the blade wheel (49) for the left-hand brake and blade wheel for the right-hand brake (50) is attached by means of flexible clamps (52).

20 – The differentiation of the blade wheel (L) for the left brake and blade wheel for the right brake (P) is shown in the figure.
21 - Fit the fixed plate (61) and another plate c/w lining (60) onto the plates' hub (55) and dowel (56).

**Note:** Plates c/w lining must be positioned so that the holes are aligned to assure a good oil flow.

22 - If the thrust plate is not prepared for the assembly as a unit (65), fit five balls (63) on each part, slide five springs (62) on each plate and slide the roller (64) into each plate.

23 - Fit plates (65) on each other and hang up five springs (62).

24 - Mount the unit of the thrust plate (65), plate c/w lining (60), fixed plate (61) and base plate (54) into the brake basket (53).

**Caution!** Take care that the thrust plate (65) is positioned correctly.
25 - Use flexible clamps (52) to fix the complete clarifier (51).

26 - Smear the contact surfaces of the base plate (54) and rear axle bush with sealant Rhodoseal 5662.

Use four bolts (48) to attach the base plate (54) to the rear axle bush.

27 - Hang up the axle shaft on the lifting device, smear the contact surfaces of the rear axle with sealant Rhodoseal 5662 and use bolts (7, 8) to attach the complete half-axle to the axle final drive housing. Smear the bolt threads with sealant Loctite 243.

28 - If the tractor is fitted with the digital instrument board, mount the speed sensor to the left portal.
29 - The speed sensor is delivered as an assembled complete unit. Before installing it, check whether the couple of nuts are in the distance of 22.3 mm from the face of the speed sensor.

Three leads are hanging from the sensor. The letter C is a black lead, H is a brown lead and M is a blue lead.

The letter D marks a diode which lights when the sensor is in operation.

30 - If the fault repeats itself (e.g. knocked-off sensor), make sure that a gap between the addendum and sensor is 1.0 to 1.1 mm.

Note: Due to tolerances, run-out and temperature the real gap may be within the range of 0.2 to 1.6 mm during operation.

31 - Mount the control mechanism (13) of the foot-operated disc brake (Group 227).

32 - After installing the control mechanism of the foot-operated brake, carry out the setting of the brake so that you turn the wheel shaft using a lever and adjust the control mesh of the thrust wedge.

Note: Bleed the brake working cylinder.
This is for regular Zetor service network only
9 Front Drive Axle Output and Propeller Shaft (Group 185)

9.1 Removal

The output and propeller shaft are usually dismounted when changing the combination of tires dimensions used both on the front and on the rear axle. The allowable combinations of tires dimensions are given in the introduction to the manual. Not keeping the prescribed combinations result in big differences in the front axle advances what will cause the transmission defects and enhanced wear of tires.

Note: The front drive axle advance should range between 0 and 5% and the recommended value is 1 to 3%.

The output and the propeller shaft are always dismounted during the gearbox overall removal or when a defect is found out on the output.

Prior to start the removal of the output:

1 – Dismount the propeller shaft dw carrier assembly (105).

2 – Drain the oil from gearbox by unscrewing the plug at the bottom of the output housing.

3 – Disconnect the engaging lever control mechanism on the output housing.

4 – Support the body of the output housing on a jack.

5 – Loosen and unscrew four bolts (44) and four bolts (34). Dismount the output housing.

6 – Check the number stamped on the side of the housing, which means a number of the output gear teeth, related to various combinations of tires dimensions on the front and rear axle. The numeral 2 means 22 teeth on the output gear (64). This gear is not shown because it is located in the housing.

Note: Numbers of teeth on gears (64, 65) related to tires dimensions are mentioned in the introduction to the manual.
7 – The gear (64, 65) which determines the transmission ratio is situated inside the output housing and is accessible after the below-mentioned removal of the output.

8 – Prior to press out the pin (61), push the dowel (60) into the pin.

9 – Press out the pin (61) and remove the intermediate gear (5) with bearings (53).

10 – Unscrew the screw (42), remove the lock piece (40) and slide the complete shaft (43) out.
Front Drive Axle Output and Propeller Shaft (Group 185)

11 – Unscrew eight bolts (72) and withdraw caps (81, 70) from both sides of the housing.

12 – Press out the output shaft from the output housing towards the propeller shaft.

13 – After pressing out of the output shaft (62) complete with bearing (84) from the housing, remove the output gear (64 or 65 as per version) and fork (35) c/w clutch (63).
9.2 Installation

Prior to start the installation, find out which tires dimensions should be mounted on a tractor. Verify the designation by numerals 2 or 3 according to number of teeth of the mounted output gear (64 or 65). If this numeral does not correspond to the mounted gear (64 or 65), correct the marking on the housing to assure a later correct tires replacement.

Note: Mount the gears into the output housing in accordance with the table given in the introduction to the manual.

1 – Install the fork (35) c/w clutch (63) and output gear (64 or 65) into the housing and prepare the output shaft (62) c/w bearing (84).

2 – Slide the complete shaft (43) c/w key (39) into the output housing so that the shaft passes through the fork (35). Then carefully slide the prepared output shaft (62) into the clutch and output gear.

3 – Fit the spacer pipe (67) on the output shaft.
4 - Fit the inner ring of the bearing (68) on a press and drive the output shaft (62) into the housing.

5 - After pressing the output shaft (62), turn the housing upside down and fit the outer ring of the bearing (68) and press it into the housing.

6 - Turn the housing upside down again and press the bearing (84).

7 - Check the shaft seal COMBI in the cap (81) for a condition and replace it with a new one if need be. Slide the cap (81) clamping ring (82) so that slots on the cap allow the sliding-on of fastening screws (44).
8 - After pressing-on of bearings and the front cap (81), measure the countersinking depth of the bearing outer ring (68).

9 - Now measure the height of the recess on the cover cap (70) and fit spacers (83, 91, 98, 99, 100) so that the clearance in bearings (81 and 90) is 0.05 mm.

10 - Smear the contact surfaces of caps and the output housing with sealant Rhodoseal 5662. Use bolts (77) to attach both caps (81) and (70).

11 - Prepare the intermediate gear (56) for the installation into the housing. Slide the bearing (53) and lock ring (55) into the gear. Fit the ring (54) and set of spacers (57, 58, 59) prepared from disassembly on the lock ring.
12 – After installation of the other bearing (53) measure the mounting dimension of the whole assembly.

13 – After measuring the eyes pitch on the output housing, the difference of dimensions should amount to 0.05 mm. If this value is not attained, it is necessary to correct this dimension by installing spacers between bearings (53).

14 – Use the pin (61) to attach the gear (56) and lock it with the dowel (60).

15 – Clean the contact surfaces of the housing and gearbox. Smear the surfaces with sealant Rhodoseal 5662. Fit the housing to the gearbox on dowels and use four bolts (34) and four bolts (44) to attach it.
This is for regular Zetor service network only
10 List of Service Tools

78.942.006
Puller to remove double-purpose clutch and torque multiplicator - basic part

78.942.101
Tool to compress spring of three-stage torque multiplier

78.942.102
Tool to compress spring of two-stage torque multiplier

78.942.614
Puller (for gear box - base plate)
List of Service Tools

78.942.615
Puller to remove reduction gear lay shaft

78.942.625
Taper roller for fitting hydraulic pipe in main transmission

78.942.650
Puller multi-purpose

78.942.657
Puller of bearing
# List of Service Tools

<table>
<thead>
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<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>78.942.900</td>
<td>Disassembling jack</td>
</tr>
<tr>
<td>78.942.901</td>
<td>Guide for jack</td>
</tr>
</tbody>
</table>

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