5610S, 6610S, 7610S, 7010, 8010 REPAIR MANUAL COMPLETE CONTENTS

The following pages are the collation of the contents pages from each section and chapter of the 5610S, 6610S, 7610S, 7010, and 8010 Tractor Repair manual. Complete Repair part # 87032901.

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the 5610S, 6610S, 7610S, 7010, and 8010 Tractors.

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GENERAL INSTRUCTIONS

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by New Holland authorised workshops. All instructions should be carefully observed and special equipment where indicated should be used.
Anyone who carries out service operations described without carefully observing these prescriptions will be directly responsible for any damage caused.

NOTES FOR EQUIPMENT

Equipment which NEW HOLLAND proposes and shows in this manual is:

- studied and designed expressly for use on NEW HOLLAND tractors;
- necessary to make a reliable repair;
- accurately built and strictly tested to offer efficient and long-lasting working life.

NOTICES

The words “front”, “rear”, “right hand”, and “left hand” refer to the different parts as seen from the operator’s seat oriented to the normal direction of movement of the tractor.

HEALTH AND SAFETY

CONTENTS

HEALTH AND SAFETY PRECAUTIONS

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This section lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. The precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures and the handling of materials, should be carried out with health and safety in mind.

ACIDS AND ALKALIS - see Battery acids, e.g. caustic soda, sulfuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Causes burns.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective gloves and goggles. Can destroy ordinary protective clothing. Do not breathe mists.

Ensure access to water and soap is readily available for splashing accidents.

ADHESIVES AND SEALERS - see Fire

Highly Flammable, Flammable, combustible.

Generally should be stored in "No Smoking" areas; cleanliness and tidiness in use should be observed, e.g. disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labelled.

Solvent based Adhesives/Sealers - See Solvents.

Follow manufacturers instructions.

Water based Adhesives/Sealers

Those based on polymer emulsions and rubber lattices may contain small amounts of volatile toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Follow manufacturers instructions.

Resin based Adhesives/Sealers - e.g. epoxide and formaldehyde resin based.

Mixing should only be carried out in well ventilated areas as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation; dermatitis and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact. Follow manufacturers instructions.

Anaerobic, Cyanoacrylate and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturers instructions followed.

Cyanoacrylate adhesives (super-glues) must not contact the skin or eyes. If skin or eye tissue is bonded cover with a clean moist pad and get medical attention. do not attempt to pull tissue apart. Use in well ventilated areas as vapours can cause irritation of the nose and eyes.

For two-pack systems see Resin based adhesives/ sealers.

Isocyanate (Polyurethane) Adhesives/ Sealers - see Resin based Adhesives.

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Any spraying should preferably be carried out in exhaust ventilated booths removing vapours and spray droplets from the breathing zone. Individuals working with spray applications should wear supplied air respirators.

ANTIFREEZE - see Fire, Solvents e.g. Isopropanol, Ethylene Glycol, Methanol.

Highly Flammable, Flammable, Combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

Vapours given off from coolant antifreeze (glycol) arise only when heated.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze if swallowed is fatal and medical attention must be found immediately.

ARC WELDING - see Welding.

BATTERY ACIDS - see Acids and Alkalis.

Gases released during charging are explosive. Never use naked flames or allow sparks near charging or recently charged batteries.

BRAKE AND CLUTCH FLUIDS (Polyalkylene Glycols) - see Fire.

Combustible.

Splashes to the skin and eyes are slightly irritating. Avoid skin and eye contact as far as possible. Inhalation of vapour hazards do not arise at ambient temperatures because of the very low vapour pressure.

BRAZING - see Welding.

CHEMICAL MATERIALS - GENERAL - see Legal Aspects.

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, oils and grease should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly inflammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life-expectancy.

DO'S

Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.

Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, poster or other instructions. Material health and safety data sheets can be obtained from Manufacturers.

Do organise work practices and protective clothing to avoid soiling of the skin and eyes; breathing vapours/aerosols/dusts/fumes; inadequate container labelling; fire and explosion hazards.

Do wash before job breaks; before eating, smoking, drinking or using toilet facilities when handling chemical materials.

Do keep work areas clean, uncluttered and free of spills.

Do store according to national and local regulations.

Do keep chemical materials out of reach of children.

DO NOTS

Do Not mix chemical materials except under the manufacturers instructions; some chemicals can form other toxic or harmful chemicals; give off toxic or harmful fumes; be explosive when mixed together.

Do Not spray chemical materials, particularly those based on solvents, in confined spaces e.g. when people are inside a vehicle.

Do Not apply heat or flame to chemical materials except under the manufacturers' instructions. Some are highly inflammable and some may release toxic or harmful fumes.

Do Not leave containers open. Fumes given off can build up to toxic, harmful or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas, pits etc.

Do Not transfer chemical materials to unlabelled containers.

Do Not clean hands or clothing with chemical materials. Chemicals, particularly solvents and fuels will dry the skin and may cause irritation with dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.

Do Not use emptied containers for other materials, except when they have been cleaned under supervised conditions.

Do Not sniff or smell chemical materials. Brief exposure to high concentrations of fumes can be toxic or harmful.

Clutch Fluids - see Brake and Clutch Fluids.

Clutch Linings and Pads - see Brake and Clutch Linings and Pads.

CORROSION PROTECTION MATERIALS - see Solvents, Fire.

Highly flammable, flammable.

These materials are varied and the manufacturers instructions should be followed. They may contain solvents, resins, petroleum products etc. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

Cutting - see Welding.

De-Waxing - see Solvents and Fuels (Kerosene).

DUSTS

Powder, dusts or clouds may be irritant, harmful or toxic. Avoid breathing dusts from powdery chemical materials or those arising from dry abrasion operations. Wear respiratory protection if ventilation is inadequate.

ELECTRIC SHOCK

Electric shocks can result from the use of faulty electrical equipment or from the misuse of equipment even in good condition.

Ensure that electrical equipment is maintained in good condition and frequently tested.

Ensure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged.

Ensure that electric equipment is protected by the correct rated fuse.

Never misuse electrical equipment and never use equipment which is in any way faulty. The results could be fatal.

Use reduced voltage equipment (110 volt) for inspection and working lights where possible.

Ensure that the cables of mobile electrical equipment cannot get trapped and damaged, such as in a vehicle hoist.

Use air operated mobile equipment where possible in preference to electrical equipment.

In cases of electrocution:-

- switch off electricity before approaching victim

- if this is not possible, push or drag victim from source of electricity using dry non-conductive material

- commence resuscitation if trained to do so

- SUMMON MEDICAL ASSISTANCE

EXHAUST FUMES

These contain asphyxiating, harmful and toxic chemicals and particles such as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should only be run under conditions of adequate extraction or general ventilation and not in confined spaces.

Gasolene (Petrol) Engine

There may not be adequate warning properties of odour or irritation before immediate and delayed toxic or harmful effects arise.

Diesel Engine

Soot, discomfort and irritation usually give adequate warning of hazardous fume concentrations.

FIBRE INSULATION - see Dusts.

Used in noise and sound insulation.

The fibrous nature of surfaces and cut edges can cause skin irritation. This is usually a physical and not a chemical effect.

Precautions should be taken to avoid excessive skin contact through careful organisation of work practices and the use of gloves.

FIRE - see Welding, Foams, Legal Aspects.

Many of the materials found on or associated with the repair of vehicles are highly flammable. Some give off toxic or harmful fumes if burnt.

Observe strict fire safety when storing and handling flammable materials or solvents, particularly near electrical equipment or welding processes.

Ensure before using electrical or welding equipment but that there is no fire hazard present.

Have a suitable fire extinguisher available when using welding or heating equipment.

FIRST AID

Apart form meeting any legal requirements it is desirable for someone in the workshop to be trained in first aid procedures.

Splashes in the eye should be flushed with clean water for at least ten minutes.

Soiled skin should be washed with soap and water.

Inhalation affected individuals should be removed to fresh air immediately.

If swallowed or if effects persist consult a doctor with information (label) on material used.

Do not induce vomiting (unless indicated by manufacturer).

FOAMS - Polyurethane - see Fire.

Used in sound and noise insulation. Cured foams used in seat and trim cushioning.

Follow manufacturers instructions.

Unreacted components are irritating and may be harmful to the skin and eyes. Wear gloves and goggles.

Individuals with chronic respiratory diseases, asthma, bronchial medical problems or histories of allergic diseases should not work with or near uncured materials.

The components, vapours, spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful.

Vapours and spray mists must not be breathed. These materials must be applied with adequate ventilation and respiratory protection. Do not remove respirator immediately after spraying, wait until vapour/ mists have cleared.

Burning of the uncured components and the cured foams can generate toxic and harmful fumes.

Smoking, open flames or the use of electrical equipment during foaming operations and until vapours/mists have cleared should not be allowed. Any heat cutting of cured foams or partially cured foams should be conducted with extraction ventilation (see Body Section 44 Legal and Safety Aspects).

SECTION 10 - ENGINE

Chapter 1 - Diesel Engines

CONTENTS

ENGINE SPECIFICATIONS

Model	Unit	5610 S	6610 S	7610 S	7010	8010
Turbocharged Engine		No	No	Yes	Yes	No
Cylinders		4	4	4	4	6
Bore	mm	111.8	111.8	111.8	111.8	111.8
	in	4.4	4.4	4.4	4.4	4.4
Stroke	mm	111.8	127.0	127.0	127.0	127.0
	in	4.4	5.0	5.0	5.0	5.0
Displacement	cu cm	4392	4987	4987	4987	7480
	cu in	268	304	304	304	456
Compression Ratio		17.5:1	17.5:1	17.5:1	17.5:1	17.5:1
Cylinder Bore Compression (at cranking speed of 200 rpm)	bar	25.85	25.85	25.85	25.85	25.85
	psi ± 50	375	375	375	375	375
Firing Order		1·3·4·2	1·3·4·2	1·3·4·2	1·3·4·2	1·5·3·6·2·4
Low-Idle Speed	rev/min ± 25	750	750	750	750	750
High-Idle Speed	rev/min ± 25	2350	2350	2250	2250	2250
Maximum No-Load Speed	rev/min	2375	2375	2375	2250	2250
Rated Engine Speed	rev/min	2200	2200	2100	2200	2100

CYLINDER BLOCK

Cylinder Bore Taper	maximum wear limit	0.127 mm	0.005 in.
	maximum repair limit	0.025 mm	0.001 in.
Cylinder Bore Out-of-Round	maximum wear limit	0.127 mm	0.005 in.
	maximum repair limit	0.030 mm	0.001 in.
Cylinder Bore Diameter		110.017-110.080 mm	4.331-4.334 in.
Rear Oil Seal Diameter		140.77-140.87 mm	5.542-5.546 in.
Head-to-Block Surface Flatness Limit	any 152 mm (6 in.) area	0.080 mm	0.003 in.
	any 25.40 mm (1 in.) area	0.030 mm	0.001 in.
	overall	0.127 mm	0.005 in.

CYLINDER HEAD

Valve Guide Bore Diameter	9.469-9.495 mm	0.3728-0.3738 in.

EXHAUST VALVES

Face Angle	relative to valve head	44°15′-44°30′	
Stem Diameter	Std	9.401-9.421 mm	0.3701-0.3709 in.
		0.076 mm	0.003 in.
	oversize	9.477-9.497 mm	0.3731-0.3739 in.
		0.381 mm	0.015 in.
	oversize	9.781-9.802 mm	0.3851-0.3859 in.
		0.762 mm	0.030 in.
	oversize	10.163-10.183 mm	0.4001-0.4009 in.
Head Diameter		42.88-43.13 mm	1.688-1.698 in.
Stem-to-Guide Clearance		0.048-0.094 mm	0.0019-0.0037 in.
Lash Clearance	cold	0.43-0.53 mm	0.017-0.021 in.
Valve Head-to-Cylinder Head Face Depth		1.2-1.6 mm	0.047-0.063 in.

INTAKE VALVES

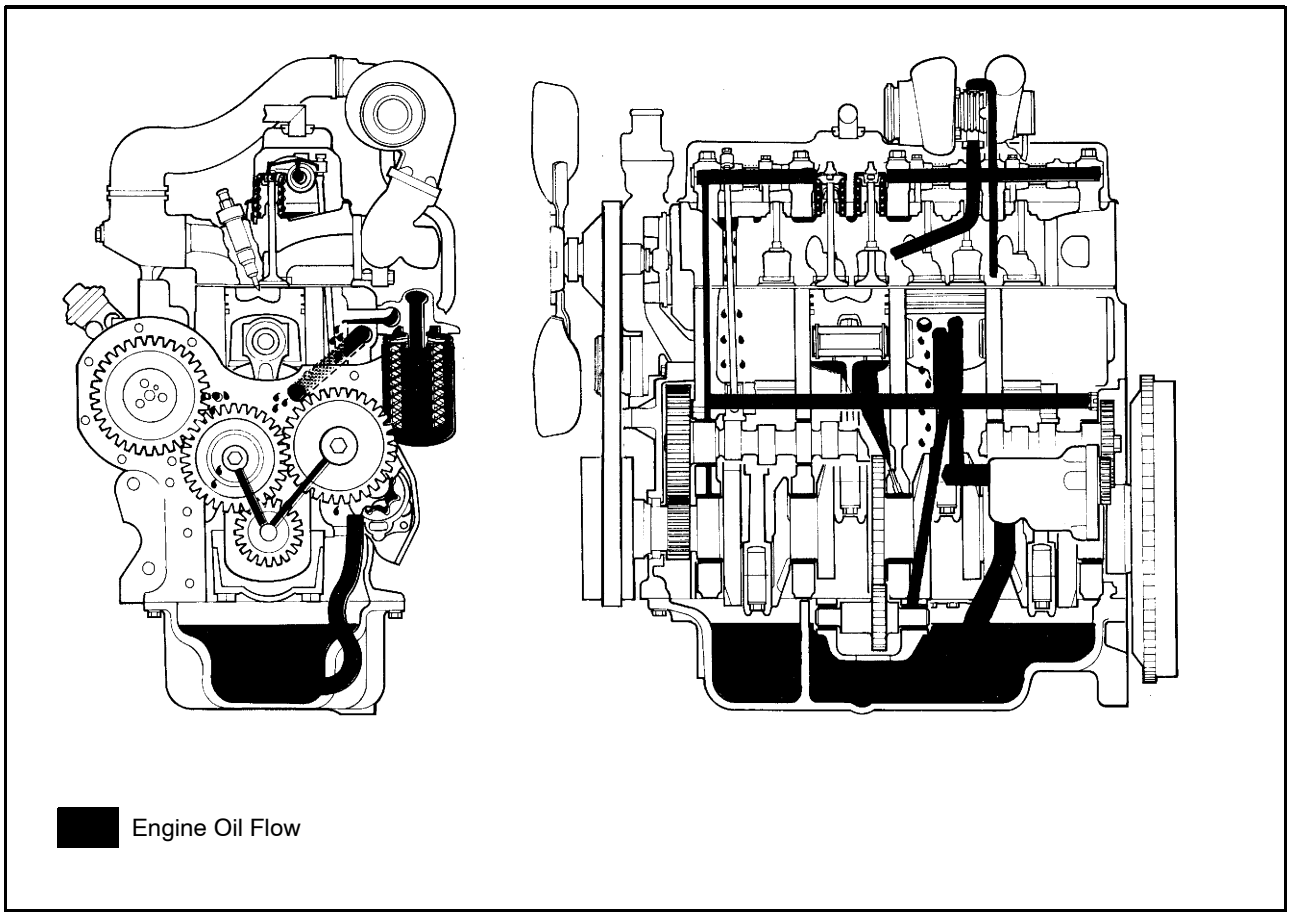
Face Angle	relative to valve head	29°15′-29°30′	
Stem Diameter	Std	9.426-9.446 mm	0.3711-0.3719 in.
		0.076 mm	0.003 in.
	oversize	9.502-9.522 mm	0.3741-0.3749 in.
		0.381 mm	0.015 in.
	oversize	9.807-9.827 mm	0.3861-0.3869 in.
		0.762 mm	0.030 in.
	oversize	10.188-10.208 mm	0.4011-0.4019 in.
Head Diameter		47.37-47.63 mm	1.865-1.875 in.
Stem-to-Guide Clearance		0.023-0.069 mm	0.0009-0.0027 in.
Lash Clearance	cold	0.36-0.46 mm	0.014-0.018 in.
Valve Head-to-Cylinder Head Face Depth		0.86-1.32 mm	0.034-0.052 in.

VALVE SPRINGS

Free Length		60.7 mm	2.4 in.
Length	loaded at 28-31 kg (62-68 lbs.)	48.3 mm	1.9 in.
Length	loaded at 61-69 kg (135-152 lbs.)	35.7 mm	1.4 in.

VALVE TIMING

Intake Opening	before top dead center	12°
Intake Closing	after bottom dead center	38°
Exhaust Opening	before bottom dead center	48°
Exhaust Closing	after top dead center	12°



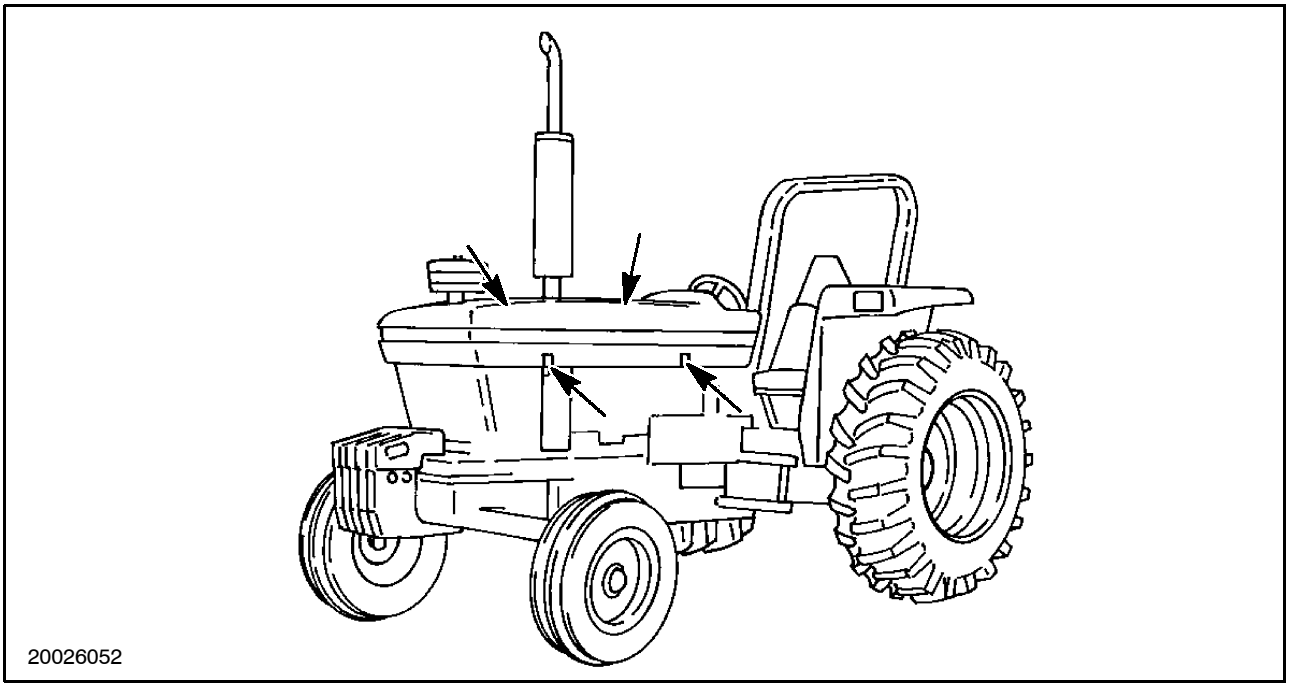
1

Engine Lubrication System with Turbocharger Installed

SEPARATING THE TRACTOR

Separating the engine from the front transmission

1. Raise the right-hand hood assembly and support with rod. Disconnect the battery.
2. Remove the vertical exhaust muffler (where installed) to facilitate removing the left-hand hood assembly.
3. Completely remove the left and right-hand side hood assemblies, Figure 2, by removing retaining bolts.
4. Remove the exhaust piping on the left-hand side of the engine (where installed) at the clamp below the auxiliary engine mounted hydraulic pump.
5. Remove the hydraulic piping at the auxiliary engine mounted pump (where installed). Cap and plug all exposed openings to prevent contamination. Remove and retain brackets for piping.
6. Remove the hydraulic steering piping on the left-hand side of the engine. Cap and plug all exposed openings to prevent contamination. Remove and retain brackets for piping.
7. Disconnect the rear hood assembly from the left, right and center brackets by removing the retaining bolts.
8. Disconnect the front and rear harness assemblies and ground wires. Remove and retain clips.
9. Disconnect the hydraulic oil cooler tubing at the center housing. Cap and plug all exposed openings to prevent contamination. Remove and retain brackets and clamps for piping.
10. Disconnect the wires at the starter motor.
11. Remove the starter motor, and the battery grounding cable from the retaining bolt.
12. Remove the bolts securing the fuel tank to the center support bracket at the front of the tank.
13. Disconnect the throttle control rod from the fuel injection pump.
14. Close the fuel shut-off valve and disconnect the fuel tank-to-fuel filter tube at the tank.
15. Disconnect the fuel filter hose from the fuel auxiliary tank (where installed).
16. Release the fuel leak-off tube from the neck of the filler tube (where installed).
17. Remove the engine flywheel access cover.
18. Remove the drive shaft guard assembly (where installed).
19. Remove the drive shaft-to-axle drive flange retaining bolts, and remove drive shaft (where installed).



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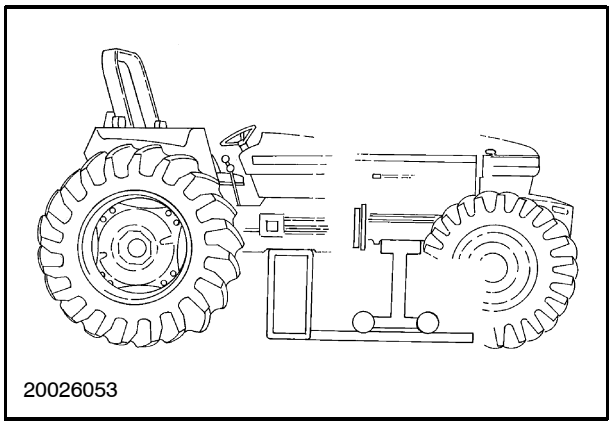
2

20. Position the tractor Splitting Tool No. 201387, Figure 3.
21. Remove the engine-to-front transmission buckle up bolts and pull the front of the tractor away from the rear of the tractor.

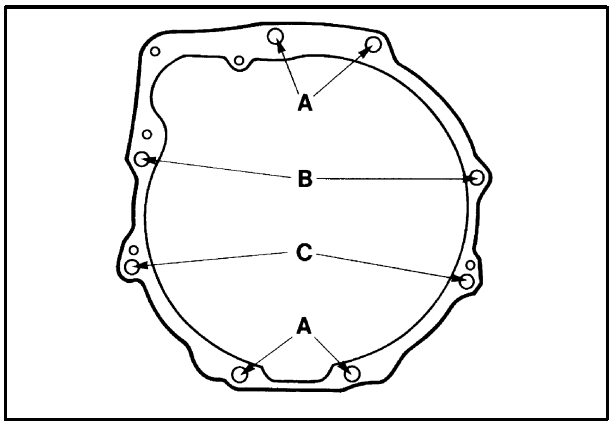


3

Reconnecting the engine to the front transmission

Reconnecting the engine to the front transmission follows the separation procedures in reverse with the following requirements:

1. When aligning the front of the tractor with the rear, ensure the correct positioning of all components to prevent damage from bending, pinching or crushing.
2. Tighten the top two and bottom two engine to-transmission buckle up bolts to 373-460 N·m (275-339 ft.-lb.). Tighten the two lower side bolts to 224-271 N·m (165-200 ft.-lb.), and the upper two side bolts to 190-230 N·m (140-170 ft.-lb.), see Figure 4.
3. Tighten the starter motor to a torque of 27-34 N·m (240-300 in.-lb.).
4. Check for proper installation of all washers, spacers, brackets and clamps.
5. Check all fuel connections for proper tightening.
6. Bleed air from fuel system and leak check piping.
7. Check all hydraulic connections for proper tightening.
8. Check level of hydraulic oil and replenish as necessary.
9. Bleed air from hydraulic system and leak check piping.
10. Perform check of the steering system.



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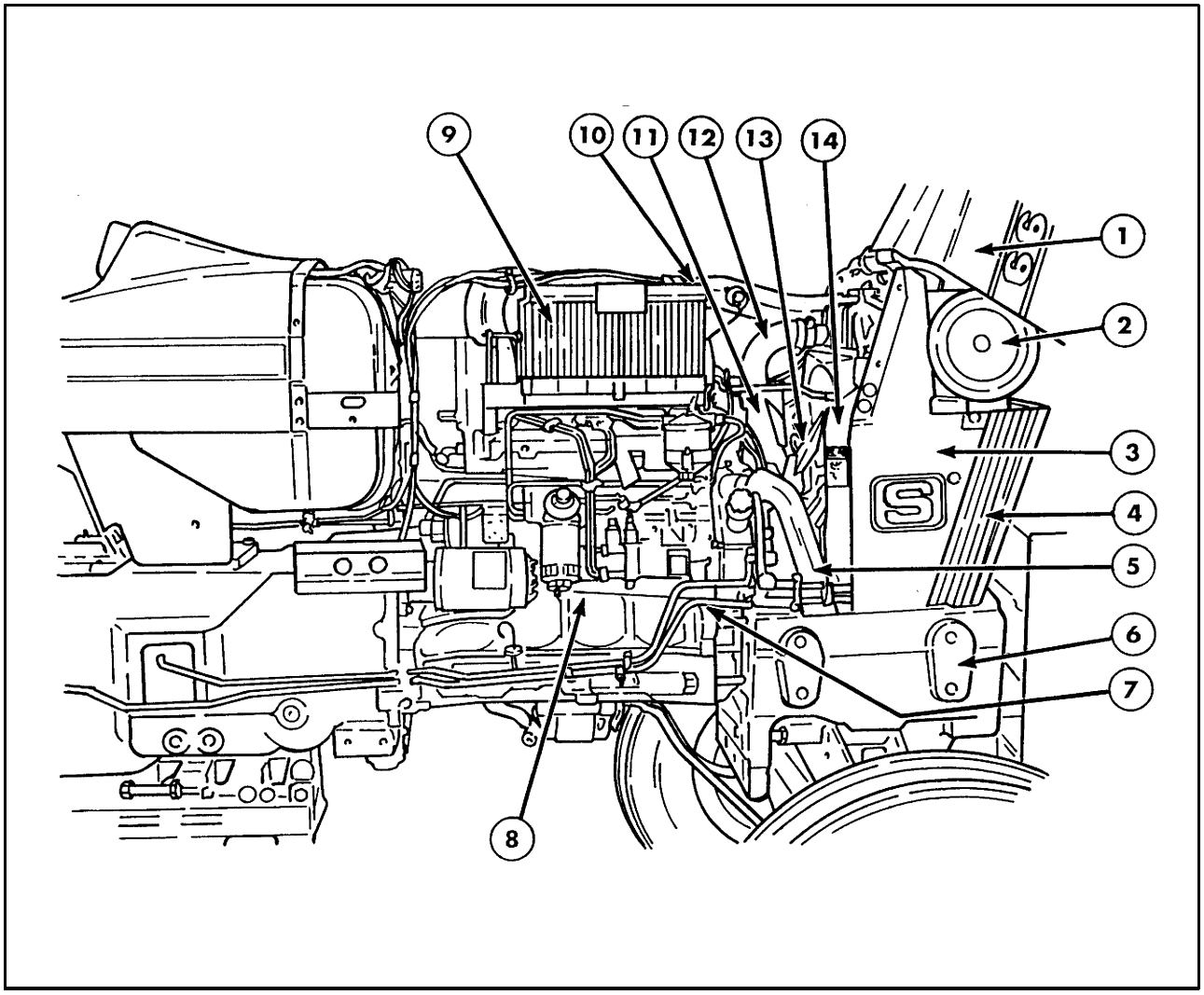
Separating the engine from the front axle assembly

1. Correctly discharge the refrigerant from the air conditioning system (where installed).
2. Raise the right-hand hood assembly and support with rod. Disconnect the battery (9).
3. Remove the vertical exhaust muffler (where installed).
4. Remove the left and right hood assemblies by removing the retaining bolts.
5. Remove the air pre-cleaner to facilitate removing the front hood assembly.
6. Raise the front hood assembly (1), and support with rod.
7. Remove the radiator grill assembly (4).
8. Disconnect the electrical connections to the horn, headlamps, and air conditioning thermostat (where installed).
9. Disconnect clips retaining the front wiring harness to the front section of the tractor.
10. Drain the radiator coolant. Refer to section 10, Chapter 2 “Cooling System”.
11. Remove the engine fan shroud (14).
12. Disconnect the oil cooler piping (7). Cap and plug all openings to prevent contamination.
13. Loosen the clamps and disconnect the upper (12) and lower (5) hoses from the radiator. Disconnect all other radiator hoses.
14. Loosen clamps and disconnect intake hose (10) from air cleaner (2).
15. Disconnect hoses from the air conditioning condenser (where installed).
16. Insert wooden wedges between the axle support (6) and the front axle to prevent movement.
17. Remove the retaining bolts and radiator shell (3) from support.
18. Remove the retaining bolt and separate the drag link from the steering arm (where installed).
19. Remove the hydraulic steering piping on the left-hand side of the engine. Cap and plug all exposed openings to prevent contamination. Remove and retain brackets for piping.
20. Remove the drive shaft guard assembly (where installed).
21. Remove the drive shaft-to-axle drive flange retaining bolts, and remove drive shaft (where installed).



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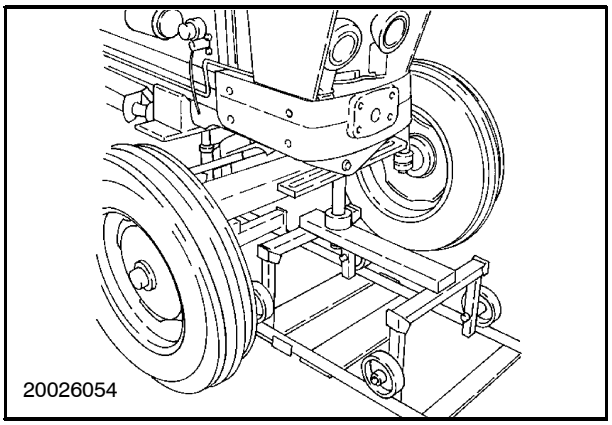
22. Position the Splitting Tool No. 201387 under the tractor.
23. Remove the buckle-up bolts and separate the engine from the front axle.

NOTE: *If needed, remove the front axle rear pin and raise the engine a sufficient distance to facilitate removal of the front axle.*



6

Reconnecting the engine to the front axle assembly

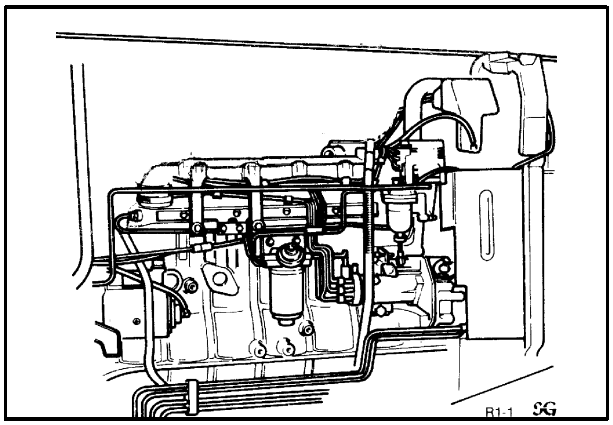
Reconnecting the engine to the front axle assembly follows the separation procedures in reverse with the following requirements:

1. When aligning the front axle assembly with the engine, ensure the correct positioning of all components to prevent damage from bending, pinching or crushing.
2. Tighten the buckle-up bolts to a torque of 240-298 N·m (177-220 ft.-lb.).
3. Check for proper installation of all washers, spacers, brackets and clamps.
4. Service the air conditioning system as needed (where installed).
5. Replenish the cooling system. Refer to Section 10, Chapter 2 “Cooling System”.
6. Check all cooling system hoses for leaks.
7. Replenish and bleed air from hydraulic system as needed.
8. Check the hydraulic oil cooler hoses for leaks.
9. Check that the horn, headlamps and air conditioning thermostat function properly (where installed).
10. Check the steering system for proper operation.

DISASSEMBLY AND OVERHAUL

Dismantle the engine following conventional techniques, or by referring to the following removal procedure. Refer to the Engine Specifications section.

NOTE: *Replace gaskets, seals, and O-rings when reassembling components and/or the engine.*



7

Right Hand View of Engine

CYLINDER HEAD, VALVES, AND RELATED PARTS

Removal

1. Disconnect battery and swing battery tray away from engine.
2. Remove vertical exhaust muffler (where installed) and the exhaust extension pipe.
3. Remove left and right hood assemblies.
4. Remove air pre-cleaner. Raise and secure the front hood assembly.
5. Remove engine side panels and guards.
6. Drain coolant from the radiator and engine block. Refer to Section 10, Chapter 2 “Cooling System”.
7. Shut off heater hose taps. Disconnect and plug heater hoses.
8. Remove radiator top hose. Cap and plug all openings to prevent contamination.
9. Remove air cleaner-to-intake manifold tube.
10. Shut off fuel valve at bottom of fuel tank.
11. Disconnect low-pressure fuel pipes and remove inlet manifold. Cap and plug openings
12. Disconnect and remove fuel pipes to the fuel injector pump. Cap and plug all openings.
13. Disconnect ‘thermostart’ fuel pipe on the intake manifold. Cap and plug all openings.
14. Disconnect and remove the ventilation tube on the rocker cover.
15. Loosen the belt tension and remove the alternator.
16. Disconnect tacho-drive on the engine front cover. (where installed)
17. Disconnect all loom connections on engine harness and secure clear of the engine.

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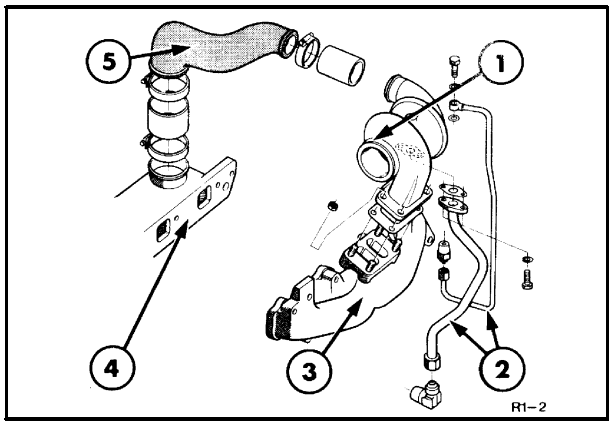
18. Remove turbocharger assembly, Figure 8. Refer to Section 10, Chapter 5 “Turbocharger Overhaul”. Cap and plug all openings.

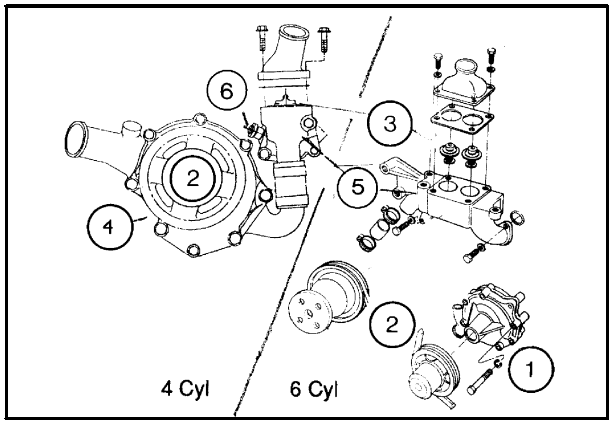


8

Turbocharger Assembly

1. Turbo Housing
2. Oil Feed/Return Tubes
3. Exhaust Manifold
4. Inlet Manifold
5. Inlet Hoses/Tubes

19. Remove water pump. Refer to Section 10, Chapter 2 “Cooling System”. Cap and plug all openings.
20. Remove water pump connector from the engine cylinder head.



9

Water Pump Assembly

1. Pump Body
2. Pulley Assembly
3. Thermostat
4. Gasket
5. Thermostat Housing
6. Temperature Sender