

MDF0893A

# T5030 - T5040 - T5050 - T5060 - T5070 TRACTORS SERVICE MANUAL

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S E R V I C E

## INTRODUCTORY NOTES

- *This manual is divided into sections identified by two-figure numbers and each section has independent page numbering.*
- *The different sections can easily be found by consulting the table of contents on the following pages.*
- *The document number of the manual and the edition/update dates are given at the bottom of each page.*
- *Pages updated in the future will be identified by the same document number followed by an additional digit: first edition standard manual 87679925A - 1st update 87679925A1 - 2nd update 87679925A2 - etc. The update pages can replace or supplement the pages of the standard manual; the information necessary for the procedure for adding or replacing pages is given on the title page of the update. The publication will be completed with an appropriate index. If it is necessary to issue a new updated manual (2nd edition) it will have document number 87679925B, this indicates that the manual is composed of the standard version 87679925A completed with all the updates: 1st update 87679925A1 - 2nd update 87679925A2 - etc.*
- *The information contained in this manual was current on the date printed on each section. As NEW HOLLAND constantly improves its product range, some information may be out of date subsequent to modifications implemented for technical or commercial reasons or to meet legal requirements in different countries. In the event of conflicting information, consult the NEW HOLLAND Sales and Service Departments.*

## IMPORTANT WARNINGS

- *All maintenance and repair work described in this manual must be performed exclusively by NEW HOLLAND, service technicians in strict accordance with the instructions given and using any specific tools necessary.*
- *Anyone performing the operations described herein without strictly following the instructions is personally responsible for any eventual injury or damage to property.*
- *The Manufacturer and all organisations belonging to the Manufacturer's distribution network, including but not restricted to national, regional or local distributors, will accept no responsibility for personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer, including those used for maintenance and/or repair of the product manufactured or marketed by the Manufacturer. In any case, the product manufactured or marketed by the Manufacturer is covered by no guarantee of any kind against personal injury or damage to property caused by abnormal function of parts and/or components not approved by the Manufacturer.*

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### **IMPORTANT NOTES**

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- contents volume 1 pages 3 to 8.
- section 10 chap. 1, pages 1 to 6 and 53–54.
- section 18, Chapter 1, pages 9–10.
- section 25, Chapter 1, pages 7–8, 29–30 and 47–48.
- section 33, Chapter 1, pages 3–4.
- section 33, Chapter 2, pages 1 to 18.
- section 35 Chap. 1, pages 23–24.
- section 35 Chap. 4, pages 5 to 10.
- contents volume 2 pages 1 to 4.
- section 35 Chap. 7, pages 17–18.
- section 41, Chapter 1, pages 7–8.
- section 55 Chap. 6, pages 1 to 32, 39–40, 49–50, 57 to 60, 71 to 74, 83 to 86, 93–94, 99 to 02, 113 to 116 and 125 to 128.
- contents volume 3 pages 1–2.
- section 55 Chap. 7, pages 1÷4, 11 to 22, 69–70, 73–74, 79 to 82, 91 to 94 and 111 to 118.
- section 55 Chap. 10, pages 7–8 and 27–28.

**The following pages are newly issued:**

- section 33, Chapter 2, pages 19 to 22.
- section 35 Chap. 8, pages 1 to 106.
- section 55 Chap. 3, pages 1 to 14.
- section 55 Chap. 4, pages 1 to 8.
- section 55 Chap. 5, pages 1 to 14.
- section 55 Chap. 7, pages 141 to 142.
- section 55 Chap. 8, pages 1 to 30.
- section 55 Chap. 9, pages 1 to 234.

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- preface pages 1-2
- contents volume 1 pages 3 to 8.
- Sect. 00, Chapter 1, pages 5-6.
- Sect. 10 chap. 1, pages 1 to 6, 53 and 54.
- Sect. 18, Chapter 1, pages 5-6.
- Sect. 21 Chap. 3, pages 35-36 and 39-40.
- Sect. 21 Chap. 4, pages 49-50 and 53 to 56.
- Sect. 27, Chapter 1, pages 3-4, 15 to 18 and 49 to 54.
- Sect. 31, Chapter 2, pages 1 to 4 and 25-26.
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- contents volume 3 pages 1-2.
- Sect. 55 Chap. 7, pages 1 to 8, 11-12, 15-16, 53 to 62, 77-78, 87-88, 109 to 112, 125-126 and 131-132.
- Sect. 55 Chap. 9, pages 23 to 34, 87-88, 117-118, 133-134, 169-170, 187-188,
- Sect. 55 Chap. 10, pages 1 to 42.

**The following pages are newly issued:**

- Sect. 21 Chap. 5, pages 1 to 26.
- Sect. 55 Chap. 6, pages 251 to 254
- Sect. 55 Chap. 7, pages 143 to 150,
- Sect. 55 Chap. 9, pages 235 to 254,
- Sect. 55 Chap. 10, pages 43-44.

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## GENERAL INSTRUCTIONS

### IMPORTANT NOTICE

All maintenance and repair work described in this manual must be performed exclusively by NEW HOLLAND service technicians, in strict accordance with the instructions given and using any specific tools necessary.

Anyone performing the operations described herein without strictly following the instructions is personally responsible for any eventual injury or damage to property.

### SHIMMING

For each adjustment operation, select adjusting shims and measure individually using a micrometer, then add up the recorder values: Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value indicated for each on shim.

### ROTATING SHAFT SEALS

For correct rotating shaft seal installation, proceed as follows:

- before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes;
- thoroughly clean the shaft and check that the working surface on the shaft is not damaged;
- position the sealing lip facing the fluid; with hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will deviate the fluid towards the inner side of the seal;
- coat the sealing lip with a thin layer of lubricant (use oil rather than grease) and fill the gap between the sealing lip and the dust lip on double lip seals with grease;
- insert the seal in its seat and press down using a flat punch; do not tap the seal with a hammer or mallet;
- whilst inserting the seal, check that it is perpendicular to the seat; once settled, make sure that it makes contact with the thrust element, if required;
- to prevent damaging the seal lip on the shaft, position a protective guard during installation operations.

### O-RING SEALS

Lubricate the O-RING seals before inserting them in the seats, this will prevent them from overturning and twisting, which would jeopardise sealing efficiency.

### SEALING COMPOUNDS

Apply one of the following sealing compounds on the mating surfaces marked with an X: RTV SILMATE, RHODORSIL CAF 1 or LOCTITE PLASTIC GASKET.

Before applying the sealing compound, prepare the surfaces as follows:

- remove any incrustations using a wire brush;
- thoroughly de-grease the surfaces using one of the following cleaning agents: trichlorethylene, petrol or a water and soda solution.

## BEARINGS

When installing bearings it is advised to:

- heat the bearings to 80 ÷ 90 °C before fitting on the shafts;
- allow the bearings to cool before installing them.

## SPRING PINS

When fitting split socket elastic pins, ensure that the pin notch is positioned in the direction of the force required to stress the pin.

Spiral spring pins do not require special positioning.

## SPARE PARTS

Use solely **genuine parts**, which guarantee the same quality, duration and safety as the original parts as they are identical to the ones fitted during production.

Only **genuine parts** can offer this guarantee.

When ordering spare parts, always provide the following information:

- tractor model (commercial name) and frame number;
- engine type and number;
- part number of the ordered part, which can be found in the "Microfiches" or the "Spare Parts Catalogue", used for order processing.

## NOTES FOR EQUIPMENT

The tools that NEW HOLLAND propose and illustrate in this manual are:

- specifically researched and designed for use with NEW HOLLAND vehicles;
- necessary to make reliable repair;
- accurately built and strictly tested to offer efficient and long-lasting working means.

By using these tools, repair personnel will benefit from:

- operating in optimal technical conditions;
- obtaining the best results;
- saving time and effort;
- working in safe conditions.

## IMPORTANT NOTES

Wear limit values indicated for certain parts are recommended, but not binding. The terms "front", "rear", "right-hand" and "left-hand" (when referred to different parts) are intended as seen from the driving position with the tractor in the normal direction of movement.

## MOVING THE TRACTOR WITH THE BATTERY REMOVED

External power supply cables should only be connected to the respective positive and negative cable terminals, using efficient clamps that guarantee adequate and secure contact.

Disconnect all services (lights, windshield wipers, etc.) before starting the vehicle.

If the vehicle electrical system requires checking, carry out operations with the power supply connected; once checking is completed, disconnect all services and switch off the power supply before disconnecting the cables.

## SAFETY REGULATIONS

### WARNING AND DANGER SYMBOL



*This warning symbol points out important messages concerning your safety.*

*Carefully read the following safety regulations and observe advised precautions in order to avoid potential hazards and safeguard your health and safety.*

*In this manual the symbol is accompanied by the following key-words:*

**WARNING** - Warnings concerning unsuitable repair operations that may jeopardise the safety of Repair personnel.

**DANGER** - Specific warnings concerning potential hazards for operator safety or for other persons directly or indirectly involved.



### TO PREVENT ACCIDENTS

Most accidents or injuries that occur in workshops are the result of non-observance of simple and fundamental safety regulations.

For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED: by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of vehicle, regardless of how well it was designed and built.

A careful and judicious service technician is the best guarantee against accidents.

Precise observance of the most basic safety rule is normally sufficient to avoid many serious accidents.

**DANGER.** Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

### SAFETY REGULATIONS

#### GENERAL

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewellery, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips that may remain entangled in moving parts.

It is advised to wear approved safety clothing, e.g: non-slip footwear, gloves, safety goggles, helmets, etc.

- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Operate the vehicle and use the implements exclusively from the driver's seat.
- Do not carry out operations on the vehicle with the engine running, unless specifically indicated.
- Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.
- Disconnect the batteries and label all controls to indicate that the vehicle is being serviced. Block the machine and all equipment which should be raised.
- Do not check or fill fuel tanks, accumulator batteries, nor use starting liquid when smoking or near naked flames, as these fluids are inflammable.
- Brakes are inoperative if manually released for repair or maintenance purposes.  
Use blocks or similar devices to secure the machine in these conditions.
- The fuel nozzle should always be in contact with the filling aperture. Maintain this position until filling operations are completed in order to avoid possible sparks caused by the accumulation of static electricity.

- Only use specified towing points for towing the tractor, connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction.  
Never remain near the towing bars, cables or chains that are operating under load.
- Transport vehicles that cannot be driven using a trailer or a low-loading platform trolley, if available.
- When loading or unloading the vehicle from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels, firmly secure the tractor to the truck or trailer and lock the wheels in the position.
- Electric heaters, battery-chargers and similar equipment must only be powered by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never pour gasoline or diesel oil into open, wide and low containers.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-inflammable, non toxic commercially available solvents.
- Wear safety goggles with side guards when cleaning parts with compressed air.
- Limit the air pressure to a maximum of 2.1 bar, according to local regulations.
- Do not run the engine in confined spaces without suitable ventilation.
- Do not smoke, use naked flames, or cause sparks in the area when fuel filling or handling highly inflammable liquids.
- Never use naked flames for lighting when working on the machine or checking for leaks.
- All movements must be carried out carefully when working under, on or near the vehicle and wear protective equipment: helmets, goggles and special footwear.
- When carrying out checks with the engine running, request the assistance of an operator in the driver's seat. The operator must maintain visual contact with the service technician at all times.
- If operating outside the workshop, position the vehicle on a flat surface and lock in position. If working on a slope, lock the vehicle in position and move to a flat area as soon as is safely possible.
- Damaged or bent chains or cables are unreliable. Do not use them for lifting or towing.  
Always use suitable protective gloves when handling chains or cables.
- Chains should always be safely secured. Make sure that the hitch-up point is capable of sustaining the load in question.  
Keep the area near the hitch-up point, chains or cables free of all bystanders.
- Maintenance and repair operations must be carried out in a CLEAN and DRY area, eliminate any water or oil spillage immediately.
- Do not create piles of oil or grease-soaked rags as they represent a serious fire hazard; store them in a closed metal container.  
Before starting the vehicle or implements, make sure that the driver's seat is locked in position and always check that the area is free of persons or obstacles.
- Empty pockets of all objects that may fall unobserved into the vehicle parts when disassembled.
- In the presence of protruding metal parts, use protective goggles or goggles with side guards, helmets, special footwear and gloves.
- When welding, use protective safety devices: tinted safety goggles, helmets, special overalls, gloves and footwear. All persons present in the area where welding is taking place must wear tinted goggles.  
**NEVER LOOK DIRECTLY AT THE WELDING ARC WITHOUT SUITABLE EYE PROTECTION.**
- Metal cables tend to fray with repeated use. Always use suitable protective devices (gloves, goggles, etc.) when handling cables.
- Handle all parts carefully, do not put your hands or fingers between moving parts, wear suitable safety clothing - safety goggles, gloves and shoes.



## START UP

- Never start the engine in confined spaces that are not equipped with adequate ventilation for exhaust gas extraction.
- Never place the head, body, limbs, feet, hands or fingers near fans or rotating belts.

## ENGINE

- Always loosen the radiator cap slowly before removing it to allow any remaining pressure in the system to be discharged. Coolant should only be added when the engine is stopped or idling, if hot.
- Never fill up with fuel when the engine is running, especially if hot, in order to prevent the outbreak of fire as a result of fuel spillage.
- Never check or adjust fan belt tension when the engine is running.  
Never adjust the fuel injection pump when the vehicle is moving.
- Never lubricate the vehicle when the engine is running.

## ELECTRICAL SYSTEMS

- If it is necessary to use auxiliary batteries, remember that both ends of the cables must be connected as follows: (+) with (+) and (-) with (-).
- Avoid short-circuiting the terminals. **GAS RELEASED FROM BATTERIES IS HIGHLY INFLAMMABLE.**
- During charging, leave the battery compartment uncovered to improve ventilation.
- Never check the battery charge using "jumpers" (metal objects placed on the terminals).
- Avoid sparks or flames near the battery zone to prevent explosion hazards.
- Before servicing operations, check for fuel or current leaks: Eliminate any eventual leaks before starting work.
- Do not charge batteries in confined spaces: Make sure that there is adequate ventilation in order to prevent accidental explosion hazards as a result of the accumulation of gases released during charging operations.
- Always disconnect the battery before performing any kind of servicing on the electrical system.

## HYDRAULIC SYSTEMS

- A liquid leaking from a tiny hole may be almost invisible but, at the same time, be powerful enough to penetrate the skin. Check for leaks using a piece of cardboard, **NEVER USE HANDS.**

- If any liquid penetrates skin tissue, call for medical aid immediately.
- Serious skin infections may result if medical attention is not given.
- Use the specific tools when checking pressure values on the hydraulic system.

## WHEELS AND TYRES

- Make sure that the tyres are correctly inflated at the pressure specified by the manufacturer.  
Periodically check the rims and tyres for damage.
- Stand away from (at the side of) the tyre when checking inflation pressure.
- Only check pressure when the vehicle is unloaded and the tyres are cold, to avoid incorrect readings as a result of over-pressure.
- Do not re-use parts of recovered wheels as incorrect welding or brazing may heat the material, causing it to weaken and eventually damage or break the wheel.
- Never cut or weld a rim mounted with an inflated tyre.
- When removing the wheels, lock both the front and rear vehicle wheels.
- Always position support stands when raising the vehicle, in order to conform to current safety regulations.
- Deflate the tyre before removing any object caught in the tyre tread.
- Never inflate tyres using inflammable gases; this could cause an explosion and put operator safety at risk.

## REMOVAL AND RE-FITTING

- Lift and handle all heavy parts using suitable lifting equipment and make sure that all slings and hooks are correctly secured.
- Handle all parts carefully during lifting operations, keep an eye on the personnel working near the load to be lifted. Never insert hands or fingers between parts, always wear approved accident prevention clothing (goggles, gloves and work boots).
- Avoid twisting chains or metal cables and always wear safety gloves when handling cables or chains.

## CONSUMABLES

COMPONENT TO BE FILLED OR TOPPED UP	QUANTITY dm <sup>3</sup> (litres)	RECOMMENDED NEW HOLLAND PRODUCT	NEW HOLLAND SPECIFICATION	INTERNATIONAL SPECIFICATION
Cooling system: less cab: ..... with cab: .....	14 16	Water and <b>AMBRA AGRIFLU</b> 50% + 50%	NH 900 A	-
Windscreen wash reservoir .	2	Water & cleaning liquid	-	-
Fuel tank - all models ..... - mod.: 71/97, 78/106 and 83/113 KW/CV (suppl. tank) .....	127 40	Decanted, filtered diesel fuel	-	-
Engine oil sump: without filter: ..... with filter: .....	8,9 9,5	<b>AMBRA MASTERGOLD HSP</b> fluid	NH 330H (SAE 15 - 40)  NH 324H (SAE 10W-30)	API CH-4 ACEA E5 SAE 15W-40 API CH-4 SAE 10W-30
Brake control circuit without front brakes	0,4	<b>AMBRA BRAKE LHM</b> fluid	NH 610 A	ISO 7308
Front axle: axle housing: - all models ..... final drives (each): - with brakes ..... - without brakes .....	7,5 2,0 1.4	<b>AMBRA MULTI G</b> fluid	NH 410 B	API GL4 ISO 32/46 SAE 10W-30
Rear transmission (bevel drive, final drives and brakes), gearbox, hydraulic lift, PTO and power steering - Mech. transmissions ..... - Power shuttle .....	50 60			
Front hubs .....	-	<b>AMBRA GR9</b> grease	NH 710 A	NLGI 2
Grease fittings .....	-			
Antifreeze fluid reservoir for air brakes .....	0,5	Antifreeze fluid <b>AMBRA SUPER FLUID</b>	NH 202 A	-

(overleaf)

Head retaining bolts (*):	-	-	-	-
1 <sup>st</sup> phase - 2 <sup>nd</sup> phase .....	M12x70	50	5.0	90°
1 <sup>st</sup> phase - 2 <sup>nd</sup> phase - 3 <sup>rd</sup> phase .....	M12x140	40	4.0	90° + 90°
1 <sup>st</sup> phase - 2 <sup>nd</sup> phase - 3 <sup>rd</sup> phase .....	M12x180	70	7.0	90° + 90°
Rocker arm covers .....	M8x1.25x65	24 ± 4	2.4 ± 0.4	-
Intake manifold fastening .....	M8x1.25	24 ± 4	2.4 ± 0.4	-
Air intake union assembly .....	M8x1.25	24 ± 4	2.4 ± 0.4	-
Oil by-pass valve fastening on the filter head .....	M22x1.5x10	80 ± 8	8.0 ± 0.8	-
Plug .....	M12x1.25x12	10 ± 1	1.0 ± 0.1	-
Exhaust manifold fastening .....	M10x1.25x65	43 ± 6	4.3 ± 0.6	-
Coolant pump fastening .....	M8x1.25x25	24 ± 4	2.4 ± 0.4	-
Coolant inlet connector assembly .....	M8x1.25x35	24 ± 4	2.4 ± 0.4	-
	M8x1.25x70	24 ± 4	2.4 ± 0.4	-
Fan hub fastening .....	M10x1.25x20	33 ± 5	3.3 ± 0.3	-
Fan pulley fastening .....	M6	10 ± 2	1.0 ± 0.2	-
	M10	43 ± 6	4.3 ± 0.6	-
Rear lifting bracket fastening .....	M12x1.75x30	77 ± 12	7.7 ± 1.2	-
Crankshaft pulley .....	M12x1.75 (10.9)	110 ± 5	11.0 ± 0.5	-
Flywheel casing fastening: .....	M12x120	85 ± 10	5.5 ± 1.0	-
	M12x70	85 ± 10	5.5 ± 1.0	-
	M12x140	49 ± 5	4.9 ± 0.5	-
	M12x180	49 ± 5	4.9 ± 0.5	-
Flywheel fastening on the crankshaft	-	-	-	-
1 <sup>st</sup> phase .....	M12x1.25	30 ± 4	3.0 ± 0.4	-
2 <sup>nd</sup> phase .....	M12x1.25	-	-	60° ± 5°
Inlet pump gear cover .....	M8x1.25x16	24 ± 4	2.4 ± 0.4	-
Fuel injectors .....	-	60 ± 5	6.0 ± 0.6	-
Fuel priming pump fastening .....	-	24 ± 4	2.4 ± 0.4	-
Turbo-blower / exhaust manifold fastening .....	M10	43 ± 6	4.3 ± 0.6	-
Oil inlet pipe / filter fastening .....	-	24 ± 4	2.4 ± 0.4	-
Lubrication piping / turbo-blower fastening .....	M12x1.5	35 ± 5	3.5 ± 0.5	-
Turbo-blower exhaust piping fastening .....	M8x1.25x16	24 ± 4	2.4 ± 0.4	-

(overleaf)

(overleaf)

Alternator fastening on its support .....	M8x1.25x30	24 ± 4	2.4 ± 0.4	-
Alternator support / thermostat cover fastening .....	M8x1.25x30	24 ± 4	2.4 ± 0.4	-
Alternator support / thermostat cover assembly .....	M8x1.25x30	24 ± 4	2.4 ± 0.4	-
Lower support assembly .....	M10x1.25x25	24 ± 4	2.4 ± 0.4	-
Fastening of the top of the alternator on the support ..	M10	49 ± 5	4.9 ± 0.5	-
Alternator support fastening .....	M12x1.75x120	43 ± 6	4.3 ± 0.6	-
Electrical connections on the alternator .....	M6x1	10 ± 2	1.0 ± 0.2	-
Starter motor / flywheel cover casing fastening .....	M10	49 ± 5	4.9 ± 0.5	-
Crankshaft cap retaining bolts:	-	-	-	-
1 <sup>st</sup> phase .....	M12	50 ± 6	5 ± 0.6	-
2 <sup>nd</sup> phase .....	M12	80 ± 6	8 ± 0.6	-
3 <sup>rd</sup> phase .....	M12	-	-	90° ± 5°
Camshaft longitudinal retaining plate fixing bolt .....	M8	24 ± 4	2.4 ± 0.4	-
Camshaft gear retaining bolt .....	M8	36 ± 4	3.6 ± 0.4	-
Connecting rod cap retaining bolt:	-	-	-	-
1 <sup>st</sup> phase .....	M11	60 ± 5	6 ± 0.5	-
2 <sup>nd</sup> phase .....	M11	-	-	60° ± 5°

(\*) To tighten the head, proceed as follows:

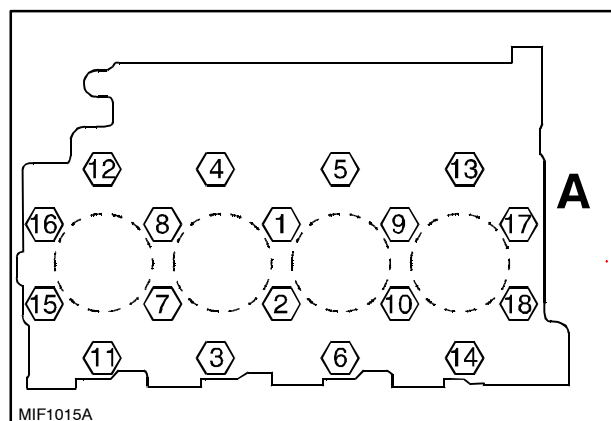
- 1<sup>st</sup> phase** of tightening with torque wrench:  
M12 x 1.75 x 70 bolt: 50 Nm ÷ 5 Nm  
(ref. 3-6-11-14)

M12 x 1.75 x 140 bolt: 40 Nm ÷ 5 Nm  
(ref. 1-2-7-8-9-10-15-16-17-18)

M12 x 1.75 x 180 bolt: 70 Nm ÷ 5 Nm  
(ref. 4-5-12-13)

- 2<sup>nd</sup> phase** tightening to an angle of 90° for all the screws.
- 3<sup>rd</sup> stage** additional tightening to an angle of 90° for 140 and 180 mm long bolts only.

A = fan side



**SPECIAL TOOLS**

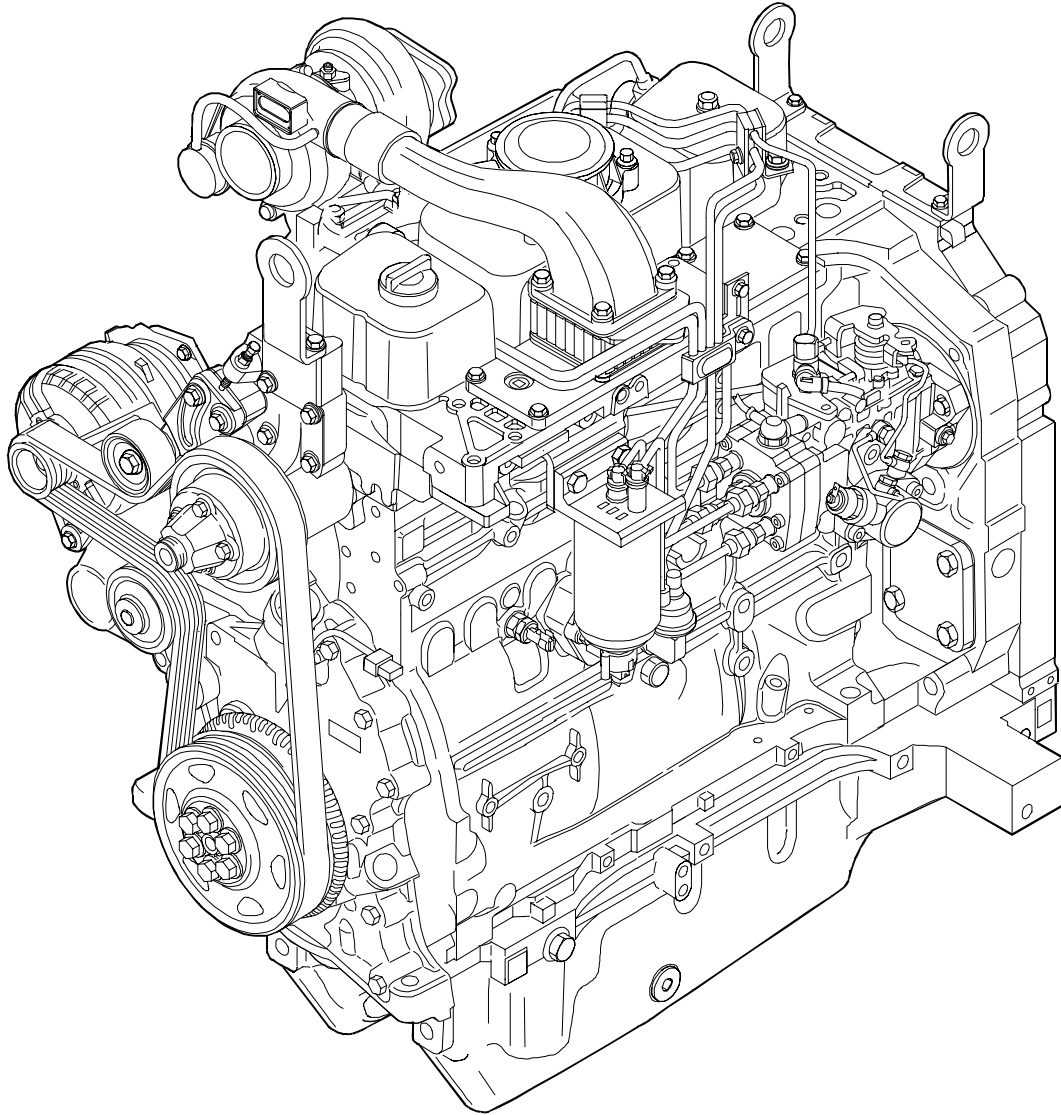
**Warning** - The operations described in this section can only be carried out with **ESSENTIAL** tools indicated by an (X).

To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools, which are to be made according to the drawings included in this manual.

**List of specific tools required for the various operations described in this Section**

X 380000216	Engine removal and installation tool.	X 380000664	Splining tool for fitting rear seal on crankshaft.
380000220	Clamp for fitting piston in cylinder liner (60-125 mm).	X 380000665	Tool to extract crankshaft front seal.
X 380000221	Pliers for piston ring disassembly and reassembly (65-110 mm).	X 380000666	Splining tool for fitting front seal on crankshaft.
380000301	Rotating stand for overhaul operations (capacity 1000 daN, torque 120 daN/m).	X 380000667	Drift for camshaft bushing disassembly and reassembly (use with 380000668).
X 380000302	Tool for engine valve disassembly and reassembly.	380000668	Grip for interchangeable drifts.
380000304	Pair of gauges for angular tightening with 1/2" and 3/4" square connection.	X 380000669	Gasket extraction tool.
380000362	Crankshaft lifting tool.	X 380000670	Tool for cartridge filter disassembly.
X 380000364	Dial gauge base for various measurements (use with 380000228).	380000671	Injector extraction tool.
380000569	Movable tool for dismantling tractors with bracket 380000500 and adapter plate 380000844.	380000975	Box with full set of tools to regrind valve seats.
X 380000661	Engine mounting brackets for rotating stand 380000301.	380000976	Spring load test appliance.
X 380000663	Tool to extract crankshaft rear seal.	380001003	Complete square to check for connecting rod distortion.
		380001268	Belt tension gauge.
		<b>Injection pump bench test</b>	
		380000228	Dial gauge (0-5 mm).
		X 380000914	Dial-gauge holder tool for rotary injection pump timing (use with 380000228).
		X 380000732	Tool for engine flywheel rotation (use with 380000988).
		X 380000988	Plate for engine flywheel rotation tool with flywheel timing pin (use with 380000732).

ENGINE VIEW



MIF1097A

## ENGINE TROUBLESHOOTING

Problems	Possible Problem	Solutions
<b>Engine does not start.</b>	1. Battery partially discharged.	Check and recharge batteries. Replace if necessary.
	2. Battery terminal connections corroded or loose.	Clean, inspect and tighten terminal nuts. Replace terminals and nuts if excessively corroded.
	3. Injection pump timing incorrect.	Adjust injection pump timing on the engine.
	4. Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.
	5. No fuel in tank.	Fill tank.
	6. Fuel supply pump malfunction.	Check and replace pump if necessary.
	7. Air in fuel system.	Check fuel lines, unions, supply pump, filters and injection pump for air, then bleed system; then bleed the air from the circuit.
	8. Starter motor faulty.	Repair or replace starter motor.
	9. Thermostarter faulty.	Check and replace thermostarter if necessary.
<b>Engine stalls.</b>	1. Slow idling speed too low.	Adjust slow idling speed.
	2. Injection pump delivery irregular.	Check delivery on the test bench.
	3. Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.
	4. Fuel filters clogged.	Replace the filter cartridges.
	5. Incorrect valve - rocker arm clearances.	Adjust the clearance between the rocker arms and the valves.
	6. Burnt or cracked valves.	Replace the valves.
	7. Air in fuel system.	Check fuel lines, unions, supply pump, filters and injection pump for air, then bleed system; then bleed the air from the circuit.
	8. Injection pump drive mechanism damaged.	Replace damaged parts.

(overleaf)

**SECTION 10 - ENGINE****Chapter 1 - Engine****CONTENTS**

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GENERAL SPECIFICATIONS	4-cylinder
Engine, technical type:	
- mod. 56/76 KW/HP .....	F4CE9484A*J600
- mod. 63/86 KW/HP .....	F4CE9484N*J601
- mod. 71/97 KW/HP .....	F4CE9484M*J601
- mod. 78/106 KW/HP .....	F4CE9484L*J600
- mod. 83/113 KW/HP .....	F4CE9484C*J600
Cycle .....	diesel, 4-stroke
Fuel injection .....	Direct
Number of cylinders in line .....	4
mod. 56/76, 63/86, 71/97, 78/106 and 83/113 KW/HP	
- Piston diameter .....	104 mm
- Piston stroke .....	132 mm
Total displacement:	
- mod. 56/76, 63/86, 71/97, 78/106 and 83/113 KW/HP ....	4485 cm <sup>3</sup>
Compression ratio	
- mod. 56/76, 63/86, 71/97, 78/106 and 83/113 KW/HP ....	16,5:1
Maximum Power Output:	
- mod. 56/76 KW/hp - type F4CE9484A*J600 .....	56 KW (76 hp)
- mod. 63/86 KW/hp - type F4CE9484N*J601 .....	63 kW (86 Hp)
- mod. 71/97 KW/hp - type F4CE9484M*J601 .....	71 kW (97 Hp)
- mod. 78/106 KW/hp - type F4CE9484L*J600 .....	78 KW (106 hp)
- mod. 83/113 KW/HP - type F4CE9484C*J600 .....	83 KW (113 hp)
Maximum power speed .....	2300 rpm
Maximum torque	
- mod. 56/76 KW/hp - type F4CE9484A*J600 .....	324 (Nm)
- mod. 63/86 KW/hp - type F4CE9484N*J601 .....	366 (Nm)
- mod. 71/97 KW/hp - type F4CE9484M*J601 .....	404 (Nm)
- mod. 78/106 KW/hp - type F4CE9484L*J600 .....	425 (Nm)
- mod. 83/113 KW/HP - type F4CE9484L*J600 .....	445 (Nm)
Maximum torque speed .....	1300 rpm
Number of main bearings .....	5
Sump pan .....	structural, cast iron

(continued)

(Continued)

GENERAL SPECIFICATIONS	4-cylinder
<b>Lube</b> ..... Pump drive ..... Engine speed/oil pump speed ratio ..... Oil filtration ..... Normal oil pressure with motor warmed-up: at slow idling ..... at fast idling .....	forced, with lobe pump Camshaft mesh screen on oil pick-up and filter cartridge in delivery line > 0.7 bar (> 0.71 Kg/cm <sup>2</sup> ) 3,1 ± 0,9 (3,16 ± 0,91)
<b>Cooling system</b> ..... Radiator on Mod. 56/76, 63/86, 71/97, 78/106 and 83/113 KW/HP ..... Fan, attached to the pulley ..... Coolant pump ..... Coolant thermometer ..... Temperature ranges corresponding to each section: - Initial blue section ..... - Middle green section (normal working conditions) ..... - red end section ..... Temperature control ..... - initial opening .....	coolant circulation three-row vertical pipes intake, in plastic with 10 blades centrifugal vane-type coloured scale divided into three sections 40° ÷ 60 °C 60° ÷ 110 °C 110° ÷ 120 °C via thermostat valve 81 ± 2 °C
<b>Timing</b> ..... Intake: - start: before T.D.C. ..... - end: after B.D.C. ..... Exhaust: - start: before B.D.C. ..... - end: after T.D.C. ..... Clearance between valves and rocker arms with engine cold: - intake ..... - exhaust .....	overhead valves operated by tappets, rods and rocker arms via the camshaft located in the engine block; the camshaft is driven by the crankshaft using straight-tooth gears 16° ± 30' 32° ± 30' 48° ± 30' 4° ± 30' 0.30 ± 0.05 mm 0.55 ± 0.05 mm

(continued)

(Continued)

GENERAL SPECIFICATIONS	4-cylinder
<p><b>Boost</b></p> <p>Turbocharger type:</p> <ul style="list-style-type: none"> <li>- Holset</li> </ul> <p>Air filter .....</p> <p>Charge Pump .....</p> <p>Fuel filtration .....</p> <p>Cam operated .....</p> <p>BOSCH pump .....</p> <p>All-speed governor, incorporated in pump:</p> <p>BOSCH .....</p> <p>Automatic advance regulator, incorporated in pump:</p> <p>BOSCH .....</p> <p>Fixed advance (pump setting on engine for start of delivery before TDC) .....</p>	<p>With intercooler</p> <p>HX25</p> <p>dual cartridge dry air filter, with clogged filter indicator with centrifugal pre-filter and automatic dust ejector</p> <p>with double diaphragm</p> <p>through wire filter in fuel supply pump, and replaceable cartridge on delivery line to injection pump</p> <p>via engine timing</p> <p>rotating distributor type</p> <p>centrifugal counterweights</p> <p>hydraulic</p> <p>refer to the data given in the table for operation 14 page 53</p>
<p><b>Filling</b></p> <p>Oil sump</p> <p>Engine sump + filter</p>	<p>8.9 litres</p> <p>9.5 litres</p>
<p><b>Anti-pollution system</b></p> <p>Type: .....</p>	<p>Exhaust gas recirculation system <b>EGR (*)</b></p>

(\*) Modification to the profile of the intake cam that permits partial opening of the valve simultaneously with the exhaust valve (exhaust gas recirculation EGR).

## FUEL SYSTEM DATA

Injection pump .....	rotating distributor with speed governor and advance variator incorporated
BOSCH pump:	
- mod. 56/76 KW/hp - type F4CE9484A*J600 .....	VE 4/12 F1150 L2042
- mod. 63/86 KW/hp - type F4CE9484N*J601 .....	VE 4/12 F1150 L2033
- mod. 71/97 KW/hp - type F4CE9484M*J601 .....	VE 4/12 F1150 L2029
- mod. 78/106 KW/hp - type F4CE9484L*J600 .....	VE 4/12 F1150 L2041
- mod. 83/1113 KW/HP - type F4CE9484C*J600 .....	VE 4/12 F1150 L___
Direction of rotation .....	anticlockwise
Injection order .....	1-3-4-2 (for all models)

	56/76 KW/hp	63/86 KW/hp	71/97 KW/hp	78/106 KW/hp	83/113 KW/hp
BOSCH-type injectors:	DSLA 145 P 1441				
- F4CE9484A*J600 .....					
- F4CE9484N*J601 .....					
- F4CE9484M*J601 .....					
- F4CE9484L*J600 .....					
- F4CE9484C*J600 .....					
Number of nozzle holes .....	6				
Nozzle hole diameter mm.	0,226				
- F4CE9484A*J600 .....					
- F4CE9484N*J601 .....					
- F4CE9484M*J601 .....					
- F4CE9484L*J600 .....					
- F4CE9484C*J600 .....					
Setting pressure bar (kg/cm <sup>2</sup> ) .....	260 ÷ 272 (265.13 ÷ 277.36)				

**NOTE:** For more information on the **engine** and overhauling, refer to the specific manual:  
document no° 87664161A for Italian  
document no° 87659057A for English  
document no° 87659058A for French  
document no° 87659059A for German  
document no° 87659060A for Spanish.

PARTS TO BE TIGHTENED	Thread	Tightening torque		
		Nm	kgm	kgm
Cooling nozzles .....	M 8X1.25X10	15 ± 3	1,5 ± 0,3	-
Main bearings:	-	-	-	-
1 <sup>st</sup> phase .....	-	50 ± 6	5,0 ± 0,6	-
2 <sup>nd</sup> phase .....	-	80 ± 6	8,0 ± 0,6	-
3 <sup>rd</sup> phase .....	-	-	-	90° ± 5°
Rear gearbox .....	M 8X1.25X40	24 ± 4	2,4 ± 0,4	-
	M 8X1.25X25	24 ± 4	2,4 ± 0,4	-
	M 10x1.5	49 ± 5	4,9 ± 0,5	-
Oil pump .....	M 8X1.25X30	8 ± 1	0,8 ± 0,1	-
Front box cover .....	M 8X1.25X45	24 ± 4	2,4 ± 0,4	-
	M 8X1.25X30	24 ± 4	2,4 ± 0,4	-
Big-end cap bolts:	-	-	-	-
1 <sup>st</sup> phase .....	M 11X1.25	30 ± 3	3,0 ± 0,3	-
2 <sup>nd</sup> phase .....	M 11X1.25	60 ± 5	6,0 ± 0,5	-
3 <sup>rd</sup> phase .....	M 11X1.25	-	-	60° ± 5°
Bracket assembly .....	M 10X1.25X25	43 ± 5	4,3 ± 0,5	-
Plugs on the cylinder block .....	M 10X1	6 ± 1	0,6 ± 0,1	-
	M 14x1.5	11 ± 2	1,1 ± 0,2	-
Oil inlet pipe assembly .....	M 8X1.25X20	24 ± 4	2,4 ± 0,4	-
Oil sump installation .....	M 8X1.25X25	24 ± 4	2,4 ± 0,4	-
	M 18x1.5	60 ± 9	6,0 ± 0,9	-
Timing system locking pin installation .....	M5 T25	5 ± 1	0,5 ± 0,1	-
Fuel pump installation .....	M8	24 ± 4	2,4 ± 0,4	-
	M6	10 ± 1	1,0 ± 0,1	-
Fuel pump retaining bolts:	-	-	-	-
pre-tightening .....	M 10x1.25	10÷15	1.0 ÷ 1.5	-
end torque .....	M 10x1.25	50÷55	5.0 ÷ 5.5	-
Fuel pump gear:	-	-	-	-
precision torque .....	Retaining nut	15÷20	1.5 ÷ 2.0	-
end torque .....	Retaining nut	85÷90	8.5 ÷ 9.0	-
Inspection cover on the gearbox .....	-	30÷35	3.0 ÷ 3.5	-
Fixing the rocker arm on the head .....	M8	24 ± 4	2,4 ± 0,4	-

(continued)

## ENGINE TROUBLESHOOTING

(overleaf)

Problems	Possible Problem	Solutions
<b>Engine overheating.</b>	1. Coolant pump malfunction.	Overhaul pump and replace if necessary.
	2. Thermostat faulty.	Replace thermostat.
	3. Radiator inefficient.	Remove internal deposits by flushing. Check for leaks and repair.
	4. Deposits in cylinder head and crankcase coolant passages.	Flush out coolant system.
	5. Coolant pump and fan drive belt slack.	Check and adjust belt tension.
	6. Coolant level low.	Top up expansion tank with specified coolant mixture.
	7. Incorrect engine timing.	Check and adjust engine timing.
	8. Injection pump calibration incorrect - delivering too much or too little fuel.	Calibrate pump on test bench to values specified in calibration tables.
	9. Air filter clogged.	Clean the assembly and, if necessary, replace the filtering element.
<b>Engine lacks power and runs unevenly.</b>	1. Injection pump timing incorrect.	Adjust injection pump timing on the engine.
	2. Auto advance regulator in injection pump damaged.	Overhaul injection pump and adjust on test bench to values specified in calibration table.
	3. Control valve journal worn.	Overhaul injection pump and adjust on test bench to values specified in calibration table.
	4. Injection pump delivery irregular.	Overhaul injection pump and adjust on test bench to values specified in calibration table.
	5. All-speed governor damaged.	Overhaul injection pump and adjust on test bench to values specified in calibration table.
	6. Injectors partially obstructed or damaged.	Clean, overhaul and calibrate injectors.
	7. Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.

(overleaf)

## ENGINE TROUBLESHOOTING

(overleaf)

Problems	Possible Problem	Solutions
<p><b>The engine makes anomalous knocking noises.</b></p>	8. Fuel supply pump damaged.	Replace fuel supply pump.
	9. Incorrect valve - rocker arm clearances.	Adjust the clearance between the rocker arms and the valves.
	10. Cylinder compression low.	Test compression and overhaul engine if necessary.
	11. Air filter clogged.	Clean the assembly and, if necessary, replace the filtering element.
	12. Tie-rod in linkage between accelerator and injection pump incorrectly adjusted.	Adjust to correct length.
	13. Fast idling speed screw on injection pump incorrectly adjusted.	Adjust fast idling speed screw.
	1. Injectors partially obstructed or damaged.	Clean, overhaul and calibrate injectors.
	2. Impurities accumulating in fuel lines.	Clean fuel lines and replace severely dented pipes; clean injection pump if necessary.
	3. Injection pump timing incorrect.	Adjust injection pump timing on the engine.
	4. Crankshaft knocking due to excessive play in one or more main or big-end bearings or excessive endfloat.	Re-grind crankshaft journals and crankpins. Fit oversize shell bearings and thrust washers.
	5. Crankshaft out of balance.	Check crankshaft alignment and balance; replace if necessary.
	6. Flywheel bolts loose.	Replace any bolts that have worked loose and tighten all bolts to the specified torque + angle values.
	7. Connecting rod axes not parallel.	Straighten connecting rods, check axes parallelism; replace con rods if necessary.
	8. Pistons knock due to excessive wear.	Rebore cylinder liners and fit oversize pistons.
9. Noise caused by excessive play of gudgeon pins in small-end and piston bushings. Loose fit of small-end bushing.	Fit oversize gudgeon pin, rebore piston seats and small-end bushings. Replace with new bushings.	
10. Excessive tappet / valve noise.	Check for broken springs or excessive play between valve stems and guides, tappets and bores; adjust the clearance between valves and rocker arms.	

(overleaf)

## ENGINE TROUBLESHOOTING

(overleaf)

Problems	Possible Problem	Solutions
<b>The engine produces abnormal smoke: black or dark grey.</b>	<ol style="list-style-type: none"> <li>1. Maximum delivery of injection pump too high.</li> <li>2. Injection pump delivery excessively retarded or automatic advance regulator damaged.</li> <li>3. Injection pump delivery excessively advanced.</li> <li>4. Injectors partially or totally obstructed or incorrectly adjusted.</li> <li>5. Air filter clogged.</li> <li>6. Loss of engine compression due to:               <ul style="list-style-type: none"> <li>- piston rings sticking;</li> <li>- cylinder liner wear;</li> <li>- worn or incorrectly adjusted valves.</li> </ul> </li> <li>7. High-pressure fuel lines damaged.</li> </ol>	<p>Calibrate pump on test bench to values specified in calibration tables.</p> <p>Adjust injection pump timing or check automatic advance regulator.</p> <p>Adjust injection pump timing on the engine.</p> <p>Clean, overhaul and calibrate injectors; if necessary, replace.</p> <p>Clean the assembly and, if necessary, replace the filtering element.</p> <p>Replace damaged parts or, if necessary, overhaul the engine.</p> <p>Inspect and replace if necessary.</p>
<b>Blue, grey-blue or grey-white smoke.</b>	<ol style="list-style-type: none"> <li>1. Injection pump delivery excessively retarded or automatic advance regulator damaged.</li> <li>2. Injectors obstructed or damaged.</li> <li>3. Oil leaking past piston rings due to sticking rings or cylinder liner wear.</li> <li>4. Oil leaking through the inlet valve guides due to guide or valve stem wear.</li> <li>5. Engine does not reach correct operating temperature (thermostat faulty).</li> </ol>	<p>Adjust injection pump timing or check automatic advance regulator.</p> <p>Clean, overhaul and calibrate injectors, replace if necessary.</p> <p>Replace damaged parts or, if necessary, overhaul the engine.</p> <p>Overhaul cylinder head.</p> <p>Replace thermostat.</p>
<b>Engine runs on after switching off.</b>	<ol style="list-style-type: none"> <li>1. Engine stop electromagnet damaged.</li> <li>2. All-speed governor damaged.</li> </ol>	<p>Replace electromagnet.</p> <p>Overhaul injection pump and adjust on test bench to values specified in calibration table.</p>



**ENGINE R.I.****DANGER**

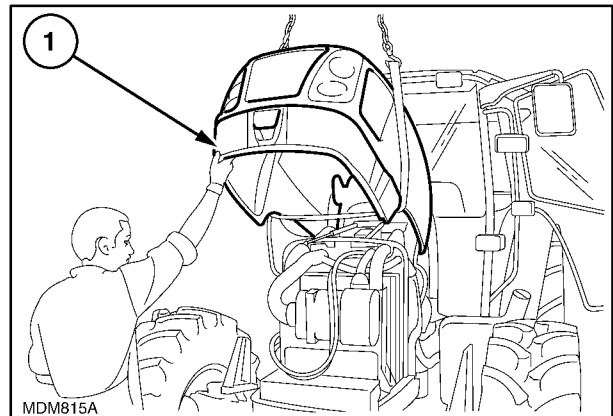
Lift and handle all heavy parts using suitable lifting equipment.

Make sure that assemblies or parts are supported by means of suitable slings and hooks. Ensure that no-one is in the vicinity of the load to be lifted.

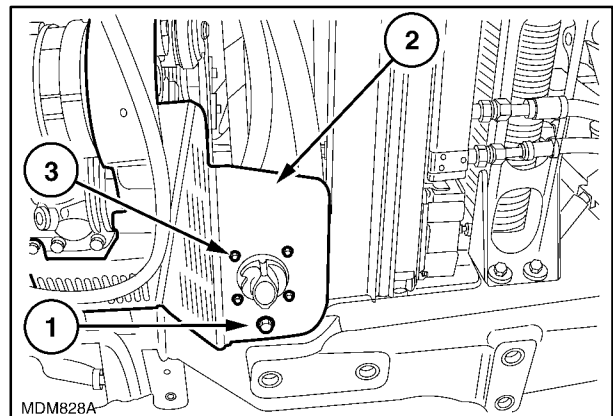
**ATTENTION**

Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

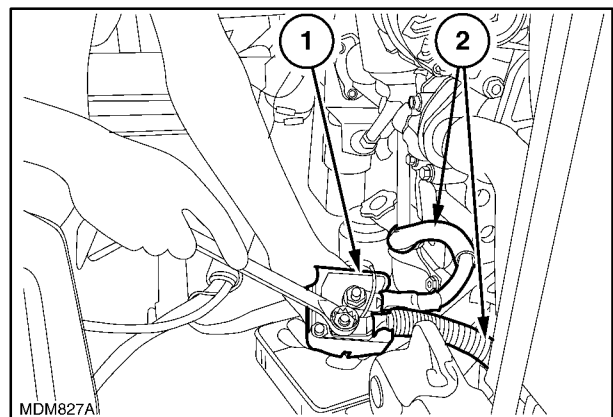
1. Remove the bonnet (1) as described, see section 90.
2. Disconnect the battery negative cable.
3. Drain the oil from the transmission-gearbox housing.
4. Remove the retaining bolts (1) and the guard (2) on the right-hand side of the fan, then remove the four bolts retaining the mechanical battery cut-out switch (1) from the guard.
5. Unscrew the control unit memory fuse power cable (1) with the related positive cables (2) from the battery cut-out switch.



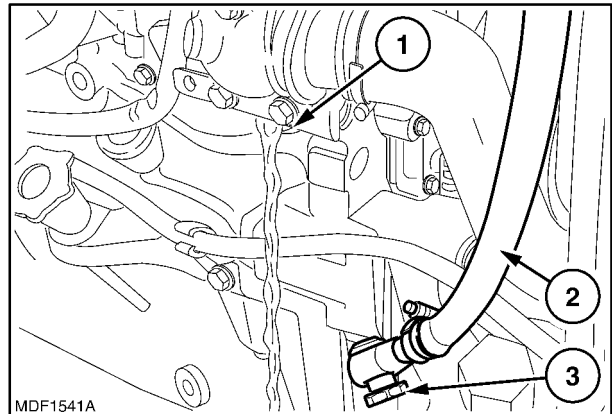
1



2

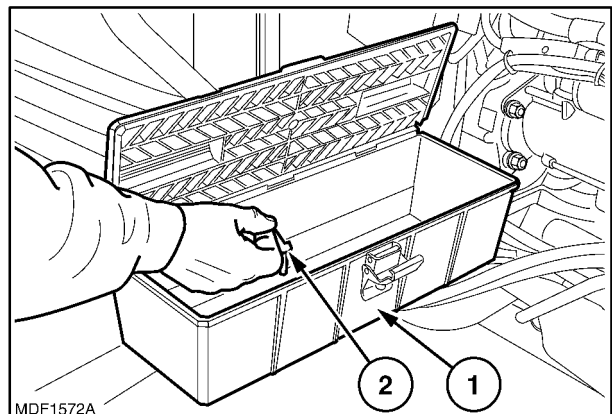


6. Detach the fitting (3) of the return pipe (2) for the coolant from the cab heater radiator connected to the underside of the coolant pump (1) and drain off the engine coolant.



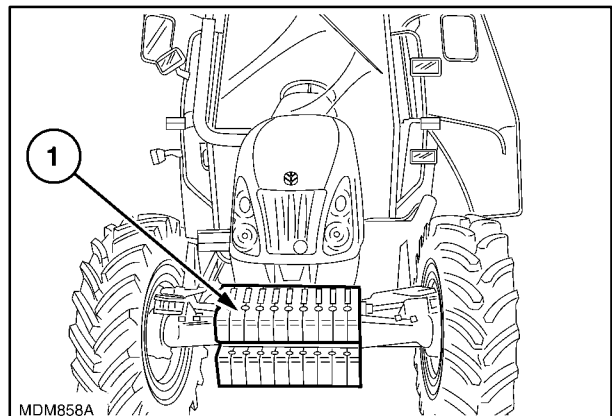
3

7. Remove the catch (2) and detach the toolbox (1).



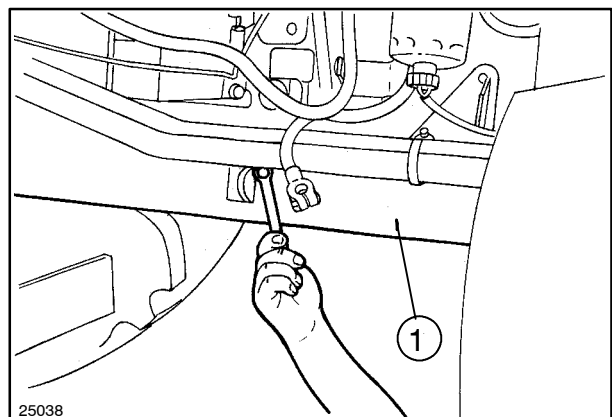
4

8. Remove the split pins, retaining pin and front ballast assembly (1) from the support.



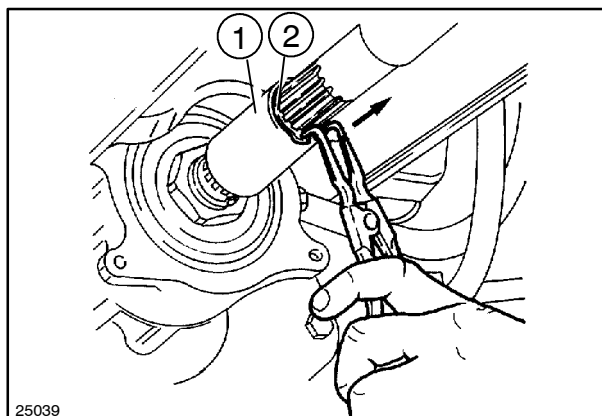
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9. Unscrew the front central and rear retaining bolts on the front axle shaft guard, then remove the guard (1).



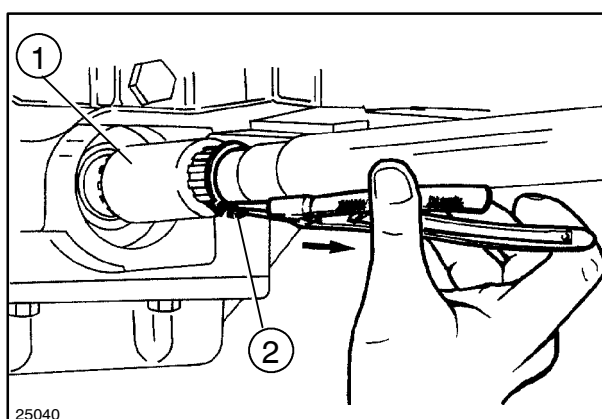
6

10. Remove the circlip (2) and move the front sleeve (1) in the direction indicated by the arrow until it is released from the groove on the front axle.



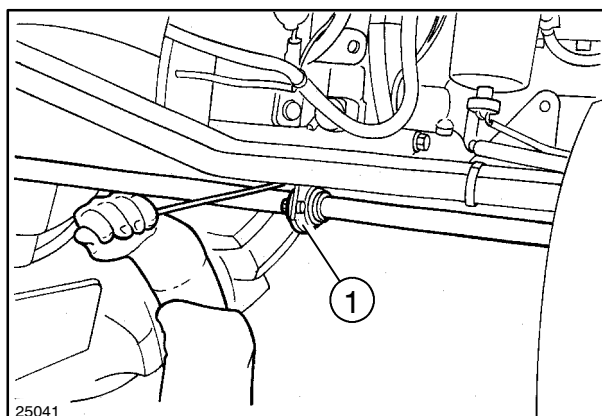
7

11. Remove the circlip (2) and move the rear sleeve (1) in the direction indicated by the arrow until it is released from the groove on the drive.



8

12. Remove the propeller shaft central support (1) retaining bolts and extract the shaft together with the support.

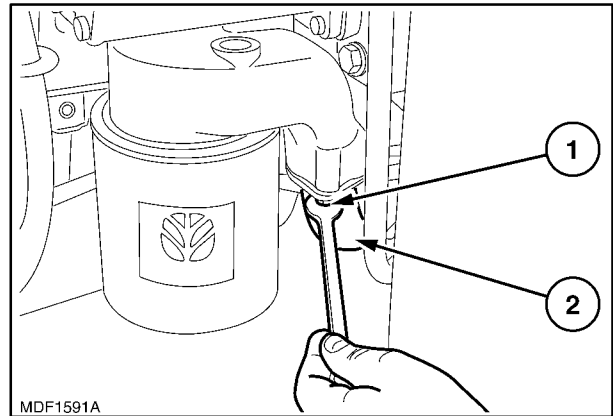


9

13. Remove the retaining bolts (1) of the draw pipe (2) of the lift pump.

On the same side of the machine, on the left, unscrew the underlying oil pipes and, if there are clamps on them screwed onto the frame, unscrew them to free the pipes from the frame.

- Unscrew the nozzle oil delivery pipe on the high-pressure pump.
- On the power steering pump, unscrew the oil hose delivering oil to the power steering control valve.
- Again on the left-hand side behind the connection between the clutch casing and engine, on the control valve of the gearbox (if there is a hydraulic gearbox) or on the services control valve, unscrew the delivery and return pipes to the cooler and the supply pipe to the control valve.
- Still in the area of the latter, unscrew the second part of the front differential lock pipe.

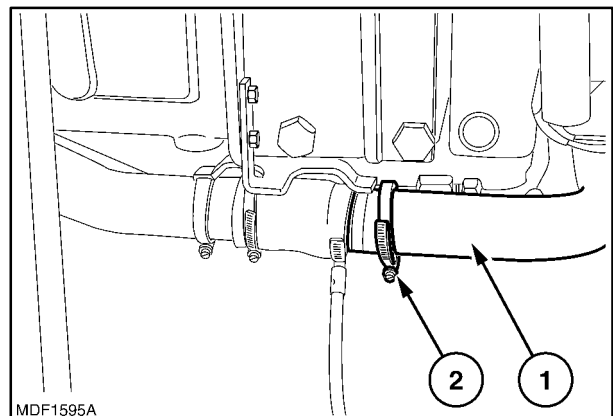


10

14. Remove the two metal clamps (2) and the rigid pipe (1) for drawing oil from the transmission via the pumps of the lift and power steering, remove the pipe.

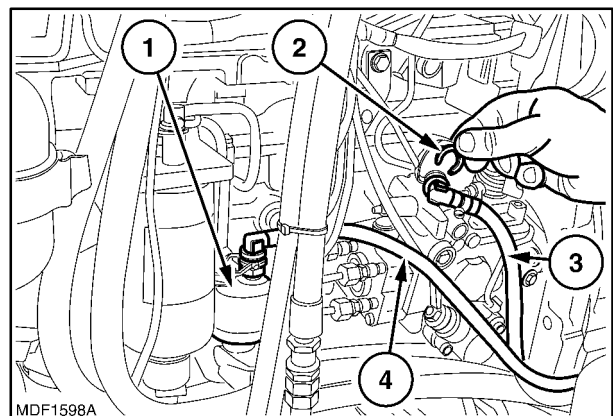
On the same side of the machine, on the right, unscrew the underlying oil pipes and, if there are clamps on them screwed onto the frame, unscrew them to free the pipes from the frame.

- High pressure user supply pipe, remove the pipe.
- On the gearbox filter, remove the delivery to the gearbox control valve and extract the pipe, then remove the filter too.
- Again on the gearbox filter, remove the power steering outlet hose to the filter (in the case of the hydraulic transmission) or remove the supply pipe to the services control valve (in the case of the mechanical transmission) then remove the pipe.



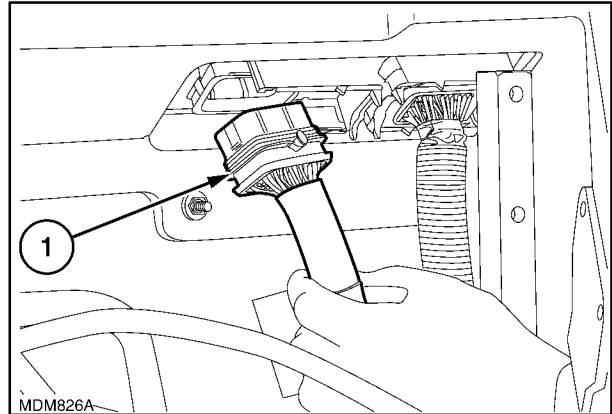
11

15. Extract the plastic fasteners (2) and detach the diesel recovery pipe (3) and delivery pipe (4) to the diesel pump (1).



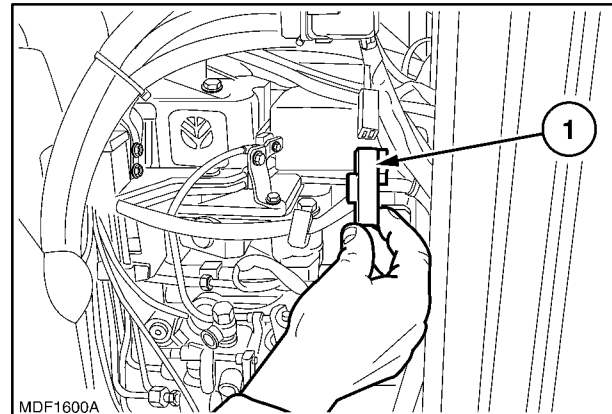
12

16. Disconnect the electrical connections (1) of the engine main cable from the cab cable.



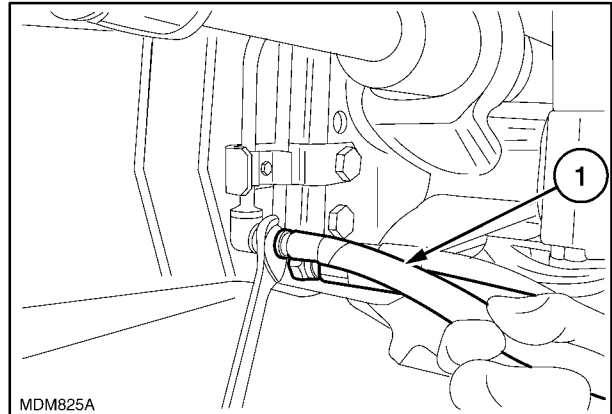
13

17. Disconnect all the electrical connections (1) located on the cab main cable and connect on the engine users.



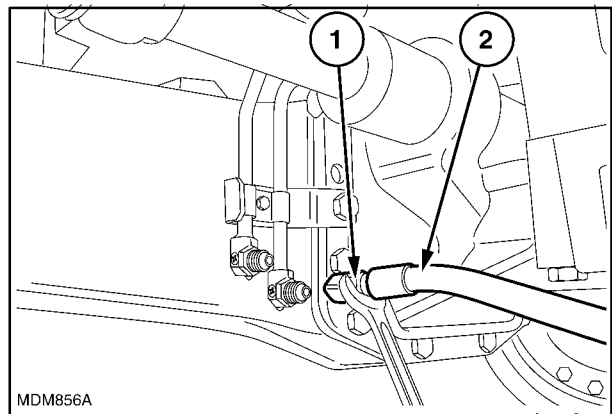
14

18. Disconnect the two power steering oil delivery and return hoses (1), remove the pipe.



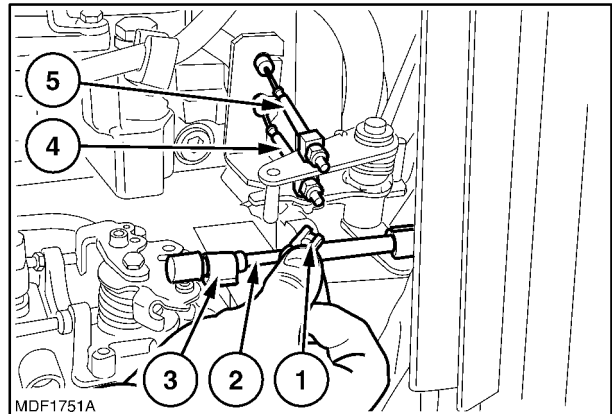
15

19. Remove the front differential lock union (1) and the hose (2) together with the pipe disconnected in the operation 13.



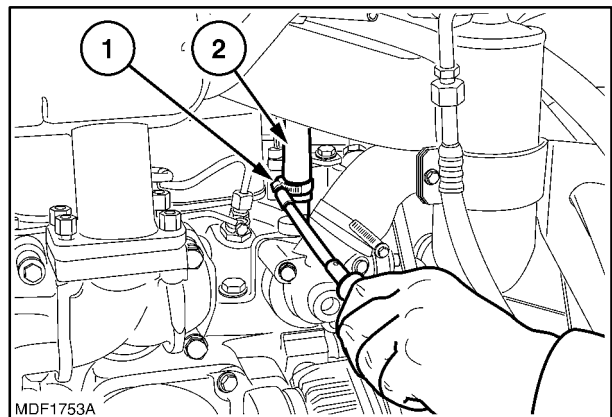
16

20. Remove the retaining clips (1) and detach the flexible cables governing the hand throttle (5) and pedal throttle (4).
21. Remove the retaining clip (3) and detach the throttle control tie-rod (2) connected to the injection pump.



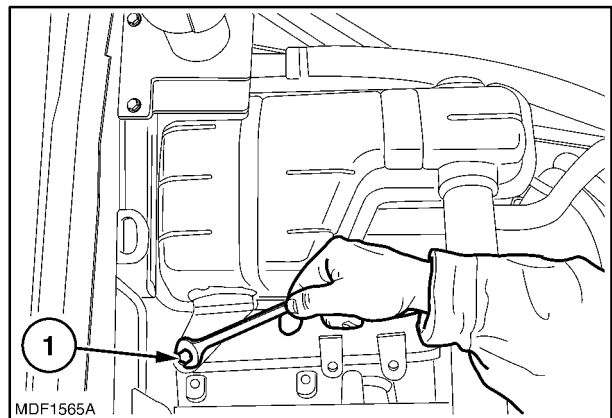
17

22. Detach the clamp (1) and the cab heater delivery pipe (2).



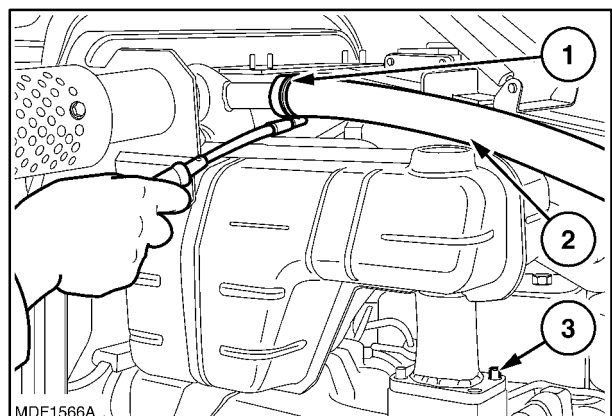
18

23. Take out the three exhaust silencer rear retaining bolts (1).



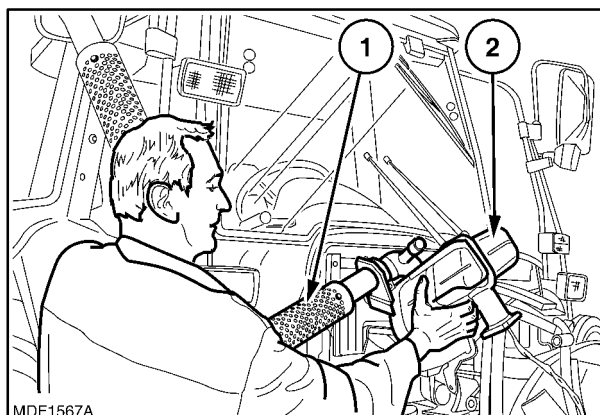
19

24. Remove the clamp (1), the air filter dust ejector pipe (2) and the four nuts (3) securing the silencer to the exhaust manifold.



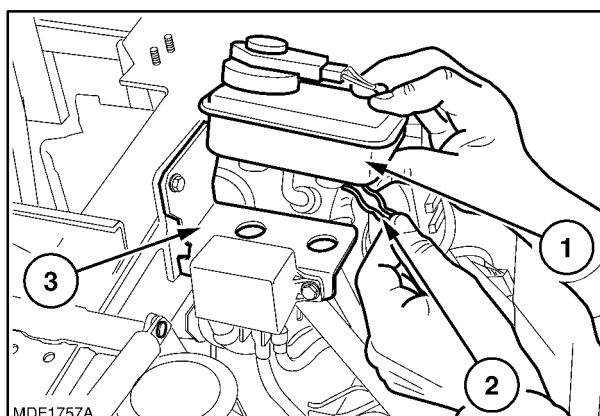
20

25. Remove the silencer (2) together with the exhaust pipe (1).



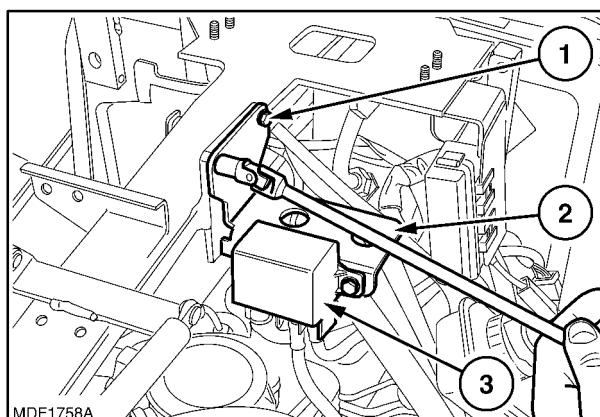
21

26. Remove the two clips (2) for retaining to the support (3) and the brake fluid reservoir (1).



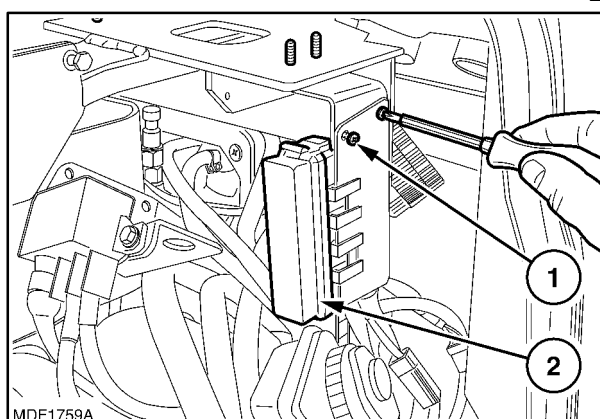
22

27. Remove the two retaining bolts (1) and the support (2) together with the relays (3) protecting the system.



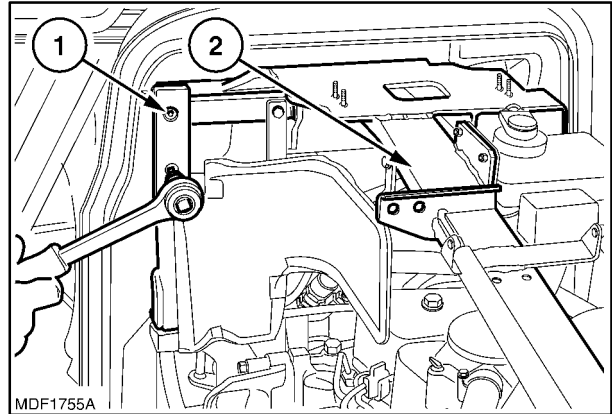
23

28. Remove the two retaining bolts (1) and the support together with the fuse-holder box (2).



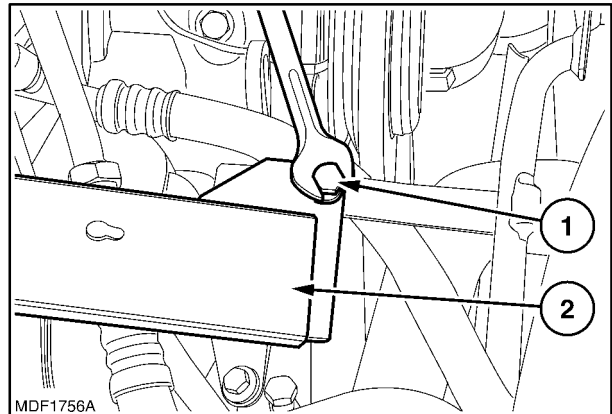
24

29. Remove the four rear retaining bolts (1) of the bonnet support (2).



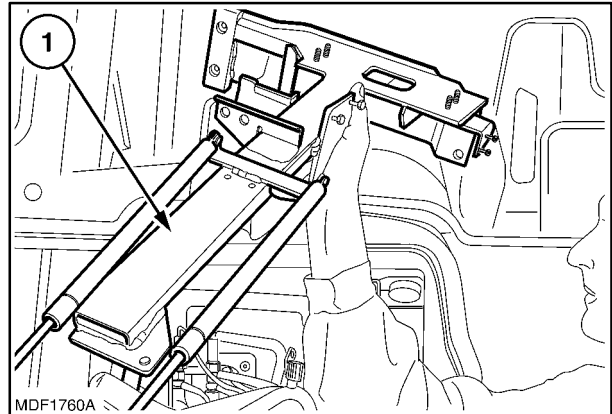
25

30. Remove the three front retaining bolts (1) of the bonnet support (2).



26

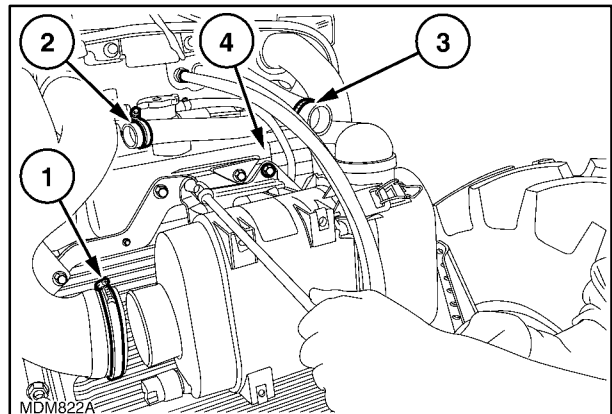
31. Detach the bonnet support (1).



27

32. Disconnect the clogged filter sensor, loosen the clamps and detach the pipes on the air filter:

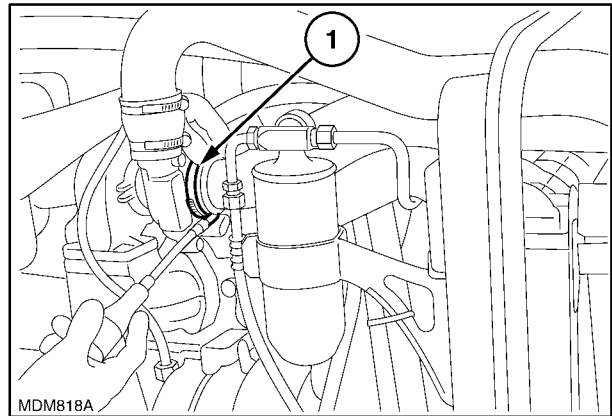
- air delivery to the turbo (1), (remember also to disconnect the pipe on the oil vapour recovery filter that will remain connected to the delivery pipe)
  - pneumatic braking compressor intake (2), (if installed)
  - ejector (3) then recovery it
- take out the screws (4), remove the air filter.



28

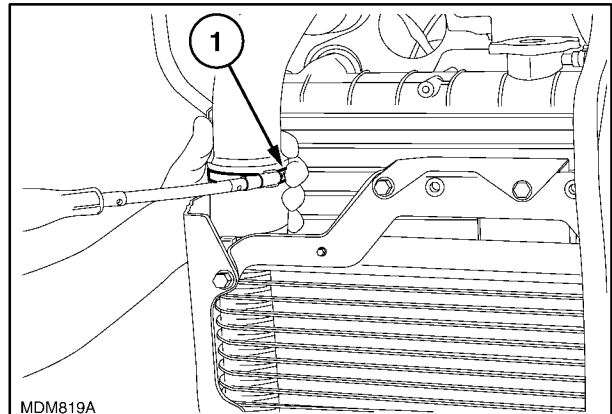


33. Loosen the air delivery retaining clamp (1) on the turbo and extract the pipe.



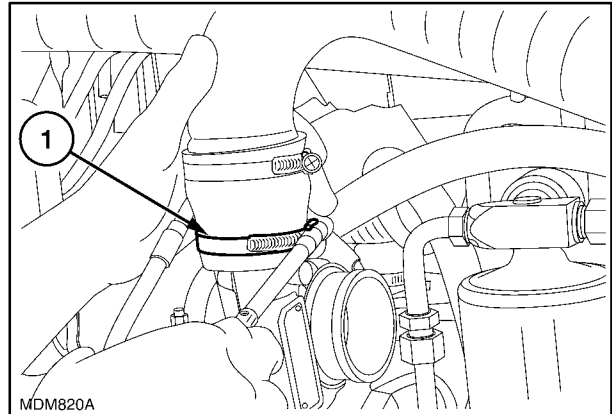
29

34. Loosen the air delivery pipe clamp (1) from the turbo to the air / air exchanger; perform the same operation on the left-hand air supply pipe, from the cooler to the intake manifold.



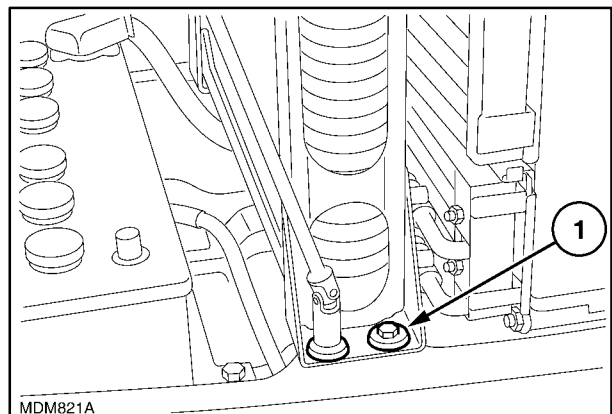
30

35. Loosen the clamp on the turbo then extract the pipe, on the left-hand side loosen the one on the intake manifold recovering the pipe.



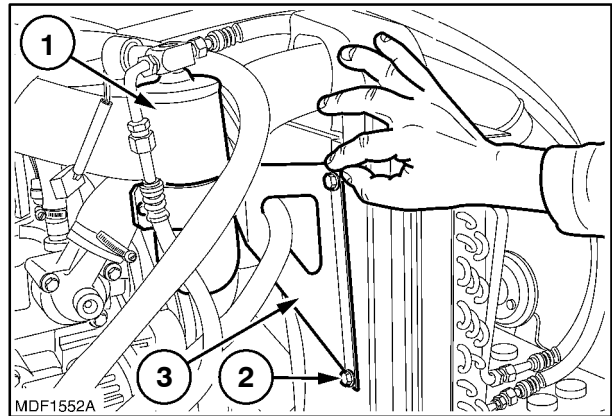
31

36. Remove the coolant compensation box from the support.  
Unscrew the retaining bolts (1) on the right and left, then remove the cooler.



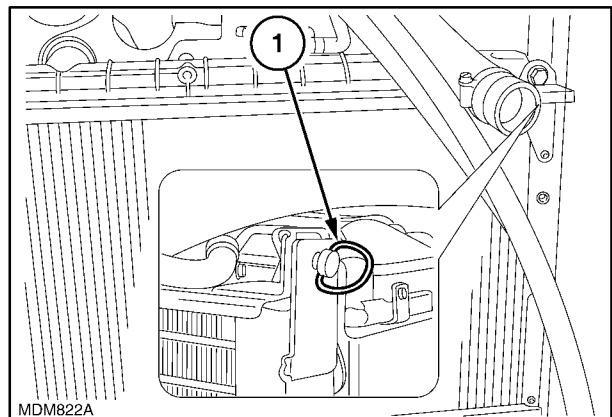
32

37. Remove the two retaining bolts (2) and detach the support (3) together with the dryer filter (1) and pipes.



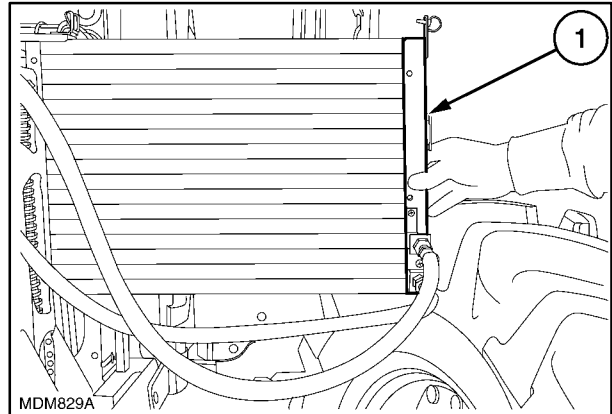
33

38. Unhook the top pin (1) retaining the condenser.



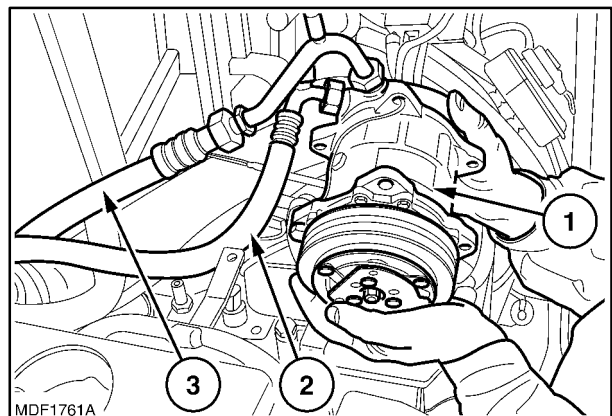
34

39. Turn the steering wheel fully to the left, remove the radiator of the condenser (1) from the same side of the tractor.



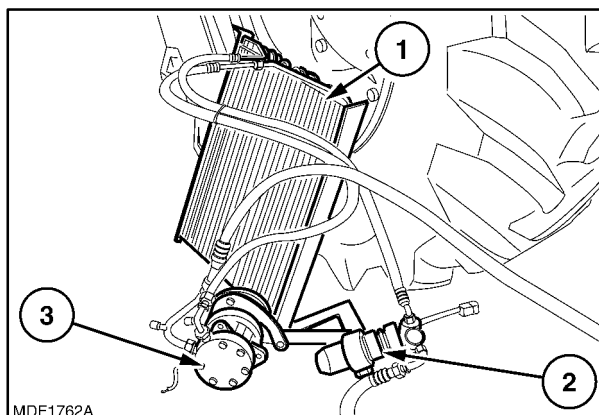
35

40. Remove the compressor (1) as described in section 50 without detaching pipes (2) and (3) so as not to then have to recover, evacuate and charge the gas in the air conditioning system.



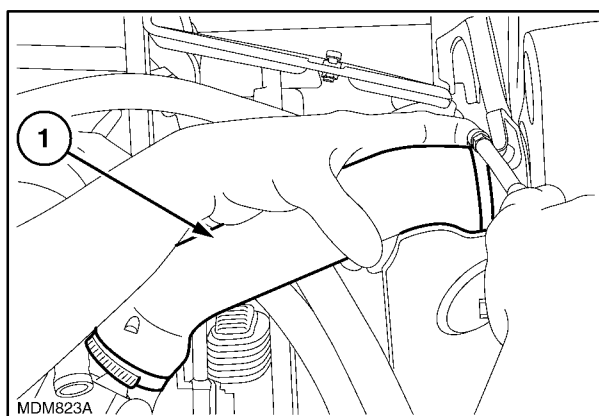
36

41. Remove the condenser radiator (1) the dryer filter (2) with its support and the compressor (3), resting them alongside the right-hand rear wheel with the associated piping.



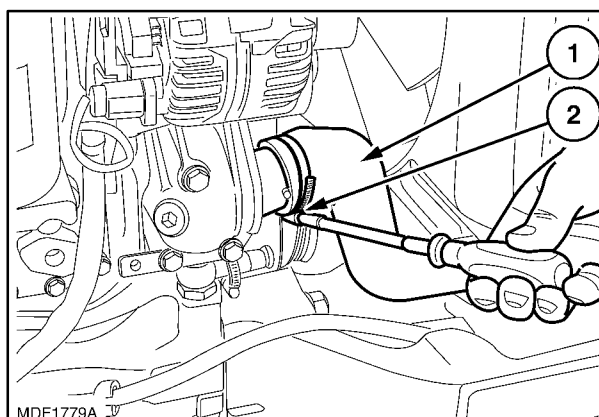
37

42. Loosen the corresponding retaining clamps and extract the top pipe between the radiator and the thermostatic valve on the engine.



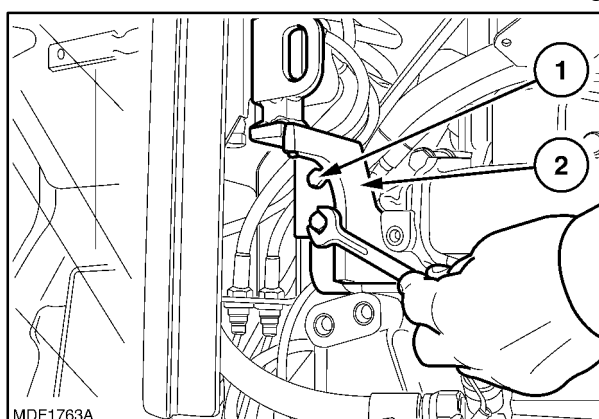
38

43. Loosen the retaining clamp (2) and extract the pipe (1) joining the coolant pump to the bottom of the radiator.



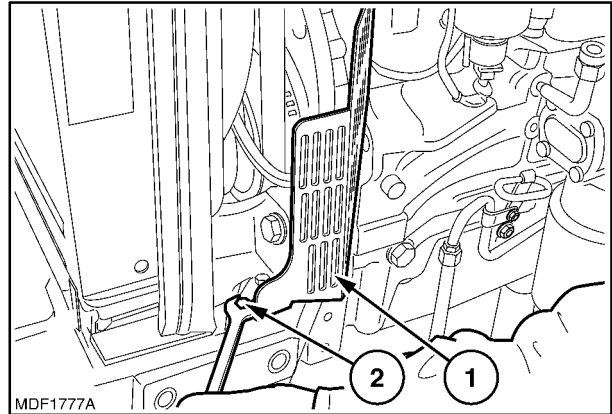
39

44. Remove the two retaining bolts (1) and the brake piping support (2).



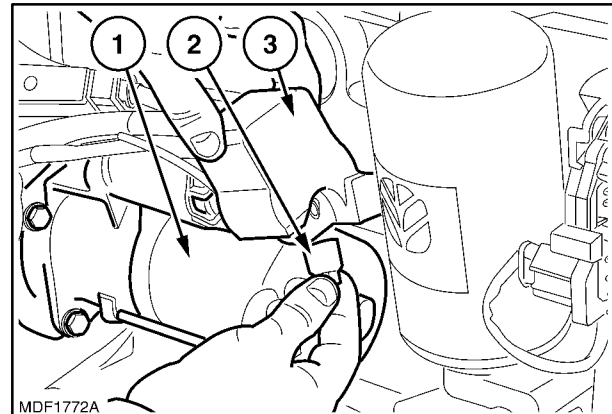
40

45. Remove the three retaining bolts (2) and the left-hand side guard (1) of the engine fan.



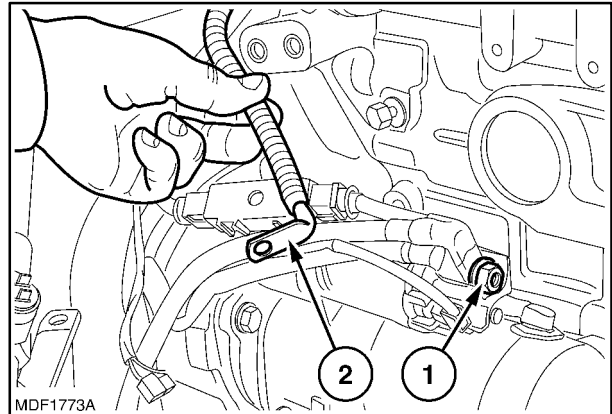
41

46. Working from the side of the starter motor (1), remove the retaining nut (2) and the protective cable housing (3).



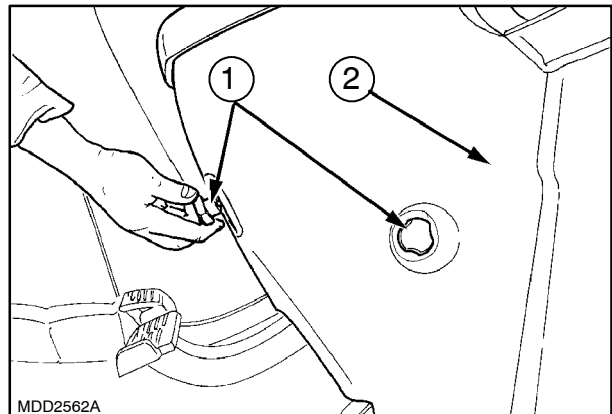
42

47. Remove the retaining nut (1) and the electrical cable (2) connected to the fuse-holder box and the positive cable between the motor and battery cut-out.  
 Disconnect all the connections of the engine main cable (on the brake pump pressure switches, on the brake oil cup, on the coolant temperature sensor, engine speed, engine oil pressure, grid heater, ..... ) cut the plastic clamps and remove the metal ones, recover the electrical system.



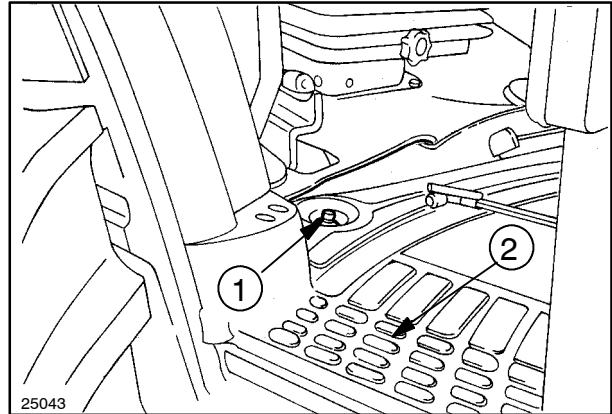
43

48. Remove the four knobs (1) and take off the two right- and left-hand dashboard panels (2).



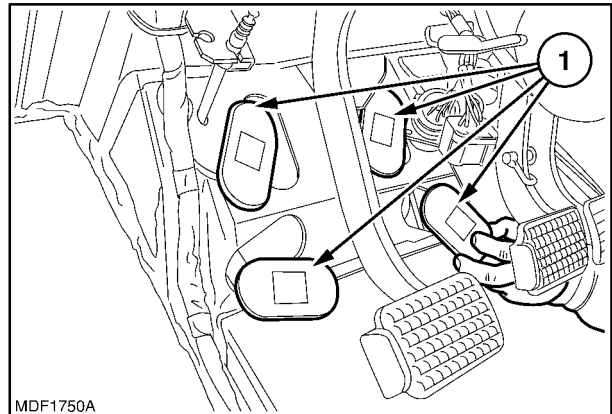
44

49. Extract the differential lock pedal retaining pin (in the case of standard machines) from the drive shaft (1), remove the pedal and footboard (2).



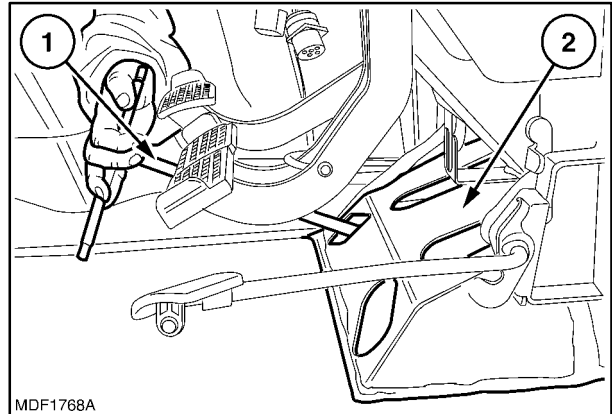
45

50. Remove the four plugs (1) in order to gain access to the engine upper retaining bolts.



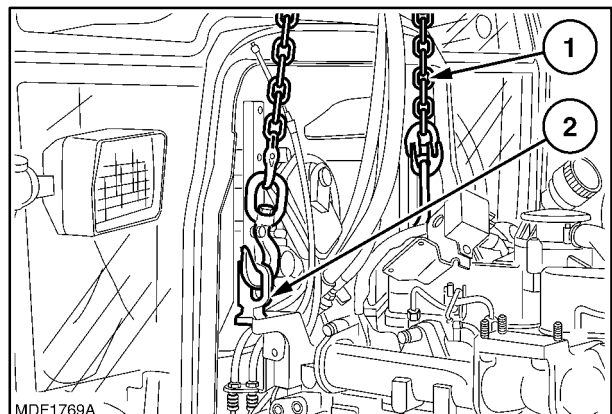
46

51. Using the wrench (1), remove the two nuts and two bolts fastening the engine to the transmission, gaining access via the four slots in the platform (2).



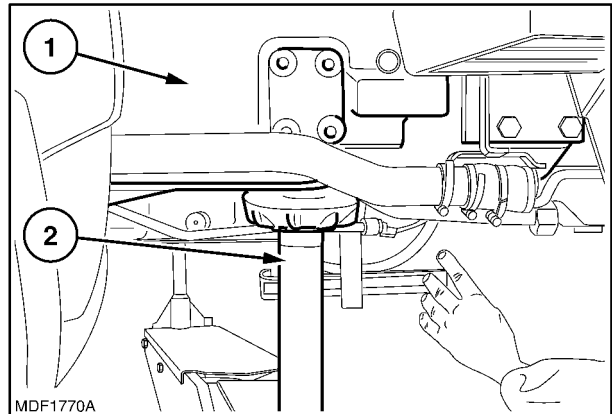
47

52. Hitch the engine to the hoist with the chains (1) anchoring it to the attachments (2) on the engine.



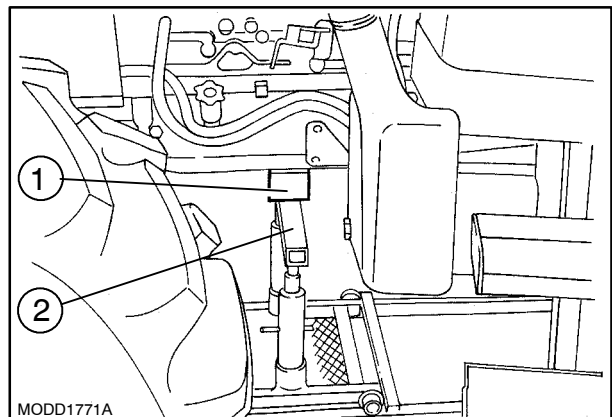
48

53. Position a fixed stand (2) under the clutch housing (1) near the engine attachment flanging and apply the handbrake.



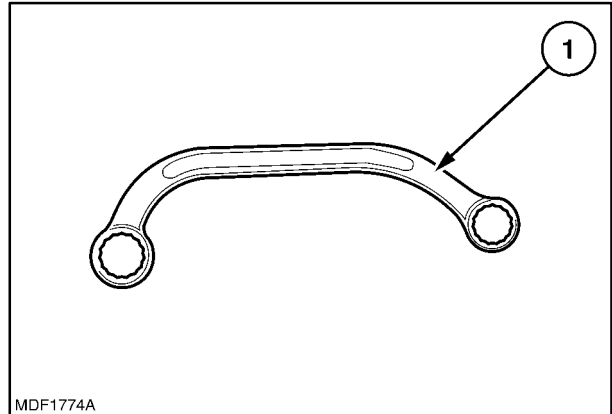
49

54. Position the movable tool for dismantling tractors **380000569** (2) with the bracket **380000500** and adapter plate **380000844** under the engine and place a wooden block (1) in between the points of contact between the tool and tractor.



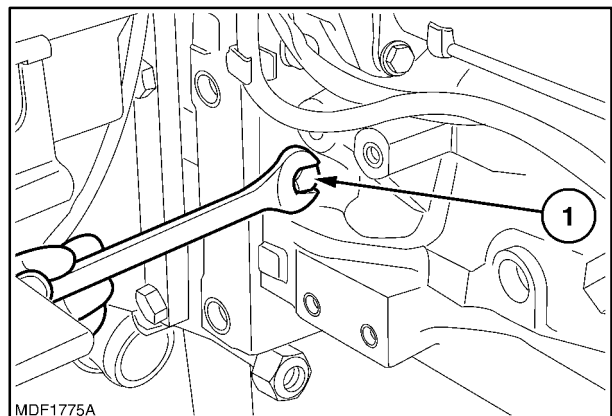
50

55. Remove the two bolts fastening the engine to the transmission on the tank side using the 19 mm wrench (1) shown alongside.



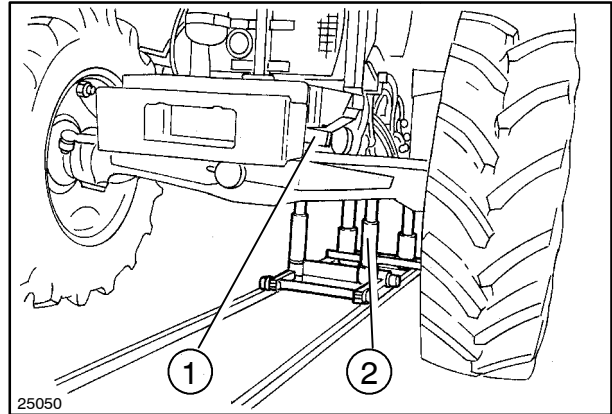
51

56. Remove the remaining six retaining bolts (1) at the bottom and side.



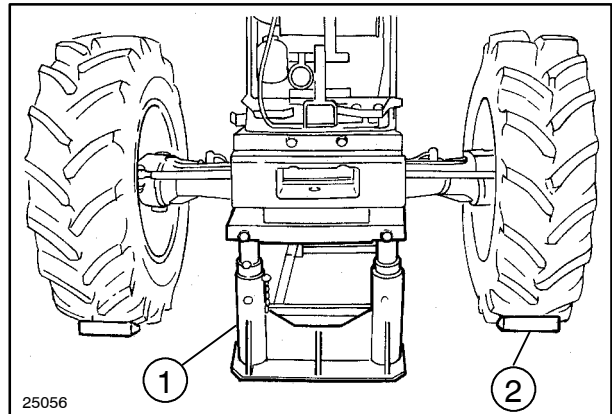
52

57. Separate the engine (1) from the transmission with the tool **380000569** (2).



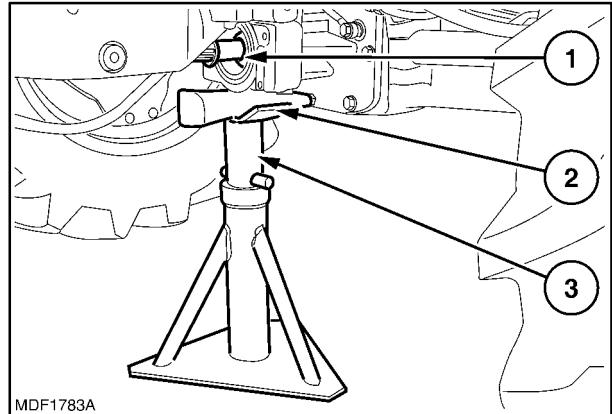
53

58. Insert the fixed stand (1) under the ballast support and secure the front wheels with wooden blocks (2).



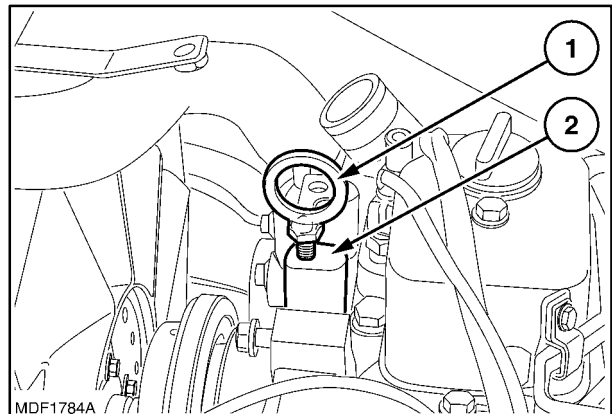
54

59. Position a fixed stand (3) under the support of the groove (1) of the front axle drive placing a wooden plug (2) between the parts (3) and (1).



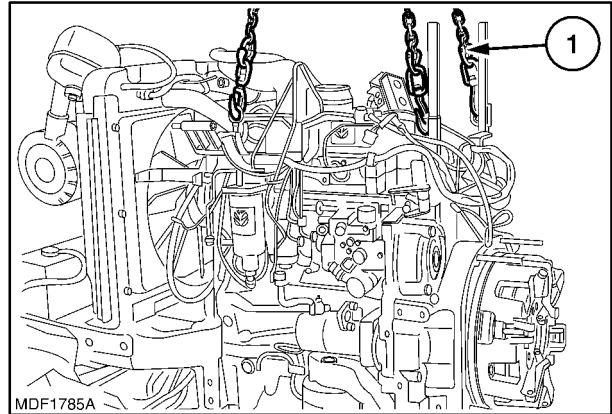
55

60. Fit the lifting eyelet (1) in the threading on the support (2).



56

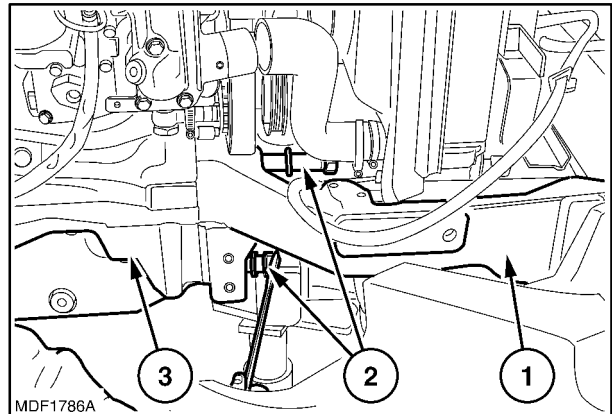
61. Insert the hooks of the lifting chains (1) in the eyelets shown in the figure, afterwards tensioning the chains with the hoist.



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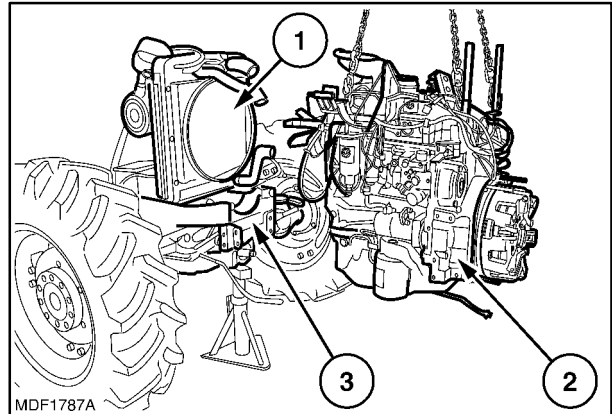
62. Remove the four bolts (2) fastening the front axle support (1) to the engine (3).



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58

63. Detach the engine (2) from the front axle (3), trying to avoid incorrect operations with the hoist so as not to let the engine fan damage the fins of the radiator (1), left on the axle (3).
64. Then rest the engine (2) on a platform support.



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59



65. To refit the engine, proceed as follows:



### ATTENTION



Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

- Respect the tightening torques prescribed on page 6.
- Insert the three hooks of the chain in the eyelets on the engine and, using the hoist, lift the assembly off the platform support.
- Position the engine on the front axle, trying to avoid incorrect operations with the hoist so as not to let the engine fan damage the fins of the radiator, then join the two assemblies together with the four retaining bolts.
- Reposition the movable tool for dismantling tractors **380000569** under the engine and place a wooden block in between the point of contact between the tool and engine.
- With the aid of the hoist, place the engine on the tool **380000569** and remove the lifting eyelet previously fitted on the front of the engine.
- Remove the fixed stand previously positioned under the support of the groove of the drive of the front axle and the wooden plug.
- Remove the fixed U-bolt fitted beforehand under the ballast support and the two wooden wedges locking the front wheels.
- Remove the old sealing paste from the two surfaces between the engine and clutch casing.
- Apply LOCTITE sealing compound on the engine/clutch casing contact surfaces.
- Position wooden blocks under the rear wheels, make sure that the handbrake is fully applied and that all fixed and mobile stands are safely positioned.
- The installation phase described here requires the presence of two or three workers to use the movable tool for dismantling tractors **380000569** to move the engine/front axle assembly close to the clutch casing.
- In the phase of installing the engine/front axle assembly to the clutch casing, it is necessary to push on the front wheels, taking great care in the end phase of coupling over both the pipes and the cables/electrical connections to prevent crushing between the two bodies. During this phase, it is moreover necessary to turn the crankshaft with the aid of the radiator cooling fan to help the coupling between the sleeve and the drive shaft.
- Secure both assemblies by tightening all the bolts locking the engine to the clutch casing.
- Disconnect the hoist chains, remove the U-bolt previously fitted under the clutch casing and recover the movable tool for dismantling tractors **380000569**.
- Refit the 4 plugs on the platform and refit the footboard and, in the case of standard machines, refit the lock pedal.
- Refit the two cabinets under the instrument panel with the 4 knobs.
- Refit the specific electric cable of the engine, bind it with the plastic clamps and with the related metal clamps, refit the related plastic guards on the starter motor too.
- Refit the fan guard on the left-hand side.
- Refit the brake pipe support.
- Refit the two cylinder block / radiator connecting pipes, top and bottom, with the metal clamps.
- Install the compressor as described in section 50 together with the pipes.
- Refit the condenser radiator together with the pipes and reconnect the top condenser retaining pin.
- Refit the dryer filter together with its support and piping, tightening the two retaining bolts.
- Refit the air / air cooler with the metal pipes and sleeves, tightening them with the metal clamps.

- Refit the air filter, ejector pipe, delivery pipe to the turbo with the pipe on the oil vapour recovery filter, and the air brakes compressor intake pipe (if installed), tighten the metal clamps, reconnect the electrical system to the clogged filter sensor.
- Refit the bonnet support, tightening the retaining bolts.
- Refit the support with the fuse-holder box on the bonnet support, tightening the two retaining bolts.
- Refit the support together with the relays protecting the system on the bonnet support, fitting the two retaining bolts.
- Refit the brake fluid reservoir onto the support and the two retaining clips.
- Refit the silencer together with the exhaust pipe.
- Secure the silencer to the exhaust manifold with the four nuts and connect the air filter dust extractor pipe to the silencer exhaust, inserting the retaining clamp.
- Refit the three rear retaining bolts of the exhaust silencer.
- Fit the cab heater delivery and return pipes and insert the associated clamps.
- Install the flexible cables governing the hand and pedal throttle, inserting the retaining clips.
- Reconnect the throttle control tie-rod to the injection pump, inserting the retaining clip.
- Refit the hose together with the front differential lock pipe.
- Reconnect the right and left steering hoses to the front axle.
- Reconnect all the pins of the cab main electrical system to the users on the engine.
- Reconnect the engine cable main connection to the cab.
- Reconnect the diesel recovery and delivery pipes to the pump.
- Position and reconnect the oil pipes (described in operation 14.) on the right-hand side, taking care to tighten the clamps to the frame.
- Position and reconnect the oil pipes (described in operation 13.) on the left-hand side, taking care to tighten the clamps to the frame.
- Refit the propeller shaft with its central support and the retaining bolts.
- Refit the front axle drive shaft guard, tightening the front, central and rear retaining bolts.
- Refit the front ballast together with the support and insert the retaining pin and the split pins.
- Refit the toolbox and the catch.
- Refit the positive cables and the control unit memory cable on the mechanical battery cut-out switch.
- Refit the battery cut-out switch on the guard on the right-hand side of the fan, refit the guard tightening the three retaining bolts.
- Refill the oil from the transmission/gearbox and the coolant in the radiator.
- Install the bonnet as described, see section 90.
- Reconnect the battery negative cable.

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