SERVICE MANUAL

TT55 / TT65 / TT75

Tractor

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SERVICE MANUAL

TT55 2WD tractor , TT55 4WD tractor , TT65 2WD tractor , TT65 4WD tractor , TT75 2WD tractor , TT75 4WD tractor

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Foreword

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 reliable repair.
- Accurately built and strictly tested to offer efficient and long-lasting working life.

Notice

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

Safety rules

 This warning symbol points out important messages involving personal safety. Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and safeguarded your safety.

In this manual you will find this symbol together with the following keywords.

WARNING: It gives warning about improper repair operations and potential consequences affecting the service technician's personal safety.
DANGER: It gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved in the operation.

To prevent accidents

Most accidents and personal injuries taking place in workshops are due from non-observance of some essential rules and safety precautions.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precautions against accidents.
Careful observance of this only basic precaution would be enough to avoid many severe accidents.

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

Safety rules

Generalities

Carefully follow specified repair and maintenance procedures.

- Do not wear rings, wrist watches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught in moving parts. Use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
- Wear safety glasses with side guards when cleaning parts using compressed air.
- Damaged or frayed wires and chains are unreliable. Do not use them for lifting or towing.
- Wear suitable protection such as approved eye protection, helmets, special clothing, gloves and footwear whenever welding. All persons standing in vicinity of the welding process should wear approved eye protection. Never look at the welding arc if your eyes are not suitably protected.
- Never carry out any repair on the machine if someone is sitting on the operator's seat, except they are qualified operators assisting in the operation to be carried out.
- Never operate the machine or use attachments from a place other than sitting at the operator's seat or at the side of the machine when operating the fender switches.
- Never carry out any operation on the machine when the engine is running, except when 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 should be carried out with greatest care and attention.
- Disconnect the batteries and label all controls to warn that the tractor is being serviced. Block the machine and all equipment which should be raised.
- Never check or fill fuel tanks or batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- The fuel filling gun should always remain in contact with filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity build-up.
- To transfer a failed tractor, use a trailer of a low loading platform trolley if available.
- To load and unload the machine from the transportation means, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or the trailer platform and block wheels as required by the transporter.
- Always use lifting equipment of appropriate capacity to lift or move heavy components.
- Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stand near the fastening point.
- The working area should be always kept clean and dry. Immediately clean any spillage of water or oil.
- Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.
- Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container.

Start up

- Never run the engine in confined spaces which are not equipped with adequate ventilation for exhaust gas extraction.
- Never bring your body, arms, legs, feet, hands, fingers near fans or rotating belts.

Engine

- Always loosen the radiator cap very slowly before removing it to allow pressure in the system to dissipate. Coolant should be topped up only when the engine is stopped.
- Do not fill up fuel tank when the engine is running.
- Never adjust the fuel injection pump when the tractor is moving. Never lubricate the tractor when the engine is running.

Electrical systems

- If it is necessary to use auxiliary batteries, cables must be connected at both sides as follows. (+) to (+) and (-) to (-). Avoid short-circuiting the terminals. Gas released from batteries is highly flammable. During charging, leave the battery compartment uncovered to improve ventilation. Avoid sparks or flames near the battery area. Do not smoke.
- Do not charge batteries in confined spaces.
- Always disconnect the batteries before performing any type of service on the electrical system.

Hydraulic systems

- Some fluid coming out from a very small port can be almost invisible and be strong enough to penetrate skin. For this reason, Never use your hands to check for leaks, but use a piece of cardboard or a piece of wood for this purpose. If any fluid is injected into the skin, seek medical aid immediately. Lack of immediate medical attention may result in serious infections or dermatitis.
- Always take system pressure readings using the appropriate gauges.

Wheels and tires

- Check that the tires are correctly inflated at the pressure specified by the manufacturer. Periodically check for possible damage to the rims and tires.
- Stay a the tire side when inflating.
- Check the pressure only when the tractor is unloaded and tires are cold to avoid wrong reading due to over- pressure.
- Never cut, nor weld a rim with the inflated tire assembled.
- To remove the wheels, block both front and rear tractor wheels. Raise the tractor and install safe and stable supports under the tractor in accordance with the regulations in force.
- Deflate the tire before removing any object caught into the tire tread.
- Never inflate tires using flammable gases as they may originate explosions and cause injuries to bystanders.

Removal and installation

- Lift and handle all heavy components using lifting equipment of adequate capacity. Ensure that parts are supported by appropriate slings and hooks. Use lifting eyes provided to this purpose. Take care of the persons near the loads to be lifted.

Safety rules

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.

Acid 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 adhesive / sealers

See solvents. Follow manufacturer’s instructions.

Water base adhesive / 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 of 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.

Cyanaocrylate 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 vapors 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 vapors and spray droplets form the breathing zone. Individuals working with spray applications should wear supplied air respirators.

Antifreeze

See fire, solvents e.g. isopropanol, ethylene glycol, menthol.

Highly flammable, flammable, combustible.

Used in vehicle cooling systems, brake air pressure systems, screen wash solutions.

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

Antifreeze may be absorbed through 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 vapor hazards do not arise at ambient temperatures because of the very low vapor 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 warning 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 soling of the skin and eyes, breathing vapors / 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 not's

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, particular 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 unlabeled 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 manufactures' 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 shocks

Electric shocks can result from the use of the 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 anyway faulty. The results could be fatal.

Use reduced voltage 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 ventilator and not in confined spaces.

Gasoline (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.

Fiber insulation

See ducts.

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 organization 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 inflammable. 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 suitable fire extinguisher available when using welding or heating equipment.

First aid

Apart from meeting any legal requirements its i 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 **10 min**.

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

See fire.

Used in sound and noise insulation. Cured foams used in seat and trim cushioning.
Follow manufacturers' instructions.

Un reacted 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, vapors, spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful.

vapors 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 vapor / 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 vapors/mists have cleared should not be allowed. Any heat cutting of cured foams or partially cured foams should be conducted with extraction ventilation.

Fuels

See fire, legal aspects, chemicals - general, solvents.
Used as fuels and cleaning agents.

Gasoline (petrol)

Highly flammable.

Swallowing can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Aspiration of liquid into the lungs, e.g. through vomiting, is a very serious hazard.

Gasoline dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.

Motor gasoline may contain appreciable quantities of benzene, which is toxic upon inhalation and the concentrations of gasoline vapors must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.

Ensure there is adequate ventilation when handling and using gasoline. Great care must be taken to avoid the serious consequences of inhalation in the event of vapor build up arising from spillages in confined spaces.

Special precautions apply to cleaning and maintenance operations on gasoline storage tanks. Gasoline should not be used as a cleaning agent. It must not be siphoned by mouth.

Kerosene (paraffin)

Used also as heating fuel, solvent and cleaning agent.

Flammable.

Irritation of the mouth and throat may result from swallowing. The main hazard from swallowing arises if liquid aspiration into the lungs occurs. Liquid contact dries the skin and can cause irritation or dermatitis. Splashes in the eye may be slightly irritating.

In normal circumstances the low volatility does not give rise to harmful vapors. Exposure to mists and vapors from kerosene at elevated temperatures should be avoided (mists may arise in de-waxing). Avoid skin and eye contact and ensure there is adequate ventilation.

Gas-oil (diesel fuel)

See fuels (kerosene). Combustible.

Gross or prolonged skin contact with high boiling gas oils may also cause serious skin disorders including skin cancer.

Gas cylinders

See fire.

Gases such as oxygen, acetylene, carbon dioxide, argon and propane are normally stored in cylinders at pressures of up to 2000 lb/sq. in. (13,790 kn/m2) and great care should be taken in handling these cylinders to avoid mechanical damage to them or to the valve gear attached. The contents of each cylinder should be clearly identified by appropriate markings.

Cylinders should be stored in well ventilated enclosures, and protected from ice and snow, or direct sunlight. Fuel gases (e.g. acetylene and propane) should not be stored in close proximity to oxygen cylinders.

Care should be exercised to prevent leaks from gas cylinders and lines, and to avoid sources of ignition.
Only trained personnel should undertake work involving gas cylinders.

Gases

See gas cylinders.

Gas shielded welding

See welding.

Gas welding

See welding.

General workshop tools and equipment

It is essential that all tools and equipment are maintained in good condition and the correct safety equipment used where required.

Never use tools or equipment for any purpose other than that for which they were designed.

Never overload equipment such as hoists, jacks, axle and chassis stands or lifting slings. Damage caused by overloading is not always immediately apparent andmay result in a fatal failurethe next time that the equipment is used.

Do not use damaged or defective tools or equipment, particularly high speed equipment such as grinding wheels. A damaged grinding wheel can disintegrate without warning and cause serious injury.

Wear suitable eye protection when using grinding, chiselling or sand blasting equipment.

Wear a suitable breathing mask when using sand blasting equipment, working with asbestos based materials or using spraying equipment.

Glues

See adhesives and sealers.

High pressure air, lubrication and oil test equipment

See lubricants and greases.

Always keep high pressure equipment in good condition and regularly maintained, particularly at joints and unions.

Never direct a high pressure nozzle at the skin as the fluid may penetrate to the underlying tissue etc. and cause serious injury.

Legal aspects

Many laws and regulations make requirements relating to health and safety in the use of materials and equipment in workshops.

Workshops should be familiar, in detail, with associated laws and regulations. Consult local factory inspectorate if in any doubt.

Lubricants and greases

Avoid all prolonged and repeated contact with mineral oils, especially used oils. Used oils contaminated during service (e.g. routine service change sump oils) are more irritating and more likely to cause serious effects including skin cancer in the event of gross and prolonged skin contact.

Wash skin thoroughly after work involving oil. Proprietary hand cleaners may be of value provided they can be removed from the skin with water. Do not use petrol, paraffin or other solvents to remove oil from the skin.

Lubricants and greases may be slightly irritating to the eyes.

Repeated or prolonged skin contact should be avoided by wearing protective clothing if necessary. Particular care should be taken with used oils and greases containing lead. Do not allow work clothing to be contaminated with oil. Dry clean or launder such clothing at regular intervals. Discard oil soaked shoes.

Do not employ used engine oils as lubricants or for any application where appreciable skin contact is likely to occur. Used oils may only be disposed of in accordance with local regulations.

There are publications describing the problems and advising on precautionary measures.

Noise insulation materials

See foams, fibre insulation.

Paints

See solvents and chemical materials - general.
Highly flammable, flammable.

One pack

Can contain harmful or toxic pigments, driers and other components as well as solvents. Spraying should only be carried out with adequate ventilation.

Two pack

Can also contain harmful and toxic unreacted resins and resin hardening agents. The manufacturers instructions should be followed and the on resin based adhesives, isocyanate containing adhesives and foams should be consulted.

Spraying should preferably be carried out in exhausted ventilated booths removing vapor and spray mists from the breathing zone. Individuals working in booths should wear respiratory protection. Those doing small scale repair work in the open shop should wear supplied air respirators.

Paint thinners

See solvents.

Petrol

See fuels (gasoline).

Pressurised equipment

See high pressure air, lubrication and oil test equipment.

Resistance welding

See welding.

Sealers

See adhesives and sealers.

Solder

See welding.

Solders are mixtures of metals such that the melting point of the mixture is below that of the constituent metals (normally lead and tin). Solder application does not normally give rise to toxic lead fumes, provided a gas/air flame is used. Oxy-acetylene flames should not be used, as they are much hotter and will cause lead fumes to be evolved.

Some fumes may be produced by the application of any flame to surfaces coated with grease etc. and inhalation of these should be avoided.

Removal of excess solder should be under taken with care, to ensure that fine lead dust is not produced, which can give toxic effects if inhaled. Respiratory protection may be necessary.

Solder spillage and filing should be collected and removed promptly to prevent general air contamination by lead.

High standards of personal hygiene are necessary in order to avoid indigestion of lead or inhalation of solder dust from clothing.

Solvents

See chemical materials- general fuels (kerosene), fire.

E.g. Acetone, white spirit, toluene, xylene, trichlorethane.

Used in cleaning materials, de-waxing, paints, plastics, resins, thinners etc.

Highly Inflammable, flammable.

Skin contact will decrease the skin and may result in.irritation and dematitis following repeated or prolonged contact. Some can be absorbed through the skin in toxic or harmful quantities.

Splashes in the eye may cause severe irritation and could lead to loss of vision.

Brief exposure to high concentrations of vapors or mists will cause eye and throat irritation, drowsiness, dizziness, headaches and in the worst circumstances, unconsciousness.

Repeated or prolonged exposures to excessive but lower concentrations of vapors or mists, for which theremight not be adequatewarning indications, can cause more serious toxic or harmful effects.

Aspiration into the lungs (e.g. through vomiting) is the most serious consequence of swallowing.

Avoid splashes to the skin, eyes and clothing. Wear protective gloves, goggles and clothing if necessary.

Ensure good ventilation when in use, avoid breathing fumes, vapors and spray mists and keep containers tightly sealed. Do not use in confined spaces.

When the spraying material contains solvents, e.g. paints, adhesives, coatings, use extraction ventilation or personal respiratory protection in the absence of adequate general ventilation.

Do not apply heat or flame except under specific and detailed manufacturers instructions.

Sound insulation

See fibre insulation, foams.

Spot welding

See welding.

Suspended loads

There is always a danger when loads are lifted or suspended. Never work under an unsupported suspended or raised load, e.g. jacked up vehicle, suspended engine, etc.

Always ensure that lifting equipment such as jacks, hoists, axle stands, slings, etc. are adequate and suitable for the job, in good condition and regularly maintained.

Never improvise lifting tackle.

Underseal

See corrosion protection.

Welding

See fire, electric shock, gas cylinders.

Welding processes include resistance welding (spot welding), arc welding and gas welding.

Resistance welding

This process may cause particles of molten metal to be emitted at high velocity and the eyes and skin must be protected.

Arc welding

This process emits a high level of ultraviolet radiation which may cause eye and skin burns to the welder and to other persons nearby. Gas-shielded welding processes are particularly hazardous in this respect. Personal protection must be worn, and screens used to shield other people.

Metal spatter will also occur and appropriate eye and skin protection is necessary.

The heat of the welding arc will produce fumes and gases from the metals being welded and from any applied coatings or contamination on the surfaces being worked on. These gases and fumes may be toxic and inhalation should always be avoided. The use of extraction ventilation to remove the fumes from the working area may be necessary,

particularly in cases where the general ventilation is poor, or where considerable welding work is anticipated. In extreme cases where adequate ventilation cannot be provided, supplied air respirators may be necessary.

Gas welding

Oxy-acetylene torches may be used for welding and cutting and special care must be taken to prevent leakage of these gases, with consequent risk of fire and explosion.

The process will produce metal spatter and eye and skin protection is necessary.

The flame is bright and eye protection should be used, but the ultra-violet emission is much less than that from arc welding, and lighter filters may be used.

The process itself produces few toxic fumes, but such fumes and gases may be produced from coatings on the work, particularly during cutting away of damaged body parts and inhalation of the fumes should be avoided.

In brazing, toxic fumes may be evolved from the metals in the brazing rod, and a severe hazard may arise if brazing rods containing cadmium are used. In this event particular care must be taken to avoid inhalation of fumes and expert advice may be required.

Special precautions must be taken before any welding or cutting takes place on vessels which have contained combustible materials, e.g. boiling or steaming out of fuel tanks.

White spirit

See solvents.

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Engine and crankcase - 001

Engine - General specification

General specifications	TT75	TT55
Make	IVECO	
Type	4 stroke, diesel, naturally aspirated, direct injection, water cooled	
Power	**75 Hp**	**55 Hp**
Number of cylinders	4	3
Bore	**104.000 mm** (**4.094 in**)	**104.000 mm** (**4.094 in**)
Stroke	**115.000 mm** (**4.528 in**)	**115.000 mm** (**4.528 in**)
Cubic capacity	**3908 cm³** (**238 in³**)	**2931 cm³** (**179 in³**)
Compression ratio	18:1	18:1
Firing order	1-3-4-2	1-2-3
Idle speed	**650 RPM**	**650 RPM**
Maximum no load speed	**2770 RPM**	**2770 RPM**
Rated speed	**2500 RPM**	**2500 RPM**

Engine block	
Cylinder liner seat diameter in engine block	**106.850 – 106.900 mm** (**4.207 – 4.209 in**)
Cylinder sleeve O.D	**107.020 – 107.050 mm** (**4.213 – 4.215 in**)
Interference between liners and seats in block	**0.120 – 0.200 mm** (**0.005 – 0.008 in**)
Liner O.D oversize	**0.200 mm** (**0.008 in**)
Cylinder liner inner diameter	**104.00 – 104.024 mm** (**4.09 – 4.095 in**)
Maximum ovality and taper due to wear	**0.120 mm** (**0.005 in**)
Liner inner diameter oversize	**0.400 – 0.800 mm** (**0.016 – 0.031 in**)

Camshaft bush seat diameters	
• Front	**54.780 – 54.805 mm** (**2.157 – 2.158 in**)
• Intermediate	**54.280 – 54.305 mm** (**2.137 – 2.138 in**)
• Rear	**53.780 – 53.805 mm** (**2.117 – 2.118 in**)
Tappet seat bore diameter	**15.000 – 15.018 mm** (**0.591 – 0.591 in**)
Tappet oversize	**0.100 mm** (**0.004 in**) – **0.200 mm** (**0.008 in**) – **0.300 mm** (**0.012 in**)
Main bearing seat bore diameter	**84.200 – 84.230 mm** (**3.315 – 3.316 in**)

Cylinder head	
Valve guide seat bore diameter in head	**13.950 – 13.983 mm** (**0.549 – 0.551 in**)
Valve guide oversize	**0.200 mm** (**0.008 in**)
Valve stand-in	**0.700 – 1.000 mm** (**0.028 – 0.039 in**)
• Maximum stand-in permitted	**1.300 mm** (**0.051 in**)
Injector standout	**0.050 – 0.700 mm** (**0.002 – 0.028 in**)
• Maximum stand-out permitted	**1.000 mm** (**0.039 in**)
Original cylinder head height	**92 mm** (**4 in**)
Maximum head dressing allowed	**0.500 mm** (**0.020 in**)

Exhaust valves	
Valve head diameter	**37.500 – 37.750 mm** (**1.476 – 1.486 in**)
Valve stem diameter	**7.985 – 8.000 mm** (**0.314 – 0.315 in**)
Face angle	45° 30’±7’
Stem to guide clearance (worm or cold)	**0.300 mm** (**0.012 in**)
Cam lift	**5.677 mm** (**0.224 in**)
Valve lift	**10.060 mm** (**0.396 in**)

Intake valves	
Valve head diameter	**43.300 – 45.500 mm** (**1.705 – 1.791 in**)
Valve stem diameter	**7.985 – 8.000 mm** (**0.314 – 0.315 in**)

Face angle	60° 30'±7'
Stem to guide clearance (worm or cold)	**0.300 mm** (**0.012 in**)
Cam lift	**5.250 mm** (**0.207 in**)
Valve lift	**9.310 mm** (**0.367 in**)

Valve springs	
Number per valve	1
Free length	**44.600 mm** (**1.756 in**)
Length loaded at **26.1 – 28.9 kg** (**57.5 – 63.7 lb**)	**34.000 mm** (**1.339 in**)
Length loaded at **51.2 – 56.5 kg** (**112.9 – 124.6 lb**)	**23.800 mm** (**0.937 in**)

Valve timing	
Intake opening (before top dead centre)	12°
Intake closing (after bottom dead centre)	31°
Exhaust opening (before bottom dead centre)	50°
Exhaust closing (after top dead centre)	16°

Valve inserts	
Valve guide O.D	**13.933 – 14.016 mm** (**0.549 – 0.552 in**)
Valve guide oversize	**0.200 mm** (**0.008 in**)
Valve guide interference fit in housing cylinder head	**0.0050 – 0.0500 mm** (**0.0002 – 0.0020 in**)
Valve guide fitted I.D after reaming	**8.023 – 8.043 mm** (**0.316 – 0.317 in**)
Valve stem clearance in guide	**0.0230 – 0.0580 mm** (**0.0009 – 0.0023 in**)
Maximum wear clearance	**0.130 mm** (**0.005 in**)
Maximum valve stem eccentricity over one revolution with stylus on sealing face	**0.030 mm** (**0.001 in**)

Engine - Torque

Description	Thread size	Torque	Angle
Bolt, cylinder head **(C1)**	**M12 x 1.25**	**40 N·m** (**354 lb in**)	(**125 – 135°**) + (**135 – 145°**)
Bolt, main bearing caps **(C2)**	**M14 x 1.25**	**80 N·m** (**708 lb in**)	**90°**
Bolt, timing cover and case **(C3)**	**M12 x 1.25**	**40 N·m** (**354 lb in**)	–
Bolt, connecting rod caps **(C4)**	**M11 x 1.25**	**40 N·m** (**354 lb in**)	**60°**
Bolt, flywheel **(C5)**	**M12 x 1.25**	**40 N·m** (**354 lb in**)	**60°**
Bolt, rocker shaft bracket **(C6)**	**M8 x 1.25**	**25 N·m** (**221 lb in**)	–
Nut, crankshaft pulley hub **(C7)**	**M30 x 1.5**	**300 N·m** (**2655 lb in**)	–
Bolt, fan and alternator drive pulley **(C8)**	**M12 x 1.25**	**49 N·m** (**434 lb in**)	–
Nut, injection pump shaft gear **(C9)**	**M12 x 1.25**	**64 N·m** (**566 lb in**)	–
Nuts, injection pump to support **(C10)**	**M12 x 1.25**	**23 N·m** (**204 lb in**)	–
Retaining screws, additional weights **(C11)**	**M12 x 1.25**	**110 N·m** (**974 lb in**)	–

Engine - Sealing

Operation description	Sealant specification
Adopter for oil filter **(S1)**	**LOCTITE® 270**
Adopter for tachometer cable **(S2)**	**LOCTITE® 243™**
Flywheel housing to engine block **(S3)**	**LOCTITE® 510™**
Timing gear case studs **(S4)**	**LOCTITE® 270**
Timing gear cover dowel pin **(S5)**	**LOCTITE® 270**
Starter motor to flywheel housing **(S6)**	**LOCTITE® 510™**
Allen plug in cylinder head thermostat housing **(S7)**	**LOCTITE® 243™**
Cylinder head exhaust manifold studs **(S8)**	**LOCTITE® 270**
Oil sump to engine block **(S9)**	Loctite® 5699

Operation description	Sealant specification
Silencer mounting studs on exhaust manifold **(S10)**	Loctite® 77164
Flywheel bolt **(S11)**	**LOCTITE® 243™**

Engine - Special tools

CAUTION
Operations described in this section of the manual must be performed using the following essential tools to work safely and achieve the best technical results with additional savings of time and effort.

Tool description	Tool number
Injector tester	290284
Sling hook, engine	**290740**
Cylinder head valve spring compressor	**291050**
Tractor splitting trolley	292320
Installer rear main oil seal	9970846
Installer front oil seal	9970845
Dummy injector	9970364
Swan neck pipe (fuel timing)	9970848
Engine mounting bracket (to be used with engine stand 293860)	9970844
Steering wheel puller	82834312
Bushes for steering wheel puller	9971375
Remover, hand accelerator pin	9971378
Cylinder pressure test Kit	9971410
Lube pressure check Kit	9971367
Piston ring compressor	Local
Piston ring expander	Local

Crankcase - General specification

Crank gear

Crankshaft - bearings

Main journal diameter	**79.791 – 79.810 mm** (**3.141 – 3.142 in**)
Main journal undersize	**0.254 mm** (**0.010 in**) – **0.508 mm** (**0.020 in**) – **0.762 mm** (**0.030 in**) – **1.016 mm** (**0.040 in**)
Main bearing wall thickness	**2.168 – 2.178 mm** (**0.085 – 0.086 in**)
Main bearing undersize	**0.254 mm** (**0.010 in**) – **0.508 mm** (**0.020 in**) – **0.762 mm** (**0.030 in**) – **1.016 mm** (**0.040 in**)
Main journal clearance in bearings	**0.034 – 0.103 mm** (**0.001 – 0.004 in**)
• Maximum wear clearance	**0.180 mm** (**0.007 in**)
Crankpin diameter	**63.725 – 63.744 mm** (**2.509 – 2.510 in**)
Crankpin undersize	**0.254 mm** (**0.010 in**) – **0.508 mm** (**0.020 in**) – **0.762 mm** (**0.030 in**) – **1.016 mm** (**0.040 in**)
Big end bearing wall thickness	**1.805 – 1.815 mm** (**0.071 – 0.071 in**)
Big end bearing undersize	**0.254 mm** (**0.010 in**) – **0.508 mm** (**0.020 in**) – **0.762 mm** (**0.030 in**) – **1.016 mm** (**0.040 in**)
Crankpin clearance in big end bearing	**0.033 – 0.087 mm** (**0.001 – 0.003 in**)
• Maximum wear clearance	**0.180 mm** (**0.007 in**)
Crankshaft thrust washer thickness	**3.378 – 3.429 mm** (**0.133 – 0.135 in**)
Thrust washer oversize	**0.127 mm** (**0.005 in**) – **0.254 mm** (**0.508 in**) – **0.508 mm** (**0.020 in**)
Width of main bearing housing over thrust washers	**31.766 – 31.918 mm** (**1.251 – 1.257 in**)
Length of corresponding main journal	**32.000 – 32.100 mm** (**1.260 – 1.264 in**)
Crankshaft end float	**0.082 – 0.334 mm** (**0.003 – 0.013 in**)
• Maximum wear clearance	**0.400 mm** (**0.016 in**)
Maximum main journal and crankpin ovality or taper after grinding	**0.0100 mm** (**0.0004 in**)
Maximum main journal and crankpin ovality or taper due to wear	**0.0500 mm** (**0.0020 in**)
Maximum main journal misalignment crankshaft resting on end journals	**0.0100 mm** (**0.00039 in**)
Maximum misalignment of crankpins relative to main journals (in either direction)	**0.2500 mm** (**0.00984 in**)
Tolerance from outer crankpin edge to crankshaft center line	± **0.1000 mm** (**0.0039 in**)
Maximum crankshaft flange run-out with gauge stylu, over **108.000 mm** (**4.252 in**) diameter (total gauge reading)	**0.0250 mm** (**0.0010 in**)
Maximum flywheel seat eccentricity relative to main journals (total gauge reading)	**0.0400 mm** (**0.0016 in**)

Connecting rods

Small end bore diameter	**41.846 – 41.884 mm** (**1.647 – 1.649 in**)
Small end bushing outer diameter	**41.979 – 42.017 mm** (**1.647 – 1.649 in**)
Bushing interference fit in small end	**0.0950 – 0.1710 mm** (**0.0037 – 0.0067 in**)
Small end bushing fitted ID	**38.004 – 38.014 mm** (**1.496 – 1.497 in**)
Big end bore diameter	**67.407 – 67.422 mm** (**2.654 – 2.654 in**)
Maximum connecting rod axis misalignment at **125.000 mm** (**4.921 in**)	± **0.0700 mm** (**0.0028 in**)
Maximum connecting rod weight difference over a complete set from the same engine	**25.00 g** (**0.88 oz**)

Pistons

Piston diameter (Measured at **57.000 mm** (**2.244 in**) from base of skirt and right angles to pin)	**103.852 – 103.870 mm** (**4.089 – 4.089 in**)
Piston clearance in liner	**0.174 – 0.212 mm** (**0.007 – 0.008 in**)
• Maximum wear clearance	**0.300 mm** (**0.012 in**)
Piston oversize range	**0.400 – 0.800 mm** (**0.016 – 0.031 in**)
Piston stand-out with respect to head at TDC	**0.430 – 0.840 mm** (**0.017 – 0.033 in**)
Piston pin diameter	**37.983 – 37.990 mm** (**1.495 – 1.496 in**)
Piston pin seat bore in piston	**38.000 – 38.006 mm** (**1.496 – 1.496 in**)
Piston pin clearance in piston	**0.0100 – 0.0230 mm** (**0.0004 – 0.0009 in**)
Piston pin clearance in small end bushing	**0.0140 – 0.0310 mm** (**0.0006 – 0.0012 in**)
• Maximum wear clearance	**0.060 mm** (**0.002 in**)
Maximum weight difference between pistons on same engine	**20.00 g** (**0.71 oz**)
Piston ring clearance in groove	
• Top	**0.0900 – 0.1220 mm** (**0.0035 – 0.0048 in**)
• 2nd	**0.0600 – 0.0850 mm** (**0.0024 – 0.0033 in**)
• 3rd	**0.0400 – 0.0750 mm** (**0.0016 – 0.0030 in**)
Maximum wear clearance	
• Top	**0.500 mm** (**0.020 in**)
• 2nd and 3rd	**0.200 mm** (**0.008 in**)
Piston ring gap	
• Top	**0.400 – 0.650 mm** (**0.016 – 0.026 in**)
• 2nd	**0.300 – 0.550 mm** (**0.012 – 0.022 in**)
• 3rd	**0.300 – 0.600 mm** (**0.012 – 0.024 in**)
Maximum wear gap	**1.200 mm** (**0.047 in**)

Dynamic balancer (TT75 only)

Idler gear jack shaft clearance in gear bushing *	**0.050 – 0.100 mm** (**0.002 – 0.004 in**)
Flyweight gear shaft clearance in front bushing *	**0.050 – 0.100 mm** (**0.002 – 0.004 in**)
Drive pinion clearance in bushings *	**0.050 – 0.100 mm** (**0.002 – 0.004 in**)
Connecting sleeve spine, Power Take-Off (PTO) gear connection and flyweight drive gear backlash	**0.038 – 0.106 mm** (**0.001 – 0.004 in**)
Flyweight gear shaft clearance in rear bushing **	**0.013 – 0.061 mm** (**0.001 – 0.002 in**)
Pivot clearance in flyweight bushings	**0.020 – 0.073 mm** (**0.001 – 0.003 in**)
Flyweight bushing interference fit in housing	**0.040 – 0.100 mm** (**0.002 – 0.004 in**)
Idler gear jack shaft clearance in bushing **	**0.013 – 0.061 mm** (**0.001 – 0.002 in**)

* Bushing interference fit in housing: **0.063 – 0.140 mm** (**0.002 – 0.006 in**)

** Bushing interference fit in housing: **0.037 – 0.101 mm** (**0.001 – 0.004 in**)

Engine - Static description

The engines are with 4 cylinders (TT75) and 3 cylinders (TT55). Both engines feature cross flow cylinder heads, with the inlet and exhaust manifolds on opposite sides of the cylinder head. The fuel and air combustion process, takes place in the specially designed bowel in the crown of the pistons.

Cylinder head assembly

The cylinder head incorporates valves and springs, with the valve rocker arm shaft assembly bolted to the cylinder block through the cylinder head. Cylinder head retaining bolts are evenly spaced with a six- point pattern around each cylinder, this ensures an even clamping load across the cylinder head.

The intake and exhaust manifolds are bolted to the head. The intake manifold is mounted on the right-hand side of the engine, with the diesel injectors mounted outside the rocker cover. The exhaust manifold is mounted on the left side of the engine.

Water outlet connections and thermostat being attached to the front of the cylinder block directly behind the radiator.

Valve guides are inserted into the cylinder head, and replaceable. Special replaceable cast alloy valve seats are pressed into each valve port during manufacturing. No over size valve seats on guides are available.

All valves are fitted with positive value rotators, valve clearance is maintained by adjustment of the self locking adjusting screw, mounted in each of the rocker arms.

Camshaft assembly

The camshaft runs in 3 replaceable bushes. The camshaft drive gear is in mesh with and driven by the camshaft idler gear which is driven by the crankshaft timing gear.

Camshaft end thrust is controlled by a thrust plate bolted to the block, and located between the camshaft gear and the front camshaft journal.

A helical gear is integral on rear of cam shaft, and drives the engine oil lubrication pump mounted forward of the flywheel.

Cylinder block assembly

The cylinder block is an alloy cast iron with deep cylinder skirts & water jackets for cooling the cylinders. The cylinder bores are machined integral with the cylinder block, during the manufacturing process. Cylinders are in line and vertical and numbered from 1 to 3 or 4 from front of the engine to the rear.

The oil sump, which is attached to the bottom of the cylinder block, is the reservoir for the engine oil lubrication system. A cast iron engine front cover and front plate is attached to the front of the engine and covers all of the timing gear assembly.

Crankshaft assembly

The crankshaft is supported in the cylinder block by 5 and 4 main bearings in TT75 and TT55 engines respectively.

The crankshaft is manufactured from steel with machined finished crank webs.

End thrust is controlled by a thrust bearing incorporated in the centre main bearing of the crankshaft in TT75 engine and in the second main bearing from flywheel side in TT55 engine.

A dynamic balancer is fitted and driven by crankshaft to ensure smooth running operation.

Front and rear crankshaft oil sealing is effected by one piece seals that are designed for long and durable service life.

Connecting rods

Connecting rods “Wedge” shaped at the small end has been designed to reduce the reciprocating weight at the piston end. The connecting rods are heavy beam construction and are assembled as a matched set to each engine, attached to the crankshaft, by means of insert type bearings.

They are retained in position by the connecting rod big end cap and secured by two bolts per rod. The small end of the connecting rod is fitted with a replaceable bronze bushing, through which the free floating piston pin is fitted. The steel pin being held in place within the piston by two snap rings.

Pistons

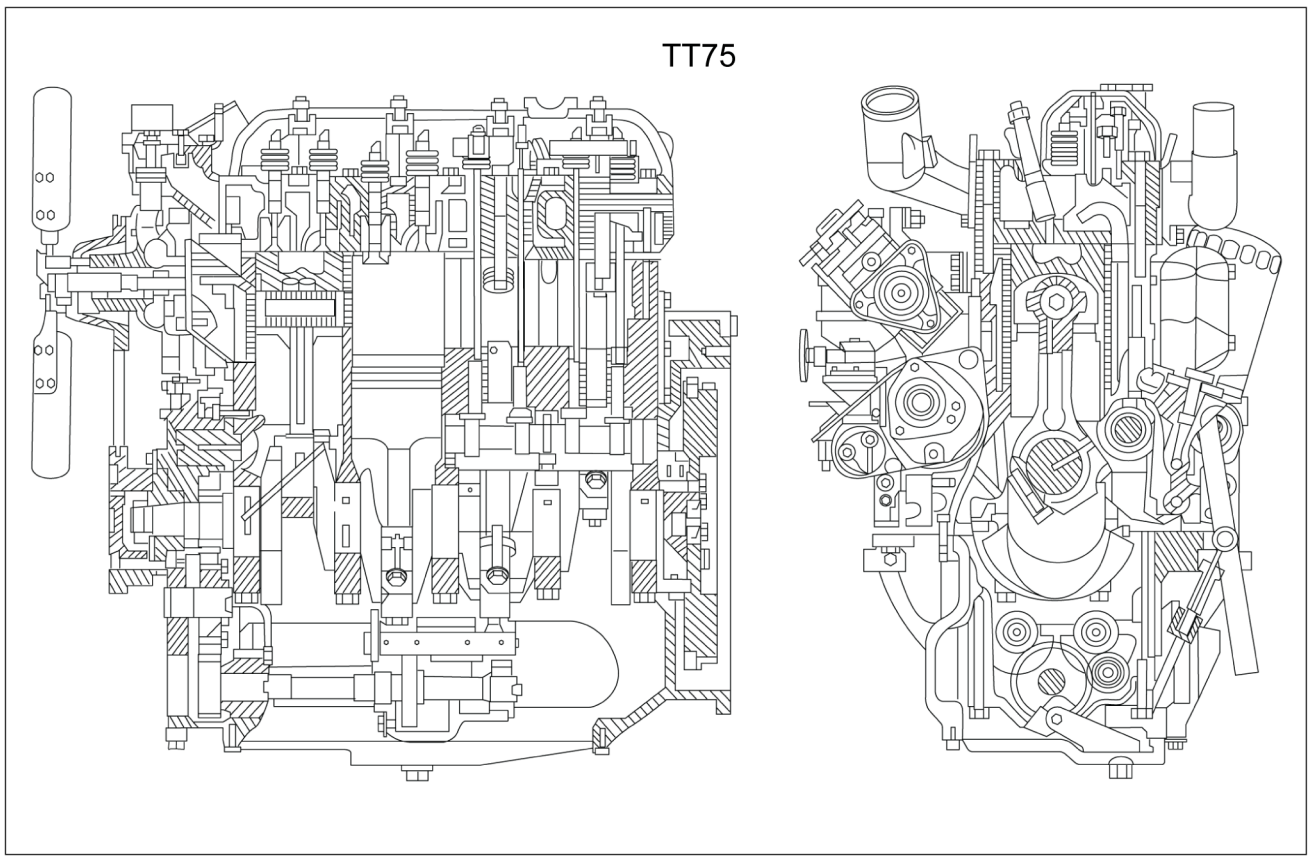
Pistons are constructed of an aluminium silicon alloy with notch type combustion chamber being recessed in to the piston crowns.

Each piston has two compression rings and one oil control ring, to reduce the friction and increase positive seating. All rings are located above the piston pin.

Manifolds

The cross flow design aluminium intake, and cast iron exhaust manifolds are on opposite sides of the cylinder head. This is designed to maintain balanced heat distribution within the cylinder head. The configuration of the manifolds also ensures minimum heat transfer to the intake manifold.

The intake manifold is connected through hose to air cleaner.



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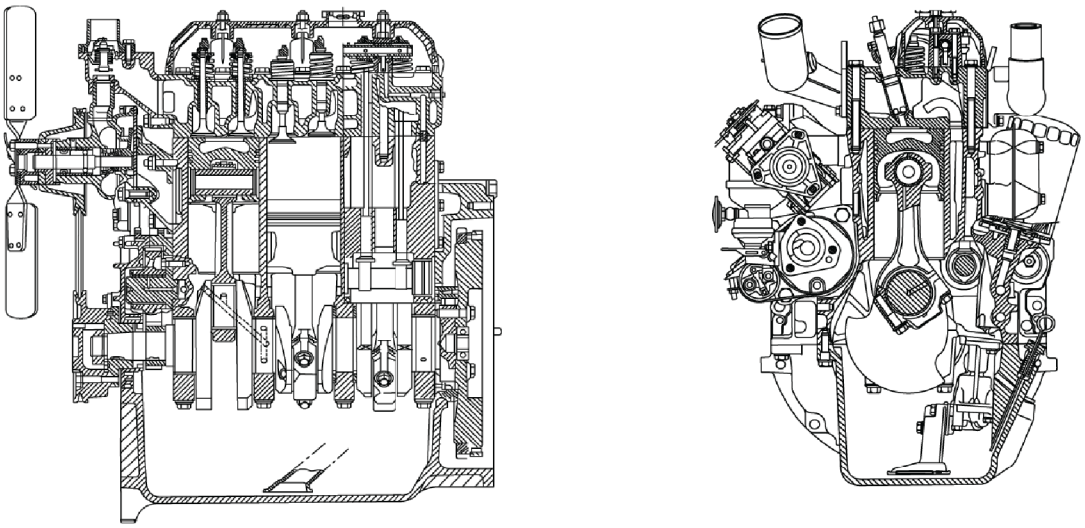
TT55



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Timing gears

The crankshaft timing gear is heated and press fitted on to the front of the crankshaft, to a high degree of accuracy during manufacturing. This enables precise timing being maintained during the life of the engine. The crankshaft gear drives the idler gear, which is attached to the front of cylinder block. The idler gear then drives the camshaft and the injection pump via meshing helical gears.

The camshaft gear is bolted to the front of the shaft and is keyed to maintain position of the gear on the camshaft.

Lubrication system

Lubrication of the engine is maintained by a gear type oil pump mounted in the rear of the engine block., forward of the flywheel on the left hand side viewing from rear side of the engine. The oil pump is driven from the rear of the camshaft and drains oil from the engine oil sump through a tube and screen assembly.

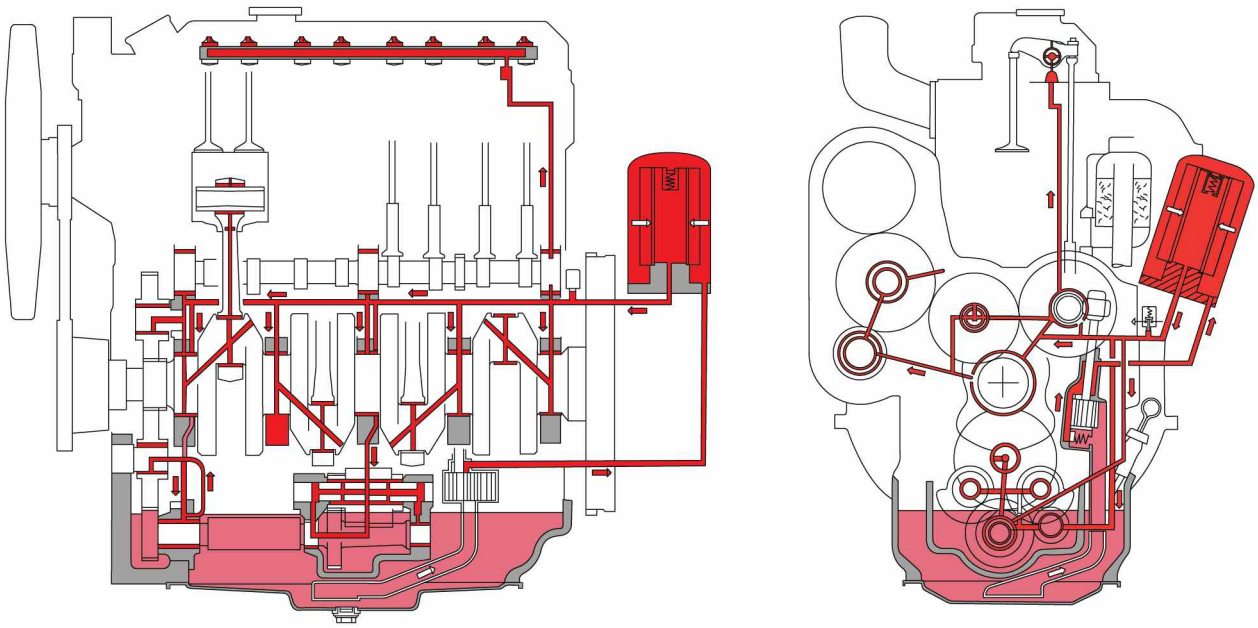
A spring loaded relief valve is integral with the oil filter and prevents over pressurization of the system. A spin on type oil filter is mounted externally to its support housing on the left hand side of the engine. Oil flows from the filter to the main oil gallery, which runs the length of the cylinder block, which also intersects the camshaft follower chamber.

The main gallery also supplies oil to the crankshaft main bearings, connecting rods both big and small ends and timing gear bushes. The underside of the pistons and pins are lubricated by oil pressure jets.

Timing gears are lubricated by splashed oil from the cam follower chamber and the pressure lubricated camshaft drive gear bushing.

An intermittent flow of oil is directed to the value rocker arm shaft assembly via a drilled passage in the cylinder block. This is located vertically above number 3 camshaft bearing and aligns to a hole in the cylinder head. The rotation of the camshaft allows a controlled intermediate flow of lubrication.

TT75



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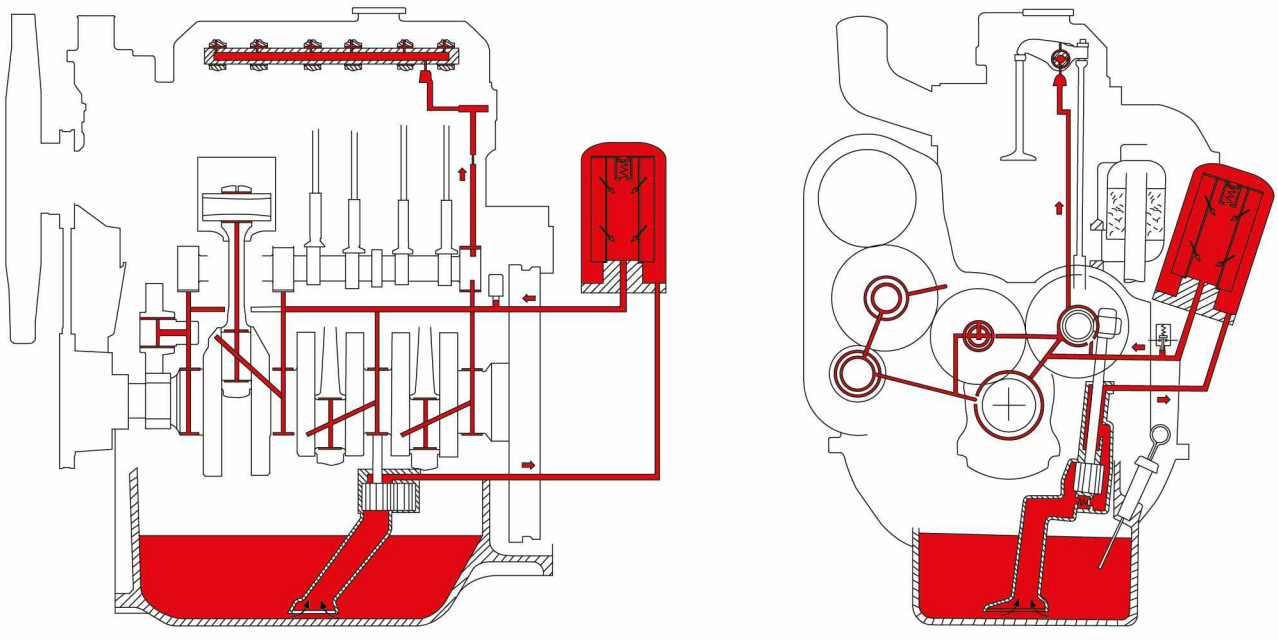
TT55



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Cooling system

The function of the water pump mounted at the front of the engine, is to maintain a continuous flow of water around the cooling system. This is essential to ensure correct engine temperature, and performance, during vehicle operation.

The pump is driven by a 'V' belt from the crankshaft pulley, when the engine is running.

The cooling system for the new generation of engines, is of recirculating by-pass type with full length water-jackets for the bottom tank of the radiator by the water pump, which passes the coolant to the cylinder block. This coolant then flows through cored passages to cool the cylinder walls.

Passages in the cylinder head gasket allow coolant to flow from the cylinder block, into the cylinder head cored passages also conduct the coolant to the fuel injector nozzle locations before re-entering the water pump below the thermostat.

The thermostat is located in the top of the water pump body, and controls the flow of the water as required by temperature changes.

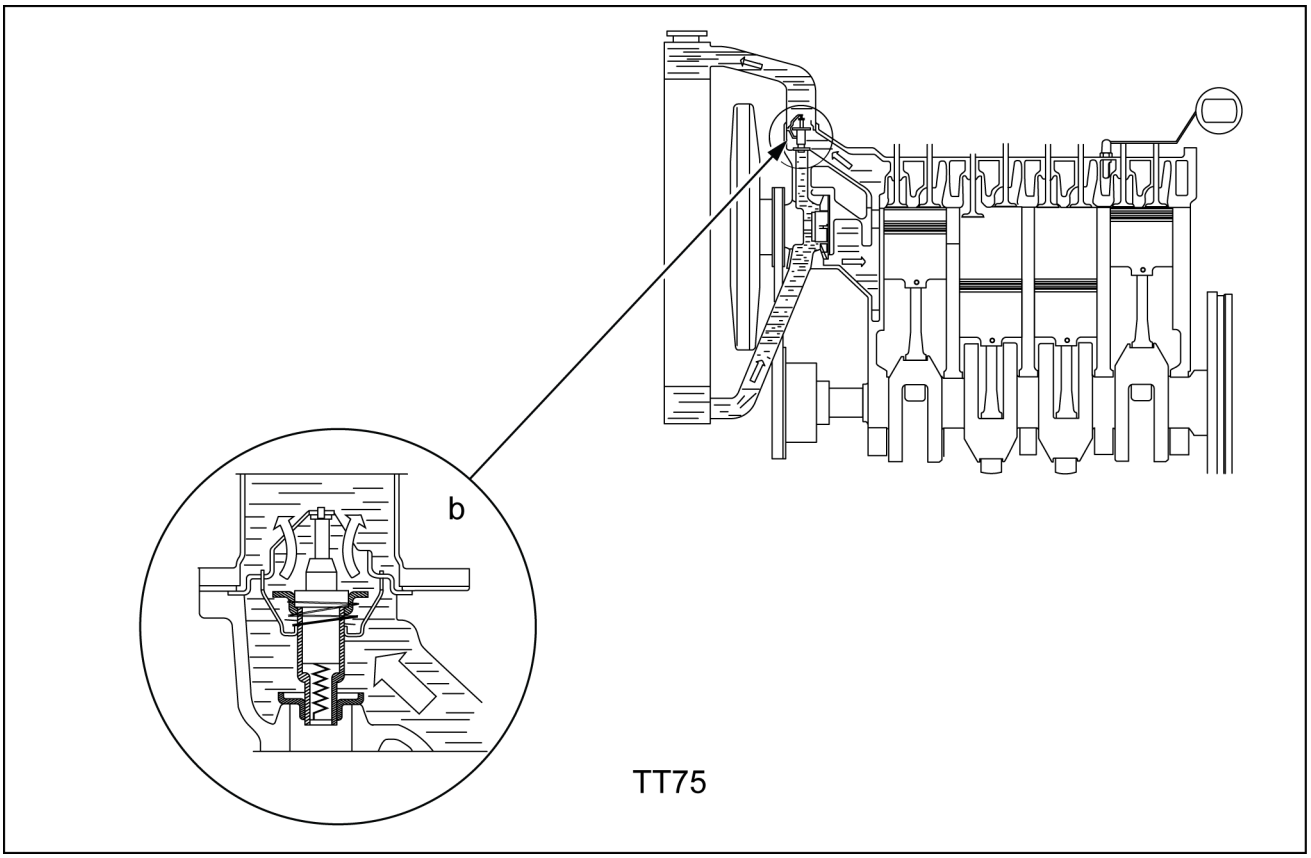
NOTE: *A faulty thermostat may cause the engine to operate at too high (hot) or low (cold) on operating temperature. If not replaced this could result in a damaged engine or impaired engine performance.*

When the thermostat is closed a recirculating by-pass is provided to allow the coolant to recirculate from the head to the block to effort a faster warm-up.

Once the engine has reached its normal operating temperature, the thermostat will open and allow water to be drawn through the radiator by the pump action. Cooled water then returns to the engine system. Cooling occurs as the coolant passes down through the radiator cores, which are exposed to the air as it is drawn through the radiator by the fan.

NOTE: *Do not operate an engine without a thermostat. The cooling system incorporates a drain plug, on the left hand side of the cylinder block. The cap on the radiator is a system pressure cap and should not be removed unless refilling the system from empty.*

The engine cooling fan is mounted on a pump pulley which is belt driven from the crankshaft.



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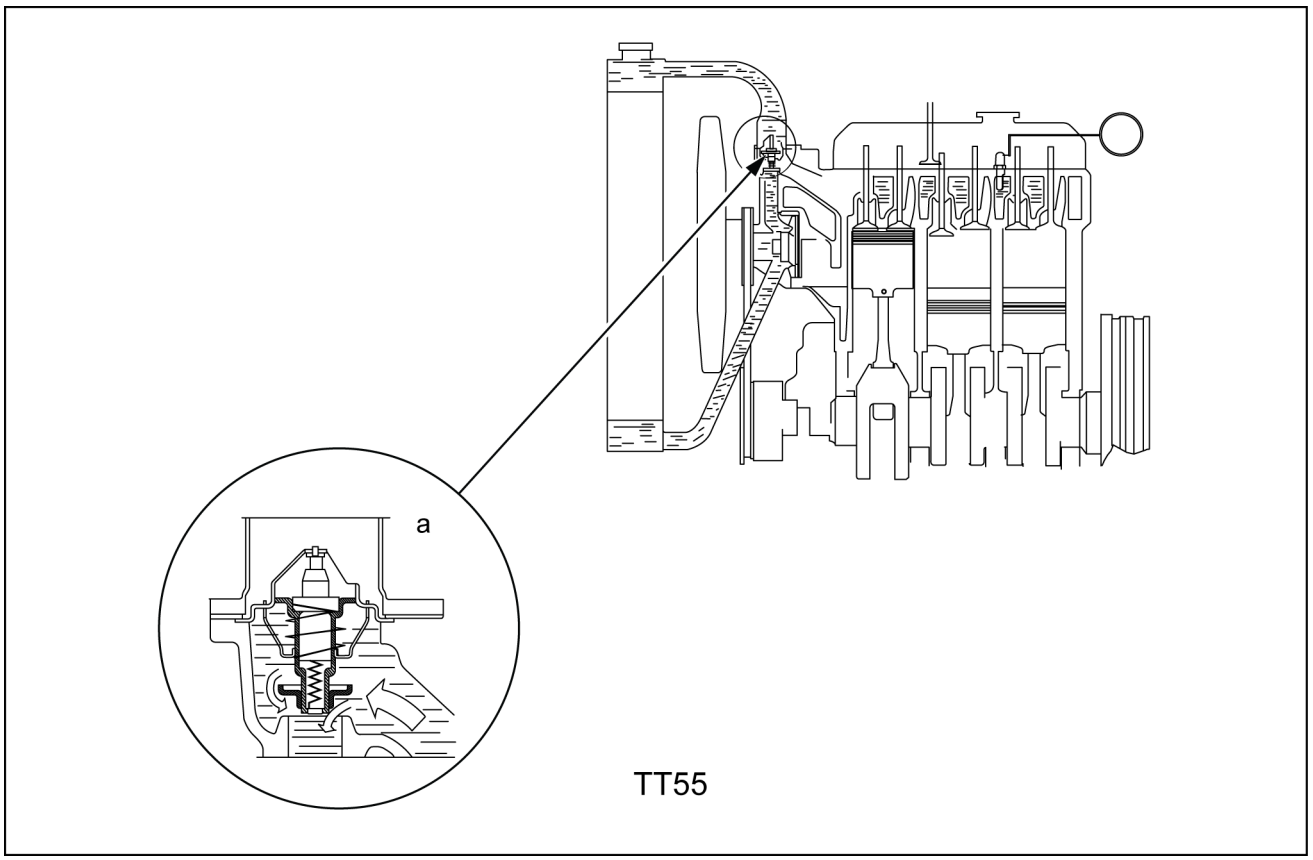

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Fuel system

The diesel fuel system consists of fuel tank, lift pump, fuel filters, mico rotary type fuel injection pump, fuel injectors, and interconnecting tubes and lines.

The fuel injection pump is pressure fed from the lift pump. Fuel flows from the fuel tank to the sediment separator (incorporated in lift pump), through the lift pump, then through the primary fuel filter and then to secondary fuel filter. from the filter the fuel passes to the fuel injection pump to supply fuel at high pressure to each injector and also provides extra fuel which lubricates and cools the injection pump.

This extra fuel is recirculated to the fuel tank, by means of the injector leak-off line.

Also excess fuel that leaks past the needle value of the injectors in directed back to the fuel tank, by means of the injection leaf off-line.

Fuel shut-off (Injection pump)

Fuel injection pump is equipped with an electrically operated fuel shut off solenoid is energized by operation of the ignition switch mounted in the instrument panel.

With the ignition switched “Off” a spring loaded plunger in the solenoid (held in position by the spring tension), prevents fuel flowing into the pump from the main fuel feed port. With the ignition switched “on” the magnetized plunger is energized by an internal coil and is drawn up into the body of the solenoid. Fuel is then allowed to flow through the open port into the pump.

Lift pump

A diaphragm type fuel lift pump is located between tank and primary fuel filter. The pump draws fuel from the tank via the sediments (incorporated in lift pump) and passes fuel under pressure to the primary and secondary fuel filter and onto the fuel injection pump.

Fuel Filters

Spin-on type fuel filters situated to the right-hand side of the engine, receives fuel from lift pump. From the filter head the fuel is diverted down through the filter element and into the base chamber.

The filtered fuel then flows up the centre tube of the element to the filter head outlet and into the injection pump.

Engine - Service instruction

In the following procedures and illustrations the engine in the main is shown removed from the tractor.

However there are certain operations that can performed with the engine still in the tractor, or separated at the connection to the front axle support, or separated from the transmission housing.

The engine overhaul procedure initially describes the assembly process for rebuilding an engine using all new components. Following this section are defined headings, which describe detailed repair specifications and procedures, where components are suitable for re-use.

Where overhaul of components is required without engine being removed from the tractor refer to the following headings, and the relevant paragraphs, in the main overhaul procedure.

Operations or repairs that can be performed with the engine still in the tractor.

1. Cylinder head and associated inlet and exhaust components.
2. Fuel injection pump and related parts.
3. Water pump, thermostat, and associated components.
4. Front timing cover/timing gear removal.
5. Front pulley.

Operations or repair that are performed with the engine separated from the front axle.

- Oil pan removal for access to oil pan gasket, crankshaft, bearing shells, piston removal and oil pump.

Operations or repairs that are performed with the engine separated from the transmission housing, and with oil pan removed.

- Crankshaft rear oil seal and carrier removal. Dismantle the engine by referring to the following removal procedure. Refer to the specification section as necessary.

NOTE: *All gaskets, seals and O-rings must be replaced while reassembling. Where new sealant is to be applied refer to "Engine Specifications".*

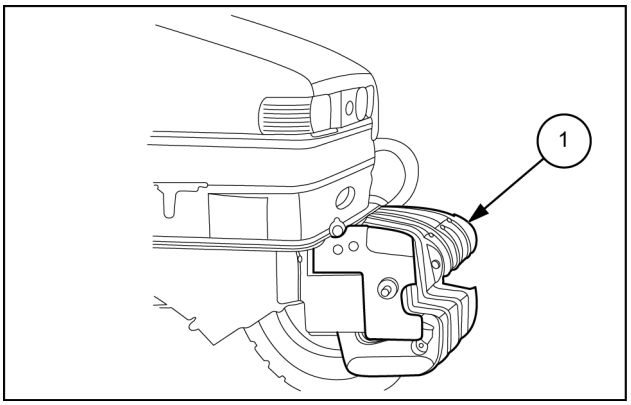
Engine - Remove

⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

1. Remove front ballast weights if fitted.



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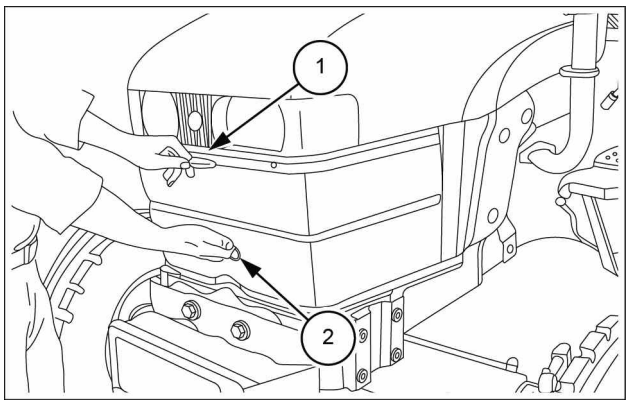
2. Slide the lock **(1)** to right, hold and lift the handle **(2)** to raise the hood.



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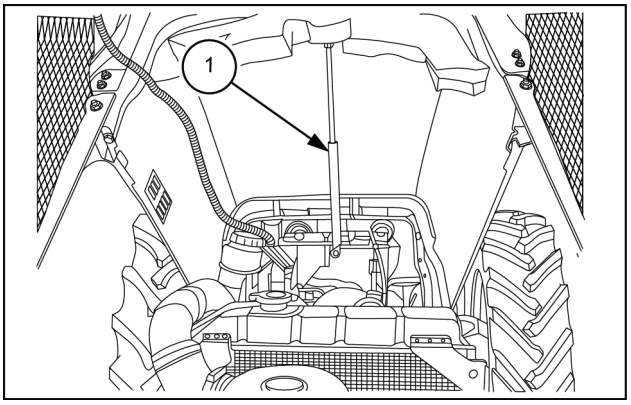
3. To maintain the hood in the raised position, a gas strut **(1)** is provided underside the hood.



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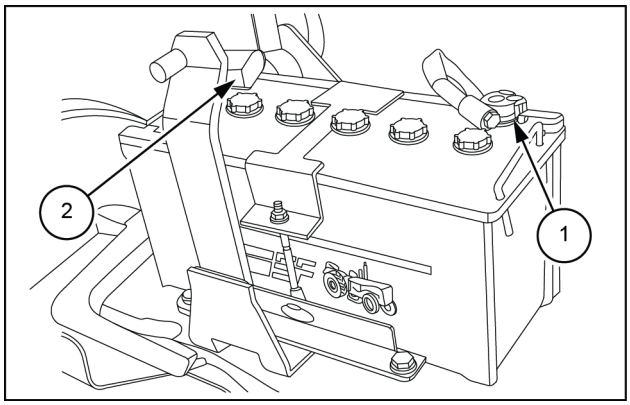
4. Disconnect battery terminals **(1)** and **(2)**.

NOTICE: *Always disconnect the negative cable **(1)** first.*



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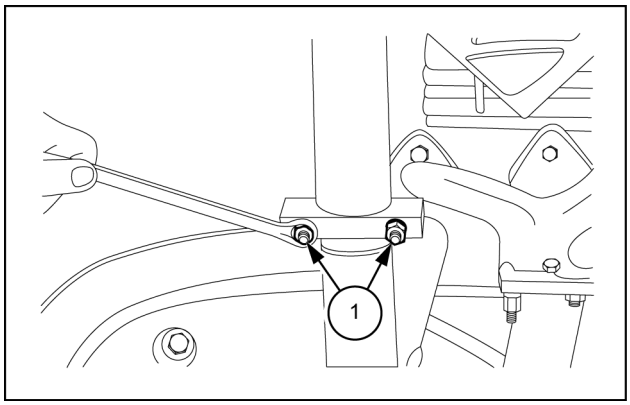
5. Loosen silencer mounting clamp bolts **(1)** and remove the silencer assembly.



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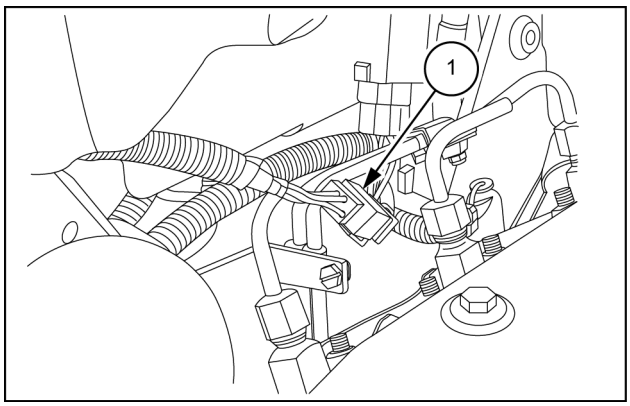
6. Disconnect electric connections of centre harness **(1)**.



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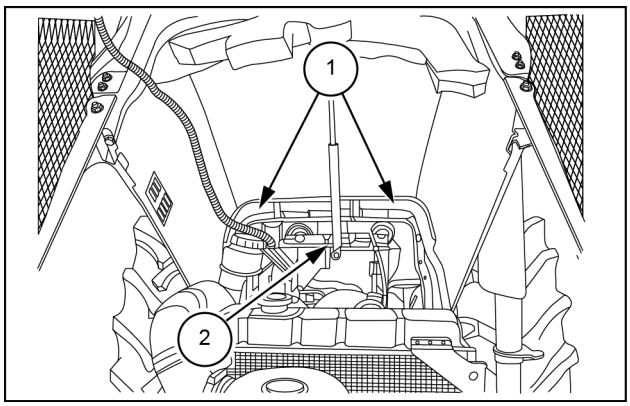
7. Remove the split pins and remove the roll pins **(1)**.
8. Unscrew the gas strut bolt **(2)** and remove the front hood.



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