

FARMALL® 40B
FARMALL® 50B
Tier 3
Compact Tractor

SERVICE MANUAL

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CASE II
AGRICULTURE



SERVICE MANUAL

Farmall® 40B
Farmall® 50B

Link Product / Engine

Product	Market Product	Engine
Farmall® 40B	North America	S4Q2
Farmall® 50B	North America	S4Q2

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INTRODUCTION

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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.

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.

International symbols

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

 Thermostat starting aid	 Radio	 PTO	 Position Control
 Alternator charge	 KAM Keep alive memory	 N Transmission in neutral	 Draft Control
 Fuel level	 Turn signals	 Creeper gears	 Accessory socket
 Automatic Fuel shut-off	 Turn signals -one trailer	 Slow or low setting	 Implement socket
 Engine speed (RPM x 100)	 Turn signals -two trailers	 Fast or high setting	 %age slip
 Hours recorded	 Front wind-screen wash/wipe	 Ground speed	 Hitch raise (rear)
 Engine oil pressure	 Rear wind-screen wash/wipe	 Differential lock	 Hitch lower (rear)
 Engine coolant temperature	 Heater temperature control	 Rear axle oil temperature	 Hitch height limit (rear)
 Coolant level	 Heater fan	 Transmission oil pressure	 Hitch height limit (front)
 Tractor lights	 Air conditioner	 FWD engaged	 Hitch disabled
 Headlamp main beam	 Air filter blocked	 FWD dis-engaged	 Hydraulic and transmission filters
 Headlamp dipped beam	 Parking brake	 Warning!	 Remote valve extend
 Work lamps	 Brake fluid level	 Hazard warning lights	 Remote valve retract
 Stop lamps	 Trailer brake	 Variable control	 Remote valve float
 Horn	 Roof beacon	 Pressurised! Open carefully	 Malfunction! See Operator's Manual
	 Warning! Corrosive substance		 Malfunction! (alternative symbol)

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 - 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

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.**

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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.

INTRODUCTION

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 that 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.

INTRODUCTION

- 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 of 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

Nom- inal 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)

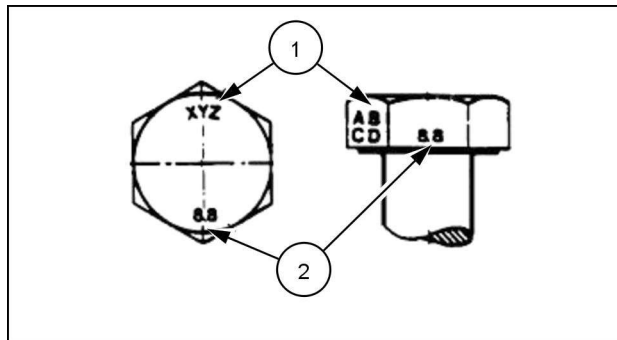
NOTE: M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.

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

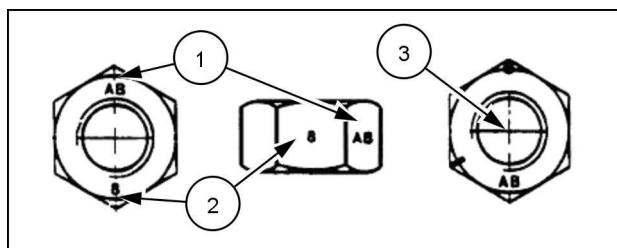
Metric hex head and carriage bolts, classes 5.6 and up



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)

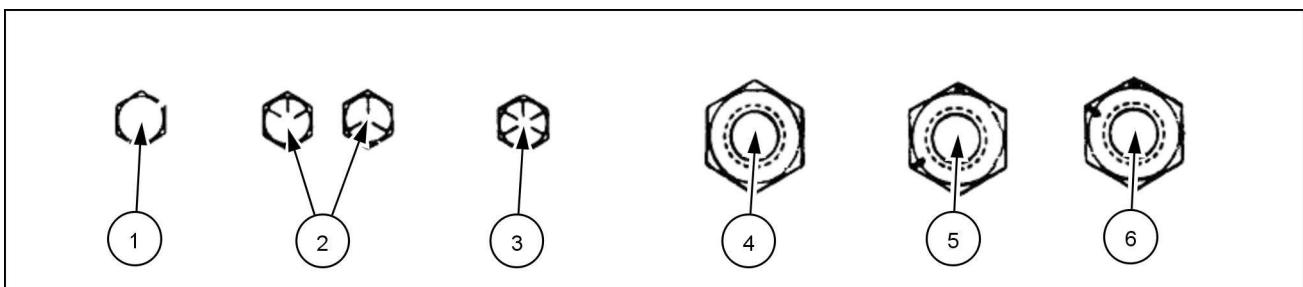
NOTE: For imperial units, 1/4 in and 5/16 in hardware torque specifications are shown in pound-inches. 3/8 in through 1 in hardware torque specifications are shown in pound-feet.

Inch flanged hardware

Nom- inal 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

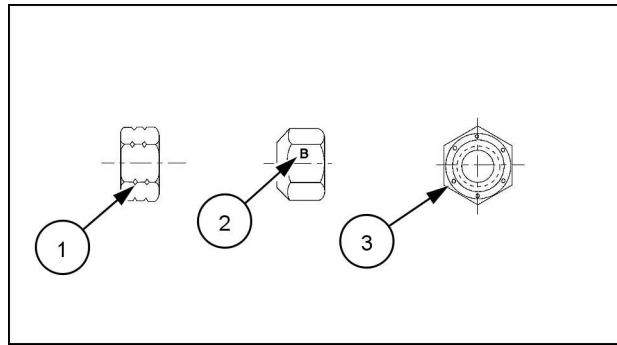


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Grade marking examples

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)



20090268 4

Grade identification

Grade	Corner marking method (1)	Flats marking method (2)	Clock marking method (3)
Grade A	No notches	No mark	No marks
Grade B	One circumferential notch	Letter B	Three marks
Grade C	Two circumferential notches	Letter C	Six marks

Torque - Standard torque data for 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, CASE IH 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 $\pm 10\%$. 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.

CASE IH 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.

INTRODUCTION

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

Metric thread	S-Series *		L-Series **	
	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

Metric thread	Ferrous		Non-ferrous N·m (lb ft) ± 10 %
	Internal hex N·m (lb ft) ± 10 %	External hex 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)

INTRODUCTION

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

BSPP thread G- Gas; A- medium coarse threads	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
	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 thread	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
	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.

INTRODUCTION

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

SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	S-Series *		L-Series **	
			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

SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	S-Series *		L-Series **	
			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.

INTRODUCTION

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

SAE dash size	UN/UNF thread size	Ferrous		Non-Ferrous
		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)	–	–

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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)

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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 CASE IH 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 CASE IH 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 CASE IH suggests and illustrate in this manual have been specifically researched and designed for use with CASE IH 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

Wheel tread settings

NOTE: Tread settings are measured from center of tire to center of tire.

Front wheel settings

Tire Type	Tractor Model	Setting	NOTE
Agricultural, R1 9.5-16	Front-Wheel Drive	1263 mm (49.7 in)	Not Adjustable
Turf, R3 29 x 12.5-15 (Dished In Only)	Front-Wheel Drive	1209 mm (47.6 in)	Not Adjustable
Industrial (R4) 10- 16.5 (Dished In Only)	Front-Wheel Drive	1314 mm (51.7 in)	Not Adjustable

NOTICE: Never attempt to widen the tread setting by reversing front wheels on a front-wheel drive system.

NOTE: Torque front wheel bolts and nuts to 176 - 196 N·m (130 - 145 lb ft).

Rear wheel settings

Tire Type	Tractor Model	Setting	NOTE
Agricultural, R1 13.6-24	Front-Wheel Drive	1144 - 1316 mm (45.0 - 51.8 in)	Adjustable by switching - Dish in or dish out
Turf, R3 41 x 14.00-20	Front-Wheel Drive	1135 mm (44.7 in)	Not Adjustable
Industrial, (R4) 43 x 16-20 (Dished In Only)	Front-Wheel Drive	1211 mm (47.7 in)	Not adjustable - Dish In Only
Industrial (R4) 420/70-24	Front-Wheel Drive	1211 mm (47.7 in)	Not adjustable - Dish In Only

NOTE: Torque rear wheel bolts and nuts to . 176 - 196 N·m (130 - 145 lb ft)

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