

580N
580SN WT
580SN
590SN
Tier 3
Tractor Loader Backhoe

SERVICE MANUAL

Part number 47860801

English
March 2015





SERVICE MANUAL

**580N Four-Wheel Drive (4WD) TIER 3 , 580N Two-Wheel Drive (2WD) TIER 3 ,
580N Two-Wheel Drive (2WD) TIER 3 , 580SN Four-Wheel Drive (4WD) TIER
3 , 580SN Four-Wheel Drive (4WD) TIER 3 , 580SN Two-Wheel Drive (2WD)
TIER 3 , 580SN Two-Wheel Drive (2WD) TIER 3 , 580SN WT Four-Wheel Drive
(4WD) TIER 3 , 590SN Four-Wheel Drive (4WD) TIER 3 , 590SN Two-Wheel
Drive (2WD) TIER 3**

Link Product / Engine

Product	Market Product	Engine
580N Two-Wheel Drive (2WD) TIER 3	Middle East Africa	F4GE9454K*J603
580N Two-Wheel Drive (2WD) TIER 3	North America	F4GE9454K*J603
580N Two-Wheel Drive (2WD) TIER 3	Latin America	F4GE9454K*J603
580N Two-Wheel Drive (2WD) TIER 3	Australia New Zealand	F4GE9454K*J603
580N Two-Wheel Drive (2WD) TIER 3	Asia Pacific	F4GE9454K*J603
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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

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

Battery - Basic instructions

⚠ 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.

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⚠ 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.

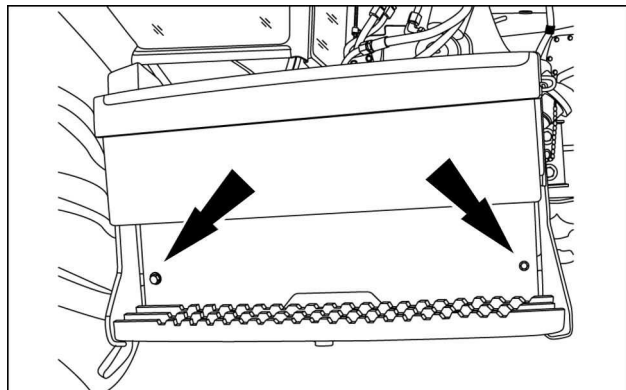
Failure to comply could result in death or serious injury.

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- Do not run the engine with the alternator wires disconnected.
- Before using an electric welder, disconnect the alternator wires, instrument cluster and batteries. Disconnect the Engine Control Unit (ECU) connectors.
- Do not use a steam cleaner or a cleaning solvent to clean the alternator.
- Keep the battery vents clean. Ensure the battery vents are not restricted.

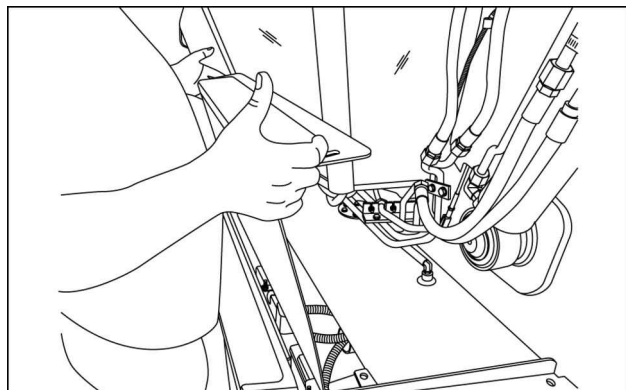
Disconnect battery

1. Remove the battery cover hardware.



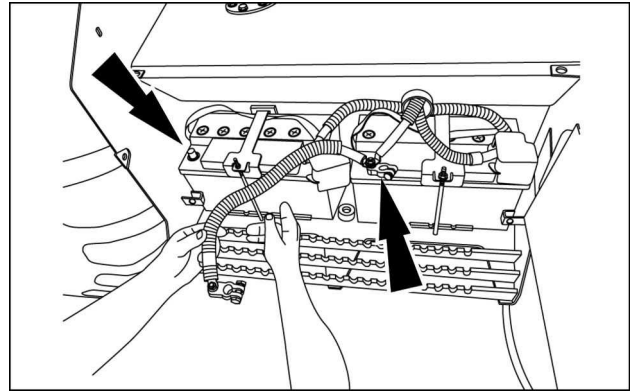
RCPH11TLB001AAM 1

2. Remove the battery cover.



RCPH11TLB002AAM 2

3. Disconnect the negative battery cable from the negative battery terminal.



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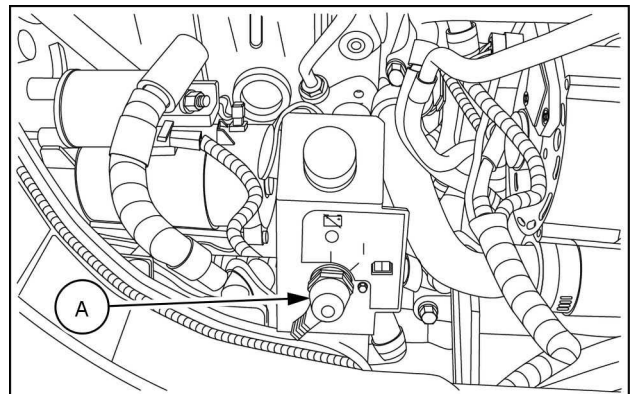
Master disconnect switch (if equipped)

Enable or disable electrical power from the machine batteries to the electrical components using the master disconnect switch, located on the right hand side of the engine.

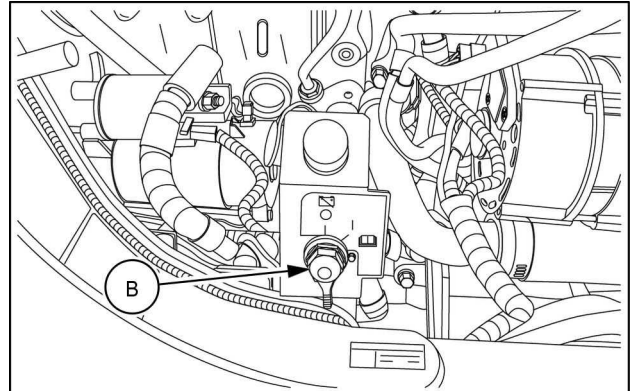
- (A) – Connect the battery power
- (B) – Disconnect the battery power

NOTICE: Wait at least 60 seconds after ignition key is placed in the OFF position before turning master disconnect switch to OFF. This allows the machine controllers to shutdown properly.

NOTICE: Some machine service procedures require an actual terminal disconnect of the batteries. Do not use the master disconnect for those types of procedures, such as welding on the machine.



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Basic instructions – Support strut for loader lift arm

⚠ WARNING

Crushing hazard!

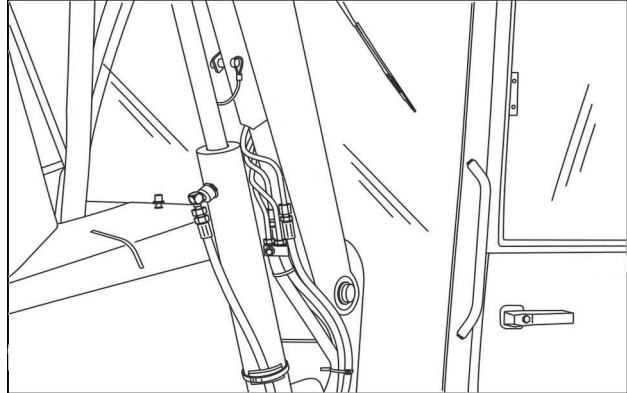
If you service the machine with the loader lift arms raised, always use the support strut. Remove the retaining pin and place the support strut onto the cylinder rod. Install the retaining pin into the support strut. Lower the lift arms onto the support strut.

Failure to comply could result in death or serious injury.

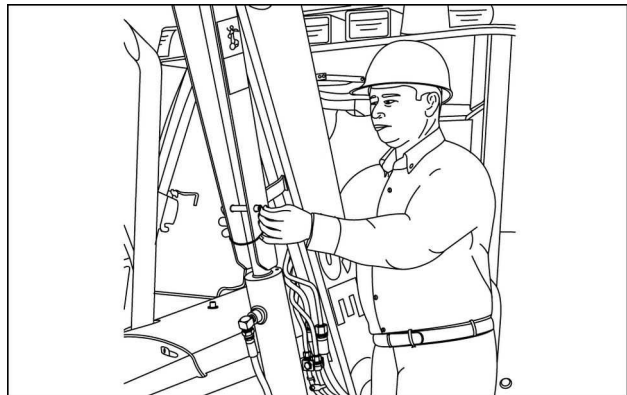
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Raise and support loader lift arms:

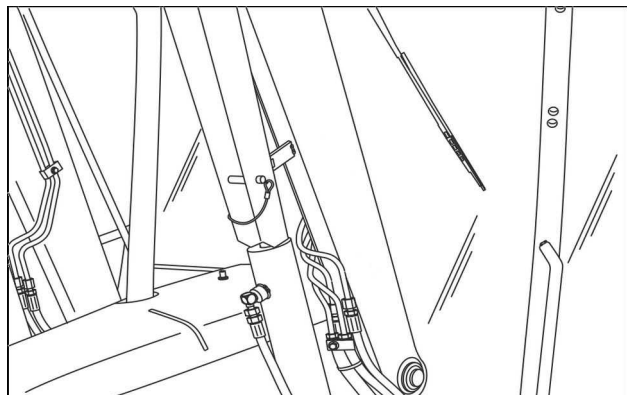
1. Empty the loader bucket.
2. Raise the loader lift arms to the maximum height.
3. Shut down the engine.



4. Remove the retaining pin.
5. Lower the support strut onto the cylinder rod.
6. Install the retaining pin.

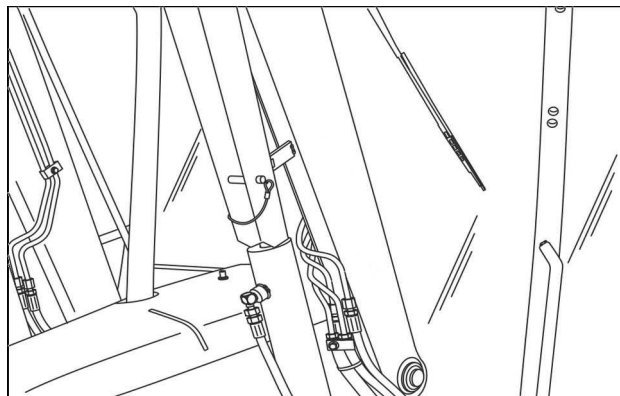


7. Start the engine.
8. Slowly lower the lift arms so that the end of the support strut rests on the cylinder.



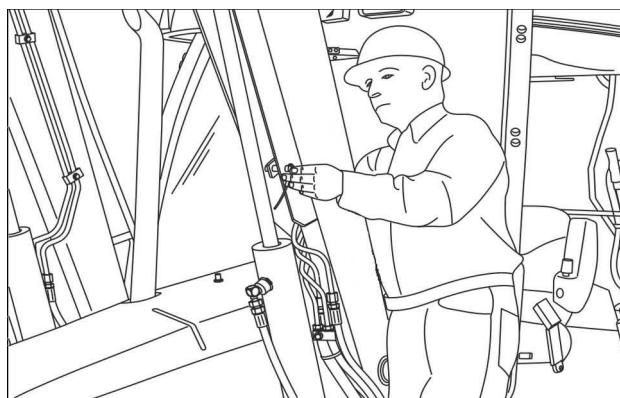
Lower supported loader lift arms:

1. Raise the lift arms so that the end of the support strut no longer rests on the cylinder.
2. Shut down the engine.



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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, as shown.



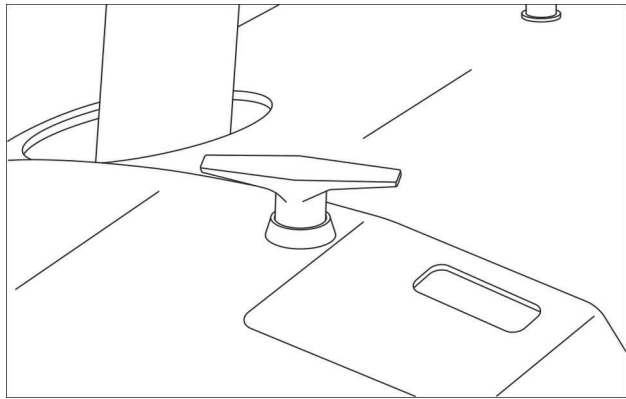
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5. Start the engine.
6. Lower the loader to the ground.

Basic instructions Hood

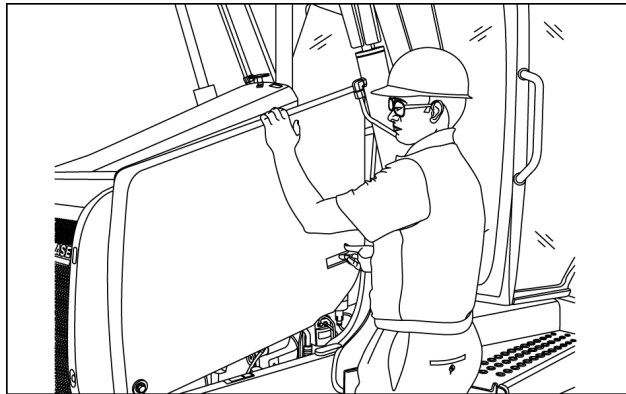
Open the hood:

1. Shut down the engine.
2. Turn the handle counter-clockwise to release the hood latch.



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3. Lift the hood and rotate forward.

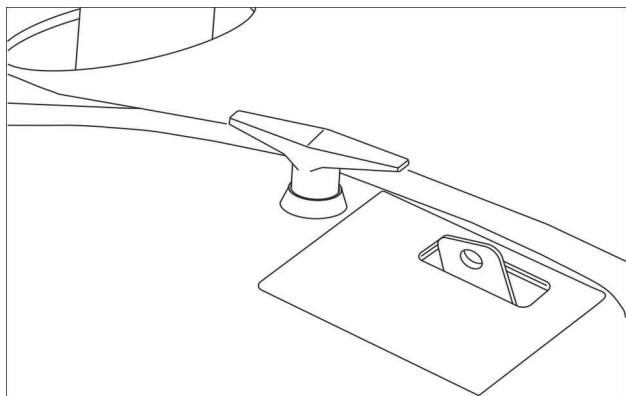


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NOTICE: To avoid damage to the hood parts, always close the hood before moving the loader.

Close the hood:

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



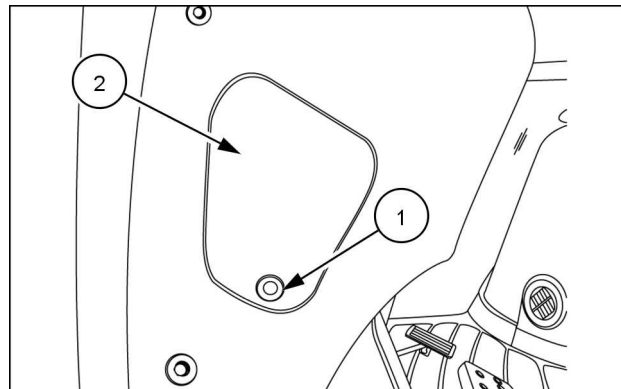
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Basic instructions - Fuse and relay locations

The machine is equipped with two fuse boxes and if equipped an external in harness fuse for the **SiteWatch™** feature. A front console box and a side console box.

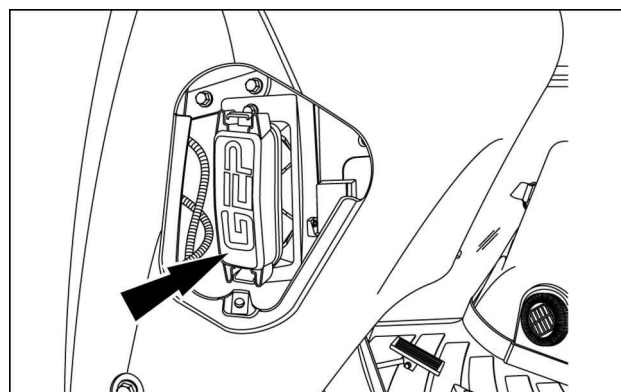
Front console box

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

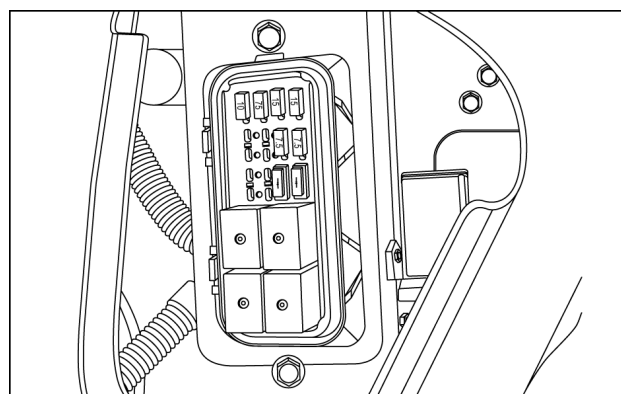


RCPH10TLB320AAF 1

2. Remove the fuse box cover.

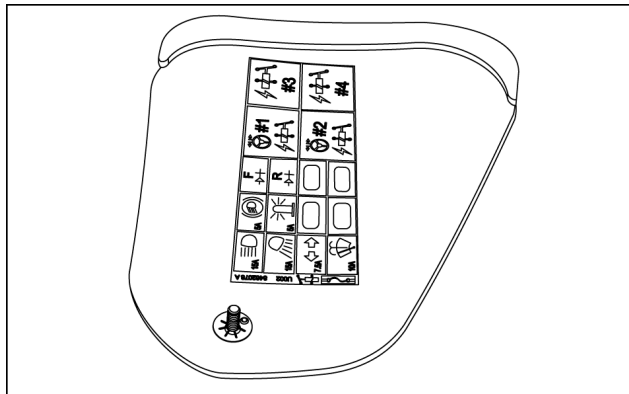


RCPH10TLB307AAF 2



RCPH10TLB303AAF 3

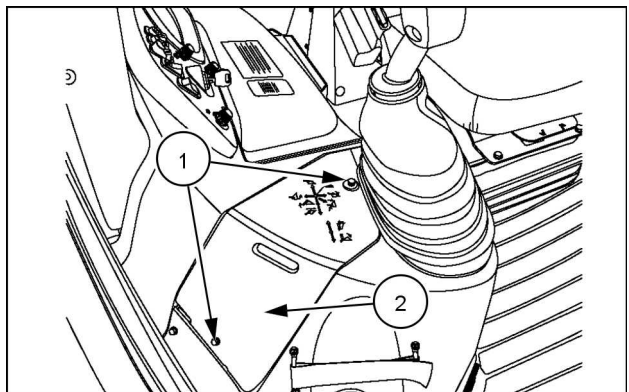
3. Refer to the decal on the interior side of the panel cover for fuse, relay, and/or diode functions.



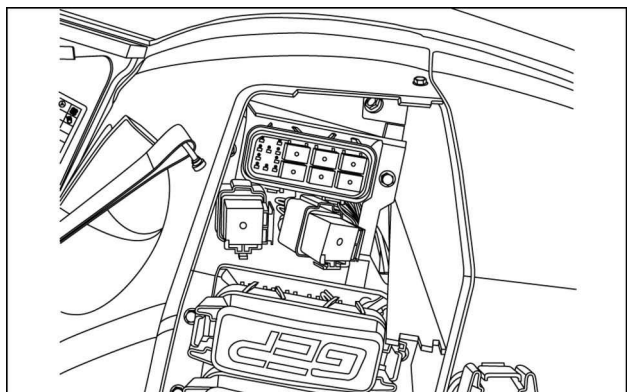
RCPH10TLB310AAF 4

Side console box

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

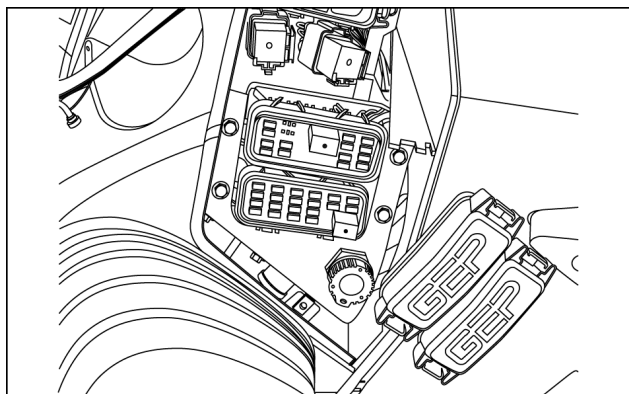


RCPH10TLB437AAF 5



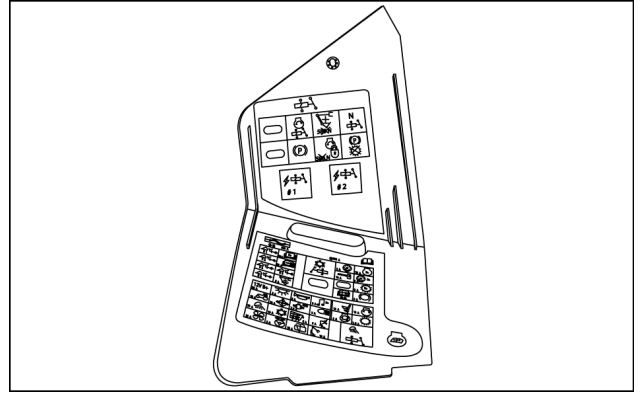
RCPH10TLB301AAF 6

2. Remove the fuse box covers as needed.



RCPH10TLB302AAF 7

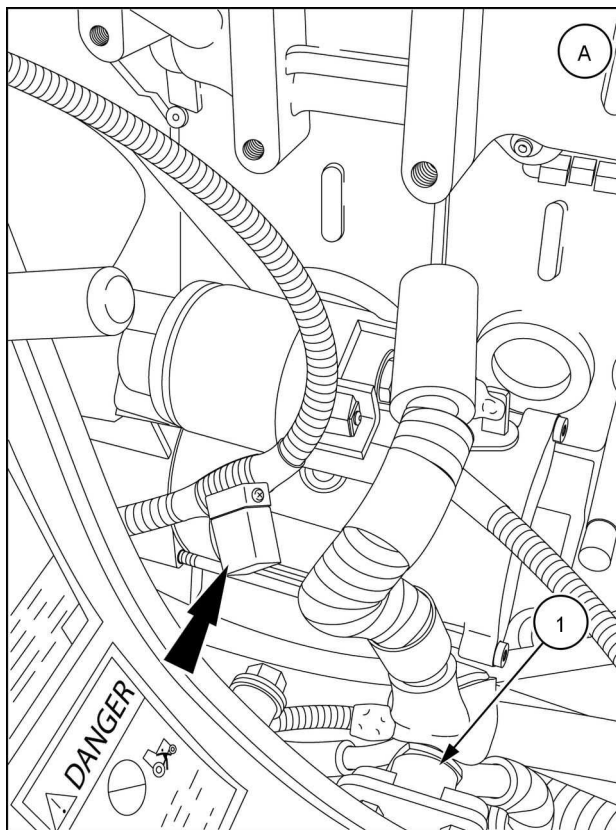
3. Refer to the decal on the interior side of the panel cover for fuse, relay, and/or diode functions.



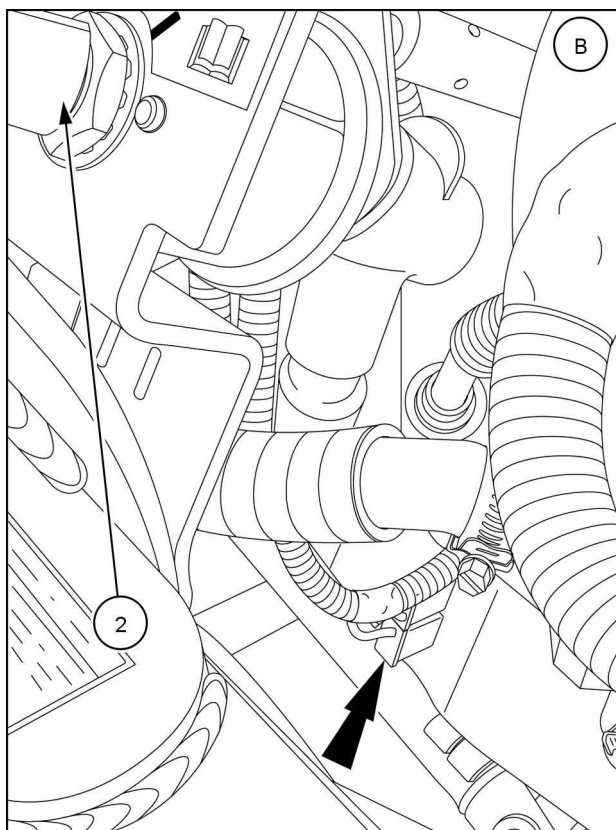
RCPH10TLB319AAF 8

Telematics system fuse (if equipped)

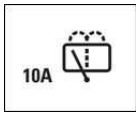
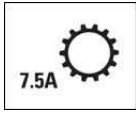
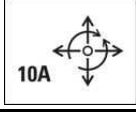
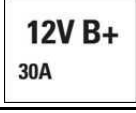
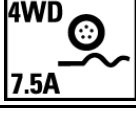
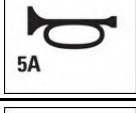
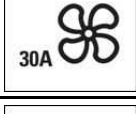
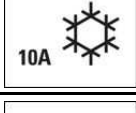
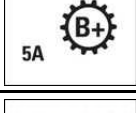
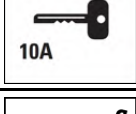
1. Raise the loader arm and engage the safety support.
2. Lift the engine hood.
3. On the right-hand side of the engine locate the wire harness with the in-line **5 A** fuse. The location of the fuse will depend on the machine configuration:
 - A. Machines equipped with the Battery Power Junction Stud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



RAIL13TLB0207BA 9



RAIL13TLB0206BA 10

Symbol	Function
	Rear wipers/washers
	Transmission differential lock
	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
	2WD, Ride Control

Symbol	Function
	Quick coupler, EH Clam, Radio Key ON
	SAHR brake
	Comfort Steer
	PowerLift
	Side lights
	Customer B+
	Customer key ON
	Starter

Relay icon definitions

Symbol	Function
	Power relay #1
	Power relay #2
	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
	PowerLift relay

Diode icon definitions

Symbol	Function
	Quick coupler diode #1
	Quick coupler diode #2
	Quick coupler diode #3
	Quick coupler diode #4
	Quick coupler diode #5
	Reverse signal diode (Power Shuttle only)
	Forward signal diode (Power Shuttle only)
	Torque control diode

Left-hand side steering column console panel

Power Shuttle	Powershift
84262076 3	84262078 4

Fuse icon definitions

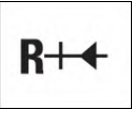
Symbol	Function
	Head lights
	Front work lights
	Turn signal, Hazards
	Front wiper/washer
	High beam
	Beacon

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 De-clutch relay (Powershift only)

Symbol	Function
	Transmission lock relay (Powershift only)
	Power relay #3
	Power relay #4

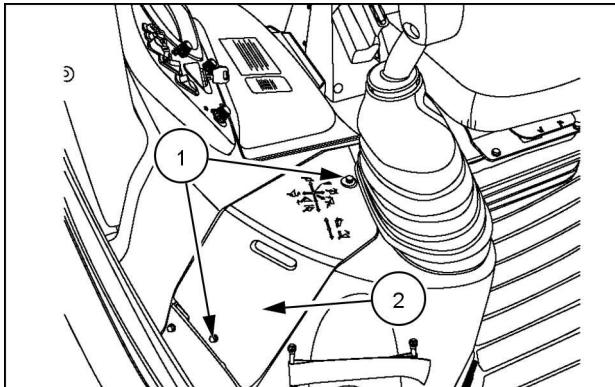
Diode icon definitions

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

Basic instructions - Diagnostic service tool port

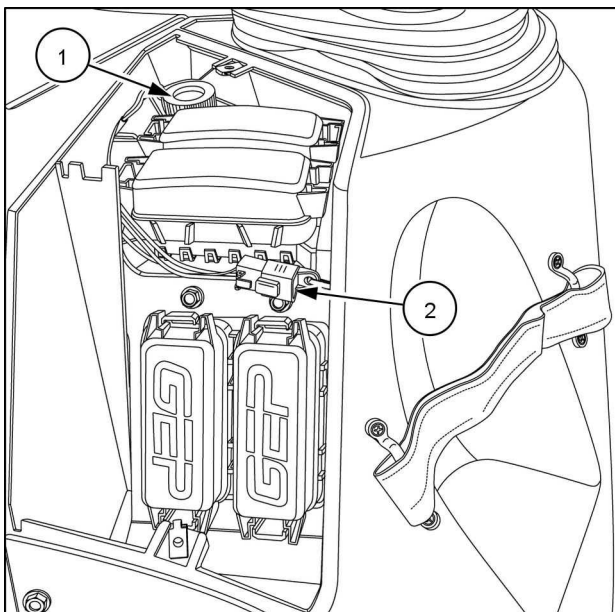
The diagnostic/service tool port is located in the fuse box at the side console. Connect the Electronic Service Tool (EST) or DATAR to this port to update software and/or perform service and diagnostic tests.

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 if equipped connect to the **SiteWatch™** (telematics) connector (2).

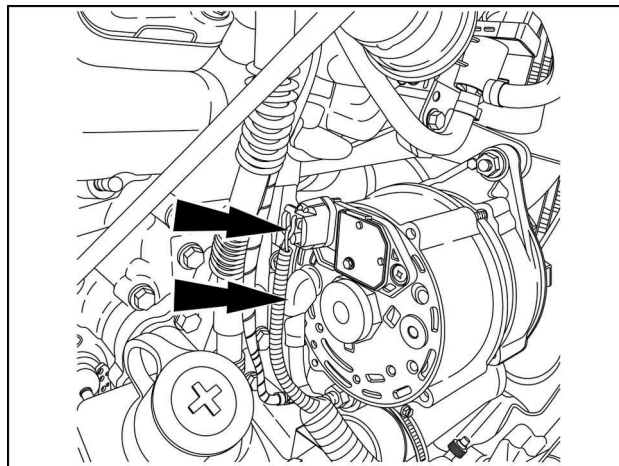


RAIL14TLB1053BA 2

Basic instructions - Welding on the machine

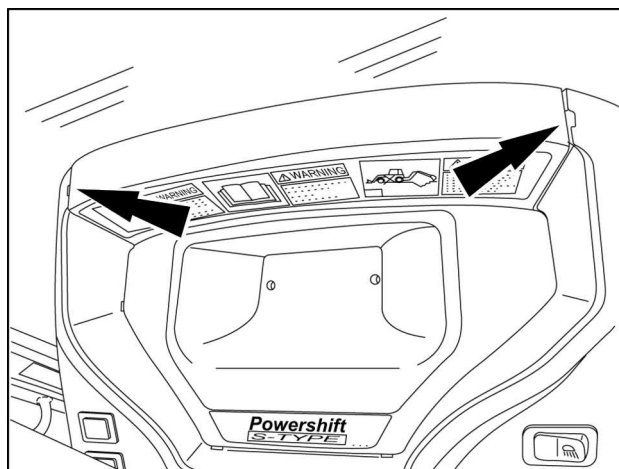
The following procedures must be completed before welding.

1. Disconnect the batteries. See **Battery - Basic instructions (55.302)** for details.
2. Disconnect the alternator terminal wires.



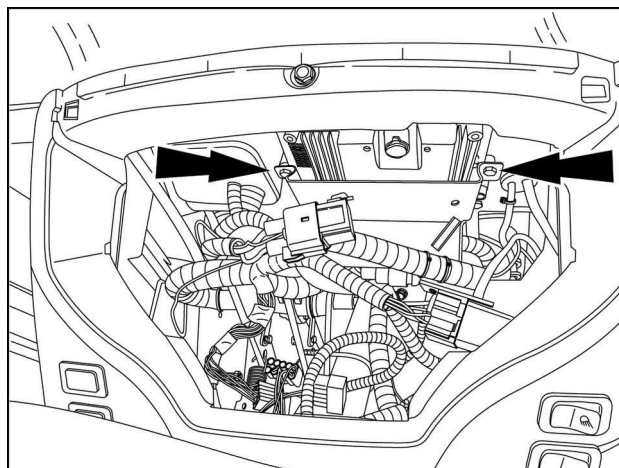
RAPH12FRK0163AA 1

3. Remove the cover from the steering column shroud.



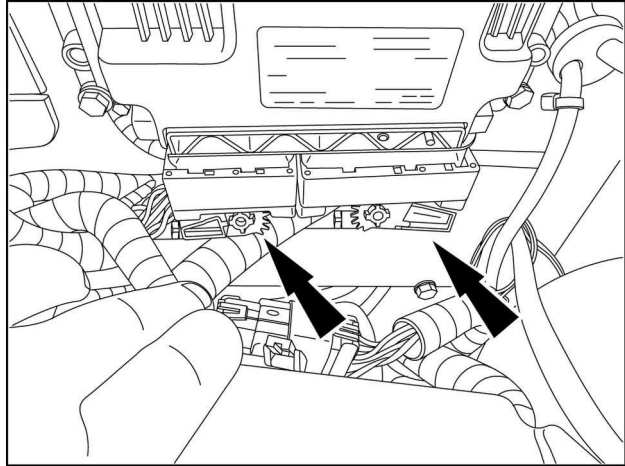
RCPH11TLB012BAD 2

4. Remove the Engine Control Unit (ECU) guard plate.



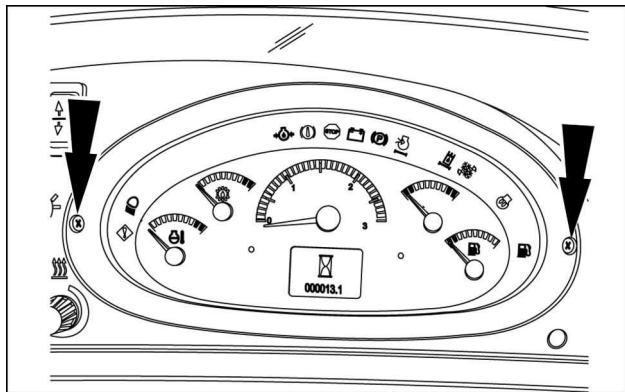
RCPH11TLB009BAD 3

5. Disconnect both connectors.

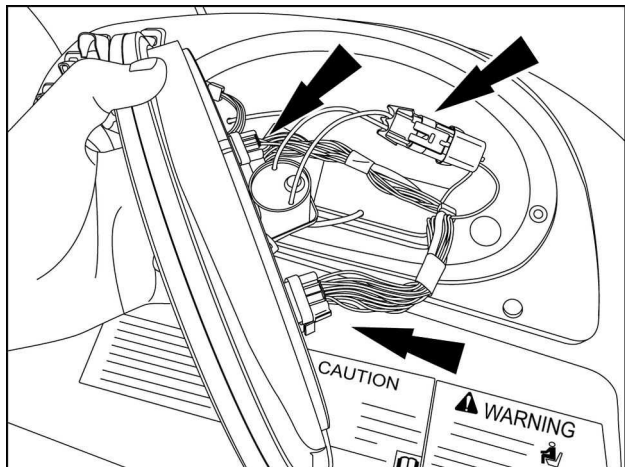


RCPH11TLB054BAD 4

6. Remove the instrument cluster panel screws and the instrument cluster.
7. Disconnect all connectors from the back of the panel.



RCPH10TLB339AAF 5



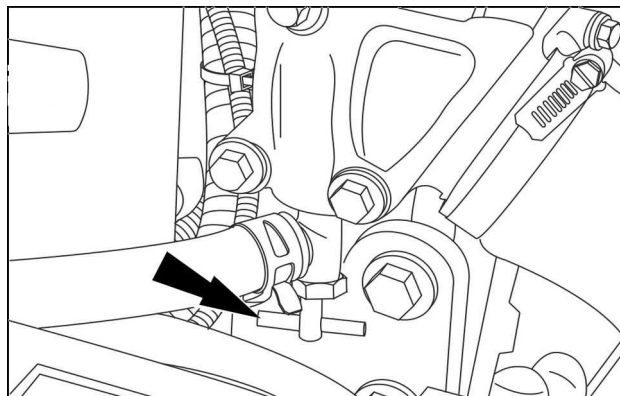
RAIL15TLB0007BA 6

8. Disconnect the controller for backhoe pilot controls, if equipped (one connector).
9. Disconnect the transmission controller, if equipped (one connector, located under the front steering cowl-ing).
10. 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).

Cab heater - Basic instructions

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

- 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.



RCPH10TLB159AAF 1

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)

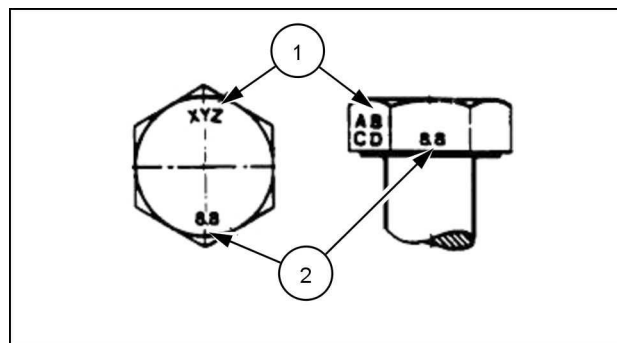
NOTE: M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.

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

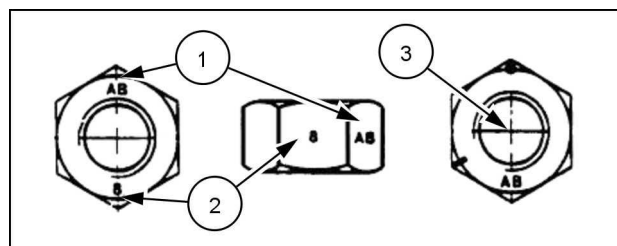
Metric Hex head and carriage bolts, classes 5.6 and up



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)

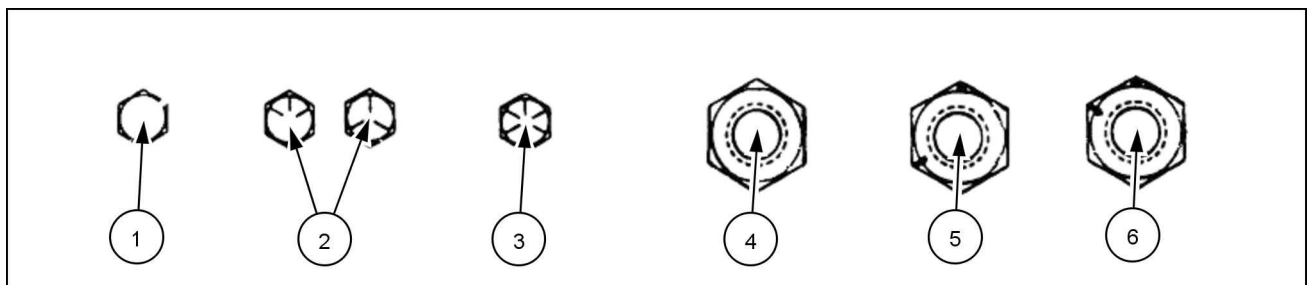
NOTE: For Imperial Units, **1/4 in** and **5/16 in** hardware torque specifications are shown in pound-inches. **3/8 in** through **1 in** hardware torque specifications are shown in pound-feet.

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

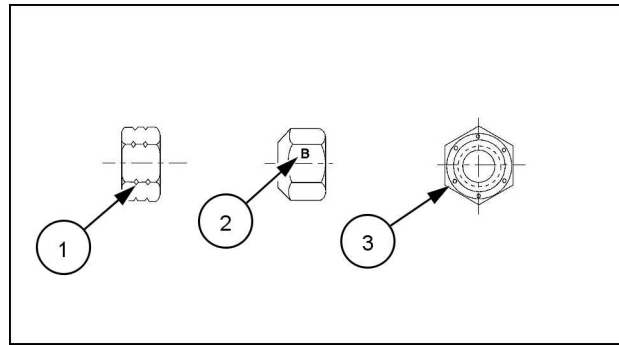


20083682 3

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

Abbreviation Measurements

Typical applications	Metric unit		Imperial unit	
	Name	Symbol	Name	Symbol
Area (Land area)				
	hectare	ha	acre	ac
	square meter	m ²	square foot	ft ²
			square inch	in ²
	square millimeter	mm ²	square inch	in ²
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	inH ₂ O
	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 – 580N

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:	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40
SCWP specification:	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	13.6 L (14.4 US qt)

Fuel tank

Standard specification:	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification:	Winter diesel fuel blend with a diesel fuel additive
Capacity:	159 L (42 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.

Cooling system

Standard and SCWP specification:	CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT (50 % concentrate and 50 % distilled water)
Without heater	16.1 L (17.0 US qt)
With heater	16.8 L (17.8 US qt)

Hydraulic system

Standard specification:	CASE AKCELA NEXPLORE™ FLUID
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	100.0 L (105.7 US qt)
Total system with Extendahoe	105.7 L (111.7 US qt)
Reservoir with filter change	55.0 L (58.1 US qt)
Reservoir without filter change	53.0 L (56.0 US qt)

Transmission

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.

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

Standard and SCWP specification:	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)
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Rear axle (differential and hubs)

Standard and SCWP specification:	TUTELA TRANSAXLE FLUID SAE 80W-140
----------------------------------	---

Capacity:

13.6 L (14.4 US qt)

Capacities – 580SN

Engine crank case

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.

Standard specification:	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40
SCWP specification:	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	13.6 L (14.4 US qt)

Fuel tank

Standard specification:	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification:	Winter diesel fuel blend with a diesel fuel additive
Capacity:	159 L (42 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.

Cooling system

Standard and SCWP specification:	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:	CASE AKCELA NEXPLORE™ FLUID
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	113.0 L (119.4 US qt)
Total system with Extendahoe	118.7 L (125.4 US qt)
Reservoir with filter change	55.0 L (58.1 US qt)
Reservoir without filter change	53.0 L (56.0 US qt)

Transmission

Standard specification:	CASE AKCELA NEXPLORE™ FLUID	
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL	
Capacity:		
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.		

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

Standard and SCWP specification:	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)	

Rear axle (differential and hubs)

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

Capacities – 580SN WT

Engine crank case

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.

Standard specification:	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40
SCWP specification:	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	13.6 L (14.4 US qt)

Fuel tank

Standard specification:	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification:	Winter diesel fuel blend with a diesel fuel additive
Capacity:	159 L (42 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.

Cooling system

Standard and SCWP specification:	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:	CASE AKCELA NEXPLORE™ FLUID
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	123.0 L (130.0 US qt)
Total system with Extendahoe	128.7 L (136.0 US qt)
Reservoir with filter change	55.0 L (58.1 US qt)
Reservoir without filter change	53.0 L (56.0 US qt)

Transmission

Standard specification:	CASE AKCELA NEXPLORE™ FLUID
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Manual (powershuttle)	Four wheel drive
Total system	19.4 l (21 US qt)
Refill (with or without filter change)	13.0 l (14 US qt)
Powershift S-type	Four wheel drive
Total system	20.7 l (21.9 US qt)
Refill (with or without filter change)	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.	

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

Standard and SCWP specification:	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:	TUTELA TRANSAXLE FLUID SAE 80W-140
Capacity:	18.6 L (14.4 US qt)

Capacities – 590SN

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:	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40
SCWP specification:	CASE AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40
Capacity:	
With filter change	13.6 L (14.4 US qt)

Fuel tank

Standard specification:	ASTM D975 GRADE No. 2-D S15 (No. 2 diesel)
SCWP specification:	Winter diesel fuel blend with a cold weather diesel fuel additive
Capacity:	159 L (42 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.

Cooling system

Standard and SCWP specification:	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:	CASE AKCELA NEXPLORE™ FLUID
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL
Capacity:	
Total system	123.0 L (130.0 US qt)
Total system with Extendahoe	128.7 L (136.0 US qt)
Reservoir with filter change	55.0 L (58.1 US qt)
Reservoir without filter change	53.0 L (56.0 US qt)

Transmission

Standard specification:	CASE AKCELA NEXPLORE™ FLUID	
SCWP specification:	CASE AKCELA HY-TRAN® ULTRACTION SSL	
Capacity:		
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.		

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

Standard and SCWP specification:	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:	TUTELA TRANSAXLE FLUID SAE 80W-140	
Capacity:	18.6 L (19.7 US qt)	

Consumables

Recommended engine oil selection

NOTICE: Do not put performance additives or other oil additive products in the engine crankcase. The oil change intervals given in this manual are according to tests with Case Akcela lubricants.

Case Akcela No. 1 engine oil is recommended for use in your Case engine. Case Akcela engine oil will lubricate your engine correctly under all operating conditions.

If Case Akcela No. 1 Multi-Viscosity or Single Viscosity engine oil is not available, use a commercial oil that meets API engine oil service category CJ-4 (preferred) or CI-4.

	(H)	0W-40 CJ-4 UNITEK to MAT3521									
		API 0W-40									
		API CI-4 10W-30									
		10W-40 CJ-4 UNITEK to CNH MAT3521									
		API 10W-40									
		15W-40 CJ-4 UNITEK to CNH MAT3521									
		API 15W-40									
		API CI-4 20W-50									
-40 °C -40 °F	-30 °C -22 °F	-20 °C -4 °F	-10 °C 14 °F	0 °C 32 °F	10 °C 50 °F	20 °C 68 °F	30 °C 86 °F	40 °C 104 °F	50 °C 122 °F		
(H) Engine oil pan or coolant block heater recommended in this range											

Dye and black light procedure for detecting oil leaks

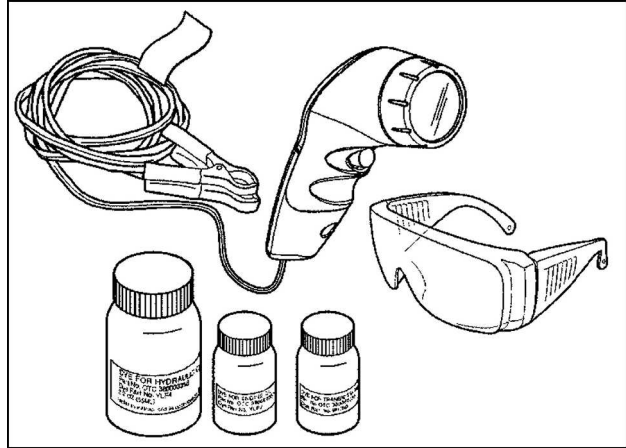
Oils and grease have natural phosphors and will illuminate differently under the black light. Oil, bluish-white, grease, brilliant-white, anti-freeze, greenish-yellow, sealing compounds, red to orange.

Kit part number 380040182 consisting of:

1. Prior to adding dye, connect the black light to the machine's battery and investigate suspected areas.
2. Once suspected leak areas are found, attempt to trace the leak completely to the origin.

NOTE: At the origin, the leak should be the brightest in color.

3. After confirmation of the suspected leak, thoroughly clean the area of the leak to remove any existing fluids. Recheck the area with the black light to assure the area is clean. Good cleaning is important for the following reasons:
 - Fluids captured by threaded joints or other cavities will continue to show signs of leakage unless completely clean.
 - Casting surfaces can hold residual oil.



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4. Use the entire contents of the bottle of dye in the system/systems of the suspected leak.
5. Run the unit for 5 to 10 minutes and cycle through suspect system functions to ensure that the dye is available to all possible leak points.

NOTE: The hydraulic oil should be heated to **71 °C (160 °F)**, engine at normal operating temperature, and transmission should be in the normal operating range on the gauge.

6. Use a clean cloth and wipe the dipstick or the inside surface of the filler tube on each of the 3 sumps.
7. View traces of dyed fluid on the cloth under the black light to ensure good samples.
8. Use these 3 samples as your baseline when inspecting the unit with the black light.

NOTE: High hour engine oil can reduce the effectiveness of the dye. In this event change the oil.

9. Avoid common errors.
 - Fan airflow blowing leaking fluid.
 - Gravity pulling leak paths down.
 - When paint at a joint is not broken, the joint is not leaking.

NOTE: It is not necessary to change oils after this check.

Diesel fuel

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No. 1 and No. 2 diesel fuels is temporarily permitted. The use of a cold weather fuel additive is recommended.

NOTICE: See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel is below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.

The diesel fuel used in this machine must meet the specifications in the chart or Specification D975-81 of the American Society for Testing and Materials.

Specifications for acceptable No. 2 Diesel Fuel	
API gravity (minimum)	34
Flash point (minimum)	60 °C (140 °F)
* Cloud point (maximum)	-20 °C (-4 °F)
* Pour point (maximum)	-26 °C (-15 °F)
Viscosity (at)	88 °C (190 °F)
Centistokes	(2.0) to (4.3)
Saybolt Seconds Universal	(32) to (40)
* Refer to the Notice on this page.	

Fuel Storage

If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

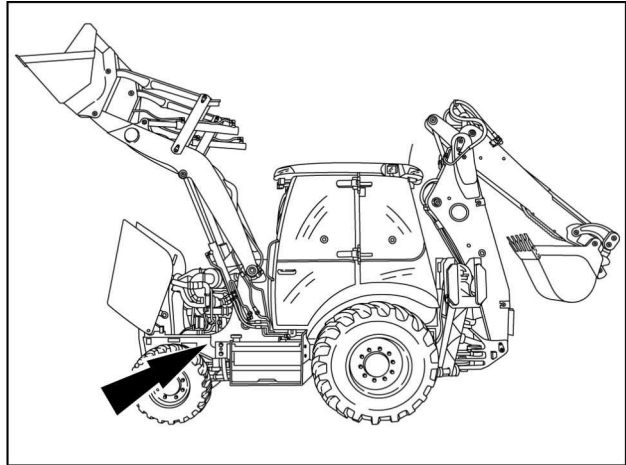
Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

General specification - Severe Cold Weather Package (SCWP) (optional)

Machines with the Severe Cold Weather Package (SCWP) option installed, have specific components that allow for near normal machine operation at consistent or prolonged ambient temperatures below 0 °C (32 °F). The owner operator or dealer may easily identify a machine equipped with the Severe Cold Weather Package (SCWP) by the decal next to the maintenance decal on the left-hand side of the machines engine compartment.

NOTICE: Only use the recommended fluids for the Severe Cold Weather Package (SCWP) as listed in the capacities chart in this manual. Do not mix fluids as it may have an adverse affect on a components operation.

- 580N see **Capacities – 580N ()**.
- 580SN see **Capacities – 580SN ()**.
- 580SN WT see **Capacities – 580SN WT ()**.
- 590SN see **Capacities – 590SN ()**.



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Hydraulic contamination

Contamination in the hydraulic system is a major cause of the malfunction of hydraulic components. Contamination is any foreign material in the hydraulic oil.

Contamination can enter the hydraulic system in several ways:

- When you drain the oil or disconnect any line
- When you disassemble a component
- From normal wear of the hydraulic components
- From damaged seals or worn seals
- From a damaged component in the hydraulic system

All hydraulic systems operate with some contamination. The design of the components in this hydraulic system permits efficient operation with a small amount of contamination. An increase in this amount of contamination can cause problems in the hydraulic system.

The following list includes some of these problems:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- Movement of control valve spools is difficult
- Hydraulic oil that becomes too hot
- Pump gears, housing, and other parts that wear rapidly
- Relief valves or check valves held open by dirt
- Quick failure of components that have been repaired
- Slow cycle times are slow. The machine does not have enough power.

If your machine has any of these problems, check the hydraulic oil for contamination.

There are two types of contamination: microscopic and visible.

Microscopic contamination occurs when very fine particles of foreign material are suspended in the hydraulic oil. These particles are too small to see or feel. Microscopic contamination can be found by identification of the following problems or by testing in a laboratory.

Examples of problems caused by microscopic contamination:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- The hydraulic system has a high operating temperature

Visible contamination is foreign material that can be found by sight, touch, or odor. Visible contamination can cause a sudden failure of components.

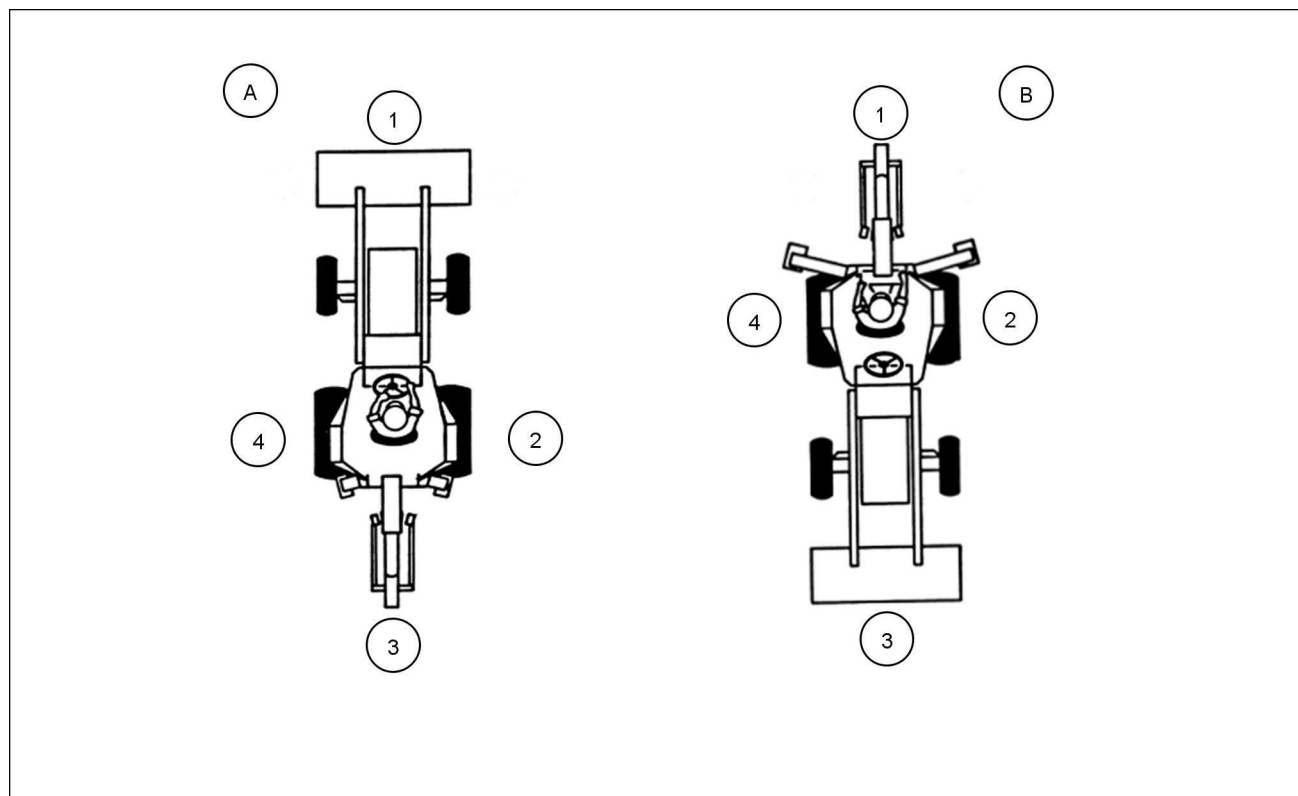
Examples of problems caused by visible contamination:

- Particles of metal or dirt in the oil
- Air in the oil
- Dark or thick oil
- Oil with an odor of burned oil
- Water in the oil

If you find contamination, use a portable filter to clean the hydraulic system.

Product overview - Machine orientation

The terms right-hand and left-hand, when used in this manual, indicate the right and left sides of the machine as seen from the operator's seat.



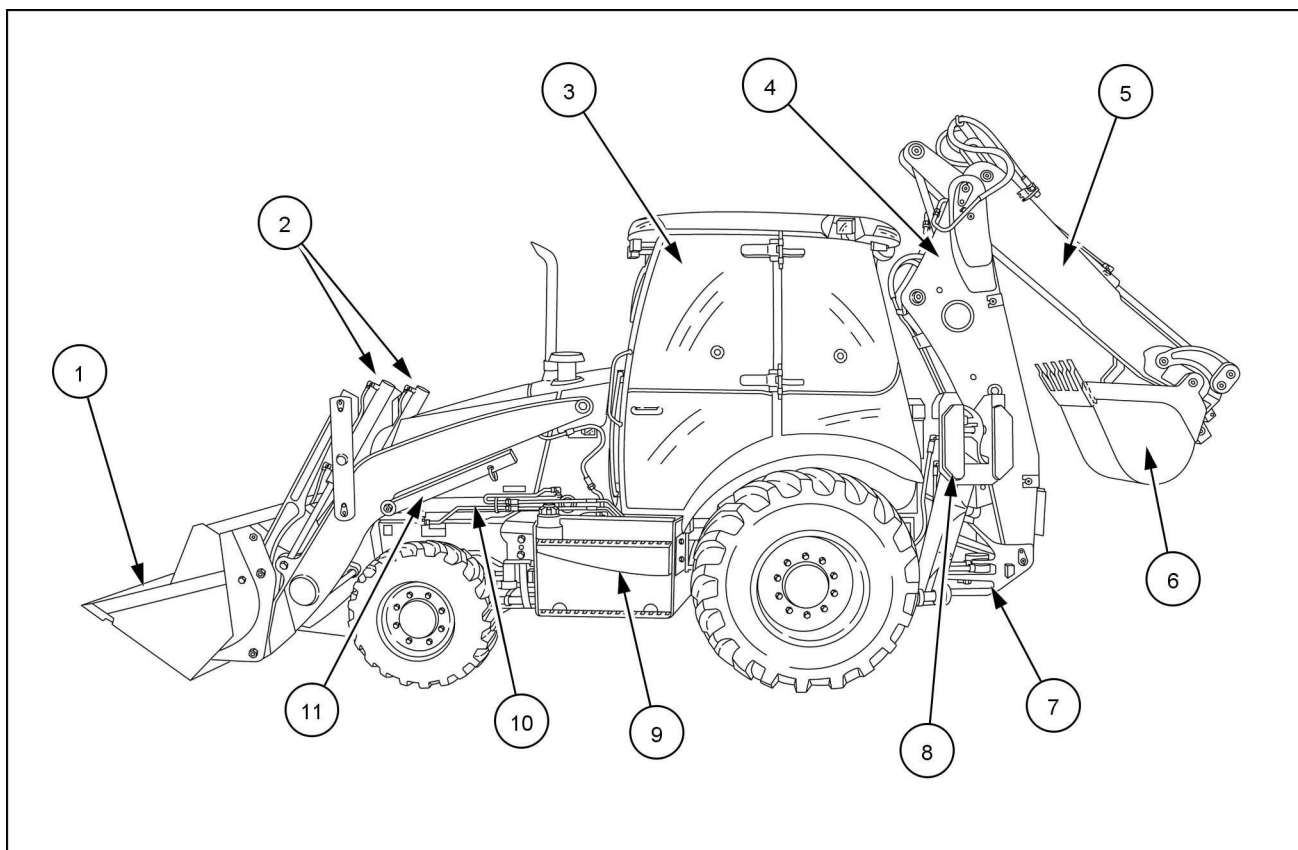
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A – Driving and front loader operation

1. Front
2. Right-hand side
3. Rear
4. Left-hand side

B – Backhoe operation

1. Front
2. Right-hand side
3. Rear
4. Left-hand side



RAIL12TLB0138FA 2

- | | |
|------------------------------|---|
| 1. Loader bucket | 6. Backhoe bucket |
| 2. Bucket cylinders | 7. Stabilizer (shown in transport position) |
| 3. Cab | 8. Fuel tank and operator's step |
| 4. Boom | 9. Loader lift cylinder |
| 5. Dipper (Extendahoe shown) | 10. Lift arm support strut |



SERVICE MANUAL

Engine

**580N Four-Wheel Drive (4WD) TIER 3 , 580N Two-Wheel Drive (2WD) TIER 3 ,
580N Two-Wheel Drive (2WD) TIER 3 , 580SN Four-Wheel Drive (4WD) TIER
3 , 580SN Four-Wheel Drive (4WD) TIER 3 , 580SN Two-Wheel Drive (2WD)
TIER 3 , 580SN Two-Wheel Drive (2WD) TIER 3 , 580SN WT Four-Wheel Drive
(4WD) TIER 3 , 590SN Four-Wheel Drive (4WD) TIER 3 , 590SN Two-Wheel
Drive (2WD) TIER 3**

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