

Workshop Manual

ZX

35U-3

50U-3

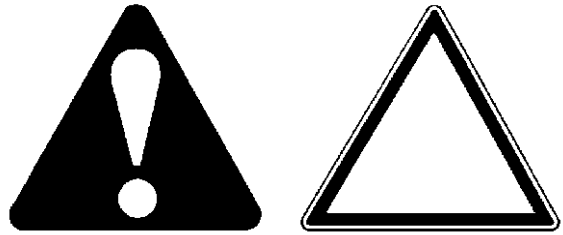
60USB-3

Hydraulic Angle Blade

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.
- 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.

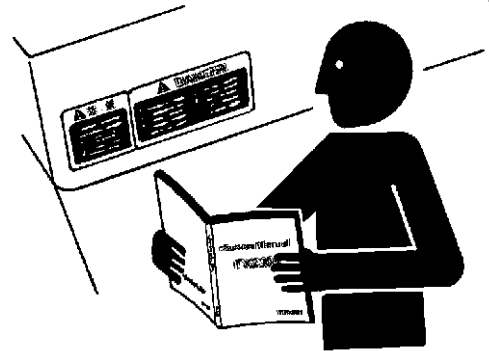


SA-1223

SAFETY

FOLLOW SAFETY INSTRUCTIONS

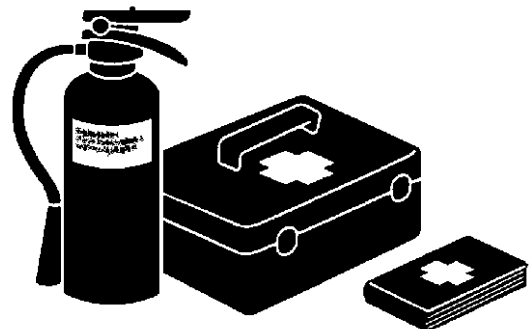
- Carefully read and follow all safety signs on the machine as well as all safety messages in this manual.
- Safety signs must be installed, maintained and replaced if damaged.
 - If a safety sign or this manual is damaged or missing, order a replacement from your authorized dealer in the same way you order other replacement parts (be sure to state machine model and serial number when ordering).
- Allow only properly trained, qualified, authorized personnel to operate the machine.
- Learn how to correctly operate and service the machine.
- Keep your machine in proper working condition.
- Always operate the machine within the specification.
 - Unauthorized modifications of the machine may impair the functions 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 possible hazardous situation you may encounter. If you have any questions concerning safety, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.



SA-003

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 and 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 any fire or accidents which may occur.
- Keep emergency numbers for doctors, ambulance service, hospitals, and fire department posted near your telephone.



SA-437

SAFETY

WEAR PROTECTIVE CLOTHING

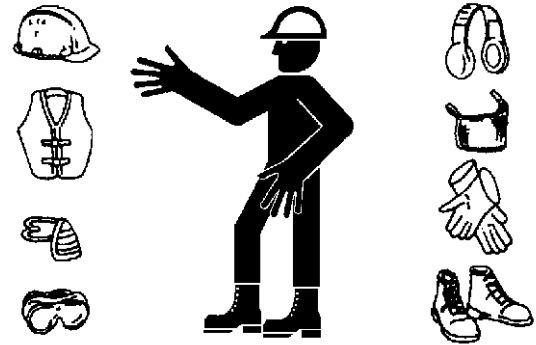
- Wear close fitting clothing and safety equipment appropriate to the job.

You may need:

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

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.



SA-438

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

- If any abnormality is found, be sure to repair it immediately before operating the machine.
- In the walk-around inspection, be sure to cover all points described in the “PRE-START INSPECTION” chapter in the operator’s manual.



SA-435

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GENERAL / Precautions for Disassembling and Assembling

PRECAUTIONS FOR DISASSEMBLING AND ASSEMBLING

Precautions for Disassembling and Assembling

- 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

- To prevent dirt from entering, cap or plug the removed pipes.
- Before disassembling, clean the exterior of the components and place on a work bench.
- Before disassembling, drain gear oil from the reduction gear.
- Be sure to provide appropriate containers for draining fluids.
- Use matching marks for easier reassembling.
- 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 as 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.

GENERAL / Precautions for Disassembling and Assembling

- 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 suitable lubricant onto parts in order to prevent them from seizing.
- Be sure to replace O-rings, backup rings, and oil seals with new ones once they are disassembled. Apply a film of 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.
- Utilize matching marks when assembling.
- 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 complete, count the number of tools, so as to make sure that no forgotten tools remain in the assembled machine.

Bleeding Air from Hydraulic System

When hydraulic oil is drained, the suction filter or the suction lines are replaced, or the removal and installation of the pump, swing motor, travel motor or cylinder is done, bleed air from the hydraulic system in the following procedures:

IMPORTANT: If the engine is started with air trapped in the hydraulic pump housing, damage to the pump may result. If the hydraulic motor is operated with air trapped in the hydraulic motor housing, damage to the motor may result. If the cylinder is operated with air trapped in the cylinder tube, damage to the cylinder may result. Be sure to bleed air before starting the engine.

- Bleeding Air from Hydraulic Pump

- Remove the air bleeding plug from the top of the pump and fill the pump housing with hydraulic oil.
- After the pump housing is filled with hydraulic oil, temporarily tighten the plug. Then, start the engine and run at slow idle speed.
- Slightly loosen the plug to bleed air from the pump housing until hydraulic oil oozes out.
- After bleeding all the air, securely tighten the plug.

- Bleeding Air from Travel Motor / Swing Motor

- With the drain plug / hose on travel motor / swing motor removed, fill the motor case with hydraulic oil.


GENERAL / Precautions for Disassembling and Assembling

- 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 oil circuit has an air bleed device, air trapped in the pilot oil circuit will be bled while performing the above operation for approx. 5 minutes.
 - Reposition the front attachment to check hydraulic oil level.
 - Stop the engine. Recheck hydraulic oil level. Replenish oil as necessary.

GENERAL / Tightening

TIGHTENING TORQUE

No.	Descriptions	Bolt Dia.	Q'ty	Wrench Size (mm)	Torque		
					N·m	(kgf·m)	
1.	ORS fittings for hydraulic hoses and piping	Metal joint	7/16-20UNF		17	25	(2.5)
			9/16-18UNF		19	30	(3)
					22	40	(4)
			3/4-16UNF		27	65	(6.5)
			1-1/16-12UNF		36	180	(18)
		1-5/16-12UNF		41	200	(20)	
		ORS	9/16UNF		19	30	(3)
11/16UNF			22	70	(7)		
13/16UNF			27	95	(9.5)		
2.	Control valve mounting bolt	10	4	17	50	(5)	
	Control valve base mounting bolt	10	4	17	50	(5)	
3.	Cover mounting bolt	6		10	5	(0.5)	
		8		13	10	(1)	
		10		17	50	(5)	
4.	Front stopper pin	10		17	50	(5)	
		12		19	90	(9)	
		14		22	140	(14)	
		16		24	210	(21)	
		18		27	400	(40)	

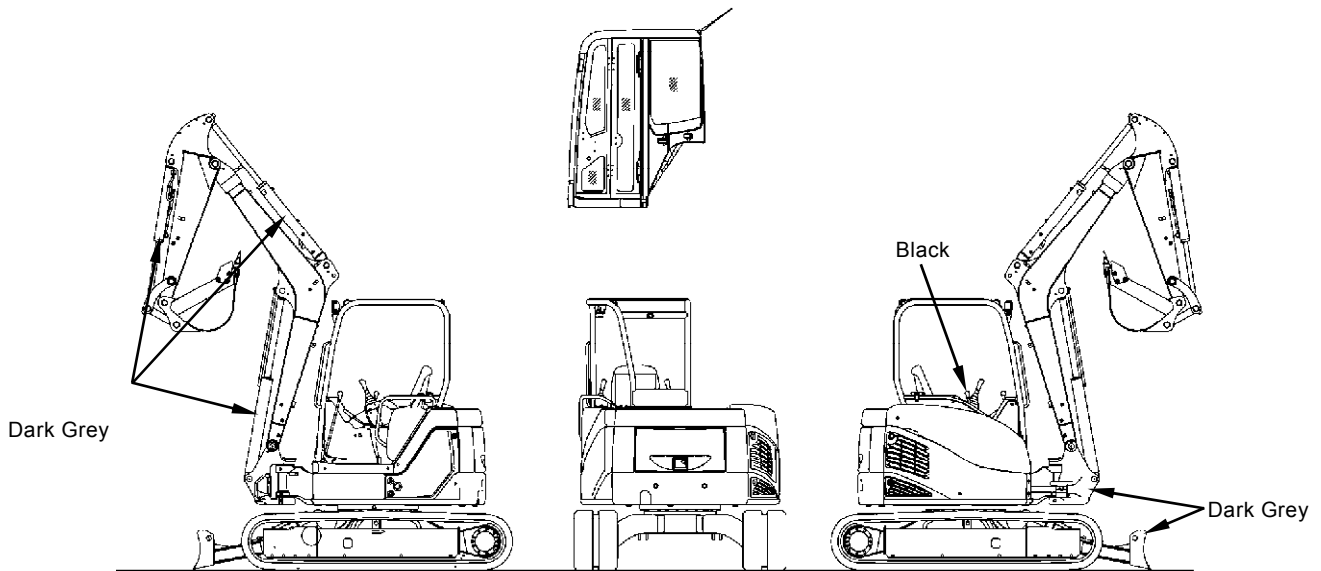
 **NOTE:** 1: Apply lubricant to bolts and nuts to reduce friction coefficient of them.
(Example: White zinc B dissolved Into Spindle oil)

2: Make sure bolt and nut threads are clean before installing.

GENERAL / Painting

PAINTING

Parts	Surfaces to Be Painted	Painting Color
Upperstructure	Blade Lever	N-10 [N1.0]
Undercarriage	Blade (Including Cylinder and Cover)	SP-424 [Dark Grey]
Front Attachment Attachment	Boom, Arm, Bucket, Link	YR1-01 [TAXI Yellow]
	Cylinder (Boom, Arm, Bucket) Swing Post (Including Cylinder)	SP-424 [Dark Grey]



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GENERAL / Bleeding Air from Hydraulic Oil Tank

BLEED AIR FROM HYDRAULIC OIL TANK



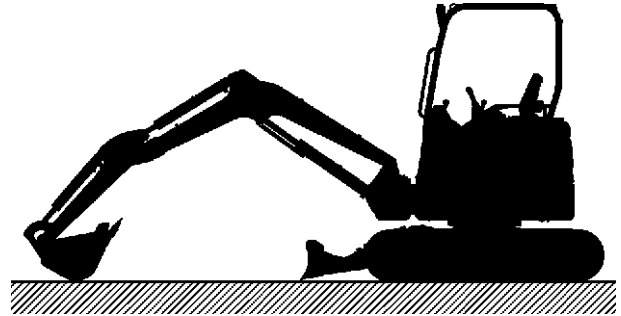
CAUTION: Escaping fluid under pressure may penetrate the skin and eyes, and cause serious injury. Release the pressure before removing hydraulic or other lines.

Hot hydraulic oil just after operation may spout and cause severe burns. Wait for oil in order to cool before starting any work.

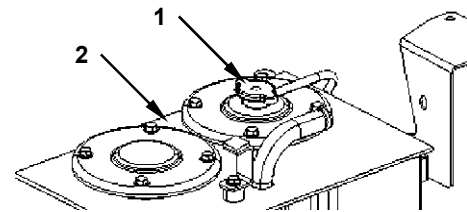
Do not turn the cap on hydraulic oil tank quickly. The cap may fly off by internal pressure. Release any remaining pressure and remove the cap.

Preparation

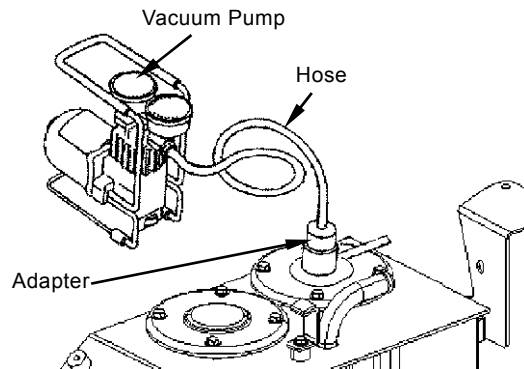
1. Park the machine on a solid, level surface. Lower the front attachment onto the ground.
2. Stop the engine. Loosen cap (1) on hydraulic oil tank (2) and release any remaining pressure.
3. Remove cap (1) on hydraulic oil tank (2).
4. Install a vacuum pump to the hole without cap (1). Operate the vacuum pump and maintain negative pressure in the hydraulic oil tank. Run the vacuum pump continuously while working.



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W1M9-01-04-002

GENERAL / Floor-Tilting Device

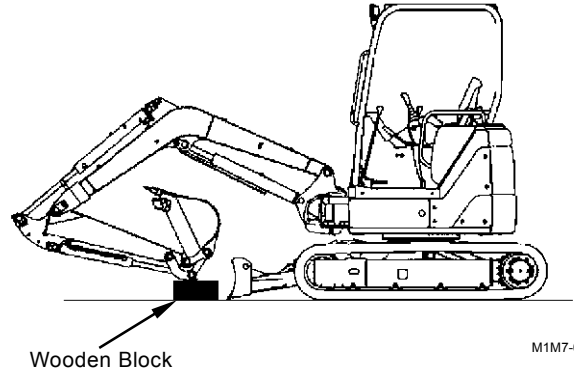
FLOOR-TILTING DEVICE OPERATION PROCEDURE

Preparation

- Park the machine in a flat and solid place.
- Lower the blade.
- Roll-in the arm and bucket, and put them on the front wooden block or something.

IMPORTANT: Be careful because interference of the boom and canopy (cab) takes place unless the front end attachment is lowered in advance.

- Close the door of the cab (optional).




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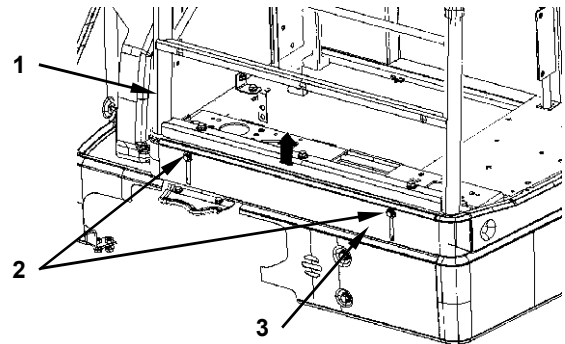
GENERAL / Floor-Tilting Device

PROCEDURE FOR FLOOR TILTING UP (ZX35U-3, ZX50U-3)

IMPORTANT: If tilting up operation is made with the door open, it interferes with cover (3).

1. Loosen bolts (2) (2 used). Move cover (3) to the upper end. Temporarily tighten cover (3) to the canopy or cab (1) with bolts (2) (2 used).

 : 13 mm




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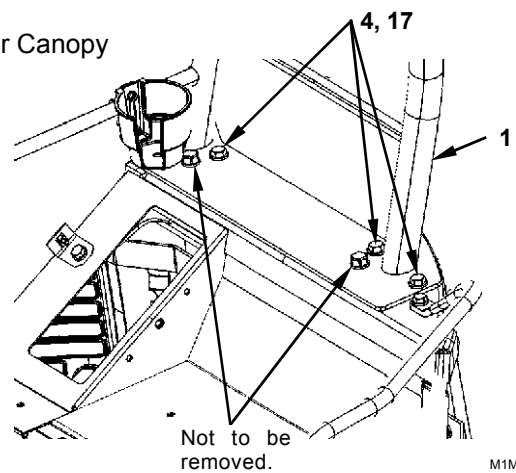
IMPORTANT: Near bolts (4), two bolts for fixing the canopy or cab (1) are fitted. Never remove these two bolts in tilting up operation.

A bolt never to be removed can be identified by the attached cap or red paint.

2. Remove bolts (4) (3 used) and washers (17) (3 used) from the canopy or cab (1).

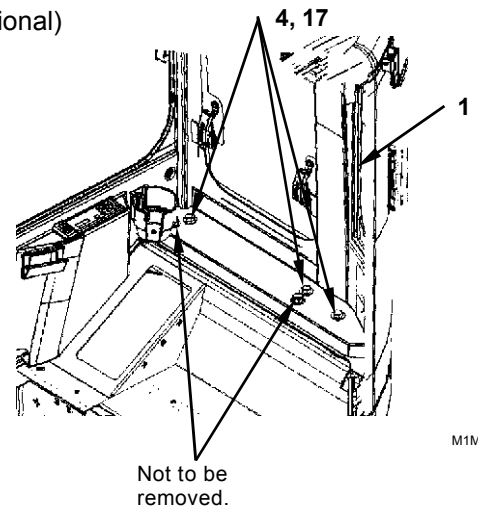
 : 19 mm

4-Pillar Canopy



M1M7-07-063

Cab (Optional)




M1M7-07-064

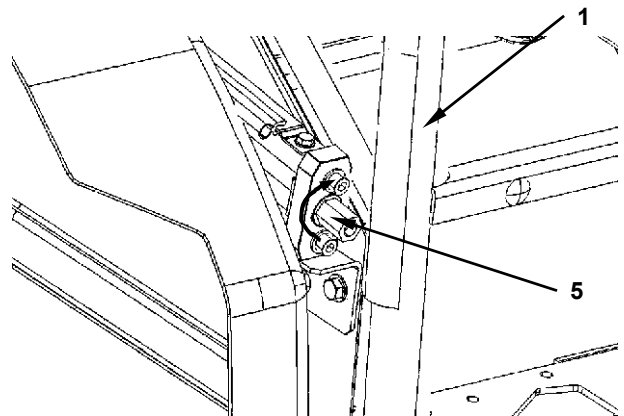
GENERAL / Floor-Tilting Device

IMPORTANT: The operating torque of adjuster screw (5) is 25 N·m (2.5 kgf·m, 18 lbf·ft) or lower. In case larger torque is required, it is probable that bolts (4) remain not removed. Re-check from this perspective.

3. Turn adjuster screw (5). Tilt the canopy or cab (1) assembly toward front.

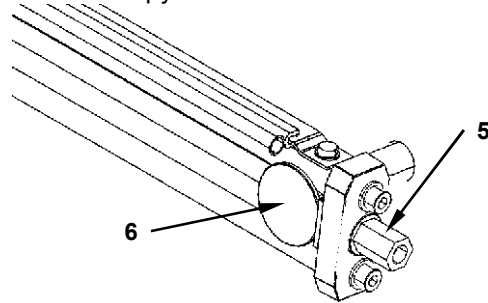
 : 17 mm

4. Turn adjuster screw (5) clockwise until disc (6) on the side face of the tilting device moves to the farthest end.



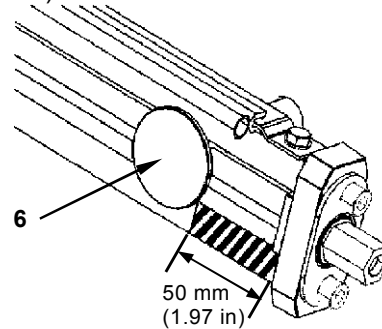
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4-Pillar Canopy



M1M7-07-066

Cab (Optional)



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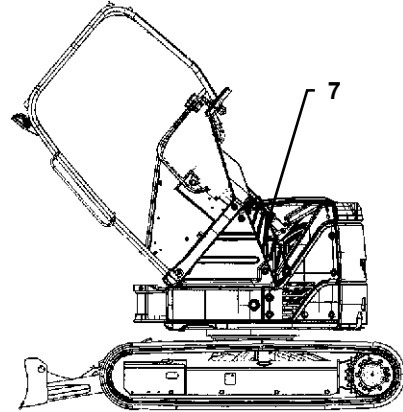
CAUTION: Do not tilt up cab (1) as far as the striped region. If done so, cab (1) tilts forward because the center of gravity overhangs the balancing point, which is dangerous.

5. In cab (1) version machines, stop tilting up 50 mm before the farthest end (before the striped region (6)).

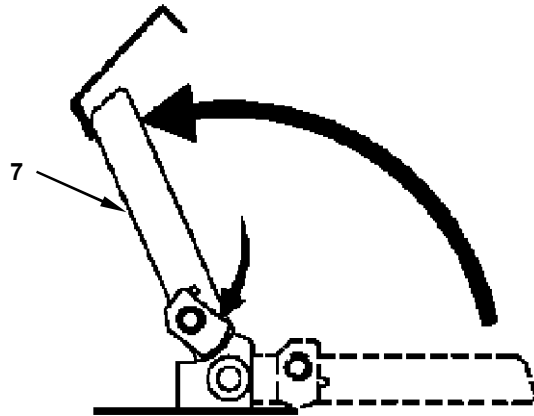
GENERAL / Floor-Tilting Device

IMPORTANT: Do not make tilting up operation by other means (e.g. by crane) than the tilting device. Otherwise, the tilting device or floor could be damaged.

6. In case of work done lying under the floor, support the opening space of the raised floor for security with fall prevention lever (7).



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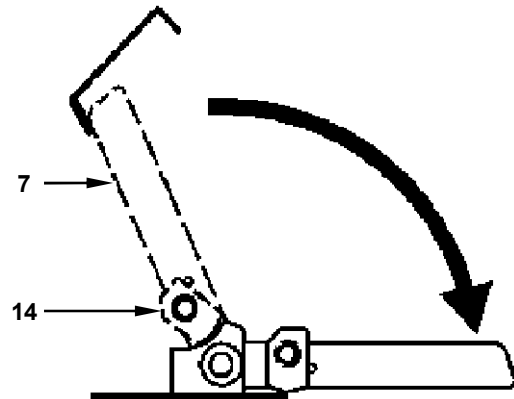


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GENERAL / Floor-Tilting Device


PROCEDURE FOR FLOOR TILTING DOWN (ZX35U-3, ZX50U-3)

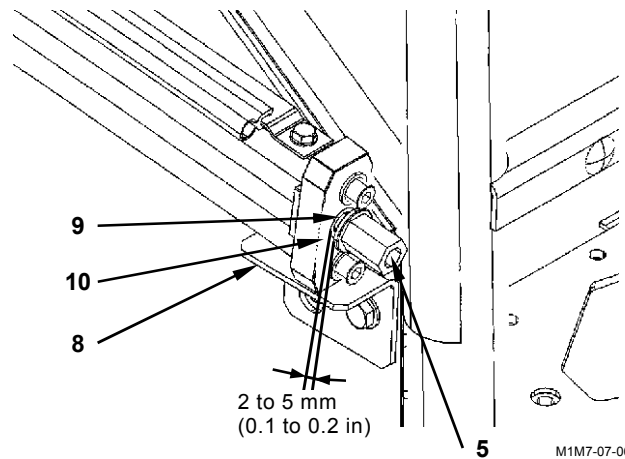
1. Return fall prevention lever (7) toward direction of the arrow while raising lock stopper (14).



M1M7-07-082

⚠ CAUTION: Do not lower the floor abruptly. If adjuster screw (5) is rotated abruptly in lowering the floor, the floor trembles enormously, which is dangerous.

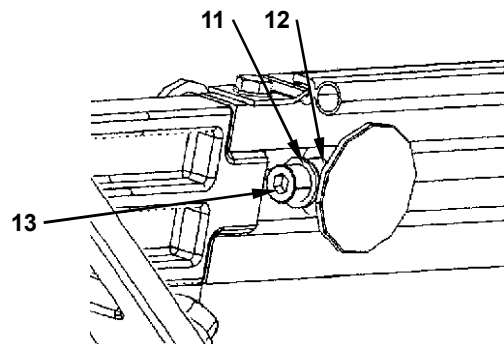
2. Slowly turn adjuster screw (5) counterclockwise.
 : 17 mm
3. Turn adjuster screw (5) counterclockwise until the farthest end contacts receiver seat (8).



M1M7-07-068

⚠ CAUTION: After the floor has been lowered completely, if adjuster screw (5) is kept turned, it will not be turned any longer when unscrewed by about 15 mm because washer (11) touches pin (12). Be careful not to turn adjuster screw (5) further because washer (11) deforms and gets damaged, causing fall of bolt (13).


4. When the floor has been lowered completely, adjuster screw (5) is drawn. Make adjustment so that the clearance between collar (9) of adjuster screw (5) and contact face (10) becomes 2 to 5 mm (0.1 to 0.2 in).




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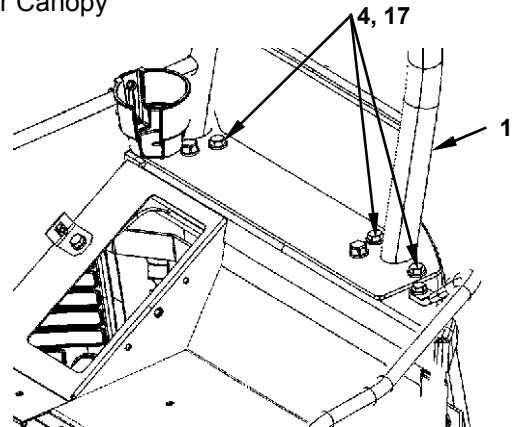
GENERAL / Floor-Tilting Device

5. Install the canopy or cab (1) with bolts (4) (3 used) and washers (17) (3 used)

 : 19 mm

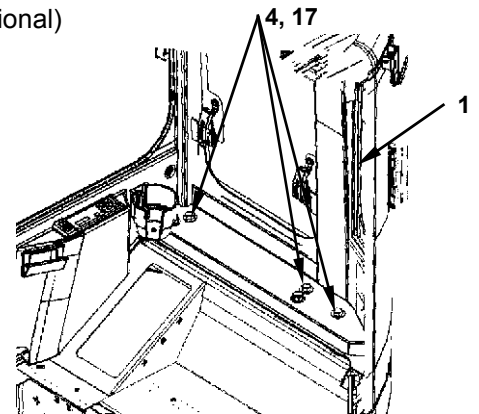
 : 90 N·m (9 kgf·m, 66 lbf·ft)

4-Pillar Canopy




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
Cab (Optional)

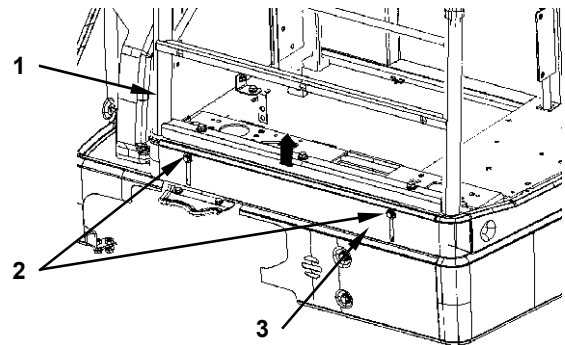


M1M7-07-064

6. Loosen bolts (2) (2 used). Move cover (3) to the lower end. Install cover (2) to the canopy or cab (1) with bolts (2) (2 used).

 : 13 mm

 : 10 N·m (1 kgf·m, 7 lbf·ft)



M1M7-07-061

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