

PART NO. WJAC91-EN-00

**HITACHI**

Reliable solutions

# Workshop Manual

# ZX470LC-5G

## Hydraulic Excavator

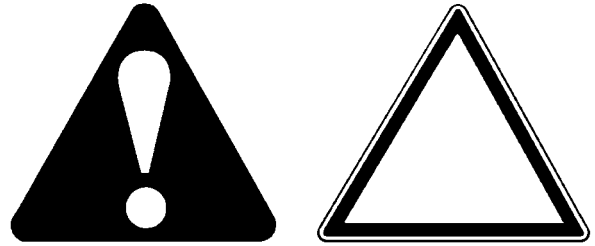
Service Manual consists of the following separate Part No.  
Technical Manual (Operational Principle) : Vol. No.T0JAC91-EN  
Technical Manual (Troubleshooting) : Vol. No.TTJAC91-EN  
Workshop Manual : Vol. No.WJAC91-EN

## SAFETY

---


### Recognize Safety Information

- These are the **SAFETY ALERT SYMBOLS**.
  - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



SA-688

### Understand Signal Words

- On machine safety signs, signal words designating the degree or level of hazard - **DANGER**, **WARNING**, or **CAUTION** - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER or WARNING safety signs** are located near specific hazards. General precautions are listed on **CAUTION safety signs**.
  - Some safety signs do not use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.
- **CAUTION** also calls attention to safety message in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
-  **NOTE**: indicates an additional explanation for an element of information.



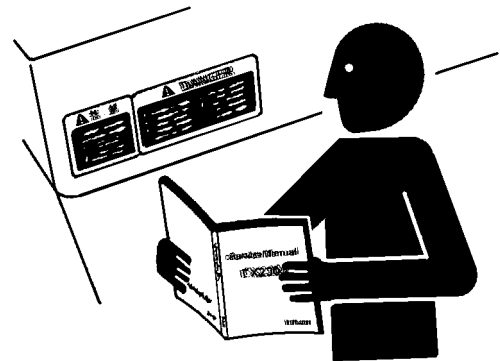
SA-1223

## SAFETY

---

### Follow Safety Instructions

- Carefully read and follow all safety signs on the machine and all safety messages in the operator's manual.
- Safety signs should be installed, maintained and replaced when necessary.
  - If a safety sign or the operator's manual is damaged or missing, order a replacement from your authorized dealer in the same way you order other replacement parts (be sure to state machine model and serial number when ordering).
- Learn how to operate the machine and its controls correctly and safely.
- Allow only trained, qualified, authorized personnel to operate the machine.
- Keep your machine in proper working condition.
  - Unauthorized modifications of the machine may impair its function and/or safety and affect machine life.
  - Do not modify any machine parts without authorization. Failure to do so may deteriorate the part safety, function, and/or service life. In addition, personal accident, machine trouble, and/or damage to material caused by unauthorized modifications will void Hitachi Warranty Policy.
  - Do not use attachments and/or optional parts or equipment not authorized by Hitachi. Failure to do so may deteriorate the safety, function, and/or service life of the machine. In addition, personal accident, machine trouble, and/or damage to material caused by using unauthorized attachments and/or optional parts or equipment will void Hitachi Warranty Policy.
- The safety messages in this SAFETY chapter are intended to illustrate basic safety procedures of machines. However it is impossible for these safety messages to cover every hazardous situation you may encounter. If you have any questions, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.



SA-003

## SAFETY

### Prepare for Emergencies

- Be prepared if a fire starts or if an accident occurs.
  - Keep a first aid kit and fire extinguisher on hand.
  - Thoroughly read and understand the label attached on the fire extinguisher to use it properly.
  - To ensure that a fire extinguisher can be always used when necessary, check and service the fire extinguisher at the recommended intervals as specified in the fire extinguisher manual.
  - Establish emergency procedure guidelines to cope with fires and accidents.
  - Keep emergency numbers for doctors, ambulance service, hospital, and fire department posted near your telephone.



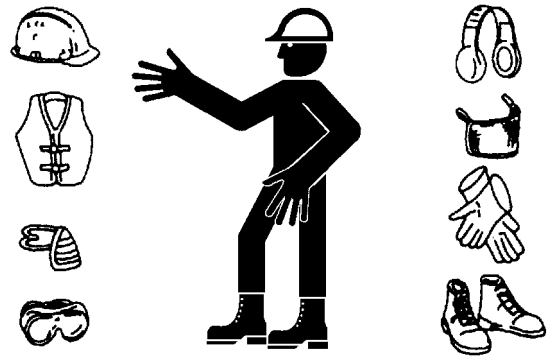
SA-437

### Wear Protective Clothing

- Wear close fitting clothing and safety equipment appropriate to the job.

You may need:

- A hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask.



SA-438

Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

- Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.
- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating the machine.

## SAFETY

---

### Protect Against Noise

- Prolonged exposure to loud noise can cause impairment or loss of hearing.
- Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortably loud noises.



SA-434

---

### Inspect Machine

- Inspect your machine carefully each day or shift by walking around it before you start it to avoid personal injury.
- In the walk-around inspection be sure to cover all points described in the "Inspect Machine Daily Before Starting" section in the operator's manual.



SA-435

## SAFETY

---

### General Precautions for Cab

- Before entering the cab, thoroughly remove all dirt and/or oil such as mud, grease, soil or stones that may mess up the cab from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots, the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Do not mess up around the operator's seat with parts, tools, soil, stones, obstacles that may fold up or turn over, cans or lunch box. The levers or pedals become inoperable if obstacle jams in operation stroke of the travel levers/pedals, pilot control shut-off lever or control levers, which may result in serious injury or death.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.
- Use proper floor mat dedicated to the machine. If another floor mat is used, it may be displaced and contact with the travel pedals during operation, resulting in serious injury or death.

## **SECTION AND GROUP CONTENTS**

### **WORKSHOP MANUAL**

---

## **SECTION 1 GENERAL INFORMATION**

<b>Group 1 Precautions for Disassembling and Assembling</b>
<b>Group 2 Tightening Torque</b>
<b>Group 3 Painting</b>
<b>Group 4 Bleeding Air from Hydraulic Oil Tank</b>
<b>Group 5 Hydraulic Circuit Pressure Release Procedure</b>
<b>Group 6 Preparation</b>

## **SECTION 2 MAINTENANCE STANDARD**

<b>Group 1 Upperstructure</b>
<b>Group 2 Undercarriage</b>
<b>Group 3 Attachment</b>

## **SECTION 3 UPPERSTRUCTURE**

<b>Group 1 Cab</b>
<b>Group 2 Counterweight</b>
<b>Group 3 Main Frame</b>
<b>Group 4 Engine</b>
<b>Group 5 Radiator</b>
<b>Group 6 Hydraulic Oil Tank</b>
<b>Group 7 Fuel Tank</b>
<b>Group 8 Pump Device</b>
<b>Group 9 Control Valve</b>
<b>Group 10 Swing Device</b>
<b>Group 11 Pilot Valve</b>
<b>Group 12 Solenoid Valve</b>
<b>Group 13 Signal Control Valve</b>
<b>Group 14 Shockless Valve</b>

## **SECTION 4 UNDERCARRIAGE**

<b>Group 1 Swing Bearing</b>
<b>Group 2 Travel Device</b>
<b>Group 3 Center Joint</b>
<b>Group 4 Track Adjuster</b>
<b>Group 5 Front Idler</b>
<b>Group 6 Upper and Lower Roller</b>
<b>Group 7 Track</b>

## **SECTION 5 ATTACHMENT**

<b>Group 1 Front Attachment</b>
<b>Group 2 Cylinder</b>

## **SECTION 6 ENGINE**

TECHNICAL MANUAL (Operational Principle)	TECHNICAL MANUAL (Troubleshooting)
<p>SECTION 1 GENERAL</p> <ul style="list-style-type: none"> <li>Group 1 Specification</li> <li>Group 2 Component Layout</li> <li>Group 3 Component Specifications</li> </ul> <p>SECTION 2 SYSTEM</p> <ul style="list-style-type: none"> <li>Group 1 Controller</li> <li>Group 2 Control System</li> <li>Group 3 Hydraulic System</li> <li>Group 4 Electrical System</li> </ul> <p>SECTION 3 COMPONENT OPERATION</p> <ul style="list-style-type: none"> <li>Group 1 Pump Device</li> <li>Group 2 Swing Device</li> <li>Group 3 Control Valve</li> <li>Group 4 Pilot Valve</li> <li>Group 5 Travel Device</li> <li>Group 6 Signal Control Valve</li> <li>Group 7 Others (Upperstructure)</li> <li>Group 8 Others (Undercarriage)</li> </ul>	<p>SECTION 4 OPERATIONAL PERFORMANCE TEST</p> <ul style="list-style-type: none"> <li>Group 1 Introduction</li> <li>Group 2 Standard</li> <li>Group 3 Engine Test</li> <li>Group 4 Excavator Test</li> <li>Group 5 Component Test</li> <li>Group 6 Adjustment</li> </ul> <p>SECTION 5 TROUBLESHOOTING</p> <ul style="list-style-type: none"> <li>Group 1 Diagnosing Procedure</li> <li>Group 2 Monitor</li> <li>Group 3 e-Service</li> <li>Group 4 Component Layout</li> <li>Group 5 Troubleshooting A</li> <li>Group 6 Troubleshooting B</li> <li>Group 7 Air Conditioner</li> </ul>



---

# SECTION 1

# GENERAL

## CONTENTS

### **Group 1 Precautions for Disassembling and Assembling**

Precautions for Disassembling  
and Assembling .....W1-1-1-1

### **Group 2 Tightening**

Tightening Bolts and Nuts .....W1-2-1-1  
Piping Joint .....W1-2-1-4

### **Group 3 Painting**

Painting Specification .....W1-3-1-1  
Final Painted Color .....W1-3-1-1

### **Group 4 Bleeding Air**

Bleeding Air from Hydraulic Oil Tank.....W1-4-1-1  
Bleeding Air from Hydraulic System .....W1-4-1-2  
Bleeding Air from Fuel System .....W1-4-1-3  
Bleeding Air from Radiator .....W1-4-1-4

### **Group 5 Pressure Release Procedure**

Hydraulic Circuit Pressure Release Procedure .....W1-5-1-1

### **Group 6 Preparation**

Preparation before Inspection  
and Maintenance.....W1-6-1-1

## SECTION 1 GENERAL

### Group 1 Precautions for Disassembling and Assembling

---

#### Precautions for Disassembling and Assembling

##### Precautions for Disassembling

- **Clean the Machine**  
Thoroughly wash the machine before bringing it into the shop. Bringing a dirty machine into the shop may cause machine components to be contaminated during disassembling / assembling, resulting in damage to machine components, as well as decreased efficiency in service work.
- **Inspect the Machine**  
Be sure to thoroughly understand all disassembling / assembling procedures beforehand to help avoid incorrect disassembling of components as well as personal injury.  
Check and record the items listed below to prevent problems from occurring in the future.
  - The machine model, machine serial number, and hour meter reading.
  - Reason for disassembly (symptoms, failed parts, and causes).
  - Clogging of filters and oil, water or air leaks, if any. Capacities and condition of lubricants.
  - Loose or damaged parts.
- **Prepare and Clean Tools and Disassembly Area**  
Prepare the necessary tools to be used and the area for disassembling work.

##### Precautions for Disassembling and Assembling

- **Precautions for Disassembling**
  - Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling.
  - Before disassembling, clean the exterior of the components and place on a workbench.
  - Drain hydraulic oil and gear oil from the hydraulic components and reduction gear.
  - Be sure to provide appropriate containers for draining fluids.
  - Use matching marks for easier reassembling if necessary.
  - Be sure to use the specified special tools when instructed.

- If a part or component cannot be removed after removing its securing nuts and bolts, do not attempt to remove it forcibly. Find the cause (s), then take the appropriate measures to remove it.
  - Orderly arrange disassembled parts. Mark and tag them if necessary.
  - Store common parts, such as bolts and nuts with reference to where they are to be used and in a manner that will prevent loss.
  - Inspect the contact or sliding surfaces of disassembled parts for abnormal wear, sticking, or other damage.
  - Measure and record the degree of wear and clearances.
- **Precautions for Assembling**
    - Be sure to clean all parts and inspect them for any damage. If any damage is found, repair or replace part.
    - Dirt or debris on the contact or sliding surfaces may shorten the service life of the machine. Take care not to contaminate any contact or sliding surfaces.
    - Apply appropriate lubricant oil onto parts in order to prevent them from seizing.
    - Be sure to replace O-rings, backup rings, oil seals, and floating seals with new ones once they have been disassembled. Apply grease before installing
    - Be sure that liquid-gasket-applied surfaces are clean and dry.
    - If an anti-corrosive agent has been used on a new part, be sure to thoroughly clean the part to remove the agent.
    - Fit the matching marks made when disassembling and assemble them.
    - Be sure to use the designated tools to assemble bearings, bushings, and oil seals.
    - Keep a record of the number of tools used for disassembly / assembly. After assembling is completed, count the number of tools so as to make sure that no forgotten tools remain in the assembled machine.

# SECTION 1 GENERAL

## Group 1 Precautions for Disassembling and Assembling

### Precautions for Using Floating Seal

1. In general, replace the floating seal with a new one after disassembling.

If the floating seal is required to be reused, follow these procedures:

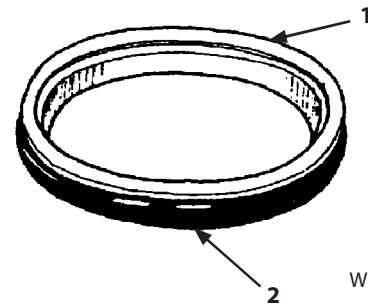
- Keep seal rings together as a matched set with seal ring (1) surfaces together. Apply oil onto sliding surface (e) of seal ring (1).
- Check sliding surface (e) of seal ring (1) for scuffing, scoring, corrosion, deformation, or uneven wear. Check the step part of seal ring (1).
- Check O-ring (2) for tears, breaks, deformation, or hardening.

2. If incorrectly assembled, oil leakage or damage will occur. Be sure to do the following to prevent trouble.

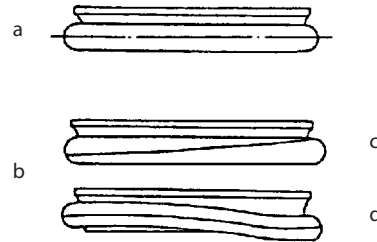
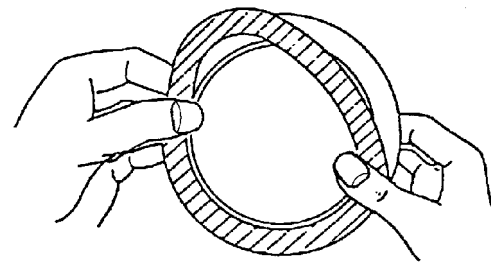
- Clean the floating seal and seal mounting bores with cleaning solvent.

Use a wire brush to remove mud, rust, or dirt from seal mounting bores. After cleaning, thoroughly dry parts with compressed air.

- Clean seal ring (1) and O-ring (2) mounting bores. Check the bore surface for scuffing or scoring by touching the surface with finger.
- After installing the floating seal, check that O-ring (2) is not twisted, and that it is installed correctly on seal ring (1).
- After installing the floating seal, check that O-ring (2) and seal ring sliding surface (e) is parallel with seal mating surface (f) by measuring the distances (e) and (f) at point (A) and (B), as illustrated. If these distances differ, correct O-ring (2) seating.

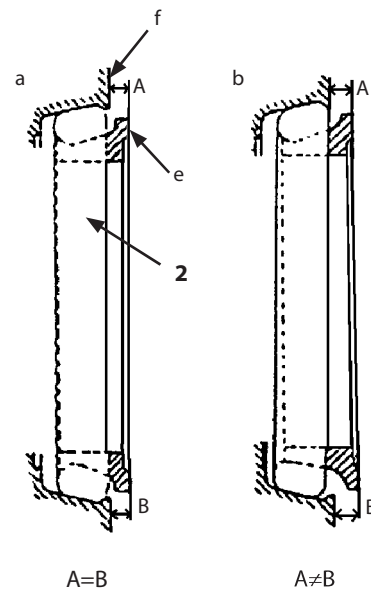


W178-02-11-001



W178-02-11-002

- a - Correct  
 b - Incorrect  
 c - Twist of O-Ring  
 d - Bend of O-Ring



W178-02-11-003

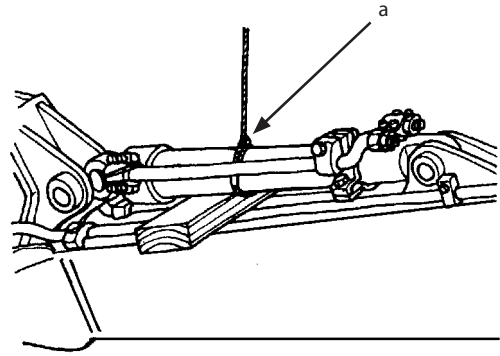
- a - Correct  
 b - Incorrect  
 e - Sliding Surface  
 f - Seal Mating Surface

## SECTION 1 GENERAL

### Group 1 Precautions for Disassembling and Assembling

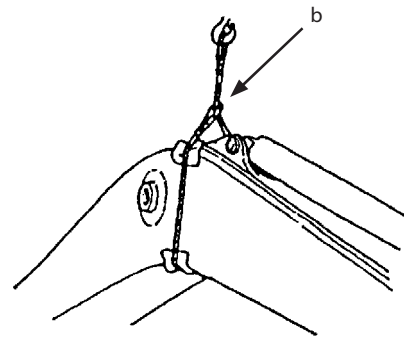
#### Precautions for Using Nylon Sling

1. Follow the precautions below to use nylon slings safely.
  - Attach protectors (soft material) on the corners of the load so that the nylon sling does not directly contact the corners. This will prevent the nylon sling from being damaged and the lifted load from slipping.
  - Lower the temperature of the lifted load to lower than 100 °C (212 °F). If unavoidably lifting a load with a temperature of 100 °C (212 °F) or more, reduce the load weight.
  - Do not lift acid or alkali chemicals.
  - Take care not to allow the sling to become wet. The load may slip.
  - When required to use more than one sling, use slings with the same width and length to keep the lifted load balanced.
  - When lifting a load using an eyehole, be sure to eliminate any gaps between the sling and load. (Refer to the right illustration.) Reduce the load weight so that it is less than 80 % of the sling breaking force.
  - Avoid using twisted, bound, connected, or hitched slings.
  - Do not place any object on twisted or bent slings. (Refer to the right illustration.)
  - When removing the slings from under the load, take care not to damage the nylon slings. Avoid contact with protrusions.
  - Avoid dragging slings on the ground, throwing slings, or pushing slings with a metal object.
  - When using with other types of slings (wire rope) or accessories (shackle), protect the joint so that the nylon sling is not damaged.
  - Store the nylon slings indoors so that they won't deteriorate with heat, sun light, or chemicals.



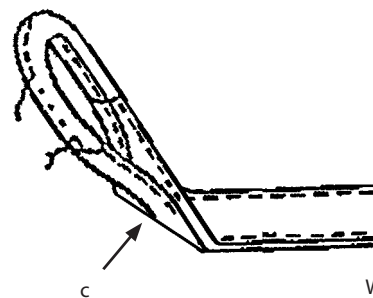
W102-04-02-016

a - Correct Eyehole Lifting Method



W105-04-01-008

b - Incorrect Eyehole Lifting Method



W162-01-01-009

c - Bent of Sling

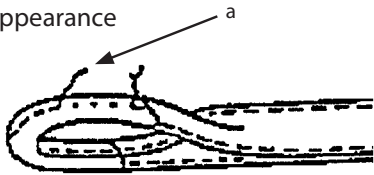
# SECTION 1 GENERAL

## Group 1 Precautions for Disassembling and Assembling

**CAUTION:** If a load is lifted with a damaged nylon sling, serious personal injury may result. Be sure to visually check the nylon sling for any damage before using.

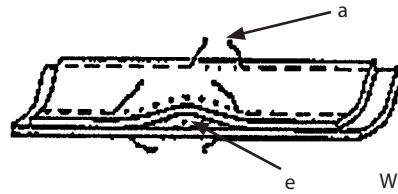
- Before using a nylon sling, visually check the nylon sling for any damage corresponding to examples shown to the right. If any damage is found, cut and discard the sling. Even if no damage is found, do not use slings older than 7 years.

Damaged Appearance



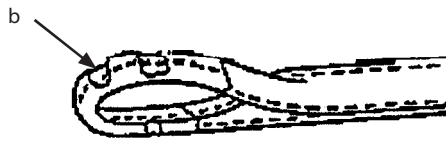
W162-01-01-002

a - Broken Sewing Thread



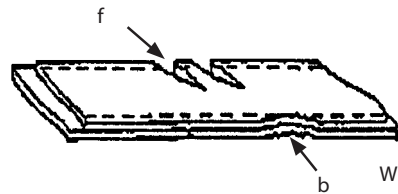
W162-01-01-006

a - Broken Sewing Thread e - Separation of Belt



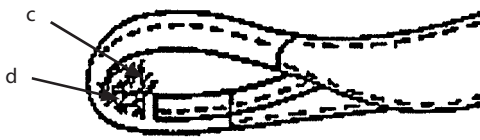
W162-01-01-003

b - Scuffing



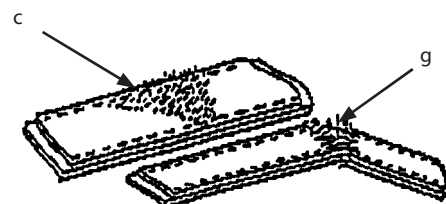
W162-01-01-007

b - Scuffing f - Scoring



W162-01-01-004

c - Fuzz d - Broken Sewing Thread



W162-01-01-008

c - Fuzz g - Broken Warp



W162-01-01-005

a - Broken Sewing Thread

## SECTION 1 GENERAL

### Group 1 Precautions for Disassembling and Assembling

---

#### Maintenance Standard Terminology

##### “Standard”

1. Dimension for parts on a new machine.
2. Dimension of new components or assemblies adjusted to specification. Allowable errors will be indicated if necessary.

##### “Allowable Limit”

1. Normal machine performance cannot be accomplished after exceeding this limit.
2. Repair or adjustment is difficult after exceeding this limit.
3. Repair or adjustment is impossible after exceeding this limit.  
Therefore, in consideration of operation efficiency and maintenance expense, proper maintenance shall be carried out before reaching the “Allowable Limit”.

# SECTION 1 GENERAL

## Group 2 Tightening

### Tightening Bolts and Nuts

**CAUTION:** Use tools appropriate for the work to be done. Makeshift tools and procedures can create safety hazards. For loosening and tightening nuts and bolts, use correct size tools. Otherwise, tightening tools may slip, potentially causing personal injury.

**NOTE:**

- Apply lubricant (e.g. white zinc B dissolved into spindle oil) to bolts and nuts to reduce friction coefficient of them.
- Make sure bolt and nut threads are clean before installing.










WDAA-01-02-001

### Bolt Types

Tighten the nuts or bolts correctly to the torque specifications.

As the different types and grades of bolt are used, use and tighten the correct bolts correctly when assembling the machine or components.

### Specified Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Wrench Size	   WDAA-01-02-002			   WDAA-01-02-003 Socket Bolt			 WDAA-01-02-004		
			N-m	(kgf-m)	(lbf-ft)	N-m	(kgf-m)	(lbf-ft)	N-m	(kgf-m)	(lbf-ft)
M6	10	5							3 to 4	(0.3 to 0.4)	(2.2 to 3)
M8	13	6	30	(3)	(22)	20	(2)	(15)	10	(1)	(7.4)
M10	17	8	65	(6.5)	(48)	50	(5)	(37)	20	(2)	(15)
M12	19	10	110	(11)	(81)	90	(9)	(66)	35	(3.5)	(26)
M14	22	12	180	(18)	(133)	140	(14)	(103)	55	(5.5)	(41)
M16	24	14	270	(27)	(200)	210	(21)	(155)	80	(8)	(59)
M18	27	14	400	(40)	(300)	300	(30)	(220)	120	(12)	(89)
M20	30	17	550	(55)	(410)	400	(40)	(300)	170	(17)	(125)
M22	32		750	(75)	(550)	550	(55)	(410)	220	(22)	(162)
M24	36		950	(95)	(700)	700	(70)	(520)	280	(28)	(205)
M27	41		1400	(140)	(1030)	1050	(105)	(770)	400	(40)	(300)
M30	46		1950	(195)	(1440)	1450	(145)	(1070)	550	(55)	(410)
M33	50		2600	(260)	(1920)	1950	(195)	(1440)	750	(75)	(550)
M36	55		3200	(320)	(2360)	2450	(245)	(1810)	950	(95)	(700)

# SECTION 1 GENERAL

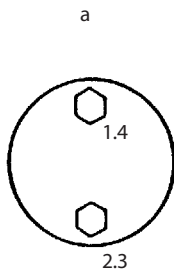
## Group 2 Tightening

**IMPORTANT:** The following items are applied to both fine and coarse pitch threads.

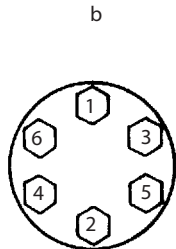
- Apply lubricant to the bolts and nuts in order to reduce friction coefficient of them. (For example, spindle oil with white zinc B dissolved in it)
- Torque tolerance is  $\pm 10\%$ .
- Use the bolts of correct length. The bolts that are too long cannot be tightened as the bolt tip comes into contact with the bottom of bolt hole. Also the bolts that are too short cannot develop sufficient tightening force.
- The torque given in the chart on the previous page are for general use only, however, a different torque is given for a specific application. Use the specified torque.
- Clean the nut and bolt threads and remove dirt or corrosion before installing.

### Tightening Order

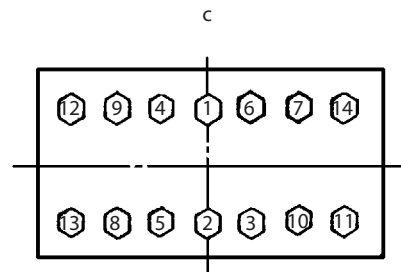
When tightening two or more bolts, tighten them alternately, as shown, to ensure even tightening.



a - Equally tighten upper and lower alternately



b - Tighten diagonally



c - Tighten from center diagonally

W105-01-01-003



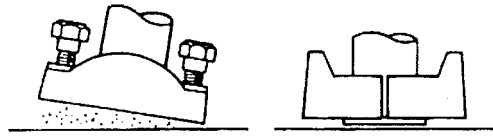
# SECTION 1 GENERAL

## Group 2 Tightening

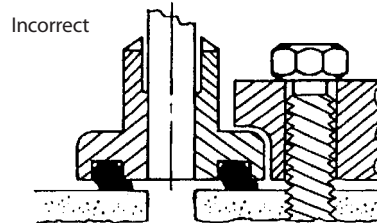
### Precautions for Spilt Flange

#### IMPORTANT:

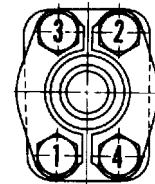
- Clean the sealing surfaces. Check if there are any scratches and roughness on the surface of the seal that cause oil leaks and damage to the O-ring.
- Use only specified O-rings. Inspect O-rings for any damage. Do not file the O-ring surfaces. When installing O-ring into a groove, use grease in order to hold O-ring in place.
- While tightening the bolt by hand, check that flange is installed to the port correctly. Do not pinch the O-ring.
- Tighten the bolts up and down, left and right alternately, in order to ensure even tightening to the specified torque.
- Do not use air wrenches. Using an impact wrench often causes tightening of one bolt fully before tighten the others, resulting in damage to O-rings or uneven tightening of bolts.



WDAA-01-02-005



WDAA-01-02-006



W105-01-01-008

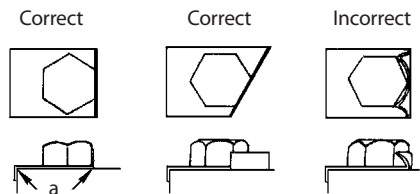
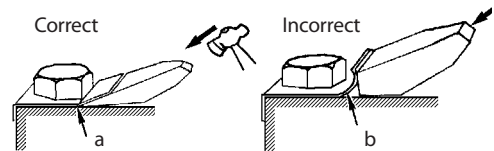
### Nut and Bolt Locking

- Lock Plate

**IMPORTANT:** Do not reuse the lock plates. Do not try to bend the same point twice.

- Split Pin

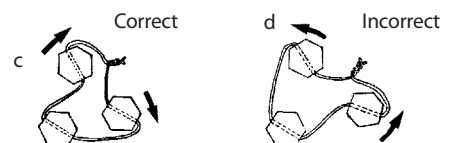
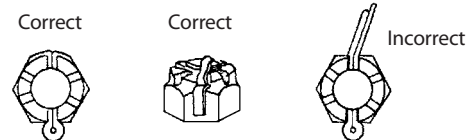
**IMPORTANT:** Do not turn in the loosening direction in order to align the grooves and holes on the nut. Always turn in the tightening direction. Do not reuse the split pins.



WDAA-01-02-007

a- Bend along edge sharply

b- Do not bend it round



WDAA-01-02-008

c- Tighten

d- Loosen

# SECTION 1 GENERAL

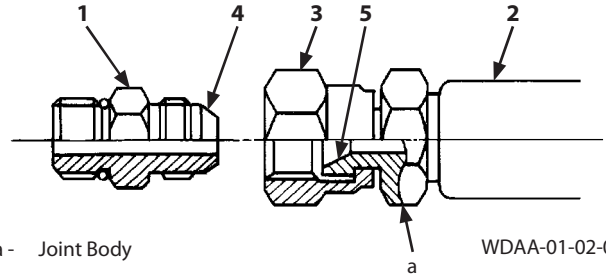
## Group 2 Tightening

### Piping Joint

**IMPORTANT:** The torque given in table below are for general use only, however, a different torque is given for a specific application. Use the specified torque.

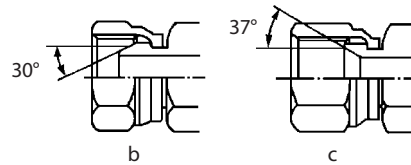
#### Union Joint

Metal sealing surfaces (4) and (5) of adapter (1) and hose (2) fit together to seal pressure oil. Union joints are used to join small-diameter lines.



**IMPORTANT:**

- Do not over-tighten union nut (3). Excessive force will be applied to metal sealing surfaces (4) and (5), possibly cracking the adapter. Tighten union nut (3) to the specifications.
- Scratches or other damage to sealing surfaces (4) or (5) will cause oil leakage at the joint. Take care not to damage them when connecting / disconnecting.




b - Male Union Joint

c - Female Union Joint

WDAA-01-02-010

Description	Wrench Size mm	Tightening Torque		
	Union Nut	N-m	(kgf-m)	(lbf-ft)
30° male	17	25	(2.5)	(18)
	19	30	(3)	(22)
	22	40	(4)	(30)
	27	80	(8)	(59)
	32	140	(14)	(103)
	36	180	(18)	(133)
	41	200	(20)	(148)
	50	270	(27)	(200)
	55	380	(38)	(280)
37° female	17	25	(2.5)	(18)
	19	30	(3)	(22)
	22	40	(4)	(30)
	27	80	(8)	(59)
	32	140	(14)	(103)
	36	180	(18)	(133)
	41	200	(20)	(148)

 **NOTE:** Tightening torque of 37° male coupling without union is similar to tightening torque of 37° female.

# SECTION 1 GENERAL

## Group 2 Tightening

### Pipe Joint

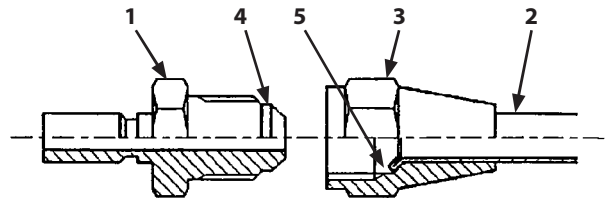
Pipe connection (metal joint)  
(Union Nut Wrench Size: 17, 19, 22, 27)

Metal (3) of adapter (1) and pipe (2) seals pressure oil.

- Precautions for use  
Do not damage sealing surfaces (4) and (5) when disassembling and assembling.

Tightening Torque  
Use the specified tightening torque in the table below.

Wrench Size (mm)		17	19	22	27
Tightening Torque	N·m	25	30	40	80
	(kgf·m)	(2.5)	(3)	(4)	(8)
	(lbf·ft)	(18)	(22)	(30)	(59)



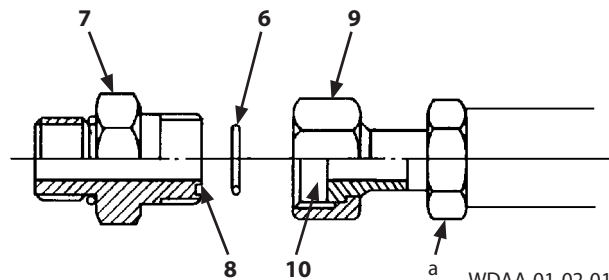
M1M7-07-005

### O-ring Seal Joint

O-ring (6) is installed against the end surface of adapter (7) and seals pressure oil.

#### IMPORTANT:

- **Replace O-ring (6) with a new one when reinstalling.**
- **Before tightening union nut (9), confirm that O-ring (6) is seated correctly in O-ring groove (8). Tightening union nut (9) with O-ring (6) displaced will damage O-ring (6), resulting in oil leakage.**
- **Do not damage O-ring groove (8) of adapter (7) or sealing surface (10) on the hose side. Damage to O-ring (6) may cause oil leakage.**
- **If union nut (9) is found to be loose, causing oil leakage, do not tighten it to stop the leak. Instead, replace O-ring (6) with a new one, then tighten union nut (9) after confirming that O-ring (6) is securely seated in O-ring groove (8).**



WDAA-01-02-011

a - Joint Body

Wrench Size mm	Tightening Torque		
	N·m	(kgf·m)	(lbf·ft)
Union Nut			
19	30	(3)	(22)
22	70	(7)	(52)
27	95	(9.5)	(70)
32	140	(14)	(103)
36	180	(18)	(133)
41	200	(20)	(148)
50	350	(35)	(260)

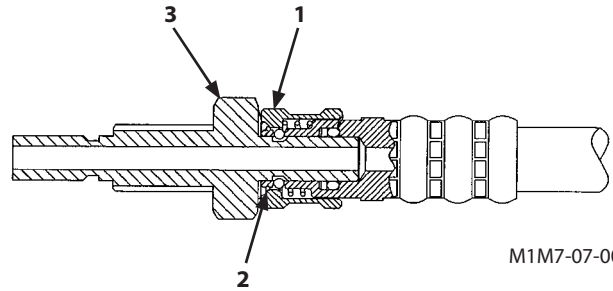
## SECTION 1 GENERAL

### Group 2 Tightening

#### Quick Coupling

##### 1. Coupling procedure

- Push socket ring (1) into plug (3) by rotating it fully counterclockwise and then pulling it toward you.
- Release socket ring (1). Check that socket ring (1) is returned by the spring force and the coupling is locked completely by ball (2). At this time, check if socket ring (1) is returned to the original position (to the rightmost direction).



##### 2. Separating procedure

- Remove the hose by rotating socket ring (1) fully counterclockwise and then pulling it. Because no check function is attached inside, be careful that oil flows out.
- Cap the removed hoses using special plug.

#### **⚠ CAUTION:**

- **When disconnecting, do not damage joint surface.**
- **When disconnecting, clean the joint part and thoroughly wipe off the cleaning solution to prevent any foreign material from entering.**
- **Complete the joint disconnecting / connecting procedure. Check enough if oil leaks especially after installation.**
- **After installation, check if socket ring (1) is returned to the original position (to the rightmost direction).**

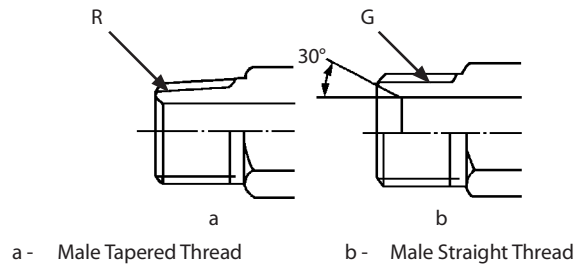
# SECTION 1 GENERAL

## Group 2 Tightening

### Screw-In Connection

Depending on types of screw and sealing, different types of screw-in connection are used.

**IMPORTANT:** Check that the thread pitch and thread type (tapered or straight) are the correct type before using any screw-in connection. (In general, the screw-in connection of male tapered thread is used except for measurement purpose.)



W105-01-01-018

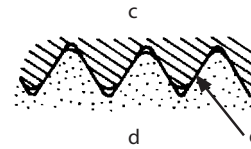
Wrench Size mm	Tightening Torque	
	FC material	SS material
Joint Body		
19	15 (1.5, 11)	35 (3.5, 26)
22	30 (3, 22)	50 (5, 37)
27	50 (5, 37)	95 (9.5, 70)
36	70 (7, 52)	160 (16, 118)
41	110 (11, 81)	200 (20, 148)
50	160 (16, 118)	330 (33, 245)
60	200 (20, 148)	

NOTE: Unit: N·m (kgf·m, lbf·ft)

### Seal Tape Application

Seal tape is used in order to seal clearances between male and female threads so that any leaks between threads may be prevented. Therefore, apply just enough seal tape to fill up thread clearances. Do not overwrap.

• Application Procedure  
Check that the thread surface is clean and, free of dirt or damage. Apply the seal tape around threads in order to leave one to two pitch threads uncovered. Wrap the seal tape in the same direction as the threads.



c - Internal Thread  
d - External Thread  
e - Clearance

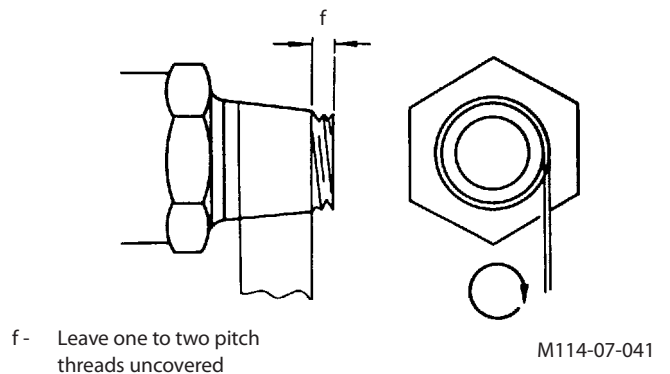
W105-01-01-019

### Low-Pressure-Hose Clamp Tightening

Low-pressure-hose clamp tightening torque differs depending on the type of clamp.

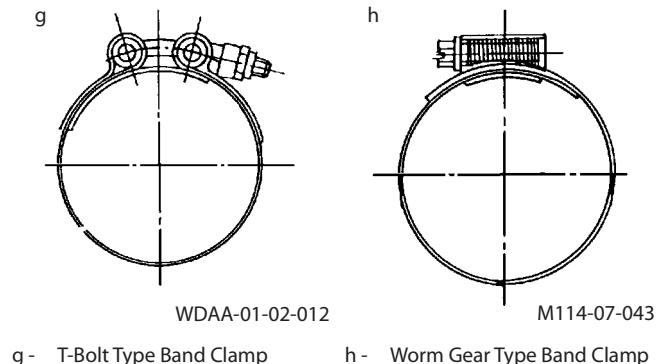
T-Bolt Type Band Clamp:  
4.5 N·m (0.45 kgf·m, 3.3 lbf·ft)

Worm Gear Type Band Clamp:  
6 to 7 N·m (0.6 to 0.7 kgf·m, 4.4 to 5.2 lbf·ft)



f - Leave one to two pitch threads uncovered

M114-07-041



WDAA-01-02-012

M114-07-043

g - T-Bolt Type Band Clamp

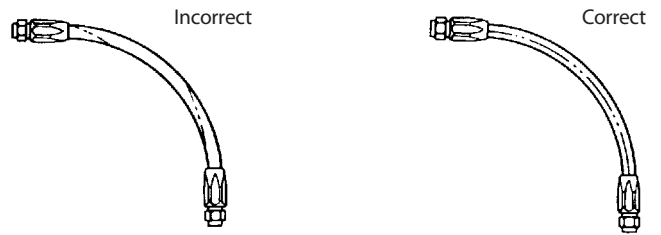
h - Worm Gear Type Band Clamp

# SECTION 1 GENERAL

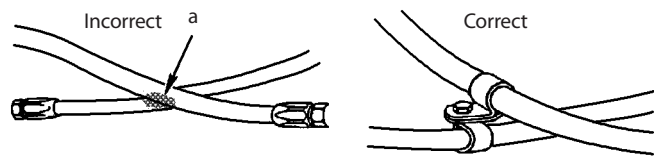
## Group 2 Tightening

### Connecting Hose

**CAUTION:** When replacing the hoses, use only genuine Hitachi service parts. Using hoses other than genuine Hitachi hoses may cause oil leaks, hose rupture or separation of fitting, possibly resulting in a fire on the machine. Do not install hoses kinked. Application of high oil pressure, vibration, or an impact to a kinked hose may result in oil leaks, hose rupture or separation of fitting. Utilize the print marks on hoses when installing in order to prevent hose from being kinked. Take necessary measures to protect hoses from rubbing against each other. If the hoses rub against each other, wear to the hoses may result and lead to hose rupture. Take care so that the hoses do not come into contact with the moving parts or sharp objects.

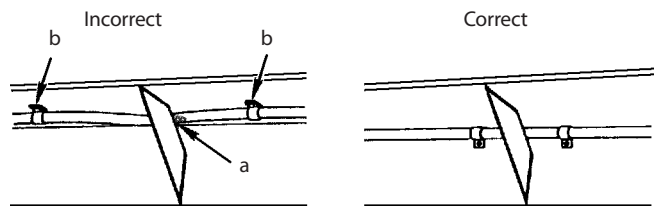


W105-01-01-011



W105-01-01-012

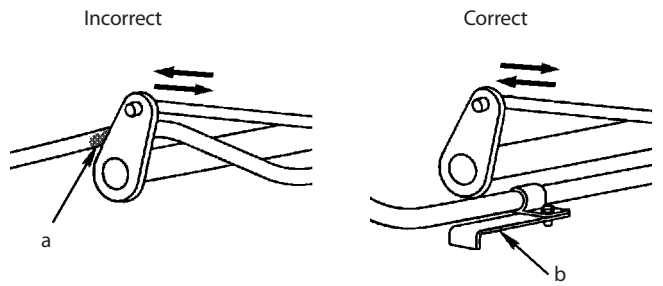
a - Rubbing Against Each Other



W105-01-01-013

a - Rubbing Against Each Other

b - Clamp



W105-01-01-014

a - Rubbing Against Each Other

b - Clamp

## SECTION 1 GENERAL

### Group 3 Painting

#### Painting specification

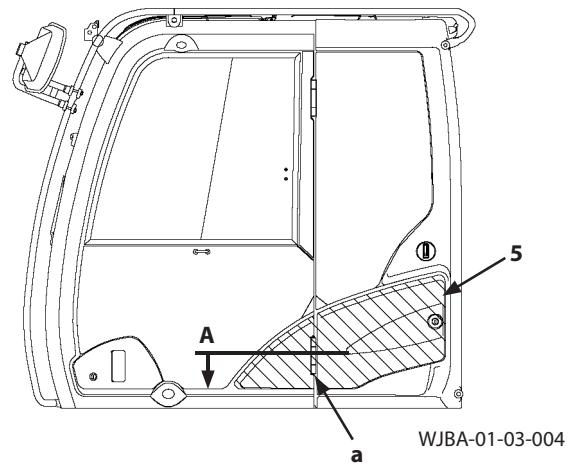
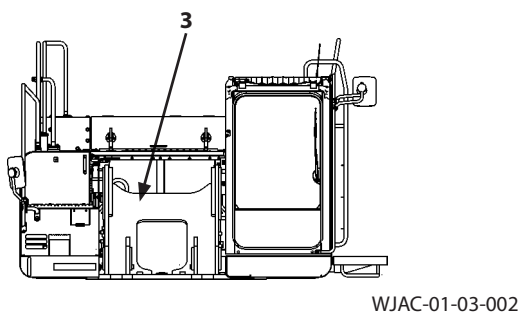
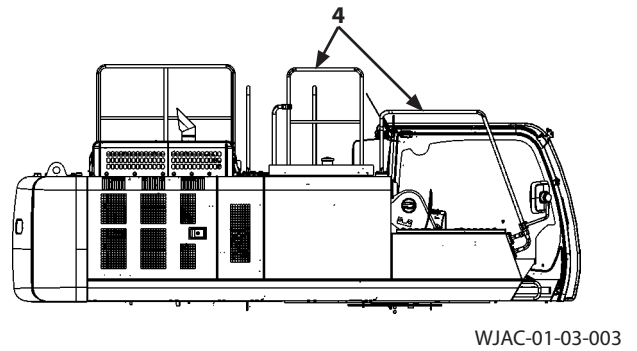
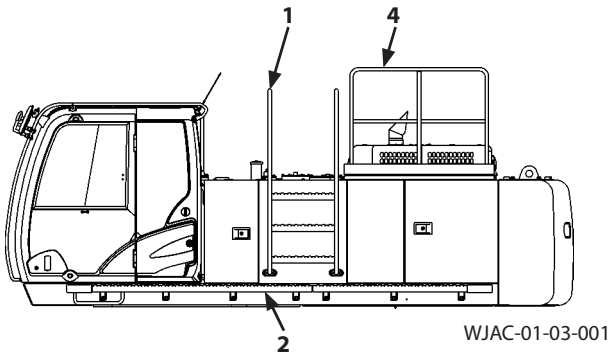
Surfaces to Be Painted	Painting Colour
Main surface of upperstructure (except cab)	YR-01 [TAXI yellow]
Main frame	P1-01 [High Grade Black]
Inner	HK1 Coat Primer gray
Step	High Grade Black
Counterweight	YR-01 [TAXI yellow]
Front attachment	YR-01 [TAXI yellow]
Track	N-1.0 [Black]
Floor plate	M/F Cation (allowed)

#### Final painted color

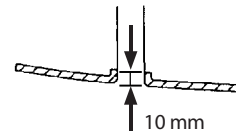
Inside and outside surface of cab	High Grade Black
Shaded area on cab (Only the left side)	Shining Silver
Suspension lifter	N2.0 [Black]
Lever (Travel, pilot shut-off, foot rest)	High Grade Black
Eruption plate	Deep Black
Ladder, Handrail	High Grade Black
Mirror stay	High Grade Black
Muffler exhaust pipe	B701K (Black heat-resistant painting)

# SECTION 1 GENERAL

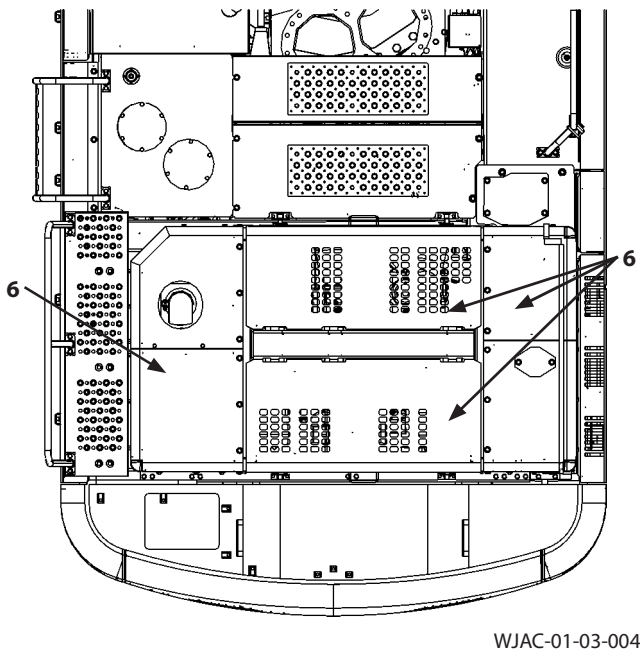
## Group 3 Painting



Section A



W1J1-01-03-005



a - Paint all circumference in the lower hinge swing position shining silver.

1- Ladder  
2- Step (Front, Rear)

3- Main Frame  
4- Handrail

5- Shaded Area on Cab  
6- Cover [High Grade Black]



## SECTION 1 GENERAL

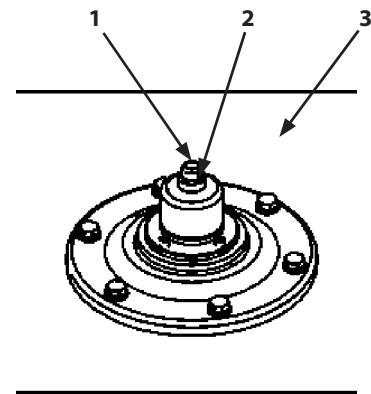
### Group 4 Bleeding Air

#### Bleeding Air from Hydraulic Oil Tank

**CAUTION:** Escaping fluid under pressure may penetrate the skin and eyes, and cause serious injury. Release the pressure before disconnecting the hydraulic pipings or removing other equipment. Hot hydraulic oil just after operation may spout out and cause severe burns. Wait until oil cools before starting any work. Do not turn cap (2) of hydraulic oil tank (3) quickly. Cap (2) may fly off by internal pressure. Release any remaining pressure before removing cap (2).

#### Preparation

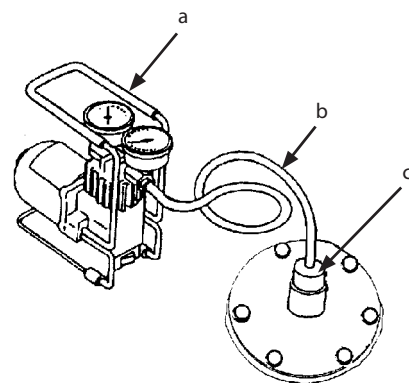
1. Park the machine on a solid and level surface. Set the front attachment in position for checking hydraulic oil level.
2. Stop the engine. Push air bleed button (1) of hydraulic oil tank (3) and bleed air from hydraulic oil tank (3).
3. Remove cap (2) of hydraulic oil tank (3).



W1R7-01-04-001

4. Install vacuum pump (a) to the position where cap (2) has been removed. Operate vacuum pump (a) and maintain negative pressure in hydraulic oil tank (3).

**NOTE:** Operate vacuum pump (a) continuously while working.



W1R7-01-04-002

- a - Vacuum Pump
- b - Hose
- c - Adapter

# SECTION 1 GENERAL

## Group 4 Bleeding Air

---

### Bleeding Air from Hydraulic System

Bleed air from the hydraulic system as follows when hydraulic oil has been drawn, the suction filter and suction pipe have been replaced, or the pump device, swing motor, travel motor, cylinders have been removed/installed.

**IMPORTANT: If air is accumulated inside of the pump and if the engine starts in lacking of hydraulic oil, the pump may be damaged.**

- Bleeding Air from Pump
  - Remove the air bleed plug on top of the pump. Add hydraulic oil to the pump.
  - After the pump is filled with hydraulic oil, temporarily tighten the plug. Then, start the engine and run it at slow idle speed.
  - Slightly loosen the plug and bleed air from the pump until hydraulic oil comes out from the gap.
  - After bleeding all air, securely tighten the plug.

**IMPORTANT: If air is accumulated inside of the motor and if the engine starts in lacking of hydraulic oil, the motor may be damaged.**

- Bleeding Air from Travel Motor, Swing Motor
  - Remove the air bleed plug (top) from the travel motor and swing motor. Fill the motor case with hydraulic oil.

**IMPORTANT: If air is accumulated inside of the cylinder and if the cylinder is operated suddenly in lacking of hydraulic oil, the seal may be damaged or the cylinder may seize.**

- Bleeding Air from Hydraulic Circuit
  - After refilling hydraulic oil, start the engine. While operating each cylinder, swing motor, and travel motor evenly, operate the machine under light loads for 10 to 15 minutes. Slowly start each operation (never fully stroke the cylinders during initial operation stage).
  - As the pilot circuit has an air bleed device, air in the pilot circuit will be bled while performing the above operation for approx. 5 minutes.
  - Reset the front attachment in position for checking hydraulic oil level.
  - Stop the engine. Check hydraulic oil level. Replenish hydraulic oil if necessary.

## SECTION 1 GENERAL

### Group 4 Bleeding Air


#### Bleeding Air from Fuel System

Air in the fuel system may make the engine hard to start or make it run irregularly. After draining water and sediment from the fuel filter, replacing the fuel filter, cleaning the fuel solenoid pump strainer or running the fuel tank dry, be sure to bleed the air from the fuel system.


#### Air Bleeding Procedures

**CAUTION:** Fuel leaks may lead to fires.

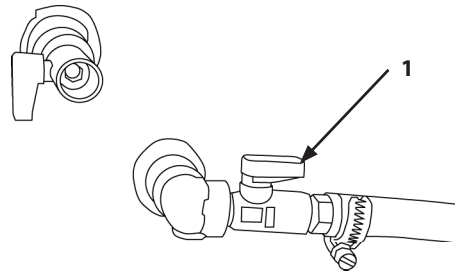
1. Check that fuel cock (1) on bottom of the fuel tank is opened.
2. Loosen priming pump (3).
3. Loosen joint bolt (2) on the fuel main filter.

 : 12 mm

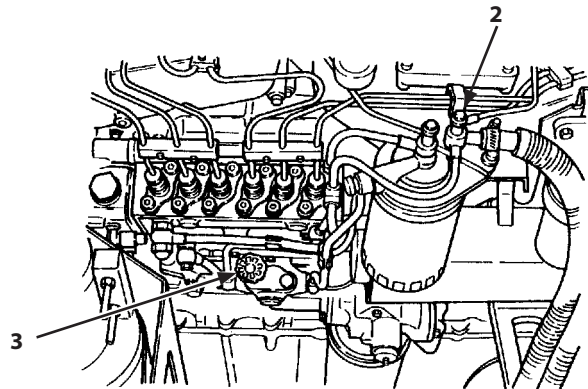
4. Supply fuel by reciprocating priming pump (3). After no air bubbles are spouted through joint bolt (2), tighten joint bolt (2).

 : 12 mm

5. After tightening joint bolt (2), reciprocate priming pump (3) until its movement becomes slow.
6. Tighten priming pump (3).
7. Wipe off any spilled fuel.
8. Start the engine. Check that no fuel leaks are present. If the engine does not start, repeat the above procedures from step 1.



M1U1-07-015




M111-07-046

## SECTION 1 GENERAL

### Group 4 Bleeding Air

---

#### Bleeding Air from Radiator

 **CAUTION:** Do not loosen the radiator cap until the system has cooled. Hot steam may spout out and cause severe burns. Wait until coolant cools and loosen the cap slowly. Release all pressure and remove the cap.

#### Preparation

1. Park the machine on a solid and level surface.  
Set the front attachment in position for checking hydraulic oil level.
2. Stop the engine. Remove the radiator cap.


## SECTION 1 GENERAL

### Group 5 Pressure Release Procedure

#### Hydraulic Circuit Pressure Release Procedure

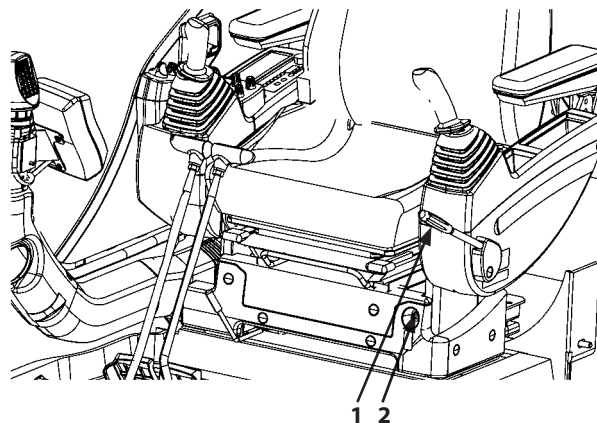
Release any remaining pressure as follows before removing/installing the front attachment.

1. Set pilot shut-off lever (1) to the UNLOCK position.
2. Turn engine stop switch (2) ON.

 **NOTE:** Perform step 1 and step 2, and set the key switch to the START position. Although the starter rotates, the engine does not start.

**IMPORTANT: Battery will deplete. Operate the key switch for short period.**

3. With the key switch set in the START position, operate the control lever in order to release any pressure in the hydraulic circuit 4 to 5 times.
4. Return pilot shut-off lever (1) to the LOCK position.
5. Turn engine stop switch (2) OFF.



M1U1-01-029

## SECTION 1 GENERAL

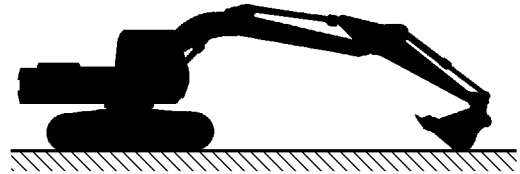
### Group 6 Preparation

#### Preparation before Inspection and Maintenance

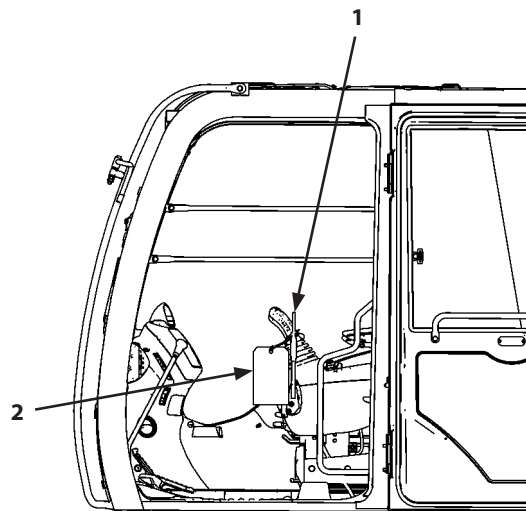
**CAUTION:** Components, hydraulic oil, lubricant, and coolant just after operation are too hot. Wait until they cool. Then, start the work.

Before performing the maintenance procedures given in the following chapters, park the machine as described below, unless otherwise specified.

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch OFF.
4. Set the engine control dial to the slow idle position. Run the engine at slow idle speed without load for five minutes.
5. Set the key switch to the OFF position. Stop the engine. Remove the key from the key switch. If maintenance should be performed with the engine running, do not leave the machine unattended.
6. Set pilot shut-off lever (1) to the LOCK position.
7. Before performing any work on the machine, attach tag (2) on the door or control lever.



M104-07-021



WDAA-01-06-001

---

## SECTION 2

# MAINTENANCE STANDARD

### CONTENTS

#### Group 1 Upperstructure

Main Pump.....	W2-1-1-1
Swing Motor.....	W2-1-2-1

#### Group 2 Undercarriage

Travel Motor.....	W2-2-1-1
Sprocket.....	W2-2-1-2
Center Joint.....	W2-2-2-1
Front Idler.....	W2-2-3-1
Upper Roller.....	W2-2-4-1
Lower Roller.....	W2-2-4-2
Track.....	W2-2-5-1

#### Group 3 Front Attachment

Remove and Install Bushing.....	W2-3-1-1
Pin and Bushing.....	W2-3-1-3
Side Cutter.....	W2-3-1-5
Point.....	W2-3-1-5
Standard Dimensions for Arm and Bucket	
Connection.....	W2-3-1-6
Standard Dimensions for Arm and Boom	
Connection.....	W2-3-1-8
Cylinder.....	W2-3-2-1

**BUY NOW**

**Then Instant Download  
the Complete Manual  
Thank you very much!**