

# **FARMALL® 45C FARMALL® 55C Tier 4B (final) Compact Tractor**

*FARMALL® 45C Cab: PIN LSMF45CCxx0010001 to LSMF45CCPH0010018  
FARMALL® 45C ROPS: PIN LSMF45CRxx0010001 to LSMF45CRVH0010031  
FARMALL® 55C Cab: PIN LSMF55CCxx0010001 to LSMF55CCAH0010024  
FARMALL® 55C ROPS: PIN LSMF55CRxx0010001 to LSMF55CRLH0010014*

## **SERVICE MANUAL**

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## **SERVICE MANUAL**

- Farmall® 45C Tier 4B (final), Cab [LSMF45CCxx0010001 -  
LSMF45CCPH0010018]**
- Farmall® 45C Tier 4B (final), ROPS [LSMF45CRxx0010001 -  
LSMF45CRVH0010031]**
- Farmall® 55C Tier 4B (final), Cab [LSMF55CCxx0010001 -  
LSMF55CAH0010024]**
- Farmall® 55C Tier 4B (final), ROPS [LSMF55CRxx0010001 -  
LSMF55CRLH0010014]**

## Link Product / Engine

Product	Market Product	Engine
Farmall® 45C Tier 4B (final), ROPS [LSMF45CRxx0010001 - LSMF45CRVH0010031]	North America	L3C19-T3
Farmall® 45C Tier 4B (final), Cab [LSMF45CCxx0010001 - LSMF45CCPH0010018]	North America	L3C19-T3
Farmall® 55C Tier 4B (final), ROPS [LSMF55CRxx0010001 - LSMF55CRLH0010014]	North America	L3C19-T1
Farmall® 55C Tier 4B (final), Cab [LSMF55CCxx0010001 - LSMF55CCAH0010024]	North America	L3C19-T1

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## INTRODUCTION



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## **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 CASE IH Sales and Service Networks.

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## Foreword

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

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

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## 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

### **CALIFORNIA PROPOSITION 65 WARNING**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery post, terminals and related accessories contain lead and lead compounds.

**Wash hands after handling**

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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. CASE IH strongly recommends that you return all used batteries to a CASE IH 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

Farmall® 45C Tier 4B (final), Cab [LSMF45CCxx0010001 - LSMF45CCPH0010018]	
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### 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 Farmall 45C/50C/55C cab tractors use **700 g (25 oz)** of **R134A** refrigerant.

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## 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 with 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.

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## 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.**

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.

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## 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 Farmall 45C/50C/55C cab tractors use **1.0 kg (2.2 lb)** of R134a refrigerant.

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## 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 containers 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.

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## 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

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## 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.



## INTRODUCTION

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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.

Click on the image link below for the full  
version of the service manual

