SERVICE MANUAL

Boomer™ 35
Boomer™ 40
Tier 4B (final)
Compact Tractor

Boomer™ 35 ROPS - From PIN LSM0B35Rxx0010001 to LSM0B35RVH0010043
Boomer™ 40 Cab - From PIN LSM0B40Cxx0010001 to LSM0B40CAH0010053
Boomer™ 40 ROPS - From PIN LSM0B40Rxx0010001 to LSM0B40REH0010028

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NEW HOLLAND AGRICULTURE

SERVICE MANUAL

Boomer™ 35 Tier 4B (final), ROPS [LSM0B35Rxx0010001 - LSM0B35RVH0010043]
Boomer™ 40 Tier 4B (final), Cab [LSM0B40Cxx0010001 - LSM0B40CAH0010053]
Boomer™ 40 Tier 4B (final), ROPS [LSM0B40Rxx0010001 - LSM0B40REH0010028]

Link Product / Engine

Product	Market Product	Engine
Boomer™ 35 Tier 4B (final), ROPS [LSM0B35Rxx0010001 - LSM0B35RVH0010043]	North America	L3C19-T5
Boomer™ 40 Tier 4B (final), ROPS [LSM0B40Rxx0010001 - LSM0B40REH0010028]	North America	L3C19-T4
Boomer™ 40 Tier 4B (final), Cab [LSM0B40Cxx0010001 - LSM0B40CAH0010053]	North America	L3C19-T4

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INTRODUCTION

(*) See content for specific models

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.

Foreword

This repair manual provides the technical information needed to properly service the NEW HOLLAND models Boomer 40 and 50 tractors. Use this manual in conjunction with the operator's manual for complete operation, adjustment, and maintenance information

On NEW HOLLAND equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

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 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.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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 or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine 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

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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.

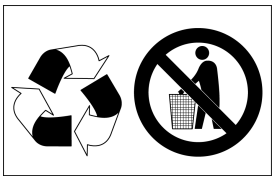
Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these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

Safety rules Service precautionary statements climate control

Boomer™ 40 Tier 4B (final), Cab [LSM0B40Cxx0010001 - LSM0B40CAH0010053]	

SERVICE PRECAUTIONARY STATEMENTS

Leak Testing

Recharging an air conditioning system that leaks simply allows more refrigerant to escape into the atmosphere and ultimately leaves the system non-functioning and in need of additional charging.

Therefore, the proper service procedure is to locate and fix any leaks before putting any more refrigerant into the system.

If a large amount of refrigerant has leaked out, the system pressure will be too low to identify all but the largest leaks. In this case, partially recharge the system with no more than one pound of refrigerant to check for leaks.

NOTICE: *• Any refrigerant introduced into the system for the purpose of finding leaks must also be recovered without releasing it into the atmosphere.*

• Always use the same type of refrigerant for checking leaks as was originally installed into the AC system by the manufacturer.

• Never use compressed air to detect system leaks. The introduction of air into the system may create a fire or explosion hazard, may overload the desiccant with moisture, and could contaminate the system with dirt and improper oil.

All automotive type air conditioning systems leak to some extent. When servicing them it is important that leakage be minimized. Much of the normal leakage comes from the slow seepage of refrigerant through the flexible hoses. Other common sources of leaks are at joints between the flexible hose and metal tubing or at threaded hose connections. These are usually much larger leaks than the natural seepage through the walls of the hose and are almost always repairable.

Research by the EPA has found that leak detection can be difficult, but existing halogen leak detection systems are adequate for the major task of finding and repairing leaks causing complaints. Dye stains are not very satisfactory for finding small leaks.

Newer electronic leak detectors may offer even better leak detection capabilities. However, no single method can find every leak. Electronic leak detectors may not detect leaks of all refrigerants. For example, older units designed to detect R12 may not detect **R134A**. Be sure that the leak detector you use is state-of-the-art and that it is designed to detect the refrigerant in the system you are servicing.

Service professionals must be extremely diligent in their work to correct all possible leaks. Diligence is essential to ensure that no small, difficult-to-find leaks go undetected.

Before leaving a job, make one last leak check. Catching a leak just after service will save an inconvenient and expensive return visit.

Refilling

Refill the air conditioning system using the weight method. The lubricants used in R134a tend to layer onto the walls of the refrigeration system. This layering obscures the view through the sight glass. Visual methods of refilling R134a systems will result in improper system charging. For this reason, we do not recommend the old practice of topping off a partially discharged air conditioning system using the sight glass. The Boomer 45/50/55 cab tractors use **700 g** (**25 oz**) of **R134A** refrigerant.

CONTAMINANTS

General

No mobile air conditioning system can operate for long without picking up some contaminants in the refrigerant. The flexible hoses, for example, allow moisture and air to migrate into the refrigerant from the outside atmosphere. Moisture and non-condensable gases (air) are the most common contaminants found in mobile air conditioning systems.

NOTICE: *Contaminating* ***R134A*** *with R12 or CFC will lead to copper plating of steel components and major compressor failure.*

Lubricant and refrigerant that remain in service equipment can be contaminants. When you recover a refrigerant, you also will capture a certain amount of lubricant in the extraction or recovery equipment. The equipment will drain the lubricant in a catch bottle or reservoir for measurement and proper final disposal.

Never use a lubricant that has come out of an air conditioning system. Reusing this oil will result in contamination of the air conditioning system with refrigerant, moisture and air from the old oil. Instead, refill the air conditioning system using fresh oil in the same amount as that removed during service. Dispose of the used oils in a manner that complies with federal, state and local disposal requirements.

To avoid contamination between systems using dissimilar refrigerants, the extraction and recycling equipment MUST be dedicated to a single refrigerant.

Preventing Mixing of Service Equipment

To help avoid the mistake of charging a system with an incorrect, incompatible refrigerant, the compressor fittings are different for refrigerants R12 and **R134A**. Systems using **R134A** have quick couple service connections, while R12 systems use screw threads. This prevents the use of the same tools for different refrigerants, thereby helping to avoid the mixing of refrigerants in service equipment.

If refrigerants become mixed, the thermodynamic and chemical characteristics will change. This change results in excessive pressure and poor lubrication and leads to failure of the compressor, desiccant (drier) and other system components.

Ultimately, system failure and an expensive repair bill will result if refrigerants become mixed in a single set of service equipment.

REFRIGERANT EXTRACTION AND RECYCLING EQUIPMENT

Both extraction and recycling equipment are in use and available to service technicians. Both types of equipment will remove the refrigerant from an air conditioning system. However, extraction equipment only pulls the refrigerant from the air conditioning system and stores it in an appropriate container. Extraction equipment does not clean the refrigerant. Its only purpose is to recover the refrigerant from an air conditioning system prior to disassembling and servicing it.

Always recycle or reclaim recovered refrigerant before putting it back into an air conditioning system. During service operations involving a partial recharge, or while the air conditioning system is in use, refrigerant can pick up moisture, lubricants, microscopic metal chips, and other potential contaminants. In many cases the contaminants contribute to or are the primary cause of the system failure. Putting used, unclean refrigerant back into an air conditioning system may result in poor system performance.

NOTICE: *Reuse of unrecycled, unreclaimed refrigerant will void the warranty.*

Equipment that removes refrigerant from a mobile air conditioning system (recovery equipment) may allow you to put the used refrigerant back in the system without first cleaning it to minimize performance. You may also use such conditioning systems. Non-mobile air conditioning systems use refrigerants and contain contaminants that are different from those in mobile air conditioning systems. Recovery equipment may therefore allow the mixing of different types of refrigerants or introduce contaminants that may not be removable by recycling equipment available in the service shop.

If you want to remove, clean and reuse **R134A** refrigerant, you must use a machine that both extracts and recycles refrigerant from mobile air conditioning systems. Dedicate that machine to R134a only.

Recycling equipment meeting SAE standards J1990 and J2210 is designed to extract and recycle refrigerants that have been in mobile air conditioning systems only. **R134A** refrigerant that also is used in non-mobile systems may introduce contaminants to the refrigerant that equipment meeting SAE J1990 and J2210 cannot remove. This equipment is not intended for use on non-mobile systems.

Using Extraction Equipment

Extraction equipment is relatively small and easily portable. It is best used if a shop must service vehicles, such as agricultural or off-highway equipment, that cannot easily be brought into the shop. It is also convenient for shops that must deal with a variety of different refrigerant types and exchange recovered refrigerant at some central location.

Always use extraction equipment on those refrigerants for which it was designed. The lubricants, hoses, and seals in this equipment have been designed to work with only one refrigerant.

To help avoid a mix-up of service equipment and refrigerants, equipment hoses designed for use which each refrigerant are easily identifiable. New service hoses used with **R134A** must have a black stripe along the hose length and carry the designation "SAE J2196/ **R134A**" (hoses labeled "SAE J 2196" and lacking the black stripe were used for R12.)

If you use extraction equipment and send your recovered refrigerant to a reclamation facility, reclaimed refrigerant you purchase must meet the Air Conditioning and Refrigeration Institute standards of purity (ARI Standard 700-88). This will ensure that the refrigerant you are using not only meets the purity requirements of SAE J1991 (for R12) OR J2099 (for **R134A**), but also that it does not contain incompatible lubricants or other contaminants from non-automotive air conditioning systems.

Using Recycling Equipment

Recycling equipment extracts and removes common contaminants from refrigerants. Recycling equipment designed and certified to meet SAE standards can make refrigerant recovery from mobile air conditioning systems suitable for reuse in automotive air conditioning systems. Like extraction equipment, SAE standards require that each piece of recycling equipment be dedicated to a single refrigerant.

NOTICE: *Only equipment capable of recovering and cleaning **R134A** to meet SAE J2099 purity levels carries a label with the phrase "Design certified by Underwriters" Laboratories, Inc. for compliance with SAE J2099.*

The Underwriters' Laboratories label must be specific that the equipment is "design certified" for the SAE J2099 standard. If not, it certifies only that the machine is free of reasonable shock or other electrical hazards to the user.

Recycling vs. Reclaiming

Recycled refrigerant has been recovered from a mobile air conditioning system and is cleaned by the same shop that recovered it to meet J2099 for **R134A**. The equipment designed to recycle refrigerant in the shop environment removes only contaminants picked up during the operation of a mobile air conditioning system.

Refrigerant that is either properly recycled or reclaimed is adequate for use in mobile air conditioning systems.

CONTAINMENT OF AIR CONDITIONING REFRIGERANTS

The following procedure is a guide to servicing mobile air conditioning systems in a way that minimizes the potential for losing refrigerant to the atmosphere. Following the procedures in this section will help ensure compliance with SAE J2211 for **R134A** systems.

⚠ DANGER

Avoid injury!
Observe ALL precautions listed below when servicing the air-conditioning system and handling refrigerant.
Failure to comply will result in death or serious injury.

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Fire or explosion hazard exists with R-134a under certain conditions. R-134a has been shown to be nonflammable at ambient temperature and atmospheric pressure. However, tests under controlled conditions have indicated that, at pressures above atmospheric and with air concentrations greater than 60% by volume, R-134a can form combustible mixtures. While it is recognized that an ignition source is also required for combustion to occur, the presence of combustible mixtures is a potentially dangerous situation and should be avoided.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air. Mixtures of air and R-134a have been known to be combustible at elevated pressures. These mixtures are potentially dangerous and could result in fire or explosion causing injury or property damage. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers. Failure to comply could result in death or serious injury.

Recovery

1. Be sure that all service equipment hose lines have shutoff valves or check valves within **30 cm** (**12 in**) of their ends. This will ensure that only minimal quantities of refrigerant escape to the atmosphere when the equipment is disconnected from the air conditioning system, and only small amounts of moisture and other contaminants can enter the system.
2. Be sure that all equipment, including the connecting hose lines and manifold, are compatible with the refrigerant in the system with which you are going to work, and that your equipment has previously been used only with the refrigerant you are about to service.
3. Be sure that all shutoff valves are tight before connecting them to the air conditioning system.

   NOTE: *Keep shutoff valves closed at all times unless they are connected to a vehicle's air conditioning system, a refrigerant storage container or another piece of service equipment containing the same refrigerant. This prevents refrigerant from escaping into the atmosphere, damaging the environment, contaminating the equipment, and costing you money.*
4. Connect the extraction or recovery equipment to the air conditioning system in accordance with the instructions supplied by the equipment manufacturer.
5. Start the recovery process by turning on the extraction equipment and extracting the refrigerant from the air conditioning system in accordance with the equipment manufacturer's instructions.
6. Continue to extract refrigerant until the air conditioning system is under a vacuum and there is no refrigerant remaining in the vehicle system.
7. Verify that there is no refrigerant remaining in the system by:

   a) Shutting off the extraction unit and observing the system pressure level.

   b) Waiting five minutes and observing the system pressure again. If the system pressure has not risen above atmospheric pressure (0 gauge pressure), all refrigerant has been removed and you may proceed to step 8.

   If after five minutes, the system pressure reading has risen above atmospheric pressure (0 gauge pressure), the extraction / recovery process must be repeated until the pressure reading remains at or below atmospheric for at least two minutes with the extraction equipment shut off before proceeding to step 8.
8. Close the shutoff valve in the service lines.
9. Remove the service lines from the vehicle system. If the recovery equipment has automatic closing shutoff valves, verify that they are operating properly and do not leak.

10. Determine the amount of lubricant removed from the air conditioning system during the refrigerant extraction process. Replenish the air conditioning system with an equal volume of new, correct lubricant.
11. The system is now ready for service or repair.

Flushing

Flushing needs to be performed when the compressor is replaced due to internal parts failure, or when a desiccant bag deteriorates and desiccant travels throughout the system.

⚠ DANGER

Avoid injury!
Observe ALL precautions listed below when servicing the air-conditioning system and handling refrigerant.
Failure to comply will result in death or serious injury.

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Flushing should never be done with compressed air. Certain mixtures of air and R-134a are combustible. Using compressed air to flush R-134a systems could result in fire or explosion. Air from a shop compressor also contains moisture that would contaminate the system.

NOTICE: *Never use CFC11, R11, CFC12, R12, CFC113, R13 or any other substance to flush an R134a system. To do so would break down the lubricant and cause system corrosion.*

Use of other flushing solvents may cause other problems. If a vacuum pump does not remove the solvent, it could affect the chemical stability of the refrigerant and lubricant.

Recharging/Refilling

Recharge the system only with the proper virgin refrigerant or recycled refrigerant purified to meet SAE purity standard (J2099 for **R134A**). Use the weight method to determine the proper amount of refrigerant. The Boomer 45/50/55 cab tractors use **1.0 kg** (**2.2 lb**) of R134a refrigerant.

Using a Manifold Gauge Set

When using a manifold gauge set to diagnose, recharge, or service the tractor air conditioning system:

1. Be sure that all equipment hose lines are fitted with shutoff valves or check valves within **30 cm** (**12 in**) of their ends and that the valves are closed. This will ensure that only minimal quantities of refrigerants escape to the atmosphere, and that only small amounts of moisture and other contaminants can enter the system.
2. Be sure that all equipment including the connecting hose lines and manifolds are:

   - Compatible with the refrigerant in the air conditioning system;

   - Free of all contaminants;

   - Used only for the same type of refrigerant in the system.
3. Be certain that all shutoff valves are closed tightly before connecting them to the air conditioning system or charging source.
4. Connect the manifold gauge set to the unit according to the instructions supplied by the gauge manufacturer.
5. Perform the desired diagnostic and service operation.
6. Close the shutoff valves on the service hoses.
7. Disconnect the hoses from the system.

   NOTE: *Attach the hoses to recovery or recycling equipment whenever disconnecting the manifold gauge set from the air conditioning system, emptying refrigerant from it, or moving the center hose to another device which cannot accept refrigerant pressure. Remove the refrigerant, lubricant, and contaminants from the hoses.*

Checking Refrigerant for Excess Air

At times you may question whether or not a container of refrigerant has been recycled. One check which can be done in the shop is to determine if there is excess air mixed in with the refrigerant. This check is a simple comparison of the container pressure with theoretical pressure at a known temperature. If the pressure is equal to or less than a theoretical value of usable purity established for **R134A**, the container does not have excess air.

NOTICE: *Using **R134A** with excess air will result in higher system operating pressures and may cause damage to the air conditioning system.*

Do this check in the following manner:

1. Store the container for at least 12 hours at a known temperature of **18.3 °C** (**65 °F**) or higher. The container must not be in direct sunlight or under the influence of any other direct source of heat.

   Carry out all of the next steps in the same area in which the container is stored, as it is very important that the temperature of the container remain stable.
2. Attach an appropriate pressure gauge to the container. This pressure gauge should read in increments of **6.9 kPa** (**1 psi**)
3. Use a calibrated thermometer to measure the air temperature within **10 cm** (**4 in**) of the container surface.
4. Compare the pressure in the container with the pressure shown for the temperature of the tank for **R134A**. If the pressure in the container is equal to or less than the pressure in the table, the refrigerant in the container meets the requirements for excess air.

   If the pressure is greater than shown in the table, you may still be able to use the refrigerant by proceeding to step 5.
5. If the pressure exceeds that of the table, connect the tank to recovery or recycling equipment in such a way as to allow you to continue to monitor tank pressure.
6. Bleed a small amount of vapor from the tank into the recovery or recycling equipment until the tank pressure is below that shown in the table for the temperature at which the tank was stored. Close the shutoff valves in the recovery/recycling equipment service hose.

   NOTICE: *This process may cause the temperature of the tank to drop.*
7. Allow the tank temperature to stabilize at the temperature of the storage room by shaking it and allowing it to sit in the same spot for up to another 12 hours.

8. After making certain that container temperature has again stabilized to room temperature, repeat step 4 above.

If the pressure exceeds that in the table for the storage temperature you measured, the refrigerant in the tank has too much excess air to be used and must be recycled or reclaimed.

If the refrigerant being checked has been contaminated with other refrigerant such as R12, the tank pressure may indicate it contains air. If the tank is vented and the pressures still indicates a high reading and you think there is a possibility of the **R134A** refrigerant being contaminated with R12, the container must be sent to a reclaim facility.

Containers for Storing Recycled Refrigerant

Recycled refrigerant must be stored in DOT CFR Title 49 or UL containers approved for such use. The container must be specifically marked for the refrigerant type you are storing. The use of unmarked containers can lead to mixing of refrigerants and consequent air conditioning system failure.

Disposable refrigerant containers should not be used for the storage or recovery of used or recycled refrigerant. Disposable container are the type of container in which virgin refrigerant is often sold.

Any container of recycled refrigerant that has been stored or transferred must be checked prior to its use in accordance with the temperature / pressure check described previously in "Checking Refrigerant for Excess Air."

New storage tanks must be evacuated to at least **635 mm** (**25 in**) of mercury prior to use. Otherwise, excess air may be introduced to the refrigerant.

Disposal of Empty or Near-Empty Disposable Containers

Improper scrapping of a disposable container can release some refrigerant into the atmosphere. This must be avoided by removing any of the remaining contents with a recovery or recycling machine as follows:

1. Attach the service hose of your recovery or recycling machine to the container.
2. Open the container valve and the recovery/recycling equipment shutoff valve and evacuate the container just as you would a mobile air conditioning system.
3. When the maximum stable vacuum has been achieved, close the container valve and the service hoses valve, allowing the vacuum to be in the container.
4. Mark the container "empty" and dispose of it properly.

APPLICABLE SAE STANDARDS

J639 - Safety and containment of refrigerant for mechanical vapor compression systems used for mobile air conditioning systems
J1989 - Recommended service procedure for the containment of R12
J1991 - Standard of purity for use in mobile air conditioning systems
J2099 - Standard of purity for recycled **R134A** for use in a mobile air conditioning system
J2196 - Service hose for automotive air conditioning
J2197 - R134a service hose fittings for automotive air conditioning service equipment
J2211 - Recommended service procedure for the containment of **R134A**
J2219 - Mobile Air Conditioning Industry Criteria and Guidelines

Related SAE Standards:

J1990 Extraction and recycle equipment for mobile air conditioning systems
J2209 - R12 extraction equipment for mobile air conditioning systems
J2210 - R134a recycling equipment for mobile air conditioning systems

These and other SAE standards may be obtained from

SAE Customer Service
400 Commonwealth Drive
Warrendale, PA 15096-0001

Safety rules - Personal safety

⚠ General safety rules ⚠

Read this manual carefully before starting, using carrying out maintenance, refueling or performing any other type of operation on the tractor.

Read all the safety decals on the tractor and follow the instructions thereon before starting, operating, refueling or carrying out maintenance on the tractor. Promptly replace any decals that are damaged, lost or illegible. Clean the decals if they are covered by mud or debris.

The tractor must only be used by responsible personnel, trained in tractor use and authorized to operate the tractor.

Use caution when operating the tractor on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the tractor. The tractor can tip or roll over when near ditches and embankments or uneven surfaces.

Avoid using the tractor in unsuitable physical conditions, stop work instead.

Never permit anyone other than the operator to ride on the tractor.

Never operate the tractor under the influence of alcohol, drugs, or while otherwise impaired.

When digging or using ground engaging attachments be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop engine, remove key and relieve the pressure before connecting or disconnecting fluid lines.
- Make sure all components are in good condition and tighten all connections before starting the engine or pressurizing the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.
- Before removing any hydraulic tubing, check that the system is not pressurized.

Do not alter the calibration of the pressure relief valves in the various hydraulic circuits (steering, hydraulic lift, auxiliary distributors, etc.).

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the tractor while it is being operated or components are in motion.

Make sure all guards and shields are in good condition and properly installed before operating the tractor. Never operate the tractor with shields removed. Always close access doors or panels before operating the tractor.

Enter and leave the tractor using the steps and handles provided. Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a tractor can be struck or crushed by the tractor or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate engine in enclosed spaces as harmful exhaust gases may build up.

Before starting the tractor, be sure that all controls are in neutral or park lock position.

Before starting the engine, make sure that all attached implements are lowered to the ground.

Start the engine only from the operator's seat. If the safety start switch is bypassed, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, all lighting, and Slow Moving Vehicle (SMV) emblem clean to provide the best possible visibility while operating the tractor.

Operate controls only when seated in the operator's seat, except for those controls expressly intended for use from other locations.

Before leaving the tractor:

1. Park tractor on a firm level surface.
2. Put all controls in neutral or park lock position.
3. Engage park brake. Use wheel chocks if required.
4. Lower all hydraulic equipment — Implements, header, etc.
5. Turn off engine and remove key.

When, due to exceptional circumstances, you would decide to keep the engine running after leaving the operator's station, then the following precautions must be followed:

1. Bring the engine to low idle speed.
2. Disengage all drive systems.
3. **⚠ WARNING**

   Some components may continue to run down after you disengage drive systems.
   Make sure all drive systems are fully disengaged.
   Failure to comply could result in death or serious injury.

   W0113A

   Shift the transmission into neutral.
4. Apply the parking brake.

⚠ Using the tractor ⚠

1. Select the most suitable wheel setting for the work in hand, i.e.: the setting that provides the best stability.
2. Depress the speed control pedal slowly: if engaged too quickly, especially when the tractor is getting out of a hole, ditch or operating on muddy ground or steep slopes, the tractor may overturn.

   Release the speed control pedal immediately if front wheels begin to lift.
3. When traveling downhill, keep the tractor in gear. Never place shuttle shift lever in the neutral position.
4. When the tractor is moving, the operator must remain correctly seated in the driving position.
5. Never get on or off the tractor while in movement.
6. When using the brakes, press the pedal down slowly.
7. Avoid taking turns at high speeds.
8. Always use the tractor at a speed that will guarantee safe operation on the type of land being worked. When working on uneven ground, use maximum care to ensure proper stability.
9. If you have to work with the tractor on a gradient, for example on hillsides, drive at moderate speed especially when taking turns.
10. Proceed with maximum caution when working with the wheels near the edge of ditches or slopes.
11. When driving on public highways, observe the Highway Code.

⚠ General maintenance safety ⚠

Keep area used for servicing the tractor clean and dry. Clean up spilled fluids.

Service tractor on a firm level surface.

Install guards and shields after servicing the tractor.

Close all access doors and install all panels after servicing the tractor.

Do not attempt to clean, lubricate, clear obstructions or make adjustments to the tractor while it is in motion or while the engine is running.

Always make sure working area is clear of tools, parts, other persons and pets before you start operating the tractor.

Unsupported hydraulic cylinders can lose pressure and drop the equipment causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless securely supported.

Jack or lift the tractor only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When towing a disabled tractor follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove key and relieve pressure before disconnecting or connecting fluid lines.

Stop the engine and remove key before disconnecting or connecting electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling system operates under pressure. Hot coolant can spray out if a cap is removed while the system is hot. Allow system to cool before removing cap. When removing a cap turn it slowly to allow pressure to escape before completely removing the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

Engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when servicing such components. Allow surfaces to cool before handling or disconnecting hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before welding on the tractor. Always wash your hands after handling battery components.

Before touching any electrical components, disconnect the ground lead from the battery.

Only remove the radiator cap after the engine has been allowed to cool. With the engine switched off, use a cloth to slowly unscrew the cap and release the pressure before completely removing the cap.

⚠ Wheels and tires ⚠

Upon receiving your tractor, check the air pressure in the tires and check every 50 hours or weekly. Refer to the table below for tire pressure for normal operation.

Make sure tires are correctly inflated. Do not exceed recommended load or pressure. Follow instructions in the manual for proper tire inflation.

Tires are heavy. Handling tires without proper equipment could cause death or serious injury.

Never weld on a wheel with a tire installed. Always remove tire completely from wheel prior to welding.

Always have a qualified tire technician service the tires and wheels. If a tire has lost all pressure, take the tire and wheel to a tire shop or your dealer for service. Explosive separation of the tire can cause serious injury.

DO NOT weld to a wheel or rim until the tire is completely removed. Ensure the rim is clean and free of rust or damage. Do not weld, braze, otherwise repair or use a damaged rim. Inflated tires can generate a gas mixture with the air that can be ignited by high temperatures from welding procedures performed on the wheel or rim. Removing the air or loosening the tire on the rim (breaking the bead) will NOT eliminate the hazard. This condition can exist whether tires are inflated or deflated. The tire MUST be completely removed from the wheel or rim prior to welding the wheel or rim.

When changing or storing tires, make sure they are stacked correctly and cannot roll or topple over causing personal injury.

When checking tire pressures, inspect the tires for damaged tread and side walls. Incorrect pressure will lead to early tire failure.

Do not inflate a tire that has been run flat or seriously under-inflated until it has been inspected for damage by a qualified person.

Torque wheel bolts to specification after installing the wheel. Check nut tightness daily until torque stabilizes.

Refer to the 'TRACTOR BALLASTING' section in the Operator’s Manual before adding ballast to the tires.

Use jack stands or other suitable blocking to support the tractor while repairing tires. Ensure the jack is placed on a firm, level surface. Ensure the jack has adequate capacity for lifting your tractor. Do not put any part of your body under the tractor or start the engine while the tractor is on the jack.

Never hit a tire or rim with a hammer.

Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.

⚠ Driving on public roads and general transportation safety ⚠

Comply with local laws and regulations.

Use appropriate lighting to meet local regulations.

Make sure Slow-Moving Vehicle (SMV) emblem is visible.

Make sure brake pedal latch is engaged. Brake pedals must be locked together for road travel.

Use safety chains for trailed equipment when provided with tractor or equipment.

Lift implements and attachments high enough above ground to prevent accidental contact with road.

When transporting equipment or tractor on a transport trailer, make sure it is properly secured. Be sure the SMV on the equipment or tractor is covered while being transported on a trailer.

Be aware of overhead structures or power lines and make sure the tractor and/or attachments can pass safely under.

Travel speed should be such that complete control and tractor stability is maintained at all times.

Slow down and signal before turning.

Pull over to allow faster traffic to pass.

Follow correct towing procedure for equipment with or without brakes.

When driving, do not rest your feet on the brake pedals.

⚠ Towing

1. To guarantee tractor stability when moving, adjust the hitching device according to the trailer or implement to be used.
2. Drive slowly when towing extremely heavy loads.
3. Do not tow trailers that are not fitted with an independent braking system.
4. If the tractor is used to tow heavy loads, always use the hitching device and never hitch loads onto the lower arms or the top link of the three-point linkage. This may result in tipping or overturning
5. When towing, do not negotiate turns with the differential lock engaged as this may prevent you from steering the tractor.

⚠ Using implements and agricultural machinery⚠

1. Do not connect implements or machinery that require more power than can be generated by your tractor model.
2. Never negotiate sharp turns with the power take-off under a heavy load; this may damage the universal joints on the transmission shaft connected to the power take-off.
3. Never stand between the reversing tractor and the implement when hitching.
4. When using implements that require the tractor to be stationary with the engine running, keep the shuttle lever in the neutral position, apply the hand brake and use suitable wheel chocks.
5. Do not operate tractors connected to the power take-off without first ensuring that the operating range of the tractor is free of bystanders. Also check that all rotating parts connected to the power take-off shaft are correctly protected.
6. Add some type of rear ballast when using lifting equipment fitted to the front of the tractor. Rear ballast, such as, rear wheel weights, fluid in rear tires or three-point weight box.

⚠ Fire and explosion prevention ⚠

Fuel or oil leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces.

Always have a fire extinguisher on or near the tractor.

Make sure the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day remove all trash and debris from the tractor especially around hot components such as engine, transmission, exhaust, battery, etc. More frequent cleaning of your tractor may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fan, etc. More frequent cleaning of your tractor may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections or frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the tractor.

Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the tractor to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the tractor.

⚠ General battery safety ⚠

Always wear eye protection when working with batteries.

Do not create sparks or have open flame near battery.

Ventilate when charging or using in an enclosed area.

Disconnect negative (-) first and reconnect negative (-) last.

When welding on the tractor, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When using auxiliary batteries or connecting jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow manufacturer's instructions when storing and handling batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling. This is a California Proposition 65 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.

Keep out of reach of children and other unauthorized persons.

⚠ Operator presence system ⚠

Your tractor is equipped with an operator presence system to prevent the use of some features while the operator is not in the operator's seat.

The operator presence system should never be disconnected or bypassed.

If the system is inoperable, the system must be repaired.

⚠ Power Take-Off (PTO) ⚠

Power Take-Off (PTO) driven machinery can cause death or serious injury. Before working on or near the PTO shaft or servicing or clearing the driven tractor, put the PTO lever in the disengage position, stop the engine, and remove the key.

Whenever a PTO is in operation, a guard must be in place to prevent death or injury to the operator or bystanders.

When doing stationary PTO work, keep clear of all moving parts and make sure appropriate guards are in place.

Never use a spline adapter:

- Match the right tractor PTO spline and speed with the PTO driveshaft provided with an implement. This will assure proper geometry and operating speed.
- Never operate **540 RPM** implements at **1000 RPM**.
- Never operate **1000 RPM** implements at **540 RPM**.
- Use of PTO adapters will void the warranty of the drive shaft, and the PTO drive train of the machine and implement.
- For correct hitch geometry, see the implement operator's manual.

⚠ Reflectors and warning lights ⚠

Flashing amber warning lights must be used when operating on public roads. Location and use of flashing amber warning lights is shown in the Operator's Manual.

⚠ Seat belts ⚠

Seat belts must be worn at all times.

Seat belt inspection and maintenance:

- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have cuts that can make the belt weak.
- Check that bolts are tight on the seat bracket or mounting.
- If belt is attached to seat, make sure seat or seat brackets are mounted securely.
- Keep seat belts clean and dry.

- Clean belts only with soap solution and warm water.
- Do not use bleach or dye on the belts because this can make the belts weak.
- For proper seat belt use, see the Operator’s Manual.

⚠ Operator protective structure ⚠

Your tractor is equipped with an operator protective structure, such as: a Roll Over Protective Structure (ROPS), Falling Object Protective Structure (FOPS), or a cab with ROPS. A ROPS may be a can frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the tractor are part of the ROPS.

The protective structure is a special safety component of your tractor.

DO NOT attach any device to the protective structure for pulling purposes. DO NOT drill holes to the protective structure.

The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion, or modification will weaken the structure and reduce your protection. If this occurs, THE PROTECTIVE STRUCTURE MUST BE REPLACED so that it will provide the same protection as a new protective structure. Contact your dealer for protective structure inspection and replacement.

After an accident, fire, tip or roll over, the following MUST be performed by a qualified technician before returning the tractor to field or job-site operations:

- The protective structure MUST BE REPLACED.
- The mounting or suspension for the protective structure, operator seat and suspension, seat belts and mounting components, and wiring within the operator's protective system MUST be carefully inspected for damage.
- All damaged parts MUST BE REPLACED.

DO NOT WELD, DRILL HOLES, ATTEMPT TO STRAIGHTEN, OR REPAIR THE PROTECTIVE STRUCTURE. MODIFICATION IN ANY WAY CAN REDUCE THE STRUCTURAL INTEGRITY OF THE STRUCTURE, WHICH COULD CAUSE DEATH OR SERIOUS INJURY IN THE EVENT OF FIRE, TIP, ROLL OVER, COLLISION, OR ACCIDENT.

Seat belts are part of your protective system and must be worn at all times. The operator must be held to the seat inside the frame in order for the protective system to work.

⚠ Personal Protective Equipment (PPE) ⚠

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

⚠ Do Not Operate tag ⚠

Before you start servicing the tractor, attach a 'Do Not Operate' warning tag to the tractor in an area that will be visible.

⚠ Hazardous chemicals ⚠

If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your tractor can be hazardous. They may be attractive and harmful to domestic animals as well as humans.

Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures and procedures to be taken in the event of a spill or accidental release. MSDS are available from your dealer.

Before you service your tractor check the MSDS for each lubricant, fluid, etc. used in this tractor. This information indicates the associated risks and will help you service the tractor safely. Follow the information in the MSDS, on manufacturer containers, as well as the information in this manual when servicing the tractor.

Dispose of all fluids, filters, and containers in an environmentally safe manner according to local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.

Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.

Keep out of reach or children or other unauthorized persons.

Additional precautions are required for applied chemicals. Obtain complete information from the manufacturer or distributor of the chemicals before using them.

⚠ Utility safety ⚠

When digging or using ground-engaging equipment, be aware of buried cables and other services. Contact your local utilities or authorities, as appropriate to determine the locations of services.

Make sure the tractor has sufficient clearance to pass in all directions. Pay special attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety. Contact local authorities or utilities to obtain safe clearance distances from high voltage power lines.

Retract raised or extended components, if necessary. Remove or lower radio antennas or other accessories. Should a contact between the tractor and an electric power source occur, the following precautions must be taken:

- Stop the tractor movement immediately.
- Apply the park brake, stop the engine, and remove the key.
- Check if you can safely leave the cab or your actual position without contact with electrical wires. If not, stay in your position and call for help. If you can leave your position without touching lines, jump clear of the tractor to make sure you do not make contact with the ground and the tractor at the same time.
- Do not permit anyone to touch the tractor until power has been shut off to the power lines.

⚠ Electrical storm safety ⚠

Do not operate tractor during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

If an electrical storm should strike during operation, remain in the cab. Do not leave the cab or operator's platform. Do not make contact with the ground or objects outside the tractor.

⚠ Mounting and dismounting ⚠

Mount and dismount the tractor only at designated locations that have handholds, steps, or ladders.

Do not jump off the tractor.

Make sure steps, ladders, and platforms remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.

Face the tractor when mounting and dismounting.

Maintain a three-point contact with steps, ladders, and handholds.

Never mount or dismount from a moving tractor.

Do not use the steering wheel or other controls or accessories as handholds when entering or exiting the cab or operator's platform.

⚠ Working at heights ⚠

When the normal use and maintenance of the tractor requires working at heights:

- Correctly use installed steps, ladders, and railings.
- Never use ladders, steps, or railings while the tractor is moving.
- Do not stand on surfaces which are not designated as steps or platforms.

Do not use the tractor as a lift, ladder, or platform for working at heights.

⚠ Lifting and overhead loads ⚠

Never use loader buckets, forks, etc. or other lifting, handling, or digging equipment to lift persons.

Do not use raised equipment as a work platform.

Know the full area of movement of the tractor and equipment and do not enter or permit anyone to enter the area of movement while the tractor is in operation.

Never enter or permit anyone to enter the area underneath raised equipment. Equipment and/or loads can fall unexpectedly and crush persons underneath it.

Do not leave equipment in raised position while parked or during service, unless securely supported. Hydraulic cylinders must be mechanically locked or supported if they are left in a raised position for service or access.

Loader buckets, forks, etc. or other lifting, handling, or digging equipment and its load will change the center of gravity of the tractor. This can cause the tractor to tip on slopes or uneven ground.

Load items can fall off the loader bucket or lifting equipment and crush the operator. Care must be taken when lifting a load. Use proper lifting equipment.

Do not lift load higher than necessary. Lower loads to transport. Remember to leave appropriate clearance to the ground and other obstacles.

Equipment and associated loads can block visibility and cause an accident. Do not operate with insufficient visibility.

Torque - Minimum tightening torques for normal assembly

Metric non-flanged hardware

Nominal size	Class 8.8 bolt and class 8 nut		Class 10.9 bolt and class 10 nut		Lock nut class 8 with class 8.8 bolt	Lock nut class 10 with class 10.9 bolt
	Unplated	Plated with ZnCr	Unplated	Plated with 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)

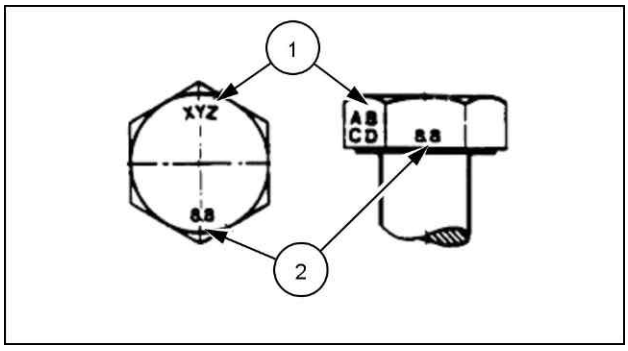
NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

Metric flanged hardware

Nominal size	Class 8.8 bolt and class 8 nut		Class 10.9 bolt and class 10 nut		Lock nut class 8 with class 8.8 bolt	Lock nut class 10 with class 10.9 bolt
	Unplated	Plated with ZnCr	Unplated	Plated with 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

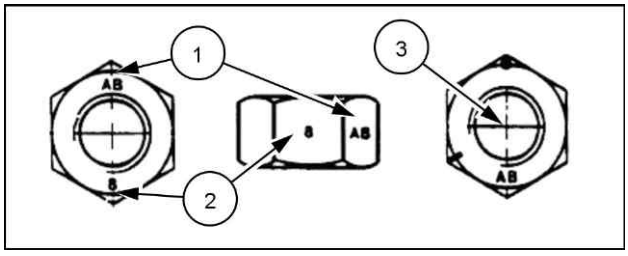
Metric hex head and carriage bolts, classes 5.6 and up



20083680 1

1. Manufacturer's identification
2. Property class

Metric hex nuts and lock nuts, 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		Lock nut Grade B with Grade 5 bolt	Lock nut Grade C with Grade 8 bolt
	Unplated or plated Silver	Plated with ZnCr Gold	Unplated or plated Silver	Plated with 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)**

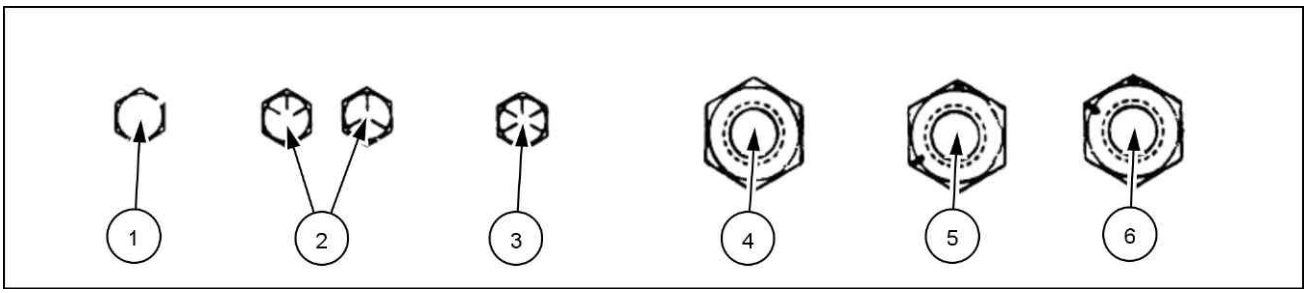
NOTE: *For imperial units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*

Inch flanged hardware

Nominal size	SAE Grade 5 bolt and nut		SAE Grade 8 bolt and nut		Lock nut Grade F with Grade 5 bolt	Lock nut Grade G with Grade 8 bolt
	Unplated or plated Silver	Plated with ZnCr Gold	Unplated or plated Silver	Plated with 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



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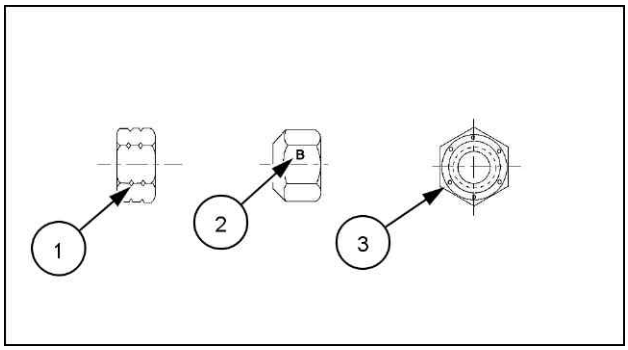
Grade marking examples

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)



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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 hydraulic connections

General information

- Hydraulic connections require a minimum assembly torque in order to provide zero leakage at rated pressure with adequate fatigue resistance. Over-torquing of a hydraulic connection can also lead to leakage or failure. For some connections, NEW HOLLAND requires a different torque value than is listed in the ISO and SAE standards.
- The torque values in this document should be used whenever possible or applicable.

  NOTICE: *Always follow the instructions in this manual for specific torque values when you service components. The information in this section is for general guidance only when a procedure contains no specific torque value.*

Tolerance

- The tolerance for all torque values is ± **10%**. This tolerance must include all assembly variation, not only the torque wrench repeatability.

Lubrication

Application of grease or other lubricants to hydraulic connectors should be avoided. If clean hydraulic oil is already on the connection, it is not required to remove the oil. Generally, application of grease:

- May cause a significant change in the torque required to properly tighten the connection.
- May reduce the connection's resistance to vibration.
- Excessive grease may displace an elastomer seal during tightening.
- Grease extrusion when connection is tightened may be mistaken for leakage.

NEW HOLLAND products generally use O-Ring Boss (ORB) connectors that have Teflon™-coated O-rings, eliminating the need for O-ring lubrication during installation. For connections which are made into aluminum manifolds or with stainless steel connectors, it may be required to apply a lubricant to prevent galling.

Use of **LOCTITE®** and other thread-locking compounds is prohibited. These compounds:

- May cause a significant change in the torque required to properly tighten the connections.
- Reduce the serviceability of the joint.
- May prevent the O-ring from properly sealing if the compound gets on the O-ring.

Torque values for metric O-Ring Boss (ORB) port connections

	S-Series *		L-Series **	
Metric thread	**Ferrous N·m (lb ft) ± 10%**	**Non-Ferrous N·m (lb ft) ± 10%**	**Ferrous N·m (lb ft) ± 10%**	**Non-Ferrous N·m (lb ft) ± 10%**
M8 x 1	10.5 (7.7)	6.3 (4.6)	8.5 (6.3)	5 (3.7)
M10 x 1	21 (15.5)	12.5 (9.2)	15.5 (11.4)	9.3 (6.9)
M12 x 1.5	37 (27.3)	22 (16.2)	27 (19.9)	16 (11.8)
M14 x 1.5	47 (34.7)	28 (20.7)	37 (27.3)	22 (16.2)
M16 x 1.5	58 (42.8)	35 (25.8)	42 (31)	25 (18.4)
M18 x 1.5	74 (54.6)	44 (32.5)	47 (34.7)	28 (20.7)
M22 x 1.5	105 (77.4)	63 (46.5)	63 (46.5)	38 (28)
M27 x 2	178 (131.3)	107 (78.9)	105 (77.4)	63 (46.5)
M30 x 2	225 (166)	135 (99.6)	136 (100.3)	82 (60.5)
M33 x 2	325 (239.7)	195 (143.8)	168 (123.9)	101 (74.5)
M42 x 2	345 (254.5)	207 (152.7)	220 (162.3)	132 (97.4)
M48 x 2	440 (324.5)	264 (194.7)	273 (201.4)	164 (121)
M60 x 2	525 (387.2)	315 (232.3)	330 (243.4)	198 (146)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for metric O-Ring Boss (ORB) port plugs

	Ferrous		Non-ferrous
Metric thread	**Internal hex N·m (lb ft) ± 10%**	**External hex N·m (lb ft) ± 10%**	**N·m (lb ft) ± 10%**
M8 x 1	8.5 (6.3)	10.5 (7.7)	6.3 (4.6)
M10 x 1	16 (11.8)	21 (15.5)	12.5 (9.2)
M12 x 1.5	23 (17)	37 (27.3)	22 (16.2)
M14 x 1.5	47 (34.7)	47 (34.7)	28 (20.7)
M16 x 1.5	58 (42.8)	58 (42.8)	35 (25.8)
M18 x 1.5	74 (54.6)	74 (54.6)	44 (32.5)
M22 x 1.5	105 (77.4)	105 (77.4)	63 (46.5)
M27 x 2	178 (131.3)	178 (131.3)	107 (78.9)
M30 x 2	225 (166)	225 (166)	135 (99.6)
M33 x 2	325 (239.7)	325 (239.7)	195 (143.8)
M42 x 2	345 (254.5)	345 (254.5)	207 (152.7)
M48 x 2	440 (324.5)	440 (324.5)	264 (194.7)
M60 x 2	525 (387.2)	525 (387.2)	315 (232.3)

Torque values for port connections (British Standard Pipe Parallel (BSPP) thread ports and stud ends)

	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
BSPP thread G- Gas; A- medium coarse threads	**S-Series ***	**L-Series ****	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**
G 1/8 A	–	6 (0.236)	–	21 (15.5)	–	12.5 (9.2)
G 1/4 A	6 (0.236) or 8 (0.315)	8 (0.315) or 10 (0.394)	63 (46.5)	53 (39.1)	38 (28)	32 (23.6)
G 3/8 A	10 (0.394) or 12 (0.472)	12 (0.472)	95 (70.1)	84 (62)	57 (42)	50 (36.9)
G 1/2 A	16 (0.630)	15 (0.591) or 18 (0.709)	136 (100.3)	105 (77.4)	82 (60.5)	63 (46.5)
G 3/4 A	20 (0.787)	22 (0.866)	210 (154.9)	210 (154.9)	126 (92.9)	126 (92.9)
G 1 A	25 (0.984)	28 (1.102)	400 (295)	400 (295)	240 (177)	240 (177)
G 1 1/4 A	30 (1.181)	35 (1.378)	525 (387.2)	525 (387.2)	315 (232.3)	315 (232.3)
G 1 1/2 A	38 (1.496)	42 (1.654)	660 (486.8)	660 (486.8)	396 (292.1)	396 (292.1)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for metric port connections (Metric face-seal ports and stud ends)

	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
Metric thread	**S-Series ***	**L-Series ****	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**
M10 x 1	–	4 (0.157)	–	21 (15.5)	–	12.5 (9.2)
M12 x 1.5	4 (0.157)	6 (0.236)	47 (34.7)	32 (23.6)	28 (20.7)	19 (14)
M14 x 1.5	5 (0.197)	7 (0.276)	63 (46.5)	53 (39.1)	38 (28)	32 (23.6)
M16 x 1.5	7 (0.276)	9 (0.354)	84 (62)	63 (46.5)	50 (36.9)	38 (28)
M18 x 1.5	8 (0.315)	11 (0.433)	105 (77.4)	84 (62)	63 (46.5)	50 (36.9)
M20 x 1.5	10 (0.394)	–	147 (108.4)	–	88 (64.9)	–
M22 x 1.5	12 (0.472)	14 (0.551)	158 (116.5)	147 (108.4)	95 (70.1)	88 (64.9)
M26 x 1.5	–	18 (0.709)	–	210 (154.9)	–	126 (92.9)
M27 x 1.2	16 (0.630)	–	210 (154.9)		126 (92.9)	–
M33 x 2	20 (0.787)	23 (0.906)	400 (295)	400 (295)	240 (177)	240 (177)
M42 x 2	25 (0.984)	30 (1.181)	525 (387.2)	525 (387.2)	315 (232.3)	315 (232.3)
M48 x 2	32 (1.260)	36 (1.417)	630 (464.7)	630 (464.7)	396 (292.1)	396 (292.1)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for Inch O-Ring Boss (ORB) port non-adjustable connections

			S-Series *		L-Series **	
SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%
2	5/16-24	3.18 (0.125)	–	–	8.5 (6.3)	5 (3.7)
3	3/8-24	4.76 (0.187)	15.5 (11.4)	9.3 (6.9)	10.5 (7.7)	6.3 (4.6)
4	7/16-20	6.35 (0.250)	37 (27.3)	22 (16.2)	19 (14)	11.5 (8.5)
5	1/2-20	7.94 (0.313)	42 (31)	25 (18.4)	26 (19.2)	15.5 (11.4)
6	9/16-18	9.52 (0.375)	47 (34.7)	28 (20.7)	32 (23.6)	19 (14)
8	3/4-16	12.7 (0.500)	89 (65.6)	53 (39.1)	53 (39.1)	32 (23.6)
10	7/8-14	15.88 (0.625)	121 (89.2)	73 (53.8)	63 (46.5)	38 (28)
12	1-1/16-12	19.05 (0.750)	178 (131.3)	107 (78.9)	100 (73.8)	60 (44.3)
14	1-3/16-12	22.22 (0.875)	225 (166)	135 (99.6)	131 (96.6)	79 (58.3)
16	1-5/16-12	25.4 (1.000)	283 (208.7)	170 (125.4)	156 (115.1)	94 (69.3)
20	1-5/8-12	31.75 (1.250)	300 (221.3)	180 (132.8)	210 (154.9)	126 (92.9)
24	1-7/8-12	38.1 (1.500)	388 (286.2)	233 (171.9)	220 (162.3)	132 (97.4)
32	2-1/2-12	50.8 (2.000)	388 (286.2)	233 (171.9)	315 (232.3)	189 (139.4)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for inch O-Ring Boss (ORB) port adjustable connections

			S-Series *		L-Series **	
SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%
2	5/16-24	3.18 (0.125)	–	–	8.5 (6.3)	5 (3.7)
3	3/8-24	4.76 (0.187)	10.5 (7.7)	9.3 (6.9)	10.5 (7.7)	6.3 (4.6)
4	7/16-20	6.35 (0.250)	21 (15.5)	21 (15.5)	19 (14)	11.5 (8.5)
5	1/2-20	7.94 (0.313)	42 (31)	25 (18.4)	26 (19.2)	15.5 (11.4)
6	9/16-18	9.52 (0.375)	47 (34.7)	28 (20.7)	32 (23.6)	19 (14)
8	3/4-16	12.7 (0.500)	89 (65.6)	53 (39.1)	53 (39.1)	32 (23.6)
10	7/8-14	15.88 (0.625)	121 (89.2)	73 (53.8)	63 (46.5)	38 (28)
12	1-1/16-12	19.05 (0.750)	178 (131.3)	107 (78.9)	100 (73.8)	60 (44.3)
14	1-3/16-12	22.22 (0.875)	225 (166)	135 (99.6)	131 (96.6)	79 (58.3)
16	1-5/16-12	25.4 (1.000)	285 (210.2)	170 (125.4)	156 (115.1)	94 (69.3)
20	1-5/8-12	31.75 (1.250)	300 (221.3)	180 (132.8)	210 (154.9)	126 (92.9)
24	1-7/8-12	38.1 (1.500)	388 (286.2)	233 (171.9)	220 (162.3)	132 (97.4)
32	2-1/2-12	50.8 (2.000)	388 (286.2)	233 (171.9)	315 (232.3)	189 (139.4)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for inch O-Ring Boss (ORB) port plugs

		Ferrous		Non-Ferrous
SAE dash size	UN/UNF thread size	Internal hex N·m (lb ft) ± 10%	External hex N·m (lb ft) ± 10%	N·m (lb ft) ± 10%
2	5/16-24	7.5 (5.5)	12.5 (9.2)	7.5 (5.5)
3	3/8-24	14.5 (10.7)	21 (15.5)	12.5 (9.2)
4	7/16-20	21 (15.5)	37 (27.3)	22 (16.2)
5	1/2-20	28 (20.7)	42 (31)	25 (18.4)
6	9/16-18	47 (34.7)	47 (34.7)	28 (20.7)
8	3/4-16	89 (65.6)	89 (65.6)	53 (39.1)
10	7/8-14	116 (85.6)	116 (85.6)	70 (51.6)
12	1-1/16-12	176 (129.8)	176 (129.8)	106 (78.2)
14	1-3/16-12	247 (182.2)	247 (182.2)	148 (109.2)
16	1-5/16-12	284 (209.5)	284 (209.5)	170 (125.4)
20	1-5/8-12	357 (263.3)	357 (263.3)	214 (157.8)
24	1-7/8-12	441 (325.3)	441 (325.3)	265 (195.5)
32	2-1/2-12	536 (395.3)	536 (395.3)	322 (237.5)

Torque values for four-bolt flange connections (Metric Screws, Class 10.9)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	M8 x 1.25	34 (25.1)	M8 x 1.25	34 (25.1)
19	3/4	M10 x 1.5	74 (54.6)	M10 x 1.5	74 (54.6)
25	1	M10 x 1.5	74 (54.6)	M12 x 1.75	137 (101)
32	1-1/4	M10 x 1.5	74 (54.6)	M12 x 1.75	137 (101)
				M14 x 1.5	189 (139.4)
38	1-1/2	M12 x 1.75	137 (101)	M16 x 2	310 (228.6)
51	2	M12 x 1.75	137 (101)	M20 x 2.5	575 (424.1)
64	2-1/2	M12 x 1.75	137 (101)	M24 x 3	575 (424.1)
76	3	M16 x 2	310 (228.6)	M30 x 3.5	680 (501.5)
89	3-1/2	M16 x 2	310 (228.6)	–	–
102	4	M16 x 2	310 (228.6)	–	–
127	5	M16 x 2	310 (228.6)	–	–

Torque values for four-bolt flange connections (Metric Screws, Class 8.8)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	M8 x 1.25	29 (21.4)	M8 x 1.25	29 (21.4)
19	3/4	M10 x 1.5	57(42)	M10 x 1.5	57(42)
25	1	M10 x 1.5	57(42)	M12 x 1.75	100 (73.8)
32	1-1/4	M10 x 1.5	57(42)	M12 x 1.75	100 (73.8)
				M14 x 1.5	160 (118)
38	1-1/2	M12 x 1.75	100 (73.8)	M16 x 2	250 (184.4)
51	2	M12 x 1.75	100 (73.8)	M20 x 2.5	500 (368.8)
64	2-1/2	M12 x 1.75	100 (73.8)	M24 x 3	575 (424.1)
76	3	M16 x 2	250 (184.4)	M30 x 3.5	680 (501.5)
89	3-1/2	M16 x 2	250 (184.4)	–	–
102	4	M16 x 2	250 (184.4)	–	–
127	5	M16 x 2	250 (184.4)	–	–

Torque values for four-bolt flange connections (Inch Screws, Grade 8)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	5/16-18	34 (25.1)	5/16-18	34 (25.1)
19	3/4	3/8-16	63 (46.5)	3/8-16	63 (46.5)
25	1	3/8-16	63 (46.5)	7/16-14	97 (71.5)
32	1-1/4	7/16-14	97 (71.5)	1/2-13	158 (116.5)
38	1-1/2	1/2-13	158 (116.5)	5/8-11	310 (228.6)
51	2	1/2-13	158 (116.5)	3/4-10	473 (348.9)
64	2-1/2	1/2-13	158 (116.5)	–	–
76	3	5/8-11	310 (228.6)	–	–
89	3-1/2	5/8-11	310 (228.6)	–	–
102	4	5/8-11	310 (228.6)	–	–
127	5	5/8-11	310 (228.6)	–	–

Tapered thread connection tightening

British Standard Pipe Taper (BSPT) thread size (inch)	National Pipe Thread Fuel (NPTF) thread size (inch)	Turns from finger tight
1/8-28	1/8-27	2 - 3
1/4-19	1/4-18	2 - 3
3/8-19	3/8-18	2 - 3
1/2-14	1/2-14	2 - 3
3/4-14	3/4-14	2 - 3
1-11	1-11 1/2	1.5 - 2.5
1-1/4-11	1-1/4-11 1/2	1.5 - 2.5
1-1/2-11	1-1/2-11 1/2	1.5 - 2.5
2-11	2-11 1/2	1.5 - 2.5

Torque values for banjo bolt connections (Copper washer style)

Bolt thread (metric)	Hex size (mm)	Torque N·m (lb ft) ± 10%
M8 x 1.25	13	13 (9.6)
M10 x 1.25	17	16 (11.8)
M12 x 1.5	17	40 (29.5)
M14 x 1.5	19	45 (33.2)
M16 x 1.5	22	48 (35.4)
M18 x 1.5	24	50 (36.9)
M20 x 1.5	27	73 (53.8)
M22 x 1.5	32	73 (53.8)
M24 x 1.5	32	73 (53.8)

Torque values for O-Ring Face Seals (ORFS) connections

SAE dash size	UN/UNF thread size	Inch tube OD (mm)	Metric tube OD (mm)	Hex size (mm) (Reference only)	* Swivel nut torque N·m (lb ft) ± 10%	** Swivel nut torque N·m (lb ft) ± 10%
4	9/16-18	6.35	6	17	27 (19.9)	27 (19.9)
5	5/8-18	7.94	8	19	34 (25.1)	34 (25.1)
6	11/16-16	9.52	10	22	44 (32.5)	44 (32.5)
8	13/16-16	12.7	12	24	65 (47.9)	65 (47.9)
10	1-14	15.88	16	30	100 (73.8)	100 (73.8)
12	1-3/16-12	19.05	20	36	150 (110.6)	131 (96.6)
14	1-5/16-12	22.23	22	41	163 (120.2)	131 (96.6)
16	1-7/16-12	25.4	25	41	210 (154.9) ***	131 (96.9)
20	1-11/16-12	31.75	30	50	280 (206.5) ***	178 (131.3)
24	2-12	38.1	38	60	375 (276.6) ***	210 (154.9)

* High/Medium-pressure applications > **50 bar** (**725 psi**).

** Low-pressure applications < **50 bar** (**725 psi**).

*** It is recommended to use a four-bolt flange connection instead of O-Ring Face Seals (ORFS) sizes "16" and up.

Torque values for 37° flare connections - Joint Industry Council (JIC)

SAE dash size	UN/UNF thread size	Metric tube OD (mm)	Inch tube OD (mm)	Swivel nut torque N·m (lb ft) ± 10%
2	5/16-24	–	3.18	8.25 (6.1)
3	3/8-24	–	4.76	11.5 (8.5)
4	7/16-20	6	6.35	15.5 (11.4)
5	1/2-20	8	7.94	20 (14.8)
6	9/16-18	10	9.52	25 (18.4)
8	3/4-16	12	12.7	52 (38.4)
10	7/8-14	16	15.88	81 (59.7)
12	1-1/16-12	20	19.05	112 (82.6)
14	1-3/16-12	–	22.22	133 (98.1)
16	1-5/16-12	25	25.4	155 (114.3)
20	1-5/8-12	30/32	31.75	180 (132.8)
24	1-7/8-12	38	38.1	225 (166)
32	2-1/2-12	50	50.8	348 (256.7)

Torque values for 30° flare, 60° cone connections

Nominal size (mm)	British Standard Pipe Parallel (BSPP) thread size	Hex size (mm)	Swivel nut torque N·m (lb ft) ± 10%
5, 6, 6.3	G 1/4	17	25 (18.4)
8, 9, 10	G 3/8	19	34 (25.1)
12, 12.5	G 1/2	22	64 (47.2)
15, 16, 19	G 3/4	30	132 (97.4)
25	G 1	36	196 (144.6)
31.5, 32	G 1-1/4	46	225 (166)
38	G 1-1/2	50	255 (188.1)
50, 51	G 2	65	316 (223.1)

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

General specification - Biodiesel usage

Biodiesel usage in NEW HOLLAND products

Introduction to Fatty Acid Methyl Ester (FAME) biodiesel

FAME biodiesel, called biodiesel fuel in the following section, consists of a family of fuels derived from vegetable oils treated with methyl esters.

There are two main biodiesel fuel types: Rapeseed Methyl Ester (RME) and Soybean Methyl Ester (SME). RME is a blend of rapeseed and sunflower methyl ester, and is the preferred crop in Europe. SME is the preferred crop in the United States.

Biodiesel fuel is a renewable alternative fuel source. Its use and development is promoted worldwide, especially in Europe and in the United States.

NOTICE: *Your emissions control system is compatible with up to **7%** biodiesel fuel (B7). Be aware that the use of biodiesel fuel that does not comply with the standards mentioned in this section could lead to severe damage to the engine, fuel system or aftertreatment system of your machine. The use of non-approved fuels may void NEW HOLLAND Warranty coverage.*

Biodiesel can be used to run Tier 4b diesel engines only when blended with standard diesel fuel:

- B5: indicates the blend of **5%** biodiesel and **95%** diesel fuel.
- B7: indicates the blend of **7%** biodiesel and **93%** diesel fuel.
- B20: indicates the blend of **20%** biodiesel and **80%** diesel fuel. DO NOT USE!

Biodiesel fuel has several positive features in comparison with diesel fuel:

- Biodiesel fuel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel.
- Biodiesel has a greater cetane number and burns cleaner.
- Biodiesel produces less particulate matter and reduces smoke emissions.
- Biodiesel is fully biodegradable and non-toxic.

Diesel and biodiesel fuel specifications

Tier 4b diesel fuel specifications are covered by the following:

- **ASTM D975**, Standard Specification for Diesel Fuel Oils. (15 ppm sulfur maximum.)

Biodiesel blends are covered by:

- United States Diesel Fuel Specification **ASTM D6751** allows up to **5%** biodiesel since 2009. United States fuel suppliers are allowed to use up to **5%** biodiesel fuel (B5) to supply the network.
- United States Biodiesel Fuel Specification **ASTM D7467-09A** provides specifications for diesel and biodiesel blends.

Pure biodiesel blend stock (B100) specification is covered by the following requirements:

- **ASTM D6751** - Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels.

  NOTE: ASTM D6751 *specification has been updated to improve the quality of biodiesel in the market place.*

Before raw oil can be converted into usable biodiesel fuel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerine from the fat or vegetable oil. This process leaves behind two products: methyl ester (the chemical name for biodiesel) and glycerine (a byproduct usually sold for use in soaps or other products).

NOTICE: *Biodiesel fuels approved for use in the NEW HOLLAND equipment must be transesterified and comply with the North America Standard **ASTM D6751**.*

NOTICE: *Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel, are fuels that are normally made from Rapeseed oil or similar high oil content crops. These kinds of fuel are not transesterified, so they do not fulfil the **ASTM D6751** requirements. There is no recognized quality standard available for these types of fuel. Therefore the use of Cold Pressed Biodiesel, Cold Pressed*

Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel are NOT APPROVED at any blend in any NEW HOLLAND product.

***NOTICE:** Any engine and fuel injection equipment fitted to a NEW HOLLAND vehicle found to have run with any blend of NON-APPROVED fuel (fuel not fulfilling the specification described in the requirement **ASTM D6751**) will no longer be covered for Warranty by NEW HOLLAND.*

Biodiesel fuel usage conditions

You must stringently follow the biodiesel fuel usage conditions. Incorrect application of the biodiesel fuel usage conditions could lead to severe damage to the engine, fuel injection equipment and aftertreatment system.

The main concerns related to operation with biodiesel fuels are:

- Filters and injector blockage caused by poor fuel quality.
- Wear and corrosion of internal components due to water content, which affects lubricity.
- Deterioration of some rubber sealing compounds in the fuel system.
- Biodiesel oxidation, which can lead to the formation of deposits that can harm the fuel injection system.

***NOTICE:** Any problem in the engine fuel injection equipment associated with non-compliance to the following conditions for biodiesel fuel handling and maintenance will not be covered for Warranty by NEW HOLLAND.*

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality. It is highly recommended that you use biodiesel from BQ 9000 accredited suppliers to maintain the quality and consistency of the fuel. The BQ 9000 Quality Management Program is accredited by the National Biodiesel Board for producers and marketers of biodiesel fuel. See the National Biodiesel Board website at www.biodiesel.org for more information.

The use of biodiesel blends above B5 through B20 will not void the NEW HOLLAND warranty as long as the following conditions for biodiesel fuel handling and maintenance are stringently followed:

Biodiesel fuel must be pre-blended by the supplier. Mixing biodiesel fuels on-site can result in an incorrect mixture that could damage the engine and/or fuel system.

For machines using Tier 4b engines with an exhaust aftertreatment system:

1. If the biodiesel blend stock to **ASTM D6751** is used, special precautions need to be taken to insure that it fully complies with the following special requirements:
   - Group I Metals content (Sodium + Potassium) is ≤ **5 mg/kg** per **EN14538** as specified in the biodiesel spec.
   - Group II Metals content (Calcium + Magnesium) is ≤ **5 mg/kg** per **EN14538** as specified in the biodiesel spec.
   - Phosphorus content lower than specified is a mandatory requirement. Phosphorus must not exceed **4 mg/kg** per **ASTM D4951**.
2. The resulting greater than B5 through B20 blend must not exceed **1 mg/kg** for Group I Metals (Sodium + Potassium) and for Group II Metals (Calcium + Magnesium).

NOTICE: For machines using Tier 4b engines with an exhaust aftertreatment system in regions where the biodiesel blend stock is supplied to the ASTM D6751 standard, it is essential that evidence of compliance to the special limits for Group I Metals, Group II Metals and the reduced phosphorus content specified above be obtained on every delivery of fuel from the fuel supplier. Failure to comply with this requirement can result in damage to the catalyst of the aftertreatment system which will not be covered under warranty.

***NOTICE:** NEW HOLLAND may void your warranty if the problem is associated with poor fuel quality due to improper blending. It is the responsibility of the fuel supplier and/or yourself to ensure the right type of fuel and blend is delivered and used.*

Maintenance intervals

For machines using the all electronic engines with a high pressure common rail fuel system, the engine oil and filter change interval is reduced to **250 h** when using biodiesel blends greater than B5 up to B20. Please refer to the maintenance intervals specified in the Operator Manual for all engines.

Check all hoses, connections and gaskets to ensure integrity and cleanliness every 3 months or 150 hours of operation, whichever comes first.

Regular oil sampling is highly recommended to monitor for oil and engine deterioration.

NOTE: *Oil sampling kits are available from your authorized NEW HOLLAND dealer.*

When switching back from biodiesel to regular #2 diesel, all fuel filter, oil and oil filter should be changed even if this falls between routine service intervals.

Storage

The machine should not be stored for more than three months with biodiesel in the fuel system. For longer storage time, it is strongly suggested that only regular #2 diesel fuel is used.

NOTE: *If storage for longer than 3 months is necessary, the engine must be run on regular #2 diesel for a minimum of* ***20 h*** *to flush the biodiesel fuel out of the fuel system prior to storage.*

Biodiesel is highly hygroscopic and tends to collect water more than diesel fuel. This increases the risk of algae and bacteria growth which can cause severe damage to the fuel injection system. Keep the machine fuel tanks and on-site storage tanks as full as possible to limit the amount of air and water vapors inside the tank. Drain water from the tanks at least once a week.

NOTICE: *Do not use biocide additives on Tier 4b engines with an exhaust aftertreatment system.*

Consumables

Lubricant	Type and Description	Part Number	Container Size
Engine Oil API CJ-4	**NEW HOLLAND AMBRA MASTERGOLD™ ENGINE OIL CJ-4 SAE 10W-30**	9613313	**0.946 l** (**1 US qt**)
		86641052	**3.785 l** (**1 US gal**)
		9673508	**18.93 l** (**5 US gal**)
	NEW HOLLAND AMBRA MASTERGOLD™ ENGINE OIL CJ-4 SAE 15W-40	86641081	**0.946 l** (**1 US qt**)
		86641082	**3.785 l** (**1 US gal**)
		86641083	**18.93 l** (**5 US gal**)
Transmission/Hydraulic Oil	**NEW HOLLAND AMBRA MULTI G 134™ HYDRAULIC TRANSMISSION OIL**	9624451	**18.93 l** (**5 US gal**)
	TUTELA F200A MULTI-SEASON	B17805	**18.93 l** (**5 US gal**)
Front Axle/Gear Oil	**NEW HOLLAND AMBRA HYPOIDE 90**	B80901	**0.946 l** (**1 US qt**)
		B80903	**9.46 l** (**2.5 US gal**)
Grease	**NEW HOLLAND AMBRA GR-9 MULTI-PURPOSE GREASE**	73340211	Tube **14 oz**
Coolant	Ethylene Glycol Coolant	NA	NA

General specification

	Model Boomer™ 35 Hydrostatic/Mechanical	Model Boomer™ 40 Hydrostatic/Mechanical
Engine		
Type	Diesel	Diesel
Model	L3C19-T5	L3C19–T4
Emission level (tier)	Tier 4B (final)	Tier 4B (final)
Aspiration	Turbo	Turbo
Engine gross horsepower	**26 kW** (**35 Hp**)	**29 kW** (**39 Hp**)
Cylinders	3	3
Bore	**88.000 mm** (**3.465 in**)	**84 mm** (**3.3 in**)
Stroke	**103.000 mm** (**4.055 in**)	**103.000 mm** (**4.055 in**)
Displacement	**1879 cm³** (**114.7 in³**)	**1879 cm³** (**114.7 in³**)
Compression ratio	17.0:1	17.0:1
Firing order	1-2-3	1-2-3
Low idle speed	**850 RPM**	**850 RPM**
Maximum speed :		
High Idle	**2800 RPM**	**2800 RPM**
Rated	**2600 RPM**	**2600 RPM**
Valve clearance (cold)		
Intake	**0.2 mm** (**0.008 in**)	**0.2 mm** (**0.008 in**)
Exhaust	**0.2 mm** (**0.008 in**)	**0.2 mm** (**0.008 in**)
Block type:		
	Cast iron	Cast iron
Lubrication:		
	Pressure feed w/ trochoid pump	Pressure feed w/ trochoid pump
Capacities		
Fuel tank	**47.0 L** (**12.4 US gal**)	**47.0 L** (**12.4 US gal**)
Cooling system	**7.5 L** (**7.1 US qt**)	**7.5 L** (**7.1 US qt**)
Engine crankcase:		
With Filter	**5.0 L** (**5.3 US qt**)	**5.0 L** (**5.3 US qt**)
Rear axle & transmission (Includes hydraulics)		
Mechanical	**32 l** (**8.5 US gal**)	**32 l** (**8.5 US gal**)
HST	**32.0 l** (**8.5 US gal**)	**32.0 l** (**8.5 US gal**)
Front axle	**5.5 l** (**5.8 US qt**)	**5.5 l** (**5.8 US qt**)
Cooling system		
Type	Pressurized liquid with recirculating bypass	Pressurized liquid with recirculating bypass
Water pump:		
Type	Centrifugal	Centrifugal
Drive	V-Belt	V-Belt
Belt deflection	**10 – 13 mm** (**0.4 – 0.5 in**) when **10 kg** (**22 lb**) pressure is applied midway between belt pulleys	**10 – 13 mm** (**0.4 – 0.5 in**) when **10 kg** (**22 lb**) pressure is applied midway between belt pulleys
Fan diameter	**380 mm** (**15.0 in**)	**380 mm** (**15.0 in**)
Thermostat:		
Start to open	**82 °C** (**179.6 °F**)	**82 °C** (**179.6 °F**)
Fully Open	**95 °C** (**203 °F**)	**95 °C** (**203 °F**)
Radiator cap	**90 kPa** (**12.8 psi**)	**90 kPa** (**12.8 psi**)
Electrical system		

	Model Boomer™ 35 Hydrostatic/Mechanical	Model Boomer™ 40 Hydrostatic/Mechanical
Alternator	**12 V**, Heavy duty, **70 A**	**12 V**, Heavy duty, **70 A**
Battery	**12 V**, w/ negative ground, 80 / 660 cca BCI Group 34	**12 V**, w/ negative ground, 80 / 660 cca BCI Group 34
Starting motor	Solenoid pre-engaged reduction	Solenoid pre-engaged reduction
Cold - start aid	Glow plug	Glow plug
Fuel system		
Fuel type	Diesel	Diesel
Type of fuel to use if above **-7 °C** (**19 °F**)	No. 2-Diesel, Cetane rating: minimum 40	No. 2-Diesel, Cetane rating: minimum 40
Type of fuel to use if below **-7 °C** (**19 °F**)	No. 1-Diesel, Cetane rating: minimum 40	No. 1-Diesel, Cetane rating: minimum 40
Sulphur content (Maximum) :	No. 1-Diesel	**0.3%**
Sulphur content (Maximum) :	No. 2-Diesel	**0.3%**
Injection pump :		
Type	High pressure common rail	High pressure common rail
Timing	Varies, Engine Control Unit (ECU) controlled	Varies, Engine Control Unit (ECU) controlled
Mechanical Transmission		
Clutch		
Type	Dry disc	Dry disc
Number of clutches	1	1
Number of plates	1	1
Material	Organic	Organic
Plate diameter	**240 mm** (**9.4 in**) Transmission 12x12 Trans	**240 mm** (**9.4 in**) Transmission 12x12 Trans
Plate surface area	**25133 mm²** (**39 in²**)	**25133 mm²** (**39 in²**)
Method of operation	Foot-Mechanical	Foot-Mechanical
Pedal : Free-travel	**20 – 30 mm** (**0.8 – 1.2 in**)	**20 – 30 mm** (**0.8 – 1.2 in**)
HST Transmission		
Number of range gears and speeds	3	3
Range synchronization	None	None
Number of gear levers	1	1
Cruise control offering	STD	STD
Cruise control type	Electro - magnetic	Electro - magnetic
High pressure relief valve setting	**39224 kPa** (**5689 psi**)	**39224 kPa** (**5689 psi**)
Trans/rear axle oil capacity	**32 L** (**8.5 US gal**)	**32 L** (**8.5 US gal**)
Service brake		
Type	Wet disc	Wet disc
Actuation	Mechanical	Mechanical
Number of plates - per axle	2	2
Total number pf Plates	4	4
Disc lining diameter OD	**223.5 mm** (**8.79 in**)	**223.5 mm** (**8.79 in**)
Disc lining diameter ID	**174 mm** (**6.85 in**)	**174 mm** (**6.85 in**)
Lining type (Material)	Paper	Paper
Service brake pedal parking lock	Yes	Yes
Parking brake		

	Model Boomer™ 35 Hydrostatic/Mechanical	Model Boomer™ 40 Hydrostatic/Mechanical
Type	Latch	Latch
Location	Seat side	Seat side
Actuation	Mechanical	Mechanical
Number of plates	4	4
Lever latching	Cable activated	Cable activated
Steering		
Type	Power	Power
Turns lock-to-lock:		
FWD	2.86 L to R 2.89 R to L	2.86 L to R 2.89 R to L
Front wheel		
Toe-in	**0 – 5 mm** (**0 – 0.20 in**)	**0 – 5 mm** (**0 – 0.20 in**)
Turning radius w/o brakes:		
FWD	**3463 mm** (**136 in**) Left turn **3463 mm** (**136 in**) Right turn	**3463 mm** (**136 in**) Left turn **3463 mm** (**136 in**) Right turn
Steering system relief valve setting	**120 Kg/cm²** (**1707 psi**)	**120 Kg/cm²** (**1707 psi**)
Maximum pump flow:	**15.9 L/min** (**4.2 US gpm**) Mechanical , **19.9 L/min** (**5.3 US gpm**) HST	**15.6 L/min** (**4.1 US gpm**) Mechanical, **19.9 L/min** (**5.3 US gpm**) HST
Power Take - Off (Rear)		
Type	Independent	Independent
Clutch type	Wet disc	Wet disc
Clutch material, asbestos free (Yes or No)	Yes	Yes
Number of plates	6	6
Plate diameter	**90.0 mm** (**3.5 in**)	**90.0 mm** (**3.5 in**)
Plate surface area	**3145.0 mm²** (**4.9 in²**)	**3145.0 mm²** (**4.9 in²**)
Actuation	Switch	Switch
Number of splines	6	6
Shaft size:	**35.0 mm** (**1.4 in**)	**35.0 mm** (**1.4 in**)
Engine speed for **540 RPM** rear PTO operation	**2509 RPM**	**2509 RPM** -
PTO Horsepower observed	**20.6 kW** (**28.0 Hp**) - HST **21.8 kW** (**29.7 Hp**) - Mechanical	**23.5 kW** (**32.0 Hp**) - HST **25.0 kW** (**34.0 Hp**) Mechanical
Mid PTO (optional)		
Type	Independent	Independent
Clutch type	Wet disc	Wet disc
Number of plates	6	6
Actuation	Manual lever	Manual lever
Direction of rotation (As viewed from rear of tractor)	Clockwise	Clockwise
Number of splines	15	15
Shaft size:	**25.4 mm** (**1 in**)	**25.4 mm** (**1 in**)
Engine Speed for **2000 RPM** mid PTO operation	**2545 RPM**	**2545 RPM**
Hydraulic lift system		
Type	Open center	Open center
Pump type	Gear	Gear
Pump capacity	**31.2 L** (**8.2 US gal**)	**31.2 L** (**8.2 US gal**)
System relief valve setting	**16671 kPa** (**2418 psi**)	**16671 kPa** (**2418 psi**)

	Model Boomer™ 35 Hydrostatic/Mechanical	Model Boomer™ 40 Hydrostatic/Mechanical
Transmission speeds (Hydrostatic)		
	(**2600 RPM** Engine rated speed with 11.2-24 Rear tires)	(**2600 RPM** Engine rated speed with 11.2-24 Rear tires)
Gear position:		
Low	**0 – 5.23 km/h** (**0 – 3.251 mph**)	**0 – 5.23 km/h** (**0 – 3.251 mph**)
Mid	**0 – 10.69 km/h** (**0 – 6.64 mph**)	**0 – 10.69 km/h** (**0 – 6.64 mph**)
High	**0 – 24.07 km/h** (**0 – 14.96 mph**)	**0 – 24.07 km/h** (**0 – 14.96 mph**)
Reverse low	**0 – 5.23 km/h** (**0 – 3.25 mph**)	**0 – 5.23 km/h** (**0 – 3.25 mph**)
Reverse mid	**0 – 10.69 km/h** (**0 – 6.64 mph**)	**0 – 10.69 km/h** (**0 – 6.64 mph**)
Reverse high	**0 – 24.07 km/h** (**0 – 14.96 mph**)	**0 – 24.07 km/h** (**0 – 14.96 mph**)
Transmission speeds (Mechanical)		
Gear position: forward		
Range Low, 1st gear	**1.19 km/h** (**0.74 mph**)	**1.19 km/h** (**0.74 mph**)
Range Low, 2nd gear	**1.73 km/h** (**1.07 mph**)	**1.73 km/h** (**1.07 mph**)
Range Low, 3rd gear	**2.24 km/h** (**1.39 mph**)	**2.24 km/h** (**1.39 mph**)
Range Low, 4th gear	**2.76 km/h** (**1.72 mph**)	**2.76 km/h** (**1.72 mph**)
Range Mid, 1st gear	**3.23 km/h** (**2.01 mph**)	**3.23 km/h** (**2.01 mph**)
Range Mid, 2nd gear	**4.71 km/h** (**2.93 mph**)	**4.71 km/h** (**2.93 mph**)
Range Mid, 3rd gear	**6.12 km/h** (**3.80 mph**)	**6.12 km/h** (**3.80 mph**)
Range Mid, 4th gear	**7.54 km/h** (**4.68 mph**)	**7.54 km/h** (**4.68 mph**)
Range High 1st gear	**9.39 km/h** (**6.14 mph**)	**9.39 km/h** (**6.14 mph**)
Range High, 2nd gear	**14.42 km/h** (**8.95 mph**)	**14.42 km/h** (**8.95 mph**)
Range High, 3rd gear	**18.71 km/h** (**11.61 mph**)	**18.71 km/h** (**11.61 mph**)
Range High, 4th gear	**23.07 km/h** (**14.33 mph**)	**23.07 km/h** (**14.33 mph**)
Gear position: reverse		
Range Low, 1st gear	**1.13 km/h** (**0.70 mph**)	**1.13 km/h** (**0.70 mph**)
Range Low, 2nd gear	**1.64 km/h** (**1.02 mph**)	**1.64 km/h** (**1.02 mph**)
Range Low, 3rd gear	**2.13 km/h** (**1.32 mph**)	**2.13 km/h** (**1.32 mph**)
Range Low, 4th gear	**2.63 km/h** (**1.63 mph**)	**2.63 km/h** (**1.63 mph**)
Range Mid, 1st gear	**3.07 km/h** (**1.91 mph**)	**3.07 km/h** (**1.91 mph**)
Range Mid, 2nd gear	**4.48 km/h** (**2.78 mph**)	**4.48 km/h** (**2.78 mph**)
Range Mid, 3rd gear	**5.81 km/h** (**3.61 mph**)	**5.81 km/h** (**3.61 mph**)
Range Mid, 4th gear	**7.17 km/h** (**4.46 mph**)	**7.45 km/h** (**4.63 mph**)
Range High 1st gear	**9.40 km/h** (**5.84 mph**)	**9.76 km/h** (**6.07 mph**)
Range High, 2nd gear	**13.71 km/h** (**8.52 mph**)	**14.23 km/h** (**8.85 mph**)
Range High, 3rd gear	**17.78 km/h** (**11.05 mph**)	**18.47 km/h** (**11.47 mph**)
Range High, 4th gear	**21.93 km/h** (**13.63 mph**)	**21.93 km/h** (**13.63 mph**)
Cast iron weights		
Front end:		
With weight extension bracket installed	(5) weights @ **26 kg** (**60 lb**) each	(5) weights @ **26 kg** (**60 lb**) each
With weight extension bracket installed	Optional (3) weights @ **45 kg** (**100 lb**) each	Optional (3) weights @ **45 kg** (**100 lb**) each
Rear wheel:		
R-4 Tires	**50 kg** (**110 lb**)	**50 kg** (**110 lb**)
Turf Tires	NA	NA
Ag. Tires	**50 kg** (**110 lb**)	**50 kg** (**110 lb**)
Drawbars		

	Model Boomer™ 35 Hydrostatic/Mechanical	Model Boomer™ 40 Hydrostatic/Mechanical
Adjustable	Standard	Standard
Max permissible towing weight and max load		
Max permissible towing weight, lbs (kg)	**1300 kg** (**2866 lb**)	**1300 kg** (**2866 lb**)
Max load, Kg, (lbs.), drawbar in short position	**730 kg** (**1609 lb**)	**730 kg** (**1609 lb**)
Max load, Kg, (lbs.), drawbar in regular position	**504 kg** (**1111 lb**)	**504 kg** (**1111 lb**)
Max load, Kg, (lbs.), drawbar in extend position	**344 kg** (**758 lb**)	**344 kg** (**758 lb**)
Tires		
Front :		
Agricultural:	7-14, 6PR, R1	7-14, 6PR, R1
Turf:	25 x 8.50-14, 4PR, R3	25 x 8.50-14, 4PR, R3
Industrial:	25 x 8.50-14, 6PR, R4	25 x 8.50-14, 6PR, R4
Rear :		
Agricultural	11.2-24, 4PR, R1	11.2-24, 4PR, R1
Turf	41 x 14.00-20, 4PR, R3	41 x 14.00-20, 4PR, R3
Industrial	43 x 16-20, 4PR, R4	43 x 16-20, 4PR, R4
Wheel bolt torques		
Front wheel --- disc-to-hub:		
FWD	**176 – 196 N·m** (**130 – 145 lb ft**)	**176 – 196 N·m** (**130 – 145 lb ft**)
Rear wheel --- disc-to axle	**176 – 196 N·m** (**130 – 145 lb ft**)	**176 – 196 N·m** (**130 – 145 lb ft**)
ROPS attaching bolt torques		
ROPS to rear axle	**147 N·m** (**108 lb ft**)	**147 N·m** (**108 lb ft**)
Seat belt	**54 N·m** (**40 lb ft**)	**54 N·m** (**40 lb ft**)

Dimension - Roll Over Protection System (ROPS)

Boomer™ 35 Tier 4B (final), ROPS [LSM0B35Rxx0010001 - LSM0B35RVH0010043]	
Boomer™ 40 Tier 4B (final), ROPS [LSM0B40Rxx0010001 - LSM0B40REH0010028]	

	Boomer™ 35	Boomer™ 40
(1) - Minimum ground clearance (under drawbar):		
Ag. tires: 11.2-24	**330.5 mm** (**13.0 in**)	**330.5 mm** (**13.0 in**)
Turf tires: 41 x 14.00-20	**300.0 mm** (**11.8 in**)	**300.0 mm** (**11.8 in**)
Ind. tires: 43 x 16-20	**310.0 mm** (**12.2 in**)	**310.0 mm** (**12.2 in**)
Wheel tread settings:		
(2)-Front:		
Ag. tires: 7-14	**1205 mm** (**47.4 in**)	**1205 mm** (**47.4 in**)
Turf tires: 25 x 8.50-14 4 PR (Dished in only)	**1159 mm** (**45.6 in**)	**1159 mm** (**45.6 in**)
Ind. tires: 25 x 8.50-14 6 PR (Dished in only)	**1159 mm** (**45.6 in**)	**1159 mm** (**45.6 in**)
(3)-Rear:		
Ag. tires: 11.2-24	**1166 mm** (**45.9 in**)	**1166 mm** (**45.9 in**)
Turf tires: 41 x 14.00-20	**1208 mm** (**47.5 in**)	**1208 mm** (**47.5 in**)
Ind. tires 43 x 16-20 (Dished in only)	**1283 mm** (**50.5 in**)	**1283 mm** (**50.5 in**)
(4) - Width (Maximum) :		
Rear axle - Outside to outside of rear tire:		
Ag. tires: 11.2-24		
Dished out	**1632 mm** (**64.2 in**)	**1632 mm** (**64.2 in**)
Turf tires: 41 x 14.00-20		
Dished out	**1694 mm** (**66.7 in**)	**1694 mm** (**66.7 in**)
Ind. tires: 43 x 16-20		
Dished in (Only)	**1687 mm** (**66.4 in**)	**1687 mm** (**66.4 in**)
(5) - Top of ROPS - Folding: Down position		
Ag. Tires: 11.2-24		
Down position	**1902 mm** (**74.9 in**)	**1902 mm** (**74.9 in**)
Turf tires: 41 x 14.00-20		
Down position	**1872 mm** (**73.7 in**)	**1872 mm** (**73.7 in**)
Ind. Tires: 43 x 16-20		
Down position	**1882 mm** (**74.1 in**)	**1882 mm** (**74.1 in**)
(6) - Top of ROPS - Folding: Up position		
Ag. tires: 11.2-24		
Up position	**2375 mm** (**93.5 in**)	**2375 mm** (**93.5 in**)

	Boomer™ 35	Boomer™ 40
Turf tires: 41 x 14.00-20		
Up position	**2344 mm** (**92.3 in**)	**2344 mm** (**92.3 in**)
Ind. tires: 43 x 16-20		
Up position	**2354 mm** (**92.7 in**)	**2354 mm** (**92.7 in**)
(7) - Wheel base:		
FWD	**1674 mm** (**66 in**)	**1674 mm** (**66 in**)
(8) - Length:		
FWD:	**3023 mm** (**119 in**)	**3023 mm** (**119 in**)
Weight with ROPS / less tires:		
HST (FWD)	**1302 kg** (**2870 lb**)	**1302 kg** (**2870 lb**)
Mechanical (FWD)	**1272 kg** (**2804 lb**)	**1272 kg** (**2804 lb**)