

# **721E** **Wheel Loader**

## **Service Manual**

**Part Number**

**71114022**

2<sup>nd</sup> Edition

English 02/2016

***CASE***  
CONSTRUCTION



## **SERVICE MANUAL**

**721E Tier3 XT. [N8AE12517 - ]**  
**721E Tier3 Z-bar Bagage suggar. [N8AE12525 - ]**  
**721E Tier3 Z-bar Fertilizer. [ N8AE12547 - ]**  
**721E Tier3 Z-bar. [N7AE12500 - ]**

# Link Product / Engine

---

<b>Product</b>	<b>Market Product</b>	<b>Engine</b>
721E Tier3 Z-bar. [N7AE12500 - ]	Latin America	F4HE9684F*J100
721E Tier3 Z-bar Fertilizer. [ N8AE12547 - ]	Latin America	F4HE9684F*J100
721E Tier3 Z-bar Bagage suggar. [N8AE12525 - ]	Latin America	F4HE9684F*J100
721E Tier3 XT. [N8AE12517 - ]	Latin America	F4HE9684F*J100

**<https://www.ebooklibonline.com>**

Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

**<https://www.ebooklibonline.com>**

# Contents

---

## INTRODUCTION

<b>Engine</b> .....	<b>10</b>
[10.001] Engine and crankcase .....	10.1
[10.400] Engine cooling system .....	10.2
[10.310] Aftercooler.....	10.3
<b>Transmission</b> .....	<b>21</b>
[21.113] Powershift transmission .....	21.1
[21.135] Powershift transmission external controls.....	21.2
[21.155] Powershift transmission internal components.....	21.3
[21.145] Gearbox internal components.....	21.4
<b>Front axle system</b> .....	<b>25</b>
[25.100] Powered front axle .....	25.1
[25.102] Front bevel gear set and differential .....	25.2
[25.108] Final drive hub, steering knuckles, and shafts .....	25.3
<b>Rear axle system</b> .....	<b>27</b>
[27.100] Powered rear axle.....	27.1
[27.106] Rear bevel gear set and differential .....	27.2
[27.120] Planetary and final drives .....	27.3
<b>Brakes and controls</b> .....	<b>33</b>
[33.202] Hydraulic service brakes .....	33.1
<b>Hydraulic systems</b> .....	<b>35</b>
[35.000] Hydraulic systems.....	35.1
[35.359] Main control valve .....	35.2
[35.701] Front loader arm hydraulic system .....	35.3
<b>Steering</b> .....	<b>41</b>
[41.910] Auxiliary steering .....	41.1

Wheels .....	44
[44.511] Front wheels .....	44.1
Cab climate control .....	50
[50.200] Air conditioning .....	50.1
Electrical systems .....	55
[55.000] Electrical system .....	55.1
[55.100] Harnesses and connectors .....	55.2
[55.015] Engine control system .....	55.3
[55.201] Engine starting system .....	55.4
[55.301] Alternator .....	55.5
[55.302] Battery .....	55.6
[55.202] Cold start aid .....	55.7
[55.011] Fuel tank system .....	55.8
[55.012] Engine cooling system .....	55.9
[55.519] Cab brake controls .....	55.10
[55.030] Service brake electrical system .....	55.11
[55.031] Parking brake electrical system .....	55.12
[55.512] Cab controls .....	55.13
[55.051] Cab Heating, Ventilation, and Air-Conditioning (HVAC) controls .....	55.14
[55.050] Heating, Ventilation, and Air-Conditioning (HVAC) control system .....	55.15
[55.047] Steering control system .....	55.16
[55.524] Cab controls (Lift arm, Boom, Dipper, Bucket) .....	55.17
[55.415] Loader arm and bucket control system .....	55.18
[55.518] Wiper and washer system .....	55.19
[55.510] Cab or platform harnesses and connectors .....	55.20
[55.408] Warning indicators, alarms, and instruments .....	55.21
[55.DTC] FAULT CODES .....	55.22
Platform, cab, bodywork, and decals .....	90

[90.150] Cab..... 90.1  
[90.124] Pneumatically-adjusted operator seat..... 90.2



## INTRODUCTION

---

## **Foreword - Important notice regarding equipment servicing**

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

---

## Foreword - How to use and navigate through this manual

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through web delivery (eTIM), DVD, and paper manuals. A coding system called SAP has been developed to link the technical information to other Product Support functions, e.g., Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on their machine it is usually because a function or system on their machine is not working at all, is not working efficiently, or is not responding correctly to their commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the SAP coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system, you will then find all the mechanical, electrical or hydraulic devices, components, assemblies, and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system: the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting), and the service data (remove, install adjust, etc.).

By integrating SAP coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - the component or function on the machine, that the piece of technical information is going to describe (e.g., Fuel tank).
- INFORMATION TYPE - the piece of technical information that has been written for a particular component or function on the machine (e.g., Capacity would be a type of Technical Data describing the amount of fuel held by the fuel tank).
- PRODUCT - the model for which the piece of technical information is written.

Every piece of technical information will have those three categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on their machine.

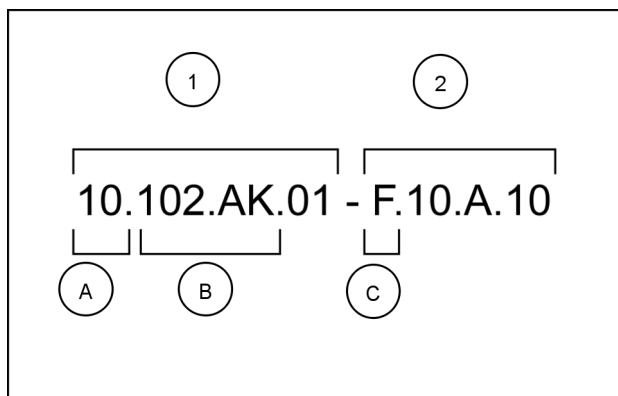
That information could be:

- the procedure for how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

## Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

Example information unit	Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10)					
Information Unit SAP code	10	102	AK	01	F	10.A.10
SAP code classification	Engine	Pan and covers	Engine block cover	Front	Service data	Remove



NHIL12GEN0070A 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.  
**(B)** corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows “.01”, which represents the “Front” block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.  
**(C)** corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.  
**(A)** and **(B)** are also shown in the page numbering on the page footer.  
THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.  
You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

## Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9

---

## Safety rules - Ecology and the environment

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

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

### Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- The air-conditioning system contains gases that should not be released into the atmosphere. Consult an air-conditioning specialist or use a special extractor to recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

### Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CASE CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



### Mandatory battery recycling

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

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

Points of sale are obliged to:

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

---

## Safety rules

21E

LA

---


### 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 safety signs, 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. The color associated with DANGER is RED.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

### **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 damage or property damage. The color associated with Notice is BLUE.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine damage 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.



## **SERVICE MANUAL**

### **Engine**

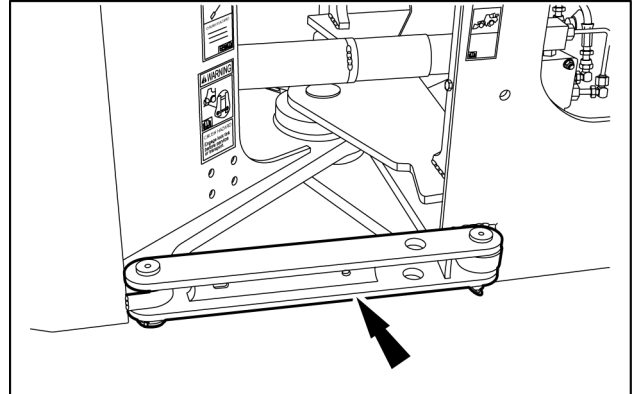
**721E Tier3 XT. [N8AE12517 - ]**  
**721E Tier3 Z-bar Bagage suggar. [N8AE12525 - ]**  
**721E Tier3 Z-bar Fertilizer. [ N8AE12547 - ]**  
**721E Tier3 Z-bar. [N7AE12500 - ]**

## Radiator - Remove

721E

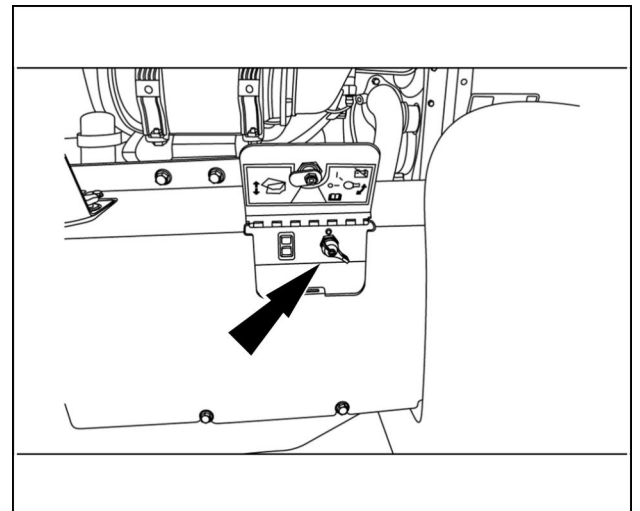
LA

1. Park the machine on a level surface. Lower the bucket to the ground. Apply parking brake and shut down engine.
2. Place the linkage lock in the "LOCKED" position.



LAIL11WL1525A0A 1

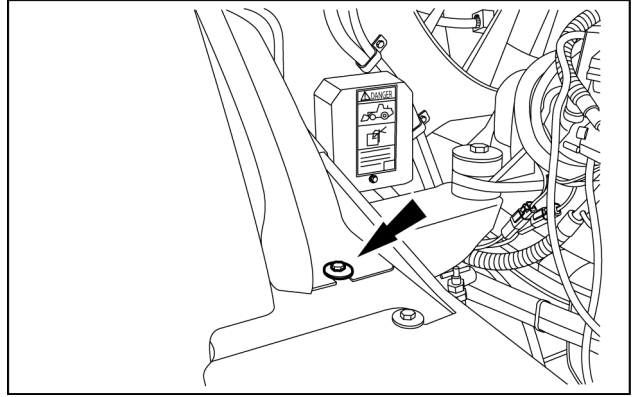
3. Place the master disconnect switch in the "OFF" position.



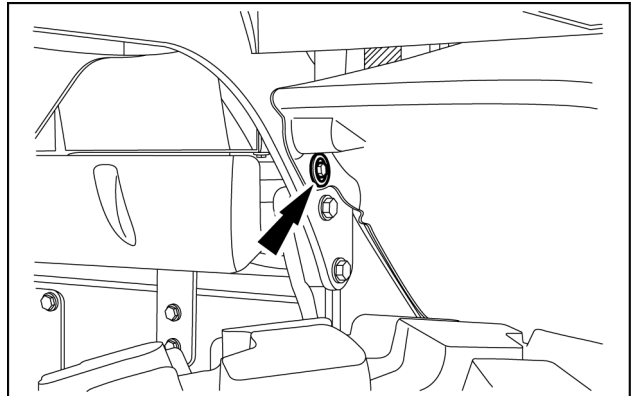
RCPH11WHL653BAU 2

4. Have another person lift and secure the side panel in the raised position. Remove the fastening bolts from the side panel. Remove the panel.

5. Remove the two bolts and the fastening washers from the fender on the left-hand side. Remove the left-hand fender.

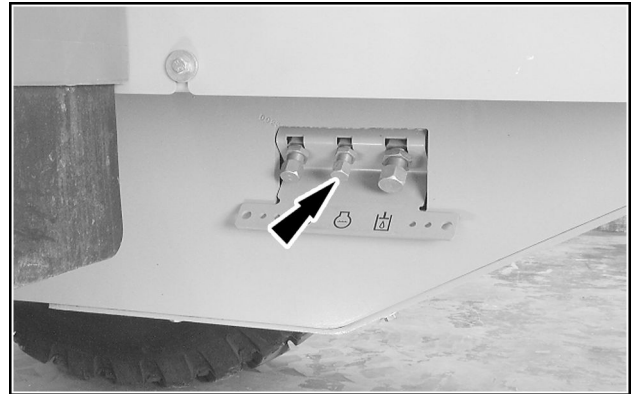


LAIL11WL0947A0A 3



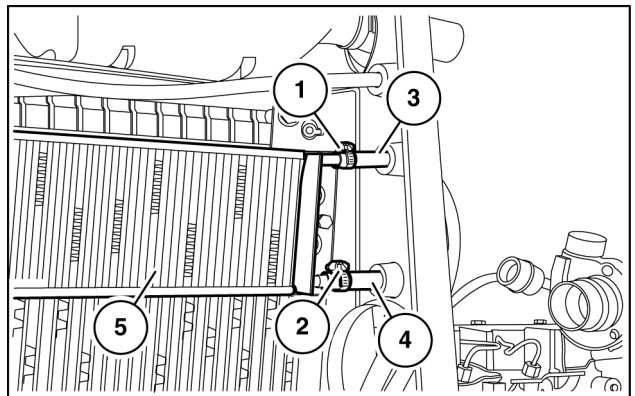
LAIL11WL0948A0A 4

6. Place a container with a **45.0 L (11.9 US gal)** capacity under the radiator drain. Remove the radiator cap. Then remove the drain plug and drain the coolant into the container. Install the drain plug after you have drained out the coolant. Install the radiator cap.



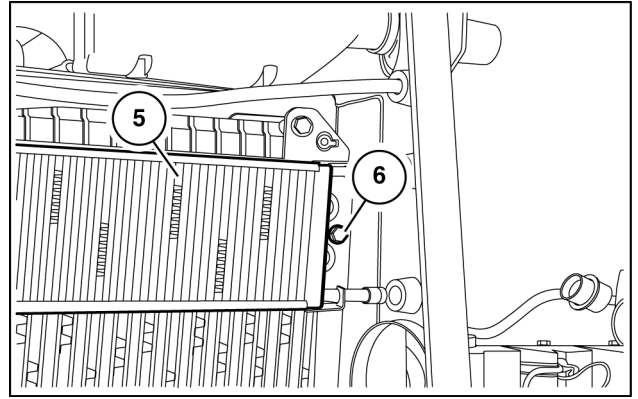
BRCE12WLCCM143B 5

7. Loosen the clamps **(1)** and **(2)** of the two hoses. Disconnect the two hoses **(3)** and **(4)** from the fuel cooler **(5)**. Plug the ends of the hoses and the holes of the cooler in order to prevent the entry of foreign material into the fuel system.



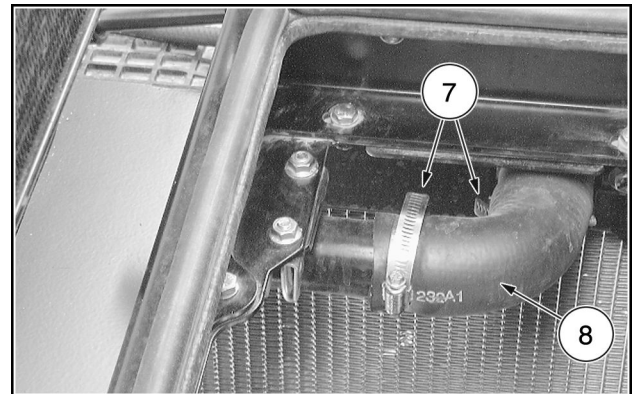
LAIL11CW1068A0A 6

8. Support the fuel cooler (5). Remove the two bolts (6) and the washers. Remove the fuel cooler.



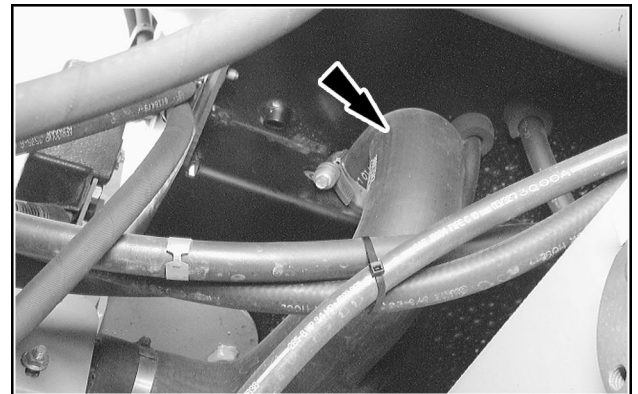
LAIL11CW1069A0A 7

9. If the loader is equipped with air conditioning, unlock the latch that secures the air conditioning condenser, located on the top of the frame of the cooling system. Tilt the air conditioning condenser to its vertical position. Loosen the two hose clamps (7). Remove hose (8).



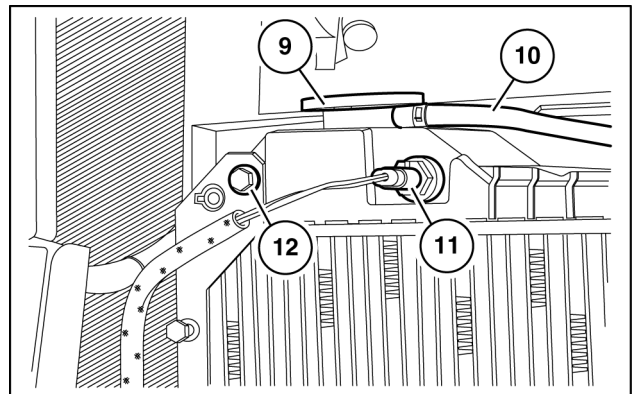
BRCE12WLCCM067B 8

10. Loosen the two clamps that secure the lower radiator hose. Remove the lower hose.



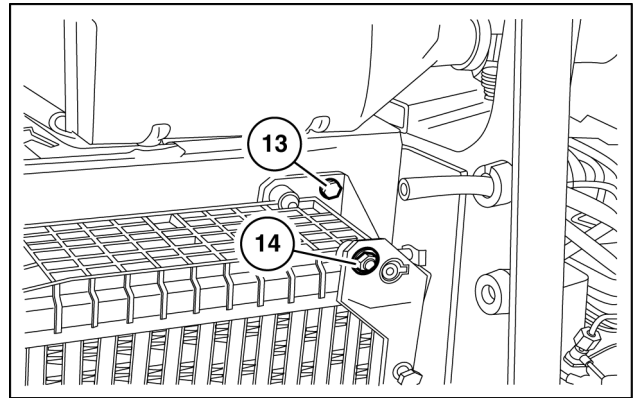
BRCE12WLCCM092A 9

11. Remove the radiator cap (9). Disconnect the overfilling (overflow) hose (10). Install the radiator cap. Disconnect the connector of the coolant level sender (11). Remove the bolt (12). Install a lifting eye.



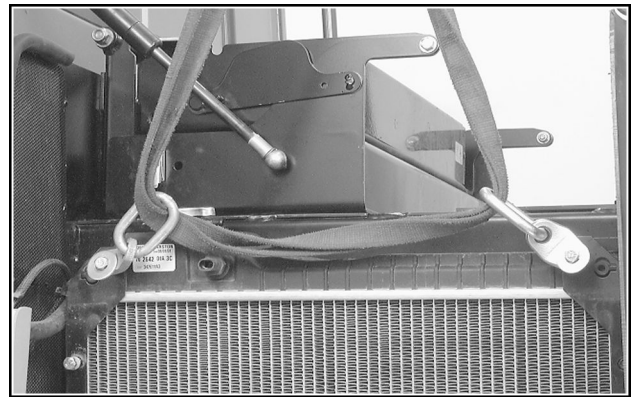
LAIL11CW1070A0A 10

12. Remove the two bolts **(13)** and the lock washers located on both sides of the radiator. Remove the bolt **(14)**. Install a lifting eye.



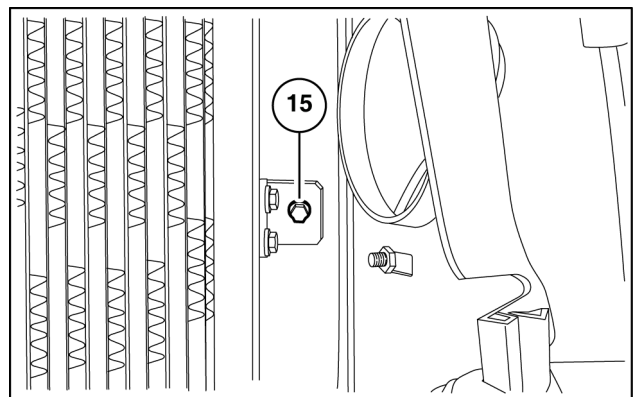
LAIL11CW1071A0A 11

13. Install the lifting equipment on the lifting eyes. Eliminate any slack present in the straps of the lifting equipment.



BRCE12WLCCM093A 12

14. Remove the four bolts **(15)** and the lock washers that secure the radiator to the cooling frame. Slowly and carefully lift the radiator cooling frame. Remove the frame from the loader.



LAIL11CW0897A0A 13

## Aftercooler - Remove

721E

LA

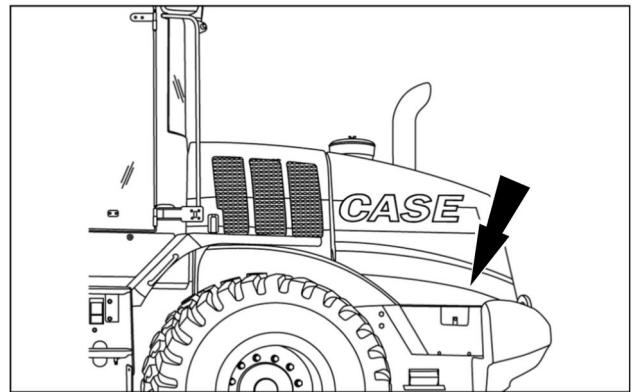
### **⚠ WARNING**

#### **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.**

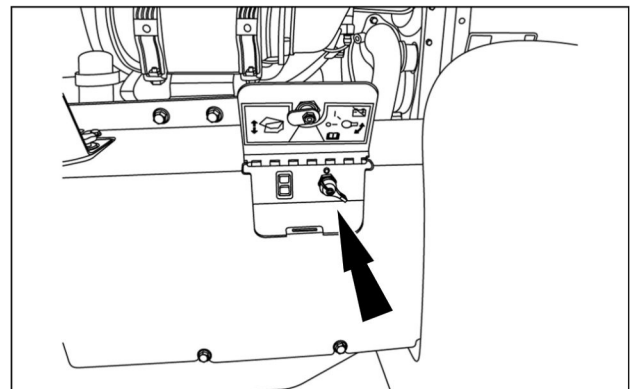
W0398A

1. Raise hood using controls located behind the access cover.



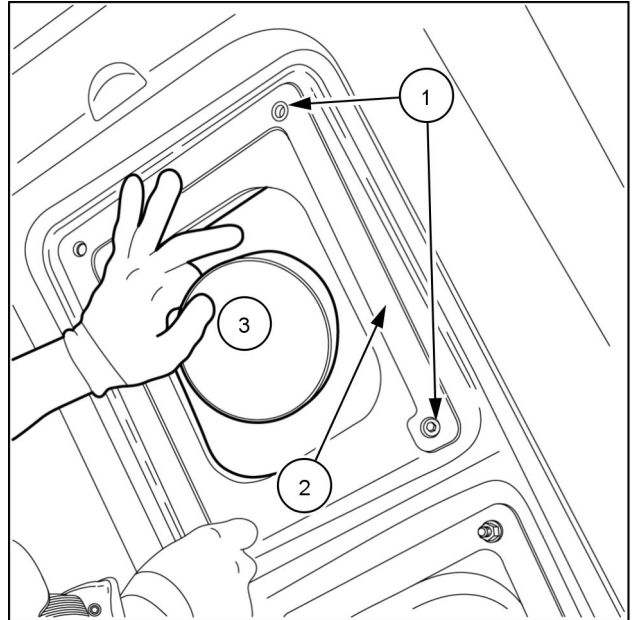
RCPH11WHL652BAU 1

2. After hood is raised, turn master electric switch to the off position.



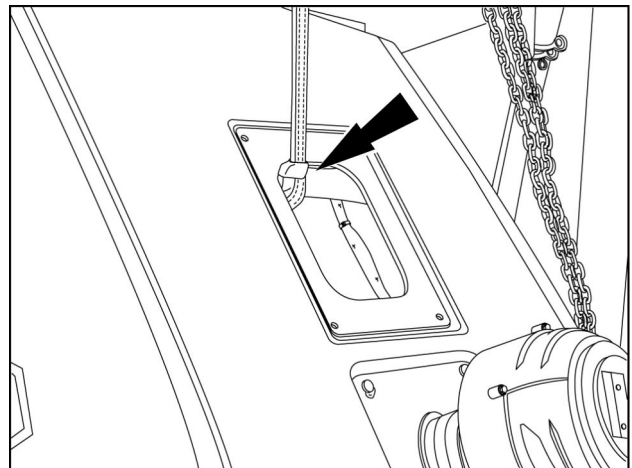
RCPH11WHL653BAU 2

3. On the underside of hood, remove bolts (1) from exhaust stack, then remove plate (2).
4. Remove exhaust stack (3).



RAPH12WEL0194AA 3

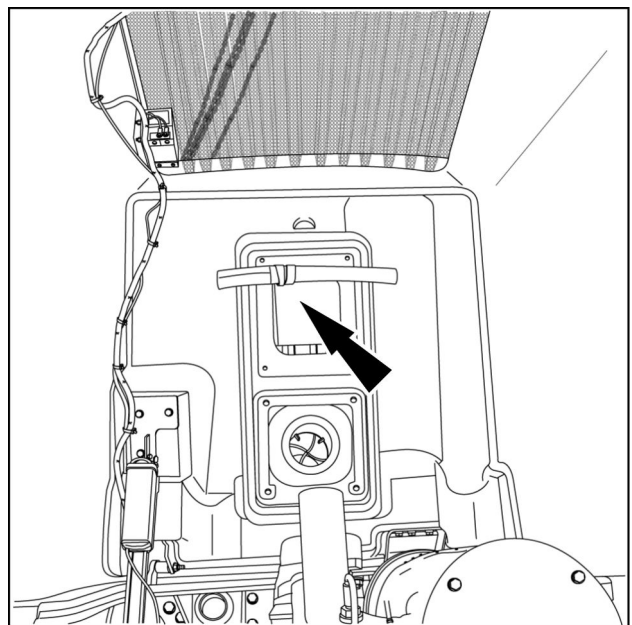
5. Double up a nylon lifting strap. From the topside, slide looped strap through the hood exhaust opening.



RAPH12WEL0170AA 4

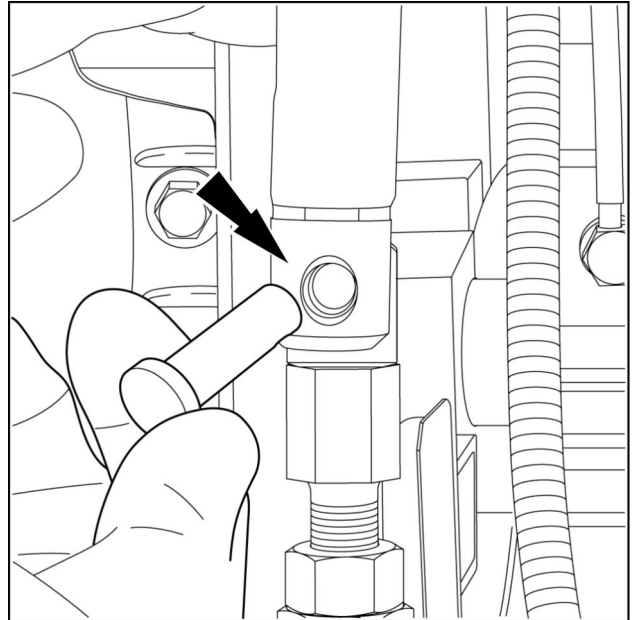
6. Place a solid steel bar through the strap loop (see arrow) and tighten. Attach the other end of the strap to a suitable lifting device and remove any slack in the line.

**NOTE:** Note the position of the lifting bar strap. It is offset to even out the weight distribution of the hood.



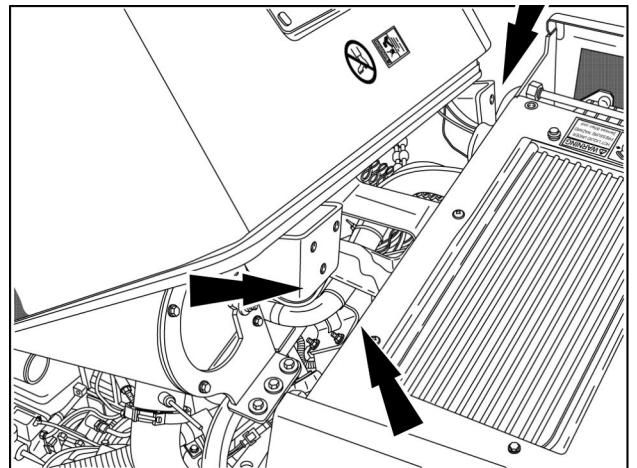
RAPH12WEL0193AA 5

7. Remove cotter pin and pin from the lift cylinder. Turn electrical master switch back on and run lift cylinder up. Once cylinder is retracted, return the electrical master switch back to the OFF position.



RAPH12WEL0191AA 6

8. Remove the hood bracket bolts and move hood away from back plate, allowing enough clearance to reach air cooler unit front bolts.

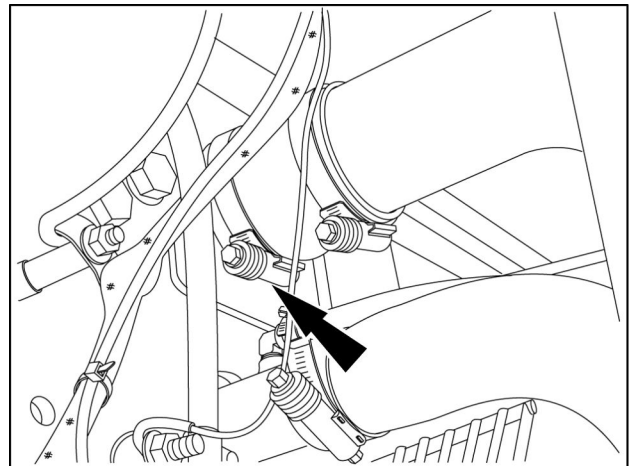


RAPH12WEL0169AA 7

### Turbocharger tube removal

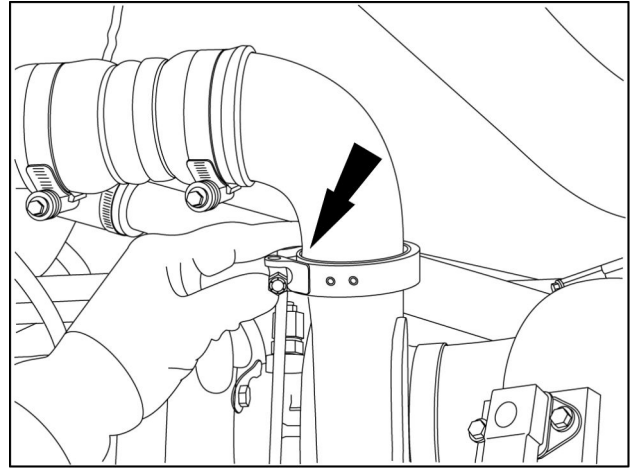
9. Loosen top left side clamp of the air cooler outlet hose.

**NOTE:** Loosen only the clamp closest to the air cooler.



RAPH12WEL0207AA 8

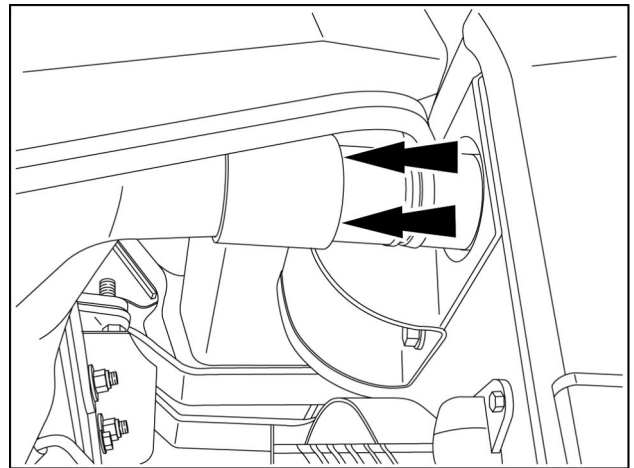
10. Loosen the clamp at the elbow-turbocharger connection end. Remove tube and plug turbocharger.



RAPH12WEL0206AA 9

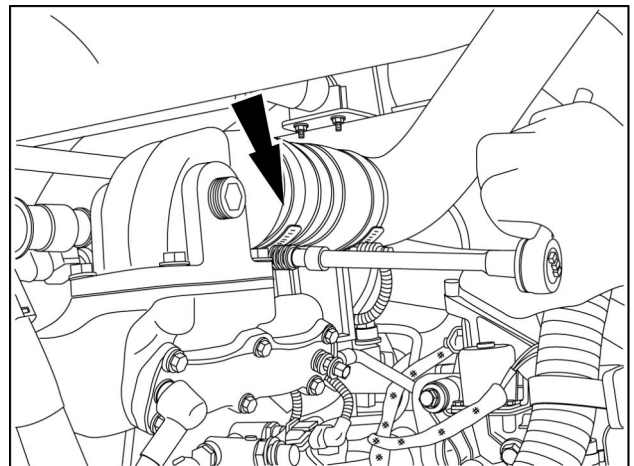
### Intake port tube removal

11. Loosen top right side clamps of the air cooler intake hose. Slide hose back far enough to clear air cooler tube.



RAPH12WEL0200AA 10

12. Loosen end clamp on intake port side of the engine. Remove tube with hose.

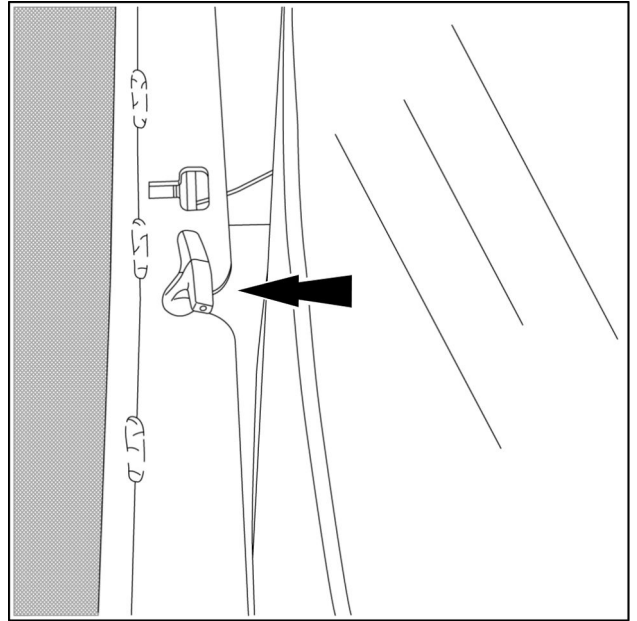


RAPH12WEL0202AA 11

### Screen cover removal

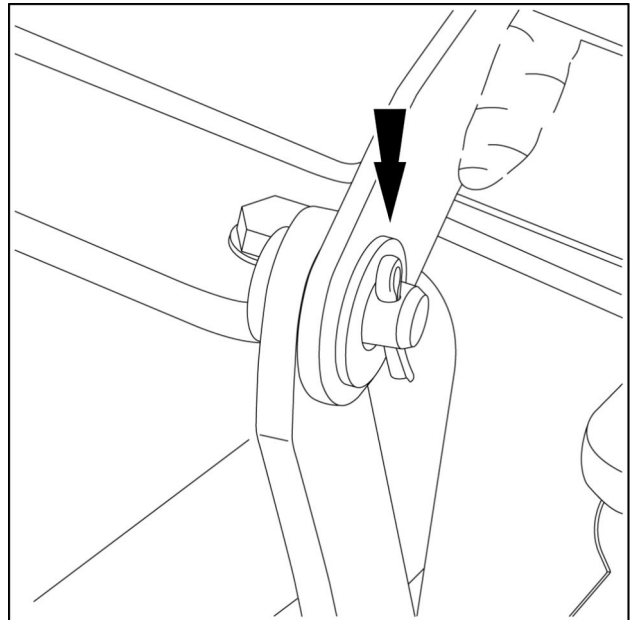
13. Unlatch the rubber T-handle from the screen cover.

**NOTE:** Screen cover may be different from what is shown.



RAPH12WEL0190AA 12

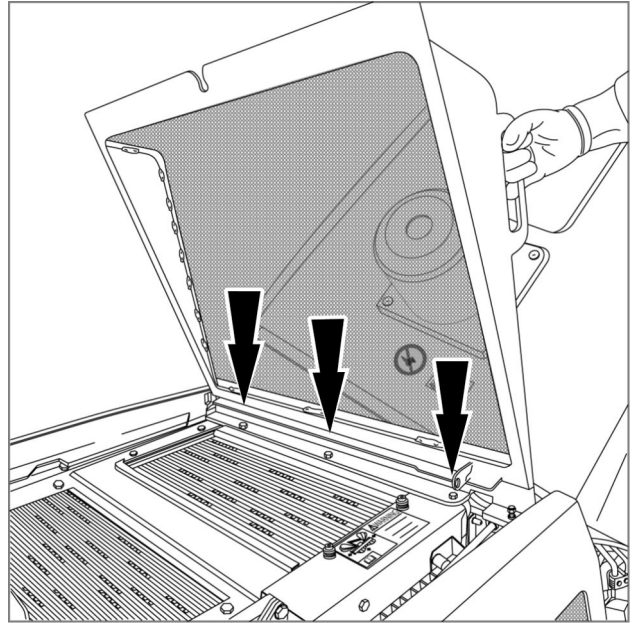
14. Lift screen cover part way. Pull cotter pin and washer from screen tab and locking bar prop.



RAPH12WEL0189AA 13

15. Open screen cover completely and remove the bolts.  
Lift and remove cover.

**NOTE:** Always use proper lifting devices.



RAPH12WEL0181AA 14

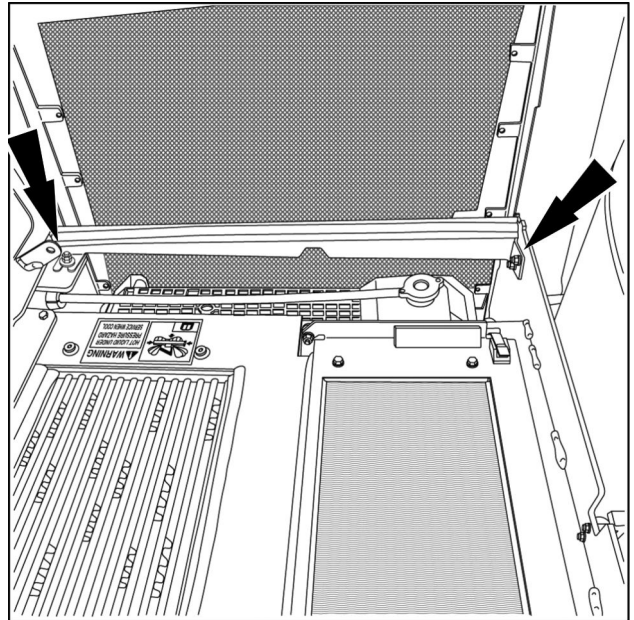
### air cooler unit removal

**NOTE:** For Commodity King, include instruction 16. For Standard 721F omit instruction 16 and go to instruction 17.

#### Commodity king only

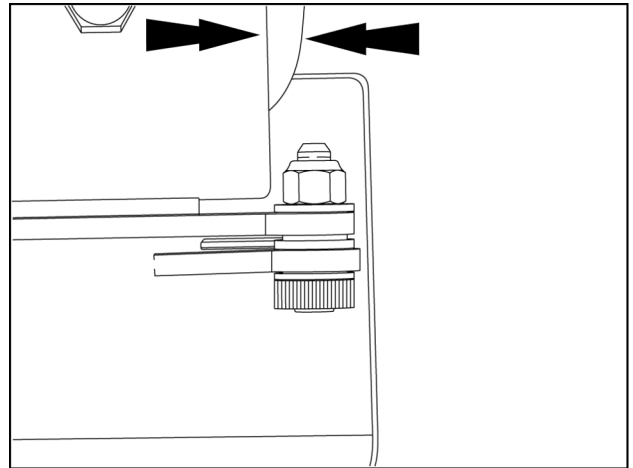
16. Lift side panels. Unbolt and remove left and right beam seals, then lower side panels.

**NOTE:** Left side shown.



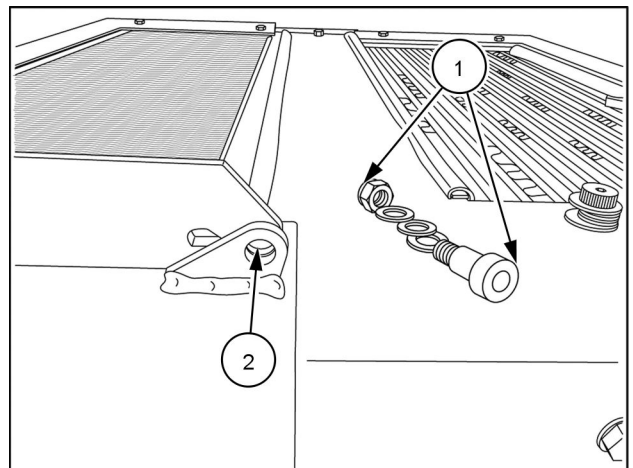
RAPH12WEL0222AA 15

17. With a sharp cutting tool, make a slice in the gasket (arrowed) near the shoulder bolt.



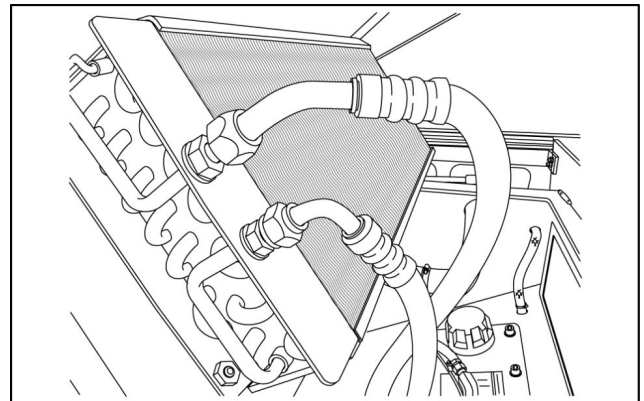
RAPH12WEL0177AA 16

18. Remove shoulder bolt, washers and nut (1) from air conditioner condenser unit (2).



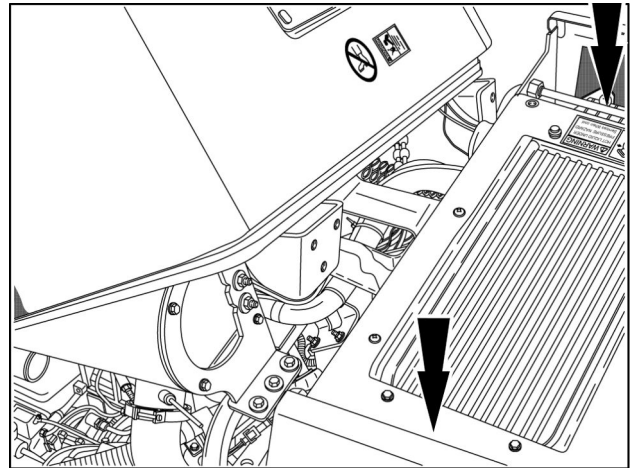
RAPH12WEL0221AA 17

19. Lift air conditioner condenser up and angle toward the back of the cab. Support in place if needed.



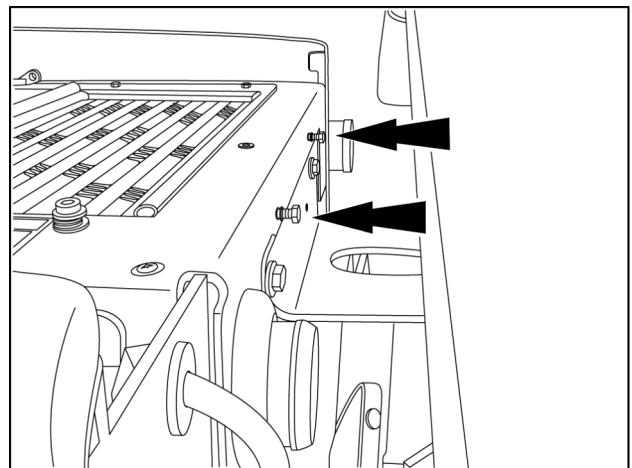
RAPH12WEL0146AA 18

20. Lift up side panels. Remove the left and right side bolt of air cooler unit.



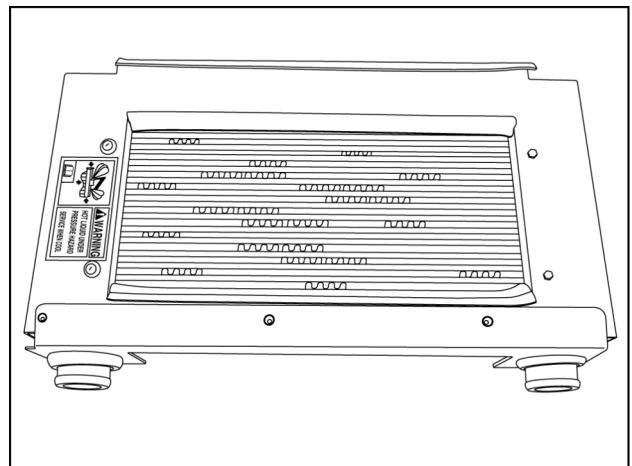
RAPH12WEL0169AA 19

21. Remove front bolts of air cooler unit.



RAPH12WEL0174AA 20

22. Remove air cooler unit out of cooler package framework.



RAPH12WEL0172AA 21

**Next operation:**  
**Aftercooler - Testing (10.310)**

## Aftercooler - Install

721E

LA

### **⚠ WARNING**

#### **Heavy objects!**

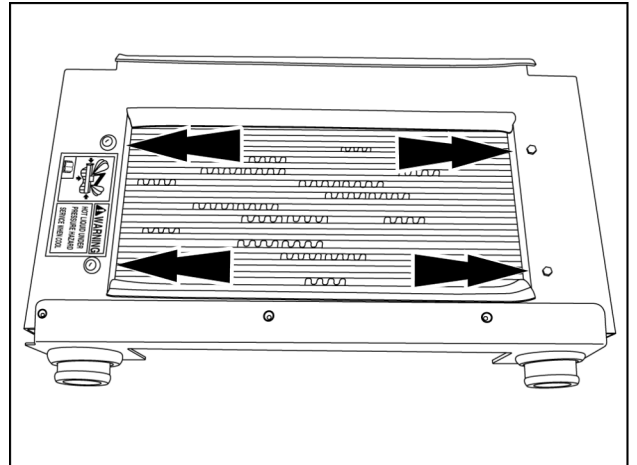
**Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply could result in death or serious injury.**

W0398A

#### **Prior operation:**

#### **Aftercooler - Remove (10.310) Aftercooler - Testing (10.310)**

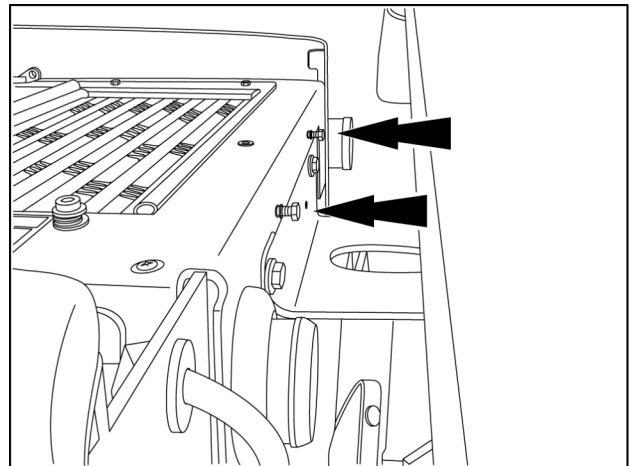
1. Attach frame to air cooler assembly. Bolt in place with four bolts and washers.



RAPH12WEL0172AA 1

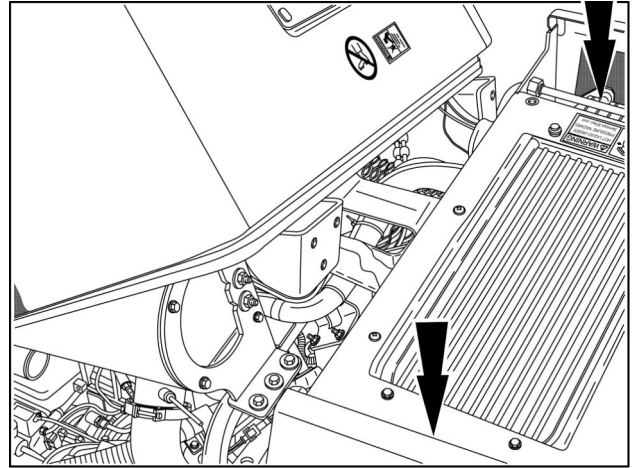
2. Using proper lifting equipment, lift and position completed air cooler unit into the cooler package framework with the tubes situated within the front plate cut-out, facing the engine (1). Insert two bolts (2) and partially set.

**NOTE:** Do not tighten bolts at this time.



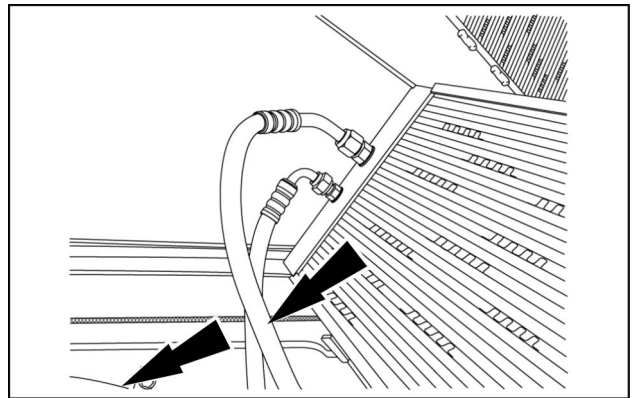
RAPH12WEL0174AA 2

3. Raise side panel and insert bolt into each side of the air cooler unit. Run bolt PART way.
4. Once air cooler unit is semi-secured, tighten sides and front bolts, then lower side panels.



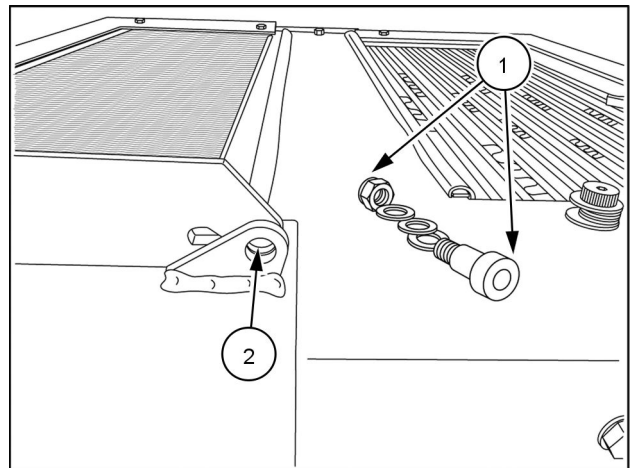
RAPH12WEL0169AA 3

5. Slide air conditioner condenser unit back in place.



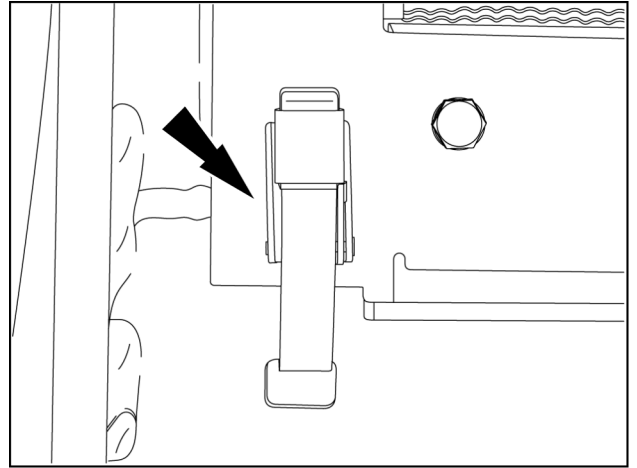
RAPH12WEL0145AA 4

6. Using a shoulder bolt, three washers and a nut **(1)**, secure air conditioner condenser unit **(2)** in place.



RAPH12WEL0221AA 5

7. Flip latch closed on air conditioner condenser unit.

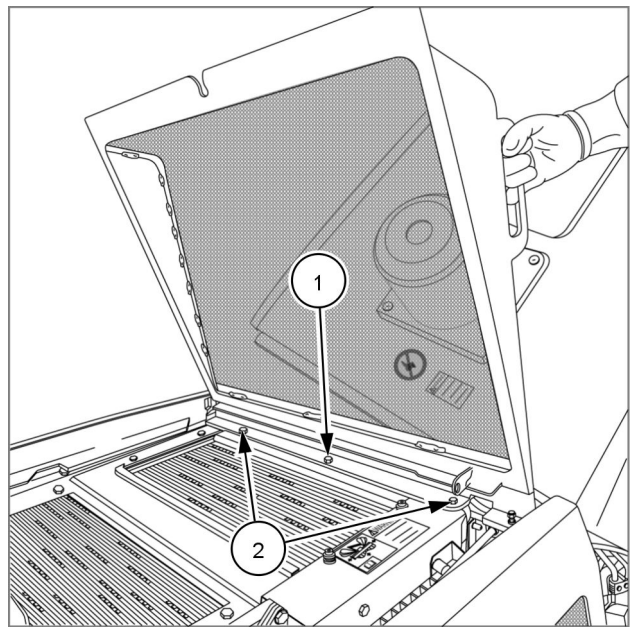


RAPH12WEL0179AA 6

8. Line up screen cover and run center bolt PART way (1). Insert outer bolts (2) then securely tighten all three bolts.

**NOTE:** Screen cover may be different than shown.

**NOTE:** For Commodity King, continue instructions. Standard 721F go to instruction 12.

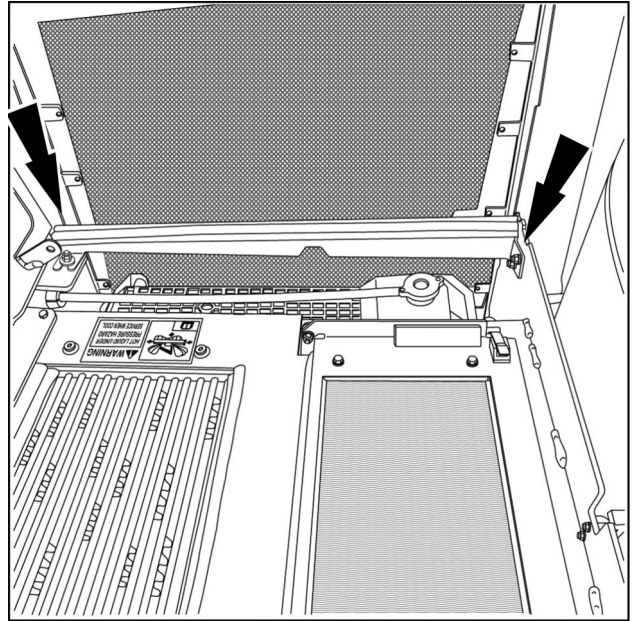


RAPH12WEL0181AA 7

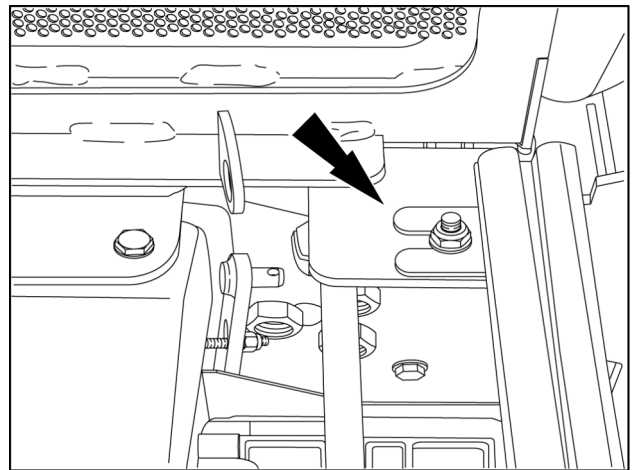
**Commodity king only**

9. Lift side panel. Attach hood beam seal with weather stripping shield facing up.

**NOTE:** Left side panel shown.

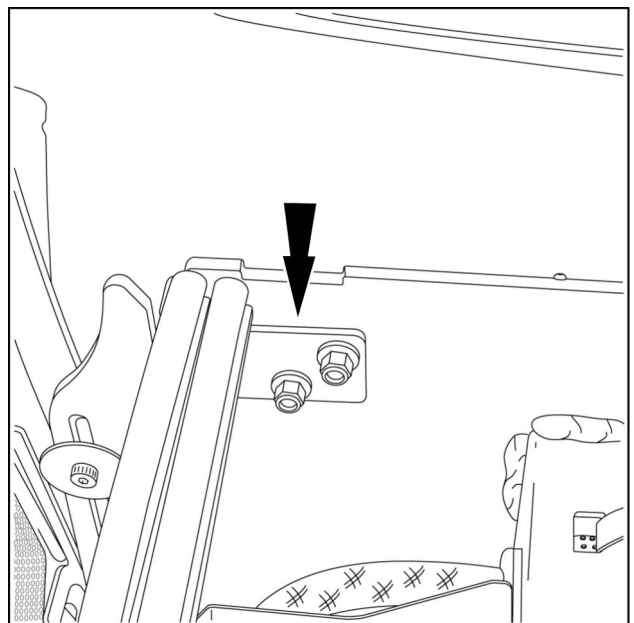


10. Slide beam seal onto hood hinge stud and tighten in place with washer and nut.



11. Insert two bolts on opposite end of beam seal and frame. Tighten in place with washers and nuts.

**NOTE:** Repeat procedure on right side.





**Suggest:**

**If the above button click is invalid.**

**Please download this document**

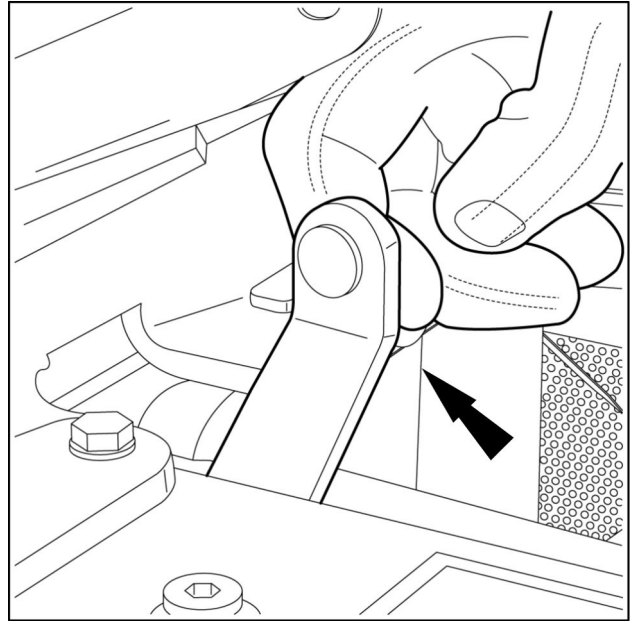
**first, and then click the above link**

**to download the complete manual.**

**Thank you so much for reading**

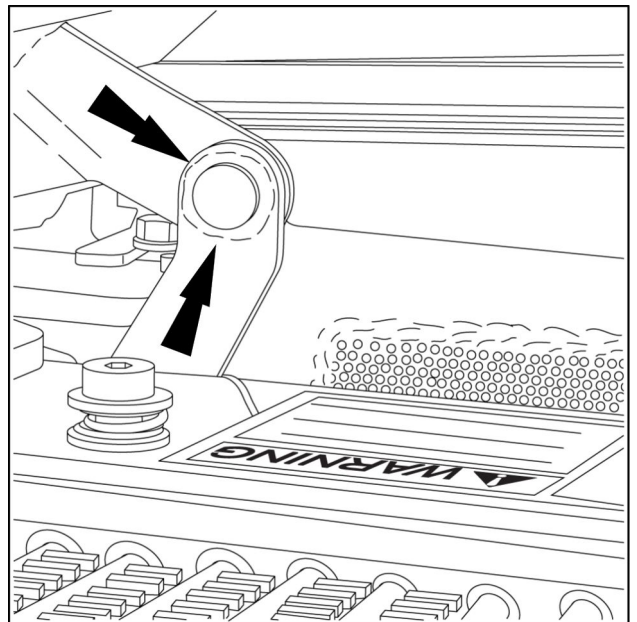
### Screen cover installed

12. Raise screen cover locking bar prop on left side.



RAPH12WEL0187AA 11

13. Partially lower screen cover, lining up screen tab with locking bar prop.



RAPH12WEL0188AA 12

**<https://www.ebooklibonline.com>**

Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

**<https://www.ebooklibonline.com>**