

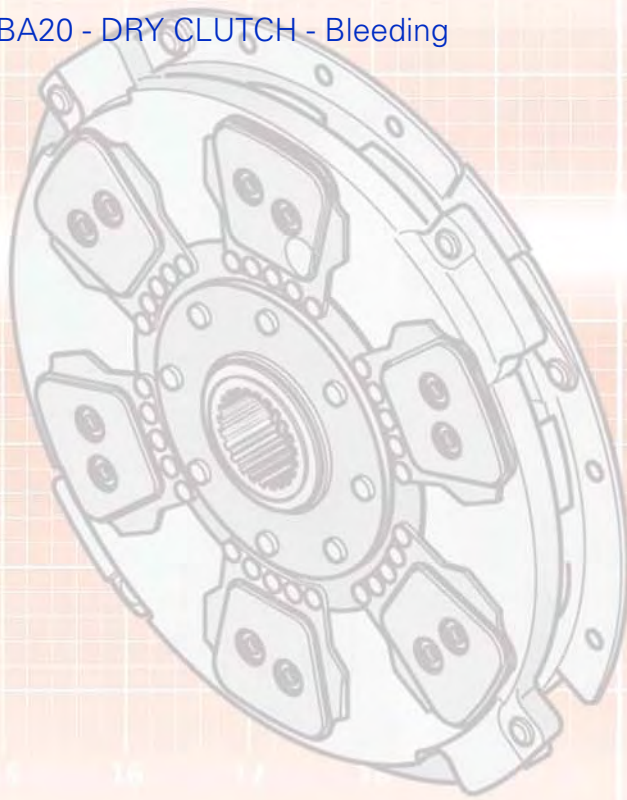


04 - Clutch

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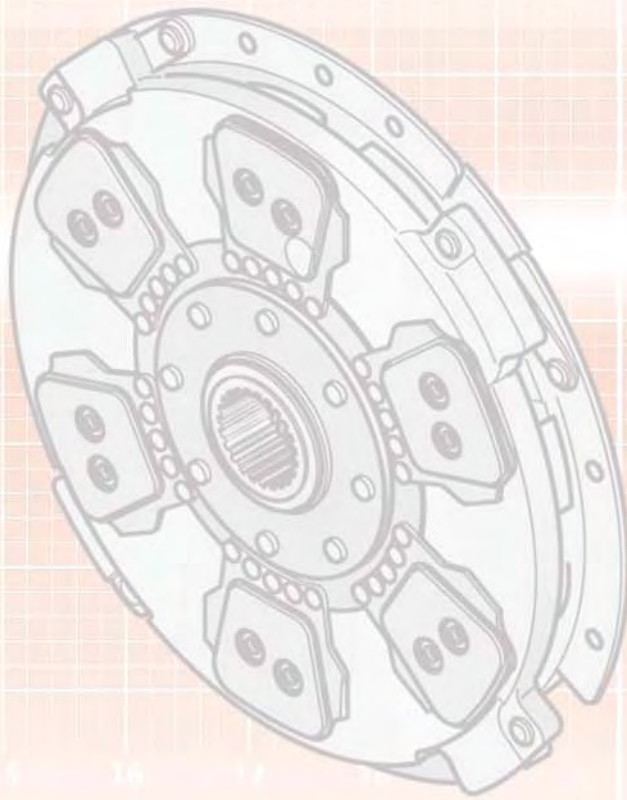
4A11 - GBA20 - DRY CLUTCH - Bleeding



Clutch



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GBA20 - DRY CLUTCH - Disassembling and reassembling

4A10- GBA20 - DRY CLUTCH - Disassembling and reassembling

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GBA20 - DRY CLUTCH - Disassembling and reassembling

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A . General

The dry clutch consists of (Fig. 1):

- a thrust bearing carrier (2) and thrust ball bearing (1),
- a diaphragm mechanism (9),
- a bladed friction disc (6).

It is controlled by a power assisted master cylinder supplied by the tractor low pressure (17 bar) hydraulic system.

Construction (Fig. 1)

The hydraulic slave device / thrust bearing carrier assembly is attached to the Speedshift input unit cover plate at the front of the gearbox.

The thrust bearing carrier supports the bearing. It is controlled by the hydraulic slave device assembly.

The clutch thrust bearing is:

- sealed: the ball bearing races are lubricated for life and designed to be lubricated constantly when rotating;
- held in permanent contact with the clutch mechanism by springs (13) located behind each piston (3). This design avoids undue pedal clearance;
- automatically centred when the engine starts running.

Each piston (3) is guided in its cylinder by rings (11).

Piston / cylinder tightness is ensured by composite seals (12) (24).

NOTE: Composite seals comprise a sealing ring (12) held under constant pressure against a piston (3) by an "O" ring (24).

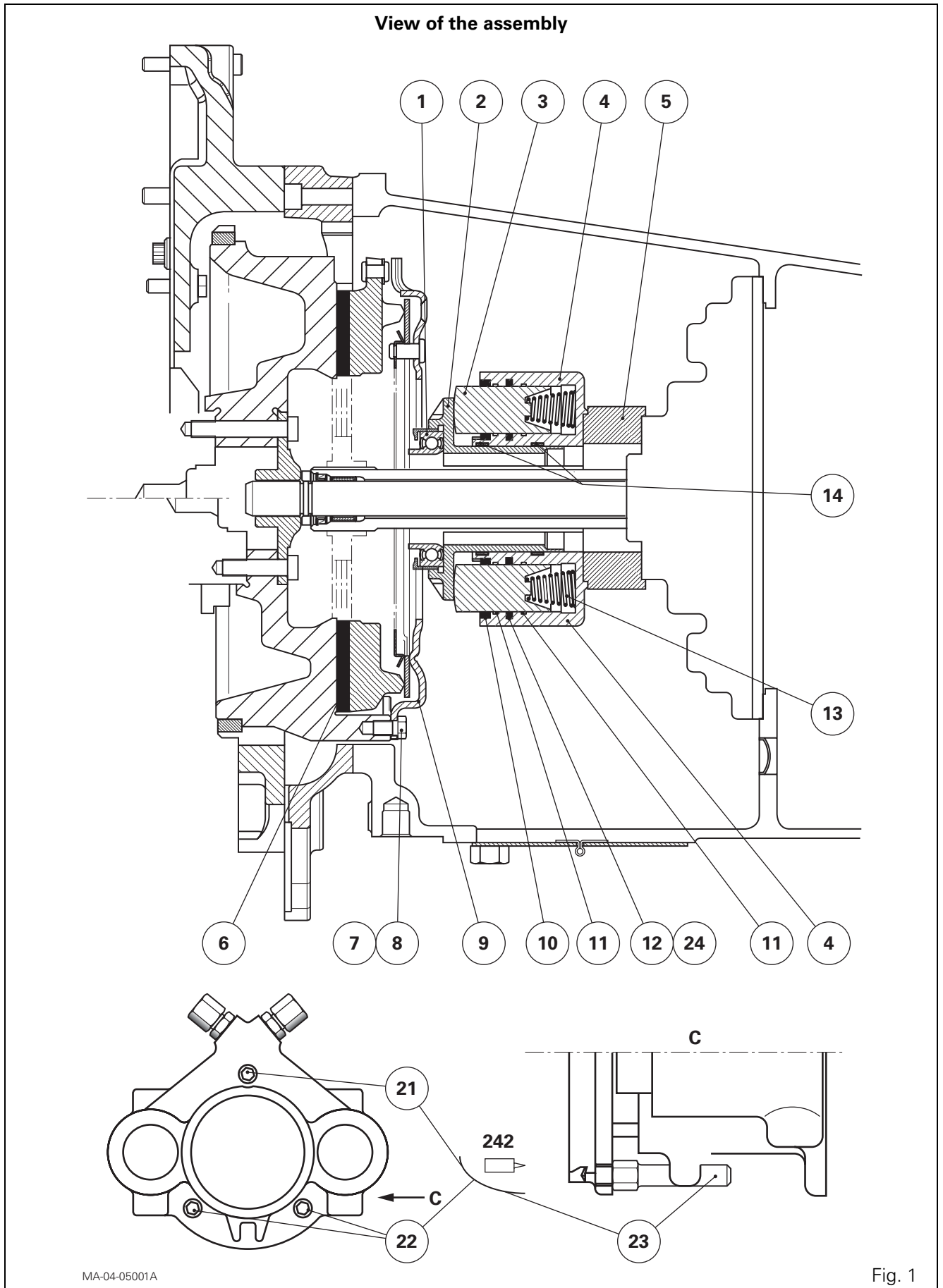
Any dust created by the friction of the disc (6) is driven from the rims of the pistons (3) by wiper seals (10).

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Parts list (Fig. 1)

- (1) Clutch thrust bearing
- (2) Thrust bearing carrier
- (3) Pistons
- (4) Hydraulic slave device assembly
- (5) Spacer
- (6) Friction disc
- (7) Screw
- (8) Dowel
- (9) Mechanism
- (10) Wiper seals (dust seals)
- (11) Guide rings
- (12) Sealing ring (composite)
- (13) Springs
- (14) Guide rings
- (21) Screw
- (22) Screw
- (23) Guide pin
- (24) "O" ring (composite)

GBA20 - DRY CLUTCH - Disassembling and reassembling



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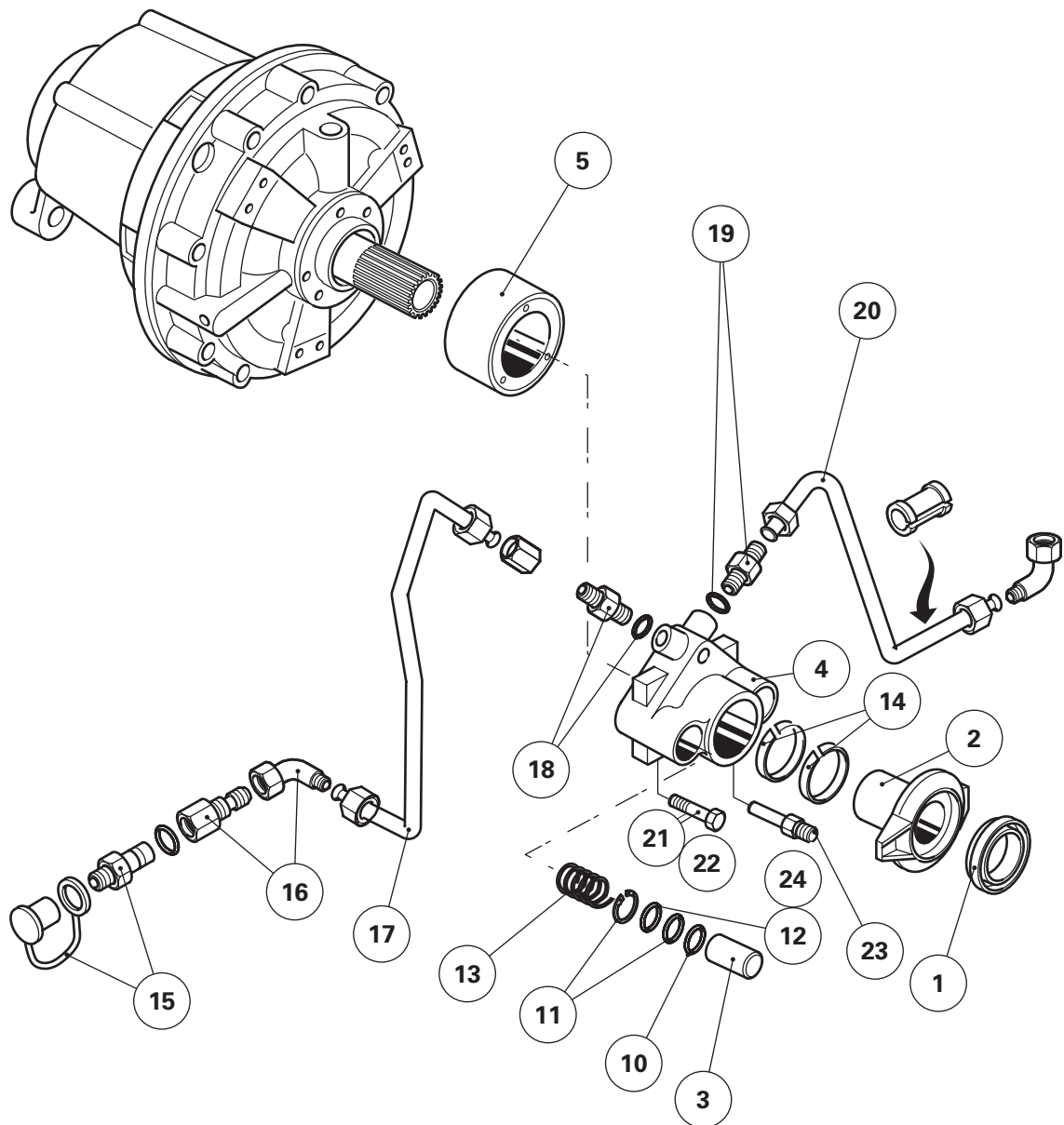
GBA20 - DRY CLUTCH - Disassembling and reassembling

Parts list (Fig. 2)

- (1) Clutch thrust bearing
- (2) Thrust bearing carrier
- (3) Pistons
- (4) Hydraulic slave device assembly
- (10) Wiper seals (dust seals)
- (11) Guide rings
- (12) Sealing ring (composite)
- (13) Springs
- (14) Guide rings
- (15) Bleed or pressure connector
- (16) Unions
- (17) Pipe
- (18) Union and seal
- (19) Union and seal
- (20) Supply pipe
- (21) Screw
- (22) Screw
- (23) Guide pin
- (24) "O" ring (composite)

GBA20 - DRY CLUTCH - Disassembling and reassembling

Blown-up view



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Fig. 2

GBA20 - DRY CLUTCH - Disassembling and reassembling

B . Operation

Clutch disengaged position

The dry clutch is controlled by a standard clutch pedal that acts on a master cylinder via a rod.

The quantity of oil moved by the master cylinder piston causes the thrust bearing carrier and its bearing to move.

The diaphragm mechanism is then compressed and the clutch disc released.

Clutch engaged position

When the pedal is released, the pressure drops in the slave cylinders.

The clutch mechanism diaphragm forces:

- the thrust bearing carrier and its bearing to return to position;
- the clutch mechanism pressure plate to move forwards.

The friction disc (6) is then locked between the pressure plate and the engine flywheel. This allows drive to be transmitted from the engine to the gearbox.

GBA20 - DRY CLUTCH - Disassembling and reassembling

C . Removing and refitting the diaphragm mechanism and friction disc

Preliminary step

1. Disconnect the tractor between the engine and the gearbox (see chapter 2).

Removal (Fig. 3)

2. Fully insert centring tool MF457 in the friction disc and hub of the engine flywheel PTO shaft. This prevents the friction disc (6) from falling off.
3. Gradually and evenly loosen and remove opposing screws (7) from the mechanism (9).
4. Remove the mechanism and the friction disc (6).

NOTE: The friction disc can have five or six blades depending on the tractor power.

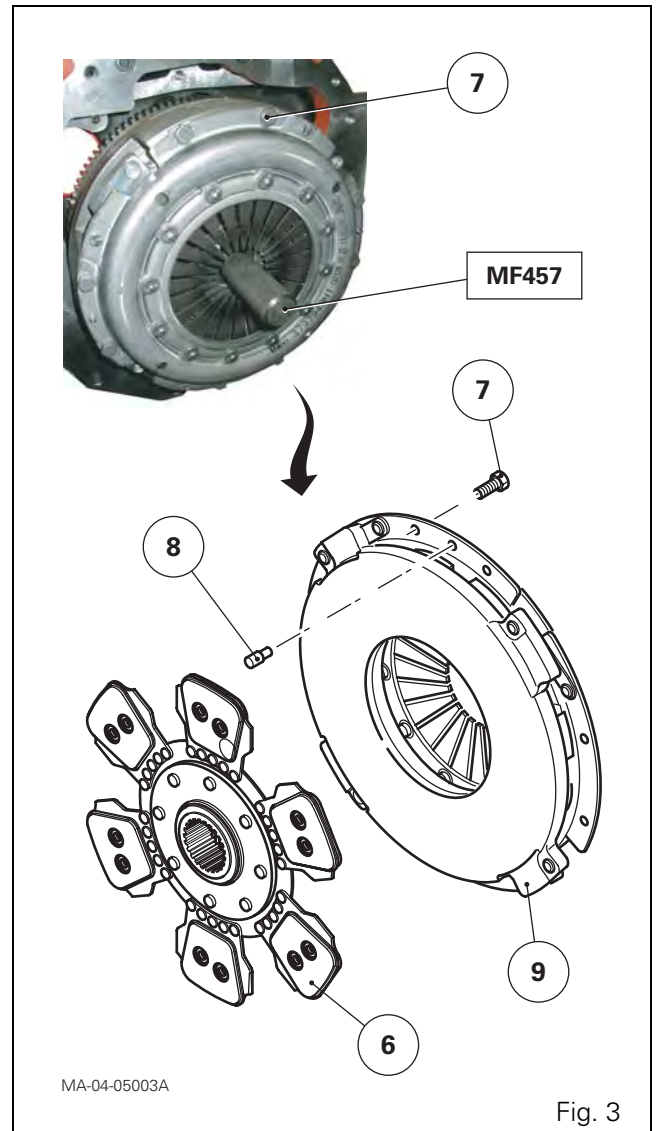


Fig. 3

GBA20 - DRY CLUTCH - Disassembling and reassembling

Refitting (Fig. 4)

5. Remove dust from the engine flywheel. Clean it with a solvent.
6. Check for any signs of wear, scratches, surface cracks, buckling or overheating on the mechanism and on the engine flywheel.
Replace defective parts.
7. Lightly smear the splines of the PTO shaft hub (1) with AS767 grease or equivalent.

NOTE: The hub (1) is located in the engine flywheel.

8. Check that the dowels (8) are present on the engine flywheel (Fig. 3).
9. Fit the following onto the engine flywheel:
 - the friction disc (6),
 - centring tool MF457,
 - the clutch mechanism (9).

IMPORTANT: Turn the thick part "E" of the friction disc (6) towards the clutch mechanism (9).

10. Lightly smear the thread of the screws (7) with Loctite 270 or equivalent. Gradually screw in the screws. Tighten the screws equally in diametrically opposed pairs to a torque of 50 - 70 Nm.
11. Take off centring tool MF457.

Final step

12. Reconnect the tractor between the engine and the gearbox (see chapter 2).

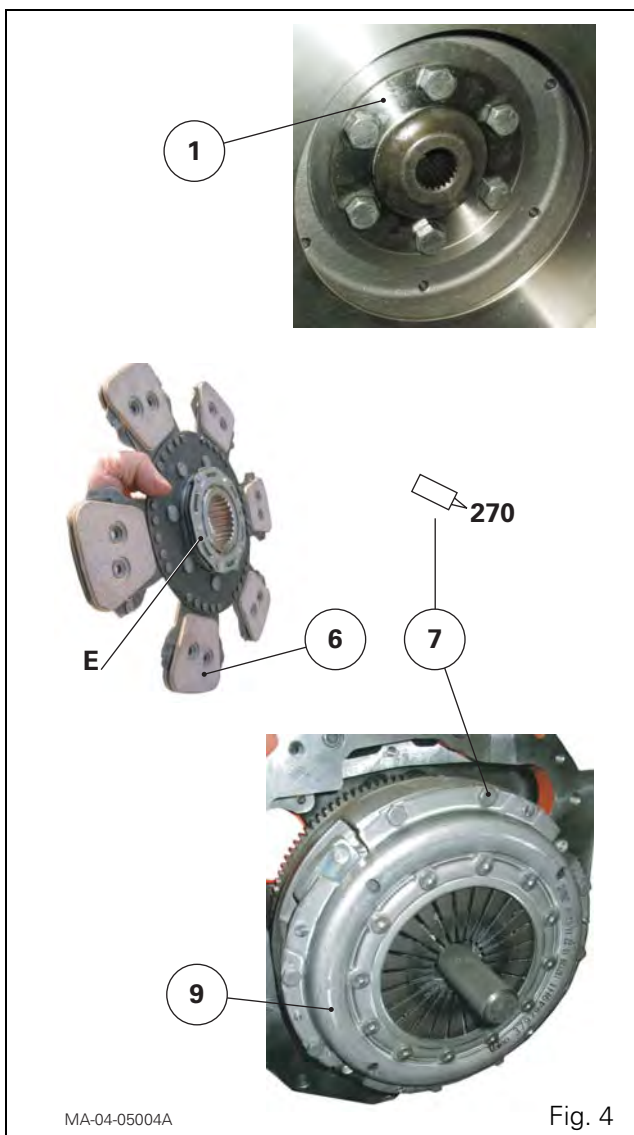


Fig. 4

GBA20 - DRY CLUTCH - Disassembling and reassembling

D . Replacing the clutch thrust bearing

Preliminary steps

13. Disconnect the tractor between the engine and the gearbox (see chapter 2).
14. Take out the thrust bearing carrier and its bearing from the hydraulic slave device assembly.

Disassembly (Fig. 5)

15. Moderately compress the clips of the thrust ball bearing cage (3) using a screwdriver. Separate the cage (3) from the thrust bearing carrier (2).
16. Remove the spring washer (4).
17. Remove the thrust ball bearing (1).

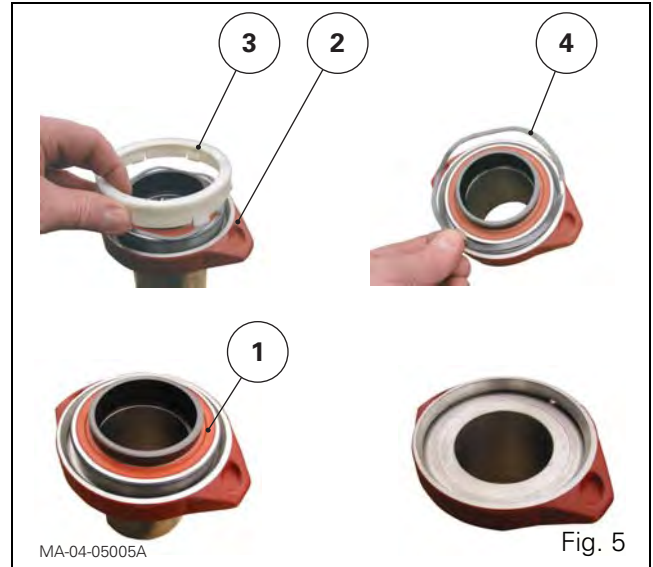


Fig. 5

GBA20 - DRY CLUTCH - Disassembling and reassembling

Reassembly

- 18.** Check the condition of the ball bearing in the thrust bearing and ensure its tightness by checking there is no grease on the operating zone.

Replace the ball bearing if unsure of its condition.

IMPORTANT: *Never soak the ball bearing in solvent. If required, wipe it with a dry cloth.*

- 19.** On the thrust bearing carrier (2), fit (Fig. 6):

- the thrust ball bearing (1),
- the spring washer (4).

- 20.** Manually compress the cage (3). Engage its clips in the thrust bearing carrier groove (Fig. 6).

- 21.** Check:

- the rotation of the ball bearing in the thrust bearing,
- the radial movement of the thrust bearing.

Final steps

- 22.** Check that the guide rings (14) are present and fitted correctly.

- 23.** Lightly grease the strut of the thrust bearing carrier (2) with clean transmission oil.

- 24.** Return the thrust bearing carrier into the hydraulic slave device assembly (4).

NOTE: *There may be stiffness when returning the thrust bearing carrier into the assembly.*

Move the thrust bearing to and fro several times.



GBA20 - DRY CLUTCH - Disassembling and reassembling

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E . Removing and refitting the hydraulic slave device assembly

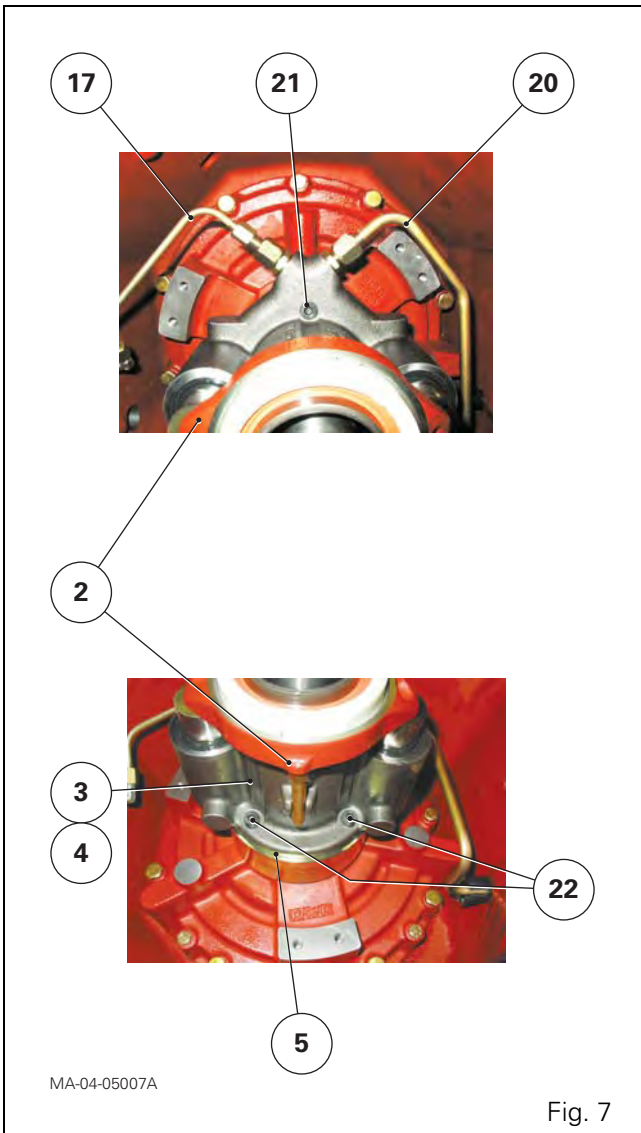
Preliminary step

- 25.** Disconnect the tractor between the engine and the gearbox (see chapter 2).

Removal (Fig. 7)

- 26.** Remove the supply pipe (20) and bleed pipe or pressure connector pipe (17) from the hydraulic slave devices.
- 27.** If required, remove the thrust bearing carrier (2) from the hydraulic slave device assembly (4). Take out the screws (21) and (22).
- 28.** Manually hold the pistons (3) in position. Take off the hydraulic slave device (4) / spacer (5) assembly.

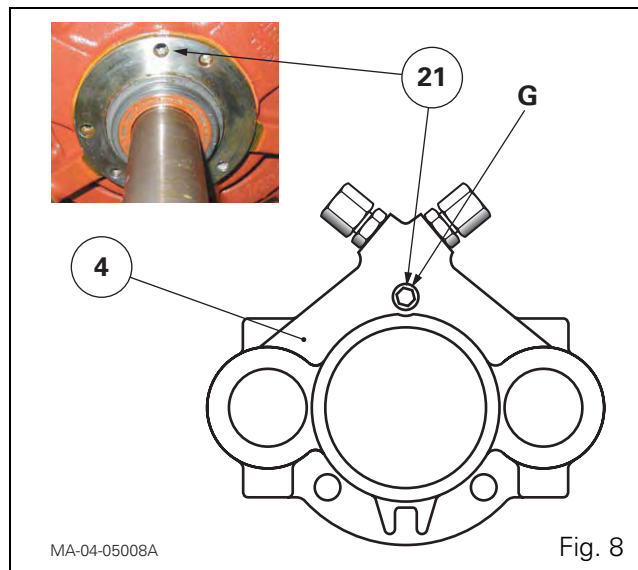
IMPORTANT: If no work is to be carried out on the pistons, ensure that they are not separated from the slave cylinders. This precaution prevents unwanted leaks and seepage.



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Refitting

29. Clean the tapped holes in the Speedshift cover plate and the thread of the screws (21) and (22).
30. Screw an M8 guide stud "G" of sufficient length into the top hole of the front cover plate in the position of screw (21) (Fig. 8).
31. Lightly smear the thread of the screws (21) and (22) with Loctite 242 or equivalent.
32. Turn the spacer (5). Position it against the Speedshift front cover plate.
Manually hold the pistons of the hydraulic slave device assembly in place. Slide the hydraulic slave device assembly (4) onto the guide stud "G" (Fig. 8). Position the hydraulic slave device assembly up against the spacer.
33. Fit the screws (21) (L = 95 mm) and (22) (L = 75 mm), respecting their length depending on their positioning on the hydraulic slave device assembly. Take out the guide stud. Tighten the screws to a torque of 25-35 Nm.
If removed, refit the thrust bearing carrier (2) in the hydraulic slave device assembly (4).



Final steps

34. Reconnect the tractor between the engine and the gearbox (see chapter 2).
35. Ensure the hydraulic pipes (17) and (20) (Fig. 7) do not leak through the cover located under the front of the gearbox.

GBA20 - DRY CLUTCH - Disassembling and reassembling

F . Replacing the guide rings and piston seals of the hydraulic slave device assembly

Preliminary steps

36. Disconnect the tractor between the engine and the gearbox (see chapter 2).
37. Remove the hydraulic slave device assembly (see § E).

Disassembly

38. Take the pistons (3) out of the slave cylinders (4). Recover the springs (13) (Fig. 9).

NOTE: Pair the pistons with their respective cylinders if they are to be reused.

39. From the cylinders extract (Fig. 9):

- the wiper seal or dust seal (10),
- the first guide ring (11),
- the composite seal (12) (24),
- the second guide ring (11).

From the hydraulic slave device assembly extract (Fig. 9):

- the guide rings (14).

IMPORTANT: The seals and rings should be discarded, regardless of their function (wiper, guide or sealing).

40. If necessary, unscrew the pin (23) of the thrust bearing carrier (2).

Reassembly

41. If disassembled, lightly smear the thread of the pin (23) with Loctite 242 or equivalent. Screw in and tighten the pin to a torque of 25 - 35 Nm.

42. Carefully clean the hydraulic slave device assembly and each seal groove.

IMPORTANT: The grooves must be cleaned without using sharp or pointed tools.

43. Ensure that:

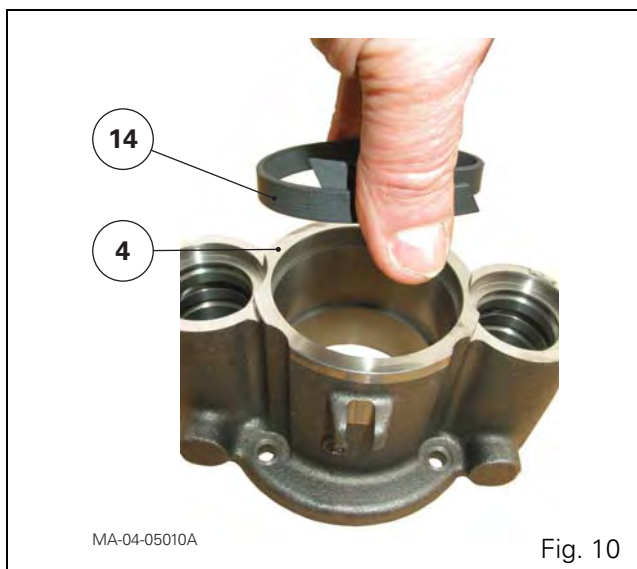
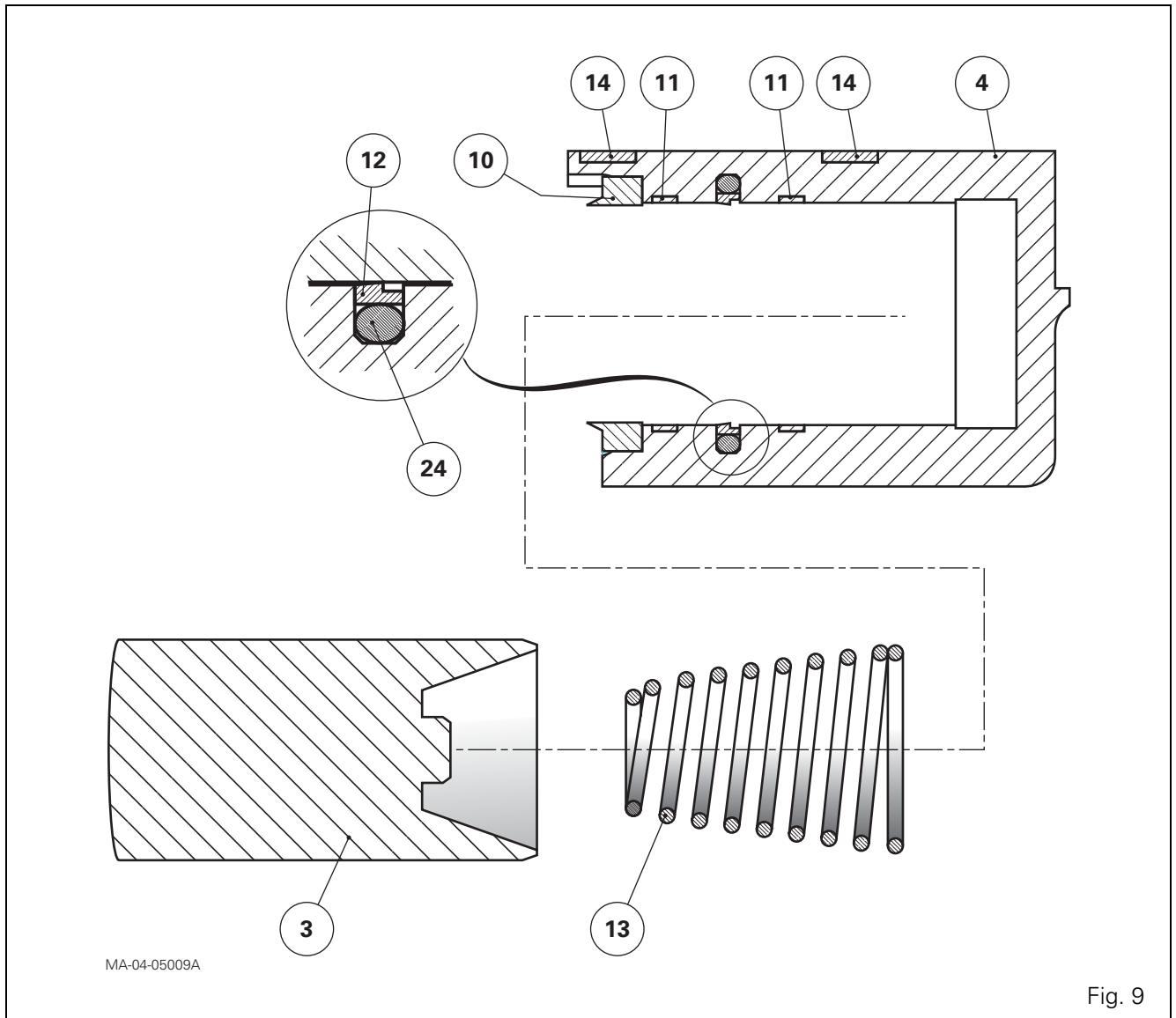
- the bleed and supply lines on the slave device assembly are not obstructed,
- there are no scratches in the cylinder bores or on the pistons.

Replacing the guide rings (14) of the hydraulic slave device assembly (Fig. 10)

44. Pre-form a guide ring (14) by reducing its diameter by approximately one third. Fit it into the lower groove of the central bore in the hydraulic slave device assembly (4).

45. Pre-form a second guide ring (14) as described above. Fit it into the top groove of the central bore in the hydraulic slave device assembly (4).

GBA20 - DRY CLUTCH - Disassembling and reassembling



GBA20 - DRY CLUTCH - Disassembling and reassembling

Replacing the guide rings (11) and composite seal (12) (24) of a slave cylinder (Fig. 11)

46. Pre-form a guide ring (11) by reducing its diameter by approximately one third. Fit it into the lower groove of the slave cylinder (4).

47. Lubricate and fit an "O" ring (24), without twisting it, into the intermediate groove of the slave cylinder (4).

Form a composite seal (12) as shown in Fig. 12, without creating any sharp angles. Fit this seal manually and evenly against the "O" ring (24).

IMPORTANT: The lip of the composite seal (12) should be turned towards the pressure chamber of the slave cylinder (A, Fig. 12).

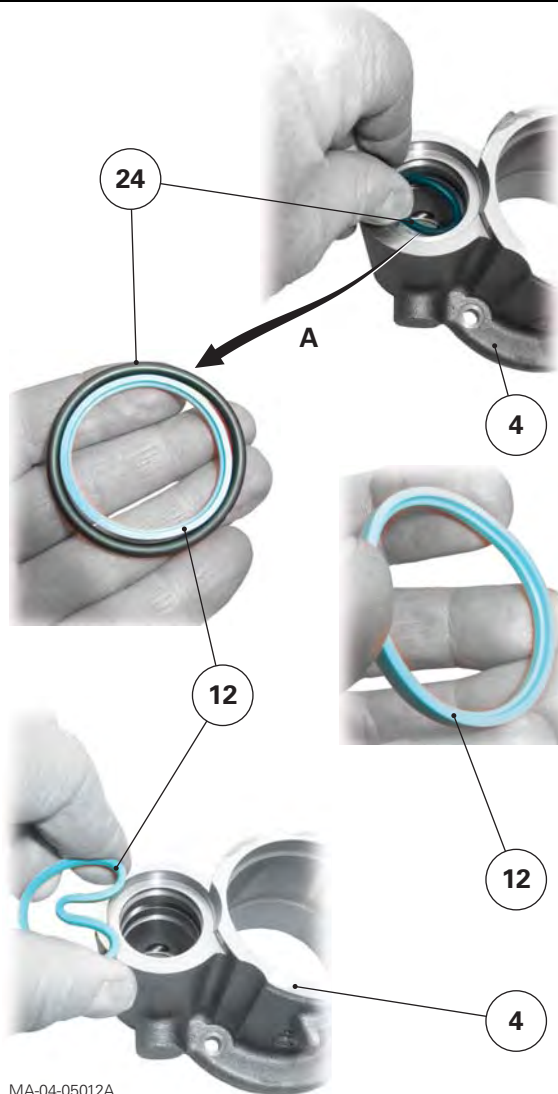
48. Pre-form a second guide ring (11) as described above. Fit it into the top groove of the slave cylinder.

49. Use the same assembly method to replace the guide rings (11) and composite seal (12) (24) in the second slave cylinder.



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Fig. 11



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Fig. 12

GBA20 - DRY CLUTCH - Disassembling and reassembling

Calibrating the guide rings (11) and composite seal (12) (24) of a slave cylinder

Calibration consists of helping guide rings and the composite seal return to their initial shape after they become misshapen at assembly.

IMPORTANT: Calibration should be carried out before fitting the wiper seal (10).

50. Lightly lubricate the guide rings (11) and sealing ring (12) inside the slave cylinder with clean transmission oil.
51. Take an original piston (3). Ensure it shows no signs of knocks or deep scratches on its rim or entry chamfer.
52. Place the piston in the slave cylinder: the piston chamfer must be turned towards the pressure chamber.
53. Partially insert the piston into the slave cylinder by gently tapping on its top surface with a plastic hammer.
54. Rotate the piston several turns.
55. Remove the piston by striking the back of the slave cylinder with a plastic hammer.
Visually check the appearance of the guide rings (11) and sealing ring (12).
56. Use the same calibration method for the guide rings (11) and composite seal (12) (24) in the second slave cylinder.
57. Fit the wiper seals (10) (Fig. 13).

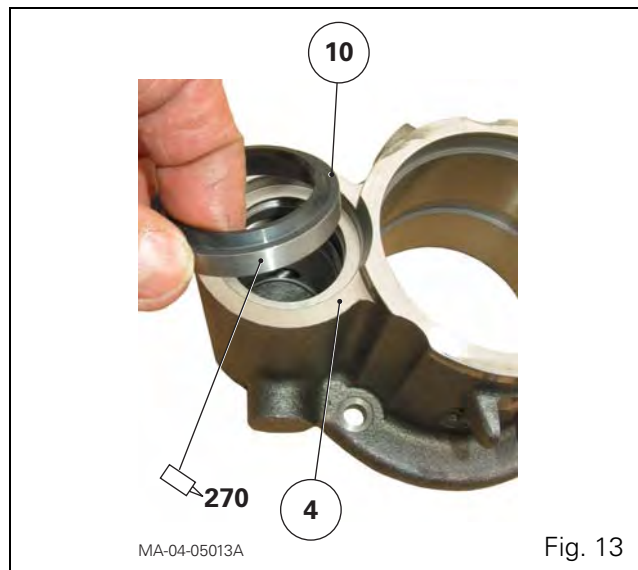


Fig. 13

Replacing a slave cylinder wiper seal (10) (Fig. 13)

58. Lightly smear the rim of the wiper seal (10) with Loctite 270 or equivalent. Fit the wiper seal in the front counterbore of the slave cylinder (4) using a press and a suitable fixture.
IMPORTANT: The lip of the wiper seal should be turned towards the front of the slave cylinder.
59. Remove any traces of Loctite after fitting.
60. Use the same fitting method to replace the wiper seal (10) of the second slave cylinder.

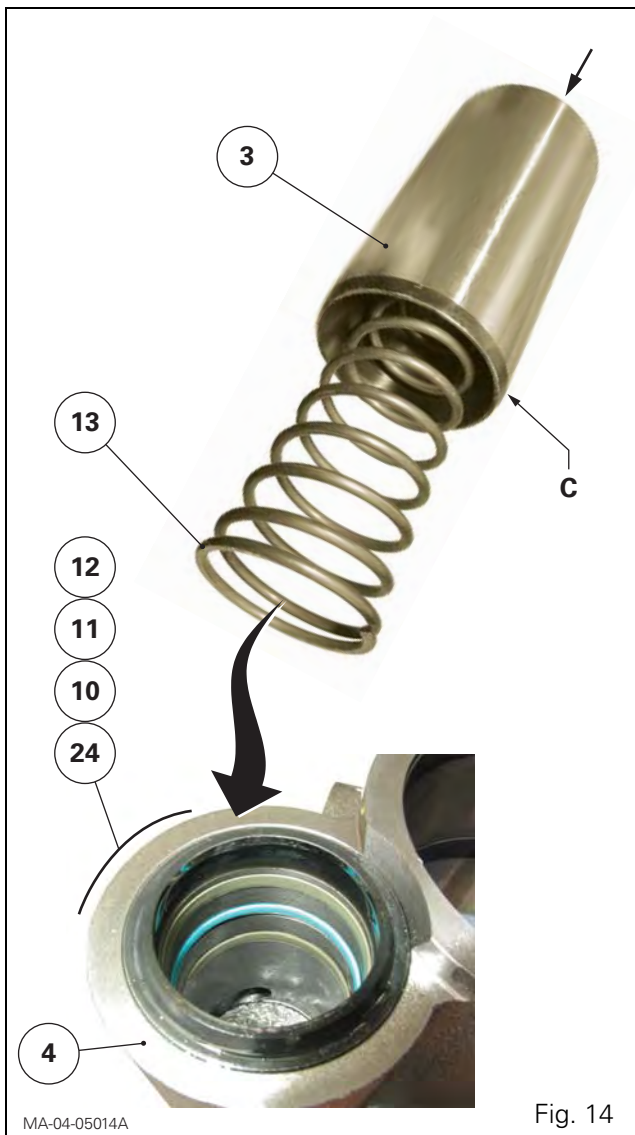
GBA20 - DRY CLUTCH - Disassembling and reassembling

Assembling pistons (3) (Fig. 14)

61. Ensure there are no signs of knocks or deep scratches on the rim or chamfer "C" of each piston (3).
62. Lightly lubricate the guide rings (11), the composite seal (12) (24) and the wiper seal (10) of the slave cylinders with clean transmission oil.
63. Fit the springs (13) on the locating pin of each piston.
64. Insert each piston (3)/spring (13) assembly into each slave cylinder (4) by gently tapping the top surface of the piston with a plastic hammer.
Check that the pistons move correctly when fitted.
IMPORTANT: *The pistons must not resist manual pressure. They should return with almost no effort due to their return springs (13).*
If one or two piston(s) lock, find the cause of the problem.

Final steps

65. Refit the hydraulic slave device assembly (see § E).
66. Reconnect the tractor between the engine and the gearbox (see chapter 2).
67. Bleed the hydraulic mechanism of the engine clutch (see chapter 9). If required, check its pressure (approximately 10 bar) on the diagnostics connector located on the front right-hand side of the gearbox.

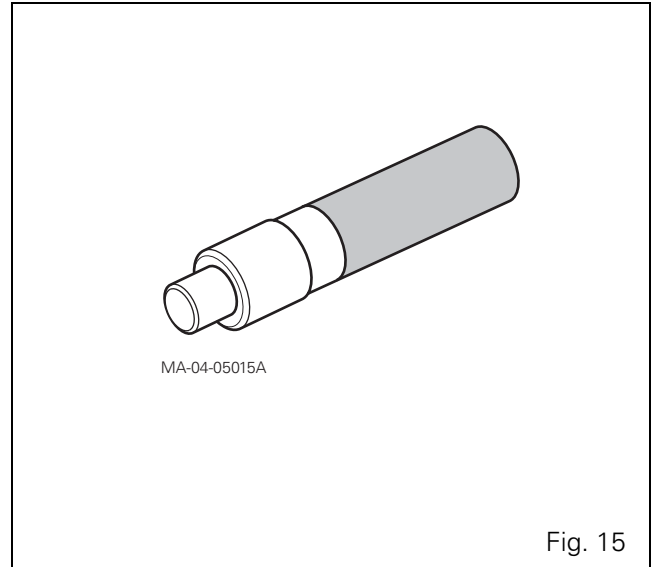


GBA20 - DRY CLUTCH - Disassembling and reassembling

G . Service tool

Tool available in the AGCO network

- **MF457**: Friction disc centring tool ([Fig. 15](#))



4A11 - GBA20 - DRY CLUTCH - Bleeding

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GBA20 - DRY CLUTCH - Bleeding

A . General

Tractors equipped with a mechanical reverse shuttle have a dry disc diaphragm clutch.

The clutch is controlled via the clutch pedal by a master cylinder/slave cylinder assembly and the tractor's 17 bar hydraulic system.

After dismantling the control system, the circuit must be bled.

B . Preliminary steps

1. Park the tractor on a flat surface.
2. Put the transmission lever into neutral and apply the hand brake.
3. Check the transmission oil level. Adjust as necessary.

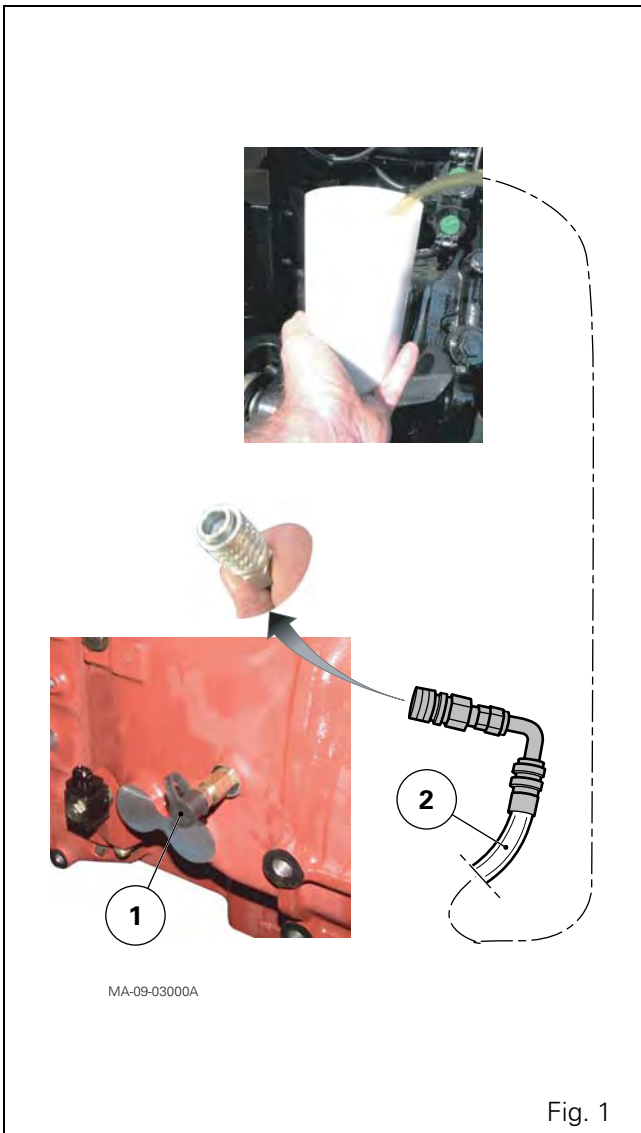
GBA20 - DRY CLUTCH - Bleeding

C . Bleeding the clutch system

Bleeding the clutch by pumping the clutch pedal

NOTE: This bleeding method requires two people.

4. Rig up a makeshift transparent hose (2) with a Parker PD242 connection ref. 3582045M1 on one end (available in the Massey Ferguson network), and the other end inside in a container (Fig. 1).
5. Connect the hose on the clutch bleed nipple (1) located on the right-hand side at the front of the gearbox (Fig. 1).
6. Start the engine. Set the engine speed between 1200 and 1500 rpm.
7. Assisted by an operator, pump the clutch pedal until there are no more bubbles in the transparent hose.
8. When no further bubbles leave the system, keep the pedal depressed, disconnect the transparent hose and then release the clutch pedal.
9. Check the bleeding. The pedal should be firm. If the pedal is too spongy, perform another bleeding operation (steps 5 to 8).
10. Check the clutch operation.



GBA20 - DRY CLUTCH - Bleeding

Bleeding the clutch using hydraulic pressure

NOTE: A male quick connector is fitted as standard on the 5 bar line of the left-hand hydraulic cover plate. It facilitates bleeding of the clutch system.

11. Rig up a makeshift hose (2) with two Parker PD242 connections ref. 3582045M1 (available in the Massey Ferguson network (Fig. 2).
12. Using this hose, connect the 5 bar quick connector (3) located on the left-hand cover plate of the rear axle with the clutch bleed nipple (1) located on the right-hand side at the front of the gearbox.
13. Start the engine.



CAUTION: Do not touch the clutch pedal. If the pedal is activated, the clutch mechanism joints may move.

14. Wait for about two minutes then disconnect the bleed hose whilst the engine is running.
15. Check the bleeding. The pedal should be firm. If the pedal is too spongy, perform another bleeding operation (steps 12 to 14).
16. Check the clutch operation.

