

**580N
580SN WT
580SN
590SN
Tier 4B (final)
Tractor Loader Backhoe**

*580N PIN NHC740665 and above; 580SN WT PIN NHC745126 and above;
580SN PIN NHC743044 and above; 590SN PIN NHC746245 and above*

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580N Four-Wheel Drive (4WD) Tier 4B (final) [NHC740665 -], 580N Two-Wheel Drive (2WD) Tier 4B (final) [NHC740665 -], 580SN Four-Wheel Drive (4WD) Tier 4B (final) [NHC743044 -], 580SN Two-Wheel Drive (2WD) Tier 4B (final) [NHC743044 -], 580SN WT Four-Wheel Drive (4WD) Tier 4B (final), Wide Track [NHC745126 -], 590SN Four-Wheel Drive (4WD) Tier 4B (final) [NHC746245 -], 590SN Two-Wheel Drive (2WD) Tier 4B (final) [NHC746245 -]

Link Product / Engine

Product	Market Product	Engine
580N Two-Wheel Drive (2WD) Tier 4B (final) [NHC740665 -]	North America	F5BFL413A*B007
580N Four-Wheel Drive (4WD) Tier 4B (final) [NHC740665 -]	North America	F5BFL413A*B007
580SN Two-Wheel Drive (2WD) Tier 4B (final) [NHC743044 -]	North America	F5BFL413A*B007
580SN Four-Wheel Drive (4WD) Tier 4B (final) [NHC743044 -]	North America	F5BFL413A*B007
580SN WT Four-Wheel Drive (4WD) Tier 4B (final), Wide Track [NHC745126 -]	North America	F5BFL413A*B007
590SN Two-Wheel Drive (2WD) Tier 4B (final) [NHC746245 -]	North America	F5BFL413A*B007
590SN Four-Wheel Drive (4WD) Tier 4B (final) [NHC746245 -]	North America	F5BFL413A*B007

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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 CONSTRUCTION Sales and Service Networks.

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 - Personal safety

Unless otherwise instructed, always perform these steps before you service the machine:

1. Park the machine on a flat, level surface.
2. Place the backhoe in the transport position with the swing lock pin installed for transport.
3. Place the loader bucket on the ground, with the bottom of the loader bucket parallel to the surface.
4. Place the direction control lever and the transmission in neutral.
5. If you need to open the hood to perform service, raise the loader arms and install the support strut.
6. Shut down the engine.
7. Place a 'Do Not Operate' tag on the key switch so that it is visible to other workers or remove the key.

Safety rules - Ductile iron



⚠ DANGER

Altering cast ductile iron can cause it to weaken or break.

Before you weld, cut, or drill holes on any part of this machine, make sure that the part is not cast ductile iron.

Failure to comply will result in death or serious injury.

D0148A

Altering cast ductile iron can cause it to weaken or break. Unauthorized modifications to cast ductile iron parts can cause death or serious injury. Do not weld, cut, drill, repair, or attach items to cast ductile iron parts on this machine.

Before you weld, cut, or drill holes on any part of this machine, make sure the part is not cast ductile iron. See your dealer if you do not know if a part is cast ductile iron.

The following items are examples of cast ductile iron parts. There may also be other parts made of cast ductile iron that are not on the list below.

- two-wheel drive steering link
- dump links
- front axle
- stabilizers
- extend-a-hoe
- swing tower
- bucket linkage
- Air-Conditioning (A/C) compressor mounting bracket

Do not make any unauthorized modifications. Consult an authorized dealer before making any changes, additions, or modifications to this machine.

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 CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



Mandatory battery recycling

NOTE: The following requirements are mandatory in Brazil.

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

Points of sale are obliged to:

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

Basic instructions - Shop and assembly

Shimming

For each adjustment operation, select adjusting shims and measure the adjusting shims individually using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value shown on each shim.

Rotating shaft seals

For correct rotating shaft seal installation, proceed as follows:

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

NOTE: With hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will move the fluid towards the inner side of the seal.

4. Coat the sealing lip with a thin layer of lubricant (use oil rather than grease). Fill the gap between the sealing lip and the dust lip on double lip seals with grease.
5. Insert the seal in its seat and press down using a flat punch or seal installation tool. Do not tap the seal with a hammer or mallet.
6. While you insert the seal, check that the seal is perpendicular to the seat. When the seal settles, make sure that the seal makes contact with the thrust element, if required.
7. To prevent damage to the seal lip on the shaft, position a protective guard during installation operations.

O-ring seals

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

Sealing compounds

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

Spare parts

Only use CNH Original Parts or CASE CONSTRUCTION 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 CONSTRUCTION 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.

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Special tools

The special tools that CASE CONSTRUCTION suggests and illustrate in this manual have been specifically researched and designed for use with CASE CONSTRUCTION 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:

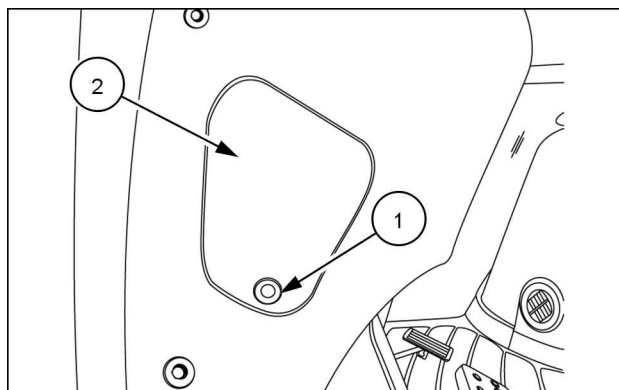
- Operating in optimal technical conditions
- Obtaining the best results
- Saving time and effort
- Working in safe conditions

Basic instructions - Fuse and relay locations

The machine is equipped with easily accessible fuse and relay locations.

Front console box

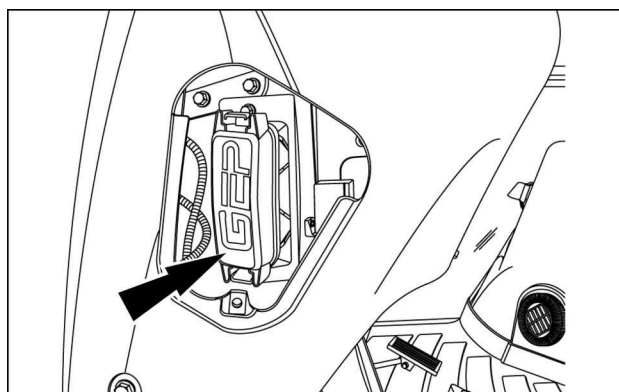
1. Turn the thumb screw (1) to loosen the panel cover (2) for the fuse box. Remove the panel cover.



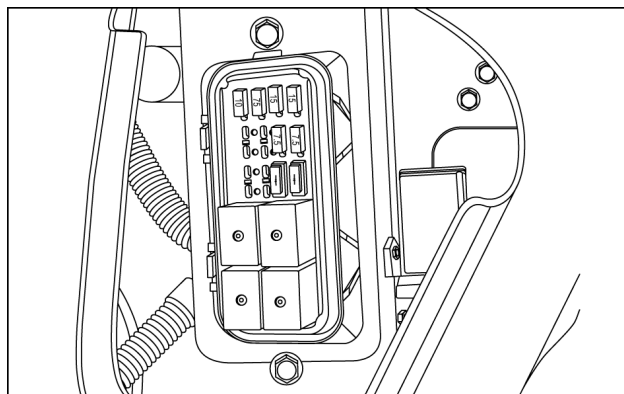
RCPH10TLB320AAF 1

2. Remove the fuse box cover.

NOTE: The fuse and relay decal is on the underside of the cover.



RCPH10TLB307AAF 2

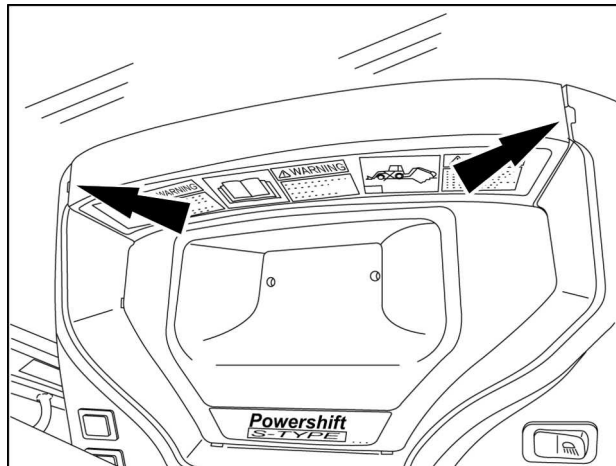


RCPH10TLB303AAF 3

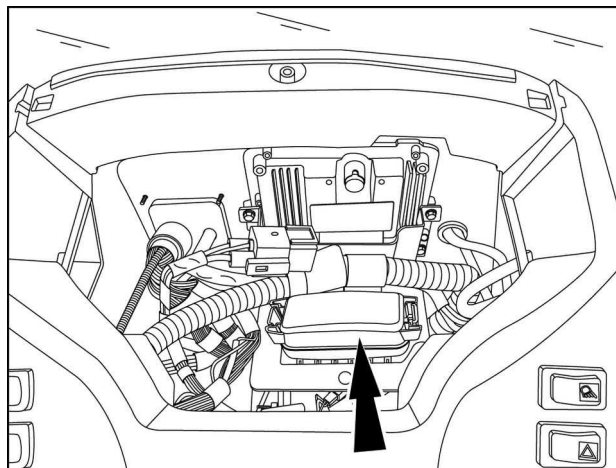
Front console ECU fuse and relay

1. Remove the cover from the steering column shroud.

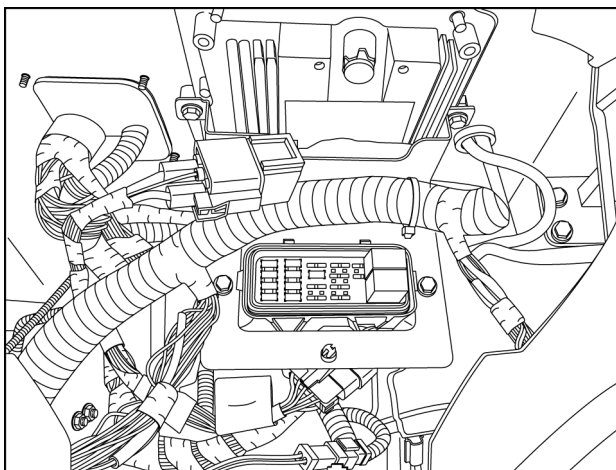
NOTE: The fuse and relay decal is on the underside of the steering column shroud cover.



RCPH11TLB012BAD 4



RAIL14TLB1061BA 5

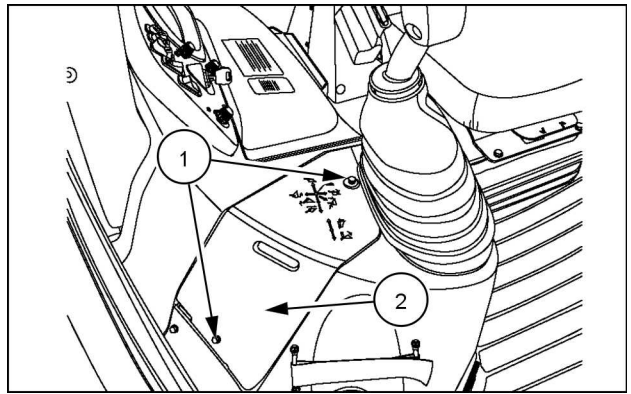


RAIL15TLB0001BA 6

Side console box

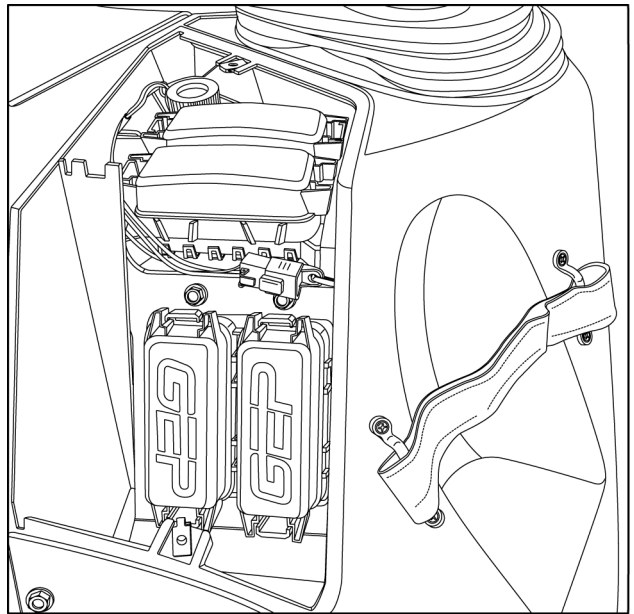
1. Turn the thumb screws **(1)** to loosen the panel cover **(2)** for the fuse box. Remove the panel cover.

NOTE: The fuse and relay decal is on the underside of the cover.



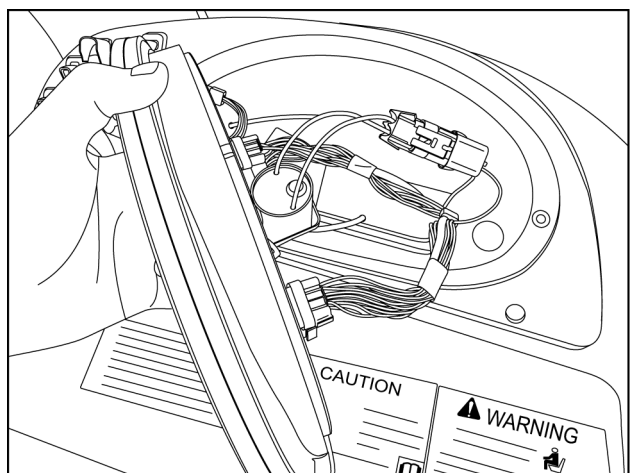
RCPH10TLB437AAF 7

2. Remove the fuse box covers as needed.



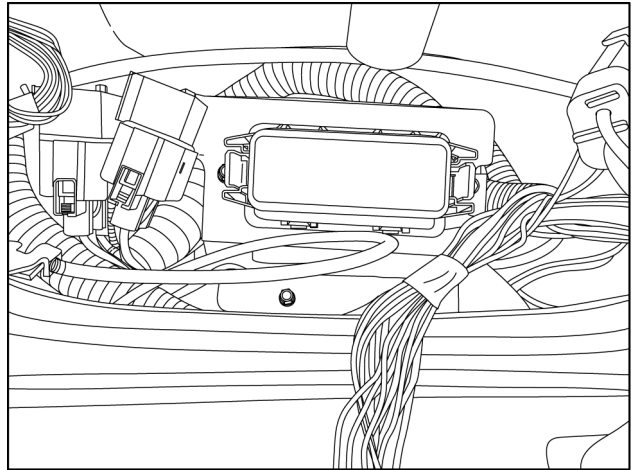
RAIL14TLB1053BA 8

1. Remove the instrument cluster.



RAIL15TLB0007BA 9

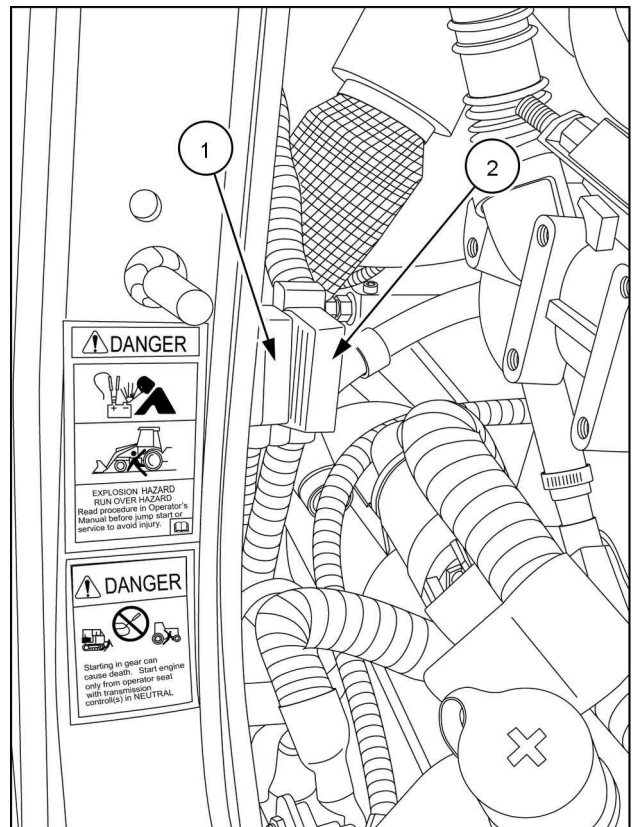
2. Locate the fuse and relay box. Refer to the decal for fuse, relay, and/or diode functions.



RAIL15TLB0008BA 10

Glow-plug Control Unit (GCU) fuse and dosing heater fuse

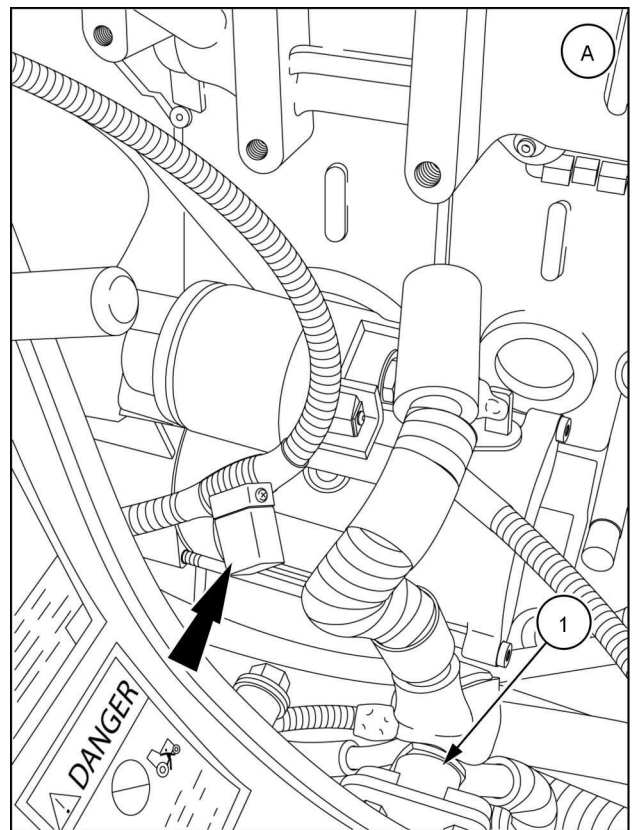
1. Raise the loader arm and engage the safety support.
2. Lift the engine hood.
3. Locate the GCU fuse (1) and the dosing heater fuse (2) on the right-hand side of the engine attached to the cab frame.



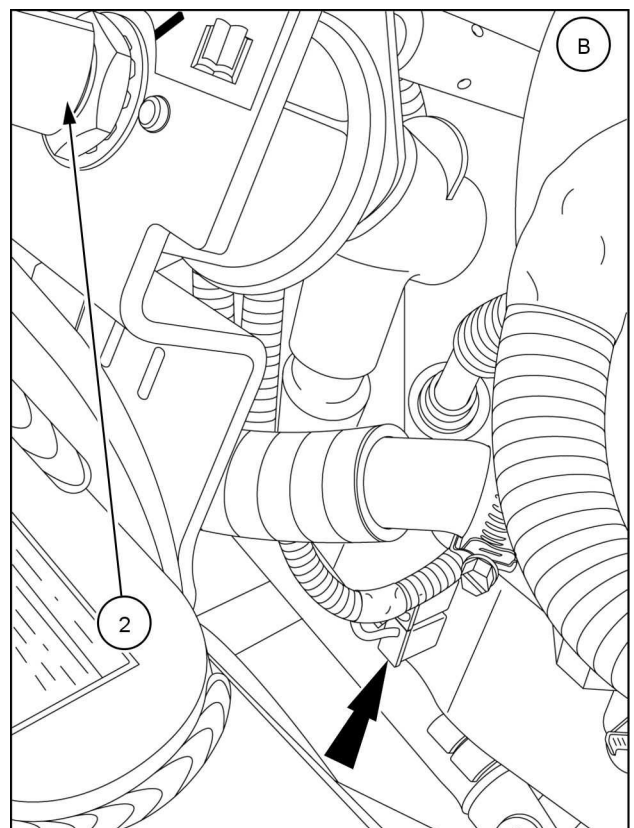
RAIL14TLB0853BA 11

Telematics system fuse

1. Raise the loader arm and engage the safety support.
2. Lift the engine hood.
3. On the right-hand side of the engine locate the wire harness with the in-line **5 A** fuse. The location of the fuse will depend on the machine configuration:
 - A. Machines equipped with the Battery Power Junction Stud **(1)** .
 - B. Machines equipped with a Master Disconnect Switch **(2)**.



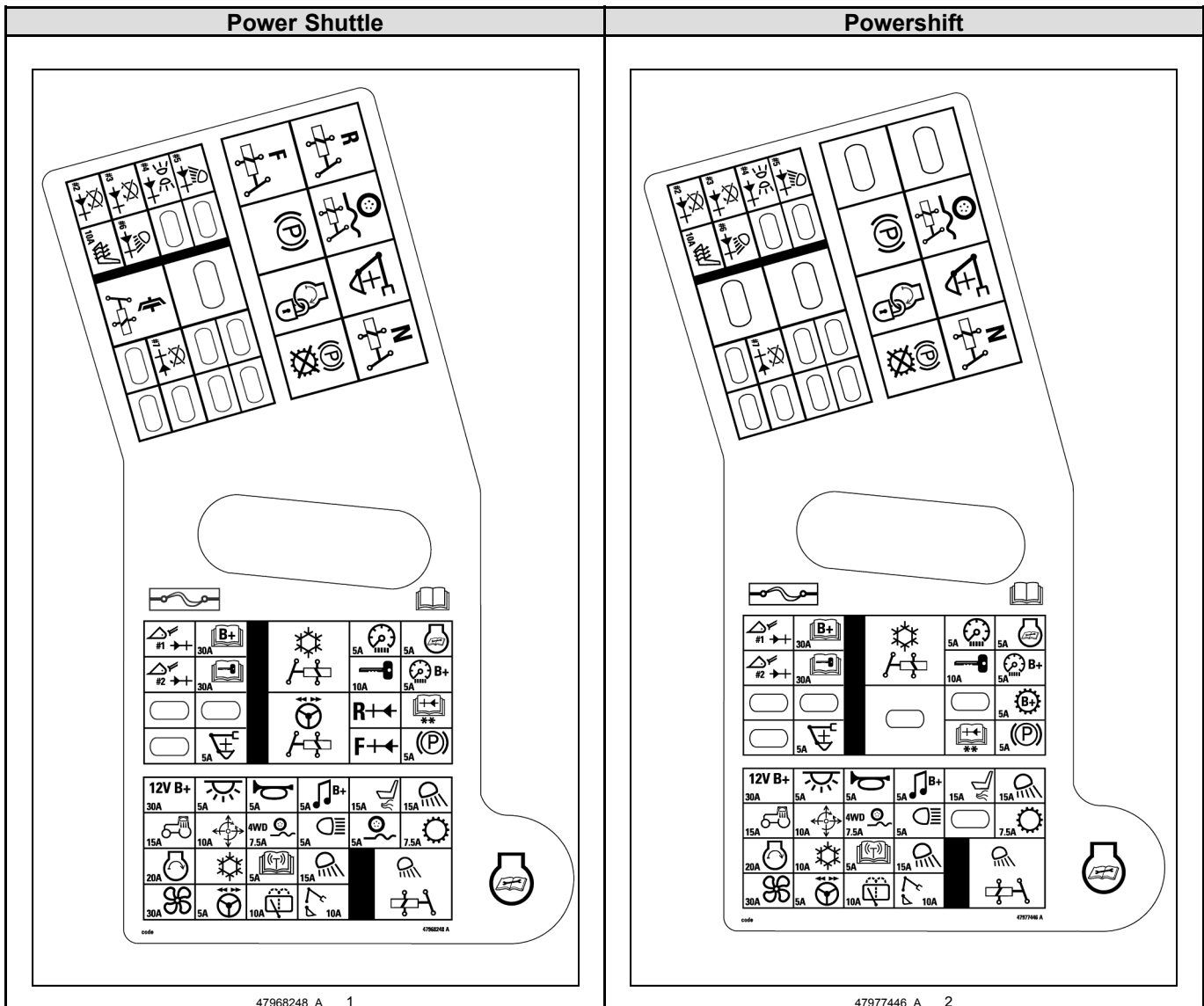
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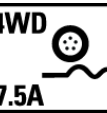
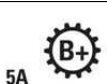
Basic instructions - Fuse, relay, and diode icon definitions

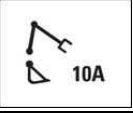
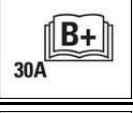
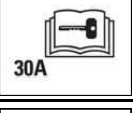
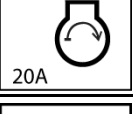
Right-hand side console panel



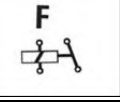
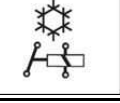
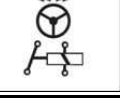
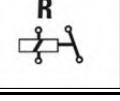
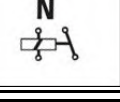
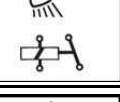
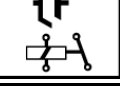
Fuse icon definitions

Symbol	Function
	Diagnostic B+
	Instrument cluster key ON
	Instrument cluster B+

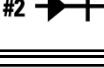
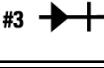
Symbol	Function
	Rear lights
	Rear wipers/washers
	Transmission differential lock, de-clutch button, and clutch relay
	Tail lights
	Pilot controls
	Cigarette lighter plugs
	4WD, Auto Ride Control
	Dome light
	Radio B+
	Horn
	Blower motor
	A/C
	TRAX B+
	Key switch
	Air seat

Symbol	Function
	Heated seat
	2WD, Ride Control
	Quick coupler, EH Clam, Radio Key ON
	SAHR brake
	Comfort Steer
	Side lights
	Customer B+
	Customer key ON
	Starter
	Power Lift™
	Telematics NOTE: The Telematics system has an additional external fuse location.

Relay icon definitions

Symbol	Function
	Power Lift™ relay
	SAHR park brake relay
	SAHR park brake transmission cutout relay
	Forward relay (Power Shuttle only)
	A/C relay
	Comfort Steer relay (Power Shuttle only)
	Reverse relay (Power Shuttle only)
	Neutral relay
	Starter interlock relay
	Auto Ride Control relay
	Rear light relay
	Transmission De-clutch relay (Powershift only)

Diode icon definitions

Symbol	Function
	Quick coupler diode #1
	Quick coupler diode #2
	Reverse signal diode (Power Shuttle only)
	Forward signal diode (Power Shuttle only)
	Torque control diode
	Auto engine shutdown diode #2
	Auto engine shutdown diode #3
	Head light diode #4
	Front work light diode #5
	Rear work light diode #6
	Auto engine shutdown diode #7

Left-hand side steering column console panel

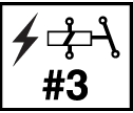
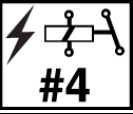
Power Shuttle	Powershift
RCPH11TLB014AAD 3	47747125_A 4

Fuse icon definitions

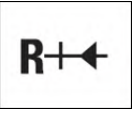
Symbol	Function
	Head lights
	Front work lights
	Turn signal, Hazards
	Front wiper/washer
	High beam
	Beacon

Relay icon definitions

Symbol	Function
	Comfort steer relay and Power relay #1 (Power Shuttle only)
	Comfort steer relay and Power relay #2 (Power Shuttle only)
	Transmission lock relay (Powershift only)

Symbol	Function
	Power relay #3
	Power relay #4
	Start relay

Diode icon definitions

Symbol	Function
	Reverse Signal Diode (Power Shuttle only)
	Forward Signal Diode (Power Shuttle only)

Front console fuse and relay panel

Power Shuttle				Powershift			
AUX MAIN 			 15A	 5A	 7.5A	 20A	 7.5A
			 10A				
SCR MAIN 		 7.5A	 10A	 25A	 7.5A	 20A	 7.5A
			 10A				

47747127_A 5

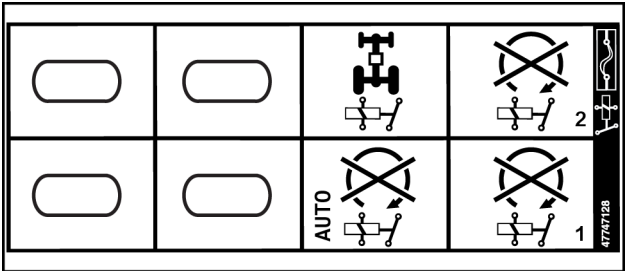
Fuse icon definitions

Symbol	Function
 7.5A	Hazard lights
 15A	Crankcase Ventilation (CCV) heater
 10A	Unswitched Battery + to SCR pump module
 10A	Unswitched Battery + to SCR heat valve and pump
 25A	Unswitched Battery + to T4B and urea sensors
 5A	By-pass relay battery +
 7.5A	AUX main relay, electric valve, by-pass relay coil power
 20A	ECU Battery +B and +C
 7.5A	ECU Battery voltage

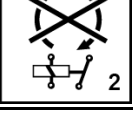
Relay icon definitions

Symbol	Function
	AUX main relay
	SCR main relay

Side console fuse and relay panel (under the instrument cluster)

Power Shuttle	Powershift
	

Relay icon definitions

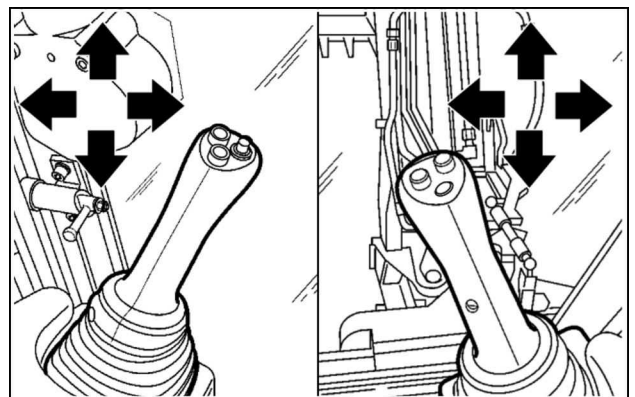
Symbol	Function
	Four-Wheel Drive (4WD) relay NOTE: Machines with H-Type Powershift only.
	Auto engine shutdown relay
	Shutdown relay 1
	Shutdown relay 2

Basic instructions - Releasing hydraulic pressure on machines with pilot backhoe controls

1. Park the machine on firm level ground.
2. Put all transmission controls in the Neutral position.
3. Engage the parking brake.
4. Lower the bucket to the ground but do not apply down pressure; or raise the loader arm and engage the loader arm safety support.
5. Rotate the operator seat into the backhoe operation position.
6. Place the backhoe in the stowed position with swing lock pin in the lock position. If applicable, insert the Extendahoe lock pin. You may choose to rest the backhoe attachment on the ground.
7. Shut off the engine.
8. Turn the key switch to the ON position but DO NOT start the engine.
9. Press the emblem end of the backhoe and stabilizer control switch to activate all backhoe controls.

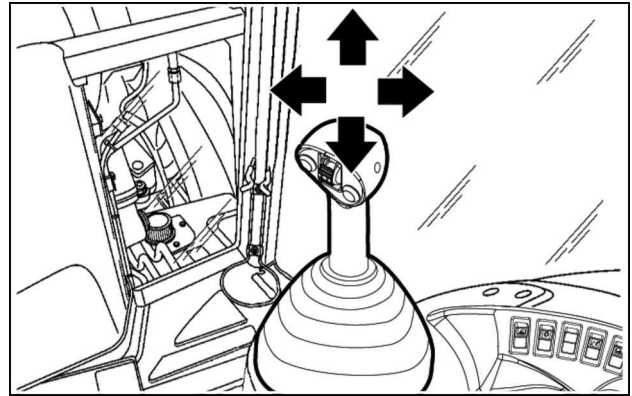
NOTE: When turning the backhoe and stabilizer control switch to the ON position, wait approximately half a second before activating the stabilizers, **Extendahoe®** (if equipped) or bi-directional auxiliary hydraulics (if equipped). If an operator attempts to operate the functions before the delay passes, the functions will not operate. Cycle the power switch and wait for the delay to pass.

10. If equipped with combo auxiliaries, enable the bi-directional switch on the right-hand side panel.
11. Cycle the bi-directional proportional control buttons on the left-hand pilot control joystick.
12. Move each pilot backhoe control joystick in one complete circle, stopping in the neutral (center) position.
13. Deactivate the backhoe and stabilizer control switch.
14. Rotate the operator seat into the driving position.



LEEN12T0487AA 1

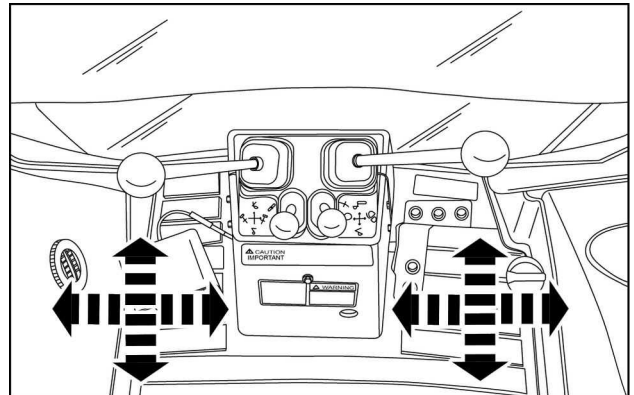
15. Rotate the loader control joystick in one complete circle, stopping in the neutral (center) position.
16. If applicable, operate the bucket control switch.
17. Turn the key switch to the Off position.



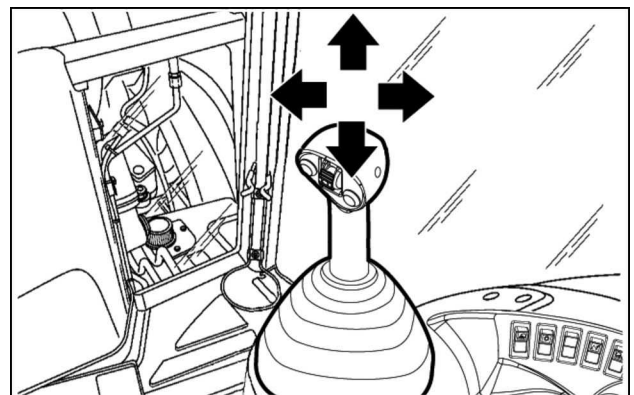
LEEN12T0485AA 2

Basic instructions - Releasing hydraulic pressure on machines with mechanical backhoe controls

1. Park the machine on firm level ground.
2. Put all transmission controls in the Neutral position.
3. Engage the parking brake.
4. Lower the bucket to the ground but do not apply down pressure; or raise the loader arm and engage the loader arm safety support.
5. Rotate the operator seat into the backhoe operation position.
6. Place the backhoe in the stowed position with swing lock pin in the lock position. If applicable, insert the Extendahoe lock pin. You may choose to rest the backhoe attachment on the ground.
7. Shut off the engine.
8. Turn the key switch to the ON position but DO NOT start the engine.
9. If equipped with combo auxiliaries, enable the bidirectional switch on the right-hand side panel.
10. Cycle the bi-directional control lever or pedal.
11. Cycle each backhoe control lever in each direction and then release in the neutral position.
12. Rotate the operator seat into the driving position.
13. Rotate the loader control joystick in one complete circle, stopping in the neutral (center) position.
14. If applicable, operate the bucket control switch.
15. Turn the key switch to the Off position.



RAIL14TLB0702AA 1

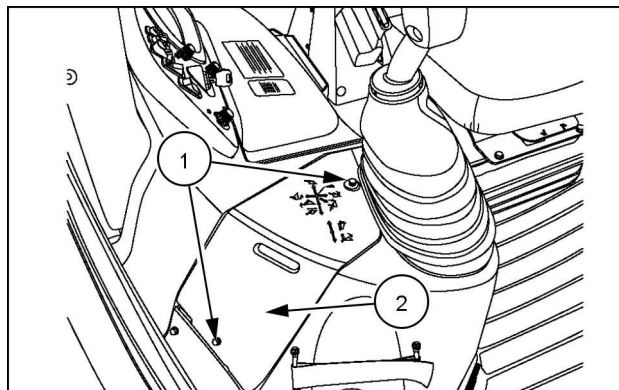


LEEN12T0485AA 2

Basic instructions - Diagnostic service tool port

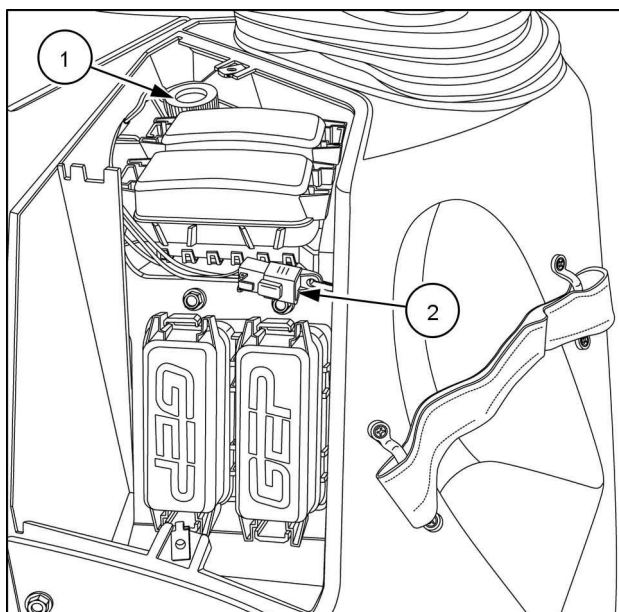
The diagnostic/service tool port is located in the fuse box at the side console. Connect the Electronic Service Tool (EST) or DATAR to this port to update software and/or perform service and diagnostic tests.

1. Turn the thumb screws **(1)** to loosen the panel cover **(2)** for the fuse box. Remove the panel cover.



RCPH10TLB437AAF 1

2. Unscrew the cap for the diagnostic/service tool port **(1)** or connect to the **SiteWatch™** (telematics) connector **(2)**.



RAIL14TLB1053BA 2

Basic instructions - Hydraulic diagnostic test ports

If equipped, the machine's hydraulic system pressure can be easily checked from the hydraulic quick disconnect diagnostic test port(s) located on the right-hand side of the machine above the hydraulic reservoir tank and near the right-hand stabilizer on the inside of the chassis.

Hydraulic test port configurations

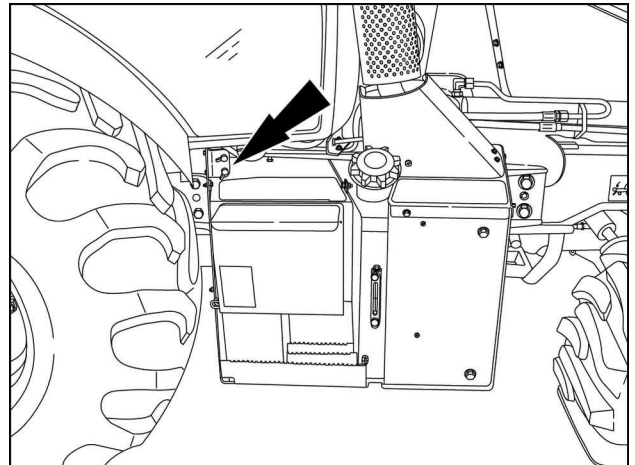
NOTE: Hydraulic test ports on a machine with pilot backhoe controls shown in the illustration.

NOTICE: Always keep the covers on the quick connect test ports when not in use.

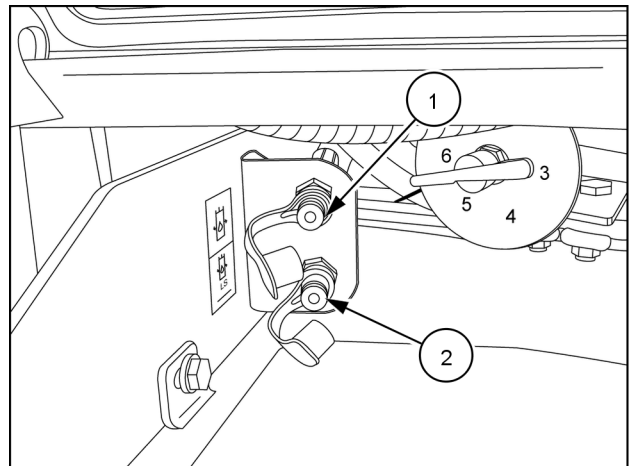
Remote hydraulic test ports, if equipped

- Top port **(1)** - Pump output pressure
- Bottom port **(2)** - Load sense (LS) pressure

NOTE: Load sense pressure port not available on machines with mechanical backhoe controls.

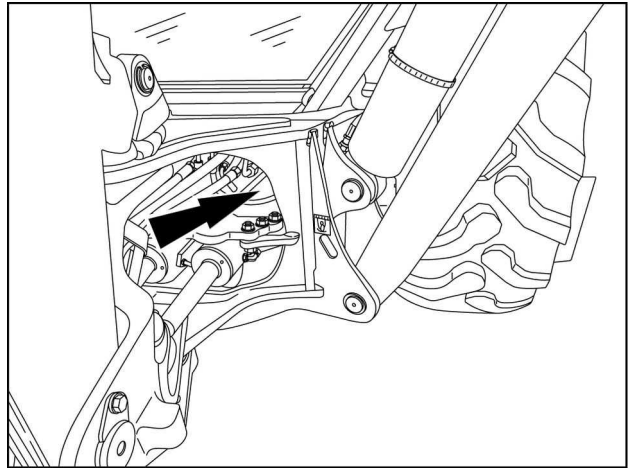


RAIL14TLB1017BA 1

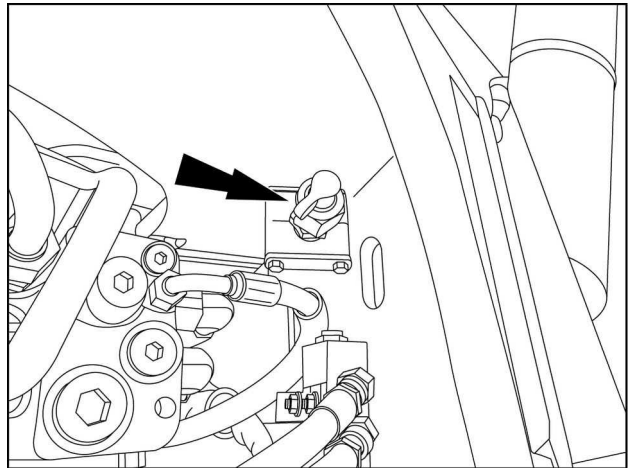


RAIL14TLB0838BA 2

- Rear port (attenuator hose)- Pump output pressure, hydraulic flow, and bleed air from the system.



RAIL15TLB0003BA 3



RAIL15TLB0004BA 4

Basic instructions - Welding on the machine

⚠ WARNING

Explosive gas!

Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.

Failure to comply could result in death or serious injury.

W0005A

⚠ WARNING

Hazardous chemicals!

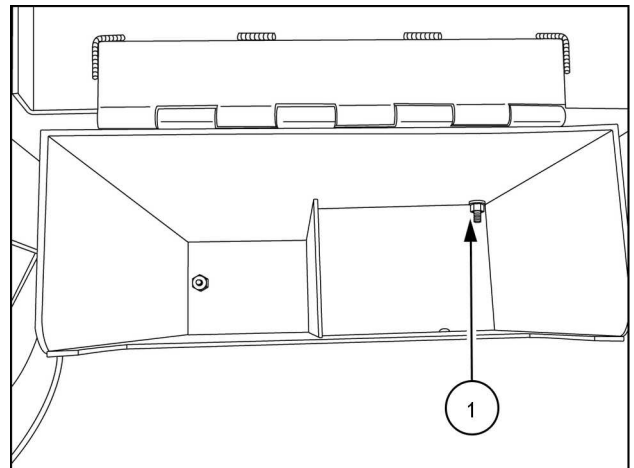
Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.

Failure to comply could result in death or serious injury.

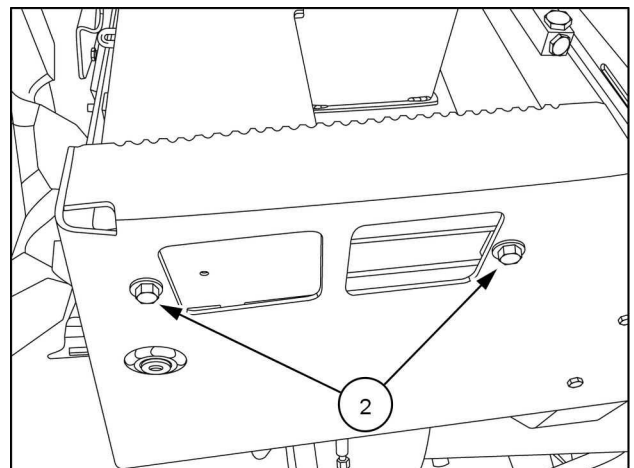
W0006A

The following procedures must be completed before welding.

1. If applicable remove the tool box.
 - A. Open the tool box lid.
 - B. Remove the nut (1) from the inside of the tool box.
 - C. Remove bolts (2) from underneath step.
 - D. Remove the tool box from the machine.



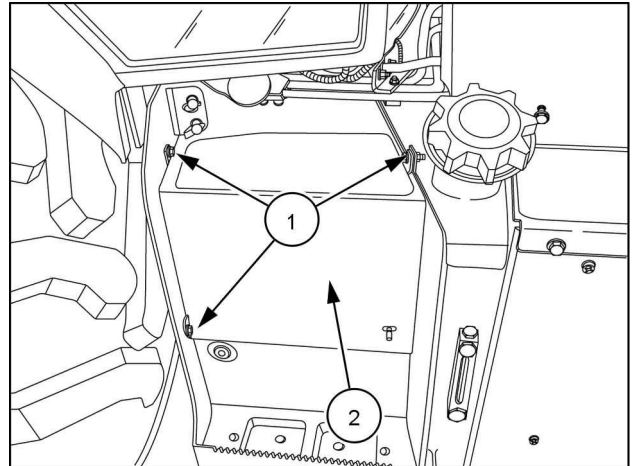
RAIL14TLB1059BA 1



RAIL14TLB1055BA 2

2. Disconnect the battery.

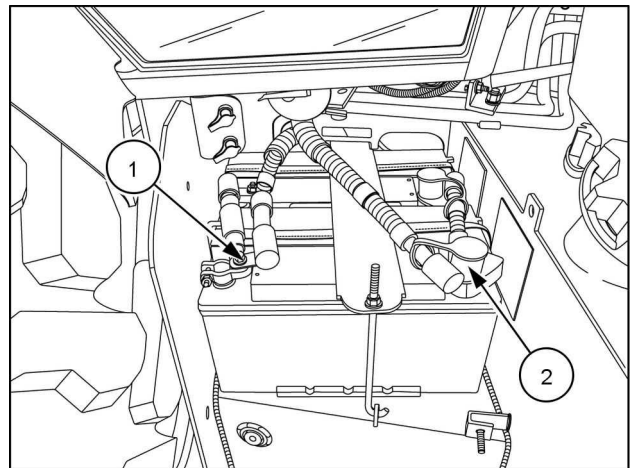
- A. Remove the battery cover bolt (1) hardware.
- B. Slide the battery cover (2) out and away from the machine.



RAIL14TLB1056BA 3

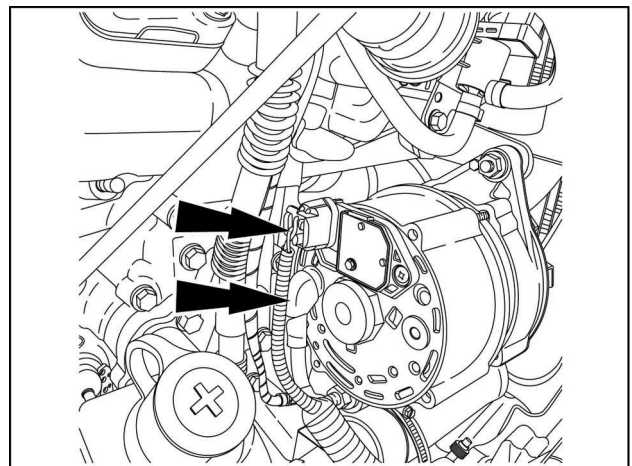
- C. Disconnect the negative battery cable from the negative battery terminal.
- D. Disconnect the positive battery cable from the positive battery terminal.

NOTE: The procedure is the same for machines with only one battery.



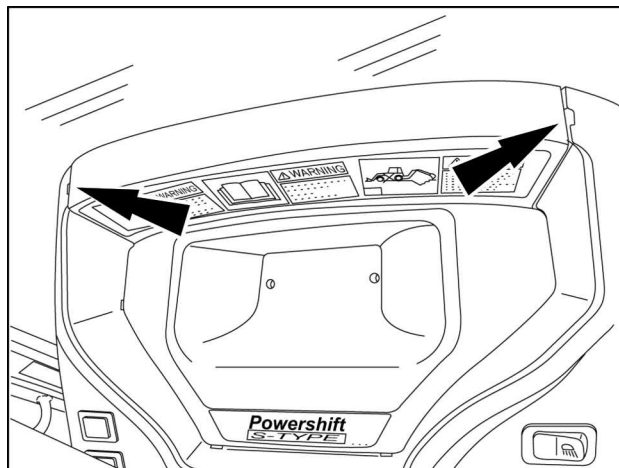
RAIL14TLB1057BA 4

3. Disconnect the alternator terminal wires.



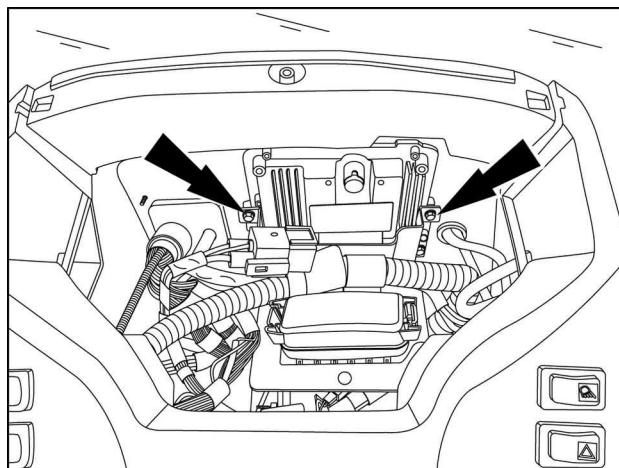
RAPH12FRK0163AA 5

4. Remove the cover from the steering column shroud.



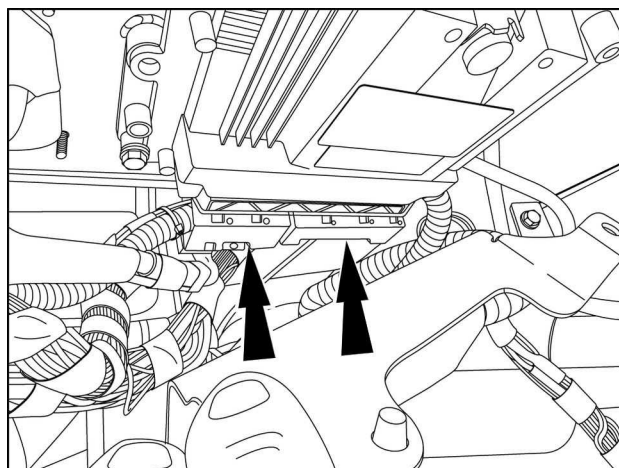
RCPH11TLB012BAD 6

5. Remove the fuse panel mounting plate from the Engine Control Unit (ECU).



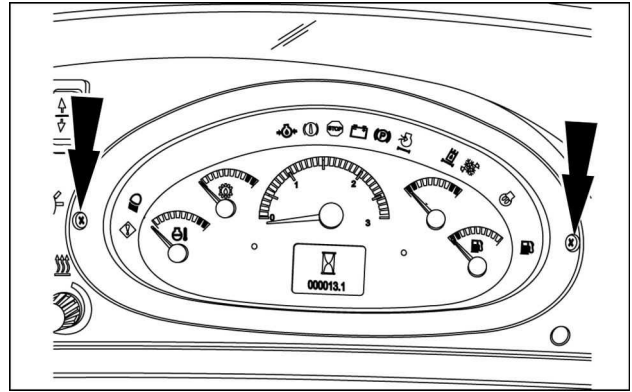
RAIL14TLB1061BA 7

6. Disconnect both connectors.



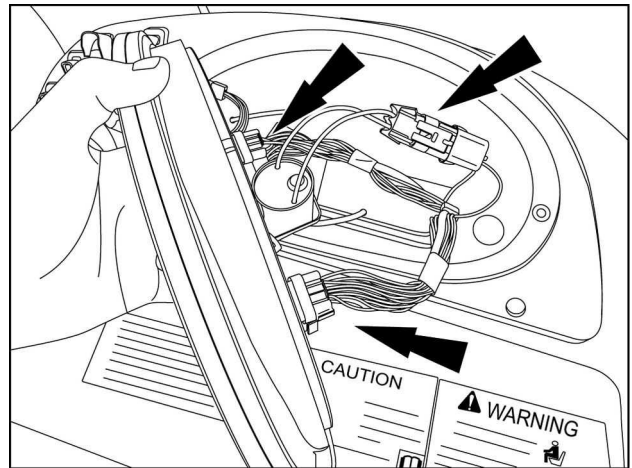
RAIL14TLB1062BA 8

7. Remove the instrument cluster panel screws and the instrument cluster.



RCPH10TLB339AAF 9

8. Disconnect all connectors from the back of the panel.



RAIL15TLB0007BA 10

9. Disconnect the controller for backhoe pilot controls, if equipped (one connector).
10. Disconnect the transmission controller, if equipped (one connector, located under the front steering cowl-ing).
11. Disconnect the controller for the loader 4-in-1 bucket or auxiliary hydraulics, if equipped (one connector, lo-cated under the loader valve at the rear, left under-side of the machine).

Basic instructions - Heater coolant shutoff valve

⚠ CAUTION

Burn hazard!

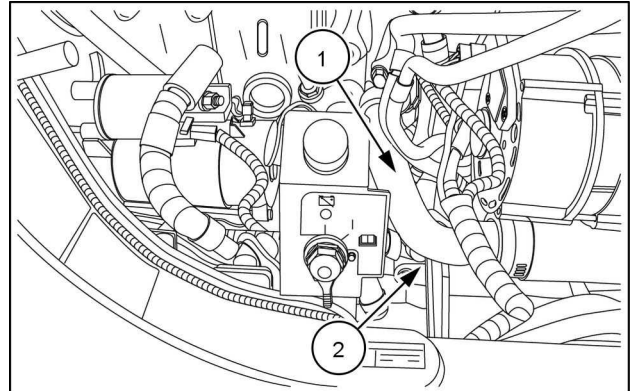
The engine and exhaust system become hot during operation. To prevent burns, open the engine compartment and allow the components to cool to a comfortable touch temperature before you work inside the engine compartment.

Failure to comply could result in minor or moderate injury.

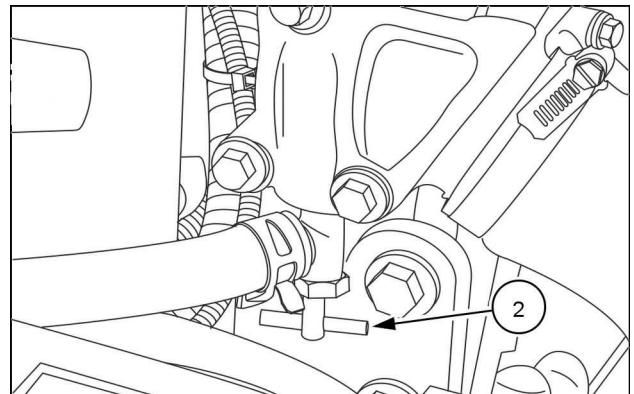
C0178A

The cab heater coolant shutoff valve controls the flow of hot coolant to the heater.

1. Park the machine.
2. Engage the loader arm support strut.
3. Open the engine hood.
4. Locate the shutoff valve (2) on the left-hand side of the engine. The shutoff valve connects to the engine coolant return-to-radiator tube (1).
5. Perform one of the following actions:
 - In warm ambient temperatures, turn the shutoff valve clockwise to stop hot coolant flow to the heater.
 - In cold ambient temperatures, turn the shutoff valve counter-clockwise to allow hot coolant to flow to the heater.



RAIL14TLB0410AA 1



RCPH10TLB159AAF 2

Engine cooling system - Basic instructions

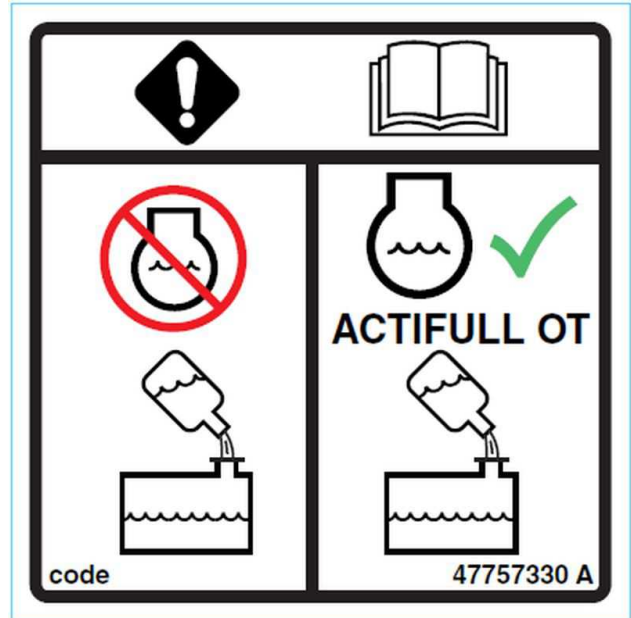
CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** is preferred. The coolant must meet the specifications outlined in the CNH Industrial material specification **MAT3624**. Use of coolant not meeting this specification is not allowed. Mixing of different coolant brands is not recommended.

NOTICE: OAT coolant is mandatory for all FPT engines compliant to Tier 4B (final) emissions using Selective Catalytic Reduction (SCR). NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water. You can use a refractometer to check the concentration level. You should not use Supplemental Coolant Additives (SCA) when using **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. Change the coolant solution at the recommended change interval.

The decal shown is located near the fill point of the cooling system whenever the factory fill is **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. This decal is available in three different sizes. See the table below for the associated part numbers.

NOTE: Organic Acid Technology (OAT) appears yellow in small quantities. OAT coolant can also appear yellow when against translucent backgrounds. However, under certain lighting conditions and backgrounds, such as looking into the coolant overflow tank, OAT coolant may appear green. The green appearance is similar to the color of ethylene glycol coolant. This color appearance is normal, which is not an indication of mixed coolant fill in new units built after the implementation of OAT coolant.

CNH Industrial part number	Size
47757330	50 mm x 50 mm
47757331	75 mm x 75 mm
47757332	100 mm x 100 mm



47757330 1

You may notice the older version of the OAT decal (CNH Industrial part number 47488993) on some applications. Both decals convey the same message.

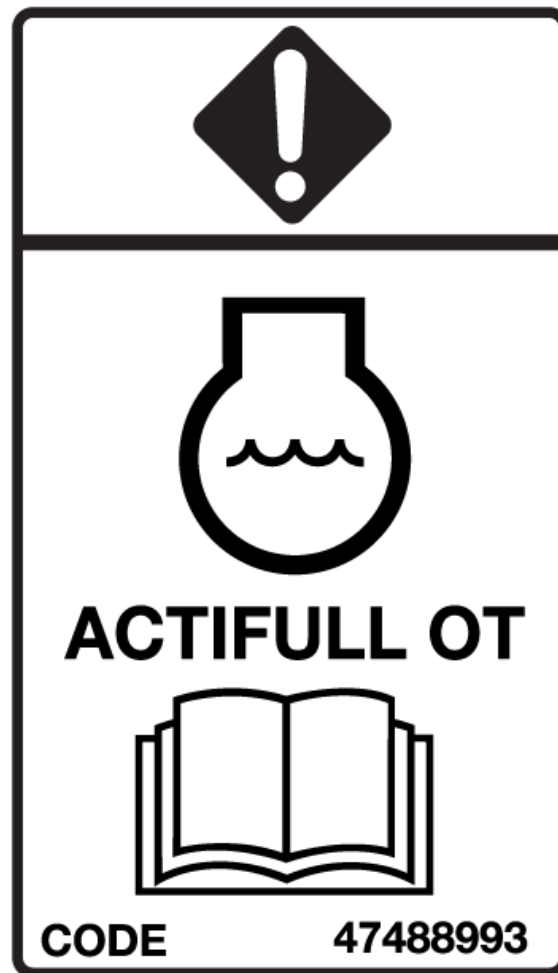
Definitions

Conventional coolant:

A coolant that relies on inorganic inhibitors such as silicates, nitrites, and phosphates for corrosion and cavitation protection.

Organic Acid Technology (OAT) coolant:

A coolant that relies on inhibitors such as organic acid salts for corrosion and cavitation protection.



47488993 2

Basic instructions - Support strut for loader lift arm

⚠ WARNING

Crushing hazard!

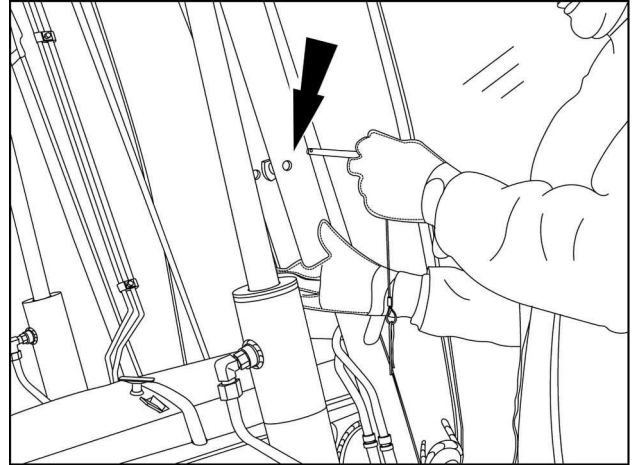
If you service the machine with the loader lift arms raised, always use the support strut. Remove the retaining pin and place the support strut onto the cylinder rod. Install the retaining pin into the support strut. Lower the lift arms onto the support strut.

Failure to comply could result in death or serious injury.

W0230A

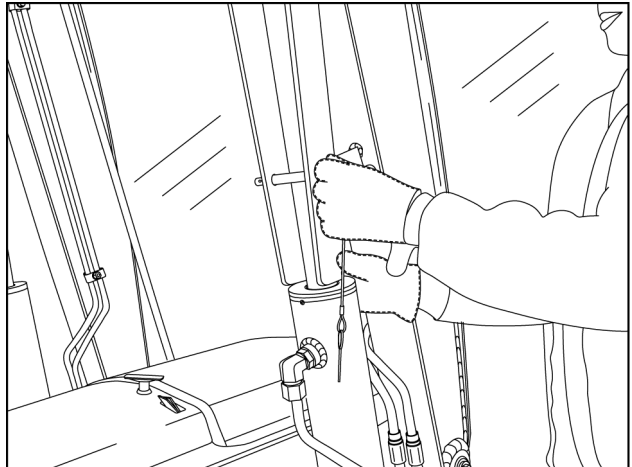
Engage the loader arm support strut:

1. Empty the loader bucket.
2. Raise the loader lift arms to the maximum height.
3. Shut down the engine.
4. Remove the retaining pin.



RAIL14TLB0846BA 1

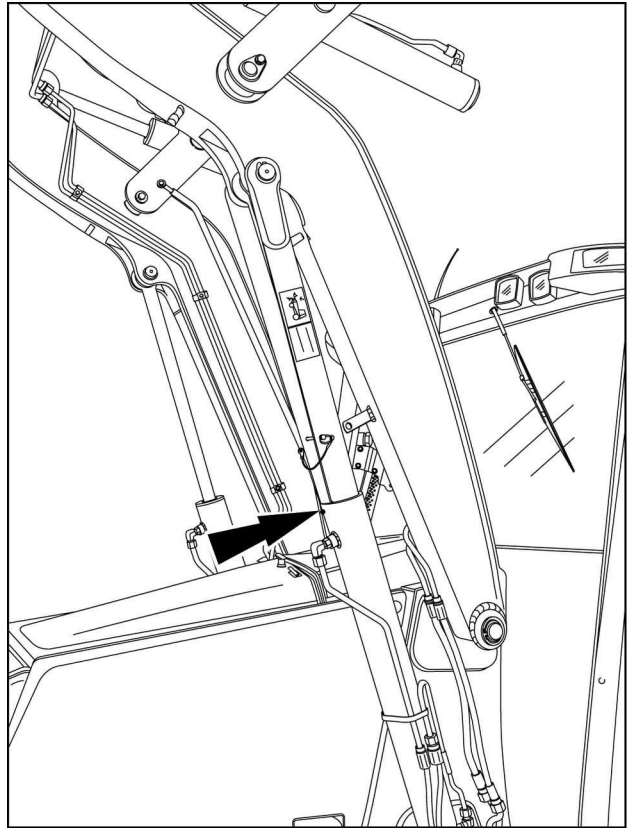
5. Lower the support strut onto the cylinder rod.
6. Install and secure the retaining pin.



RAIL14TLB0847BA 2

NOTICE: Avoid excess pressure on the loader arm cylinder. Do not start the engine to lower the loader arm onto the support strut.

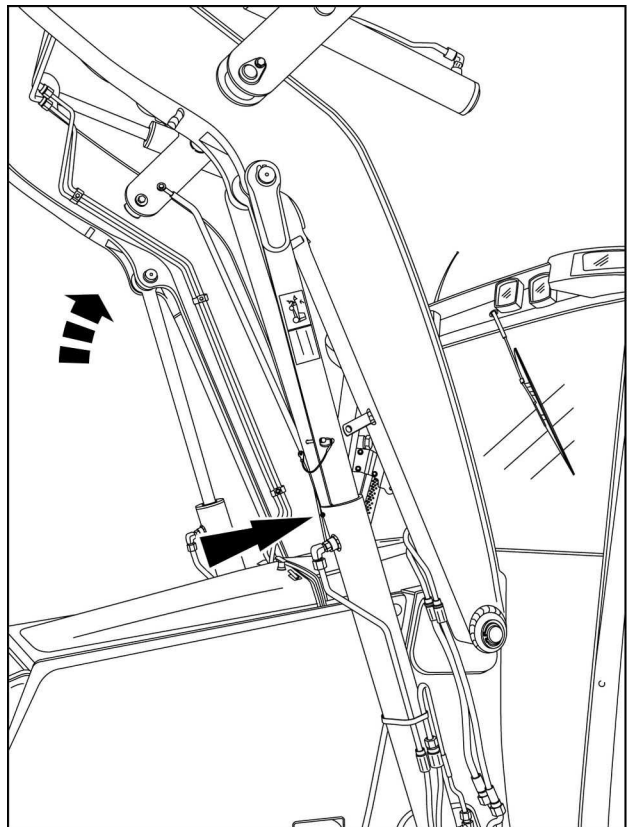
7. Move the loader control lever to relieve hydraulic pressure. The bottom of the support strut will brace against the top of the cylinder base.



RAIL14TLB0859BA 3

Disengage the loader arm support strut:

1. Raise the loader arms so that the end of the support strut no longer against the cylinder.
2. Shut down the engine.

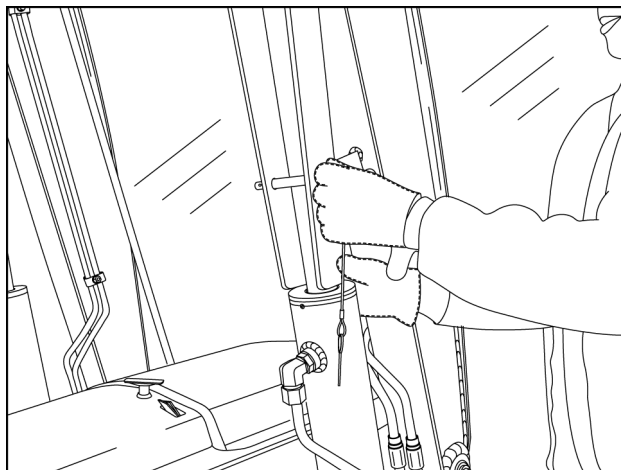


RAIL14TLB0859BA 4

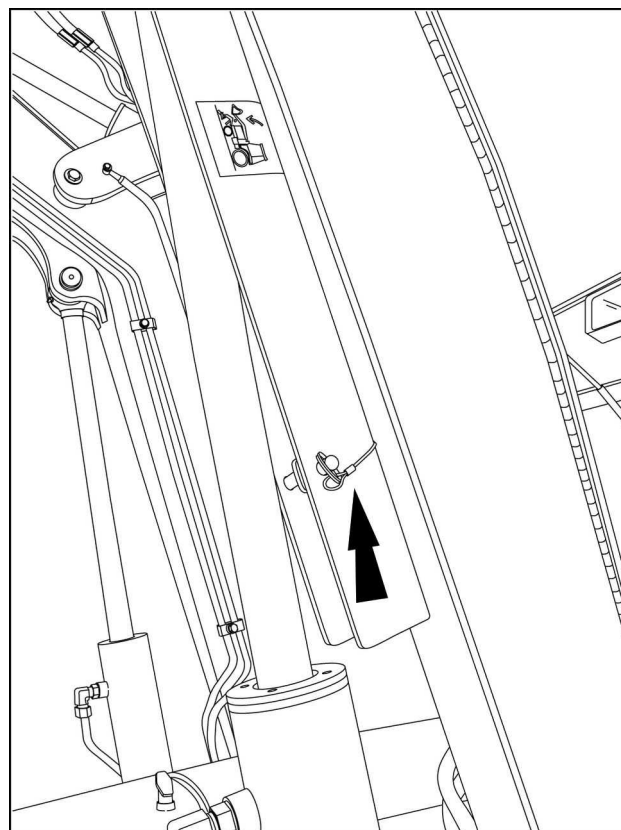
3. Remove the retaining pin from the support strut.
4. Raise the support strut up to the storage position and secure with the retaining pin.

NOTICE: Make sure that the cable strap on the retaining pin is not around the loader arm cylinder.

5. Start the engine.
6. Lower the loader to the ground.



RAIL14TLB0847BA 5



RAIL14TLB0977BA 6

Basic instructions - Hood

⚠ WARNING

Crushing hazard!

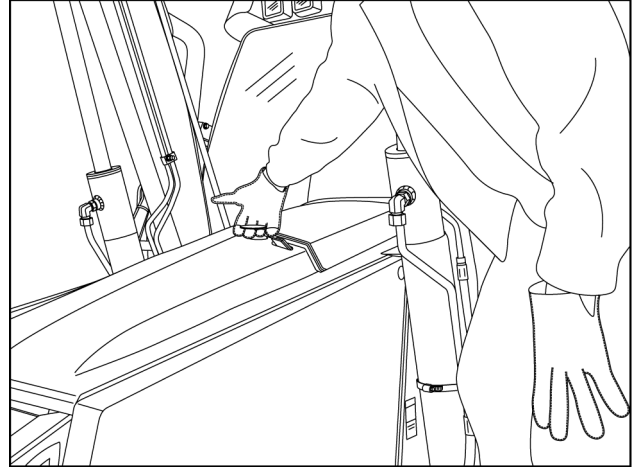
If you service the machine with the loader lift arms raised, always use the support strut. Remove the retaining pin and place the support strut onto the cylinder rod. Install the retaining pin into the support strut. Lower the lift arms onto the support strut.

Failure to comply could result in death or serious injury.

W0230A

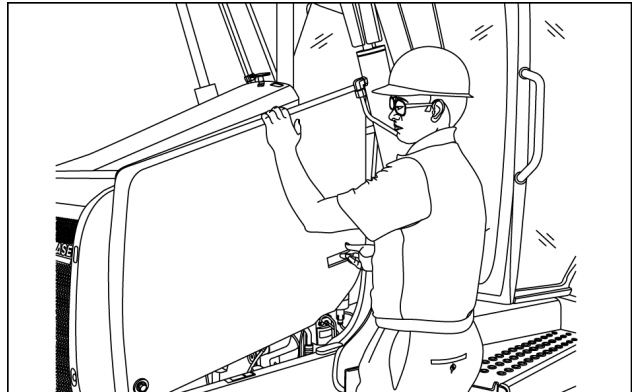
Open the hood:

1. Raise the loader and engage the support strut.
2. Shut down the engine.
3. Turn the handle counter-clockwise to release the hood latch.



RAIL14TLB0848BA 1

3. Lift the hood and rotate forward.

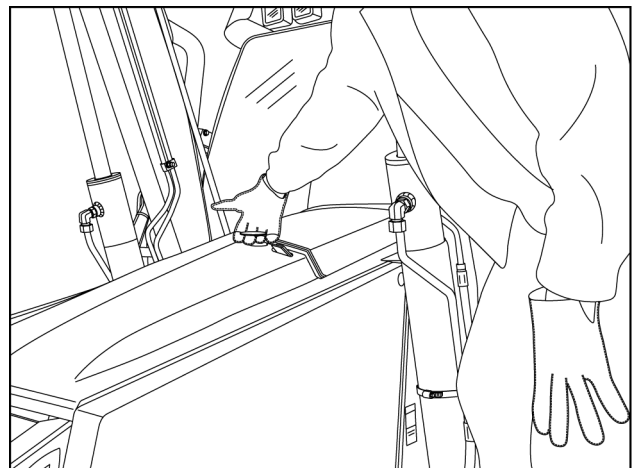


RCPH10TLB356AAF 2

NOTICE: To avoid damage to the hood parts, always close the hood before moving the loader.

Close the hood:

1. Lower the hood.
2. Turn the handle clockwise to lock the hood latch.



RAIL14TLB0848BA 3

Torque - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

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

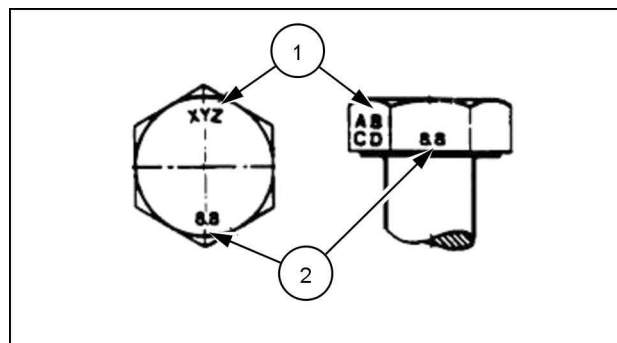
NOTE: M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.

METRIC FLANGED HARDWARE

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

IDENTIFICATION

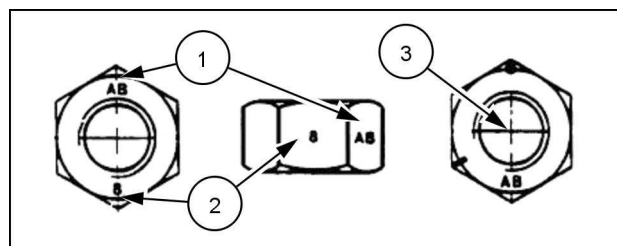
Metric Hex head and carriage bolts, classes 5.6 and up



20083680 1

1. Manufacturer's Identification
2. Property Class

Metric Hex nuts and locknuts, classes 05 and up



20083681 2

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

INCH NON-FLANGED HARDWARE

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

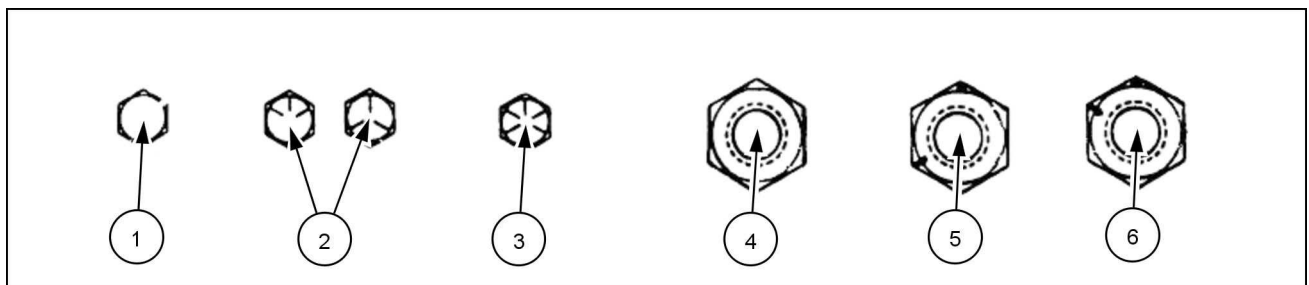
NOTE: For Imperial Units, **1/4 in** and **5/16 in** hardware torque specifications are shown in pound-inches. **3/8 in** through **1 in** hardware torque specifications are shown in pound-feet.

INCH FLANGED HARDWARE

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

IDENTIFICATION

Inch Bolts and free-spinning nuts

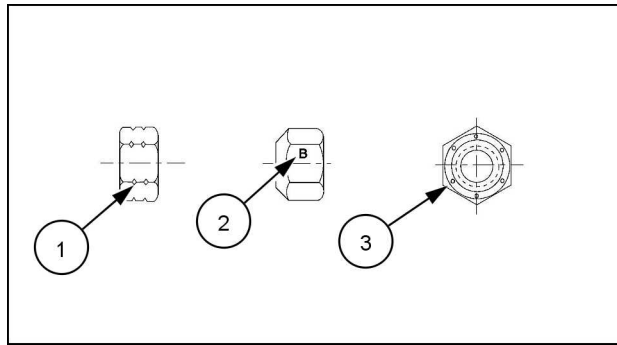


20083682 3

Grade Marking Examples

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

Inch Lock Nuts, All Metal (Three optional methods)



20090268 4

Grade Identification

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

Torque - Standard torque data for hydraulics

NOTICE: Hydraulic connections require a minimum assembly torque in order to provide zero leakage at rated pressure with adequate fatigue resistance. Too much torque on a hydraulic connection can lead to leakage or failure.

NOTICE: There are several different kinds of parallel thread ports, including those using metric threads, inch threads, and British Standard Pipe Parallel (BSPP) threads. None of these port systems are interchangeable, and using the wrong connector in a port will not provide an adequate seal, even if it is possible to install the part.

NOTE: Hand install and hand tighten all connections before using tools to set the torque. This will reduce the possibility of thread damage.

Torques for Metric O-Ring Boss (ORB) stud ends and port connections

Metric Thread	S-Series (Heavy Duty)		L-Series (Light Duty)	
	Ferrous	Non-Ferrous	Ferrous	Non-Ferrous
M8x1	10.5 N·m (7.7 lb ft)	6.3 N·m (4.6 lb ft)	8.5 N·m (6.3 lb ft)	5 N·m (3.7 lb ft)
M10x1	21 N·m (15.5 lb ft)	12.5 N·m (9.2 lb ft)	15.5 N·m (11.4 lb ft)	9.3 N·m (6.9 lb ft)
M12x1.5	37 N·m (27.3 lb ft)	22 N·m (16.2 lb ft)	27 N·m (19.9 lb ft)	16 N·m (11.8 lb ft)
M14x1.5	47 N·m (34.7 lb ft)	28 N·m (20.7 lb ft)	37 N·m (27.3 lb ft)	22 N·m (16.2 lb ft)
M16x1.5	58 N·m (42.8 lb ft)	35 N·m (25.8 lb ft)	42 N·m (31.0 lb ft)	25 N·m (18.4 lb ft)
M18x1.5	74 N·m (54.6 lb ft)	44 N·m (32.5 lb ft)	47 N·m (34.7 lb ft)	28 N·m (20.7 lb ft)
M22x1.5	105 N·m (77.4 lb ft)	63 N·m (46.5 lb ft)	63 N·m (46.5 lb ft)	38 N·m (28.0 lb ft)
M27x2	178 N·m (131.3 lb ft)	107 N·m (78.9 lb ft)	105 N·m (77.4 lb ft)	63 N·m (46.5 lb ft)
M30x2	225 N·m (166.0 lb ft)	135 N·m (99.6 lb ft)	136 N·m (100.3 lb ft)	82 N·m (60.5 lb ft)
M33x2	325 N·m (239.7 lb ft)	195 N·m (143.8 lb ft)	168 N·m (123.9 lb ft)	101 N·m (74.5 lb ft)
M42x2	345 N·m (254.5 lb ft)	207 N·m (152.7 lb ft)	220 N·m (162.3 lb ft)	132 N·m (97.4 lb ft)
M48x2	440 N·m (324.5 lb ft)	264 N·m (194.7 lb ft)	273 N·m (201.4 lb ft)	164 N·m (121.0 lb ft)
M60x2	525 N·m (387.2 lb ft)	315 N·m (232.3 lb ft)	330 N·m (243.4 lb ft)	198 N·m (146.0 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for Metric O-Ring Boss (ORB) port plugs

Metric Thread	Ferrous		Non-Ferrous
	Internal Hex	External Hex	
M8x1	8.5 N·m (6.3 lb ft)	10.5 N·m (7.7 lb ft)	6.3 N·m (4.6 lb ft)
M10x1	16 N·m (11.8 lb ft)	21 N·m (15.5 lb ft)	12.5 N·m (9.2 lb ft)
M12x1.5	23 N·m (17.0 lb ft)	37 N·m (27.3 lb ft)	22 N·m (16.2 lb ft)
M14x1.5	47 N·m (34.7 lb ft)		28 N·m (20.7 lb ft)
M16x1.5	58 N·m (42.8 lb ft)		35 N·m (25.8 lb ft)
M18x1.5	74 N·m (54.6 lb ft)		44 N·m (32.5 lb ft)
M22x1.5	105 N·m (77.4 lb ft)		63 N·m (46.5 lb ft)
M27x2	178 N·m (131.3 lb ft)		107 N·m (78.9 lb ft)
M30x2	225 N·m (166.0 lb ft)		135 N·m (99.6 lb ft)
M33x2	325 N·m (239.7 lb ft)		195 N·m (143.8 lb ft)
M42x2	345 N·m (254.5 lb ft)		207 N·m (152.7 lb ft)
M48x2	440 N·m (324.5 lb ft)		264 N·m (194.7 lb ft)
M60x2	525 N·m (387.2 lb ft)		315 N·m (232.3 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for British Standard Pipe Parallel (BSPP) straight-pipe-thread port connections

BSPP Thread	Metric Tube OD		Ferrous		Non-Ferrous	
	S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)
G 1/8 A	—	6 mm	—	21 N·m (15.5 lb ft)	—	12.5 N·m (9.2 lb ft)
G 1/4 A	6 mm	8 mm	63 N·m (46.5 lb ft)	53 N·m (39.1 lb ft)	38 N·m (28.0 lb ft)	32 N·m (23.6 lb ft)
	8 mm	10 mm				
G 3/8 A	10 mm	12 mm	95 N·m (70.1 lb ft)	84 N·m (62.0 lb ft)	57 N·m (42.0 lb ft)	50 N·m (36.9 lb ft)
	12 mm					
G 1/2 A	16 mm	15 mm	136 N·m (100.3 lb ft)	105 N·m (77.4 lb ft)	82 N·m (60.5 lb ft)	63 N·m (46.5 lb ft)
		18 mm				
G 3/4 A	20 mm	22 mm	210 N·m (154.9 lb ft)	210 N·m (154.9 lb ft)	126 N·m (92.9 lb ft)	126 N·m (92.9 lb ft)
G 1 A	25 mm	28 mm	400 N·m (295.0 lb ft)	400 N·m (295.0 lb ft)	240 N·m (177.0 lb ft)	240 N·m (177.0 lb ft)
G 1-1/4 A	30 mm	35 mm	525 N·m (387.2 lb ft)	525 N·m (387.2 lb ft)	315 N·m (232.3 lb ft)	315 N·m (232.3 lb ft)
G 1-1/2 A	38 mm	42 mm	660 N·m (486.8 lb ft)	660 N·m (486.8 lb ft)	396 N·m (292.1 lb ft)	396 N·m (292.1 lb ft)

NOTE: Final torque tolerance is +/- 10% of the given torque specification.

Torques for Metric O-Ring Face Seal (ORFS) ports and stud end connections

BSP Thread	Metric Tube OD		Ferrous		Non-Ferrous	
	S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)
M10x1	—	4 mm	—	21 N·m (15.5 lb ft)	—	12.5 N·m (9.2 lb ft)
M12x1.5	4 mm	6 mm	47 N·m (34.7 lb ft)	32 N·m (23.6 lb ft)	28 N·m (20.7 lb ft)	19 N·m (14.0 lb ft)
M14x1.5	5 mm	7 mm	63 N·m (46.5 lb ft)	53 N·m (39.1 lb ft)	38 N·m (28.0 lb ft)	32 N·m (23.6 lb ft)
M16x1.5	7 mm	9 mm	84 N·m (62.0 lb ft)	63 N·m (46.5 lb ft)	50 N·m (36.9 lb ft)	38 N·m (28.0 lb ft)
M18x1.5	8 mm	11 mm	105 N·m (77.4 lb ft)	84 N·m (62.0 lb ft)	63 N·m (46.5 lb ft)	50 N·m (36.9 lb ft)
M20x1.5	10 mm	—	147 N·m (108.4 lb ft)	—	88 N·m (64.9 lb ft)	—
M22x1.5	12 mm	14 mm	158 N·m (116.5 lb ft)	147 N·m (108.4 lb ft)	95 N·m (70.1 lb ft)	88 N·m (64.9 lb ft)
M26x1.5	—	18 mm	—	210 N·m (154.9 lb ft)	—	126 N·m (92.9 lb ft)
M27x1.2	16 mm	—	210 N·m (154.9 lb ft)	—	126 N·m (92.9 lb ft)	—
M33x2	20 mm	23 mm	400 N·m (295.0 lb ft)	400 N·m (295.0 lb ft)	240 N·m (177.0 lb ft)	240 N·m (177.0 lb ft)
M42x2	25 mm	30 mm	525 N·m (387.2 lb ft)	525 N·m (387.2 lb ft)	315 N·m (232.3 lb ft)	315 N·m (232.3 lb ft)
M48x2	32 mm	36 mm	630 N·m (464.7 lb ft)	630 N·m (464.7 lb ft)	396 N·m (292.1 lb ft)	396 N·m (292.1 lb ft)
NOTE: Final torque tolerance $\pm 10\%$ of the given torque specification.						

Torques for Inch O-Ring Boss (ORB) non-adjustable port and stud end connections

SAE Dash size	UN/UNF Thread size	Inch Tube OD	Ferrous		Non-Ferrous	
			S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)
2	5/16–24	3.18 mm (0.125 in) 1/8	—	—	8.5 N·m (6.3 lb ft)	5 N·m (3.7 lb ft)
3	3/8–24	4.76 mm (0.187 in) 3/16	15.5 N·m (11.4 lb ft)	9.3 N·m (6.9 lb ft)	10.5 N·m (7.7 lb ft)	6.3 N·m (4.6 lb ft)
4	7/16–20	6.35 mm (0.25 in) 1/4	37 N·m (27.3 lb ft)	22 N·m (16.2 lb ft)	19 N·m (14.0 lb ft)	11.5 N·m (8.5 lb ft)
5	1/2–20	7.94 mm (0.313 in) 5/16	42 N·m (31.0 lb ft)	25 N·m (18.4 lb ft)	26 N·m (19.2 lb ft)	15.5 N·m (11.4 lb ft)
6	9/16–18	9.52 mm (0.375 in) 3/8	47 N·m (34.7 lb ft)	28 N·m (20.7 lb ft)	32 N·m (23.6 lb ft)	19 N·m (14.0 lb ft)
8	3/4–16	12.7 mm (0.5 in) 1/2	89 N·m (65.6 lb ft)	53 N·m (39.1 lb ft)	53 N·m (39.1 lb ft)	32 N·m (23.6 lb ft)
10	7/8–14	15.88 mm (0.625 in) 5/8	121 N·m (89.2 lb ft)	73 N·m (53.8 lb ft)	63 N·m (46.5 lb ft)	38 N·m (28.0 lb ft)
12	1-1/16–12	19.05 mm (0.75 in) 3/4	178 N·m (131.3 lb ft)	107 N·m (78.9 lb ft)	100 N·m (73.8 lb ft)	60 N·m (44.3 lb ft)
14	1-3/16–12	22.22 mm (0.875 in) 7/8	225 N·m (166.0 lb ft)	135 N·m (99.6 lb ft)	131 N·m (96.6 lb ft)	79 N·m (58.3 lb ft)
16	1-5/16–12	25.4 mm (1.0 in) 1	283 N·m (208.7 lb ft)	170 N·m (125.4 lb ft)	156 N·m (115.1 lb ft)	94 N·m (69.3 lb ft)
20	1-5/8–12	31.75 mm (1.25 in) 1-1/4	300 N·m (221.3 lb ft)	180 N·m (132.8 lb ft)	210 N·m (154.9 lb ft)	126 N·m (92.9 lb ft)
24	1-7/8–12	38.1 mm (1.5 in) 1-1/2	388 N·m (286.2 lb ft)	233 N·m (171.9 lb ft)	220 N·m (162.3 lb ft)	132 N·m (97.4 lb ft)
32	2-1/2–12	50.8 mm (2.0 in) 2	388 N·m (286.2 lb ft)	233 N·m (171.9 lb ft)	315 N·m (232.3 lb ft)	189 N·m (139.4 lb ft)
NOTE: Final torque tolerance +/- 10% of the given torque specification.						

Torques for Inch O-Ring Boss (ORB) adjustable stud end and port connections

SAE Dash size	UN/UNF Thread size	Inch Tube OD	Ferrous		Non-Ferrous	
			S-Series (Heavy Duty)	L-Series (Light Duty)	S-Series (Heavy Duty)	L-Series (Light Duty)
2	5/16–24	3.18 mm (0.125 in) 1/8	—	—	8.5 N·m (6.3 lb ft)	5 N·m (3.7 lb ft)
3	3/8–24	4.76 mm (0.187 in) 3/16	10.5 N·m (7.7 lb ft)	9.3 N·m (6.9 lb ft)	10.5 N·m (7.7 lb ft)	6.3 N·m (4.6 lb ft)
4	7/16–20	6.35 mm (0.25 in) 1/4	21 N·m (15.5 lb ft)	21 N·m (15.5 lb ft)	19 N·m (14.0 lb ft)	11.5 N·m (8.5 lb ft)
5	1/2–20	7.94 mm (0.313 in) 5/16	42 N·m (31.0 lb ft)	25 N·m (18.4 lb ft)	26 N·m (19.2 lb ft)	15.5 N·m (11.4 lb ft)
6	9/16–18	9.52 mm (0.375 in) 3/8	47 N·m (34.7 lb ft)	28 N·m (20.7 lb ft)	32 N·m (23.6 lb ft)	19 N·m (14.0 lb ft)
8	3/4–16	12.7 mm (0.5 in) 1/2	89 N·m (65.6 lb ft)	53 N·m (39.1 lb ft)	53 N·m (39.1 lb ft)	32 N·m (23.6 lb ft)
10	7/8–14	15.88 mm (0.625 in) 5/8	121 N·m (89.2 lb ft)	73 N·m (53.8 lb ft)	63 N·m (46.5 lb ft)	38 N·m (28.0 lb ft)
12	1-1/16–12	19.05 mm (0.75 in) 3/4	178 N·m (131.3 lb ft)	107 N·m (78.9 lb ft)	100 N·m (73.8 lb ft)	60 N·m (44.3 lb ft)
14	1-3/16–12	22.22 mm (0.875 in) 7/8	225 N·m (166.0 lb ft)	135 N·m (99.6 lb ft)	131 N·m (96.6 lb ft)	79 N·m (58.3 lb ft)
16	1-5/16–12	25.4 mm (1.0 in) 1	285 N·m (210.2 lb ft)	170 N·m (125.4 lb ft)	156 N·m (115.1 lb ft)	94 N·m (69.3 lb ft)
20	1-5/8–12	31.75 mm (1.25 in) 1-1/4	300 N·m (221.3 lb ft)	180 N·m (132.8 lb ft)	210 N·m (154.9 lb ft)	126 N·m (92.9 lb ft)
24	1-7/8–12	38.1 mm (1.5 in) 1-1/2	388 N·m (286.2 lb ft)	233 N·m (171.9 lb ft)	220 N·m (162.3 lb ft)	132 N·m (97.4 lb ft)
32	2-1/2–12	50.8 mm (2.0 in) 2	388 N·m (286.2 lb ft)	233 N·m (171.9 lb ft)	315 N·m (232.3 lb ft)	189 N·m (139.4 lb ft)
NOTE: Final torque tolerance +/- 10% of the given torque specification.						

Torques for Inch O-Ring Boss (ORB) port plug

SAE Dash size	UN/UNF Thread size	Ferrous		Non-Ferrous
		Internal Hex	External Hex	
2	5/16–24	7.5 N·m (5.5 lb ft)	12.5 N·m (9.2 lb ft)	7.5 N·m (5.5 lb ft)
3	3/8–24	14.5 N·m (10.7 lb ft)	21 N·m (15.5 lb ft)	12.5 N·m (9.2 lb ft)
4	7/16–20	21 N·m (15.5 lb ft)	37 N·m (27.3 lb ft)	22 N·m (16.2 lb ft)
5	1/2–20	28 N·m (20.7 lb ft)	42 N·m (31.0 lb ft)	25 N·m (18.4 lb ft)
6	9/16–18	47 N·m (34.7 lb ft)	47 N·m (34.7 lb ft)	28 N·m (20.7 lb ft)
8	3/4–16	89 N·m (65.6 lb ft)	89 N·m (65.6 lb ft)	53 N·m (39.1 lb ft)
10	7/8–14	116 N·m (85.6 lb ft)	116 N·m (85.6 lb ft)	70 N·m (51.6 lb ft)
12	1-1/16–12	176 N·m (129.8 lb ft)	176 N·m (129.8 lb ft)	106 N·m (78.2 lb ft)
14	1-3/16–12	247 N·m (182.2 lb ft)	247 N·m (182.2 lb ft)	148 N·m (109.2 lb ft)
16	1-5/16–12	284 N·m (209.5 lb ft)	284 N·m (209.5 lb ft)	170 N·m (125.4 lb ft)
20	1-5/8–12	357 N·m (263.3 lb ft)	357 N·m (263.3 lb ft)	214 N·m (157.8 lb ft)
24	1-7/8–12	441 N·m (325.3 lb ft)	441 N·m (325.3 lb ft)	265 N·m (195.5 lb ft)
32	2-1/2–12	536 N·m (395.3 lb ft)	536 N·m (395.3 lb ft)	322 N·m (237.5 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for O-Ring Face Seal (ORFS) hose connectors

SAE Dash size	UN/UNF Thread size	Tube OD	High/Medium pressure applications (greater than 50 bar (725 psi))	Low pressure applications (less than 50 bar (725 psi))
			Swivel nut torque	
4	9/16–18	6.35 mm (0.25 in) 1/4	27 N·m (19.9 lb ft)	27 N·m (19.9 lb ft)
5	5/8–18	7.94 mm (0.313 in) 5/16	34 N·m (25.1 lb ft)	34 N·m (25.1 lb ft)
6	11/16–16	9.52 mm (0.375 in) 3/8	44 N·m (32.5 lb ft)	44 N·m (32.5 lb ft)
8	13/16–16	12.7 mm (0.5 in) 1/2	65 N·m (47.9 lb ft)	65 N·m (47.9 lb ft)
10	1–14	15.88 mm (0.625 in) 5/8	100 N·m (73.8 lb ft)	100 N·m (73.8 lb ft)
12	1-3/16–12	19.05 mm (0.75 in) 3/4	150 N·m (110.6 lb ft)	131 N·m (96.6 lb ft)
14	1-5/16–12	22.22 mm (0.875 in) 7/8	163 N·m (120.2 lb ft)	131 N·m (96.6 lb ft)
16	1-7/16–12	25.4 mm (1.0 in) 1	210 N·m (154.9 lb ft)	131 N·m (96.6 lb ft)
20	1-11/16–12	31.75 mm (1.25 in) 1-1/4	280 N·m (206.5 lb ft)	178 N·m (131.3 lb ft)
24	2–12	38.1 mm (1.5 in) 1-1/2	375 N·m (276.6 lb ft)	210 N·m (154.9 lb ft)

NOTE: Final torque tolerance $\pm 10\%$ of the given torque specification.

Torques for four-bolt flange connections (Metric class 10.9)

Bolt Length	Bolt (SAE Code 61)	Torque (SAE Code 61)	Bolt (SAE Code 62)	Torque (SAE Code 62)
13 mm (0.5 in)	M8x1.25	34 N·m (25.1 lb ft)	M8x1.25	34 N·m (25.1 lb ft)
19 mm (0.75 in)	M10x1.5	74 N·m (54.6 lb ft)	M10x1.5	74 N·m (54.6 lb ft)
25 mm (1.0 in)	M10x1.5	74 N·m (54.6 lb ft)	M12x1.75	137 N·m (101.0 lb ft)
32 mm (1.25 in)	M10x1.5	74 N·m (54.6 lb ft)	M12x1.75	137 N·m (101.0 lb ft)
			M14x1.5	189 N·m (139.4 lb ft)
38 mm (1.5 in)	M12x1.75	137 N·m (101.0 lb ft)	M16x2	310 N·m (228.6 lb ft)
51 mm (2.0 in)	M12x1.75	137 N·m (101.0 lb ft)	M20x2.5	575 N·m (424.1 lb ft)
64 mm (2.5 in)	M12x1.75	137 N·m (101.0 lb ft)	M24x3	575 N·m (424.1 lb ft)
76 mm (3.0 in)	M16x2	310 N·m (228.6 lb ft)	M30x3.5	680 N·m (501.5 lb ft)
89 mm (3.5 in)	M16x2	310 N·m (228.6 lb ft)	—	—
102 mm (4.0 in)	M16x2	310 N·m (228.6 lb ft)	—	—
127 mm (5.0 in)	M16x2	310 N·m (228.6 lb ft)	—	—

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for four-bolt flange connections (Metric class 8.8)

Bolt Length	Bolt (SAE Code 61)	Torque (SAE Code 61)	Bolt (SAE Code 62)	Torque (SAE Code 62)
13 mm (0.5 in)	M8x1.25	29 N·m (21.4 lb ft)	M8x1.25	29 N·m (21.4 lb ft)
19 mm (0.75 in)	M10x1.5	57 N·m (42.0 lb ft)	M10x1.5	57 N·m (42.0 lb ft)
25 mm (1.0 in)	M10x1.5	57 N·m (42.0 lb ft)	M12x1.75	100 N·m (73.8 lb ft)
32 mm (1.25 in)	M10x1.5	57 N·m (42.0 lb ft)	M12x1.75	100 N·m (73.8 lb ft)
			M14x1.5	160 N·m (118.0 lb ft)
38 mm (1.5 in)	M12x1.75	100 N·m (73.8 lb ft)	M16x2	250 N·m (184.4 lb ft)
51 mm (2.0 in)	M12x1.75	100 N·m (73.8 lb ft)	M20x2.5	500 N·m (368.8 lb ft)
64 mm (2.5 in)	M12x1.75	100 N·m (73.8 lb ft)	M24x3	575 N·m (424.1 lb ft)
76 mm (3.0 in)	M16x2	250 N·m (184.4 lb ft)	M30x3.5	680 N·m (501.5 lb ft)
89 mm (3.5 in)	M16x2	250 N·m (184.4 lb ft)	—	—
102 mm (4.0 in)	M16x2	250 N·m (184.4 lb ft)	—	—
127 mm (5.0 in)	M16x2	250 N·m (184.4 lb ft)	—	—

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for four-bolt flange connections (Inch grade 8)

Bolt Length	Bolt (SAE Code 61)	Torque (SAE Code 61)	Bolt (SAE Code 62)	Torque (SAE Code 62)
13 mm (0.5 in)	5/16-18	34 N·m (25.1 lb ft)	5/16-18	34 N·m (25.1 lb ft)
19 mm (0.75 in)	3/8-16	63 N·m (46.5 lb ft)	3/8-16	63 N·m (46.5 lb ft)
25 mm (1.0 in)	3/8-16	63 N·m (46.5 lb ft)	7/16-14	97 N·m (71.5 lb ft)
32 mm (1.25 in)	7/16-14	97 N·m (71.5 lb ft)	1/2-13	158 N·m (116.5 lb ft)
38 mm (1.5 in)	1/2-13	158 N·m (116.5 lb ft)	5/8-11	310 N·m (228.6 lb ft)
51 mm (2.0 in)	1/2-13	158 N·m (116.5 lb ft)	3/4-10	473 N·m (348.9 lb ft)
64 mm (2.5 in)	1/2-13	158 N·m (116.5 lb ft)	—	—
76 mm (3.0 in)	5/8-11	310 N·m (228.6 lb ft)	—	—
89 mm (3.5 in)	5/8-11	310 N·m (228.6 lb ft)	—	—
102 mm (4.0 in)	5/8-11	310 N·m (228.6 lb ft)	—	—
127 mm (5.0 in)	5/8-11	310 N·m (228.6 lb ft)	—	—

NOTE: Final torque tolerance $\pm 10\%$ of the given torque specification.

Tapered thread connection tightening

BSPT Thread size	NPTF Thread size	Turns From Finger Tight (TFFT)
1/8–28	1/8–27	2 to 3 full turns
1/4–19	1/4–18	2 to 3 full turns
3/8–19	3/8–18	2 to 3 full turns
1/2–14	1/2–14	2 to 3 full turns
3/4–14	3/4–14	2 to 3 full turns
1–11	1–11-1/2	1-1/2 to 2-1/2 full turns
1-1/4–11	1-1/4–11-1/2	1-1/2 to 2-1/2 full turns
1-1/2–11	1-1/2–11-1/2	1-1/2 to 2-1/2 full turns
2–11	2–11-1/2	1-1/2 to 2-1/2 full turns

Torques for Banjo-bolt connectors (copper washer style)

Metric bolt thread	Hex size	Torque
M8x1.25	13 mm (0.5 in)	13 N·m (9.6 lb ft)
M10x1.25	17 mm (0.67 in)	16 N·m (11.8 lb ft)
M12x1.5	17 mm (0.67 in)	40 N·m (29.5 lb ft)
M14x1.5	19 mm (0.75 in)	45 N·m (33.2 lb ft)
M16x1.5	22 mm (0.9 in)	48 N·m (35.4 lb ft)
M18x1.5	24 mm (0.9 in)	50 N·m (36.9 lb ft)
M20x1.5	27 mm (1.1 in)	73 N·m (53.8 lb ft)
M22x1.5	32 mm (1.3 in)	73 N·m (53.8 lb ft)
M24x1.5	32 mm (1.3 in)	73 N·m (53.8 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for 37° Flare hose connectors (JIC)

SAE Dash size	UN/UNF Thread size	Tube OD	Swivel nut torque
2	5/16–24	3.18 mm (0.125 in) 1/8	8.25 N·m (6.1 lb ft)
3	3/8–24	4.76 mm (0.187 in) 3/16	11.5 N·m (8.5 lb ft)
4	7/16–20	6.35 mm (0.25 in) 1/4	15.5 N·m (11.4 lb ft)
5	1/2–20	7.94 mm (0.313 in) 5/16	20 N·m (14.8 lb ft)
6	9/16–18	9.52 mm (0.375 in) 3/8	25 N·m (18.4 lb ft)
8	3/4–16	12.7 mm (0.5 in) 1/2	52 N·m (38.4 lb ft)
10	7/8–14	15.88 mm (0.625 in) 5/8	81 N·m (59.7 lb ft)
12	1-1/16–12	19.05 mm (0.75 in) 3/4	112 N·m (82.6 lb ft)
14	1-3/16–12	22.22 mm (0.875 in) 7/8	133 N·m (98.1 lb ft)
16	1-5/16–12	25.4 mm (1.0 in) 1	155 N·m (114.3 lb ft)
20	1-5/8–12	31.75 mm (1.25 in) 1-1/4	180 N·m (132.8 lb ft)
24	1-7/8–12	38.1 mm (1.5 in) 1-1/2	225 N·m (166.0 lb ft)
32	2-1/2–12	50.8 mm (2.0 in) 2	348 N·m (256.7 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Torques for 30° Flare and 60° Cone hose connectors

Nominal size	BSPP Thread size	Hex	Swivel nut torque
5, 6, 6.3	G 1/4	17.0 mm (0.7 in)	25 N·m (18.4 lb ft)
8, 9, 10	G 3/8	19.0 mm (0.7 in)	34 N·m (25.1 lb ft)
12, 12.54	G 1/2	22.0 mm (0.9 in)	64 N·m (47.2 lb ft)
15, 16, 19	G 3/4	30.0 mm (1.2 in)	132 N·m (97.4 lb ft)
25	G 1	36.0 mm (1.4 in)	196 N·m (144.6 lb ft)
31.5, 32	G 1-1/4	46.0 mm (1.8 in)	225 N·m (166.0 lb ft)
38	G 1-1/2	50.0 mm (2.0 in)	255 N·m (188.1 lb ft)
50, 51	G 2	65.0 mm (2.6 in)	316 N·m (233.1 lb ft)

NOTE: Final torque tolerance +/- 10% of the given torque specification.

Installation of adjustable O-Ring Bosses (ORB) connectors

Adjustable port connectors are commonly found on shaped connectors, which allow for orientation of the connection. Adjustable port connectors utilize a locknut and back-up washer.

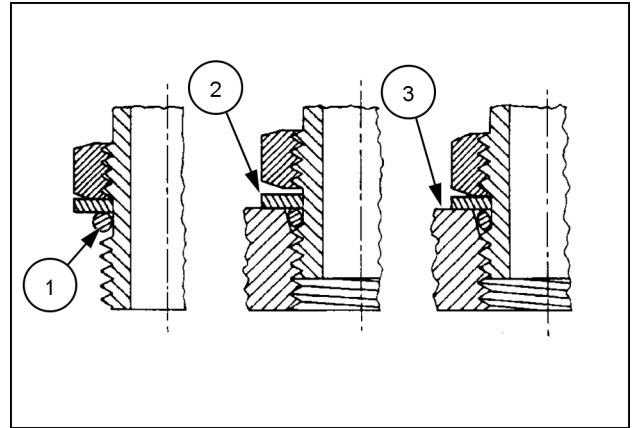
NOTICE: Teflon coated O-rings do not require lubrication. For connections which are made into aluminum manifolds or with stainless steel connectors, it may be required to apply a lubricant to prevent galling.

1. Remove protective connector caps only immediately prior to assembly.
2. Inspect the components to ensure that the male and female port threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Make sure the washer (2) is on the fitting before the O-ring (1).
4. Back off the lock nut as far as possible. Make sure that the back-up washer is not loose and it is as far up on the connector as possible.
5. Screw the connector into the port until the back-up washer (2) or the retaining ring contacts the face of the port (3). Light wrenching may be necessary.
6. Unscrew the connector until you achieve the correct angle of the connector. Do not unscrew the connector more than one full turn.

NOTICE: Do not over tighten the connector you may damage the washer and increase the possibility of a leak to occur.

7. Using two wrenches, hold the position of the connector and tighten the locknut to the proper torque value. See the torque tables for the proper torque value.

NOTICE: Make sure that the O-ring is not pinched and that the washer is seated flat on the face of the port. Do not over tighten and distort the back-up washer.



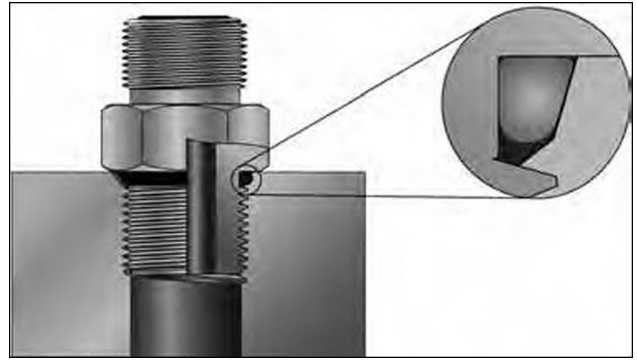
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Installation of non-adjustable O-Ring Bosses (ORB) connectors

Non-adjustable port connectors are commonly found on straight connectors, which do not require the installer to adjust the orientation of the connection.

NOTICE: *Teflon coated O-rings do not require lubrication. For connections which are made into aluminum manifolds or with stainless steel connectors, it may be required to apply a lubricant to prevent galling.*

1. Remove protective connector caps only immediately prior to assembly.
2. Inspect the components to ensure that the male and female port threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Install the connector by hand.
4. Tighten to the proper torque. See the torque tables for the proper torque value.



RAIL15TLB0538AA 2

Installation of tapered thread connectors

1. Remove protective connector caps only immediately prior to assembly.

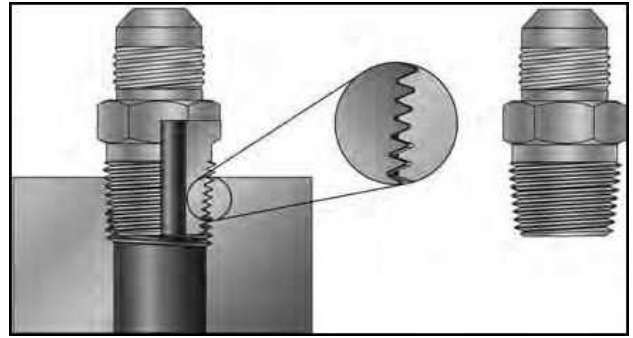
NOTICE: Pre-applied sealants, such as **LOCTITE® 503™ VIBRA-SEAL®** and/or powdered PTFE are the preferred sealants for tapered thread connectors. Non-preferred sealant types include PTFE tape, paste sealants, and anaerobic liquids. PTFE tape and paste sealants may contribute to hydraulic system contamination.

2. Inspect the components to ensure that the male and female port threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Apply the sealant/lubricant to the male pipe threads, if not pre-applied. The first one or two threads should not have sealant applied to them to avoid system contamination.

NOTICE: If you require a specific orientation of a shaped connector, take into consideration that final position before you proceed with the next steps. Never back off (loosen) tapered thread connectors to achieve alignment you will increase the possibility of leaks.

4. Screw the connector into the port to the finger tight position.
5. Use a wrench to tighten the connector. See the torque table for the proper number of Turns From Finger Tight (TFFT).

NOTE: Normally, the total number of threads engaged should be between 3.5 and 6. If more than 6 threads are engaged, this may indicate an over-tightened connection. If fewer than 3.5 threads are engaged, this may indicate an under-tightened connection. For an over-tightened connection, check both threads and replace the part which has out-of-tolerance threads. If the connection is under-tightened, it is acceptable to tighten it further, but no more than one full turn.



RAIL15TLB0539AA 3

Installation of flange connectors

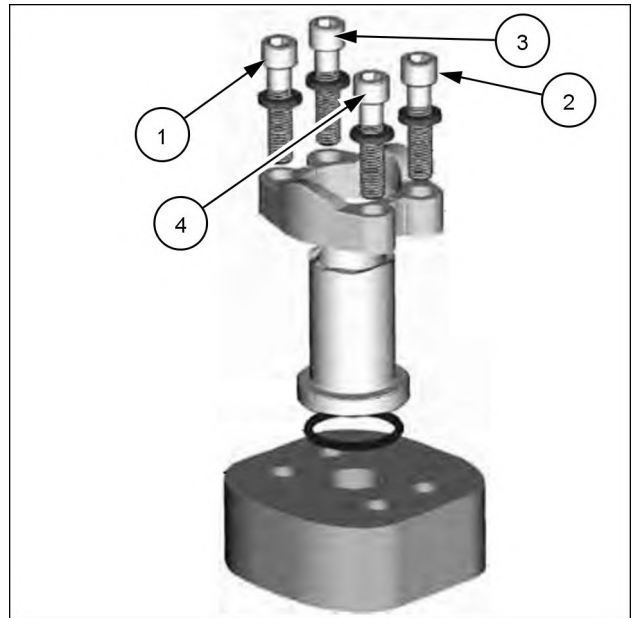
Flange connections typically have four bolts, although some flange connections may have more or fewer. The flange connector consists of four main components:

- A body (flange head)
- An O-ring
- One “captive” or two “split” flange clamps
- Bolts and washers

1. Remove protective connector caps only immediately prior to assembly.
2. Inspect the components to ensure that the male and female port threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Place the O-ring in the groove, the groove will be either on the port side or the flange side.
4. Assemble the flange head and the clamps.
5. Position and hold the flange assembly over the port.
6. Finger tighten the bolt hardware evenly and in a crossing pattern.
7. Tighten the bolt hardware to **60%** of the torque value. Use the same crossing pattern. See the torque tables for the proper torque value.

NOTE: For bolt hardware that is not Metric Class 8.8 and 10.9 or Inch Grade 8 see the “Torque - Minimum tightening torques for normal assembly” **Torque - Minimum tightening torques for normal assembly** () .

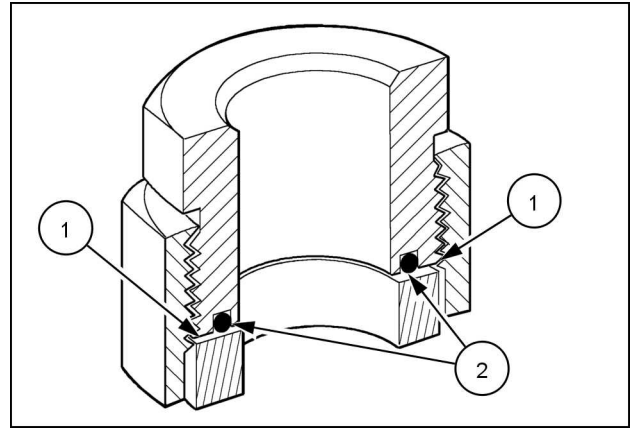
8. Tighten the bolt hardware 1 and 2 to **100%** of the torque value.
9. Tighten the bolt hardware 3 and 4 to **100%** of the torque value.



RAIL15TLB0611BA 4

Installation of O-Ring Face Seal (ORFS) connections

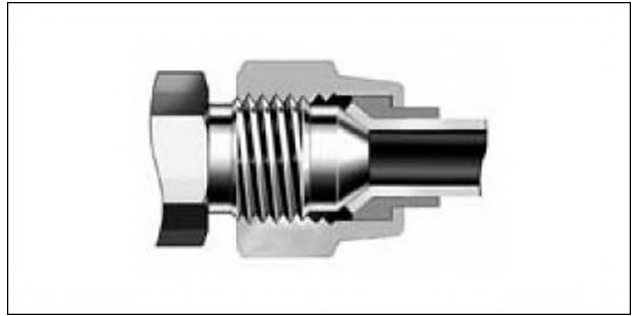
1. Remove protective connector caps only immediately prior to assembly.
2. Inspect the components to ensure that the male and female threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Check that the seal is properly installed in the groove on the male connector. If the seal is not pre-installed on the connector body, it must be installed using an assembly tool:
 - A. Position the O-ring inside the assembly tool, against the plunger.
 - B. Position the tool over the ORFS male end until it is against the bottom of the tool.
 - C. Push the plunger of the tool until the O-ring is fully seated into the groove on the connector.
4. Place the face of the female connector against the face and O-ring of the male connector.
5. Thread the nut completely onto the male connector by hand.
6. Complete steps 1 through 5 for both ends of the hose or tube before continuing.
7. Hand-tighten any clamps that hold the position of the hose or tube.
8. Tighten the ORFS connection to the proper torque value. See the torque tables for the proper torque value.
9. Complete tightening of any clamps that hold the hose or tube only after both end fittings have been fully tightened.



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Installation of Flare-less Bite type and Flared connections

1. Remove protective connector caps only immediately prior to assembly.
2. Inspect the components to ensure that the male and female threads and sealing surfaces are free of burrs, nicks, and scratches, or any foreign material. Do not use if impurities are found.
3. Place the face of the female connector against the face and O-ring of the male connector.
4. Thread the nut completely onto the male connector by hand.
5. Complete steps 1 through 5 for both ends of the hose or tube before continuing.
6. Hand-tighten any clamps that hold the position of the hose or tube.
7. Tighten the connection to the proper torque value. See the torque tables for the proper torque value.
8. Complete tightening of any clamps that hold the hose or tube only after both end fittings have been fully tightened.



RAIL15TLB0541AA 6

Basic instructions - Snap-to-Connect (STC®) hydraulic connectors

⚠ WARNING

Escaping fluid!

Relieve all pressure before you disconnect fluid lines or perform work on the hydraulic system. Make sure that all components are in good condition and that all connections are secure before you pressurize the system. **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper.

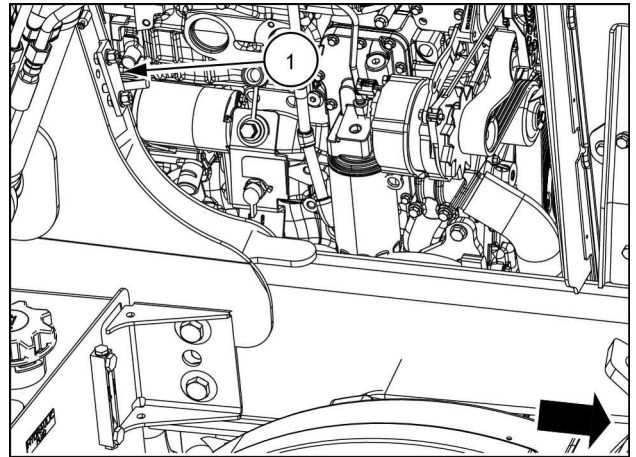
Failure to comply could result in death or serious injury.

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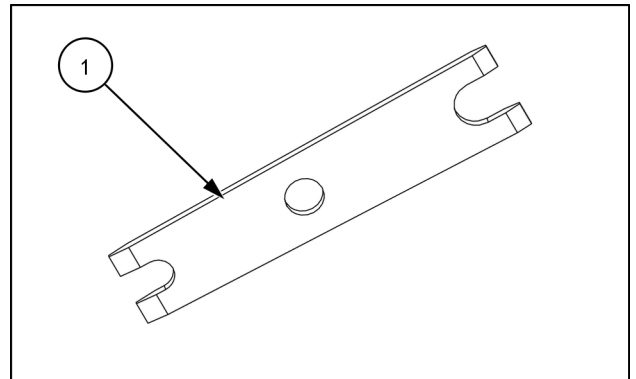
NOTE: Depending on the date of manufacture, your Tractor Loader Backhoes (TLB) hydraulic and steering systems may have STC® connectors that attach to system components. Not all connectors in these systems will be STC® connectors. STC® connectors do not require tightening or a torque specification but will require the use of a tool to disconnect.

STC® disconnect tool storage location

The tool (1) is mounted to the right-hand chassis upright inside the engine compartment.



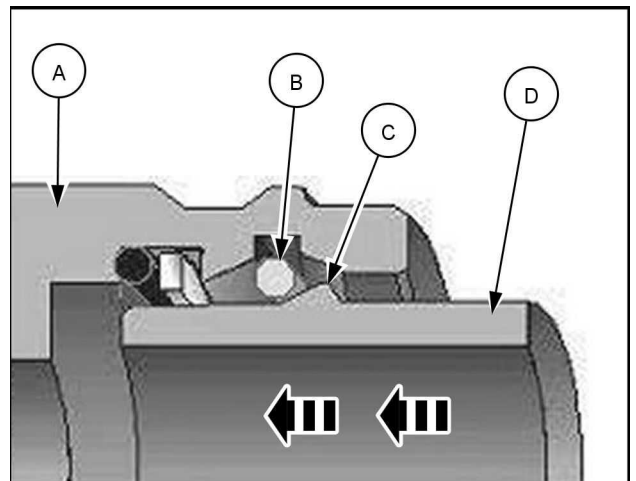
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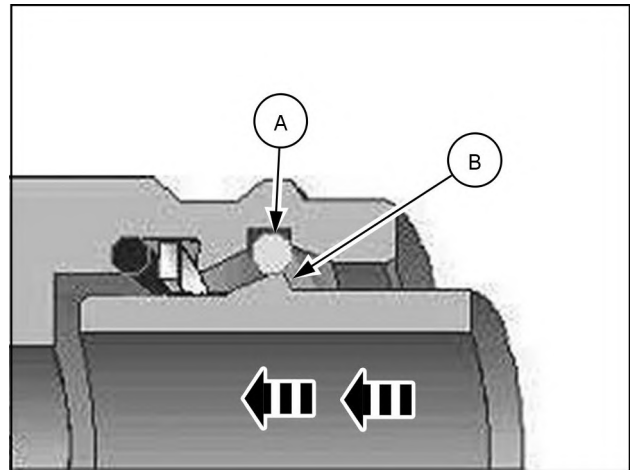
STC® assembly action

The male connector (D) inserts into the female connector (A). The male shoulder (C) spreads the latch ring (B) open.



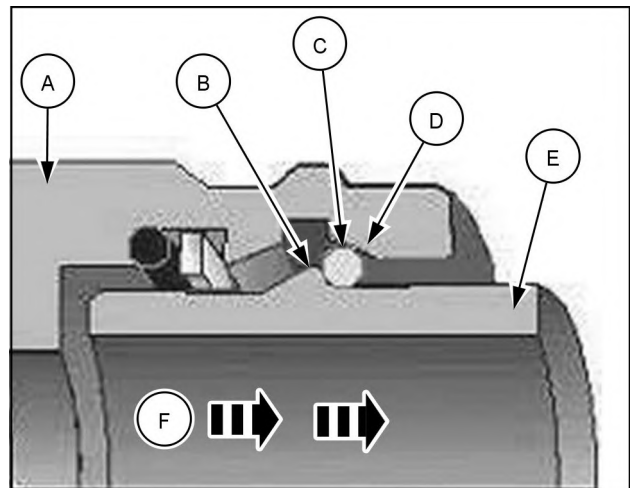
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When the latch ring **(A)** is in its open position, the male shoulder **(B)** can slide past the latch ring **(A)**.



RAIL17TLB0019AA 4

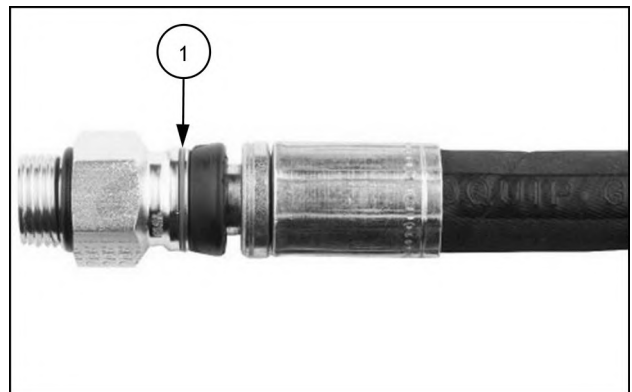
The male **(E)** and female **(A)** connectors are locked into place. As fluid pressure **(F)** is applied, the latch ring **(C)** is wedged between the male shoulder **(B)** and the female angle **(D)**.



RAIL17TLB0018AA 5

Connection of **STC®** connectors

- Do not use the rubber sleeve as leverage to push the male half into the female half of the **STC®** connection.
- Do not hold sleeve during assembly.
- If the red indication ring **(1)** is visible after the connection attempt repeat the connection procedure.



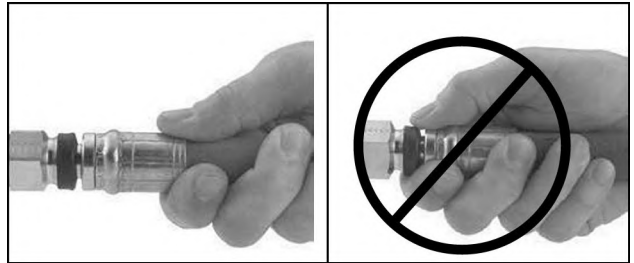
RAIL17TLB0021AA 6

Assembly method and verification:

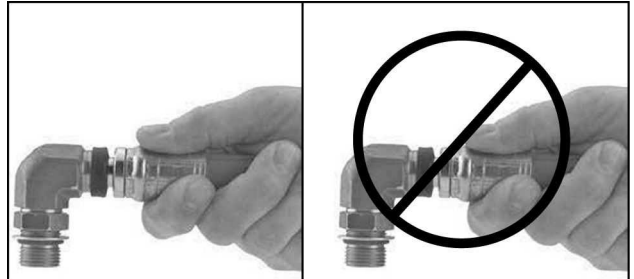
1. Align the **STC**® fitting on the hose assembly with the **STC**® connector.
2. Push the hose fitting into the mating connector until you feel a definite snap and a solid stop.

NOTE: Be sure that the direction of pull is parallel to the axis of the **STC**® connection.

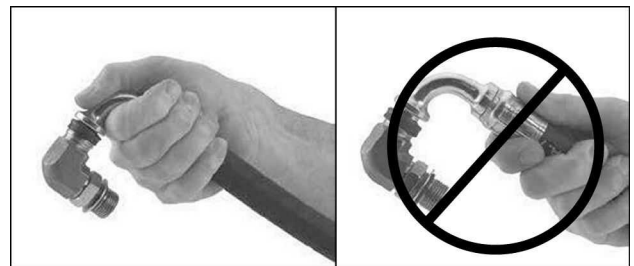
3. Verify that the **STC**® connection has been made successfully by pulling on the connection to make sure that the male connector has been properly inserted into female connector.



RAIL17TLB0015AA 7



RAIL17TLB0014AA 8

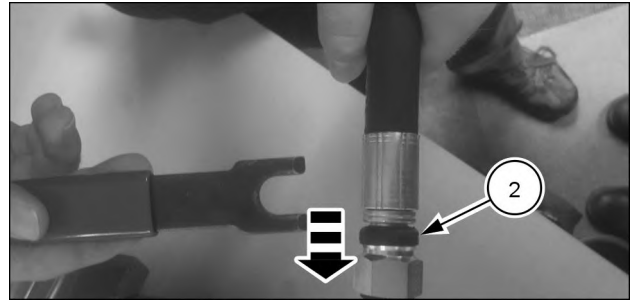


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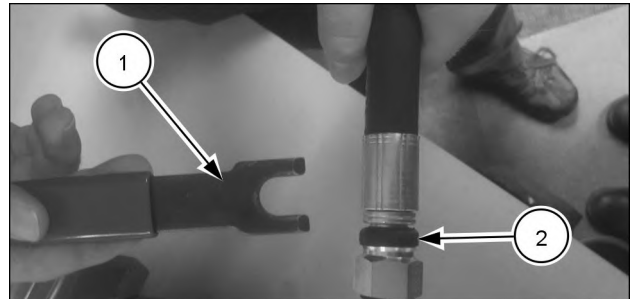
STC® disassembly action

NOTICE: Do not use the disconnect tool to pry on the parts. Prying can result in damage. Insert the tool straight into the connection. The proper connection and disconnection of **STC®** parts is outlined later in this section.

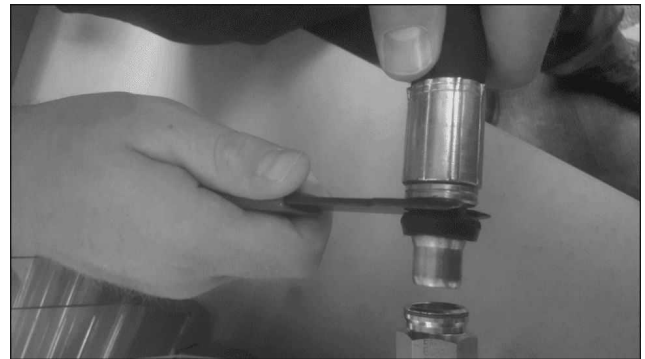
1. Release pressure from the hydraulic system prior to disconnecting components.
2. Some fluid may still be in the system. Minimize fluid loss by draining the fluid from system components prior to disconnection.
3. Prior to disconnection, clean the area around the fittings with a clean cloth, Or using an airgun to blow dirt and debris from the release sleeve area.
4. To help avoid the release sleeve from tearing, create an (for the release sleeve) insertion gap by moving the sleeve in the release direction. This can be done either by hand or by using a single prong of the release tool.
5. As the **STC®** tool (1) is inserted behind the release sleeve (2), the steel insert pushes the latching ring forward into a groove in the female half I.D., allowing the two halves to be pulled apart. The thickness of the tool moves the sleeve forward far enough to make the disconnection, so prying sideways with the tool is unnecessary



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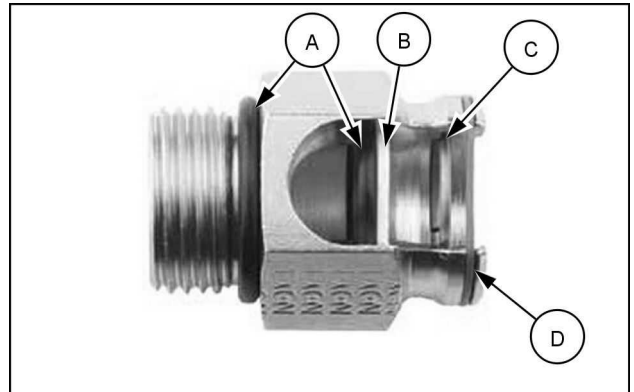
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Seal replacement instructions inspection

- Inspect mating **STC®** fittings to ensure they are in good condition, clean and free of contaminants, nicks, scratches, flat spots, etc.
 - Check the Latch Ring (C) to ensure that it is in proper position in the female **STC®** connector prior to installation or connection.
 - Check the O-Ring (A) to ensure it is not cut or otherwise damaged prior to installation or connection.
 - Check the Back-Up Ring (B) to ensure it is not damaged. Verify that it is at the front of the O-Ring groove prior to connection the fitting.
- If any damage is detected on either of the O-Ring, Back-Up Ring or Latch Ring, replace them by following these procedures:
1. Carefully remove O-Ring (A) and Back-Up Ring (B) with an O-Ring pick with out damaging the interior surfaces of the fitting.
 2. Inspect the interior surfaces and grooves of the fitting and ensure that they are free of foreign material or nicks, scratches, dents, etc.
 3. If undamaged, clean the fitting and install the Back-Up Ring (B) at the front of the O-Ring groove.



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4. Install the new O-Ring **(A)** in the groove behind the Back-Up Ring **(B)** and inspect to ensure that the O-Ring and Back-Up ring are secure in the groove. Lubricate the O-Ring with clean hydraulic fluid **CASE AKCELA NEXPLORE™ FLUID**.
5. If the Latch Ring **(C)** is damaged, carefully remove the Latch Ring without damaging the interior surfaces of the connector.
6. Carefully insert the Latch Ring in the Latch Ring groove. The new Latch Ring should be able to rotate in the groove.
7. Inspect and reinstall the connector. Follow the installation/connection steps for installation.

Abbreviation Measurements

Typical applications	Metric unit		Imperial unit	
	Name	Symbol	Name	Symbol
Area (Land area)				
	hectare	ha	acre	ac
	square meter	m²	square foot	ft²
			square inch	in²
	square millimeter	mm²	square inch	in²
Electricity				
	ampere	A	ampere	A
	volt	V	volt	V
	microfarad	µF	microfarad	µF
	ohm	Ω	ohm	Ω
Force				
	kilonewton	kN	pound	lb
	newton	N	pound	lb
Force per length				
	newton per meter	N/m	pound per foot	lb/ft
			pound per inch	lb/in
Frequency				
	megahertz	MHz	megahertz	MHz
	kilohertz	kHz	kilohertz	kHz
	hertz	Hz	hertz	Hz
Frequency – Rotational				
	revolution per minute	r/min	revolution per minute	r/min ^a
		rpm		rpm
Length				
	kilometer	km	mile	mi
	meter	m	foot	ft
	centimeter	cm	inch	in
	millimeter	mm	inch	in
	micrometer	µm		
Mass				
	kilogram	kg	pound	lb
	gram	g	ounce	oz
	milligram	mg		
Power				
	kilowatt	kW	horsepower	Hp
	watt	W	Btu per hour	Btu/hr
			Btu per minute	Btu/min
Pressure or stress (Force per area)				
	kilopascal	kPa	pound per square inch	psi
			inch of mercury	inHg
	pascal	Pa	inch of water	inH2O
	megapascal	MPa	pound per square inch	psi

Typical applications	Metric unit		Imperial unit	
	Name	Symbol	Name	Symbol
Temperature (other than Thermodynamic)				
	degrees Celsius	°C	degrees Fahrenheit	°F
Time				
	hour	h	hour	h
	minute	min	minute	min
	second	s	second	s
Torque (includes Bending moment, Moment of force, and Moment of a couple)				
	newton meter	N m	pound foot	lb ft
			pound foot	lb in
Velocity				
	kilometer per hour	km/h	mile per hour	mph
	meter per second	m/s	foot per second	ft/s
	millimeter per second	mm/s	inch per second	in/s
	meter per minute	m/min	foot per minute	ft/min
Volume (includes Capacity)				
	cubic meter	m ³	cubic yard	yd ³
				cu yd
	liter	l	cubic inch	in ³
	liter	l	US gallon	US gal
			UK gallon	UK gal
			US quart	US qt
			UK quart	UK qt
	milliliter	ml	fluid ounce	fl oz
Volume per time (includes Discharge and Flow rate)				
	cubic meter per minute	m ³ /min	cubic foot per minute	ft ³ /min
	liter per minute	l/min	US gallon per minute	US gal/min
	milliliter per minute	ml/min	UK gallon per minute	UK gal/min
Sound power level and Sound pressure level				
	decibel	dB	decibel	dB

Capacities and fluids - 580N (factory fill)

580N Four-Wheel Drive (4WD) Tier 4B (final) [NHC740665 -]	
580N Two-Wheel Drive (2WD) Tier 4B (final) [NHC740665 -]	

NOTE: Machines with the optional Severe Cold Weather Package (SCWP) use the SCWP recommended fluids. Your machine will have a decal that indicates that the machine is equipped with the SCWP option. The decal is on the left-hand side of the engine near the maintenance decal.

Engine crank case

Standard specification (factory fill):	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40(API CJ-4)
SCWP specification (factory fill):	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	8.0 L (8.5 US qt)

Fuel tank

Standard specification (factory fill):	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification (factory fill):	Winter diesel fuel blend with a diesel fuel additive
Capacity:	132 L (35 US gal)

NOTE: Contact your CASE CONSTRUCTION dealer for assistance and availability of winter diesel fuel blends in your area. Follow the directions on the manufactures label of the cold weather diesel fuel additive for recommended use.

Diesel Exhaust Fluid (DEF)/AdBlue® tank

Standard and SCWP specification (factory fill):	DEF/AdBLUE®
Capacity:	13.5 L (3.6 US gal)

Cooling system

Standard and SCWP specification (factory fill):	CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT (50% concentrate and 50% distilled water)
Without heater	17.3 L (18.3 US qt)
With heater	18.0 L (19.0 US qt)

Hydraulic system

Standard specification (factory fill):	CASE AKCELA NEXPLORE™ FLUID
SCWP specification (factory fill):	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	105.0 L (111.0 US qt)
Total system with Extendahoe	110.7 L (117.0 US qt)
Reservoir with filter change	52.4 L (55.0 US qt)
Reservoir without filter change	50.5 L (53.4 US qt)

NOTE: CASE AKCELA HY-TRAN® ULTRACTION is an acceptable alternative to CASE AKCELA NEXPLORE™ FLUID.

Transmission

Standard specification (factory fill):		CASE AKCELA NEXPLORE™ FLUID
SCWP specification (factory fill):		CASE AKCELA HY-TRAN® ULTRACTION SSL
Manual (powershuttle)		
	Two wheel drive	Four wheel drive
Total system	17.0 l (18 US qt)	19.4 l (21 US qt)
Refill (with or without filter change)	10.5 l (11 US qt)	13.0 l (14 US qt)
Powershift S-type		
	Two wheel drive	Four wheel drive
Total system	21.7 l (22.9 US qt)	20.7 l (21.9 US qt)
Refill (with or without filter change)	15.3 l (16.2 US qt)	14.3 l (15.1 US qt)
NOTE: The master brake cylinder receives fluid from the transmission.		

NOTE: CASE AKCELA HY-TRAN® ULTRACTION is an acceptable alternative to CASE AKCELA NEXPLORE™ FLUID.

Front drive axle - Four-Wheel drive (4WD) – Standard duty

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:		
Differential	7.7 L (8.1 US qt)	
Each planetary hub	0.5 L (0.5 US qt)	

Front drive axle - Four-Wheel drive (4WD) – Heavy duty (12.5/80 x 18 tire only)

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:		
Differential	8.6 L (9.1 US qt)	
Each planetary hub	1.0 L (1.1 US qt)	

Rear axle (differential and hubs)

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:	13.6 L (14.4 US qt)	

Capacities and fluids - 580SN (factory fill)

580SN Four-Wheel Drive (4WD) Tier 4B (final) [NHC743044 -]	
580SN Two-Wheel Drive (2WD) Tier 4B (final) [NHC743044 -]	

NOTE: Machines with the optional Severe Cold Weather Package (SCWP) use the SCWP recommended fluids. Your machine will have a decal that indicates that the machine is equipped with the SCWP option. The decal is on the left-hand side of the engine near the maintenance decal.

Engine crank case

Standard specification (factory fill):	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40(API CJ-4)
SCWP specification (factory fill):	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	8.0 L (8.5 US qt)

Fuel tank

Standard specification (factory fill):	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification (factory fill):	Winter diesel fuel blend with a diesel fuel additive
Capacity:	132 L (35 US gal)

NOTE: Contact your CASE CONSTRUCTION dealer for assistance and availability of winter diesel fuel blends in your area. Follow the directions on the manufactures label of the cold weather diesel fuel additive for recommended use.

Diesel Exhaust Fluid (DEF)/AdBlue® tank

Standard and SCWP specification (factory fill):	DEF/AdBLUE®
Capacity:	13.5 L (3.6 US gal)

Cooling system

Standard and SCWP specification (factory fill):	CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT (50% concentrate and 50% distilled water)
Without heater	17.3 L (18.3 US qt)
With heater	18.0 L (19.0 US qt)

Hydraulic system

Standard specification (factory fill):	CASE AKCELA NEXPLORE™ FLUID
SCWP specification (factory fill):	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	117.9 L (124.6 US qt)
Total system with Extendahoe	123.6 L (130.6 US qt)
Reservoir with filter change	52.4 L (55.0 US qt)
Reservoir without filter change	50.5 L (53.4 US qt)

NOTE: CASE AKCELA HY-TRAN® ULTRACTION is an acceptable alternative to CASE AKCELA NEXPLORE™ FLUID.

Transmission

Standard specification (factory fill):	CASE AKCELA NEXPLORE™ FLUID	
SCWP specification (factory fill):	CASE AKCELA HY-TRAN® ULTRACTION SSL	
Manual (powershuttle)		
	Two wheel drive	Four wheel drive
Total system	17.0 l (18 US qt)	19.4 l (21 US qt)
Refill (with or without filter change)	10.5 l (11 US qt)	13.0 l (14 US qt)
Powershift S-type		
	Two wheel drive	Four wheel drive
Total system	21.7 l (22.9 US qt)	20.7 l (21.9 US qt)
Refill (with or without filter change)	15.3 l (16.2 US qt)	14.3 l (15.1 US qt)
Powershift H-type		
		Four wheel drive only
Total system		18.0 L (19.0 US qt)
Refill (with or without filter change)		11.4 L (12.0 US qt)
NOTE: The master brake cylinder receives fluid from the transmission.		

NOTE: The master brake cylinder receives fluid from the transmission.

NOTE: CASE AKCELA HY-TRAN® ULTRACTION is an acceptable alternative to CASE AKCELA NEXPLORE™ FLUID.

Front drive axle - Four-Wheel drive (4WD) - Standard duty

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140
Capacity:	
Differential	7.7 L (8.1 US qt)
Each planetary hub	0.5 L (0.5 US qt)

Front drive axle - Four-Wheel drive (4WD) – Heavy duty (12.5/80 x 18 tire only)

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140
Capacity:	
Differential	8.6 L (9.1 US qt)
Each planetary hub	1.0 L (1.1 US qt)

Rear axle (differential and hubs)

Standard and SCWP specification (factory fill):	TUTELA TRANSAXLE FLUID SAE 80W-140
Capacity:	13.6 L (14.4 US qt)

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