SERVICE MANUAL

T7.150 / T7.180

Tractor

Part number 48079508
English
July 2017

SERVICE MANUAL

T7.150 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.150 PIN HCCZ, Without cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, Without cab, Tier 0, Exported, 15x12

Link Product / Engine

Product	Market Product	Engine
T7.150 PIN HCCZ, Without cab, Tier 0, Exported, 15x12	Middle East Africa	F4CE0654F*B601
T7.150 PIN HCCZ, With cab, Tier 0, Exported, 15x12	Middle East Africa	F4CE0654F*B601
T7.180 PIN HCCZ, Without cab, Tier 0, Exported, 15x12	Middle East Africa	F4CE0654H*B601
T7.180 PIN HCCZ, With cab, Tier 0, Exported, 15x12	Middle East Africa	F4CE0654H*B601

Contents

INTRODUCTION

Contents

INTRODUCTION

Foreword - How to use and navigate through this manual

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through web delivery (eTIM), DVD, and paper manuals. A coding system called SAP has been developed to link the technical information to other Product Support functions, e.g., Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on their machine it is usually because a function or system on their machine is not working at all, is not working efficiently, or is not responding correctly to their commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the SAP coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system, you will then find all the mechanical, electrical or hydraulic devices, components, assemblies, and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system: the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting), and the service data (remove, install adjust, etc.).

By integrating SAP coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - the component or function on the machine, that the piece of technical information is going to describe (e.g., Fuel tank).
- INFORMATION TYPE - the piece of technical information that has been written for a particular component or function on the machine (e.g., Capacity would be a type of Technical Data describing the amount of fuel held by the fuel tank).
- PRODUCT - the model for which the piece of technical information is written.

Every piece of technical information will have those three categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on their machine.

That information could be:

- the procedure for how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

Manual content

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of each Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Service Data (remove disassemble, assemble, install) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a number (00, 35, 55, etc.). The Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

	PRODUCT				
	Tractors				
		Vehicles with working arms: backhoes, excavators, skid steers, ….			
			Combines, forage harvesters, balers, ….		
				Seeding, planting, floating, spraying equipment, ….	
SECTION					Mounted equipment and tools, ….
00 - Maintenance	X	X	X	X	X
05 - Machine completion and equipment	X	X	X	X	X
10 - Engine	X	X	X	X	
14 - Main gearbox and drive	X	X	X	X	
18 - Clutch	X	X	X		
21 - Transmission	X	X	X	X	
23 - Four wheel drive (4WD) system	X	X	X	X	
25 - Front axle system	X	X	X	X	
27 - Rear axle system	X	X	X	X	
29 - Hydrostatic drive	X	X	X	X	
31 - Power Take-Off (PTO)	X		X		
33 - Brakes and controls	X	X	X	X	
35 - Hydraulic systems	X	X	X	X	
36 - Pneumatic system	X	X	X	X	
37 - Hitches, drawbars and implement couplings	X		X	X	
39 - Frames and ballasting	X	X	X	X	X
41 - Steering	X	X	X	X	
44 - Wheels	X	X	X	X	
46 - Steering clutches					
48 - Tracks and track suspension	X	X	X		
50 - Cab climate control	X	X	X	X	
55 - Electrical systems	X	X	X	X	X
56 - Grape harvester shaking					
58 - Attachments/headers			X		
60 - Product feeding			X		

61 - Metering system				X		
62 - Pressing - Bale formation			X			
63 - Chemical applicators				X		
64 - Chopping			X			
66 - Threshing			X			
68 - Tying/Wrapping/Twisting			X			
69 - Bale wagons						
70 - Ejection			X			
71 - Lubrication system	X	X	X	X	X	
72 - Separation			X			
73 - Residue handling			X			
74 - Cleaning			X			
75 - Soil preparation/Finishing						
76 - Secondary cleaning / Destemmer						
77 - Seeding				X		
78 - Spraying				X		
79 - Planting				X		
80 - Crop storage / Unloading			X			
82 - Front loader and bucket	X	X				
83 - Telescopic single arm	X	X				
84 - Booms, dippers and buckets	X	X				
86 - Dozer blade and arm	X	X				
88 - Accessories	X	X	X	X	X	
89 - Tools	X	X	X	X	X	
90 - Platform, cab, bodywork and decals	X	X	X	X		

Chapters

Each Chapter is identified by a number e.g. Engine - Engine and crankcase - 10.001. The first number is identical to the Section number i.e. Chapter 10.001 is inside Section 10, Engine. The second number is representative of the Chapter contained within the Section.

CONTENTS

The Chapter Contents lists all the technical data (specifications), functional data (how it works), diagnostic data (fault codes and troubleshooting), and service data (remove, install, adjust, etc.), that have been written in that Chapter for that function or system on the machine.

Contents

ENGINE

ENGINE - Engine and crankcase – 10.001

INDEX

The Chapter Index lists in alphabetical order all the types of information (called information units) that have been written in that Chapter for that function or system on the machine.

Index

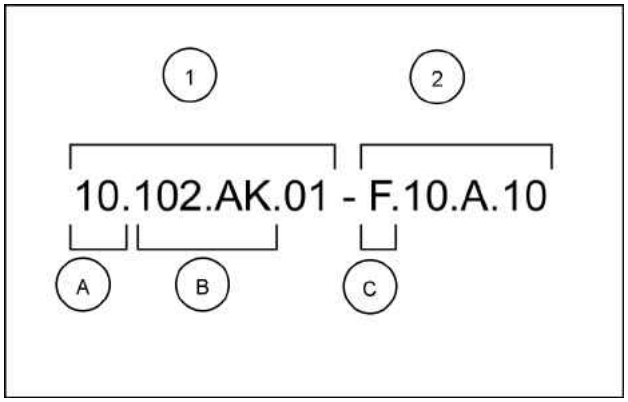
ENGINE - 10

ENGINE

Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

Example information unit	Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10)					
Information Unit SAP code	10	102	AK	01	F	10.A.10
SAP code classification	Engine	Pan and covers	Engine block cover	Front	Service data	Remove



NHIL12GEN0070A 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.
  (B) corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows ".01", which represents the "Front" block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.
  (C) corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.
  (A) and **(B)** are also shown in the page numbering on the page footer.
  THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
  You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9

Foreword - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your NEW HOLLAND Sales and Service Networks.

Safety rules

SAFETY NORMS

General Aspects

- Strictly follow repair and maintenance procedures.
- Do not wear rings, wrist watches, jewelry, accessories, unbuttoned items of clothing, unsecured clothing like ties, torn clothing, scarves, or open jackets or shirts with open zippers that could get caught in moving parts. Use approved safety clothing, such as anti-slip footwear, sleeves, protective goggles, helmets etc.
- Wear safety goggles with side shields when cleaning parts using compressed air.
- Worn or damaged cables and chains are not reliable. Do not use these elements in lifting or towing operations.
- Use regulation safety equipment, such as approved eye protection, helmets, clothes, sleeves, and special footwear whenever you are welding. All individuals near the welding process must use regulation eye protection. NEVER LOOK AT THE WELDING ARC WITHOUT USING SUITABLE EYE PROTECTION.
- Never perform any repairs on the machine if there is someone in the operator seat, except when the person is a qualified operator who is helping with the service to be performed.
- Never run the machine or use accessories from a place other than the operator seat or next to the machine when operating the fender switches.
- Never perform any operations on the machine with the engine running, except when specifically instructed to do so. Shut down the engine and release all the pressure from the hydraulic circuits before removing covers, cases, valves etc.
- You must conduct all repair and maintenance operations with the utmost care and attention.
- Disconnect the batteries and put warning labels on all the controls to warn that the tractor is being repaired. Lock the machine and all the equipment that you remove.
- Never check or fill the fuel tank or batteries or use starting fluid when you are smoking or near a naked flame, because these fluids are flammable.
- The fuel filling gun must remain in contact with the filler neck. Maintain the contact until the fuel stops flowing into the tank in order to avoid sparks caused by static electricity build-up.
- To transport a faulty tractor, use a trailer or a low loader platform trolley, if available.
- To load and unload the machine from the mode of transport, choose a flat area that offers firm support for the wheels of the truck or trailer. Securely fasten the machine to the platform of the trailer or truck, in accordance with the transporter’s requirements.
- Always use hoist mechanisms with an appropriate capacity for lifting or moving heavy components.
- Chains must always be securely fastened. The fastening device must have sufficient capacity to support the intended load. It is prohibited for bystanders to be near the fastening position.
- The work area must always be CLEAN and DRY. Clean it immediately if any water or oil is spilled.
- Never use gasoline, diesel, or other flammable liquids for cleaning. Use only non-toxic solvents.
- Do not allow cloths soaked with oil or grease to accumulate because they can cause a fire risk. Always keep these cloths in a metal container.

STARTING

- Never run the engine in enclosed spaces that are not equipped with a suitable exhaust or gas extraction system.
- Never bring your head, body, arms, legs, feet, hands, or fingers close to fans or rotating belts.

ENGINE

- Always loosen the radiator cap slowly before removing it, in order to dissipate the system pressure. You must top up the coolant with the engine stopped.
- Do not fill up the fuel tank when the engine is running.
- Never adjust the fuel injection pump when the tractor is in motion.
- Never lubricate the tractor when the engine is running.

ELECTRICAL SYSTEMS

- If it is necessary to use auxiliary batteries, you must connect the cables on both sides as follows: (+) to (+) and (-) to (-). Avoid causing the terminals to short circuit. GAS RELEASED FROM BATTERIES IS HIGHLY FLAMMABLE. During charging, leave the battery compartment open to improve ventilation. Avoid sparks and naked flames near the battery. Do not smoke.
- Do not charge the batteries in enclosed spaces.
- Always disconnect the batteries before carrying out any type of servicing on the electrical system.

HYDRAULIC SYSTEM

- A little fluid coming out of a small bore could be almost invisible, but strong enough to penetrate the skin. For this reason, NEVER USE YOUR HANDS TO CHECK FOR LEAKS. Instead, use a piece of cardboard or timber. If any fluid penetrates your skin, seek medical assistance immediately. Failure to seek immediate medical assistance could result in serious infections or dermatitis.
- Always read the system pressure using suitable gauges.

WHEELS AND TIRES

- Make sure that the tires are correctly inflated at the pressure specified by the manufacturer. Inspect the rims and tires regularly for any damage.
- Remain next to the tire when filling it with air.
- Only check the pressure when the tractor has no load and the tires are cold, in order to prevent inaccurate readings caused by overpressure.
- Never cut or weld a rim with a full tire fitted.
- When removing wheels, lock both the front wheels and the rear wheels of the tractor. Lift the tractor and install stable and secure supports under the tractor, in accordance with the legislation in force.
- Deflate the tire before removing any objects that may be caught in the tire tread.
- Never inflate tires using flammable gases, as they could cause explosions and injure bystanders.

REMOVAL AND INSTALLATION

- Lift and handle all heavy components using hoist devices of appropriate capacity. You must suspend the parts using suitable hooks and slings. Use the hoist eyes provided for this purpose. Be careful if there are any bystanders near the hoisted load.

HEALTH AND SAFETY PRECAUTIONS

Many of the procedures involved in vehicle maintenance and repair services involve physical hazards and other health risks. This section is an alphabetical list of some of these hazardous procedures and the materials and equipment associated with them. It identifies the precautions necessary for avoiding these hazards.
The list is not comprehensive. You must take health and safety into account when carrying out all operations and procedures and when handling materials.

ACIDS AND ALKALIS

See Battery acids, e.g. caustic soda, sulfuric acid.
Used in batteries and cleaning materials.

Irritate and corrode the skin, eyes, nose, and throat. Causes burns.

Avoid splashing into your eyes and nose, or onto your skin and clothing. Wear suitable sleeves and protective goggles. Can destroy normal protective clothing. Do not inhale the fumes.
Soap and water must always be available in case of accidental splashing.

ADHESIVES AND SEALANTS

See Fire.
Highly flammable, flammable, combustible.
In general, you must store them in “No smoking” areas. You must take care as regards cleaning and organization during use, e.g. workbenches covered with paper towels; use applicators wherever possible; containers, including secondary containers, must be labeled.

Solvent-based adhesives/sealants

See Solvents.
Follow the manufacturer’s instructions.

Water-based adhesives/sealants

Those based on emulsions of polymers and reticular rubber could contain small quantities of harmful chemicals. You must avoid contact with the eyes and the skin, and ensure that there is adequate ventilation during use.
Follow the manufacturer’s instructions.

Resin-based adhesives/sealants

e.g. formaldehyde-based and epoxide-based.
These could release volatile, harmful, or toxic chemicals. You must therefore only mix them in well-ventilated areas.
Skin contact with uncured hardeners or resins could result in irritation, dermatitis, and the absorption of toxic or harmful chemicals through the skin. Splashes could cause eye injuries.
Ensure that there is adequate ventilation and avoid contact with the skin and the eyes. Follow the manufacturer’s instructions.

Anaerobic, cyanoacrylate, and other acrylic adhesives

Many cause irritation, sensitization, or harm to the skin. Some are eye irritants.
You must avoid contact with the eyes and the skin. Follow the manufacturer’s instructions.
Cyanoacrylate adhesives (super-glues) must not come into contact with the skin or the eyes. If your skin or eye tissue is glued, cover it with a wet compress and seek medical assistance. Do not attempt to pull apart glued tissue. Use in well-ventilated areas, because the fumes can irritate the nose and the eyes.
For dual coat systems, see Resin-based adhesives/sealants.

Isocyanate (polyurethane)-based adhesives/sealants

See Resin-based adhesives.
Individuals who suffer from asthma or respiratory allergies must not work with or be around these materials because they can cause sensitization reactions.
You should preferably perform spraying applications in a ventilated cab with an exhaust system removing the fumes and spray from the breathing area. Individuals who are working with spraying must use respirators with an air supply.

ANTI-FREEZE

See Fires, Solvents – e.g. isopropanol, ethanediol and methanol.
Highly flammable, flammable, combustible.
Used in vehicle cooling systems, air brake pressure systems, and screen cleaning solutions.
The fumes from coolant anti-freeze (glycol) only rise when heated.
Anti-freeze can be absorbed through the skin in toxic or harmful quantities. Ingesting anti-freeze can cause death and you must seek medical assistance immediately.

ARC WELDING

See Welding.

BATTERY ACIDS

See Acids and alkalis.

The gases released during charging are explosive.
Never allow naked flames or sparks near batteries that are charging or have recently been charged.

BRAKE AND CLUTCH FLUIDS (polyalkylene-glycol)

See Fire.
Combustible.
Splashes on the skin and in the eyes cause mild irritation.
Avoid contact with the eyes and the skin as far as possible.
The danger of fume inhalation does not increase at room temperature because of very low vapor pressure.

BRAZING

See Welding.

CHEMICALS – GENERAL

See Legal aspects.
You must always take care when using and handling chemicals such as solvents, sealants, adhesives, paints, foam resins, battery acids, anti-freeze, brake fluid, oils and greases. They may be harmful, toxic, corrosive, irritant, or highly flammable. They may also emit hazardous fumes or dust.
The effects of excessive exposure to chemicals may manifest themselves immediately of after a delay; they may be brief or permanent; they may be cumulative; they may be superficial; and they may cause a risk of death or reduce life expectancy.

DO

Remove chemicals from skin and clothing as soon as possible after contact. Change very dirty clothes and make provision for cleaning them.
Read and comply scrupulously with the safety recommendations on chemicals' containers (labels), and on the pamphlets, posters, or other instructions that accompany them. Manufacturers supply health and safety information sheets.
Organize working methods and protective equipment to prevent contact with the skin and the eyes; inhalation of fumes/aerosols/dust/smoke; incorrect container identification; and fire and explosion risks.
When working with chemicals, wash before breaks, and before eating, smoking, drinking, or using the bathroom.
Keep work areas clean, organized, and free of spillages.
Store according to local and national legislation.
Keep chemicals out of the reach of children.

DO NOT

Do not mix chemicals, except in accordance with the manufacturer's instructions. Some substances could form other chemical substances that are toxic or harmful, emit toxic or harmful fumes, or become explosive after mixing.
Do not spray chemicals, especially solvent-based chemicals, in enclosed spaces, e.g. when there are people inside the vehicle.
Do not apply heat or flames to chemicals, except in accordance with the manufacturer's instructions. Some are highly flammable or could release toxic or harmful fumes.
Do not leave containers open. The fumes emitted could accumulate in toxic, harmful, or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas, trenches etc.
Do not put chemicals into unmarked containers.
Do not clean your hands or clothes with chemicals. Chemicals, particularly solvents and fuels, dry out the skin and can cause irritation and dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.
Do not use empty containers to store other chemicals, except when they have been cleaned under supervision.
Do not attempt to sniff or inhale chemicals. Rapid exposure to high concentrations of fumes can be toxic or harmful.

Clutch fluids

See Brake and clutch fluids.

Clutch pads and linings

See Brake and clutch pads and linings.

ANTI-CORROSIVE PROTECTIVE MATERIAL

See Solvents, Fire.
Highly flammable, flammable.
These materials are varied and you must follow the manufacturers' instructions. They may contain solvents, resins, petroleum derivatives etc. You must avoid contact with the skin and the eyes. You must carry out spraying with adequate ventilation and never in enclosed spaces.

Sections

See Welding.

Wax removal

See Solvents and Fuels (kerosene).

DUST

Dust, powders, or clouds may be irritant, harmful, or toxic. Avoid inhaling the chemical powders or dusts that result from dry abrasion services. Use respiratory protection if ventilation is not adequate.

ELECTRIC SHOCK

Electric shocks result from using faulty electrical equipment or from using equipment that is in good condition incorrectly.
You must keep electrical equipment in good condition and test it frequently.
Check that wires, cables, sockets, and plugs are not worn, cracked, severed, broken, or damaged in any way.
Electrical equipment must be protected by a fuse with an appropriate nominal capacity.
Never use electrical equipment inappropriately and never use equipment that is faulty. The consequences could be fatal.
Use low-voltage equipment (**110 volt**) for work lights and inspection lights wherever possible.
Take care that the cables of mobile electrical equipment are not caught or damaged, for example in a motorized hoist.
Use pneumatic equipment instead of electrical equipment wherever possible.

In the event of electrocution:

- Turn off the electricity before approaching the victim
- If that is not possible, push or pull the victim away from the source of the electricity using a dry, non-conductive material
- Start resuscitation, if you are trained to do so
- SEEK MEDICAL ASSISTANCE

EXHAUST FUMES

These fumes contain asphyxiating, toxic, or harmful chemical substances, such as oxocarbons, aldehydes, aromatic hydrocarbons, and lead. You must only run engines in adequate extraction or general ventilation conditions, and never in enclosed spaces.

Gasoline engine

The warning properties of odor and irritation may not alert the user in time, before the immediate or subsequent toxic or harmful effects have appeared.

Diesel Engine

Soot, discomfort, and irritation generally warn of hazardous concentrations of fumes.

FIBER INSULATION

See Dust.
Used for soundproofing.
The fibrous nature of cut surfaces and edges can cause skin irritation. In general, the effect is physical and not chemical.
You must take precautions to avoid excessive skin contact. Take care when organizing your work methods. Wear sleeves.

FIRE

See Welding, Foams, and Legal aspects.
Many materials relating to vehicle repair are highly flammable. Some release toxic or harmful fumes when burned.
Scrupulously obverse the fire prevention safety recommendations when storing and handling flammable materials or solvents, particularly in the vicinity of electrical equipment or welding processes.
Before using any electrical or welding equipment, check that there is no fire risk.
Always keep a suitable fire extinguisher close by when using welding or heating equipment.

FIRST AID

In addition to complying with legal requirements, it is always advisable for someone in the workshop to be trained in first aid procedures.
You must flush splashes in the eyes with clean running water for at least ten minutes.
You must wash contaminated skin with soap and water.
You must take individuals who have inhaled harmful fumes into the fresh air immediately.
If someone has ingested the substance or if the effects persist, consult a doctor with the information (label) on the material used.
Do not induce vomiting (except where indicated by the manufacturer).

FOAMS – polyurethane

See Fire.
Used for soundproofing. Cured foams used in seat cushions and finishes.
Follow the manufacturer's instructions.
Components that have not reacted are irritants and could be harmful to the eyes and the skin. Wear sleeves and protective goggles.
Individuals with chronic respiratory illnesses, asthma, bronchial problems, or a history of allergic illnesses must not work with or be in proximity to uncured materials.
Components, fumes, and aerosol clouds can cause irritation and sensitization reactions, and may be toxic or harmful.
You must not breathe in fumes or aerosol clouds. You must apply these materials with adequate respiratory protection and adequate ventilation. Do not remove the respirator when you have finished spraying, but keep it on until the fumes and clouds disperse.
Burning uncured components and cured foams can generate toxic and harmful fumes.
Do not permit smoking, the presence of naked flames, or the use of electrical equipment during the application of foam, and until the fumes/clouds have dispersed.
You must hot cut cured or partially cured foams in an environment with a ventilation system with extraction (see Section 44 Legal and safety aspects).

Fuels

See Fire, Legal aspects, Chemicals – general, and Solvents.
Used as fuels and cleaning materials.

Gasolene (Petrol).

Highly flammable.
Ingestion can cause irritation to the mouth and throat, and absorption by the stomach can cause dizziness and loss of consciousness. Small amounts can be fatal to children. Breathing liquid into the lungs – e.g. by vomiting – is a serious risk.
Prolonged or recurrent contact with gasoline dries out the skin and causes irritation and dermatitis. Getting the liquid in the eyes causes severe pain.

Gasoline for engines may contain a considerable quantity of benzene, which is toxic if inhaled. You must keep concentrations of gasoline fumes low. High concentrations cause eye, nose, and throat irritation, nausea, headaches, depression, and symptoms of intoxication. Very high concentrations result in rapid loss of consciousness.
Ensure that there is adequate ventilation when handling and using gasoline. Be extremely careful to avoid the serious consequences of inhalation if fumes have accumulated as a result of spillages in enclosed spaces.
Special precautions are necessary when cleaning and maintaining gasoline storage tanks.
You must not use gasoline as a cleaning material. You must not transfer gasoline from one container to another by making a siphon with your mouth.

Kerosene (Paraffin)

Used as a fuel for heating, a solvent, and a cleaning material.
Flammable.
Ingesting kerosene can cause irritation to the mouth and throat. The greatest danger from ingesting kerosene is the possibility of breathing it into the lungs. Liquid contact dries the skin and can cause irritation or dermatitis. Splashes on the skin and in the eyes cause mild irritation.
Its volatility is low under normal conditions and it does not release harmful fumes. You must avoid exposure to kerosene fumes and clouds at high temperatures (fumes may be released during wax removal processes).
Avoid contact with the eyes and the skin as far as possible and ensure that there is adequate ventilation.

Fuel oil (diesel fuel)

See Fuels (kerosene).
Combustible.
When the quantities are large or the exposure period is long, skin contact with fuel oils with a high boiling point can cause serious skin diseases, including skin cancer.

GAS CYLINDERS

See Fire.
In general, gases, such as oxygen, carbon dioxide, argon, and propane, are stored in cylinders with pressures of up to **140 bar** (**2000 lb/in2**). You need to take sufficient care when handling them to prevent physical damage to the cylinders and the valve accessories. The content of each cylinder must be clearly identified with suitable labels.
You must store the cylinders in a well-ventilated room, protected from ice, rain, and direct sunlight. You must not store combustible gases (e.g. acetylene and propane) near to oxygen cylinders.
Be careful to prevent leaks from the cylinders and the gas lines, and to avoid ignition sources.
Only qualified personnel may perform services using the cylinders.

Gases

See Gas cylinders.

Gas shielded welding

See Welding.

Gas welding

See Welding.

GENERAL WORKSHOP EQUIPMENT AND TOOLS

You must keep all equipment and tools in good condition and you must use the correct safety equipment whenever necessary.
Never use tools or equipment for any purpose other than that for which they are intended.
Never overload equipment such as hoists, jacks, chassis bases and axles, or hoisting slings. The damage caused by overloading does not always appear immediately and could cause a fatal accident the next time that the equipment is used.
Do not use faulty or damaged equipment or tools, particularly high-speed equipment, such as emery wheels. A damaged emery wheel can disintegrate suddenly and cause serious injury.
Use protective goggles whenever you use equipment for grinding, cutting, polishing, or sandblasting.

Wear a respirator when using sandblasting equipment, working with asbestos-based materials, or using spraying equipment.

Glues

See Adhesives and sealants.

Oil test equipment, lubrication test equipment, and high-pressure air test equipment, in accordance with local legislation

See Lubricants and greases.
Always keep high-pressure equipment in good condition and carry out regular maintenance, particularly on connections and fittings.
Never point a high-pressure nozzle at the skin because the fluid can penetrate the subcutaneous tissue etc. and cause serious injury.

LEGAL ASPECTS

Various laws and regulations lay down the health and safety requirements for working with materials and equipment in workshops. Always observe the regulations and laws in force in the country in which you are working.
Workshops must have detailed knowledge of the relevant regulations and laws. Consult the local supervisory authorities or related government bodies if you are in any doubt.

LUBRICANTS AND GREASES

Avoid prolonged or recurrent contact with mineral oils, particularly used oils. In general, used oils contaminated during maintenance (e.g. reservoir oils from routine changes) are more irritating and have more serious effects, including skin cancer if contact is extensive and prolonged.
Thoroughly wash the skin after tasks using oil. Exclusive hand washers can be very useful because they are removed with water. Do not use gasoline, paraffin, or other solvents to remove oil from the skin.
Lubricants and greases can cause mild eye irritation.
You must avoid repeated or prolonged skin contact by wearing protective clothing where necessary. You must take particular care with used greases and oils that contain lead. Do not allow your work clothes to become contaminated with oil. Wash or dry clean work clothes regularly. Discard oil-soaked shoes.
Do not use used engine oil as a lubricant or for applications where it might come into contact with the skin. You may only discard used oil in accordance with local legislation.

Soundproofing materials

See Foams and Fiber insulation.

PAINTS

See Solvents and Chemicals – general.
Highly flammable, flammable.
One package. May contain pigments, drying agents, and other harmful or toxic components, as well as solvents. There must be adequate ventilation when you are spraying.
Two packages. May also contain unreacted resins and resin hardening agents that are toxic and harmful. You must observe the manufacturers' instructions. See also Section 5 on resin-based adhesives, isocyanate-based adhesives, and foams.
You should preferably perform spraying applications in a ventilated cab with an exhaust system removing the fumes and spray from the breathing area. Individuals working in cabs must use respiratory protection. Personnel carrying out small-scale repair work must use respirators with an air supply.

Paint solvents

See Solvents.

Gasolene (Petrol).

See Fuels (gasoline).

Pressurized equipment

See Oil test equipment, lubrication test equipment, and high-pressure air test equipment.

Resistance welding

See Welding.

Sealants

See Adhesives and sealants.

SOLDERING

See Welding.
Solders are mixtures of metals whose melting point is lower than that of the constituent metals (normally lead and tin). Applying solder generally does not release toxic lead fumes, since a gas/air flame is used. You must not use oxy-acetylene flames because they are much hotter and cause lead smoke to be released.
Smoke may be produced when you apply any flame to surfaces covered in grease etc. It is recommended that you avoid inhalation.
You must remove excess solder carefully so as not to produce a fine lead dust, which has toxic effects if inhaled. You may need to use respiratory protection.
You must collect solder spillage and filing in order to prevent general contamination of the air with lead.
High hygiene standards are necessary to prevent ingestion of lead and inhalation of solder dust from clothes.

SOLVENTS

See Chemicals – General. See Fire.
Examples: acetone, turpentine, toluene, xylene, and trichloroethylene.
Used in materials for cleaning and wax removal, paints, plastics, resins, thinners etc.
Highly flammable, flammable.
Contact dries out the skin, and prolonged or recurrent contact can cause irritation and dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.
Splashes into the eyes can cause serious irritation and even lead to blindness.
Brief exposure to high concentrations of fumes or clouds can cause throat irritation, dizziness, headaches, and, in the worst cases, unconsciousness.
Recurrent or prolonged exposure to large quantities, but with lower-concentration fumes or clouds, where the warning signs are insufficient, could cause effects that are toxic or more seriously harmful.
Inhalation into the lungs (e.g. by vomiting) is the most serious consequence of ingestion.
Avoid splashing into your eyes and nose, or onto your skin and clothing. Wear protective sleeves, protective goggles, and protective clothing, if necessary.
Ensure that there is good ventilation during use, avoid inhaling smoke, fumes, and spray clouds, and keep containers securely closed. Do not use in enclosed spaces.
When the spraying material contains solvents – e.g. paints, adhesives, coatings – use an extractor fan or personal respiratory protection in the absence of adequate general ventilation.
Do not apply heat or flame, except in accordance with specific and detailed instructions from the manufacturer.

Soundproofing

See Fiber insulation and Foams.

Spot welding

See Welding.

SUSPENDED LOADS

There is always danger when loads are lifted or hoisted. Never work underneath a suspended load or a lifted load without support, e.g. vehicle lifted up with a service jack, suspended engine etc.
Lifting equipment such as jacks, hoists, axle supports, slings etc. must always be suitable for the work, be in good condition and undergo regular maintenance.

Never improvise a hoist mechanism.

Lower protective sheath

See Anti-corrosive protection.

WELDING

See Gas cylinders, Fire, and Electric shock.
Welding processes include resistance welding (spot welding??), arc welding, and gas welding.

Resistance welding

This process can throw out molten metal particles at high speed, so you must protect your eyes and skin.

Arc welding

This process emits a high level of ultraviolet radiation that can burn the eyes and skin of the welder and of other people nearby. Gas-protected welding processes are particularly dangerous in this respect. Personal protection is mandatory. Barriers to protect other people are also necessary.
You also need to use suitable eye and skin protection because of metal splashes.
The heat of arc welding will produce gases and fumes from the metals that are being melted, and from the coatings applied to or contamination on the worked surfaces. These gases and fumes may be toxic and you must avoid inhaling them. You may need to use ventilation with extraction to remove smoke from the work area, particularly in cases where there is not enough general ventilation or in places where a considerable amount of welding is expected to take place. In extreme cases, where adequate ventilation cannot be guaranteed, you may need to use respirators with an air supply.

Gas welding

You can use oxy-acetylene torches for welding and cutting. You need to take particular care to prevent gas leaks and the resulting risk of fire and explosion.
You must use skin and eye protection because the process produces metal splashes.
The flame is very bright, so you must use eye protection. Far less ultraviolet light is emitted than with arc welding, so you can use lighter filters.
The process itself releases little toxic smoke. However, toxic smoke and gases may be released from coatings on the service area, especially during cutting of damaged parts. You must therefore avoid inhaling this smoke.
In brazing, toxic fumes may be released by the brazing rod. The risk is fairly serious when you use rods containing cadmium. In this specific case, you must take particular care to avoid inhaling the fumes. If you do inhale fumes, you will need to consult a specialist.
YOU MUST TAKE SPECIAL PRECAUTIONS BEFORE WELDING OR CUTTING CONTAINERS HOLDING COMBUSTIBLE MATERIALS, E.G. BOILING OR RELEASE OF FUMES FROM FUEL TANKS.

Turpentine

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. In general, agricultural consultants will be able to help.

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 accordance with local legislation and the available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. Do not allow them to enter the soil. They must be collected and disposed of safely.
6. Do not open the air conditioning system. It contains gases that 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

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine safety signs, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine damage or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine damage or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules - Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

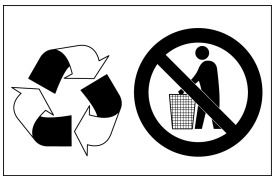
Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- The air-conditioning system contains gases that should not be released into the atmosphere. Consult an air-conditioning specialist or use a special extractor to recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. NEW HOLLAND strongly recommends that you return all used batteries to a NEW HOLLAND dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

Basic instructions - Shop and assembly

Shimming

For each adjustment operation, select adjusting shims and measure the adjusting shims individually 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 shown on each shim.

Rotating shaft seals

For correct rotating shaft seal installation, proceed as follows:

1. Before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes.
2. Thoroughly clean the shaft and check that the working surface on the shaft is not damaged.
3. Position the sealing lip facing the fluid.

   NOTE: *With hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will move the fluid towards the inner side of the seal.*
4. 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.
5. 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.
6. While you insert the seal, check that the seal is perpendicular to the seat. When the seal settles, make sure that the seal makes contact with the thrust element, if required.
7. To prevent damage to the seal lip on the shaft, position a protective guard during installation operations.

O-ring seals

Lubricate the O-ring seals before you insert them in the seats. This will prevent the O-ring seals from overturning and twisting, which would jeopardize sealing efficiency.

Sealing compounds

Apply a sealing compound on the mating surfaces when specified by the procedure. Before you apply the sealing compound, prepare the surfaces as directed by the product container.

Spare parts

Only use CNH Original Parts or NEW HOLLAND Original 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 Original Parts can offer this guarantee.

When ordering spare parts, always provide the following information:

- Machine model (commercial name) and Product Identification Number (PIN)
- Part number of the ordered part, which can be found in the parts catalog

Protecting the electronic and/or electrical systems during charging and welding

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

1. Never make or break any of the charging circuit connections when the engine is running, including the battery connections.
2. Never short any of the charging components to ground.
3. Always disconnect the ground cable from the battery before arc welding on the machine or on any machine attachment.
   - Position the welder ground clamp as close to the welding area as possible.
   - If you weld in close proximity to a computer module, then you should remove the module from the machine.
   - Never allow welding cables to lie on, near, or across any electrical wiring or electronic component while you weld.
4. Always disconnect the negative cable from the battery when charging the battery in the machine with a battery charger.

   NOTICE: *If you must weld on the unit, you must disconnect the battery ground cable from the machine battery. The electronic monitoring system and charging system will be damaged if this is not done.*
5. Remove the battery ground cable. Reconnect the cable when you complete welding.

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

Special tools

The special tools that NEW HOLLAND suggests and illustrate in this manual have been specifically researched and designed for use with NEW HOLLAND machines. The special tools are essential for reliable repair operations. The special tools are accurately built and rigorously tested 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

Torque - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.2 N·m (19 lb in)	2.9 N·m (26 lb in)	3.2 N·m (28 lb in)	4.2 N·m (37 lb in)	2 N·m (18 lb in)	2.9 N·m (26 lb in)
M5	4.5 N·m (40 lb in)	5.9 N·m (52 lb in)	6.4 N·m (57 lb in)	8.5 N·m (75 lb in)	4 N·m (36 lb in)	5.8 N·m (51 lb in)
M6	7.5 N·m (66 lb in)	10 N·m (89 lb in)	11 N·m (96 lb in)	15 N·m (128 lb in)	6.8 N·m (60 lb in)	10 N·m (89 lb in)
M8	18 N·m (163 lb in)	25 N·m (217 lb in)	26 N·m (234 lb in)	35 N·m (311 lb in)	17 N·m (151 lb in)	24 N·m (212 lb in)
M10	37 N·m (27 lb ft)	49 N·m (36 lb ft)	52 N·m (38 lb ft)	70 N·m (51 lb ft)	33 N·m (25 lb ft)	48 N·m (35 lb ft)
M12	64 N·m (47 lb ft)	85 N·m (63 lb ft)	91 N·m (67 lb ft)	121 N·m (90 lb ft)	58 N·m (43 lb ft)	83 N·m (61 lb ft)
M16	158 N·m (116 lb ft)	210 N·m (155 lb ft)	225 N·m (166 lb ft)	301 N·m (222 lb ft)	143 N·m (106 lb ft)	205 N·m (151 lb ft)
M20	319 N·m (235 lb ft)	425 N·m (313 lb ft)	440 N·m (325 lb ft)	587 N·m (433 lb ft)	290 N·m (214 lb ft)	400 N·m (295 lb ft)
M24	551 N·m (410 lb ft)	735 N·m (500 lb ft)	762 N·m (560 lb ft)	1016 N·m (750 lb ft)	501 N·m (370 lb ft)	693 N·m (510 lb ft)

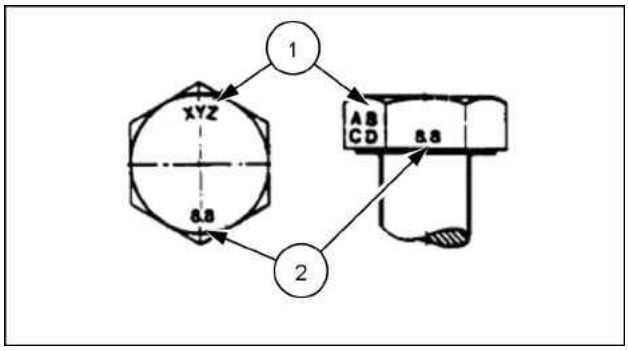
NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

METRIC FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.4 N·m (21 lb in)	3.2 N·m (28 lb in)	3.5 N·m (31 lb in)	4.6 N·m (41 lb in)	2.2 N·m (19 lb in)	3.1 N·m (27 lb in)
M5	4.9 N·m (43 lb in)	6.5 N·m (58 lb in)	7.0 N·m (62 lb in)	9.4 N·m (83 lb in)	4.4 N·m (39 lb in)	6.4 N·m (57 lb in)
M6	8.3 N·m (73 lb in)	11 N·m (96 lb in)	12 N·m (105 lb in)	16 N·m (141 lb in)	7.5 N·m (66 lb in)	11 N·m (96 lb in)
M8	20 N·m (179 lb in)	27 N·m (240 lb in)	29 N·m (257 lb in)	39 N·m (343 lb in)	18 N·m (163 lb in)	27 N·m (240 lb in)
M10	40 N·m (30 lb ft)	54 N·m (40 lb ft)	57 N·m (42 lb ft)	77 N·m (56 lb ft)	37 N·m (27 lb ft)	53 N·m (39 lb ft)
M12	70 N·m (52 lb ft)	93 N·m (69 lb ft)	100 N·m (74 lb ft)	134 N·m (98 lb ft)	63 N·m (47 lb ft)	91 N·m (67 lb ft)
M16	174 N·m (128 lb ft)	231 N·m (171 lb ft)	248 N·m (183 lb ft)	331 N·m (244 lb ft)	158 N·m (116 lb ft)	226 N·m (167 lb ft)
M20	350 N·m (259 lb ft)	467 N·m (345 lb ft)	484 N·m (357 lb ft)	645 N·m (476 lb ft)	318 N·m (235 lb ft)	440 N·m (325 lb ft)
M24	607 N·m (447 lb ft)	809 N·m (597 lb ft)	838 N·m (618 lb ft)	1118 N·m (824 lb ft)	552 N·m (407 lb ft)	

IDENTIFICATION

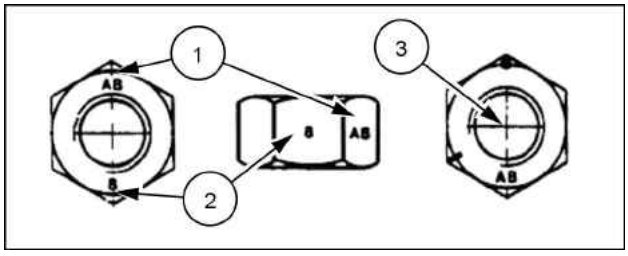
Metric Hex head and carriage bolts, classes 5.6 and up



20083680 1

1. Manufacturer's Identification
2. Property Class

Metric Hex nuts and locknuts, classes 05 and up



20083681 2

1. Manufacturer's Identification
2. Property Class
3. Clock Marking of Property Class and Manufacturer's Identification (Optional), i.e. marks **60°** apart indicate Class 10 properties, and marks **120°** apart indicate Class 8.

INCH NON-FLANGED HARDWARE

NOMINAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrB W/ Gr5 BOLT	LOCKNUT GrC W/ Gr8 BOLT
	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	**8 N·m (71 lb in)**	**11 N·m (97 lb in)**	**12 N·m (106 lb in)**	**16 N·m (142 lb in)**	**8.5 N·m (75 lb in)**	**12.2 N·m (109 lb in)**
5/16	**17 N·m (150 lb in)**	**23 N·m (204 lb in)**	**24 N·m (212 lb in)**	**32 N·m (283 lb in)**	**17.5 N·m (155 lb in)**	**25 N·m (220 lb in)**
3/8	**30 N·m (22 lb ft)**	**40 N·m (30 lb ft)**	**43 N·m (31 lb ft)**	**57 N·m (42 lb ft)**	**31 N·m (23 lb ft)**	**44 N·m (33 lb ft)**
7/16	**48 N·m (36 lb ft)**	**65 N·m (48 lb ft)**	**68 N·m (50 lb ft)**	**91 N·m (67 lb ft)**	**50 N·m (37 lb ft)**	**71 N·m (53 lb ft)**
1/2	**74 N·m (54 lb ft)**	**98 N·m (73 lb ft)**	**104 N·m (77 lb ft)**	**139 N·m (103 lb ft)**	**76 N·m (56 lb ft)**	**108 N·m (80 lb ft)**
9/16	**107 N·m (79 lb ft)**	**142 N·m (105 lb ft)**	**150 N·m (111 lb ft)**	**201 N·m (148 lb ft)**	**111 N·m (82 lb ft)**	**156 N·m (115 lb ft)**
5/8	**147 N·m (108 lb ft)**	**196 N·m (145 lb ft)**	**208 N·m (153 lb ft)**	**277 N·m (204 lb ft)**	**153 N·m (113 lb ft)**	**215 N·m (159 lb ft)**
3/4	**261 N·m (193 lb ft)**	**348 N·m (257 lb ft)**	**369 N·m (272 lb ft)**	**491 N·m (362 lb ft)**	**271 N·m (200 lb ft)**	**383 N·m (282 lb ft)**
7/8	**420 N·m (310 lb ft)**	**561 N·m (413 lb ft)**	**594 N·m (438 lb ft)**	**791 N·m (584 lb ft)**	**437 N·m (323 lb ft)**	**617 N·m (455 lb ft)**
1	**630 N·m (465 lb ft)**	**841 N·m (620 lb ft)**	**890 N·m (656 lb ft)**	**1187 N·m (875 lb ft)**	**654 N·m (483 lb ft)**	**924 N·m (681 lb ft)**

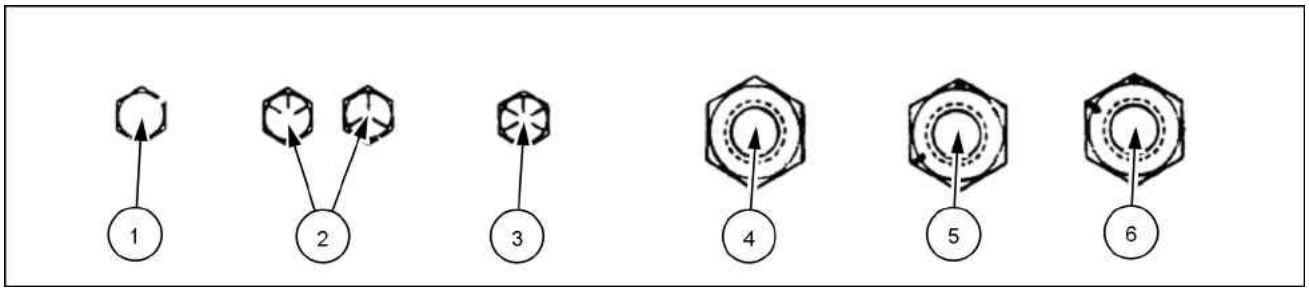
NOTE: *For Imperial Units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*

INCH FLANGED HARDWARE

NOM-INAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrF W/ Gr5 BOLT	LOCKNUT GrG W/ Gr8 BOLT
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	9 N·m (80 lb in)	12 N·m (106 lb in)	13 N·m (115 lb in)	17 N·m (150 lb in)	8 N·m (71 lb in)	12 N·m (106 lb in)
5/16	19 N·m (168 lb in)	25 N·m (221 lb in)	26 N·m (230 lb in)	35 N·m (310 lb in)	17 N·m (150 lb in)	24 N·m (212 lb in)
3/8	33 N·m (25 lb ft)	44 N·m (33 lb ft)	47 N·m (35 lb ft)	63 N·m (46 lb ft)	30 N·m (22 lb ft)	43 N·m (32 lb ft)
7/16	53 N·m (39 lb ft)	71 N·m (52 lb ft)	75 N·m (55 lb ft)	100 N·m (74 lb ft)	48 N·m (35 lb ft)	68 N·m (50 lb ft)
1/2	81 N·m (60 lb ft)	108 N·m (80 lb ft)	115 N·m (85 lb ft)	153 N·m (113 lb ft)	74 N·m (55 lb ft)	104 N·m (77 lb ft)
9/16	117 N·m (86 lb ft)	156 N·m (115 lb ft)	165 N·m (122 lb ft)	221 N·m (163 lb ft)	106 N·m (78 lb ft)	157 N·m (116 lb ft)
5/8	162 N·m (119 lb ft)	216 N·m (159 lb ft)	228 N·m (168 lb ft)	304 N·m (225 lb ft)	147 N·m (108 lb ft)	207 N·m (153 lb ft)
3/4	287 N·m (212 lb ft)	383 N·m (282 lb ft)	405 N·m (299 lb ft)	541 N·m (399 lb ft)	261 N·m (193 lb ft)	369 N·m (272 lb ft)
7/8	462 N·m (341 lb ft)	617 N·m (455 lb ft)	653 N·m (482 lb ft)	871 N·m (642 lb ft)	421 N·m (311 lb ft)	594 N·m (438 lb ft)
1	693 N·m (512 lb ft)	925 N·m (682 lb ft)	979 N·m (722 lb ft)	1305 N·m (963 lb ft)	631 N·m (465 lb ft)	890 N·m (656 lb ft)

IDENTIFICATION

Inch Bolts and free-spinning nuts

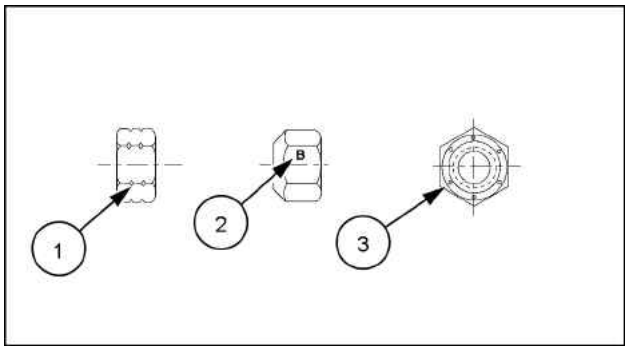


20083682 3

Grade Marking Examples

SAE Grade Identification			
1	Grade 2 - No Marks	4	Grade 2 Nut - No Marks
2	Grade 5 - Three Marks	5	Grade 5 Nut - Marks **120°** Apart
3	Grade 8 - Five Marks	6	Grade 8 Nut - Marks **60°** Apart

Inch Lock Nuts, All Metal (Three optional methods)



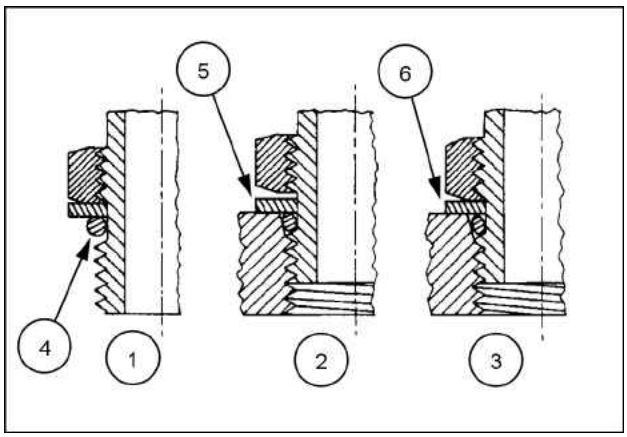
20090268 4

Grade Identification

Grade	Corner Marking Method (1)	Flats Marking Method (2)	Clock Marking Method (3)
Grade A	No Notches	No Mark	No Marks
Grade B	One Circumferential Notch	Letter B	Three Marks
Grade C	Two Circumferential Notches	Letter C	Six Marks

Torque - Standard torque data for hydraulics

Installation of adjustable fittings in straight thread O-ring bosses



23085659 1

1. Lubricate the O-ring by coating it with a light oil or petroleum. Install the O-ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove **(4)**.
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss **(5)**.

   NOTE: *Do not over tighten and distort the metal backup washer.*
3. Position the fitting by turning out (counterclockwise) 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 **(6)**.

Standard torque data for hydraulic tubes and fittings

Tube nuts for 37° flared fittings				O-ring boss plugs adjustable fitting locknuts, swivel JIC-37° seats
Size	**Tubing OD**	**Thread size**	**Torque**	**Torque**
4	**6.4 mm** (**1/4 in**)	7/16-20	**12 – 16 N·m** (**9 – 12 lb ft**)	**8 – 14 N·m** (**6 – 10 lb ft**)
5	**7.9 mm** (**5/16 in**)	1/2-20	**16 – 20 N·m** (**12 – 15 lb ft**)	**14 – 20 N·m** (**10 – 15 lb ft**)
6	**9.5 mm** (**3/8 in**)	9/16-18	**29 – 33 N·m** (**21 – 24 lb ft**)	**20 – 27 N·m** (**15 – 20 lb ft**)
8	**12.7 mm** (**1/2 in**)	3/4-16	**47 – 54 N·m** (**35 – 40 lb ft**)	**34 – 41 N·m** (**25 – 30 lb ft**)
10	**15.9 mm** (**5/8 in**)	7/8-14	**72 – 79 N·m** (**53 – 58 lb ft**)	**47 – 54 N·m** (**35 – 40 lb ft**)
12	**19.1 mm** (**3/4 in**)	1-1/16-12	**104 – 111 N·m** (**77 – 82 lb ft**)	**81 – 95 N·m** (**60 – 70 lb ft**)
14	**22.2 mm** (**7/8 in**)	1-3/16-12	**122 – 136 N·m** (**90 – 100 lb ft**)	**95 – 109 N·m** (**70 – 80 lb ft**)
16	**25.4 mm** (**1 in**)	1-5/16-12	**149 – 163 N·m** (**110 – 120 lb ft**)	**108 – 122 N·m** (**80 – 90 lb ft**)
20	**31.8 mm** (**1-1/4 in**)	1-5/8-12	**190 – 204 N·m** (**140 – 150 lb ft**)	**129 – 158 N·m** (**95 – 115 lb ft**)
24	**38.1 mm** (**1-1/2 in**)	1-7/8-12	**217 – 237 N·m** (**160 – 175 lb ft**)	**163 – 190 N·m** (**120 – 140 lb ft**)
32	**50.8 mm** (**2 in**)	2-1/2-12	**305 – 325 N·m** (**225 – 240 lb ft**)	**339 – 407 N·m** (**250 – 300 lb ft**)

These torques are not recommended for tubes of **12.7 mm** (**1/2 in**) OD and larger with wall thickness of **0.889 mm** (**0.035 in**) or less. The torque is specified for **0.889 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 clean solvent or Loctite cleaner and apply hydraulic sealant **LOCTITE® 569™** to the **37°** flare and the threads.

Install fitting and torque to specified torque, loosen fitting and retorque to specifications.

Pipe thread fitting torque

Before installing and tightening pipe fittings, clean the threads with a clean solvent or Loctite cleaner and apply sealant **LOCTITE® 567™ PST PIPE SEALANT** for all fittings including stainless steel or **LOCTITE® 565™ PST** for most metal fittings. For high filtration/zero contamination systems use **LOCTITE® 545™**.

Thread size	Torque (maximum)
1/8-27	**13 N·m** (**10 lb ft**)
1/4-18	**16 N·m** (**12 lb ft**)
3/8-18	**22 N·m** (**16 lb ft**)
1/2-14	**41 N·m** (**30 lb ft**)
3/4-14	**54 N·m** (**40 lb ft**)

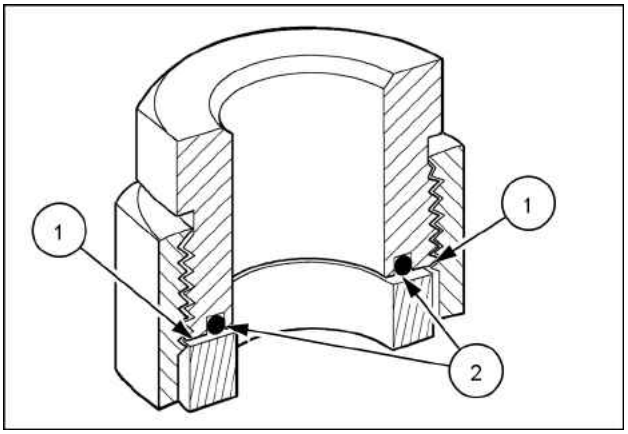
Installation of ORFS (O-Ring Flat Seal fittings)

When installing ORFS fittings thoroughly clean both flat surfaces of the fittings **(1)** and lubricate the O-ring **(2)** with light oil. Make sure both surfaces are aligned properly. Torque the fitting to specified torque listed throughout the repair manual.

NOTICE: *If the fitting surfaces are not properly cleaned, the O-ring will not seal properly. If the fitting surfaces are not properly aligned, the fittings may be damaged and will not seal properly.*

NOTICE: *Always use genuine factory replacement oils and filters to ensure proper lubrication and filtration of engine and hydraulic system oils.*

The use of proper oils, grease, and keeping the hydraulic system clean will extend machine and component life.



50011183 2

Consumables

System	Volume	Recommended fluid	International specification
Motor			
– Mechanical engine	**17 L** (**4 US gal**)	**NEW HOLLAND AMBRA MASTERGOLD™ HSP ENGINE OIL SAE 10W-30** **NEW HOLLAND AMBRA MASTERGOLD™ HSP ENGINE OIL SAE 15W-40**	ACEA E7/E5 API CI-4/CH-4 CES 20078/77/76/72
– Electronic engine	**19 L** (**5 US gal**)		
Oil from the transmission, rear axle, hydraulic system (models with Semi-Powershift transmission)			
– Maximum level	**82 L** (**22 US gal**)	**NEW HOLLAND AMBRA MULTI G™ HYDRAULIC TRANSMISSION OIL**	SAE 10W-30 API GL4 ISO VG32/46 MAT 3525
– Extra volume (*)	**100 L** (**26 US gal**)		
Oil from the transmission, rear axle, hydraulic system (models with mechanical transmission)			
	68 L (**18 US gal**)	**NEW HOLLAND AMBRA MULTI G™ HYDRAULIC TRANSMISSION OIL**	SAE 10W-30 API GL4 ISO VG32/46
Front axle			
– Central housing (conventional axle)	**11 L** (**3 US gal**)	**NEW HOLLAND AMBRA MULTI G™ HYDRAULIC TRANSMISSION OIL**	SAE 10W-30 API GL4, ISO VG32/46 MAT 3525
Sugar cane axle – Central housing	**17.5 L** (**4.6 US gal**)		
Sugar cane axle – Central housing extension (per unit)	**2.7 L** (**0.7 US gal**)		
– Hubs (per unit)	**2.2 L** (**0.6 US gal**)		
Coolant	**22 L** (**6 US gal**)	**NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT** mixed with 50% de água	Etilenoglicol
Air-conditioning compressor oil	As required	Óleo de baixa viscosidade SP10	PAG-E13 Viscosidade ISO100
Grease and bearing housings	As required	**NEW HOLLAND AMBRA GR-9 MULTI-PURPOSE GREASE**	NLGI2, Li-Ca
Main fuel reservoir	**209 L** (**55 US gal**)	Diesel oil or Biodiesel B (B5) - Brazil	-
Auxiliary fuel reservoir	**105 L** (**28 US gal**)		
Air-conditioning compressor oil	As required	SP10 low-viscosity oil	PAG-E13 ISO100 viscosity
Brake fluid (models with Semi-Powershift transmission)	As required	**NEW HOLLAND AMBRA BRAKE LHM**	-
Brake and clutch fluid (models with mechanical transmission)			

* Extra level only if the implement uses the tractor oil.

NOTE: *Always check that the implement does not use more oil than is available in the tractor. The transmission should have at least the minimum oil level in order to operate.*

A list of the oils and lubricants recommended for your machine is available on a decal fixed to the left-hand side of the engine water radiator. Contact your NEW HOLLAND dealer to get a new decal if it is damaged or illegible.

CUIL13TR01062AA 1

CONSUMABLES INDEX

SERVICE MANUAL

Engine

T7.150 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.150 PIN HCCZ, Without cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, Without cab, Tier 0, Exported, 15x12

Contents

Engine - 10

CONSUMABLES INDEX

Consumable	Reference	PAGE
NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT	Engine cooling system - Filling	10.3 / 5

Engine - 10

Fuel tanks - 216

T7.150 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.150 PIN HCCZ, Without cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, With cab, Tier 0, Exported, 15x12
T7.180 PIN HCCZ, Without cab, Tier 0, Exported, 15x12

Contents

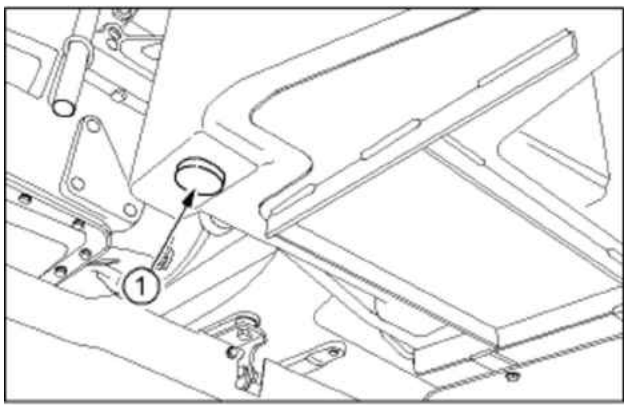
Engine - 10

Fuel tanks - 216

SERVICE

Fuel tank - Drain fluid

1. Park the machine on a level and hard surface.
2. Place a suitably sized container under the component.
3. Remove the plug **(1)** to drain the fluid.
4. Dispose of the collected fluid in an appropriate manner. Adhere to the legislation in effect in your region or country.



BRAG12TRLUE0562 1

Fuel tank - Remove

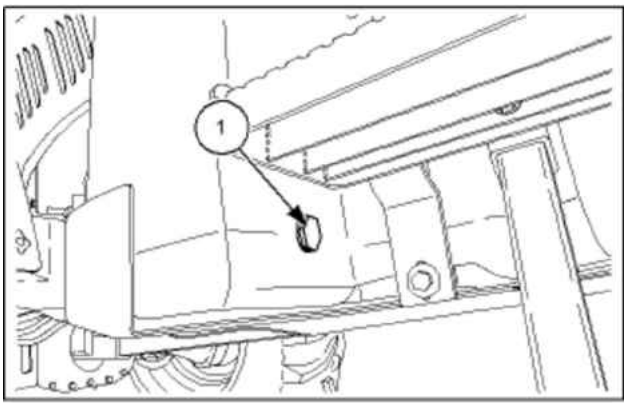
⚠ WARNING

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 could result in death or serious injury.

W0398A

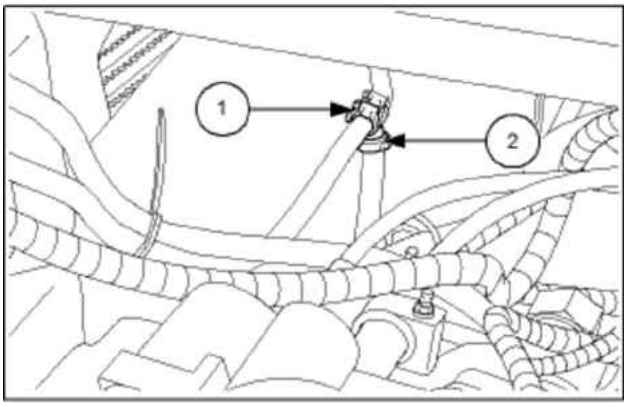
1. Place a container under the fuel tank drain plug. Remove the plug **(1)** to drain all the fuel. Reinstall plug **(1)**.

NOTE: *See the procedure for draining the auxiliary fuel tank in* ***Auxiliary fuel tank - Remove (10.216)****.*



BRAG12TRLUE1333 1

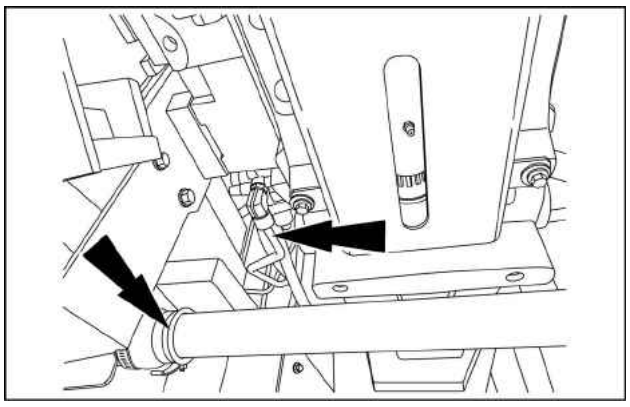
2. Loosen clamps **(1)** and **(2)**. Disconnect the fuel tank breather hoses.



BRAG12TRLUE1337 2

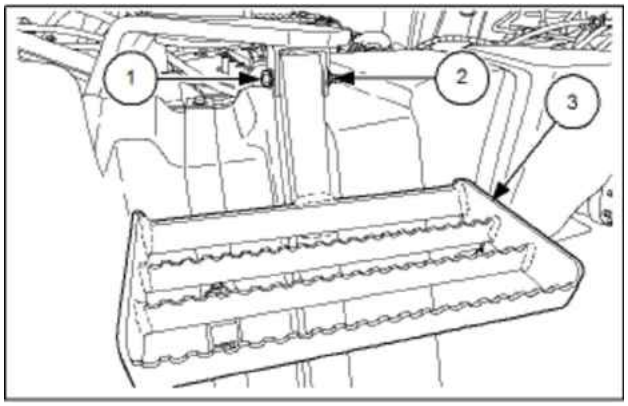
3. Release the clamp. Disconnect the fuel transfer hose from the auxiliary fuel tank. Loosen the hose clamp on the main fuel tank.

NOTE: *Clean all of the components before performing this procedure. This will reduce the contamination risk.*



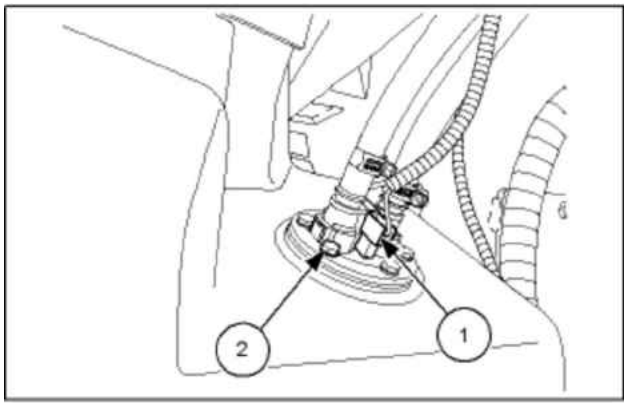
CUIL13TR00536AA 3

4. Remove the nut **(2)**. Where fitted, remove the screw **(1)** and remove the ladder **(3)** from the left-hand side.



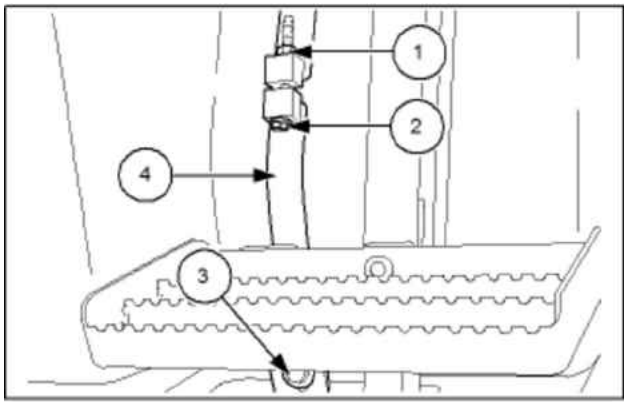
BRAG12TRLUE1344 4

5. Disconnect the electrical connectors **(1)** from the fuel tank float. Remove the mounting bolts **(2)**. Remove the float.



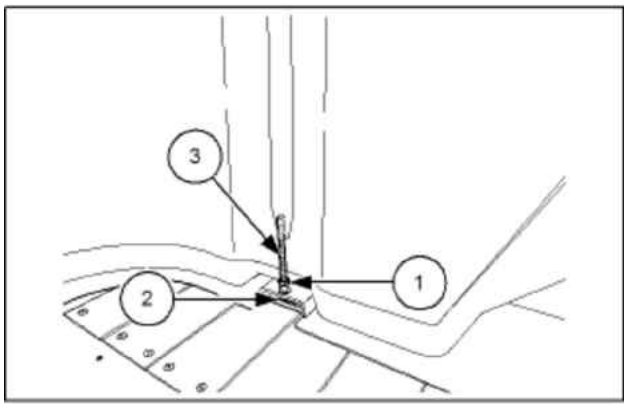
BRAG12TRLUE1332 5

6. Loosen the nut **(1)** to release the retaining strap **(4)**. Detach the retaining strap **(4)** from the bracket located between the fuel tank and the transmission. Loosen the bolt **(3)**. Remove the retaining strap **(4)**.



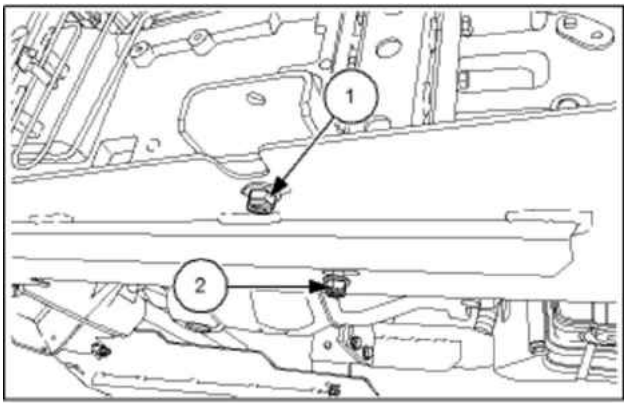
BRAG12TRLUE1349 6

7. Loosen nuts **(1)** and **(2)** from the strap located behind the rear tire. Remove the bolt **(3)**.



BRAG12TRLUE1346 7

8. Loosen retaining nuts **(1)** and **(2)** from the tank bracket plate to facilitate fuel tank removal. Remove the fuel tank.



BRAG12TRLUE1334 8

Next operation:
Fuel tank - Install (10.216).

Fuel tank - Install

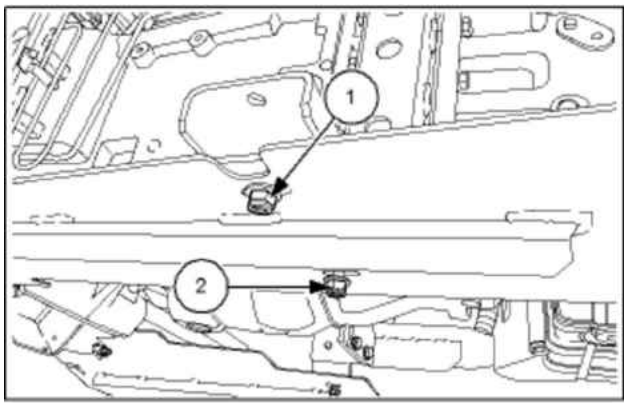
⚠ WARNING

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 could result in death or serious injury.

W0398A

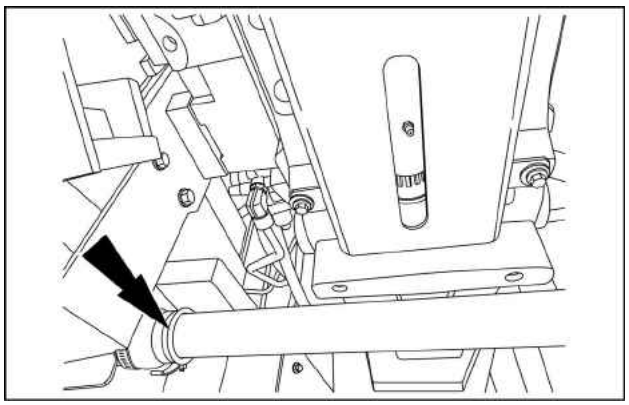
Prior operation:
Fuel tank - Remove (10.216).

1. Fit the fuel tank in its housing. Tighten mounting bolts **(1)** and **(2)**.



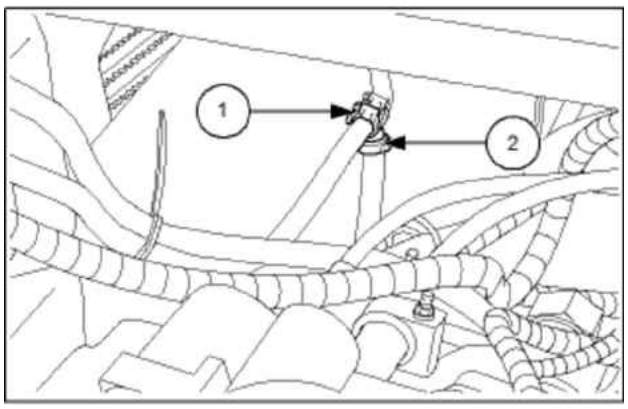
BRAG12TRLUE1334 1

2. Fit the hose connecting the main and auxiliary fuel tanks. Tighten the clamps on both sides. Torque to **3,7 – 4,8 N·m**.



CUIL13TR00536AA 2

3. Fit the hoses to the fuel tank breather. Tighten clamps **(1)** and **(2)**. Torque to **2,6 – 3,4 N·m**.



BRAG12TRLUE1337 3