

Product: Case CX160C Crawler Excavator Service Manual

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CX160C Crawler Excavator

SERVICE MANUAL

Part number 47795403

English

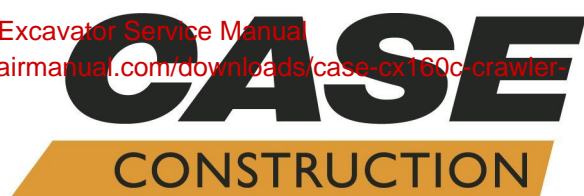
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January 2016



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SERVICE MANUAL

CX160C Crawler excavator LC version (TIER 4) - APAC Region - ANZ Market

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EN

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INTRODUCTION

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Foreword - Important notice regarding equipment servicing

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

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

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

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

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

Safety rules

Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules – General information

Cleaning

Clean the metal parts with cleaning solution that meets the standard and steam cleaning. (except for bearings)

After cleaning, dry well, and inject oil in all parts.

Also inject oil into the bearings after drying.

Inspection

When disassembling parts, check all the parts.

If there are any worn or damaged parts, replace them.

Inspect carefully to prevent initial breakdowns.

Bearing

Replace any loose bearings.

Air dry bearings before installing them.

Needle bearing

When inserting needle bearings, be very careful not to damage them.

Apply grease to the section where the needle bearing will be inserted.

Gear

Check that there is no wear and no damage.

Oil seal, O-ring, gasket

Always install new oil seals, O-rings, and gaskets.

Apply grease to sections where oil seals and O-rings will be inserted.

Shaft

Check that there is no wear and no damage.

Check the bearings and check for damaged oil seals on the shaft.

Service parts

Install CASE CONSTRUCTION genuine service parts.

When placing an order, check the parts catalog. It contains the CASE CONSTRUCTION genuine part numbers.

Any breakdowns arising from the installation of non-genuine parts are not covered by the warranty.

Lubricants (fuel, hydraulic oil)

Use the oil from the specified company or specified in the operator's manual or service Manual.

Any breakdowns arising from any fuel or hydraulic oil other than those specified are not covered by the warranty.

Safety rules – Personal safety

 **WARNING:**

This symbol indicates a precaution.
It gives information concerning the safety of the operator and those in the surroundings.
Read and understand these precautions thoroughly before performing the work.

Always comply with warnings and precautions so as to avoid any accidents.

This section covers information related to overall safety.

Check whether all warning labels are in place.

Additional labels can be ordered from Service Parts.

 **WARNING:**

Read the operator's manual to gain a thorough understanding of machine control operations.

 **WARNING:**

Perform any machine operations from the seating position.
Any other method may cause severe injuries.

 **WARNING:**

Only the one operator is to ride on the machine. No one else is to ride on it.

 **WARNING:**

Check the safety messages in the operator's manual before starting the engine.
Check all the warning labels on the machine.
Check that no one is within the machine's operating range.
Check the operating methods in a safe location before starting the actual work.
Understand the machine operations well, then operate in compliance with all service-related laws and regulations.
The operator's manual can be purchased at your CASE CONSTRUCTION dealer.

 **WARNING:**

Working with sloppy clothes or clothes with which safety cannot be ensured leads to damage to the machine and injury to the operator.
Always wear clothes that ensures safety.
In order to work more safely, it is recommended to wear additional safety equipment.
Helmet, safety shoes, ear protection, goggles, work clothes, and gloves

 **WARNING:**

Pay careful attention when working with the engine running.

 **WARNING:**

Check hydraulic equipment.
Work according to the procedure.
Do not change the procedure.

INTRODUCTION

 WARNING:

Check that there is no one in the surroundings before draining the pressure from hydraulic circuits during machine hydraulic cylinder inspection.

 WARNING:

Use gloves when handling high-temperature parts.

 WARNING:

Bring the lower parts or attachments in contact with the ground before inspecting or repairing them.

 WARNING:

Check that hoses and tubes are securely connected.
If there is any damage to a hose or tube, replace it.
Do not check for oil leaks by hand. Use cardboard or wood.

 WARNING:

When removing an attachment pin or other hardened pin, use a hammer that has a soft head.

 WARNING:

Wear eye protection when using a hammer to install a pin or when working with a grinder.
At this time, use goggles or eye protectors that meet standards.

 WARNING:

Park the machine in a safe location when repairing or inspecting it.

 WARNING:

Use work site protection when repairing the machine.
Check the oil, coolant, grease, and tools.
Recover materials and parts as necessary.
Pay enough attention to safety.

 WARNING:

Some of the machine's parts are extremely heavy.
Use an appropriate lifting equipment for such parts.
For weights and procedures, see the Service Manual.

 WARNING:

Exhaust gases are toxic.
Always provide good ventilation when working indoors or in any other enclosed space.

 WARNING:

If the electrolytic battery solution freezes, it may explode.

Safety rules – ROPS judgment

1. Purpose

Check against the ROPS judgment criteria to judge whether the machine satisfies the ROPS criteria or not.

The weight and boom of the machine greatly effects whether the ROPS judgment criteria is satisfied or not.

The ROPS test assumes that the weight being used is the weight of the machine when the maximum number of selectable options are mounted (as of 2009).

However, depending on the derivative machinery or the order details, the weight and boom position may differ from the assumed weight or position.

2. Criteria for judging whether a machine satisfies the ROPS criteria

Weight

The weight must not be over the weight shown below for each class.

If the weight is exceeded, there is a danger that the cab could be damaged and the operator could die or sustain a serious injury when the machine falls over.

If the weight exceeds the stipulated weight, the machine will not satisfy the ROPS criteria.

- Weight (X3 model)

To satisfy the ROPS criteria, the weight must not be over the indicated weight. (The below weights are the weights indicated on the plate within the ROPS cab.)

Machine body total weight	Class
16000 kg (35273.96 lb) max.	CX75C
	CX80C
	CX145C
20500 kg (45194.76 lb) max.	CX130C
	CX160C
28000 kg (61729.43 lb) max.	CX235C
	CX210C
31000 kg (68343.30 lb) max.	CX250C
	CX250C LR
	CX300C
	CX470C
50000 kg (110231.13 lb) max.	

* The ROPS test assumes that the CX470C has a cage guard (alone).

- Weight (X2 model)

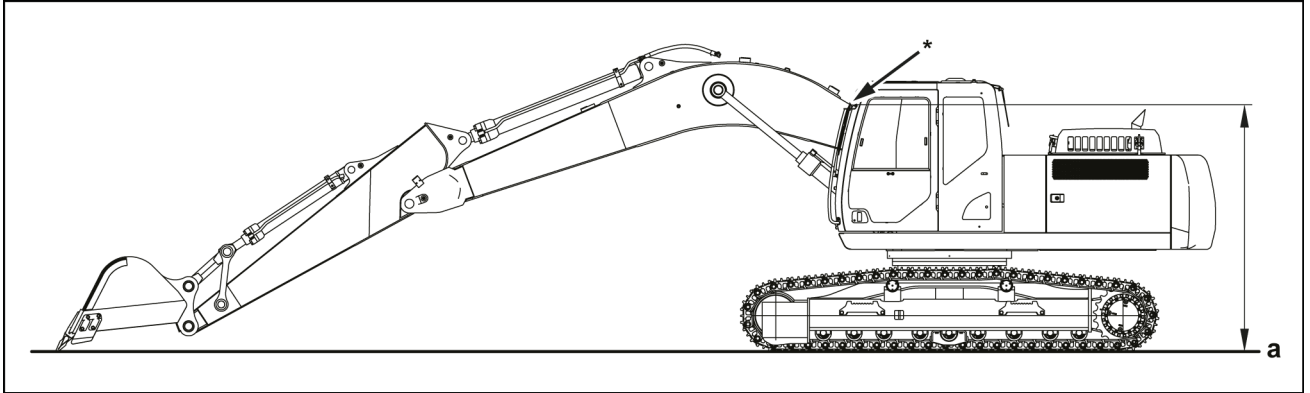
To satisfy the ROPS criteria, the weight must not be over the indicated weight. (The below weights are the weights indicated on the plate within the ROPS cab.)

Machine body total weight	Class
26600 kg (58642.96 lb) max.	CX130B
	CX160B
	CX180B
	CX210B
	CX240B

Boom position

⚠ WARNING:

- If the machine has been modified so that the boom position has been lowered, the machine will not satisfy the ROPS criteria.
- It is necessary to consult with us if it is possible that the boom's position has been lowered by modification.
- The extent to which a boom position has moved cannot be determined in the same way for all machines.



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(a) Ground point

With the tip of the bucket in contact with the ground surface at maximum work radius, if the position (* in the diagram) that overlaps with the cab when viewed from the side is markedly lower than that of a standard machine (standard arm), the machine will not satisfy the ROPS criteria.

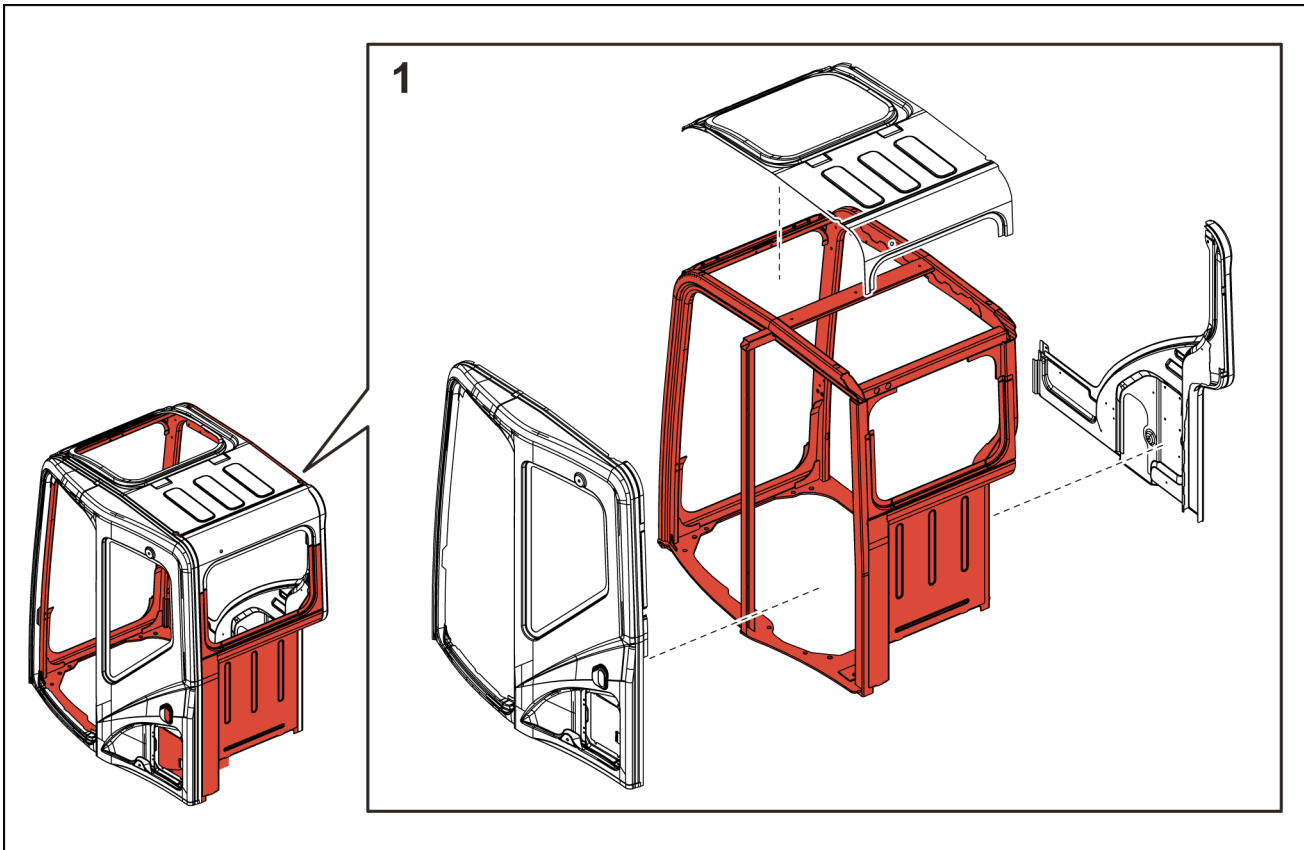
Also, with a machine body with a cab mounted that can withstand up to **31 ton**, the effect of mounting a **24 ton** machine, which is near the restriction weight, and a **21 ton** machine to the same cab will not be the same.

3. Prohibited items

- Modifications that reduce the strength of a platform that has a cab with a ROPS mounted to it. (Actions or modifications that reduce the functionality of the anchoring part at the left-rear of the cab)
- Modifications that effect the strength of the ROPS of a cab.

Modification prohibited (Red part)	All modifications (grinding, welding, drilling holes, removing, etc.) are prohibited.
Modification permitted under conditions (Gray part)	Removal of parts is prohibited. Bar welding and making holes (up to diameter 20 mm (0.787 in)) by drilling are possible.

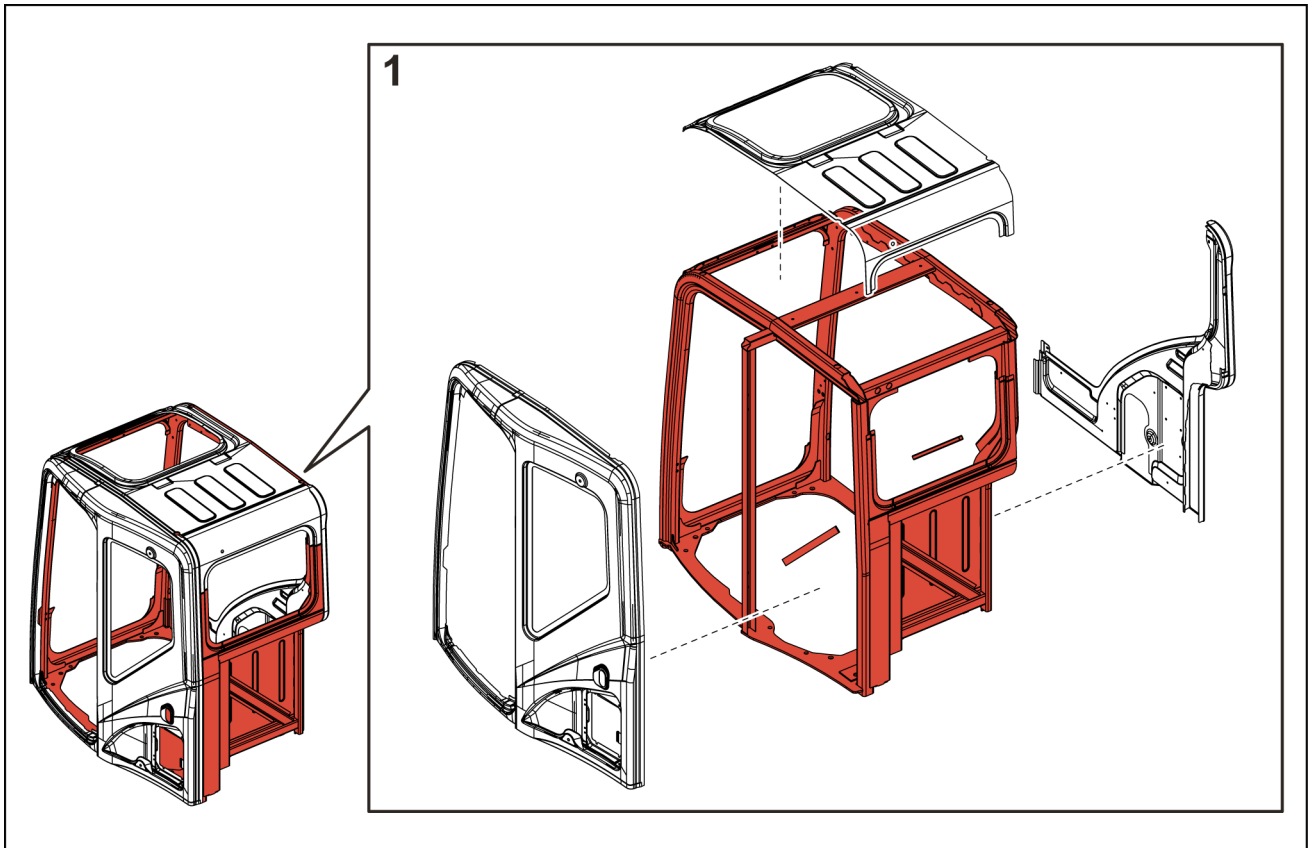
[X3 cab (CX75C/CX80C/CX145C)]



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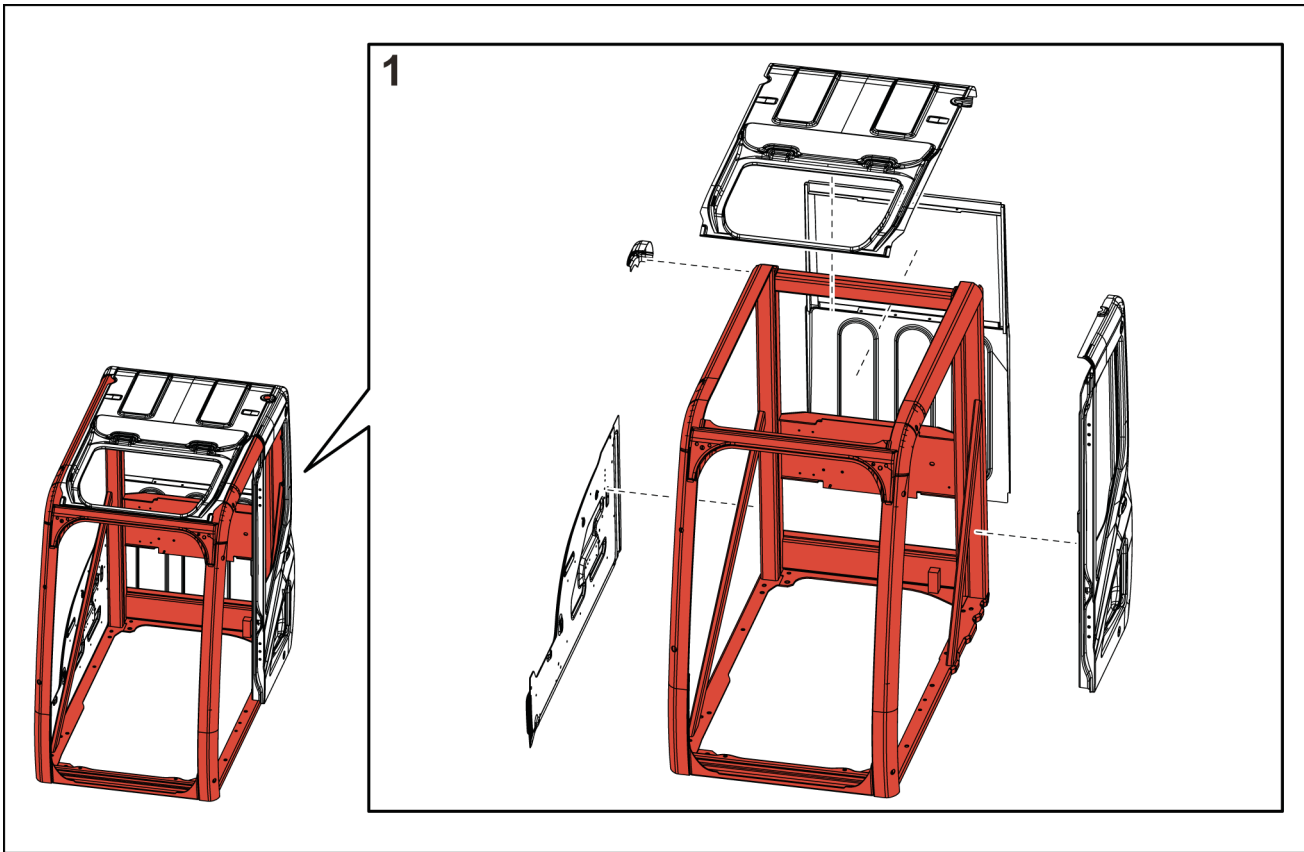
[X3 cab (CX235C)]

The cab for the MSR model (CX235C) is the cab of the MSR model on the diagram (CX75C/ CX80C/CX145C) with reinforcement materials added in 3 locations.



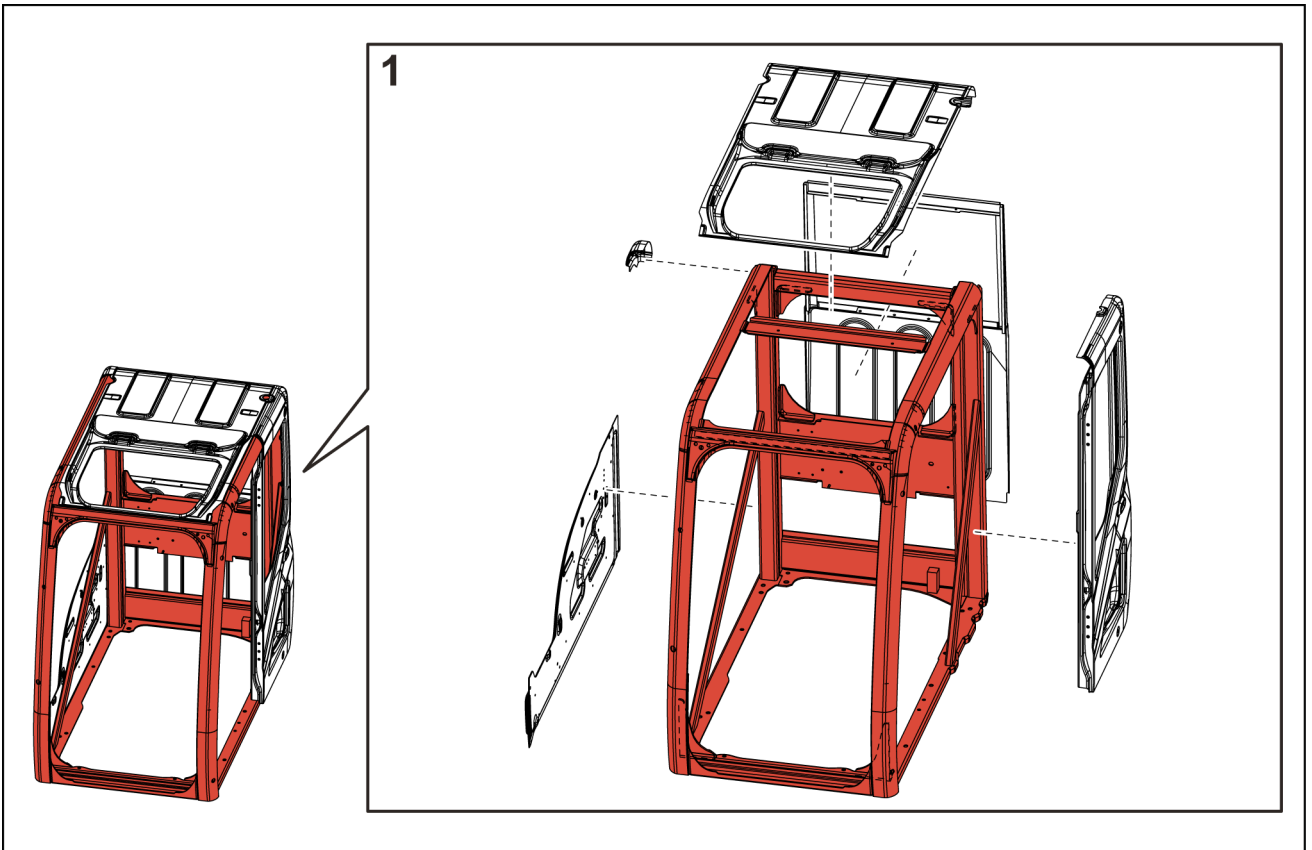
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[X3 cab (CX130C/CX160C)]



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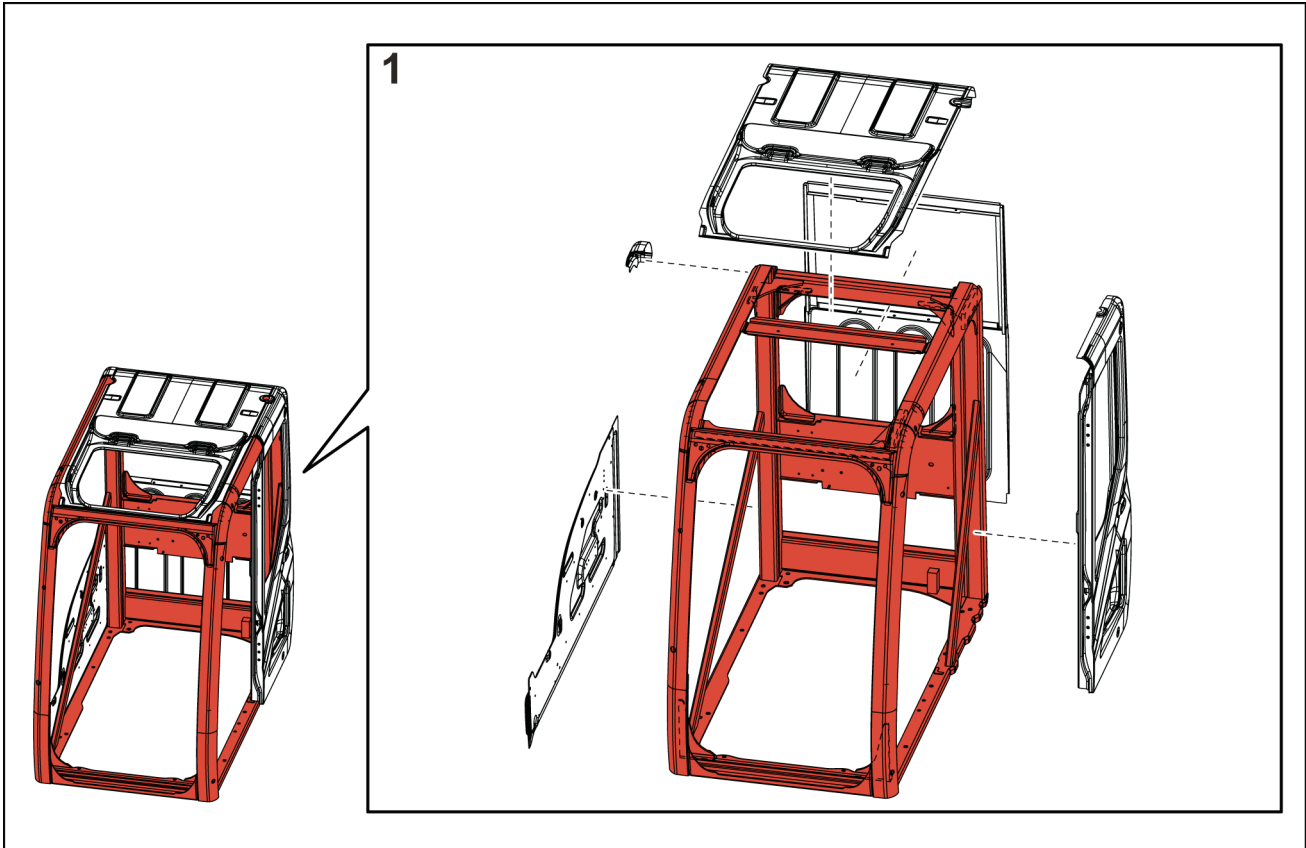
[X3 cab (CX210C/CX240C/CX290C)]



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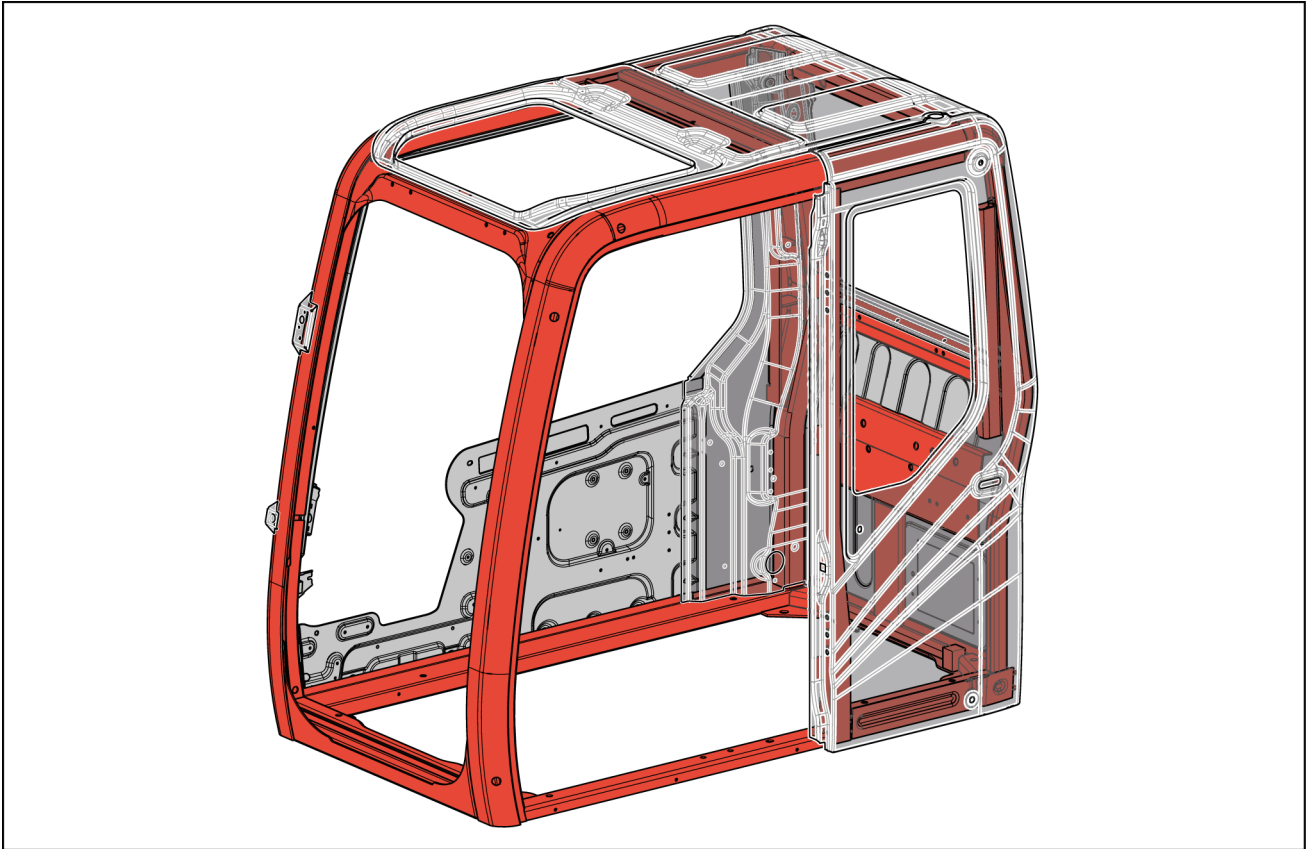
[X3 cab (CX350C)]

The cab for the large-sized model (CX350C) is the cab of the medium-sized model on the diagram (CX210C - CX290C) with reinforcement materials added in 7 locations.



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[X2 cab (CX130B/CX160B/CX210B/CX240B)]

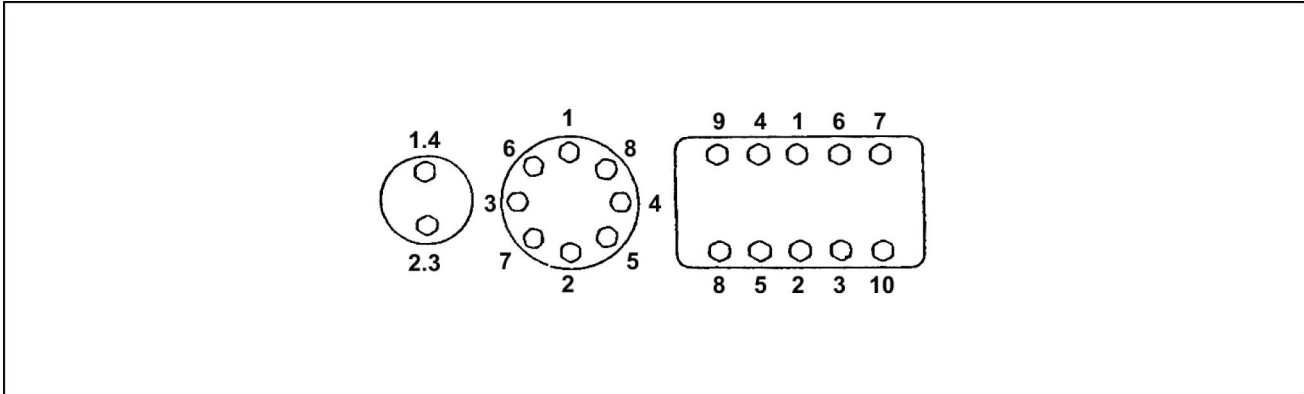


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- In general, high cabs do not satisfy the ROPS criteria. (It is necessary to consult with us to check if the high cab model satisfies the ROPS criteria.)

Torque – Bolt and nut

- Tighten alternating between left and right and top and bottom so that uniform tightening force is applied.



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- If **LOCTITE®** was used on a removed bolt (there is something white sticking to the bolt when it is removed), clean the old **LOCTITE®** off with cleaning fluid, dry the bolt, then apply 2 - 3 drops of **LOCTITE®** to the thread section of the bolt.

Torque table

Bolt nominal diameter (size)		M6	M8	M10	M12	M14	M16	M18	M20
Hexagon bolt	Wrench	10 mm	13 mm	17 mm	19 mm	22 mm	24 mm	27 mm	30 mm
	Tightening torque	6.9 N·m (5.089 lb ft)	19.6 N·m (14.456 lb ft)	39.2 N·m (28.912 lb ft)	58.8 N·m (43.369 lb ft)	98.1 N·m (72.355 lb ft)	156.9 N·m (115.72 m (115.72 3 lb ft)	196.1 N·m (144.63 m (144.63 6 lb ft)	294.2 N·m (216.99 m (216.99 1 lb ft)
Hexagon socket head bolt	Wrench	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	14 mm	17 mm
	Tightening torque	8.8 N·m (6.491 lb ft)	21.6 N·m (15.931 lb ft)	42.1 N·m (31.051 lb ft)	78.5 N·m (57.899 lb ft)	117.7 N·m (86.811 lb ft)	176.5 N·m (130.18 m (130.18 0 lb ft)	245.2 N·m (180.85 m (180.85 0 lb ft)	343.2 N·m (253.13 m (253.13 1 lb ft)

Torque – Special torque settings

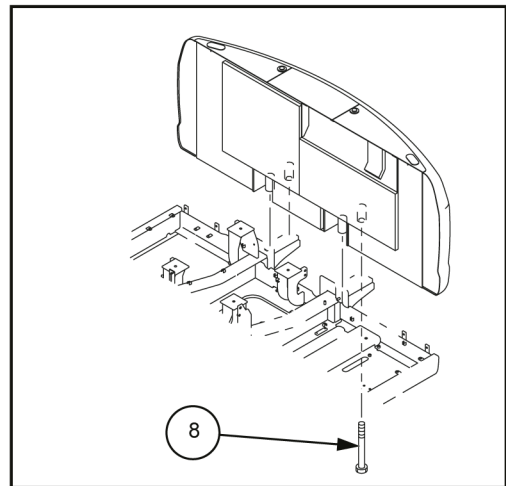
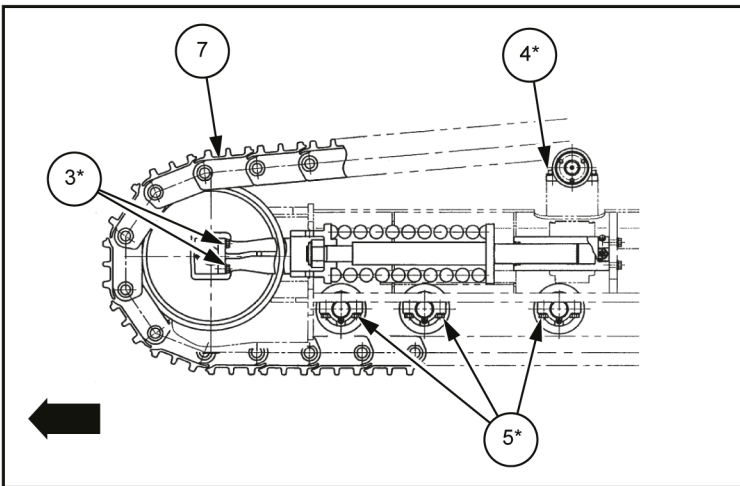
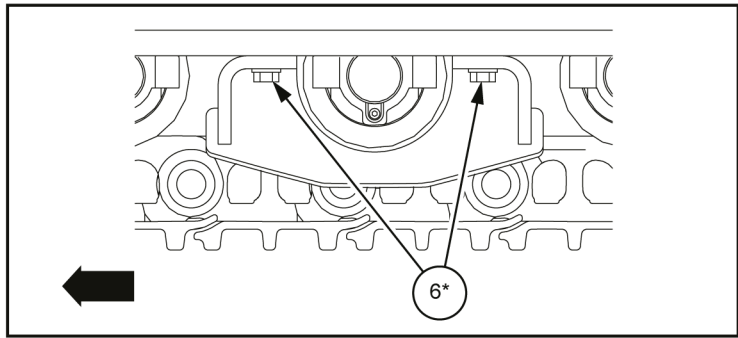
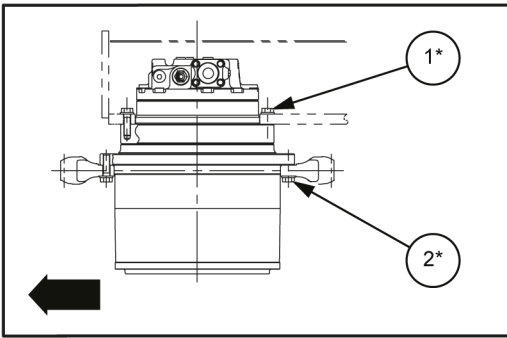
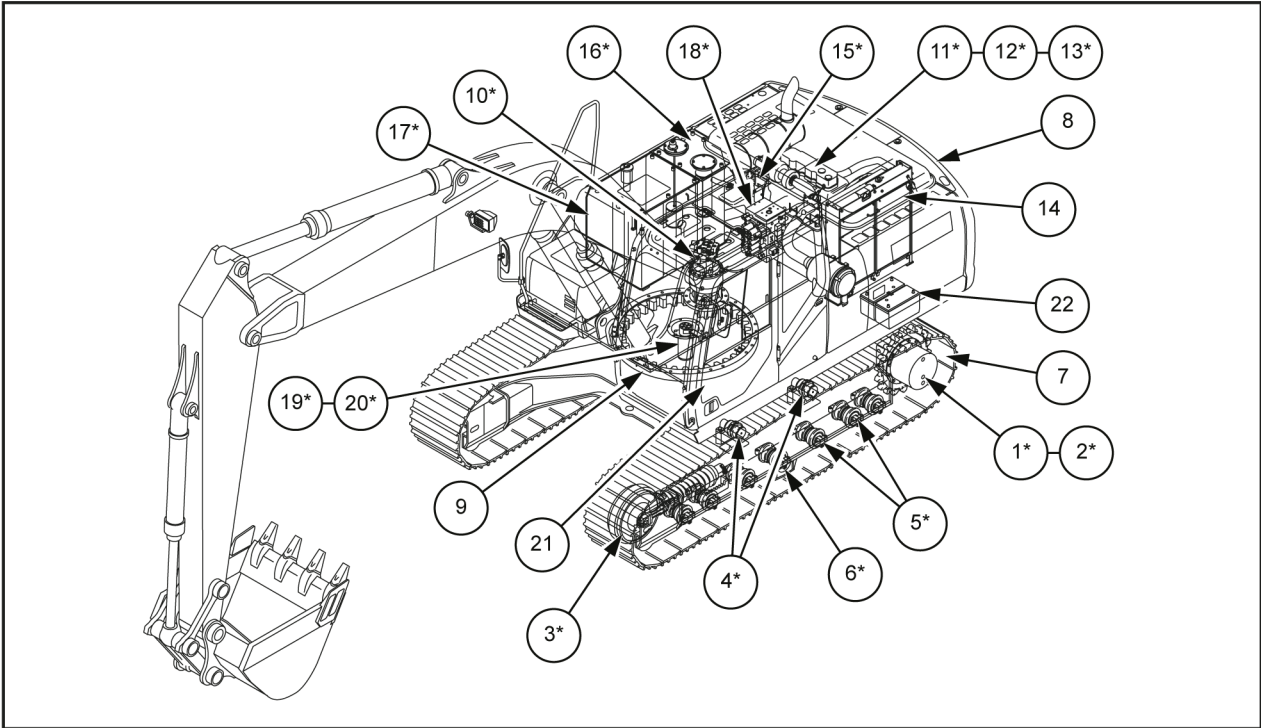
Code	Retightening location		Bolt nominal diameter	Wrench	Tightening torque
1*	Travel motor		M16	24 mm	267 - 312 N·m (196.93 - 230.12 lb ft)
2*	Drive sprocket		M16	24 mm	267 - 312 N·m (196.93 - 230.12 lb ft)
3*	Take-up roller		M16	24 mm	267 - 312 N·m (196.93 - 230.12 lb ft)
4*	Upper roller		M20	30 mm	521 - 608 N·m (384.27 - 448.44 lb ft)
5*	Lower roller		M18	27 mm	371 - 432 N·m (273.64 - 318.63 lb ft)
6*	Track guard		M18	27 mm	400 - 462 N·m (295.02 - 340.75 lb ft)
7	Shoe		M20	30 mm	755 - 853 N·m (556.86 - 629.14 lb ft)
8	Counterweight		M27	41 mm	1078 - 1274 N·m (795.09 - 939.65 lb ft)
9	Turntable bearing		M20	30 mm	468 - 545 N·m (345.18 - 401.97 lb ft)
10*	Swing unit		M20	30 mm	539.4 - 629.6 N·m (397.84 - 464.37 lb ft)
11*	Engine	Mount	M16	24 mm	264.9 - 313.9 N·m (195.38 - 231.52 lb ft)
13*		Rear bracket	M12	19 mm	109 - 127 N·m (80.39 - 93.67 lb ft)
14	Radiator		M12	19 mm	63.8 - 73.6 N·m (47.06 - 54.28 lb ft)
15*	Hydraulic pump	Pump	M16	14 mm hexagon socket head	223 - 247 N·m (164.48 - 182.18 lb ft)
16*	Hydraulic oil tank		M16	24 mm	232.4 - 276 N·m (171.41 - 203.57 lb ft)
17*	Fuel tank		M16	24 mm	232.4 - 276 N·m (171.41 - 203.57 lb ft)
18*	Control valve		M16	24 mm	267 - 312 N·m (196.93 - 230.12 lb ft)
19*	Center joint	Lock bar	M12	19 mm	88.3 - 107 N·m (65.13 - 78.92 lb ft)
20*		Joint	M12	19 mm	109 - 127 N·m (80.39 - 93.67 lb ft)
21	Cab		M16	24 mm	149 - 173 N·m (109.90 - 127.60 lb ft)
22			M10	17 mm	19.6 - 29.4 N·m (14.46 - 21.68 lb ft)



CAUTION:

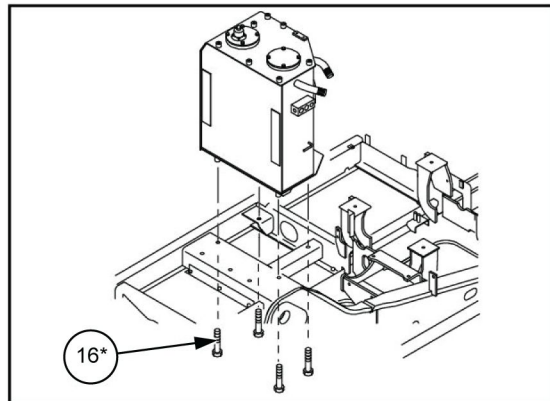
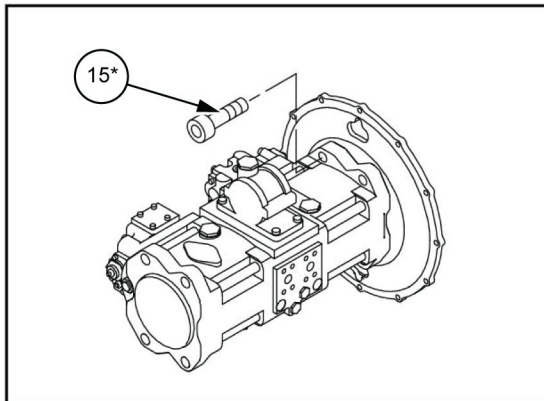
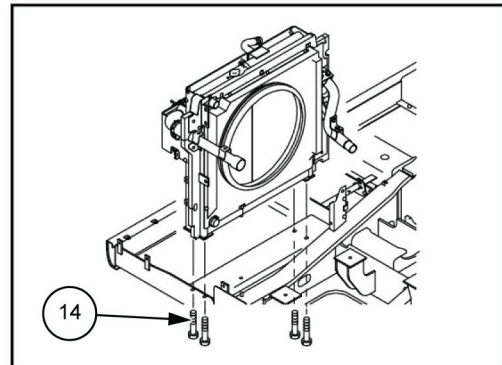
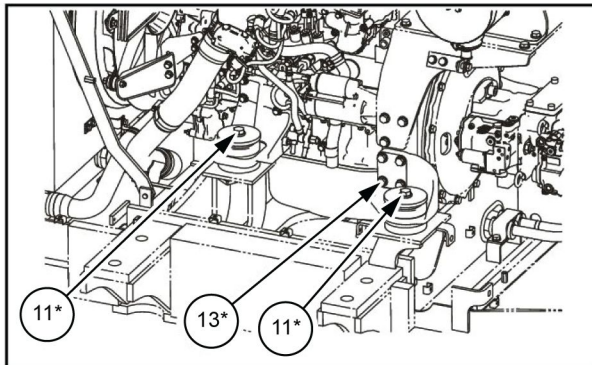
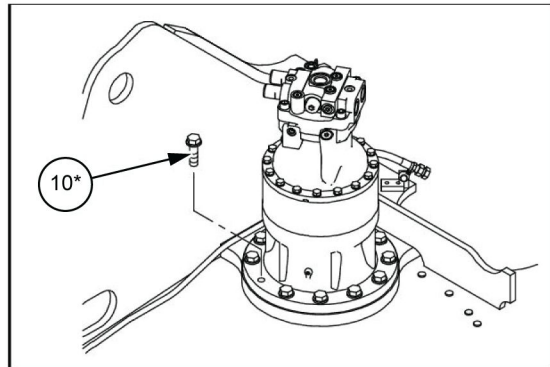
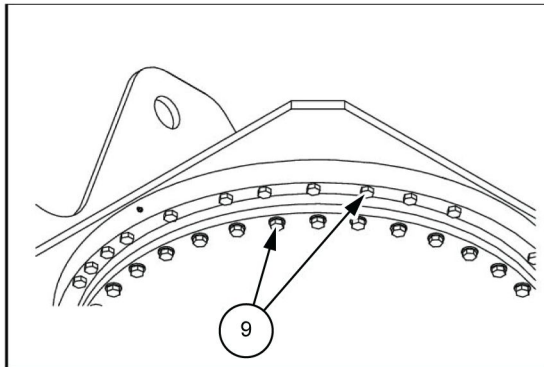
For items marked with *, always apply **LOCTITE® 262™** or the equivalent and tighten to the specified torque. The tightening torque in kgf·m is determined with $N \cdot m \div 9.8$ ($lbf \cdot ft \div 7.2$).

INTRODUCTION



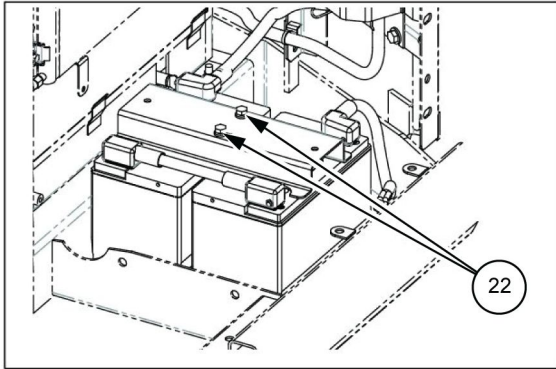
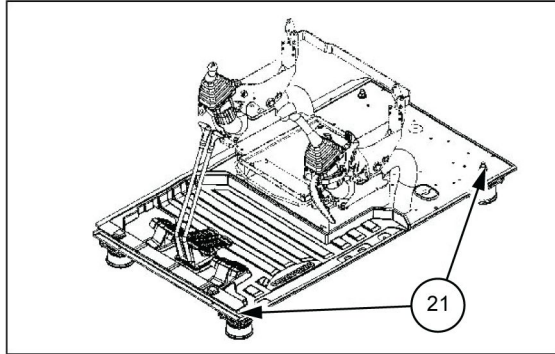
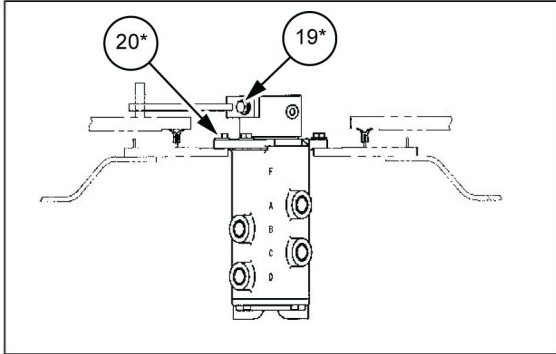
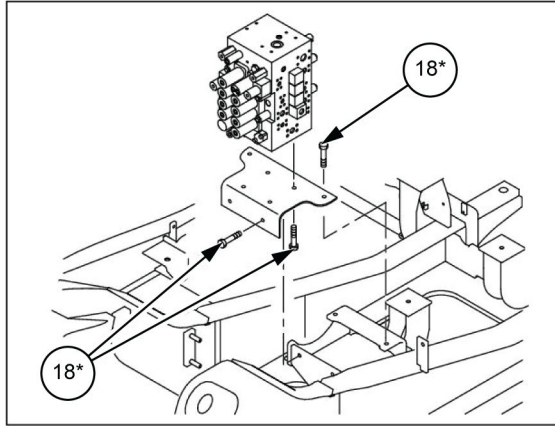
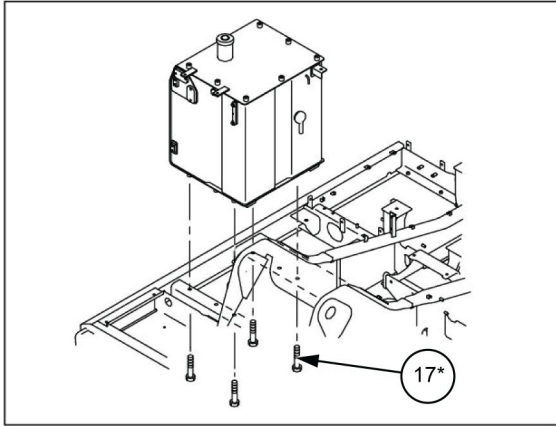
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INTRODUCTION



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INTRODUCTION



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Basic instructions - Shop and assembly

Shimming

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

Rotating shaft seals

For correct rotating shaft seal installation, proceed as follows:

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

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

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

O-ring seals

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

Sealing compounds

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

Spare parts

Only use CNH Original Parts or CASE CONSTRUCTION Original Parts.

Only genuine spare parts guarantee the same quality, duration, and safety as original parts, as they are the same parts that are assembled during standard production. Only CNH Original Parts or CASE CONSTRUCTION Original Parts can offer this guarantee.

When ordering spare parts, always provide the following information:

- Machine model (commercial name) and Product Identification Number (PIN)
- Part number of the ordered part, which can be found in the parts catalog

Protecting the electronic and/or electrical systems during charging and welding

To avoid damage to the electronic and/or electrical systems, always observe the following practices:

1. Never make or break any of the charging circuit connections when the engine is running, including the battery connections.
2. Never short any of the charging components to ground.
3. Always disconnect the ground cable from the battery before arc welding on the machine or on any machine attachment.
 - Position the welder ground clamp as close to the welding area as possible.
 - If you weld in close proximity to a computer module, then you should remove the module from the machine.
 - Never allow welding cables to lie on, near, or across any electrical wiring or electronic component while you weld.
4. Always disconnect the negative cable from the battery when charging the battery in the machine with a battery charger.

NOTICE: *If you must weld on the unit, you must disconnect the battery ground cable from the machine battery. The electronic monitoring system and charging system will be damaged if this is not done.*

5. Remove the battery ground cable. Reconnect the cable when you complete welding.

WARNING

Battery acid causes burns. Batteries contain sulfuric acid.

Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately. Failure to comply could result in death or serious injury.

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Special tools

The special tools that CASE CONSTRUCTION suggests and illustrate in this manual have been specifically researched and designed for use with CASE CONSTRUCTION machines. The special tools are essential for reliable repair operations. The special tools are accurately built and rigorously tested to offer efficient and long-lasting operation.

By using these tools, repair personnel will benefit from:

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

General specification

Engine

Type	Water-cooled, 4-cycle diesel, 4-cylinder in line, high pressure common rail system (electric control), turbocharger with air cooled intercooler, DPD system	
Model	ISUZU AM-4JJ1X	
Rated flywheel horse power (SAE J1349 NET)	92.2 kW (125.4 Hp) at 2200 RPM	
Piston displacement	2999 cm³ (183 in³)	
Maximum torque		
SAE J1349	391 N·m (288 lb ft) at 1800 RPM	
Bore and stroke	95.4 - 104.90 mm (3.76 - 4.13 in)	
Voltage	24 V	
Alternator	50 A	
Starter	24 V 4.0 kW	

Hydraulic system

Main pumps	2 variable displacement axial piston pumps with regulating system	
Max. oil flow	2 × 142 L (37.5 US gal) at 2200 RPM	
Working circuit pressure	Boom/Arm/Bucket	34.3 MPa (4975.215 psi)
		36.3 MPa (5265.315 psi) with auto power up
	Swing circuit	27.9 MPa (4046.895 psi)
	Travel circuit	34.3 MPa (4975.215 psi)
Pilot pump	1 gear pump	
Max. oil flow	20 L (5.283 US gal)	
Working circuit pressure	3.9 MPa (565.695 psi)	
Control valves	With boom/arm holding valve	
	One 4-spool valve for right track travel, bucket, boom and arm acceleration	
	One 5-spool valve for left track travel, auxiliary, swing, boom acceleration and arm	
Swing device		
Motor	Fixed displacement axial piston motor	
Brake	Mechanical disc brake	
Final drive	Planetary gear reduction	
Turn table bearing	Ball bearing type with internal gear	
Maximum swing speed	11.5 RPM	
Swing torque	45100 N·m (33264.05 lb ft)	
Cylinders	NO. of cylinders – bore X Rod diameter X Stroke	
Boom	2 x Ø 115 mm (4.528 in) - Ø 80 mm (3.150 in) - 1179 mm (46.417 in)	
Arm	1 x Ø 125 mm (4.921 in) - Ø 90 mm (3.543 in) - 1280 mm (50.394 in)	
Bucket	1 x Ø 105 mm (4.134 in) - Ø 75 mm (2.953 in) - 985 mm (38.780 in)	
Cooling system		
Fan	Ø 550 mm (21.654 in) with 8-blades	
Radiator capacity	73.9 kW (100.476 Hp)	
	fin type	Corrugated fin (wavy type)
	fin space	1.75 mm (0.06890 in)
Long life coolant	Coolant 55 % , Water 55 %	
Oil cooler capacity	43.4 kW (59.008 Hp)	
	fin type	Corrugated fin (wavy type)
	fin space	1.75 mm (0.06890 in)

Sample manual. Download All pages at:

<https://www.arepairmanual.com/downloads/case-cx160c-crawler-excavator-service-manual/>