SR160B
SR175B
SR210B
SR240B
SV185B
SV280B
Tier 4B (FINAL)
Stage IV and Stage V

B Series Skid Steer Loader

PIN NJM453496 and after

TR270B
TR310B
TV370B
Tier 4B (FINAL)
Stage IV and Stage V

B Series Compact Track Loader

PIN NJM453496 and after

OPERATOR'S MANUAL

Part number 90416894
2nd edition English
February 2021
Replaces part number 51522648

CASE CONSTRUCTION

ORIGINAL INSTRUCTIONS - *according to Directive 2006/42/EC, Annex I 1.7.4.1*

OPERATOR'S MANUAL

SR160B
SR175B
SR210B
SR240B
SV185B
SV280B
Tier 4B (FINAL), Stage IV and Stage V
B Series Skid Steer Loader

PIN NJM453496 and after

TR270B
TR310B
TV370B
Tier 4B (FINAL), Stage IV and Stage V
B Series Compact Track Loader

PIN NJM453496 and after

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CASE CONSTRUCTION

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INITIAL 50 HOURS
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EVERY 50 HOURS
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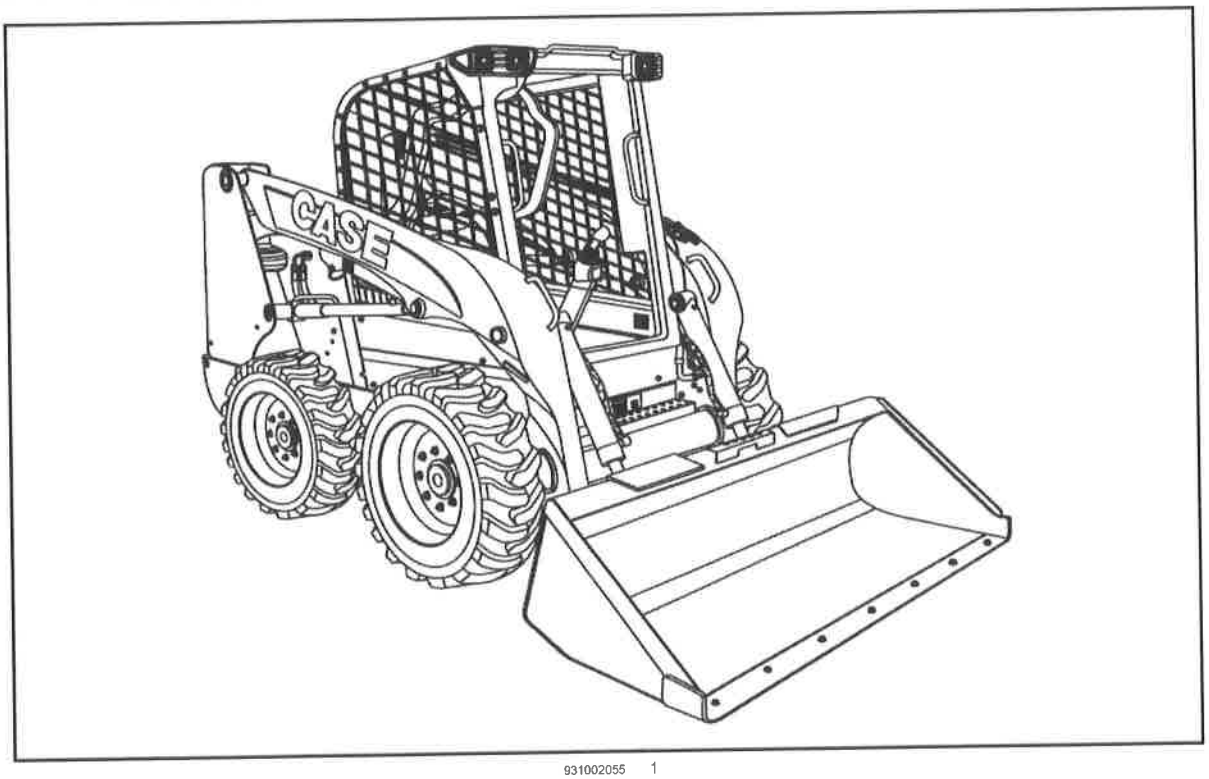
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1 - GENERAL INFORMATION

Note to the owner



931002055 1

This manual contains important information about the safe operation, adjustment, and maintenance of your machine. Refer to the detailed INDEX at the end of this manual for locating specific items about your machine. Your machine conforms to current safety regulations. Use this manual as a guide. Your machine will remain a reliable working tool as long as it is kept in good working condition and serviced properly.

Use this manual as a guide. Your machine will remain a reliable working tool as long as it is kept in good working condition and serviced properly.

This machine, with standard equipment and authorized attachments, is intended for above ground material handling. Use only approved accessories and attachments designed for your machine.

DEALER'S STAMP OR CARD

CNH Industrial America LLC
P.O. Box 9228
Wichita, Kansas
U.S.A
67277

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 authorized dealer to obtain additional manuals. Contact your authorized dealer for any further information or assistance about your machine. Your authorized dealer has manufacturer approved service parts. Your authorized dealer has technicians with special training that know the best methods or repair and maintenance for your machine. Your authorized dealer is available for any further information. They will also provide any after-sales service you may need, and genuine CASE CONSTRUCTION spare parts, your guarantee of quality and match.

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

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 and on machine decals, 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.

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. All persons who will be operating this machine shall possess a valid local vehicle operating permit and/or other applicable local age work permit. The information in this manual is provided on the basis of information that was available at the time that the manual was written. Settings, procedures, part numbers, software, and other items can change. These changes can affect the service that is given to the machine. Ensure that you have complete and most current information from your dealer before you start your machine operation.

DO NOT use this machine for any purpose or in any manner other than as described in the 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 country regulations and safety requirements. Unauthorized modifications will cause serious injury or death. Anyone making such unauthorized modifications is responsible for the consequences.

Use only approved accessories and attachments designed for your machine. Consult your dealer on changes, additions, or modifications that may be required for your machine. Do not make any unauthorized modifications to your machine.

ATTENTION: *The engine and fuel system on your machine is designed and built to government emissions standards. Tampering by dealers, customers and operators 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!*

Electro-Magnetic Compatibility (EMC)

This machine complies strictly with the European Regulations on 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.

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

Product identification

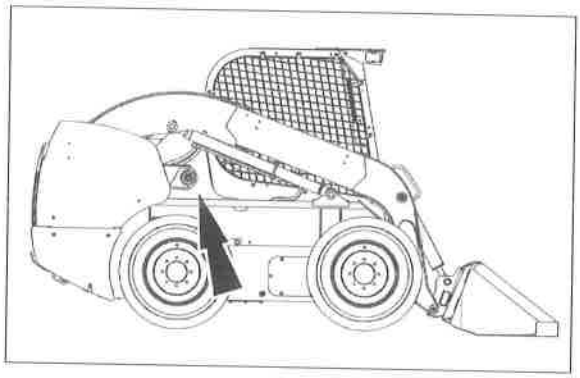
Write your machine model number, Product Identification Number (PIN), and serial numbers on the lines provided below. Always give these numbers and component plate numbers to your dealer when you need parts or information for your machine.

Make a record of the numbers. Keep this record 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
Machine Model and Type
Product Identification Number
Year of Build
Engine Serial Number
Hydrostatic Pump Serial Number
Bucket Serial Number

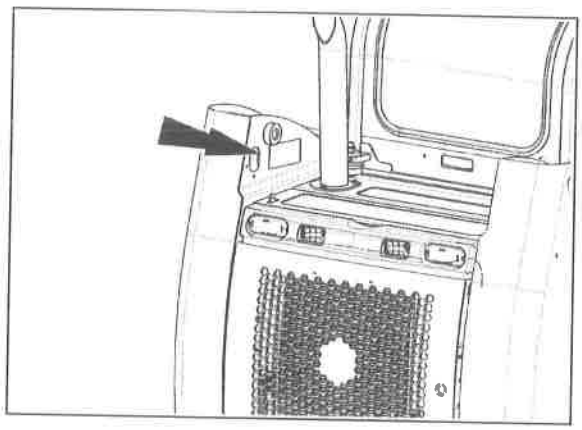
Product Identification Number (PIN)

- Outside right-hand side of chassis - vertical lift.



RCPH11SSL005AAD 1

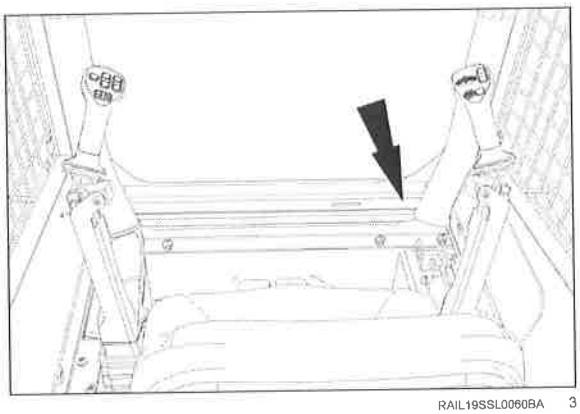
- Inside left-hand side loader arm tower - radial lift.



931002296A 2

Roll Over Protective Structure (ROPS) certification plate.

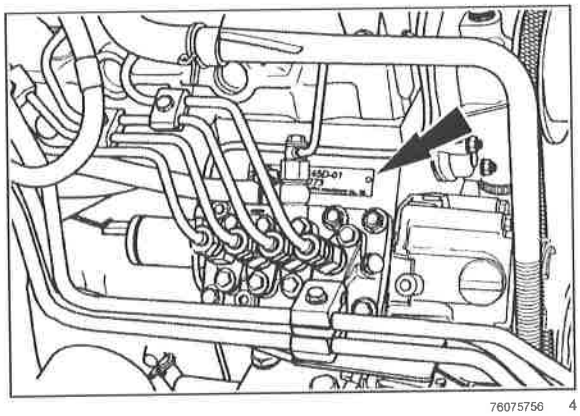
- Front edge (lower) inside cab.



RAIL19SSL0060BA 3

Engine serial number plate location for model SR160B.

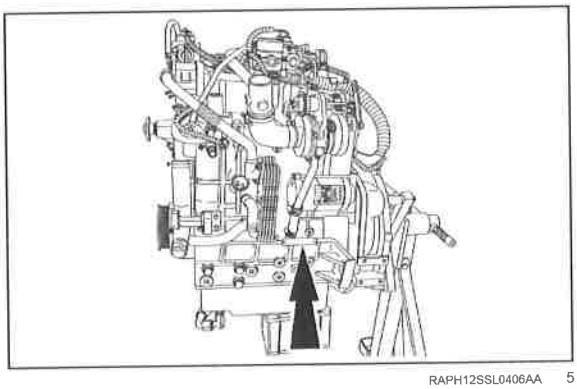
- On the fuel injection pump.



76075756 4

Engine serial number plate location for models SR175B and SV185B

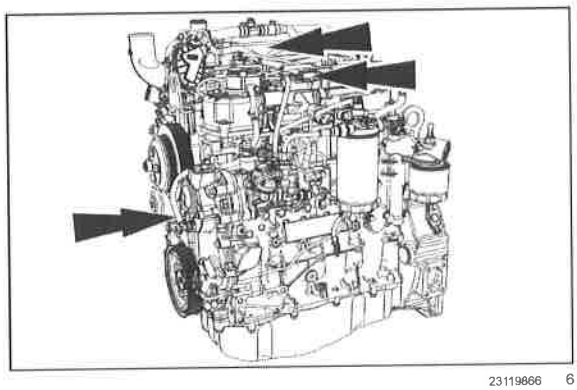
- On the right-hand side of the engine.



RAPH12SSL0406AA 5

Engine serial number plate location for models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B.

- On the side of the Exhaust Gas Recirculation (EGR) cooler.
- On top of the valve cover.
- The serial number is also stamped on the engine front cover.

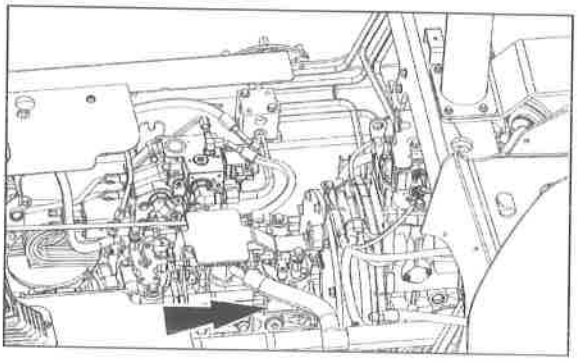


23119866 6

Hydrostatic pump

- Mechanical (Manual) hydrostatic pump

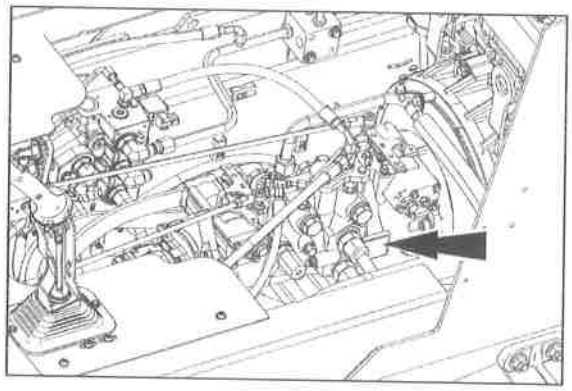
NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



RAIL15SSL0134BA 7

- Mechanical (Servo) hydrostatic pump

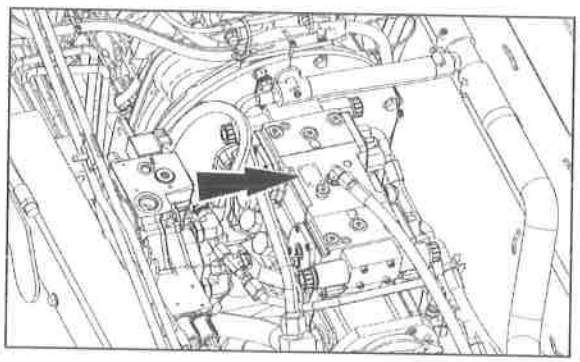
NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



RAIL15SSL0133BA 8

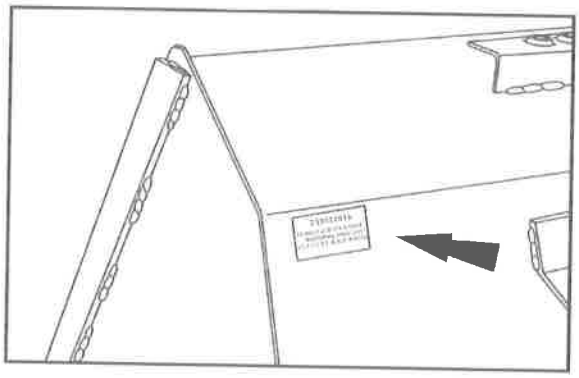
- Electro-Hydraulic (EH) hydrostatic pump

NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



RAIL15SSL0135BA 9

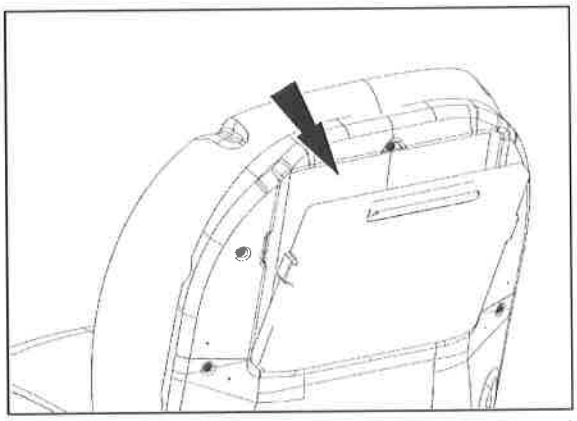
Bucket identification plate.



BT04F026-01 10

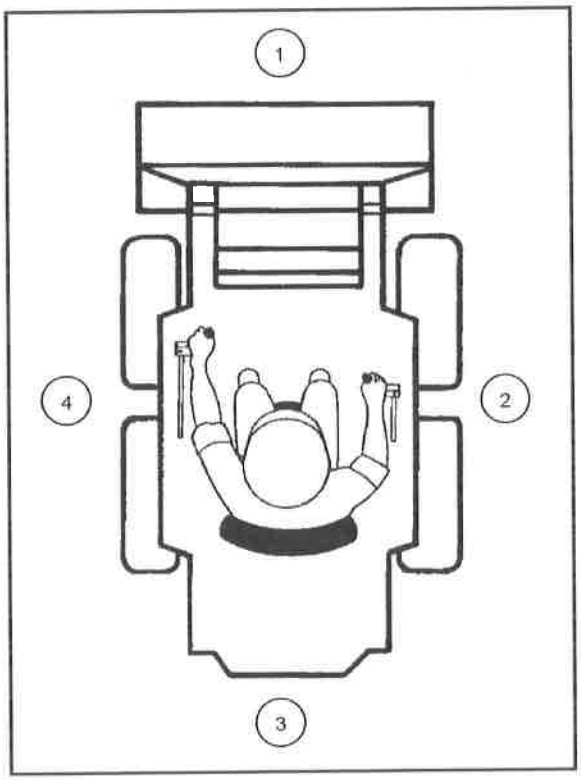
Operator's manual storage on the machine

Keep the Operator's manual in the storage compartment behind the operator's seat. The Operator's manual must be available for use by all operators.



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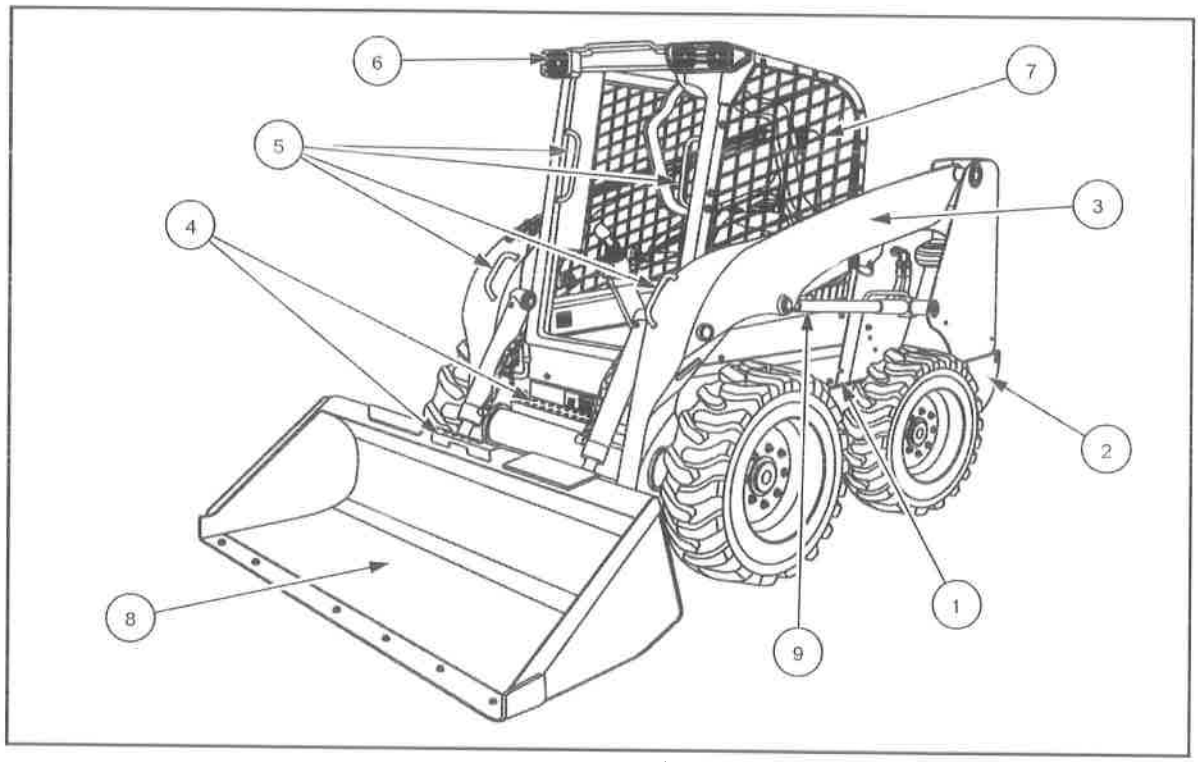
Machine orientation



RAPH12SSL0057BA 1

The terms front (1), right-hand side (2), rear (3), and left-hand side (4) are used in this manual to indicate the direction as seen from the operator's seat.

Machine components



RCPH11SSL022FAP 1

(1) Chain compartment access
(2) Service access cover
(3) Loader arm
(4) Steps
(5) Hand holds
(6) Front light
(7) Operator's compartment
(8) Bucket
(9) Loader arm cylinder

Official documents

On this page is provided 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. 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 (please refer to page **2-17** for other detail).
2. Under point 2 are listed all information required by EU "Outdoor Noise" Directive **2000/14/EC** . Please refer to your own original EC Declaration of Conformity for specific machine information. Other information about machine guaranteed sound power level (LwA) can be found on page **2-8**. On the same page are indicated information about operators station noise level (LpA), which is not matter of above mentioned EU Directive and therefore not indicated on it.
3. Generic serial number or Product Identification Number (PIN) for this machine type. Sequence of letters and numbers may vary depending on machine configuration.
4. EC Declaration of Conformity serial number or Product Identification Number (PIN). Please make reference to this number when requiring information or support to CASE CONSTRUCTION about EC Declaration of Conformity.
5. Signature of a person authorized to sign the document on behalf of the company.

CASE CONSTRUCTION

F35464A.006.web.2014.02.17.

CNH INDUSTRIAL AMERICA, LLC
700, State Street – 53404 Racine, Wisconsin – U.S.A.

"EC" DECLARATION OF CONFORMITY

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/EC "Safety of machinery"

1.1 European Harmonised standards under which conformity is declared: **EN 474-1:2006+A4:2013; EN 474-3:2006+A1:2009**

1.2 Main safety components installed and supplied with the machine

	Yes	No
1.2.1 Falling Object Protective Structure (F.O.P.S.)	☒	☐
1.2.3 Roll Over Protective Structure (R.O.P.S.)	☒	☐
1.2.7 ###	☐	☒

1.4 Name and address of the person authorised to compile the technical file:
XXXXXXXXXX

2. 2000/14/EC "Noise emission"

2.1 Conformity assessment procedure followed: Annex XXXXXXXXXX

2.2 Name and address of the Notified Body involved: XXXXXXXXXX

2.3 Measured sound power level LWA (ref. 1 pW): 0 dB(A)

2.4 Guaranteed sound power level LWA (ref. 1 pW): 0 dB(A)

2.5 Engine power (as defined by ISO 14396): 0 kW

2.6 Holder of the technical documentation: XXXXXXXXXX

3. 2004/108/EC "Electromagnetic compatibility"

3.1 European Harmonised standards under which conformity is declared: **EN 13309:2010**

4. Other applicable Directive/s: **###**

5. Manufacturer: **CNH INDUSTRIAL AMERICA, LLC** **6. Category:** **Wheeled loader**

7. Type: **-** **8. Serial n°:**

9. EC Representative: **CNH INDUSTRIAL ITALIA S.p.A.**
Via Plava, 80 – 10135 Torino – Italia

Wichita, Kansas (U.S.A.)

Signature
(Name and Function)

RAIL14SSL0036HA 1

CASE CONSTRUCTION

F35464A 006 web 2014.02.17

CNH INDUSTRIAL AMERICA, LLC
700, State Street – 53404 Racine, Wisconsin – U.S.A.

"EC" DECLARATION OF CONFORMITY

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/EC "Safety of machinery"

1.1 European Harmonised standards under which conformity is declared: **EN 474-1:2006+A4:2013; EN 474-3:2006+A1:2009**

	Yes	No
1.2 Main safety components installed and supplied with the machine		
1.2.1 Falling Object Protective Structure (F.O.P.S.)	☒	☐
1.2.3 Roll Over Protective Structure (R.O.P.S.)	☒	☐
1.2.7 ###	☐	☒

1.4 Name and address of the person authorised to compile the technical file: XXXXXXXXXX

2. 2000/14/EC "Noise emission"

2.1 Conformity assessment procedure followed: Annex XXXXXXXXXX

2.2 Name and address of the Notified Body involved: XXXXXXXXXX

2.3 Measured sound power level LWA (ref. 1 pW): 0 dB(A)

2.4 Guaranteed sound power level LWA (ref. 1 pW): 0 dB(A)

2.5 Engine power (as defined by ISO 14396): 0 kW

2.6 Holder of the technical documentation: XXXXXXXXXX

3. 2004/108/EC "Electromagnetic compatibility"

3.1 European Harmonised standards under which conformity is declared: **EN 13309:2010**

4. Other applicable Directive/s: ###

5. Manufacturer: **CNH INDUSTRIAL AMERICA, LLC**

6. Category: **Loader (tracked)**

7. Type: -

8. Serial n°:

9. EC Representative: **CNH INDUSTRIAL ITALIA S.p.A.**
Via Plava, 80 – 10135 Torino – Italia

Wichita, Kansas (U.S.A.)

Signature
(Name and Function)

Emissions overview

What is Exhaust Gas Recirculation (EGR)?

Your CASE CONSTRUCTION machine is equipped with additional components to comply with national and local exhaust emissions requirements. EGR works by recirculating a portion of the engine exhaust gasses back into the engine combustion chamber to lower combustion temperatures.

What is a Diesel Oxidation Catalyst (DOC)?

The Diesel Oxidation Catalyst (DOC) is the first section of the DPF assembly. The catalyst converts the Nitrogen Oxide (NOx) in the exhaust stream to harmless gases and water.

- All SR160B uses a DPF with the DOC.
- Stage IV and Tier 4B (final) Models: SR175B (built before March 1st 2021), SV185B (built before March 1st 2021), SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B use DOC only.
- Tier 4B (final) Models: SR175B and SV185B (built after March 1st 2021) use a DPF with the DOC.
- Stage V: All machines use a DPF with the DOC.

What is a Diesel Particulate Filter (DPF)?

A Diesel Particulate Filter (DPF) is a filter mounted in the exhaust stream. During normal operating conditions, the exhaust gasses pass through the porous walls of the DPF and trap Particulate Matter (PM) generated by the combustion process of the engine. When channels inside the DPF fill up with PM, the system must be cleaned. The cleaning process is called regeneration.

How does the regeneration process work?

When the DPF becomes restricted, the system will need to be cleaned or regenerated by raising exhaust temperatures to burn off the trapped Particulate Matter (PM). This process is usually done automatically, but may require a manual regeneration sequence to be activated depending on operating conditions. Burned PM will leave behind traces of ash within the DPF. The ash must be cleaned out by a CASE CONSTRUCTION dealer outfitted with machines specifically designed to clean DPF systems. See **7-33** for service intervals.

NOTE: *Auto-regeneration and Manual regeneration procedures apply to all Stage V machines.*

NOTE: *Auto-regeneration and Manual regeneration procedures apply to all SR160B and Tier 4B (final) models SR175B and SV185B (built after March 1st 2021).*

Automatic Catalyst Management (ACM) mainly referenced as Auto-regeneration

NOTE: *For more details see the "Auto-regeneration"* ***7-90*** *procedure in the "Maintenance section" of this manual.*

When the DPF enters automatic regeneration mode, the display will indicate " REGEN ACTVE" and a light will illuminate on the left-hand column or the LCD display (if equipped). Several conditions need to be followed to properly let the machine perform this function.

- During this mode do not idle or shut the machine down.
- If you idle the engine or shut down the engine, the regeneration will continue automatically when all required conditions are met again.
- Hot exhaust gasses will be generated. Use in a well ventilated area away from combustible materials.
- Use the machine under normal work scenarios until the automatic regeneration process has completed.

Manual Catalyst Management (MCM) mainly referenced as Manual regeneration

NOTE: *For more details see the "Manual regeneration"* ***7-92*** *procedure in the "Maintenance section" of this manual.*

When automatic regeneration of the DPF is inhibited or unsuccessful, or the machine had to be shut down during the automatic regeneration process, manual regeneration is used. During the manual regeneration mode, the display will indicate " REGEN ACTVE" and a light will illuminate on the left-hand column or the LCD display (if equipped). Several conditions need to be followed to properly let the machine perform this function.

- During this mode, the machine will be unusable.
- Move the machine to a safe place away from combustible materials.
- Hot exhaust gasses will be generated. Park the machine in a well ventilated area away from combustible materials.
- Follow any prompts on the instrument cluster to start the regeneration.
- Let the regeneration finish before shutting the machine off.

Finding a Diesel Particulate Filter (DPF) cleaning facility

To find a CASE CONSTRUCTION dealer that is fully equipped service your DPF system, please call the number below.

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
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

Case Construction		
Country	**Toll Number**	**Spoken Language**
Malta (00356)	0044 2030245588	English
Switzerland (0041)	00800 2273 7373	German French Italian

Case IH Agriculture **Toll free number: 00800 2273440**			
Country	Toll free fax	Local number	E-mail
Italy (0039)	800872685	02 44412 245	CaseIHItaly@cnh.com
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 02 44412 245.			
Country	Toll free fax	Local number	E-mail
United Kingdom (0044)	8003457994	02030245589	EUUKROI@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 02030245589.			
Country	Toll free fax	Local number	E-mail
Republic of Ireland (00353)	1800409688	014073444	EUUKROI@cnh.com
The call is free. However if you call from a mobile phone please dial 014073444. Please be aware that a call made from a mobile phone will not be free but will be charged to you. For any information about charge rate, please enquire in advance from your provider.			
Country	Toll free fax	Local number	E-mail
France (0033)	0800912855	0157323205	EUCaseIHFrance@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 0157323205.			
Country	Toll free fax	Local number	E-mail
Spain (0034)	900948925	912754406	EuCaseIHSpain@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 912754406.			
Country	Toll free fax	Local number	E-mail
Germany (0049)	08001812440	06951709288	EUCaseIHGermany@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 kostenpflichtigen Rufnummer 06951709288.			
Country	Toll free fax	Local number	E-mail
Austria (0043)	-	0179567159	EUCaseIHAustria@cnh.com

Case IH Agriculture
Toll free number: 00800 2273440

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 kostenpflichtigen Rufnummer 0179567159.

Country	Toll free fax	Local number	E-mail
Belgium (0032)	080080605	022006111	Max.Caseih.Belgium@cnh.com

Benelux - NLO
Dit is een gratis nummer. Als u echter met een gsm vanuit België of Luxemburg telefoneert, kiest u 022006111 voor België en 03420808282 voor Luxemburg. Merk op dat telefoneren met een gsm niet gratis is, maar voor eigen rekening gebeurt. Voor informatie in verband met het prijstarief neemt u best vooraf contact op met uw provider.
Benelux - BFO
L'appel est gratuit. Toutefois, si vous appelez de Belgique ou du Luxembourg à partir d'un téléphone portable, veuillez appeler le 022006111 pour la Belgique et le 03420808282 pour le Luxembourg. Veuillez noter qu'un appel à partir d'un téléphone portable ne sera pas gratuit mais vous sera facturé. Pour plus d'informations sur le tarif, veuillez vous renseigner à l'avance auprès de votre opérateur.

Country	Toll free fax	Local number	E-mail
Luxembourg (00352)	80027824	03420808282	Max.Caseih.luxembourg@cnh.com

Benelux - NLO
Dit is een gratis nummer. Als u echter met een gsm vanuit België of Luxemburg telefoneert, kiest u 022006111 voor België en 03420808282 voor Luxemburg. Merk op dat telefoneren met een gsm niet gratis is, maar voor eigen rekening gebeurt. Voor informatie in verband met het prijstarief neemt u best vooraf contact op met uw provider.
Benelux - BFO
L'appel est gratuit. Toutefois, si vous appelez de Belgique ou du Luxembourg à partir d'un téléphone portable, veuillez appeler le 022006111 pour la Belgique et le 03420808282 pour le Luxembourg. Veuillez noter qu'un appel à partir d'un téléphone portable ne sera pas gratuit mais vous sera facturé. Pour plus d'informations sur le tarif, veuillez vous renseigner à l'avance auprès de votre opérateur.

Country	Toll free fax	Local number	E-mail
Denmark (0045)	80 888046	038322992	Max.Caseih.Danmark@cnh.com

Opkaldet er gratis. Visse europæiske udbydere pålægger dog et gebyr, hvis opkaldet sker fra en mobiltelefon. Kontakt venligst dit telefonselskab for oplysninger om takster. Hvis der er problemer med at komme igennem på det gratis telefonnummer, kan du også ringe på 038322992.

Country	Toll free fax	Local number	E-mail
Netherlands (0031)	0800 2273440	0202008277	Max.CaseIH.Nederland@cnh.com

Benelux - NLO
Dit is een gratis nummer. Als u echter met een gsm vanuit België of Luxemburg telefoneert, kiest u 022006111 voor België en 03420808282 voor Luxemburg. Merk op dat telefoneren met een gsm niet gratis is, maar voor eigen rekening gebeurt. Voor informatie in verband met het prijstarief neemt u best vooraf contact op met uw provider.
Benelux - BFO
L'appel est gratuit. Toutefois, si vous appelez de Belgique ou du Luxembourg à partir d'un téléphone portable, veuillez appeler le 022006111 pour la Belgique et le 03420808282 pour le Luxembourg. Veuillez noter qu'un appel à partir d'un téléphone portable ne sera pas gratuit mais vous sera facturé. Pour plus d'informations sur le tarif, veuillez vous renseigner à l'avance auprès de votre opérateur.

Country	Toll free fax	Local number	E-mail
Portugal	800 844606	-	-

-

Country	Toll free fax	Local number	E-mail
Poland	-	0223060102	MaxService.Polska@caseih.com

-

For countries outside of the toll free access area, please use the table below:

Case IH Agriculture		
Country	**Toll Number**	**Spoken Language**
Portugal (00351)	0044 2030245589	
Norway (0047)	0044 2030245589	English
Sweden (0046)	0044 2030245589	English
Finland (00358)	0044 2030245589	English
Iceland (00354)	0044 2030245589	English
Estonia (00372)	0044 2030245589	English
Latvia (00371)	0044 2030245589	English
Lithuania (00370)	0044 2030245589	English
Czech Republic (00420)	00800 22734400	Czech
Slovakia (00421)	0044 2030245589	English
Slovenia (00386)	0044 2030245589	English
Croatia (00385)	0044 2030245589	English
Republic of Serbia (00381)	0044 2030245589	English
Bosnia & Herzegovina (00387)	0044 2030245589	English
Albania (00355)	0044 2030245589	English
Macedonia (00389)	0044 2030245589	English
Greece (0030)	0044 2030245589	English
Bulgaria (00359)	0044 2030245589	English
Romania (0040)	0044 2030245589	English
Hungary (0036)	0044 2030245589	English
Cyprus (00357)	0044 2030245589	English
Malta (00356)	0044 2030245589	English
Switzerland (0041)	00800 22734400	German French Italian

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.

Safety rules

⚠ General safety rules ⚠

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

When digging or using ground-engaging attachments, be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key (if applicable), and move the control handles around to relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate the engine in enclosed spaces as harmful exhaust gases may build up.

Before you start the machine, be sure that all controls are in neutral or park lock position.

Start the engine only from the operator's seat. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, all lighting, and Slow-Moving Vehicle (SMV) emblem clean to provide the best possible visibility while you operate the machine.

Operate controls only when seated in the operator's seat, except for those controls expressly intended for use from other locations.

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Lower the loader arms and attachments to the ground.
3. Place all controls in the neutral position.
4. Press the Operate button on the instrument panel, this should disable the ground drive and the loader hydraulic controls.
5. Engage the park brake.
6. Check that the interlock system is functioning by moving the controls out of the neutral position. If any movement occurs do not operate the machine. Park the machine, turn off the engine, and contact your authorized dealer for assistance.
7. Turn off the engine and if applicable remove the key.
8. Exit the machine.
9. Use wheel chocks if required.

When, due to exceptional circumstances, you would decide to keep the engine running and leave the operator's station, then you must follow these precautions:

1. Bring the engine to low idle speed.
2. Lower the loader arms and attachments to the ground.
3. Place all controls in their neutral position.

4. Press the Operate button on the instrument panel, this should disable the ground drive and the loader hydraulic controls.

⚠ WARNING

Some components may continue to run down after you disengage drive systems. Make sure all drive systems are fully disengaged. Failure to comply could result in death or serious injury.

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5. Engage the park brake.
6. Check that the interlock system is functioning by moving the controls out of the neutral position. If any movement occurs do not operate the machine. Park the machine, turn off the engine, and contact your authorized dealer for assistance.
7. Exit the machine.

⚠ General maintenance safety ⚠

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.

⚠ Wheels and tires ⚠

Make sure that tires are correctly inflated. Do not exceed any recommended load or pressure. Follow the instructions in the manual for proper tire inflation.

Tires are heavy. Handling tires without proper equipment could cause death or serious injury.

Always have a qualified tire technician service the tires and wheels. If a tire has lost all pressure, take the tire and wheel to a tire shop or your dealer for service. Explosive separation of the tire can cause serious injury.

DO NOT weld to a wheel or rim until the tire is completely removed. Inflated tires can generate a gas mixture with the air that can be ignited by high temperatures from welding procedures performed on the wheel or rim. Removing the air or loosening the tire on the rim (breaking the bead) will NOT eliminate the hazard. This condition can exist whether tires are inflated or deflated. The tire MUST be completely removed from the wheel or rim prior to welding the wheel or rim.

⚠ Driving on public roads and general transportation safety ⚠

Comply with local laws and regulations.

Use appropriate lighting to meet local regulations.

Make sure that the SMV emblem is visible.

Lift implements and attachments high enough above ground to prevent accidental contact with road.

When you transport equipment or a machine on a transport trailer, make sure that it is properly secured. Be sure the SMV on the equipment or machine is covered while being transported on a trailer.

Be aware of overhead structures or power lines and make sure that the machine and/or attachments can pass safely under.

Travel speed should be such that you maintain complete control and machine stability at all times.

Slow down and signal before turning.

Pull over to allow faster traffic to pass.

⚠ Fire and explosion prevention ⚠

Fuel or oil that is leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces.

Always have a fire extinguisher on or near the machine.

Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as the engine, transmission, exhaust, battery, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fans, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections and frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the machine.

Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the machine to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the machine.

⚠ General battery safety ⚠

Always wear eye protection when you work with batteries.

Do not create sparks or have open flame near a battery.

Ventilate the area when you charge a battery or use a battery in an enclosed area.

Disconnect the negative (-) terminal first and reconnect the negative (-) terminal last.

When you weld on the machine, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When you use auxiliary batteries or connect jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow the manufacturer's instructions when you store and handle batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.

Battery acid causes burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.

Keep out of reach of children and other unauthorized persons.

⚠ Operator presence system ⚠

Your machine is equipped with an operator presence system to prevent the use of some features while the operator is not in the operator's seat.

Never disconnect or bypass the operator presence system.

If the operator presence system is inoperable, then it must be repaired. Follow the test procedure (**7-45**).

⚠ Reflectors and warning lights ⚠

You must use flashing amber warning lights when you operate equipment on public roads.

⚠ Air-conditioning system ⚠

The air-conditioning system is under high pressure. Do not disconnect any lines. The release of high pressure can cause serious injury.

The air-conditioning system contains gases that are harmful to the environment when released into the atmosphere. Do not attempt to service or repair the system.

Only trained service technicians can service, repair, or recharge the air-conditioning system.

⚠ Personal Protective Equipment (PPE) ⚠

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

⚠ Do Not Operate tag ⚠

Before you start servicing the machine, attach a 'Do Not Operate' warning tag to the machine in an area that will be visible.

⚠ Operator protective structure ⚠

Your machine is equipped with an operator protective structure, such as: a Roll Over Protective Structure (ROPS), Falling Objects Protective Structure (FOPS), or a cab with a ROPS. A ROPS may be a can frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the 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 to the protective structure.

The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion, or modification will weaken the structure and reduce your protection. If this occurs, THE PROTECTIVE STRUCTURE MUST BE REPLACED so that it will provide the same protection as a new protective structure. Contact your dealer for protective structure inspection and replacement.

After an accident, fire, tip over, or roll over, the following MUST be performed by a qualified technician before returning the machine to field or job-site operations:

- The protective structure MUST BE REPLACED.
- The mounting or suspension for the protective structure, operator's seat and suspension, seat belts and mounting components, and wiring within the operator's protective system MUST be carefully inspected for damage.
- All damaged parts MUST BE REPLACED.

DO NOT WELD, DRILL HOLES, ATTEMPT TO STRAIGHTEN, OR REPAIR THE PROTECTIVE STRUCTURE. MODIFICATION IN ANY WAY CAN REDUCE THE STRUCTURAL INTEGRITY OF THE STRUCTURE, WHICH COULD CAUSE DEATH OR SERIOUS INJURY IN THE EVENT OF FIRE, TIP OVER, ROLL OVER, COLLISION, OR ACCIDENT.

Seat belts are part of your protective system and must be worn at all times. The operator must be held to the seat inside the frame in order for the protective system to work.

⚠ Hazardous chemicals ⚠

If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.

Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures, and procedures to take in the event of a spill or accidental release. MSDS are available from your dealer.

Before you service your machine check the MSDS for each lubricant, fluid, etc. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, and on manufacturer containers, as well as the information in this manual, when you service 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.

Applied chemicals require additional precautions. Obtain complete information from the manufacturer or distributor of the chemicals before you use them.

⚠ Electrical storm safety ⚠

Do not operate machine during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

If an electrical storm should strike during operation, remain in the cab. Do not leave the cab or operator's platform. Do not make contact with the ground or objects outside the machine.

⚠ Lifting and overhead loads ⚠

Never use loader buckets, forks, etc. or other lifting, handling, or digging equipment to lift persons.

Do not use raised equipment as a work platform.

Know the full area of movement of the machine and equipment and do not enter or permit anyone to enter the area of movement while the machine is in operation.

Never enter or permit anyone to enter the area underneath raised equipment. Equipment and/or loads can fall unexpectedly and crush persons underneath it.

Do not leave equipment in raised position while parked or during service, unless securely supported. Hydraulic cylinders must be mechanically locked or supported if they are left in a raised position for service or access.

Loader buckets, forks, etc. or other lifting, handling, or digging equipment and its load will change the center of gravity of the machine. This can cause the machine to tip on slopes or uneven ground.

Load items can fall off the loader bucket or lifting equipment and crush the operator. Care must be taken when lifting a load. Use proper lifting equipment.

Do not lift load higher than necessary. Lower loads to transport. Remember to leave appropriate clearance to the ground and other obstacles.

Equipment and associated loads can block visibility and cause an accident. Do not operate with insufficient visibility.

Airborne noise emission

Information concerning airborne noise emission
Sound power level
LwA =101 dBA (Wheel loader)
LwA=103 dBA (Track loader)

Guaranteed sound power level **(1)** determined according to European Directive **2000/14/EC**.

Sound pressure level at operator's station
LpA = 77 dBA

Equivalent continuous A-weighted emission sound pressure level at the operator's station measured with cab door and windows closed and the heating/air conditioning fan in operation at 2nd speed, measured on identical machine according to **ISO 6396:2008**.

Information concerning hand-arm and whole body vibration emission

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. 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 regularly inspect the suspension of the seat, performing the adjustments and repairs as required.
- Regularly perform the current maintenance operations of the machine at the prescribed intervals.
- Operate the equipment in a uniform manner, avoiding sharp movements or excessive loads.
- When travelling, avoid very rough terrain or driving over obstacles such as large rocks.
  This machine is equipped with an operator's seat which meets the criteria of EN **ISO 7096:2000** representing vertical vibration input under severe but typical operating conditions.
  This seat is tested with input spectral class EM 9 and has a seat transmissibility factor SEAT<0.9
  The intent is to limit the machine operator's exposure to vibrations. The exposure is dependant on basic machine operating techniques which can be controlled by following the instructions described in this manual.
- The weighted root mean square acceleration emission of the machine to which the operator's arms are subjected does not exceed **2.5 m/s²**.
- The weighted root mean square acceleration of the machine to which the body is subjected does not exceed **0.5 m/s²**.
  These results were obtained using an acceleration gauge while stock-piling on a level surface.

NOTE: *Whole body exposure value is determined under particular operating and terrain conditions and is therefore not representative of all possible operating conditions within 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****. Conducting actual working condition measurements is recommended. If this is not feasible, use the information provided in the table below, from* ***ISO/TR 25398:2006*** *, is suggested.*

Typical operating conditions — Skid steer loader

	Average			Standard deviation		
	1.4*Aw,eqx m/s^2	1.4*Aw,eqy m/s^2	Aw,eqz m/s^2	1.4*Sx m/s^2	1.4*Sy m/s^2	Sz m/s^2
Load and carry motion	0.86	0.73	0.93	0.30	0.33	0.35
Transfer movement	0.76	0.91	0.49	0.33	0.35	0.17
V-shaped motion	0.99	0.84	0.54	0.29	0.32	0.14

Typical operating conditions — Compact track loader

	Average			Standard deviation		
	1.4*Aw,eqx m/s^2	1.4*Aw,eqy m/s^2	Aw,eqz m/s^2	1.4*Sx m/s^2	1.4*Sy m/s^2	Sz m/s^2
Load and carry motion	0.89	0.67	0.52	0.12	0.16	0.10
Transfer movement	0.58	0.49	0.60	0.18	0.12	0.15
V-shaped motion	1.21	1.00	0.82	0.30	0.84	0.32

Utility safety

YOU MUST FOLLOW safety precautions when you work near buried utility lines.

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

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

NOTE: *Before construction work begins it is your responsibility to be aware of all utility lines in the area of your project and to avoid them.*

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

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

Call all utility companies before you perform any machine operation

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

Where applicable, know the utility color code.

Electric	Red
Gas, Oil, or Petroleum	Yellow
Communication, Telephone, Television	Orange
Water	Blue
Sewer	Green or Brown
Proposed Excavation	White
Surveying	Pink
Reclaimed Water and Slurry	Purple

Coordinate all excavation activity with the proper authorities and professionals before beginning.

Proper entry and exit

⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

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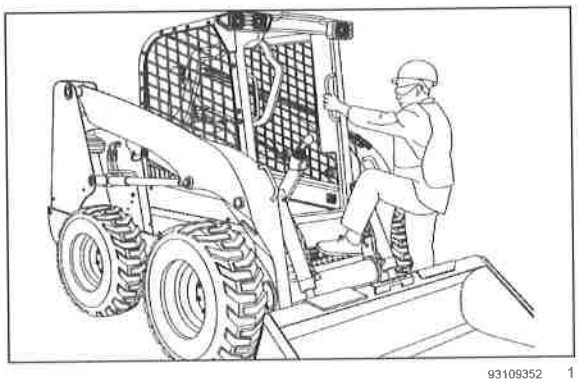
⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

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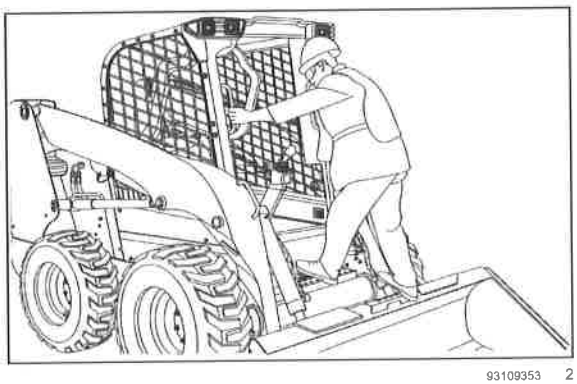
Enter the machine

1. Face the cab entry point.
2. If applicable, open the cab door.
3. Hand holds are provided on the loader arm, front cab posts, or on the inside of the cab door. Grab the hand holds.
4. Place one foot on the loader arm coupler step or on the bucket step.



93109352 1

5. Pull yourself up, face the machine, and stand on the step(s).
6. Position your hands so that you are comfortable with stepping into the cab.
7. Place one foot into the center area of the cab. A step area is provided between the foot pedals, if equipped.
8. Step into the cab, turn your body, and sit in the operator's seat.



93109353 2

⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

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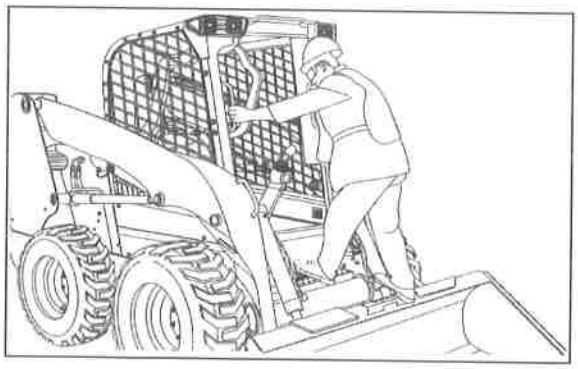
⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

W0141A

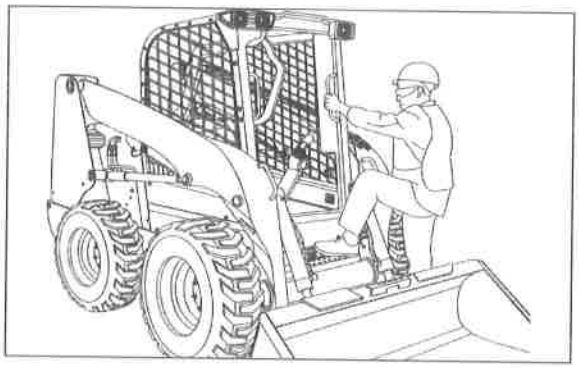
Exit the machine

1. Lower the loader arm and or attachments to the ground.
2. Stop the engine. The parking brake is automatically set.
3. Remove the seat belt and raise the seat restraint bar.
4. If applicable, open the cab door.
5. Grab the hand holds.
6. Pull yourself up and place one foot on the loader arm coupler step or on the bucket step.
7. Position your hands on the hand holds so that you are comfortable with stepping out of the cab.
8. Step out of the machine and turn your body so that you face the machine.



93109353 3

9. Look and make sure that the ground area is clear to step off of the machine.
10. Position your hands so that you are comfortable with stepping off of the machine.
11. Place one foot on the ground.
12. Place the other foot on the ground and safely move away from the machine.



93109352 4

Starting and stopping precautions

- Walk around the machine and attachments to 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 and attachment. Ensure that all safety precautions / warnings are upheld and all safety devices are working as the attachment manufacture states in their safety information.
- Check that the parking device is applied, place all controls in neutral or park as specified by the manufacturer, before starting the machine.
- Adjust, secure and latch the seat belt, and lower the restraint bar before starting the machine.
- To avoid potential serious injury by contact with the machines moving attachment, DO NOT rewire to bypass the seat or restraint bar switches (if equipped).
- Start and operate the machine only from the operator's seat.
- Use jumper cables only in the recommended manner. Improper use can result in battery explosion or unexpected machine motion. Ventilate the battery area before using jumper cables. Make sure that using jumper cables will not interfere or harm electronic devices.
- 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/slope, park the machine with the wheels or track securely blocked.
- Before leaving the operator station, lower the equipment to the ground and shut off the engine.
- Remove the starter key or lock the instrument panel, or turn the master disconnect switch (if equipped) to the OFF position when leaving the machine parked or unattended.

Seat belt precautions

⚠ Seat belts ⚠

Seat belts must be worn at all times.

Seat belt inspection and maintenance:

- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have cuts that can make the belt weak.

⚠ WARNING

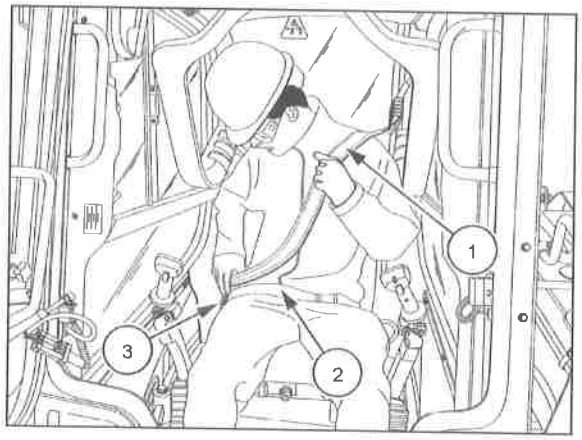
Avoid injury!
Before starting the engine, securely fasten the seat belt. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

W0142A

1. Pull the seat belt retractable half **(2)** across and buckle securely with the buckle half **(3)**.
2. A shoulder belt **(1)** is available from your dealer. Some machine configurations are equipped with a shoulder belt.

   NOTE: *State or Local regulations may require a **7.6 cm (3 in)** webbing seat belt available through Dealer Service Parts. This belt may be necessary in some industrial applications. Check your local codes.*

- Check that bolts are tight on the seat bracket or mounting.
- If belt is attached to seat, make sure seat or seat brackets are mounted securely.
- Keep seat belts clean and dry.
- Clean belts only with soap solution and warm water.
- Do not use bleach or dye on the belts because this can make the belts weak.

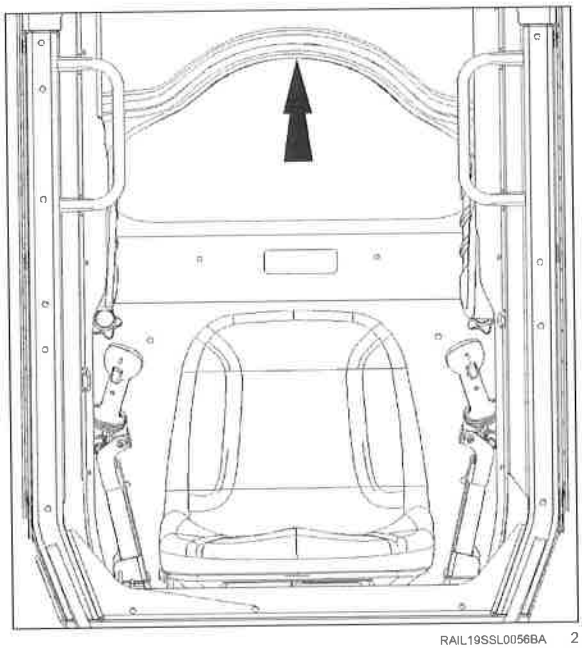


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Seat restraint bar

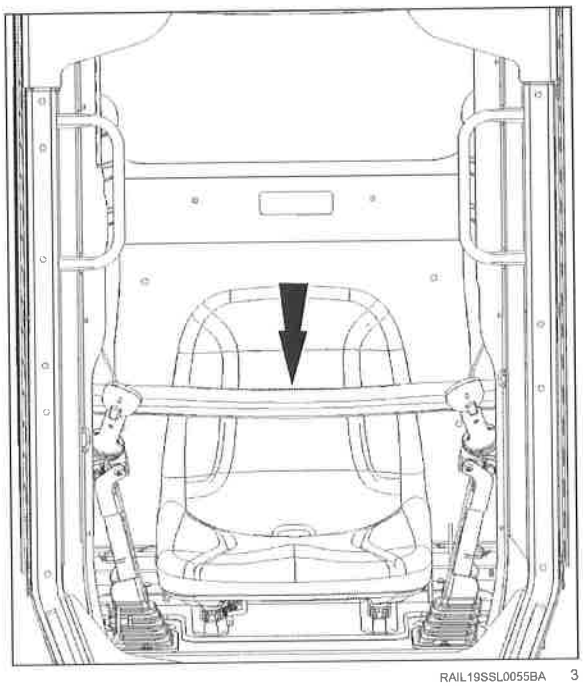
The restraint bar must be down in the operating position before starting.

Seat restraint bar in the raised position.



RAIL19SSL0056BA 2

Seat restraint bar in the operating position.



RAIL19SSL0055BA 3

Specific precautions to this machine

⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

D0168A

Specific precautions to this machine:

- All machines are equipped with safety support features when service or maintenance of the machine is required. You may secure the loader arm in a raised position and secure the cab in a tilt position. These features allow greater access to the internal components of the machine. Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page **2-19** or "Loader arm lock and cab tilt procedure - vertical lift machines" page **2-23** in this manual.
- Place all controls in neutral before leaving the cab and be careful not to engage them accidently when entering or exiting the cab.
- Before leaving the operators compartment check the interlock system so movement of controls do not result in machine movement. See the "Loader arm and bucket hydraulic interlock" procedure on page **7-45**.
- Keep the load or tool as low as possible while moving the machine around the job site.
- Confirm that the coupler lock pins are engaged with the bucket or attachment retaining tabs.
- Do not over fill the bucket. Dirt, rocks and debris can enter the operator area.

Fire extinguisher

It is recommended that you have a fire extinguisher on your machine. Contact your dealer for the type and location of a fire extinguisher on this machine.

Roll Over Protective Structure (ROPS)

⚠ DANGER

Crushing hazard!
DO NOT operate the machine with the Roll-Over Protective Structure (ROPS) removed. Remove the ROPS only for service or replacement.
Failure to comply will result in death or serious injury.

D0032A

⚠ DANGER

Crushing hazard!
Do not change the Roll Over Protective Structure (ROPS) in any way. Unauthorized changes such as welding, drilling, or cutting will weaken the ROPS and decrease your protection. Have an authorized dealer replace the ROPS if damage of any kind occurs. DO NOT TRY TO REPAIR THE ROPS.
Failure to comply will result in death or serious injury.

D0037A

⚠ 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.

W0143A

⚠ 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

Your machine has a Roll Over Protective Structure (ROPS). The ROPS or Cab Structural Frame (CSF) is a special safety component of your machine.

DO NOT attach any device to the ROPS or CSF for pulling purposes.

The ROPS or CSF is a certified structural support and any damage, fire, corrosion, or modification will weaken the structure and reduce your protection. If this occurs, the ROPS or CSF must be replaced so that it will provide the same protection as a new ROPS or CSF.

After an accident, fire, or rollover, the following MUST be performed before returning the machine to the field or job site:

- The ROPS or CSF structure MUST be replaced.
- The ROPS or CSF mounting or suspension, 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.

Maintenance and inspection of the Roll Over Protective Structure (ROPS)

1. Check the torque of the ROPS mounting bolts. If necessary, tighten the bolts to the correct torque, for the front pivot bolts tighten them down to **42 N·m (31.0 lb ft)** and the rear bolts to **170 N·m (125.4 lb ft)**.
2. Check for cracks, rust, or holes in the ROPS and ROPS parts. Age, weather, and accidents can cause damage to the ROPS and ROPS parts. If you have any doubts about the ROPS system, see your dealer.
3. Check the operator's seat and the mounting parts for the seat belt. Tighten the bolts to the correct torque. Replace the parts that have wear or damage.

Seat belt

The seat belt is an important part of your ROPS. You must wear the seat belt at all times when you operate the machine.

Before you operate this machine, always make sure that the ROPS and operator's seat belt are correctly installed.

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

When you carry out a welding operation on the machine as authorized by the manufacturer and in accordance with the manufacturer's instructions

- Disconnect the batteries
- Disconnect the Engine Control Unit (ECU)
- If your machine is equipped with the Electro-Hydraulic controls option, disconnect the Universal Control Module (UCM)
- Disconnect the alternator B+ and D+ terminal wires
- Connect the ground cable from the welding apparatus to the component on which you will perform the welding operation.

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.

Loader arm lock and cab tilt procedure - radial lift machines

⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

D0168A

⚠ DANGER

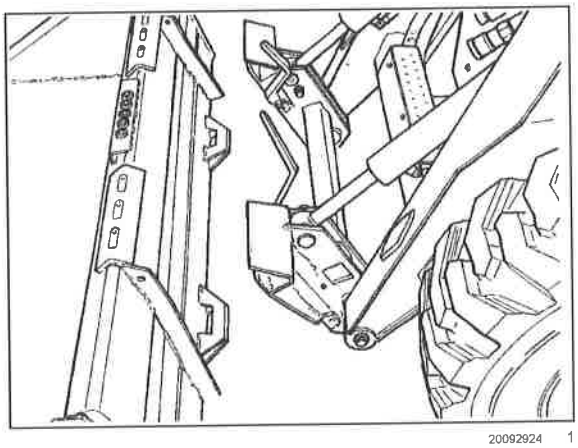
Crushing hazard!
The loader arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021B

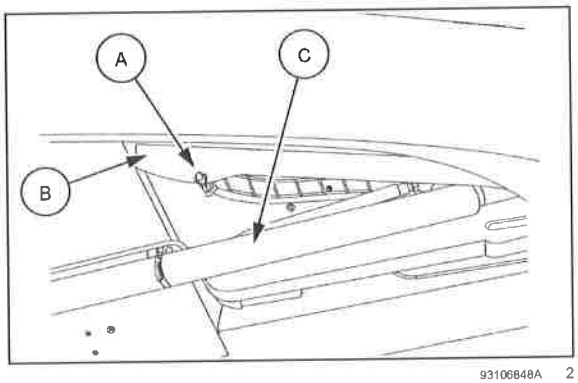
Raise and lock the loader arm for machine service

NOTE: *An instructional decal on the inside of the right-hand loader arm, just above the support strut is also available. Understand the loader arm lock procedure before continuing.*

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down, and start the engine.
2. Press the OPERATE button to enable the hydraulics.
3. Remove the bucket or attachment from the mounting plate. See "Mechanical attachment mounting systems" (**6-1**) or "Hydraulic attachment mounting systems" (**6-4**) for assistance.
4. Park the machine on firm and level surface.
5. If an assistant is not available, turn off the engine and exit the machine.
6. Remove the support strut pin **(A)** and let the support strut **(B)** rest on the lift cylinder barrel **(C)**.

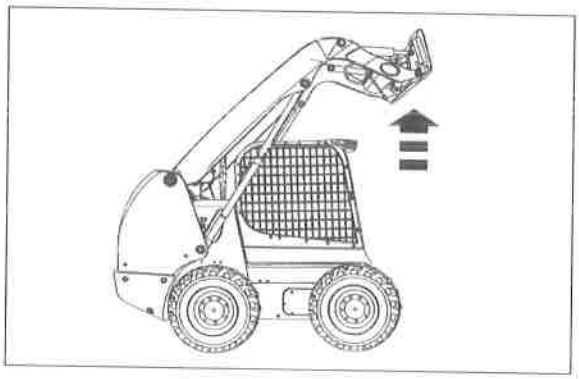


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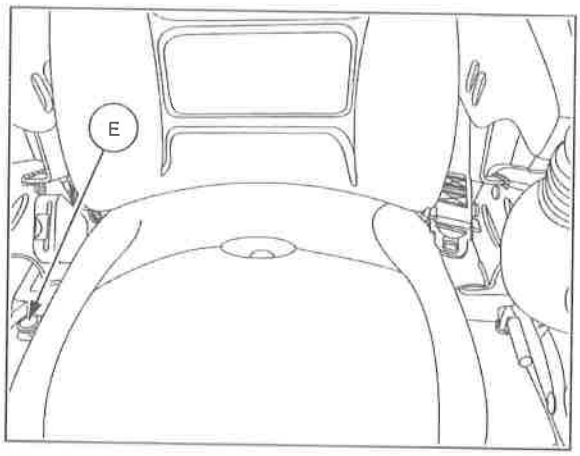
7. Slowly raise the loader arm until the support strut **(B)** falls onto the cylinder rod **(D)**.
8. Stop the engine.



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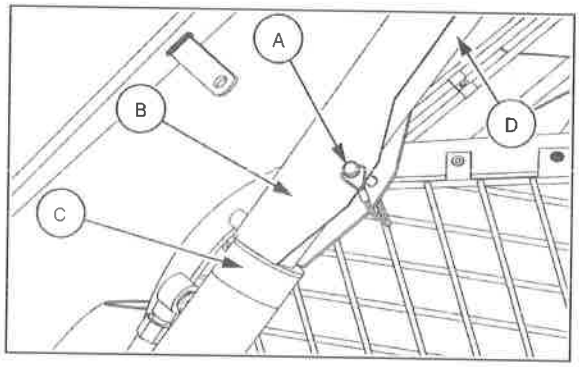
9. Pull up on the override control knob **(E)** (red control knob near the right-hand side of the operator's seat). The support strut **(B)** will brace against the top of the cylinder barrel **(C)** supporting the weight of the loader arm.

NOTICE: *Only use the override control knob to lower the loader arm in emergency situations when engine power is not available or to lower the loader arm onto the support strut for servicing the machine.*



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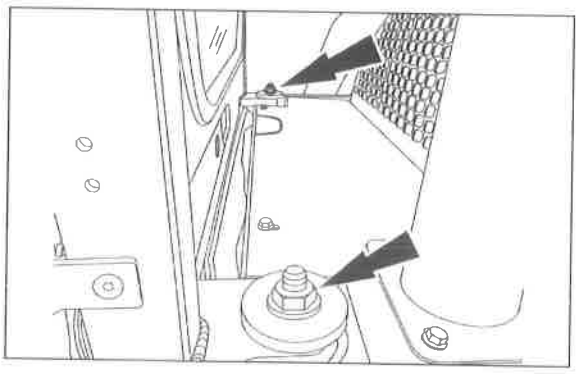
10. Ask an assistant to insert the pin **(A)** into the support strut **(B)**. If an assistant is not available visually confirm that the support strut is braced against the top of the cylinder barrel before exiting the machine.



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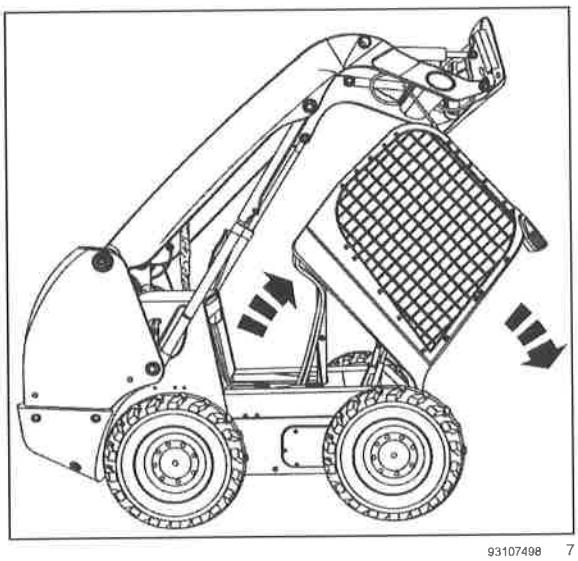
Tilt and lock the cab forward for machine service

1. Remove the two, rear retaining nuts, located at the rear of the cab.



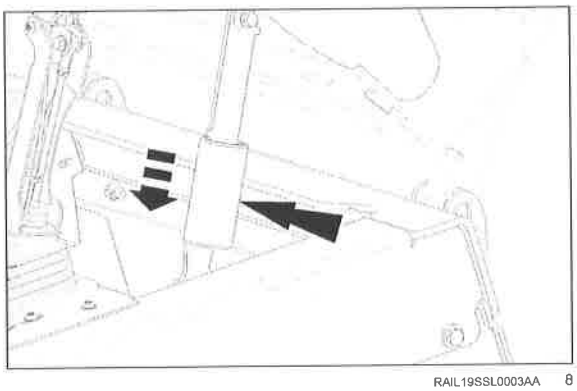
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2. Pull on the hand holds at the front of the machine until the cab is completely tilted forward.



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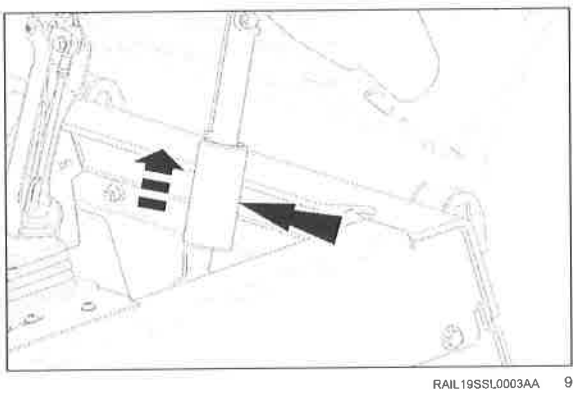
3. Confirm that the red lock tube has lowered over the cab pivot linkage. If it has, the cab tilt position is now secure.



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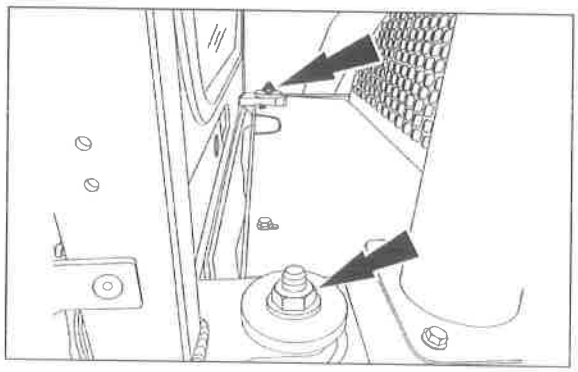
Tilt and secure the cab for machine operation

1. Raise the red lock tube exposing the cab pivot linkage.
2. Push the cab backward into the operation position.



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3. Install the retaining nuts. Torque the nuts to **170 N·m (125 lb ft)**.



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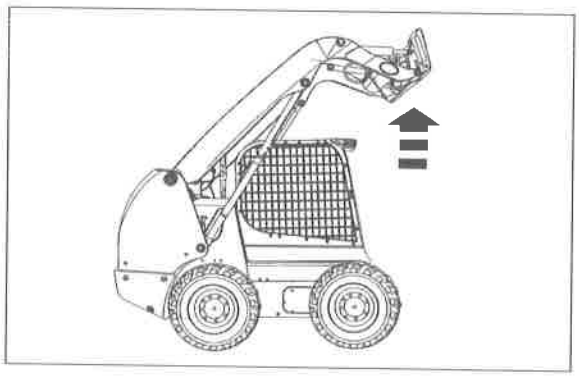
Unlock and lower the loader arm for machine operation

⚠ DANGER

Crushing hazard!
The loader arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021B

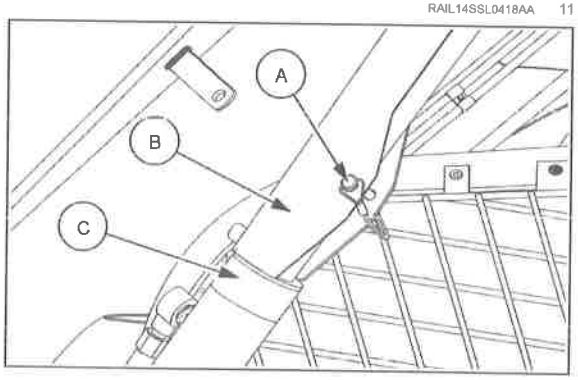
NOTE: An instructional decal on the inside of the right-hand loader arm, just above the support strut is also available. Understand the loader arm unlock procedure before continuing.



RAIL14SSL0418AA 11

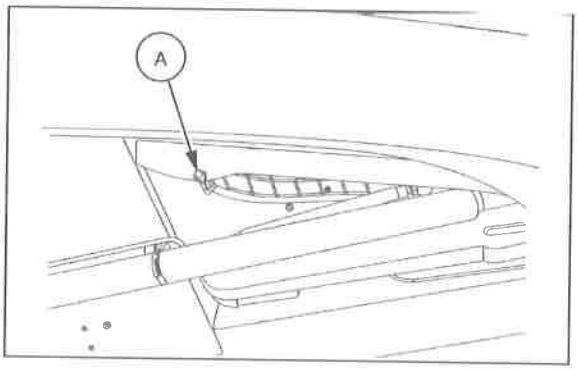
Placing the support strut in the storage position requires a second person. The operator must remain in the seat during this procedure.

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down, and start the engine.
2. Press the operate button to enable the hydraulics.
3. Raise the loader arm until the support strut **(B)** is not resting on the end of the cylinder barrel **(C)**.



93106854A 12

4. Instruct the second person to remove the support strut pin **(A)** and place the support strut in the stowed position and reinstall the support strut pin **(A)**. When the second person has cleared the area, the operator may now lower the loader arm.
5. Commence work operations or park the machine and stop the engine.



93106848A 13

Loader arm lock and cab tilt procedure - vertical lift machines

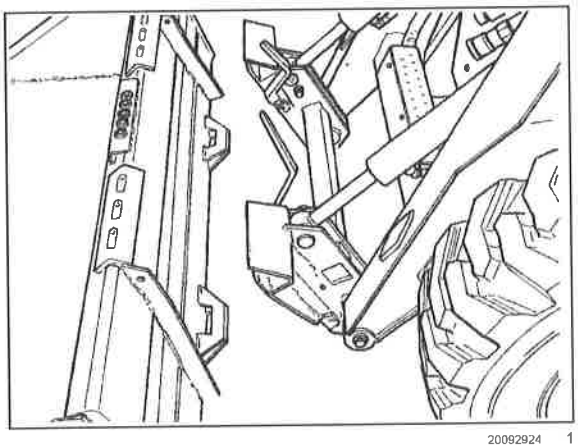
⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

D0168A

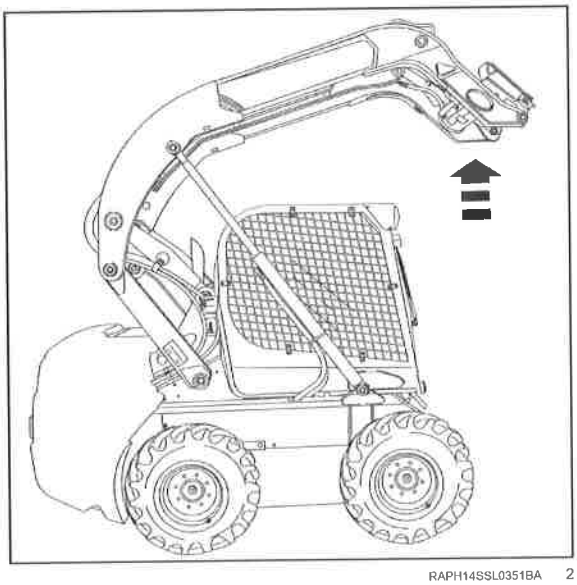
Raise and lock the loader arm for machine service

1. Sit in the operator's seat, fasten the seat belt, pull down the restraint bar down, and start the engine.
2. Press the operate button to enable the hydraulics.
3. Remove the bucket or attachment from the mounting plate. See "Mechanical attachment mounting systems" (**6-1**) or "Hydraulic attachment mounting systems" (**6-4**) for assistance.
4. Park the machine on a level surface.



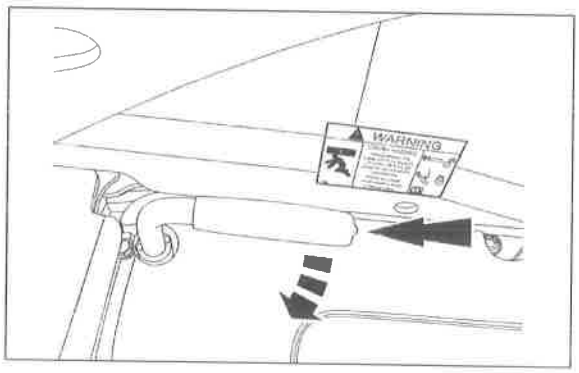
20092924 1

5. Fully raise the loader arm.



RAPH14SSL0351BA 2

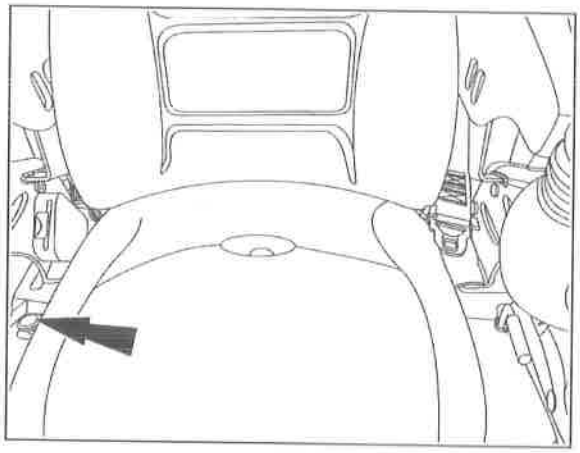
6. Locate the loader arm lock lever on the right-hand side of the operator's seat.
7. Rotate the lock lever toward the operator's seat (clockwise) to engage the lock support pin(s).
8. Stop the engine.



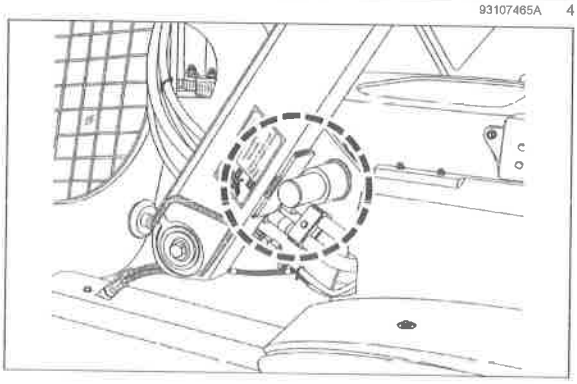
RAIL15SSL0353AA 3

9. Pull up on the override control knob (red control knob near the right-hand side of the operator's seat). The loader will brace against the lock support pin and keep the loader arm in a raised position.

NOTE: *Only use the override control knob to lower the loader arm in emergency situations when engine power is not available or to lower it onto the lock support pin for servicing the machine.*



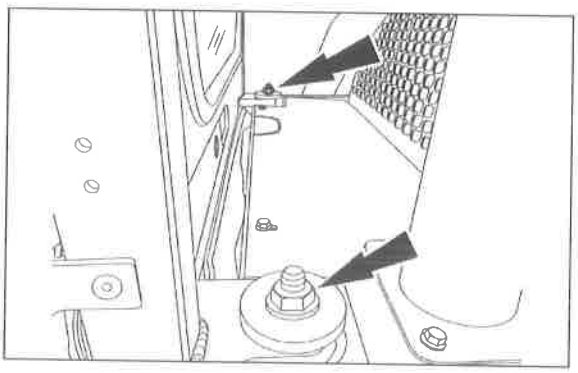
93107465A 4



93107457 5

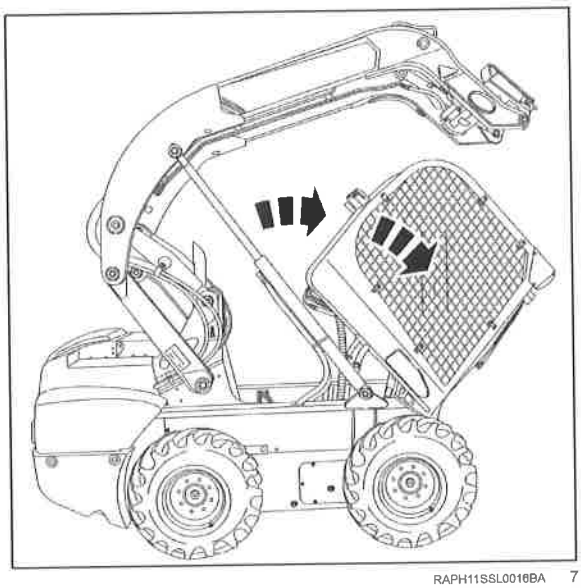
Tilt and lock the cab forward for machine service

1. Remove the two, rear retaining nuts, located at the rear of the cab.



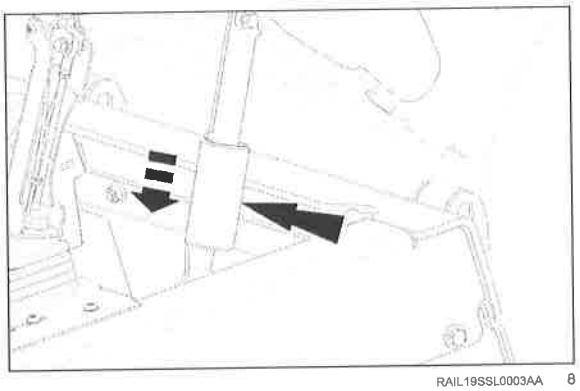
931001633 6

2. Pull on the hand holds at the front of the machine until the cab is completely tilted forward.



RAPH11SSL0016BA 7

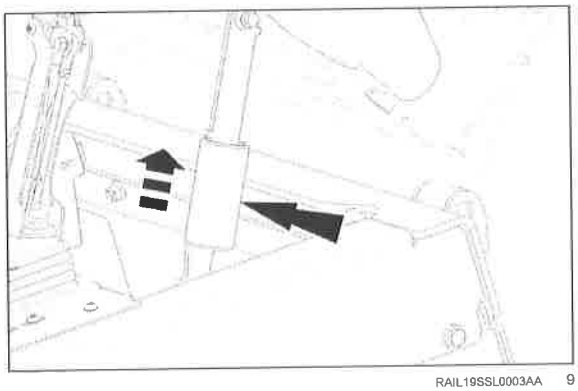
3. Confirm that the red lock tube has lowered over the cab pivot linkage. If it has, the cab tilt position is now secure.



RAIL19SSL0003AA 8

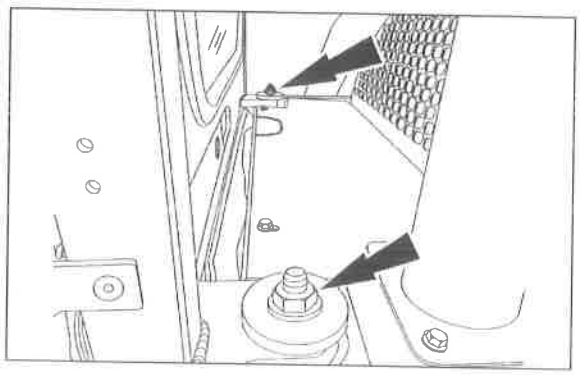
Tilt and secure the cab for machine operation

1. Raise the red lock tube exposing the cab pivot linkage.
2. Push the cab backward into the operation position.



RAIL19SSL0003AA 9

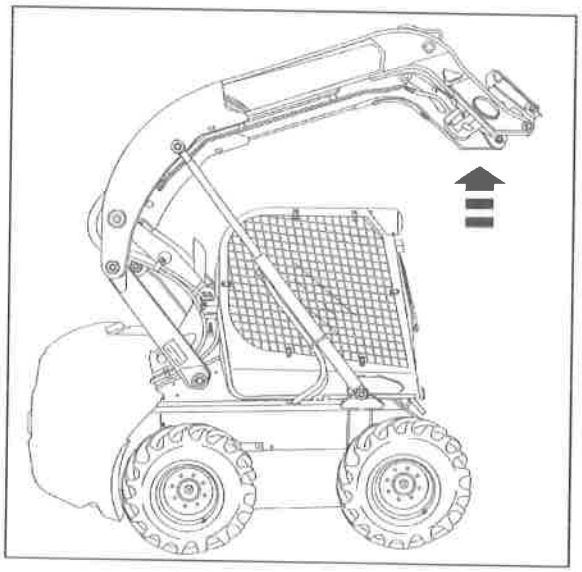
3. Install the retaining nuts. Torque the nuts to **170 N·m (125 lb ft)**.



931001833 10

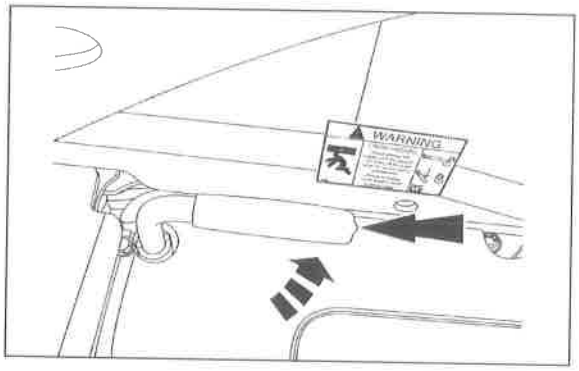
Unlock and lower the loader arm for machine operation

1. Sit in the operator's seat, fasten the seat belt, pull down the restraint bar down, and start the engine.
2. Press the operate button to enable the hydraulics.
3. Fully raise the loader arm.



RAPH14SSL0351BA 11

4. Rotate the lock lever away from the seat (counter clockwise) to retract the lock pin(s).
5. Lower the loader arm.
6. Commence work operations or park the machine and stop the engine.



RAIL15SSL0353AA 12

No engine power - loader arm up and down control

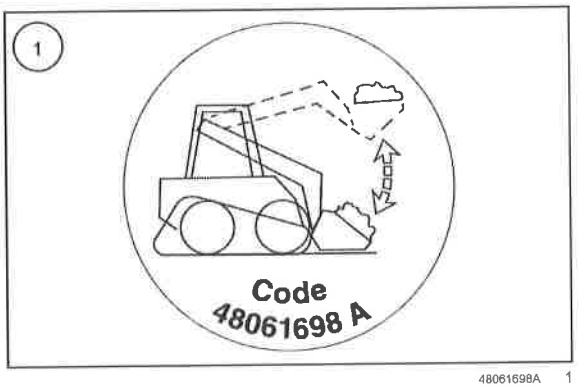
⚠ DANGER

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply will result in death or serious injury.

D0168A

NOTE: *The override control knob is for service and emergency situations only and should not be used in day-to-day operations.*

In the event of the loss of engine power, the override control knob will allow the operator to raise or lower the loader arm. See the decal on the override control knob **(1)** (red control knob on the right-hand side of the operator's seat).

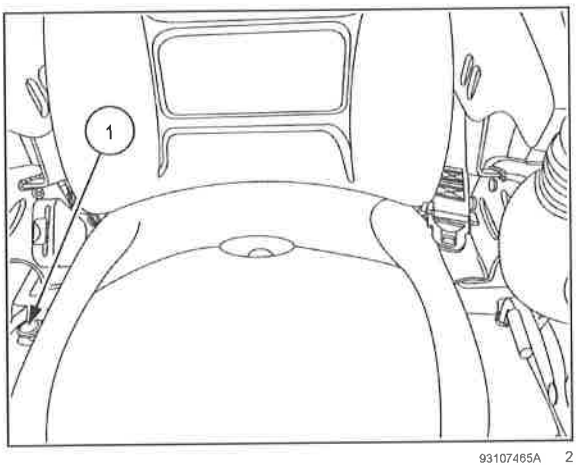


48061698A 1

Before attempting to raise or lower the loader arm/attachment on a machine that has lost engine power, alert personnel in the area of your intention. Do not leave the seat, or unfasten the seat belt or raise the restraint bar.

To lower the loader arm/attachment:

1. Confirm that personnel and obstacles are clear.
2. Pull the override control knob UP. The loader arm/attachment will start to lower.
3. To stop the loader arm/attachment from lowering, press the control knob DOWN at any time.
4. Once the loader arm/attachment is safely supported on the ground or on the loader arm lock support, make sure that the override control knob is completely in the DOWN position.



93107465A 2

To raise the loader arm/attachment:

1. Have an assistant attach a secondary external lifting device to the front of the loader arm.

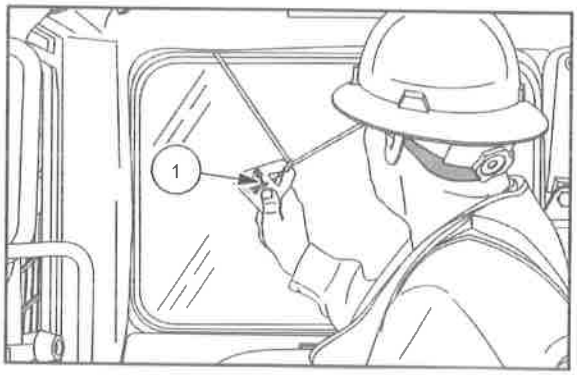
   NOTICE: *Do not attempt to move or lift the machine while raising the loader arms. You may damage the loader arm or attachment.*
2. Confirm that personnel and obstacles are clear.
3. Pull the override control knob UP while the assistant raises the secondary external lifting device.
4. Engage the loader arm lock as shown on "Loader arm lock and cab tilt procedure - radial lift machines" **2-19** or "Loader arm lock and cab tilt procedure - vertical lift machines" **2-23**.
5. Press the override control knob DOWN before disconnecting the external lifting device.

Emergency exit

The rear window can be removed to provide an exit for the operator in the event the front exit is blocked.

To remove the rear window, pull on the tag **(1)** and remove the window molding strip. Push on the bottom half of the window to force it away from the molding.

NOTICE: *If the rear window was removed for use as an exit, do the following before you operate the machine: Install the rear window and the molding. Secure the window in place with the locking strip.*



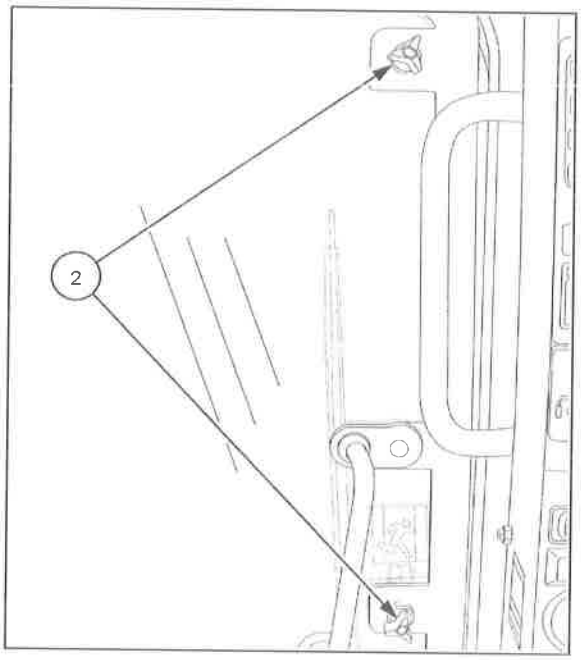
20100005 1



RAPH12SSL0289BA 2

The front door can be removed from the inside to provide an exit for the operator in the event the front door will not open. To remove the front door from inside the unit, unscrew and remove the two hand knobs **(2)** on the right side of the door window and push to remove the front door.

NOTICE: *If the front door was removed for exiting, reinstall the front door before operating the skid steer.*



RAIL13SSL0083BA 3

Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances. 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.

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.



NHIL14GEN0038AA 1

Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

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

Points of sale are obliged to:

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

Safety signs

⚠ WARNING

Avoid injury!
Make sure safety signs are legible. Clean safety signs regularly. Replace all damaged, missing, painted over, or illegible safety signs. See your dealer for replacement safety signs. If a safety sign is on a part that is replaced, make sure the new part has a safety sign.
Failure to comply could result in death or serious injury.

W0168A

The following safety signs are on your machine as a guide for your safety and for the safety of those working with you. Walk around the machine and note the content and the location of all safety signs before you operate your machine.

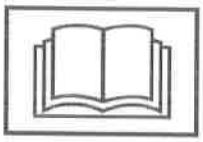
Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and gentle detergent.

NOTICE: *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 you or your dealer replaces, make sure that you or your dealer install the safety sign on the new part. See your dealer for replacement safety signs.

Read operator's manual symbol

Safety signs that display the "Read operator's manual" symbol direct you 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, consult the appropriate page of the operator's manual.



Read service manual symbol

Safety signs that display the "Read service manual" symbol direct you to the service manual. If you doubt your ability to perform service operations, contact your dealer.



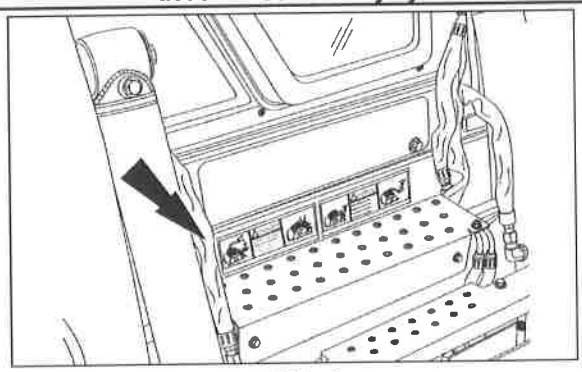
Following is a listing of Safety Signs and locations. Read and understand them before operating the machine.



51612553 1

WARNING FALL HAZARD NO Riders. Not a man lift or work platform. Failure to comply could result in death or serious injury.	DANGER CRUSH HAZARD Keep out of this area when lift arm is raised, unless lift arm is supported. Failure to comply will result in death or serious injury.

Quantity: 1
Pictorial: 51612553
Location:
Under the entry door way.



931002209 2

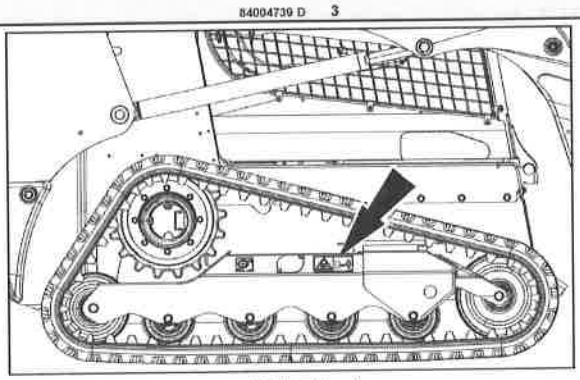
NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-19*** *or "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-23*** *in this manual.*

CAUTION
Flying debris. Stay clear. Failure to comply could result in minor or moderate injury.



84004739 D 3

Quantity: 2
Pictorial: 84004739
Location:
On the track debris guard. One on each side of the machine.

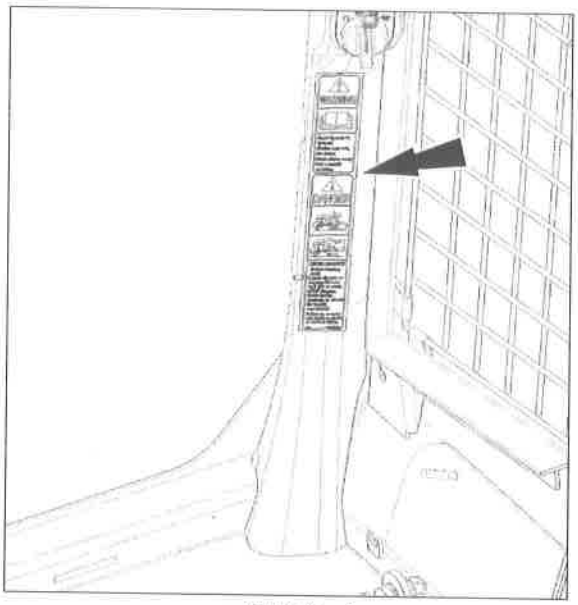


RAIL15SSL0357AA 4

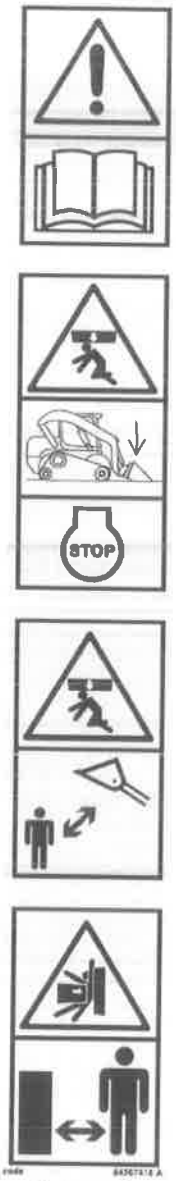
NOTE: *Only applicable to Compact Track Loaders (CTL) models TR270B, TR310B, and TV370B.*

WARNING
Read Operator's manual. Fasten seat belt. No riders. Keep others away. Not a man lift machine. Failure to comply could result in death or serious injury.
DANGER
CRUSH HAZARD
Before leaving seat:
Lower lift arm or engage lift arm lock pin or strut.
STOP engine.
Move loader controls to check for loader movement.
Failure to comply will result in death or serious injury.

Quantity: 1
Pictorial: 84367418
Location:
Under the right-hand side of the instrument cluster.



RAIL19SSL0054BA 5



84367418 A 6

NOTE: *Read and understand the "General safety rules" on page* ***2-2****.*

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-19*** *or "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-23*** *in this manual.*



84315533 7

WARNING
CRUSH HAZARD

Always engage the loader lift arm support strut when the lift arms are raised for service and / or maintenance. Failure to comply could result in death or serious injury.

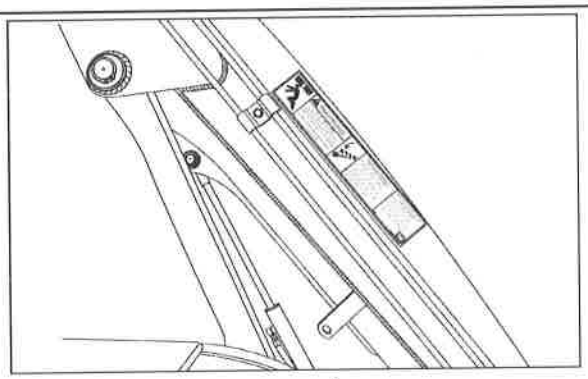
PROCEDURE TO SECURE LIFT ARMS IN RAISED POSITION

1. Remove any attachment.
2. Park machine on firm and level surface.
3. Lower loader lift arms to the ground and turn of engine.
4. Remove support strut lock pin.
5. Lower support strut onto cylinder and hydraulic plumbing.
6. Start engine and slowly raise lift arms until support strut drops over cylinder rod.
7. Slowly lower loader lift arms until end of strut contacts cylinder.
8. Install support strut lock pin.

PROCEDURE TO PLACE SUPPORT STRUT IN STORAGE

1. Start engine and raise loader lift arms **1 – 2 in(25 – 50 mm**).
2. Stop engine and ensure loader hydraulics are inoperable.
3. Have assistant remove support strut lock pin, then raise and secure support strut with lock pin in storage position.
4. Lower loader lift arms to ground.

Quantity: 1
Pictorial: 84315533
Location:
On the inside of lift arm above the support strut that is mounted on the right-hand side of the loader arm.



93109382 8

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-19*** *in this manual.*

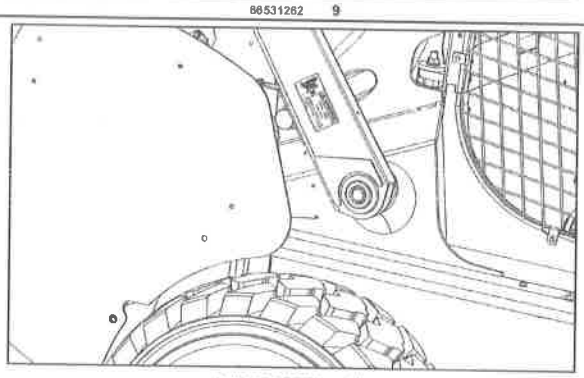
NOTE: *Only applicable to SR160B, SR175B, SR210B, SR240B, TR270B, and TR310B machines.*

WARNING
PINCH AREA
Keep away. Failure to comply could result in death or serious injury.



86531282 9

Quantity: 2
Pictorial: 86531262
Location:
On the right-hand side of the boom where it rests against the lift arm support pin. Also on the left-hand side of the boom.

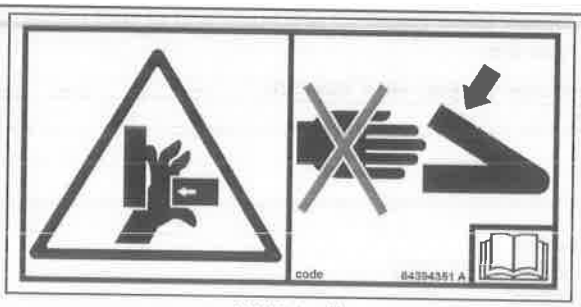


RAIL17SSL0054BA 10

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-23*** *in this manual.*

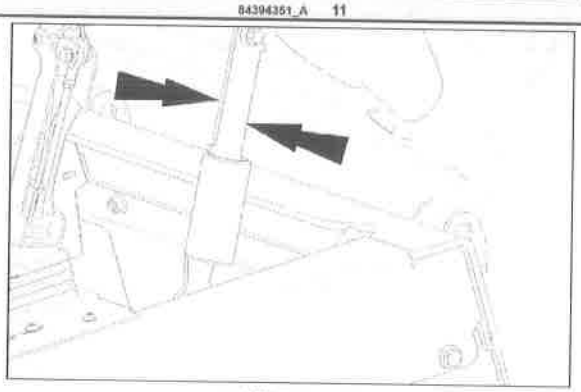
NOTE: *Only applicable to models SV185B, SV280B, and TV370B.*

WARNING
PINCH HAZARD
Keep clear.
Failure to comply could result in death or serious injury.



84394351_A 11

Quantity: 2
Pictorial: 84394351
Location:
On each side of the upper link on the Roll Over Protective Structure (ROPS) lock mechanism.



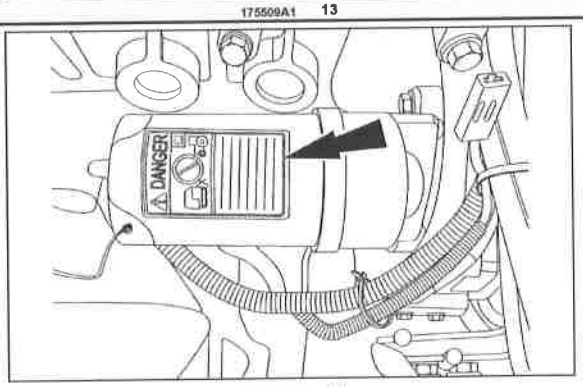
RAIL19SSL0003AA 12

DANGER
Starting in gear can cause death. Start engine only from the operator seat with transmission control(s) in NEUTRAL. Failure to comply WILL result in death or serious injury.



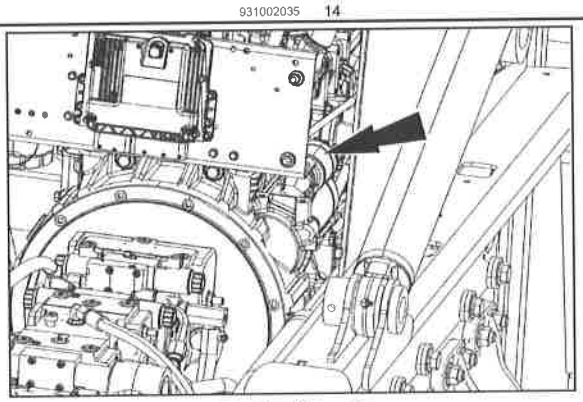
175509A1 13

Quantity: 1
Pictorial: 175509A1
Location:
On the right-hand side of the engine on top of the starter.
Models SR160B, SR175B, and SV185B only



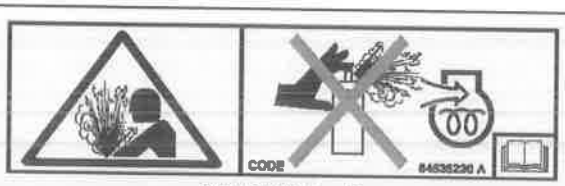
931002035 14

Quantity: 1
Pictorial: 175509A1
Location:
On the left-hand side of the engine on top of the starter.
Models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only



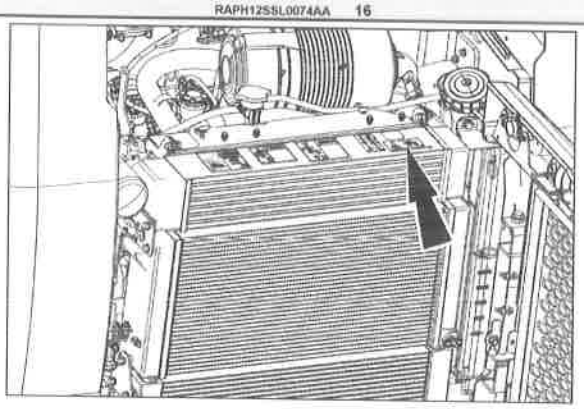
RAIL15SSL0381BA 15

WARNING
Explosion hazard!
DO NOT use ether. Failure to comply could result in death or serious injury.



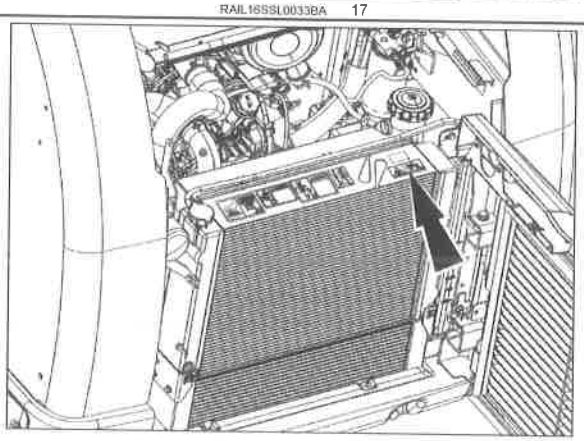
RAPH12SSL0074AA 16

Quantity: 1
Pictorial: 84535230
Location:
On top of the charge air cooler. Models SR175B and SV185B only.



RAIL16SSL0033BA 17

Quantity: 1
Pictorial: 84535230
Location:
On top of the radiator. Models SR160B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only.



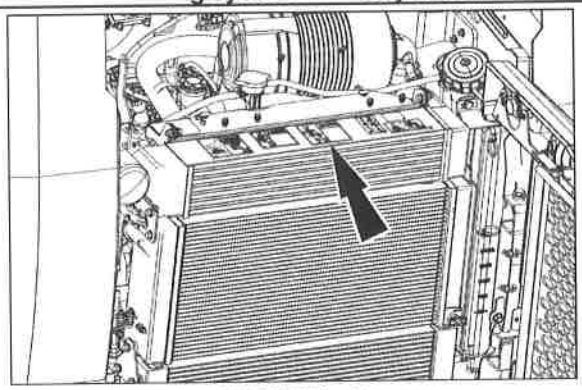
RAIL16SSL0035BA 18



51612550 19

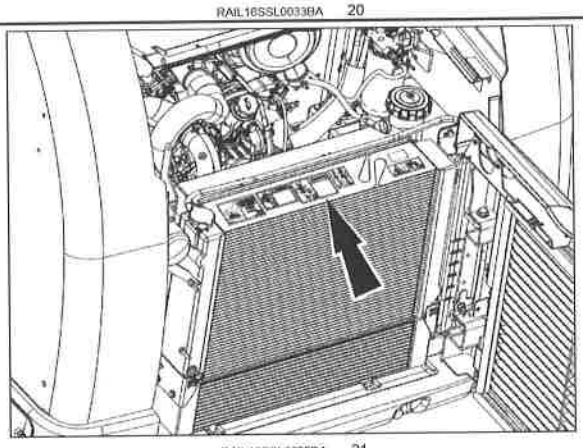
WARNING **Hot Surface Hazard. Stay clear.** **Failure to comply could result in death or serious injury.**	**WARNING** **Hot liquid under pressure!** **DO NOT remove radiator cap.** **CHECK coolant level in recovery tank.** **Failure to comply could result in death or serious injury.**
WARNING **Entanglement hazard!** **Keep hands and clothing away from rotating fan and belts. Failure to comply could result in death or serious injury.**	**Organic Acid Technology (OAT) coolant is mandatory for all FPT engines compliant to Tier 4B (final) emissions using Selective Catalytic Reduction (SCR). NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water.**

Quantity: 1
Pictorial: 51612550
Location:
On top of the charge air cooler. Models SR175B and SV185B only.



RAIL16SSL0033BA 20

Quantity: 1
Pictorial: 51612550
Location:
On top of the radiator. Models SR160B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only.



RAIL16SSL0035BA 21

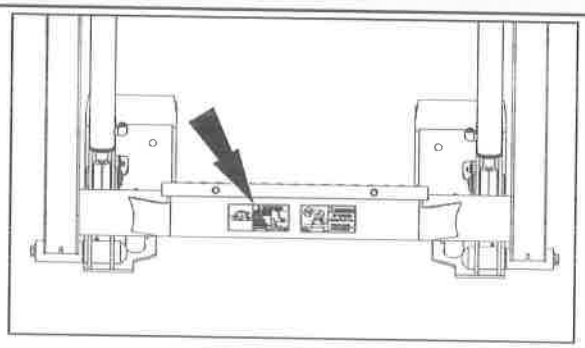
NOTE: *See "Organic Acid Technology (OAT) coolant" **7-18** for more details.*

WARNING
CRUSH HAZARD
Check attachment for proper engagement before using. Failure to comply could result in death or serious injury.
WARNING
TIP HAZARD
Carry load low. Failure to comply could result in death or serious injury.



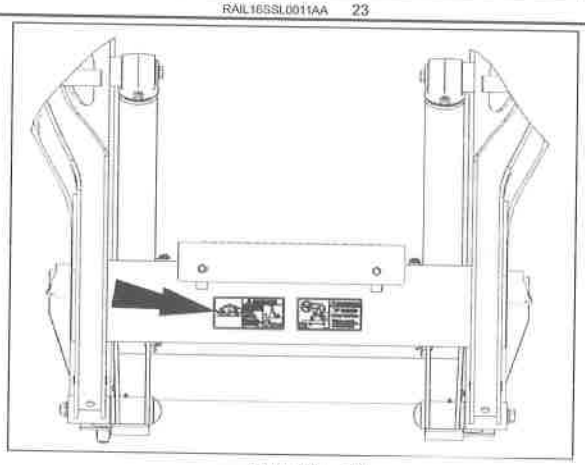
51485886A 22

Quantity: 1
Pictorial: 51485886
Location:
On the back side of the front loader arm cross tube.
Models SR160B only.



RAIL16SSL0011AA 23

Quantity: 1
Pictorial: 51485886
Location:
On the back side of the front loader arm cross tube.
Models SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only.



RAIL15SSL0374BA 24

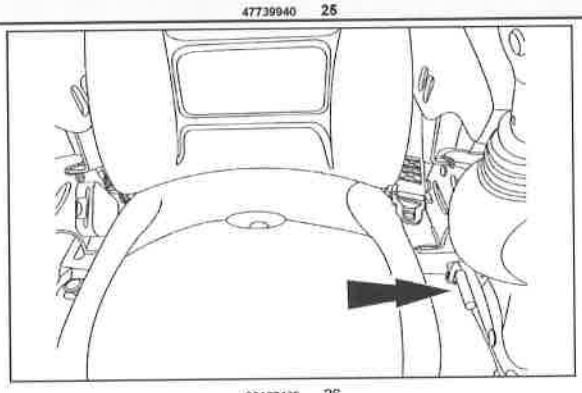
NOTE: *Read and understand the "Mechanical attachment mounting system" page* ***6-1*** *or "Hydraulic attachment mounting system" page* ***6-4*** *in this manual.*

WARNING
CRUSH HAZARD
Always engage the Loader Lift Arms support pin when Lift Arms are raised for service and/or maintenance.
Failure to comply could result in death or serious injury.



47739940 25

Quantity: 1
Pictorial: 47739940
Location:
On the lower left-hand side of the operators seat, attached to the ROPS.



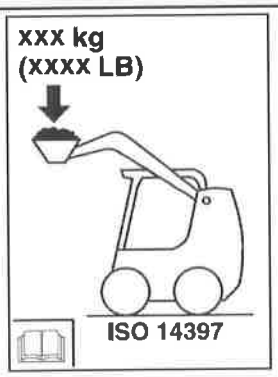
93107465 26

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-23*** *in this manual.*

NOTE: *Only applicable to SV185B, SV280B, and TV370B machines.*

Model		SAE Rated Operating Capacity (ROC)	Decal part number
SSL	*SR160B	**725 kg (1598 lb)**	47466754
	*SR175B	**790 kg (1750 lb)**	84350655
	*SV185B	**840 kg (1850 lb)**	84350657
	*SR210B	**955 kg (2100 lb)**	47481763
	*SR240B	**1090 kg (2403 lb)**	47619485
	*SV280B	**1270 kg (2800 lb)**	47619478
CTL	*TR270B	**859 kg (1894 lb)**	84350666
	*TR310B	**986 kg (2174 lb)**	47716630
	*TV370B	**1177 kg (2595 lb)**	48111224

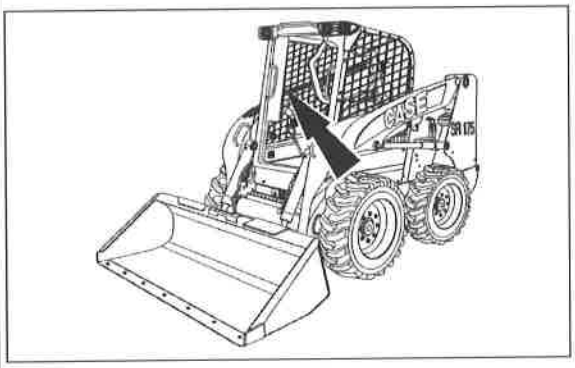
Decal/placement location



93109348 27

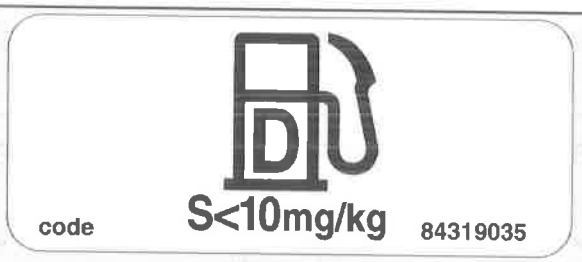
Location:
On right-hand console (post).

NOTE: **The Compact Track Loaders (CTL) are rated at* ***35%*** *of tipping capacity and the Skid Steer Loaders (SSL) are rated at* ***50%*** *of tipping capacity.*



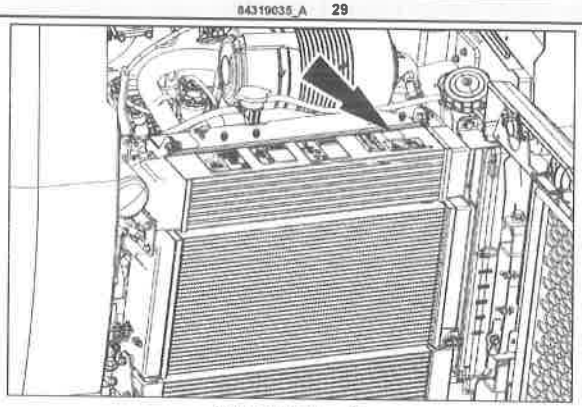
93106896 28

Only use Ultra-Low Sulfur Diesel (ULSD) fuel with a sulfur content of less than 10 mg/kg.



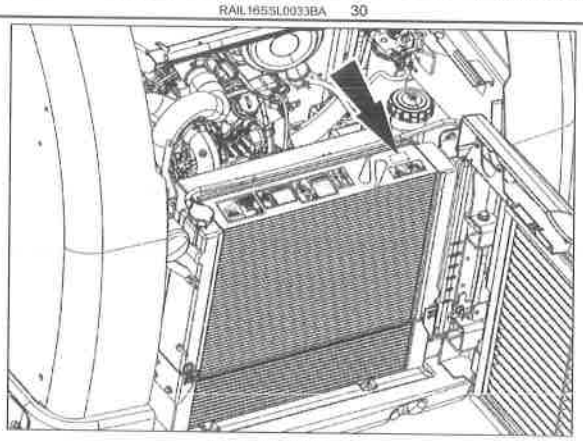
84319035_A 29

Quantity: 1
Pictorial: 84319035
Location:
On top of the charge air cooler. Models SR175B and SV185B only.



RAIL16SSL0033BA 30

Quantity: 1
Pictorial: 84319035
Location:
On top of the radiator. Models SR160B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only.



RAIL16SSL0035BA 31

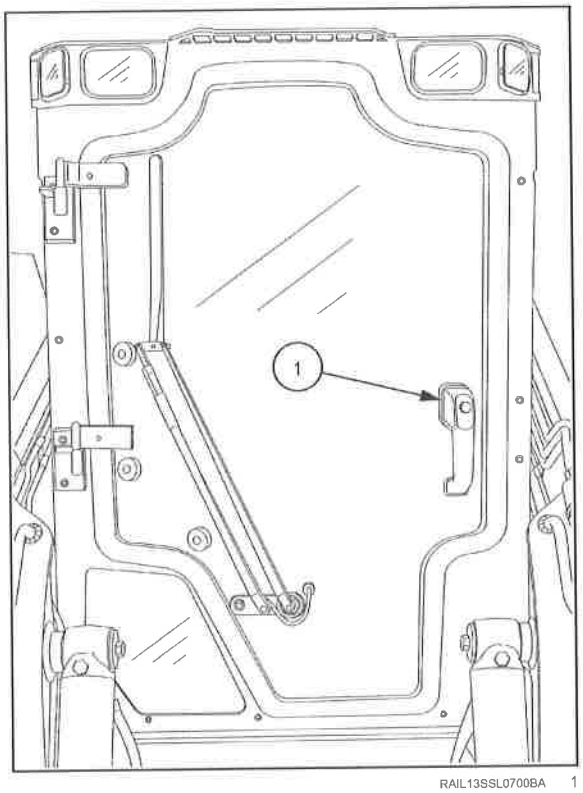
3 - CONTROLS AND INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Door latches, cab

Exterior door latch

Push on the knob **(1)** to release the door for entry. The starter switch key may be used to lock the door.

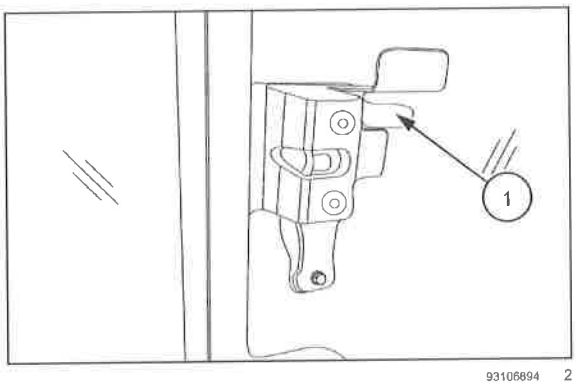


RAIL13SSL0700BA 1

Interior door latch

Push on the lever **(1)** to release the door latch and open door.

NOTICE: *Do not raise or lower loader lift arm until you have confimed the door is fully closed. Damage may occur to the door assembly.*

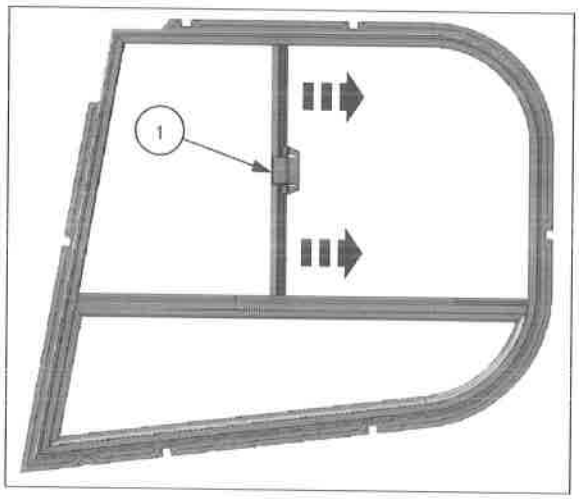


93106894 2

Window glass, cab

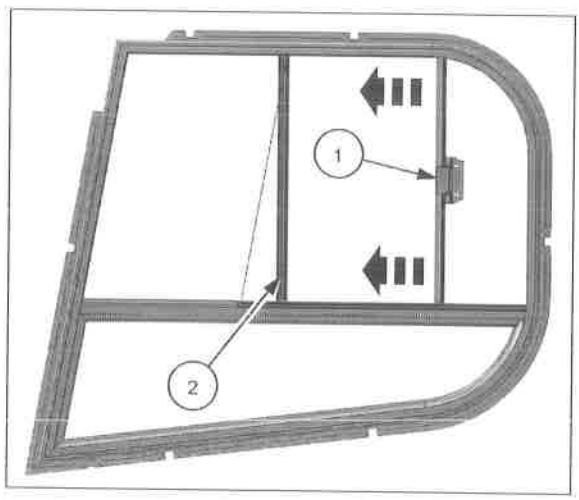
Opening and closing window glass

To open the window. Pull the front part of the window latch **(1)** and slide the window into the desired position. The window will maintain that spot.



RAIL17SSL0039BA 1

To close the window. Pull the front part of the window latch **(1)** and slide the window forward until the latch can engage the vertical rail of the fixed window **(2)**.

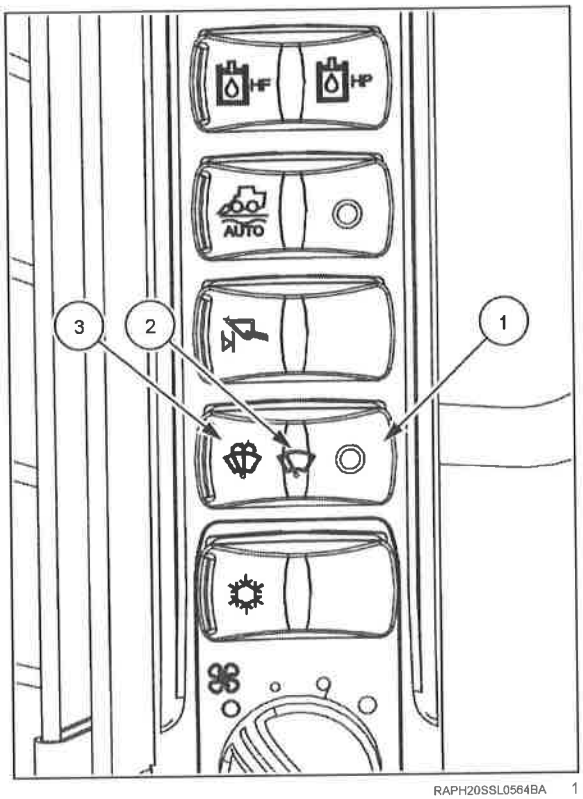


RAIL17SSL0038BA 2

Windshield wiper and washer controls

Windshield wiper switch

- This three position switch located on the left "A" post console turns the wiper ON, OFF and operates the washer fluid spray.
- Off position **(1)**.
- Center, on position **(2)**.
- Momentary spray- when released, switch returns to ON position **(3)**.

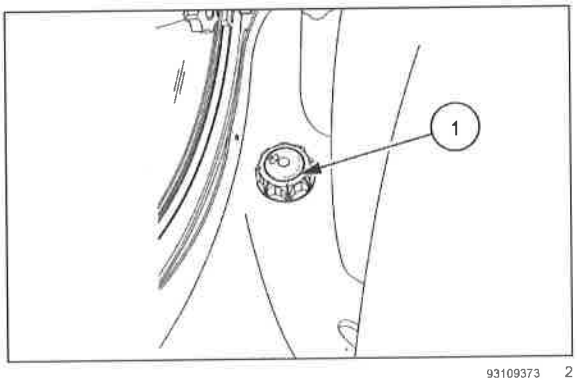


RAPH20SSL0564BA 1

Windshield washer reservoir **(1)**.

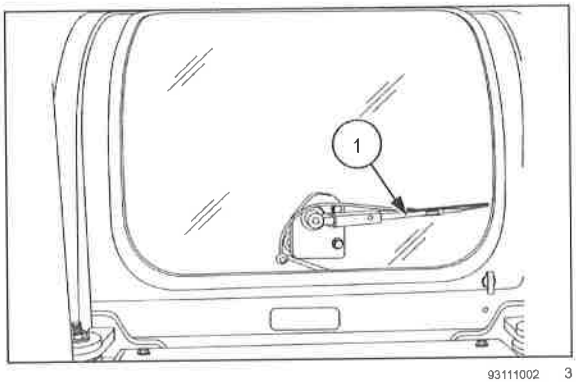
- The windshield washer reservoir is located in the lower right-hand side of the cab behind the operators elbow.

NOTICE: *Never operate the windshield washer motor without fluid in the reservoir. Damage to the motor could occur.*



93109373 2

Rear windshield wiper **(1)**.

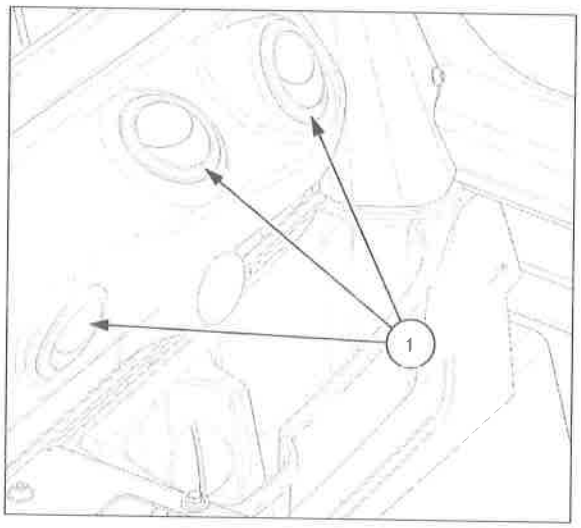


93111002 3

Cab air louvers

The air louvers **(1)** are located to the lower right and left of the operator and are adjustable for operator comfort. Air flow, direction, and volume can be adjusted.

For maximum defrosting, point louvers in direction of desired defrost area. Air louvers can rotate **360°** and tilt up and down, to achieve the direction of operator's desire.

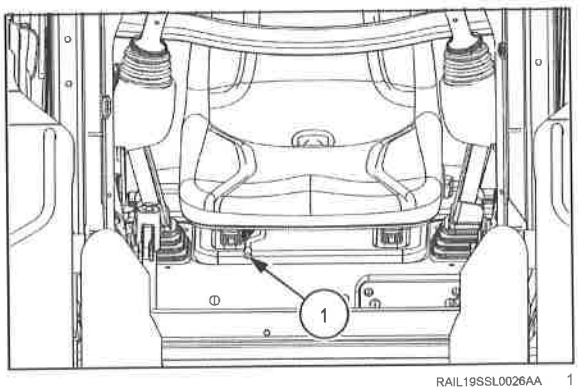


RAIL19SSL0052BA 1

OPERATOR'S SEAT

Standard seat

The standard seat is adjustable fore and aft using adjustment lever **(1)**.

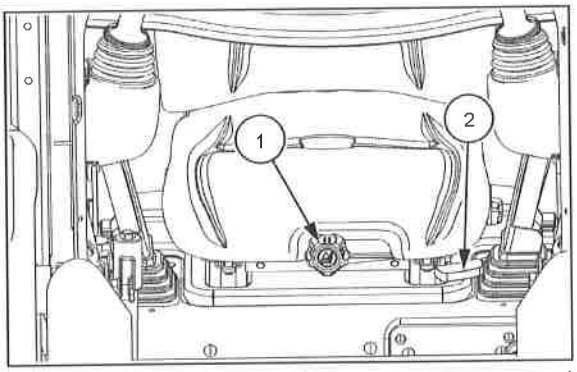


RAIL19SSL0026AA 1

Mechanical suspension seat

The mechanical suspension seat is adjustable fore and aft using adjustment lever **(2)**.

The mechanical suspension seat has a weight adjustment system. Sit in the seat and turn the knob **(1)** counter-clockwise to decrease the pressure for lighter operators or turn clockwise to increase the pressure for heavier operators.



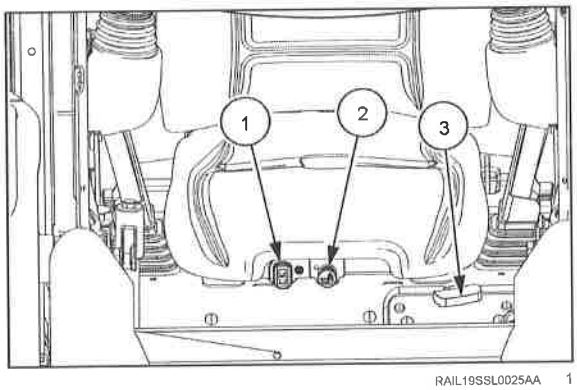
RAIL19SSL0024AA 1

Air seat

The air seat is adjustable fore and aft using adjustment lever **(3)**.

The weight adjustment system uses an air pressure adjustment switch **(2)** that can be activated for operator preference. Push to release pressure for lighter operators, and pull to add air pressure for heavier operators.

This seat also has a heating element. Turn the heating element ON or OFF with the rocker switch **(1)**.



RAIL19SSL0025AA 1

Seat belt operation

⚠ WARNING

Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C

⚠ WARNING

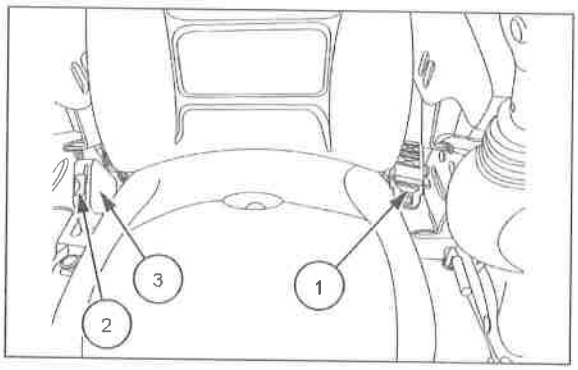
Avoid injury!
Before starting the engine, securely fasten the seat belt. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

W0142A

Overview

The unit is equipped with a retractable seat belt **(1)** that should be worn at all times.

Always securely fasten your seat belt before operating the machine. Carefully inspect the seat belts at regular six-month intervals for proper fit and function, oil-soaked or stained webbing, web fraying and corrosion. Replace the seat belt assembly immediately if damage such as worn or damaged hardware, nicked or frayed strap, buckle or retractor malfunction, or loose stitching is found. If such damage or wear is not found, some seat belt manufacturers recommend replacement of the seat belt every three years.
The belt can be cleaned with clean, soapy water. Do not use solvents, bleach, or dye on the belt as they may weaken it.

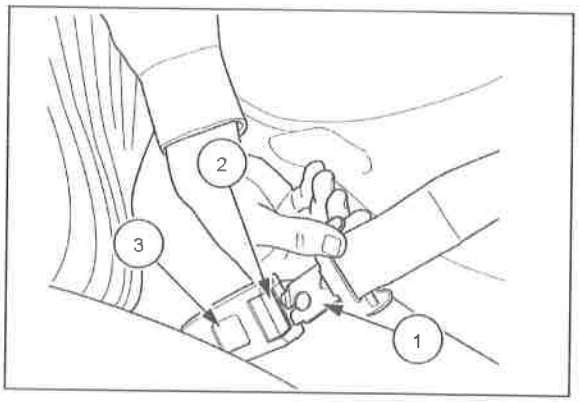


93107465 1

Seat belt

To fasten the belt, pull it from the reel and push the tongue end **(1)** into the buckle end **(3)** until a "click" indicates it is fully engaged.

To release the belt, push the red release button **(2)** on the buckle and pull the tongue from the buckle.



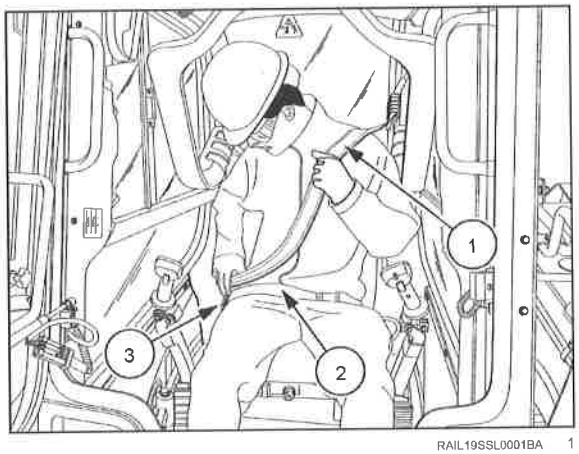
10041220 2

Shoulder belt

Pull the seat belt retractable half **(2)** across the operator and buckle securely with the buckle half **(3)**.

A shoulder belt **(1)** is available from your dealer. Some machine configurations are equipped with a shoulder belt.

NOTE: *State or Local regulations may require a* ***3 in*** *webbing seat belt available through Dealer Service Parts. This belt may be necessary in some industrial applications. Check your local codes.*

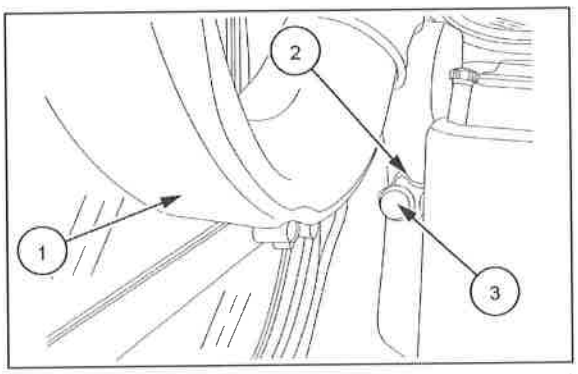


RAIL19SSL0001BA 1

Restraint bar

The restraint bar can be adjusted for operator comfort.

1. Adjust the height of the restraint bar **(1)** by loosening the two lock knobs **(2)** located on each side where the restraint bar rests on the back of the cab.
2. Turn the adjusting stops **(3)** out to raise the resting position of the restraint bar and in to lower the position.
3. Adjust the stops **(3)** so the restraint bar rests on both of the stops evenly.
4. Tighten the lock knobs **(2)**.



RAPH12SSL0066AA 1

MECHANICAL HYDRAULIC CONTROLS

Steering and travel

Moving the machine

⚠ WARNING

Collision hazard!
Always make sure the area behind the machine is clear of all persons, animals, and obstructions BEFORE backing up.
Failure to comply could result in death or serious injury.

W0232A

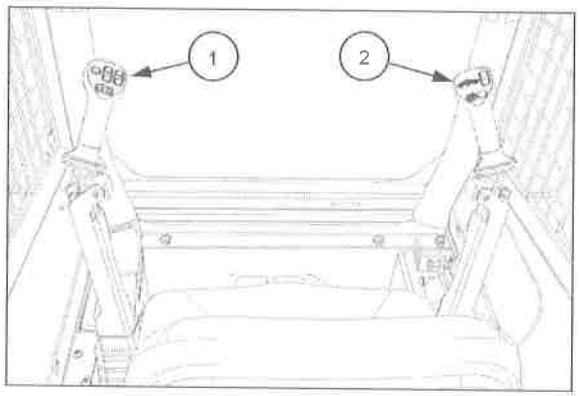
⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Push both the left-hand control lever **(1)** and the right-hand control lever **(2)** forward, from neutral, to move the machine forward. Pull both of the control levers rearward, from neutral, to move the machine in the reverse direction. Move the control levers forward a short distance for maximum power and slow speed. Move the control levers completely forward for maximum speed.

Move both control levers to the neutral position to stop movement of the machine.

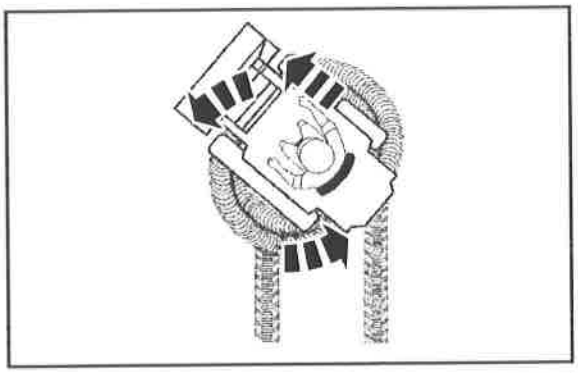


RAIL19SSL0060BA 1

Turning the machine

Pivot turn - power to only one side

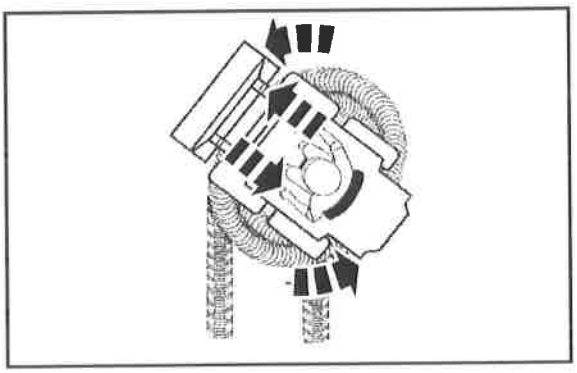
- To make a pivot turn left: hold the left steering control lever in neutral and move the right steering control lever forward.
- To make a pivot turn right: hold the right steering control lever in neutral and move the left steering control lever forward.
- To make a pivot turn in reverse left: after confirming that all personnel and objects are clear, hold the left steering control lever in neutral and move the right steering control lever rearward.
- To make a pivot turn in reverse right: after confirming that all personnel and objects are clear, hold the right steering control lever in neutral and move the left steering control lever rearward.



BT06G022 1

Counter rotation turn - power to both sides in opposing directions

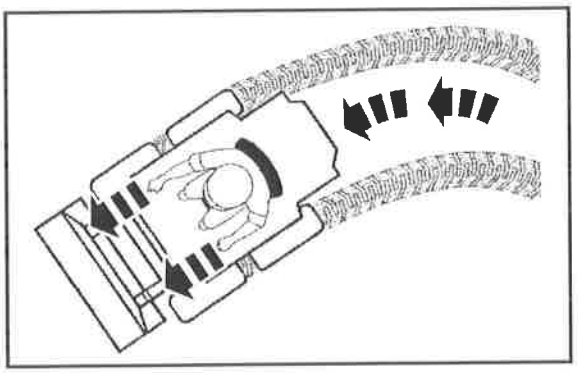
- To counter rotate left: move the left steering control lever rearward and push the right steering control lever forward.
- To counter rotate right: move the right steering control lever rearward and push the left steering control lever forward.



BT06G023 2

Gradual turn - power to both sides in the same direction

- To make a gradual turn left: move the right steering control lever further forward while pushing the left steering control lever partially forward.
- To make a gradual turn right: move the left steering control lever further forward while pushing the right steering control lever partially forward.



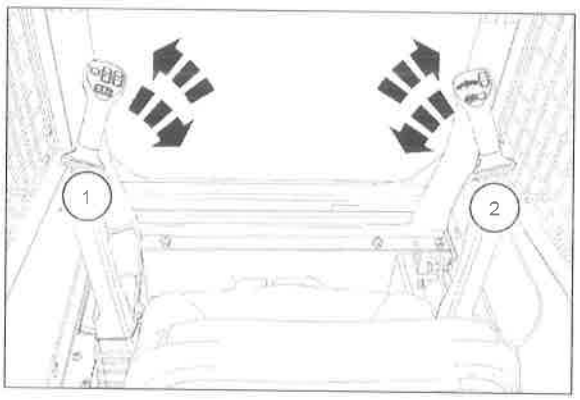
BT06G024 3

Lift arm and bucket controls

Hand controls

Lift arm raise and lower control.

- The left-hand control lever **(1)** controls the lift arm. The lift arm will raise by pivoting the handle "UP" to the outside of the cab. Pivoting the handle "DOWN" to the inside of the cab will lower the lift arm.
- The lift arm spool is equipped with a detent "FLOAT" circuit if the operator wants the lift arm to float over changing ground contour. To put the valve in "FLOAT" position, pivot the left handle "DOWN" until a slight "jump" is felt. In this position, the handle is locked in float and does not return to the neutral position unassisted, but will do so when light pressure is applied to the handle to pivot it "UP".



RAIL19SSL0060BA 1

Bucket dump and curl control.

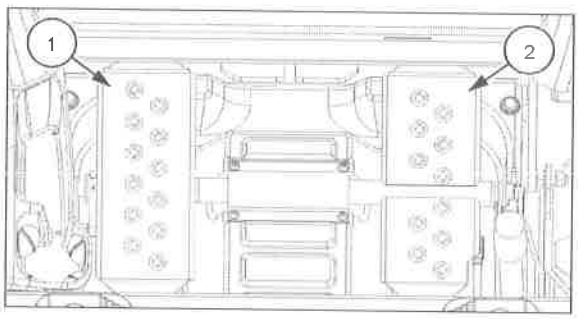
- The right hand control lever **(2)** controls the bucket. The bucket will dump by pivoting the handle "UP" to the outside of the cab. Pivoting the handle "DOWN" to the inside of the cab and the bucket will roll back (curl).

NOTE: *There is no detent or float position on the bucket dump or curl spools.*

Foot controls

Lift arm raise and lower control.

- The lift arm is controlled by the left foot pedal **(1)** located on the floor and is marked with a decal. The lift arm is raised by depressing the heel (rear) of the pedal. The lift arm is lowered by depressing the toe (front) of the pedal.
- The lift arm spool is equipped with a detent FLOAT circuit if the operator wants the lift arm to float over changing ground contour. To put the valve in FLOAT position, depress the toe of the pedal until a slight jump is felt. In this position, the pedal is locked in float and does not return to the neutral position unassisted, but will do so when light pressure is applied to the heel of the pedal



RAIL19SSL0002AA 1

Bucket dump and curl control.

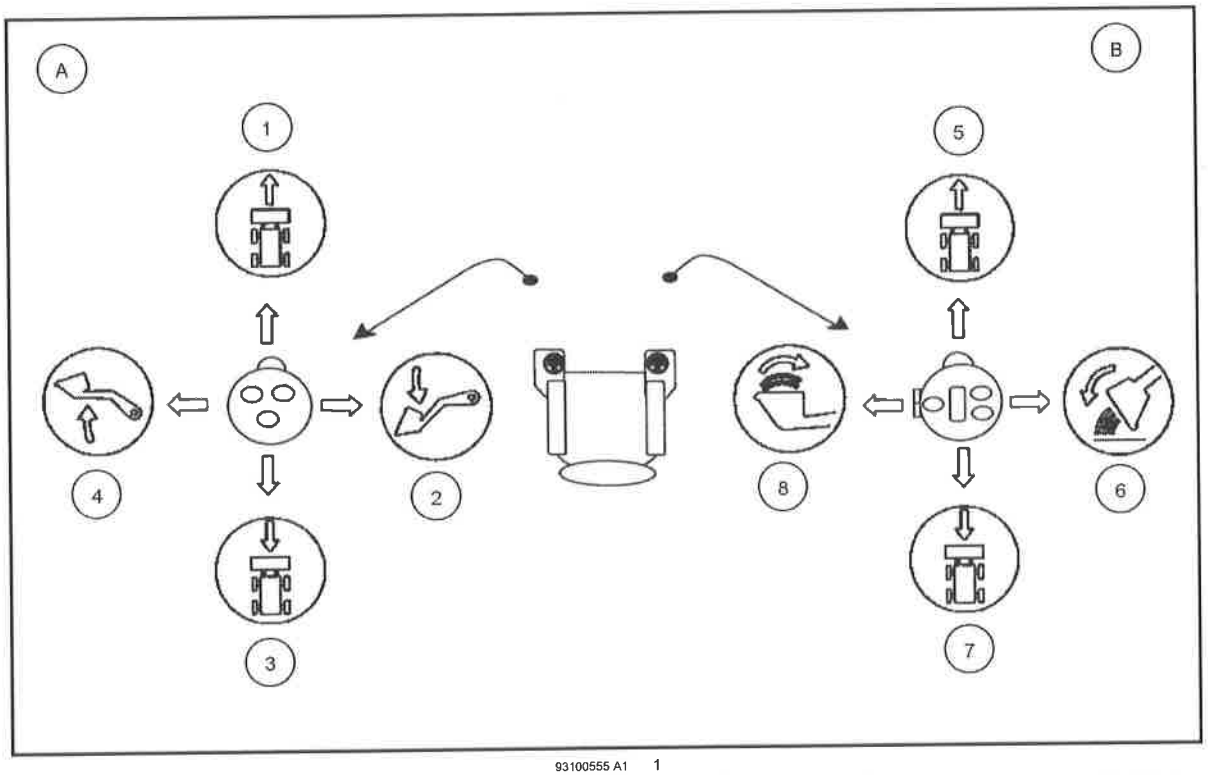
- The bucket is tilted by activation of the right foot pedal **(2)** located on the floor and is marked with a decal. For dumping, depress the toe end of the pedal. To achieve rollback (curl), push the pedal downward at the heel.

NOTE: *There is no detent or float position on the bucket dump and curl spool.*

ELECTRO-HYDRAULIC CONTROLS

Control pattern overview

Standard H control pattern



93100555 A1 1

The chart below will give a description of the control lever functions. The left-hand control lever is represented by the letter (A) and the right-hand control lever by letter (B).

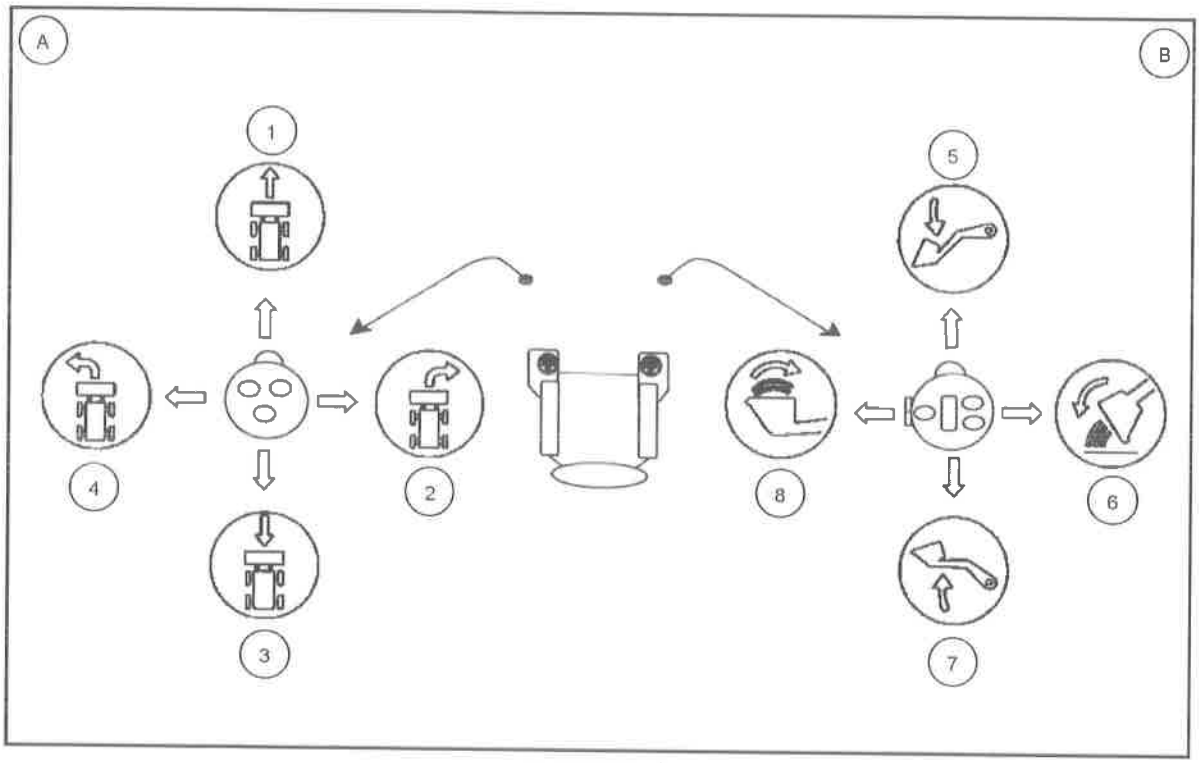
(A) Left-hand control lever	
(1)	Left side drive forward.
(2)	Loader arm lower.
(3)	Left side drive reverse.
(4)	Loader arm raise.

(B) Right-hand control lever	
(5)	Right side drive forward.
(6)	Bucket dump.
(7)	Right side drive reverse.
(8)	Bucket rollback (curl).

NOTE: *The standard H control pattern uses both left-hand and right-hand control levers for ground drive functions.*

NOTICE: *Do not operate the unit until the hydraulic oil is at sufficient operating temperature.*

Standard ISO control pattern



RAIL14SSL0314FA 1

The chart below will give a description of the control lever functions. The left-hand control lever is represented by the letter (A) and the right-hand control lever by letter (B).

(A) Left-hand control lever	
(1)	Drive forward.
(2)	Turn right, clockwise rotate.
(3)	Reverse.
(4)	Turn left, counter-clockwise rotate.

(B) Right-hand control lever	
(5)	Loader arm lower.
(6)	Dump bucket.
(7)	Loader arm raise.
(8)	Rollback bucket (curl).

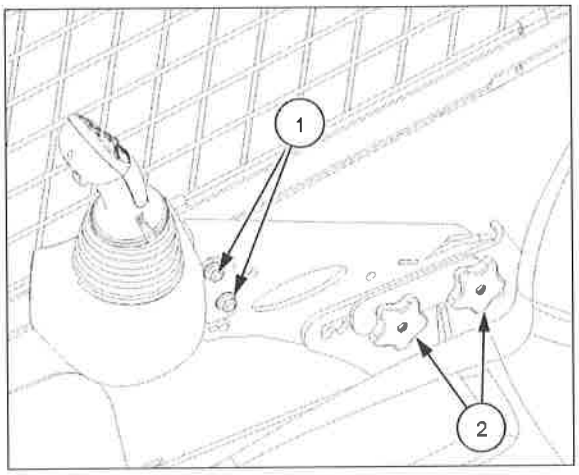
NOTE: *The standard ISO control pattern uses the left-hand control lever for ground drive functions and the right-hand control lever for loader arm and bucket functions.*

NOTICE: *Do not operate the unit until the hydraulic oil is at sufficient operating temperature.*

Electro-hydraulic control handle adjustment

The control levers can be adjusted for operator comfort.

1. Adjust the height of the control lever by loosening two nuts **(1)** and moving the control lever assembly into one of the three notches provided in the mounting bracket. Tighten the two nuts **(1)**.
2. Adjust the forward and rearward position of the control lever by loosening two hand knobs **(2)** and sliding the control lever assembly to the desired position. Tighten the hand knobs **(2)**.



RAIL19SSL0059BA 1

H control pattern steering and travel

Hand controls

⚠ WARNING

Collision hazard!
Always make sure the area behind the machine is clear of all persons, animals, and obstructions BEFORE backing up.
Failure to comply could result in death or serious injury.

W0232A

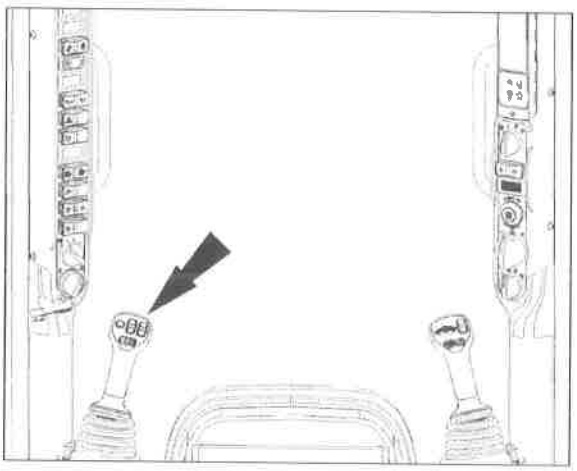
⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Left-hand control lever

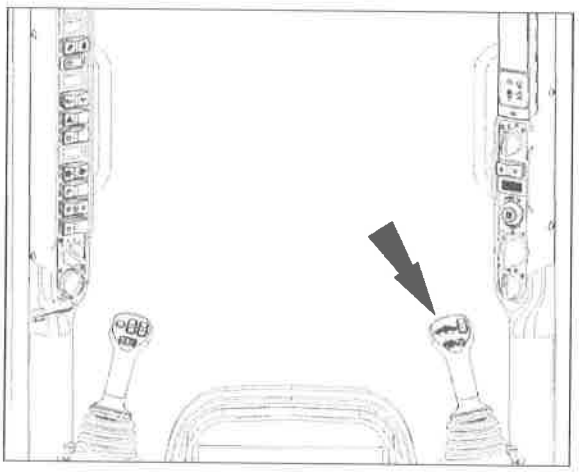
By moving the left-hand control lever forward from neutral, the left-hand side tires will rotate forward. When the left-hand control lever is moved rearward from neutral, the left-hand side tires will rotate in reverse.



RAIL19SSL0058BA 1

Right-hand control lever

By moving the right-hand control lever forward from neutral, the right-hand side tires will move forward. When the right-hand control lever is moved rearward from neutral, the right-hand side tires will move in reverse.

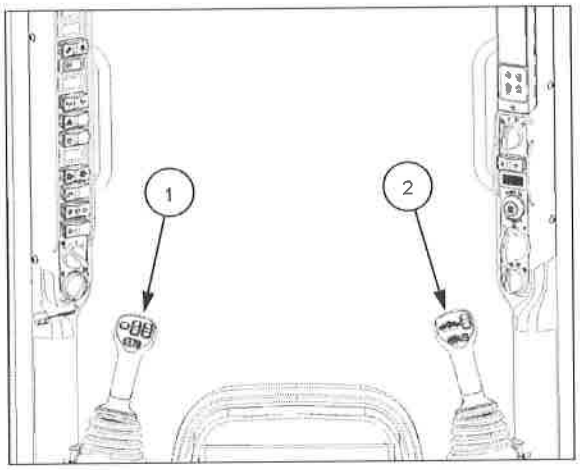


RAIL19SSL0058BA 2

Moving the machine

Push both the left-hand control lever **(1)** and the right-hand control lever **(2)** forward, from neutral, to move the machine forward. Pull both of the control levers rearward from neutral, to move the machine in reverse. Move the control levers forward a short distance for maximum power and slow speed. Move the control levers completely forward for maximum speed.

Move both control levers to NEUTRAL to stop movement of the machine.

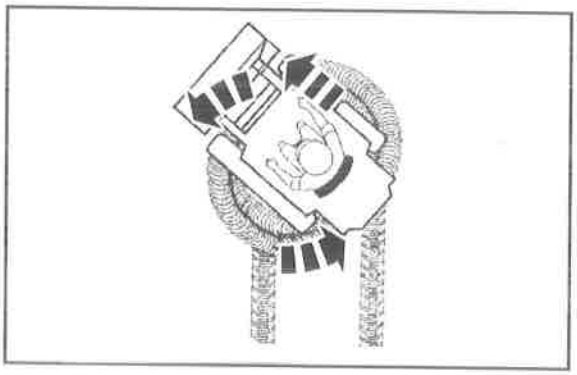


RAIL19SSL0058BA 1

Turning the machine

Pivot turn - power to only one side

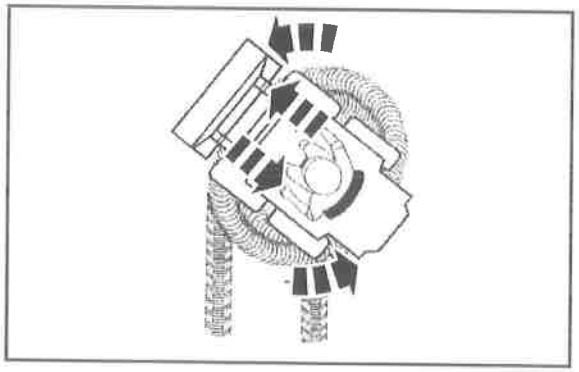
- To make a pivot turn left: hold the left-hand control lever in neutral and move the right-hand control lever forward.
- To make a pivot turn right: hold the right-hand control lever in neutral and move the left-hand control lever forward.
- To make a pivot turn in reverse left: after confirming that all personnel and objects are clear, hold the left-hand control lever in neutral and move the right-hand control lever rearward.
- To make a pivot turn in reverse right: after confirming that all personnel and objects are clear, hold the right-hand control lever in neutral and move the left-hand control lever rearward.



BT06G022 1

Counter rotation turn - power to both sides in opposing directions

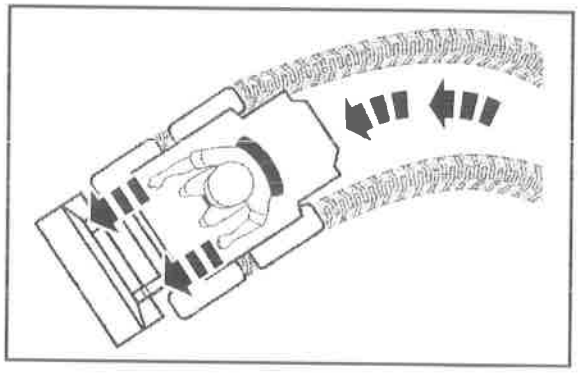
- To counter rotate left: move the left-hand control lever rearward and push the right-hand control lever forward.
- To counter rotate right: move the right-hand control lever rearward and push the left-hand control lever forward.



BT06G023 2

Gradual turn - power to both sides in the same direction

- To make a gradual turn left: move the right-hand control lever further forward while pushing the left-hand control lever partially forward.
- To make a gradual turn right: move the left-hand control lever further forward while pushing the right-hand control lever partially forward.



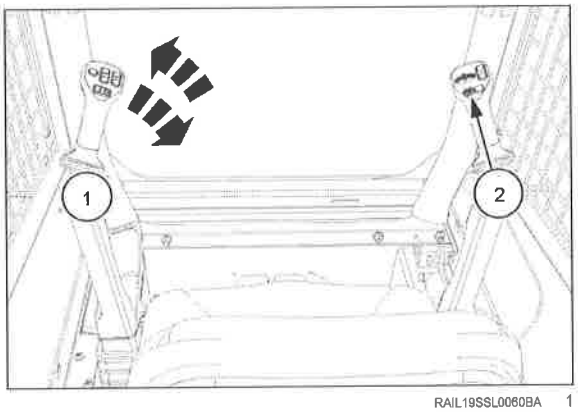
BT06G024 3

H control pattern lift arm and bucket controls

Lift arm raise/lower control

Lift arm raise and lower control:

- The left-hand control lever **(1)** controls the lift arm. The lift arm will raise by pivoting the handle "UP" to the outside of the cab. Pivoting the handle "DOWN" to the inside of the cab will lower the lift arm.
- The lift arm spool is equipped with a detent "FLOAT" circuit if the operator wants the lift arm to float over changing ground contour.
  For the Electro-Hydraulic (EH) system, the float is engaged by pressing the float button on the right-hand control lever **(2)** and pushing the left-hand control lever **(1)** partially to the down stroke. If the operator has the left-hand control lever partially in the down stroke position and then presses the float button, the float will engage. To disengage the float, pull the left-hand control lever to the up stroke slightly.



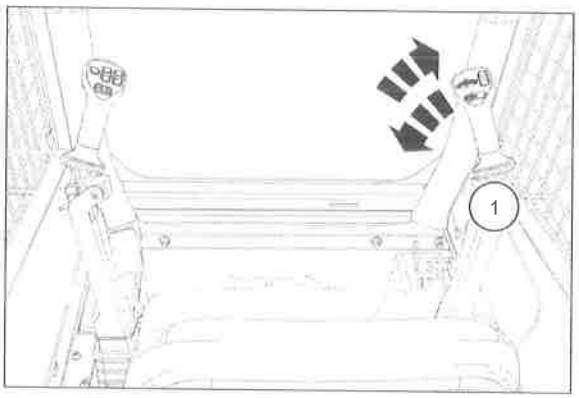
RAIL19SSL0060BA 1

Bucket curl/dump control

Bucket dump and curl control.

- The right-hand control lever **(1)** controls the bucket. The bucket will dump by pivoting the handle "UP" to the outside of the cab. Pivoting the handle "DOWN" to the inside of the cab and the bucket will roll back (curl).

NOTE: *There is no detent or float position on the bucket dump or curl spools.*



RAIL19SSL0060BA 1

Bucket shake activation

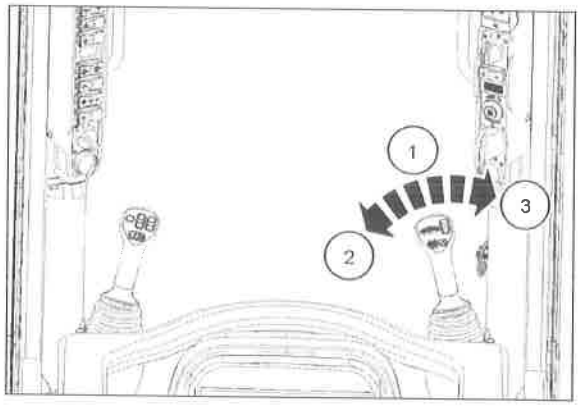
The bucket shake feature is only available on machines with Electro-Hydraulic (EH) controls. The operator can activate the Universal Control Module (UCM) to rapidly shake the bucket to help the operator either clear the bucket or to fill the bucket. The operator's action must be deliberate to activate the bucket shake feature.

Bucket dump shake activation (quickly empty the bucket)

- The operator must quickly move the right-hand control lever from the "Roll" position **(2)** to the "Dump" position **(3)** three full cycles. The control lever must travel more than **10°** from the "Neutral" position **(1)** in both directions.

Bucket roll (curl) shake activation (quickly flip the bucket to fill)

- The operator must quickly move the right-hand control lever from the "Dump" position **(3)** to the "Roll" position **(2)** three full cycles. The control lever must travel more than **10°** from the "Neutral" position **(1)** in both directions.



RAIL19SSL0057BA 1

ISO control pattern steering and travel

Moving the machine

⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

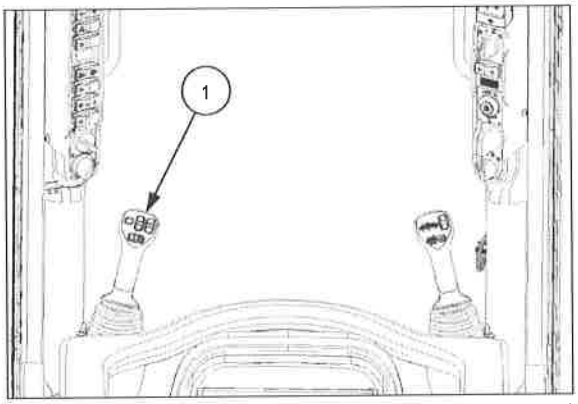
W0237A

⚠ WARNING

Collision hazard!
Always make sure the area behind the machine is clear of all persons, animals, and obstructions BEFORE backing up.
Failure to comply could result in death or serious injury.

W0232A

All steering and travel controls are directed with the left-hand control lever **(1)** only. Use the face of a clock for orientation. The machine will move in the direction the lever is moved from neutral, center. Release the lever and it will detent to neutral. Although the machine will turn and counter-turn sharply, it is best to travel through forward or reverse gradually when turning.



RAIL19SSL0057BA 1

NOTE: *Adjust the seat lap bar for maximum stability of controls and to reduce operator fatigue.*

Straight forward drive:

- Push the control lever straight forward (12:00 position) and the machine will move forward.

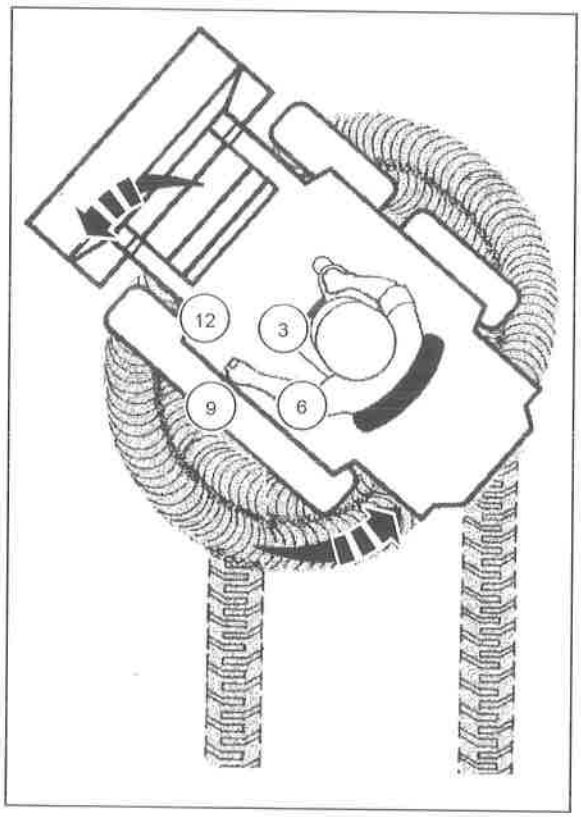
Straight rearward drive:

- Pull the control lever straight rearward (6:00 position) and the machine will move rearward.

Turning the machine

Pivot turn - power to only one side

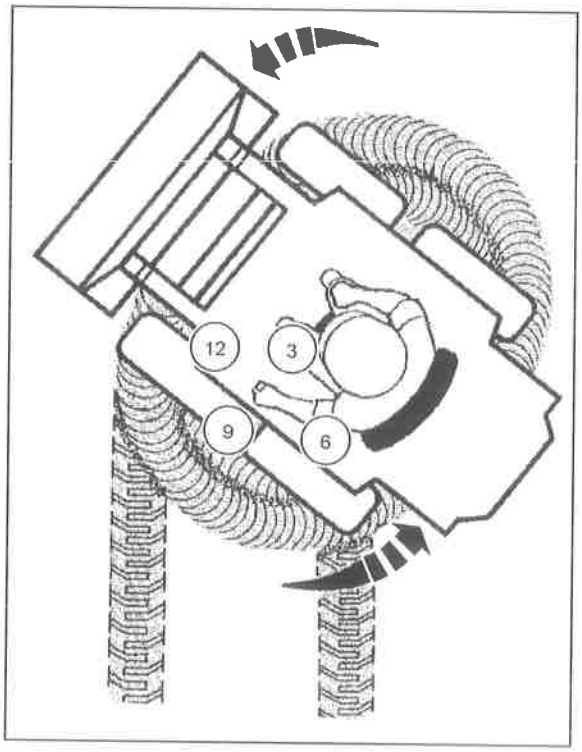
- To make a pivot turn left: from neutral, push the left-hand control lever slightly forward, and then left to the 10:00 position.
- To make a pivot turn right: from neutral, push the left-hand control lever slightly forward, and then right to the 2:00 position.
- To make a pivot turn reverse left: from neutral, pull the left-hand control lever slightly rearward, and then right to the 4:00 position.
- To make a pivot turn reverse right: from neutral, pull the left-hand control lever slightly rearward, and then left to the 8:00 position.



BS06G035 1

Counter rotation turn - power to both sides in opposing directions

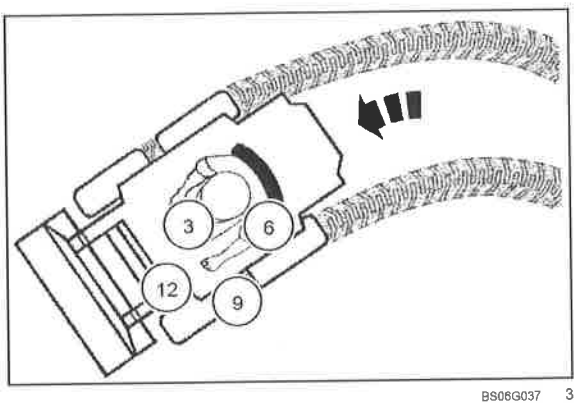
- To counter- rotate left: from neutral, push the left-hand control lever straight to the left (outward) toward the 9:00 position. The left-hand side drive will engage in reverse travel as the right-hand side drive will engage forward travel.
- To counter-rotate right: from neutral, push the left-hand control lever straight to the right (inward) toward the 3:00 position. The right-hand side drive will engage in reverse travel as the left-hand side drive will engage in forward travel.



BS06G036 2

Gradual turn - power to both sides in the same direction

- To make a gradual forward turn left: from neutral, push the left-hand control lever forward and slightly toward the 11:00 position.
- To make a gradual forward turn right: from neutral, push the left-hand control lever forward and slightly toward the 1:00 position.



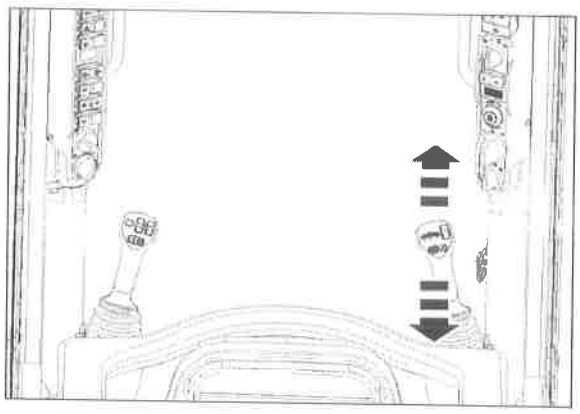
BS06G037 3

ISO control pattern lift arm and bucket controls

Lift arm and bucket controls

Lift arm raise and lower control.

- Pull back on the right-hand control lever to raise (up) the lift arm.
- Push the right-hand control lever forward to lower (down) the lift arm.
- The lift arm spool is equipped with a detent FLOAT circuit. In this detent position the lift arm will float over changing ground contour and the lever will remain in this position until pulled back toward the up stroke slightly.



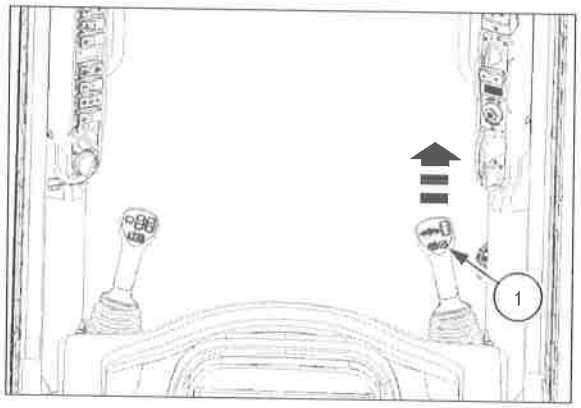
RAIL19SSL0057BA 1

Engage the float feature:

Press the float button on the right-hand control lever and push the lever partially forward. If the operator has the right-hand control lever already partially in the down stroke position and then presses the float button, the float feature will engage.

Disengage the float feature:

Pull back on the right-hand control lever out of the detent position.

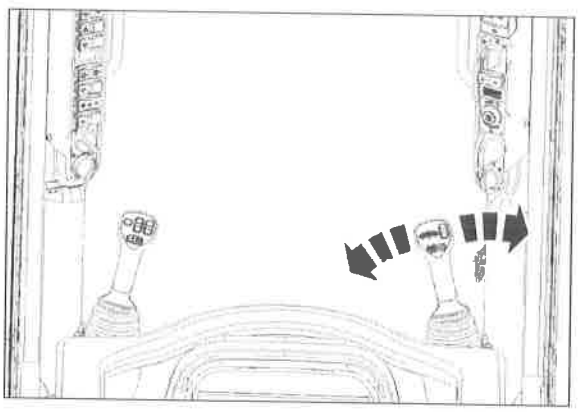


RAIL19SSL0057BA 2

Bucket dump and curl control.

- Pivot the right-hand control lever inward (down) and the bucket will roll back (curl).
- Pivot the right-hand control lever outward (up) and the bucket will dump.

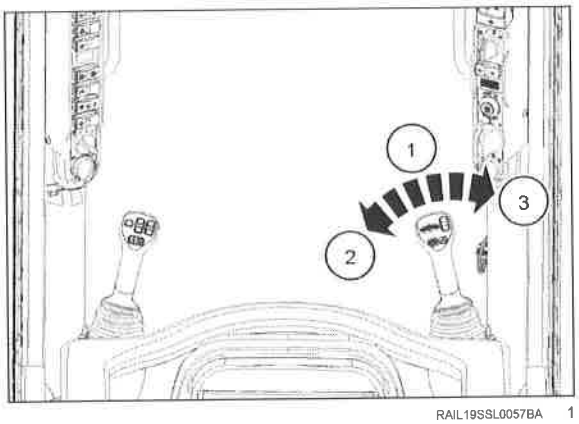
NOTE: *There is no detent or float position on the bucket dump and curl circuit.*



RAIL19SSL0057BA 3

Bucket shake activation

The bucket shake feature is only available on machines with Electro-Hydraulic (EH) controls. The operator can activate the Universal Control Module (UCM) to rapidly shake the bucket to help the operator either clear the bucket or to fill the bucket. The operator's action must be deliberate to activate the bucket shake feature.



RAIL19SSL0057BA 1

Bucket dump shake activation (quickly empty the bucket)

- The operator must quickly move the right-hand control lever from the "Roll" position **(2)** to the "Dump" position **(3)** three full cycles. The control lever must travel more than **10°** from the "Neutral" position **(1)** in both directions.

Bucket roll (curl) shake activation (quickly flip the bucket to fill)

- The operator must quickly move the right-hand control lever from the "Dump" position **(3)** to the "Roll" position **(2)** three full cycles. The control lever must travel more than **10°** from the "Neutral" position **(1)** in both directions.

CONTROL LEVERS

Switch configurations

The following functions can be activated from the control handles depending on your machine's configuration.

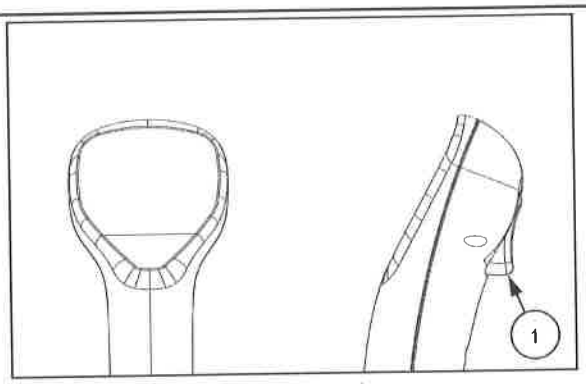
- Horn — Squeeze the trigger to sound the horn.
- Park — Press the park button to activate or deactivate the parking brake. The park symbol on the instrument panel will illuminate red when the parking brake is on.

  NOTE: *The park brake button on the right-hand control lever will not turn off the park brake until the operator presses the " PUSH TO OPERATE" button.*

  NOTE: *The other hydraulic functions remain active when the parking brake is ON.*
- Proportional auxiliary — Activate the hydraulic component attached to the standard or high flow auxiliary hydraulic ports.
- 2nd auxiliary hydraulic — Activate the hydraulic component attached to the secondary auxiliary hydraulic ports.
- Multi-function hydraulics ON/OFF — Activate the hydraulic component attached to the enhanced high flow or high flow auxiliary hydraulic ports.
- 2-Speed and Creep speed setting — Press  to downshift from 2nd gear to 1st gear. Press  to shift back to 2nd gear. For more details refer to **3-29**. This rocker switch is also used to increase and decrease machine speed in creep mode. For more details on creep mode see **3-69**.
- **Ride Control™** — Press and hold the control lever trigger to activate **Ride Control™** and release to deactivate. **Ride Control™** reduces machine rocking motion during transport and material hauling operations. When engaged, loader down pressure is limited to the weight of the loader plus the attachment, and also reduces shock loads to the machine. The weight of the attachment is hydraulically cushioned during transport.
- Float — Press to activate or deactivate the lift arm float function. When float is activated, the lift arm will float over the ground contour the machine is traveling over. For more details refer to page **3-17** for the H control pattern, and page **3-22** for the ISO control pattern. Mechanical units do not have a float button.
- Multi-functional #1, #2, #3, and #4 — Press to control additional components attached to the machine. Refer to the owner's manual of the attachment for operating functions.

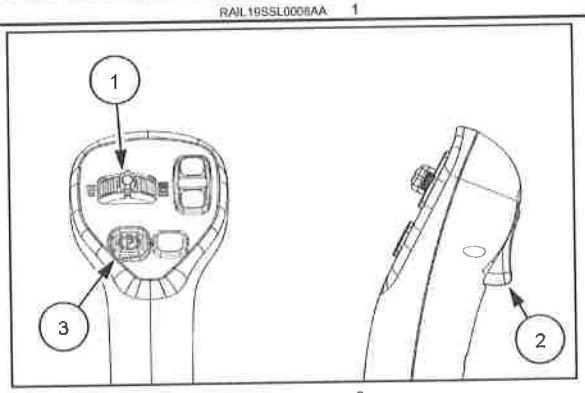
Level 100 control levers

Left-hand side control lever
(1) Horn



RAIL19SSL0008AA 1

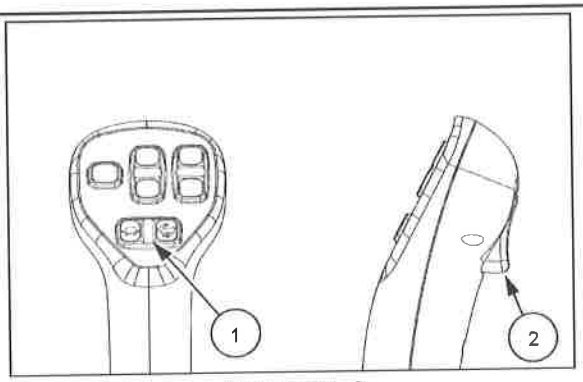
Right-hand side control lever
(1) Proportional auxiliary
(2) Not active
(3) Park brake



RAIL19SSL0009AA 2

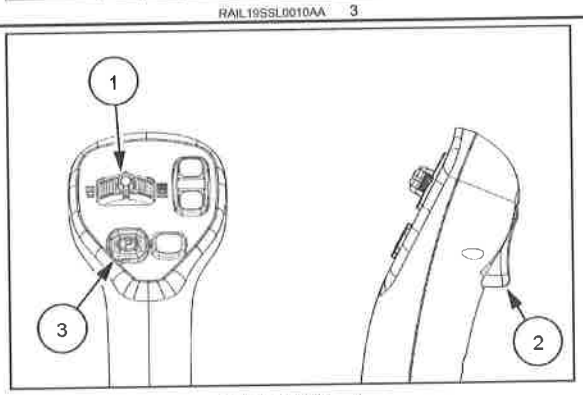
Level 200 control levers

Left-hand side control lever
(1) 2–Speed
(2) Horn



RAIL19SSL0010AA 3

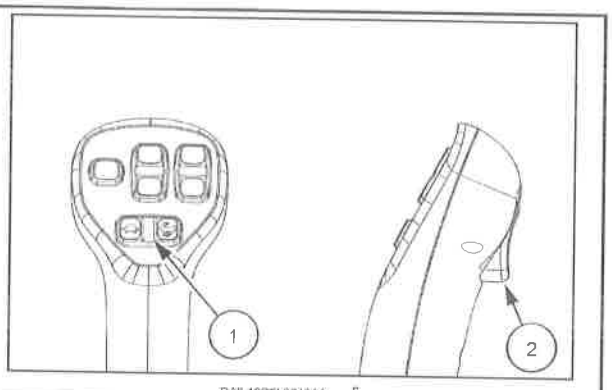
Right-hand side control lever
(1) Proportional auxiliary
(2)Ride Control™
(3) Park brake



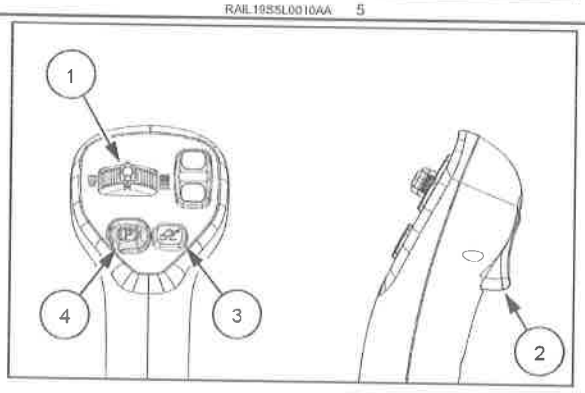
RAIL19SSL0009AA 4

Level 250 control levers

Left-hand side control lever
(1) Horn
(2) 2–Speed / Creep

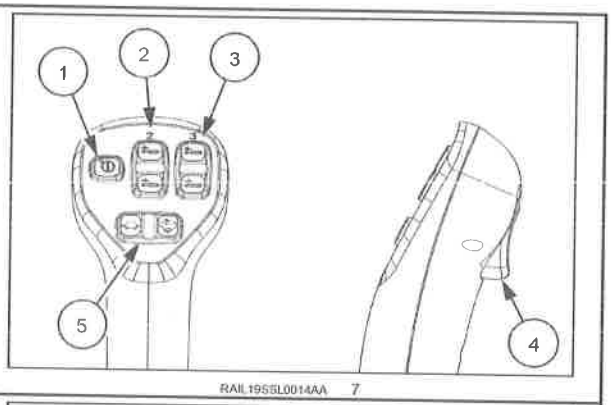


Right-hand side control lever
(1) Proportional auxiliary
(2)Ride Control™
(3) Float
(4) Park brake

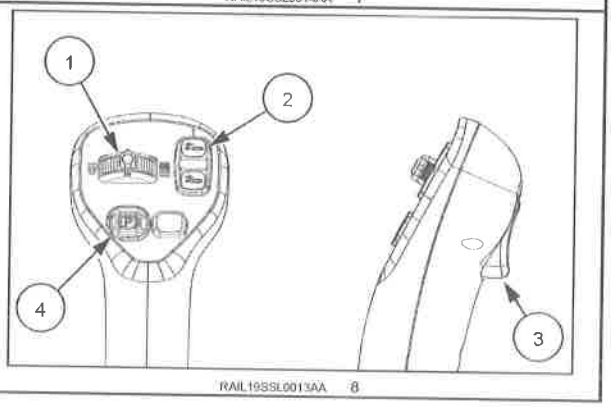


Level 300 control levers

Left-hand side control lever
(1) Multi-function hydraulics ON/OFF
(2) Multi-functional #2
(3) Multi-functional #3
(4) Horn
(5) 2–Speed

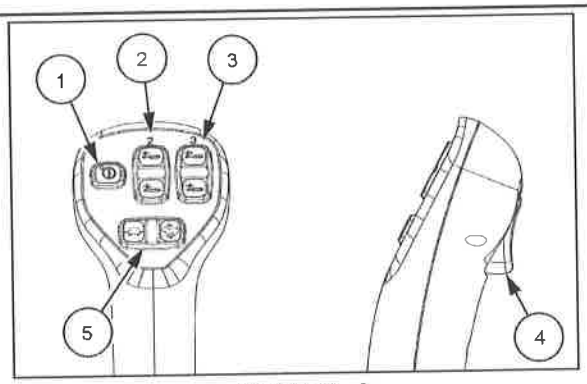


Right-hand side control lever
(1) Proportional auxiliary
(2) Multi-functional #1
(3)Ride Control™
(4) Park brake



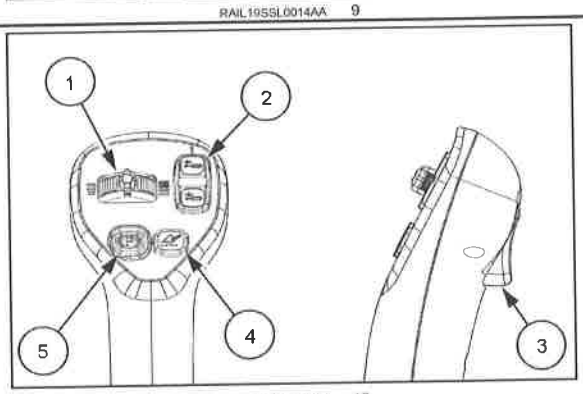
Level 350 control levers

Left-hand side control lever
(1) Multi-function hydraulics ON/OFF
(2) Multi-functional #2
(3) Multi-functional #3
(4) Horn
(5) 2–Speed / Creep



RAIL19SSL0014AA 9

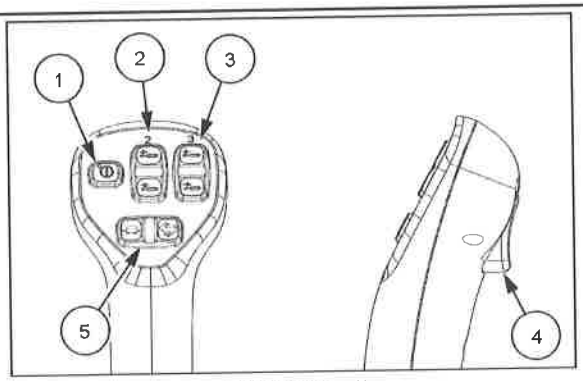
Right-hand side control lever
(1) Proportional auxiliary
(2) Multi-functional #1
(3)Ride Control™
(4) Float
(5) Park brake



RAIL15SSL0012AA 10

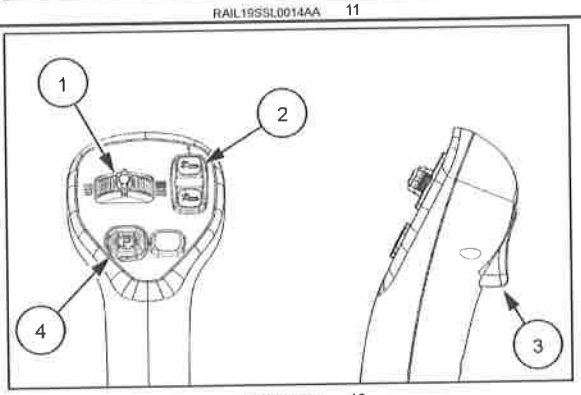
Level 400 control levers

Left-hand side control lever
(1) Multi-function hydraulics ON/OFF
(2) 2nd auxiliary hydraulics
(3) Multi-functional #3
(4) Horn
(5) 2–Speed



RAIL19SSL0014AA 11

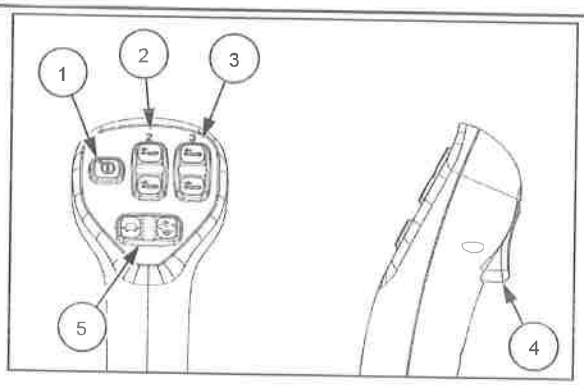
Right-hand side control lever
(1) Proportional auxiliary
(2) Multi-functional #1
(3)Ride Control™
(4) Park brake



RAIL19SSL0013AA 12

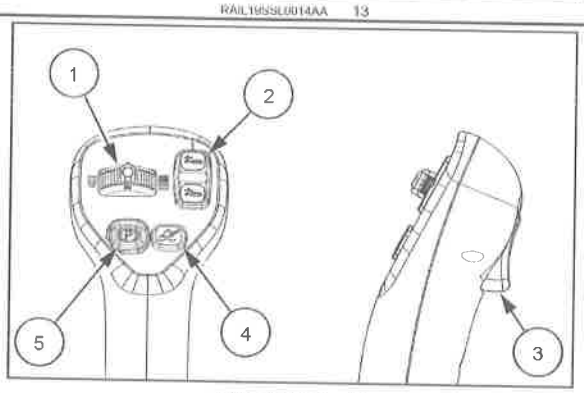
Level 450 control levers

Left-hand side control lever
(1) Multi-function hydraulics ON/OFF
(2) 2nd auxiliary hydraulics
(3) Multi-functional #3
(4) Horn
(5) 2–Speed / Creep



RAIL19SSL0014AA 13

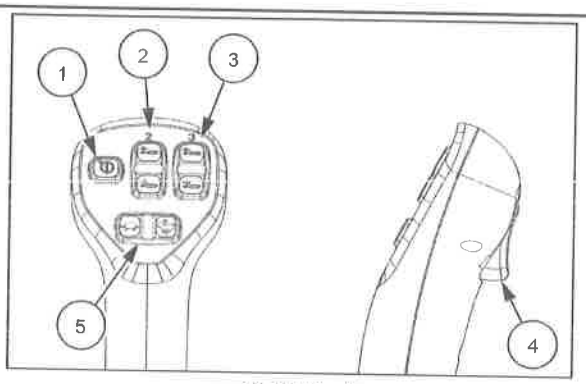
Right-hand side control lever
(1) Proportional auxiliary
(2) Multi-functional #1
(3)Ride Control™
(4) Float
(5) Park brake



RAIL19SSL0012AA 14

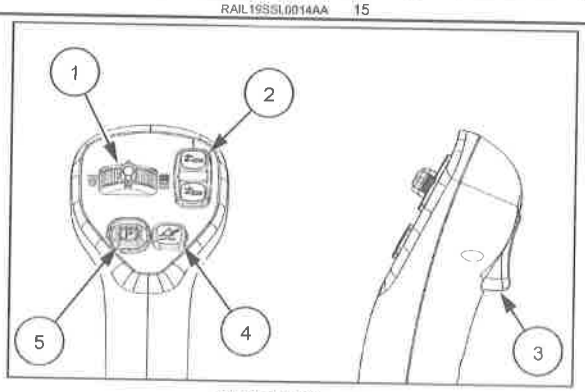
Level 550 control levers

Left-hand side control lever
(1) Multi-function hydraulics ON/OFF
(2) Enhanced High Flow (EHF)
(3) Multi-functional #3
(4) Horn
(5) 2–Speed / Creep



RAIL19SSL0014AA 15

Right-hand side control lever
(1) Proportional auxiliary
(2) Multi-functional #1
(3)Ride Control™
(4) Float
(5) Park brake



RAIL19SSL0012AA 16

Two-speed function

Function-enable conditions

The two-speed function can be activated ONLY IF ALL of the following conditions are met.

- Operator is seated properly.
- The restraint bar is in the down position while the operator is in the seat.
- The hydraulic system is activated.
- Park brake is not set.
- The key or knob switch is in the ON position.

Two-Speed Function



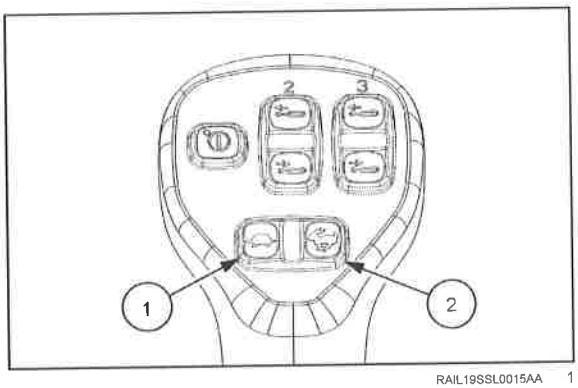
Press the turtle symbol to downshift from 2nd gear to 1st gear.



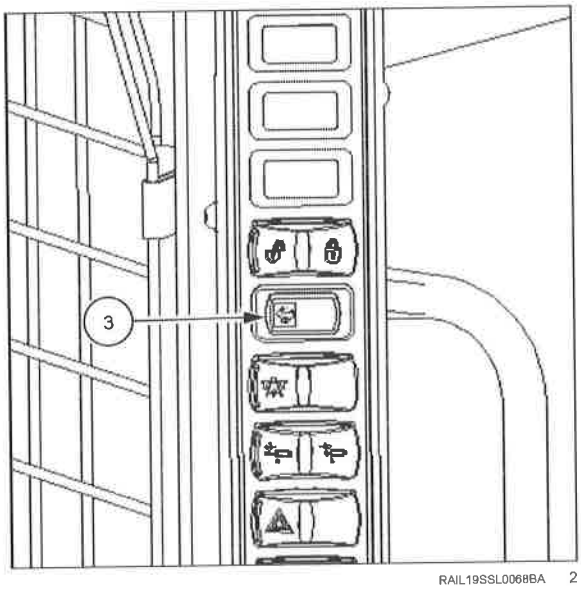
Press the rabbit symbol to shift from 1st gear to 2nd gear.

NOTE: *The rabbit symbol* ***(3)*** *on the left-hand column illuminates when the two-speed function is active.*

NOTE: *If equipped with creep mode the 2–speed function buttons are also used to increase or decrease the machine speed in creep mode. See "Creep mode (optional)"* ***3-69*** *for more details.*



RAIL19SSL0015AA 1



RAIL19SSL0068BA 2

AUXILIARY HYDRAULICS

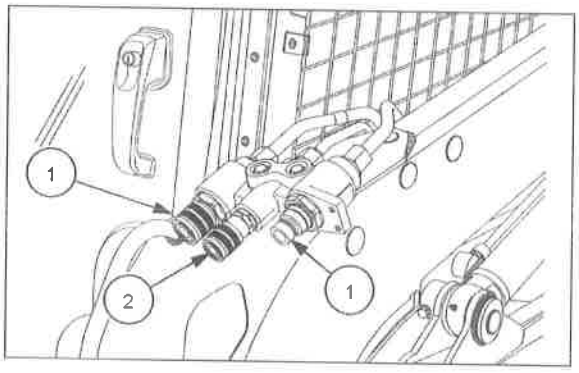
Standard auxiliary hydraulics

Follow the attachment's operator's manual on specific installation procedures, operation, and removal procedures.

Auxiliary hydraulic couplers are located on the left-hand loader arm.

1. Work ports — 1/2 inch coupler size
2. Case drain — 3/8 inch coupler size

Use the Proportional Auxiliary "rotary" switch on the right-hand control lever to operate the attachment connected to the standard auxiliary hydraulics ports. See your control lever "Switch configurations" **3-24** for more details.

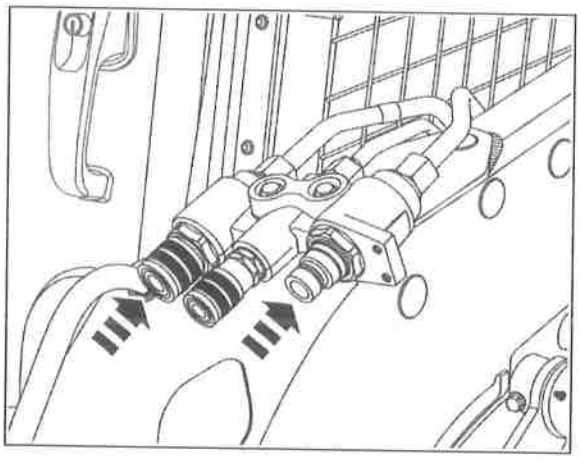


63106839 1

Relieve pressure before connecting attachment hoses

Machines with auxiliary hydraulic ports are built with a Connect-Under-Pressure (CUP) valve for the auxiliary hydraulic quick disconnects. Follow this procedure to relieve the pressure prior to connecting the hydraulic hoses from the attachment:

1. Using the palm of your hand push the 1/2 inch female quick disconnect coupling toward CUP valve. When done properly, the coupling will move about **10.0 mm (0.4 in)**, relieving the stored pressure.
2. Perform the same action for the 1/2 inch male quick disconnect coupling, relieving the stored pressure.

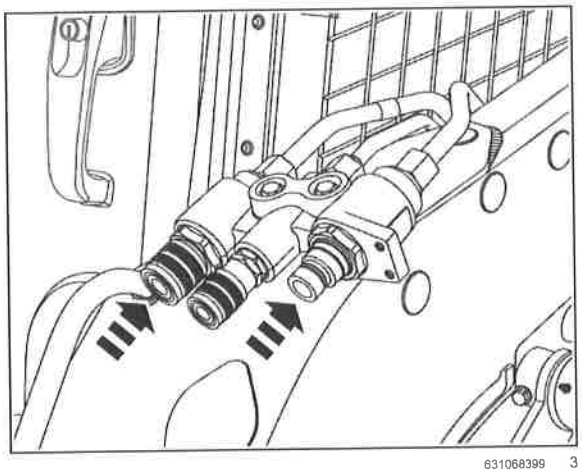


631068399 2

Relieve pressure before disconnecting attachment hoses

NOTICE: *Before removing attachments, make sure that you relieve pressure from the hydraulic system BEFORE disconnecting the auxiliary hoses. If the pressure is not relieved, you WILL NOT be able to reattach hoses.*

1. Lower the loader arm all the way down and ensure that the loader arm or attachment is not supporting the weight of the machine with the front wheels off the ground.
2. Place all controls in the neutral position.
3. Press the Operate button to deactivate the hydraulic system and ground drive system.
4. Stop the engine.
5. Move the controls to ensure that the hydraulic interlock is engaged and the loader arm and bucket cylinders do not move.
6. Raise the restraint bar, unfasten the seat belt, and safely exit the machine.
7. Prior to disconnecting the attachment hoses, grab each hose and push it toward the Connect-Under-Pressure (CUP) valve. When done properly, the coupling will move about **6.00 mm (0.24 in)**, relieving any stored pressure in that circuit. Repeat on the outside hose/coupling.
8. Disconnect the attachment hydraulic hoses from the Connect-Under-Pressure (CUP) valve quick disconnects.
9. Install the coupler port covers, if available.



631068399 3

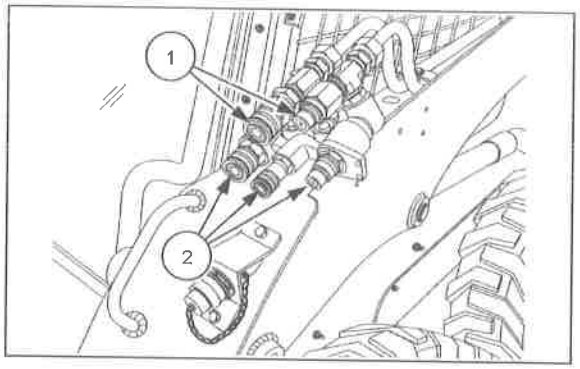
High flow auxiliary hydraulics

Follow the attachment's operator's manual on specific installation procedures, operation, and removal procedures. The high flow auxiliary hydraulic feature provides hydraulic oil pressure and flow to the auxiliary circuit.

Models	System Relief Pressure	Rated Flow
SR175B / SV185B	210 bar (3045 psi)	116.2 L/min (30.7 US gpm)
SR210B	210 bar (3045 psi)	122.6 L/min (32.4 US gpm)
TR270B / TR310B	210 bar (3045 psi)	125.7 L/min (33.2 US gpm)
SR240B / SV280B TV370B	210 bar (3045 psi)	142.5 L/min (37.6 US gpm)

If the machine is equipped with a high flow auxiliary hydraulics there will be two 5/8 inch couplers **(1)** attached to the top of the standard auxiliary hydraulic coupler block **(2)** on the left-hand loader arm.

NOTICE: *Always use the 5/8 inch couplers during high flow operation to prevent high back pressure and overheating of the hydraulic system.*



93106839B 1

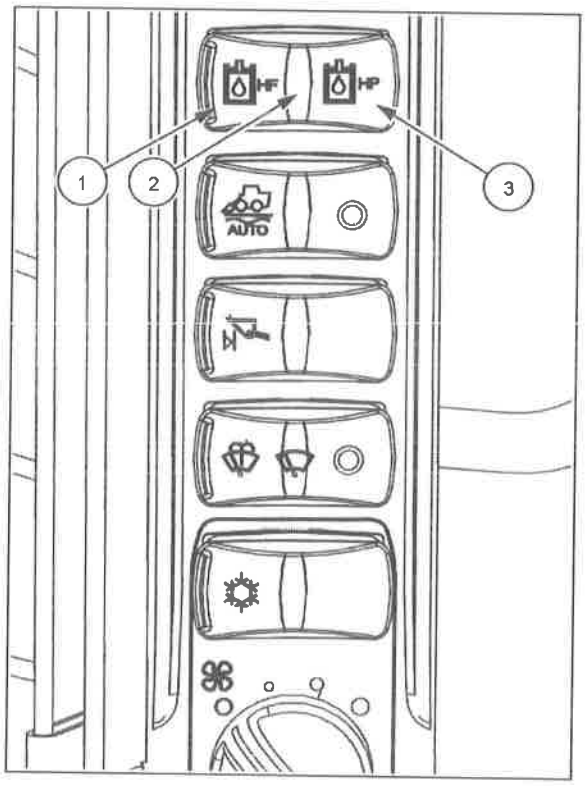
Use the three position switch on the left-hand ROPS post to activate the high flow option

- Position **(1)** — HF High Flow is activated
- Position **(2)** — Neutral or standard flow
- Position **(3)** — HP High Pressure is activated if equipped with Enhanced High Flow auxiliary hydraulics

  NOTE: *Only machines equipped with Enhanced high flow auxiliary hydraulics will be able to activate the HP function.*

NOTICE: *The high flow switch must be turned to the neutral position when not in use or required. Otherwise, overheating of the hydraulic oil or poor attachment operation may occur.*

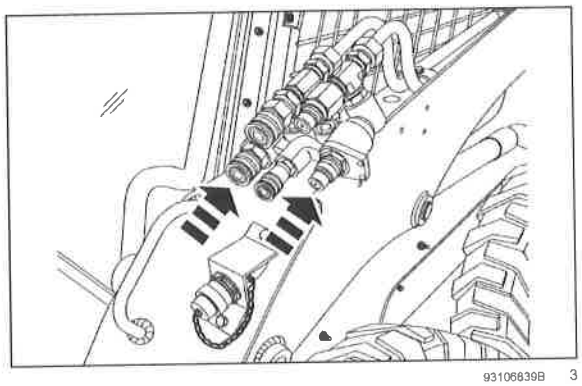
Use the Proportional Auxiliary "rotary" switch on the right-hand control lever to operate the attachment connected to the high flow auxiliary ports. Refer to your control lever "Switch configurations" **3-24** for more details.



RAPH20SSL0564BA 2

NOTICE: *Before removing attachments, make sure that you relieve pressure from the hydraulic system BEFORE disconnecting the auxiliary hoses. If the pressure is not relieved, you WILL NOT be able to reattach hoses. The high flow 5/8 inch quick disconnects on the machine do not have the ability to relieve pressure when connecting or disconnecting, but the following procedure shows how to release the pressure.*

Relieve pressure before disconnecting attachment hoses



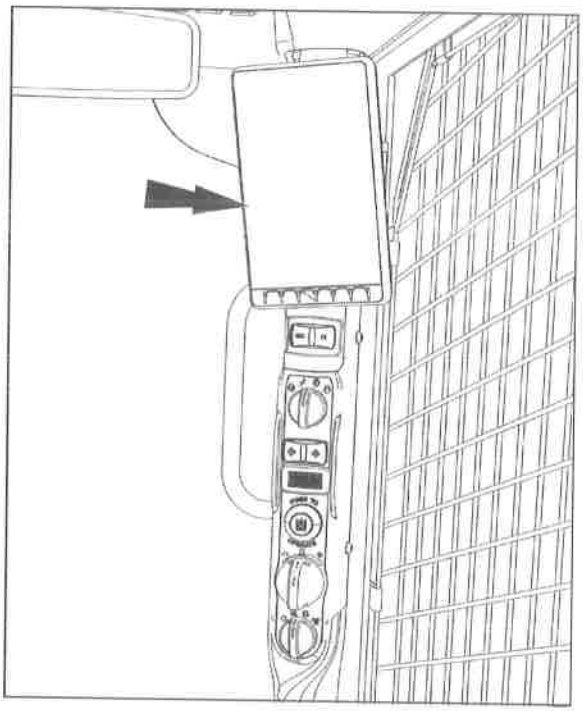
93106839B 3

1. Lower the loader arm all the way down and ensure that the loader arm or attachment is not supporting the weight of the machine with the front wheels off the ground.
2. Place all controls in the neutral position.
3. Press the Operate button to deactivate the hydraulic system and ground drive system.
4. Stop the engine.
5. Move the controls to ensure that the hydraulic interlock is engaged and the loader arm and bucket cylinders do not move.
6. Raise the restraint bar, unfasten the seat belt, and safely exit the machine.
7. Prior to disconnecting the 5/8 inch high flow attachment hoses, with the palm of your hand push one of the lower, 1/2 inch quick disconnect couplings towards the Connect-Under-Pressure (CUP) valve. When done properly, the coupling will move about **6 mm** (**0.25 in**), relieving any stored pressure in that circuit.
8. Repeat Step 7 on the other 1/2 inch coupling.
9. Disconnect the 5/8 inch high flow attachment hydraulic hoses from the quick disconnects.
10. Install the coupler covers, if equipped.

INSTRUMENT CLUSTER

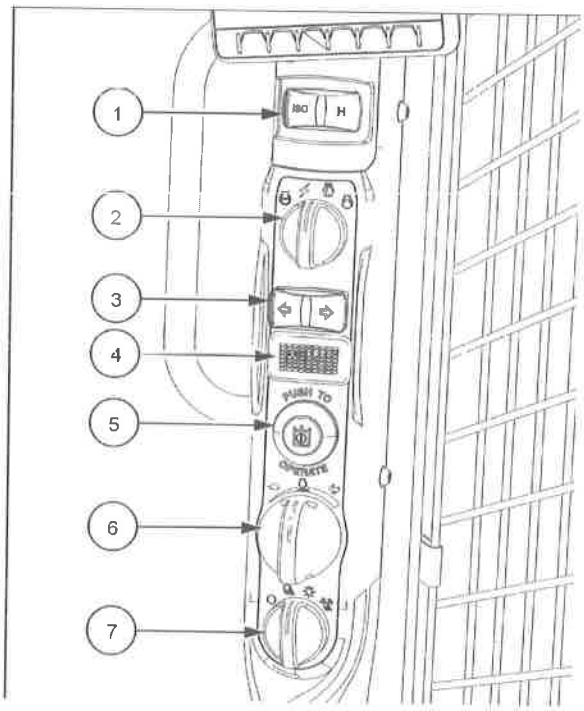
LCD multi-function display (if equipped)

See the LCD multi-function display "Equipment manual" that ships with the machine for details on display features, controls, and operation. The following pages in this section; pages **3-37 – 3-62** are only applicable to machines with the Instrument Cluster (IC).



RAIL19SSL0071BA 1

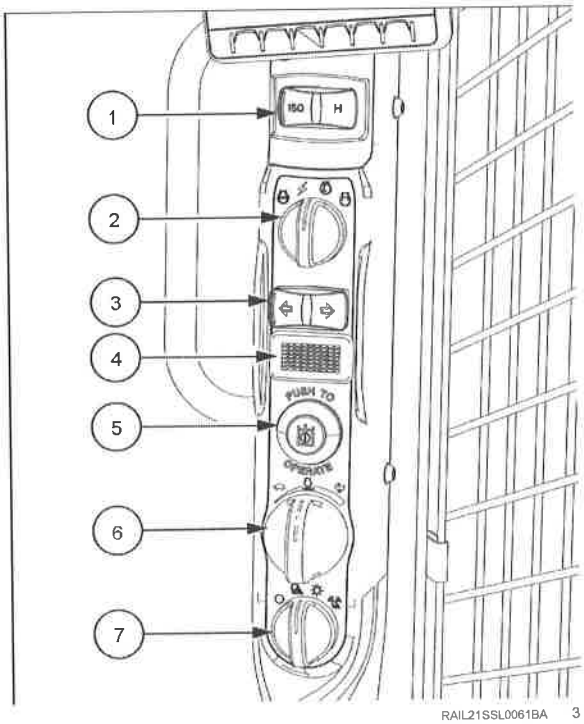
(1)	ISO or H pattern control switch
ISO/H	On machines with ISO or H drive, the switch **(1)** determines which drive system the machine is operating. ISO drive (single lever controls drive) or H drive (traditional two lever drive control). See "ISO or H pattern control switch" **3-63** for more details.



RAIL21SSL0061BA 2

(2)	KEY SWITCH (four position) ***NOTE:*** *Follow the starting procedure* ***4-3*** *described in this manual.*
	Stop position Turn the key to the Stop position. The engine will stop and the electrical system will be inactive to the operator. ***NOTE:*** *Some electrical components continue to receive power from the battery.*
	Accessory position Turn the key to the left, the machine's electrical system is now active. ***NOTICE:*** *Do not leave the key in this position otherwise you may drain the battery power.*
	Run position Turn the key to the RUN position. The machine's electrical system becomes active, the system checks all starting criteria is met, and prepares the engine for starting.
	Start position (temporary position) Turn and hold the key to the Start position, release the key to the Run position once the engine starts. ***NOTICE:*** *Do not operate the starter motor continuously for more than 30 seconds.*

(3)	Turn signal indicator, if equipped
	When operating on the public roads use the turn signal switch to indicate the direction of travel. The direction selected will flash until you turn it off.

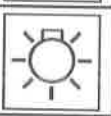


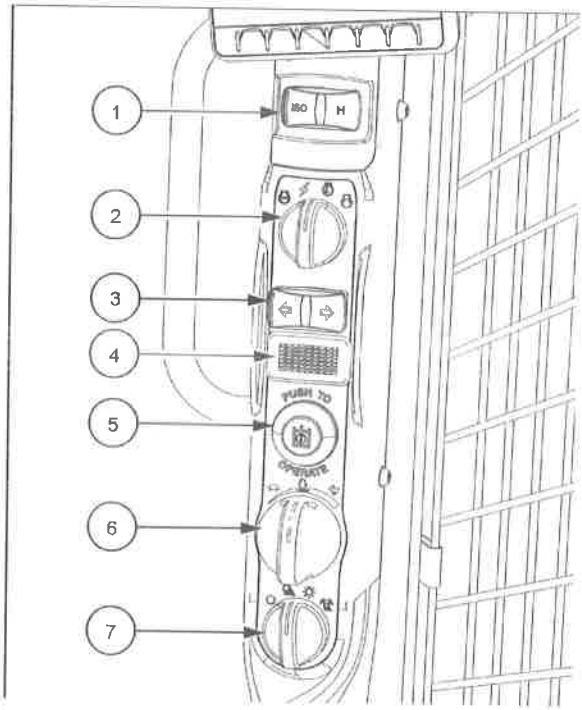
RAIL21SSL0061BA 3

(4)	MICROPHONE (if equipped)
	Microphone for hands free calling. Refer to the radio user guide for pairing your smart-phone with the **Bluetooth®** radio (if equipped).

(5)	PUSH TO OPERATE
	This button activates and deactivates the hydraulic system when the engine is running.

(6)	ENGINE THROTTLE
	This dial increases or decreases the engine RPM.

(7)	WORK LIGHTS			
Position	Front work lights	Side work lights	Rear work lights	Rear red lights
	OFF	OFF	OFF	OFF
	ON	OFF	ON	OFF
	ON	OFF	OFF	ON
	ON	ON	ON	OFF



RAIL21SSL0061BA 4

Instrument Cluster (IC)

Instrument Cluster (IC)

The Instrument Cluster (IC) is on the right-hand cab post.

Once in the seat, the alarm sounds and selected lamps illuminate briefly. Monitor these lamps on a daily basis to confirm that they will function in the event of a system alarm. The fuel gauge and hour meter will remain illuminated for operator monitoring.

When started, the machine will be in park with the park brake lamp **(1)** illuminated.

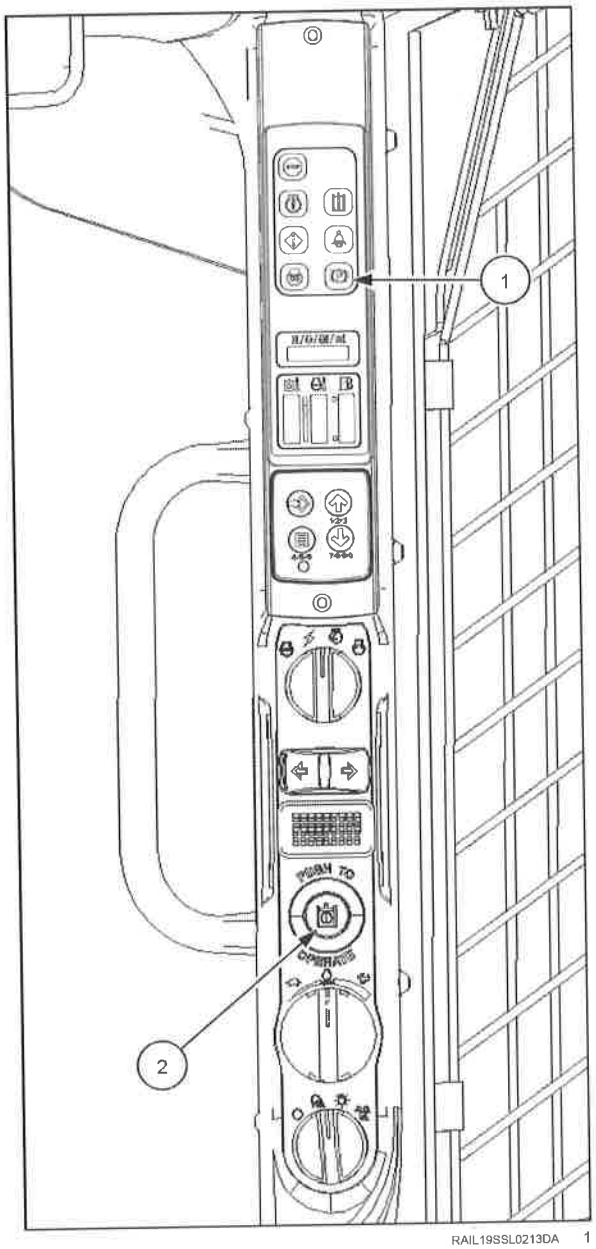
NOTE: *The park brake button on the right-hand control lever will not turn off the park brake until the operator presses the " PUSH TO OPERATE " button* ***(2)****.*

The operator must be in the seat with the seat belt fastened and the restraint bar lowered. After the operator starts the machine, the operator must push the OPERATE button **(2)** to activate the loader arms and ground drive.

A "Setup" menu allows the user to view, select, change, and customize a number of machine settings. A security code may be entered into the Instrument Cluster. Once the security code has been entered, each user will have to enter the code before the machine will start. Contact your dealer for detailed information on the "Setup" menu and security feature activation.

NOTE: *The active fault code is visible to the operator on the display on the right-hand column. Locate the fault code definitions in the troubleshooting section.*

NOTICE: *Low hydraulic charge pressure will cause engagement of the park brake. With an Electro-Hydraulic (EH) control unit, the park brake lamp will flash and an audible alarm will sound, if this condition exists.*

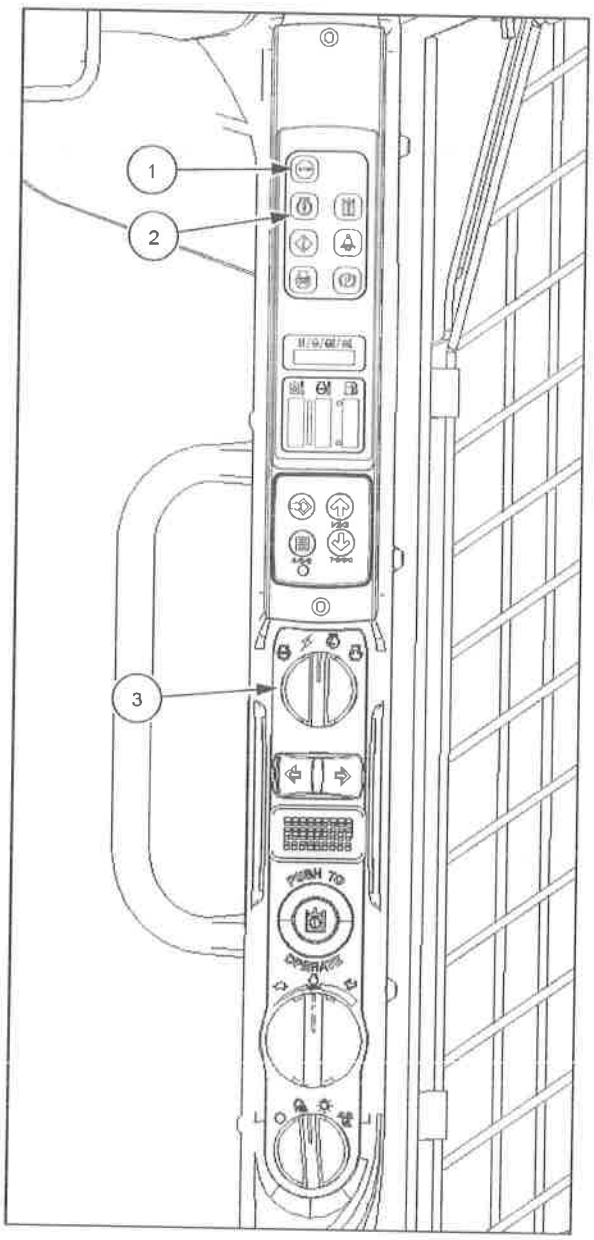


RAIL19SSL0213DA 1

(1)	STOP
	Severe warning requiring immediate shut down, RED lamp will flash and audible alarm will sound. Use the fault code that appeared in the text display and reference it in the trouble shooting section of this manual.

(2)	ENGINE MALFUNCTION
	Yellow lamp will flash when an engine fault is detected. Use the fault code that appeared in the text display and reference it in the trouble shooting section of this manual.

(3)	KEY SWITCH (four position) ***NOTE:*** *Follow the starting procedure* ***4-3*** *described in this manual.*
	Stop position Turn the key to the Stop position. The engine will stop and the electrical system will be inactive to the operator. ***NOTE:*** *Some electrical components continue to receive power from the battery.*
	Accessory position Turn the key to the left, the machine's electrical system is now active. ***NOTE:*** *Do not leave the key in this position otherwise you may drain the battery power.*
	Run position Turn the key to the RUN position. The machine's electrical system becomes active, the system checks all starting criteria is met, and prepares the engine for starting.
	Start position (temporary position) Turn and hold the key to the Start position, release the key to the Run position once the engine starts. ***NOTE:*** *Do not operate the starter motor continuously for more than 30 seconds.*



RAIL19SSL0213DA 2

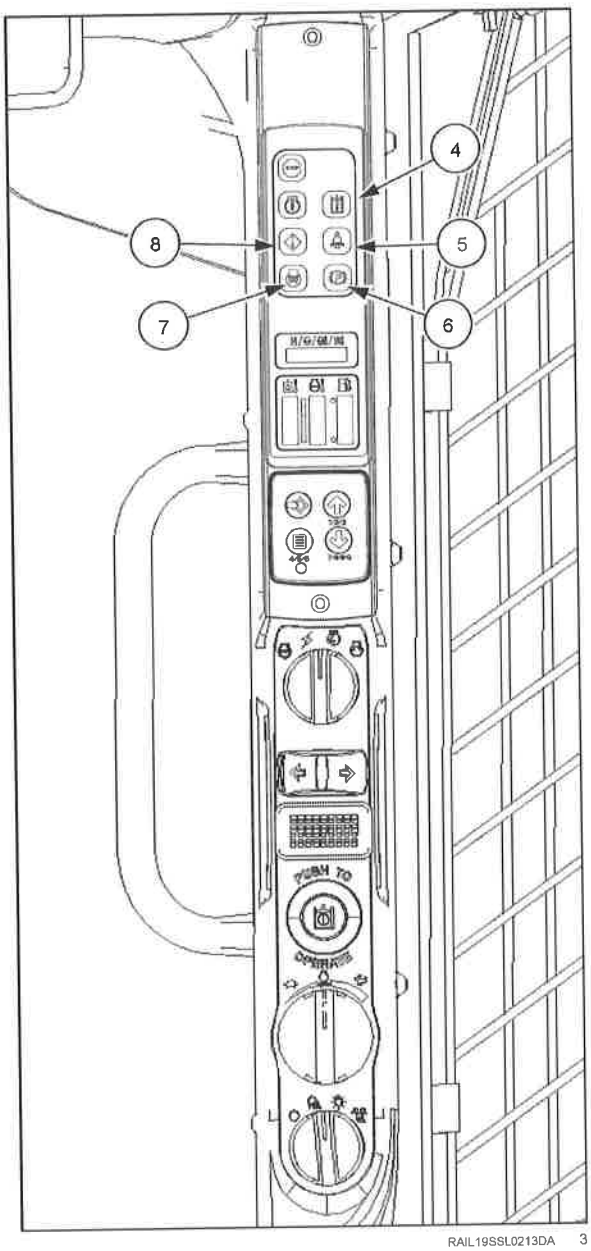
(4)	HYDRAULIC SYSTEM MALFUNCTION
	Yellow Lamp will flash when a hydraulic fault is detected. Use the fault code that appeared in the text display and reference it in the trouble shooting section of this manual.

(5)	SEAT BELT
	RED lamp will illuminate when the restraint bar is raised. RED lamp will also illuminate when the operator leaves the operator's seat.

(6)	PARK BRAKE LAMP
	This Red lamp illuminates to indicate the park brake is engaged. Under normal conditions the park brake will be set when: • The park brake button is activated (located on the right-hand control lever) • The OPERATE button is pressed to deactivate the hydraulics • The engine is shut off • The engine is running and the restraint bar is raised • The operator leaves the seat

(7)	ENGINE PREHEATING LAMP
	In cold climate starting conditions, after turning the key switch to run position, this yellow engine pre-heating lamp will illuminate, instructing the operator that incoming air is being preconditioned for smoother starting. The operator must wait until the lamp goes out before attempting to start the engine.

(8)	ELECTRONIC SYSTEM MALFUNCTION
	This yellow lamp will flash and the alarm will sound. Use the fault code that appeared in the text display and reference it in the troubleshooting section of this manual.



RAIL19SSL0213DA 3

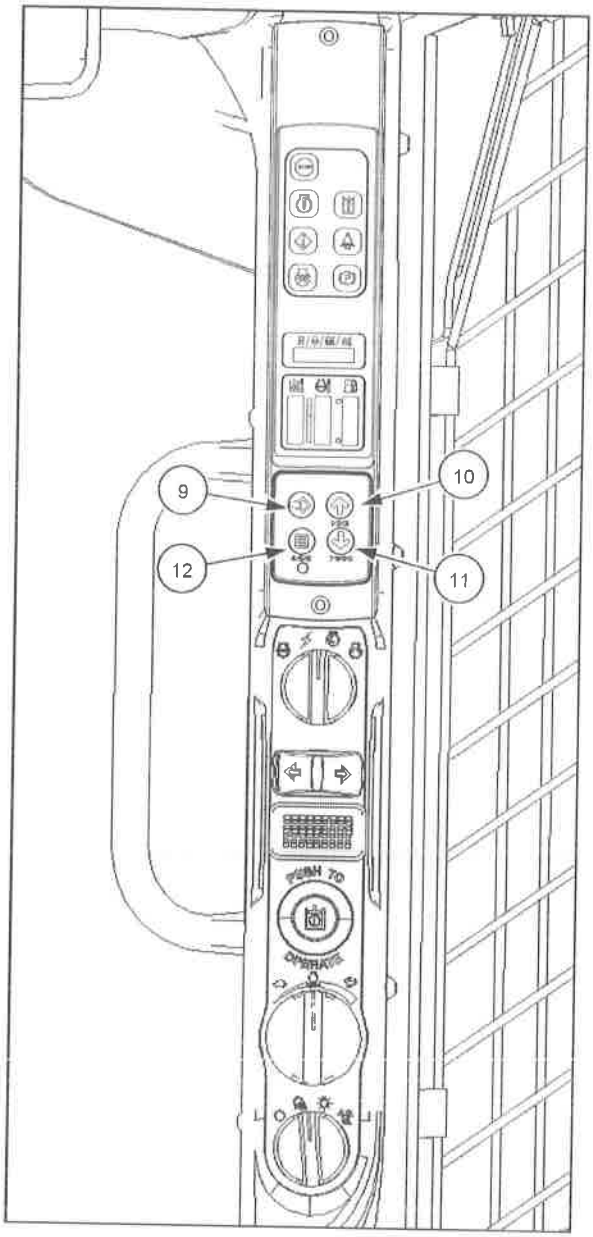
(9)	ENTER BUTTON
	Use this, when in the "Setup" menu, as the "enter" data key ***NOTE:*** *This button is used for user code lock and unlock.*

(10)	UP BUTTON
	Use to scroll Up within the "Setup menu" or cycle through the display options during normal operation. ***NOTE:*** *This button is used for user code lock and unlock.*

(11)	DOWN BUTTON
	Use to scroll Down within the "Setup menu" or cycle through the display options during normal operation. ***NOTE:*** *This button is used for user code lock and unlock.*

(12)	DISPLAY BUTTON
	Use to enter the "Set up" menu and to return to upper level menus. ***NOTE:*** *This button is used for user code lock and unlock.*

NOTE: *For a fault code associated with a yellow amber light, record the code number and press the ENTER button twice to silence the code and return to normal operation. If the code appears again, contact your dealer for support.*



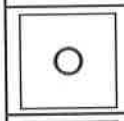
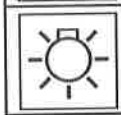
RAIL19SSL0213DA 4

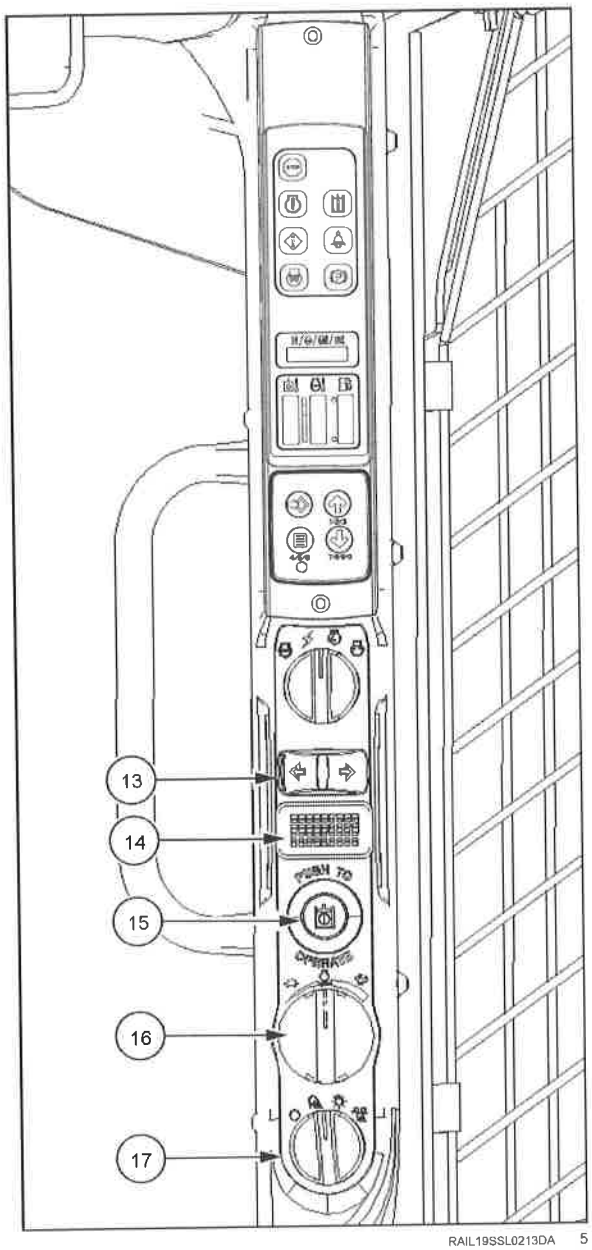
(13)	Turn signal indicator, if equipped
	When operating on the public roads use the turn signal switch to indicate the direction of travel. The direction selected will flash until you turn it off.

(14)	MICROPHONE (if equipped)
	Microphone for hands free calling. Refer to the radio user guide for pairing your smart-phone with the **Bluetooth®** radio (if equipped).

(15)	PUSH TO OPERATE
	This button activates and deactivates the hydraulic system when the engine is running.

(16)	ENGINE THROTTLE
	This dial increases or decreases the engine RPM.

(17)	WORK LIGHTS			
Position	Front work lights	Side work lights	Rear work lights	Rear red lights
	OFF	OFF	OFF	OFF
	ON	OFF	ON	OFF
	ON	OFF	OFF	ON
	ON	ON	ON	OFF

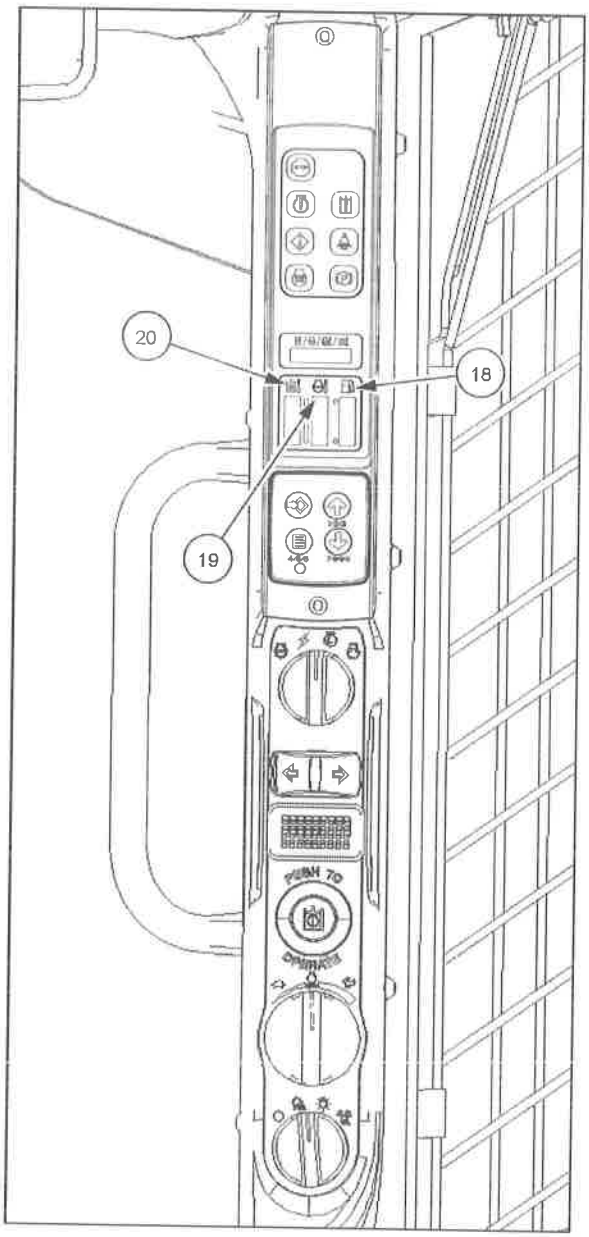


RAIL19SSL0213DA 5

(18)	FUEL BAR GRAPH:
	The fuel gauge consists of a series of bars that indicate the level of fuel in the fuel tank. When all 8 bars are visible the fuel tank is full. Bottom bar flashing indicates approximately **3.8 L (1.0 US gal)** of fuel remaining.

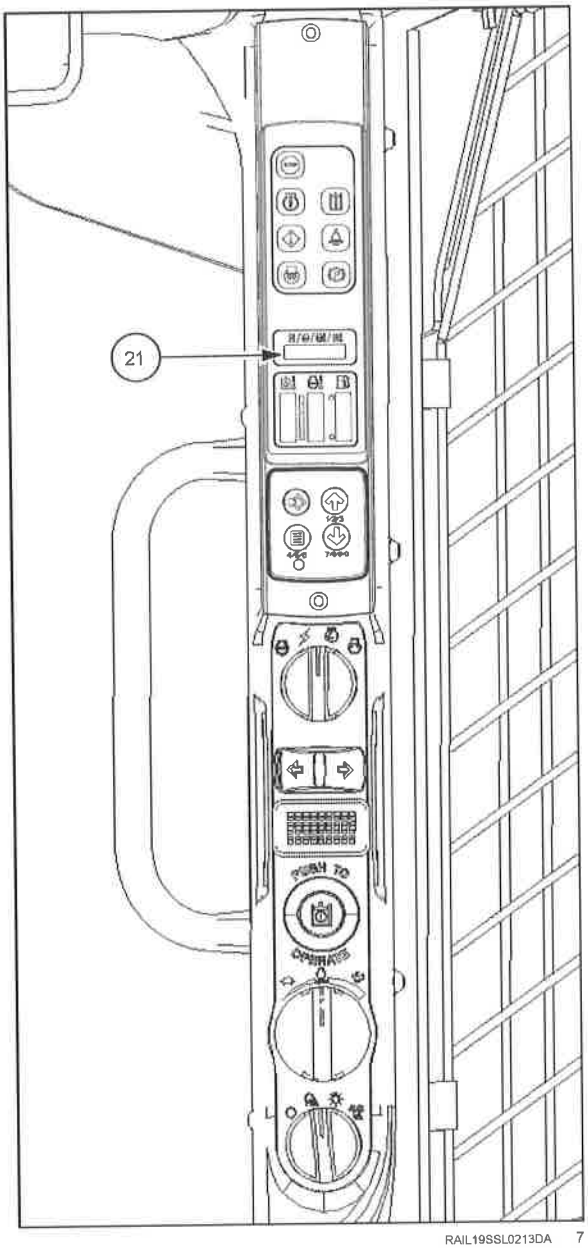
(19)	HYDRAULIC FLUID TEMPERATURE BAR GRAPH:
	This Hydraulic Oil Temperature Bar Graph indicates the relative temperature of the hydraulic oil from **0 – 110 °C (32 – 230 °F)**. If the temperature exceeds **110 °C (230 °F)**, all 8 graph segments will display, backlighting will flash, and the audible alarm will sound.

(20)	ENGINE COOLANT TEMPERATURE BAR GRAPH:
	This bar graph indicates the relative temperature of the engine coolant from **0 – 110 °C (32 – 230 °F)**. If the coolant temperature rises above **110 °C (230 °F)**, all 8 bars will display, the backlighting will flash, and an audible alarm will sound.



RAIL19SSL0213DA 6

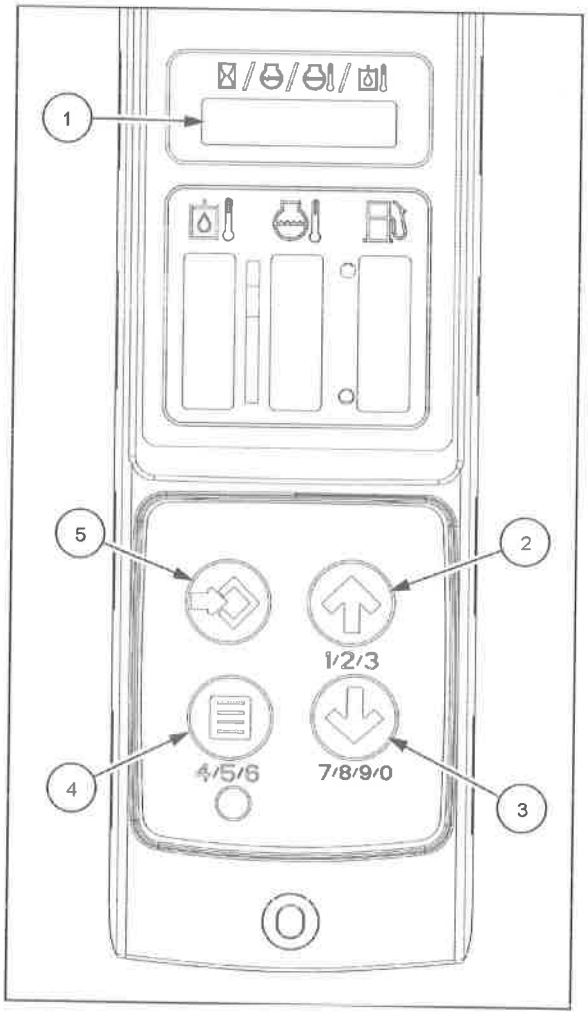
(21)	TEXT DISPLAY:
	This display will show the following during normal operation, as selected by the operator. • Engine hours: Engine hours will always be displayed momentarily when the operator initially sits in the seat. The operator may choose to leave engine hours on display continuously or select one of the following. • Engine RPM • Engine coolant temperature (degrees F or C) • Hydraulic oil temperature (degrees F or C) • Cycle: If this display option is chosen, the display will continuously cycle through all four of the above items The text display will also help the operator or technician with information as the "Setup" menu is utilized.



RAIL19SSL0213DA 7

Instrument cluster navigation buttons

Use the four switch buttons to navigate through the instrument cluster Menu by following the setup menu functions. Many of the setup menu functions are intended for service technicians and owners. Contact your dealer for the service manual or security code information.



RAIL19SSL0105CA 1

(1) TEXT DISPLAY

Displays the menu text.

(2) UP Arrow

Navigates upward through selections on the menu level.

Certain menus will prompt the user to enter an access code or allow the user to change a numerical value.

NOTE: *Pushing the UP button will increment the flashing digit 1,2,3 for number entry.*

(3) DOWN Arrow

Navigates downward through selections on the menu level.

NOTE: *Pushing the DOWN button will increment the flashing digit 7, 8, 9, 0 for number entry.*

(4) DISPLAY

Exits the sub-menu and moves top level to the next option.

Increments the flashing digit 4,5,6 for number entry.

(5) ENTER

For number entry, moves flashing digit to the next place.

Saves entry.

Enters the sub-menu.

Top level menu options

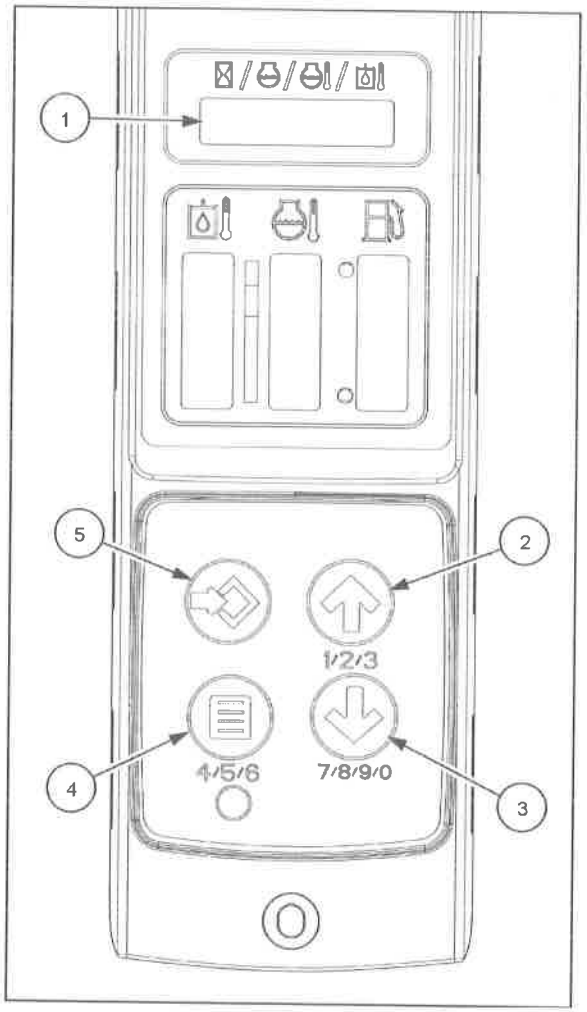
- EXIT — Exit the setup menu.
- dSPLY — Choose between the selected display parameters.
- AUX OVVRD — Auxiliary Hydraulic Interlock Override
- UNITS — Allows the operator to select between Fahrenheit (Imperial units) and Celsius (Metric units).
- JTIME — Job timer. Timer that displays engine operating hours since last reset. Ideal for rentals or job tracking.
- REGEN — Used to request the engine controller to inhibit the regeneration process for one key cycle or request a manual (force) regeneration. Only applicable to models all SR160B, SR175B / SV185B built after March 1st, and all Stage V machines.

  NOTE: *The option to request a manual (force) regeneration is not applicable to models SR160B, SR175B, and SV185B.*
- OIL — Used to request the engine controller to reset the oil life monitoring status after an oil change.
- LOCK — Used to create/change owner and user codes
- SUSP TMOUT — Suspend Lock Time-out. Used to change the Suspend Lock delay.
- CRANK — Used to enable or disable the Crank capability when the machine is locked.
- IC SHTdN — Instrument Cluster (IC) Shutdown. Used to change whether the IC automatically powers OFF after delay set with below menu selection.
- IC TMOUT — Instrument Cluster (IC) Time-out. Used to change the IC power OFF delay.

Instrument cluster main menu

Entering the main menu:

1. Place the machine on firm, level ground with the loader arm and bucket down.
2. Push the DISPLAY button to enter the main menu.
3. You may now sit down and navigate through the menu using the ARROW / buttons . Familiarize yourself with the use of the switch buttons in order to help prevent erroneous settings.



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Instrument cluster display setting

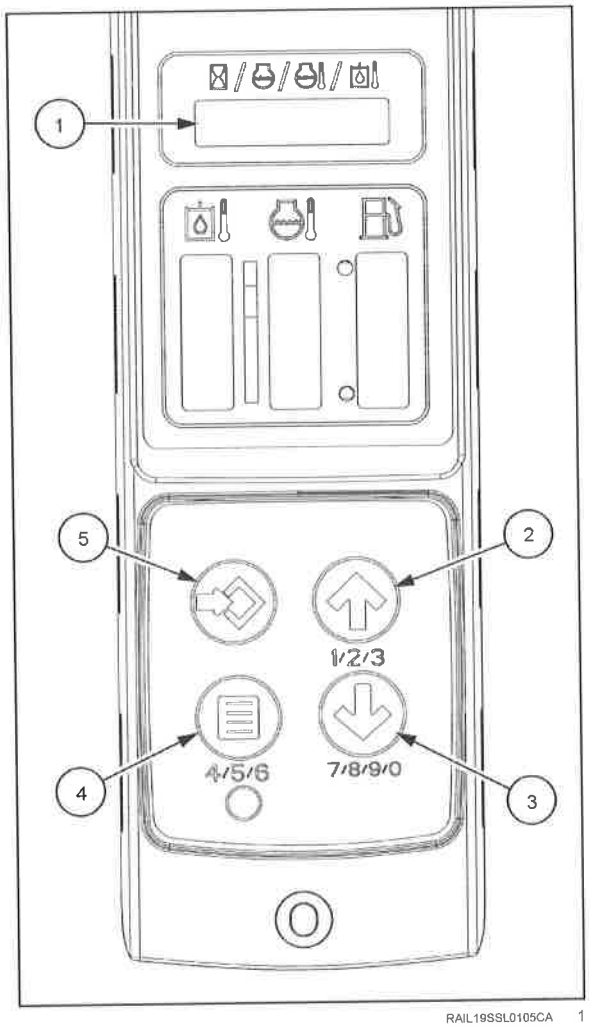
The operator may choose a continuous display of one of the four following parameters or select cycle from the dSPLY top level menu and momentarily display all four of the parameters in a cycle for a few seconds each.

- HOUR - Engine hours.
- RPM - Engine RPM.
- COOLT - Engine coolant temperature.
- HOILT - Hydraulic fluid temperature.
- CYCLE - Cycle though all four parameters.

NOTE: *The instrument cluster is programmed to display the last setting selected when you sit in the seat.*

To change or select from the dSPLY top level menu

1. Push the DISPLAY button to enter the main menu.
2. Push the button to display the current selection.
3. Push the or button to toggle through the selections.
4. Once the desired selection appears on the text display, push the button **(5)** to save the selection.



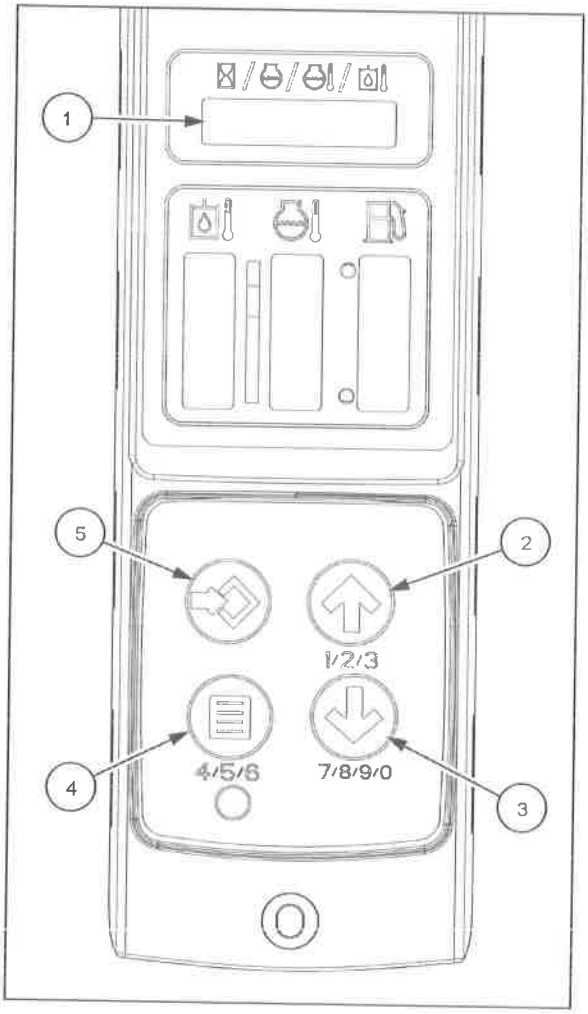
RAIL19SSL0105CA 1

Auxiliary hydraulic interlock override (AUX OVRRD)

NOTE: *Some attachments have their own controls and this feature allows the auxiliary hydraulic oil flow to continue when the operator is out of the seat. The machine's control levers will be inactive.*

When the operator leaves the seat, hydraulic oil flow and control levers are disabled.

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until AUX OVVRD appears on the display **(1)**.
3. Push the ENTER button to access the AUX OVVRD menu.
4. Push the ARROW buttons to toggle between the ON and OFF selection.
5. Push the Enter button on the OFF selection to only allow auxiliary hydraulic operations from the operator seat. The small red indicator lamp below the DISPLAY button will not illuminate when the override feature is OFF.
6. Push the Enter button on the ON selection to only allow auxiliary hydraulic operations to be operated without an operator in the seat. The operator must leave the seat within 30 seconds to override the auxiliary hydraulic interlock. The small red indicator lamp below the DISPLAY button will illuminate when the override feature is ON.
7. Push the DISPLAY button to return to normal operation.



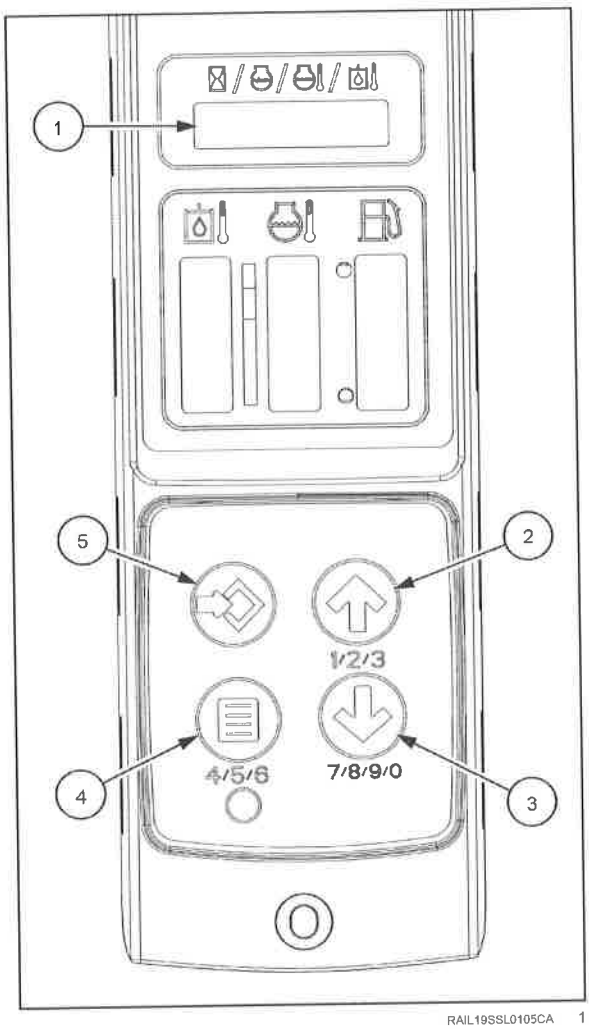
RAIL19SSL0105CA 1

Temperature display selection

The operator may choose to display either Celsius (°C) or Fahrenheit (°F) temperature scales.

To change the temperature scales:

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until UNITS appears on the display **(1)**.
3. Push the ENTER button to drop down into the sub-menu. Fahrenheit or Celsius will appear in the display.
4. Push the ARROW buttons to toggle between the temperature scales.
5. Once the selected scale appears on the display **(1)**, push the ENTER button. The display **(1)** will blink OFF then ON and show the selected temperature scale.
6. To exit, push the DISPLAY button until the display **(1)** shows the word EXIT.
7. With EXIT in the display **(1)** push the ENTER button to return to normal operation.



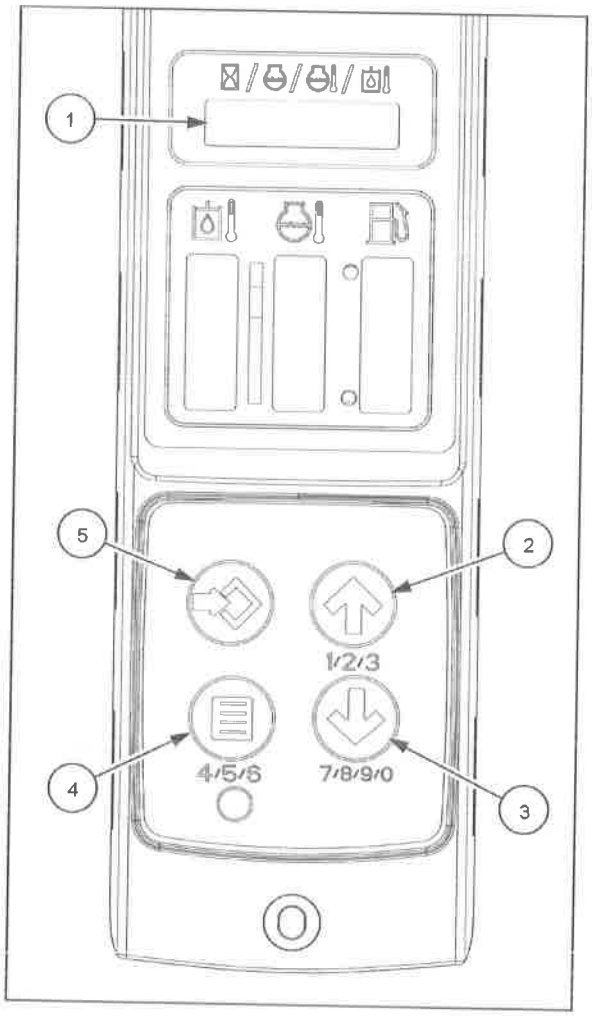
RAIL19SSL0105CA 1

View or reset Job Timer (JTIME)

The operator may choose to set a timer that will run independent from the machine hours.

To view or reset the timer:

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until JTIME appears on the display **(1)**.
3. Push the ENTER button to drop down into the sub-menu. RESET or view the timer in the display.
4. Push the ARROW buttons to toggle between reset and hours.
5. Once the RESET appears on the display **(1)**, push the ENTER button. The display **(1)** will blink OFF then ON and the JTIME counter will start over..
6. To exit, push the DISPLAY button until the display **(1)** shows the word EXIT.
7. With EXIT in the display **(1)** push the ENTER button to return to normal operation.



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Regeneration inhibit or manual (force)

	SR160B	SR175B	SV185B	SR210B	SR240B	SV280B	TR270B	TR310B	TV370B
REGEN INHIBIT	Stage IV or Tier 4B (Final)	Stage V or Tier 4B (Final)**	Stage V or Tier 4B (Final)**	Stage V	Stage V	Stage V	Stage V	Stage V	Stage V
REGEN MANUAL	Not applicable	Not applicable	Not applicable	Stage V	Stage V	Stage V	Stage V	Stage V	Stage V

NOTE: *Tier 4B (Final)** SR175B / SV185B built after March 1st 2021.*

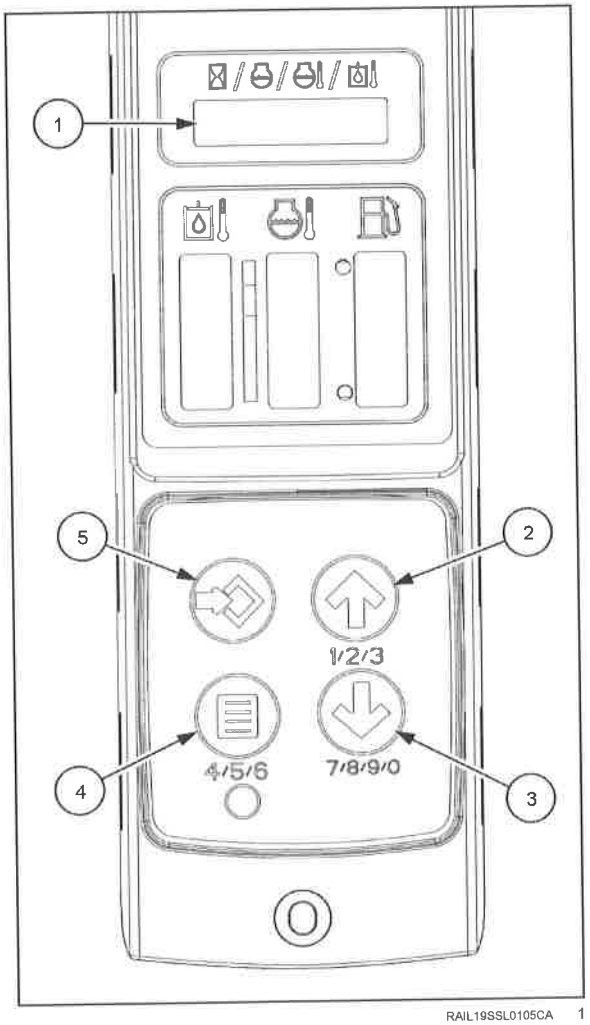
To inhibit the regeneration process: REGEN

The regeneration inhibit selection display allows the operator to turn off ALLOW the auto-regeneration procedure to be inhibited during the current key cycle.

NOTE: *The regeneration inhibit feature returns to the OFF setting by default at the next key cycle.*

NOTE: *Operators that continue to disable ALLOW the auto-regeneration procedure to be inhibited will eventually de-rate the engine's performance.*

NOTE: *When a manual regeneration is required, the display reads REGEN PARK for five seconds every five minutes with an audible alarm. See "Manual regeneration"* ***7-92****.*

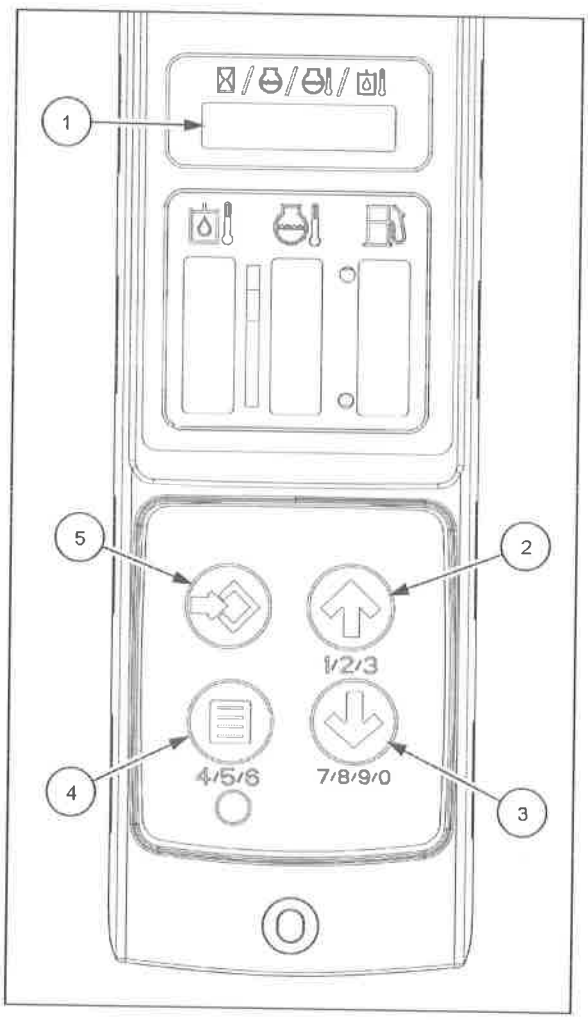


RAIL19SSL0105CA 1

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until REGEN appears on the display **(1)**.
3. Push the ENTER button to drop down into the sub-menu. INHIb will appear in the display.
4. Push the ARROW buttons to toggle between INHb and MANUL.
5. When INHb appears on the display **(1)**, push the ENTER button. The display **(1)** will blink OFF then ON and show the selection.
6. Push the ARROW buttons to toggle between ALLOW and OFF.
7. Once the desired selection appears on the display **(1)**, push the ENTER button. The display **(1)** will blink OFF then ON and show the selection.
8. To exit, push the DISPLAY button until the display **(1)** shows the word EXIT.
9. With EXIT in the display **(1)** push the ENTER button to return to normal operation.

To force the regeneration process: REGEN

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until REGEN appears on the display **(1)**.
3. Push the ENTER button to drop down into the sub-menu. INHIb will appear in the display.
4. Push the ARROW buttons to toggle between MANUL and INHIb.
5. When MANUL appears on the display **(1)**, push the ENTER button. The display **(1)** will show START.
6. Push the ENTER button. The below checks will occur and if the criteria is met, the manual regeneration process will occur.



RAIL19SSL0105CA 2

Criteria (Stage V machines with FPT engines only)

After START is selected Criteria A is checked by the Instrument Cluster (IC) and Engine Control Unit (ECU). If the Criteria A is not met OIL + CHANGE will flash on the display five times. Change the engine oil and reset the engine oil life. If the Criteria A is met, then Criteria B is checked. If the Criteria B is not met NOT + READY will flash on the display five times. If Criteria B is met the manual regeneration process will occur. See "Manual regeneration" on page **7-92** for more details.

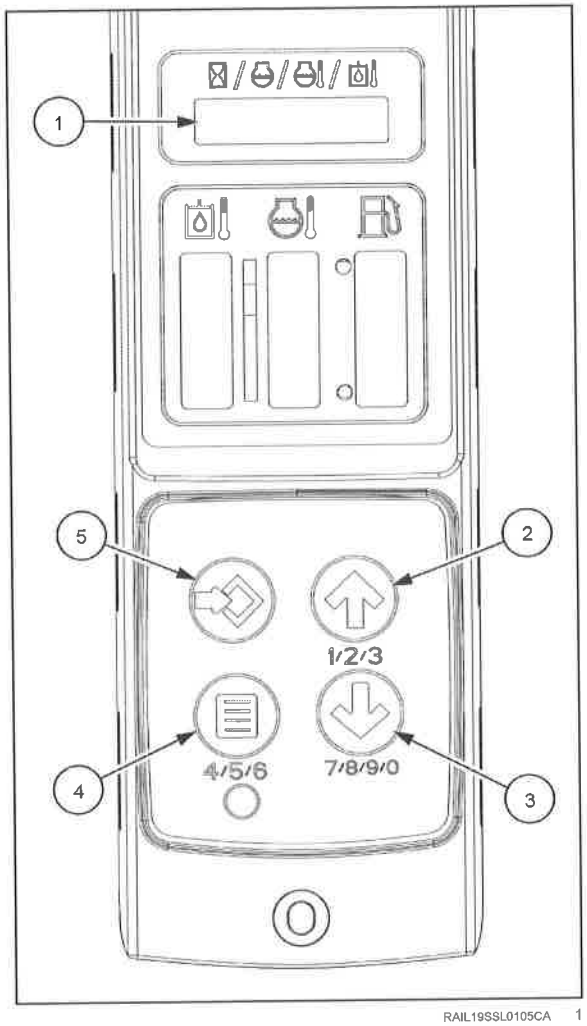
A. Criteria A
   - The manual regeneration counter is less than 5.
   - The ECU is not requesting an oil change.
   - The ECU manual regeneration counter has not been exceeded, Diagnostic Trouble Codes (DTC) are not active.

B. Criteria B
   - Fuel Level is above 50%.
   - Engine is running.
   - A manual regeneration has not already occurred during the current key cycle.
   - The ECU is not currently inhibiting the regeneration process due to a system fault.

Oil life reset

To reset the oil life monitoring feature.

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until OIL appears on the display **(1)**.
3. Push the ENTER button to drop down into the sub-menu. RESET will appear in the display.
4. Push the ENTER button to reset the oil life monitoring feature.
5. To exit, push the DISPLAY button until the display **(1)** shows the word EXIT.
6. With EXIT in the display **(1)** push the ENTER button to return to normal operation.



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Anti-theft protection

Locking the instrument panel – Manual Lock, Suspend Lock, Off:

Manual Lock feature:

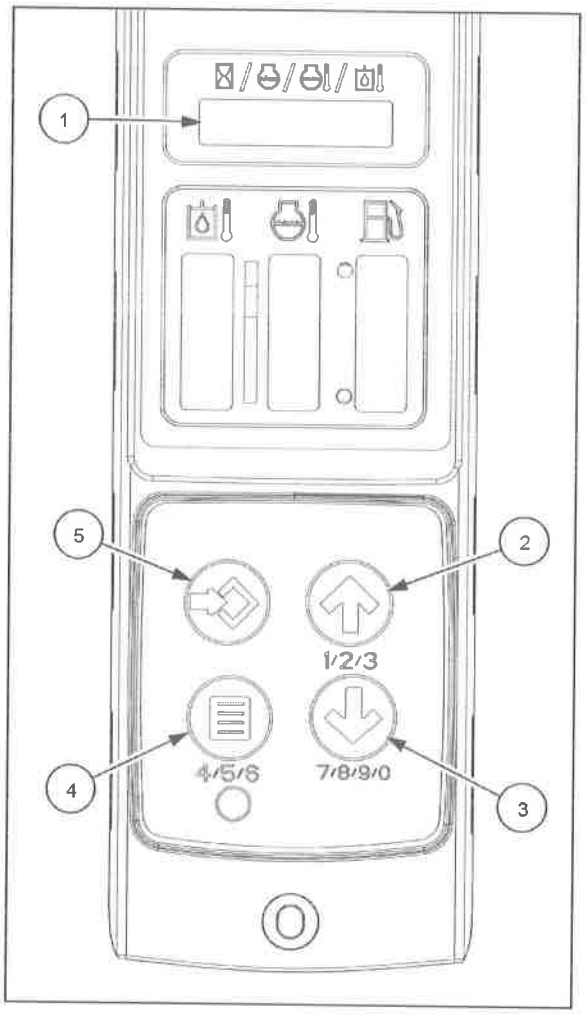
If a lock code has been entered; immediately after shutting off the engine the display will show PRESS ENTER TO LOCK. Anti-theft is set by pressing the Enter button. The panel is now locked and LOCKd is displayed. Restarting requires entering the code. If the ENTER button is not pressed, the machine can be started without a code.

Suspend Lock feature:

If a lock code has been entered; after shutting off the engine the display will show PRESS ENTER TO SUSPD WTHOT LOCK. Pressing the ENTER button delays the machine from locking for the time period chosen in the SUSP LOCK menu. If the ENTER button is not pressed, the machine may only be started after reentering the code.

Off feature:

If a LOCK code has not been entered; when the engine is shut off the display will not show lock? and the machine can be started without a code until a lock code is entered.



RAIL19SSL0105CA 1

Unlocking the instrument panel:

1. Sit in the seat to power the instrument panel. The warning lamps will illuminate and there will be an audible beep.

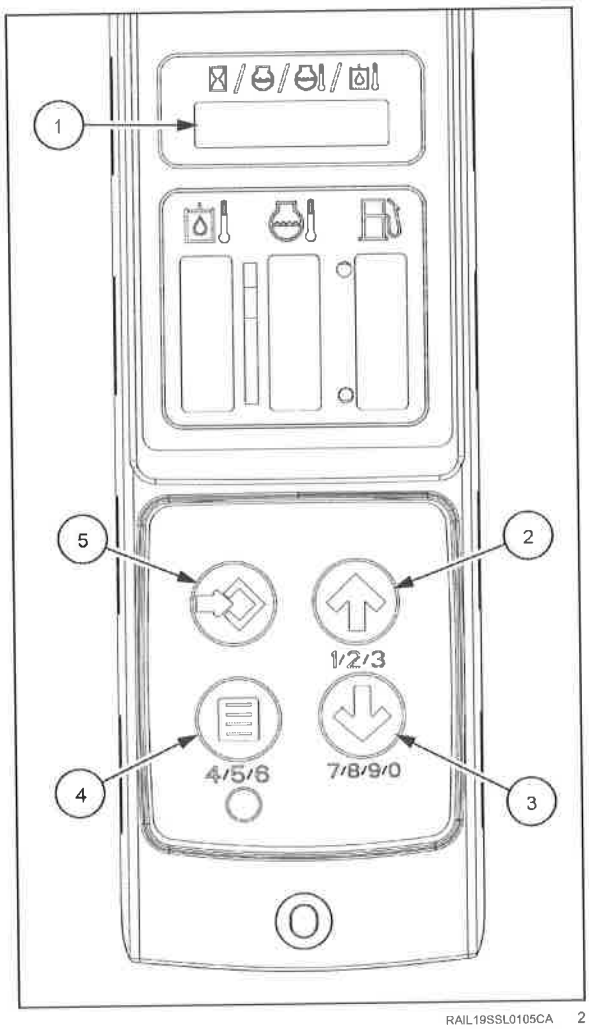
2. Press the flashing ENTER button. The display **(1)** will show unloc.

3. Enter the code by using multiple presses of the , , , and . Press the ENTER button to save each digit and move to the next.

   NOTE: *For numbers 1, 2, 3 use the button. For numbers 4, 5, 6 use the button. For numbers 7, 8, 9, 0 use the button.*

4. Press the ENTER button after the fifth digit to enter the code. The engine preheat lamp will illuminate and the display **(1)** will begin the thirty second countdown.

   NOTE: *If the incorrect code is entered, ERROR is displayed, followed by 00000 prompting the operator to enter the correct code.*



RAIL19SSL0105CA 2

Creating codes

The panel cannot be locked until a code is created. The instrument panel has one owner code and up to ten user codes. The owner code will always unlock the panel. The owner code will be required to create or change user codes and to modify the owner code.

Owner code:

Access the main menu, press the DISPLAY button and use the ARROW , to move to the LOCK menu. Press the ENTER button to enter the LOCK menu.

To create an owner code:

If no owner code exists, the display will show the word OWNCR (Owner Create), followed by 00000 . Write down the planned 5 digit code or use a code you already know.

NOTICE: *Once the code is created, the panel cannot be unlocked without the code. If the panel cannot be unlocked, contact your Dealer.*

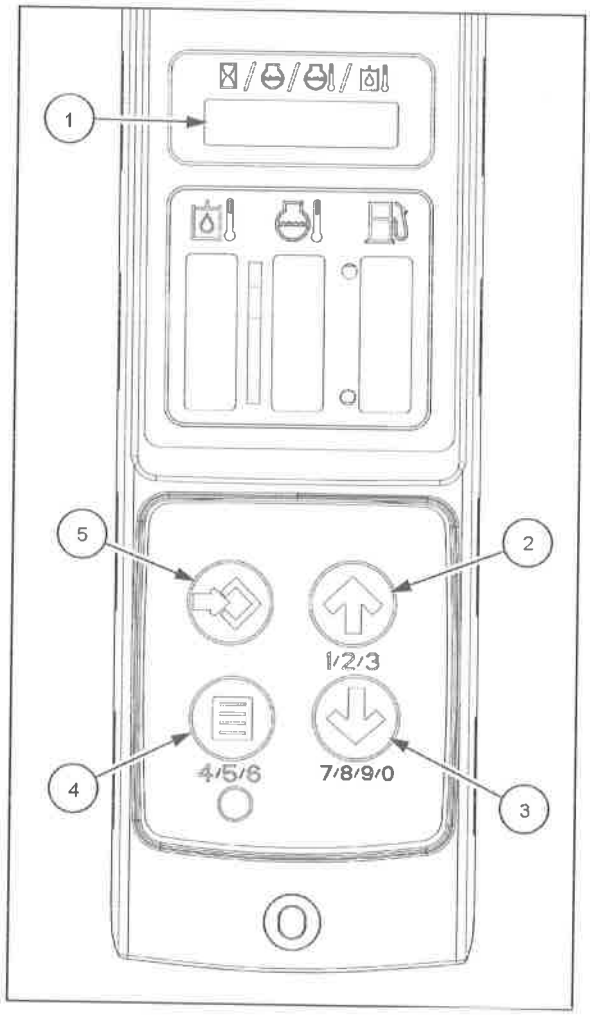
1. Enter code by using multiple presses of the , , and buttons. Press the ENTER button to save each digit and move to the next.

   NOTE: *For numbers 1, 2, 3 use the button. For numbers 4, 5, 6 use the button. For numbers 7, 8, 9, 0 use the button.*

   NOTE: *If you decide you do not want to create a code, enter all 0s, you will return to OWNCR.*

2. Press the ENTER button after the fifth digit to enter the code. The engine preheat lamp will illuminate and the display will begin the thirty second countdown.

3. Press the DISPLAY button to exit the menu. The panel is not locked at this point.



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If an owner code has been created and LOCK function is disabled

NOTE: *You can set the lock function to one of three settings OFF, MANUAL LOCK, or SUSPEND LOCK by pressing the ENTER button when the display* ***(1)*** *shows ON.*

1. If you cannot remember or enter an incorrect code you will return to OWNCR.

To modify the owner code:

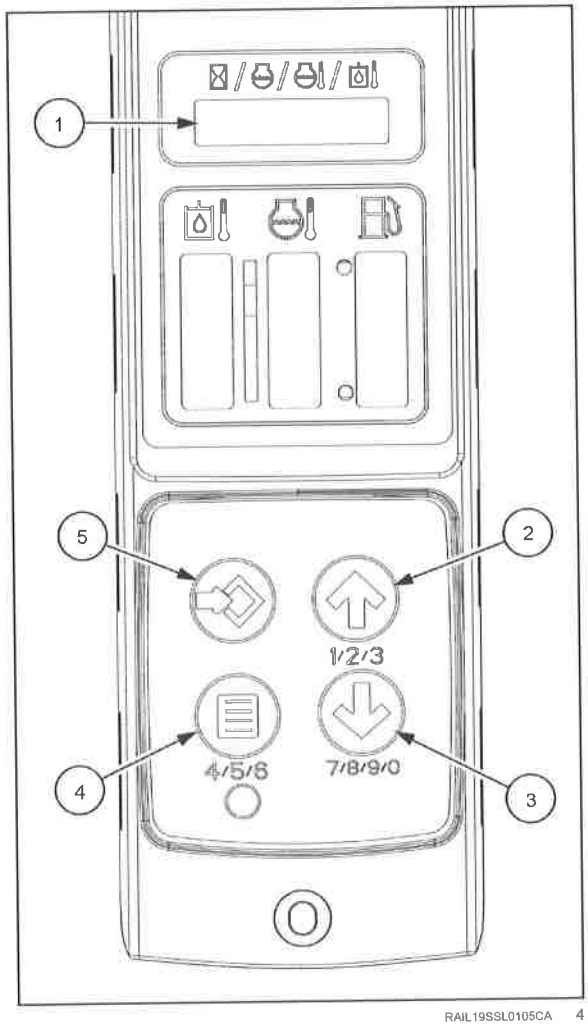
Once in the LOCK menu, the display will show OWNER.

Press the ENTER button to enter the OWNER menu. The display will show open followed by 00000.

1. Enter code by using multiple presses of the , , and buttons. Press the ENTER button to save each digit and move to the next.

   NOTE: *For numbers 1, 2, 3 use the button. For numbers 4, 5, 6 use the button. For numbers 7, 8, 9, 0 use the button.*

2. Press the ENTER button after the fifth digit to enter the code. The display (1) will show the word OWNCR followed by the saved owner code.
3. Enter a new owner code to overwrite the existing code. The panel will return to the main menu.



RAIL19SSL0105CA 4

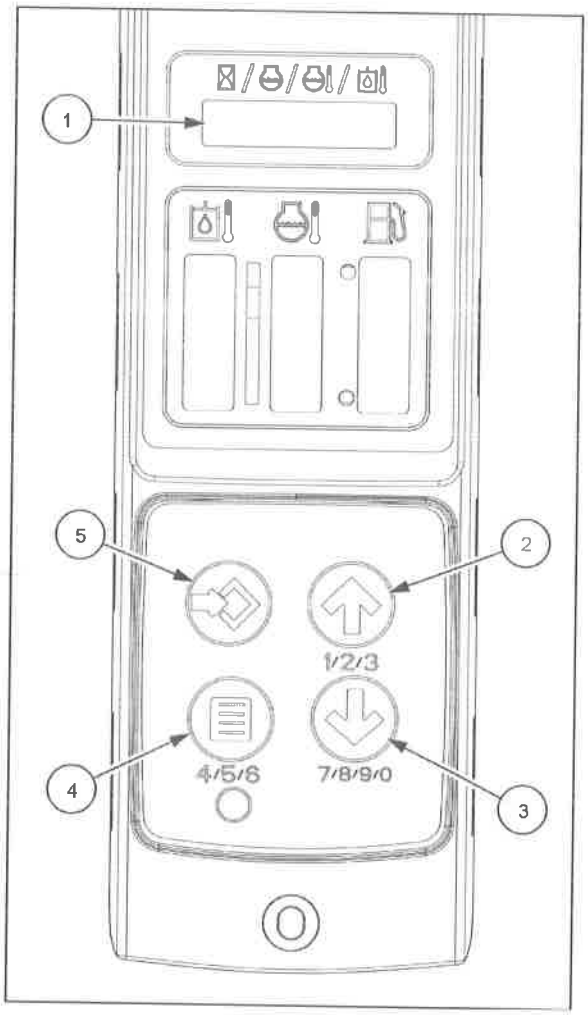
User codes

Once in the main menu, press the ARROW , button to move to the LOCK menu. Press the ENTER button to enter the LOCK menu.

To create or modify a user code:

NOTE: *An owner code must be saved before a user code.*

1. Once in the LOCK menu, the display will show the word OWNER. Press the ARROW , button to move to the USER menu. Press the ENTER button.
2. Use the ARROW , buttons to move to user0 through user9. Press the ENTER button to create or change that user code. The display **(1)** will show the word USRCR (user create) followed by 00000 .
3. Enter the owner code. 00000 or the existing user code will be displayed.
4. Enter a new user code to enter or overwrite the existing code. The panel will return to the "main menu.
5. Press the DISPLAY button until the EXIT menu, appears. Press the ENTER button to exit the main menu. The panel is not locked at this point.

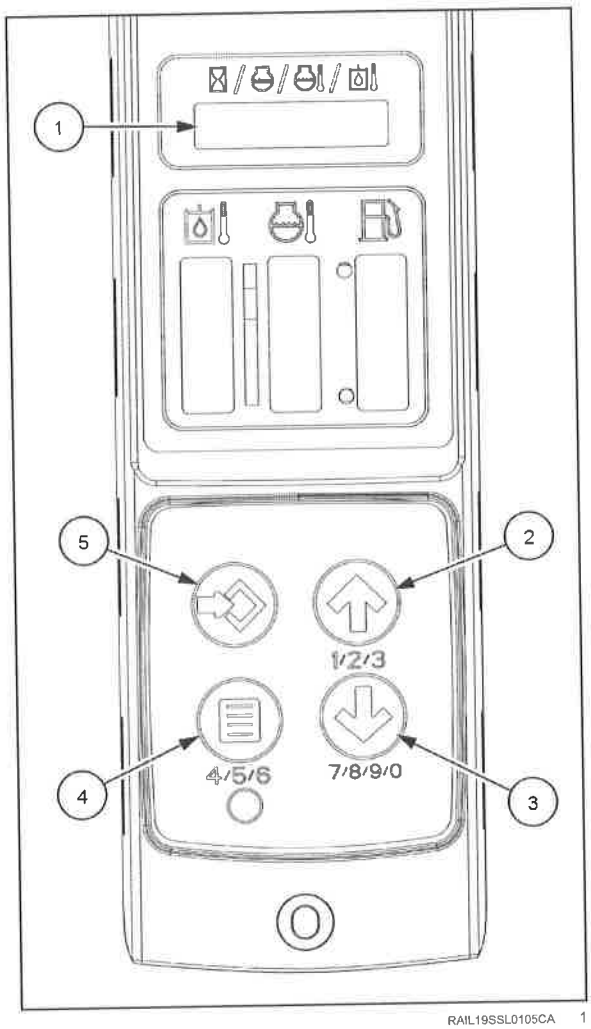


RAIL19SSL0105CA 5

Instrument cluster suspend time-out feature (SUSP TMOUT)

Machines may be setup to allow an operator to restart the machine without re-entering an unlock code within a set amount of time. To set the Suspend Time-out feature:

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until SUSP TMOUT appears on the display **(1)**.
3. Push the ENTER button to access the SUSP TMOUT menu.
4. Push the ARROW buttons until the desired time-out setting appears on the display. Settings are available in **10 min** increments up to **60 min**.
5. Push the Enter button save the selection.
6. Push the DISPLAY button to return to normal operation.

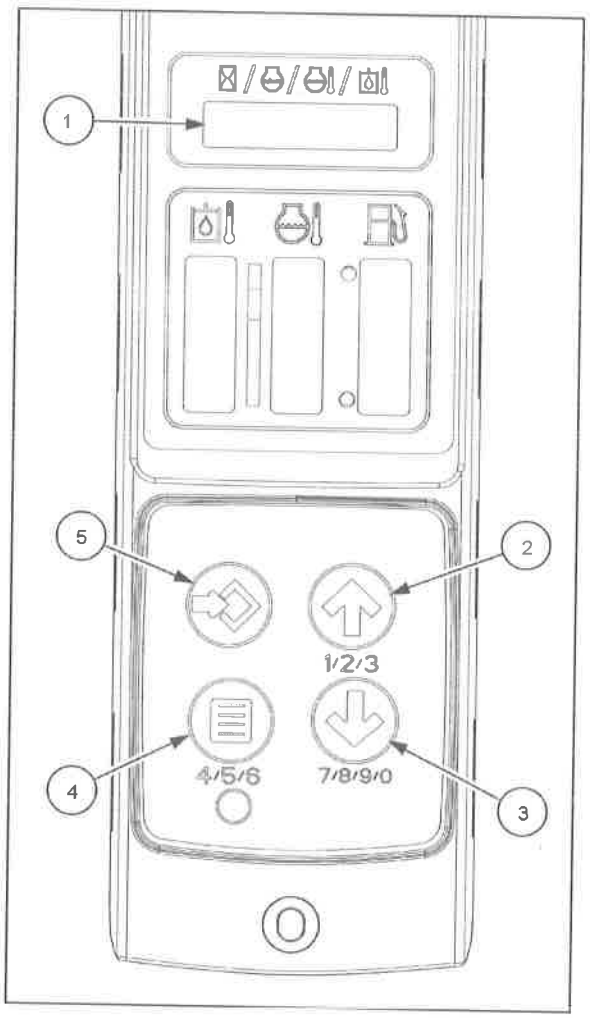


RAIL19SSL0105CA 1

Crank enable/disable feature

The machines may be setup to allow starting of the machine without entering an unlock code. The unlock code must then be entered before enabling hydraulic functions on the unit. To set the Crank enable or disable feature:

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until CRANK appears on the display **(1)**.
3. Push the ENTER button to access the CRANK menu.
4. Push the ARROW buttons to select whether the crank function will be ON or OFF.
5. Push the Enter button save the selection.
6. Push the DISPLAY button to return to normal operation.

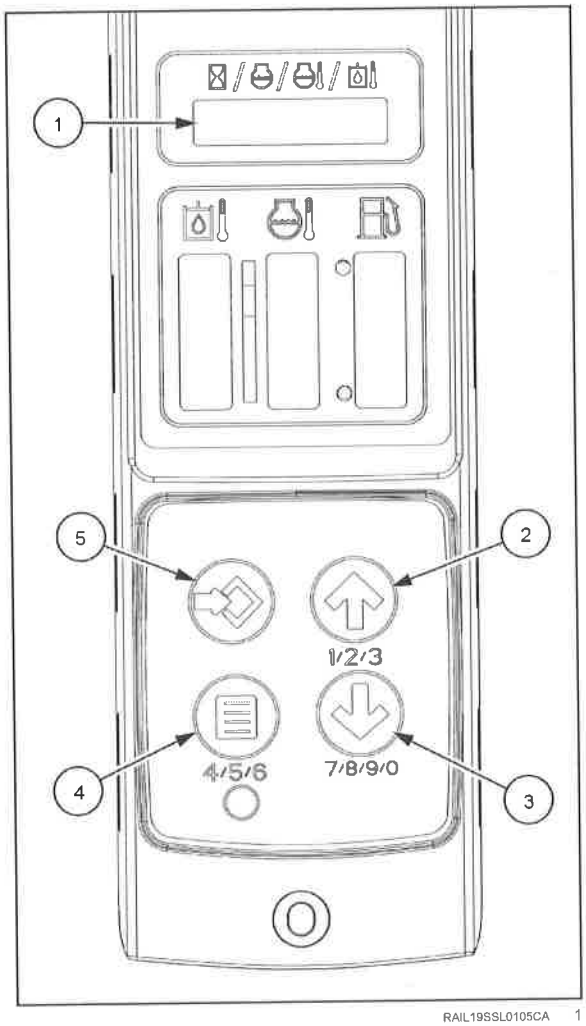


RAIL19SSL0105CA 1

Instrument cluster shutdown feature (IC SHTdN)

This enables the Instrument Cluster (IC) to shut down as described in the "Instrument cluster time-out feature (IC TMOUT)" **3-62**. To set the Instrument cluster shutdown enable or disable feature:

1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until IC SHTdN appears on the display **(1)**.
3. Push the ENTER button to access the CRANK menu.
4. Push the ARROW buttons to select whether the Instrument cluster shutdown feature will be ON or OFF.
5. Push the Enter button save the selection.
6. Push the DISPLAY button to return to normal operation.



RAIL19SSL0105CA 1

Instrument cluster time-out feature (IC TMOUT)

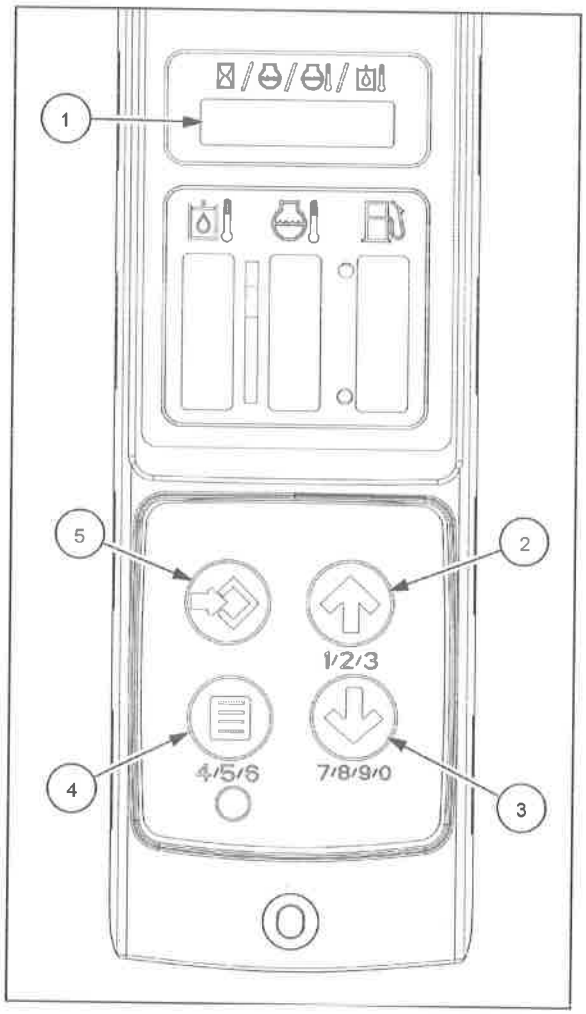
The Instrument Cluster (IC) will automatically go to a Power OFF state, if ALL of the following conditions are true for a continuous period of **10 – 60 min** (use the main menu to adjust):

- The operator is not in the operator seat
- The Instrument Cluster (IC) indicates Power ON
  - Key or Knob in the ON position
- Engine is not running

NOTE: *If the Instrument Cluster (IC) enters Power OFF state due to the Time-out feature, the IC will resume normal behavior after turning the key or knob from the ON position to the OFF position*

To set the Instrument cluster time-out feature:

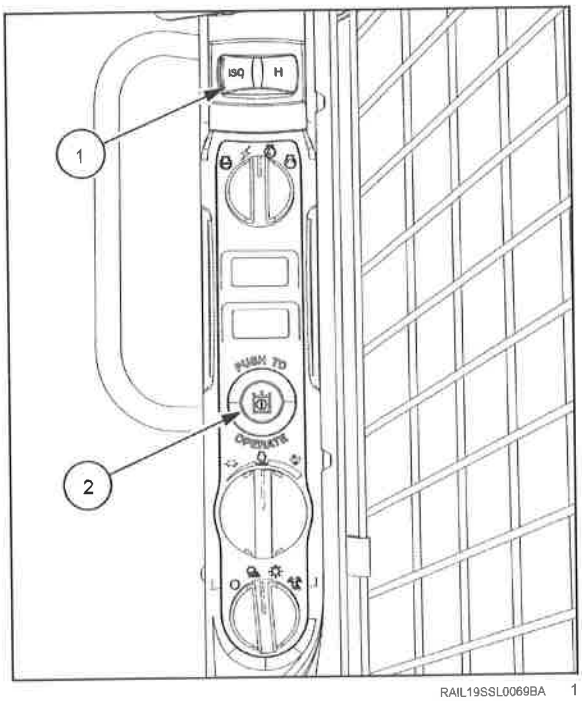
1. Push the DISPLAY button to enter the main menu.
2. Push the ARROW buttons until IC TMOUT appears on the display **(1)**.
3. Push the ENTER button to access the IC TMOUT menu.
4. Push the ARROW buttons until the desired time-out setting appears on the display **(1)** . Settings are available in **10 min** increments up to **60 min**.
5. Push the Enter button save the selection.
6. Push the DISPLAY button to return to normal operation.



RAIL19SSL0105CA 1

ISO or H pattern control switch

On machines with ISO or H drive, switch **(1)** determines which drive system the machine is operating. ISO drive (single lever controls drive) or H drive (traditional 2 lever drive control).



RAIL19SSL0069BA 1

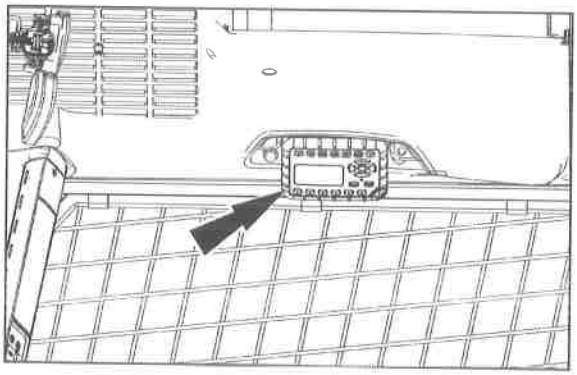
Switching from ISO to H pattern

1. Make sure that the machine is on level ground, lower the loader lift arms all the way down, and place the throttle control lever in the low idle position.
2. Press the OPERATE button **(2)**
   - The Park light will illuminate
   - The ground drive and loader hydraulics will not function
3. Confirm that the AUX roller switch on the right-hand control lever is in the neutral position.

   NOTE: *The AUX roller switch must be in neutral to change the pattern.*
4. Push and hold the ISO - H pattern select switch **(1)** to the desired pattern for a few seconds. An audible alarm will sound to let you know that the pattern switch is successful.
5. Reference the text display to confirm the change of the control pattern. The switch will illuminate only on the selected side.
6. Activate the hydraulic system by pressing the OPERATE button **(2)**.

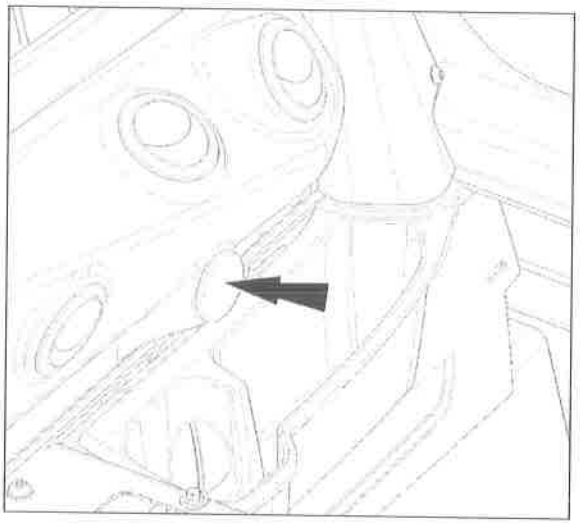
Bluetooth® radio (if equipped)

See the **Bluetooth®** radio user manual that ships with the machine for details on radio features, controls, and operation.



RAIL19SSL0005AA 1

The radio has an Aux-in port and a USB port. These ports are located above the cup holder.

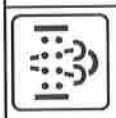


RAIL19SSL0052BA 2

LEFT-HAND COLUMN SWITCH IDENTIFICATION

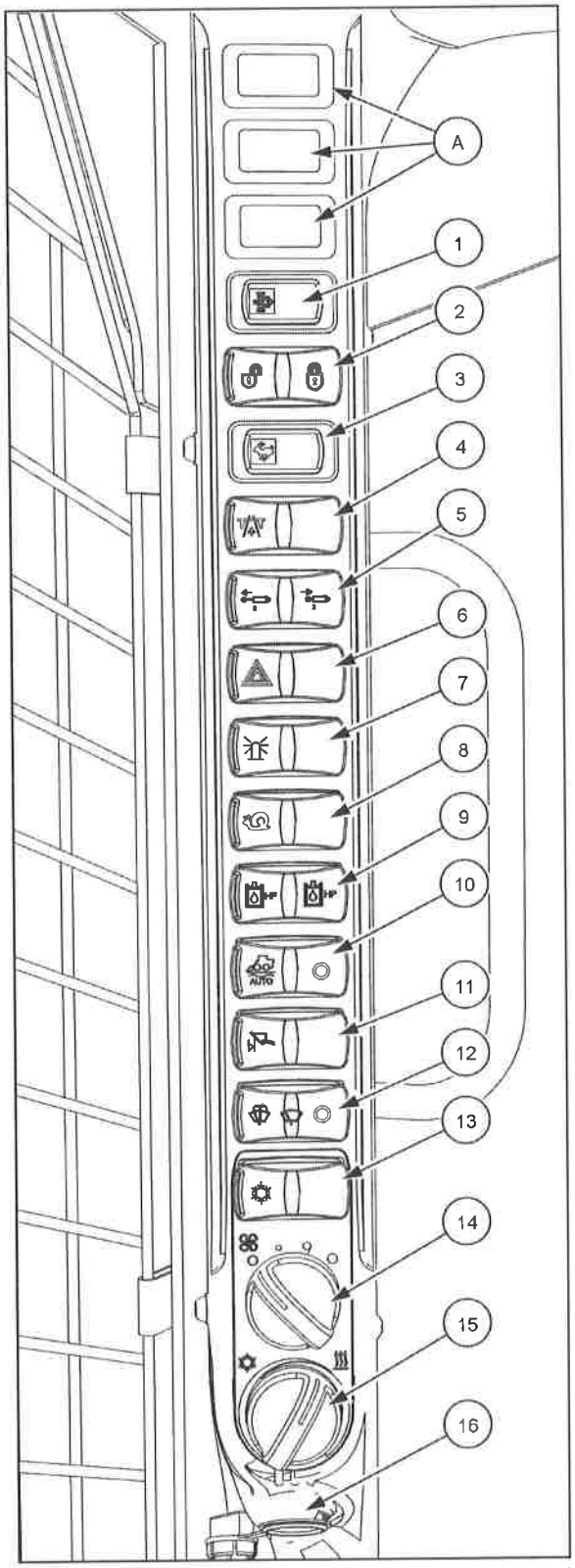
Left-hand column switch identification

(A)	Blanks

(1)	Auto-regeneration and Manual regeneration indicator • All SR160B • Tier 4B (final) SR175B / SV185B built after March 1st, 2021 • All Stage V machines
	The regeneration lamp will illuminate when the regeneration process is active. See "Auto-regeneration" **7-90** or "Manual regeneration" **7-92**. ***NOTICE:*** *Never turn off the engine when this lamp is illuminated.*

(2)	Hydraulic attachment coupler switch
	Push the unlock side of this switch to unlock the coupler from the attachment. This switch must be used in conjunction with hydraulic pressure from the loader arm down, attachment curl in or auxiliary. To Lock: with the coupler properly inserted in the attachment, apply hydraulic pressure from the loader arm down, attachment curl in or auxiliary making sure that the hydraulic system goes over system relief to set lock pins.

(3)	Two-speed indicator
	Indicates the two-speed system is in use.



RAPH20SSL0512DA 1

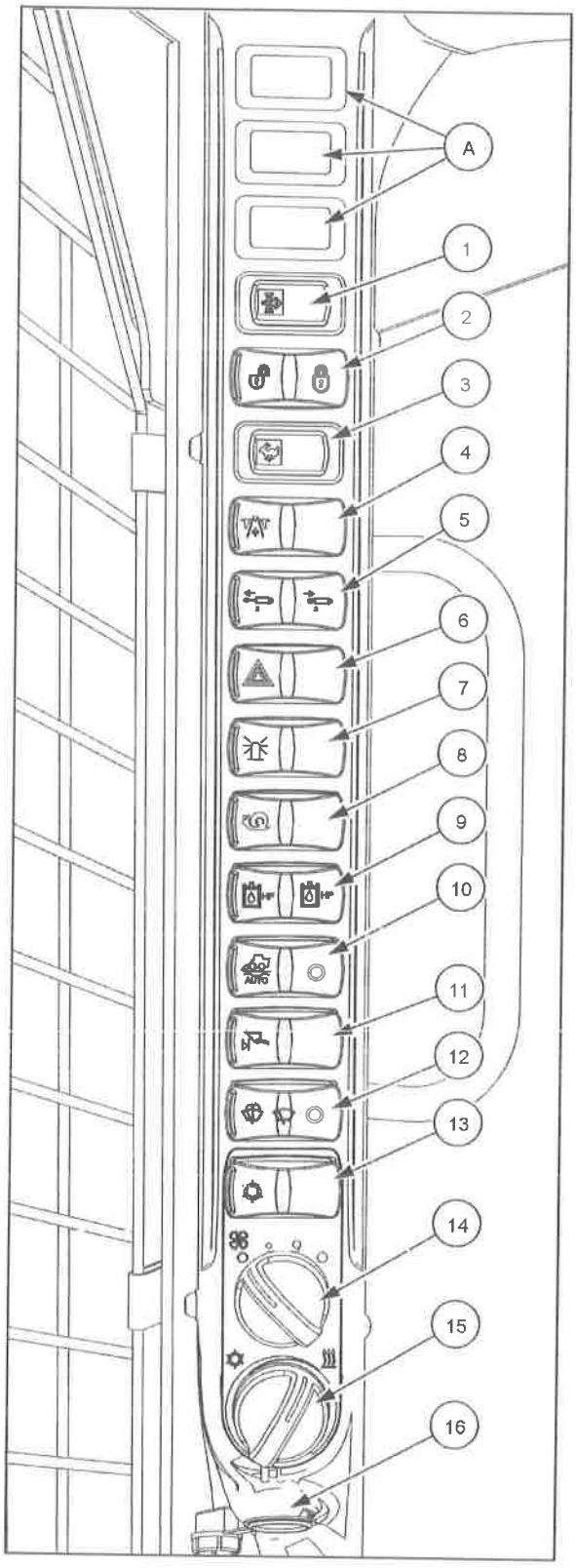
(4)	Loader lockout switch
	If equipped, push to disable loader control while roading the unit. The bucket and loader arm will be locked in the position they are in when the loader lockout switch is pressed to the ON position. This prevents the operator from inadvertently lowering or raising the loader arm or bucket while driving the machine on roads.

(5)	Auxiliary electric switch #2
	If equipped, this switch is for the front electric connector.

(6)	Hazard flasher switch
	If equipped, push the switch to activate the 4-way flashers.

(7)	Rotating beacon switch
	If equipped, push the switch to activate the rotating beacon.

(8)	Creep mode
	If equipped, push the switch to activate creep mode. For more details on creep mode refer to **3-69**.



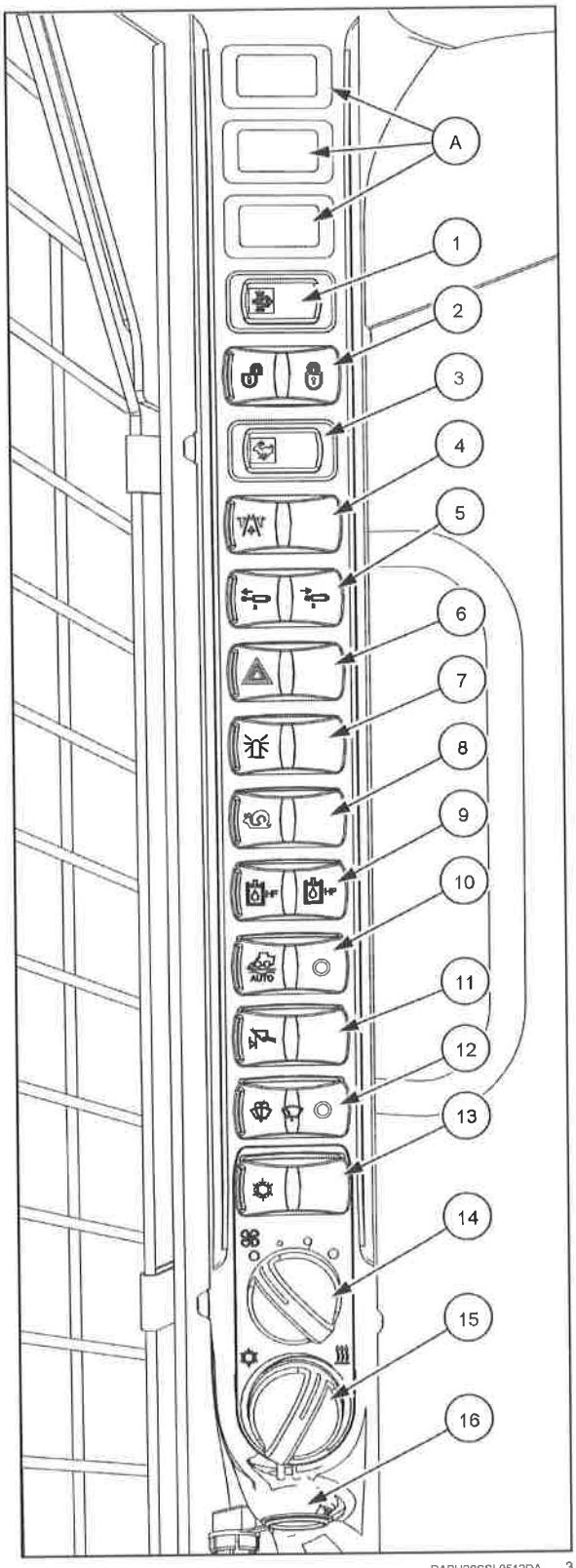
RAPH20SSL0512DA 2

(9)	Auxiliary hydraulic switch
HF HP	If equipped, push the HF side of the switch to engage the high flow auxiliary hydraulic mode that produces **207 bar (3000 psi)**. Push the HP side of the switch to engage the enhanced high flow mode to produce **276 bar (4000 psi)** if equipped with an approved attachment. The lamp will illuminate when activated. Keep the switch in the neutral position to disable high flow.

(10)	**Auto-Ride Control™** (ARC)
AUTO	If equipped, use this switch to enable the **Auto-Ride Control™** (ARC) feature. When enabled, the **Ride Control™**feature will become active when the vehicle speed exceeds the ARC activation speed selection made by the operator in the display.

(11)	Self-leveling switch
	If equipped, use this switch to activate the self-leveling feature. As you raise the loader arm the bucket will rotate to maintain a level position.

(12)	Windshield wiper switch
	If equipped, this three position switch turns the wiper ON/OFF and operates the washer fluid spray.



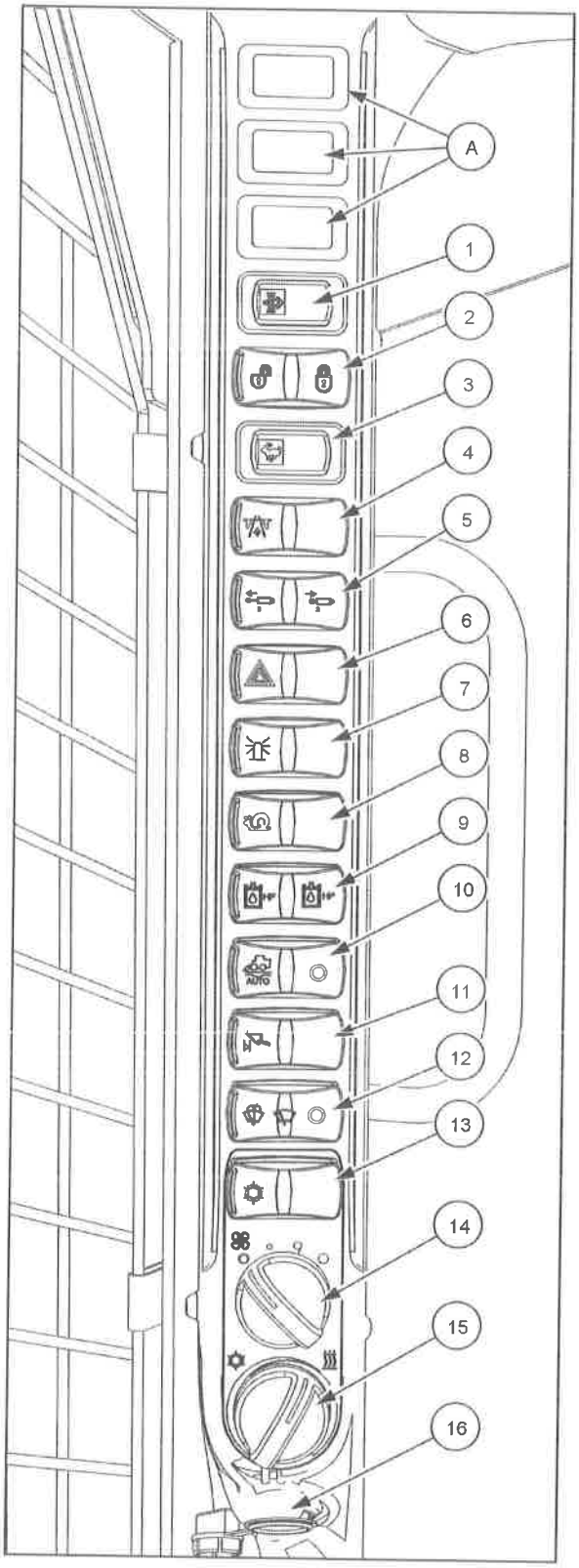
RAPH20SSL0512DA 3

(13)	Air-conditioning switch
	If equipped, this switch turns the air conditioning ON or OFF. The lamp will illuminate, to confirm the system is operational, once the fan switch has been activated.

(14)	Fan dial
	Rotate this dial to activate the fan.

(15)	Heating, Ventilation, Air-Conditioning (HVAC) dial
	Rotate this dial to adjust temperature.

(16)	**12 V** Power port
	Supplies **12 V** of power for accessories.



RAPH20SSL0512DA 4

Creep mode (if equipped)

Function-enable conditions

The creep function can be activated ONLY IF ALL of the following conditions are met.

- Operator is seated properly.
- The restraint bar is in the down position while the operator is in the seat.
- The machine has no ground drive movement.
- The key or knob switch is in the ON position.
- The operator pressed the OPERATE button.

NOTE: *If the operator tries to operate creep without meeting all of the function-enable conditions the creep switch on the left-hand column will flash ON and OFF. If equipped with the LCD multi-function display, the display will read "Creep not able to activate vehicle must be stopped". A message will appear to give guidance to the operator on how to activate creep mode.*

NOTE: *The creep feature only works when in the low speed mode. If the machine is in 2-speed mode when creep is activated, the machine will automatically go into low speed mode.*

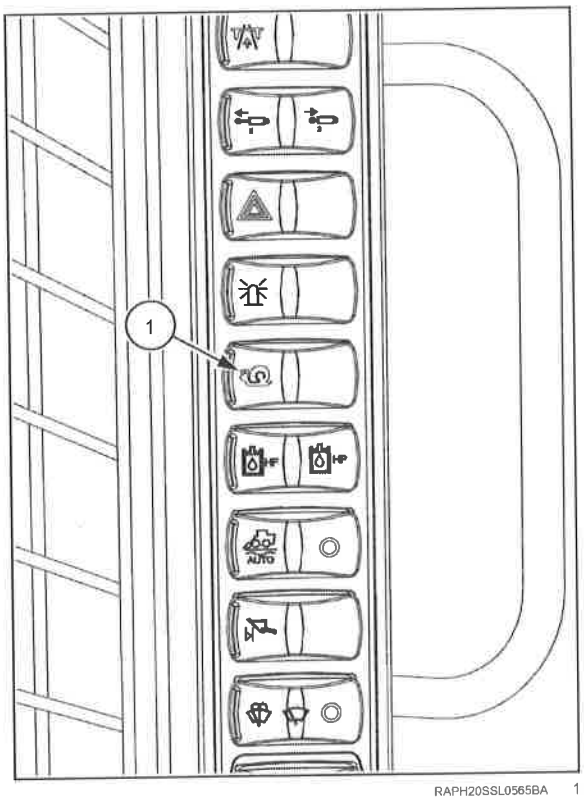
Activate creep mode:

1. Operator must satisfy the "Function enable conditions".
2. Press the creep mode switch **(1)** on the left-hand column panel. The creep symbol will illuminate. If equipped with the LCD multi-function display, the display will indicate the machine is in creep mode with the creep number setting (1-100). The factory default creep setting is 50 which is equivalent to approximately **4.0 km/h (2.5 mph)**.

NOTE: *Environmental conditions will affect the accuracy of the creep speed setting. Creep speed settings will be adjustable whether in neutral or during active use of the feature. See "Adjust the creep mode speed setting" in this section.*

NOTE: *The machine will default to the last creep speed setting before the machine was shut off.*

NOTE: *If the operator leaves the unit running while it is in creep mode and exits the vehicle, the unit will remain in creep mode. All normal interlocks that prevent ground drive activation will be active.*

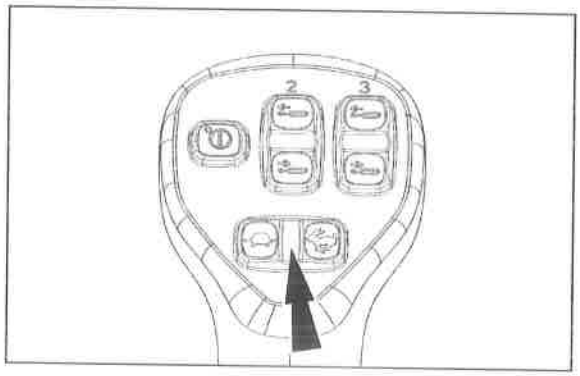


RAPH20SSL0565BA 1

Adjust the creep mode speed setting:

1. Activate creep mode.
2. Press and release the on the left-hand control lever to increase the creep speed by one increment.
3. Press and release the on the left-hand control lever to decrease the creep speed by one increment.

NOTE: *Press and hold either button or for a minimum of 1 second and the operator will be able to move rapidly up or down the speed setting increments until the button is released. Pressing the will stop at 100 and not cycle back to 1. Pressing the will stop at 1 and not cycle up to 100.*

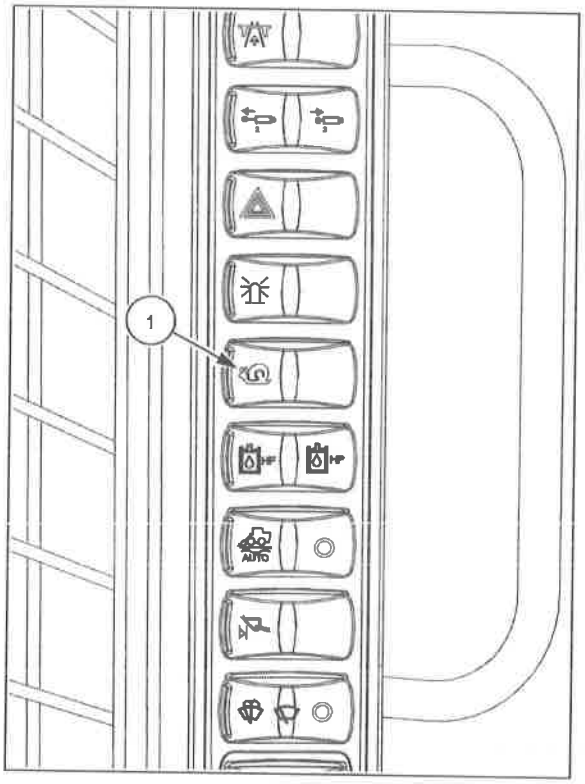


RAIL19SSL0015AA 2

Deactivate creep mode:

1. Press the creep mode rocker switch **(1)** on the left-hand column panel. The creep symbol will no longer be lit. If equipped with the LCD multi-function display, the display will no longer show the creep symbol or setting.

NOTE: *If the machine is turned off while in creep, the creep function will be disabled until the switch is again pushed by the momentary switch to activate the function once the machine is restarted.*



RAPH20SSL0565BA 3

Auto-Ride Control™ (ARC) (if equipped)

⚠ WARNING

Unexpected movement!
Stand clear of the machine. Activating ride control when the loader arm is applying down force, for example supporting or lifting the front end of the machine off the ground, may cause the machine or load to lower unexpectedly.
Failure to comply could result in death or serious injury.

W1163A

Auto-Ride Control™ is an optional feature on machines with Electro-Hydraulic (EH) controls. When **Auto-Ride Control™** (ARC) is active, the loader down pressure is limited to the weight of the loader and the attachment (bucket). The weight of the loader attachment is hydraulically cushioned during transport.

***NOTE: Auto-Ride Control™** should not be used for fine grading with the loader bucket or when precise placement of the loader is required.*

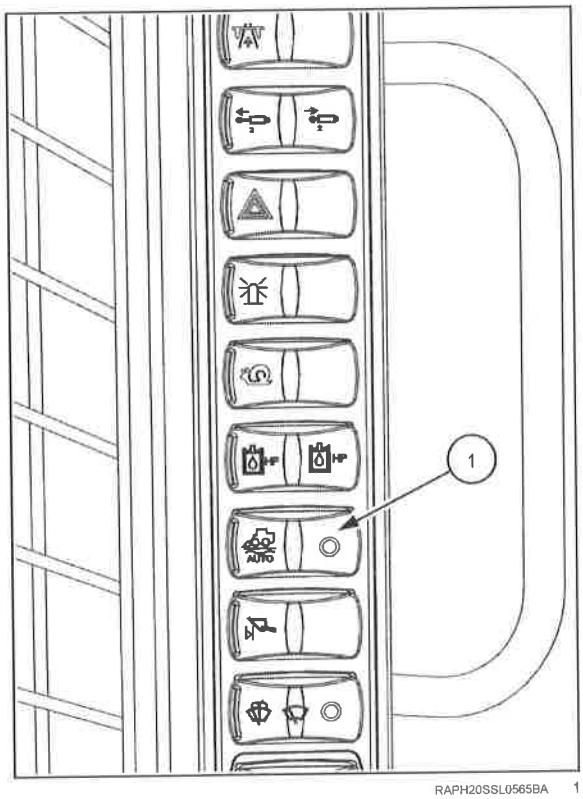
***NOTE:** ARC speed settings can be adjusted to suit the operator's preference. See **Auto-Ride Control™** in the LCD Multi-function Display "Equipment Manual."*

Auto-Ride Control™ (ARC) operation:

1. Place the rocker switch in the center position. In the automatic position, the emblem will illuminate indicating **Auto-Ride Control™** is functioning anytime the machine is traveling above the speed threshold defined in the "Machine Settings" on the LCD Multifunction Display.
2. Disable **Auto-Ride Control™**, press the blank side of the rocker switch. The emblem no longer illuminates.

***NOTE:** When **Auto-Ride Control™** is disabled, the operator may use the trigger on the right-hand control lever to momentarily activate **Ride Control™** (if equipped). Press and hold the control lever trigger to activate **Ride Control™** and release to deactivate.*

The operator may choose to leave **Auto-Ride Control™** in the AUTO (center) position. The selection will hold even when power to the machine has been cycled OFF and ON.



RAPH20SSL0565BA 1

4 - OPERATING INSTRUCTIONS

COMMISSIONING THE UNIT

Operating Instructions

Before each operating period, it is the responsibility of the operator to confirm that the machine is safe and serviced.

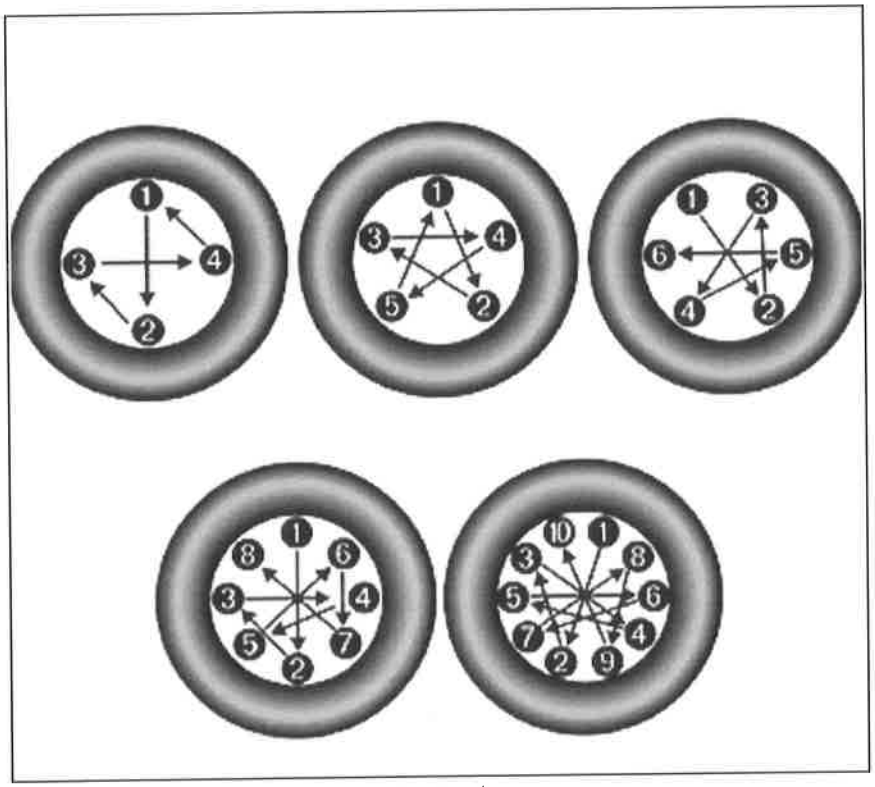
During the first 20 hours of operation, make sure to do the following:

1. If possible, operate the engine at intermittent heavy loads and engine speeds for this period to ensure proper engine break-in.
2. Keep the engine at normal operating temperature.
3. Do not run the engine at idle speeds for long periods of time.
4. During the first 20 hour break-in period, check the oil level at approximately one hour intervals. Oil consumption may be higher during the initial break-in period.
5. It is recommended that the operator run the engine at full throttle when operating conditions permit.

Wheel bolts

If the machine is new or if a wheel is removed for service, check and tighten the wheel bolts every 2 hours of operation until they remain tight. If the machine is equipped with stamped center wheels, the lug nuts will be tapered. Tighten each lug nut to a torque of **162.7 – 196.6 N·m (120 – 145 lb ft)**.

If the machine is equipped with solid center wheels, the lug nuts will be flanged. Tighten each lug nut to a torque of, **189.8 – 223.7 N·m (140 – 165 lb ft)**.



63109344 1

Pre-start checklist

Operating and environmental conditions must be considered and the following checked:

1. Fill the tank with No. 1 diesel or No. 2 diesel fuel. Use No. 1 diesel if the ambient temperature is expected to be less than **4 °C (40 °F)** or if the machine is to be used at an altitude exceeding **1524 m (5000 ft)**. The sediment and water content should not exceed **0.5%**. Use ultra-low sulfur fuel only (less than **15 ppm**).
2. Remove all dirt and debris from the floor board area to maintain full range of foot pedal travel and foot throttle if equipped.
3. Confirm that the radiator and coolers are clean of debris and obstruction.
4. **⚠ WARNING**

   Hot liquid under pressure!
   Service when cool.
   Failure to comply could result in death or serious injury.

   W1187A

   Check fluid levels of the engine, hydraulic reservoir and coolant tank.
5. Lubricate any fittings in accordance with the lubrication and maintenance schedule.
6. Inspect the machine for loose parts, damaged components or missing items. Keep all shields in the proper position.
7. Confirm that all safety signs are legible and properly placed on the correct component. Replace any safety signs that are not legible. Contact your dealer for replacement safety signs.
8. Check the seat belt and seat switch for damage and proper operation. See the maintenance chapter of this manual under daily maintenance for the complete procedure.
9. Confirm that all controls operate freely and correctly.
10. Confirm that the drive control is correct and that the machine does not creep forward or rearward. Contact your dealer if the machine does not remain stationary with the drive controls in the neutral position.
11. Confirm that the parking brake holds the machine from movement when powered or on an incline.
12. **⚠ 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

    Confirm that the attachment is properly secured to the attachment coupler.

STARTING THE UNIT

Engine operation

⚠ DANGER

Improper operation or service of this machine can result in an accident.
Do not operate this machine or perform any lubrication, maintenance, or repair on it until you have read and understood the operation, lubrication, maintenance, and repair information.
Failure to comply will result in death or serious injury.

D0010A

⚠ WARNING

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

W0148B

⚠ WARNING

Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C

Walk-around inspection

Each day before you start the engine:

- Check for leaks under the machine.
- Check tire condition and pressure or track condition.
- Check the machine, equipment and attachments for wear, damaged, or missing parts.
- Check the machine for debris, especially around the radiator and engine area. Make sure these areas are clean.
- Clean or replace any safety or instructional signs that you cannot read.
- Clean the steps, handrails, and operator compartment. Remove any loose items in the operator's compartment.
- See the maintenance chart in this manual and do all the items under **10 h**.

Engine speed

NOTICE: *Prevent damage to the turbocharger. If the engine stalls during normal operation, immediately return the throttle to idle before restarting.*

NOTE: *This machine is not intended to be driven on public roads or highways. Contact your local and regional authorities before operating this machine on public roads or highways.*

NOTICE: *DO NOT run the engine at idle speed for more than **3 h**. This can cause a low operating temperature, which can cause acids and deposits in the engine oil, and in the Diesel Particulate Filter (DPF). It is recommended that you run the engine at full throttle when operating conditions permit and when safe.*

Starting the engine

When the operator sits in the seat the instrument cluster panel will light all functions for about **3 s**, during this time the instrument cluster is self-checking the electrical circuits. All lights will go off except the parking brake and the fasten seat belt light will flash until the seat belt is buckled and/or the restraint bar is lowered. The instrument cluster will sense this and the fasten seat belt light will go off allowing the operator to start the machine.

NOTICE: *If the machine is to be operated in consistently low temperatures, contact your dealer for the correct oil.*

NOTICE: *ALWAYS allow the engine and hydraulic system to warm up before applying a load.*

NOTICE: *If the engine does not start within **30 s**, allow the starter to cool for one minute and then begin the procedure again.*

Start the engine:

1. Adjust the seat, fasten the seat belt, and lower the restraint bar.
2. Place the control levers in the neutral position.
3. If applicable, put the High Flow (HF)/High Pressure (HP) switch in the standard flow (center) position.
4. Increase the throttle to approximately 1/8 throttle.
5. Sound the horn to alert others of your intentions. Follow the applicable system start procedure.
6. Turn the key/knob switch to the RUN position.
7. Monitor the instrument cluster lamps. If the engine preheat lamp illuminates, wait until the engine preheat lamp is off before you start the engine.
8. Turn and hold the key/knob in the START position until the engine starts. Do not hold the key/knob in the START position for longer than **30 s**.
9. After starting the engine, monitor the indicator lights and confirm that the machine functions are normal.

Operating in extreme temperatures

⚠ WARNING

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

W0148B

Operating in cold weather

Cold weather conditions require specific procedures. During these conditions your machine will require special attention to prevent serious damage. Cold weather maintenance will extend the service life of the machine.

Cold weather increases the viscosity of the oil in the hydraulic system. Cold oil can cause changes in the operational characteristics of the machine, particularly in machines equipped with the electro-hydraulic control system. It is recommended to warm the machine to sufficient operating temperature and take care when starting and stopping, and making steering adjustments until you are comfortable with the controls.

Allow extra time during cold weather to bring the machine and components up to operating temperature. Run the engine below **1500 RPM** until the engine temperature rises. Once the engine temperature rises, throttle the engine up to operating speed and operate the machine. DO NOT run the engine at idle speed for extended periods. This will help to extend the engine life and if applicable the Diesel Particulate Filter (DPF) life.

NOTE: *Contact your dealer for approved cold temperature starting aids.*

NOTE: *For models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B (FPT engines), at cold ambient temperatures the engine speed will be automatically limited by the electronic engine control system until the engine has reached a warm operating temperature. This is to protect the engine system. During this time, the engine throttle controls will be unresponsive.*

Battery and electrical system

Clean the battery and make sure it is at full charge. Inspect the battery cables and terminals. Clean and spray the terminals with battery terminal protector to prevent corrosion.

A fully charged battery at **-17 °C (0 °F)** has only **40%** of the normal starting power.

Lubricants

Use the correct viscosity oil in each component based on climate condition. Consideration for extreme temperatures and the correct viscosity are recommended.

Diesel fuel system

Verify with your fuel supplier for the correct cold weather fuel. Diesel engine power will be reduced if wax particles are in the fuel filter. Consult your dealer for the best fuel for these machines.

Cold temperature operation can cause moisture condensation in the fuel tank. Keep the fuel tank full and check for water frequently.

NOTICE: *Failure to remove water from the fuel may result in an inoperative engine and damage to the fuel system.*

Cooling system

Keep the coolant at the correct level in the reservoir and radiator. Use **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** premix (**50%** concentrate and 50% distilled water). This mixture protects the engine cooling system to **-35.0 °C (-31.0 °F)**.

Keep dirt and debris from restricting air flow to the radiator and coolers. Take extra precaution to monitor build up while operating.

Improper fan belt tension may cause an overheating issue.

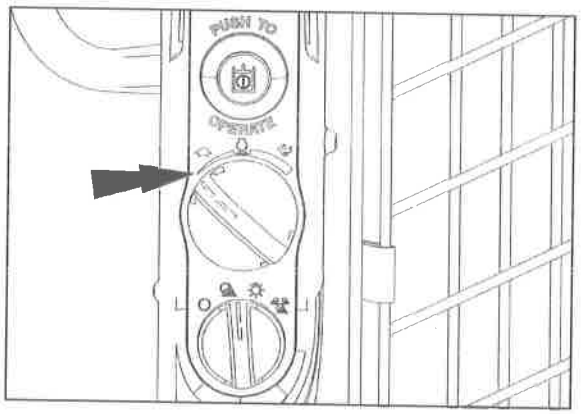
Throttle control

Hand throttle

NOTE: *At cold ambient temperatures the engine speed will be automatically limited by the electronic engine control system until the engine has reached a warm operating temperature. This is to protect the engine system. During this time, the engine throttle controls will be unresponsive.*

Hand throttle control dial to be in low to 1/8 throttle position for starting.

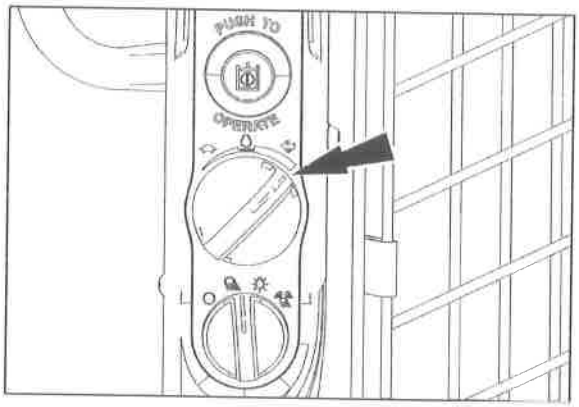
NOTE: *If the throttle control dial is not in the low idle position when starting the engine, the engine speed will be limited to low idle until the throttle control lever is returned to the low idle position.*



RAIL19SSL0061BA 1

Hand throttle control dial in the high throttle position.

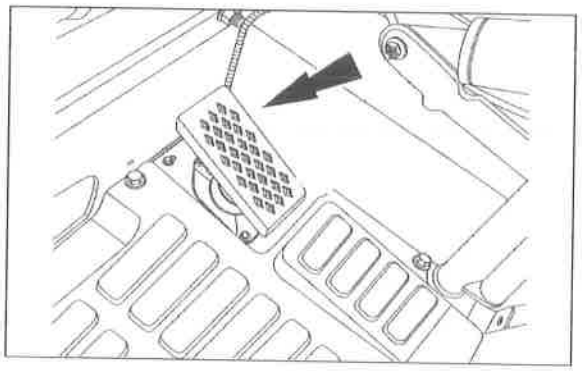
NOTE: *Most operating conditions require full throttle (high throttle) position.*



RAIL19SSL0062BA 2

Foot throttle

The foot throttle is on the right-hand side, if equipped. Push the foot throttle pedal down to increase engine speed. Release the foot throttle pedal to decrease engine speed. When you completely release the foot throttle pedal, it will default to the throttle position of the hand throttle control lever.



93109350 3

Booster battery procedure

⚠ 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

Two persons are required for this procedure. Make sure the person making the connections is wearing face protection.

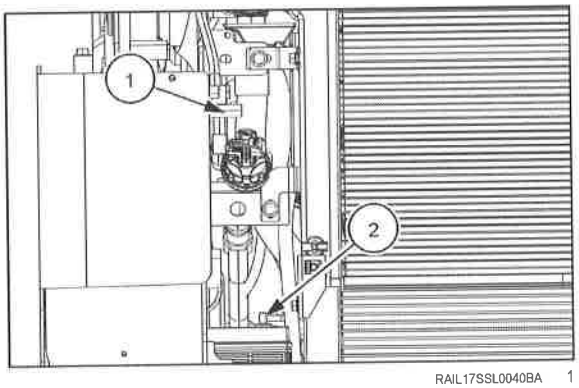
1. Sit in the operator's seat and have the other person make the connections. Make sure the booster battery is **12 V**.

   NOTICE: *Prevent the primary machine's electrical system from receiving excess voltage. Make sure that the secondary machine's engine is not operating or if applicable the charger is not in the boost position when you attempt to start the primary vehicle.*

2. If using another machine for power, make sure the two machines do not touch.
3. Connect the positive jumper cable from the boost battery to the positive battery terminal **(2)** of the dead battery first.
4. Connect the negative jumper cable from the boost battery to a good frame ground **(1)**, away from the dead battery.

   NOTE: *Follow the engine starting procedure in this manual.*

5. After starting the engine, have the other person disconnect the negative jumper cable **(1)** first and the positive jumper cable **(2)** last.



RAIL17SSL0040BA 1

STOPPING THE UNIT

Parking the machine and stopping the engine

⚠ WARNING

Equipment rolling hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0265A

⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

W0141A

NOTICE: *Damage to the turbocharger (if equipped) may occur if the engine is not properly shut down.*

NOTICE: *For model SR160B, after the engine is shut down, the Engine Control Unit (ECU) remains powered to after-cool the exhaust burner. The duration depends on the exhaust temperature, but should be no longer than approximately thirty minutes. During this time, do not use the battery disconnect switch (if equipped) to disconnect the electrical circuit. If the battery disconnect is turned off, the power to the ECU will be cut off and stop the after-cooling which could damage the burner and injectors.*

1. When the work day is complete, park the machine on level ground and lower the loader arms to the ground.
2. Before exiting the machine, ensure that the loader arm or attachment is not supporting the weight of the machine with the front tires off the ground.
3. Run the engine at idle speed and allow time for the engine and component parts to cool evenly.
4. Place all control levers in the neutral position.
5. Turn the key/knob switch to the Stop position to stop the engine. The parking brake will automatically engage.
6. Remove the key (if equipped), release the seat belt, and raise the restraint bar. Use the grab handles when exiting the machine.

MOVING THE UNIT

Machine operation

⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

⚠ WARNING

Impact hazard!
Refer to the cold weather operations section of this manual for start-up and operation in low temperatures 0 °C (32 °F). Follow these procedures to avoid sluggish operation or a change in operation characteristics.
Failure to comply could result in death or serious injury.

W1239A

⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

W0141A

⚠ WARNING

Roll-over hazard! A full bucket in the raised position alters the center of gravity of the machine.
When operating a loader with a full bucket on slopes, observe the following precautions:
1. Avoid turning the machine on slopes.
2. Always drive slowly straight up and down slopes.
3. Always carry the load as low as possible.
Failure to comply could result in death or serious injury.

W0018A

⚠ WARNING

Misuse hazard!
Multiple sensors on your machine control safety functions. For example, a sensor in the operator's seat automatically disengages the drive to the attachment when the operator leaves the seat. To ensure a safe operating mode, DO NOT disconnect or bypass these sensors. Repair all inoperable sensors.
Failure to comply could result in death or serious injury.

W0014A

⚠ 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

NOTICE: *Before you operate the machine, check the control levers, instruments, warning lamps, engine throttle, and attachment hydraulic controls. Also check the seat belt/seat - restraint bar switch. If you know there is a malfunction, missing part, or part that needs adjustment, stop the machine, and correct the problem immediately.*

NOTICE: *For Electro-Hydraulic (EH) machines, when the operator presses the OPERATE button on the right-hand instrument cluster to enable the hydraulic system and a control lever is not in the neutral position; the hydraulics will not enable. JOYNU will appear on the display to inform the operator. Move the control levers to their neutral positions and press the OPERATE button. If JOYNU continues to appear contact your Dealer.*

NOTICE: *For all machines (mechanical or EH), if the operator is out of the seat, the restraint bar is unplugged or up, and the OPERATE button is pressed, error message OPRPR will appear on the display. Check the restraint bar plug connection, engage the restraint bar, sit in the operator's seat, engage the seat belt, press the OPERATE button. If OPRPR continues to appear contact your Dealer.*

1. Set the engine speed at the desired throttle setting. Control the machine ground speed with the control levers. When the job site conditions permit, the throttle should be set at full throttle.

   NOTE: *The minimum throttle setting should be* ***1400 to 1500 RPM*** *for acceptable control.*

2. If you are a new operator, always operate the machine in an open area at a reduced machine ground speed until you get a feel for the controls. Move the control levers slowly and smoothly to avoid machine bouncing. If the machine starts to bounce, bring the control handles back to the neutral position.
3. Keep all machine and loader arm movements smooth, and the work cycle as short as possible. Complete more work in a shorter time frame with a smooth, short work cycle.
4. Keep the work site as smooth and level as possible.

NOTE: *Use the correct tires for the job site conditions.*
Contact your dealer for tire options.

5 - TRANSPORT OPERATIONS

SHIPPING TRANSPORT

Transporting the machine

⚠ 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

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

⚠ WARNING

Transport hazard!
Only use the identified tie-down points to secure the machine for transport on a trailer.
Failure to comply could result in death or serious injury.

W1431A

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

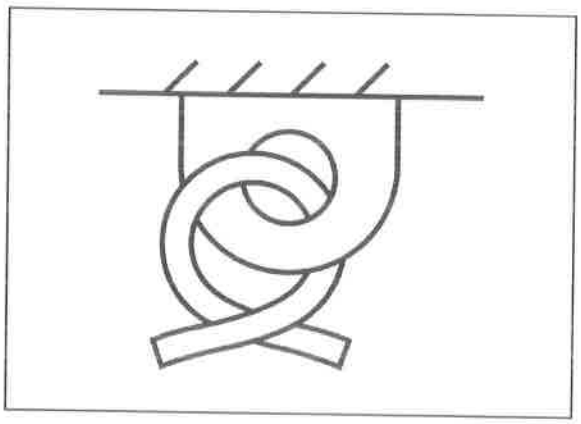
Load the machine on to a trailer:

1. Put a chock block to the front and rear of all trailer wheels.
2. Use low idle speed, move the skid steer slowly onto the trailer. Keep the machine in the center of the ramp and trailer.
3. Lower the bucket or attachments onto the trailer. Make sure not to lift the front of the machine off the trailer.
4. Shut the engine off.
5. If applicable, remove the key.

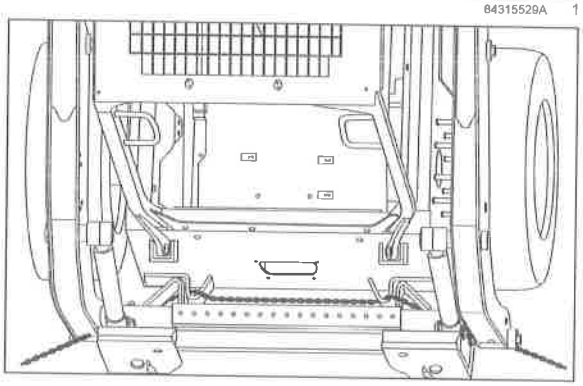
   NOTE: *Small frame units should route the strap shown in Figure* **2** *shows. Medium and large frame units should route the strap shown in Figure* **3** *, through the hand holds or use the key hole available on the lift arm stops.*
6. Use straps to fasten the skid steer to the trailer. Only use the tie-down locations, in the front and rear identified with the tie-down decal.
7. Put chock blocks at both ends of the wheels or tracks of the machine.
8. Remove the chock blocks from the trailer wheels.

Unload the machine from a trailer:

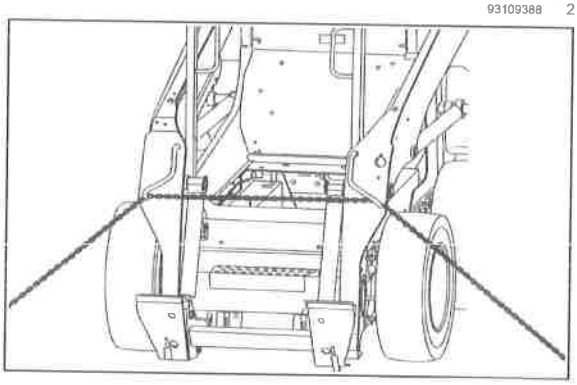
1. Put a chock block to the front and rear of all trailer wheels.
2. Remove the tie-down straps.
3. Remove the chock blocks at both ends of the wheels or tracks of the machine.
4. Start the machine and keep at a low idle speed.
5. Drive slowly down the center of the trailer or ramps.



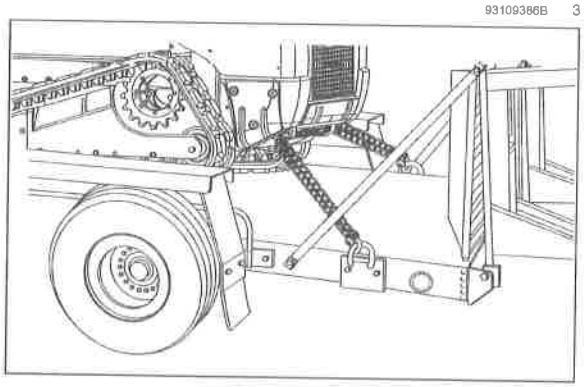
84315529A 1



93109388 2



93109386B 3



93109385 4

Lifting the machine with a four-point lifting device

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply could result in death or serious injury.

W0398A

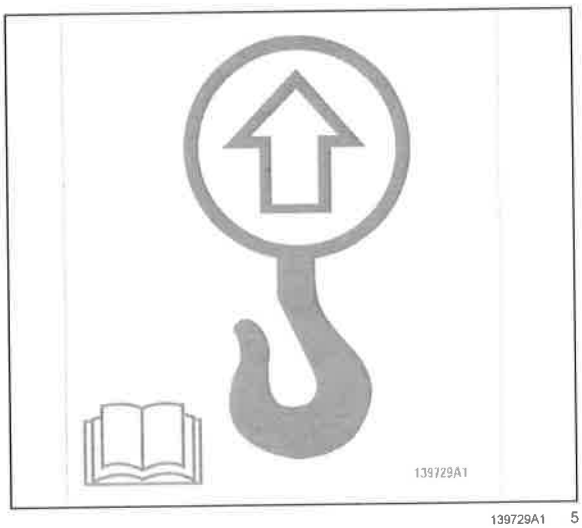
NOTICE: *Only personnel with heavy machine lifting experience should attempt lifting the machine. Contact your dealer for assistance.*

These machines are designed for a four-point lifting device. Use only lifting equipment with a rated capacity to handle the weight of the machine model being lifted. The lifting equipment weight must be added.

1. Remove any and all attachments before lifting the machine.
2. Use the two front lift points and the two rear lift points (one on each side).

NOTICE: *To prevent damage to the cab, synthetic slings must be used for the front lift points.*

Use the correct sling lengths to ensure the proper lift hook point above the cab is maintained for a level machine lift.



139729A1 5

The following precautions must be followed when craning (lifting or lowering) a machine.

- Only attach suitable lifting equipment to the machine at the designated lift points identified with the decal shown.
- Secure suitable lifting equipment to the designated lift points using hooks or shackles with the proper capacity rating.
- Never allow personnel on the machine while craning.
- Remove attachments before craning.
- Use only properly rated lifting devices.
- The weight of the lifting equipment must be added to the machine weight for the proper lift capacity requirement.
- Always inspect the lifting equipment to confirm safe condition. DO NOT use if worn or damaged.
- Do not attach lifting devices to the loader arms or attachments on the machine.
- Make sure that the loader arms are in the lowest position.
- Make sure that the engine is off and parking brake is engaged before craning.
- Keep bystanders a safe distance away from the machine while craning.

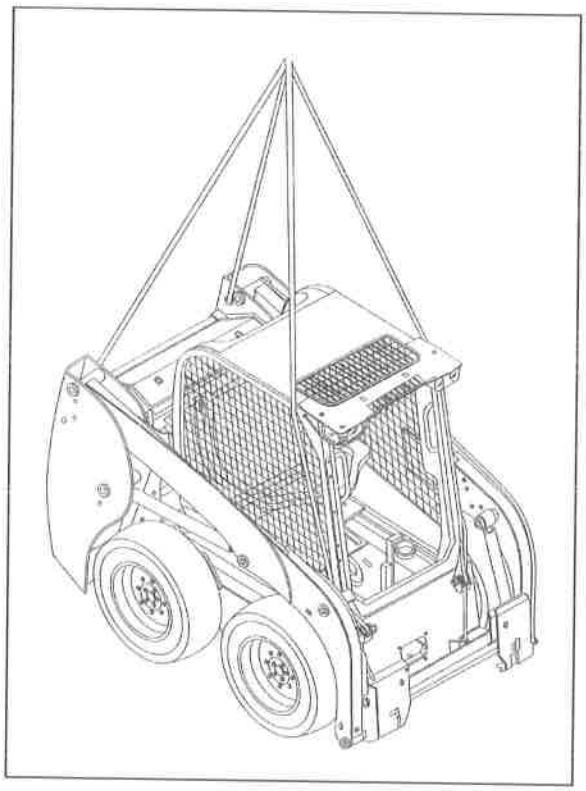
SR160B only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.706 x Gross Vehicle Weight (GVW).

Rear sling requirements:

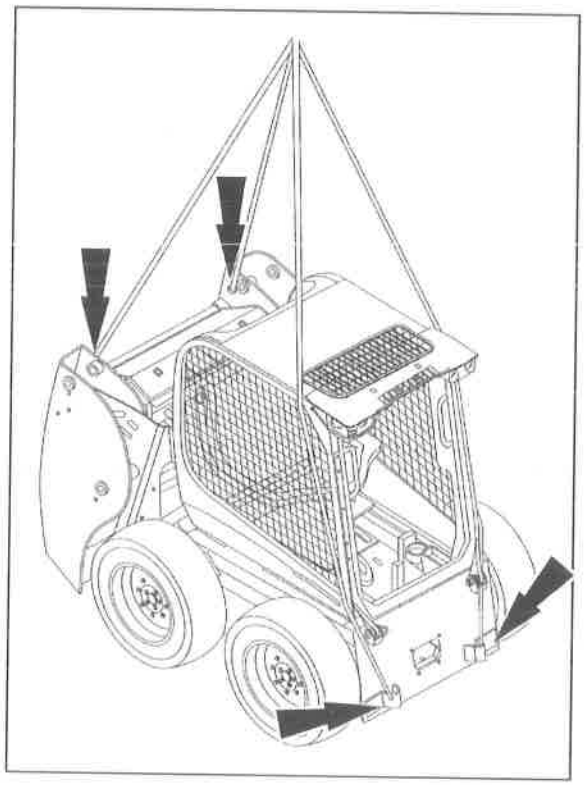
- Two chains approximately **2.5 m** (**8.1 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.550 x Gross Vehicle Weight (GVW).



RAIL14SSL0403BA 6

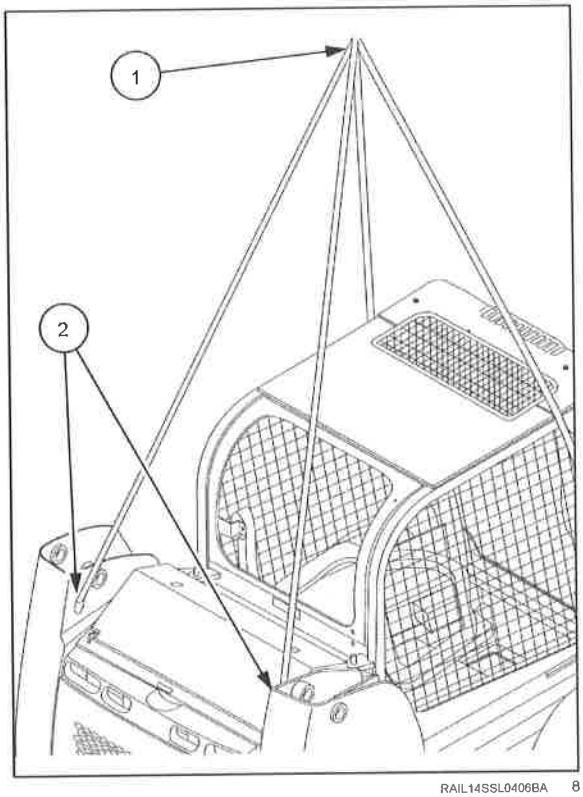
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal



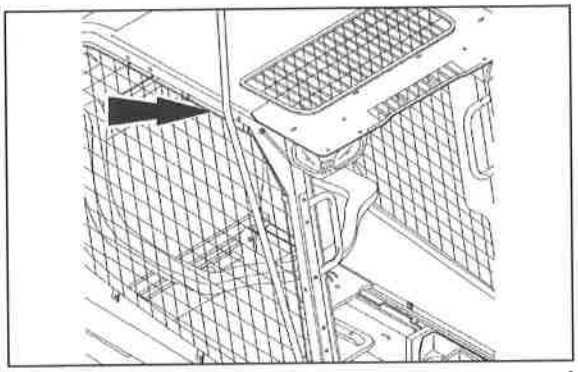
RAIL14SSL0405BA 7

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



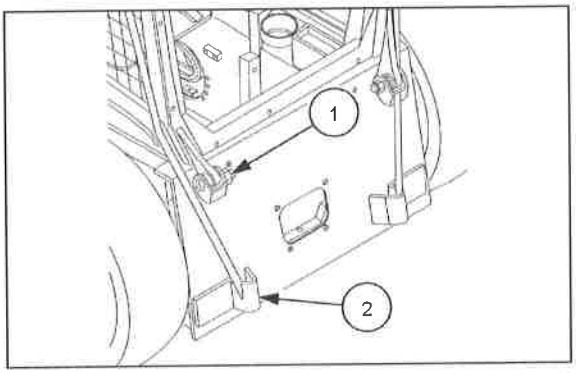
RAIL14SSL0406BA 8

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0407BA 9

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0404BA 10

SR175B, SR210B, SR240B, TR270B, and TR310B only

SR240B Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.748 x Gross Vehicle Weight (GVW).

SR240B Rear sling requirements:

- Two chains approximately **2.4 m** (**8.0 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.555 x Gross Vehicle Weight (GVW).

SR175B, SR210B, TR270B, and TR310B Front sling requirements:

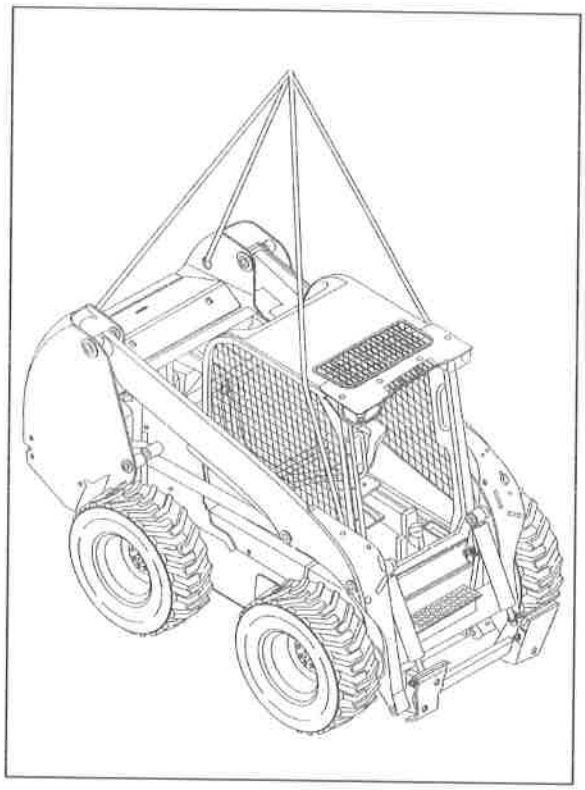
- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.741 x Gross Vehicle Weight (GVW).

SR175B, SR210B, TR270B, and TR310B Rear sling requirements:

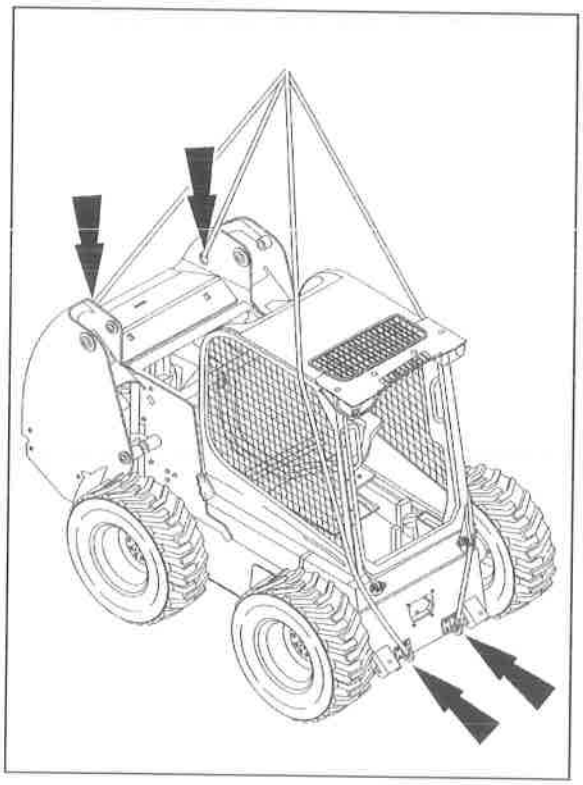
- Two chains approximately **2.4 m** (**8.0 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.536 x Gross Vehicle Weight (GVW).

NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal

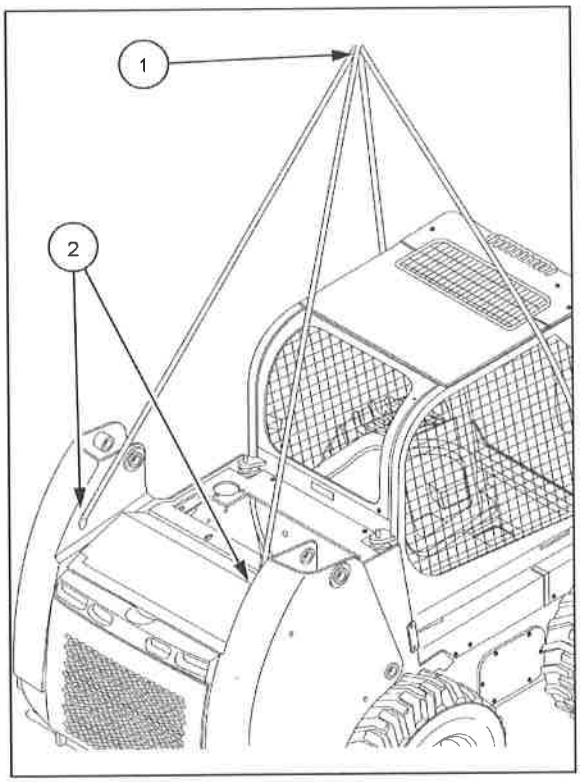


RAIL14SSL0393BA 11



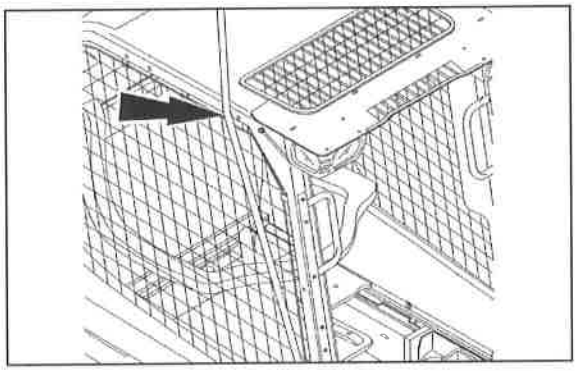
RAIL14SSL0394BA 12

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



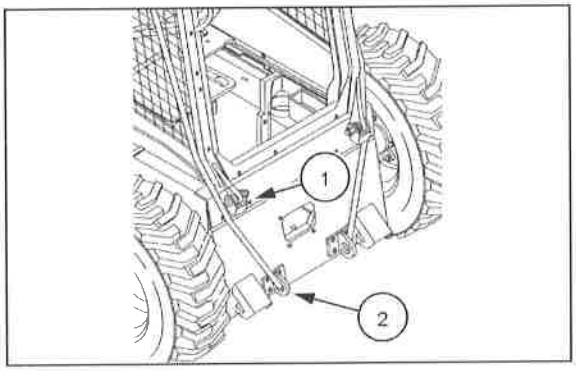
RAIL14SSL0397BA 13

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0395BA 14

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0396BA 15

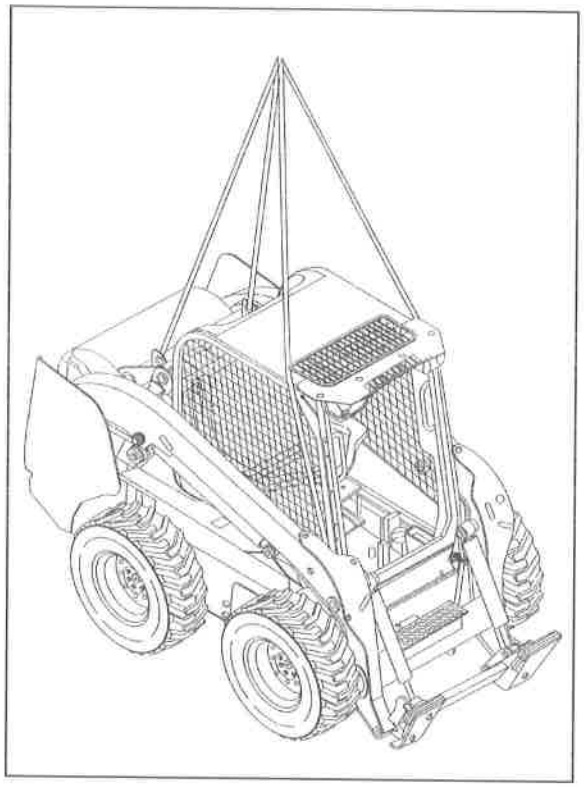
SV185B only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.552 x Gross Vehicle Weight (GVW).

Rear sling requirements:

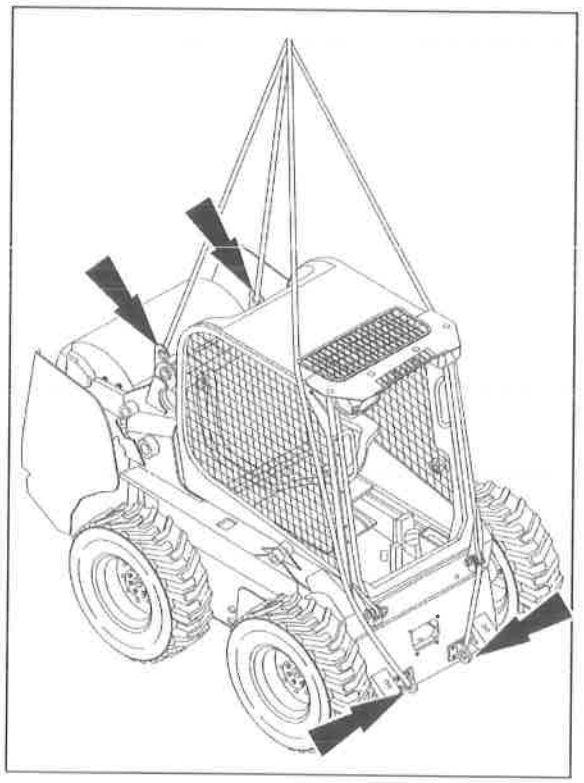
- Two chains approximately **2.2 m** (**7.1 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.676 x Gross Vehicle Weight (GVW).



RAIL14SSL0398BA 16

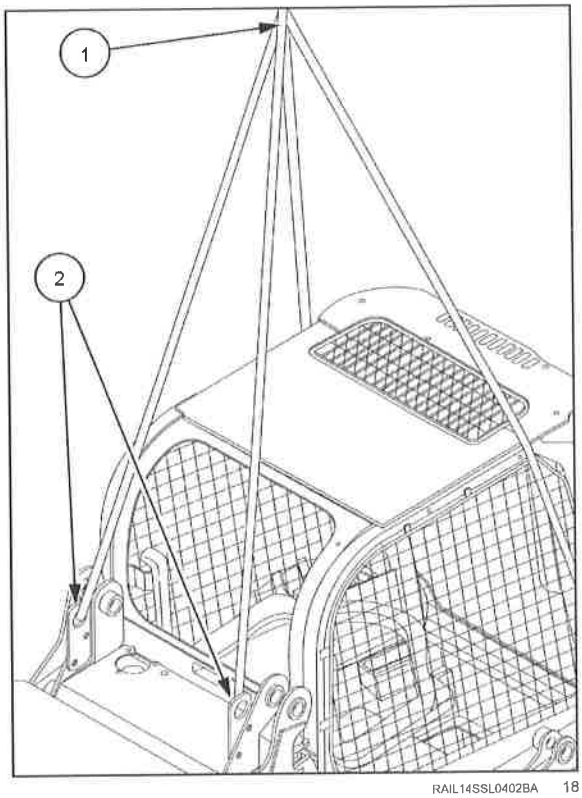
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal.



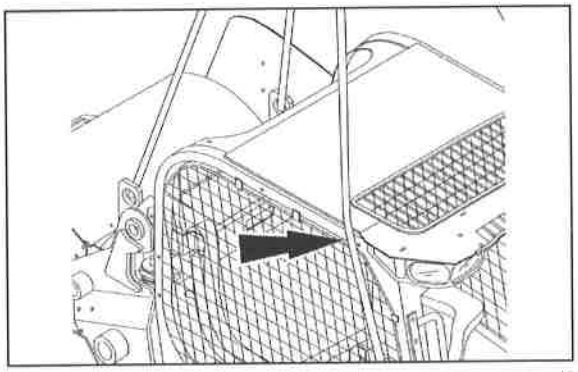
RAIL14SSL0399BA 17

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



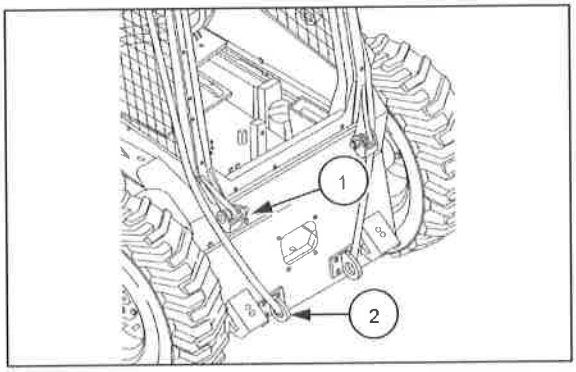
RAIL14SSL0402BA 18

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0401BA 19

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0400BA 20

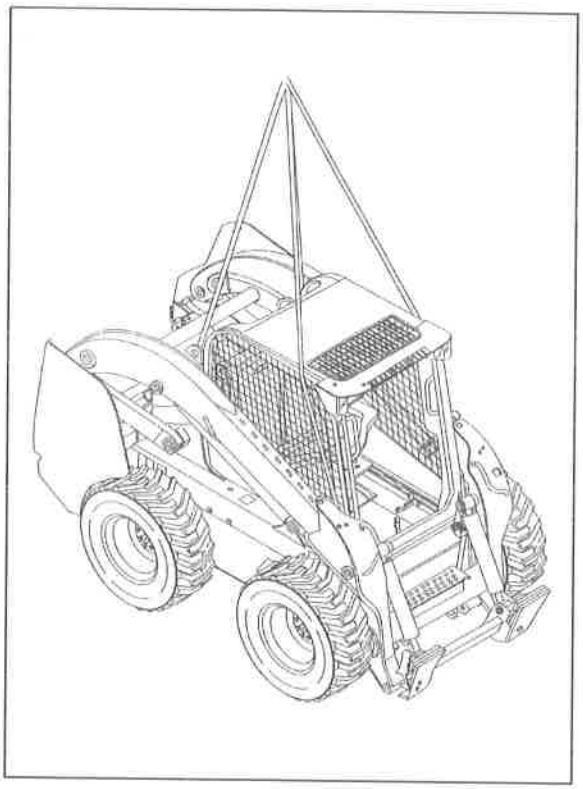
SV280B and TV370B only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.368 x Gross Vehicle Weight (GVW).

Rear sling requirements:

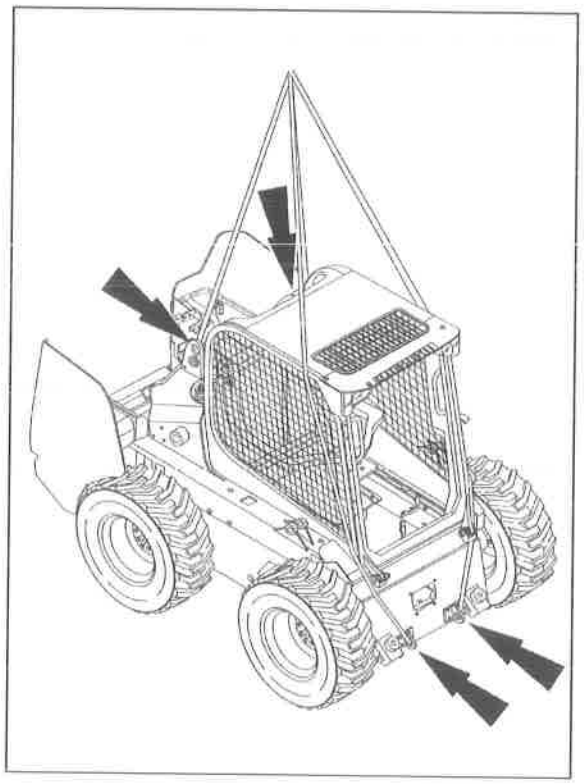
- Two chains approximately **2.0 m** (**6.5 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.851 x Gross Vehicle Weight (GVW).



RAIL14SSL0478BA 21

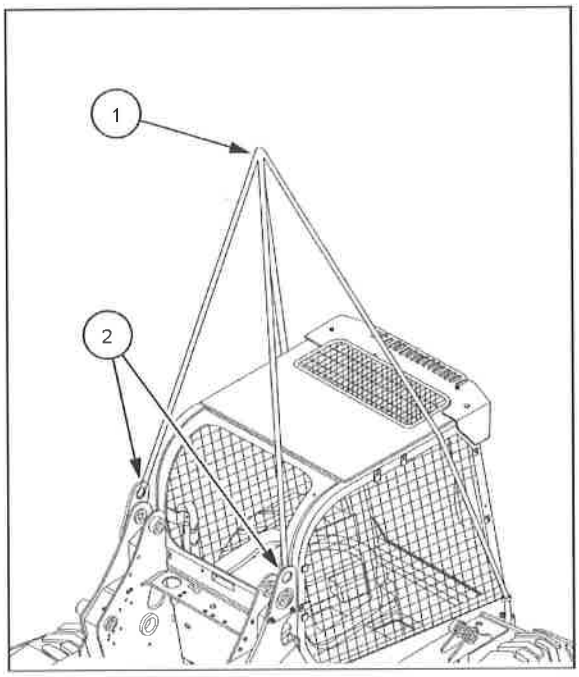
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal.



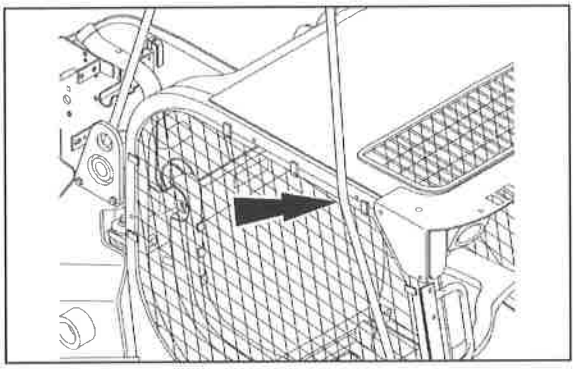
RAIL14SSL0479BA 22

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



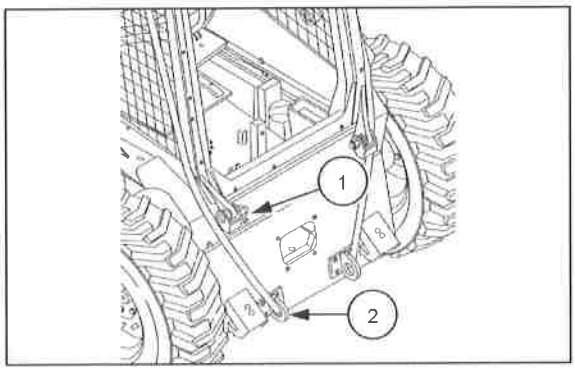
RAIL14SSL0415BA 23

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0417BA 24

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0400BA 25

Lifting the machine with a single-point lifting device

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply could result in death or serious injury.

W0398A

NOTICE: *The craning (lifting) device must be centered over the attachment point when lifting the unit equipped with a single point lifting device. If not centered properly (off to either side or fore and aft of attachment point), the single point lifting device mounting hardware could be damaged.*

NOTICE: *Never drag the unit by connecting to the single point lifting device attachment point. Never pull or tow anything by connecting to the single point lifting device attachment point. Either of these actions may result in damage to the single point lifting device mounting hardware.*

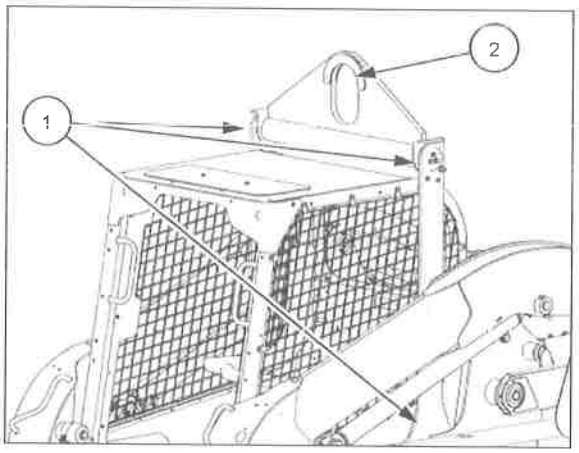
NOTICE: *Only personnel with heavy machine lifting experience should attempt lifting the machine. Contact your dealer for assistance.*

The following precautions must be followed when craning (lifting or lowering) a machine.

- Never allow personnel on the machine while craning.
- Remove attachments before craning.
- Use only properly rated lifting devices.
- The weight of the lifting equipment must be added to the machine weight for the proper lift capacity requirement.
- Always inspect the lifting equipment to confirm safe condition. DO NOT use if worn or damaged.
- Do not attach lifting devices to the loader arms or attachments on the machine.
- Make sure that the loader arms are in the completely lowered position.
- Make sure the engine is shut off and parking brake is engaged before craning.
- Keep bystanders a safe distance away from the machine while craning.

Use only lifting equipment with a rated capacity to handle the weight of the model skid steer being lifted. The lifting equipment weight must be added.

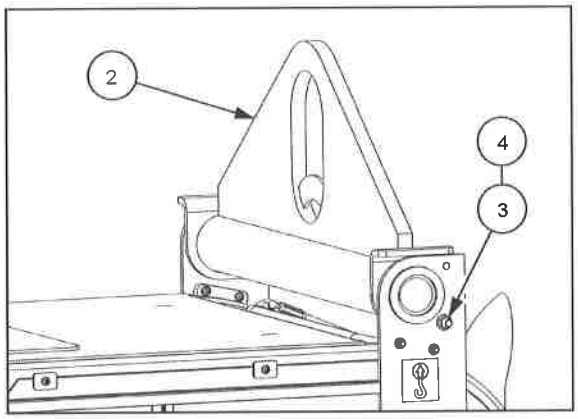
1. Remove any and all attachments before lifting the machine.
2. Only use a CASE CONSTRUCTION approved single-point lifting attachment specifically designed for your machine. Confirm all four hardware **(1)** locations are properly tightened (right-hand side lower hardware not shown).



RCPH11SSL016BAD 26

3. The carrier weldment **(2)** maybe locked in the upright position as shown or in a stowing position by inserting an M12 locking bolt **(3)** and nut **(4)** on each side, into the corresponding holes.
4. Only attach an suitable lifting device to the single point lifting attachment at point **(2)**.
5. If applicable remove M12 locking bolt **(3)** and nut **(4)** from each side before lifting the machine.

   NOTE: *The locking bolt mentioned above is not intended to carry a load. It is only intended to hold the carrier in position while attaching the lifting devise or stowing it for travel. It is recommended that the bolts be removed while the lift straps are being used.*



RAIL19SSL0073BA 27

RECOVERY TRANSPORT

Moving a disabled machine

⚠ WARNING

Loss of control!
Only tow at safe speeds. Use caution when making corners or meeting traffic.
Failure to comply could result in death or serious injury.

W0126A

NOTICE: *CASE CONSTRUCTION does not recommend towing the machine. Do not attempt to move the machine if you believe more damage to the machine will occur. You may damage the machine more severely if you attempt to tow or move a disabled machine. If possible, repair the machine at the job site. Contact your dealer if the machine is disabled.*

6 - WORKING OPERATIONS

GENERAL INFORMATION

Mechanical attachment mounting systems

⚠ WARNING

Unexpected machine movement!
Always make sure the machine is at operating temperature before mounting or removing tools or attachments.
Failure to comply could result in death or serious injury.

W0184A

⚠ 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

Crushing hazard!
On some attachments, it may appear there are two saddle positions for the coupler. Always use the lower position to ensure proper latching of the attachments.
Failure to comply could result in death or serious injury.

W0182B

⚠ WARNING

Falling parts!
Debris build up may interfere with proper and complete mounting or removal of a tool or attachment. Always make sure all debris is cleared from the machine, attachment, or tool before attempting any mounting or removal procedures.
Failure to comply could result in death or serious injury.

W0214A

⚠ WARNING

Crushing hazard!
Never extend any part of the body from the operator's compartment to latch or unlatch components while changing attachments. Always follow the correct procedure in this manual.
Failure to comply could result in death or serious injury.

W0213A

⚠ 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

⚠ DANGER

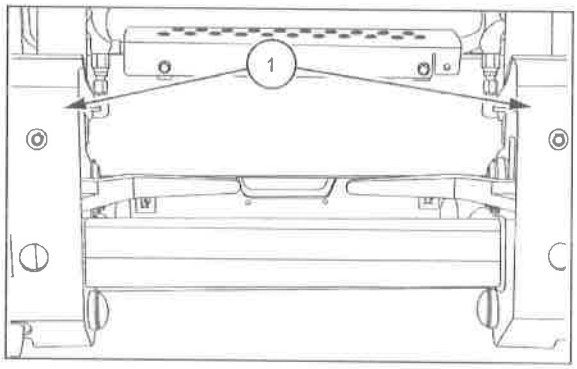
Crushing hazard!
Loader lift arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader lift arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021A

Installing the attachment

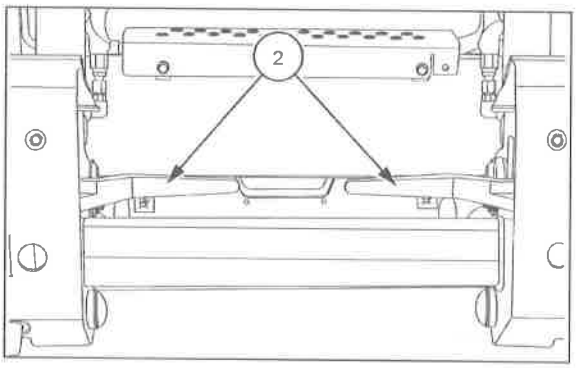
NOTICE: *Read the manufacturer's instruction manual for attachments not included in this manual.*

A pivoting coupler **(1)** is supplied with the machine as standard equipment and remains attached to the loader arm.



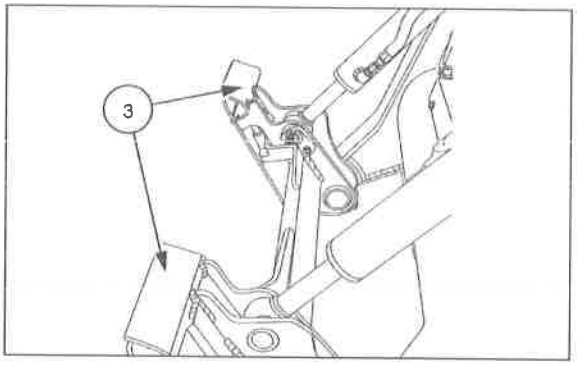
931007516A 1

1. Rotate the latch handles **(2)** up and outward to the unlatched position. Be sure the latch handles are all the way up so the lock pins are fully retracted.



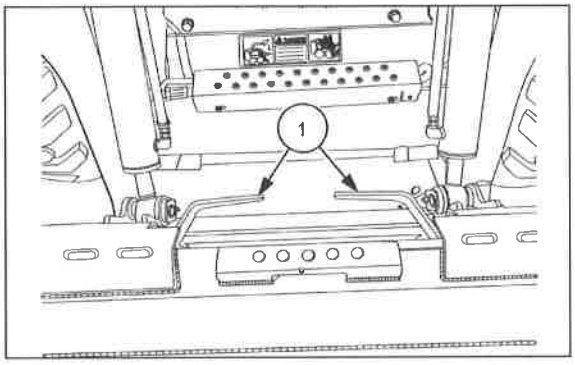
931007516 2

2. Hydraulically tilt the couplers **(3)** forward while guiding the crest of the coupler under the attachment saddle.



931007517 3

3. Raise and curl the coupler until the back surface of the attachment comes to rest flat against the front surface of the coupler.
4. When the attachment is fully supported, lower the loader arm until the loader arm is completely down on the loader stops.
5. Roll the bucket or attachment out, stopping with the bucket edge just off the ground.
6. Turn off the engine, unfasten the seat belt, and exit the operator's compartment.
7. Push the two latch handles **(1)** inward and down over center to engage the lock pins with the retaining tabs on the attachment.



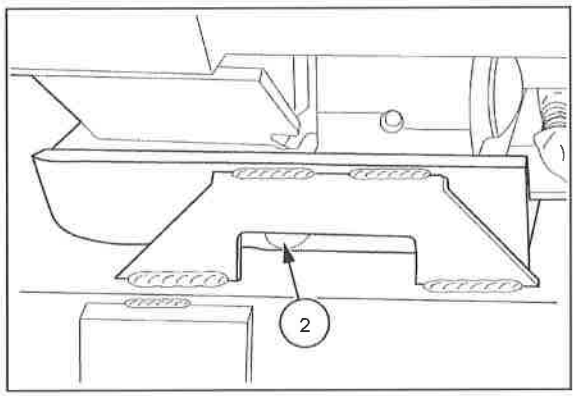
93106897 4

⚠ 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

8. Raise the attachment and slowly roll the bucket or attachment out. Make a visual inspection of the lock pins **(2)** engagement in the attachment lower tab slots.



86092926 5

- If the attachment is not properly secured to the coupler , lower the loader arm and repeat the mounting procedure.
- Before using the attachment, the operator must operate it through its full range of motion and confirm that the attachment is secure and safe.

Removing the attachment

1. Lower the attachment to the ground, stop the engine, confirm that the parking brake is set, and exit the skid steer.
2. Pull the latching handles up and outward to the unlatched position to release the pins from the lower attachment tabs.

NOTICE: *Be sure the latch handles are fully raised.*

3. Fasten your seat belt, start the skid steer, and release the park brake.
4. Tilt the attachment forward so that the front edge is resting on the ground.
5. Continue tilting the coupler forward as you back the machine away from the attachment at the same time.

Hydraulic attachment mounting systems

The optional hydraulic coupler allows the operator to remain in the operator seat and quickly change the loader arm attachments.

The hydraulic coupler switch must be used in conjunction with the one of the three hydraulic functions (held to the end of its stroke):

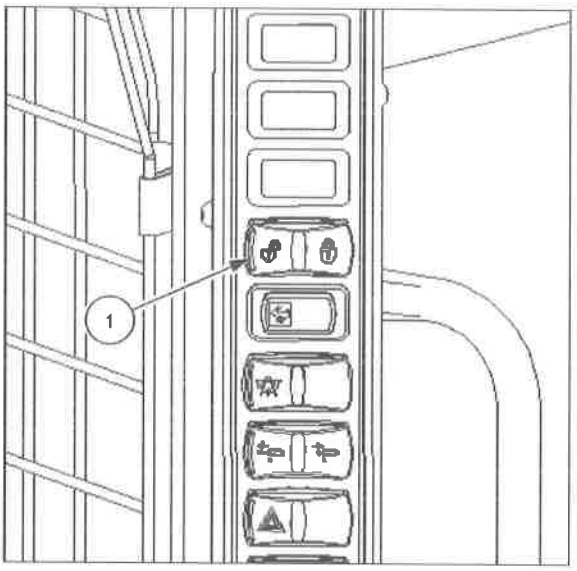
- The control lever's auxiliary switch
- The loader arm down operation
- The attachment curl-in operation

To simplify the instructions only one of the three hydraulic functions is mentioned.

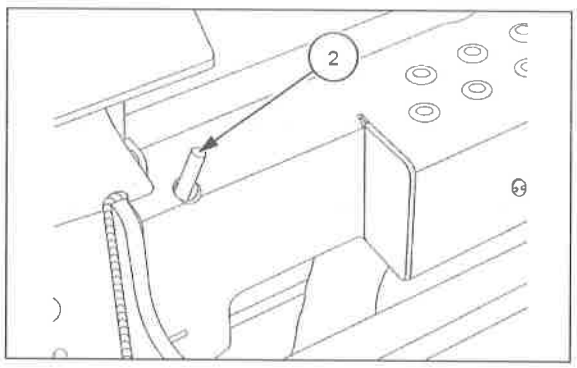
NOTE: *If you have any questions about installing or removing attachments, contact your dealer.*

Removing the attachment

1. Position the attachment above the dismount surface.
2. Press and hold the hydraulic coupler switch **(1)** in the unlock direction. With the other hand activate and hold the control lever's auxiliary switch.
3. Continue to hold the switches as you watch for the red markings on the indicator pins **(2)** to appear. Visible red markings indicate the coupler is in the unlock position.
4. Release the control lever's auxiliary switch and the hydraulic coupler switch.
5. Place the attachment on the dismount surface, roll the coupler out, and back the machine away from the attachment.



RAIL19SSL0068BA 1



93106838 2

Installing the attachment

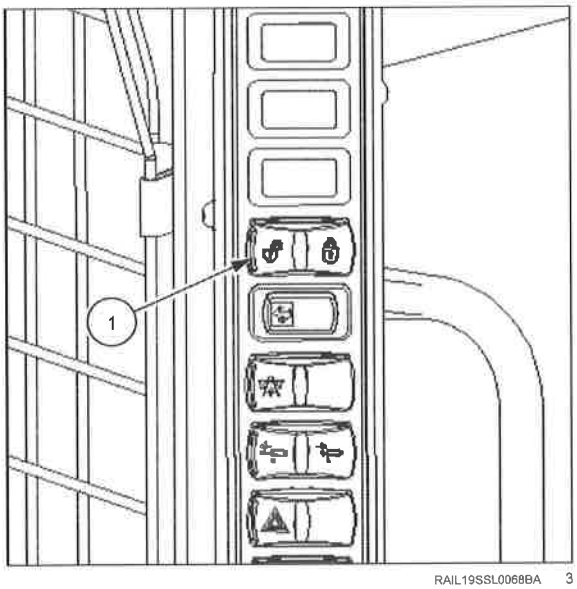
1. Confirm the red markings on the indicator pins **(2)** are visible (unlock position). If the red markings are not visible, press and hold the hydraulic coupler switch **(1)** in the unlock direction. With the other hand activate and hold the control lever's auxiliary switch.
2. Tilt the hydraulic coupler forward.
3. Slowly move the machine toward the attachment until both tabs on top of the coupler are underneath and in alignment with the attachment's mounting points.
4. Raise the loader arm enough to engage the attachment.
5. Curl the coupler back towards the machine until the attachment is completely resting on the coupler and off the ground.

   NOTE: *In the next step, if the indicator pins do not retract you may need to reposition the attachment on the coupler.*
6. Activate the auxiliary switch on the control lever to the end of its control stroke. The indicator pins **(2)** on the coupler will retract into the lock position and the red markings will no longer be visible on the indicator pins.
7. Slowly raise and roll the attachment outward. Do not leave the operator seat but make a visual inspection from the cab that the hydraulic coupler's lower lock pins **(1)** extend fully into the attachment's lower tab slots.

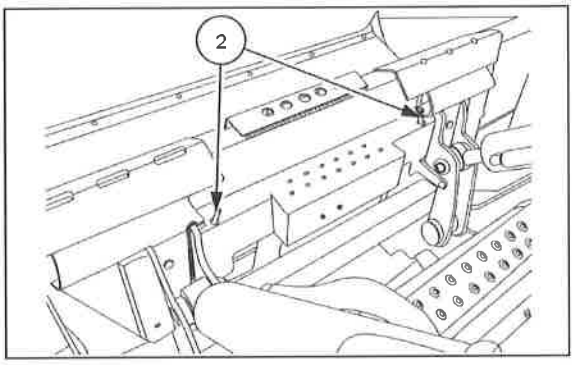
⚠ WARNING

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

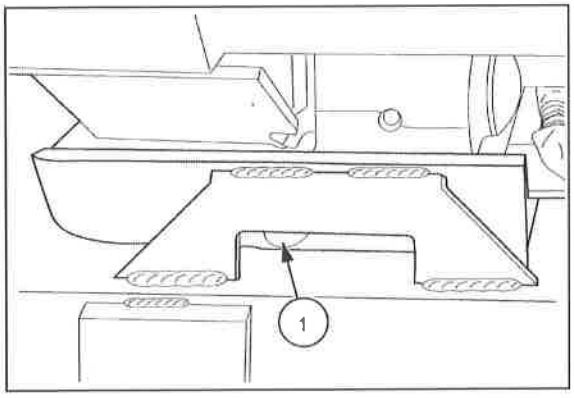
W0947A



RAIL19SSL0068BA 3



93106837A 4



86092926 5

8. Make sure that the attachment is secure and safe to use. Operate the attachment through the full range of motions before you begin normal work operations.

Field operation

⚠ WARNING

Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C

⚠ WARNING

Roll-over hazard! A full bucket in the raised position alters the center of gravity of the machine.
When operating a loader with a full bucket on slopes, observe the following precautions:
1. Avoid turning the machine on slopes.
2. Always drive slowly straight up and down slopes.
3. Always carry the load as low as possible.
Failure to comply could result in death or serious injury.

W0018A

⚠ WARNING

Overturning hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0051A

⚠ 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

⚠ WARNING

Falling object hazard!
Wear an approved safety hat when operating the machine and while in any work area.
Failure to comply could result in death or serious injury.

W0219A

⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Job layout

For efficient operation, arrange the job to minimize the time required to perform the work cycle. In spotting the dump site, consider wind direction, and ground slope. Whenever possible, position the dump site so that the wind will carry dust away from the operator. Before the operator begins work, take a few minutes to level off the work area if it is not smooth. Minimize transport distances for a faster work cycle.

Operating load capacities

⚠ WARNING

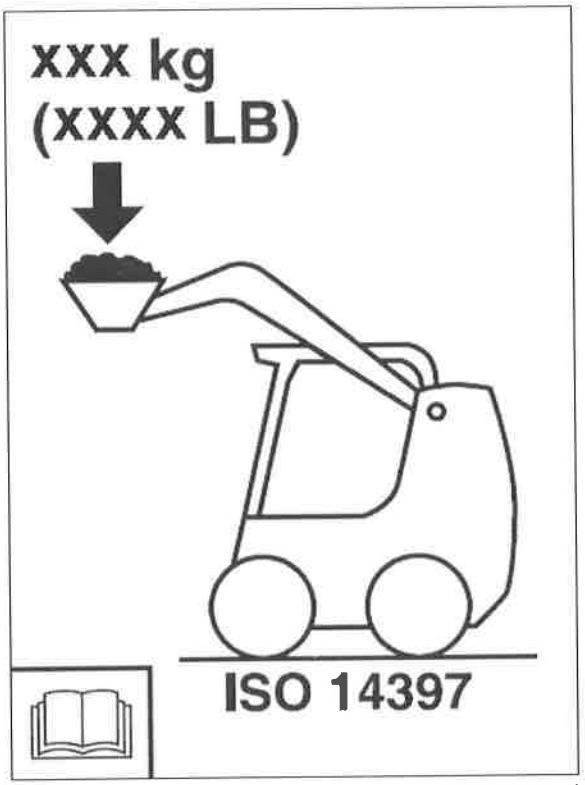
Overturning hazard!
The operator must know the correct OPERATING LOAD capacity of the machine before attempting to operate the machine. Always follow the recommended load limits.
Failure to comply could result in death or serious injury.

W0216A

⚠ WARNING

Roll-over hazard!
Overloading the rated capacity of the machine could cause the machine to roll over. Always follow the recommended load limits. Never overload the rated capacity of the machine.
Failure to comply could result in death or serious injury.

W0217A



RAIL15SSL0380BA 1

See page **9-2** for a list of models and specifications. For your specific machine, see the decal on your machine for the operating load capacity. The decal is located on the cab right-hand console post. If you have questions about the load capacity of your machine, contact your dealer.

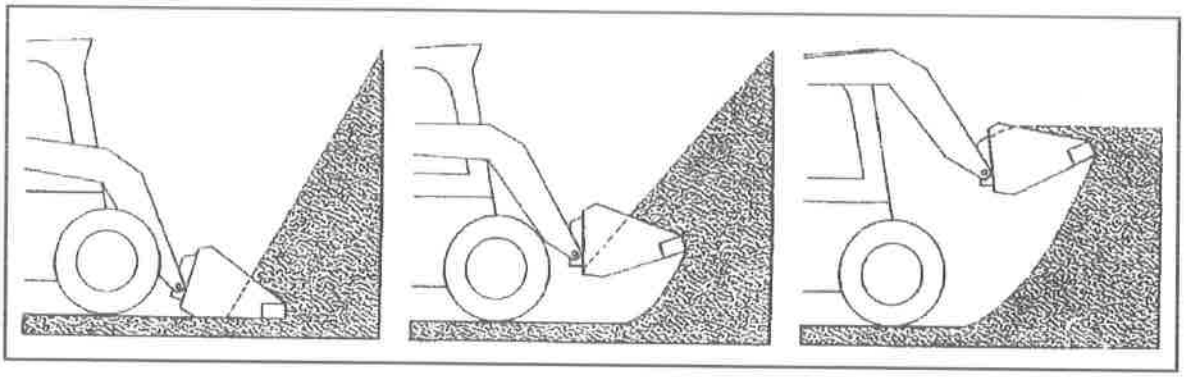
- Before starting work, familiarize yourself with the work area. Locate holes, obstacles, and debris that can be cleared from the site. Be aware that the job site may change repeatedly during the course of the work day.
- Locate any unavoidable danger areas such as, power lines, bridges, and tight corners to make sure that you can operate safely in these areas.
- Confirm the possibility of other personnel in the machine vicinity and clear the area of unauthorized personnel.
- If possible, arrange the job site to minimize the time required to perform the work cycle. Consider wind direction and ground slope. Position the dump site so that the wind will carry dust and dirt away from the operator.
- Use low range for maximum machine efficiency.

Filling the bucket

There are two basic methods of filling a bucket from a pile: arc penetration and step penetration. Judge the type of penetration needed for loading and vary the methods to suit the materials.

Arc penetration

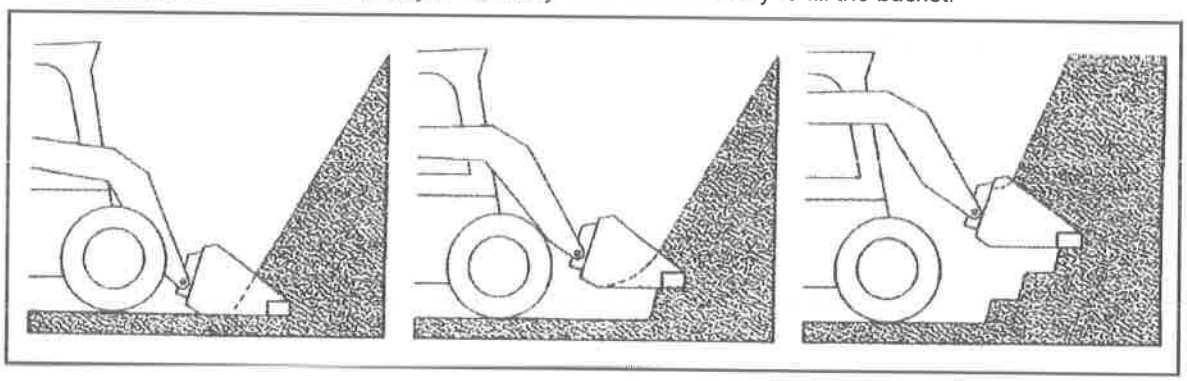
With the arc penetration method, the bucket is forced into the pile and rolled back while raised in a continuous upward arc until the bucket is filled. When using this method, remember that too much roll back may over load the lift system. When activating both the lift and bucket hydraulic systems at the same time, the lift system may occasionally stall. When this happens, disengage either the lift or roll back function to allow maximum hydraulic force to act upon one set of cylinders.



BT09A228 2

Step penetration

With the step penetration method, the bucket is forced into the pile at ground level with the bucket bottom horizontal. Force the bucket into the pile as far as possible during the initial thrust. Raise the bucket about **0.3 m** (**1 ft**) and then force it further into the pile. Repeat this cycle as many times as necessary to fill the bucket.



BT09A229 3

Digging

⚠ WARNING

Loss of control hazard!
Travel speed should be such that complete control and machine stability is maintained at all times. Where possible, avoid operating near ditches, embankments and holes. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
Failure to comply could result in death or serious injury.

W0233A

⚠ WARNING

Tip-over hazard!
Raising an overloaded bucket could cause an accident. If this situation should occur, and the machine should start to tip forward, IMMEDIATELY lower the lift arms.
Failure to comply could result in death or serious injury.

W0255A

⚠ WARNING

Loss of control hazard!
A full bucket in the raised position may cause the machine to slide when operating over rough ground. Keep the bucket as low as possible during operation for better stability and visibility. Always operate the machine at slow speeds over rough ground.
Failure to comply could result in death or serious injury.

W0271A

⚠ WARNING

Collision hazard!
Always make sure the area behind the machine is clear of all persons, animals, and obstructions BEFORE backing up.
Failure to comply could result in death or serious injury.

W0232A



BC04F048X 4

When digging with the machine, remove a thin layer with each pass. This method is efficient and minimizes wheel slippage. When encountering firmly packed materials, flutter the bucket control valve to assist penetration.

NOTE: *If the engine pulls down as the machine is engaging a load, the directional controls are being held to far in the direction of travel. Maximum torque is obtained at minimum ground speed in low range for all machines.*

Transporting the load

When backing out and transporting a load, carry the bucket just high enough to clear obstacles in the loaders path. Raising the bucket higher than necessary reduces stability.

Dumping the bucket

Coordinate the forward ground speed and lift arm lift speed to attain the desired bucket height when arriving at the dump site.

Before the forward and lifting motions are stopped, begin dumping the bucket to gradually empty the load at minimum lift arm height. By emptying before stopping, machine stability can be maximized.

When loading into a truck, the bucket can be used to push materials to the far side of the truck if the bucket is in a tilted down position. For greatest efficiency this should be done as the load is being dumped, before the machine's forward motion is stopped. Try to spot the truck so that you dump over the low side and into the far side of the truck first.

When handling adhesive materials, the bucket can be fluttered to loosen the materials which tend to stick to the back of the bucket.

Returning the bucket load to the loading position

Immediately after the bucket has been fully dumped, begin the roll back cycle as the machine is backed away from the dump site. Repositioning the bucket for the filling cycle while lowering the lift arms is a good time saver. Fine adjustments in bucket height can be made as the machine begins forward on the filling cycle, thereby saving a period of dead time between the dumping and filling cycles.

Dozing with the bucket

The machine can be used for dozing by controlling the tilt of the bucket.

The machine can be used for leveling, by placing the bucket in the dump position and back dragging loose soil. The tilt of the bucket will control the amount of soil that is moved.

Place the lift arm control valve spool in the detent position to allow the bucket to follow the ground contour and deposit soil in the low areas.

NOTICE: *Do not push against objects with the lift arms fully raised or damage to the lift arms or lift arm cylinders may occur.*

NOTICE: *Do not push forward with the bucket in the fully dumped position because the bucket cylinders may be damaged.*

Dislodging mired machine

In most cases, when a machine becomes bogged down, the bucket can be used to push the loader to more solid ground. When this is done, the bucket is in the fully dumped position and the lift arms are lowered. The bucket is then curled back as the steering control levers are pulled back. When the bucket has stroked out of ground engagement, immediately return the steering control levers to neutral. DO NOT spin the wheels. Repeat this cycle as necessary to move the machine to solid ground.

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.

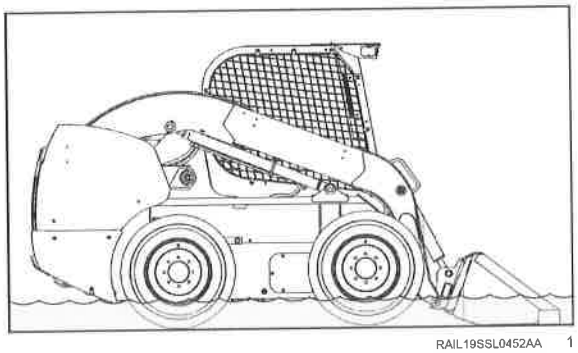
W0151A

Make sure that the bed of the stream or stretch of water can support the weight of the machine.

The level of the water must not exceed the bottom of the machine belly pan.

Before taking the machine into the water, pump plenty of new grease into the attachment linkages on the machine.

After operating the machine in the water, pump plenty of new grease into the attachment linkages on the machine.



RAIL19SSL0452AA 1

7 - MAINTENANCE

GENERAL INFORMATION

General safety before you service

⚠ WARNING

Pressurized system!
Always remove all pressure before working on the hydraulic system. Follow the pressure BLEED program in the Configuration Mode to remove the pressure in the entire hydraulic system.
Failure to comply could result in death or serious injury.

W1410A

⚠ 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

Improper operation or service of this machine can result in an accident.
If you do not understand a maintenance procedure, or doubt your ability to perform a maintenance procedure correctly, see your authorized dealer.
Failure to comply could result in death or serious injury.

W0157A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Raised equipment or machine movement without an operator can cause serious injury. Always do the following before performing any maintenance:
Park the machine on flat, level ground.
Lower the attachment to the ground.
Shut down the engine and remove the starter switch key.
Lock the tracks.
Failure to comply could result in death or serious injury.

W0269A

⚠ WARNING

Crushing hazard!
Never use the machine lift arms or attachment to raise the machine for service. Use adequate blocking to ensure the machine is supported safely with all four wheels off the ground.
Failure to comply could result in death or serious injury.

W0345A

⚠ WARNING

Overturning hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0051A

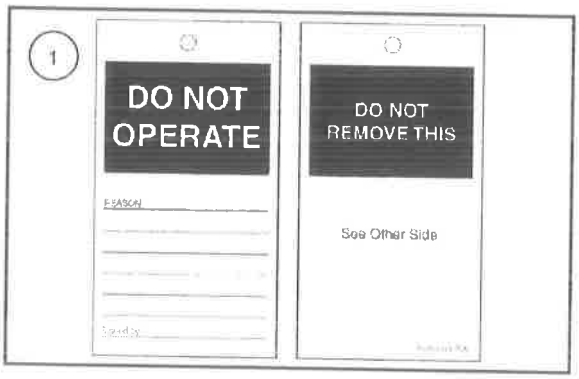
Read the safety signs and instructional signs on the machine. Read the operator's manual and safety manual. Understand the operation of the machine before you start servicing.

Use the correct safety clothing and safety equipment. Understand how to use a fire extinguisher and first aid kit.

Maintenance and lubrication schedules are defined for NORMAL working environments and conditions. Extreme working conditions and environments require more frequent service and care. Contact your dealer if you have any questions about your service intervals or requirements.

Before you service the machine, put a DO NOT OPERATE TAG **(1)** on the instrument panel or key switch.

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.*

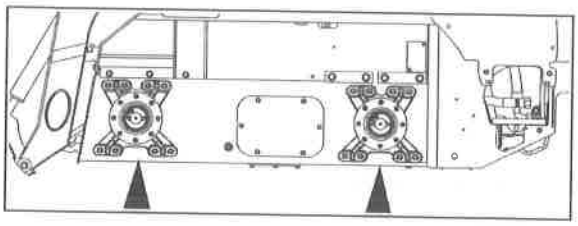


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Properly support a raised machine without tires

If servicing, lubrication or maintenance requires the machine being raised, securely support the machine with adequate blocks before removing the tires (if needed).

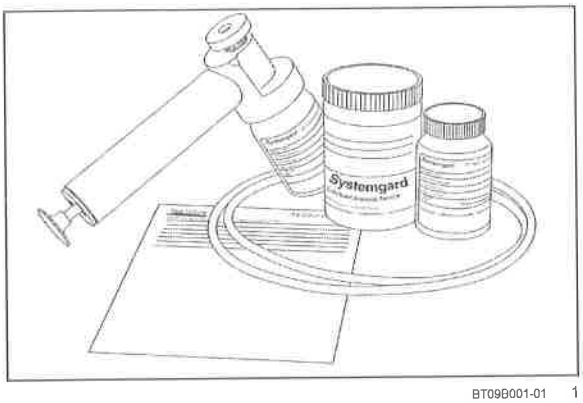
NOTE: *See the torque chart for the wheel bolts on page* ***9-30****.*



931002280 2

Lubrication analysis program

Ask your dealer about a lubricant analysis program. Through this service, your lubricants are tested in an independent laboratory. You simply remove a sample of lubricant from your machine and send the sample to the independent laboratory. After the sample is processed, the laboratory will report back to you and guide you with maintenance requirements. A lubricant analysis program can help support your equipment up time and provide you with a service that can pay back dividends when you trade for another piece of equipment. The normal engine oil change interval is listed in the maintenance chart. Operating conditions, quality of the engine oil, and sulfur content of the fuel can change this interval. It is recommended that you use a lubricant analysis program. See your dealer.



BT09B001-01 1

Plastic and resin parts

Avoid using gasoline, kerosene, paint thinner, etc., when cleaning plastic windows, console, instrument cluster, monitor, gauges, etc. Use ONLY water, mild soap and a soft cloth when you clean these parts. Using gasoline, kerosene, thinners, etc., will cause discoloration, cracking or deformation of the part being cleaned.

Machine cleaning

⚠ WARNING

Fire hazard!
Failure to inspect and clean machine and engine compartment could result in reduced machine performance, machine damage, and increased risk of fire. Fire can result in total loss of vehicle and property, and may cause serious personal injury. Check machine and engine compartment daily for debris build up, especially in operating environments with high debris. Remove any debris immediately.
Failure to comply could result in death or serious injury.

W1181A

It is recommended that the complete machine be kept clean. Machine operation in water, mud, dust, landfill, land clearing, or forestry will require complete machine clean up. Cleaning includes periodic removal of inspection covers and guards to gain access for cleaning and removal of dirt and debris. Clean all dirt and foreign material from the engine area and from around all access doors and panels. Clean all cooling systems and radiators.
After cleaning is complete, install all covers and guards. DO NOT operate the machine with covers or guards removed.

NOTICE: *When washing the machine, DO NOT direct the water jet onto electrical or electronic components, assemblies, or openings. Water ingress may cause malfunctions or the failure of the entire electronic system.*

NOTICE: *Avoid direct power washing of interior electrical components such as the instrument panel, switches, radio, and speakers.*

NOTICE: *The Diesel Particulate Filter (DPF) has ceramic internal parts that could be damaged if the unit is shut down when the engine is very hot and the DPF is washed with extremely cold water. Wait until the DPF is cool before washing with extremely cold water.*

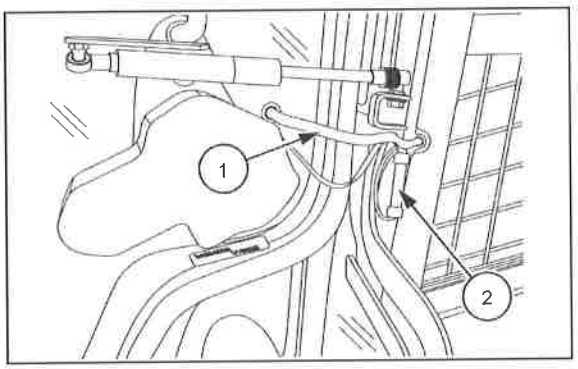
Cab door removal and installation

NOTICE: *During the removal process retain all door hinge shims and keep in a secure location. The shims are required for a proper fit when installing the door at a later date.*

Removal

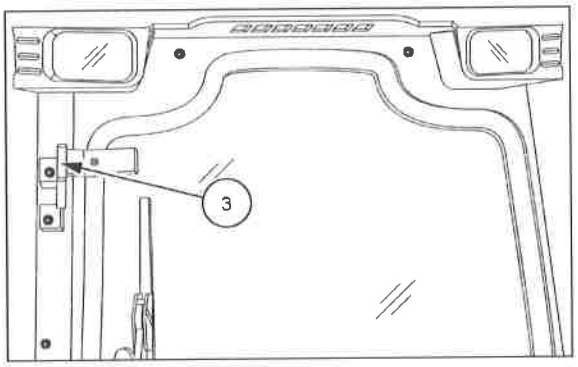
1. Open door.
2. Disconnect the washer hose **(1)**.
3. Disconnect the wire harness **(2)**.
4. Plug the jumper connector into the harness **(2)**.

   NOTE: *Jumper connector is tied to the door harness.*



93106895 1

5. Lift the door off the hinges **(3)**.

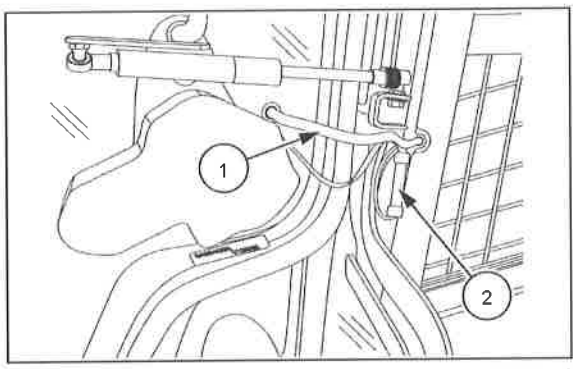


93106842 2

Installation

NOTE: *If door hinge shims were removed during the removal procedure, install the shims.*

1. Install the door on the hinges.
2. Install the washer hose **(1)**.
3. Unplug the jumper connector from the wire harness **(2)**.
4. Connect the wire harness **(2)**.
5. Tie the jumper connector to the door harness.



93106895 3

Battery safety - check and 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

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

⚠ WARNING

Explosive gas!
Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0005A

⚠ WARNING

Battery gas can explode!
To prevent an explosion: 1. Always disconnect the negative (-) battery cable first. 2. Always connect the negative (-) battery cable last. 3. Do not short circuit the battery posts with metal objects. 4. Do not weld, grind, or smoke near a battery.
Failure to comply could result in death or serious injury.

W0011A

⚠ 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

Arc flash 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.

W1366A

⚠ WARNING

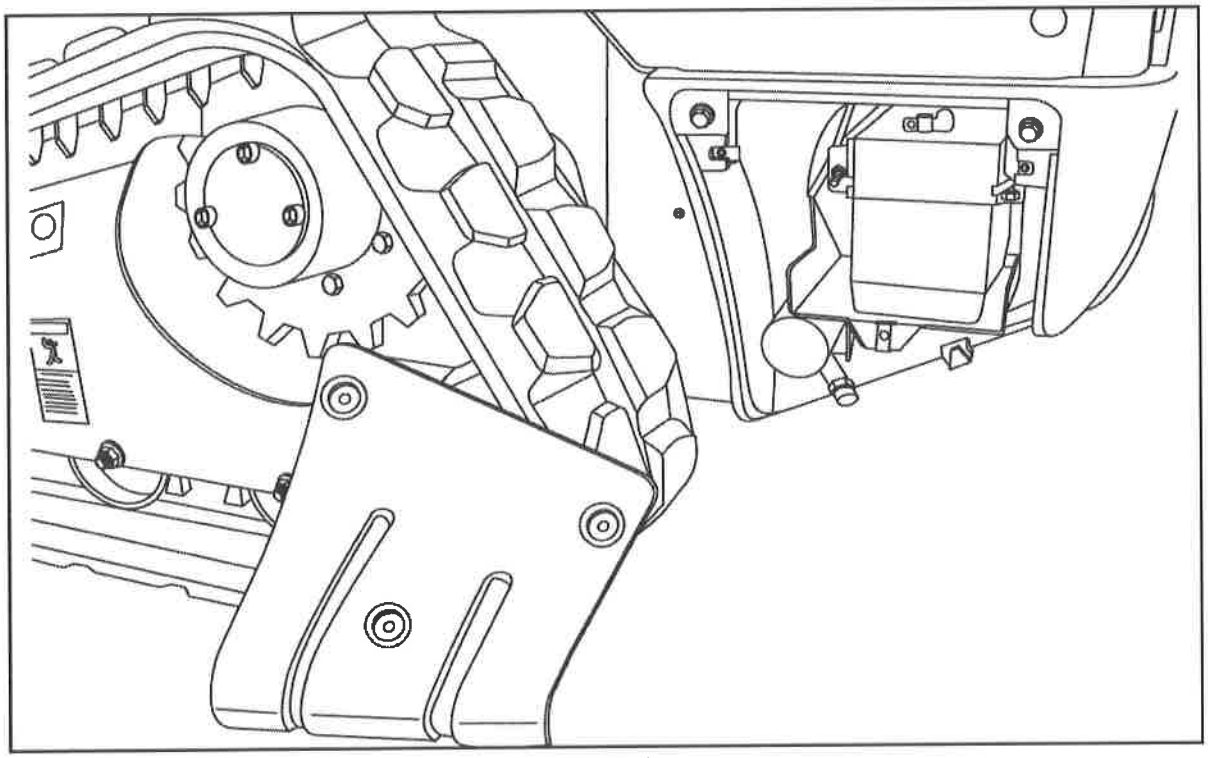
Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

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



63107490 1

Check the battery as required, for dirt corrosion and damage. Dirt mixed with electrolyte or moisture on the top of the battery can cause a discharged condition in the battery. Clean the battery by using baking soda or ammonia and flush the outside of the battery with water. Spray the battery terminals with battery terminal protector. DO NOT use grease.

Battery removal and installation

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0396A

⚠ 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

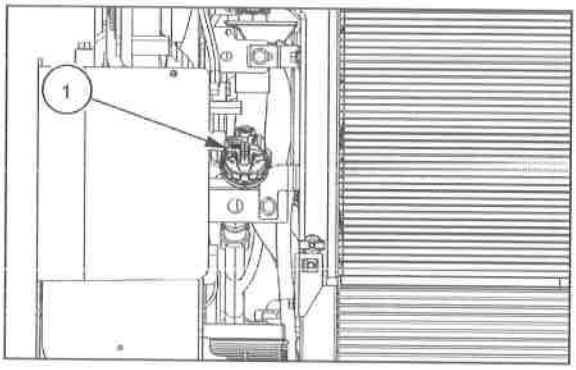
⚠ WARNING

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

Battery – Remove

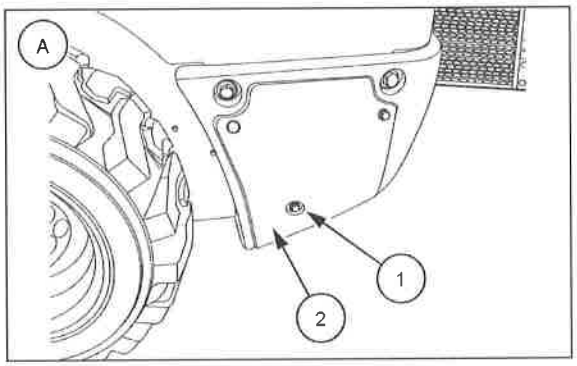
1. Open the engine door and turn the battery quick disconnect switch **(1)** to the OFF position.



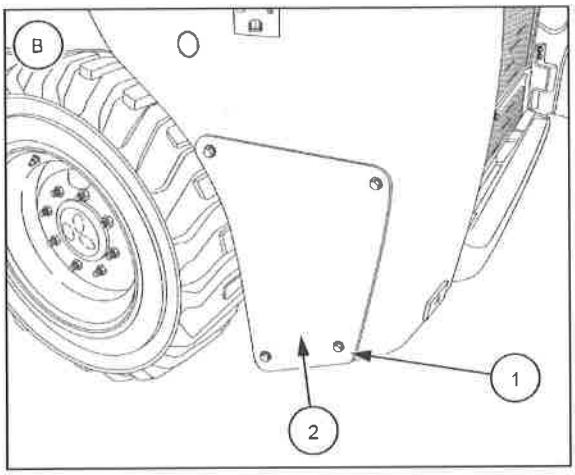
RAIL17SSL0040BA 1

2. Remove the battery cover hardware **(1)** and the battery cover **(2)**.

   NOTE: *The top image* ***(A)*** *is applicable to SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B machines. The bottom image* ***(B)*** *is applicable to SR160B machines.*

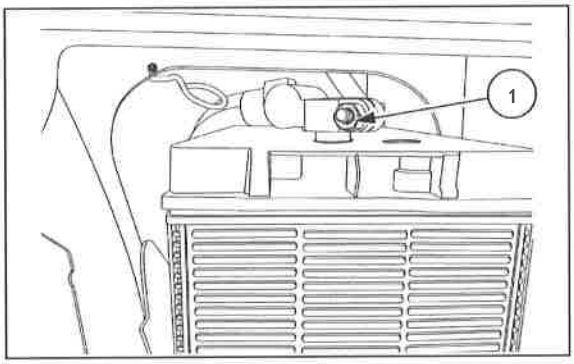


931001637 2



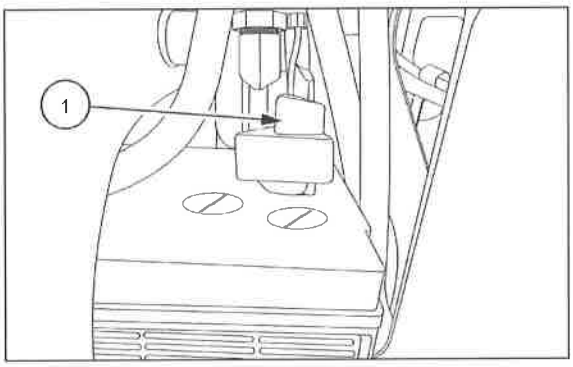
RAIL13SSL0582BA 3

3. Disconnect the negative (-) battery cable **(1)** from the battery



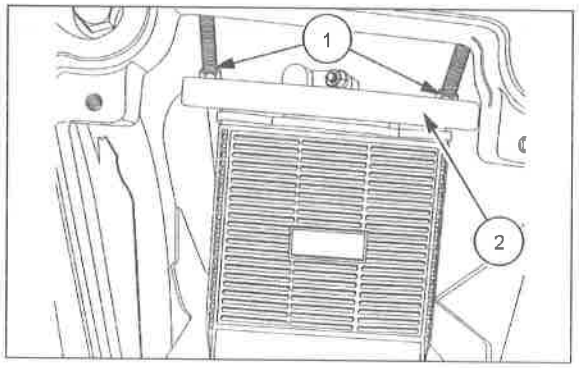
931001641 4

4. Disconnect the positive (+) battery cable from the battery.



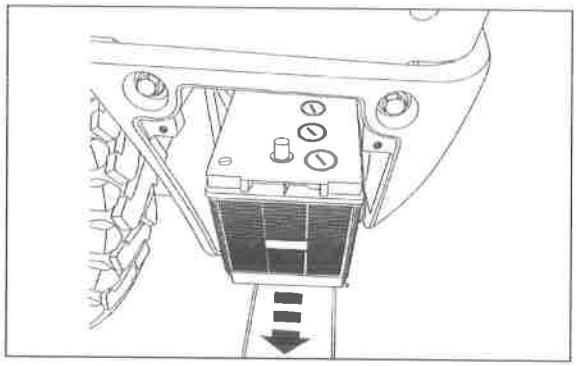
931002054 5

5. Loosen the nuts **(1)** and remove the battery hold-down **(2)** .

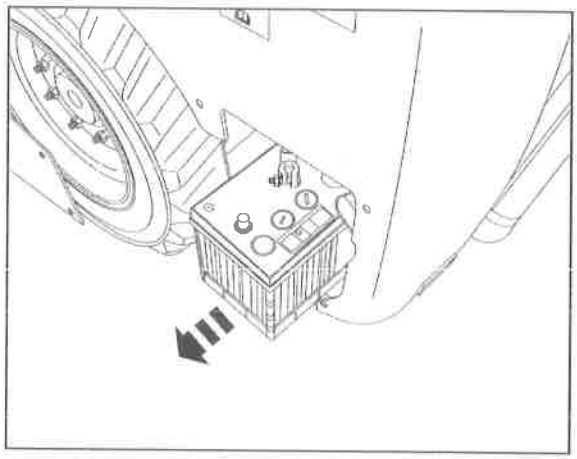


931001639 6

6. Remove the battery in direction of the arrow.



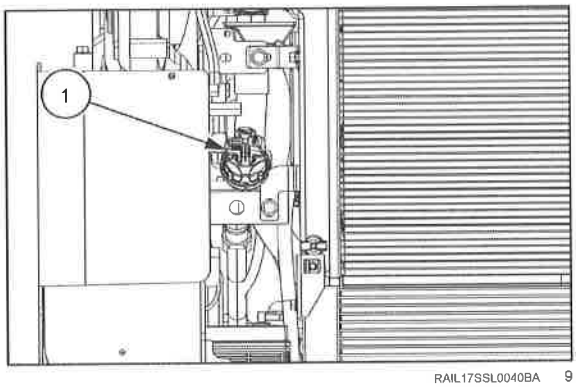
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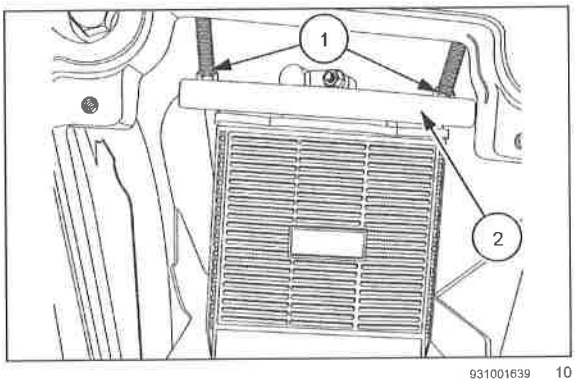
Battery – Install

1. Confirm that the battery quick disconnect switch **(1)** is in the OFF position.



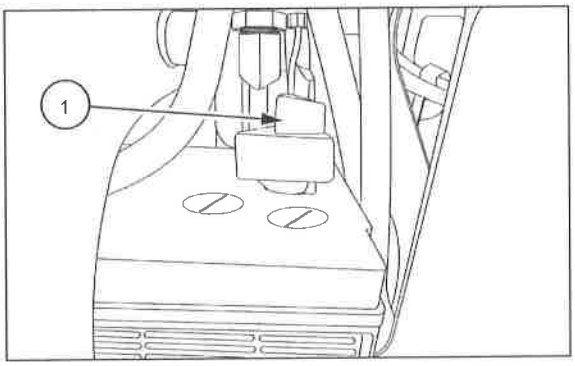
RAIL17SSL0040BA 9

2. Place the battery on the battery tray.
3. Install the battery hold-down **(2)** and secure with nuts **(1)** .



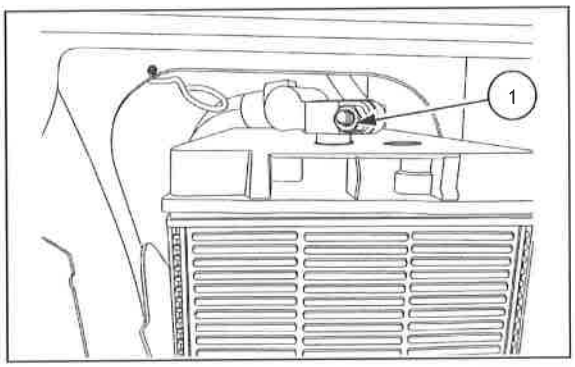
931001639 10

4. Connect the positive (+) battery cable **(1)**.



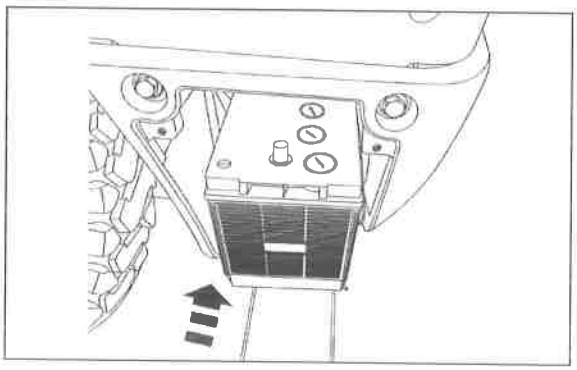
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5. Connect the negative (-) battery cable **(1)**.

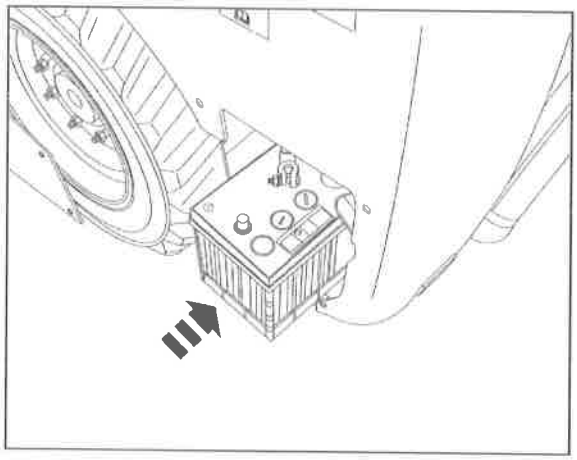


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6. Slide the battery back into the compartment.



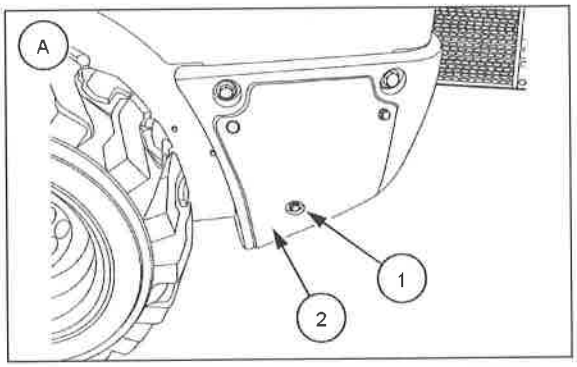
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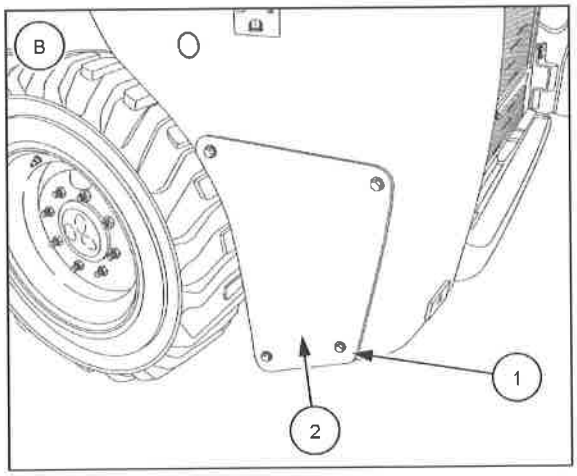
RAIL13SSL0581BA 14

7. Install the battery compartment cover **(2)** and secure with bolts **(1)**.

   NOTE: *The top image* ***(A)*** *is applicable to SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B machines. The bottom image* ***(B)*** *is applicable to SR160B machines.*

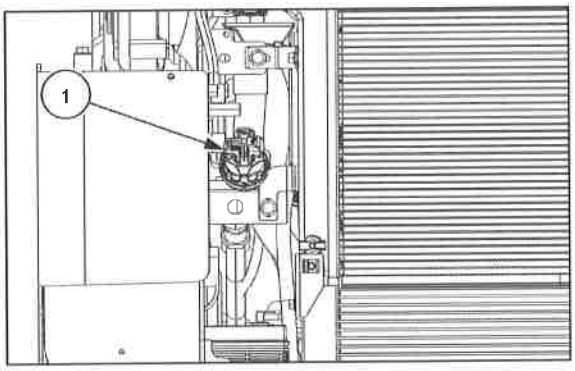


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8. Turn the battery quick disconnect switch **(1)** to the ON position.
9. Close the engine door.



RAIL17SSL0040BA 17

Fire extinguisher

It is recommended that you have a fire extinguisher on your machine. See your dealer for the type and mounting information.

NOTICE: *Use the fire extinguisher mounting kit provided by your dealer. DO NOT make any modifications to the Roll Over Protective Structure (ROPS) or Falling Object Protective Structure (FOPS).*

NOTICE: *Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.*

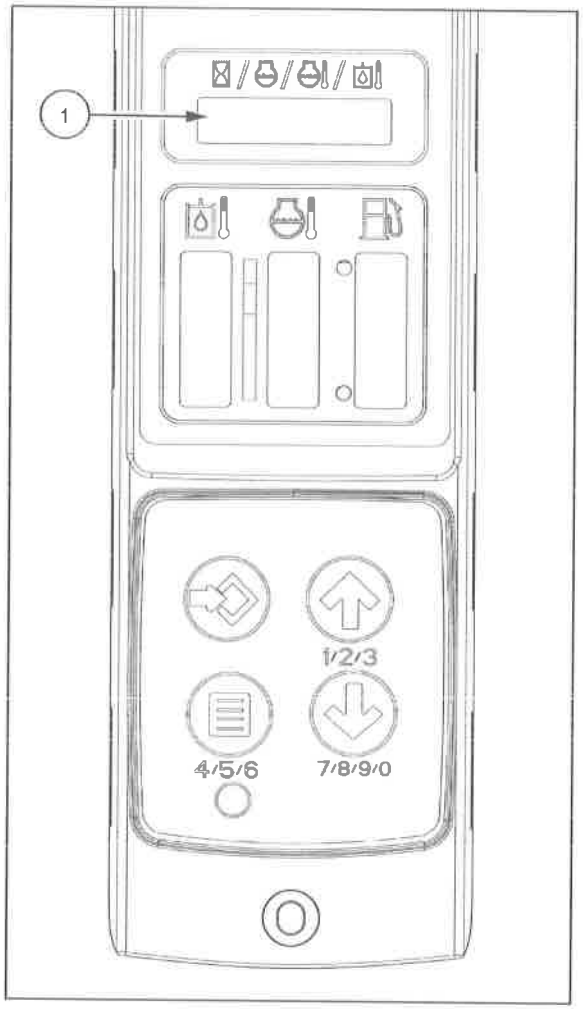
Engine hourmeter

Service your machine at the intervals and locations given in the maintenance and lubrication chart. When you service your machine, use only high quality lubricants.

The engine hourmeter **(1)** shows the amount of actual hours the engine has run. The first number to the right displays tenths of an hour and the remaining digits to the left display hours. Use the engine hourmeter along with the lubrication and maintenance chart to service your machine at the correct intervals.

Engine hours are displayed with the key switch off or with the engine running, if the operator chooses.

NOTE: *After the machine hourmeter reaches 9999.9 hours the tenths position will no longer be shown. The display will only show whole hours.*



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Fluids and lubricants

Fuel tank

Capacity	
SR160B	**60.5 L (16.0 US gal)**
SR175B, SV185B, SR210B, TR270B, TR310B	**75.5 L (20.0 US gal)**
SR240B, SV280B, TV370B	**95.5 L (25.5 US gal)**
Specifications	#1 or #2 Diesel ultra-low sulfur

Cooling system

Capacity	
SR160B, SR175B, SV185B	**15.6 L (4.1 US gal)**
SR210B, TR270B, TR310B	**17.0 L (4.5 US gal)**
SR240B, SV280B, TV370B	**19.0 L (5.0 US gal)**
Specifications	**AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

Hydraulic system

Reservoir capacity	**15.0 L (3.96 US gal)**
System capacity:	
SR160B	**29.9 L (7.9 US gal)**
SR175B, SV185B, SR210B, TR270B, TR310B	**38.1 L (10.0 US gal)**
SR240B, SV280B, TV370B	**45.4 L (12.0 US gal)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Chain compartments

Capacity - each side	
SR160B	**6.25 L (6.6 US qt)**
SR175B, SV185B	**7.4 L (7.9 US qt)**
SR210B	**26.0 L (27.5 US qt)**
SR240B, SV280B	**22.2 L (23.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Grease fittings

Quantity	As required
Specifications	**TUTELA MOLY GREASE GR-75** (Molydisulfide)

Engine crank case oil

Capacity - with filter change	
SR160B, SR175B, SV185B	**7.0 L (7.5 US qt)**
SR210B, SR240B, SV280B, TR270B, TR310B, TV370B	**8.5 L (9.0 US qt)**
Specifications	**AKCELA UNITEK NO. 1™ SBL CJ-4**

Final track drive

Capacity - each side	**1.0 L (1.06 US qt) +/- 0.1 L (0.1 US qt)**
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

Engine oils

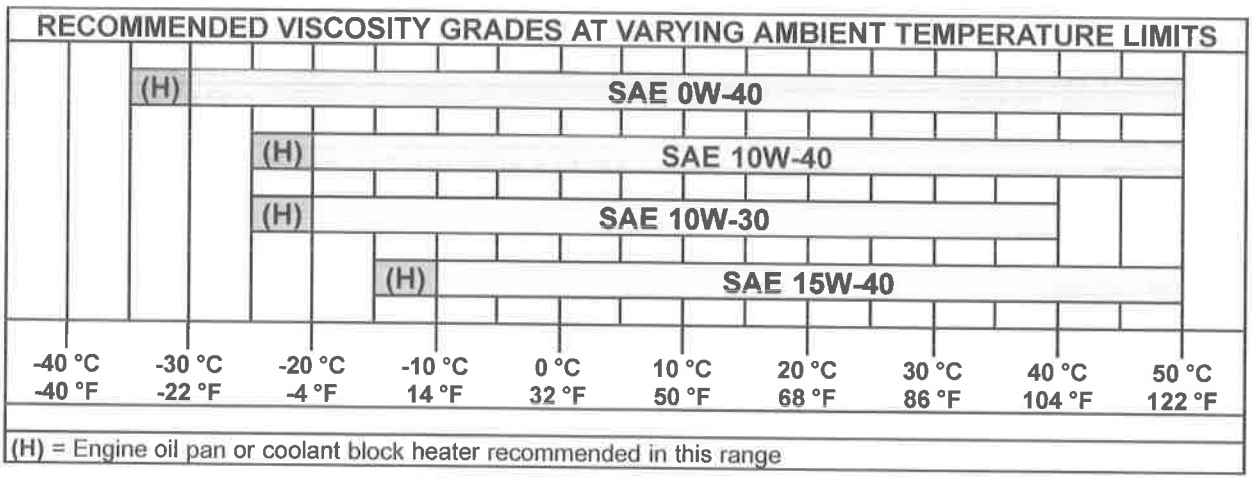
CASE CONSTRUCTION prefers the use of engine oils that meet CNH Industrial standard **MAT3571** in your engine.

You may also use engine oils that meet CNH Industrial standard **MAT3572** in your engine.

You may use other engine oils if the engine oils meet **API CJ-4** or **API CK-4** or **ACEA E6** or **ACEA E9** performance requirements.

CASE CONSTRUCTION engine oils exceed API and ACEA performance requirements.

NOTE: *Do not put performance additives or other oil additive products in the engine crankcase. See your CASE CONSTRUCTION dealer for approved engine oil additives, engine oil analysis test package information.*



Engine oil and filter service intervals

CASE CONSTRUCTION develops the oil/filter change intervals given in this manual from tests with CASE CONSTRUCTION lubricants/filters.

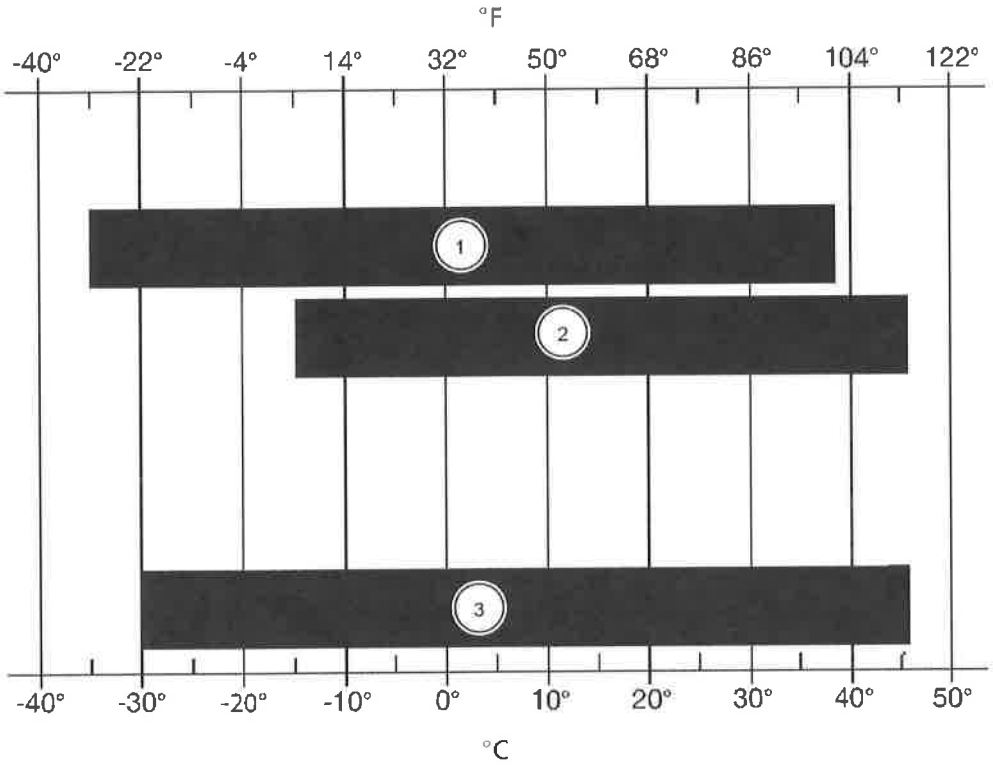
Engine oil and filter service interval recommendations are based on type of engine oil, oil filter used, sulfur, bio-diesel content of diesel fuel. See diesel fuel recommendations for the approved Diesel fuel sulfur content, Bio-Diesel blends, and fuel specification information.

Always change engine oil and oil filter at the service intervals described in your maintenance chart. See **7-33**.

NOTICE: *Service intervals must be reduced by **50%** (Maximum **300 h**) when using engine oils that do not meet CNH Industrial standards **MAT3571** or **MAT3572**. Service intervals must be reduced by **20%** (Maximum of **500 h**) when using engine oils that meet CNH Industrial standard **MAT3572**.*

Hydraulic oil viscosity

Hydraulic oil for all models



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Block	Viscosity	Temperature range
(1)	AKCELA HYDRAULIC EXCAVATOR FLUID	-35 – 38 °C (-31 – 100 °F)
(2)	AKCELA AW HYDRAULIC FLUID 68 HV	-15 – 46 °C (5 – 115 °F)
(3)	AKCELA UNITEK NO. 1™ SSL CJ-4 SAE 0W-40	-30 – 46 °C (-22 – 115 °F)

NOTE: *CASE CONSTRUCTION recommends* ***AKCELA AW HYDRAULIC FLUID 68 HV*** *for applications where continuous operations above* ***38 °C (100 °F)*** *ambient temperature or frequent roading applications (above 20 to 30 minutes) are common.*

NOTE: *CASE CONSTRUCTION recommends* ***AKCELA HYDRAULIC EXCAVATOR FLUID*** *for improved cold weather operation. Standard factory fill oil* ***AKCELA AW HYDRAULIC FLUID 68 HV*** *is acceptable for cold weather operation when sufficient warm up time is provided.*

Organic Acid Technology (OAT) coolant

CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. The coolant must meet the specifications outlined in the CNH Industrial material specification MAT3724. 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) or Stage V emissions using Selective Catalytic Reduction (SCR). NEVER mix OAT coolant with IAT coolant. Under no circumstances should you top off a cooling system with only water.*

Use distilled or demineralized water for diluting when using OAT coolant concentrate. The optimum OAT coolant to water concentration is 50/50. This concentration will protect the cooling system to **-37 °C** (**-35 °F**) . Do not exceed **60%** by volume ethylene glycol-based coolant. The heat dissipation and antifreeze properties may otherwise be negatively affected. You can use a refractometer to check the concentration level. If distilled or demineralized water is not available, use water for dilution with the following properties:

Property	Limit Maximum
Total Solids	**340 ppm**
Total Hardness	**170 ppm**
Chloride (Cl)	**40 ppm**
Sulfate (SO4)	**100 ppm**
Acidity pH	5.5 to 9.0

You should not use Supplemental Coolant Additives (SCA). Do not add rust inhibitors or other additives to your vehicle's cooling system. Contact your CASE CONSTRUCTION dealer for approved additives and coolant analysis test package information.

Service intervals

See **7-33** for the proper service intervals. Drain and flush the cooling system at the recommended drain interval, then fill with fresh coolant.

Definitions

Inorganic Acid Technology (IAT) coolant:

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

Organic Acid Technology (OAT) coolant:

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

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).*

General specification - 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 can 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.*

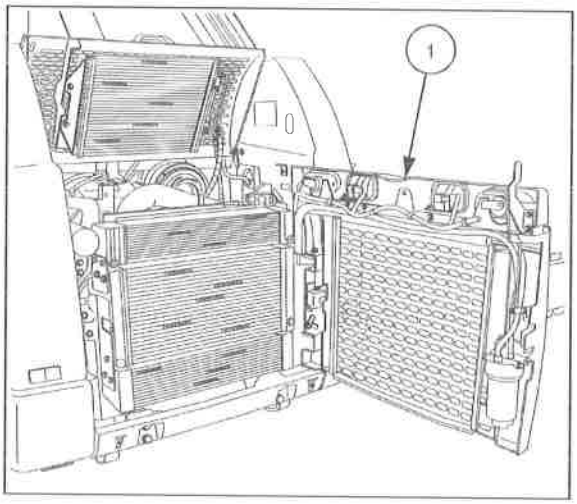
Lubrication and maintenance access

1. Lift open the engine hood. Make sure that the hood pivots to a fully open position.
2. Pull rearward on the hood lock tab to open the rear service door. Otherwise, lift up on the rear service door latch to open the rear service door, if equipped.

NOTE: *This style hood and door may be locked with a padlock.*

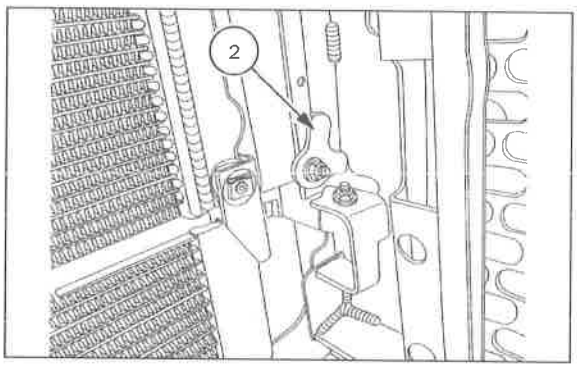
The open engine hood and rear access door **(1)** will allow the operator or technician to:

- Check the engine oil.
- Access engine oil fill.
- Add fuel.
- Check radiator and hydraulic oil coolers (fill, drain and clean debris).
- Check and clean the coolant reservoir.
- Service both fuel filters (in-line and spin on element water separator) drain water from spin on filter element canister
- Service the hydraulic filter.
- Service the air filters.
- Access hydraulic oil fill.
- The drive belts.
- The alternator.



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Always lock the rear access door open when servicing or monitoring components, pivot latch **(2)** down to lock.

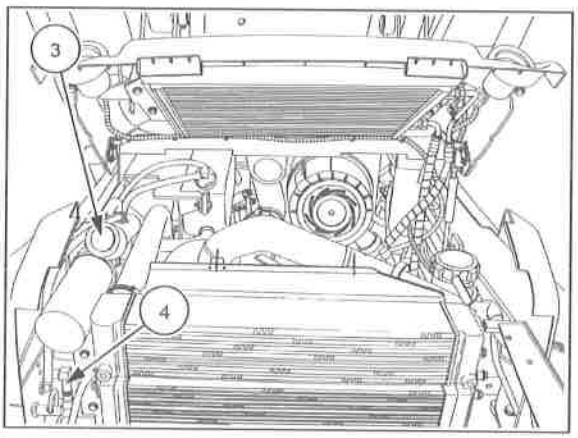


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Open the rear service door. The following may be accessed:

- Hydraulic oil fill **(3)**.

NOTE: *If the hydraulic oil fill cap is to be removed, wipe clean before removing to prevent hydraulic system contamination.*

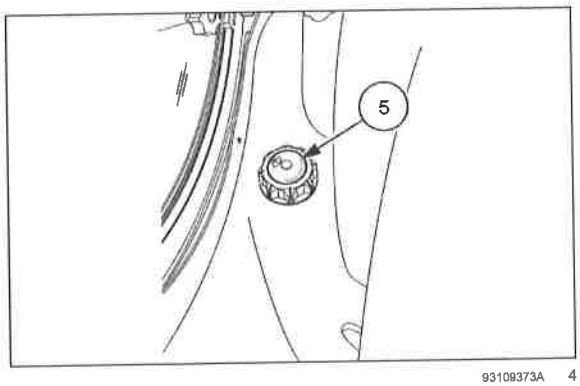


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Hydraulic oil level indicator sight glass **(4)**.

The rear inside cab.

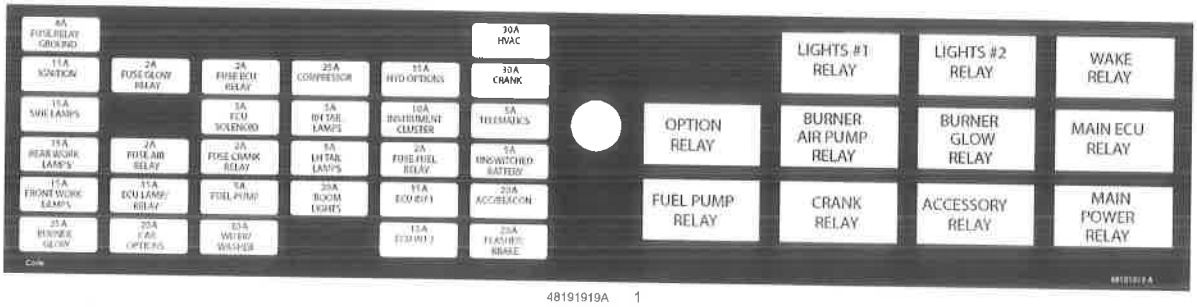
- Windshield washer reservoir **(5)** is located inside of the cab, right side of the seat between side window of the cab and the seat.



93109373A 4

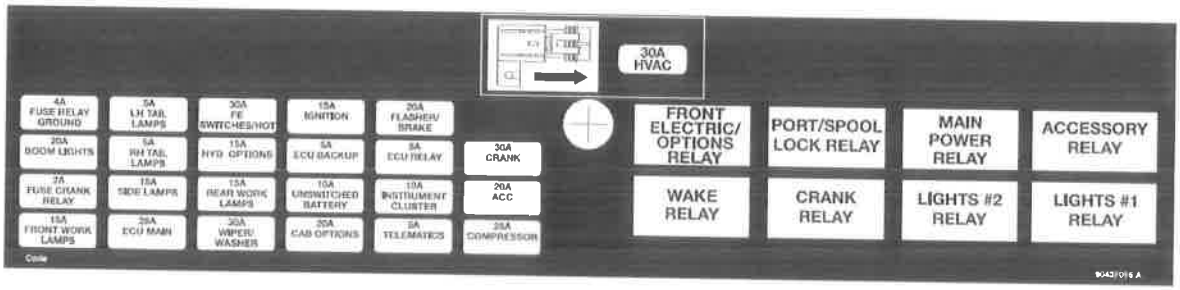
Fuses and relays

SR160B with mechanical controls and Instrument Cluster (IC)



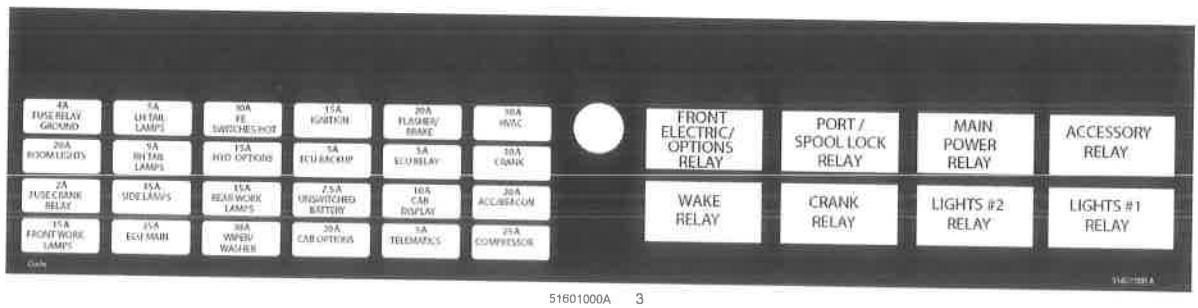
48191919A 1

SR175B and SV185B with mechanical controls with Instrument Cluster (IC)



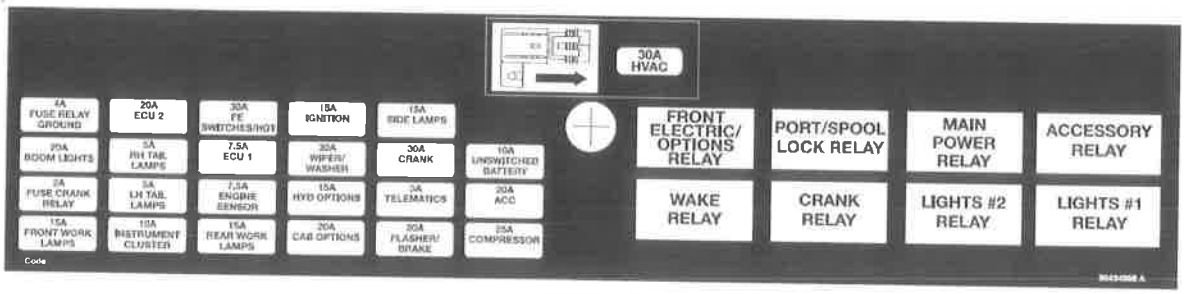
90437015A 2

SR175B and SV185B with mechanical controls and LCD Multi-Function Display



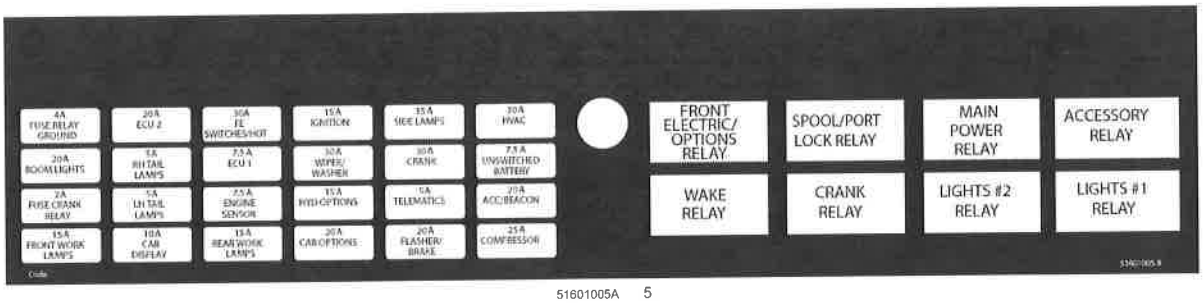
51601000A 3

SR210B, TR270B, and TR310B with mechanical controls and Instrument Cluster (IC)



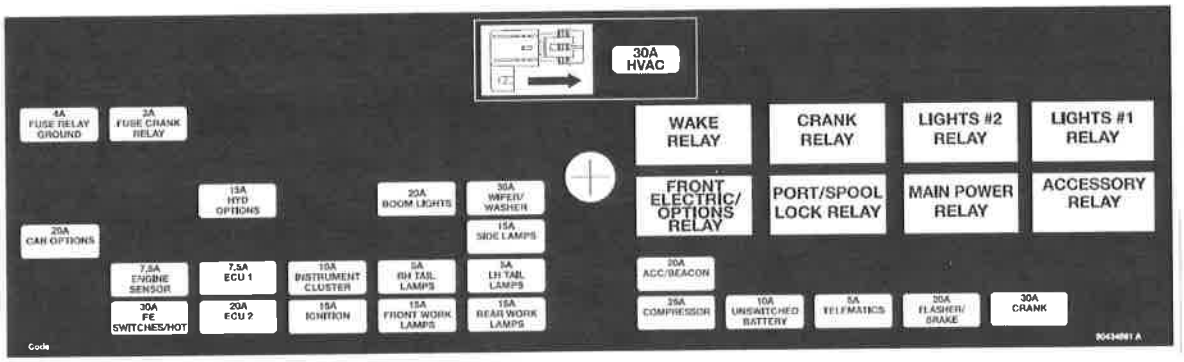
90434958A 4

SR210B, TR270B, and TR310B with mechanical controls and LCD Multi-Function Display



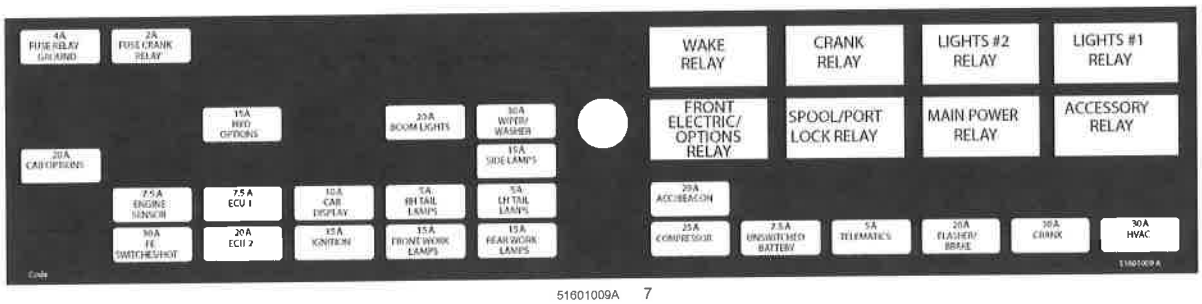
51601005A 5

SR240B, SV280B, TV370B with mechanical controls and Instrument Cluster (IC)



90434961A 6

SR240B, SV280B, TV370B with mechanical controls and LCD Multi-Function Display



51601009A 7

Fuse and relays in the cab area – Mechanical controls only

1. Remove all the screws **(1)** from the cover panel **(2)** to expose the fuse and relay blocks.

   NOTE: *The fuse and relay identification decal is on the back side of the cover panel.*

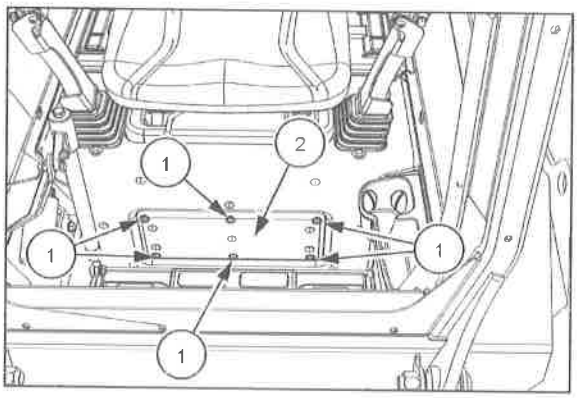
2. Remove the fuse panel **(2)** to expose the cab area fuses and relays.
3. Press both of the locking tabs **(3)** on each side of the cover and lift off of the fuse and relay block.

   NOTICE: *Only replace fuse and relays with the same type and amperage rating. Failure to do so may result in an electrical system failure.*

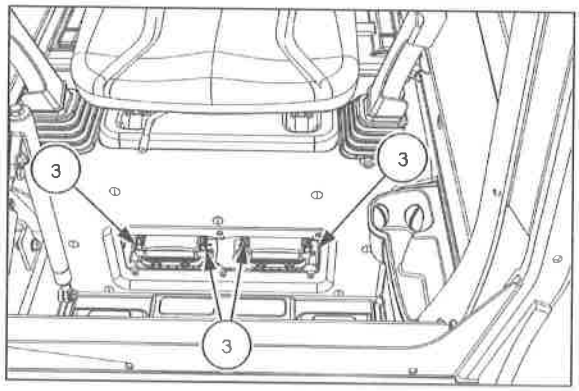
4. Locate and check the problem fuse or relay. If necessary, replace the fuse or relay.

   NOTICE: *To prevent water from entering the power center, make sure that the fuse panel cover is in the proper position and secure. Failure to do so may allow water to enter the power center and possibly result in an electrical system failure.*

5. Align the locking tabs on the fuse block cover and push down to secure in place. Make sure that the cover is in proper position and secure.



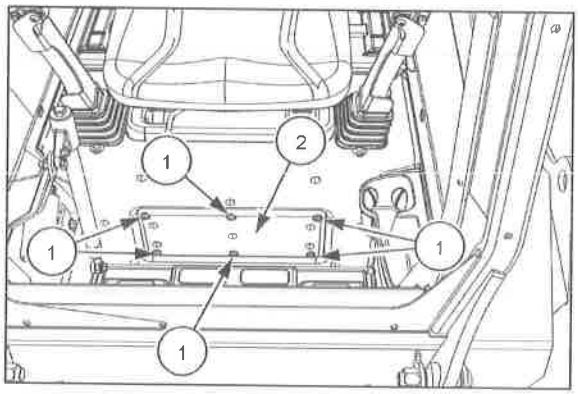
RAIL19SSL0065BA 8



RAIL19SSL0066BA 9

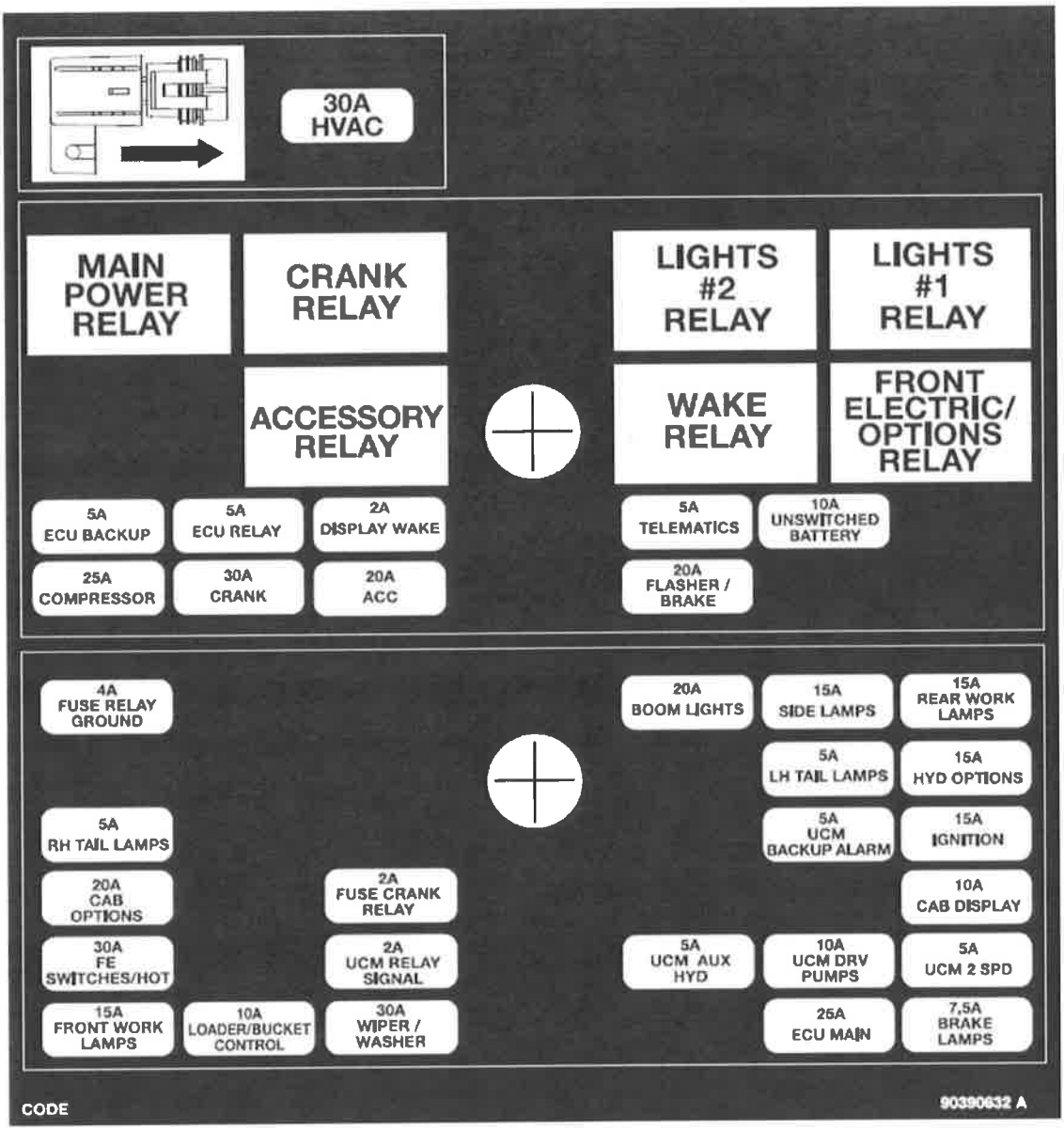
NOTICE: *To prevent water from entering the power center, make sure that the fuse panel cover is in the proper position and secure. Failure to do so may allow water to enter the power center and possibly result in an electrical system failure.*

9. Position the fuse and relay cover **(2)** so that all sides are flush or even with the heel kick plate.
10. Hold the fuse and relay panel cover in position.
11. Tighten the screws **(1)** to secure the cover in position.



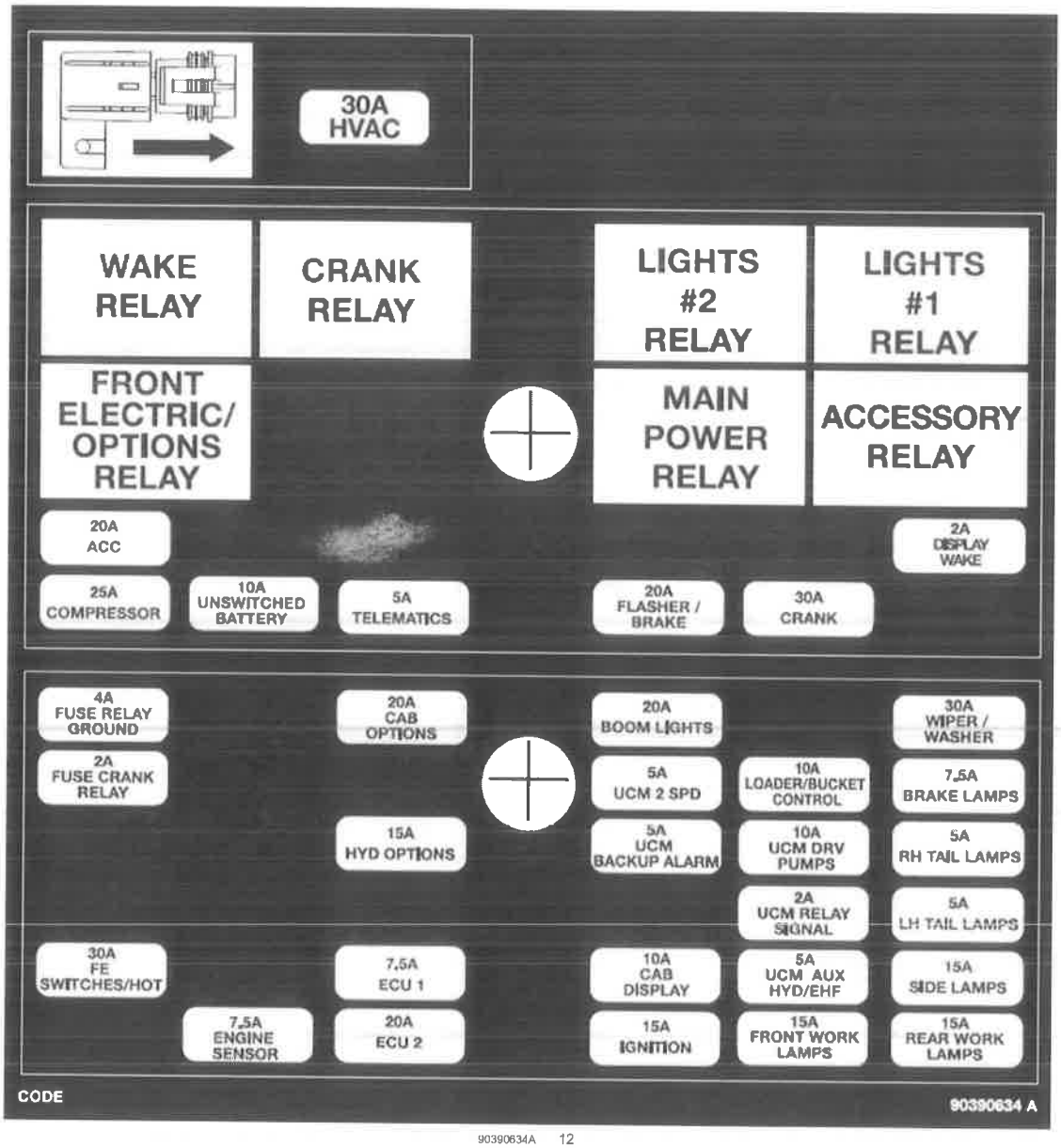
RAIL19SSL0065BA 10

SR175B and SV185B with Electro-Hydraulic (EH) controls



90390632A 11

SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B with Electro-Hydraulic (EH) controls

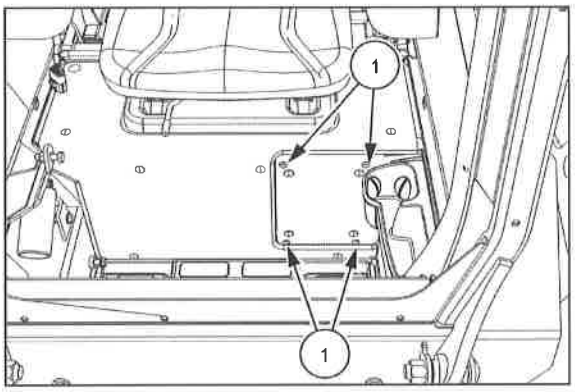


90390634A 12

Electro-Hydraulic (EH) controls - fuse and relay panel in the cab area

1. Remove the screws **(1)** from the cover panel to expose the fuse and relay blocks.

NOTE: *The fuse and relay identification decal is on the back side of the cover panel.*



RAIL19SSL0063BA 13

2. Press both of the locking tabs on each side of the cover and lift off of the fuse and relay block.

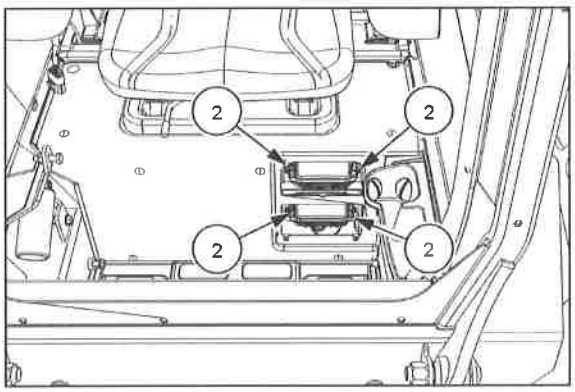
   NOTICE: *Only replace fuse and relays with the same type and amperage rating. Failure to do so may result in an electrical system failure.*

3. Locate and check the problem fuse or relay. If necessary, replace the fuse or relay.

   NOTICE: *To prevent water and moisture from entering the fuse and relay block, make sure that the cover is properly positioned and fully latched. Failure to do so may allow water or moisture to enter the power center and possibly result in an electrical system failure.*

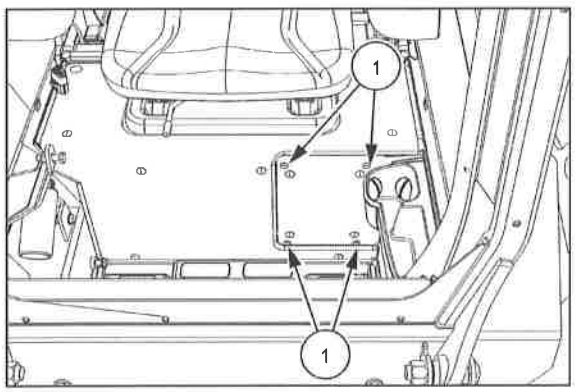
4. Align the locking tabs **(2)** on the fuse block cover and push down to secure in place. Make sure that the cover is in proper position and secure.

   NOTICE: *To prevent water and moisture entering the power center, make sure that the fuse panel cover is in the proper position and secure. Failure to do so may allow water to enter the power center and possibly result in an electrical system failure.*



RAIL19SSL0064BA 14

5. Position the fuse and relay cover so that all sides are flush or even with the heel kick plate.
6. Hold the fuse and relay panel cover in position.
7. Tighten the screws **(1)** to secure the cover in position.



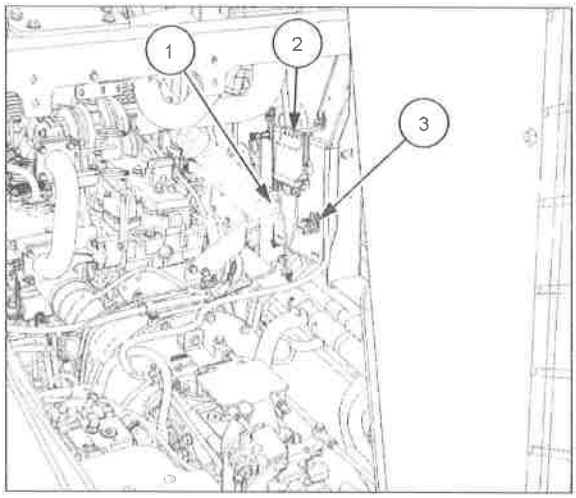
RAIL19SSL0063BA 15

Engine Control Unit (ECU) and relays in the engine area (all models)

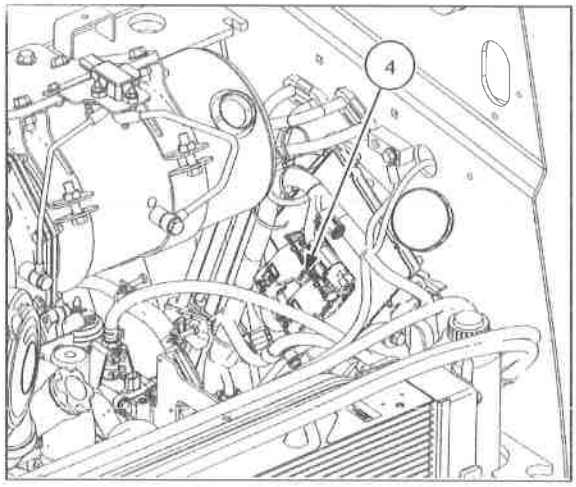
Tilt the cab forward. See "Loader arm lock and cab tilt procedure - radial lift machines" **2-19** or "Loader arm lock and cab tilt procedure - vertical lift machines" **2-23**.

SR160B Engine Control Unit (ECU) and relay identification

- Glow-plug Control Unit (GCU) **(1)**
- Telematics module **(2)** (if equipped)
- Flasher relay **(3)** (if equipped with turn signals)
- Engine Control Unit (ECU) **(4)** is on the right-hand chassis tower near the fuel fill cap.



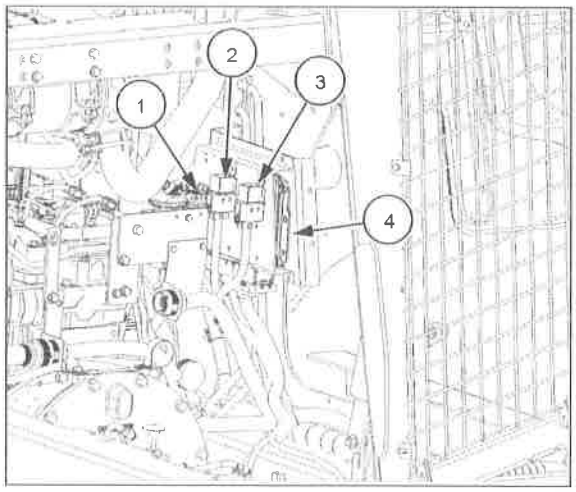
RAIL16SSL0031BA 16



RAIL19SSL0079BA 17

SR175B Engine Control Unit (ECU) and relay identification

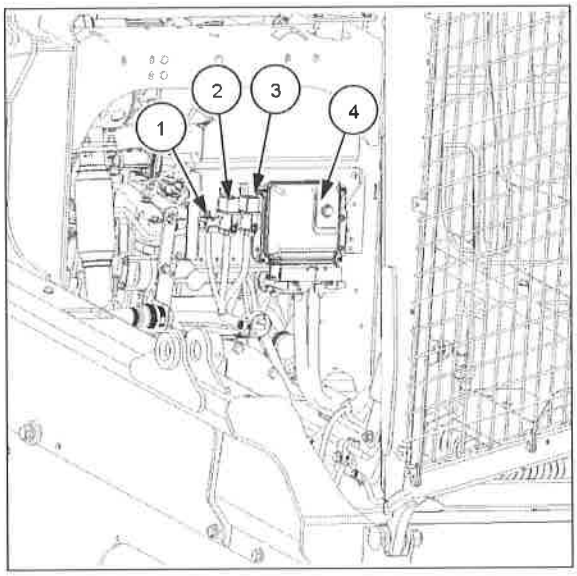
- Flasher relay **(1)** (if equipped with turn signals)
- Engine Control Unit (ECU) relay **(2)**
- Glow-plug Control Unit (GCU) **(3)**
- Engine Control Unit (ECU) **(4)**



RAIL15SSL0097BA 18

SV185B Engine Control Unit (ECU) and relay identification

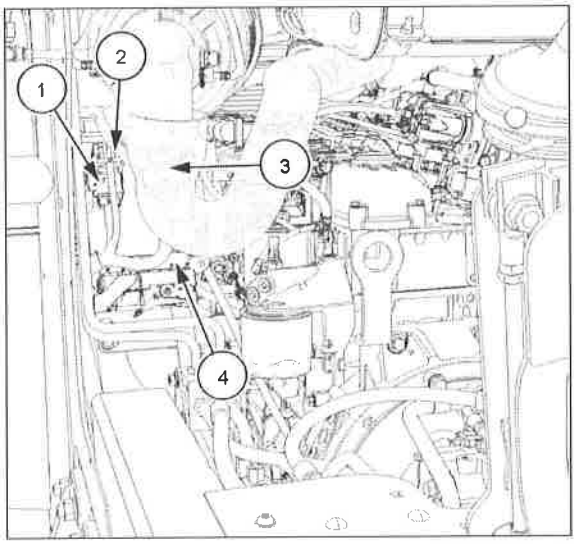
- Flasher relay **(1)** (if equipped with turn signals)
- Engine Control Unit (ECU) relay **(2)**
- Glow-plug Control Unit (GCU) **(3)**
- Engine Control Unit (ECU) **(4)**



RAIL15SSL0102BA 19

SR210B, TR270B, and TR310B Engine Control Unit (ECU) and relay identification

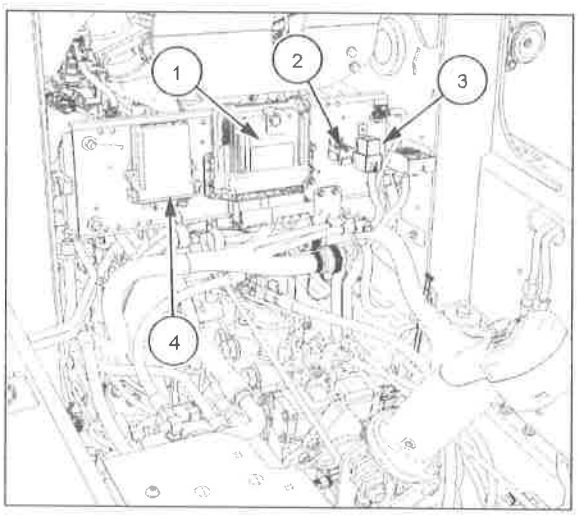
- Engine Control Unit (ECU) relay **(1)**
- Flasher relay **(2)** (if equipped with turn signals)
- Glow-plug Control Unit (GCU) **(3)**
- Engine Control Unit (ECU) **(4)**



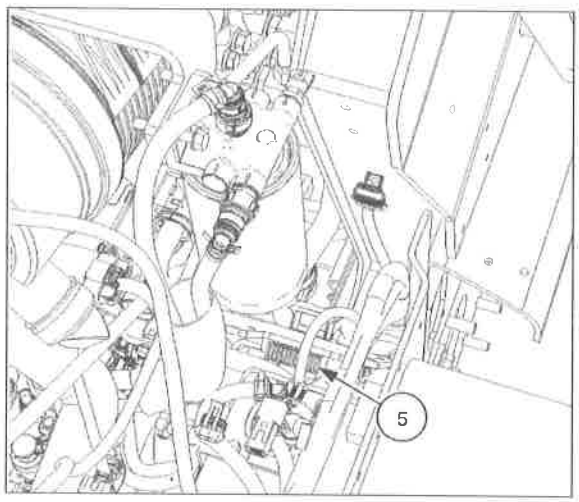
RAIL15SSL0104BA 20

SR240B, SV280B, and TV370B Engine Control Unit (ECU) and relay identification

- Engine Control Unit (ECU) **(1)**
- Flasher relay **(2)** (if equipped with turn signals)
- Engine Control Unit (ECU) relay **(3)**
- Telematics module (if equipped) **(4)**
- Glow-plug Control Unit (GCU) **(5)**



RAIL15SSL0103BA 21



RAIL15SSL0096BA 22

MAINTENANCE CHART

Maintenance chart

Maintenance action	Check	Cleaning	Grease	Drain fluid	Replace	Change fluid	Page no.
INITIAL 10 HOURS							
Track tension check and adjustment	x						7-35
Tire pressure and wheel hardware torque	x						7-36
Alternator and air conditioning compressor (if equipped) belt tension - SR160B, SR175B, and SV185B only	x						7-38
EVERY 10 HOURS OR DAILY							
Clean tracks and components		x					7-39
Engine and hydraulic coolers	x						7-40
Engine coolant level	x						7-41
Engine oil level	x						7-42
Loader arm pivot points, coupler pins, and cylinder pins - Radial lift			x				7-43
Loader arm pivot points, coupler pins, and cylinder pins - Vertical lift			x				7-43
Hydraulic oil level	x						7-44
Loader arm and bucket hydraulic interlock	x						7-45
INITIAL 50 HOURS							
Roll Over Protective Structure (ROPS) mechanism and hardware check	x						7-46
EVERY 50 HOURS							
Track tension check and adjustment	x						7-47
Tire pressure and wheel hardware torque	x						7-48
Cab intake filter	x						7-50
Seat restraints - Check	x						7-51
INITIAL 100 HOURS							
Final drive oil (track models)				x			7-52
EVERY 250 HOURS							
In-line fuel filter - (SR160B only)					x		7-53
Fuel-water separator filter - drain fluid						x	7-54
Drive chain tension check	x						7-55
EVERY 500 HOURS							
Engine oil and oil filter - Change					x		7-56
Fuel-water separator filter element					x		7-61
Fuel filter					x		7-63
Hydraulic oil filter					x		7-66
Final drive chain tank oil	x						7-67
Air cleaner elements					x		7-70
Final drive oil (track models)				x			7-72
Roll Over Protective Structure (ROPS) mechanism and hardware check	x						7-73
Cab door - Grease			x				7-74
EVERY 1000 HOURS							
Hydraulic oil and filter				x			7-75
Final drive chain tank oil				x			7-79
Oil Mist Separator (OMS) filter - (SR160B, SR175B, and SV185B only)					x		7-82
EVERY 1500 HOURS							
Blow-by recirculation system (models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only)					x		7-83
EVERY 4000 HOURS							

Maintenance action	Check	Cleaning	Grease	Drain fluid	Replace	Change fluid	Page no.
Diesel Particulate Filters (DPF) - Cleaning		x					7-84
Engine cooling system - Change fluid						x	7-85
AS REQUIRED							
Auto-regeneration		x					7-90
Manual regeneration		x					7-92
Window removal and cleaning		x					7-95
Hardware - loose or damaged	x						7-99

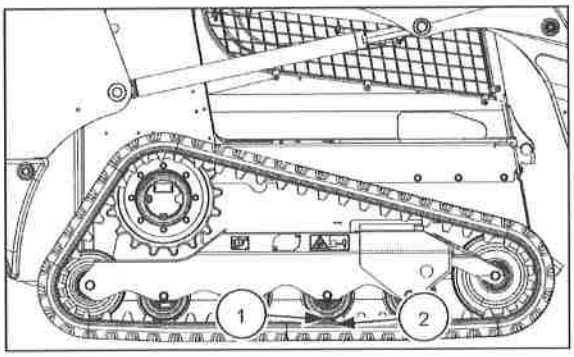
INITIAL 10 HOURS

Track tension check and adjustment

Check the track tension after the first **10 h** on a new machine or if new tracks have been installed. After the initial **10 h** check, the track tension should be checked every **50 h** thereafter. For this procedure, the tracks, rollers, idler wheels, debris guard, and final drive sprockets must be clean of dirt and debris.

Track tension check

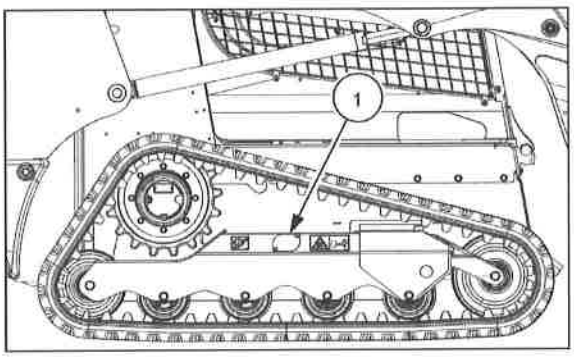
1. Park the machine on firm level surface.
2. Raise, block, and support machine properly until the tracks are about **50 mm** (**2.0 in**) off the surface.
3. Measure from the bottom of the center roller wheel **(1)** to the lower track top surface **(2)**. The allowable track sag is **12 – 19 mm** (**0.5 – 0.75 in**).



RAIL15SSL0356AA 1

Track tension adjustment

1. Use a **13 mm** tool and remove the track adjustment access cover **(1)** to expose the track adjustment fitting.



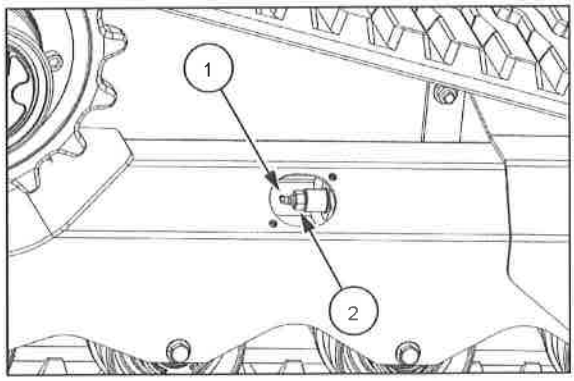
RAIL15SSL0356AA 2

Increase track tension:

Add **TUTELA MOLY GREASE GR-75** grease to increase track tension adjustment fitting **(1)**.

Decrease track track tension:

Use a **19 mm** tool and slowly turn the fitting **(2)** counterclockwise. Grease will escape from the bottom of the fitting and decrease tension.



RAIL15SSL0382BA 3

Tire pressure and wheel hardware torque

⚠ WARNING

Explosion hazard!
Always maintain correct tire pressure as indicated in this manual. DO NOT inflate tires above the recommended pressure. Excessive pressure could result in tire failure.
Failure to comply could result in death or serious injury.

W0109A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

The skid steer will be hard to turn and the tires will wear faster if the correct pressure is not maintained. When a worn or damaged tire is replaced, the replacement must be the same size and tread design as the other tires on the machine. Two different sized tires on one side of the machine will cause accelerated tire wear, loss of power, and excessive strain on the drivetrain. Replace worn tires in pairs with the two new tires used on the same side of the loader. If this tilts the loader too much, replace all four tires.

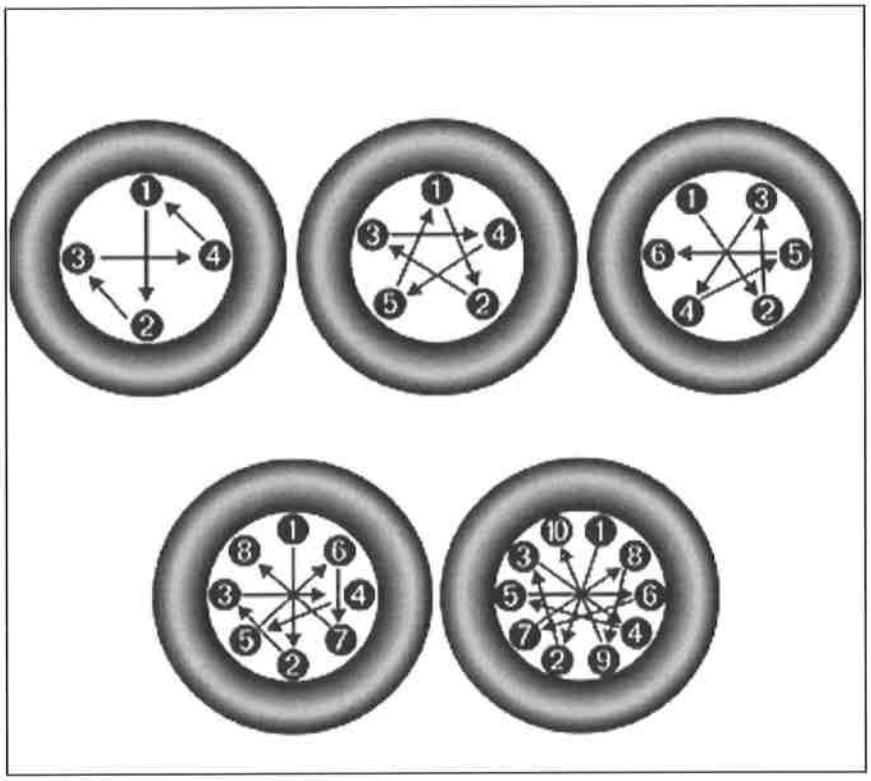
Adding air to the tire

NOTICE: *Tire pressure gauges should be checked at regular intervals for calibration and accuracy.*

1. Check the tire pressure.
2. Before you add air, have the wheel correctly installed on the machine or put the wheel in a restraining device (tire inflation cage).
3. Use an air hose with a remote shutoff valve, self-locking air chuck and wear eye protection.
4. Stand BEHIND the tread of the tire and make sure ALL persons are away from the side of the tire before you start to add air.
5. Inflate the tire to the recommended air pressure. DO NOT inflate the tire more than the recommended maximum pressure given on the tire.

TIRE	SIZE	PRESSURE
Heavy Duty	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa (52 – 60 psi)**
Premium	27/10.5 x 15	**290 – 345 kPa (42 – 50 psi)**
	10 x 16.5	
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa (52 – 60 psi)**
Premium with liner	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
Severe Duty	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
	14 x 17.5	**531 – 586 kPa (77 – 85 psi)**
Flotation	31.5 x 13 x 16.5	**179 – 241 kPa (26 – 35 psi)**
	33 x 15.5 x 16.5	**290 – 345 kPa (42 – 50 psi)**
Mining	12 x 16.5	**290 – 345 kPa (42 – 50 psi)**
Non-Pneumatic	12 x 16.5	not required
	14 x 17.5	

Wheel torque



63109344 1

1. Check that the wheel nuts have the proper torque setting.

Wheel taper nut torque	**169.5 N·m (125 lb ft)**
Flange nut	**203.5 N·m (150 lb ft)**

2. If necessary, tighten the nuts in a cross-pattern sequence as shown.

Alternator and air conditioning compressor (if equipped) belt tension – SR160B, SR175B, and SV185B only

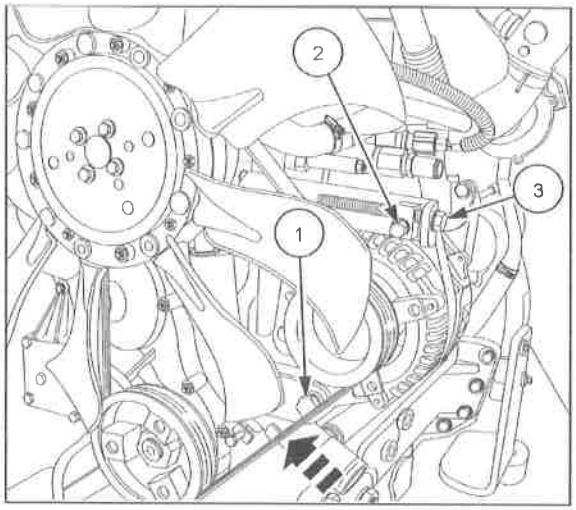
NOTE: *Models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B with a CASE CONSTRUCTION approved self-adjusting belt, do not require a belt tension check. The proper adjustment is with the alternator in its fully extended mounting position. The same machines equipped with air-conditioning (AC) the AC compressor must also be in the fully extended mounting position.*

NOTE: *An eight rib alternator pulley is used with a six rib belt. When installing a belt; install the belt on the six ribs furthest from the engine. The two ribs closest to the engine will not be used.*

Check the alternator belt tension after the first **10 h** of operation on a new machine or if a new belt has been installed.

Measure the deflection of the belt at center of the span between the crankshaft pulley and the alternator pulley. Adjust as necessary.

1. Loosen the pivot bolt **(1)** and the locking bolt **(2)**.
2. Turn bolt **(3)** clockwise to tighten. The belt is tightened properly when a force of **5.0 kg** (**11.0 lb**) is applied perpendicular to the belt at the center of the span between the crankshaft pulley and the alternator pulley with a **5 mm** (**0.2 in**) deflection.
3. Tighten the locking bolt **(2)** and the pivot bolt **(1)**.

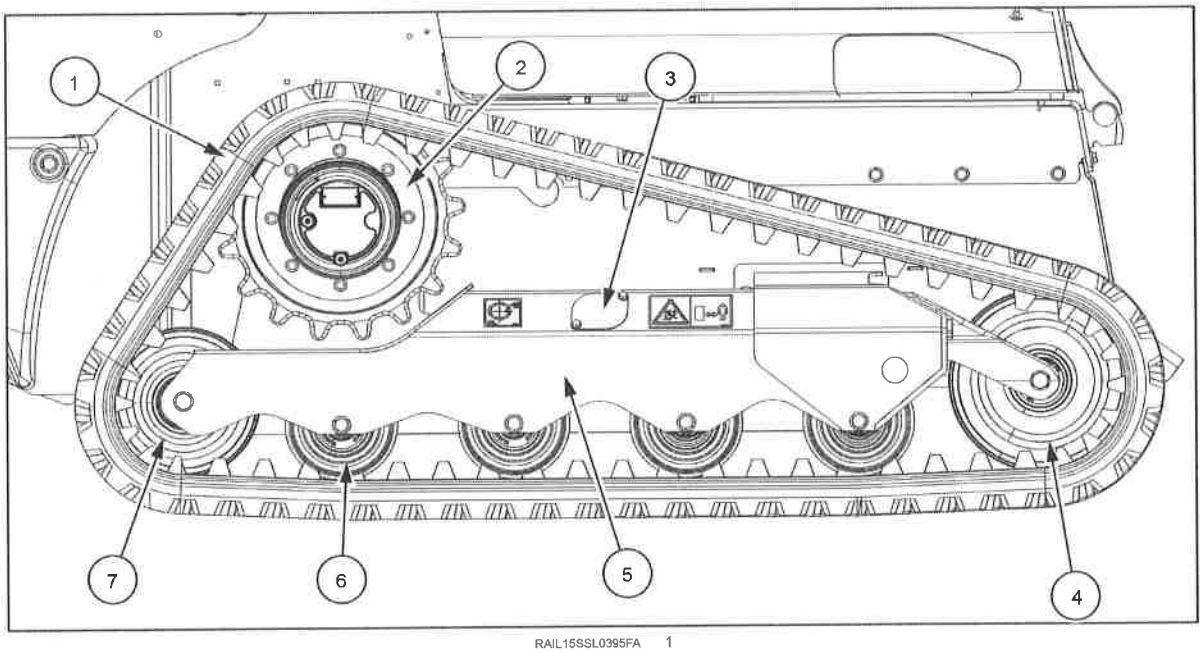


RAPH12SSL0407BA 1

EVERY 10 HOURS OR DAILY

Clean tracks and components

Clean the components in the illustration every **10 h** or daily, and when the machine has worked in muddy conditions.

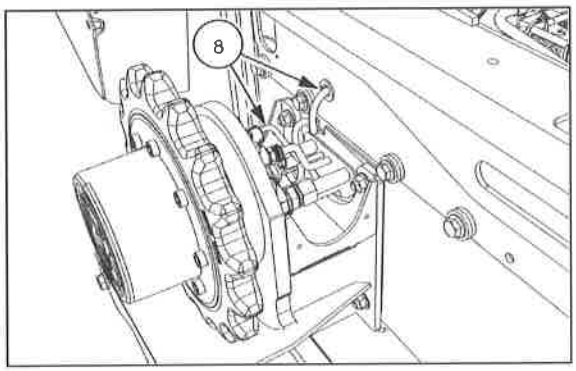


RAIL15SSL0395FA 1

1	Rubber track	5	Track debris guard
2	Final drive sprocket (1 each side)	6	Track roller wheels (4 each side)
3	Track adjustment access cover (1 each side)	7	Rear idler wheel (1 each side)
4	Front idler wheel (1 each side)	8	Speed sensor harness (if equipped)

NOTICE: *Avoid using sharp objects when cleaning debris out of the track tube covers. Failure to comply may damage the motor speed sensor harness (if equipped).*

(8) Speed sensor harness (if equipped)



RAIL19SSL0074BA 2

Engine and hydraulic coolers

NOTICE: *DO NOT USE A PRESSURE WASHER! The machine should be cool before you proceed. If compressed air is used, keep the attachment enough distance away from the cooler fins to prevent damage or bending over and restricting air flow. The bent fins may restrict flow enough to cause overheating. If compressed air is not available, use water regulated to a low pressure.*

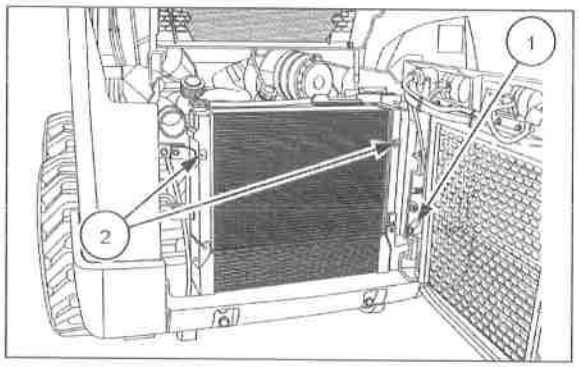
Radiator and oil cooler for models SR160B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B

1. Raise the engine hood and ensure it stays in the open position.
2. Open the rear service door. Use the service lock **(1)** in the lower right to secure the door in the open position.
3. Remove bolts **(2)** to allow the radiator/cooler assembly to pivot out for inspection and cleaning.
4. **⚠ 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

   Use compressed air to clean the radiator/cooler assembly.



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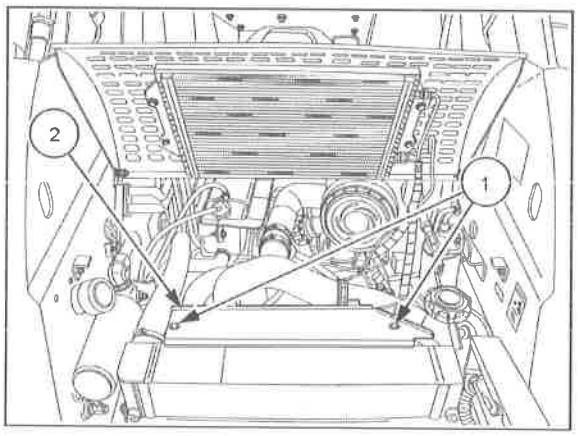
Radiator and oil cooler for models SR175B and SV185B

1. Raise the engine hood and ensure it stays in the open position.
2. Open the rear service door. Use the service lock in the lower right to secure the door in the open position.
3. Remove thumb screws **(1)** and cover **(2)** to access the radiator/cooler assembly for inspection and cleaning.
4. **⚠ 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

   Use compressed air to clean the radiator/cooler assembly.



RCPH11SSL040BAP 2

Engine coolant level

⚠ WARNING

Hot liquid under pressure!
Service when cool.
Failure to comply could result in death or serious injury.

W1187A

NOTICE: *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. Supplemental Coolant Additives (SCA) should not be used when using* ***AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT****.*

Check the level of the coolant when the engine is stopped and the coolant is cold.

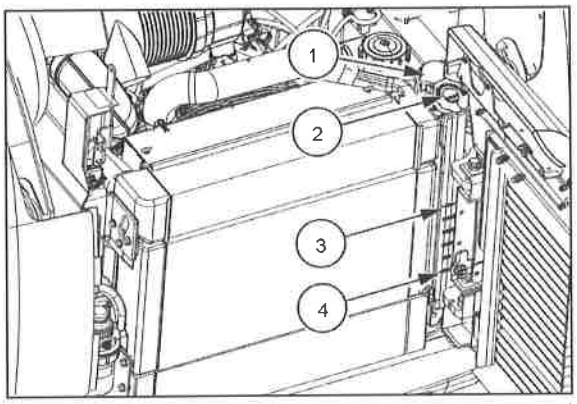
Coolant specifications – **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

1. Open the engine hood and rear service door.
2. Engage the door lock located near the lower hinge.
3. Check the coolant level on the reservoir bottle:
   A. Level with the FULL mark **(3)** if the engine coolant is hot.
   B. Level with the ADD mark **(4)** if the engine coolant is cold.
4. **⚠ WARNING**

   Hot liquid under pressure!
   Service when cool.
   Failure to comply could result in death or serious injury.

   W1187A

   If the coolant is cool and the level is below the ADD mark **(4)**, add **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** to the reservoir bottle **(2)** until it reaches the ADD mark **(4)** on the bottle.



RAIL15SSL0383BA 1

NOTE: *If the coolant system has been opened and/or had maintenance performed recently, open the radiator fill cap* ***(1)*** *and check the coolant level in the radiator fill neck. Add coolant until the level reaches the top of the radiator fill neck, if necessary.*

Engine oil level

NOTICE: *DO NOT put performance additives or other oil additive products in the engine crankcase.*

During the first **20 h** of operation, check the oil level at **1 h** intervals. After the initial **20 h** check, check the engine oil level daily or every **10 h** of operation. Always check the oil with the engine stopped and when the machine is on level ground.

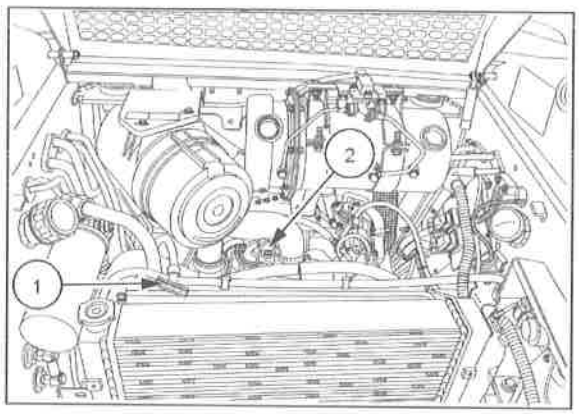
Engine oil specification – **AKCELA UNITEK NO. 1™ SBL CJ-4** is recommended.

See the "Engine oils" chart on page **7-16** for the recommended viscosity at ambient temperature ranges.

Engine oil level for models SR160B, SR175B, and SV185B

The engine oil dipstick **(1)** is located just above the radiator toward the left-hand side of the machine.

1. Make sure the engine oil level dipstick is pushed completely down, then pull out to check the oil level.
2. If the oil level is below the ADD mark, add oil at the engine oil fill tube **(2)**. DO NOT raise the oil level above the FULL mark.

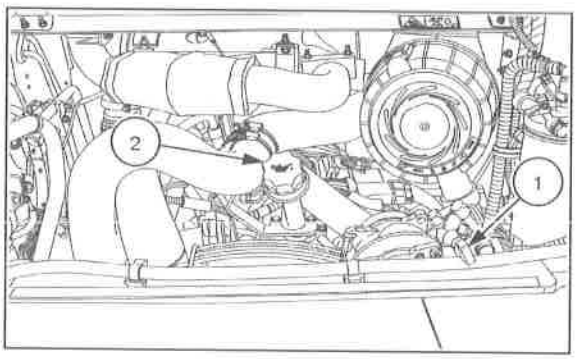


RAPH12SSL0408BA 1

Engine oil level for models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B

The engine oil dipstick **(1)** is located just above the radiator toward the right-hand side of the machine.

1. Make sure the engine oil level dipstick is pushed completely down, then pull out to check the oil level.
2. If the oil level is below the ADD mark, add oil at the engine oil fill tube **(2)**. DO NOT raise the oil level above the FULL mark.



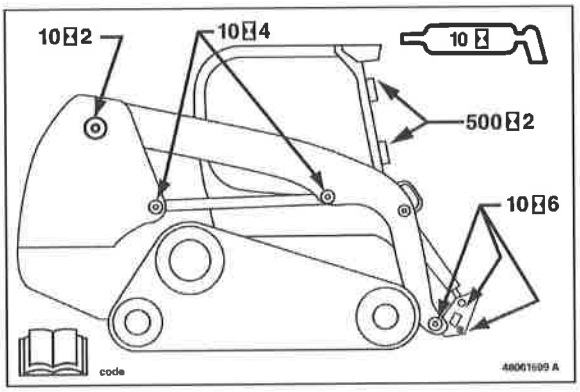
RAIL13SSL0608AA 2

Loader arm pivot points, coupler pins, and cylinder pins – Radial lift

Use **TUTELA MOLY GREASE GR-75** every 10 hours of operation. Lower pins may require more frequent service intervals if submerged in water.

NOTE: *All of the loader arm lubrication points are easily accessible with the loader arm down.*

1. Lower the loader arms and tilt the coupler forward. The attachment does not need to be removed.
2. Clean the grease fittings before greasing.
3. Grease the loader arm pivot points, coupler pins, and cylinder pins.
4. Repeat on the other side of the machine.



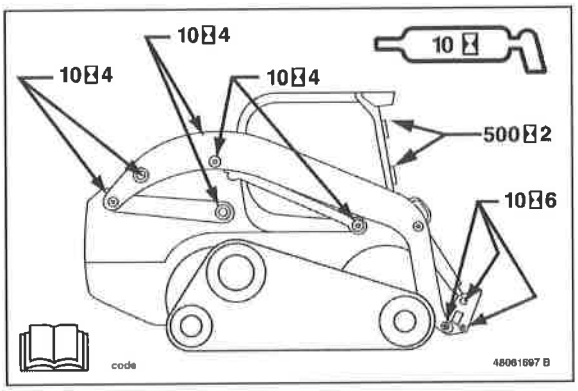
48061699A 1

Loader arm pivot points, coupler pins, and cylinder pins – Vertical lift

Use **TUTELA MOLY GREASE GR-75** every 10 hours of operation. Lower pins may require more frequent service intervals if submerged in water.

NOTE: *All of the loader arm lubrication points are easily accessible with the loader arm down.*

1. Lower the loader arms and tilt the coupler forward. The attachment does not need to be removed.
2. Clean the grease fittings before greasing.
3. Grease the loader arm pivot points, coupler pins, and cylinder pins.
4. Repeat on the other side of the machine.



48061697B 1

Hydraulic oil level

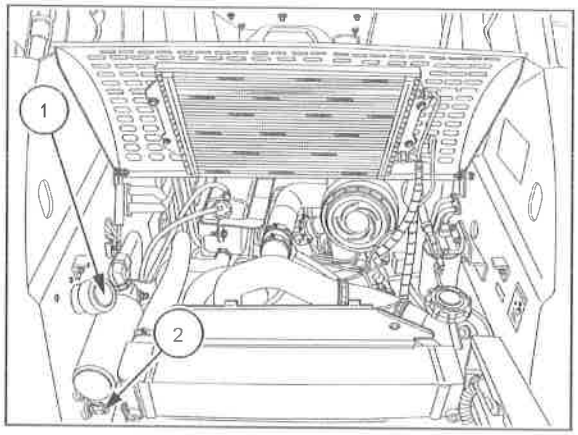
Check the hydraulic reservoir oil level daily, before beginning operation or every **10 h** of operation. Check the level with the lift arms down on the ground, bucket flat on the ground, engine off, and hydraulic oil cold.

Hydraulic oil specifications: **AKCELA AW HYDRAULIC FLUID 68 HV**. Use the proper hydraulic oil when topping off or changing oil see the "Hydraulic oil viscosity" chart **7-17** for more details.

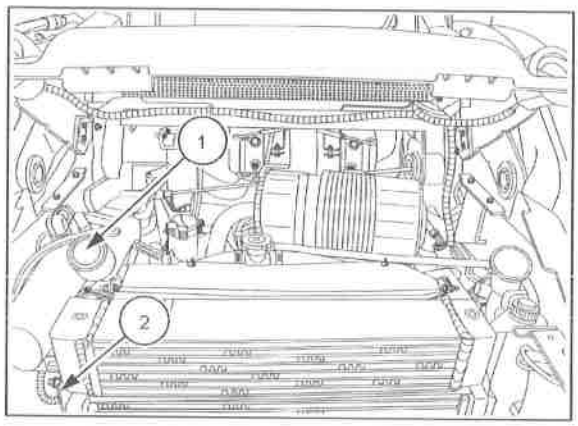
Hydraulic reservoir oil check

NOTICE: *When servicing the reservoir it is important to prevent contamination. Clean the components and all areas around the components to help reduce the risk of contamination.*

1. Park the machine on a firm, level surface with safe access all around.
2. Lower the lift arms down on the ground and bucket flat on the ground.
3. Lift engine compartment hood and open the rear access door, and engage lock. Locate the hydraulic oil fill cap **(1)** and the hydraulic oil level **(2)**. See Figure **1** for radial machines and Figure **2** for vertical machines.
4. Check the fluid level. The oil level should be within the middle one third of the sight glass **(2)**.



RAPH12SSL0018AA 1



RAPH12SSL0412BA 2

NOTE: *Always remove the filler cap slowly.*

5. If oil needs to be added:
   A. Clean the filler cap and the area around the cap to reduce the risk of contamination.
   B. Slowly turn the filler cap counterclockwise but DO NOT remove the cap until pressure is relieved.
   C. Remove the filler cap and add oil as required.
   D. Watch the site glass for proper level.
   E. Replace the cap.

Loader arm and bucket hydraulic interlock

⚠ WARNING

Machine damage can cause accidents!
If you discover any problem or defect on the machine, repair it immediately or see your authorized dealer. Do not operate the machine until all problems are corrected.
Failure to comply could result in death or serious injury.

W0159A

The seat switch, restraint bar, loader arm, and bucket interlock prevents the operation of loader arm and bucket function from movement if the operator raises the restraint bar or leaves the seat with the ignition switch on.

Check the interlock operation:

1. Enter the machine, sit in the seat, connect the seat belt, and lower the restraint bar.
2. Start the engine and run at idle speed.
3. Make sure that the loader arm is completely lowered to the ground and the attachment is empty.
4. Push the operate button to activate the hydraulic and ground drive systems.
5. Engage the park brake, push the Park Brake button on the right-hand control lever.
6. Operate the loader arm and bucket controls to ensure they function properly.
7. Raise the restraint bar and attempt to move the loader arm and bucket controls. The operation should be locked.
8. Lower the restraint bar, and push the Operate Button to reactivate the hydraulic functions.
9. Operate the loader arm and bucket controls to ensure they function properly.
10. Lift yourself for **5 s** with no more than **25 mm (1 in)** off the seat and attempt to move the loader arm and bucket controls. The operation should be locked.
11. If the controls are not locked properly, contact your dealer for assistance. Do not operate the machine until the fault is resolved.

INITIAL 50 HOURS

Roll Over Protective Structure (ROPS) mechanism and hardware check

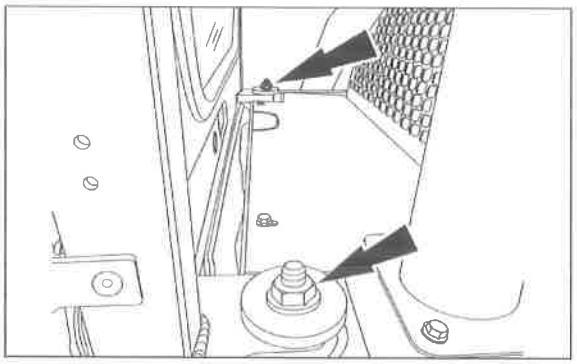
⚠ WARNING

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.

W0143A

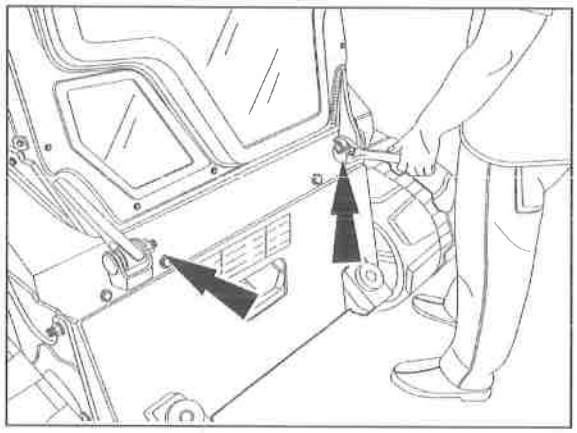
Check the Roll Over Protective Structure (ROPS) cab to lower mainframe hardware for proper torque.

1. Check the ROPS hardware at the back of the machine that are used to secure the cab. Torque the hardware to **170 N·m (125.4 lb ft)**.



931001633 1

2. Check the ROPS front pivot bolts. Torque these bolts to **42 N·m (31.0 lb ft)**.



RAIL14SSL0469BA 2

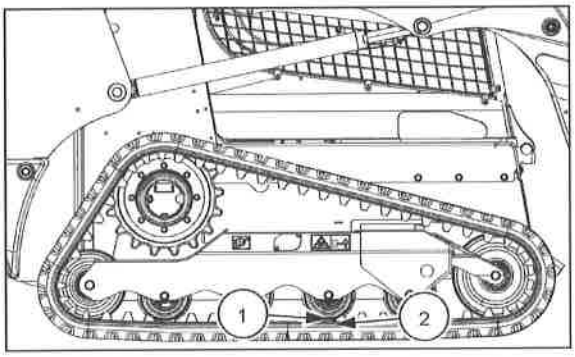
EVERY 50 HOURS

Track tension check and adjustment

Check the track tension after the first **10 h** on a new machine or if new tracks have been installed. After the initial **10 h** check, the track tension should be checked every **50 h** thereafter. For this procedure, the tracks, rollers, idler wheels, debris guard, and final drive sprockets must be clean of dirt and debris.

Track tension check

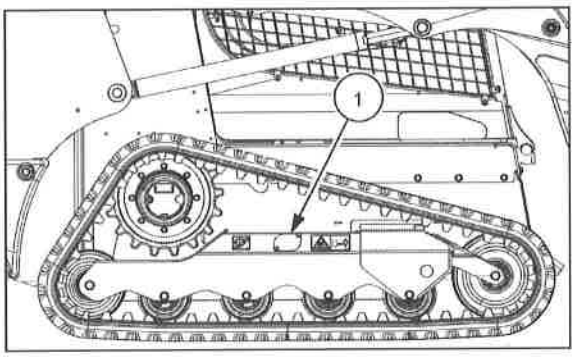
1. Park the machine on firm level surface.
2. Raise, block, and support machine properly until the tracks are about **50 mm** (**2.0 in**) off the surface.
3. Measure from the bottom of the center roller wheel **(1)** to the lower track top surface **(2)**. The allowable track sag is **12 – 19 mm** (**0.5 – 0.75 in**).



RAIL15SSL0356AA 1

Track tension adjustment

1. Use a **13 mm** tool and remove the track adjustment access cover **(1)** to expose the track adjustment fitting.



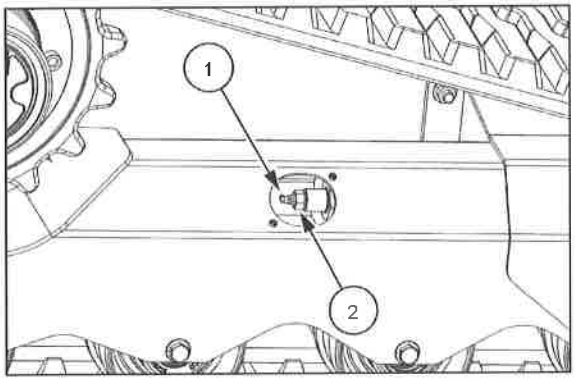
RAIL15SSL0356AA 2

Increase track tension:

Add **TUTELA MOLY GREASE GR-75** grease to increase track tension adjustment fitting **(1)**.

Decrease track tension:

Use a **19 mm** tool and slowly turn the fitting **(2)** counterclockwise. Grease will escape from the bottom of the fitting and decrease tension.



RAIL15SSL0382BA 3

Tire pressure and wheel hardware torque

⚠ WARNING

Explosion hazard!
Always maintain correct tire pressure as indicated in this manual. DO NOT inflate tires above the recommended pressure. Excessive pressure could result in tire failure.
Failure to comply could result in death or serious injury.

W0109A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

The skid steer will be hard to turn and the tires will wear faster if the correct pressure is not maintained. When a worn or damaged tire is replaced, the replacement must be the same size and tread design as the other tires on the machine. Two different sized tires on one side of the machine will cause accelerated tire wear, loss of power, and excessive strain on the drivetrain. Replace worn tires in pairs with the two new tires used on the same side of the loader. If this tilts the loader too much, replace all four tires.

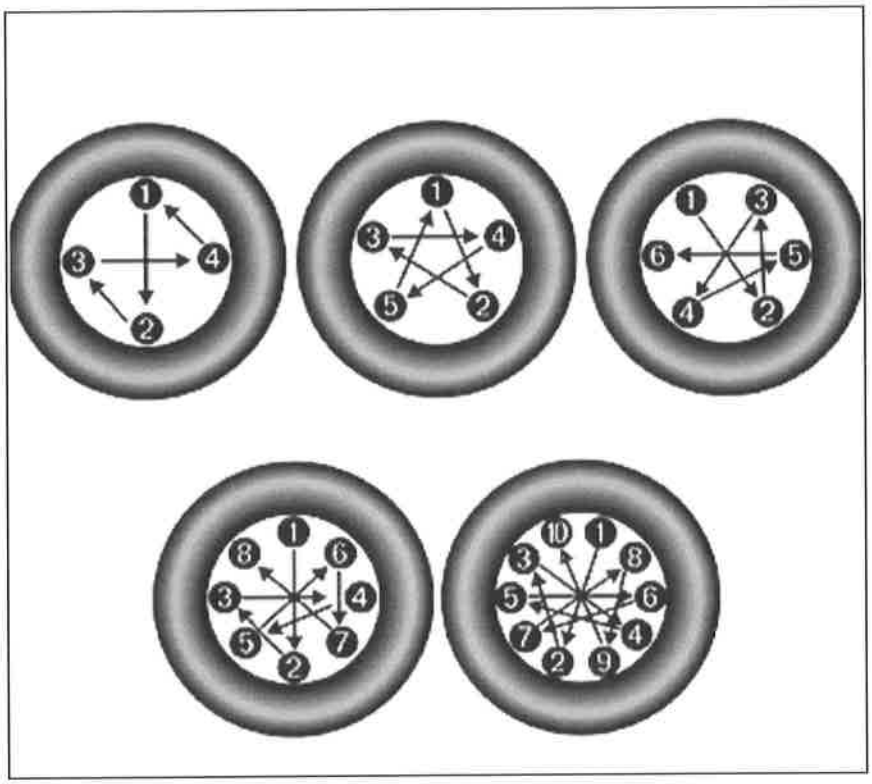
Adding air to the tire

NOTICE: *Tire pressure gauges should be checked at regular intervals for calibration and accuracy.*

1. Check the tire pressure.
2. Before you add air, have the wheel correctly installed on the machine or put the wheel in a restraining device (tire inflation cage).
3. Use an air hose with a remote shutoff valve, self-locking air chuck and wear eye protection.
4. Stand BEHIND the tread of the tire and make sure ALL persons are away from the side of the tire before you start to add air.
5. Inflate the tire to the recommended air pressure. DO NOT inflate the tire more than the recommended maximum pressure given on the tire.

TIRE	SIZE	PRESSURE
Heavy Duty	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa (52 – 60 psi)**
Premium	27/10.5 x 15	**290 – 345 kPa (42 – 50 psi)**
	10 x 16.5	
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa (52 – 60 psi)**
Premium with liner	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
Severe Duty	10 x 16.5	**290 – 345 kPa (42 – 50 psi)**
	12 x 16.5	
	14 x 17.5	**531 – 586 kPa (77 – 85 psi)**
Flotation	31.5 x 13 x 16.5	**179 – 241 kPa (26 – 35 psi)**
	33 x 15.5 x 16.5	**290 – 345 kPa (42 – 50 psi)**
Mining	12 x 16.5	**290 – 345 kPa (42 – 50 psi)**
Non-Pneumatic	12 x 16.5	not required
	14 x 17.5	

Wheel torque



63109344 1

1. Check that the wheel nuts have the proper torque setting.

Wheel taper nut torque	**169.5 N·m (125 lb ft)**
Flange nut	**203.5 N·m (150 lb ft)**

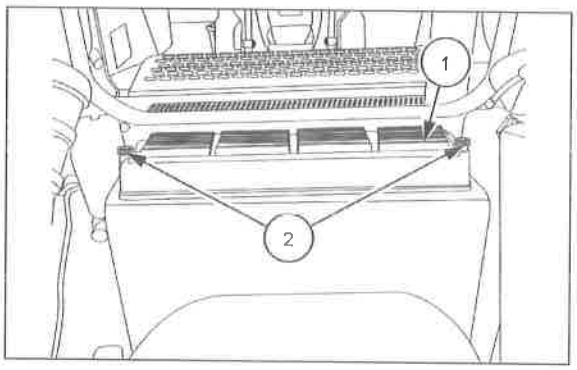
2. If necessary, tighten the nuts in a cross-pattern sequence as shown.

Cab intake filter

If the machine is equipped with a cab heater or air conditioning, the cab intake filter should be inspected. The cab intake filter **(1)** is located inside the cab behind the seat below the rear window.

NOTE: *The service interval for the cab intake filter is dependent on the amount of use and the operating conditions. It is recommended to check more often if working in extreme environmental conditions.*

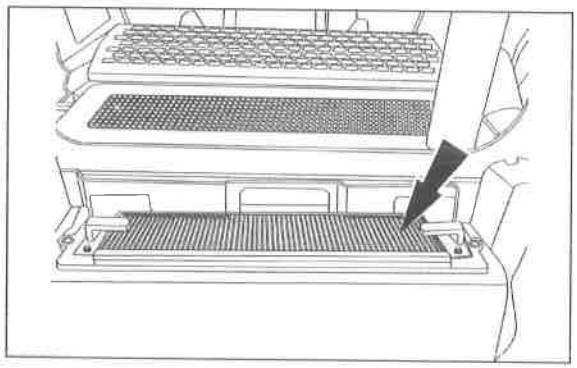
1. Open the access cover using knobs **(2)**. Replace the cab intake filter **(1)** if it is damaged, torn, or if it is clogged with debris and dirt.



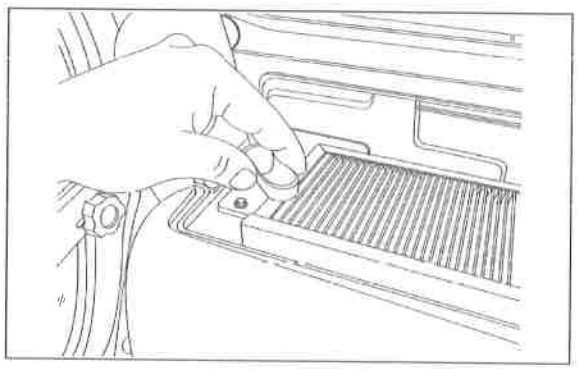
93106883 1

2. Remove the cab intake filter.

NOTICE: *Maintain the filter in a horizontal orientation when removing from the air box. This will prevent dust and debris from being accidently dumped in the cab.*


93106884 2

3. Clean the cab intake filter compartment of dirt and debris. The rubber gasket on the filter must seal properly with the compartment filter flange.
4. Replace the new or cleaned components in the reverse order.


93107489A 3

NOTICE: *Make sure to get a good seal between the filter and the housing.*

Seat restraints - Check

NOTE: *State or Local regulations may require a* ***7.6 cm (3.0 in)*** *webbing seat belt available through Dealer Service Parts. This belt may be necessary in some industrial applications. Check your local codes.*

Seat belt inspection and maintenance:

- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have cuts that can make the belt weak.
- Check that bolts are tight on the seat bracket or mounting.
- If belt is attached to seat, make sure seat or seat brackets are mounted securely.
- Keep seat belts clean and dry.
- Clean belts only with soap solution and warm water.
- Do not use bleach or dye on the belts because this can make the belts weak.

INITIAL 100 HOURS

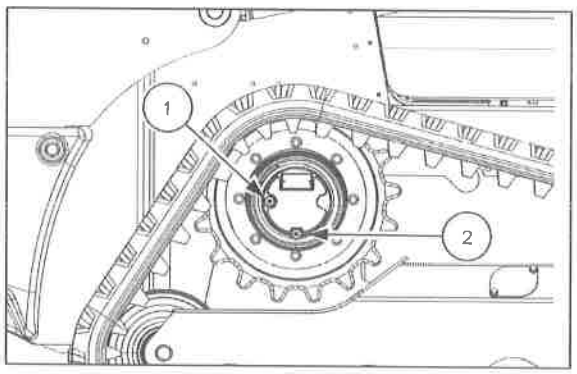
Final drive oil (track models)

Change the final track drive gear oil after the initial **100 h** of operation and then every **500 h** of operation.

Final track drive gear oil specification – **TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

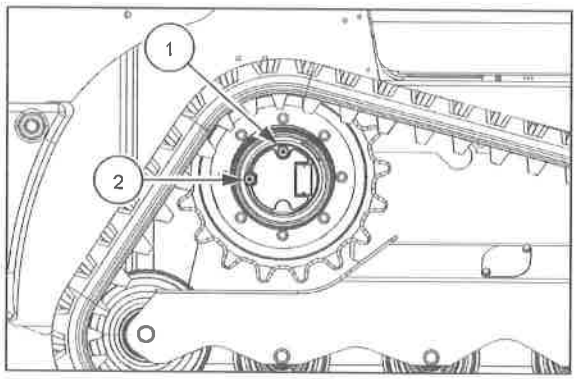
To change oil

1. Position the final drive hub so that one of the drain plugs **(2)** is in the 6:00 position as shown.
2. Remove drain plug **(2)** and let oil drain completely before replacing the drain plug.



RAIL15SSL0358AA 1

3. Rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
4. Using a funnel, fill the track drive hub until oil starts to flow from **(2)** that is at 3:00 or 9:00 position.
5. Insert both plugs **(1)** and **(2)** and wipe any excess or spilled oil and repeat this procedure on the other side of the machine.

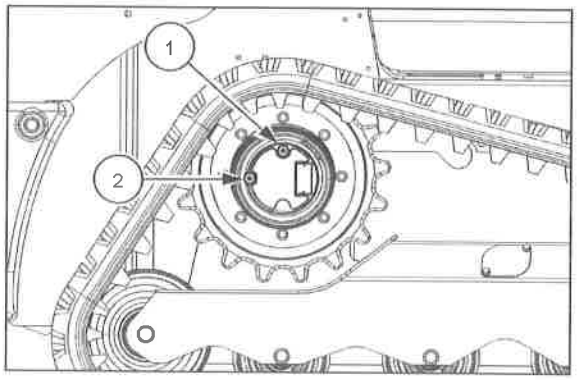


RAIL15SSL0359AA 2

Capacity - each side	**1.0 L (1.06 US qt) +/- 0.1 L (0.1 US qt)**
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

To check oil level

1. To check the final drive oil level, rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
2. Remove the drain plug **(2)**. If the oil level is at the proper level, the oil should be even with the bottom of the drain plug.
3. If the oil is low, remove the top plug **(1)** and add oil until it starts to flow out of **(2)**.



RAIL15SSL0359AA 3

EVERY 250 HOURS

In-line fuel filter – (SR160B only)

⚠ WARNING

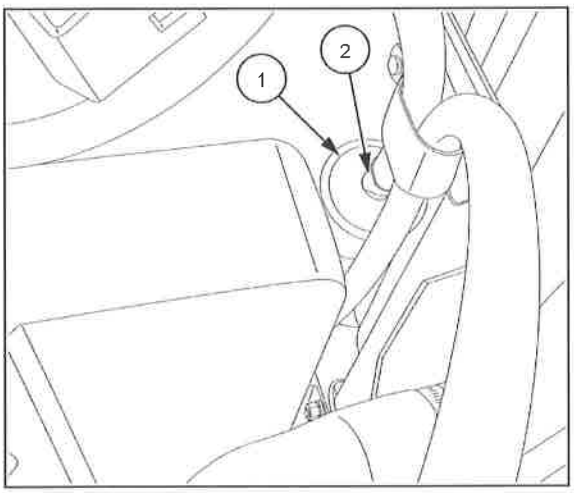
Hot surface possible!
Wait for all components to cool before performing any operation.
Failure to comply could result in death or serious injury.

W0251A

The in-line fuel filter **(1)** should be replaced every **250 h** of operation.

Removal

1. Place the machine on a firm, level surface.
2. Turn off engine.
3. Open the engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The in-line fuel filter is located to the right-hand side near the coolant reservoir.
4. Loosen and slide the clamps **(2)** away from both sides of the in-line fuel filter **(1)**.
5. Grab the fuel hose with one hand and the filter with the other. Twist and pull away from each other to remove the filter from the hose. Repeat procedure for the other side.



RAIL13SSL0155BA 1

Installation

1. Grab the fuel hose with one hand and the filter with the other. Push the fuel hose onto the fuel filter. Repeat procedure for the other side.

NOTE: *Be sure the arrow marked on the filter is facing in the same direction as the old filter.*

2. Slide the clamps in place on each end of the fuel filter and tighten.

NOTICE: *Do not start the engine until you purge the air from the fuel system.*

3. Press the POWER button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge air from the fuel system.
4. Start the engine.
5. Inspect the area around the in-line filter for leaks.
6. Unlatch and close rear service door and close engine hood.

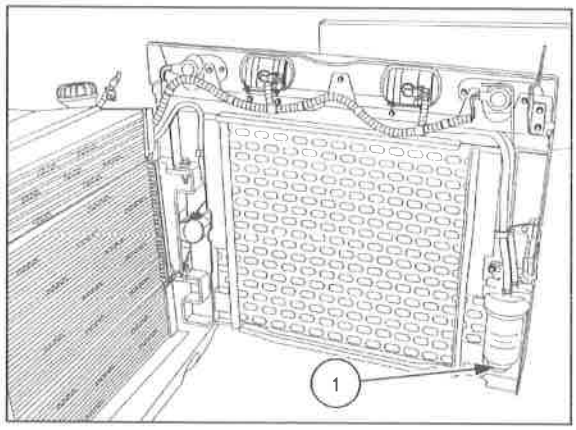
Fuel-water separator filter - drain fluid

Check for water in the fuel-water separator filter every **250 h** of operation. The quality of fuel may determine if the fuel-water separator filter needs to be checked more frequently than **250 h**

Model SR160B only

1. Place the machine on a firm, level surface.
2. Turn off the engine.
3. Open engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The fuel-water separator filter is on the inside of the rear service door.
4. Place a clean suitable container underneath the fuel water separator filter.
5. Turn the drain valve on the bottom of the fuel-water separator filter **(1)** counter-clockwise and drain the water until only fuel is present.
6. Close the drain valve.

NOTICE: *If excess water is found in the filter, the fuel tank should also be checked.*

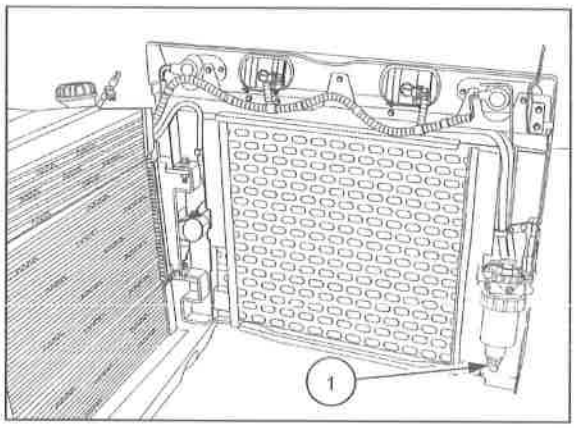


RAIL13SSL0150BA 1

Models SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only

1. Place the machine on a firm, level surface.
2. Turn off the engine.
3. Open engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The fuel-water separator filter is on the inside of the rear service door.
4. Place a clean suitable container underneath the fuel-water separator filter.
5. Turn the drain valve on the bottom of the fuel-water separator filter **(1)** counter-clockwise and drain the water until only fuel is present.
6. Close the drain valve.

NOTICE: *If excess water is found in the filter, the fuel tank should also be checked.*



RAIL13SSL0739BA 2

Drive chain tension check

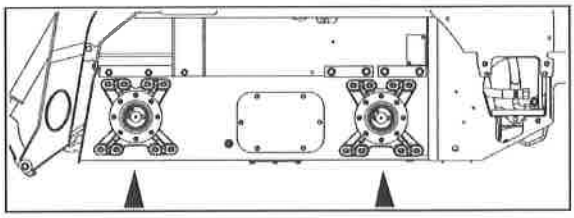
⚠ WARNING

Jack stands can slip or fall over. Dropping, tipping, or slipping of machine or its components is possible.
DO NOT work under a vehicle supported by jack stands only. Park machine on a level surface. Block wheels. Support machine with safety stands.
Failure to comply could result in death or serious injury.

W0069A

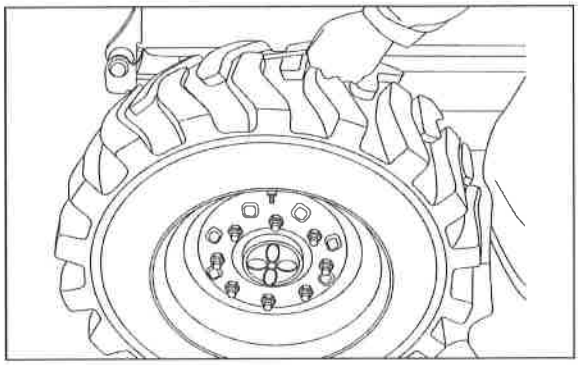
Check the tension of the four drive chains every **250 h** s of operation.

1. With suitable equipment properly support the machine securely off the ground at the points shown (only one side shown, total four locations).



931002280 1

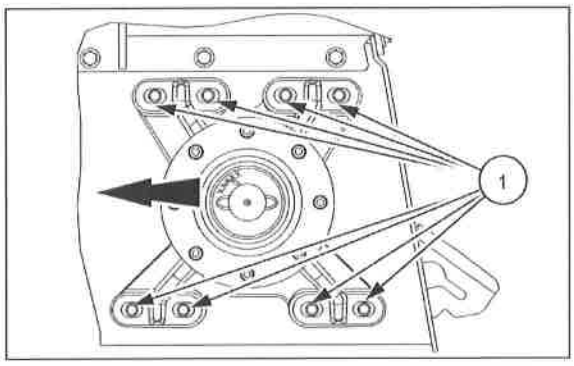
2. With the machine off the ground, rotate each tire and check for allowable movement. **6 – 12 mm (0.2 – 0.5 in)** is the acceptable range.



63107489 2

Drive chain adjustment

1. Adjust each axle drive chain by loosening the retaining nuts **(1)** (left front shown) and sliding the axle-hub assembly to remove the excessive slack.
2. To tighten the chains, slide the front axle-hubs forward and rear axle-hubs rearward.
3. Torque the axle retaining hardware to **244 N·m (180 lb ft)**.



93109317 3

EVERY 500 HOURS

Engine oil and oil filter - Change

⚠ DANGER

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply will result in death or serious injury.

D0076A

⚠ CAUTION

Burn hazard!
Do not handle any service fluid (engine coolant, engine oil, hydraulic oil, etc.) at temperatures that exceed 49 °C (120 °F). Allow fluids to cool before proceeding.
Failure to comply could result in minor or moderate injury.

C0107B

⚠ CAUTION

Chemical hazard!
Avoid getting engine oil on your skin. In case of skin contact, wash with running water.
Failure to comply could result in minor or moderate injury.

C0202B

Change engine oil and filter at **500 h** intervals.

Oil specification – **AKCELA UNITEK NO. 1™ SBL CJ-4**

For models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B use quick disconnect drain fitting 48103849 and quick-disconnect hose assembly 48109944.

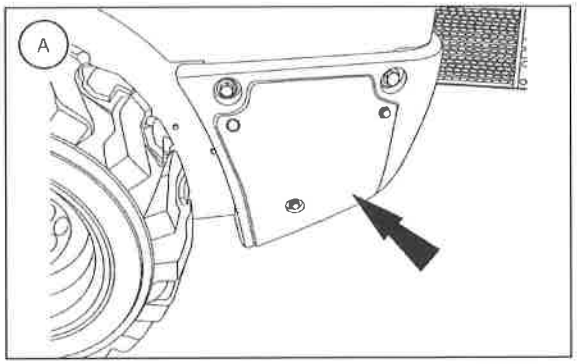
For models SR160B, SR175B, and SV185B use quick disconnect drain fitting 48103847 and quick-disconnect hose assembly 48109944.

NOTE: *The images may differ slightly based on the machine configuration. The procedure is the same.*

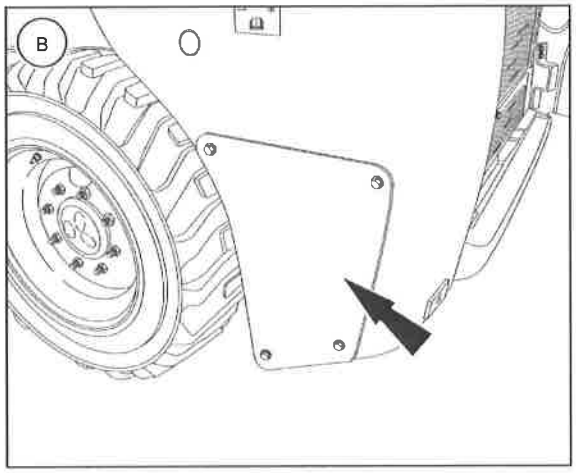
1. Place the machine on firm, level ground.

2. Remove the access cover from the rear lower left-hand side of the machine.

NOTE: *The top image* ***(A)*** *is applicable to SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B machines. The bottom image* ***(B)*** *is applicable to SR160B machines. The remaining steps will show one image but the processes will be the same.*



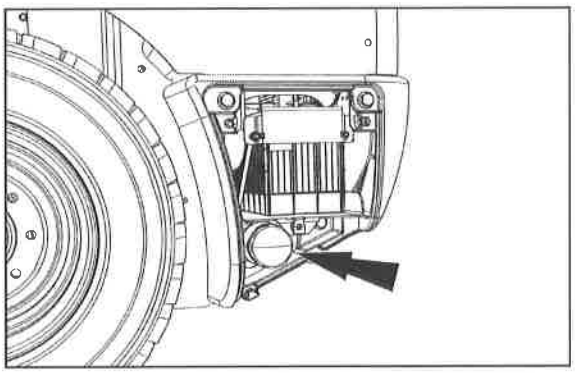
931001637 1



RAIL13SSL0582BA 2

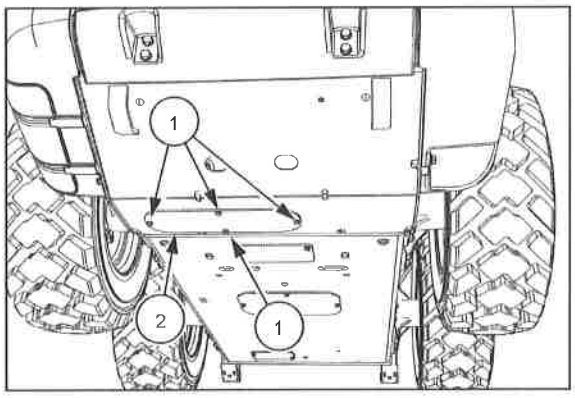
3. Locate the engine oil remote filter.
4. If applicable, use compressed air to clean the engine oil filter assembly.

NOTICE: *If compressed air is not available, use a clean rag or cloth to wipe the area clean. This reduces the potential of dirt contamination into the engine.*



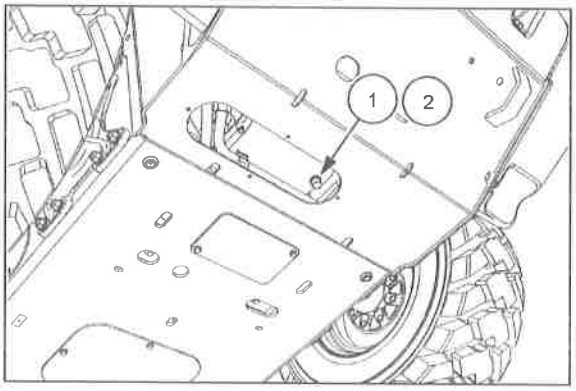
RAIL21SSL0112AA 3

5. Remove the mounting hardware **(2)** and cover **(1)** from underneath the machine.



RAIL18SSL0076BA 4

6. Remove the cap **(1)** from the quick disconnect drain fitting **(2)**.

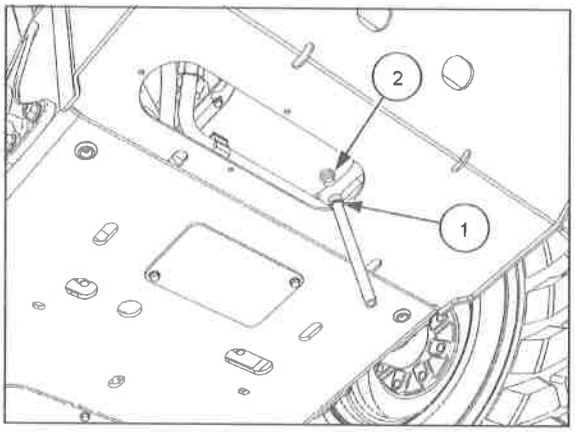


RAIL18SSL0077BA 5

7. Place a drain receptacle under the machine.

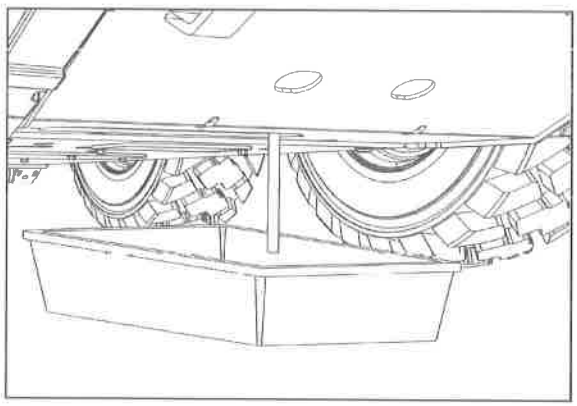
NOTE: *After the quick-disconnect hose installation, oil will automatically begin to flow out of the hose.*

8. Thread the quick-disconnect hose assembly **(1)** onto the quick-disconnect drain fitting **(2)**.
9. Allow the oil to drain completely from the crankcase.



RAIL18SSL0078BA 6

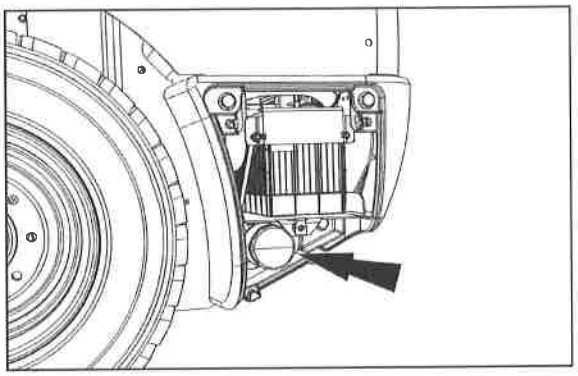
10. Remove the receptacle, with the used oil, from under the machine.
11. Dispose of the oil in accordance with the local regulations.



RAIL18SSL0079BA 7

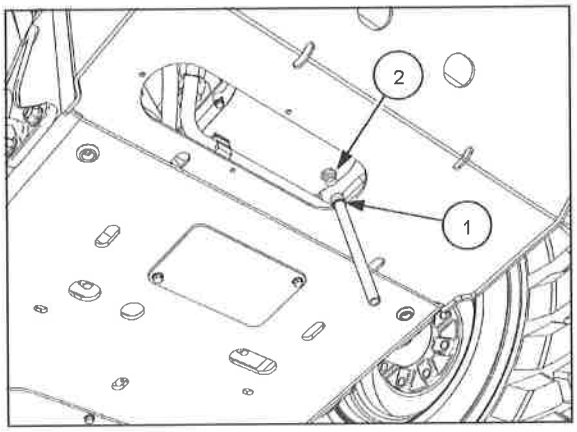
12. Turn the old engine oil filter counter-clockwise to remove.
13. Dispose of the filter in accordance with the local regulations.
14. Use a clean cloth and wipe sealing surface of the old filter base to remove all dirt.
15. Apply a thin layer of clean grease or oil to the gasket of the new filter.

NOTICE: *DO NOT use a filter strap wrench to install the oil filter. An oil filter strap wrench can cause a leak if the filter is dented or overstressed.*



RAIL21SSL0112AA 8

16. Turn the new oil filter clockwise onto the base until the gasket makes contact with the base. Continue to tighten the filter with your hand for 3/4 to one full turn as directed on the filter label.
17. Remove the quick-disconnect hose assembly **(1)** from the quick-disconnect drain fitting **(2)**.

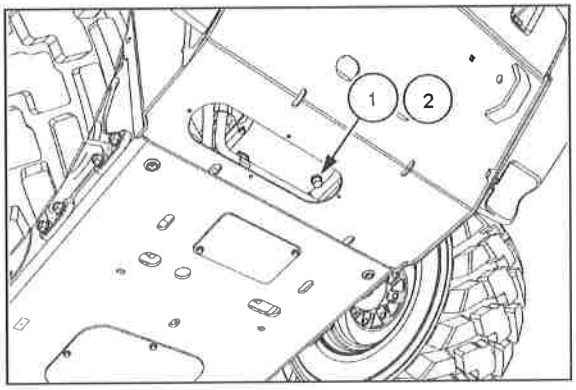


RAIL18SSL0078BA 9

18. Install the cap **(1)** onto the quick-disconnect drain fitting **(2)**.

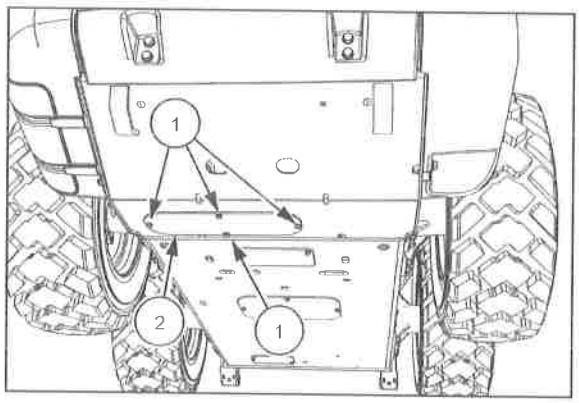
NOTE: *Make sure the o-ring is installed on the drain fitting* ***(2)****, if it is damaged, then replace with new.*

NOTE: *The cap* ***(1)*** *is only hand tight on the drain fitting* ***(2)****.*



RAIL18SSL0077BA 10

19. Install the cover **(1)** underneath the machine and secure with the hardware **(2)**.



RAIL18SSL0078BA 11

NOTE: *Top image is applicable to SR160B, SR175B, and SV185B machines. The lower image is applicable to SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B machines.*

20. Remove the engine oil dipstick **(1)** to provide crankcase ventilation.

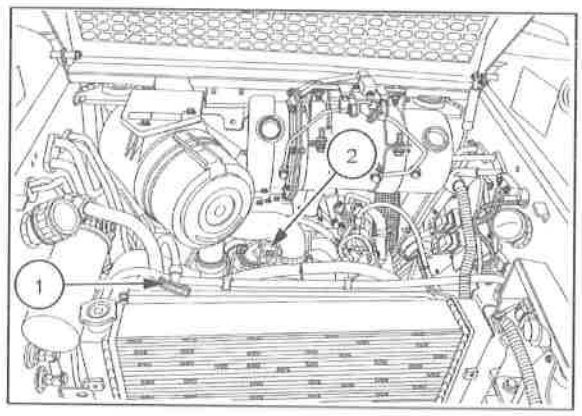
NOTICE: *Slowly fill to avoid flooding valve cover with oil.*

NOTE: *Use an oil spout that is smaller than the engine oil fill neck* ***(2)****. This will allow air to pass around the oil fill neck as you pour.*

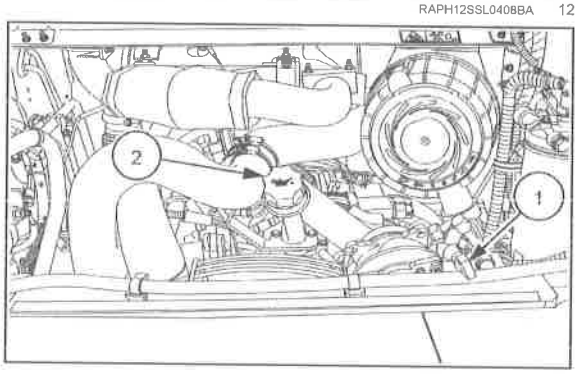
21. Slowly add the correct type and quantity of oil, see the oil table below.

NOTE: *Keep the oil fill spout in the upper half of the oil fill neck.*

22. Install the engine oil fill cap.
23. Install the engine oil dipstick.
24. Start the engine and run at idle speed. Check the engine oil filter and drain plug for leaks. After **2 min**, stop the engine, wait for **2 – 3 min**, and check the engine oil level.
25. Install access cover and secure with bolts.
26. Close rear access door and engine hood.
27. Use the instrument panel to reset the oil life monitoring feature. See "Oil life reset" **3-53**.



RAPH12SSL0408BA 12



RAIL13SSL0608AA 13

Engine crank case oil

Capacity - with filter change	
SR160B, SR175B, and SV185B	**7.0 L (7.5 US qt)**
SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B	**8.5 L (9.0 US qt)**
Specifications	**AKCELA UNITEK NO. 1™ SBL CJ-4**

NOTE: *See the "Engine oils" chart on page* ***7-16*** *for the recommended viscosity at ambient temperature ranges.*

Fuel-water separator filter element

Replace the fuel-water separator filter every **500 h** of operation.

Models SR175B and SV185B

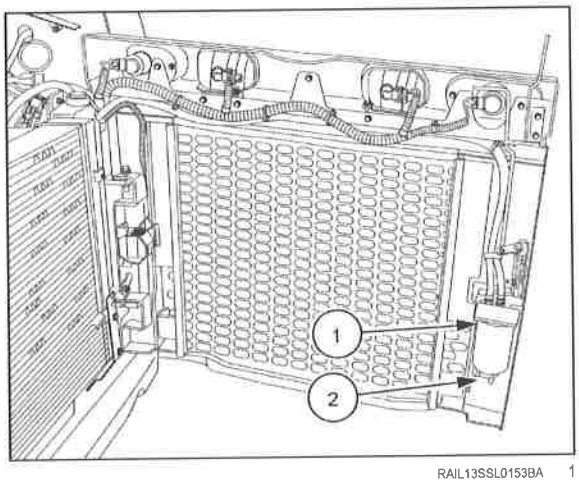
1. Place the machine on firm, level surface.
2. Turn off the engine.
3. Open engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The fuel-water separator filter is on the inside of the rear service door.
4. Place a suitable container underneath the fuel-water separator filter.
5. Clean the area around the fuel-water separator filter **(1)** with water before proceeding.
6. Disconnect the electrical connection **(2)** on the bottom of the fuel-water separator filter.
7. Use a strap wrench and remove the pre-filter **(1)**.
8. Remove the rubber seal from the stud on the pre-filter head.
9. Use a cloth and clean the gasket surfaces of the pre-filter body.
10. Apply clean engine oil to the new rubber seal.
11. Install the rubber seal on the pre-filter head stud.
12. Apply clean engine oil to the gasket of the new pre-filter. DO NOT fill the new pre-filter with fuel before installation.

NOTICE: *DO NOT use a strap wrench to tighten the pre-filter.*

13. Turn the pre-filter onto the pre-filter body until the pre-filter gasket makes contact with the pre-filter body. Continue to tighten the pre-filter with your hand for 1/2 to 3/4 turn.
14. Attach the electrical connector **(2)** to the bottom of the fuel-water separator filter.

NOTICE: *Do not start the engine until you purge the air from the fuel system.*

15. Press the POWER button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge air form the fuel system.
16. Start the engine.
17. Inspect the area around the fuel-water separator filter for leaks.
18. Unlatch and close the rear service door and close the engine hood.



RAIL13SSL0153BA 1

Models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B

1. Place the machine on firm, level surface.
2. Turn off the engine.

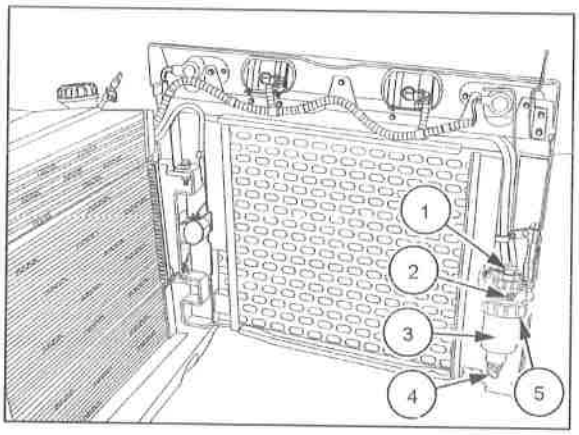
3. Open engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The fuel-water separator filter is on the inside of the rear service door.
4. Place a clean suitable container underneath the fuel-water separator filter.
5. Clean the area around the fuel-water separator filter **(3)** with water before proceeding.
6. Disconnect the electrical connection **(4)** on the bottom of the fuel-water separator filter.
7. Unscrew the black retaining ring **(5)**.
8. Pull the filter **(3)** straight down. Do not twist or turn the filter, as it is not threaded.
9. Wipe filter head with a clean cloth.
10. Apply a thin film of clean motor oil to the gasket.
11. Push the new filter up to the filter head.
12. Hand tighten the retaining ring until it clicks.

NOTICE: *DO NOT use a strap wrench to tighten the pre-filter.*

13. Replace water-in-fuel sensor and attach the electrical connector **(4)** on the bottom of the fuel-water separator filter.
14. Turn the bleed screw **(2)** out approximately one turn and pump the hand pump **(1)** on top of the pre-filter until fuel is coming out of the bleed screw **(2)**; then immediately close the bleed screw **(2)** while fuel is coming out.

NOTICE: *Do not start the engine until you purge the air from the fuel system.*

15. Start the engine.
16. Inspect the area around the fuel-water separator filter for leaks.
17. Unlatch and close the rear service door and close the engine hood.



RAIL13SSL0739BA 2

Fuel filter

Replace the fuel filter every **500 h** of operation.

Model SR160B only

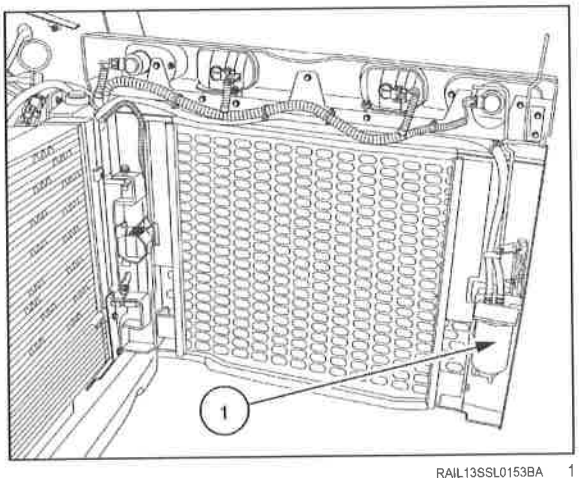
1. Place the machine on a firm, level surface.
2. Turn off the engine.
3. Open engine hood and rear service door. Engage the rear service door latch located near the lower hinge. The fuel filter **(1)** is on the inside of the rear service door.
4. Clean the area around the fuel filter **(1)** before proceeding.
5. Use a strap wrench and remove the filter.
6. Remove the rubber seal from the stud on the filter head.
7. Use a cloth and clean the gasket surfaces of the filter body.
8. Apply clean engine oil to the new rubber seal.
9. Install the rubber seal on the filter head stud.
10. Apply clean engine oil to the gasket of the new filter. DO NOT fill the new filter with fuel before installation.

NOTICE: *DO NOT use a strap wrench to tighten the filter.*

11. Turn the filter onto the filter body until the filter gasket makes contact with the filter body. Continue to tighten the filter with your hand for 1/2 to 3/4 turn.

NOTICE: *DO NOT start the engine until you purge the air from the fuel system.*

12. Press the power button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge any air from the fuel system.
13. Start the engine and check for leaks around the fuel filter.
14. Unlatch and close the rear service door.
15. Close the engine hood.



RAIL13SSL0153BA 1

Models SR175B and SV185B only

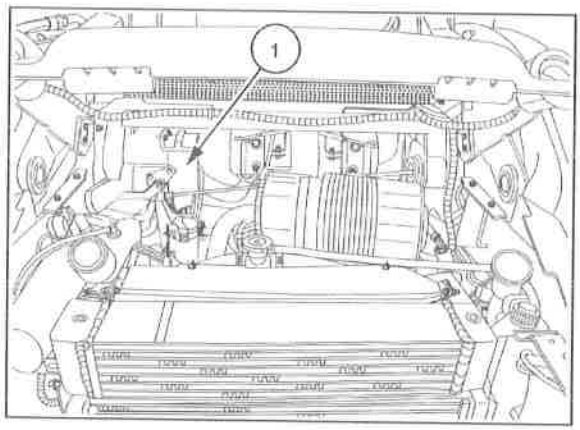
1. Place the machine on a firm, level surface.
2. Turn off the engine.
3. Open engine hood. The fuel filter is located on the left side of the engine compartment.
4. Clean the area around the fuel filter **(1)** before proceeding.
5. Use a strap wrench and remove the filter.
6. Remove the rubber seal from the stud on the filter head.
7. Use a cloth and clean the gasket surfaces of the filter body.
8. Apply clean engine oil to the new rubber seal.
9. Install the rubber seal on the filter head stud.
10. Apply clean engine oil to the gasket of the new filter. DO NOT fill the new filter with fuel before installation.

NOTICE: *DO NOT use a strap wrench to tighten the filter.*

11. Turn the filter onto the filter body until the filter gasket makes contact with the filter body. Continue to tighten the filter with your hand for 1/2 to 3/4 turn.

NOTICE: *DO NOT start the engine until you purge the air from the fuel system.*

12. Press the power button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge any air from the fuel system.
13. Start the engine and check for leaks around the fuel filter.
14. Unlatch and close the rear service door.
15. Close the engine hood.



RAPH12SSL0412BA 2

Models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B

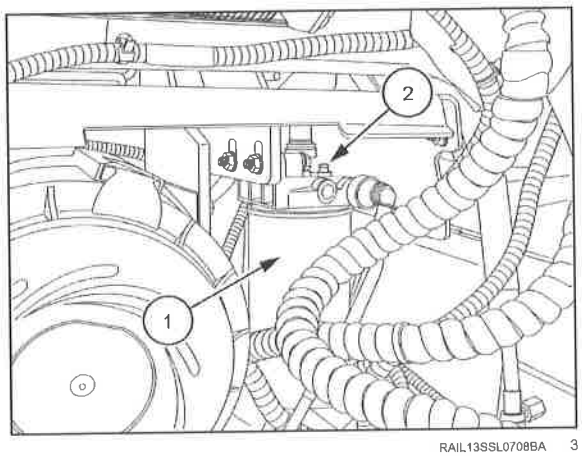
1. Place the machine on a firm, level surface.
2. Turn off the engine.
3. Open engine hood. The fuel filter is located on the right side of the engine compartment.
2. Clean the area around the fuel filter **(1)** before proceeding.
3. Use a strap wrench and remove the filter.
4. Remove the rubber seal from the stud on the filter head.
5. Use a cloth and clean the gasket surfaces of the filter body.
6. Apply clean engine oil to the new rubber seal.
7. Install the rubber seal on the filter head stud.
8. Apply clean engine oil to the gasket of the new filter. DO NOT fill the new filter with fuel before installation.

NOTICE: *DO NOT use a strap wrench to tighten the filter.*

9. Turn the filter onto the filter body until the filter gasket makes contact with the filter body. Continue to tighten the filter with your hand for 1/2 to 3/4 turn.
10. Turn the bleed screw **(2)** out approximately five turns and pump the hand pump on top of the pre-filter (located on the bottom of the door) until fuel is coming out of the bleed screw **(2)**; then immediately close the bleed screw **(2)** while fuel is coming out.

NOTICE: *DO NOT start the engine until you purge the air from the fuel system.*

11. Start the engine and check for fuel leaks around the fuel filter.
12. Unlatch and close the rear service door.
13. Close engine hood.



RAIL13SSL0708BA 3

Hydraulic oil filter

⚠ WARNING

Burn hazard!
Do not handle engine coolant, engine oil, or hydraulic oil at temperatures that exceed 49 °C (120 °F).
Allow fluids to cool before proceeding.
Failure to comply could result in death or serious injury.

W0330A

The hydraulic oil filter should be replaced every **500 h** of operation or if the warning lamp illuminates.

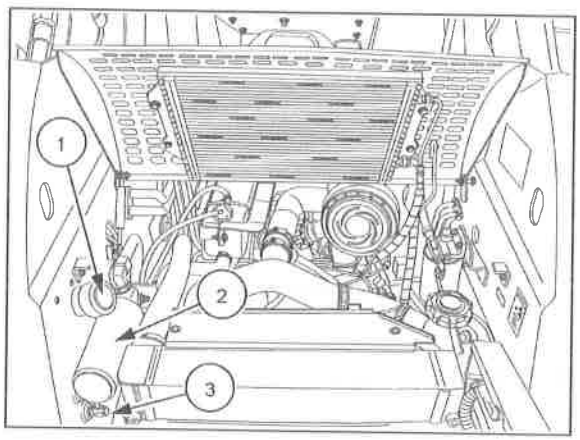
Hydraulic oil specifications – **AKCELA AW HYDRAULIC FLUID 68 HV**. See "Hydraulic oil viscosity" **7-17** for other options.

NOTICE: *Replace the hydraulic oil filter after **20 h** of operation if a major hydraulic component has been replaced.*

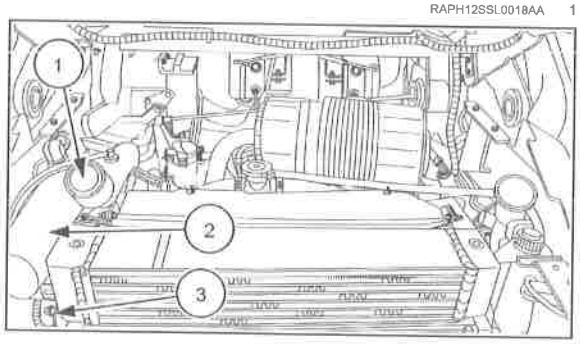
1. Remove any attachments and place the machine on firm level ground.
2. Open the engine hood and rear service door. Engage the rear service door latch located near the lower hinge.
3. Locate the Hydraulic oil filter **(2)** to the left of the radiator, see Figure **1** for radial machines and Figure **2** for vertical machines.
4. Check funnel and drain hose are secure. Position the drain hose to drain oil into a suitable container.
5. Slowly loosen the hydraulic fill cap **(1)** to relieve pressure in the system. Leave the cap on, but loose.
6. Clean the area around the hydraulic filter.
7. Turn hydraulic filter counter-clockwise and remove. Dispose of the filter and oil properly.
8. Apply a thin layer of clean oil on the O-ring of the new filter.
9. Install the filter. Hand tighten the filter 1/2 to 3/4 turn after the filter O-ring touches the filter head.

NOTICE: *DO NOT use a filter strap wrench to tighten the filter. Hand tighten only.*

10. Start the engine and check for oil leaks around the hydraulic filter.
11. Check the fluid level. The oil level should be within the middle one third of the sight glass **(3)**. Add oil as required.
12. Unlatch/close rear service door and close engine hood.



RAPH12SSL0018AA 1



RAIL13SSL0755AA 2

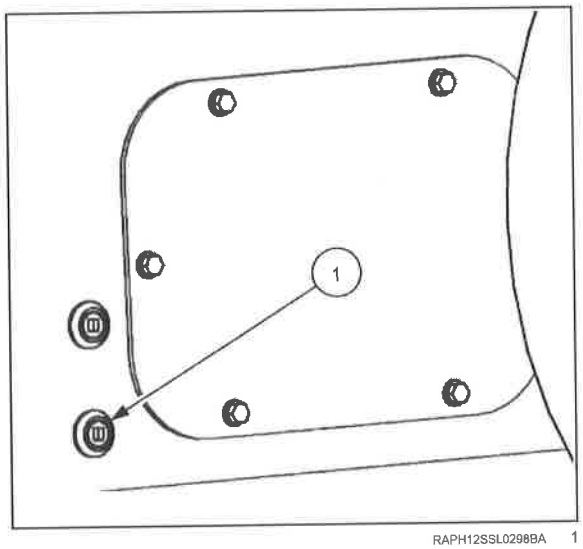
Final drive chain tank oil

The final drive chain tank oil should be checked every **500 h** of operation.

Final drive chain tank oil specification – **AKCELA AW HYDRAULIC FLUID 68 HV**

SR175B and SV185B models only

1. Park the machine on a firm level surface.
2. Clean the area around the chain tank fill/level plug **(1)**.
3. Remove the chain tank fill/level plug **(1)**. The oil should be up to the bottom of the inspection orifice.



RAPH12SSL0298BA 1

4. Add **AKCELA AW HYDRAULIC FLUID 68 HV** engine oil if necessary.
5. Replace the chain tank fill/level plug **(1)**.

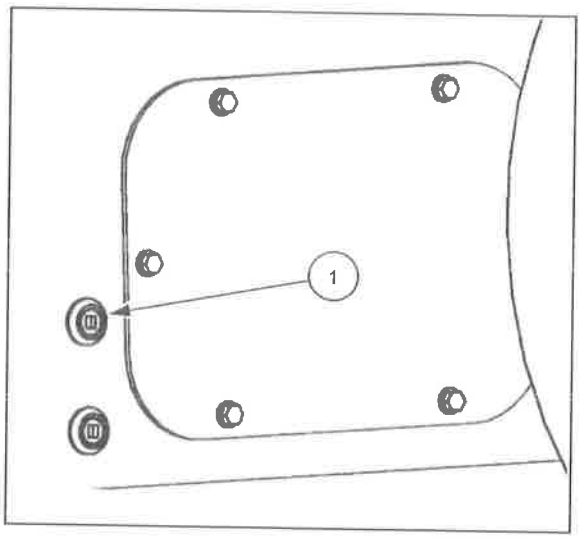
NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plug.*

6. Repeat this procedure for the other side.

Capacity - each side	
SR175B, SV185B	**7.4 L (7.9 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

SR210B only

1. Park the machine on a firm level surface.
2. Clean the area around the chain tank fill/level plug **(1)**.
3. Remove the chain tank fill/level plug **(1)**. The oil should be up to the bottom of the inspection orifice.
4. Add **AKCELA AW HYDRAULIC FLUID 68 HV** engine oil if necessary.
5. Replace the chain tank fill/level plug **(1)**.



RAPH12SSL0298BA 2

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plug.*

6. Repeat this procedure for the other side.

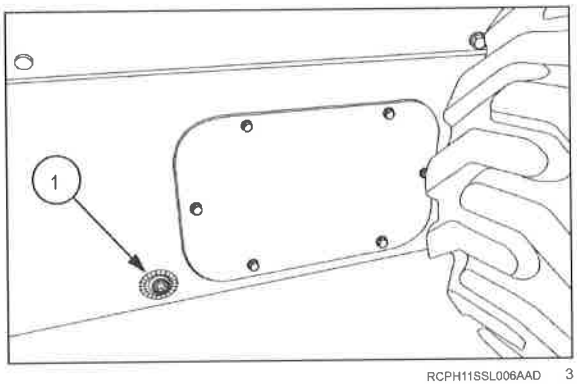
Capacity - each side	
SR210B	**26.0 L (27.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

SR160B, SR240B, and SV280B models only

1. Park the machine on firm level surface.

NOTE: *For models SR160B only: Raise the machine enough to remove the wheels and block the machine with support blocks to secure the machine in a level position. Remove the front right wheel and the rear left wheel from the machine to access the chain tank fill/level plug* ***(1)****.*

2. Clean the area around the chain tank fill/level plug **(1)**.
3. Remove the chain tank fill/level plug **(1)**. The oil should be up to the bottom of the inspection orifice.



RCPH11SSL006AAD 3

4. Add **AKCELA AW HYDRAULIC FLUID 68 HV** engine oil if necessary.
5. Replace the chain tank fill/level plug **(1)**.

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plug.*

6. Repeat this procedure for the other side.

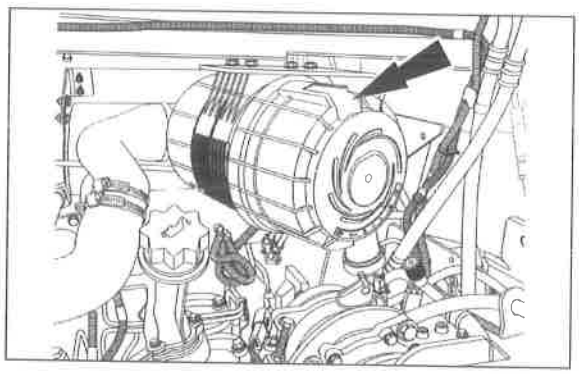
Capacity - each side	
SR160B	**6.25 L (6.6 US qt)**
SR240B, SV280B	**22.2 L (23.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Air cleaner elements

Both air cleaner elements should be changed at 500 hours of operation or if the air restriction indicator is illuminated.

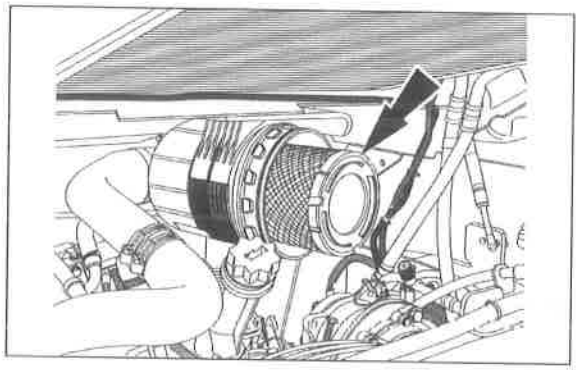
Air cleaner filter removal

1. Open the engine hood and rear service door. Engage the rear service door latch located near the lower hinge.
2. Pull the yellow tab out, rotate the cover counterclockwise until the cap turns to open. See instructions symbols and decal on the cover. Pull the cap off and clean the inside.



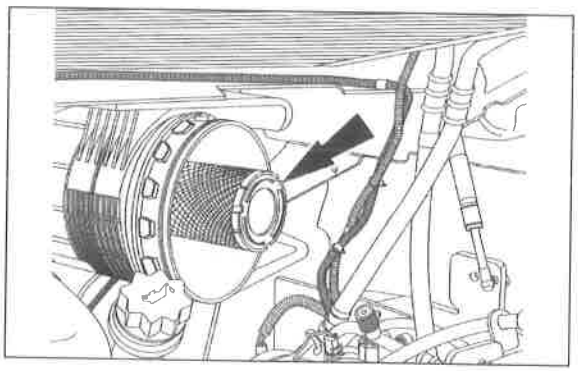
93107494 1

3. Remove the primary filter.



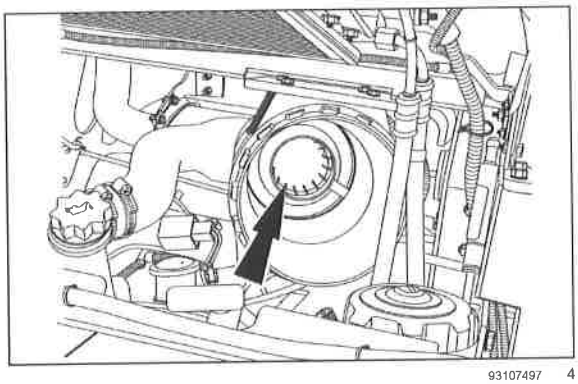
93107495 2

4. Remove the secondary filter.



93107496 3

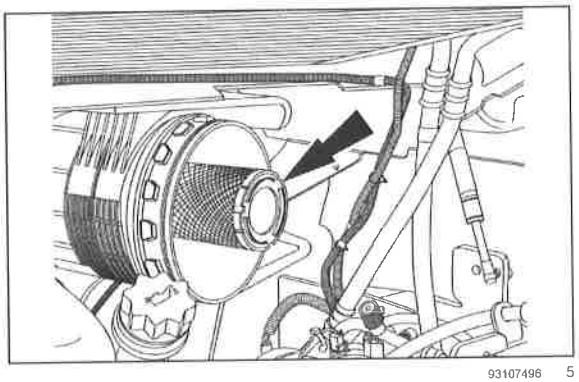
5. When both of the air cleaner filters have been removed, be sure to clean out the box, without allowing any debris to fall into the intake track.



93107497 4

Air cleaner filter installation

1. Install the secondary filter.

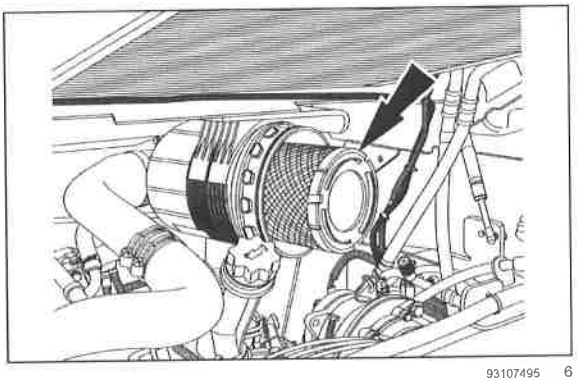


93107496 5

2. Install the primary filter.

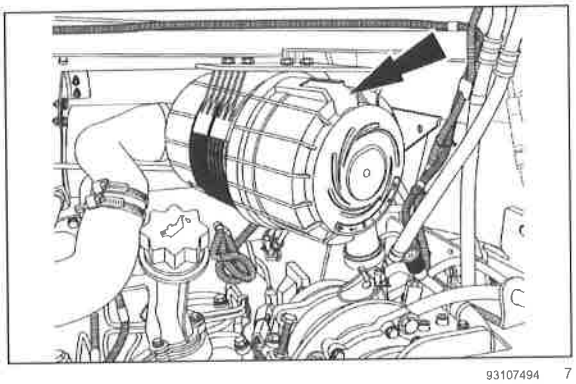
NOTE: *Make sure the filters are seated properly into the filter housing.*

NOTICE: *The inner end of the canister must be free of dirt and debris to insure the filters will seal properly. Failure of a good seal between the filter and canister may cause major engine damage.*



93107495 6

3. Install the cover by rotating clockwise until tight and push the yellow tab in to lock the cover in place.



93107494 7

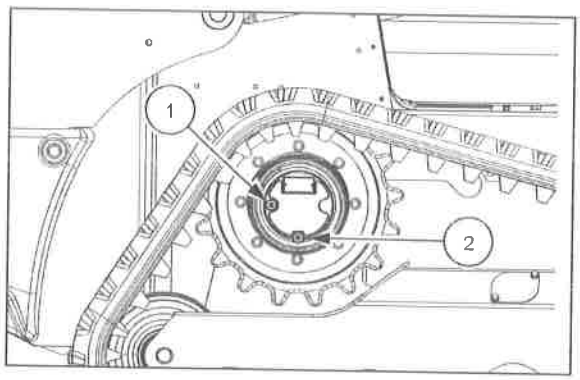
Final drive oil (track models)

Change the final track drive gear oil after the initial **100 h** of operation and then every **500 h** of operation.

Final track drive gear oil specification – **TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

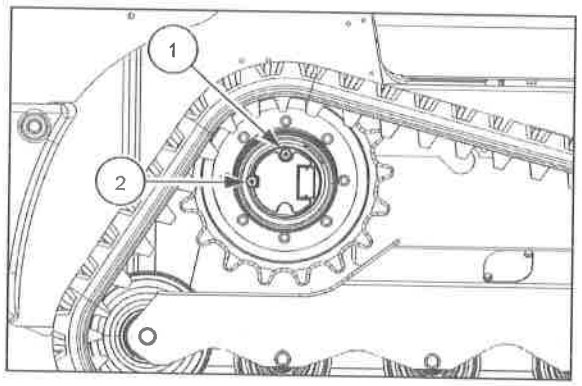
To change oil

1. Position the final drive hub so that one of the drain plugs **(2)** is in the 6:00 position as shown.
2. Remove drain plug **(2)** and let oil drain completely before replacing the drain plug.



RAIL15SSL0358AA 1

3. Rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
4. Using a funnel, fill the track drive hub until oil starts to flow from **(2)** that is at 3:00 or 9:00 position.
5. Insert both plugs **(1)** and **(2)** and wipe any excess or spilled oil and repeat this procedure on the other side of the machine.

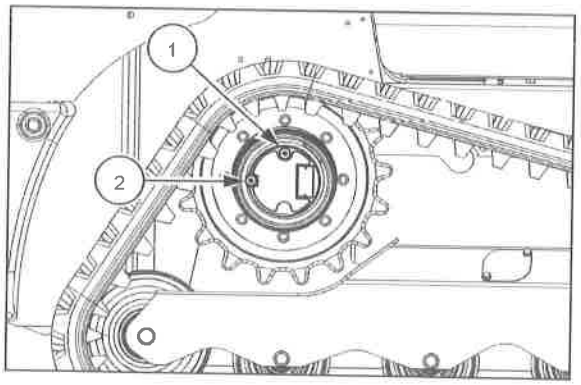


RAIL15SSL0359AA 2

Capacity - each side	**1.0 L (1.06 US qt) +/- 0.1 L (0.1 US qt)**
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

To check oil level

1. To check the final drive oil level, rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
2. Remove the drain plug **(2)**. If the oil level is at the proper level, the oil should be even with the bottom of the drain plug.
3. If the oil is low, remove the top plug **(1)** and add oil until it starts to flow out of **(2)**.



RAIL15SSL0359AA 3

Roll Over Protective Structure (ROPS) mechanism and hardware check

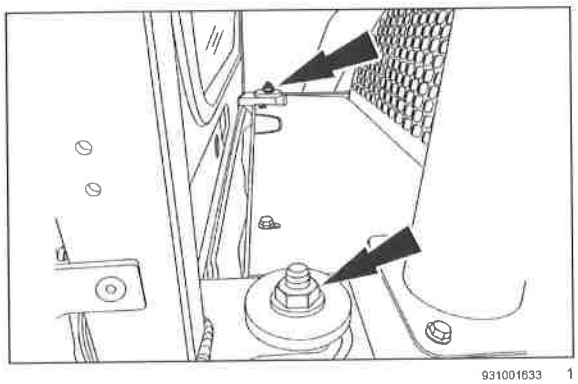
⚠ WARNING

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.

W0143A

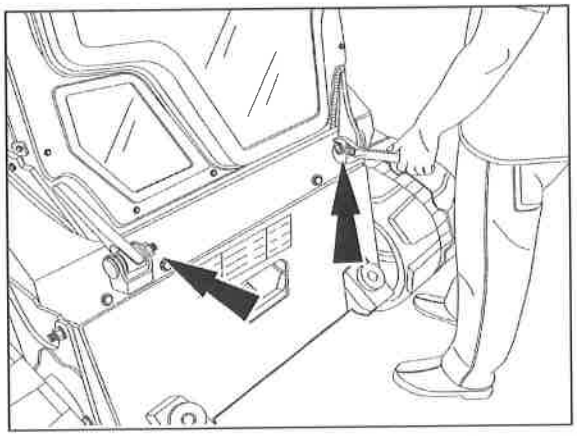
Check the Roll Over Protective Structure (ROPS) cab to lower mainframe hardware for proper torque.

1. Check the ROPS hardware at the back of the machine that are used to secure the cab. Torque the hardware to **170 N·m (125.4 lb ft)**.



931001633 1

2. Check the ROPS front pivot bolts. Torque these bolts to **42 N·m (31.0 lb ft)**.

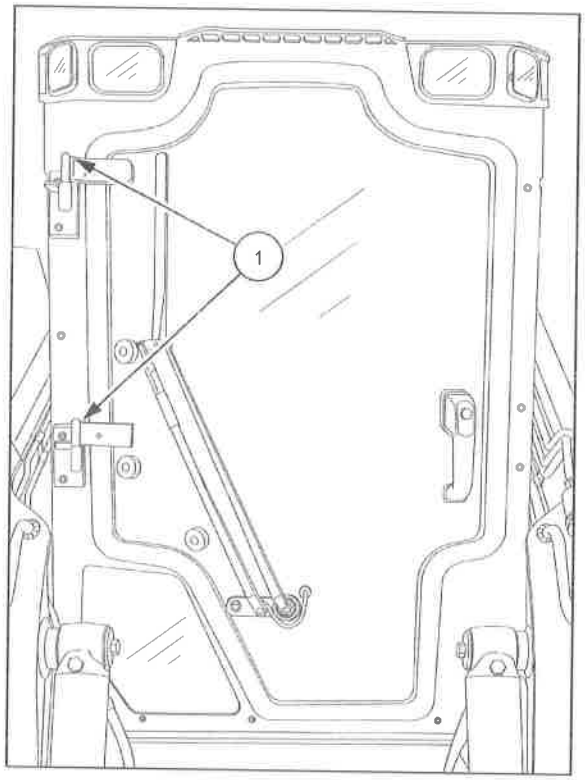


RAIL14SSL0469BA 2

Cab door - Grease

Grease both door hinges every **500 h** with **TUTELA MOLY GREASE GR-75**.

1. Clean the grease fittings **(1)** before greasing.
2. Open and close the door to work in the grease.



RAIL13SSL0700BA 1

EVERY 1000 HOURS

Hydraulic oil and filter

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

⚠ 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

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

⚠ 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

Every **1000 h** of operation or if a major hydraulic component has been replaced, rebuilt, or damaged, the hydraulic oil and filter should be changed.

Hydraulic oil specification – **AKCELA AW HYDRAULIC FLUID 68 HV** or see "Hydraulic oil viscosity" chart **7-17** for other options.

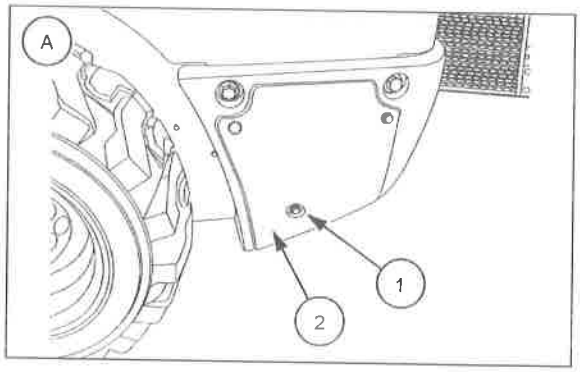
NOTE: *The drain plug for the hydraulic tank is in the battery compartment. The battery must be removed before draining the hydraulic oil.*

NOTICE: *See **7-66** to replace the hydraulic oil filter.*

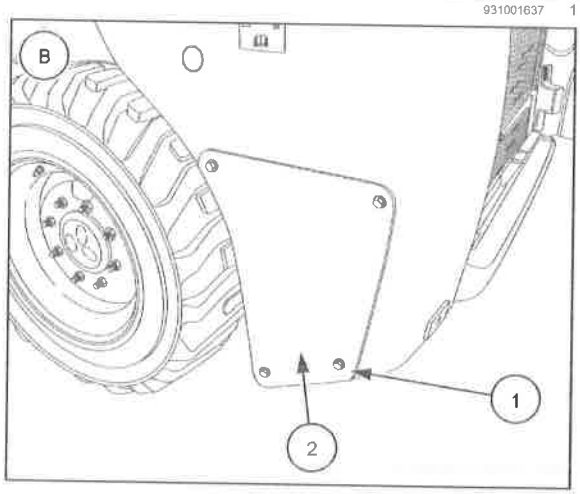
1. Park the machine on firm level surface.
2. Lower the loader arms to the ground and shut off the engine.

3. Remove the battery cover hardware **(1)** and the battery cover **(2)**.

NOTE: *The top image* ***(A)*** *is applicable to SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B machines. The bottom image* ***(B)*** *is applicable to SR160B machines.*

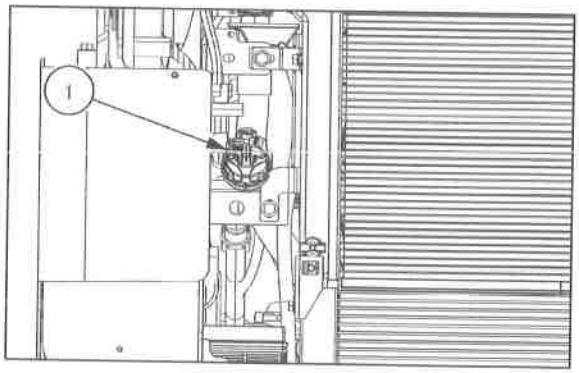


931001637 1



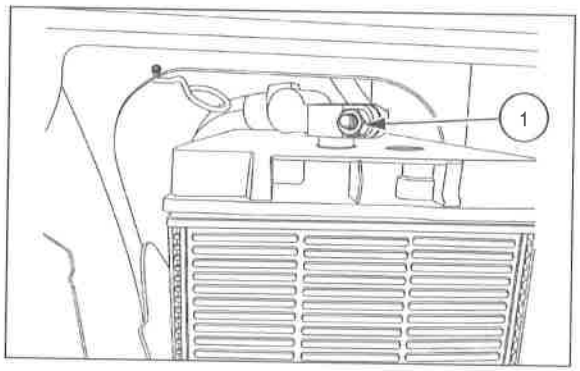
RAIL13SSL0582BA 2

4. Turn the Battery Disconnect Switch **(1)**, to the OFF position.



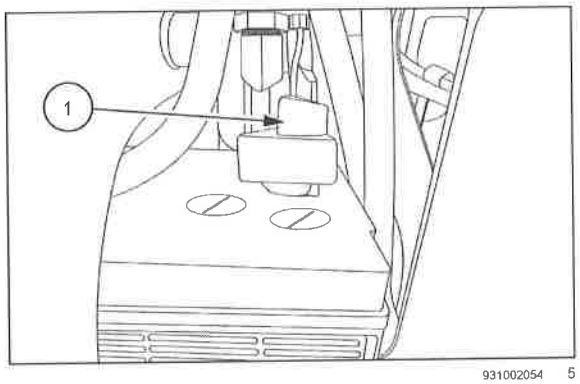
RAIL17SSL0040BA 3

5. Disconnect the negative cable connection **(1)**.



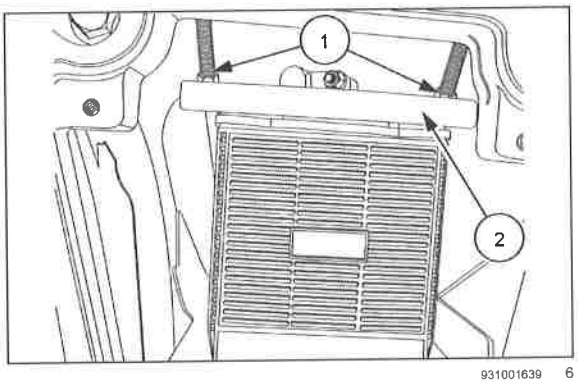
931001641 4

6. Disconnect the positive cable connection **(1)**.



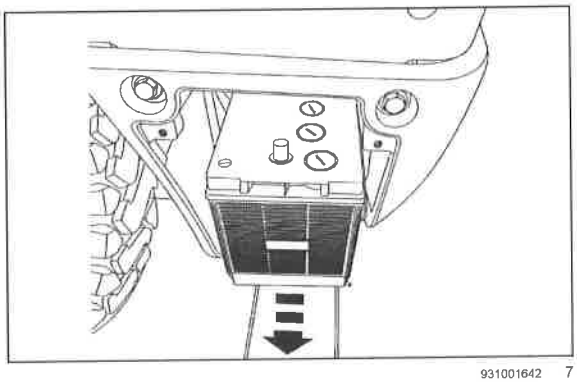
931002054 5

7. Loosen the nuts **(1)** and remove the battery hold-down **(2)**.

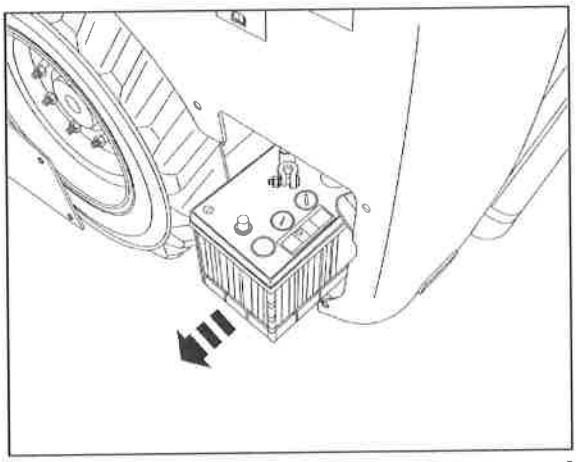


931001639 6

8. Remove the battery in direction of the arrow.



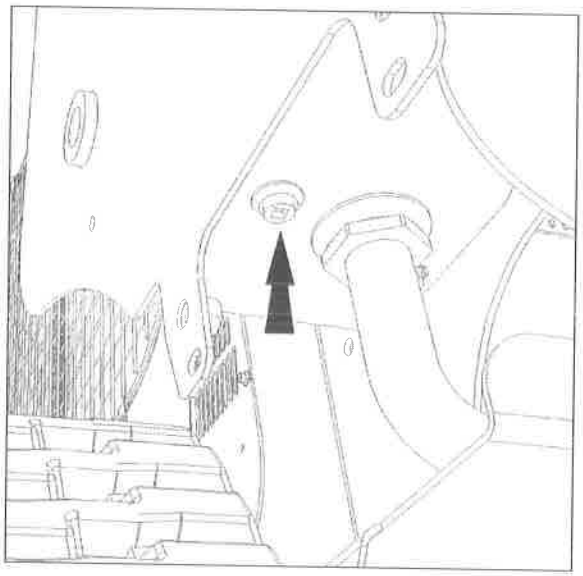
931001642 7



RAIL13SSL0581BA 8

NOTE: *The drain plug for the hydraulic tank is located inside of the battery compartment.*

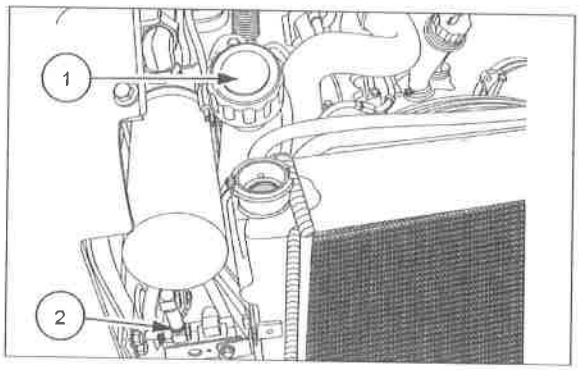
9. Remove the filler cap on the battery compartment.
10. Place a container under the battery compartment.
11. Slowly remove the drain plug.



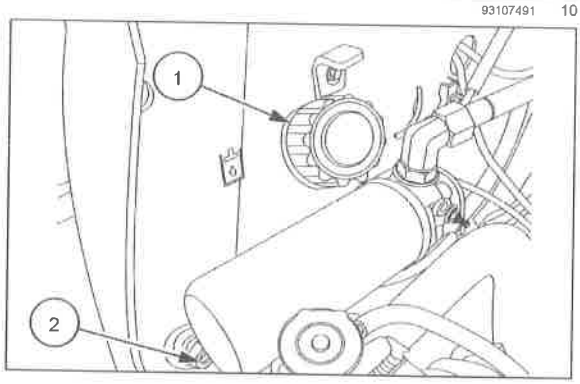
RAIL15SSL0099BA 9

NOTE: *The loader arms should be all the way down before filling the hydraulic tank.*

12. Clean the reservoir filler cap **(1)** and the area around the filler cap with cleaning solvent.
13. Turn the filler cap 1/2 turn to relieve air pressure from the reservoir. Do not remove the filler cap from the reservoir until the pressure is relieved.
14. Remove the filler cap from the reservoir.
15. Add the correct oil to the reservoir until the proper oil level in the reservoir is established. Fill the reservoir until the oil level is at the midpoint of the sight gauge **(2)**.
16. Install the reservoir cap.
17. Start and run the engine and operate the hydraulics. Lower the loader lift arms to the ground.
18. Stop the engine and check the oil level in the reservoir. Add oil as required.



93107491 10



93106865 11

Reservoir capacity	**15.0 L (3.96 US gal)**
System capacity:	
SR160B	**29.9 L (7.9 US gal)**
SR175B, SV185B, SR210B, TR270B, TR310B	**38.1 L (10.0 US gal)**
SR240B, SV280B, TV370B	**45.4 L (12.0 US gal)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Final drive chain tank oil

Change the oil in the chain tanks every **1000 h** of operation.

Final drive chain oil specification – **AKCELA AW HYDRAULIC FLUID 68 HV**

SR175B and SV185B models only

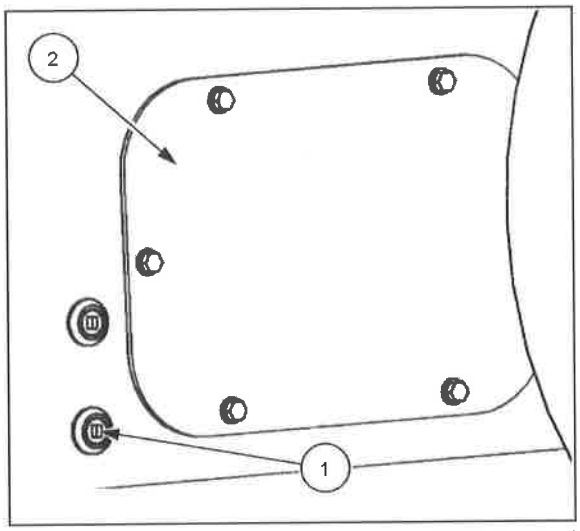
1. Park the machine on firm level surface.
2. Clean the area around the chain tank drain plugs (not shown), located on the bottom of the drive chain tank, near the rear of the drive chain tank, one on each side.
3. Clean the area around the chain tank fill/level plug **(1)**.
4. Place a suitable container under the chain tank drain plug and slowly remove the drain plug.

NOTE: *Use a jack and raise the front of the machine slightly for better draining.*

5. Remove the chain tank fill/level plug **(1)**.
6. After the oil has been completely drained, replace the chain tank drain plug.
7. Fill the tank with new oil and replace the chain tank fill/level plug **(1)**.

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plugs.*

8. Repeat this procedure for the other side.



RAPH12SSL0298BA 1

NOTE: *The chain tank may be cleaned with a solvent based cleaner by removing the inspection cover* ***(2)*** *on each side, after the oil has been removed. Allow the tank to dry thoroughly before filling with oil.*

Capacity - each side	
SR175B and SV185B	**7.4 L (7.9 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

SR210B only

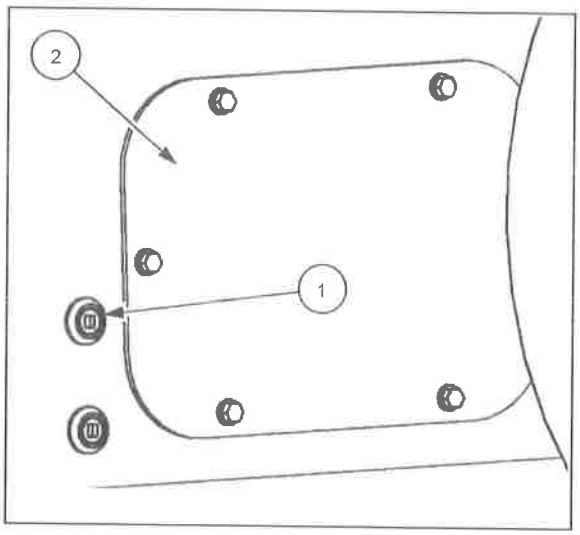
1. Park the machine on firm level surface.
2. Clean the area around the chain tank drain plugs (not shown), located on the bottom of the drive chain tank, near the rear of the drive chain tank, one on each side.
3. Clean the area around the chain tank fill/level plug **(1)**.
4. Place a suitable container under the chain tank drain plug and slowly remove the drain plug.

NOTE: *Use a jack and raise the front of the machine slightly for better draining.*

5. Remove the chain tank fill/level plug **(1)**.
6. After the oil has been completely drained, replace the chain tank drain plug.
7. Fill the tank with new oil and replace the chain tank fill/level plug **(1)**.

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plugs.*

8. Repeat this procedure for the other side.



RAPH12SSL0298BA 2

NOTE: *The chain tank may be cleaned with a solvent based cleaner by removing the inspection cover* ***(2)*** *on each side, after the oil has been removed. Allow the tank to dry thoroughly before filling with oil.*

Capacity - each side	
SR210B	**26.0 L (27.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

SR160B, SR240B, and SV280B models only

1. Park the machine on firm level surface.

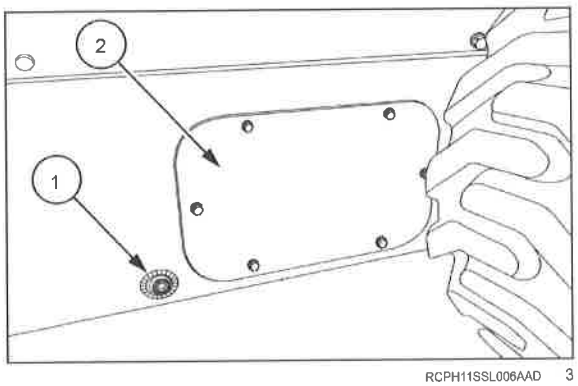
NOTE: *For model SR160B only: Raise the machine enough to remove the wheels and block the machine with support blocks to secure the machine in a level position. Remove the front right wheel and the rear left wheel from the machine to access the chain tank fill/level plug* ***(1)****.*

2. Clean the area around the chain tank drain plugs (not shown), located on the bottom of the drive chain tank, near the rear of the drive chain tank, one on each side.
3. Clean the area around the chain tank fill/level plug **(1)**.
4. Place a suitable container under the chain tank and slowly remove the tank drain plug.

NOTE: *Use a jack and raise the front of the machine slightly for better draining.*

5. Remove the chain tank fill/level plug **(1)**.
6. After the oil has been completely drained, replace the chain tank drain plug.
7. Fill the tank with new oil and replace the chain tank fill/level plug **(1)**.

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the threads of the plugs.*



RCPH11SSL006AAD 3

Capacity - each side	
SR160B	**6.25 L (6.6 US qt)**
SR240B and SV280B	**22.2 L (23.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

8. Repeat this procedure for the other side.

NOTE: *The chain tank may be cleaned with a solvent based cleaner by removing the inspection cover* ***(2)*** *on each side, after the oil has been removed. Allow the tank to dry thoroughly before filling with oil.*

Oil Mist Separator (OMS) filter – (SR160B, SR175B, and SV185B only)

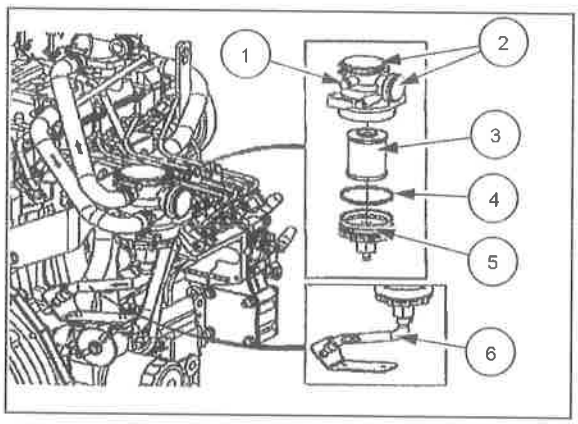
NOTE: *The Oil Mist Separator (OMS) contains the Positive Crankcase Ventilation Valve (PCV). The following instructions are for replacing the filter.*

1. Remove the drain hose **(6)**.

NOTE: *Do not remove caps* ***(2)****.*

2. Remove the case **(5)**.
3. Remove the filter element **(3)** and O-ring **(4)**.
4. Assemble with the new filter **(3)** and the same O-ring **(4)**.

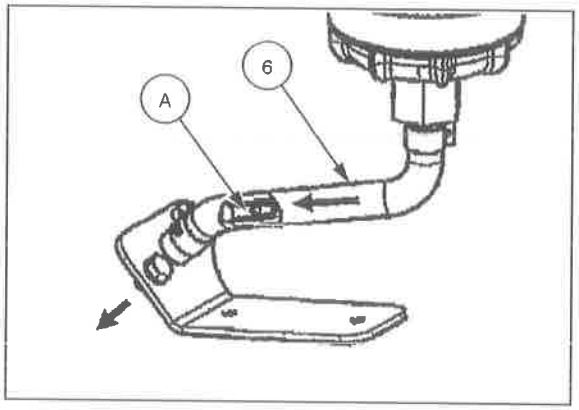
NOTE: *Replace the O-ring if it is damaged.*



RAIL13SSL0752BA 1

5. Install the hose **(6)** as shown.

NOTE: *The hose has a one way valve* ***(A)*** *and must be installed as shown.*



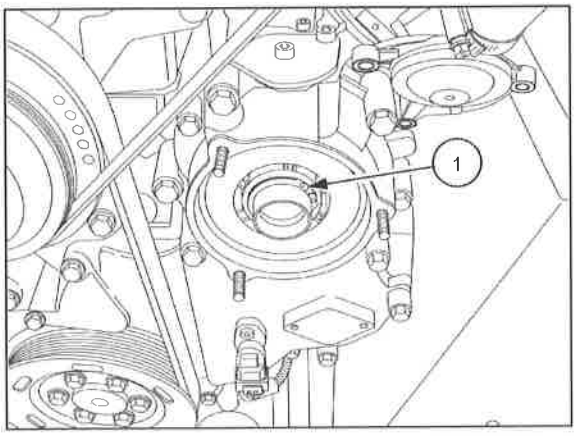
RAIL13SSL0753BA 2

EVERY 1500 HOURS

Blow-by recirculation system – (models SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B only)

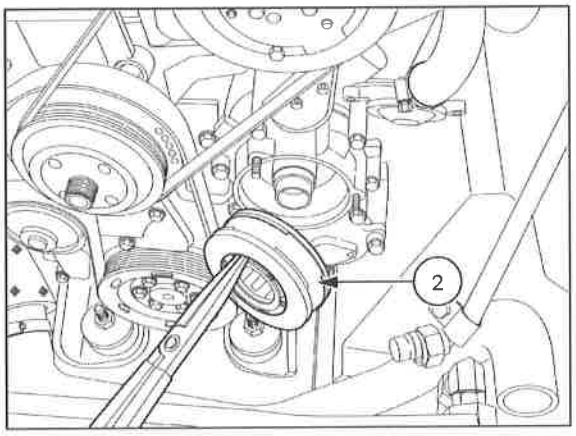
NOTE: *The charge air cooler and the radiator must be removed to access the blow-by recirculation filter.*

1. Remove the cover.
2. Remove the snap ring **(1)**.



RAPH12SSL0060AA 1

3. Slide the filter **(2)** off the drive hub.
4. Slide the new filter on the drive hub.
5. Install the snap ring **(1)**.
6. Install the cover.



RAPH12SSL0059AA 2

EVERY 4000 HOURS

Diesel Particulate Filters (DPF) - Cleaning

Contact an authorized dealer to have the Diesel Particulate Filter (DPF) cleaned.

NOTICE: *Operating a machine with an excessively high soot and/or ash level in the DPF will de-rate the engine performance significantly.*

NOTE: *Operating a machine with a high ash level in the DPF will increase the frequency of DPF regeneration.*

Some models have additional components in order to achieve emission regulations for Stage V, Stage IV, or Tier 4B (final).

- All SR160B have a Diesel Particulate Filter (DPF).
- Stage IV or Tier 4B (final) Models SR175B (built before March 1st 2021), SV185B (built before March 1st 2021), SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B do not have a Diesel Particulate Filter (DPF).
- Tier 4B (final) Models SR175B / SV185B (built after March 1st 2021) have a Diesel Particulate Filter (DPF).
- Stage V Models SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B have a Diesel Particulate Filter (DPF).

Engine cooling system - Change fluid

⚠ WARNING

Burn hazard!
Do not handle engine coolant, engine oil, or hydraulic oil at temperatures that exceed 49 °C (120 °F).
Allow fluids to cool before proceeding.
Failure to comply could result in death or serious injury.

W0330A

⚠ WARNING

Hot surface possible!
Wait for all components to cool before performing any operation.
Failure to comply could result in death or serious injury.

W0251A

⚠ 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

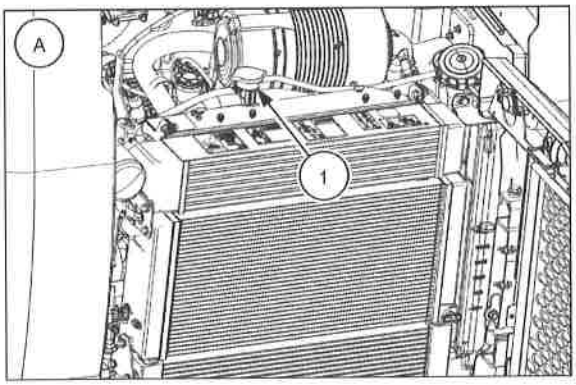
Drain and flush the cooling system every **4000 h** of operation or every two years. Clean the system and replace the coolant if the coolant becomes dirty or has the color of rust.

Coolant specifications – **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

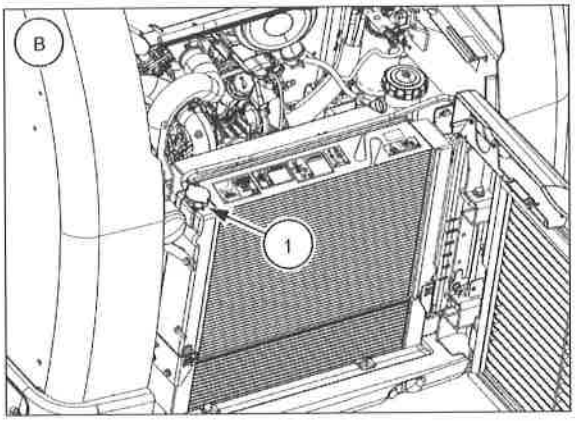
Coolant system flush procedure

1. Lift open the engine hood.
2. Open the rear engine door and engage the lock.
3. Remove the radiator fill cap **(1)**.

NOTE: *Depending on your machine the radiator cap* ***(1)*** *will be in the center as shown in Figure* ***(A)*** *or on the top left-hand side of the radiator as shown in Figure* ***(B)****. For all the steps of this procedure Figure* ***(A)*** *will be shown.*

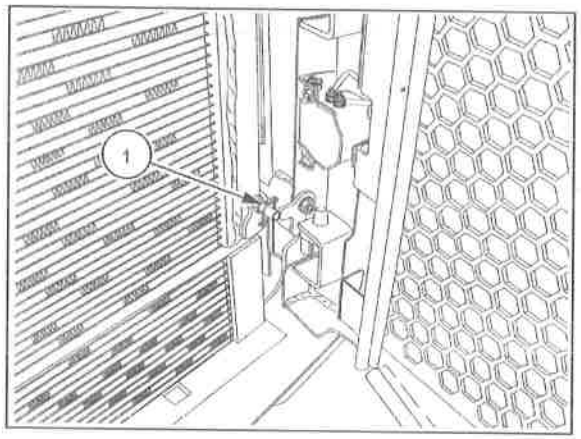


RAIL16SSL0033BA 1



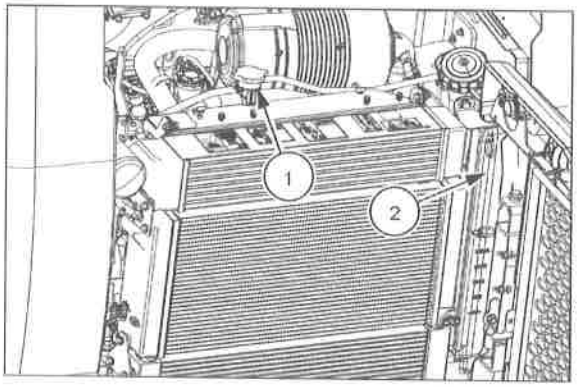
RAIL16SSL0035BA 2

4. Attach a hose to the radiator drain valve **(1)**. Place the other end of the hose into a suitable container that will hold at least **19.0 L (5.0 US gal)**.
5. Open the radiator drain valve **(1)**.
6. Close the radiator drain valve after coolant stops draining from the tube.

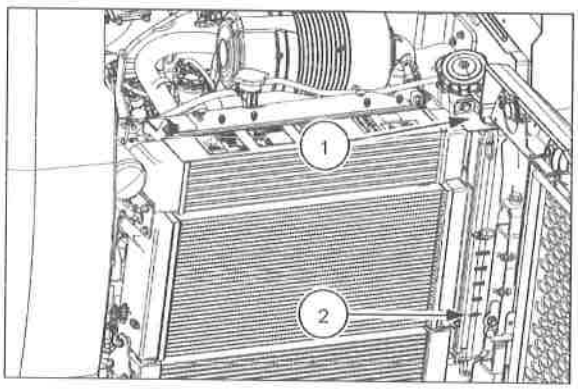


RAPH12SSL0025BA 3

7. Disconnect the tube **(1)** that connects the radiator fill neck to the reservoir bottle **(2)**.
8. Remove the bolt and bracket from the top of the reservoir bottle.
9. Remove the reservoir bottle from the machine.
10. Flush the reservoir bottle a few times with clean distilled or demineralized water.
11. Position the reservoir bottle in the mounting location with the bottle markings facing outward.
12. Secure the reservoir bottle with the bolt and bracket.
13. Attach the tube from the reservoir bottle to the radiator fill neck. If necessary, secure with tie wraps.
14. Fill the reservoir bottle **(1)** with clean distilled or demineralized water to the ADD mark **(2)**.
15. Secure the cap on the reservoir bottle.
16. Fill the radiator with clean distilled or demineralized water until the level is at the top of the fill neck.
17. Secure the cap on the radiator.
18. Start the engine.
19. If equipped, set the cab HVAC temperature control knob to full heat and the fan control knob on setting 1, 2, or 3.



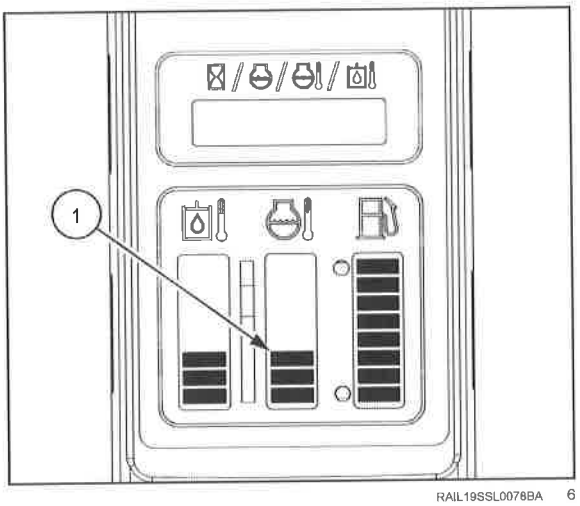
RAIL16SSL0033BA 4



RAIL16SSL0033BA 5

20. Machines with the Instrument Cluster (IC) follow STEP A. Machines with the LCD multi-function display follow STEP B.

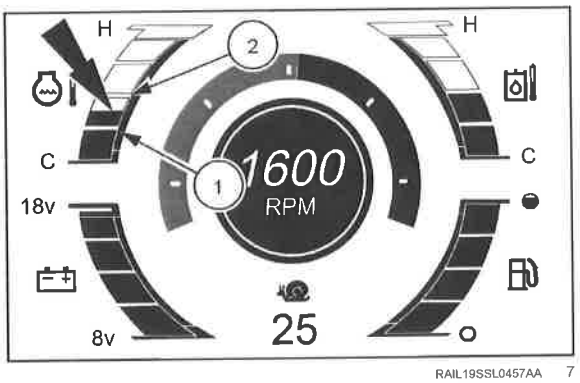
    A. Run the engine until the coolant temperature level **(1)** on the instrument cluster shows three bars for **5 min**. Increase engine speed and/or load if necessary.



RAIL19SSL0078BA 6

    B. Run the engine until the coolant temperature level is halfway between the coolant temperature gauge increment **(1)** and increment **(2)** for **5 min**. Increase engine speed and/or load if necessary.

    NOTE: *Alternatively, check the Sensor Status submenu and run the engine for* ***5 min*** *after the coolant temperature reaches* ***71 °C (160 °F)****. See the LCD multi-function display equipment manual for more details.*



RAIL19SSL0457AA 7

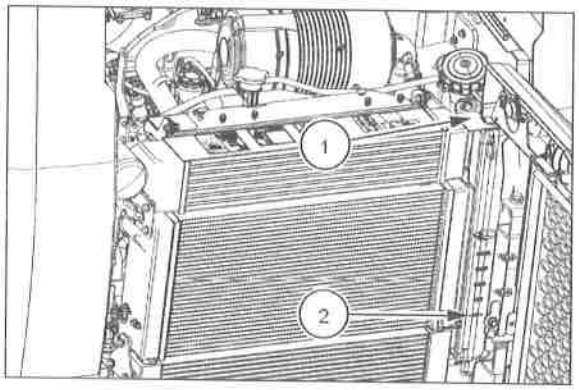
21. Stop the engine and allow to cool.
22. Open the radiator drain valve and drain the system.
23. Close the radiator drain valve.
24. Repeat steps **14** through **23** and flush the system two more times. Use fresh clean distilled or demineralized water each time.

Coolant system fill procedure

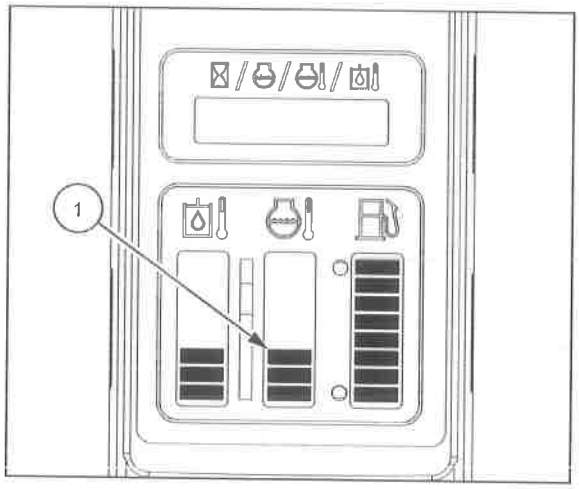
NOTICE: *NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water. You can use a refractometer to check the concentration level. Supplemental Coolant Additives (SCA) should not be used when using* ***AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT.***

1. Fill the reservoir bottle **(1)** with **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** to the ADD mark **(2)**.
2. Secure the cap on the reservoir bottle.
3. Remove the radiator cap.
4. Fill the radiator with **AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** until the coolant level is at the top of the fill neck.
5. Secure the cap on the radiator.
6. Start the engine.
7. If equipped, set the cab HVAC temperature control knob to full heat and the fan control knob on setting 1, 2, or 3.
8. Machines with the Instrument Cluster (IC) follow STEP A. Machines with the LCD multi-function display follow STEP B.

   A. Run the engine until the coolant temperature level **(1)** on the instrument cluster shows three bars for **5 min**. Increase engine speed and/or load if necessary.



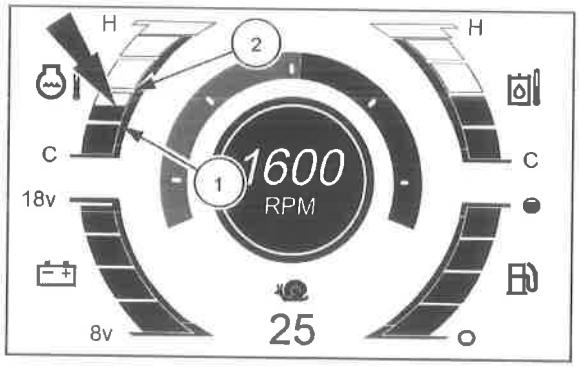
RAIL16SSL0033BA 8



RAIL19SSL0078BA 9

   B. Run the engine until the coolant temperature level is halfway between the coolant temperature gauge increment **(1)** and increment **(2)** for **5 min**. Increase engine speed and/or load if necessary.

      NOTE: *Alternatively, check the Sensor Status sub-menu and run the engine for* ***5 min*** *after the coolant temperature reaches* ***71 °C (160 °F)****. See the LCD multi-function display equipment manual for more details.*



RAIL19SSL0457AA 10

9. Stop the engine and allow to cool.
10. Remove the radiator fill cap and check the coolant level in the radiator fill neck. Add coolant until the level reaches the top of the radiator fill neck, if necessary.
11. Check the coolant level in the reservoir bottle. Add coolant to reach the ADD mark, if necessary.
12. Check the hoses, elbows and system for leaks. Repair or replace as necessary.

Capacity	
SR160B, SR175B, SV185B	**15.6 L (4.1 US gal)**
SR210B, TR270B, TR310B	**17.0 L (4.5 US gal)**
SR240B, SV280B, TV370B	**19.0 L (5.0 US gal)**
Specifications	**AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

AS REQUIRED

Auto-regeneration

⚠ CAUTION

Burn hazard!
During the Diesel Particulate Filter (DPF) regeneration process the exhaust stack and fixed hood area becomes extremely hot. Allow area to cool before servicing or working near the exhaust system components.
Failure to comply could result in minor or moderate injury.

C0102B

NOTE: *Follow the prompts on the LCD Multi-function display (if equipped).*

NOTE: *The frequency of auto-regeneration is dependent on the machine's usage.*

NOTE: *The operator may continue to operate the machine normally during the auto-regeneration. In order for the regeneration process to completely self-clean it must run for 25 - 40 minutes uninterrupted which requires that the engine must NOT be shut off.*

NOTE: *The operator may choose to prevent the auto-regeneration procedure, but will eventually force the engine to de-rate significantly affecting machine performance. To bypass the procedure refer to the Instrument cluster, page* ***3-51****, "To inhibit the regeneration process: REGEN."*

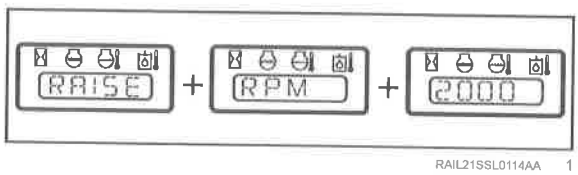
Auto-regeneration

All machines have a Diesel Oxidation Catalyst (DOC) system. Some models have additional components in order to achieve emission regulations for Stage V, Stage IV, or Tier 4B (final).

- All SR160B have a Diesel Particulate Filter (DPF) which requires auto-regeneration.
- Stage IV or Tier 4B (final) Models SR175B (built before March 1st 2021), SV185B (built before March 1st 2021), SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B do not require an auto-regeneration.
- Tier 4B (final) Models SR175B / SV185B (built after March 1st 2021) have a Diesel Particulate Filter (DPF) which requires auto-regeneration.
- Stage V Models SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B have a Diesel Particulate Filter (DPF) which requires auto-regeneration.

1. If requested by the instrument cluster, raise the engine RPM to **2000 RPM** or higher.

NOTE: *In some cases the Engine Control Unit (ECU) will notify the operator through the instrument cluster to raise the RPM to 2000. The display will show three messages 'RAISE' + 'RPM' + '2000'.*



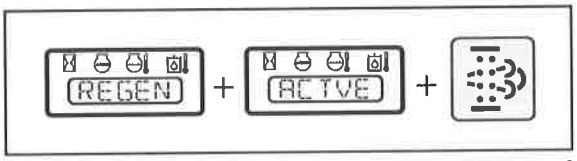
RAIL21SSL0114AA 1

2. The instrument cluster will display REGEN + ACTVE and will produce an audible beep periodically during this time until the regeneration process is complete. The regeneration symbol on the left-hand side console will illuminate.

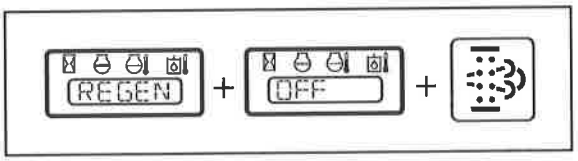
NOTICE: *Be aware that if the engine is shut OFF prior to finishing the regeneration process, the system will consider the regeneration incomplete. The system will attempt to regenerate again once the conditions are met after the engine is restarted. After multiple incomplete regeneration attempts, the system will start to de-rate the engine.*

3. When regeneration is complete, the instrument cluster will display REGEN + OFF , the audible beep will stop, and the regeneration indicator light on the left-hand side console will turn OFF. This will appear on the display screen for approximately 30 seconds.

NOTICE: *Make sure that the regeneration indicator is not lit before powering down your machine to avoid eventual loss of engine power.*



RAIL19SSL0463AA 2



RAIL19SSL0464AA 3

Manual regeneration

⚠ WARNING

Fire hazard!
During the Diesel Particulate Filter (DPF) forced regeneration process the exhaust stack and fixed hood area becomes extremely hot. Park the machine outside and away from combustible or highly flammable material.
Failure to comply could result in death or serious injury.

W1165B

NOTE: *Follow the prompts on the LCD Multi-function display (if equipped).*

NOTICE: *There are two levels of warning if the operator does not perform the manual regeneration when requested. Level 1 warning is provided when the presence of particulate matter reaches maximum load at which time the engine power is reduced by **25%**. Level 1 is communicated by a yellow lamp on the instrument cluster, an alarm, and a diagnostic trouble code. Level 2 warning is provided when the presence of particulate matter is over the maximum load at which time the engine power is reduced by **50%**. Level 2 is communicated by a red lamp on the instrument cluster, an alarm, and a diagnostic trouble code. The DPF requires a manual regeneration.*

Manual regeneration is only necessary if high levels of particulate matter are present.

Manual regeneration may also be referenced as a forced regeneration.

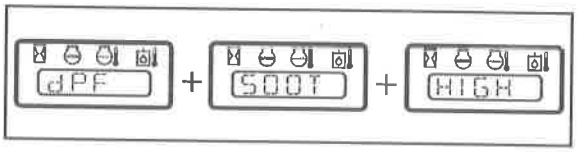
The operator may request a manual regeneration, see "Regeneration inhibit or manual (force)" **3-51** "To force the regeneration process: REGEN".

All machines have a Diesel Oxidation Catalyst (DOC) system. Some models have additional components in order to achieve emission regulations for Stage V, Stage IV, or Tier 4B (final).

- All SR160B have a Diesel Particulate Filter (DPF) which requires a manual regeneration.
- Stage IV or Tier 4B (final) Models SR175B (built before March 1st 2021), SV185B (built before March 1st 2021), SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B do not require a manual regeneration.
- Tier 4B (final) Models SR175B / SV185B (built after March 1st 2021) have a Diesel Particulate Filter (DPF) which requires a manual regeneration.
- Stage V Models SR175B, SV185B, SR210B, SR240B, SV280B, TR270B, TR310B, and TV370B have a Diesel Particulate Filter (DPF) which requires a manual regeneration.

In some cases the DPF may collect an extreme high level of soot. If this occurs, at a minimum a manual regeneration is required. In some cases the DPF will need to be cleaned **7-84** or replaced.

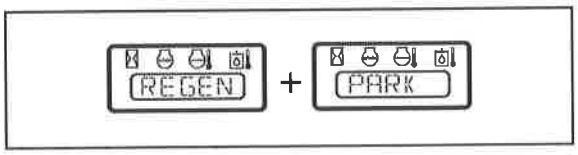
NOTICE: *The DPF can be damaged with high soot levels and as a result the ECU may de-rate the engine RPMs to low idle.*



RAIL21SSL0115AA 1

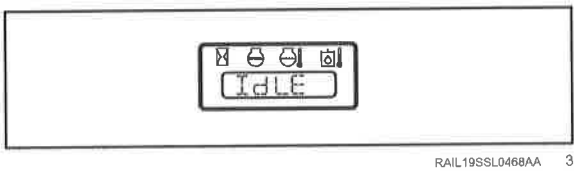
Manual regeneration

1. Operator will be notified with one of the following:
   - Extended audible alert, amber LED and the REGEN + PARK symbol will appear on the display screen of the instrument panel indicating a high level of particulate matter is present in the system.
   - Constant audible alert, red LED and the REGEN + PARK symbol will appear on the display screen of the instrument panel indicating an extremely high level of particulate matter is present in the system.



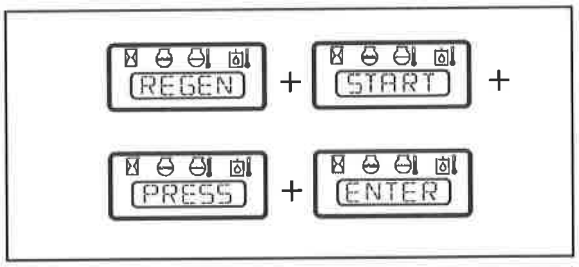
RAIL19SSL0469AA 2

2. Find a location out of the way on the job site and clear away from any combustible material. Perform the following:
   A. Bring unit to operating temperature.
   B. Disable all hydraulics.
   C. Put both the hand and foot throttles in their idle position.
   D. Fuel level is above 50%.
   E. Engine oil and oil filter change is not being requested by the ECU (not applicable to Perkins engines).
   F. Wait for the IdLE symbol to appear on the display.



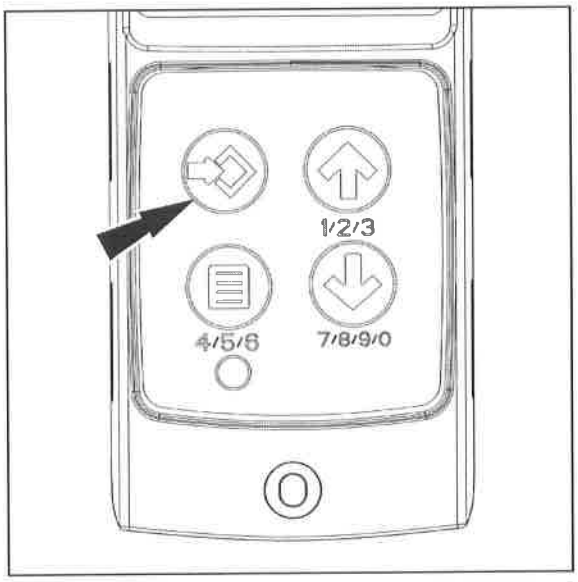
RAIL19SSL0468AA 3

3. REGEN + START + PRESS + ENTER appears on the display. The system is ready for the regeneration process to begin.



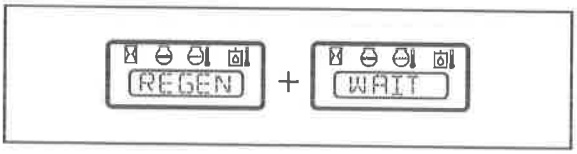
RAIL19SSL0465AA 4

4. Press the "ENTER button to start the regeneration process.



RAIL19SSL0080BA 5

5. REGEN + WAIT will appear on the display. The system is checking that all criteria for a manual regeneration is met from Step **2**



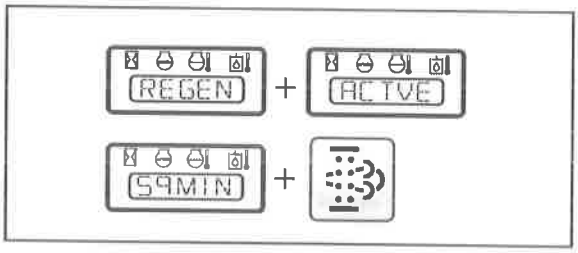
RAIL19SSL0466AA 6

6. One of the following will occur.
   - The instrument cluster will display REGEN + ACTVE + xxMIN and will produce an audible beep periodically during this time until the regeneration process is complete. The regeneration symbol on the left-hand side console will illuminate.

NOTE: *The timer is not available on machines with a Perkins engine.*

NOTE: *The estimated time to complete the manual regeneration will be shown in minutes on the display. 99 MIN will appear for estimates of* ***99 min*** *or higher.*

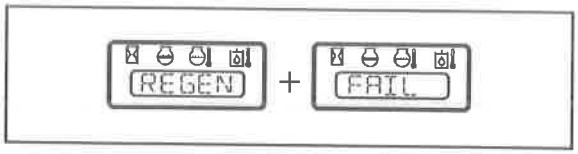
NOTICE: *Be aware that if the engine is shut OFF prior to finishing the regeneration process, the system will consider the regeneration incomplete. The system will attempt to regenerate again once the conditions are met after the engine is restarted. After multiple incomplete regeneration attempts, the system will start to de-rate the engine.*



RAIL21SSL0116AA 7

   - REGEN + FAIL is displayed indicating the machine is not ready. Repeat Step **2**.

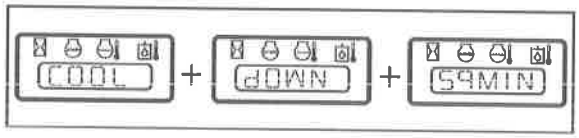
NOTE: *If the regeneration process continues to FAIL, contact your authorized dealer for service.*



RAIL19SSL0467AA 8

NOTICE: *The cool down (COOL + DOWN) process is not applicable to machines with a Perkins engine.*

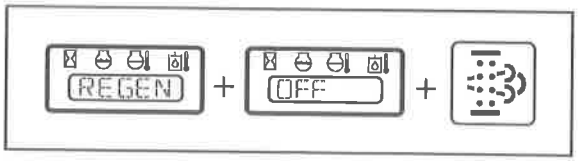
If the regeneration fails or is interrupted or aborted a cool down phase may be required to avoid damaging the DPF. The instrument cluster display will show the following message COOL + DOWN + xxMIN.



RAIL21SSL0117AA 9

NOTE: *The estimated time to complete the cool down will be shown in minutes on the display. 99 MIN will appear for estimates of* ***99 min*** *or higher.*

7. When regeneration is complete, the instrument cluster will display REGEN + OFF, the audible beep will stop, and the regeneration indicator light on the left-hand side console will turn OFF. This will appear on the display screen for approximately 30 seconds.



RAIL19SSL0464AA 10

NOTICE: *Make sure that the regeneration indicator is not lit before powering down your machine to avoid eventual loss of engine power.*

Window removal and cleaning

⚠ WARNING

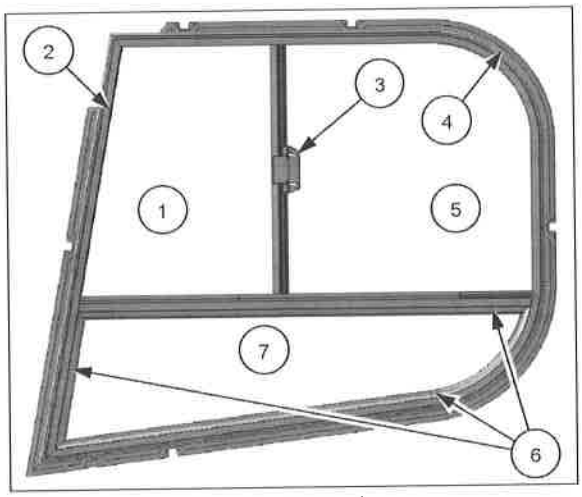
Avoid injury and/or machine damage!
Debris on the window can severely obstruct the operator's vision. To ensure that the operator has clear visibility through the windows, always keep the windows clean.
Failure to comply could result in death or serious injury.

W1517A

NOTICE: *DO NOT change the window position without properly locking the window latch! Improper use WILL result in premature wear.*

NOTICE: *It is suggested that for normal cleaning, a water hose or power washer on low pressure be used to clear the glass from outside of the machine. Do not direct the stream from a power washer into the seals or joints of the window. If removal of the glass is necessary for maintenance, replacement, or more thorough cleaning, each pane can be removed from inside the cab.*

Removal

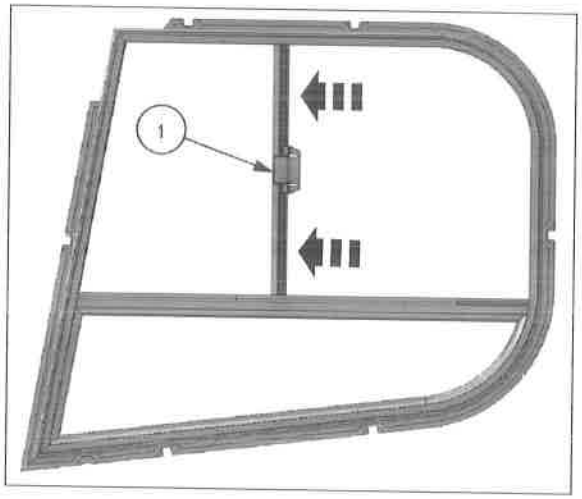


RAIL17SSL0039BA 1

1	Slider glass	5	Fixed upper glass
2	Frame	6	Lower seals
3	Latch	7	Lower glass
4	Frame		
NOTE: *Tools required: Small screwdriver, flat drive, about* ***178 – 203 mm (7 – 8 in)****.*			

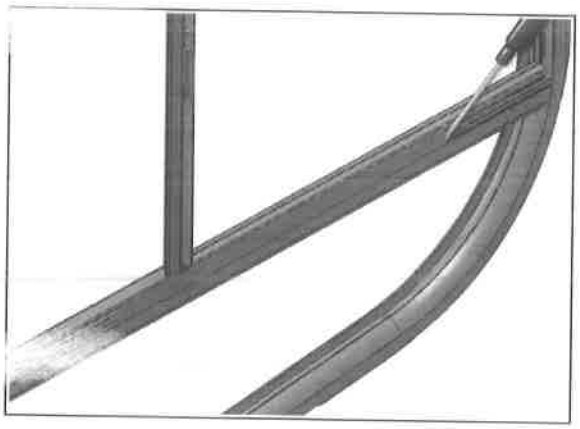
Slider glass

1. Verify that the slider glass is shut and latched.



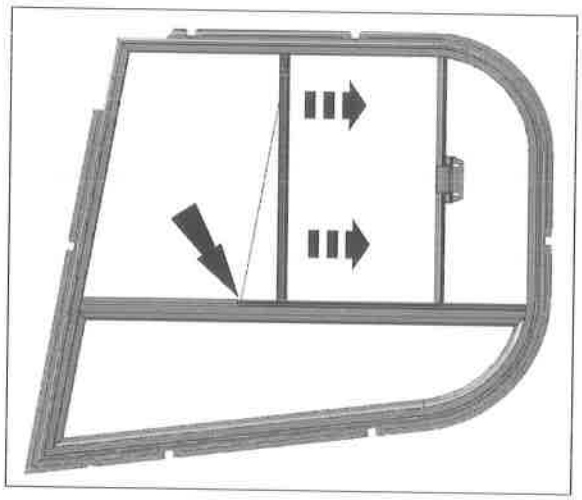
RAIL17SSL0039BA 2

2. Slip the screwdriver down into the aluminum track from the back, and slide forward underneath the rear inner rigid PVC slider channel.
3. Pry upward until you are able to grab hold of the end of the PVC channel.
4. Lift the PVC channel up and out of the track. Pull rearward until it slides free from underneath the slider glass.



RAIL17SSL0348BA 3

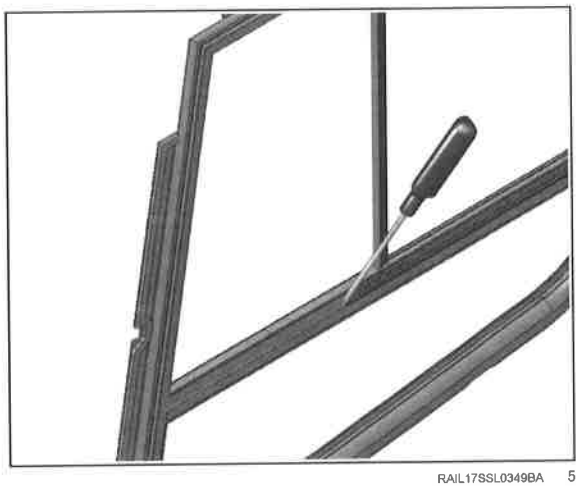
5. Unlatch and move the slider glass rearward until it clears the front PVC channel.
6. Tip the lower edge of the glass into the cab and drop down and out of the frame.



RAIL17SSL0038BA 4

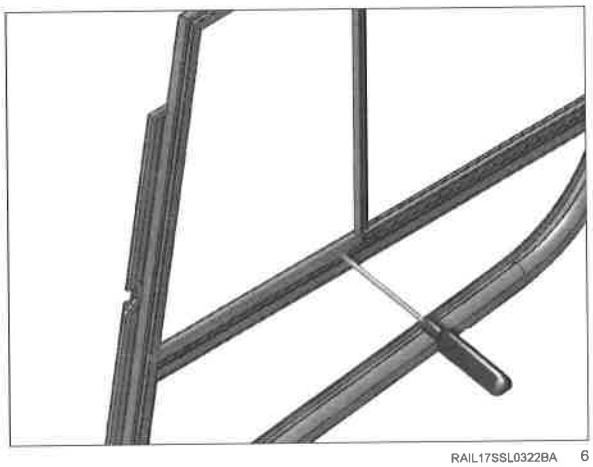
Fixed upper glass

7. Slip the screwdriver down into the aluminum track from the back, and slide forward underneath the front inner rigid PVC slider channel.
8. Pry upward until you are able to grab hold of the end of the PVC channel.



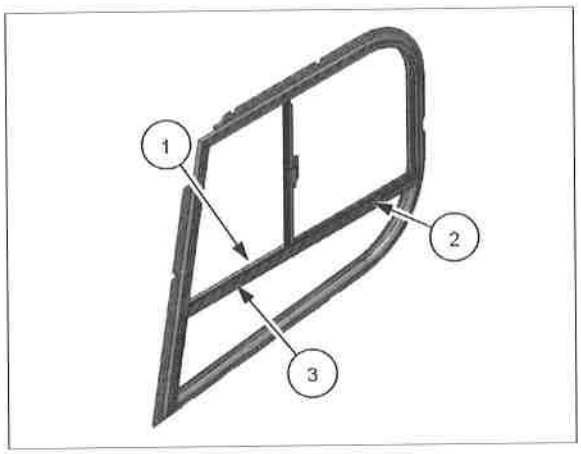
RAIL17SSL0349BA 5

9. Using the flat drive end of the screwdriver, place it under the edge of the outer PVC channel as shown and pry the PVC channel up and out of the aluminum frame.
10. Slide the fixed glass forward until it clears the remaining PVC channel.
11. Tip the lower edge into the cab and drop down and out of the frame.



RAIL17SSL0322BA 6

Lower glass



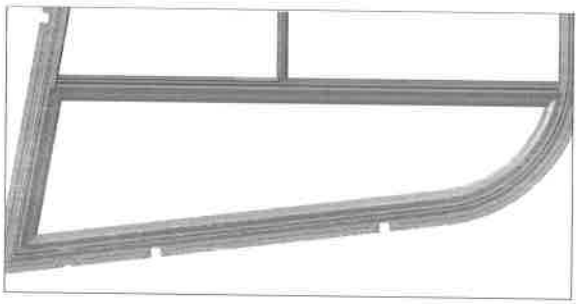
RAIL17SSL0325BA 7

1	Outer PVC channel	3	Front inner PVC channel
2	Rear inner PVC channel		

NOTICE: *While the lower glass seal is removable, it was designed to be removed only when replacement of the glass is necessary. It is not intended as a means for cleaning. If removed periodically, the ability to seal out water and dust from the cab may be diminished. When a lower glass pane is ordered for replacement, new inner seals will be included for replacement as well.*

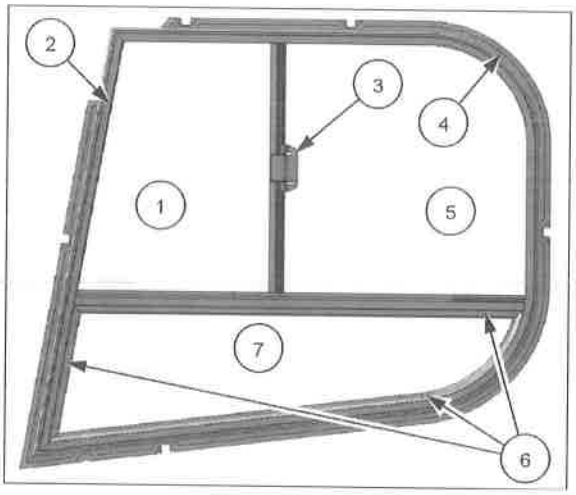
NOTICE: *Do not remove the outer seal. Damage can occur that may lead to leaks.*

12. Push the flat end of the screwdriver between the ends of the top and front vertical seals where they meet.
13. Pry the end of the front vertical seal out.
14. Pull the seal out of the aluminum frame.
15. Repeat for the remaining pieces.
16. The glass can then be tipped in and removed.



RAIL17SSL0324AA 8

Installation



RAIL17SSL0039BA 9

1	Slider glass	5	Fixed upper glass
2	Frame	6	Lower seals
3	Latch	7	Lower glass
4	Frame		

Lower glass

1. Place the glass into the outer seal.
2. Starting at the front, bottom corner, press the lower seal down into the frame all the way to the back.
3. Starting at the front, top corner, press the upper seal up into the frame all the way to the back.
4. Starting at the top, press the front seal into the frame all the way down to the bottom corner.

Fixed upper glass

5. Place glass back into the frame and slide into rearward position just as it was removed.

6. Press the outer PVC channel down into the frame until it snaps in place.

Slider glass

7. Press the front, inner PVC channel down into the frame, sliding it forward as far as possible.
8. Place the slider glass into the track and push forward until latched.
9. Press the front edge of the last PVC channel down into the frame just behind the slider glass until and push forward until it meets the front PVC channel underneath the glass.
10. Press the channel down into the frame working from front to back until it snaps into place.

Hardware - loose or damaged

Check the entire machine for hardware that is loose or damaged. Replace damaged hardware and use the proper torque values.

STORAGE

Storing the machine

Geographic, environmental, and actual storage conditions make it difficult to follow a set storage procedure for all areas and conditions. The following procedure is for a storage period of six months or longer. This procedure is a good starting point but may not be all inclusive. If you have questions about storing your machine, contact your dealer.

1. Prior to storing, inspect the machine for visible signs of wear, breakage, or damage. Order any parts required and make the necessary repairs to avoid delays when starting the next operating period.
2. Prior to storing, wash the machine.
3. Lubricate the entire machine.
4. Paint any areas where the paint has been damaged.
5. Move all hydraulic controls through their complete ranges several times to relieve any pressure in the circuits.
6. Drain the fuel tank.
7. Put approximately **8 l (2.1 US gal)** of diesel flushing oil in the fuel tank. Run the engine until the exhaust smoke is blue-white.
8. Drain the flushing oil from tank.
9. Fill the fuel tank and add diesel fuel conditioner by following the directions on the container.
10. Change the engine oil and replace the filter.
11. Drain the cooling system. Leave the drains open and do not tighten the radiator cap.
12. Put a DO NOT OPERATE or OUT OF SERVICE tag or marker in the cab.
13. Replace the air filter elements if the hours of operation or time interval will lapse during storage.
14. Cover the exposed cylinder rods, and valve spools and any other bare metal parts with a rust and corrosion preventive.
15. Cover exhaust outlet.
16. Park the machine inside a building. If a building is not available, park the machine in a dry area on planks and cover with a waterproof cover.
17. Remove and clean the battery. Fully charge the battery. Store the battery in a cool dry place where it will not freeze.
18. Block the machine up so that the tires are just off the ground, if possible.

NOTE: *EXTREME precautions must be taken when blocking up a machine for long periods. Block the machine with the tires just off the surface. No more than* ***25 mm (1.0 in)*** *above the surface.*

19. Do periodic checks for protection. Look for corrosion.

Preparing the machine after storage

Geographic, environmental, and actual storage conditions make it difficult to follow a set storage procedure for all areas and conditions. The following procedure is for removing a machine from a storage period of six months or longer. This procedure is a good starting point but may not be all inclusive. If you have questions about removing the machine from storage, contact your dealer.

1. If machine is blocked, lower it to the ground.
2. Change the fuel filters and fill the fuel tank if needed.
3. Tighten the cooling system drain valves.
4. Fill engine coolant system.
5. Check engine oil level.
6. Check the condition of the engine fan belt. Replace it if required.
7. Check the hydraulic fluid level.
8. Lubricate the machine grease fittings.
9. Use a petroleum base solvent and remove the rust and corrosion preventive from the hydraulic cylinder rods and spools, etc.
10. Install a fully charged battery.
11. Remove air from the engine fuel lines.
12. Prime the turbocharger oil lines with oil using the following procedure:
    - Disconnect the electrical connector to the injection pump solenoid. This will prevent the engine from starting.
    - Make sure all persons are clear of the machine. Turn key to START and actuate the starter for about 10 to 15 seconds.
    - Reconnect the wires to the injection pump solenoid.

NOTE: *Before starting the engine, make sure there are no leaks, missing or broken parts.*

13. Start the engine and run at idle speed for 2 minutes. Check for leaks around the filters and drain plugs.
14. Stop the engine and check the fluid levels of the engine cooling system and final drive chain compartments.

8 - TROUBLESHOOTING

FAULT CODE RESOLUTION

Display warnings

The table provides a list of messages that may appear on the instrument cluster display, the possible cause, and the corrective action the operator may take.

Message on the display	Possible cause	Action
ATS FAIL	The Diesel Particulate Filter (DPF) system and/or Exhaust Gas Recirculate (EGR) system detected a malfunction.	Follow the manual regeneration procedure in this manual.
		Contact your dealer if ATS FAIL continues to appear.
DPF SOOT HIGH	The Diesel Particulate Filter (DPF) system detected high levels of soot.	Manual regeneration required.
OIL CHNGE (FPT engines only)	The manual regeneration process is stopped due to the number of regenerations that have already occurred on one engine oil change interval.	Change the engine oil and oil filter.
NOT READY (FPT engines only)	The manual regeneration process is stopped due to criteria not being met.	See the criteria in the "Regeneration inhibit or manual (force)" **3-51**.
CRKON	The OPERATE button is being pressed while attempting to start the machine.	Do not push the OPERATE button while attempting to start the machine.
ENG OIL SERV	The instrument cluster is telling the operator that the machine needs an engine oil change.	Replace the engine oil, filter, and reset the oil life meter on the instrument cluster.
EOLT	The instrument cluster does not have the latest software.	Contact your dealer.
JOYNU	One or both of the control levers are not in the neutral position.	Move the control levers to the neutral position.
	One or both of the control levers are not calibrated correctly.	Contact your dealer.
LOCK?	The instrument cluster is asking the operator if he/she wants to lock the machine to prevent unwanted machine operation.	No action needed. The machine is working as designed. Do not press the ENTER button. This will lock the machine controls. You will not be able to start the machine without an owner's code if the ENTER button has been pressed.
OPRPR	The restraint bar is not engaged.	Release and re-engage. Contact your dealer if the problem continues.
	The seat switch does not detect an operator in the machine.	Contact your dealer.
WIF	Water is detected in the fuel. Fuel-water separator filter is full.	Follow the "Fuel-water separator filter — drain fluid" maintenance procedure **7-54**.
30 s count down	The instrument cluster detected a critical machine error which will result in an engine shutdown.	Contact your dealer.

Fault code index

NOTE: *If you have a fault code (DTC) associated with a red light flashing and an audible alarm, shut the unit down and call your dealer for support. For a fault code (DTC) associated with a yellow amber light, record the code number and press the ENTER button twice to silence code and return to normal operations. If the code appears again, contact your dealer for support.*

NOTE: *For machines equipped with the LCD multi-function display refer to the "Equipment manual" that ships with the machine.*

The following are the error codes and associated functions.

DTC	Engine Type	Detected	Description	SPN	FMI
1002	ALL	IC	Engine Coolant Temperature Is Above Normal	110	00
1003	ALL	IC	Engine Coolant Temperature Is Above Normal - Level 1 Warning		
1004	ALL	IC	Hydraulic Oil Filter Restricted	518116	05
1009	ALL	IC	Hydraulic Oil Temperature Is Above Normal - Level 2 Warning	177	00
1010	PERKINS / ISM-DI	ENGINE	Battery 5V Reference 1 Circuit Low	3509	04
1011	PERKINS / ISM-DI	ENGINE	Battery 5V Reference 1 Circuit High	3509	03
1012	PERKINS / ISM-DI	ENGINE	Battery 5V Reference 2 Circuit Low	3510	04
1013	PERKINS / ISM-DI	ENGINE	Battery 5V Reference 2 Circuit High	3510	03
1014	PERKINS / ISM-DI	ENGINE	Vehicle System Voltage Too High	168	03
1014	PERKINS / ISM-IDI	ENGINE	Vehicle System Voltage Too High	168	03
1015	PERKINS / ISM-DI	ENGINE	Vehicle System Voltage Too Low	168	04
1015	PERKINS / ISM-IDI	ENGINE	Vehicle System Voltage Too Low	168	04
1025	ALL	IC	Foot Throttle Sensor Is Above Range - Shorted To Power	91	03
1026	ALL	IC	Hand Throttle Sensor Is Above Range - Shorted To Power	29	03
1030	ALL	IC	Foot Throttle Sensor Is Below Range - Open Or Shorted To Ground	91	04
1031	ALL	IC	Hand Throttle Sensor Is Below Range - Open Or Shorted To Ground	29	04
1040	F5C	IC	RPM Monitoring Over Speed	190	16
1041	ALL	IC	RPM Monitoring Over Speed Max	190	00
1044	ALL	IC	Fuel level sensor below 5.0 ohm for 30 seconds, shorted low	96	04
1045	ALL	IC	Fuel Level Sensor Open Circuit	96	05
1051	ALL	IC	No CAN Communication With Engine Controller	5111	02
1052	ALL	IC	Engine CAN timeout	5111	09
1053	F5C	IC	Timeout of CAN Message CM1BC	184	09
1053	PERKINS / ISM-DI	IC	Timeout of CAN Message CM1BC	184	09
1053	PERKINS / ISM-IDI	IC	Timeout of CAN Message CM1BC	184	09
1054	ALL	IC	Timeout of CAN Message ET1	183	09
1056	F5C	IC	Timeout of CAN Message DPFC1	185	09
1056	PERKINS / ISM-IDI	IC	Timeout of CAN Message DPFC1	185	09
1058	F5C	IC	Timeout of CAN Message EDC2BC	182	09
1059	ALL	IC	Timeout of CAN Message DM1	180	09
1064	ALL	IC	Hydraulic Oil Temperature Is Above Normal - Level 1 Warning	5536	16
1100	ALL	UCM	Engine crank signal shorted to Power	1060	03
1101	ALL	UCM	Engine crank signal shorted to Ground	1060	04
1102	ALL	UCM	Engine crank signal open circuit	1060	05
1201	ALL	IC	Hydraulic Filter Restriction Switch Open Circuit	518116	05
1205	ALL	IC	Hydraulic Enable Output Shorted To Power (Electro-Hydraulic Machines)	519295	03
1206	ALL	UCM	CAN Connection - Configuration Response Timeout	629	09
1207	ALL	UCM	Memory Parameter - Invalid Configuration Between IC and VCM	522809	02
1208	ALL	IC	Seat Switch Plausibility Fault	1504	02
1211	ALL	UCM	Joystick Calibration not Complete	2660	13
1212	ALL	UCM	Ground Drive Calibration not Complete	519303	13
1213	ALL	UCM	Loader Valve Calibration not Complete	519039	13
1215	ALL	UCM	Saturation Function not complete - Forward Pumps	519332	13
1216	ALL	UCM	Saturation Function not complete - Reverse Pumps	521343	13
1221	ALL	UCM	VCM Temperature / Current Draw Over Limit	518389	16
1222	ALL	UCM	VCM Sustained Over Temperature Limit	518389	00

DTC	Engine Type	Detected	Description	SPN	FMI
1223	ALL	UCM	VCM Sustained Over Current Limit	518389	06
1224	ALL	UCM	VCM Internal Memory or Core Monitoring Fault	5531	12
1225	ALL	UCM	VCM EEPROM Memory Checksum Fault	522809	12
1350	ALL	UCM	Hydraulic Enable Switch - Implausible State (Hardware Vs CAN)	519270	02
1400	ALL	UCM	Awake PWR Releay shorted to Power	1047	03
1401	ALL	UCM	Awake PWR Releay shorted to Ground	1047	04
1402	ALL	UCM	Awake PWR Releay open circuit	1047	05
1403	ALL	UCM	Main PWR Releay shorted to Power	1048	03
1404	ALL	UCM	Main PWR Releay shorted to Ground	1048	04
1405	ALL	UCM	Main PWR Releay open circuit	1048	05
1406	ALL	UCM	Acc PWR Releay shorted to Power	1049	03
1407	ALL	UCM	Acc PWR Releay shorted to Ground	1049	04
1408	ALL	UCM	Acc PWR Releay open circuit	1049	05
1512	ALL	UCM	Right Brake Light Shorted To Ground	1045	04
1513	ALL	UCM	Right Brake Light Shorted To Power	1045	03
1521	ALL	UCM	Left Brake Light Open Circuit	1046	05
1522	ALL	UCM	Left Brake Light Shorted To Ground	1046	04
1523	ALL	UCM	Left Brake Light Shorted To Power	1046	03
1532	ALL	UCM	Backup Alarm Shorted To Ground	520591	04
1533	ALL	UCM	Backup Alarm Shorted To Power	520591	03
1600	ALL	IC	Vehicle Configuration Error		
1800	PERKINS / ISM-IDI	ENGINE	DOC Intake Temperature Sensor Out Of Range Low	4765	04
1801	PERKINS / ISM-IDI	ENGINE	DOC Intake Temperature Sensor Out Of Range High	4765	03
1802	PERKINS / ISM-IDI	ENGINE	DPF Exhaust Temperature Sensor Out Of Range Low	3241	04
1803	PERKINS / ISM-IDI	ENGINE	DPF Exhaust Temperature Sensor Out Of Range High	3241	03
1804	PERKINS / ISM-IDI	ENGINE	High DPF Intake temperature	3242	01
1805	PERKINS / ISM-IDI	ENGINE	High DOC Intake temperature	4765	01
1806	PERKINS / ISM-IDI	ENGINE	High DPF Exhaust temperature	3241	01
1807	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Glow Voltage Low	3484	04
1808	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Glow Voltage High	3484	03
1809	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Glow Voltage Out Of Range High	3484	00
1816	PERKINS / ISM-DI	ENGINE	Capacitor Charge-up Circuit Malfunction (Insufficient Charge)	3597	01
1817	PERKINS / ISM-DI	ENGINE	Capacitor Charge-up Circuit Malfunction (Excessive Charge)	3597	00
1818	PERKINS / ISM-DI	ENGINE	ECU Watchdog fault	1077	08
1819	PERKINS / ISM-IDI	ENGINE	Engine overspeed	190	08
1822	PERKINS / ISM-IDI	ENGINE	Crank Speed Sensor Low Voltage	4201	04
1823	PERKINS / ISM-IDI	ENGINE	Camshaft Speed Sensor Low Voltage	723	04
1824	PERKINS / ISM-IDI	ENGINE	Diesel Particulate Filter High Soot Load	3701	03
1900	ALL	UCM	VCM Ground Fault	158	05
1901	ALL	UCM	VCM - VCM Supply Voltage High	158	03
1902	ALL	UCM	VCM - VCM Supply Voltage Low	158	04
1903	ALL	UCM	VCM - VCM Supply Voltage Below Operational Limit	158	18
1904	ALL	UCM	VCM - Rail 12VB - 5V Regulators Supply Input Power Off	518841	04
1905	ALL	UCM	VCM - 5Vref1 Sensor Supply Voltage Out Of Range	3509	02
1906	ALL	UCM	VCM - 5Vref3 Sensor Supply Voltage Out Of Range	3510	02
1907	ALL	UCM	VCM - Rail 12VF1 - Aux Retract Input Power Off	518847	04
1908	ALL	UCM	VCM - Rail 12VF2 - Bucket Extend Input Power Off	518848	04
1909	ALL	UCM	VCM - Rail 12VF3 - Boom Raise/Lower Input Power Off	518849	04
1910	ALL	UCM	VCM - Rail 12VH - Loader Pilot Interlock And Port Lock Input Power Off	518851	04
1911	ALL	UCM	VCM - Rail 12VH1 - Left And Right Pump Reverse Input Power Off	518852	04
1912	ALL	UCM	VCM - Rail 12VM - Left And Right Brake Lights And Aux Extend Input Power Off	518853	04
1913	ALL	UCM	VCM - Rail 12VS1 - Bucket Curl Input Power Off	518855	04
1914	ALL	UCM	VCM - Rail 12VS2 - Backup Alarm Input Power Off	518856	04
1915	ALL	UCM	VCM - Rail 12VT1 - Two Speed Input Power Off	518857	04

DTC	Engine Type	Detected	Description	SPN	FMI
1916	ALL	UCM	VCM - Rail 12VU1 - Right And Left Pumps Forward Input Power Off	518858	04
1917	ALL	UCM	VCM - Rail 12VU2 - Park Brake Solenoid Input Power Off	518859	04
1918	ALL	UCM	VCM - Rail 12VR - Combination Outputs Power Off	518860	04
1919	ALL	UCM	UCM - Rail 12VS2 - Park Brake Solenoid Input Power Off		
1920	ALL	UCM	UCM - 8Vref2 Sensor Supply Voltage Out Of Range Pin 1		
3007	PERKINS / ISM-DI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Above Range Max	110	03
3007	PERKINS / ISM-DI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Above Range Max	110	15
3007	PERKINS / ISM-IDI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Above Range Max	110	03
3007	PERKINS / ISM-IDI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Above Range Max	110	15
3007	F5C	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Above Range Max	10031	03
3008	PERKINS / ISM-DI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Below Range Min	110	04
3008	PERKINS / ISM-IDI	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Below Range Min	110	04
3008	F5C	ENGINE	Engine Coolant Temperature Sensor Circuit - Signal Below Range Min	10031	04
3010	PERKINS / ISM-DI	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Above Range Max	172	03
3010	PERKINS / ISM-IDI	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Above Range Max	172	03
3010	F5C	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Above Range Max	10033	03
3011	PERKINS / ISM-DI	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Below Range Min	172	04
3011	PERKINS / ISM-IDI	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Below Range Min	172	04
3011	F5C	ENGINE	Intake Manifold Boost Temperature Sensor Circuit - Signal Below Range Min	10033	04
3015	PERKINS / ISM-DI	ENGINE	Fuel Temperature Sensor - Signal Above Range Max	174	03
3015	F5C	ENGINE	Fuel Temperature Sensor - Signal Above Range Max	10035	03
3015	F5C	ENGINE	Fuel temperature Sensor : Signal Range check high for fuel temperature sensor	10035	03
3016	PERKINS / ISM-DI	ENGINE	Fuel Temperature Sensor - Signal Below Range Min	174	04
3016	F5C	ENGINE	Fuel Temperature Sensor - Signal Below Range Min	10035	04
3016	F5C	ENGINE	Fuel temperature Sensor : Signal Range check low for fuel temperature sensor	10035	04
3019	PERKINS / ISM-DI	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Above Range Max	102	03
3019	PERKINS / ISM-IDI	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Above Range Max	102	03
3019	F5C	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Above Range Max	10034	03
3019	F5C	ENGINE	Intake air pressure sensor : Diagnostic fault check for SRC high in air pressure upstream of intake valve sensor	10034	03
3024	PERKINS / ISM-DI	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Above Range Max. Replace Engine Controller.	108	03
3024	PERKINS / ISM-IDI	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Above Range Max. Replace Engine Controller.	108	03
3024	F5C	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Above Range Max. Replace Engine Controller.	100EB	03
3025	PERKINS / ISM-DI	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Below Range Min. Replace Engine Controller.	108	04
3025	PERKINS / ISM-IDI	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Below Range Min. Replace Engine Controller.	108	04
3025	F5C	ENGINE	Atmospheric Pressure Sensor Inside ECU Out Of Range - Signal Below Range Min. Replace Engine Controller.	100EB	04
3027	F5C	ENGINE	Oil Pressure Sw Failure	20038	03
3037	PERKINS / ISM-DI	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Below Range Min	102	04
3037	PERKINS / ISM-IDI	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Below Range Min	102	04
3037	F5C	ENGINE	Intake Manifold Boost Pressure Sensor Circuit - Signal Below Range Min	10034	04
3037	F5C	ENGINE	Intake air pressure sensor : Diagnostic fault check for SRC low in air pressure upstream of intake valve sensor	10034	04
3059	PERKINS / ISM-IDI	ENGINE	ECU Main Power Relay Failed Closed	1485	07
3059	F5C	ENGINE	Engine Controller Main Relay Circuit (Terminal 30) - Stuck Main Relay Error	20025	03
3059	F5C	ENGINE	Main Relay : DFC for stuck main relay error	20025	03
3061	F5C	ENGINE	Injector, solenoid : Short circuit Low Side to High Side injector 1	10061	03
3063	F5C	ENGINE	Cylinder 1 Injector Circuit - Short Circuit	10061	02
3063	F5C	ENGINE	Injector, solenoid Power stage : Short circuit in the injector 1	10061	02

DTC	Engine Type	Detected	Description	SPN	FMI
3069	F5C	ENGINE	Injector, solenoid : short circuit Low Side to High Side Injector 3	10063	03
3071	F5C	ENGINE	Cylinder 3 Injector Circuit - Short Circuit	10063	02
3071	F5C	ENGINE	Injector, solenoid Power stage : Short circuit in the injector 3	10063	02
3077	F5C	ENGINE	Injector, solenoid : short circuit Low Side to High Side Injector 2	10062	03
3079	F5C	ENGINE	Cylinder 2 Injector Circuit - Short Circuit	10062	02
3079	F5C	ENGINE	Injector, solenoid Power stage : Short circuit in the injector 2	10062	02
3081	F5C	ENGINE	Injector, solenoid : short circuit Low Side to High Side Injector 4	10064	03
3083	F5C	ENGINE	Cylinder 4 Injector Circuit - Short Circuit	10064	02
3083	F5C	ENGINE	Injector, solenoid Power stage : Short circuit in the injector 4	10064	02
3088	PERKINS / ISM-DI	ENGINE	Crankshaft Speed Sensor - No Signal	4201	08
3088	PERKINS / ISM-IDI	ENGINE	Crank Speed Sensor High Voltage	4201	03
3088	PERKINS / ISM-IDI	ENGINE	Crank Speed Sensor Out Of Range	4201	08
3088	PERKINS / ISM-DI	ENGINE	Crankshaft Speed Sensor - No Signal	4202	08
3088	F5C	ENGINE	Crankshaft Speed Sensor - No Signal	10041	02
3088	F5C	ENGINE	Crankshaft Sensor : Crankshaft signal diagnose - no signal	10041	02
3089	PERKINS / ISM-DI	ENGINE	Crankshaft Speed Sensor - Invalid Signal	4201	02
3089	F5C	ENGINE	Crankshaft Speed Sensor - Invalid Signal	10041	04
3089	F5C	ENGINE	Crankshaft Sensor : Crankshaft signal diagnose - disturbed signal	10041	04
3090	PERKINS / ISM-DI	ENGINE	Camshaft Speed Sensor - No Signal	723	08
3090	PERKINS / ISM-IDI	ENGINE	Camshaft Speed Sensor Out Of Range	723	08
3090	PERKINS / ISM-IDI	ENGINE	Camshaft Speed Sensor High Voltage	723	03
3090	F5C	ENGINE	Camshaft Speed Sensor - No Signal	10043	02
3090	F5C	ENGINE	Camshaft Sensor : Camshaft signal diagnose - no signal	10043	02
3091	F5C	ENGINE	Camshaft Speed Sensor - Invalid Signal	10043	04
3091	F5C	ENGINE	Camshaft Sensor : Camshaft signal diagnose - disturbed signal	10043	04
3093	F5C	ENGINE	Offset Between Camshaft And Crankshaft Speed Sensors. Check Correct Positions Of Camshaft Signal Wheel And Crankshaft Signal Wheel.	10044	03
3093	F5C	ENGINE	Camshaft Sensor : Camshaft offset angle exceeded	10044	03
3096	F5C	ENGINE	Primary Vehicle CAN Bus Failure - Bus Off On CAN Node A	100B1	03
3102	PERKINS / ISM-DI	ENGINE	Rail Pressure Sensor - Signal Below Range Min	157	04
3102	F5C	ENGINE	Rail Pressure Sensor - Signal Below Range Min	10036	04
3104	F5C	ENGINE	Rail Pressure Relief Valve - Open	10037	03
3105	F5C	ENGINE	Rail Pressure Relief Valve - Pressure Shock Requested	10037	04
3106	F5C	ENGINE	Rail Pressure Relief Valve - pressure relief valve reached maximum allowed opening count	10037	02
3107	F5C	ENGINE	Engine Controller High Pressure Pump Metering Unit Circuit - Short Circuit To Battery	20059	03
3107	F5C	ENGINE	Fuel Metering Unit : short circuit to battery of metering unit output	20059	03
3108	F5C	ENGINE	Engine Controller High Pressure Pump Metering Unit Circuit - Short Circuit To Ground	30059	04
3110	F5C	ENGINE	Fuel pressure Sensor : rail pressure raw value is above maximum offset	20036	03
3111	F5C	ENGINE	Fuel pressure Sensor : rail pressure raw value is below minimum offset	20036	04
3112	PERKINS / ISM-DI	ENGINE	Rail Pressure Sensor - Signal Above Range Max	157	03
3112	F5C	ENGINE	Rail Pressure Sensor - Signal Above Range Max	10036	03
3137	F5C	ENGINE	Engine Controller High Pressure Pump Metering Driver - Open Load	10059	02
3137	F5C	ENGINE	Fuel Metering Unit : open load of metering unit output	10059	02
3141	F5C	ENGINE	Fuel System - High Pressure Pump Is Pumping More Fuel Than Expected. Check Metering Unit Circuit, Low Pressure Fuel Tubes (Return From Pump To Tank Clogged), Fuel Pressure Sensor, Or If Injectors Are Leaking.	10058	03
3146	F5C	ENGINE	Water Detected In Fuel	1001C	03
3157	F5C	IC	ECM Not Detected On CAN Bus - The Engine Dataset Registration Information Was Not Available From The Engine Within The Time Required.	5657	09
3158	F5C	IC	The Engine Dataset Installed Does Not Match The Dataset Registered For This Machine. Register The New Dataset If The Dataset Has Just Been Updated	5657	02
3166	F5C	ENGINE	Engine Controller Fuel Filter Heater Circuit - Short Circuit To Battery	10049	03
3167	F5C	ENGINE	Engine Controller Fuel Filter Heater Circuit - Short Circuit To Ground	10049	04
3168	F5C	ENGINE	Engine Controller Fuel Filter Heater Circuit - Open Load	10049	02
3169	F5C	ENGINE	Engine Controller Fuel Filter Heater Circuit - Signal Not Plausible	10049	12
3170	PERKINS / ISM-IDI	ENGINE	DPF Exhaust Temperature Higher Than 700 deg C	3241	15

DTC	Engine Type	Detected	Description	SPN	FMI
3171	PERKINS / ISM-IDI	ENGINE	DPF Outlet Pressure Sensor Low Voltage	3610	04
3173	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Temperature Sensor Low Voltage	5487	04
3174	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Temperature Sensor High Voltage	5487	03
3175	PERKINS / ISM-DI	ENGINE	Exhaust Gas Temperature 1 Sensor Signal Too Low	3242	04
3175	PERKINS / ISM-IDI	ENGINE	DPF Intake Temperature Sensor Low Voltage	3242	04
3176	F5C	ENGINE	Fuel System - High Pressure Pump Flow Setting Is Higher Than Expected To Maintain Normal Rail Pressure At Zero Fueling.	10057	03
3179	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - BC2EDC2	200B4	02
3179	F5C	ENGINE	CAN Bus Received frames : CAN-Receive-Frame BC2EDC2	200B4	02
3180	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - VM2EDC	100B5	02
3188	F5C	ENGINE	Cylinder 1 Injector Circuit - Open Load	10067	02
3188	F5C	ENGINE	Injector, solenoid : Open load error of an injector 1 (interruption of an electric connection)	10067	02
3192	F5C	ENGINE	Cylinder 2 Injector Circuit - Open Load	10068	02
3192	F5C	ENGINE	Injector, solenoid : Open load error of an injector 2 (interruption of an electric connection)	10068	02
3196	F5C	ENGINE	Cylinder 3 Injector Circuit - Open Load	10069	02
3196	F5C	ENGINE	Injector, solenoid : Open load error of an injector 3 (interruption of an electric connection)	10069	02
3200	F5C	ENGINE	Cylinder 4 Injector Circuit - Open Load	1006A	02
3200	F5C	ENGINE	Injector, solenoid : Open load error of an injector 4 (interruption of an electric connection)	1006A	02
3210	PERKINS / ISM-DI	ENGINE	Injector Bank 1 Circuit (Cyl 1 And 4) - Short Circuit	651	03
3210	PERKINS / ISM-DI	ENGINE	Injector Bank 1 Circuit (Cyl 1 And 4) - Short Circuit	654	03
3210	F5C	ENGINE	Injector Bank 1 Circuit (Cyl 1 And 4) -Short Circuit	10071	03
3210	F5C	ENGINE	Injector, solenoid : Short circuit in an injection bank 1 (all injectors of the same bank can be affected)	10071	03
3218	PERKINS / ISM-DI	ENGINE	Injector Bank 2 Circuit (Cyl 2 And 3) - Short Circuit	652	03
3218	PERKINS / ISM-DI	ENGINE	Injector Bank 2 Circuit (Cyl 2 And 3) - Short Circuit	653	03
3218	F5C	ENGINE	Injector Bank 2 Circuit (Cyl 2 And 3) - Short Circuit	10073	03
3218	F5C	ENGINE	Injector, solenoid : Short circuit in an injection bank 2 (all injectors of the same bank can be affected)	10073	03
3230	F5C	ENGINE	SPI Communication Failure - Replace Engine Controller (Chip Specific Fault). Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	1007C	12
3230	F5C	ENGINE	Injector, solenoid Power stage : Chip error in the Injector CY33x power stage component	1007C	12
3238	F5C	ENGINE	Replace Engine Controller (Internal Communication Chip Error) - CJ940. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	100D1	03
3239	PERKINS / ISM-IDI	ENGINE	ECM EEPROM - Read Operation Failure	2840	13
3240	PERKINS / ISM-IDI	ENGINE	ECM EEPROM - Write Operation Failure	2840	12
3245	F5C	ENGINE	Engine Controller (Internal Communication Error). If Error Exists Only Temporarily (i.e. Injection Reoccurs), Error Can Be Ignored. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	100D4	12
3245	F5C	ENGINE	Analog Digital Converter (ADC) : Diagnostic fault check to report errors in query-/response-communication	100D4	12
3252	F5C	ENGINE	Engine Controller (Internal Communication Error). If Error Exists Only Temporarily (i.e. Injection Reoccurs), Error Can Be Ignored. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	100D8	12
3253	F5C	ENGINE	Replace Engine Controller (ADC Failure). After Replacement, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	100D9	03
3255	F5C	ENGINE	Replace Engine Controller (ADC Failure). After Replacement, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	100D9	02
3256	F5C	ENGINE	Replace Engine Controller (ADC Failure). After Replacement, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	100D9	12
3258	PERKINS / ISM-DI	ENGINE	Starter Relay Circuit - Shorted To High Source	677	03
3258	F5C	ENGINE	Starter Relay Circuit - Short Circuit To Battery	100E1	03
3259	PERKINS / ISM-DI	ENGINE	Starter Relay Circuit - Shorted To Low Source	677	04
3259	F5C	ENGINE	Starter Relay Circuit - Short Circuit To Ground	100E1	04

DTC	Engine Type	Detected	Description	SPN	FMI
3260	F5C	ENGINE	Engine Controller Starter Relay Circuit Low Side Driver - Open Load	200E1	02
3261	F5C	ENGINE	Engine Controller Starter Relay Circuit Low Side Driver - Short Circuit To Battery Of Excess Temperature	200E1	03
3262	F5C	ENGINE	Engine Controller Starter Relay Circuit Low Side Driver - Short Circuit To Ground	200E1	04
3265	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Injection Time During Overrun Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	100E3	03
3266	PERKINS / ISM-DI	ENGINE	RPM Monitoring Over Speed Max	190	00
3266	PERKINS / ISM-IDI	ENGINE	Engine overspeed Error - Crank Speed Sensor or Camshaft Speed Sensor Failure	190	00
3266	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Engine Crank Speed Fault). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	100E4	03
3266	PERKINS / ISM-IDI	ENGINE	Engine overspeed Error - Crank Speed Sensor or Camshaft Speed Sensor Failure	723	10
3266	PERKINS / ISM-IDI	ENGINE	Engine overspeed Error - Crank Speed Sensor or Camshaft Speed Sensor Failure	4201	10
3267	PERKINS / ISM-DI	ENGINE	Engine ECU Fuel Pump Output - Shorted To High Source	1347	03
3268	PERKINS / ISM-DI	ENGINE	Engine ECU Fuel Pump Output - Shorted To Low Source	1347	04
3283	F5C	ENGINE	Engine Regulated 5 Volt Sensor Supply # 2 - Too High. (K = 94 Connector - Vehicle Side, A = 60pin Connector - Engine; K12; K13; K14; K15; K16)	100E7	03
3285	F5C	ENGINE	Engine Regulated 5 Volt Sensor Supply # 3 - Too High. (K = 94 Connector - Vehicle Side, A = 60pin Connector - Engine; A29; K17; K18)	100E8	03
3293	PERKINS / ISM-DI	ENGINE	Fuel System - Rail Pressure Lower Than Desired Target. Check For Clogged Fuel Filter, Leakage In High Pressure System, Low Pressure Pump Hydraulic Circuit, High Pressure Pump Low Efficiency.	157	00
3293	F5C	ENGINE	Fuel System - Rail Pressure Lower Than Desired Target. Check For Clogged Fuel Filter, Leakage In High Pressure System, Low Pressure Pump Hydraulic Circuit, High Pressure Pump Low Efficiency.	10051	03
3301	F5C	ENGINE	Fuel System - Rail Pressure Is Not Reducing When High Pressure Pump Is At Minimum Flow. Check Metering Unit Circuit, Low Pressure Fuel Tubes (Return From Pump To Tank Clogged).	10053	03
3305	PERKINS / ISM-DI	ENGINE	Common Rail Pressure Below Target Pressure	157	01
3309	PERKINS / ISM-DI	ENGINE	Common Rail Pressure Exceeds Upper Limit	157	15
3334	PERKINS / ISM-DI	ENGINE	CAN Message Not Received From Vehicle Controller - TSC1-PE Active	639	14
3334	PERKINS / ISM-IDI	ENGINE	CAN Message TSC1 Error	639	14
3334	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - TSC1-PE Active	100C6	03
3335	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - TSC1	200C6	02
3338	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - TSC1_VE Message Passive	300C8	02
3339	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - TSC1-VE Active	100C8	03
3350	F5C	ENGINE	Terminal 50 (Crank Input) In Crank State For Longer Than 30 Seconds.	1001A	03
3358	F5C	ENGINE	Engine Sensor CAN Bus Failure (Engine Controller Cannot Transmit To Sensors, Or Sensors Not On Bus)	100B7	02
3368	F5C	ENGINE	Fueling Limited Due To Other Engine Fault Detected, See Other Fault Codes.	1009D	04
3369	F5C	ENGINE	Fueling Limited To Prevent Smoke, See Other Fault Codes.	1009E	04
3370	F5C	ENGINE	Torque Limitation Due To High Temperatures Of Exhaust Gas, Coolant Or Fuel.	4009E	04
3371	F5C	ENGINE	Temporary Torque Limitation Due To High Fuel Temperature. See Other Fault Codes.	6009E	04
3374	F5C	ENGINE	Injector Codes Not Valid In Controller Memory. Write Correct Injector Codes With Service Tool	1007F	12
3390	ALL	IC	Air Filter Restriction Switch Short To Ground	519156	04
3402	F5C	ENGINE	Rail Fuel Pressure Too High - Maximum Rail Pressure Exceeded	50035	03
3403	F5C	ENGINE	Engine Controller Starter Relay Circuit Low Side Driver - Power Stage Overtemperature.	200E1	12
3405	F5C	ENGINE	Engine Controller Waste Gate Turbocharger Actuator Circuit - Open Load Output Power Stage	30093	02
3406	F5C	ENGINE	Engine Controller Waste Gate Turbocharger Actuator Circuit - Power Stage Overtemperature. No Reaction Needed If Failure Isn't Present After Short Time. Replace EDC If Fault Persists.	30093	12
3409	PERKINS / ISM-DI	ENGINE	Engine Oil Pressure Too Low	100	01
3409	PERKINS / ISM-IDI	ENGINE	Engine Oil Pressure Too Low	100	01
3409	F5C	ENGINE	Engine Oil Pressure Too Low	20038	04

DTC	Engine Type	Detected	Description	SPN	FMI
3410	F5C	ENGINE	Desired Throttle Valve Actuator (TVA) Position Can Not Be Reached (Valve Sticks, Position Sensor Mismatched)	5008C	03
3411	F5C	ENGINE	Desired Throttle Valve Actuator (TVA) Position Can Not Be Reached (Valve Sticks, Position Sensor Mismatched)	5008C	04
3414	F5C	ENGINE	Short Circuit In Glow Plugs - Cyl.1	7002C	00
3415	F5C	ENGINE	Short Circuit In Glow Plugs - Cyl.2	7002C	01
3416	F5C	ENGINE	Short Circuit In Glow Plugs - Cyl.3	7002C	02
3417	F5C	ENGINE	Short Circuit In Glow Plugs - Cyl.4	7002C	03
3418	F5C	ENGINE	Engine Controller Waste Gate Turbocharger Actuator Circuit - Failed High	30093	03
3419	F5C	ENGINE	Engine Controller Waste Gate Turbocharger Actuator Circuit - Failed Low	30093	04
3427	F5C	ENGINE	DPF Differential Pressure Too Low. Possible DPF Removal Or Differential Pressure Sensor Circuit	300F1	04
3428	F5C	ENGINE	DPF Differential Pressure Sensor: Not Plausible Error	300F3	12
3429	F5C	ENGINE	Differential Pressure Hose-line Failure (e.g. Due To Leakage) - Check Hose-line Integrity. Check Sensor.	700F3	12
3517	F5C	ENGINE	Air Filter Temperature Sensor Circuit - Signal Too High	1003C	03
3518	F5C	ENGINE	Air Filter Temperature Sensor Circuit - Signal Too Low	1003C	04
3616	F5C	ENGINE	Fueling Limited Due To Other Engine Fault Detected, See Other Fault Codes.	3009E	04
3648	F5C	ENGINE	Turbocharger Boost Pressure Higher Than Desired Target (Wastegate Sticking, Boost Pressure Sensor, Exhaust Pressure Sensor).	10099	02
3650	F5C	ENGINE	Battery Voltage Incorrect. Check Alternator, Or EDC.	20026	03
3650	F5C	ENGINE	Battery voltage : SRC high for battery voltage sensor	20026	03
3651	F5C	ENGINE	Battery Voltage Uncorrect. Check Alternator, Battery, Or Wiring Harness.	20026	04
3651	F5C	ENGINE	Battery voltage : SRC low for battery voltage sensor	20026	04
3652	F5C	ENGINE	Primary Vehicle CAN Bus Failure - Bus Off On CAN Node A	100B1	04
3655	F5C	ENGINE	Fueling Limited Due To Other Engine Fault Detected, See Other Fault Codes.	3009D	04
3656	F5C	ENGINE	Torque Limited Due To DPF Load, See Other Fault Codes.	4009D	04
3657	F5C	ENGINE	CAN Bus Received Frames - Timeout Error Of CAN-Receive-Frame CM1BC	700BA	02
3659	PERKINS / ISM-IDI	ENGINE	Engine ECU Battery Supply Voltage High	168	00
3665	F5C	ENGINE	Desired EGR Valve Position Can Not Be Reached (EGR Valve Sticks, Position Sensor Mismatched).	50089	03
3665	F5C	ENGINE	EGR valve control governor deviation above threshold	50089	03
3666	F5C	ENGINE	Desired EGR Valve Position Can Not Be Reached (EGR Valve Sticks, Position Sensor Mismatched).	50089	04
3666	F5C	ENGINE	EGR valve control governor deviation below threshold	50089	04
3667	F5C	ENGINE	EGR Valve Circuit - Open Load Error For Power Stage. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	5008B	02
3667	F5C	ENGINE	Open load error for EGR valve H-bridge	5008B	02
3668	F5C	ENGINE	EGR Valve Circuit - No Reaction Needed If Failure Isn't Present Again After Short Time. Replace Engine Controller If Fault Persists. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	5008B	12
3668	F5C	ENGINE	Over current error for EGR valve H-bridge	5008B	12
3669	F5C	ENGINE	EGR Valve Circuit - Short Circuit To Battery (A = 60pin Connector - Engine; A50)	6008B	00
3669	F5C	ENGINE	Over temperature error for EGR valve H-bridge	6008B	00
3670	F5C	ENGINE	EGR Valve Circuit - Short Circuit To Battery (A = 60pin Connector - Engine; A35)	6008B	03
3670	F5C	ENGINE	Short circuit to battery of EGR valve H-bridge - high pin A50	6008B	03
3671	F5C	ENGINE	EGR Valve Circuit - Short Circuit To Ground (A = 60pin Connector - Engine; A50)	6008B	01
3671	F5C	ENGINE	Short circuit to battery of EGR valve H-bridge - low pin A35	6008B	01
3672	F5C	ENGINE	EGR Valve Circuit - Short Circuit To Ground (A = 60pin Connector - Engine; A35)	6008B	04
3672	F5C	ENGINE	Short circuit to ground of EGR valve H-bridge - high pin A50	6008B	04
3673	F5C	ENGINE	EGR Valve Circuit - Short Circuit Overload Error For H-Bridge	6008B	02
3673	F5C	ENGINE	Short circuit to ground of EGR valve H-bridge - low pin A35	6008B	02
3674	F5C	ENGINE	EGR Valve Circuit - Under Voltage Error For H-Bridge. Check Electrical System Of Vehicle, Replace Ecu (Due To High Voltage Fluctuations In The System).	6008B	07
3674	F5C	ENGINE	Short circuit over load error for EGR valve H-bridge	6008B	07
3675	F5C	ENGINE	EGR Valve Is Blocked In Closed Position. Replace EGR Valve.	60089	04
3675	F5C	ENGINE	EGR valve too long time drift at closed position	60089	04
3676	F5C	ENGINE	EGR Valve Position Sensor Circuit - High	70089	00
3676	F5C	ENGINE	EGR valve position sensor voltage above threshold (Short to battery)	70089	00
3677	F5C	ENGINE	EGR Valve Position Sensor Circuit - Low	70089	01
3677	F5C	ENGINE	EGR valve position sensor voltage below threshold (Short to ground)	70089	01
3680	F5C	ENGINE	Reprogram/Replace EDC. - Replace Engine Controller If Fault Persists. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	20056	03
3680	F5C	ENGINE	Injection cut off : Injection cut off demand (ICO) for shut off coordinator	20056	03
3684	F5C	ENGINE	Exhaust temperature : Fault Check for enhanced SRC-Max of Second exhaust gas temperature	300F7	03
3688	F5C	ENGINE	Replace Water In Fuel Sensor.	1001C	02

DTC	Engine Type	Detected	Description	SPN	FMI
3689	F5C	ENGINE	Communication Error Between Glow Plug Unit And Engine Controller (Wrong Data Transmission). Check Wiring, Or Replace Glow Plug Unit.	5002C	01
3689	F5C	ENGINE	DFC for faulty diagnostic data transmission or protocol error	5002C	01
3691	PERKINS / ISM-DI	ENGINE	Glow Plug Circuit. - No Load Error For Low Voltage System	676	03
3691	F5C	ENGINE	Glow Plug Circuit. - No Load Error For Low Voltage System	3002B	02
3692	F5C	ENGINE	Glow Plug Circuit Power Stage Overtemperature. No Reaction Needed If Failure Isn't Present After Short Time. Replace Glow Plug Control Unit If Fault Persists.	3002B	12
3693	F5C	ENGINE	Glow Plug Circuit. - Short Circuit To Battery Error For Low Voltage System	3002B	03
3694	PERKINS / ISM-DI	ENGINE	Glow Plug Circuit. - Short Circuit To Ground Error For Low Voltage System	676	04
3694	F5C	ENGINE	Glow Plug Circuit. - Short Circuit To Ground Error For Low Voltage System	3002B	04
3704	F5C	ENGINE	Injector Codes Are Invalid - Write Correct Injector Codes With Service Tool (Cyl.2).	2007F	12
3704	F5C	ENGINE	Injector Adjustment programming : check of missing injector adjustment value programming: injector 2	2007F	12
3705	F5C	ENGINE	Injector Codes Are Invalid - Write Correct Injector Codes With Service Tool (Cyl.3).	3007F	12
3705	F5C	ENGINE	Injector Adjustment programming : check of missing injector adjustment value programming: injector 3	3007F	12
3706	F5C	ENGINE	Injector Codes Are Invalid - Write Correct Injector Codes With Service Tool (Cyl.4).	4007F	12
3706	F5C	ENGINE	Injector Adjustment programming : check of missing injector adjustment value programming: injector 4	4007F	12
3727	F5C	ENGINE	Poor Oil Quality Detected - Amber Lamp Level. Change The Oil And Reset Counter Via Service Tool.	100FF	04
3728	F5C	ENGINE	Poor Oil Quality Detected - Red Lamp Level. Change The Oil And Reset Counter Via Service Tool.	100FF	02
3735	F5C	ENGINE	Fuel Metering Unit Circuit. - Over Temperature Of Device Driver Of Metering Unit	50059	12
3738	F5C	ENGINE	Reprogram/Replace EDC - Replace Engine Controller If Fault Persists. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	200D4	04
3738	F5C	ENGINE	Analog Digital Converter (ADC) : Diagnostic fault check to report multiple error while checking the complete ROM-memory	200D4	04
3739	F5C	ENGINE	ECM Internal Error. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300D4	12
3739	F5C	ENGINE	Power stages, Injector : Loss of synchronization sending bytes to the MM from CPU.	300D4	12
3740	F5C	ENGINE	Injector Circuit Error. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300D4	02
3740	F5C	ENGINE	Power stages, Injector : DFC to set a torque limitation once an error is detected before MoCSOP's error reaction is set	300D4	02
3741	F5C	ENGINE	ECM Internal Error. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300D4	03
3741	F5C	ENGINE	Power stages, Injector : Wrong set response time	300D4	03
3742	F5C	ENGINE	ECM Internal Error. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300D4	04
3742	F5C	ENGINE	Power stages, Injector : Too many SPI errors during MoCSOP execution.	300D4	04
3743	F5C	ENGINE	EDC Internal Failure (Injectors Power Stage) - Error In Undervoltage Monitoring. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters	400D4	04
3743	F5C	ENGINE	Power stages, Injector : Diagnostic fault check to report the error in under voltage monitoring	400D4	04
3744	F5C	ENGINE	EDC Internal Failure (Injectors Power Stage) - Error In Overvoltage Monitoring. If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	400D4	03
3744	F5C	ENGINE	Power stages, Injector : Diagnostic fault check to report the error in overvoltage monitoring	400D4	03
3745	F5C	ENGINE	Injector Circuit Or Ecu Power Stages - WDA Is Not Working Correctly	500D4	02
3745	F5C	ENGINE	Power stages, Injector : Diagnostic fault check to report that WDA is not working correct	500D4	02
3746	F5C	ENGINE	Injector Circuit Or Ecu Power Stages - OS Timeout In The Shut Off Path Test. Failure Setting The Alarm Task Period.	500D4	03
3746	F5C	ENGINE	Power stages, Injector : OS timeout in the shut off path test. Failure setting the alarm task period.	500D4	03
3747	F5C	ENGINE	Injector Circuit Or Ecu Power Stages - Positive Test Failed	500D4	04
3747	F5C	ENGINE	Power stages, Injector : Diagnostic fault check to report that the positive test failed	500D4	04
3748	F5C	ENGINE	Injector Circuit Or Ecu Power Stages - Timeout In The Shut Off Path Test	500D4	12
3748	F5C	ENGINE	Power stages, Injector : Diagnostic fault check to report the timeout in the shut off path test	500D4	12
3750	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Injection Time). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	00
3750	F5C	ENGINE	Injection control : Error in the plausibility of the injection energizing time	300E3	00

DTC	Engine Type	Detected	Description	SPN	FMI
3751	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Injection Angles). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	01
3751	F5C	ENGINE	Injection control : Error in the plausibility of the start of energizing angles	300E3	01
3752	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Zero Fuel Calibration). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	02
3752	F5C	ENGINE	Level 2 Monitoring: Error in the plausibility of the energizing times of the zero fuel quantity calibration	300E3	02
3753	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	03
3753	F5C	ENGINE	Level 2 Monitoring : Diagnostic fault check to report the error due to Over heating	300E3	03
3754	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	04
3754	F5C	ENGINE	Level 2 Monitoring : Diagnostic fault check to report the plausibility error in rail pressure monitoring	300E3	04
3755	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	300E3	12
3755	F5C	ENGINE	Level 2 Monitoring : Diagnostic fault check to report the error due to torque comparison	300E3	12
3756	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	400E3	03
3756	F5C	ENGINE	Level 2 Monitoring : Diagnosis fault check to report the demand for normal mode due to an error in the PoI2 quantity	400E3	03
3757	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	400E3	04
3757	F5C	ENGINE	Level 2 Monitoring : Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off	400E3	04
3758	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	400E3	12
3758	F5C	ENGINE	Level 2 Monitoring : Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor	400E3	12
3759	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	500E3	03
3760	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	500E3	04
3761	F5C	ENGINE	Reload Engine Dataset Or Replace Engine Controller If Fault Persists (Level 2 Monitoring). If EDC Replaced, Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	500E3	12
3762	F5C	ENGINE	Level 2 Monitoring : Reported Over Voltage Of Supply	40026	03
3763	F5C	ENGINE	Level 2 Monitoring : Reported Under Voltage Of Supply	40026	04
3764	PERKINS / ISM-DI	ENGINE	Engine Controller Main Relay Circuit (Terminal 30) - Early Opening Defect Of Main Relay	1485	02
3764	F5C	ENGINE	Engine Controller Main Relay Circuit (Terminal 30) - Early Opening Defect Of Main Relay	20025	04
3764	F5C	ENGINE	Main Relay : Early opening defect of main relay	20025	04
3766	F5C	ENGINE	DPF Differential Pressure Sensor (Replace Sensor)	100F3	12
3767	F5C	ENGINE	Replace Engine Controller - Reporting 'Wda Active' Due To Errors In Query/Response Communication. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	600D4	02
3768	F5C	ENGINE	Replace Engine Controller - Reporting 'Abe Active' Due To Undervoltage Detection. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	600D4	04
3769	F5C	ENGINE	Replace Engine Controller - Reporting 'Abe Active' Due To Overvoltage Detection. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	600D4	03
3770	F5C	ENGINE	Replace Engine Controller. Follow The Appropriate Service Tool Procedure To Restore Self Learning Parameters.	600D4	12
3773	F5C	ENGINE	Boost Pressure Below The Target - Check Waste Gate, Turbocharger, Piping.	20099	04
3773	F5C	ENGINE	Turbocharger : Under boost detected in Pressure charger regulator	20099	04
3794	F5C	ENGINE	Intake Manifold Boost Pressure Value Illogical When Compared To Other Pressures In System.	10034	00
3794	F5C	ENGINE	Intake air pressure sensor : Plausibility Check for air pressure at the upstream of intake valve sensor	10034	00

DTC	Engine Type	Detected	Description	SPN	FMI
3795	F5C	ENGINE	Intake Manifold Boost Pressure Value Illogical When Compared To Other Pressures In System.	10034	01
3795	F5C	ENGINE	Intake air pressure sensor : Plausibility Check for air pressure at the upstream of intake valve sensor	10034	01
3796	F5C	ENGINE	DPF Differential Pressure Sensor - Hose Line Detached Or Blocked (Implausible Pressure Drop)	500F5	12
3797	PERKINS / ISM-DI	ENGINE	DPF Differential Pressure Sensor Circuit - High Error	3251	03
3797	PERKINS / ISM-IDI	ENGINE	DPF Differential Pressure Sensor Circuit - High Error	3251	03
3797	F5C	ENGINE	DPF Differential Pressure Sensor Circuit - High Error	100F1	03
3798	PERKINS / ISM-DI	ENGINE	DPF Differential Pressure Sensor Circuit - Low Error	3251	04
3798	PERKINS / ISM-IDI	ENGINE	DPF Differential Pressure Sensor Circuit - Low Error	3251	04
3798	F5C	ENGINE	DPF Differential Pressure Sensor Circuit - Low Error	100F1	04
3799	F5C	ENGINE	Pressure Relief Valve - Forced To Open, Perform Pressure Shock. See Other Fault Codes.	20037	04
3800	F5C	ENGINE	Pressure Relief Valve - Quantity Balance Check If A Successful PRV Opening Is Ensured. See Other Fault Codes.	20037	12
3801	F5C	ENGINE	Exhaust Gas Pressure Sensor Circuit (Upstream Turbine) - High Error	4009B	03
3802	F5C	ENGINE	Exhaust Gas Pressure Sensor Circuit (Upstream Turbine) - Low Error	4009B	04
3808	F5C	ENGINE	Fuel System: High Pressure Pump Fuel Quantity Not Plausible At Low Idle. Check For Clogged Fuel Filter, Leakage In High Pressure System, Low Pressure Pump Hydraulic Circuit, High Pressure Pump Low Efficiency, Or Injectors For Tightness.	40055	03
3811	F5C	ENGINE	Engine Regulated 5 Volt Sensor Supply # 1 - Too High. (A = 60pin Connector - Engine; A07; A08; A09; A10; A11; A12; A13)	100E6	12
3818	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Open Load Error For Power Stage	4008D	02
3818	F5C	ENGINE	Open load error for throttle valve H-bridge	4008D	02
3819	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Over Current Error For H-Bridge	4008D	03
3819	F5C	ENGINE	Over current error for throttle valve H-bridge	4008D	03
3820	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Over Temperature Error For H-Bridge	4008D	12
3820	F5C	ENGINE	Over temperature error for throttle valve H-bridge	4008D	12
3821	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Short Circuit To Battery (A = 60pin Connector - Engine; A49)	5008D	03
3821	F5C	ENGINE	Short circuit to battery of throttle valve H-bridge - high pin A49	5008D	03
3822	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Short Circuit To Battery (A = 60pin Connector - Engine; A34)	6008D	03
3822	F5C	ENGINE	Short circuit to battery of throttle valve H-bridge - low pin A34	6008D	03
3823	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Short Circuit To Ground (A = 60pin Connector - Engine; A49)	5008D	04
3823	F5C	ENGINE	Short circuit to ground of throttle valve H-bridge - high pin A49	5008D	04
3824	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Short Circuit To Ground (A = 60pin Connector - Engine; A34)	6008D	04
3824	F5C	ENGINE	Short circuit to ground of throttle valve H-bridge - low pin A34	6008D	04
3825	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Short Circuit Over Load Error For H-Bridge	7008D	03
3825	F5C	ENGINE	Short circuit over load error for throttle valve H-bridge	7008D	03
3827	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Under Voltage Error For H-Bridge	7008D	04
3827	F5C	ENGINE	Under voltage error for throttle valve H-bridge	7008D	04
3830	PERKINS / ISM-DI	ENGINE	Intake Valve Position Signal Too High	2950	03
3831	PERKINS / ISM-DI	ENGINE	Intake valve position Signal Too Low	2950	04
3834	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - High Error (Power Stages)	7008B	03
3834	F5C	ENGINE	Throttle valve position sensor voltage above threshold (Short to battery)	7008B	03
3835	F5C	ENGINE	Throttle Valve Actuator (TVA) Circuit - Low Error (Power Stages)	7008B	04
3835	F5C	ENGINE	Throttle valve position sensor voltage below threshold (Short to ground)	7008B	04
3838	F5C	ENGINE	Temperature Sensor Circuit (T1) Upstream Oxicat - High Error	300F6	03
3838	F5C	ENGINE	OxiCat upstream temperature sensor : Diagnostic fault check for SRC high in Oxidation Catalyst upstream temperature	300F6	03
3839	F5C	ENGINE	Temperature Sensor Circuit (T1) Upstream Oxicat - Low Error	300F6	04
3839	F5C	ENGINE	OxiCat upstream temperature sensor : Diagnostic fault check for SRC low in Oxidation Catalyst upstream temperature	300F6	04
3840	PERKINS / ISM-DI	ENGINE	Exhaust Gas Temperature 1 Sensor Signal Too High	3242	03
3840	PERKINS / ISM-IDI	ENGINE	DPF Intake Temperature Sensor High Voltage	3242	03
3840	F5C	ENGINE	Temperature Sensor Circuit (T2) Downstream Oxicat - High Error	100F7	03
3841	F5C	ENGINE	Temperature Sensor Circuit (T2) Downstream Oxicat - Low Error	100F7	04
3842	F5C	ENGINE	Exhaust Gas Temperature Sensor Circuit (Upstream Turbine) - High Error	2009B	03
3843	F5C	ENGINE	Exhaust Gas Temperature Sensor Circuit (Upstream Turbine) - Low Error	2009B	04

DTC	Engine Type	Detected	Description	SPN	FMI
3870	F5C	ENGINE	CAN Message Not Received From Vehicle Controller - BC2EDC1	100B4	02
3870	F5C	ENGINE	CAN Bus Received frames : CAN-Receive-Frame BC2EDC1	100B4	02
3885	PERKINS / ISM-IDI	ENGINE	DPF Outlet Pressure Sensor High Voltage	3610	03
3886	PERKINS / ISM-IDI	ENGINE	DPF Intake Temperature Higher Than 700 deg C	3242	15
3887	PERKINS / ISM-IDI	ENGINE	DOC Intake Temperature Higher Than 700 deg C	4765	15
3900	F5C	ENGINE	Engine Coolant Temperature Too High (Warning Level, T>110°C)	50032	03
3915	F5C	ENGINE	Rail Pressure Relief Valve - Averaged Rail Pressure Is Outside The Expected Range With Open PRV	10037	12
3916	F5C	ENGINE	Pressure Relief Valve - Reached Maximum Allowed Open Time. See Other Fault Codes.	20037	03
3948	PERKINS / ISM-DI	ENGINE	EGR Lift Sensor 1 Signal Too High	27	03
3949	PERKINS / ISM-DI	ENGINE	EGR Lift Sensor 1 Signal Too Low	27	04
3950	PERKINS / ISM-DI	ENGINE	EGR Valve Stuck Open/Closed	27	07
3953	PERKINS / ISM-DI	ENGINE	Exhaust Gas Temperature 2 Sensor Signal Too High	3246	03
3954	PERKINS / ISM-DI	ENGINE	Exhaust Gas Temperature 2 Sensor Signal Too Low	3246	04
3955	PERKINS / ISM-DI	ENGINE	Camshaft Sensor Error - Invalid Signal	723	02
3956	PERKINS / ISM-DI	ENGINE	Injector 1 And/Or 4 Shorted To High Source	655	03
3957	PERKINS / ISM-DI	ENGINE	Injector 1 And/Or 4 Shorted To Low Source	655	04
3958	PERKINS / ISM-DI	ENGINE	Injector 1 And 4 - Open Circuit	655	02
3959	PERKINS / ISM-DI	ENGINE	Injector 2 And/Or 3 - Shorted To High Source	656	03
3960	PERKINS / ISM-DI	ENGINE	Injector 2 And/Or 3 - Shorted To Low Source	656	04
3961	PERKINS / ISM-DI	ENGINE	Injector 2 And 3 - Open Circuit	656	02
3962	PERKINS / ISM-DI	ENGINE	Supply Pump Control Valve (Suction Control Valve) Stuck	1347	07
3963	PERKINS / ISM-DI	ENGINE	Actual Rail Pressure Above Target	638	02
3964	PERKINS / ISM-DI	ENGINE	Actual Rail Pressure Is Excessive	638	00
3965	PERKINS / ISM-DI	ENGINE	Engine Stop Switch Stuck Closed	970	07
3966	PERKINS / ISM-DI	ENGINE	Water In Fuel Filter Failure	97	02
3967	PERKINS / ISM-DI	ENGINE	Injector Codes Not Written To ECU	2840	07
3968	PERKINS / ISM-DI	ENGINE	Incorrect Injector Codes	2840	02
3969	PERKINS / ISM-DI	ENGINE	Invalid Injector Codes	1538	00
3970	PERKINS / ISM-DI	ENGINE	ECU Memory Fault	1077	02
3971	PERKINS / ISM-DI	ENGINE	Engine ECU Memory Error - Verify Engine Dataset	628	02
3972	PERKINS / ISM-DI	ENGINE	Intake Throttle Motor Driver Circuit Invalid	2950	02
3973	PERKINS / ISM-DI	ENGINE	EGR Valve Position Does Not Match The Target Position	2791	10
3974	PERKINS / ISM-DI	ENGINE	EGR Motor Signal Shorted To Power Or Ground	2791	03
3975	PERKINS / ISM-DI	ENGINE	Intake Throttle Valve Stuck	2950	07
3976	PERKINS / ISM-DI	ENGINE	Perform Maintenance On EGR Timing 1-1	2648	14
3977	PERKINS / ISM-DI	ENGINE	Perform Maintenance On EGR Timing 1-2	2648	13
3980	PERKINS / ISM-IDI	ENGINE	Engine ECU Memory Failure	2840	11
3981	PERKINS / ISM-IDI	ENGINE	DOC-In temperature under 220 deg C during regeneration	3473	12

DTC	Engine Type	Detected	Description	SPN	FMI
3985	PERKINS / ISM-IDI	ENGINE	Engine ECU Temperature Too High	1136	00
3986	PERKINS / ISM-IDI	ENGINE	Fuel Solenoid Short Circuit	638	06
3987	PERKINS / ISM-IDI	ENGINE	Fuel Solenoid Position Sensor Low Voltage	733	04
3988	PERKINS / ISM-IDI	ENGINE	Fuel Solenoid Position Sensor High Voltage	733	03
3989	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Injector 1 Short Circuit	4077	06
3990	PERKINS / ISM-IDI	ENGINE	Aftertreatment Burner Injector 2 Short Circuit	3480	06
3991	PERKINS / ISM-IDI	ENGINE	Engine ECU Relay Output Power Short Circuit	4016	06
3992	PERKINS / ISM-IDI	ENGINE	Diesel Particulate Filter Soot Level Full	3719	00
3992	F5C	ENGINE	EGR Control : Not plausible state 1	10082	12
3993	PERKINS / ISM-IDI	ENGINE	DPF Intake Temperature Higher Than 800 deg C	3242	16
3993	F5C	ENGINE	DFC for valve drift at closed position	40089	03
3994	PERKINS / ISM-IDI	ENGINE	DOC Intake Temperature Higher Than 800 deg C	4765	16
3994	F5C	ENGINE	Cold start bypass valve relay: open load or valve [relay] not installed	2002B	02
3995	PERKINS / ISM-IDI	ENGINE	DPF Exhaust Temperature Higher Than 800 deg C	3241	16
3995	F5C	ENGINE	Cold start bypass valve relay: over temperature error	2002B	12
3996	F5C	ENGINE	Cold start bypass valve relay: short circuit to battery	2002B	03
3997	F5C	ENGINE	Cold start bypass valve relay: short circuit to ground	2002B	04
4043	ALL	IC	Hydraulic Oil Temperature Sensor Shorted To Ground	177	04
4044	ALL	IC	Hydraulic Oil Temperature Sensor Open Circuit	177	05
4055	ALL	UCM	Park Brake Valve (On / Off) Solenoid Supply Open Circuit	517776	05
4056	ALL	UCM	Park Brake Valve (On / Off) Solenoid Supply Shorted To Ground	517776	04
4057	ALL	UCM	Park Brake Valve (On / Off) Solenoid Supply Shorted To Power	517776	03
4061	ALL	UCM	Forward Pump Control Valves (Directional) Solenoid Right (A) Supply Open Circuit	519334	05
4062	ALL	UCM	Forward Pump Control Valves (Directional) Solenoid Right (A) Supply Shorted To Ground	519334	04
4071	ALL	UCM	Forward Pump Control Valves (Directional) Solenoid Left (B) Supply Open Circuit	519335	05
4072	ALL	UCM	Forward Pump Control Valves (Directional) Solenoid Left (B) Supply Shorted To Ground	519335	04
4081	ALL	UCM	Forward Pump Control Valves (Directional) Pumps Forward Solenoid(s) Shorted To Power	519332	03
4082	ALL	UCM	Forward Pump Control Valves (Directional) Pumps Forward Solenoid(s) Shorted To Ground	519332	04
4083	ALL	UCM	Forward Pump Control Valves (Directional) Solenoids Return Open Circuit	519332	05
4100	ALL	UCM	Creep Engagement return fault	519345	02
4101	ALL	UCM	creep engagement indicator short to power	519347	03
4102	ALL	UCM	creep engagment indicator short to ground	519346	04
4309	ALL	UCM	Park Brake Button Timeout (30 Seconds)	518083	09
4361	ALL	UCM	Reverse Pump Control Valves (Directional) Solenoid Right (A) Supply Open Circuit	519336	05
4362	ALL	UCM	Reverse Pump Control Valves (Directional) Solenoid Right (A) Supply Shorted To Ground	519336	04
4371	ALL	UCM	Reverse Pump Control Valves (Directional) Solenoid Left (B) Supply Open Circuit	519337	05
4372	ALL	UCM	Reverse Pump Control Valves (Directional) Solenoid Left (B) Supply Shorted To Ground	519337	04
4381	ALL	UCM	Reverse Pump Control Valves (Directional) Pumps Reverse Solenoid(s) Shorted To Power	519333	03
4382	ALL	UCM	Reverse Pump Control Valves (Directional) Pumps Reverse Solenoid(s) Shorted To Ground	519333	04
4383	ALL	UCM	Reverse Pump Control Valves (Directional) Solenoids Return Open Circuit	519333	05
4401	ALL	IC	Park Brake (Mechanical Machines) Solenoid Open Circuit	116	05
4402	ALL	IC	Park Brake (Mechanical Machines) Shorted To Power	116	03
4431	ALL	UCM	Park Brake Pressure Switch (Plausibility Check With Solenoid Valve)	619	02
4731	ALL	UCM	Right Swash Plate Angle Sensor Pin A Open Or Shorted To Ground	7017	04
4732	ALL	UCM	Right Swash Plate Angle Sensor Pin A Shorted To Power	7017	03
4734	ALL	UCM	Right Swash Plate Angle Sensor Pin B Open Or Shorted To Ground	519338	04
4735	ALL	UCM	Right Swash Plate Angle Sensor Pin B Shorted To Power	519338	03
4737	ALL	UCM	Right Swash Plate Angle Sensor In-Range Fault	7017	02
4741	ALL	UCM	Left Swash Plate Angle Sensor Pin A Open Or Shorted To Ground	519339	04
4742	ALL	UCM	Left Swash Plate Angle Sensor Pin A Shorted To Power	519339	03
4744	ALL	UCM	Left Swash Plate Angle Sensor Pin B Open Or Shorted To Ground	519340	04
4745	ALL	UCM	Left Swash Plate Angle Sensor Pin B Shorted To Power	519340	03

DTC	Engine Type	Detected	Description	SPN	FMI
4747	ALL	UCM	Left Swash Plate Angle Sensor In-Range Fault	519339	02
4752	ALL	UCM	Left Swash Plate Angle Sensor - Command Does not Match Swash Plate Angle	519339	07
4754	ALL	UCM	Right Swash Plate Angle Sensor - Command Does not Match Swash Plate Angle	7017	07
4781	ALL	UCM	Solenoid Valve Supply Open Circuit	848	05
4782	ALL	UCM	Solenoid Valve Supply Shorted To Ground	848	04
4783	ALL	UCM	Solenoid Valve Supply Shorted To Power	848	03
4951	ALL	IC	Hydraulic Interlock Solenoid Shorted To Power	519296	03
4952	ALL	IC	Hydraulic Interlock Solenoid Open Circuit	519296	05
5051	ALL	UCM	Loader Pilot Interlock Valve (On/Off) Solenoid Supply Open Circuit	518177	05
5052	ALL	UCM	Loader Pilot Interlock Valve (On/Off) Solenoid Supply Shorted To Ground	518177	04
5053	ALL	UCM	Loader Pilot Interlock Valve (On/Off) Solenoid Supply Shorted To Power	518177	03
5061	ALL	UCM	Port Lock Valve (On/Off) Solenoid Supply Open Circuit	519310	05
5062	ALL	UCM	Port Lock Valve (On/Off) Solenoid Supply Shorted To Ground	519310	04
5063	ALL	UCM	Port Lock Valve (On/Off) Solenoid Supply Shorted To Power	519310	03
5121	ALL	UCM	Right Joystick Forward-Back Axis Pin A Open Or Shorted To Ground Or Power	2661	03
5121	ALL	UCM	Right Joystick Forward-Back Axis Pin A Open Or Shorted To Ground Or Power	2661	03
5122	ALL	UCM	Right Joystick Forward-Back Axis Pin B Open Or Shorted To Ground Or Power	2663	03
5122	ALL	UCM	Right Joystick Forward-Back Axis Pin B Open Or Shorted To Ground Or Power	2663	03
5124	ALL	UCM	Right Joystick Forward-Back Axis In-Range Fault	2661	12
5124	ALL	UCM	Right Joystick Forward-Back Axis In-Range Fault	2661	12
5131	ALL	UCM	Right Joystick Right-Left Axis (ISO/H Pattern) Pin A Open Or Shorted To Ground	2660	04
5132	ALL	UCM	Right Joystick Right-Left Axis (ISO/H Pattern) Pin A Shorted To Power	2660	03
5134	ALL	UCM	Right Joystick Right-Left Axis (ISO/H Pattern) Pin B Open Or Shorted To Ground	2662	04
5135	ALL	UCM	Right Joystick Right-Left Axis (ISO/H Pattern) Pin B Shorted To Power	2662	03
5137	ALL	UCM	Right Joystick Right-Left Axis (ISO/H Pattern) In-Range Fault	2660	12
5141	ALL	UCM	Aux Thumbwheel Axis Pin A Open Or Shorted To Ground	2664	04
5142	ALL	UCM	Aux Thumbwheel Axis Pin A Shorted To Power	2664	03
5144	ALL	UCM	Aux Thumbwheel Axis Pin B Open Or Shorted To Ground	4746	04
5145	ALL	UCM	Aux Thumbwheel Axis Pin B Shorted To Power	4746	03
5147	ALL	UCM	Aux Thumbwheel Axis In-Range Fault	2664	12
5201	ALL	UCM	Left Joystick Right-Left Axis Pin A Open Or Shorted To Ground Or Power	2697	03
5201	ALL	UCM	Left Joystick Right-Left Axis Pin A Open Or Shorted To Ground Or Power	2697	03
5202	ALL	UCM	Left Joystick Right-Left Axis Pin B Open Or Shorted To Ground Or Power	2699	03
5202	ALL	UCM	Left Joystick Right-Left Axis Pin B Open Or Shorted To Ground Or Power	2699	03
5204	ALL	UCM	Left Joystick Right-Left Axis In-Range Fault	2697	12
5204	ALL	UCM	Left Joystick Right-Left Axis In-Range Fault	2697	12
5211	ALL	UCM	Left Joystick Forward-Back Axis Pin A Open Or Shorted To Ground	2698	04
5212	ALL	UCM	Left Joystick Forward-Back Axis Pin A Shorted To Power	2698	03
5214	ALL	UCM	Left Joystick Forward-Back Axis Pin B Open Or Shorted To Ground	2700	04
5215	ALL	UCM	Left Joystick Forward-Back Axis Pin B Shorted To Power	2700	03
5217	ALL	UCM	Left Joystick Forward-Back Axis In-Range Fault	2698	12
5221	ALL	UCM	Loader Arm Valve (Directional) Solenoid Raise (A) Supply Open Circuit	519311	05
5222	ALL	UCM	Loader Arm Valve (Directional) Solenoid Raise (A) Supply Shorted To Ground	519311	04
5231	ALL	UCM	Loader Arm Valve (Directional) Solenoid Lower (B) Supply Open Circuit	518130	05
5232	ALL	UCM	Loader Arm Valve (Directional) Solenoid Lower (B) Supply Shorted To Ground	518130	04
5241	ALL	UCM	Loader Arm Valve (Directional) Loader Arm Solenoid(s) Shorted To Power	518129	03
5242	ALL	UCM	Loader Arm Valve (Directional) Loader Arm Solenoid(s) Shorted To Ground	518129	04
5243	ALL	UCM	Loader Arm Valve (Directional) Solenoids Return Open Circuit	518129	05
5251	ALL	UCM	Loader Bucket Valve (Directional) Solenoid Rollback (A) Supply Open Circuit	518132	05
5252	ALL	UCM	Loader Bucket Valve (Directional) Solenoid Rollback (A) Supply Shorted To Ground	518132	04
5261	ALL	UCM	Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Open Circuit	518133	05
5262	ALL	UCM	Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground	518133	04
5271	ALL	UCM	Loader Bucket Valve (Directional) Loader Bucket Solenoid(s) Shorted To Power	519312	03
5272	ALL	UCM	Loader Bucket Valve (Directional) Loader Bucket Solenoid(s) Shorted To Ground	519312	04
5273	ALL	UCM	Loader Bucket Valve (Directional) Solenoids Return Open Circuit	519312	05
5281	ALL	UCM	Loader Auxiliary Valve (Directional) Solenoid Forward (A) Supply Open Circuit	519313	05
5282	ALL	UCM	Loader Auxiliary Valve (Directional) Solenoid Forward (A) Supply Shorted To Ground	519313	04
5291	ALL	UCM	Loader Auxiliary Valve (Directional) Solenoid Reverse (B) Supply Open Circuit	519314	05
5292	ALL	UCM	Loader Auxiliary Valve (Directional) Solenoid Reverse (B) Supply Shorted To Ground	519314	04
5309	ALL	UCM	Float Button Timeout (30 Seconds)	518058	09
5313	ALL	UCM	EHF Enable Switch STP	519315	03
5323	ALL	UCM	EHF Fwd/Rev Switch STP	519316	03
5371	ALL	UCM	EHF Forward Solenoid (A) Supply STG	519317	05
5372	ALL	UCM	EHF Forward Solenoid (A) Supply OC	519317	04
5381	ALL	UCM	EHF Reverse Solenoid (B) Supply STG	519318	05
5382	ALL	UCM	EHF Reverse Solenoid (B) Supply OC	519318	04
5391	ALL	UCM	EHF Solenoids Return OC	519319	05
5392	ALL	UCM	EHF Pump Solenoid(s) STG	519319	04

DTC	Engine Type	Detected	Description	SPN	FMI
5393	ALL	UCM	EHF Pump Solenoid(s) STP	519319	03
5409	ALL	UCM	Aux Override Disabled Due To Aux Override Button Timeout (30 Seconds)	519269	09
5501	ALL	UCM	Loader Arm Spool Sensor Open or Shorted To Ground	519320	04
5502	ALL	UCM	Loader Arm Spool Sensor Shorted To Power	519320	03
5503	ALL	IC	Electro-Hydraulic Aux Output Shorted To Power	519297	03
5504	ALL	UCM	Bucket Valve Spool Sensor Open Or Shorted To Ground	519341	04
5505	ALL	UCM	Bucket Valve Spool Sensor Shorted To Power	519341	03
5507	ALL	UCM	Auxiliary Valve Spool Sensor Open Or Shorted To Ground	519342	04
5508	ALL	UCM	Auxiliary Valve Spool Sensor Shorted To Power	519342	03
5511	ALL	UCM	Implausible Loader Arm Sensor State Vs Loader Arm Command - Stuck Spool Or PRV	519320	02
5512	ALL	UCM	Implausible Bucket Sensor State Vs Loader Bucket Command - Stuck Spool Or PRV	519341	02
5513	ALL	UCM	Implausible Auxiliary Sensor State Vs Auxiliary Command - Stuck Spool Or PRV	519342	02
5601	ALL	UCM	Loader Auxiliary Valve (Directional) Loader Auxiliary Solenoid(s) Shorted To Power	924	03
5602	ALL	UCM	Loader Auxiliary Valve (Directional) Loader Auxiliary Solenoid(s) Shorted To Ground	924	04
5603	ALL	UCM	Loader Auxiliary Valve (Directional) Solenoids Return Open Circuit	924	05
5703	ALL	UCM	Pattern Switch Shorted To Power	519280	03
5811	ALL	UCM	Loader Port Lock Switch Is In An Implausible State	518357	02
9004	ALL	IC	Memory Error - Triple Redundant - Hour Meter Location 1 Corrupt	519298	02
9005	ALL	IC	Memory Error - Triple Redundant - Hour Meter Location 2 Corrupt	519299	02
9006	ALL	IC	Memory Error - Triple Redundant - Hour Meter Location 3 Corrupt	519300	02
9151	ALL	UCM	Bus-Warn at CAN-Bus No.1	520329	09
9152	ALL	UCM	Bus-Warn at CAN-Bus No.1	521259	31
9153	ALL	UCM	Timeout of CAN Message EEC1		
9154	ALL	UCM	Timeout of CAN Message TSC1		
9156	ALL	UCM	Hydraulic Enable Button Error From AIC	519270	02
9158	ALL	UCM	H Pattern Indicator Shorted To Ground	519343	04
9159	ALL	UCM	ISO Pattern Indicator Shorted To Ground	519344	04
9160	ALL	UCM	H Pattern Indicator Shorted To Power	519343	03
9161	ALL	UCM	ISO Pattern Indicator Shorted To Power	519344	03
9401	ALL	IC	Memory Error - Double Redundant Memory - Corruption Detected And Repaired	519301	02
9403	ALL	IC	Memory Error - Double Redundant Memory - Unrecoverable Memory Corruption Operable	519301	12
9404	ALL	IC	Memory Error - Triple Redundant - Hour Meter Failure	519302	02
9405	ALL	IC	Loss Of DM1 Message From VCM	5113	09
9406	ALL	IC	No CAN Communication From VCM	5113	02
9407	ALL	IC	Memory Error - Unrecoverable Hardware ID	6714	02
9408	ALL	IC	Memory Error - Unrecoverable Panel ID	519304	02
9410	F5C	IC	Loss Of EGR Inducement Status Message From EDC	188	09
17100	F5C	ENGINE	EGR Control : Not plausible state 2	30082	12
17101	F5C	ENGINE	EGR Control : Not plausible state 3	40082	12
17102	F5C	ENGINE	EGR Control : Not plausible state 4	50082	12
17103	F5C	ENGINE	EGR Control : Not plausible state 5	60082	12
17104	F5C	ENGINE	EGR Control : Not plausible state 6	70082	12
17105	F5C	ENGINE	Turbo protection cold start detection	30099	03
17513	F5C	ENGINE	Physical Range Check high for ECU temperature sensor	100F7	00
17514	F5C	ENGINE	TSC1 blocked or with wrong checksum	700CC	12
19191	F5C	ENGINE	CAN Bus Received frames : CAN-Receive-Frame CCSSBC timeout	600BA	02
19192	F5C	ENGINE	CAN Bus Received frames : CAN-Receive-Frame CCVSV timeout	100BD	02

9 - SPECIFICATIONS

Fluids and lubricants

Fuel tank

Capacity	
SR160B	**60.5 L (16.0 US gal)**
SR175B, SV185B, SR210B, TR270B, TR310B	**75.5 L (20.0 US gal)**
SR240B, SV280B, TV370B	**95.5 L (25.5 US gal)**
Specifications	#1 or #2 Diesel ultra-low sulfur

Cooling system

Capacity	
SR160B, SR175B, SV185B	**15.6 L (4.1 US gal)**
SR210B, TR270B, TR310B	**17.0 L (4.5 US gal)**
SR240B, SV280B, TV370B	**19.0 L (5.0 US gal)**
Specifications	**AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

Hydraulic system

Reservoir capacity	**15.0 L (3.96 US gal)**
System capacity:	
SR160B	**29.9 L (7.9 US gal)**
SR175B, SV185B, SR210B, TR270B, TR310B	**38.1 L (10.0 US gal)**
SR240B, SV280B, TV370B	**45.4 L (12.0 US gal)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Chain compartments

Capacity - each side	
SR160B	**6.25 L (6.6 US qt)**
SR175B, SV185B	**7.4 L (7.9 US qt)**
SR210B	**26.0 L (27.5 US qt)**
SR240B, SV280B	**22.2 L (23.5 US qt)**
Specifications	**AKCELA AW HYDRAULIC FLUID 68 HV**

Grease fittings

Quantity	As required
Specifications	**TUTELA MOLY GREASE GR-75** (Molydisulfide)

Engine crank case oil

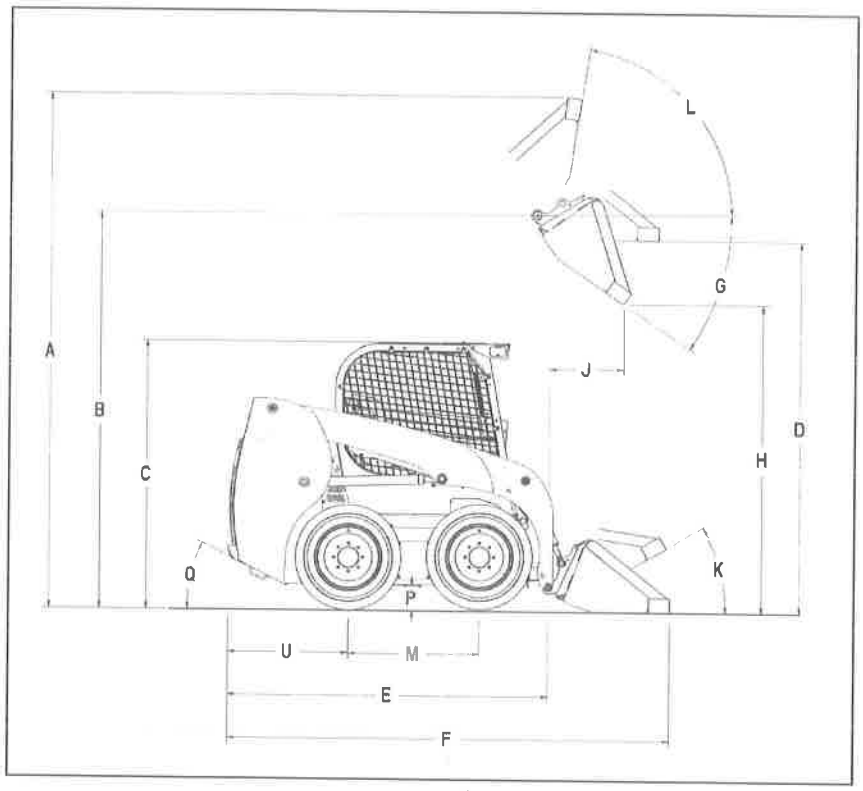
Capacity - with filter change	
SR160B, SR175B, SV185B	**7.0 L (7.5 US qt)**
SR210B, SR240B, SV280B, TR270B, TR310B, TV370B	**8.5 L (9.0 US qt)**
Specifications	**AKCELA UNITEK NO. 1™ SBL CJ-4**

Final track drive

Capacity - each side	**1.0 L (1.06 US qt) +/- 0.1 L (0.1 US qt)**
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

General specification

NOTE: *All specifications are given according to SAE standards or recommended practices where the specification applies.*

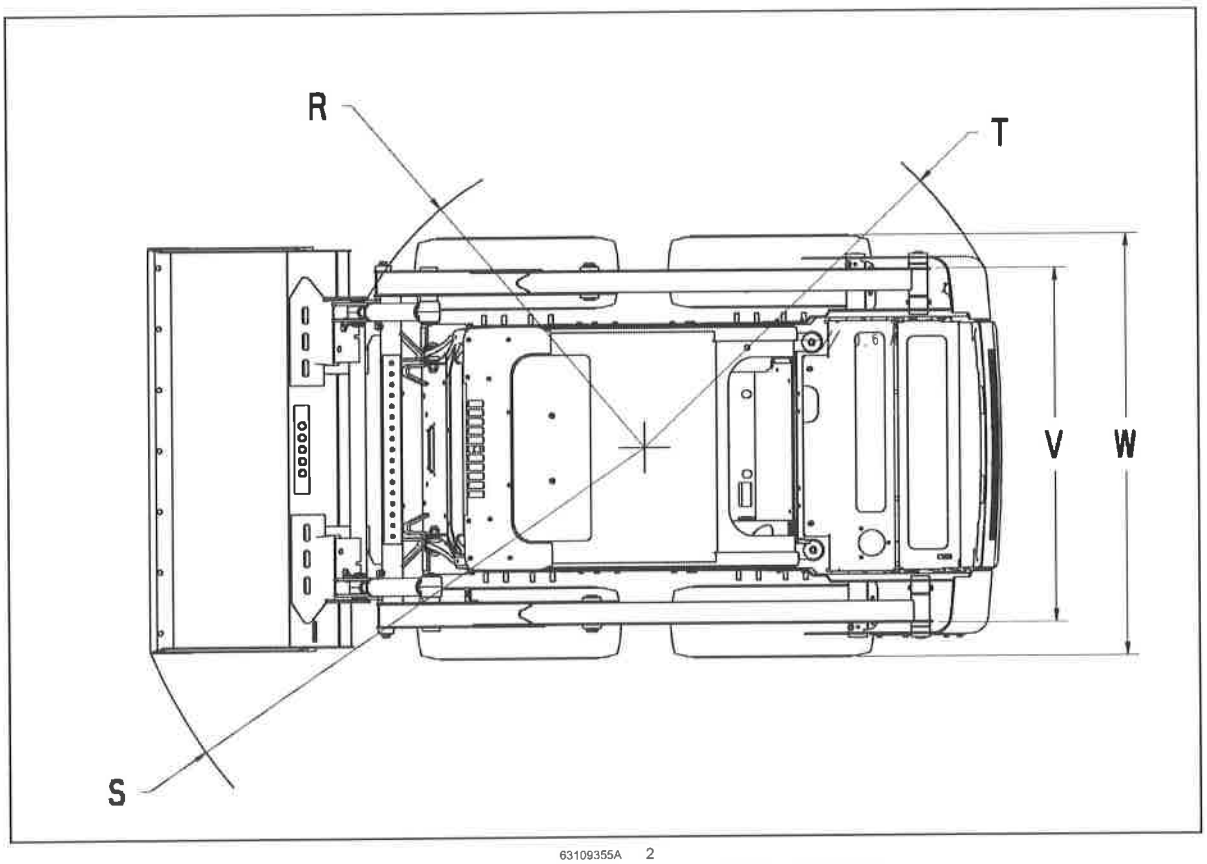


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SMALL RADIAL FRAME WHEEL UNITS (SR160B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	3591 mm (141.4 in)
B	Height to bucket hinge pin (Fully Raised)	2845 mm (112 in)
C	Top of Roll Over Protective Structure (ROPS)	1919 mm (75.5 in)
D	Highest Level Bucket Height	2682 mm (105.6 in)
E	Overall Length (No Attachment)	2435 mm (95.9 in)
F	Overall Length (With standard Bucket)	3028.0 mm (119.2 in)
G	Dump Angle (Fully Raised)	40.2°
H	Dump Height (Maximum Reach) at full dump angle	2246.0 mm (88.4 in)
J	Dump Reach (Fully Raised) at full dump angle	469 mm (18.5 in)
K	Maximum Rollback at Ground	26.1°
L	Maximum Rollback (Fully Raised)	95.2°
M	Wheel Base	941 mm (37 in)
P	Ground Clearance (Belly Pan)	178 mm (7 in)
Q	Angle of Departure	22°
U	Rear Axle to Bumper	858 mm (33.8 in)

NOTE: *All measurements are based on machines with 10 x 16.5 tires and a* ***1524.0 mm (60.0 in)*** *Dirt & Foundry (DF) bucket.*



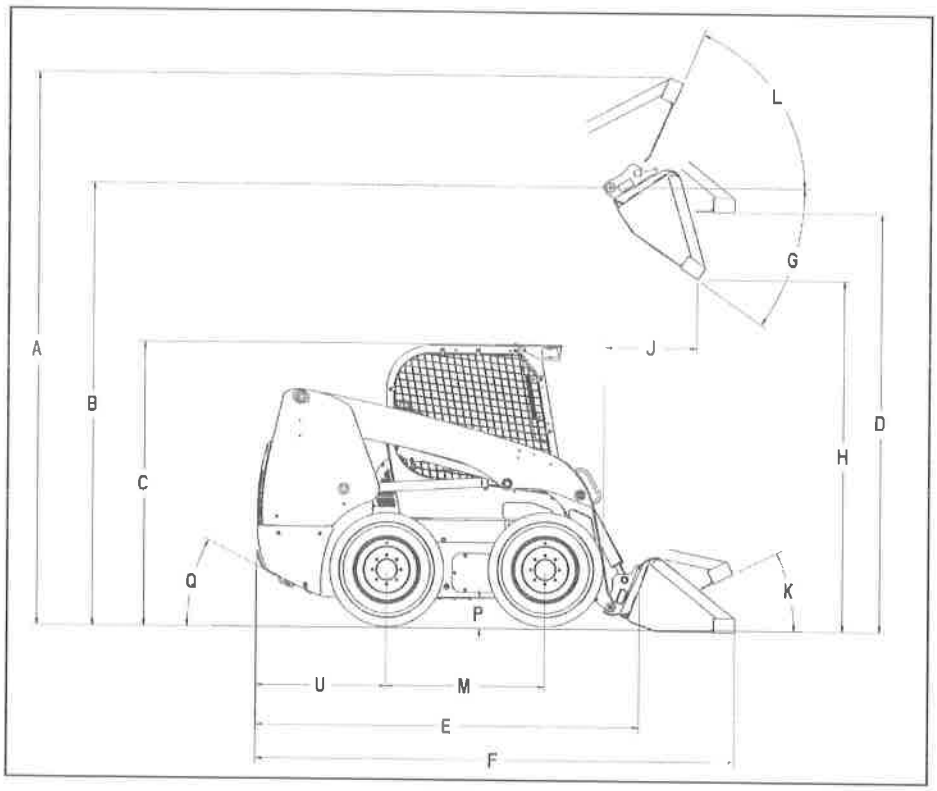
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SMALL RADIAL FRAME WHEEL UNITS (SR160B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1240.0 mm (48.8 in)**
S	Clearance circle radius with **1524.0 mm (60.0 in)** DF bucket	**1862.0 mm (73.3 in)**
S	Clearance circle radius with **1524.0 mm (60.0 in)** LP bucket	**1994.0 mm (78.5 in)**
S	Clearance circle radius with **1524.0 mm (60.0 in)** LPE bucket	**2112.0 mm (83.1 in)**
T	Clearance circle radius rear	**1433.0 mm (56.4 in)**
V	Over the tire width	**1248.0 mm (49.1 in)**
W	Overall width	**1518.0 mm (59.8 in)**
Operating weight		**2560 kg (5644 lb)**
SAE Rated Operating Capacity (ROC)		**725 kg (1598 lb)**
Tipping load		**1455 kg (3208 lb)**
Counter weight (optional)		**76.6 kg (168.9 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *All measurements are based on machines with 10 x 16.5 tires and a* ***1524.0 mm (60.0 in)*** *Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

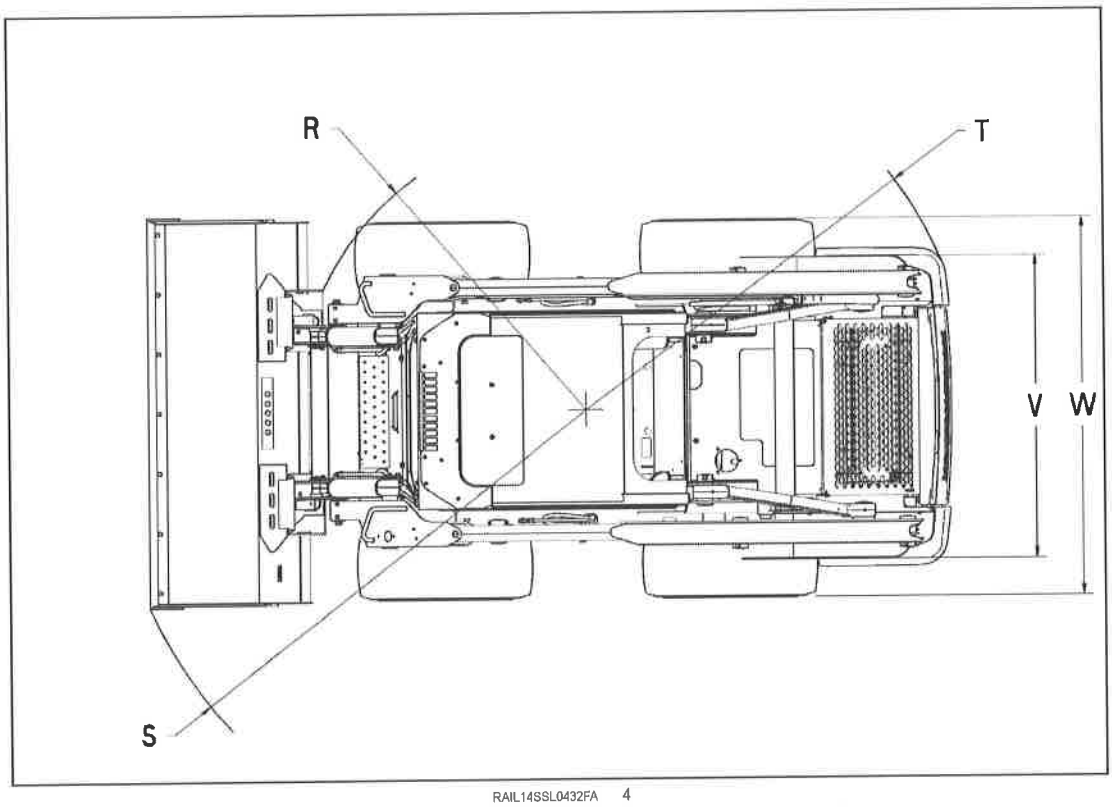


63109359 3

MEDIUM RADIAL FRAME WHEEL UNITS (SR175B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3895 mm (153.4 in)**
B	Height to bucket hinge pin (Fully Raised)	**3099 mm (122 in)**
C	Top of Roll Over Protective Structure (ROPS)	**1974 mm (77.7 in)**
D	Highest Level Bucket Height	**2925 mm (115.2 in)**
E	Overall Length (No Attachment)	**2685 mm (105.7 in)**
F	Overall Length (With standard Bucket)	**3305 mm (130.1 in)**
G	Dump Angle (Fully Raised)	**39.6°**
H	Dump Height (Maximum Reach) at full dump angle	**2470 mm (97.2 in)**
J	Dump Reach (Fully Raised) at full dump angle	**542 mm (21.3 in)**
K	Maximum Rollback at Ground	**31.6°**
L	Maximum Rollback (Fully Raised)	**98.6°**
M	Wheel Base	**1128 mm (44.4 in)**
P	Ground Clearance (Belly Pan)	**178 mm (7 In)**
Q	Angle of Departure	**23°**
U	Rear Axle to Bumper	**924 mm (36.4 in)**

NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm (66.0 in)*** *Dirt & Foundry (DF) bucket.*



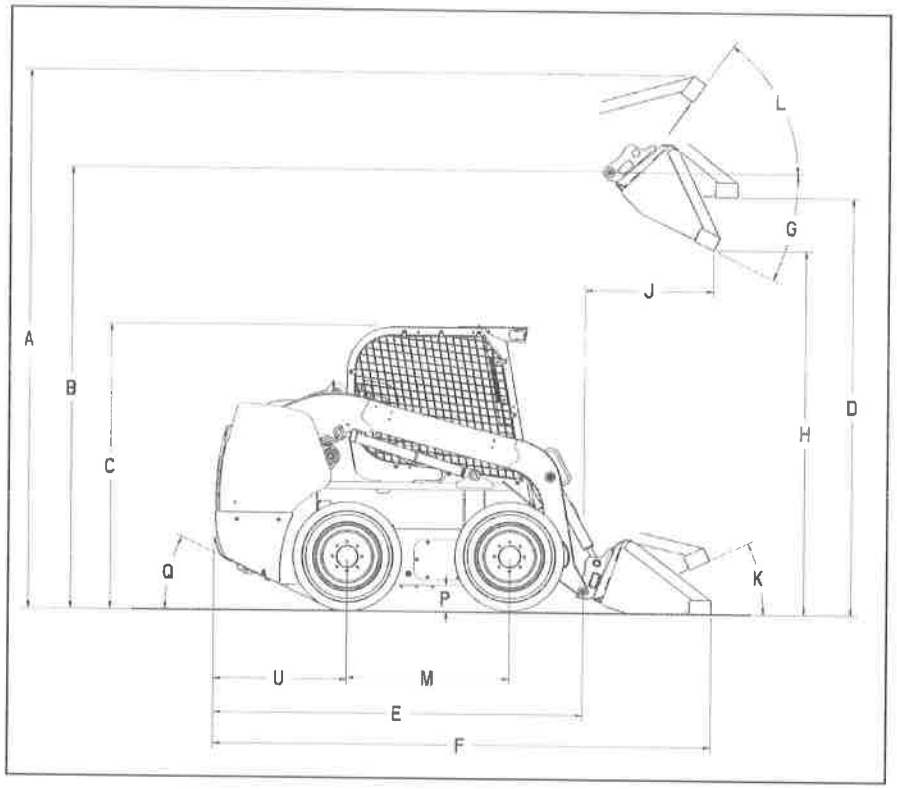
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MEDIUM RADIAL FRAME WHEEL UNITS (SR175B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1325.0 mm (52.2 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** DF bucket	**2015.0 mm (79.3 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** LP bucket	**2110.0 mm (83.1 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** LPE bucket	**2228.0 mm (87.7 in)**
T	Clearance circle radius rear	**1599.0 mm (63.0 in)**
V	Over the tire width	**1371.0 mm (54.0 in)**
W	Overall width	**1642.0 mm (64.6 in)**
Operating weight		**2860 kg (5181.0 lb)**
SAE Rated Operating Capacity (ROC)		**790 kg (1742 lb)**
Tipping load		**1588 kg (3501 lb)**
Counter weight (optional)		**63.8 kg (140.7 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm (66.0 in)*** *Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

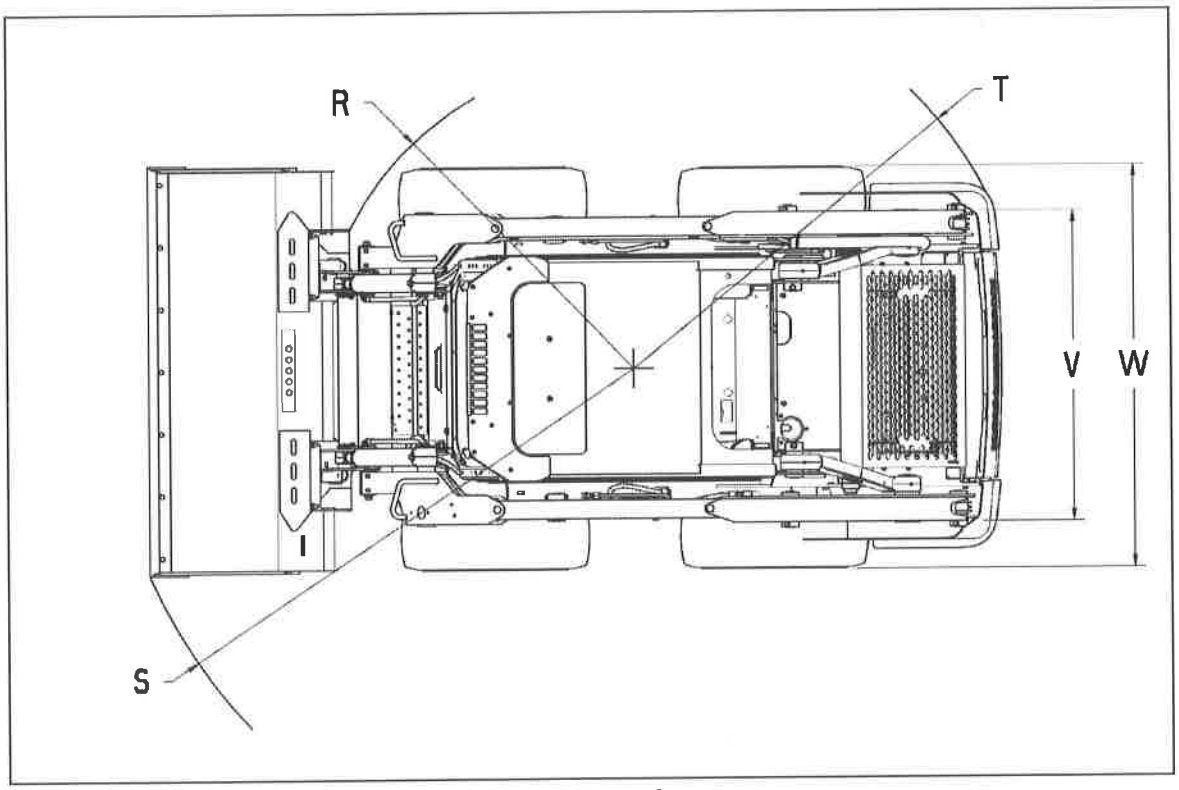


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MEDIUM VERTICAL FRAME WHEEL UNIT (SV185B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3820 mm (150.4 in)**
B	Height to Hinge Pin (Fully Raised)	**3048 mm (120 in)**
C	Cab Height	**1974 mm (77.7 in)**
D	Highest Level Bucket Height	**2877 mm (113.3 in)**
E	Overall Length (No Attachment)	**2685 mm (105.7 in)**
F	Overall Length (With standard Bucket)	**3345 mm (131.7 in)**
G	Dump Angle (Fully Raised)	**51.9°**
H	Dump Height (Maximum Reach)	**2380.0 mm (93.7 in)**
J	Dump Reach (Fully Raised)	**783 mm (30.8 in)**
K	Maximum Rollback @ Ground	**35°**
L	Maximum Rollback (Fully Raised)	**87.6°**
M	Wheel Base	**1128 mm (44.4 in)**
P	Ground Clearance (Belly Pan)	**178 mm (7 in)**
Q	Angle of Departure	**23°**
U	Rear Axle to Bumper	**924 mm (36.4 in)**

NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm (66.0 in)*** *Dirt & Foundry (DF) bucket.*



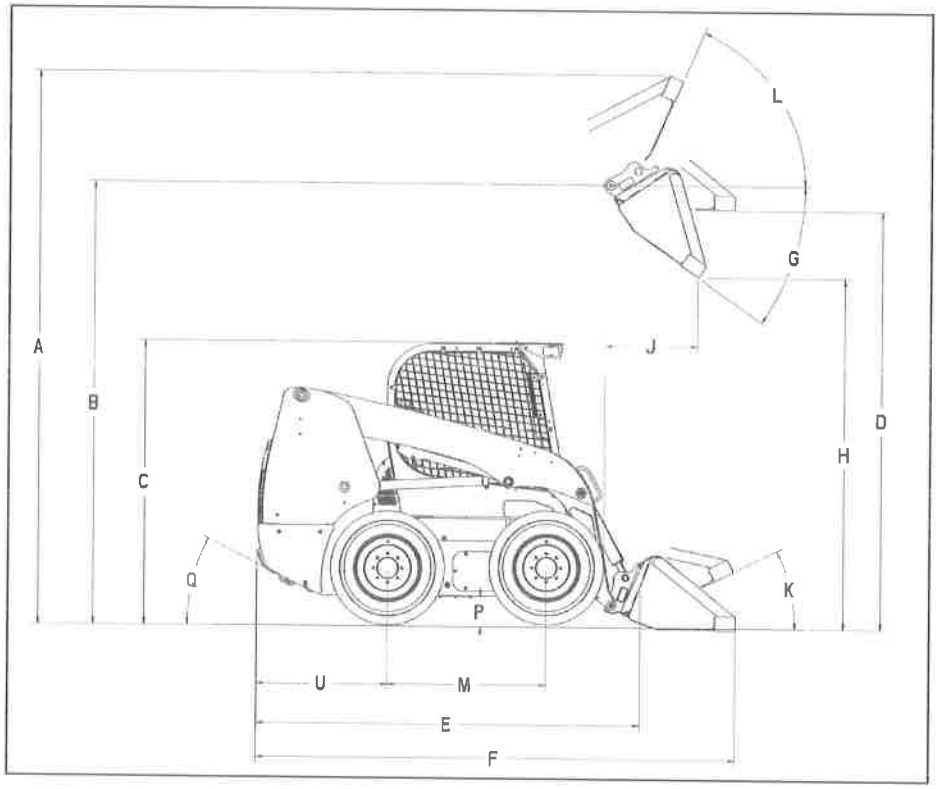
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MEDIUM VERTICAL FRAME WHEEL UNIT (SV185B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1347.0 mm (53.0 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** DF bucket	**2037.0 mm (80.2 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** LP bucket	**2133.0 mm (84.0 in)**
S	Clearance circle radius with **1676.4 mm (66.0 in)** LPE bucket	**2251.0 mm (88.6 in)**
T	Clearance circle radius rear	**1599.0 mm (63.0 in)**
V	Over the tire width	**1371.0 mm (54.0 in)**
W	Overall width	**1642.0 mm (64.6 in)**
Operating weight		**3150 kg (6945 lb)**
SAE Rated Operating Capacity (ROC)		**840 kg (1852 lb)**
Tipping load		**1678 kg (3699 lb)**
Counter weight (optional)		**63.8 kg (140.7 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**60.8 kg (134.0 lb)**
Cab Lexan door (optional)		**33.6 kg (74.1 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm (66.0 in)*** *Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

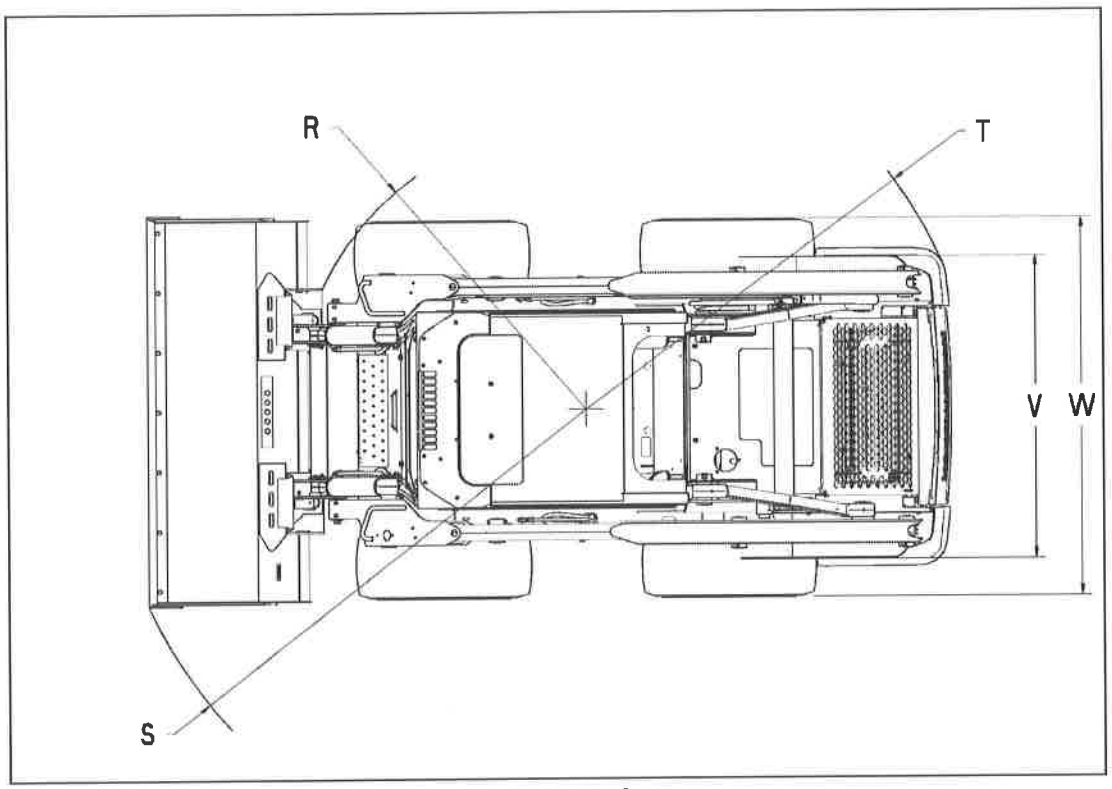


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MEDIUM RADIAL FRAME WHEEL UNITS (SR210B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3920 mm (154.3 in)**
B	Height to Hinge Pin (Fully Raised)	**3124 mm (123 in)**
C	Cab Height	**1998 mm (78.7 in)**
D	Highest Level Bucket Height	**2950 mm (116.1 in)**
E	Overall Length (No Attachment)	**2669 mm (105.1 in)**
F	Overall Length (With standard Bucket)	**3292 mm (129.6 in)**
G	Dump Angle (Fully Raised)	**39.6°**
H	Dump Height (Maximum Reach)	**2495 mm (98.2 in)**
J	Dump Reach (Fully Raised)	**517 mm (20.3 in)**
K	Maximum Rollback @ Ground	**31.0°**
L	Maximum Rollback (Fully Raised)	**98.6°**
M	Wheel Base	**1128 mm (44.4 in)**
P	Ground Clearance (Belly Pan)	**203 mm (8 in)**
Q	Angle of Departure	**25°**
U	Rear Axle to Bumper	**924 mm (36.4 in)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm (72 in)*** *Dirt & Foundry (DF) bucket.*



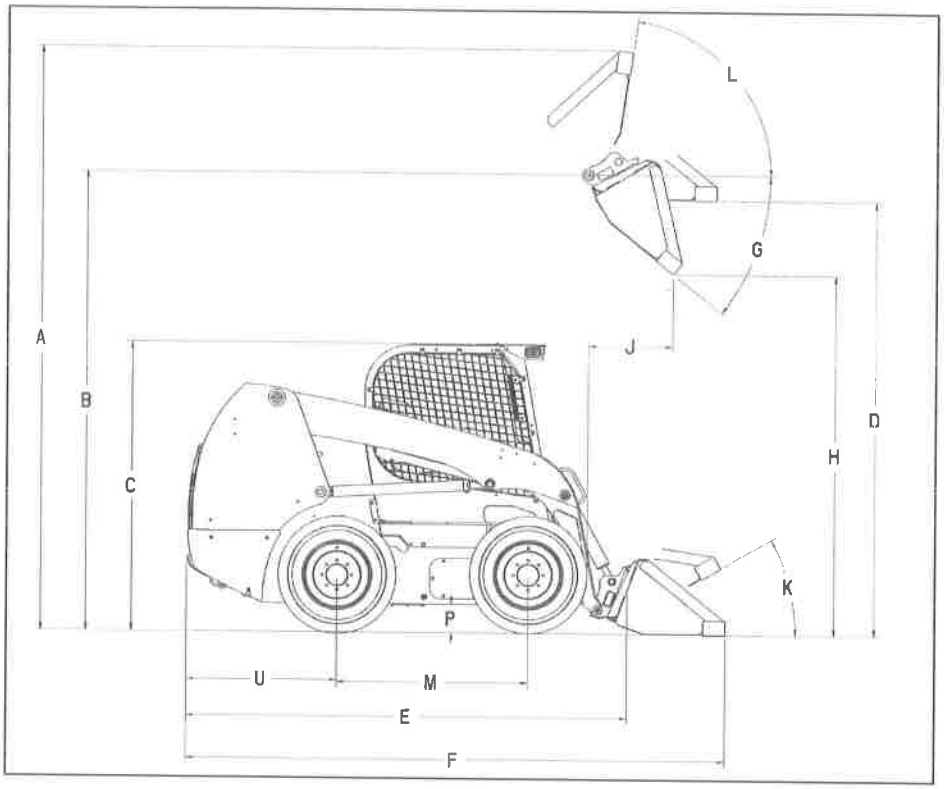
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MEDIUM RADIAL FRAME WHEEL UNITS (SR210B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1311.0 mm (51.6 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** DF bucket	**2034.0 mm (80.1 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LP bucket	**2127.0 mm (83.7 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LPE bucket	**2243.0 mm (88.3 in)**
T	Clearance circle radius rear	**1599.0 mm (63.0 in)**
V	Over the tire width	**1448.0 mm (57.0 in)**
W	Overall width	**1755.0 mm (69.1 in)**
Operating weight		**3300 kg (7275 lb)**
SAE Rated Operating Capacity (ROC)		**905 kg (1995 lb)**
Tipping load		**1814 kg (3999 lb)**
Counter weight (optional)		**63.8 kg (140.7 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a **1829 mm (72 in)** Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

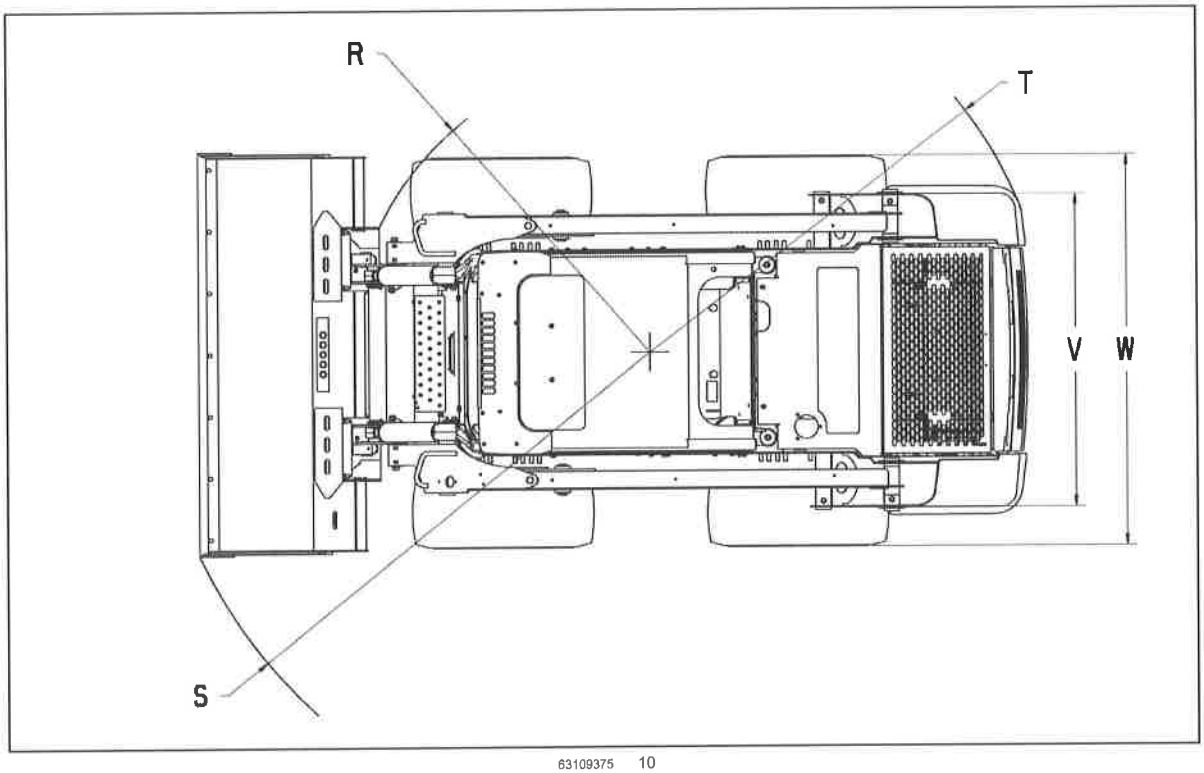


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LARGE RADIAL FRAME WHEEL UNITS (SR240B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3969 mm (156 in)**
B	Height to Hinge Pin (Fully Raised)	**3178 mm (125 in)**
C	Cab Height	**2002 mm (78.8 in)**
D	Highest Level Bucket Height	**2998 mm (118 in)**
E	Overall Length (No Attachment)	**2981 mm (117.4 in)**
F	Overall Length (With standard Bucket)	**3611 mm (142 in)**
G	Dump Angle (Fully Raised)	**38.1°**
H	Dump Height (Maximum Reach)	**2562 mm (101 in)**
J	Dump Reach (Fully Raised)	**494 mm (19 in)**
K	Maximum Rollback @ Ground	**30.7°**
L	Maximum Rollback (Fully Raised)	**99.7°**
M	Wheel Base	**1322 mm (52 in)**
P	Ground Clearance (Belly Pan)	**203 mm (8 in)**
Q	Angle of Departure	**23.5°**
U	Rear Axle to Bumper	**1034 mm (40.7 in)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm (72 in)*** *Dirt & Foundry (DF) bucket.*



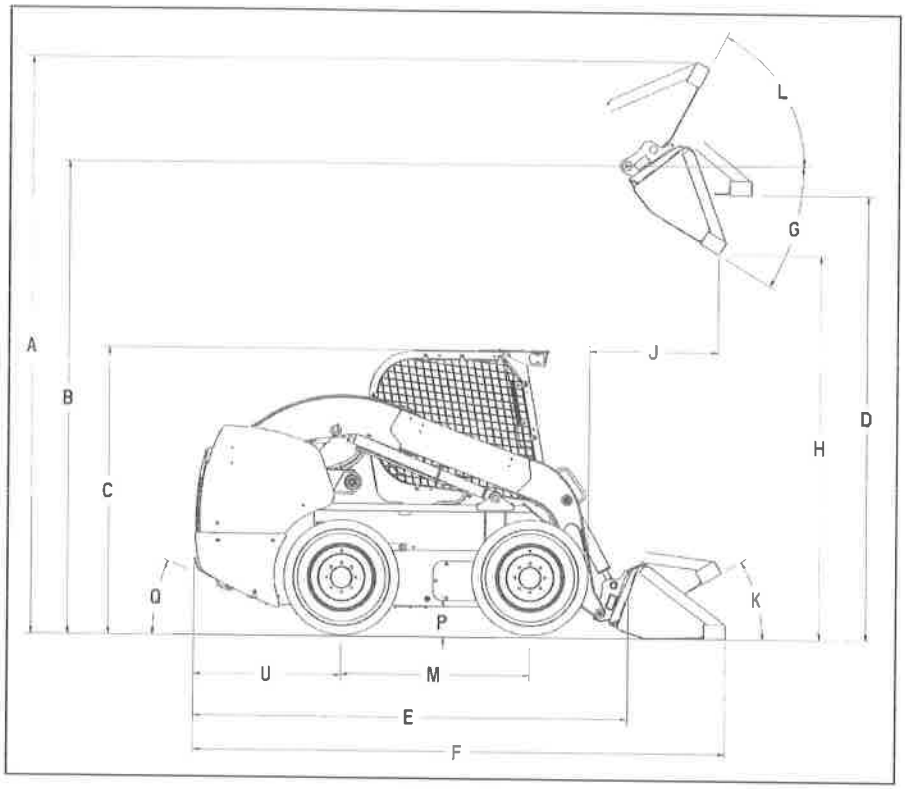
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LARGE RADIAL FRAME WHEEL UNITS (SR240B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1400.0 mm (55.1 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** DF bucket	**2122.0 mm (83.5 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LP bucket	**2215.0 mm (87.2 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LPE bucket	**2333.0 mm (91.9 in)**
T	Clearance circle radius rear	**1789.0 mm (70.4 in)**
V	Over the tire width	**1448.0 mm (57.0 in)**
W	Overall width	**1768.0 mm (69.6 in)**
Operating weight		**3436 kg (7575 lb)**
SAE Rated Operating Capacity (ROC)		**1088 kg (2399 lb)**
Tipping load		**2177 kg (4799 lb)**
Counter weight (optional)		**136.0 kg (299.8 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm (72 in)*** *Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

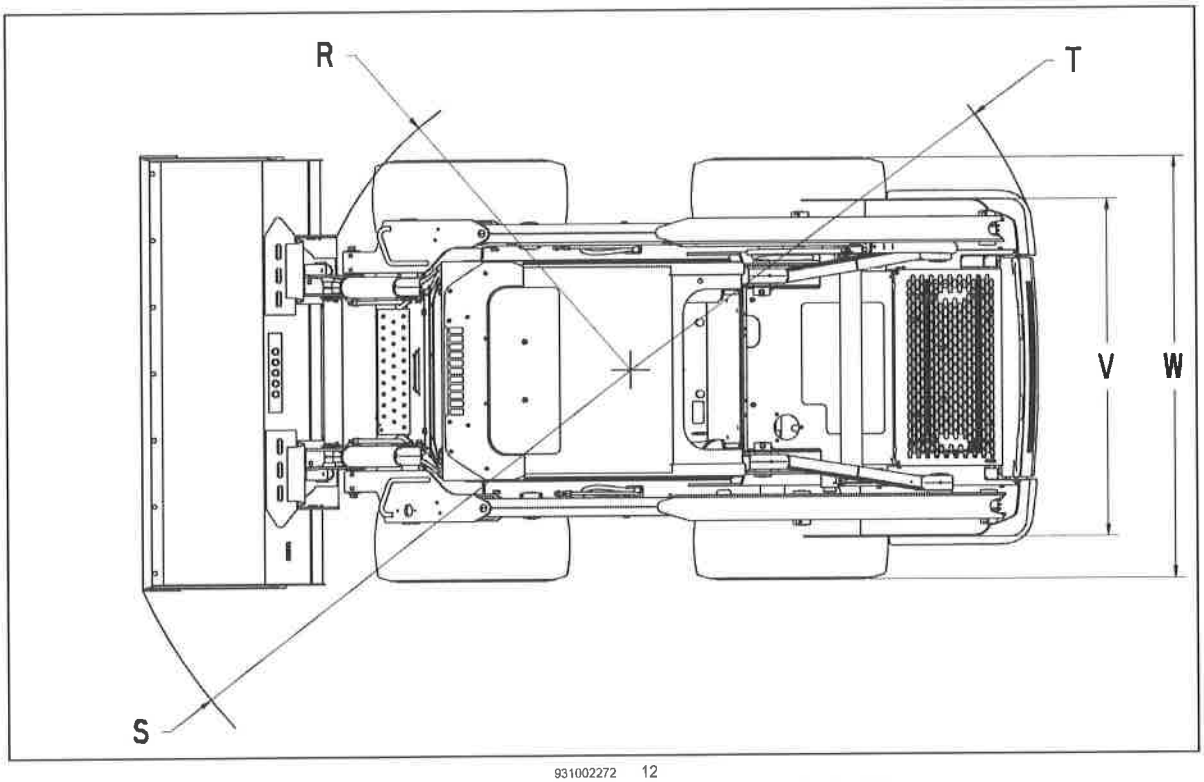


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LARGE VERTICAL FRAME WHEEL UNIT (SV280B)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**4176.0 mm (160.4 in)**
B	Height to Hinge Pin (Fully Raised)	**3302 mm (130 in)**
C	Cab Height	**2002 mm (78.8 in)**
D	Highest Level Bucket Height	**3038 mm (120 in)**
E	Overall Length (No Attachment)	**2990 mm (117.7 in)**
F	Overall Length (With standard Bucket)	**3708 mm (146 in)**
G	Dump Angle (Fully Raised)	**53.5°**
H	Dump Height (Maximum Reach)	**2556 mm (101 in)**
J	Dump Reach (Fully Raised)	**744 mm (29.3 in)**
K	Maximum Rollback @ Ground	**35°**
L	Maximum Rollback (Fully Raised)	**86°**
M	Wheel Base	**1322 mm (52 in)**
P	Ground Clearance (Belly Pan)	**203 mm (8 in)**
Q	Angle of Departure	**23.5°**
U	Rear Axle to Bumper	**1034 mm (40.7 in)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm (72 in)*** *Low Profile (LP) bucket.*



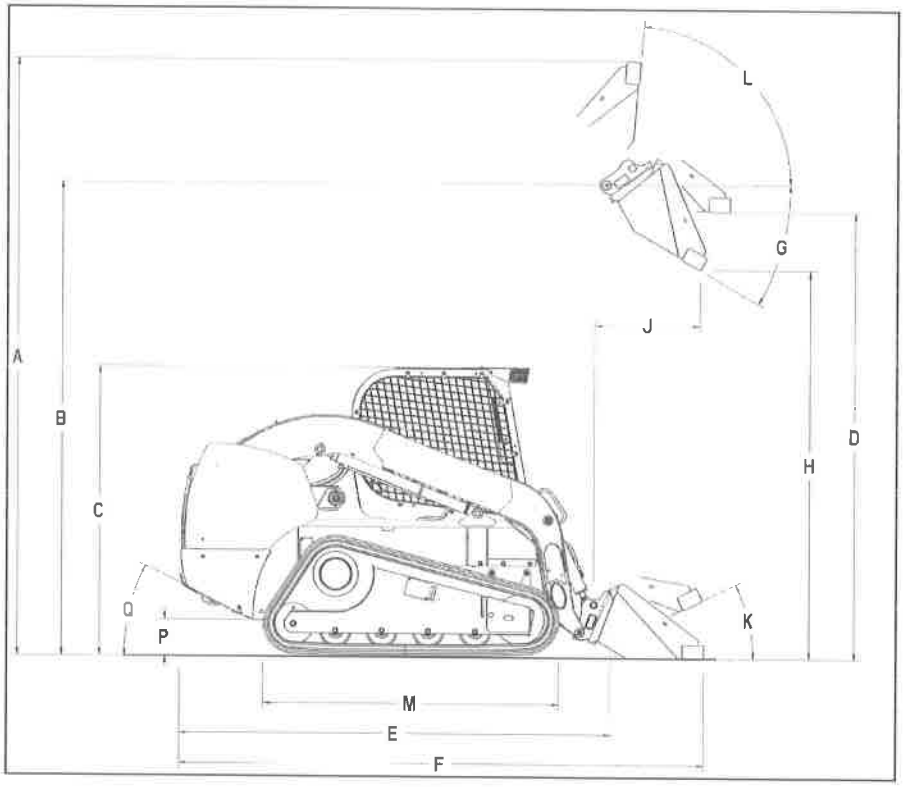
931002272 12

LARGE VERTICAL FRAME WHEEL UNIT (SV280B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1415.0 mm (55.7 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** DF bucket	**2136.0 mm (84.1 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LP bucket	**2230.0 mm (87.8 in)**
S	Clearance circle radius with **1828.8 mm (72.0 in)** LPE bucket	**2348.0 mm (92.4 in)**
T	Clearance circle radius rear	**1789.0 mm (70.4 in)**
V	Over the tire width	**1448.0 mm (57.0 in)**
W	Overall width	**1768.0 mm (69.6 in)**
Operating weight		**3670 kg (8091 lb)**
SAE Rated Operating Capacity (ROC)		**1270 kg (2800 lb)**
Tipping load		**2540 kg (5600 lb)**
Counter weight (optional)		**136.0 kg (299.8 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm (72 in)*** *Low Profile (LP) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

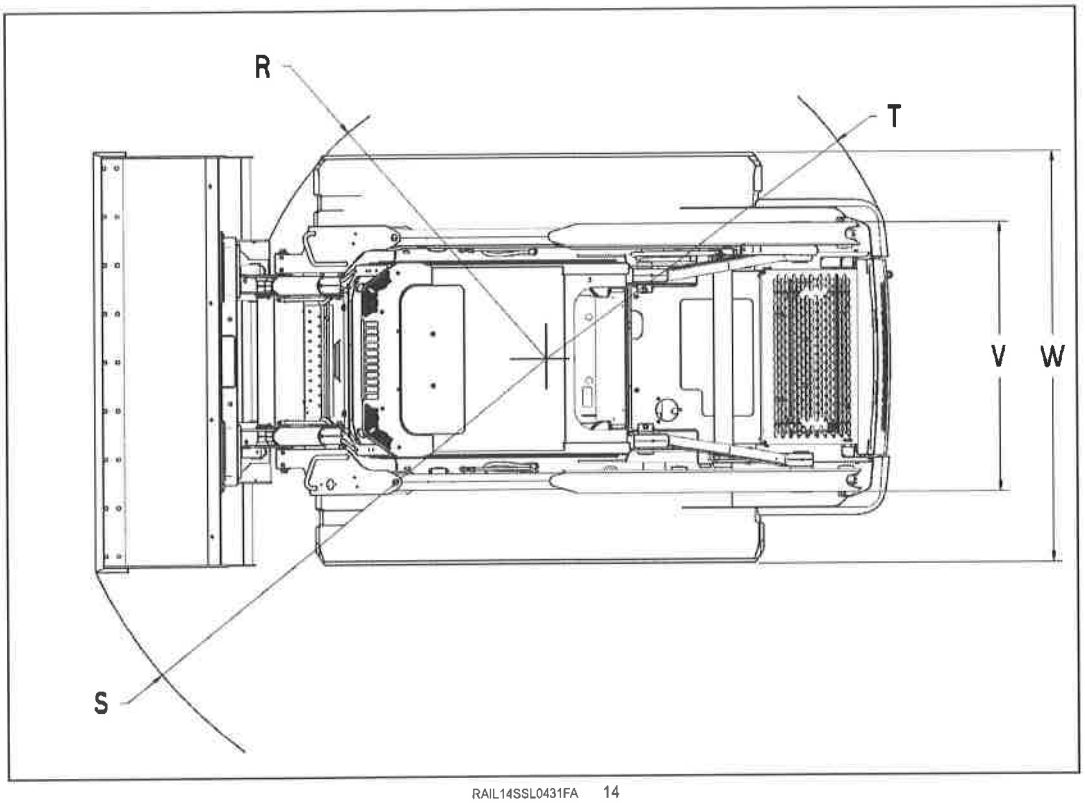


63109363 13

MEDIUM RADIAL FRAME TRACK UNITS (TR270B and TR310B)

LOCATION	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3920 mm (154.3 in)**
B	Height to Hinge Pin (Fully Raised)	**3124 mm (123 in)**
C	Cab Height	**1998 mm (78.7 in)**
D	Highest Level Bucket Height	**2950 mm (116.1 in)**
E	Overall Length (No Attachment)	**2669 mm (105.1 in)**
F	Overall Length (With standard Bucket)	**3292 mm (129.6 in)**
G	Dump Angle (Fully Raised)	**39.6°**
H	Dump Height (Maximum Reach)	**2495 mm (98.2 in)**
J	Dump Reach (Fully Raised)	**568 mm (22.3 in)**
K	Maximum Rollback @ Ground	**31°**
L	Maximum Rollback (Fully Raised)	**98.6°**
M	Track length on ground	**1419.0 mm (55.9 in)**
P	Ground Clearance (Belly Pan)	**203 mm (8 in)**
Q	Angle of Departure	**32°**

NOTE: *All measurements are based on machines with a* ***1828.8 mm (72.0 in)*** *Dirt & Foundry (DF) bucket.*



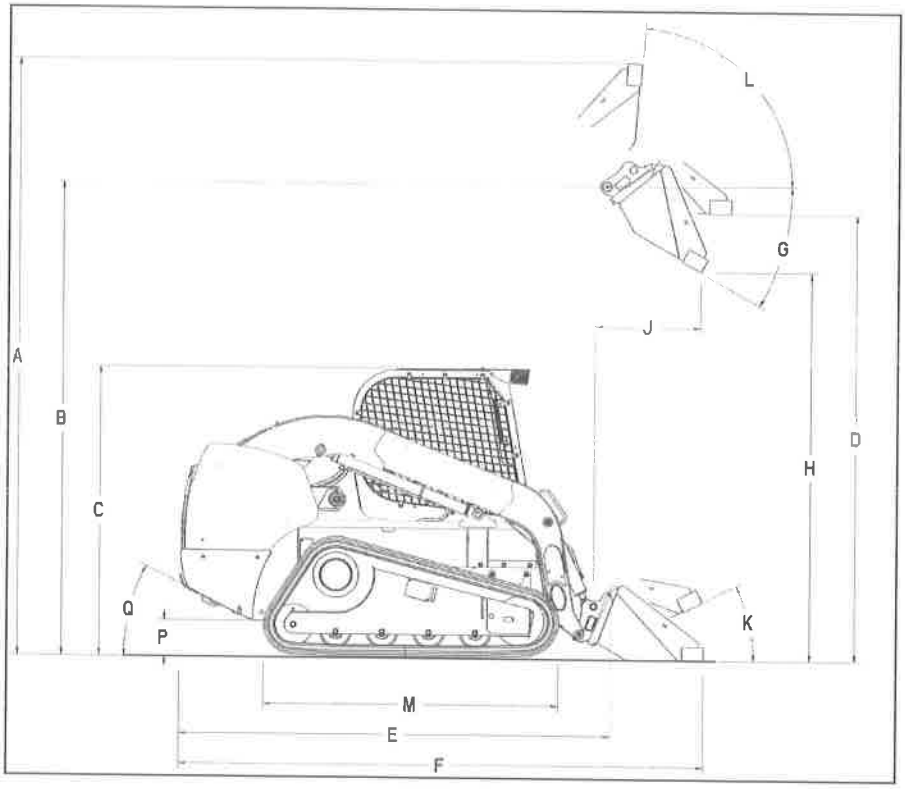
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MEDIUM RADIAL FRAME TRACK UNITS (TR270B and TR310B)

ITEM	COMPONENT	MEASUREMENT	
		TR270B	TR310B
R	Clearance circle radius without tool	**1410.0 mm (55.5 in)**	
	Bucket size	**1828.8 mm (72.0 in)** bucket	**1981.2 mm (78.0 in)** bucket
S	Clearance circle radius with DF bucket	**2132.0 mm (83.9 in)**	**2166.0 mm (85.3 in)**
S	Clearance circle radius with LP bucket	**2226.0 mm (87.6 in)**	**2263.0 mm (89.1 in)**
S	Clearance circle radius with LPE bucket	**2344.0 mm (92.3 in)**	**2374.0 mm (93.5 in)**
T	Clearance circle radius rear	**1501.0 mm (59.1 in)**	
V	Over the track width	**1356.0 mm (53.4 in)**	
W	Overall width	**1676.0 mm (66.0 in)**	
Operating weight		**3750 kg (8267 lb)**	**4027 kg (8878 lb)**
SAE Rated Operating Capacity (ROC)			
	35% of tipping load	**860 kg (1896 lb)**	**984 kg (2169 lb)**
	50% of tipping load	**1225 kg (2701 lb)**	**1406 kg (3100 lb)**
Tipping load		**2450 kg (5401 lb)**	**2810 kg (6195 lb)**
Counter weight (optional)		**63.8 kg (140.7 lb)**	
Cab side glass (optional)		**21.3 kg (47.0 lb)**	
Cab glass door (optional)		**34.0 kg (75.0 lb)**	
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**	
Suspension seat (optional)		**10.0 kg (22.0 lb)**	

NOTE: *All measurements are based on machines with a* ***1828.8 mm (72.0 in)*** *Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*

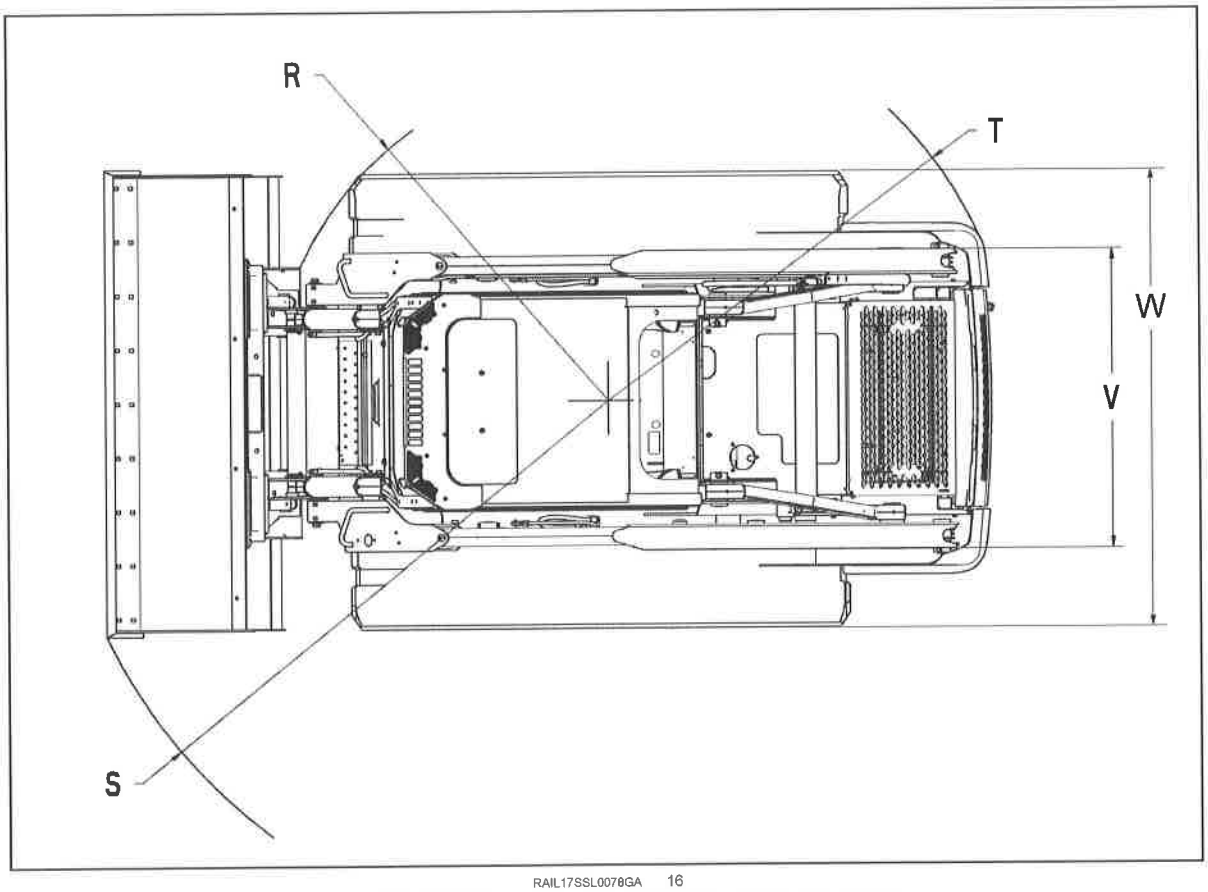


63109363 15

LARGE VERTICAL FRAME TRACK UNITS (TV370B)

LOCATION	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**4216 mm (166.0 in)**
B	Height to Hinge Pin (Fully Raised)	**3342 mm (131.6 in)**
C	Cab Height	**2043 mm (80.4 in)**
D	Highest Level Bucket Height	**3169 mm (124.8 in)**
E	Overall Length (No Attachment)	**2995 mm (117.9 in)**
F	Overall Length (With standard Bucket)	**3713 mm (146.2 in)**
G	Dump Angle (Fully Raised)	**53.5°**
H	Dump Height (Maximum Reach)	**2596 mm (102.2 in)**
J	Dump Reach (Fully Raised)	**798 mm (31.4 in)**
K	Maximum Rollback @ Ground	**34.2°**
L	Maximum Rollback (Fully Raised)	**86°**
M	Track length on ground	**1639 mm (64.5 in)**
P	Ground Clearance (Belly Pan)	**243 mm (9.6 in)**
Q	Angle of Departure	**32°**

*NOTE: All measurements are based on machines with a **1981.2 mm (78.0 in)** Heavy Dirt (HD) bucket.*



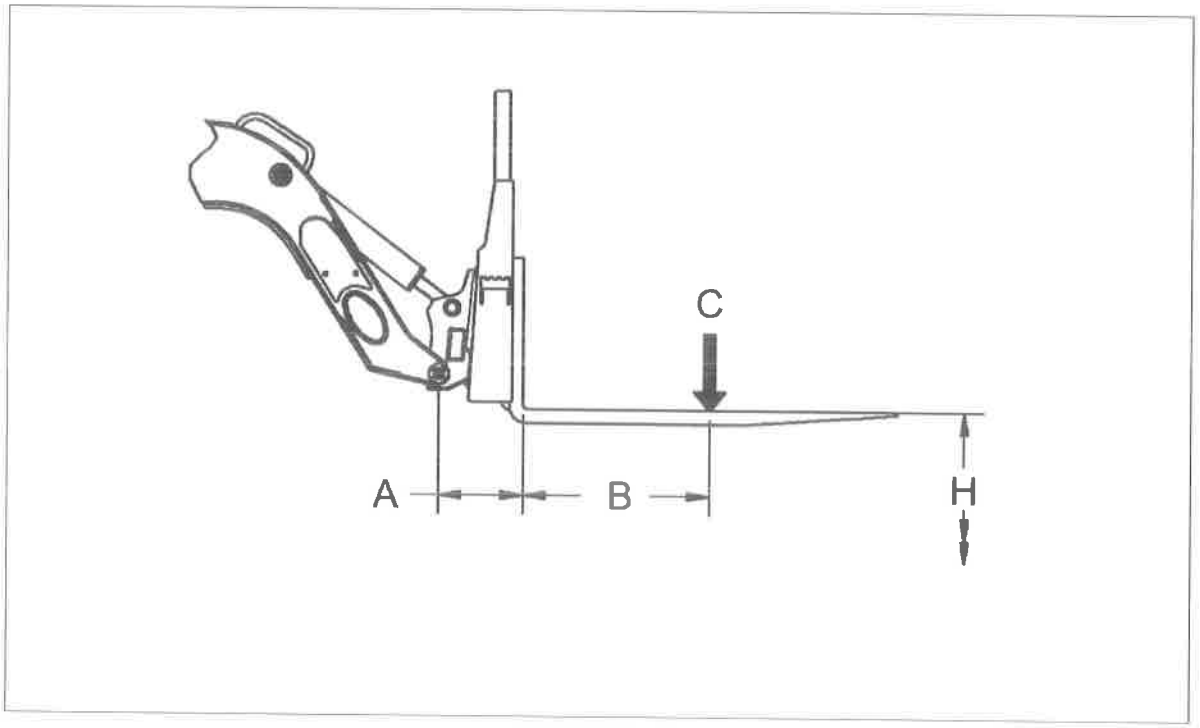
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LARGE VERTICAL FRAME TRACK UNITS (TV370B)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1482 mm (58.3 in)**
S	Clearance circle radius with DF bucket	**2228 mm (87.7 in)**
S	Clearance circle radius with LP bucket	**2325 mm (91.5 in)**
S	Clearance circle radius with LPE bucket	**2438 mm (96.0 in)**
T	Clearance circle radius rear	**1702 mm (67.0 in)**
V	Over the track width	**1480 mm (58.3 in)**
W	Overall width	**1930 mm (76.0 in)**
Operating weight		**4370 kg (9634 lb)**
SAE Rated Operating Capacity (ROC)		
	35% of tipping load	**1178 kg (2597 lb)**
	50% of tipping load	**1682 kg (3708 lb)**
Tipping load		**3364 kg (7416 lb)**
Counter weight (optional)		**273 kg (601.9 lb)**
Cab side glass (optional)		**21.3 kg (47.0 lb)**
Cab glass door (optional)		**34.0 kg (75.0 lb)**
Cab Lexan door (optional)		**34.0 kg (75.0 lb)**
Suspension seat (optional)		**10.0 kg (22.0 lb)**

NOTE: *All measurements are based on machines with a* ***1981.2 mm (72.0 in)*** *Heavy Dirt (HD) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



RCPH11WHL007FAN 17

Pallet Fork 201 kg (443 lb) – Rated Operating Capacity (ROC)

Legend:	A = **277 mm (10.9 in)**	B= **610 mm (24.0 in)**	C= Load Center of Gravity (CG)
Model	H = Height @ maximum reach	SAE Rated Operating Capacity (ROC)	ROC with Standard Weight Kit
SR160B	**1330 mm (52.4 in)**	**355 kg (783 lb)**	**384 kg (847 lb)**
SR175B	**1480 mm (52.4 in)**	**389 kg (858 lb)**	**418 kg (922 lb)**
SV185B	**2495 mm (52.4 in)**	**403 kg (888 lb)**	**433 kg (955 lb)**
SR210B	**1505 mm (52.4 in)**	**520 kg (1146 lb)**	**549 kg (1210 lb)**
SR240B	**1505 mm (52.4 in)**	**586 kg (1292 lb)**	**651 kg (1435 lb)**
SV280B	**2405 mm (52.4 in)**	**808 kg (1781 lb)**	**885 kg (1951 lb)**
TR270B[1]	**1505 mm (59.3 in)**	**438 kg (966 lb)**	**459 kg (1012 lb)**
TR310B[1]	**1505 mm (59 in)**	**522 kg (1151 lb)**	**543 kg (1197 lb)**
TV370B[1]	**2412 mm (95 in)**	**736 kg (1623 lb)**	**856 kg (1887 lb)**
[1]Specified ROC for track models is **35%** tipping load.			

Loader arm stop pucks

The loader arm stop pucks are stoppers located where the loader arm and frame meet. By design, the loader arm stop pucks allow the operator to lower the arms to the bottom position and level the bucket for precision grading. These pucks can also be used to change the grade of a bucket. A thinner puck will lower the grade and a thicker puck will raise the grade. The pucks installed at the factory are based on the tire size of the machine.

Frame size	Tire size width	Loader geometry	Loader stop height	Stop bolt hole location
Medium	10x	Radial	**50 mm (2.0 in)**	Lower
Medium	10x	Vertical	**63 mm (2.5 in)**	Lower
Medium	12x	Radial	**23 mm (0.9 in)**	Lower
Medium	12x	Vertical	**40 mm (1.6 in)**	Lower
Medium	Track	Radial	**23 mm (0.9 in)**	Lower
Large	12x	Radial	**50 mm (2.0 in)**	Upper
Large	12x	Vertical	**63 mm (2.5 in)**	Upper
Large	14x	Radial	**23 mm (0.9 in)**	Upper
Large	14x	Vertical	**40 mm (1.6 in)**	Upper
Large	Track	Radial	**40 mm (1.6 in)**	Upper
Large	Track	Vertical	**40 mm (1.6 in)**	Upper

Product identification – attachments

NOTE: *Contact your CASE CONSTRUCTION dealer if you need any assistance.*

Table legend:

A = Applicable to this model

HF = Requires High Flow Hydraulics

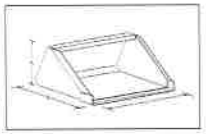
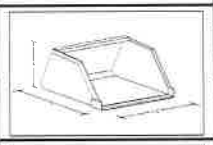
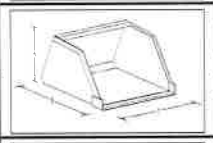
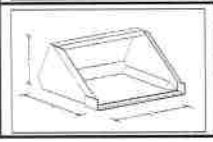
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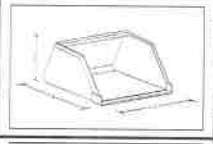
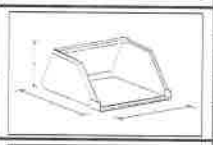
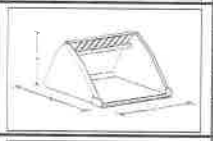
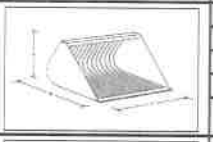
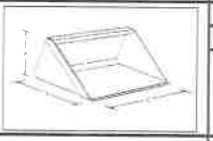
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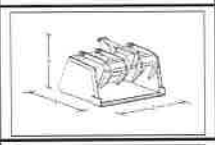
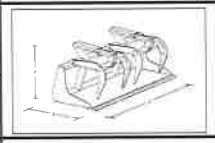
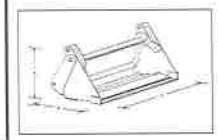
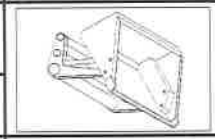
M3 = Meters cubed

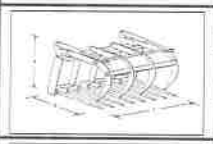
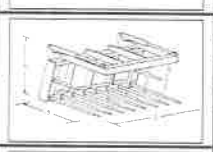
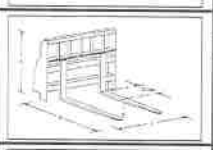
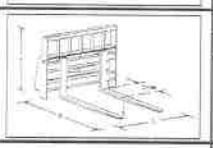
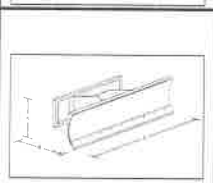
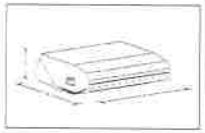
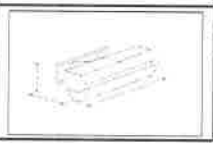
KG = Kilograms

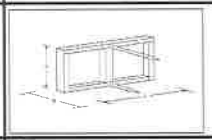
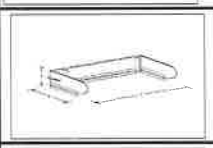
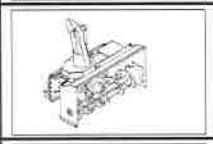
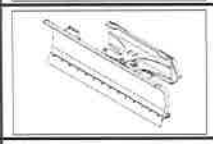
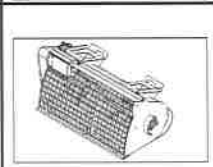
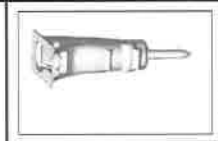
L/MIN = Liters per minute

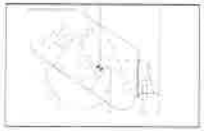
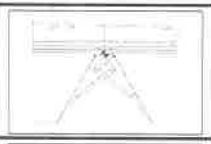
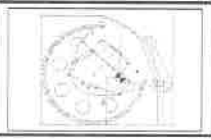
ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
BUCKET STANDARD		1,525	725	532	0.35	150			A					
		1,680	775	556	0.48	176				A	A			
		1,850	906	601	0.61	230				A	A			
BUCKET HD		1,525	818	532	0.35	171			A					
		1,680	868	556	0.48	200				A	A			
		1,850	999	601	0.61	257				A	A			
		1,850	890	586	0.57	230						A	A	
		2,080	890	586	0.65	330						A		A
		1,850	1,010	586	0.57	257						A	A	
		2,080	1,010	586	0.65	290						A		A
BUCKET LOW PROFILE		1,525	807	540	0.40	120			A					
		1,680	807	540	0.44	160				A	A			
		1,830	807	540	0.48	220				A	A			
		1,525	893	540	0.40	155			A					
		1,680	893	540	0.44	183				A	A			
		1,830	893	540	0.48	249				A	A			
		1,525	934	540	0.47	140			A					
		1,680	934	540	0.52	155				A	A			
		1,830	934	540	0.57	225				A	A			
BUCKET LOW PROFILE - HD		1,850	870	536	0.58	250						A	A	
		2,080	870	536	0.65	278						A		A
		1,850	960	536	0.60	259						A	A	
		2,080	960	536	0.66	288						A		A
		1,850	990	536	0.65	260						A	A	
		2,080	990	536	0.74	282						A		A
BUCKET UTILITY		1,525	862	714	0.59	141			A					
		1,680	862	714	0.72	280			A	A	A			
		1,830	862	714	0.85	318				A	A			
BUCKET UTILITY - HD		1,850	1,058	727	0.90	322						A	A	
		2,080	1,058	727	1.01	366						A		A
BUCKET SLURRY		1,525	949	594	0.53	145			A					
		1,680	949	594	0.59	154				A	A			
		1,830	949	594	0.65	225				A	A			
BUCKET SLURRY - HD		1,850	949	594	0.53	150						A	A	
		2,080	949	594	0.59	159						A		A
BUCKET DIRT - HD		1,525	778	559	0.43	195			A					
		1,680	778	559	0.48	246				A	A			
		1,850	890	586	0.56	272						A	A	
		2,080	890	586	0.63	320						A		A

ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
BUCKET LIGHT MATERIAL		1,525	907	630	0.63	185			A					
		1,680	907	630	0.69	222				A	A			
		1,830	907	630	0.77	332				A	A			
		1,980	907	630	0.85	342					A			
BUCKET LIGHT MATERIAL - HD		1,850	1,083	830	1.10	342						A	A	
		2,080	1,083	830	1.20	373						A		A
BUCKET FERTILIZER		1,680	958	599	0.67	185			A	A	A			
		1,830	958	599	0.73	222				A	A			
		2,000	958	599	0.80	332					A			
BUCKET FERTILIZER - HD		1,850	1,391	833	1.24	322						A	A	
		2,080	1,391	833	1.40	342						A		A
BUCKET SHIP TRIMMING		1,680	944	687	0.71	260				A	A			
		1,850	944	687	0.79	300				A	A			
		2,000	944	687	0.85	345				A	A			
BUCKET SHIP TRIMMING - HD		1,850	1,400	974	0.79	305						A	A	
		2,080	1,400	974	0.89	315						A		A
BUCKET POULTRY		1,750	1,004	802	0.95	264				A	A			
		1,830	1,004	802	0.99	342				A	A			
		2,000	1,004	802	1.09	346				A	A			
BUCKET POULTRY - HD		1,850	1,004	802	1.00	350						A	A	
		2,080	1,004	802	1.13	410						A		A
BUCKET ROOT CROP		1,680	1,008	685	0.63	185			A					
		1,825	1,008	685	0.70	266				A	A			
		1,980	1,008	685	0.75	340				A	A			
BUCKET ROOT CROP - HD		1,850	1,008	685	0.72	290						A	A	
		2,080	1,008	685	0.79	327						A		A
BUCKET CALIBRATED		1,180	832	497	0.20	117			A	A	A	A	A	A
		1,406	1,064	618	0.40	148				A	A	A	A	A
		1,748	1,064	618	0.50	161					A	A	A	A
BUCKET DUTCH STONE		1,525	955	625	0.36	175			A					
		1,525	1,040	625	0.36	204			A					
		1,680	955	625	0.40	186				A	A			
		1,680	1,040	625	0.40	220				A	A			
		1,850	955	625	0.44	276				A	A			
		1,850	1,040	625	0.44	310				A	A			
BUCKET DUTCH STONE - HD		1,850	835	695	0.33	238						A	A	
		1,850	835	695	0.33	242						A	A	
		2,080	835	695	0.38	242						A		A
		2,080	835	695	0.38	245						A		A

ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
BUCKET with GRAPPLE		1,525	762	819	0.60	300	225	20-80	A, SF					
		1,680	762	819	0.75	324	225	20-80		A, SF	A, SF			
BUCKET INDUSTRIAL		1,525	986	765	0.60	350	225	20-80	A, SF					
		1,680	986	765	0.75	400	225	20-80		A, SF	A, SF			
		1,830	986	765	0.77	450	225	20-80		A, SF	A, SF			
BUCKET INDUSTRIAL - HD		1,850	986	765	0.77	495	225	20-80				A, SF	A, SF	
		2,080	986	765	0.87	522	225	20-80				A, SF		A, SF
BUCKET 4 IN 1		1,525	734	722	0.33	253	225	20-80	A, SF					
		1,525	868	724	0.35	280	225	20-80	A, SF					
		1,525	734	722	0.35	290	225	20-80	A, SF					
		1,525	868	724	0.35	280	225	20-80	A, SF					
		1,680	734	722	0.40	283	225	20-80		A, SF	A, SF			
		1,680	868	724	0.40	320	225	20-80		A, SF	A, SF			
		1,680	734	722	0.40	308	225	20-80		A, SF	A, SF			
		1,680	868	724	0.40	320	225	20-80		A, SF	A, SF			
		1,850	753	768	0.43	310	225	20-80				A, SF	A, SF	
		1,850	868	724	0.44	367	225	20-80		A, SF	A, SF			
BUCKET 4 IN 1 - HD		1,850	807	724	0.44	387	225	20-80				A, SF	A, SF	
		1,850	868	724	0.44	403	225	20-80				A, SF	A, SF	
		2,080	807	724	0.50	435	225	20-80				A, SF		A, SF
		2,080	868	724	0.50	453	225	20-80				A, SF		A, SF
BUCKET HIGH TIP		1,525	968	606	0.55	336	225	20-80	A, SF					
		1,680	968	606	0.61	370	225	20-80		A, SF	A, SF			
		1,850	968	606	0.67	407	225	20-80		A, SF	A, SF			
BUCKET HIGH TIP - HD		1,850	968	606	0.67	407	225	20-80				A, SF	A, SF	
		2,080	968	606	0.76	426	225	20-80				A, SF		A, SF
BUCKET SIDE TIP		1,525	1,048	748	0.40	230	225	20-80	A, SF					
		1,525	1,048	748	0.40	230	225	20-80	A, SF					
		1,680	1,048	748	0.50	245	225	20-80		A, SF	A, SF			
		1,680	1,048	748	0.50	245	225	20-80		A, SF	A, SF			
		1,850	1,048	748	0.55	250	225	20-80		A, SF	A, SF			
		1,850	1,048	748	0.55	250	225	20-80		A, SF	A, SF			
BUCKET SIDE TIP - HD		1,850	1,048	748	0.55	250	225	20-80				A, SF	A, SF	
		1,850	1,048	748	0.55	250	225	20-80				A, SF	A, SF	
		2,080	1,048	748	0.60	295	225	20-80				A, SF		A, SF
		2,080	1,048	748	0.60	295	225	20-80				A, SF		A, SF
FORK FARM		1,525	893	593		153			A					
		1,680	893	593		170				A	A			
		1,850	893	593		221				A	A	A	A	
FORK FARM - HD		2,080	893	593		211						A		A

ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
FORK FARM with GRAPPLE		1,525	1,010	796	0.85	250	225	20-80	A, SF					
		1,680	1,010	796	0.92	260	225	20-80		A, SF	A, SF			
FORK FARM with GRAPPLE - HD		1,850	1,010	796	1.01	310	225	20-80		A, SF	A, SF			
		1,850	1,010	796	1.01	341	225	20-80				A, SF	A, SF	
		2,080	1,010	796	1.14	381	225	20-80				A, SF		A, SF
FORK SILAGE with GRAPPLE		1,525	903	776	0.85	255	225	20-80	A, SF					
		1,680	903	776	0.91	302	225	20-80		A, SF	A, SF			
FORK SILAGE with GRAPPLE - HD		1,850	903	776	1.01	334	225	20-80		A, SF	A, SF			
		1,850	903	776	1.02	367	225	20-80				A, SF	A, SF	
		2,080	903	776	1.14	407	225	20-80				A, SF		A, SF
FORK PALLET		1,216	1,096	904		126			A	A	A			
		1,216	1,248	904		144			A	A	A			
FORK PALLET - HD		1,220	1,401	904		194			A	A	A	A	A	A
FORK PALLET with SIDE SHIFT		1,220	1,300	900		308	225	20-80	A, SF	A, SF	A, SF			
		1,220	1,450	900		312	225	20-80	A, SF	A, SF	A, SF			
FORK PALLET with SIDE SHIFT - HD		1,220	1,760	900		320	225	20-80	A, SF	A, SF	A, SF	A, SF	A, SF	A, SF
SNOW PLOW / DOZER BLADE		1,980	812	627		285			A	A	A		A	
		1,980	812	627		305	225	20-80	A, SF	A, SF	A, SF		A, SF	
		2,135	812	627		288				A	A		A	
		2,135	812	627		325	225	20-80		A, SF	A, SF		A, SF	
SNOW PLOW / DOZER BLADE - HD		2,135	812	679		316						A	A	
		2,135	812	627		358	225	20-80				A, SF	A, SF	
		2,365	812	679		328						A		A
		2,365	812	627		370	225	20-80				A, SF		A, SF
		2,640	1,068	716		650	225	20-80				A, SF		A, SF
BROOM BUCKET		1,778	1,310	683	0.35	400	225	20-80	A, SF					
		1,933	1,310	683	0.38	430	225	20-80		A, SF	A, SF		A, SF	
		2,100	1,310	683	0.43	460	225	20-80		A, SF	A, SF		A, SF	
		2,100	1,314	683	0.43	460	225	20-80				A, SF		
		2,333	1,314	683	0.48	490	225	20-80				A, SF		A, SF
		1,778	1,314	696	0.35	405	225	20-80	A, SF					
		1,933	1,314	696	0.38	435	225	20-80		A, SF	A, SF		A, SF	
		2,130	1,314	696	0.43	465	225	20-80		A, SF	A, SF		A, SF	
BROOM ANGLE		1,960	1,342	772		405	<300	<95	A, SF					
		2,250	1,342	772		435	<300	<95		A, SF	A, SF		A, SF	
BROOM ANGLE - HD		2,610	1,342	772		465	<300	<95		A, SF	A, SF	A, SF		A, SF

ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
BALE SPIKE		1,220	980	610		55			A	A	A	A	A	A
SCRAPER		1,750	1,092	600		145			A					
		2,080	1,092	600		176				A	A			
SCRAPER - HD		2,080	1,092	600		198						A	A	A
SNOW BLOWER		1,590	990	780		494	170-210	65-90	A, SF					
		1,790	990	780		506	170-210	65-90		A, SF	A, SF	A, SF	A, SF	
		1,790	990	780		506	170-210	65-90		A, HF	A, HF	A, HF	A, HF	
		2,080	990	780		524	170-210	65-90			A, SF	A, SF	A, SF	A, SF
		2,080	990	780		524	170-210	65-90			A, HF	A, HF	A, HF	A, HF
SNOW BLADE		2,100	990	700		315	<180	<80	A, SF	A, SF	A, SF		A, SF	
		2,400	990	800		410	<180	<80				A, SF		A, SF
CEMENT MIXER		1,170	750	630	0.15	255	140-260	60-115		A, SF	A, SF	A, SF	A, SF	A, SF
		1,490	750	630	0.20	290	140-260	60-115		A, SF	A, SF	A, SF	A, SF	A, SF
		1,490	820	720	0.25	345	140-260	60-115			A, SF	A, SF	A, SF	A, SF
		1,490	820	720	0.25	340	140-260	60-115			A, SF	A, SF	A, SF	A, SF
		1,575	820	820	0.30	365	140-260	60-115				A, SF	A, SF	A, SF
		1,575	820	820	0.30	355	140-260	60-115				A, SF	A, SF	A, SF
		1,700	820	820	0.35	420	210-280	80-120					A, SF	A, SF
		1,760	980	980	0.45	590	210-280	80-120						A, SF
HAMMER		292	361	869		180	120-140	30-63	A, SF					
		380	417	911		275	80-130	35-90	A, SF					
		380	417	911		275	80-130	35-90		A, SF	A, SF	A, SF	A, SF	A, SF
		380	453	1,032		385	80-130	40-120		A, SF	A, SF	A, SF	A, SF	A, SF
		380	453	1,032		385	80-130	40-120		A, HF	A, HF	A, HF	A, HF	A, HF
		400	508	1,217		505	100-140	50-150				A, HF		A, HF
COLD PLANER		1,520	1,025	810		615	<250	<90		A, SF	A, SF	A, SF	A, SF	A, SF
		1,740	1,165	890		780	<215	<120		A, HF	A, HF		A, HF	
		1,740	1,165	890		810	<215	<120		A, HF	A, HF		A, HF	
		1,740	1,165	890		780	<215	<135			A, HF	A, HF	A, HF	A, HF
		1,740	1,165	890		1,100	<215	<155			A, HF	A, HF	A, HF	A, HF

ATTACHMENT FAMILY	IMAGE	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	SR160B	SR175B SV185B	SR210B	SR240B SV280B	TR270B TR310B	TV370B
ROCK WHEEL		1,740	1,900	1,650		1,255	<215	<155			A, HF	A, HF	A, HF	A, HF
		1,740	1,900	1,650		1,125	<215	<155			A, HF	A, HF	A, HF	A, HF
		1,740	1,900	1,650		1,180	<215	<155			A, HF	A, HF	A, HF	A, HF
		1,740	2,130	1,930		1,595	<215	<155				A, HF	A, HF	A, HF
		1,740	2,130	1,930		1,340	<215	<155				A, HF	A, HF	A, HF
		1,740	2,130	1,930		1,390	<215	<155				A, HF	A, HF	A, HF
		1,740	2,130	1,930		1,390	<215	<155				A, HF	A, HF	A, HF
		1,740	2,130	1,930		1,390	<215	<155				A, HF	A, HF	A, HF
ASPHALT FLOAT		2,012	1,459	823		675	<250	<90			A, SF	A, SF	A, SF	A, SF
WHEEL COMPACTOR		1,341	1,334	1,154		615	<215	<90		A, SF	A, SF	A, SF	A, SF	A, SF
		1,740	1,555	1,215		615	<250	<90		A, SF	A, SF	A, SF	A, SF	A, SF
		1,740	1,555	1,215		615	<250	<90		A, SF	A, SF	A, SF	A, SF	A, SF

Material weights

MATERIAL	kg/m³	lbs/ft³
Alum		
Lump	881	55
Pulverized	769	48
Ashes	561–833	35 - 52
Bauxite	1202 - 1922	75 - 120
Beans	769	48
Charcoal	368	23
Chips	288	18
Coal	1282	80
Coke - Lump - Loose	849 - 1009	53 - 63
Clay	368 - 513	23 - 32
Concrete	1378 - 1778	86 - 111
Copper Ore	1666	104
Corn - Shelled	673	42
Cottonseed	401	25
Earth		
Dry Loam	929 - 1089	58 - 68
Wet	1602 - 1666	100 - 104
Earth - Sand Gravel	1570	98
Ensilage	577	36
Granite	1490 - 1778	93 - 111
Gravel		
Dry	1522	95
Wet	1906	119
Ice - Crushed	593	37
Iron Ore	2323	145
Limestone - Loose - Crushed	1538 - 1602	96 - 100
Oats	416	26
Peanuts - Shelled	280	17
Peas	769	48
Peat - Solid	753	47
Phosphate - Granular	1442	90
Potash	1089	68
Potatoes	769	48
Quartz - Granular	1762	110
Rice	769	48
Rye	705	44
Salt - Rock - Solid	2163	135
Sand & Gravel		
Dry	1730	108
Wet	2003	125
Sand - Foundry	1522	95
Shale	1410	88
Slag - Crushed	1121	70
Slate	2243	130
Snow	240 - 801	15 - 50
Soybeans	743	46
Sugar Beet Pulp - Wet	561	35
Sugar - Raw	961	60
Sulfur - Lumpy	1330	83
Taconite	1714	107
Wheat	769	48

Units of measure and conversion

QUANTITY	TYPICAL APPLICATION	FROM U.S. UNIT	TO SI UNIT	MULTIPLY BY
Flow, volume	Liquid flow, pump capacity	US gpm	l/min	3.7854117834
Force, thrust, drag	Pedal, spring, belt, lever	lb	N	4.4482216153
Length or distance	Land distance, odometers	miles	km	1.6093440001
		yd	m	0.9144000003
		ft	m	0.3048000000
		in	mm	25.4000000001
Torque bending moment	General, engine torque, fasteners	lb in	N·m	0.1129848333
		lb ft	N·m	1.3558179999
		kgf cm	N·m	.0980665
Power	Air conditioning, heating	btu/min	W	17.58427
		btu/h	W	.2930711
	Motors	Hp	kW	0.7354990839
	Engine	Hp	kW	0.7354990839
Power quotient	Engine performance	lb/hp	kg/kW	.6080327
Temp scale	General use	°F	°C	°C = (°F-32)/1.8
Velocity, linear	Vehicle	mph	km/h	1.6093439998
Volume	Bucket capacity	yd^3	m^3	0.7645548582
		ft^3	m^3	0.0283168466
		Bu	m^3	.03523907
		Bu	l	35.2390700035
	Liquid, fuel, lubricants	US gal	l	3.7854117834
		US qt	l	0.9463529464
		US pt	l	0.4731764730
		US fl oz	ml	29.5735295641
Flow, mass		psi	bar	0.0689655172
		psi	kPa	6.8947572946
		lb	kg	0.4535923700

Ampere	A
Volt	V
kiloNewton	kN
Newton	N
pound	lb
ounce	oz
Newton meters	N·m
pound inches	lb in
revolutions per minute	RPM
kilometer	km
meter	m
centimeter	cm
millimeter	mm
miles	miles
yard	yd
foot	ft
inch	in
kilogram	kg
kiloWatts	kW
Watt	W
horsepower	Hp
Btu per hour	Btu/hr
kiloPascal	kPa
pound per square inch	psi
degrees Celsius	°C
degrees Fahrenheit	°F
pound feet	lb ft
kilometers per hour	km/h
miles per hour	mph
cubic meter	m^3
cubic yard	yd^3
liter	l
milliliters	ml
cubic inches	in^3
US gallons	US gal
US quarts	US qt
US fluid ounces	US fl oz

Torque charts - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

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

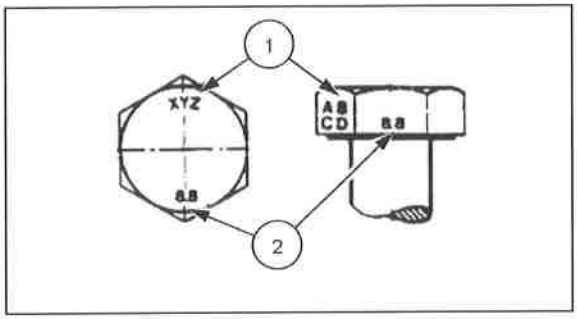
NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

METRIC FLANGED HARDWARE

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

IDENTIFICATION

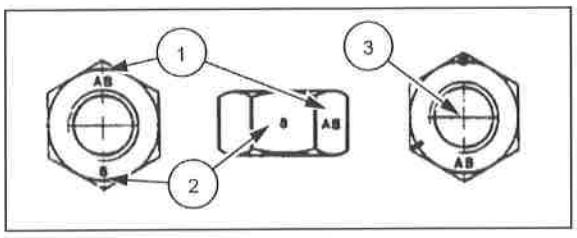
Metric Hex head and carriage bolts, classes 5.6 and up



20083680 1

1. Manufacturer's Identification
2. Property Class

Metric Hex nuts and locknuts, classes 05 and up



20083681 2

1. Manufacturer's Identification

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

INCH NON-FLANGED HARDWARE

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

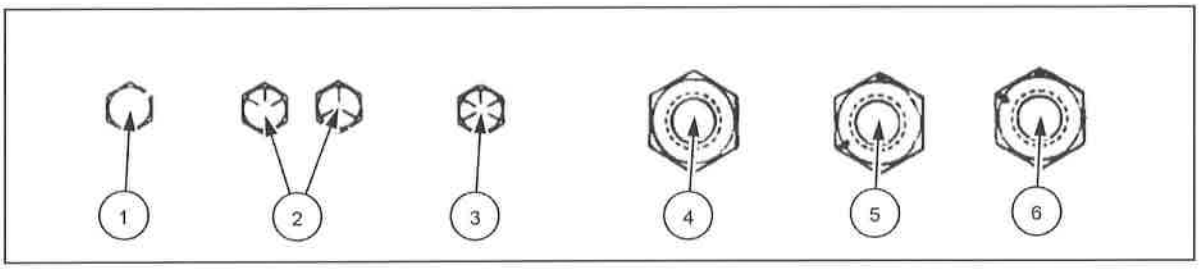
NOTE: *For Imperial Units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*

INCH FLANGED HARDWARE

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

IDENTIFICATION

Inch Bolts and free-spinning nuts

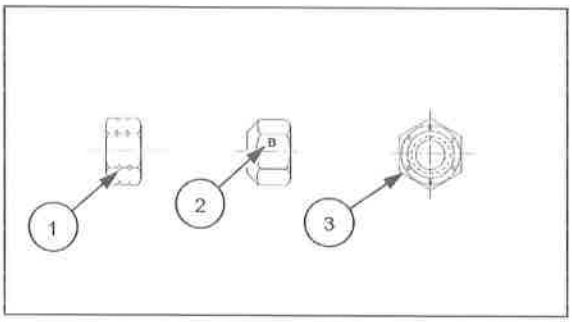


20083682 3

Grade Marking Examples

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

Inch Lock Nuts, All Metal (Three optional methods)



20090268 4

Grade Identification

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

10 - ACCESSORIES

Telematics - Overview with Case SiteWatch™

NOTE: *The CASE CONSTRUCTION**SiteWatch**™ website (www.casesitewatch.com) will not be accessible until the CASE CONSTRUCTION**SiteWatch**™ subscription for this machine is registered by an authorized CASE CONSTRUCTION dealer. Contact an authorized CASE CONSTRUCTION dealer for details.*

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 the user interface CASE CONSTRUCTION**SiteWatch™** at www.casesitewatch.com. Using cellular technology, the transponder can send:

- equipment data, including location, and on/off status
- usage and production metrics
- diagnostic data
- movement alarms and unauthorized usage
- machine maintenance status

SIMPLIFIED EU DECLARATION OF CONFORMITY

The full text of the EU declaration of conformity is available at the following internet address:

www.tierratelematics.com/docs/am53_doc_en.pdf (English)
www.tierratelematics.com/docs/am53_doc_it.pdf (Italian)
www.tierratelematics.com/docs/am53_doc_bg.pdf (Bulgarian)
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www.tierratelematics.com/docs/am53_doc_fi.pdf (Finnish)
www.tierratelematics.com/docs/am53_doc_sv.pdf (Swedish)

TIERRA
TELEMATICS DESIGN

EU DECLARATION OF CONFORMITY

1. Radio equipment (product, type, batch or serial number): **Asset Management Control Unit – AM53**

2. Name and address of the manufacturer or his authorised representative:

   Tierra S.p.A – Via Lombardore 223 , Leinì (Torino) 10040 - Italy

3. This declaration of conformity is issued under the sole responsibility of the manufacturer:

   Tierra S.p.A – Via Lombardore 223 , Leinì (Torino) 10040 – Ita

4. Object of the declaration (identification of the radio equipment allowing traceability; it may include a colour image of sufficient clarity where necessary for the identification of the radio equipment):

   Asset Management Control Unit – AM53

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

   Directive 2014/53/UE

6. References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared. References must be listed with their identification number and version and, where applicable, date of issue:

Health and Safety:
- EN62311:2008 (human exposure restriction for EM fields)
- IEC/EN 60950-1:2006/A2:2013 (safety of IT equipment)

EMC:
- ETSI EN 301 489-01 V1.9.2/V.2.1.1 (EMC standard for radio equipment and services; Part 1: Common Technical requirements
- ETSI EN 301 489-07 V1.3.1 EMC and Radio spectrum Matters: Part 7 Specific conditions for mobile and portable radio and ancillary equipment.. (GSM and DCS)
- ETSI EN 301 489-024 V1.5.1 EMC and Radio spectrum Matters: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for mobile and portable (UE) radio and ancillary equipment.
- EN 50498:2010 EMC requirements for electronic devices to be installed on vehicles (after sale)

Spectrum:
- ETSI EN 301 511 V9.0.2 GSM harmonized standard for mobile stations in the GSM900 and DCS1800 bands (Art. 3.2 of the 1999/5/EC directive)

Other:
- CNH doc: 82036374 ENS0310 Rev J ENVIRONMENTAL TEST SPECIFICATION – ELECTRONIC COMPONENTS
- AGCO_GC10700601: 2006-09 Electrical requirements and environmental conditions for electrical/electronic components.

8. Where applicable, description of accessories and components, including software, which allow the radio equipment to operate as intended and covered by the EU declaration of conformity:

   Our devices are based on Gemalto's Radio module with the follow firmware version:

   PX98 Rel.3.3 L30960-N2600-A330

9. Leini, June , 6th , 2017

   Signed for the Manufacturer: .....

   Name: Paolo Traso
   Title: CEO

A TOPCON and DIVITECH company
TIERRA S.p.A. Via Lombardore 223 - Leini (Turin), 10040 Italy tel. +39 011 2341 5584 - fax +39 011 4785 164
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accounting@tierraservice.com / www.tierraservice.com / www.topcontierra.com

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Dealer's stamp

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