SERVICE MANUAL

Boomer™ 46D CVT
Boomer™ 54D CVT
Tier 4B (final)
Compact Tractor

Part number 47851943
1st edition English
February 2016

NEW HOLLAND AGRICULTURE

SERVICE MANUAL

Boomer™ 46D CVT
Boomer™ 54D CVT

47851943 03/02/2016

EN

Link Product / Engine

Product	Market Product	Engine
Boomer™ 46D CVT Boomer 46D, CVT, TIER 4B (FINAL), ROPS	North America	R 753 IE4
Boomer™ 46D CVT Boomer 46D, CVT, TIER 4B (FINAL), Cab	North America	R 753 IE4
Boomer™ 54D CVT Boomer 54D, CVT, TIER 4B (FINAL), ROPS	North America	R 753 IE4
Boomer™ 54D CVT Boomer 54D, CVT, TIER 4B (FINAL), Cab	North America	R 753 IE4

Contents

INTRODUCTION

Contents

INTRODUCTION

Foreword

This repair manual provides the technical information needed to properly service the NEW HOLLAND Boomer 46D, 54D CVT (Constant Velocity Transmission) model 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

Precautionary statements

Personal safety

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

Throughout this manual and on machine decals, 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 which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

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

CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

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

Machine Safety

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

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

Information

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

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

ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of a non compliance to simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of machines, regardless of how well the machine in question was designed and built.

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

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

⚠ WARNING

Unexpected machine movement!
Disengage power, shut down the tractor, and be sure that all moving parts have stopped before servicing, adjusting, cleaning, or unclogging the equipment.
Failure to comply could result in death or serious injury.

W0924A

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

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

SAFETY RULES

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

THE TRACTOR

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

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.
2. Keep any type of open flame away from the tractor and do not smoke while refueling.Wait for the engine to cool before refueling.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.

4. Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion.
5. Stop the engine before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
   - DO NOT use your hand to check for leaks.
   - Use a piece of cardboard or paper to search for leaks.
   - Stop the engine and relieve pressure before connecting or disconnecting lines.
   - Tighten all connections before starting the engine or pressurizing lines.
7. Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a NEW HOLLAND Dealer.
8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.
9. Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil.Wash skin promptly with soap and water.
10. Some components of your tractor, such as gaskets and friction surfaces (brake linings, clutch linings, etc.) may contain asbestos. Breathing asbestos dust is dangerous to your health. You are advised to have any maintenance or repair on such components carried out by an authorized NEW HOLLAND Dealer. However, if service operations are to be undertaken on parts that contain asbestos, the essential precautions listed below must be observed:
    - Work out of doors or in a well ventilated area.
    - Dust found on the tractor or produced during work on the tractor should be removed by extraction, not by blowing.
    - Dust waste should be dampened, placed in a sealed container, and marked to ensure safe disposal.
    - If any cutting, drilling, etc. is attempted on materials containing asbestos, the item should be dampened and only hand tools or low speed power tools used.

OPERATING THE TRACTOR

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

13. Use the flasher/turn signal lights and SMV signs when traveling on public roads both day and night (unless prohibited by law).
14. When operating at night, adjust lights to prevent blinding oncoming drivers.

DRIVING THE TRACTOR

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

OPERATING THE PTO

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

DIESEL FUEL

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

SAFETY FRAME (ROPS)

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

UNDER NO CIRCUMSTANCES should you:

- Modify, drill, or alter the safety frame in any way. Doing so may render you liable to legal prosecution.

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

Safety rules Service precautionary statements

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 tractors use **1.0 kg** (**2.2 lb**) 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.

D0043A

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

Do not flush this system. In the event of a major compressor failure, replace the compressor output pressure line and receiver/drier to collect most of the debris.

⚠ 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.

D0043A

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 3040, 3045, and 3050 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 restabilize 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

Basic instructions - 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 information in this manual is up-to-date at the date of the publication. It is the policy of the manufacturer for continuous improvement. Some information could not be updated due to modifications of a technical or commercial type, or changes to the laws and regulations of different countries.

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

Basic instructions - Shop and Assembly

SHIMMING

For each adjustment operation, select adjusting shims and measure 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 indicated on each shim.

ROTATING SHAFT SEALS

For correct rotating shaft seal installation, proceed as follows:

- before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes.
- thoroughly clean the shaft and check that the working surface on the shaft is not damaged.
- position the sealing lip facing the fluid; with hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will deviate the fluid towards the inner side of the seal.
- coat the sealing lip with a thin layer of lubricant (use oil rather than grease) and fill the gap between the sealing lip and the dust lip on double lip seals with grease.
- insert the seal in its seat and press down using a flat punch or seal installation tool. Do not tap the seal with a hammer or mallet.
- whilst inserting the seal, check that it is perpendicular to the seat; once settled, make sure that it makes contact with the thrust element, if required.
- to prevent damaging the seal lip on the shaft, position a protective guard during installation operations.

O-RING SEALS

Lubricate the O-RING seals before inserting them in the seats, this will prevent them from overturning and twisting, which would jeopardise sealing efficiency.

SEALING COMPOUNDS

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

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

SPARE PARTS

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

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

- machine model (commercial name) and serial number
- part number of the ordered part, which can be found in the "Microfiches" or the "Service Parts Catalogue", used for order processing

PROTECTING THE ELECTRONIC/ ELECTRICAL SYSTEMS DURING CHARGING OR WELDING

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

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

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

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

⚠ WARNING ⚠

Battery acid causes severe burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote - EXTERNAL: flush with water. INTERNAL: drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetables oil. Call physician immediately. EYES: flush with water for 15 minutes and get prompt medical attention.

84-110

TOOLS

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

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

By using these tools, repair personnel will benefit from:

- operating in optimal technical conditions
- obtaining the best results
- saving time and effort
- working in safe conditions

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

Basic instructions Hardware

General

Your tractor has been built using metric hardware.

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

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

Plating

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

Nut Tightening

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

Approximately 90% of the torque applied during assembly goes to overcoming friction between the parts. The other 10% is used to tension (stretch) the bolt. After assembly, the frictional forces disappear, which is the basis for the saying 'If it does not fail during assembly, it will not fail in service.' The bolt may later fail due to other factors, but not from being over tightened.

Locknuts

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

Jam Nuts

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

Thread Lubrication

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

Special tools

Gauge (0-3000 psi)	OEM 1462
Gauge (6000 psi)	OEM 1464
Gauge (300 psi)	OEM 1457
Hose	Procure Locally
Tee Fitting	CNH299061
Adapter	FNH00227
Male Plug	Included with CNH299061
Female Cap	Included with CNH299061
Variseal Installation Tool	293955
Detent Tool	FNH00081
Seal Driver Set	FNH00293
Injector Test	FNH01721
Injector Adapter Set	FNH01728
Clutch Alignment Tool	FNH299006
Engine Compression Test Adapter	FNH00120
Engine Compression Test Gauge Assembly	OEM1074
Oil Pump Port Block Remover Tool	380002888
Oil Pump Port Block Installer Tool	380002887
Oil Pump Port Block Installer Pins	FNH11044
Micrometer	**0 - 25 mm** (**0 - 1 in**)
Micrometer	**25 - 51 mm** (**1 - 2 in**)
Micrometer	**76 - 102 mm** (**3 - 4 in**)
Small Hole Gauge	**19 - 25 mm** (**0.75 - 1 in**)
Cylinder Bore Gauge	**76 - 102 mm** (**3 - 4 in**)
Cylinder Bore Gauge	**25 - 51 mm** (**1 - 2 in**)
HST High Pressure Test Fitting	CNH299007
Engine Oil Pressure Test Fitting	FNH00011
PTO Clutch Pack Pressure Test Fitting	CNH299008
PTO Clutch Pack Press Tool	CNH299009

Torque Wheel Bolt Torques

	Boomer 3040	Boomer 3045	Boomer 3050
Front Wheel - Disc-to-Hub: FWD	**129 N·m** (**95 lb ft**)	**129 N·m** (**95 lb ft**)	**129 N·m** (**95 lb ft**)
Rear Wheel - Rear Wheel & Disc-to Axle	**129 N·m** (**95 lb ft**)	**129 N·m** (**95 lb ft**)	**129 N·m** (**95 lb ft**)
Disc-to Rim .	**244 N·m** (**180 lb ft**)	**244 N·m** (**180 lb ft**)	**244 N·m** (**180 lb ft**)