SERVICE MANUAL

TD65F / TD75F / TD85F

Tractor

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NEW HOLLAND AGRICULTURE

SERVICE MANUAL

TD65F
TD75F
TD85F

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EN

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INTRODUCTION

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International symbols

As a guide to the operation of the machine, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.


Thermostart starting aid


Alternator charge


Fuel level


Automatic Fuel shut-off


Engine speed (rev/min x 100)


Hours recorded


Engine oil pressure


Engine coolant temperature


Coolant level


Tractor lights


Headlamp main beam


Headlamp dipped beam


Work lamps


Stop lamps


Horn


Radio

Keep alive memory


Turn signals

Turn signals -one trailer

Turn signals -two trailers


Front wind-screen wash/wipe


Rear wind-screen wash/wipe


Heater temp-erature control


Heater fan


Air conditioner


Air filter blocked


Parking brake


Brake fluid level


Trailer brake


Roof beacon


Warning ! Corrosive substance


PTO

Transmission in neutral


Creeper gears


Slow or low setting


Fast or high setting


Ground speed

Differential lock


Rear axle oil tem-perature


Transmission oil pressure


FWD engaged


FWD dis-engaged


Warning!


Hazard warning lights


Variable control


Pressurised! Open carefully


Position Control


Draft Control


Accessory socket


Implement socket

%age slip


Hitch raise (rear)


Hitch lower (rear)


Hitch height limit (rear)


Hitch height limit (front)


Hitch dis-abled


Hydraulic and transmission filters


Remote valve extend


Remote valve retract


Remote valve float


Malfunction! See Operator's Manual


Malfunction! (alter-native symbol)

Safety rules

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by 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 instructions will be directly responsible for any damage caused.

NOTES FOR EQUIPMENT

Equipment shown in this manual is:

- designed expressly for use on these 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.

SAFETY RULES

PAY ATTENTION TO THIS SYMBOL

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 safeguard your safety.
In this manual you will find this symbol together with the following key-words:
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 basic precaution would be enough to avoid many severe accidents.

SAFETY RULES

Generalities

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught on 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 the 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 if 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 the 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 the 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 or 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 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 head, 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 no 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 the 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 TYRES

- Check that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check for possible damage to the rims and tyres.
- Stay at the tyre side when inflating.
- Check the pressure only when the tractor is unloaded and tyres are cold to avoid wrong readings due to over-pressure.
- Never cut, nor weld a rim with the inflated tyre 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 regulations in force.
- Deflate the tyre before removing any object caught into the tyre tread.
- Never inflate tyres using flammable gases as they may generate 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.

HEALTH AND SAFETY

CONTENT

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, sulphuric 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 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 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 from 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).

FUELS

see Fire, Legal Aspects, Chemicals - General, Solvents.
Used as fuels and cleaning agents.

Gasolene (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.
Gasolene dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.
Motor gasolene may contain appreciable quantities of benzene, which is toxic upon inhalation and the concentrations of gasolene vapours 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 gasolene. Great care must be taken to avoid the serious consequences of inhalation in the event of vapour build up arising from spillages in confined spaces.
Special precautions apply to cleaning and maintenance operations on gasolene storage tanks.
Gasolene 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 vapours. Exposure to mists and vapours 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 **140 bar**(**2000 lb/in2**) 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 and may result in a fatal failure the 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 accordance with local regulations

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. Always conform to the laws and regulations applicable to the country in which you are working.
Workshops should be familiar, in detail, with the associated laws and regulations. Consult the local factory inspectorate or appropriate authority 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.

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 section of page 5 on resin based adhesives, isocyanate containing Adhesives and Foams should be consulted.
Spraying should preferably be carried out in exhausted ventilated booths removing vapour 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 (Gasolene).

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 undertaken 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 degrease the skin and may result in irritation and dermatitis 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 vapours 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 vapours or mists, for which there might not be adequate warning 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, vapours 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.

ECOLOGY AND THE ENVIRONMENT

Soil, air and water are vital factors of agriculture and life in general. Where legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti freeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances. Agricultural consultants will, in many cases, be able to help you as well.

HELPFUL HINTS

1. Avoid filling tanks using unsuitable containers or inappropriate pressurised fuel delivery systems which may cause considerable spillage.
2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which can be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in ordinary heating systems.
4. Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
6. Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system anyway.
7. Repair any leaks or defects in the engine cooling or hydraulic system immediately.
8. Do not increase the pressure in a pressurised circuit as this may lead to the components exploding.
9. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, causing the loss of oils, coolant, etc.

Safety rules

PRECAUTIONARY STATEMENTS

Personal Safety

Throughout this manual and on machine signs, you will find precautionary statements ("DANGER", "WARNING", and "CAUTION") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

FAILURE TO FOLLOW THE "DANGER", "WARNING", AND "CAUTION" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

Machine Safety

The precautionary statement ("IMPORTANT") is followed by specific instructions. This statement is intended for machine safety.

NOTICE: *The word "IMPORTANT" is used to inform the reader of something they need to know to prevent minor machine damage if a certain procedure is not followed.*

Information

NOTE: *Instructions used to identify and present supplementary information.*

LEGAL OBLIGATIONS

This machine may be equipped with special guarding or other devices in compliance with local legislation. Some of these require active use by the operator. Therefore, check local legislation on the usage of this machine.

ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of a non compliance to 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 machines, regardless of how well the machine in question was designed and built.

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

Decisive awareness of the most basic safety rule is normally sufficient to avoid many serious accident.

ATTENTION: *Shut down the machine, remove key, be sure all moving parts have stopped and all pressure in the systems is relieved before cleaning, adjusting or lubricating the equipment. Failure to comply will result in death or serious injury.*

SAFETY REQUIREMENTS FOR FLUID POWER SYSTEMS AND COMPONENTS - HYDRAULICS (EUROPEAN STANDARD PR EM 982)

Flexible hose assemblies must not be constructed from hoses which have been previously used as part of a hose assembly.
Do not weld hydraulic piping.
When flexible hoses or piping are damaged, replace them immediately.
It is forbidden to modify a hydraulic accumulator by machining, welding or any other means.
Before removing hydraulic accumulators for servicing, the liquid pressure in the accumulators must be reduced to zero.
Pressure check on hydraulic accumulators shall be carried out by method recommended by the accumulator manufacturer.
Care must be taken not to exceed the maximum allowable pressure of the accumulator. After any check or adjustment there must be no leakage of gas.

SAFETY RULES

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read and take the following precautions before operating this tractor. Equipment should be operated only by those who are responsible and instructed to do so.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved roll bar and seat belt for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a roll bar and seat belt, see your NEW HOLLAND Dealer.
3. Always use the seat belt. The only instance when the seat belt should not be used is if the roll bar has been removed from the tractor or folding ROPS is in down position.
4. If a front end loader is to be installed, always use a FOPS (Falling Object Protective Structure) canopy to avoid injury from falling objects.
5. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
6. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
7. Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the Decal section of this manual.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.
2. Keep any type of open flame away from the tractor and do not smoke while refueling.Wait for the engine to cool before refueling.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
4. Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion.
5. Stop the engine before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
   - DO NOT use your hand to check for leaks.
   - Use a piece of cardboard or paper to search for leaks.
   - Stop the engine and relieve pressure before connecting or disconnecting lines.
   - Tighten all connections before starting the engine or pressurizing lines.
7. Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a NEW HOLLAND Dealer.
8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.
9. Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil.Wash skin promptly with soap and water.
10. Some components of your tractor, such as gaskets and friction surfaces (brake linings, clutch linings, etc.) may contain asbestos. Breathing asbestos dust is dangerous to your health. You are advised to have any maintenance or repair on such components carried out by an authorized NEW HOLLAND Dealer. However, if service operations are to be undertaken on parts that contain asbestos, the essential precautions listed below must be observed:
    - Work out of doors or in a well ventilated area.

- Dust found on the tractor or produced during work on the tractor should be removed by extraction, not by blowing.
- Dust waste should be dampened, placed in a sealed container, and marked to ensure safe disposal.
- If any cutting, drilling, etc. is attempted on materials containing asbestos, the item should be dampened and only hand tools or low speed power tools used.

OPERATING THE TRACTOR

1. Before starting the tractor, apply the parking brake, place the PTO lever in the 'OFF' position, the lift control lever in the down position, the remote control valve levers in the neutral position, and the transmission in neutral.
2. Always sit in the tractor seat when starting the engine or operating controls. Do not start the engine or operate controls while standing beside the tractor.
3. Do not bypass the neutral start switches. Consult your NEW HOLLAND Dealer if your neutral start controls malfunction. Use jumper cables only in the recommended manner. Improper use can result in tractor runaway.
4. Avoid accidental contact with the gear shift lever while the engine is running, as this can cause unexpected tractor movement.
5. Before getting off the tractor, disengage the PTO, turn the engine off, and apply the parking brake. Never get off the tractor while it is in motion.
6. Do not park the tractor on a steep incline.
7. Do not operate the tractor engine in an enclosed building without adequate ventilation. Exhaust fumes can cause death or illness.
8. If the power steering or engine ceases operating, stop the tractor immediately.
9. Pull only from the drawbar or the lower link drawbar in the down position. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle or any point above the axle may cause the tractor to upset.
10. 1If the front end of the tractor tends to rise when heavy implements are attached to the three-point hitch, install front end or front wheel weights. Do not operate the tractor with a light front end.
11. Always set the hydraulic selector lever in position control when attaching or transporting equipment. Ensure hydraulic couplers are properly mounted and will disconnect safely in case of accidental detachment of implement
12. Do not leave equipment in the raised position.
13. Use the flasher/turn signal lights and SMV signs when traveling on public roads both day and night (unless prohibited by law).
14. When operating at night, adjust lights to prevent blinding oncoming drivers.

DRIVING THE TRACTOR

1. Watch where you are going, especially at row ends, on roads, around trees and low hanging obstacles.
2. To avoid upsets, drive the tractor with care and at a safe speed. Use extra caution when operating over rough ground, when crossing ditches or slopes, and when turning corners.
3. To provide two-wheel braking, lock tractor brake pedals together when transporting on roads.
4. Do not coast or free wheel down hills. Use the same gear when going downhill as is used when going uphill.
5. Any towed vehicle with a total weight exceeding that of the towing tractor should be equipped with brakes for safe operation.
6. If the tractor becomes stuck or the tires become frozen to the ground, back up the tractor to prevent upset.
7. Always check overhead clearance, especially when transporting the tractor.
8. When operating at night, adjust lights to prevent blinding oncoming drivers.

OPERATING THE PTO

1. When operating PTO driven equipment, shut off the engine and wait until the PTO stops before getting off the tractor and disconnecting the equipment.
2. Do not wear loose clothing when operating the power take-off or when near rotating equipment.
3. When operating stationary PTO driven equipment, always place all gear shift levers in neutral position.
4. To avoid injury, do not clean, adjust, unclog, or service PTO driven equipment when the tractor engine is running.

5. Ensure the PTO master shield is installed at all times. Always replace the PTO shield cap when the PTO is not in use.

DIESEL FUEL

1. UNDER NO CIRCUMSTANCES should gasoline, alcohol, or blended fuels be added to diesel fuel. These combinations can create an increased fire or explosive hazard. Such blends are more explosive than pure gasoline in a closed container such as a fuel tank. DO NOT USE THESE BLENDS.
2. Never remove the fuel cap or refuel with the engine running or hot.
3. Do not smoke while refueling or when standing near fuel.
4. Maintain control of the fuel filler pipe nozzle when filling the tank.
5. Do not fill the fuel tank to capacity. Allow room for expansion.
6. Wipe up spilled fuel immediately.
7. Always tighten the fuel tank cap securely.
8. If the original fuel tank cap is lost, replace it with a NEW HOLLAND approved cap. A non-approved, proprietary cap may not be safe.
9. Keep equipment clean and properly maintained.
10. Do not drive equipment near open fires.
11. Never use fuel for cleaning purposes.
12. Arrange fuel purchases so that winter grade fuels are not held over and used in the spring.

SAFETY FRAME (ROPS)

Your NEW HOLLAND tractor is equipped with a safety frame. It must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

UNDER NO CIRCUMSTANCES should you:

- Modify, drill, or alter the safety frame in any way. Doing so may render you liable to legal prosecution.
- Attempt to straighten or weld any part of the main frame or retaining brackets which have suffered damage. Doing so may weaken the structure and endanger your safety.
- Secure any parts on the main frame or attach your safety frame with anything other than the special high tensile bolts and nuts specified.
- Attach chains or ropes to the main frame for pulling purposes.
- Take unnecessary risks even though your safety frame affords you the maximum protection possible.

Personal safety

Safty Precautions

- Before servicing an air conditioning system, read and comply with the following safety precautions. Make sure that any repairs are performed by duly trained and skilled personnel only.
- Never attempt to remove the air conditioning system. Refrigerant leaks can cause serious burns to the eyes and hands.
- The refrigerant must always be handled very carefully in order to avoid accidents.
- Keep the refrigerant packaging as well as the air conditioning system away from flames or heat sources, as the resulting increase in pressure may cause the package or system to explode.
- If there is direct contact with naked flames or heated metal surfaces, the refrigerant will decompose and will produce toxic products and acids.
- Never discharge refrigerant into the atmosphere. A certified refrigerant recovery unit operated by a technician should be used to repair air conditioning units.
- When discharging the refrigerant in the system, do so in a well-ventilated area with perfect air circulation and away from naked flames.
- When charging or discharging the system, always wear safety goggles and take adequate precautions to protect the face in general and the eyes in particular, in case of accidental refrigerant spillage.
- The refrigerant and oil mixture inside the air conditioning system is pressurised. Because of this, never loosen the joints or work with the tubes without first depressurising the system.
- Before loosening any connector, cover it with a thick rag and use goggles and gloves to prevent the refrigerant from coming into contact with the skin or eyes.
  If an accident does happen, proceed as follows:
- If refrigerant gets into the eyes, wash immediately with copious amounts of distilled or tap water, and take the victim to hospital for specialist medical care.
- If refrigerant comes into contact with the skin, wash with cold water and seek medical assistance immediately at a hospital.

Basic instructions Hardware

General

The TD tractor has been built using metric hardware.

NOTE: *Make sure you use the hardware specified when using tapped holes, as trying to install a metric bolt in an inch thread, or an inch bolt in a metric thread, will damage the thread.*

Certain hardware must be tightened to specific torque specifications. If specific torque specifications are not noted, tighten the hardware to the standard torque chart specification listed in this manual.

Overlay

Hardware used on New Holland balers is plated with zinc chromate (gold color). Gold colored hardware has different torquing requirements from unplated or zinc plated (silver color) hardware because of the difference in the coefficient of friction of the plating material. The torque charts in this manual list the correct specifications for gold, silver, and unplated bolts.

Nut Tightening

Whenever possible, the nut should be tightened, not the head of the bolt. When tightening using the bolt head, the clamp load can be lost because some of the torque applied twists the bolt instead of tensioning (stretching) it. The tension on the bolt is what holds the joint together.

Approximately 90% of the torque applied during assembly goes to overcoming friction between the parts. The other 10% is used to tension (stretch) the bolt. After installation, the friction forces disperse, leading to the expression "If it doesn't fail during installation, it won't fail in service". The bolt may fail later due to other factors, but may not be over tightened.

Locknuts

Most locknuts are coated with a special lubricant that is dry to the touch. Anytime a locknut is used, a lower than normal torque is required. Refer to the torque charts in this manual for specific values.

Locknuts

When using a jam nut to lock a regular nut, the jam nut should be installed first and tightened to one half the recommended torque, then held in place while installing a regular nut to the recommended torque.

Thread Lubrication

The addition of antiseize compound, Molykote, oil, graphite, or any other lubricant to a bolt decreases the friction between it and a nut. This makes it necessary to reduce the recommended torque to prevent over tensioning of the bolt. When using the torque charts in this manual, decrease the value by 20% whenever a lubricant is used.

Torque Specification Tables

Standard Bolt Hardware & Hydraulic Connector Torques, Specifications and Information

This specification establishes general torque values to be used in bolted joints for metric and inch hardware. This specification is assumed to apply unless another specification (standard or specified requirement) is indicated in the repair manual.

NOTE: These Standards do not include electrical or hydraulic components, they are referred to in their specific charts or tables.

INCH 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS								
	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS	
Nominal Size	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Unplated or Plated Silver	Plated w/ZnCr Gold	Gr.B w/Gr5 Bolt	Gr.C w/Gr8 Bolt
1/4	6.2 (55)*	8.1 (72)*	9.7 (86)*	13 (112)*	14 (121)*	18 (157)*	8.5 (75)*	12.2 (109)*
5/16	13 (115)*	17 (149)*	20 (178)*	26 (229)*	28 (21)	37 (27)	17.5 (155)*	25 (220)*
3/8	23 (17)	30 (22)	35 (26)	46 (34)	50 (37)	65 (48)	31 (23)	44 (33)
7/16	37 (27)	47 (35)	57 (42)	73 (54)	80 (59)	104 (77)	50 (37)	71 (53)
1/2	57 (42)	73 (54)	87 (64)	113 (83)	123 (91)	159 (117)	76 (56)	108 (80)
9/16	81 (60)	104 (77)	125 (92)	163 (120)	176 (130)	229 (169)	111 (82)	156 (115)
5/8	112 (83)	145 (107)	174 (128)	224 (165)	244 (180)	316 (233)	153 (113)	215 (159)
3/4	198 (146)	256 (189)	306 (226)	397 (293)	432 (319)	560 (413)	271 (200)	383 (282)
7/8	193 (142)	248 (183)	495 (365)	641 (473)	698 (515)	904 (667)	437 (323)	617 (455)
1	289 (213)	373 (275)	742 (547)	960 (708)	1048 (773)	1356 (1000)	654 (483)	924 (681)

NOTE: Torque values shown with * are inch pounds.

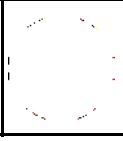
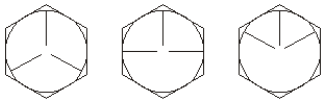
NOTICE: *Values shown on these charts are minimum hardware tightening torques unless otherwise stated.*

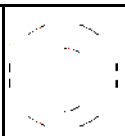
METRIC 'NON-FLANGED' HARDWARE AND LOCKNUTS {MINIMUM HARDWARE TIGHTENING TORQUES}

IN NEWTON-METERS (FOOT-POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS							
	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCK-NUTS
Nominal Size	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Unplated	Plated w/ZnCr	Cl.8 w/Cl8.8 Bolt
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (21)	31 (23)	40 (30)	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

NOTE: *Torque values shown with * are inch pounds.*

SAE HARDWARE IDENTIFICATION CHART

Grade	1 or 2	5	8
SAE Markings for Bolts and Cap Screws			

SAE Markings for Hex Nuts			
Grade A-B-C Locknuts	**A (No Notches)**	**B (Three Marks)**	**C (Six Marks)**

METRIC HARDWARE IDENTIFICATION CHART

Class	**5.8**	**8.8**	**10.9**
			
Hex Cap Screw and Carriage Bolts	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt	Located on the face or flat, on the cap of the bolt
Hex Nuts and Locknuts	Located on the face or flat of the nut	Located on the face or flat of the nut	Located on the face or flat of the nut

Metric cap screws and nuts are identified by the grade number stamped on the head of the cap screw or on the surface of the nuts. U.S. customary cap screws are identified by radial lines stamped on the head of the cap screw.

DEFINITIONS:

1. Break-Away Torque - Torque measured in the direction of tightening, the moment before the bolt/nut starts to turn.
2. Clamping Force - Force equal to the tension in the fastener that clamps the parts together.
3. Stabilized Torque - Torque measured on a joint that has had a settling time after fastener installation, and the torque is measured in the direction of tightening, the moment after the bolt/nut begins to turn.
4. Proof Load - Safe test load for fasteners, approximately 10% below the yield load.
5. Torque - Force on the wrench handle times the handle length.
6. Torque and Turn - Bolting method utilizing a torque sufficient to close the joint, followed by rotation of a specific angle to obtain the desired bolt stretch.
7. Torque to Yield - Bolting method that tightens the joint until 0.2% yield is detected. Generally requires a computer monitored tightening tool.
8. Target Torque - Torque specified by engineering, generally nominal torque.
9. Ultimate Load - Load when bolt failure occurs.
10. Yield Load - Load when 0.2% deformation occurs.

NOTE: Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. When replacing cap screws, always use a cap screw of the same measurement and strength as the cap screw being replaced.

NOTE: Make sure the fasteners threads are clean, and that thread engagement is started. This will prevent them from failing when being tightened. Assure that joints that utilize threaded fasteners are properly tightened, and that they remain tight during the period of their intended usage.

NOTE: Tighten plastic insert or crimped steel-type lock nuts to approximately 50 % of table torque, applied to the nut, not the bolt head. Tighten toothed or serrated type lock nuts to their full torque value.

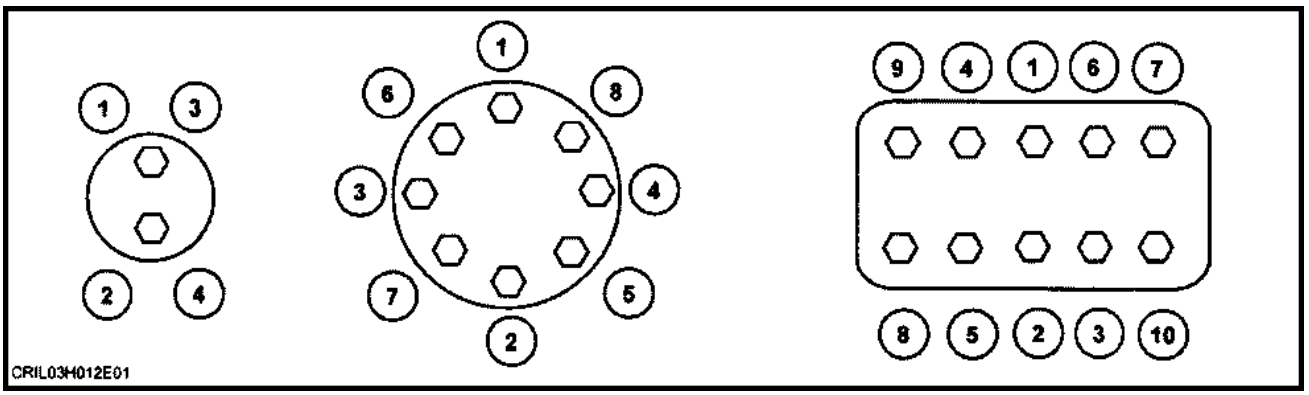
NOTE: Always use the torque values listed in the supplied charts in this section when values are not supplied in a procedure.

NOTE: DO NOT use these torque values when values are given in a specified procedure.

NOTE: Reuse of fasteners. Fasteners that have been tightened above yield point during assembly should not be reused after disassembly. They have been permanently deformed and the elastic range has been shifted closer to the ultimate tensile point.

NOTE: Torque and Turn is a recommended procedure for manufacturing and service when sophisticated tools are not available, especially for large diameter fasteners.

NOTE: Large diameter fasteners, unless specifically stated, should be tightened in sequence using the related torque chart below, at a low torque that is sufficient until the joint is closed. Each bolt is then rotated 90 degrees in sequence. Each bolt is then rotated another 90 degrees in sequence. The result is a clamp load above the yield point. This procedure results in a consistent clamp load. The fasteners should not be reused after disassembly.



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NOTE: Shown above is the suggested initial torque tightening sequences for general applications, tighten in sequence from item 1 through to the last item of hardware.

Hydraulic Hoses and Tubes

NOTE: Tightening the joint to the proper torque will keep it leak free, and prevent it from damaging the hose or fitting.

Always replace hoses and tubes with damaged cone ends or the end connections.
When installing a new hose, loosely connect each end and make sure the hose fits its desired location, without kinking or twisting, before tightening the connection. Tighten non-swivel end of hose first if applicable. Tighten the hose clamps enough to hold the hose without chafing but not so tight as to crush the ends.
Keep the hoses and tubes clear of moving parts and replace any hoses and fittings that have moved from their original positions over time. A hose with a chafed outer cover will allow moisture to get into the system. Concealed corrosion of the wire reinforcement will then occur along the hose length and result in hose failure.
Ballooning of the hose indicates internal leakage as the hose deteriorates. This condition can rapidly lead to hose failure.
Kinked, crushed, stretched or damaged hoses generally suffer internal structural damage that restricts fluid flow, reduces performance and ultimately causes the hose to fail.
Do not allow free moving, unsupported hoses or tubes to touch each other or related working surfaces. This causes chafing and reduces line life.

National Pipe Thread (NPT) Fittings

Before installing and tightening pipe fittings, clean the threads with a cleaning solvent or Loctite® brand cleaner. Apply the appropriate Loctite® brand sealant to all fittings including stainless steel, unless as otherwise stated. Generally Loctite® 567™ can be used for all fittings including stainless steel. Loctite® 565™ is used for most metal fittings. For high filtration/zero contamination systems use Loctite® 545™.

NPT PIPE FITTING TORQUE CHART

Thread Size	Torque (Maximum)
1/8" - 27	**13 Nm** (**10 lb ft**)
1/4" - 18	**16 Nm** (**12 lb ft**)
3/8" - 18	**22 Nm** (**16 lb ft**)
1/2" - 14	**41 Nm** (**30 lb ft**)
3/4" - 14	**54 Nm** (**40 lb ft**)

PIPE FITTING

Nom. SAE Dash Size	Thread Size	TFFT (Turns For Finger Tight)
-2	1/8 - 27	2.0 - 3.0
-4	1/4 - 18	2.0 - 3.0
-6	3/8 - 18	1.5 - 3.0
-8	1/2-14	2.0 - 3.0
-12	3/4 - 14	2.0 - 3.0
-16	1 - 11-1/2	1.5 - 2.5
-20	1-1/4 - 11-1/2	1.5 - 2.5
-24	1-1/2 - 11-1/2	1.5 - 2.5
-32	2 - 11-1/2	1.5 - 2.5

Apply sealant/lubricant to male pipe threads. The first two threads should be left uncovered to avoid system contamination. Screw pipe fitting into female pipe port to the finger tight position. Wrench tighten fitting to the appropriate turns from finger tight (TFFT) shown in table above, making sure the tube end of an elbow or tee fitting is aligned to receive incoming tube or hose fitting.

Installation of Adjustable Fittings in Straight Thread O Ring Bosses

1. Lubricate the O ring by coating it with light oil or petroleum jelly. Install the O ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove.
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss.
   NOTE: Do not over tighten and distort the metal backup washer.
3. Position the fitting by turning out (counter clockwise) up to a maximum of one turn. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss.
4. When hose ends or connectors are made of materials other than steel, different torque values may be required.

O RING BOSS END FITTING OR LOCK NUT

Nom. SAE Dash Size	Thread Size	Newton·meters	lb/in	lb/ft
-6	9/16 - 18	48 to 54	432 to 480	
-8	3/4 - 16	70 to 78	612 to 684	
-10	7/8 - 14	102 to 114		75 to 84
-12	1-1/16 - 12	142 to 160		105 to 117
-16	1-5/16 - 12	237 to 254		175 to 187

37 DEGREE FLARE FITTING (STEEL HYDRAULIC FITTINGS)

Nom. SAE Dash Size	Tube OD/Hose ID		Thread Size	Newton·meters	lb/in	lb/ft
-2			5/16 - 24	8 to 9	72 to 84	
-3			3/8 - 24	11 to 12	96 to 108	
-4	6.4 mm	1/4 inch	7/16 - 20	14 to 16	120 to 144	
-5	7.9 mm	5/16 inch	1/2 - 20	18 to 21	156 to 192	
-6	9.5 mm	3/8 inch	9/16 - 18	27 to 33	240 to 300	
-8	12.7 mm	1/2 inch	3/4 - 16	46 - 56	408 to 504	
-10	15.9 mm	5/8 inch	7/8 - 14	77 to 85	684 to 756	
-12	19.0 mm	3/4 inch	1-1/16 - 12	107 to 119		79 to 88
-14	22.2 mm	7/8 inch	1-3/16 -12	127 to 140		94 to 103
-16	25.4 mm	1.0 inch	1-5/16 - 12	131 to 156		97 to 117
-20	31.8 mm	1-1/4 inch	1-5/8 - 12	197 to 223		145 to 165
-24	38.1 mm	1-1/2 inch	1-7/8 - 12	312 to 338		230 to 250

37 DEGREE FITTINGS

TUBE NUTS FOR 37 DEGREE FLARED FITTINGS								O RING BOSS PLUGS ADJUSTABLE FITTING LOCKNUTS, SWIVEL JIC-37° SEATS			
				TORQUE				TORQUE			
Size	Tubing OD		Thread Size	Newton· Meters		Foot Pounds		Newton· Meters		Foot Pounds	
	mm	in.		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
4	6.4	1/4	7/16-20	12	16	9	12	8	14	6	10
5	7.9	5/16	1/2-20	16	20	12	15	14	20	10	15
6	9.5	3/8	9/16-18	29	33	21	24	20	27	15	20
8	12.7	1/2	3/4-16	47	54	35	40	34	41	25	30
10	15.9	5/8	7/8-14	72	79	53	53	47	54	35	40
12	19.1	3/4	1-1/ 16-12	104	111	77	82	81	95	60	70
14	22.2	7/8	1-3/ 16-12	122	136	90	100	95	109	70	80
16	25.4	1	1-5/ 16-12	149	163	110	120	108	122	80	90
20	31.8	1-1/4	1-5/8-12	190	204	140	150	129	158	95	115

These torques are not recommended for tubes of **12.7 mm** (**0.5 in**) OD and larger with wall thickness of **0.89 mm** (**0.035 in**) or less. The torque is specified for **0.89 mm** (**0.035 in**) wall tubes on each application individually. Before installing and torquing 37° flared fittings, clean the face of the flare and threads with a cleaning solvent or Loctite® brand cleaner, and apply hydraulic sealant Loctite® 569™ to the 37° flare and the threads. Install fitting, and torque to specified torque, loosen fitting and re-torque to specifications.

Basic instructions - Shop and Assembly

SHIMS

For each adjustment operation, select adjusting shims and measure separately using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value indicated on each 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). 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 or seal installation tool. 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 overturning and twisting, which would jeopardize sealing efficiency.

SEALING COMPOUNDS

Apply one of the following sealing compounds on the mating surfaces when specified: SILMATE® RTV1473, or **LOCTITE® RTV 598™** or **LOCTITE® INSTANT GASKET 587™ BLUE**. Before applying the sealing compound, prepare the surfaces as directed on product container or as follows:

- remove any deposits with a wire brush
- thoroughly de-grease the surfaces using a locally-approved cleaning agent such as safety solvent or brake parts cleaner.

SPARE PARTS

Only use "CNH Original Parts" or " NEW HOLLAND Parts".

Only genuine spare parts guarantee the same quality, duration and safety as original parts, as they are the same parts that are assembled during standard production. Only "CNH Original Parts" or " NEW HOLLAND Parts" can offer this guarantee.
When ordering spare parts, always provide the following information:

- machine model (commercial name) and serial number
- part number of the ordered part, which can be found in the "Microfiches" or the "Spare Parts Catalogue", used to process orders

PROTECTING THE ELECTRONIC/ ELECTRICAL SYSTEMS DURING CHARGING OR WELDING

To avoid damage to the electronic/electrical systems, always observe the following:

1. Never connect or disconnect any part of the charging circuit, including the battery connections, when the engine is running.
2. Never short any of the charging components to earth.
3. Always disconnect the ground cable from the battery before arc welding on the combine or on any header attached to the combine.
   - position the welder ground clamp as close to the welding area as possible
   - if welding in close proximity to a computer module, then the module should be removed from the combine
   - never allow welding cables to lay on, near or across any electrical wiring or electronic component while welding is in progress
4. Always disconnect the negative cable from the battery when charging the battery in the combine with a battery charger.

NOTICE: *If welding must be performed on the unit, either the combine or the header (if it is attached), the battery ground cable must be disconnected from the combine battery. The electronic monitoring system and charging system will be damaged if this is not done.*

Remove the battery ground cable. Reconnect the cable when welding is completed.

TOOLS

The tools that NEW HOLLAND suggests and illustrated in this manual have been:

- specifically researched and designed for use with NEW HOLLAND machines
- essential for reliable repair operations
- accurately built and rigorously tested so as to offer efficient and long-lasting operation

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

NOTE: *The terms "front", "rear", "right-hand" and "left-hand" (when referred to different parts) are determined from the rear, facing in the direction of travel of the machine during operation.*

CONSUMABLES INDEX

Consumable	Reference	PAGE
Loctite® RTV 598™	Basic instructions - Shop and Assembly	27
Loctite® Instant Gasket 587™ Blue	Basic instructions - Shop and Assembly	27

SERVICE MANUAL

Engine

TD65F
TD75F
TD85F

Contents

Engine - 10

Engine - 10

Engine and crankcase - 001

TD65F
TD75F
TD85F

Contents

Engine - 10

Engine and crankcase - 001

SERVICE

Engine - Remove

⚠ DANGER

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply will result in death or serious injury.

D0076A

⚠ CAUTION

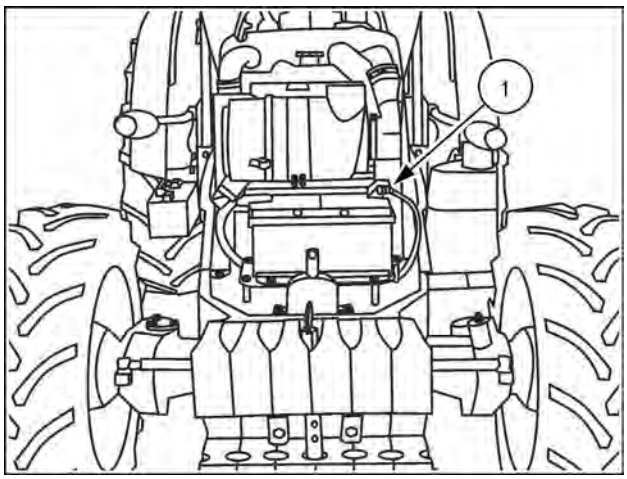
Pinch hazard!
Always use suitable tools to align mating parts. DO NOT use your hand or fingers. Failure to comply could result in minor or moderate injury.

C0044A

To access the clutch it is necessary to separate the engine complete with the front axle from the transmission.

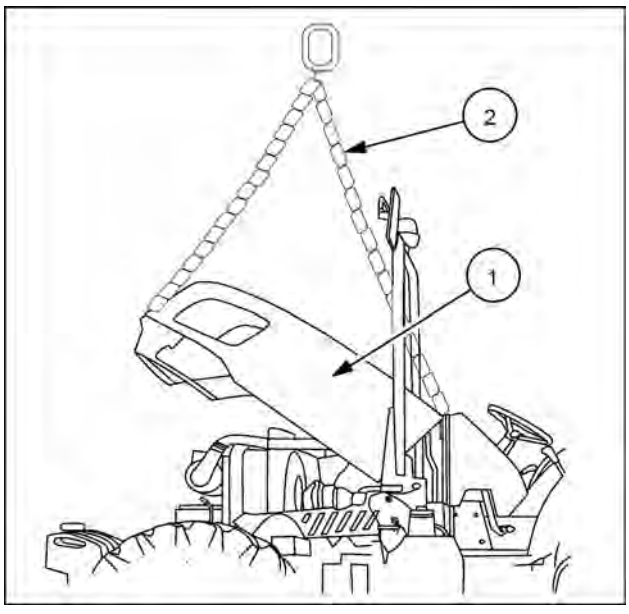
Proceed as follows:

1. Disconnect the negative battery lead **(1)** .



AKU 1

2. Drain off the oil from the gearbox/transmission casing.
3. Drain off the coolant from the engine cooling system.
4. Remove the exhaust pipe. Attach lifting chains **(2)** to the bonnet **(1)** and attach the chain to the hoist.



KAPUTKALDIRMA 2