ORIGINAL INSTRUCTIONS

921G
Stage V
Wheel Loader

OPERATOR'S MANUAL

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CASE CONSTRUCTION

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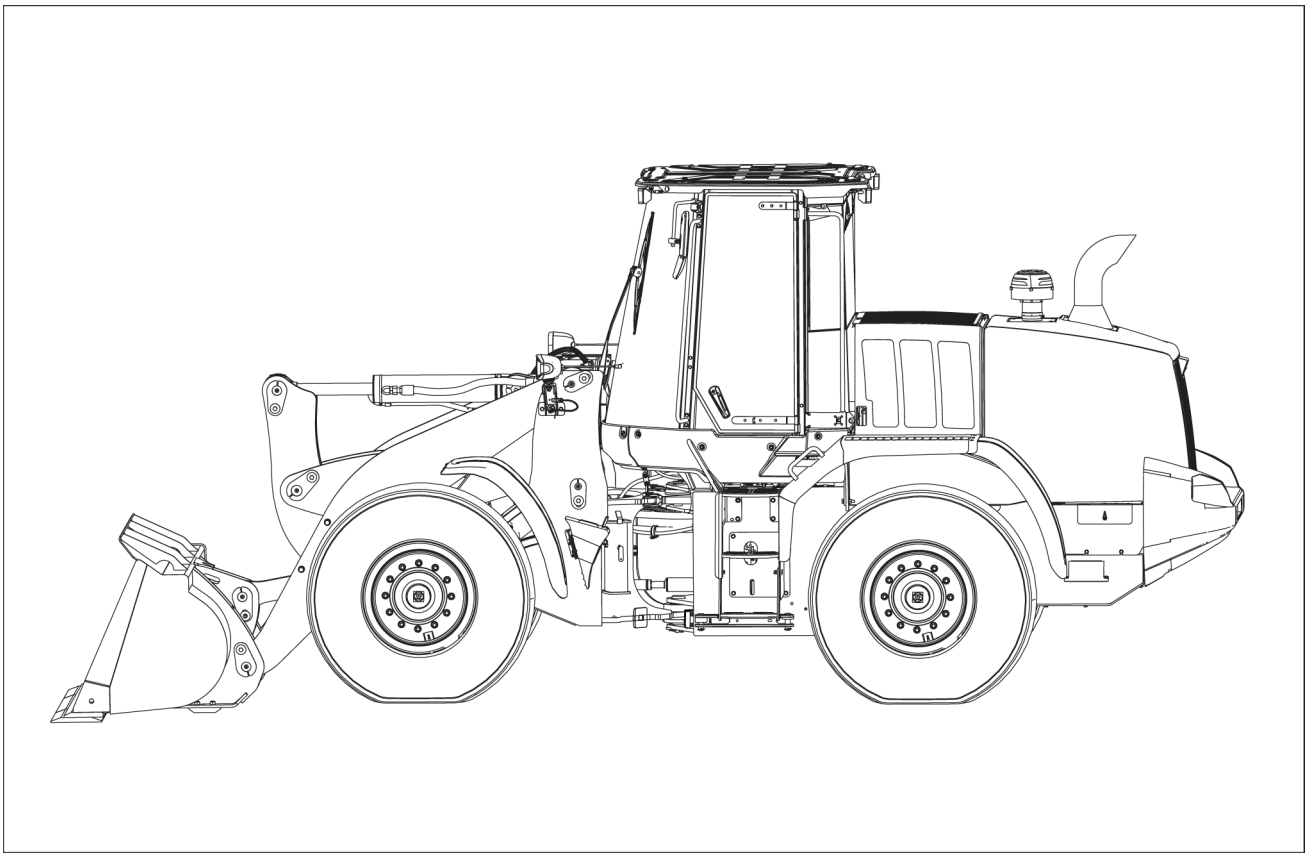
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1 - GENERAL INFORMATION

Note to the Owner



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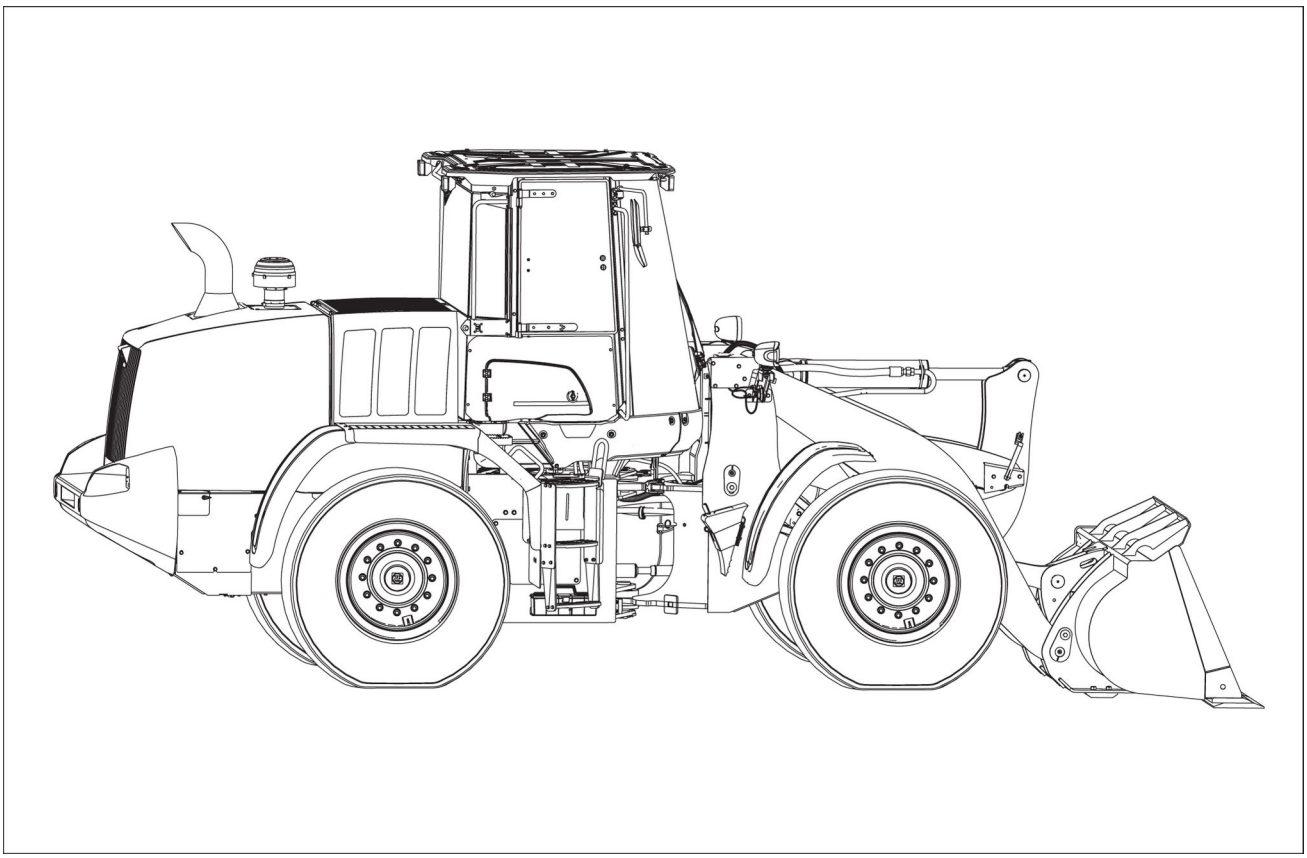
Read this manual before you start the engine or operate the machine. If you need more information, see your authorized dealer.

This manual contains important information about the safe operation, adjustment, and maintenance of your machine. Refer to the index at the back of this manual for locating specific items about your machine. The wheel loader conforms to current safety regulations at the time of its manufacture.

Consult an authorized dealer or CNH Industrial on changes, additions, or modifications that can be required for this machine to comply with various country regulations and safety requirements. Unauthorized modifications will cause serious injury or death. Anyone making such unauthorized modifications is responsible for the consequences.

The information in this manual is provided on the basis of information that was available at the time the manual was written. Settings, procedures, part numbers, software and other items can change. These changes can affect the maintenance performed on the machine. Ensure that you have complete and current information from your dealer before you start any machine operation.

ATTENTION: *the fuel system and engine on your machine are designed and built to government emissions standards. Tampering by dealers, customers, operators, and users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action, and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only!*



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DO NOT OPERATE or permit anyone to operate or service this machine until you or the other persons have read and understand the safety, operation and maintenance instructions in this manual. Use only trained operators who have demonstrated the ability to operate and service this machine correctly and safely.

This operator’s manual is to be stored in the manual compartment equipped on this machine. Make sure this manual is complete and in good condition. Contact your dealer to obtain additional manuals or manuals in languages other than that of the country of use.

Your dealer is at your disposal for any further information. He will also provide any after-sales service you may require and genuine replacement parts, your guarantee of quality and match.

This manual contains information concerning the adjustment and maintenance of your new equipment. You have purchased a dependable machine, but only by proper care and operation can you expect to receive the performance and long service built into this equipment. Please have all operators read this manual carefully and keep it available for ready reference.

Your authorized dealer will instruct you in the general operation of your new equipment. Your dealer's staff of factory-trained service technicians will be glad to answer any questions that may arise regarding the operation of your machine.

Your authorized dealer carries a complete line of genuine service parts. These parts are manufactured and carefully inspected to insure high quality and accurate fitting of any necessary replacement parts. Be prepared to give your dealer the model and product identification number of your new equipment when ordering parts. Locate these numbers now and record them below. Refer to the 'General Information' section of this manual for the location of the model and product identification numbers of your machine.

PLEASE RECORD THE FOLLOWING INFORMATION

Model _____

Date Purchased _____



This is the safety alert symbol. It is used with and without signal words to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

⚠ WARNING

Avoid injury and/or machine damage!
Illustrations may show protective shielding open or removed to better illustrate a particular feature or adjustment. Unless instructed otherwise, the machine should be turned off and hazardous energies dissipated before you open any shields. Replace all shields before you operate the machine.
Failure to comply could result in death or serious injury.

W1399A

IMPROVEMENTS

CNH Industrial is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

Intended use

This wheel loader, with standard equipment and attachments is intended to be used for digging and general earth moving purposes such as land leveling, truck loading, and material rehandling.

DO NOT use this machine for any application or purpose other than those described in this manual, decals, or other product safety information provided with the machine. These materials define the machine's intended use.

Consult an authorized dealer on changes, additions or modifications that can be required for this machine to comply with various applications and/or country regulations and safety requirements.

Before permitting a new operator on this machine, make certain:

- That the operator has received the necessary training to operate the machine correctly and safely.
- That the operator has read and understands the instructions given in this manual.

All persons who will be operating this machine shall possess a valid local vehicle operating permit and/or other applicable local age work permits.

- Travel with a full bucket rolled-back and lowered as much as possible to ensure maximum visibility, stability and safety to a travelling machine. Operate the machine at a speed adequate to the working conditions in the site and slow enough to ensure complete control at all times.
- Do not use the machine for another purpose than intended by the manufacturer and outlined in this manual.
- Do not use the machine on higher speeds than allowed by the load and environment. A wet surface or other low adherence conditions may increase the braking distance or result in vehicle instability. Adapt your traveling speed according to the load of the vehicle and the characteristics of the road.
- Always check the conditions and carrying capacity of bridges and ramps before driving over them.
- Do not use the machine without wearing the seat restraint system during activities where roll over or tip-over hazard exist. The ROPS cab or ROPS structure will only be fully effective when the driver remains attached to the seat.
- Do not use equipment mounted on the machine which is not correctly matching and firmly fixed. Such equipment may increase the risk of roll-over and hit the machine when coming loose.
- Do not use the machine beyond its limits of dynamic stability. High speed, abrupt maneuvers and fast and short cornering will increase the risk of roll-over.
- Take the necessary precautions to always be aware of the possible presence of bystanders. Do not work if bystanders are within the range of the operation of the machine. Keep people away from the machine during work; bystanders must leave the working area.
- Do not allow riders on the machine. Do not allow people standing on the access way or step to the cab when the machine is moving. Your view to the left-hand will be obstructed and a rider risks to fall from the machine during unforeseen or abrupt movements.
- Always stay clear from implements operating area. When operating lift controls ensure bystanders are not near operating areas.
- A machine has only one operator station and is a one man operated vehicle. Other people on or around the machine during normal operation are not allowed.
- The machine is intended to be used under normal conditions for the applications described in this manual. If the machine is used for other purposes or in dangerous environments, for example in a flammable or explosive atmosphere, special safety regulations must be followed and the machine must be equipped for use in these environments.

Electro-Magnetic Compatibility (EMC)

This machine complies strictly with the European Regulations on the electro-magnetic emissions. However, interference may arise as a result of add-on equipment which may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

- Ensure that each piece of non- CASE CONSTRUCTION equipment fitted to the machine bears the CE mark.
- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine.
- The electromagnetic field generated by the add on system should not exceed **100 V/m** at any time and at any location in the proximity of electronic components.

Failure to comply with these rules will render the CASE CONSTRUCTION warranty null and void.

Manual scope and required training level

Introduction to this manual

This manual gives information about the use of your CASE CONSTRUCTION machine as intended and under the conditions foreseen by CASE CONSTRUCTION during normal operation, routine service, and maintenance.

This manual does not contain all the information that relates to periodic service, conversions, and repairs that only trained service personnel can perform. Some of these activities may require appropriate facilities, technical skills, and/or tools that CASE CONSTRUCTION does not supply with the machine.

The manual contains the chapters as shown on the Contents pages. See the Index at the end of this manual to locate specific items about your CASE CONSTRUCTION machine.

Normal operation

Normal operation consists of the use of this machine for the purpose CASE CONSTRUCTION intends by an operator that:

- Is familiar with the machine and any mounted equipment or towed equipment
- Complies with the information on operation and safe practices as specified by CASE CONSTRUCTION in this manual and by the signs on the machine

Normal operation includes:

- Preparation and storage of the machine
- Connection and disconnection of mounted equipment and/or towed equipment
- Adjustment and configuration of the machine and equipment for the specific conditions of the job site, field, and/or crop
- Movement of components into and out of working positions

Routine service and maintenance

Routine service and maintenance consists of the daily activities necessary to maintain the proper machine function. The operator must:

- Be familiar with the machine characteristics
- Comply with the information on routine service and safe practices as specified by CASE CONSTRUCTION in this manual and by the signs on the machine

Routine service can include:

- Fueling
- Cleaning
- Washing
- Topping off fluid levels
- Greasing
- Replacing consumable items such as light bulbs

Periodic service, conversions, and repairs

Periodic service consists of activities that are necessary to maintain the expected life of the CASE CONSTRUCTION machine. These activities have defined intervals.

Trained service personnel familiar with the machine characteristics must perform these activities at the defined intervals. Trained service personnel must comply with the information on periodic service and safe practices as partly specified by CASE CONSTRUCTION in this manual and/or other company literature.

Periodic service includes:

- Oil change service for the engine, hydraulic circuits, or transmission
- Periodic exchange of other substances or components as required

Conversion activities rebuild the CASE CONSTRUCTION machine in a configuration that is appropriate for a specific job site and/or soil conditions. Conversion activities must be done:

- By trained service personnel familiar with the machine characteristics
- By trained service personnel that comply with the information on conversion as partly specified by CASE CONSTRUCTION in this manual, assembly instructions, and/or other company literature

Repair activities restore proper function to a CASE CONSTRUCTION machine after a failure or degradation of performance. Dismantling activities occur during the scrapping and/or dismantling of the machine.

Trained service personnel familiar with the machine characteristics must perform these activities. Trained service personnel must comply with the information for repair as specified by CASE CONSTRUCTION in the service manual.

Before you operate

Read this manual before you start the engine or operate this CASE CONSTRUCTION machine. Contact your CASE CONSTRUCTION dealer if:

- You do not understand any information in this manual
- You need more information
- You need assistance

All persons training to operate, or who will operate this CASE CONSTRUCTION machine should be old enough to possess a valid local vehicle operating permit (or meet other applicable local age requirements). These persons

must demonstrate the ability to operate and service the CASE CONSTRUCTION machine in a correct and safe manner.

Metric and imperial units abbreviations

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				
	milliampere	mA	milliampere	mA
	ampere	A	ampere	A
	ampere–hours	A*h	ampere–hours	A*h
	volt	V	volt	V
	microfarad	µF	microfarad	µF
	ohm	Ω	ohm	Ω
Force				
	kilonewton	kN	pound	lb
	newton	N		
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				
	revolutions per minute	r/min	revolutions per minute	r/min
		rpm		rpm
Length				
	kilometer	km	mile	mi
	meter	m	foot	ft
	centimeter	cm	inch	in
	millimeter	mm		
	micrometer	µm		
Mass				
	metric ton	t	pound	lb
	kilogram	kg		
	gram	g	ounce	oz
	milligram	mg		
Mass per Mass				
	milligram per kilogram	mg/ kg		
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
	megapascal	MPa		
	pascal	Pa	inch of water	inH2O
			inch of mercury	inHg

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 inch	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
			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

Glossary

Acronym	Definition
ACM	Active Catalyst Management
API	American Petroleum Institute
ASTM	American Society for Testing and Material
CCTV	Closed-Circuit Television System
CE	European Community
CUC	Clean Up Catalyst
DEF	**DIESEL EXHAUST FLUID (DEF)/ADBLUE®**
DIN	German Industrial Standard Institute
DOC	Diesel Oxidation Catalyst
DPF	Diesel Particulate Filter
DTC	Diagnostic Trouble Code
ECU	Electronic Control Unit
ECM	Electronic Control Module
EN	European standard
EOL	End Of Line
EST	Electronic Service Tool
FAME	Fatty Acid Methyl Ester
FMHL	Follow Me Home Light
FMI	Failure Mode Indicator
FOPS	Falling Objects Protective Structures
FWD	Front Wheel Drive
GWP	Global Warming Potential
ISO	International Standardization Organization
JSS	Joystick Steering System
LC	Load Center
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LpA	Sound pressure level in the workplace
LwA	Sound pressure level of the machine when stationary
MCM	Manual Catalyst Management
MSDS	Material Safety Data Sheet
NO_x	Nitrogen Oxide
OAT	Organic Acid Technology
PCV	Positive Crankcase Ventilation
PPE	Personal Protective Equipment
ppm	Parts Per Million
ROPS	Roll Over Protective Structures
SAE	Society of Automotive Engineers (USA)
SCA	Supplemental Coolant Additives
SCR	Selective Catalytic Reduction
SCRoF	Selective Catalytic Reduction on Filter
SFB	Smart Fuse Box
SM	Supply Module
TCU	Transmission Control Unit
UCM	Universal Control Module
UDST	Urea Dosing System Test
ULSD	Ultra Low Sulfur Diesel
UQS	Urea Quality Sensor
VGT	Variable Geometry Turbo
WH	Waste Handler

Product identification

Model, serial number, and year of manufacture

Record the machine and part identification numbers. When ordering parts, obtaining information or assistance, always supply your dealer with the type and serial number of your machine or accessories. Keep a record of these numbers and your Manufacturer's Statement of Origin in a safe place. If the machine is stolen, report the numbers to your local law enforcement agency.

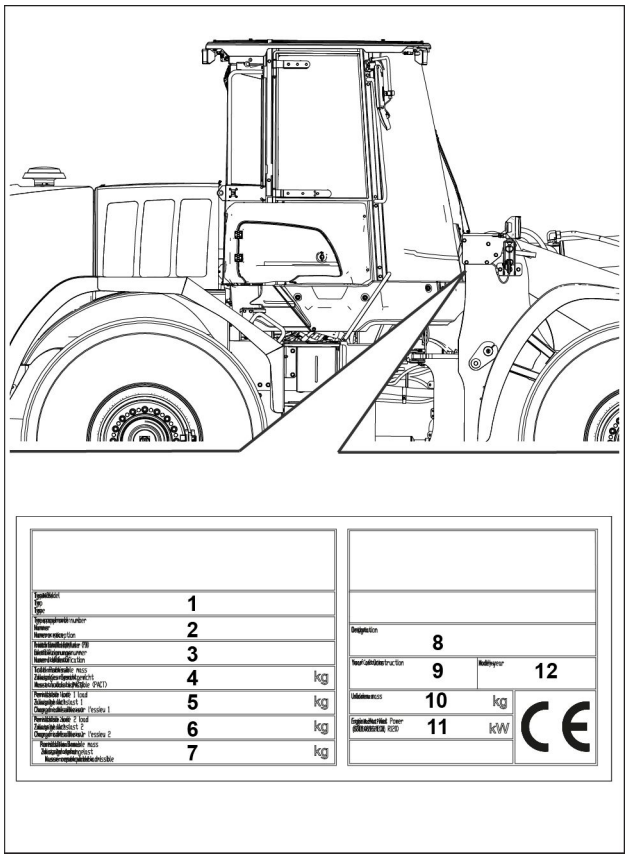
Machine identification

Model name
PIN
Model year

The Product identification number (PIN) plate is located on the right-hand side of the machine.

The identification plate includes the following main data of the machine.

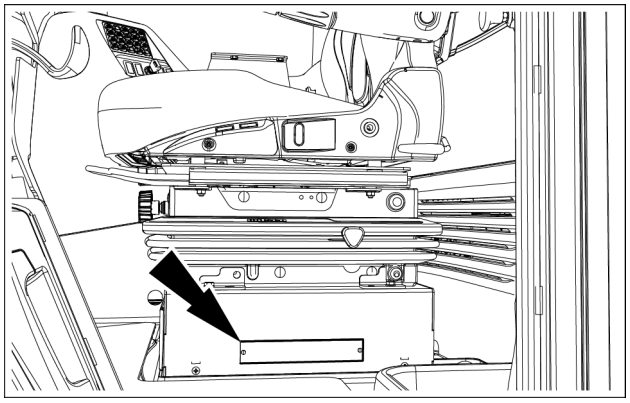
1. Machine model.
2. Homologation code number of the machine target market, if foreseen.
3. Machine serial number.
4. Maximum total weight which the machine can bear.
5. Maximum weight which the front axle can bear.
6. Maximum weight which the rear axle can bear.
7. This field is not used since the machine is not designed to tow.
8. Category of the machine.
9. Year of manufacturing of the machine.
10. Total weight of the machine standard version.
11. Engine power in KW according to standard **ISO 14396**
12. Year of the model



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Roll-Over Protective Structure (ROPS)

The serial number plate is located inside the cab, under the operator's seat at the left-hand side.



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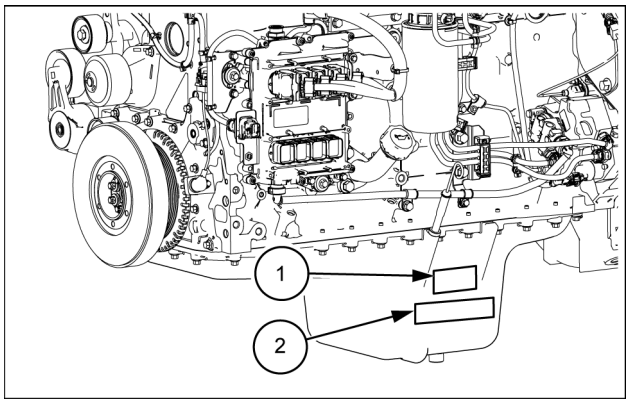
Engine make and model

Engine serial number

The identification plates of the engine **(1)** and **(2)** are located on the engine oil pan.

The homologation plate **(1)** shows:
- Serial number
- Engine type

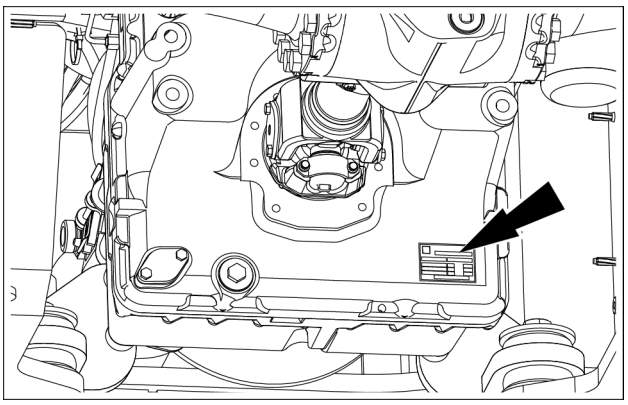
The identification plate **(2)** shows:
- Serial number
- Manufacturing date
- CNH part number
- FPT part number



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Transmission

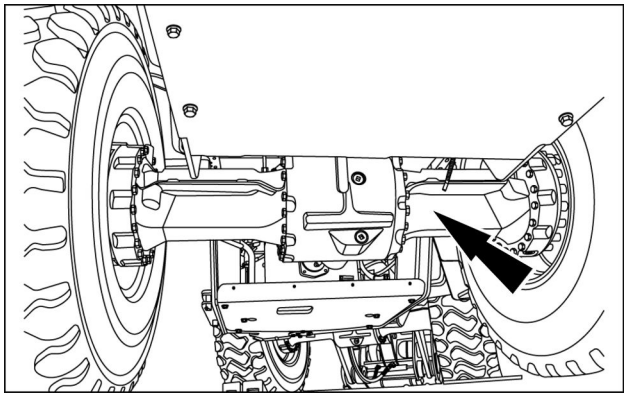
The serial number plate is on the transmission face plate.



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Axle

The serial number plate is on the axle cross member.



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Operator's manual storage on the machine - ROPS

The operator’s manual is storage in the cab.

READ THIS MANUAL COMPLETELY and make certain you understand the controls. All equipment has a limit. Make sure you understand the speed, brakes, steering, stability and load characteristics of this machine before you start to operate.

DO NOT remove this manual or the safety manual from the machine. See your dealer for additional manuals. Keep the operator's manual and the safety video in the storage compartment provided on the machine. The operator's manual and safety video must be available for use by all operators.



When you see this symbol, read your operator's manual.

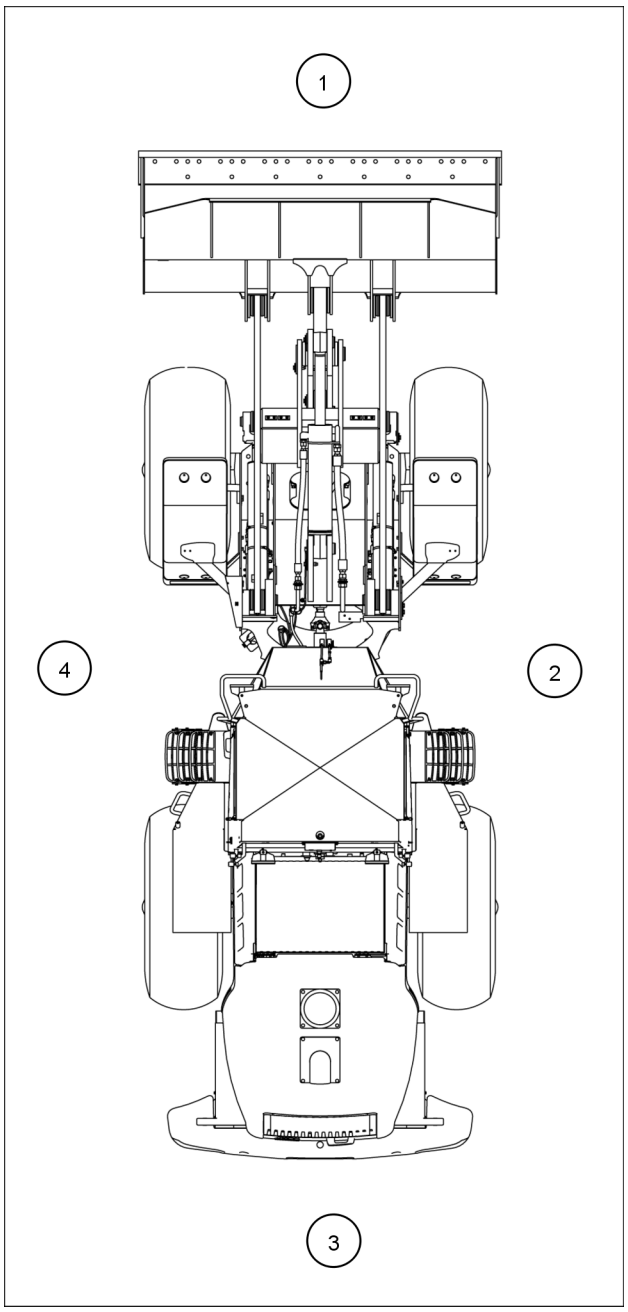


When you see this symbol, refer to your service manual.

Machine orientation

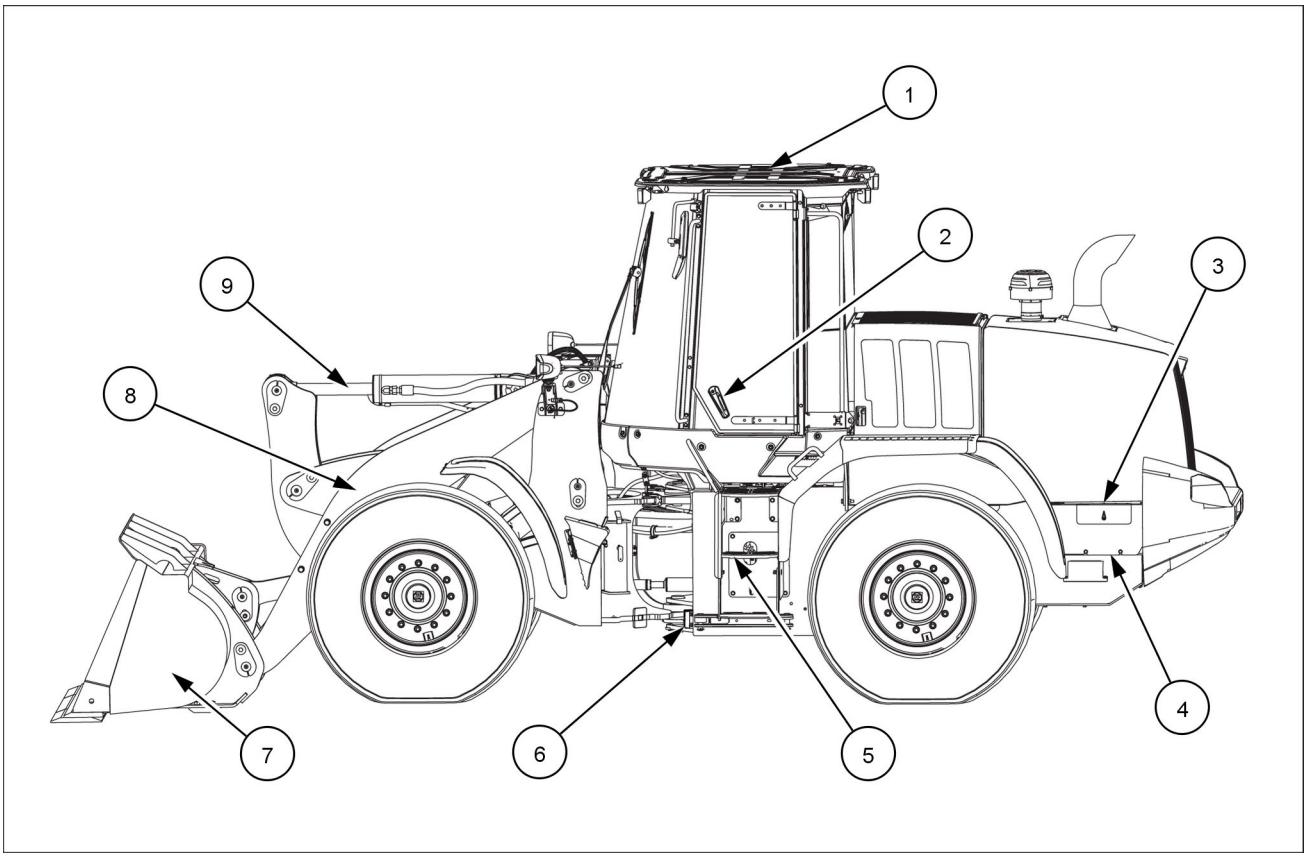
The terms right-hand, left-hand, front, and rear are used in this manual to indicate the sides as they are seen from the operator's seat.

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



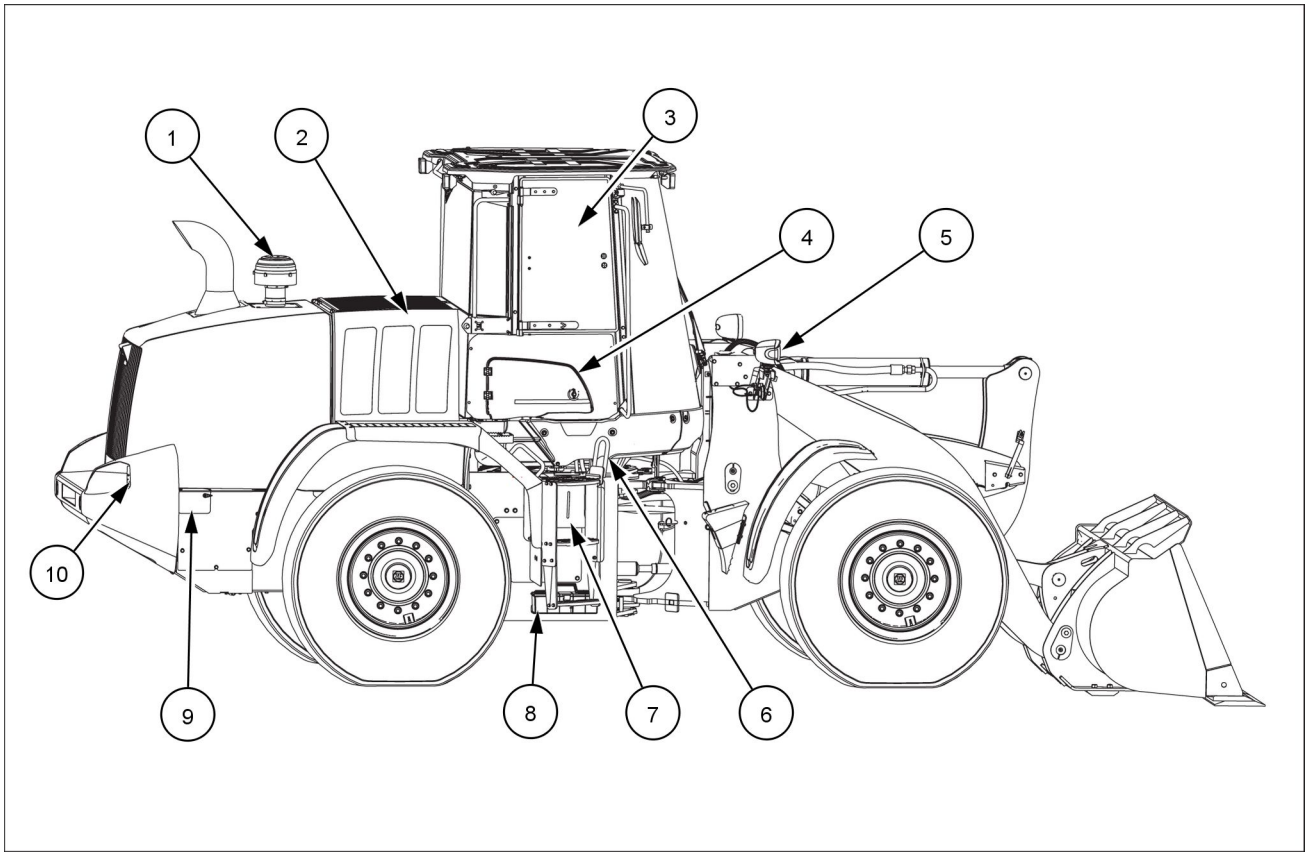
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Identification of machine components



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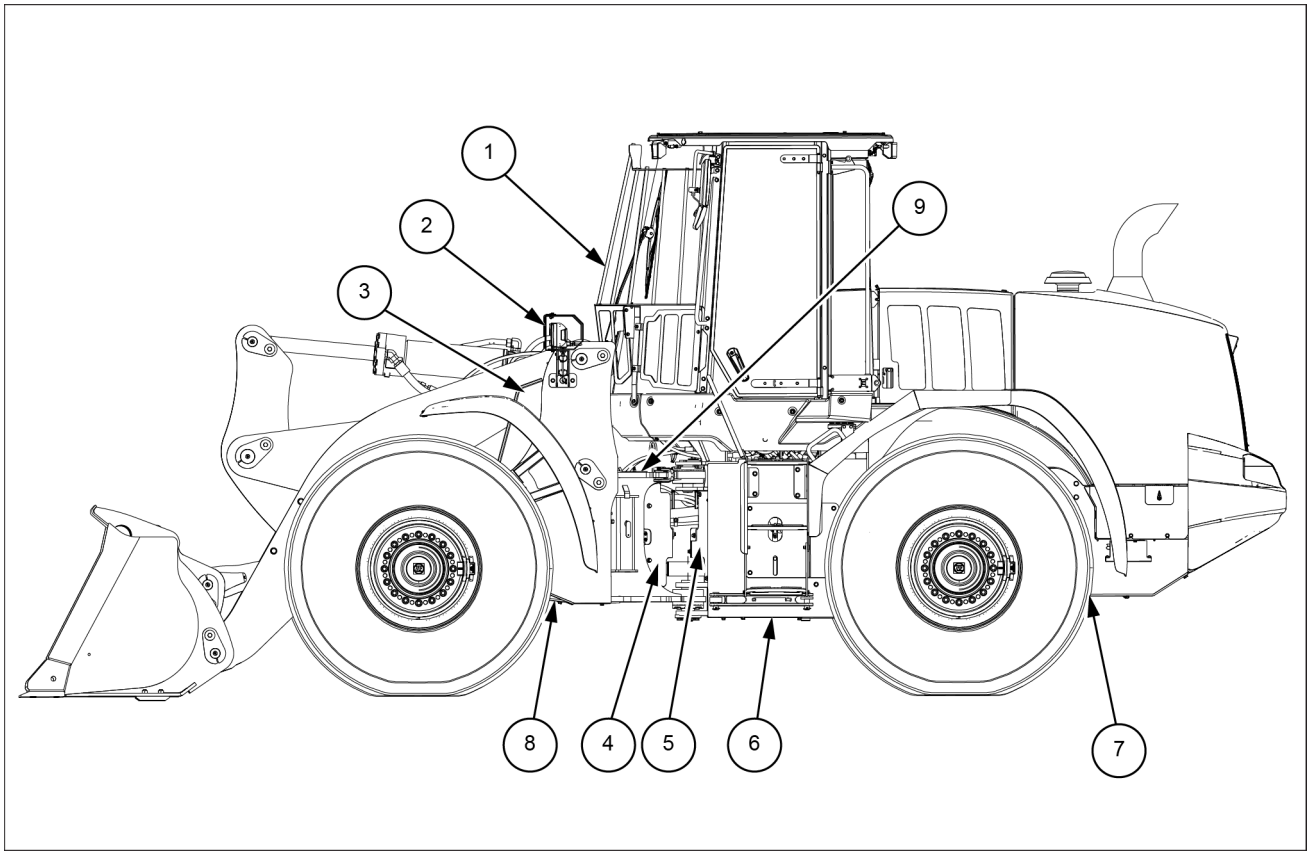
1. Roll Over Protection System (ROPS) cab
2. Cab door handle
3. Timed disconnect switch, hood raise switch and optional battery jump post
4. Battery access
5. Steps
6. Articulation soft stop
7. Bucket
8. Loader lift arms
9. Bucket cylinder



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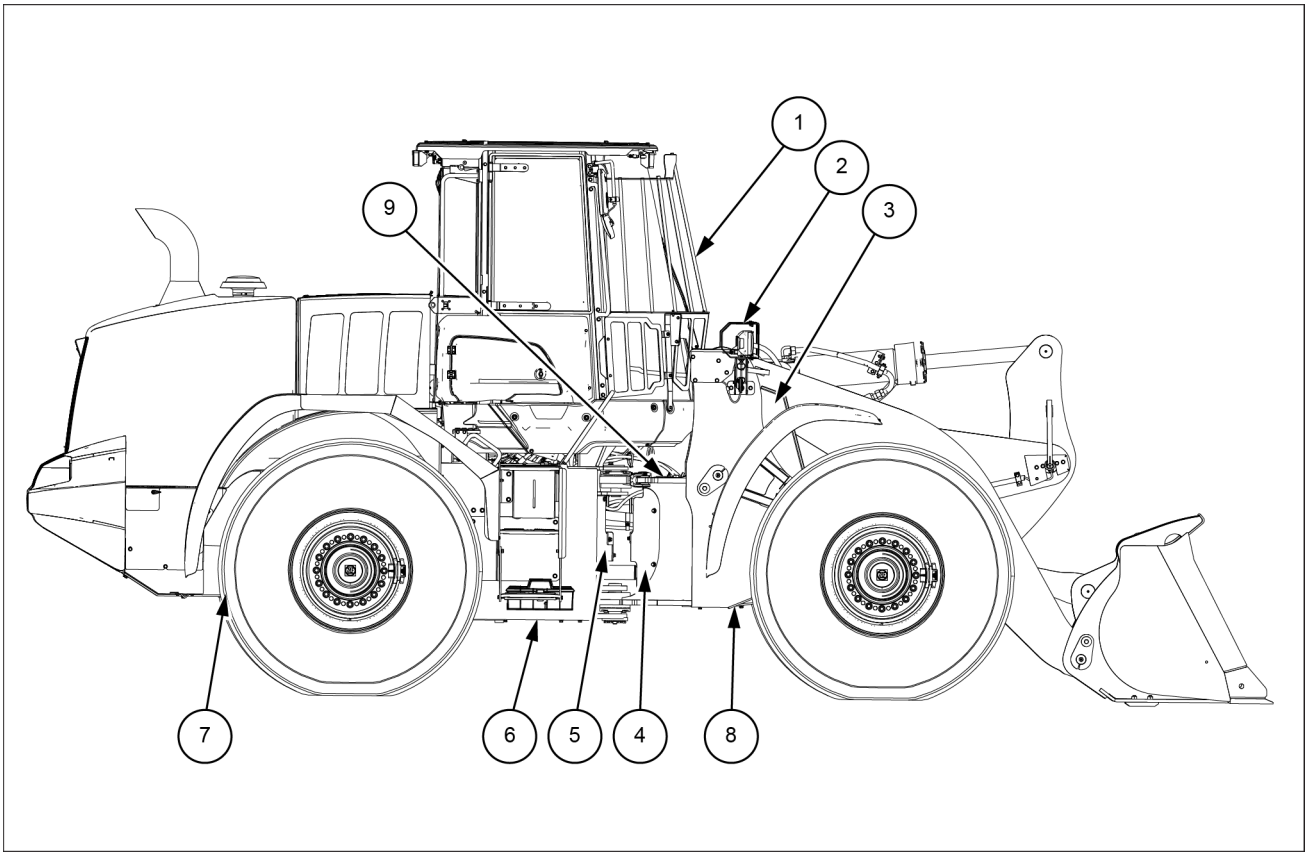
1. Pre-cleaner
2. Sliding access panel
3. Cab side window
4. Cab air filter door
5. Driving lights
6. Handrail
7. Windshield washer bottle
8. Toolbox
9. **Diesel Exhaust Fluid (DEF)/AdBlue®** fill tank
10. Tail light

Waste Handler (WH) configuration



LEIL17WHL2018FB 3

1. Windshield guard
2. Driving light guard
3. Chassis side cover
4. Front articulation joint cover
5. Rear articulation joint cover
6. Transmission guard
7. Fuel tank guard
8. Front chassis guard
9. Upper articulation cover



LEIL17WHL2017FB 4

1. Windshield guard
2. Driving light guard
3. Chassis side cover
4. Front articulation joint cover
5. Rear articulation joint cover
6. Transmission guard
7. Fuel tank guard
8. Front chassis guard
9. Upper articulation cover

EC Declaration of Conformity

The following page provides a facsimile copy of the “EC” Declaration of Conformity. The EC Declaration of Conformity is the manufacturer’s declaration about machine compliance to relevant EU provisions. Please keep the original document in a safe place. Local authorities may require you to show this document in order to assure compliance of your machine.

Translation of this declaration in your own country language is provided on the reverse page of the original document.

For your better and easier understanding of the document
hereafter you’ll find some explanatory notes.

1. QR code
2. Under section 1.2 are listed those options or variants which have safety related functions. Some of them are standard provided, like FOPS or ROPS.
3. Under section 2 are listed all information required by EU "Outdoor Noise" Directive **2000/14/EC**. Please refer your own original EC Declaration of Conformity for specific machine information.
4. Generic serial number for this machine type. Sequence of letters and numbers may vary depending on machine configuration.
5. EC Declaration of Conformity serial number. Please make reference to this number when requiring information or support about declaration.
6. Signature of a person authorized to sign the document on behalf of the company.

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(1)

CASE CONSTRUCTION

CNH INDUSTRIAL ITALIA S.p.A.
Via Plava, 80 – 10135 Torino – Italia

DICHIARAZIONE "CE" DI CONFORMITÀ

"EC" DECLARATION OF CONFORMITY

Il sottoscritto dichiara che la sottoindicata macchina è stata progettata e costruita in conformità alle seguenti Direttive Europee, come emendate, e ai decreti e regolamenti che le traspongono nelle leggi nazionali:

The undersigned declare that the machine described below has been designed and manufactured in compliance with the following European Directives, as amended, and the regulations transposing them into national laws:

1. 2006/42/CE "Sicurezza delle macchine"

1.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 474-1:2006+A5:2018; EN 474-3:2006+A1:2009**
European Harmonised standards under which conformity is declared:

	Sì *Yes*	No *No*
1.2 Principali componenti di sicurezza montati e forniti con la macchina *Main safety components installed and supplied with the machine*		
1.2.1 Struttura di protezione contro la caduta di oggetti (F.O.P.S.) *Falling Object Protective Structure (F.O.P.S.)*	☒	☐
1.2.3 Struttura di protezione in caso di ribaltamento (R.O.P.S.) *Roll Over Protective Structure (R.O.P.S.)*	☒	☐
1.2.7 # # #	☐	☒

(2)

1.4 Nome e indirizzo della persona autorizzata a costituire il fascicolo tecnico:
Name and address of the person authorised to compile the technical file:
CNH Industrial Italia S.p.A. - Zona Industriale Lecce - 73100 Lecce, Italy

2. 2000/14/CE "Emissione acustica"

2.1 Procedura di valutazione di conformità eseguita: Allegato VI Art. 6/1
Conformity assessment procedure followed:

2.2 Nome e indirizzo dell'Organismo Notificato coinvolto: Eurofins Product Testing Italy S.r.l. (0477)
Name and address of the Notified Body involved:

2.3 Livello di potenza sonora misurato LWA (rif. 1 pW): - dB(A)
Measured sound power level LWA (ref. 1 pW):

2.4 Livello di potenza sonora garantito LWA (rif. 1 pW): - dB(A)
Guaranteed sound power level LWA (ref. 1 pW):

(3)

2.5 Potenza motore (come definita dalla ISO 14396): - kW
Engine power (as defined by ISO 14396):

2.6 Detentore della documentazione tecnica: CNH Industrial Italia S.p.A. - Engineering Department Zona Industriale Lecce - 73100 Lecce, Italy
Holder of the technical documentation:

3. 2014/30/UE "Compatibilità Elettromagnetica"

3.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 13309:2010**
European Harmonised standards under which conformity is declared:

4. Altre Direttive applicabili: **# # #**
Other applicable Directive/s:

5. Costruttore: CNH INDUSTRIAL ITALIA S.p.A.
Manufacturer:

6. Categoria: **Pala caricatrice gommata**
Category: *Wheeled loader*

7. Tipo: **-**
Type:

8. Matricola: **-**
Serial n°:

(4)

(5) **-**

(6)

Lecce, Italia 26/03/2019

Signature
(Name and Function)

FACSIMILE

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2 - SAFETY INFORMATION

Safety rules and signal word definitions

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.

Personal safety

Most accidents involving machine operation and maintenance can be avoided by following basic safety rules and precautions. Read and understand all the safety messages in this manual, the safety manual, and the safety signs on the machine before you operate or service the machine. See your dealer if you have any questions.

READ THIS MANUAL COMPLETELY and make sure you understand the controls. All equipment has a limit. Make sure you understand the speed, brakes, steering, stability, and load characteristics of the machine before you start to operate this machine.

DO NOT remove this manual or the safety manual from the machine. See your dealer for additional manuals. Also see the manual information on the Title pages (first and second pages in front of the Table of Contents) of this manual.

The safety information given in this manual does not replace safety codes, insurance needs, federal, state, or local laws. Make sure that your machine has the correct equipment according to these rules or laws.

Additional safety messages are used in the text of the manual to show specific safety hazards.

NOTICE: *the safety messages in this chapter point out conditions which can happen during the normal operation and maintenance of your machine. These safety messages also give possible ways of dealing with these conditions.*

Safety rules



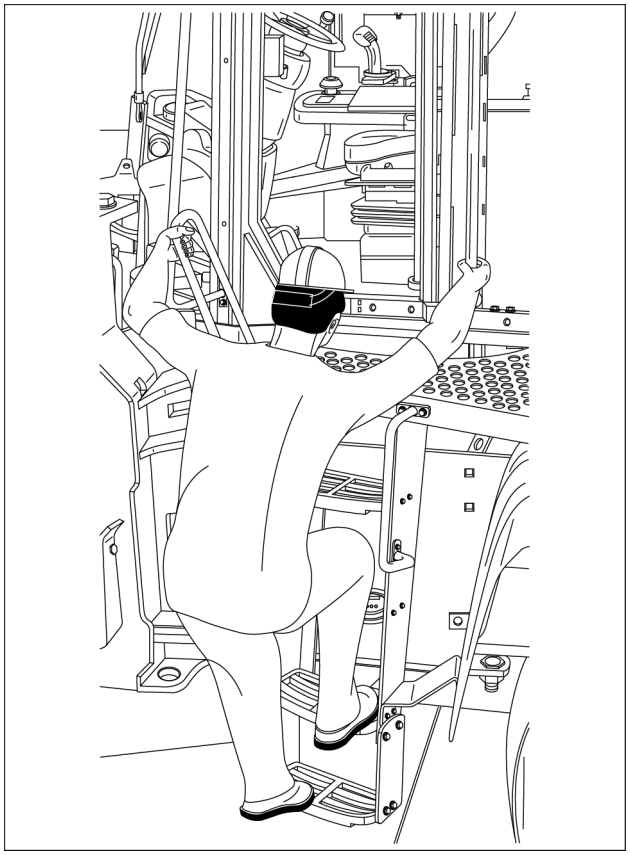
- It is the responsibility of the operator to read and understand the operator's manual and other information provided, and use the correct operating procedure. Machines should be operated only by qualified operators.
- Do not operate this machine or perform maintenance work if you have not had appropriate training. Read and fully understand all the instructions and warnings in this manual.
- Be prepared for emergencies. Always have a first aid kit and a working fire extinguisher with you and know how to use each.
- Avoid loose fitting clothing, loose or uncovered long hair, jewelry and loose personal articles.
- Know and use the protective equipment that is to be worn when operating this machine. Hard hats, protective glasses, protective shoes, gloves, reflector type vests, respirators and ear protection are examples of equipment that may be required.
- Certain protective equipment must be replaced and renewed due to age or wear. Old hard hats may not afford the original intended protection. Faded and soiled vests are no longer as highly visible as the original intent. See the manufacturer's recommendation.
- Know and use the hand signals required for particular jobs and know who has the responsibility for signaling.
- Wear the seat belt to maximize the protection capability of a ROPS (Roll Over Protective Structure) when the machine is so equipped.
- Inspect the ROPS and seat belt mounting bolts on a daily basis to ensure their integrity.
- Do not permit riders on the machine if there is no manufacturer's designated place for a rider.
- Make sure that all protective guards, canopies, doors, etc. are in place and secure.
- Remove all loose objects stored in the machine. Remove all objects which do not belong in or on the machine and its equipment.

Attachment quick coupler safety information

- Always inspect the coupler locking pin extension before operating the machine. Position the locking pins in your field of vision and make certain they are engaged properly.
- Improperly locked attachments could release and cause serious injury.
- Do not attempt to engage attachment with locking pins extended.
- Make certain that locking pins and connections are free of dirt or mud before attempting to engage and disengage the attachment.
- Do not extend or retract coupler locking pins with attachment on the ground or in the dump position.
- If any damage is visible on the coupler or attachment points, do not operate or attach bucket.
- Never stand under an attachment or allow others to do so. Do not allow anyone under elevated loads.
- Do not lift loads or push materials with the coupler without an attachment. This can cause damage to the coupler components.
- Check coupler operation periodically for any unusual movement and/or noise.
- Inspect hydraulic hoses for any leaks or damage.
- Visually inspect welds and if necessary contact your dealer.
- Check for any loose bolts. Torque as required.
- Do not modify the machine or attachments. Such modifications can damage and/or affect the integrity of the attachment and can affect safety and function of the attachment and/or machine.
- Check all controls in a clear area and make certain the machine is operating correctly.

Getting on and off the machine

- Inspect steps and hand holds to ensure they are in good working order.
- Use the recommended hand holds and steps with at least three points of support when getting on and off the machine. The door must be latched and secured in the open position before using the door hand hold.
- Face the machine and use the hand holds and steps adhering to a three-point access system when climbing up and down.
- Do not jump off the machine.
- Do not dismount while the machine is in motion.
- Foreign material or grease on the steps, platform and hand rails can cause an accident. Keep steps, platform and hand rails clean.



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Starting and stopping precautions

- Walk around the machine and warn all personnel who may be servicing the machine or are in the machine path prior to starting. Do not start until all personnel are clearly away from the machine. Sound the horn, if equipped, before starting.
- Walk around the machine's tool, attachment, or furthermost contact point to view operation danger area from the work site personnel's view and angle.
- Check that the parking device is applied, place the transmission in neutral or park as specified by the manufacturer, before starting the machine.
- Adjust, secure and latch the seat and fasten the seat belt before starting the machine.
- Start and operate the machine only from the operator's station.
- Do not bypass the machine's neutral-start system. The neutral-start system must be repaired if it malfunctions.
- Use battery booster cables only in the recommended manner. Improper use can result in battery explosion or unexpected machine motion. Ventilate the battery area before using booster cables.
- Do not operate the engine in an enclosed area without adequate ventilation.
- Park the machine on level ground whenever possible and apply the parking brake. On grades, park the machine with the wheels securely blocked.
- Before leaving the operator's station, lower the bucket/attachment to the ground and shut off the engine.
- Remove the starter key and/or use the timed disconnect switch when leaving the machine parked or unattended.

Operating precautions

- Check brakes, steering and other machine control devices in accordance with the manufacturer's instructions prior to starting operation. Observe all gauges or warning instruments for proper operation. Operate all controls to ensure proper operation. If any malfunctions are found, remove the starter key or timed disconnect switch key. Place a DO NOT OPERATE tag on the machine until the malfunction is corrected.
- If a failure that causes loss of control such as steering, service brakes, or engine occurs, stop the machine motion as quickly as possible, remove the starter key or timed disconnect switch key. Place a DO NOT OPERATE tag on the machine, and keep it securely parked until the malfunction is corrected or the machine can be safely towed.
- Understand the machine limitations, and keep the machine under control.
- Operate and drive the machine with care and at speed compatible with conditions. Use extra caution when operating over rough ground, on slopes, and when turning.
- Note and avoid all hazards and obstructions such as ditches, underground lines, trees, cliffs, overhead electrical wires, or areas where there is danger of a landslide.
- Carry loads in recommended positions for maximum stability.
- Never lift loads in excess of capacity.
- Use the recommended machine ballast and counterweighting. Ballast is not permitted in the tires.
- Know and understand the job site traffic flow patterns and obey signalmen, road signs, and flagmen.
- Know and understand that job site conditions may change on an hourly basis. Hills of dirt, debris or obstructions may grow and change from the time you began the day. It is your responsibility to monitor the changes and keep the machine, tools and attachments, etc. at a safe distance from people, objects etc.
- Watch for bystanders and never allow anyone to be under or to reach through the machine and its equipment while operating.
- Select a gear that will prevent excessive speed when going downhill. Do not coast downhill.
- When traveling a machine on road, know and use the signaling devices required on the machine. Provide an escort for traveling on road where required.
- Use the recommended transport devices when traveling on road. Proper lights, flashers, signals, and beacons may be required. Use reflective slow moving vehicle signs where necessary. Follow local, state, and federal regulations.
- The machine is not approved for towing.
  Retrieval point in rear of machine is only to be used to move disabled or stuck machine.
- Before you operate at night, check that all lamps illuminate.
- If your machine has a cab, make sure that all windows are clean and that the windshield wipers and washers work correctly.
- Engine exhaust fumes can cause death. If you operate this machine in an enclosed area, make sure there is ventilation to replace the exhaust fumes with fresh air.
- Check all controls in a clear area and make sure the machine is operating correctly. Dust, fog, smoke, etc., can decrease your vision and cause an accident. Stop the machine or decrease the speed until you can see.
- Contact with high voltage power lines, underground cables, etc., can cause serious injury or death from electrocution.
- Before you drive or operate in an area with high voltage lines, cables, or a power station, inform the power or utility company of your intentions.
- You MUST HAVE THE POWER DISCONNECTED OR KEEP A SAFE WORKING DISTANCE from any power lines, cables, or power stations.
- Keep all parts of the machine a safe distance away from the power source. You must also know any federal, state/provincial, or local safety codes or regulations that apply to the job site.
- If a part of the machine comes in contact with high voltage power:
  1. Warn other workers NOT TO TOUCH THE MACHINE and to stay away from the machine.
  2. If you can break contact, reverse the operation that caused contact with the high voltage power, and move the machine away from the danger area. If you cannot break contact stay in the machine until the utility company de-energizes the line and tells you that the power is off.
- If you have extreme conditions, such as a fire, etc., and you are forced to leave the machine, do not step off the machine. Jump as far from the machine as possible with your feet together and do not touch the ground with your hands.

- Do not operate the machine if you do not feel well. This can be dangerous for you and for the people around you.
- Do not operate the machine when on certain medications.
- Do not operate the machine under the influence of alcohol or drugs.
- You must make a judgment if weather, road, or earth conditions will permit safe operation on a hill, ramp, or rough ground.
- Stay away from hazardous areas such as ditches, overhangs, etc. Walk around the work area before you start and look for hazards.
- Be alert and always know the location of all workers in your area. Keep all other persons completely away from your machine. Injury or death can result if you do not follow these instructions.
- Develop fluid and smooth operating techniques, and maintain the surface condition where the machine travels in order to control vibration transfer to the operator.
- Avoid steering movements when a bystander is nearby.
- Always apply the parking brake prior to leaving the cab and/or when parking the machine on slopes.
- A speed limited transmission controller is required for use with solid tire applications.
  The controller is already set if the machine comes from the factory with the solid tires option mounted.
  If the solid tire option is fitted later, the transmission control unit must be properly set by the dealer.

Maintenance precautions

- Do not attempt repairs unless trained. Refer to manuals and experienced repair personnel for help.
- Before you service the machine, always place a DO NOT OPERATE tag on the key switch. Make sure that the machine is clearly “tagged out”.
- Wear protective glasses and other required safety equipment when servicing or repairing the machine.
- Wear gloves to protect hands when handling cables.
- Disconnect the battery clamp from the negative battery terminal before working on the electrical system. Know the consequences of disconnecting any electronics or computer devices.
- Avoid lubrication or mechanical adjustments with the machine in motion or the engine operating. If the engine must be in operation to make certain adjustments, place the transmission in neutral, install the articulation lock, apply the parking device, place the bucket/attachment in a safe position, securely block the wheels and use extreme caution.
- Securely block the machine or any component that may fall before working on the machine or component. If possible, use a backup or secondary blocking device as well.
- To prevent unexpected movement, securely block working elements when repairing or changing working tool parts such as cutting edges.
- Never make repairs on pressurized components, fluid, gas or mechanical components until the pressure has been relieved according to the manufacturer’s instructions.
- Use extreme caution when removing radiator, reservoir, or tank caps, drain plugs, grease fittings or pressure taps. Park the machine and let it cool before opening a pressurized tank.
- Release all pressure before working on systems which have an accumulator.
- Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injuries. To prevent personal injury, relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make certain all connections are tight and components are in good condition.
- Use a piece of cardboard, newspaper, or wood to check for any pressurized leaks to prevent fluid penetrating the skin. Pressurize accumulators with the proper gas according to manufacturer’s recommendations.
- When inflating tires, use a self-attaching inflation chuck with remote shutoff and stand clear of the tire. Position yourself beside the tire and not beside the rim.
- When absolutely necessary to tow the machine, do not exceed the recommended towing speed. Be sure the towing machine has sufficient braking capacity to stop the towed load. If the towed machine cannot be braked, a tow bar must be used or two towing machines must be used - one in front pulling and one in the rear to act as a brake. Avoid towing over long distances.
- Always observe proper maintenance procedures.
- Always replace all missing, illegible or damaged safety signs or decals as necessary. Keeps all safety signs and decals clean and legible.

Observe proper maintenance procedures

- Whenever servicing or replacing hardened pins, etc., use a brass drift or other suitable material between the hammer and the pin. Alt: use a brass hammer, drift or suitable material on the pin, etc.
- Keep the brakes and steering systems in good operating condition.

Fuel handling

- Do not smoke or permit open flames while fueling or near fueling operations.
- Never remove the fuel cap or refuel machines with the engine running or the engine hot. Never allow fuel to spill on hot machine components. Avoid spilling fuel on the ground or contaminating the environment.
- Always maintain control of the fuel filler nozzle when filling the tank. This will help avoid spilling fuel.
- Clean up spilled fuel immediately and dispose of all contaminated material in an environmentally correct manner.
- Tighten the fuel tank cap securely. If you lose the fuel cap, replace it only with the manufacturer's approved cap. Use of a non-approved cap without proper venting may result in pressurization of the tank.
- Never use gasoline for cleaning purposes.
- Use the correct fuel for the operating season.

Handling DIESEL EXHAUST FLUID (DEF)/ ADBLUE®

- Your machine is equipped with additional components to comply with national and local exhaust emissions requirements. Diesel exhaust fluid or **DEF/ADBLUE®** is a non-toxic aqueous urea solution. It chemically reduces NOx emissions from heavy duty diesel powered machines. It is neither explosive nor considered harmful to the environment and is classified under the minimum risk category of transportable fluids.
- Personal Protection Equipment (PPE) is not required under normal conditions. If splashing is likely, wear eye protection.
- For prolonged or repeated contact, impervious gloves are recommended.
- Clean up spilled fluid immediately and dispose of all contaminated material in an environmentally correct manner.
- Follow the precautions listed in this safety information chapter when handling any service fluid.
- **DEF/ADBLUE®** must be stored in clean, sealed containers.
- Make sure that no debris enters the machine **DEF/ADBLUE®** tank. Clean the **DEF/ADBLUE®** tank cap and the surrounding area before opening.
- Fill the **DEF/ADBLUE®** tank using clean filling equipment with the correct length and diameter nozzle.

Burn prevention

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
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.

W0120A

⚠ CAUTION

Burn hazard!
Hot coolant can spray out if you remove the filler cap while the system is hot. After the system has cooled, turn the filler cap to the first notch and wait for all pressure to release before proceeding.
Failure to comply could result in minor or moderate injury.

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⚠ 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.

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- When the battery electrolyte is frozen, the battery can explode if you try to charge the battery or if you try to boost start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others in the area can be injured.
- Hot coolant can spray out if the cooling system cap is removed. To remove the cap, let the cooling system cool, turn the cap to the first notch, wait until the pressure is released, then remove the cooling system tank cap.
- Hot surfaces within the engine compartment can cause burns: the engine and the exhaust system will be very hot. To prevent burns, open the engine compartment and allow components to cool to comfortable touch temperature before working inside the engine compartment.

Hazardous chemicals



- If you are exposed to, or come in contact with, hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolants, etc. required for the function of the machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.
- Safety Data Sheets (SDS) provide information about chemical substances within a product, safe handling procedures, first aid measures, and procedures to be taken in the event of a spill or accidental release. SDS are available from your dealer.
- Before you service the machine, check the SDS for each lubricant, fluid, etc. used in the machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the SDS, on manufacturer's containers, as well as the information in this manual when servicing the machine.
- Dispose of all fluids, filters, and containers in an environmentally safe manner according to local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.
- Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.
- Keep out of reach of children or other unauthorized persons.

Transporting precautions



- Know the rules, laws, and safety equipment necessary for transporting this machine on a road or highway.
- Use appropriate lighting as defined by local regulations. Make sure the slow moving vehicle (SMV) and/or speed indicator (SIS) is visible when driving on a public roads or highways.

Fire extinguisher



- A fire extinguisher on board is recommended for all construction equipment.
- Contact your dealer for the type and location of a fire extinguisher for this machine.

Precautions specific to this machine



- Keep the load or bucket/attachment as low as possible while moving the machine around the job site.
- Hydraulic circuits with accumulators may contain residual pressure. You must know which circuits have accumulators and how to release pressure properly.
- When servicing the machine, turn the machine off, place the attachment on the ground, release hydraulic pressure, and set the emergency brake. If you must service the machine with the lift arms raised, use the lift arm support strut with the bolt turned completely in and lift arm lowered onto and supported by the strut.

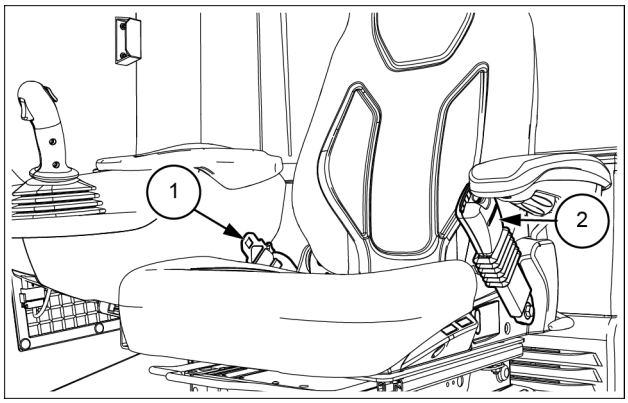
Seat belts

⚠ WARNING

Roll-over hazard!
Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab, ROPS canopy, or ROPS frame for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Failure to comply could result in death or serious injury.

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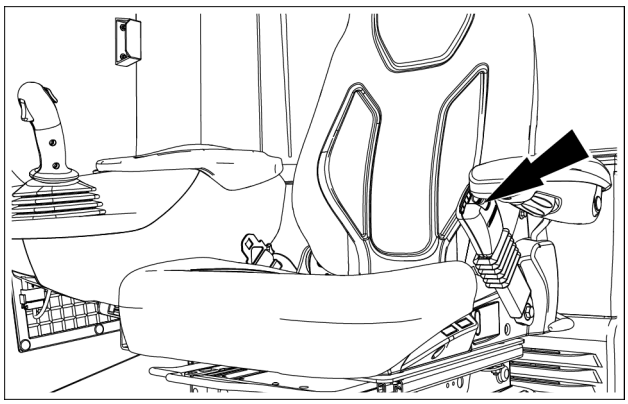
1. Insert the metal end **(1)** of the right-hand belt strap into the latch mechanism **(2)** on the left-hand side of the seat.
2. To tighten the seat belt, pull on the loose end of the right-hand seat belt.



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1. Right-hand belt strap
2. Latch mechanism

1. To unlatch the seat belt, press the red button on the left-hand side mechanism.



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Support strut and service link

Support strut

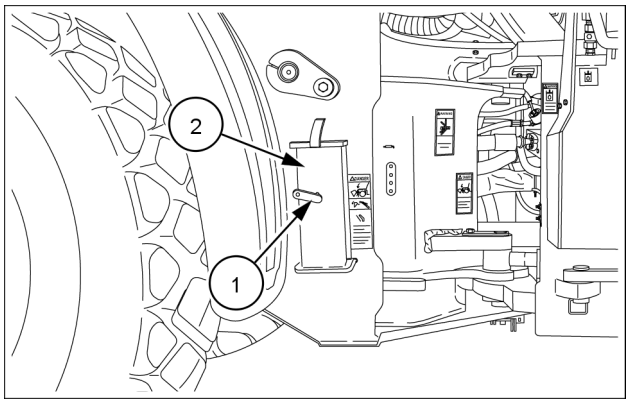
⚠ WARNING

Crushing hazard!
If you service the machine with the loader lift arms raised, always use the support strut. Remove the support strut from the storage position and place the strut onto the cylinder rod. Install the retaining bolt entirely into the strut. Lower lift arms onto the support strut.
Failure to comply could result in death or serious injury.

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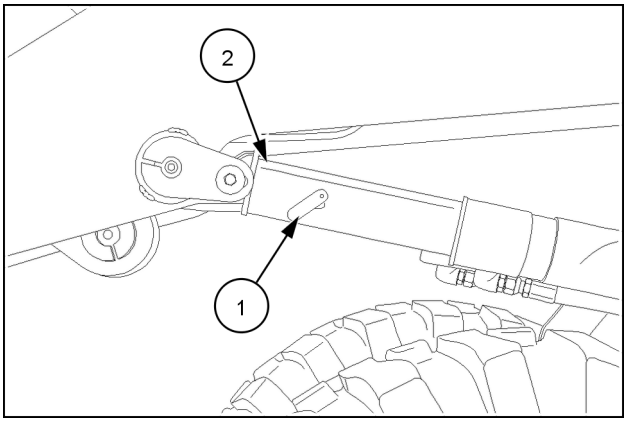
If you service the machine with the loader lift arms raised, always use the support strut.

1. Empty the loader bucket, raise the loader lift arms to approximately **2.1 m** (**7 ft**) and stop the engine.
2. Maintain the bucket in a dumped position. Remove the retaining bolt **(1)**. Remove the support strut **(2)** from the storage position.
3. Place the support strut **(2)** on the cylinder rod with the guide lock tab on top of cylinder and pointing toward the bucket.
4. Install the retaining bolt **(1)** entirely into the support strut **(2)** using all threads.
5. Slowly lower the lift arms onto the support strut. Maintain the bucket in a dumped position.



LEIL15WHL1850AA 1

NOTE: *support strut in transport position.*



RCPH10WHL061BAL 2

NOTE: *support strut in service position.*

If you do not follow this procedure, you can cause death or serious injury if the loader lift arms are lowered unexpectedly.

Transport service link

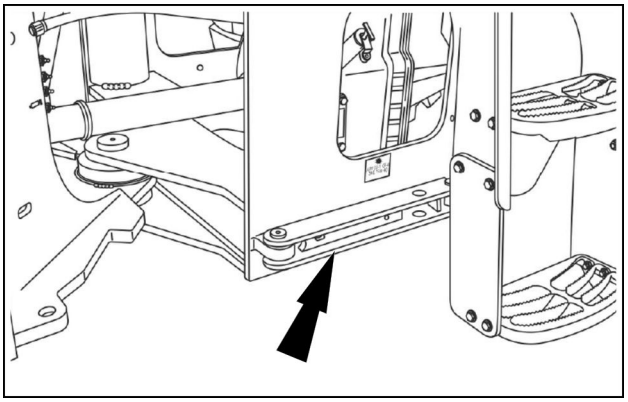
⚠ WARNING

Crushing hazard!
Engage the safety lock link before service or transport.
Failure to comply could result in death or serious injury.

W1154A

Park the machine on a level surface, lower the attachment to the ground, turn the engine off and set the parking brake before exiting the cab. Prior to any maintenance, service work or transportation, lock the articulation transport service link.

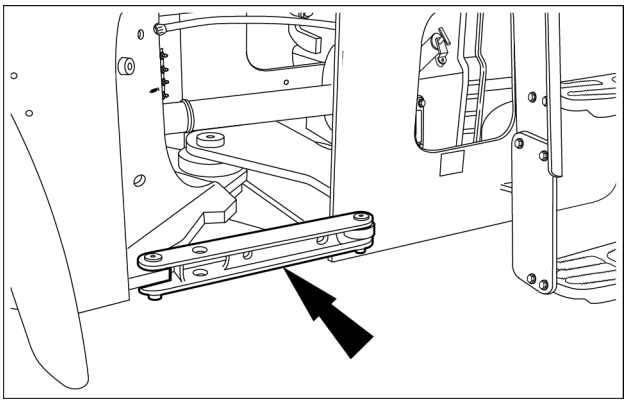
1. Remove the safety security pin to change the positions of the service link.



LEIL16WHL0047AA 3

NOTE: *service link in operating (unlocked) position.*

2. Move the service link into the locked position to prevent articulation. Insert the safety security pin.



LEIL16WHL0048AB 4

NOTE: *service link in locked position.*

Utility safety

⚠ WARNING

Electrical shock hazard!
Do not work under overhangs or electric wires. Do not work where there is a danger of sliding.
Failure to comply could result in death or serious injury.

W0215A

Safety precautions must be followed when working near buried and overhead utility lines.

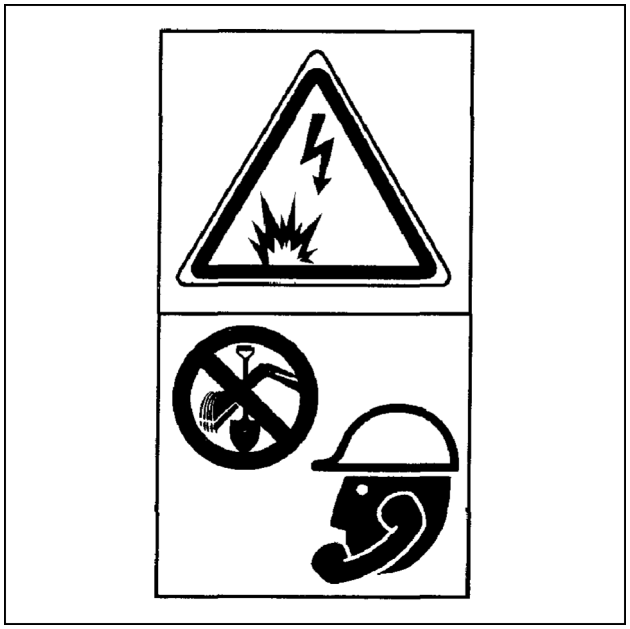
During operation it is likely that you will be working around or near buried or overhead utility lines which may include, but are not limited to:

- Electrical power line
- Gas line
- Water line
- Communication line - telephone or cable television
- Sewer line

NOTICE: *before beginning any machine operation, it is your responsibility to be aware of all such utility lines buried and overhead in the area of your project and to avoid them.*

Always have all local utility companies mark the location of their lines.

NOTICE: *check with local authorities for laws, regulations and/or strict penalties requiring you to locate and avoid existing utilities.*



RCPH10WHL001BAH 1

Call all local utility companies before you perform any machine operation

Know the utility color code:	
Electric	Red
Gas, oil, or petroleum	Yellow
Communication, telephone, television	Orange
Water	Blue
Sewer	Green/Brown
Proposed excavation	White
Surveying	Pink
Reclaimed water and slurry	Purple

After locating any buried utility lines, carefully dig a hole by hand and/or automatic vacuum equipment to the utility line to verify the location and depth of the line.

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.

NOTE: *the following are recommendations that may be of assistance:*

- 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. Your CASE CONSTRUCTION dealer can also provide assistance.

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.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your CASE CONSTRUCTION dealer or air-conditioning specialist has a special extractor for this purpose and can 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

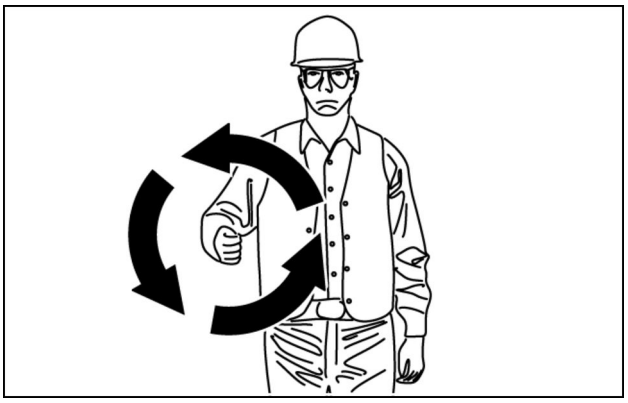
Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CASE CONSTRUCTION strongly recommends that you return 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.



Hand signals

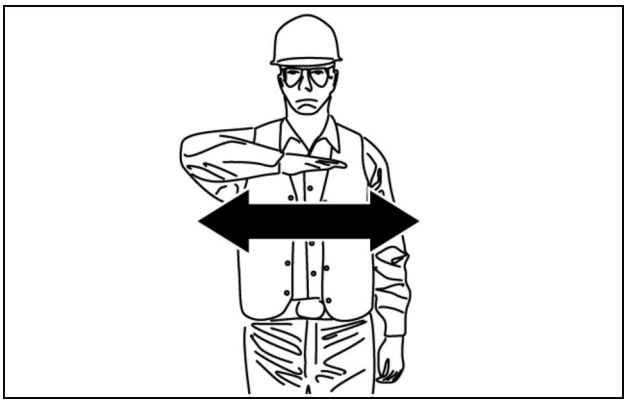
When operating the machine, never attempt to carry out tasks calling for fine control or to work in areas where visibility is poor or impaired without seeking the assistance of a signal person. Make perfectly sure that you and the signal person understand the signals to be used.

Start the engine



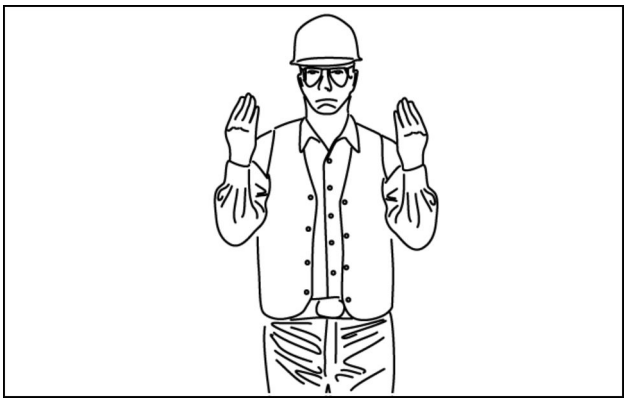
LEEN11T0005AA 1

Stop the engine



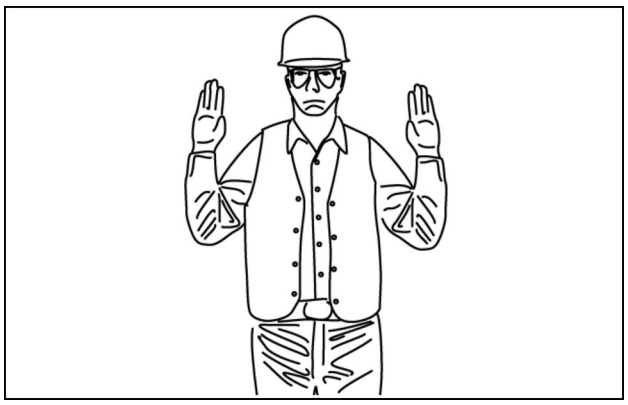
LEEN11T0006AA 2

Come to me
Wave hands back and forth (palms inward).



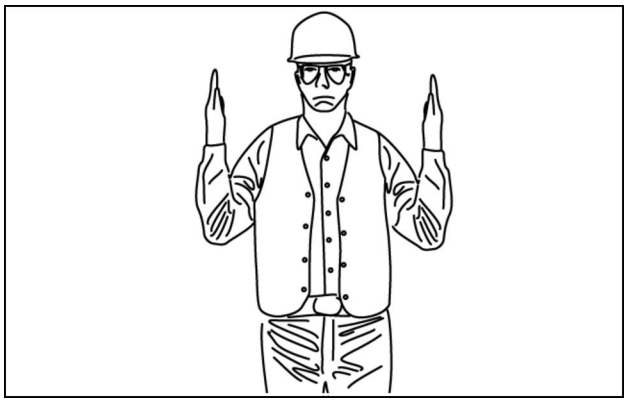
LEEN11T0007AA 3

Move away from me
Wave hands back and forth (palms outward).



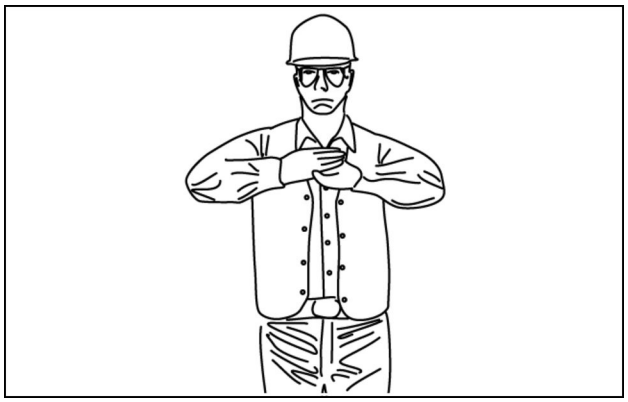
LEEN11T0008AA 4

Go this far



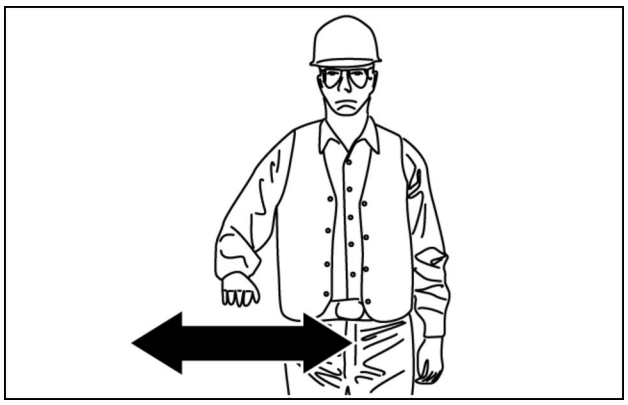
LEEN11T0009AA 5

All stop and hold



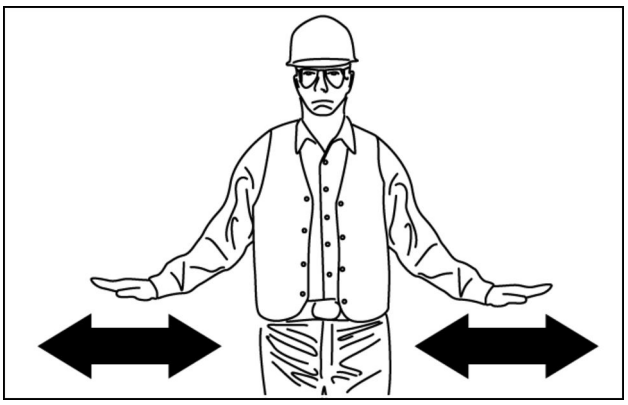
LEEN11T0010AA 6

Stop
Move one hand back and forth.



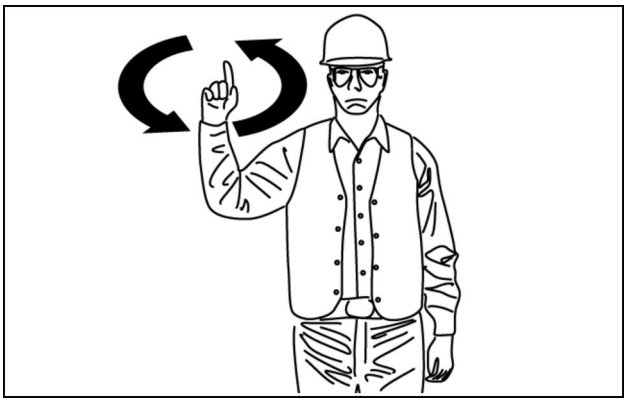
LEEN11T0011AA 7

Emergency stop
Move both hands back and forth.



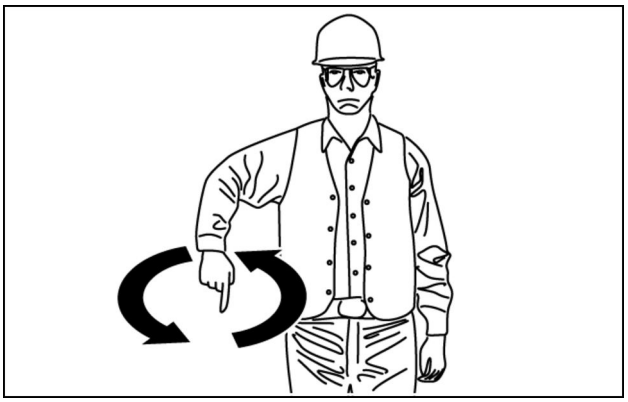
LEEN11T0012AA 8

Raise load or tool



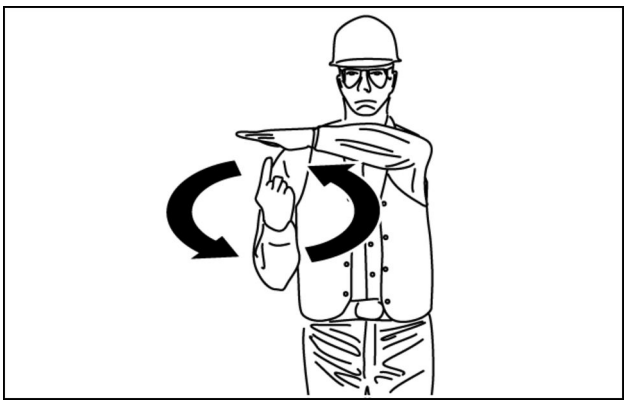
LEEN11T0013AA 9

Lower load or tool



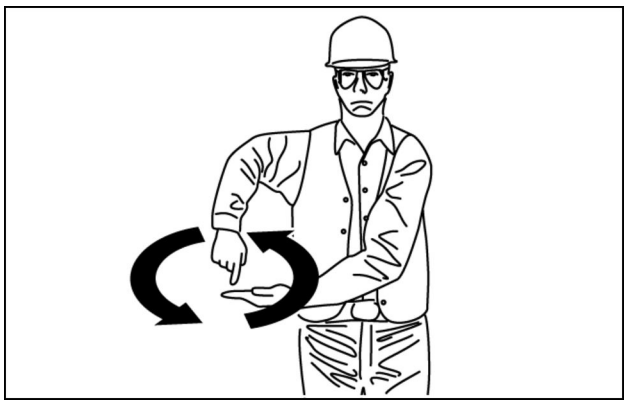
LEEN11T0014AA 10

Raise load or tool slowly



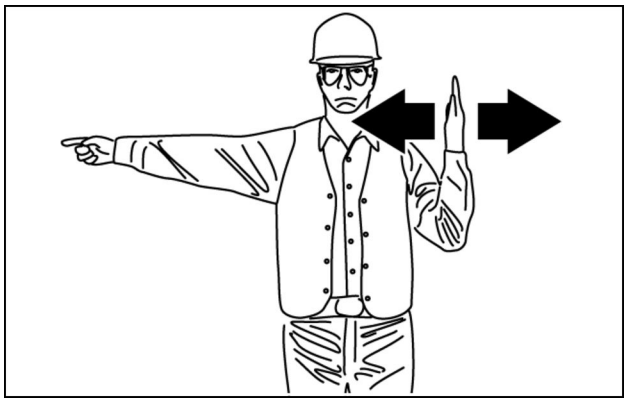
LEEN11T0015AA 11

Lower load or tool slowly



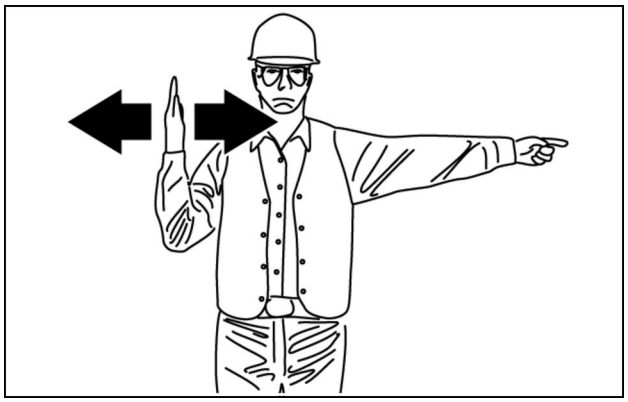
LEEN11T0016AA 12

Turn machine left swing load left
To stop movement, stop moving hand and make a fist.



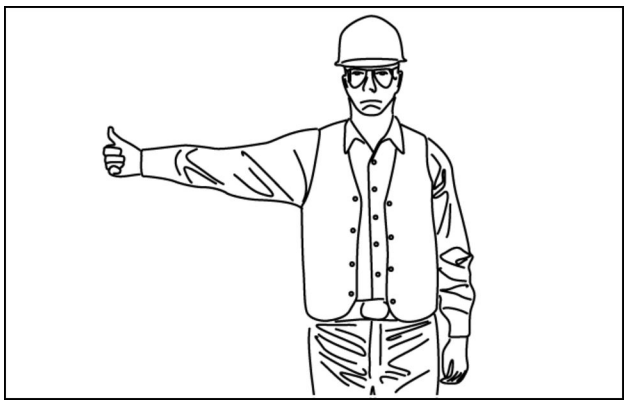
LEEN11T0017AA 13

Turn machine right swing load right
To stop movement, stop moving hand and make a fist



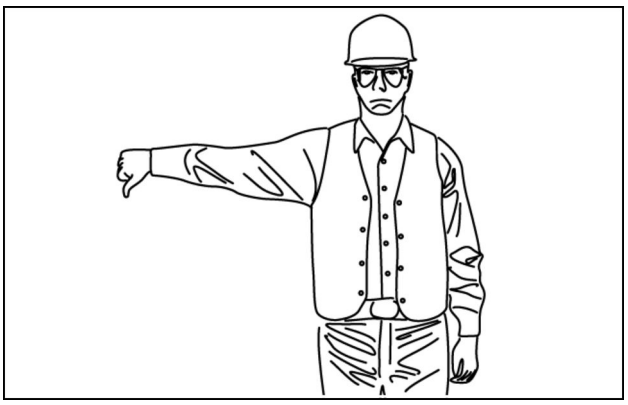
LEEN11T0018AA 14

Raise boom



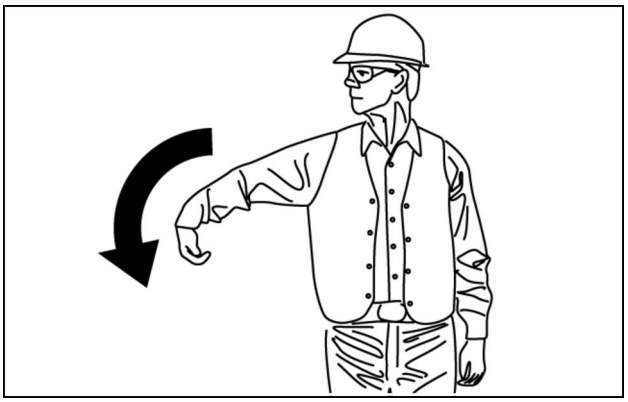
LEEN11T0019AA 15

Lower the boom



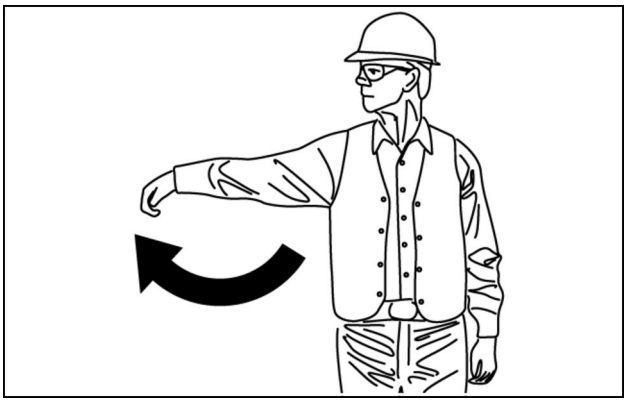
LEEN11T0020AA 16

Retract arm



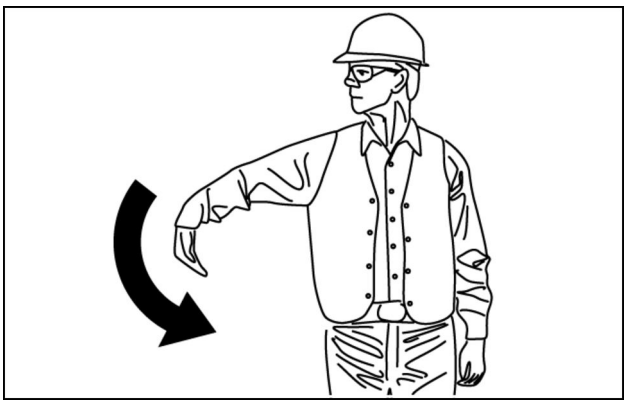
LEEN11T0021AA 17

Extend arm



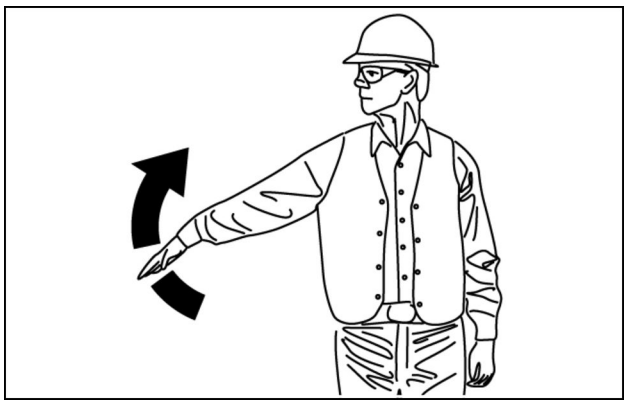
LEEN11T0022AA 18

Fill tool



LEEN11T0023AA 19

Empty tool

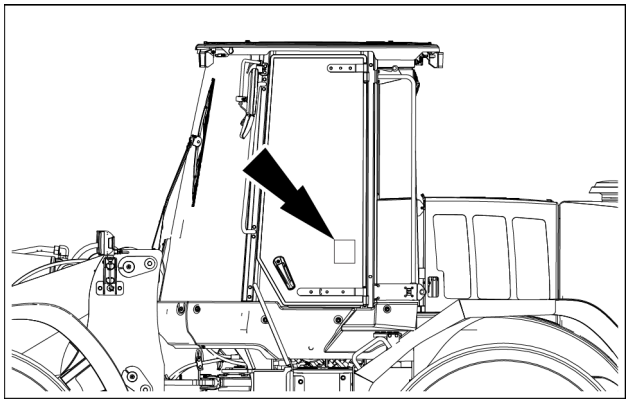


LEEN11T0024AA 20

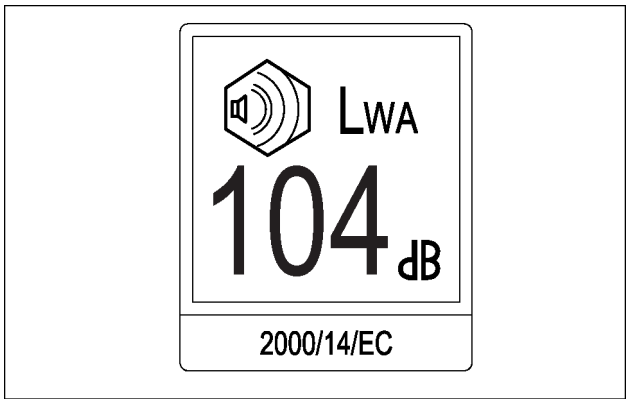
Noise emission

Sound power level

Guaranteed sound power level is determined according to European Directive **2000/14/EC**.
LWA = **104 dB (A)**



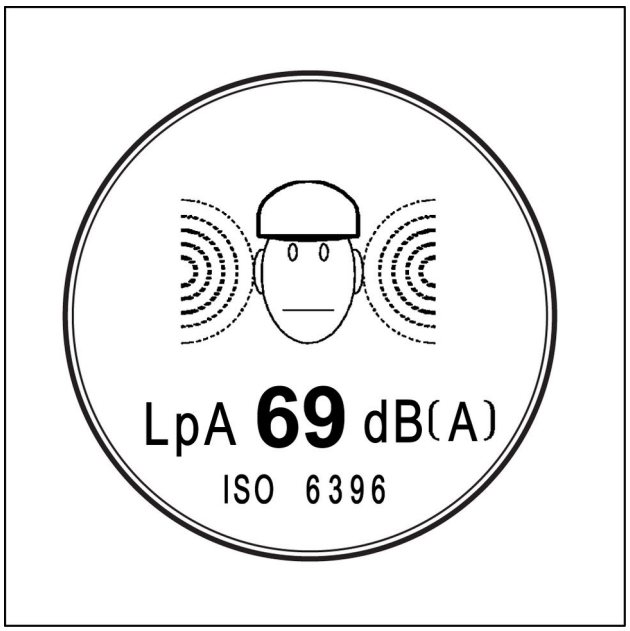
LEIL17WHL1704AB 1



LEIL14WHL0550AA 2

Sound pressure level at operator's station

LpA = **69 ± 2 dB (A)**
Equivalent continuous weighed sound pressure level in correspondence with the operator station with cab door and windows closed and fan of the heater/conditioner operating in second speed, measured on identical machine, in compliance with standard **ISO 6396:2008**.



LEIL15WHL0645YA 3

Vibration levels

The level of vibrations transmitted to the operator depends mainly upon the conditions of the ground on which operations take place, the mode of operation of the machine and its equipment. Thus, the exposure to vibrations can be considerably reduced when the following recommendations are complied with:

- Use equipment compatible with the machine and the type of work to be done.
- Adjust and lock the seat in the correct position. Also inspect regularly the suspensions of the seat, performing the adjustments and repairs as required.
- Perform regularly the current maintenance operations of the machine at the prescribed intervals.
- Operate the equipment in a uniform manner, preventing, as far as possible, sharp movements or excessive loads.
- When traveling, avoid, as far as possible, particularly rough terrain or the impact against possible obstacles.
- This machine is equipped with an operator seat, which meets the criteria of **ISO 7096:2000** representing vertical vibration input under severe but typical operating conditions. This seat has been tested with the input spectral class EM 3-9, and its transmissibility factor is within the foreseen values. This ensures that the exposure of the operators body to vibrations comply with the protection requisites for the protection against vibrations when the machine operates as required by the operational scopes, in accordance with the prescriptions of this manual. The effective value of the acceleration issued by the machine to which the arms of the operator are subjected does not exceed **2,5 m/s²**. The effective value of the acceleration issued by the machine to which the body is subjected does not exceed **0,5 m/s²**. These results have been achieved using an accelerometer during load and unload operations.

NOTE: *whole-body emission value is determined under particular operating and terrain conditions and is therefore not representative for the various conditions in accordance with the intended use of the machine. Consequently this single whole-body vibration emission value is not intended to determine the whole-body vibration exposure as required by European Directive* ***2002/44/EC****. For this purpose it is recommend to carry out real working condition measurement. If not feasible, use of below reported information on* ***ISO/TR 25398:2006*** *(*) is suggested.*

Typical operating condition	Average			Standard deviation (s)		
	1,4*aw , eqx m/s²	**1,4*aw , eqy m/s²**	**aw , eqz m/s²**	**1,4*Sx m/s²**	**1,4*Sy m/s²**	**Sz m/s²**
Load and carry motion	0,84	0,81	0,52	0,23	0,20	0,14
Mining application	1,27	0,97	0,81	0,31	0,31	0,47
Transfer movement	076	0,91	0,49	0,35	0,35	0,17
V-shape motion	0,99	0,54	0,54	0,32	0,32	0,14

(*) **ISO/TR 25398:2006** Mechanical vibration - Guideline for the assessment of exposure to whole-body vibration of ride on operated earth moving machines - Using harmonized data measured by international institutes, organizations and manufacturers.

Safety signs

Decals

⚠ WARNING

Avoid injury!
Make sure decals are perfectly legible. Clean decals regularly. Replace all damaged, missing, painted over, or illegible decals. See your dealer for replacement decals. When replacing parts bearing decals, be sure to put new decals on each new part.
Failure to comply could result in death or serious injury.

W0229A

The following safety signs are placed on your machine as a guide for your safety and for those working with you. Walk around the machine and note the content and location of these safety signs before operating your machine.
Keep safety signs clean and legible. Clean safety signs with a soft cloth, water, and a gentle detergent. Do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove safety signs.
Replace all safety signs that are damaged, missing, painted over, or illegible. If a safety sign is on a part that is replaced, make sure the safety sign is installed on the new part. See your dealer for replacement safety signs.

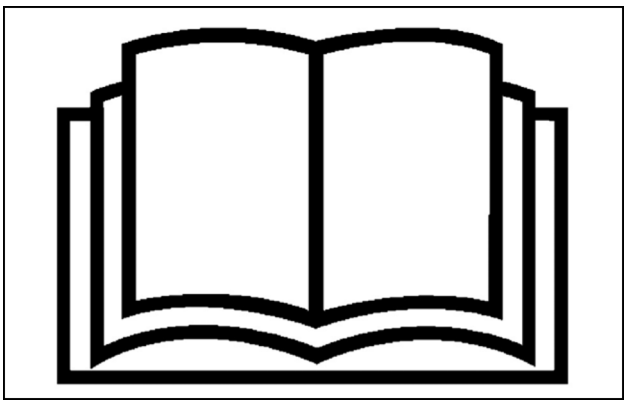
Make sure that you read all the safety decals and all instructional decals. The decals are intended for the personal safety of you and those working with you. Review the decals with all machine operators.

NOTE: *some decal locations may vary slightly between various model configurations.*

NOTE: *when you clean the decals, use only a cloth, water and soap. Do not use solvents, gasoline, etc.*

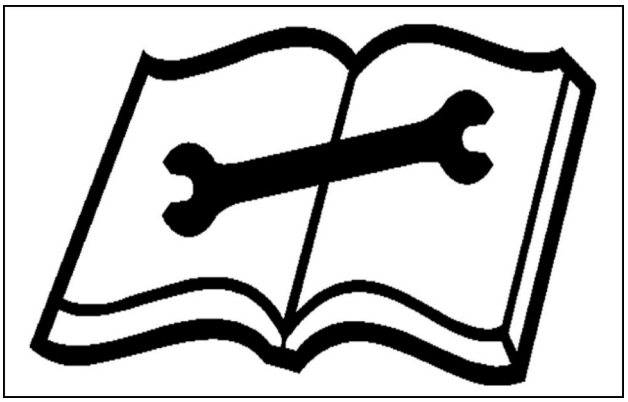
NOTE: *this chapter covers decals relating to safety and machine operation and servicing.*

Safety signs that display the "Read operator's manual" symbol are intended to direct the operator to the operator's manual for further information regarding maintenance, adjustments, or procedures for particular areas of the machine. When a safety sign displays this symbol, refer to the appropriate page of the operator's manual.

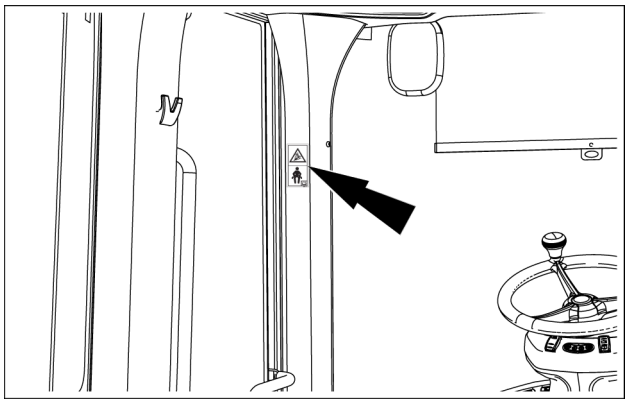


LEEN11T0027AA 1

This symbol instructs you to refer to the service manual. If you doubt your ability to perform any service operation, contact your authorized dealer.



LEEN11T0028AA 2



LEIL18WHL1081AA 3

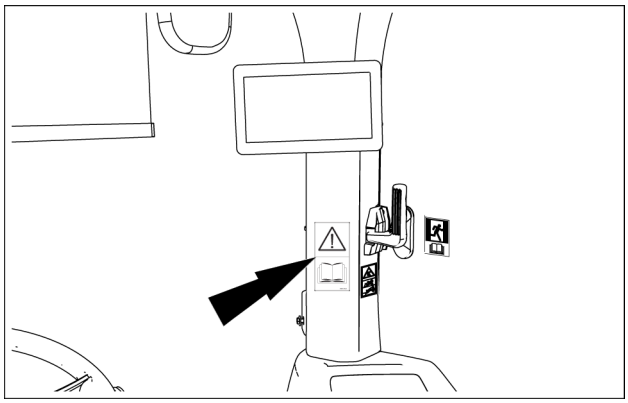
Location: support inside the operator’s compartment. See “Seat belts” – Chapter 2 in this manual for more information.

WARNING
Avoid crushing!
Do not jump if machine tips. Use the seat belt.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 386241A1



386241A1 4

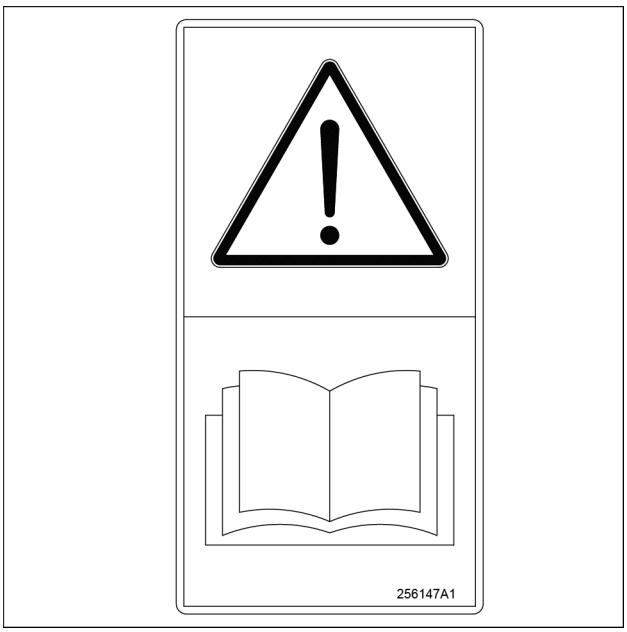


LEIL18WHL1082AA 5

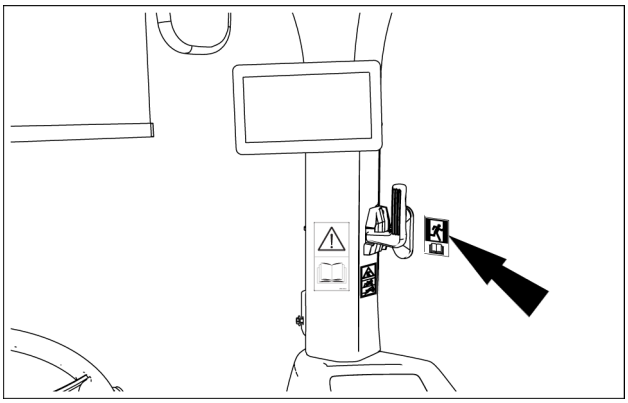
Location: support inside the operator's compartment.

WARNING
Avoid injury!
Read the operator's manual. Fasten the seat belt. No riders. Keep others away.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 256147A1



256147A1_ 6



LEIL18WHL1082AA 7

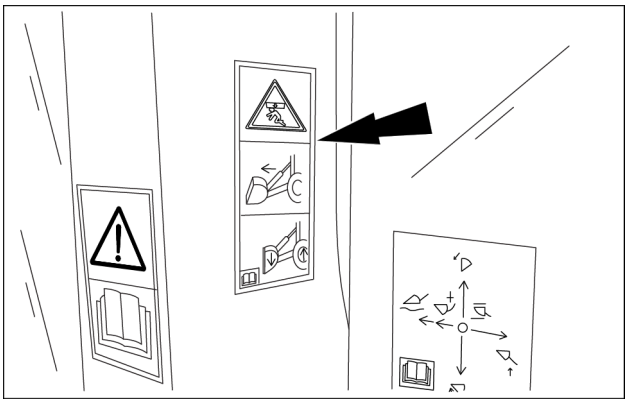
Location: right-hand operator's compartment window.

This safety sign indicates that the window is the emergency exit.

ISO decal number: 329051A1



329051A1 8

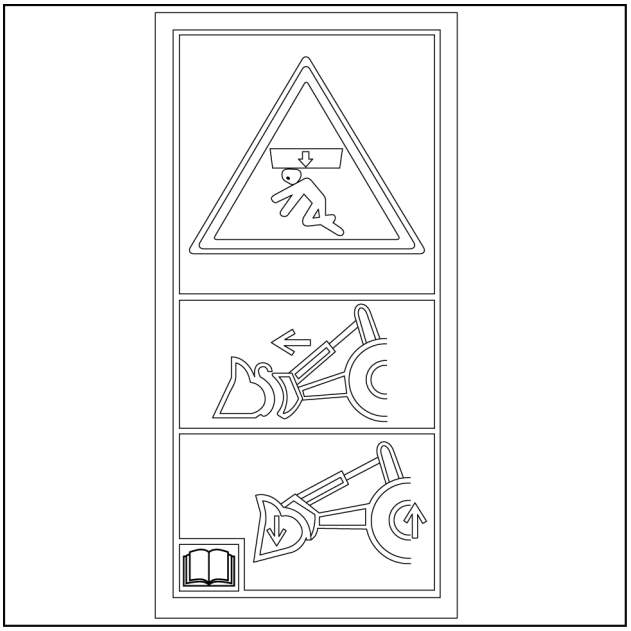


LEIL15WHL1866AA 9

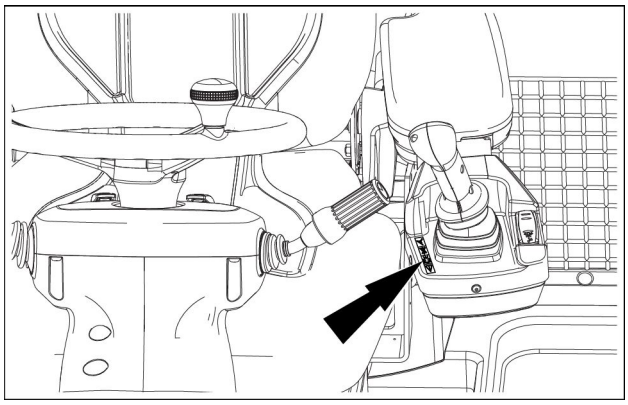
Location: right-hand support, inside the operator's compartment.

WARNING
Falling object hazard!
Always check the attachment for proper engagement before using.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 364917A1



364917A1_ 10



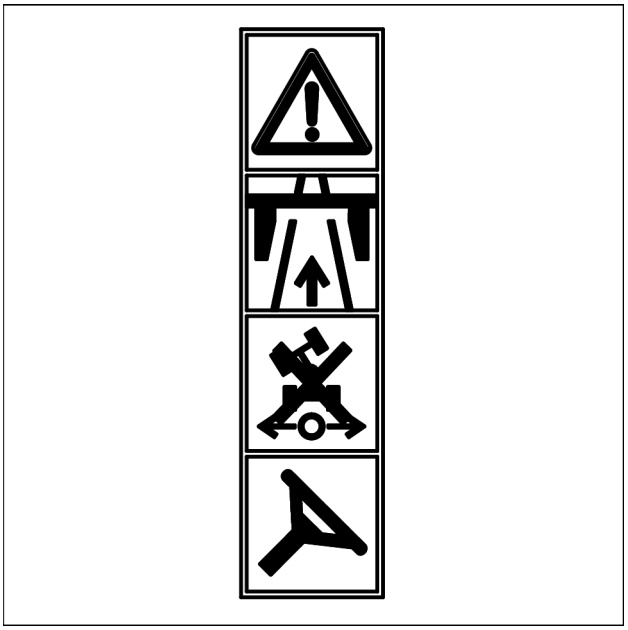
LEIL17WHL1617AB 11

Only for machine equipped with joystick steering.

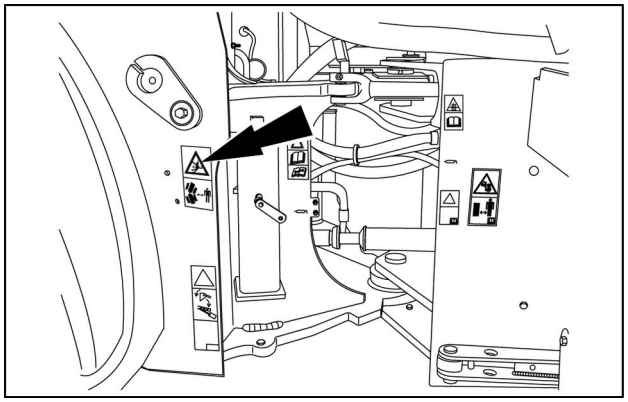
Location: left-hand armrest.

WARNING
Driving hazard!
Do not use joystick steering when traveling on road.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 48088662



48088662 12



LEIL15WHL0078AA 13

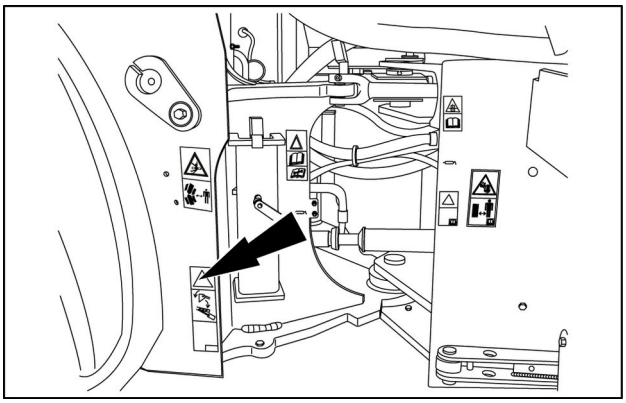
Location: left-hand side of the machine, near the articulation area.

WARNING
Crush hazard!
Keep clear.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 323695A1



323695A1 14

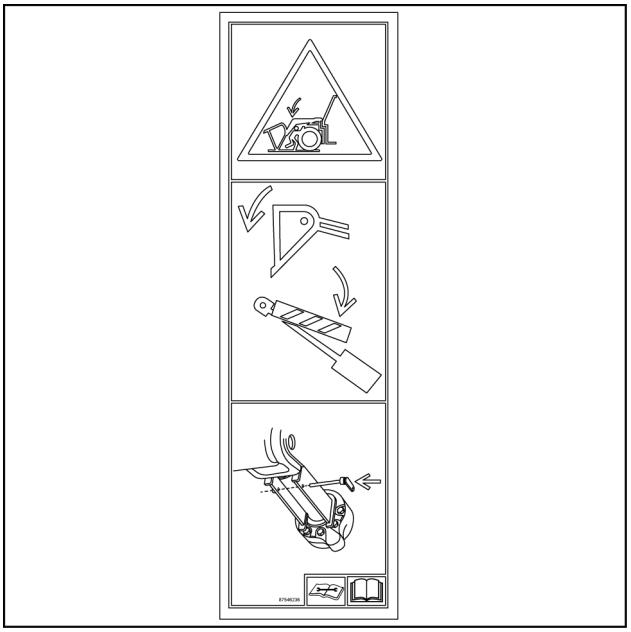


LEIL15WHL0078AA 15

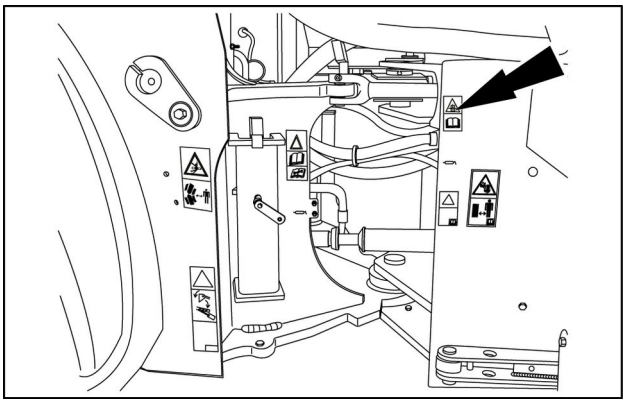
Location: left-hand side of the machine. See “Support strut and service link” – Chapter 2 in this manual for more information.

DANGER
Crush hazard!
Always install the lift arm support before maintenance or repair.
Failure to comply will result in death or serious injury.

ISO decal number: 87546236



87546236 16

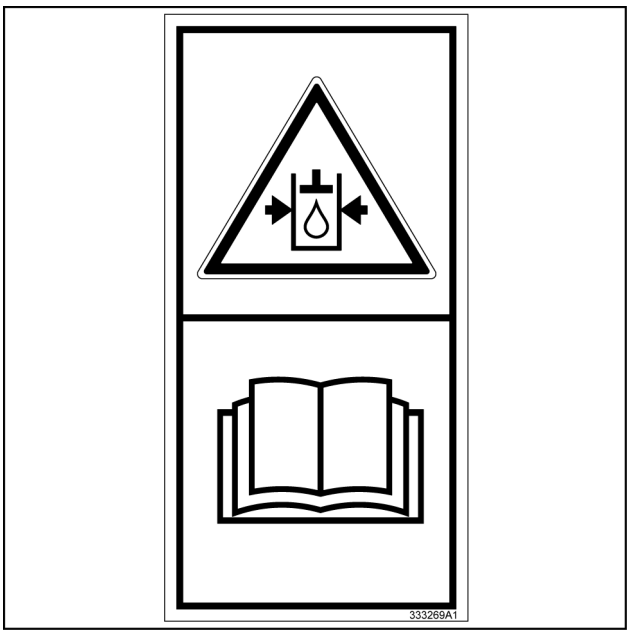


LEIL15WHL0078AA 17

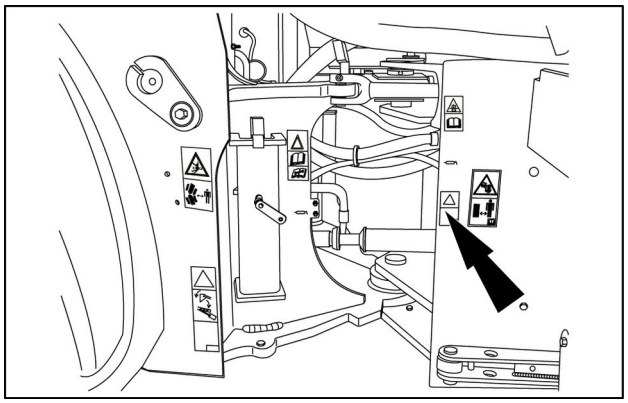
Location: left-hand side of the machine, near the articulation area. Refer to **7-3** for more information.

WARNING
Pressurized system hazard!
Release pressure before maintenance.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 333269A1



333269A1 18

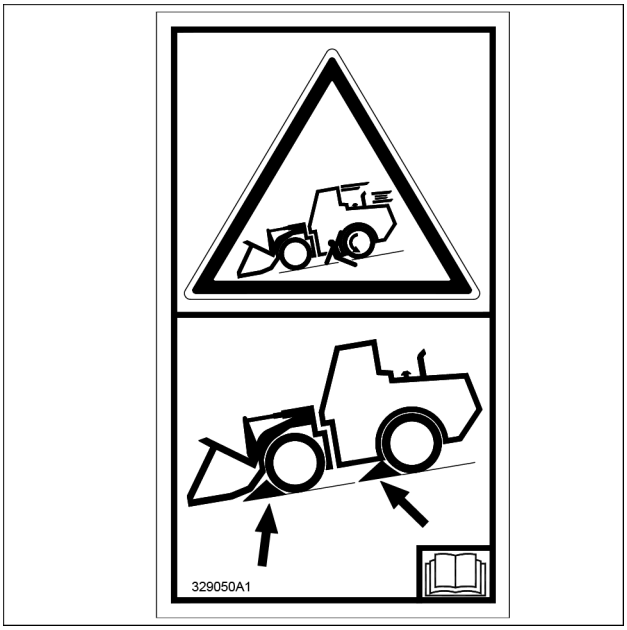


LEIL15WHL0078AA 19

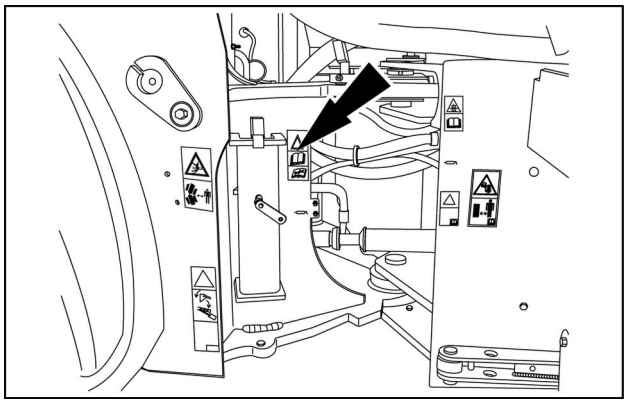
Location: left-hand side of the machine, near the articulation area.

WARNING
Run-over hazard!
Block the wheels to prevent movement before disengaging the parking brake.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 329050A1



329050A1_ 20

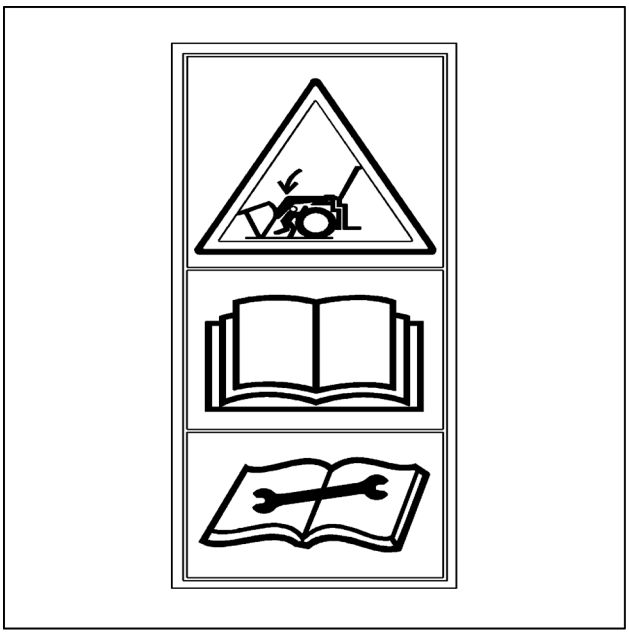


LEIL15WHL0078AA 21

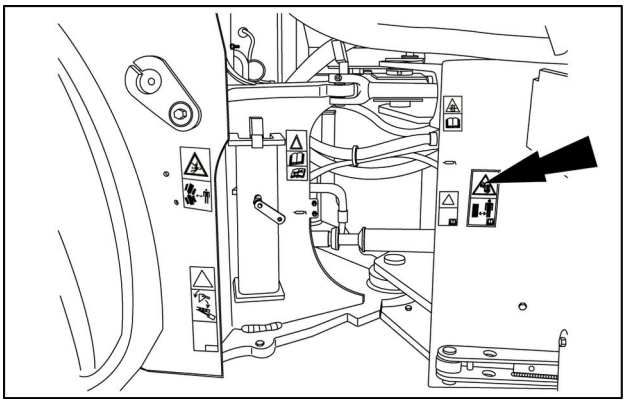
Location: left-hand side of the machine, near the articulation area.

DANGER
Crush hazard!
Servicing the valve will cause the lift arms to fall.
Failure to comply will result in death or serious injury.

ISO decal number: 87453136



87453136 22



LEIL15WHL0078AA 23

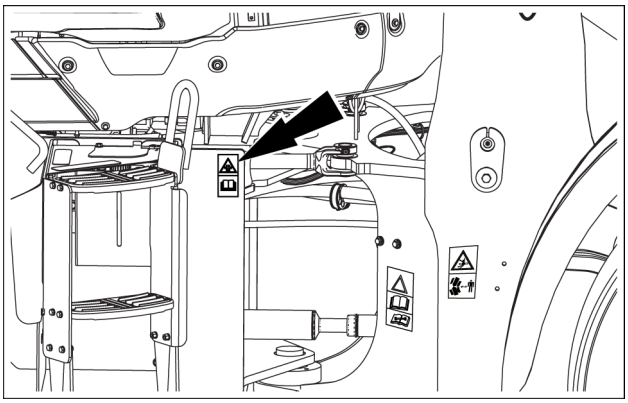
Location: left-hand side of the machine. See “Support strut and service link” – Chapter 2 in this manual for more information.

WARNING
Crush hazard!
Always engage the service link before service or transport.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 329048A1



329048A1_ 24

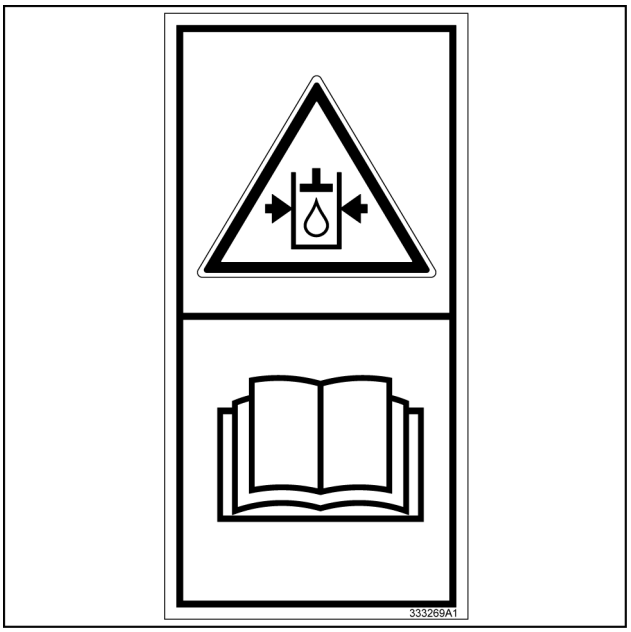


LEIL18WHL1084AA 25

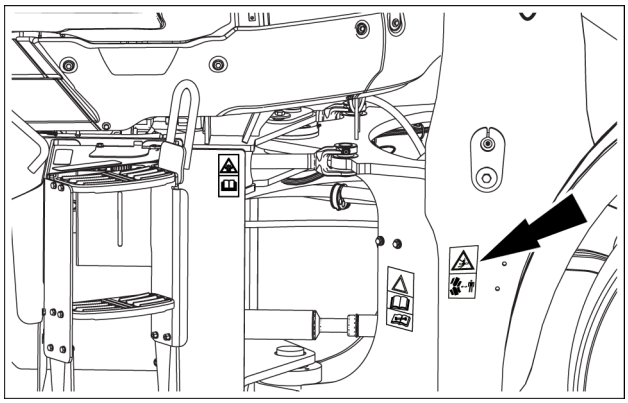
Location: right-hand side of the machine, near the articulation area. Refer to **7-3** for more information.

WARNING
Pressurized system hazard!
Release pressure before maintenance.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 333269A1



333269A1 26

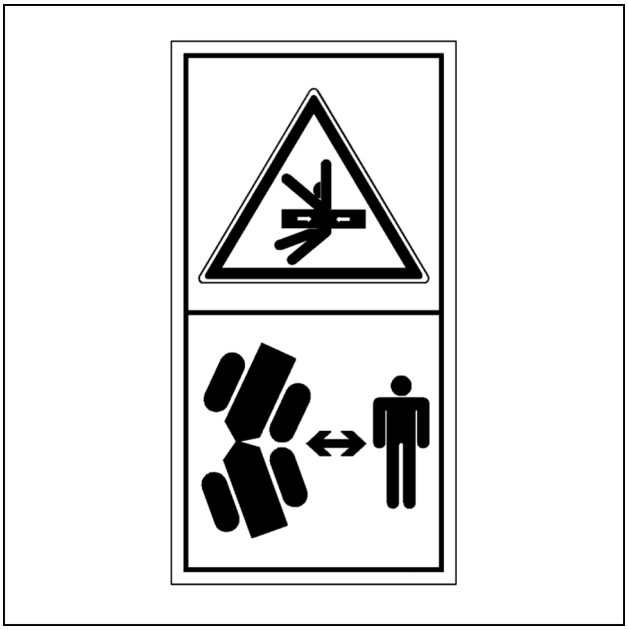


LEIL18WHL1084AA 27

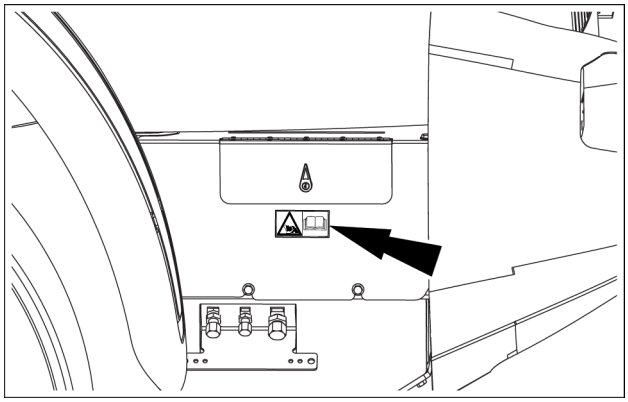
Location: right-hand side of the machine, near the articulation area.

WARNING
Crush hazard!
Keep clear.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 323695A1



323695A1 28



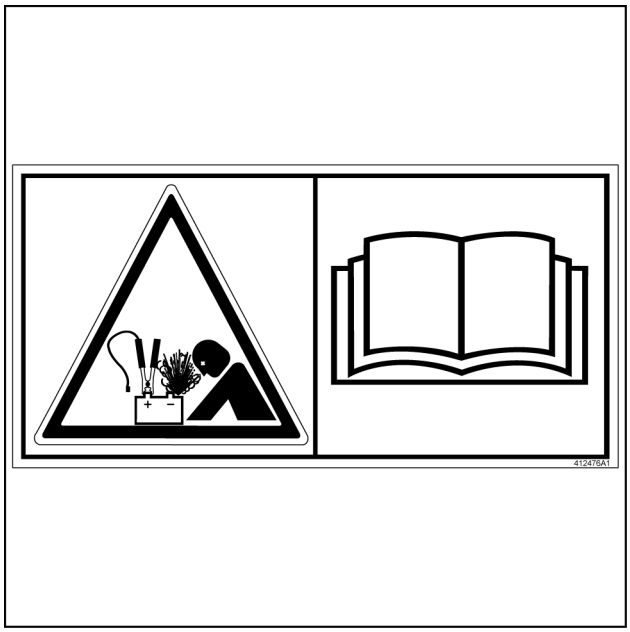
LEIL18WHL1085AA 29

Only for machine equipped with remote jump start.

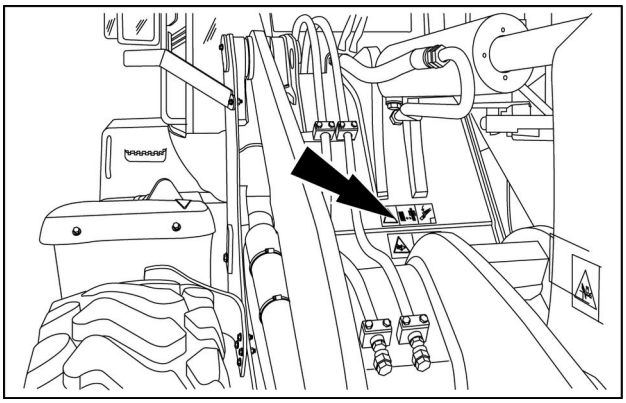
Location: left-hand side of the machine.

DANGER
Explosion hazard!
Read the procedure in the operator's manual before jump start or service to avoid injury.
Failure to comply will result in death or serious injury.

ISO decal number: 412476A1



412476A1 30

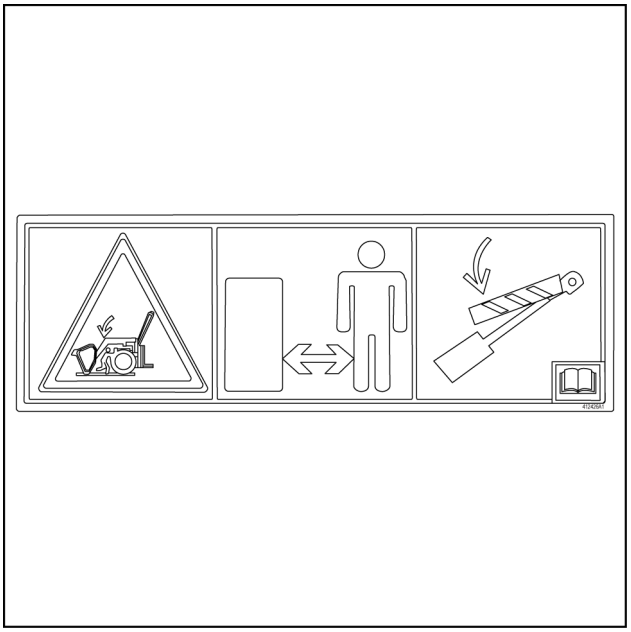


LEIL15WHL0068AA 31

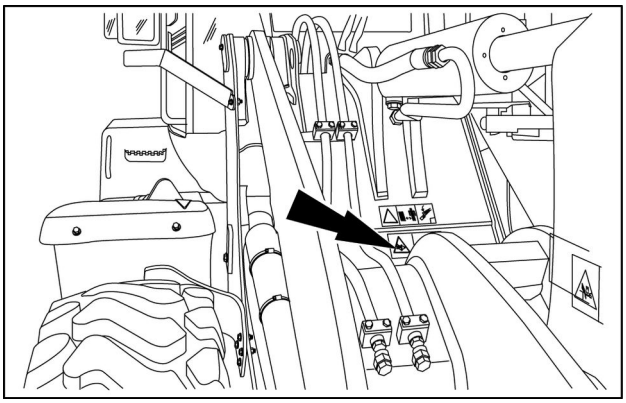
Location: front of the machine, under the bucket control cylinder.

DANGER
Crush hazard!
Always install the support strut on the cylinder rod when the machine is used with the loader lift arms raised.
Failure to comply with this warning will result in death or serious injury.

ISO decal number: 412426A1



412426A1_1 32

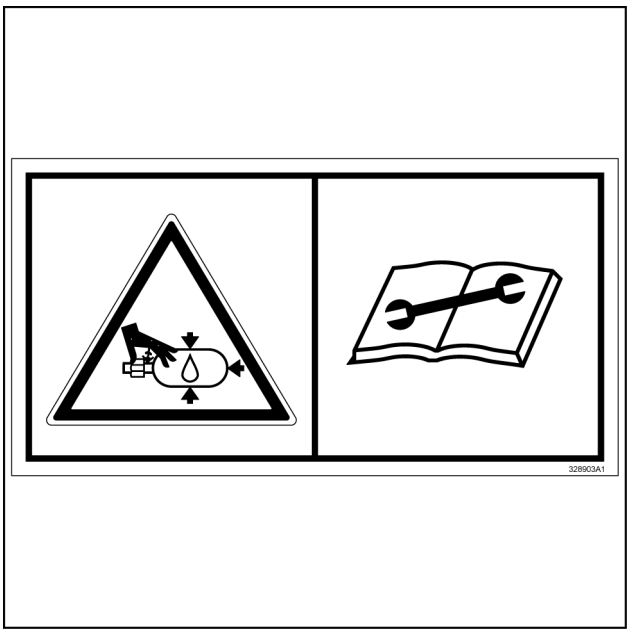


LEIL15WHL0068AA 33

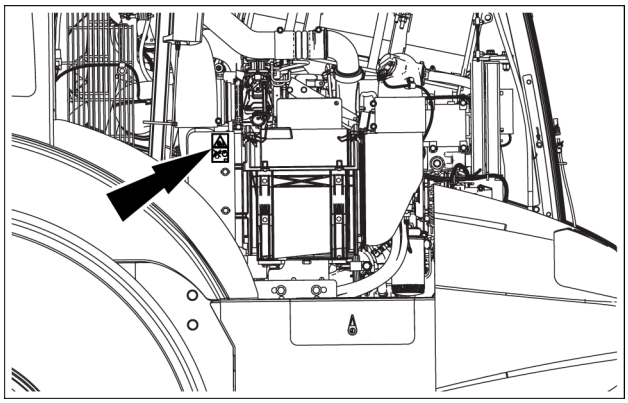
Location: front of the machine, under the bucket control cylinder.

WARNING
Pressured system hazard!
Release all pressure before working systems which have an accumulator.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 328903A1



328903A1 34



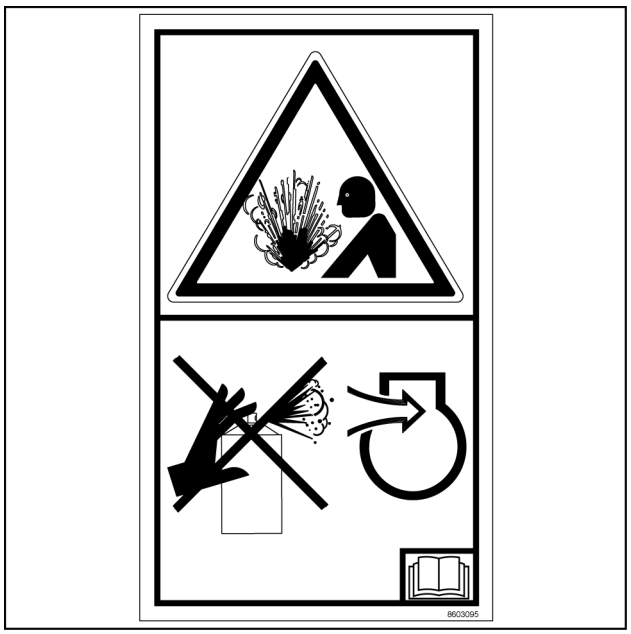
LEIL18WHL1094AA 35

Only for machine equipped with grid heater.

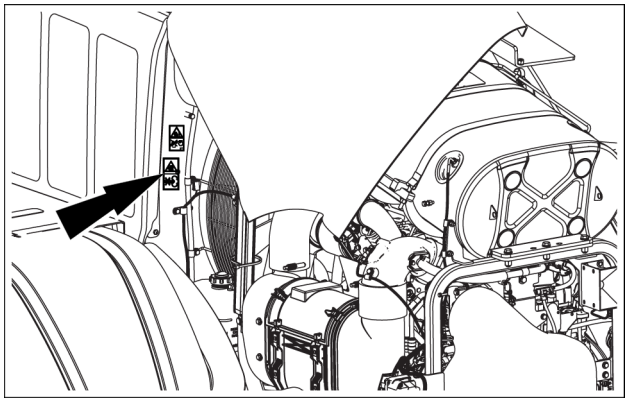
Location: air cleaner housing.

WARNING
Explosion hazard!
Do not use ether.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 8603095



8603095 36

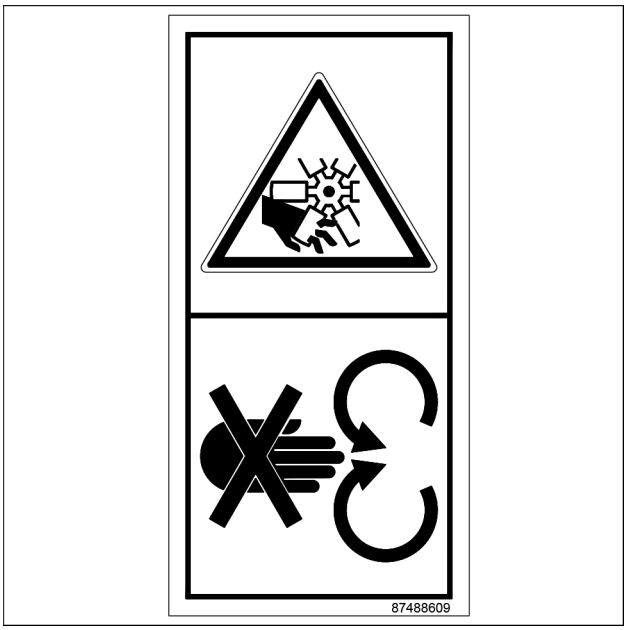


LEIL18WHL1098AA 37

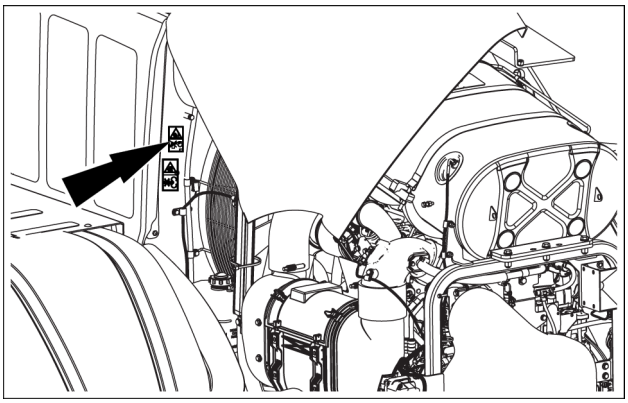
Location: left-hand side of the machine, near the fan shroud.

WARNING
Entanglement hazard!
Keep clear or stop the engine before servicing.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87488609



87488609_ 38



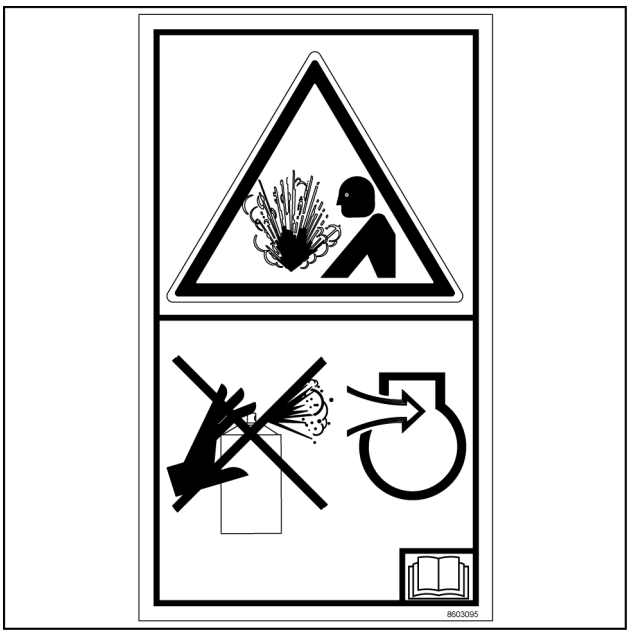
LEIL18WHL1098AA 39

Only for machine equipped with grid heater.

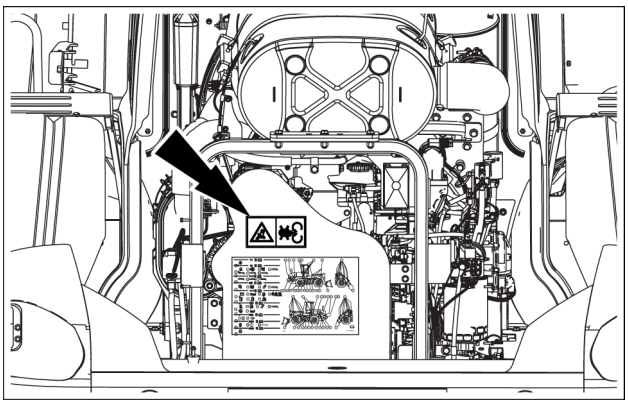
Location: left-hand and right-hand side of the machine, near the fan shroud.

WARNING
Explosion hazard!
Do not use ether.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 8603095



8603095 40

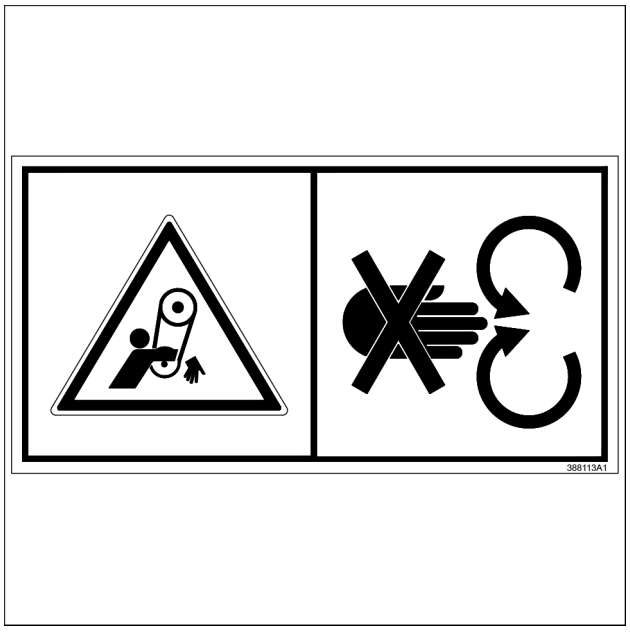


LEIL18WHL1095AA 41

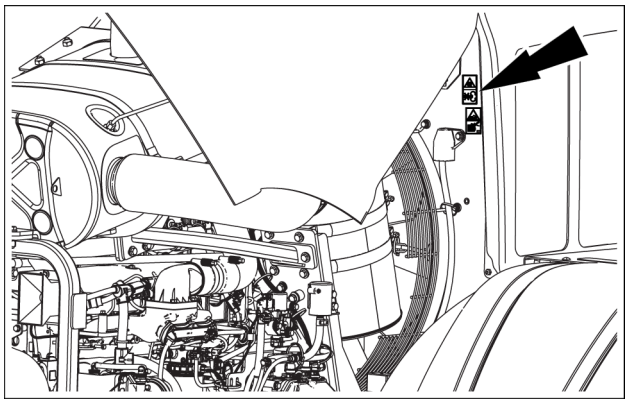
Location: rear of the engine compartment, on the fan guard.

WARNING
Entanglement hazard!
Keep clear or stop the engine before servicing.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 388113A1



388113A1_ 42

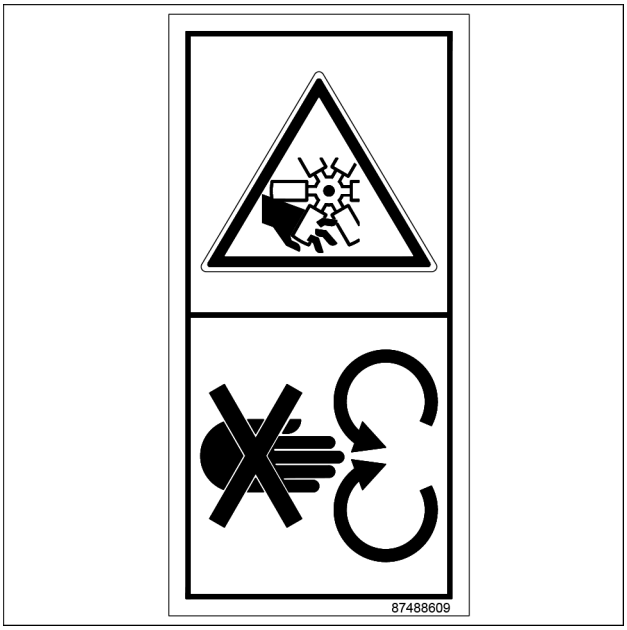


LEIL18WHL1096AA 43

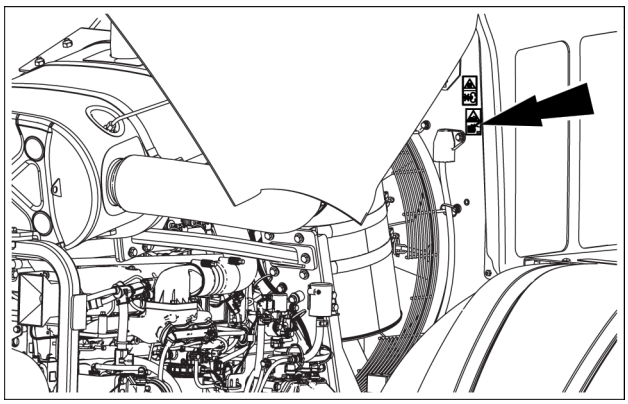
Location: right-hand side of the machine, near the fan shroud.

WARNING
Entanglement hazard!
Keep clear or stop the engine before servicing.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87488609



87488609_ 44



LEIL18WHL1096AA 45

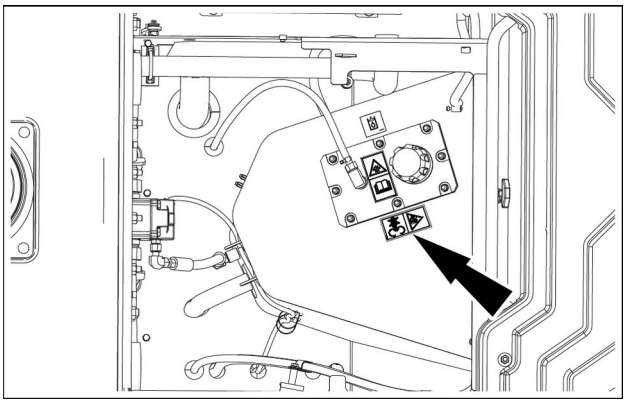
Location: right-hand side of the engine compartment, on the fan guard.

DANGER
Unexpected movement!
Start the engine from the operator's seat. Transmission must be in neutral.
Failure to comply will result in death or serious injury.

ISO decal number: 87488619



87488619_ 46

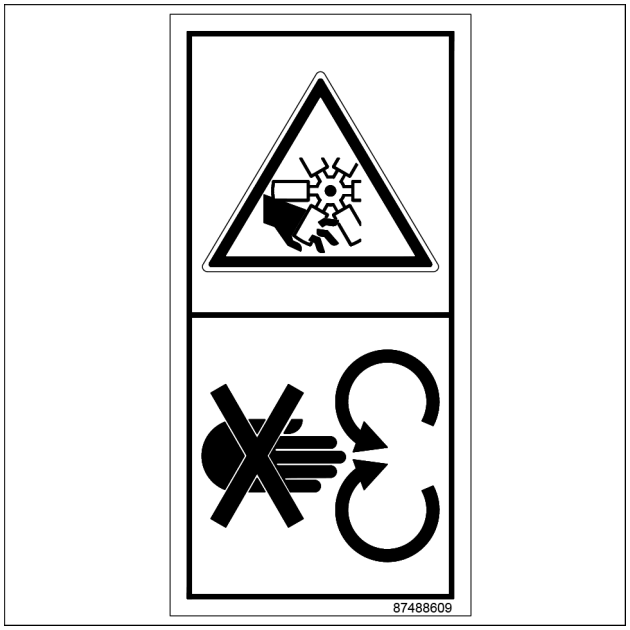


LEIL17WHL2066AB 47

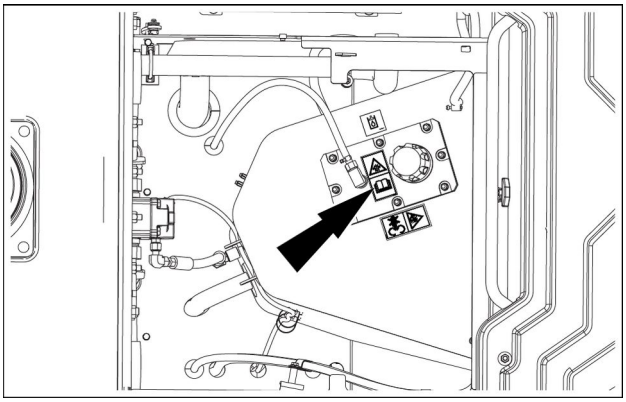
Location: access compartment on the top of the machine, behind the cab.

WARNING
Entanglement hazard!
Keep clear or stop the engine before servicing.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87488609



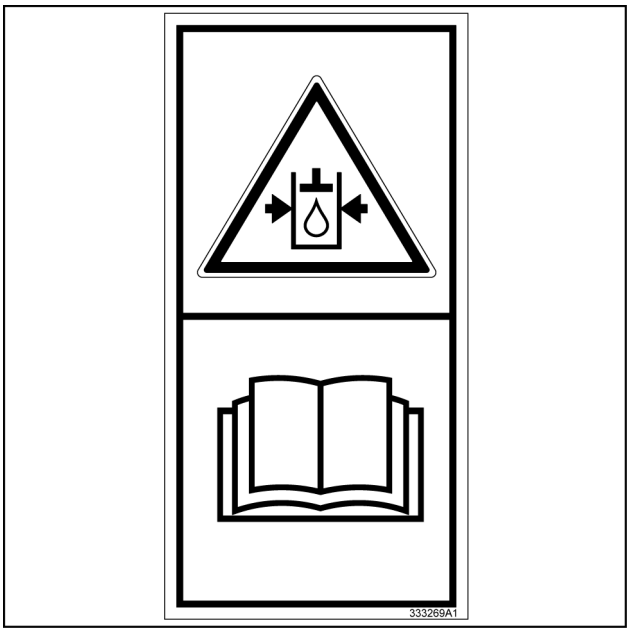
87488609_ 48



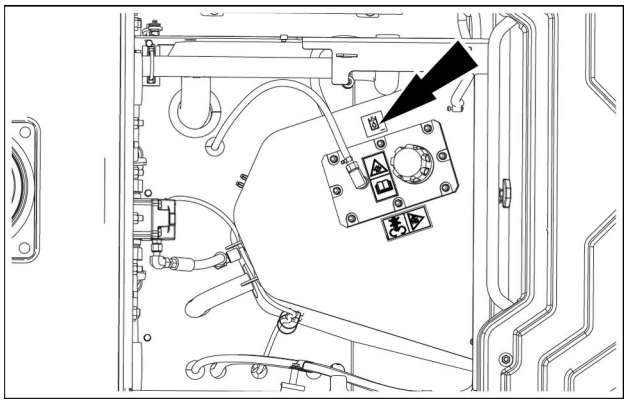
LEIL17WHL2066AB 49

Location: access compartment on the top of the machine, behind the cab.
WARNING
Pressurized system hazard!
Release pressure before maintenance.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 333269A1



333269A1 50

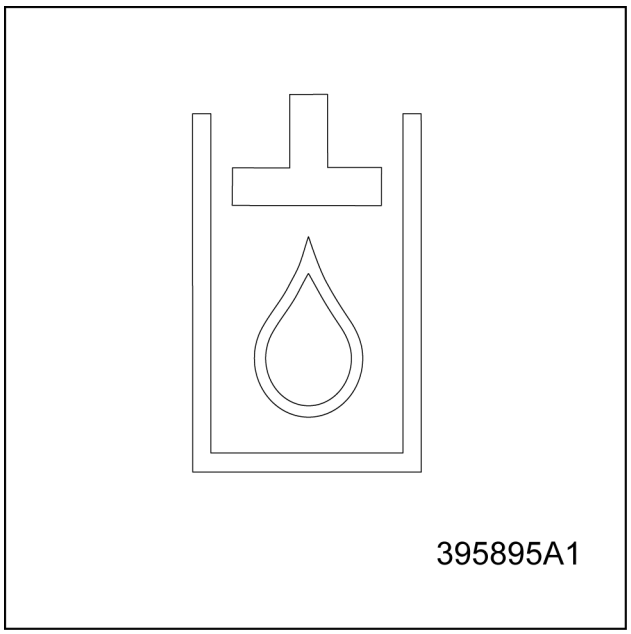


LEIL17WHL2066AB 51

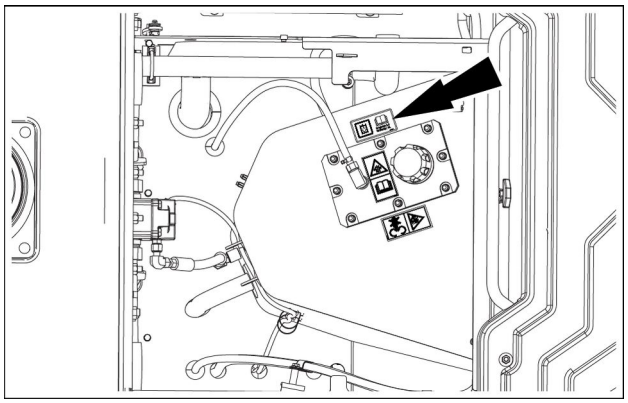
Location: access compartment on the top of the machine, behind the cab.

Informational decal: hydraulic oil

ISO decal number: 395895A1



395895A1 52



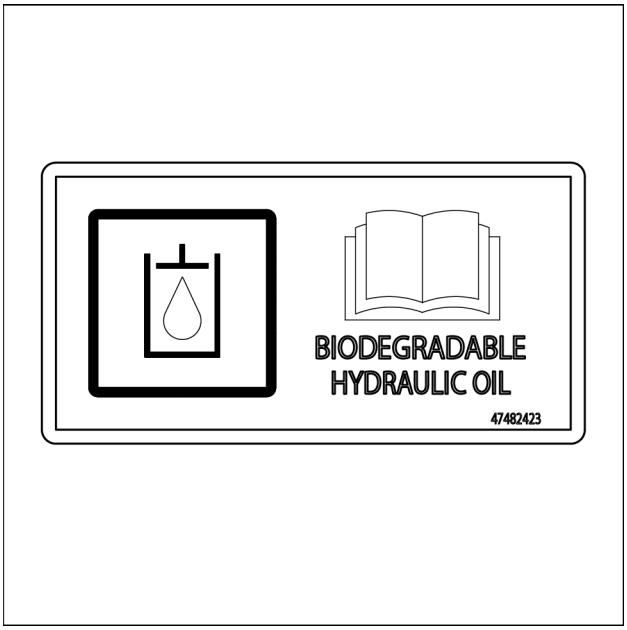
LEIL17WHL2065AB 53

Location: access compartment on the top of the machine, behind the cab.

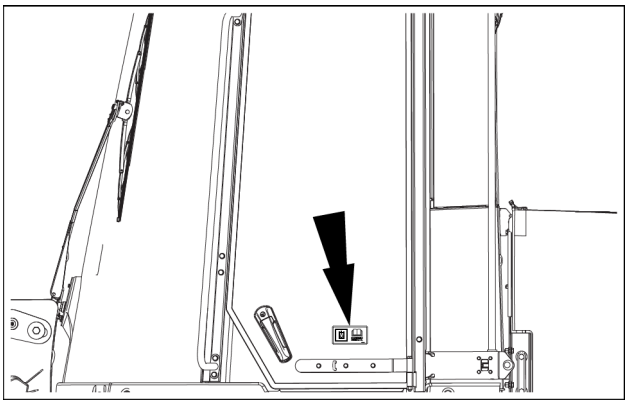
NOTE: *only with optional use of biodegradable hydraulic oil, the P/N 47482423 replaces the P/N 395895A1 decal.*

Informational decal: biodegradable hydraulic oil

ISO decal number: 47482423



47482423_A 54



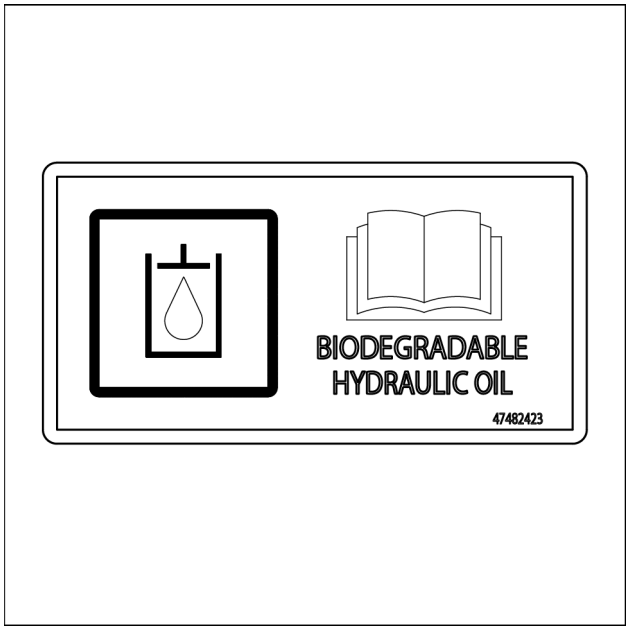
LEIL17WHL2061AB 55

Location: at the bottom side of cab door

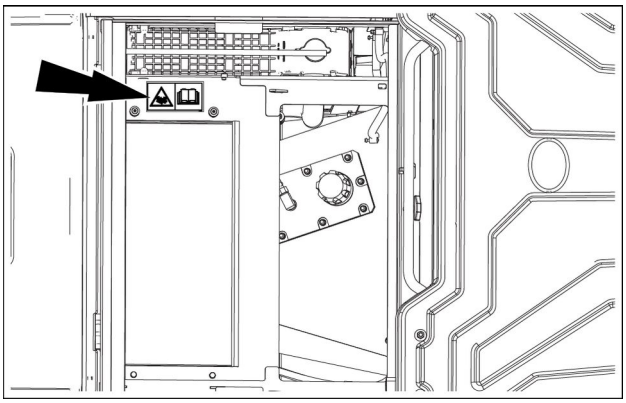
NOTE: *only with optional use of biodegradable hydraulic oil*

Informational decal: biodegradable hydraulic oil

ISO decal number: 47482423



47482423_A 56

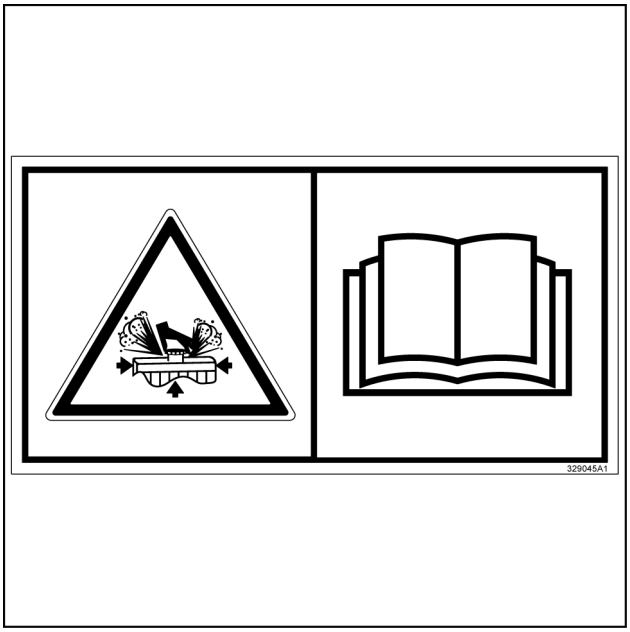


LEIL17WHL2067AB 57

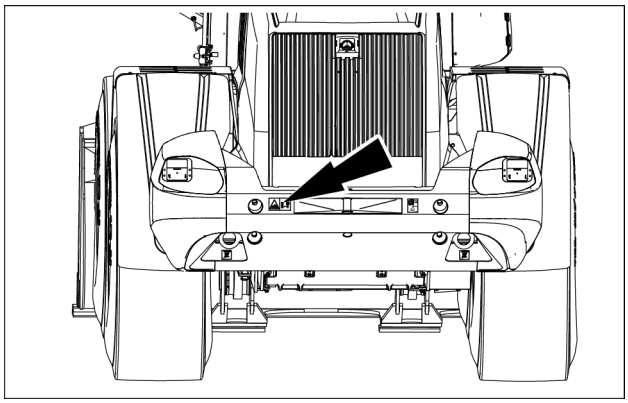
Location: access compartment on the top of the machine, behind the cab.

WARNING
Hot liquid under pressure hazard!
Service when cool.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 329045A1



329045A1 58



LEIL17WHL1321AA 59

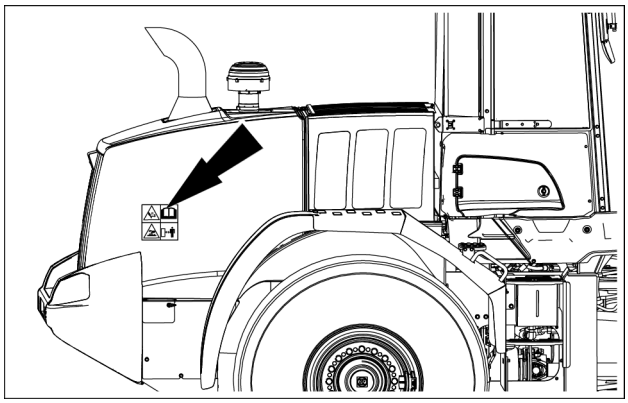
Location: rear side of the machine.

DANGER
Run-over hazard!
Keep clear of the machine.
Failure to comply with this warning will result in death or serious injury.

ISO decal number: 328753A1



328753A1_ 60



LEIL17WHL1322AA 61

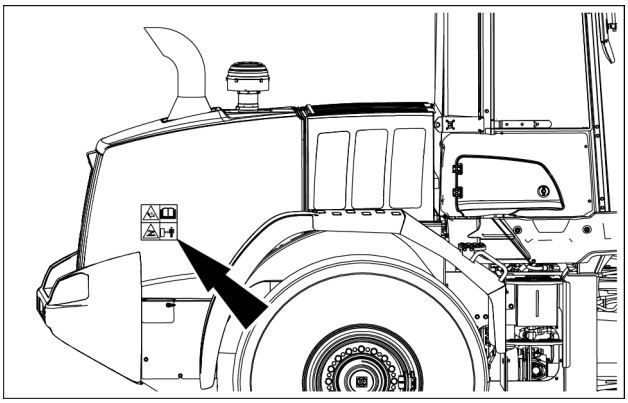
Location: left-hand and right-hand side of the engine hood.

WARNING
Moving parts!
When the machine or its equipment are moving, do not place limbs or parts of the body in the engine compartment to prevent the risk of amputation.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87741372



87741372_1 62



LEIL17WHL1322AA 63

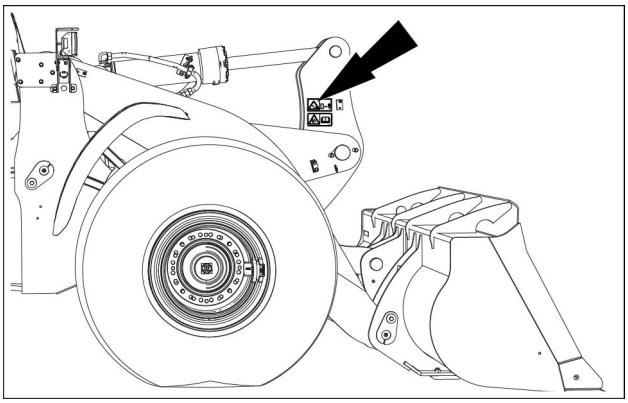
Location: left-hand and right-hand side of the engine hood.

WARNING
Hot area!
The engine, engine oil, exhaust pipes, the radiator and coolant can cause burns, when hot. Keep in mind this warning when it is necessary to approach or to work near these surfaces.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87415865



87415865_1 64

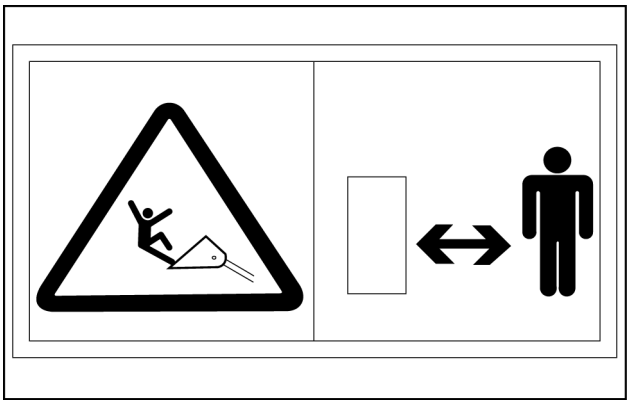


LEIL16WHL1538AA 65

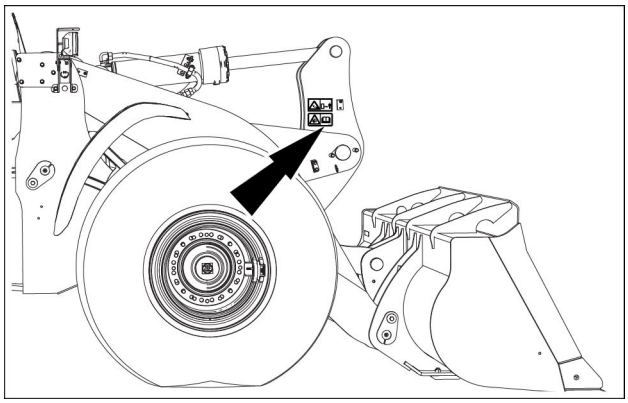
Location: left-hand and right-hand side of the bell crank.

WARNING
Avoid injury!
Never get on the bucket. A fall from the bucket or other equipment of the machine can cause injury or death.
Failure to comply with this warning could result in death or serious injury.

ISO decal number: 47880081



47880081 66



LEIL16WHL1538AA 67

Location: left-hand and right-hand side of the bell crank.

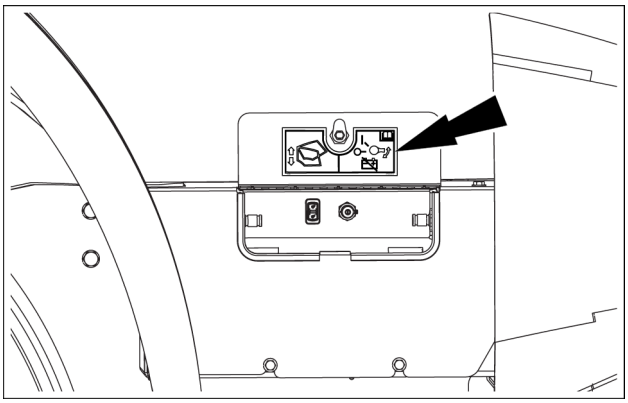
WARNING
Moving parts!
When the machine or its equipment are moving, do not place limbs or parts of the body between the mechanism of the booms or bucket to prevent the risk of amputation. Failure to comply with this warning could result in death or serious injury.

ISO decal number: 87741372



87741372_1 68

Informational decals

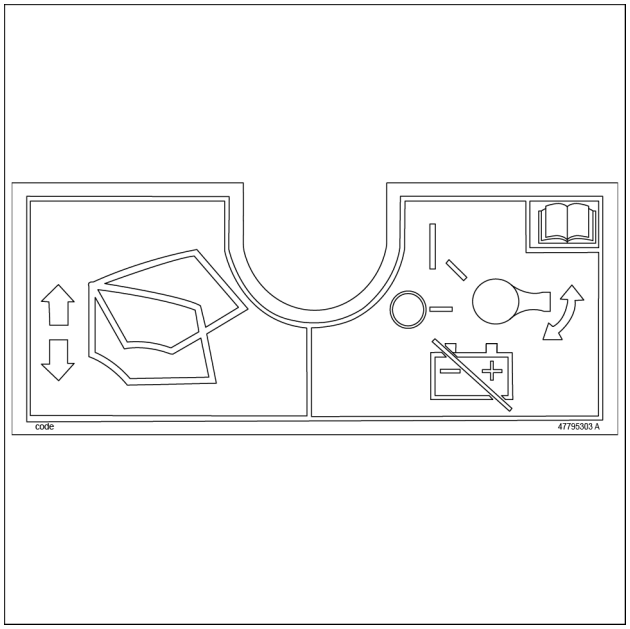


LEIL18WHL1083AA 69

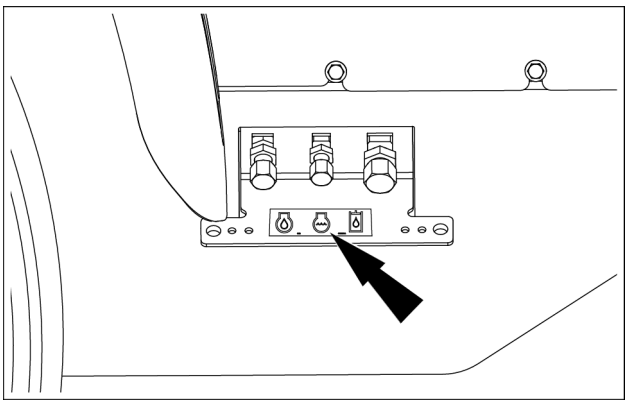
Location: inner side of the timed disconnect switch compartment door (left-hand side of the machine).

Informational decal: timed disconnect switch

ISO decal number: 47795303



47795303_ 70

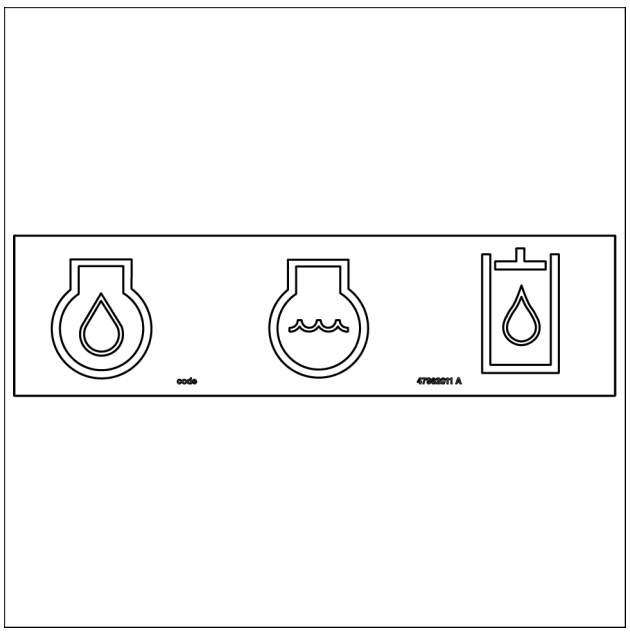


LEIL18WHL1285AA 71

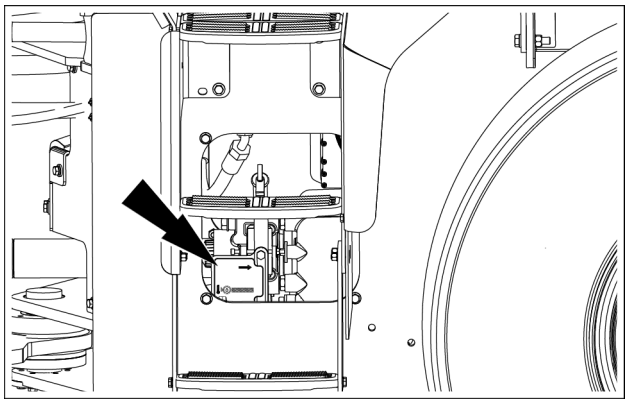
Location: inner side of the fluid drain compartment (left-hand side of the machine).

Informational decal: fluid drains
(engine oil – coolant – hydraulic oil)

ISO decal number: 47982011



47982011 72

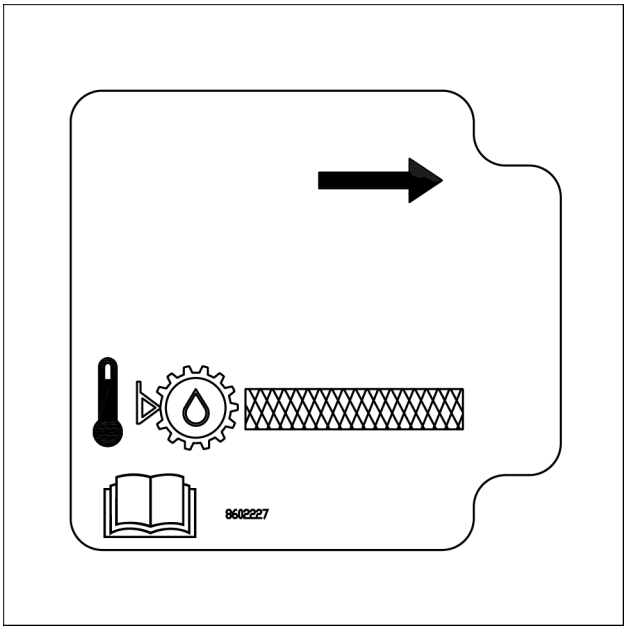


LEIL18WHL1302AA 73

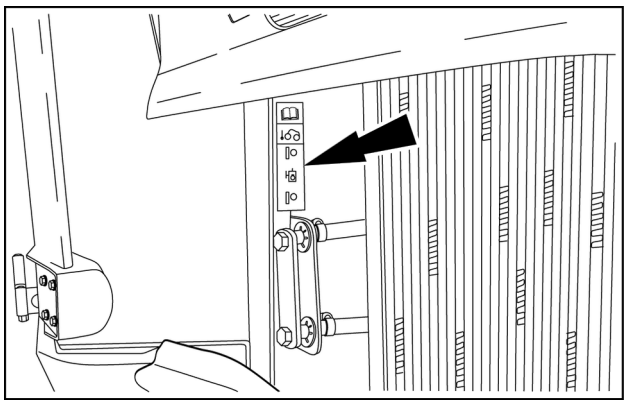
Location: plate of the transmission fill tube (right-hand side of the machine).

Informational decal: transmission oil level

ISO decal number: 8602227



8602227 74

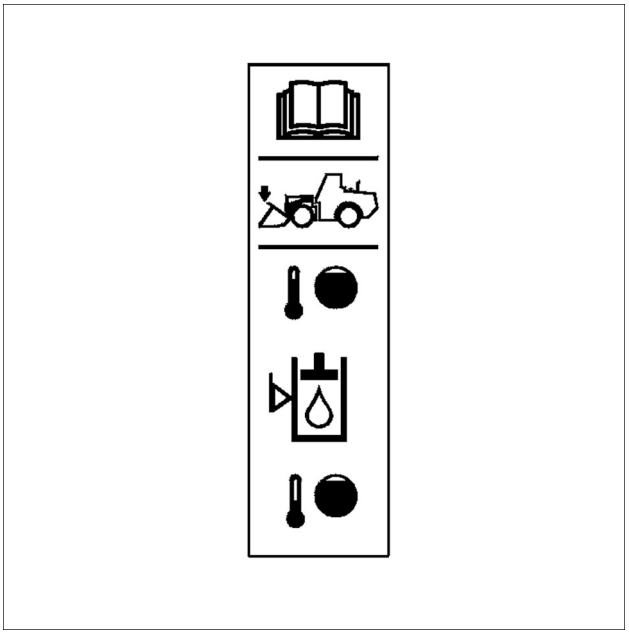


LEIL15WHL0096AA 75

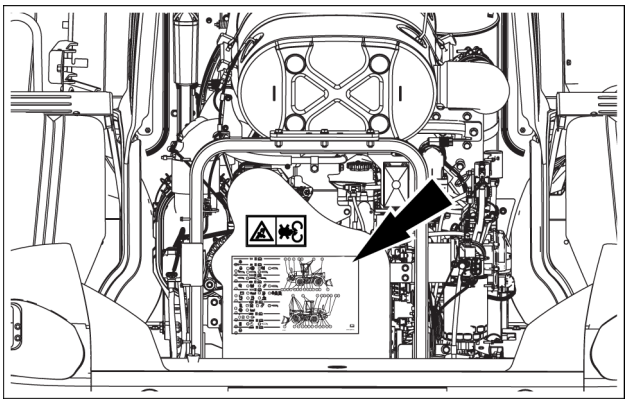
Location: cooling box near the hydraulic fluid gauge and access door (left-hand side of the machine).

Informational decal: hydraulic fluid temperature level.

ISO decal number: 386741A2



386741A20 76

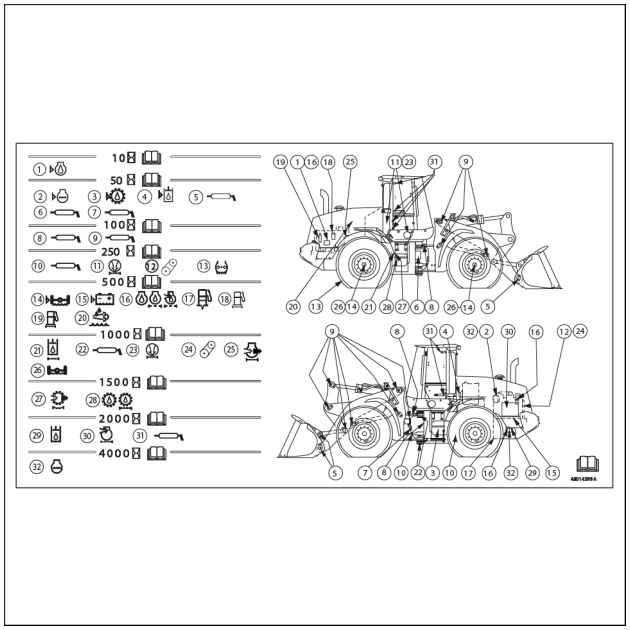


LEIL18WHL1095AA 77

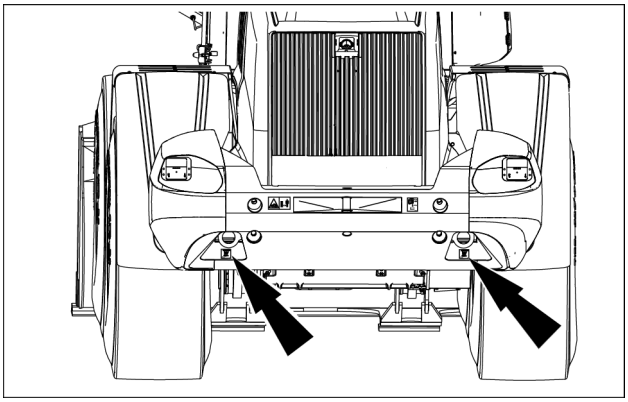
Location: rear of the engine compartment, on the belt guard.

Informational decal: maintenance intervals.

ISO decal number: 48014399



48014399 78



LEIL17WHL1321AA 79

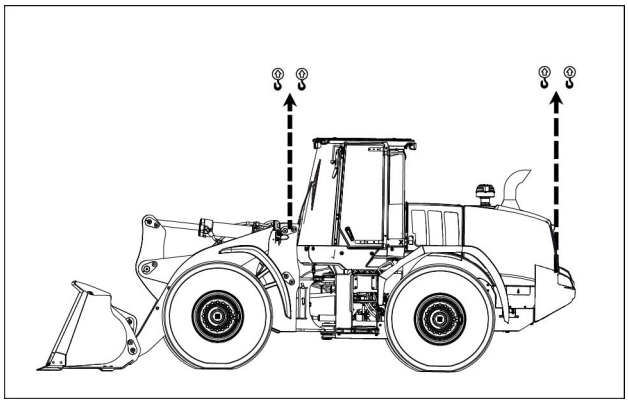
Location: front and rear side of the machine.

Informational decal: tie down the machine only from the tie down points identified by this decal. See “Transporting the machine” – Chapter 5 in this manual for more information.

ISO decal number: 84409663



84409663_ 80

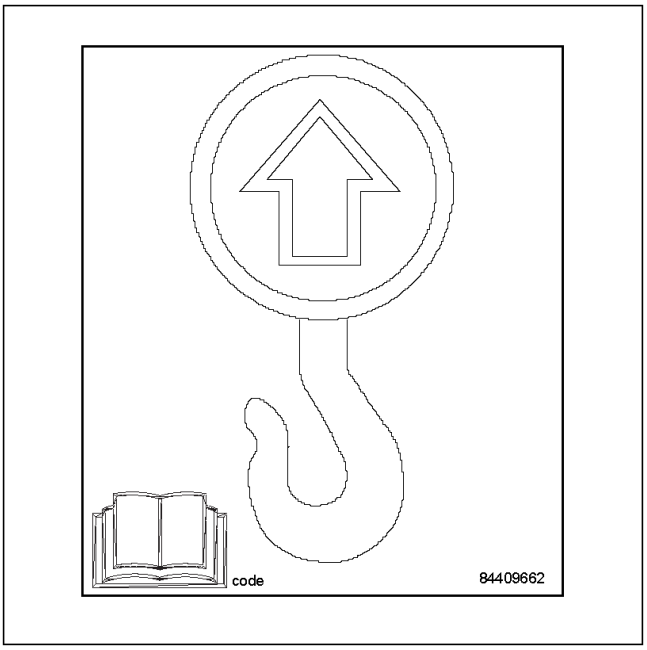


LEIL17WHL1323AA 81

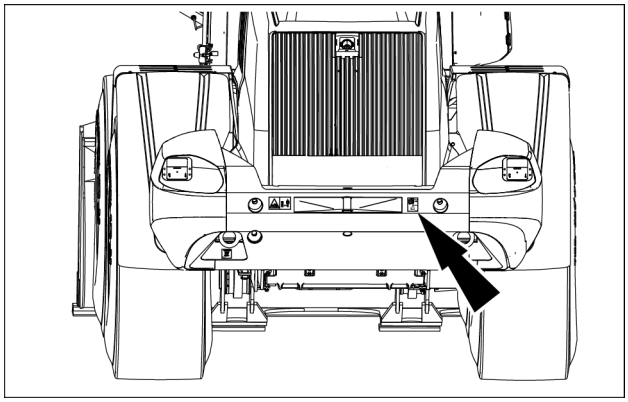
Location: front and rear side of the machine.

Informational decal: lift the machine only from the tie down points, as indicated by this decal. See “Transporting the machine” – Chapter 5 in this manual for more information.

ISO decal number: 84409662



84409662_ 82

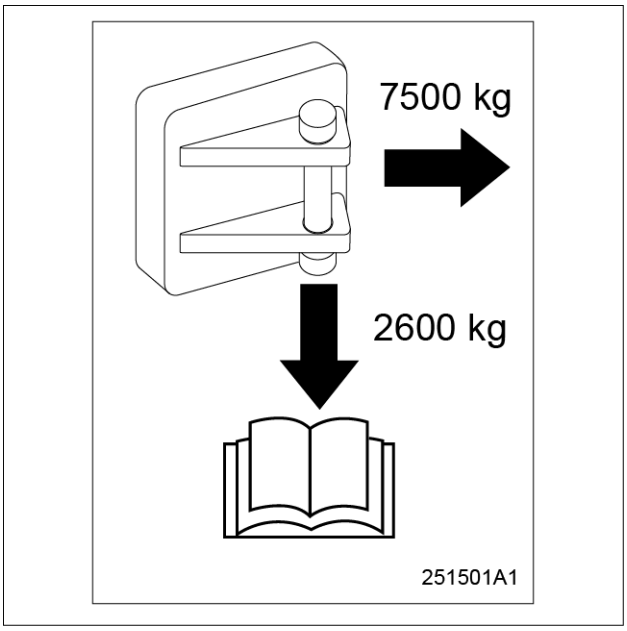


LEIL17WHL1321AA 83

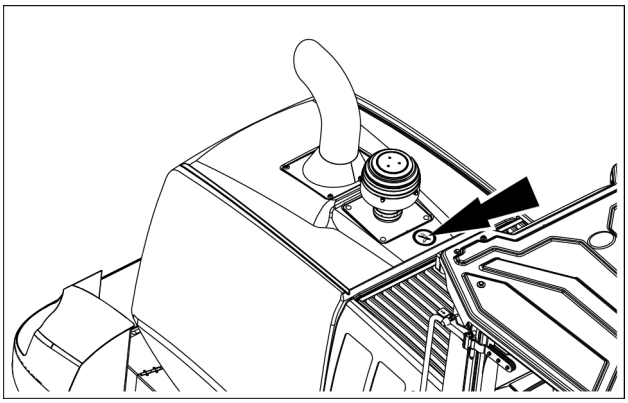
Location: rear side of the machine.

Informational decal: hitch weight.

ISO decal number: 251501A1



251501A1_1 84



LEIL17WHL1318AA 85

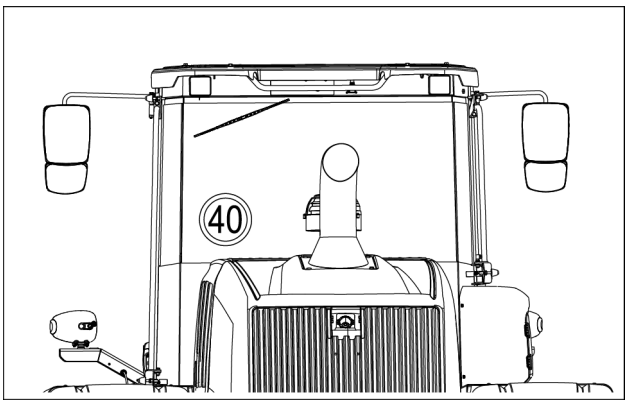
Location: engine hood.

Informational decal: do not step on the engine hood. Failure to comply could result in death or serious injury.

ISO decal number: E134402



134402 86



LEIL17WHL1319AA 87

Location: rear window of the cab.

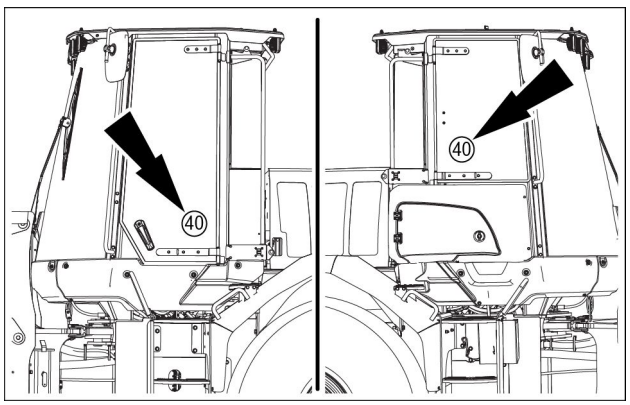
Informational decal: speed limit.

ISO decal number: 76048337

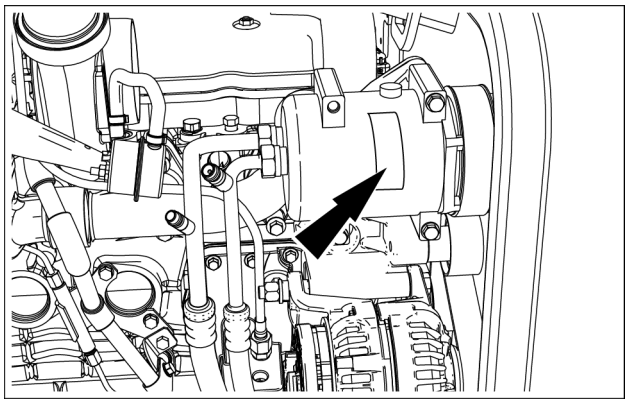


76048337_ 88

For German market this informational decal is located on the rear window and on the both sides of the cab.



LEIL16WHL1540AB 89



LEIL16WHL2693AB 90

Location: engine compartment, on the air conditioning compressor.

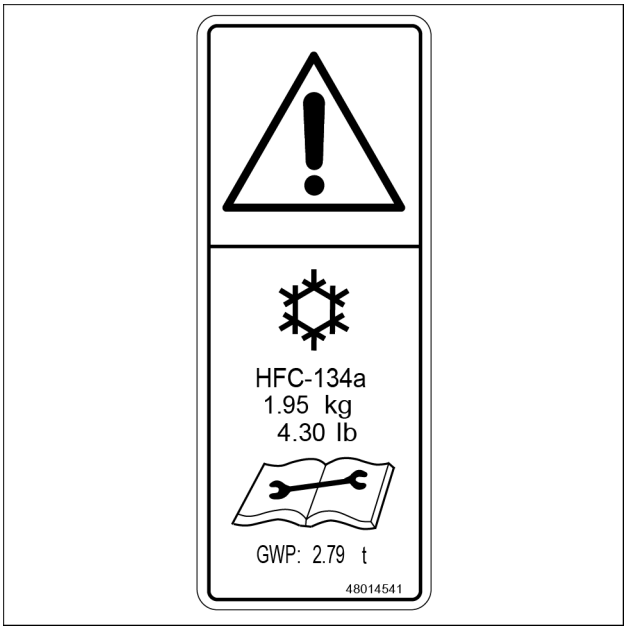
⚠ WARNING

Explosion hazard!
Air-conditioning refrigerant boils at -26 °C (-15 °F)!
-NEVER expose any part of the air-conditioning system to a direct flame or excessive heat.
-NEVER disconnect or disassemble any part of the air-conditioning system.
Discharging refrigerant gas into the atmosphere is illegal in many countries.
Failure to comply could result in death or serious injury.

W0340B

This sign indicates that the vehicle uses a fluorinated greenhouse gas and shows the designation for such gas **R134A**), the gas quantity included in the air conditioning system, and the Global Warming Potential (GWP) of the gas.
For **1.95 kg** (**4.30 lb**) of **R134A**, the GWP is equal to 2.79 t.

ISO decal number: 48014541



48014541 91

3 - CONTROLS AND INSTRUMENTS

Access to operator's platform

Proper entry and exit

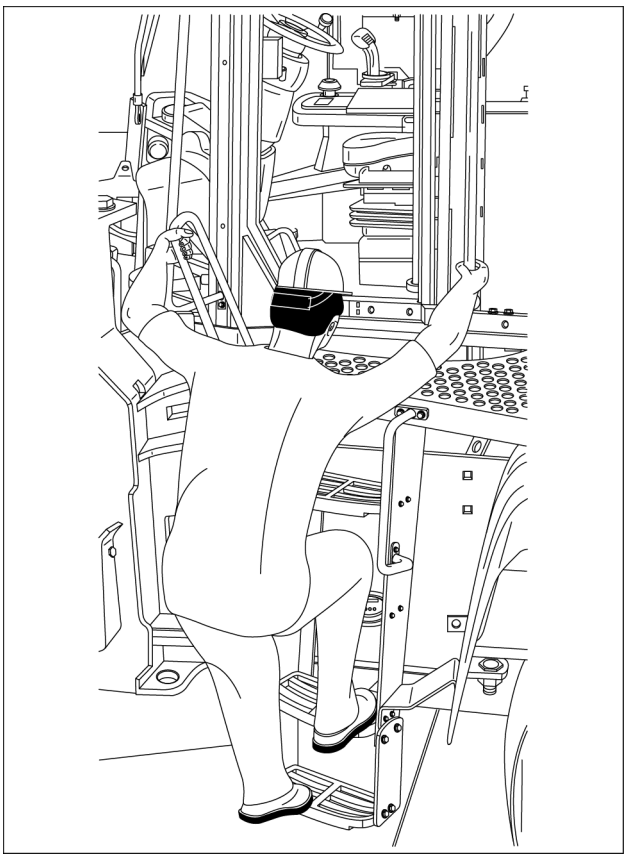
⚠ WARNING

Fall hazard!
Clean the steps and access handles to remove all traces of grease, oil, mud, and ice (in winter).
Failure to comply could result in death or serious injury.

W0139A

Steps and hand holds

Use the steps and hand holds to get down from or get onto the machine. Use at least three points of support to get on and off the machine. Lock the cab door into the full open or full closed position.



LEIL18WHL1111BA 1

⚠ WARNING

Fall hazard!
Always lock the cab doors in the full open or full closed position before using the handrails on the doors.
Failure to comply could result in death or serious injury.

W0133A

Cab door

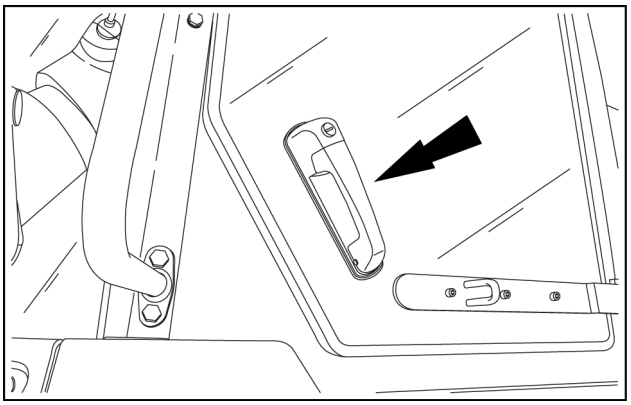
Use the key to lock or unlock the cab door from outside the machine. Use the cab door handle to open the cab door from the outside.

To lock in place, open the cab door completely until the cab door latches in place against the cab.

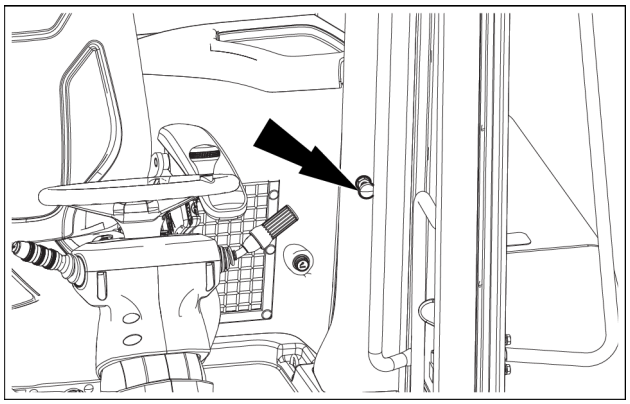
NOTICE: *lock the cab door into the full open or full closed position before using the door hand hold.*

NOTE: *the key provided with the machine can be used to lock and unlock the various panels and to activate the engine starter switch functions.*

To unlock the cab door from the fully open (locked) position, pull the knob located inside of B pillar.



LEIL15WHL0502AA 2

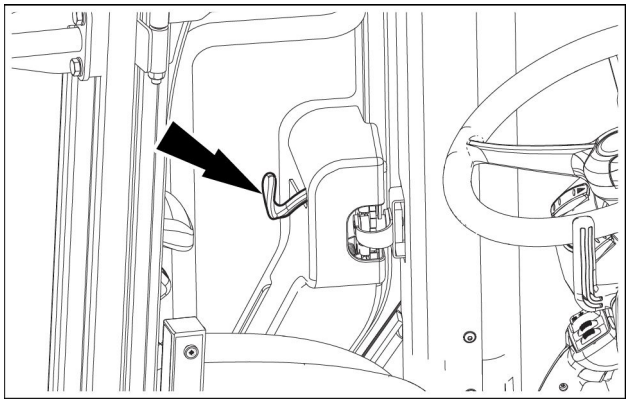


LEIL17WHL1482AB 3

Inside opening of the cab door

Push down on the lever to open the cab door from the inside.

To secure the cab door in the open position, push the cab door back slowly until the cab door locks on the cab door catch at the rear of the cab.



LEIL17WHL1483AB 4

Operator's seat

Overview

⚠ WARNING

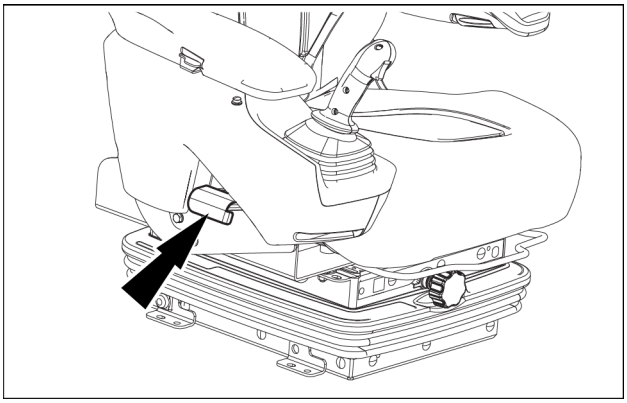
Loss of control hazard!
DO NOT make seat adjustments while the machine is in motion. All seat adjustment should be made with the machine stationary and the parking brake applied.
Failure to comply could result in death or serious injury.

W0293A

Standard operator seat – Mechanical suspension

Console Fore/Aft adjustment

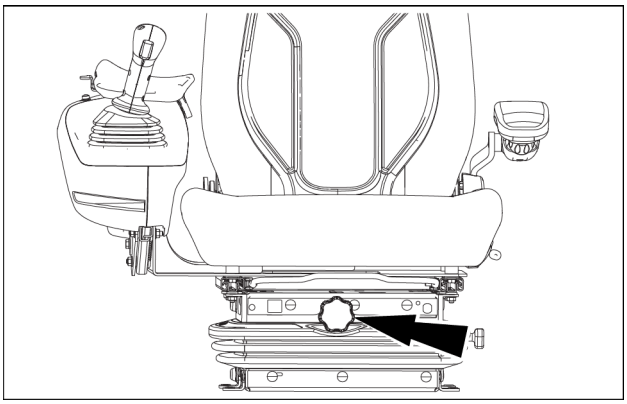
Lift up the handle and adjust the control carrier equipment forward or backward as required.



LEIL17WHL1484AB 1

Weight adjustment

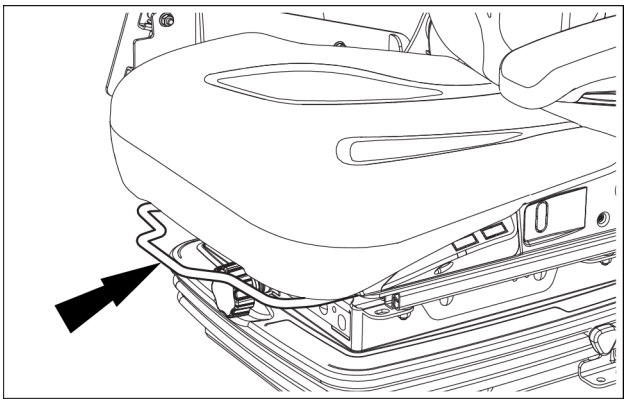
Operator weight adjustment range: **50 – 140 kg** (about 30 knob turns).
Turn the knob counterclockwise to go to the minimum weight setting until it stops. Increase the weight range from there.



LEIL17WHL1485AB 2

Seat Fore/Aft adjustment

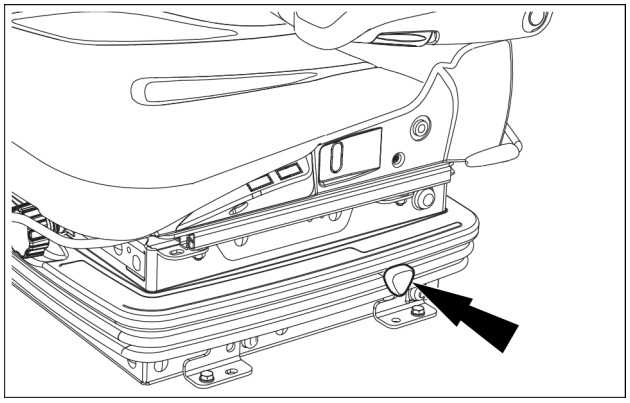
Pull the slide adjustment lever up and adjust the seat forward or backward as required. Release the lever to lock the seat in position. Always make adjustments from the front center of the adjustment bar.



LEIL16WHL1386AB 3

Variable damper adjustment

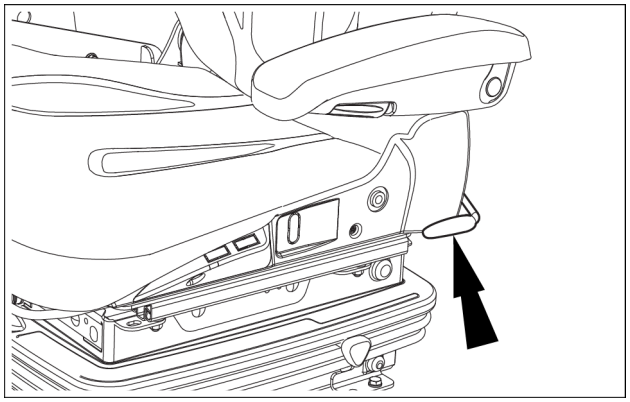
Turn the knob clockwise to increase the dampening. If the weight adjustment range is too far off for the operator, you will not notice a difference using the adjustable damper.



LEIL16WHL1387AB 4

Backrest adjustment

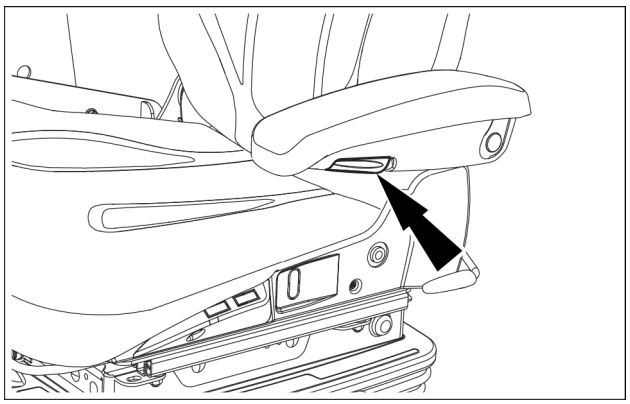
Lift up the handle and move the backrest to the desired position. Release the handle to lock in position.



LEIL16WHL1388AB 5

Armrest angle adjustment

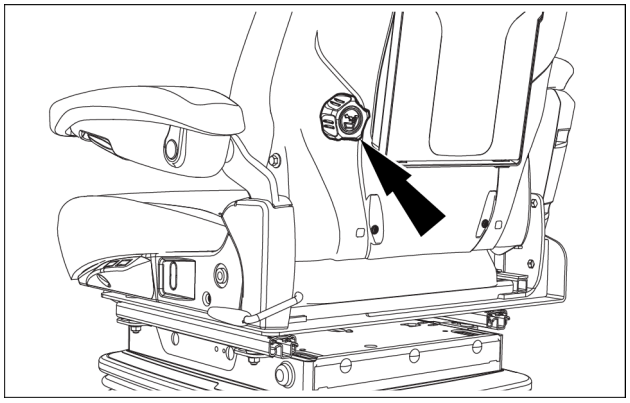
Turn the knob to raise or lower the armrest to the desired position.



LEIL16WHL1389AB 6

Lumbar adjustment

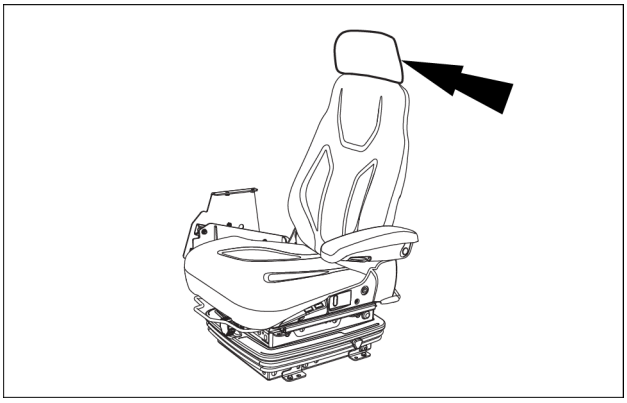
Turn the knob to adjust both the height and curvature of the backrest cushion.



LEIL16WHL1390AB 7

Headrest (Optional)

The seat is equipped at the top with provisions for an optional headrest.

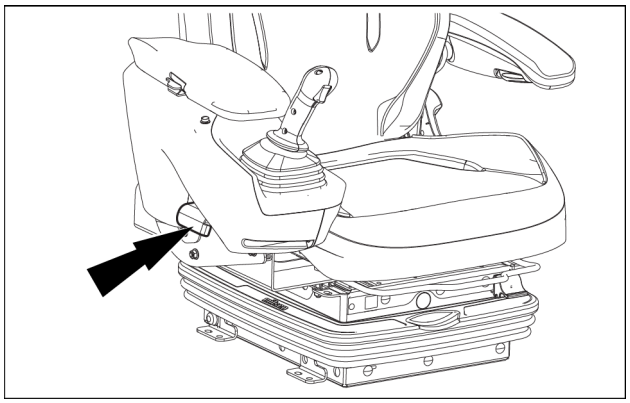


LEIL16WHL1391AB 8

Optional operator seat – Air suspension, heated seat

Console Fore/Aft adjustment

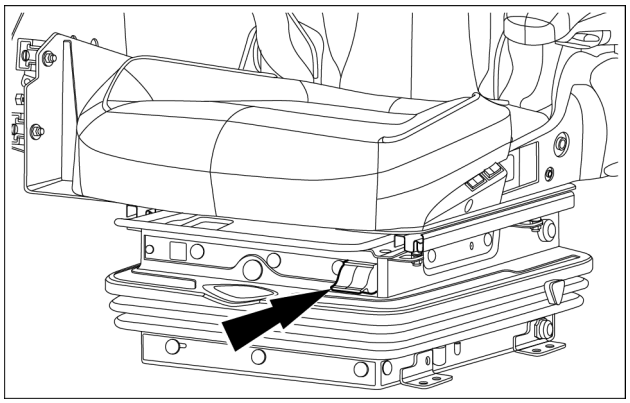
Lift up the handle and adjust the control carrier equipment forward or backward as required.



LEIL17WHL1486AB 9

Weight adjustment

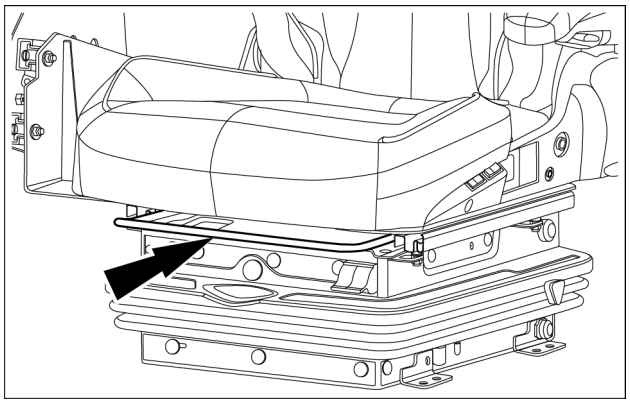
Use the lever to increase or decrease the weight resistance. Adjust the seat for operator preference and comfort.



LEIL16WHL1409AB 10

Seat Fore/Aft adjustment

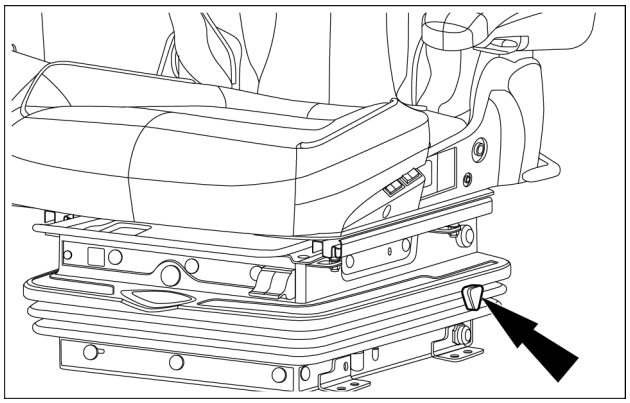
Pull the slide adjustment lever up and adjust the seat forward or backward as required. Release the lever to lock the seat in position. Always make adjustments from the front center of the adjustment bar.



LEIL16WHL1408AB 11

Variable damper adjustment

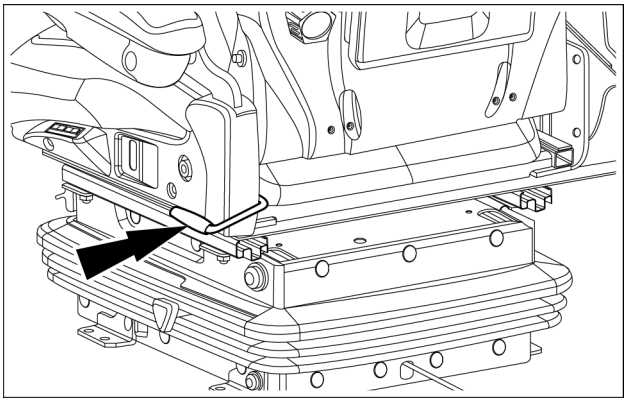
Use the knob to adjust the damping forces for operator ride preference.



LEIL16WHL1425AB 12

Backrest adjustment

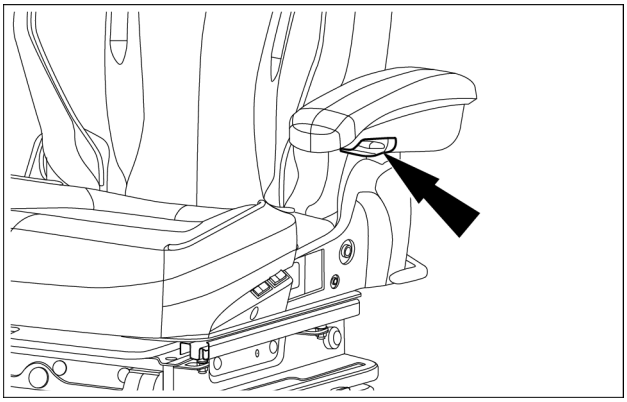
Lift up the handle and move the backrest to the desired position. Release the handle to lock in position.



LEIL16WHL1427AB 13

Armrest angle adjustment

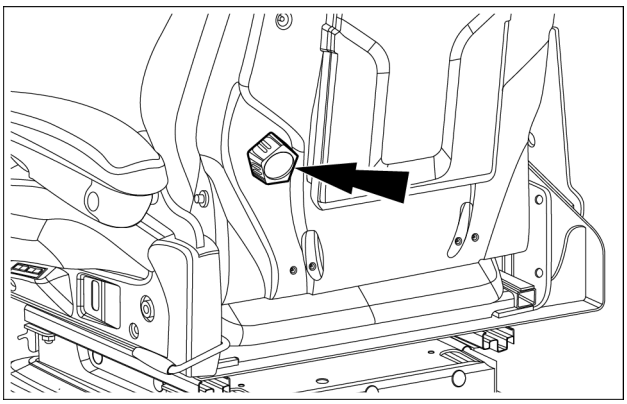
Turn the knob to raise or lower the armrest to the desired position.



LEIL16WHL1430AB 14

Lumbar adjustment

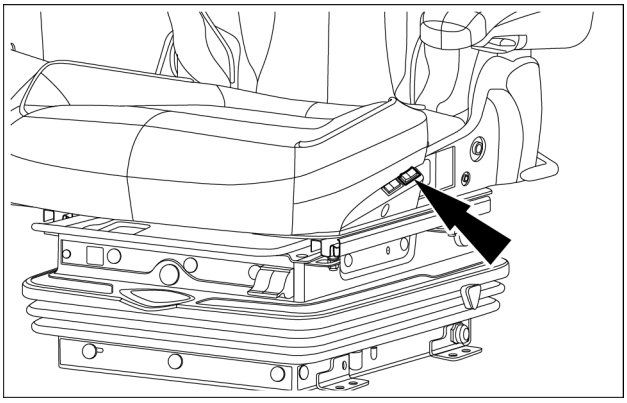
Turn the knob to adjust both the height and curvature of the backrest cushion.



LEIL16WHL1428AB 15

Seat heating

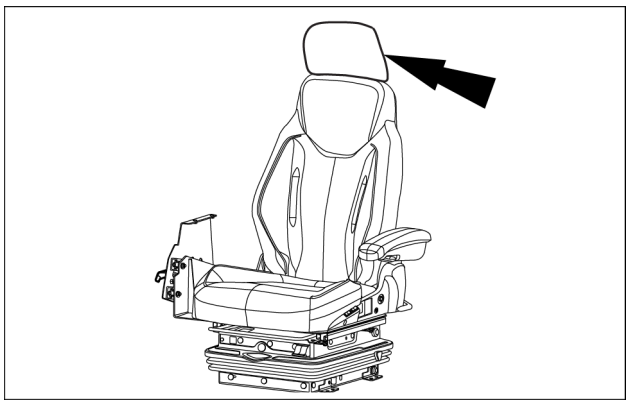
Use the rocker switch to activate the seat heating for cold weather comfort.



LEIL16WHL1410AB 16

Headrest (Optional)

The seat is equipped at the top with provisions for an optional headrest.

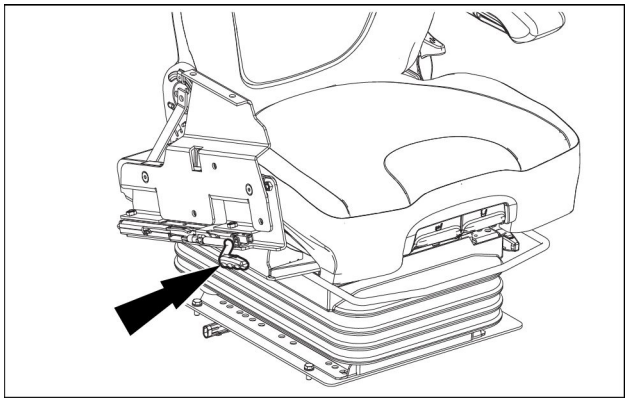


LEIL16WHL1429AB 17

Optional premium operator seat – Air suspension, heated seat

Console Fore/Aft adjustment

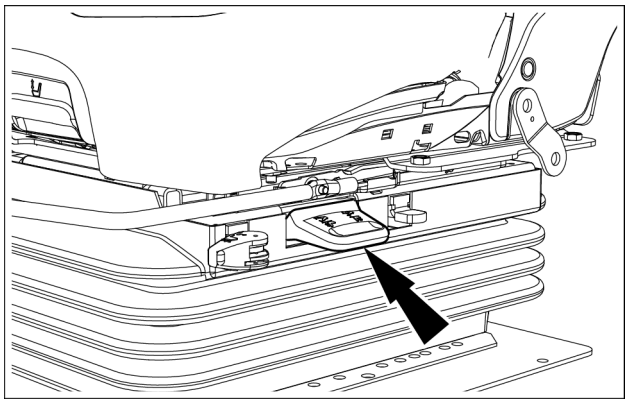
Lift up the lever and adjust the control carrier equipment forward or backward as required.



LEIL17WHL1487AB 18

Height and weight adjustment

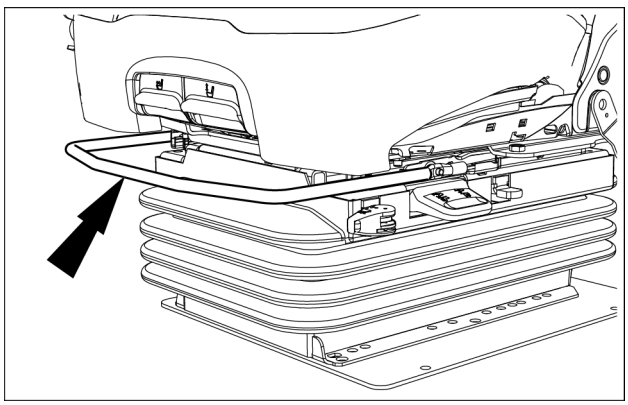
Push or pull the lever fully up or down to adjust the seat height.
Pull the lever with the vehicle at a standstill and the operator sitting on the seat to adjust the seat for your weight.



LEIL16WHL1396AB 19

Seat Fore/Aft adjustment

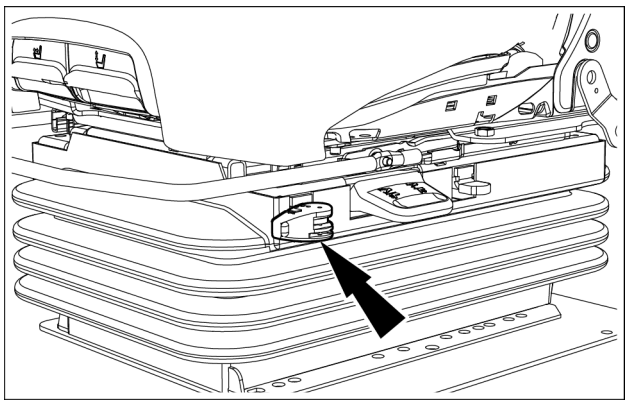
Pull the slide adjustment lever up and adjust the seat forward or backward as required. Release the lever to lock the seat in position. Always make adjustments from the front center of the adjustment bar.



LEIL16WHL1397AB 20

Fore/aft isolator

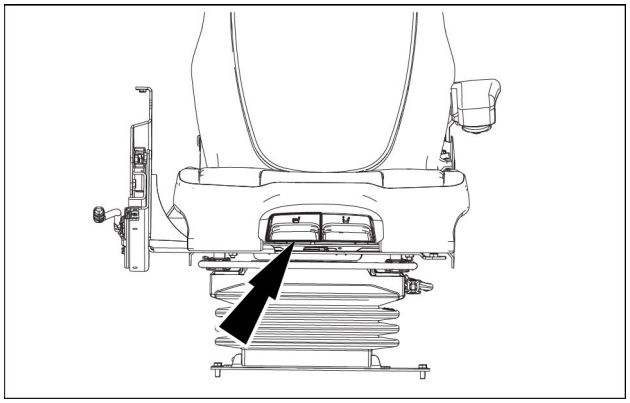
Lock the lever for fore/aft isolation under certain operation conditions (shock impacts).



LEIL16WHL1398AB 21

Seat depth adjustment

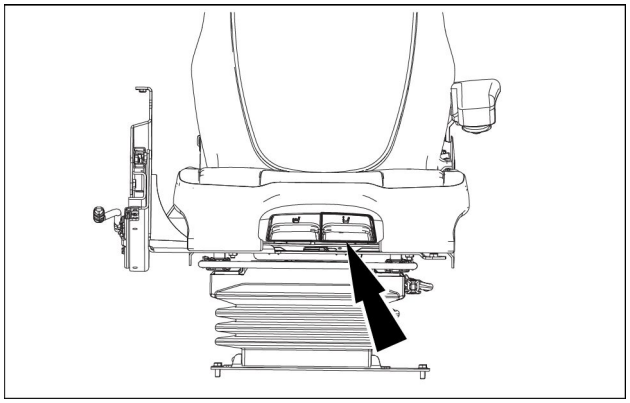
Lift handle up and move the cushion to the desired position. Release the handle to lock the cushion in place.



LEIL17WHL1488AB 22

Seat cushion angle adjustment

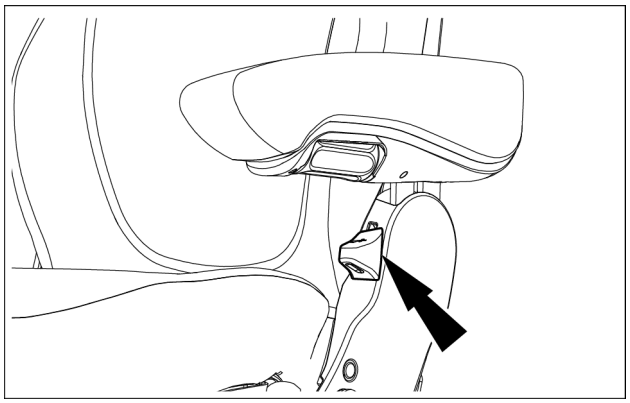
Lift up on the handle and move the seat to the desired angle. Release the handle to lock the cushion angle.



LEIL17WHL1489AB 23

Backrest adjustment

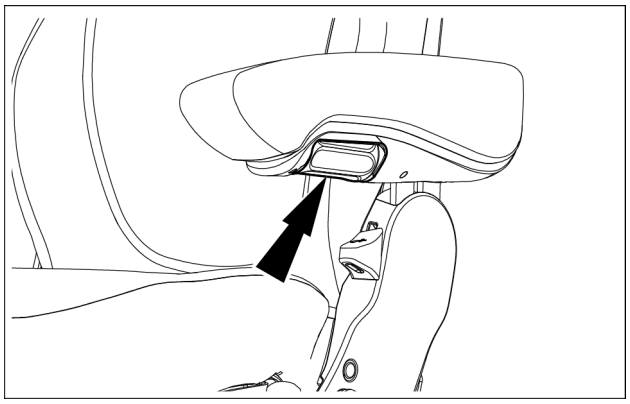
Lift up the handle and move the backrest to the desired position. Release the handle to lock in position.



LEIL16WHL1399AB 24

Armrest angle adjustment

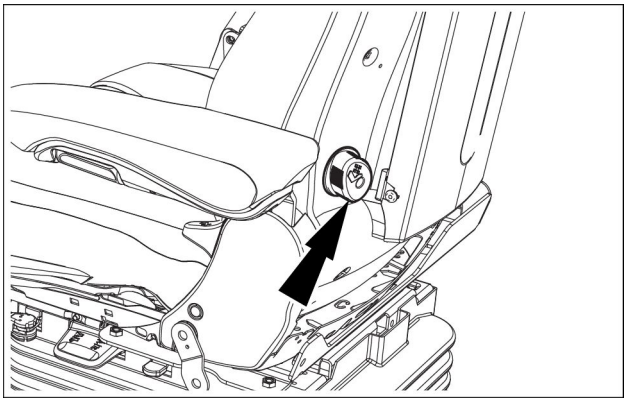
Turn the knob to raise or lower the armrest to the desired position.



LEIL16WHL1400AB 25

Lumbar adjustment

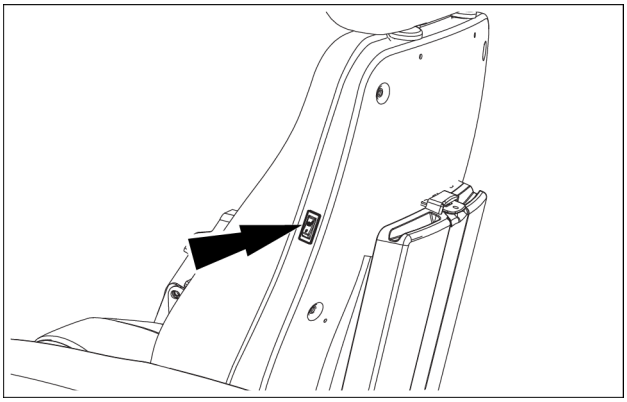
Turn the knob to adjust both the height and curvature of the backrest cushion.



LEIL16WHL1401AB 26

Seat heating

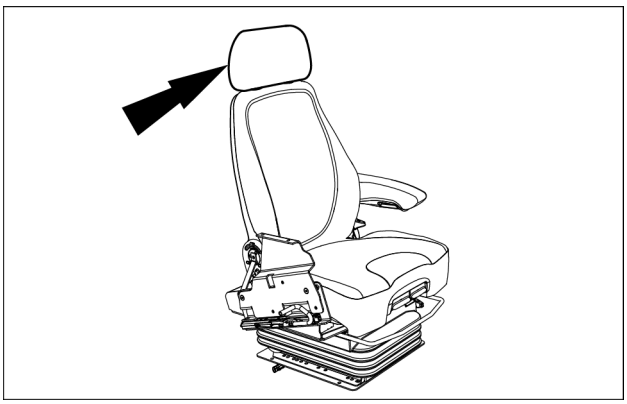
Use the rocker switch to activate the seat heating for cold weather comfort.



LEIL16WHL1402AB 27

Headrest (Optional)

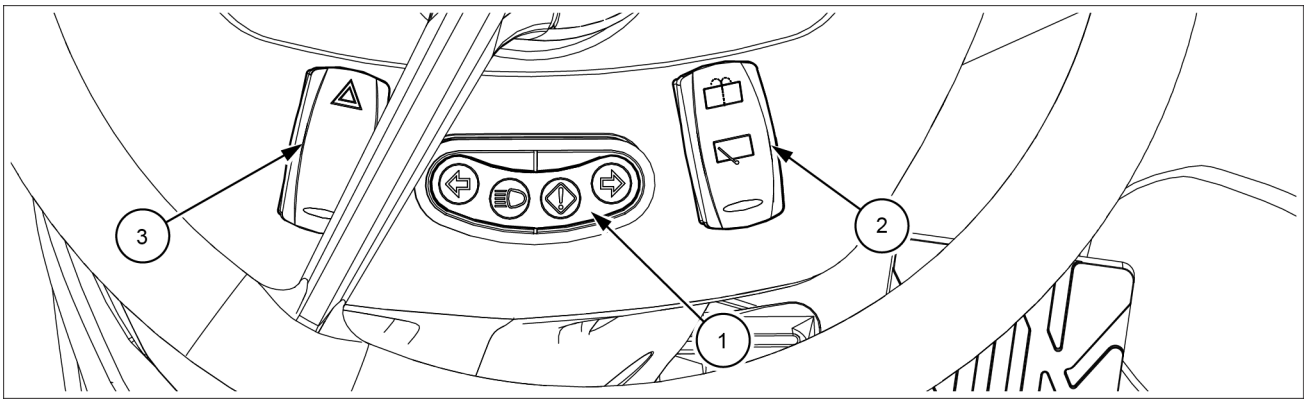
The seat is equipped at the top with provisions for optional headrest.



LEIL16WHL1392AB 28

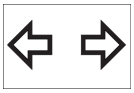
Forward controls

Front console



LEIL17WHL1058EB 1

1. Signal indicator



Four-way flasher and turn signal indicator (green)

The indicator lamps will flash when the operator signals a turn or when the operator activates the four-way flashers.



Caution master indicator (yellow)

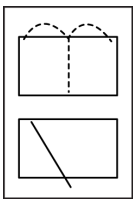
The indicator illuminates when a critical or non-critical warnings appear on the multifunction display. See “Display – Status and warning icons” – Chapter 3 of this manual to see all critical and non-critical warning displays that may appear on the multifunction display and the corrective action required. When the caution master indicator is ON, change the operating method and schedule a shutdown for maintenance. If the condition persists, contact your dealer.



Lamp indicator (blue)

The indicator illuminates when the driving high beam lamps are ON.

2. Rear wiper switch



Push the switch (center position) to enable the wiper.
Push and hold the switch (top position) to enable the washer fluid.

3. Four-way flasher



Push the top side of the flasher switch to activate the flashers. Push the bottom side of the flasher switch for the OFF position.

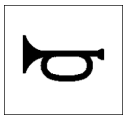
Steering column

⚠ WARNING

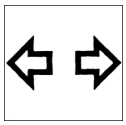
Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

W0304A

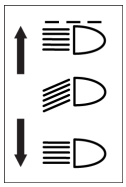
Right-hand multifunction lever



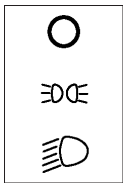
1. Horn
Push the horn button in to actuate the horn.



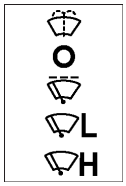
2. Turn signal lever
Push the control lever up to signal a left turn. Pull the lever down to signal a right turn. Move the lever manually to the center position to stop the signals.



3. High beam headlights and flashing
Pull the multifunction lever to turn on the high beam headlights. Push the multifunction lever for flashing.

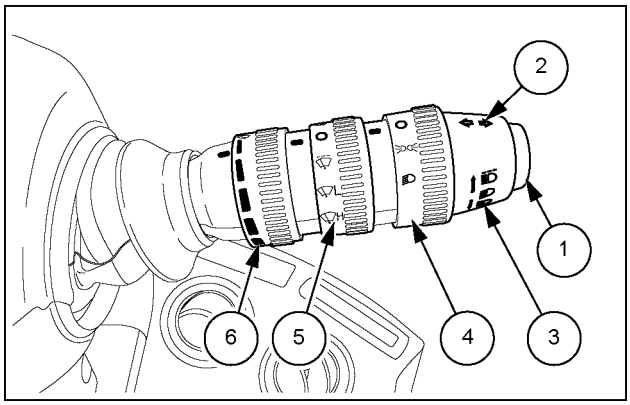


4. Driving light wheel
Rotate the wheel **(4)** to set one of the three positions:
0 – Lights OFF
1 – Marker/position lights
2 – Low beam headlights



5. Front wiper/washer wheel
Rotate the wheel **(5)** to set one of the four positions:
0 - OFF position.
I - ON position – Rotate clockwise the wheel **(5)** to the first position to activate the front wiper.
L - INTERMITTENT - Rotate clockwise the wheel **(5)** to the second position to activate the front wiper at the intermittent speed.
H - CONTINUOUSLY - Rotate clockwise the wheel **(5)** to the third position. The front wiper runs continuously.
WASH - Rotate counterclockwise and hold the wheel **(5)** for washer fluid.

6. Front wiper speed wheel
Rotate the wheel **(6)** to adjust and set the front wiper intermittent speed. There are six settings for the front wiper intermittent speed.

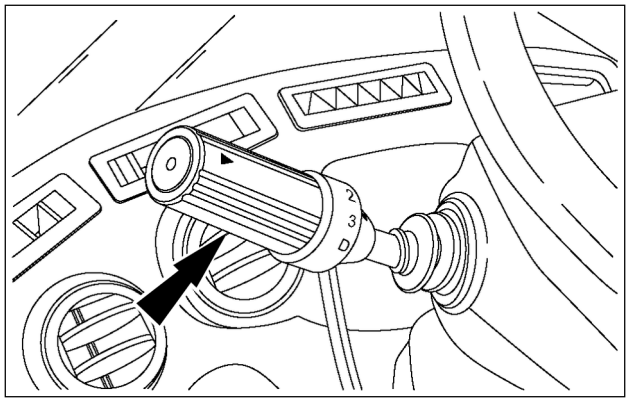


LEIL16WHL0542AB 1

Transmission control lever

Use the transmission control lever to shift the transmission gears from first gear through drive. Turn the transmission control lever away from you to select a higher gear. Turn the lever toward you to select a lower gear. Also use this control lever to put the transmission in FORWARD, NEUTRAL, and REVERSE (F-N-R):

- Move the control lever away from you for FORWARD.
- The center position of the control lever is NEUTRAL.
- Move the control lever toward you for REVERSE.



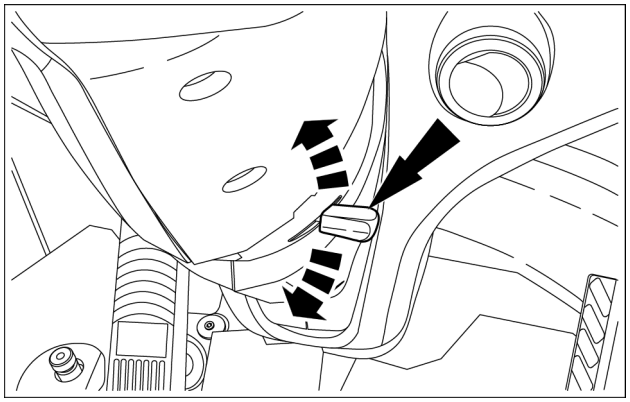
LEIL16WHL1468AA 2

All the following steps are required in order to use the transmission control lever:

1. Service brake pressure must be at operating pressure.
2. Transmission control lever must be in NEUTRAL upon startup.
3. Push the parking brake button to release the parking brake switch.
4. Place the transmission control lever in either FORWARD or REVERSE to move the machine.

Steering wheel tilt control

The steering wheel tilt control allows the operator to adjust the steering wheel to multiple positions. Push or pull back the handle, and adjust the steering wheel to the correct and most comfortable angle. Release the handle to hold in that position. Tilt the steering wheel completely up when leaving the machine. Always adjust the steering wheel to the correct position before starting the engine.



LEIL15WHL1885AB 3

Pedal controls

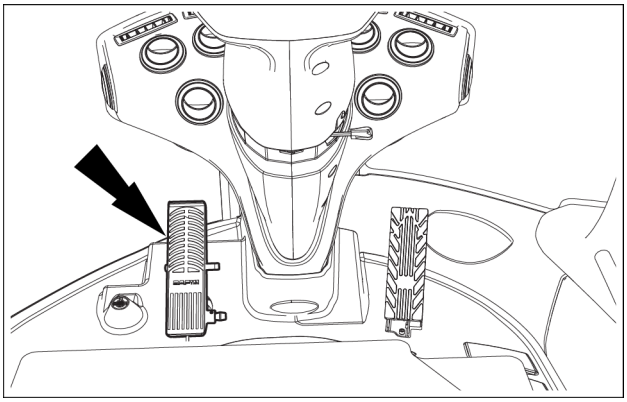
Brake pedal

When pushed, the brake pedal actuates the machine brakes.

NOTE: *the pedal works in conjunction with the transmission Declutch switch or Powerinch for more efficient braking. See “Loader functions – Declutch switch" – Chapter 4 in this manual for further information.*

NOTICE: *on steep slopes, use the down shift mode of the transmission to aid braking and to help prevent brake overheating and premature disc wear.*

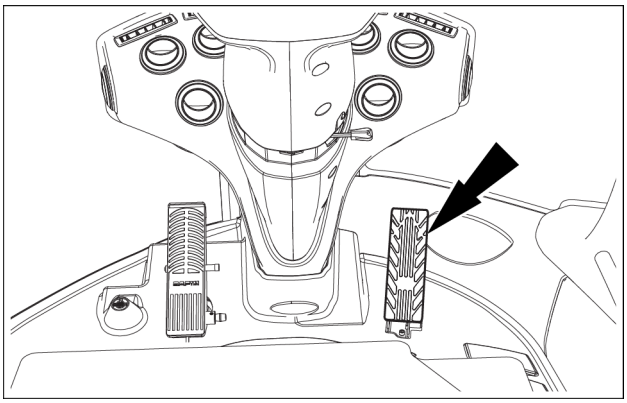
NOTE: *when the machine is shut off, the parking brake is automatically set.*



LEIL16WHL1556AB 1

Foot Throttle

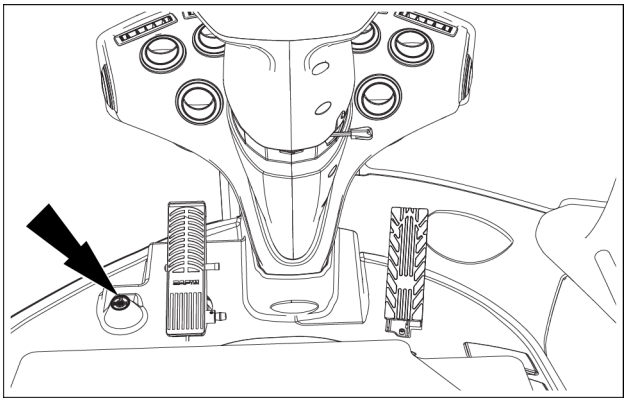
Push the foot throttle to increase the engine speed. When the pedal is released the engine runs at low idle.



LEIL16WHL1557AB 2

Differential lock (Optional)

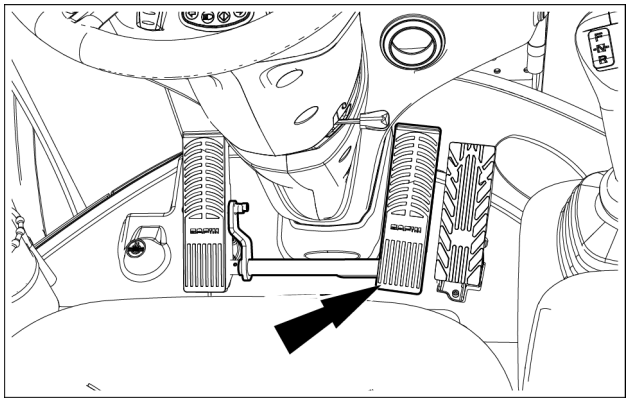
Depress the differential lock foot switch to lock the front axle differential. Release the switch to unlock the differential.



LEIL16WHL1558AB 3

Right-hand brake pedal (Optional)

An additional right brake pedal can be added, allowing both the left and right pedal to be locked together. Braking can be performed from either pedal.



LEIL16WHL1270AB 4

Joystick steering

⚠ WARNING

Driving hazard!
If the hydraulic pilots are disengaged, the joystick steering remains active. Always disengage the joystick steering when not in use.
Failure to comply could result in death or serious injury.

W0449A

⚠ WARNING

Driving hazard! Limit the use the Joystick Steering System (JSS) at speeds above 20 km/h (12.4 mph). Use the Joystick Steering System (JSS) to assist work cycle operations. For optimum control, always use the primary steering wheel when you operate at higher speeds. Do not use JSS for long travel at high speeds. When you enable JSS, the maximum machine speed is 30 km/h (18.6 mph).
Failure to comply could result in death or serious injury.

W1514A

⚠ WARNING

Driving hazard!
Always use the primary steering when traveling on a public road or highway. The left armrest must be raised and in a locked position during travel. Do not use joystick steering when traveling on a public road or highway.
Failure to comply could result in death or serious injury.

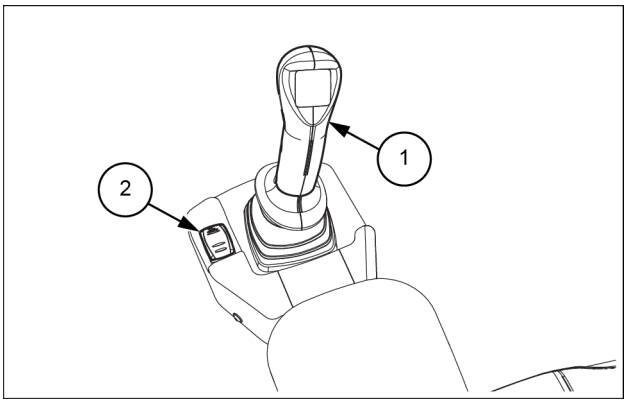
W0451A

Joystick steering (optional)

The joystick steering (JSS) allows the operator to steer using a hand controls located on the left-hand operator seat armrest. The joystick steering allows for steering movement at the operator's fingertips.

Use these controls in short cycle, repetitive, high production load and carry operations to reduce operator fatigue and increase operating efficiency.
The system is set up so that the steering wheel is always usable (it always has priority).
The JSS is not deactivated with steering wheel use. When the steering wheel is used, the JSS no longer has control. As soon as the steering wheel is no longer being turned, the operator is able to go back to using the joystick without having to reactivate it.

See Chapter 6 - "WORKING OPERATIONS" for further information.



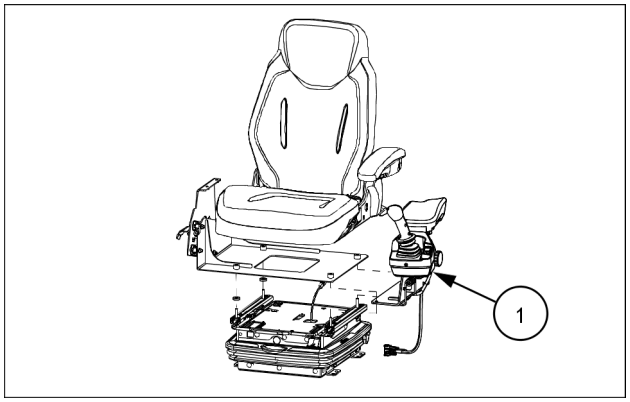
LEIL16WHL1403AB 1

1. Joystick steering (JSS) control lever
2. Joystick steering (JSS) switch

Joystick steering armrest installation

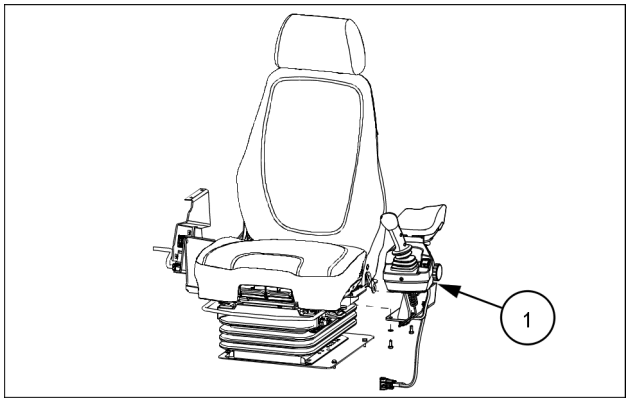
The joystick steering armrest **(1)** is installed at the left-hand side of the operator seat.

Standard operator seat (mechanical suspension)
Optional operator seat (air suspension, heated)



LEIL16WHL1436AA 2

Optional premium operator seat (air suspension, heated)



LEIL16WHL1437AA 3

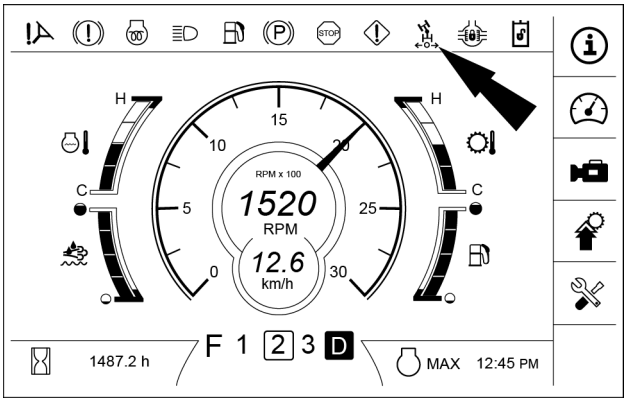
⚠ WARNING

Driving hazard!
Check all controls and safety devices in a safe, open area before starting work.
Failure to comply could result in death or serious injury.

W0248A

Joystick steering enabled (green)

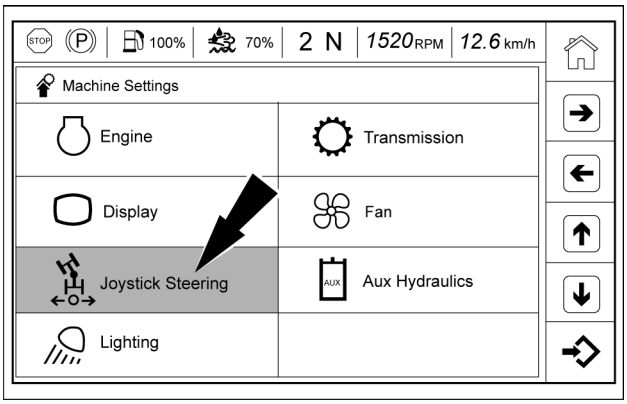
When joystick steering has been enabled, the joystick steering indicator on the Liquid Crystal Display (LCD) will illuminate. Use the joystick steering for repetitive, high production operations such as truck loading, etc. Joystick steering is not intended for primary steering use or while traveling on road.



LEIL16WHL0407AB 4

Joystick steering speed select

To select the most suitable speed for the operation to be performed when using the joystick steering, access the “Machine Settings” menu and highlight “Joystick Steering” at the settings screen and press the enter key.



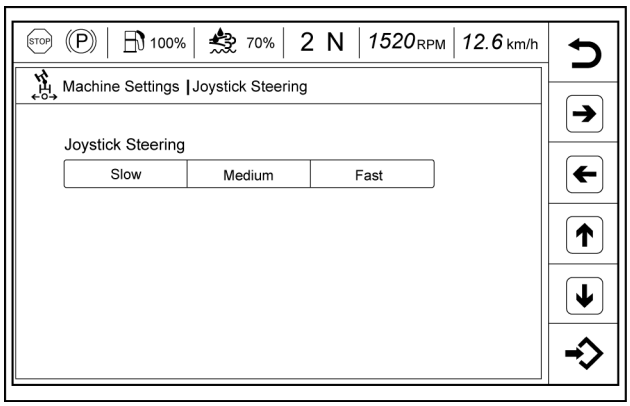
LEIL18WHL1217AA 5

At the joystick steering screen, use the arrow keys and select one of the three available speed ranges: slow, medium or fast.

The higher the range selected, the more responsive steering capabilities of the machine become.

NOTICE: *when first becoming accustomed to joystick steering, operate the machine in a lower speed range in a clear open area.*

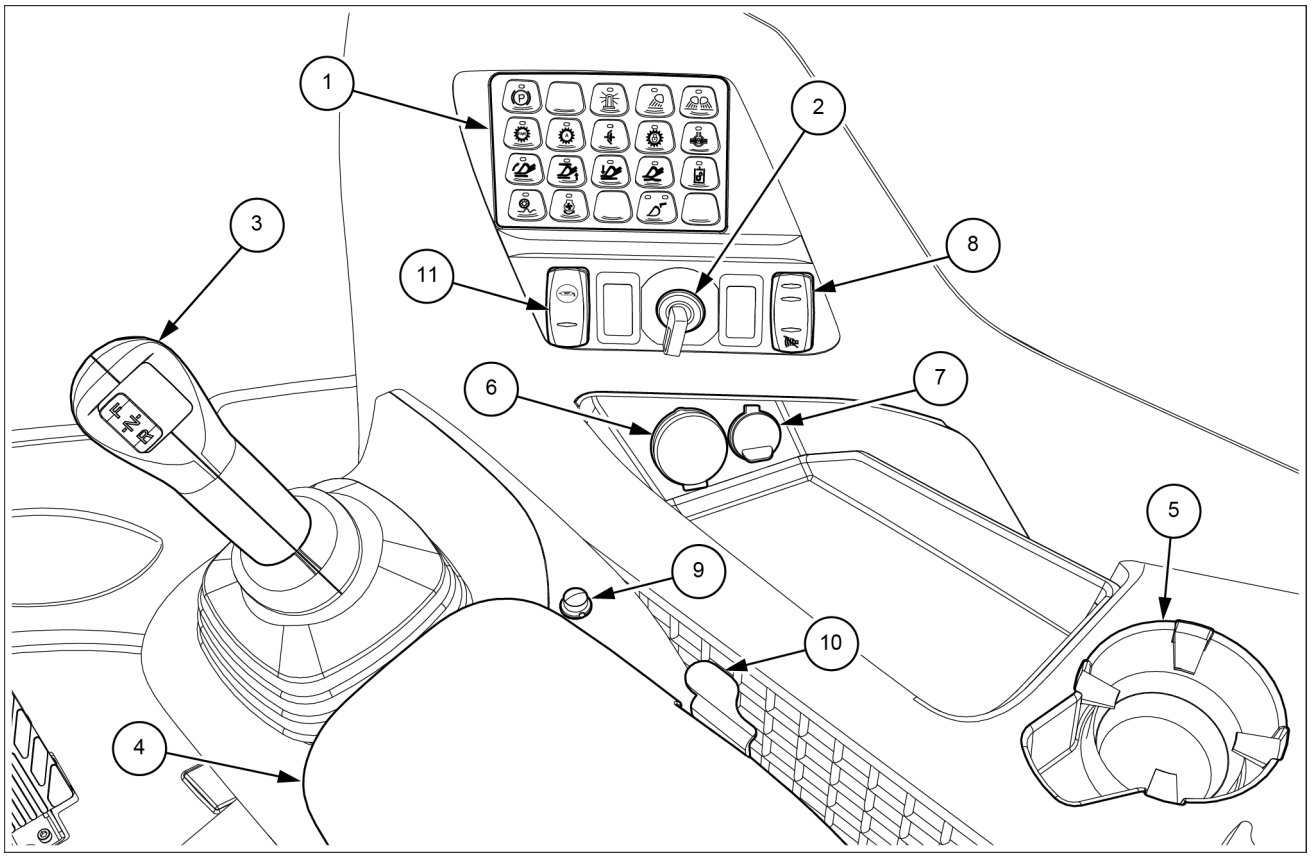
Always set the speed to suit both the operator, operating conditions, and work to be performed. As the operator becomes more familiar with joystick steering, a higher steering speed may be desired.



LEIL15WHL0533AA 6

Right-hand side controls

Overview



LEIL17WHL1587FB 1

1. Multifunction keypad
2. Ignition switch
3. Control lever (joystick)
4. Arm pad
5. Cup holder
6. USB and AUX ports
7. Power outlet socket **12 V**
8. Backup alarm cancel (optional)
9. Horn
10. Arm pad release
11. Automatic lubrication button (optional)

The right-hand side console allows the operator to make adjustments to machine operations and functions.

1. Multifunction keypad

Refer to “Multifunction keypad” – Chapter 3 of this manual to the multifunction keypad operations.

2. Ignition switch

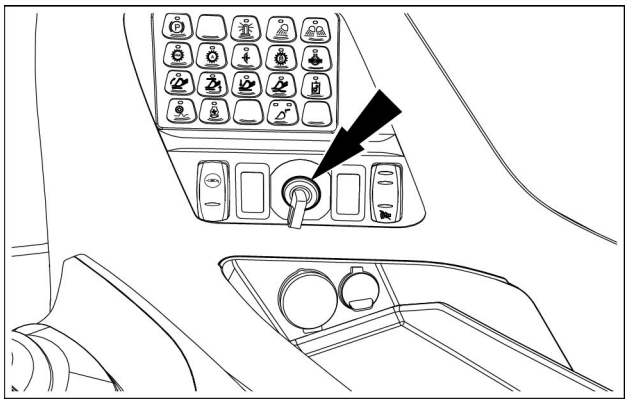
The ignition switch has four positions:

A. OFF position
In this position, all switch-controlled current is OFF. Turn the key to OFF to stop the engine. Remove the key and turn the timed disconnect switch to OFF.

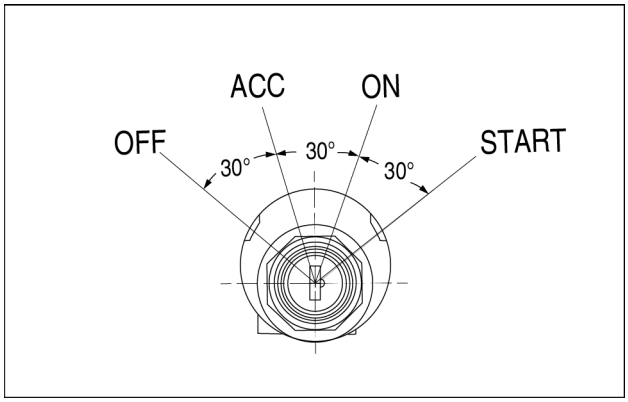
B. ACCESSORY position
This position will activate the optional radio only. It will not activate the instruments or start the engine.

C. ON position
This position will activate all electrical systems. The key will return to this position after you release the key from the start position.

D. START position
Turn the key to this position to engage the starter motor to start the engine. The switch is spring loaded and will return to the ON position when released.



LEIL17WHL1588AB 2

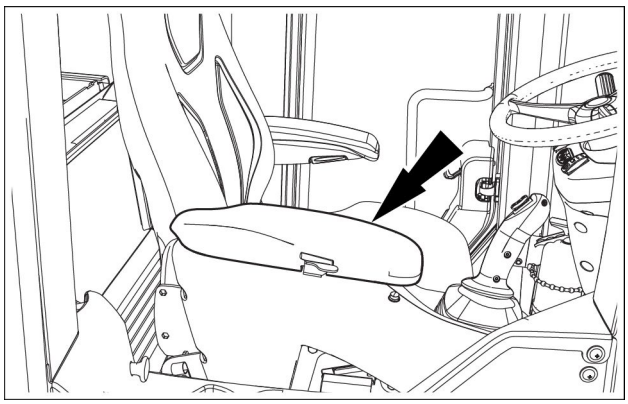


LEIL17WHL1446AA 3

3. Control lever (joystick)

Refer to “Control lever operation” – Chapter 3 of this manual for the joystick/control lever operation.

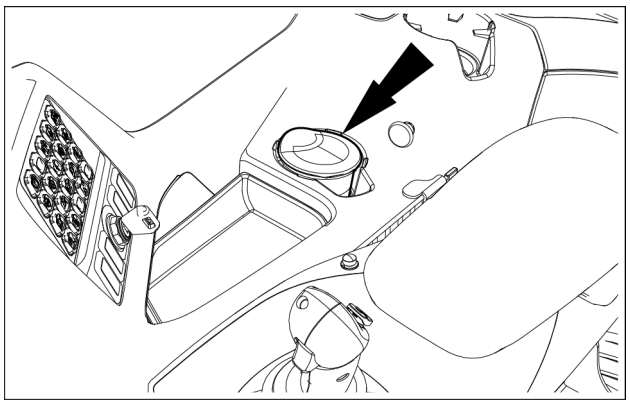
4. Arm pad



LEIL16WHL1304AB 4

5. Cup holder

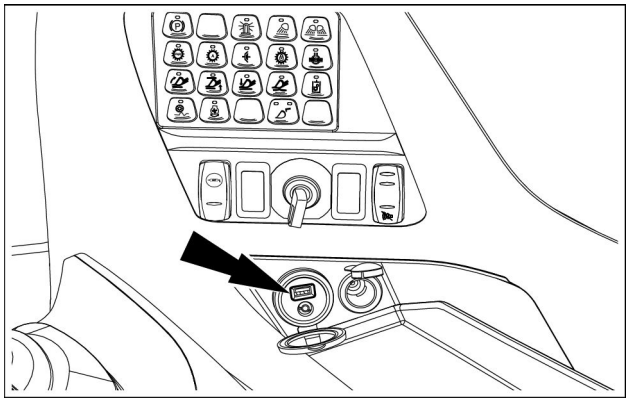
A cup holder is located at the rear part of the right-hand console. This area can also be used to accommodate the optional ashtray.



LEIL16WHL1279AB 5

6. USB and AUX ports

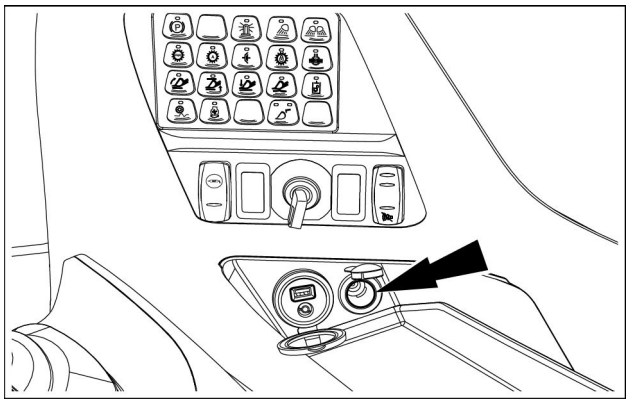
USB and AUX ports are located in the lower part of the right-hand console.



LEIL17WHL1589AB 6

7. Power outlet socket 12V

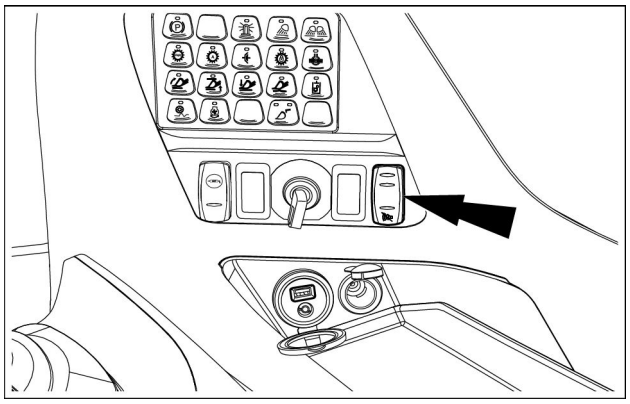
A **12 V** power outlet socket is located next to the USB and AUX ports in the lower part of the right-hand console.



LEIL17WHL1590AB 7

8. Backup alarm cancel (optional)

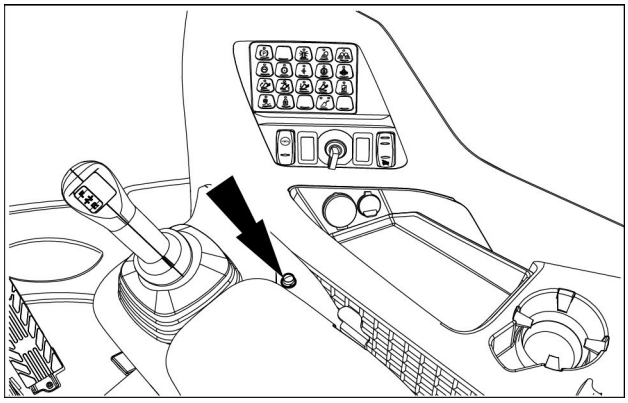
The backup alarm cancel switch allows the alarm deactivation.



LEIL17WHL1591AB 8

9. Horn

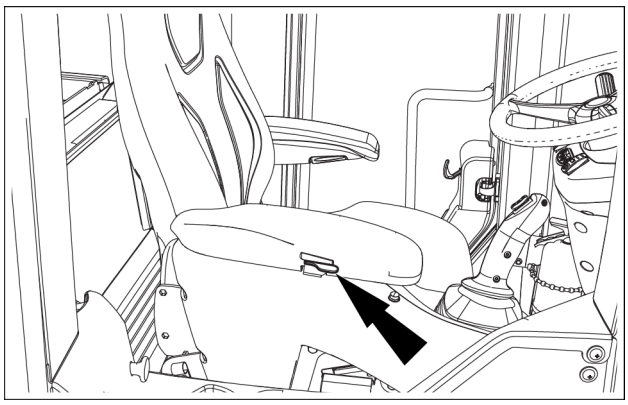
Press the switch to activate the horn.



LEIL17WHL1593AB 9

10. Arm pad release

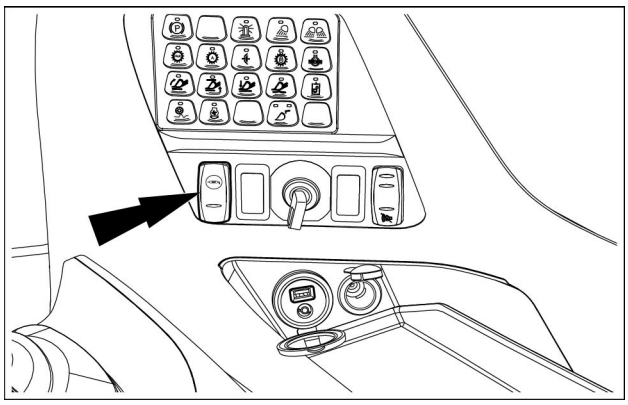
Lift arm pad to raise.
Rotate lever to release and lower.



LEIL16WHL1305AB 10

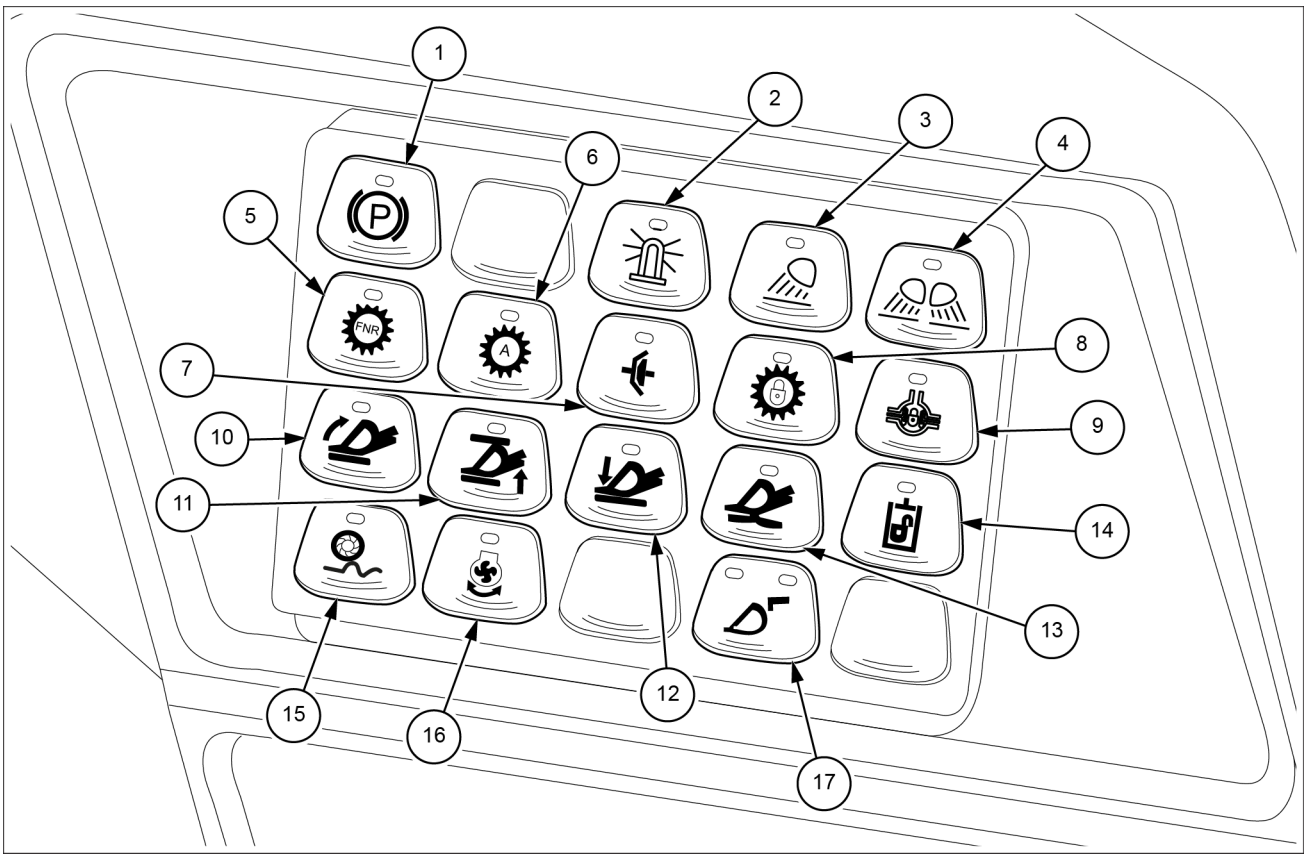
11. Automatic lubrication button (optional)

If the machine is equipped with an automatic lubrication system, at any time the operator can press this button to manually start a grease cycle. For more details refer to the section "Automatic lubrication system" in Chapter 7.



LEIL17WHL1592AB 11

Multifunction keypad



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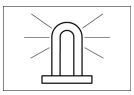
NOTE: *all multifunction keypad buttons are momentary switches with LED indicator of current status. When the LED is ON the corresponding function is activated.*

1. Parking brake



Press the parking brake button to engage/disengage the parking brake on the transmission output shaft.
LED color: red.

2. Beacon



Press the beacon button to turn ON/OFF the rotating beacon.
LED color: green.

3. Work lights 1



Press the work light 1 button to turn ON/OFF the front work lights.
LED color: green.

4. Work lights 2



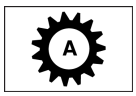
Press the work light 2 button to turn ON/OFF the front and rear lights.
LED color: green.

5. Auxiliary F-N-R



Press the auxiliary F-N-R button to enable/disable the auxiliary F-N-R switch located on the joystick or next to the single axis levers.
See Chapter 4 for further information.
LED color: green.

6. Auto shift



Press the auto shift button to enable/disable the automatic operation mode for the transmission. When the auto shift function is activated, the transmission will automatically shift up and down between 1st or 2nd and the highest speed setting on the transmission control lever.
See Chapter 4 for further information.
LED color: green.

7. Declutch (4-speed only) / Powerinch (5-speed only)



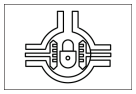
Press the Declutch/Powerinch button to enable/disable the Declutch on 4-speed transmissions or Powerinch on 5-speed transmissions. This feature can improve loader applications when truck loading and tight corner operations are required.
See Chapter 4 for further information.
LED color: green.

8. Torque converter lock-up (5-speed only)



Press the torque converter lock-up button to enable/disable the torque converter lock-up function. This function allows a direct mechanical connection between the engine and the transmission to eliminate torque converter loss. It allows the torque converter to remain locked up from the second gear upward. It allows for faster vehicle accelerations and speeds.
LED color: green.

9. Automatic differential lock (if equipped)



With the automatic differential lock button in ON position, the automatic differential lock system is enabled. The hydraulic differential lock will automatically engage when required for the wheel loader. The differential lock is activated any time the operator presses the differential lock foot switch, regardless of whether the automatic differential lock system is enabled or not.
LED color: green.

10. Return-to-dig



Press the return-to-dig button to enable/disable the return-to-dig function. This function allows the bucket to return to level with the ground for digging.
See Chapter 4 for further information.
LED color: green.

11. Height control



Press the height control button to enable/disable the height control function. This function allows the bucket to raise to the set height position when activated.
See Chapter 4 for further information.
LED color: green.

12. Return-to-travel



Press the return-to-travel button to enable/disable the return-to-travel function. This function allows the bucket to automatically return to the travel position after you have dumped the loader bucket.
See Chapter 4 for further information.
LED color: green.

13. Float



Press the float button to enable/disable the float function. This function allows the bucket to automatically move to the float position.
See Chapter 4 for further information.
LED color: green.

14. Hydraulic functions lock-out



Press the hydraulic functions lock-out button to lock/unlock all hydraulic functions (except steering).
LED color: red.

15. Ride control



Press the ride control button to enable/disable the ride control function. Ride control will automatically activate when ground speed is above **5 km/h** (**3.1 mph**) and automatically shut off when ground speed is below **5 km/h** (**3.1 mph**).
See Chapter 4 for further information.
LED color: green.

16. Fan reverser



To use the fan reverser let the machine idle in NEUTRAL. Press and hold the fan reverser button and press the throttle to high idle for a minimum of **10 s** or until debris stops blowing out of the coolers. Return the machine to idle and release the fan reverser button. Press the fan reverser function to turn ON/OFF the automatic reversing function.
LED color: green.

17. Coupler engagement



The coupler engagement button allows the engagement of the attachment from the operator's compartment. Push and hold the button to retract the pins for the attachment. The red LED will illuminate when the pins have been retracted. Press the button again to lock the pins in the extended position.
See Chapter 6 for further information.
LED color: red - green.

Control lever operation

1. Lift arm and bucket control

Two function valve - one control lever (joystick)

Lift arm and bucket control **(1)**

A. FLOAT - When in the FLOAT position, the loader bucket floats across the rough ground.

B. LOWER

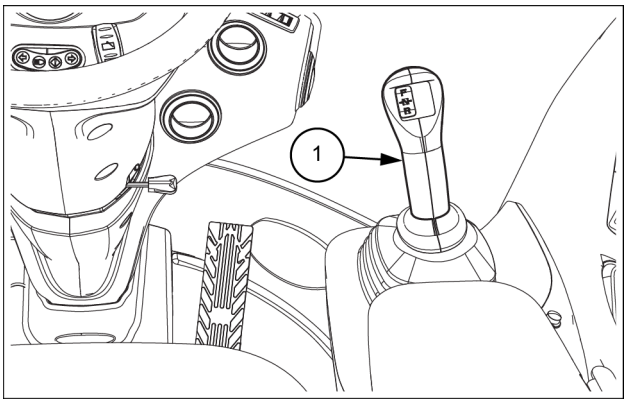
C. HOLD (central position) - The loader arms and bucket will not move when the joystick is in the HOLD position. When released, the joystick **(1)** will automatically return to the HOLD position.

D. RAISE

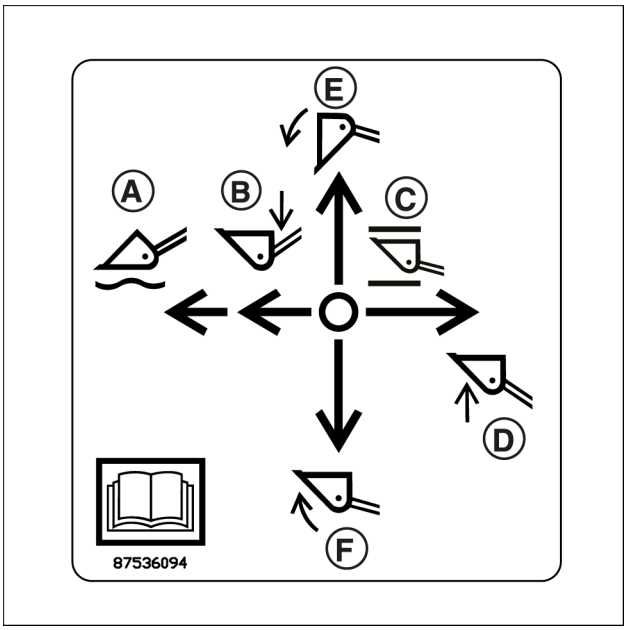
E. DUMP

F. ROLLBACK

E - F. AUTOMATED BUCKET METERING – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “E” Dump to “F” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.



LEIL16WHL1287AB 1



87536094 2

NOTE: *since the decal is applied on the right-hand side window, the directions are to be intended as follows:*
A, B: Forward
D: Backward
E: Right-hand
F: Left-hand

Two function valve - two control levers

Bucket Control **(1)**

A. DUMP

B. ROLLBACK

A - B. AUTOMATED BUCKET METERING – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “A” Dump to “B” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

C. HOLD (central position) - The loader arms and bucket will not move when the control lever is in the HOLD position. When released, the control lever will automatically return to the HOLD position.

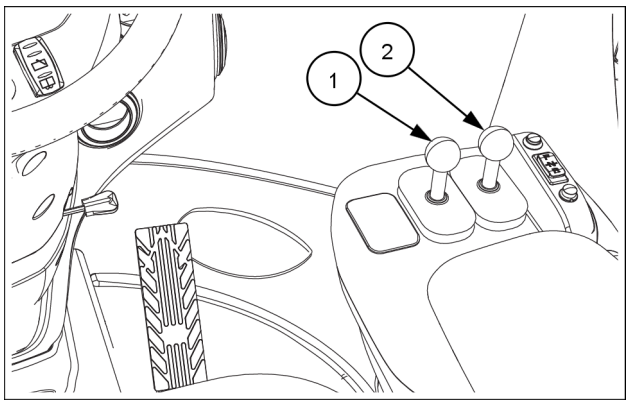
Lift Arm Control **(2)**

D. FLOAT – When in the FLOAT position, the loader bucket floats across the rough ground.

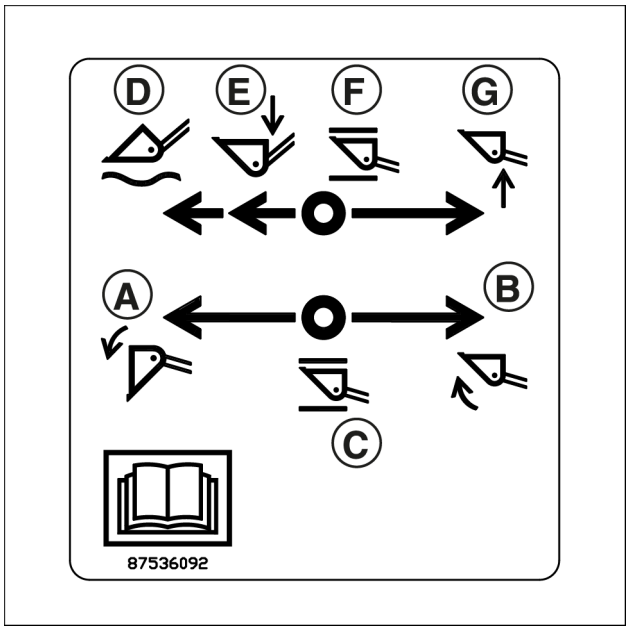
E. LOWER

F. HOLD (central position)

G. RAISE



LEIL16WHL1303AA 3



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NOTE: *since the decal is applied on the right-hand side window, the directions are to be intended as follows:*
A, D, E: Forward
B, G: Backward

Three function valve - one control lever (joy-stick) with one auxiliary function

Lift arm and bucket control **(1)**

A. DUMP

B. ROLLBACK

A - B. AUTOMATED BUCKET METERING – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “A” Dump to “B” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

C. HOLD (central position) - The loader arms and bucket will not move when the control lever is in the HOLD position. When released, the control lever will automatically return to the HOLD position.

Lift Arm Control **(2)**

D. FLOAT – When in the FLOAT position, the loader bucket floats across the rough ground.

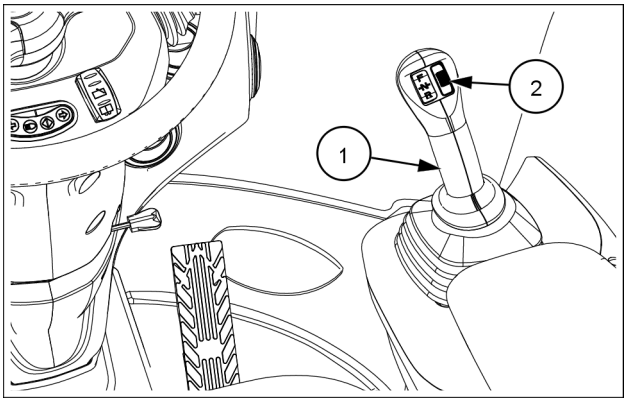
E. LOWER

F. RAISE

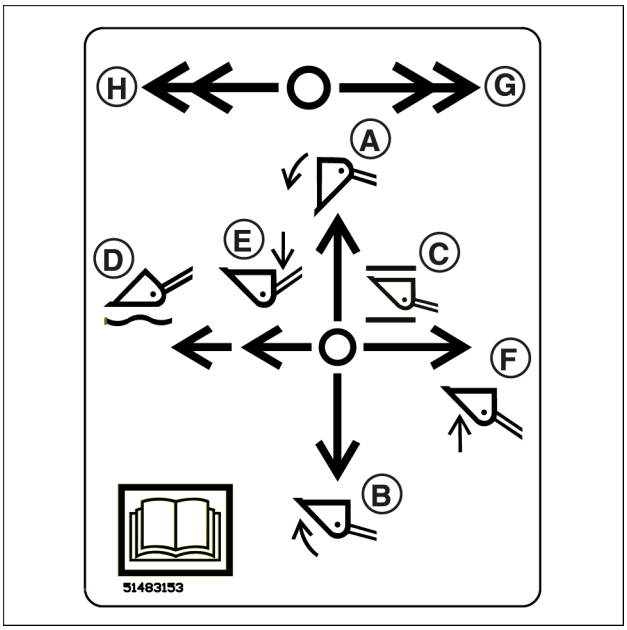
Auxiliary control **(2)**

G. AUXILIARY FUNCTION (WITH DETENT)

H. AUXILIARY FUNCTION (WITH DETENT)



LEIL16WHL1289AB 5



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NOTE: *since the decal is applied on the right-hand side window, the directions are to be intended as follows:*
D, E, H: Forward
F, G: Backward
A: Right-hand
B: Left-hand

Three function valve - three control levers

Bucket Control **(1)**

A. DUMP

B. ROLLBACK

A - B. AUTOMATED BUCKET METERING – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “A” Dump to “B” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

C. HOLD (central position) - The loader arms and bucket will not move when the control lever is in the HOLD position. When released, the control lever will automatically return to the HOLD position.

Lift Arm Control **(2)**

D. FLOAT – When in the FLOAT position, the loader bucket floats across the rough ground.

E. LOWER

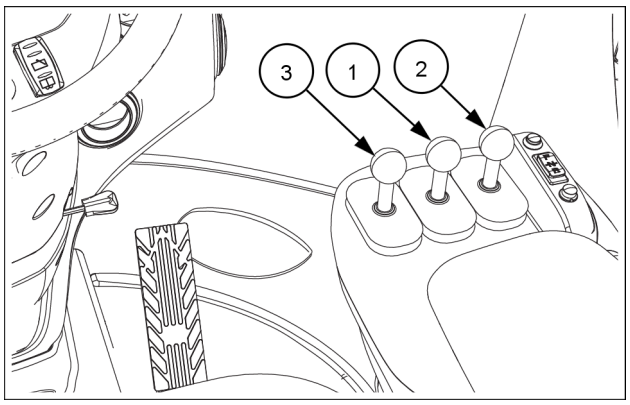
F. HOLD (central position) - The loader arms and bucket will not move when the control lever is in the HOLD position. The control lever will automatically return to the HOLD position when released.

G. RAISE

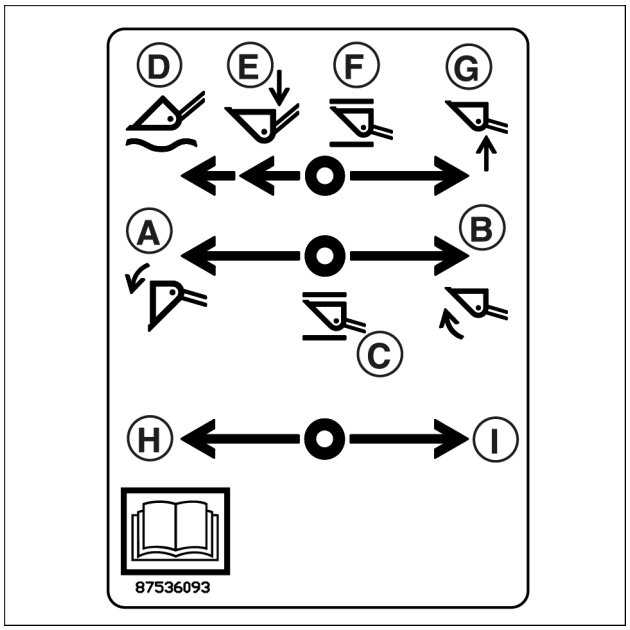
Auxiliary control **(3)**

H. AUXILIARY FUNCTION

I. AUXILIARY FUNCTION



LEIL16WHL1302AA 7



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NOTE: *since the decal is applied on the right-hand side window, the directions are to be intended as follows:*
A, D, E, H: Forward
B, G, I: Backward

Four function valve - one control lever (joystick) with two auxiliary functions

Lift arm and bucket control **(1)**

A. DUMP

B. ROLLBACK

A - B. AUTOMATED BUCKET METERING – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “A” Dump to “B” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

C. HOLD (central position) - The loader arms and bucket will not move when the control lever is in the HOLD position. When released, the control lever will automatically return to the HOLD position.

D. FLOAT – When in the FLOAT position, the loader bucket floats across the rough ground.

E. LOWER

F. RAISE

Auxiliary control **(2)**

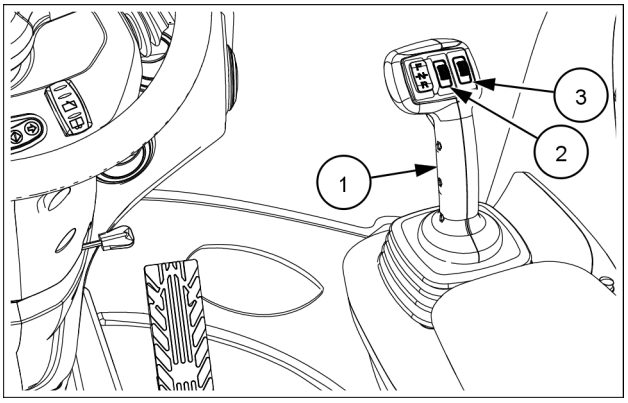
G. AUXILIARY FUNCTION (WITH DETENT)

H. AUXILIARY FUNCTION (WITH DETENT)

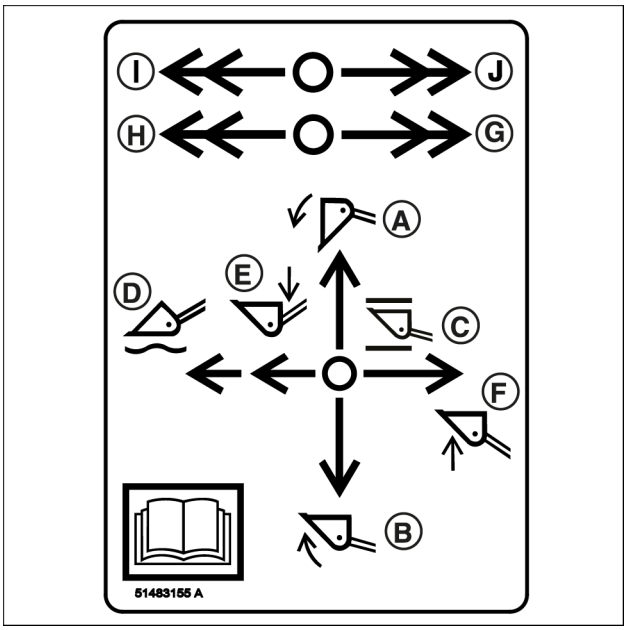
Auxiliary control **(3)**

I. AUXILIARY FUNCTION (WITH DETENT)

J. AUXILIARY FUNCTION (WITH DETENT)



LEIL16WHL1290AA 9



51483155 10

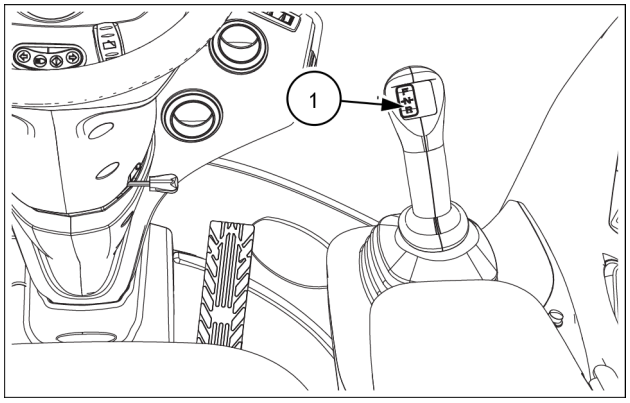
NOTE: *since the decal is applied on the right-hand side window, the directions are to be intended as follows:*
D, E, G, I: Forward
F, H, J: Backward
A: Right-hand
B: Left-hand

2. Auxiliary F-N-R switch

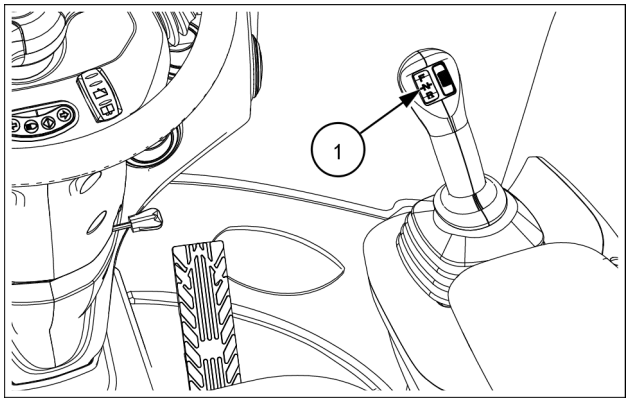
The F-N-R function of the transmission control lever may be moved to the loader control lever for operating efficiency. The auxiliary F-N-R switch **(1)** is located on the joystick or next to the control levers.

All the following steps are required to use this transmission shift function:

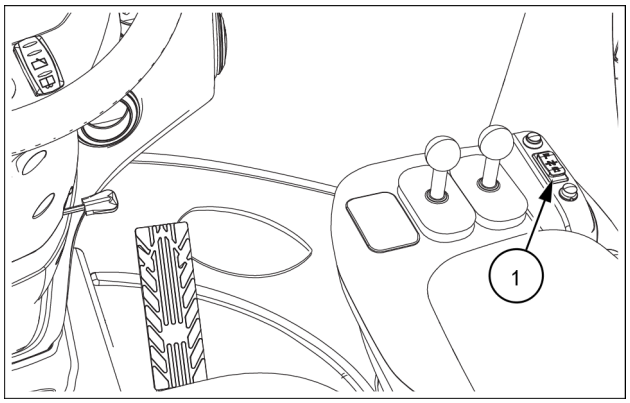
1. Service brake pressure must be at operating pressure.
2. The transmission control lever on the left-hand side of the steering column must be in NEUTRAL.
3. F-N-R switch **(1)** on the joystick or next to the control levers must be in NEUTRAL.
4. Machine speed must be zero.
5. Engine must be running.



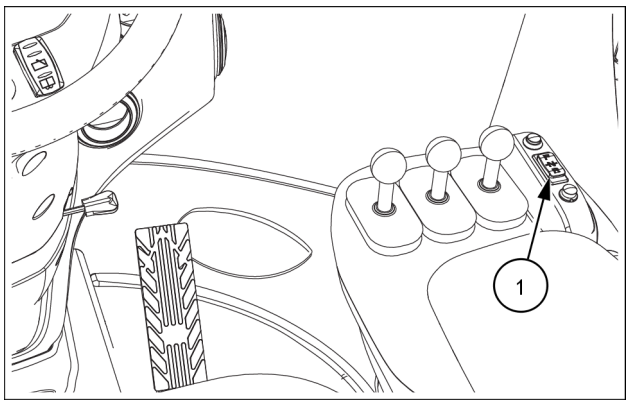
LEIL16WHL1288AB 11



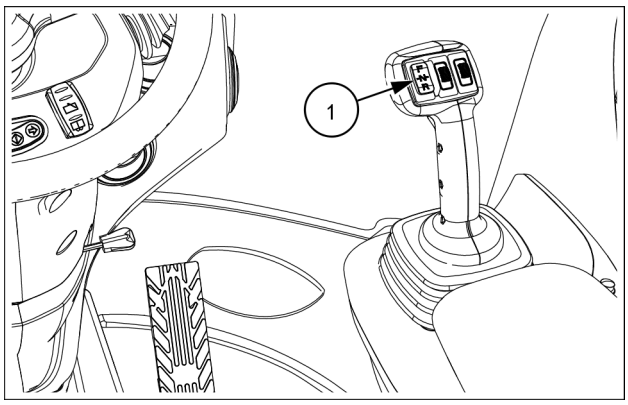
LEIL16WHL1331AA 12



LEIL16WHL1303AA 13

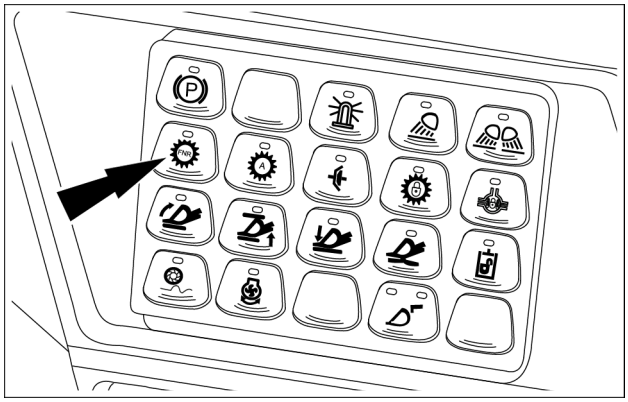


LEIL16WHL1302AA 14



LEIL16WHL1290AA 15

6. Press the auxiliary F-N-R button located on the right-hand side console. The indicator light on the button will illuminate when activated.
7. Press the parking brake button to release the parking brake.
8. Place the auxiliary F-N-R switch **(1)** in either FORWARD or REVERSE to move the machine.

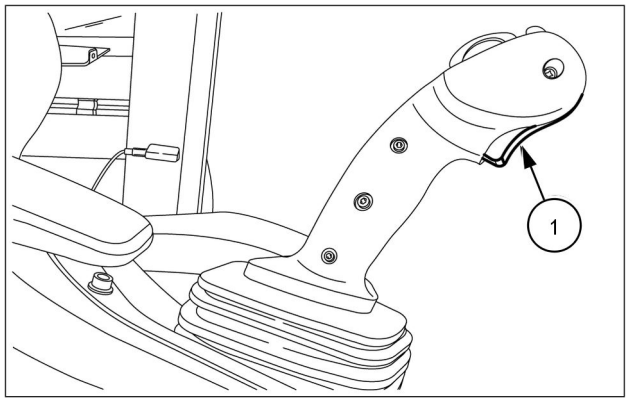


LEIL16WHL1125AA 16

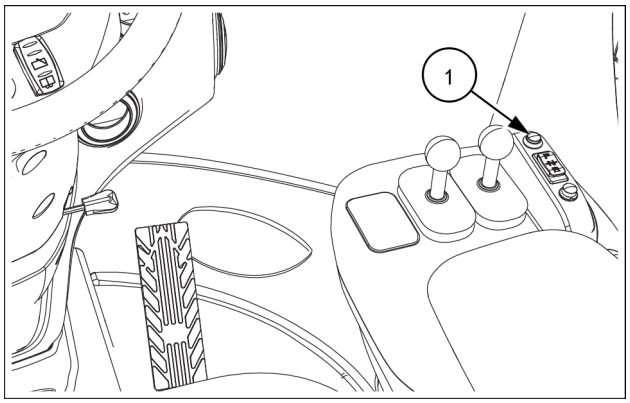
3. Kick-down button

You can use the kick-down button **(1)** to shift down through the gears in single steps. Each time you press the kick-down button **(1)**, the transmission will shift down one gear range until the first gear is reached. Once the kick-down button **(1)** has been pressed down, the transmission maximum gear allowed is lowered.
The kick-down button **(1)** will return to the automatic mode in one of the two cases, as follows:

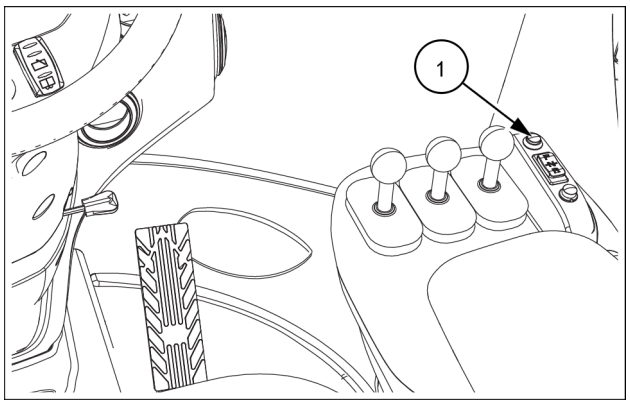
1. when the transmission control lever changes gear;
2. when the transmission control lever is moved to NEUTRAL and then to FORWARD or to REVERSE.



LEIL15WHL0652AB 17



LEIL16WHL1303AA 18



LEIL16WHL1302AA 19

Parking brake

⚠ WARNING

Run-over hazard!
Apply the parking brake before leaving the cab.
Failure to comply could result in death or serious injury.

W1390A

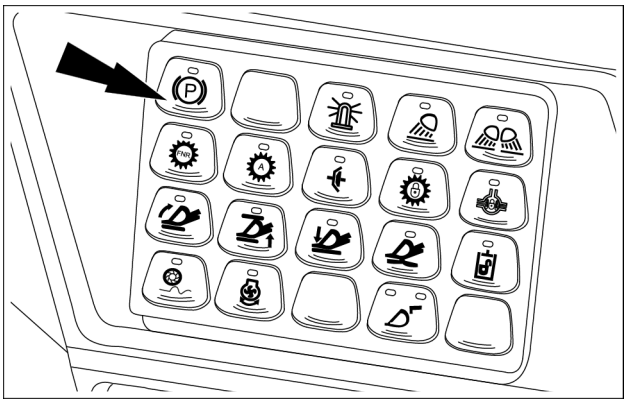
Parking brake button



Make sure the machine has come to a complete stop before applying the parking brake.

The parking brake button engages the parking brake on the transmission output shaft.

NOTICE: *the parking brake is a spring applied, hydraulic released brake which is applied to the drive shaft. The parking brake will effectively hold the machine in place when used correctly.*



LEIL16WHL1125AA 1

Engaging the parking brake

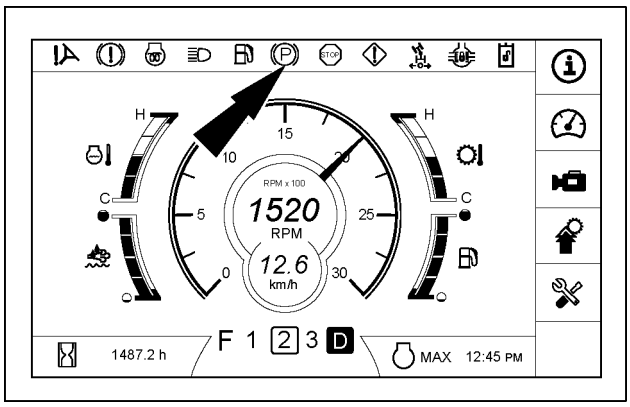
To engage the parking brake, move the transmission control lever to NEUTRAL (N), stop the machine and push the parking brake button. The parking brake will automatically engage when the machine is shut off.

NOTICE: *a failure in the operating procedure or a failure in the electrical or hydraulic function can result in abrupt engagement of the parking brake. Always wear your seat belt.*

NOTICE: *apply the parking brake prior to leaving the cab and/or parking the machine on slopes.*

Parking brake release

NOTE: *the service brake must be at operating pressure before the parking brake can be released to move the machine. The brake pressure indicator lamp on multifunction display must not be illuminated when disengaging the parking brake. Attempting to move the machine prior to the service brake pressures being sufficient causing low operating pressure can result in premature parking brake pad wear.*



LEIL16WHL1570AB 2

Arm pad

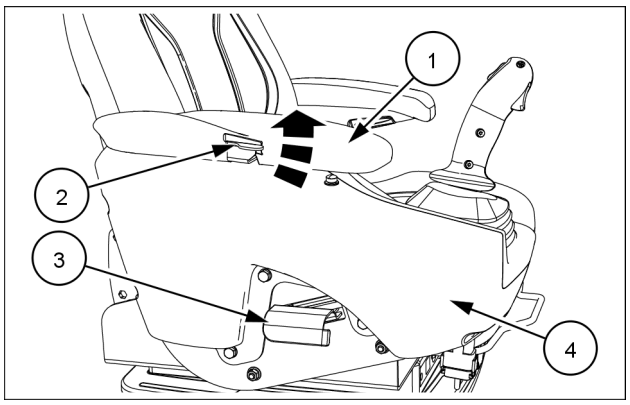
Adjust the arm pad to a comfortable height to operate the loader control levers.

Adjustment lever

To lower the arm pad **(1)**, pull up the lever **(2)**. Adjust the arm pad to a comfortable height. To raise, pull up on the arm pad **(1)**.

Adjustment console

Pull up on the handle **(3)** and adjust the position of the console **(4)** with respect to the operator's seat, by sliding it forward or backward.



LEIL16WHL1467AB 1

Exterior controls

Hood and Timed Disconnect Switches

⚠ WARNING

Automatic closure!
Keep your hands and body and all personnel clear of the machine hood as it closes.
Failure to comply could result in death or serious injury.

W0048A

Hood switch

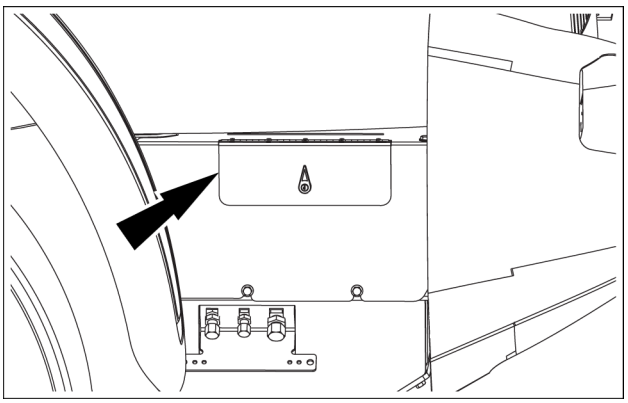
The hood switch is located on the left-hand side of the machine. The hood, left-hand and right-hand side engine covers allow the access to both engine sides, air cleaner and coolers. A locking mechanism is provided for the hood switch cover. Use the machine key to open and close this cover.

1. Insert the key. Make sure to completely insert the key for proper operation.

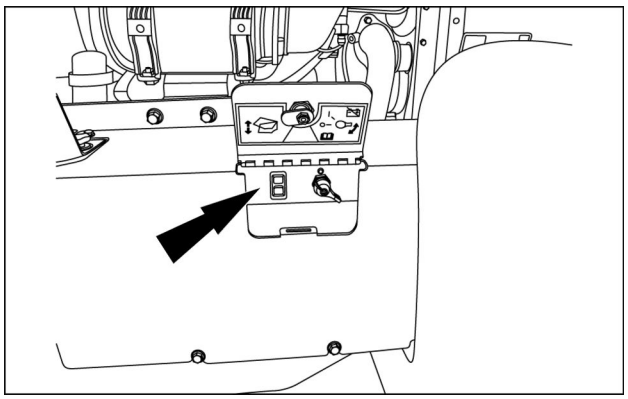
   NOTICE: *damage can occur to the key or locking mechanism if key is improperly inserted and turned.*

2. After releasing the lock, remove the key and open the cover.

3. The hood switch will automatically raise the hood on the machine. Keep all tools, service equipment, and personnel away from the hood when it is opening and closing.



LEIL18WHL1085AA 1



RCPH10WHL106AAH 2

4. Push up on the switch to raise the hood. The switch will remain in the up position for hands free opening. To close the hood, push down on the switch. As a built in safety measure, the down control must be held in order to lower the hood.

Manual hood opening

⚠ WARNING

Crushing hazard!
The hood is extremely heavy. When manually raising the hood, use suitable blocking equipment and watch for sharp edges on machine.
Failure to comply could result in death or serious injury.

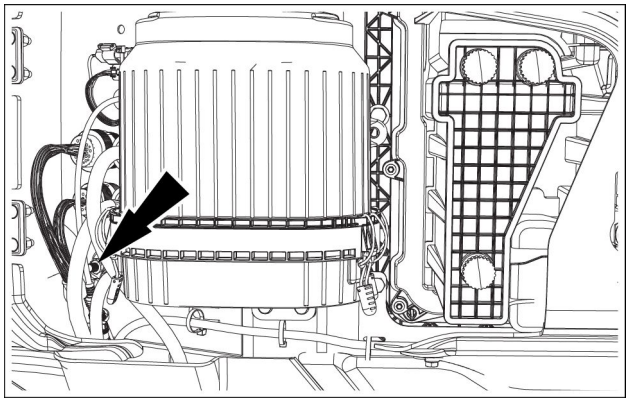
W0049B

If the machine has no power or the battery is too low for the hood switch to function

NOTICE: *do not use this procedure to start the engine. Jump starting the engine from this location may cause electrical and/or harness damage to the machine.*

This machine is equipped with a **24 V** system. Use appropriate booster battery equipment.

1. Use booster battery cables to provide power. Connect the positive booster cable to the cab B+ junction post, located behind the right-hand side cab access door.
2. Connect the negative cable to a proper ground. The hood may now be operated at the switch.

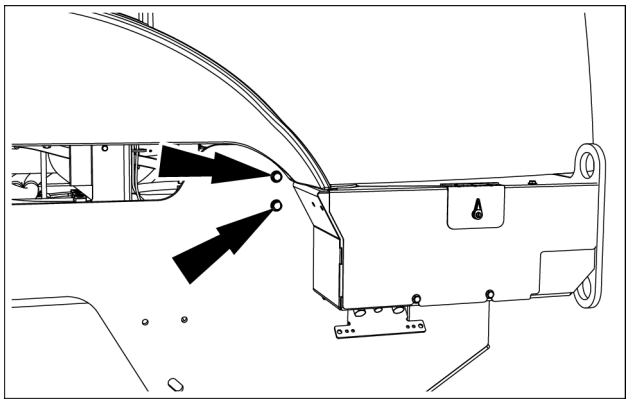


LEIL16WHL1589AB 3

If the machine has power, but the actuator is not functioning

Keep all non-authorized personnel clear of the area. Park the machine on firm, level ground, and lower the attachment. Put the transmission in neutral and apply the parking brake. Turn the engine off.

1. Remove the two actuator mounting bolts at the left-hand rear of the machine just in front of the battery compartment.
2. Raise the hood manually with a suitable hoist. Block for safety. Do not allow the hood to swing over any personnel.

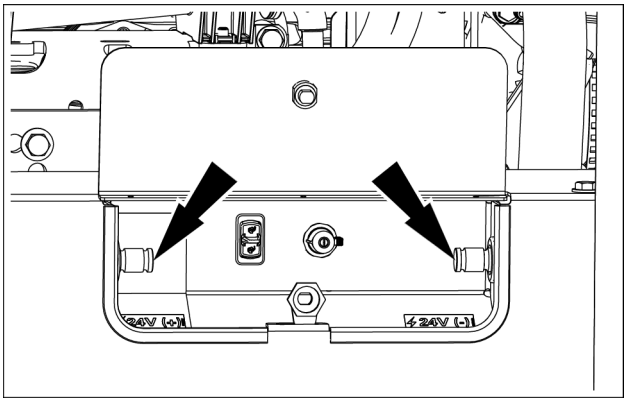


LEIL16WHL1126AB 4

Jump post (optional)

Battery jump posts are located inside the hood opening and timed disconnect switch compartment. The positive and negative posts allow a booster battery to be used, if necessary, to start the machine or to raise the hood.

NOTE: *see "Auxiliary battery connections - Check - Jump post (optional)" – Chapter 7 in this manual for further information.*



LEIL18WHL1100AA 5

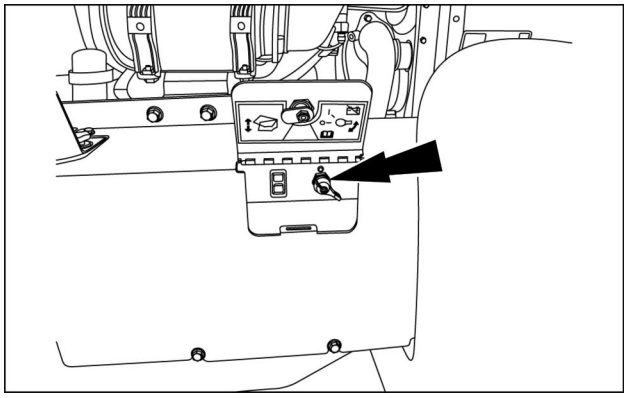
Timed disconnect switch

⚠ WARNING

Electrocution hazard!
When you turn the timed disconnect switch to the OFF position, there is a delay before the switch stops the flow of power to the vehicle. Wait for an audible click before you perform any electrical service.
Failure to comply could result in death or serious injury.

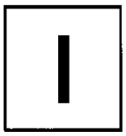
W1521A

The timed disconnect switch has two positions: ON and OFF.



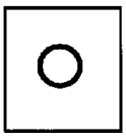
RCPH10WHL106AAH 6

Timed disconnect switch ON



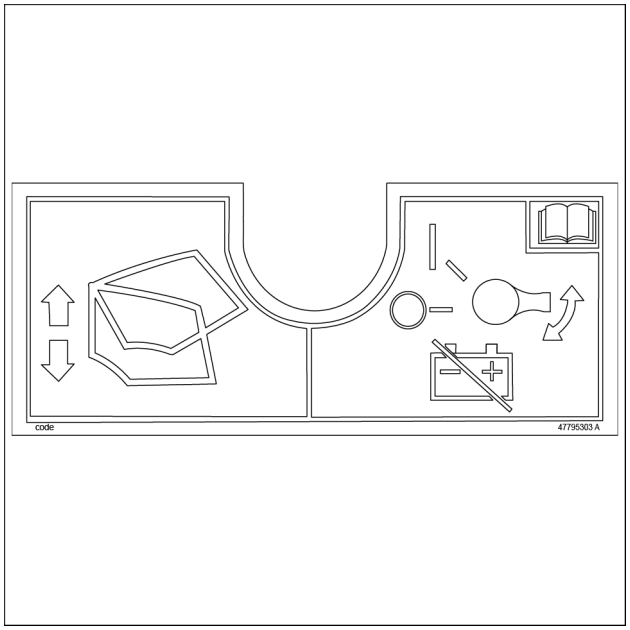
The timed disconnect switch in ON position energizes the entire electrical system. When the timed disconnect switch is ON and the key switch is OFF, the dome lamp, horn, stop lamps, four-way flashers, and rotary light beacon are powered and functional.

Timed disconnect switch OFF



In OFF position, all machine power is interrupted, once the vehicle control module opens the battery isolator.

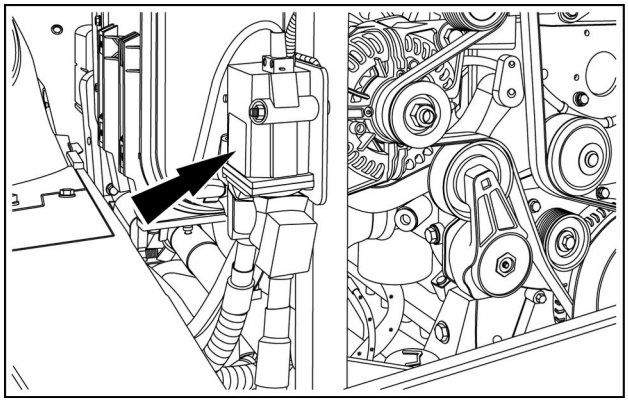
NOTICE: *DO NOT use the timed disconnect switch to stop the engine.*



47795303_ 7

Battery isolator

1. The vehicle is equipped with a battery isolator that supplies battery power to the vehicle. The battery isolator is controlled by the vehicle controller and the timed disconnect switch located at the rear of the machine in the battery box.



LEIL15WHL0563AA 8

2. The vehicle controller will turn ON the battery isolator with the following inputs:
   - Timed disconnect switch
   - Key switch
   - Door switch
3. Under normal operation when the timed disconnect switch is in ON position (switch closed) and the operator either opens the door or turns the key switch from OFF to ACC or ON position, the vehicle controller will turn ON the battery isolator.
4. The vehicle controller will turn OFF the isolator when the key switch has been in OFF position for a period of time (about **5 min**) to allow vehicle functions to complete prior to turning OFF the battery isolator.
5. If the timed disconnect switch is in OFF position (switch open), the vehicle will not turn ON the battery isolator.
6. If the timed disconnect switch is in ON position (with key in OFF position), but for **5 min** none of the actions before described are carried out or the machine is not used, the power supply is excluded through the UCM and the relays.
   To restore the power supply, switch to OFF position first and then switch back to ON position or turn the key to ON position.
7. The operator can hear an audible “click” when the battery isolator opens and closes.

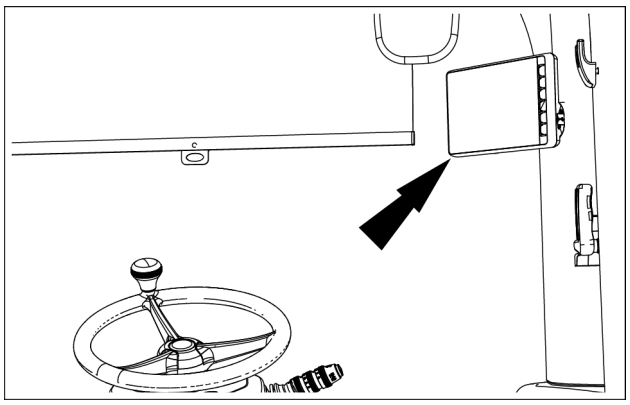
Display

Display description

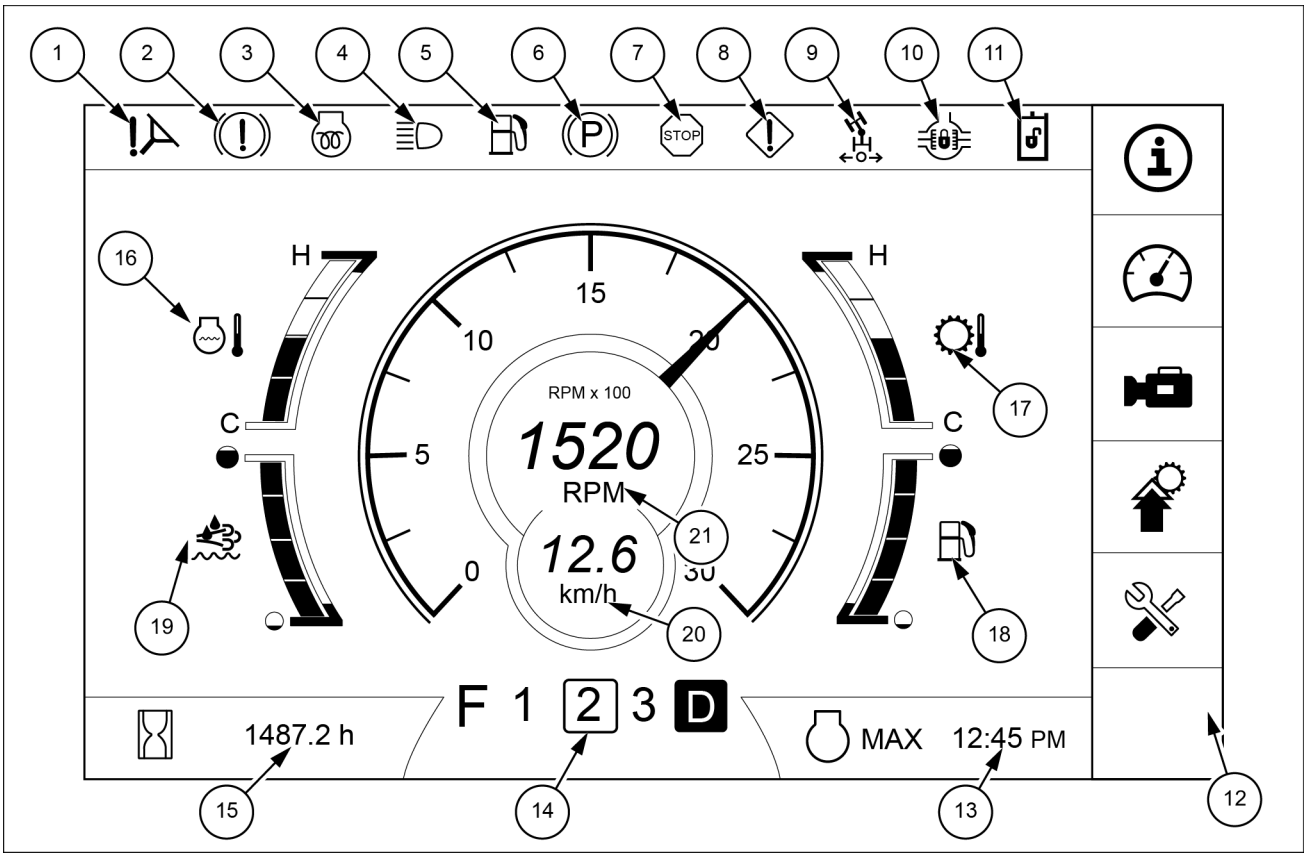
LCD multifunction display

The Liquid Crystal Display (LCD) multifunction display is located above the multifunction keypad.

Information will be displayed on the LCD as directed by the operator or automatically by machine operations. The screen offers prompts to assist the operator when programming machine functions and/or performing diagnostics.



LEIL16WHL0996AB 1



LEIL16WHL1103FB 2

The top section of the screen displays the indicators:

1. Secondary steering pressure indicator (red)
2. Brake pressure indicator (red)
3. Engine grid heater lamp indicator (orange)
4. High beam lamp indicator (blue)
5. Low fuel level (orange)
6. Parking brake indicator (red)
7. Stop master indicator (red, critical)
8. Caution master indicator (yellow, non-critical)
9. Joystick steering indicator (green)
10. Differential lock indicator (red)
11. Hydraulic functions indicator (red)

The right-hand section of the screen displays the main menu **(12)**.

The bottom of the screen displays:

13. Digital clock
14. Gear engaged, the transmission selection FORWARD, NEUTRAL or REVERSE (F-N-R) as selected by the operator
15. Machine hours

The center section of the screen displays:

16. Engine coolant temperature
17. Transmission oil temperature
18. Fuel level
19. **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** level
20. Vehicle speed
21. Engine speed

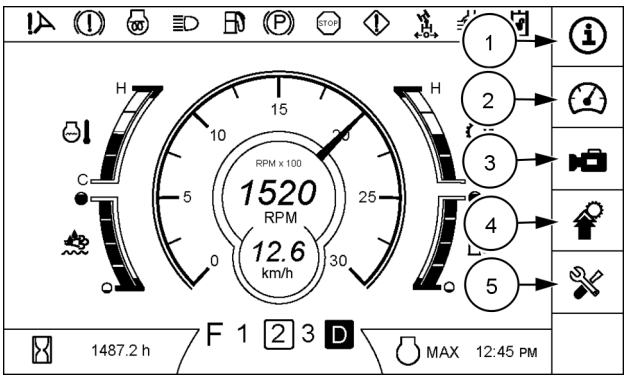
The display is controlled by machine technology and geared toward operator preferences.

MAIN MENU

After the key switch has been turned to ON, the operator or service technician may use the main menu to adjust the machine configurations to working conditions, to test components, to view faults that may have occurred, or to select preferences.

Items and selections in this menu are:

1. Machine status
2. Trip
3. Rearview Camera
4. Machine settings
5. Machine Service



LEIL16WHL1581AA 3

DISPLAY OPERATION

Navigation through the Liquid Crystal Display (LCD) multifunction display screens

A keypad is located on the right-hand external border of the display.
Use this keypad to move from one screen to another, to choose various selections, to monitor the machine functions, and to retrieve information. All selections made with the computerized technology of the LCD screen are essentially programmed in the same manner.
Follow any screen prompts when given and use the confirm key to enter the selection. Use the home key **(A)** to return to the main menu. This will lock the chosen selection into memory.
You can access all functions in the same basic manner.

A. Home key - Use this key to exit and return to the driving screen. You can use this key anytime to start over and begin again or to exit a field. You can also use this key to electronically check fault codes.

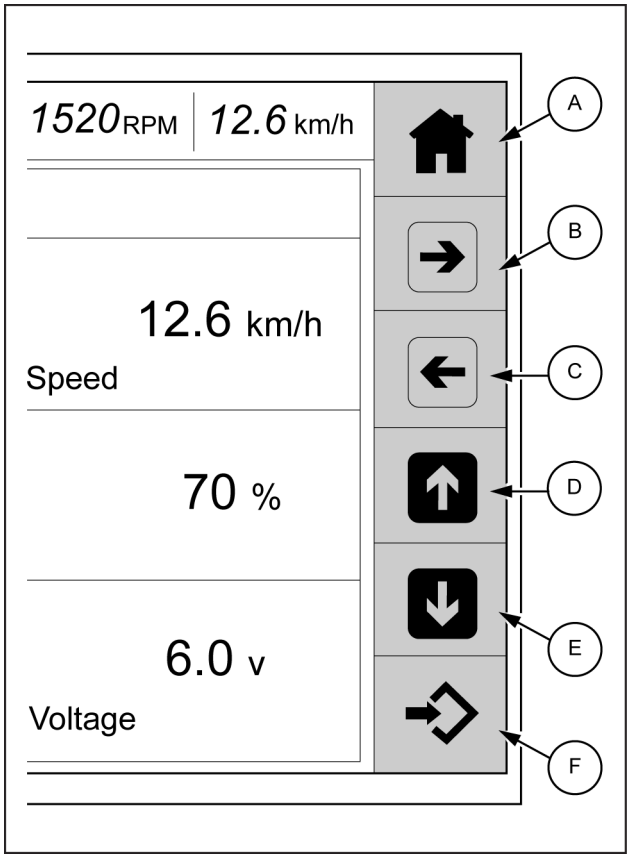
B. Right arrow key - Use this key to scroll right to selections/screens.

C. Left arrow key - Use this key to scroll left to selections/screens.

D. Up arrow key - Use this key to scroll up to selections/screens.

E. Down arrow key - Use this key to scroll down to selections/screens.

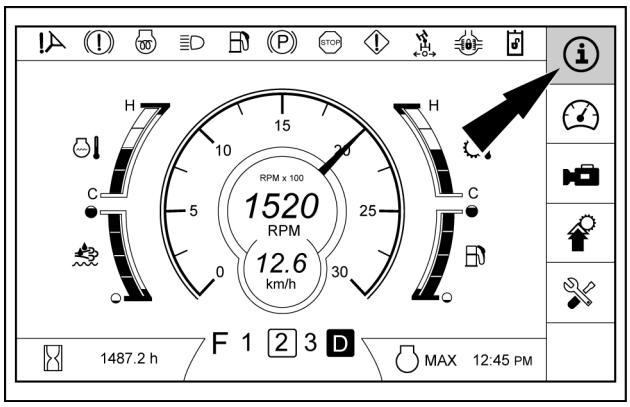
F. Enter/confirm key - Use this key to confirm selections. After selections have been highlighted, use the enter/confirm key to choose selections.



LEIL15WHL0581BB 4

Machine status

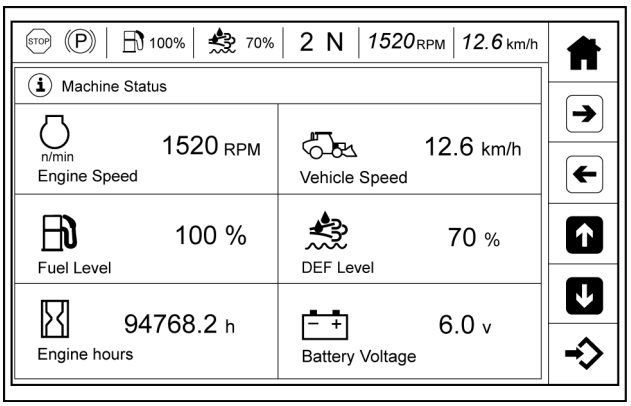
Use the keypad on the right-hand of the display to select the key to access to the “Machine status” screens.



LEIL15WHL0629AA 5

First screen:

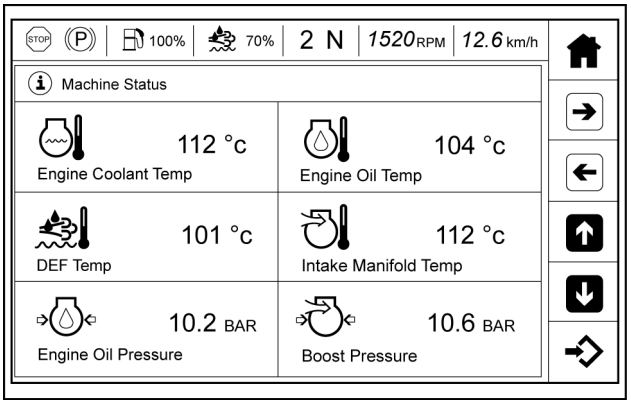
- Engine speed
- Vehicle speed
- Fuel Level
- **DEF/ADBLUE®** level
- Engine hours
- Battery voltage



LEIL15WHL0520AA 6

Second screen:

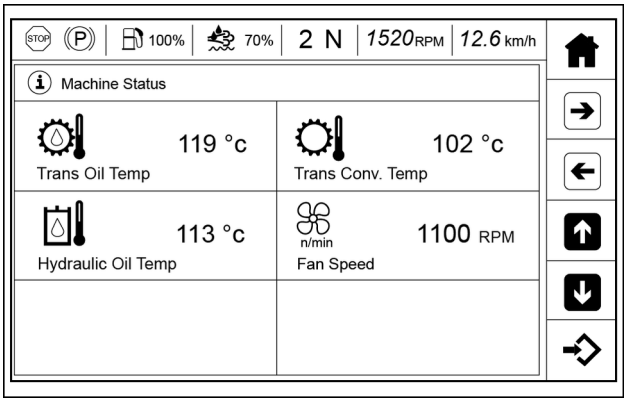
- Engine coolant temperature
- Engine oil temperature
- **DEF/ADBLUE®** temperature
- Intake manifold temperature
- Engine oil pressure
- Boost pressure



LEIL15WHL0521AA 7

Third screen:

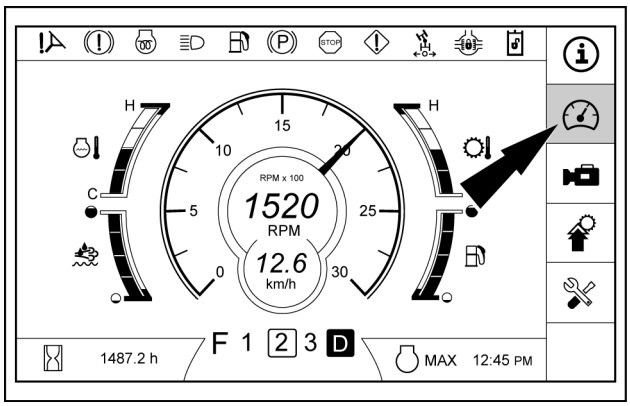
- Transmission oil temperature
- Transmission converter temperature
- Hydraulic oil temperature
- Fan speed



LEIL17WHL1644AA 8

Trip

Use the keypad on the right-hand of the display to select the key to access to the “Trip” screen.

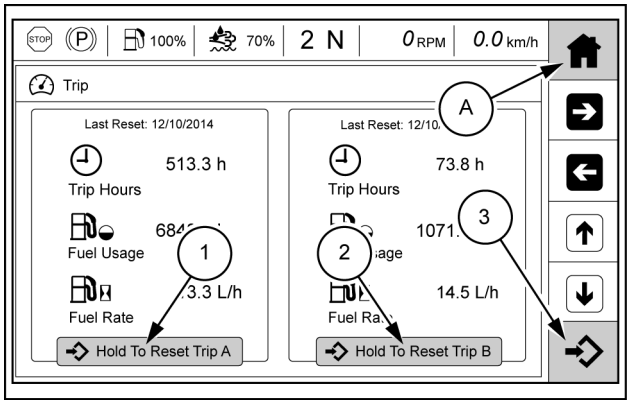


LEIL15WHL0630AA 9

The screen displays:

- Trip A
- Trip B

To reset the trip screen, select desired Trip A **(1)** or B **(2)**. Press and hold the confirm key **(3)**. Press the home key **(A)** to return to the main menu.

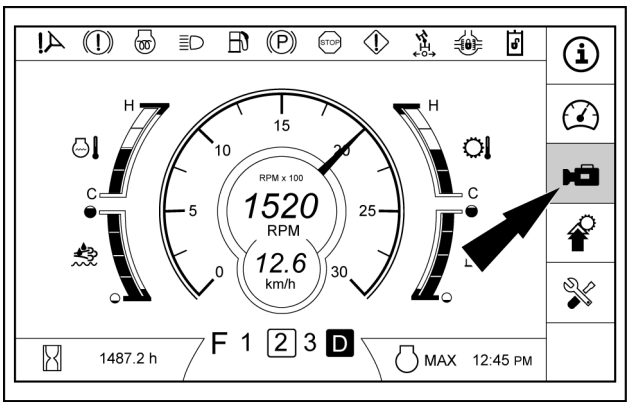


LEIL15WHL0523AB 10

Rearview backup camera

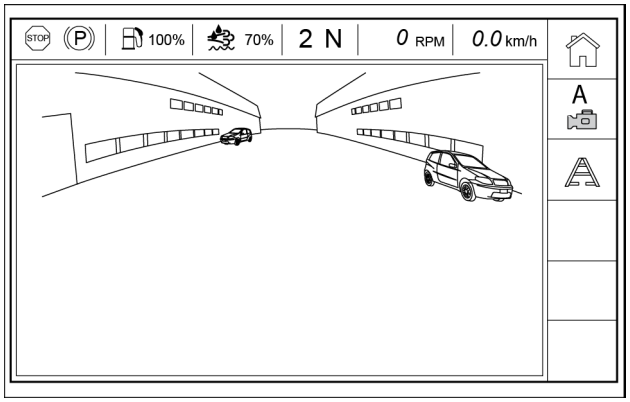
NOTE: *the CCTV (Closed-Circuit Television System) assembled on the machine has one rear camera and the monitor is configured to provide a reverse image.*

Use the keypad on the right-hand of the display to select the key to activate the rearview backup camera.



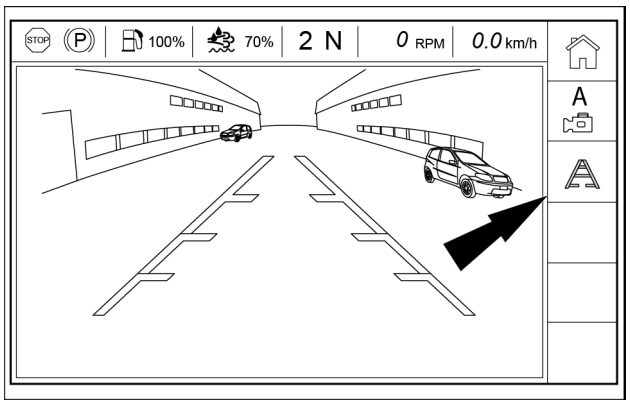
LEIL15WHL0631AA 11

In the display appears the image projected from the rearview camera.



LEIL16WHL0873AA 12

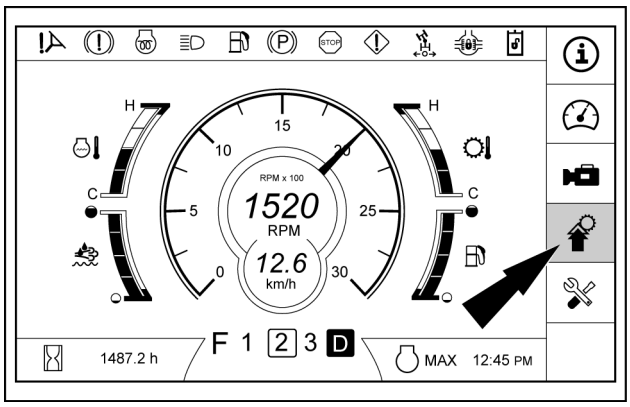
Use the keypad on the right-hand of the display to select the key to activate the “assistant parking line”.



LEIL16WHL0872AA 13

Machine Settings

Use the keypad on the right-hand of the display to select the key to access to the “Machine settings” screens.



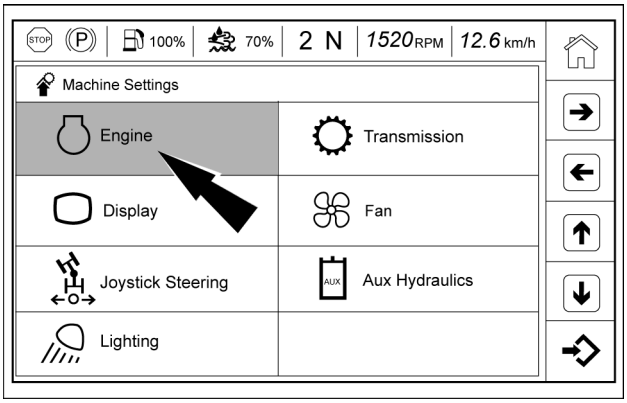
LEIL15WHL0632AA 14

Selections at the setting menu include:

- Engine
- Transmission
- Display
- Fan (if equipped)
- Joystick Steering (if equipped)
- Auxiliary Hydraulics (if equipped)

Engine

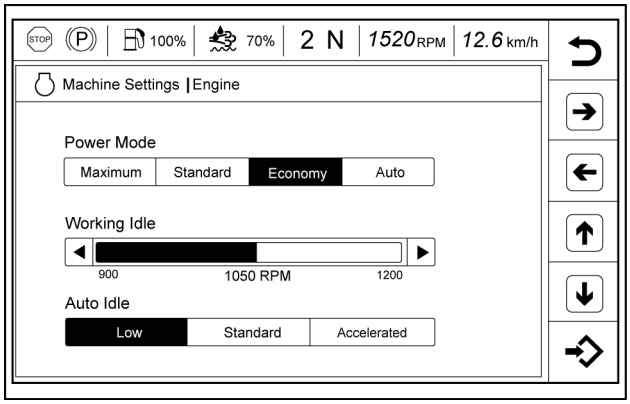
Use the keypad on the right-hand of the display to select the key to switch to the “Engine” settings.



LEIL18WHL1213AA 15

→ Engine selections

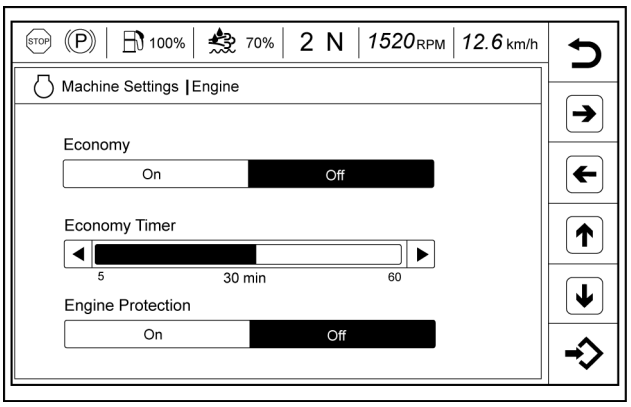
Power Mode
Working Idle
Auto Idle



LEIL15WHL0526AA 16

Economy Auto Shutdown / Economy Timer

This optional feature allows the operator to turn the economy auto engine shutdown ON or OFF along with setting the shutdown intervals (**5 – 60 min**) in five minute increments. The engine and key switch electric power will shut down when the machine is stopped, the transmission is in neutral, and the engine is at idle. The screen will display engine shutdown in a count down of seconds. This allows the operator to cancel this operation. It is designed to save fuel and machine wear when the machine is at an idling condition for a set period of time.



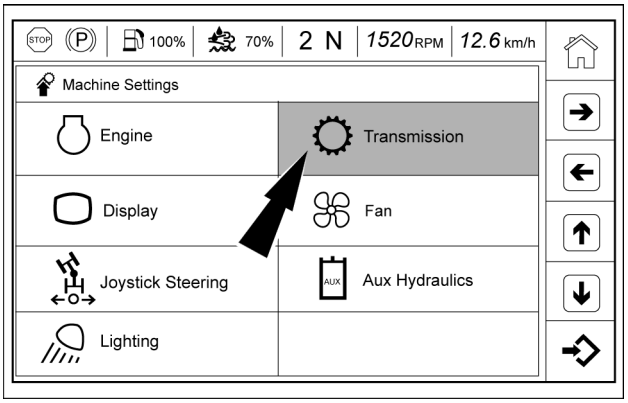
LEIL15WHL0527AA 17

Engine Protection Auto Shutdown

In the engine protection mode, a higher level of system protection is offered. If a warning occurs while the machine is moving, the engine speed will reduce to low idle (**900 RPM**) to allow continued movement. When the machine stops, the engine will shut down. The protection system activates if a critical problem occurs.

Transmission

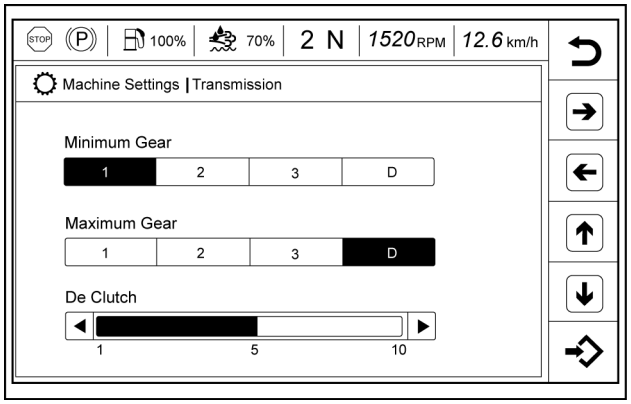
Use the keypad on the right-hand of the display to select the key to switch to the “Transmission” settings.



LEIL18WHL1214AA 18

→ Transmission selections

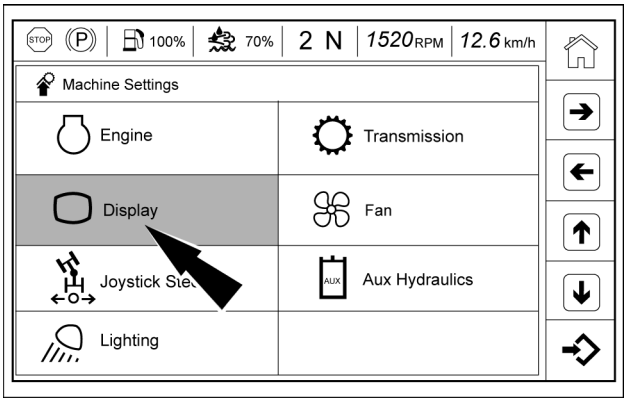
Minimum Gear
Maximum Gear
De Clutch (4 speed only)



LEIL15WHL0528AA 19

Display

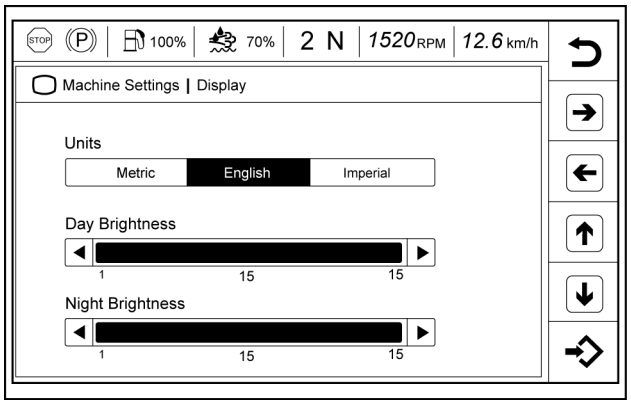
Use the keypad on the right-hand of the display to select the key to switch to the “Display” settings.



LEIL18WHL1215AA 20

→ Display selections

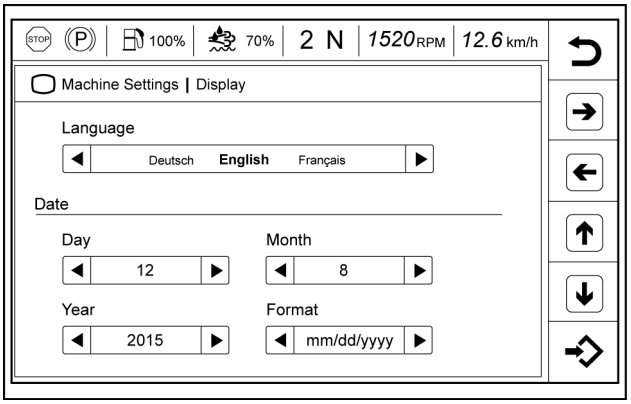
Units
Day Brightness
Night Brightness



LEIL15WHL0529AA 21

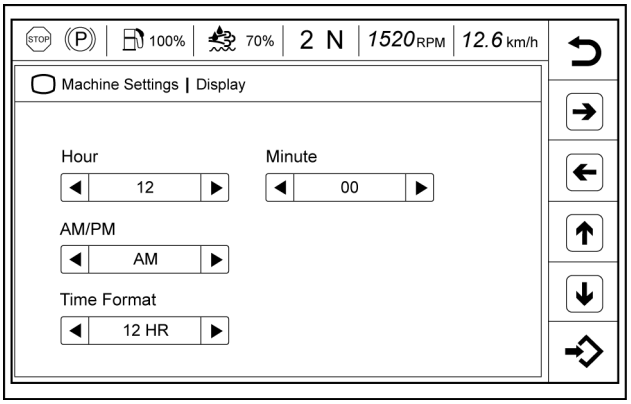
Language

Date



LEIL15WHL0530AA 22

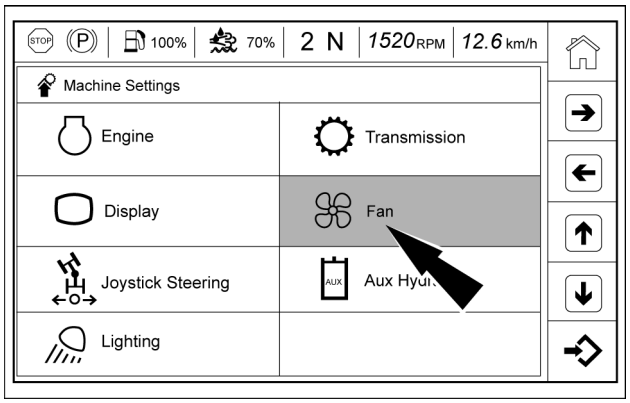
Digital clock



LEIL15WHL0531AA 23

Fan

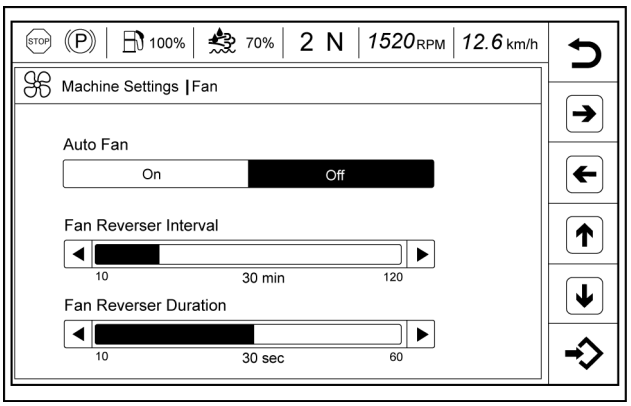
Use the keypad on the right-hand of the display to select the key to switch to the “Fan” settings.



LEIL18WHL1216AA 24

→ Fan selections

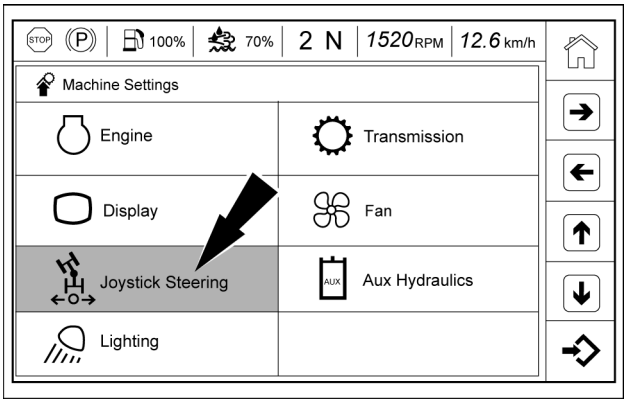
Auto Fan
Fan Reverser Interval
Fan Reverser Duration



LEIL15WHL0532AA 25

Joystick Steering

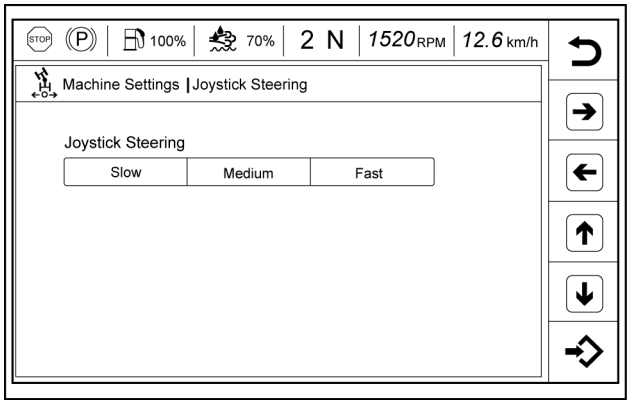
Use the keypad on the right-hand of the display to select the key to switch to the “Joystick Steering” settings.



LEIL18WHL1217AA 26

→ Joystick Steering selections

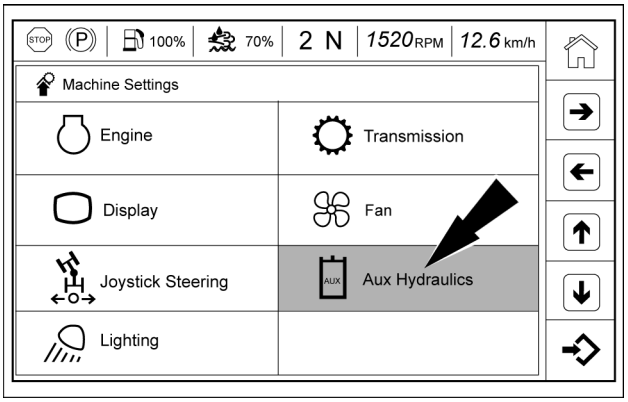
Joystick Steering



LEIL15WHL0533AA 27

Aux Hydraulics

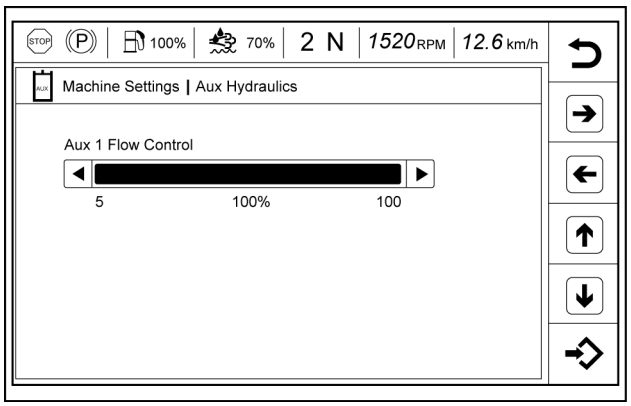
Use the keypad on the right-hand of the display to select the key to switch to the “Auxiliary Hydraulics” settings.



LEIL18WHL1218AA 28

→ Aux Hydraulics selections

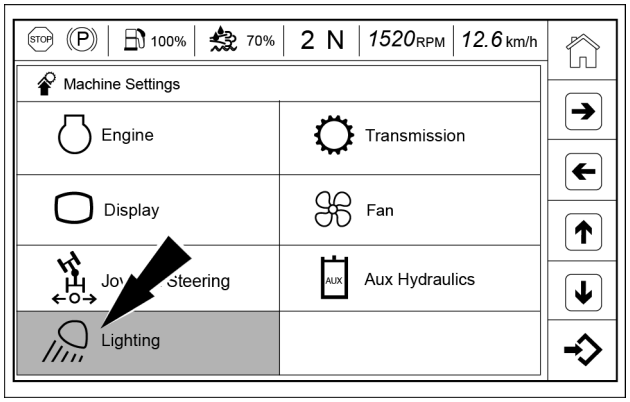
Aux 1 Flow Control



LEIL15WHL0534AA 29

Lighting

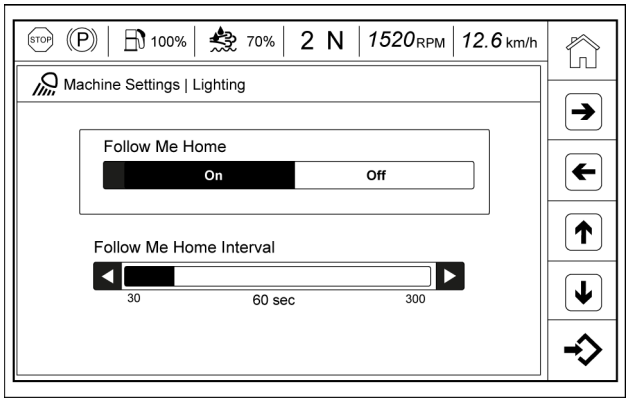
Use the keypad on the right-hand of the display to select the key to switch to the “Lighting” settings.



LEIL18WHL1091AA 30

→ Lighting selections

Follow Me Home
Follow Me Home Interval



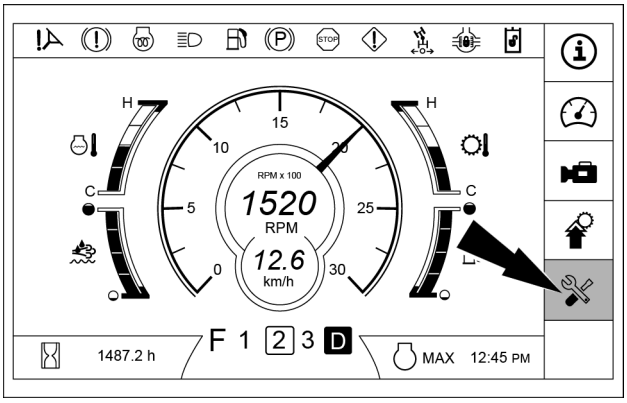
LEIL18WHL1220AA 31

MACHINE SERVICE

Use the keypad on the right-hand of the display to select the key to access to the “Machine service” screens.

Items and selections in this menu are:

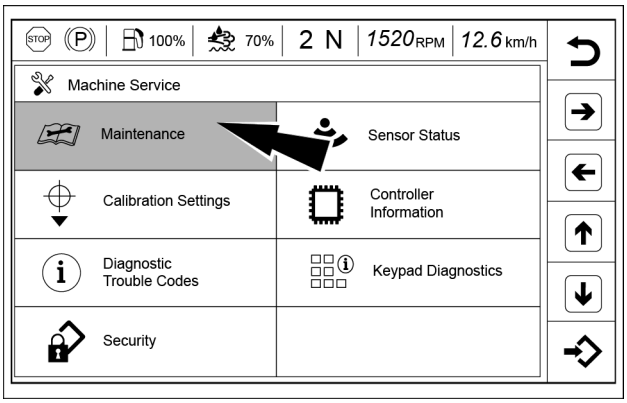
- Maintenance
- Sensor Status
- Calibration Settings
- Controller Information
- Diagnostic Trouble Codes
- Keypad Diagnostics
- Security



LEIL16WHL0908AA 32

Maintenance

Use the keypad on the right-hand of the display to select the key to switch to the “Maintenance” settings.

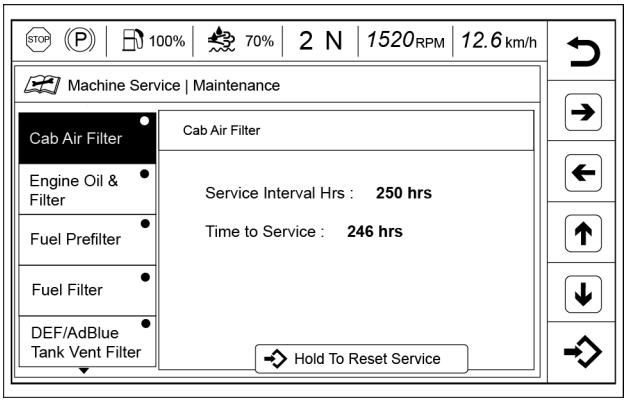


LEIL16WHL0910AA 33

→ Maintenance selections:

Cab air filter:

• Service Intervals Hrs: **250 h**
• Time to Service: (hours remaining until service is due)

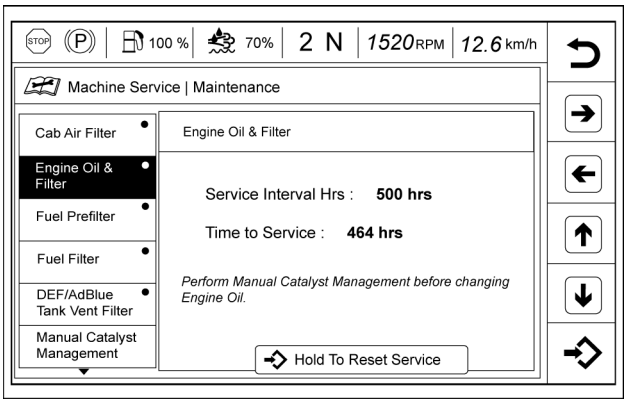


LEIL16WHL0896AA 34

Engine Oil &Filters:

• Service Intervals Hrs: **500 h**
• Time to Service: (hours remaining until service is due)

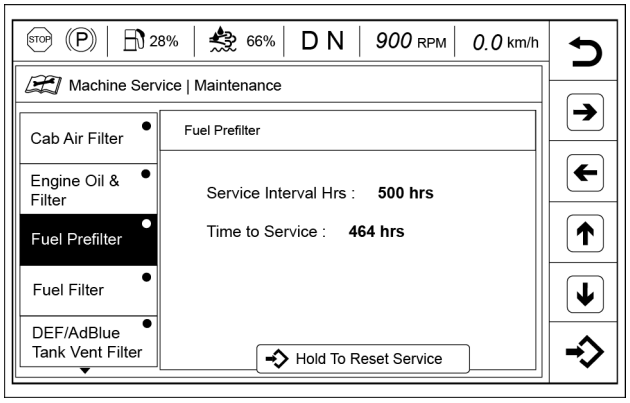
***NOTE:** perform the Manual Catalyst Management (MCM) immediately before changing the engine oil.*



LEIL19WHL0397AA 35

Fuel Pre-filter:

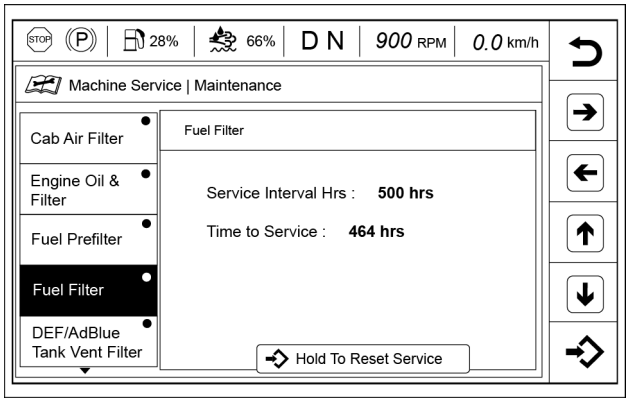
• Service Intervals Hrs: **500 h**
• Time to Service: (hours remaining until service is due)



LEIL16WHL0962AA 36

Fuel Filter:

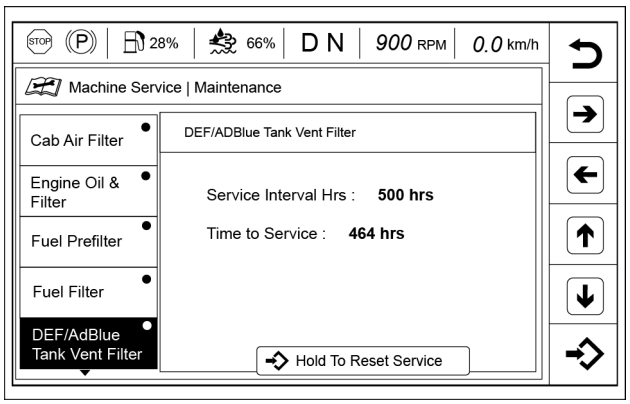
• Service Intervals Hrs: **500 h**
• Time to Service: (hours remaining until service is due)



LEIL16WHL0963AA 37

DEF/ADBLUE® Tank Vent Filter:

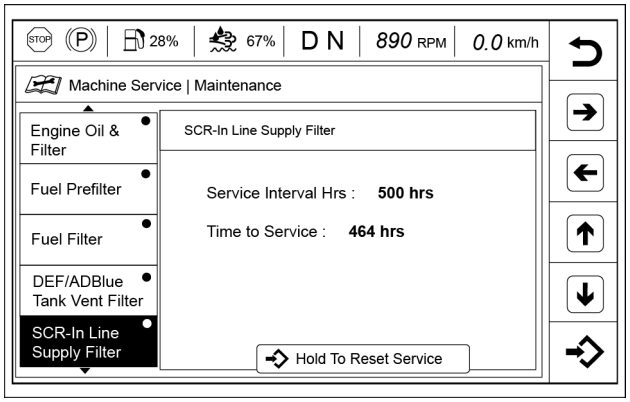
• Service Intervals Hrs: **500 h**
• Time to Service: (hours remaining until service is due)



LEIL16WHL0964AA 38

SCR-In Line Supply Filter:

• Service Intervals Hrs: **500 h**
• Time to Service: (hours remaining until service is due)

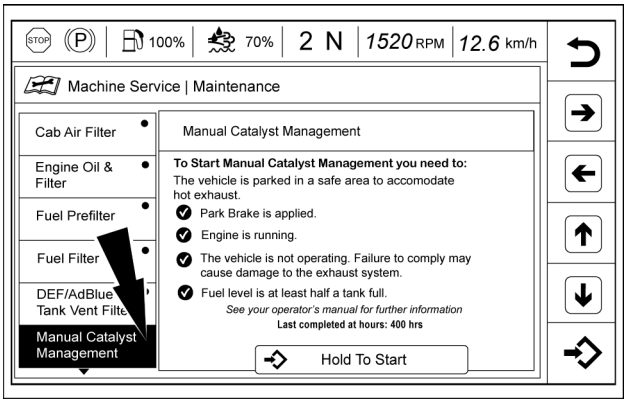


LEIL16WHL0965AA 39

Manual Catalyst Management

Conditions to be satisfied to start the Manual Catalyst Management (MCM):

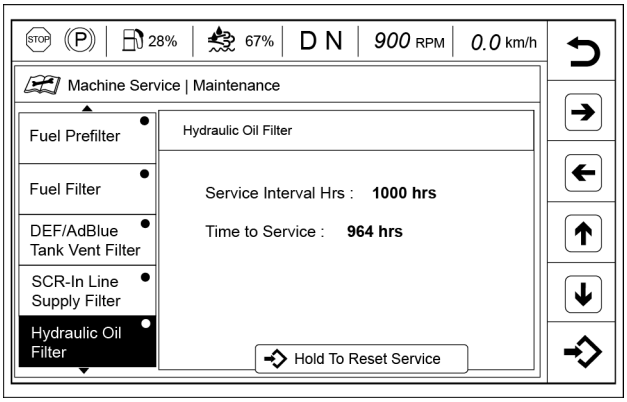
- Park the machine in a safe area to accommodate hot exhaust
- Parking brake is applied
- Engine is running
- The vehicle is not operating
- The fuel is at least half a tank full.



LEIL19WHL0398AA 40

Hydraulic Oil Filter:

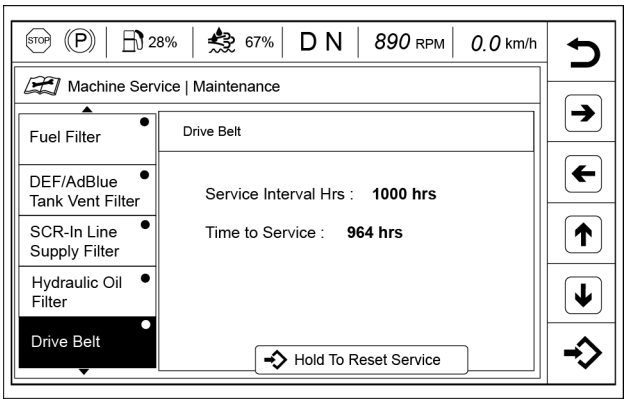
- Service Intervals Hrs: **1000 h**
- Time to Service: (hours remaining until service is due)



LEIL16WHL0966AA 41

Drive Belt:

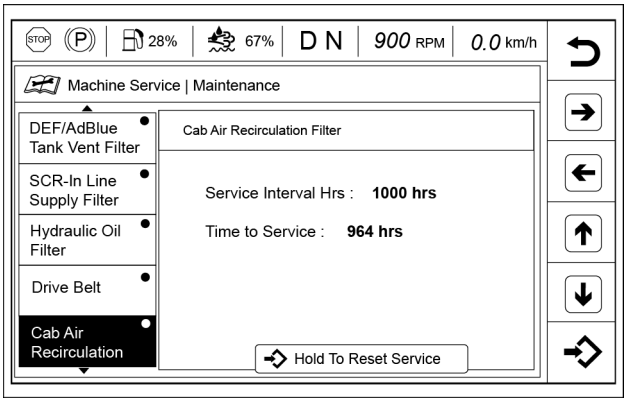
Service Intervals Hrs: **1000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0967AA 42

Cab Air Recirculation:

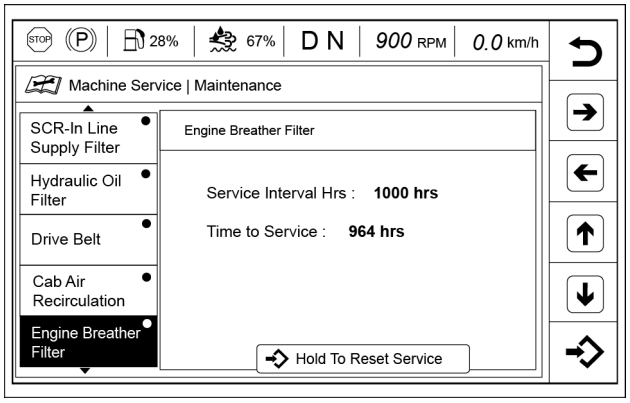
Service Intervals Hrs: **1000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0968AA 43

Engine Breather Filter:

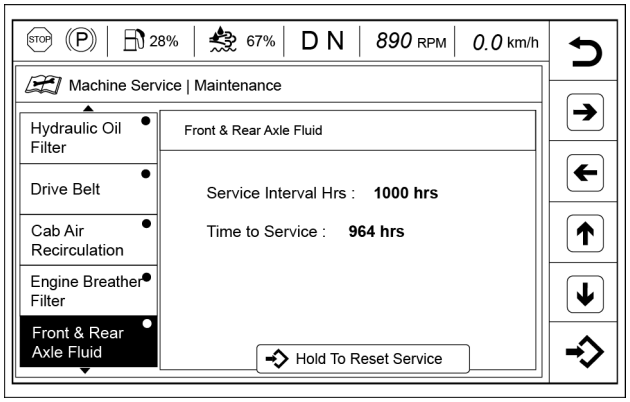
Service Intervals Hrs: **1000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0969AA 44

Front & Rear Axle Fluid:

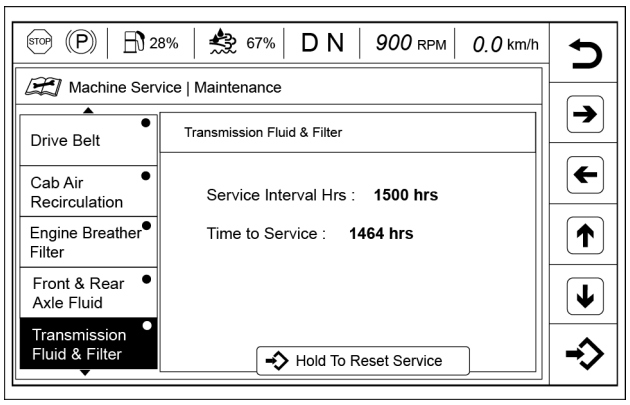
Service Intervals Hrs: **1000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL1307AA 45

Transmission Fluid & Filter:

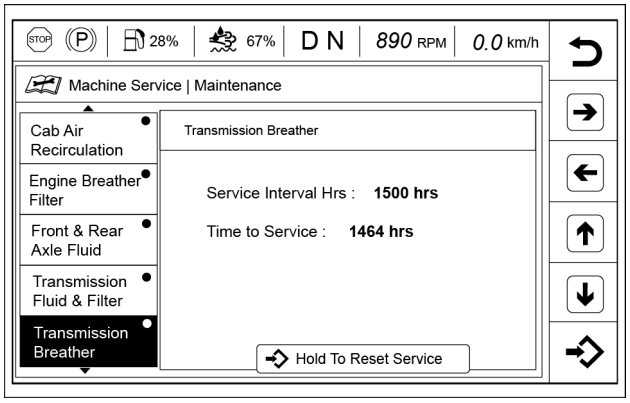
Service Intervals Hrs: **1500 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0971AA 46

Transmission Breather:

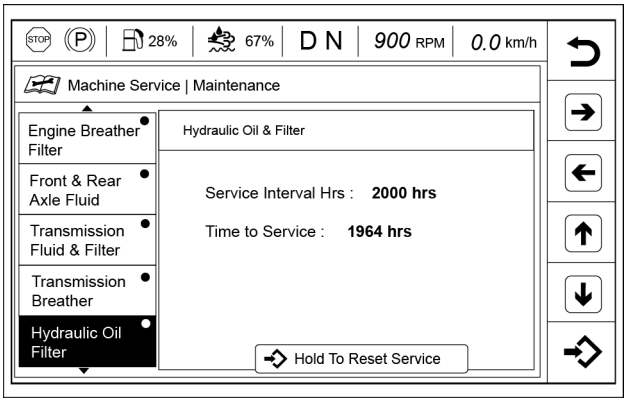
Service Intervals Hrs: **1500 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0972AA 47

Hydraulic Oil & Filter:

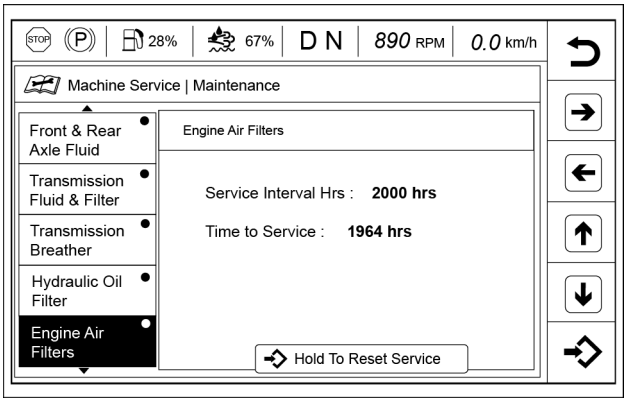
Service Intervals Hrs: **2000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0973AA 48

Engine Air Filters:

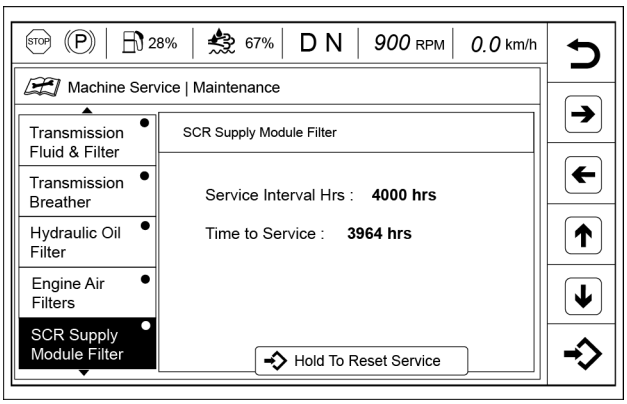
Service Intervals Hrs: **2000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0974AA 49

SCR Supply Module Filter:

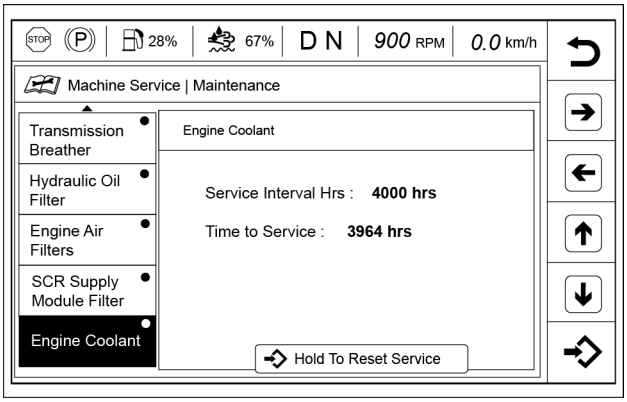
Service Intervals Hrs: **4000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0975AA 50

Engine Coolant:

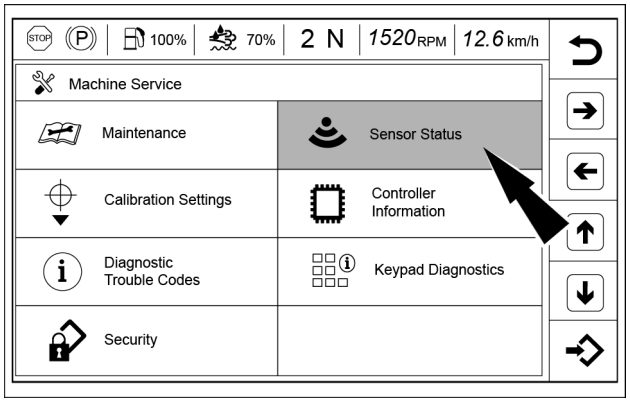
Service Intervals Hrs: **4000 h**
Time to Service: (hours remaining until service is due)



LEIL16WHL0976AA 51

Sensor Status

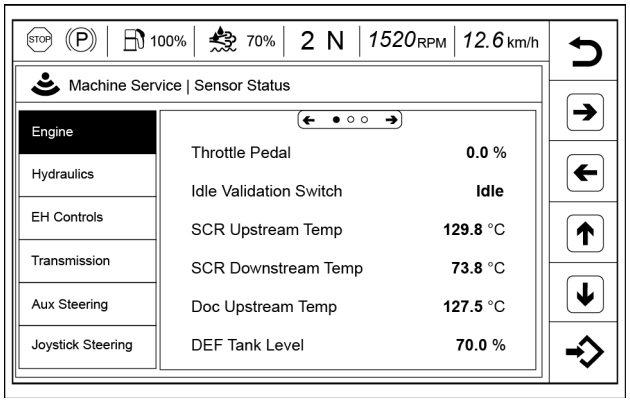
Use the keypad on the right-hand of the display to select the key to switch to the “Sensor Status” screens.



LEIL16WHL0930AA 52

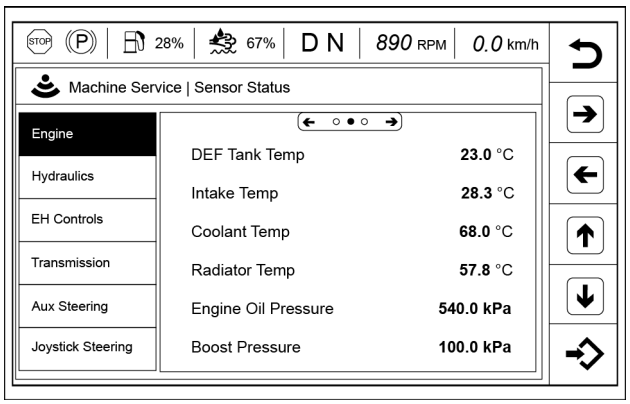
→ Engine

Throttle Pedal
Idle Validation Switch
SCR Upstream Temperature
SCR Downstream Temperature
Doc Upstream Temperature
DEF/ADBLUE® Tank Level



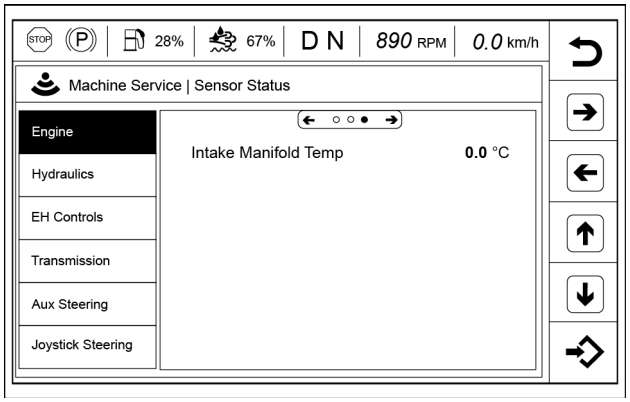
LEIL16WHL0890AA 53

DEF Tank Temp
Intake Temp
Coolant Temp
Radiator Temp
Engine Oil Pressure
Boost Pressure



LEIL16WHL0983AA 54

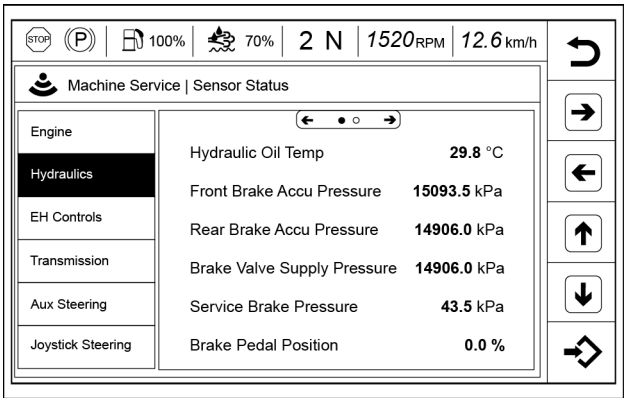
Intake Manifold Temp



LEIL16WHL0982AA 55

→ Hydraulics

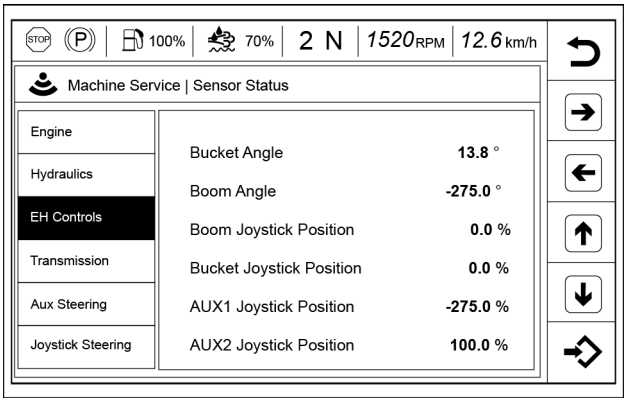
Hydraulic Oil Temperature
Front Brake Accumulator Pressure
Rear Brake Accumulator Pressure
Brake Valve Supply Pressure
Service Brake Pressure
Brake Pedal Position



LEIL16WHL0891AA 56

→ EH (Electro-Hydraulic) Controls

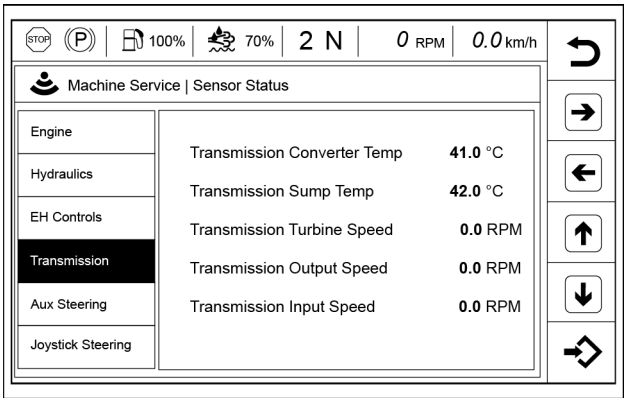
Bucket Angle
Boom Angle
Boom Joystick Position
Bucket Joystick Position
AUX1 Joystick Position
AUX2 Joystick Position



LEIL16WHL0892AA 57

→ Transmission

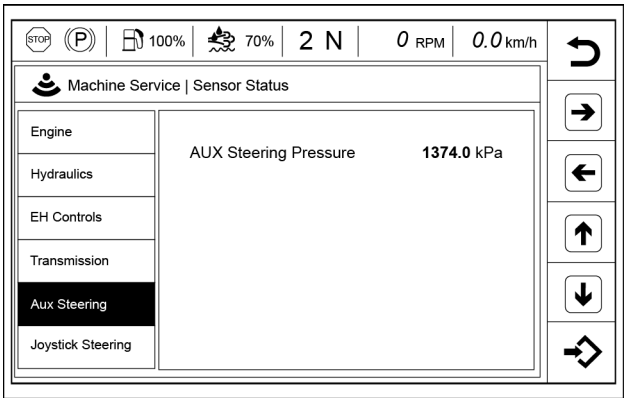
Transmission Converter Temperature
Transmission Sump Temperature
Transmission Turbine Speed
Transmission Output Speed
Transmission Input Speed



LEIL16WHL0893AA 58

→ Auxiliary Steering

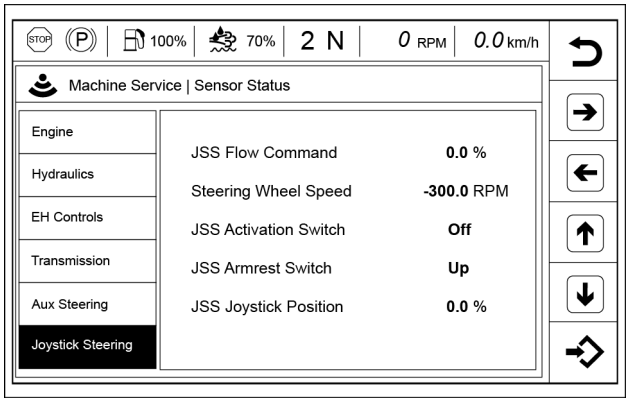
Auxiliary Steering



LEIL16WHL0894AA 59

→ Joystick Steering

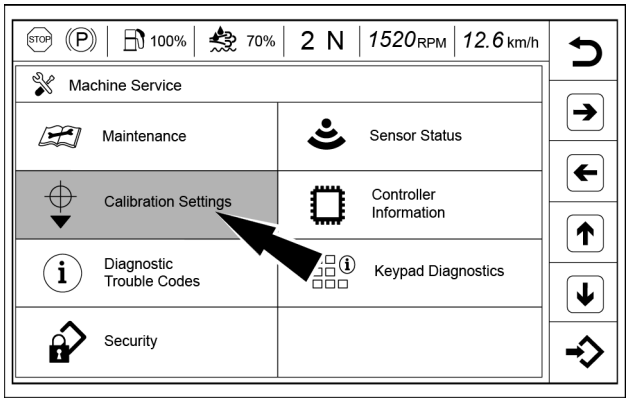
JSS Flow Command
Steering Wheel Speed
JSS Activation Switch
JSS Armrest Switch
JSS Joystick Position



LEIL16WHL0895AA 60

Calibration Settings

Use the keypad on the right-hand of the display to select the key to switch to the “Calibration Settings” screens.

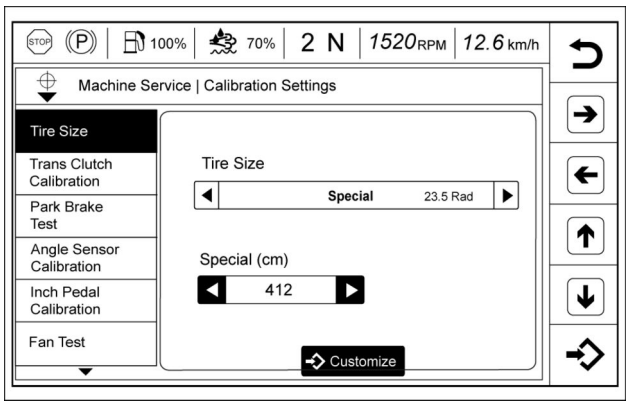


LEIL16WHL0874AA 61

→ Tire Size

Tire Size
Special (cm)

NOTICE: *only for special Tire.*



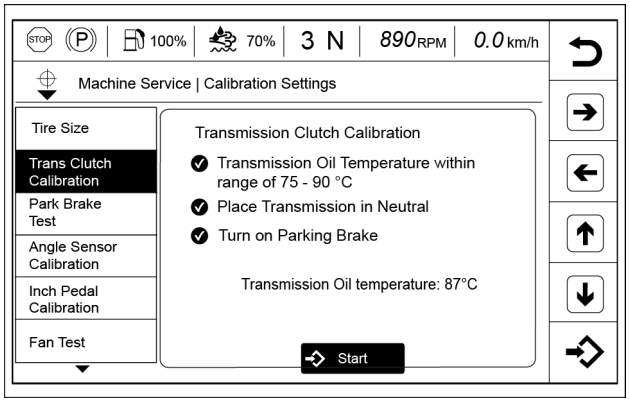
LEIL20WHL1040AA 62

→ Transmission Clutch Calibration

Conditions to be satisfied to start the transmission clutch calibration:

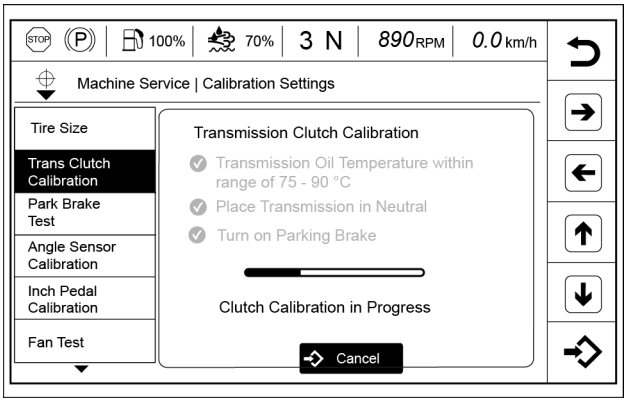
- Transmission Oil Temperature within range of **75 – 90 °C**
- Place Transmission in Neutral
- Turn on Parking Brake

Select “Start” to proceed with the transmission clutch calibration.



LEIL17WHL0952AA 63

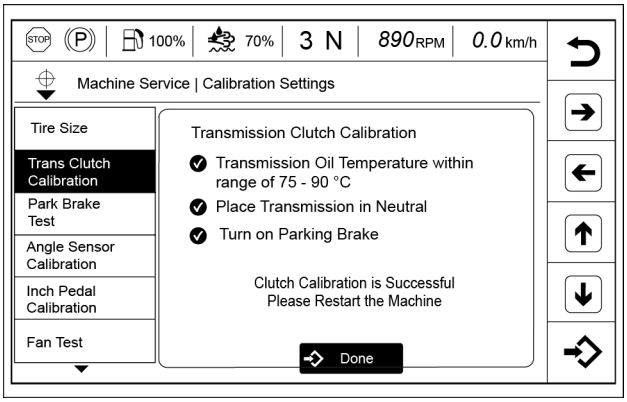
Transmission clutch calibration in progress



LEIL17WHL0953AA 64

Transmission clutch calibration is successful.

Select “Done” to exit. Restart the machine.



LEIL17WHL0954AA 65

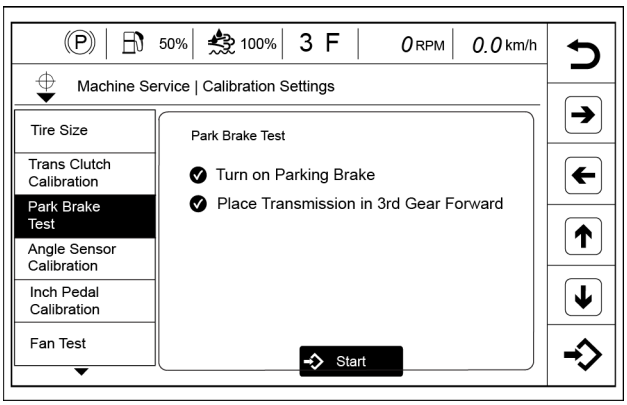
→ Parking Brake Test

Conditions to be satisfied to start the parking brake test:

- Turn On parking brake
- Place Transmission in 3rd Gear Forward

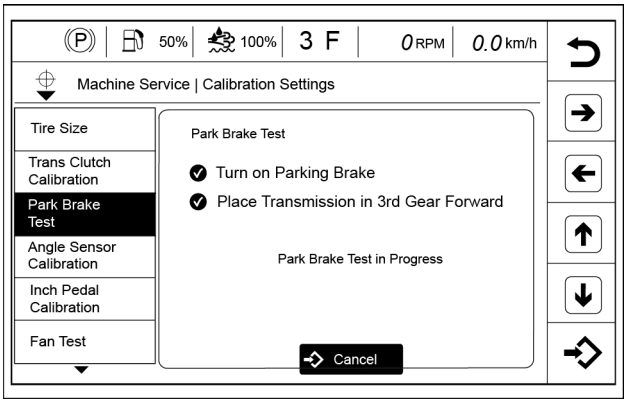
Select “Start” to proceed with the parking brake test.

NOTICE: *before starting the test make sure you have room to move forward.*



LEIL17WHL1647AA 66

Parking brake test in progress

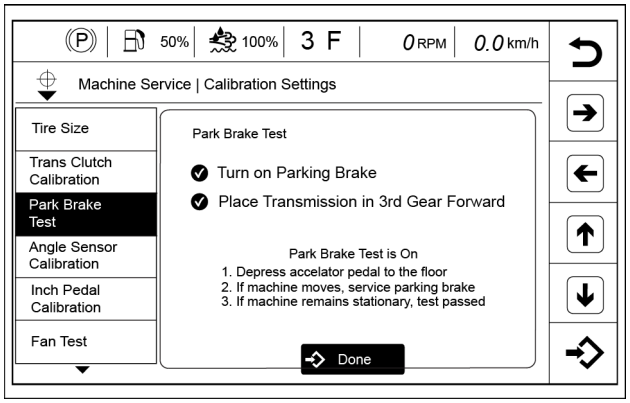


LEIL17WHL1648AA 67

When the parking brake test is ON, carry out the following steps:

- Depress the accelerator pedal to floor
- If machine moves forward (parking brake worn), the test failed; service parking brake
- If machine remains stationary, test passed

Select “Done” to exit.



LEIL17WHL1649AA 68

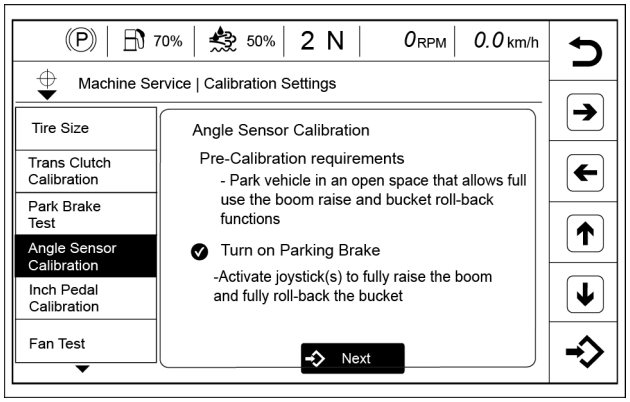
→ Angle sensor Calibration

Conditions to be satisfied to start the angle sensor calibration:

- Park the vehicle in an open space that allows to use the boom raise and bucket roll-back functions
- Turn On Parking Brake

Activate the joystick(s) to fully raise the boom and fully roll-back the bucket.

Select “Next” to proceed with the angle sensor calibration procedure.

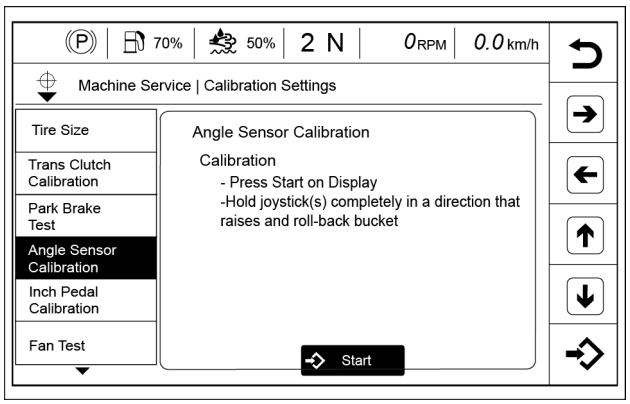


LEIL17WHL1055AA 69

→ Angle sensor Calibration

Select “Start” to proceed with the angle sensor calibration procedure.

Hold joystick(s)completely in a direction that raises and roll-back bucket.



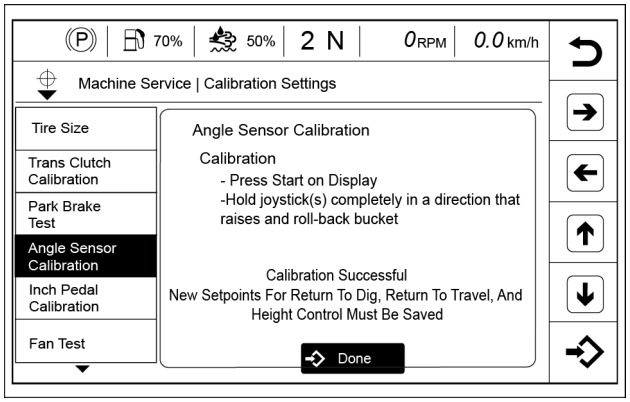
LEIL17WHL1056AA 70

→ Angle sensor Calibration

Calibration Successful

New setpoints for Return-to-dig, Return-to-travel and Height Control must be saved

Select “Done” to exit.



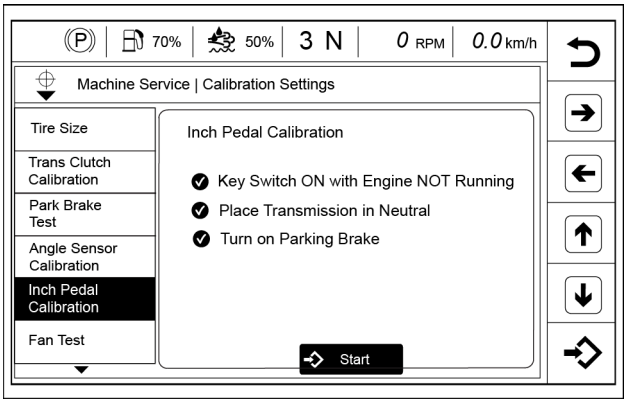
LEIL17WHL1057AA 71

→ Inch Pedal Calibration (5 speed only)

Conditions to be satisfied to start the inch pedal calibration:

- Key Switch ON with Engine NOT Running
- Place Transmission in Neutral
- Turn On Parking Brake

Select “Start” to proceed with the inch pedal calibration.

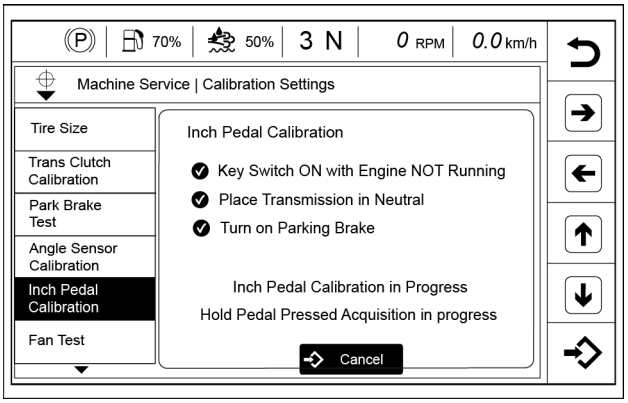


LEIL17WHL1638AA 72

Inch pedal calibration is in progress

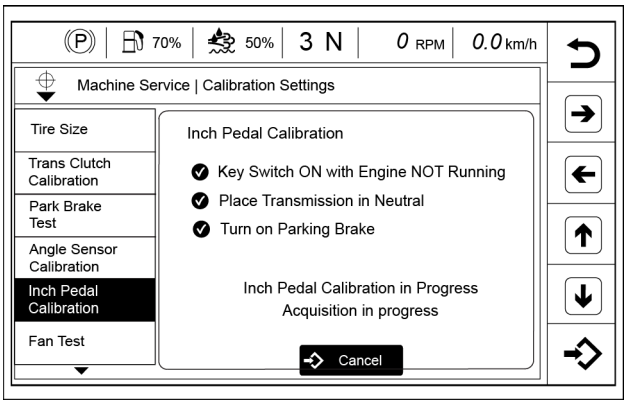
Press the service brake pedal

Hold the service brake pedal pressed for acquisition



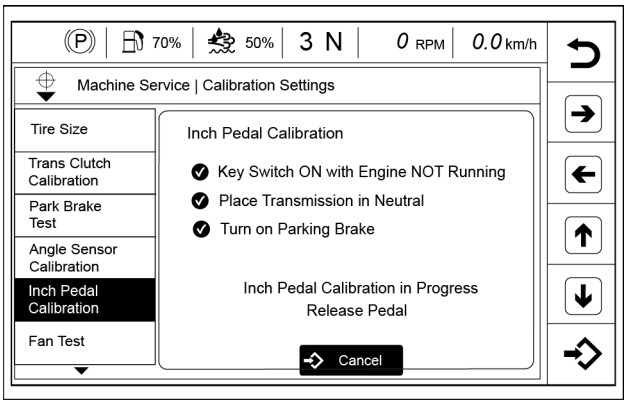
LEIL17WHL1640AA 73

Acquisition is in progress



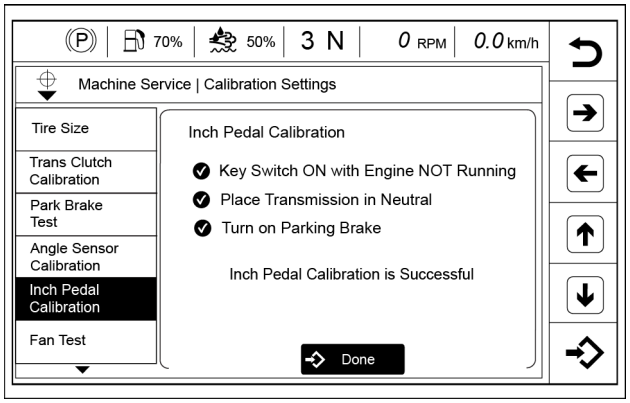
LEIL17WHL1641AA 74

Release the service brake pedal



LEIL17WHL1642AA 75

Inch pedal calibration is successful.
Select “Done” to exit.



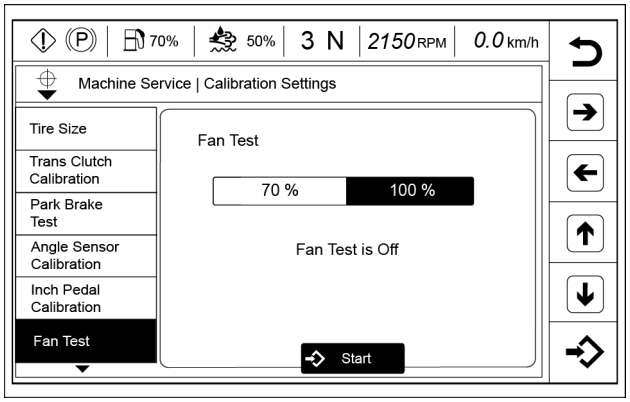
LEIL17WHL1643AA 76

→ Fan Test

Fan Test selection:

- **70%**
- **100%**

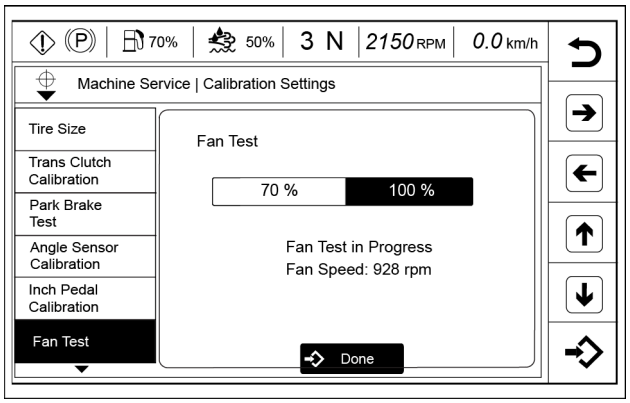
Select “Start” to proceed with the Fan Test.



LEIL17WHL1634AA 77

Fan Test is in progress.
Fan speed is displayed.

Select “Done” to exit.



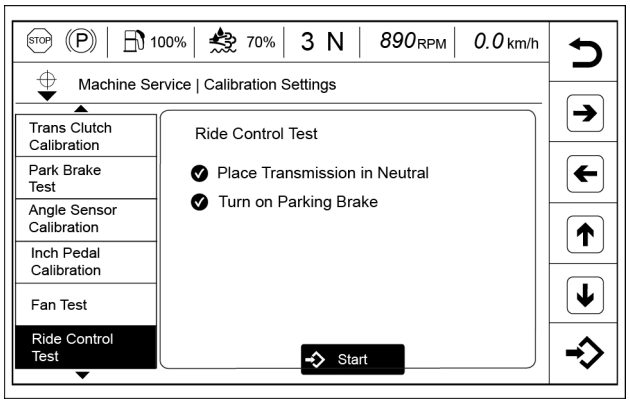
LEIL17WHL1633AA 78

→ Ride Control Test

Conditions to be satisfied to start the Ride Control Test:

- Place Transmission in Neutral
- Turn On Parking Brake

Select “Start” to proceed with the ride control test.

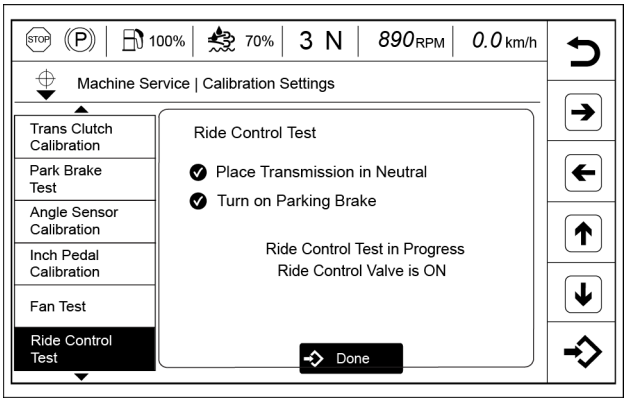


LEIL17WHL1051AA 79

Ride Control Test is in Progress.

Ride Control Valve status is displayed.

Select “Done” to exit.



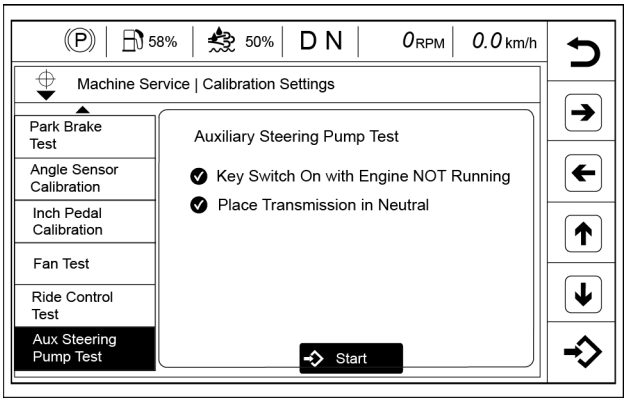
LEIL17WHL1052AA 80

→ Auxiliary Steering Pump Test

Conditions to be satisfied to start the auxiliary steering pump test:

- Key Switch ON with Engine NOT Running
- Place Transmission in Neutral

Select “Start” to proceed with the auxiliary steering pump test.

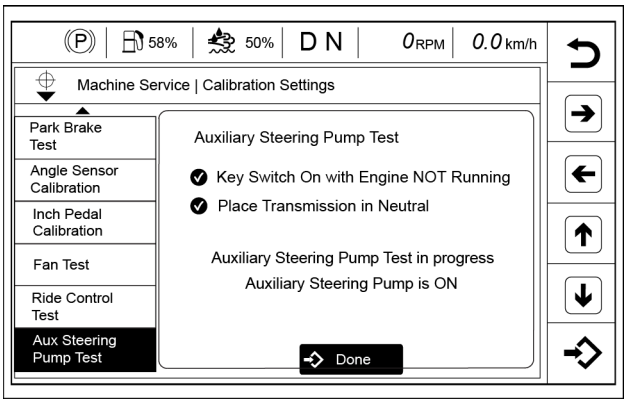


LEIL17WHL1636AA 81

Auxiliary Steering Pump Test is in Progress.

Auxiliary Steering Pump status is displayed.

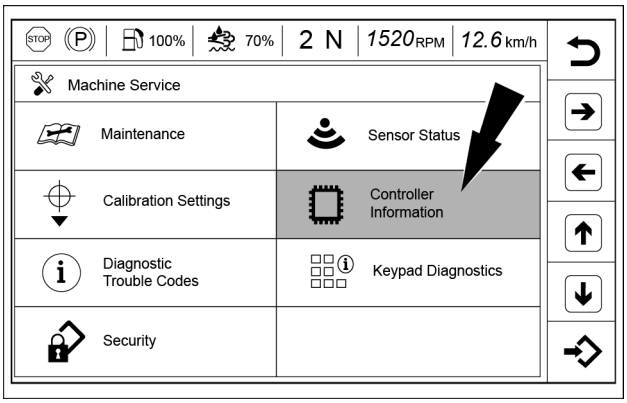
Select “Done” to exit.



LEIL17WHL1635AA 82

Controller Information

Use the keypad on the right-hand of the display to select the key to switch to the “Controller Information” screens. Screen shows hardware and software information for the selected electronic controller.

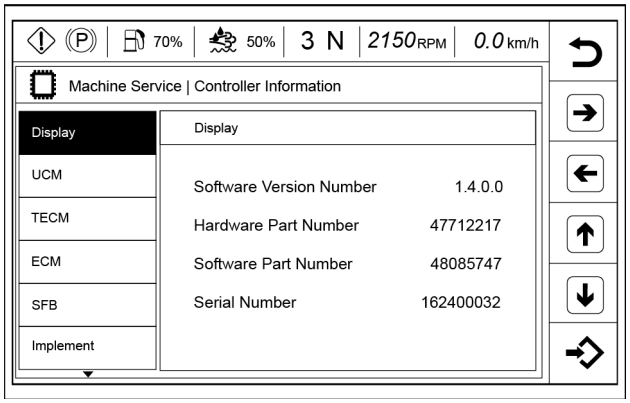


LEIL16WHL0931AA 83

→ Display (Example)

This page shows the following information regarding the display controller:

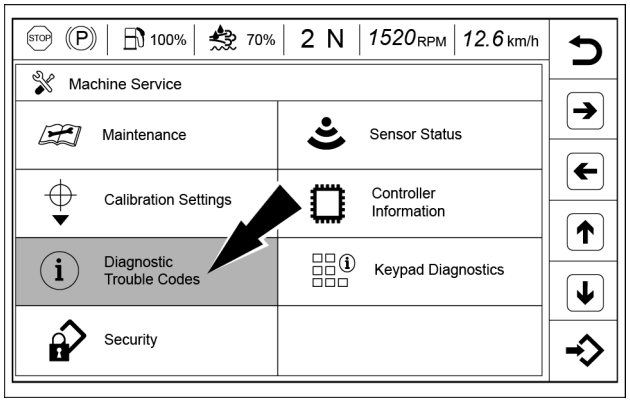
- Software Version Number
- Hardware Part Number
- Software Part Number
- Serial Number



LEIL17WHL1637AA 84

Diagnostic Trouble Codes

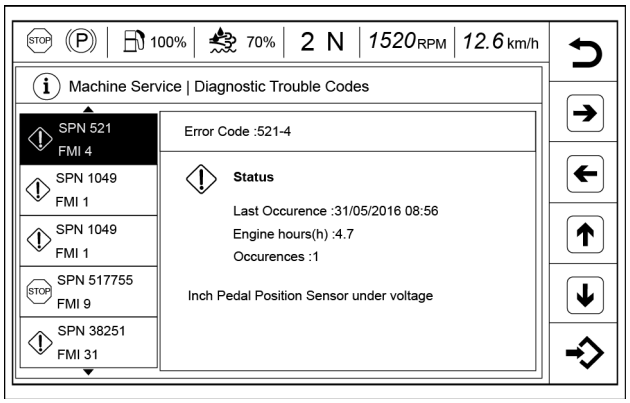
Use the keypad on the right-hand of the display to select the key to switch to the “Diagnostic Trouble Codes” page.



LEIL16WHL0909AA 85

→ Diagnostic Trouble Codes

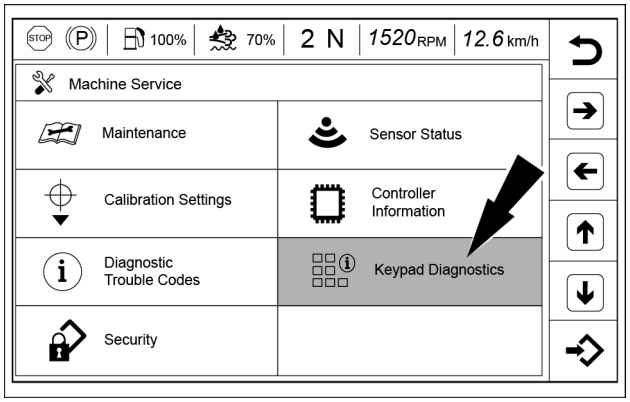
This page shows the list of the fault codes occurred in the machine.



LEIL16WHL0881AA 86

Keypad Diagnostics

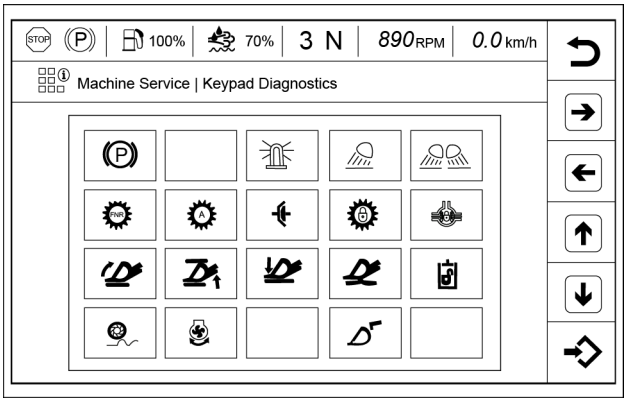
Use the keypad on the right-hand of the display to select the key to switch to the “Keypad Diagnostics” page.



LEIL16WHL0932AA 87

→ Keypad Diagnostics

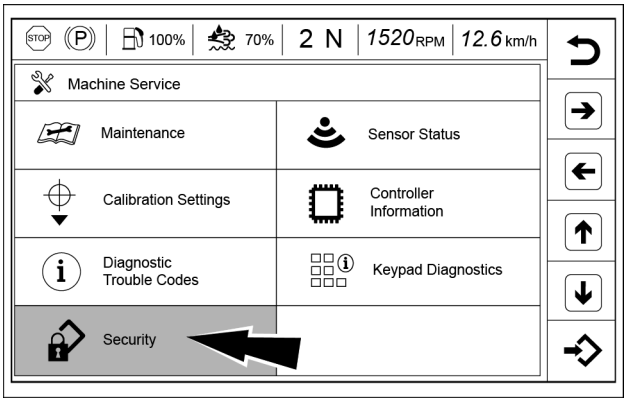
This page shows the button icons of the multifunction keypad.
When keypad button is pressed, the corresponding button on the display is highlighted.



LEIL18WHL1282AA 88

Security

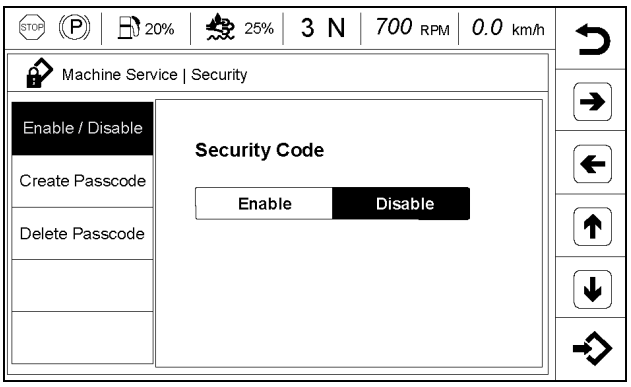
Use the keypad on the right-hand of the display to select the key to switch to the “Security” page.



LEIL16WHL0933AA 89

→ Enable/Disable

Default option is selected.

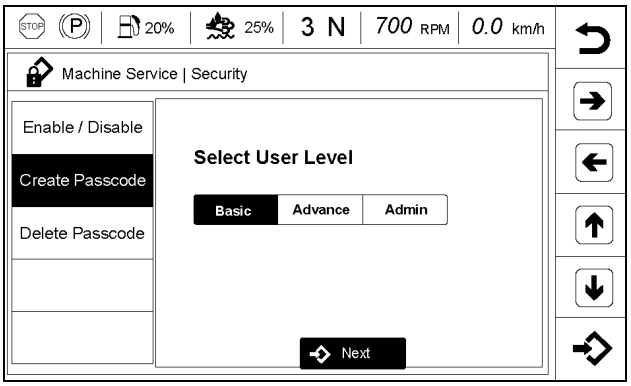


LEIL16WHL1543AA 90

→ Create Passcode

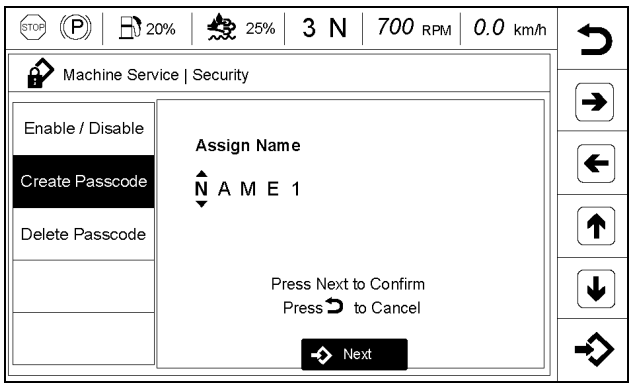
Passcode creation in the security page has three levels:

1. Select the user level between basic, advanced and admin (see table “Access level summery” for accessible features by each user level).



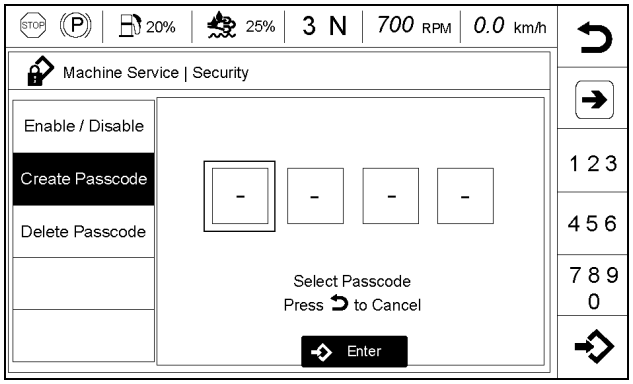
LEIL16WHL1547AA 91

2. Assign a default or custom name to the passcode.



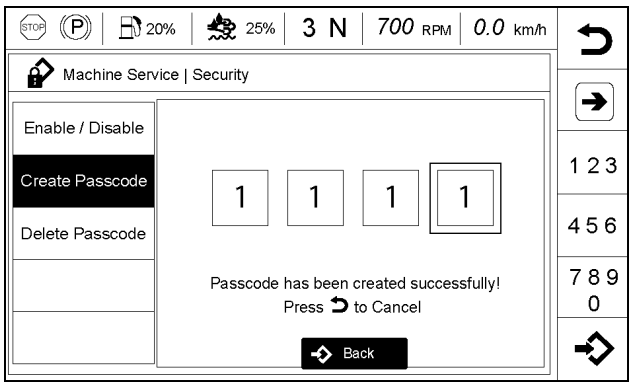
LEIL16WHL1548AA 92

3. Enter a 4-digit passcode.



LEIL16WHL1549AA 93

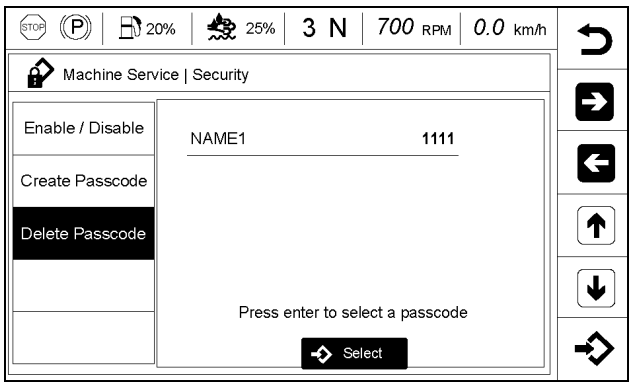
The passcode is created successfully.



LEIL16WHL1546AA 94

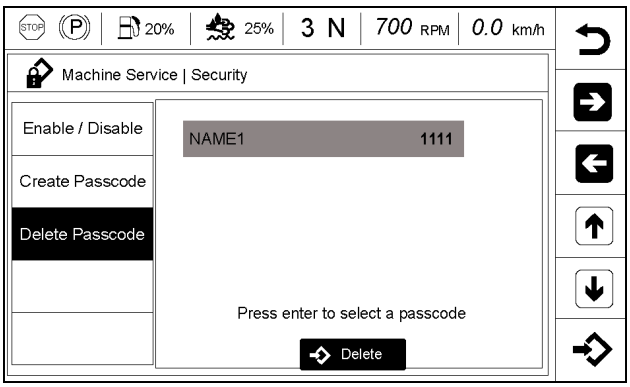
→ Delete Passcode

Delete Passcode tab lists all the created passcodes along with associated names.



LEIL16WHL1550AA 95

Select the passcode to delete from the system and confirm.

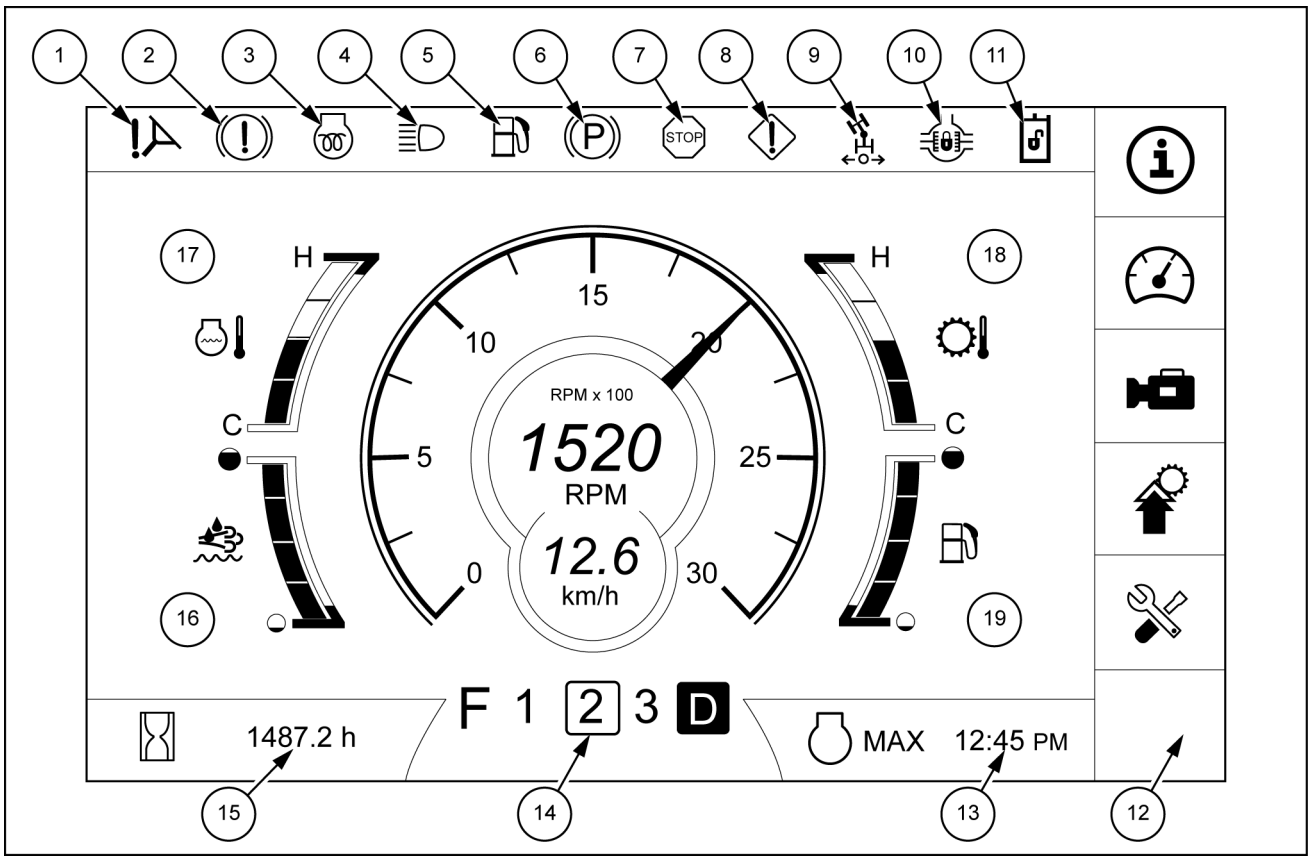


LEIL16WHL1551AA 96

Access level summary

Features	Basic User	Advanced User	Administrator
Start Lockout	x	x	x
Trip computer	x	x	x
Machine Status Information	x	x	x
Machine Settings - Engine		x	x
Machine Settings - Transmission		x	x
Machine Settings - Display		x	x
Machine Settings - Fan		x	x
Machine Settings - Joystick Steering	x	x	x
Machine Settings - Aux Hydraulics		x	x
Machine Service - Maintenance			x
Machine Service -Sensor Status Info	x	x	x
Machine Service - Calibration Settings			x
Machine Service - Controller Information	x	x	x
Machine Service - Diagnostics	x	x	x
Machine Service -Security Code			x
Machine Service - Keypad Test	x	x	x
Camera View and Settings	x	x	x
Factory Setup menu			x

Status and warning icons



LEIL15WHL0519FB 1

Indicators

The multifunction display will check each monitored system when you turn the key switch to the ON position. All lights will illuminate, and the warning alarm will sound for **3 s**. At the end of this check all monitored systems will return to normal operation. If there is an open circuit between a sensor and the multifunction display on some circuits, the lights will flash and the warning alarm will sound for **5 s**.



1. Secondary steering pressure (if equipped, red)

This indicator illuminates when the primary steering system pressure is too low. The alarm sounds continuously and the stop master indicator turns red.
If this situation occurs, stop the machine immediately and contact your dealer.



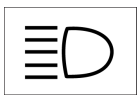
2. Brake pressure indicator (red)

The indicator illuminates when the brake system pressure is too low. The alarm sounds continuously, and the stop master indicator will be red. Stop the machine, and correct the problem.



3. Engine grid heater lamp indicator (if equipped, orange)

To start the engine, turn the key switch to the ON position. The indicator illuminates when the engine grid heater is operating. Wait until the indicator light goes OFF before moving the key switch to the START position to start the engine. The indicator light may come on again during cranking and shortly after the engine starts for post heating of the air.



4. High beam lamp indicator (blue)

The indicator illuminates when the driving high beam lamps are ON.

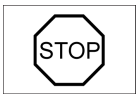


5. Low fuel level (orange)
The indicator illuminates when the tank is almost empty.



6. Parking brake indicator (red)
This indicator illuminates when the parking brake is applied.

7. Stop master indicator (red, critical)



The Stop Master Indicator is a critical warning display. See the “Critical warnings” table. When the Stop Master indicator illuminates, IMMEDIATELY bring the machine safely to a stop, and turn the engine OFF. Failure to do so may result in personal injury and/or damage to the machine.

The following table lists critical warning displays that may appear on the multifunction display and the corrective action that is required. Should a fault occur, a continuous audible alarm will sound and the Stop Master Indicator will be RED. A warning message will be displayed in the message area.

Critical warnings

Display	Description	Corrective Action
Engine oil pressure	Low engine oil pressure	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Brake pressure	Low brake pressure	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Steering pressure (w/auxiliary steering)	Low steering pressure	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Coolant temperature	High engine coolant temperature	Bring the machine to a safe stop, and turn the engine OFF immediately. Check the coolant levels after allowing the engine and the coolant to cool. Contact your dealer.
Hydraulic oil temperature	High hydraulic oil temperature	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Transmission oil temperature	High transmission oil temperature	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Poor **DEF/ADBLUE®** Quality Detected, Power Limited	Moderate engine power loss has begun, up to **65%** torque reduction and **40%** engine speed within **40 min** of engine running time.	**DEF/ADBLUE®** quality/concentration is questionable. Drain the tank and discard the **DEF/ADBLUE®**. Fill with new **DEF/ADBLUE®**. ***NOTE:*** *see “**DEF/ADBLUE®** tank refilling” section for important tank draining information.*
DEF/ADBLUE® Injection Failed Power Limited	SCR fault/failure detected. Up to **65%** torque reduction and **40%** engine speed reduction within **40 min**.	Contact your local authorized dealer for repair.

Display	Description	Corrective Action
DEF/ADBLUE® Level, Tank EMPTY, Power Limited	**DEF/ADBLUE®** level is less than **5%** of tank volume (**0%** will be displayed). Up to **65%** torque reduction and **40%** engine speed reduction within **40 min** of engine running time.	Refill **DEF/ADBLUE®** immediately and reset the system by cycling the key switch OFF then ON.
DEF/ADBLUE® Level, Tank EMPTY, Ext. Power Lim	When the tank has reached **0%** level, there is a **50%** torque reduction, and engine speed is limited to low idle within an additional **30 min** of engine run time.	Refill **DEF/ADBLUE®** immediately and reset the system by cycling the key switch OFF then ON.
Poor **DEF/ ADBLUE®** Quality Detected Power Limited	**DEF/ADBLUE®** quality/concentration is questionable **60 min** after the initial warning. Up to **65%** torque reduction and **40%** engine speed reduction within **40 min** of engine running time.	Drain **DEF/ADBLUE®** tank, clean and refill with approved **DEF/ADBLUE®** solution. Contact your local authorized dealer if failure persists. ***NOTE:*** *see "* ***DEF/ADBLUE®*** *tank refilling" section for important tank draining information.*
DEF/ADBLUE® Injection Failed Ext. Power Lim	SCR fault/failure detected. Up to **65%** torque reduction and **50%** engine speed reduction within **30 min**.	Contact your local authorized dealer for repair, cycle key, or validation re-start.

8. Caution master indicator (yellow, non-critical)



The caution master indicator is a non-critical warning display. See the “Non-critical warnings” table. When the caution master indicator is ON, change the operating method, schedule a shutdown for maintenance, or if the condition persists, contact your dealer.

The “Non-critical warnings” table lists warning displays that may appear on the multifunction display and the corrective action required.

NOTICE: *when a fault occurs, an audible alarm may sound and the Caution Master Indicator will be yellow. The caution message will be displayed in the message area. If this occurs, return the machine to a service position, and turn the engine off and take corrective action to help avoid expensive repairs.*

Non-critical warnings

Display	Description	Corrective action
Parking brake	Parking brake engaged and machine shifted forward or reverse	Release the parking brake.
Coolant temperature	High engine coolant temperature	1. Idle the machine and monitor the temperature. 2. Clean the radiator or operate the fan reverser (if equipped) 3. Check the coolant level and add coolant if necessary 4. If condition persists, contact your dealer.
Hydraulic temperature	High hydraulic temperature	1. Idle the machine and monitor the temperature. 2. Clean the cooler or operate the fan reverser (if equipped). 3. Check the hydraulic fluid level. 4. If condition persists, contact your dealer.
Transmission temperature	High transmission temperature	1. Idle the machine and monitor the temperature. 2. Clean the cooler or operate the fan reverser (If equipped). 3. Use a lower gear. 4. If condition persists, contact your dealer.
Air filter	High air filter restriction	1. Clean the air filter. 2. Replace the primary and secondary filters. 3. If condition persists, contact your dealer.
Transmission filter	Transmission filter restriction	1. Replace the transmission filter. 2. If condition persists, contact your dealer.
Hydraulic filter	Hydraulic filter restriction	1. Replace the hydraulic filter 2. If condition persists, contact your dealer.
Alternator	Alternator malfunction	See your local authorized dealer for repair.
Start Engine to check Emission System	Engine start required to perform the system reset. Validation re-start counter is enabled Follow the instructions on the machine display.	See your local authorized dealer for repair.
Operate Engine at High Speed and Load	Exhaust temperature is low. Operate the machine for approximately **20 min** at a minimum of **50%** load to check the SCR system performance.	See your local authorized dealer for repair.

Display	Description	Corrective action
Maintain Current Conditions. Test In Progress	SCR system test in progress. Maintain current operating conditions. If all three validation re-starts have been used and the system has not been reset, the machine is limited to emergency re-starts only.	See your local authorized dealer for repair.
DEF/ADBLUE® Level LOW	**DEF/ADBLUE®** level is less than **10%** of tank volume. No engine power loss at this level	Fill the **DEF/ADBLUE®** tank.
Poor **DEF/ ADBLUE®** quality detected	Poor **DEF/ADBLUE®** quality detected. After the engine has run for **50 min** with poor **DEF/ADBLUE®** quality, there will be a torque and speed reduction.	Drain the tank. Replace **DEF/ADBLUE®**. ***NOTE:*** *see " **DEF/ADBLUE®** tank refilling" section for important tank draining information.*
DEF/ADBLUE® Injection Failed, Power Limited	Technical failure detected. **25%** torque reduction ramped in within **25 min**. Further torque/speed reduction **2 h** after initial fault detection.	Contact your authorized dealer.
Fuel	Low fuel	Fill the fuel tank - do not allow the tank to totally empty.

Resetting the Selective Catalytic Reduction (SCR) system

After a failure or warning has been set, the SCR system must perform automatic tests to determine if failures or warnings have been resolved. There are two categories of system warnings:

1. Electrical failures which only need key cycle to heal.
2. Failures which need an active Urea Dosing System to heal:
   • Heated up SCR
   • High engine speed and torque

The system must perform the following actions in order to recognize the resolved failures or warnings and reset itself.

1. For **DEF/ADBLUE®** level warnings:

   a. Key switch must be cycled OFF then ON.

2. For poor **DEF/ADBLUE®** quality warnings:

   a. Key switch must be cycled OFF then ON.

3. For SCR system warnings, one of the following conditions must occur, depending on the exact cause of the warning:

   a. Requires the machine to be operated for approximately **20 min** at a minimum of **50%** load to operate the SCR system.

   b. Requires starting and running the engine, but does not require the SCR system to operate.

   c. Requires the key switch to be cycled OFF then ON.

Validation re-starts

Validation re-starts apply to the scenario “3a” of SCR system warnings (see list above). Validation re-starts allow operation of the machine for up to **30 min** without power loss after a poor **DEF/ADBLUE®** quality or SCR system fault has been detected. Up to three re-starts are permitted. Re-starts are counted if one of the following conditions are met:

1. Key off, wait **2 min** for ECU after-run.
2. Key on, wait **5 – 15 s**
3. Key off, wait **5 – 15 s**
4. Key on, wait **5 – 15 s**
5. Start

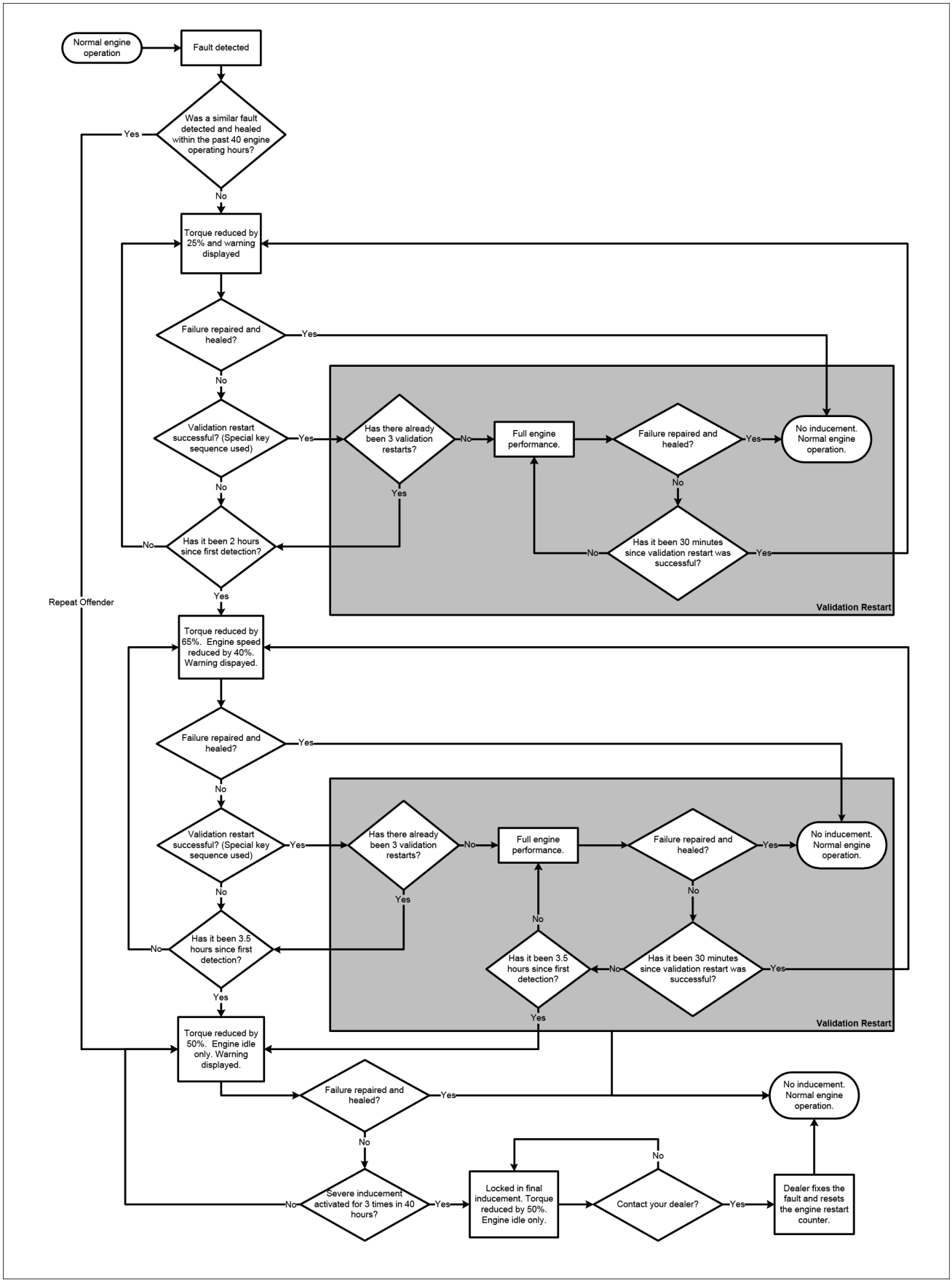
Normal operation will resume if a reset is detected within the **30 min** window.

If a reset is not detected within **30 min**, power loss will occur as described in the table above.

Validation re-starts are not available **7 min** before severe inducement, or if inducement is activated a second time within **40 h** (inducements from low tank level are not considered toward validation restart availability)

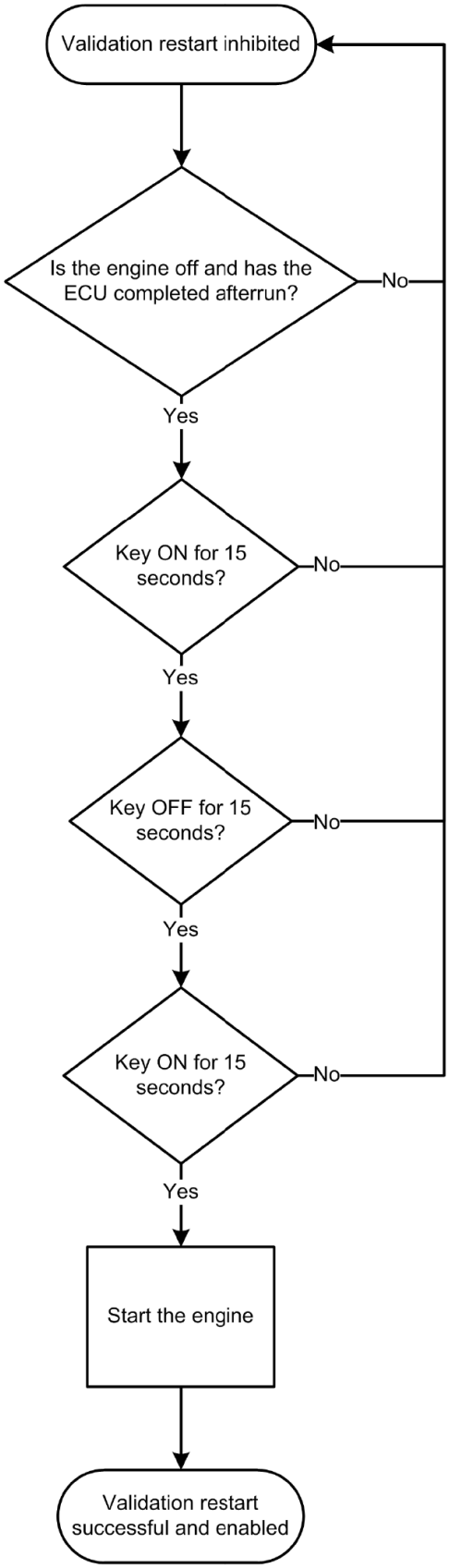
If all three validation re-starts have been used and the system has not been reset, see your local authorized dealer for repair.

Inducement and validation re-starts



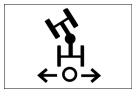
LEIL14WHL0394HA 2

Validation re-start procedure



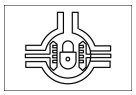
LEIL15WHL0608HA 3

9. Joystick steering indicator (if equipped, green)



The indicator illuminates when the joystick steering function is active.

10. Differential lock indicator (green)



The indicator illuminates when the automatic differential lock function is enabled via multifunction keypad.

11. Hydraulic functions indicator (red)



The indicator illuminates when hydraulic functions are blocked.

12. Tool bar

13. Digital clock

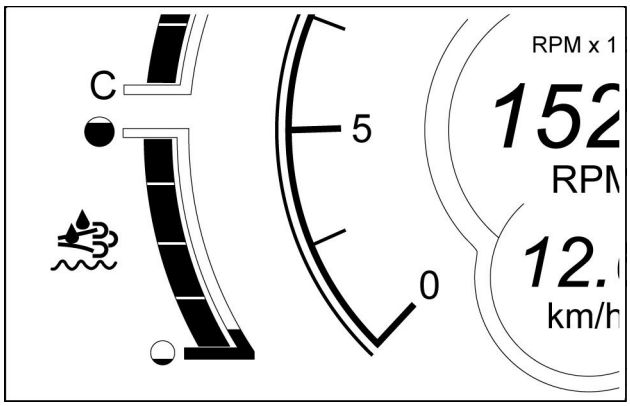
14. Information on gear

15. Hours of use of the machine

16. DIESEL EXHAUST FLUID (DEF)/ADBLUE® level gauge



The **DEF/ADBLUE®** level bar gauge indicates the level of diesel exhaust fluid in the **DEF/ADBLUE®** tank. When all bars are illuminated, the tank is full. Illuminated bars indicate the level of fluid remaining in the **DEF/ADBLUE®** tank. When the tank is at **5–10%** of tank volume, the warning system will flash and/or will flash and sound an audible alarm dependent upon **DEF/ADBLUE®** levels.



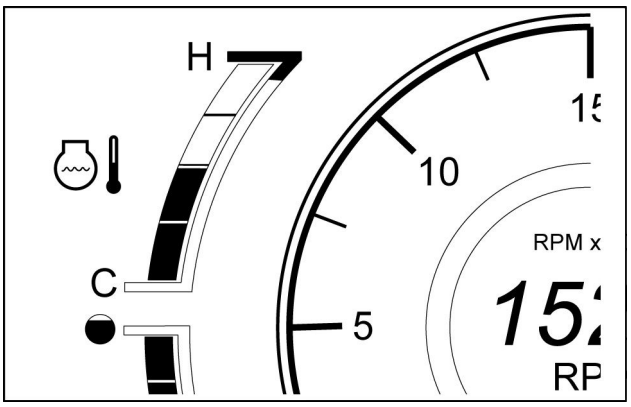
LEIL15WHL0575AA 4

DEF/ADBLUE® level gauge			
Gauge indication	**Condition**	**Master indicator**	**Alarm status**
6-10%	No engine power loss	Caution (yellow)	None
5% and below	Moderate engine power loss	Stop (red)	Continuous
Empty	Severe engine power loss - engine will not shut down	Stop (red)	Continuous

17. Engine coolant temperature gauge

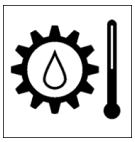


The engine coolant temperature gauge indicates the coolant temperature of the engine. When the engine coolant temperature continues to increase and the gauge moves into the red zone, the warning alarm sounds continuously. The stop master indicator turns red. Do not operate the machine when the temperature is in the red zone.



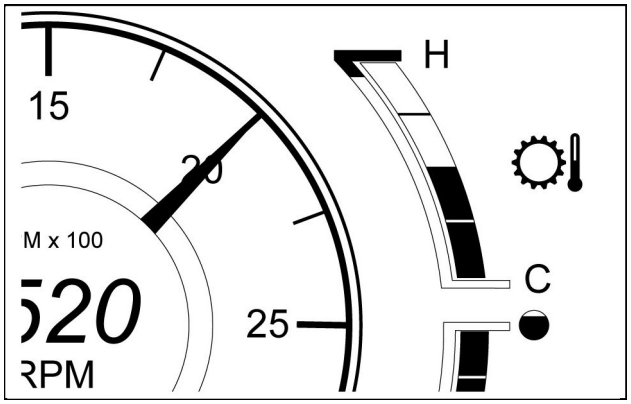
LEIL15WHL0576AA 5

18. Transmission oil temperature gauge



The transmission oil temperature gauge indicates the oil temperature of the transmission.

When the transmission oil temperature continues to increase and the gauge moves into the red zone, the warning alarm sounds continuously. The stop master indicator turns red. Do not operate the machine when the temperature is in the red zone.



LEIL15WHL0577AA 6

NOTE: *to prevent damage to the transmission, stop the machine, shift the transmission to NEUTRAL and run the engine at partial throttle (approximately* ***1700 RPM****) until the transmission cools. If the transmission oil temperature does not return to normal operating temperature, run the engine at idle speed and check the transmission oil level. Correct the problem before continuing to operate the machine.*

19. Fuel level gauge

⚠ WARNING

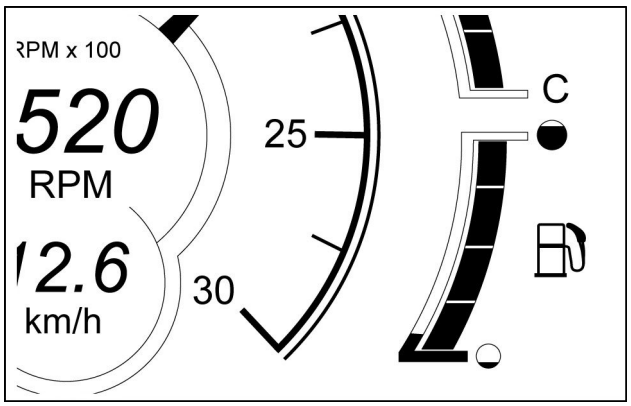
Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
If the machine runs out of fuel, do not attempt to work on pressurized hydraulic lines. Lines are under high pressure.
Failure to comply could result in death or serious injury.

W0372A



The fuel level gauge indicates the fuel level. When the tank is almost empty, the gauge moves into the red zone, the fuel indicator turns on and the warning alarm sounds.

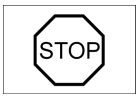
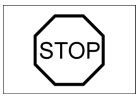
NOTICE: *do not allow the machine to run completely out of fuel.*



LEIL15WHL0578AA 7

DIESEL EXHAUST FLUID (DEF)/ADBLUE® instrumentation warning

Your machine is equipped with a warning system to inform the operator of the **DEF/ADBLUE®** level, system malfunctions and engine power loss that may result from the SCR system for reducing exhaust emissions.

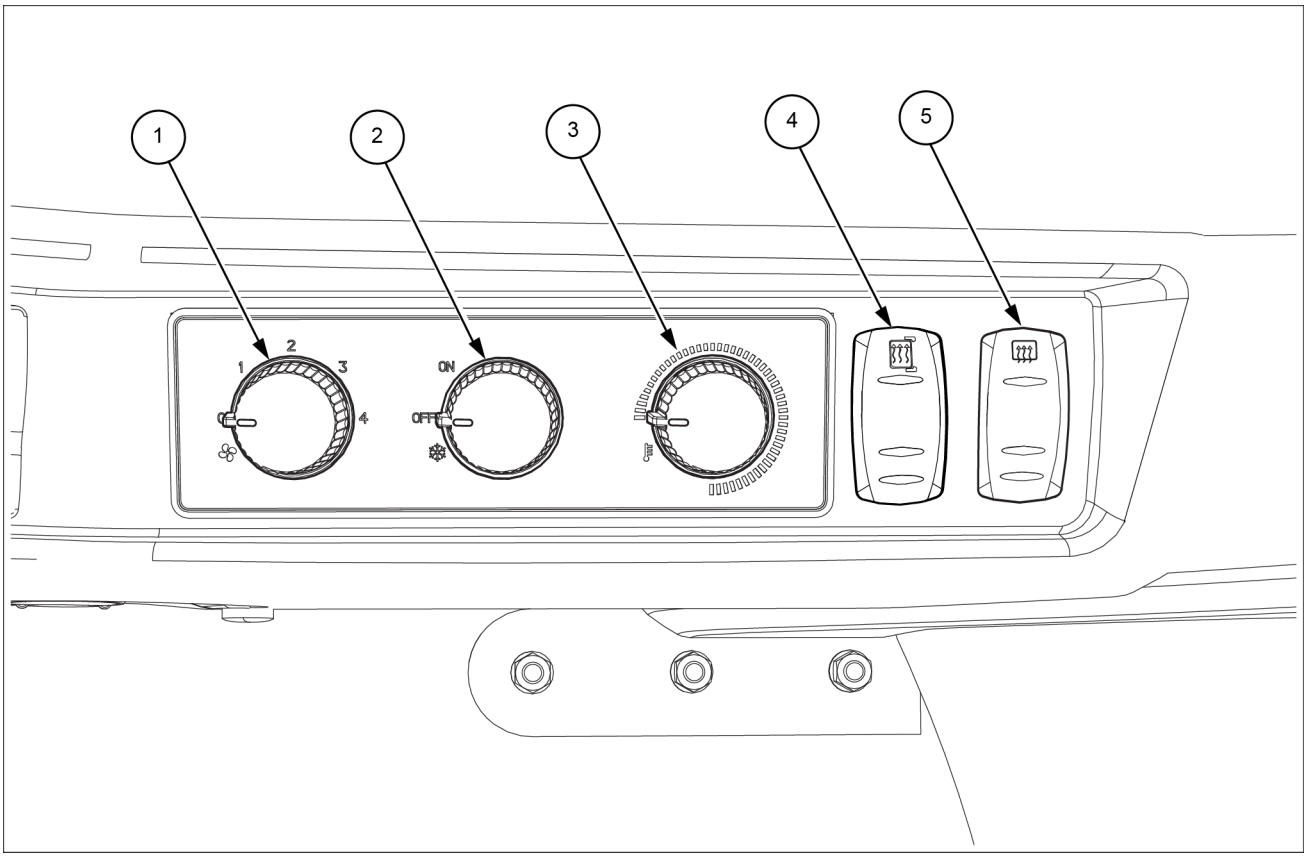
OPERATING CAPACITY	NORMAL	NORMAL	REDUCED (stage 1)	LIMITED* (stage 2)	LIMITED* (final stage)
OPERATION		No engine derate	Gradually derates to LIMITED*	Engine speed and torque gradually derate to low idle but the engine will not shut down	Engine speed and torque are derated to low idle, rendering unit movable but the engine will not shut down
% **DEF/ADBLUE®** in tank	**100% - 10%**	**10%**	**5%**	**0%**	**0%**
Master indicators	No flashes or alarm	 **DEF/ADBLUE®** gauge flashes	 **DEF/ADBLUE®** gauge flashes with audible alarm	 **DEF/ADBLUE®** gauge flashes with audible alarm. Refilling **DEF/ADBLUE®** fluid will restore machine to full operating capacity.	

* PERFORMANCE REDUCTION ARE GRADUAL

- Approximately **95 min** from stage 1 to final stage
- Time may vary depending on the working condition
- No limit to number of re-starts

Climate controls

Climate controls



LEIL16WHL1307FB 1

NOTE: *the figure shows the climate control panel for machines equipped with air-conditioning; for machines with heater only, the control* ***(2)*** *is missing.*

1. Fan

Turn the control **(1)** clockwise for higher fan speed and adjust the control to the desired speed. The blower fan switch has five positions: OFF, 1, 2, 3, and 4. Turn the switch to 4 for maximum speed and to 1 for the lowest speed. Turn completely counterclockwise for OFF.

2. Air-conditioning

Operate the control **(2)** to set one of the two positions:
OFF
ON - Air-conditioning

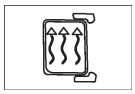
3. Climate control

Turn the control **(3)** clockwise, and adjust the control **(3)** to the desired temperature. Blue markings indicate cooler temperatures. Red markings indicate warmer temperatures when using the heater.

NOTE: *make sure the water inlet for the heater is in the full ON position. This inlet is located in the left-hand rear of the engine compartment.*

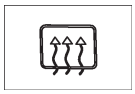
NOTE: *during some conditions, it is possible to have ice on the air-conditioning core. Operating at the maximum cold setting of the air-conditioning control with the blower speed at low can cause ice. It is best to operate air-conditioning at the center range of the temperature control with the blower speed at medium or high. Another cause of ice can be a restricted air filter in the cab.*

4. Heated mirror



Push the rocker switch **(4)** to turn the heated mirror function ON. This feature allows to heat the external mirrors and keeps the operator's field of vision clear of ice, frost, freezing rain.

5. Rear window defrost

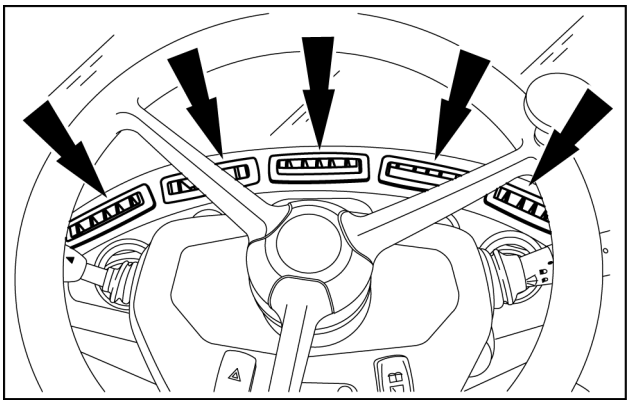


Push the rocker switch **(5)** to activate the rear window defrost.

Cab air louvers

Main air louvers

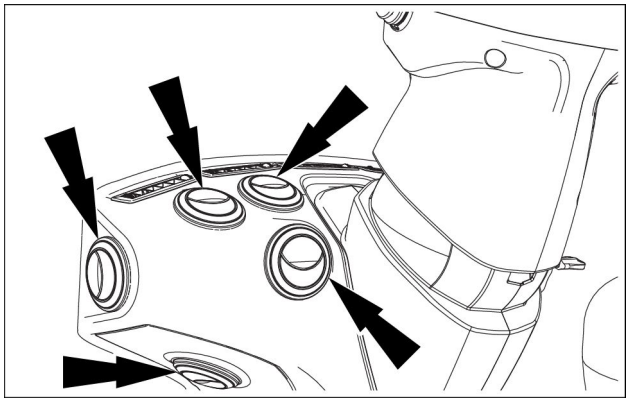
The louvers on the front console direct air flow toward the operator or toward the front window for defrosting. To get maximum air flow on the window, close all other louvers and turn the blower fan to the highest speed. If equipped with air conditioning, turn the air conditioning ON and turn the climate control completely clockwise.



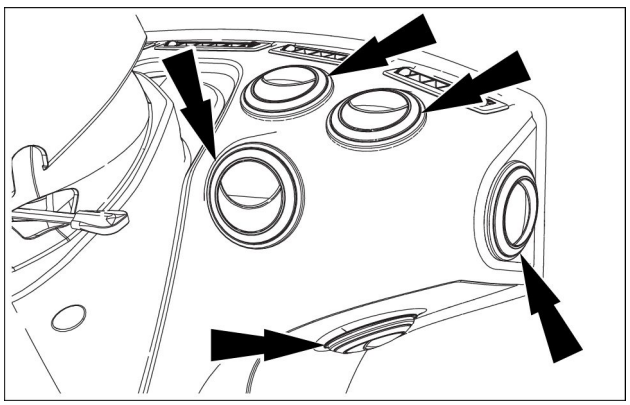
LEIL15WHL0536AA 1

Louvers on the right-hand and left-hand of the steering column supports direct air toward the operator and toward the floor.

You can adjust the louvers to direct the air flow.



LEIL16WHL1327AB 2



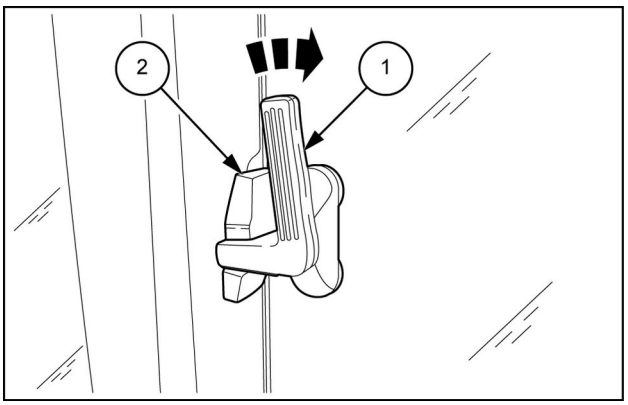
LEIL16WHL1328AB 3

Windows

Window lever

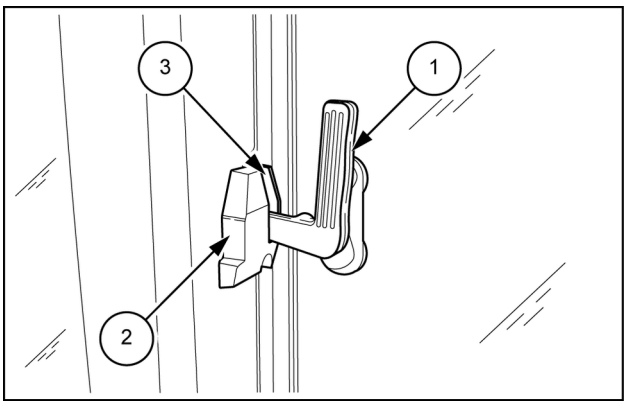
To open the window, turn the lever **(1)** up to release it from the block retainer **(2)**.

To keep the window wide open, swing the window until it locks against the cab.



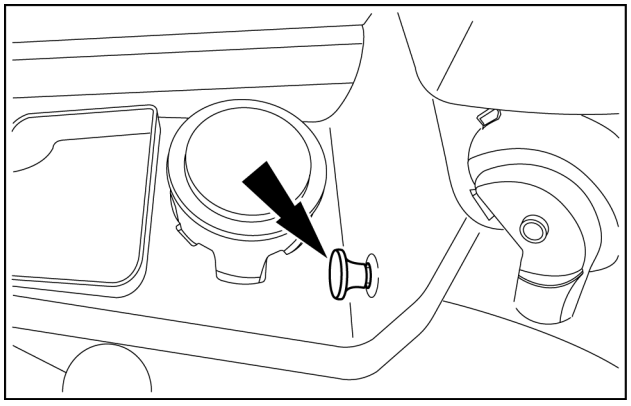
LEIL15WHL0539AB 1

You can keep the window partially open by inserting the lever **(1)** within the slot **(3)** on the block retainer **(2)**.



LEIL15WHL0540AB 2

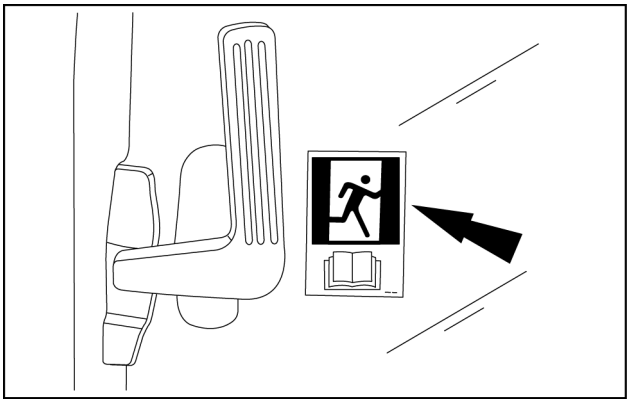
To release the window from the full open position, pull on the window release in the right-hand rear corner of the cab.



LEIL15WHL0541AA 3

Emergency exit

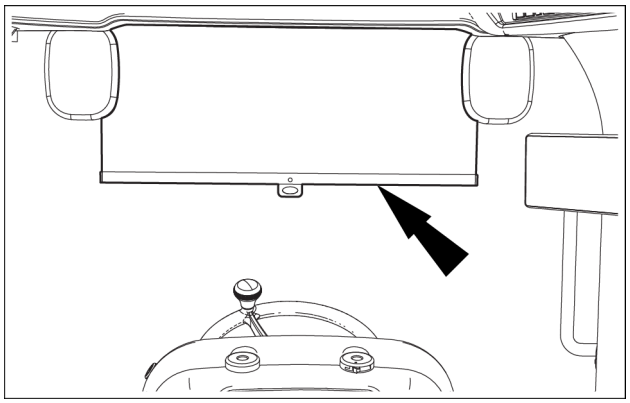
You can use the right-hand window of the cab as an emergency exit. Be proactive and open and close the emergency window exit as a safety measure to become familiar with its operation.



LEIL15WHL0500AB 4

Front sunblind

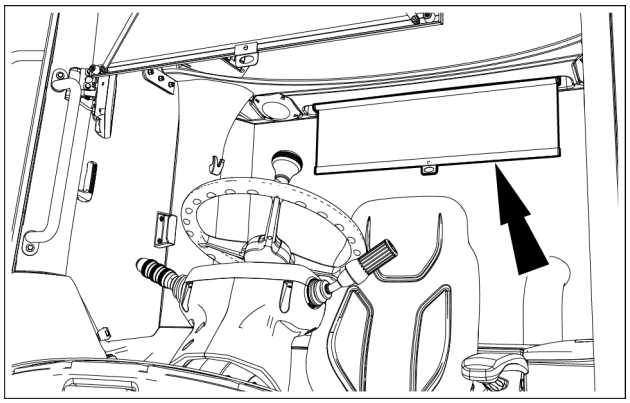
The machine is equipped with a front sunblind. Use the lower eyelet to position the sunblind at the desired height.



LEIL16WHL1329AB 5

Rear sunblind (Optional)

The machine can be equipped with a rear sunblind. Use the lower eyelet to position the sunblind at the desired height.

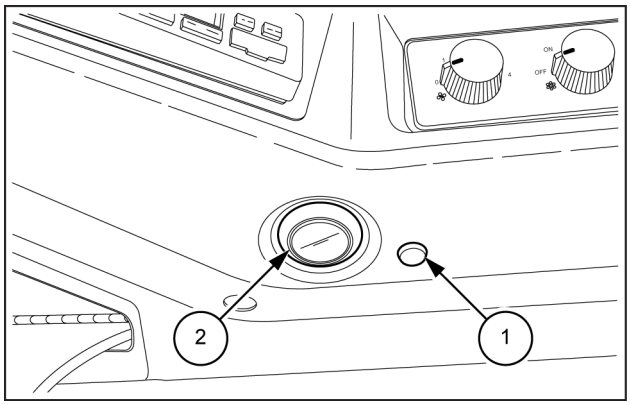


LEIL16WHL1268AB 6

Internal cab lights

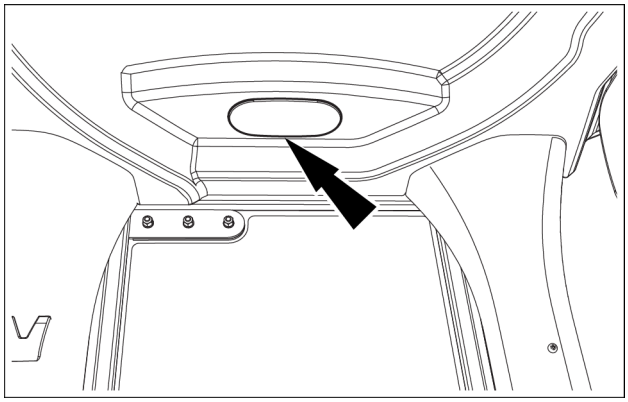
Cab lights

Press the map light button **(1)** to turn ON/OFF the right-hand cab light **(2)**.



LEIL15WHL0544AB 1

Press the dome lamp to turn ON/OFF the left-hand cab light.



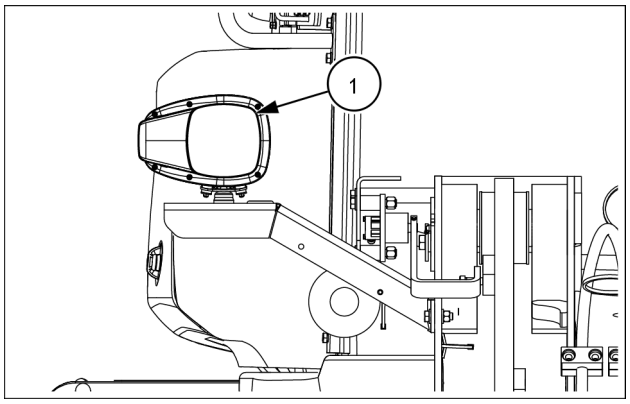
LEIL16WHL1330AB 2

Follow Me Home Lights

The Follow Me Home Lights (FMHL) provide illumination when the operator gets out from cab and are activated when the operator works in dark conditions.

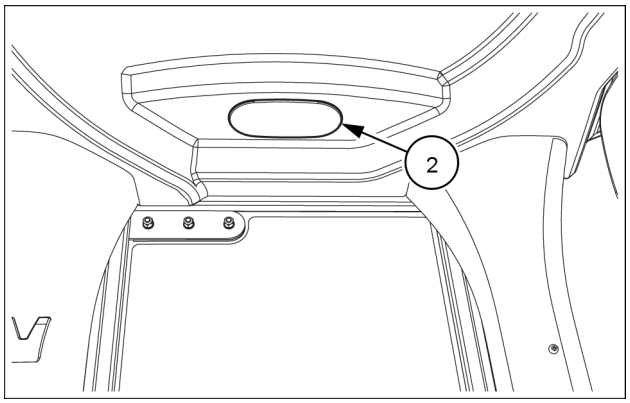
The Follow Me Home Lights work with:

- Driving (low beam only) lights **(1)**, both halogen and LED



LEIL18WHL1109AB 1

- Left-hand cab light **(2)** only if it's in AUTO position



LEIL18WHL1120AA 2

- White reverse lights **(3)** (if equipped) when the FMHL function is ACTIVE.

The FMHL function and duration can be enabled / disabled through the following methods:

1. EST Machine Configuration Menu
2. EOL
3. Vehicle Display Lighting Menu.

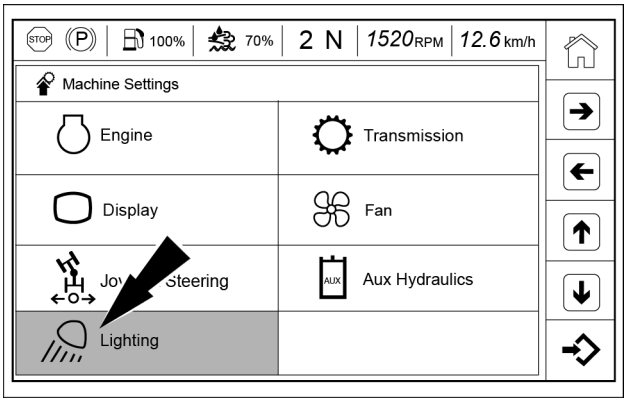
The FMHL is ACTIVE when:

1. The FMHL function is ENABLED
2. The key switch is turned from ON to OFF
3. Either the Driving Lights OR Work Lights OR Position Lights were ON within **180 s** of the key switch state change from ON to OFF
4. Door switch changes state from CLOSED to OPEN.

The FMHL is DE-ACTIVE when:

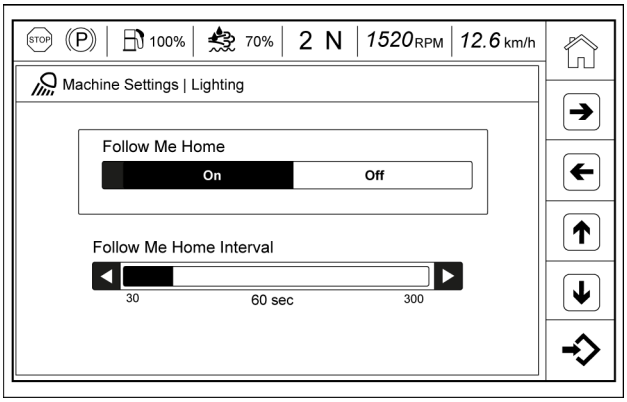
1. The FMHL timer has expired
2. The key switch is turned from OFF to ON
3. The SFB is entering shutdown / sleep state.

The follow home me function is selected via display by setting the “Lighting” parameter in “Machine settings”–“Lighting” screen to ON.



LEIL18WHL1091AA 3

From this screen the operator can also set the follow me home interval within a range of **30 s** to **300 s** in **30 s** intervals (default value **60 s**).



LEIL18WHL1220AA 4

4 - OPERATING INSTRUCTIONS

Commissioning the unit

Before starting the engine

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-is instructed in the safe and proper use of this machine.
-reads and understands the operator's manual for this machine.
-reads and understands ALL safety signs on the machine.
Failure to comply could result in death or serious injury.

W0188A

⚠ WARNING

Avoid injury!
Do not operate the machine while under the influence of alcohol or drugs.
Failure to comply could result in death or serious injury.

W0160A

Before starting the engine

1. Perform a daily walk around and visual inspection of the machine. Check for loose connections, faulty hoses, oil leaks, debris or trash buildup, loose bolts, damaged, or missing parts that could affect the normal and safe operation of the machine. Make any necessary corrections before operating the machine.
2. See the quick reference “Maintenance Chart” – Chapter 7 in this manual and complete the items in the daily - 10 hours section of the chart.
3. Check that the machine fuel tank is filled with clean fuel that matches the specifications given in “General specification - Diesel fuel" – Chapter 7 in this manual.
4. Check and make certain the **DEF/ADBLUE®** tank is properly filled. Low volume in the tank can cause loss of power and torque. Fill the **DEF/ADBLUE®** tank after approximately 1.5 fuel fills. Do not allow the **DEF/ADBLUE®** tank to drop below **10%** volume for the best engine performance.

The machine will last longer, give better and more economical performance, if you pay particular attention to the engine and carry out the following checks:

- Warm up the engine before using it under load.
- Do not operate the engine at maximum power for prolonged periods of time.
- Do not run the engine for a long period at idle speed.
- Check the indicators on the multifunction display frequently.
- Check the oil levels and coolant level frequently.

Starting the unit

Starting the engine

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-is instructed in the safe and proper use of this machine.
-reads and understands the operator's manual for this machine.
-reads and understands ALL safety signs on the machine.
Failure to comply could result in death or serious injury.

W0188A

Before operating the machine

Before operating this machine, complete the following procedures:

1. Check the level of all fluids (engine oil, fuel, transmission oil, **DEF/ADBLUE®**, hydraulic fluid, and coolant) and make sure that the fluids and lubricants are suitable for prevailing conditions.
2. Carry out the daily maintenance operations.
3. Inspect the machine, look for any signs of possible leakage and check the hoses. Tighten or replace as necessary.
4. Check the tires for any visible damage. Replace or repair as necessary. Check for correct tire air pressure and adjust the pressure if necessary.
5. Clean the steps and hand holds. Grease, oil, mud, or ice in winter on the steps and access handles can cause accidents. Keep the steps and the access handles clean at all times.
6. Clean or replace any decals which are illegible. See “Safety signs” - Chapter 2 in this manual for further information.
7. Make sure that the engine access panels and all doors are properly closed and latched.
8. Secure the cab door in either fully closed or fully opened position.
9. Remove any obstructions which hinder visibility. Clean the windshield, the windows and the rear view mirrors, and backup camera lens.
10. Check that no tools or other items have been left on the machine or in the operator's compartment.
11. Make sure no one is on or under the machine. The operator must be alone on the machine.
12. Make sure no one is standing in the machine working area.
13. Find out about current safety measures in use on the work site.
14. Work out a convenient means of escape from the machine (emergency exit via the windshield, the rear or side window glass) in the event of the cab door being jammed or the machine turning over.
15. Before undertaking any travel or working operations during hours of darkness, make sure the lighting and signaling equipment are fully operative.
16. Adjust the seat so that you can apply the foot brakes when your back is against the seat backrest.
17. Fasten and adjust the seat belt.
18. With the engine running and at operating temperature, check the instrument panel for correct indications.
19. Check the loader controls for correct operation.

Starting the engine

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position. Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

W0204A

NOTE: *if the machine has been out of use for some time, see "Removal" - Chapter 7 in this manual.*

NOTE: *if you need to start the engine using a booster battery, see "Auxiliary battery connections - Check" - Chapter 7 in this manual.*

1. Turn the timed disconnect switch to the ON position.
2. Take up the correct position in the operator's seat with the seat belt correctly fastened. Make sure you can push the foot pedals completely down with your back against the seat cushion.
3. Make certain the transmission direction control is in NEUTRAL and the parking brake is applied.
4. Turn the key switch to the ON position and check the instrument indicators.
5. Keep all non-authorized personnel clear of the area. Sound the horn to alert others of your intent to start the engine. Turn the key switch to the START position until the engine starts, then release the key.

   NOTICE: *the starter has an automatic cut-out to protect itself. In cold weather conditions, extended cranking may be necessary.*
6. After the engine starts, check the instruments to make sure the indications are correct. Run the engine at low idle with the transmission in NEUTRAL until the engine coolant temperature is warm.

   NOTICE: *operate the machine at reduced loads until all systems reach operating temperature. This is very important during extremely cold weather operation to protect both the engine and hydraulic systems.*
   The transmission will not shift into gear unless the transmission fluid is warm enough.

Engine speed

DO NOT OPERATE the engine at idle speed for long periods. This can cause a low operating temperature. A low operating temperature can cause acids and deposits in the engine oil.

Run the engine at low idle for a minute at start up before picking up speed and load.

NOTICE: *always bring the engine to low idle for a few minutes to let all parts cool evenly before shut down.*

Operating in extreme temperatures

Operating the machine in hot climates

1. Keep the coolant at the correct level in the coolant reservoir and in the radiator.
2. Use the correct solution of ethylene glycol and water in the cooling system.
3. Check the cooling system cap before hot weather starts. Replace the cap as required. Replace with a genuine replacement part to insure the correct PSI rated cap.
4. Clean all dirt and debris from the radiator, cooler, and engine area.
5. Check the condition of the engine accessory drive belt.
6. Use lubricants of the correct viscosity. See “Fluids and lubricants” – Chapter 7.
7. Check battery fluid levels.

Operating in cold climate conditions

⚠ WARNING

Hazard to bystanders!
Make sure the area surrounding the machine is clear of all persons before starting the engine.
Failure to comply could result in death or serious injury.

W0090A

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position.
Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

W0204A

Cold weather conditions require special operating procedures. During these conditions your machine will require special start-up, warm-up and maintenance procedures for the best performance. Proper cold weather maintenance will extend the service life of your machine.

Batteries

Clean the batteries and make sure they are at full charge. In cold conditions run the machine long enough to return the charge lost by starting. In most cold conditions this is about 10 minutes, but in extreme cold it can be 30 minutes.

***NOTE:** a fully charged battery at **-17 °C** (**1.4 °F**) has only **40%** of the normal starting power. At **-29 °C** (**-20.2 °F**) the battery has only **18%**.*

Inspect the battery cables and terminals. Clean the terminals and apply electrical terminal sealers to prevent corrosion. See your dealer.

If water is added to the batteries and the temperature is below **0 °C** (**32.0 °F**), charge the batteries or run the engine for approximately 2 hours. This will prevent battery freezing.

Lubricants

Follow the recommended oil and filter service for the engine and hydraulic system as shown in this manual. Use the correct viscosity oil in each component for the ambient temperatures the machine is operating in. For extreme cold conditions, contact your dealer for alternative lubricants for the hydraulic and transmission systems.

Fuel

Check with your fuel supplier for the correct cold weather fuel. Engine power will be reduced if wax particles are in the fuel filters. Some cold weather fuel blends result in lower engine power.

Check for water in the fuel system. Cold temperatures can cause condensation to form in the fuel tank. Check and drain the fuel pre-filter and fuel tank for water as required.

DIESEL EXHAUST FLUID (DEF)/ADBLUE®

During cold weather conditions, it is normal for the **DEF/ADBLUE®** to freeze inside the tank. Your machine is equipped with an internal tank heater to thaw frozen **DEF/ADBLUE®**. The **DEF/ADBLUE®** level gauge may not display an accurate level until the tank is completely thawed.

NOTICE: *do not use an anti-gelling or freeze point improver in your* ***DEF/ADBLUE®****. The* ***32.5%*** *solution is specifically designed to provide the optimum NO_X reduction properties. Any further blending or adjusting of the* ***DEF/ADBLUE®*** *mixture will lessen its ability to perform correctly and may cause damage to the SCR components.*

Cooling system

Check the coolant mixture before operating in cold temperatures. Use a mixture of **50%** Organic Acid Technology (OAT) coolant and **50%** water. It is recommended to use the OAT coolant and water in the machine all year long.

Cold temperature starting aids

⚠ WARNING

Explosion hazard!
DO NOT use ether starting fluid. Serious engine damage, explosion, death, or serious personal injury could occur.
Failure to comply could result in death or serious injury.

W0148A

This machine may be equipped with engine grid heater. Turn the key switch to ON and if the engine grid heater indicator is on, wait until it goes out. The indicator may come on again during cranking and shortly after the engine starts for post heating. This allows for smooth running conditions during cold weather warm-up. Contact your dealer for additional cold weather starting aids.

Machine warm-up

During this period:

- After initial start-up, the engine low idle speed may increase to warm up the engine.
- After engine warm-up, to unlock all hydraulic functions press the hydraulic functions lock-out button on the multifunction keypad. At this time, place the lift arm into float and the bucket into roll back to load the engine in order to heat the hydraulic oil. Hold for approximately two minutes. Apply and hold the foot brake, cycle the lift arm and bucket. Repeat the float/roll back heating procedure again for approximately two minutes. Raise the lift arm enough to steer the unit full left and right to warm the oil in the steering cylinders. In extreme cold conditions, hold the float/roll back condition for five minutes maximum.
- Even with the correct oil in the hydraulic/brake system, the first few times the operator actuates the brakes there may be some delay before the brakes work. The operator must actuate the brake pedal a minimum of 8 to 10 times to obtain proper heating prior to moving the machine. Actuating and releasing the brakes should occur in a cycle of 3 seconds full on and 3 seconds off to obtain exchange of the brake oil.
- In extreme cold weather conditions, the brake response can be slow. Use the correct oil in the hydraulic/brake system in persistently severe applications. Contact your dealer for the correct oil.
- When you have correctly warmed up the machine, apply the foot brake and hold, push the parking brake to OFF position, shift the transmission to FORWARD, and release the foot brake. Operate the machine in a clear safe area. Check the full operation of the machine.

NOTICE: *DO NOT operate the machine on the road until you have correctly warmed up the transmission oil and axle oil. Operate the machine in a clear safe area before road operation in first and second gear only.*

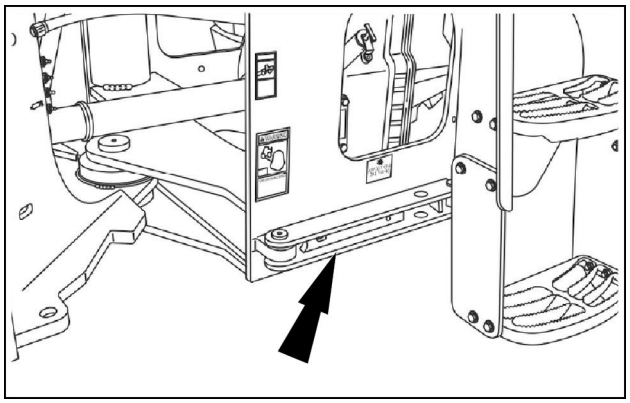
- If you have left the machine idling in cold temperature, the engine will stay warm, but the hydraulic/brake oil and the axle oil will not stay warm. The oil and components can become cold and slow brake function response time. If this should happen you MUST go through the complete warm-up procedure.

NOTE: *the transmission is equipped with internal protection that does not allow the transmission to engage if the oil temperature is below* ***-12 °C*** *(****10 °F****). If the transmission does not engage, allow 2 to 4 minutes of running in NEUTRAL and try again.*

Operating the machine

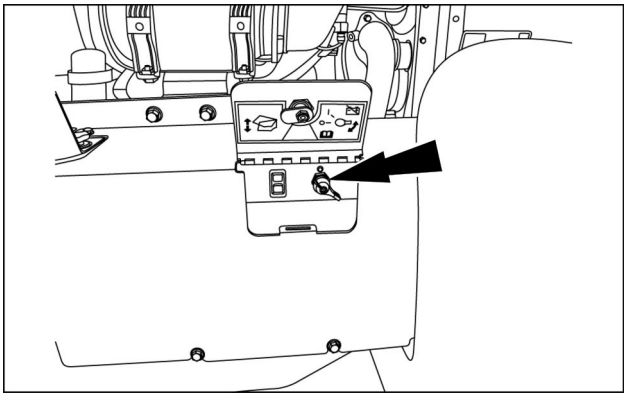
Starting and stopping the loader

1. Remove the transport/service link from the locked position, and secure the transport/service link in the work (unlocked) position.



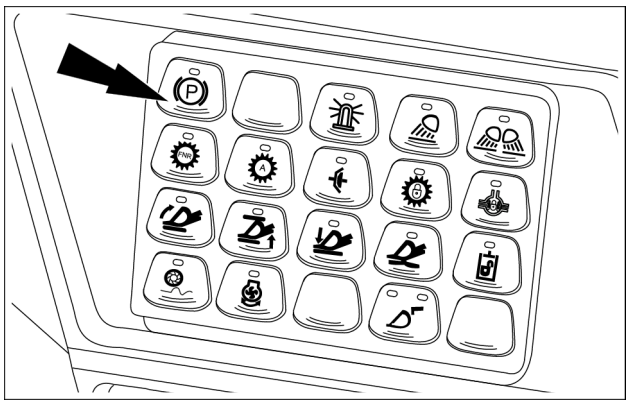
LEIL16WHL0047AA 1

2. Place the timed disconnect switch into the ON position.



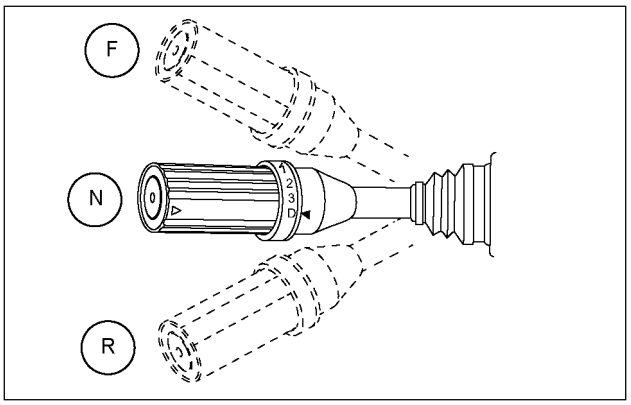
RCPH10WHL106AAH 2

3. Sit in the operator's seat with the seat belt correctly fastened. Make sure you can push the foot pedals completely down with your back against the seat cushion. Confirm that the parking brake button is ON (brake engaged). Keep all non-authorized personnel clear of the area.



LEIL16WHL1125AA 3

4. The transmission control lever must be in NEUTRAL.



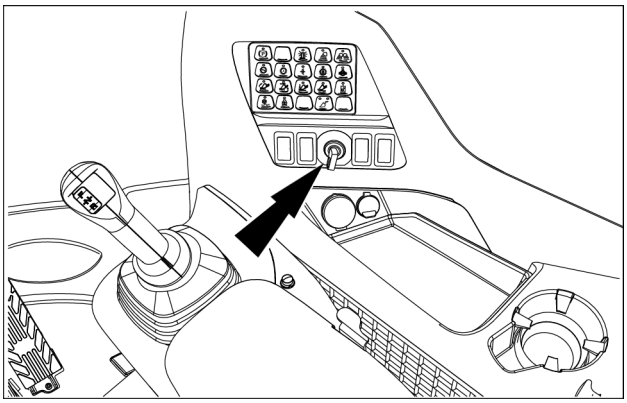
LEIL16WHL1469AB 4

5. Make certain the area is clear of all non-authorized personnel. Sound the horn to warn those around the work area of your intentions.

6. Insert the key into the ignition switch and turn it into the ON position. Monitor the console indicators. Do not attempt to start the engine until the grid heater light is out. When the grid heater light is no longer illuminated, turn the key to the START position. Once the engine starts, allow it to run at low idle until the engine coolant temperature is warm.

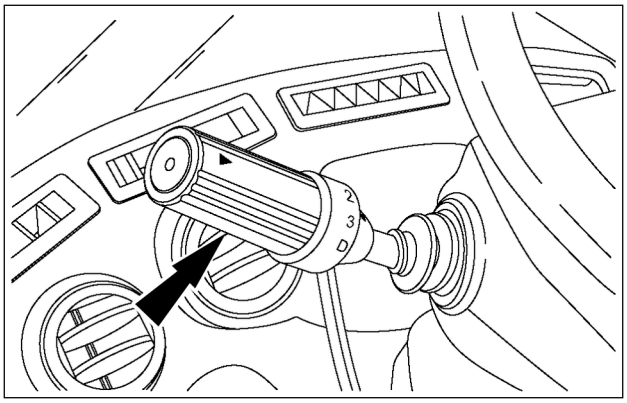
   NOTE: *if the engine starts and then stops, do not engage the starter motor again until the starter motor stops turning. Let the motor cool for two minutes before cranking again.*

   NOTICE: *the starter has an automatic cut-out to protect itself. In cold weather conditions, extended cranking may be necessary.*



LEIL16WHL1286AA 5

7. Raise the loader arm so that the equipment is raised approximately **380 mm** (**15 in**).
8. To move the machine:
   - Apply and hold the foot brake
   - Press the parking brake button to the OFF position
   - Place the transmission control lever into the FORWARD or REVERSE position
   - Release the foot brake and accelerate smoothly
9. Use the transmission control lever to shift manually the transmission gears from first gear through drive. Turn the transmission control lever away from you to select a higher gear. Turn the lever toward you to select a lower gear. Also use this control lever to put the transmission in FORWARD, NEUTRAL, and REVERSE.
   - Move the control lever away from you for FORWARD.
   - The center position of the control lever is NEUTRAL.
   - Move the control lever toward you for REVERSE.



LEIL16WHL1468AA 6

Stopping the unit

Stopping the machine

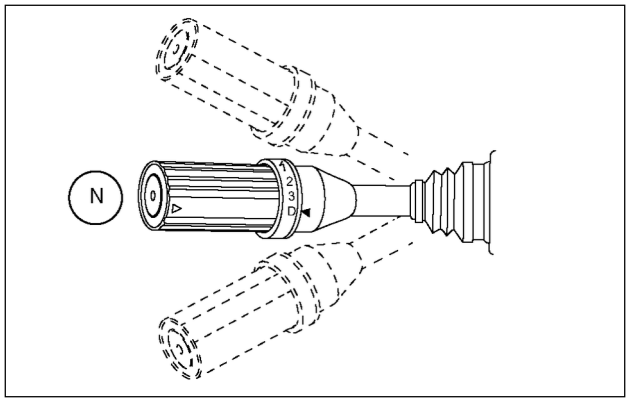
⚠ WARNING

Unexpected movement!
Always engage the parking brake and switch off the engine before exiting the machine.
Failure to comply could result in death or serious injury.

W0209A

1. Stop the machine on hard, level ground and place the transmission control lever in NEUTRAL.

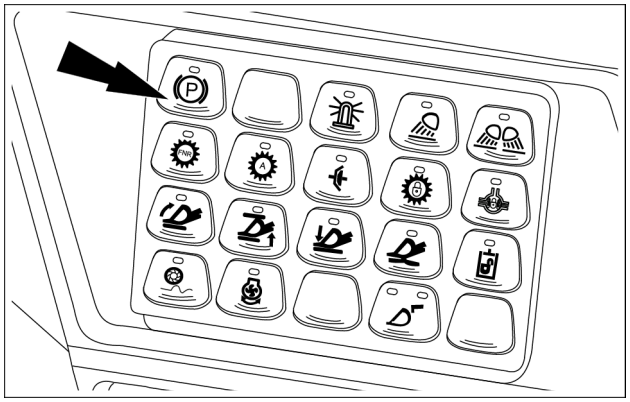
   NOTICE: *if you must temporarily park the machine on a hillside, put the front of the machine toward the bottom of the hill. Make sure the machine is behind an object that will not move.*



LEIL16WHL1469AB 1

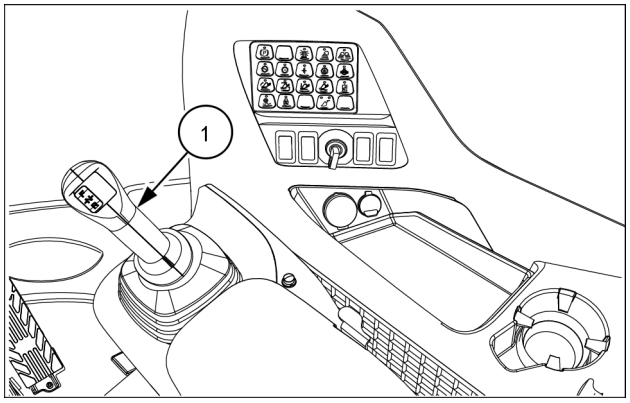
2. Slowly move the joystick forward to rest the lift arm attachment on the ground.

3. Press the parking brake button to the ON position. Turn the engine off by turning the key to the ACCESSORY or OFF position.



LEIL16WHL1125AA 2

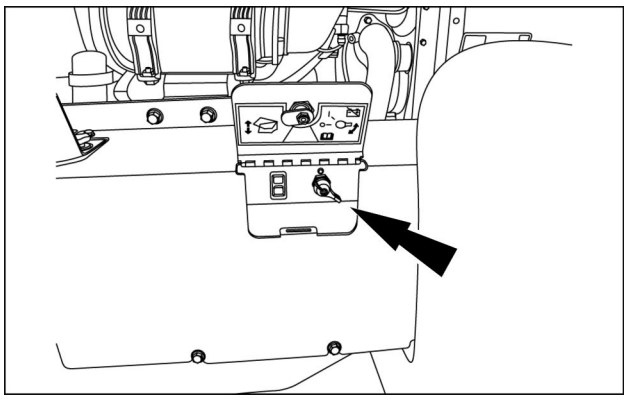
4. Turn the key to the ON position. Slowly move the joystick **(1)** through all directions to release residual pressures in the hydraulic system. Turn the key to the OFF position.



LEIL16WHL1286AA 3

5. Turn the timed disconnect switch to the OFF position, close and lock the compartment.

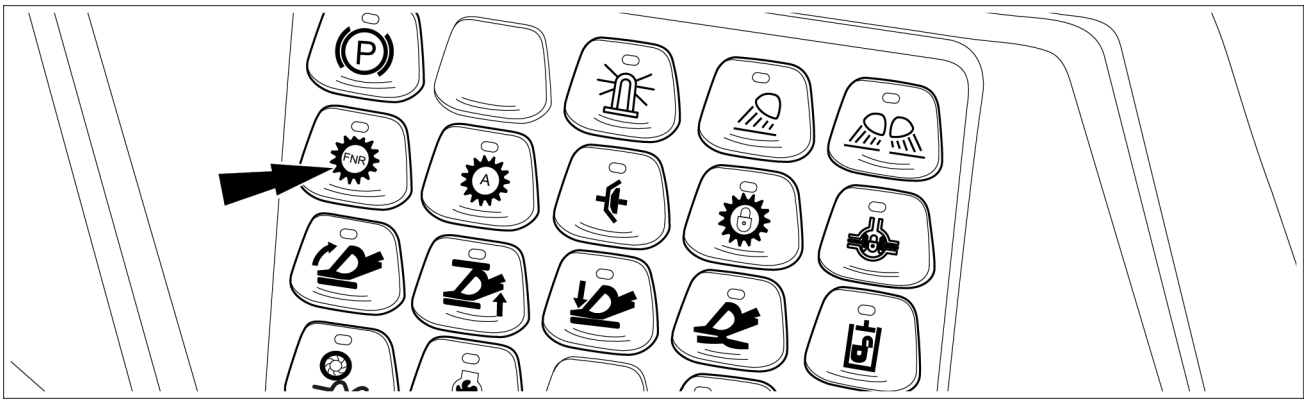
   NOTICE: *it is not recommended to turn the disconnect switch to the OFF position while the engine is running, unless for an emergency.*



RCPH10WHL106AAH 4

Moving the unit

Enabling the Auxiliary F-N-R switch



LEIL16WHL1127EA 1

You can enable the auxiliary F-N-R switch located on the joystick or next to the single axis levers after the following conditions have been completed:

1. the transmission controller is in NEUTRAL (left-hand side of the steering column);
2. the auxiliary F-N-R switch is in NEUTRAL;
3. the engine must be running;
4. the machine is stationary.

NOTE: *refer to page* ***4-20*** *to see the FNR switch location on both joystick and single axle lever.*

Push the auxiliary F-N-R button on multifunction keypad to enable the auxiliary F-N-R switch. The LED on the auxiliary F-N-R button lights up when the auxiliary F-N-R switch is activated.

If you move the transmission control lever from NEUTRAL or you stop the engine, the auxiliary F-N-R mode is deactivated.

Ride control



Ride control is an optional feature that increases the ride comfort of the wheel loader over all types of terrain with either an empty or loaded bucket. Ride control allows faster speeds during operation, resulting in increased productivity and operator comfort. Ride control will also reduce shock loads to the wheel loader for reduced tire flex, structural fatigue and vibration, resulting in longer component life and reduced costs. Ride control will reduce fore and aft pitching motion during travel to allow faster speeds in load and carry applications.

The machine is equipped with a ride control switch (auto and off). Most commonly, the operator will choose to leave this switch in the automatic position. With ride control active, the green indicator light will illuminate. Anytime the machine is traveling faster than **5 km/h** (**3.1 mph**) ride control is functioning. Ride control will disengage automatically at slower speeds for loading and unloading.

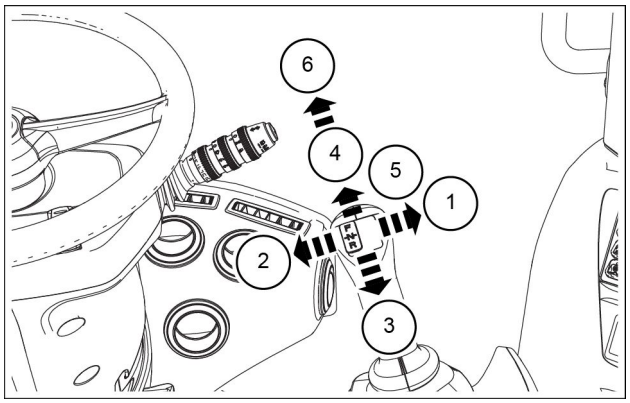
To turn ride control OFF, press the ride control button until the LED light turns off.

NOTE: *turn ride control OFF when you operate the bucket in fine grading operations or when precision placement of a load suspended from the bucket or other attachment is required.*

Control levers

Two function valve - one control lever (joystick)

NOTE: *this page shows the basic joystick positions.*



LEIL16WHL1332AB 1

See “Loader functions” - Chapter 4 in this manual for return-to-dig, bucket height control, return-to-travel and float functions.

1. Dump bucket

2. Rollback bucket

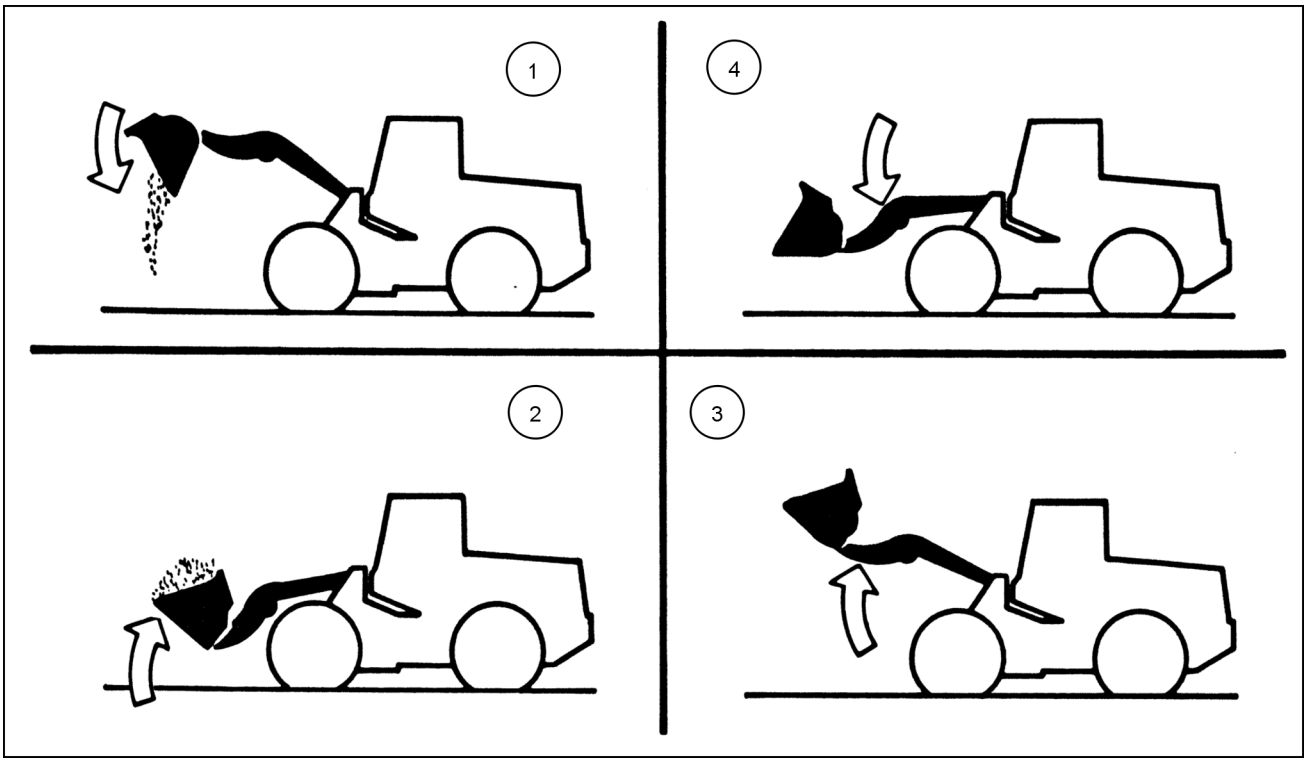
1 – 2. Automated bucket metering – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “1” Dump to “2” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

3. Raise lift arms

4. Lower lift arms

5. Hold (central position) - The loader arms and bucket will not move when the control lever is in the hold position. When released, the joystick will automatically return to the hold position.

6. Float - When in the float position, the loader bucket floats across the rough ground.



RCPH10WHL045BAH 2

Two function valve - two single axis levers

NOTE: *this page shows the basic two control lever positions.*

See “Loader functions” - Chapter 4 in this manual for return-to-dig, bucket height control, return-to-travel and float functions.

1. Dump bucket

2. Rollback bucket

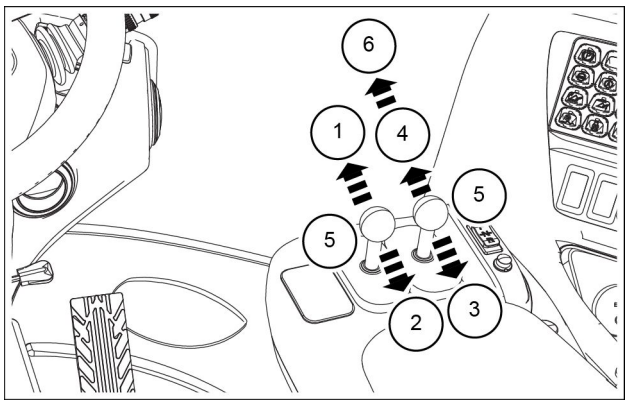
1 – 2. Automated bucket metering – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “1” Dump to “2” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

3. Raise lift arms

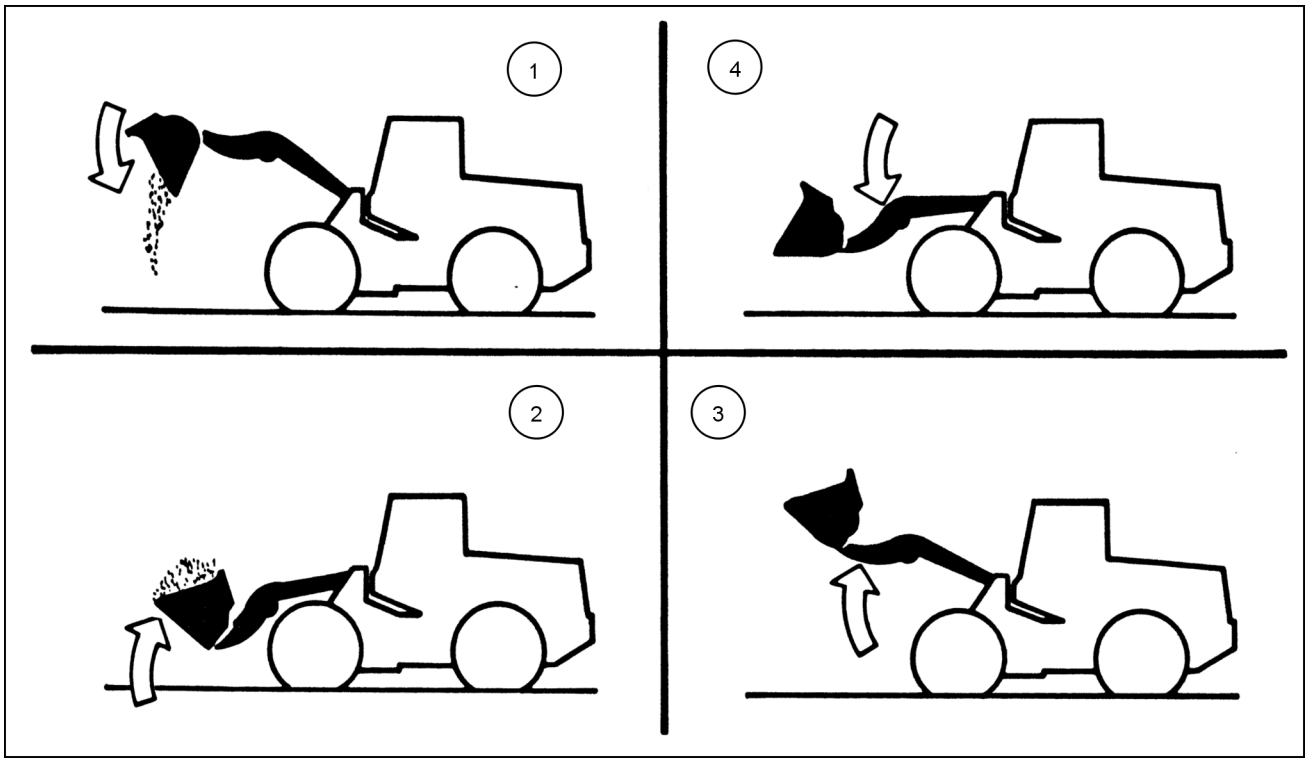
4. Lower lift arms

5. Hold (central position) - The loader arms and bucket will not move when the control levers are in the hold position. When released, the control levers will automatically return to the hold position.

6. Float - When in the float position, the loader bucket floats across the rough ground.



LEIL16WHL1333AB 3



RCPH10WHL045BAH 4

Three function valve - one control lever (joystick) with one auxiliary function

NOTE: *this page shows the basic joystick with one auxiliary control function positions.*

See “Loader functions” - Chapter 4 in this manual for return-to-dig, bucket height control, return-to-travel and float functions.

1. Dump bucket

2. Rollback bucket

1 – 2. Automated bucket metering – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “1” Dump to “2” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

3. Raise lift arms

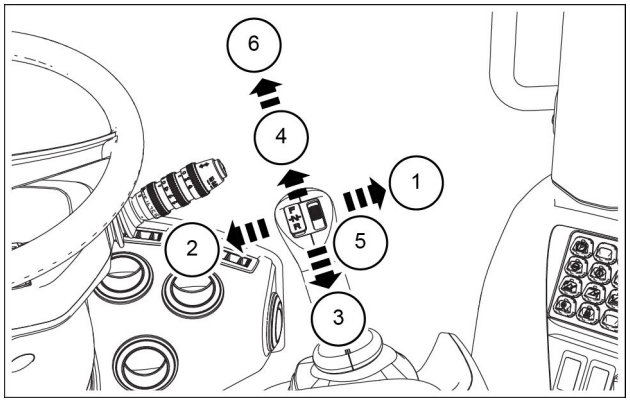
4. Lower lift arms

5. Hold (central position) - The loader arms and bucket will not move when the control levers are in the hold position. When released, the control levers will automatically return to the hold position.

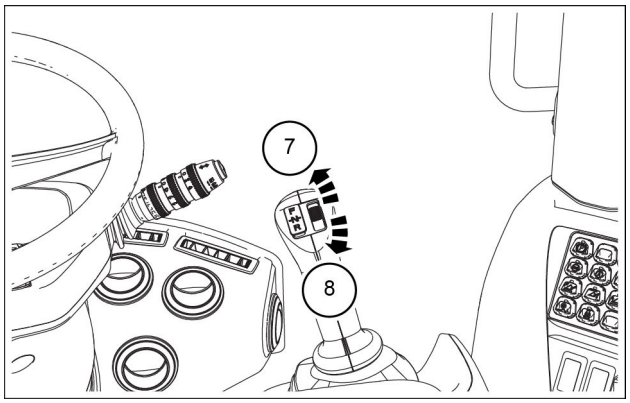
6. Float - When in the float position, the loader bucket floats across the rough ground.

7. Auxiliary function (with detent)

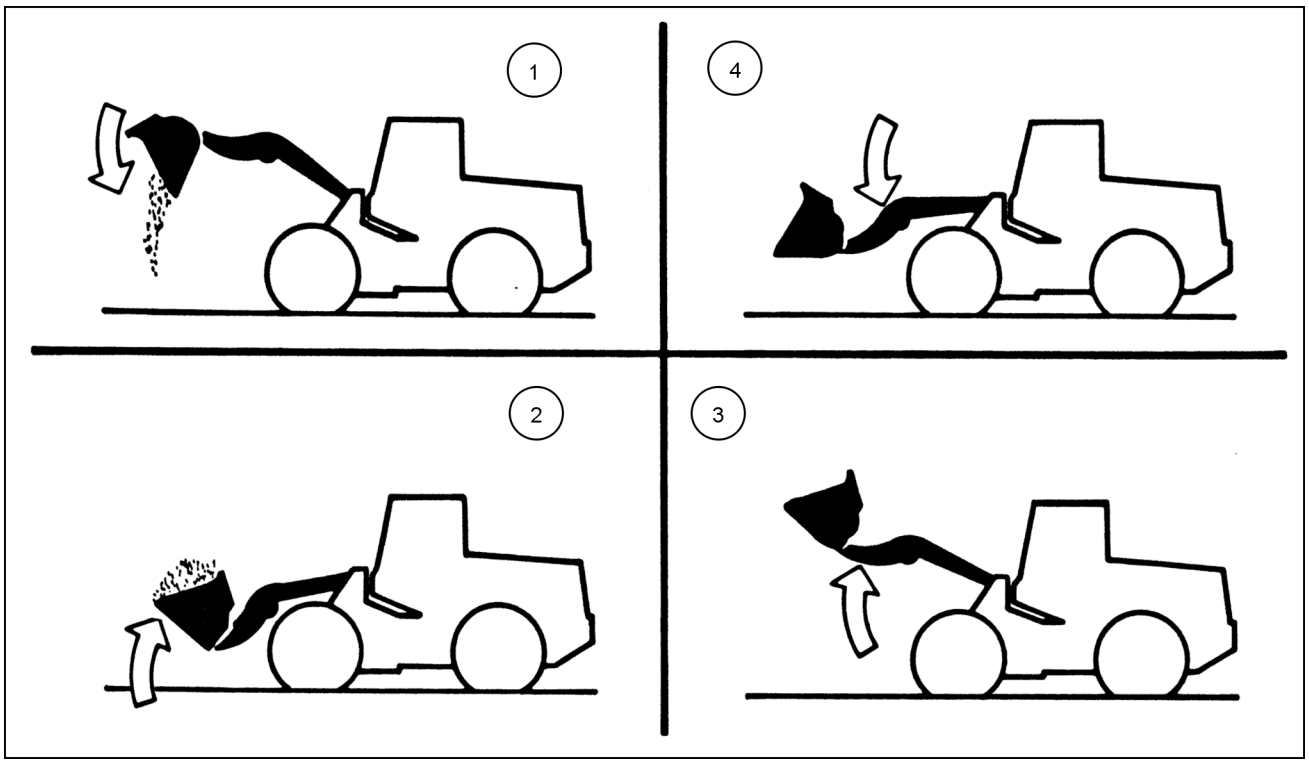
8. Auxiliary function (with detent)



LEIL16WHL1335AB 5



LEIL16WHL1338AB 6

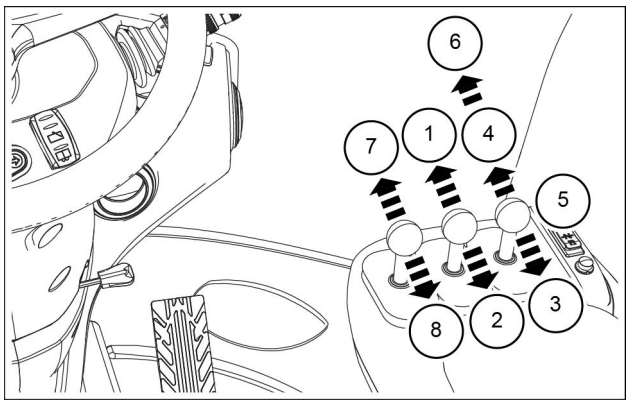


RCPH10WHL045BAH 7

Three function valve - three single axis levers

NOTE: *this page shows the basic three control lever positions.*

See “Loader functions” - Chapter 4 in this manual for return-to-dig, bucket height control, return-to-travel and float functions.



LEIL16WHL1334AB 8

1. Dump bucket

2. Rollback bucket

1 – 2. Automated bucket metering – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “1” Dump to “2” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

3. Raise lift arms

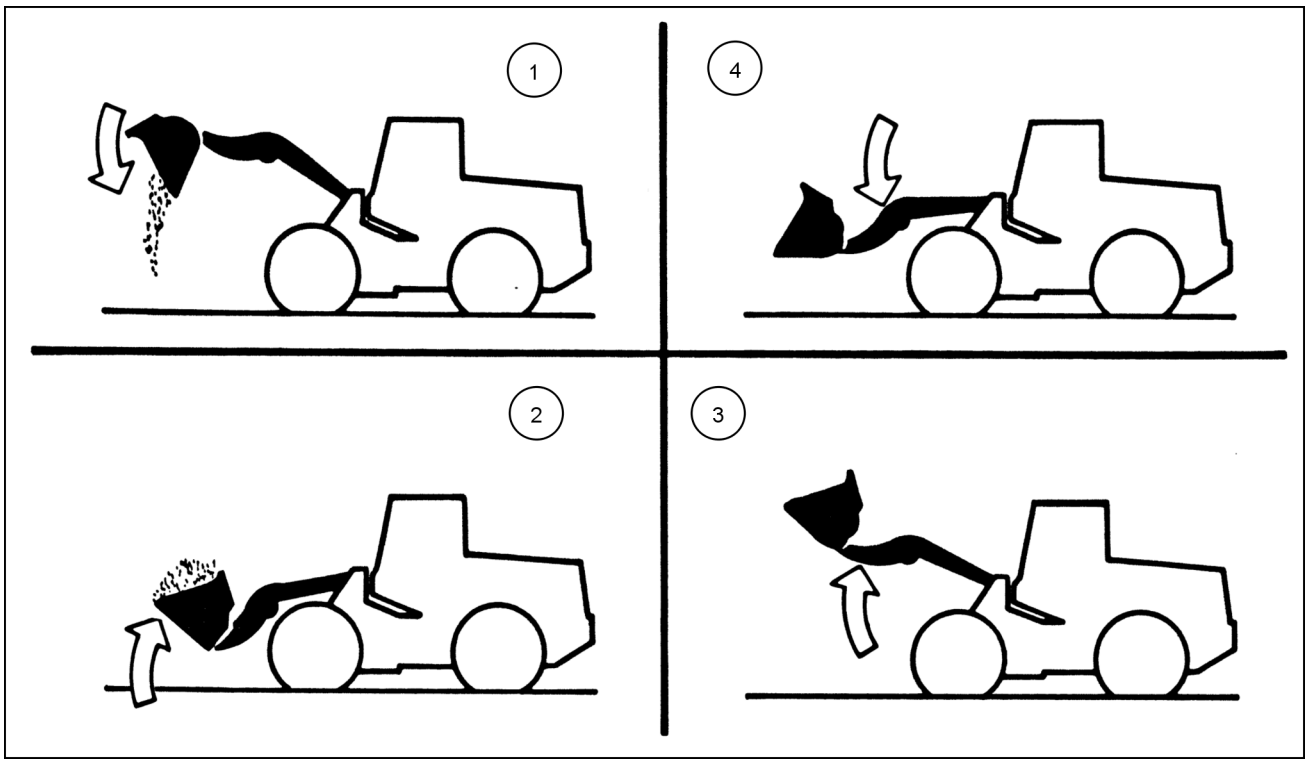
4. Lower lift arms

5. Hold (central position) - The loader arms and bucket will not move when the control levers are in the hold position. When released, the control levers will automatically return to the hold position.

6. Float - When in the float position, the loader bucket floats across the rough ground.

7. Auxiliary function

8. Auxiliary function



RCPH10WHL045BAH 9

Four function valve - one control lever (joystick) with two auxiliary functions

NOTE: *this page shows the joystick with two auxiliary control function positions.*

See “Loader functions” - Chapter 4 in this manual for return-to-dig, bucket height control, return-to-travel and float functions.

1. Dump bucket

2. Rollback bucket

1 – 2. Automated bucket metering – used to improve material metering out of the bucket at a consistent rate. To engage automated functionality, move the joystick rapidly back and forth from “1” Dump to “2” Rollback position. The bucket accelerates more quickly while this motion is maintained after 4 neutral point crossings. Regular bucket control resumes as soon as the back and forth motion is stopped.

3. Raise lift arms

4. Lower lift arms

5. Hold (central position) - The loader arms and bucket will not move when the control levers are in the hold position. When released, the control levers will automatically return to the hold position.

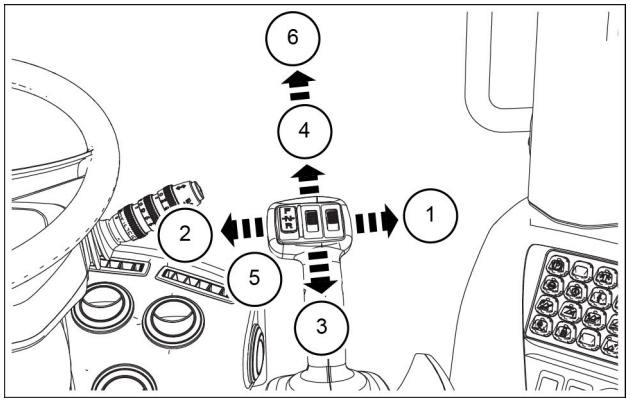
6. Float - When in the float position, the loader bucket floats across the rough ground.

7. Auxiliary function (with detent)

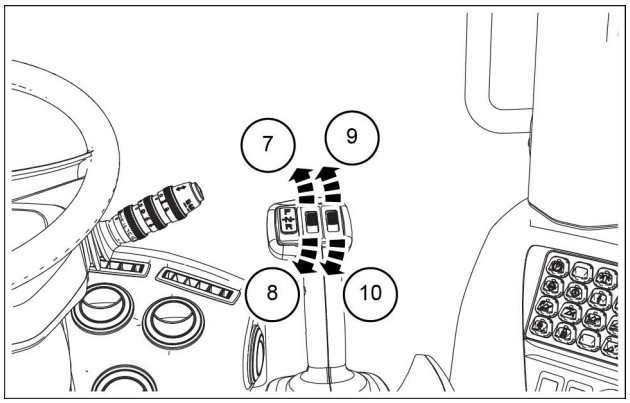
8. Auxiliary function (with detent)

9. Auxiliary function (with detent)

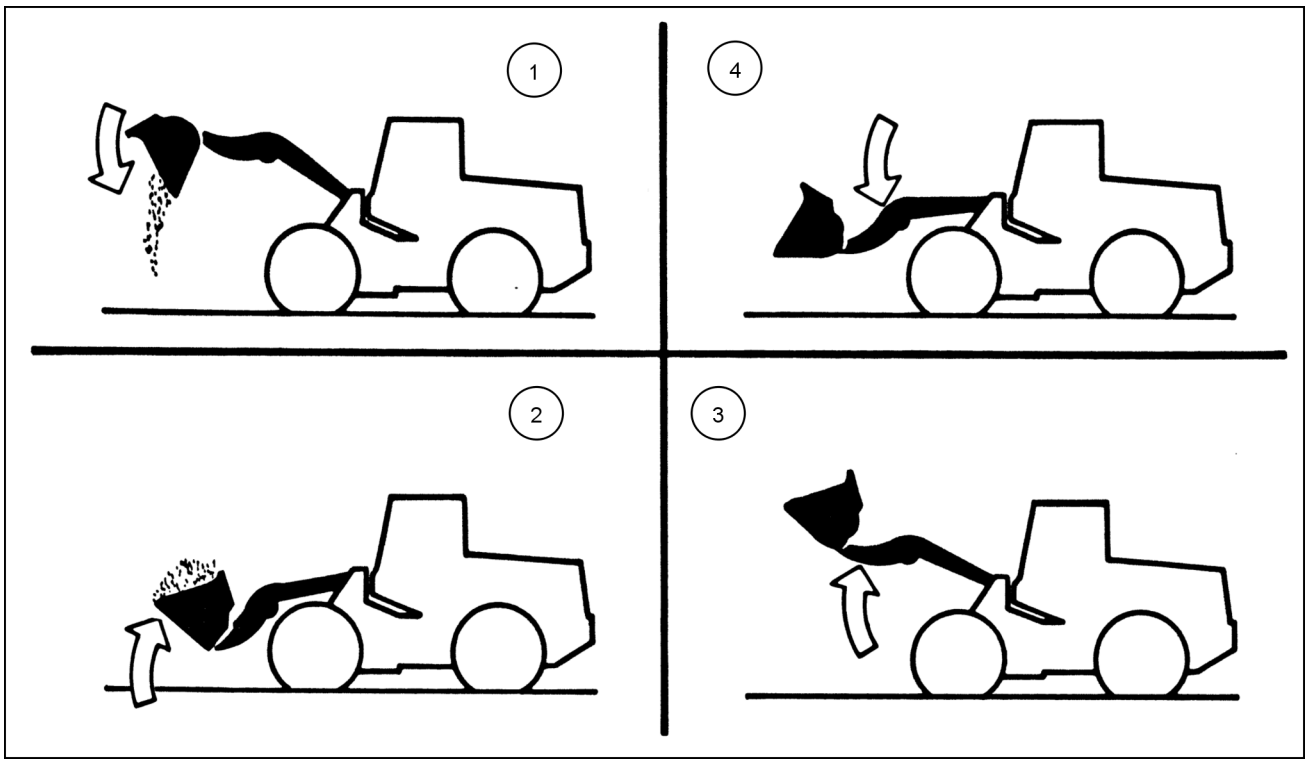
10. Auxiliary function (with detent)



LEIL16WHL1336AB 10



LEIL16WHL1337AB 11



RCPH10WHL045BAH 12

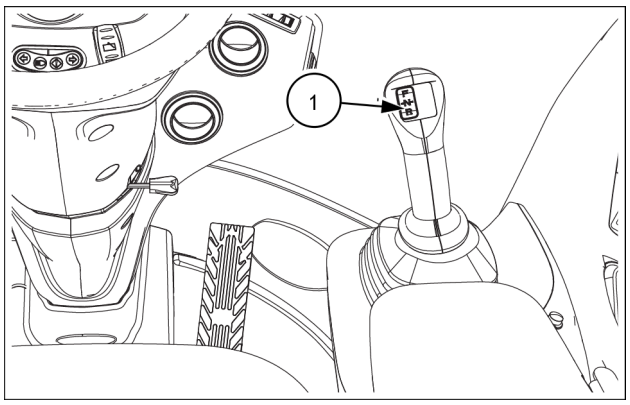
Auxiliary Forward, Neutral, Reverse (F-N-R) switch

Auxiliary F-N-R switch **(1)** for all joystick and single axis lever applications.

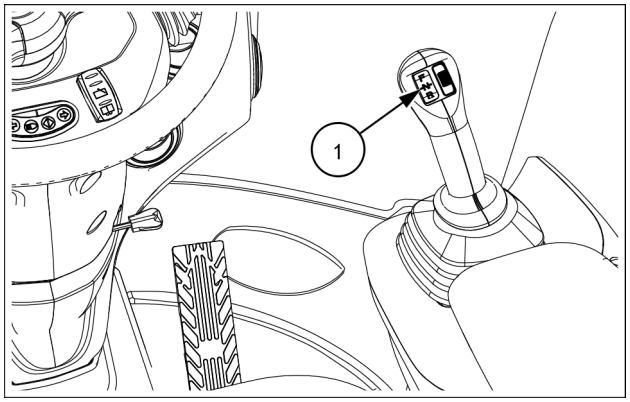
F. FORWARD

N. NEUTRAL

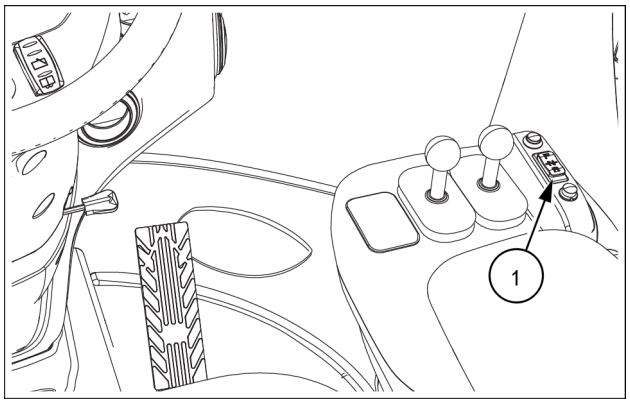
R. REVERSE



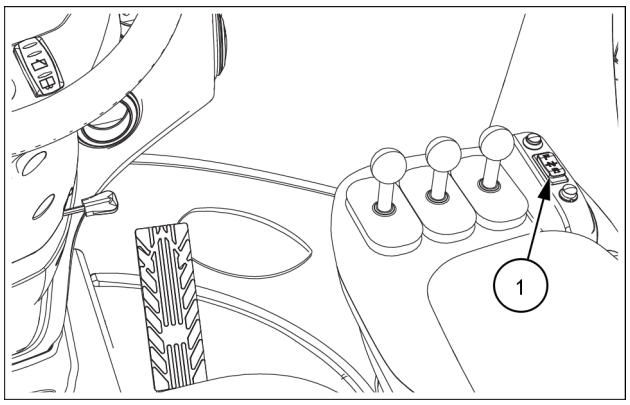
LEIL16WHL1288AB 1



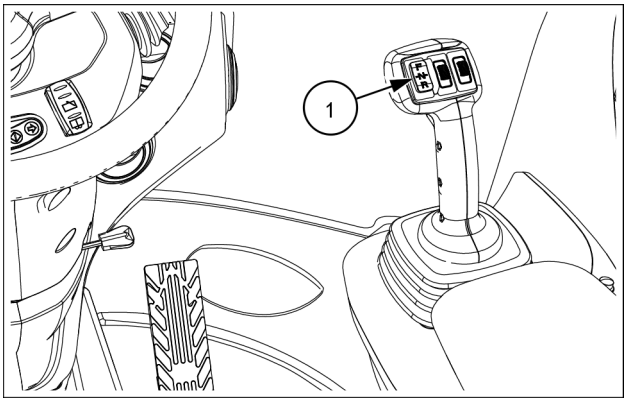
LEIL16WHL1331AA 2



LEIL16WHL1303AA 3



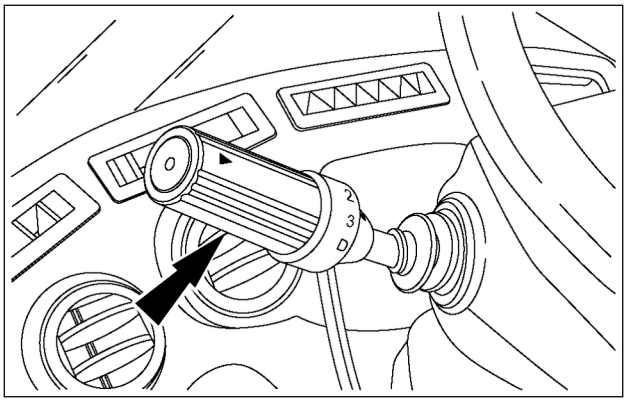
LEIL16WHL1302AA 4



LEIL16WHL1290AA 5

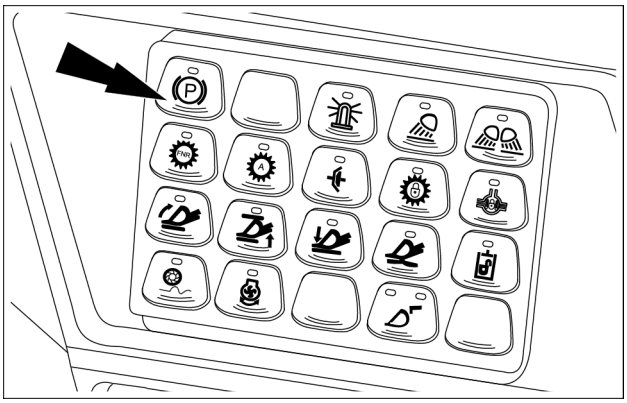
To actuate the auxiliary F-N-R switch, fulfill the following conditions:

1. Machine stopped
2. Engine running
3. Auxiliary F-N-R Switch **(1)** in NEUTRAL **(N)**
4. Transmission control lever in NEUTRAL



LEIL16WHL1468AA 6

5. Release the parking brake.

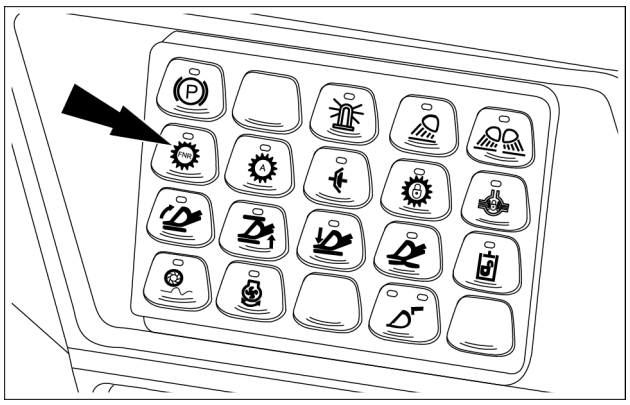


LEIL16WHL1125AA 7

When steps 1 through 5 have been completed, you can press the auxiliary F-N-R button on keypad to activate the auxiliary F-N-R switch. The indicator light of the button will illuminate.

The auxiliary F-N-R switch will be deactivated and F-N-R control will default back to the standard transmission control lever if:

1. the engine is stopped;
2. the transmission control lever is taken out of the NEUTRAL position.

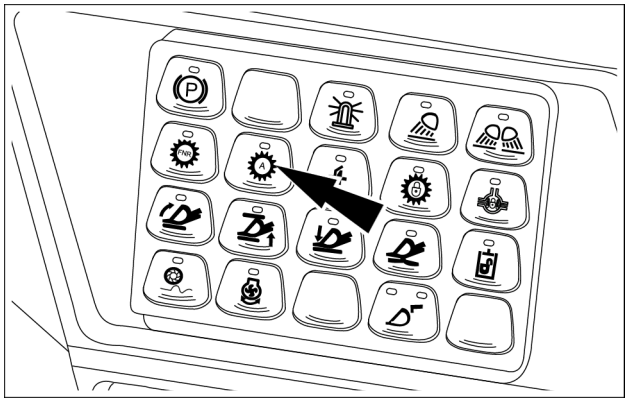


LEIL16WHL1125AA 8

Transmission automatic mode

Automatic mode operation

Press the auto shift button on the multifunction keypad to put the transmission in the automatic mode.



LEIL16WHL1125AA 1

Automatic shifting mode

When the transmission is in the automatic mode, the transmission will start out in second gear, and automatically shift up until the gear selected has been reached. The transmission will also shift down automatically as the speed decreases.

Kick-down function, automatic mode

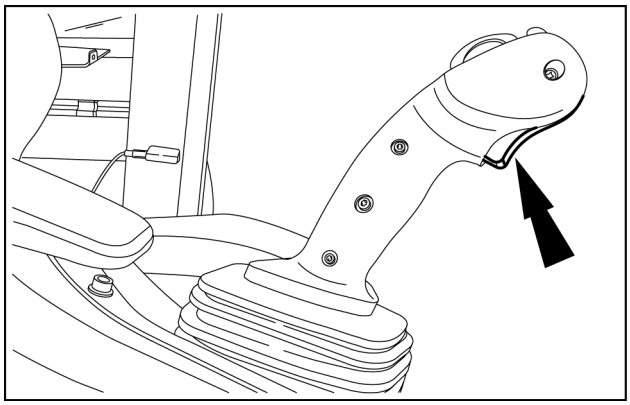
⚠ WARNING

Driving hazard!
Check all controls and safety devices in a safe, open area before starting work.
Failure to comply could result in death or serious injury.

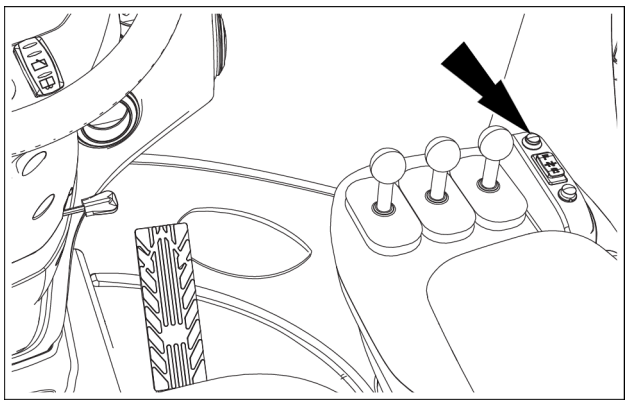
W0248A

You can use the kick-down button to shift down through the gears in single steps. Each time you press the kick-down button, the transmission will shift down one gear range until the first gear is reached. Once the kick-down button has been pressed down, the transmission maximum gear allowed is lowered.
The kick-down button will return to the automatic mode in one of the two cases, as follows:

1. when the transmission control lever changes gear;
2. when the transmission control lever is moved to NEUTRAL and then to FORWARD or to REVERSE.



LEIL15WHL0516AA 2



LEIL16WHL1302AA 3

Shuttle shifting (direction change)

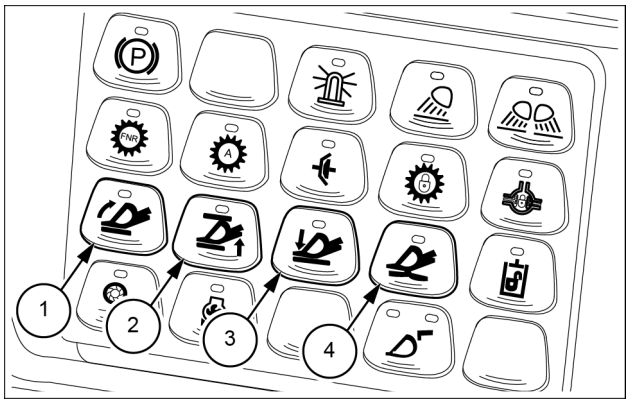
It is not necessary to bring the machine to a complete stop when changing directions from forward to reverse or reverse to forward (transmission in either automatic or manual shifting modes). For smooth operation and operator comfort, reduce the engine speed before direction changes.

Loader functions

Loader function buttons

1. Return-to-dig
2. Height control
3. Return-to-travel
4. Float

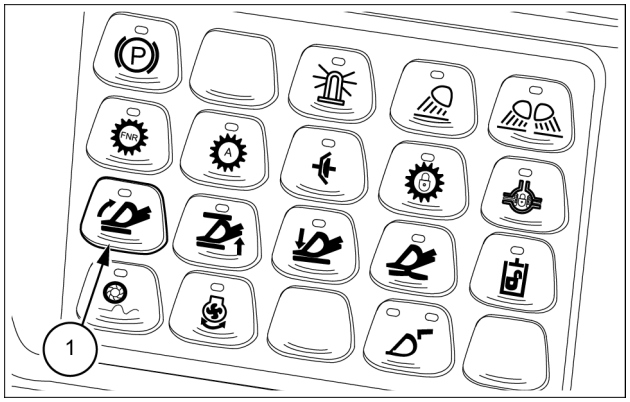
Press the relevant button to engage or disengage all these four loader functions. When the green LED indicator lights up, the corresponding loader function is activated.
You cannot engage the return-to-travel function and the float function simultaneously. If one of these two functions is engaged the other one is disengaged.



LEIL16WHL1128AB 1

Return-to-dig

Use the return-to-dig function to automatically return the loader bucket to the dig position after you have dumped the loader bucket. To enable the return-to-dig function press the button **(1)**.
The green LED indicator lights up to indicate that the function is active.

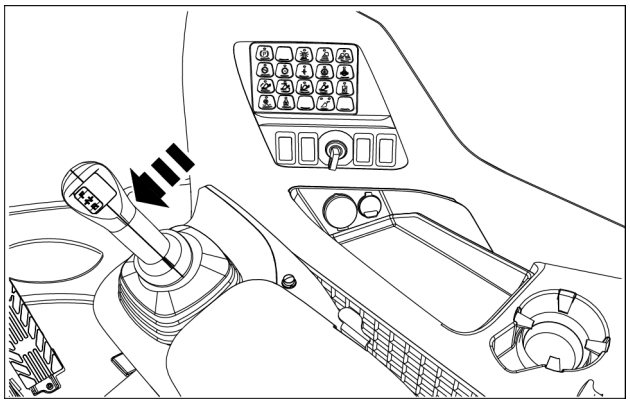


LEIL16WHL1129AB 2

To set the return-to-dig function proceed as follows:

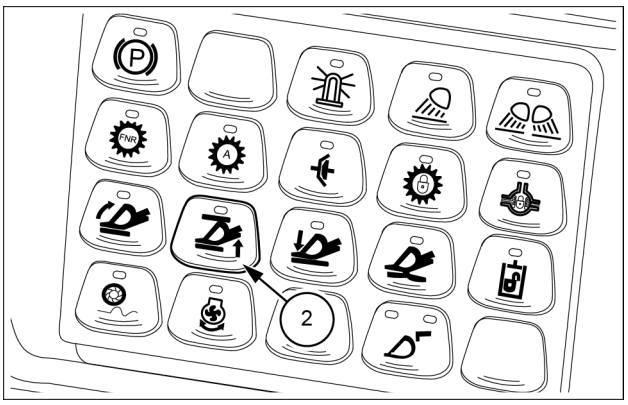
1. Briefly press the corresponding button **(1)** on the multifunction keypad to activate the function; the green LED indicator lights up to indicate that the function is active.
2. Set the attachment or the bucket to the desired location.
3. Press and hold the corresponding button **(1)** on the multifunction keypad until the green LED indicator light flashes (approximately **2 s**).
4. The return-to-dig function is now set. Display will prompt that the detent position is saved.

To actuate the return-to-dig function, move the joystick into the ROLLBACK position until the function activation point is reached. When the function activation point is reached, the operator will notice more resistance from the joystick. If released, the joystick will automatically return to the HOLD (central) position and the bucket will continue to rollback until it reaches the desired return-to-dig position. If you move the joystick when the return-to-dig function is activated, the bucket will stop.



LEIL17WHL2054AB 3

Bucket height control

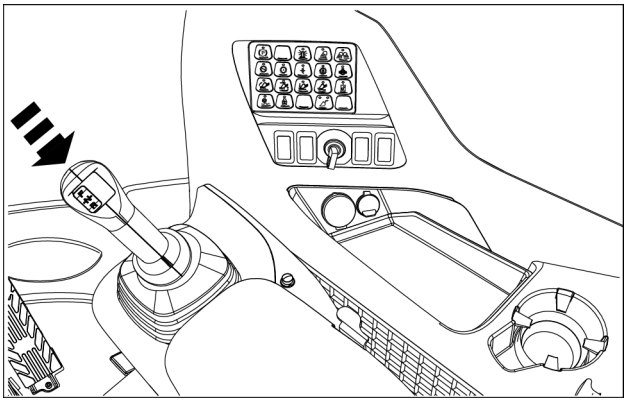


LEIL16WHL1130AB 4

Use the bucket height control to automatically stop the loader arms at the height selected while traveling upward. To enable the bucket height control press the button **(2)**. The green LED indicator lights up to indicate that the function is active.

To set the bucket height control proceed as follows:

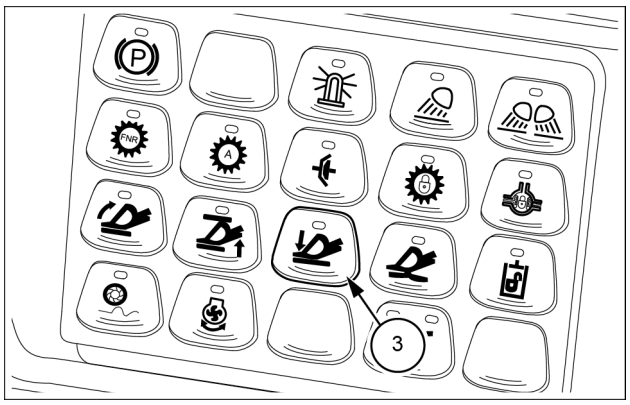
1. Briefly press the corresponding button **(2)** on the multifunction keypad to activate the function; the green LED indicator lights up to indicate that the function is active.
2. Set the attachment or the bucket to the desired location.
3. Press and hold the button **(2)** on the multifunction keypad until the green LED indicator light flashes (approximately **2 s**).
4. The bucket height control function is now set. Display will prompt that the detent position is saved.



LEIL17WHL2055AB 5

To actuate the bucket height control function, move the joystick full back into the RAISE position until the function activation point is reached. When the function activation point is reached, the operator will notice more resistance from the joystick. If released, the joystick will automatically return to the HOLD (central) position and the lift arms will continue to raise until the arms reach the desired height. If you move the joystick when the bucket height control function is activated, the loader arms will stop.

Return-to-travel

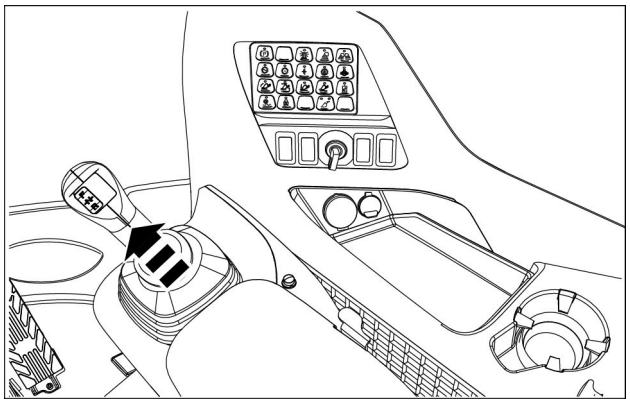


LEIL16WHL1132AB 6

Use the return-to-travel function to automatically stop the loader bucket while traveling downward at the carry height selected. To enable the return-to-travel function, press the return-to-travel button **(3)**.
The green LED indicator lights up to indicate that the function is active.

To set the return-to-travel function proceed as follows:

1. Briefly press the corresponding button **(3)** on the multifunction keypad to activate the function; the green LED indicator lights up to indicate that the function is active.
2. Set the attachment or the bucket to the desired location.
3. Press and hold the button **(3)** on the multifunction keypad until the green LED indicator light flashes (approximately **2 s**).
4. The return-to-travel function is now set. Display will prompt that the detent position is saved.



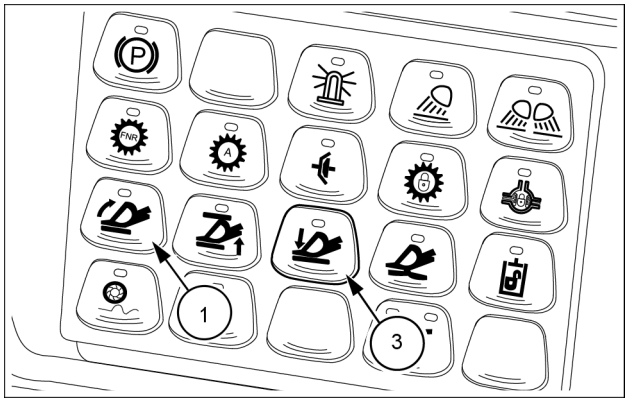
LEIL17WHL2071AB 7

To actuate the return-to-travel function, move the joystick into the full forward LOWER position until the function activation point is reached. When the function activation point is reached, the operator will notice more resistance from the joystick. If released, the joystick will automatically return to the HOLD (central) position and the lift arms will continue to lower until the arms reach the desired travel position. If you move the joystick when the return-to-travel function is activated, the loader arms will stop.

Return-to-dig and Return-to-travel

The operator can actuate the return-to-dig and the return-to-travel functions simultaneously as follows:

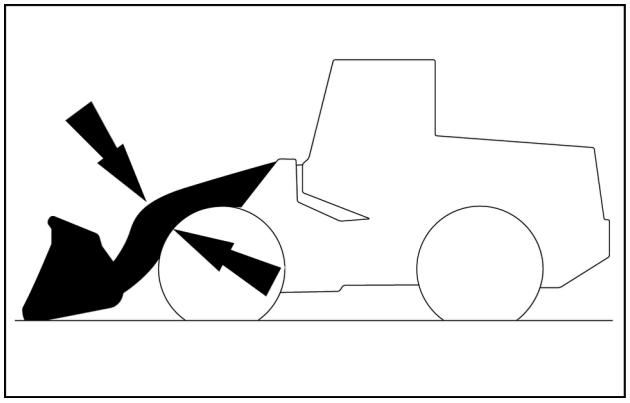
1. Press the corresponding buttons **(1)** and **(3)** on the multifunction keypad to activate the functions; the green LED indicators light up to indicate that the functions are active.
2. Move the joystick in ROLLBACK and LOWER positions in sequence.



LEIL16WHL1132AB 8

Float

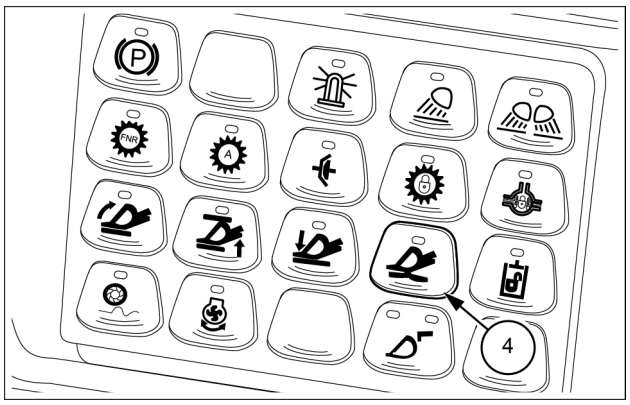
Use the float function to let the loader bucket float across the rough ground. This opens the valve at the rod and base end of the cylinder so hydraulic oil can freely flow on each end of the cylinder (the front and the rear chambers of the loader arm cylinders begin communicating).



LEIL15WHL1828AA 9

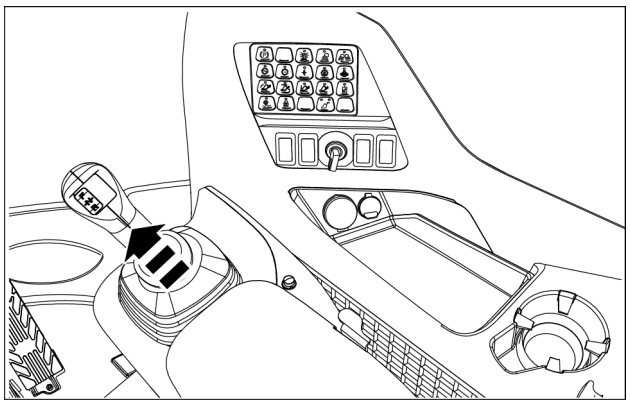
To enable this function press the float button **(4)**.
The green LED indicator lights up to indicate that the function is active.

NOTE: *if the return-to-travel function is activated when the operator presses the float button* ***(4)****, the return-to-travel function is deactivated automatically. The float function and the return-to-travel function cannot be activated simultaneously.*



LEIL16WHL1134AB 10

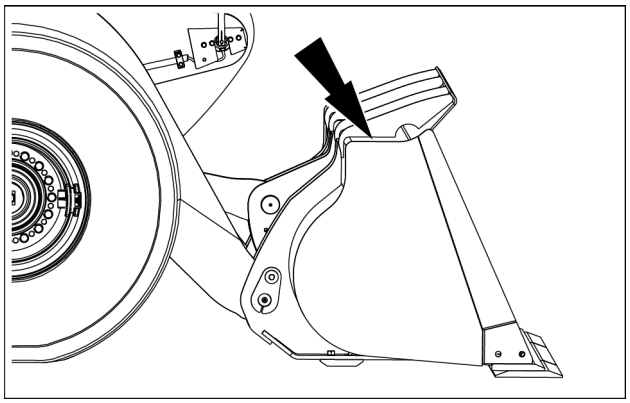
To actuate the float function, move the joystick into the FLOAT position until the function activation point is reached. When the function activation point is reached, the operator will notice more resistance from the joystick. If released, the joystick will automatically return to the HOLD (central) position and the loader arms will remain in the float position. If you move the joystick when the float function is activated, the loader arms will stop.



LEIL17WHL2071AB 11

Bucket level indicator

The bottom of the bucket is parallel with the ground when the flat portion of the bucket is horizontal.



LEIL17WHL1452AB 12

Loader control

The joystick is connected to a hydraulic accumulator through a pressure reducing valve. The purpose of the reducing valve and accumulator combination is:

- to allow the operator to lower the loader arms if the engine stops with the loader arms raised

OR

- to give the control system hydraulic pressure assistance when operating the machine at low idle speed.

To test accumulator performance, carry out the following procedure:

1. Start the engine.
2. Raise the lift arms.
3. Stop the engine.
4. Turn the key to ON.
5. Verify that the indicator of the hydraulic functions lockout button is OFF, allowing the hydraulic functions to work.

Move the lift arm control to LOWER. The loader bucket must lower to the ground. If the bucket does not lower to the ground, see the service manual for this machine or contact your dealer.

Brake accumulators

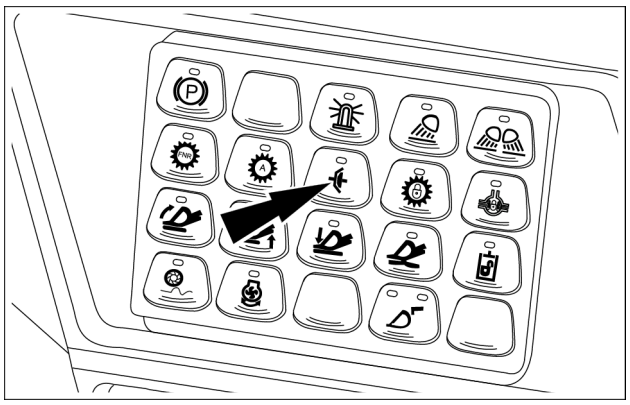
Two hydraulic accumulators are connected in the brake system. The accumulators provide the brake modulating valve with a positive supply of pressurized hydraulic fluid.

Periodically test the accumulators for correct operation.

1. Start the engine.
2. Run the engine at 1/2 throttle for **15 s**.
3. Stop the engine.
4. Without starting the engine, turn the ignition key to the ON position. After the diagnostic check completion, confirm that the brake pressure light is OFF.
5. Repeatedly pump the brake pedal until the brake pressure lamp illuminates. When pumping the brake pedal, there should be some resistance pressure felt. You should feel a slight increase in the pressure as you pump the brakes.
6. After the lamp illuminates, continue to pump the brake pedal and count the number of full applications.

NOTE: *if you can complete six full brake applications after the indicator lamp illuminates, the accumulators are working correctly. If you cannot complete six applications, see the service manual for this machine or contact your dealer.*

Declutch switch (4-speed only)



LEIL16WHL1125AA 13

Declutch can increase the speed of the lift arms by temporarily removing the load of the transmission from the engine. It is often used by operators while approaching a truck with a full bucket. The declutch switch will decouple the transmission from the engine when brake pressure is sensed, allowing more engine power for hydraulics. This pressure is adjustable in the display. A higher brake pressure to activate the declutch function is desirable when operating on inclines. Higher brake pressure is the result of increasing brake pedal travel. A lower brake pressure to activate the declutch function is desirable when operating on firm, flat terrain. Lower brake pressure is the result of limited brake pedal travel. Push the declutch button on the side console to activate the declutch function. Declutch pressure adjustment is made in the display (access to Machine settings/Transmission – see Chapter 3 in this manual).

Powerinch (5-speed only)

Powerinch adjusts the clutch cut-off point depending on transmission output torque and brake pressure. It controls the vehicle's tractive force through the brake pedal, regardless of engine speed. Powerinch is a drive line management system which improves the operation of the wheel loader, making it ideal for loading trucks or turning tight corners. At full hydraulic performance, the tractive force needed to move the vehicle is limited to the minimum required instead of the maximum available. This principle reduces power loss in the torque converter and energy loss in the axle service brake. It will aid productivity, as more power is available for the vehicle hydraulics and the operator can experience smooth control at high engine and low driving speeds. It will improve overall handling as well.

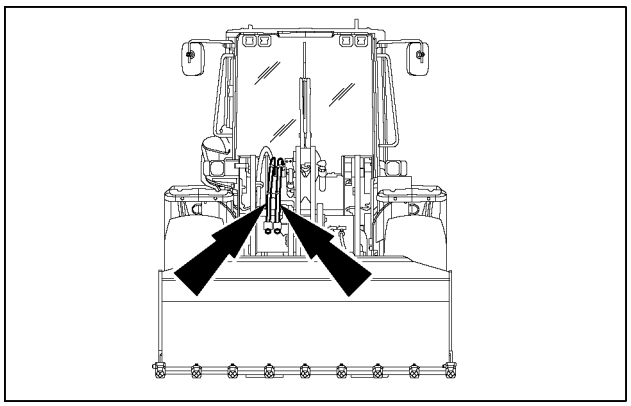
Auxiliary hydraulic connection (if equipped)

⚠ WARNING

Escaping fluid!
Do not disconnect hydraulic quick coupler under pressurized conditions. Make sure all hydraulic pressure is removed from the system before disconnecting hydraulic quick coupler.
Failure to comply could result in death or serious injury.

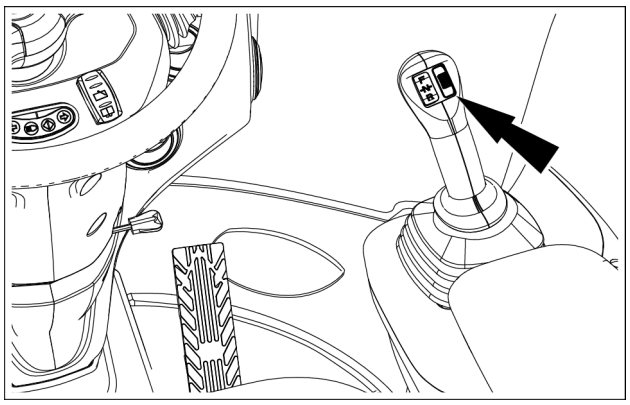
W0095A

Your wheel loader may be equipped with an auxiliary hydraulic system.

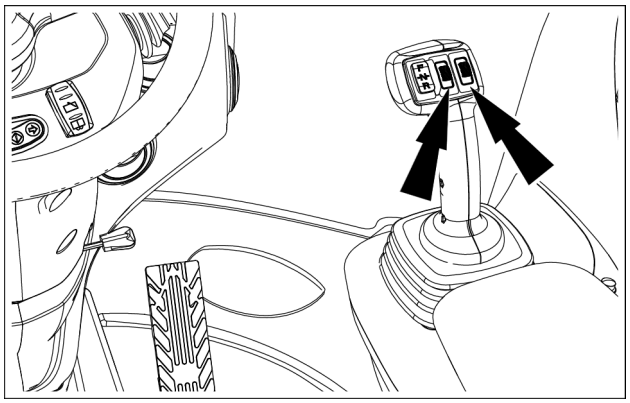


LEIL16WHL1447AB 14

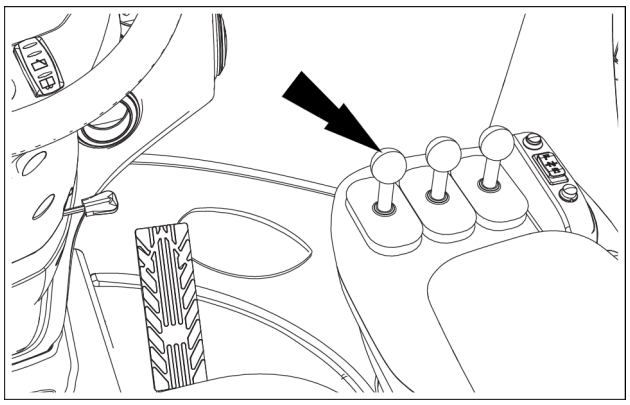
One or two rollers on the joystick or one additional lever control the flow to the auxiliary hydraulic connection points on the lift arms.



LEIL16WHL1331AA 15



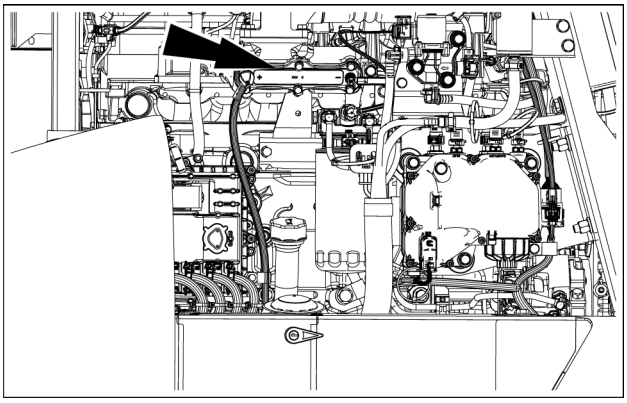
LEIL16WHL1290AA 16



LEIL16WHL1302AA 17

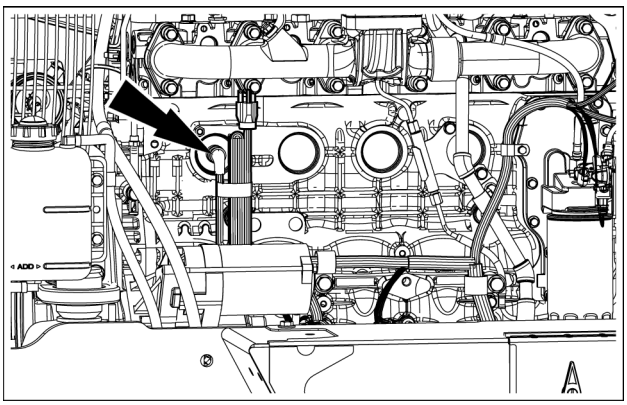
Engine coolant heater (if equipped)

The right-hand side of the engine block has a connection for installing an optional grid heater. See your authorized dealer for this cold weather option.



LEIL19WHL0130AB 18

The left-hand side of the engine block has a connection for installing an optional **240 V** cooler heater.



LEIL19WHL0174AB 19

5 - TRANSPORT OPERATIONS

Recovery transport

Safety rules

⚠ WARNING

Crushing hazard!
Engage the safety lock link before service or transport.
Failure to comply could result in death or serious injury.

W1154A

⚠ WARNING

Driving hazard!
Know all rules, regulations, laws, and required safety equipment for transporting or operating this machine on a road or highway. See your dealer to obtain a rotating beacon, backup alarm, Slow Moving Vehicle (SMV) emblem, and other safety equipment.
Failure to comply could result in death or serious injury.

W0154A

⚠ WARNING

Transport hazard!
The machine can slip or fall from a ramp or trailer. Make sure the ramp and trailer are not slippery. Remove all oil, grease, ice, etc. Move the machine on or off the trailer with machine centered on the trailer or ramp.
Failure to comply could result in death or serious injury.

W0152A

⚠ WARNING

Transport hazard!
Always use the primary steering when loading or unloading the machine for transport. Do not use joystick steering when loading or unloading the machine from a truck or trailer.
Failure to comply could result in death or serious injury.

W0448A

Make sure you know the safety rules and regulations before transporting the machine. You must know the rules or laws for transportation and safety that are used in each area that you will be in. Make sure that the truck and machine are equipped with the correct safety equipment.

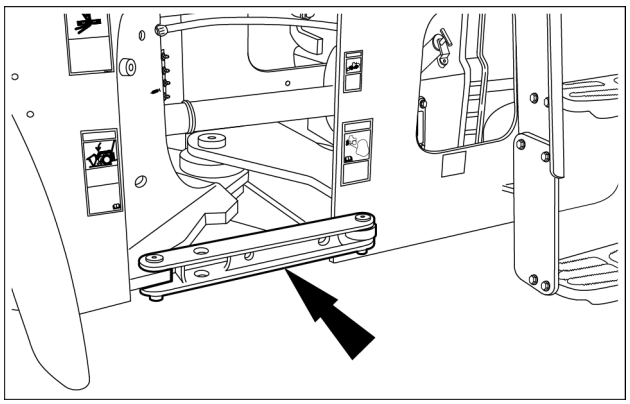
Transporting the machine

Transporting the machine on trailer

NOTICE: *make certain that the truck and the trailer are adequate for the machine. The truck, the trailer, and the machine must be equipped with the correct safety equipment for transport. Wide load escorts may be required for some machines. Remove all dirt, mud, snow, ice, oil, or grease from the trailer and the ramp before loading or unloading the machine.*

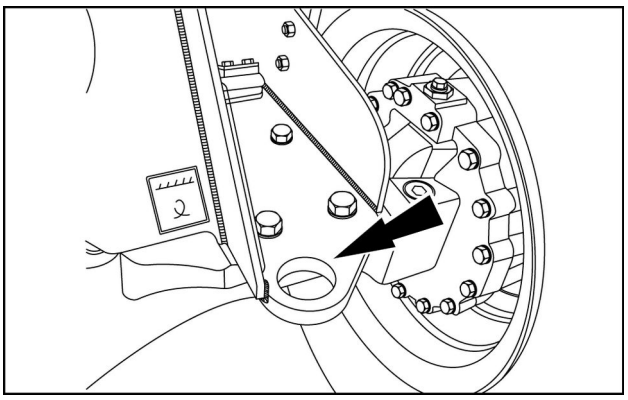
Use care when loading a machine. Always use primary steering.

1. Place a block at the front and rear of each trailer wheel.
2. Carefully move the machine SLOWLY onto the trailer.
3. Lower the loader bucket onto the trailer.
4. Apply the parking brake. Make sure that the transmission control lever is in the NEUTRAL position and the joystick is in the HOLD position. Stop the engine.
5. Remove the key. Turn the timed disconnect switch to OFF position.
6. Lock all doors, hoods and access panels.
7. Place blocks at the front and rear of each tire of the machine.
8. Place the transport service link in the locked position.



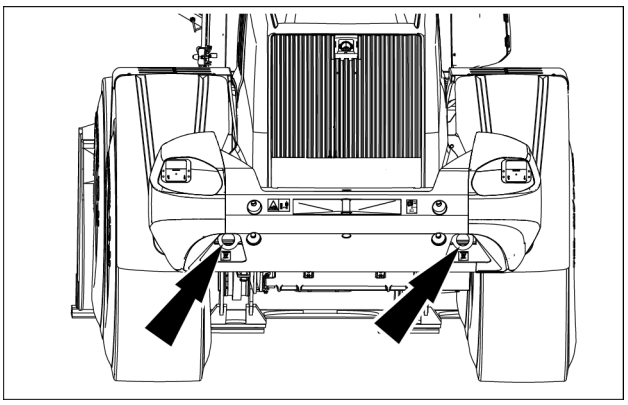
LEIL16WHL0048AB 1

9. Use provided tie down locations to safely secure the machine.



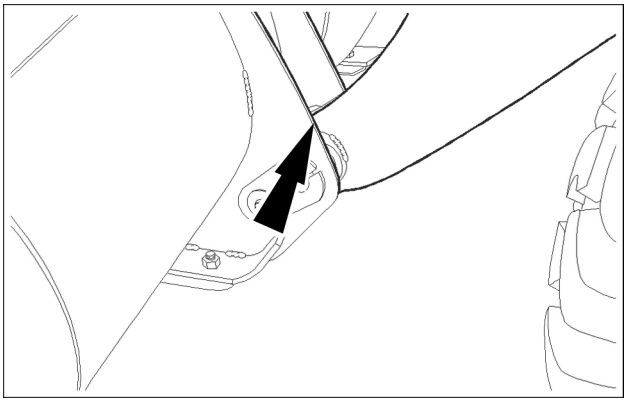
RCPH10WHL133BAL 2

10. Securely fasten the chains to the left-hand and right-hand rear tie down holes and the trailer. Tie down decals indicate the tie down locations on the machine.



LEIL17WHL1321AA 3

11. Securely fasten the chains around the left-hand and right-hand side of the loader arm.
12. Put a cover over the exhaust pipe.
13. Measure the distance between the ground and the highest point of the machine. You must know the clearance height of the machine on the trailer.
14. Advise the driver of the machine weights and attachments if special permits or guidelines are necessary.

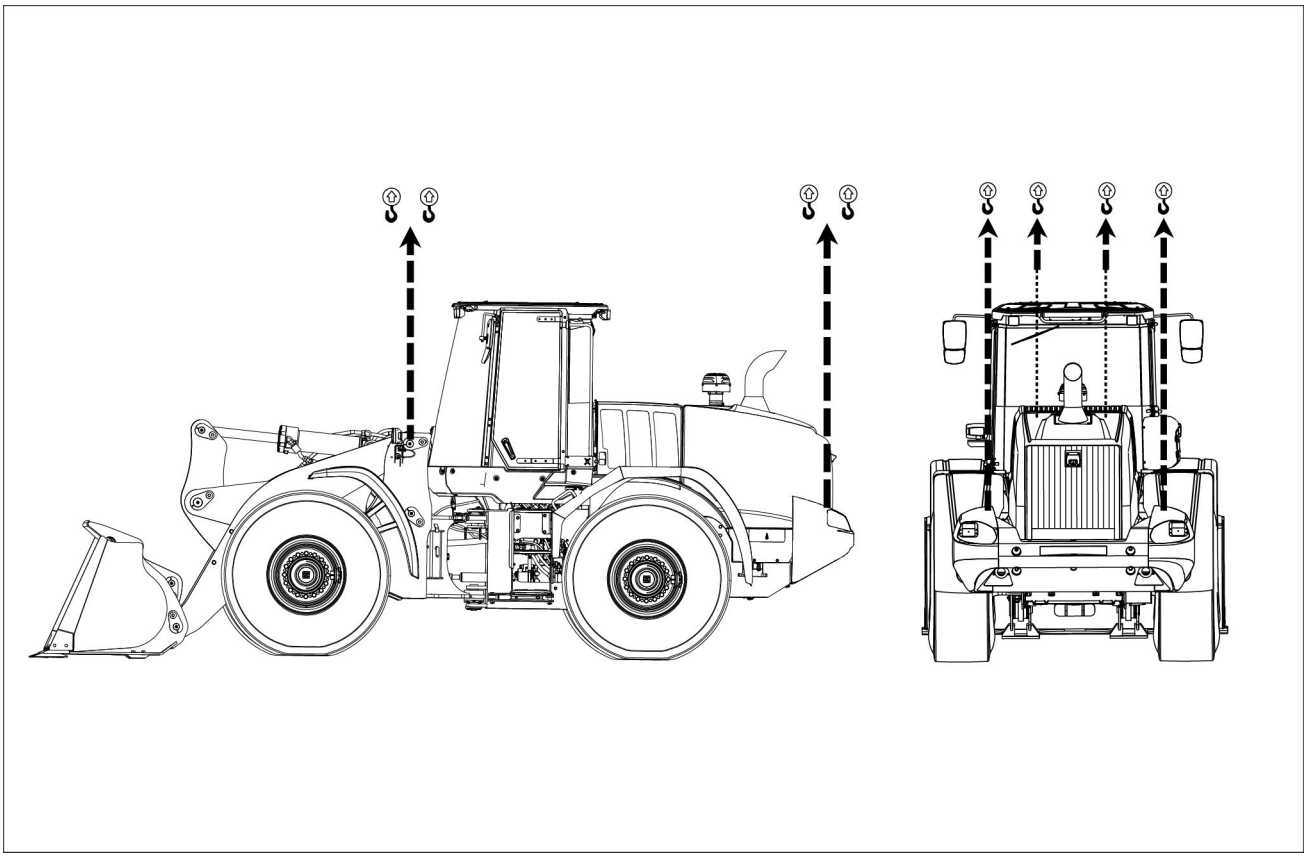


LEIL16WHL0090AB 4

Transporting the machine by rail or ship

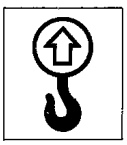
Transport by rail or ship is subject to specific regulation. Consult an approved organization.

Lifting the machine



LEIL17WHL1325FA 5

Lifting hooks



Always place the articulation transport service link in the locked position prior to lifting. Lift the wheel loader using the four lifting attachment points identified on the machine by the lift hook symbol. Orient the lifting accessories in a vertical position as shown in the figure above.

Traveling on public roads

⚠ CAUTION

Driving hazard!
Never drive on public roads with any mechanisms engaged.
Failure to comply could result in minor or moderate injury.

C0030A

⚠ DANGER

Unexpected machine movement!
Always engage the transport stops when working around a raised header or when transporting the machine on a public road.
Failure to comply will result in death or serious injury.

D0042A

Check all levels and the tire inflation pressure.

Place the equipment within the overall dimensions of the machine and raise the equipment from the ground only if the height will not interfere with the maneuver.

Check the correct operation of all signal lights.

Some types of tire and thread are not suitable for traveling on road: check with the tire manufacturer.

Consider the stopping distances and adjust the travel speed of the vehicle accordingly.

Comply with all road regulations

⚠ WARNING

Driving hazard!
When traveling on public roads, only use the headlights and hazard warning lights. DO NOT use the work lights. An oncoming vehicle may confuse the rear work lights with the headlights.
Failure to comply could result in death or serious injury.

W0211A

⚠ WARNING

Driving hazard!
Know all rules, regulations, laws, and required safety equipment for transporting or operating this machine on a road or highway. See your dealer to obtain a rotating beacon, backup alarm, Slow Moving Vehicle (SMV) emblem, and other safety equipment.
Failure to comply could result in death or serious injury.

W0154A

NOTE: *the prescriptions listed hereby could require adjustments or modifications as required by the road regulations in effect in different countries.*

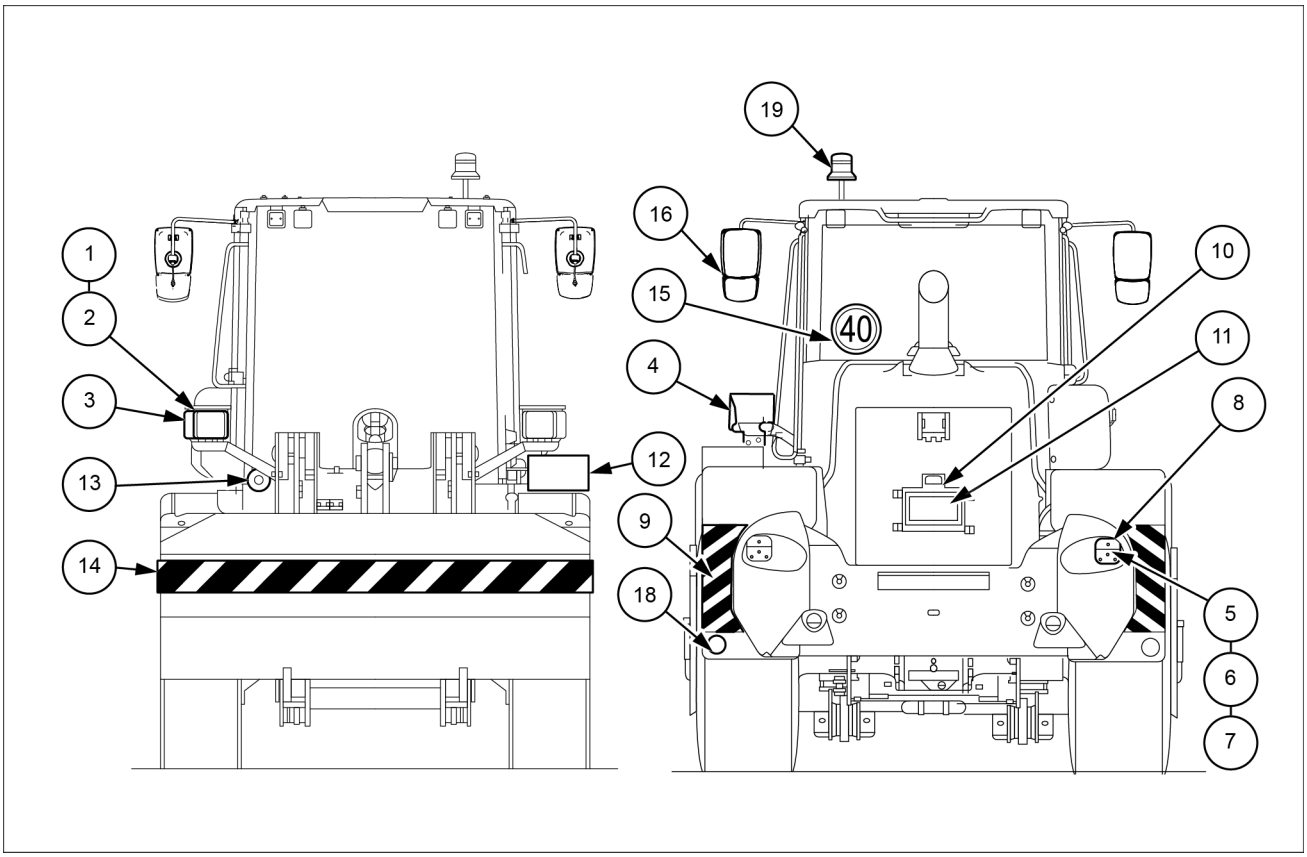
In the event of slowing-down of the traffic, move the machine to the curb of the road.

After two hours on the road, stop the machine for 30 minutes and let the tires cool-off. When rolling, the tire pressure increases. This is normal and it must not be decreased.

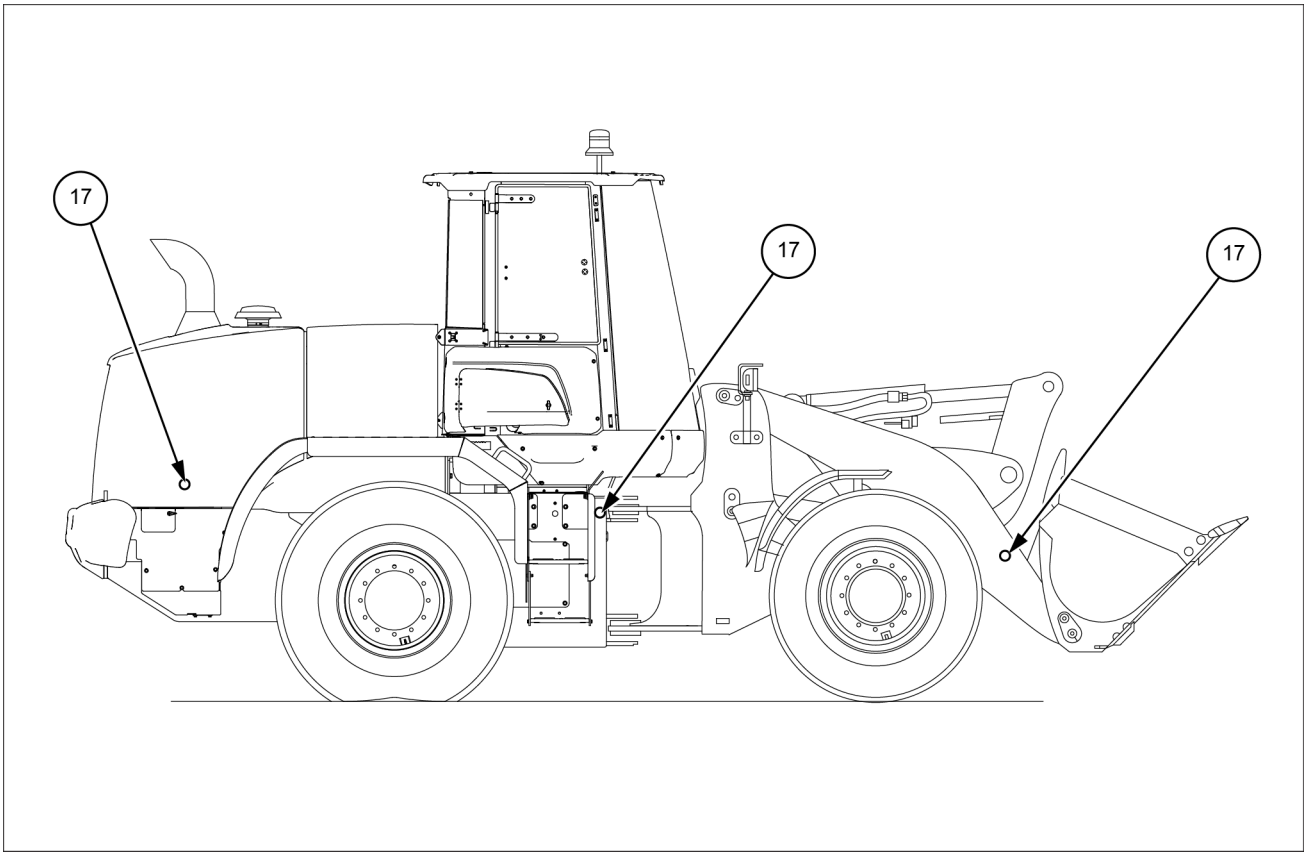
Check the instrumentation frequently to monitor its operation. Have an escort vehicle warning other road users of your presence on the road with adequate signals (flashing lights, boards etc.).

In the event a "rhythmical motion" occurs, it becomes necessary to slow-down the machine with the brakes to stop the phenomenon and resume traveling at a lower speed.

Lights and visual signal lights (conventional lights)

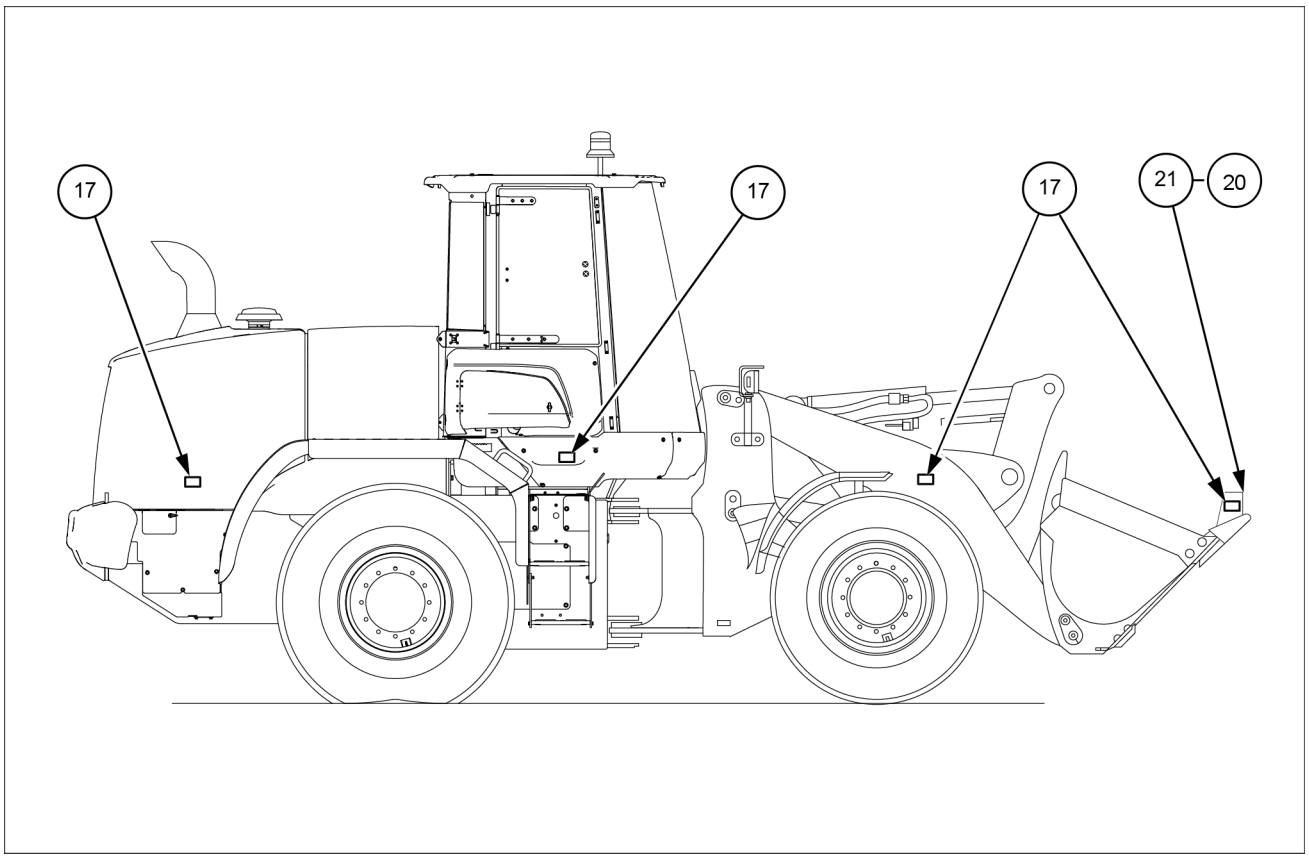


LEIL17WHL1256FB 1



LEIL16WHL2614FB 2

for Z-Bar models

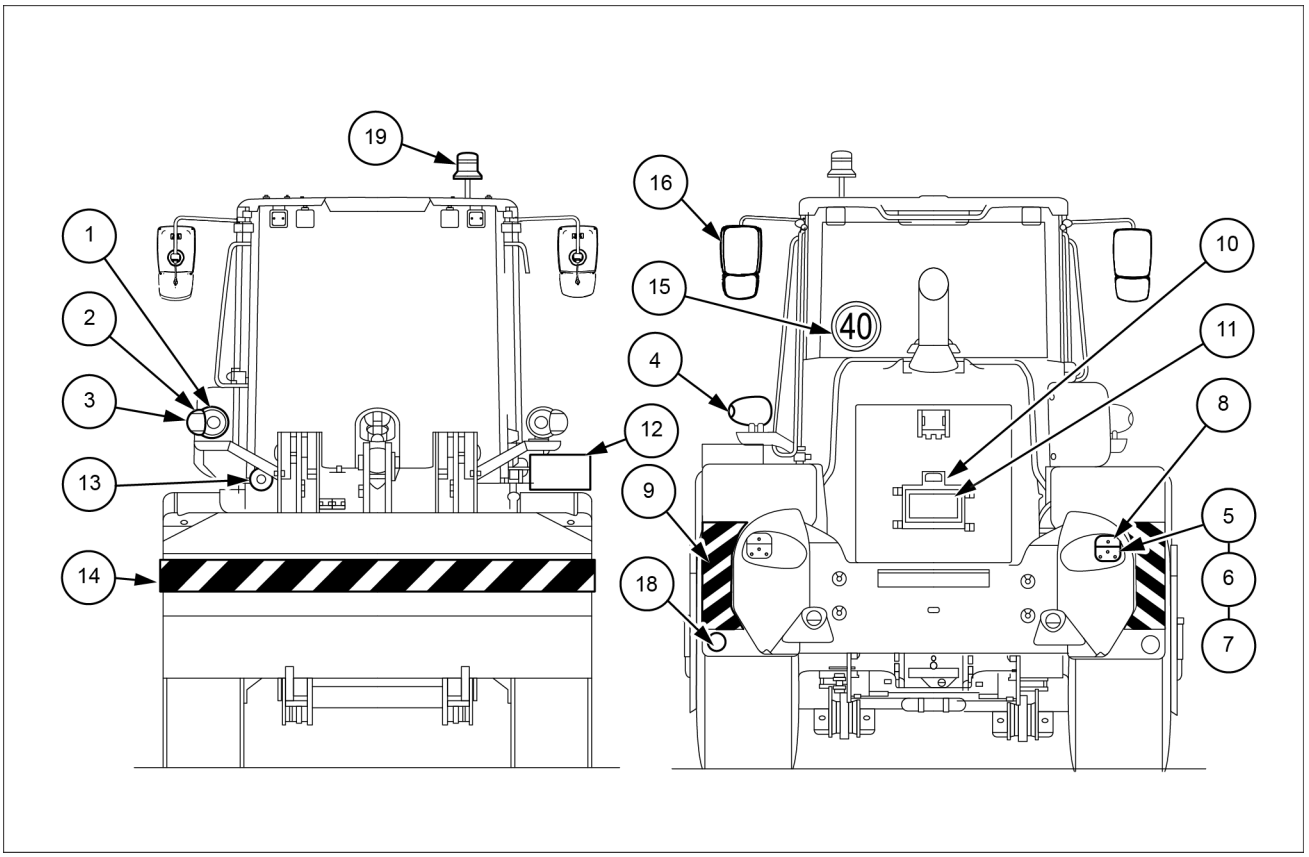


LEIL16WHL2615FB 3

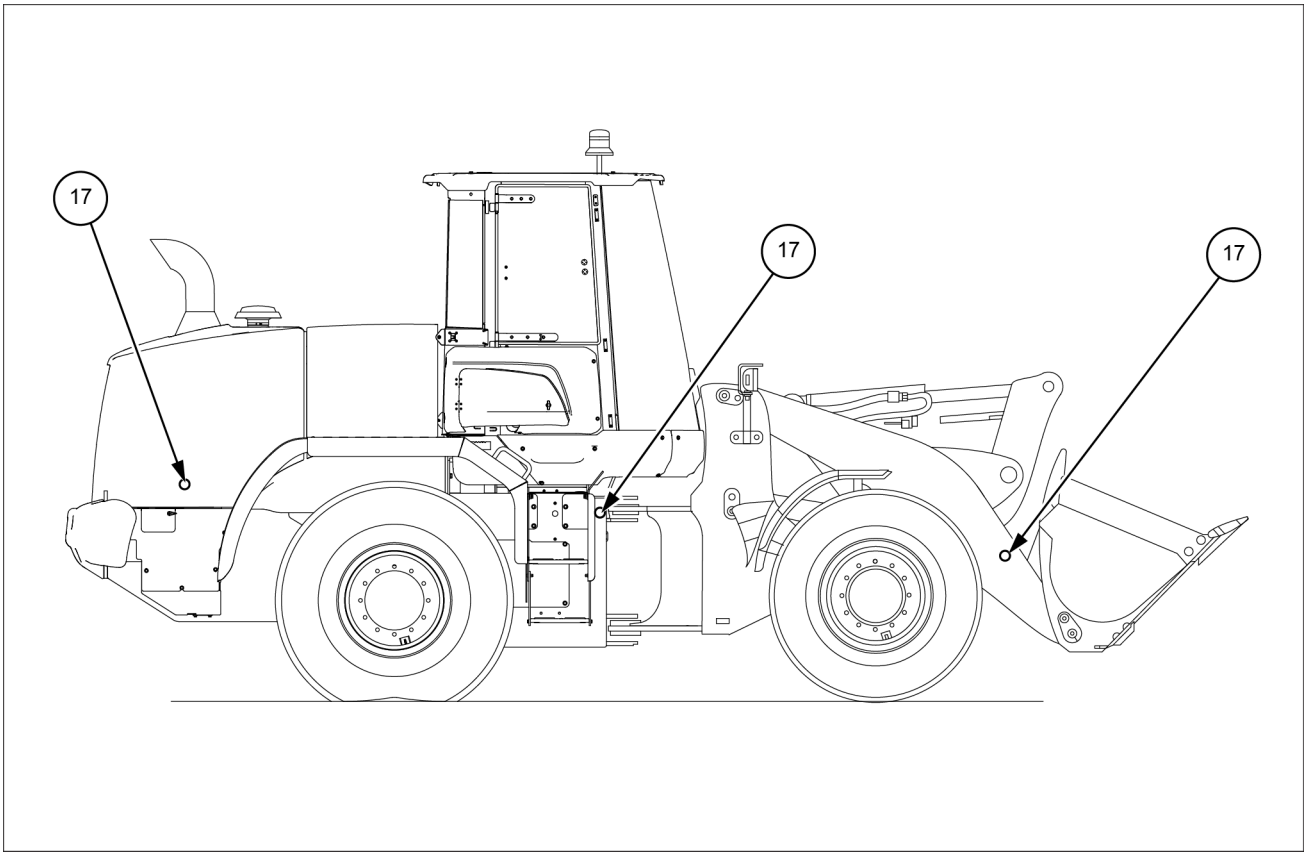
for XR models

1. Low/high beam
2. Position lights
3. Front turn lights
4. Side turn lights
5. Rear position
6. Rear red reflectors
7. Stop lights
8. Rear turn lights
9. Rear panels red and white
10. License plate light
11. Rear license plate
12. Front license plate
13. Horn
14. Front panel red and white
15. **40 km/h** speed limit decal
16. External rear mirror
17. Side orange reflectors
18. Rear red reflectors
19. Rotary beacon
20. Front turn lights on bucket (only for XR models)
21. Front position lights on bucket (only for XR models)

Lights and visual signal lights (LED lights)

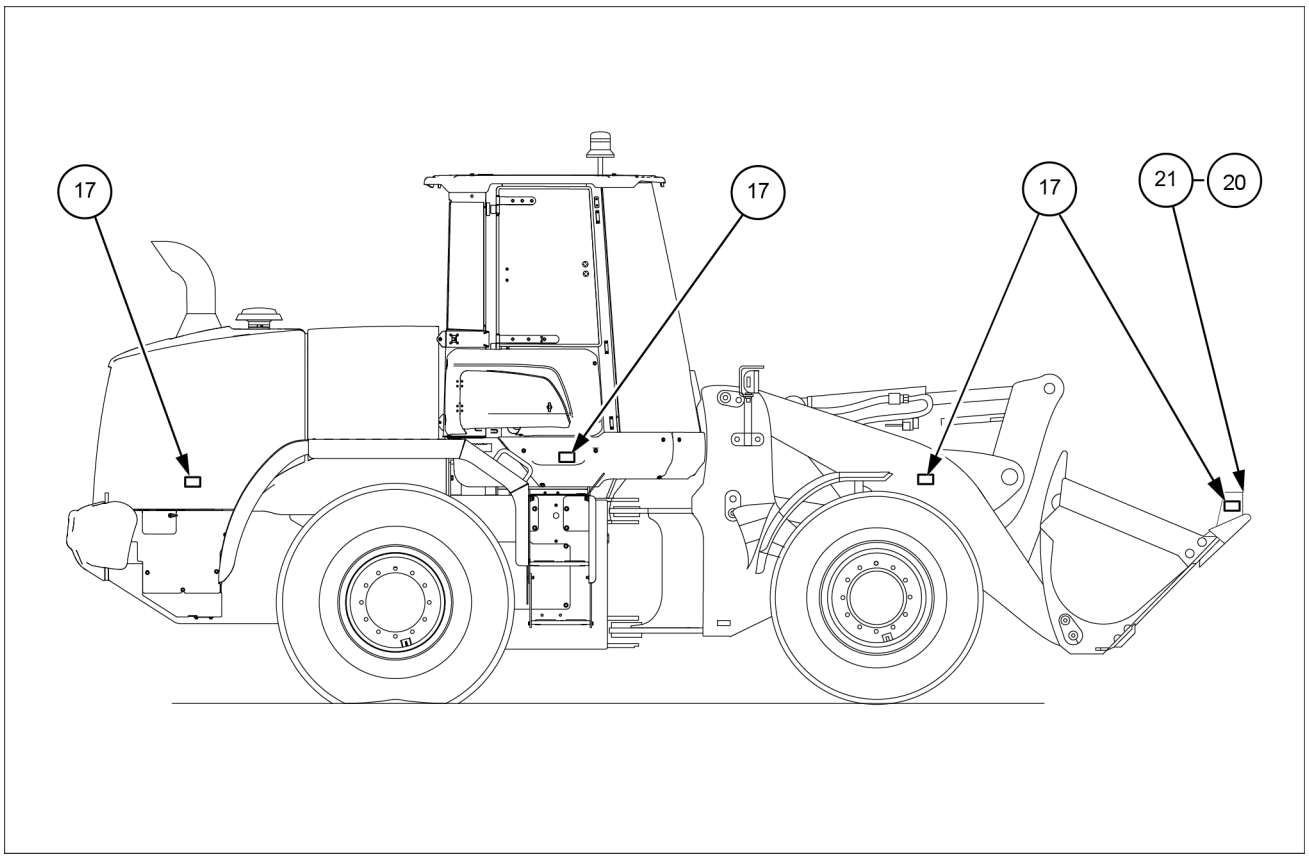


LEIL17WHL1254FB 4



LEIL16WHL2614FB 5

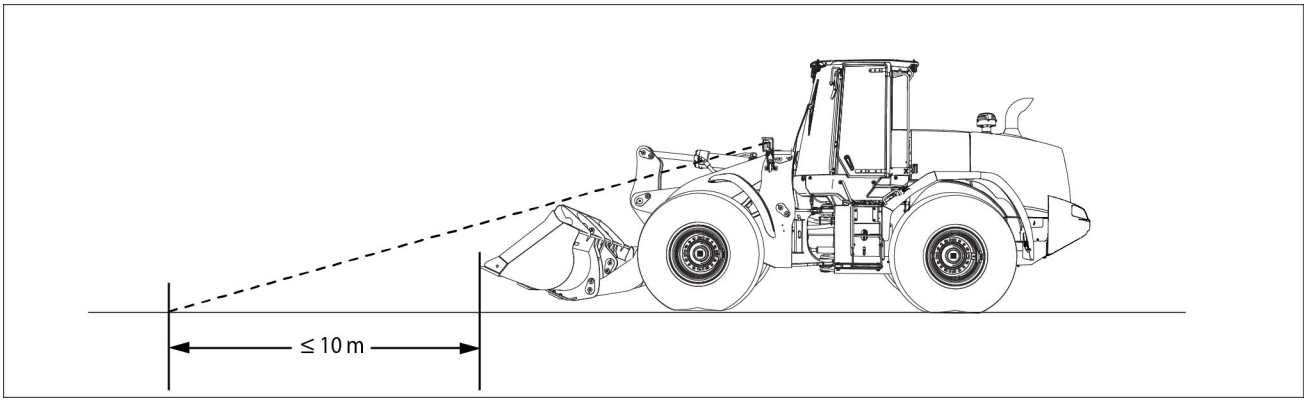
for Z-Bar models



LEIL16WHL2615FB 6

for XR models

1. Low/high beam
2. Position lights
3. Front turn lights
4. Side turn lights
5. Rear position
6. Rear red reflectors
7. Stop lights
8. Rear turn lights
9. Rear panels red and white
10. License plate light
11. Rear license plate
12. Front license plate
13. Horn
14. Front panel red and white
15. **40 km/h** speed limit decal
16. External rear mirror
17. Side orange reflectors
18. Rear red reflectors
19. Rotary beacon
20. Front turn lights on bucket (only for XR models)
21. Front position lights on bucket (only for XR models)



LEIL17WHL1252EB 7

Adjust the angle of the lights beams of the low-beam lights downward so that the lights meet the ground. The maximum distance from the teeth or segment of the bucket and the patch of light on the ground is **10 m** (**32.8 ft**).

On-road regulations

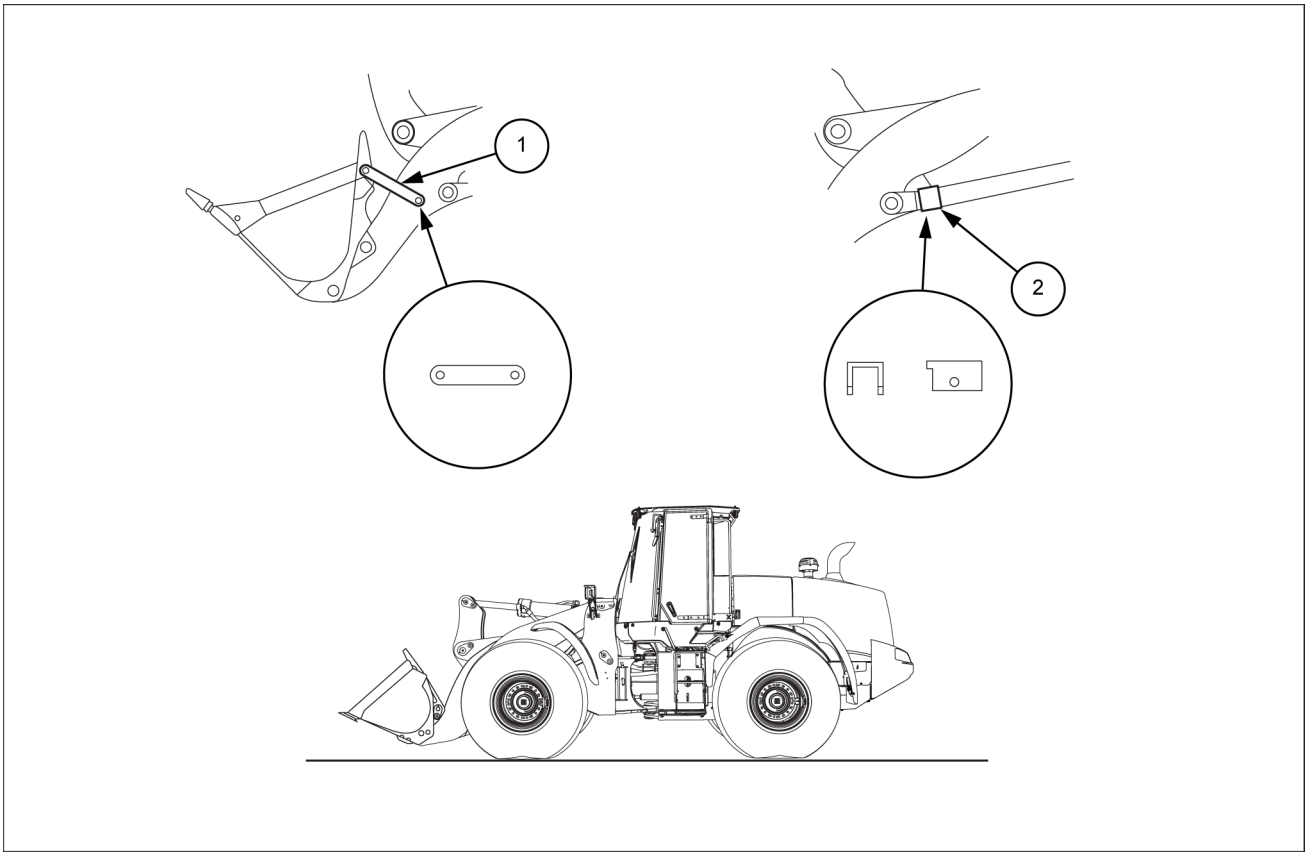
- Equipment and accessories blocked;
- Cutting edges and teeth protected;
- Compulsory operation of approved flashing lights even if lit is not required the use of lighting devices;
- Traveling on road only if empty;
- Work controls locked;
- Working lights blanked out;
- Traveling on road can occur providing that the personnel of the Company help the operator, but not from the machine itself.

Equipment locking devices when traveling on road

The controls of the equipment working system hydraulic circuits are hydraulically locked by a lever, to prevent unintentional movements by the operator, while traveling on road.
Inside the compartment, a plate lists the various warnings, including:

NOTICE: *when traveling on road, lock all equipment by appropriate mechanical blocks (provided), lock always the control levers by the appropriate locks or close the hydraulic cut-off lever.*

Equipment and accessories blocked are showed below:



LEIL19WHL0129FB 8

1. Bar equipment lock
2. Sleeve bucket dropping lock

Moving a disabled machine

⚠ WARNING

Misuse hazard!
Towing is a delicate maneuver that is always carried out at the risk of the user. The manufacturer's warranty does not apply to incidents or accidents that occur during towing. Where possible, carry out the repairs at the site.
Failure to comply could result in death or serious injury.

W0286A

⚠ DANGER

Loss of control hazard!
Make sure you use a towing vehicle with adequate weight. Towing with an underweight vehicle could cause a loss of control during transport or braking. Calculate the minimum towing vehicle weight required as instructed in this manual.
Failure to comply will result in death or serious injury.

D0049A

Engine stalls while traveling

The operator can apply the brakes by pressing the pedal for four or five applications until the accumulator is discharged. The operator must limit the use of the brakes in this situation. If the brakes cannot be applied by the pedal, apply the parking brake.
The steering effort increases when the hydraulic system loses power. If the engine stalls while traveling, park the loader in a safe position and find the problem.

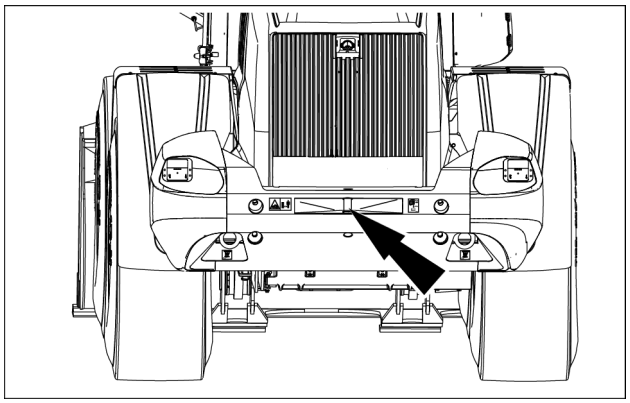
Engine or hydraulic failure

If your machine is disabled, you must judge if the machine can be moved without further damage. If possible, repair the machine at the job location.
If you cannot repair the machine at the job location and if you have a transport trailer, park the trailer as close as possible to the machine.

Never tow the machine from the front

Attach a rigid draw-bar to the machine.

NOTICE: *make certain the towing machine has adequate brake capacity to safely stop both machines.*



LEIL17WHL1321AA 1

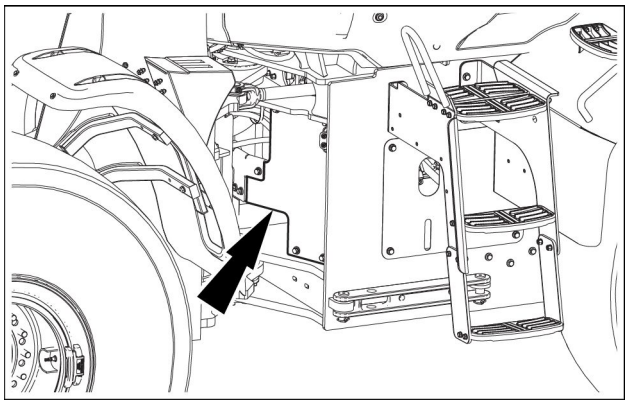
Releasing parking brake on stalled machine

⚠ DANGER

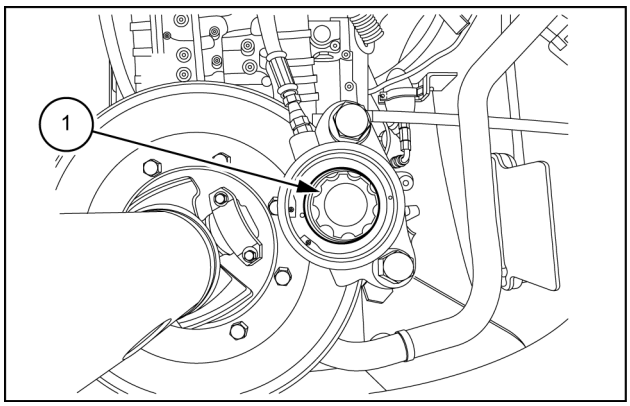
Run-over hazard!
Be aware that the parking brake does not operate when it is manually disengaged. When parked, chock wheels to prevent machine movement. Repair parking brake as soon as possible if it fails.
Failure to comply will result in death or serious injury.

D0096B

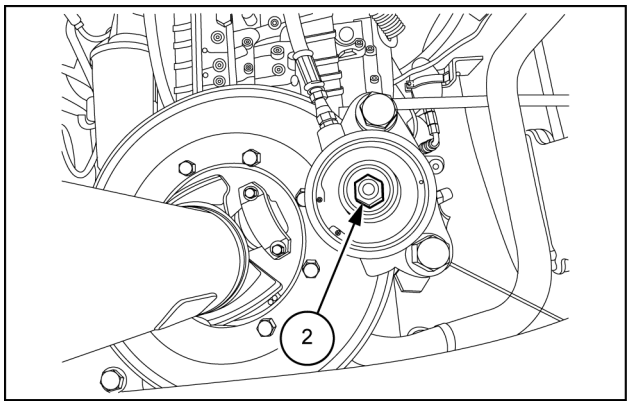
1. If you cannot start the machine to release the parking brake, do the following steps:
   A. Put blocks in front of and behind each wheel.
   B. Access the parking brake. In Waste Handler (WH) models, first you need to remove the rear articulation joint cover.
   C. Clean the area around the parking brake cover to eliminate contamination.
   D. Remove the parking brake cover **(1)**.
   E. Loosen the lock nut **(2)**.
   F. Turn the adjusting screw counterclockwise until the parking brake is released.
   G. Tighten the locknut and replace the cover **(1)**.
   H. In WH models re-install the rear articulation joint cover.
2. If the machine is to be towed more than **0.8 km** (**0.5 miles**), disconnect the front and rear drive shafts.
3. Tow the disabled machine at a maximum speed of **8 km/h** (**5 mph**).



LEIL17WHL1579AB 2



LEIL15WHL1826AB 3



LEIL15WHL1827AB 4

6 - WORKING OPERATIONS

Preparing for work

Operating tips

⚠ WARNING

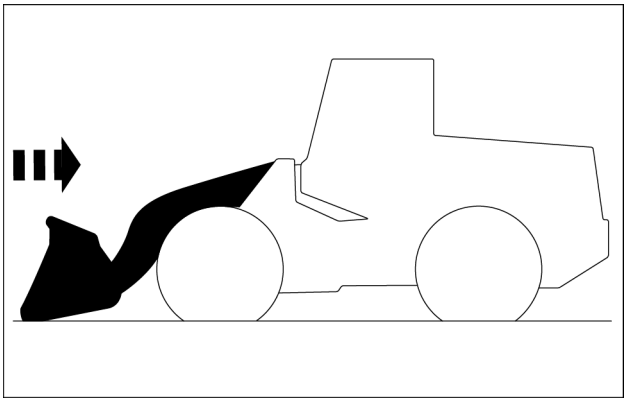
Impact hazard!
Bucket edge or teeth can catch on frozen surfaces or buried objects during surface scraping operations. Before operation, inspect the area for hazardous objects. Operate the machine at slow speed around objects.
Failure to comply could result in death or serious injury.

W0459A

This wheel loader, with standard equipment and authorized attachments, is intended to be used for above ground level digging and general earth moving purposes such as land leveling, truck loading, material rehandling and ditch cleaning. If the machine is to be used for lifting objects, ensure that the machine is properly equipped and follow the instructions and safety precautions in this manual.

Leveling operation

Always operate the machine in reverse when leveling the surface.

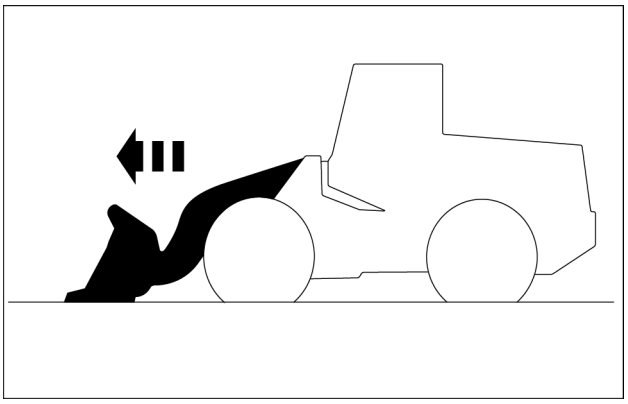


LEIL16WHL0036AB 1

Pushing operation

When pushing material, do not set the bucket dumping angle more than **20°**.

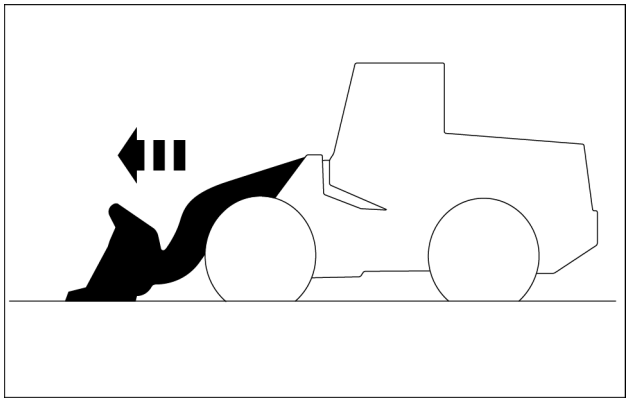
NOTICE: *the bucket MUST NOT be in the FULL DUMP position during the pushing operation.*



LEIL16WHL0037AB 2

Scraping operation

When scraping hard or frozen surfaces, the bucket must be level and flat to the surface. Operate the machine at a slow speed.

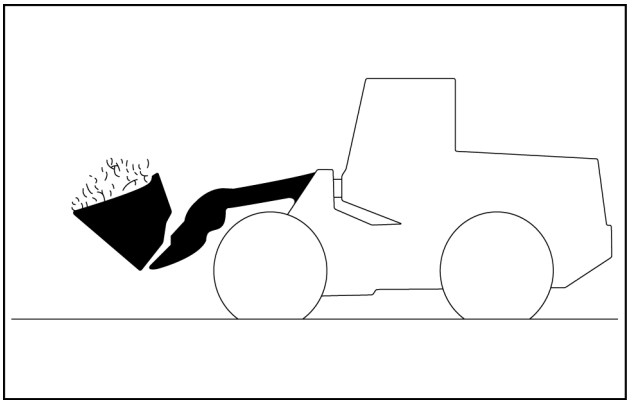


LEIL16WHL0037AB 3

Transport and carry operation

The bucket must be in the rollback position and the bottom of the bucket must not be more than **305 – 457 mm** (**12.0 – 18.0 in**) off the ground.

NOTICE: *keep the loader bucket as low as possible, during the work in order to have a better balance and see more clearly. Always operate at slow speed if the bucket is full and the machine is over rough ground or surfaces that can cause the machine to slide.*



LEIL15WHL1830AA 4

Operating on a slope

⚠ WARNING

Driving hazard!
Hillside operations can be dangerous. Rain, snow, ice, loose gravel, or soft ground, etc. can change the ground conditions. You must make a judgment if it is safe to operate your machine on any hillside or ramp.
Failure to comply could result in death or serious injury.

W0144A

Before you operate this machine on a hill, always put the transmission in a lower gear and test the brakes. DO NOT operate the machine on a hill with the transmission in NEUTRAL. DO NOT use the Declutch switch when operating on a hill

- Use extra caution during hillside operations.
- Make sure that the low speed travel is selected.
- Always travel in the same direction as the slope, whether it be up or down, in order to minimize the possibility of machine roll-over.

NOTICE: *on steep slopes, operator can utilize the transmission for machine braking by downshifting and to prevent premature brake disc wear and brake overheating during extended brake usage.*

Operating the machine in water

⚠ WARNING

Driving hazard!
Do not operate the machine in a fast flowing stream. Fast flowing water can cause you to lose control of the machine.
Failure to comply could result in death or serious injury.

W0151A

- Make sure that the bottom of the stream, or water in which you will work, can support the weight of the machine.
- Do not operate machine in water levels that are above the bottom of the wheel rim height of the machine.
- Prior to operation of machine in water, inject the recommended quantities of fresh grease into the appropriate grease fittings in order to prevent water ingress and rusting within these fittings.
- Upon completion of operation, inject fresh quantities of grease into any fitting that was in water to prevent seizure of fittings.

Changing loader attachments

Attachment quick coupler pin engagement (if equipped)

⚠ WARNING

Crushing hazard!
Always use approved attachments. Make sure the attachment is compatible with the machine mounting system.
Failure to comply could result in death or serious injury.

W0183A

⚠ WARNING

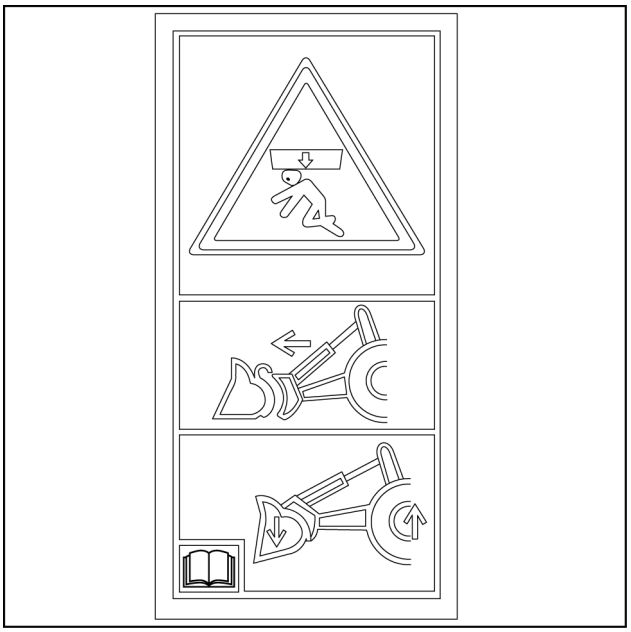
Falling object hazard!
Before operating the machine, always make sure the bucket or attachment is securely locked into the quick-attach plate. A loader bucket or attachment that is not securely locked into the quick-attach plate could come off during loader operation.
Failure to comply could result in death or serious injury.

W0166A

Make certain all unauthorized personnel are clear of the area when changing attachments. Change attachments in a flat area clear of obstructions.

Changing attachments

Use the factory/field installed coupler system to change attachments. Follow procedures in the sections “Coupling the attachments” and “Uncoupling the attachments” in this manual.



364917A1_ 1

Quick coupler

⚠ WARNING

Escaping fluid!
Do not disconnect hydraulic quick coupler under pressurized conditions. Make sure all hydraulic pressure is removed from the system before disconnecting hydraulic quick coupler.
Failure to comply could result in death or serious injury.

W0095A

The attachment quick coupler system and coupler bucket will give your machine increased versatility and function. The ease of coupling, combined with a remote locking control allows for a single operator to handle the attachment coupling and uncoupling operation without special tools and without leaving the cab.
DO NOT operate or permit anyone to operate or service the machine and/or attachments until you or the other persons have read and understood the safety, operation and maintenance instructions in this manual. Use only trained operators who have demonstrated the ability to operate the machine correctly and safely. The wheel loader with the attachment quick coupler system and bucket is intended to be used for digging and general earth moving purposes such as land leveling, truck loading, and material rehandling.

Safety precautions specific to attachment and coupler

- Always inspect the coupler locking pin extension before operating the machine. Position the locking pins in your field of vision, and make certain they are engaged properly.
- Improperly locked attachments may release and could result in death or serious injury.
- Do not attempt to engage the attachment with the locking pins extended.
- Make certain that the locking pins and connections are free of dirt or mud before attempting to engage and disengage the attachment.
- Do not extend or retract the coupler locking pins with the attachment on the ground or in the dump position.
- If any damage is visible on the coupler or attachment points, do not operate or attach the bucket.
- Never stand under an attachment or allow others to do so. Do not allow anyone under elevated loads.
- Do not lift loads or push materials with the coupler without an attachment. This can cause damage to the coupler components.
- Check coupler operation periodically for any unusual movement and/or noise.
- Inspect hydraulic hoses for any leaks or damage.
- Visually inspect welds and make any repairs as necessary.
- Check for any loose bolts. Torque as required.
- Do not modify the machine or attachments. Such modifications can damage and/or affect the integrity of the attachment and can also affect safety and function of the attachment and/or machine.
- Check all controls in a clear area and make certain the machine is operating correctly.

Coupling to the attachment

⚠ WARNING

Falling object hazard!
Before starting the machine, make sure the coupler switch is in the locked position.
Failure to comply could result in death or serious injury.

W0931B

⚠ WARNING

Falling object hazard!
Always visually inspect coupler locking pins for proper engagement. An improperly locked attachment could release and fall.
Failure to comply could result in death or serious injury.

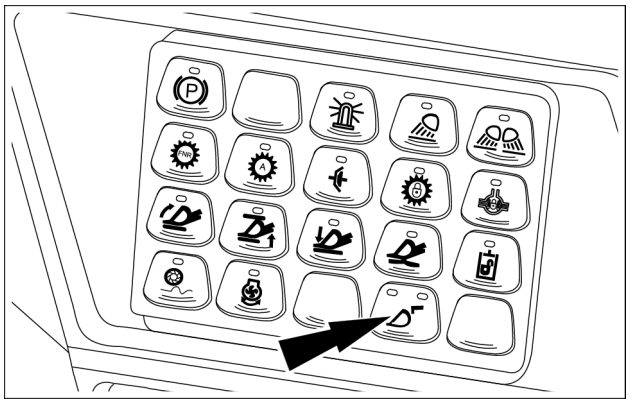
W0930A

⚠ WARNING

Avoid injury and/or machine damage!
Before operating the machine, make sure the attachment is securely connected to the machine. Apply downward pressure with the bucket to the ground to make sure the coupler connection is secure.
Failure to comply could result in death or serious injury.

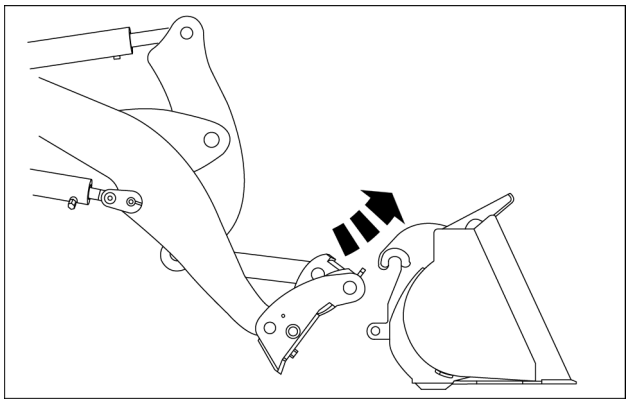
W0932A

1. Locate the coupler engagement button on the right-hand console of operator's compartment. When the coupler locking pins are extended, the green light on this button is on.
2. Press and hold (about **3 s**) the coupler engagement button to retract the locking pins. The display shows the message "Coupler pins Disengaging" and the pins start to move. Once the locking pins are fully retracted, the green light goes out and the red light illuminates. The display shows the message "Coupler pins Disengaged".
   Do not engage the attachment with the locking pins extended.



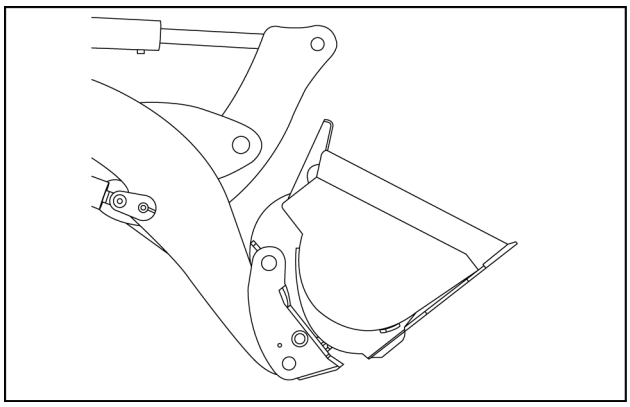
LEIL16WHL1125AA 1

3. Situate the machine with upper male portion of the coupler aligned with the upper female portion of the attachment the operator wishes to couple. Position the front of the coupler into the attachment as shown.



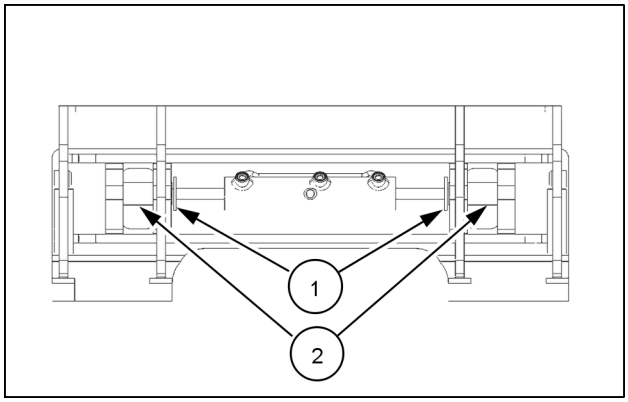
LEIL16WHL0038AA 2

4. Roll back the coupler with attachment to align the attachment pin holes with coupler locking pins.



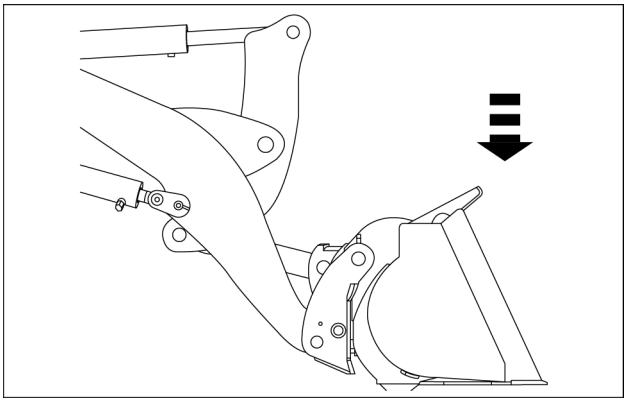
LEIL15WHL1831AA 3

5. Press the coupler engagement button to extend the locking pins. Once the locking pins are fully extended, the red light goes out and the green light turns on.
6. Maintain the coupler in rollback position. Position the red coupler locking visual indicators **(1)** in your full field of view. Verify and ensure the coupler locking pins **(2)** are fully extended.



LEIL16WHL1339AA 4

7. Lower the attachment and roll the front end toward the ground. Apply downward pressure to ensure the attachment is securely locked.



LEIL16WHL0039AB 5

Uncoupling the attachment

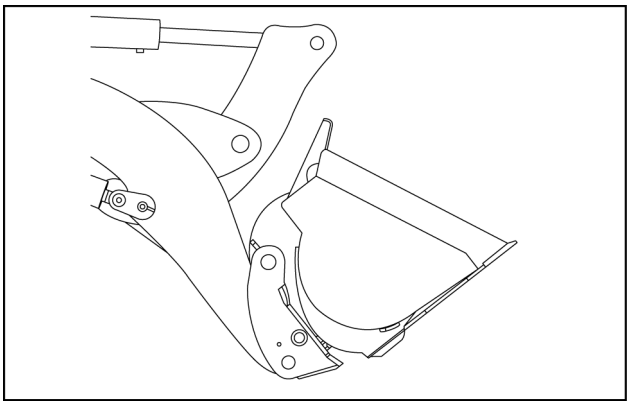
⚠ WARNING

Avoid injury and/or machine damage!
Before disconnecting the couplers, you must:
• Lower the connected attachments.
• Stop the engine,
• Turn the key switch to the ON position,
• Move the control levers forward and backward to discharge pressure from the hydraulic system.
Failure to comply could result in death or serious injury.

W1569A

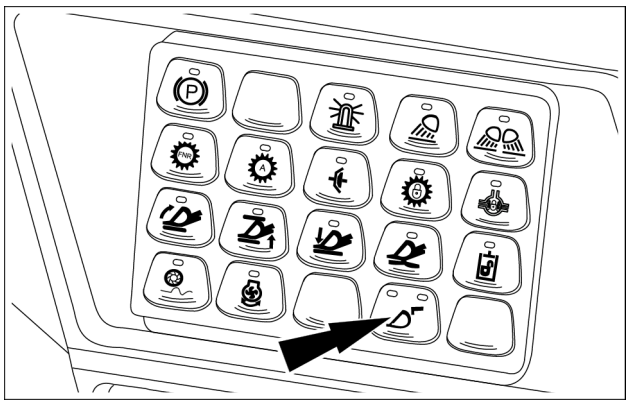
NOTE: *if using a hydraulic attachment, disconnect the auxiliary hydraulic hoses from the quick disconnect prior to uncoupling the attachment. Do not try to disconnect the hydraulic quick coupler when the system is under pressure.*

1. With the attachment coupled, lower the lift arms, and position the coupler in the rollback position.
   Locate the coupler engagement button on the right-hand console of operator's compartment. The green light is on.



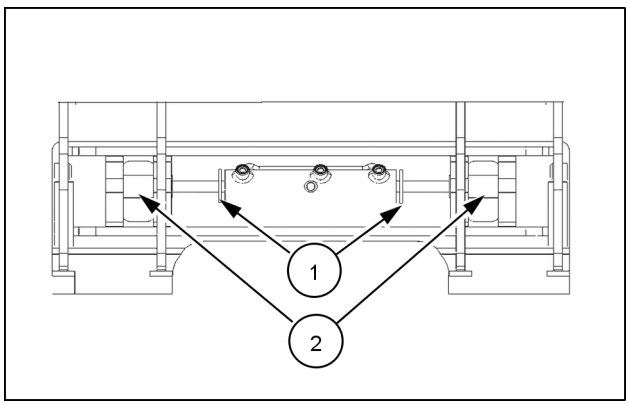
LEIL15WHL1831AA 1

2. Press and hold (about **3 s**) the coupler engagement button to retract the locking pins. The display shows the message "Coupler pins Disengaging" and the pins start to move. Once the locking pins are fully retracted, the green light goes out and the red light illuminates. The display shows the message "Coupler pins Disengaged".
   Do not retract the locking pins with the attachment on the ground or in the dump position.



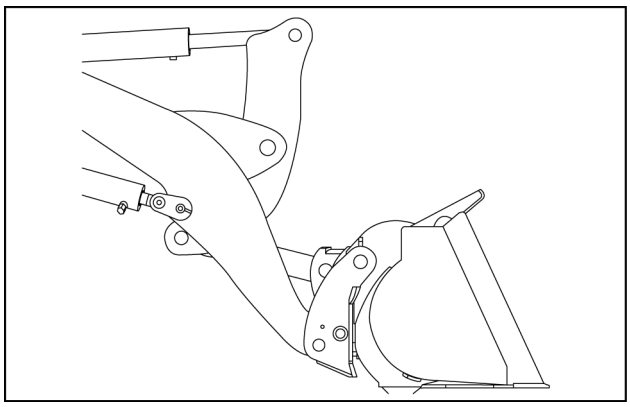
LEIL16WHL1125AA 2

3. Make certain the coupler locking pins **(2)** are fully retracted. Maintain the coupler in rollback position, and position the red coupler locking visual indicators **(1)** in your full field of view to visually ensure and verify the locking pins are fully retracted.



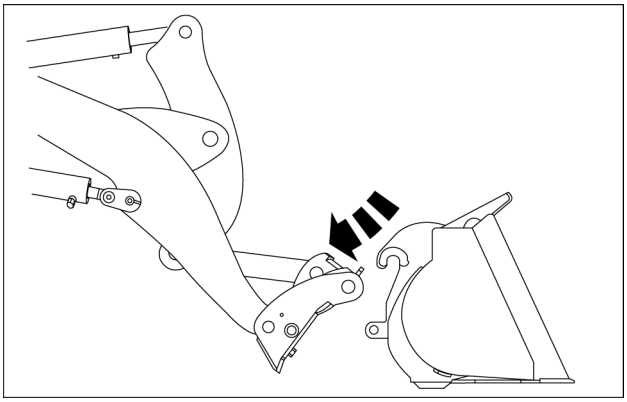
LEIL16WHL1340AA 3

4. After visually inspecting the locking pins to ensure they are fully retracted, rest the attachment firmly and safely on the ground.



LEIL15WHL1832AA 4

5. Roll the coupler forward and down, while slowly backing away from the attachment, to remove the upper male portion of the coupler from the upper female portion of the attachment.

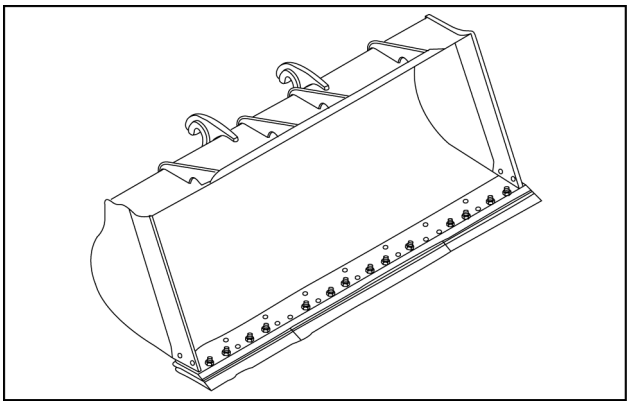


LEIL16WHL0038AA 5

Buckets

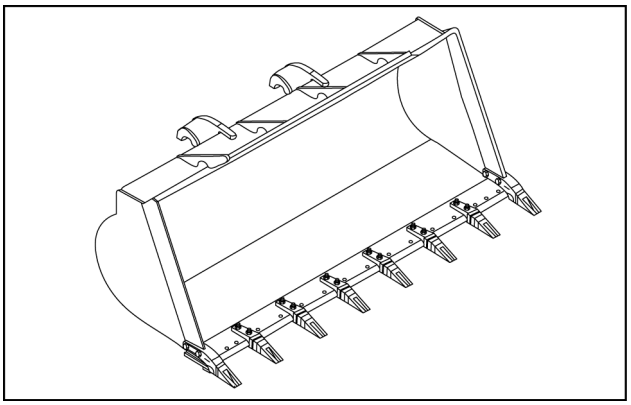
Use only attachments recommended and approved by CASE CONSTRUCTION. The manufacturer’s liability will be denied in case of unapproved modification.

Bucket with cutting edge



LEIL15WHL1833AA 6

Bucket with teeth



LEIL15WHL1834AA 7

NOTE: *bolt on edge segments between teeth available from service parts.*

Joystick steering operation

⚠ WARNING

Driving hazard!
Check all controls and safety devices in a safe, open area before starting work.
Failure to comply could result in death or serious injury.

W0248A

⚠ WARNING

Driving hazard!
Always use the primary steering when traveling on a public road or highway. The left armrest must be raised and in a locked position during travel. Do not use joystick steering when traveling on a public road or highway.
Failure to comply could result in death or serious injury.

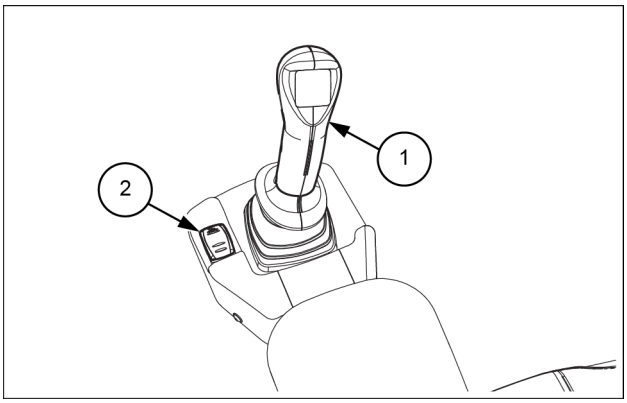
W0451A

Joystick steering (optional)

The joystick steering (JSS) allows the operator to steer the loader using a hand controls located on the left-hand operator seat armrest. The joystick steering allows for steering movement at the operator's fingertips.

Moving the JSS control lever **(1)** right or left steers the machine in the right or left direction. When the joystick is released, the JSS control lever **(1)** will return to the neutral (center) position automatically while leaving the machine articulated in the current position.

The use of these controls are intended for short cycle, repetitive, high production load and carry operations to reduce operator fatigue and increase operating efficiency. The system is set up so that the steering wheel is always usable (it always has priority).
The JSS is not deactivated with steering wheel use. When the steering wheel is used, the JSS no longer has control. As soon as the steering wheel is no longer being turned, the operator is able to go back to using the joystick without having to reactivate it.
The joystick steering switch **(2)** is located on the joystick steering console.
Lift the left-hand armrest to the vertical position to disable the JSS.



LEIL16WHL1403AB 1

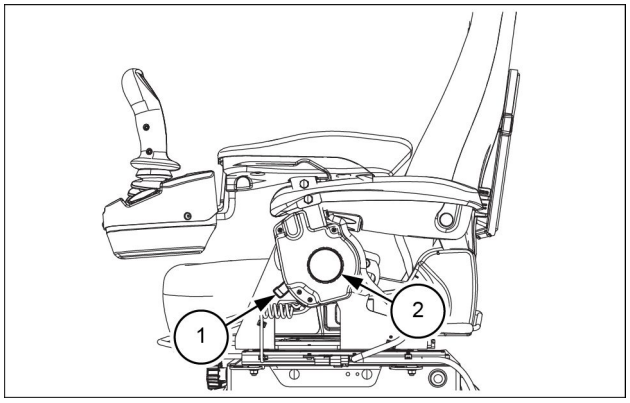
1. Joystick steering (JSS) control lever
2. Joystick steering (JSS) switch

Joystick steering armrest adjustment

The left-hand armrest equipped with optional joystick steering controls can be adjusted for operator comfort.

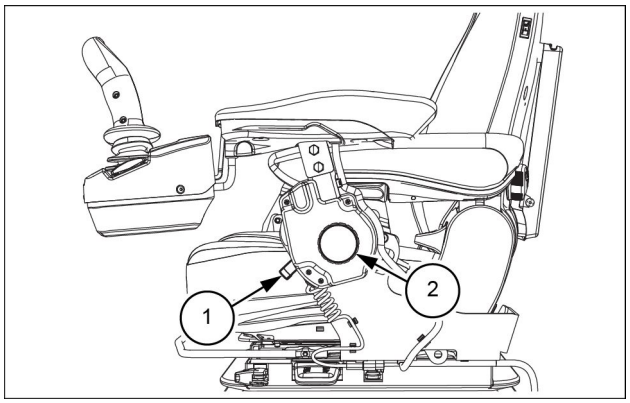
To adjust the height of the armrest, use the lever **(1)**. Lower or raise the armrest into the desired position.

For tilt adjustment, loosen the knob **(2)**, then tilt the armrest into the desired position. Retighten the knob **(2)** once the adjustment is complete.



LEIL16WHL1405AB 2

Standard operator seat



LEIL16WHL1404AB 3

Premium operator seat

Joystick steering control lever

⚠ WARNING

Driving hazard!
Use caution when steering with the joystick steering control. Abrupt movements of the joystick steering control could cause the machine to articulate more sharply than acceptable. Take necessary precautions.
Failure to comply could result in death or serious injury.

W1570A

⚠ WARNING

Driving hazard!
If the hydraulic pilots are disengaged, the joystick steering remains active. Always disengage the joystick steering when not in use.
Failure to comply could result in death or serious injury.

W0449A

⚠ WARNING

Driving hazard! Limit the use the Joystick Steering System (JSS) at speeds above 20 km/h (12.4 mph). Use the Joystick Steering System (JSS) to assist work cycle operations. For optimum control, always use the primary steering wheel when you operate at higher speeds. Do not use JSS for long travel at high speeds. When you enable JSS, the maximum machine speed is 30 km/h (18.6 mph).
Failure to comply could result in death or serious injury.

W1514A

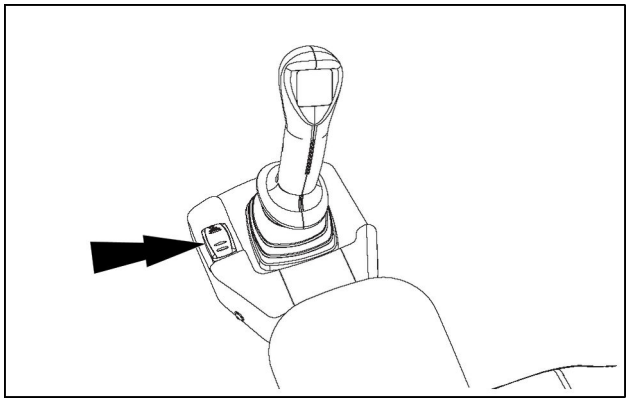
⚠ WARNING

Driving hazard!
Always use the primary steering when traveling on a public road or highway. The left armrest must be raised and in a locked position during travel. Do not use joystick steering when traveling on a public road or highway.
Failure to comply could result in death or serious injury.

W0451A

Joystick steering activation

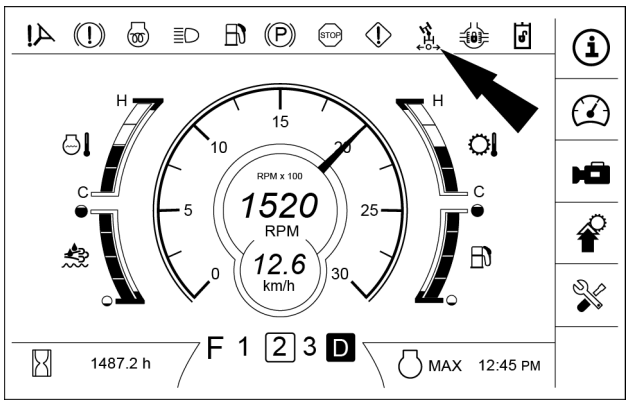
The joystick steering switch is a two position rocker switch for activation/deactivation of the joystick steering function. The joystick steering switch is located on the joystick steering console.



LEIL16WHL1406AA 4

The joystick steering indicator on the display will illuminate, indicating that the machine steering is operated with the joystick. To return the steering wheel to operation, stop the machine in neutral, engage the brake, and roll downward the joystick steering switch. The joystick steering speed can be set with the “Machine Settings” menu.

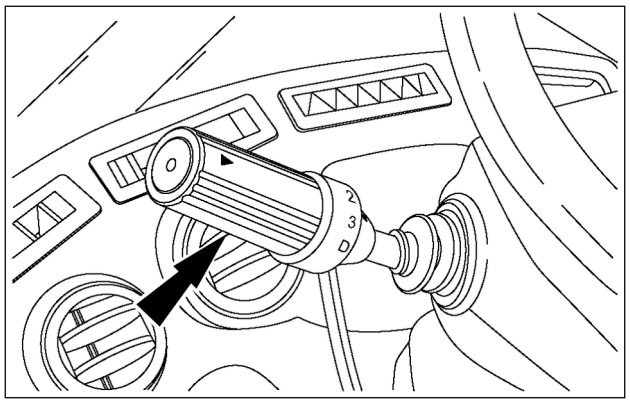
NOTICE: *if the operator moves the standard steering wheel, the joystick steering function automatically ceases and steering capabilities return to the standard steering wheel. When the steering wheel is released, the operator can return to joystick steering, and joystick steering will again be functional. The operator can also choose to turn off joystick steering at this time if the operation is complete.*



LEIL16WHL0407AB 5

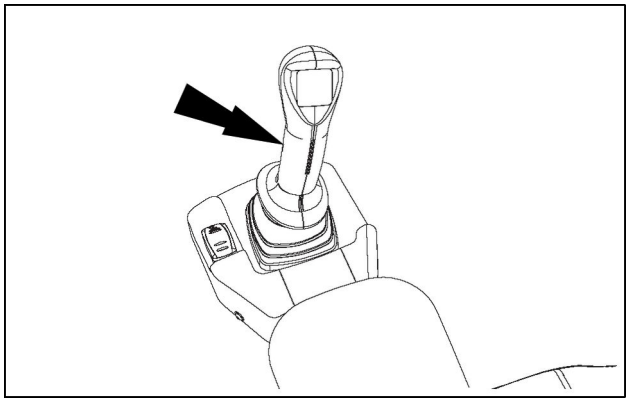
Before activating the joystick steering:

1. Stop the machine.
2. Lower the left-hand armrest to the horizontal position.
3. Move the transmission control lever on the steering column to the NEUTRAL position.



LEIL16WHL1468AA 6

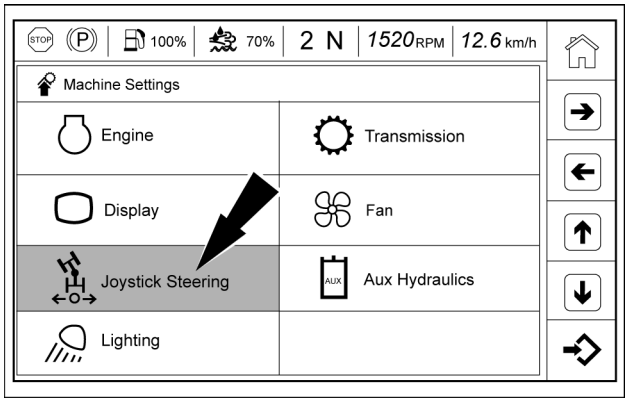
4. Steering is directed with the joystick steering control lever only when the joystick steering is activated.



LEIL16WHL1406AA 7

Joystick steering speed select

To select the most suitable speed for the operation to be performed when using the joystick steering, access the “Machine Settings” menu and select “Joystick Steering” at the settings screen.



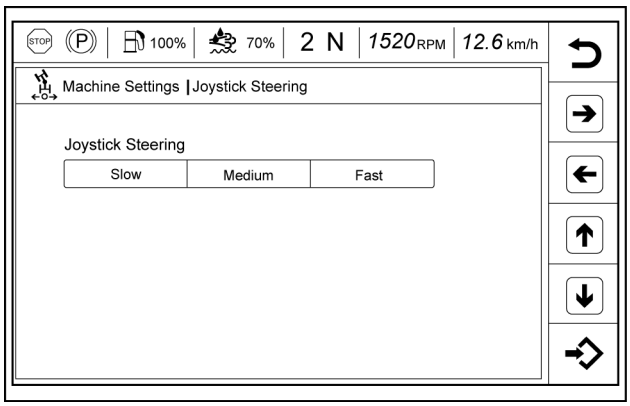
LEIL18WHL1217AA 8

Choose one of the three available speed ranges: slow, medium or fast.

The higher the range selected, the more responsive the steering capabilities of the machine become.

NOTICE: *when first becoming accustomed to joystick steering, operate the machine in a lower speed range in a clear open area.*

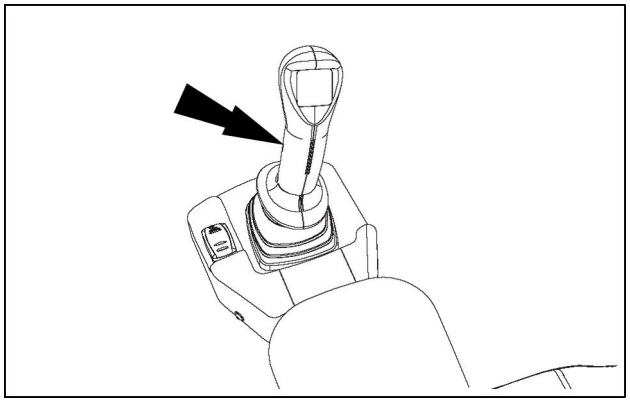
Always set the speed to suit both the operator, operating conditions, and work to be performed. As the operator becomes more familiar with joystick steering, a higher steering speed may be desired.



LEIL15WHL0533AA 9

Steering with joystick control

The machine will travel in the direction in which the joystick steering control lever is moved (left/right). When the joystick steering control lever is released, it will return to the neutral, center position. Use caution when turning the machine, as the machine can turn sharply if the joystick steering control lever is used abruptly. When executing a turn, move the joystick steering control lever gradually in the direction of the desired turn.
Steering can be returned instantly to standard steering if the steering wheel is moved from its stationary position.



LEIL16WHL1406AA 10

Left turn

Move the joystick steering control lever gradually to the left. An abrupt movement to the left will cause the machine to turn sharply to the left. Be sure to move the joystick steering control lever in a careful, gradual movement.

Right turn

Move the joystick steering control lever gradually to the right. An abrupt movement to the right will cause the machine to turn sharply to the right. Be sure to move the joystick steering control lever in a careful, gradual movement.

Reverse left

With the transmission in reverse, move the joystick steering control lever gradually to the left for a left reverse turn. An abrupt movement to the left reverse will cause the machine to turn sharply to the left. Be sure to move the joystick steering control lever in a careful, gradual movement.

Reverse right

With the transmission in reverse, move the joystick steering control lever gradually to the right for a right reverse turn. An abrupt movement to the right reverse will cause the machine to turn sharply to the right. Be sure to move the joystick steering control lever in a careful, gradual movement.

Steering and bucket

The steering speed of the wheel loader is the same in both directions and will increase gradually with the position of the joystick.
The lift arm and bucket control lever will operate as it would with conventional steering. Practice with the joystick steering in a clear area unobstructed by people and other equipment.

7 - MAINTENANCE

General information

Servicing

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

⚠ WARNING

Personal Protective Equipment (PPE) required.
When assembling, operating, or servicing the machine, wear protective clothing and PPE necessary for the particular procedure. Some PPE that may be necessary includes protective shoes, eye and/or face protection, hard hat, heavy gloves, filter mask, and hearing protection.
Failure to comply could result in death or serious injury.

W0353A

⚠ CAUTION

Burn hazard!
Wait for all components to cool before performing any operation.
Failure to comply could result in minor or moderate injury.

C0053A

Follow the maintenance intervals by checking the hour meter every day. Before starting maintenance, park the machine on flat, firm ground, away from any obstacles, with the bucket/attachment on the ground. Keep all unauthorized personnel clear of the area. Unless otherwise specified, carry out all maintenance operations with:

- the engine stopped
- the machine parked on a firm, level surface
- the transport/service link locked into position to stop the machine from unexpected articulation
- the parking brake engaged
- the key removed from the key switch
- a "DO NOT OPERATE" tag on the key switch
- wheel chocks blocking the wheels
- all circuits cooled down prior to starting work
- all hydraulic pressure released in lift arm and bucket/attachment circuits
- any accumulator pressure released for the appropriate circuit

Clean the grease fittings before lubrication. Clean around plugs and filler holes before adding fluid. Dust or dirt must not enter the components or the circuits. Wear suitable clothing and remember to use the necessary safety equipment.

When performing service work on the machine, place a “DO NOT OPERATE” tag on the instrument panel or the key switch. Turn off the engine and remove the key before leaving the operator's compartment.

Any modification to this machine without prior authorization could cause serious injury. Do not make any modifications without authorization. Consult your dealer.

The service intervals in this chapter refer to normal operating conditions. During the first operation period of a new machine (100 initial hours) or rebuilt component and under particularly severe conditions, carry out the service intervals more frequently.

NOTICE: *take particular care to replace all filters regularly. Clean filters mean longer engine running life.*

NOTICE: *oils and fluids must be disposed of properly.*

Hour meter

The hour meter enables service operations to be scheduled. Its hourly indications are the same as those of a clock when the engine is running.

Servicing intervals are carefully calculated to guarantee safe and efficient machine operation.

Be sure to carry out all the servicing operations properly as defined in this manual.

Variable periodic maintenance

Some working environments require that maintenance be performed more frequently. Take into consideration dust, dirt, moisture, extreme hot or cold and many other factors when servicing the machine. Certain equipment or auxiliary tools may cause more stress on hydraulics, drivetrain, engines or filters. Perform the following maintenance on regular schedules, but maintenance often needs special attention when conditions so require.

Engine air filter

Replace the primary element if the air filter indicator lamp illuminates.

The primary element may be cleaned, however a new element is recommended. The inner element cannot be cleaned and must be replaced.
To clean the primary air filter, hold with the rubber seal facing up. Tap all sides of the filter with your hand. Blow the filter out with compressed air — maximum pressure **4.8 bar** (**70 psi**). Hold the nozzle a minimum of **7.6 cm** (**3 in**) away from filter. Use a nozzle diameter no smaller than **6.4 mm** (**0.25 in**). Inspect the filter for damage. Wipe the filter seal off and clean all dust from air cleaner housing. Never use water to clean the primary filter.

Tires and wheels

Adjust the inflation pressure of the tires when circumstances require. Keep the tires properly inflated and check the torque of the wheel bolts/studs.

Check the wheels for proper torque every twenty hours when new and until the wheels remain tight.

Air conditioning condenser

The air conditioning condenser is located in the cooling box behind the cab of the machine. Use compressed air to remove debris and build up on the condenser.

Fuel cooler

The fuel cooler is located in the cooling box behind the cab of the machine. Use compressed air to remove debris and build up that may impede proper function of the cooler.

Fuel pre-filter

Raise the engine hood and drain water and sediment from the fuel pre-filter. Remove electrical connectors. Slowly loosen the drain valve located under the pre-filter until clean fuel runs out.
Retighten the valve and replace the electrical connectors. Do not overtighten valve. This procedure should be a periodic maintenance procedure dependent upon climate and use conditions. See the complete procedure for the fuel pre-filter and fuel filter in this section. Use the bleed screw on the filter housing to release air from the fuel system.

Priming the fuel system

Prolonged period of inactivity or running out of fuel may allow air to get into the fuel system. If this should happen make sure the tank is full and then prime the system using the manual priming pump on the fuel pre-filter.

Fuses

Open the access panel located inside the cab, behind the operator's seat, to reach the fuses.

NOTE: *if a fuse blows, replace the fuse at once. Locate the problem and if it reoccurs, have it checked by a service technician.*

Releasing pressure in the hydraulic system

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0178A

⚠ WARNING

Escaping fluid!
Do not disconnect hydraulic quick coupler under pressurized conditions. Make sure all hydraulic pressure is removed from the system before disconnecting hydraulic quick coupler.
Failure to comply could result in death or serious injury.

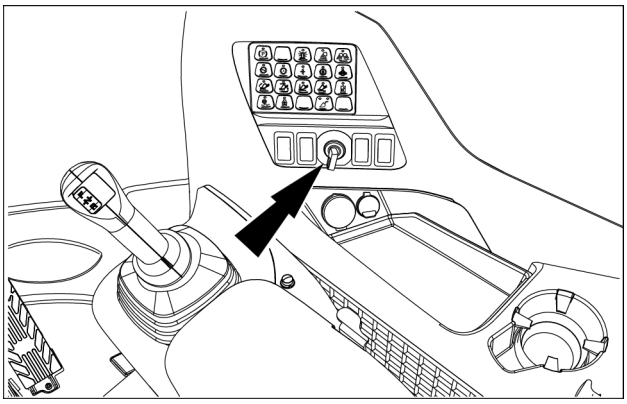
W0095A

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

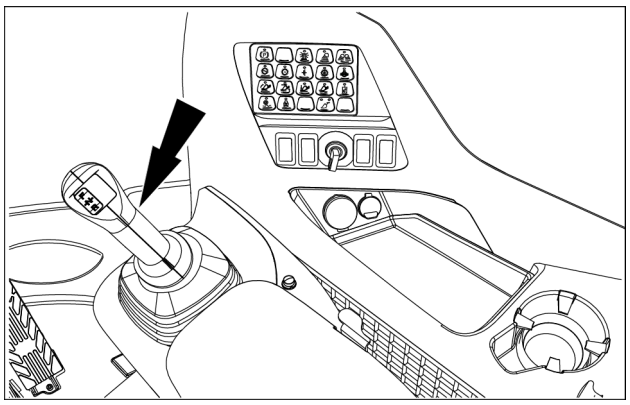
1. Park the machine on firm, level ground, lower the bucket/attachment to the ground and stop the engine.
2. Keep all non-authorized personnel clear of the machine. Turn the ignition switch key to the “ON” position.



LEIL16WHL1286AA 1

3. Operate the joystick from right-hand to left-hand and front to rear approximately a dozen times. Turn the ignition key to the OFF position.

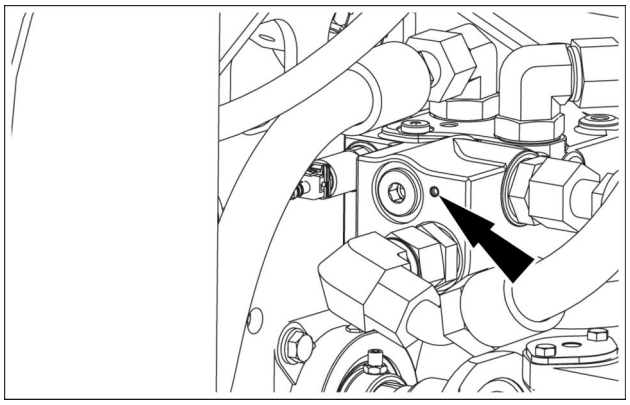
4. Pump the brakes approximately 30 times to bleed the accumulators.



LEIL16WHL1286AA 2

5. Relieve the pressure in the Ride control accumulator (if equipped) with the manual bleeder valve located on the top of the ride control valve. Remove the plug and turn the valve two turns counter-clockwise.

NOTICE: *before any service work on the hydraulic system, allow the hydraulic system to cool (the temperature should not exceed* ***40 °C*** *(****104.0 °F****).*



LEIL18WHL1177AA 3

General specification - Diesel fuel

Only use diesel fuel that conforms to European standard **EN 590** or equivalent in your engine. Do not use any other low grade diesel fuel.

NOTICE: *Use of other low grade diesel fuels will result in loss of engine power, high fuel consumption, and damage to the exhaust aftertreatment system (if equipped).*

NOTE: *When operating the machine in very cold climates, the use of winter blended fuel is permitted for a short period of time. See your fuel supplier for winter fuel requirements in your area.*

Fuel conditioner

Diesel fuel conditioner is available from your CASE CONSTRUCTION dealer. Instructions for the use of the fuel conditioner is on the container.

The use of diesel fuel conditioner will:

- Clean fuel injectors, valves, and manifolds for increased service life
- Disperse insoluble gummy deposits that form in the fuel system
- Separate moisture from the fuel
- Stabilize fuel in storage

NOTICE: *Use only CASE CONSTRUCTION approved biocide additives to prevent damage to the exhaust aftertreatment system (if equipped).*

Biodiesel - Biodiesel fuels

Biodiesel usage in CASE CONSTRUCTION products

Introduction to Fatty Acid Methyl Ester (FAME) biodiesel

FAME biodiesel, called biodiesel fuel in the following section, consists of a family of fuels derived from vegetable oils treated with methyl esters.

There are two main biodiesel fuel types: Rapeseed Methyl Ester (RME) and Soybean Methyl Ester (SME). RME is a blend of rapeseed and sunflower methyl ester, and is the preferred crop in Europe. SME is the preferred crop in the United States.

Biodiesel fuel is a renewable alternative fuel source. Its use and development is promoted worldwide, especially in Europe and in the United States.

NOTICE: *Your emissions control system is compatible with up to **7%** biodiesel fuel (B7). Be aware that the use of biodiesel fuel that does not comply with the standards mentioned in this section could lead to severe damage to the engine, fuel system or aftertreatment system of your machine. The use of non-approved fuels may void CASE CONSTRUCTION Warranty coverage.*

Biodiesel can be used to run Tier 4B (final), Stage IV and Stage V diesel engines only when blended with standard diesel fuel:

- B7: indicates the blend of **7%** biodiesel and **93%** diesel fuels.
- B20: indicates the blend of **20%** biodiesel and **80%** diesel fuels. Do not use.

Biodiesel fuel has several positive features in comparison with diesel fuel:

- Biodiesel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel.
- Biodiesel has a greater cetane number and burns cleaner.
- Biodiesel produces less particulate matter and reduces smoke emissions.
- Biodiesel is fully biodegradable and non-toxic.

Diesel and biodiesel fuel specifications

Tier 4B (final), Stage IV and Stage V diesel fuel specifications are covered by the following:

- **EN 590** - Specification of Diesel fuel. (10 ppm sulfur maximum.)

Biodiesel blends are covered by:

- European Diesel Fuel Specification **EN 590** allows up to **7%** biodiesel since 2009. European fuel suppliers are allowed to use up to **7%** biodiesel fuel (B7) to supply the network.

Pure biodiesel blend stock (B100) specification is covered by the following requirements:

- Europe: **EN14214** - Automotive fuels. Fatty Acid Methyl Ester (FAME) for diesel engines. Requirements and test methods.
- **DIN V 51606** - German standard for biodiesel.

Before raw oil can be converted into usable biodiesel fuel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerine from the fat or vegetable oil. This process leaves behind two products: methyl ester (the chemical name for biodiesel) and glycerine (a byproduct usually sold for use in soaps or other products).

NOTICE: *Biodiesel fuels approved for use in the CASE CONSTRUCTION equipment must be transesterified and comply with the European Standard **EN14214** or the German standard **DIN V 51606**.*

NOTICE: *Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel, are fuels that are normally made from Rapeseed oil or similar high oil content crops. These kinds of fuel are not transesterified, so they do not fulfil the **EN14214** requirements. There is no recognized quality standard available for these types of fuel. Therefore the use of Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel are NOT APPROVED at any blend in any CASE CONSTRUCTION product.*

NOTICE: *Any engine and fuel injection equipment fitted to a CASE CONSTRUCTION vehicle found to have run with any blend of NON-APPROVED fuel (fuel not fulfilling the specification described in the requirement **EN14214**) will no longer be covered for Warranty by CASE CONSTRUCTION.*

Biodiesel fuel usage conditions

You must stringently follow the biodiesel fuel usage conditions. Incorrect application of the biodiesel fuel usage conditions could lead to severe damage to the engine, fuel injection equipment and aftertreatment system.

The main concerns related to operation with biodiesel fuels are:

- Filters and injector blockage caused by poor fuel quality.
- Wear and corrosion of internal components due to water content, which affects lubricity.
- Deterioration of some rubber sealing compounds in the fuel system.

- Biodiesel oxidation, which can lead to the formation of deposits that can harm the fuel injection system.

NOTICE: *Any problem in the engine fuel injection equipment associated with non-compliance to the following conditions for biodiesel fuel handling and maintenance will not be covered for Warranty by CASE CONSTRUCTION.*

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality.

The use of biodiesel blends up to B7 will not void the CASE CONSTRUCTION warranty as long as the following conditions for biodiesel fuel handling and maintenance are stringently followed:

Biodiesel fuel must be pre-blended by the supplier. Mixing biodiesel fuels on-site can result in an incorrect mixture that could damage the engine and/or fuel system.

NOTICE: *CASE CONSTRUCTION may void your warranty if the problem is associated with poor fuel quality due to improper blending. It is the responsibility of the fuel supplier and/or yourself to ensure the right type of fuel and blend is delivered and used.*

Storage

The machine should not be stored for more than 6 months with biodiesel in the fuel system. For longer storage time, it is strongly suggested that only regular **EN 590** or #2 diesel fuel is used.

NOTE: *If storage for longer than 6 months is necessary, the engine must be run on regular **EN 590** or #2 diesel for a minimum of 20 hours to flush the biodiesel fuel out of the fuel system prior to storage.*

Biodiesel is highly hygroscopic and tends to collect water more than diesel fuel. This increases the risk of algae and bacteria growth which can cause severe damage to the fuel injection system. Keep the machine fuel tanks and on-site storage tanks as full as possible to limit the amount of air and water vapors inside the tank. Drain water from the tanks at least once a week.

NOTICE: *Use only CASE CONSTRUCTION approved biocide additives on Tier 4B (final), Stage IV and Stage V engines with an exhaust aftertreatment system.*

Fluids and lubricants

Capacities and specifications

Engine		
	Type of oil	**NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**
	Technical specifications	**SAE 10W-40** **API CK-4**
	CASE CONSTRUCTION specifications	**MAT3571**
	Type of oil	**NO.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40 CK-4** (cold weather)
	Technical specifications	**SAE 0W-40** **API CK-4**
	CASE CONSTRUCTION specifications	**MAT3571**
	Capacity (with filter change)	**13.25 L** (**14 US qt**)
	Total capacity in system	**15.1 L** (**16 US qt**)
Cooling system		
	Type of coolant	**OAT EXTENDED LIFE COOLANT/ANTIFREEZE**
	CASE CONSTRUCTION specifications	**MAT3624**
	System capacity	**30 L** (**32 US qt**)
Fuel system		
	System capacity	**288 L** (**76 US gal**)
Hydraulic system		
	Type of standard hydraulic fluid	**PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR**
	Technical specifications	**ISO VG-46**
	CASE CONSTRUCTION specifications	**MAT3509**
	Type of alternative hydraulic fluid	Biodegradable oil PANOLIN HLP SYNTH VG 46
	Technical specifications	**ISO VG-46** (MS 1230) **DIN** 51524 HVLP
	Total system capacity	**200 L** (**53 US gal**)
	Reservoir capacity	**110 L** (**29 US gal**)
Transmission		
	Type of oil	**HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**
	Technical specifications	**SAE 10W - 30** **API GL-4** **ISO VG-32/46**
	CASE CONSTRUCTION specifications	**MAT 3525**
	Service capacity - with filter change	**34.1 L** (**36 US qt**)
Axles		
	Type of oil	**PREMIUM TRANSAXLE OIL 80W-140**
	Technical specifications	**SAE 80W-140** **API GL-4**
	CASE CONSTRUCTION specifications	**MAT 3510**
	Front axle	**42 L** (**44.4 US qt**)
	Rear axle	**40 L** (**42.3 US qt**)
DEF/ADBLUE®		
	Technical specifications	**ISO 22241-1**
	CASE CONSTRUCTION specifications	ES-BS001
	Total capacity	**58.9 L** (**15.6 US gal**)
	Total usable capacity (*)	**47.2 L** (**12.5 US gal**)
Grease fittings, as required		**MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2**
	CASE CONSTRUCTION specifications	**MAT3550** Grade C

NOTICE: *(*) some liters always remain in the **DEF/ADBLUE®** reservoir. This allows for correct functioning of the wheel loader components. DO NOT overfill the **DEF/ADBLUE®** tank. The tank is full when the **DEF/ADBLUE®** fluid level in*

the tank reaches the bottom of the fill neck. Adequate air volume must be present in the top of the tank for proper functionality of the after treatment system.

Engine oil viscosity/Temperature range

		(H)	0W-40 or CK-4 or ACEA E6*							
			(H)	5W-30 ACEA E6* or ACEA E9*						
				(H)	10W-40 CK-4 or ACEA E6*or ACEA E9*					
					(H)	15W-40 CK-4** to ACEA E9				
-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
* Requires a **50%** reduction in oil change interval
Maximum engine oil service change interval is **400 h

NOTE: *the use of an engine oil pan heater or an engine coolant heater may be required when operating temperatures are in winter or arctic conditions.*

Transmission oil viscosity/Temperature range

			HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL							
MULTI-SEASON HYDRAULIC TRANSMISSION OIL SAE 0W-20										
-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	

Hydraulic oil - Brake oil viscosity/Temperature range

PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR									
-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

Hydraulic biodegradable oil viscosity/Temperature range

Hydraulic biodegradable oil									
-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

NOTE: *the hydraulic system must be warmed up before commencing work. Warm up the hydraulic system for approximately* ***10 min****, with the engine at half-speed and repeated actuation of all control valves.*

Fuel

Use diesel fuel suitable for the ambient temperature conditions (ASTM-D-975).

Use fuel which is to ASTM (American Society for Testing and Materials) D975 standard.

Use grade No. 2 fuel. The use of other types of fuel can result in a loss of power of the engine and may cause high fuel consumption.

In very low ambient temperatures, use a mixture of fuels No. 1 and No. 2 as necessary. Consult your fuel supplier for appropriate fuel supply.

If the temperature falls below the fuel cloud point (point at which wax begins to form) the wax crystals will cause power loss or will prevent the engine from starting.

In cold weather, fill the fuel tank at the end of the day's work in order to prevent the formation of condensation.

Fuel storage

Prolonged storage of fuel can lead to the accumulation of impurities and condensation in the fuel. Engine trouble can often be traced to the presence of water in the fuel.

The storage tank must be placed outside and the temperature of the fuel should be kept as low as possible. Drain off water and impurities regularly.

Standard hydraulic oil

PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR meets the CNH material specification MAT 3509 and is specifically designed for high pressure applications and for CASE CONSTRUCTION hydraulic systems. Your CASE CONSTRUCTION dealer can provide hydraulic fluid to fulfill different climate/temperature conditions. Refer to the charts at the beginning of this section.

Alternative hydraulic oil – Biodegradable oil

The hydraulic system of this machine can be filled at the factory with environmentally friendly, biodegradable hydraulic fluid (nonstandard). Stickers with corresponding instructions are then attached to the machine.

For the initial filling, we use only: PANOLIN HLP SYNTH VG 46

This synthetic hydraulic fluid has been tested by CASE CONSTRUCTION and approved for use in our machines. A changeover from mineral hydraulic fluid to this biodegradable hydraulic fluid can, however, be made at a later date.
Environmentally friendly, biodegradable, hydraulic fluid must be properly disposed of in the same manner as other used oil.

If hydraulic fluid seeps into the ground, the machine owner and the authorities responsible must be informed.
PANOLIN HLP SYNTH VG 46 is suitable only for use in hydraulic systems.
As PANOLIN HLP SYNTH VG 46 is not soluble in water, condensed water may be deposited in the hydraulic fluid tank.
Condensed water must therefore be drained off at regular intervals and after lengthy downtimes, then disposed of in the same way as used oil.
Use only PANOLIN HLP SYNTH VG 46 for changing or topping up the hydraulic fluid.
The hydraulic fluid may not be mixed with hydraulic fluids or hydraulic fluids from other manufacturers, as this reduces its biodegradability.
Operating equipment and attachments operated with mineral hydraulic fluid must not be mounted until thoroughly emptied, cleaned, and flushed.
Analysis will show whether the hydraulic fluid can be used beyond the standard changing intervals.
See also **7-116**.

Transmission component oil

Extreme pressure oil must be used for enclosed transmission components. Choose an oil that is manufactured for your climate/temperature conditions such as **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**. See the charts at the beginning of this section.

Front and rear axle oil

Extreme pressure oil must be used for enclosed axle components. Choose an oil that is manufactured for your climate/temperature conditions such as **PREMIUM TRANSAXLE OIL 80W-140**.

Grease

MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2.

Environment

Before you service this machine and dispose of oil, fluids, and lubricants, obey environmental regulations. Do not drain oil or fluids on to the ground or into containers that leak. Check with your local environmental, recycling center or your dealer for correct disposal information.

Engine oil

NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40 is recommended for your engine. This oil insures correct lubrication of your engine in all working conditions. See charts at the beginning of this section to choose the correct oil for climate/temperatures.

If **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40** cannot be obtained, use only oil of the API SERVICE CK-4 or ACEA E9 category.

NOTE: *do not put any Performance Additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out utilizing CASE CONSTRUCTION lubricants.*

Engine cooling system

Organic Acid Technology (OAT) coolant

CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. **OAT EXTENDED LIFE COOLANT/ANTIFREEZE** 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), Stage IV and Stage V 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* ***OAT EXTENDED LIFE COOLANT/ANTIFREEZE****. Change the coolant solution at the recommended change interval.*

NOTE: *mix the* ***OAT EXTENDED LIFE COOLANT/ANTIFREEZE*** *with 50% of clean water. Water for dilution of OAT coolant concentrate: distilled or demineralized. If demineralized water is not available, use water for dilution with the following properties:*

Property	Maximum limit
Total Solids	340 ppm
Total Hardness	170 ppm
Chloride (Cl)	40 ppm
Sulfate (SO4)	100 ppm
Acidity pH	5.5 to 9.0

This solution ensures protection of the circuit from **-40.0 °C** (**-40.0 °F**) to **125.0 °C** (**257.0 °F**).

The optimum coolant/water concentration is 50/50. This concentration will protect the cooling system to **-37 °C** (**-35 °F**).If a premixed coolant is not available, mix the concentrate with 50 % of water. The coolant concentration in the coolant/water mixture can be determined with a refractometer designed to measure ethylene glycol content.
Distilled water or deionized water is recommended for the use in the engine cooling systems.
DO NOT use hard water, sea water and, softened sea water. The minerals and salts present in potable water can cause corrosion and deposits resulting in shortened engine life.

In the case that the customer may have topped off an OAT coolant system with conventional coolant, follow the “Washing of the cooling system” on the next page to attain the full benefit of the coolant.

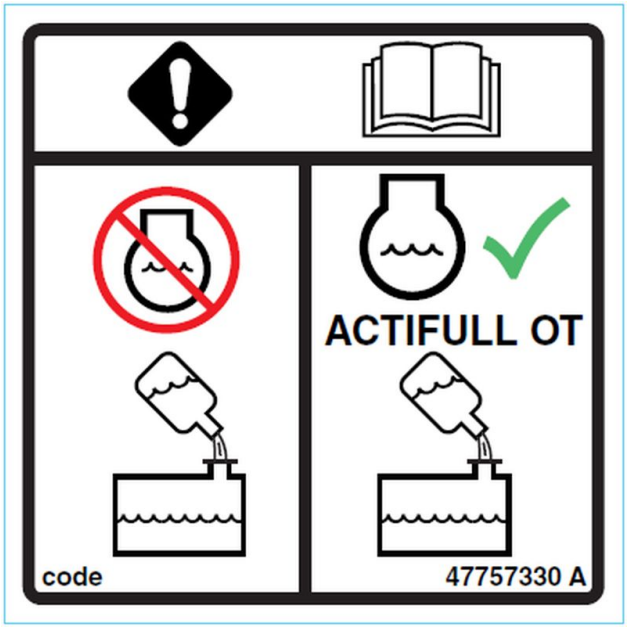
Washing of the cooling system

1. Empty the engine cooling system by draining the coolant into a suitable container.
2. Fill the system with clean water.
3. Start the engine and run the engine for at least **30 min**.

   NOTE: *make sure that you activate the heating system (if equipped) to circulate fluid through the heater core.*
4. Repeat Steps 1 to 3 for a total of two washes.
5. Fill the system with OAT coolant.
6. Operate the engine until it is warm. Inspect the machine for leaks.

You can identify OAT coolant by its yellow color. Also, the decal shown is located near the fill point of the cooling system whenever the factory fill is **OAT EXTENDED LIFE COOLANT/ANTIFREEZE**. This decal is available in three different sizes. See the table below for the associated part numbers.

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

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:

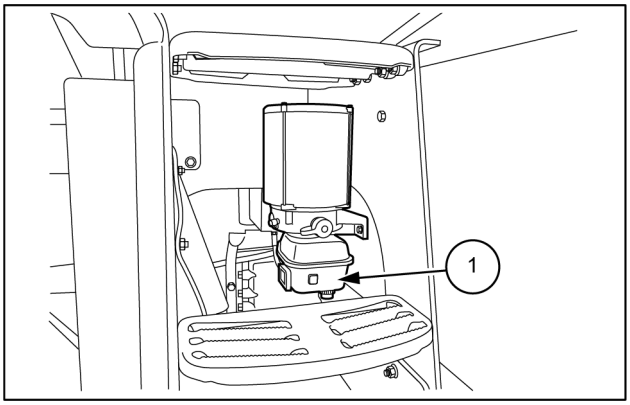
A coolant that relies on inhibitors such as organic acid salts (potassium and sodium salts) for corrosion and cavitation protection. The organic salts produce a protective film on the cylinder lines, avoiding cavitation erosion.

Automatic lubrication system

The wheel loaders can be equipped with a centralized lubrication system, that delivers controlled amounts of grease to multiple locations on the machine at pre-set time intervals (**30 min** by default).

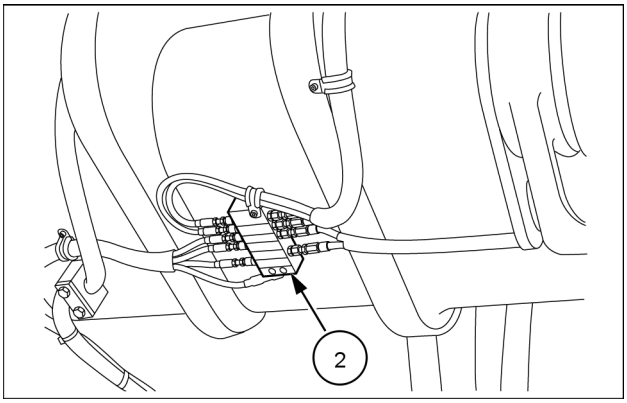
The automatic lubrication system consists of:

- pump with reservoir **(1)**, located on the left-hand side of the rear chassis, under the steps;



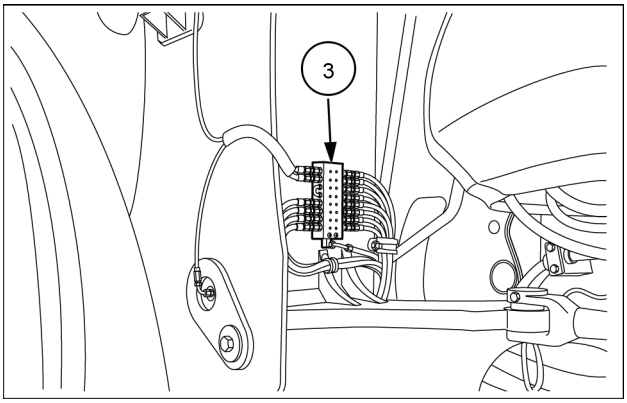
LEIL17WHL1598AB 1

- grease manifold **(2)**, located on the bottom side of the lift arm cross member;



LEIL17WHL1600AB 2

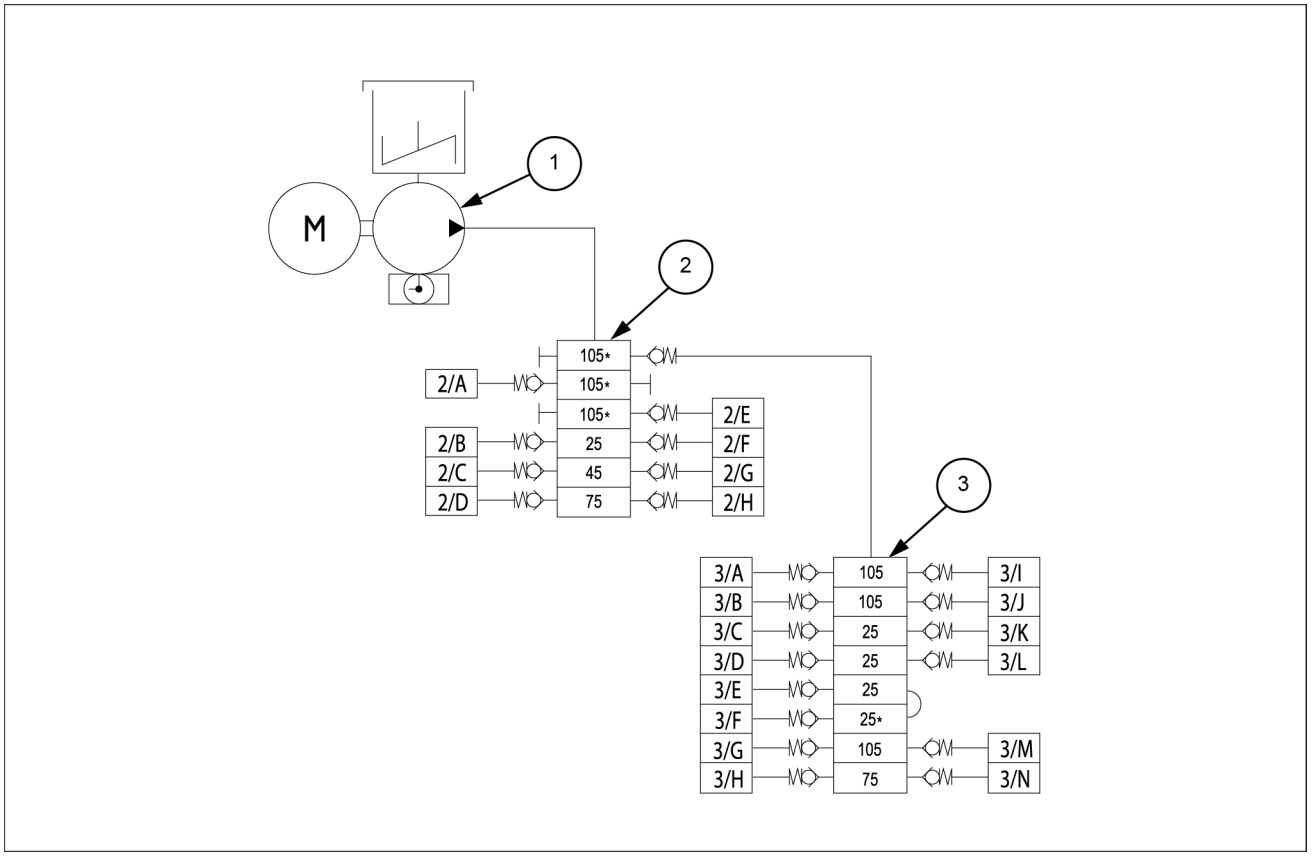
- grease manifold **(3)**, located on the left-hand side of the front chassis, near the lift arm cylinder grease fitting;



LEIL17WHL1599AB 3

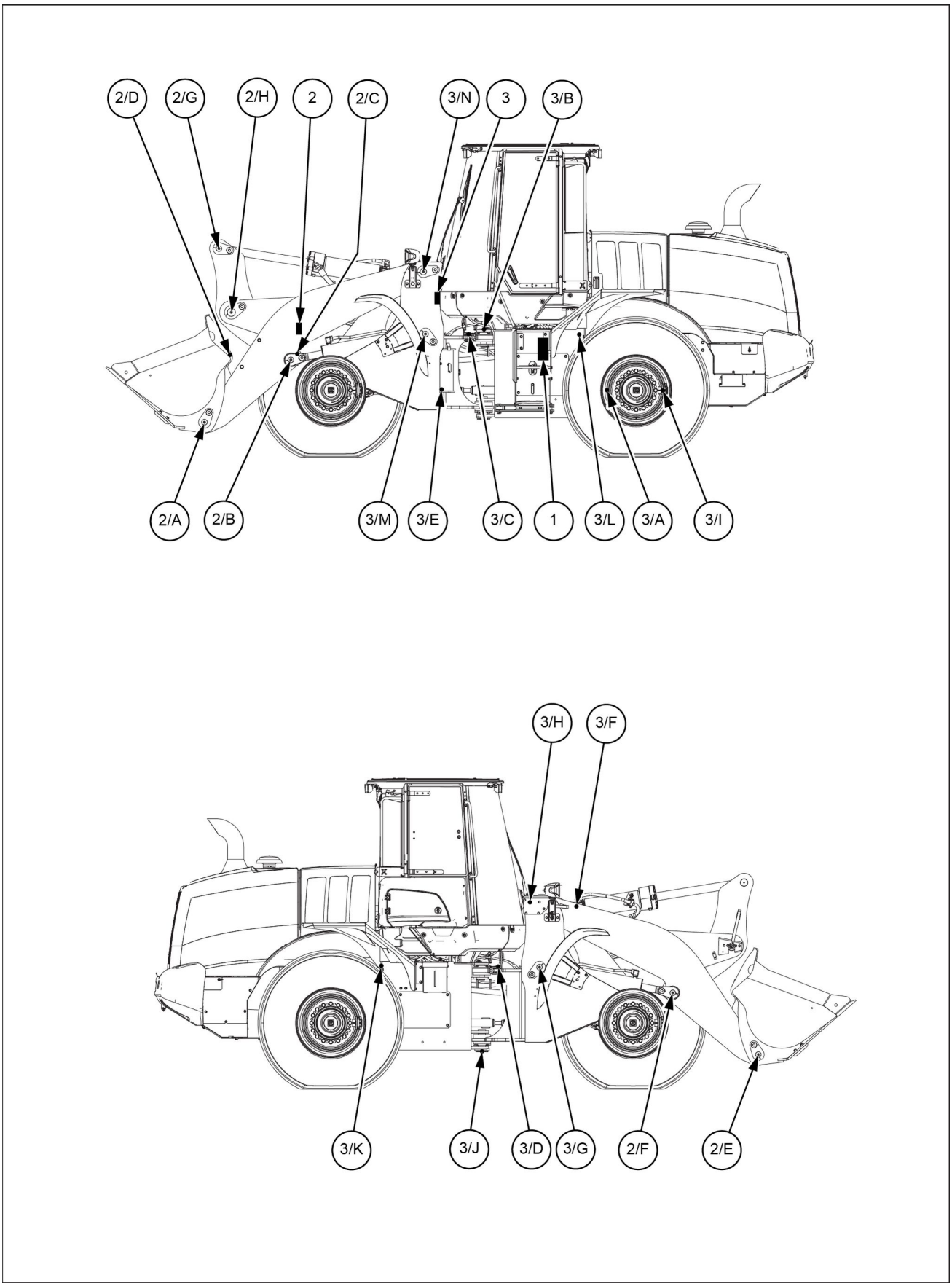
- supply lines.

The figure shows a schematic of the automatic lubrication layout with the location of the grease application points.



LEIL17WHL1678FB 4

(1) pump with reservoir
(2) grease manifold
(3) grease manifold
(2/A), **(2/D)**, **(2/E)** Bucket fittings
(2/C) Dump link pin
(2/H) Bell crank pin
(2/G) Tilt cylinder pin
(2/B), **(2/F)**, **(3/G)**, **(3/M)** Lift cylinder pins
(3/A), **(3/I)** Rear axle trunnion
(3/B), **(3/J)** Articulation joints
(3/C), **(3/D)**, **(3/K)**, **(3/L)** Steering cylinders
(3/E) Drive shaft
(3/H), **(3/N)** Lift arm pins

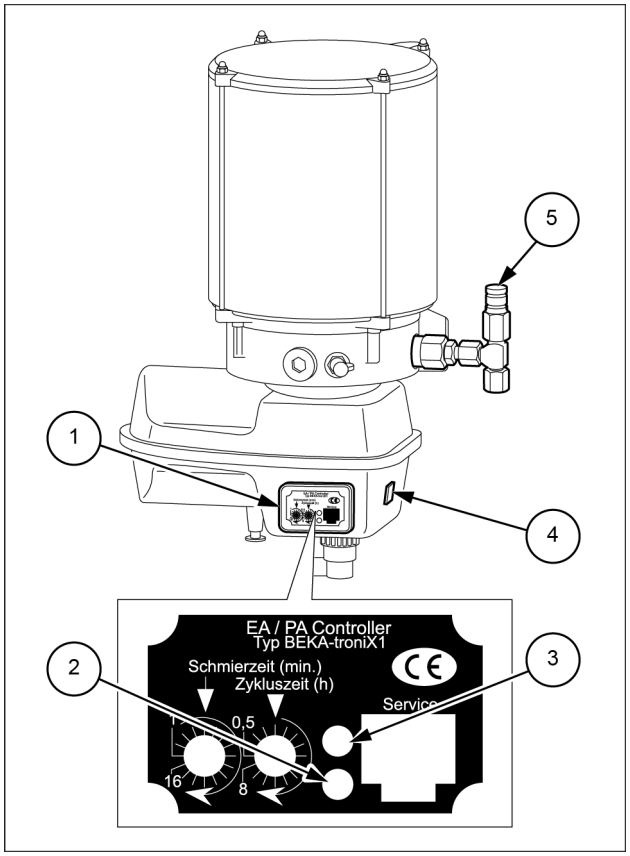


LEIL17WHL1665H 5

When the key is turned to ON position, the green and red LED's **(2)**, **(3)** illuminate on the control panel **(1)** of the pump. After about **1.5 s**, both lights go off to confirm the correct operation of the system.

NOTICE: *do not act on the control panel of the pump; this may cause an incorrect setting of the lubrication system.*

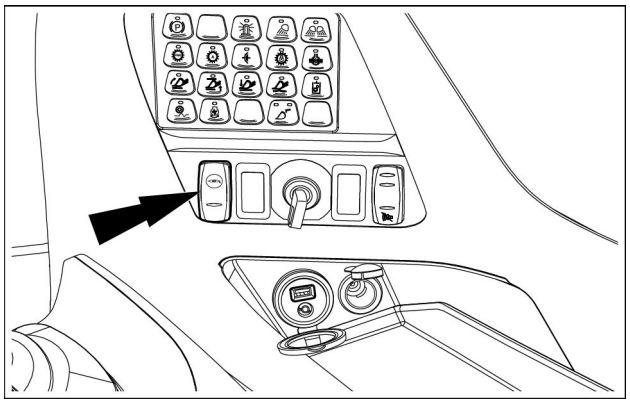
When the lubrication cycle starts, the green LED illuminates and stays on during the whole cycle until it ends.
If the engine shuts down during a lubrication cycle, the integrated electronic controller records the elapsed time so that once the engine starts, the lubrication cycle can start again and proceed for the remaining time.



LEIL17WHL1614BB 6

The operator can manually start a new lubrication cycle at any time, by pressing the automatic lubrication button located on the right-hand console in the cab. The controller will set the next automatic greasing cycle from the latter.

NOTE: *the same function can be performed by pressing the button* ***(4)*** *located on the greasing pump.*



LEIL17WHL1592AB 7

Automatic lubrication system faults:

- the illumination of the red LED on the control panel indicates faults in the system;
- the leakage of grease from the pressure relief valve **(5)** indicates a potential obstruction of the system.

In both cases, immediately contact your authorized dealer.

Selective Catalytic Reduction (SCR) exhaust treatment - Overview

Diesel Exhaust Fluid (DEF)/AdBlue® instrumentation warning

ATTENTION: *the fuel system, exhaust after-treatment system, and engine on your machine are designed and built to government emissions standards. Tampering by dealers, customers, operators, and users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action, and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only!*

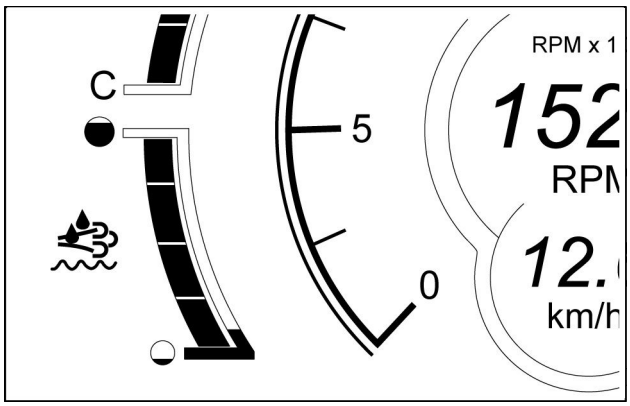
Your machine is equipped with a warning system to inform the operator of the **DEF/ADBLUE®** level, system malfunctions, and engine power loss that may result from the SCR system for reducing exhaust emissions.

During normal operation of your machine, the instrument cluster displays the **DEF/ADBLUE®** fluid level at all times.

Warning lights and indicators will illuminate with a warning on the visual display. The display changes automatically to allow the operator to view the warning indicator and display message.



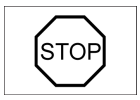
The **DEF/ADBLUE®** level bar gauge indicates the level of diesel exhaust fluid in the **DEF/ADBLUE®** tank. When all bars are illuminated, the tank is full. Illuminated bars indicate the level of fluid remaining in the **DEF/ADBLUE®** tank. When the tank is at **5–10%** of tank volume, the warning system will flash and/or will flash and sound an audible alarm dependent upon **DEF/ADBLUE®** levels.



LEIL15WHL0575AA 1

DEF/ADBLUE® level gauge			
Gauge indication	**Condition**	**Master indicator**	**Alarm status**
6–10%	No engine power loss	Caution (yellow)	None
5% and below	Moderate engine power loss	Caution (yellow)	Continuous
Empty	Severe engine power loss	Stop (red)	Continuous

Stop master indicator (red, critical)



The Stop Master Indicator is a critical warning display. See the “Critical Warnings” table. When the Stop Master indicator illuminates, IMMEDIATELY bring the machine safely to a stop, and turn the engine OFF.

Display	Description	Corrective Action
Poor **DEF/ADBLUE®** Quality Detected, Power Limited	Moderate engine power loss has begun, up to **65%** torque reduction and **40%** engine speed within **40 min** of engine running time.	**DEF/ADBLUE®** quality/concentration is questionable. Drain the tank and discard the **DEF/ADBLUE®**. Fill with new **DEF/ADBLUE®**. ***NOTE:*** *see “* ***DEF/ADBLUE®*** *tank refilling” section for important tank draining information.*
DEF/ADBLUE® Injection Failed Power Limited	SCR fault/failure detected. Up to **65%** torque reduction and **40%** engine speed reduction within **40 min**.	Contact your local authorized dealer for repair.

Display	Description	Corrective Action
DEF/ADBLUE® Level, Tank EMPTY, Power Limited	**DEF/ADBLUE®** level is less than **5%** of tank volume (**0%** will be displayed). Up to **65%** torque reduction and **40%** engine speed reduction within **40 min** of engine running time.	Refill **DEF/ADBLUE®** immediately and reset the system by cycling the key switch OFF then ON.
DEF/ADBLUE® Level, Tank EMPTY, Ext. Power Lim	When the tank has reached **0%** level, there is a **50%** torque reduction, and engine speed is limited to low idle within an additional **30 min** of engine run time.	Refill **DEF/ADBLUE®** immediately and reset the system by cycling the key switch OFF then ON.
Poor **DEF/ADBLUE®** Quality Detected Power Limited	**DEF/ADBLUE®** quality/concentration is questionable **60 min** after the initial warning. Up to **65%** torque reduction and **40%** engine speed reduction within **40 min** of engine running time.	Drain **DEF/ADBLUE®** tank, clean and refill with approved **DEF/ADBLUE®** solution. Contact your local authorized dealer if failure persists. ***NOTE:*** *see "**DEF/ADBLUE®** tank refilling" section for important tank draining information.*
DEF/ADBLUE® Injection Failed Ext. Power Lim	SCR fault/failure detected. Up to **65%** torque reduction and **50%** engine speed reduction within **30 min**.	Contact your local authorized dealer for repair, cycle key, or validation re-start.

Caution master indicator (yellow, non-critical)



The caution master indicator is a non-critical warning display. See the “Non-critical warnings” table. When the caution master indicator is ON, change the operating method, schedule a shutdown for maintenance, or if the condition persists, contact your dealer.

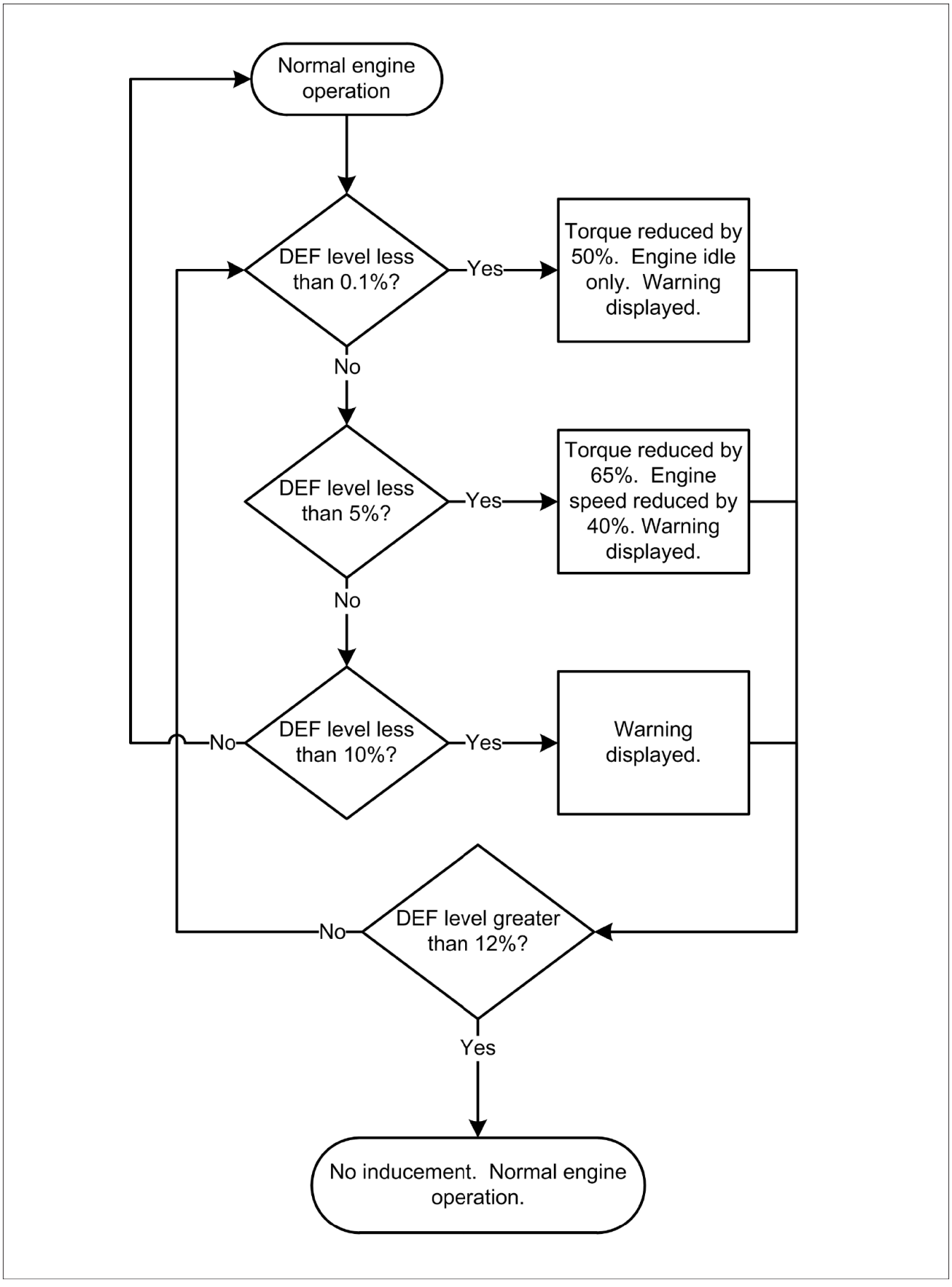
The “Non-critical warnings” table lists warning displays that may appear on the instrument cluster and the corrective action required.

NOTICE: *when a fault occurs, an audible alarm may sound and the Caution Master Indicator will be yellow. The caution message will be displayed in the message area. If this occurs, return the machine to a service position, and turn the engine off, and take corrective action to help avoid expensive repairs.*

Non-critical warnings

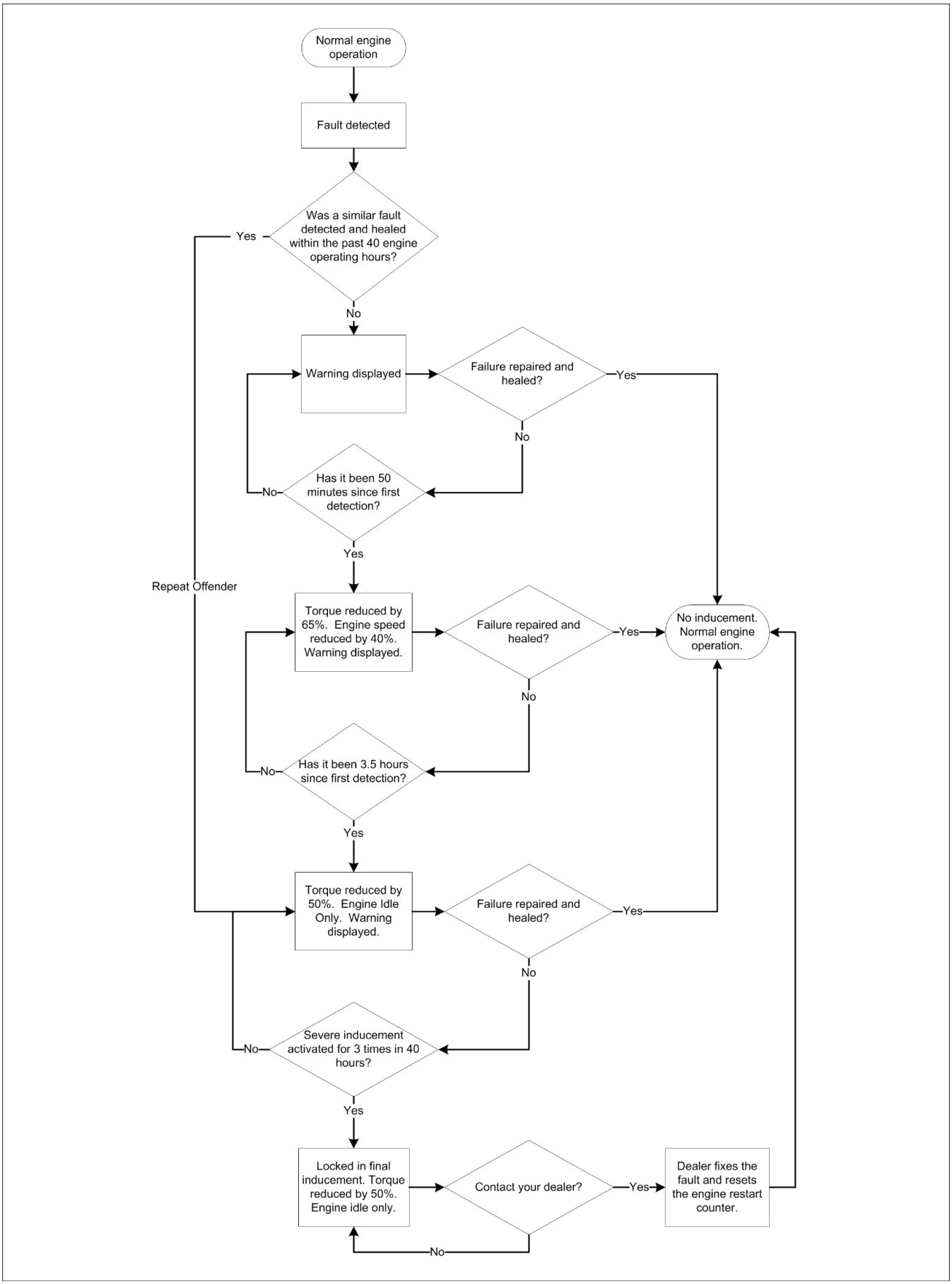
Display	Description	Corrective action
DEF/ADBLUE® Level LOW	**DEF/ADBLUE®** level is less than **10%** of tank volume. No engine power loss at this level	Fill the **DEF/ADBLUE®** tank.
Poor **DEF/ ADBLUE®** quality detected	Poor **DEF/ADBLUE®** quality/concentration detected. After the engine has run for **50 min** with poor **DEF/ADBLUE®** quality, there will be a torque and speed reduction.	Drain the tank. Replace **DEF/ADBLUE®**. ***NOTE:*** *see “* ***DEF/ADBLUE®*** *tank refilling” section for important tank draining information.*
DEF/ADBLUE® Injection Failed, Power Limited	Technical failure detected. **25%** torque reduction ramped in within **25 min**. Further torque/speed reduction **2 h** after initial fault detection if fault does not heal.	Contact your authorized dealer.
Fuel	Low fuel	Fill the fuel tank - do not allow the tank to totally empty.

DEF/AdBlue® level faults, failures, and engine power loss levels



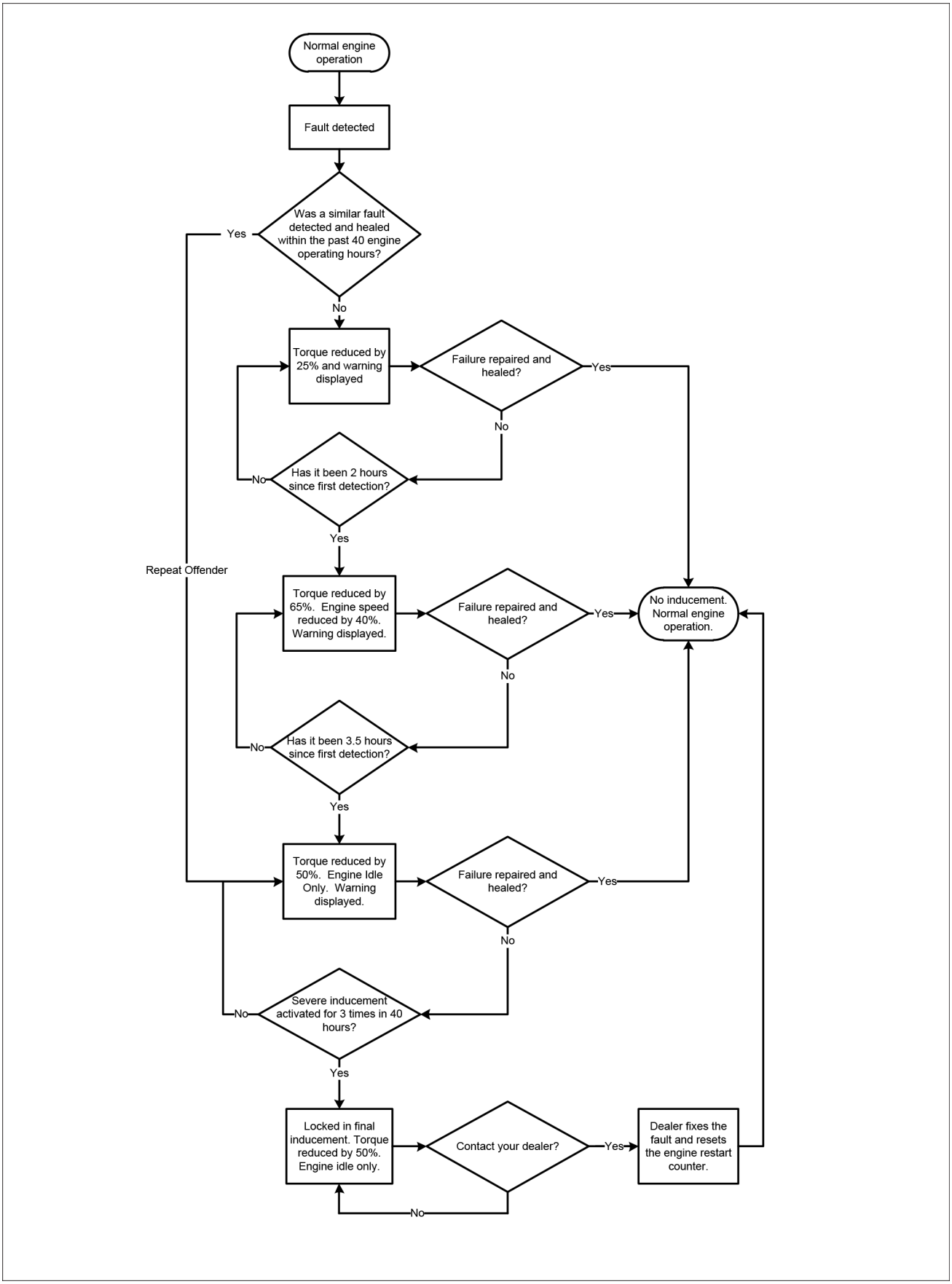
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DEF/AdBlue® quality faults, failures, and engine power loss levels



LEIL15WHL0609HA 3

DEF/AdBlue® technical faults



LEIL14WHL0392HA 4

Resetting the Selective Catalytic Reduction (SCR) system

For **DEF/ADBLUE®** storage tank fluid level faults, failures which can cause engine power loss, perform as follows:

- Raise the **DEF/ADBLUE®** tank level above **12%** of the total volume.
- Cycle the key switch to the OFF position or return the throttle to low idle position.

For **DEF/ADBLUE®** quality and SCR system technical faults, failures which can cause engine power loss, read the following:

- To fully reset the system, repair or replace the component/failure causing the fault.
- Switching off the engine will reset the system and the engine will restart at full power.
- If the same failure is re-detected within **40 h** of engine operation, the last active engine power loss level will be activated.
- If the same failure is detected three consecutive times within **40 h** of engine operation, maximum engine power loss will remain active after engine restart until the system is repaired.
- Please contact your authorized CASE CONSTRUCTION dealer for service.

Selective Catalytic Reduction (SCR) system

What is Selective Catalytic Reduction (SCR)?

Your machine is equipped with additional components to comply with national and local exhaust emissions requirements. The main components of the SCR system include the SCR catalyst, the Diesel Oxidation Catalyst (DOC) the **Diesel Exhaust Fluid (DEF)/AdBlue®** dosing module, and the **DEF/ADBLUE®** tank.

How does Selective Catalytic Reduction (SCR) work?

During combustion, harmful Nitrogen Oxide (NO_x) molecules are formed in the exhaust. By injecting a **DEF/ADBLUE®** solution into the exhaust prior to a catalyst, the NO_x can be converted to harmless elemental Nitrogen and water. This happens when the NO_x molecules react inside the catalyst with the heat generated by the engine and the ammonia in the **DEF/ADBLUE®** solution. The DOC is used to maximize the SCR catalyst efficiency by maintaining a 50/50 ratio of Nitric Oxide (NO) and Nitrogen Dioxide (NO_2) prior to exhaust gases entering the SCR chamber.

During cold engine operation at low engine coolant and ambient air temperatures, water vapor will be visible from the exhaust when the engine operates. This water vapor will resemble steam or light white smoke and will dissipate as the engine and machine components warm and is considered normal.

***NOTE:** after engine shutdown, the SCR system will perform a purge cycle, which permits the Supply Module to continue to run for up to 90 seconds. This is to be considered normal and requires no action from the operator.*

What is Diesel Exhaust Fluid (DEF)/AdBlue® ?

DEF/ADBLUE® is a clear, colorless, non-toxic aqueous urea solution (**32.5%**) with a slight ammonia odor used to chemically reduce NO_x emissions from heavy-duty diesel powered vehicles. **DEF/ADBLUE®** is neither explosive nor harmful to the environment and is classified under the minimum-risk category of transportable fluids.

DEF/ADBLUE® quality is defined by International standard ISO 22241-1.

Finding Diesel Exhaust Fluid (DEF)/AdBlue®

Your CASE CONSTRUCTION dealer is fully equipped to accommodate all your **DEF/ADBLUE®** needs.

CASE CONSTRUCTION Toll free number: 00800 2273 7373			
Country	Toll free fax	Local number	E-mail
Italy (0039)	-	02 44412 342	-
La chiamata è gratuita. Tuttavia, con alcuni gestori europei le chiamate da telefono cellulare sono a pagamento. Per qualsiasi informazione sulle tariffe, consultare in anticipo il proprio gestore telefonico. In caso di difficoltà a chiamare il numero verde, è possibile rivolgersi anche al numero 0244412342.			
Country	Toll free fax	Local number	E-mail
United Kingdom (0044)	8000856134	02030245588	EUCaseCEUKROI@cnh.com
The call is free. However some European Operators may apply a charge, if the call is made from a mobile phone. For any information about charge rate, please enquire in advance from your provider. Should you have difficulties getting through to the free phone number, you can also call 02030245588.			
Country	Toll free fax	Local number	E-mail
Republic of Ireland (00353)	-	012421888	EUCaseCEUKROI@cnh.com
In the Republic of Ireland please only use 00800 64655263 if calling from a land line. The call will be free of charge. However, to call using a mobile telephone please dial 01 2421888. A call made from a mobile telephone will not be free but will be charged to you. For information about charge rates, please contact your service provider before making the call.			
Country	Toll free fax	Local number	E-mail
France (0033)	-	0157323204	CaseCustomerAssistance.France@cnh.com
L'appel est gratuit. Toutefois, certains opérateurs européens peuvent facturer l'appel s'il provient d'un téléphone portable. Pour plus d'informations sur les tarifs, veuillez vous renseigner à l'avance auprès de votre opérateur. Si vous rencontrez des difficultés à joindre la ligne téléphonique gratuite, vous pouvez également appeler le 0157323204.			
Country	Toll free fax	Local number	E-mail
Spain (0034)	-	912754405	CaseCustomerAssistance.Spain@cnh.com
La llamada es gratuita. No obstante, con algunos operadores europeos la llamada puede ser de pago si se efectúa desde un teléfono móvil. Para obtener mayor información acerca de las tarifas, consulte previamente a su proveedor. Si tiene problemas para comunicar con el número de teléfono gratuito, puede llamar al número de pago 912754405.			
Country	Toll free fax	Local number	E-mail
Germany (0049)	-	06951709325	CaseCustomerAssistance.Germany@cnh.com
Der Anruf ist gebührenfrei. Bei Anruf aus dem Mobilnetz könnten einige europäische Netzbetreiber Gebühren berechnen. Bitte erfragen Sie die Tarife zuvor bei Ihrem Anbieter. Falls Sie Probleme bei der Anwahl der Freecall-Nummer haben sollten, empfehlen wir Ihnen den Anruf unter unserer kosten- pflichtigen Rufnummer 06951709325.			

For countries outside of the toll free access area, please use the table below:

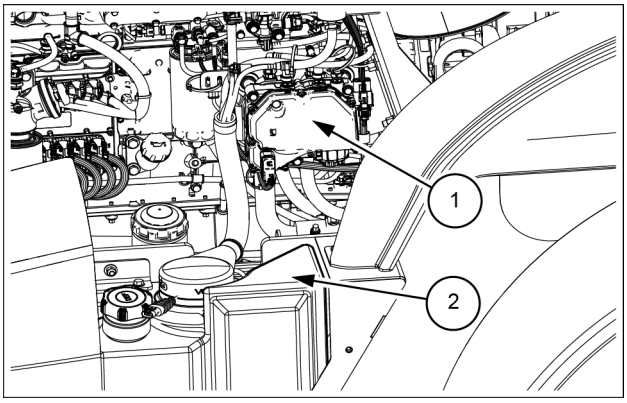
Case Construction		
Country	**Toll Number**	**Spoken Language**
Austria (0043)	0049 6951709325	German
Belgium (0032)	0044 2030245588	English

Case Construction		
Country	**Toll Number**	**Spoken Language**
Luxembourg (00352)	0044 2030245588	English
Denmark (0045)	0044 2030245588	English
Netherlands (0031)	0044 2030245588	English
Portugal (00351)	0044 2030245588	English
Poland (0048)	0044 2030245588	English
Norway (0047)	0044 2030245588	English
Sweden (0046)	0044 2030245588	English
Finland (00358)	0044 2030245588	English
Iceland (00354)	0044 2030245588	English
Estonia (00372)	0044 2030245588	English
Latvia (00371)	0044 2030245588	English
Lithuania (00370)	0044 2030245588	English
Czech Republic (00420)	0044 2030245588	Czech
Slovakia (00421)	0044 2030245588	English
Slovenia (00386)	0044 2030245588	English
Croatia (00385)	0044 2030245588	English
Republic of Serbia (00381)	0044 2030245588	English
Bosnia & Herzegovina (00387)	0044 2030245588	English
Albania (00355)	0044 2030245588	English
Macedonia (00389)	0044 2030245588	English
Greece (0030)	0044 2030245588	English
Bulgaria (00359)	0044 2030245588	English
Romania (0040)	0044 2030245588	English
Hungary (0036)	0044 2030245588	English
Cyprus (00357)	0044 2030245588	English
Malta (00356)	0044 2030245588	English
Switzerland (0041)	00800 2273 7373	German French Italian

Selective Catalytic Reduction (SCR) main components

Supply Module (SM)

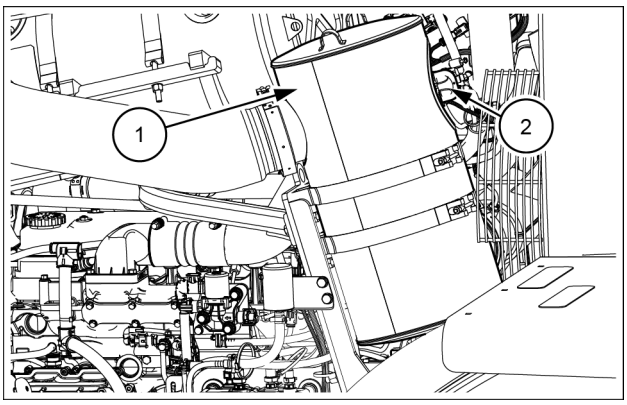
The Supply Module (SM) **(1)** contains a pump which withdraws the **DEF/ADBLUE®** fluid from the **DEF/ADBLUE®** tank **(2)**. The **DEF/ADBLUE®** fluid is then directed to the dosing module connected to the Diesel Oxidation Catalyst (DOC).



LEIL18WHL1101AB 1

Diesel Oxidation Catalyst (DOC)

The Diesel Oxidation Catalyst (DOC) **(1)** converts part of the NO to NO_2. The DOC is required to achieve as close as possible **50%**/ **50%** NO_2/NO_x ratio before the SCR. The presence of NO_2 increases the NO_x conversion efficiency of the SCR catalyst. The **DEF/ADBLUE®** fluid is injected in the DOC by the dosing module **(2)** connected to the DOC.



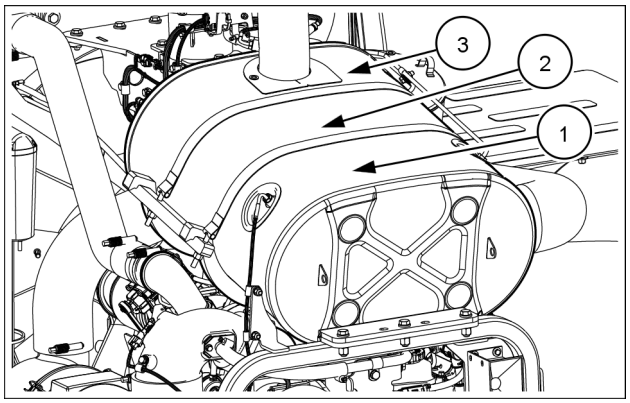
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Selective Catalytic Reduction (SCR)

Is composed by:

Selective Catalytic Reduction on Filter (SCRoF) (1)

The Selective Catalytic Reduction on Filter (SCRoF) **(1)** is located at the inlet of the SCR catalyst **(2)**. In the SCRoF occurs the physical filtration of the the Particulate Matter (PM) and the reaction of the exhaust gas.



LEIL18WHL1103AA 3

Selective Catalytic Reduction (SCR) (2)

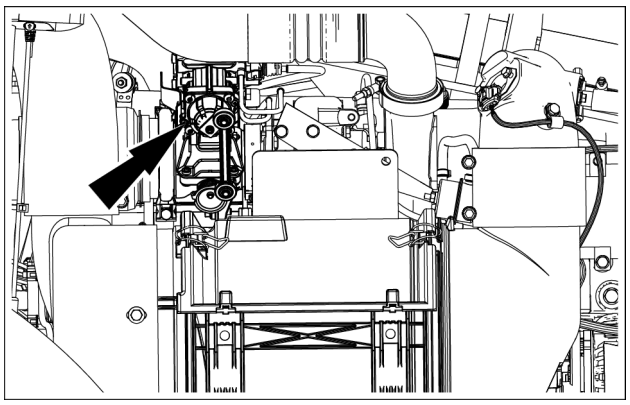
The main reaction involved in the SCR catalyst is the conversion of the NO_x to N_2 and water (H_2O). An average NO_2/NO_x ratio around **50%** is required to give the optimum NO_x reduction efficiency in the exhaust system.
Excess of ammonia (NH_3) is often used to facilitate the NO_x reduction to nitrogen (N_2), resulting in NH_3 slip. This ammonia must be removed by a secondary step in the Clean Up Catalyst (CUC).

Clean Up Catalyst (CUC) (3)

The Clean Up Catalyst (CUC) is located at the end of the SCR catalyst. The CUC converts the ammonia (NH_3) slip to nitrogen (N_2) and water vapor (H_2O). The CUC ensures that the ammonia slip to ambient is minimal.

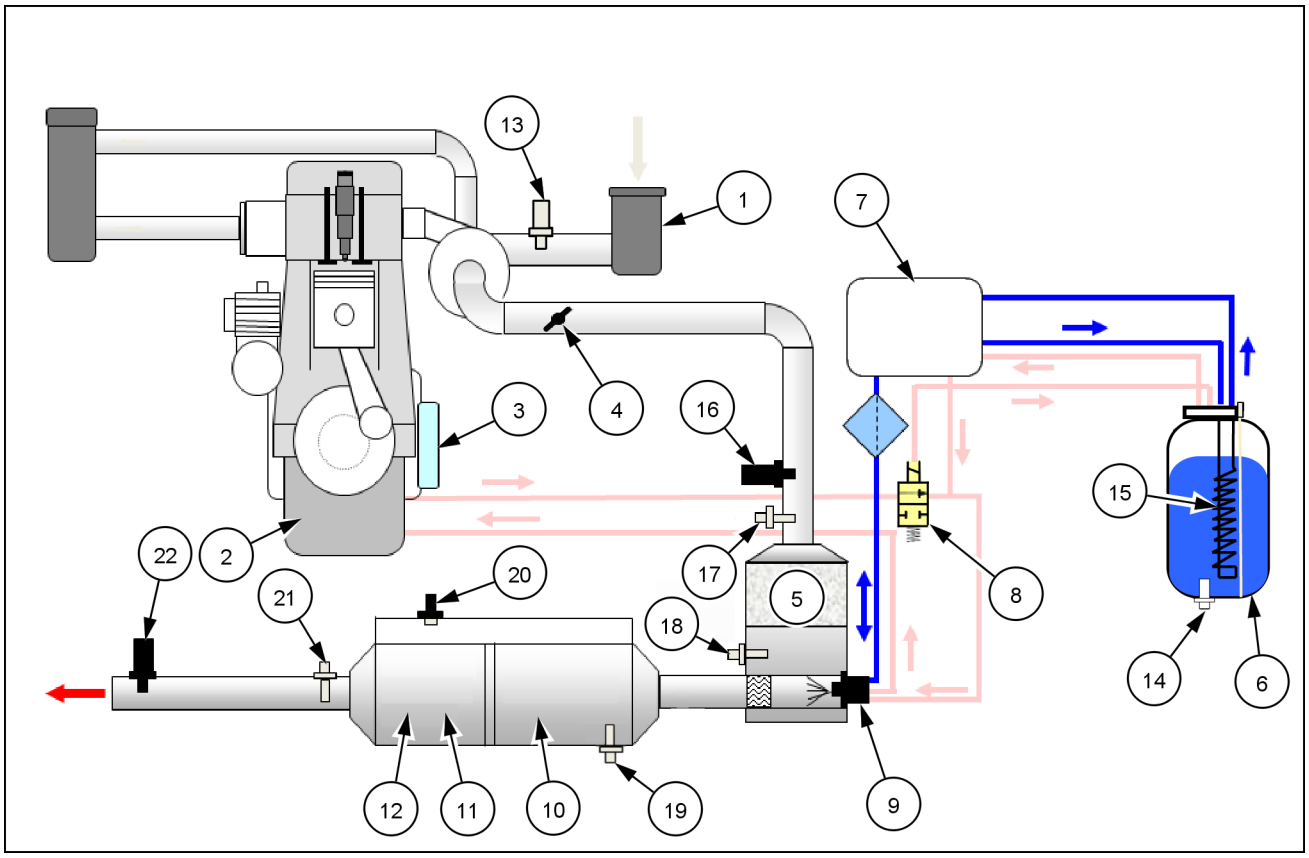
Exhaust flap

The exhaust flap is a device located between the turbine and the exhaust system. The exhaust flap is equipped with a throttle valve which manages the rate and the “light off” temperature of the exhaust gas.
The “light off” temperature indicates the temperature at which the catalytic process starts.



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Selective Catalytic Reduction (SCR) system description



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Exhaust gas flow Coolant line **DEF/ADBLUE®** line

Components	Sensors
(1) Air filter	**(13)** Intake air humidity and temperature sensor
(2) Engine	**(14)** **DEF/ADBLUE®** quality sensor
(3) Engine Control Unit (ECU)	**(15)** **DEF/ADBLUE®** level and temperature sensor
(4) Exhaust Flap	**(16)** DOC upstream NO_x sensor
(5) Diesel Oxidation Catalyst (DOC)	**(17)** DOC upstream temperature sensor
(6) **DEF/ADBLUE®** tank	**(18)** DOC downstream temperature sensor
(7) Supply Module	**(19)** SCR upstream temperature sensor
(8) Coolant control valve	**(20)** Differential pressure sensor
(9) Dosing Module	**(21)** SCR downstream temperature sensor
(10) Selective Catalytic Reduction on Filter (SCRoF)	**(22)** SCR downstream NO_x sensor
(11) Selective Catalytic Reduction (SCR) catalyst	
(12) Clean Up Catalyst (CUC)	

The humidity in the intake to the engine **(2)** affects the emissions in the exhaust stream. The intake air humidity sensor **(13)** is located in the intake air piping to the engine between the air filter **(1)** and the intake manifold. The information from this sensor is sent directly to the Engine Control Unit (ECU) **(3)**.

Engine exhaust system temperature is critical to the catalytic reactions that take place in the emissions control components. To quickly increase the catalyst temperature at initial start-up and light operating loads, there is an exhaust flap **(4)** located in the exhaust stream near the turbocharger. The maximum temperature of the exhaust flap is critical, therefore engine coolant is circulated through the core of this valve. Limiting NO_x emissions in the exhaust stream is one of the major goals of the emission control system on these engines. The upstream NO_x sensor **(16)** is located in the exhaust stream at the inlet to the Diesel Oxidation Catalyst (DOC) **(5)**. The NO_x sensor transmits data to the ECU via the engine CAN data bus. A temperature sensor **(17)** is located at the inlet to the DOC and another temperature sensor **(21)** is located at the outlet to the DOC to closely monitor temperature.

DEF/ADBLUE® fluid freezes at **-11 °C** (**12 °F**). A **DEF/ADBLUE®** fluid level and temperature sensor **(15)** is installed in the tank and the instrument cluster displays those levels. The **DEF/ADBLUE®** quality sensor **(14)** monitors the quality of the **DEF/ADBLUE®** fluid.

To precisely control the quantity of **DEF/ADBLUE®** fluid injected from the **DEF/ADBLUE®** tank into the exhaust stream, a **DEF/ADBLUE®** dosing module **(9)** is integrated in the outlet area of the DOC canister. The dosing valve is Pulse Width Modulation (PWM) controlled by the ECU. The ECU determines the amount of **DEF/ADBLUE®** fluid to inject based on inputs from sensors in the exhaust stream. Pressurized **DEF/ADBLUE®** fluid is supplied to the dosing module from the Supply Module **(7)** at approximately **9 bar** (**130 psi**).

Removal of NO_x requires a chemical reaction. This chemical reaction takes place in the SCR **(11)**. **DEF/ADBLUE®** reacts with the SCR catalyst to convert NO_x to harmless nitrogen and water vapor.

The physical filtration of the Particulate Matter (PM) occurs in the SCRoF **(10)**.

To assure that the emission system is functioning correctly, a downstream NO_x sensor **(22)** is located in the exhaust stream at the outlet of the SCR.

Temperature and pressure are very important to the chemical reactions that take place in the emission control system. An SCR upstream temperature sensor **(19)** is located in the exhaust stream at the inlet of the SCR and compares the reading of the SCR downstream temperature sensor **(21)** located in the exhaust stream at the outlet of the SCR. The catalyst requires about **230 °C** (**446 °F**) for the chemical reaction to take place.

While a delta pressure (dp) sensor **(20)**, located on the SCR catalyst monitors the pressure of the exhaust gas at the inlet and at the outlet of the SCR catalyst.

Service

After a proper shutdown of the Tier 4B (final), Stage IV and Stage V vehicle, the Supply Module can remain in a deactivated status for up to four months under the following conditions:

- Store the vehicle in a dry environment, non-salty environment, and clean environment.
- Store the vehicle between **-40 °C** (**-40 °F**) and **25 °C** (**77 °F**).
- The relative humidity should be between **0 – 60%**.
- Protect the catalyst (muffler outlet) against direct rain and snow.
- Drain the **DEF/ADBLUE®** tank.

NOTE: *see " **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** tank refilling" section for important tank draining information.*

- Flush the **DEF/ADBLUE®** tank with deionized water.
- Drain the deionized water.
- Do not disconnect any electrical connectors or **DEF/ADBLUE®** coolant connectors for the SCR system.
- If the vehicle will be in storage for more than 30 days, remove the ground cable(s) from the battery(s).

Storage, handling, and transport

NOTICE: *storage temperatures above **30 °C** (**86 °F**) greatly reduce the shelf life of DEF.*

DEF/ADBLUE® has a typical shelf life of 6-12 months. Refer to the SHELF LIFE table below.

In order for **DEF/ADBLUE®** to remain in a usable condition, storage requirements need to be met.

- Store between **-11 °C** (**12 °F**) and **30 °C** (**86 °F**).
- Use only an approved **DEF/ADBLUE®** container. Contact your dealer to obtain proper storage container(s).
- Keep container tightly closed.
- Keep container in a cool, well-ventilated area.
- Keep away from heat and direct sunlight.

To prevent decomposition of the **DEF/ADBLUE®** and the evaporation of water:

- Do not store **DEF/ADBLUE®** in vented containers.
- Protect **DEF/ADBLUE®** from sunlight in order to avoid any excessive temperature rise.

NOTICE: *frozen **DEF/ADBLUE®** has approximately a **7%** larger volume than the liquid.*

At the first vehicle reactivation:

- Fill the **DEF/ADBLUE®** tank.

  NOTE: *it is very important to fill the **DEF/ADBLUE®** tank before anyone starts or moves the vehicle. Otherwise SCR fault codes will appear.*
- Change the main filter on the Supply Module.
- Connect the ground cable(s) for the battery(s).
- Start the vehicle. Place the vehicle between **40 – 50%** load to start the **DEF/ADBLUE®** injection into the exhaust.

If a failure occurs:

- Perform a Urea Dosing System Test (UDST).

  NOTE: *contact your local dealer to perform this procedure.*
- Restart the vehicle.
- Place the vehicle between **40 – 50%** load to start the **DEF/ADBLUE®** injection into the exhaust.

Cold weather handling

- Your machine is equipped with an internal tank heater to thaw frozen **DEF/ADBLUE®**. Your machine will still function until the **DEF/ADBLUE®** begins to flow. The SCR system will then function normally.

  NOTE: *you may notice a slight reduction in engine torque in high demand situations until the* ***DEF/ADBLUE®*** *is fully thawed.*

- Do not heat **DEF/ADBLUE®** for long periods of time at temperatures above **30 °C** (**86 °F**). This causes the solution to decompose, which very slowly decreases the expected shelf life.

NOTICE: *do not use an anti-gelling or freeze point improver in your* ***DEF/ADBLUE®****. The* ***32.5%*** *solution is specifically designed to provide the optimum NO_X reduction properties. Any further blending or adjusting of the* ***DEF/ADBLUE®*** *mixture will lessen its ability to perform correctly and may cause damage to the SCR components.*

Handling and supply of additives

- Personal Protective Equipment (PPE) is not required under normal conditions. If splashing is likely, wear eye protection. For prolonged or repeated contact, impervious gloves are recommended. Follow the precautions listed in the SAFETY INFORMATION chapter when handling any service fluid.
- No additives are required.

NOTICE: *contaminated* ***DEF/ADBLUE®*** *can affect the performance of your machine. Follow all instructions in this manual when handling* ***DEF/ADBLUE®****.*

Shelf life

Constant ambient storage temperature	Minimum shelf life
Less than or equal to **10 °C** (**50 °F**)	36 months
Less than or equal to **25 °C** (**77 °F**) [1]	18 months
Less than or equal to **30 °C** (**86 °F**)	12 months
Less than or equal to **35 °C** (**95 °F**)	6 months
Greater than **35 °C** (**95 °F**)	-[2]
[1] To prevent decomposition of **DEF/ADBLUE®**, avoid prolonged transportation or storage above **25 °C** (**77 °F**). However, temporary exposure to higher temperatures does not necessarily influence the quality of **DEF/ADBLUE®**.	
[2] Significant loss of shelf life: check every batch before use. See your authorized dealer for more information on testing.	

NOTE: *the main factors taken into account to define the shelf life in the table above are the ambient storage temperature and the initial alkalinity of* ***DEF/ADBLUE®****. The difference in evaporation between vented and non-vented storage containers is an additional factor.*

NOTE: *the information in this table is for reference only and has been provided by the International Organization for Standardization, Document number ISO 22241-3 Diesel engines - NO_X reduction agent AUS 32 - Part 3: Handling, transportation and storage.*

NOTE: ***DEF/ADBLUE®*** *that remains in the tank of the machine after the season does not require any special precautions unless storage exceeds the shelf life table above.*

Disposal

- Dispose of **DEF/ADBLUE®** and any filter accumulations in accordance with all applicable laws governing waste disposal.

Catalyst management

Your machine is programmed with different modes to manage various types of accumulation in the catalyst.

Active Catalyst Management (ACM)

This mode is fully executed by the engine controller. Active Catalyst Management happens automatically as needed during vehicle operation. ACM does not affect vehicle performance. The engine low idle speed will be slightly increased during ACM. While ACM is active, the fuel injection and exhaust flap control is modified to increase the temperature of the exhaust. This increase in exhaust temperature is used to control:

- De-sulfurization
- Hydrocarbon management
- **DEF/ADBLUE®** deposit removal
- Soot removal

Manual Catalyst Management (MCM)

This mode of operation is required to burn off excessive soot accumulation in the catalyst. The MCM process is activated from the MCM page of the Maintenance section of the display. When the MCM process is required, a message will be shown on the display. The MCM process is required immediately before performing an oil change. Before activating the MCM process:

1. Place the machine in a safe area to accommodate hot exhaust and additional fumes prior to starting the Parked Catalyst Management.
2. Do not attempt to move or operate the machine during the process as this will abort the management cycle. Failure to comply may cause damage to the exhaust system.
3. Verify the fuel level is at least half tank prior to starting the process.

Selective Catalytic Reduction (SCR) basic instructions

Requirements

The operator must maintain appropriate **DEF/ADBLUE®** levels at all times. No additional maintenance is required.

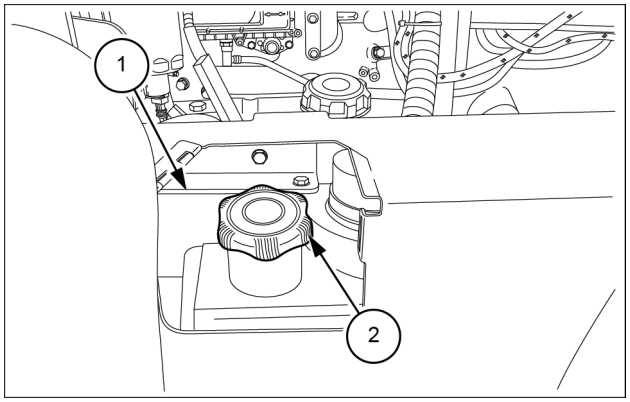
NOTE: *see your CASE CONSTRUCTION dealer for replacement components and cleaning agents.*

NOTICE: *while any company can perform necessary maintenance or repairs on your equipment, CASE CONSTRUCTION strongly recommends that you use only authorized CASE CONSTRUCTION dealers and products that meet the given specifications. Improperly or incorrectly performed maintenance and repair voids the equipment warranty and may affect service intervals.*

DEF/ADBLUE® tank refilling

The **DEF/ADBLUE®** tank is located on the right-hand side of the machine, next to the diesel filling port.

The **DEF/ADBLUE®** tank cap **(2)** is located on the right-hand side of the machine, inside its own compartment **(1)**. Open the compartment door and locate the blue tank cap **(2)**. A fitting under the cap prevents the insertion of a diesel fill nozzle.



LEIL13WHL0259AB 6

NOTE: *the urea quality sensor on the bottom of the **DEF/ADBLUE®** tank can be removed to drain fluid out of the tank as necessary. When removing the urea quality sensor, it is recommended that the electrical harness should not be disconnected from the urea quality sensor. The urea quality sensor should be cleaned by flushing with deionized water before re-installation. Note that the sensor should not be submerged while cleaning so that water does not enter the vent located on the bottom of the sensor. Also note the if the harness was disconnected from the sensor, the electrical pins must be cleaned with electrical contact cleaner and dried before the harness is reconnected to the sensor.*

NOTICE: *if any **DEF/ADBLUE®** spills or contacts any surface other than the storage tanks, immediately clean the affected surface with clean water. **DEF/ADBLUE®** will cause corrosion on painted and unpainted metallic surfaces, and may distort some plastic and rubber components.*

It is recommended that **DEF/ADBLUE®** filling equipment should be used having a fill nozzle/pump with the correct length and diameter, triggered by the magnet in the tank filler neck and with overfill flow cut out.

This will ensure that:

- The screen in the filler neck will not be damaged.
- Impurities do not enter the **DEF/ADBLUE®**. The standardized **DEF/ADBLUE®** nozzle matches the filler neck diameter.
- The **DEF/ADBLUE®** tank is not overfilled, as the **DEF/ADBLUE®** pump will stop when the **DEF/ADBLUE®** tank is full.

NOTICE: *if a warning light has been triggered for low or empty **DEF/ADBLUE®**, the system must be reset by cycling the key switch OFF then ON after refilling the **DEF/ADBLUE®** tank.*

NOTICE: *do not refill tank with a funnel, as this may lead to damage of the screen in the filler neck.*

NOTE: *the published information has been provided by the International Organization for Standardization (ISO), Document number ISO 22241-4 Diesel engines - NO_x reduction agent AUS 32 - Part 4: Refilling interface.*

Diesel Exhaust Fluid (DEF)/AdBlue® decal

The **DEF/ADBLUE®** decal is located near the **DEF/ADBLUE®** tank cap, on the inner side of the compartment door.
The associated part number is 47657122.



47657122_A 7

DIESEL EXHAUST FLUID (DEF)/ADBLUE® consumption

DEF/ADBLUE® consumption is figured against the amount of fuel consumed. Typical **DEF/ADBLUE®** consumption is approximately **6%** of fuel consumption when you operate the machine at rated engine speed. **DEF/ADBLUE®** consumption can be as high as **15%** when NO_x output increases. The consumption rate of **DEF/ADBLUE®** and fuel also depends on:

- Engine load
- Ambient humidity
- **DEF/ADBLUE®** fluid concentration
- Gear selection
- Ground drive slip
- Engine RPM during operation

NOTE: *the "typical" consumption is only a guideline to verify proper function of the SCR system. CASE CONSTRUCTION recommends to fill the* ***DEF/ADBLUE®*** *tanks at every fuel refilling interval.*

Maintenance planning

Maintenance chart

Maintenance action	Check	Grease	Cleaning	Drain fluid	Replace	Change fluid	Page no.
Daily inspection							
Daily inspection	x						**7-42**
Every 10 hours							
Engine oil level - Check	x						**7-47**
Every 50 hours							
Bucket/attachment fittings - Grease		x					**7-48**
Machine fittings - Grease		x					**7-49**
Hydraulic oil level - Check	x						**7-50**
Transmission oil level - Check	x						**7-51**
Engine coolant level - Check	x						**7-53**
Initial 100 hours							
Wheel nuts tightening - Check	x						**7-54**
Selective Catalytic Reduction (SCR) in-line filter (Initial) - Cleaning			x				**7-55**
Engine oil (Initial) - Change				x			**7-56**
Engine oil filter (Initial) - Replace					x		**7-58**
Fuel pre-filter (Initial) - Replace					x		**7-59**
Fuel filter (Initial) - Replace					x		**7-61**
Hydraulic oil filter (Initial) - Replace					x		**7-62**
Front and rear axle oil (Initial) - Change				x			**7-64**
Every 100 hours							
Machine fittings - Grease		x					**7-66**
Every 250 hours							
Drive shaft slip joint - Grease		x					**7-69**
Cab air recirculation filter - Cleaning			x				**7-70**
Cab air pre-filter - Cleaning			x				**7-72**
Cab air filter - Cleaning			x				**7-74**
Wheels - Tire inflating	x						**7-76**
Drive belt - Check	x						**7-78**
Every 500 hours							
Engine oil - Change				x			**7-80**
Engine oil filter - Replace					x		**7-82**
Fuel pre-filter - Replace					x		**7-83**
Fuel filter - Replace					x		**7-85**
Fuel tank sediment - Drain						x	**7-86**
Front and rear axle oil level - Check	x						**7-87**
Roll Over Protective Structure (ROPS) - Check	x						**7-88**
Battery fluid level - Check	x						**7-91**
DEF/AdBlue® tank vent filter - Replace					x		**7-92**
Selective Catalytic Reduction (SCR) in-line filter - Cleaning			x				**7-93**
Every 1000 hours							
Pivot points - Grease		x					**7-94**
Hydraulic oil filter - Replace					x		**7-96**
Drive belt - Replace					x		**7-98**
Cab air recirculation filter - Replace					x		**7-100**
Cab air pre-filter - Replace					x		**7-101**
Cab air filter - Replace					x		**7-102**
Engine breather filter - Replace					x		**7-104**

Maintenance action	Check	Grease	Cleaning	Drain fluid	Replace	Change fluid	Page no.
Front and rear axle oil - Change					x		**7-105**
Every 1500 hours							
Transmission oil - Change					x		**7-107**
Transmission oil filter - Replace					x		**7-109**
Transmission breather - Cleaning			x				**7-111**
Every 2000 hours							
Hydraulic oil - Change					x		**7-112**
Biodegradable hydraulic oil (if used) - Change					x		**7-114**
Hydraulic systems - Check	x						**7-116**
Primary engine air filter - Replace					x		**7-117**
Secondary engine air filter - Replace					x		**7-119**
Frame and cab - Lubricate		x					**7-121**
Engine valve clearance - Check and adjust	x						**7-122**
Every 4000 hours							
Supply module filter - Replace					x		**7-123**
Diesel Exhaust Fluid (DEF)/AdBlue® tank suction filter - Cleaning			x				**7-126**
Engine coolant - Change					x		**7-130**
As required							
Fuel pre-filter - Drain fluid				x			**7-132**
DEF/AdBlue® tank neck filter - Cleaning			x				**7-134**
Urea Quality Sensor (UQS) - Replace					x		**7-135**
Diesel Exhaust Fluid (DEF)/AdBlue® tank suction filter - Replace					x		**7-137**
Manual Catalyst Management (MCM) - Regenerate			x				**7-141**
Air conditioning condenser - Cleaning			x				**7-144**
Parking brake - Check	x						**7-145**
Auxiliary steering - Check	x						**7-147**
Cab service - Check	x						**7-149**
Windshield washer fluid level - Check	x						**7-152**
Electrical system							
Battery - Cleaning			x				**7-153**
Battery electrolyte level - Check	x						**7-156**
Auxiliary battery connections - Check	x						**7-157**
Electrical system - Replace					x		**7-159**
Fuses and relays - Replace					x		**7-162**
Lights - Replace					x		**7-167**

Daily inspection

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

Every day, before starting work, it is necessary to inspect the machine and service certain components.

General

- Check for water or oil leaks.
- Check that all screws and nuts are correctly tightened.
- Wipe off any dust and clean off any accumulated debris (engine, operator's compartment, etc.).
- Check tires for proper inflation.
- Check for damage.

Engine

- Check the oil level and change the oil, if necessary.
- Check the coolant level at sight gauge.
- Check for clogging or damage to the radiator.
- Check the engine accessory drive belt condition.
- Check that air filter restriction warning is not illuminated on console cluster.
- Check for water or oil leaks on the components.
- Check the condition of all lines.
- Check the fuel tank level.
- Check the **DEF/ADBLUE®** tank level.

Other

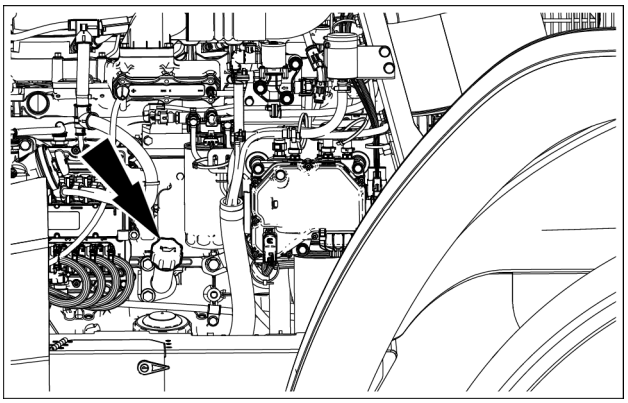
- Check the hydraulic reservoir level.
- Check that the hydraulic oil is clean.
- Check the transmission oil level.
- Check that the transmission oil is clean.
- Check the condition of all lines.
- Check for electrical short-circuits.
- Check that all battery connections are properly tightened.
- Adjust the rearview mirrors.
- Check for oil leaks on the cylinders.
- Check the condition of the bucket/attachment.

After starting the engine

- Did the engine start correctly? Are the exhaust fumes normal? Any strange noises?
- Check for abnormal noise on the hydraulic components.
- Check for water, fuel, or oil leaks on the components.
- Check the audible alarm devices, working lights and windshield wipers.
- Check that all hydraulic circuits are functioning correctly.

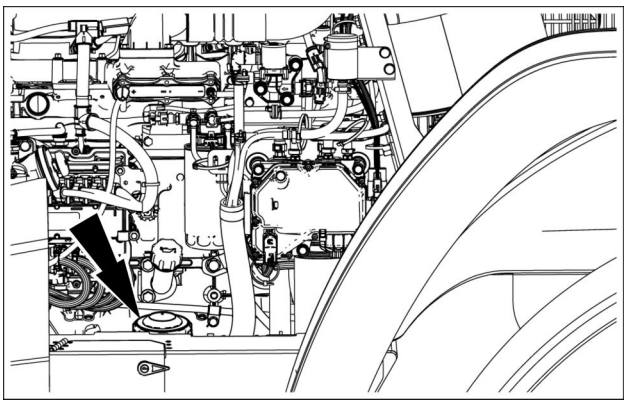
Access doors and fill locations

1. Engine oil fill location – right-hand side



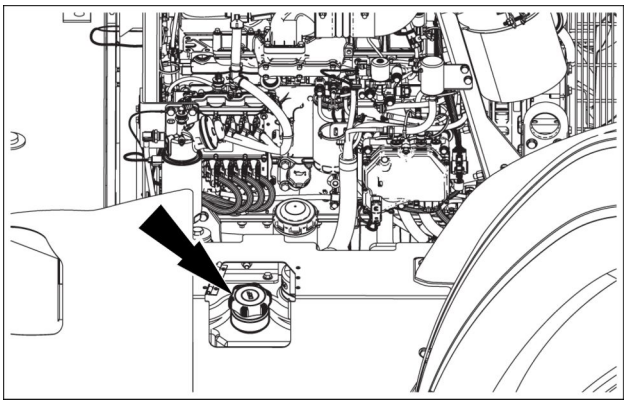
LEIL18WHL1107AA 1

2. Fuel fill location – right-hand side



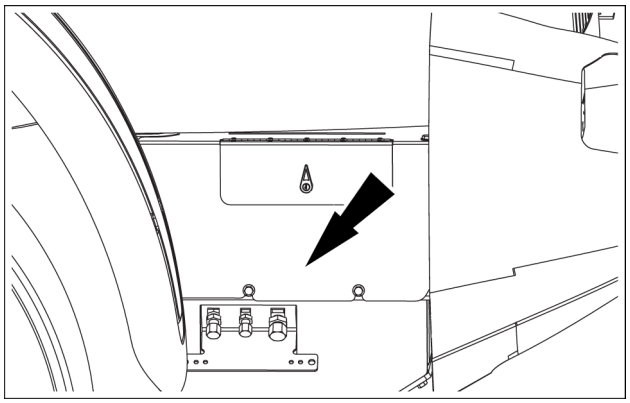
LEIL18WHL1175AA 2

3. **DIESEL EXHAUST FLUID (DEF)/ADBLUE®** fill location – right-hand side



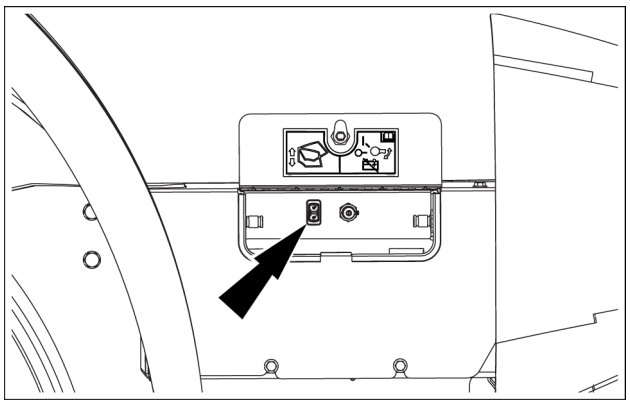
LEIL18WHL1184AB 3

4. Battery access – left-hand side



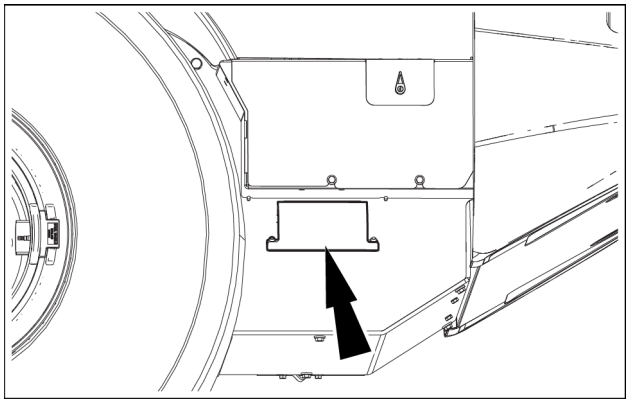
LEIL18WHL1085AA 4

5. Engine hood switch – left-hand side



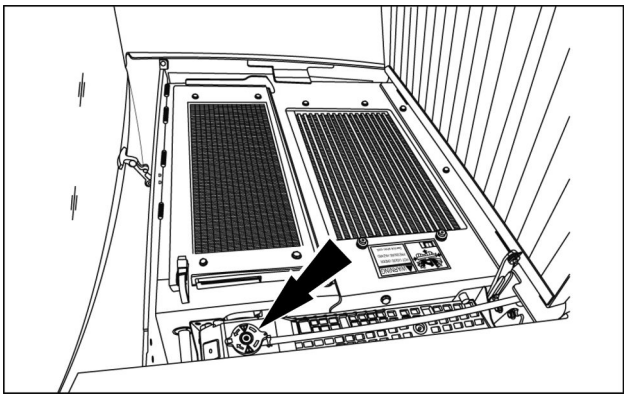
LEIL18WHL1083AA 5

6. Engine oil, coolant, hydraulic oil remote drain cover (if equipped) – left-hand side



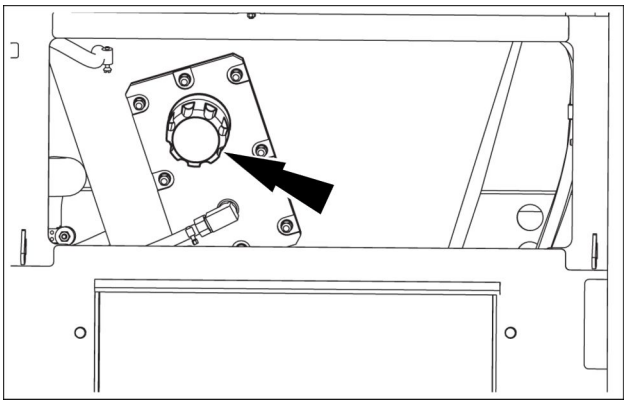
LEIL17WHL1597AB 6

7. Coolant fill – upper side of the cooling box



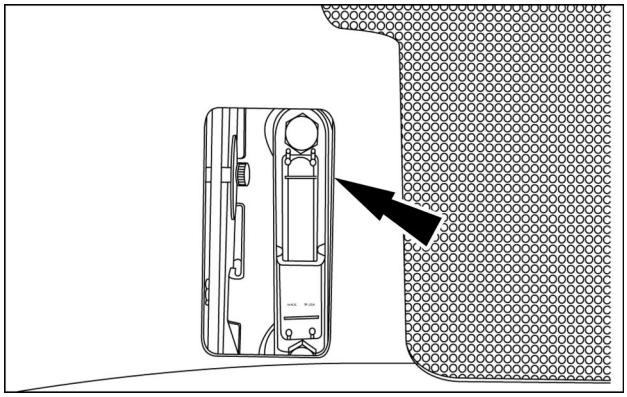
RCPH10WHL139AAH 7

8. Hydraulic fill – under the A/C condenser



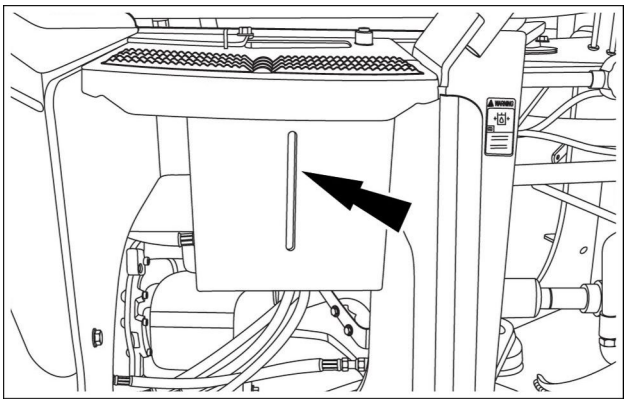
LEIL18WHL1174AA 8

9. Hydraulic fluid gauge – left-hand side panel for cooler access.



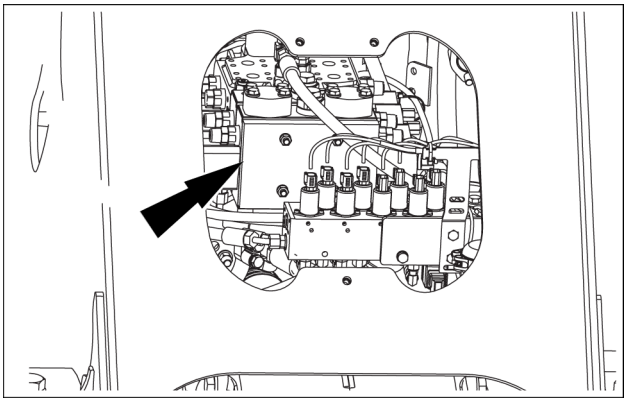
RCPH10WHL102AAH 9

10. Windshield fluid bottle access – right-hand side



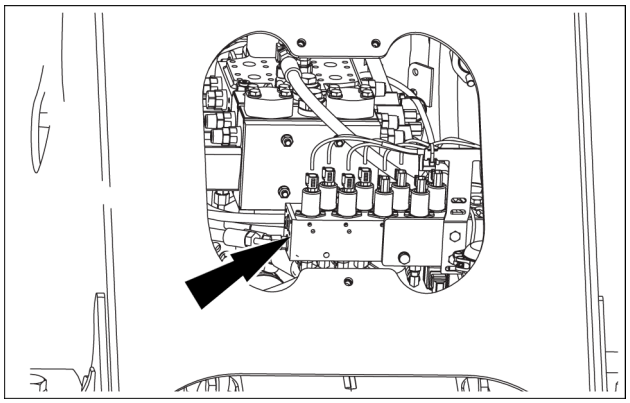
LEIL15WHL0651AB 10

11. Main control valve access – front side



LEIL18WHL1152AA 11

12. Electro-hydraulic control valve access – front side



LEIL18WHL1152AA 12

Every 10 hours

Engine oil level - Check

⚠ WARNING

Entanglement hazard!
Stop the engine and wait for all movement to stop before you open or remove the shield.
Failure to comply could result in death or serious injury.

W1419A

⚠ WARNING

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 death or serious injury.

W1406A

Check the engine oil level every 10 hours or each day, whichever occurs first.

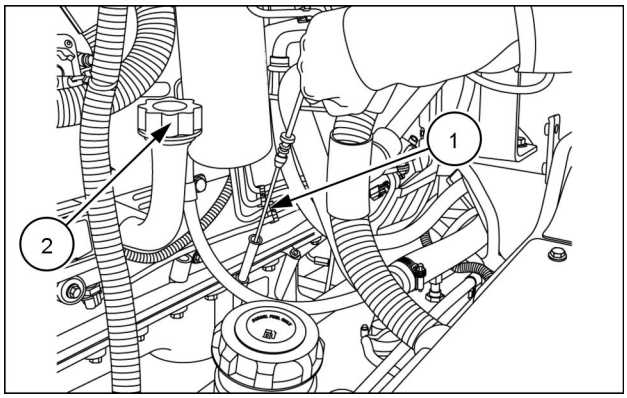
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Type of oil	**NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**
	NO.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40 (cold weather)
Service capacity (with filter change)	**15.1 l** (**16.0 US qt**)

1. Open the engine hood.
   Locate the engine oil dipstick **(1)** on the right-hand side of the engine, above the fuel fill location.
   Remove the dipstick **(1)** to check the engine oil level.
   Wipe the dipstick **(1)** clean and reinsert.
   The oil level should register at the full mark.

NOTE: *this procedure is best performed at the beginning of the work day with the engine cool and all oil drained to the engine oil pan.*

2. Locate the fill location **(2)** in the main engine compartment. Add **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, if necessary. Do not overfill engine oil.



RCPH10WHL899AAH 1

Every 50 hours

Bucket/attachment fittings - Grease

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

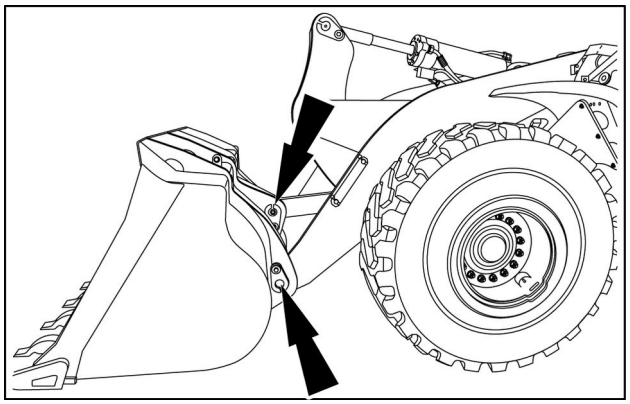
Grease the attachment fittings every 50 hours of operation or sooner if conditions so require.

Prior operation:
Always have the machine on firm, level ground with the bucket/attachment on the ground. Make sure all residual pressure is relieved from the circuits before beginning maintenance.

Service specifications	
Grease	**MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2**

NOTE: *if the machine is equipped with automatic lubrication system, you do not need to perform following instructions.*

Clean around the area to be greased (both left-hand and right-hand sides) before service. In severe conditions, such as immersion in water, it may be necessary to grease more frequently.



LEIL13WHL0245AA 1

Machine fittings - Grease

Grease the machine at the remote locations every 50 hours. In severe conditions, such as immersion in water, it may be necessary to reduce the greasing service intervals.

Prior operation:
Clean around the area to be greased before service.

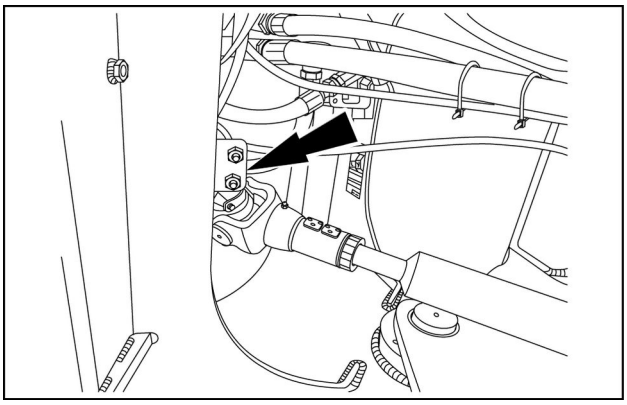
Machine grease fittings

Service specifications	
Grease Specification	**MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2**

NOTE: *if the machine (Z-bar or XR version) is equipped with automatic lubrication system, you do not need to perform following instructions.*

Drive shaft carrier bearing
Tilt cylinder

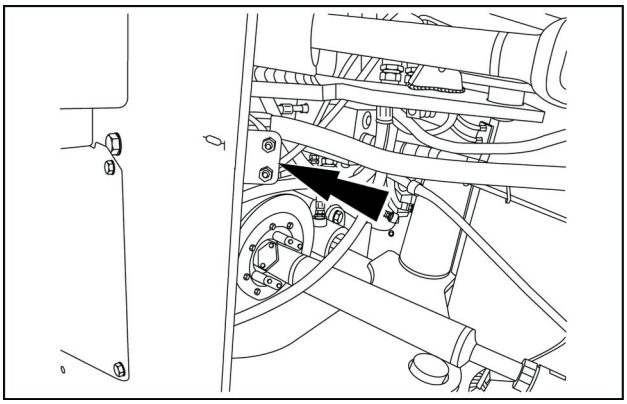
Grease the drive shaft carrier bearing and the tilt cylinder at the remote grease locations (front left-hand of machine).



LEIL15WHL1835AA 1

Rear axle trunnion

Grease the axle oscillation at the remote grease locations (rear right-hand of machine).



LEIL15WHL1836AA 2

Hydraulic oil level - Check

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

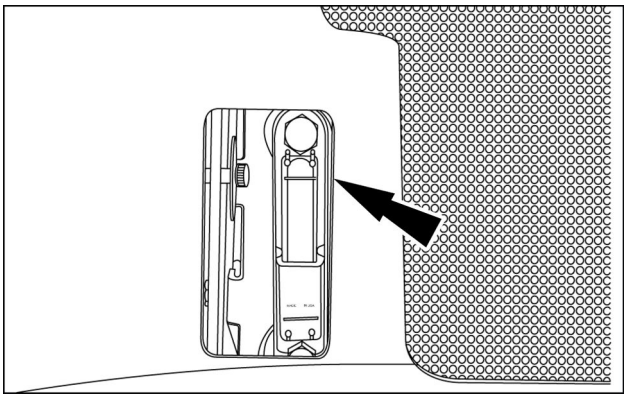
Check the level of the hydraulic oil tank every 50 hours.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Type of oil	**PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR**
Total system capacity	**200 l** (**53.0 US gal**)

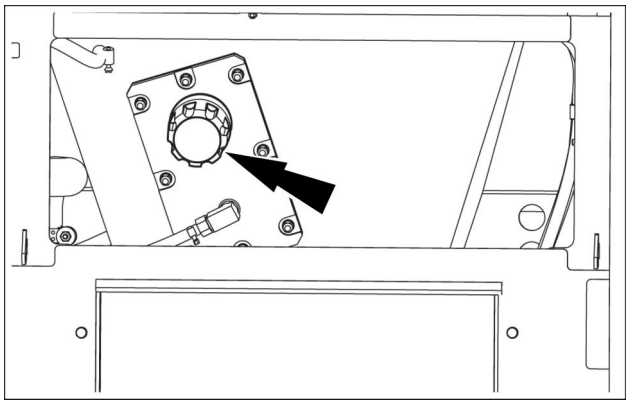
Fluid level check

1. Check the oil level in the sight gauge, before you start the engine. If the oil is cold, the level is correct when the top of the oil is aligned with the midpoint of indicator mark. If the oil is at operating temperature, the level is correct when the top of the oil is aligned with the upper indicator mark.



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2. If oil is required, relieve all pressure in the system. Slowly loosen the tank cap, and top off until the proper oil level is reached. The hydraulic oil fill cap is located under the condenser core behind the operator's cab.



LEIL18WHL1174AA 2

Transmission oil level - Check

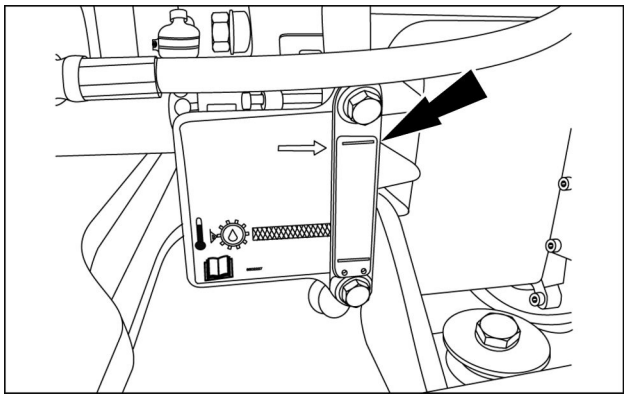
Check the transmission oil level every 50 hours of operation.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied and the attachment lowered to the ground. The transmission oil level sight gauge is on the left-hand side of the machine.

Service specifications	
Type of oil	**HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**
Capacity	**34.1 L (36 US qt)**

Cold oil level check

Before you start the engine, check the transmission oil level in the sight gauge. If the oil level is below the arrow, add **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL** to raise the oil level up to the arrow.



RCPH10WHL141AAH 1

Engine running check

⚠ WARNING

Hazard to bystanders!
Make sure the area surrounding the machine is clear of all persons before starting the engine.
Failure to comply could result in death or serious injury.

W0090A

1. Keep all non-authorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied and the attachment lowered to the ground. Engage the hydraulic functions lock-out to neutralize the hydraulic flow.
2. Place the transportation/service link in the service position in order to prevent unexpected articulation movements.
3. Locate the transmission oil level sight gauge on the left-hand side of the machine.
4. Ventilate properly to reduce the deadly exhaust fumes. If you have to perform this check in an enclosed area, make sure there is ventilation to replace the exhaust fumes with fresh air.
5. Check the transmission oil level at idle speed with the oil temperature of **65 – 70 °C** (**149.0 – 158.0 °F**). The oil level must be between the bottom and top of the cross hatch region.
6. Add **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL** if necessary. Do not overfill.

Engine coolant level - Check

⚠ WARNING

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in death or serious injury.

W0367A

⚠ WARNING

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 death or serious injury.

W1406A

⚠ WARNING

Hazardous chemicals!
Coolant can be toxic. Avoid contact with skin, eyes, and clothing. Antidotes:
EXTERNAL - Rinse thoroughly with water. Remove soiled clothing.
INTERNAL - Rinse the mouth with water. DO NOT induce vomiting. Seek immediate medical attention.
EYES - Flush with water. Seek immediate medical attention.
Failure to comply could result in death or serious injury.

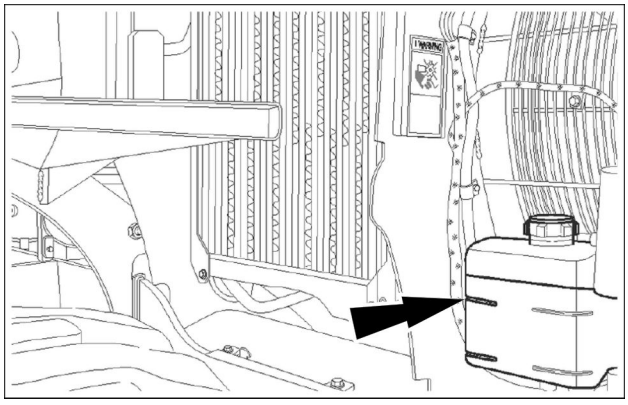
W0282A

Check the coolant reservoir level every 50 hours of operation. Perform this check when the coolant is cold and the engine is stopped.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Type of coolant	**OAT EXTENDED LIFE COOLANT/ANTIFREEZE**
Coolant capacity	**30 L** (**31.7 US qt**)

1. Locate the coolant reservoir on the left-hand side of the machine. Do not remove the radiator cap during this check. The coolant level must be between the upper and lower (ADD) indicator marks on the reservoir.
2. Add **OAT EXTENDED LIFE COOLANT/ANTIFREEZE** as required to raise the coolant level to the upper indicator mark.



LEIL16WHL0085AA 1

NOTE: *in the event that the system needs topping off make sure to use the proper ratio (**50%** / **50%**) of water and antifreeze/coolant. Do not overfill.*

Initial 100 hours

Wheel nuts tightening - Check

⚠ WARNING

Explosion hazard!
Never weld on a wheel. Welding can cause stresses that will cause a wheel to crack or break unexpectedly. Tires can separate explosively during welding. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0124A

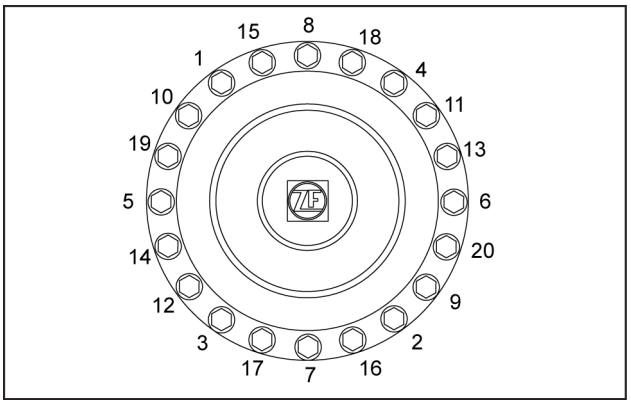
Check the tires pressure every 50 hours. A burst tire can cause serious injury. Check the tires condition and always observe the inflation pressures defined in accordance with the type of tire and ground concerned. Check the wheels nuts torque every 50 hours.

Tire or rim service

Always have a qualified tire technician service the tires and rims for this machine. It is recommended that you have this technician inflate the tires. To prevent accidents, use a restraining device (tire inflation cage), correct equipment, and correct procedure.
Explosive separation of the tire, or the tire and/or rim parts can cause serious injury or death.

Wheel nut torque

If necessary, tighten the wheel nuts to the required torque.
Use a hand wrench (not an impact) to tighten the wheel nuts to pull the wheel against the axle output flange.
Tighten the wheel nuts using the sequence shown. First tighten the nuts to **278 N·m** (**205.0 lb ft**), then tighten to a final torque of **640 – 720 N·m** (**472.0 – 531.0 lb ft**), using the same sequence.



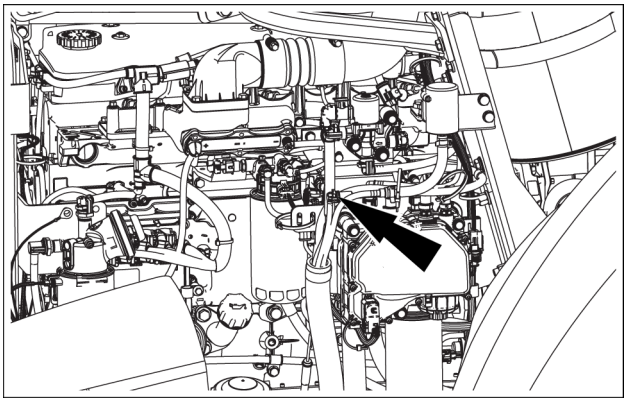
LEIL15WHL1847AA 1

Selective Catalytic Reduction (SCR) in-line filter (Initial) - Cleaning

Clean the in-line supply filter when the machine is new and the hourmeter registers 100 hours. Clean every 500 hours thereafter or more often if conditions so require. The supply line has a small mesh filter within the line.

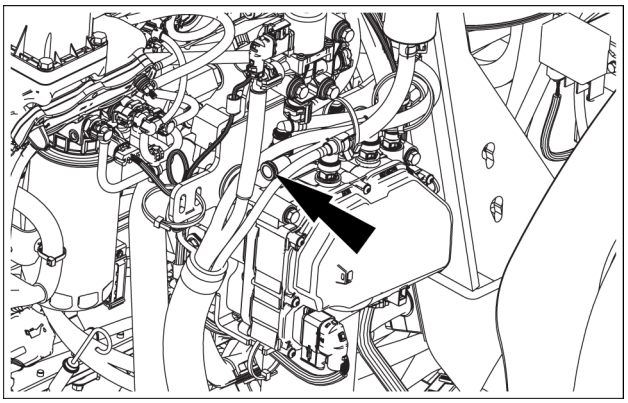
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Open the engine compartment.
2. Remove the **DEF/ADBLUE®** blanket to access to the **DEF/ADBLUE®** bundle, if equipped.
3. Locate the in-line supply filter on the right-hand side of the machine directly above the Supply Module.



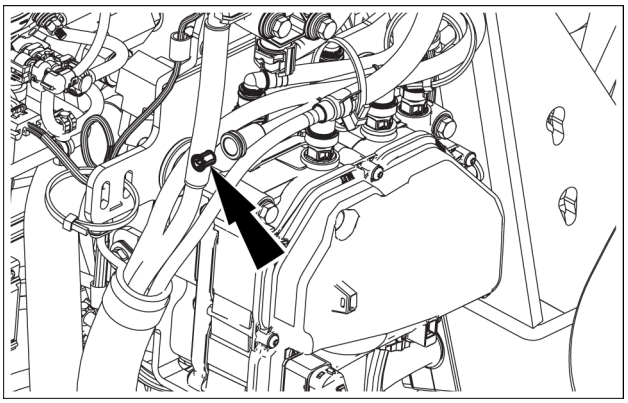
LEIL18WHL1158AA 1

4. Use a suitable container to catch any fluid that is discharged during the hose and filter disassembly. Clean the area before the disassembly. Disconnect the supply line by squeezing the tabs on the connection and separate the lines.



LEIL18WHL1159AA 2

5. Using needle nose pliers, remove the filter using care not to damage or bend filter. If the fitting does not release easily, reclean the fitting with compressed air. Direct the compressed air down into the fitting, then squirt water into the fitting to lubricate the O-ring.
6. Inspect the filter housing and rinse with water. If filter is damaged, replace the filter.
7. Reinstall the filter into the supply line and reconnect the lines.
8. Start the engine and run at idle speed. Check for leaks.



LEIL18WHL1160AA 3

Engine oil (Initial) - Change

Change the engine oil and filter when the machine is new and the hourmeter registers 100 hours.
Change the engine oil and filter every 500 hours thereafter or more frequently when the engine operating conditions are severe.

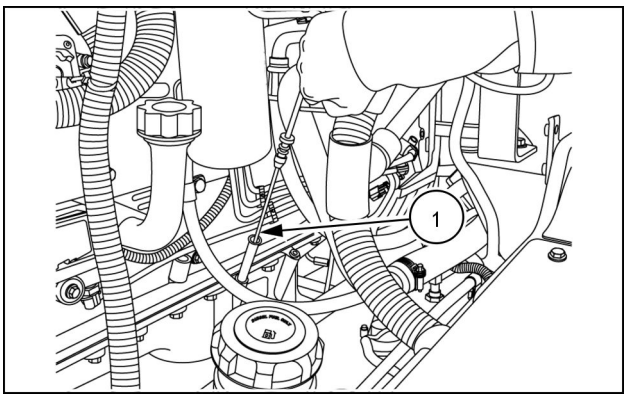
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Type of oil	**NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**
	NO.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40 (cold weather)
Capacity (with filter change)	**13.25 l** (**14 US qt**)

NOTE: *it is recommended to replace the engine oil filter when you change the engine oil.*

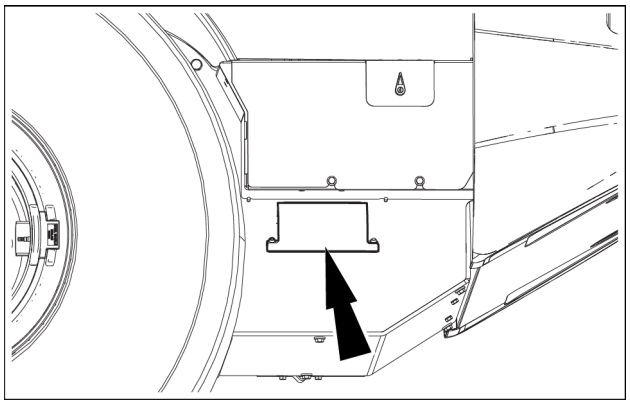
1. Raise the engine hood. Remove the dipstick **(1)**.

NOTE: *when changing the engine oil, the oil flow rate is improved if you remove the oil fill cap or the dipstick from the engine while draining, and the oil is slightly warm.*



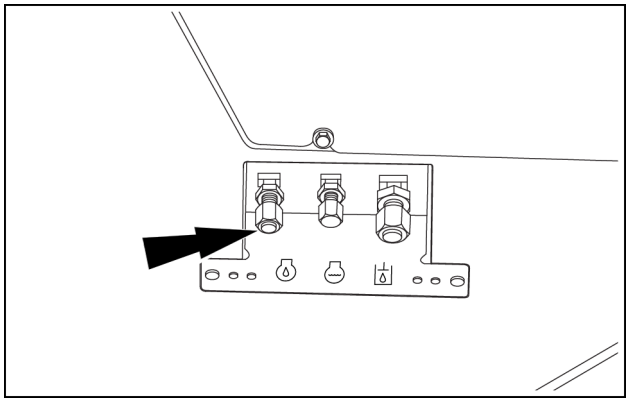
RCPH10WHL899AAH 1

2. Remove the remote drain cover to access the engine oil drain (if equipped).



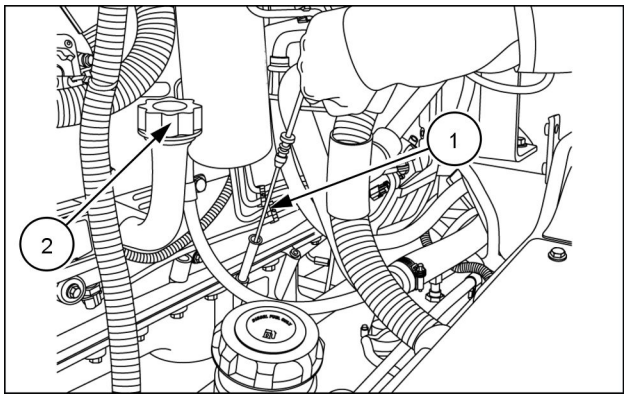
LEIL17WHL1597AB 2

3. Locate the engine oil remote drain. Use a suitable container to collect the used oil. Drain the engine oil completely.
4. Close the remote drain.



LEIL16WHL0198AA 3

5. Fill the engine with the proper amount of **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, through the fill port **(2)**.
6. Start the engine and run at idle speed. Check the engine remote drain for leak.
7. After two minutes stop the engine.
8. Wait for the engine oil to drain down for an accurate reading on the dipstick.
9. Check the dipstick **(1)** and add additional **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, if necessary.
10. Re-install the remote drain cover (if equipped).
11. Lower the engine hood.



RCPH10WHL899AAH 4

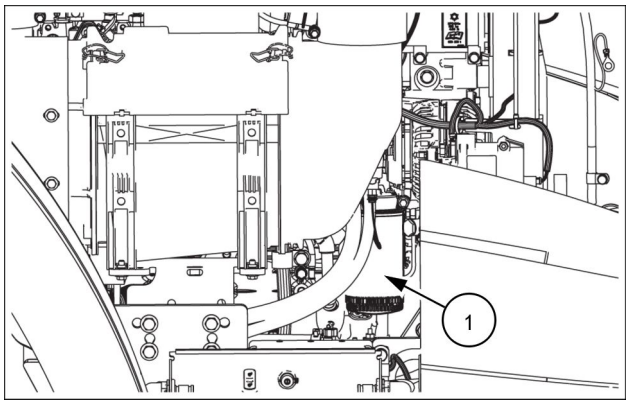
Engine oil filter (Initial) - Replace

Replace the engine oil filter when the machine is new and the hourmeter registers 100 hours. Replace the engine oil filter every 500 hours thereafter or more frequently when the engine operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

NOTE: *it is recommended to change the engine oil when you replace the engine oil filter.*

1. Raise the engine hood.
   Locate the oil filter **(1)** on the left-hand side of the machine.
   Clean the area around the filter of dirt and debris.

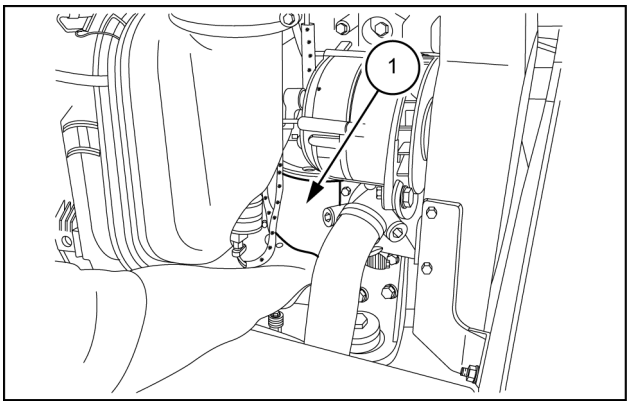


LEIL18WHL1171AA 1

2. Turn the filter housing **(1)** counterclockwise to remove. Remove and discard the filter following local environmental and waste regulations.
3. Apply a thin layer of clean **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, to the new filter gasket.

NOTICE: *never use a filter wrench to install a new filter.*

4. Turn the new oil filter onto the base until the gasket makes contact with the base and then turn by hand an additional 3/4 turn.



LEIL15WHL1841AB 2

5. Top off **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40** oil, or the oil needed for operating conditions, to replace what was removed with the filter.
6. Lower the engine hood.

Fuel pre-filter (Initial) - Replace

⚠ WARNING

Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

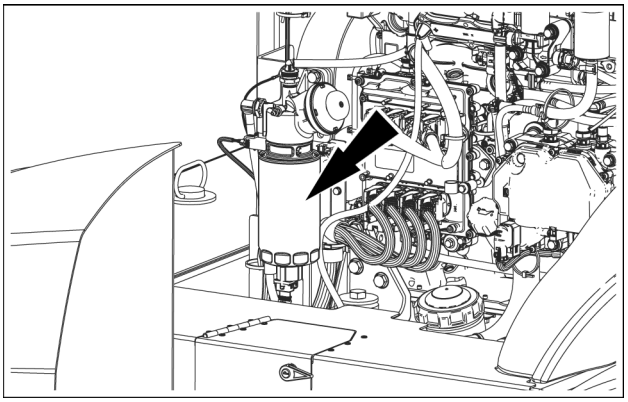
W0904A

Replace the fuel pre-filter when the machine is new and the hourmeter registers 100 hours.
Replace the pre-filter every 500 hours thereafter or more often if conditions so require or if fuel quality is poor.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

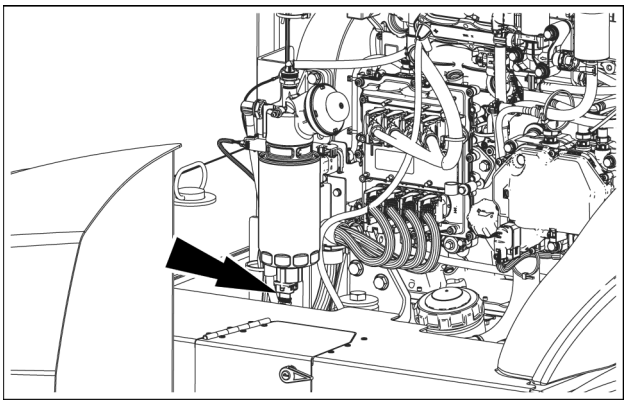
Drain fuel prefilter condensation

1. Open the engine hood. Locate the pre-filter in the engine compartment on the right-hand side of the machine.



LEIL18WHL1173AA 1

2. Remove the water sensor connector from the bottom of the pre-filter.

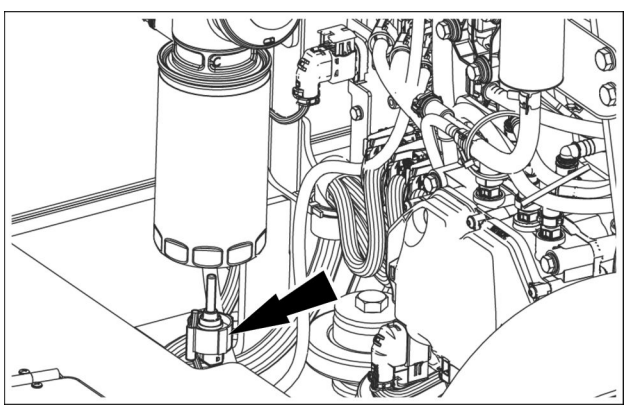


LEIL18WHL1173AA 2

3. Open the drain valve on the fuel pre-filter by turning counterclockwise two or three turns.
4. Drain the water and/or contaminants from the pre-filter into a suitable container until clean fuel flows.

NOTICE: *Do not allow fuel to spill on engine or ground.*

NOTE: *the Water in Fuel (WIF) sensor is on the drain valve on the fuel pre-filter.*

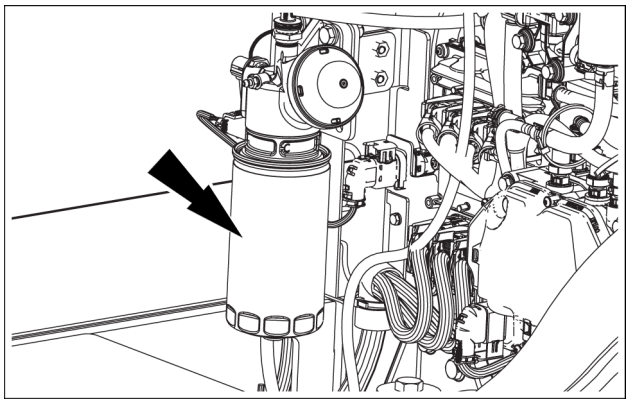


LEIL18WHL1172AA 3

5. Turn the pre-filter counterclockwise to remove it.
6. Replace with a new pre-filter cartridge, turning clockwise until the cartridge meets the pre-filter head. Hand tighten firmly in place.

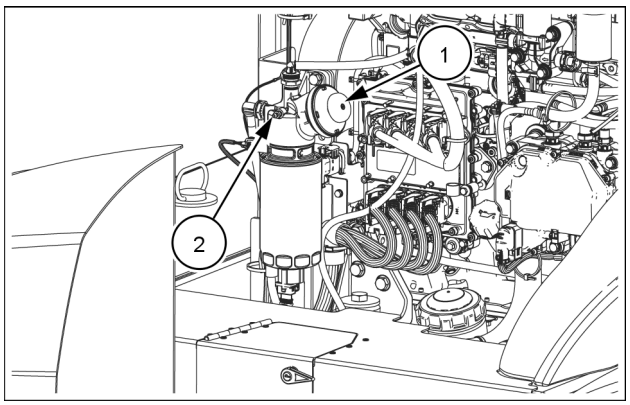
NOTICE: *Do not use a wrench to tighten.*

7. Remove the plug from the new filter (if equipped) and reinstall the WIF sensor.
8. Connect the water sensor connector at the bottom of the pre-filter.



LEIL18WHL1166AA 4

9. Use the pump **(1)** and the bleed screw **(2)** at the top of the pre-filter to bleed air from the fuel system. Pump until fuel flows out of the bleed screw **(2)** without air bubbles.



LEIL18WHL1173AA 5

Fuel filter (Initial) - Replace

⚠ WARNING

Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

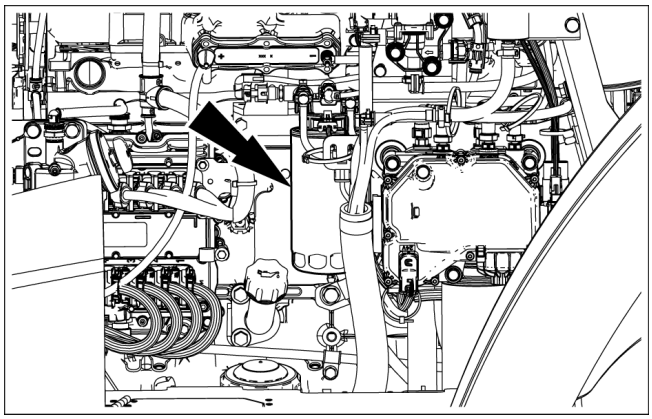
Replace the fuel filter when the machine is new and the hourmeter registers 100 hours.
Replace the fuel filter every 500 hours thereafter or more frequently when operating conditions are severe.

Clean the filter head area, the outside of the filter and remove any dirt and debris around the area that might contaminate the system.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Locate the fuel filter on the right-hand side of the machine, near the supply module.
2. Turn the filter counterclockwise and remove. Be sure to capture any fuel remaining in the lines or the filter and discard properly.
3. Apply a thin layer of clean oil to the gasket on the new filter.
4. Fill the new filter with fuel. Install the filter. Use your hands to tighten the filter 1/2 to 3/4 turn after the filter makes contact with the filter head.
   Bleed air from the fuel system.

NOTICE: *never use a filter wrench to install a new filter.*



LEIL18WHL1108AB 1

Hydraulic oil filter (Initial) - Replace

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

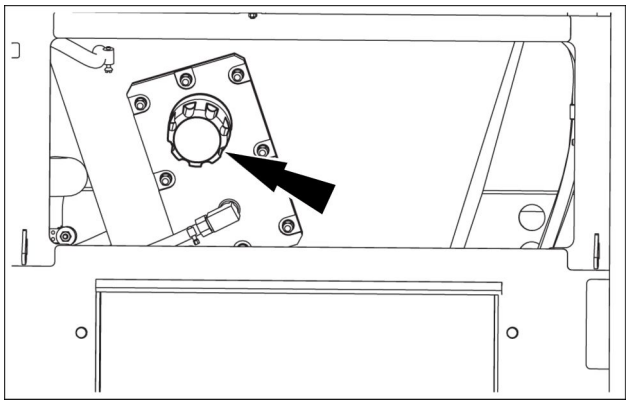
Pressurized fluid can penetrate the skin and cause severe injuries.
Keep hands and body away from any pressurized leak. DO NOT use your hand to check for leaks. Use a piece of cardboard or paper. If fluid penetrates the skin, seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0158A

Replace the hydraulic oil filter when the machine is new and the hourmeter registers 100 hours.
Replace the hydraulic oil filter every 1000 hours thereafter or more frequently when operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

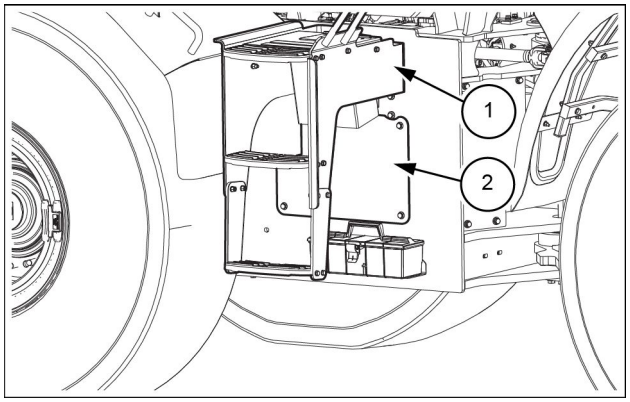
1. Release pressure in the hydraulic system. Refer to **7-3** for further information.
2. Slowly loosen the filler cap on the hydraulic reservoir to release any residual pressure in the reservoir. Leave the filler cap loose during the procedure.



LEIL18WHL1174AA 1

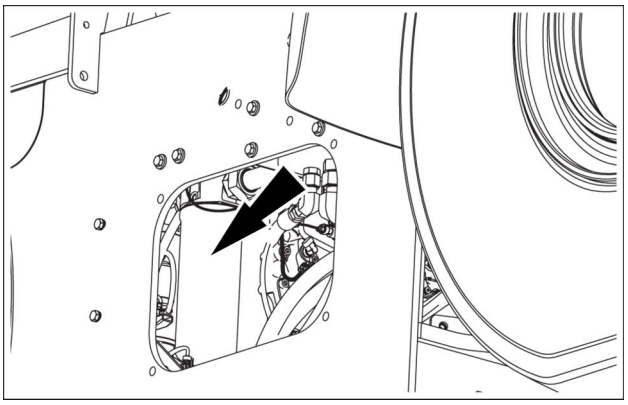
3. If present on the machine remove the right-hand steps **(1)** and chassis side cover **(2)** to access the hydraulic oil filter.

NOTE: *remove the right-hand steps **(1)** only if necessary.*



LEIL17WHL1580AB 2

4. Locate the hydraulic oil filter. Turn the filter counter-clockwise to remove.



LEIL18WHL1223AA 3

5. Lubricate the gasket and threads of the new filter with clean **PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR** and install. After the filter makes contact with the filter head tighten 1/2 to 3/4 turns.

NOTICE: *never use a filter wrench to install a new filter.*

6. Tighten the cap on the hydraulic reservoir.
7. Start the engine and run at low idle. Stop the engine and check the hydraulic level. Top off if necessary.
8. If previously removed, reinstall the right-hand steps and chassis side cover.

Front and rear axle oil (Initial) - Change

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

Drain and change the front and rear axle oil when the machine is new and the hourmeter registers 100 hours.

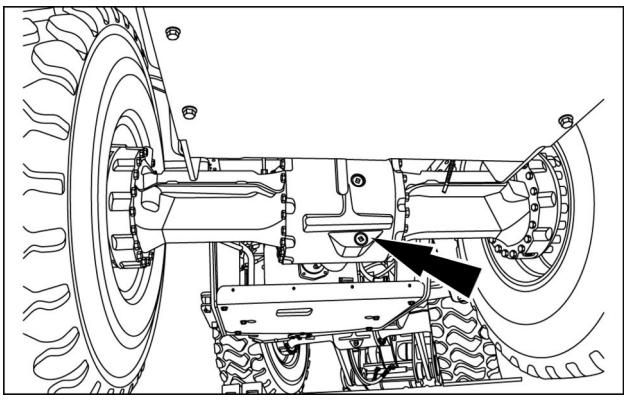
Change the front and rear axle oil every 1000 hours thereafter.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications — **PREMIUM TRANSAXLE OIL 80W-140**	
Front axle	**42 L** (**44.4 US qt**)
Rear axle	**40 L** (**42.3 US qt**)

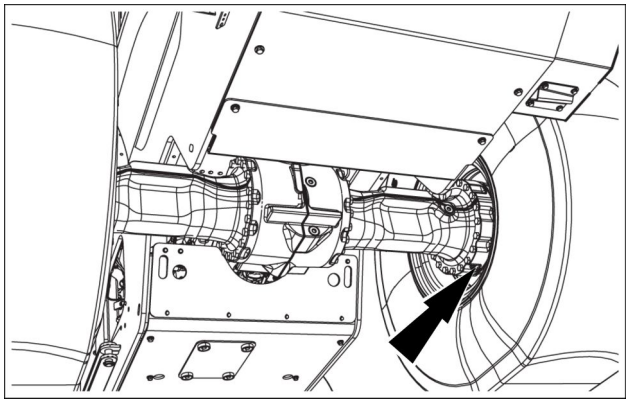
NOTE: *do not use GL-5 oil in these axles.*

1. Clean the area around the drain and fill caps of both axles and all four axle ends.
2. Place a suitable container with sufficient capacity to capture the old oil under the front and rear axles. Remove the drain plug and allow oil to drain.



RCPH10WHL081AAH 1

3. Place a suitable container with sufficient capacity to capture the old oil under each axle end. Remove the drain plugs to allow oil to drain.

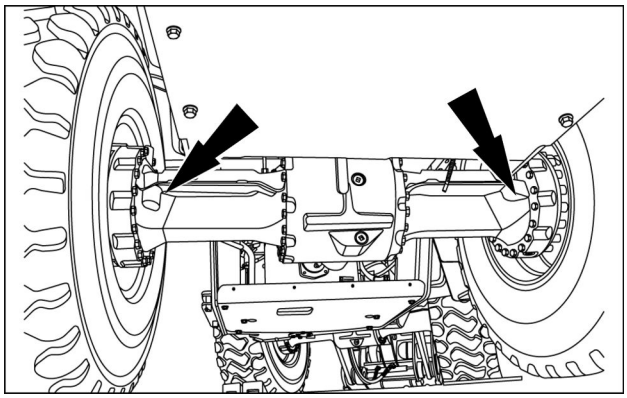


LEIL20WHL0179AA 2

4. Reinstall the drain plugs of both axles and the four axle ends. Take care not to damage the drain plug seal.

5. Fill the axles with new **PREMIUM TRANSAXLE OIL 80W-140**. The oil should reach the bottom of the fill plug.
   Fill the rear axle from the axle ends.
   Fill the front axle from the center.

NOTE: *the oil will take some time to fill each axle. Allow time for the oil to circulate throughout the axle.*



RCPH10WHL081AAH 3

Every 100 hours

Machine fittings - Grease

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

⚠ DANGER

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 will result in death or serious injury.

D0084A

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

Grease the articulation joint, machine grease fittings, lift arm fittings and lift arm cylinder every 100 hours of operation or sooner if conditions so require.

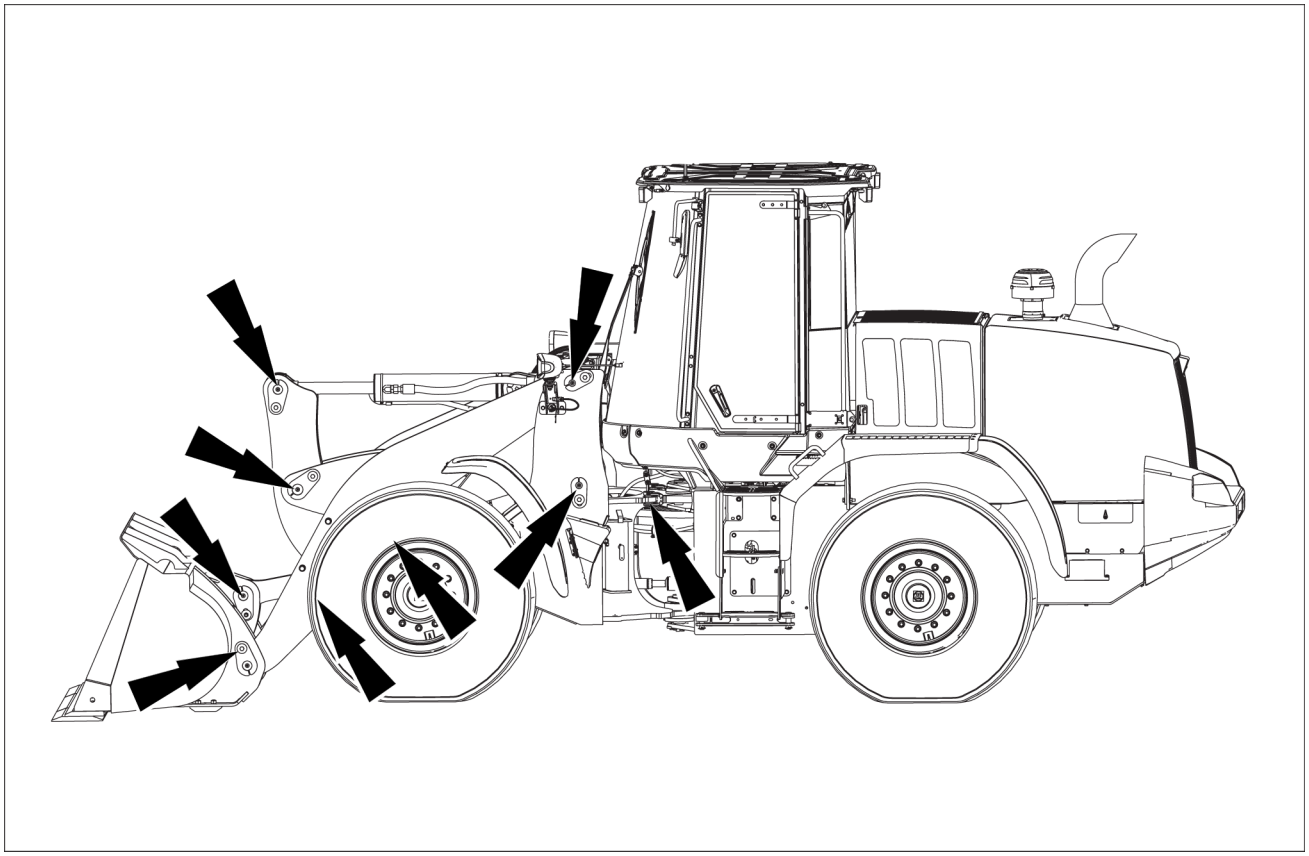
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.
Prior operation:
Make sure all residual pressure is relieved from the circuits before beginning maintenance.

Service specifications	
Grease	MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2

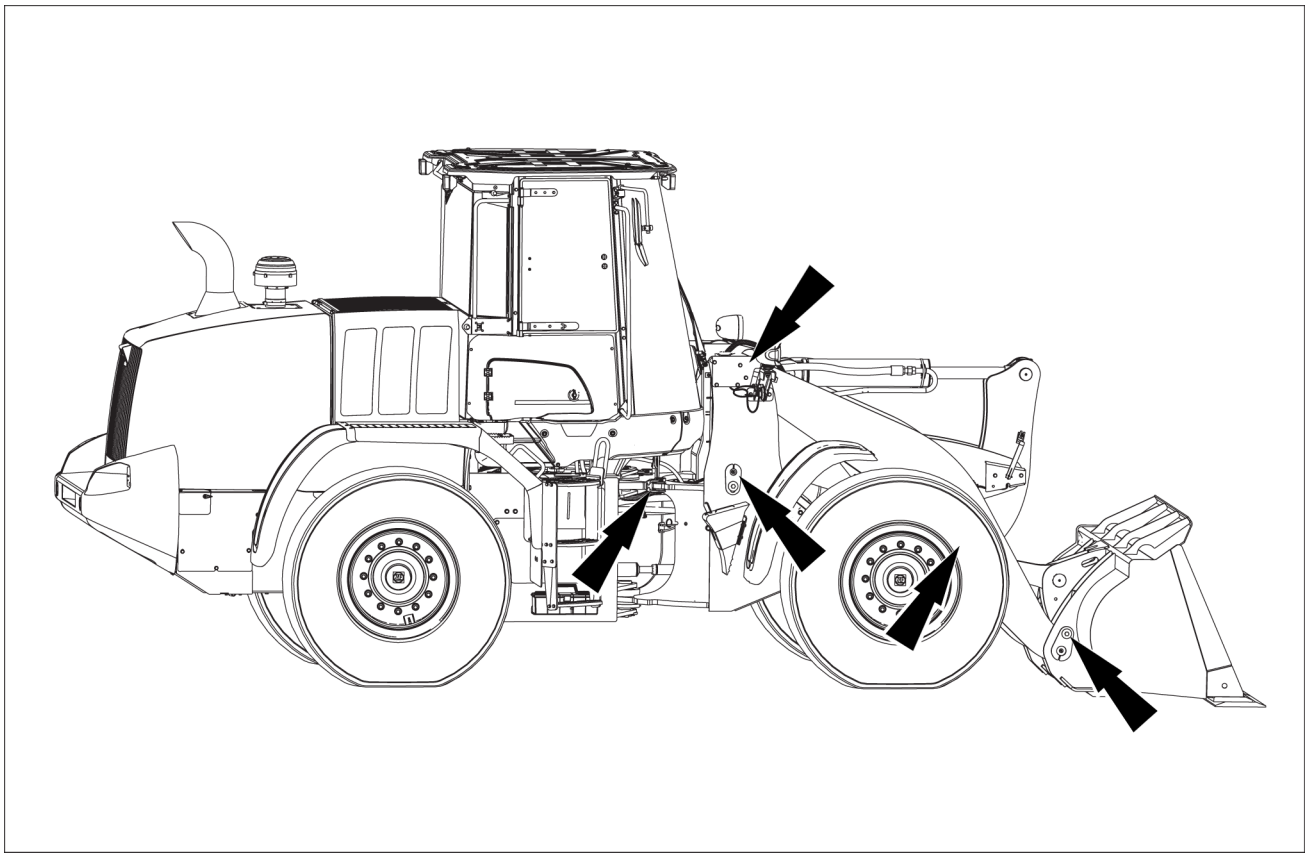
NOTE: *if the machine (Z-bar or XR version) is equipped with automatic lubrication system, you do not need to perform following instructions.*

Clean around the area to be greased before service.

NOTE: *in severe conditions, such as immersion in water, it may be necessary to reduce the greasing service intervals.*



LEIL18WHL1154FA 1

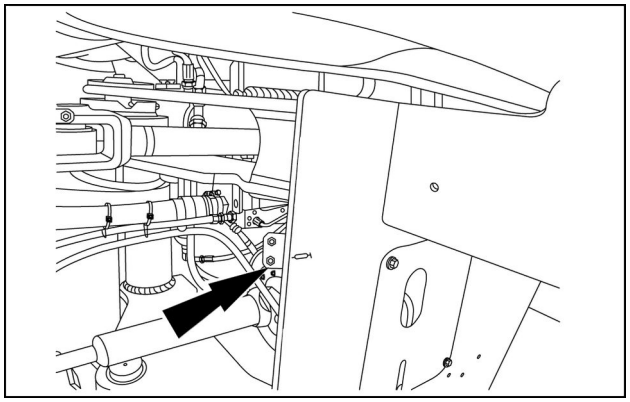


LEIL18WHL1155FA 2

Remote grease locations

Steering cylinder

Grease the steering cylinder at the remote grease locations (rear left-hand of the machine).



LEIL15WHL1849AA 3

Every 250 hours

Drive shaft slip joint - Grease

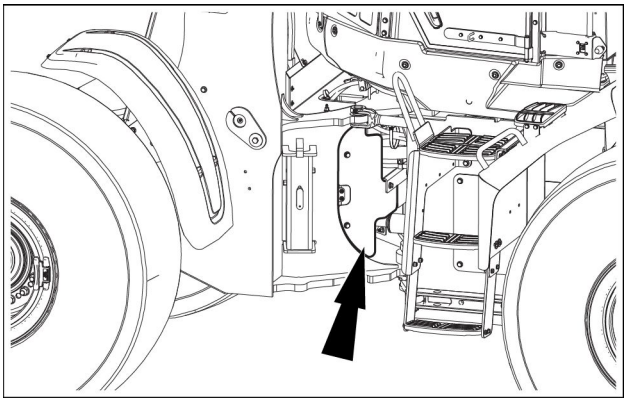
Grease the drive shaft slip joints every 250 hours or more often if conditions so require.

Prior operation:
Always have the machine on firm, level ground with the bucket/attachment on the ground. Make sure all residual pressure is relieved from the circuits before beginning maintenance.

NOTICE: *in severe conditions, such as immersion in water, it may be necessary to reduce the greasing service intervals.*

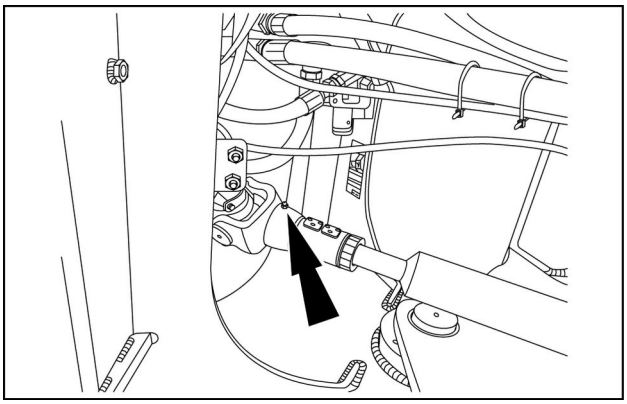
Service specifications	
Grease Specification	**MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2**

1. In Waste Handler (WH) models, remove the front articulation joint cover to access the drive shaft.



LEIL17WHL1594AB 1

2. The grease zerk is located on the drive shaft. Park the machine so that the zerk is accessible.



LEIL15WHL1835AA 2

3. Clean around the area to be greased before service.
4. Grease the drive shaft slip joint.
5. After greasing, in WH models re-install the front articulation joint cover.

Cab air recirculation filter - Cleaning

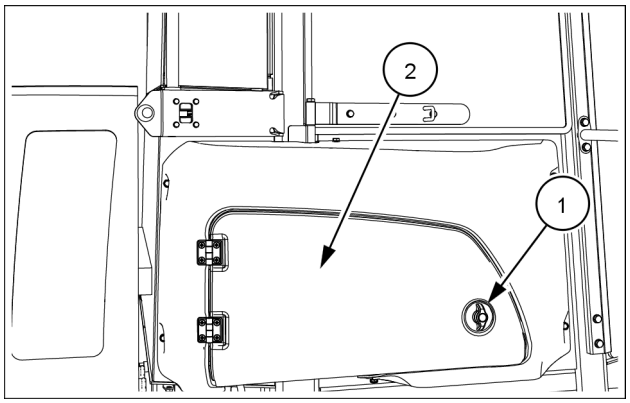
⚠ WARNING

Eye injury hazard!
Wear full coverage safety glasses with side panels when using compressed air. Limit air pressure to 200 kPa (29 psi).
Failure to comply could result in death or serious injury.

W0162A

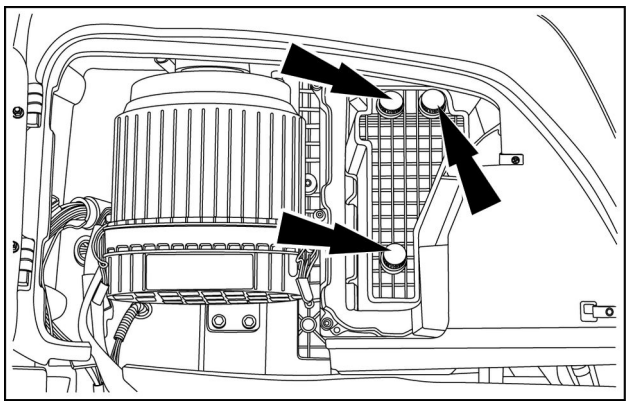
Clean the cab air recirculation filter every 250 hours.

1. Turn the latch **(1)** to open the right-hand door **(2)**.



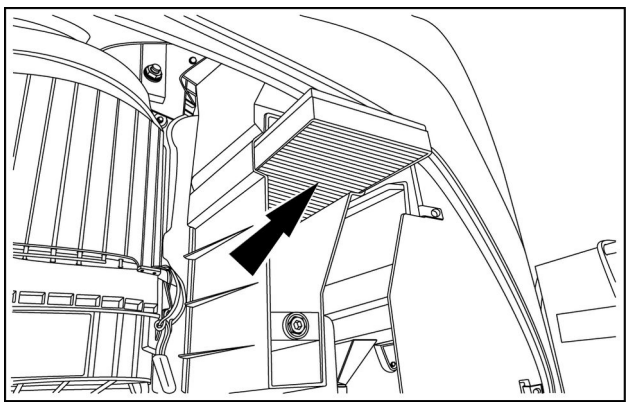
LEIL16WHL1352AA 1

2. Remove the three retaining knobs that hold the recirculation filter cover in place.



LEIL15WHL0562AA 2

3. Extract the recirculation filter.



LEIL15WHL0568AA 3

4. Check the recirculation filter for debris or tears.
5. To clean, shake the recirculation filter carefully to remove the surface dust.

NOTE: *for the best results replace the dirty filter instead of cleaning.*

NOTE: *do not clean with compressed air or wash the filter to avoid damaging the filter.*

NOTE: *using a damaged filter or not filtering the recirculation air can result in clogging the heat exchangers leading to expensive service.*

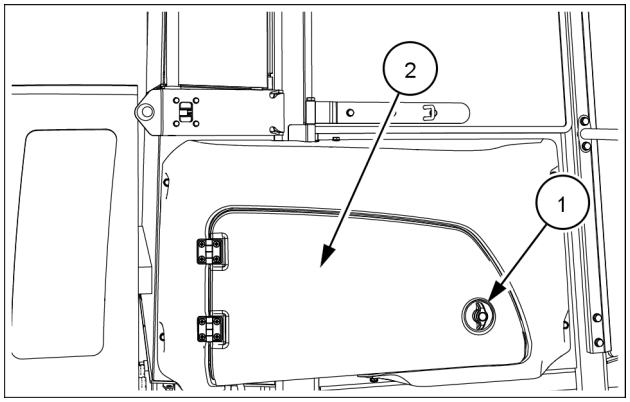
6. Reinstall the recirculation filter.
7. Secure the recirculation filter cover.
8. Close the right-hand door.

Cab air pre-filter - Cleaning

Clean the cab air pre-filter every 250 hours.

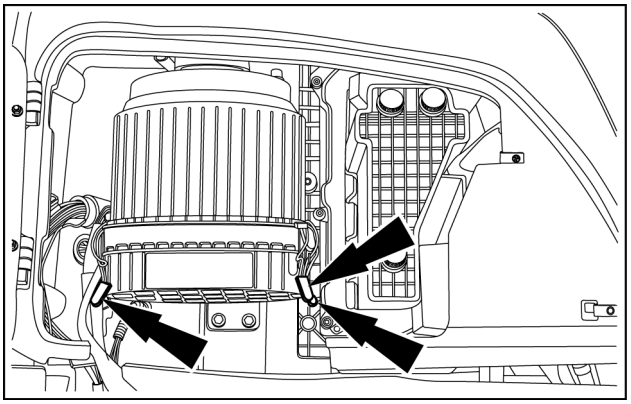
NOTE: *it is recommended to perform the cleaning of cab air pre-filter and filter at the same time.*

1. Turn the latch **(1)** to open the right-hand door **(2)**.



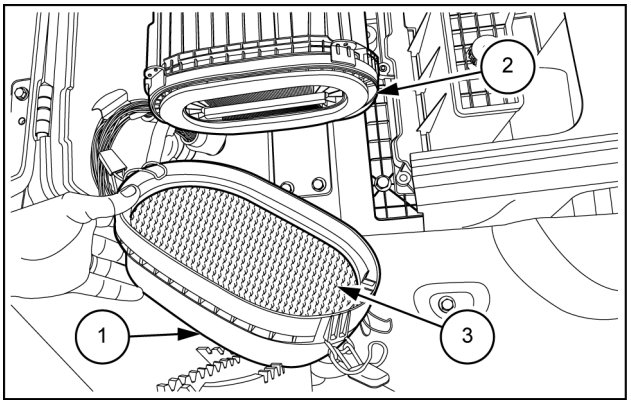
LEIL16WHL1352AA 1

2. Unhook the three clips securing the filter grid assembly.



LEIL15WHL0637AA 2

3. Remove the filter grid assembly **(1)** from the filter housing **(2)**.
4. Remove the pre-filter **(3)**.



LEIL15WHL0566AB 3

5. Remove any foreign bodies and dust deposits from the pre-filter and inside the housing by hand or by means of a brush.

NOTE: *be careful not to damage the pre-filter; do not use any hard or sharp-edged tools.*

NOTE: *if the pre-filter looks very dirty and no longer fit for purpose, proceed directly with the replacement (refer to* ***7-101****).*

6. Clean the pre-filter with soapy water and rinse with clean water.
7. Allow the pre-filter to dry.
8. Install the dry pre-filter back in the housing lid.
9. Secure the filter grid assembly to the filter housing.
10. Close the right-hand door.

Cab air filter - Cleaning

⚠ WARNING

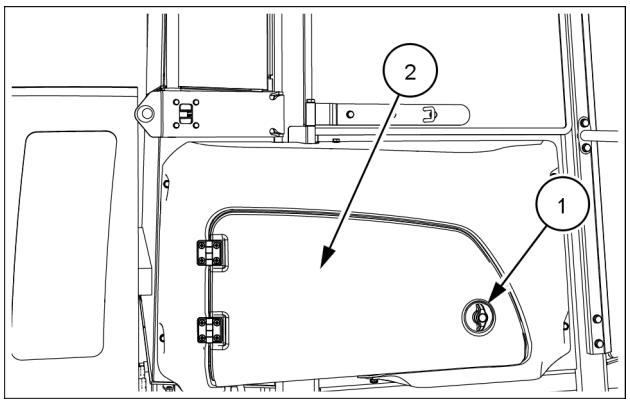
Eye injury hazard!
Wear full coverage safety glasses with side panels when using compressed air.
Failure to comply could result in death or serious injury.

W1531A

Clean the cab air filter every 250 hours.

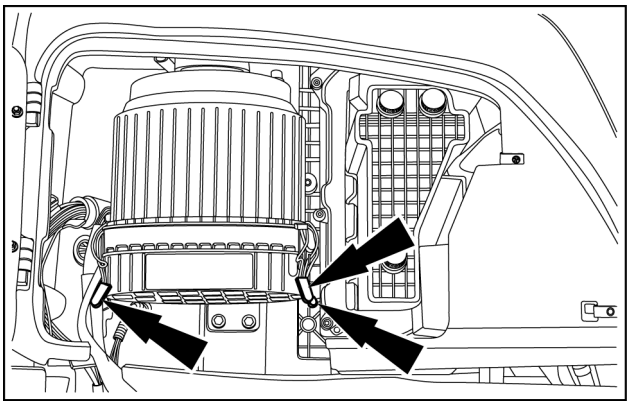
NOTE: *it is recommended to perform the cleaning of cab air pre-filter and filter at the same time.*

1. Turn the latch **(1)** to open the right-hand door **(2)**.



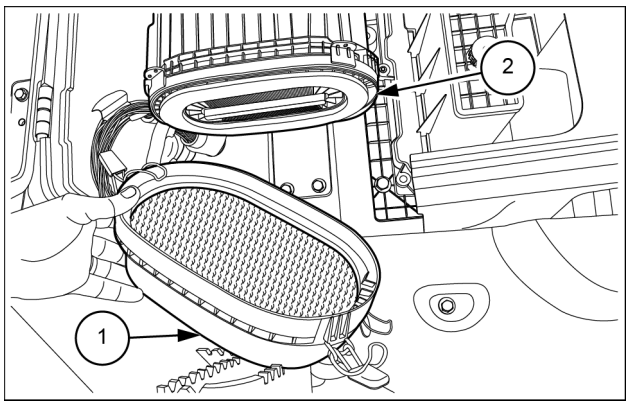
LEIL16WHL1352AA 1

2. Unhook the three clips securing the filter grid assembly.



LEIL15WHL0637AA 2

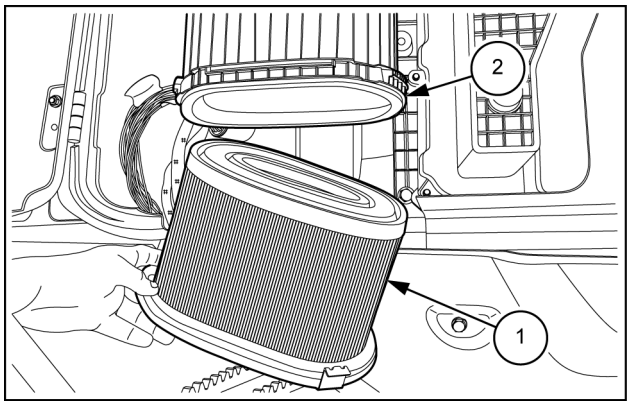
3. Remove the filter grid assembly **(1)** from the filter housing **(2)**.



LEIL17WHL1653AB 3

4. Extract the main filter element **(1)** from the filter housing **(2)**.

NOTE: *if the main filter element looks very dirty and no longer fit for purpose, proceed directly with the replacement (refer to* ***7-102****).*

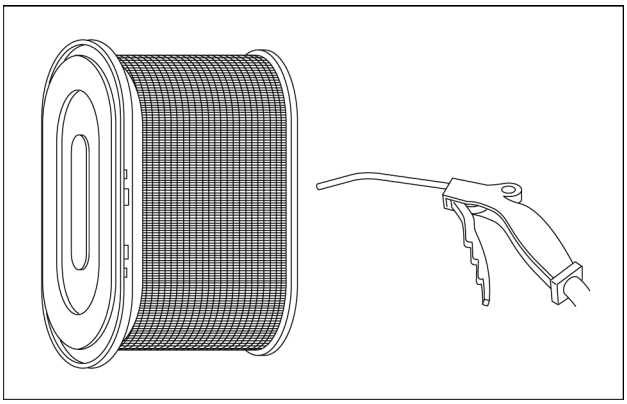


LEIL15WHL0567AB 4

5. Clean the main filter element with compressed air (maximum **5 bar** (**72.5 psi**)) carefully, applying the compressed air from the clean side (seal side) until no more dust is blown out. The tip of the compressed air gun must not touch the filter.

NOTICE: *never wash out or beat the main filter element.*

NOTICE: *when blowing clean, ensure no dust gets into the inside of the main filter element.*



LEIL17WHL1650AA 5

6. Check the cleaned main filter element thoroughly for signs of damage to the filter paper and seals.
7. Reinstall the main filter element into the filter housing.
8. Secure the filter grid assembly to the filter housing.
9. Close the right-hand door.

Wheels - Tire inflating

⚠ WARNING

Explosion hazard!
Never weld on a wheel. Welding can cause stresses that will cause a wheel to crack or break unexpectedly. Tires can separate explosively during welding. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0124A

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied. Lower the bucket/attachment to the ground.

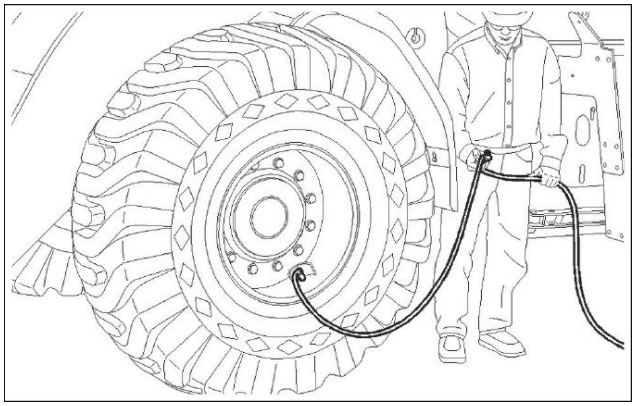
Tire service

Service specifications - Normal Work Tire Inflations		
Tire type	**Front pressure**	**Rear pressure**
23.5 R25 L3 Radial	**4.5 bar** (**65.2 psi**)	**3.2 bar** (**47 psi**)
23.5 R25 L5 Radial	**4.5 bar** (**65.2 psi**)	**3.2 bar** (**47 psi**)
23.5 R25 Snow Radial	**4.5 bar** (**65.2 psi**)	**3.2 bar** (**47 psi**)

NOTE: *for continuous operation at maximum travel speed, consult tire manufacturer for limitations on total distance traveled per hour.*

To add air to a tire:

1. Use an air hose with a remote shut-off valve and a self-locking air chuck. Put the tire in a restraining cage if possible.
2. Stand BEHIND the tread of the tire and make sure ALL personnel are away from the side of the tire before you start.
3. Inflate the tire to the recommended air pressure. DO NOT inflate the tire more than the recommended pressure.



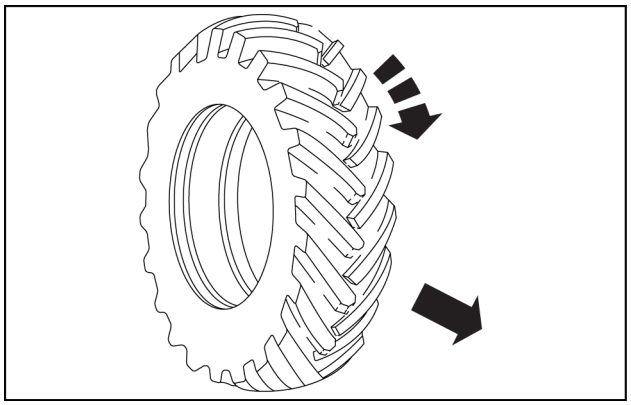
LEIL16WHL0199AA 1

Tire or rim service

Always have a qualified tire technician service the tires and rims for this machine. It is recommended that you have this technician inflate the tires. To prevent accidents, use a restraining device (tire inflation cage), correct equipment, and correct procedure.
Explosive separation of the tire, or the tire and/or rim parts can cause serious injury or death.

Tire tread direction

If the tire tread is directional, when the tire is installed on the wheel, make sure the tire tread is in the direction shown.



LEIL15WHL1842AB 2

Drive belt - Check

⚠ WARNING

Entanglement hazard!
Always stop the engine and engage the parking brake, unless otherwise instructed in this manual, before checking and/or adjusting any drive belt or chain.
Failure to comply could result in death or serious injury.

W0097A

⚠ WARNING

Moving parts!
Install all covers, panels, and guards after servicing or cleaning the machine. Never operate the machine with covers, panels, or guards removed.
Failure to comply could result in death or serious injury.

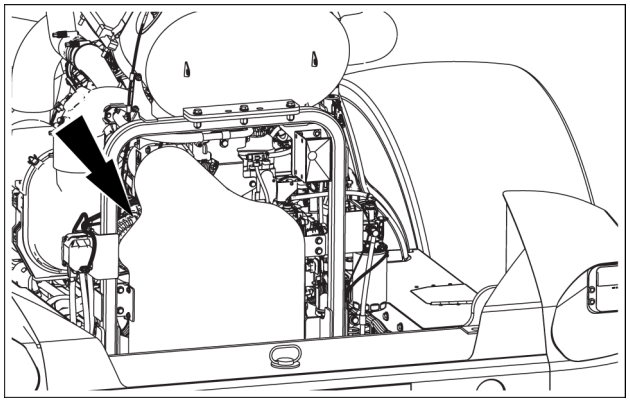
W0135A

Check the drive belt for correct tension, wear and damage every 250 hours. Wrong belt tension may cause battery charge failure, engine overheating, or belt wear.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

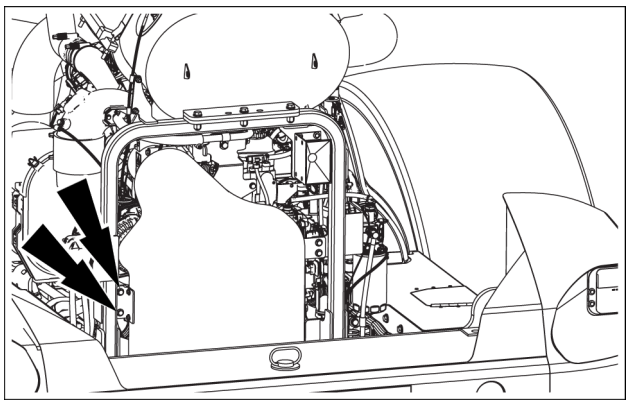
NOTICE: *if the engine runs with the drive belt loose, the drive belt can slip and cause the engine to overheat or the battery to receive insufficient charge.*

1. Check the drive belt for correct tension, wear and/or damage. Inspect the drive belt for chunking. Chunking is defined as a section of the rib missing. Replace the drive belt if a section longer than **10 mm** (**0.4 in**) is chunked out.

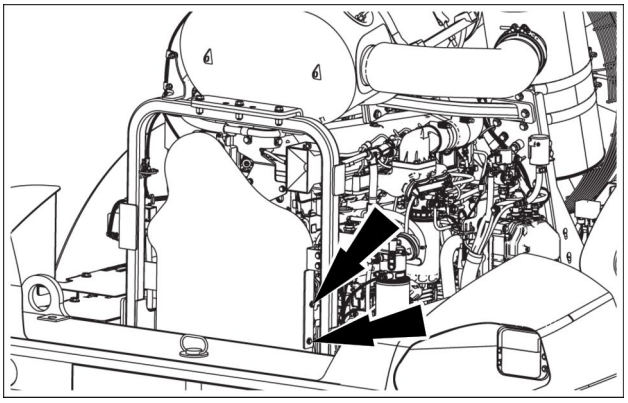


LEIL18WHL1168AA 1

2. To replace the drive belt, remove the four screws that hold the protective cover in place.

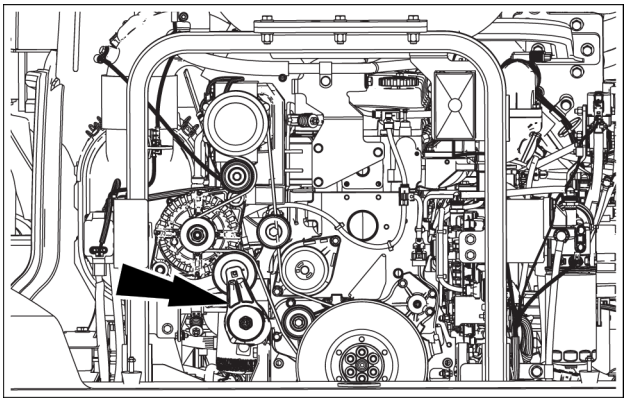


LEIL18WHL1168AA 2



LEIL18WHL1169AA 3

3. Use a 3/8 inch breaker bar to rotate the belt tensioner just enough to release the tension on the drive belt. Remove the drive belt.



LEIL18WHL1170AA 4

4. Place the drive belt around the pulleys of the crankshaft, the fan, the alternator, and the A/C compressor.
5. Rotate the belt tensioner and install the drive belt over the water pump pulley.

NOTE: *the water pump pulley has the smallest flange, which allows an easier installation of the drive belt.*

6. Lower the tensioner.
7. Inspect all the pulleys to check if the belt is in the correct position.
8. Start the engine and run at low idle for **60 – 90 s**.
9. Stop the engine.
10. Inspect the tensioner for a correct drive belt alignment.

NOTE: *the minimum clearance from the front or the rear flange of the pulley to the belt is **1 mm**.*

11. If the clearance is less than **1 mm**, check that the drive belt runs correctly on all pulleys.
12. If the drive belt does not run correctly, reinstall the drive belt, restart the engine and re-check for a correct alignment.
13. If the clearance is less than **1 mm**, replace the tensioner.
14. Reinstall the protective cover.

Every 500 hours

Engine oil - Change

Change the engine oil every 500 hours thereafter or more frequently when the engine operating conditions are severe.

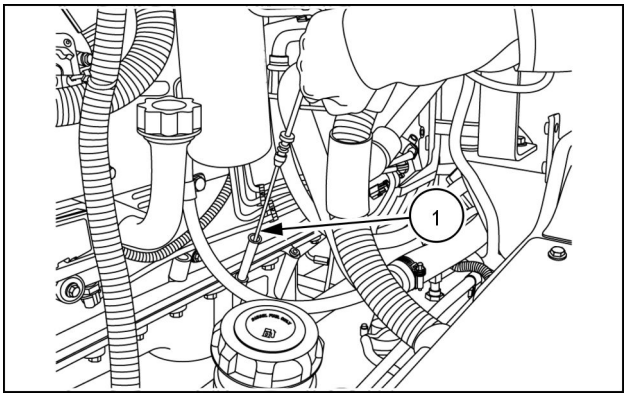
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.
Prior operation:
Activate the Manual Catalyst Management (MCM) immediately before the engine oil change. Refer to **7-141** for further information.

Service specifications	
Type of oil	**NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**
	NO.1 ENGINE™ OIL FULL SYNTHETIC SAE 0W-40 (cold weather)
Service capacity (with filter change)	**15.1 l** (**16 US qt**)

NOTE: *it is recommended to replace the engine oil filter when you change the engine oil.*

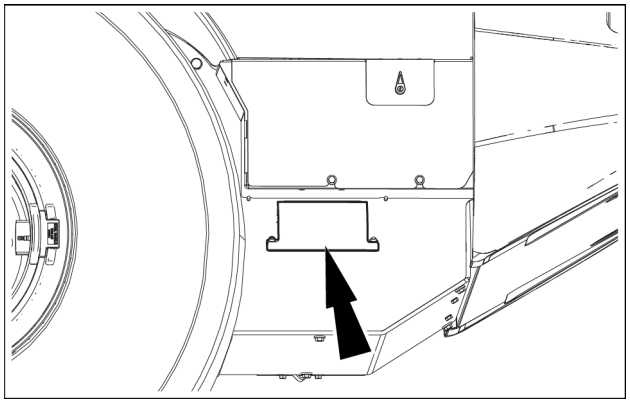
1. Raise the engine hood. Remove the dipstick **(1)**.

NOTE: *when changing the engine oil, the oil flow rate is improved if you remove the oil fill cap or the dipstick from the engine while draining, and the oil is slightly warm.*



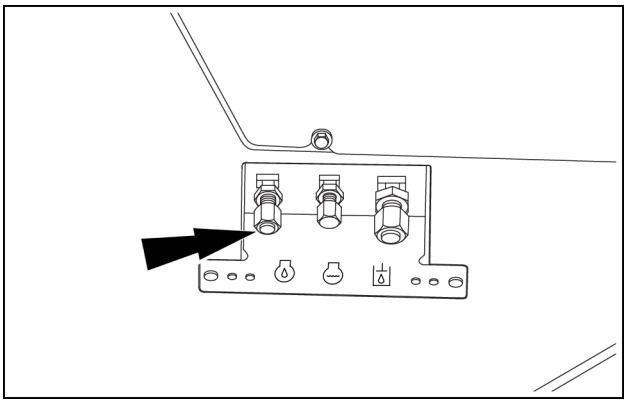
RCPH10WHL899AAH 1

2. Remove the remote drain cover to access the engine oil drain (if equipped).



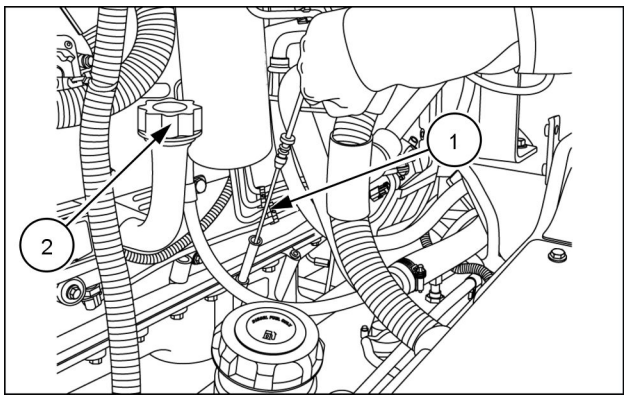
LEIL17WHL1597AB 2

3. Locate the engine oil remote drain. Use a suitable container to collect the used oil. Drain the engine oil completely.
4. Close the remote drain.



LEIL16WHL0198AA 3

5. Fill the engine with the proper amount of **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, through the fill port **(2)**.
6. Start the engine and run at idle speed. Check the engine remote drain for leak.
7. After two minutes stop the engine.
8. Wait for the engine oil to drain down for an accurate reading on the dipstick.
9. Check the dipstick **(1)** and add additional **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, if necessary.
10. Re-install the remote drain cover (if equipped).
11. Lower the engine hood.



RCPH10WHL899AAH 4

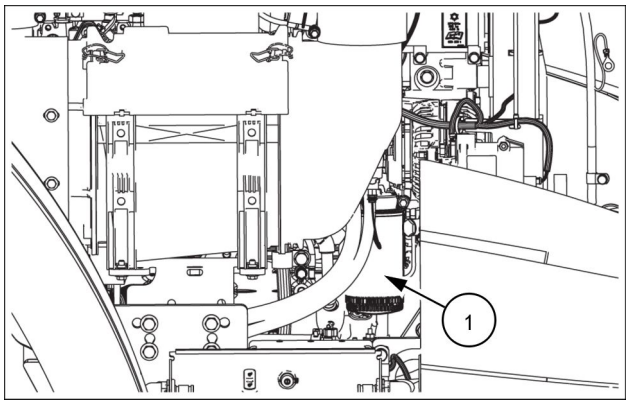
Engine oil filter - Replace

Replace the engine oil filter every 500 hours thereafter or more frequently when the engine operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

NOTE: *it is recommended to change the engine oil when you replace the engine oil filter.*

1. Raise the engine hood.
   Locate the oil filter **(1)** on the left-hand side of the machine.
   Clean the area around the filter of dirt and debris.

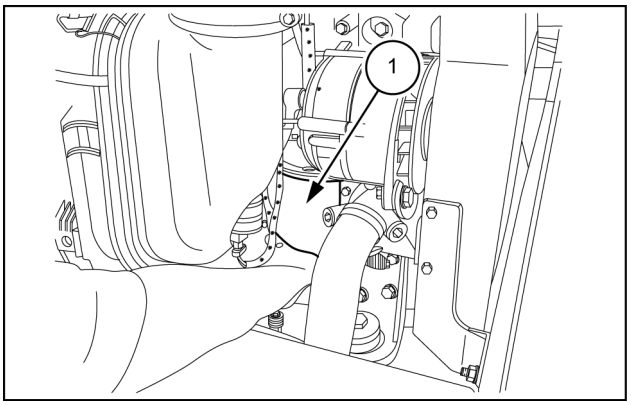


LEIL18WHL1171AA 1

2. Turn the filter housing **(1)** counterclockwise to remove. Remove and discard the filter following local environmental and waste regulations.
3. Apply a thin layer of clean **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40**, or the oil needed for operating conditions, to the new filter gasket.

NOTICE: *never use a filter wrench to install a new filter.*

4. Turn the new oil filter onto the base until the gasket makes contact with the base and then turn by hand an additional 3/4 turn.
5. Top off **NO.1 ENGINE™ OIL SEMI-SYNTHETIC 10W-40** oil, or the oil needed for operating conditions, to replace what was removed with the filter.
6. Lower the engine hood.



LEIL15WHL1841AB 2

Fuel pre-filter - Replace

⚠ WARNING

Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

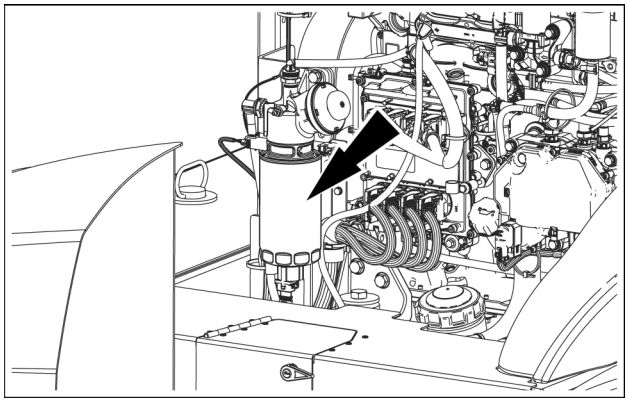
W0904A

Replace the pre-filter every 500 hours thereafter or more often if conditions so require or if fuel quality is poor.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

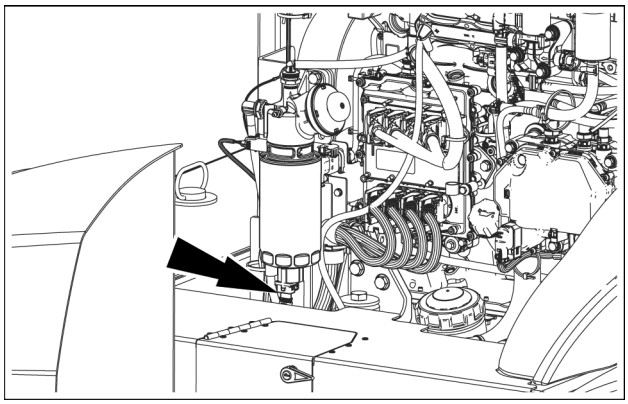
Drain fuel prefilter condensation

1. Open the engine hood. Locate the pre-filter in the engine compartment on the right-hand side of the machine.



LEIL18WHL1173AA 1

2. Remove the water sensor connector from the bottom of the pre-filter.

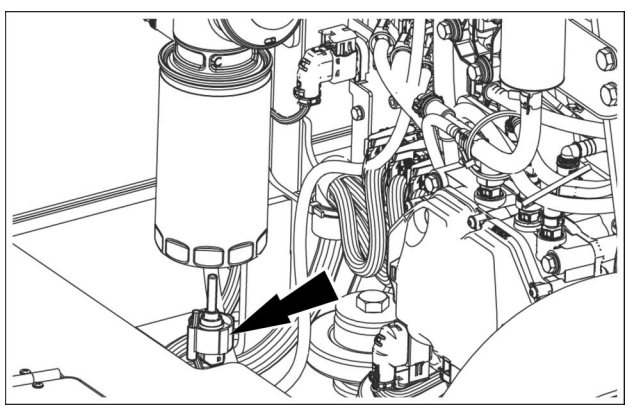


LEIL18WHL1173AA 2

3. Open the drain valve on the fuel pre-filter by turning counterclockwise two or three turns.
4. Drain the water and/or contaminants from the pre-filter into a suitable container until clean fuel flows.

NOTICE: *Do not allow fuel to spill on engine or ground.*

NOTE: *the Water in Fuel (WIF) sensor is on the drain valve on the fuel pre-filter.*

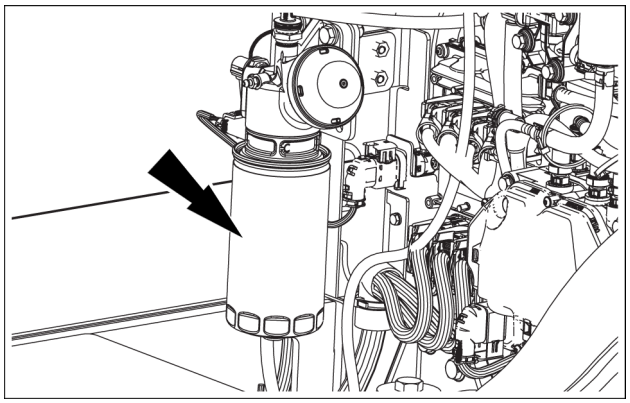


LEIL18WHL1172AA 3

5. Turn the pre-filter counterclockwise to remove it.
6. Replace with a new pre-filter cartridge, turning clockwise until the cartridge meets the pre-filter head. Hand tighten firmly in place.

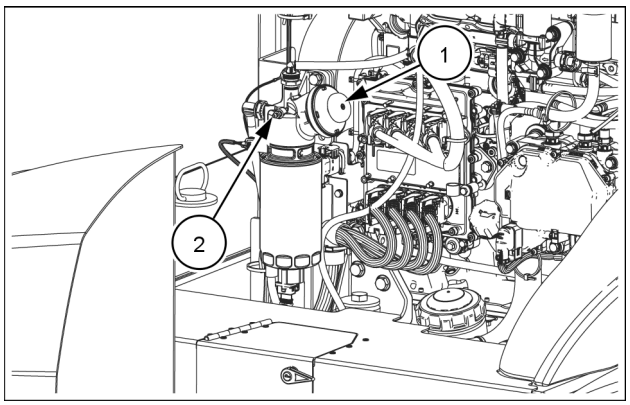
NOTICE: *Do not use a wrench to tighten.*

7. Remove the plug from the new filter (if equipped) and reinstall the WIF sensor.
8. Connect the water sensor connector at the bottom of the pre-filter.



LEIL18WHL1166AA 4

9. Use the pump **(1)** and the bleed screw **(2)** at the top of the pre-filter to bleed air from the fuel system. Pump until fuel flows out of the bleed screw **(2)** without air bubbles.



LEIL18WHL1173AA 5

Fuel filter - Replace

⚠ WARNING

Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

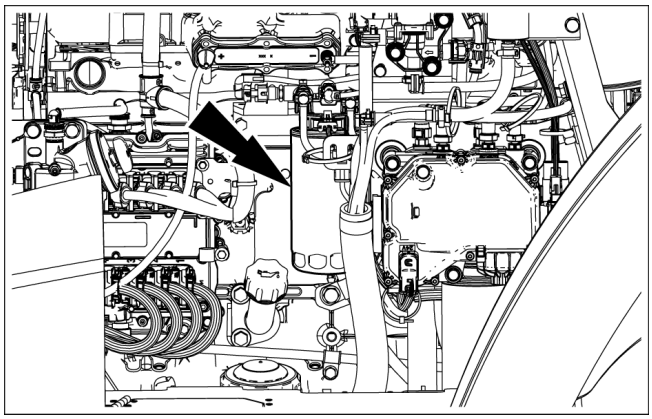
Replace the fuel filter every 500 hours thereafter or more frequently when operating conditions are severe.

Clean the filter head area, the outside of the filter and remove any dirt and debris around the area that might contaminate the system.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Locate the fuel filter on the right-hand side of the machine, near the supply module.
2. Turn the filter counterclockwise and remove. Be sure to capture any fuel remaining in the lines or the filter and discard properly.
3. Apply a thin layer of clean oil to the gasket on the new filter.
4. Fill the new filter with fuel. Install the filter. Use your hands to tighten the filter 1/2 to 3/4 turn after the filter makes contact with the filter head.
   Bleed air from the fuel system.

NOTICE: *never use a filter wrench to install a new filter.*



LEIL18WHL1108AB 1

Fuel tank sediment - Drain

⚠ WARNING

Hot liquid under pressure!
Fuel in the high pressure fuel line is still under pressure immediately after you shut down the engine. Before performing any maintenance or inspection, wait for 2 minutes after engine shutdown to allow the pressure to drop.
Failure to comply could result in death or serious injury.

W0249A

⚠ WARNING

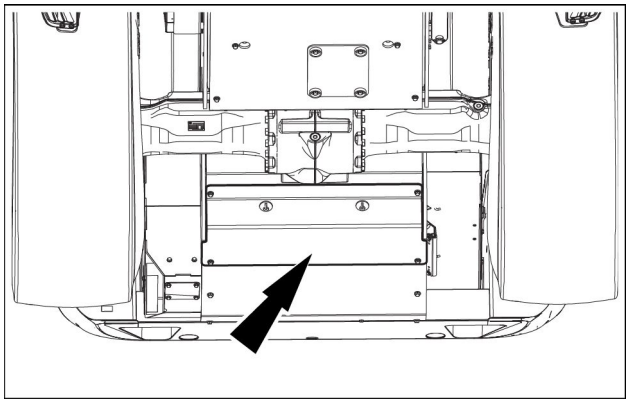
Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

Drain condensation from the fuel tank every 500 hours of operation or more frequently if conditions so require.

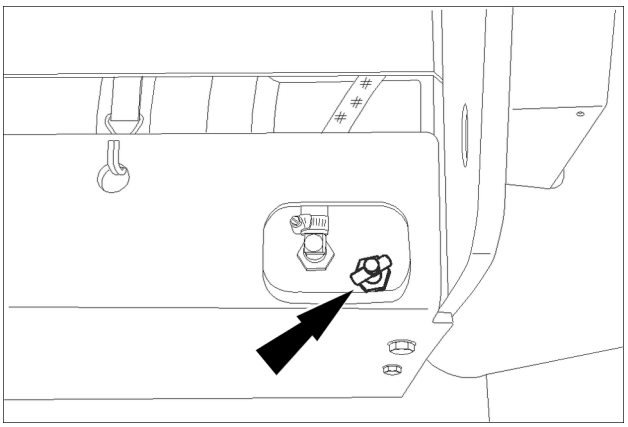
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied and the attachment lowered to the ground. Install the transport/service link into the locked position.

1. In Waste Handler (WH) models, remove the fuel tank guard from the bottom side of the machine, behind the rear axle.



LEIL17WHL1581AB 1

2. Locate the drain plug and handle on the bottom right-hand front corner of the fuel tank.
3. Have a suitable container ready to collect the condensation and fuel.
4. Open the fuel tank drain slowly, remove the tank drain plug, and allow the condensation to flow until only fuel is discharged.
   Dispose of the waste following local regulations.
5. Turn the drain handle and close the drain. Replace the tank drain plug.



RCPH10WHL075BAL 2

6. In WH models, re-install the fuel tank guard.

Front and rear axle oil level - Check

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

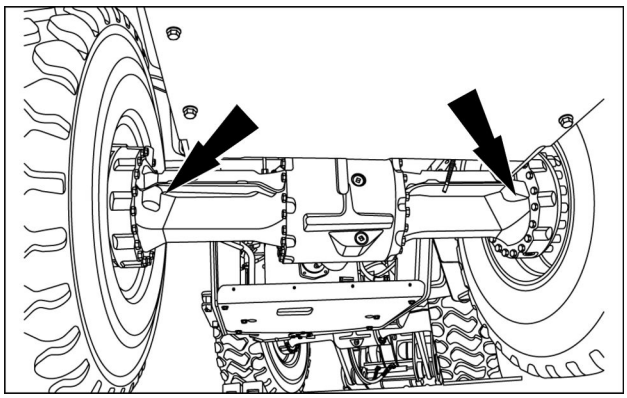
W0371A

Check the oil level in the front and rear axles every 500 hours.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications - **PREMIUM TRANSAXLE OIL 80W-140**	
Front axle	**42 L** (**44.4 US qt**)
Rear axle	**40 L** (**42.3 US qt**)

1. Remove the oil plug at fill locations from both axles. The oil level should be level with the bottom of the plug.



RCPH10WHL081AAH 1

2. Add **PREMIUM TRANSAXLE OIL 80W-140** if required. Clean and install the plug.

Roll Over Protective Structure (ROPS) - Check

⚠ WARNING

Roll-over hazard!
After an accident, fire, tip over, or roll over, a qualified technician MUST replace the Roll-Over Protective Structure (ROPS) before returning the machine to the field or job site operation.
Failure to comply could result in death or serious injury.

W0134A

⚠ WARNING

Misuse hazard!
Your machine is equipped with an operator protective structure. DO NOT weld, drill holes, attempt to straighten, or repair the protective structure. Modification in any way can reduce the structural integrity of the structure.
Failure to comply could result in death or serious injury.

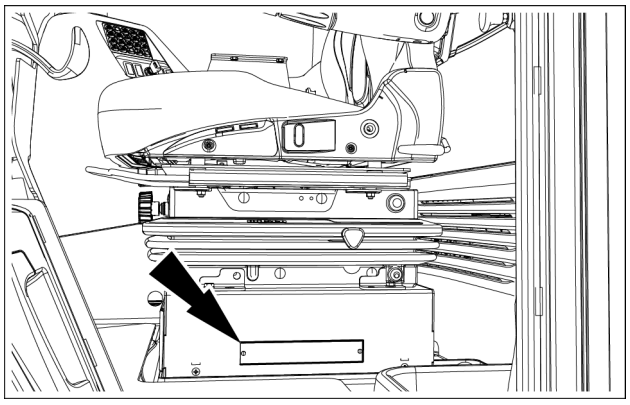
W0001B

Check and inspect the ROPS structure and the seat restraint system every 500 hours of operation.

Your machine is equipped with an operator Protective Structure, such as: Rollover Protective Structure (ROPS) or Falling Object Protective Structure (FOPS). A ROPS may be a cab frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the machine are part of the ROPS. The Protective Structure is a special safety component of your machine. DO NOT attach any device to the Protective Structure for pulling purposes. DO NOT drill holes into the Protective Structure. The Protective Structure and interconnecting components are a certified system. Any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the Protective Structure MUST be replaced so that it will provide the same protection as a new Protective Structure. Contact your dealer for Protective Structure inspection and replacement. The mounting or suspension for the Protective Structure, operator seat and suspension, seat belts and mounting components and wiring within the operator's protective system MUST be carefully inspected for damage. All damaged parts MUST be replaced.

ROPS identification plate

The wheel loader has a ROPS identification plate showing the certification of the ROPS, gross weight, approval, regulation, and model number of the machine.
The ROPS identification plate is located under the operator's seat at the left-hand side.

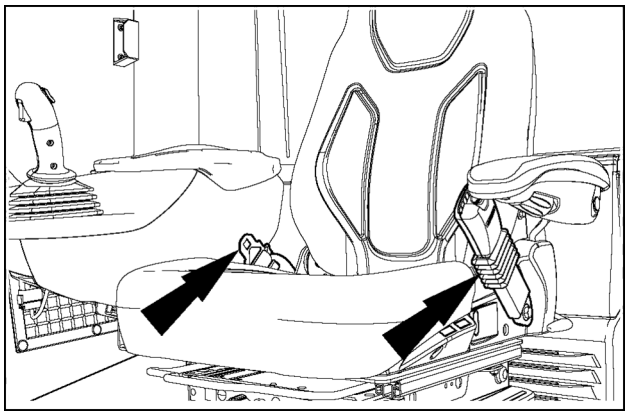


LEIL16WHL1167AB 1

Seat belt

1. Before you operate this machine, always make sure the operator's seat belt is correctly installed.

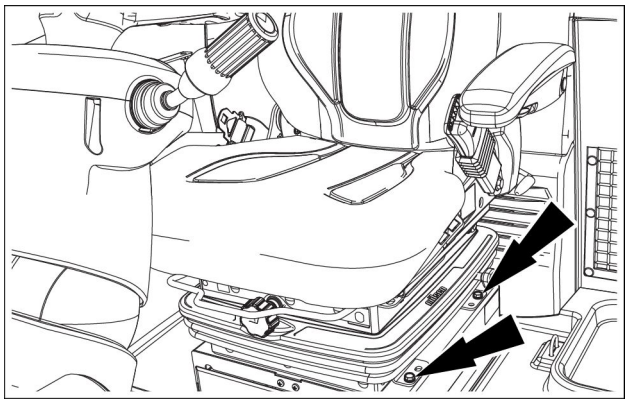
NOTICE: *the seat belt is an important part of the ROPS. You must wear the seat belt at all times when you operate the machine.*



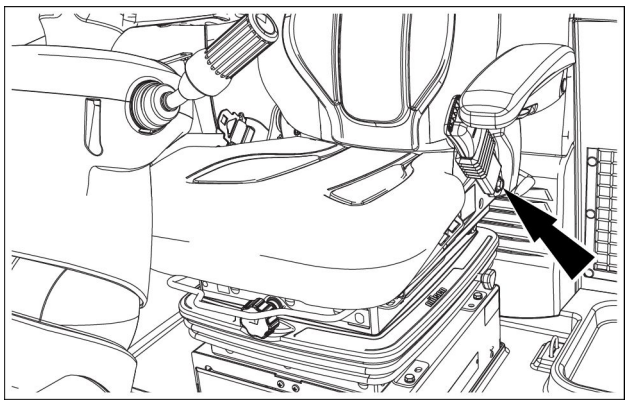
LEIL16WHL1356AB 2

Seat and mounting hardware

1. Make sure all hardware that secures the seat to the cab is properly torqued. Make sure all seat belt hardware is secure and torqued.
2. Keep the seat belts away from objects that can damage the seat belts.
3. Keep the seat belts clean. Wash the seat belts only in soap and water. Do not put the seat belts in bleach or dye. This will weaken the seat belt composition.
4. Torque the seat belt hardware to **48.7 – 65.9 N·m** (**36 – 49 lb ft**) and seat mounting hardware to **38 – 44 N·m** (**28 – 32.5 lb ft**).



LEIL16WHL1354AB 3



LEIL16WHL1355AB 4

ROPS cab torque specifications

⚠ WARNING

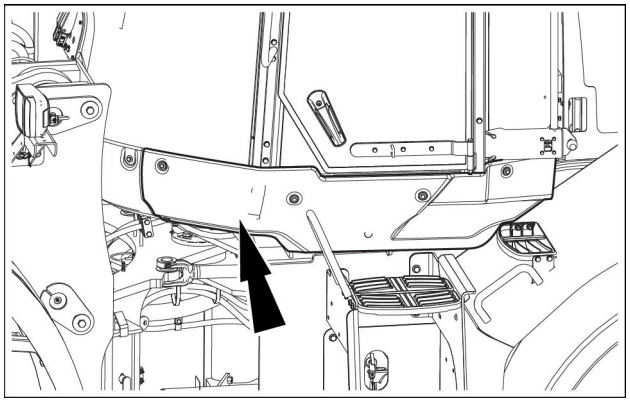
Tip-over hazard!
Adding additional weight (buckets, attachments, etc.) to the machine can create a tipping hazard. Do not exceed the gross weight indicated by the machine specifications.
Failure to comply could result in death or serious injury.

W0153A

Torque specifications	
ROPS cab mounting bolts (both sides)	**300 – 348 N·m** (**221.3 – 256.7 lb ft**)
ROPS cab retaining bolts (both sides)	**561 – 758 N·m** (**413.8 – 559.1 lb ft**)

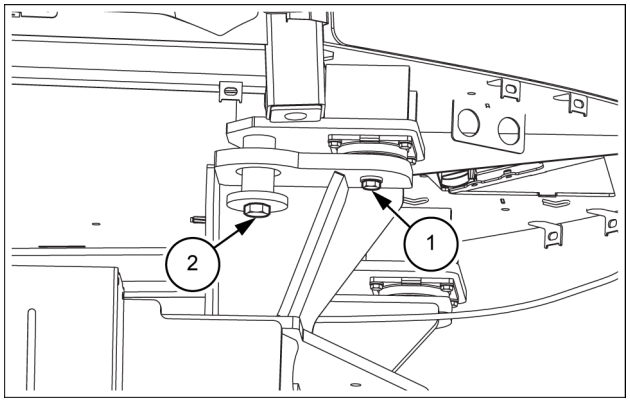
NOTE: *torque specifications are for clean, dry threads.*

1. Remove the side cab skirts to access the ROPS cab bolts.



LEIL17WHL1595AB 5

2. Check the torque of the ROPS cab mounting bolts **(1)** and ROPS cab retaining bolts **(2)**. If necessary, tighten the bolts to the correct torque.
   Re-install the cab skirts.



LEIL18WHL0874AB 6

3. Check for cracks, rust, or holes in the ROPS and ROPS components. Age, weather, and accidents can cause damage to the ROPS and ROPS parts. If you have any doubt about the integrity of the ROPS system, see your CASE CONSTRUCTION dealer.

Battery fluid level - Check

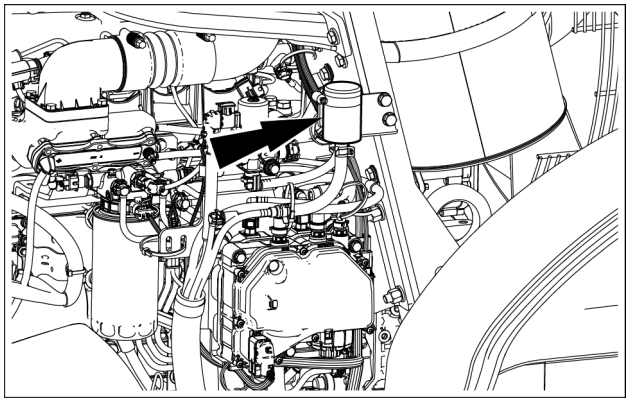
Check the fluid level of the battery every 500 hours. For complete information regarding battery, fuses, etc., see the electrical section at the end of this chapter.

DEF/AdBlue® tank vent filter - Replace

Replace the **DEF/ADBLUE®** tank vent filter every 500 hours thereafter or more frequently when operating conditions are severe.

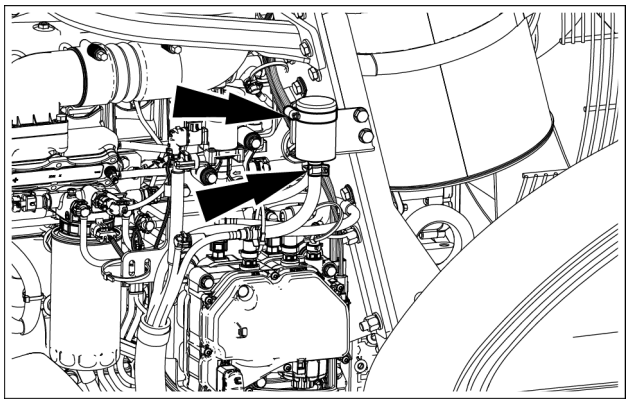
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Open the engine hood.
   The **DEF/ADBLUE®** tank vent filter is located on the right-hand side of the machine and is attached to the muffler support.



LEIL18WHL1161AB 1

2. Loosen the two clamps from the breather body and remove the tank vent filter from the hose.
3. Discard appropriately and reinstall a new filter.



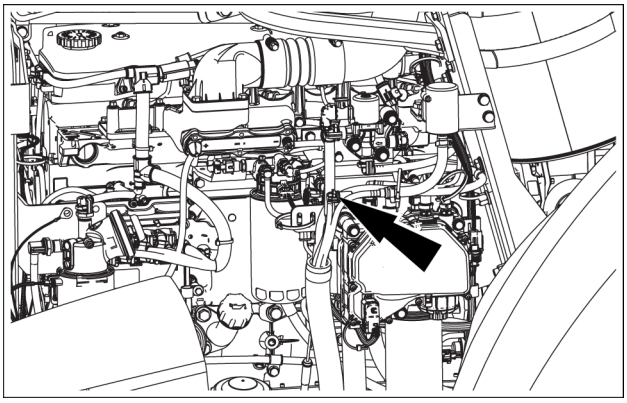
LEIL18WHL1162AB 2

Selective Catalytic Reduction (SCR) in-line filter - Cleaning

Clean every 500 hours thereafter or more often if conditions so require. The supply line has a small mesh filter within the line.

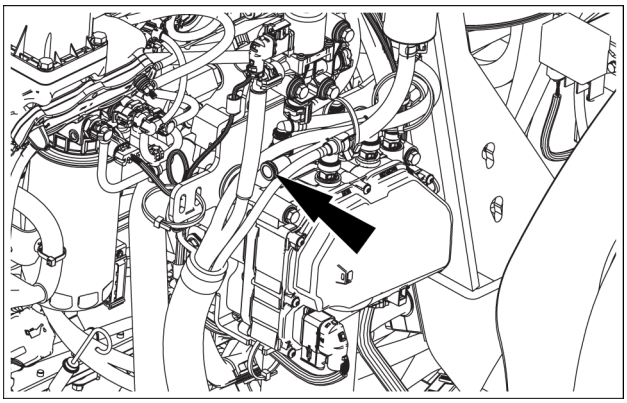
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Open the engine compartment.
2. Remove the **DEF/ADBLUE®** blanket to access to the **DEF/ADBLUE®** bundle, if equipped.
3. Locate the in-line supply filter on the right-hand side of the machine directly above the Supply Module.



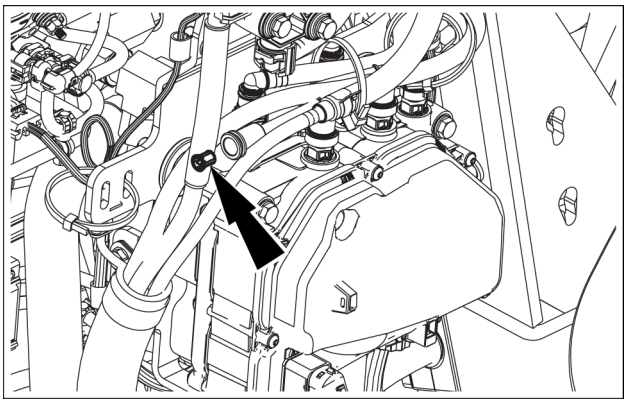
LEIL18WHL1158AA 1

4. Use a suitable container to catch any fluid that is discharged during the hose and filter disassembly. Clean the area before the disassembly. Disconnect the supply line by squeezing the tabs on the connection and separate the lines.



LEIL18WHL1159AA 2

5. Using needle nose pliers, remove the filter using care not to damage or bend filter. If the fitting does not release easily, reclean the fitting with compressed air. Direct the compressed air down into the fitting, then squirt water into the fitting to lubricate the O-ring.
6. Inspect the filter housing and rinse with water. If filter is damaged, replace the filter.
7. Reinstall the filter into the supply line and reconnect the lines.
8. Start the engine and run at idle speed. Check for leaks.



LEIL18WHL1160AA 3

Every 1000 hours

Pivot points - Grease

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

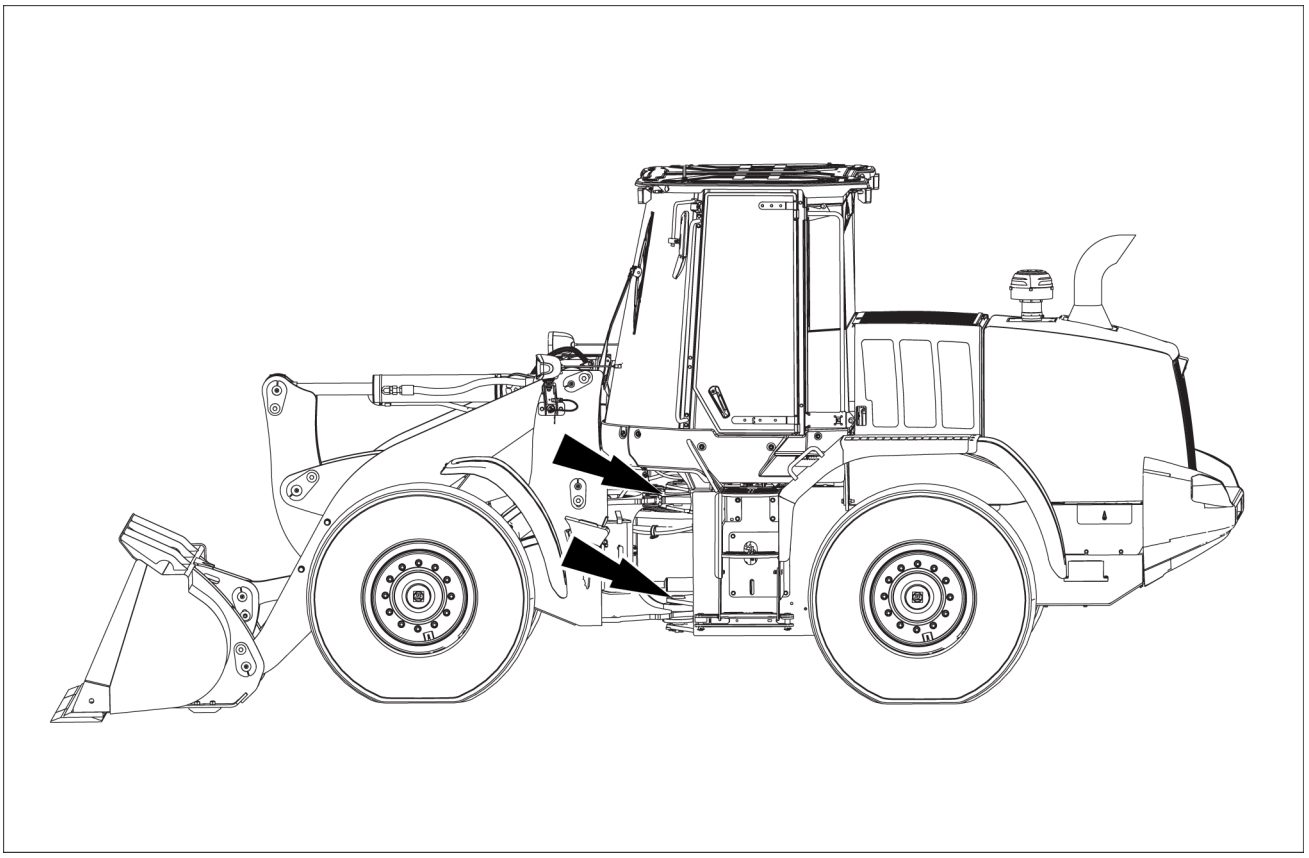
W0047A

Grease the fittings of the upper and lower chassis pivot points every 1000 hours or sooner if conditions so require.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied and the attachment lowered to the ground.

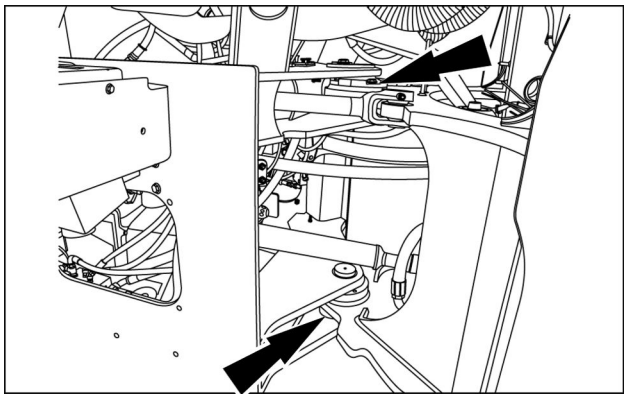
Service specifications	
Grease	**MULTI-PURPOSE MOLY GREASE EXTREME PRESSURE AND ANTI-WEAR NGLI-2**

NOTE: *if the machine is equipped with automatic lubrication system, you do not need to perform following instructions.*



LEIL18WHL1154FA 1

1. Place the transport/service link into the locked position to stop unexpected articulation movements of the machine.
2. Clean the area around each fitting and grease.



RCPH10WHL145AAH 2

Hydraulic oil filter - Replace

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

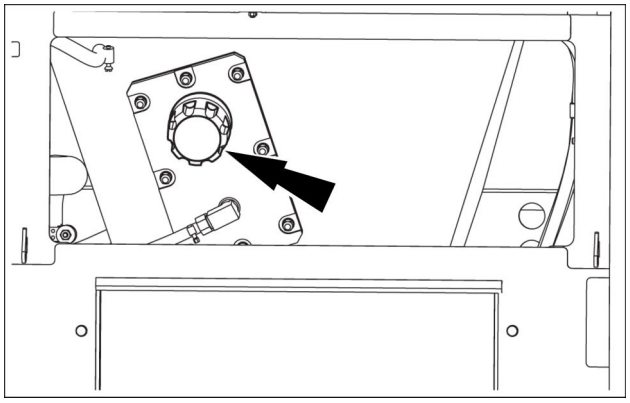
Pressurized fluid can penetrate the skin and cause severe injuries.
Keep hands and body away from any pressurized leak. DO NOT use your hand to check for leaks. Use a piece of cardboard or paper. If fluid penetrates the skin, seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0158A

Replace the hydraulic oil filter every 1000 hours or more frequently when operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

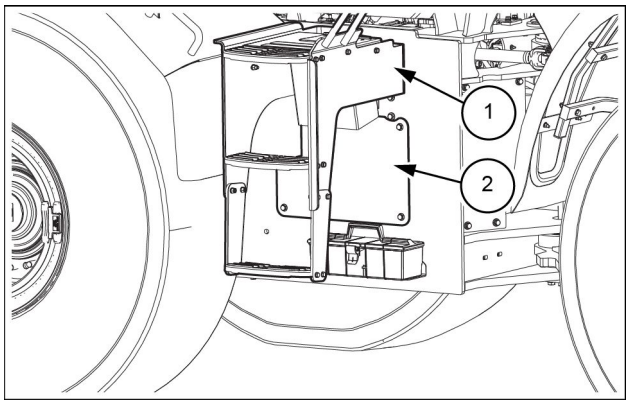
1. Release pressure in the hydraulic system. Refer to **7-3** for further information.
2. Slowly loosen the filler cap on the hydraulic reservoir to release any residual pressure in the reservoir. Leave the filler cap loose during the procedure.



LEIL18WHL1174AA 1

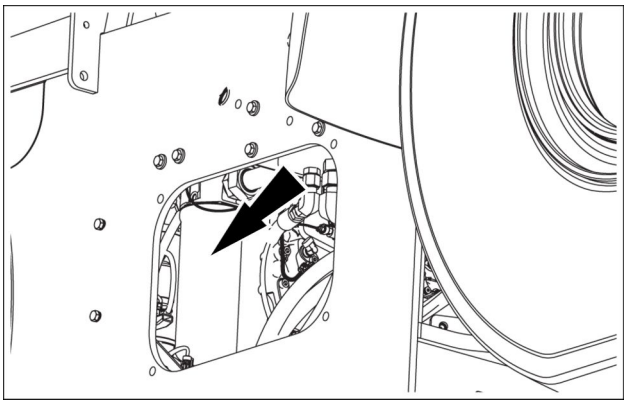
3. If present on the machine remove the right-hand steps **(1)** and chassis side cover **(2)** to access the hydraulic oil filter.

NOTE: *remove the right-hand steps* ***(1)*** *only if necessary.*



LEIL17WHL1580AB 2

4. Turn the filter counterclockwise to remove.



LEIL18WHL1223AA 3

5. Lubricate the gasket and threads of the new filter with clean **PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR** and install. After the filter makes contact with the filter head tighten 1/2 to 3/4 turns.

NOTICE: *never use a filter wrench to install a new filter.*

6. Tighten the cap on the hydraulic reservoir.
7. Start the engine and run at low idle. Stop the engine and check the hydraulic level. Top off if necessary.
8. If previously removed, reinstall the right-hand steps and chassis side cover.

Drive belt - Replace

⚠ WARNING

Entanglement hazard!
Always stop the engine and engage the parking brake, unless otherwise instructed in this manual, before checking and/or adjusting any drive belt or chain.
Failure to comply could result in death or serious injury.

W0097A

⚠ WARNING

Moving parts!
Install all covers, panels, and guards after servicing or cleaning the machine. Never operate the machine with covers, panels, or guards removed.
Failure to comply could result in death or serious injury.

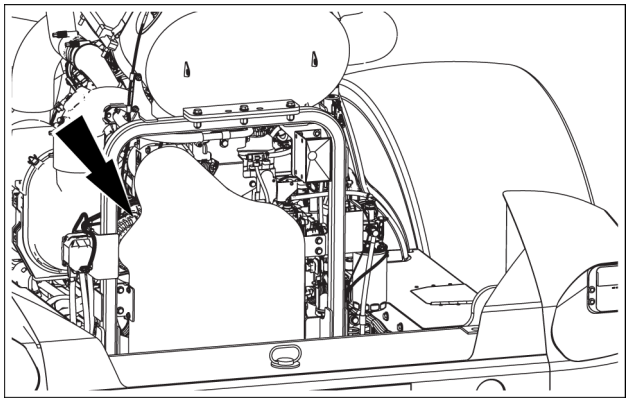
W0135A

Replace the drive belt every 1000 hours or more often if conditions so require.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

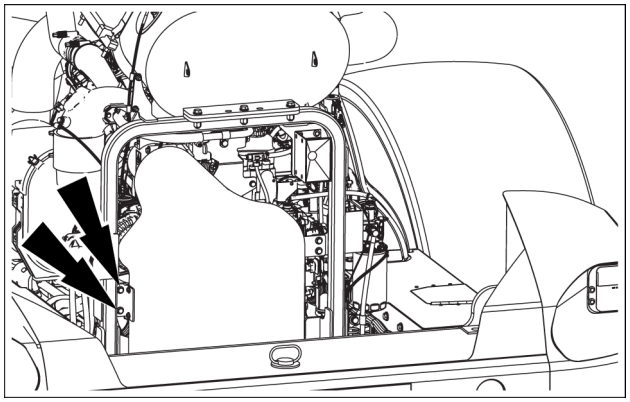
NOTICE: *if the engine runs with the drive belt loose, the drive belt can slip and cause the engine to overheat or the battery to receive insufficient charge.*

1. Open the engine hood and locate the drive belt.

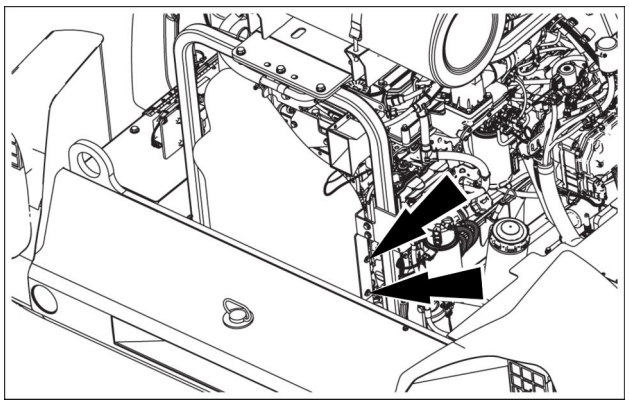


LEIL18WHL1168AA 1

2. To replace the drive belt, remove the four screws that hold the protective cover in place.

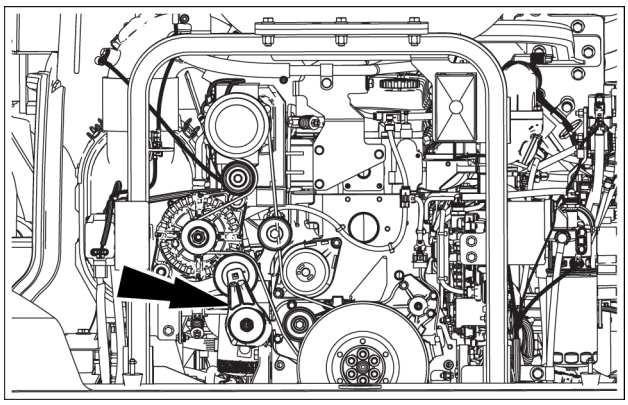


LEIL18WHL1168AA 2



LEIL18WHL1221AA 3

3. Use a 3/8 inch breaker bar to rotate the belt tensioner just enough to release the tension on the drive belt. Remove the drive belt.



LEIL18WHL1170AA 4

4. Place the drive belt around the pulleys of the crankshaft, the fan the alternator, and the A/C compressor.
5. Rotate the belt tensioner and install the drive belt over the water pump pulley.

NOTE: *the water pump pulley has the smallest flange, which allows an easier installation of the drive belt.*

6. Lower the tensioner.
7. Inspect all the pulleys to check if the belt is in the correct position.
8. Start the engine and run at low idle for **60 – 90 s**.
9. Stop the engine.
10. Inspect the tensioner for a correct drive belt alignment.

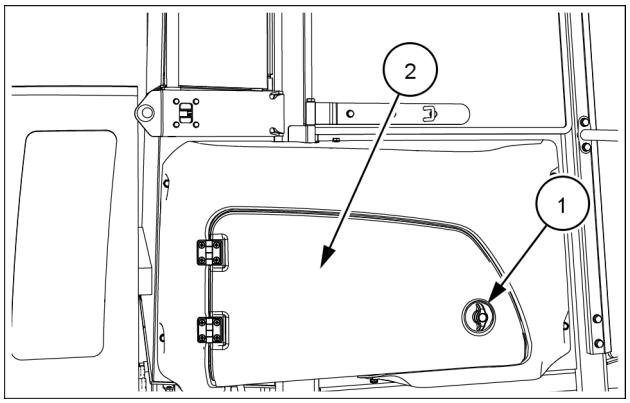
NOTE: *the minimum clearance from the front or the rear flange of the pulley to the belt is **1 mm**.*

11. If the clearance is less than **1 mm**, check that the drive belt runs correctly on all pulleys.
12. If the drive belt does not run correctly, reinstall the drive belt, restart the engine and re-check for a correct alignment.
13. If the clearance is less than **1 mm**, replace the tensioner.
14. Reinstall the protective cover.

Cab air recirculation filter - Replace

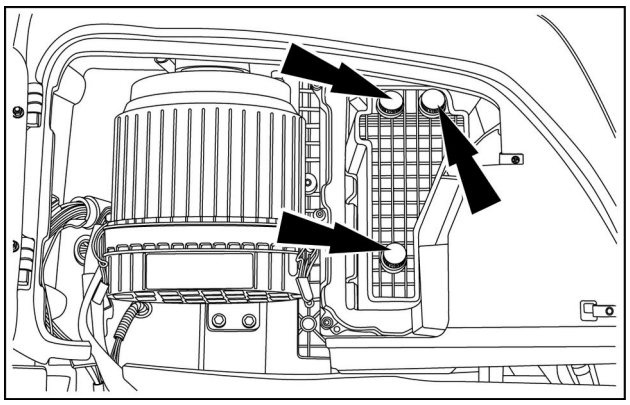
Replace the cab air recirculation filter every 1000 hours or more frequently if conditions so require.

1. Turn the latch **(1)** to open the right-hand door **(2)**.



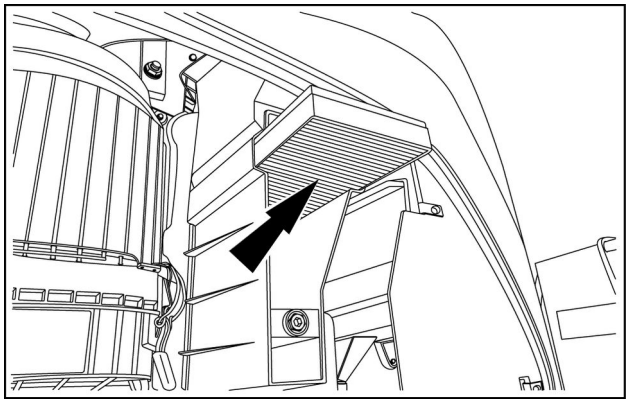
LEIL16WHL1352AA 1

2. Remove the three retaining knobs that hold the recirculation filter cover in place.



LEIL15WHL0562AA 2

3. Extract the recirculation filter.



LEIL15WHL0568AA 3

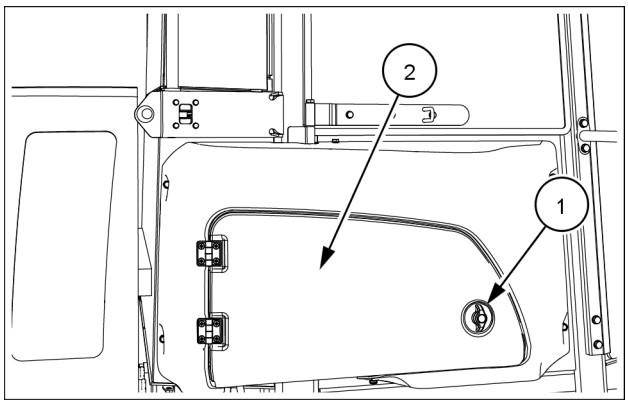
4. Discard the recirculation filter.
5. Wipe the housing clean.
6. Install a new recirculation filter.
7. Secure the recirculation filter cover.
8. Close the right-hand door.

Cab air pre-filter - Replace

Replace the cab air pre-filter every 1000 hours or more frequently if conditions so require.

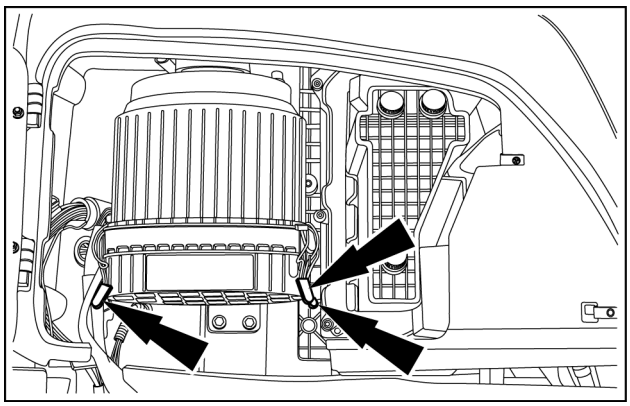
***NOTE:** it is recommended to perform the replacement of cab air pre-filter and filter at the same time.*

1. Turn the latch **(1)** to open the right-hand door **(2)**.



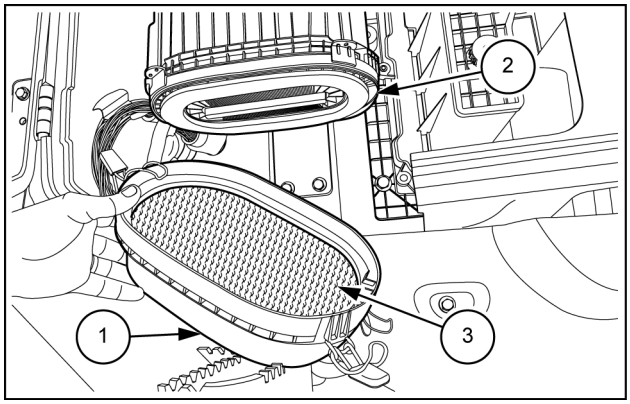
LEIL16WHL1352AA 1

2. Unhook the three clips securing the filter grid assembly.



LEIL15WHL0637AA 2

3. Remove the filter grid assembly **(1)** from the filter housing **(2)**.
4. Remove the pre-filter **(3)**.



LEIL15WHL0566AB 3

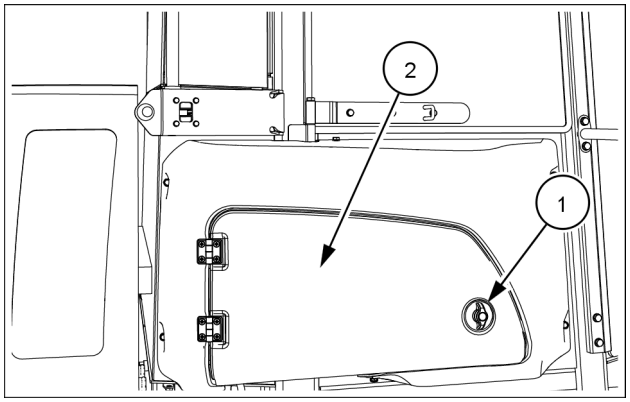
5. Discard the pre-filter.
6. Install a new pre-filter into the filter grid assembly.
7. Secure the filter grid assembly to the filter housing.
8. Close the right-hand door.

Cab air filter - Replace

Replace the cab air filter every 1000 hours or more frequently if conditions so require.

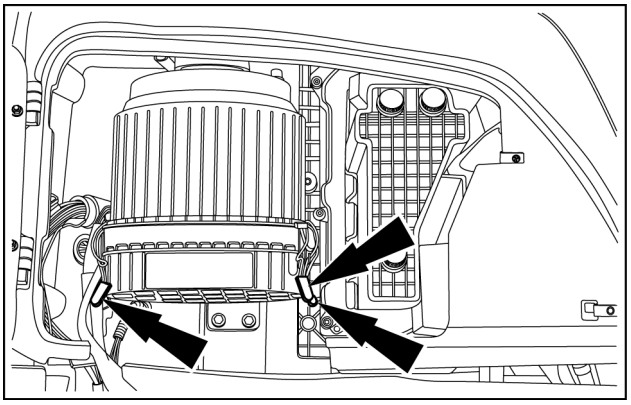
NOTE: *it is recommended to perform the replacement of cab air pre-filter and filter at the same time.*

1. Turn the latch **(1)** to open the right-hand door **(2)**.



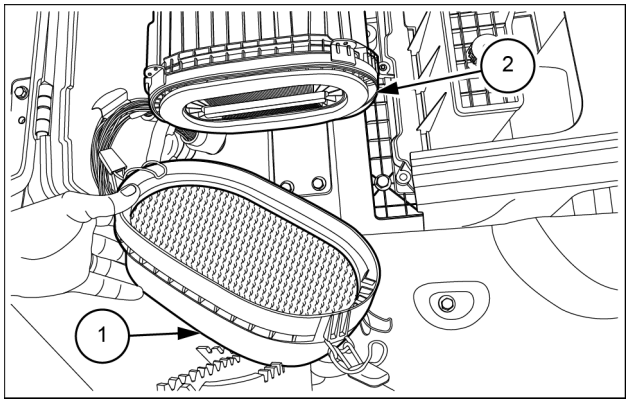
LEIL16WHL1352AA 1

2. Unhook the three clips securing the filter grid assembly.



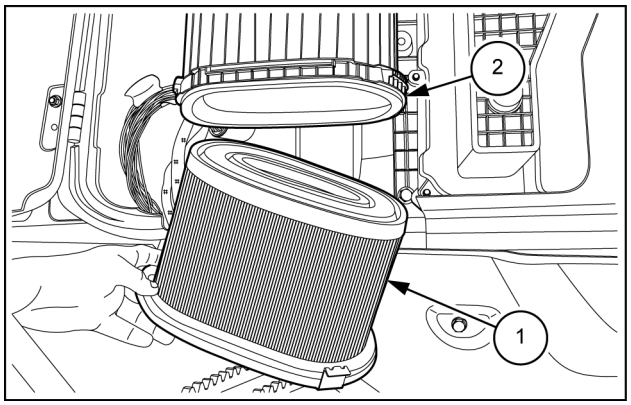
LEIL15WHL0637AA 2

3. Remove the filter grid assembly **(1)** from the filter housing **(2)**.



LEIL17WHL1653AB 3

4. Extract the main filter element **(1)** from the filter housing **(2)**.



LEIL15WHL0567AB 4

5. Discard the main filter element.
6. Wipe the inside of the filter housing.
7. Install a new main filter element into the filter housing.
8. Secure the filter grid assembly to the filter housing.
9. Close the right-hand door.

Engine breather filter - Replace

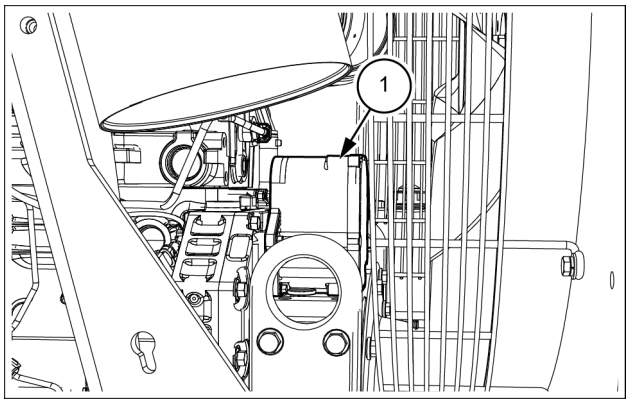
Replace the engine breather filter every 1000 hours or more frequently when operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Locate the engine breather on the back of the engine near the fan. You can access the engine breather from the right-hand side of the machine.
2. Remove the screws on the filter housing **(1)**. The housing will contain two filters.

NOTE: *it may be necessary to use an off-set screwdriver.*

3. Replace the two filters, taking care to fit back into the housing correctly. Replace the cover and tighten the screws.



LEIL16WHL0079AB 1

Front and rear axle oil - Change

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

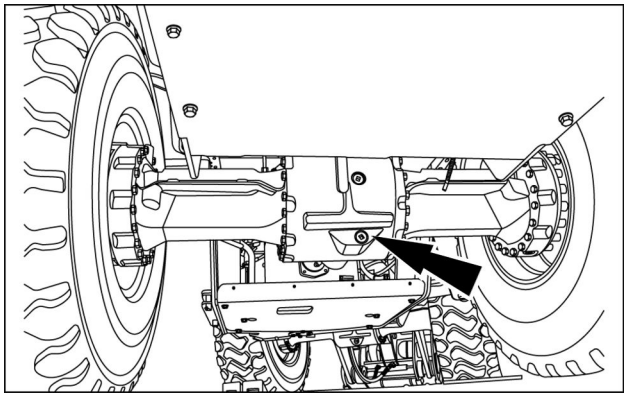
Drain and change the front and rear axle oil every 1000 hours.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications - **PREMIUM TRANSAXLE OIL 80W-140**	
Front axle	**42 L** (**44.4 US qt**)
Rear axle	**40 L** (**42.3 US qt**)

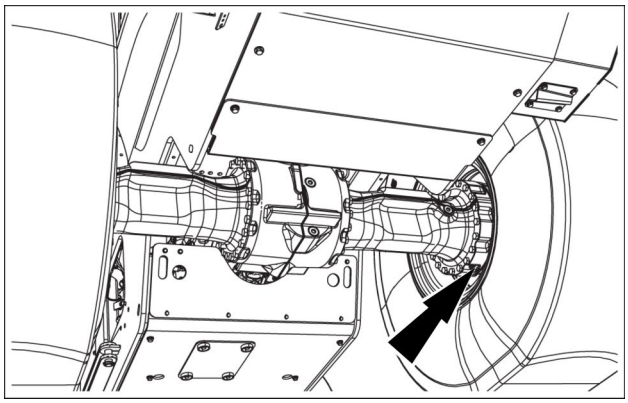
NOTE: *do not use GL-5 oil in these axles.*

1. Clean the area around the drain and fill caps of both axles. Clean the area around the four axle ends.
2. Place a suitable container with sufficient capacity to capture the old oil under the front and rear axles. Remove the drain plug and allow oil to drain.



RCPH10WHL081AAH 1

3. Place a suitable container with sufficient capacity to capture the old oil under each axle end. Remove the drain plugs to allow oil to drain.

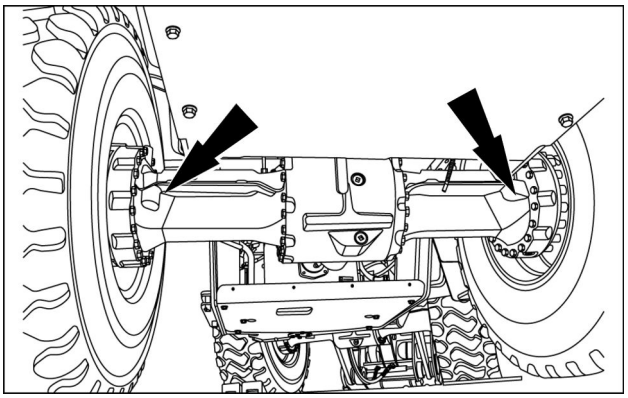


LEIL20WHL0179AA 2

4. Reinstall the drain plugs of both axles and the four axle ends. Take care not to damage the drain plug seal.

5. Fill the axles with new **PREMIUM TRANSAXLE OIL 80W-140**. The oil should reach the bottom of the fill plug.
   Fill the rear axle from the axle ends.
   Fill the front axle from the center.

NOTE: *the oil will take some time to fill each axle. Allow time for the oil to circulate throughout the axle.*



RCPH10WHL081AAH 3

Every 1500 hours

Transmission oil - Change

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

Change the transmission oil every 1500 hours or more frequently when operating conditions are severe.
Shorten the service intervals in severe applications which involve running the torque converter under high load for more than 25% of operation time. Applications include basement digging or land clearing.

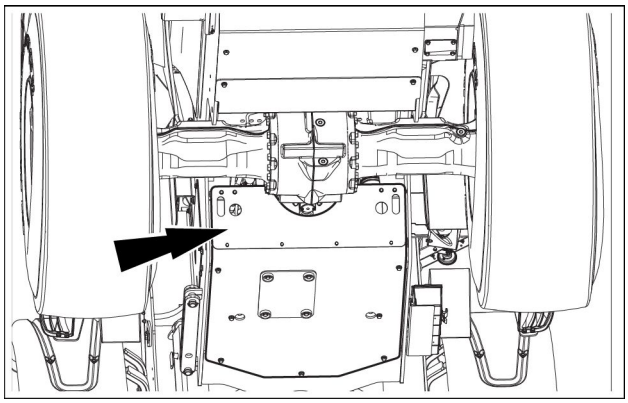
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Oil Type	
Non- **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL** (other brands)	**HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**
Normal conditions - 1000	Normal conditions - 1500
Severe conditions - 500	Severe conditions - 1000

Specifications (with filter change)	**34.1 L (36 US qt)**

NOTE: *it is recommended to replace the transmission oil filter when you change the transmission oil.*

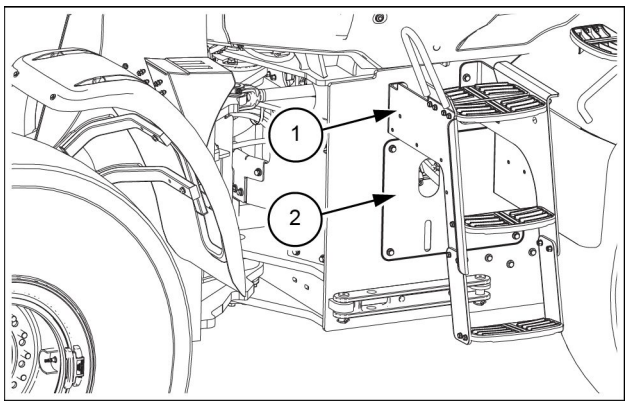
1. In Waste Handler (WH) models, remove the transmission guard at the bottom side of the machine to access the transmission drain cap.



LEIL17WHL1582AB 1

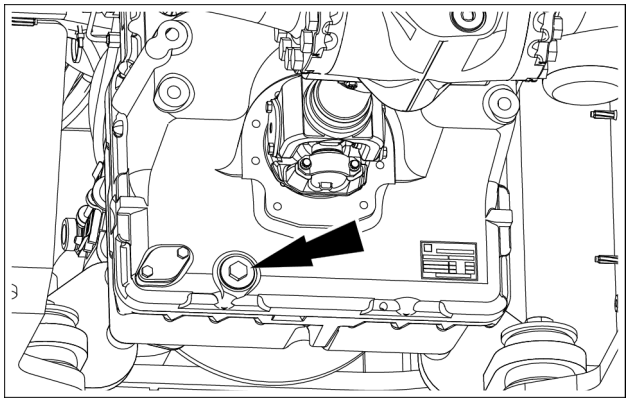
2. Remove the left-hand steps **(1)** and chassis side cover **(2)** to access the transmission fill cap.

NOTE: *remove the left-hand steps **(1)** only if necessary.*



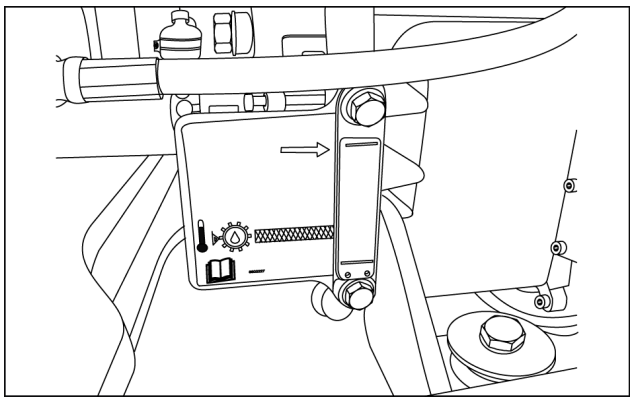
LEIL17WHL1596AB 2

3. Clean the area around the transmission drain and fill caps.
4. Have a suitable container that will hold the appropriate amount of fluid before draining.
5. Remove the drain plug and drain the oil.
   Install the drain plug.



LEIL16WHL0083AA 3

6. Refill with clean **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**.
7. Check the oil level at the sight gauge.
8. Start the engine and check for oil leaks around the filter and drain plug.
9. Bring the transmission oil up to working temperature, and check the level again. Refer to **7-51**.



RCPH10WHL141AAH 4

10. Re-install all the covers, guards and steps previously removed.

Transmission oil filter - Replace

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
Keep hands and body away from any pressurized leak. DO NOT use your hand to check for leaks. Use a piece of cardboard or paper. If fluid penetrates the skin, seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0158A

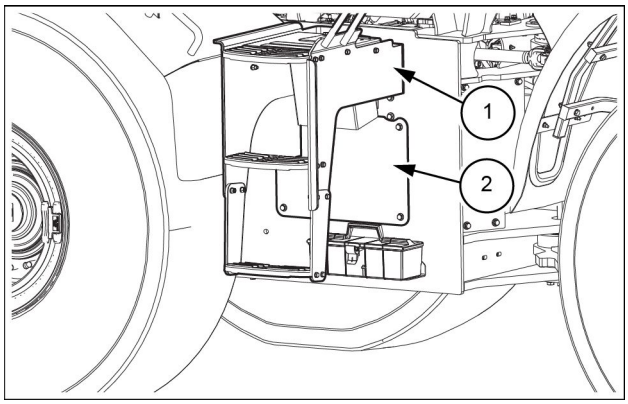
Replace the transmission oil filter every 1500 hours or more frequently when operating conditions are severe. Shorten the service intervals in severe applications which involve running the torque converter under high load for more than 25% of operation time. Applications include basement digging or land clearing.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

NOTE: *it is recommended to change the transmission oil when you replace the engine oil filter.*

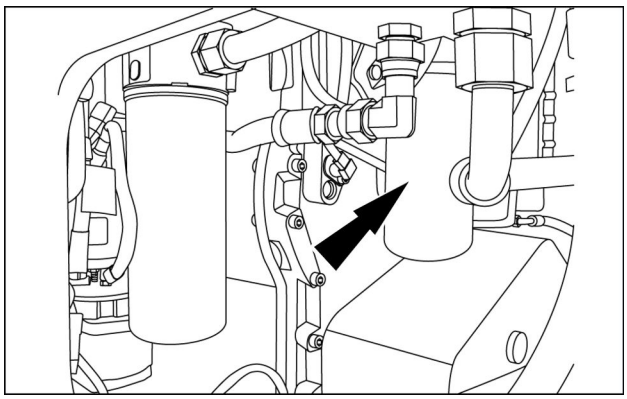
1. If present on the machine remove the right-hand steps **(1)** and chassis side cover **(2)** to access the transmission oil filter.

NOTE: *remove the right-hand steps **(1)** only if necessary.*



LEIL17WHL1580AB 1

2. Clean the area around the transmission oil filter head.
3. Remove the transmission oil filter.
4. Apply a film of clean **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL** to the gasket of the new filter and install. Make sure that the proper contact is made with the base.
5. Clean the transmission breather and reinstall. See the transmission breather cleaning procedure. Refill with clean **HY-TRAN® - PREMIUM HYDRAULIC TRANSMISSION OIL**.
6. Check the oil level at the sight gauge.
7. Start the engine and check for oil leaks around the filter and drain plug.
8. Bring the transmission oil up to working temperature, and check the level again.

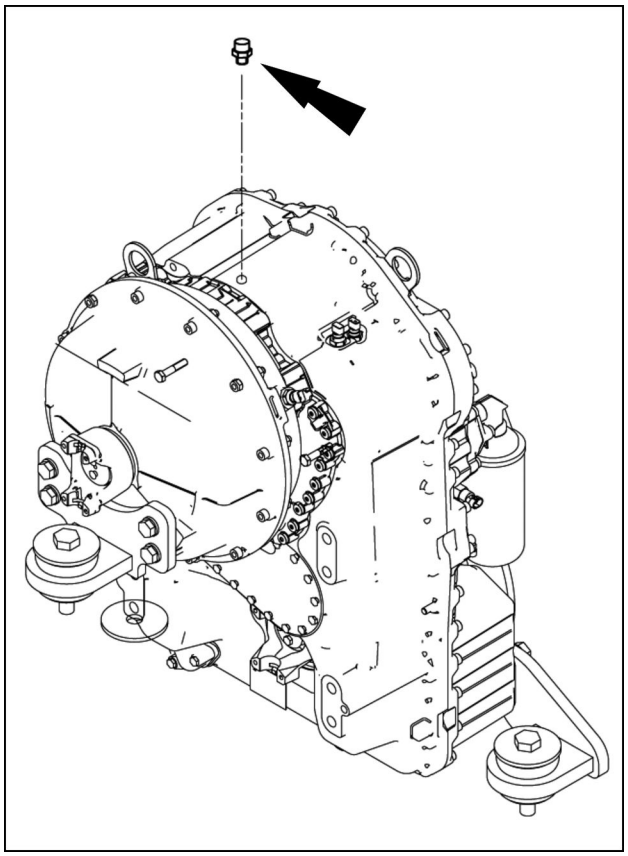


RCPH10WHL127AAH 2

9. Re-install all the covers, guards and steps previously removed.

Transmission breather - Cleaning

1. After changing the transmission oil and the transmission filter, locate the breather on the top of the transmission. Spin the breather a few times. Change the breather filter, if equipped.
2. If the breather is difficult to spin, follow steps 3 and 4.
3. Remove the breather. Clean the breather with solvent and dry with compressed air.
4. Install the breather.
5. Check the oil level at the sight gauge.
6. Start the engine, and check for oil leaks around the transmission filter and the drain plug.
7. Bring the transmission oil up to working temperature, and check the level again.



LEEN11T0309BA 1

Every 2000 hours

Hydraulic oil - Change

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

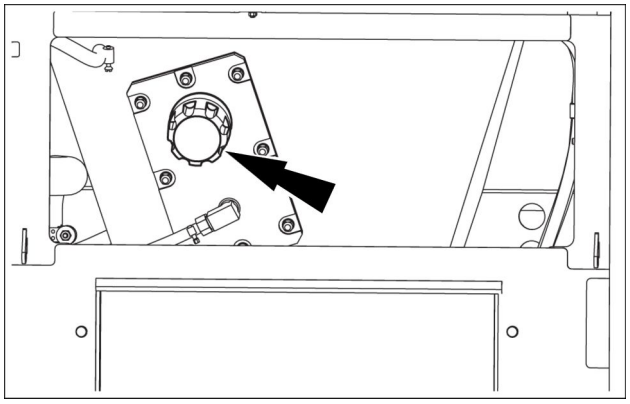
Change the hydraulic oil every 2000 hours of operation or more frequently when operating conditions are severe.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Type of oil	**PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR**
Total system capacity	**200 l** (**53.0 US gal**)

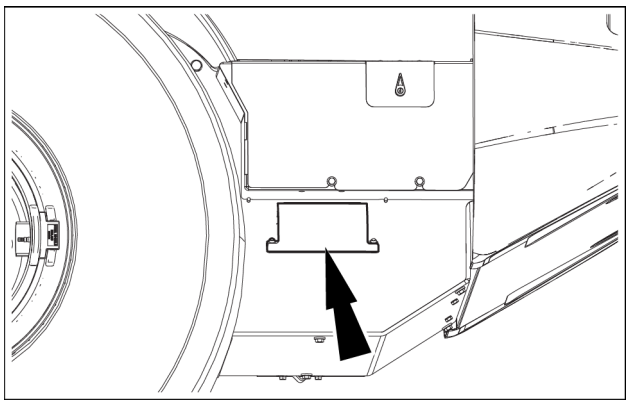
NOTE: *Replace the hydraulic oil filter when you change the hydraulic oil.*

1. Release pressure in the hydraulic system. Refer to **7-3** for further information.
2. Clean the area around the filler cap on the hydraulic reservoir. Slowly loosen the filler cap on the hydraulic reservoir to release any residual pressure in the reservoir. Leave the filler cap loose during the procedure.



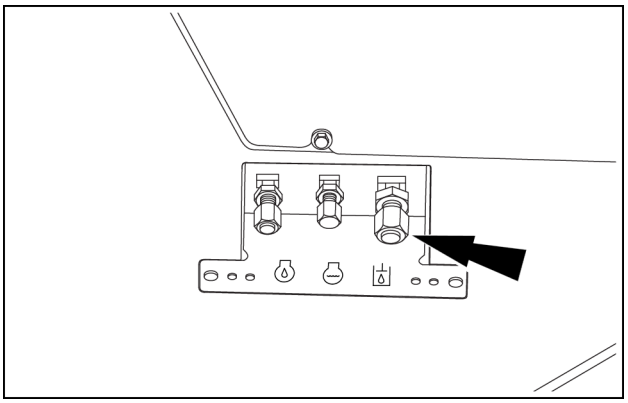
LEIL18WHL1174AA 1

3. Remove the remote drain cover to access the hydraulic oil drain (if equipped).



LEIL17WHL1597AB 2

4. Locate the hydraulic oil remote drain. Use a suitable container to collect the used oil. Drain the hydraulic oil completely.
   Close the remote drain.



LEIL16WHL0198AA 3

5. Fill the reservoir with new **PREMIUM HYDRAULIC OIL HV46 MULTI-GRADE ANTI-WEAR**.
6. Install the reservoir filler cap.
7. Start the engine and run at low idle. Check for leakage around the filter and drain.
8. Operate the joystick several times to remove any air in the lines.
9. Place the loader bucket/attachment on the ground and stop the engine. Check the hydraulic oil level.
10. If it is necessary to top off with more oil, remove the fill cap slowly to release the pressure in the reservoir.

Biodegradable hydraulic oil (if used) - Change

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

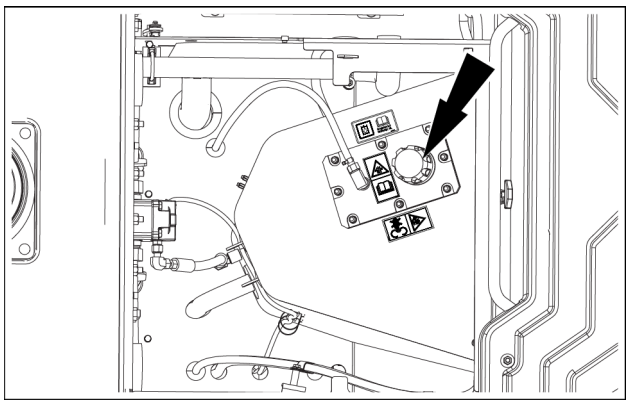
Change the biodegradable hydraulic oil (if used) every 2000 hours of operation or more frequently when operating conditions are severe. Send sample in for analysis to determine if the biodegradable oil needs to be serviced.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

Service specifications	
Biodegradable hydraulic oil	
Total system capacity	**200 l** (**53.0 US gal**)

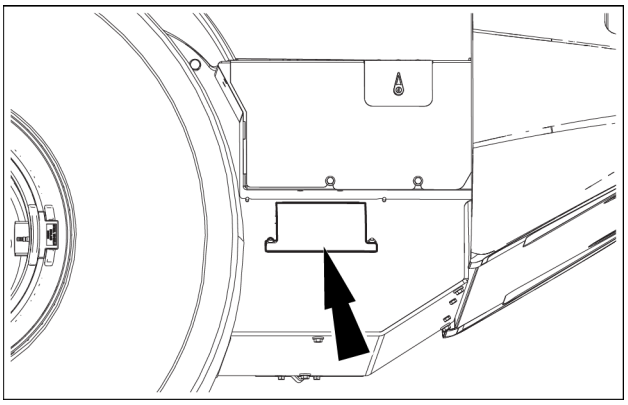
NOTE: *replace the hydraulic oil filter when you change the biodegradable hydraulic oil.*

1. Bring the hydraulic system to the operating temperature.
2. Retract all the hydraulic cylinders.
3. Release pressure in the hydraulic system. Refer to **7-3** for further information.
4. Clean the area around the filler cap on the hydraulic reservoir. Slowly loosen the filler cap on the hydraulic reservoir to release any residual pressure in the reservoir. Leave the filler cap loose during the procedure.



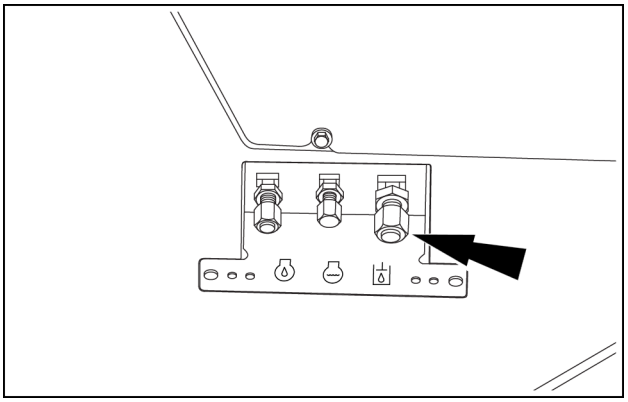
LEIL17WHL2065AB 1

5. Remove the remote drain cover to access the hydraulic oil drain (if equipped).



LEIL17WHL1597AB 2

6. Locate the hydraulic oil remote drain. Use a suitable container to collect the used oil. Drain the hydraulic oil completely. Close the remote drain.



LEIL16WHL0198AA 3

7. Fill the hydraulic reservoir with new biodegradable hydraulic oil.
8. Check that the biodegradable hydraulic oil decals applied to the cab door and hydraulic oil reservoir are visible – see “Safety signs” section in Chapter 2 of this manual for decal locations.
9. Put the machine into operating conditions. Check the biodegradable hydraulic oil level in the hydraulic reservoir.
10. The biodegradable hydraulic oil may dissolve deposits in the hydraulic system.
    Make further filter changes according to the maintenance plan.
11. Sample the biodegradable hydraulic oil after **30 – 50 h** operating hours and send in for analysis. Refer to **7-116**.

Hydraulic systems - Check

Special analysis kits are available for taking samples. They contain all necessary parts and information.

1. Analysis kits are available from the spare-parts/service department.
2. After 30 to 50 operating hours with biodegradable hydraulic oil, take the first sample.
   – Send this sample in for analysis per the instructions in the analysis kit.
3. After this, we recommend sending in a sample for analysis every 1000 operating hours or once a year.
4. It is essential that biodegradable hydraulic oil be analyzed no later than 2000 operating hours.
   – The results of the analysis shows whether the hydraulic fluid is still serviceable and the changing intervals can be extended.
   – In case of questions ask your authorized dealer.

Primary engine air filter - Replace

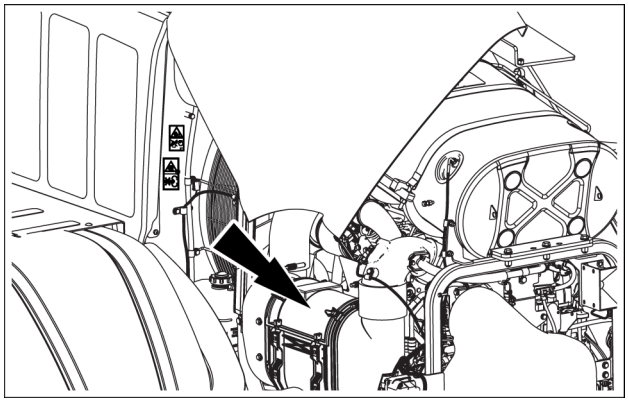
Check the engine air filter periodically for dirt and debris build up. Replace the engine primary air filter every 2000 hours or each year, whichever occurs first.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

NOTE: *replace the primary element if the filter warning lamp on the instrument cluster illuminates or the audible alarm sounds. if the caution warnings continue after the primary filter replacement, replace the secondary filter as well.*

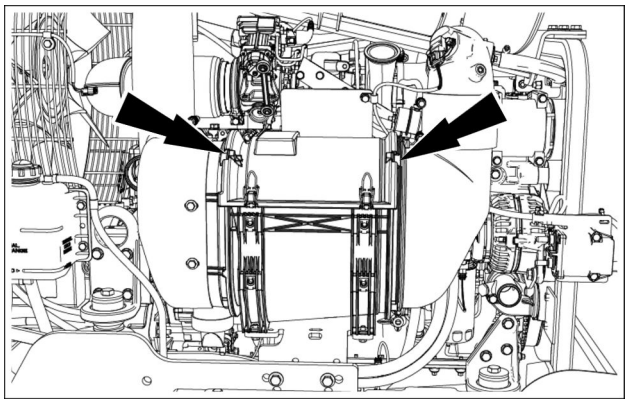
NOTE: *replace the filters more often if conditions so require.*

1. Raise the engine hood to access the engine primary and secondary air filters. The engine primary air filter is located on the left-hand side of the machine, inside the main engine compartment.



LEIL18WHL1098AA 1

2. Release the four clips that secure the filter cover. Remove the cover.

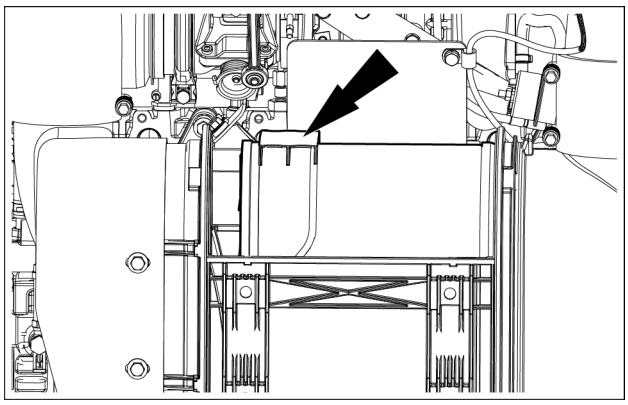


LEIL16WHL0588AA 2

3. Remove the primary filter element. Use the handle to pull the element up and straight out of housing.

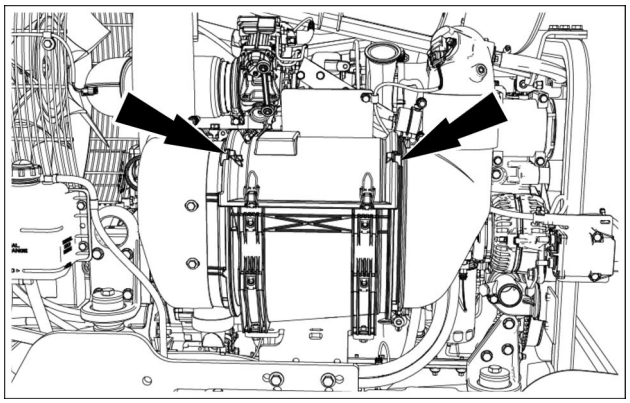
NOTE: *remove extra debris and wipe the inside of the filter housing with a clean cloth before installing new filter elements.*

4. Install the new primary filter by sliding it towards the rear of the machine and down into the housing.
5. Make certain the primary and secondary filters form an effective seal.



LEIL17WHL1673AB 3

6. Install the cover and lock the clips to secure the cover in place. If the cover does not secure in place properly, recheck the filter installation. The cover will be difficult to install if filters are not properly installed.
7. Close the engine hood.



LEIL16WHL0588AA 4

Secondary engine air filter - Replace

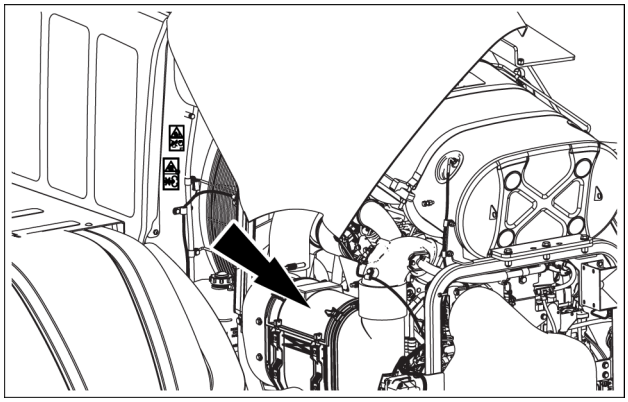
Check the engine air filter periodically for dirt and debris build up. Replace the secondary engine air filter every 2000 hours or each year, whichever occurs first.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

NOTE: *it is recommended to perform the replacement of the primary engine air filter and the secondary engine air filter at the same time.*

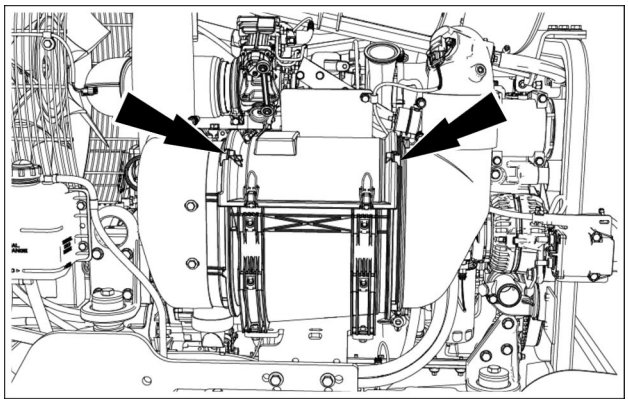
NOTE: *replace the secondary engine air filter more often if conditions so require.*

1. Raise the engine hood to access the engine primary and secondary air filters. The engine secondary air filter is located on the left-hand side of the machine, inside the main engine compartment.



LEIL18WHL1098AA 1

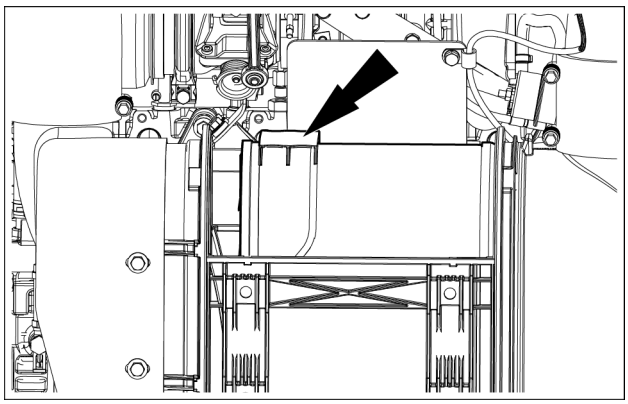
2. Release the four clips that secure the filter cover. Remove the cover



LEIL16WHL0588AA 2

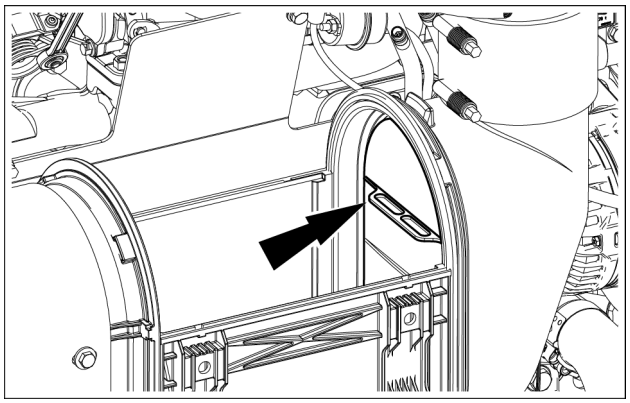
3. Remove the primary filter element. Use the handle to pull the element up and straight out of housing.

NOTE: *remove extra debris and wipe the inside of the filter housing with a clean cloth before installing new filter elements.*



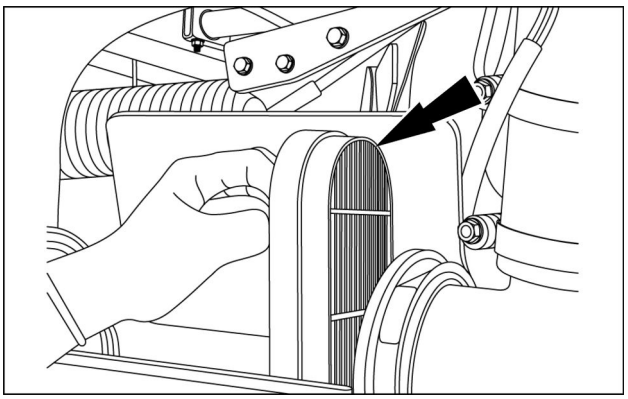
LEIL17WHL1673AB 3

4. Locate the secondary filter handle.



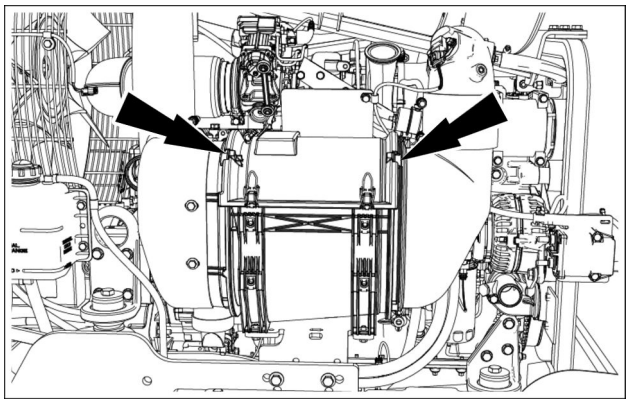
LEIL17WHL1674AB 4

5. Remove the secondary engine filter from the right-hand side of the housing.
6. Install the new secondary engine air filter by inserting the filter into the positioning slot. Make certain to firmly seat the secondary engine air filter into the inlet housing.



RCPH10WHL124AAH 5

7. Reinstall the primary filter by sliding it towards the rear of the machine and down into the housing.
8. Make certain the primary and secondary engine air filters form an effective seal.
9. Install the cover and lock the clips to secure the cover in place. If the cover does not secure in place properly, recheck the filter installation. The cover will be difficult to install if primary and secondary air filters are not properly installed.
10. Close the engine hood.



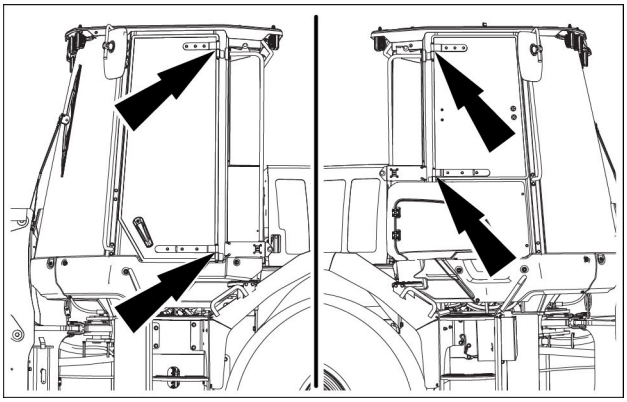
LEIL16WHL0588AA 6

Frame and cab - Lubricate

Lubricate the door and window hinges every 2000 hours or more frequently if conditions so require.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Lubricate the door and window hinges. Use graphite to lubricate the hinges. Do not use grease.



LEIL16WHL1541AB 1

Engine valve clearance - Check and adjust

Check valve adjustment

This should be performed by a qualified service technician every 2000 hours. Contact your authorized dealer.

Hoses and wiring

Check all hoses and wiring for damage. If damage occurred, see your authorized dealer for repair or replacement.

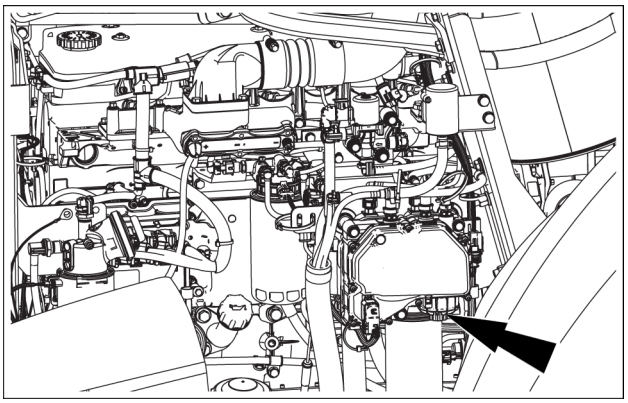
Every 4000 hours

Supply module filter - Replace

Replace the **DEF/ADBLUE®** Supply Module filter every 4000 hours. The Supply Module has a cartridge-type filter.

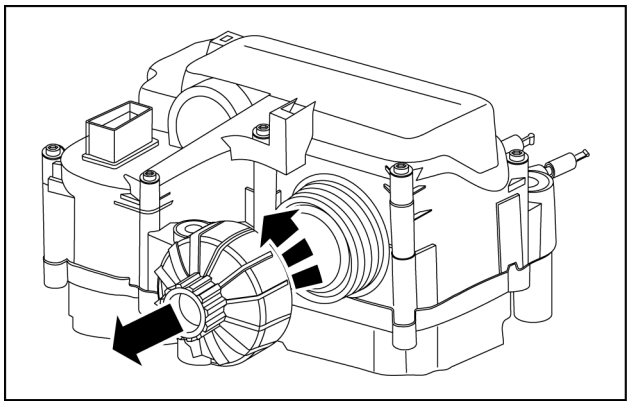
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Open the engine compartment. The Supply Module filter is located on the right-hand side of the machine directly below the Supply Module.



LEIL18WHL1158AA 1

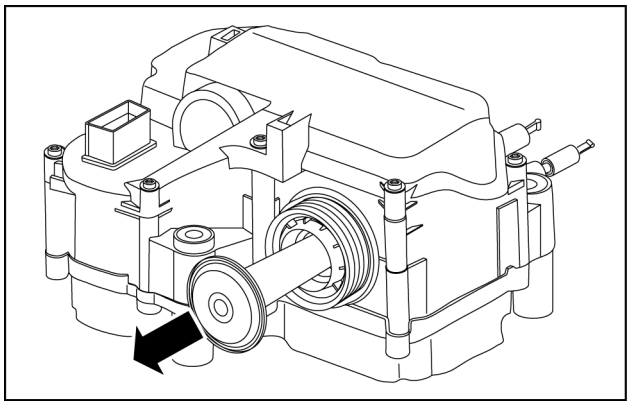
2. Use a suitable container to catch any fluid that is discharged during the hose and filter disassembly. Thoroughly clean the underside of the Supply Module using compressed air. Remove the **DEF/ADBLUE®** filter cover by turning counterclockwise.



LEIL15WHL0042AB 2

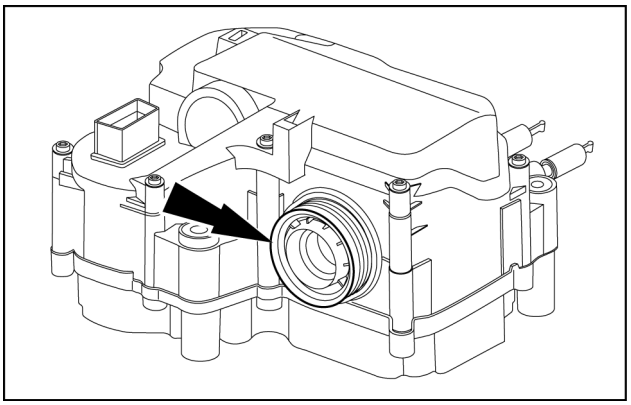
3. Remove the equalizing element from the center of the filter. Discard the equalizing element following local environmental and waste regulations.

NOTICE: *prevent contamination or damage of the sealing surface on the housing.*



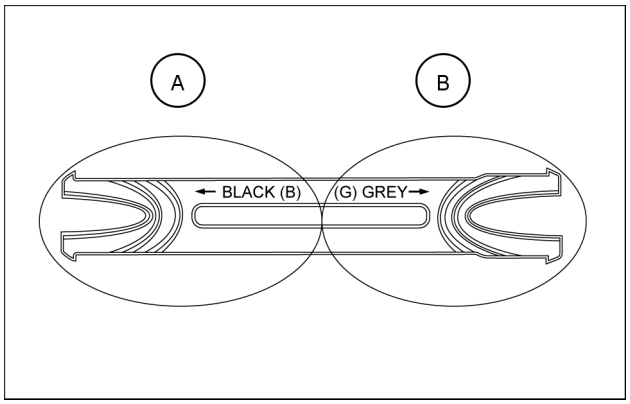
LEIL15WHL0043AB 3

4. Observe the color of the filter inside (gray or black).



LEIL15WHL0044AB 4

5. Select the edge:
   • If the color of the filter is black, insert the side **(A)** of the edge,
   • if the color of the filter is grey, insert the side **(B)** of the edge.

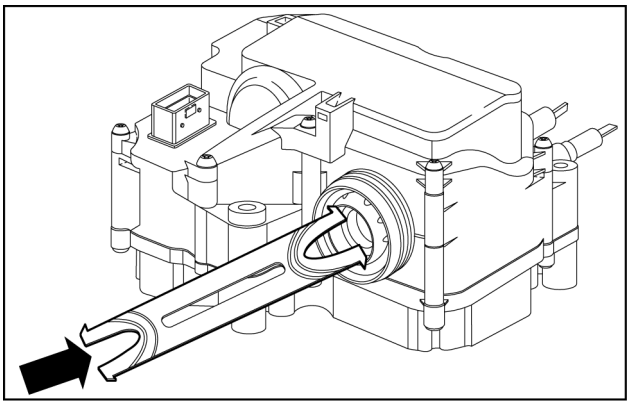


LEIL19WHL0361AB 5

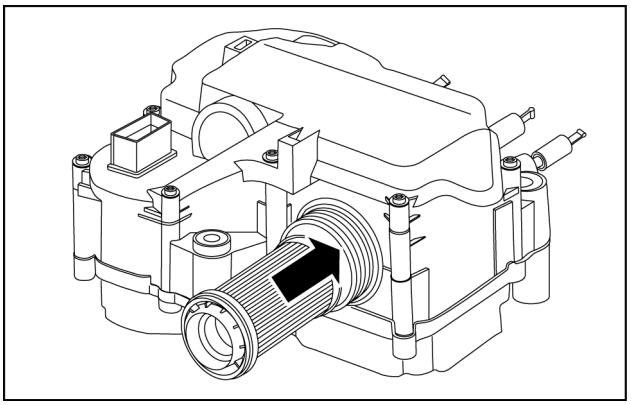
6. Insert the corresponding marked end of the filter removal tool, which is included in the replacement filter kit, until a click is felt or heard, indicating that the tool is completely inserted.
7. Pull the filter and the filter removal tool out by hand. If necessary, insert a tool in the filter removal tool's slot for additional leverage. Discard the filter following local environmental and waste regulations

NOTICE: *protect the filter chamber from contamination and particles.*

8. Clean the Supply Module's thread surfaces and the internal filter housing surface with water.
9. Oil the O-rings of the new filter and insert them into the supply module housing. FL Petronas Hidrobak ISO VG 10 oil is recommended.



LEIL14WHL0005AB 6



LEIL15WHL0045AB 7

10. Insert the new equalizing element
11. Clean the filter cover with water and reinstall. Tighten by hand till finger tight, then tighten with a 12–corner **27 mm** wrench to **15 – 25 N·m** (**11 – 18 lb ft**) torque.
12. Start the engine and run at idle speed. Check for leaks.

Diesel Exhaust Fluid (DEF)/AdBlue® tank suction filter - Cleaning

⚠ WARNING

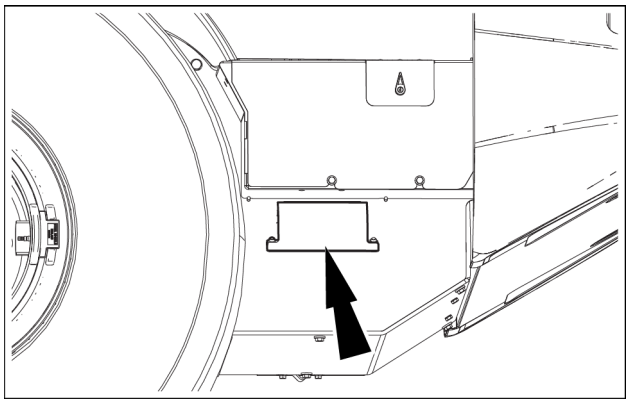
Burn hazard!
The engine and exhaust system become hot during operation. To prevent burns, open the engine compartment and allow the components to cool to a comfortable touch temperature before you work inside the engine compartment.
Failure to comply could result in death or serious injury.

W1406A

Clean the **DEF/ADBLUE®** tank suction filter every 4000 hours.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

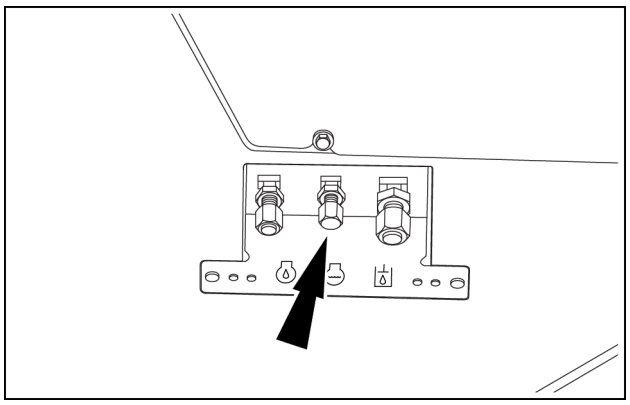
1. Remove the remote drain cover to access the radiator drain (if equipped).



LEIL17WHL1597AB 1

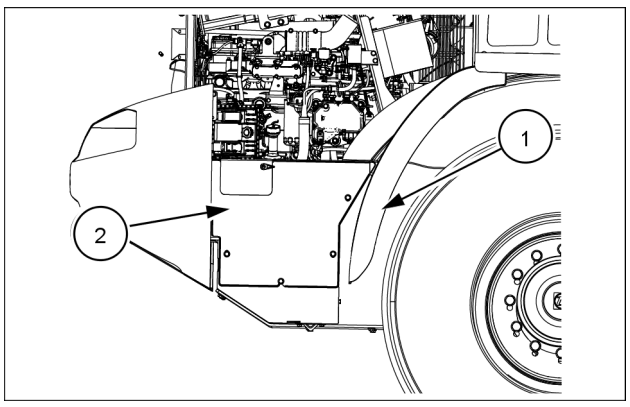
2. Place a suitable container below the radiator drain. Remove the radiator cap. Remove the drain cap. Drain the coolant. Install the tank drain plug and the radiator cap after coolant has been drained.

NOTE: *use compressed air and water to clean debris from around drain plug area.*



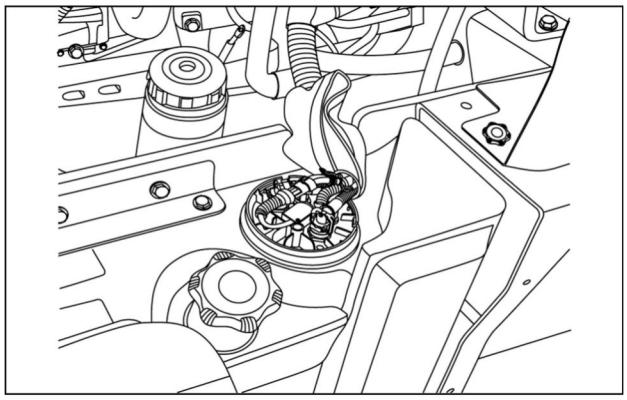
LEIL16WHL0198AA 2

3. Move the right-hand rear fender **(1)** loosening the fixing nuts to access to the bolts that holds the **DEF/ADBLUE®** supply tank cover **(2)**.
   Remove the **DEF/ADBLUE®** supply tank cover **(2)** to access the **DEF/ADBLUE®** supply tank.



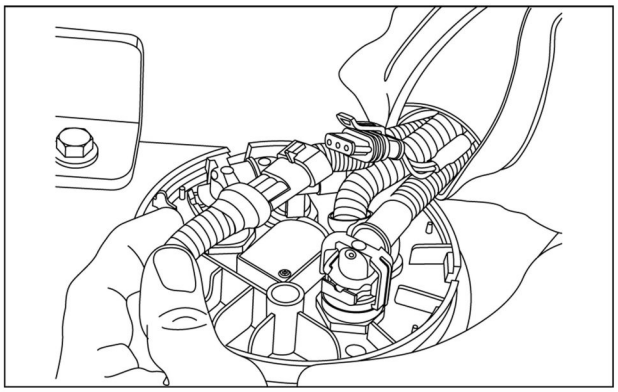
LEIL18WHL0581AB 3

4. Remove the rubber boot cover from the wires of the liquid level/temperature sensor sending unit **DEF/ADBLUE®** and engine coolant supply lines. Mark wire and hose connection positions.



RCPH11WHL704BAU 4

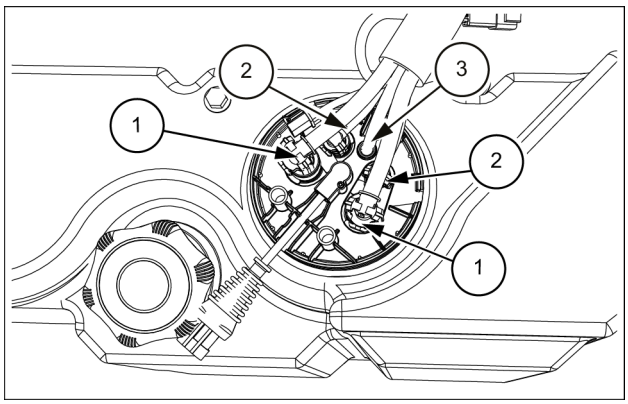
5. Unplug the wiring harness.



RCPH11WHL705BAU 5

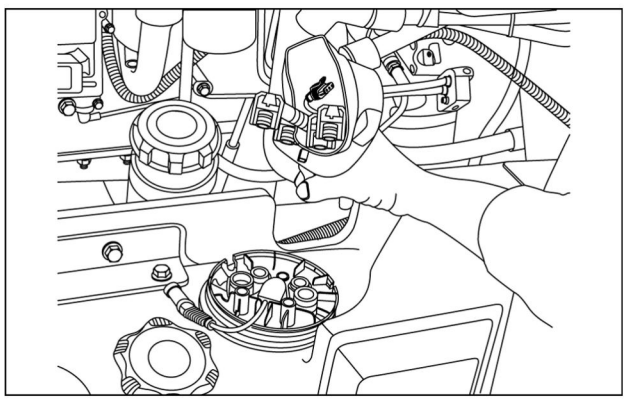
6. Disconnect the engine coolant lines **(1)** and the **DEF/ADBLUE®** lines **(2)** by pushing coupling together, squeezing the tabs and then pulling the connection apart.
   Remove the vent line **(3)** by pushing collar down with screwdriver and pulling up on the vent line **(3)**.

NOTE: *plug all lines to prevent debris from entering the system.*



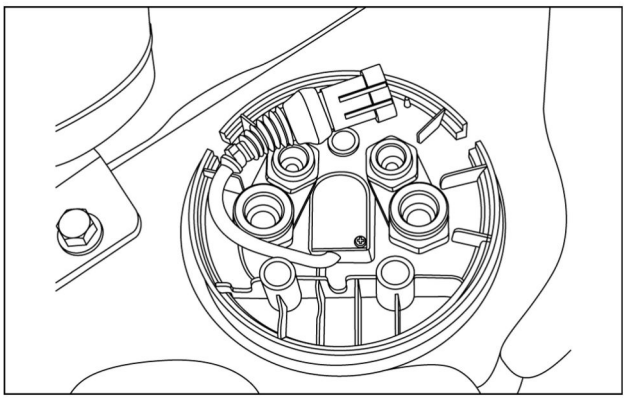
LEIL16WHL1567AB 6

7. Move the wiring harness, the engine coolant lines, the **DEF/ADBLUE®** supply/return lines and the vent line, off to the side.



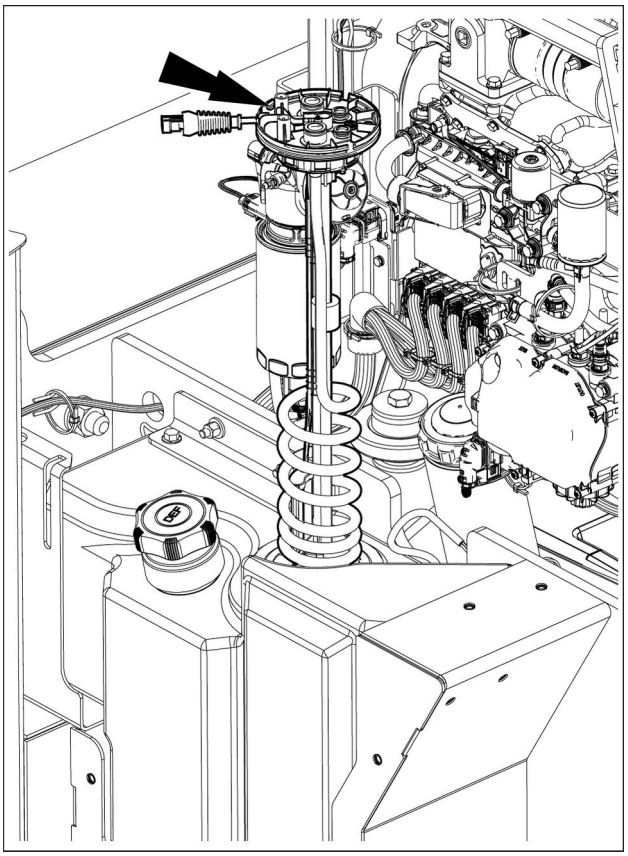
RCPH11WHL706BAU 7

8. Mark location of pickup unit within tank before removal. Use the special tool **84222467**.
   Twist the **DEF/ADBLUE®** level/temperature sensor counter clockwise to loosen it from tank.



RCPH11WHL707BAU 8

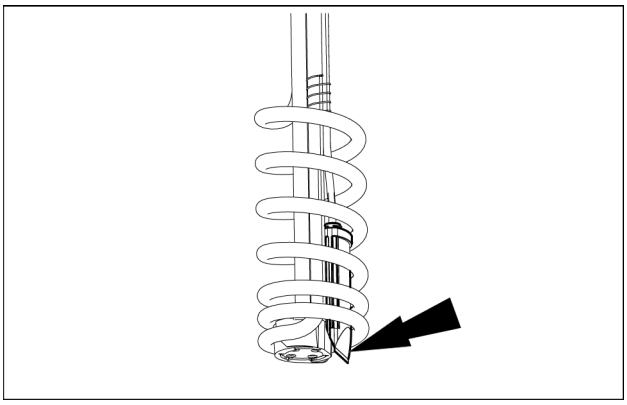
9. Lift the **DEF/ADBLUE®** level/temperature sensor out of tank.



LEIL19WHL0367BA 9

10. Clean the tank suction filter by rinsing with water.

NOTE: *if the tank suction filter is damaged proceed with the replacement (refer to* ***7-137****).*



LEIL19WHL0368AB 10

11. Reinstall the **DEF/ADBLUE®** level/temperature on the **DEF/ADBLUE®** tank.
12. Fill the engine cooling system.

Engine coolant - Change

⚠ WARNING

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in death or serious injury.

W0367A

⚠ WARNING

Rotating parts!
The engine is running. Keep clear of rotating fans and belts.
Failure to comply could result in death or serious injury.

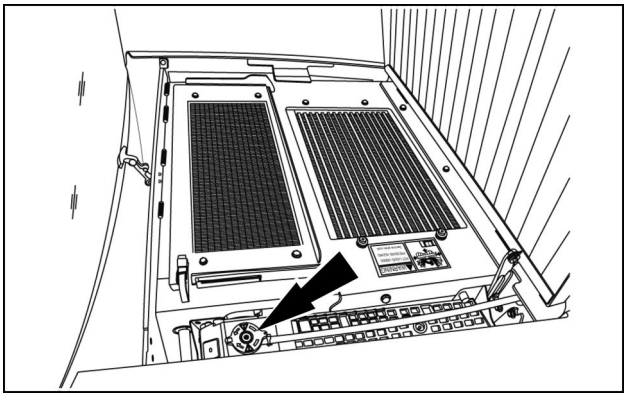
W0275A

Drain, flush and change the engine coolant every 4000 hours of operation or each year, whichever occurs first. Clean the system and change the engine coolant if it becomes dirty or is rust colored.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

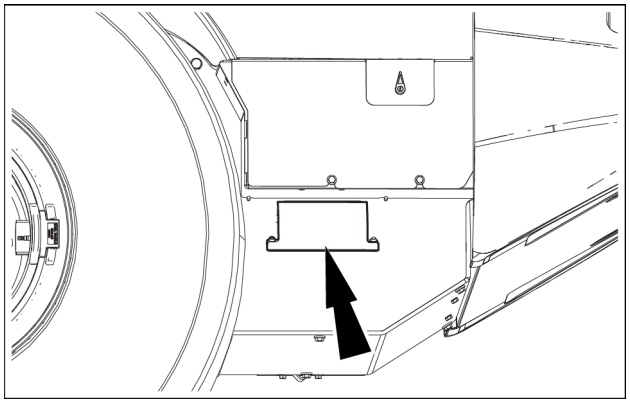
Service specifications	
Type of coolant	**OAT EXTENDED LIFE COOLANT/ANTIFREEZE**
Capacity	**30 L** (**31.7 US qt**)

1. After the engine has cooled and the temperature of the coolant has reached a safe level, remove the cap of the engine radiator on the left-hand side.



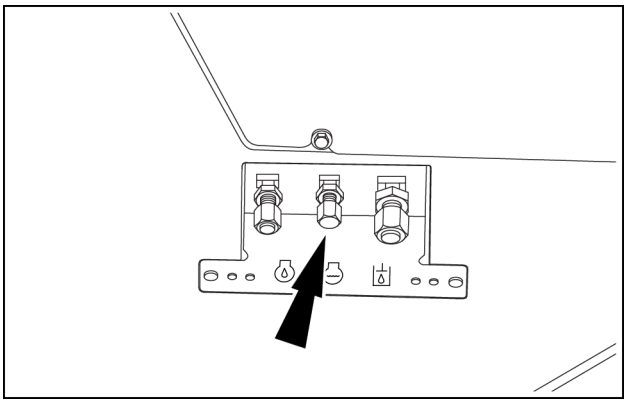
RCPH10WHL139AAH 1

2. Remove the remote drain cover to access the radiator drain (if equipped).

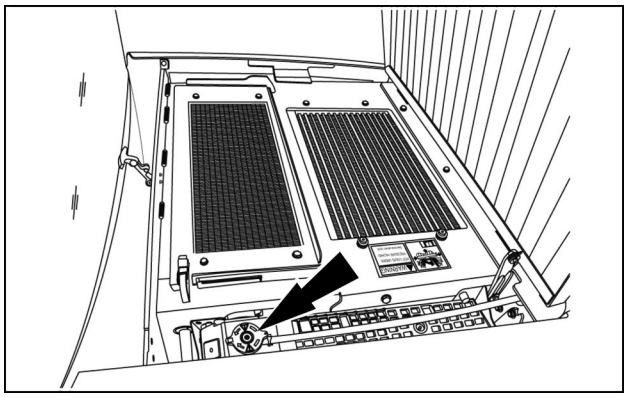


LEIL17WHL1597AB 2

3. Place a suitable container below the radiator drain. Remove the radiator cap.
   With a suitable container of the proper capacity under the drain, open the cap by turning counterclockwise and drain the coolant from the system.
4. After all the engine coolant is drained, secure the drain cap.
5. Use a system cleaning product to clean and flush the system. Contact your dealer for system cleaning products.
6. After the system has been cleaned and flushed following the cleaning product instructions, close and secure the drain valve.
7. Fill with the proper mix of **OAT EXTENDED LIFE COOLANT/ANTIFREEZE** and water for the system and for the prevailing weather conditions.
8. Start the engine, and let it run at low idle until the engine reaches operating temperature. Recheck the level of the system.



LEIL16WHL0198AA 3



RCPH10WHL139AAH 4

As required

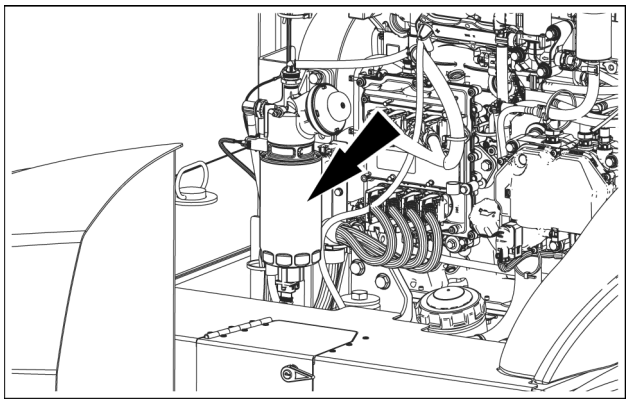
Fuel pre-filter - Drain fluid

Drain water and sediment from the fuel pre-filter as required. In certain geographic regions and climates, it may be necessary to drain condensation more frequently.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

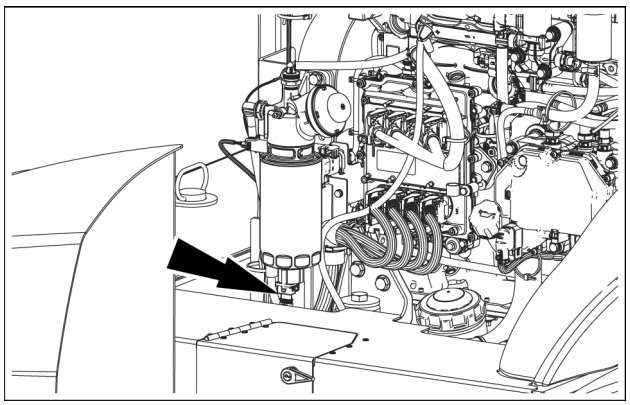
Drain fuel pre-filter condensation

1. Open the engine hood. Locate the pre-filter in the engine compartment on the right-hand side of the machine.



LEIL18WHL1173AA 1

2. Remove the water sensor connector from the bottom of the pre-filter.

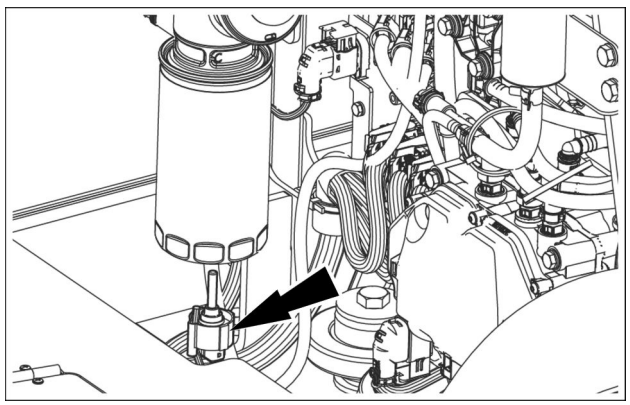


LEIL18WHL1173AA 2

3. Open the drain valve on the fuel pre-filter by turning counterclockwise two or three turns.
4. Drain the water and/or contaminants from the pre-filter into a suitable container until clean fuel flows.

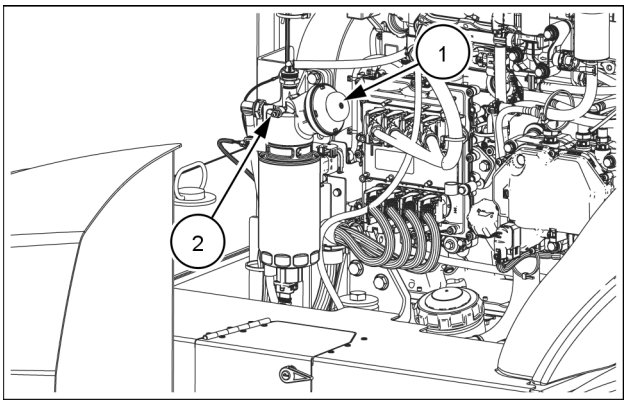
NOTICE: *do not allow fuel to spill on engine or ground.*

5. Close the drain valve. Reconnect the electrical connection. Check for leaks.



LEIL18WHL1172AA 3

NOTE: *if it is necessary to bleed the fuel system, use the attached pump* ***(1)*** *and the bleed screw* ***(2)*** *at the top of the pre-filter housing.*



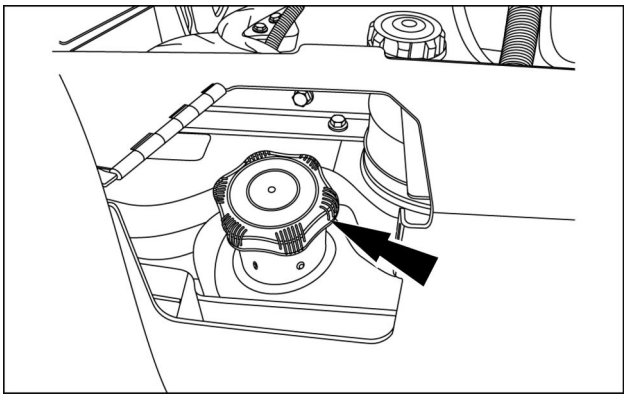
LEIL18WHL1173AA 4

DEF/AdBlue® tank neck filter - Cleaning

Clean the **DEF/ADBLUE®** tank filter as required.

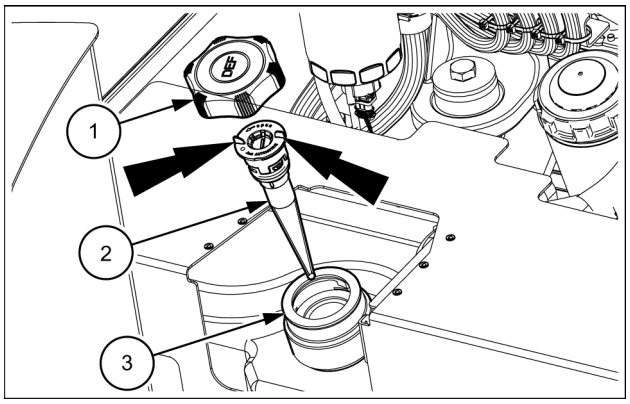
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. The **DEF/ADBLUE®** fill compartment is located on the right-hand side of the machine. The mesh filter is located within the filler neck of the **DEF/ADBLUE®** fill tube. Open the **DEF/ADBLUE®** fill compartment. Clean the area to be serviced in order to keep contamination from the **DEF/ADBLUE®** tank.



RCPH10WHL116AAH 1

2. Remove the filler cap **(1)** from the filler neck **(3)** of the **DEF/ADBLUE®** tank.
3. Press and turn on the two fins (arrows) to remove the **DEF/ADBLUE®** tank filter **(2)** from the twist filler neck **(3)**.
   Clean the **DEF/ADBLUE®** tank filter **(2)** with water to remove any debris and reinstall the **DEF/ADBLUE®** tank filter **(2)**.
4. Reinstall the filler cap **(1)**.



LEIL19WHL0372AB 2

Replacing the tank filter

5. If the **DEF/ADBLUE®** tank filter has been damaged, replace the **DEF/ADBLUE®** tank filter as described in the previous steps.

Urea Quality Sensor (UQS) - Replace

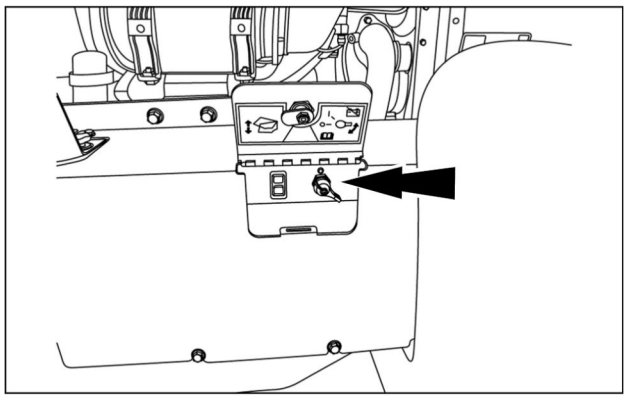
⚠ CAUTION

Flying debris!
Compressed air can propel dirt, rust, etc. into the air. Wear eye and face protection when using compressed air.
Failure to comply could result in minor or moderate injury.

C0049A

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. Turn the timed disconnect switch to the OFF position.

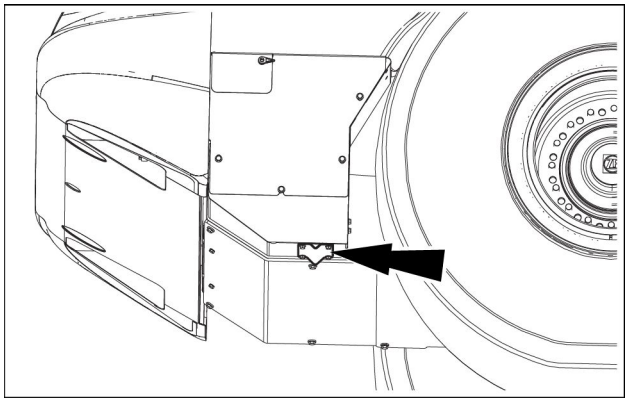


RCPH11WHL653BAU 1

2. Remove the access cover below the **DEF/ADBLUE®** tank to gain access to the Urea Quality Sensor (UQS).

NOTE: *use compressed air and water to clean debris from around drain plug area.*

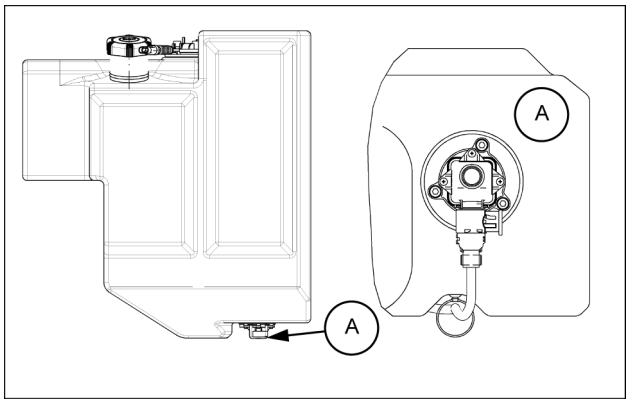
NOTE: *the urea quality sensor on the bottom of the DEF/ADBLUE® tank can be removed to drain fluid as necessary. When removing the urea quality sensor, it is recommended that the electrical harness should not be disconnected from the urea quality sensor. The urea quality sensor should be cleaned by flushing with deionized water before re-installation. Note that the sensor should not be submerged while cleaning so that water does not enter the vent located on the bottom of the sensor. Also note that if the harness was disconnected from the sensor, the electrical pins must be cleaned with electrical contact cleaner and dried before the harness is reconnected to the sensor.*



LEIL17WHL1583AB 2

3. Place a suitable container below the **DEF/ADBLUE®** supply tank.
   Remove the Urea Quality Sensor (UQS), allow the **DEF/ADBLUE®** drain through the UQS hole.
   Disconnect harness from the UQS. Clean and dry harness terminals before connecting to new UQS.
   Install a new UQS.

NOTE:** see " **DEF/ADBLUE® tank refilling" section for important tank draining information.



LEIL14WHL0207AB 3

Diesel Exhaust Fluid (DEF)/AdBlue® tank suction filter - Replace

⚠ WARNING

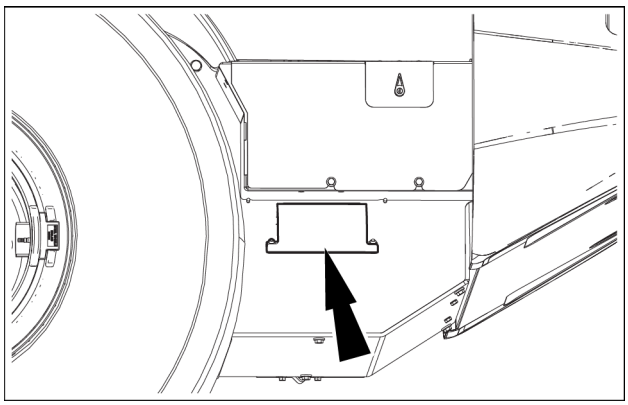
Burn hazard!
The engine and exhaust system become hot during operation. To prevent burns, open the engine compartment and allow the components to cool to a comfortable touch temperature before you work inside the engine compartment.
Failure to comply could result in death or serious injury.

W1406A

Replace the **DEF/ADBLUE®** tank suction filter as required:
• when ongoing system pressure errors are experienced. This will be evident by fault code “19335 (F-5392-14) - **DEF/ADBLUE®** system unable to build sufficient pressure for dosing” showing on the multifunctional display and/or the engine going into derate.
• when the filter has been removed for any reason.

Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

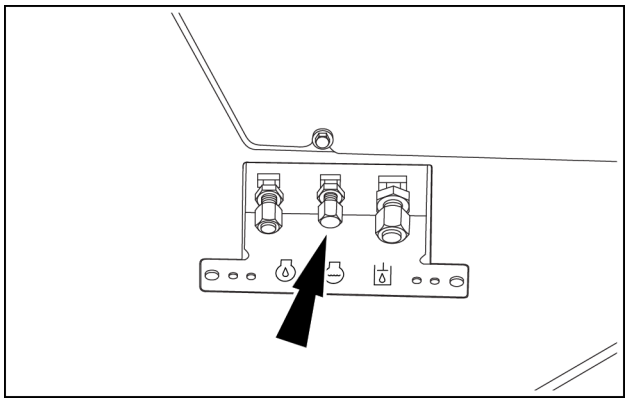
1. Remove the remote drain cover to access the radiator drain (if equipped).



LEIL17WHL1597AB 1

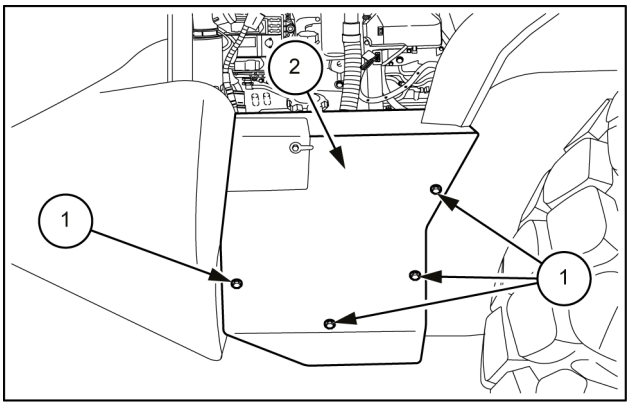
2. Place a suitable container below the radiator drain. Remove the radiator cap. Remove the drain cap. Drain the coolant. Install the tank drain plug and the radiator cap after coolant has been drained.

NOTE: *use compressed air and water to clean debris from around drain plug area.*



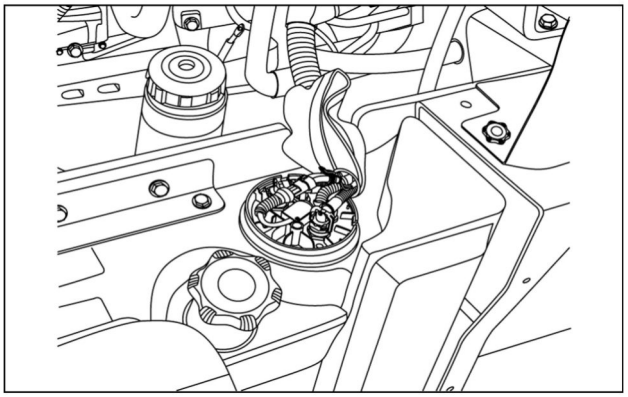
LEIL16WHL0198AA 2

3. Loosen the hexagonal bolts **(1)** and remove the cover **(2)** on the right rear of the machine to access the **DEF/ ADBLUE®** supply tank.



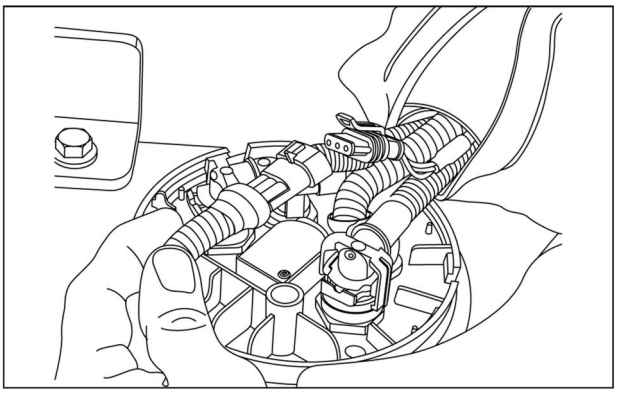
LEIL13WHL0222AB 3

4. Remove the rubber boot cover from the wires of the liquid level/temperature sensor sending unit **DEF/ADBLUE®** and engine coolant supply lines. Mark wire and hose connection positions.



RCPH11WHL704BAU 4

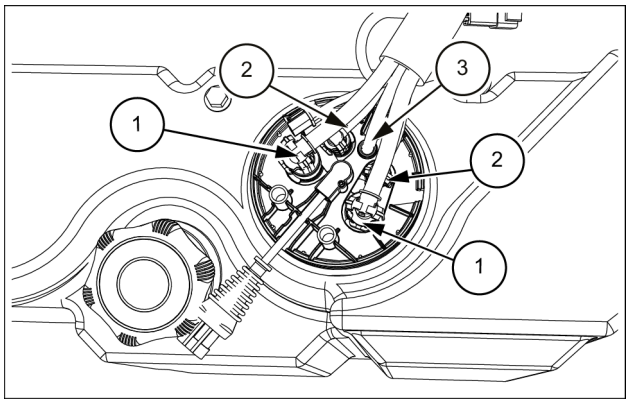
5. Unplug the wiring harness.



RCPH11WHL705BAU 5

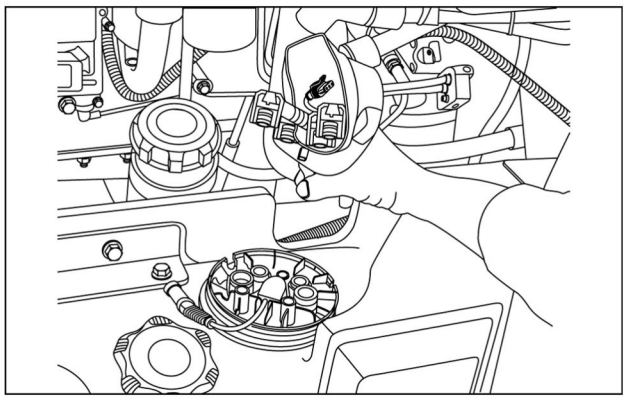
6. Disconnect the engine coolant lines **(1)** and the DEF/ADBLUE® lines **(2)** by pushing coupling together, squeezing the tabs and then pulling the connection apart.
   Remove the vent line **(3)** by pushing collar down with screwdriver and pulling up on the vent line **(3)** .

NOTE: *plug all lines to prevent debris from entering the system.*



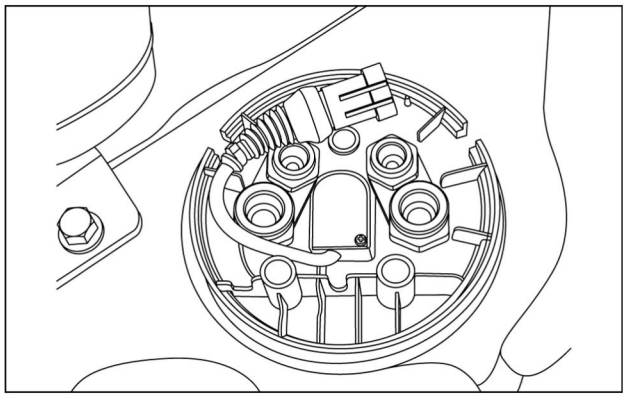
LEIL16WHL1567AB 6

7. Move the wiring harness, the engine coolant lines, the **DEF/ADBLUE®** supply/return lines and the vent line, off to the side.



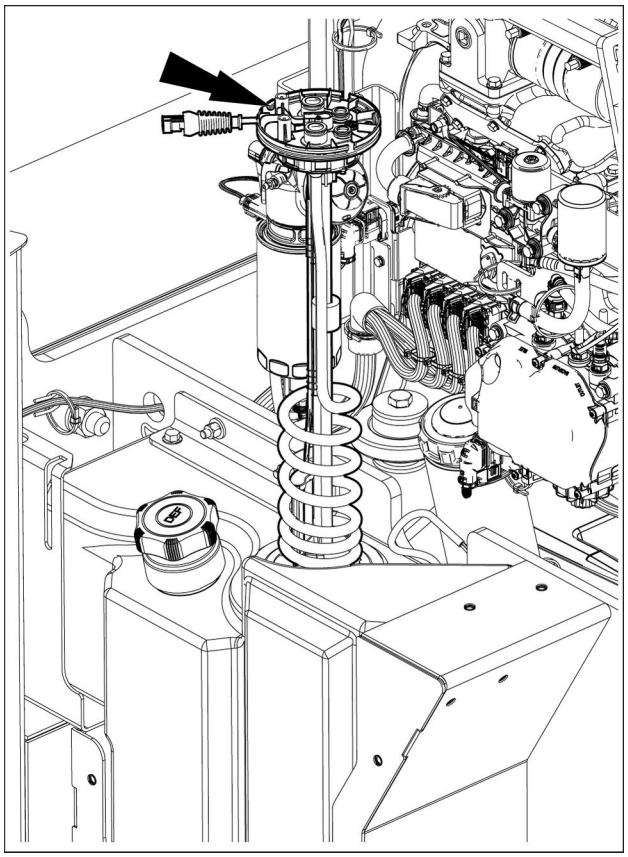
RCPH11WHL706BAU 7

8. Mark location of pickup unit within tank before removal. Use the special tool **84222467**.
   Twist the **DEF/ADBLUE®** level/temperature sensor counter clockwise to loosen it from tank.



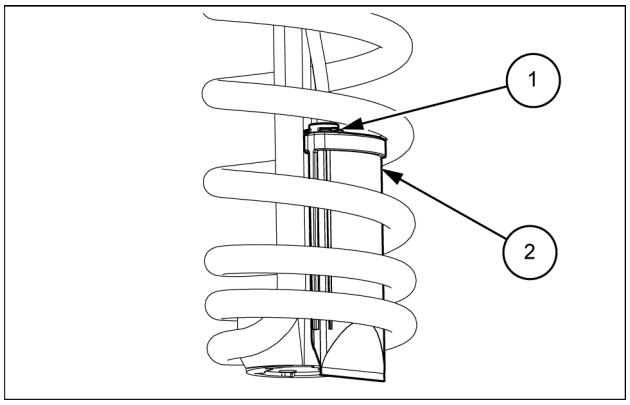
RCPH11WHL707BAU 8

9. Lift the **DEF/ADBLUE®** level/temperature sensor out of tank.



LEIL19WHL0367BA 9

10. Remove the retaining clip **(1)** from the suction filter **(2)**. Remove the old filter **(2)** and the related o-ring from the **DEF/ADBLUE®** supply line.
11. Place the new o-ring on the **DEF/ADBLUE®** supply line. Place the new filter **(2)** onto the def supply line. Place the retaining clip **(1)** onto filter securely. The retaining clip **(1)** will rest in the groove on the filter neck.



LEIL19WHL0371AB 10

12. Reinstall the **DEF/ADBLUE®** level/temperature on the **DEF/ADBLUE®** tank.
13. Fill the engine cooling system.

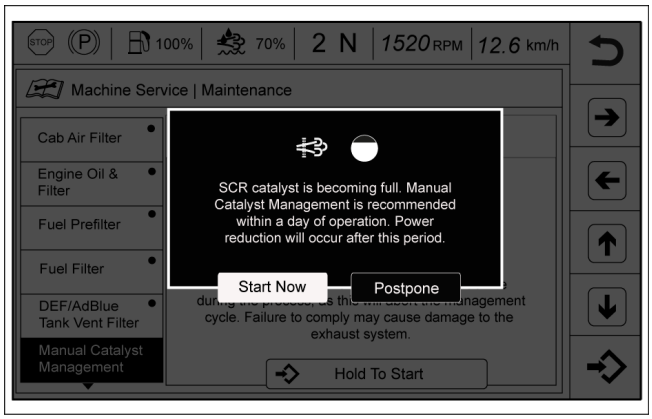
Manual Catalyst Management (MCM) - Regenerate

Prior operation:
Keep all non-authorized personnel clear of the area.

This mode of operation is required to burn off excessive soot accumulation in the catalyst.

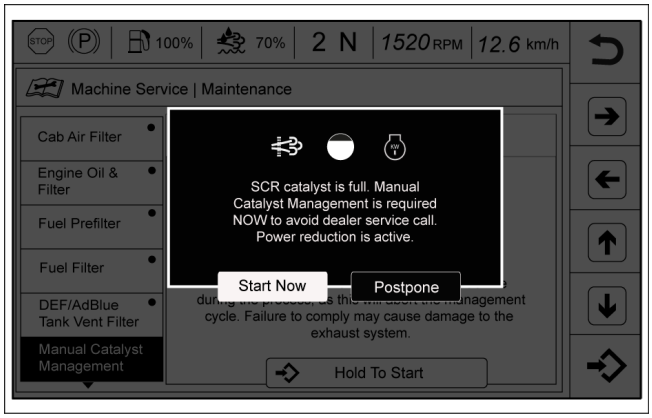
Activate the Manual Catalyst Management (MCM) as required:

- Immediately before to perform an engine oil change
- When the SCR catalyst is becoming full



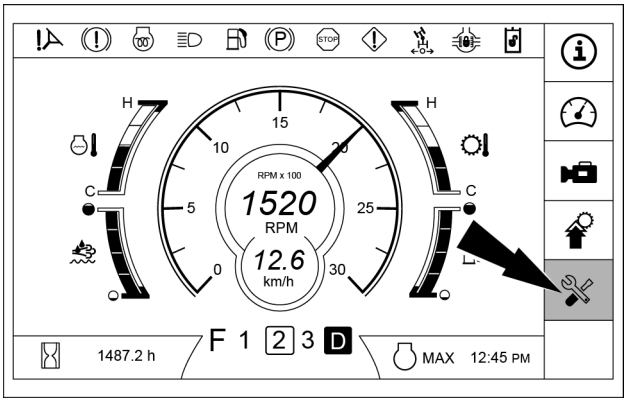
LEIL20WHL0203AA 1

- When the SCR catalyst is full



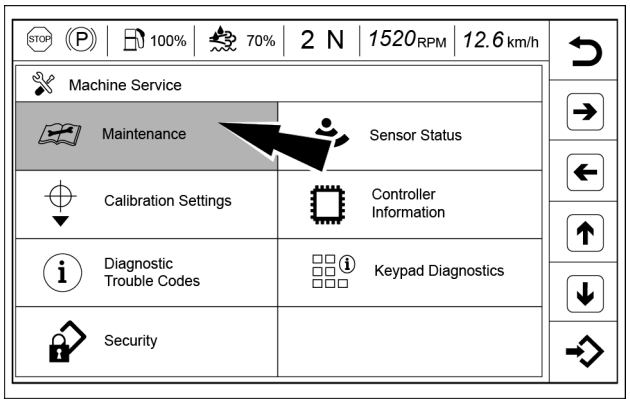
LEIL20WHL0204AA 2

1. Park the machine on a firm, level surface in a safe and well ventilated area to accommodate hot exhaust and additional fumes prior to starting.
2. The display is ON and shows the main menu.
3. Use the keypad on the right-hand of the display to select the key to access to the “Machine service” screens.



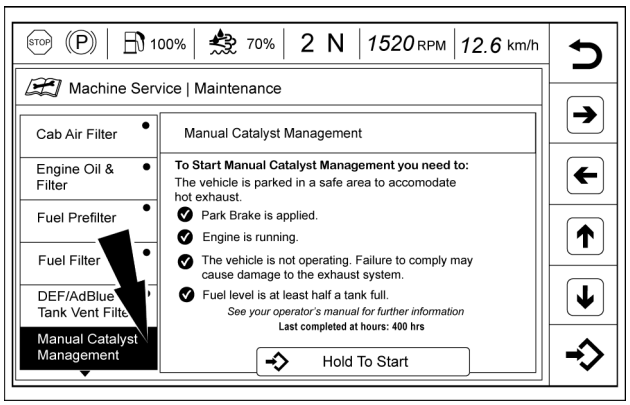
LEIL16WHL0908AA 3

4. Use the keypad on the right-hand of the display to select the key to switch to the “Maintenance” screens.



LEIL16WHL0910AA 4

5. Use the keypad on the right-hand of the display to select the “Manual Catalyst Management” item.

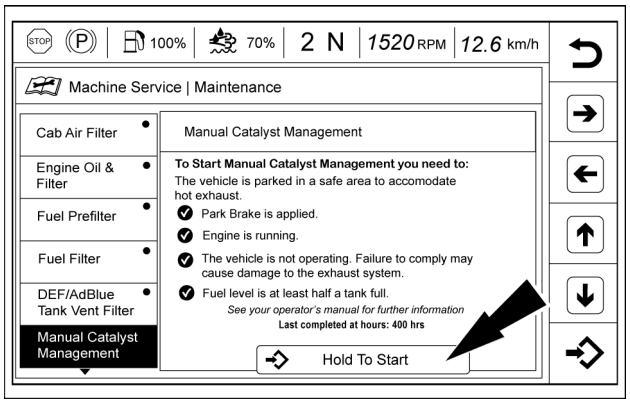


LEIL19WHL0398AA 5

6. Conditions to be satisfied to start the Manual Catalyst Management (MCM):
   - Parking brake is applied
   - Engine is running
   - The vehicle is not operating.
   - The fuel lel is at least half a tank full.

   Select “Hold to start” to request the Manual Catalyst Management.

NOTE: *the “Hold to start” button will get activated when all conditions are satisfied.*



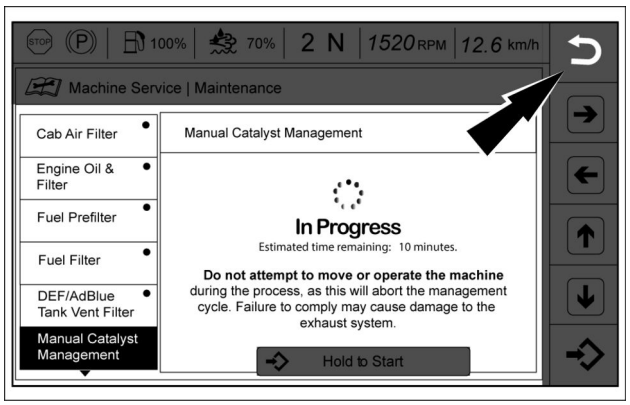
LEIL19WHL0398AA 6

7. Manual Catalyst Management is in progress.

NOTE: *Do not attempt to move or operate the machine during the process as this will abort the management cycle. Failure to comply may cause damage to the exhaust system.*

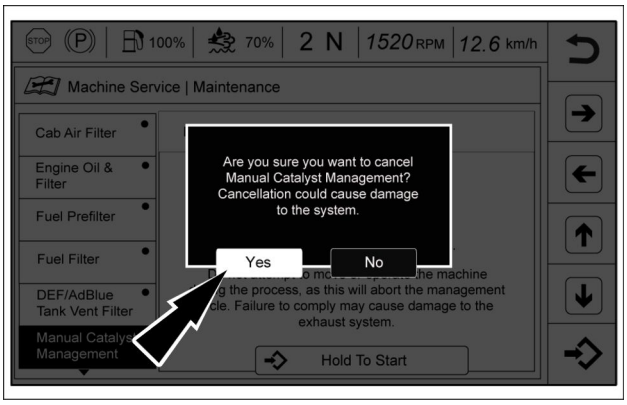
NOTE: *steps 8 and 9 describe the abort procedure of the Manual Catalyst Management.*

8. Use the “Black” arrow on the right-hand menu to request the abort of the management cycle.



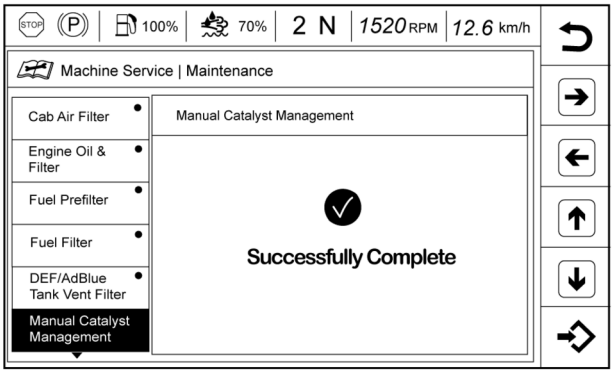
LEIL20WHL0201AA 7

9. Select the “Yes” button to confirm the abort of the Manual Catalyst Management.

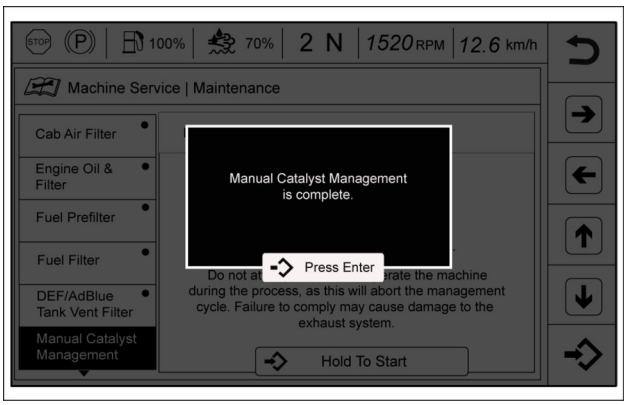


LEIL20WHL0202AA 8

10. When the management cycle terminates, a message on the screen appears.



LEIL20WHL0211AA 9



LEIL20WHL0205AA 10

Air conditioning condenser - Cleaning

⚠ WARNING

Explosion hazard!
Air-conditioning refrigerant boils at -12 °C (10 °F)!
-NEVER expose any part of the air-conditioning system to a direct flame or excessive heat.
-NEVER disconnect or disassemble any part of the air-conditioning system.
Discharging refrigerant gas into the atmosphere is illegal in many countries.
Failure to comply could result in death or serious injury.

W0340A

⚠ WARNING

Escaping refrigerant may cause frostbite!
Always wear protective goggles when handling refrigerant. If you get refrigerant in your eye, immediately flush your eyes with water for 15 minutes. Seek medical assistance immediately.
Failure to comply could result in death or serious injury.

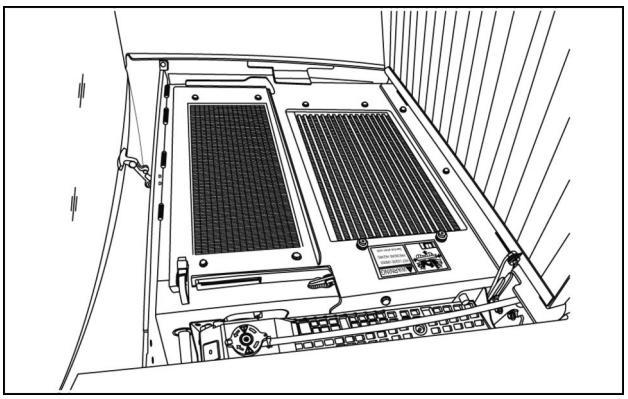
W0339A

Service the following items as required to maintain maximum operating efficiency:

Lubrication of the air conditioning compressor seal

Operate the air conditioning once every 250 hours to lubricate the compressor seals. Turn the air conditioning control to MAXIMUM for at least 15 minutes. In temperatures below **0 °C** (**32.0 °F**) put a cover over the air conditioning condenser. This will make sure the refrigerant and lubricants in the system will be at operating temperature.

Keep the air conditioning condenser core clean. Use safety type compressed air tool or a rigid brush to clean the condenser. Also check and clean the grille screen.



RCPH10WHL139AAH 1

Parking brake - Check

⚠ WARNING

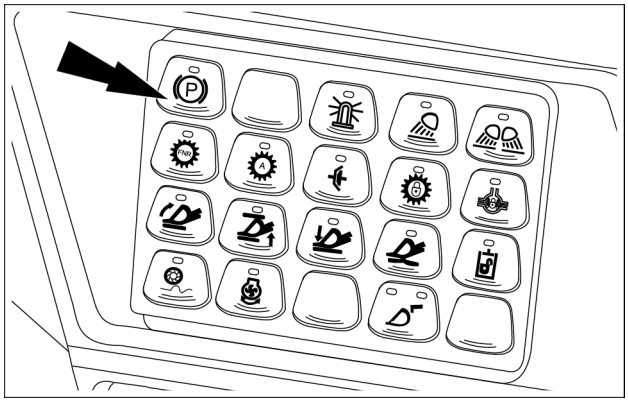
Improper operation or service of this machine can result in an accident.
Make sure you perform the required service and adjustments correctly to avoid injury and machine damage.
Failure to comply could result in death or serious injury.

W0352A

Prior operation:
Keep all non-authorized personnel clear of the area when performing the parking brake test. Park the machine with the bucket in the travel position on a firm, level surface clear of any obstructions and any non-authorized personnel or vehicles.

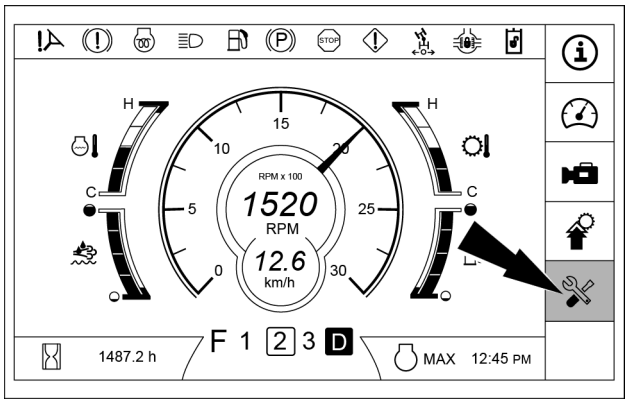
Periodically test the parking brake functions (at a maximum of every **250 h**).

1. Start the machine. Move the transmission control lever to NEUTRAL. Push the parking brake button on the multifunction keypad.



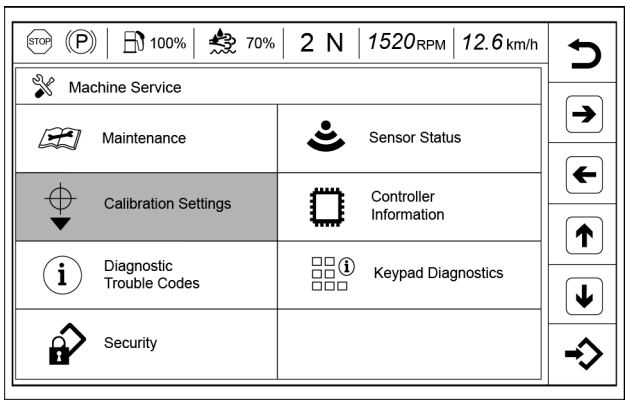
LEIL16WHL1125AA 1

2. The display is ON and shows the main menu.
3. Use the keypad on the right-hand of the display to select the key to access to the “Machine service” screens.



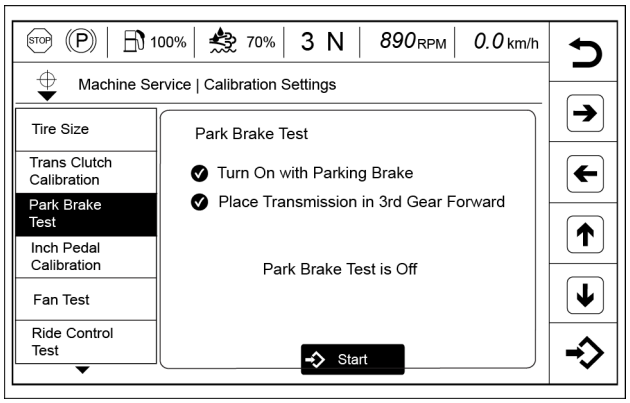
LEIL16WHL0908AA 2

4. Use the keypad on the right-hand of the display to select the key to switch to the “Calibration Settings” screens.



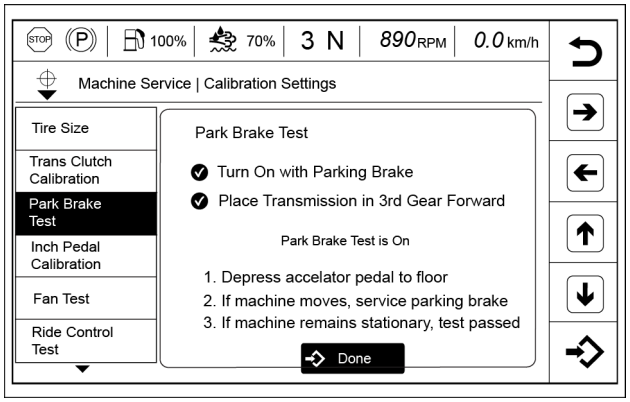
LEIL16WHL0874AA 3

5. Use the keypad on the right-hand of the display to select the key to select the “Park Brake Test” item.
6. The screen displays the two conditions to be satisfied before starting the parking brake test.
7. The machine is already ON with parking brake. Place the transmission in 3rd gear FORWARD.
8. Use the keypad on the right-hand of the display to select “Start” and proceed with the parking brake test.



LEIL16WHL0879AA 4

9. When the parking brake test is on, push the foot throttle to increase the engine speed as suggested by the message on screen.
10. If the machine moves, the test failed. The parking brake must be adjusted (see procedure in Service Manual – section “Adjusting the parking brake”).
11. If the machine remains stationary, the test passed.
12. Reduce the engine speed to low idle. Return the transmission to NEUTRAL.
13. Use the keypad on the right-hand of the display to select “Done” and terminate the test.



LEIL16WHL0880AA 5

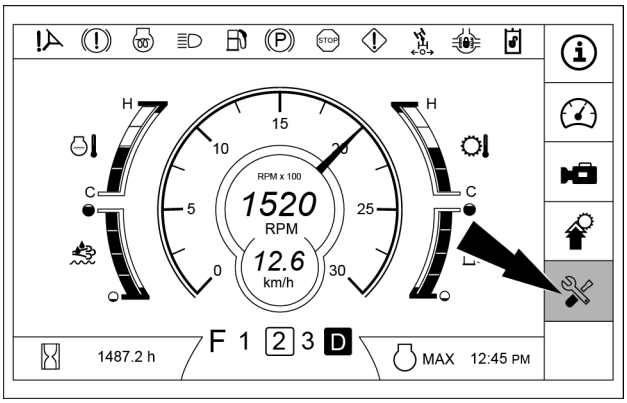
Auxiliary steering - Check

The auxiliary steering system is electrically powered. This system allows you to steer the machine if the primary steering system stops working. Maintain the batteries to assure the system will function.

Check the auxiliary steering every **250 h** or any time electronic warnings may so indicate.

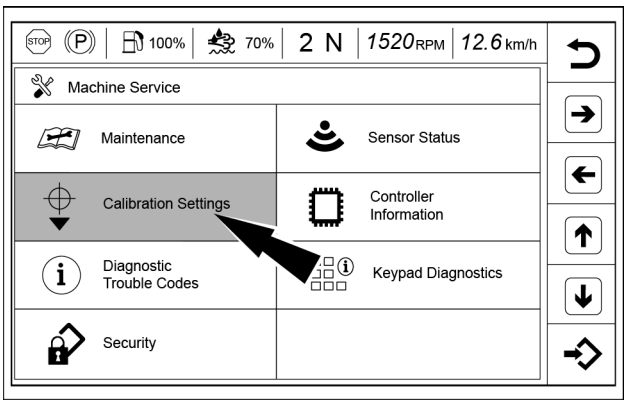
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on hard packed level ground with enough clearance around the machine to allow complete steering from side to side. Raise the bucket approximately **500 mm** (**19.7 in**) above the ground.

1. Move the key switch to ON. The display turns on and shows the main menu.
2. Use the keypad on the right-hand of the display to select the key to access to the “Machine service” screens.



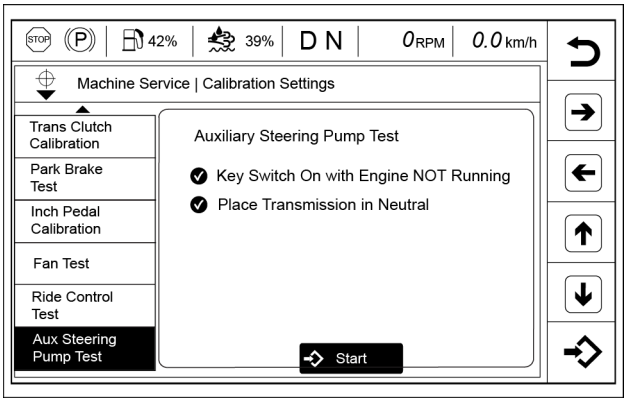
LEIL16WHL0908AA 1

3. Use the keypad on the right-hand of the display to select the key to switch to the “Calibration Settings” screens.



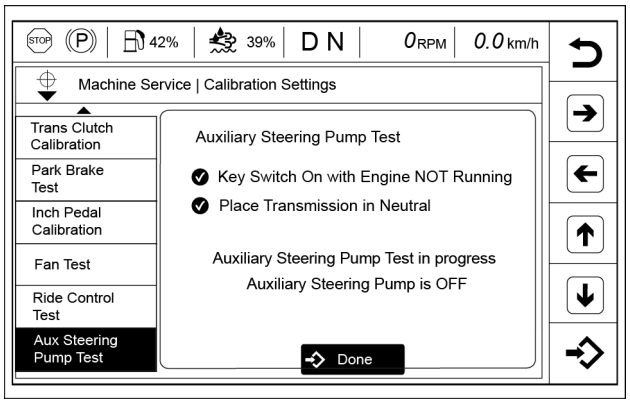
LEIL16WHL0874AA 2

4. Use the keypad on the right-hand of the display to select the “Aux Steering Pump Test” item.
5. The screen displays the conditions to be satisfied before starting the auxiliary steering pump test.
6. The key switch is already ON and engine not running. Place the transmission in NEUTRAL.
7. Use the keypad on the right-hand of the display to select “start” the test.



LEIL16WHL0875AA 3

8. When the test terminates, a message on the screen describes the state of the auxiliary steering system.
9. If needed, service the auxiliary steering system (see procedures in Service Manual – section “Auxiliary steering”).
10. Use the keypad on the right-hand of the display to select “Done” and terminate the test.



LEIL16WHL0878AA 4

Cab service - Check

Inspecting and cleaning the machine

⚠ WARNING

Moving parts!
Install all covers, panels, and guards after servicing or cleaning the machine. Never operate the machine with covers, panels, or guards removed.
Failure to comply could result in death or serious injury.

W0135A

Maintenance specifications	
Inspect and clean	Periodically

Clean immediately if oil or grease has been spilled on the machine. Clean with steam or a high pressure water jet.

Look for any leaks, and check the condition of all pipes and hoses.

Take the opportunity during this operation to make a visual check of all the welded components (in case of appearance of cracks), the bucket/attachment linkages and check the teeth and tooth tips for correct retention and for wear.

Cab headliner

The foam headliner in your cab decreases noise. To keep the headliner in good operating condition, remove dust with a vacuum cleaner.

NOTICE: *DO NOT wash the headliner with water. Water can cause damage to the headliner and lower the noise control capacity of the headliner.*

Operator's seat

⚠ WARNING

Chemical hazard!
Always wear protective clothing and goggles when cleaning with solvents, acids, or alkaline chemical agents. Always follow the chemical manufacturer's instructions.
Failure to comply could result in death or serious injury.

W0180A

Remove dust and dirt from the seat with a vacuum cleaner or soft brush. Clean stains with the correct use of a material cleaner.

Before removing stains, try to find what type and how old the stains are. Some stains can be removed with water or soap solution.

Cleaning fluid can be used for grease or oil stains. Carefully remove the item that caused the stain with a scraper or a dull knife.

Use a minimum amount of cleaner and a clean cloth. Move the cloth from the outside of the stain towards the center. When the stain is removed, use a clean cloth to dry the area to prevent a cleaning fluid pattern.

Door hinges

Use graphite to lubricate all hinges. DO NOT use oil.

Plastic and resin parts

When cleaning the plastic windows, the console, the instrument panel, the indicators, etc. do not use gasoline, kerosene, paint solvents, etc. Only use water, soap and a soft cloth.

The use of gasoline, kerosene, paint solvents, etc. will cause discoloration, cracks or deformation of these parts.

Checking for cylinder leakage

A cylinder rod should be slightly oily. Check that there are no leaks after a period of work, when the whole hydraulic system is at normal operating temperature.

1. Wipe the rod and bearing clean on the cylinder to be checked.
2. Operate normally for five or ten minutes.
3. Extend the cylinder rod.
4. Carry out the leak test.

Rod Appearance	Test	Conclusion
Dry	Slight traces of oil when a piece of paper is wiped over **20 cm** (**7.9 in**) of the rod.	Normal
Slightly greasy	Paper remains stuck to rod when run over rod.	Normal
Oily	Paper remains stuck when placed on rod.	Normal
Very oily or weeping	Each time the cylinder rod is extended, a ring of oil can be seen on the rod.	See your dealer
Leakage	Each time the rod retracts, the excess oil drips from the gland.	

Fire extinguisher (Optional)

It is strongly recommended that a fire extinguisher be kept on the machine.

Maintenance specifications	
Every month	Examine the fire extinguisher and make sure it is not damaged.
Every year	Have an approved specialist examine the fire extinguisher.
Every six year	Have an approved specialist empty and refill the fire extinguisher.

Welding on the machine

⚠ DANGER

Improper operation or service of this machine can result in an accident.
Any unauthorized modifications made to this machine can have serious consequences. Consult an authorized dealer on changes, additions, or modifications that may be required for this machine. Do not make any unauthorized modifications.
Failure to comply will result in death or serious injury.

D0030A

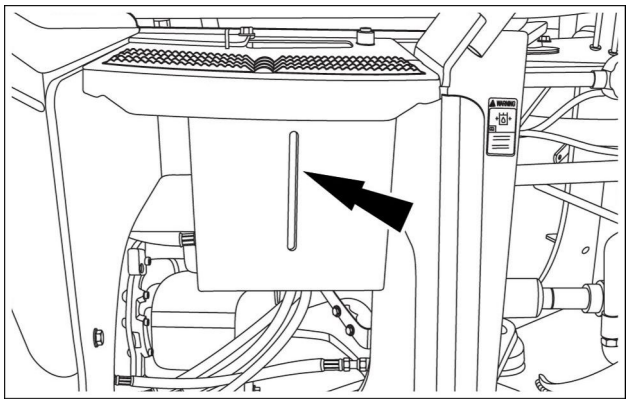
Whenever carrying out a welding operation on the machine as authorized by the manufacturer and in accordance with manufacturer's instructions, disconnect the batteries, disconnect the alternator B+ and D+ terminal wires, and connect the welding apparatus ground cable to the component on which the welding operation is to be performed.

Always connect the welding apparatus to the same structure that is being welded.

Never connect the welding apparatus ground to a component of the hydraulic system.

Windshield washer fluid level - Check

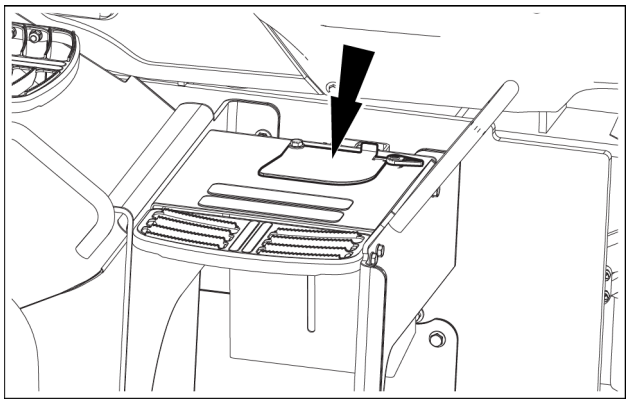
1. Check the windshield fluid level as required.
   The windshield washer reservoir is located on the right-hand side of the machine, under the steps (if equipped).



LEIL15WHL0651AB 1

2. If the windshield fluid level is too low, unlock and rotate clockwise the washer box cover to access the filler cap. Remove the filler cap and add a windshield solution as required.
   Re-install the cap.

NOTE: *use professional detergent fluid SC35 diluted with water in relation to the temperature of use. With a 50 – 50 solution of detergent and water the liquid does not freeze until* ***-10 °C*** *(****14 °F****). Below this temperature, use pure detergent.*



LEIL17WHL1610AB 2

Electrical system

Battery - Cleaning

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
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.

W0120A

⚠ WARNING

Electrical shock hazard!
Do not reverse battery terminals. Connect positive cable ends to positive terminals (+) and negative cable ends to negative terminals (-).
Failure to comply could result in death or serious injury.

W0262A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Before working on any component(s) of the electrical circuit, put the starter switch key in the off (shut down) position. When disconnecting batteries, always disconnect the negative (-) cable first. When reconnecting batteries, always connect the negative (-) cable last.
Failure to comply could result in death or serious injury.

W0264A

⚠ 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

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

Electrical shock hazard!
Before working on any part of the electrical system, disconnect the battery ground cable. Complete all electrical work before connecting the cable.
Failure to comply could result in death or serious injury.

W0129A

⚠ WARNING

Explosion hazard!
If battery electrolyte is frozen, attempting to charge the battery or jump-start the engine can cause the battery to explode. Always keep batteries at full charge to prevent frozen battery electrolyte. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0203A

⚠ WARNING

Chemical hazard!
Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.
Failure to comply could result in death or serious injury.

W0349A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Welding sparks can cause battery gases to explode. When welding on the machine, always disconnect the B+ and D+ wires from the alternator. Check the wire markings before reconnecting to ensure a correct connection.
Failure to comply could result in death or serious injury.

W0253A

Battery service

Before you service components of the electrical system, always disconnect the NEGATIVE (-) battery cable.

Dirt, moisture, and corrosion on the battery will discharge the battery. Clean the battery with CASE CONSTRUCTION Battery Saver and Cleaner. Follow the instructions on the container.

Before you use an electric welder, disconnect the alternator wires, instrument cluster, and turn the timed disconnect switch to OFF.

Do not use a steam cleaner or cleaning solvent to clean the alternator.

Battery vents

If equipped, keep the battery vents clean, make sure the vents are not restricted.

Cleaning the batteries

Check the batteries and battery compartment regularly for dirt, corrosion and damage. Dirt mixed with electrolyte or moisture on the top of the batteries can cause a discharged condition in the batteries. Use one of the following methods to clean the batteries.

- Use CASE CONSTRUCTION Battery Saver. Follow the instructions on the container. This cleaner does not need water.

Use baking soda or ammonia and flush the outside of the batteries with water. If you do not have CASE CONSTRUCTION Battery Saver, use other special cleaners to prevent corrosion on the battery terminals.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if they are not properly recycled after use. CASE CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer who will dispose of or recycle them properly. In some countries, this is a legal requirement.

Alternator

Service specification	
Check	Every 1000 hours

Ask your dealer to check the alternator.

Do not use steam cleaning equipment or a cleaning solvent to clean the alternator.

Starter motor

Service specification	
Check	Every 1000 hours

Ask your dealer to check the starter motor.

Make sure that the terminal protectors are correctly installed.

Battery electrolyte level - Check

⚠ 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

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

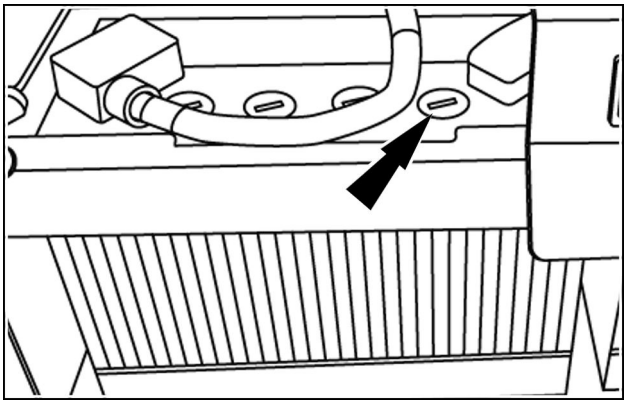
Chemical hazard!
Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.
Failure to comply could result in death or serious injury.

W0349A

Check battery fluid level and specific gravity

Check the battery fluid level every 500 hours of operation or more often if conditions are severe. The battery fluid can decrease with high temperatures.

1. Insert a flat blade screwdriver into slots at the top of battery caps. Remove the cell caps and check the level in each battery cell. The level should be no less than **4.8 mm** (**0.2 in**) from the top of the lid. Add distilled water if necessary, then install the cell caps.



RCPH10WHL490AAH 1

NOTE: *wipe the top of the battery or use compressed air to remove dust. Use care when removing caps and do not allow dirt or contaminants to enter the battery cells.*

NOTICE: *continuous use of the battery with low fluid will lower battery performance.*

2. If the terminals are dirty, wash with warm water. Reinstall the terminals, apply grease or spray rust preventive solution to create good connections.

3. If the terminal is oxidized, polish it with a wire brush or emery paper.

NOTE: *measure the specific gravity of battery fluid with a gravimeter. The measured value will vary depending on the ambient temperature.*

Auxiliary battery connections - Check

⚠ WARNING

Improper operation or service of this machine can result in an accident.
An error connecting auxiliary starting cables or short-circuiting battery terminals can cause an accident. Connect auxiliary starting cables as instructed in this manual.
Failure to comply could result in death or serious injury.

W0263A

⚠ DANGER

Explosion hazard!
Read "Connecting booster battery" procedure completely before attempting to jump-start or service a battery.
Failure to comply will result in death or serious injury.

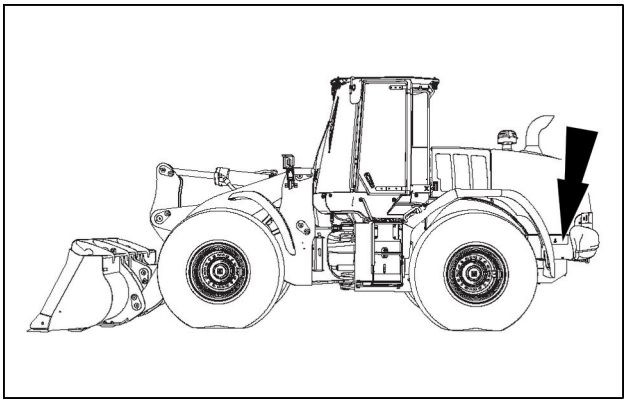
D0086A

⚠ WARNING

Explosion hazard!
Booster batteries or jumper cables must be connected properly to prevent battery explosion and/or damage to the electrical system. Connect positive to positive and negative to negative.
Failure to comply could result in death or serious injury.

W0343A

Make sure that the voltage of the booster batteries (**12 V** each battery) is the same as that of the machine system (**24 V**). The batteries are located on the left-hand side of the machine.



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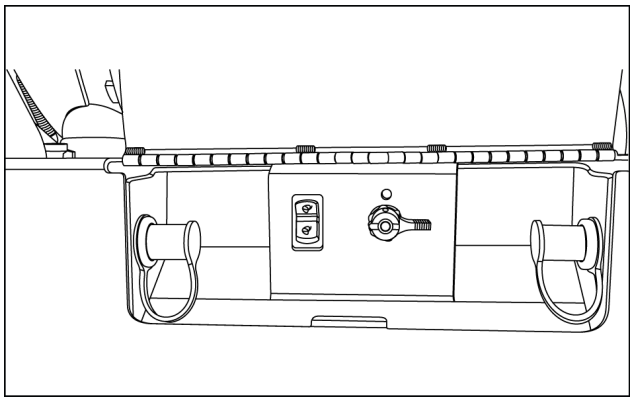
1. Turn off the ignition and all accessories on the machine. Remove the battery cover from left-hand side of the machine. Remove the battery terminal covers.
2. Identify the discharged battery.
3. Connect one end of the positive (+) cable to the positive (+) terminal on the booster battery. Connect the other end of the positive (+) cable to the positive (+) terminal of the discharged battery.
4. Connect the negative (-) cable to the negative (-) terminal on the booster battery.
5. Connect the other end of the negative cable to the engine block or frame of the machine with the discharged battery. Do not connect to the negative terminal on the battery.

NOTICE: *do not connect the other end of the negative cable to sheet metal or any rotating part, as damage can result.*

6. Start the engine.
7. Remove the booster battery negative (-) cable from the machine, then from the booster battery. Remove the positive (+) cable from the machine and then from the booster battery.
8. Install the terminal covers.

Jump post (optional for European market)

Make sure that the voltage of the booster batteries is the same as that of the machine system **24 V**. The jump post is located on the left-hand side of the machine along with the timed disconnect switch compartment.



RCPH10WHL214AAH 2

1. Turn off the ignition and all accessories on the machine(s). Use the jump posts to connect the auxiliary battery.
2. Connect one end of the positive (+) cable to the positive (+) terminal on the booster battery. Connect the other end of the positive (+) cable to the positive (+) terminal of the jump post (red).
3. Connect the negative (-) cable to the negative (-) terminal on the booster battery.
4. Connect the other end of the negative cable to the negative (black) terminal of the jump post. Do not connect to the negative terminal on the battery.

NOTICE: *do not connect the other end of the negative cable to sheet metal or any rotating part, as damage can result.*

5. Start the engine.
6. Remove the booster battery negative (-) cable from the jump post and then from the booster battery. Remove the positive (+) cable from the jump post terminal and then from the booster battery.
7. Install the terminal covers.

Battery - Replace

⚠ CAUTION

Heavy parts!
Machine batteries are extremely heavy. Make sure the battery is supported safely during the removal process.
Failure to comply could result in minor or moderate injury.

C0050A

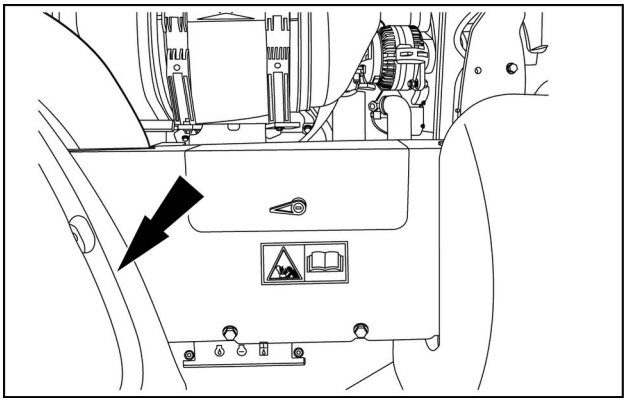
⚠ WARNING

Chemical hazard!
When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to spill through the vent caps. Lift a plastic-cased battery with a battery carrier or with your hands positioned on opposite corners of the battery. Always wash your hands after handling.
Failure to comply could result in death or serious injury.

W0385A

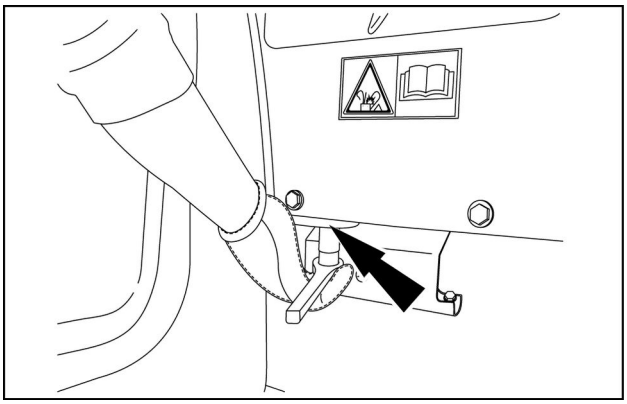
Prior operation:
Keep all non-authorized personnel clear of the area. Park the machine on a firm, level surface in neutral with the parking brake applied. Lower the bucket/attachment to the ground. Turn off the engine. Install the transport/service link into the locked position.

1. The batteries are located on the left-hand side of the machine. Remove the rear wide fender on the left-hand side (arrow) first to access the batteries.



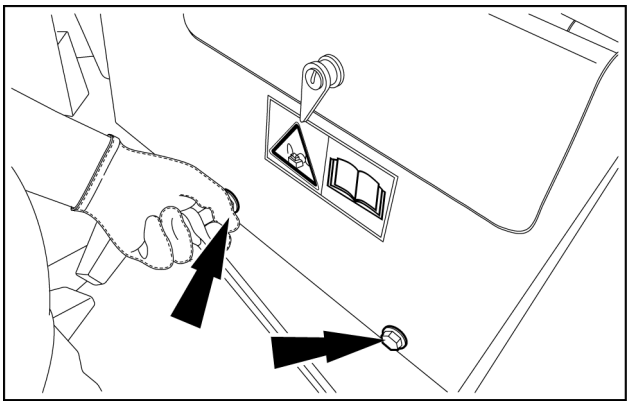
LEIL15WHL0076AA 1

2. Remove the two screws from the left-hand rear fender bracket.

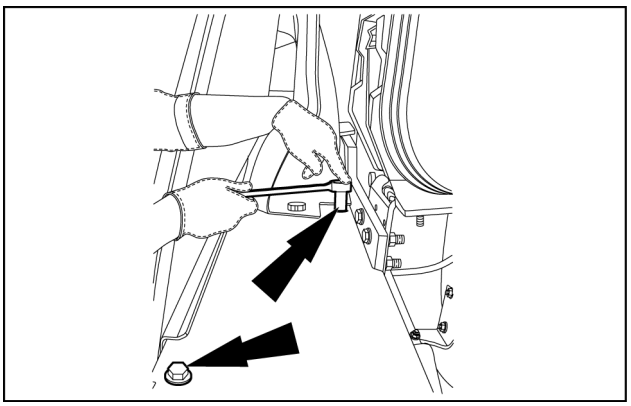


LEIL15WHL0606AA 2

3. Remove the four screws of the battery box cover.

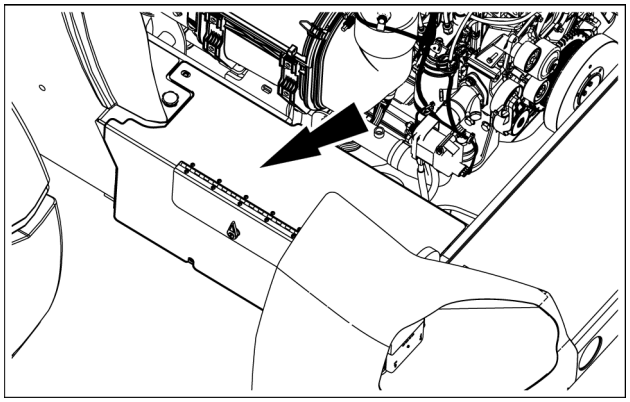


LEIL15WHL0090AB 3



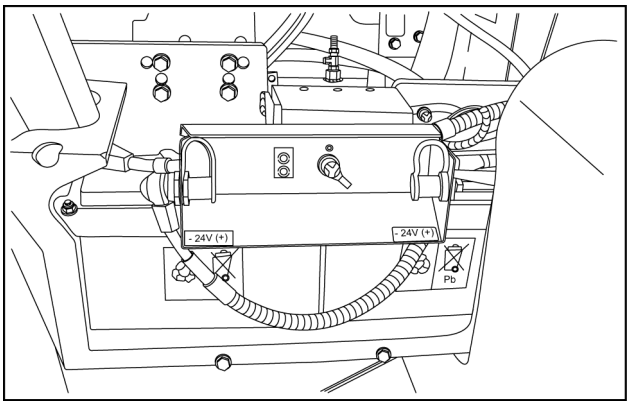
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4. Remove the battery box cover.



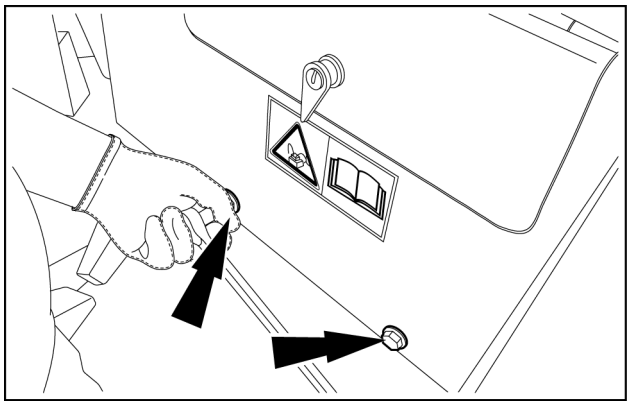
LEIL18WHL1228AA 5

5. Remove the terminal protection caps, disconnect the cables (negative terminals) and then the other cables (positive terminals).
7. Remove the screws, the washers, and retainer. Remove the old batteries.
8. Install new batteries of the correct amperage and replace retainer, washers and screws.
9. Clean the cables and battery terminals, and coat with grease. Install new anti-sulfate pellets. Reconnect the positive cable ends to the positive terminals first. Reconnect the negative cable ends to the negative terminals, and install the terminal protection caps.

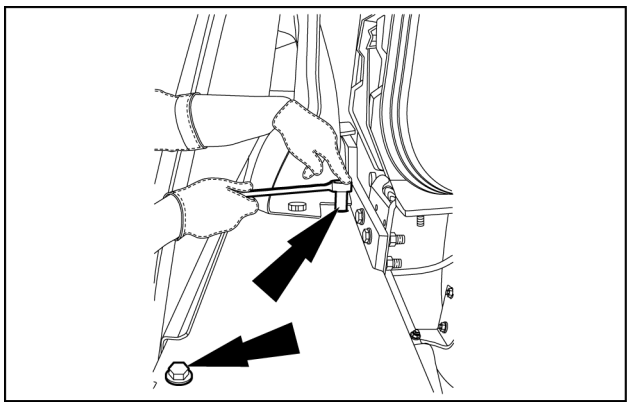


LEIL15WHL0093AA 6

10. Install the battery box cover on the rear frame chassis with the four screws.

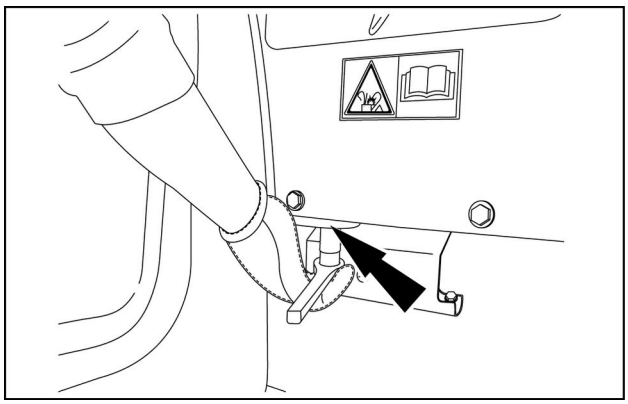


LEIL15WHL0090AB 7



LEIL15WHL0091AB 8

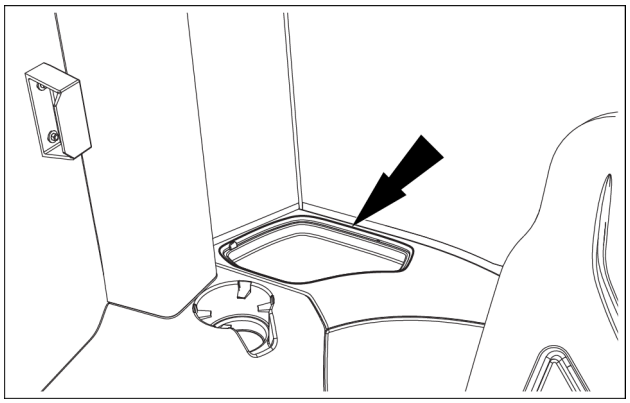
11. Install the left-hand rear wide fender bracket tightening two screws.



LEIL15WHL0606AA 9

Fuses and relays - Replace

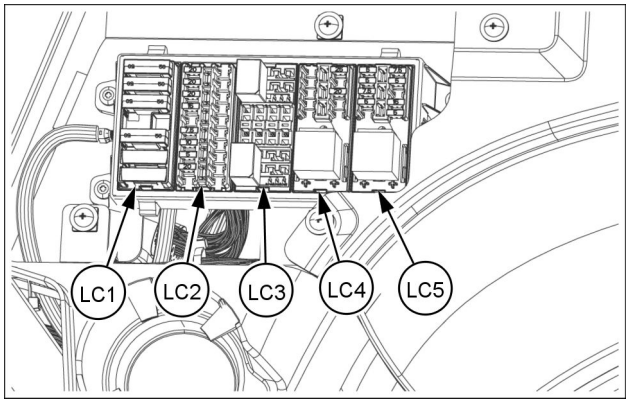
Fuses and relays located in Load Centers **(LC1)**, **(LC2)**, **(LC3)**, **(LC4)** and **(LC5)** can be found inside the cab, behind the operator's seat under the tray.



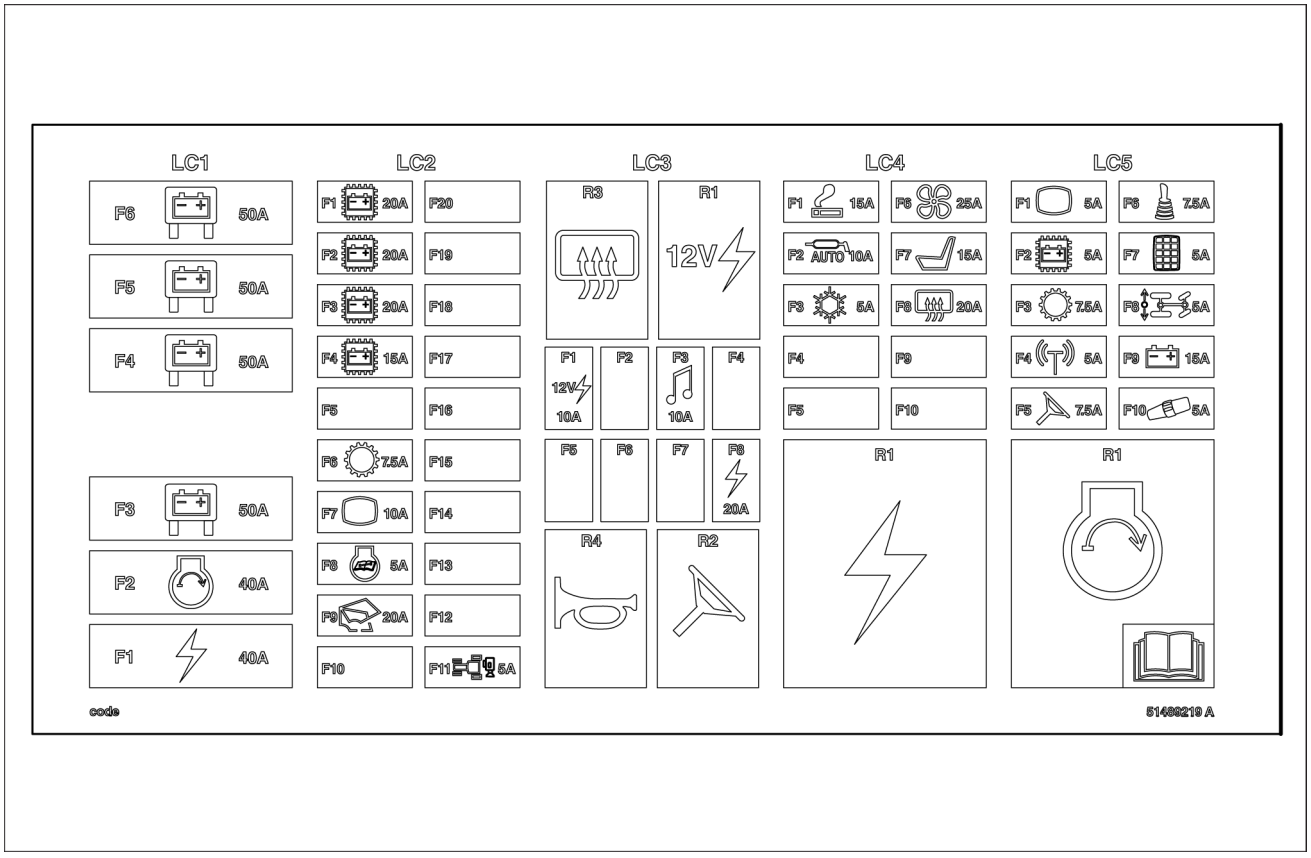
LEIL16WHL1357AB 1

If power does not come on when the key switch is turned to the ON position, check the appropriate fuse.
The fuse decal is located on the rear window inside the cab.

NOTICE: *never replace a fuse with a fuse of a different amperage.*



LEIL20WHL1069AA 2



51489219 3

Fuses replacement

LC1 fuses panel

Fuse	Ampere [A]	Function
F1	40	Accessory
F2	40	Ignition
F3	50	SFB-D
F4	50	SFB-C
F5	50	SFB-B
F6	50	SFB-A

LC2 fuses panel

Fuse	Ampere [A]	Function
F1	20	UCM-VP
F2	20	UCM VF2/3
F3	20	UCM VF4/6
F4	15	UCM VS1/VLP
F5	-	Spare
F6	7.5	Transmission control module
F7	10	Display
F8	5	Diagnostic plug
F9	20	Hood lift
F10	-	Spare
F11	5	Camera (option)
F12	-	Spare
F13	-	Spare
F14	-	Spare
F15	-	Spare
F16	-	Spare
F17	-	Spare
F18	-	Spare
F19	-	Spare
F20	-	Spare

LC3 fuses and relays panel

Fuse	Ampere [A]	Function
F1	10	**12 V** power
F2	-	Spare
F3	10	Radio
F4	-	Spare
F5	-	Spare
F6	-	Spare
F7	-	Spare
F8	20	**12 V** Converter

Relay	Function
R1	DC converter
R2	Auxiliary steering
R3	Rear defrost
R4	Horn

LC4 fuses and relays panel

Fuse	Ampere [A]	Function
F1	15	**24 V** cigar
F2	10	Automatic lubrication
F3	5	Air conditioning
F4	-	Spare
F5	-	Spare
F6	25	Blower
F7	15	Seat
F8	20	Rear defrost
F9	-	Spare
F10	-	Spare

Relay	Function
R1	Accessory

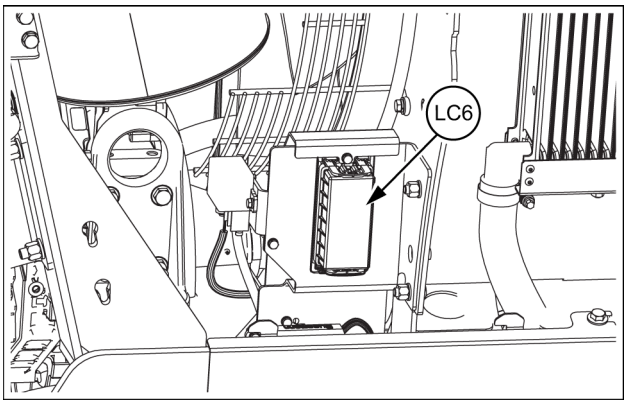
LC5 fuses and relays panel

Fuse	Ampere [A]	Function
F1	5	Display Wk
F2	5	UCM
F3	7.5	Transmission control module
F4	5	Telematics ignition
F5	7.5	Auxiliary steering
F6	7.5	Electro-hydraulic Imp joystick
F7	5	Keypad
F8	5	Joystick Steering (JSS) ignition
F9	15	Battery
F10	5	Multifunction lever / Differential lock

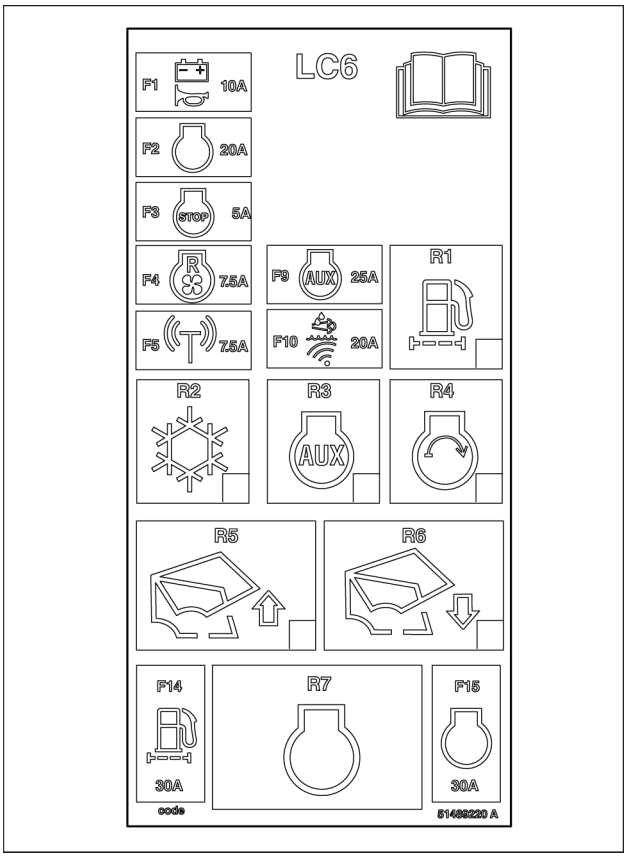
Relay	Function
R1	Ignition

1. Additional fuses and relays located in Load Center **(LC6)** are placed in the engine compartment area, as indicated by the decal.

NOTICE: *never replace a fuse with a fuse of a different amperage.*



LEIL18WHL1229AB 4



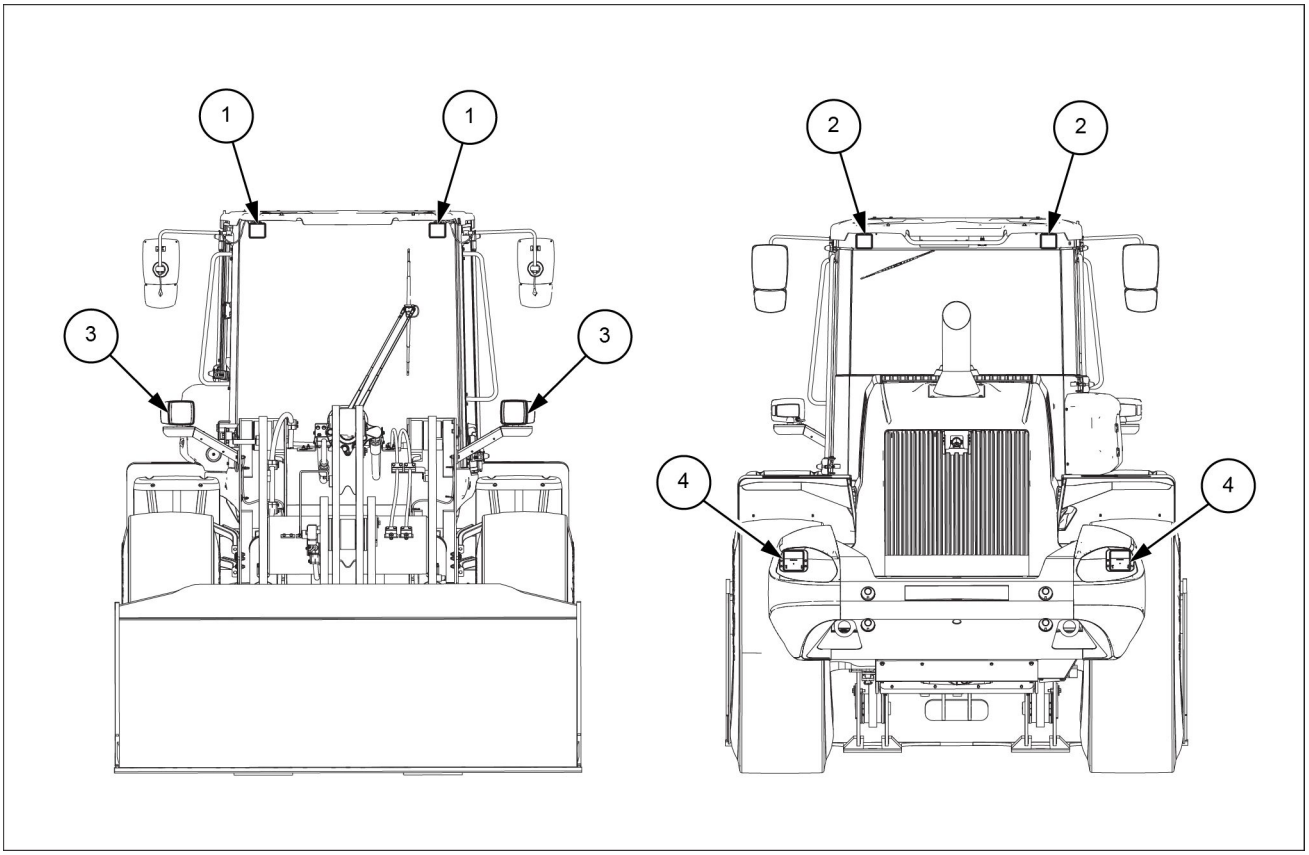
51489220 5

LC6 fuses and relays panel

Fuse	Ampere [A]	Function
F1	10	Key/horn
F2	20	e Variable Geometry Turbo (eVGT)
F3	5	ECU ignition
F4	7.5	Fan reverser
F5	7.5	Telematics
F9	25	ECU auxiliary
F10	20	SCR sensors
F14	30	Fuel/water separator heater
F15	30	ECU main

Relay	Function
R1	Fuel/water separator heater
R2	AC clutch
R3	ECU auxiliary
R4	Crank control
R5	Hood up
R6	Hood down
R7	Starter

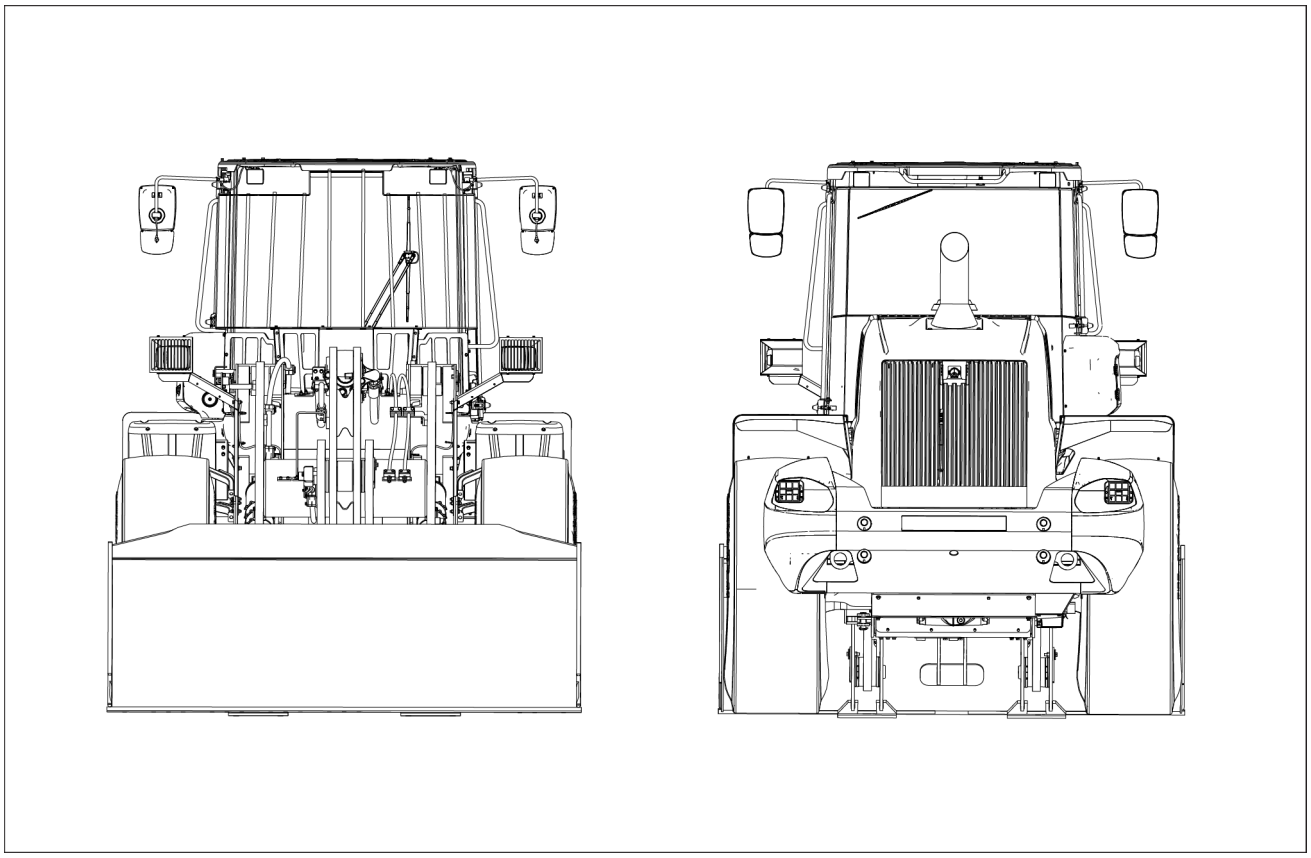
Lights - Replace



LEIL17WHL2019FB 1

1. Front work lights
2. Rear work lights
3. Driving lights
4. Tail lights

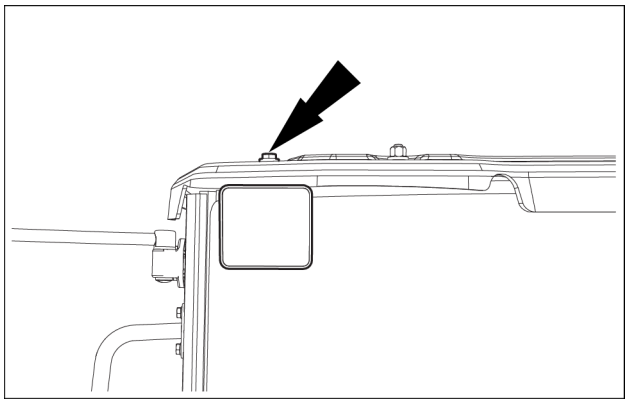
Waste Handler (WH) models



LEIL17WHL2020FA 2

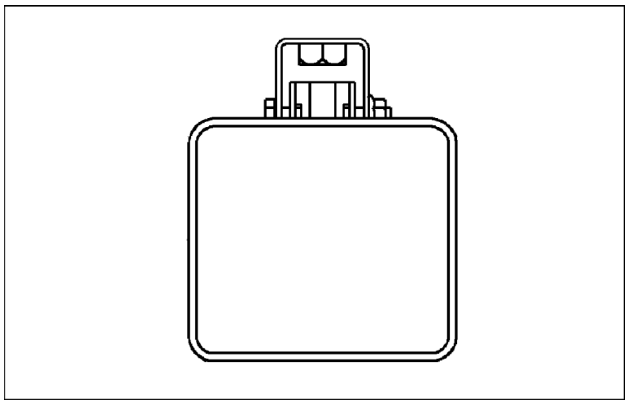
Work lights (halogen) 2 Front / 2 Rear

To replace the work lights, remove the hardware fixing the light to the cab frame. Disconnect the push-on connector, and replace the lamp assembly. Reconnect the push-on connector, making certain the connection is firmly in place. Reinstall the lamp assembly to the cab frame.



LEIL16WHL1519AB 3

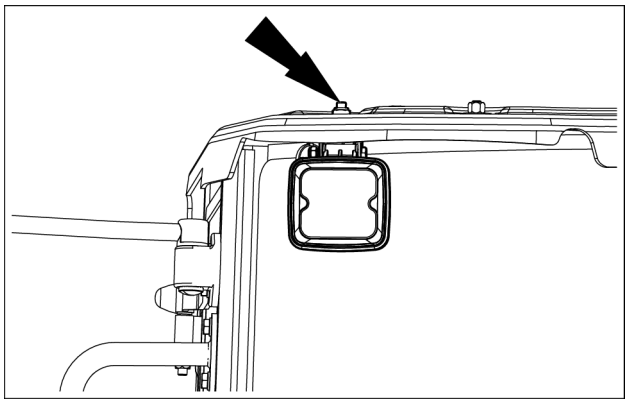
Bulb typology: H3 heavy duty bulb
Lamp caractheristics: **24 V**, **69 W**, 1300 +-195 lumen



LEIL18WHL1212AB 4

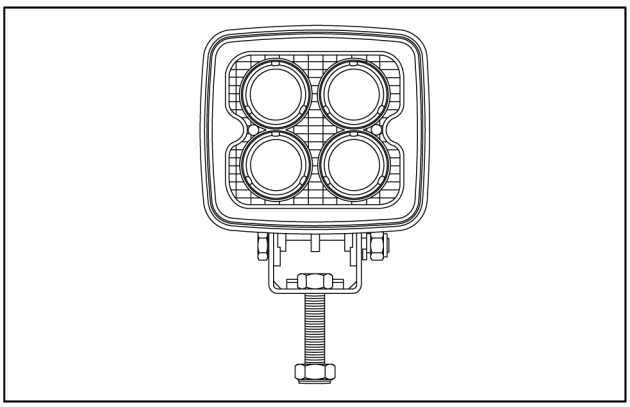
Work lights (LED) 2 Front / 2 Rear

To replace the work lights, remove the hardware fixing the light to the cab frame. Disconnect the push-on connector, and replace the lamp assembly. Reconnect the push-on connector, making certain the connection is firmly in place. Reinstall the lamp assembly to the cab frame.



LEIL18WHL0965AB 5

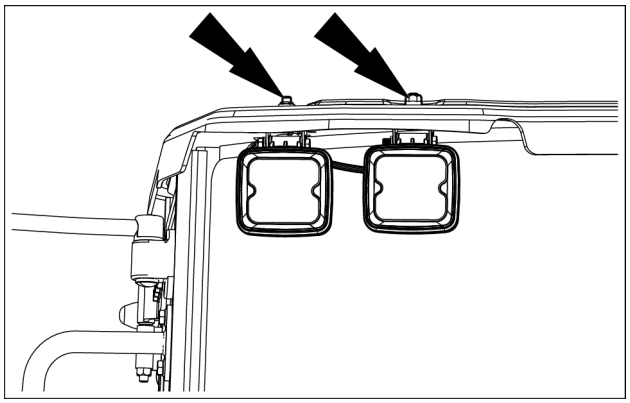
Lamp characteristics:
40 W, 40 deg (Beam angle), 2600 lumen



LEIL18WHL1191AA 6

Work lights (LED) 4 Front / 2 Rear (optional)

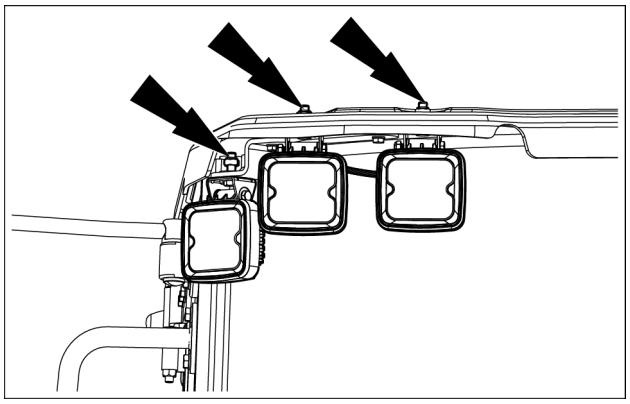
The optional two work light configuration lamps can be serviced individually. Follow the same procedure as the standard work light assembly.



LEIL18WHL0966AB 7

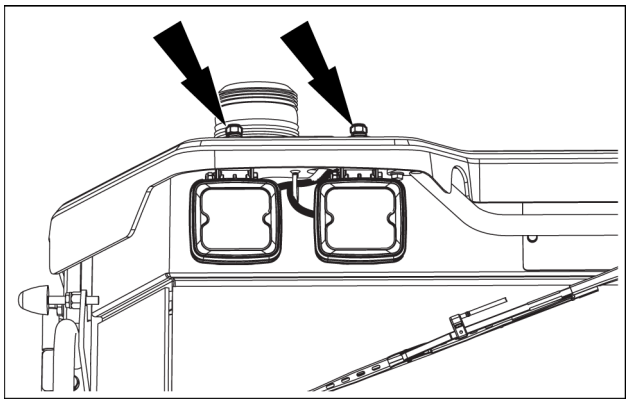
Work lights (LED) 6 Front / 4 Rear (optional)

The optional three work light configuration lamps can be serviced individually. Follow the same procedure as the standard work light assembly.



LEIL18WHL0967AB 8

Front

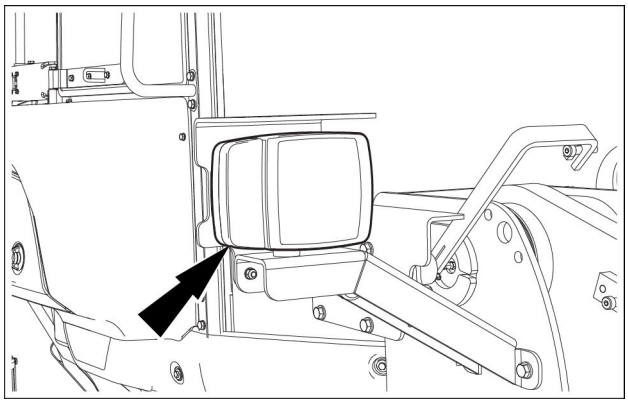


LEIL18WHL1211AB 9

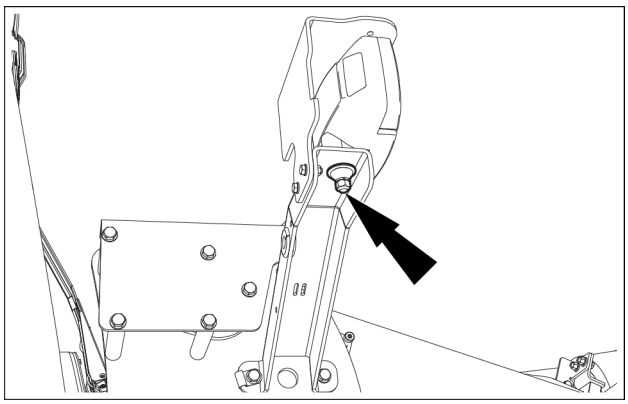
Rear

Driving lights (halogen)

To replace the driving lights, remove the hardware fixing the bottom of the light to the bracket. Disconnect the push-on connector, and replace the lamp assembly. Reconnect the push-on connector, making certain the connection is firmly in place. Reinstall the lamp assembly to the bracket.

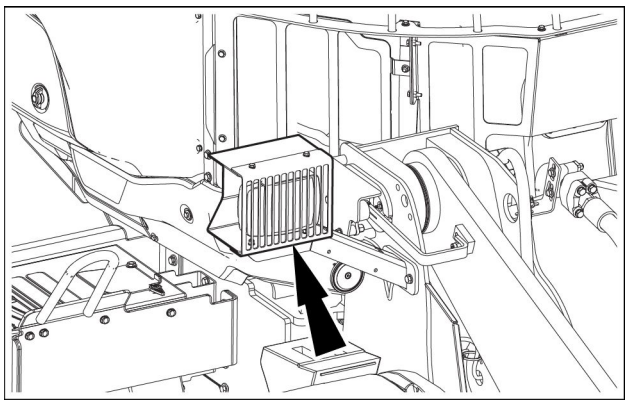


LEIL16WHL1522AB 10



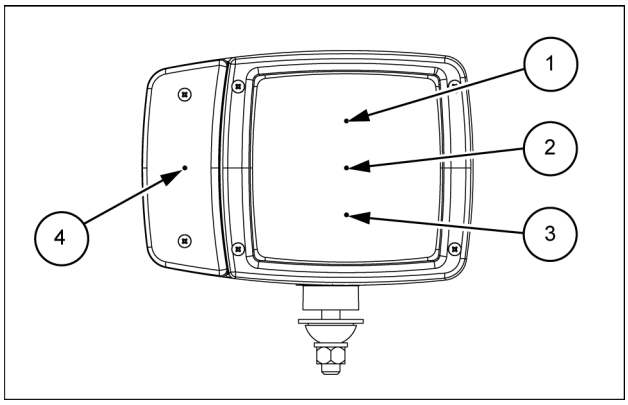
LEIL16WHL1524AB 11

In WH models, first you need to remove the driving light guard.



LEIL17WHL1584AB 12

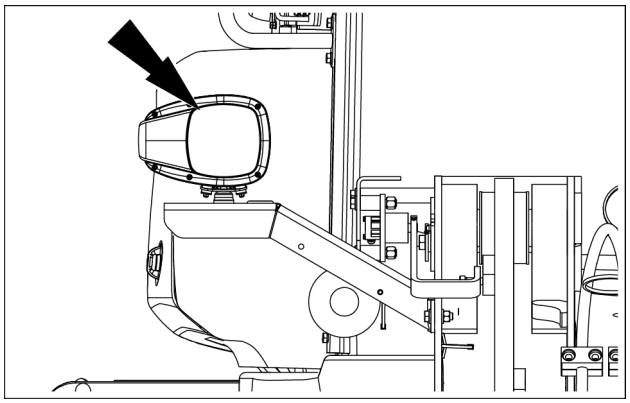
Bulb position and typology and lamp characteristics:
– **(1)** High beam bulb (H3, **24 V**)
– **(2)** Position bulb (**24 V**, **4 W**)
– **(3)** Low beam bulb (H7, **24 V**)
– **(4)** Turn bulb (**24 V**/ **21 W**)



LEIL18WHL1188AB 13

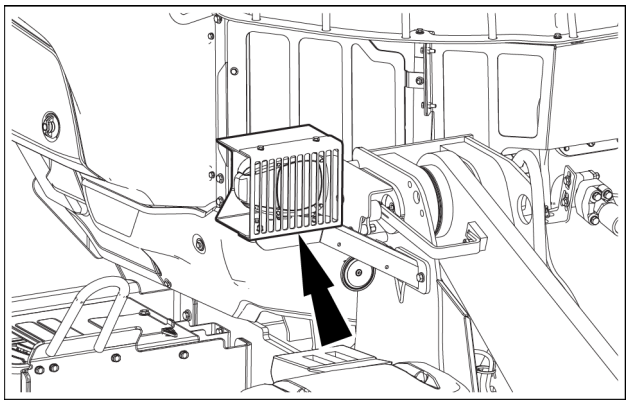
Driving lights (LED)

To replace the driving lights, remove the hardware fixing the bottom of the light to the bracket. Disconnect the push-on connector, and replace the lamp assembly. Reconnect the push-on connector, making certain the connection is firmly in place. Reinstall the lamp assembly to the bracket.



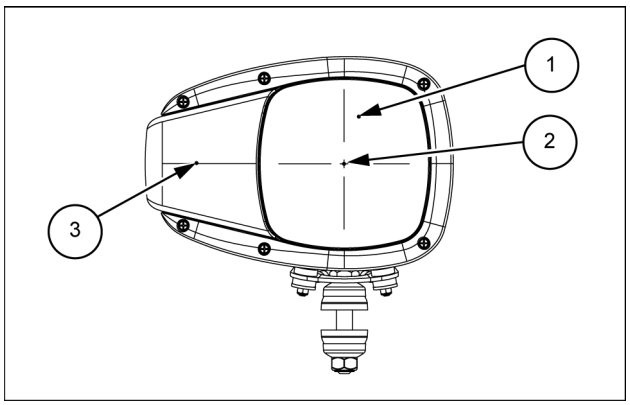
LEIL16WHL2536AB 14

In WH models, first you need to remove the driving light guard.



LEIL17WHL1585AB 15

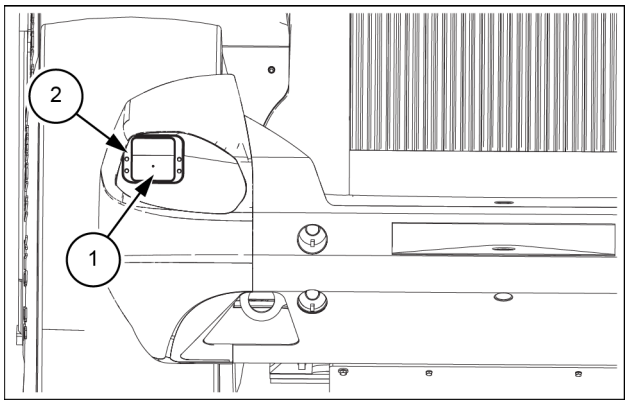
Lamp position and characteristics:
– **(1)** Position (**24 V**, **2.5 W**)
– **(2)** High/Low beam (**24 V**, **40 W**)
– **(3)** Turn (**24 V**, **6 W**)



LEIL18WHL1189AB 16

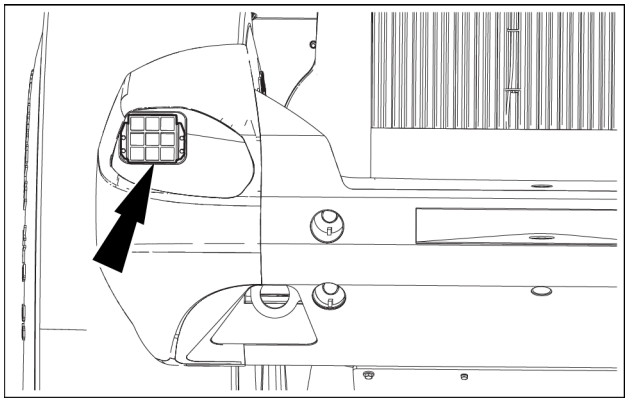
Tail lights (LED)

Remove the four bolts and washers that secure the tail light mounting plate **(2)** of the tail light **(1)** in the correct position on the concrete counterweight.



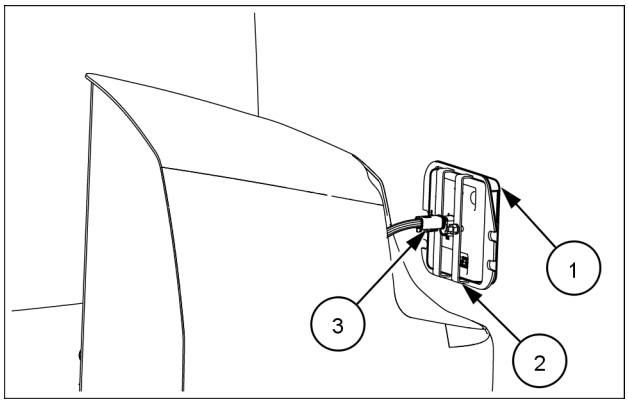
LEIL17WHL1609AB 17

In WH models, remove the guard along with the light mounting plate.



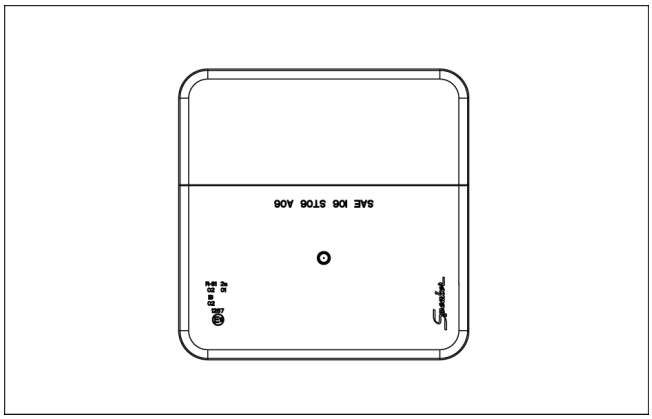
LEIL17WHL1586AB 18

Move forward the tail light mounting plate **(2)**. Disconnect the push-on connector **(3)**. Remove the hardware that fixes the tail light **(1)** to the tail light mounting plate **(2)**.
Replace the tail light with a new lamp of same wattage. Re-install the tail light.



LEIL18WHL1281AA 19

Lamp position and characteristic:
– Stop: (**24 V**, **4 W**)
– Tail: (**24 V**, **1.3 W**)
– Turn: (**24 V**, **5 W**)

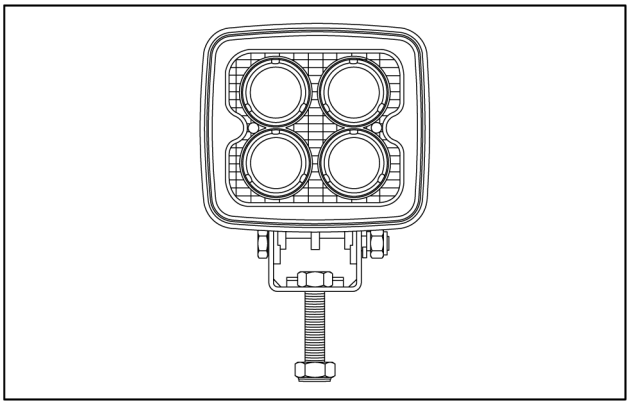


LEIL19WHL0165AA 20

White lights (LED)

The lights are located on the top of the rear grill.
To replace the white lights, remove the hardware fixing the light to the rear screen bracket. Disconnect the push-on connector, and replace the lamp assembly. Reconnect the push-on connector, making certain the connection is firmly in place. Reinstall the lamp assembly to the rear screen bracket.

Lamp characteristics:
40 W, 40 deg (Beam angle), 2600 lumen



LEIL18WHL1191AA 21

Storage

Preparation

Preparation for storage

The following procedure applies when the machine is to be stored for a month or more. Store the machine on firm, level ground, inside a building or, if not possible, outside and covered with a tarpaulin. Before storing the machine, carry out the following operations:

1. Clean the machine.
2. Retract the arm cylinder rod as far as possible, and lower the boom until the attachment is resting on the ground.
3. Grease the machine thoroughly. The exposed surfaces of the cylinder rods should be greased or covered with a protective film. See your CASE CONSTRUCTION dealer.

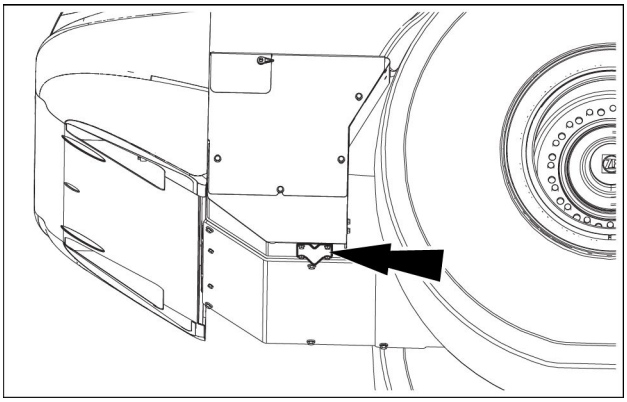
NOTE: *when the machine resumes service, the film will disappear automatically*

1. Drain the fuel tank, and fill with a mixture of 90% diesel fuel and 10% anti-corrosive oil. Run the engine at idle speed for five minutes to allow the anti-corrosive oil to reach the lines, filters, pump and injectors.
2. While the engine is still warm, drain the oil sump, fill with anti-corrosive oil, and replace the engine oil filter.
3. When the engine is cold, clean the outer parts of the engine with diesel fuel.
4. Clean or replace the air filter element.
5. Drain the cooling system, leave the drain valves open, and do not tighten the radiator cap.
6. Turn the timed disconnect switch to the OFF position.
7. Drain the **DEF/ADBLUE®** system if the machine will be in storage longer than 90 days.

NOTE: *see " **DEF/ADBLUE®** tank refilling" section for important tank draining information.*

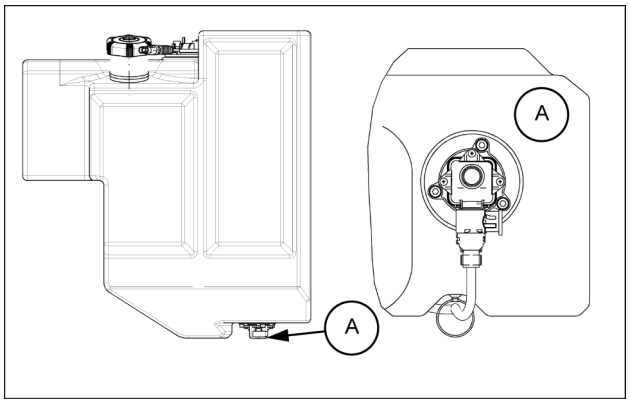
8. Remove the access cover below the supply tank to gain access to the drain.

NOTE: *use compressed air and water, to clean debris from around drain plug area.*



LEIL17WHL1583AB 1

9. Place a suitable container below the **DEF/ADBLUE®** supply tank.
   Remove the Urea Quality Sensor (UQS), allow to drain the **DEF/ADBLUE®** through the UQS hole.
   Reinstall the UQS.
10. Remove the batteries, clean the battery housings and make sure not to leave any traces of acid. Store the batteries safely in a cool and dry location, where the temperature will be higher than **0 °C** (**32.0 °F**).
11. Paint any areas where the paint shows signs of deterioration.
12. Plug the air filter inlet and the exhaust pipe.
13. Remove the starter switch key and place a "DO NOT OPERATE" label on the steering wheel.
14. Lock the hoods and the cab door.
15. If equipped with attachment quick coupler, apply anti-seize to the coupler locking pins and bores.



LEIL14WHL0207AB 2

Every 30 days

Every month, check:

1. The battery charge and battery electrolyte level. Recharge the batteries if required.
2. The grease on the cylinder rods and/or perform attachment functions monthly.
3. The fuel level in the fuel tank and the corrosive oil level in the engine. Add more if necessary.
4. The condition of all lines, connectors and clamps (rust). Grease if necessary.
5. The condition of the paint work. Apply a coat of anti-rust treatment where necessary.
6. If equipped with attachment quick coupler, reapply anti-seize to the coupler locking pins and bores as required.

Removal

Starting up after storage

⚠ WARNING

Inhalation hazard! Risk to operators and bystanders.
Avoid running the engine in confined areas. Make sure there is adequate ventilation at all times.
Failure to comply could result in death or serious injury.

W0156A

1. Close the drain valves and fill the cooling system.
2. If the **DEF/ADBLUE®** tank was drained for long term storage (90 days or more), refill the tank with fresh fluid.
3. Drain the fuel reservoir and top up with suitable fuel, see "Fluids and lubricants" in this manual.
4. Drain the engine sump, fill with clean engine oil and check the oil level.
5. Replace the filtering element of the fuel filters.
6. Install the batteries.
7. Grease the machine thoroughly.
8. Check the condition of the engine accessory drive belt, and replace it if necessary.
9. Check the condition of the air conditioning drive belt and replace it if necessary.
10. Check the hydraulic fluid level, and add more fluid if necessary.
11. Check the travel reduction gears and swing reduction gear oil level, and add more oil if necessary.
12. Clean the cylinder rods.
13. Unplug the air filter inlet and the exhaust pipe.
14. Remove the "DO NOT OPERATE" tag and start the engine, following the starting up procedure. Keep non-authorized personnel clear of the machine.
15. Keep a careful watch on all systems display panel lamps and indicators.

8 - SPECIFICATIONS

General specifications

Engine Specifications

Model	FPT F4HGE613E STAGE V certified
Type	4-stroke, turbocharged, air-to-air cooled
Cylinders	6
Bore / Stroke	**104 mm** (**4.09 in**) x **132 mm** (**5.20 in**)
Displacement	**6.7 l** (**411 in³**)
Fuel Injection	Electronic
Horsepower	
Maximum power	
Gross	**190 kW** (**255 Hp**) @ **1600 RPM**
Net	**180 kW** (**242 Hp**) @ **1600 RPM** (per ISO 9249, SAE J1349)
Torque (maximum)	
Maximum power range	
Gross	**1300 N·m** (**959 lb ft**) @ **1300 RPM**
Net	**1261 N·m** (**930 lb ft**) @ **1300 RPM**(per ISO 9249, SAE J1349)
Economy engine speeds (4 speed and 5 speed transmissions)	
Machine idled (alternate low idle)	**670 – 730 RPM**
Machine idled (cold weather alternate accelerated low idle)	**1270 – 1330 RPM**
Electrical	
Batteries	Quantity 2 of **12 V**
Alternator	**120 A**
Voltage	**24 V**

Drivetrain - 4 Speed Transmission

4F/3R Proportional with Electronic Control Module torque sensing autoshift/manual shift and modulation		
Gears	Helical cut	
Gear ratios	Forward	Reverse
1st	4.152	3.937
2nd	2.184	2.071
3rd	1.072	1.017
4th	0.636	
Torque converter stall ratio	2.283:1	
Rear axle oscillation	**24°** total	
Standard Axles	Front	Rear
Differential	Open on front and rear axles	
Differential ratio	4.11	4.11
Planetary ratio	6.00	6.00
Final axle ratio	24.67	24.67
Planetaries	Outboard	
Service brakes	Hydraulically actuated, maintenance-free, multiple wet disc w/accumulator to all four wheels	
Parking brakes	Spring-applied hydraulic release disc on transmission output shaft	
Travel speeds	Forward	Reverse
1st	**6.4 km/h** (**4.0 mph**)	**6.8 km/h** (**4.2 mph**)
2nd	**12 km/h** (**7.4 mph**)	**12.6 km/h** (**7.8 mph**)
3rd	**23.1 km/h** (**14.3 mph**)	**24.2 km/h** (**15.0 mph**)
4th	**36.0 km/h** (**22.4 mph**)	

NOTE: *travel speeds @ full engine throttle.*

Drivetrain - Optional 5 Speed Transmission

5F/3R Proportional with Electronic Control Module torque sensing autoshift/manual shift and modulation		
Gears	Helical cut	
Gear ratios	Forward	Reverse
1st	3.921	3.718
2nd	2.255	2.138
3rd	1.466	0.894
4th	0.942	
5th	0.613	
Torque converter stall ratio	2.350:1	
Rear axle oscillation	**24°** total	
Optional Axles	Front	Rear
Differential	Hydraulic Differential Lock	Open
Differential ratio	4.11	4.11
Planetary ratio	6.00	6.00
Final axle ratio	24.67	24.67
Planetaries	Outboard	
Service brakes	Hydraulically actuated, maintenance-free, multiple wet disc w/accumulator to all four wheels	
Parking brakes	Spring-applied hydraulic release disc on transmission output shaft	
Travel speeds	Forward	Reverse
1st	**6.4 km/h** (**4.0 mph**)	**6.8 km/h** (**4.2 mph**)
2nd	**11.1 km/h** (**6.9 mph**)	**11.7 km/h** (**7.3 mph**)
3rd	**17 km/h** (**10.6 mph**)	**27.7 km/h** (**17.2 mph**)
4th	**26.3 km/h** (**16.3 mph**)	
5th	**40 km/h** (**25 mph**)	

NOTE: *travel speeds @ full engine throttle and lock-up converter engaged.*

Cylinder Specifications

Lift cylinder	
Bore diameter	**152.4 mm** (**6.0 in**)
Rod diameter	**88.9 mm** (**3.5 in**)
Stroke	**845.7 mm** (**33.30 in**)
Dump cylinder	
Bore diameter	**177.8 mm** (**7.0 in**)
Rod diameter	**101.6 mm** (**4.0 in**)
Stroke	**600 mm** (**23.6 in**)
Steer cylinder	
Bore diameter	**82.6 mm** (**3.25 in**)
Rod diameter	**44.5 mm** (**1.75 in**)
Stroke	**481.9 mm** (**18.97 in**)

Instrumentation Gauges

Speedometer	Engine Coolant Temperature (ECT)	Gear position
Tachometer	Hydraulic oil temperature	Transmission modes
Hourmeter	Transmission oil temperature	Travel selected (FNR)
Fuel level	DEF level	Work mode

Operator Environment

ROPS cab with heater and A/C	Key start	Articulated power steering with tilt
Adjustable suspension seat	Single lever 2-spool loader control	Cup holder
Coat hook	Interior rear view mirror	Single brake pedal
Storage tray	Storage box	Dome light
Exterior rear view mirrors	Front (intermittent) and rear wipers	Front and rear windshield washers
Right and left steps/platforms		**52 mm** (**2 in**) retractable seat belt

Hydraulic Specifications

Pump 1	Closed centered pressure/flow compensated
Variable displacement	**85 cm³/rev** (**5.18 in³/rev**) **162 l/min @ 2000 RPM** (**42.6 US gpm @ 2000 RPM**)
Pump 2	Closed centered pressure/flow compensated
Variable displacement	**63 cm³/rev** (**3.84 in³/rev**) **120 l/min @ 2000 RPM** (**31.6 US gpm @ 2000 RPM**)
Loader auxiliary steering	hydraulic orbital center-pivot articulating w/on-demand oil flow
Filtration	10-micron, full flow replaceable cartridges on return line, condition indicator light for filter

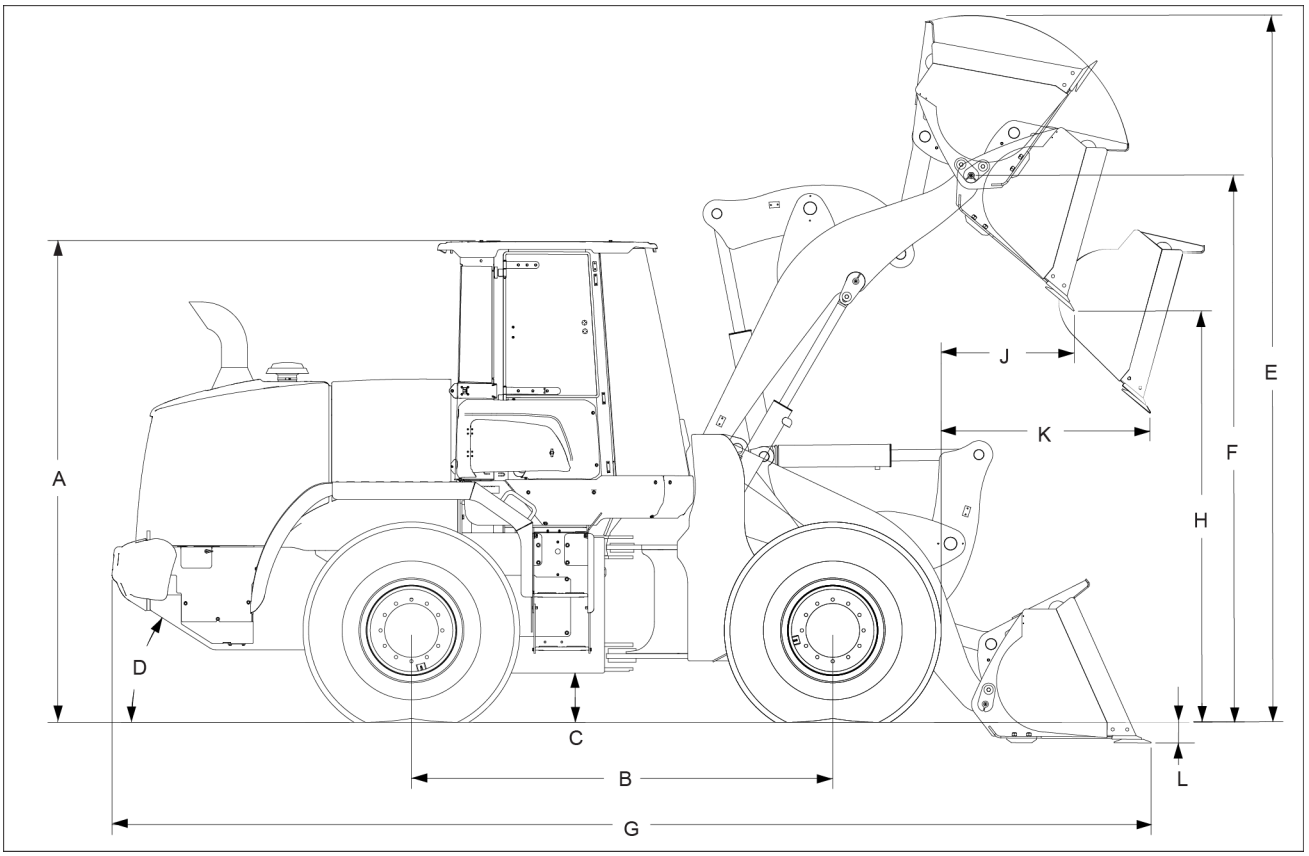
Machine specifications and dimensions

The following specifications are common for all 921G model configurations:

Common Specifications

Feature	Specification
Overall height (top of cab)	**3464 mm** (**136.4 in**)
Rear axle oscillation total	**24°**
Height to drawbar	**1071 mm** (**42.2 in**)
Vertical wheel travel (trunnion fully oscillated)	**501.5 mm** (**19.7 in**)
Loader Speeds	921G
Loaded raise (rollback @ ground)	**6.3 s**
Loaded dump (@ full height)	**1.5 s**
Empty power down	**3.5 s**
Empty float	**3.6 s**

921G Loader - Lift Arms Specifications



LEIL16WHL0629FB 1

921G Z-Bar Specifications - 3.0 m³ (3.92 yd³) - Pin On

	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**2.93 m³ (3.83 yd³)**	**3.06 m³ (4.00 yd³)**
Bucket width (maximum outer)	**2946 mm (116.0 in)**	**2946 mm (116.0 in)**
Dimensional Outline Specifications		
A (top of cab height)	**3464 mm (136.4 in)**	**3464 mm (136.4 in)**
B (wheelbase)	**3340 mm (131.5 in)**	**3340 mm (131.5 in)**
C (ground clearance)	**435 mm (17.1 in)**	**435 mm (17.1 in)**
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm (111.4 in)**	**2829 mm (111.4 in)**
Centerline tread width	**2230 mm (87.8 in)**	**2230 mm (87.8 in)**
Turning radius (outside of tires)	**6003 mm (236.3 in)**	**6003 mm (236.3 in)**
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5468 mm (215.3 in)**	**5468 mm (215.3 in)**
F (hinge pin - fully raised)	**4124 mm (162.4 in)**	**4124 mm (162.4 in)**
G (overall - bucket level on ground)	**7960 mm (313.4 in)**	**8062 mm (317.4 in)**
H (dump - fully raised, **45°** dump)	**3074 mm (121.0 in)**	**3001 mm (118.1 in)**
J (reach - fully raised, **45°** dump)	**1046 mm (41.2 in)**	**1093 mm (43.0 in)**
K (reach - **2.13 m (7.0 ft)**, **45°** dump)	**1681 mm (66.2 in)**	**1697 mm (66.8 in)**
L (dig depth)	**41 mm (1.6 in)**	**67 mm (2.6 in)**
ISO Load Specifications		
Operating Weight (without load)	**20125 kg (44368 lb)**	**20300 kg (44754 lb)**
Operating load	**6796 kg (14983 lb)**	**6620 kg (14595 lb)**
Tipping load		
Machine straight	**16888 kg (37232 lb)**	**16504 kg (36385 lb)**
40° turn	**13592 kg (29965 lb)**	**13241 kg (29191 lb)**

	Bucket with Teeth	Bucket with Segments
Bucket Specifications		
Capacity (heaped)	**2.93 m³ (3.83 yd³)**	**3.06 m³ (4.00 yd³)**
Bucket width (maximum outer)	**2983 mm (117.4 in)**	**2983 mm (117.4 in)**
Dimensional Outline Specifications		
A (top of cab height)	**3464 mm (136.4 in)**	**3464 mm (136.4 in)**
B (wheelbase)	**3340 mm (131.5 in)**	**3340 mm (131.5 in)**
C (ground clearance)	**435 mm (17.1 in)**	**435 mm (17.1 in)**
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm (111.4 in)**	**2829 mm (111.4 in)**
Centerline tread width	**2230 mm (87.8 in)**	**2230 mm (87.8 in)**
Turning radius (outside of tires)	**6003 mm (236.3 in)**	**6003 mm (236.3 in)**
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5468 mm (215.3 in)**	**5467 mm (215.2 in)**
F (hinge pin - fully raised)	**4124 mm (162.4 in)**	**4124 mm (162.4 in)**
G (overall - bucket level on ground)	**8184 mm (322.2 in)**	**8184 mm (322.2 in)**
H (dump - fully raised, **45°** dump)	**2920 mm (115.0 in)**	**2919 mm (114.9 in)**
J (reach - fully raised, **45°** dump)	**1175 mm (46.3 in)**	**1175 mm (46.3 in)**
K (reach - **2.13 m (7.0 ft)**, **45°** dump)	**1740 mm (68.5 in)**	**1740 mm (68.5 in)**
L (dig depth)	**76 mm (3.0 in)**	**76 mm (3.0 in)**
ISO Load Specifications		
Operating Weight (without load)	**20283 kg (44716 lb)**	**20381 kg (44932 lb)**
Operating load	**6693 kg (14756 lb)**	**6571 kg (14487 lb)**
Tipping load		
Machine straight	**16681 kg (36775 lb)**	**16404 kg (36165 lb)**
40° turn	**13386 kg (29511 lb)**	**13141 kg (28971 lb)**

921G Z-Bar Specifications - 3.6 m³ (4.71 yd³) - Pin On

	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**3.51 m³ (4.59 yd³)**	**3.63 m³ (4.75 yd³)**
Bucket width (maximum outer)	**2946 mm (116.0 in)**	**2946 mm (116.0 in)**
Dimensional Outline Specifications		
A (top of cab height)	**3464 mm (136.4 in)**	**3464 mm (136.4 in)**
B (wheelbase)	**3340 mm (131.5 in)**	**3340 mm (131.5 in)**
C (ground clearance)	**435 mm (17.1 in)**	**435 mm (17.1 in)**
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm (111.4 in)**	**2829 mm (111.4 in)**
Centerline tread width	**2230 mm (87.8 in)**	**2230 mm (87.8 in)**
Turning radius (outside of tires)	**6003 mm (236.3 in)**	**6003 mm (236.3 in)**
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5613 mm (221.0 in)**	**5613 mm (221.0 in)**
F (hinge pin - fully raised)	**4124 mm (162.4 in)**	**4124 mm (162.4 in)**
G (overall - bucket level on ground)	**8103 mm (319.0 in)**	**8206 mm (323.1 in)**
H (dump - fully raised, **45°** dump)	**2981 mm (117.4 in)**	**2908 mm (114.5 in)**
J (reach - fully raised, **45°** dump)	**1155 mm (45.5 in)**	**1203 mm (47.4 in)**
K (reach - **2.13 m (7.0 ft)**, **45°** dump)	**1750 mm (68.9 in)**	**1762 mm (69.4 in)**
L (dig depth)	**42 mm (1.7 in)**	**67 mm (2.6 in)**
ISO Load Specifications		
Operating Weight (without load)	**20251 kg (44646 lb)**	**20427 kg (45034 lb)**
Operating load	**6655 kg (14672 lb)**	**6512 kg (14357 lb)**
Tipping load		
Machine straight	**16592 kg (36579 lb)**	**16290 kg (35913 lb)**
40° turn	**13311 kg (29346 lb)**	**13025 kg (28715 lb)**

	Bucket with Teeth	Bucket with Segments
Bucket Specifications		
Capacity (heaped)	**3.51 m³ (4.59 yd³)**	**3.63 m³ (4.75 yd³)**
Bucket width (maximum outer)	**2983 mm (117.4 in)**	**2983 mm (117.4 in)**
Dimensional Outline Specifications		
A (top of cab height)	**3464 mm (136.4 in)**	**3464 mm (136.4 in)**
B (wheelbase)	**3340 mm (131.5 in)**	**3340 mm (131.5 in)**
C (ground clearance)	**435 mm (17.1 in)**	**435 mm (17.1 in)**
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm (111.4 in)**	**2829 mm (111.4 in)**
Centerline tread width	**2230 mm (87.8 in)**	**2230 mm (87.8 in)**
Turning radius (outside of tires)	**6003 mm (236.3 in)**	**6003 mm (236.3 in)**
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5613 mm (221.0 in)**	**5612 mm (220.9 in)**
F (hinge pin - fully raised)	**4124 mm (162.4 in)**	**4123 mm (162.3 in)**
G (overall - bucket level on ground)	**8326 mm (327.8 in)**	**8326 mm (327.8 in)**
H (dump - fully raised, **45°** dump)	**2828 mm (111.3 in)**	**2828 mm (111.3 in)**
J (reach - fully raised, **45°** dump)	**1284 mm (50.6 in)**	**1284 mm (50.6 in)**
K (reach - **2.13 m (7.0 ft)**, **45°** dump)	**1802 mm (70.9 in)**	**1802 mm (70.9 in)**
L (dig depth)	**76 mm (3.0 in)**	**77 mm (3.0 in)**
ISO Load Specifications		
Operating Weight (without load)	**20409 kg (44994 lb)**	**20507 kg (45210 lb)**
Operating load	**6550 kg (14440 lb)**	**6431 kg (14178 lb)**
Tipping load		
Machine straight	**16380 kg (36112 lb)**	**16111 kg (35519 lb)**
40° turn	**13101 kg (28883 lb)**	**12862 kg (28356 lb)**

921G Z-Bar Specifications - 4.0 m³ (5.23 yd³) - Pin On - Flat Bottom

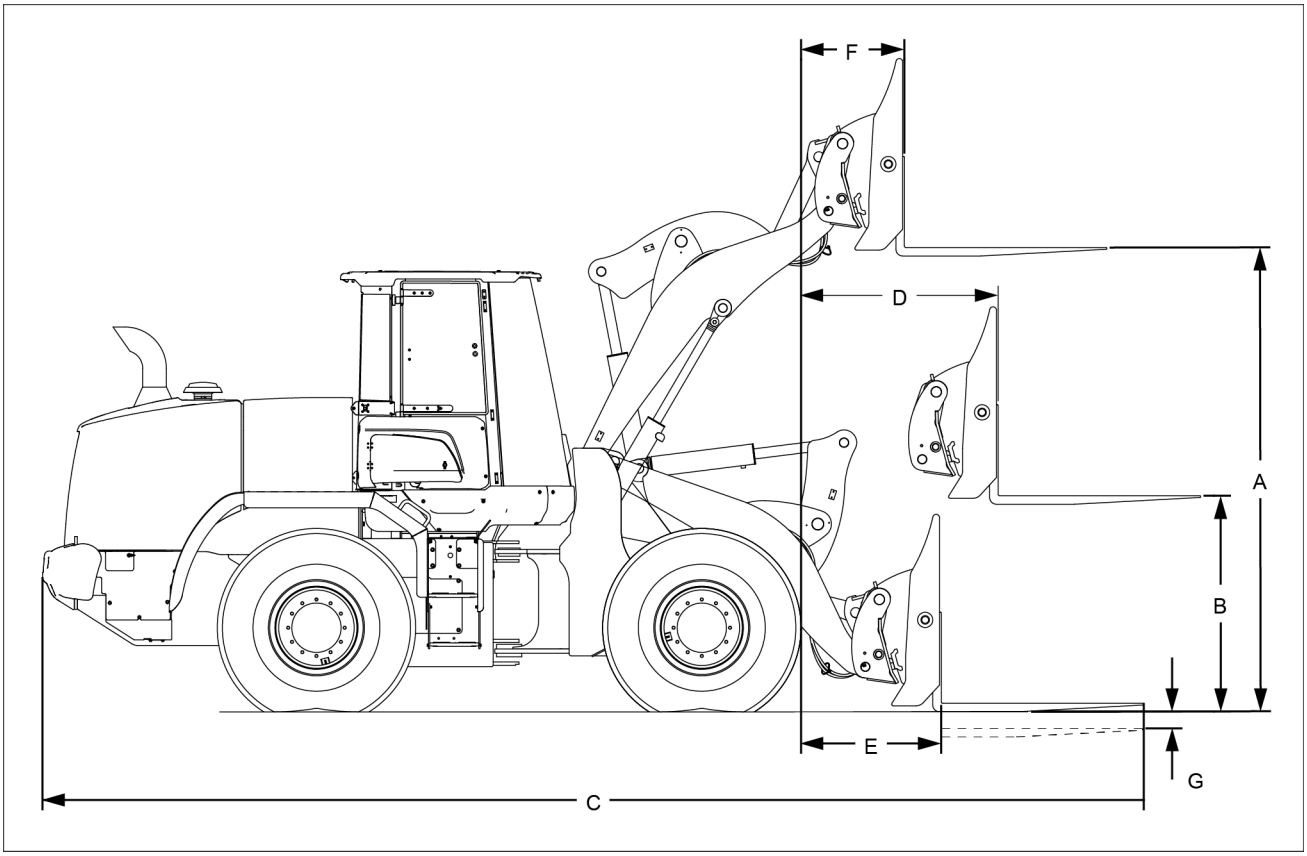
	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**3.82 m³** (**5.00 yd³**)	**3.97 m³** (**5.19 yd³**)
Bucket width (maximum outer)	**2946 mm** (**116.0 in**)	**2946 mm** (**116.0 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3433 mm** (**135.2 in**)	**3463 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**435 mm** (**17.1 in**)	**435 mm** (**17.1 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6003 mm** (**236.3 in**)	**6003 mm** (**236.3 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5702 mm** (**224.5 in**)	**5732 mm** (**225.7 in**)
F (hinge pin - fully raised)	**4093 mm** (**161.1 in**)	**4123 mm** (**162.3 in**)
G (overall - bucket level on ground)	**8066 mm** (**317.6 in**)	**8145 mm** (**320.7 in**)
H (dump - fully raised, **45°** dump)	**2917 mm** (**114.8 in**)	**2871 mm** (**113.0 in**)
J (reach - fully raised, **45°** dump)	**1009 mm** (**39.7 in**)	**1050 mm** (**41.3 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**1573 mm** (**61.9 in**)	**1591 mm** (**62.6 in**)
L (dig depth)	**73 mm** (**2.9 in**)	**67 mm** (**2.6 in**)
ISO Load Specifications		
Operating Weight (without load)	**34730 kg** (**76567 lb**)	**20549 kg** (**45303 lb**)
Operating load	**2115 kg** (**4663 lb**)	**6491 kg** (**14310 lb**)
Tipping load		
Machine straight	**2917 kg** (**6430.9 lb**)	**16246 kg** (**35816 lb**)
40° turn	**335 kg** (**738.5 lb**)	**12982 kg** (**28620 lb**)

	Bucket with Teeth	Bucket with Segments
Bucket Specifications		
Capacity (heaped)	**3.82 m³** (**5.00 yd³**)	**3.97 m³** (**5.19 yd³**)
Bucket width (maximum outer)	**2983 mm** (**117.4 in**)	**2983 mm** (**117.4 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3463 mm** (**136.3 in**)	**3463 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**435 mm** (**17.1 in**)	**435 mm** (**17.1 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6003 mm** (**236.3 in**)	**6003 mm** (**236.3 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5732 mm** (**225.7 in**)	**5732 mm** (**225.7 in**)
F (hinge pin - fully raised)	**4123 mm** (**162.3 in**)	**4123 mm** (**162.3 in**)
G (overall - bucket level on ground)	**8265 mm** (**325.4 in**)	**8265 mm** (**325.4 in**)
H (dump - fully raised, **45°** dump)	**2784 mm** (**109.6 in**)	**2784 mm** (**109.6 in**)
J (reach - fully raised, **45°** dump)	**1123 mm** (**44.2 in**)	**1123 mm** (**44.2 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**1618 mm** (**63.7 in**)	**1618 mm** (**63.7 in**)
L (dig depth)	**77 mm** (**3.0 in**)	**77 mm** (**3.0 in**)
ISO Load Specifications		
Operating Weight (without load)	**20531 kg** (**45263 lb**)	**20629 kg** (**45479 lb**)
Operating load	**6557 kg** (**14456 lb**)	**6458 kg** (**14237 lb**)
Tipping load		
Machine straight	**16408 kg** (**36173 lb**)	**16180 kg** (**35671 lb**)
40° turn	**13115 kg** (**28914 lb**)	**12916 kg** (**28475 lb**)

921G Z-Bar Specifications - 3.2 m³ (4.19 yd³) - with Leonardi Coupler

	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**3.07 m³** (**4.02 yd³**)	**3.18 m³** (**4.16 yd³**)
Bucket width (maximum outer)	**2946 mm** (**116.0 in**)	**2946 mm** (**116.0 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3462 mm** (**136.3 in**)	**3462 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**431 mm** (**17.0 in**)	**431 mm** (**17.0 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6300 mm** (**248.0 in**)	**6300 mm** (**248.0 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5595 mm** (**220.3 in**)	**5595 mm** (**220.3 in**)
F (hinge pin - fully raised)	**4122 mm** (**162.3 in**)	**4121 mm** (**162.2 in**)
G (overall - bucket level on ground)	**8237 mm** (**324.3 in**)	**8340 mm** (**328.3 in**)
H (dump - fully raised, **45°** dump)	**2809 mm** (**110.6 in**)	**2732 mm** (**107.6 in**)
J (reach - fully raised, **45°** dump)	**1142 mm** (**45.0 in**)	**1184 mm** (**46.6 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**1650 mm** (**65.0 in**)	**1648 mm** (**64.9 in**)
L (dig depth)	**47 mm** (**1.9 in**)	**72 mm** (**2.8 in**)
ISO Load Specifications		
Operating Weight (without load)	**21238 kg** (**46822 lb**)	**21415 kg** (**47212 lb**)
Operating load	**5864 kg** (**12928 lb**)	**5709 kg** (**12586 lb**)
Maximum Material Density	**1910 kg/m³** (**3219 lb/yd³**)	**1793 kg/m³** (**3022 lb/yd³**)
Tipping load - Machine straight	**14818 kg** (**32668 lb**)	**14481 kg** (**31925 lb**)
Tipping load - **40°** turn	**11728 kg** (**25856 lb**)	**11418 kg** (**25172 lb**)

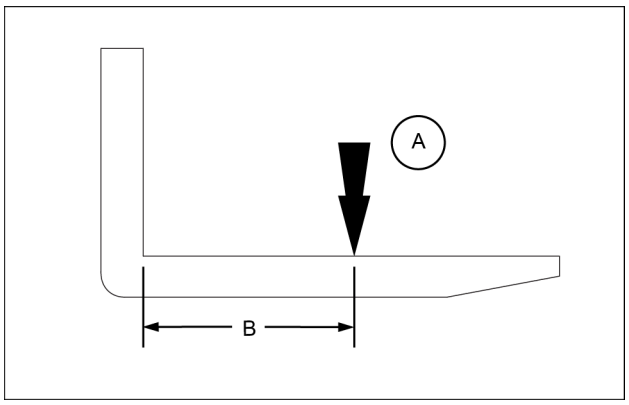
	Bucket with Teeth
Bucket Specifications	
Capacity (heaped)	**3.14 m³** (**4.11 yd³**)
Bucket width (maximum outer)	**2983 mm** (**117.4 in**)
Dimensional Outline Specifications	
A (top of cab height)	**3462 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)
C (ground clearance)	**431 mm** (**17.0 in**)
D (rear angle of departure)	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6300 mm** (**248.0 in**)
Turning angle from center	**40°**
Total turning angle	**80°**
E (fully raised with spillguard)	**5595 mm** (**220.3 in**)
F (hinge pin - fully raised)	**4122 mm** (**162.3 in**)
G (overall - bucket level on ground)	**8462 mm** (**333.1 in**)
H (dump - fully raised, **45°** dump)	**2644 mm** (**104.1 in**)
J (reach - fully raised, **45°** dump)	**1258 mm** (**49.5 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**1669 mm** (**65.7 in**)
L (dig depth)	**81 mm** (**3.2 in**)
ISO Load Specifications	
Operating Weight (without load)	**21397 kg** (**47172 lb**)
Operating load	**5739 kg** (**12652 lb**)
Maximum Material Density	**1830 kg/m³** (**3085 lb/yd³**)
Tipping load - Machine straight	**14551 kg** (**32079 lb**)
Tipping load - **40°** turn	**11477 kg** (**25302 lb**)



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921G Z-Bar Specifications - 1.2 m (47.2 in) - Forks with Leonardi Coupler

	Pallet Fork
Fork Specifications	
Fork Length	**1250 mm** (**49.2 in**)
Dimensional Outline Specifications	
A. Ground clearance at tip of shank	**3921 mm** (**154.4 in**)
B. Ground clearance at tip of fork with horizontal arm	**1854 mm** (**73.0 in**)
C. Total length (fork on ground)	**8327 mm** (**327.8 in**)
D. Front protrusion from tires with boom horizontal	**1542 mm** (**60.7 in**)
E. Front protrusion from tires with attachment on the ground	**902 mm** (**35.5 in**)
F. Front protrusion from tires at maximum height	**680 mm** (**26.8 in**)
G. Dig depth	**0 mm** (**0 in**)
ISO Load Specifications	
Operating Weight (without load)	**20498 kg** (**45191 lb**)
Operating load	
50% Articulation Tip, SAE J1197	**4900 kg** (**10804 lb**)
60% Articulation Tip, Rough Terrain, EN474-3	**5881 kg** (**12964 lb**)
80% Articulation Tip, Firm & Level Ground, EN474-3	**7841 kg** (**17286 lb**)
Tipping load	
Machine straight	**12083 kg** (**26639 lb**)
40° turn	**9801 kg** (**21607 lb**)



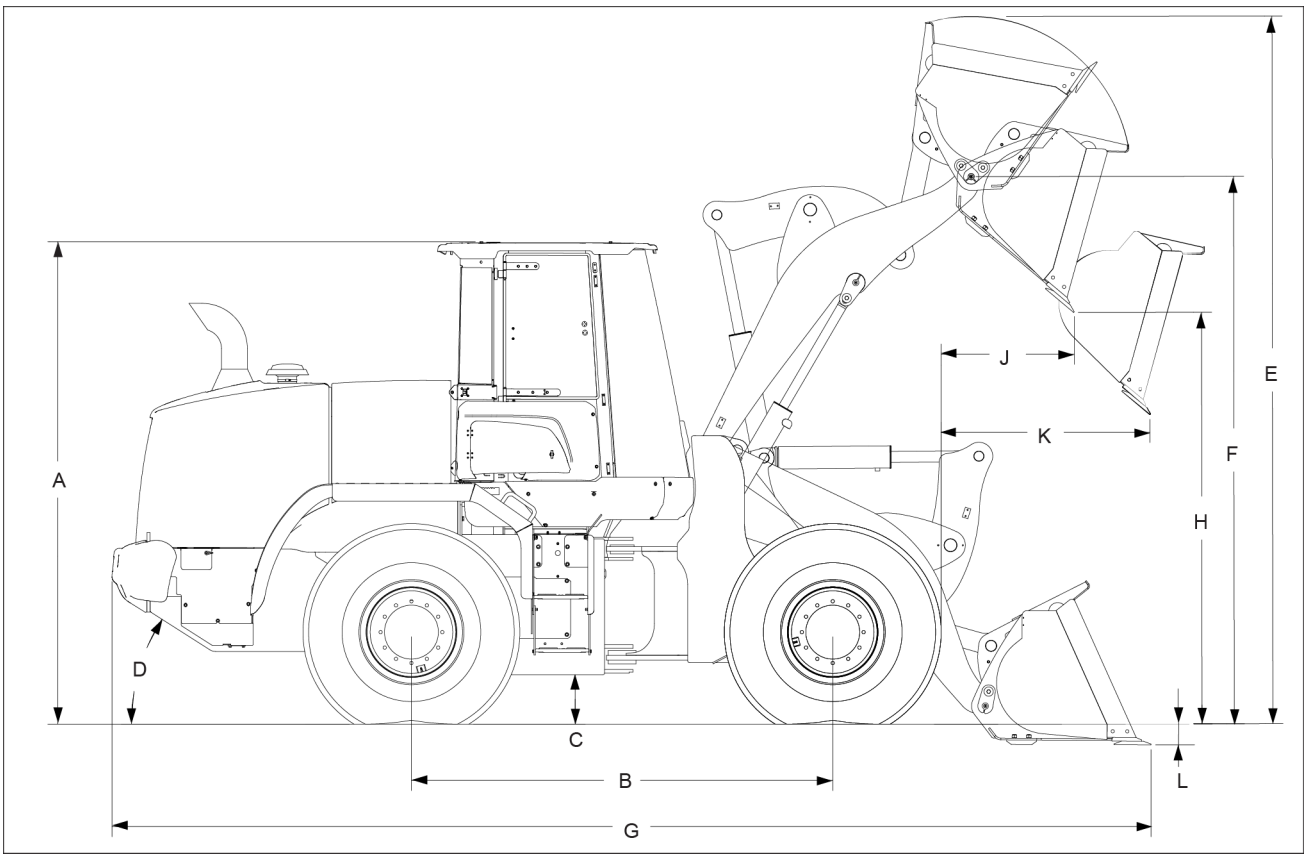
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921G Z-Bar Specifications - Forks (P/N: 87545184) with Leonardi Coupler (P/N: 87750107)

(A) Operating load
(B) 625 mm (**24.6 in**)

NOTE: *machine configured with Heavy Duty counterweight and Michelin 23.5R25 XHA2 TL tires.*

Load Specifications (EN 474–3)	
Operating load	
Rough terrain	**6125 kg** (**13503 lb**)
Firm and level ground	**8166 kg** (**18003 lb**)



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921G XR Specifications - 3.0 m³ (3.92 yd³) - Pin On

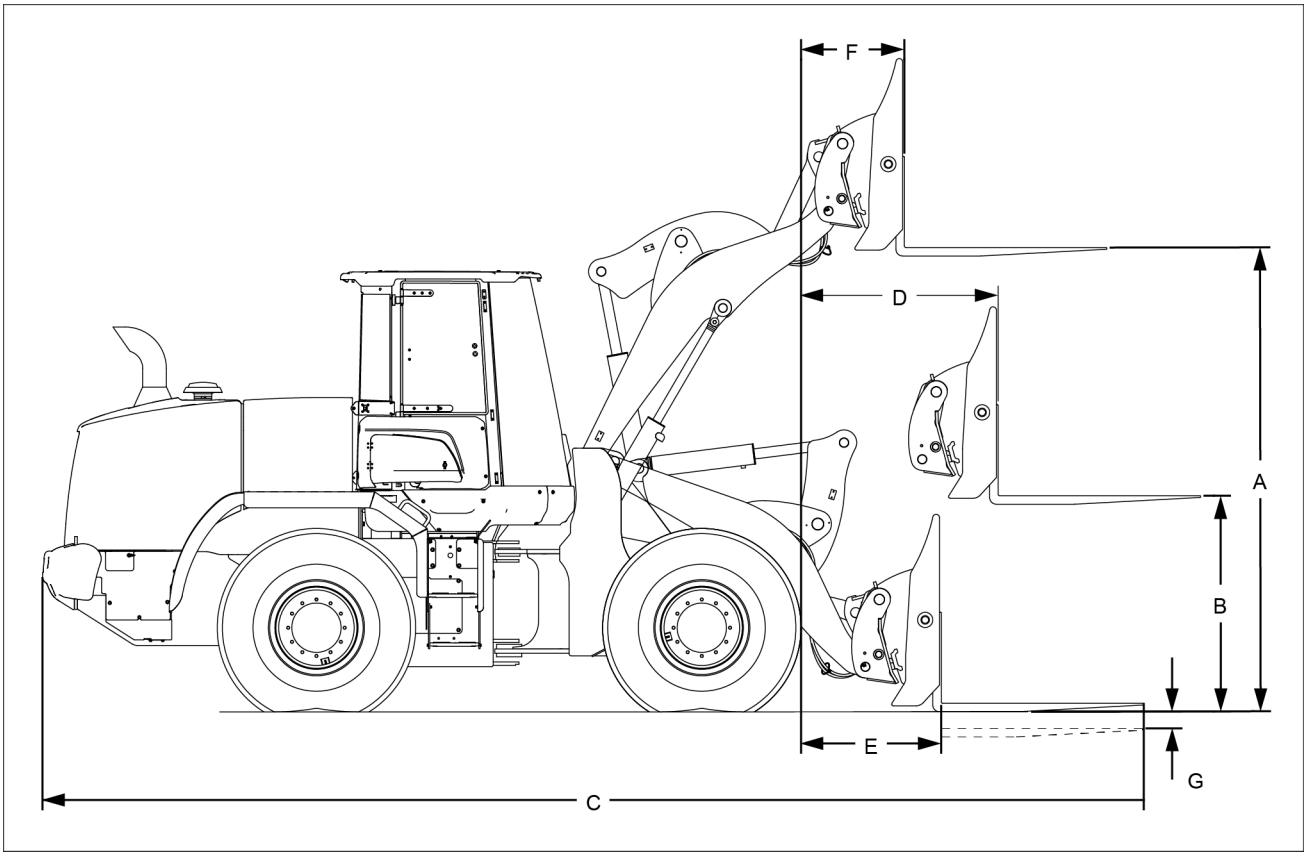
	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**2.93 m³** (**3.83 yd³**)	**3.06 m³** (**4.00 yd³**)
Bucket width (maximum outer)	**2946 mm** (**116.0 in**)	**2946 mm** (**116.0 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3464 mm** (**136.4 in**)	**3463 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**435 mm** (**17.1 in**)	**435 mm** (**17.1 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6003 mm** (**236.3 in**)	**6003 mm** (**236.3 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5909 mm** (**232.6 in**)	**5909 mm** (**232.6 in**)
F (hinge pin - fully raised)	**4566 mm** (**179.8 in**)	**4565 mm** (**179.7 in**)
G (overall - bucket level on ground)	**8450 mm** (**332.7 in**)	**8550 mm** (**336.6 in**)
H (dump - fully raised, **45°** dump)	**3515 mm** (**138.4 in**)	**3442 mm** (**135.5 in**)
J (reach - fully raised, **45°** dump)	**1158 mm** (**45.6 in**)	**1206 mm** (**47.5 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**2112 mm** (**83.1 in**)	**2132 mm** (**83.9 in**)
L (dig depth)	**108 mm** (**4.3 in**)	**134 mm** (**5.3 in**)
ISO Load Specifications		
Operating Weight (without load)	**20388 kg** (**44948 lb**)	**20564 kg** (**45336 lb**)
Operating load	**5508 kg** (**12143 lb**)	**5354 kg** (**11804 lb**)
Tipping load		
Machine straight	**13709 kg** (**30223 lb**)	**13379 kg** (**29496 lb**)
40° turn	**11015 kg** (**24284 lb**)	**10708 kg** (**23607 lb**)

	Bucket with Teeth	Bucket with Segments
Bucket Specifications		
Capacity (heaped)	**2.93 m³** (**3.83 yd³**)	**3.06 m³** (**4.00 yd³**)
Bucket width (maximum outer)	**2983 mm** (**117.4 in**)	**2983 mm** (**117.4 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3463 mm** (**136.3 in**)	**3463 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**435 mm** (**17.1 in**)	**435 mm** (**17.1 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6003 mm** (**236.3 in**)	**6003 mm** (**236.3 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**5909 mm** (**232.6 in**)	**5909 mm** (**232.6 in**)
F (hinge pin - fully raised)	**4565 mm** (**179.7 in**)	**4565 mm** (**179.7 in**)
G (overall - bucket level on ground)	**8670 mm** (**341.3 in**)	**8670 mm** (**341.3 in**)
H (dump - fully raised, **45°** dump)	**3361 mm** (**132.3 in**)	**3361 mm** (**132.3 in**)
J (reach - fully raised, **45°** dump)	**1288 mm** (**50.7 in**)	**1288 mm** (**50.7 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**2181 mm** (**85.9 in**)	**2181 mm** (**85.9 in**)
L (dig depth)	**143 mm** (**5.6 in**)	**143 mm** (**5.6 in**)
ISO Load Specifications		
Operating Weight (without load)	**20547 kg** (**45298 lb**)	**20645 kg** (**45514 lb**)
Operating load	**5408 kg** (**11923 lb**)	**5306 kg** (**11698 lb**)
Tipping load		
Machine straight	**13508 kg** (**29780 lb**)	**13282 kg** (**29282 lb**)
40° turn	**10816 kg** (**23845 lb**)	**10612 kg** (**23395 lb**)

921G XR Specifications - 3.2 m³ (4.19 yd³) - with Leonardi Coupler

	Bucket Only	Bucket with Bolt-on Edge
Bucket Specifications		
Capacity (heaped)	**3.07 m³** (**4.02 yd³**)	**3.18 m³** (**4.16 yd³**)
Bucket width (maximum outer)	**2946 mm** (**116.0 in**)	**2946 mm** (**116.0 in**)
Dimensional Outline Specifications		
A (top of cab height)	**3461 mm** (**136.3 in**)	**3461 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)	**3340 mm** (**131.5 in**)
C (ground clearance)	**431 mm** (**17.0 in**)	**431 mm** (**17.0 in**)
D (rear angle of departure)	**29°**	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6300 mm** (**248.0 in**)	**6300 mm** (**248.0 in**)
Turning angle from center	**40°**	**40°**
Total turning angle	**80°**	**80°**
E (fully raised with spillguard)	**6037 mm** (**237.7 in**)	**6036 mm** (**237.6 in**)
F (hinge pin - fully raised)	**4563 mm** (**179.6 in**)	**4563 mm** (**179.6 in**)
G (overall - bucket level on ground)	**8727 mm** (**343.6 in**)	**8826 mm** (**347.5 in**)
H (dump - fully raised, **45°** dump)	**3254 mm** (**128.1 in**)	**3178 mm** (**125.1 in**)
J (reach - fully raised, **45°** dump)	**1261 mm** (**49.6 in**)	**1303 mm** (**51.3 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**2099 mm** (**82.6 in**)	**2103 mm** (**82.8 in**)
L (dig depth)	**114 mm** (**4.5 in**)	**139 mm** (**5.5 in**)
ISO Load Specifications		
Operating Weight (without load)	**21502 kg** (**47404 lb**)	**21678 kg** (**47792 lb**)
Operating load	**4699 kg** (**10360 lb**)	**4559 kg** (**10051 lb**)
Maximum Material Density	**1530 kg/m³** (**2579 lb/yd³**)	**1432 kg/m³** (**2414 lb/yd³**)
Tipping load - Machine straight	**11943 kg** (**26330 lb**)	**11646 kg** (**25675 lb**)
Tipping load - **40°** turn	**9398 kg** (**20719 lb**)	**9118 kg** (**20102 lb**)

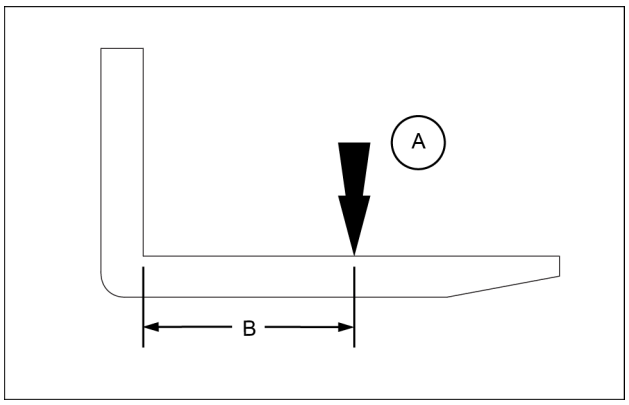
	Bucket with Teeth
Bucket Specifications	
Capacity (heaped)	**3.14 m³** (**4.11 yd³**)
Bucket width (maximum outer)	**2983 mm** (**117.4 in**)
Dimensional Outline Specifications	
A (top of cab height)	**3461 mm** (**136.3 in**)
B (wheelbase)	**3340 mm** (**131.5 in**)
C (ground clearance)	**431 mm** (**17.0 in**)
D (rear angle of departure)	**29°**
Overall width with bucket guard	**2829 mm** (**111.4 in**)
Centerline tread width	**2230 mm** (**87.8 in**)
Turning radius (outside of tires)	**6300 mm** (**248.0 in**)
Turning angle from center	**40°**
Total turning angle	**80°**
E (fully raised with spillguard)	**6036 mm** (**237.6 in**)
F (hinge pin - fully raised)	**4563 mm** (**179.6 in**)
G (overall - bucket level on ground)	**8947 mm** (**352.2 in**)
H (dump - fully raised, **45°** dump)	**3090 mm** (**121.7 in**)
J (reach - fully raised, **45°** dump)	**1378 mm** (**54.3 in**)
K (reach - **2.13 m** (**7.0 ft**), **45°** dump)	**2133 mm** (**84.0 in**)
L (dig depth)	**148 mm** (**5.8 in**)
ISO Load Specifications	
Operating Weight (without load)	**21660 kg** (**47752 lb**)
Operating load	**4583 kg** (**10104 lb**)
Maximum Material Density	**1461 kg/m³** (**2463 lb/yd³**)
Tipping load - Machine straight	**11701 kg** (**25796 lb**)
Tipping load - **40°** turn	**9166 kg** (**20208 lb**)



LEIL16WHL2343FB 5

9721G XR Specifications - 1.2 m (47.2 in) - Forks with Leonardi Coupler

	Pallet Fork
Fork Specifications	
Fork Length	**1250 mm** (**48.0 in**)
Dimensional Outline Specifications	
A. Ground clearance at tip of shank	**4362 mm** (**171.7 in**)
B. Ground clearance at tip of fork with horizontal arm	**1853 mm** (**72.9 in**)
C. Total length (fork on ground)	**8801 mm** (**346.5 in**)
D. Front protrusion from tires with boom horizontal	**1944 mm** (**76.5 in**)
E. Front protrusion from tires with attachment on the ground	**1376 mm** (**54.2 in**)
F. Front protrusion from tires at maximum height	**793 mm** (**31.2 in**)
G. Dig depth	**32 mm** (**1.3 in**)
ISO Load Specifications	
Operating Weight (without load)	**20762 kg** (**45772 lb**)
Operating load	
50% Articulation Tip, SAE J1197	**4092 kg** (**9021 lb**)
60% Articulation Tip, Rough Terrain, EN474-3	**4910 kg** (**10825 lb**)
80% Articulation Tip, Firm & Level Ground, EN474-3	**6547 kg** (**14434 lb**)
Tipping load	
Machine straight	**10170 kg** (**22421 lb**)
40° turn	**8184 kg** (**18042 lb**)



LEIL16WHL0428AB 6

921G XR Specifications - Forks (P/N: 87545184) with Leonardi Coupler (P/N: 87750107)

(A) Operating load
(B) 625 mm (**24.6 in**)

NOTE: *machine configured with Heavy Duty counterweight and Michelin 23.5R25 XHA2 TL tires.*

Load Specifications (EN 474–3)	
Operating load	
Rough terrain	**5171 kg** (**11400 lb**)
Firm and level ground	**6894 kg** (**15199 lb**)

Torque charts

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphite lubricants, Molydisulfide greases, or other extreme pressure lubricants are used.

Decimal hardware

Grade 5 bolts, nuts, and studs

Size	Nm	lb in/lb ft
1/4 in	**12 – 15 Nm**	**108 – 132 lb in**
5/16 in	**23 – 28 Nm**	**204 – 252 lb in**
3/8 in	**48 – 57 Nm**	**420 – 504 lb in**
7/16 in	**73 – 87 Nm**	**54 – 64 lb ft**
1/2 in	**109 – 130 Nm**	**80 – 96 lb ft**
9/16 in	**149 – 179 Nm**	**110 – 132 lb ft**
5/8 in	**203 – 244 Nm**	**150 – 180 lb ft**
3/4 in	**366 – 439 Nm**	**270 – 324 lb ft**
7/8 in	**542 – 651 Nm**	**400 – 480 lb ft**
1 in	**787 – 944 Nm**	**580 – 696 lb ft**
1-1/8 in	**1085 – 1193 Nm**	**800 – 880 lb ft**
1-1/4 in	**1519 – 1681 Nm**	**1120 – 1240 lb ft**
1-3/8 in	**1980 – 2278 Nm**	**1460 – 1680 lb ft**
1-1/2 in	**2631 – 2983 Nm**	**1940 – 2200 lb ft**

Markings for Grade 5 hardware





Grade 8 bolts, nuts, and studs

Size	Nm	lb in/lb ft
1/4 in	**16 – 20 Nm**	**144 – 180 lb in**
5/16 in	**33 – 39 Nm**	**288 – 348 lb in**
3/8 in	**61 – 73 Nm**	**540 – 648 lb in**
7/16 in	**95 – 114 Nm**	**70 – 84 lb ft**
1/2 in	**149 – 179 Nm**	**110 – 132 lb ft**
9/16 in	**217 – 260 Nm**	**160 – 192 lb ft**
5/8 in	**298 – 358 Nm**	**220 – 264 lb ft**
3/4 in	**515 – 618 Nm**	**380 – 456 lb ft**
7/8 in	**814 – 976 Nm**	**600 – 720 lb ft**
1 in	**1220 – 1465 Nm**	**900 – 1080 lb ft**
1-1/8 in	**1736 – 1953 Nm**	**1280 – 1440 lb ft**
1-1/4 in	**2468 – 2712 Nm**	**1820 – 2000 lb ft**
1-3/8 in	**3227 – 3688 Nm**	**2380 – 2720 lb ft**
1-1/2 in	**4285 – 4827 Nm**	**3160 – 3560 lb ft**

Markings for Grade 8 hardware





NOTE: *use thick nuts with Grade 8 bolts.*

Metric hardware

Grade 8.8 bolts, nuts, and studs

Size	Nm	lb in/lb ft
4 mm	**3 – 4 Nm**	**24 – 36 lb in**
5 mm	**7 – 8 Nm**	**60 – 72 lb in**
6 mm	**11 – 12 Nm**	**96 – 108 lb in**
8 mm	**26 – 31 Nm**	**228 – 276 lb in**
10 mm	**52 – 61 Nm**	**456 – 540 lb in**
12 mm	**90 – 107 Nm**	**66 – 79 lb ft**
14 mm	**144 – 172 Nm**	**106 – 127 lb ft**
16 mm	**217 – 271 Nm**	**160 – 200 lb ft**
20 mm	**434 – 515 Nm**	**320 – 380 lb ft**
24 mm	**675 – 815 Nm**	**500 – 600 lb ft**
30 mm	**1250 – 1500 Nm**	**920 – 1100 lb ft**
36 mm	**2175 – 2600 Nm**	**1600 – 1950 lb ft**

Markings for Grade 8.8 hardware



Grade 10.9 bolts, nuts and studs

Size	Nm	lb in/lb ft
4 mm	**4 – 5 Nm**	**36 – 48 lb in**
5 mm	**9 – 11 Nm**	**84 – 96 lb in**
6 mm	**15 – 18 Nm**	**132 – 156 lb in**
8 mm	**37 – 43 Nm**	**324 – 384 lb in**
10 mm	**73 – 87 Nm**	**54 – 64 lb ft**
12 mm	**125 – 150 Nm**	**93 – 112 lb ft**
14 mm	**200 – 245 Nm**	**149 – 179 lb ft**
16 mm	**310 – 380 Nm**	**230 – 280 lb ft**
20 mm	**610 – 730 Nm**	**450 – 540 lb ft**
24 mm	**1050 – 1275 Nm**	**780 – 940 lb ft**
30 mm	**2000 – 2400 Nm**	**1470 – 1770 lb ft**
36 mm	**3500 – 4200 Nm**	**2580 – 3090 lb ft**

Markings for Grade 10.9 hardware



Grade 12.9 bolts, nuts, and studs

Torque values specified for grade 10.9 hardware can be used for grade 12.9 hardware.

Markings for Grade 12.9 hardware



Material weights

Material weights

The following reference table provides typical material weights:

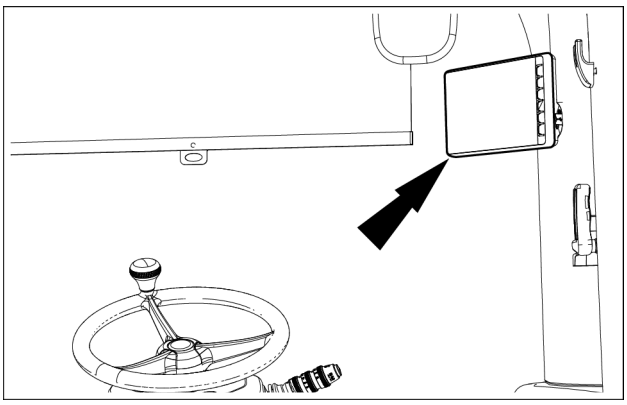
Material	**xxx kg/m³ (xxx lb/yd³)**
Alum-lump	**881 kg/m³ (1485 lb/yd³)**
Pulverized	**769 kg/m³ (1296 lb/yd³)**
Ashes	**561 – 883 kg/m³ (946 – 1488 lb/yd³)**
Bauxite	**1202 – 1992 kg/m³ (2026 – 3358 lb/yd³)**
Beans	**769 kg/m³ (1296 lb/yd³)**
Charcoal	**368 kg/m³ (620 lb/yd³)**
Chips	**288 kg/m³ (485 lb/yd³)**
Coal	**1282 kg/m³ (2161 lb/yd³)**
Coke - lump - loose	**849 – 1009 kg/m³ (1431 – 1701 lb/yd³)**
Clay	**1073 – 1826 kg/m³ (1809 – 3078 lb/yd³)**
Concrete	**2403 kg/m³ (4050 lb/yd³)**
Copper ore	**1940 – 2590 kg/m³ (3270 – 4366 lb/yd³)**
Corn - shelled	**673 kg/m³ (1134 lb/yd³)**
Cottonseed	**401 kg/m³ (676 lb/yd³)**401
Earth - dry loam	**929 – 1089 kg/m³ (1566 – 1836 lb/yd³)**
Earth - wet	**1602 – 1666 kg/m³ (2700 – 2808 lb/yd³)**
Earth - sand gravel	**1570 kg/m³ (2646 lb/yd³)**
Ensilage	**577 kg/m³ (973 lb/yd³)**
Granite	**1490 – 1778 kg/m³ (2511 – 2997 lb/yd³)**
Gravel - dry	**1522 kg/m³ (2565 lb/yd³)**
Gravel - wet	**1906 kg/m³ (3213 lb/yd³)**
Ice - crushed	**593 kg/m³ (1000 lb/yd³)**
Iron ore	**2323 kg/m³ (3916 lb/yd³)**
Limestone - loose - crushed	**1538 – 1602 kg/m³ (2592 – 2700 lb/yd³)**
Oats	**416 kg/m³ (701 lb/yd³)**
Peanuts - shelled	**641 kg/m³ (1080 lb/yd³)**
Peas	**769 kg/m³ (1296 lb/yd³)**
Peat - solid	**753 kg/m³ (1269 lb/yd³)**
Phosphate - granular	**1442 kg/m³ (2431 lb/yd³)**
Potash	**1089 kg/m³ (1836 lb/yd³)**
Potatoes	**769 kg/m³ (1296 lb/yd³)**
Quartz - granular	**1762 kg/m³ (2970 lb/yd³)**
Rice	**769 kg/m³ (1296 lb/yd³)**
Rye	**705 kg/m³ (1188 lb/yd³)**
Salt - rock - solid	**1201 kg/m³ (2024 lb/yd³)**
Sand & gravel - dry	**1730 kg/m³ (2916 lb/yd³)**
Sand & gravel - wet	**2003 kg/m³ (3376 lb/yd³)**
Sand - foundry	**1522 kg/m³ (2565 lb/yd³)**
Shale	**1586 – 2675 kg/m³ (2673 – 4509 lb/yd³)**
Slag - crushed	**1121 kg/m³ (1890 lb/yd³)**
Slate	**2243 kg/m³ (3781 lb/yd³)**
Snow	**240 – 801 kg/m³ (405 – 1350 lb/yd³)**
Soybeans	**743 kg/m³ (1252 lb/yd³)**
Sugar beet pulp - wet	**561 kg/m³ (946 lb/yd³)**
Sugar - raw	**961 kg/m³ (1620 lb/yd³)**
Sulphur - lumpy	**1330 kg/m³ (2242 lb/yd³)**
Taconite	**2803 kg/m³ (4725 lb/yd³)**
Wheat	**769 kg/m³ (1296 lb/yd³)**

9 - ACCESSORIES

General accessories

Rear view backup camera

The rearview backup camera reduces vehicle blind spots during reversing operations. The rearview backup camera assists operators when backing for loading operations and offers a view of other equipment, obstacles, and/or personnel in the work area.
The camera image displays on the vehicle display monitor, and the camera eye is located behind the rear grille. The camera eye has built-in moisture resistance for equipment that requires power washing and/or equipment that operates in harsh environments.
Do not proceed if the rear camera image is not working since the rear visibility of the operators field of view is not fulfilled. If this situation occurs, contact your dealer for immediate repair. In this condition, it is temporarily possible to operate in reverse only with the assistance of bystander.

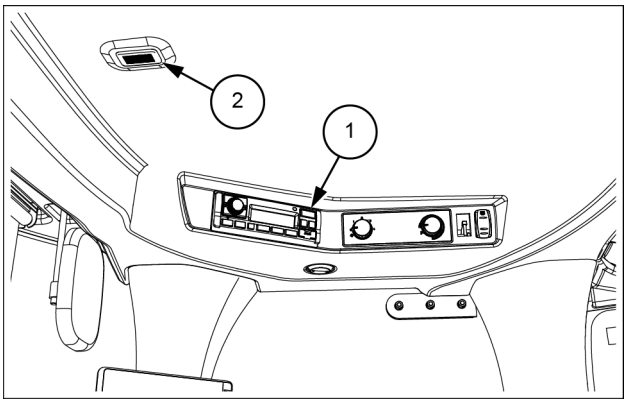


LEIL16WHL1274AB 1

Radio and Bluetooth microphone (Optional)

1. Radio
2. Bluetooth microphone

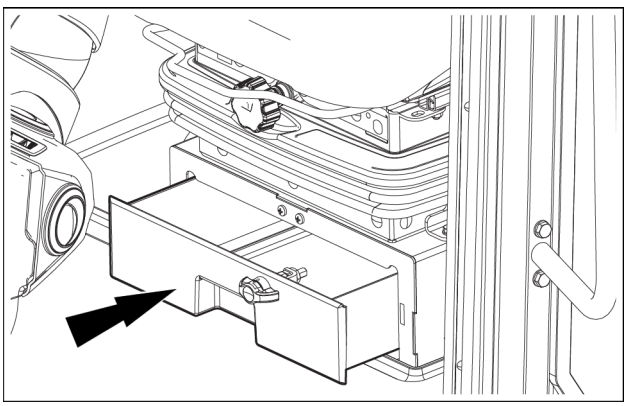
These accessories are available for this machine from your dealer. Refer to the manufacturer's instructions for correct operation.



LEIL16WHL1266AB 2

Seat storage (Optional)

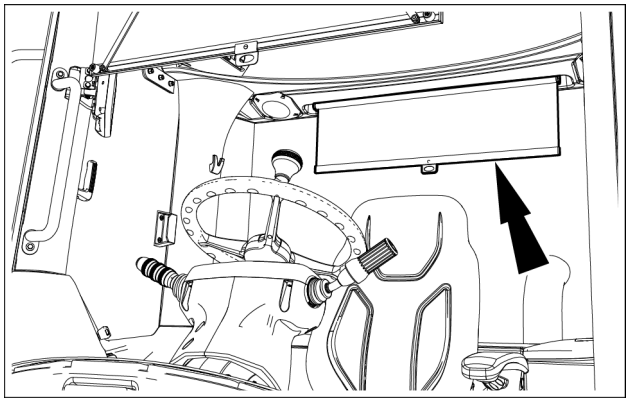
The machine can be equipped with seat storage, located at the seat base. Pull the drawer forward to use the room available for private storage.



LEIL17WHL1481AA 3

Rear sunshade (Optional)

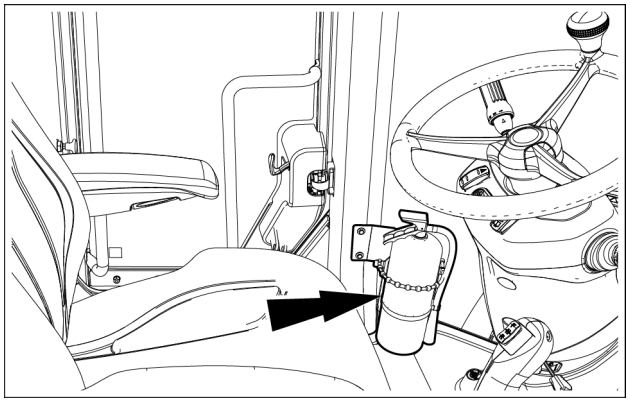
The rear sunshade is an optional feature. Use the lower eyelet to position the sunshade at the desired height.



LEIL16WHL1268AB 4

Fire extinguisher (Optional)

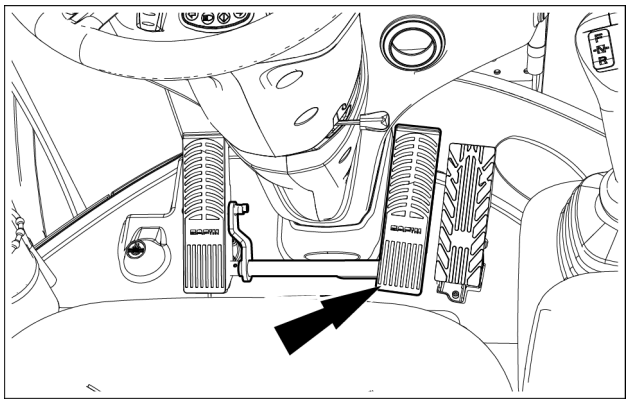
The machine can be equipped with a fire extinguisher. In the event of fire pull away the rubber security strap to release the fire extinguisher.



LEIL16WHL1269AB 5

Right-hand brake pedal (Optional)

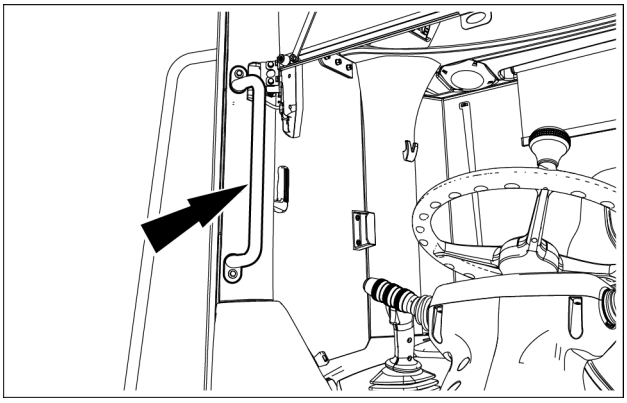
An additional right brake pedal can be added, allowing both the left and right pedal to be locked together. Braking can be performed from either pedal.



LEIL16WHL1270AB 6

Accessory mounting pole (Optional)

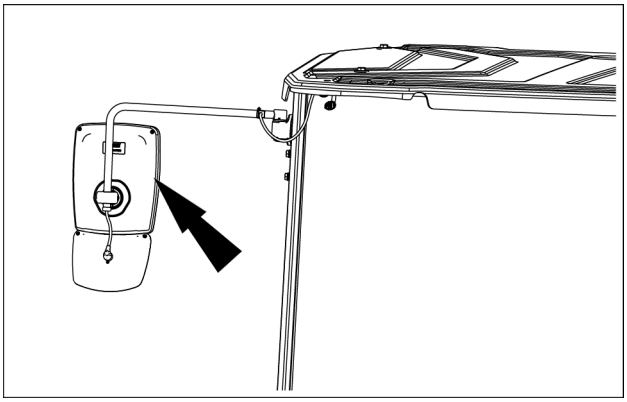
The cab can be equipped with a pole to be used for mounting additional accessories. This feature is located at the right-hand side next to the window.



LEIL16WHL1271AB 7

Heated mirrors (Optional)

Exterior mirrors on the machine at both right and left-hand sides are an important safety feature. They allow the operator to see around the machine when backing or driving. Heated mirrors offer an additional advantage by keeping the operator's field of vision clear of ice, frost, freezing rain, etc. when using the exterior mirrors. The heated feature eliminates scraping mirrors in inclement weather. Turn on and off the heated mirrors with a rocker switch located in the overhead console, inside the cab.

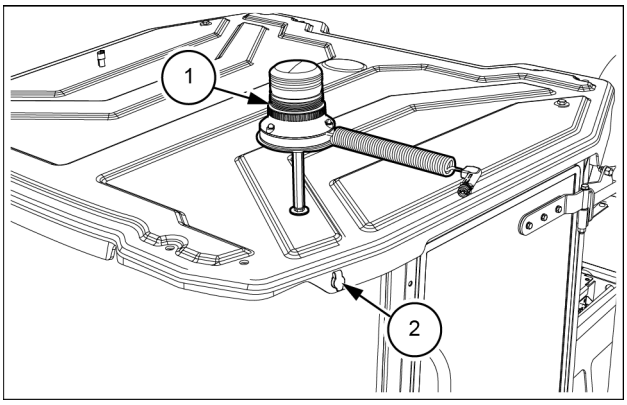


LEIL17WHL1080AB 8

Rotating LED beacon (Optional)

The rotating beacon is an optional feature to be installed at the front left-hand side of the cab roof.
The beacon **(1)** is electrically activated with the multifunction keypad via the receptacle **(2)** in the front left corner of the cab roof.

NOTE: *if installed after the buying of the machine, activate this option in the machine configuration by means of the EST tool.*

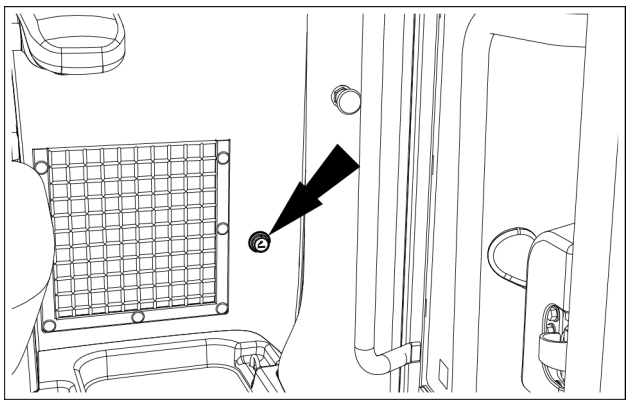


LEIL17WHL1480AB 9

Auxiliary power outlets

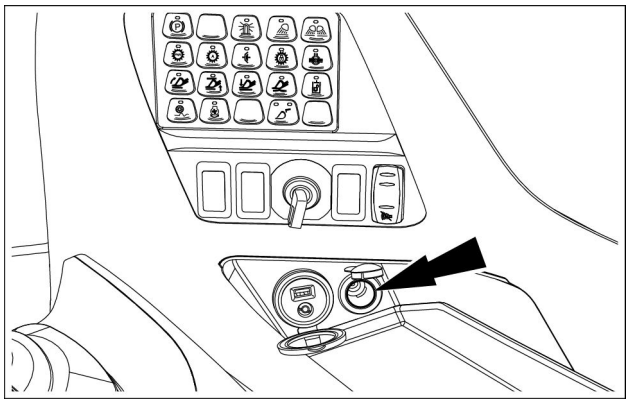
The auxiliary power outlets can be used for the connection of lighting devices to help with service and maintenance procedures or other purposes (plug in the optional cigar lighter, or charging phones, etc.).
The machine is equipped with two auxiliary power outlets:

1. one **24 V** socket located in the left-hand corner of the operator's compartment (this can be used to plug in the optional cigar lighter;



LEIL16WHL1277AB 10

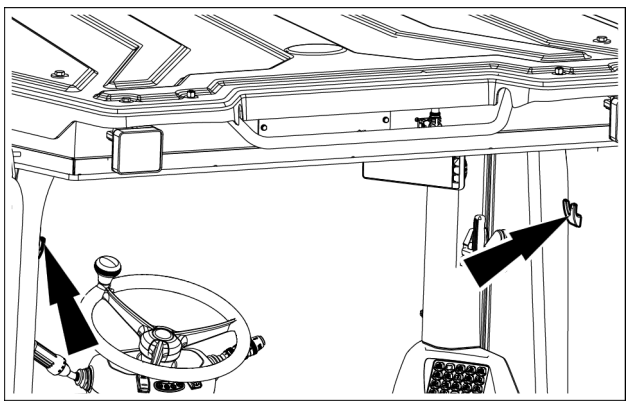
2. one **12 V** socket located in the right-hand console.



LEIL17WHL1345AB 11

Coat hooks

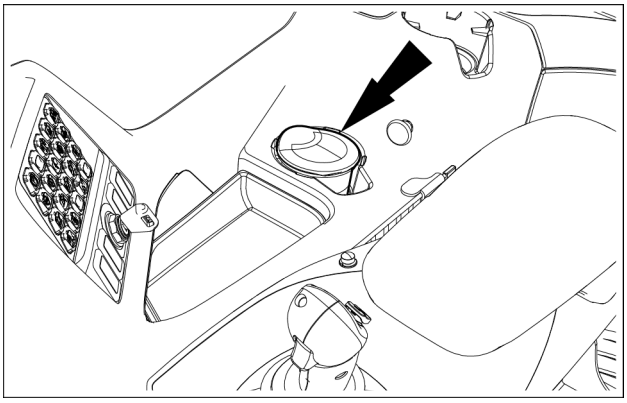
The two coat hooks are located in the operator's compartment, on the right-hand and left-hand B pillars.



LEIL17WHL1575AB 12

Cup holder or Ashtray (Optional)

The operator’s compartment is equipped with an area at the right-hand side for optional cup holder or ashtray.



LEIL16WHL1279AB 13

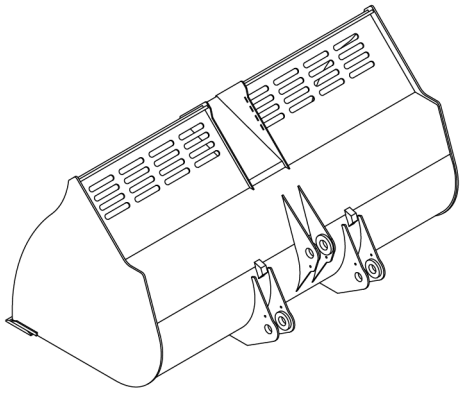
Special buckets

Only attachments recommended and approved by CNH Industrial are to be used on our machines. Technical specifications of attachments and machinery interfaces are listed in the following tables. The manufacturer's liability will be denied in any case of modification or attachment adaptation carried out without his knowing it.

LIGHT MATERIAL BUCKETS

Z-Bar / XR

Direct Fit (Pin ON)



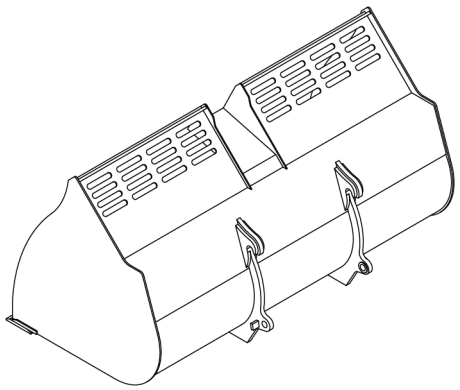
LEIL17WHL0064AA 1

Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Light material	**5.0 m³ (6.5 yd³)**	**1765 kg (3891.2 lb)**	**3000.0 mm (118.1 in)**	–	**1298 kg/m³ (2187.9 lb/yd³)**	**1045 kg/m³ (1761.4 lb/yd³)**	–
Light material	**6.0 m³ (7.8 yd³)**	**2470 kg (5445.4 lb)**	**3200 mm (126.0 in)**	–	**966 kg/m³ (1628.2 lb/yd³)**	**772 kg/m³ (1301.2 lb/yd³)**	See NOTE
Light material	**7.5 m³ (9.8 yd³)**	**2890 kg (6371.4 lb)**	**3200 mm (126.0 in)**	–	**787 kg/m³ (1326.5 lb/yd³)**	**620 kg/m³ (1045.0 lb/yd³)**	See NOTE
Light material	**9.0 m³ (11.8 yd³)**	**3240 kg (7143.0 lb)**	**3000.0 mm (118.1 in)**	–	**603 kg/m³ (1016.4 lb/yd³)**	**472 kg/m³ (795.6 lb/yd³)**	See NOTE

NOTE: *slowed hydraulics required – see Instructions.*

Z-Bar / XR

Quick Coupler Fit



LEIL17WHL0083AA 2

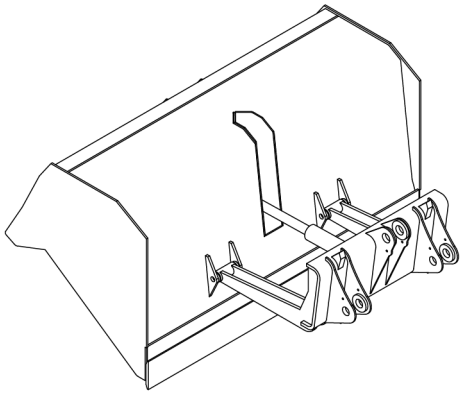
Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Light material	**5.0 m³** (**6.5 yd³**)	**2185 kg** (**4817.1 lb**)	**3000.0 mm** (**118.1 in**)	–	**1213 kg/m³** (**2044.6 lb/yd³**)	**972 kg/m³** (**1638.4 lb/yd³**)	See NOTE
Light material	**6.0 m³** (**7.8 yd³**)	**2890 kg** (**6371.4 lb**)	**3200 mm** (**126.0 in**)	–	**899 kg/m³** (**1515.3 lb/yd³**)	**714 kg/m³** (**1203.5 lb/yd³**)	See NOTE
Light material	**7.5 m³** (**9.8 yd³**)	**3310 kg/m³** (**5579.2 lb/yd³**)	**3200 mm** (**126.0 in**)	–	**706 kg/m³** (**1190.0 lb/yd³**)	**555 kg/m³** (**935.5 lb/yd³**)	See NOTE

NOTE: *slowed hydraulics required – see Instructions.*

HIGH TIP BUCKETS

Z-Bar / XR

Direct Fit (Pin ON)



LEIL17WHL0081AA 3

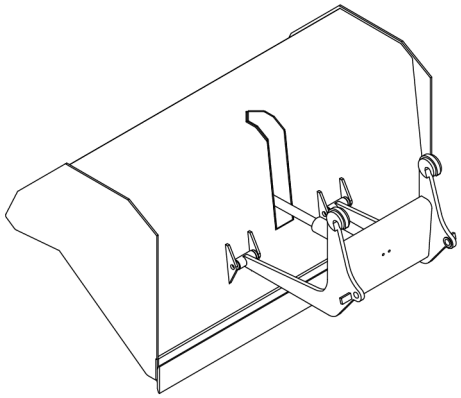
Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
High tip	**4.5 m³** (**5.9 yd³**)	**2250 kg** (**4960.4 lb**)	**3000.0 mm** (**118.1 in**)	**18.0 MPa** (**2610.9 psi**)	**1382 kg/m³** (**2329.4 lb/yd³**)	**1103 kg/m³** (**1859.2 lb/yd³**)	See NOTE **(1)**
High tip	**5.0 m³** (**6.5 yd³**)	**2570 kg** (**5665.9 lb**)	**3000.0 mm** (**118.1 in**)	**18.0 MPa** (**2610.9 psi**)	**1168 kg/m³** (**1968.7 lb/yd³**)	**930 kg/m³** (**1567.6 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**
High tip	**6.0 m³** (**7.8 yd³**)	**3150 kg** (**6944.6 lb**)	**3200 mm** (**126.0 in**)	**18.0 MPa** (**2610.9 psi**)	**940 kg/m³** (**1584.4 lb/yd³**)	**737 kg/m³** (**1242.3 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**
High tip (2 cylinders)	**6.0 m³** (**7.8 yd³**)	**3620 kg** (**7980.7 lb**)	**3200 mm** (**126.0 in**)	**18.0 MPa** (**2610.9 psi**)	**902 kg/m³** (**1520.4 lb/yd³**)	**698 kg/m³** (**1176.5 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**
High tip	**8.5 m³** (**11.1 yd³**)	**3620 kg** (**7980.7 lb**)	**3200 mm** (**126.0 in**)	**18.0 MPa** (**2610.9 psi**)	TBD	TBD	See NOTE **(1)** See NOTE **(2)**

NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

Z-Bar / XR

Quick Coupler Fit



LEIL17WHL0129 4

High Tip	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
High Tip	**4.5 m³** (**5.9 yd³**)	**2750 kg** (**6062.7 lb**)	**3000.0 mm** (**118.1 in**)	**18.0 MPa** (**2610.9 psi**)	**1220 kg/m³** (**2056.4 lb/yd³**)	**971 kg/m³** (**1636.7 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**
High Tip	**5.0 m³** (**6.5 yd³**)	**3070 kg** (**6768.2 lb**)	**3000.0 mm** (**118.1 in**)	**18.0 MPa** (**2610.9 psi**)	**1058 kg/m³** (**1783.3 lb/yd³**)	**837 kg/m³** (**1410.8 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**

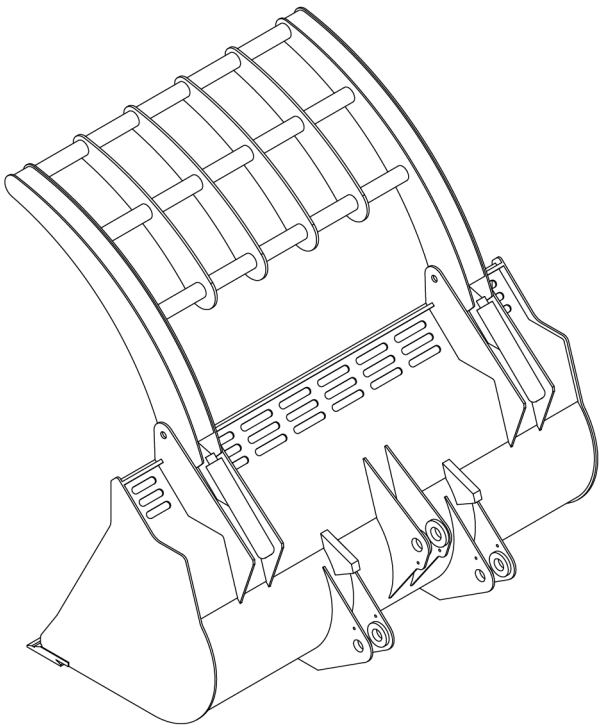
NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

GRAPPLE BUCKETS

Z-Bar / XR

Direct Fit (Pin ON)



LEIL17WHL0106BA 5

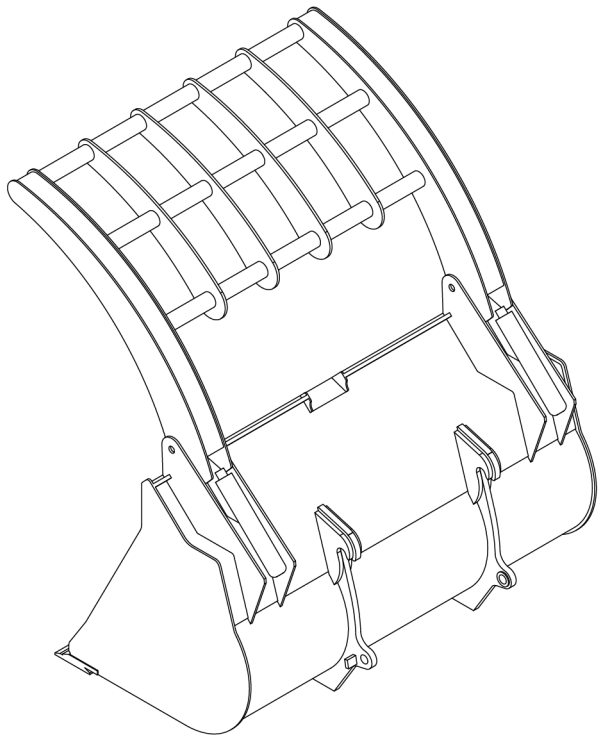
Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Grapple	**4.5 m³ (5.9 yd³)**	**2380 kg (5 247.0 lb)**	**2850 mm (112.2 in)**	**18.0 MPa (2610.9 psi)**	**1368 kg/m³ (2305.8 lb/yd³)**	**1088 kg/m³ (1833.9 lb/yd³)**	See NOTE **(1)** See NOTE **(2)**
Grapple	**5.3 m³ (6.9 yd³)**	**2550 kg (5 621.8 lb)**	**2850 mm (112.2 in)**	**18.0 MPa (2610.9 psi)**	**1146 kg/m³ (1931.6 lb/yd³)**	**908 kg/m³ (1530.5 lb/yd³)**	See NOTE **(1)** See NOTE **(2)**

NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

Z-Bar / XR

Quick Coupler Fit



LEIL17WHL0104BA 6

Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Hydraulic Setting	Max Material Density		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Grapple	**4.5 m³** (**5.9 yd³**)	**2880 kg** (**6349.3 lb**)	**2850 mm** (**112.2 in**)	**18.0 MPa** (**2610.9 psi**)	**1265 kg/m³** (**2132.2 lb/yd³**)	**998 kg/m³** (**1682.2 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**
Grapple	**5.3 m³** (**6.9 yd³**)	**3050 kg** (**6724.1 lb**)	**2850 mm** (**112.2 in**)	**18.0 MPa** (**2610.9 psi**)	**1058 kg/m³** (**1783.3 lb/yd³**)	**831 kg/m³** (**1400.7 lb/yd³**)	See NOTE **(1)** See NOTE **(2)**

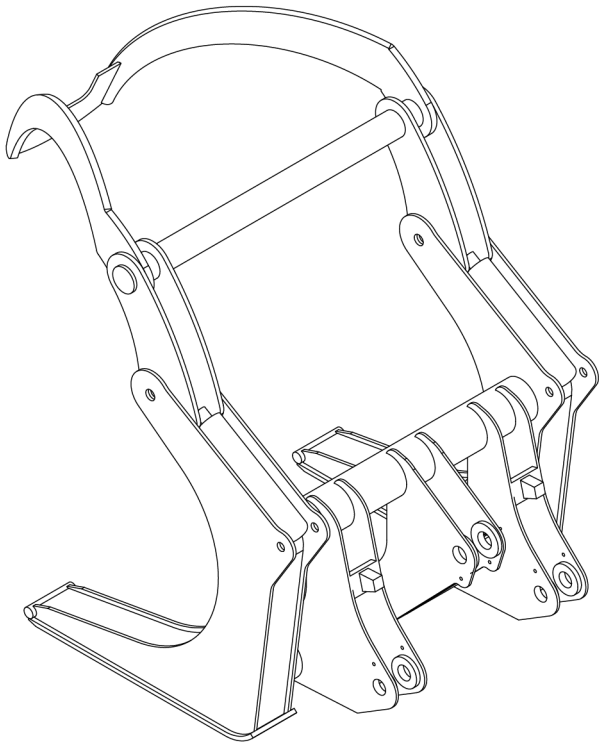
NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

LOG GRAPPLE FORKS

Z-Bar / XR

Direct Fit (Pin ON)



LEIL17WHL0103BA 7

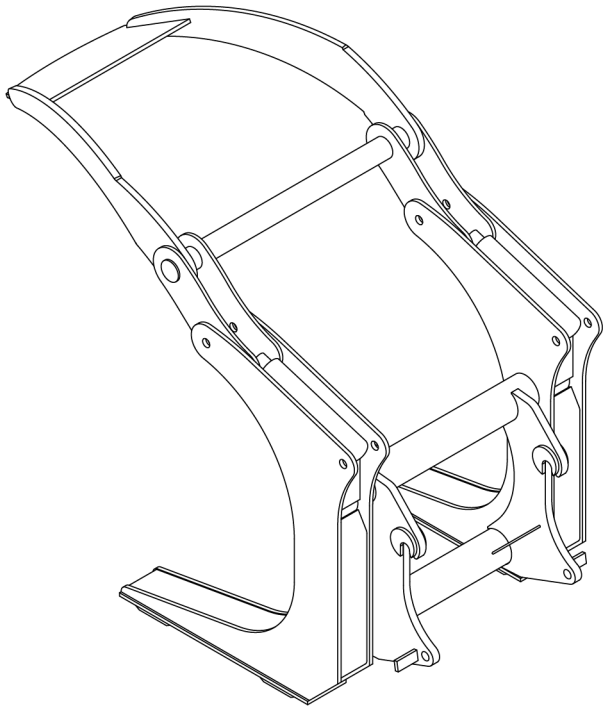
Type of Fork	Fork Capacity	Fork Weight	Fork Bucket Width	Hydraulic Setting	Load **75%** Articulation Tip, Rough Terrain, EN474-3		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Log Grapple Fork	**1.3 m²** (**14.0 ft²**)	**1695.0 kg** (**3736.8 lb**)	**1750.0 mm** (**68.9 in**)	**18.0 MPa** (**2610.9 psi**)	**7918.0 kg** (**17456.2 lb**)	**6551.0 kg** (**14442.5 lb**)	See NOTE
Log Grapple Fork	**1.8 m²** (**19.4 ft²**)	**1995.0 kg** (**4398.2 lb**)	**1750.0 mm** (**68.9 in**)	**18.0 MPa** (**2610.9 psi**)	**7334.0 kg** (**16168.7 lb**)	**6057.0 kg** (**13353.4 lb**)	See NOTE **(1)** See NOTE **(2)**
Log Grapple Fork	**2.2 m²** (**23.7 ft²**)	**2095.0 kg** (**4618.7 lb**)	**1750.0 mm** (**68.9 in**)	**18.0 MPa** (**2610.9 psi**)	**6614.0 kg** (**14581.4 lb**)	**5513.0 kg** (**12154.1 lb**)	See NOTE **(1)**

NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

Z-Bar / XR

Quick Coupler Fit



LEIL17WHL0128BA 8

Type of Fork	Fork Capacity	Fork Weight	Fork Bucket Width	Hydraulic Setting	Load **75%** Articulation Tip, Rough Terrain, EN474-3		Operative Notes
				Auxiliary Work Pressure	Z-Bar	XR	
Log Grapple Fork	**1.3 m²** (**14.0 ft²**)	**2195.0 kg** (**4839.1 lb**)	**1750.0 mm** (**68.9 in**)	**18.0 MPa** (**2610.9 psi**)	**7223.0 kg** (**15924.0 lb**)	**5937.0 kg** (**13088.8 lb**) –	See NOTE **(1)**
Log Grapple Fork	**1.8 m²** (**19.4 ft²**)	**2495.0 kg** (**5500.5 lb**)	**1750.0 mm** (**68.9 in**)	**18.0 MPa** (**2610.9 psi**)	**5824.0 kg** (**12839.7 lb**)	**4848.0 kg** (**10688.0 lb**)	See NOTE **(1)** See NOTE **(2)**

NOTE: (1) *Auxiliary Pressure Adjustment needed – see Instructions.*

NOTE: (2) *Slowed hydraulics required – see Instructions.*

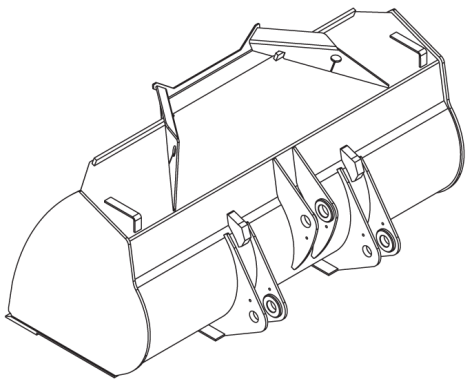
Medium material buckets

Only attachments recommended and approved by CNH Industrial are to be used on our machines. Technical specifications of attachments and machinery interfaces are listed in the following tables. The manufacturer's liability will be denied in any case of modification or attachment adaptation carried out without his knowing it.

REHANDLING BUCKET

Z-Bar / XR

REHANDLING BUCKET NO GRADING EDGE



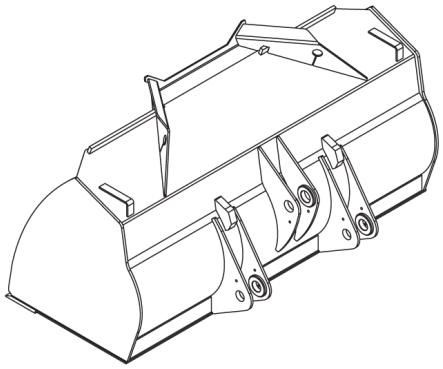
LEIL18WHL1236AA 1

Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Max Material Density	
				Z-Bar	XR
With bolt-on edge	**4.2 m³ (5.5 yd³)**	**1847 kg (4071.9 lb)**	**3190 mm (125.6 in)**	**1490 kg/m³ (2511.5 lb/yd³)**	**1203 kg/m³ (2027.7 lb/yd³)**
Flush teeth	**4.2 m³ (5.5 yd³)**	**1781 kg (3926.4 lb)**	**3190 mm (125.6 in)**	**1548 kg/m³ (2609.2 lb/yd³)**	**1251 kg/m³ (2108.6 lb/yd³)**
Welded teeth	**4.2 m³ (5.5 yd³)**	**1781 kg (3926.4 lb)**	**3190 mm (125.6 in)**	**1548 kg/m³ (2609.2 lb/yd³)**	**1251 kg/m³ (2108.6 lb/yd³)**
With segments	**4.2 m³ (5.5 yd³)**	**1869 kg (4120.4 lb)**	**3190 mm (125.6 in)**	**1487 kg/m³ (2506.4 lb/yd³)**	**1199 kg/m³ (2021.0 lb/yd³)**

NOTE: *all homologated for road circulation.*

Z-Bar / XR

REHANDLING BUCKET WITH GRADING EDGE



LEIL18WHL1235AA 2

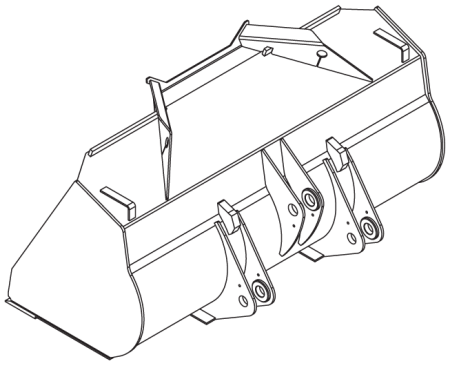
Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Max Material Density	
				Z-Bar	XR
With bolt-on edge	**4.2 m³ (5.5 yd³)**	**1920 kg/m³ (3236.3 lb/yd³)**	**3190 mm (125.6 in)**	**1481 kg/m³ (2496.3 lb/yd³)**	**1194 kg/m³ (2012.6 lb/yd³)**
Flush teeth	**4.2 m³ (5.5 yd³)**	**1854 kg (4087.4 lb)**	**3190 mm (125.6 in)**	**1539 kg/m³ (2594.1 lb/yd³)**	**1242 kg/m³ (2093.5 lb/yd³)**
Welded teeth	**4.2 m³ (5.5 yd³)**	**1854 kg (4087.4 lb)**	**3190 mm (125.6 in)**	**1539 kg/m³ (2594.1 lb/yd³)**	**1242 kg/m³ (2093.5 lb/yd³)**
With segments	**4.2 m³ (5.5 yd³)**	**1942 kg (4281.4 lb)**	**3190 mm (125.6 in)**	**1478 kg/m³ (2491.3 lb/yd³)**	**1191 kg/m³ (2007.5 lb/yd³)**

NOTE: *all homologated for road circulation.*

GENERAL PURPOSE

Z-Bar / XR

GENERAL PURPOSE NO GRADING EDGE



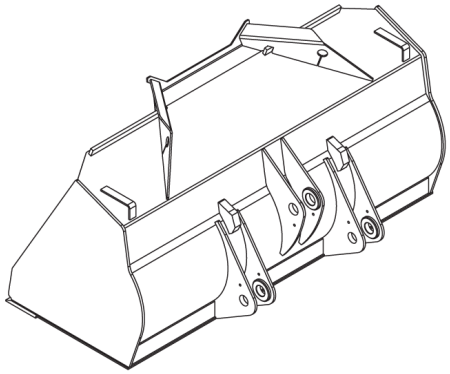
LEIL18WHL1238AA 3

Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Max Material Density	
				Z-Bar	XR
With bolt-on edge	**3.9 m³ (5.1 yd³)**	**1827 kg (4027.8 lb)**	**3190 mm (125.6 in)**	**1619 kg/m³ (2728.9 lb/yd³)**	**1306 kg/m³ (2201.3 lb/yd³)**
Flush teeth	**3.9 m³ (5.1 yd³)**	**1761 kg (3882.3 lb)**	**3190 mm (125.6 in)**	**1620 kg/m³ (2730.6 lb/yd³)**	**1308 kg/m³ (2204.7 lb/yd³)**
Welded teeth	**3.9 m³ (5.1 yd³)**	**1761 kg (3882.3 lb)**	**3190 mm (125.6 in)**	**1620 kg/m³ (2730.6 lb/yd³)**	**1308 kg/m³ (2204.7 lb/yd³)**
With segments	**3.9 m³ (5.1 yd³)**	**1849 kg (4076.3 lb)**	**3190 mm (125.6 in)**	**1615 kg/m³ (2722.2 lb/yd³)**	**1302 kg/m³ (2194.6 lb/yd³)**

NOTE: *all homologated for road circulation.*

Z-Bar / XR

GENERAL PURPOSE WITH GRADING EDGE



LEIL18WHL1237AA 4

Type of Bucket	Bucket Capacity	Bucket Weight	Bucket Width	Max Material Density	
				Z-Bar	XR
With bolt-on edge	**3.9 m³ (5.1 yd³)**	**1900 kg (4188.8 lb)**	**3190 mm (125.6 in)**	**1610 kg/m³ (2713.7 lb/yd³)**	**1296 kg/m³ (2184.5 lb/yd³)**
Flush teeth	**3.9 m³ (5.1 yd³)**	**1834 kg (4043.3 lb)**	**3190 mm (125.6 in)**	**1611 kg/m³ (2715.4 lb/yd³)**	**1299 kg/m³ (2189.5 lb/yd³)**
Welded teeth	**3.9 m³ (5.1 yd³)**	**1834 kg (4043.3 lb)**	**3190 mm (125.6 in)**	**1611 kg/m³ (2715.4 lb/yd³)**	**1299 kg/m³ (2189.5 lb/yd³)**
With segments	**3.9 m³ (5.1 yd³)**	**1922 kg (4237.3 lb)**	**3190 mm (125.6 in)**	**1606 kg/m³ (2707.0 lb/yd³)**	**1293 kg/m³ (2179.4 lb/yd³)**

NOTE: *all homologated for road circulation.*

Telematics

This machine may be equipped with a “telematics system”.

This is an asset-monitoring system that combines Internet, cellular, and GPS technologies. A transponder unit is mounted on the equipment that wirelessly communicates with a web-based user interface.

Using cellular technology, the transponder can send equipment data, including location, on/off status, usage and production metrics, diagnostic data, movement alarms, and unauthorized usage to the interface.

The system will help cut costs and keep accurate records.

See the furnished guide for operating your telematics system.

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Dealer's stamp

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CASE CONSTRUCTION