

# Shop Manual Addendum

***AVANCE***

**PC200LL-6  
PC220LL-6**

**LOGGING EXCAVATOR**

SERIAL NUMBERS **PC200LL-6** **A85001** and UP  
**PC220LL-6** **A85001**

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Due to this continuous program of research and development, periodic revisions may be made to this publication. It is recommended that customers contact their distributor for information on the latest revision.

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IF A TOPIC IS NOT DIRECTLY ADDRESSED IN THE ADDENDUM FOR THE PC200LL OR PC220LL, PLEASE USE THE TOPIC CONTAINED IN THE STANDARD *SHOP MANUAL* UNDER THE HEADING OF PC200, PC200LC, PC220, OR PC220LC.

## PRODUCT PUBLICATIONS INFORMATION

Various product Parts and Service Publications are available to all **KOMATSU** construction equipment owners, including operation and maintenance manuals, parts books and shop manuals.

Special publications, such as service tool, air conditioning and turbocharger shop manuals are also available as well as selected Operation & Service Manuals in foreign languages.

The Publications listed below are available for this particular machine(s).

DESCRIPTION	FORM NUMBER
<b>PARTS BOOK</b>	
Chassis and Engine - PC200LL-6. ....	BEPB009500
Chassis and Engine - PC220LL-6. ....	BEPB009600
<b>OPERATION AND MAINTENANCE MANUAL</b>	
Chassis and Engine. ....	CEAM008400
<b>SHOP MANUAL</b>	
Chassis. ....	CEBM005700
Engine. ....	SEBM010010
<b>SAFETY MANUAL</b>	
Excavator. ....	HE92-2

Parts and Service Publications can only be acquired by authorized **KOMATSU** distributors using the Komatsu America International Company Parts Inventory Processing System (PIPS).



If the PIPS system is not available at the distributor location, then the following Requisition for Technical Service Publications and Service Forms can be used. Form KDC91E is shown on the reverse side of this page.

# SAFETY

## SAFETY NOTICE

### IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of your machine. The service and repair techniques recommended and described in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed for the purpose.

To prevent injury to workers, the symbols  and  are used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

### GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the OPERATION & MAINTENANCE MANUAL carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
  - Always wear safety glasses when hitting parts with a hammer.
  - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

### PREPARATIONS FOR WORK

1. Before adding oil or making repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
2. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
3. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
4. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

### PRECAUTIONS DURING WORK

1. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out. Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
2. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned. Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
3. Before starting work, remove the leads from the battery. ALWAYS remove the lead from the negative (-) terminal first.

4. When raising heavy components, use a hoist or crane. Check that the wire rope, chains and hooks are free from damage. Always use lifting equipment which has ample capacity. Install the lifting equipment at the correct places. Use a hoist or crane and operate slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
5. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
6. When removing components, be careful not to break or damage the wiring, Damaged wiring may cause electrical fires.
7. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips on to the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.
8. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.
9. Be sure to assemble all parts again in their original places. Replace any damaged part with new parts.
  - When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
10. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also check that connecting parts are correctly installed.
11. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
12. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
13. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
14. Take care when removing or installing the tracks of track-type machines. When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

## GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following sections. These sections are further divided into each main group of components.

### GENERAL

This section lists the general machine dimensions, performance specifications, component weights, and fuel, coolant and lubricant specification charts.

### STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

### TESTING, ADJUSTING AND TROUBLESHOOTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs. Troubleshooting charts correlating "Problems" to "Causes" are also included in this section.

### DISASSEMBLY AND ASSEMBLY

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

### MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

#### NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your distributor for the latest information.

# HOW TO READ THE SHOP MANUAL

## VOLUMES

Shop manuals are issued as a guide to carrying out repairs. They are divided as follows:

- Chassis volume:** Issued for every machine model
- Engine volume:** Issued for each engine series

- Electrical volume:** Each issued as one to cover all models
- Attachment volume:** Each issued as one to cover all models

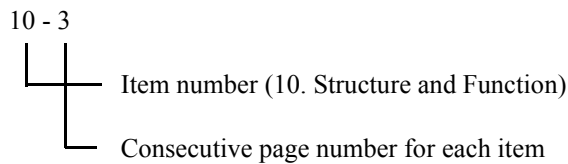
These various volumes are designed to avoid duplication of information. Therefore to deal with all repairs for any model, it is necessary that chassis, engine, electrical and attachment be available.

## DISTRIBUTION AND UPDATING

Any additions, amendments or other changes will be sent to your distributors. Get the most up-to-date information before you start any work.

## FILING METHOD

1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number: Example:



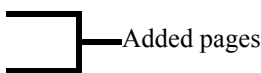
3. Additional pages: Additional pages are indicated by a hyphen (-) and numbered after the page number. File as in the example.

Example:

10-4

10-4-1

10-4-2



10-5

## REVISED EDITION MARK

When a manual is revised, an edition mark (①②③...) is recorded on the bottom outside corner of the pages.

## REVISIONS

Revised pages are shown at the LIST OF REVISED PAGES between the title page and SAFETY page.

## SYMBOLS

So that the shop manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
★	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts or systems. Caution necessary when selecting hoisting wire or when working posture is important, etc.
	Tightening torque	Places that require special attention for tightening torque during assembly.
	Coat	Places to be coated with adhesives and lubricants etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

# HOISTING INSTRUCTIONS

## HOISTING



**WARNING!** Heavy parts (25 kg or more) must be lifted with a hoist etc. In the DISASSEMBLY AND ASSEMBLY section, every part weighing 25 kg or more is indicated clearly with the symbol



- If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:
  1. Check for removal of all bolts fastening the part to the relative parts.
  2. Check for existence of another part causing interface with the part to be removed.

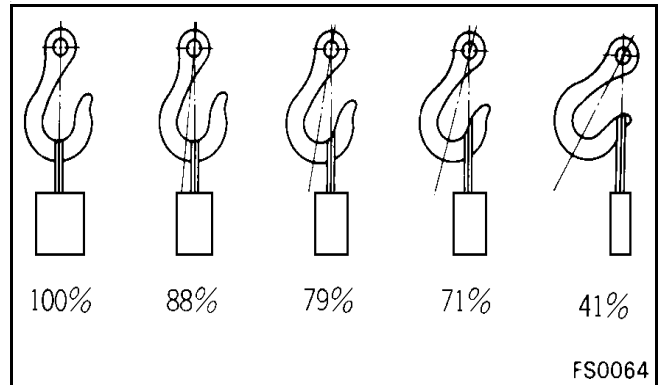
### WIRE ROPES

1. Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

Wire ropes  
(Standard "Z" or "S" twist ropes without galvanizing)

Rope diameter mm	Allowable load	
	kN	tons
10	9.8	1.0
11.2	13.7	1.4
12.5	15.7	1.6
14	21.6	2.2
16	27.5	2.8
18	35.3	3.6
20	43.1	4.4
22.4	54.9	5.6
30	98.1	10.0
40	176.5	18.0
50	274.6	28.0
60	392.2	40.0

- ★ The allowable load value is estimated to be 1/6 or 1/7 of the breaking strength of the rope used.
2. Sling wire ropes from the middle portion of the hook. Slings near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.

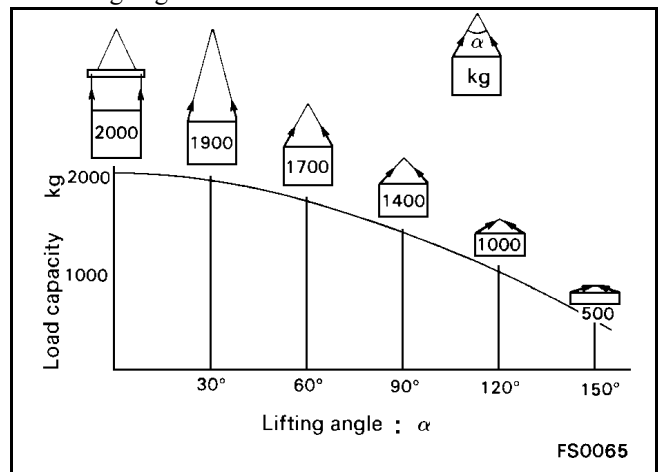


3. Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound on to the load.



**WARNING!** Slings with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident

4. Do not sling a heavy load with ropes forming a wide hanging angle from the hook. When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles. The table below shows the variation of allowable load (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, at various hanging angles. When two ropes sling a load vertically, up to 2000 kg of total weight can be suspended. This weight becomes 1000 kg when two ropes make a 120° hanging angle. On the other hand, two ropes are subject to an excessive force as large as 4000 kg if they sling a 2000 kg load at a lifting angle of 150°

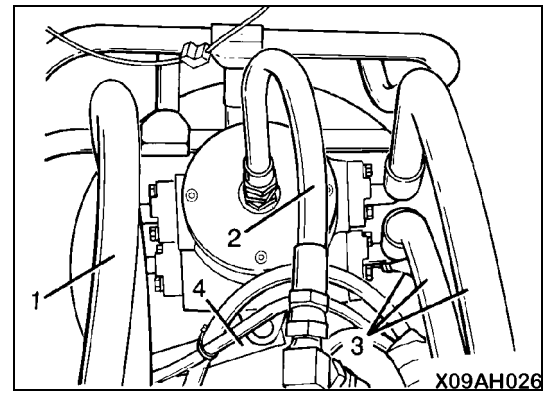




## REVOLVING FRAME

### Removal

1. Remove 2 boom cylinder assemblies. For details, see BOOM CYLINDER ASSEMBLY, Removal.
2. Remove work equipment assembly. For details, see WORK EQUIPMENT, Removal.
3. Remove counterweight assembly. For details, see COUNTERWEIGHT, Removal.
4. Disconnect top mounting hoses (1), (2), and (3) of swivel joint assembly at swivel joint assembly end.
5. Remove stopper link (4).



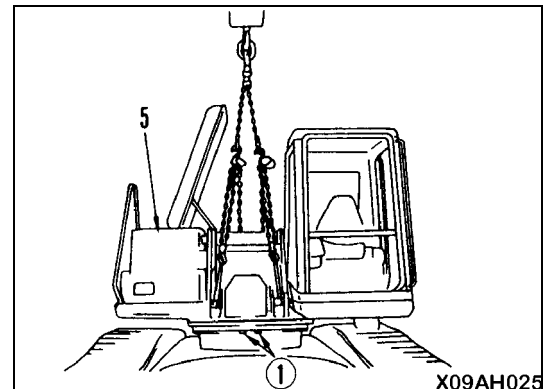
6. Remove mounting bolts, then lift off revolving frame assembly (5).
- ★ Leave 2 bolts ① each at the front and rear, use a lever block to adjust the balance of the revolving frame assembly to the front and rear, and left and right, then remove the remaining bolts, and lift off.



**WARNING!** When removing the revolving frame assembly, be careful not to hit the center swivel joint assembly

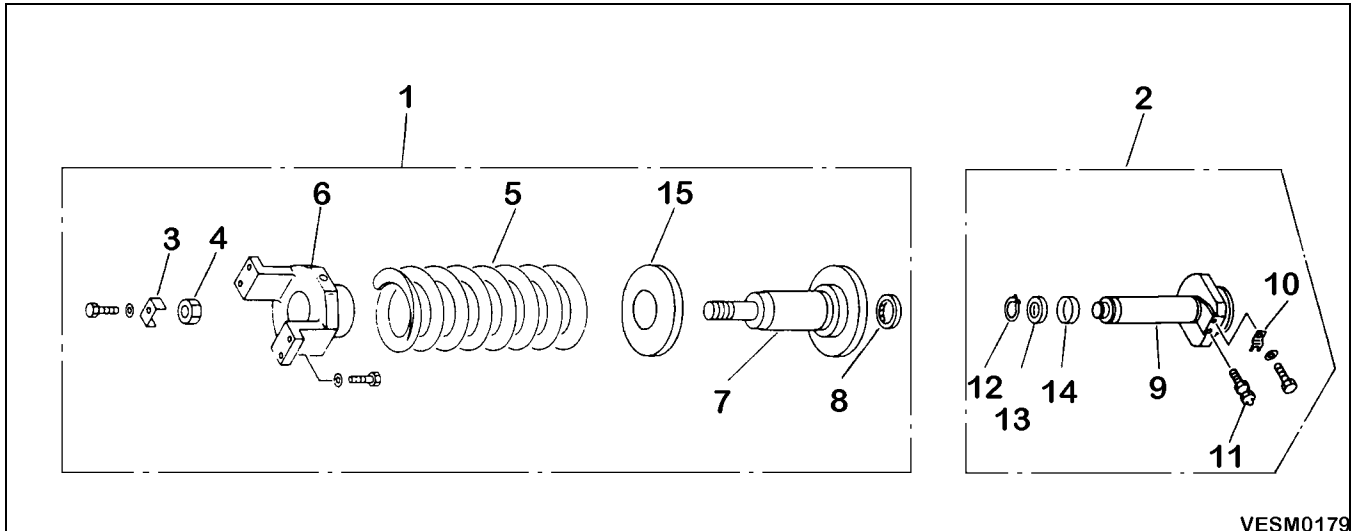


Revolving frame assembly: Approximate weight **6340 kg**



# RECOIL SPRING

## Disassembly



1. Remove piston assembly (2) from recoil spring assembly (1).
2. Disassembly of recoil spring assembly

A. Set recoil spring assembly (1) to tool H1.



**WARNING!** The recoil spring is under large installed load, so be sure to set the tool properly. Failure to do this is dangerous.

★ Installed load of spring:  
 PC200, PC220:..... **139.3 kN (19,200 kg)**

B. Apply hydraulic pressure slowly to compress spring, and remove lock plate (3), then remove nut (4).

★ Compress the spring to a point where the nut becomes loose.

★ Release the hydraulic pressure slowly and release the tension of the spring.

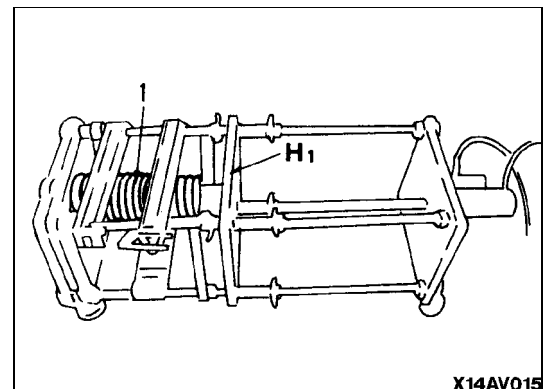
★ Free length of spring:  
 PC200, PC220:..... **603.5 mm**

C. Remove yoke (6), plate (15), cylinder (7), and dust seal (8) from spring (5).

3. Disassembly of piston assembly

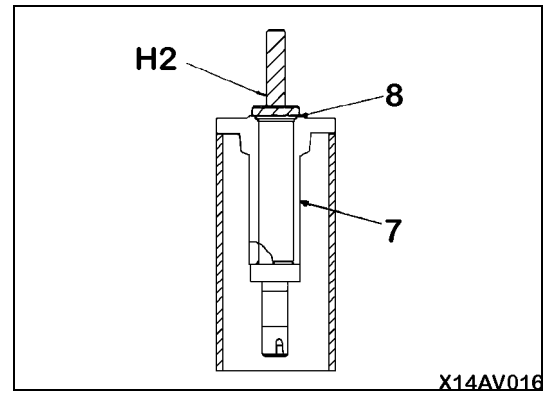
A. Remove lock plate (10) from piston (9), then remove valve (11).

B. Remove snap ring (12), then remove U-packing (13) and ring (14).




**Assembly**

1. Assembly of piston assembly
  - A. Assemble ring (14) and U-packing (13) to piston (9), and secure with snap ring (12).
  - B. Tighten valve (11) temporarily, and secure with lock plate (10).
2. Assembly of recoil spring assembly
  - A. Using tool **H2**, install dust seal (8) to cylinder (7).
  - B. Assemble cylinder (7), plate (15), and yoke (6) to spring (5), and set in tool **H1**.



X14AV016

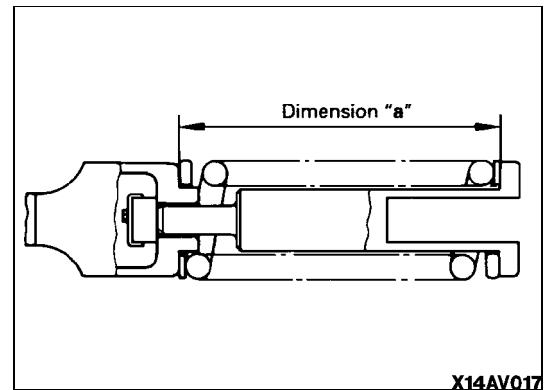
 Sliding portion of cylinder: ..... **Grease (G2-L1)**

- C. Apply hydraulic pressure slowly to compress spring, and tighten nut (4) so that installed length of spring is dimension "a", then secure with lock plate (3).


★ Installed length "a" of spring:  
 PC200, PC220: ..... **452 mm**

- D. Remove recoil spring assembly (1) from tool **H1**.

3. Assemble piston assembly (2) to recoil spring assembly (1).



X14AV017

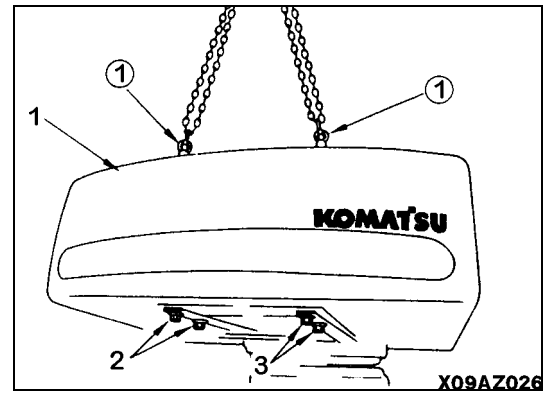
 Sliding portion of piston, wear ring: ..... **Grease (G2-L1)**

- ★ Assemble the cylinder assembly so that the mounting position of the valve is 90° to the side.
- ★ Fill the inside of the cylinder with **300 cc** of grease (**G2-L1**), then bleed air and check that grease comes out of the grease hole.

# COUNTERWEIGHT

## Removal

1. Set eyebolts ① to counterweight assembly (1), and sling.
2. Remove mounting bolts (2) and (3). ❖1
- ★ Be careful not to lose the shims when removing.
3. Lift off counterweight (1) horizontally with wire or chain block. ❖2
- ★ Be careful not to hit the engine, radiator and cooler assembly.



Counterweight assembly: PC200 ..... 4,880 kg  
 PC220 ..... 6,481 kg

## Installation

- Carry out installation in the reverse order of removal.



Thread of mounting bolt: ..... Thread tightener (LT-2)

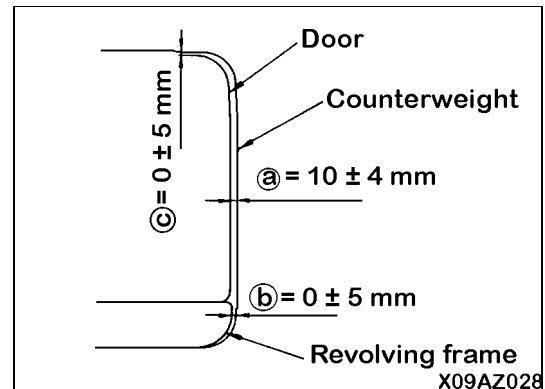


Mounting bolt: ..... 1,323 ± 147 Nm (135 ± 15 kgm)



- ★ Installing and adjusting counterweight

1. Sling counterweight with crane and set in position on frame.
2. Push counterweight and install shim and mounting bolts (2) and (3), and adjust to following dimensions.
  - A. Clearance from revolving frame: . . 10 ± 5 mm (left and right)
  - B. Clearance from bodywork door: . . 10 ± 5 mm (left and right)
  - C. Stepped difference **b** from revolving frame in left-to-right direction: ..... Max. 5 mm
  - D. Stepped difference **a** from bodywork door in left-to-right direction: ..... 10 ± 4 mm
  - E. Stepped difference **c** from bodywork top cover in vertical direction: ..... Max. 5 mm



**MEMORANDUM**

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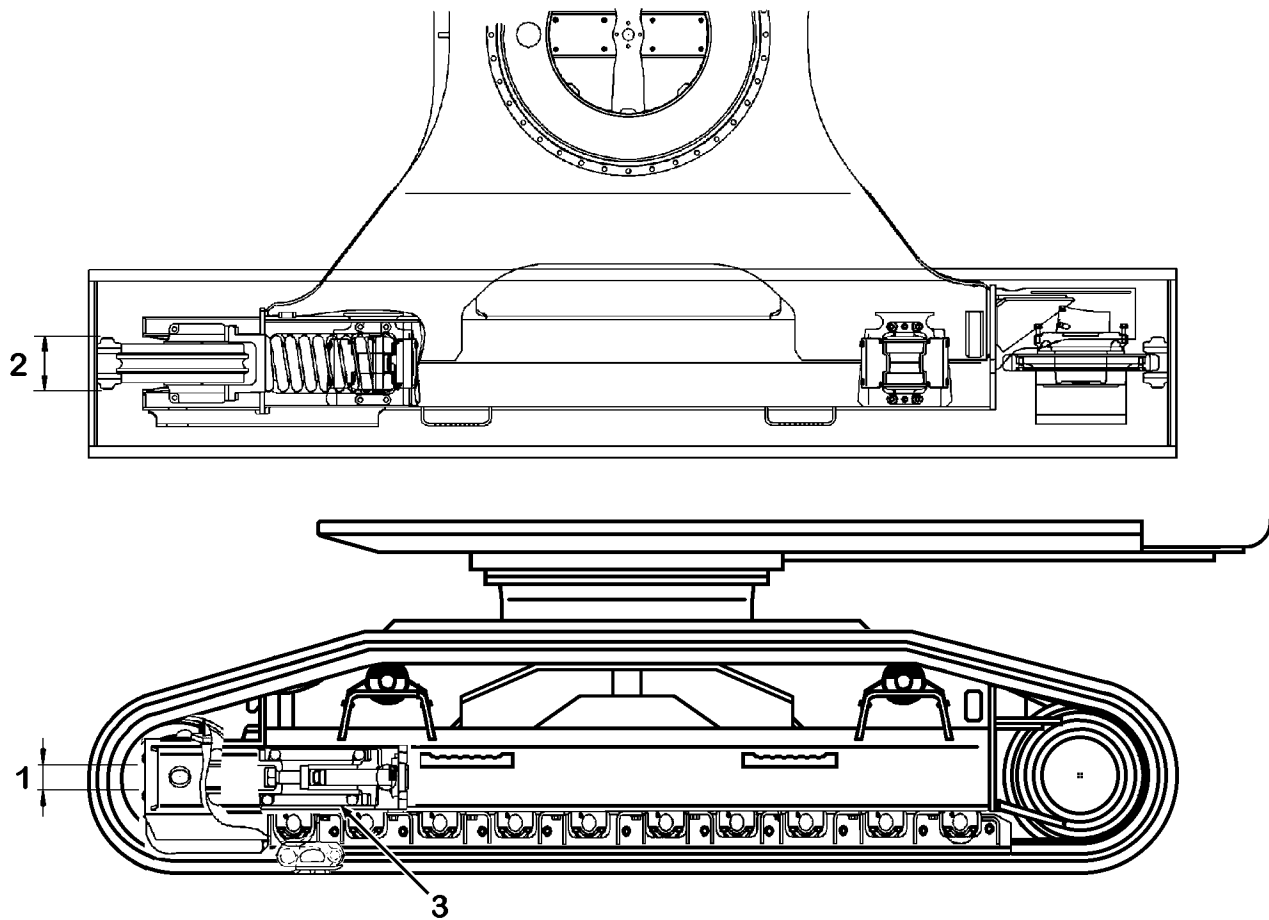
# **40 MAINTENANCE STANDARD**

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TRACK FRAME • RECOIL SPRING ..... 40-2

# TRACK FRAME • RECOIL SPRING

★ The diagram shows the PC200LL-6



VESM0180  
Unit: mm

No.	Check Item	Criteria				Remedy	
			Standard size	Tolerance	Repair limit		
1	Vertical width of idler guide	Track frame	107			Rebuild or replace	
		Idler support	105				
2	Horizontal width of idler guide	Track frame	250				
		Idler support	247.4				
3	Recoil spring	Standard size			Repair limit		Replace
		Free length X O.D.	Installed length	Installed load	Free length	Installed load	
		PC200LC PC220LC	603.5 X 239	466	12,900 kg	576	



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