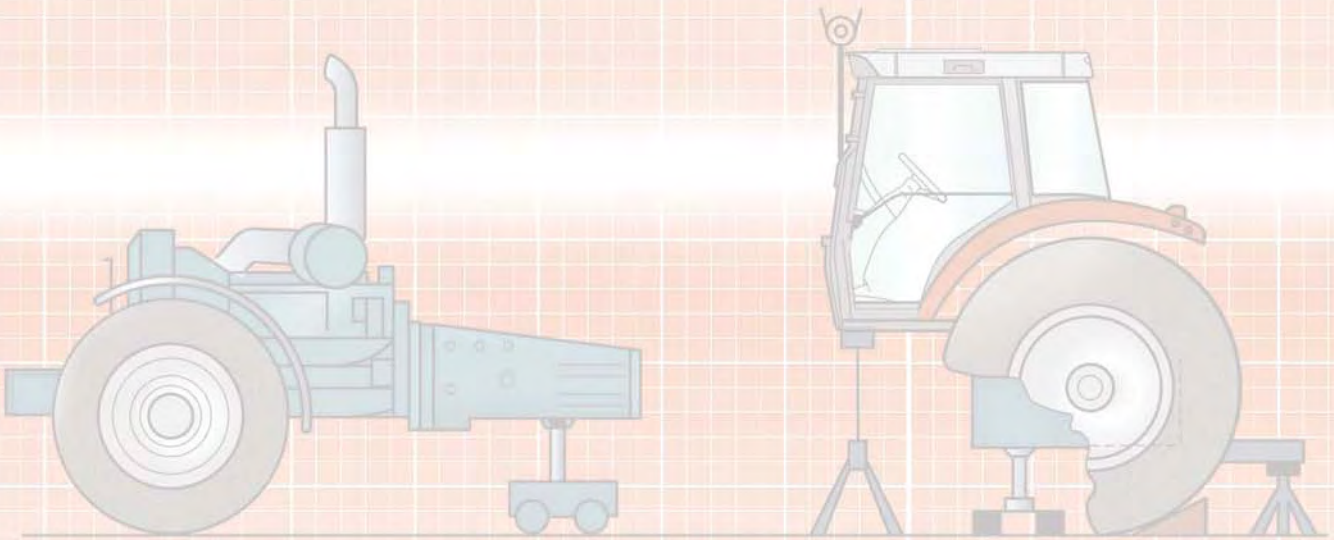


02 - Splitting the tractor

CONTENTS

MASSEY FERGUSON

Splitting the tractor



2A10 - Splitting - Front frame / Perkins engine

CONTENTS

A . General

The front frame and the engine must be disassembled when each of the assemblies needs to be replaced, or when servicing is necessary on one of the mechanical elements located at the front of the engine.

Remark

This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.

B . Disassembling and reassembling (Perkins 6-cylinder engine)

Preliminary operations

1. Apply the handbrake.
2. Ensure that the suspended front axle (if fitted) is in raised position and position chocks between the upper control arm and front axle housing (Fig. 1).
3. Remove the bleed screw from the control unit (see chapter 9).
4. Remove the lateral panels from the engine and bonnet.

Servicing under the tractor

5. Remove the guard and the shaft (4 WD tractors).

Servicing on the right-hand side of the tractor

6. Disconnect the batteries.
7. Mark then disconnect:
   - the differential lock hoses on the front axle,
   - the feed hose on the steering ram,
   - the lubricating hoses (running to and from the cooler) (Fig. 2).
8. Remove the protection grille close to the radiator.
9. Disconnect the air sleeve (1) (turbo outlet) from the cooling sleeve (Fig. 3).

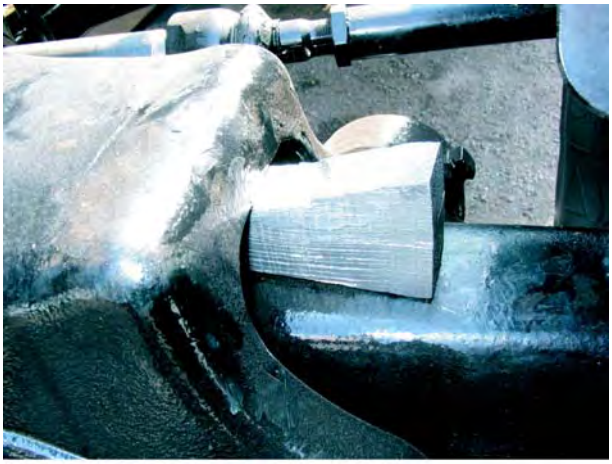


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Fig. 1

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Fig. 2

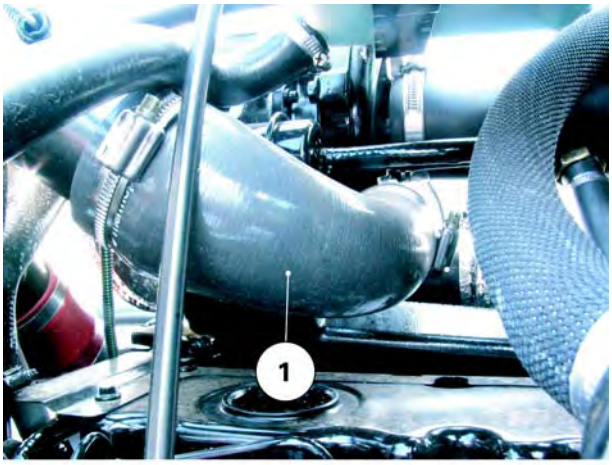

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Fig. 3

Servicing on the left-hand side of the tractor

10. Mark then disconnect:
- the feed hose on the steering ram,
- the hoses (pressure-return and LS) on the rigid tubes (Fig. 4) of the suspended front axle (if fitted).

11. Remove the protection grille close to the radiator.

12. Disconnect the air sleeve (2) (intake on inlet manifold) from the cooling sleeve (Fig. 5).

Draining the cooling system

13. Unscrew the wing plug located on the left-hand side and front of the radiator. Drain the liquid into a clean container.

If the engine is hot, gradually loosen the expansion tank plug and remove it in order to expel the pressure from the circuit.

14. Disconnect the lower radiator hose (1) and the hose (2) linking the expansion tank to the base of the radiator (Fig. 6).

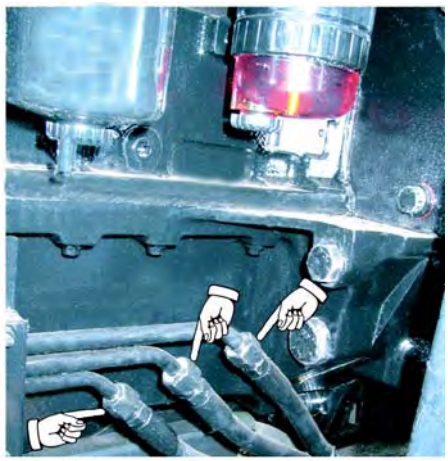
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Fig. 4

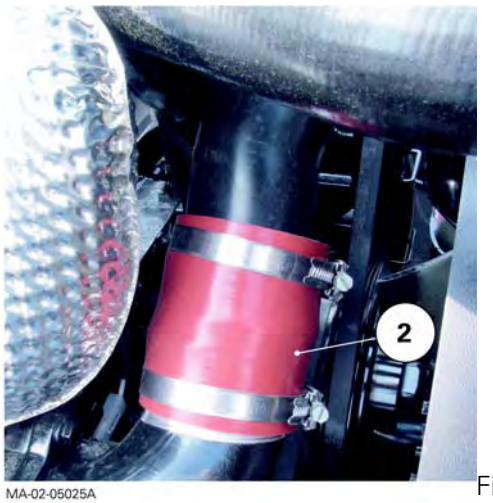

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Fig. 5

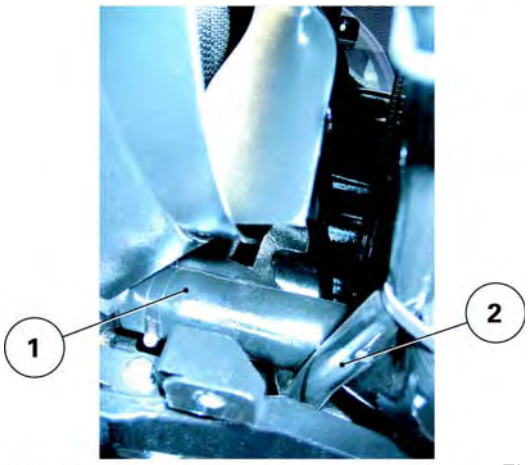

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Fig. 6

Servicing above the engine

15. Disconnect the upper radiator hose (1) (Fig. 7).

Servicing at the front of the tractor

16. Remove the weights (if fitted).

17. Separate the compressor, the condenser and the filter from their respective holders, and remove them carefully, without breaking the circuit (see chapter 12).

18. Mark and disconnect the wiring harnesses:
- inside the grille,
- on the control unit solenoid valves (suspended front axle, if fitted).

19. Disconnect the air sleeves (3) (4) on the air cooler located inside the grille (Fig. 8).

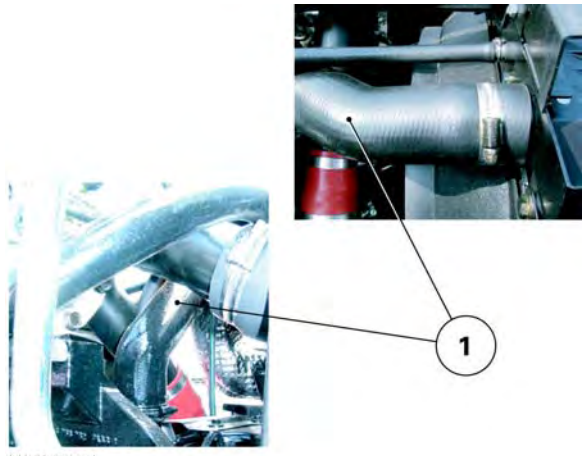

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Fig. 7

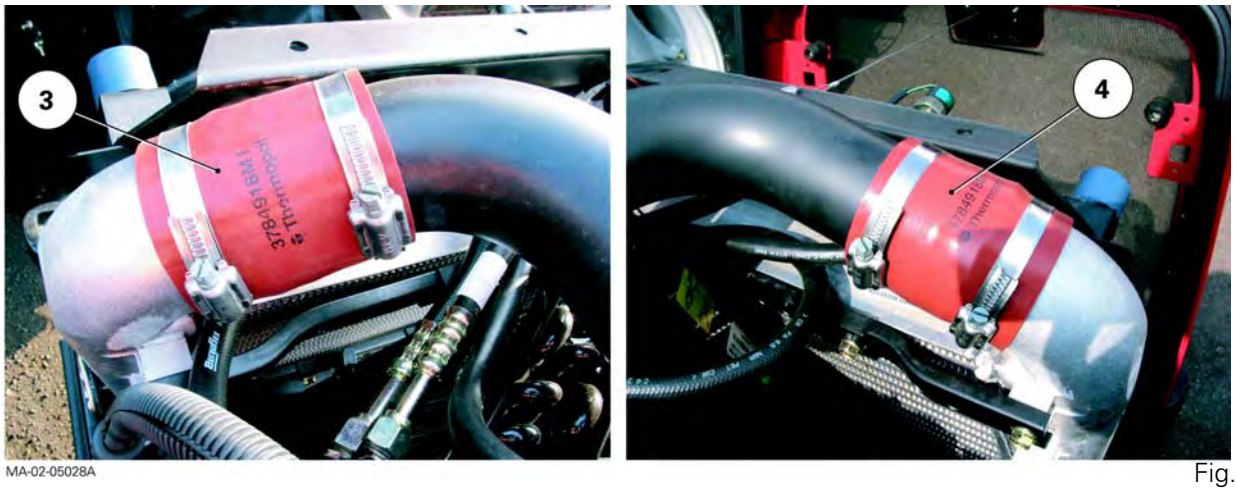

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Fig. 8

Preparing for disassembling

20. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 9).

21. Chock the rear wheels.

22. Install (Fig. 11):

- a mobile stand under the front axle beam,
- a suitable sling under the front of the frame,
- a fixed axle stand under the engine sump.

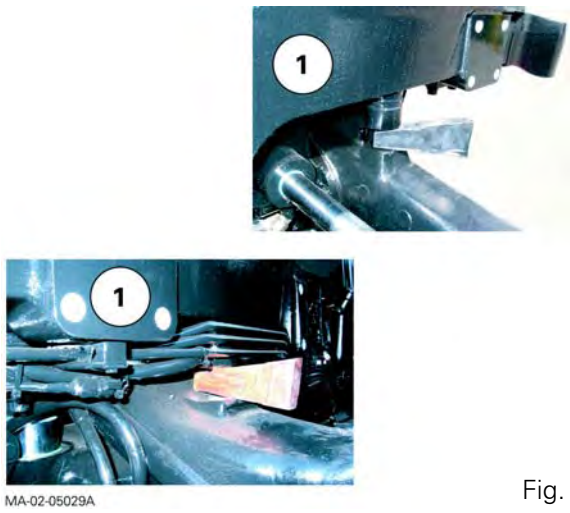

Fig. 9

Disassembly

23. Remove lateral screws (1) (Fig. 10).

24. With the help of an operator, loosen the screws (2)(3) (Fig. 10), simultaneously moving the frame away from the engine.

When disassembling, use the sling to reduce the risk of toppling of the front frame assembly.

Screw dimensions

- M16 x 55 mm.
- M16 x 60 mm.
- M16 x 115 mm.
- M20 x 190 mm.
- M24 x 200 mm.

Reminder

When disassembling, check that connections (hoses, pipes and harnesses) are all disconnected.

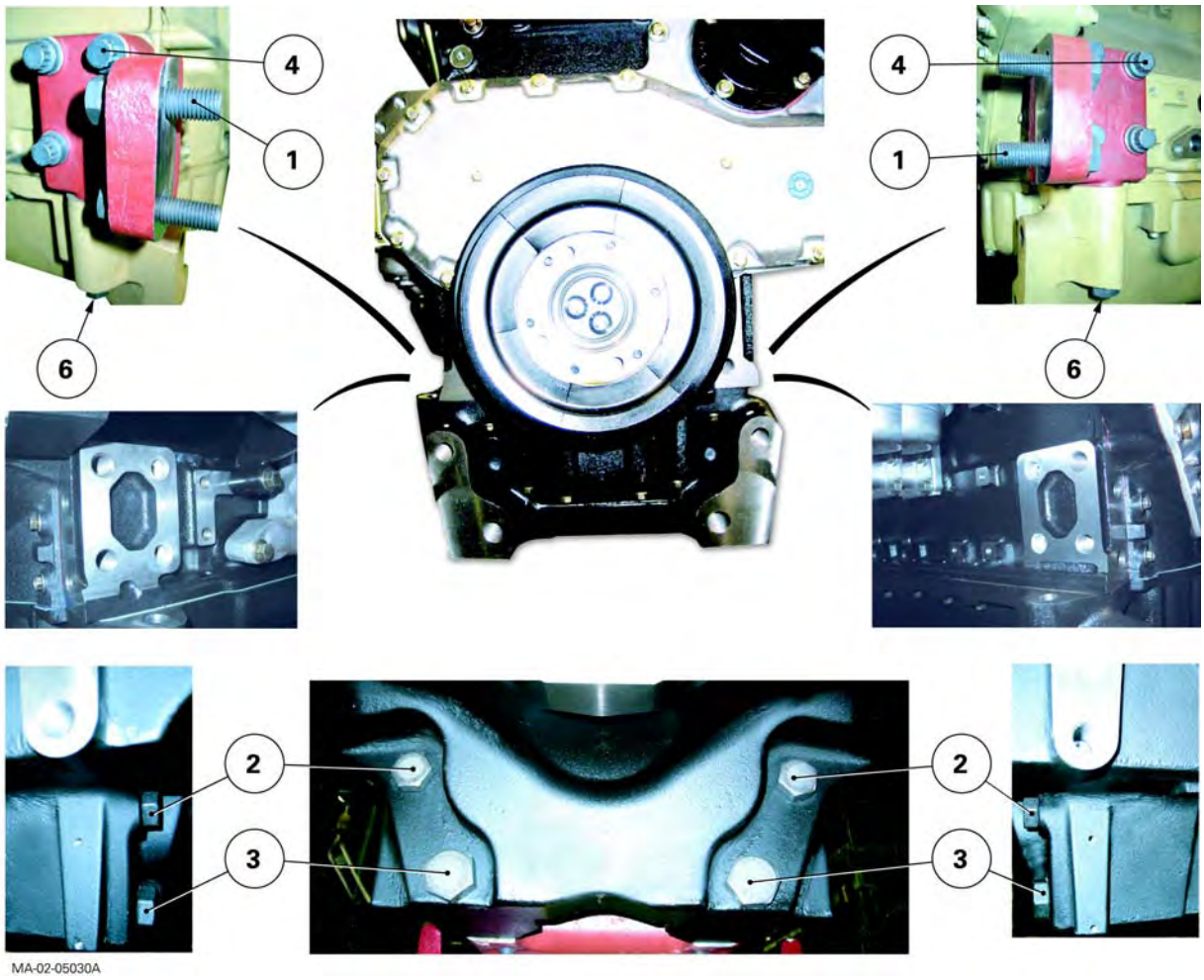

Fig. 10

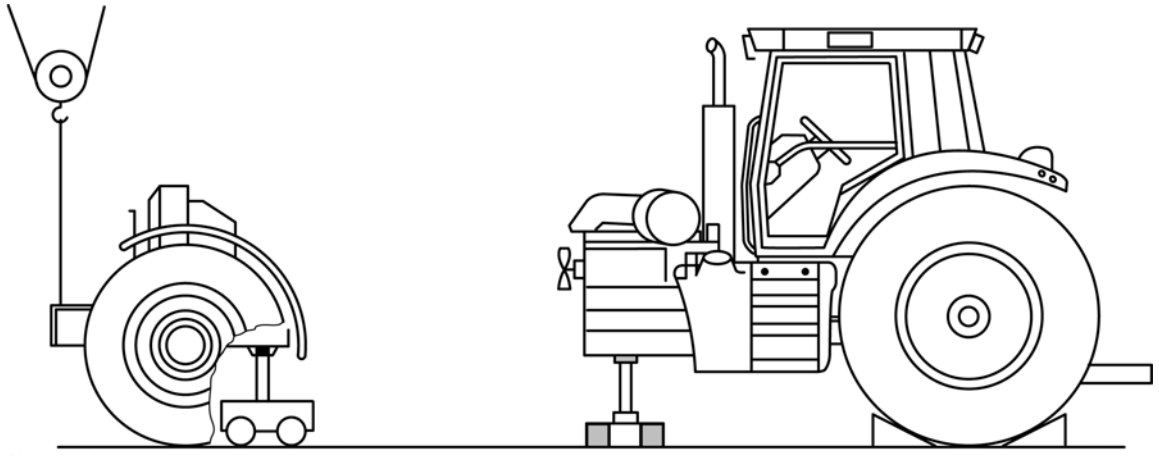

Fig. 11

Reassembly

25. Clean the mating faces of the engine and front frame.

Special point

For tractors fitted with a *Perkins* six-cylinder engine, check with a ruler prior to assembly that the supports (5) are in line with the front face of the lower engine housing (Fig. 13). If they are not, adjust the support(s) until they are correctly aligned. Tighten the screws to:

- (4) 240 - 320 Nm (Loctite 270 or equivalent),
- (6) 240 - 320 Nm.

Check correct alignment after tightening.

26. Screw a guide stud onto each rear face of the frame (Fig. 12).

27. With the help of an operator, assemble the front frame onto the engine. Take out the guide studs.

28. Fit and tighten the diametrically opposed screws in the following order:

- Screw (2): 480-640 Nm.
- Screw (3): 800-1040 Nm.
- Screw (1): 240-320 Nm.

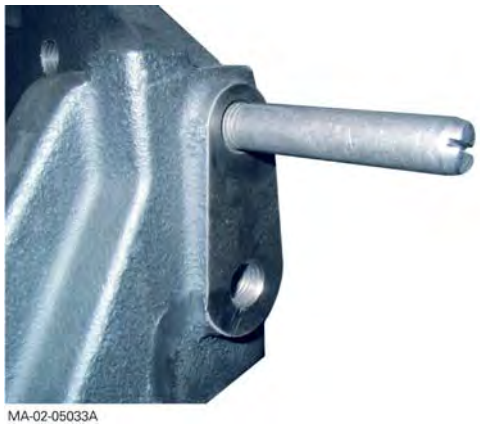

Fig. 12

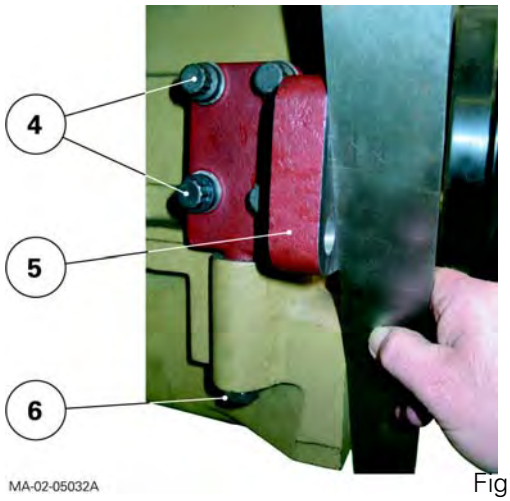

Fig. 13

Final operations

Remark

Final operations are not especially difficult.

They should be carried out in the reverse order to preliminary operations.

However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Tightening torque

As required, wheel screws or nuts (see chapter 6).

Topping-up

- of coolant, to the maximum level marked on the expansion tank (Fig. 14).

Tests

- air conditioning system (if fitted – see chapter 12),
- cab suspension (if fitted – see chapter 12),
- All mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Check tightness:

- of hydraulic unions
- of water hoses,
- of bleed screw on control unit of suspended front axle (if fitted)

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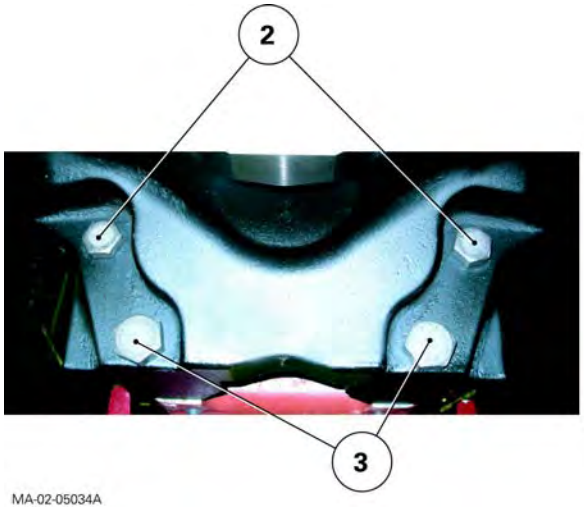
Fig. 14



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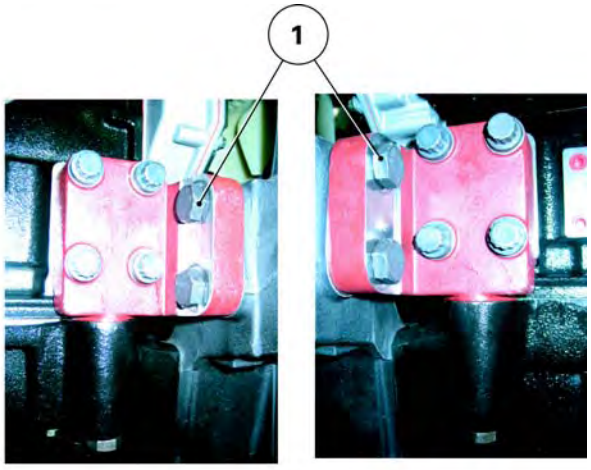

Fig. 15

C . Disassembling and reassembling (Perkins 4-cylinder engine)

Reminder

There are two types of front frame. Each model corresponds to a specific engine type: Perkins engine with mechanical injection or Perkins EEM engine with electronic injection.

The frames are different in shape and assembly.

Each front frame must be assembled to its corresponding engine.

Preliminary operations

29. Apply the handbrake.

30. Remove the side panels, prefilter (Perkins EEM engine), bonnet and side protection grilles.

Servicing under the tractor

31. Take off the guard, shaft and differential lock supply pipe (4 WD tractors).

Servicing at the front of the tractor

32. Remove the front weights (if fitted).

33. Disconnect the batteries. Remove them if required (Perkins engine with mechanical injection).

Tractors with…	Battery location
Perkins engine with mechanical injection	in the grille compartment
Perkins EEM engine	behind the right-hand footstep

Location of batteries

34. Detach the air conditioning compressor, condensor and filter from their respective supports (if fitted).

Place the assembly beside the tractor without disconnecting the pipes and hoses (see chapter 12).

Servicing inside the grille

35. Mark then disconnect:
- electrical harnesses,
- air sleeves (3) and (4) on the cooler (Perkins EEM engine - Fig. 16).

Servicing on the right-hand side of the tractor

36. Mark and disconnect the feed hose on the steering ram.

37. Mark and disconnect the lubricating hoses running to and from the cooler (Perkins EEM engine - Fig. 17).

38. Remove the protection grille close to the radiator.

39. Disconnect the air sleeve (1) (turbo outlet) from the cooling sleeve (Perkins EEM engine - Fig. 18).

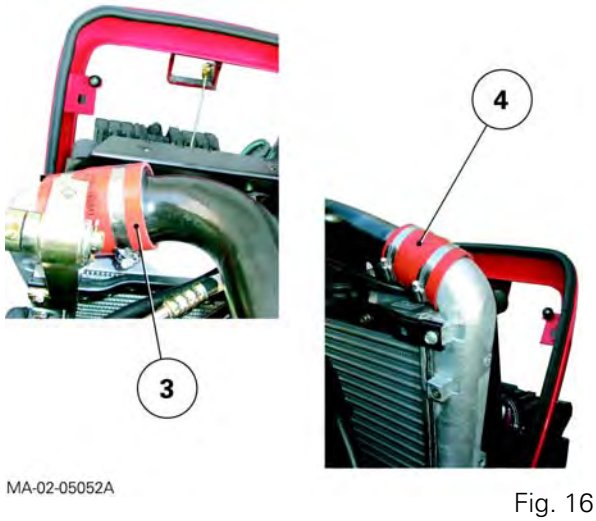

Fig. 16

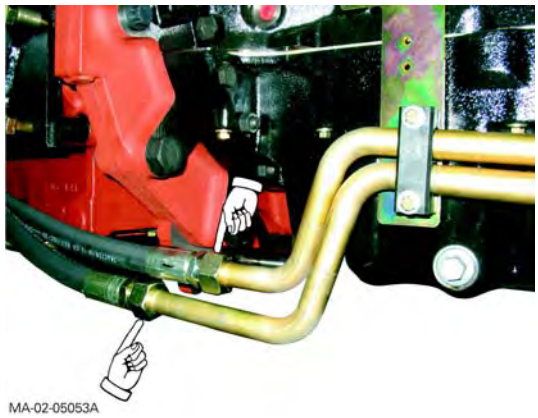

Fig. 17

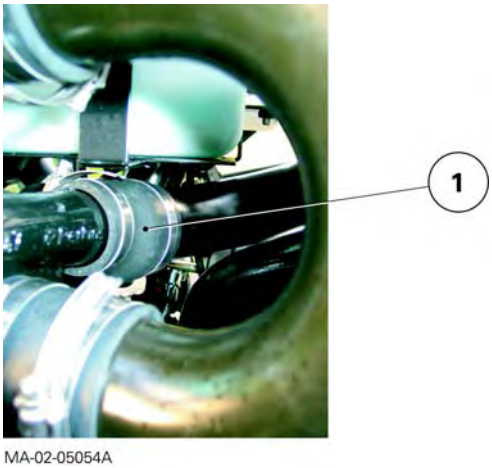

Fig. 18

Servicing on the left-hand side of the tractor

40. Mark and disconnect the feed hose on the steering ram.

41. Remove the protection grille close to the radiator.

42. If necessary, disconnect the air sleeve (2) from the cooler inlet (intake manifold inlet - Perkins EEM engine - Fig. 19).

Draining the cooling system

43. Unscrew the wing plug located on the front left-hand side of the radiator, to drain the circuit.

If the engine is hot, gradually loosen the expansion tank plug and remove it in order to release the pressure from the circuit.

44. Disconnect the lower radiator hose (1) and the hose (2) linking the expansion tank to the base of the radiator (Fig. 20).

Servicing above the engine

45. Disconnect the upper radiator hose (1) (Fig. 21).

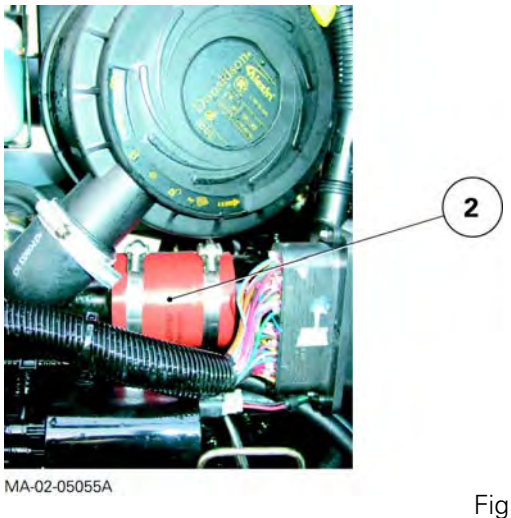

Fig. 19

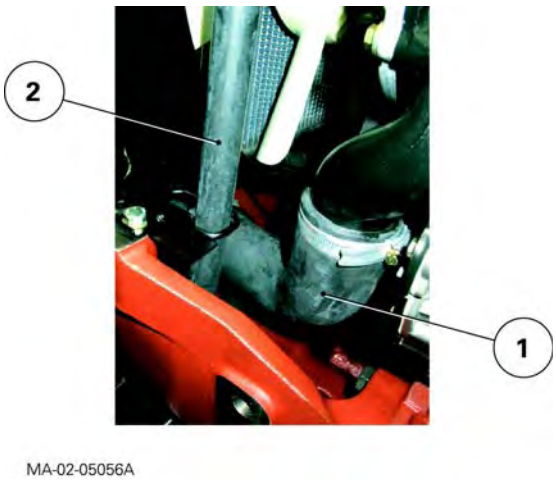

Fig. 20

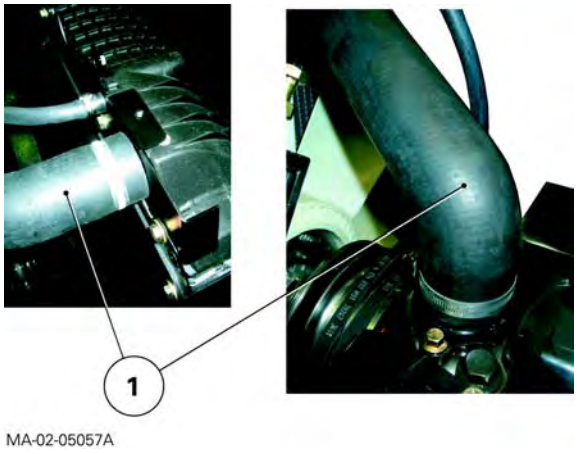

Fig. 21

Preparing for disassembling

46. Stop the front axle oscillation by sliding a suitable wooden chock either side of the support (1) (Fig. 22).

47. Chock the rear wheels.

48. Install (Fig. 25):

- a mobile stand under the front axle beam,
- a suitable sling under the front of the frame,
- a fixed axle stand under the engine sump.

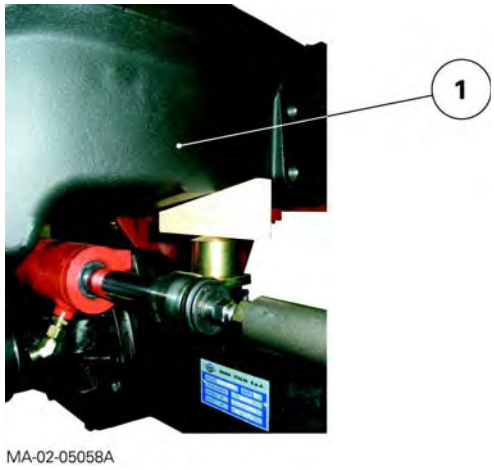

Fig. 22

Disassembly

Reminder

Before disassembling:

- check that the unions (hoses, pipes and harnesses) are all disconnected;
- note the position and location of chocks (1) inserted between the engine sump and front frame (Perkins EEM engine - Fig. 23).

49. Loosen and remove (Fig. 24):

- for Perkins engine with mechanical injection: screws and bolts (2), (4) and (1),
- for Perkins EEM engine: screws and bolts (2), (3), (4) and (1).

With the help of an operator, gradually separate the engine front frame at the same time (Fig. 25).

When disassembling, also use the sling to reduce the risk of toppling of the front frame assembly (Fig. 25).

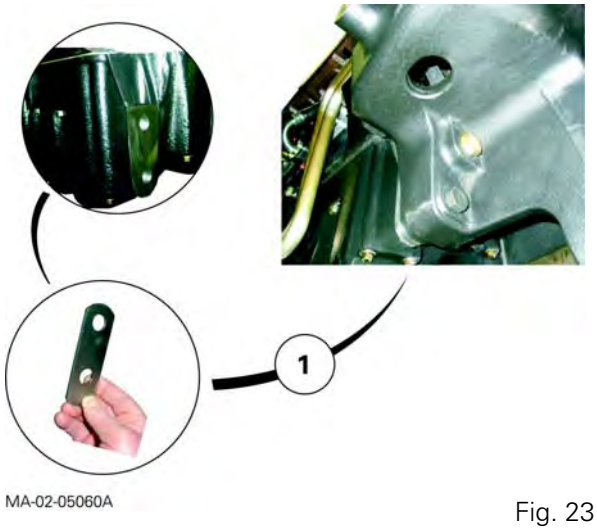

Fig. 23

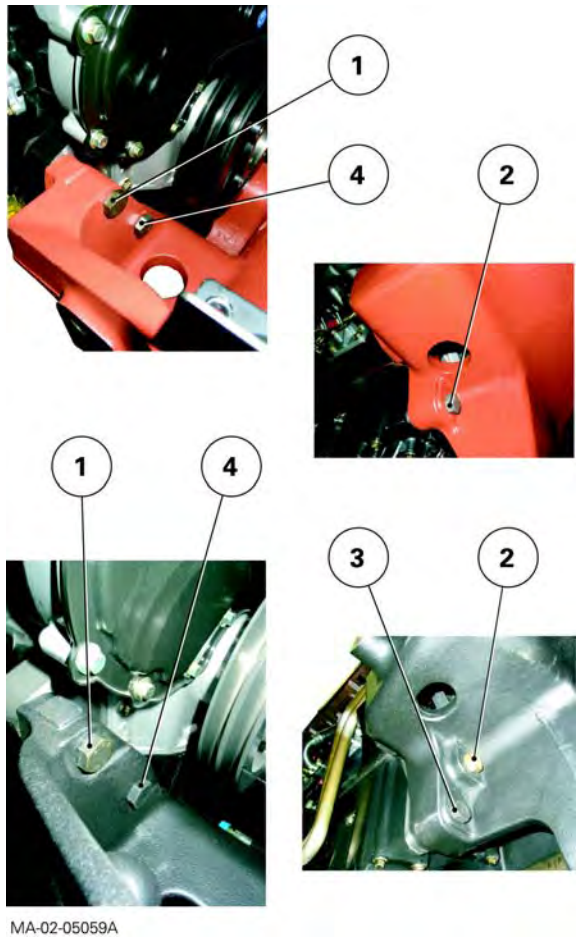

Fig. 24

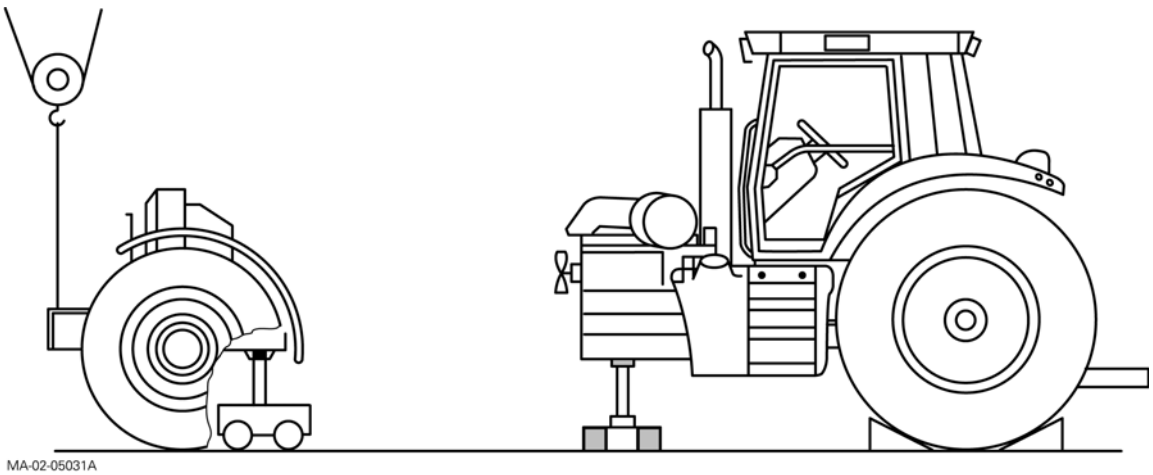

Fig. 25

Dimensions of the screws and nuts

- Front frame and Perkins engine with mechanical injection

Screws	Nuts
M16 x 75 mm M16 x 85 mm M16 x 115 mm	M16

- Front frame and Perkins EEM engine

Screws	Nuts
M16 x 85 mm M16 x 95 mm M16 x 105 mm M16 x 120 mm	M16

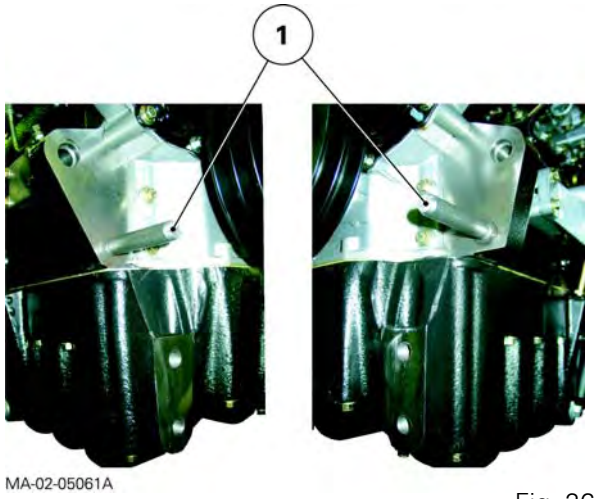

Fig. 26

Reassembly

Advice for use

Use guide studs to assist reassembly of the front frame and engine.

50. Clean the mating faces of the engine and front frame.

51. Screw two guide studs (1) to the front mating face of the engine (Fig. 26).

52. With the help of an operator, assemble the front frame onto the engine as follows:

- **Front frame and Perkins engine with mechanical injection (Fig. 27)**

  53. Fit screws (2), (4) and nuts (1), simultaneously taking out the guide studs.

  54. Tighten opposing screws and nuts to a torque of 240 - 320 Nm in the following order (2) (4) (1).

- **Front frame and Perkins EEM engine (Fig. 28)**

  Reminder

  If it is necessary to chock the front frame, refer to § D.

  55. Fit screws (2), (3) and (4) and nuts (1), simultaneously taking out the guide studs.

  56. Tighten opposing screws and nuts to a torque of 240 - 320 Nm in the following order (2) (3) (4) (1).

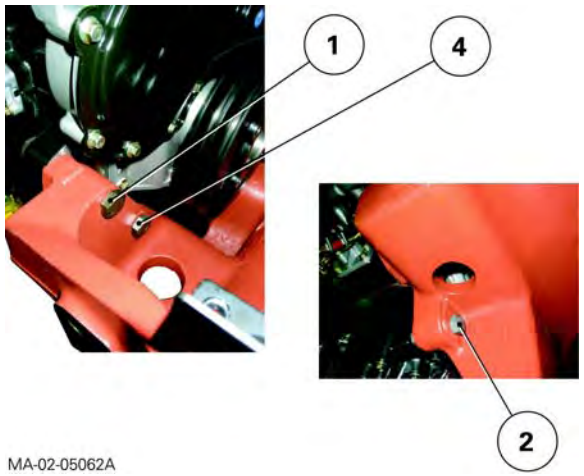

Fig. 27

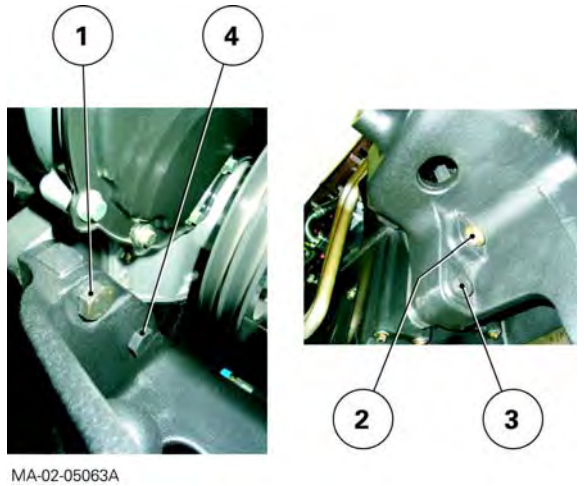

Fig. 28

Final operations

Remark

Final operations are not especially difficult.

They are carried out in reverse order to the preliminary operations. However, during reassembly, the tightening torques, settings and tests outlined below must be carried out.

Tightening torque:

- as required, wheel screws or nuts (see chapter 6).

Topping-up:

- of coolant, to the maximum level marked on the expansion tank (Fig. 29).

Tests:

- air conditioning system (if fitted) (see chapter 12),
- cab suspension (if fitted) (see chapter 12),
- all mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Check tightness:

- of hydraulic unions,
- of water hoses.

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Fig. 29

D . Shimming the front frame (Perkins 4-cylinder EEM engine)

Special point

When the front frame is fitted to the Perkins EEM engine, the mating face of the engine sump is not in contact with the mating face of the front frame. It is therefore advised to fill this space with shims (1) (Fig. 30) whose thickness will be measured and set afterwards.

Reminder

Shimming should only be carried out if the front frame and or engine has / have been replaced.

57. With the help of an operator, assemble the front frame onto the engine.

Fig. 30

Preparing for shimming (Fig. 31)

58. Fit only screws (4) and nuts (1), simultaneously taking out the guide studs.

59. Tighten opposing screws and nuts to a torque of 240 - 320 Nm in the following order (4) (1).

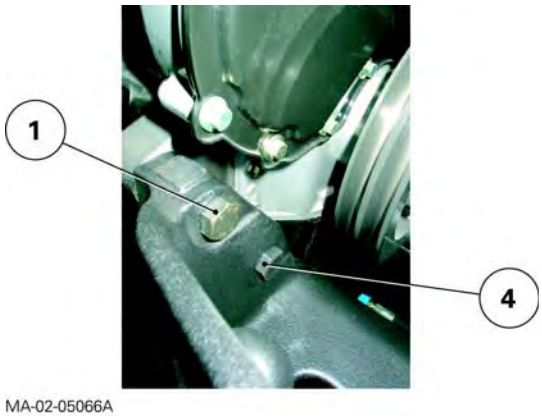

Fig. 31

Shimming

Important

To avoid applying undue loads to the mating faces during shimming, avoid adjusting the safety stands placed under the engine and front frame during disassembly.

60. Using two stacked shims (1), each at least 2.30 mm thick (Fig. 32), measure the gap between the mating faces of the engine sump and front frame.

Determine the thickness of shims to be fitted by increasing, as required, the thickness of each shim until they fit tightly in the gap.

Remark

Shimming is carried out using shims between 2.30 and 2.60 mm thick.

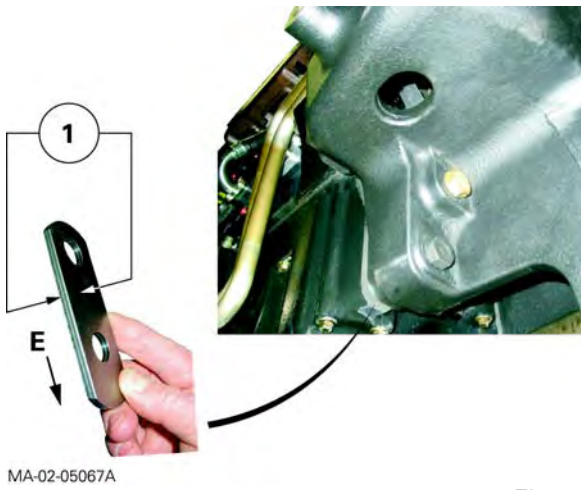

Fig. 32

Inserting shims between the front frame and the engine

61. Slightly loosen the screws (4) and bolts (1) (Fig. 31).

62. Position the shims (1): the end E should be turned downwards.

Insert them between the front frame and the engine sump (Fig. 32).

63. Fit screws (2) and (3) (Fig. 33).

64. Tighten opposing nuts and all screws of the front frame to a torque of 240 - 320 Nm in the following order (2) (3) (4) (1) (Fig. 33).

65. Release the safety stands.

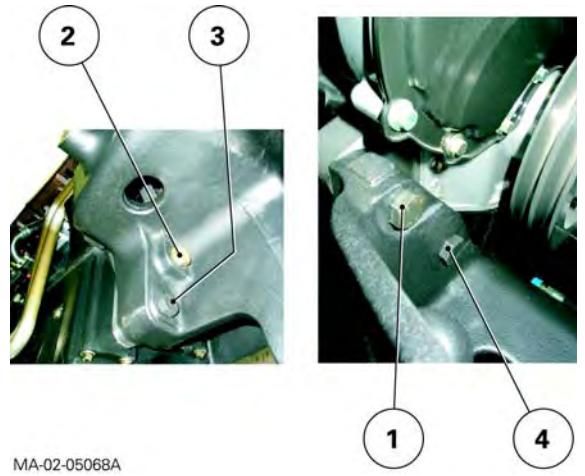

Fig. 33

2A20 - Splitting - Front frame / Sisu engine

CONTENTS

A . General

The front frame and engine must be disassembled when the assemblies need to be replaced, or when servicing is necessary on one of the mechanical elements located at the front of the engine.

Remark

This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly

B . Disassembling

Preliminary operations

1. Put on the handbrake if necessary.

Remark

Putting on the handbrake is optional because the Park Lock mechanism (option) automatically immobilises the tractor when stationary.

2. Ensure that the suspended front axle (if fitted) is in raised position and position chocks between the upper control arm and front axle housing (Fig. 1). Remove the bleed screw from the control unit (see chapter 9).

3. Remove the lateral panels from the engine and bonnet.

Servicing under the tractor

4. Remove the guard and the 4WD shaft located under the engine.

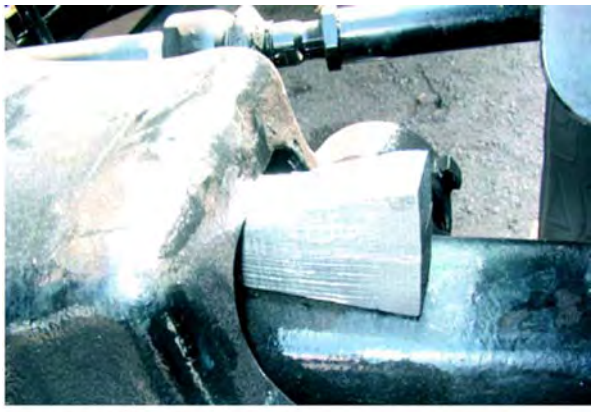

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Fig. 1

Servicing on the right-hand side of the tractor

5. Disconnect the batteries.

6. Mark then disconnect:
- the differential lock hoses on the front axle,
- the feed hose on the steering ram,
- the lubricating hoses running to and from the cooler (Fig. 2).

7. Remove the protection grille close to the radiator.

8. Disconnect the air sleeve (1) (turbo outlet) from the cooling sleeve (Fig. 3).

Servicing on the left-hand side of the tractor

9. Mark then disconnect:
- the feed hose on the steering ram,
- the hoses (pressure-return and LS) on the rigid tubes (Fig. 4) of the suspended front axle (if fitted).

10. Remove the protection grille close to the radiator.

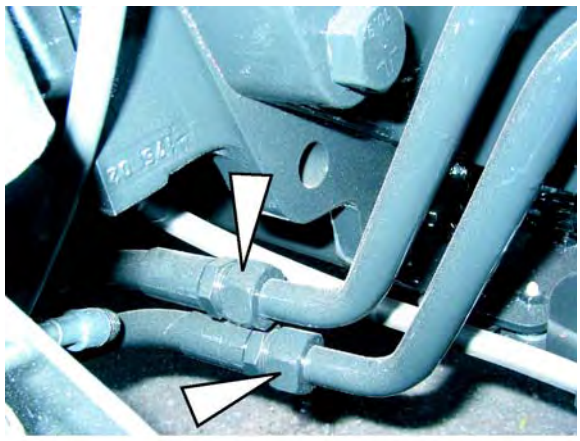

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Fig. 2

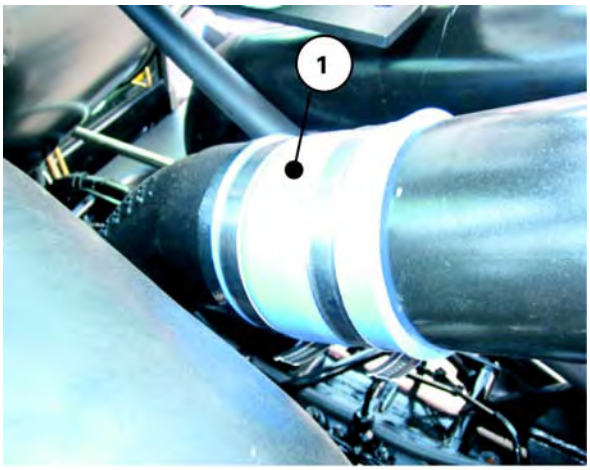

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Fig. 3

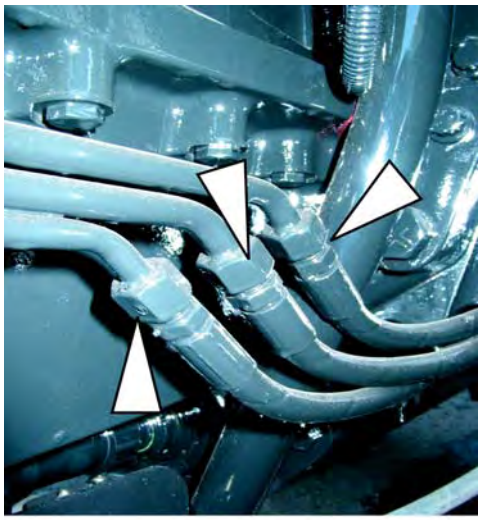

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Fig. 4

11. Disconnect the air sleeve (2) (intake on inlet manifold) from the cooling sleeve (Fig. 5).

Draining the cooling system

12. Unscrew the wing plug located on the left-hand side and front of the radiator. Drain the liquid into a clean container.

If the engine is hot, gradually loosen the expansion tank plug and remove it in order to drive the pressure from the circuit.

13. Disconnect the lower radiator hose (1) and the hose (2) linking the expansion tank to the base of the radiator (Fig. 6).

Servicing above the engine

14. Disconnect the upper radiator hose (1) (Fig. 7).

Servicing at the front of the tractor

15. Remove the weights (if fitted).

16. Separate the compressor, the condenser and the filter from their respective holders, and remove them carefully, without breaking the circuit (see chapter 12).

17. Mark and disconnect the wiring harnesses:

- inside the grille,
- on the control unit solenoid valves (suspended front axle, if fitted).

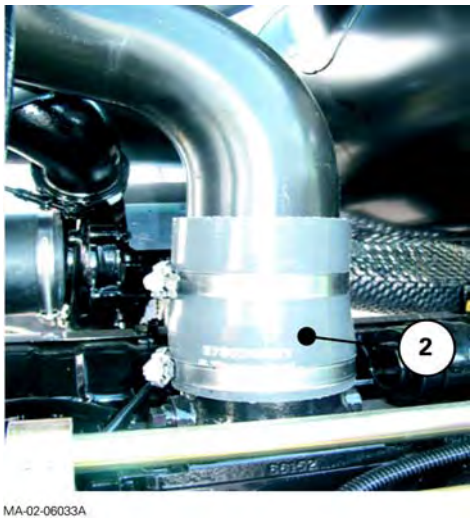

Fig. 5

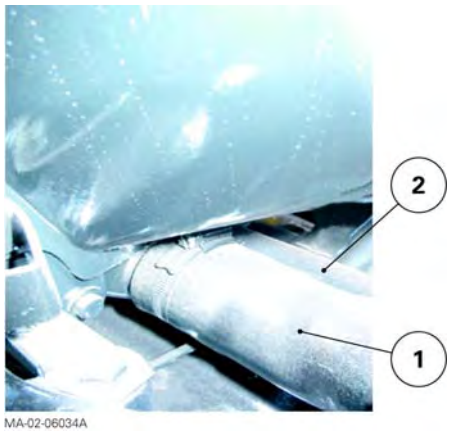

Fig. 6

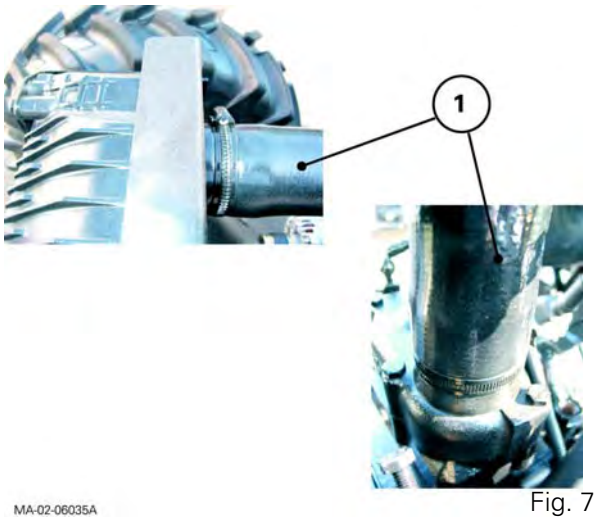

Fig. 7

18. Disconnect the air sleeve (3)(4) on the air cooler located inside the grille (Fig. 9).

Preparing for disassembling

19. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 8).

20. Chock the rear wheels.

21. Install (Fig. 11):

- a mobile stand under the front axle beam,
- a suitable sling under the front of the frame,
- a fixed axle stand under the engine sump.

Disassembling

22. Remove lateral screws (1) (Fig. 10).

23. With the help of an operator, loosen the screws (2)(3) (Fig.10), simultaneously moving the frame away from the engine.

When disassembling, use the sling to reduce the risk of toppling of the front frame assembly.

Screw dimensions

- M16 x 100
- M20 x 150
- M24 x 165

Reminder

When disassembling, check that connections (hoses, pipes and harnesses) are all disconnected.

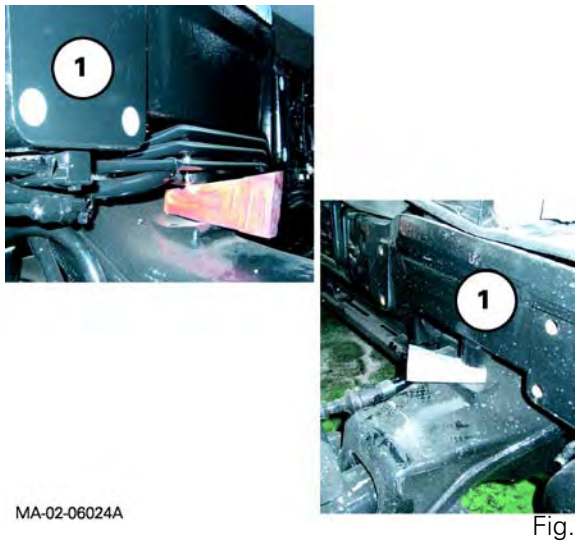

Fig. 8

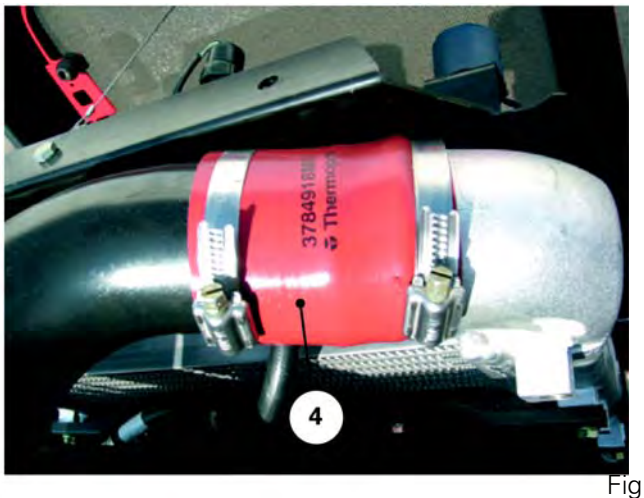

Fig. 9

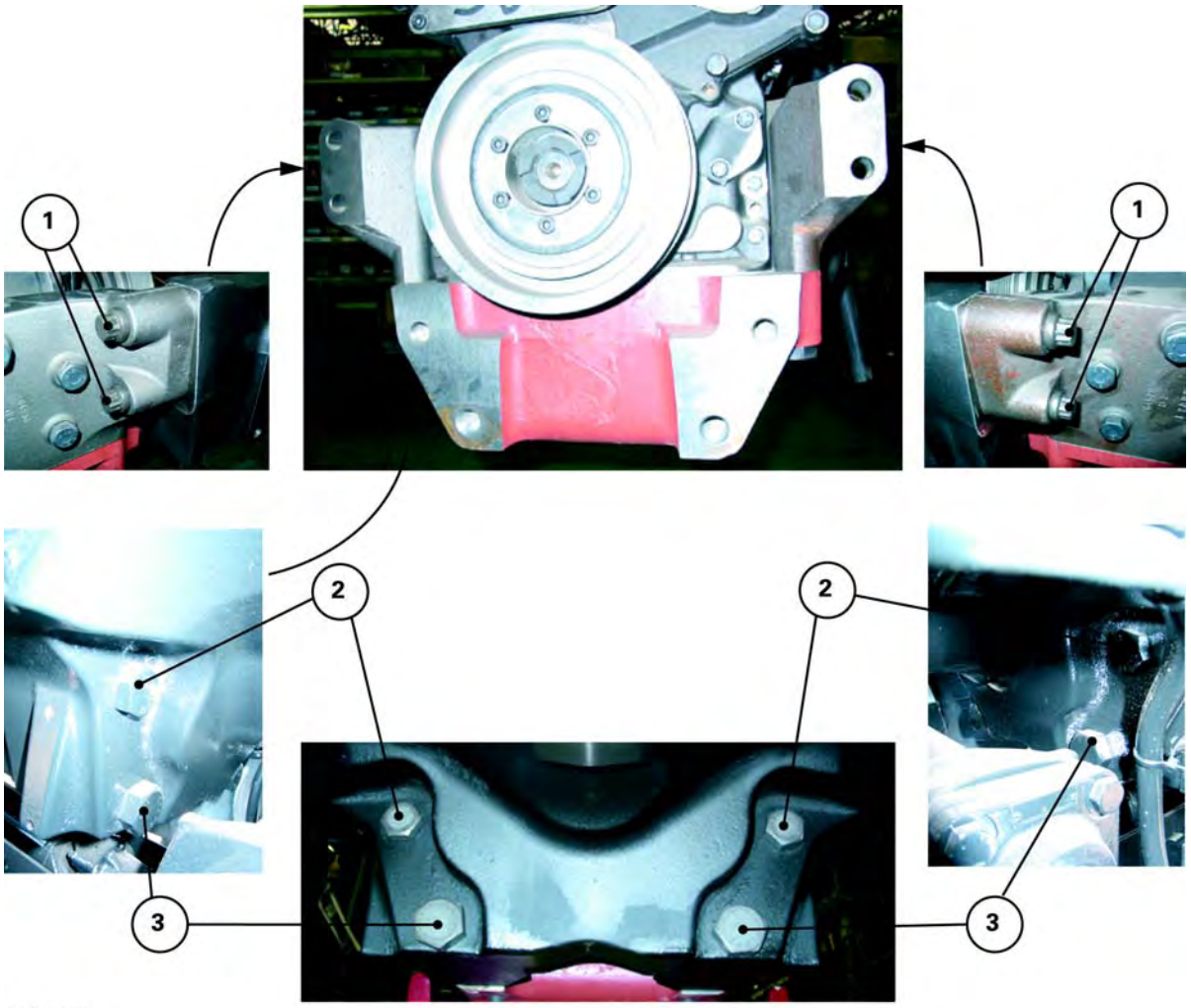

Fig. 10

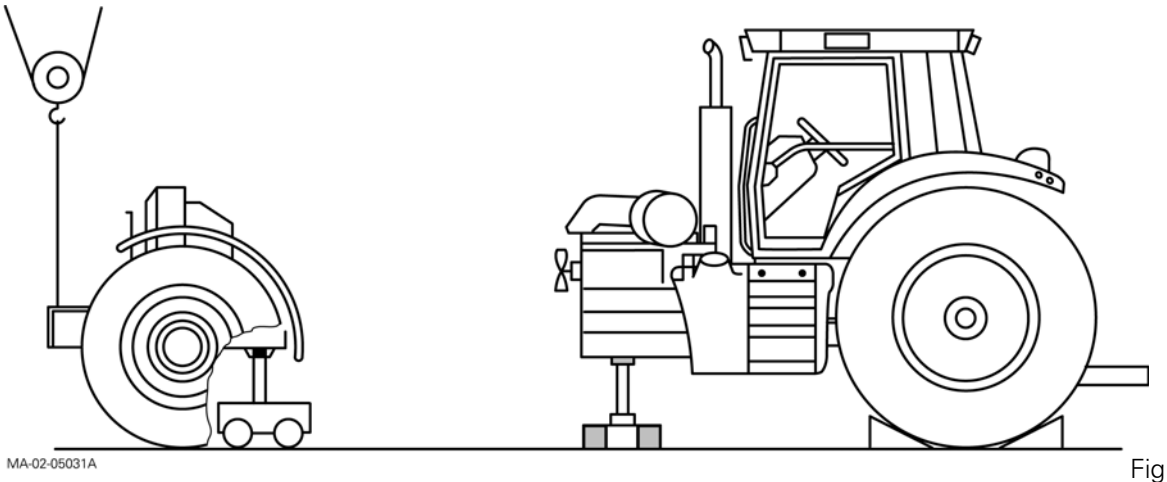

Fig. 11

C . Reassembling

24. Clean the mating faces of the engine and front frame.

25. Screw a guide studs onto each rear face of the front frame (Fig. 12).

26. With the help of an operator, assemble the front frame onto the engine. Take out the guide studs.

27. Fit and tighten the diametrically opposed screws (Fig. 10) in the following order:

- Screw (2): 480 -640 Nm,
- Screw (3): 800 -1040 Nm,
- Screw (1): 240 -320 Nm.

Final operations

Remark

Final operations are quite simple, and should therefore be carried out in the reverse order to preliminary operations.

However, it will be necessary during reassembly to carry out the tightening torques, checks and tests described below.

Tightening torques

- As required, wheel screws or nuts (see chapter 6).

Topping-up

- of coolant, to the maximum level marked on the expansion tank (Fig. 13).

Testing

- air conditioning mechanism (if fitted – see chapter 12),
- suspended front axle (if fitted – see chapter 8),
- all mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Checking tightness

- of hydraulic unions,
- of water hoses,
- of bleed screw on control unit of suspended front axle (if fitted).

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Fig. 12

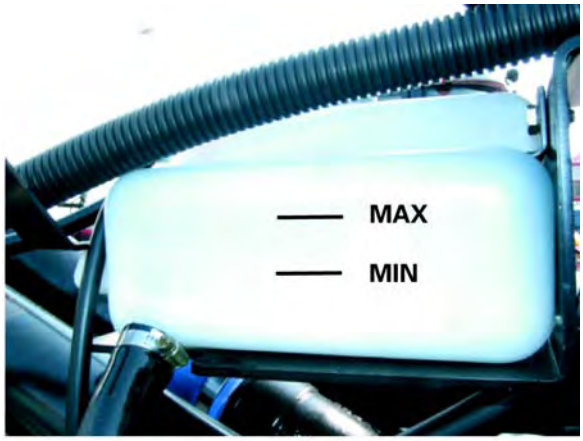

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Fig. 13

2A30 - Splitting the front frame/Sisu engine - MF 6497-6499

CONTENTS

Splitting the front frame/Sisu engine - MF 6497-6499

A . General

The front frame and engine must be split when the assemblies need to be replaced, or when servicing is necessary on one of the mechanical elements located at the front of the engine.

IMPORTANT: *This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.*

B . Disassembly

Preliminary operations

1. Apply the handbrake.
2. Check that the suspended front axle (if fitted) is in high position.
   Position chocks between the upper control arms and front axle housing (Fig. 1).
3. Remove the bleed screw from the control unit (if fitted, see chapter 9).
4. Take off:
   - the side panels either side of the engine,
   - the bonnet (if necessary).

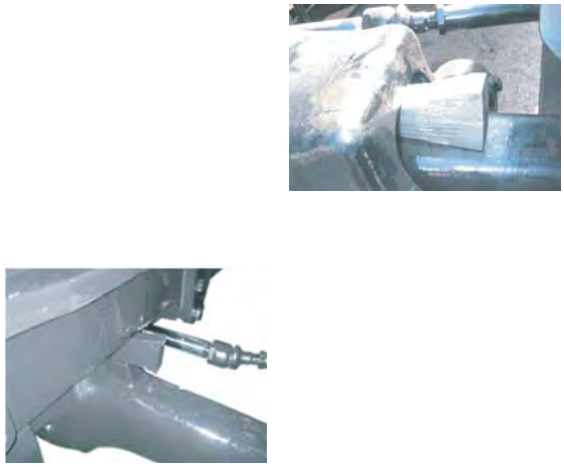

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Fig. 1

Servicing under the tractor

5. Mark then disconnect the two ends of the hoses fixed to the 4 WD transmission shaft guards (front and rear). Block their openings.
6. Remove the guards and 4 WD transmission shaft.

Servicing on the right-hand side of the tractor

7. Disconnect the batteries.
8. Take off:
   - the front mudguard;
   - the vertical exhaust assembly (including support);
   - the side engine reinforcement;
   - the protection grille close to the radiator.
9. Disconnect:
   - the turbocharger outlet air sleeve (1) (Fig. 2);
   - the flexible air filter sleeve.

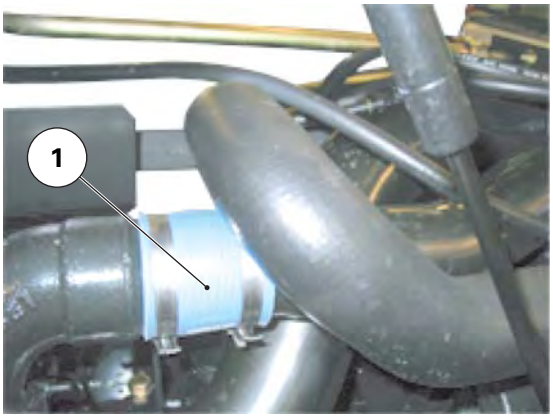

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Fig. 2

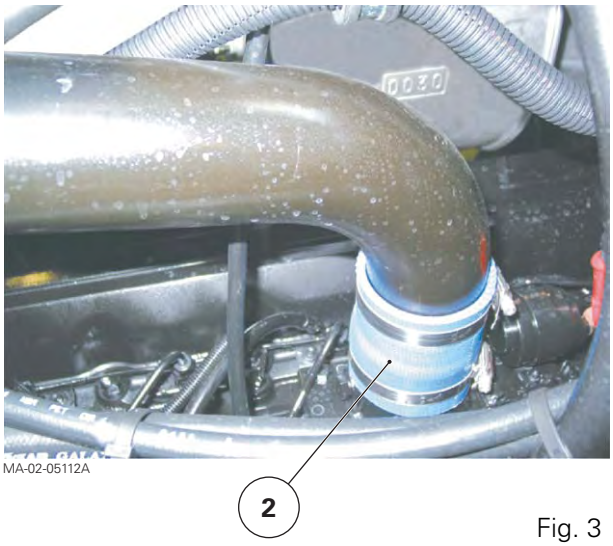

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Fig. 3

Servicing on the left-hand side of the tractor

10. Remove the front mudguard.

11. Remove or move the fuel tank apart the side of the tractor.

12. Take off:

- the side engine reinforcement;
- the protection grille close to the radiator.

13. Disconnect the intake air manifold sleeve (2) (Fig. 3).

14. Disconnect (Fig. 4):

- the rigid pipes (1) (pressure, return and LS) to the suspended front axle (if fitted);
- the rigid pipes (2) to the front linkage (if fitted).

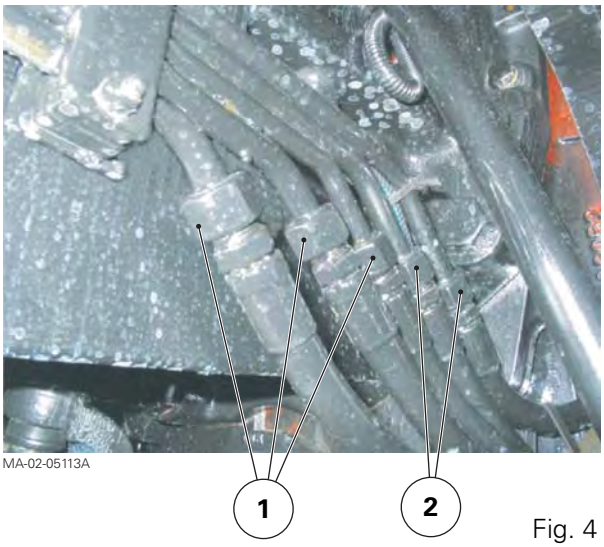

Fig. 4

Draining the cooling system

15. Unscrew the wing plug (1) located on the left-hand side and front of the radiator (Fig. 5). Drain the liquid into a clean container.

DANGER: If the engine is hot, before loosening the wing plug (1), gradually loosen the expansion tank plug and remove it in order to expel the pressure from the circuit.

16. Disconnect the lower radiator hose (1) and the hose (2) linking the expansion tank to the base of the radiator (Fig. 6).

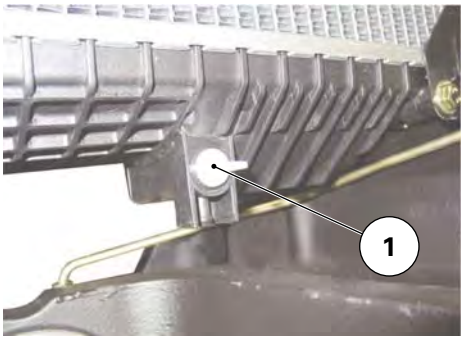

Fig. 5

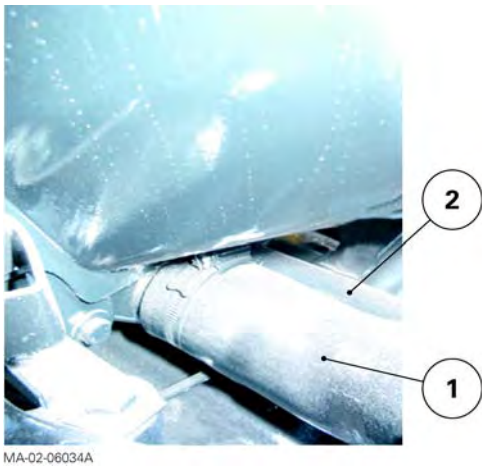

Fig. 6

Servicing above the engine

17. Take off:
- the sleeve (3) and the rigid air sleeve (5) of the air cooler inlet (Fig. 7);
- the sleeve (4) and the rigid air sleeve (6) of the air cooler outlet (Fig. 8);

18. Disconnect:
- the flexible particle suction sleeve between the air filter and the exhaust;
- the lubricating pipes/hoses connecting the rear axle right-hand hydraulic cover to the oil cooler.

19. Disconnect:
- the thermostatic fan ENG 19 connector;
- the upper hose (1) and the hose (2) linking the expansion tank to the top of the radiator (Fig. 9).

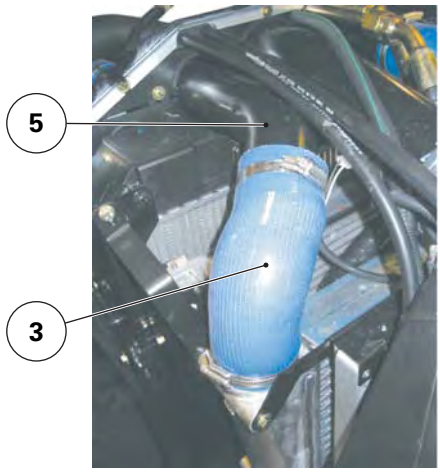

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Fig. 7

Servicing at the front of the tractor

20. Take off:
- the front weights (if fitted);
- the centre weight (if fitted).

21. Detach the air conditioning compressor, condenser and filter from their respective supports. Carefully keep them apart without opening the circuit (see chapter 12).

IMPORTANT: *If the air conditioning circuit should be open, see chapter 12 before any action.*

22. Mark and disconnect the wiring harnesses:
- inside the grille;
- on the control unit solenoid valves (suspended front axle, if fitted).

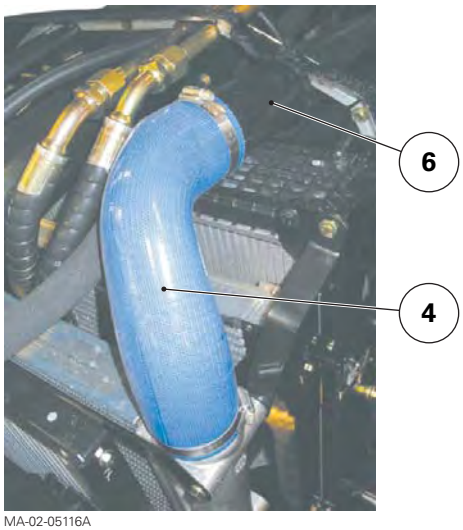

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Fig. 8

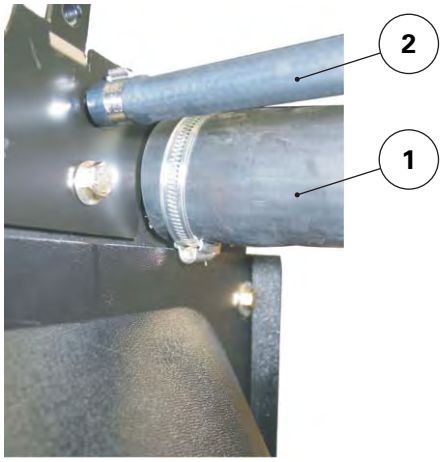

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Fig. 9

Disassembly

The lower screws M20x135 (2) and M24x165 (3), attaching the front frame to the lower engine housing, are not accessible on 4 WD tractors (Fig. 10). These screws are facing the drive pinion carrier, which also serves as a steering ram support.

Front frame / engine splitting takes place in two steps:

- first step: removing the front axle (fixed or suspended);
- second step: splitting the front frame (radiators/cooler) from the engine

First step: removing the front axle (fixed or suspended, see chapter 8)

23. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the frame and front axle (1) (Fig. 11).

24. Chock the rear wheels.

25. Remove the front wheels.

26. Install (Fig. 12):

- a fixed stand at the front of and under the gearbox;
- a fixed stand under the engine.

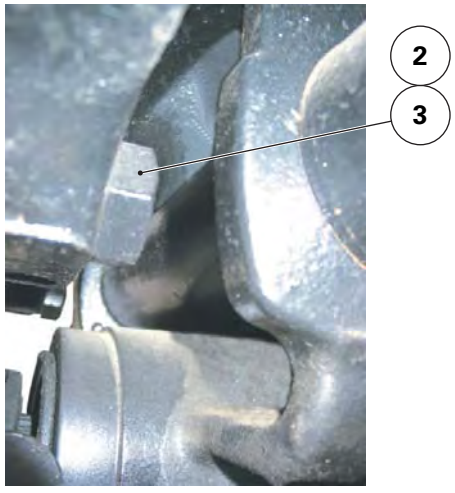

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Fig. 10

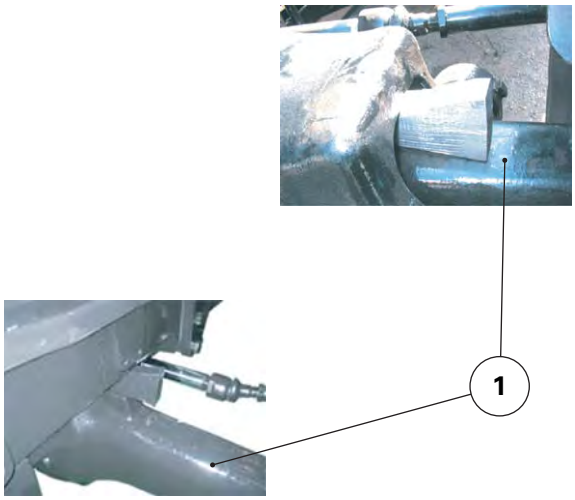

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Fig. 11

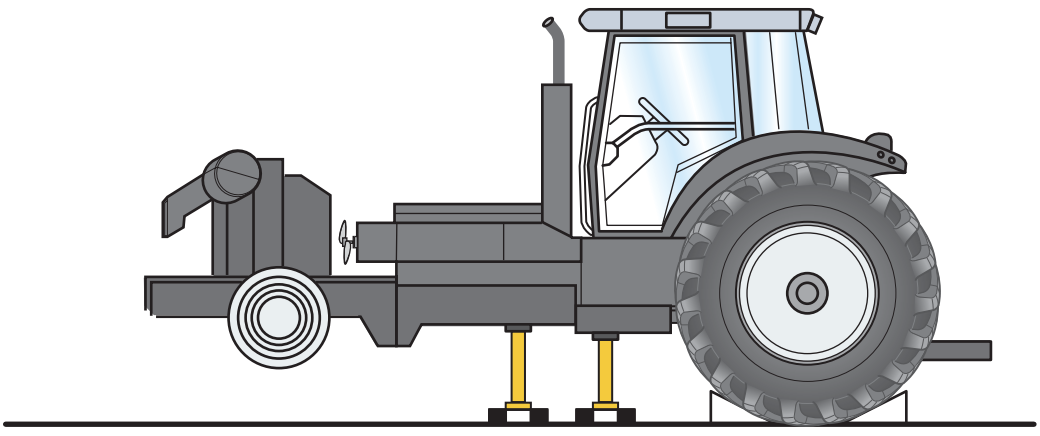

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Fig. 12

27. Remove the suspended front axle control block (if fitted, see chapter 9).

28. Remove (see chapter 8):

- the first bearing of the fixed or suspended (according to version) front axle;
- the front axle.

Second step: splitting the front frame (radiators/cooler) from the engine.

29. Correctly sling and balance the front frame assembly (radiators/cooler), using the tapped holes drilled into each side of the front frame (Fig. 14).

30. Loosen one M16x85 side screw (1) on the left and right-hand side of the engine (Fig. 13). Replace with a guide stud of appropriate length.

31. With the help of an operator, loosen the screws (2) (3) (Fig. 13).

32. Remove the front frame from the engine.

Screw dimensions (Fig. 13)

Screw	
M16x85	(1)
M20x135	(2)
M24x165	(3)

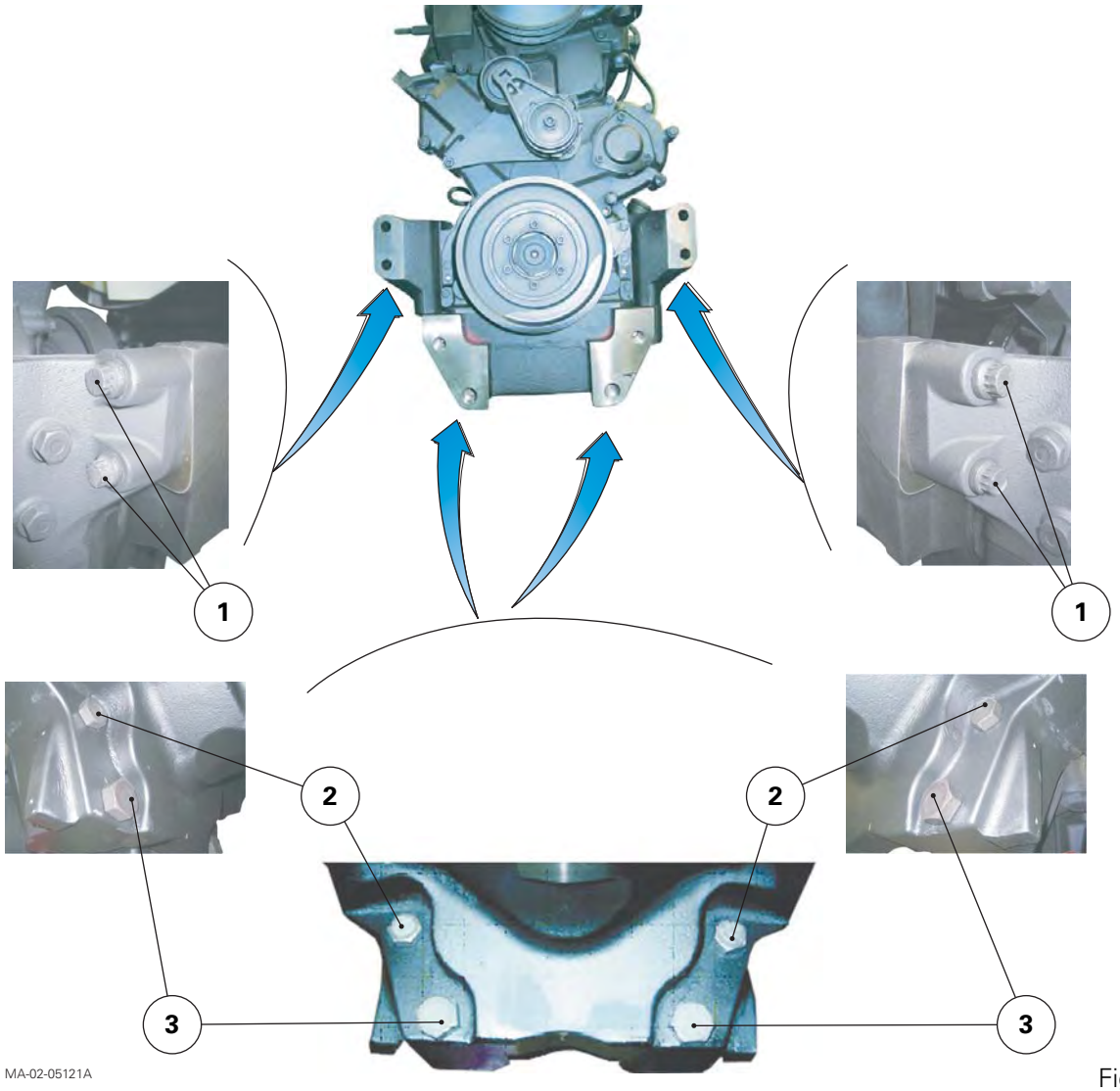

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Fig. 13

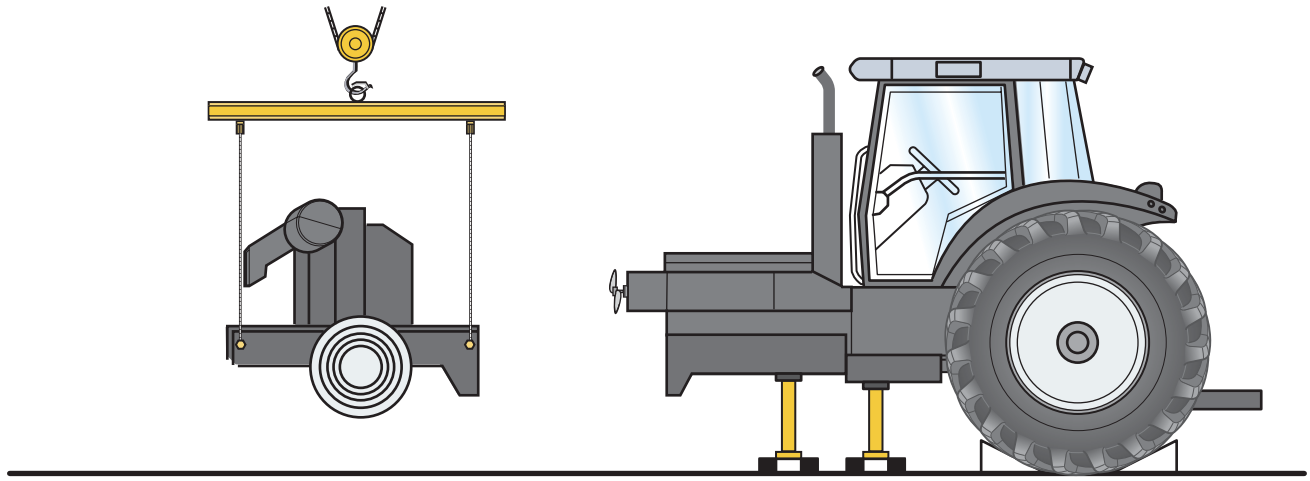

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Fig. 14

C . Reassembly

33. Clean the mating faces of the engine and front frame.

34. Screw a guide studs onto each rear face of the front frame (Fig. 15).

35. With the help of an operator, assemble the front frame onto the engine.

36. Tighten two screws (1) (Fig. 13).

Take out the guide studs.

Fit and tighten the diametrically opposed screws (Fig. 13) in the following order:

- screws (1) to a torque of 240 - 320 Nm;
- screws (2) to a torque of 480 - 640 Nm;
- screws (3) to a torque of 800 - 1040 Nm.

Fig. 15

Final operations

Final operations are not especially difficult. They therefore will be carried out in the reverse order of the preliminary operations.

However, the following operations need to be performed during refitting:

- if necessary, tighten the screws or wheel nuts at the required **tightening torque** (see chapter 6);
- make up the **level of coolant**, to the maximum level marked on the expansion tank (Fig. 16);
- **test:**
  - the air conditioning system (if fitted - see chapter 12);
  - the suspended front axle (if fitted, see chapter 8),
  - all mechanical, hydraulic, electrical and electronic functions concerned by servicing;
- **check the tightness**:
  - of the hydraulic unions,
  - of water hoses,
  - of the bleed screw on control unit of suspended front axle (if fitted).

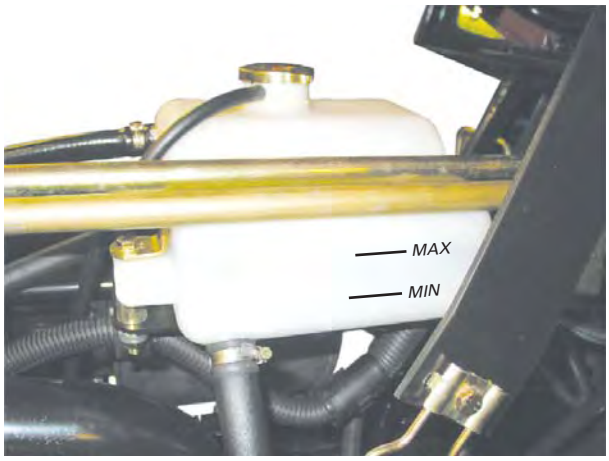

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Fig. 16

Splitting the front frame/Sisu engine - MF 6497-6499

2B10- Splitting - Perkins Engine / GBA20 Gearbox

CONTENTS

A . General

On MF6400 series tractors fitted with a GBA20 gearbox, two types of engine may be fitted:

- Perkins 6-cylinder engine.
- Perkins 4-cylinder engine.

It is required to split the tractor between the engine and the gearbox when access is necessary to carry out servicing on the main following elements:

Engine interface

- Transmission damper
- Engine flywheel
- Engine adapter plate

Gearbox interface

- Spacer and sealing ring
- Internal hydraulic pipes
- Reverse shuttle and the Dynashift

Remark

- This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.
- The cab remains attached to the centre housing.

B . Disassembling and reassembling (Perkins 6-cylinder engine)

Preliminary operations

1. Apply the handbrake.
2. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).
3. Remove the lateral panels from each side of the engine and bonnet (if necessary).

Servicing under the tractor

4. Remove the guard and the shafts (4 WD tractors).

Servicing at the front of the tractor

5. Remove the front weights (if fitted).

Servicing on the right-hand side of the tractor

6. Remove the footstep.
7. Disconnect and remove first the batteries and then the support.
8. Disconnect the flexible sleeve (1) (Fig. 1) fitted to the suction port. Remove the vertical exhaust assembly (including support Fig. 2).
9. Mark then disconnect:
   - the cables (positive and negative) on the starter,
   - the front differential lock hose,
   - the hose on the steering ram,
   - the lubricating hoses (running to and from the cooler) (Fig. 3).

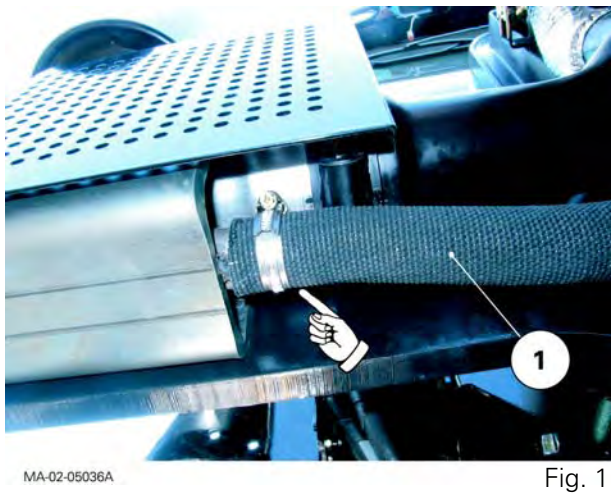

Fig. 1

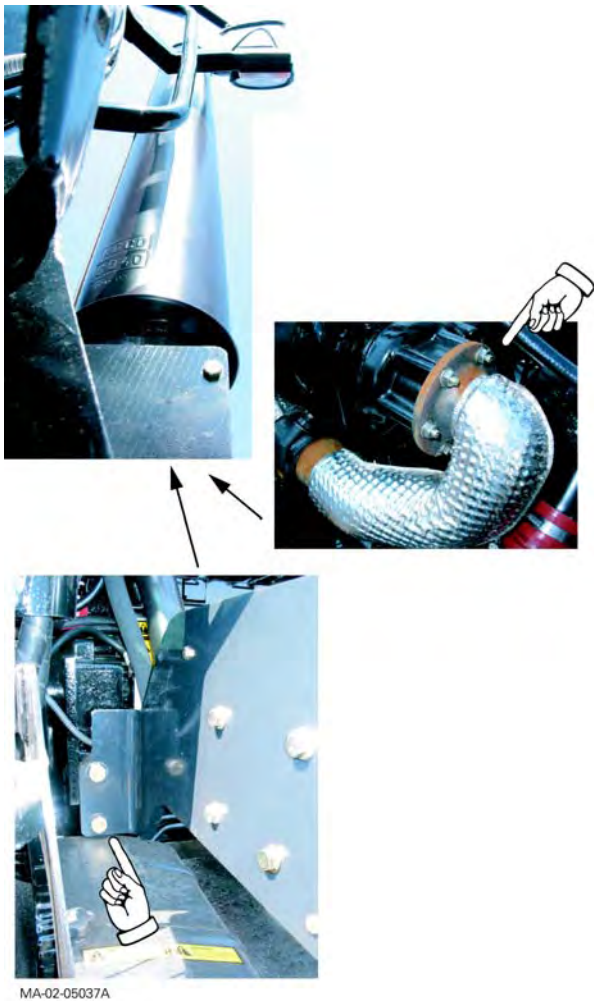

Fig. 2

Servicing on the left-hand side of the tractor

10. Remove the footstep.

11. Mark then disconnect:

- the hose on the steering ram,
- the hoses (pressure-return and LS) on the rigid pipes (Fig. 4) of the suspended front axle (if fitted).

12. Mark and disconnect the fuel feed and return hoses on the engine (block ports immediately).

Remark

If the fuel tank is not removed it obstructs access to the engine attachment screw on the spacer, but does not prevent access. However, if there is a problem, remove the tank having previously marked and disconnected:

- the gauge harness,
- the vent hose on the tank.

Servicing under the cab

13. Mark, toe-in and disconnect the heating hoses, immediately blocking the ports.

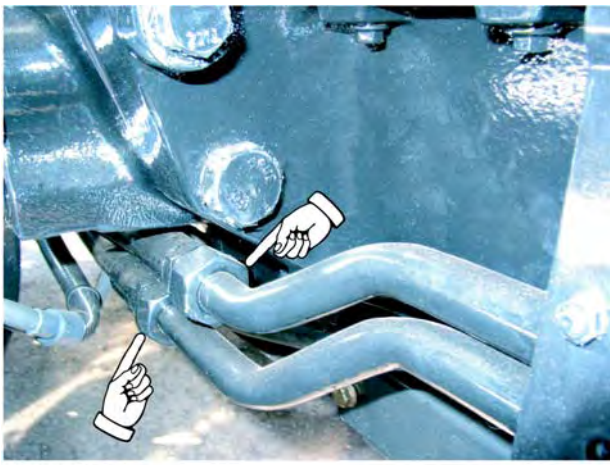

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Fig. 3

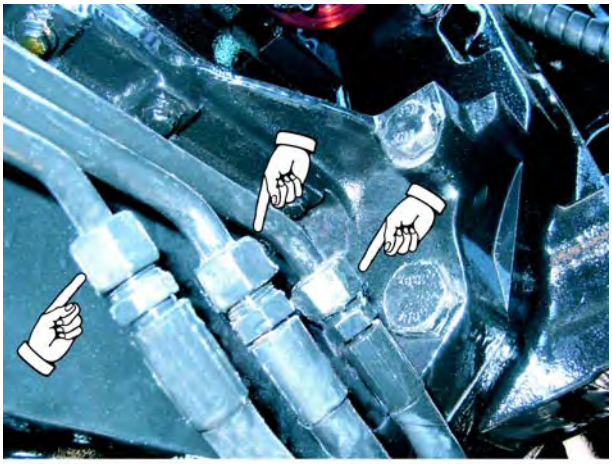

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Fig. 4

Servicing the engine

14. If necessary disconnect the connector (1) of the main wiring harness (Fig. 5).

15. Separate the compressor, the condenser and the filter from their respective holders, and remove them carefully, without breaking the circuit (see chapter 12).

Remark

Work carefully.

Servicing at the front of the cab

16. Disconnect the connectors (2) on the left-hand face of the fire wall (Fig. 5).

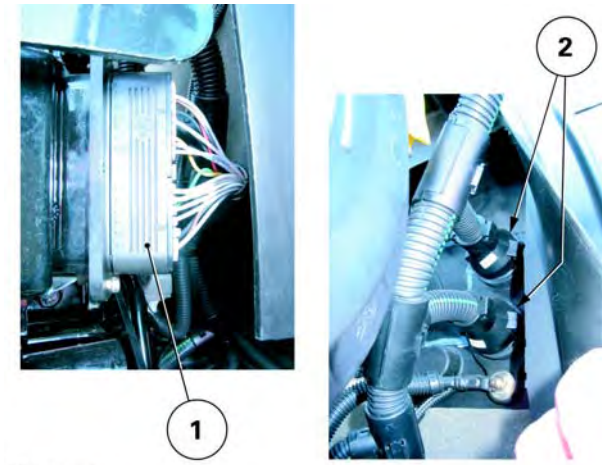

Fig. 5

Preparing for disassembling

17. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 6).

18. Chock the rear wheels.

19. Install (Fig. 7):

- a fixed stand at the front of the gearbox,
- a mobile stand at the back of the engine.

20. If necessary, separate the cab from the front right- and left-hand supports. Gently lift it using two straps fitted to the lateral handles. Fit a wooden chock temporarily between the cab and the supports.

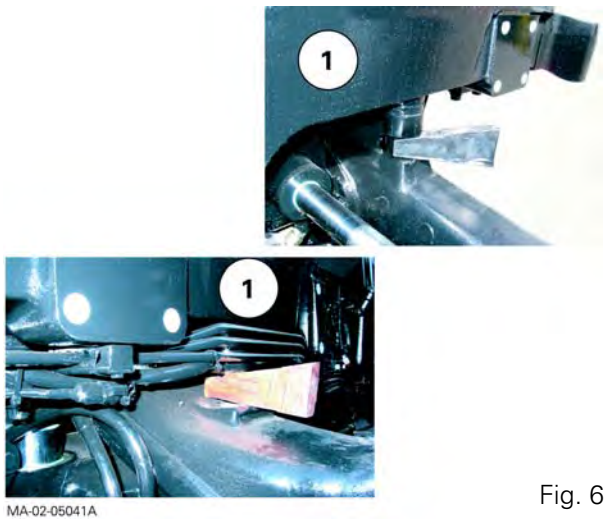

Fig. 6

Disassembly

21. Remove the screws and nuts attaching the engine to the gearbox (Fig. 8). Mark their lengths and positionings.

22. With the help of an operator, separate the assemblies (Fig. 7).

Reminder

When disassembling, check that connections (hoses, pipes and harnesses) are all disconnected.

Dimensions of the screws, studs and nuts

Screws

- M16 x 60 mm
- M16 x 115 mm
- M16 x 185 mm
- M22 x 160mm

Studs

- M12 x 185 mm
- M22 x 160 mm

Nuts

- M12
- M22

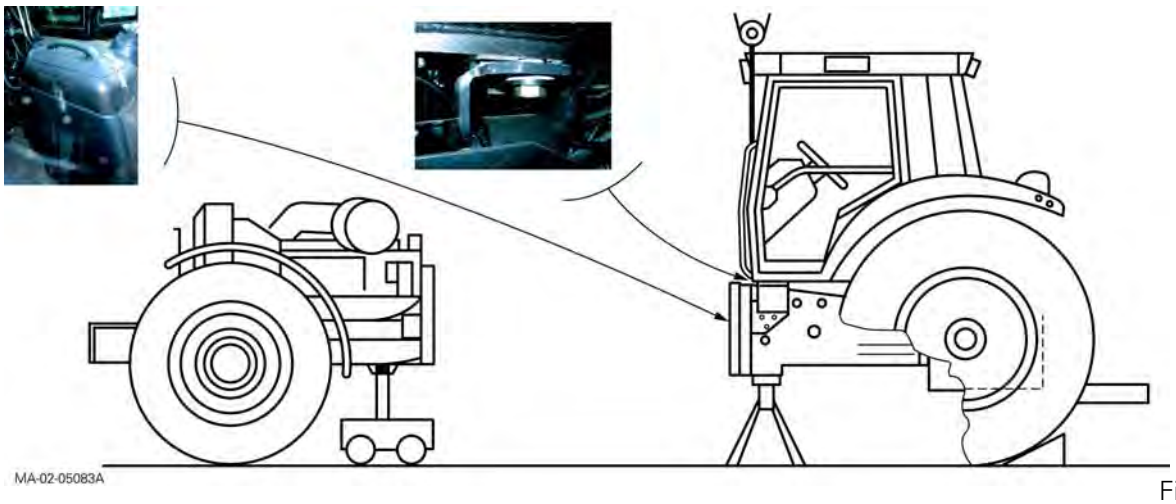

Fig. 7

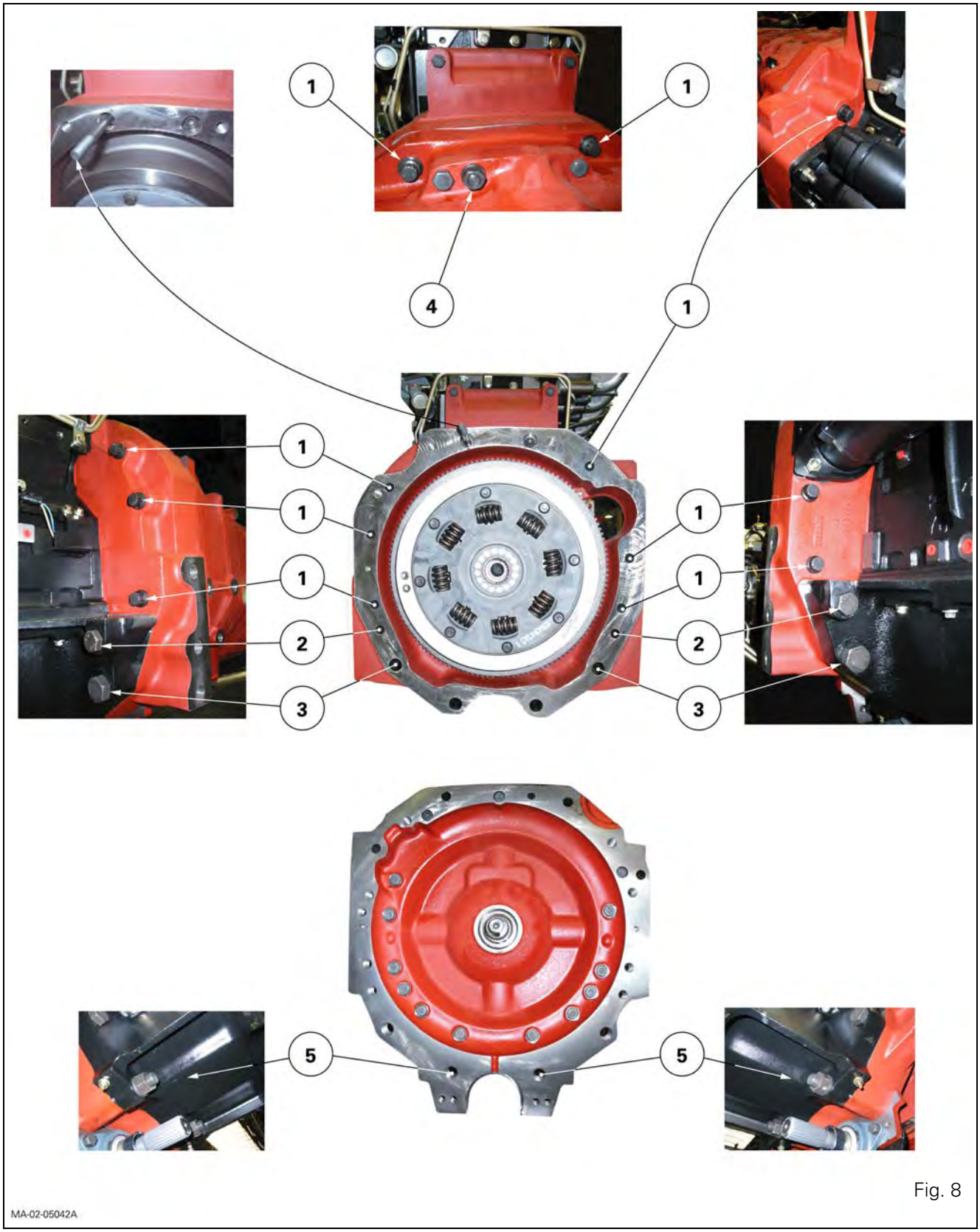

Fig. 8

Reassembly

23. Clean the mating faces of the engine and the gearbox spacer.

24. Check:

- the presence of locating pins (1) on the engine (Fig. 9),
- the tightness of the upper nut (M12) on the engine adapter plate (Loctite 270),
- the tightness of the lower studs (M22) on the gearbox spacer (Loctite 270).

25. Lightly lubricate the splines of main shaft (1) (Fig. 10) with grease (type GN + Molykote) or equivalent.

26. If necessary screw two supplementary diametrically opposed guide studs into the gearbox.

27. Assemble the engine onto the gearbox spacer.

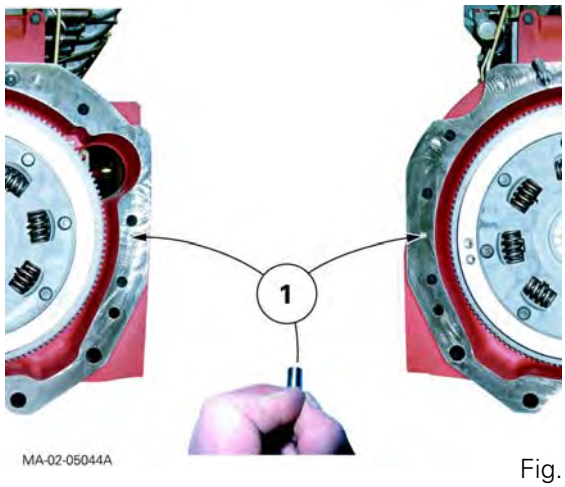

Fig. 9

Reminder

If necessary, remove the starter and turn the flywheel ring gear using a suitable tool. This will ease the engagement of the vibration damper splines with those of the main shaft. If there is resistance, do not force it and find the cause of the problem.

28. When the elements are joined, remove the guide studs (if fitted). Lightly grease the thread of the screws and nuts with Loctite 270 or equivalent and refit according to the marks made at disassembly. Tighten to the required torques (Fig. 11)

- Screw (1): 240 - 320 Nm.
- Screw (2): 240 - 320 Nm.
- Screw (3): 630 - 840 Nm.
- Nuts (4): 100 - 130 Nm.
- Nuts (5): 630 - 840 Nm.

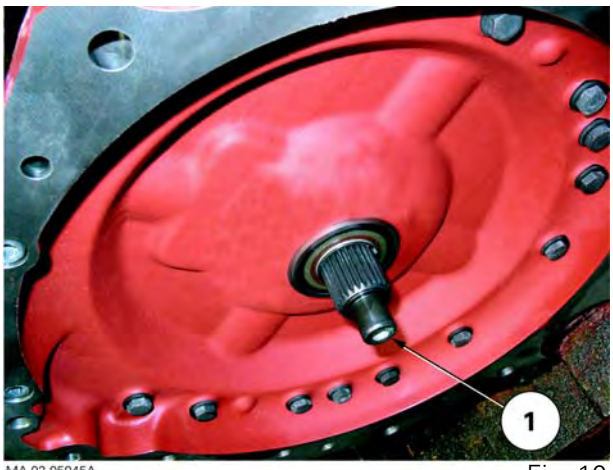

Fig. 10

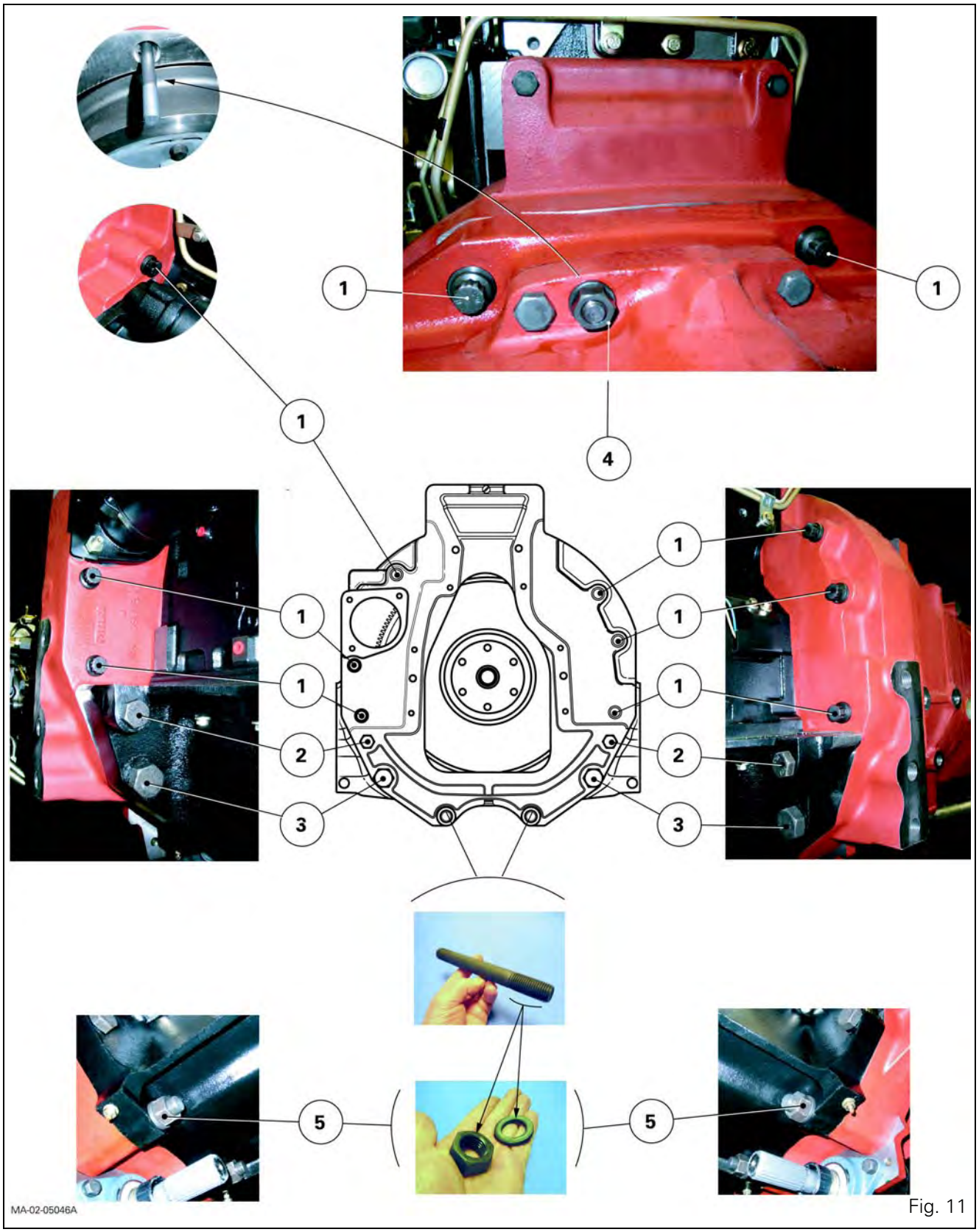

Fig. 11

Final operations

Remark

Final operations are not especially difficult. They should be carried out in the reverse order to preliminary operations. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Tightening torques

As required:

- Front cab attachment screw (see chapter 12).
- Screw (2) of connector (1) on main wiring harness (Fig. 5 and Fig. 12) 2.82 to 3.15 Nm

Topping-up

of coolant to the maximum level marked (radiator, expansion tank. Fig. 13).

Tests

- air conditioning system (if fitted – see chapter 12).
- Cab suspension (if fitted, see chapter 12).
- All mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Checking tightness

- Hydraulic unions.
- Bleed screw on control unit of suspended front axle (if fitted).

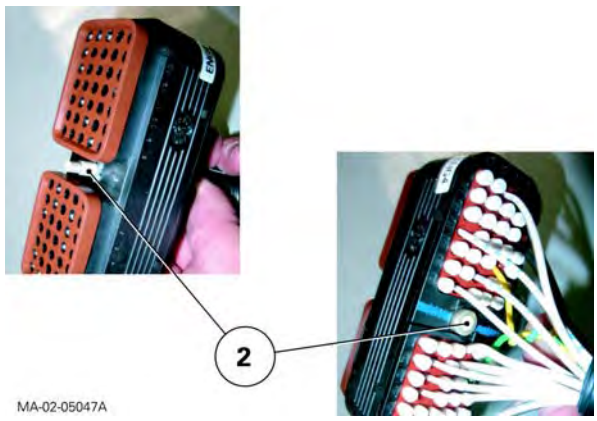

Fig. 12

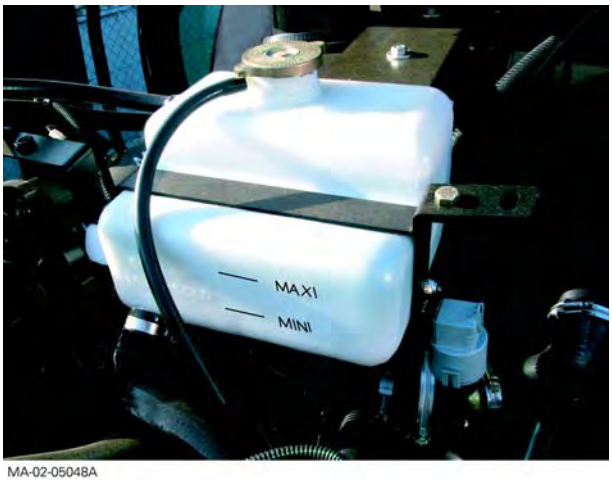

Fig. 13

C . Disassembling and reassembling (Perkins 4-cylinder engine)

Preliminary operations

29. Apply the handbrake.

30. Remove the side panels, prefilter (Perkins EEM engine) and bonnet.

Servicing under the tractor

31. Take off the guard, shaft and differential lock supply pipe (4 WD tractors).

Servicing at the front of the tractor

32. Remove front the weights (if fitted).

33. Disconnect the batteries.

Tractors with...	Battery location
Perkins engine with mechanical injection	in the grille compartment
Perkins EEM engine	behind the right-hand footstep

Location of batteries (Fig. 14)

MA-02-05069A

Fig. 14

Servicing on the right-hand side of the tractor

34. Take off the front right-hand mudguard.

35. Disconnect the flexible sleeve (1) (Fig. 15) fitted to the suction port.

If necessary, remove the vertical exhaust assembly (including support) (Fig. 15).

36. Mark then disconnect:

- the hose on the steering ram or on the spool valve (Orbitrol), depending on the tractor type;
- the lubricating hoses (running to and from the cooler) (Perkins EEM engine) (Fig. 16).

Servicing on the left-hand side of the tractor

37. Take off the front left-hand mudguard.

38. Mark then disconnect:

- the hose on the steering ram or on the spool valve (Orbitrol), depending on the tractor type;
- the gas-oil supply and return hoses on the engine. Immediately block the ports.

39. Disconnect the cables connected to the starter positive terminal (Fig. 17).

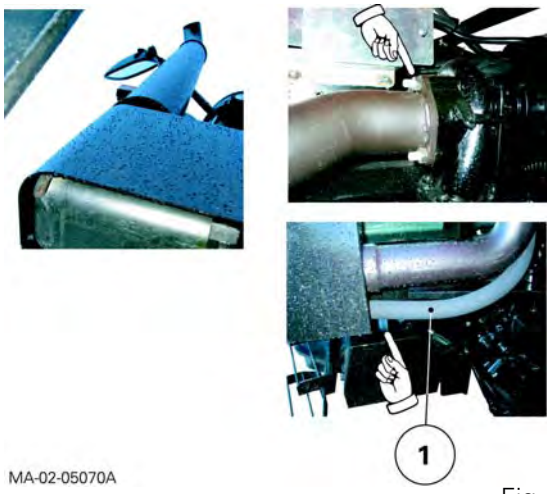

Fig. 15

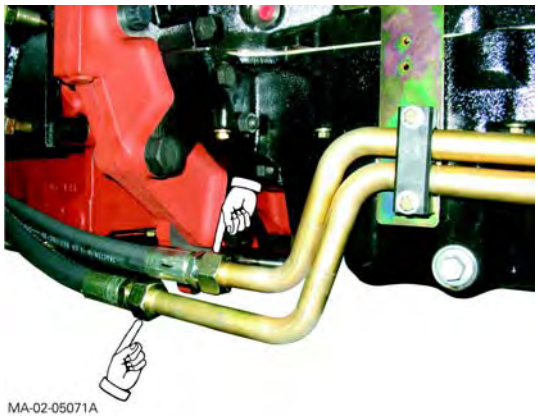

Fig. 16

Fig. 17

Servicing under the cab

If the engine is still hot, allow it to cool.

Reminder

To work on heating hoses, it is not necessary to drain the engine block cooling circuit.

40. Toe-in each heating hose using a clamp fitted with plastic jaws (Fig. 18).

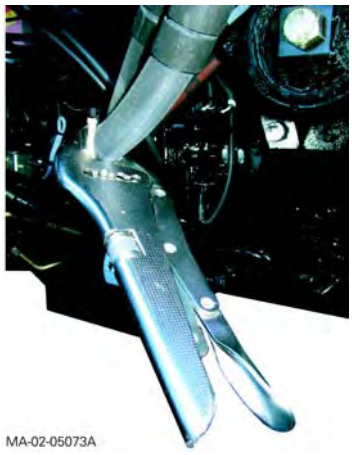

Fig. 18

Servicing the engine

41. Mark and disconnect the heating hoses on the engine block and water pump.

Immediately block the ports using suitable plugs.

42. Disconnect the negative cables on the block at the rear left-hand side of the engine (Fig. 19).

43. If necessary disconnect the connector (1) of the main wiring harness (Perkins EEM engine) (Fig. 19).

44. Detach the air conditioning compressor, condensor and filter from their respective supports (if fitted).

Place the assembly beside the tractor without disconnecting the pipes and hoses (see chapter 12).

Note: Carry out this procedure with care.

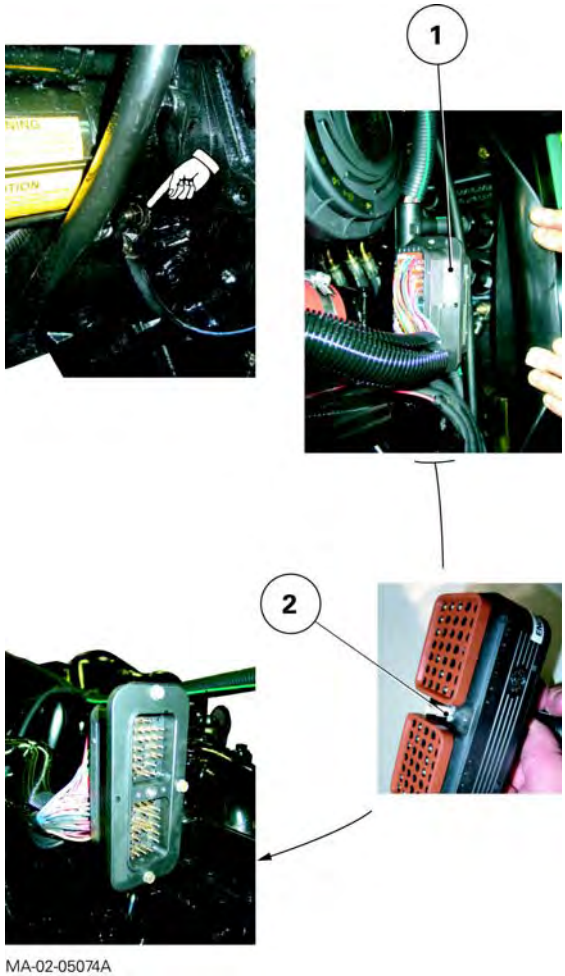

Fig. 19

Servicing at the front of the cab

45. Disconnect the connectors (2) and the ground terminals (1) on the left-hand side of the cab wall (Fig. 20).

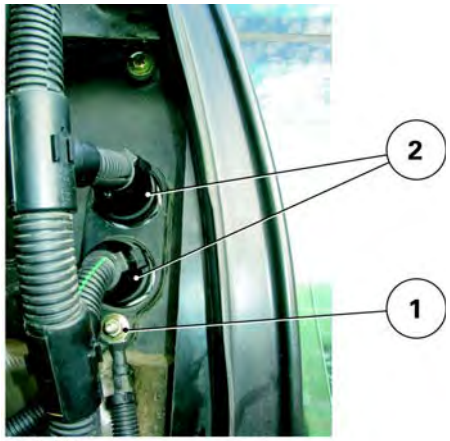

Fig. 20

Preparing for disassembling

46. Stop the front axle oscillation by sliding a suitable wooden chock either side of the support (1) (Fig. 21).

47. Chock the rear wheels.

48. Install (Fig. 22):

- a fixed stand at the front of the gearbox,
- a mobile stand at the back of the engine.

49. If necessary, separate the cab from the front right- and left-hand supports.

Gently lift the cab front using two straps fitted to the lateral handles.

Fix the cab in a raised position

Momentarily place a wooden chock between each support and the cab right- and left-hand attachments.

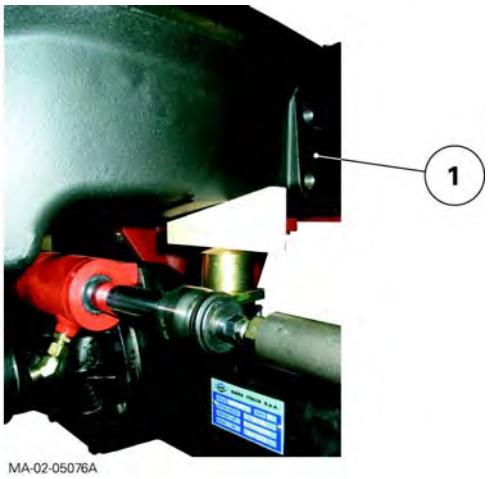

Fig. 21

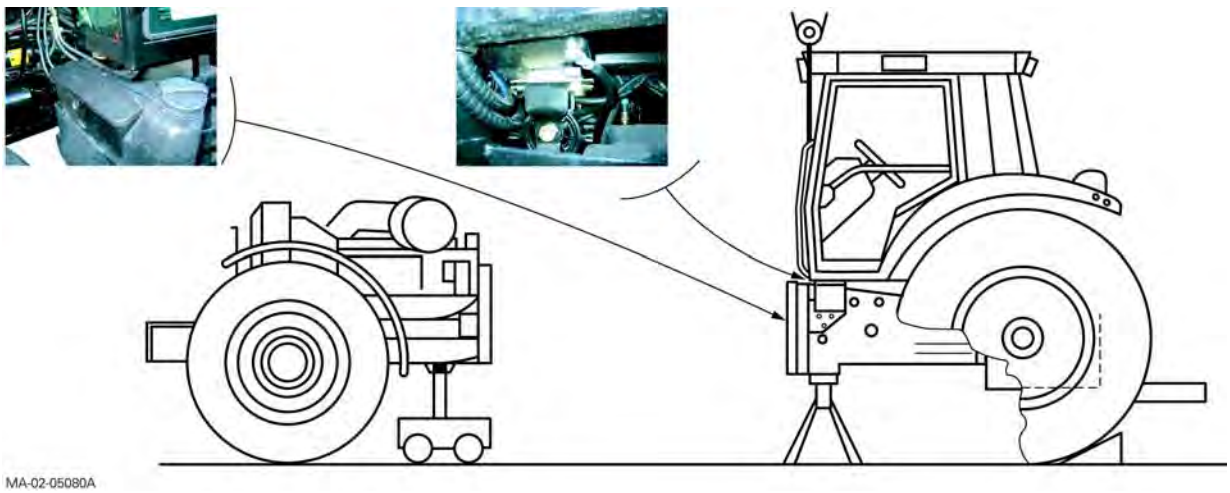

Fig. 22

Disassembly

50. Remove the screws attaching the engine to the gearbox (Fig. 23).
Mark their position and length.

51. Assisted by an operator, separate the assemblies (Fig. 22).

Screw dimensions

Screws
M16 x 50 mm
M16 x 60 mm
M16 x 80 mm
M22 x 80 mm

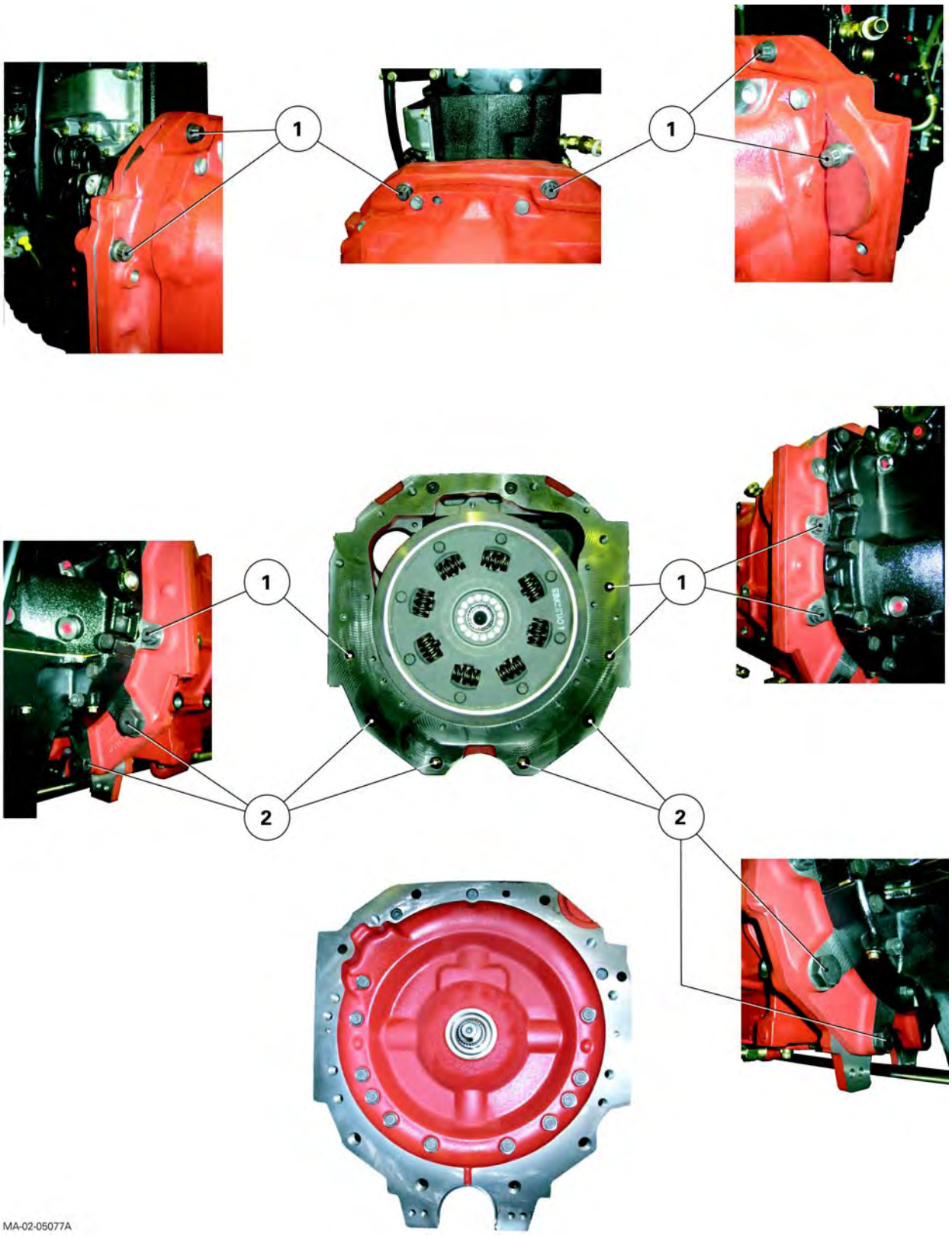

Fig. 23

Reassembly

Advice for use

Use guide studs to assist reassembly of the engine and gearbox.

52. Clean the mating face of the engine adapter plate and gearbox spacer.

53. Check for the presence of locating pins (1) on the engine adapter plate (Fig. 24).

54. Lightly smear the splines of main shaft (1) (Fig. 25) with AS767 grease or equivalent.

55. Screw two diametrically opposed guide studs to the engine adapter plate or to the gearbox spacer.

56. Assemble the engine onto the gearbox spacer.

Reminder

If necessary, remove the starter and slowly turn the flywheel ring gear using a suitable tool.

This will ease the engagement of the vibration damper splines with those of the gearbox main shaft.

If there is resistance, do not force it and find the cause of the problem.

57. When the two assemblies are joined, remove the guide studs (if fitted).

Lightly smear the thread of each of the screws (1) and (2) with Loctite 270 or equivalent. Fit them as marked at disassembly.

Tighten (Fig. 26):

- screws (1) to a torque of 240 - 320 Nm;
- screws (2) to a torque of 630 - 840 Nm.

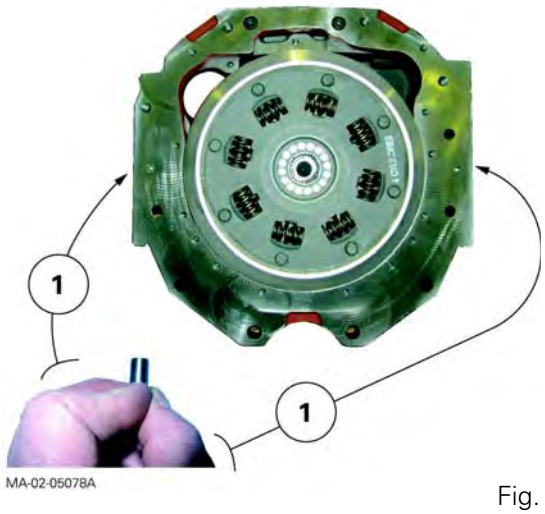

Fig. 24

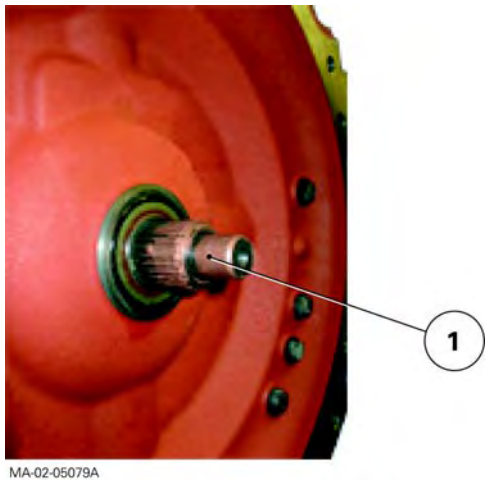

Fig. 25

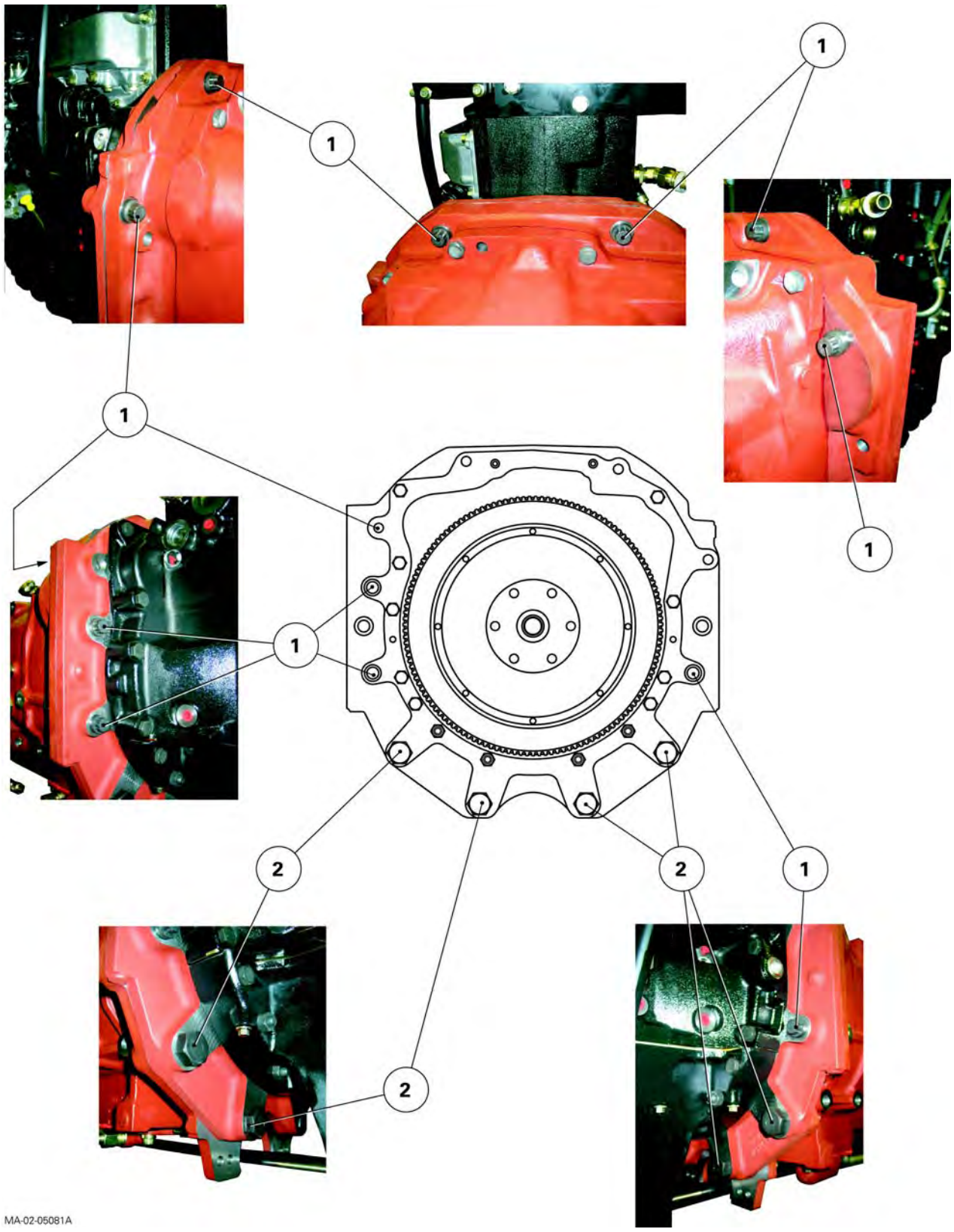

Fig. 26

Final operations

Remark

Final operations are not especially difficult.

They should be carried out in the reverse order to preliminary operations. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Tightening torques

As required:

- front cab attachment screw (see chapter 12),
- screw (2) of the connector (1) on the main harness (Perkins EEM engine) (Fig. 19 and Fig. 27) to a torque of 2.82 to 3.15 Nm.

Topping-up:

- of coolant, to the maximum level marked on the radiator and expansion tank (Fig. 28).

Tests:

- air conditioning system (if fitted) (see chapter 12),
- cab suspension (if fitted) (see chapter 12),
- all mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Check tightness:

- of hydraulic unions.

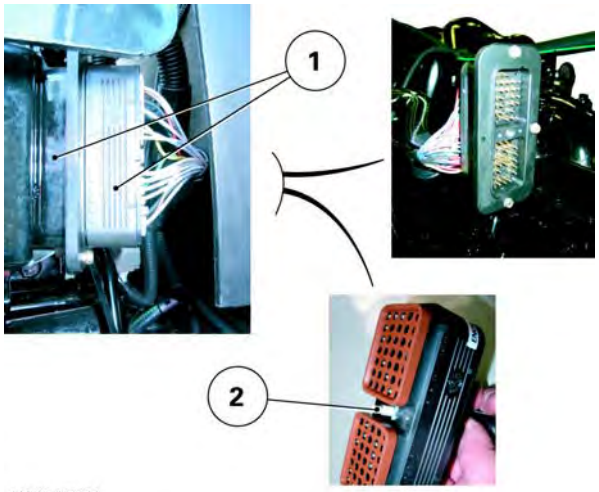

Fig. 27

Fig. 28

2B11 - Perkins/GTA2520 engine separation

CONTENTS

Perkins/GTA2520 engine separation

A . General

On 6400 series tractors fitted with a GBA 25 gearbox, two types of engine can be fitted.

- Perkins six-cylinder engine.
- Perkins four-cylinder engine.

The tractor should be split between the engine and the gearbox when access is necessary to carry out operations on the following main elements:

Engine interface

- Transmission damper
- Engine flywheel
- Engine adapter plate

Gearbox interface

- Spacer and sealing ring
- The Powershuttle, Step-up unit and Powershuttle module

***NOTE**: This section presents a general disassembly procedure. Before and during disassembly, check that all connections between the fixed assembly and mobile assembly have been disconnected.*

The cab remains attached to the centre housing.

B . Disassembling and reassembling (six-cylinder Perkins engine)

Implementation

1. Apply the handbrake.
2. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).
3. Remove the lateral panels from each side of the engine and bonnet (if necessary).

Operations underneath the tractor

4. Dismantle the front linkage reinforcements (if mounted).
5. Remove the guard and the shafts (4 WD tractors).

Operations at the front of the tractor

6. Remove the front weights (if fitted).

Operations on the right-hand side of the tractor

7. Remove the footplate.
8. Disconnect and remove the batteries then the support.
9. Disconnect the flexible sleeve (1) (Fig. 1) fitted to the suction port. Remove the vertical exhaust assembly (including support Fig. 2).
10. Mark then disconnect:
    - the cables (positive and negative) on the starter
    - the front differential lock hose
    - the hose on the steering ram
    - the lubricating hoses (running to and from the cooler) (Fig. 3)

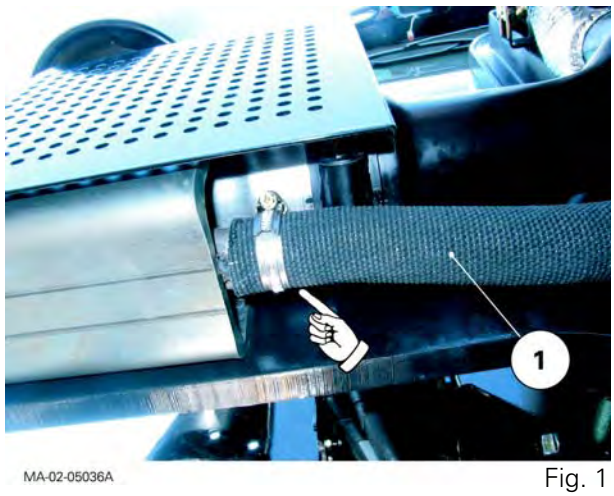

Fig. 1

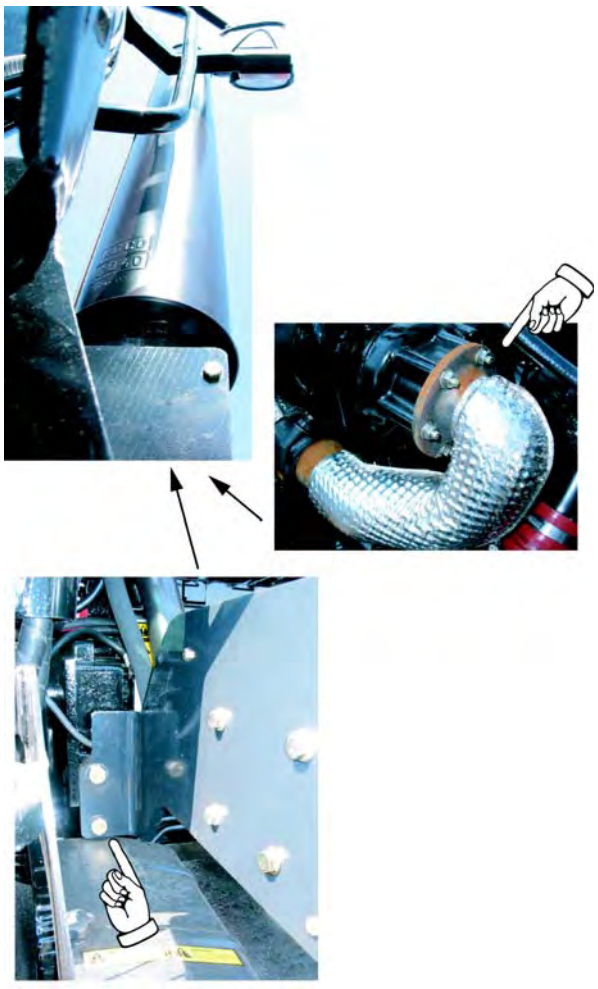

Fig. 2

Operations on the left-hand side of the tractor

11. Remove the footplate.

12. Mark then disconnect:

- the hose on the steering ram
- the hoses (pressure-return and LS) on the rigid pipes (Fig. 4) of the suspended front axle (if fitted)

13. Mark and disconnect the fuel feed and return hoses on the engine (block ports immediately).

***NOTE**: If the fuel tank is not removed it obstructs access to the engine screws on the spacer but does not prevent access. However, if there is a problem, remove the fuel tank having previously marked and disconnected:*

- *the gauge harness*
- *the vent hose on the fuel tank*

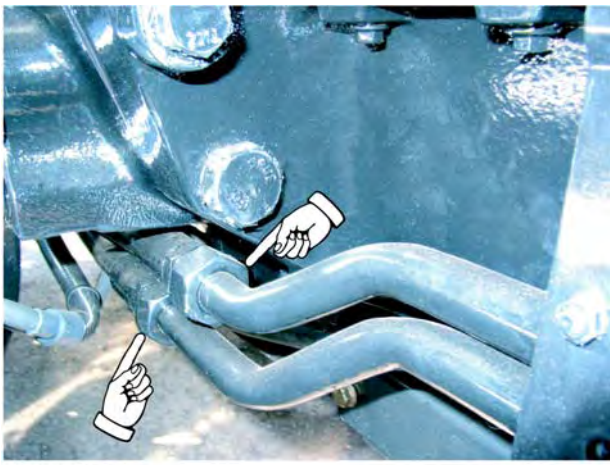

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Fig. 3

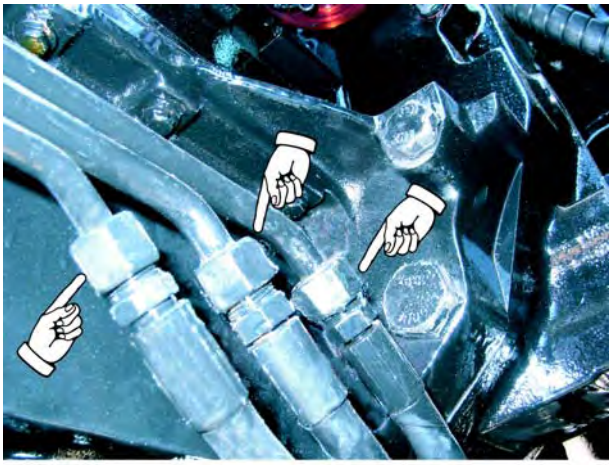

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Fig. 4

Operations under the cab

CAUTION: If the engine is still hot, allow it to cool.

***NOTE**: To work on heating hoses, it is not necessary to drain the engine block cooling circuit.*

14. Pinch out each heating hose using a clamp fitted with plastic jaws (Fig. 5).

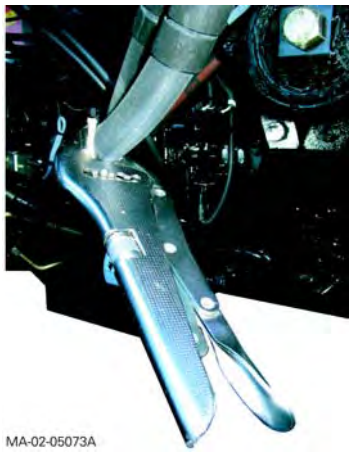

Fig. 5

Operations on the engine

15. If necessary, disconnect the connector (1) of the main wiring harness (Fig. 6).

16. Separate the compressor, the condenser and the filter from their respective holders, and remove them without breaking the circuit (see chapter 12).

***NOTE:** Proceed carefully.*

Operations at the front of the cab

17. Disconnect the connectors (2) on the left-hand face of the bulkhead (Fig. 6).

Preparing for disassembly

18. Stop the front axle swinging (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 7).

19. Chock the rear wheels.

20. Install (Fig. 8):

- a fixed stand at the front of the gearbox
- a mobile stand at the rear of the engine

21. If necessary, separate the cab from the front right- and left-hand supports. Gently lift it using two straps fitted to the lateral handles. Temporarily place a wooden chock between the cab and the supports.

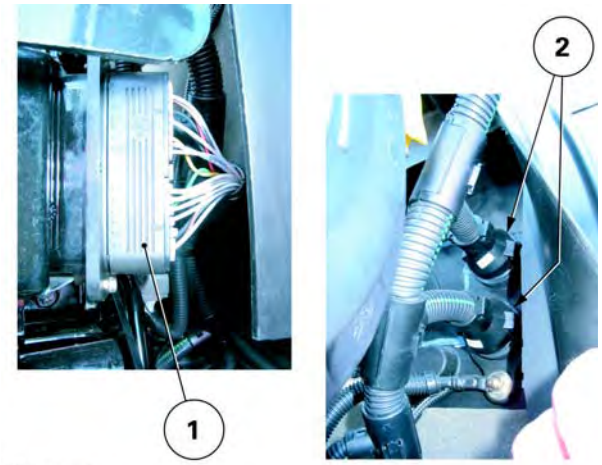

Fig. 6

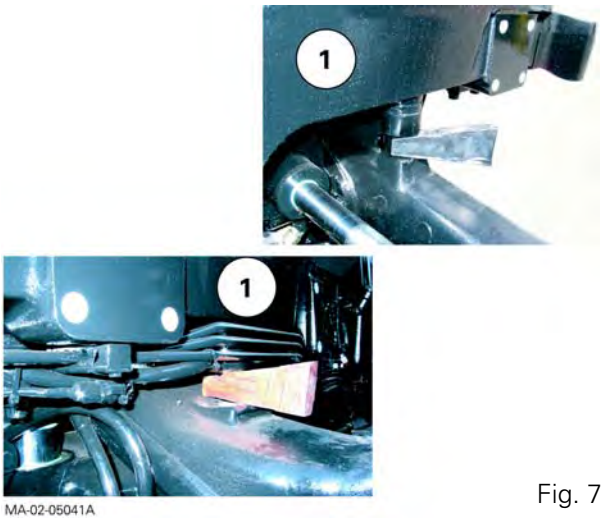

Fig. 7

Disassembly

22. Remove the screws and nuts attaching the engine to the gearbox (Fig. 9). Mark their lengths and positionings.

23. With the help of an operator, separate the assemblies (Fig. 8).

***NOTE**: When disassembling, check that all connections (hoses, pipes and harnesses) are disconnected.*

Dimensions of the screws, studs and nuts

Screws

- M16 x 60 mm
- M16 x 115 mm
- M16 x 185 mm
- M22 x 160 mm

Studs

- M22 x 160 mm

Nuts

- M22

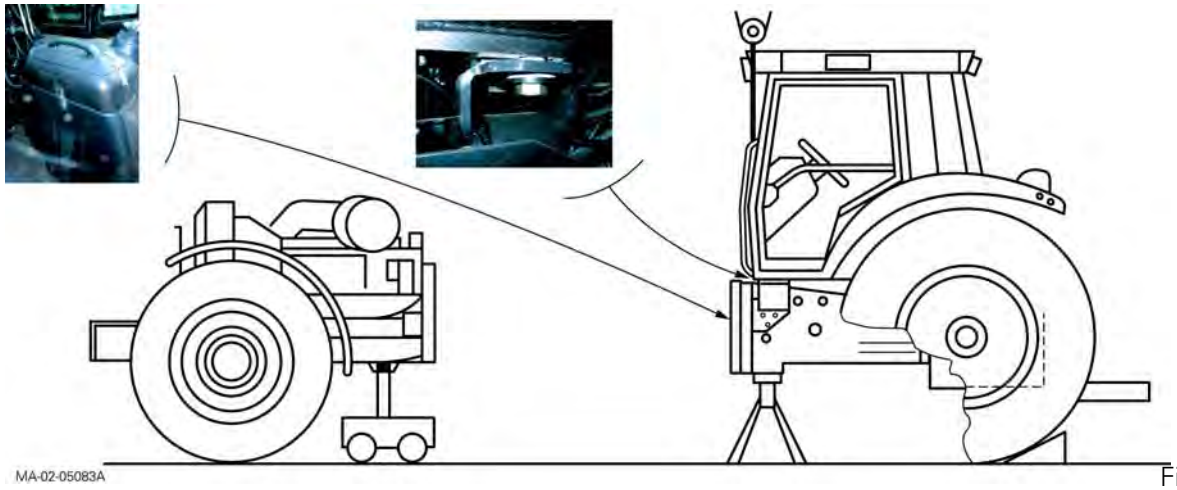

Fig. 8

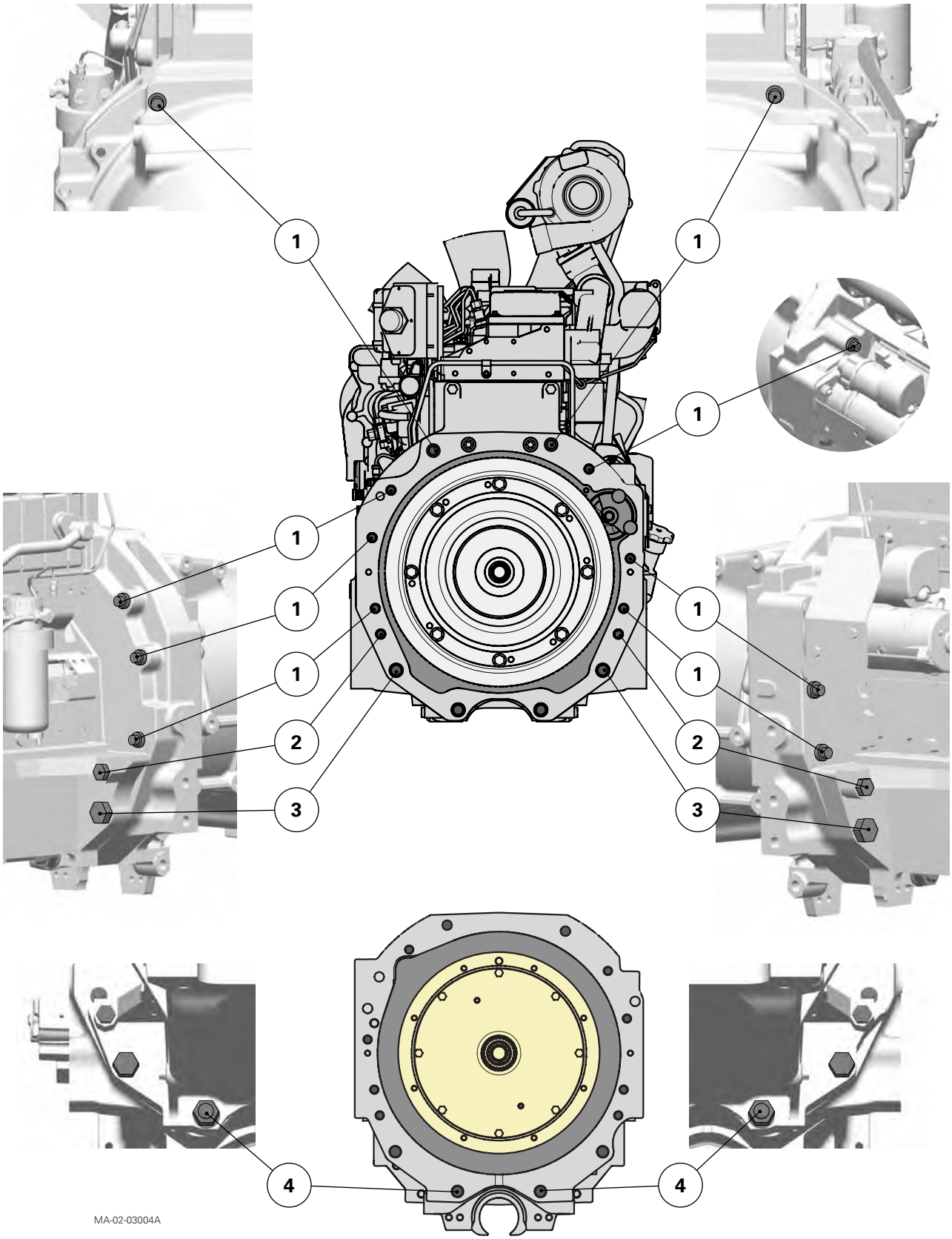

Fig. 9

Reassembly

24. Clean the mating faces of the engine and the gearbox spacer.

25. Check:
- the presence of dowels (1) on the engine (Fig. 10),
- the tightness of the lower studs (M22) on the gearbox spacer (Loctite 270).

26. Coat the input shaft splines of the gearbox lightly with grease (GN+molykote type) or equivalent.

27. If necessary, screw two supplementary, diametrically opposed guide studs into the gearbox.

28. Assemble the engine onto the gearbox spacer.

***NOTE**: If necessary, remove the starter and turn the flywheel ring gear using a suitable tool. This will ease engaging the vibration damper splines with those of the main shaft. If there is resistance, do not force it and find the cause of the problem.*

29. When the elements are joined, remove the guide studs (if fitted). Lightly smear the thread of the screws and nuts with Loctite 270 or equivalent and refit according to the marks made during disassembly. Tighten to the required torques (Fig. 11)
- Screws (1): 115 Nm
- Screws (2): 280 Nm
- Screws (3): 735 Nm
- Nuts (4): 735 Nm

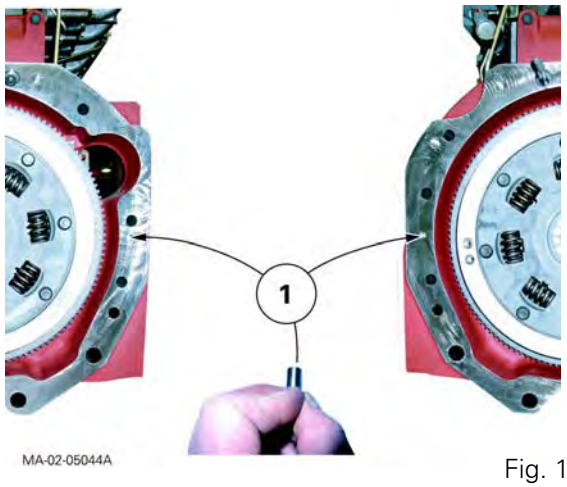

Fig. 10

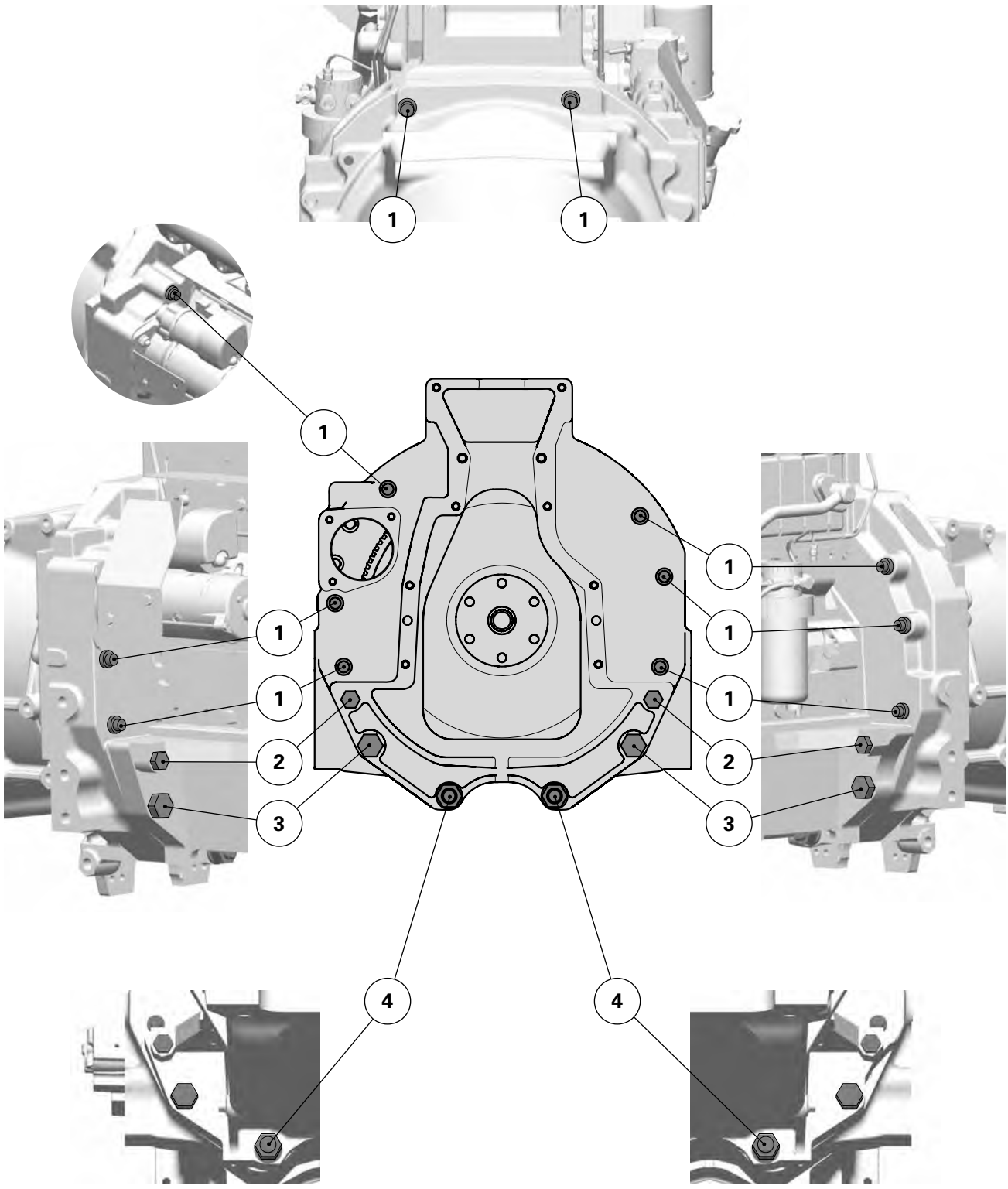

Fig. 11

Final steps

***NOTE**: Final steps are not especially difficult. They should be carried out in the reverse order to preliminary steps. However, it will be necessary during reassembly to carry out the tightening torques, checks, adjustments and tests described below.*

Tightening torques

As required:

- front cab screws (see chapter 12)
- screw (2) of connector (1) on main wiring harness (Fig. 6 and Fig. 12) 2.82 to 3.15 Nm

Topping-up

of coolant to the maximum level marked (radiator, expansion tank Fig. 13).

Tests

- air conditioning system (if fitted—see chapter 12)
- cab suspension (if fitted—see chapter 12)
- all mechanical, hydraulic, electrical and electronic functions subject to operations

Checking tightness

- of hydraulic unions
- of bleed screw on control unit of suspended front axle (if fitted)

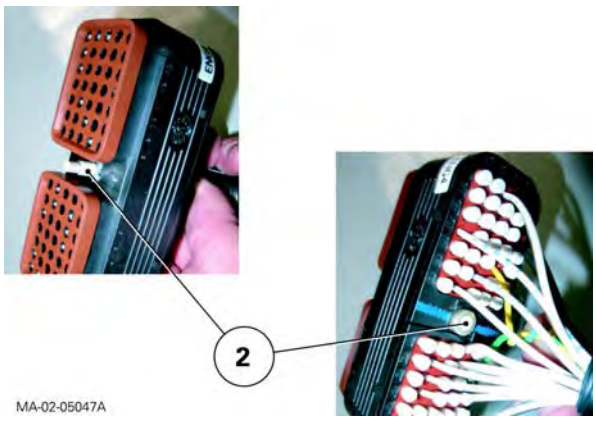

Fig. 12

Fig. 13

C . Disassembling and reassembling (four-cylinder Perkins engine)

Implementation

30. Apply the handbrake.

31. Remove the side panels, prefilter (Perkins EEM engine) and bonnet.

Operations underneath the tractor

32. Take off the guard, shaft and differential lock supply pipe (4 WD tractors).

Operations at the front of the tractor

33. Remove the front weights (if fitted).

34. Disconnect the batteries.

Tractors with...	Battery location
Perkins engine with mechanical injection	in the grille compartment
Perkins EEM engine	behind the right-hand footstep

Location of batteries (Fig. 14)

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Fig. 14

Operations on the right-hand side of the tractor

35. Take off the front right-hand mudguard.

36. Disconnect the flexible sleeve (1) (Fig. 15) fitted to the suction port.

If necessary, remove the vertical exhaust assembly (including support) (Fig. 15).

37. Mark then disconnect:

- the hose on the steering ram or on the spool valve (Orbitrol), depending on the tractor type
- the lubricating hoses (running to and from the cooler) (Fig. 16)

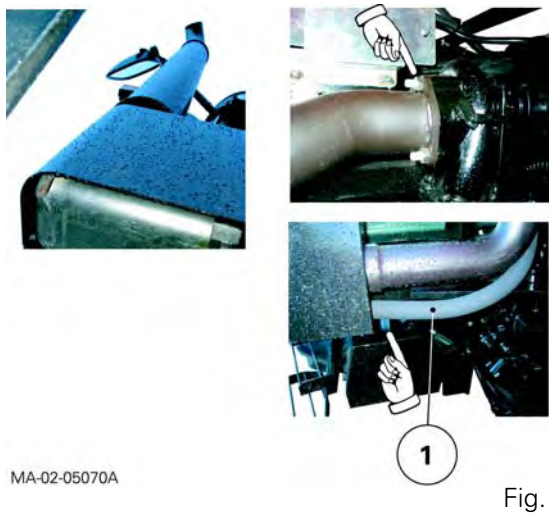

Fig. 15

Operations on the left-hand side of the tractor

38. Take off the front left-hand mudguard.

39. Mark then disconnect:

- the hose on the steering ram or on the spool valve (Orbitrol), depending on the tractor type
- the fuel feed and return hoses on the engine. Immediately block the ports.

40. Disconnect the cables connected to the starter positive terminal (Fig. 17).

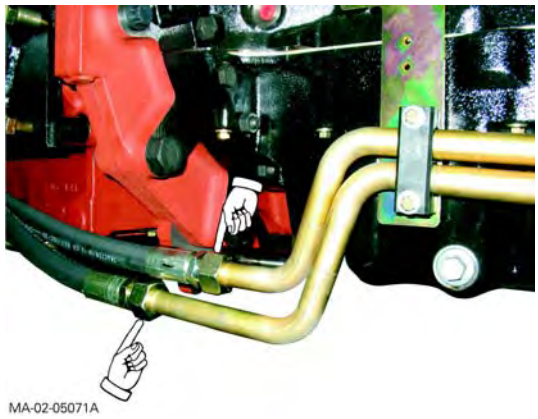

Fig. 16

Fig. 17

Operations under the cab

CAUTION: If the engine is still hot, allow it to cool.

***NOTE**: To work on heating hoses, it is not necessary to drain the engine block cooling circuit.*

41. Pinch out each heating hose using a clamp fitted with plastic jaws (Fig. 18).

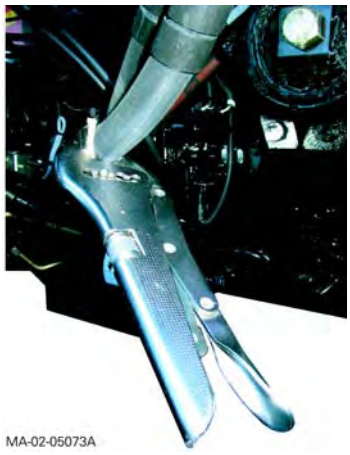

Fig. 18

Operations on the engine

42. Mark and disconnect the heating hoses on the engine block and water pump.

Block the ports immediately using suitable plugs.

43. Disconnect the negative cables on the block at the rear left-hand side of the engine (Fig. 19).

44. If necessary, disconnect the connector (1) of the main wiring harness (Perkins EEM engine) (Fig. 19).

45. Detach the air conditioning compressor, condenser and filter from their respective supports (if fitted).

Place the assembly beside the tractor without disconnecting the pipes and hoses (see chapter 12).

NOTE: *Carry out this action carefully.*

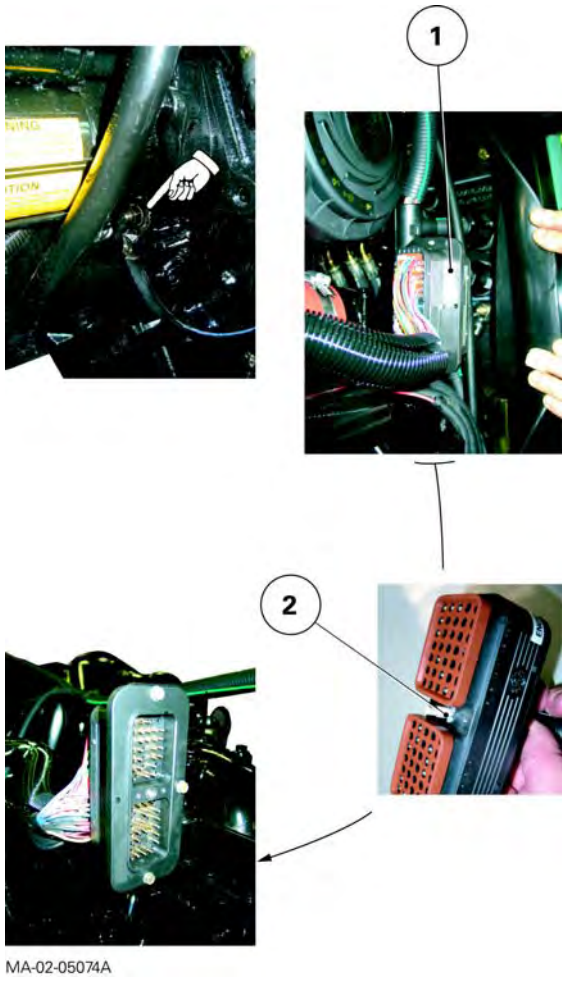

Fig. 19

Operations at the front of the cab

46. Disconnect the connectors (2) and the ground terminals (1) on the left-hand side of the cab bulkhead (Fig. 20).

Preparing for disassembly

47. Stop the front axle swinging by sliding a suitable wooden chock at each side of the support (1) (Fig. 21).

48. Chock the rear wheels.

49. Install (Fig. 22):

- a fixed stand at the front of the gearbox
- a mobile stand at the rear of the engine

50. If necessary, separate the cab from the front right- and left-hand supports.

Gently lift the cab front using two straps fitted to the lateral handles.

Fix the cab in a raised position

Temporarily place a wooden chock between each support and the cab right- and left-hand attachments.

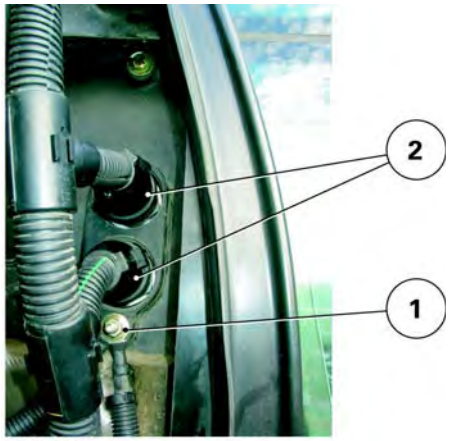

Fig. 20

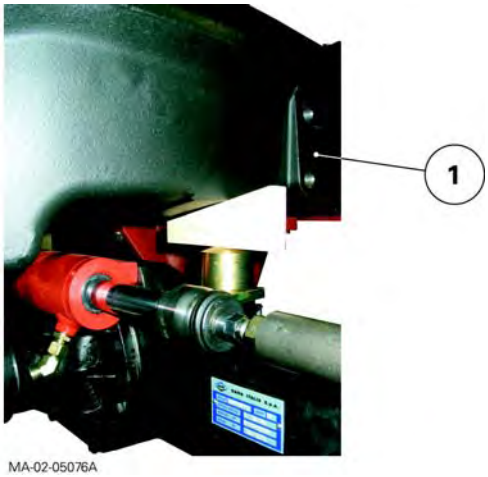

Fig. 21

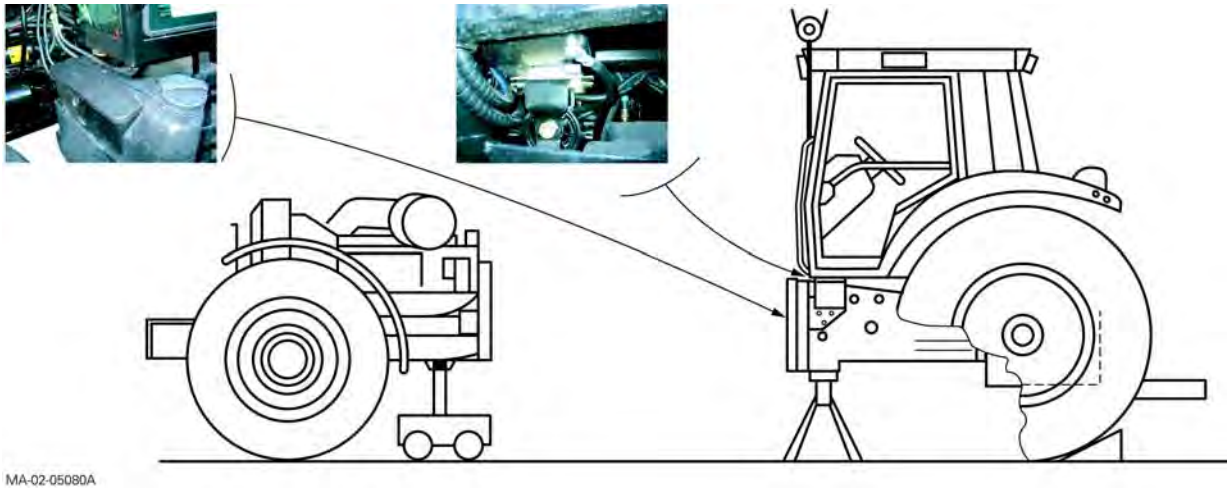

Fig. 22

Disassembly

51. Remove the screws attaching the engine to the gearbox (Fig. 23).
Mark their position and length.

52. Assisted by an operator, separate the assemblies (Fig. 22).

Dimensions of the screws, studs and nuts

Screws

- M16 x 60 mm
- M22 x 80 mm

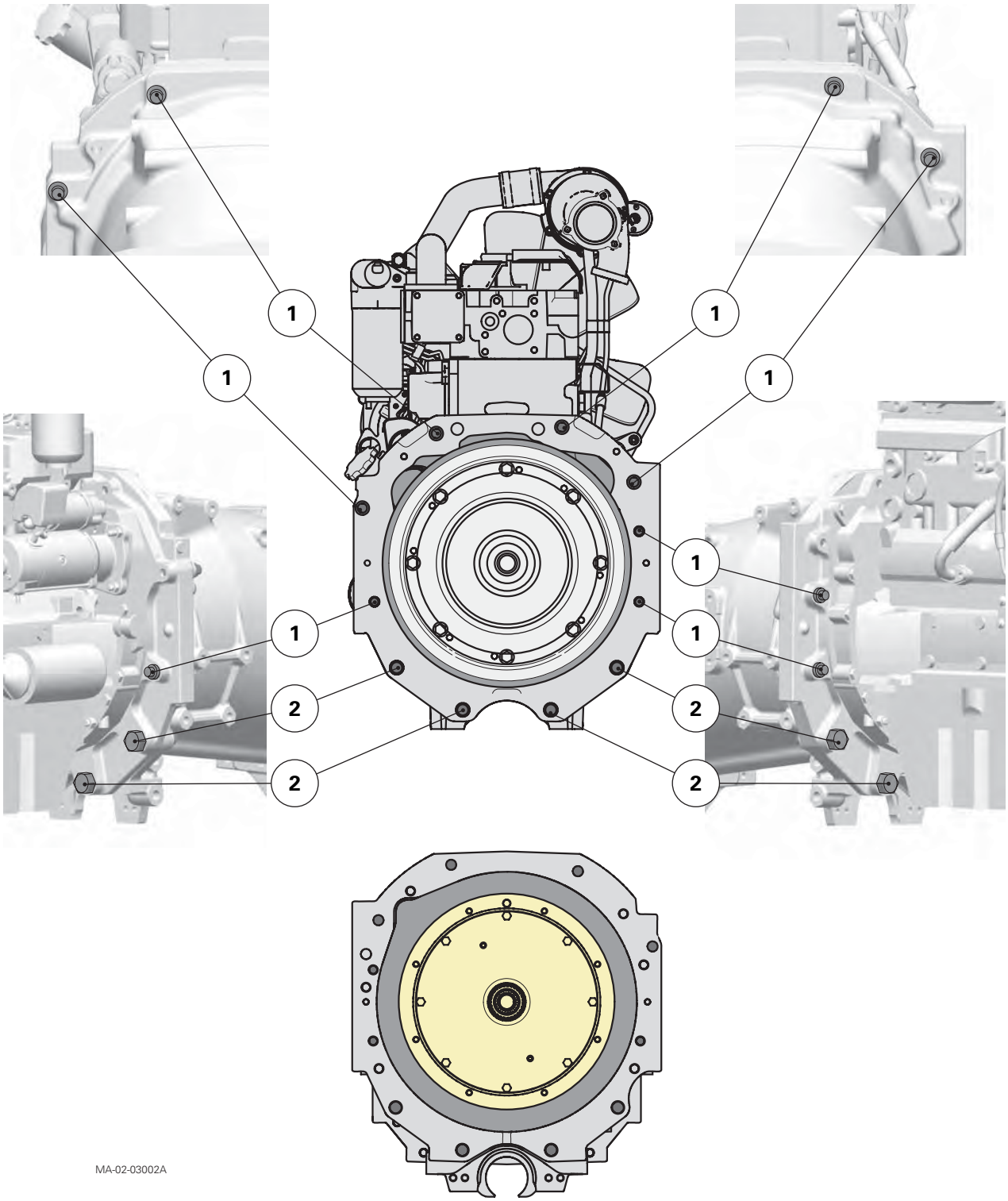

Fig. 23

Reassembly

Advice for use

Use guide studs to assist reassembly of the engine and gearbox.

53. Clean the mating face of the engine adapter plate and gearbox spacer.

54. Check for the presence of dowels (1) on the engine adapter plate (Fig. 24).

55. Coat the input shaft splines of the gearbox lightly with AS767 grease or equivalent.

56. Screw two diametrically opposed guide studs to the engine adapter plate or to the gearbox spacer.

57. Connect the engine to the gearbox spacer.

Reminder

If necessary, remove the starter and slowly turn the flywheel ring gear using a suitable tool.

This will ease engaging the vibration damper splines with those of the gearbox main shaft.

If there is resistance, do not force it and find the cause of the problem.

58. When the two assemblies are joined, remove the guide studs (if fitted).

Lightly smear the thread of each of the screws (1) and (2) with Loctite 270 or equivalent. Position them according to the marks made during disassembly.

Tighten (Fig. 25):

- screws (1) to a torque of 120 Nm
- screws (2) to a torque of 735 Nm

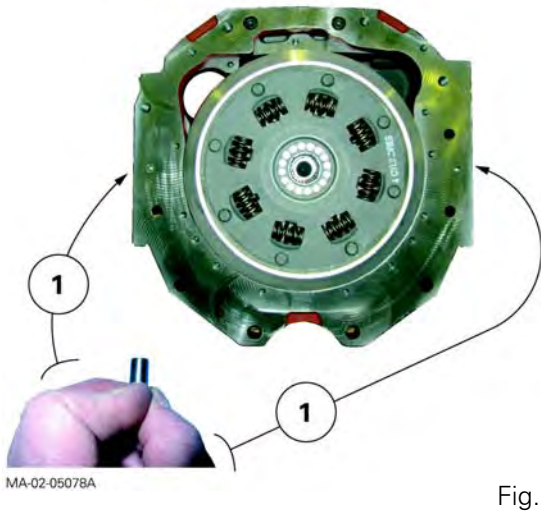

Fig. 24

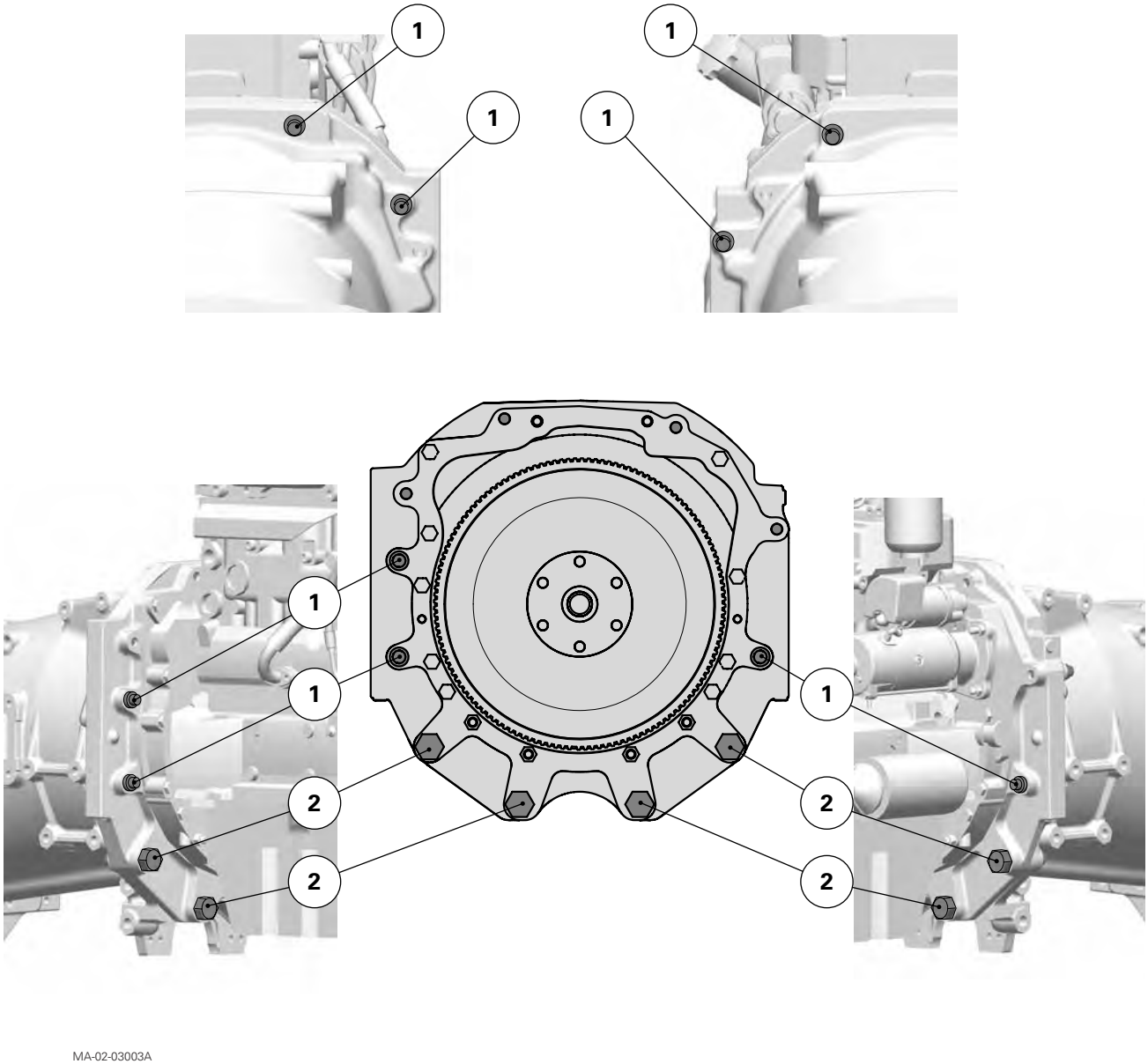

Fig. 25

Final steps

Note

Final steps are not especially difficult.

They should be carried out in the reverse order to preliminary steps. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Tightening torques

As required:

- front cab screws (see chapter 12)
- screw (2) of the connector (1) on the main harness (Perkins EEM engine) (Fig. 19 and Fig. 26) to a torque of 2.82–3.15 Nm.

Topping-up

- of coolant to the maximum level marked on the radiator and expansion tank (Fig. 27).

Tests

- air conditioning system (if fitted—see chapter 12)
- cab suspension (if fitted—see chapter 12)
- all mechanical, hydraulic, electrical and electronic functions subject to operations

Checking tightness

- of hydraulic unions

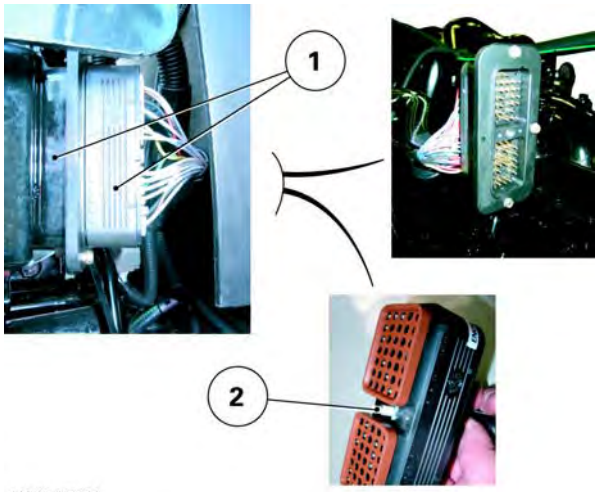

Fig. 26

Fig. 27

2B20- Splitting – Sisu Engine / GBA10 Gearbox

CONTENTS

A . General

It is required to disassemble the tractor between the engine and the gearbox when access is necessary to carry out servicing on the following elements:

Engine interface

- Transmission damper
- Engine flywheel
- Engine adaptor plate

Gearbox interface

- Spacer, cover and sealing ring
- Internal hydraulic pipes
- Reverse shuttle and Dynashift

Remark

- This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.
- The cab remains attached to the centre housing.

B . Disassembly

Preliminary operations

1. Put on the handbrake if necessary.

Remark

Putting on the handbrake is optional because the Park Lock mechanism (option) automatically immobilises the tractor when stationary.

2. Check that the suspended front axle (if fitted) is in low position and remove the control unit bleed screw (see chapter 9).

3. Remove the side panels either side of the engine and the bonnet (if necessary).

Servicing under the tractor

4. Remove the chassis reinforcements (if fitted, see chapter 2).

5. Remove the guard and the 4WD shafts.

Servicing at the front of the tractor

6. Remove the front weights (if fitted).

Servicing on the right-hand side of the tractor

7. Remove the footstep.

8. Disconnect and remove first the batteries and then the support.

9. Disconnect the flexible sleeve (1) (Fig. 1) joined to the air filter, and remove the vertical exhaust assembly (including support Fig. 2).

10. Mark then disconnect:

- the cables (positive and negative) on the starter,
- The front differential lock hose at both ends,
- the hose on the steering ram,
- the lubricating hoses (running to and from the cooler) (Fig. 3).

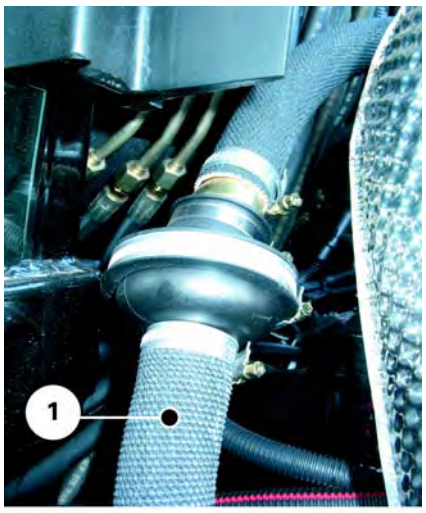

Fig. 1

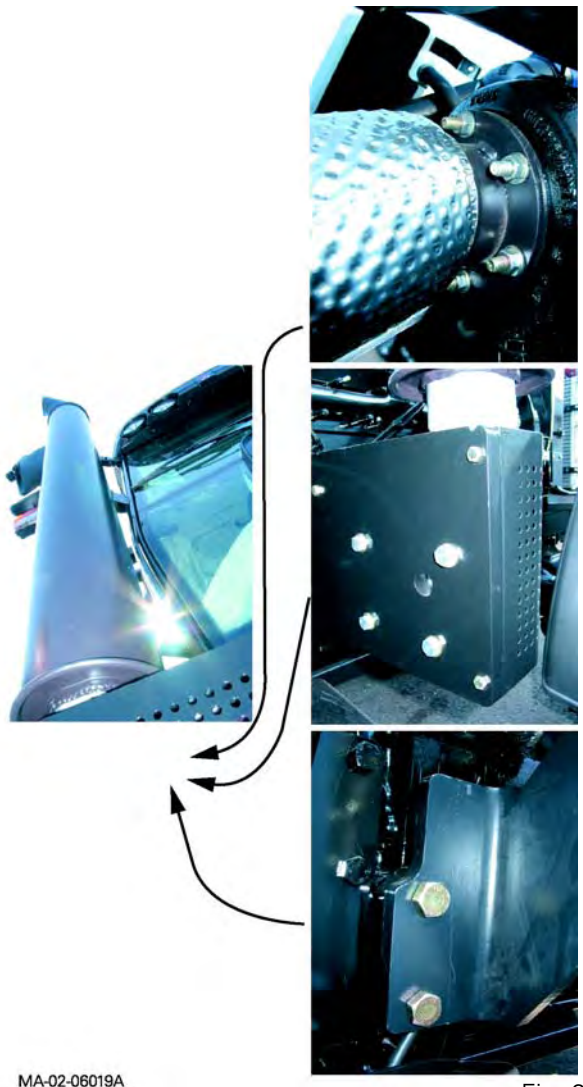

Fig. 2

Servicing on the left-hand side of the tractor

11. Remove the footstep.

12. Mark then disconnect:

- the hose on the steering ram,
- the hoses (pressure-return and LS) on the rigid pipes (Fig. 4) of the suspended front axle (if fitted).

13. Mark and disconnect the fuel feed and return hoses on the engine (block ports immediately).

Remark

If the fuel tank is not removed it obstructs access to the engine attachment screw on the spacer, but does not prevent access. However, if there is a problem, remove the tank after marking and disconnecting it:

- the gauge harness,
- the vent hose on the tank.

Servicing under the cab

14. Mark, toe-in and disconnect the heating hoses, immediately blocking the ports.

Servicing the engine

15. Disconnect the connector (1) of the main wiring harness (Fig. 5).

16. Separate the compressor, the condenser and the filter from their respective holders, and remove them carefully, without breaking the circuit (see chapter 12).

Remark

- Work carefully.

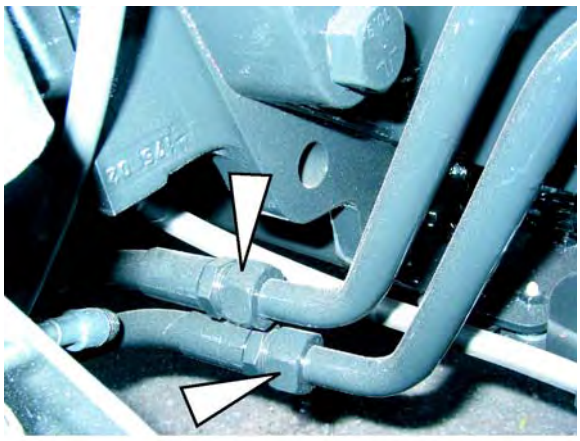

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Fig. 3

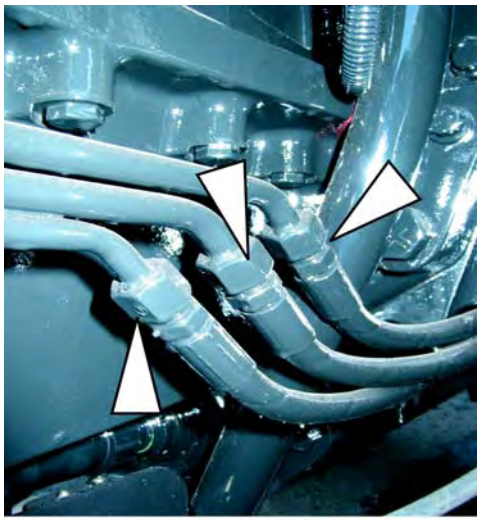

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Fig. 4

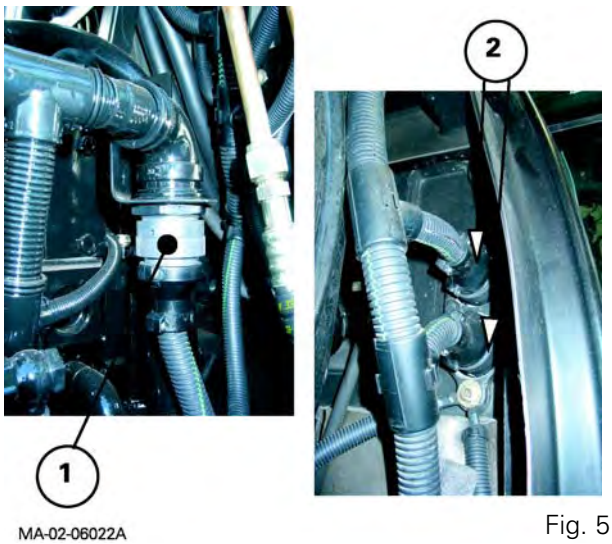

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Fig. 5

Servicing at the front of the cab

17. Disconnect the connectors (2) on the left-hand face of the fire wall (Fig. 5).

18. If necessary, mark and disconnect the steering ram hoses on the spool valve (orbitrol) (Fig. 6).

Preparing for disassembling

19. Stop the front axle oscillation (all versions) by sliding a suitable chock in either side of the support (1) (Fig. 7).

20. Chock the rear wheels.

21. Install (Fig. 9):

- a fixed stand at the front of the gearbox,
- a mobile stand at the back of the engine.

22. If necessary, separate the cab from the front right- and left-hand supports. Gently lift it using two straps fitted to the lateral handles. Place a block temporarily between the cab and the supports.

Disassembly

23. Remove the screws and nuts attaching the engine to the gearbox (Fig. 8). Mark their lengths and positionings.

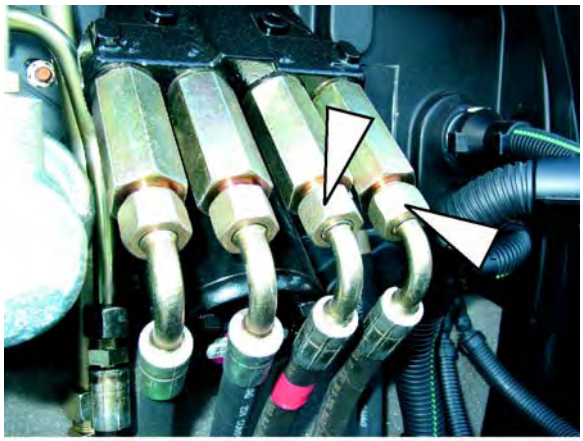

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Fig. 6

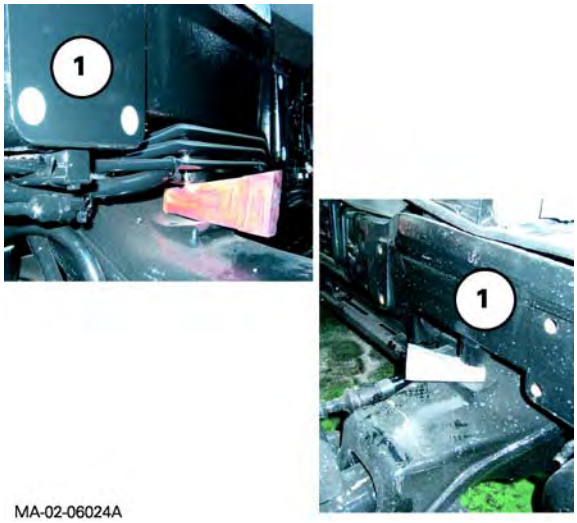

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Fig. 7

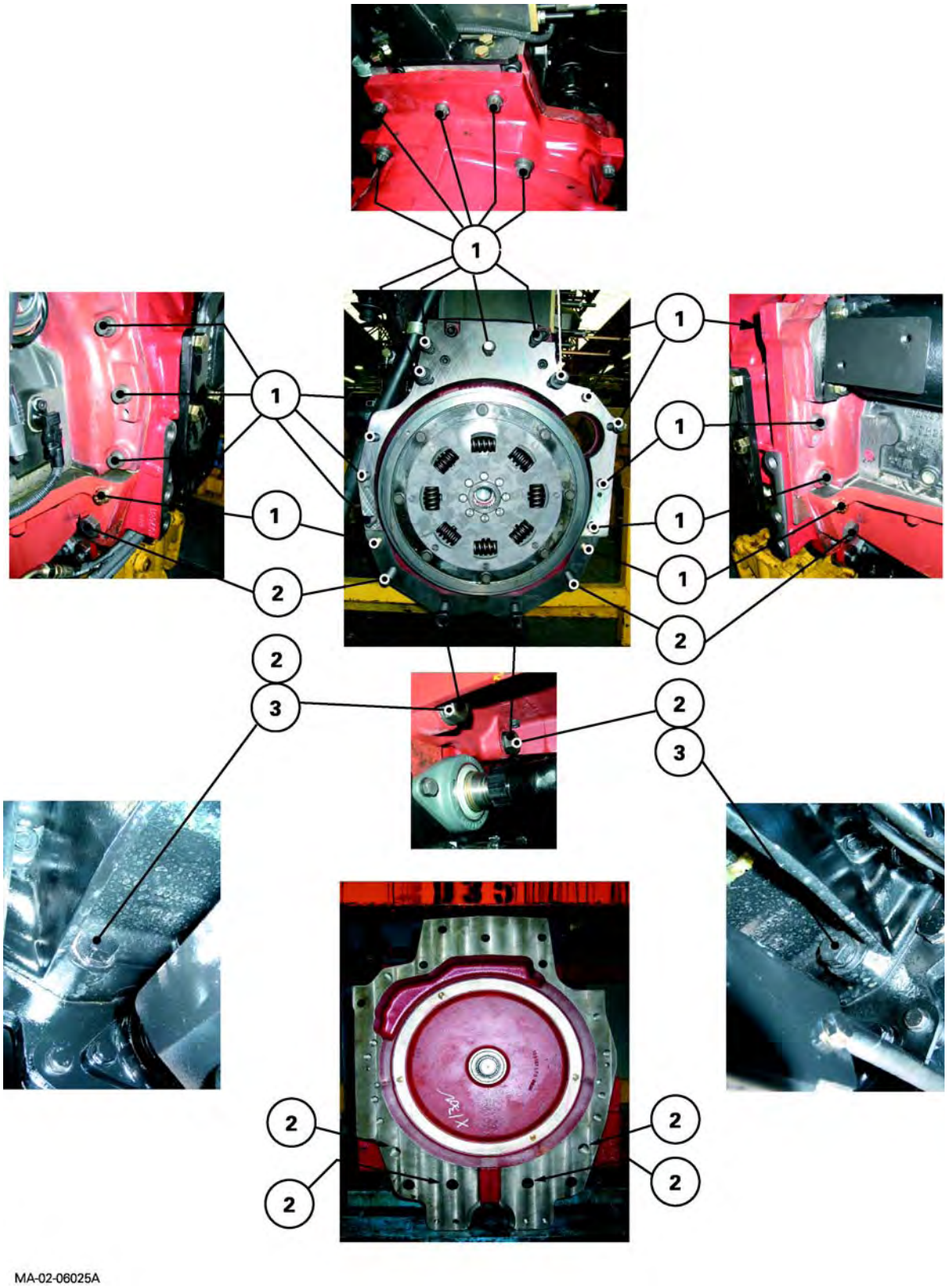

Fig. 8

Dimensions of the screws and nuts

Screws

- M16 x 60 mm
- M16 x 80 mm
- M16 x 110 mm
- M22 x 100 mm
- M22 x 120 mm

Nuts

- M22 x 2.5

24. With the help of an operator, separate the assemblies (Fig. 9).

Reminder

When disassembling, check that connections (hoses, pipes and harnesses) are all disconnected.

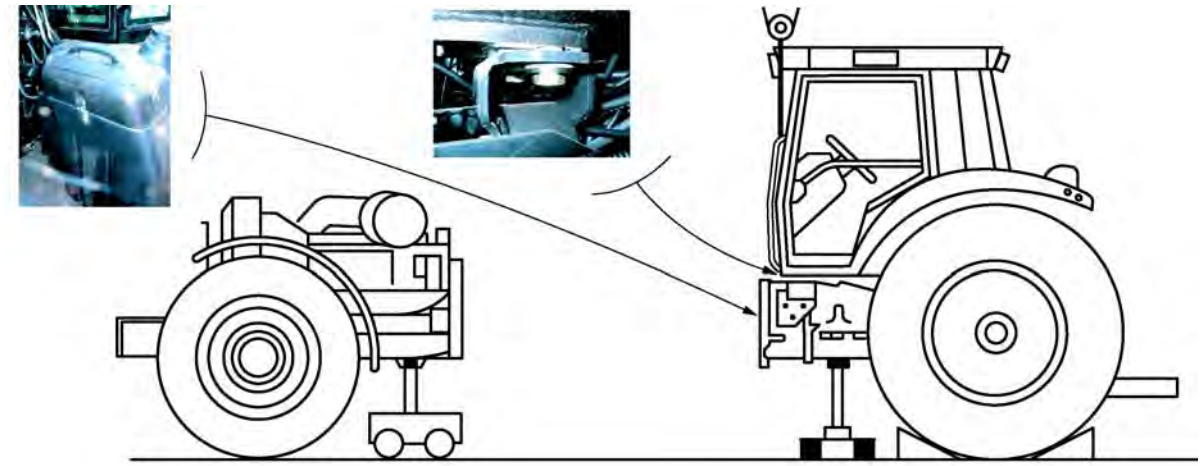

Fig. 9

C . Reassembly

25. Clean the mating faces of the engine and the gearbox spacer.

26. Check the presence of locating pins (1) on the engine (Fig. 10).

27. Lightly lubricate the splines of main shaft (1) (Fig. 11) with grease (type GN + Molykote) or equivalent.

28. Grease the mating face of the spacer with Loctite 5206 or equivalent.

29. Screw two diametrically opposed guide studs on to the spacer.

30. Assemble the engine onto the gearbox spacer.

Reminder

- If necessary, manually turn the flywheel ring gear using the port provided to fit the starter, using a suitable tool. This will ease the engagement of the vibration damper splines with those of the main shaft. If there is resistance, do not force it and find the cause of the problem.

31. When the elements are assembled, remove the guide studs. Lightly grease the thread of the screws with Loctite 270 or equivalent and refit according to the marks made at disassembly. Carry out tightening torques (Fig. 12).

- Screw (1): 240 - 320 Nm
- Screw (2): 630 - 840 Nm
- Nuts (3): 630 - 840 Nm

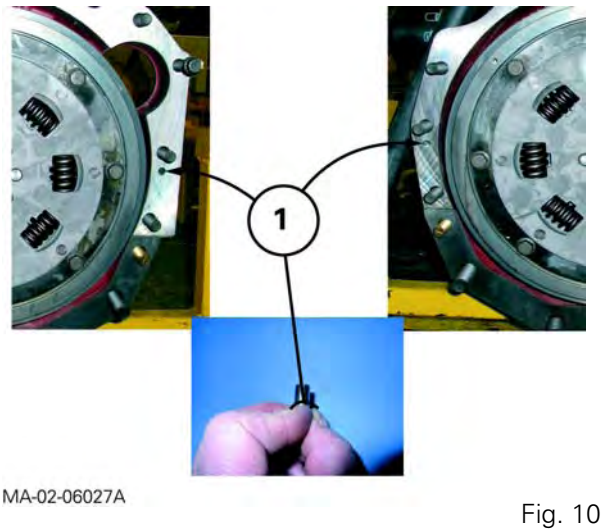

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Fig. 10

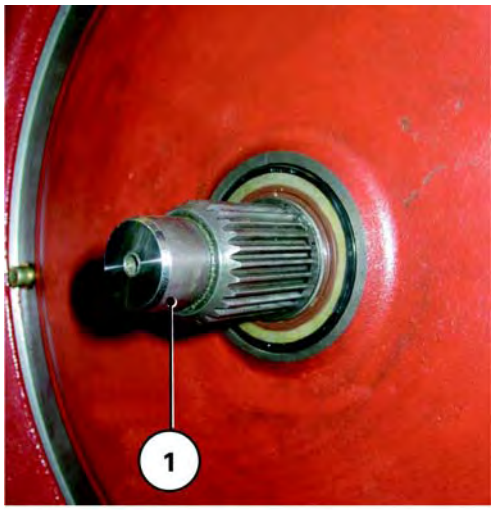

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Fig. 11

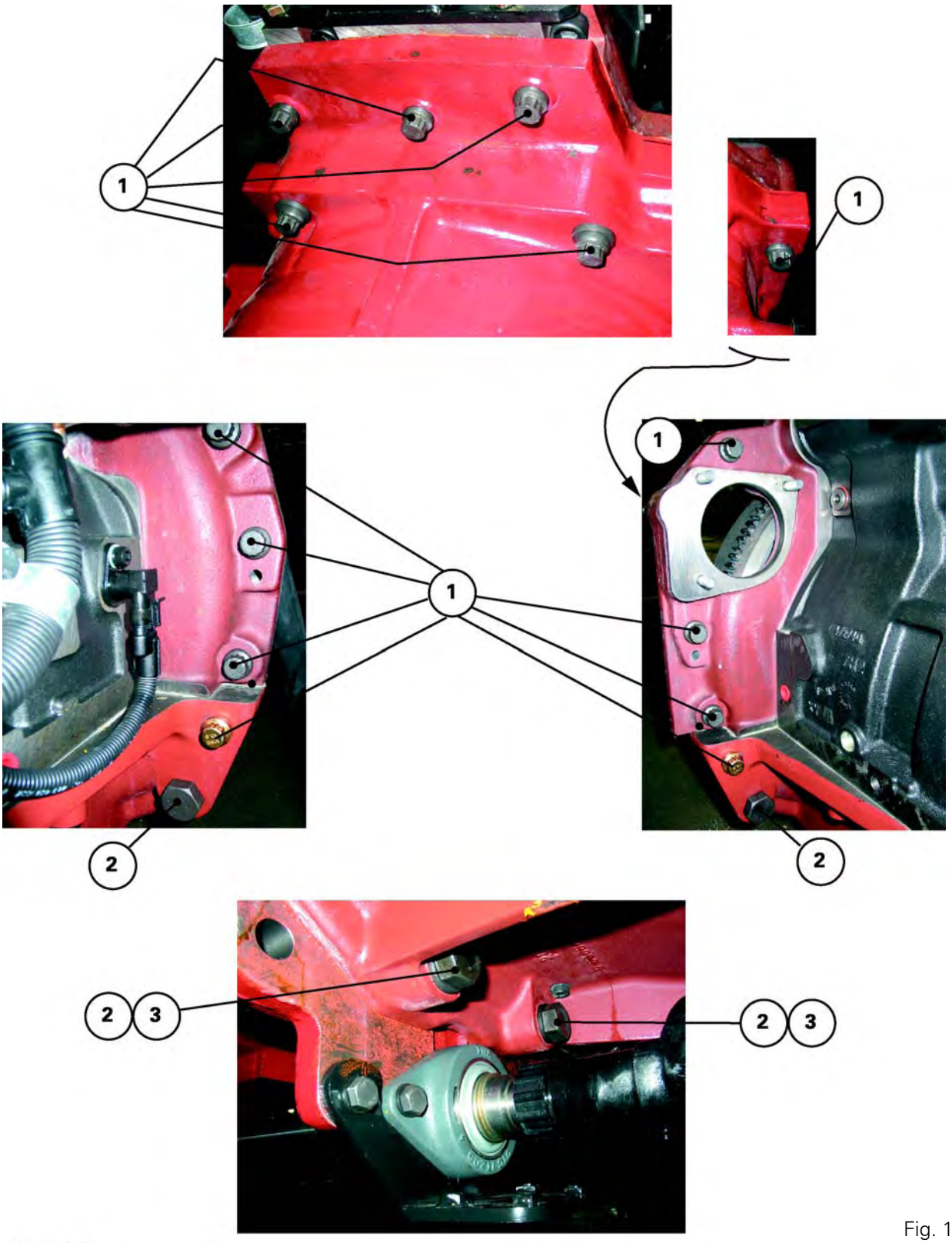

Fig. 12

Final operations

Remarks

Final operations are quite simple and should therefore be carried out in the reverse order to preliminary operations. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Tightening torque

- Front cab attachment screw, if necessary. See chapter 12.

Topping-up

- of coolant to the maximum level marked (radiator, expansion tank. Fig. 13).

Adjustments

- Chassis reinforcements (if fitted, see chapter 2).

Tests

- air conditioning system (if fitted – see chapter 12),
- cab suspension (if fitted, see chapter 12),
- All mechanical, hydraulic, electrical and electronic functions concerned by servicing.

Checking tightness

- of hydraulic unions,
- of bleed screw on control unit of suspended front axle (if fitted).

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Fig. 13

2B21 - Splitting the Sisu engine/GTA1030

CONTENTS

A . General

Engine/GBA 10 gearbox splitting is to be carried out while maintaining the cab integral with the rear axle.

This operation is needed when access to the following main elements is required for servicing:

- **Engine interface :**
  - vibration damper,
  - engine flywheel,
  - engine adapter plate;
- **Gearbox interface :**
  - spacer, cover and sealing ring,
  - hydraulic pipes internal to the spacer,
  - PowerShuttle and Dynashift.

IMPORTANT: *This section presents a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.*

B . Disassembly

Preliminary operations

1. Apply the handbrake.
2. Check that the suspended front axle is in lowered position (if fitted).
3. Remove the bleed screw from the control unit (if fitted, see chapter 9).
4. Take off:
   - the side panels either side of the engine,
   - the bonnet.

Servicing under the tractor

5. Mark then disconnect the two ends of the hoses fixed to the 4 WD transmission shaft guards (front and rear). Block their openings.
6. Remove the guards and 4 WD transmission shaft.

Servicing at the front of the tractor

7. Remove the front weights (if fitted).

Servicing on the right-hand side of the tractor

8. Disconnect the batteries.
9. Take off:
   - the front mudguard;
   - the vertical exhaust assembly (including support) (Fig. 1);
   - the side engine reinforcement;
   - the footstep (if necessary).
10. Disconnect the flexible particle suction sleeve (1) (Fig. 2) between the air filter and the exhaust.
11. Mark and disconnect the starter electrical harness.
12. Remove the starter (if necessary).

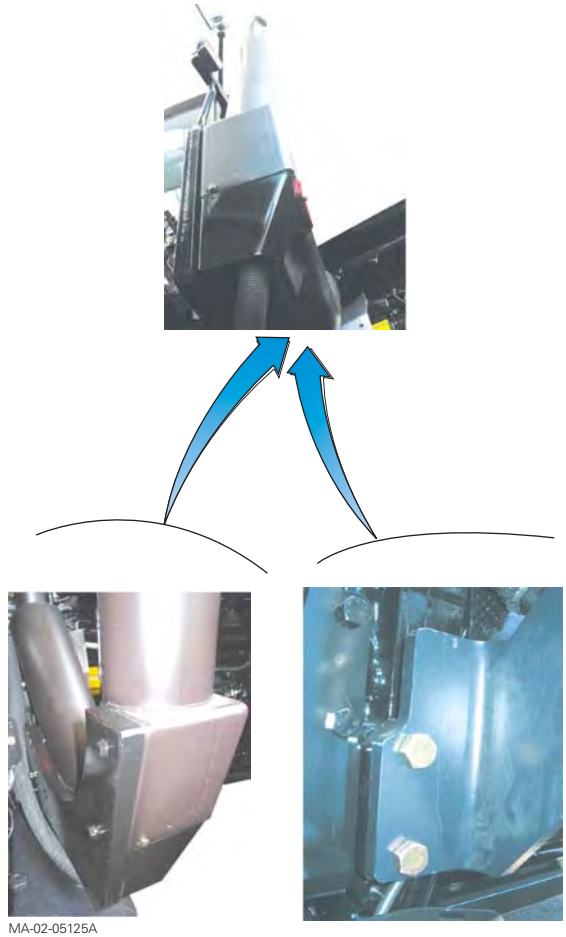

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Fig. 1

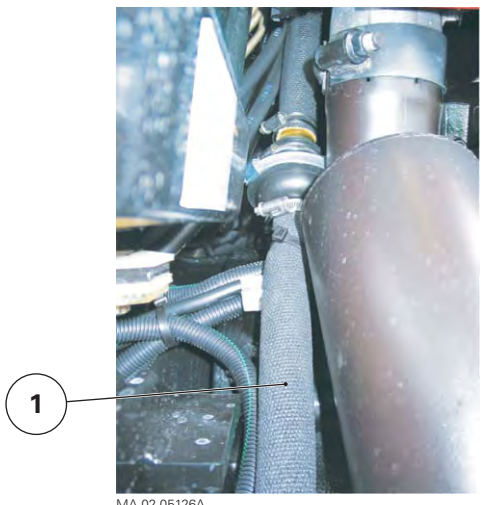

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Fig. 2

Servicing on the left-hand side of the tractor

13. Remove the front mudguard.

14. Depending on the case:

- either move the fuel tank apart;
- or, if necessary, remove the fuel tank in the following manner:
  - previously drain it partially of its fuel,
  - mark and disconnect its fuel gauge harness and vent hose,
  - Remove the tank.

15. Remove the side engine reinforcement.

16. Mark then disconnect:

- The lubrication pipes/hoses (1) located on the cab front firewall (Fig. 3). These pipes/hoses allow for oil flowing between the cooler and the rear axle right-hand hydraulic cover;
- the rigid pipes (1) (Fig. 4) (pressure, return and LS) to the suspended front axle (if fitted);
- the rigid pipes (2) (Fig. 4) to the front linkage (if fitted).
- the gas-oil supply and return hoses on the engine. Block their openings.

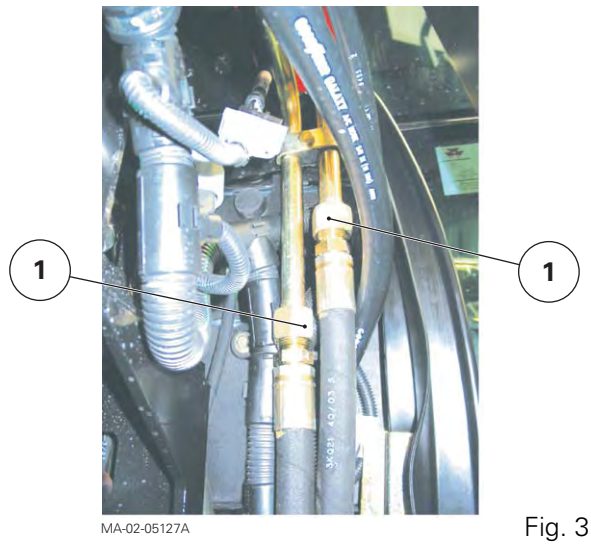

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Fig. 3

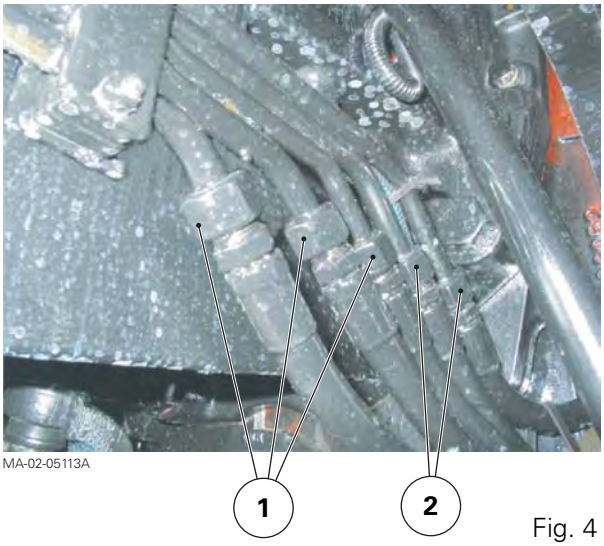

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Fig. 4

Servicing under the cab

17. Mark the heating hoses (1) (Fig. 5) at the base of the cab right-hand pillar.

Pinch them both upstream and downstream of the square unions (2) (Fig. 5) in order to keep fluid loss to a minimum.

18. ***DANGER: To perform the following operation, the engine must be cold. Opening the pressurised cooling circuit can lead to splashing of hot fluid and cause serious burns.***

If you need to perform servicing immediately (on a hot engine), ensure you are wearing appropriate protective clothing (goggles and gloves) and loosen the expansion tank plug progressively.

Disconnect the heating hoses. Block the openings.

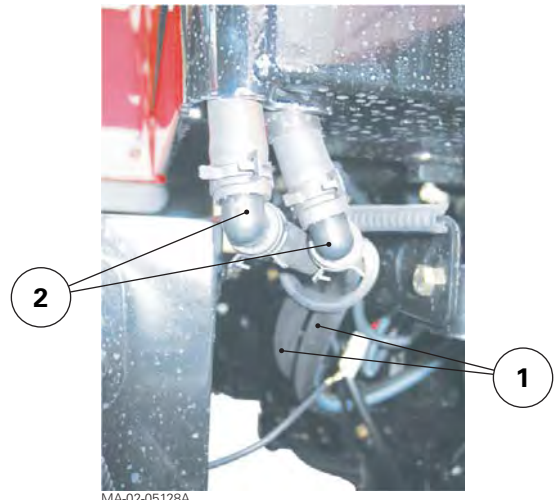

Fig. 5

Servicing the engine

19. Mark and disconnect the ENG4 connector from the main harness at the rear of the engine (Fig. 6).

20. Detach the air conditioning compressor, condenser and filter from their respective supports. Carefully keep them apart without opening the circuit (see chapter 12).

IMPORTANT: *If the air conditioning circuit should be open, see chapter 12 before any action.*

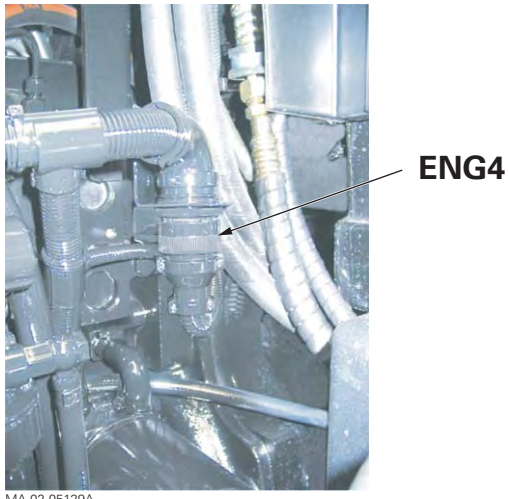

Fig. 6

Servicing at the front of the cab

21. Disconnect the ENG1 and ENG2 connectors located on the left-hand side of the cab firewall (Fig. 7).

22. If necessary, mark and disconnect (Fig. 8):

- the hose on the steering unit (Orbitol) to the left-hand steering ram union. Block its opening;
- the hose on the steering unit (Orbitol) to the right-hand steering ram union. Block its opening.

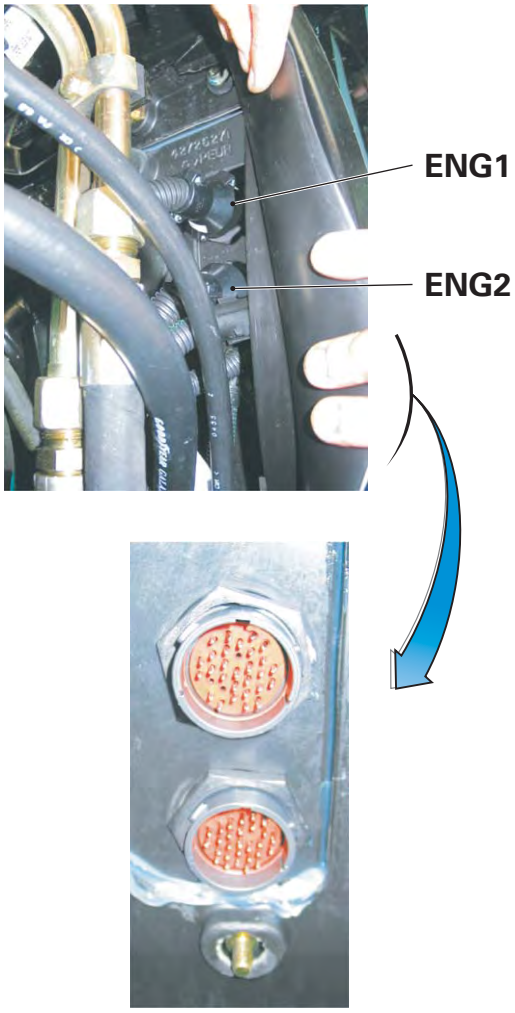

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Fig. 7

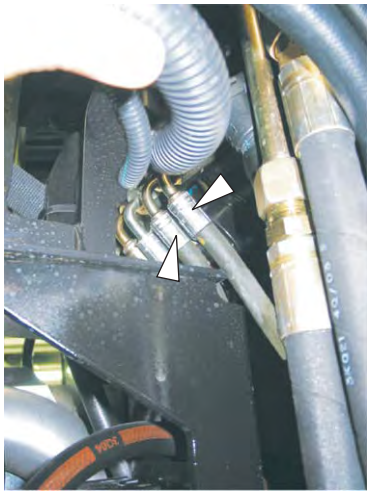

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Fig. 8

Preparing for disassembling

23. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the front frame (1) (Fig. 9).

24. Chock the rear wheels.

25. Install (Fig. 11):

- a fixed stand at the front of the gearbox,
- a mobile stand at the back of the engine.

26. If necessary, split the cab from the front right- and left-hand supports. Gently lift it using two straps fitted to the lateral handles. Temporarily chock the cab by sliding a suitable chock under each of its supports.

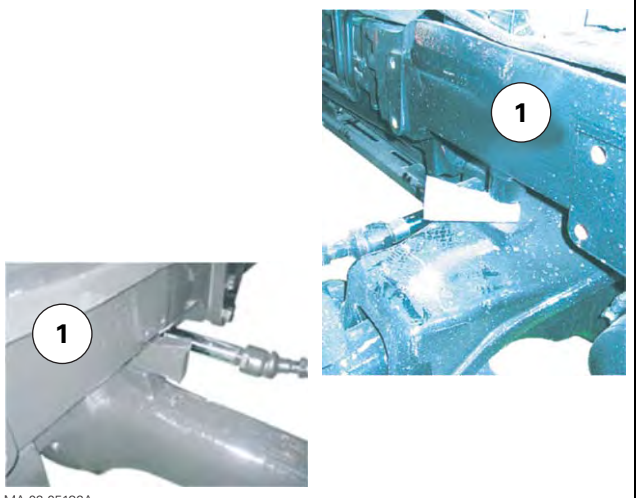

Fig. 9

Disassembly

27. Release the screws and nuts attaching the engine to the gearbox (Fig. 10).

Mark:

- screw length and position;
- nut position.

Dimensions of the screws and nuts (Fig. 10)

Screw	Nuts
M16x60 M16x80 M16x110 M22x80 M22x160	M22x2,5

28. Split the assemblies with the help of an operator (Fig. 11). When disassembling, check that connections (hoses, pipes and harnesses) are all disconnected.

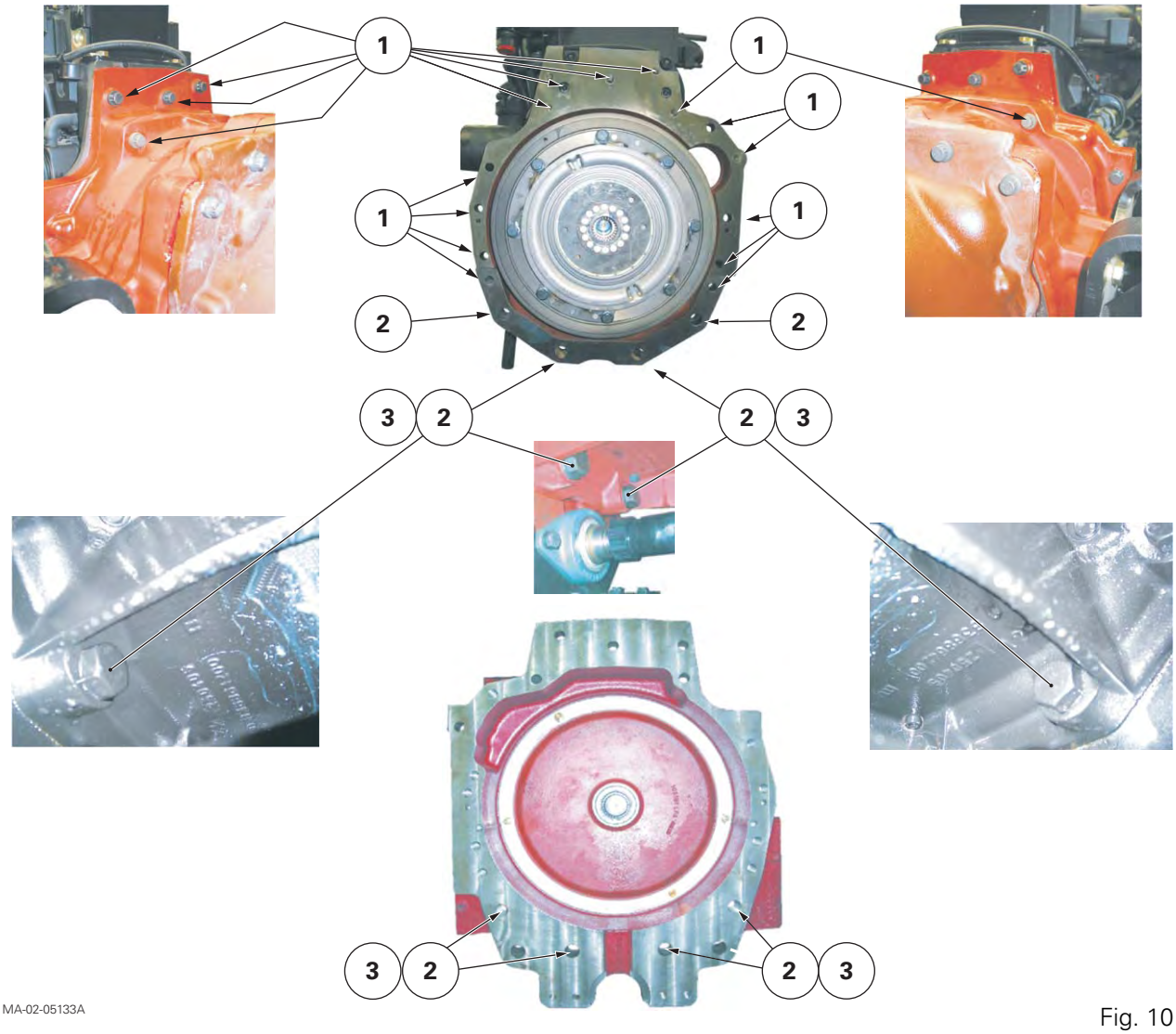

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Fig. 10

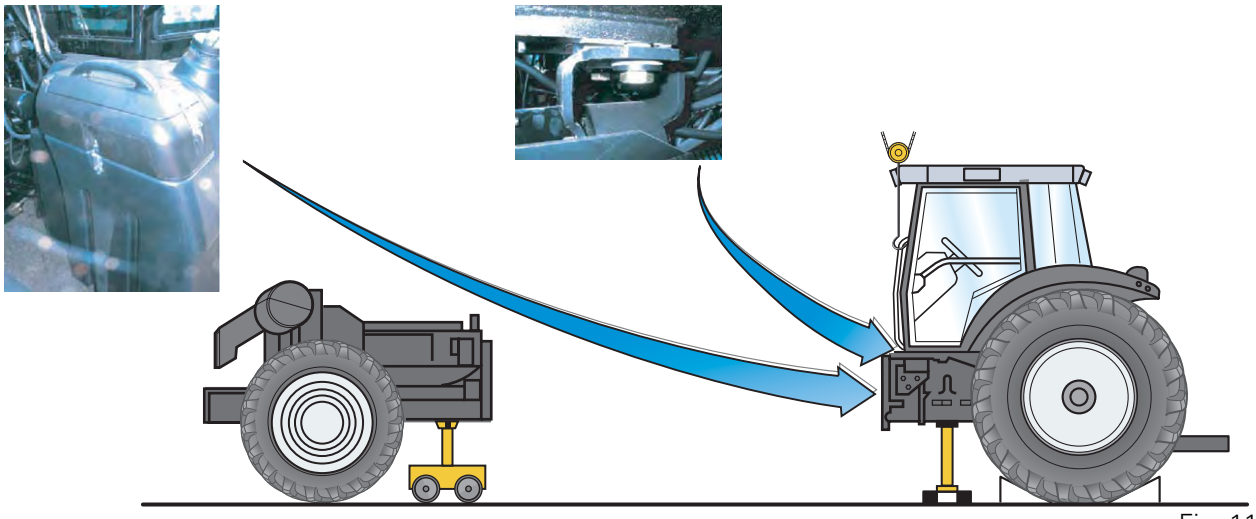

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Fig. 11

C . Reassembly

29. Clean the mating faces of the engine and the gearbox spacer.

30. Check the presence of locating pins on the gearbox spacer.

NOTA: *During assembly, these pins fit into the drill holes (1) on the engine adapter plate (Fig. 12).*

31. Lightly smear the splines of mainshaft (1) (Fig. 13) with AS767 graphite grease or equivalent.

32. Grease the mating face of the spacer with Loctite 5206 or equivalent.

33. Screw two diametrically opposed guide studs on to the spacer.

34. Assemble the engine onto the gearbox spacer.

If necessary, manually turn the flywheel ring gear using the port provided to fit the starter, using a suitable locally made tool. This eases the engagement of the vibration damper splines with those of the gearbox mainshaft. If there is resistance, do not force it and find the cause of the problem.

35. Once the engine and gearbox are assembled, remove the guide studs.

Lightly smear the thread of the screws (1) (2) with Loctite 270 or equivalent.

Fit the screws and nuts as marked during removal (Fig. 10). Tighten them to a torque of:

- screws (1): 240 - 320 Nm;
- screws (2): 630 - 840 Nm;
- nuts (3) with washers: 630 - 840 Nm.

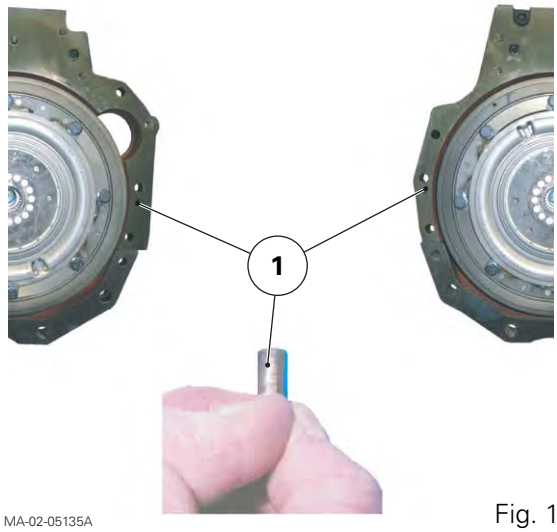


Fig. 12

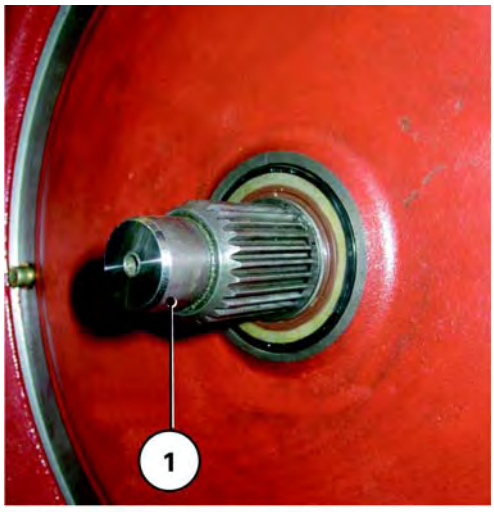


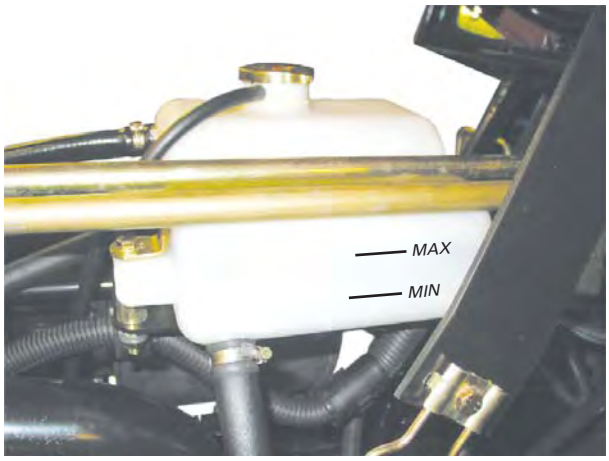
Fig. 13

Final operations

Final operations are not especially difficult. They therefore will be carried out in the reverse order of the preliminary operations.

However, the following operations need to be performed during refitting:

- if necessary, tighten the cab front silent block screws at the require **tightening torque** (see chapter 12);
- top up the **level of coolant**, to the maximum level marked on the expansion tank (Fig. 14);
- **test:**
  - the air conditioning system (if fitted - see chapter 12);
  - the suspended front axle (if fitted, see chapter 8),
  - all mechanical, hydraulic, electrical and electronic functions concerned by servicing;
- **check the tightness**:
  - of the hydraulic unions,
  - of water hoses,
  - of the bleed screw on control unit of suspended front axle (if fitted).



MA-02-05124A

Fig. 14

Splitting the Sisu engine/GTA1030

2B22 - Sisu engine/GTA1540 transmission separation

CONTENTS

A . General

When disconnecting the engine from the GTA1540 transmission, the cab remains attached to the rear axle.

This operation is needed when access to the following main elements is required for servicing:

- **Engine interface**:
  - vibration damper
  - engine flywheel and its starter ring gear
  - pilot bearing of the Powershift module input shaft in the engine flywheel
  - engine flywheel housing
  - crankshaft rear bearing seal
- **Gearbox interface**:
  - cover plate seal (multiplier module)
  - harness and its sensor (PTO Boost) (if fitted)

***IMPORTANT**: This section describes a general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and the mobile assembly.*

B . Disassembly

IMPORTANT: *The ports for the pipes and hydraulic hoses that will be disconnected in this section must be blocked using sealed plugs to prevent dirt from getting in and oil from getting out.*

1. Apply the hand brake. Chock the rear wheels.
2. Check that the suspended front axle and the front linkage (if fitted) are in the lowered position.

   IMPORTANT: *If the tractor is fitted with a suspended front axle, slightly loosen the bleed screw from its electrohydraulic control unit to release the pressure from the system.*
3. Open the bonnet.
4. Mark and disconnect the hoses fixed to each side of the 4WD transmission shaft guard.
5. Remove the guard and the 4WD transmission shaft.
6. If the tractor is fitted with a centre weight and front weights, it is advisable to remove the front weights to lighten the load on the front of the tractor.

Operations on the right-hand side of the tractor

7. Disconnect the batteries.
8. Remove (Fig. 1):
   - the step
   - the batteries and their support
   - the front mudguard (optional)
   - the vertical exhaust assembly and its support Disconnect beforehand:
     - the flexible particle suction sleeve (1) between the air filter and the exhaust
9. Remove the side reinforcement (R) (if fitted) (Fig. 2).
10. If the tractor is fitted with (Fig. 3):
    - front auxiliary connectors, disconnect their hydraulic pipe/hose (1) located on the lower right-hand side
    - a front linkage, disconnect its hydraulic pipes/hoses (2) located on the lower right-hand side
11. Disconnect the cables (negative and positive) from the starter. Remove the latter.

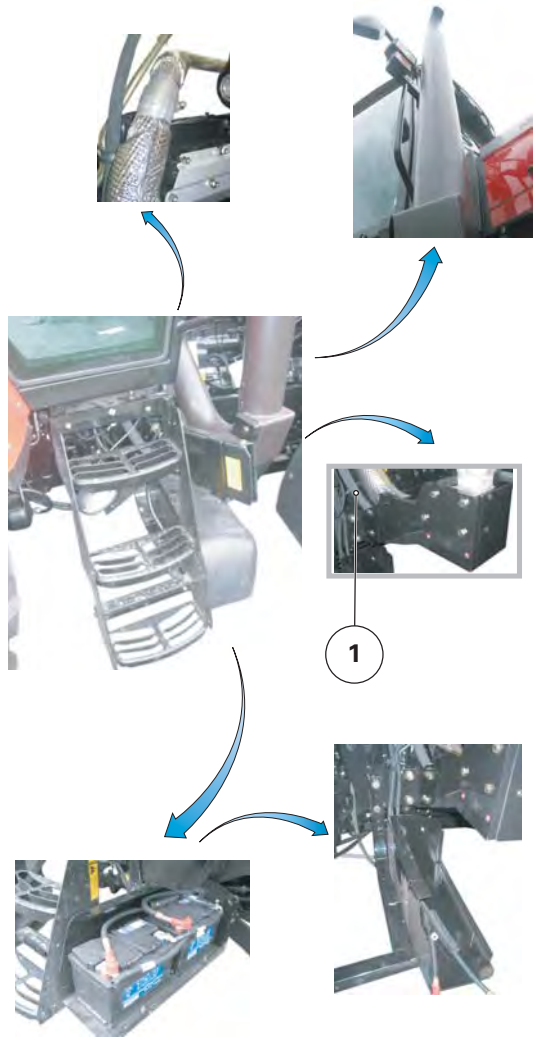


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Fig. 1

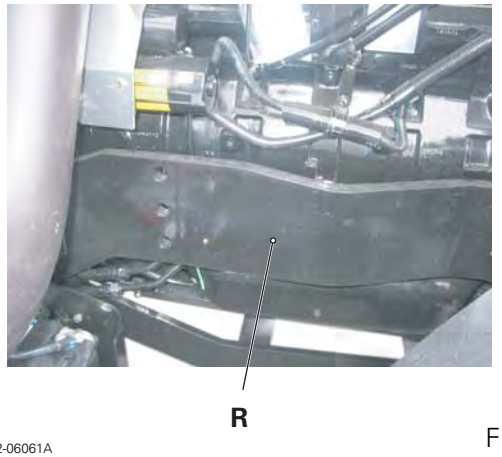

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Fig. 2

Operations on the left-hand side of the tractor

12. Remove the front mudguard (optional).

13. Remove the fuel tank as follows:

- If necessary, partially drain it of fuel beforehand
- mark and disconnect its fuel gauge harness and vent hose
- remove the fuel tank using a suitable support or a hydraulic table (Fig. 4) (depending on local equipment).

14. Remove the side reinforcement (R) (if fitted) (Fig. 5).

15. Mark then disconnect:

- depending on the situation, the lubrication hoses/pipes (A) located above the engine or the lubrication hoses/pipes (B) located on the bulk-head in front of the cab (Fig. 6). These pipes/hoses allow transmission oil to flow between the cooler and the rear axle's right-hand hydraulic cover plate.
- the fuel feed and return hoses on the engine.

16. If the tractor is fitted with front auxiliary connectors, disconnect their hydraulic pipe/hose (1) located on the lower left-hand side (Fig. 7).

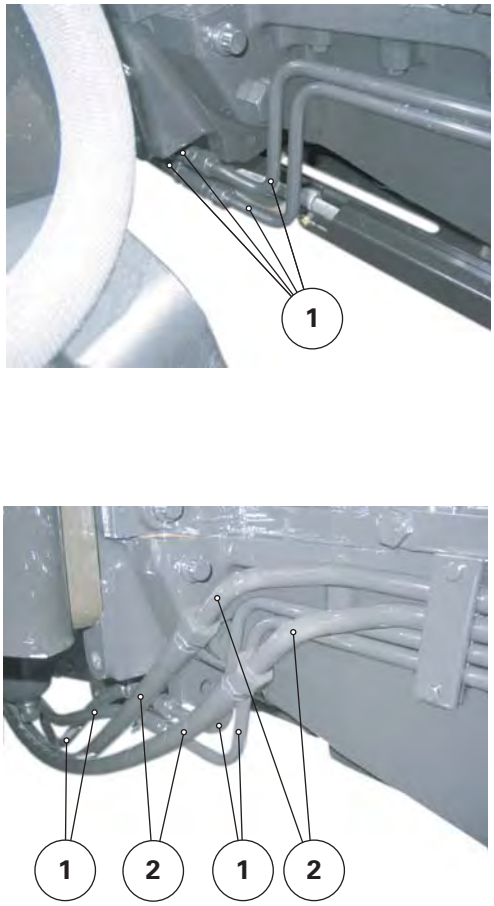

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Fig. 3

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Fig. 4

Operations under the cab

17. Mark the heating hoses (1) at the base of the cab right-hand pillar.

Pinch them both upstream and downstream of the elbow unions (2) (Fig. 8) in order to keep fluid loss to a minimum.

18. Disconnect the heating hoses. Block the ports.

DANGER: To perform the following operation, the engine must be cold. Opening the pressurised cooling system can lead to splashing of hot fluid and cause serious burns.

If you need to perform servicing immediately (on a hot engine), ensure you are wearing appropriate protective clothing (goggles and gloves) and loosen the expansion tank plug gradually.

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Fig. 5

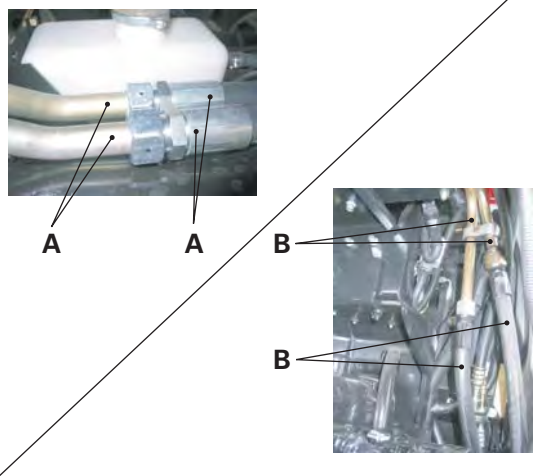

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Fig. 6

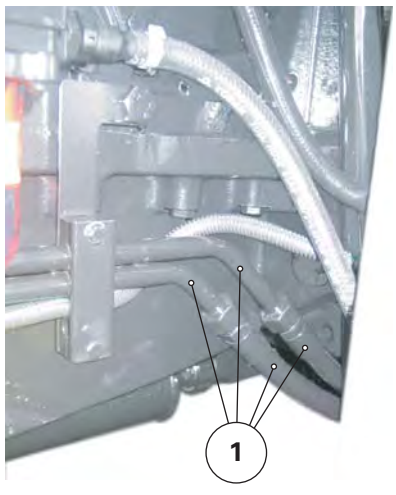

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Fig. 7

Operations on the engine

19. Mark and disconnect main harness connectors ENG3 and ENG10, located at the rear of the engine.

20. There are two ways to approach the air conditioning system:

- Solution 1:
  - Separate the air conditioning compressor, condenser and filter from their respective supports. Carefully remove them without opening up the air conditioning system.
- Solution 2:
  - Disconnect the hoses (1) located on the front left-hand side of the cab (Fig. 9).

IMPORTANT: *If the air conditioning system needs to be opened up, see chapter 12 before carrying out any work.*

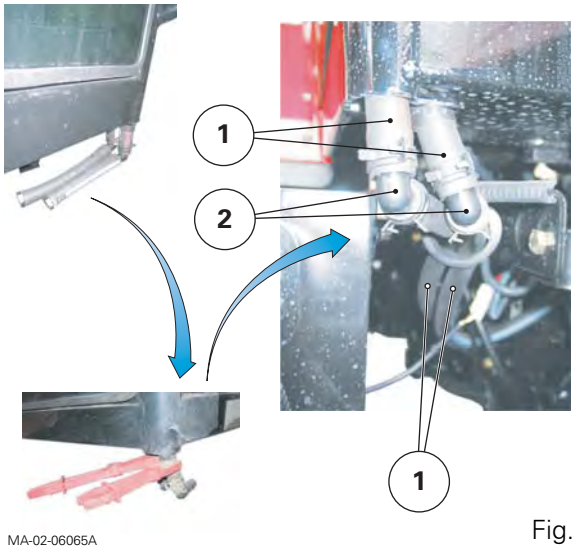

Fig. 8

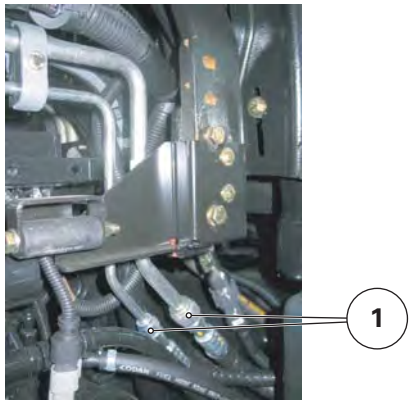

Fig. 9

Operations at the front of the cab

21. Disconnect (Fig. 10):
- connectors ENG1 and ENG2
- the terminal (C) (internal diameter 8 mm)

22. Mark and disconnect (Fig. 11):
- the hose on the spool valve (Orbitrol) going to the left-hand steering ram union
- the hose on the spool valve (Orbitrol) going to the right-hand steering ram union

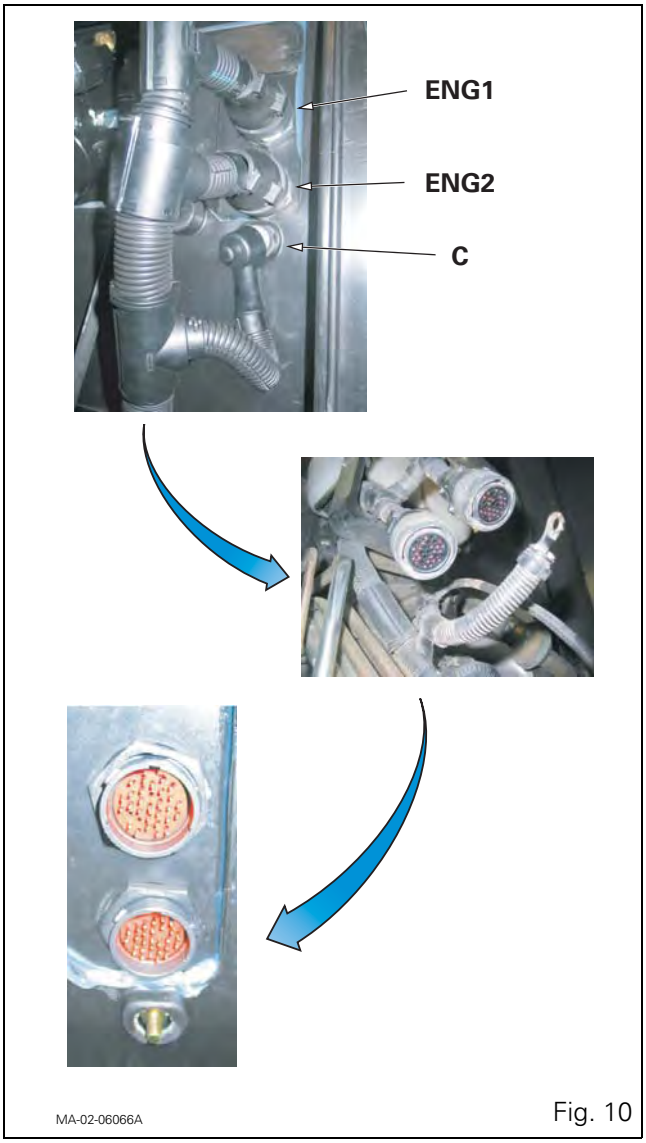

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Fig. 10

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Fig. 11

Preparing for disassembly

23. Cancel the front axle oscillation (all versions) by sliding a suitable chock (C) in at each side of the front frame (1) (Fig. 12).

24. Install (Fig. 14):

- a fixed axle stand at the front of and below the robotic gearbox
- a fixed axle stand at the rear of and below the hitch hook
- a mobile stand at the rear of and below the engine

25. If necessary, separate the cab from the front right and left-hand supports. Gently lift it using a hoist with two straps fitted to the side handles (Fig. 13). Temporarily chock the cab by sliding a suitable chock under each of its supports.

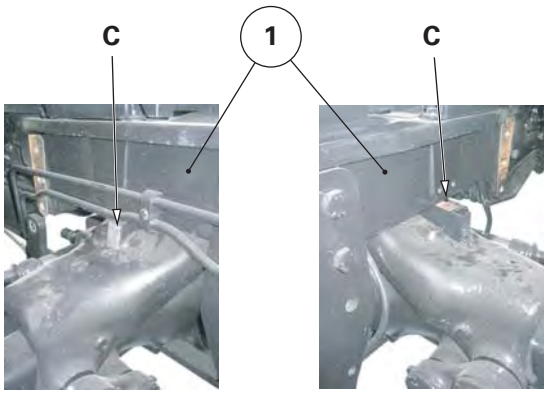

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Fig. 12

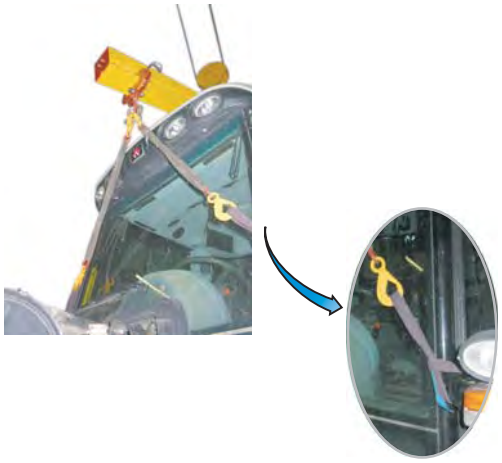

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Fig. 13

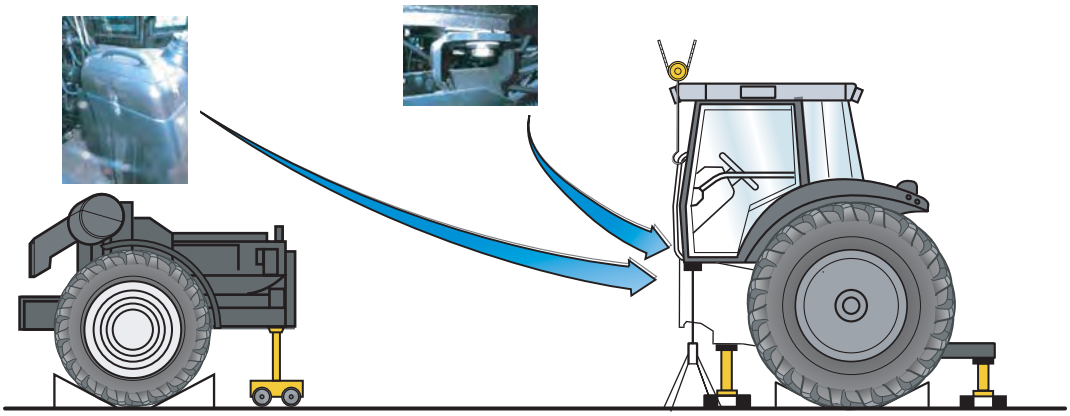

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Fig. 14

Disassembly

26. Release the screws and the nut attaching the engine to the gearbox (Fig. 17).

Mark:

- the length and location of the screws
- the location of the nut

Screw, nut and stud specifications (Fig. 17)

Screws (1)	Nut (3)	Stud (2)
M16 x 50 M16 x 60 M16 x 80 M16 x 125 M22 x 90	M16 x 2	M16 x 55

NOTE: *The thread of the stud (2) (Fig. 17)* in the Powershift housing is lightly smeared with Loctite 270 or equivalent.

27. Assisted by an operator, separate the assemblies (Fig. 14). During disassembly, check that all connections (hoses, pipes and harnesses) are disconnected.

NOTE 1: *The Sisu engine and the GTA1540 transmission are disconnected by gradually moving the engine and 4WD front axle assembly forwards using a mobile stand.*

NOTE 2: *When separating the tractor between the engine and the GTA1540 transmission, it is advisable to move the mobile section of the tractor forwards gradually while exerting tractive effort on the front axle wheels in order to keep the mobile section of the tractor aligned with the fixed section.*

To do this, it is necessary to locally manufacture a splined sleeve (2) or a splined shaft (1) (depending on the front axle type) based on existing parts in the spare parts catalogue. This sleeve or shaft will be connected by an S151 ratchet in rotation to the front axle pinion (Fig. 15). The operation will consist of manually turning the pinion and gradually driving the front axle wheels and the 4WD front axle/engine assembly at the same time.

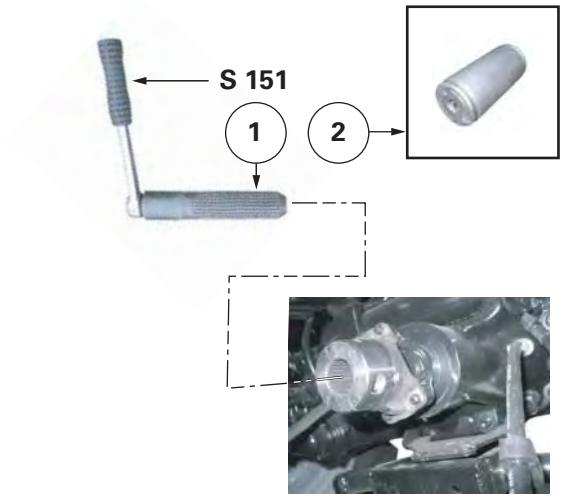

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Fig. 15

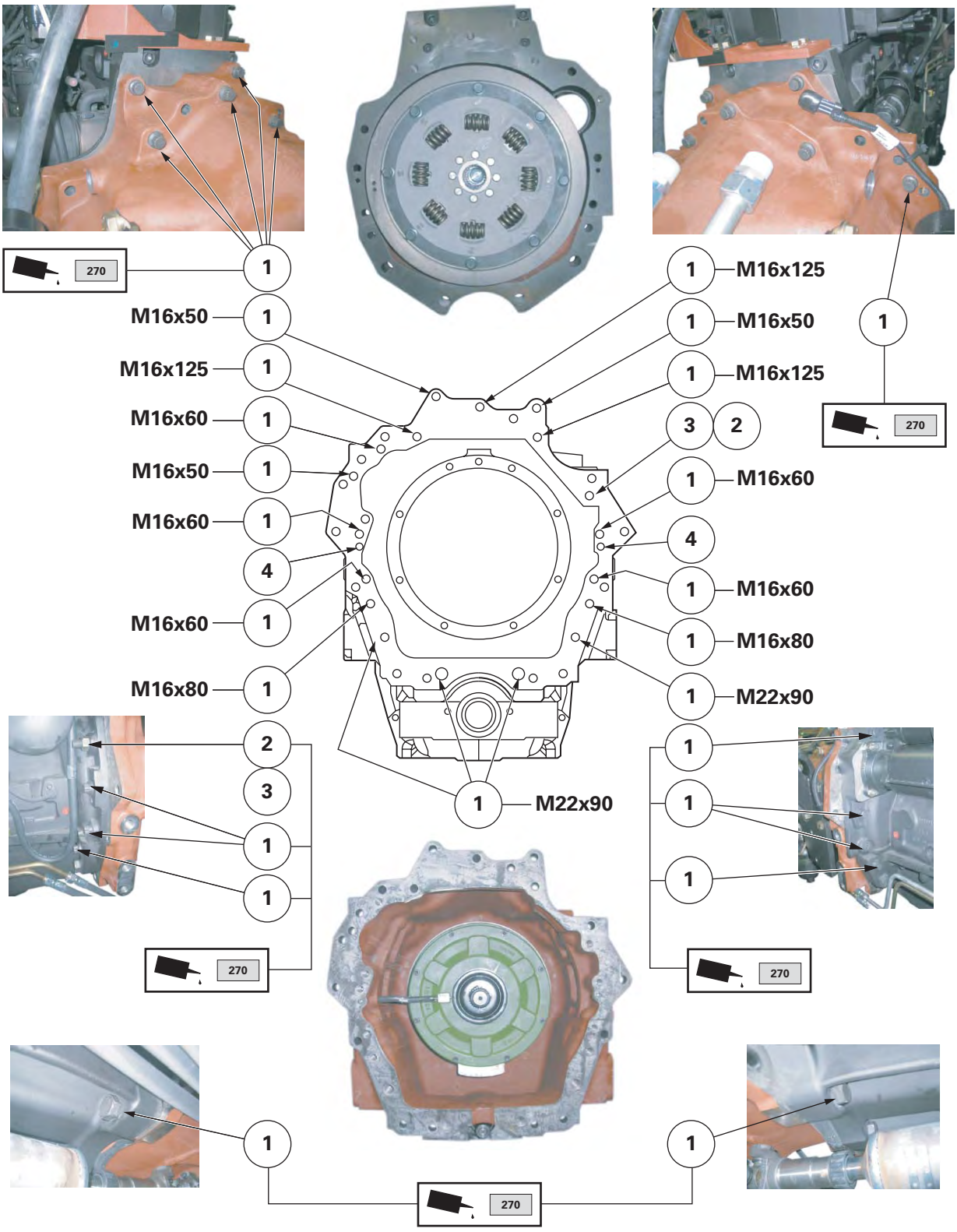
270
1
M16x50
M16x125
M16x60
M16x50
M16x60
4
M16x60
M16x80
2
3
M22x90
M16x125
M16x50
3
2
M16x60
4
M16x60
M16x80
M22x90
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Fig. 16

C . Reassembly

28. Clean the mating faces of the engine and the Powershift module housing.

29. Check that the dowels (1) are in the correct place on the Powershift module housing (Fig. 17).

NOTE: *During assembly, the dowels fit freely into the holes (P) in the engine adapter plate (Fig. 17).*

30. Lightly smear the splines of the input shaft (1) (Fig. 18) with AS767 graphite grease or equivalent.

31. Screw two diametrically opposed guide studs onto the Powershift module housing.

32. Connect the engine to the GTA1540 transmission.

If necessary, manually turn the engine flywheel ring gear using the port provided to fit the starter, using a suitable locally made tool. This will make it easier for the vibration damper splines to engage with those on the input shaft of the GBA15 gearbox. If there is resistance, do not force it; find the cause of the problem.

33. Once the engine and GTA1540 transmission are assembled, remove the guide studs.

Lightly smear the thread of the screws (1) and the thread of the nut (3) with Loctite 270 or equivalent.

Fit the screws and the nut as marked during removal (Fig. 17). Tighten them to a torque of:

- screws (1): 240-320 Nm
- nut (3): 240-320 Nm

Final steps

The final steps are not especially difficult. They therefore require the preliminary steps to be carried out in reverse order. However, the following operations need to be performed during refitting:

- if necessary, tighten the cab's front rubber mounting screws to the required **tightening torque** (see chapter 12);
- top up the **level of coolant**, to the maximum level marked on the expansion tank (Fig. 19);
- **test**:
  - the air conditioning system (if fitted - see chapter 12),
  - the suspended front axle (if fitted - see chapter 8),
  - all mechanical, hydraulic, electrical and electronic functions relating to the operation.
- **check the tightness of**:
  - the hydraulic unions
  - the water hoses
  - the bleed screw on the suspended front axle control unit (if fitted)

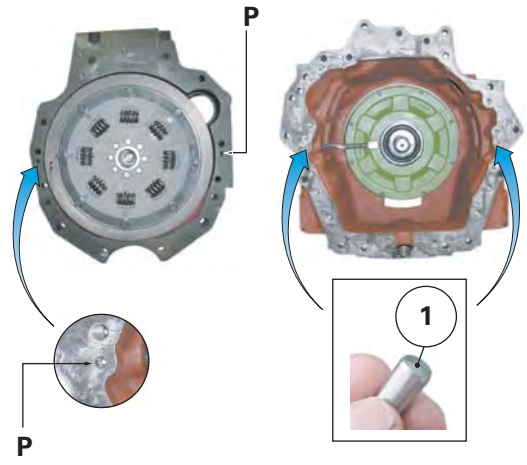

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Fig. 17

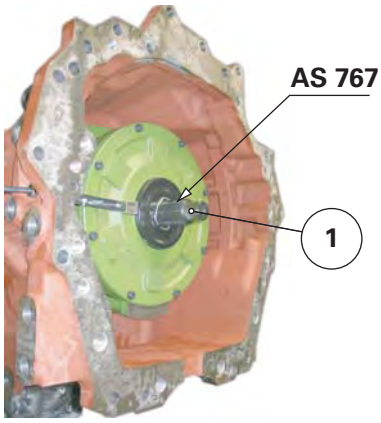

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Fig. 18

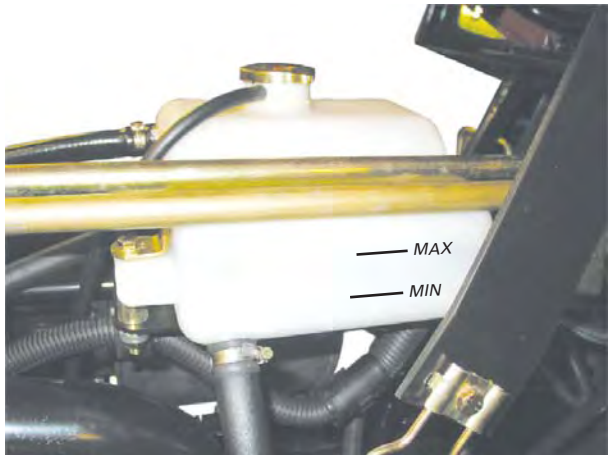

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Fig. 19

2C10- Splitting - GBA20 gearbox / Centre housing

CONTENTS

Splitting - GBA20 gearbox / Centre housing

A . General

There are two procedures for disassembling the gearbox and the centre housing, depending on the type of operation to be carried out on the tractor.

Disassembling with the cab fixed to the centre housing

Accessible elements:

- Gearbox output shaft
- Creeper unit and creeper gear selection mechanism (depending on option)
- Power take-off clutch
- Handbrake mechanism (only on tractors with no creeper gears)

Disassembling with the cab fixed to the gearbox

Accessible element:

- Bevel gear

Remark

Due to the different hydraulic equipment that may be fitted on the tractor, this section describes the general disassembly procedure. Before and during disassembly, check that all connections have been properly separated between the fixed assembly and mobile assembly.

B . Disassembling and reassembling with the cab fixed to the centre housing

Disassembling

Preliminary operations

1. Engage the handbrake.
2. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).
3. Remove the lateral panels from each side of the engine and bonnet (if necessary).
4. Place the rear wheels in the wide track position.
5. Remove the footsteps.

Servicing under the tractor

6. Remove the guards and the 4WD shafts.
7. Drain the oil from the gearbox and centre housing.
8. Remove the reverse shuttle lubricating pipe (1) located between the centre housing and gearbox (Fig. 1).

Servicing on the right-hand side of the tractor

9. Disconnect and remove the batteries.
10. Remove the battery support.
11. Mark then disconnect:
    - the hose on the steering ram
    - the main pipe (17 bar) at the selection cover
    - the front differential lock hose on the right-hand hydraulic cover
    - the return hoses on the selector cover
    - the power brake on the accumulator 17 bar supply line (depending on equipment)
    - the lubricating hoses (running to and from the cooler)
    - the gear cables on the selector cover
    - creeper gear cables (optional)

Special point (Fig. 2)

On tractors fitted with creeper gears:

- Remove screw (1)
- Pull the pin (2) outwards in order to free the "D" finger of the fork.

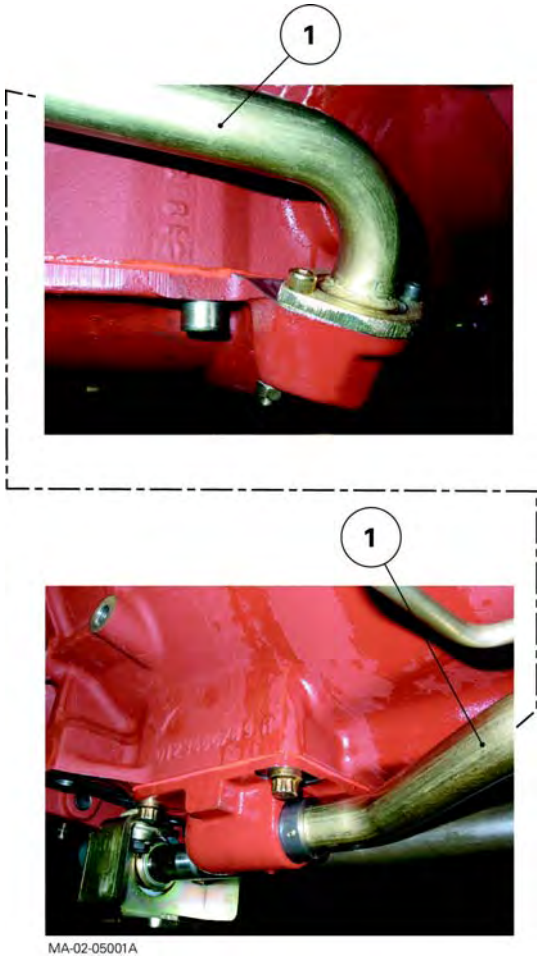


Fig. 1

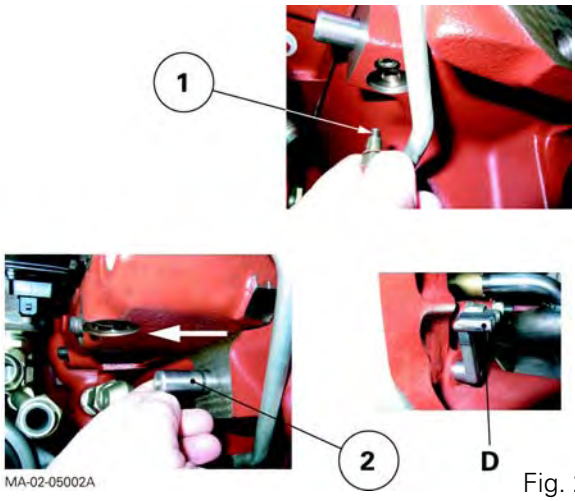


Fig. 2

12. Mark then disconnect:
- the electrical connectors on the selector cover, the control unit (Dynashift – reverse shuttle) and the right-hand hydraulic cover.
- the radar (if fitted).

Servicing on the left-hand side of the tractor

13. Mark then disconnect:
- the hose on the steering ram
- the harness of the fuel gauge on the tank
- the gas oil feed and return hoses on the engine (block ports immediately)
- the vent hose on the tank

14. Drain the tank (if necessary) and remove it.

15. Disconnect the transmission lubricating pipe or hose located at the front left-hand side of the gearbox.

Servicing under the cab

16. Mark, toe-in and disconnect the heating hoses, immediately blocking the ports.

Servicing on the engine

17. Disconnect the connector of the main engine wiring harness.

18. Disconnect the throttle control cable on the injection pump (4-cylinder engine only).

19. Separate the compressor, the condenser and the filter from their respective holders, and remove them carefully, without breaking the circuit.

Remark

Work carefully.

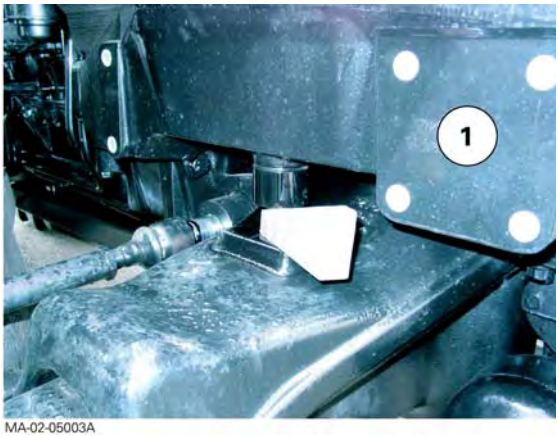


Fig. 3

Preparing for disassembling

20. Cancel the front axle oscillation (all versions) by sliding an suitable chock in at each side of the support (1) (Fig. 3).

21. Chock the rear wheels.

22. Place fixed stands (Fig. 5):
- At the front of the centre housing.
- To the rear of the hitch hook.

23. Position a mobile stand at the back of the gearbox (Fig. 5).

24. Separate the cab from the supports on the front right- and left-hand sides (fixed or suspended cab versions – see chapter 12).

25. Gently lift it using two straps fitted to the lateral handles.

26. Fit a wooden chock temporarily between the cab and the front supports.

Disassembling

27. Remove each screw (1) fixing the gearbox to the centre housing (Fig. 4), marking its position.

Screw dimensions

- M14 x 45 mm screw
- M14 x 60 mm screw
- M14 x 70 mm screw

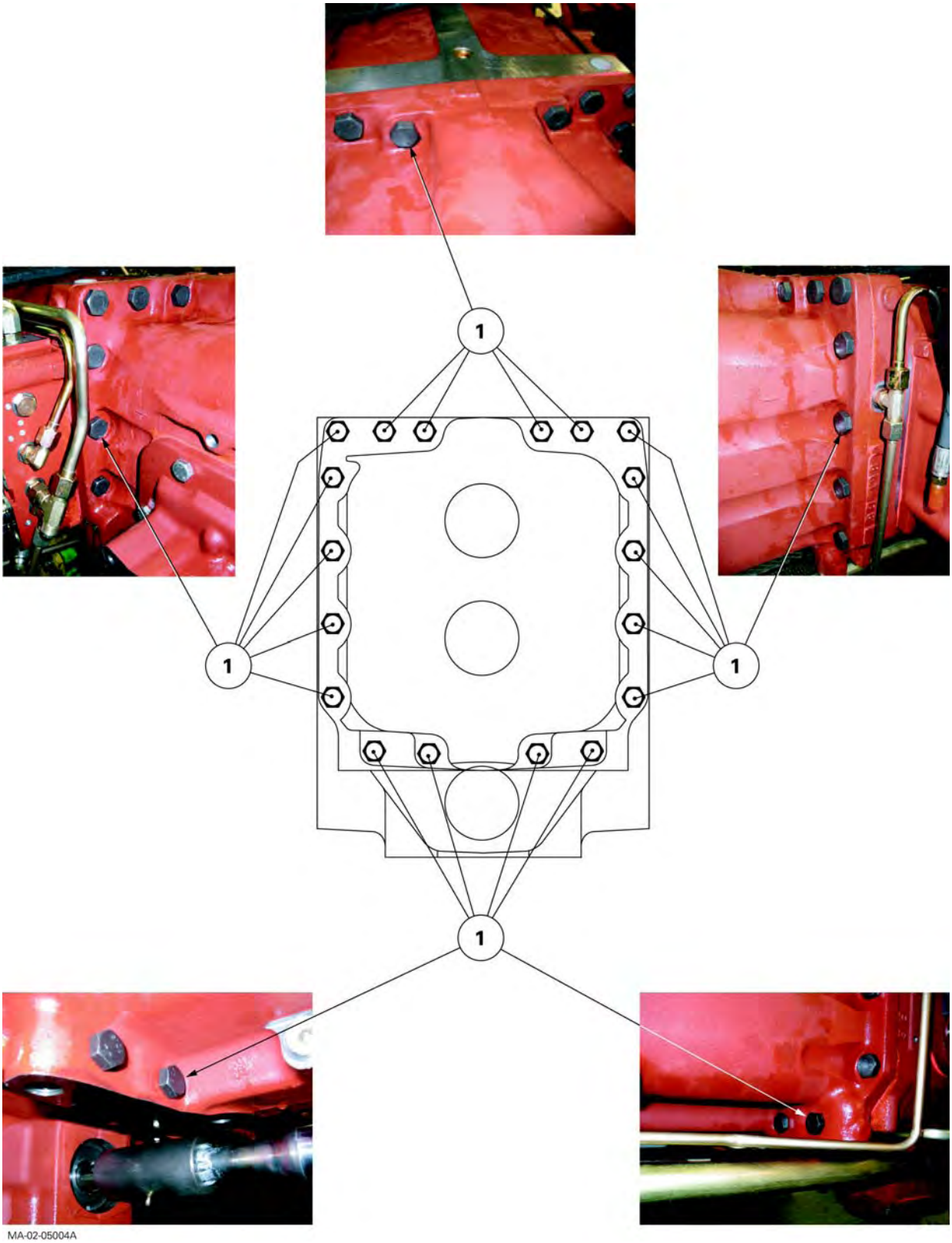


Fig. 4

28. With the help of an operator, separate the assemblies (Fig. 5).

Reminder

- During disassembling, check that connections (hoses and harnesses) are all disconnected.

29. Place the appropriate stands under the cab supports.

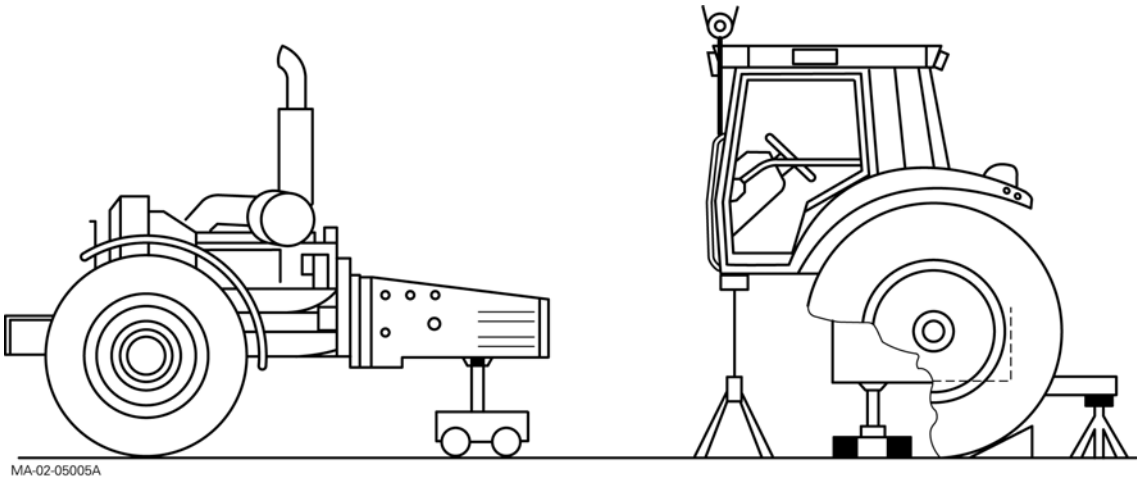


Fig. 5

Reassembling

30. Clean the mating surfaces of the gearbox and the centre housing.

On the centre housing

31. Check the presence of locating pins (4) (Fig. 6).

Remark

The pins are "force" fitted.

32. Position the spring (1) in the PTO clutch (Fig. 7).

33. Smear the mating face of the centre housing with Loctite 5206 or equivalent, avoiding the hare and tortoise ports.

34. Replace the O'rings (2) (Fig. 7).

35. Screw two diametrically opposed guide studs into the centre housing.

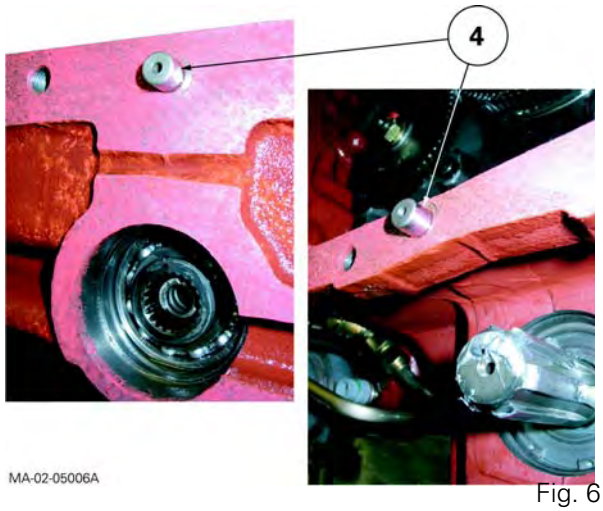


Fig. 6

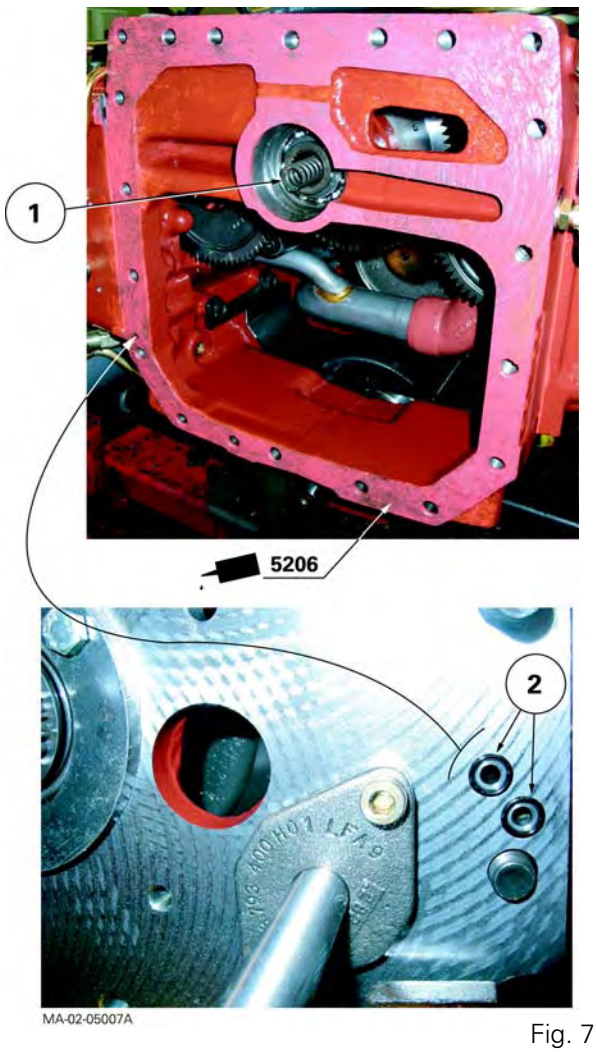


Fig. 7

On the gearbox

36. check the presence and correct positioning of the PTO shaft.

37. Check:

Version with no creeper unit

- Presence of the union shaft (1) composed of the sleeves (2) and double pins (3) (Fig. 8).

Version with creeper unit

- Correct assembly of shaft (1) composed of sleeve (2) and double pin (3) (Fig. 9).
- Correct operation of the control mechanism (fork and coupler) in each position.

38. Push the fork (4) towards the front of the gearbox in direct drive position (Fig. 9).

Remark

The gearbox output shaft supports the shaft (1) via the needle roller bearing (5) (Fig. 9).

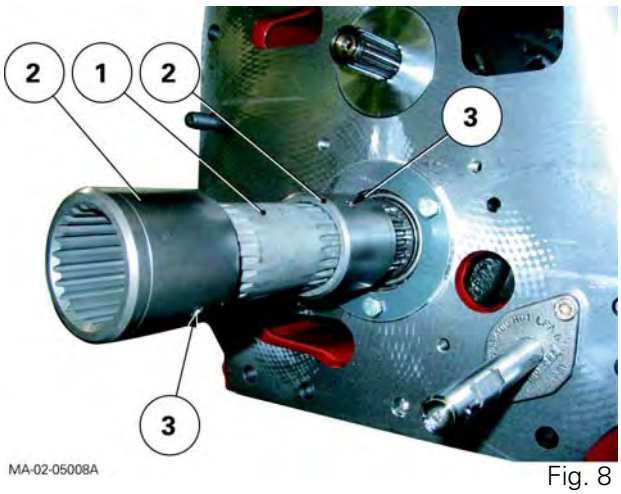


Fig. 8

On the centre housing

Remark

The rotation of the control finger "D" of the creeper gears is limited by the presence of the studs and nuts assembly (1) in the centre housing. (Tractors with closed centre hydraulic equipment - Fig. 10).

39. Pull the pin (2) outwards (Fig. 2) and direct the "D" finger towards the front of the centre housing (Fig. 10).

40. Couple the gearbox to the centre housing.

Reminder

If there is resistance when moving the elements (gearbox, centre housing) together, do not force them, and find the cause of the problem.

41. When the elements are joined, remove the guide studs. Insert the screws (1) according to the markings made at disassembly (Fig. 4) and tighten to a torque of 155 to 195 Nm.

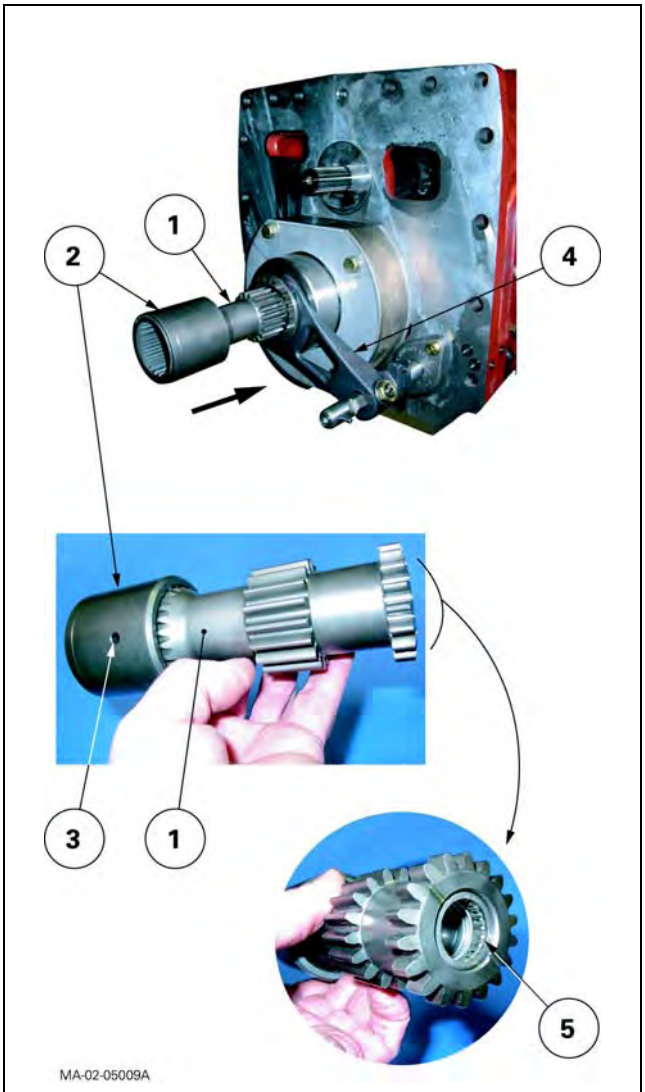


Fig. 9

Final operations

Remarks

Final operations are quite simple, and should therefore be carried out in the reverse order to preliminary operations. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Reminder

Engage the "D" finger (Fig. 10) in the creeper gear fork and position the seal on the screw (2) (Fig. 10) after lightly smearing it with Loctite 242 or equivalent. Moderately tighten the screw.

Tightening torques

- Front cab attachment (see chapter 12).
- Rear wheels screws or nuts (see chapter 6).

Topping-up

- of transmission oil in the housings (check using the gauge located at the back of the centre housing).
- of coolant (radiator – expansion tank).

Adjustments

- Creeper cables (if fitted).
- Gear cables 1 to 4 on the selector cover.
- Throttle control cable on the injection pump (4-cylinder engine only).

Tests:

- Air conditioning mechanism (if fitted – see chapter 12)
- Suspended front axle (if fitted)
- Cab suspension (if fitted, see chapter 12)
- Reverse shuttle
- Gears 1 to 4
- Hare/Tortoise range
- Dynashift
- Creeper gears (optional)

Checking tightness

- Mating faces
- Hydraulic unions
- Bleed screw on control unit of suspended front axle (if fitted)

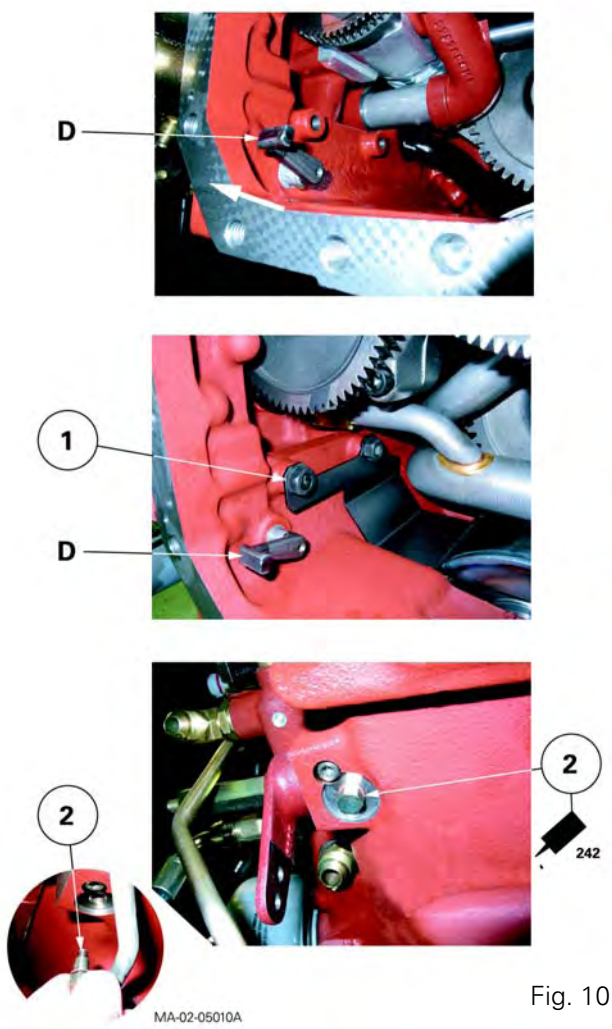


Fig. 10

C . Disassembling and reassembling with the cab fixed to the gearbox

Disassembling

Remark

The disassembly procedure with cab fixed to gearbox is almost identical to that described at § B.

However, it is necessary to add all disassembly operations concerning the centre housing in order to make the rear axle mobile and carry out disassembly in the correct conditions.

Preliminary operations

42. Engage the handbrake.

43. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).

44. Remove the lateral panels from each side of the engine and bonnet (if necessary).

45. Place the rear wheels in the wide track position.

46. Remove the footsteps.

Servicing under the tractor

47. Remove the guards and the 4WD shafts.

48. Drain the oil from the gearbox and centre housing.

49. Remove the reverse shuttle lubricating pipe (1) located between the centre housing and gearbox (Fig. 11).

Servicing on the right-hand side of the tractor

50. Disconnect and remove the batteries.

51. Remove the battery support.

52. Mark then disconnect:

- the cooler lubricant hose on the right-hand hydraulic cover
- the main pipe (17 bar) at the selector cover
- the front differential lock hose on the right-hand hydraulic cover
- the hoses joined to the cab on the right-hand hydraulic cover
- the speed sensor connector
- the linkage sensor connector
- the return hoses on the selector cover
- the creeper gear cables (optional)

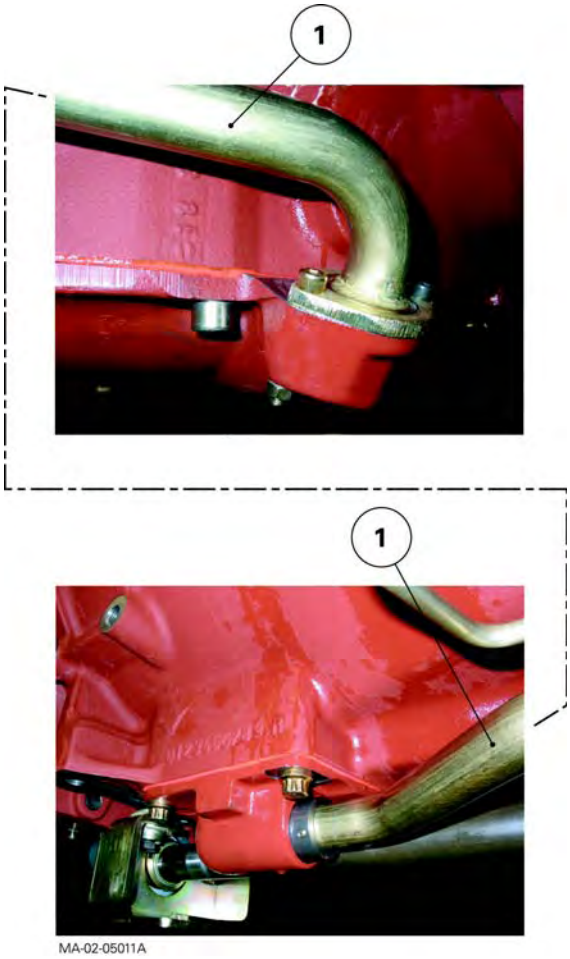


Fig. 11

Special point (Fig. 12)

On tractors fitted with creeper gears:

- Remove screw (1).
- Pull the pin (2) outwards in order to free the "D" finger of the fork.

53. Mark then disconnect:
- the electrical connectors on the selector cover, the control unit (Dynashift – reverse shuttle) and the right-hand hydraulic cover

Servicing on the left-hand side of the tractor

Mark then disconnect:

- the harness of the fuel gauge on the tank
- the gas oil feed and return hoses on the engine (block ports immediately)
- the vent hose on the tank

54. Drain the tank (if necessary) and remove it.

55. Disconnect the transmission lubricating pipe or hose located at the front left-hand side of the gearbox.

Servicing under the cab

56. Mark then disconnect:
- the right- and left-hand brake cables (block ports immediately)
- the steering hose of the trailer brake valve, if fitted (block ports immediately)
- the handbrake cable
- the speed sensor connectors (PTO and ground speed).

Servicing at the rear of the tractor

57. Mark and disconnect cables:
- of the auxiliary spool valves (optional)
- of the power take-off (all versions)

58. Mark and disconnect the connectors:
- on the electrohydraulic spool valves
- on the lift control valve
- on the power take-off
- on the effort sensors

Preparing for disassembling

59. Cancel the front axle oscillation (all versions) by sliding a suitable chock in either side of the support (1) (Fig. 13).

60. Chock the front wheels.

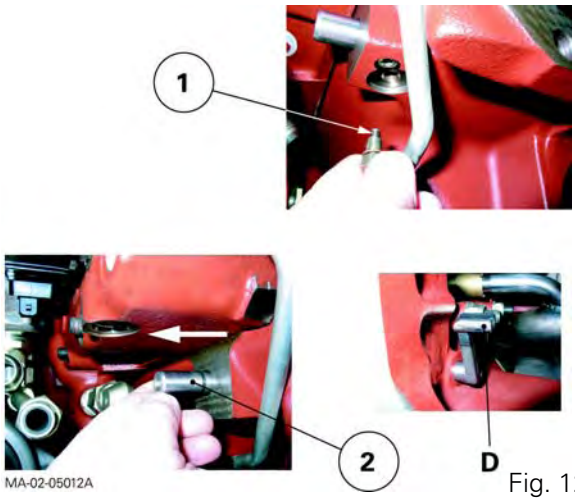


Fig. 12

Fig. 13

61. Position a fixed stand at the back of the gearbox (Fig. 15).

62. Position a mobile stand at the front of the centre housing and another at the back (Fig. 15).

63. Separate the cab from the supports on the rear right- and left-hand sides (fixed or suspended cab versions – see chapter 12).

64. Using two straps with hooks, gently lift the cab with the rear pillars (Fig. 15).

65. Fit a wooden chock temporarily between the cab and the pillars.

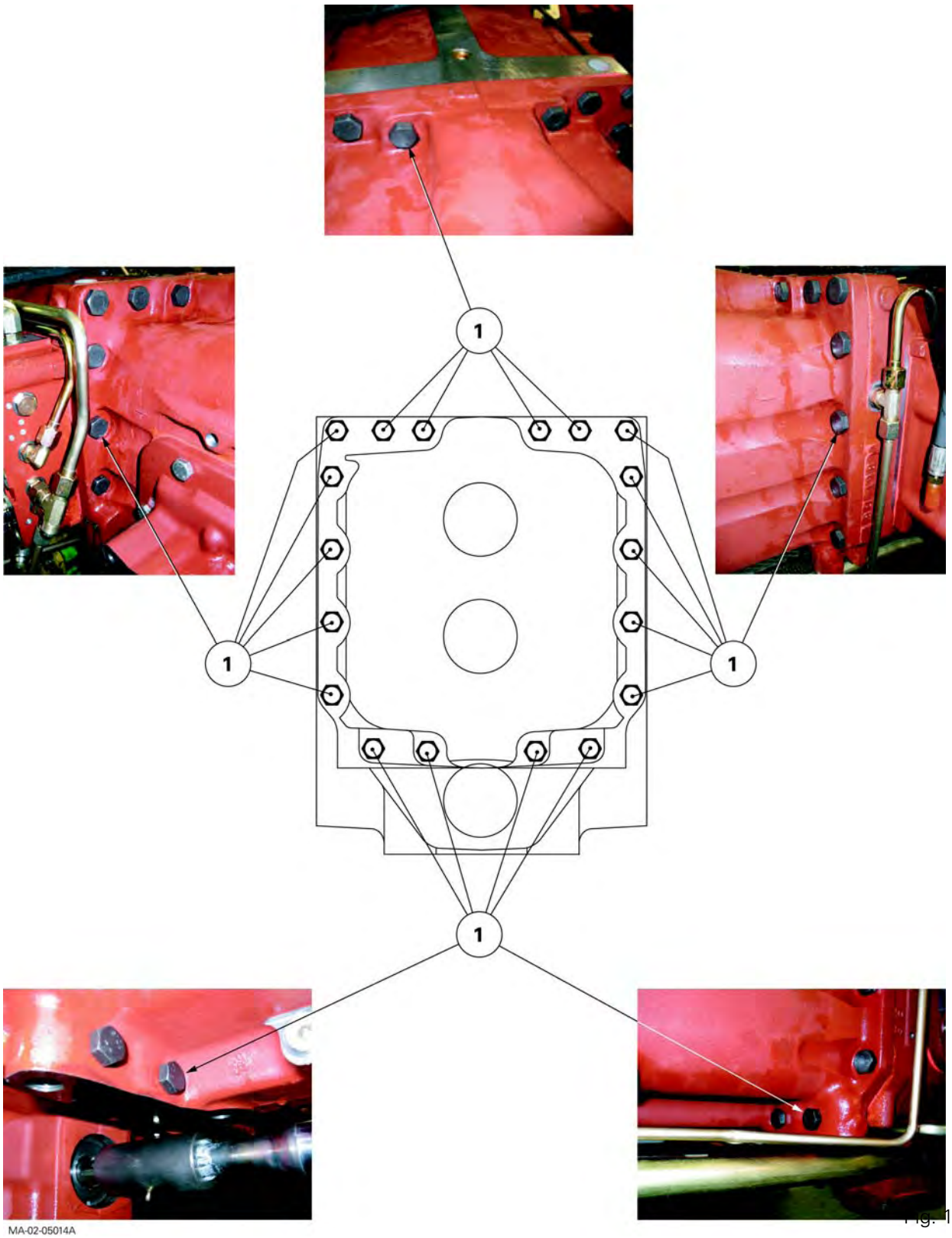


Fig. 14

Disassembling

66. Remove each screw (1) fixing the gearbox to the centre housing (Fig. 14), marking its position.

Screw dimensions

Screws

- M14 x 45 mm screw
- M14 x 60 mm screw
- M14 x 70 mm screw

67. With the help of an operator, separate the assemblies (Fig. 15)

Reminder

- During disassembly, check that connections (hoses and harnesses) are all disconnected.

68. Place the appropriate stands under the cab pillars.

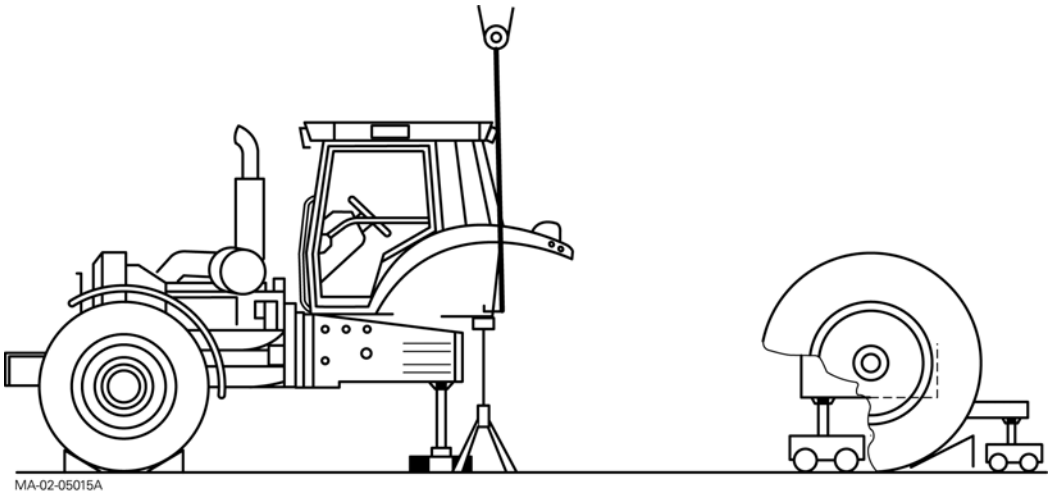


Fig. 15

Reassembling

69. Clean the mating surfaces of the gearbox and the centre housing.

On the centre housing

70. Check the presence of locating pins (4) (Fig. 16).

Remark
The pins are "force" fitted.

71. Position the spring (1) in the PTO clutch. (Fig. 17).
72. Smear the mating face of the centre housing with Loctite 5206 or equivalent, avoiding the hare and tortoise ports.
73. Replace the O'rings (2) (Fig. 17).
74. Screw two diametrically opposed guide studs into the centre housing.

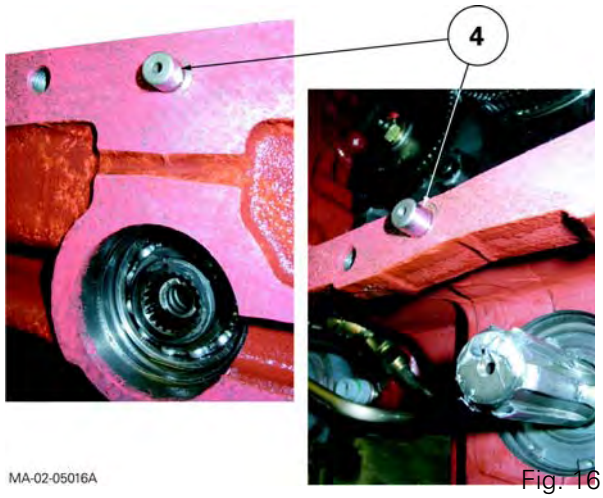


Fig. 16

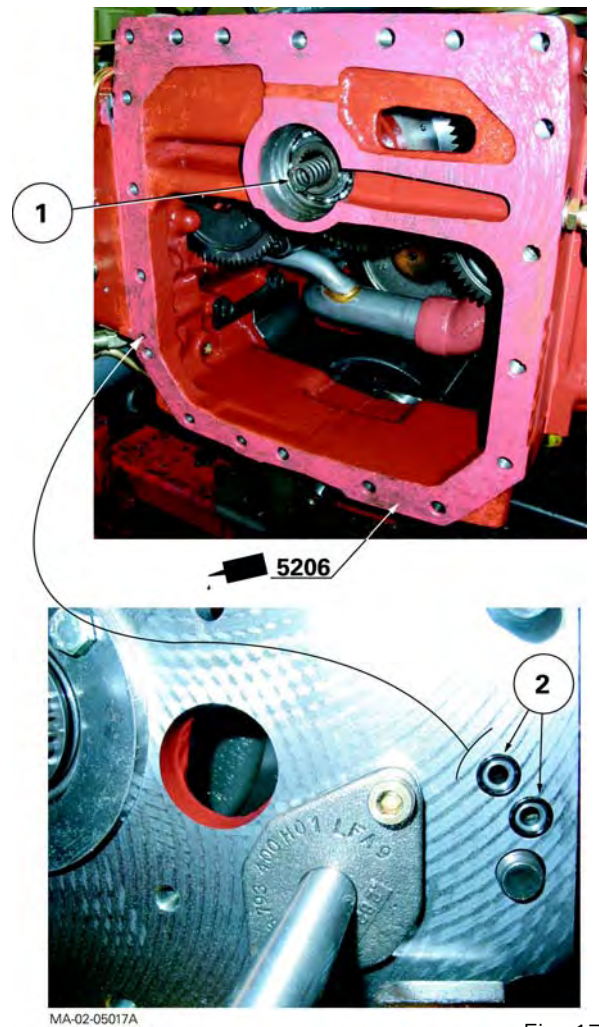


Fig. 17

On the gearbox

75. Check the presence and correct positioning of the PTO shaft.

76. Check:

Version with no creeper unit

- Presence of the union shaft (1) composed of the sleeves (2) and double pins (3) (Fig. 18).

Version with creeper unit.

- Correct assembly of shaft (1) composed of sleeve (2) and double pin (3) (Fig. 19).
- Correct operation of the control mechanism (fork and coupler) in each position.

77. Push the fork (4) towards the front of the gearbox in direct drive position (Fig. 19).

Remark

The gearbox output shaft supports the shaft (1) via the needle roller bearing (5) (Fig. 19).

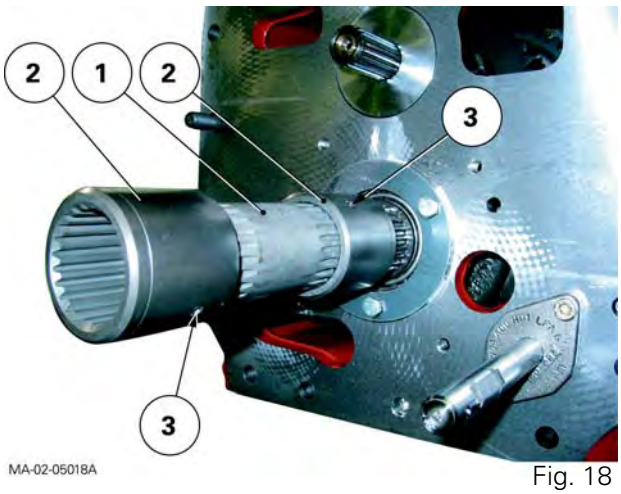


Fig. 18

On the centre housing

Remark

The rotation of the control finger "D" of the creeper gears is limited by the presence of the studs and nuts assembly (1) in the centre housing (tractors with closed centre hydraulics - Fig. 20).

78. Pull the pin (2) outwards (Fig. 12) and direct the "D" finger towards the front of the centre housing (Fig. 20).

79. Couple the gearbox to the centre housing.

Reminder

If there is resistance when moving the elements (gearbox, centre housing) together, do not force them, and find the cause of the problem.

80. When the elements are joined, remove the guide studs. Insert the screws (1) according to the markings made at disassembly (Fig. 14) and tighten to a torque of 155 to 195 Nm.

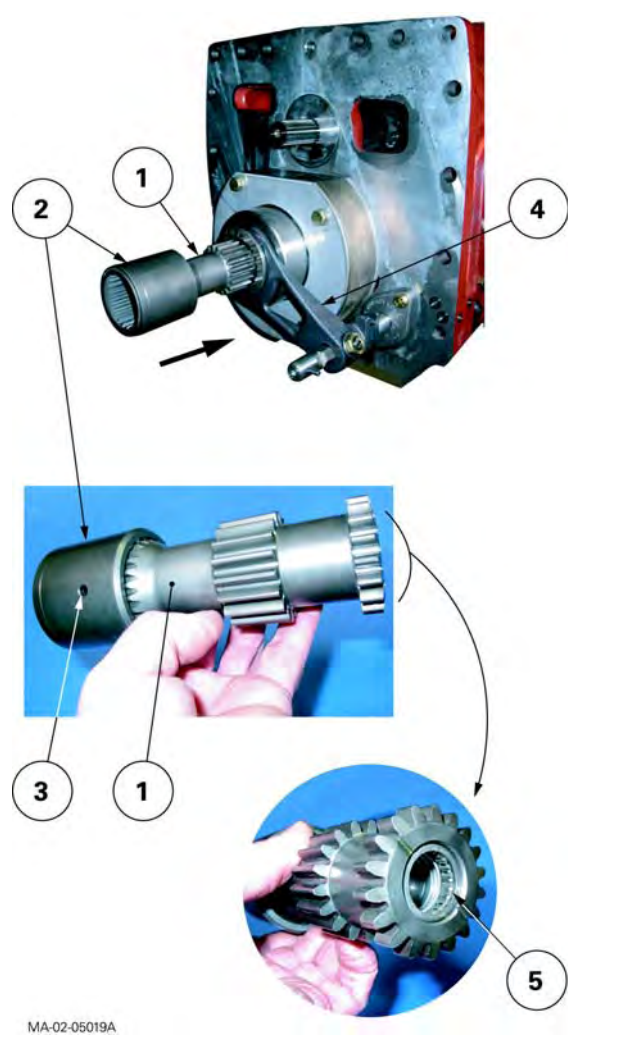


Fig. 19

Final operations

Remarks

Final operations are quite simple, and should therefore be carried out in the reverse order to preliminary operations. However, it will be necessary during reassembly to carry out the tightening torques, adjustments and tests described below.

Reminder

Engage the "D" finger (Fig. 20) in the creeper gear fork and position the seal on the screw (2) (Fig. 20) after lightly smearing it with Loctite 242 or equivalent. Moderately tighten the screw.

Tightening torques

- Rear cab attachment (see chapter 12).
- Rear wheels screws or nuts (see chapter 6).

Topping-up

- Transmission oil in the housings (check using the gauge located at the back of the centre housing).

Adjustments

- Creeper cables (if fitted).
- Gear cables on the selection cover.
- Power take-off cables (all versions).
- Auto-hitch control cables (if fitted).
- Auxiliary spool valves (depending on version).

Return to operation

- Bleeding of main brakes and trailer brake, depending on option (see chapter 9).

Testing

- Suspended front axle (if fitted)
- Cab suspension (if fitted, see chapter 12)
- Gears 1 to 4
- Creeper gears (optional)
- Linkage
- Auxiliary spool valves
- Power take-off (all versions)
- Auto-hitch (if fitted)

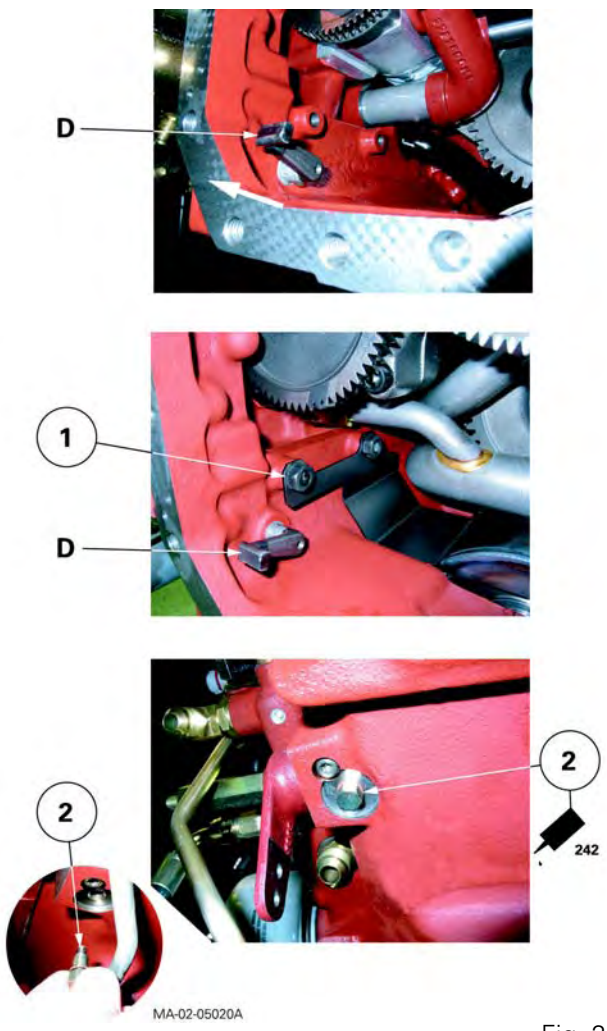


Fig. 20

Checking tightness

- Mating faces
- Hydraulic unions
- Bleed screw on control unit of suspended front axle (if fitted)

2C30 - GBA25/GPA20 separation

CONTENTS

GBA25/GPA20 separation

A . General

There are two procedures for disassembling the gearbox and the centre housing, depending on the type of operation to be carried out on the tractor.

Disassembly with the cab fixed to the centre housing

Accessible elements:

- Creeper unit and creeper gear selection mechanism (depending on option)
- Power take-off clutch
- Handbrake mechanism (only on tractors with no creeper gears)

Disassembly with the cab fixed to the gearbox

Accessible element:

- Crownwheel and pinion.

NOTE: *Due to the various types of hydraulic equipment that may be fitted onto the tractor, this section describes the general disassembly procedure. Before and during disassembly, check that all connections between the fixed assembly and mobile assembly have been disconnected.*

B . Disassembly and reassembly with the cab fixed to the centre housing

Disassembly

Implementation

1. Apply the handbrake.
2. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).
3. Remove the lateral panels from each side of the engine and bonnet (if necessary).
4. Place the rear wheels in the wide track position.
5. Remove the footsteps.

Operations underneath the tractor

6. Remove the guards and the 4 WD shafts.
7. Drain the oil from the gearbox and centre housing.
8. Dismantle the front linkage reinforcements (if mounted).

Operations on the right-hand side of the tractor

9. Disconnect and remove the batteries.
10. Remove the battery support.
11. Mark then disconnect:
    - the hose on the steering ram
    - the main tube (20 bar) to the gearbox control block (Fig. 1)
    - the front differential lock hose on the right-hand hydraulic cover
    - the return hoses on the selector cover
    - the brake hose on the accumulator 20 bar supply line (depending on equipment)
    - the lubricating hoses (running to and from the cooler depending on the model)
    - the creeper gear cables (optional)

***NOTE**:*

On tractors fitted with creeper gears (Fig. 2):

- *Remove screw (1)*
- *Pull the pin (2) outwards to free the "D" finger of the fork.*

Fig. 1

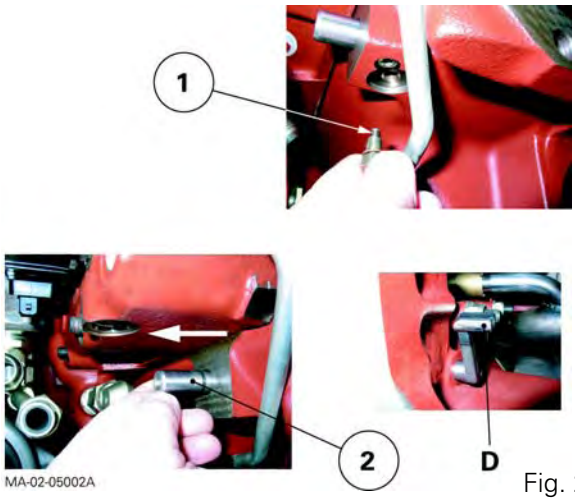


Fig. 2

12. Mark then disconnect:
- the electrical connectors on the gearbox control block and the right hydraulic cover
- the radar (if fitted).

Operations on the left-hand side of the tractor

13. Mark then disconnect:
- the hose on the steering ram
- the harness of the fuel gauge on the fuel tank
- the fuel feed and return hoses on the engine (block ports immediately)
- the vent hose on the fuel tank.

14. Drain the fuel tank (if necessary) and remove it.

15. Disconnect the lubrication hose from the flared tube located to the left of the gearbox.

16. Remove the lubrication tube from the transmission situated between the left side of the gearbox and the right cover of the centre housing.

Operations under the cab

17. Mark, pinch out and disconnect the heating hoses, blocking the ports immediately.

18. The hose between the cooler and the thermostat valve.

Operations on the engine

19. Disconnect the connector of the main engine wiring harness.

20. Disconnect the throttle control cable on the injection pump (four-cylinder engine only).

21. Separate the compressor, the condenser and the filter from their respective holders and remove them carefully without breaking the circuit.

NOTE: *Proceed carefully.*

Preparing for disassembly

22. Stop the front axle swinging (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 3).

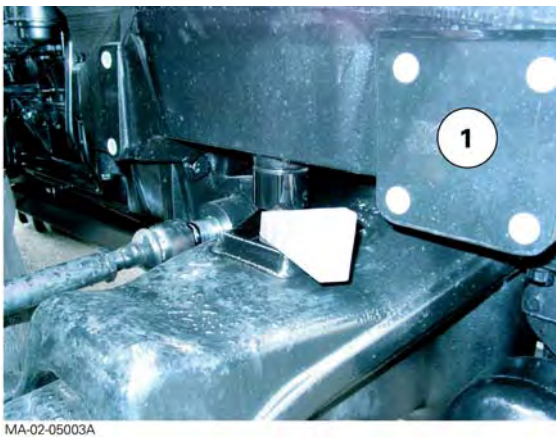


Fig. 3

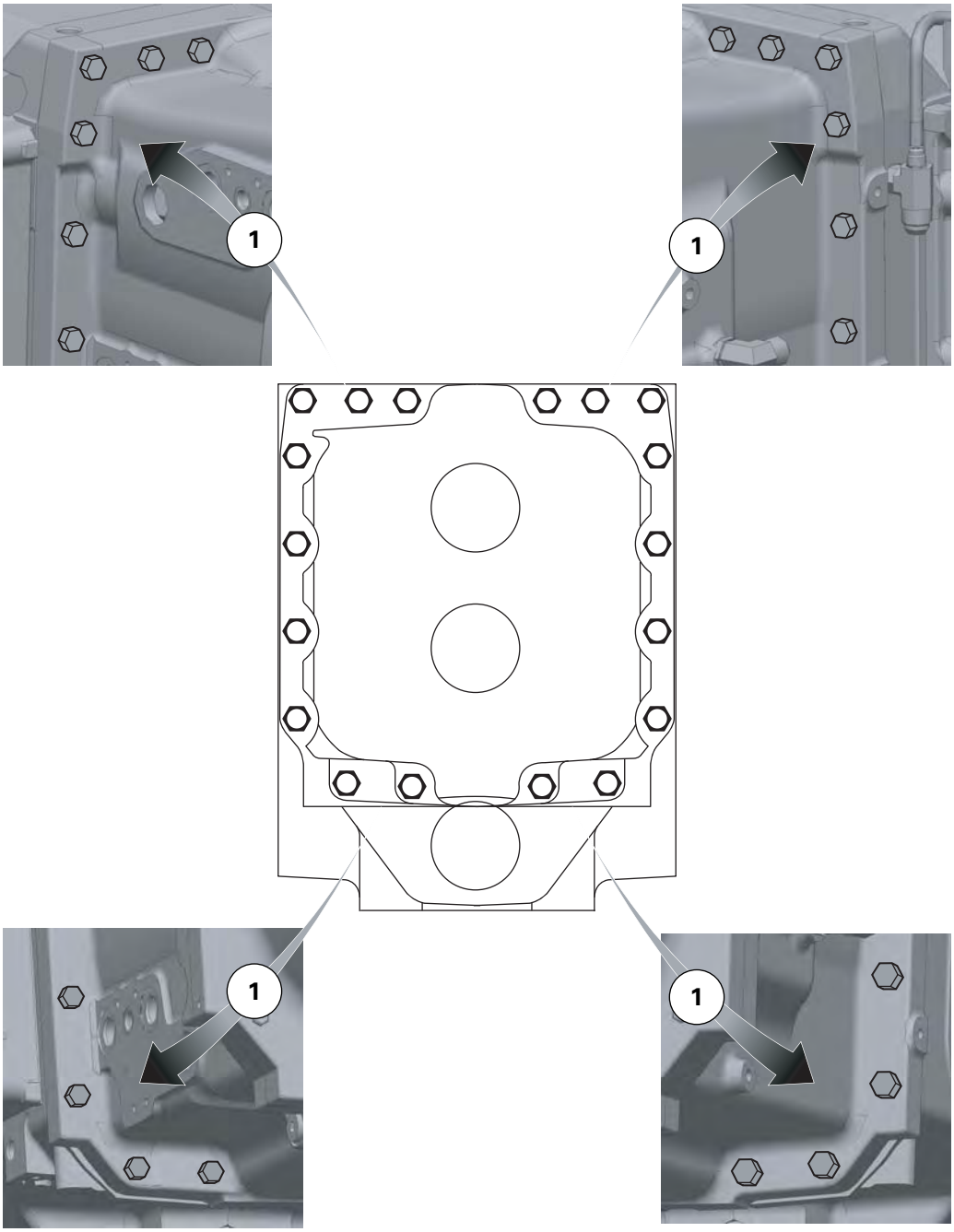


Fig. 4

23. Chock the rear wheels.

24. Place fixed stands (Fig. 5):
- at the front of the centre housing
- to the rear of the hitch hook.

25. Position a mobile stand at the rear of the gearbox (Fig. 5).

26. Separate the cab from the supports on the front right and left-hand sides (fixed or suspended cab versions—see chapter 12).

27. Gently lift the cab using two straps fitted to the lateral handles.

28. Temporarily fit a wooden chock between the cab and the front supports.

Disassembly

29. Remove each screw (1) fixing the gearbox to the centre housing (Fig. 4) and marking its position.

Screw dimensions

- M14 x 45 mm screw
- M14 x 60 mm screw
- M14 x 70 mm screw

30. With the help of an operator, separate the assemblies (Fig. 5)

NOTE: *During disassembly, check that all connections (hoses and harnesses) are disconnected.*

31. Place the appropriate stands under the cab supports.

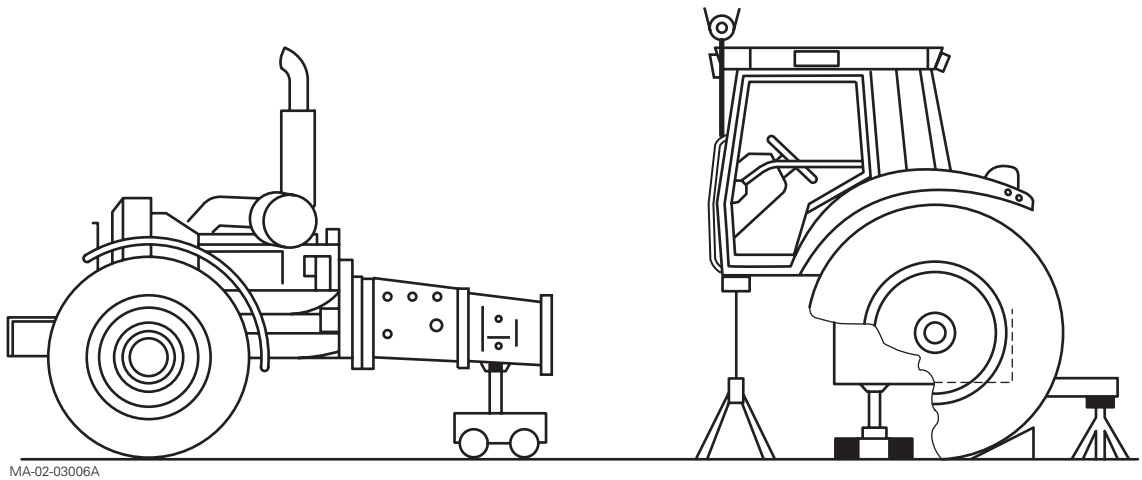


Fig. 5

Reassembly

32. Clean the mating surfaces of the gearbox and the centre housing.

On the centre housing

33. Check the presence of dowels (4) (Fig. 6).

NOTE: *The dowels are "force" fitted.*

34. Position the spring (1) in the PTO clutch (Fig. 7).

35. Smear the mating face of the centre housing with Loctite 5206 or equivalent.

36. Screw two diametrically opposed guide studs on to the housing.

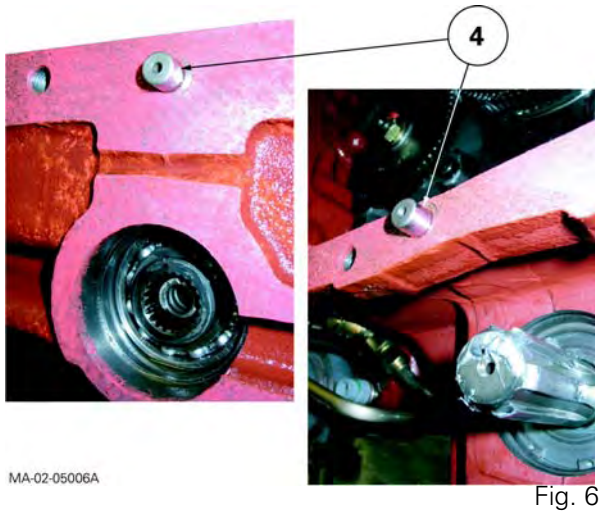


Fig. 6

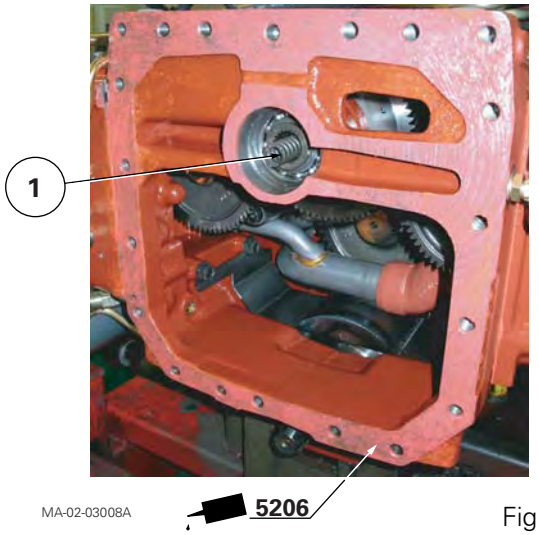


Fig. 7

On the gearbox

37. Check the PTO shaft is present and positioned correctly.

38. Check:

Version with no creeper unit

- The union shaft (1) composed of the sleeves (2) and double pins (3) is present (Fig. 8).

Version with creeper unit

- The shaft (1) composed of the sleeve (2) and double pin (3) is correctly assembled (Fig. 9).
- The control mechanism (fork and coupler) is operating correctly in each position.

39. Push the fork (4) towards the front of the gearbox in direct drive position (Fig. 9).

NOTE: *The gearbox output shaft supports the shaft (1) via the needle roller bearing (5) (Fig. 9).*

On the centre housing

NOTE: *The rotation of the control finger "D" of the creeper gears is limited by the presence of the studs and nuts assembly (1) in the centre housing. (Tractors with closed centre hydraulics—Fig. 10).*

40. Pull the pin (2) outwards (Fig. 2) and direct the "D" finger towards the front of the centre housing (Fig. 10).

41. Couple the gearbox to the centre housing.

NOTE*: If there is resistance when moving the elements (gearbox—centre housing) together, do not force them, and find the cause of the problem.*

42. When the elements are joined, remove the guide studs. Insert the screws (1) according to the markings made at disassembly (Fig. 4) and tighten to a torque of 155 to 195 Nm.

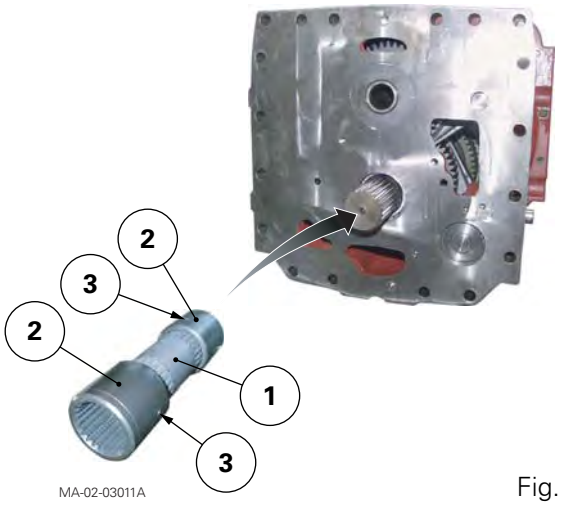


Fig. 8

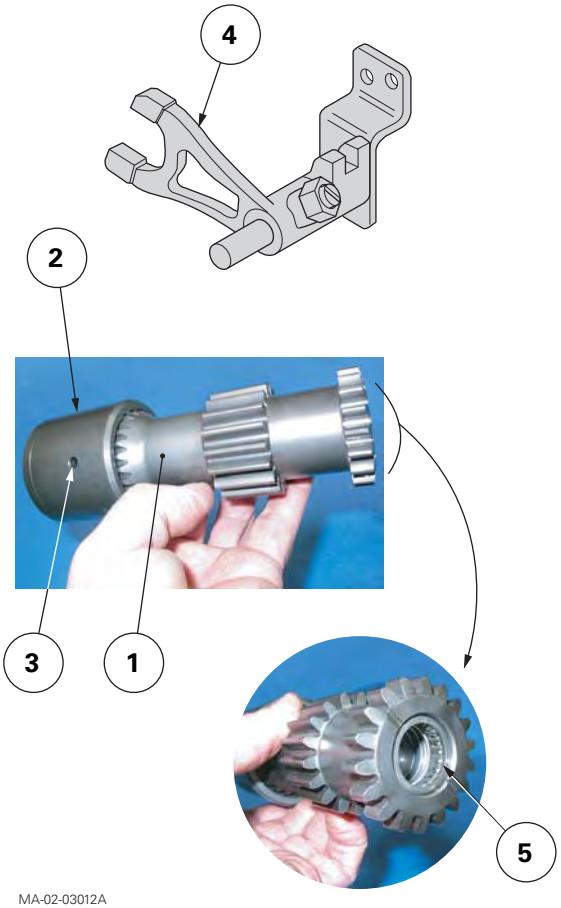


Fig. 9

Final steps

***NOTE**: Final steps are not especially difficult. They should be carried out in the reverse order to preliminary steps. However, it will be necessary during reassembly to carry out the tightening torques, checks, adjustments and tests described below.*

***NOTE:** Engage the "D" finger (Fig. 10) in the creeper gear fork and position the seal on the screw (2) (Fig. 10) after lightly smearing it with Loctite 242 or equivalent. Tighten the screw moderately.*

Tightening torques

- Attachment in front of the cab:
  - M20: 490–560 Nm
  - M16: 200–260 Nm
- Rear wheel screws or nuts (see chapter 6)

Topping-up

- Transmission oil in the housings (check using the gauge located at the rear of the centre housing)
- Coolant (radiator—expansion tank)

Adjustments

- Creeper cables (if fitted)
- Throttle control cable on the injection pump (four-cylinder engine only)

Tests:

- Suspended front axle (if fitted)
- Cab suspension (if fitted—see chapter 12)
- Gearbox lubrication
- Creeper gears (optional)
- Linkage
- Auxiliary spool valves
- Power take-off (all versions)
- Auto-hitch (if fitted)

Checking tightness

- Mating faces
- Hydraulic unions
- Bleed screw on suspended front axle control unit (if fitted)

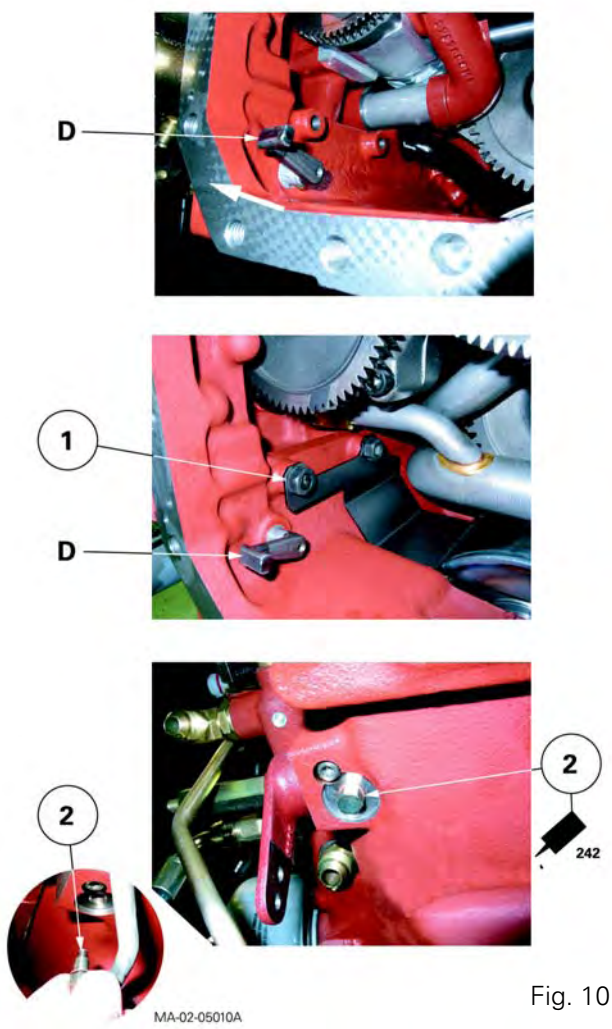


Fig. 10

C . Disassembling and reassembling with the cab fixed to the gearbox

Disassembly

NOTE: *The disassembly procedure with cab fixed to gearbox is almost identical to that described in § B.*

However, it is necessary to add all disassembly operations concerning the centre housing in order to make the rear axle mobile and carry out disassembly in the correct conditions.

Implementation

43. Apply the handbrake.

44. Check that the suspended front axle (if fitted) is in low position and unscrew the control unit bleed screw (see chapter 9).

45. Remove the lateral panels from each side of the engine and bonnet (if necessary).

46. Place the rear wheels in the wide track position.

47. Remove the footsteps.

Operations underneath the tractor

48. Remove the guards and the 4 WD shafts.

49. Drain the oil from the gearbox and centre housing.

50. Dismantle the front linkage reinforcements (if mounted).

Operations on the right-hand side of the tractor

51. Disconnect and remove the batteries.

52. Remove the battery support.

53. Mark then disconnect:

- the lubricating hoses (running to and from the cooler depending on the model)
- the main tube (20 bar) to the gearbox control block (Fig. 11)
- the front differential lock hose on the right-hand hydraulic cover
- the hoses connected to the cab on the right-hand hydraulic cover
- the speed sensor connector
- the linkage sensor connector
- the return hoses on the selector cover
- the creeper gear cables (optional)

Fig. 11

NOTE:

On tractors fitted with creeper gears (Fig. 12):

- *Remove screw (1)*
- *Pull the pin (2) outwards to free the "D" finger of the fork.*

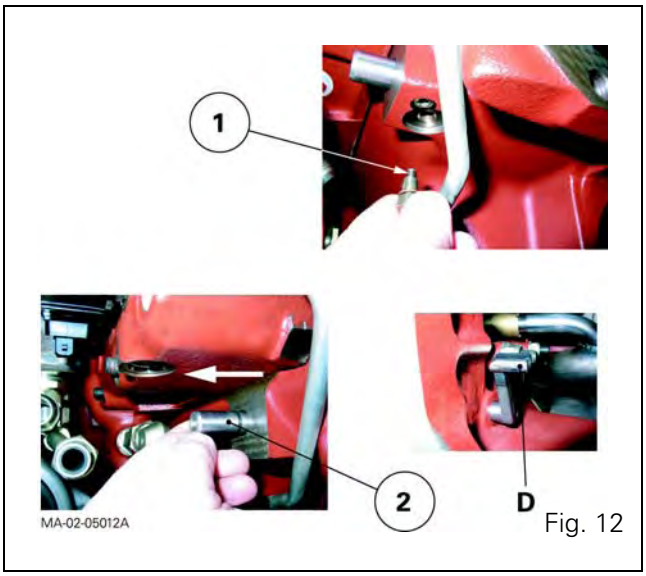


Fig. 12

54. Mark and disconnect the electrical connectors on the gearbox control block and the right hydraulic cover.

Operations on the left-hand side of the tractor

Mark then disconnect:

- the harness of the fuel gauge on the fuel tank
- the fuel feed and return hoses on the engine (block ports immediately)
- the vent hose on the fuel tank.

55. Drain the fuel tank (if necessary) and remove it.

56. Disconnect the lubrication hose from the flared tube located to the left of the gearbox.

57. Remove the lubrication tube from the transmission situated between the left side of the gearbox and the right cover of the centre housing.

Operations under the cab

58. Mark then disconnect:

- the right and left-hand brake cables (block ports immediately)
- the steering hose of the trailer brake valve, if fitted (block ports immediately)
- the handbrake cable
- the speed sensor connectors (PTO and ground speed)
- the hose between the cooler and the thermostat valve.

Operations at the rear of the tractor

59. Mark and disconnect the control cables:

- of the auxiliary spool valves (optional)
- of the PTO (all versions)

60. Mark and disconnect the connectors:

- of the electrohydraulic spool valves
- of the linkage control valve
- on the PTO
- on the effort sensors

Preparing for disassembly

61. Stop the front axle swinging (all versions) by sliding a suitable chock in at each side of the support (1) (Fig. 13).

62. Chock the front wheels.

63. Position a fixed stand at the rear of the gearbox (Fig. 15).

64. Position a mobile stand at the front of the centre housing and another at the rear (Fig. 15).

65. Separate the cab from the supports on the rear right and left-hand sides (fixed or suspended cab versions—see chapter 12).

66. Using two straps with hooks, gently lift the cab with the rear pillars (Fig. 15).

67. Temporarily place a wooden chock between the cab and the pillars.

Fig. 13

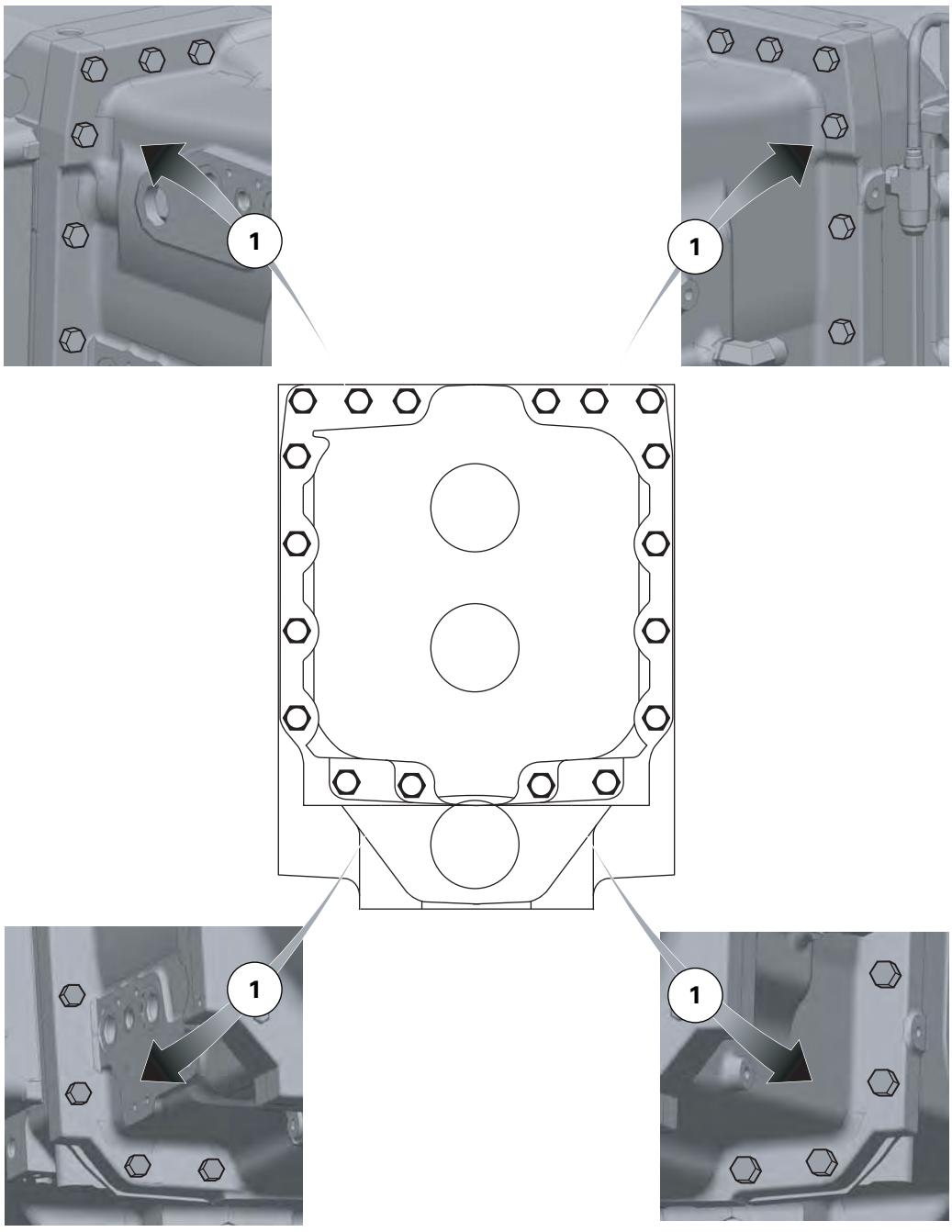


Fig. 14

Disassembly

68. Remove each screw (1) fixing the gearbox to the centre housing (Fig. 14) and marking its position.

Screw dimensions

Screws:

- M14 x 45 mm screw
- M14 x 60 mm screw
- M14 x 70 mm screw

69. With the help of an operator, separate the assemblies (Fig. 15).

NOTE: *During disassembly, check that all connections (hoses and harnesses) are disconnected.*

70. Place the appropriate stands under the cab pillars.

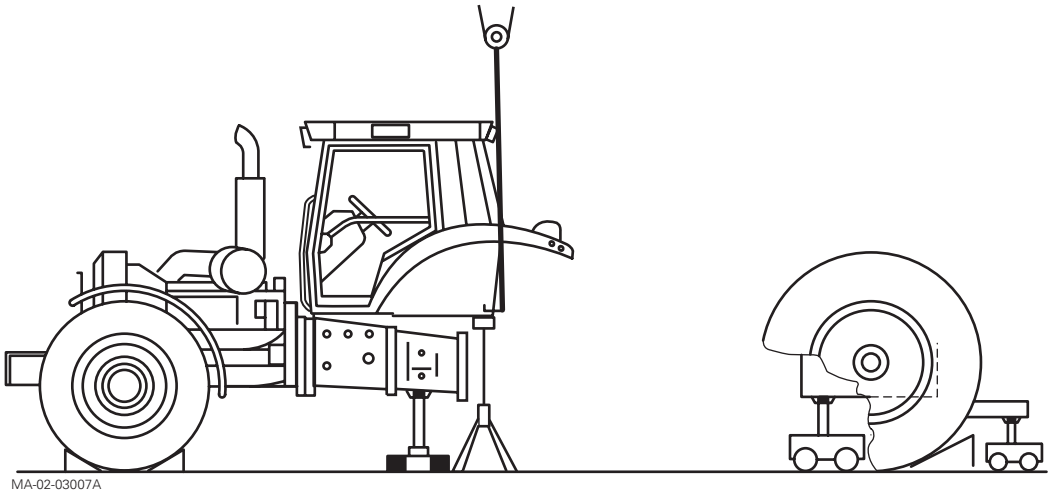


Fig. 15

Reassembly

71. Clean the mating surfaces of the gearbox and the centre housing.

On the centre housing

72. Check the presence of dowels (4) (Fig. 16).

NOTE: *The dowels are "force" fitted.*

73. Position the spring (1) in the PTO clutch. (Fig. 17).
74. Smear the mating face of the centre housing with Loctite 5206 or equivalent.
75. Screw two diametrically opposed guide studs on to the housing.

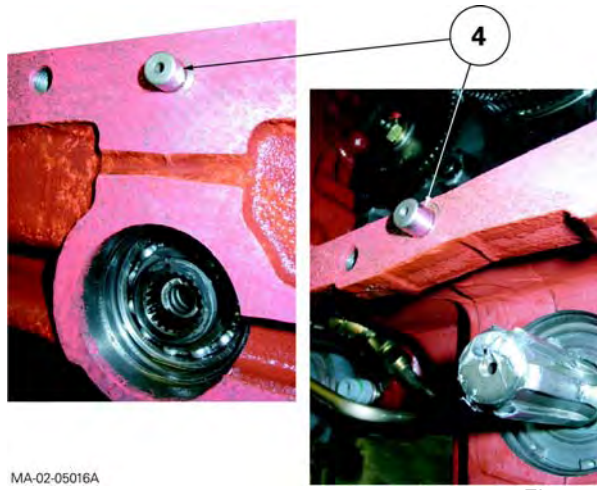


Fig. 16

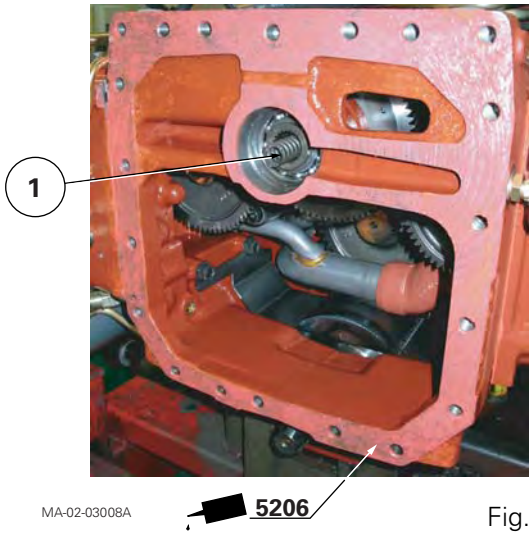


Fig. 17

On the gearbox

76. Check the PTO shaft is present and positioned correctly.

77. Check:

Version with no creeper unit

- The union shaft (1) composed of the sleeves (2) and double pins (3) is present (Fig. 18).

Version with creeper unit

- The shaft (1) composed of the sleeve (2) and double pin (3) is correctly assembled (Fig. 19).
- The control mechanism (fork and coupler) is operating correctly in each position.

78. Push the fork (4) towards the front of the gearbox in direct drive position (Fig. 19).

NOTE: *The gearbox output shaft supports the shaft (1) via the needle roller bearing (5) (Fig. 19).*

On the centre housing

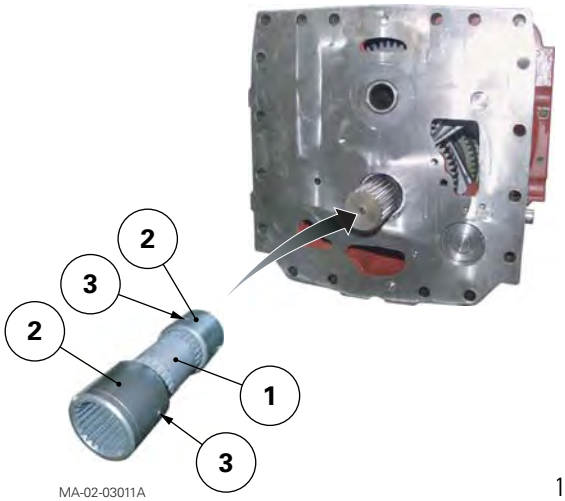
NOTE: *The rotation of the creeper gears control finger "D" is limited by the presence of the studs and nuts assembly (1) in the centre housing (tractors with closed centre hydraulics—Fig. 20).*

79. Pull the pin (2) outwards (Fig. 12) and direct the "D" finger towards the front of the centre housing (Fig. 20).

80. Couple the gearbox to the centre housing.

NOTE: *If there is any resistance when moving the elements (centre housing, gearbox), do not force it and find the cause of the problem.*

81. When the elements are joined, remove the guide studs. Insert the screws (1) according to the markings made at disassembly (Fig. 14) and tighten to a torque of 155 to 195 Nm.



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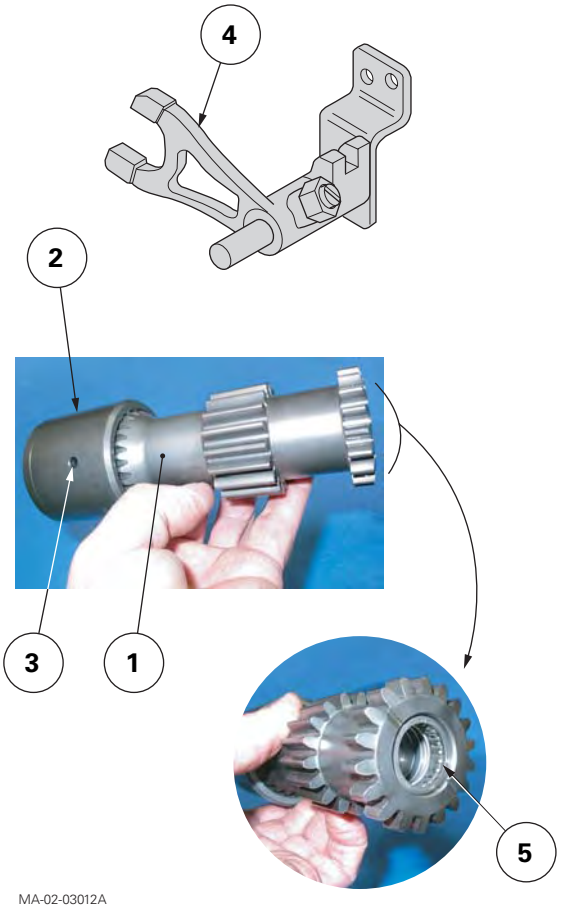

Fig. 19

Final steps

***NOTE**: Final steps are not especially difficult. They should be carried out in the reverse order to preliminary steps. However, it will be necessary during reassembly to carry out the tightening torques, checks, adjustments and tests described below.*

***NOTE:** Engage the "D" finger (Fig. 20) in the creeper gear fork and position the seal on the screw (2) (Fig. 20) after lightly smearing it with Loctite 242 or equivalent. Tighten the screw moderately.*

Tightening torques

- Attachment behind the cab:
  - M20: 490—560 Nm
  - M16: 200—260 Nm
  - M12: 115—130 Nm
  - M10: 50—60 Nm
- Rear wheel screws or nuts (see chapter 6)
  - Flange shaft: 400—450 Nm
  - Right shaft: 350—460 Nm

Topping-up

- Transmission oil in the housings (check using the gauge located at the rear of the centre housing)

Adjustments

- Creeper cables (if fitted)
- PTO cables (all versions)
- Auto-hitch control cables (if fitted)
- Auxiliary spool valves (depending on version)

Return to operation

- Bleeding of main brakes and trailer brake, depending on option (see chapter 9).

Tests

- Suspended front axle (if fitted)
- Cab suspension (if fitted—see chapter 12)
- Gearbox lubrication
- Creeper gears (optional)
- Linkage
- Auxiliary spool valves
- Power take-off (all versions)
- Auto-hitch (if fitted)

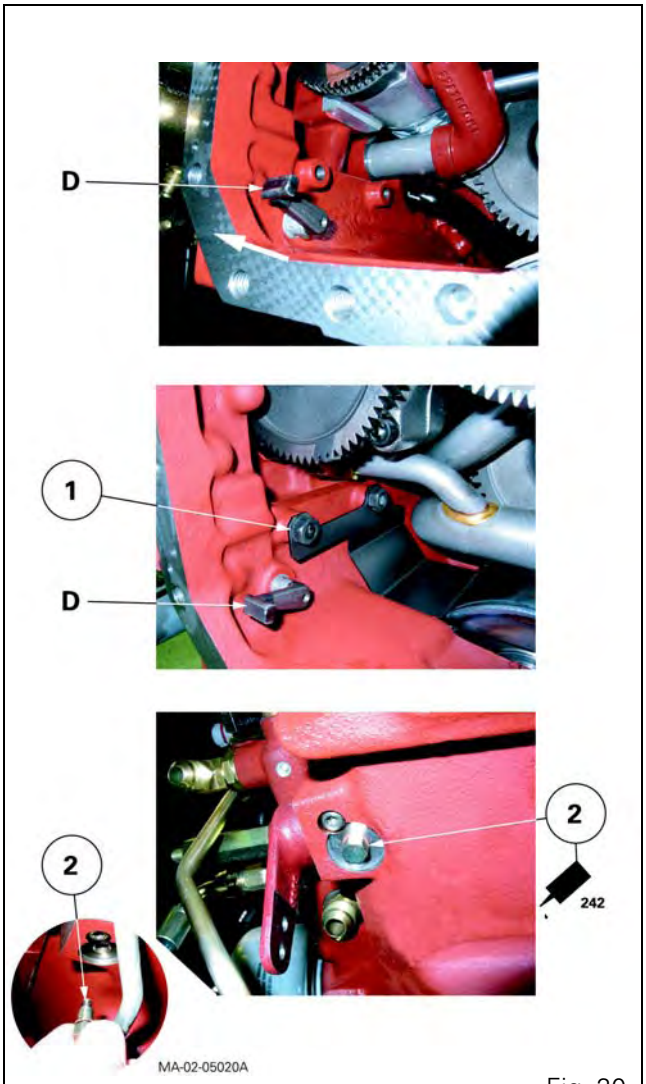

Fig. 20

Checking tightness

- Mating faces
- Hydraulic unions
- Bleed screw on suspended front axle control unit (if fitted)

2C40 - GBA10/GPA30 separation

CONTENTS

GBA10/GPA30 separation

A . General

There are two procedures for disassembling the gearbox and the intermediate housing, depending on the type of operation to be carried out on the tractor.

- **Disassembly with cab fixed to the rear axle**
  Accessible elements:
  - gearbox output shaft
  - creeper unit and creeper gear selection mechanism (if fitted).
- **Disassembly with the cab fixed to the gearbox**
  Accessible elements:
  - crownwheel and pinion
  - handbrake mechanism.

***IMPORTANT**: This section describes a general disassembly procedure. Before and during disassembly, check that all connections between the fixed assembly and mobile assembly have been disconnected.*

B . Disassembly and reassembly with the cab fixed to the rear axle

Implementation

1. Apply the handbrake.
2. Check that the suspended front axle and the front linkage (if fitted) are in the lowered position.
3. Remove:
   - the side panels either side of the engine
   - the bonnet.
4. Place the rear wheels in the wide track position.

Operations underneath the tractor

5. Mark and disconnect the hoses attached either side of the 4WD drive shaft guards (front and rear). Plug their ports.
6. Remove the guards and 4 WD transmission shaft.
7. Drain the oil from the gearbox and rear axle.
8. Remove:
   - the cover located under the rear of the gearbox
   - the PowerShuttle lubricating pipe (1) located between the intermediate housing and gearbox (Fig. 1). Plug the ports.

Operations at the front of the tractor

9. If the tractor is fitted with a centre weight and front weights, it is recommended that the front weights be removed in order to lighten the front of the tractor.

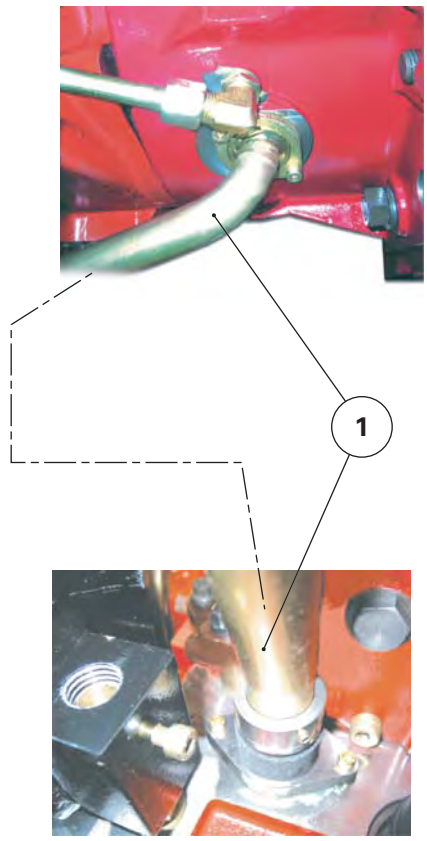

Fig. 1

Operations on the right-hand side of the tractor

10. Disconnect the batteries.

11. If necessary, remove:
- the footplate
- the batteries and their support
- the gearbox side reinforcement.

12. Mark then disconnect:
- the lubrication hoses on the right-hand hydraulic cover (these hoses are routed to the cooler). Plug the ports
- connectors TR24, TR25, TR26 and TR27 on the GBA10 control block (PowerShuttle/Dynashift) located at the front and on the right-hand side of the gearbox
- the low pressure pipe (17 bar) that connects the right-hand hydraulic cover to the selector cover. Plug the port
- the low pressure hose (17 bar) routed to the power braking assistance. Plug the port
- the front differential lock hose on the right-hand hydraulic cover.

13. Mark and disconnect the following items on the selector cover:
- the temperature sensor connector TR22
- the Tortoise/Hare solenoid valve connector TR20
- the neutral position switch connector TR21
- the safety cell connector TR19
- the radar (if fitted)
- the brake master cylinder return hose. Plug the port
- the steering spool valve (Orbitrol) return hose. Plug the port
- the power braking assistance return hose. Plug the port
- the gear shift linkage cables (see chapter 5)
- the creeper unit control cable (if fitted).

Operations on the left-hand side of the tractor

14. Mark then disconnect:
- the harness of the fuel gauge on the fuel tank
- the fuel feed and return hoses on the engine. Plug the ports
- the vent hose on the fuel tank.

15. Drain the fuel tank (if necessary).

16. Remove:
- the footplate
- the fuel tank
- the gearbox side reinforcement.

17. Disconnect:
- the lubrication hoses located on the left-hand side of the cab and at the rear of the engine (these hoses are routed to the cooler). Plug the ports
- the pressure, return and LS hoses located on the bottom left-hand side of the engine (these hoses are routed to the suspended front axle (if fitted)). Plug the ports
- the high pressure hoses located on the bottom left-hand side of the engine (these hoses are routed to the front linkage (if fitted)). Plug the ports.

18. Disconnect the gearbox lubrication pipe located at the front and on the left-hand side of it.

Operations under the cab

19. Mark the heating hoses (1) (Fig. 2) at the base of the cab right-hand pillar.

Pinch them both upstream and downstream of the square unions (2) (Fig. 2) in order to keep fluid loss to a minimum.

20. ***DANGER: To perform the following operation, the engine must be cold. Opening the pressurised cooling circuit can lead to splashing of hot fluid and cause serious burns.***

If you need to perform servicing immediately (on a hot engine), ensure you are wearing appropriate protective clothing (goggles and gloves) and loosen the expansion tank plug progressively.

Disconnect the heating hoses. Plug the ports.

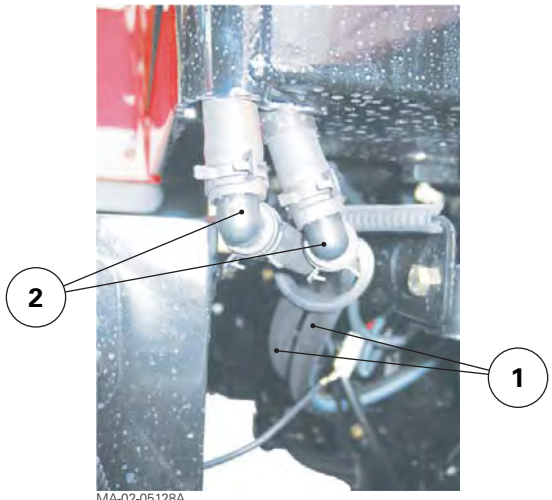

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Fig. 2

Operations on the engine

21. Disconnect the ENG4 connector from the main harness at the rear of the engine (Fig. 3).

22. Detach the air conditioning compressor, condenser and filter from their respective supports. Carefully keep them apart without opening the circuit (see chapter 12).

IMPORTANT: *If the air conditioning circuit should be open, see chapter 12 before any action.*

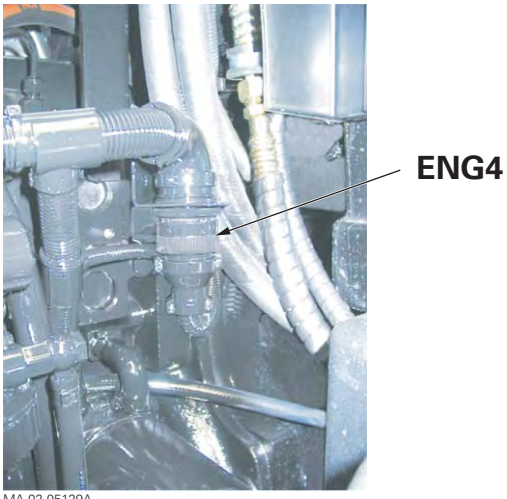

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Fig. 3

Operations at the front of the cab

23. Disconnect the ENG1 and ENG2 connectors located on the left-hand face of the cab bulkhead (Fig. 4).

24. Mark then disconnect (Fig. 5):

- the hose on the steering unit (Orbitrol) to the left-hand steering ram union. Plug its port
- the hose on the steering unit (Orbitrol) to the right-hand steering ram union. Plug its port.

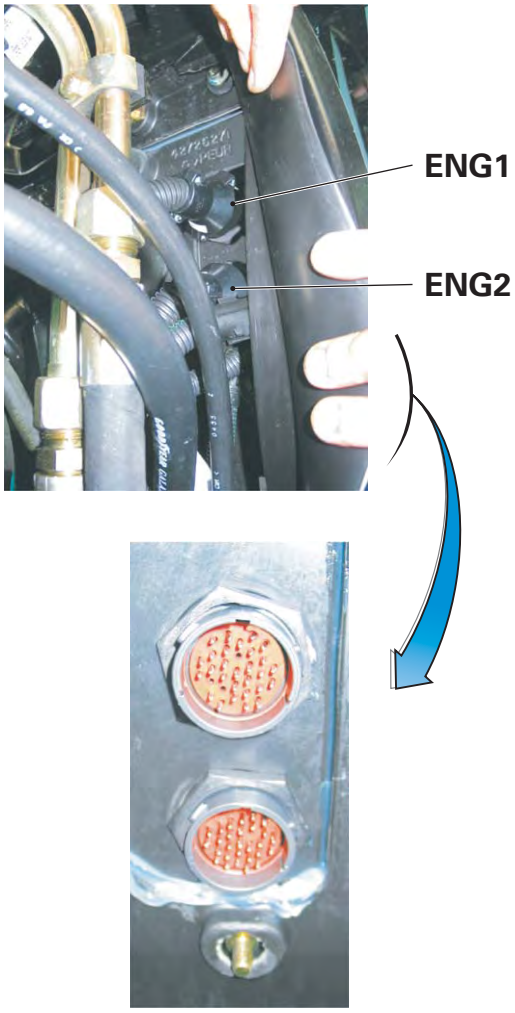

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Fig. 4

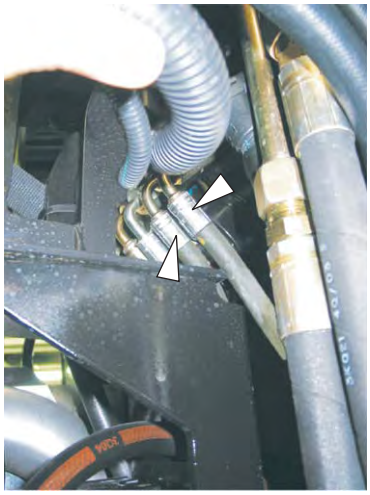

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Fig. 5

Preparing for disassembling

25. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the front frame (1) (Fig. 6).

26. Chock the rear wheels.

27. Unscrew the two lower bolts (M16) (6) through the aperture in the cover located at the rear and on top of the gearbox (Fig. 7).

28. Place (Fig. 8):

- a fixed stand at the front end of and under the centre housing
- a fixed stand at the rear end of and under the hitch
- a mobile stand at the rear of and underneath the gearbox.

29. Separate the cab from the front right- and left-hand supports. Gently lift it using two straps fitted to the lateral handles. Support the cab at the sides using suitable stands.

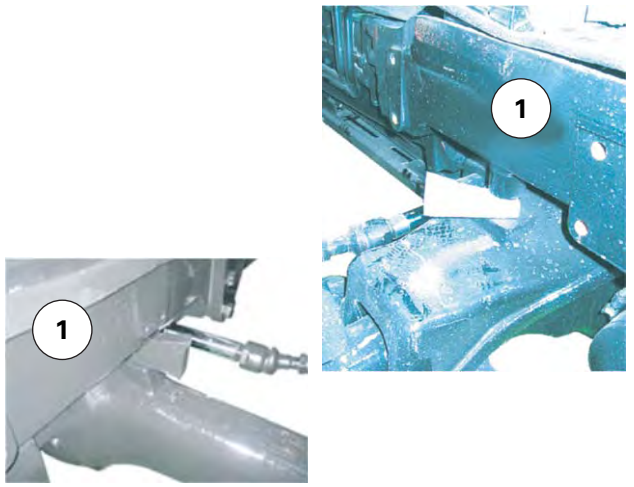

Fig. 6

Disassembly

30. Unscrew the remaining bolts (1) (5) and nuts (3) securing the gearbox to the intermediate housing (Fig. 7).

Make a note of bolt locations and lengths.

Characteristics of bolts, nuts and studs

Bolts	Nuts	Studs
M16x35 M16x50 M16x60 M16x70	M16	M16

NOTE: *The thread of studs (2) (Fig. 7) fitted in the intermediate housing is to be lightly smeared with Loctite 270 or equivalent.*

31. With the help of an operator, separate the assemblies (Fig. 8). When disassembling, check that all connections (hoses, pipes and harnesses) are disconnected.

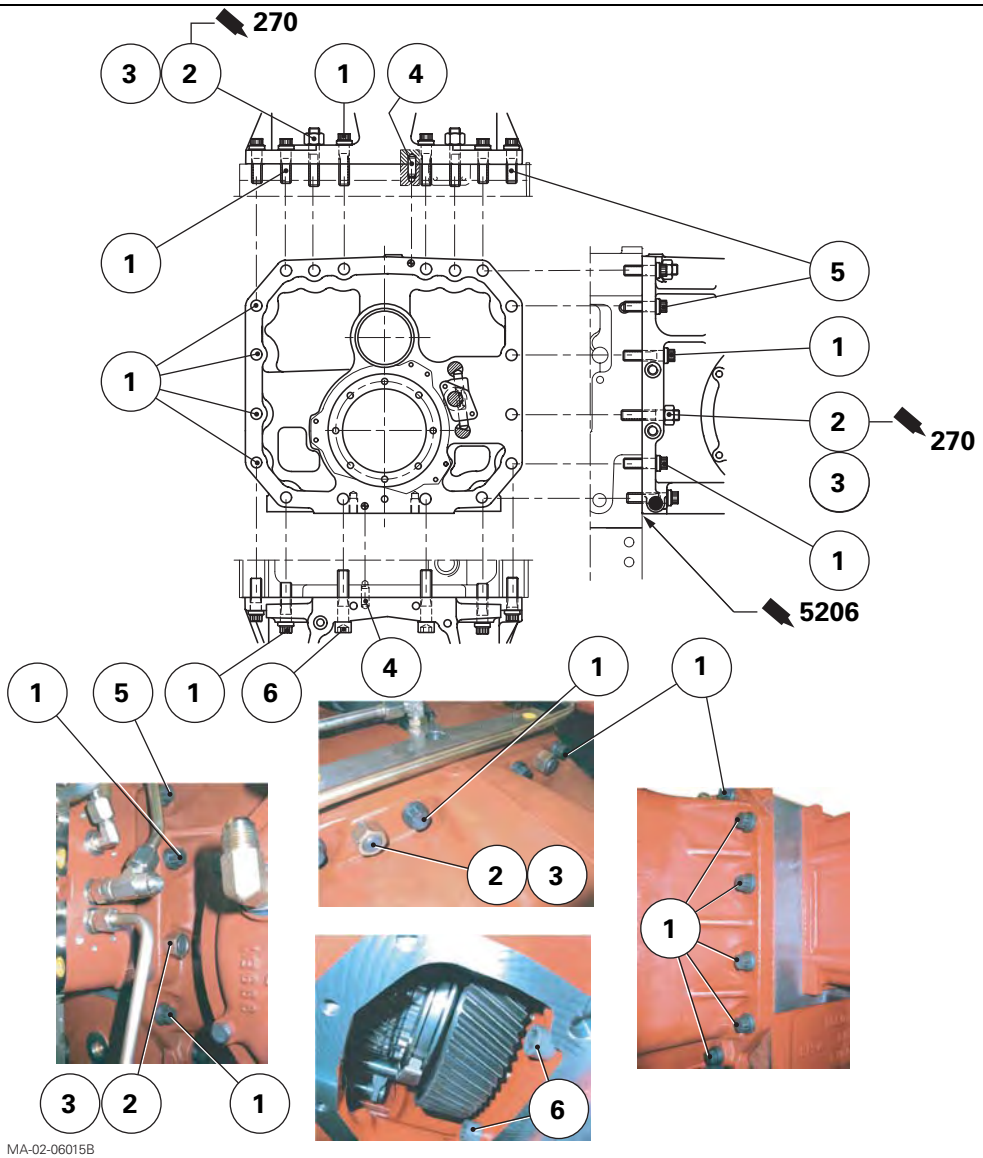
270
3
2
1
4
1
1
5
1
2
270
3
1
5206
1
5
1
6
4
1
1
2
3
1
3
2
1
6
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Fig. 7

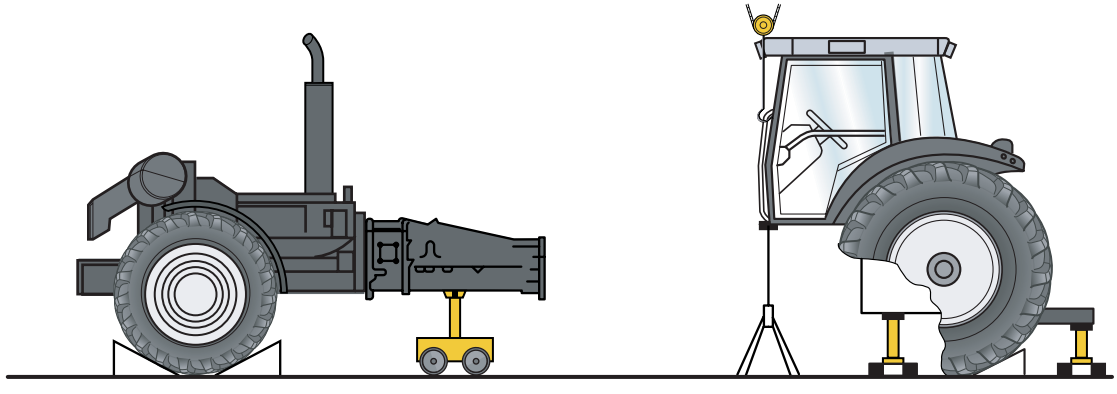
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Fig. 8

Reassembly

32. Clean the mating surfaces of the gearbox and the intermediate housing.

33. Check the presence of dowels (4) on the gearbox (Fig. 7). These dowels are to be force-fitted.

34. Check that the studs (2) are in good condition (Fig. 7) and are correctly fitted to the intermediate housing.

35. Check that the following are fitted and positioned correctly (Fig. 9):
- the PTO shaft (2) in the gearbox
- the connecting sleeve (3) on the hydraulic pump drive bearing.

36. Smear the spring (1) with miscible grease and fit it on the shaft collar (2) (Fig. 9).

37. Smear the mating face of the intermediate housing with Loctite 5206 or equivalent (Fig. 7).

38. Screw two diametrically opposed guide studs on to the intermediate housing.

39. Check:
- Version with no creeper unit
  - the correct positioning of the sleeve (2) on the pinion (Fig. 10).
- Version with creeper unit
  - that the lock ring (1) is fitted to the gearbox output shaft (Fig. 11)
  - the correct operation of the control mechanism in the intermediate housing (fork, selector rail and coupler) in each position
  - that the reduction unit connecting rod located on the right-hand side of the intermediate housing is directed upwards.

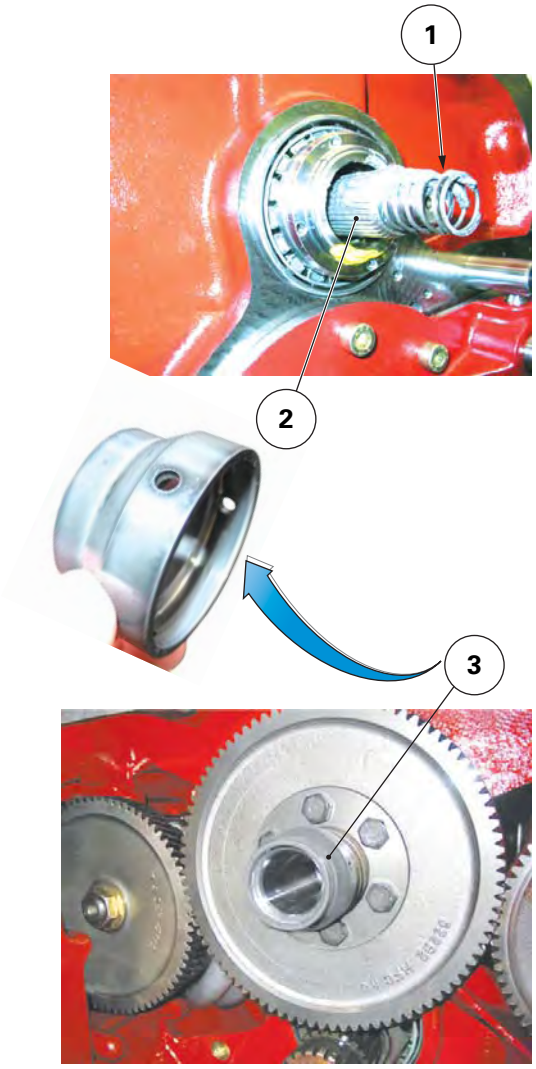

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Fig. 9

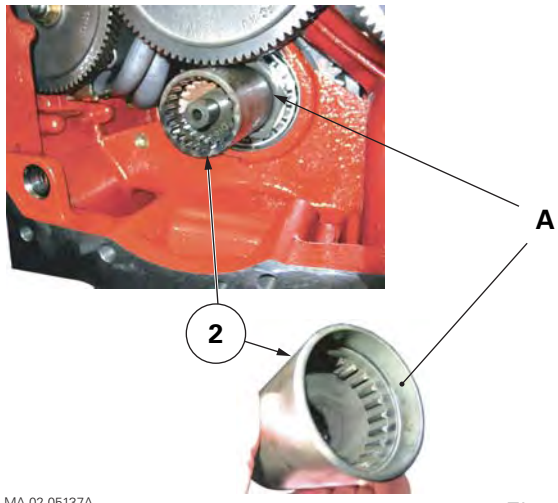

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Fig. 10

40. Couple the gearbox to the intermediate housing.

***IMPORTANT**: If there is resistance when moving the elements (gearbox and intermediate housing) together, do not force them; find the cause of the problem.*

41. When the elements are joined, remove the guide studs.

Tighten the screws and nuts as marked during removal (Fig. 7). Tighten them to a torque of:

- screw (1): 240 - 320 Nm
- screw (5): 220 - 280 Nm
- screw (6): 240 - 320 Nm
- nuts (3): 300 - 400 Nm.

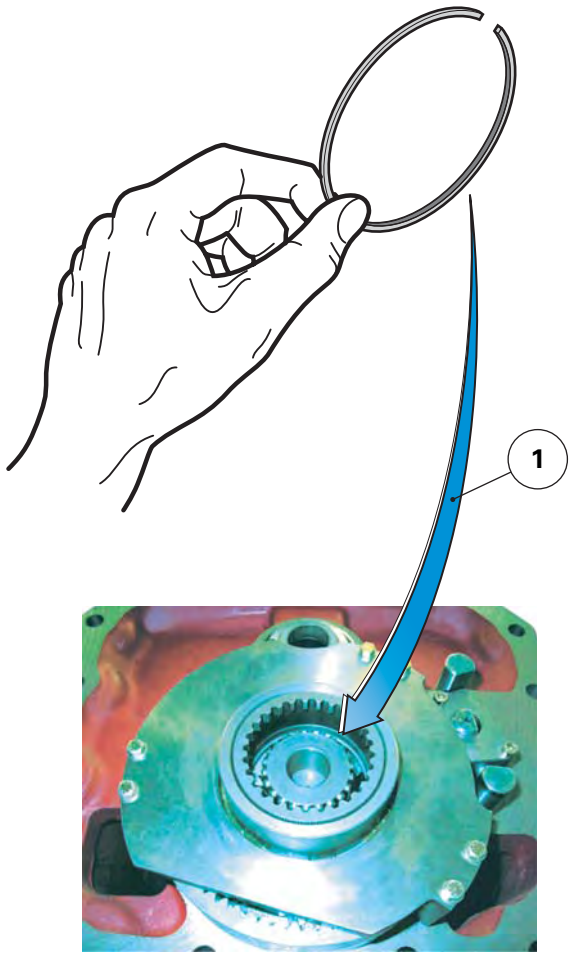

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Fig. 11

Final operations

Final steps are not especially difficult. They should therefore be carried out in the reverse order to the preliminary steps.

However, the following operations need to be performed during refitting:

- the **tightening torque**:
  - of the cab front rubber mount bolts (see chapter 12)
  - of the bolts for the cover located below and at the rear of the gearbox to 85 - 120 Nm (mating face smeared beforehand with Loctite 510 or equivalent)
  - of the rear wheel screws or nuts (see chapter 6).
- **topping-up**:
  - transmission oil in housings. This level is to be checked via the sight glass located on the left-hand side of the centre housing
  - coolant up to the maximum level marked on the expansion tank (Fig. 12).
- **settings**:
  - the creeper cable (if fitted)
  - the gear cables on the selector cover
  - chassis reinforcements (see chapter 2)
- **test**:
  - the air conditioning system (see chapter 12)
  - the suspended front axle (if fitted, see chapter 8)
  - the cab suspension (if fitted, see chapter 12)
  - the PowerShuttle
  - gears 1 to 4
  - the Hare/Tortoise ranges
  - the Dynashift
  - the creeper unit (if fitted).
- **check the tightness**:
  - the mating faces
  - the hydraulic unions.

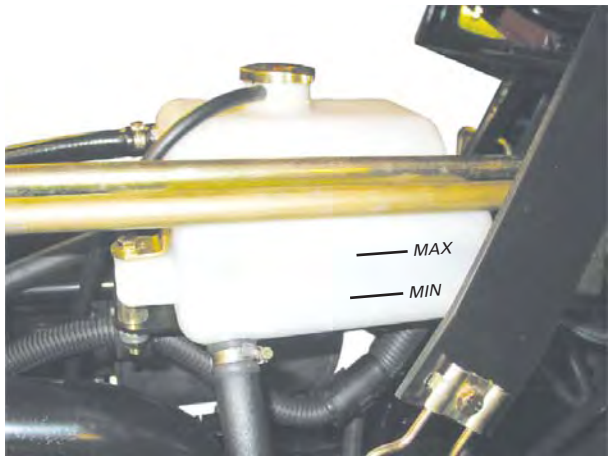

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Fig. 12

C . Disassembly and reassembly with the cab fixed to the gearbox

Disassembly with the cab fixed to the gearbox is almost identical to the procedure described in section B. The main difference lies in the added disassembly steps around the centre housing. These steps will enable the rear axle to be moved and to carry out the disassembly with the correct set-up.

Implementation

42. Apply the handbrake.

43. Check that the suspended front axle and the front linkage (if fitted) are in the lowered position.

44. Remove:

- the side panels either side of the engine
- the bonnet.

45. Place the rear wheels in the wide track position.

Operations underneath the tractor

46. Mark and disconnect the hoses attached either side of the 4WD drive shaft guards (front and rear). Plug their ports.

47. Remove the guards and 4 WD transmission shaft.

48. Drain the oil from the gearbox and rear axle.

49. Remove:

- the cover located under the rear of the gearbox
- the PowerShuttle lubricating pipe (1) located between the intermediate housing and gearbox (Fig. 13). Plug the ports.

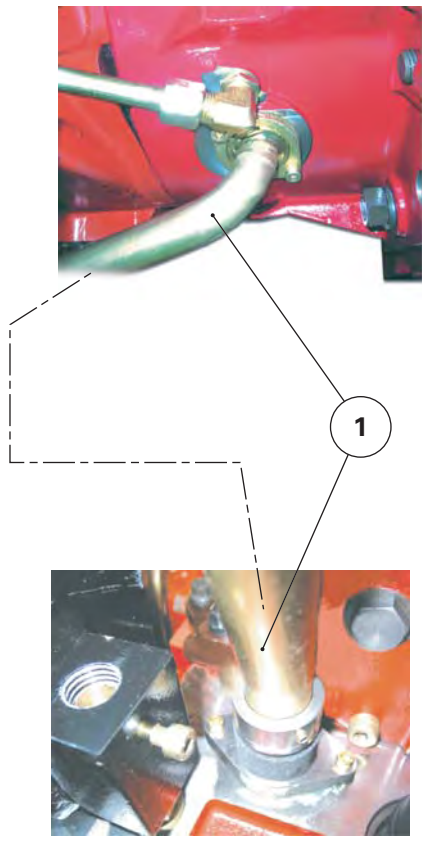

Fig. 13

Operations on the right-hand side of the tractor

50. Disconnect the batteries.

51. If necessary, remove:
- the footplate
- the batteries and their support
- the gearbox side reinforcement.

52. Mark then disconnect:
- the lubrication hoses on the right-hand hydraulic cover (these hoses are routed to the cooler). Plug the ports
- the low pressure pipe (17 bar) that connects the right-hand hydraulic cover to the selector cover. Plug the port
- the low pressure hose (17 bar) routed to the power braking assistance. Plug the port
- the front differential lock hose on the right-hand hydraulic cover
- the creeper cable (if fitted)
- the electrical connectors connected to the right-hand hydraulic cover and the 15-micron filter
- any hydraulic hoses still connected to the cab
- the engine speed sensor connector
- the linkage sensor connector.

Operations on the left-hand side of the tractor

53. Mark then disconnect:
- the harness of the fuel gauge on the fuel tank
- the fuel feed and return hoses on the fuel tank. Plug the ports
- the vent hose on the fuel tank.

54. Drain the fuel tank (if necessary).

55. Remove:
- the footplate
- the fuel tank
- the gearbox side reinforcement.

56. Disconnect the gearbox lubrication pipe located at the front and on the left-hand side of it.

Operations under the cab

57. Mark then disconnect:
- the right- and left-hand brake hoses. Plug the ports
- the steering hose of the trailer brake valve (if fitted) on the priority block. Plug the ports
- the handbrake cable
- the PTO speed sensor connectors
- the ground speed sensor connectors.

Operations at the rear of the tractor

58. Mark then disconnect:
- the Load Sensing spool valve control cable or cables (depending on version)
- the shiftable PTO cable (540 - 1000 rpm or 750 - 1000 rpm) (if fitted)
- the auto-hitch cable (if fitted)
- the connectors:
  - on the electrohydraulic spool valves (depending on version)
  - on the linkage spool valve
  - on the effort sensors.

59. Remove:
- the drawbars
- the lift rods
- the stabilisers.

Preparing for disassembling

60. Cancel the front axle oscillation (all versions) by sliding a suitable chock in at each side of the front frame (1) (Fig. 14).

61. Chock the front wheels.

62. Unscrew the two lower bolts (M16) (6) through the aperture in the cover located at the rear and under the gearbox (Fig. 15).

63. Install (Fig. 16):

- a fixed stand at the rear of the gearbox
- a mobile stand at the front of the rear axle
- a mobile stand at the rear of the rear axle.

64. Separate the standard cab from the rear right and left-hand mountings. Gently lift it using two straps, each one fitted with a hook. Fit each hook to the right and left-hand rear cab pillars. Support the rear of the cab at the sides using two suitable stands.

If the cab is fitted with pneumatic suspension, refer to chapter 12.

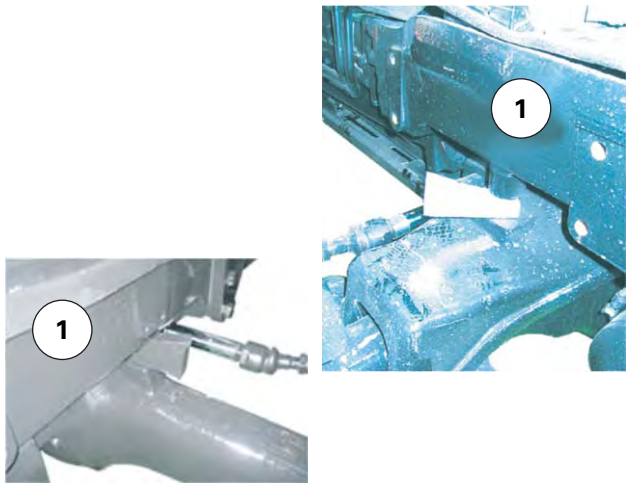

Fig. 14

Disassembly

65. Unscrew the remaining bolts (1) (5) and nuts (3) securing the gearbox to the intermediate housing (Fig. 15).

Make a note of bolt locations and lengths.

Characteristics of bolts, nuts and studs

Bolts	Nuts	Studs
M16x35 M16x50 M16x60 M16x70	M16	M16

NOTE: *The thread of studs (2) (Fig. 15) fitted in the intermediate housing is to be lightly smeared with Loctite 270 or equivalent.*

66. With the help of an operator, separate the assemblies (Fig. 16). When disassembling, check that all connections (hoses, pipes and harnesses) are disconnected.

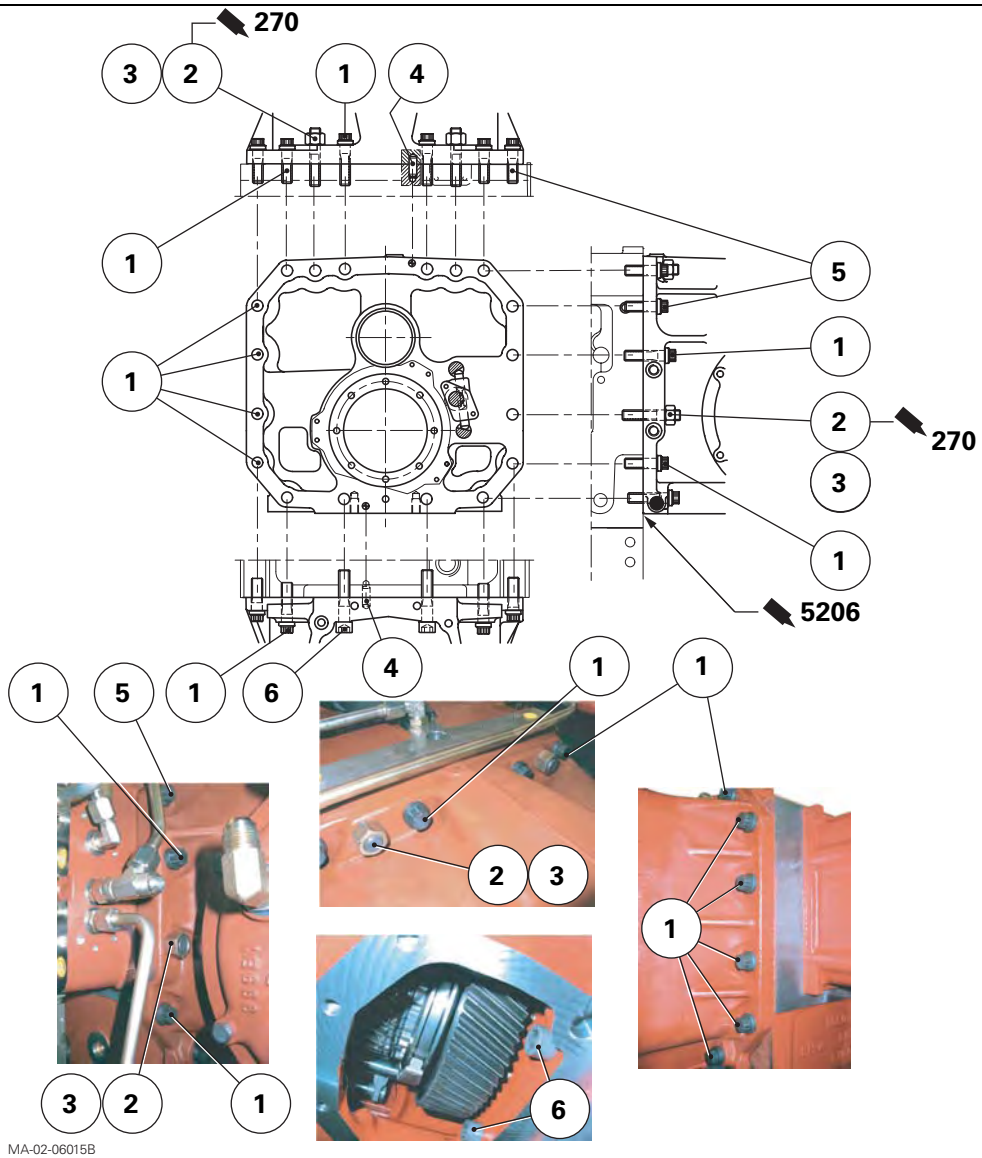
270
3
2
1
4
1
1
5
1
2
270
3
1
5206
1
5
1
6
4
1
1
2
3
1
3
2
1
6
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Fig. 15

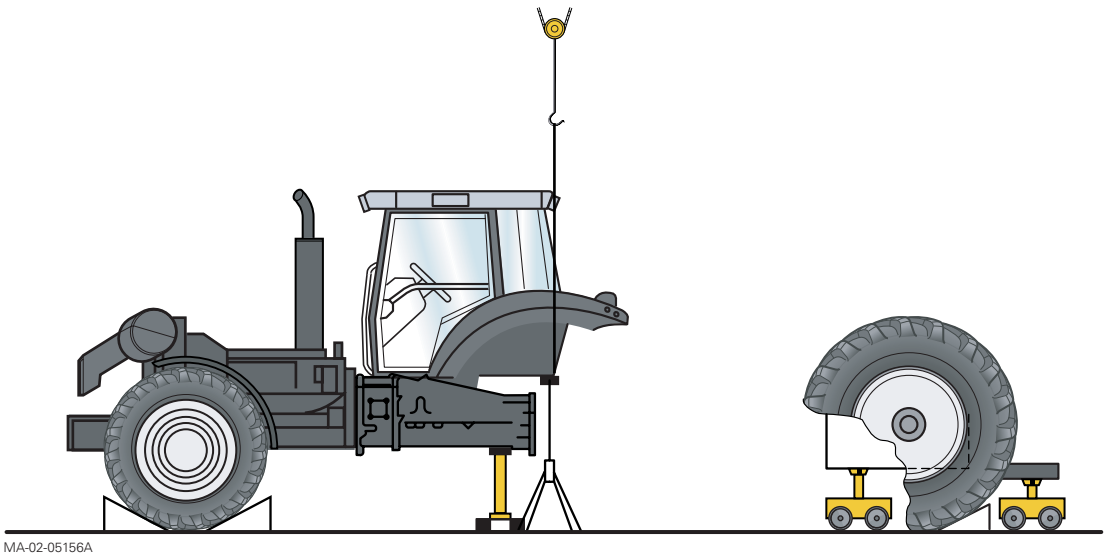
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Fig. 16

Reassembly

67. Clean the mating surfaces of the gearbox and the intermediate housing.

68. Check the presence of dowels (4) on the gearbox (Fig. 15). These dowels are to be force-fitted.

69. Check that the studs (2) are in good condition (Fig. 15) and are correctly fitted to the intermediate housing.

70. Check that the following are fitted and positioned correctly (Fig. 17):
- the PTO shaft (2) in the gearbox
- the connecting sleeve (3) on the hydraulic pump drive bearing.

71. Smear the spring (1) with miscible grease and fit it on the shaft collar (2) (Fig. 17).

72. Smear the mating face of the intermediate housing with Loctite 5206 or equivalent (Fig. 15).

73. Screw two diametrically opposed guide studs on to the intermediate housing.

74. Check:
- Version with no creeper unit
  - the correct positioning of the sleeve (2) on the pinion (Fig. 18).
- Version with creeper unit
  - that the lock ring (1) is fitted to the gearbox output shaft (Fig. 19)
  - the correct operation of the control mechanism in the intermediate housing (fork, selector rail and coupler) in each position
  - that the reduction unit connecting rod located on the right-hand side of the intermediate housing is directed upwards.

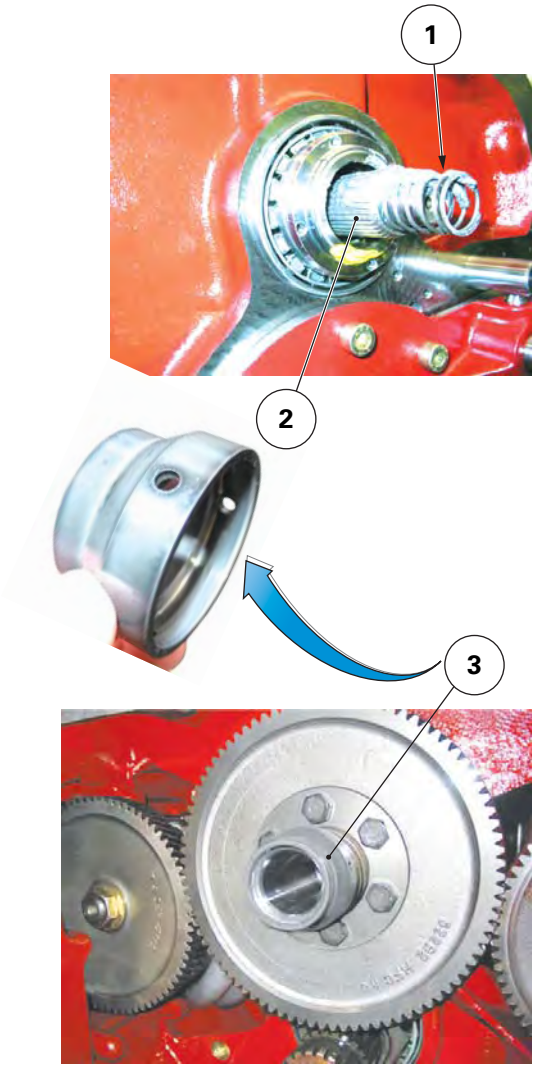

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Fig. 17

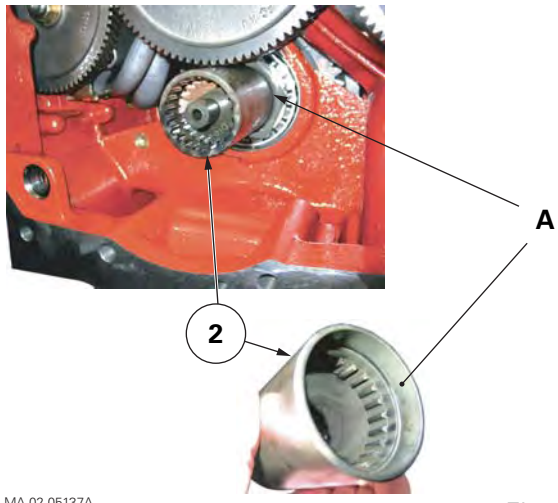

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Fig. 18

75. Couple the gearbox to the intermediate housing.

If there is resistance when moving the elements (gearbox and intermediate housing) together, do not force them; find the cause of the problem.

76. When the elements are joined, remove the guide studs.

Tighten the screws and nuts as marked during removal (Fig. 15). Tighten them to a torque of:

- screw (1): 240 - 320 Nm
- screw (5): 220 - 280 Nm
- screw (6): 240 - 320 Nm
- nuts (3): 300 - 400 Nm.

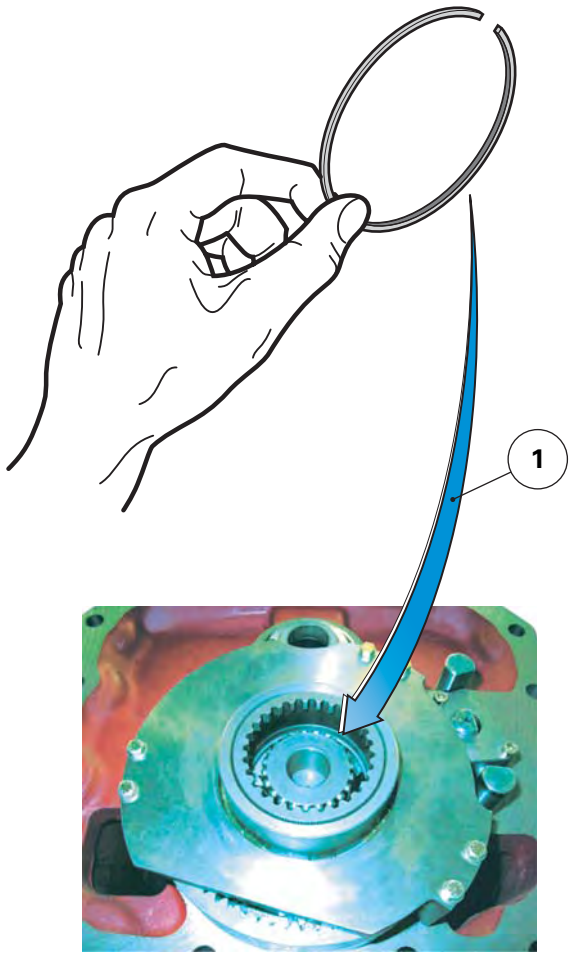

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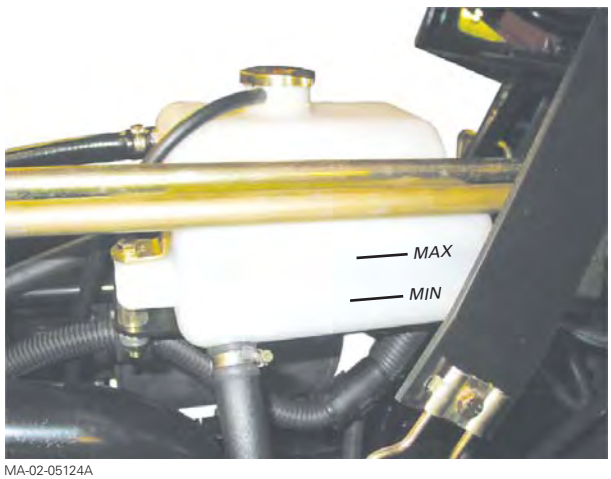
Fig. 19

Final operations

Final steps are not especially difficult. They should therefore be carried out in the reverse order to the preliminary steps.

However, the following operations need to be performed during refitting:

- the **tightening torque**:
  - of the standard cab rear rubber mount bolts or of the bolts on the suspended cab pneumatic suspension system (dampers and lateral connecting rods) (depending on version) (see chapter 12)
  - of the bolts on the cover located under and at the rear of the gearbox to 85 - 120 Nm (mating face smeared beforehand with Loctite 510 or equivalent)
  - of the rear wheel screws or nuts (see chapter 6)
- **topping-up**:
  - transmission oil in housings. This level is to be checked at the sight tube located on the left-hand side of the centre housing,
  - coolant up to the maximum level marked on the expansion tank (Fig. 20).
- **settings**:
  - the creeper cable (if fitted)
  - chassis reinforcements (see chapter 2)
  - of the shiftable PTO cable (540 - 1000 rpm or 750 - 1000 rpm) (if fitted)
  - of the auto-hitch (if fitted) cable
  - of the Load Sensing spool valve control cable or cables (depending on version).
- **setting up the brakes**: bleeding main brakes and trailer brake (depending on option, see chapter 9).
- **test**:
  - the air conditioning system (see chapter 12)
  - the suspended front axle (if fitted, see chapter 8)
  - the cab suspension (if fitted, see chapter 12)
  - the PowerShuttle
  - gears 1 to 4
  - the Hare/Tortoise ranges
  - the Dynashift
  - the creeper unit (if fitted)
  - the rear and front linkage (if fitted) in the raised, lowered and transport positions
  - the Load Sensing spool valves (cable control) and/or electrohydraulic spool valves
  - the power take-off (all versions)
  - the auto-hitch (if fitted).
- **check the tightness**:
  - the mating faces
  - the hydraulic unions.



MA-02-05124A

Fig. 20

2D10- Intermediate housing/centre housing separation - GPA30

CONTENTS

Intermediate housing/centre housing separation - GPA30

A . General

The intermediate housing (19) is to be disassembled from the centre housing (1) (Fig. 1) keeping the cab attached to the gearbox.

This disassembly is appropriate for repairs requiring access to the crownwheel and pinion and/or handbrake mechanism.

***IMPORTANT**: This section describes a general disassembly procedure. Due to the wide variety of hydraulic or mechanical options that can be fitted to the tractor, we will only refer to the main lines or connections to be disconnected.*

Before and during disassembly, check that all connections between the fixed assembly and mobile assembly have been disconnected.

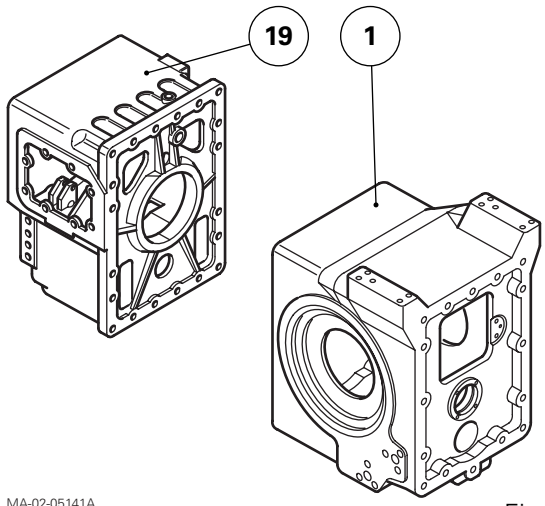


Fig. 1

B . Preliminary operations

Disassembling the intermediate housing from the centre housing requires the tractor to be split first between the GBA10 gearbox and the intermediate housing (see relevant section, chapter 2), whilst keeping the cab fixed to the gearbox.

C . Disassembly

1. Remove the following from the intermediate housing (19) (Fig. 1, Fig. 4):
   - the right-hand hydraulic cover (see chapter 9)
   - the left-hand hydraulic cover (see chapter 9)
   - the bottom cover (3) of the 4WD mechanism (if fitted).

   Removing these covers provides access to hidden bolts V that secure the intermediate housing to the centre housing (Fig. 2, Fig. 4).
2. Disconnect any remaining hydraulic hoses and pipes left attached to the housings.
3. Chock the rear wheels.
4. Place (Fig. 5):
   - a fixed stand under and at the front of the centre housing
   - a fixed stand under and at the rear of the hitch hook.
5. Sling the intermediate housing (19) using a suitable device (Fig. 5).
6. Unscrew two diametrically opposed side bolts (2) (Fig. 2). Replace with two M16 guide studs of suitable length.

   Unscrew the remaining (side and top) bolts (2) (Fig. 2). Mark their position and length.
7. Release and separate the intermediate housing (19) from the centre housing (1) (Fig. 5). The PTO shaft (28) (Fig. 4) fitted between the pump drive bearing and the PTO clutch is withdrawn with the intermediate housing.

   IMPORTANT: *If the mating face fails to release easily when attempting to split the housings, screw an M16 bolt of suitable length into each tapped hole T located in each intermediate housing mounting flange (left and right-hand side) (Fig. 3). Continue turning the screws until the housings are fully separated.*
8. Make a visual note of profile D of the PTO shaft (28) to ensure it clears the crownwheel and pinion (Fig. 4). Remove this shaft if necessary.

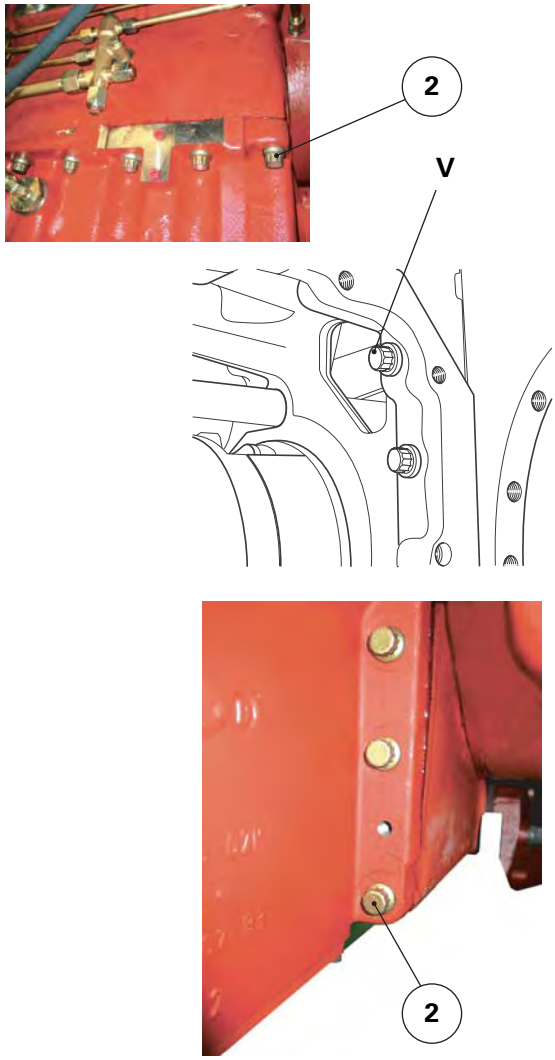


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Fig. 2

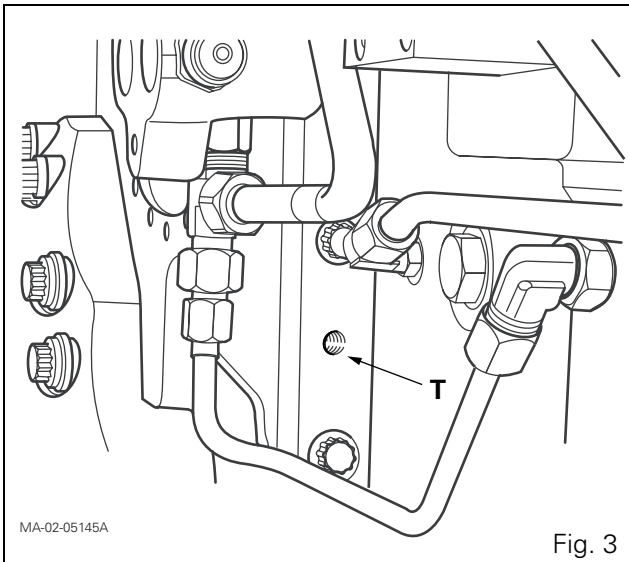

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Fig. 3

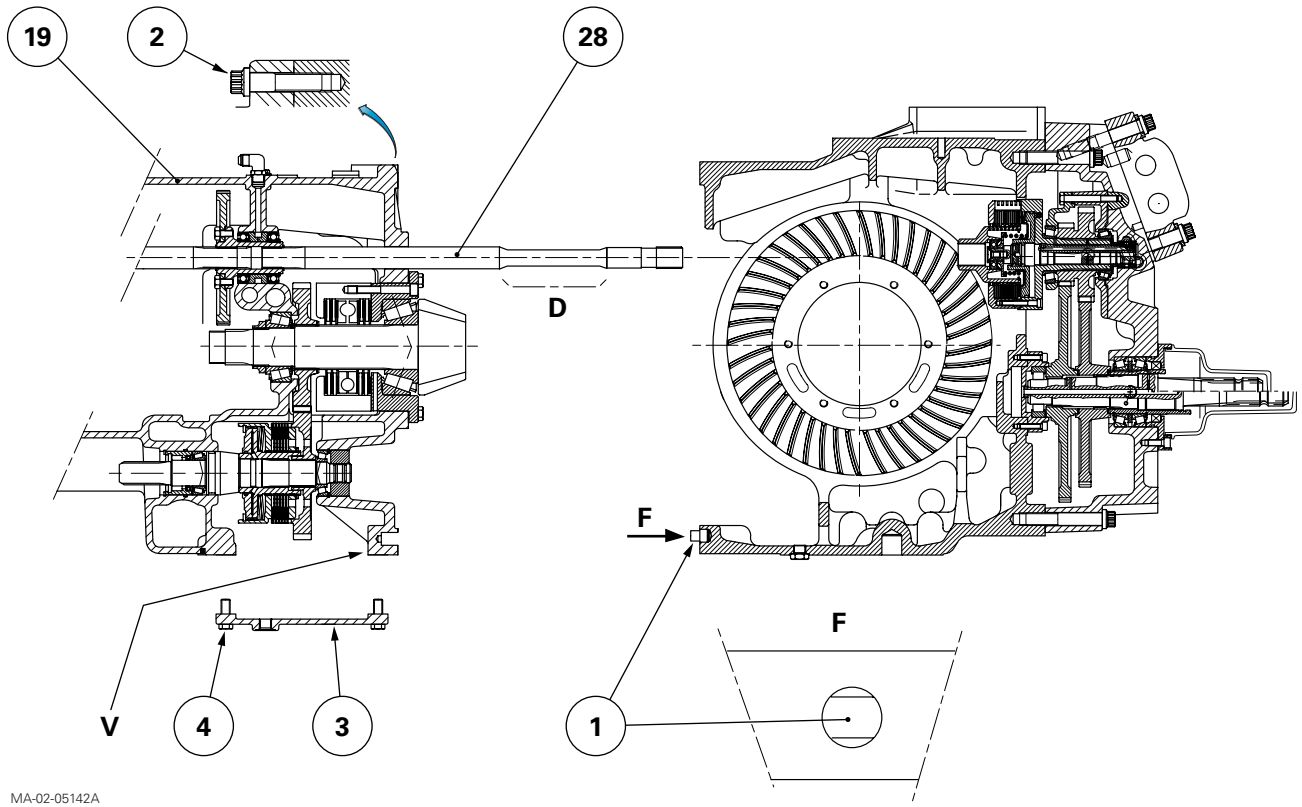

Fig. 4

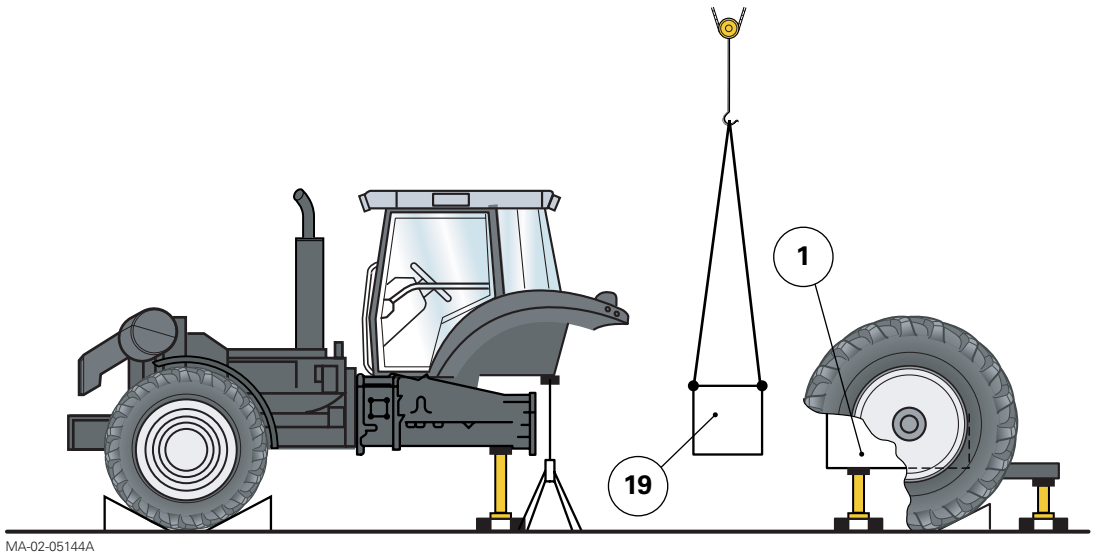

Fig. 5

D . Reassembly

9. Clean the mating faces of the intermediate and centre housings.

10. Smear the mating face of the centre housing with Loctite 5206 or equivalent (Fig. 6).

11. Check that the centring pin is fitted and in the correct position (1) (Fig. 6) which must:
- be a forced fit
- have its two flats parallel to the horizontal centreline of the housing.

12. If it was removed, replace the PTO shaft (28) ensuring its profile D is correctly positioned (Fig. 7).

13. Screw two diametrically opposed guide studs on to the housing.

14. Fit the intermediate housing to the centre housing. To make assembly easier, rotate the hydraulic pump driving gear in order to mesh the splines on the shaft (28) with those of the PTO clutch.

15. Remove the guide studs.
Refit all bolts V and (2) in their original positions. Tighten them to 300 - 400 Nm.

16. Reconnect any hydraulic hoses and pipes which were disconnected from around the housings.

17. Clean the mating faces of the intermediate housing and cover (3) (Fig. 8).

18. Smear the mating face of the intermediate housing with Loctite 510 or equivalent.

19. Refit:
- the cover (3). Tighten the screws (4) to 50 - 70 Nm (Fig. 8)
- the left-hand hydraulic cover (see chapter 9)
- the right-hand hydraulic cover (see chapter 9).

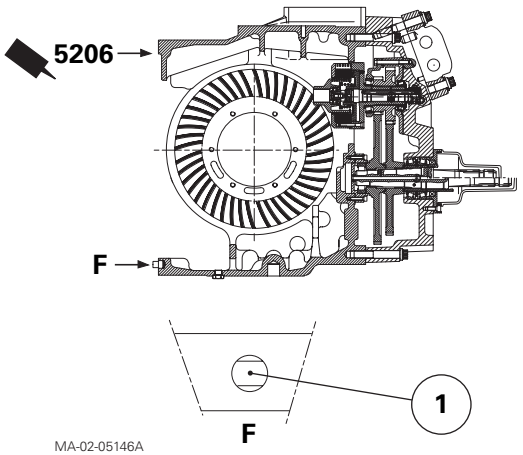

Fig. 6

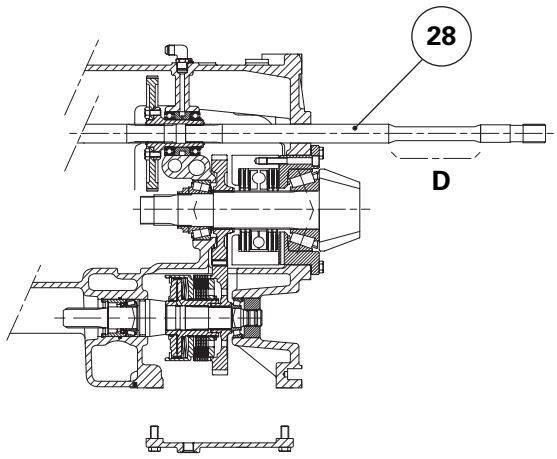

Fig. 7

E . Final operation

20. Couple the tractor between the GBA10 gearbox and the intermediate housing (see chapter 2).

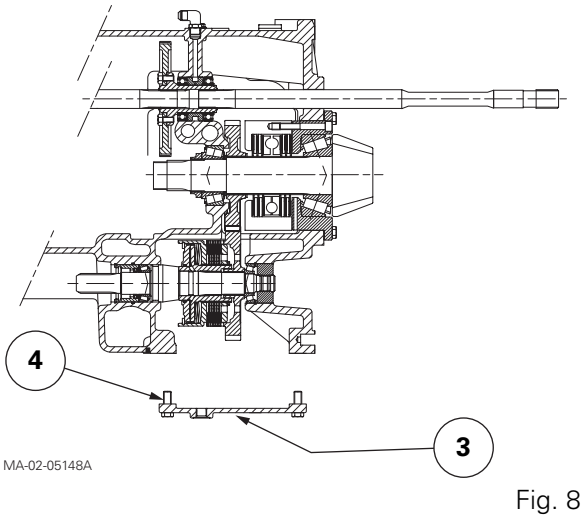

Fig. 8

2E10- Splitting - PTO housing / Centre housing

CONTENTS

Splitting - PTO housing / Centre housing

A . General

- It is necessary to move the PTO housing (1) backwards (Fig. 1) in order to:
  - gain access to the PTO brake hydraulic elements
  - work on the PTO gearing
  - replace the output shaft seal

B . Preliminary operations

1. Bleed the centre housing.
2. Remove the oil recovery tank of the hydraulic couplers.
3. Remove:
   - the 3 rd point link.
   - the swinging drawbar.
4. Remove:
   - The protectors (5), flanges (1) (Fig. 2) and harness guard of each draft sensor.
   - The draft sensors (4) (Fig. 2).
   - The stabilisers, drawbars and lift rods.
5. Disconnect the pipes (lubricating and PTO brake) located on the right-hand side of the housing.
6. Disconnect the PTO sensors (1) (2), (Fig. 3) which are fitted respectively to the 540 rpm driven gear and the output shaft.

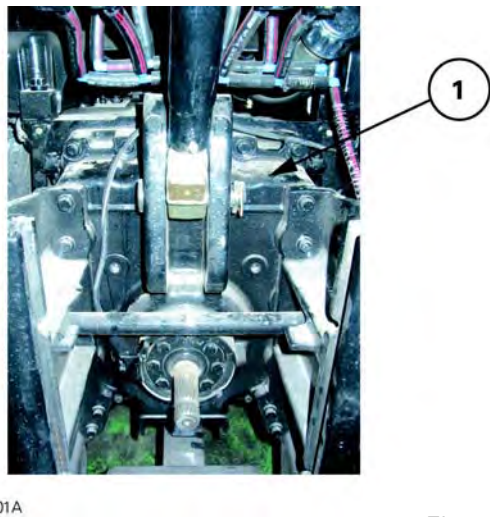

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Fig. 1

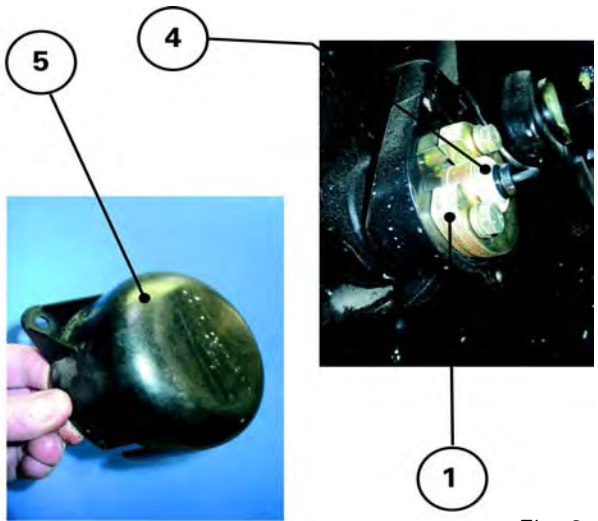

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Fig. 2

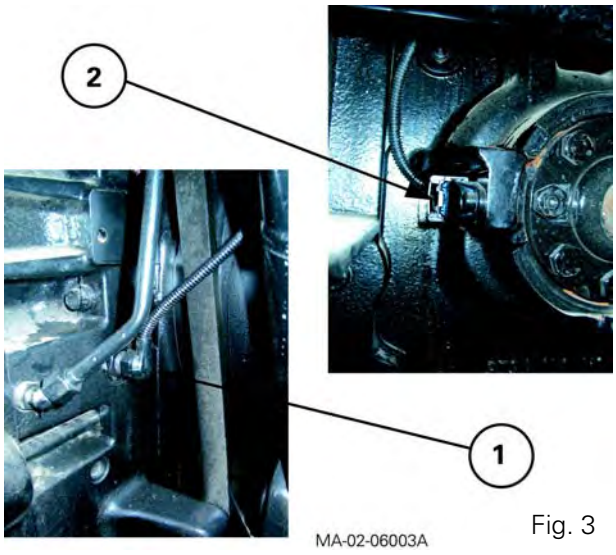

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Fig. 3

7. If necessary, with the help of an operator or a suitable lifting tool, remove the hitch support after placing two locally-made guide studs (M16 - L150 mm) on the housing.

8. Disconnect:
- On the left-hand side of the housing.
  - the cable linked to the 540 – 1000 rpm guide rod link (1) (Fig. 4).
- On the right-hand side of the housing.
  - The cable linked to the 750 rpm guide rod link (2) (if fitted - Fig. 4)
  - The cable linked to the guide rod link (3) of the GSPTO (if fitted - Fig. 5).

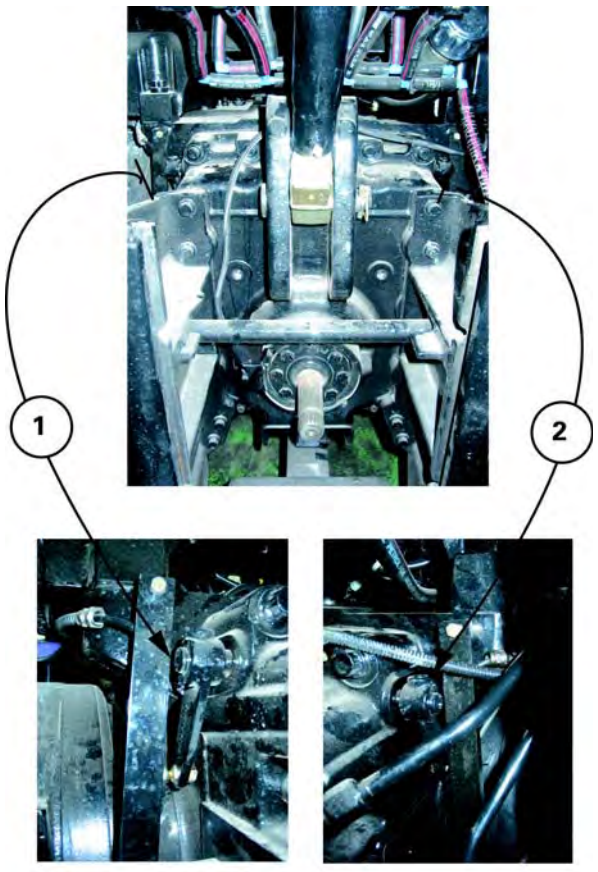

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Fig. 4

C . Disassembling

9. Position two diametrically opposed guide studs on the housing and remove the remaining M16 screws.

10. Detach the PTO housing, using a lever to carry out a weighing between it and the trumpets.

11. Sling the PTO housing as shown in Fig.6, and remove it from the centre housing with a suitable lifting tool.

Slide a pipe over the output shaft to compensate for possible oscillation of the assembly.

Remark

- The PTO housing splits completely from the centre housing, including the driving pinions and driven gears (Fig.6).
- The shaft (2) may remain in the centre housing (Fig.6).
- If the tractor is equipped with GSPTO, the same applies as for the shaft (3) (Fig.6).

D . Reassembling

12. Clean the housing mating faces.

13. Lightly smear the mating face of the centre housing with a sealing product (Loctite 5206 or equivalent) (Fig.6).

14. Check the presence of locating pins on the PTO housing.

Remark

The locating pins must protrude from the PTO housing mating face by approximately 9 to 10 mm.

15. Position the housing assembly on the "G" guide studs fitted previously and slide gradually into place (Fig.6).

16. Engage a PTO gear. Push on housing while simultaneously turning the output shaft in order to engage the mechanical elements.

17. Abut the PTO housing against the centre housing.

18. Refit the hitch support (if necessary). Fit screws (4) (Fig.6) after lightly smearing the thread with Loctite 242 or equivalent. Remove the guide studs simultaneaously. Tighten the screws to a torque of 240 -320 Nm.

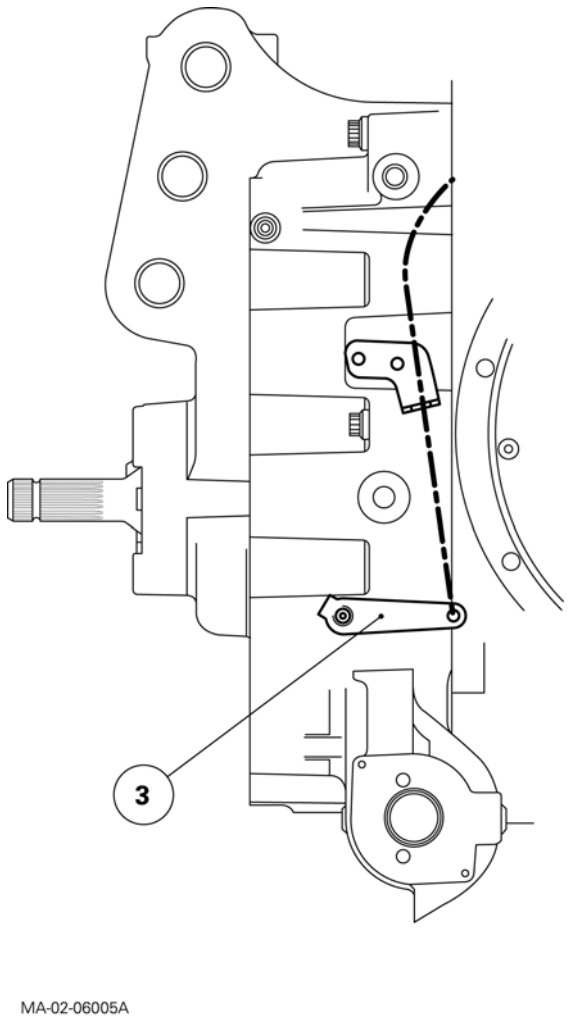

Fig. 5

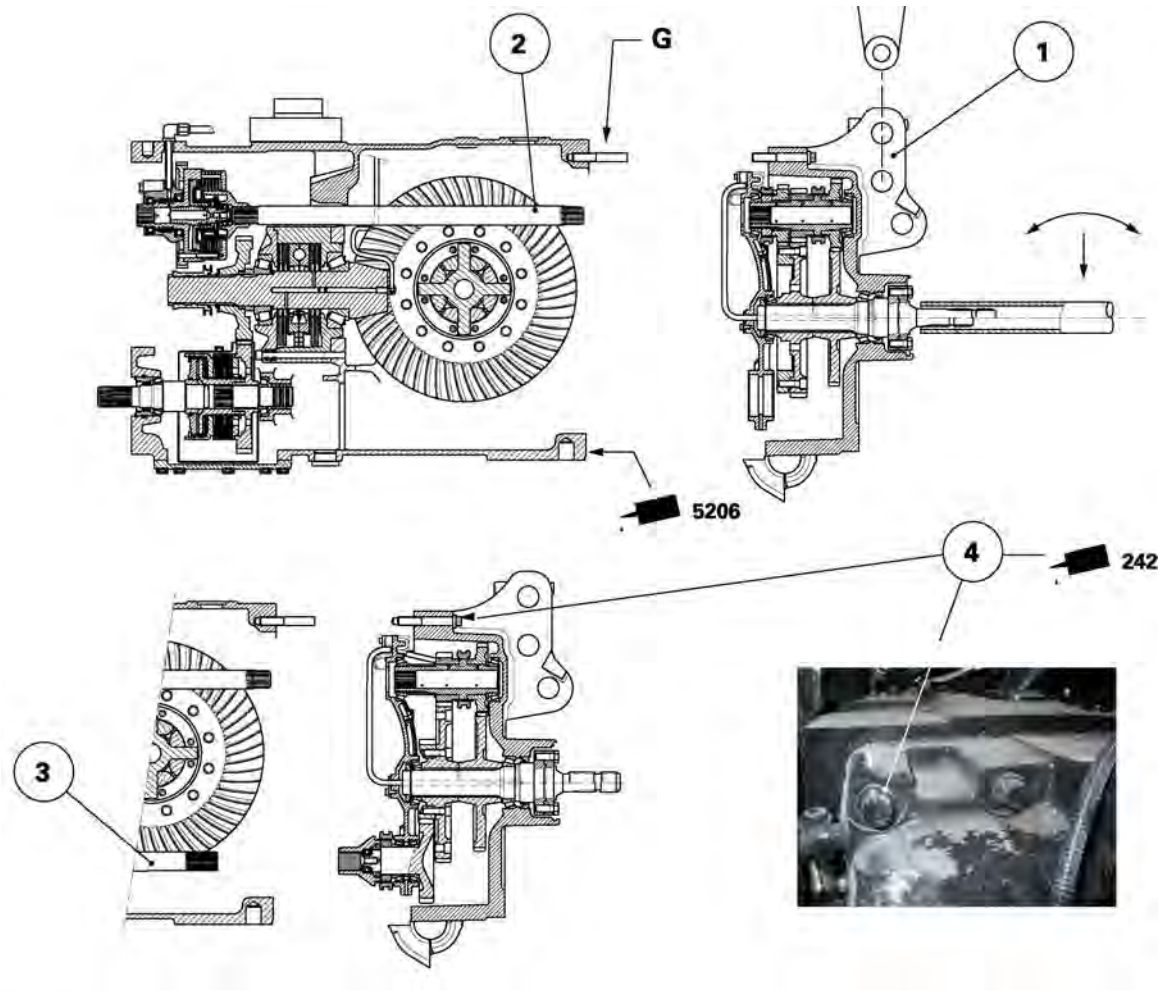

Fig. 6

E . Final operations

19. Reconnect the PTO sensors.

20. Reconnect the pipes (lubricating and PTO brake).

21. Refit:

- The lift rods, drawbars and stabilisers.
- The draft sensors.
- The harness guard of each sensor, the flanges (1) (Fig.7) and the protectors.

Tightening torques

- Screw (2): 66 - 89 Nm. The thread should be lightly smeared with Loctite 270 or equivalent (Fig. 7).

22. Refit:

- The swinging drawbar
- The third-point link.

23. Empty and clean the oil recovery tank of the hydraulic couplers and refit.

24. Top up the oil level of the housings and check using the sight glass located on the left-hand side of the PTO housing.

25. Check:

- The oil tightness of the PTO housing mating face and of the hydraulic unions.
- The operation of the power take-off:
  - 540 - 1000 and 750 rpm (if fitted).
  - GSPTO (if fitted).

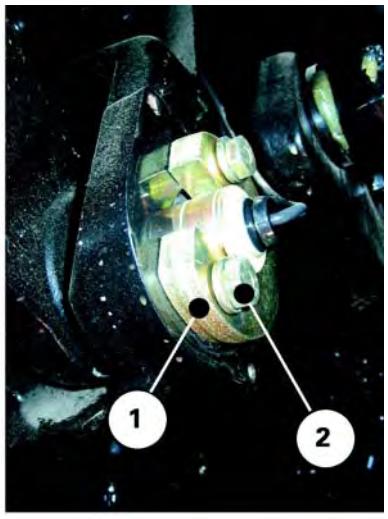

Fig. 7

Splitting - PTO housing / Centre housing

2E20- Centre housing/PTO housing separation - GPA30

CONTENTS

Centre housing/PTO housing separation - GPA30

A . General

It is necessary to move the PTO housing (1) backwards (Fig. 1) in order to:

- gain access to the PTO brake hydraulic elements
- work on the PTO gears (all types)
- replace the rear bearing cassette seal (only on tractors fitted with a shiftable or 1000 rpm output shaft PTO).

B . Preliminary operations

1. Drain the centre housing.
2. Remove the oil-recovery tank or tanks (4), depending on the hydraulic version, for the hydraulic couplings (3) (Fig. 2).
3. Remove:
   - the 3rd point link
   - the swinging drawbar.
4. Mark the position of the hoses (2). Disconnect them from the hydraulic couplings (3) (Fig. 2).
5. Disconnect the low pressure (17 bar) and lubrication pipes from the PTO clutch, which are located at the rear right-hand side of the PTO housing (1) (Fig. 2).

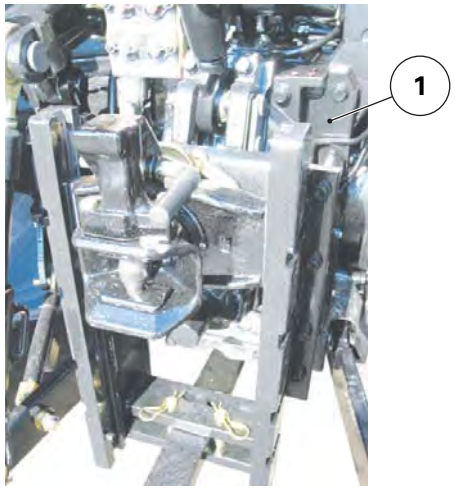

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Fig. 1

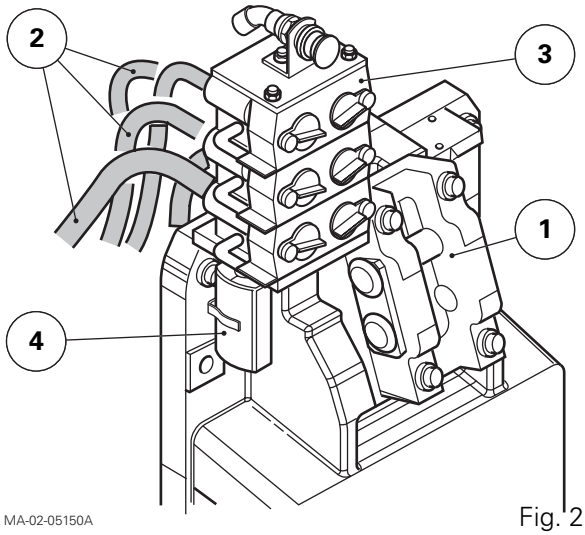

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Fig. 2

6. Disconnect (Fig. 3):
- the PTO sensor (1), located opposite the top shaft line driving gear
- the PTO sensor (3) (depending on electronic version), located opposite the output shaft.

7. Remove the right and left-hand guards from the harnesses connected to the draft sensors.

8. Unscrew two diametrically opposed bolts (5) from the hitch bracket (Fig. 3). Replace them with two M20 guide studs approximately 250 mm in length.

9. If the tractor is fitted with an auto-hitch, disconnect the (mechanical and hydraulic) hitch controls which might interfere with its removal.

10. Remove the auto-hitch or the standard hitch bracket (depending on version) with the help of an operator and suitable lifting gear.

11. Disconnect the cable attached to the connecting rod (1) (if fitted Fig. 4) of the 540 - 1000 rpm or 750 - 1000 rpm (depending on version) shiftable PTO. The connecting rod (1) is located at the rear left-hand side of the PTO housing.

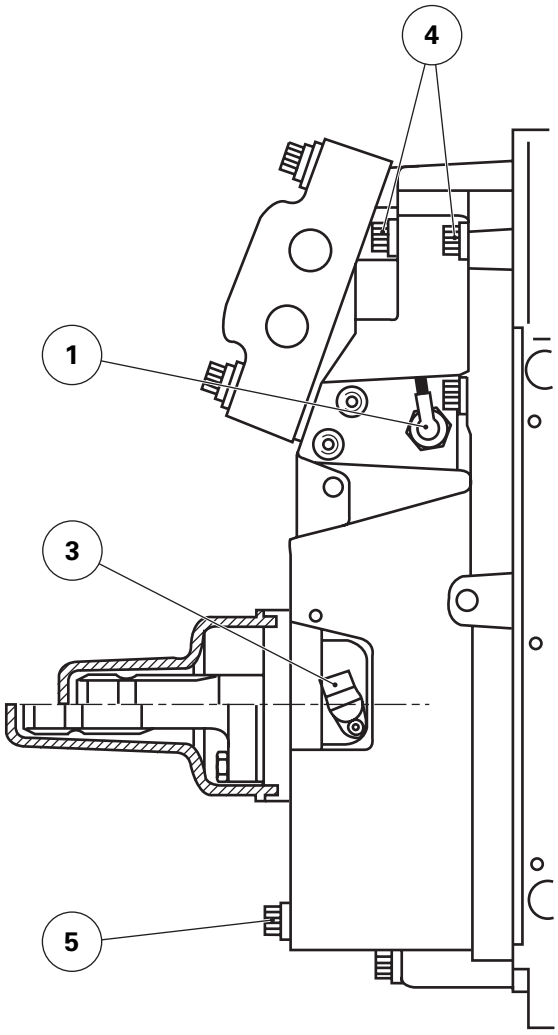

Fig. 3

C . Disassembly

12. Check that the two guide studs G (Fig. 5), fitted in operation 8, are in place.

Unscrew the remaining bolts (4) (5) from the PTO housing.

13. Release and partially separate the PTO housing (1) (Fig. 5) from the centre housing.

14. Sling the PTO housing as shown in Fig. 5. Uncouple it fully from the centre housing using suitable lifting equipment.

IMPORTANT: *Slide a T tube over the output shaft (Fig. 5) in order to restore the balance of the PTO housing as required during disassembly.*

NOTE: *The PTO housing will be withdrawn complete with clutch, driving and driven gears. Shaft (2) will remain in the intermediate and centre housings.*

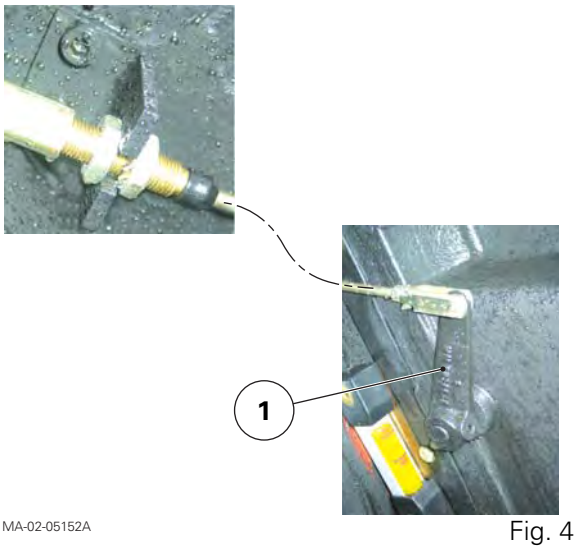

Fig. 4

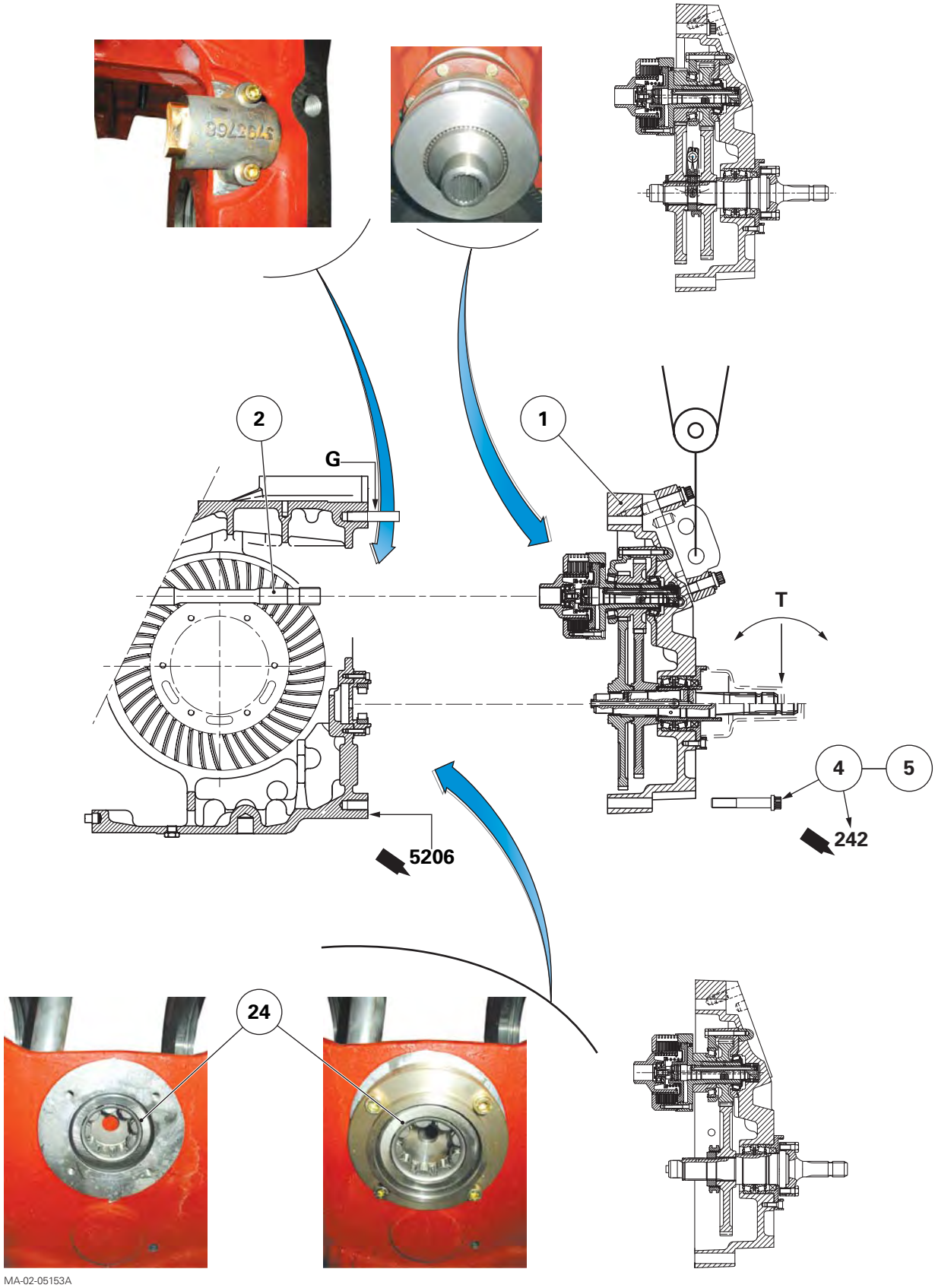

Fig. 5

D . Reassembly

15. Clean the mating faces of each housing.

16. Lightly smear the mating face of the centre housing with Loctite 5206 or equivalent sealing compound (Fig. 5).

17. Check the presence of the dowels on the centre housing.

NOTE: *These dowels are to be smeared with Loctite 638 or equivalent before fitting. Their fitted dimension is to be 11.40 mm relative to the centre housing face.*

18. Check that the PTO brake piston (1) slides freely. Bottom it out in the cylinder (2) (Fig. 6) in order to provide clearance for the clutch when refitting the PTO housing.

19. Check bearing (24) to ensure it is in good condition and rotates freely (Fig. 5).

20. Smear the friction washer (20) with miscible grease and place it against the bearing (24) (Fig. 7) (only on tractors fitted with an interchangeable output shaft PTO).

21. Check that the driven gears inside the PTO housing are located correctly on the output shaft.

22. Place the complete housing (1) (Fig. 5, Fig. 7) on the guide studs fitted previously.

23. Gradually slide the PTO housing over the guide studs towards the centre housing, so as to mesh the splines on the output shaft (2) with those of the PTO clutch and to enable the output shaft finally to engage in bearing (24) (Fig. 7).

24. Place the PTO housing against the centre housing. Hold it against the centre housing using some screws (4), having applied Loctite 242 or equivalent to their threads beforehand.

IMPORTANT: *The screws (4) selected must not be those used to secure the hitch bracket.*

25. Tighten screws (4) to 480 - 640 Nm.

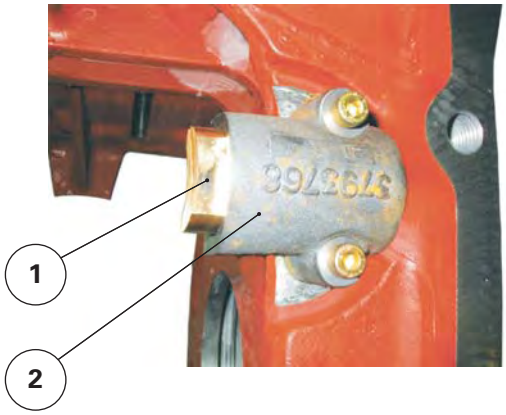

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Fig. 6

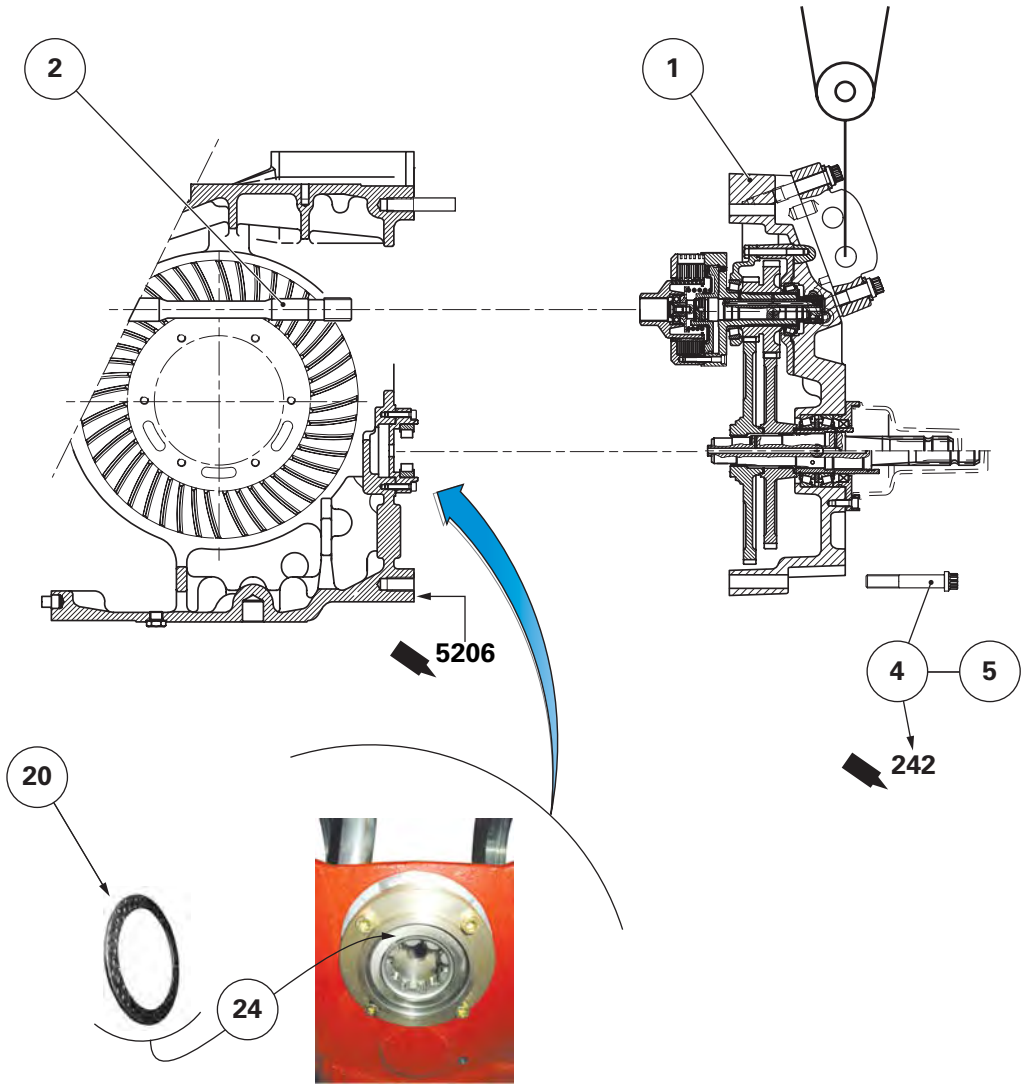

Fig. 7

E . Final operations

26. If disconnected, reconnect the cable attached to the connecting rod (1) of the 540 - 1000 rpm or 750 - 1000 rpm (depending on version) shiftable PTO (Fig. 8).

27. Refit the auto-hitch (if fitted) or the standard hitch bracket, reversing steps 9 and 10.

28. Lightly smear the thread of the remaining screws (4) (5) (Fig. 7) with Loctite 242 or equivalent.

Fit and tighten these screws to 480 - 640 -Nm while simultaneously unscrewing the guide studs.

29. Refit the right and left-hand guards from the harnesses connected to the draft sensors.

30. Reconnect:

- the PTO sensors
- the PTO clutch low pressure (17 bar) and lubrication pipes
- the hydraulic coupling hoses in accordance with the positions noted in step 4.

31. Refit:

- the swinging drawbar
- the 3rd point link.

32. Set (if fitted):

- the cable control for the 540 - 1000 rpm or 750 - 1000 rpm (depending on version) shiftable PTO (see chapter 7)
- the cable control for the auto-hitch (see chapter 6).

33. Top up the oil level in the housings. Check it using the sight glass located to the left of the centre housing.

34. Check:

- the tightness of the PTO housing mating face and of the hydraulic unions
- correct operation of:
  - the PTO and its brake
  - the auto-hitch (if fitted).

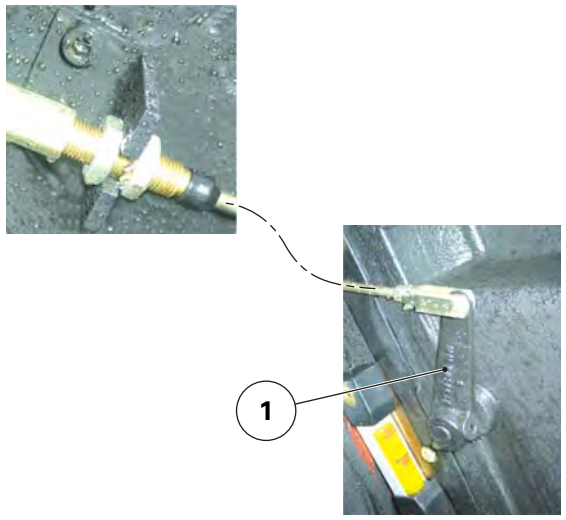

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Fig. 8

2F10- Reinforcements - GTA1040

CONTENTS

Reinforcements - GTA1040

A . General

The two reinforcements provide the tractor structure with beneficial strengthening.

They are located either side of the GBA10 gearbox.

They apply a longitudinal load on the rear axle through four set bolts (1) (Fig. 1).

Each reinforcement consists of a longitudinal member supported:

- at the front by the gearbox spacer
- at the rear, by the centre housing of the rear axle.

Parts list (Fig. 1)

(1) Set bolt
(2) Bolt
(3) Washer
(4) Screw
(6) Reinforcements

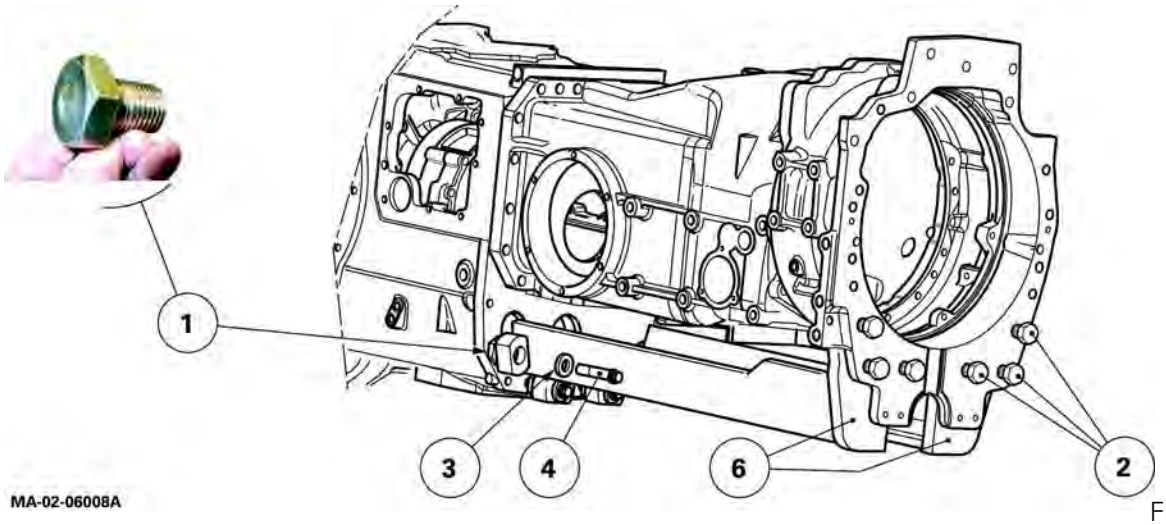

Fig. 1

B . Installation of reinforcements on the GBA10 gearbox

Installation

1. Prepare the reinforcements (6) on the work bench by tightening set screws (1) to the maximum (Fig. 2).
2. Position the reinforcements on the tractor using suitable lifting equipment and with the help of an operator.
3. Fit the screws (4) and washers (3) on the rear fixture. Partially tighten the screws, leaving a gap of approximately 5 mm between the head of the screw and the fixture (Fig. 3).
4. Fit the bolts (2) and nuts (5) on the front fixture (Fig. 5). Tighten progressively and temporarily to a torque of 20 Nm.

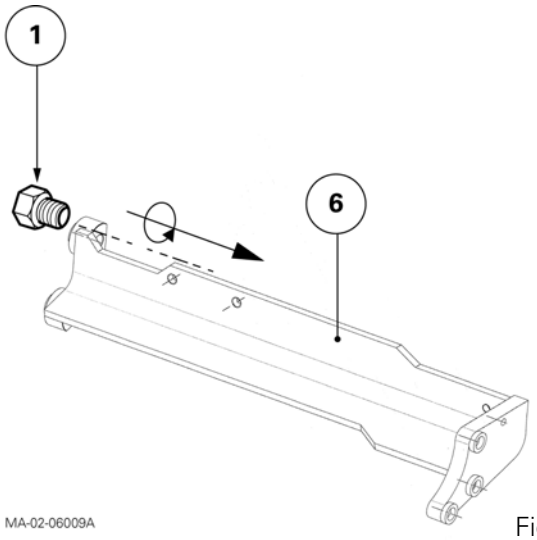

Fig. 2

Final tightening

5. Loosen set bolts (1) until they come into contact with centre housing C (Fig. 3).
6. Apply a loosening torque of 75 Nm to these screws, in the order indicated (Fig. 4).
7. Unscrew (Fig. 3, Fig. 5):
   - one bolt (2) in order to lightly smear its thread with Loctite 270 or equivalent. Tighten this bolt and its nut (5) to a final torque of 630 - 840 Nm.

     Repeat this step for the remaining bolts
   - one screw (4) in order to lightly smear its thread with Loctite 270 or equivalent. Tighten this screw to a final torque of 240 - 320 Nm.

   Repeat this step for the remaining screws.

   ***IMPORTANT**: Do not unscrew all screw-fittings (2) (4) simultaneously, since the effect of the load exerted on the reinforcements would impede unscrewing them.*

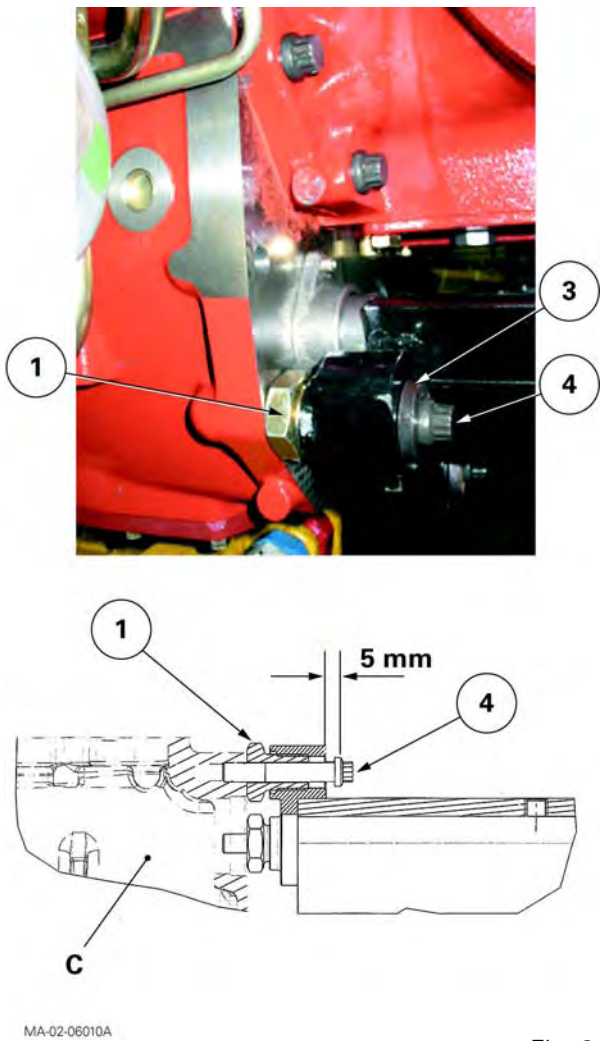

Fig. 3

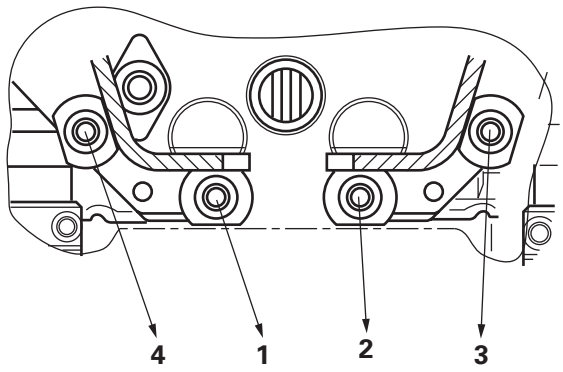

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Fig. 4

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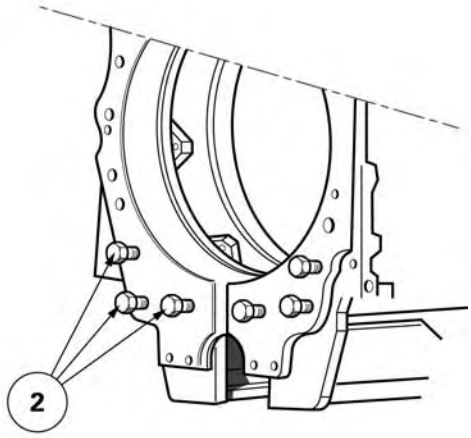

Fig. 5

2F11 - Reinforcements - GTA1030

CONTENTS

A . General

The four reinforcements provide the tractor structure with beneficial strengthening.

They are located on each side:

- of the Sisu engine (Fig. 1)
- of the GBA10 gearbox (Fig. 2).

Each reinforcement consists of a longitudinal member.

Parts list

Reinforcements on Sisu engine (Fig. 1)

(1) Bolt
(2) Bolt
(6) Reinforcement

Reinforcements on GBA10 gearbox (Fig. 2)

(1) Set bolt and spherical washer
(2) Bolt
(3) Bolt and washer
(4) Bolt (set bolt locking)
(6) Reinforcement

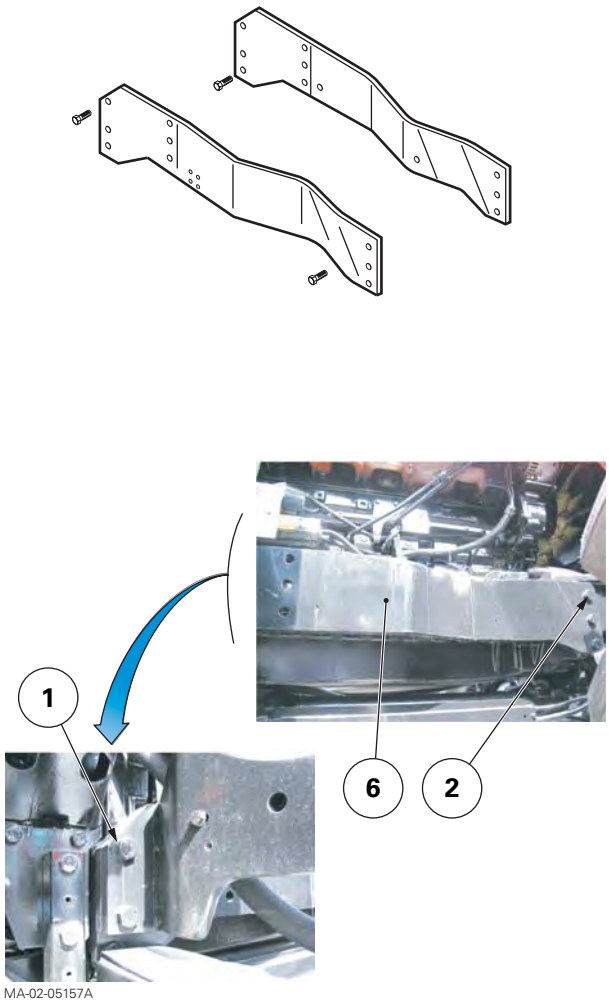

Fig. 1

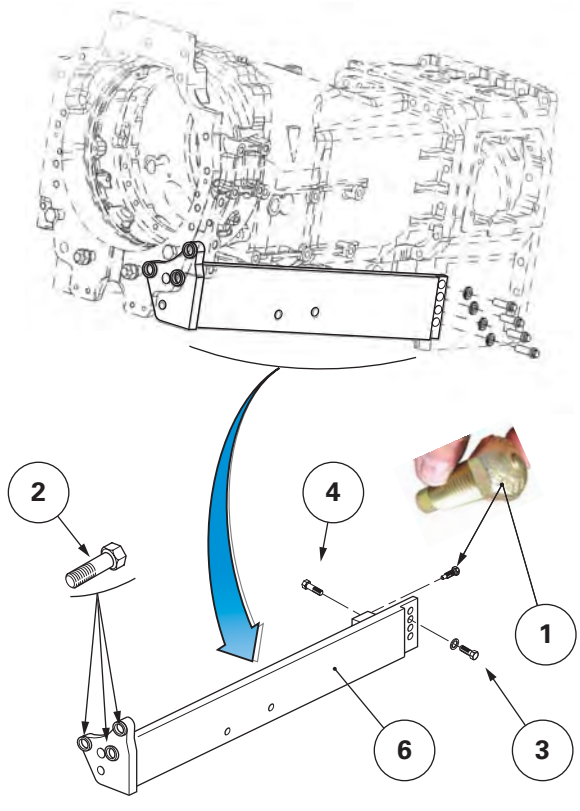

Fig. 2

B . Installation of reinforcements on the Sisu engine

1. Remove the vertical exhaust assembly (including support).
2. Fit the reinforcements (6) between the gearbox spacer and the front frame (3) (Fig. 3) using suitable lifting equipment and with the help of an operator.
3. Replace the vertical exhaust assembly (including support).
4. Fit and tighten bolts (1) and (2) to 420 - 560 Nm.

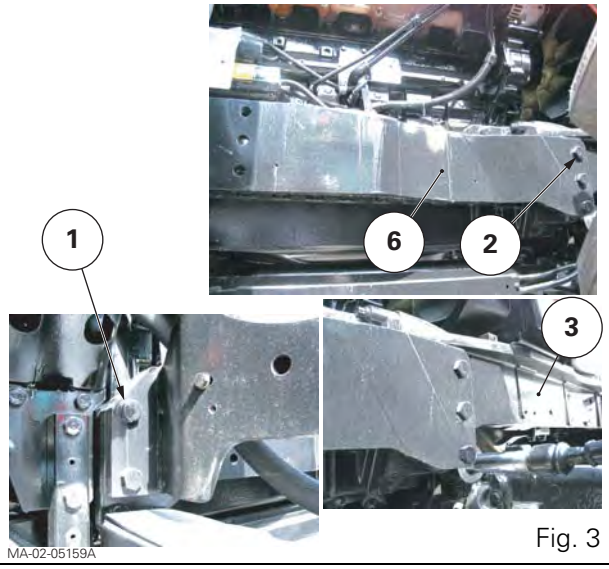

Fig. 3

C . Installation of reinforcements on the GBA10 gearbox

Installation

5. Remove or move the fuel tank from the side of the tractor.
6. Unscrew locking bolt (4) partially.
7. Fully tighten set bolt (1) on each reinforcement (6) (Fig. 4, Fig. 5).
8. Pre-assemble the reinforcements on the tractor between the gearbox and the intermediate housing of the rear axle, using suitable lifting equipment and with the help of an operator.
9. Fit:
   - bolts (3) together with their washers. Tighten them partially
   - bolts (2) fitted with their nuts beforehand and lightly coated with Loctite 270 or equivalent. Tighten them to 630 - 840 Nm.

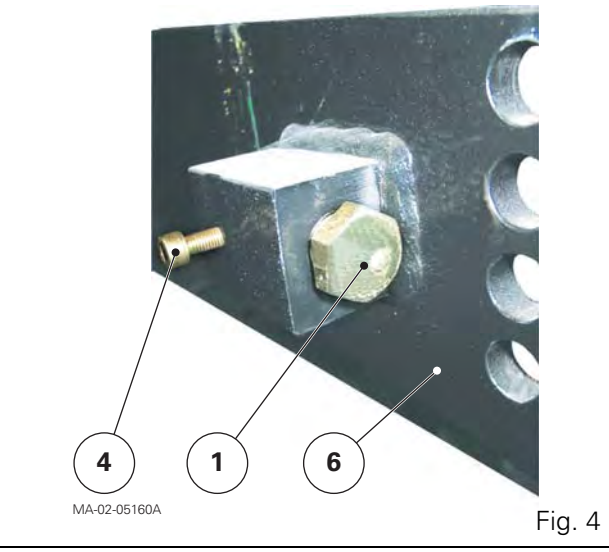

Fig. 4

Final tightening (Fig. 5, Fig. 6)

10. Pre-tighten bolts (3) to 20 Nm.

11. Unscrew set bolts (1) until they come into contact with the intermediate housing C through their spherical washer. Once their spherical washer comes into contact with the intermediate housing (Fig. 6), continue to unscrew bolts (1) using a torque wrench until a loading of 100 Nm is generated on the reinforcements.

12. Lightly smear the threads of the locking bolts (4). Tighten them to 36 - 46 Nm.

13. Unscrew a bolt (3) to smear its thread lightly with Loctite 270 or equivalent. Tighten this bolt to 240 - 320 Nm.

Repeat this step for the three remaining bolts.

***IMPORTANT**: Do not unscrew all bolts (3) simultaneously, since the effect of the load exerted on the reinforcements would impede unscrewing them.*

14. Reposition or refit the fuel tank.

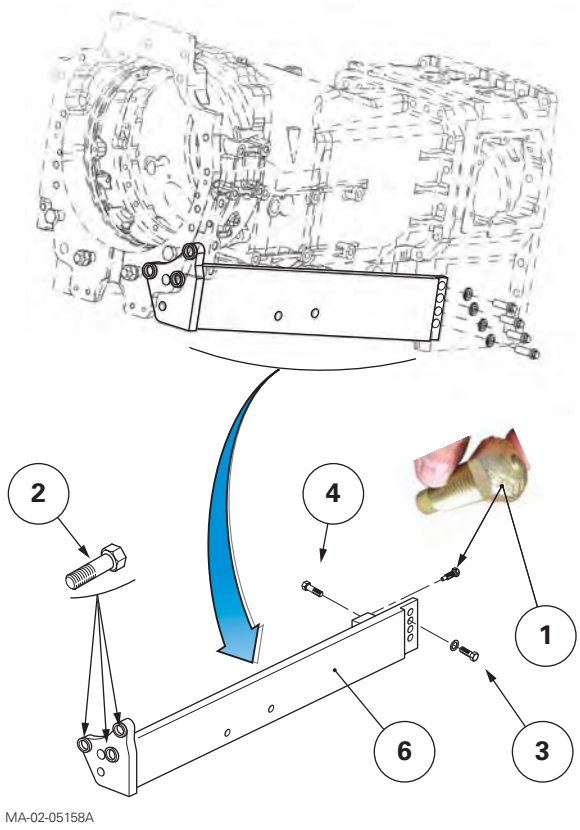

Fig. 5

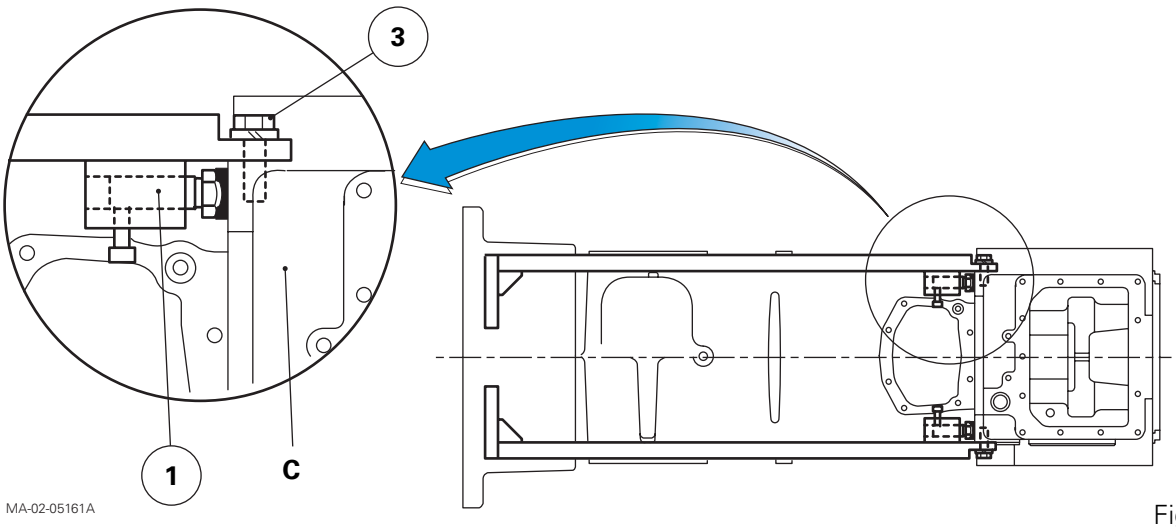

Fig. 6

2F12 - Reinforcements - GTA1540

CONTENTS

Reinforcements - GTA1540

A . General

The two reinforcements (if fitted) provide optimum reinforcement for the structure of the tractor.

They are located on either side of the Sisu engine (Fig. 1).

Each reinforcement comprises a side member.

Parts list

(1) Screw
(2) Screw
(6) Reinforcement

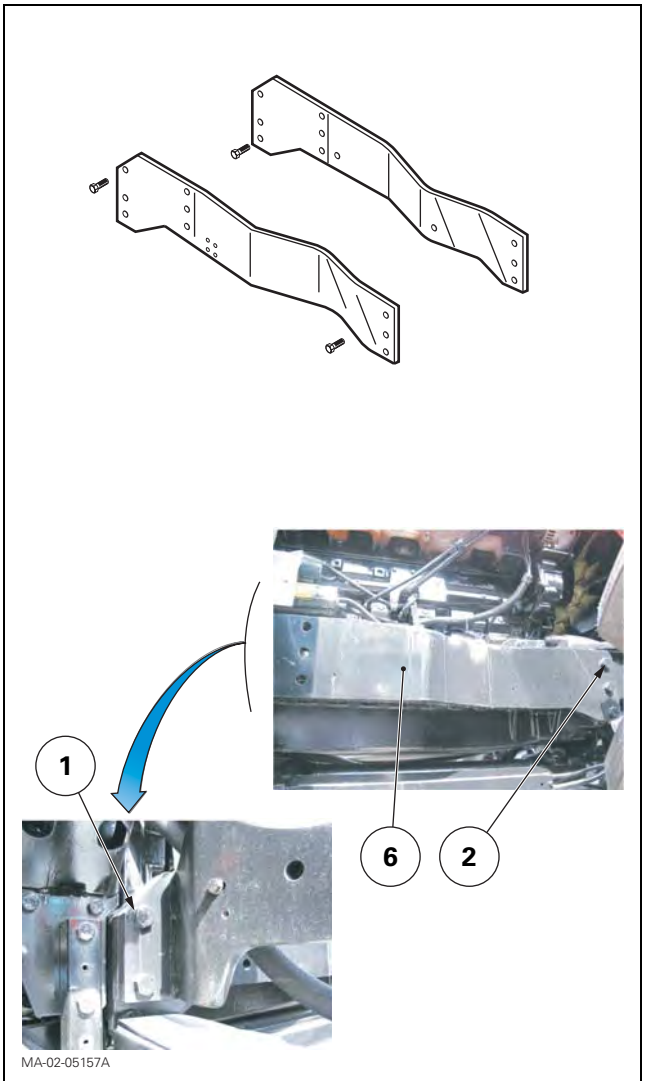

Fig. 1

B . Installing reinforcements on a Sisu engine

1. Remove the vertical exhaust assembly (including support).
2. If necessary, partially drain the fuel tank using a manual or electrical diesel pump (depending on local equipment).
3. Remove the rear left-hand wheel and fit a safety stand underneath the trumpet housing.
4. Remove the fuel tank (R) (Fig. 2), or move it away from the GTA1540 transmission, using a suitable support or a hydraulic table (depending on local equipment).

   NOTE: *If the tractor has a sediment bowl (4) on the fuel supply system (Fig. 2), move it together with the fuel tank without disconnecting the hoses.*
5. Assisted by an operator, connect the reinforcements (6) to the GBA15 Powershift module housing and to the front frame (3) (Fig. 3) using a suitable lifting device.
6. Screw in and tighten the screws (1) and (2) to 420-560 Nm.
7. Refit or reposition the fuel tank using the equipment used in step 4.

   NOTE: *If the tractor has a sediment bowl (4) on the fuel supply system, reattach the sediment bowl on the left-hand reinforcement (Fig. 2).*
8. Refit the rear wheel.

   Remove the axle stand.

   Tighten the wheel nuts (see chapter 6).
9. If necessary, pour fuel into the tank using the equipment used in step 2.
10. Refit the vertical exhaust assembly (including support).

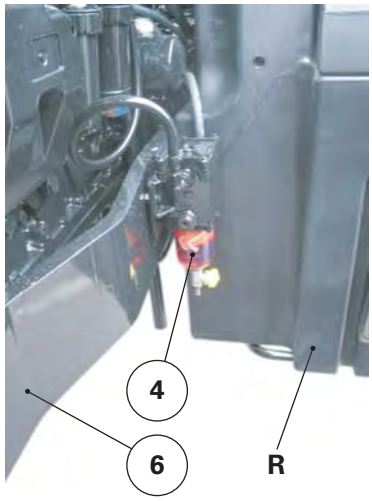

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Fig. 2

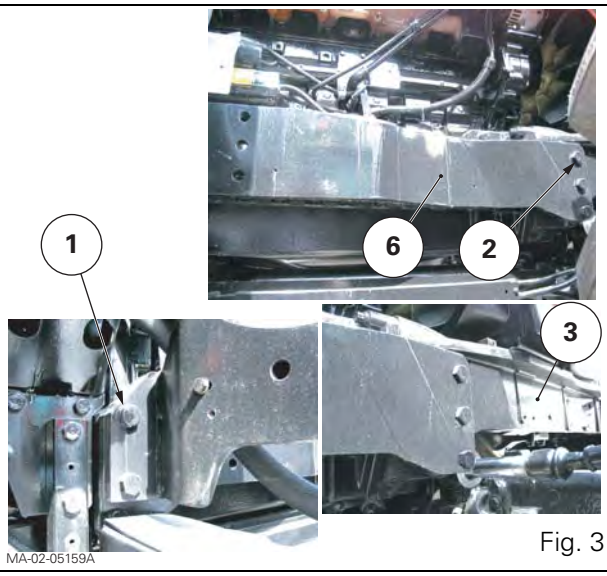

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Fig. 3