

# Workshop Manual

## ZW 150-5B 150PL-5B Wheel Loader

ZW150-5B • ZW150PL-5B WHEEL LOADER WORKSHOP MANUAL

WNDG90-EN-00

 **Hitachi Construction Machinery Co., Ltd.**

URL:<http://www.hitachi-c-m.com>

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## SAFETY

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### 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 accelerator pedal, brake pedals, control lever lock switch 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 accelerator or brake pedals during operation, resulting in serious injury or death.

## SAFETY

### Travel on Public Roads Safely

- This machine is not allowed to drive on public roads with the bucket loaded.
- Be sure to empty the bucket.
- Hold the bucket at mark (A) 300 mm (12 in) above the road surface as illustrated.



SA-453

### Avoid Injury from Rollaway Accidents

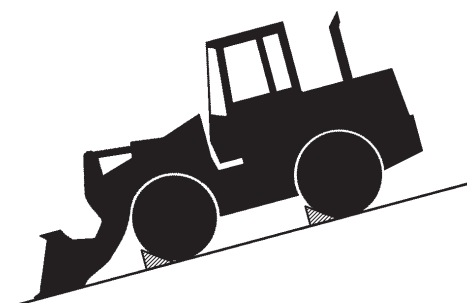
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the bucket to the ground.
- Put the forward / reverse lever (switch) in neutral, and pull up the parking brake switch (lever) in the ON (parking brake) position.
- Run the engine at low idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Turn the control lever lock switch to the lock (Ⓐ) position.
- Block both tires and lower the bucket to the ground.
- Position the machine to prevent rolling.
- Park at a reasonable distance from other machines.



SA-457



SA-458

## SAFETY

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- Sufficiently illuminate the work site. Use a maintenance work light when working under or inside the machine.
- Always use a work light protected with a guard. In case the light bulb is broken, spilled fuel, oil, antifreeze fluid, or window washer fluid may catch fire.



SA-037

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### Warn Others of Service Work

- Unexpected machine movement can cause serious injury.
- Before performing any work on the machine, attach a “Do Not Operate” tag on the control lever. This tag is available from your authorized dealer.



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### Support Machine Properly

- Never attempt to work on the machine without securing the machine first.
- Always lower the attachment to the ground before you work on the machine.
- If you must work on a lifted machine or attachment, securely support the machine or attachment. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack.



SA-527

## SAFETY

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### Handle Chemical Products Safely

- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, coolants, paints, and adhesives.
- A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
- Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and use recommended equipment.
- See your authorized dealer for MSDS's (available only in English) on chemical products used with your machine.

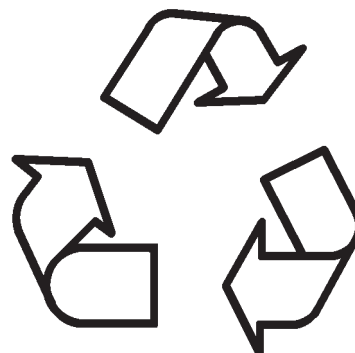


SA-309

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### Dispose of Waste Properly

- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.
- Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
- Do not pour waste onto the ground, down a drain, or into any water source.
- Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.
- Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your authorized dealer.



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## SECTION 1

# GENERAL

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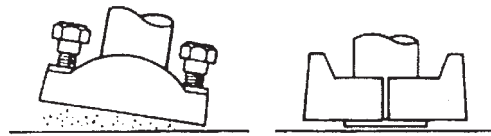
# SECTION 1 GENERAL

## Group 2 Tightening

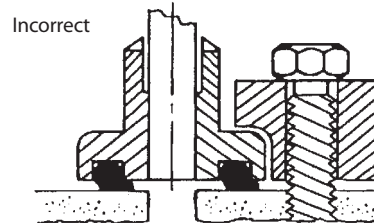
### Precautions for Spilt Flange

**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.



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WDAA-01-02-006



W105-01-01-008

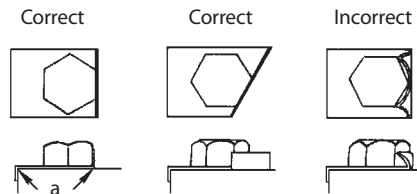
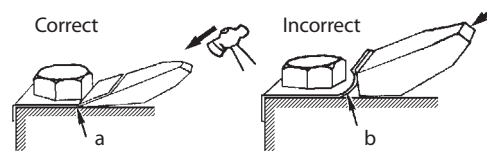
### Nut and Bolt Locking

- Lock Plate

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

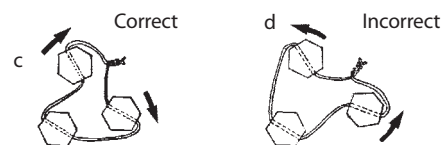
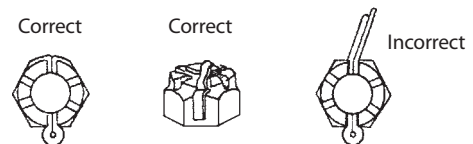
- Split Pin

**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

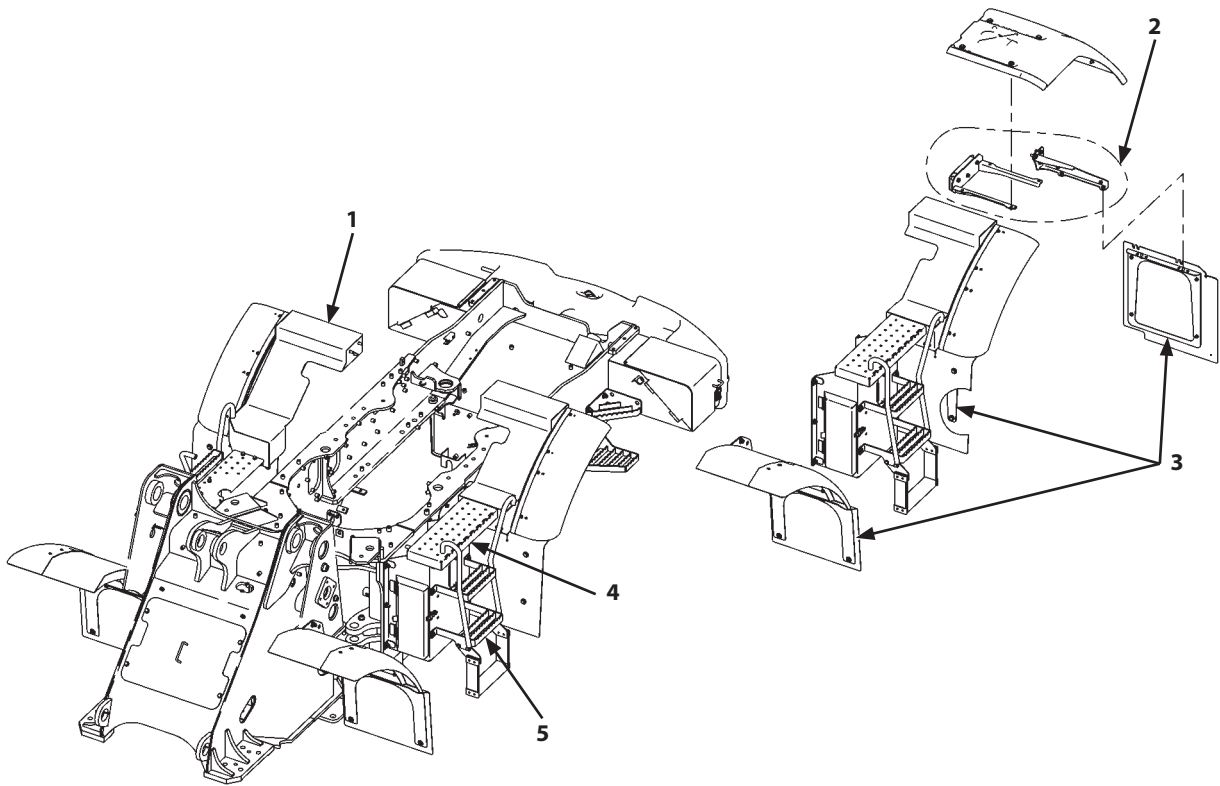


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c- Tighten      d- Loosen

# SECTION 1 GENERAL

## Group 3 Painting



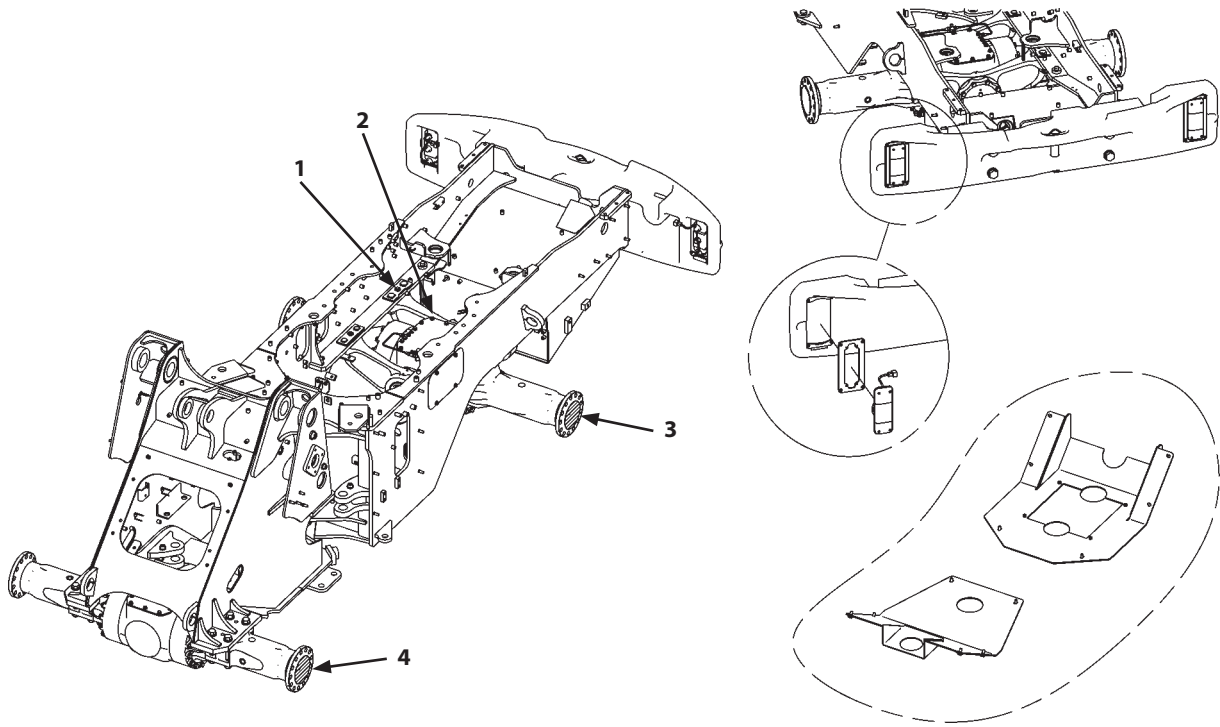
WMDF-01-03-102

	Surfaces to Be Painted	Painting Color
1	Rear Fender	High Grade Black
2	Bracket (Full Fender)	High Grade Black
3	Bracket (Mud Guard)	High Grade Black
4	Deck Plate	High Grade Black
5	Step	High Grade Black

Paint the painted surface except the above list in YR-01(TAXI Yellow).

# SECTION 1 GENERAL

## Group 3 Painting



WMDF-01-03-103

	Surfaces to Be Painted	Painting Color
1	Plate	P1-01 [High Grade Black]
2	Support (Rear Axle)	P1-01 [High Grade Black]
3	Rear Axle	Refer to W1-3-2-7.
4	Front Axle	Refer to W1-3-2-8.

Paint the painted surface except the above list in YR1-01 [TAXI yellow].

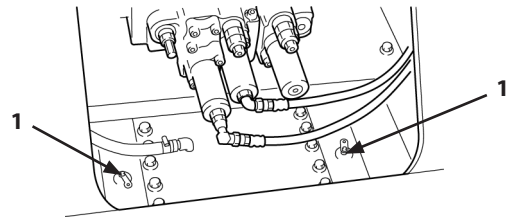
## SECTION 1 GENERAL

### Group 4 Bleeding Air

#### Bleeding Air from Brake (Axle)

**CAUTION:** If air is mixed in the brake system, the brake function is reduced and serious hazard may occur. Bleed air from the brake system after removing and installing the pipe lines and replacing hydraulic oil.

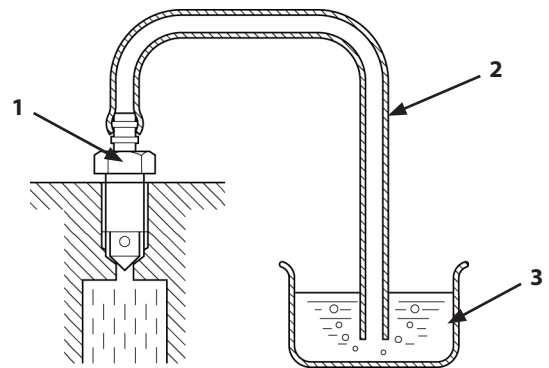
In addition, bleed air from the brake system until hydraulic oil (about 0.5 liters (0.53 US qt)) is drawn from each wheel (4 places) after bubbles stops.



T4GB-05-04-004

**NOTE:** Perform this work on all wheels (4 places) by two or more persons. Air bleed plug (1) is located around the center on front and rear axles.

1. Set the parking brake switch of front console to the ON position, start the engine, and increases service brake oil pressure.
2. Attach clear vinyl tube (2) onto one end of air bleed plug (1). Insert other of clear vinyl tube (2) into clear container (3) filled with hydraulic oil.
3. Depress brake pedal (4) several times. Then, depress and hold brake pedal (4) to the stroke end.
4. Loosen air bleed plug (1) under condition in step 3 and drain hydraulic oil and air for several seconds.
5. Tighten air bleed plug (1).
6. Drain hydraulic oil after bubbles stops in steps 3 to 5 repeatedly.

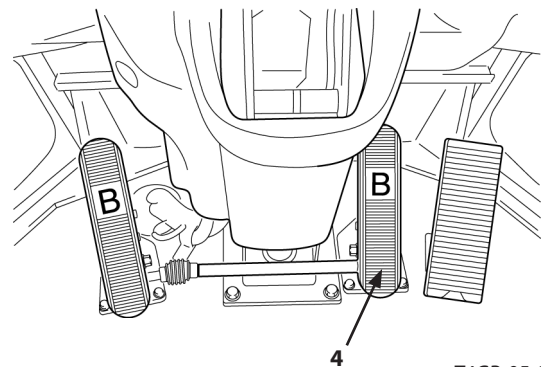


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- NOTE:** When bubbles does not stop after hydraulic oil (about 0.5 liters (0.53 US qt)) is drawn, repeat step 3 to step 5.
7. Bleed air at other 3 places in the same way as step 3 to step 5.

**IMPORTANT:** After air bleeding work is completed at 4 places, bleed air at 4 places again.

Bleed air in the same way as step 3 to step 5 twice and check that no air is remained inside.



T4GB-05-04-006

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## SECTION 2

# MAINTENANCE STANDARD

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Cylinder .....W2-3-3-1

#### Group 4 Front Attachment (Parallel Link)

Pin and Bushing.....W2-4-1-1

Standard Dimensions for Quick Coupler and

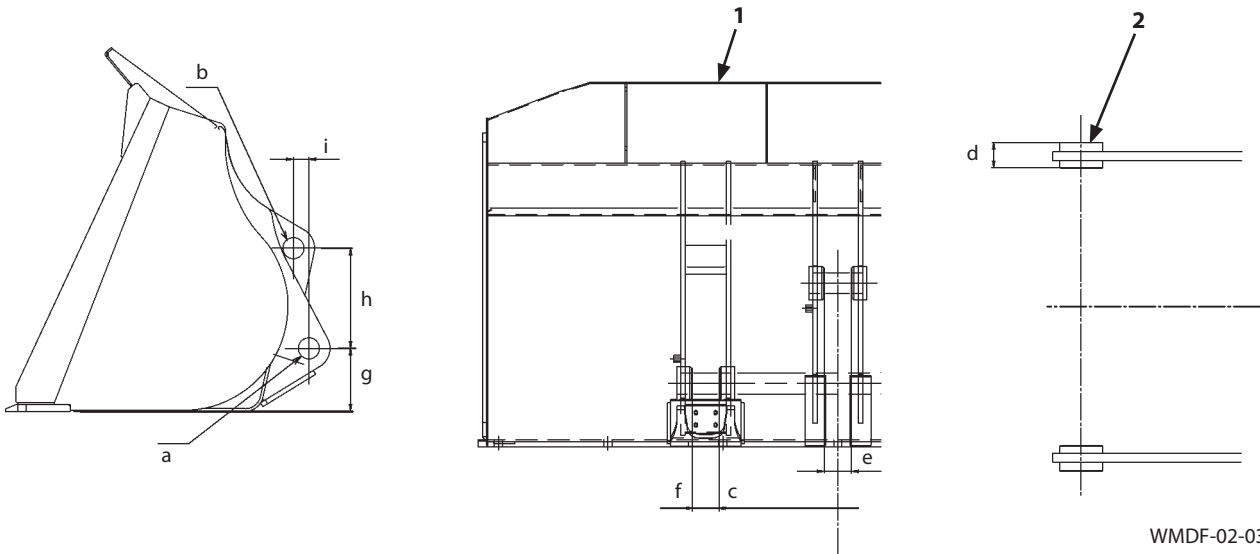
Bucket.....W2-4-2-1

Cylinder .....W2-4-3-1

# SECTION 2 MAINTENANCE STANDARD

## Group 3 Front Attachment

### Standard Dimensions for Lift Arm and Bucket



WMDF-02-03-001

1- Bucket

2- Lift Arm

Unit: mm (in)

	Dimensions
a	75 (2.95)
b	75 (2.95)
c	844 (9.23)
d	94 (3.70)
e	96 (3.78)
f	96 (3.78)
g	230 (9.06)
h	356 (2.02)
i	55 (2.17)

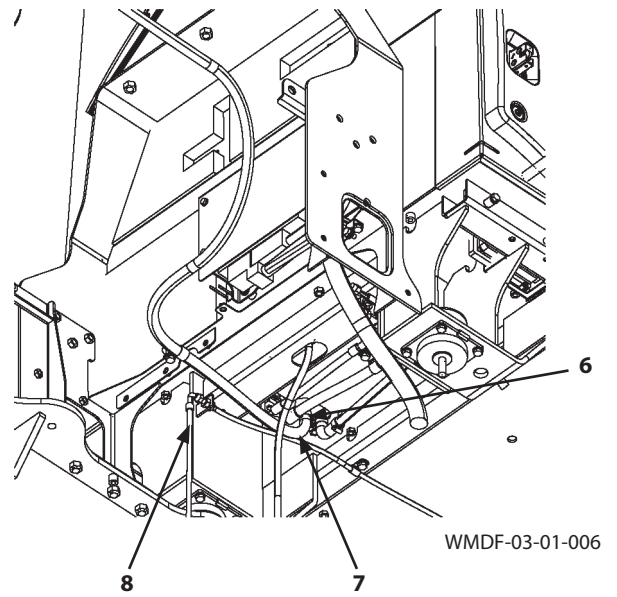
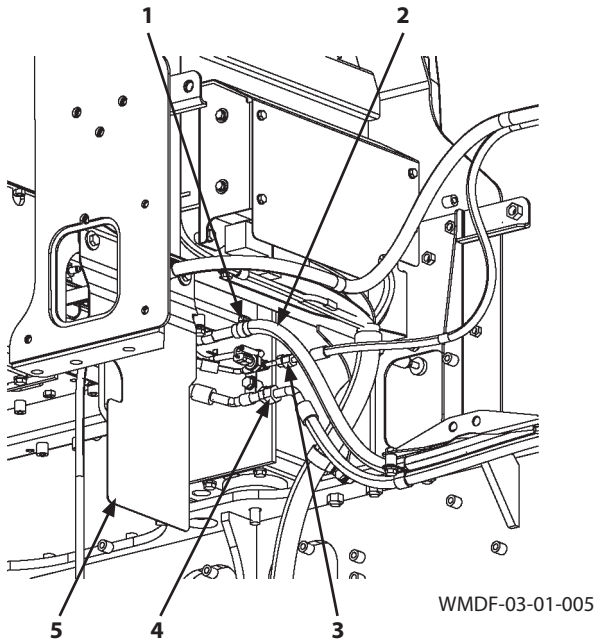
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**MEMO**

## SECTION 3 BODY


### Group 1 Cab



27. Disconnect hose (4).

 : 27 mm

28. Disconnect hose (3).


 : 19 mm

29. Remove clamp (1). Disconnect hose (2).

 : 7 mm

30. Remove cover (5). (Refer to W3-4-2.)

31. Disconnect hose (8).

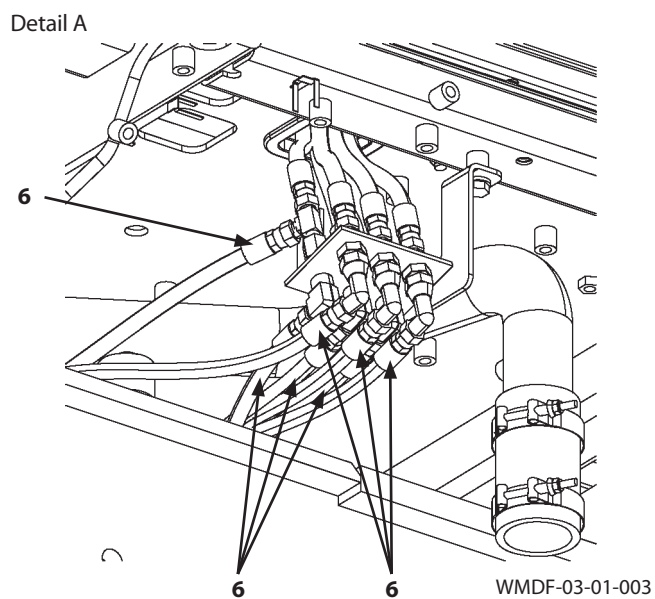
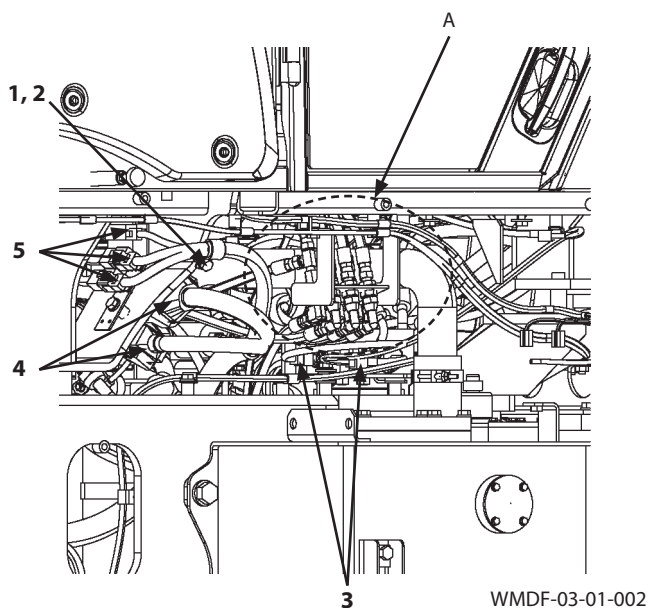
 : 17 mm

32. Remove clamp (6). Disconnect hose (7).


 : 7 mm


## SECTION 3 BODY

### Group 1 Cab



25. Connect hoses (6) (7 used).

 : 19 mm


 : 30 N·m (3 kgf·m, 22 lbf·ft)


26. Connect connectors (3) (2 used) only with the emergency steering attached.

27. Connect connectors (4) (2 used).

28. Connect connectors (5) (3 used).

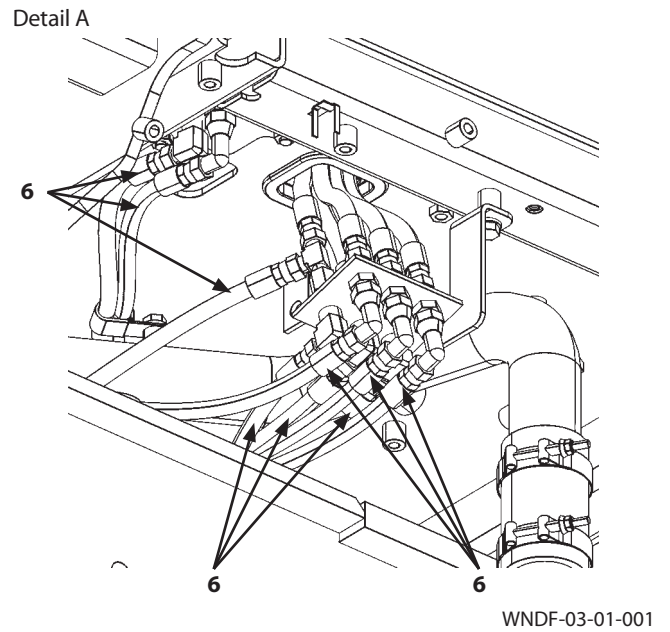
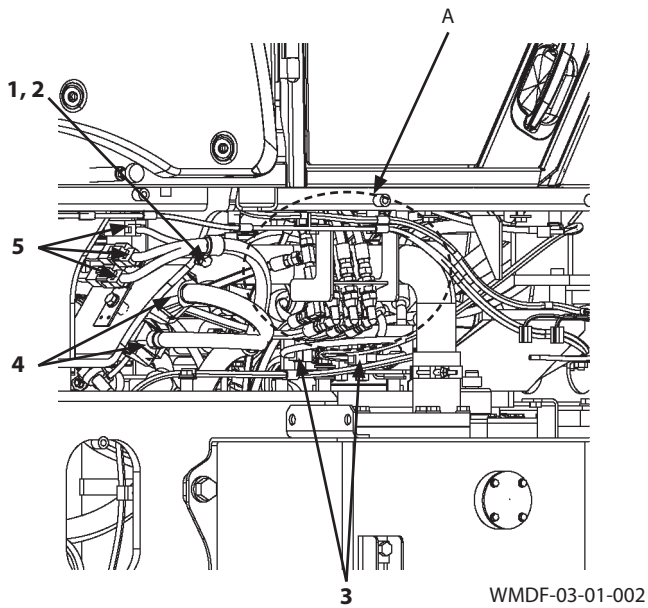
29. Install clip (2) with bolt, washer (1).

 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

## SECTION 3 BODY

### Group 1 Cab



20. Remove bolt, washer (1) and clip (2).


 : 17 mm

21. Disconnect connectors (5) (3 used).

22. Disconnect connectors (4) (2 used).

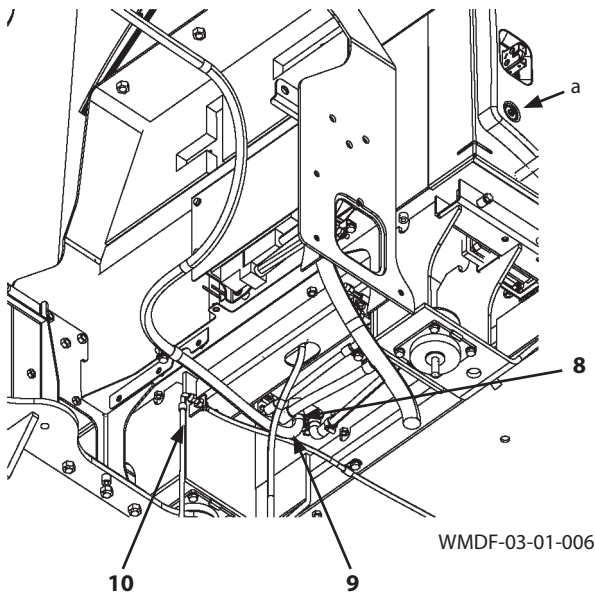
23. Disconnect connectors (3) (2 used) (only with the emergency steering attached).

24. Disconnect hoses (6) (9 used).

 : 19 mm

## SECTION 3 BODY


### Group 1 Cab




a- Cab

15. Connect hose (9) with clamp (8).

 : 7 mm

 : 3.5 to 5 N·m (0.35 to 0.5 kgf·m, 2.6 to 3.7 lbf·ft)

16. Connect hose (10).


 : 17 mm

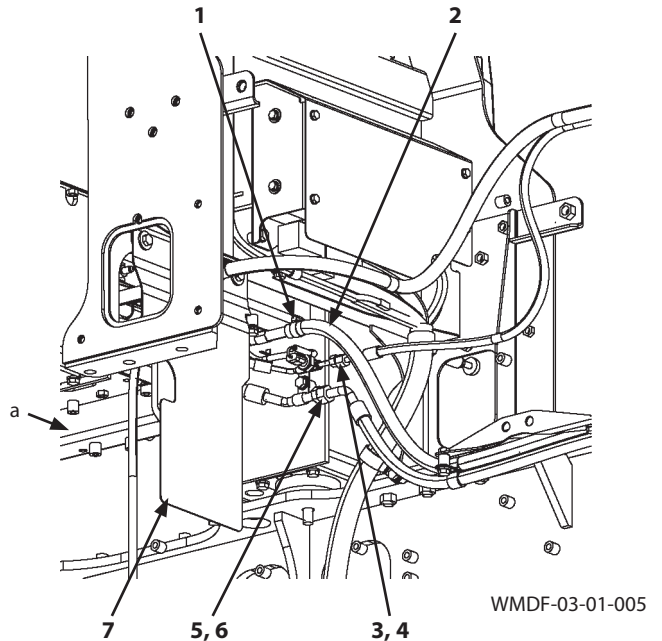
 : 25 N·m (2.5 kgf·m, 18.5 lbf·ft)

17. Install cover (7). (Refer to W3-4-2.)

18. Connect hose (2) with clamp (1).


 : 7 mm


 : 3.5 to 5 N·m (0.35 to 0.5 kgf·m, 2.6 to 3.7 lbf·ft)




a- Cab


19. Apply ND-OIL8 to O-ring (4). Install O-ring (4) to hose (3). Connect hose (3).

 : 19 mm

 : 11.8 to 14.7 N·m (1.18 to 1.47 kgf·m, 8.5 to 11 lbf·ft)

20. Apply ND-OIL8 to O-ring (6). Install O-ring (6) to hose (5). Connect hose (5).

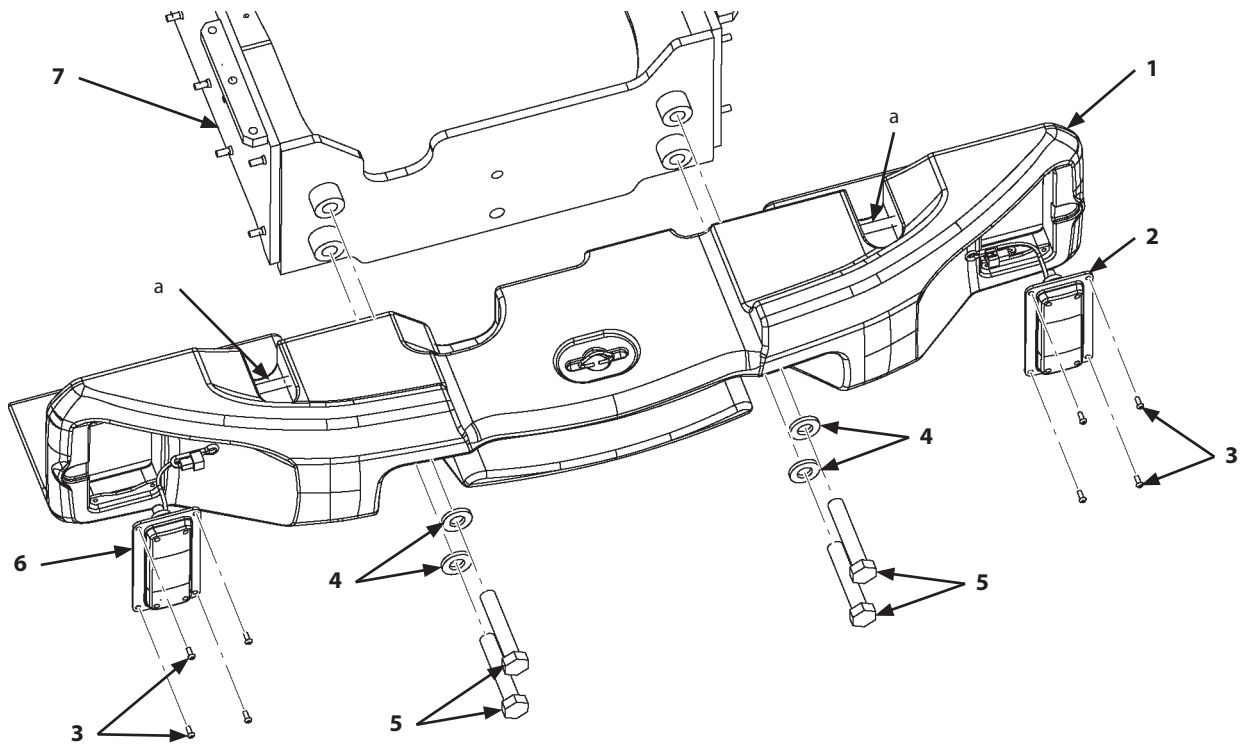
 : 27 mm

 : 29.4 to 34.3 N·m (2.94 to 3.43 kgf·m, 21.5 to 25.5 lbf·ft)

21. Add compressor oil. (Refer to T5-8 in the separated volume, Technical Manual.)

# SECTION 3 BODY

## Group 2 Counterweight




WMDF-03-02-010


a- Hoisting Position

### Installation


**CAUTION:** Counterweight (1) weight: 1040 kg (2300 lb)


1. Attach the nylon slings onto hoisting positions (a) (2 places) of counterweight (1). Hoist and fit counterweight (1) to the bolt (5) holes (4 places) on rear frame (7).
2. Install counterweight (1) with washers (4) (4 used) and bolts (5) (4 used).

 : 46 mm


 : 1510 N·m (151 kgf·m, 1110 lbf·ft)


3. Install rear combination light (2) with bolts (3) (4 used).

 : 5 mm

 : 20 N·m (2 kgf·m, 15 lbf·ft)

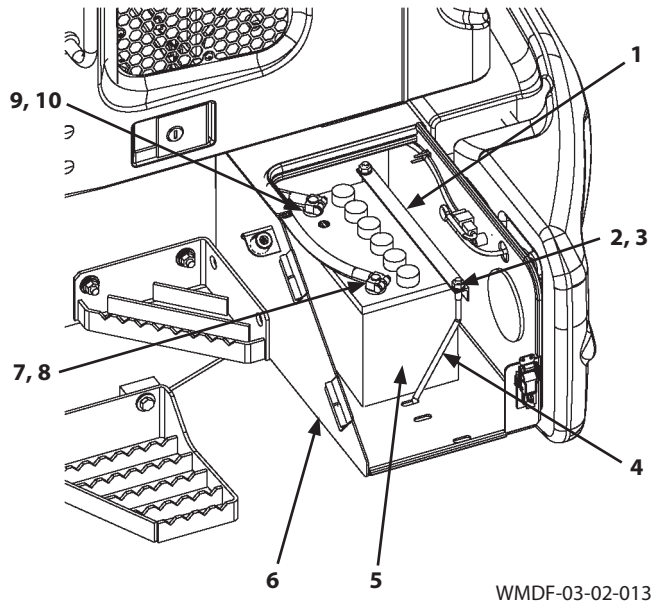
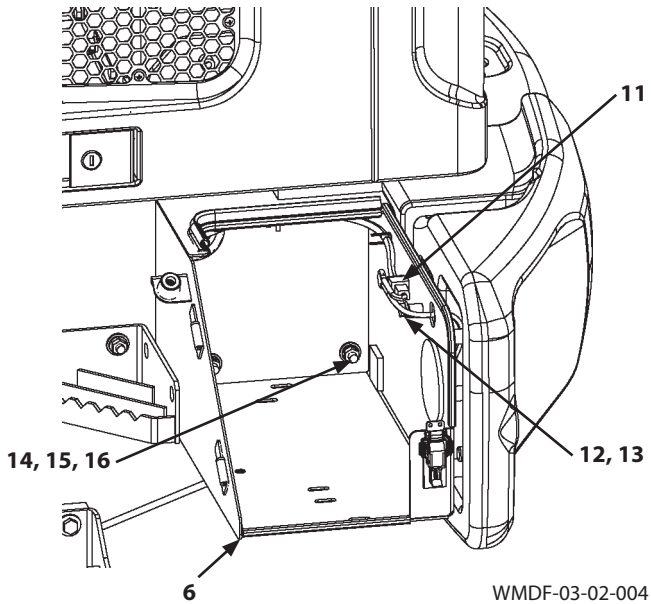
4. Install rear combination light (6) with bolts (3) (4 used).

 : 5 mm

 : 20 N·m (2 kgf·m, 15 lbf·ft)

## SECTION 3 BODY

### Group 2 Counterweight



#### Installation

##### Installation of Battery Box (Left)

**⚠ CAUTION: Battery box (6) weight: 24 kg (53 lb)**

1. Pass connector (11) and terminals (8, 10) through battery box (6). Install battery box (6) with washers (15, 16) (4 used for each) and nuts (14) (4 used).

: 19 mm

: 35 N·m (3.5 kgf·m, 26 lbf·ft)

2. Connect connector (11). Install the harnesses to all clips of battery box (6).

3. Install bracket (13) with bolt, washer (12).

: 17 mm

: 50 N·m (5 kgf·m, 37 lbf·ft)

**⚠ CAUTION: Battery (5) weight: 20 kg (45 lb)**

4. Place battery (5) on battery box (5).
5. Install bracket (1) and rods (4) (2 used) with washers (3) (2 used) and nuts (2) (2 used).

: 17 mm

: 20 N·m (2 kgf·m, 15 lbf·ft)

6. Connect terminal (10). Tighten nut (9).

: 10 mm

: 3 to 4 N·m (0.3 to 0.4 kgf·m, 2.2 to 3 lbf·ft)

7. Connect terminal (8). Tighten nut (7).

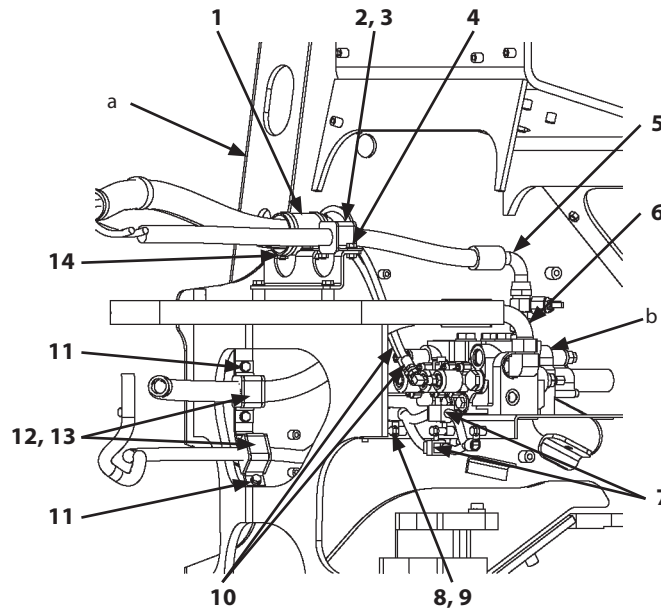
: 10 mm

: 3 to 4 N·m (0.3 to 0.4 kgf·m, 2.2 to 3 lbf·ft)

8. Close the cover of battery box (6).

## SECTION 3 BODY

### Group 3 Center Hinge




WMDF-03-03-003


a- Front Frame

b- Control Valve


12. Remove bolts, washers (14) (2 used) and clamp (1).

 : 19 mm


13. Remove bolts, washers (4) (2 used), clamp (2), and rubber plate (3).

 : 17 mm

14. Remove bolts, washers (11) (4 used), clamps (12) (2 used), and rubber plates (13) (2 used).

 : 17 mm

15. Remove bolt, washer (8) and clip (9).


 : 17 mm

16. Disconnect connectors (7) (2 used).

17. Disconnect hoses (10) (2 used).

 : 19 mm

18. Disconnect hose (5).

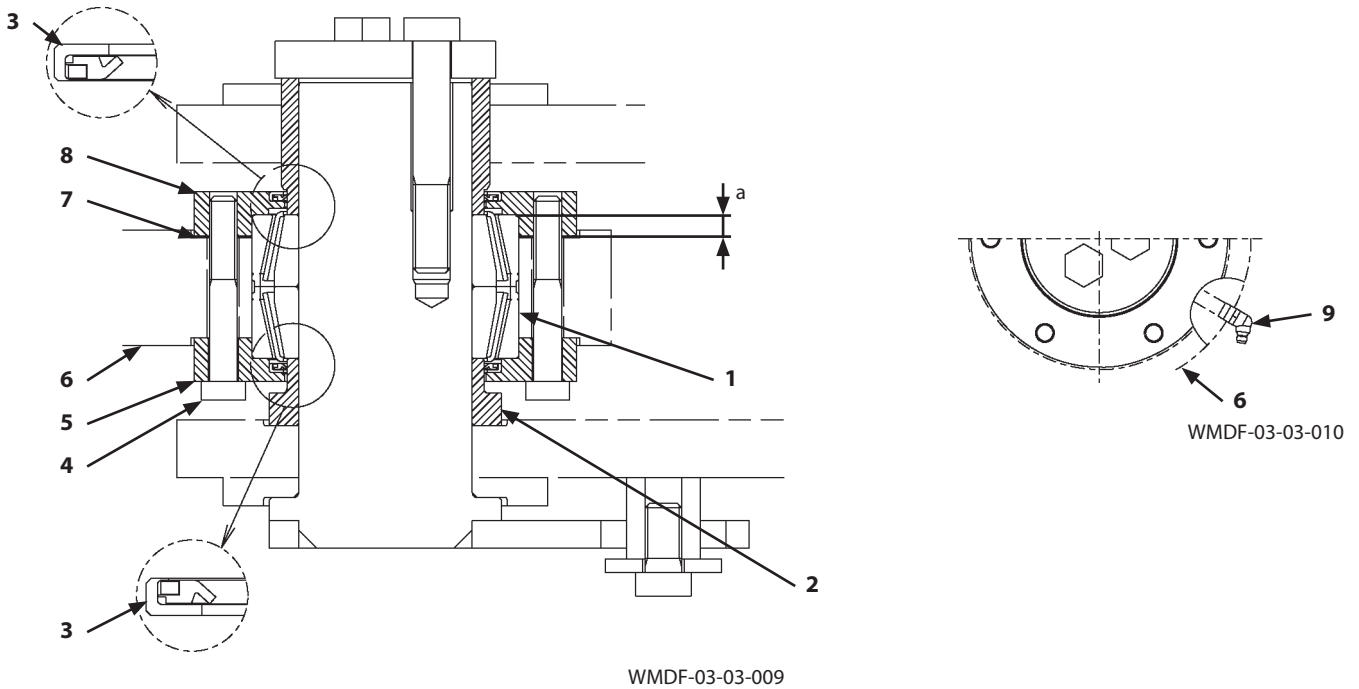
 : 41 mm

19. Disconnect hose (6).

 : 50 mm

## SECTION 3 BODY

### Group 3 Center Hinge



a- 9 mm (3.54 in)

- Upper Hinge Side

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

**IMPORTANT:** Check the position to install bearing (1).

6. Install bearing (1) to front frame (6) by using a copper hammer.

**IMPORTANT:** Face the end of grease fitting (9) to the left side of body.

7. Install grease fitting (9) to front frame (6). Apply grease.

: 10 mm

: 4 N·m (0.4 kgf·m, 3 lbf·ft)

**IMPORTANT:** Check the direction to install dust seals (3) (2 used).

8. Apply LOCTITE #262 onto the outer surface of dust seals (3) (2 used). Install dust seals (3) (2 used) to caps (5, 8) by using a plastic hammer. Crimp the cap (5, 8) side by using a punch (2 places).

9. Apply LOCTITE #262 onto bolts (4) (6 used). Install caps (5, 8) and shims (7) (2 used) to front frame (6) with bolts (4) (6 used).

: 19 mm

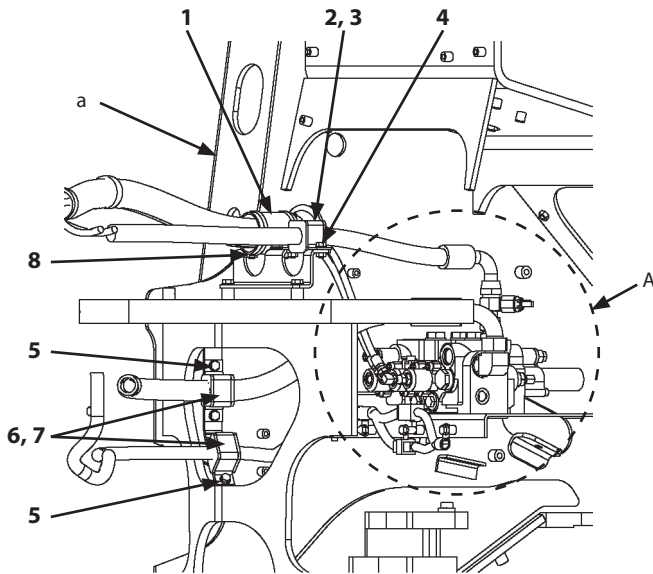
: 90 N·m (9 kgf·m, 66 lbf·ft)

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

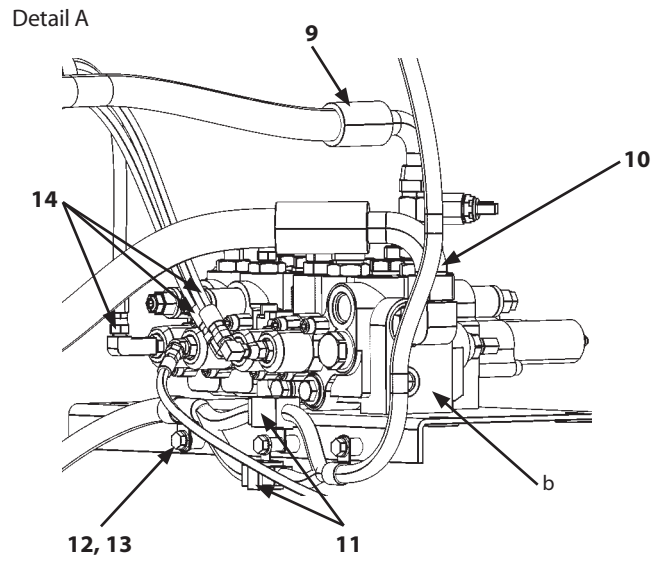
10. Install busing (2) to the position where it comes in contact with bearing (1) by using a copper hammer.

## SECTION 3 BODY

### Group 3 Center Hinge



WMDF-03-03-003




WNDF-03-03-004


a- Front Frame

b- Control Valve


12. Remove bolts, washers (8) (2 used) and clamp (1).

 : 19 mm


13. Remove bolts, washers (4) (2 used), clamp (2), and rubber plate (3).

 : 17 mm

14. Remove bolts, washers (5) (4 used), clamps (6) (2 used), and rubber plates (7) (2 used).


 : 17 mm

15. Remove bolt, washer (12) and clip (13).


 : 17 mm

16. Disconnect connectors (11) (2 used).


17. Disconnect hoses (14) (3 used).

 : 19 mm

18. Disconnect hose (9).

 : 41 mm

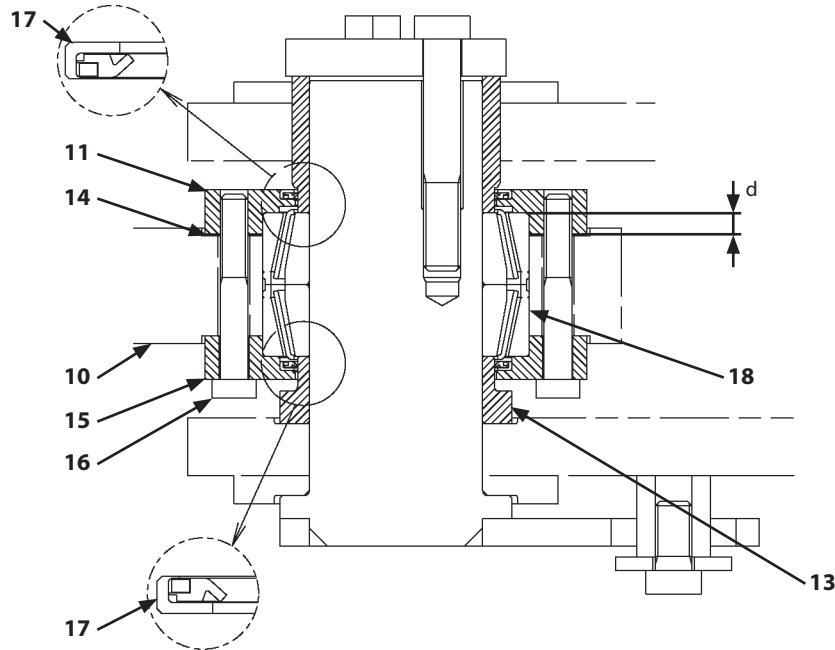
19. Disconnect hose (10).

 : 50 mm

## SECTION 3 BODY

### Group 3 Center Hinge

Section of Upper Hinge (b)



WMDF-03-03-009

d- 9 mm (0.35 in)

• Upper Hinge (b) Side

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.


**IMPORTANT:** Check the position to install bearing (18).


5. Install bearing (18) to front frame (10) by using a copper hammer.

**IMPORTANT:** Check the direction to install dust seals (17) (2 used).

6. Apply LOCTITE #263 or equivalent to the outer circumferences of dust seals (17) (2 used). Install dust seals (17) (2 used) to caps (11, 15) by using a plastic hammer. Crimp caps (11, 15) (2 places for each) by using a punch. Therefore, dust seals (17) (2 used) are secured.

7. Apply LOCTITE #263 or equivalent to bolts (16) (6 used). Install caps (11, 15) and shims (14) (2 used) to front frame (10) with bolts (16) (6 used).

 : 19 mm

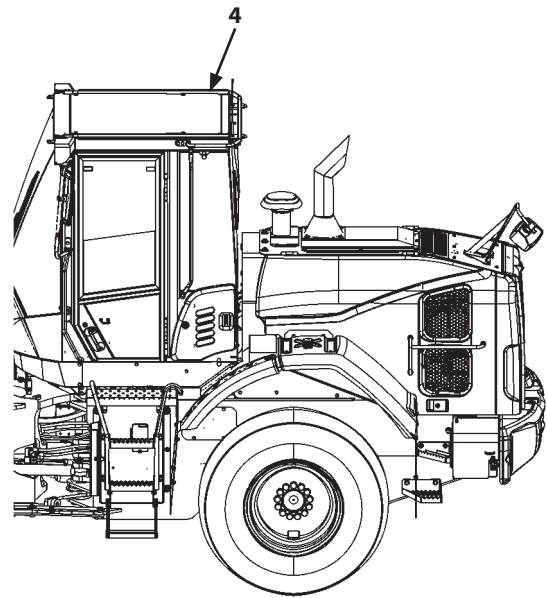
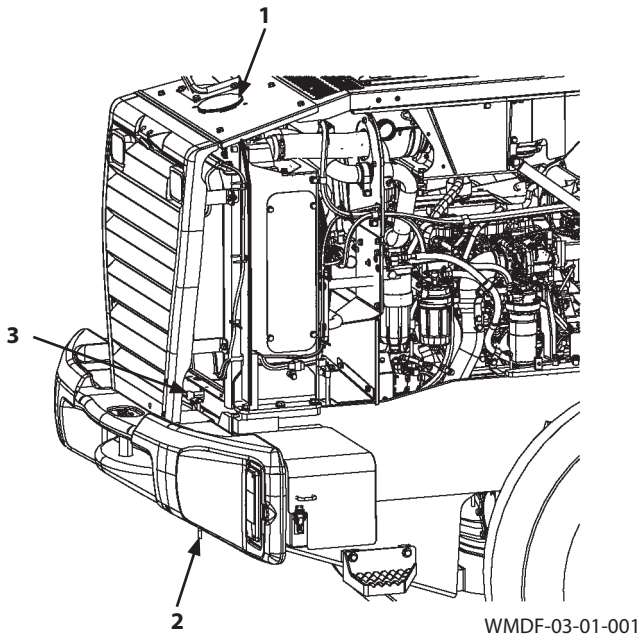
 : 90 N·m (9 kgf·m, 66 lbf·ft)

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

8. Insert busing (13) into cap (15) by using a copper hammer until busing (13) comes in contact with bearing (18).

## SECTION 3 BODY

### Group 4 Engine



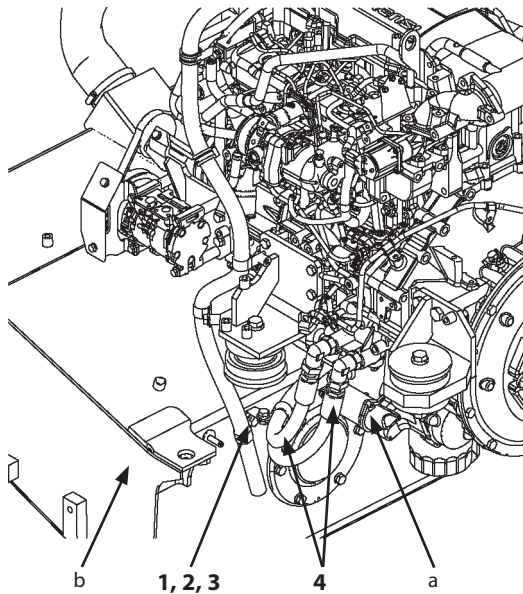
8. Remove rubber cap (1).
9. Bleed air from the radiator. (Refer to W1-4-1.)
10. Place a container under hose (2). Open cock (3). Drain off coolant. Close cock (3).

 **NOTE:** Amount of coolant: 24 L (6.4 US gal)

11. Release refrigerant of the air conditioner. (Refer to T5-8 in the separated volume, Technical Manual.)
12. Remove cab (4). (Refer to W3-1-1.)

## SECTION 3 BODY

### Group 4 Engine

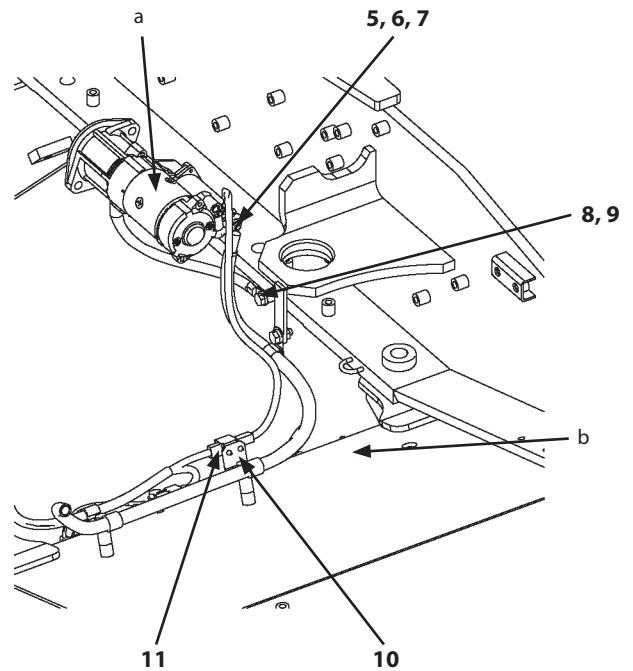


a- Starter

b- Fuel Tank

WMDF-03-04-025

Detail of Starter (a) Wire Harness




a- Starter


b- Fuel Tank

WMDF-03-04-026


73. Remove bolt, washer (1), clip (2), and bracket (3).

 : 17 mm


74. Disconnect hoses (4) (2 used).

 : 36 mm

75. Remove nut (5) and washer (6). Disconnect terminal (7).

 : 14 mm

76. Remove bolt, washer (8). Disconnect ground (9).

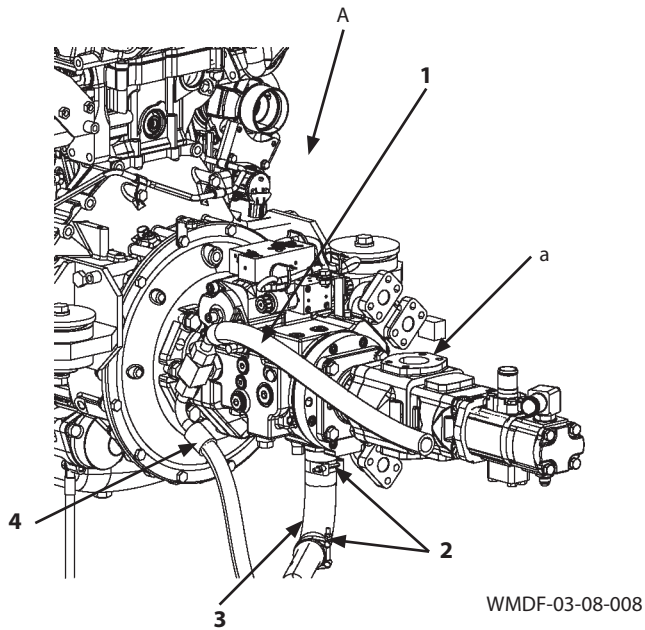
 : 17 mm

77. Disconnect connector (11).

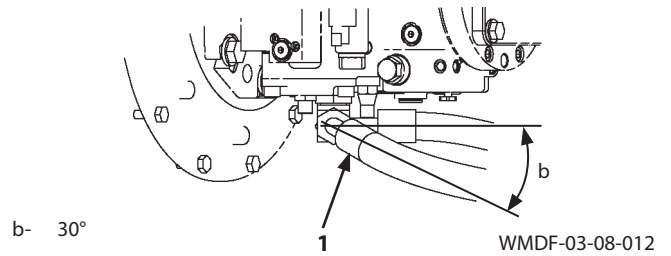
78. Remove connector (11) from bracket (10).

## SECTION 3 BODY

### Group 4 Engine





View A




a- Pump Device


46. Connect the both ends of hose (3) with clamps (2) (2 used).

 : 11 mm

 : 9.8 N·m (1 kgf·m, 7.2 lbf·ft)


47. Connect hose (4).


 : 36 mm

 : 180 N·m (18 kgf·m, 133 lbf·ft)

**IMPORTANT: Check the angle to install hose (1).**




48. Connect hose (1).

 : 41 mm

 : 210 N·m (21 kgf·m, 155 lbf·ft)

## SECTION 3 BODY

### Group 4 Engine

No.	Part Name	Q'ty	Wrench Size (mm)	Tightening Torque			Weight	
				N·m	kgf·m	lbf·ft	kg	lb
01	Engine Cover	1					33	73
02	Bolt	5	 : 24	210	21	155		
03	Washer	5						
04	Washer	5						
09	Cover	1						
13	Rear Cover	1						
17	Bolt, Washer	12	 : 17	50	5	37		
18	Bolt, Washer	4	 : 17	50	5	37		
19	Cover	1						

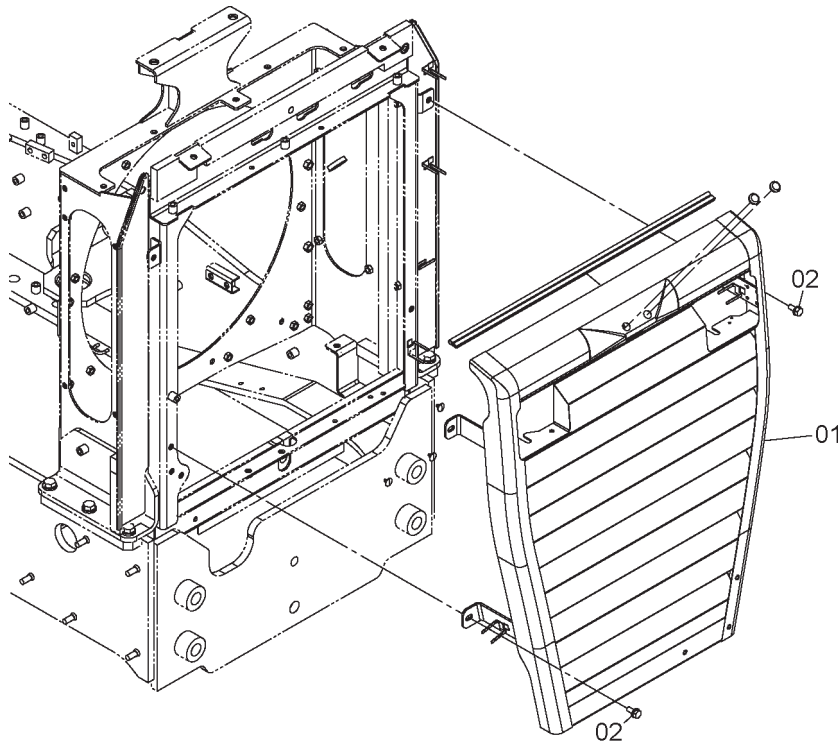
**⚠ CAUTION:** When removing and installing the following parts, hoist and hold them by using nylon slings.

- Engine cover (01) weight: 33 kg (73 lb)

## SECTION 3 BODY

### Group 4 Engine

#### Removal and Installation of Rear Grill



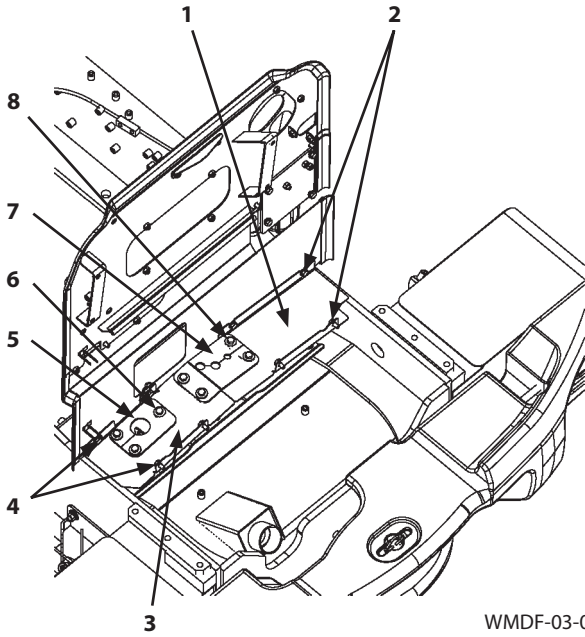
WMDF-03-04-011

No.	Part Name	Q'ty	Wrench Size (mm)	Tightening Torque			Weight	
				N-m	kgf-m	lbf-ft	kg	lb
01	Rear Grill	1						
02	Bolt, Washer	4	: 17	50	5	37		

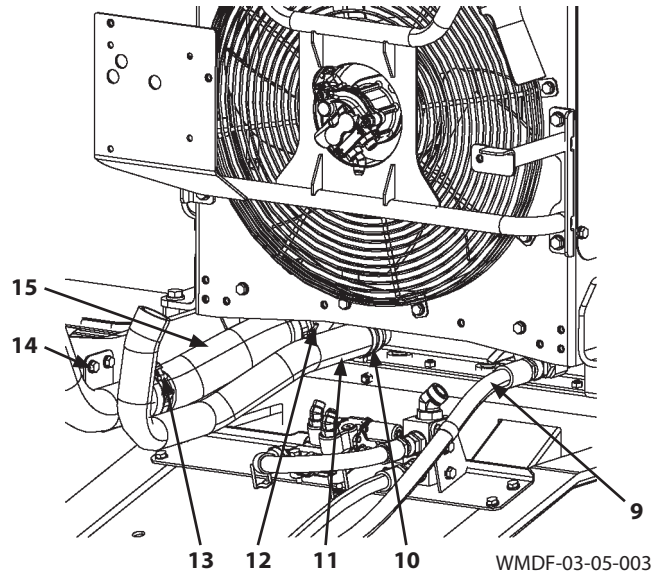
**IMPORTANT:** When removing and installing the rear grill, disconnect the connector of the work light.

## SECTION 3 BODY

### Group 5 Radiator Assembly




WMDF-03-07-002




WMDF-03-05-003


19. Remove bolts, washers (6) (3 used). Remove rubber plate (5).

 : 17 mm


20. Remove bolts, washers (8) (4 used). Remove rubber plate (7).

 : 17 mm


21. Remove bolts, washers (4) (4 used). Remove cover (3).

 : 17 mm


22. Remove bolts, washers (2) (4 used). Remove cover (1).

 : 17 mm

23. Remove bolts, washers (14) (2 used).


 : 17 mm

24. Remove clamps (12, 13). Disconnect the both ends of hose (15).


 : 11 mm

25. Remove clamps (10) (2 used). Disconnect hose (11).

 : 7 mm

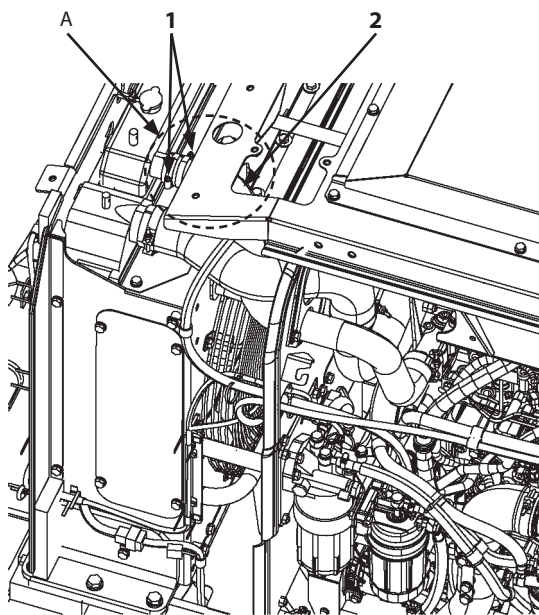
 **NOTE:** *THREEBOND #1207B has been applied on mounting surface of hose (11).*

26. Disconnect hose (9).

 : 41 mm

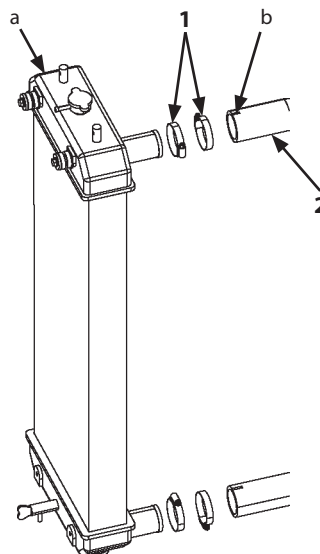
## SECTION 3 BODY

### Group 5 Radiator Assembly



WMDF-03-05-002

Detail A



WMDF-03-05-004

a- Radiator


b- Mark

**IMPORTANT:** Do not apply THREEBOND #1207B onto the inner surface of the hose (2) mounting part of radiator (a) and inner surface of hose (2).

**IMPORTANT:** Insert hose (2) 45 mm (1.8 in) with mark (b) up.

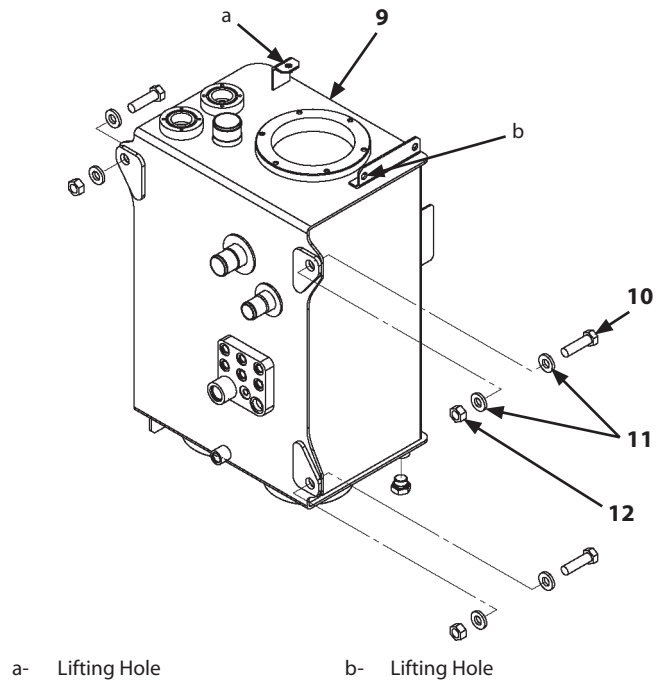
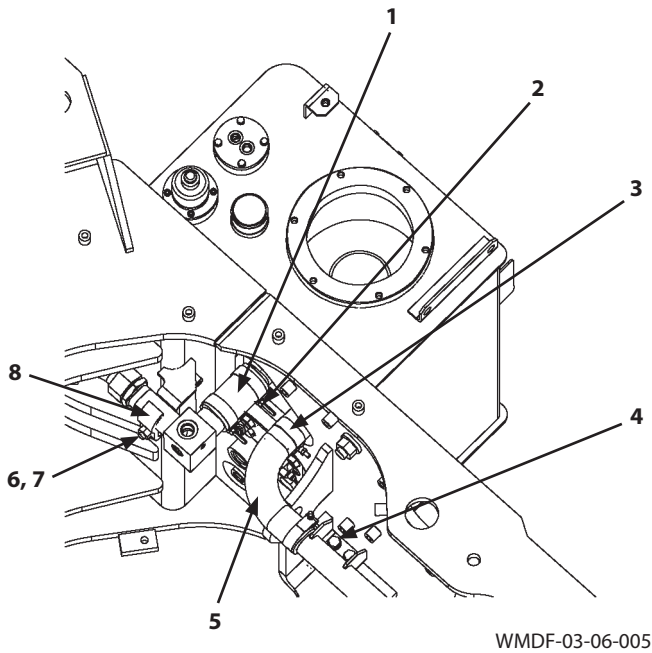
16. Apply THREEBOND #1207B onto the outer surface of the hose (2) mounting part of radiator (a). Connect hose (2) with clamps (1) (2 used).

 : 7 mm

 : 5.4 to 6.6 N·m (0.5 to 0.7 kgf·m, 4 to 4.9 lbf·ft)

## SECTION 3 BODY

### Group 6 Hydraulic Oil Tank



20. Remove bolts, washers (4) (2 used).

: 17 mm

21. Remove clamp (3). Disconnect the hose (5) assembly.

: 11 mm

22. Remove bolt, washer (6), nut (7), and clamp (8).

: 19 mm

23. Remove clamp (2). Disconnect the hose (1) assembly.

: 11 mm

**⚠ CAUTION: Hydraulic oil tank (9) weight: 120 kg (265 lb)**

24. Install an eyebolt (M10, Pitch 1.5 mm) to lifting hole (a) and an eyebolt and nut to lifting hole (b) of hydraulic oil tank (9). Attach the nylon slings onto the eyebolts (2 used). Hoist and hydraulic oil tank (9).

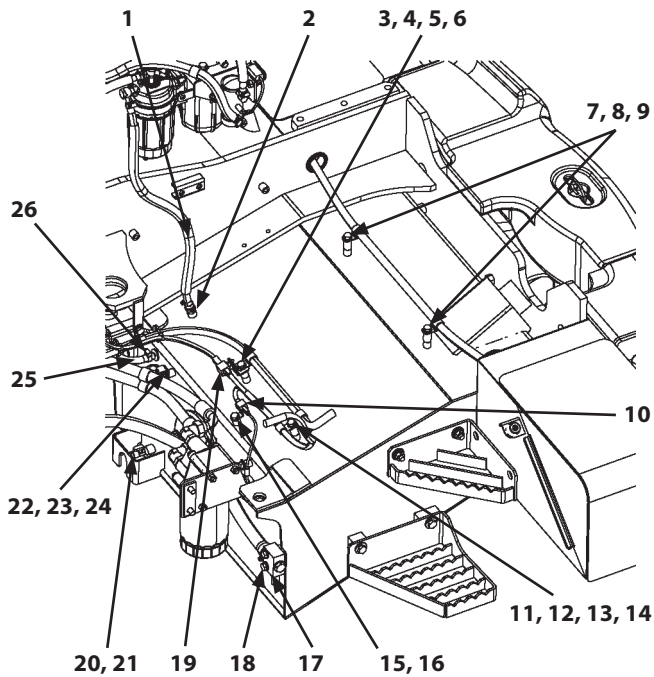
25. Remove bolts (10) (3 used), washers (11) (6 used), and nuts (12) (3 used). Remove hydraulic oil tank (9).

: 30 mm

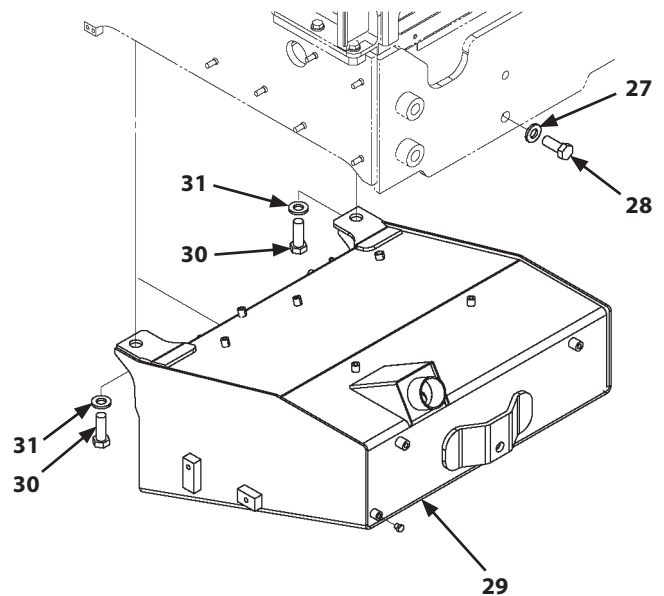
26. Remove the adapters with hydraulic oil tank (9) attached if necessary.

## SECTION 3 BODY

### Group 7 Fuel Tank



WMDF-03-07-003




WMDF-03-07-004


14. Remove clips (2, 26). Disconnect hoses (1, 25).

 : 7 mm

15. Remove bolt, washer (22), clip (23), and bracket (24).


 : 17 mm

16. Remove bolts, washers (18) (2 used). Remove block (17).


 : 17 mm

17. Disconnect connectors (10, 19).


18. Remove bolt, washer (15) and clip (16).

 : 17 mm

19. Remove bolt, washer (11), clips (12, 13), and collar (14).

 : 17 mm

20. Remove bolt, washer (3), clip (4), bracket (5), and collar (6).

 : 17 mm

21. Remove bolts, washers (7) (2 used), clips (8) (2 used), and collars (9) (2 used).


 : 17 mm

22. Place a container. Remove plug (20). Open valve (21). Drain off fuel completely.

 : 17 mm

23. Install a seal tape onto the thread part of plug (20). Close valve (21). Install plug (20).


 : 17 mm

 : 15 N·m (1.5 kgf·m, 11 lbf·ft)

 **CAUTION: Fuel tank (29) weight: 140 kg (310 lb)**

24. Hold the bottom side of fuel tank (29) by using a hydraulic jack and the wooden blocks.

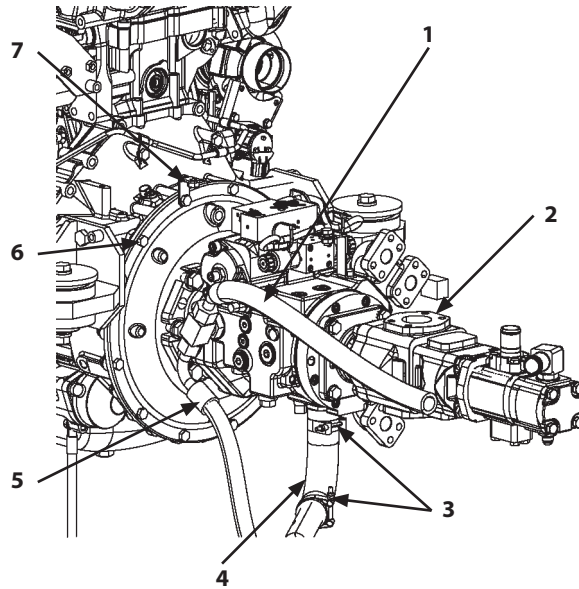
25. Remove bolts (30) (2 used), bolt (28), washers (31) (2 used), and washer (27). Remove fuel tank (29).

 : 36 mm

## SECTION 3 BODY


### Group 8 Pump Device

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WMDF-03-08-008


30. Disconnect hose (1).

 : 41 mm

31. Disconnect hose (5).

 : 36 mm


32. Remove clamps (3) (2 used). Disconnect the both ends of hose (4).

 : 11 mm

 **CAUTION:** Pump device (2) weight: 170 kg (375 lb)

33. Attach nylon slings onto pump device (2). Hoist and hold pump device (2).

34. Remove bolts (6) (12 used) and bracket (7). Remove and place pump device (2) on wooden blocks.

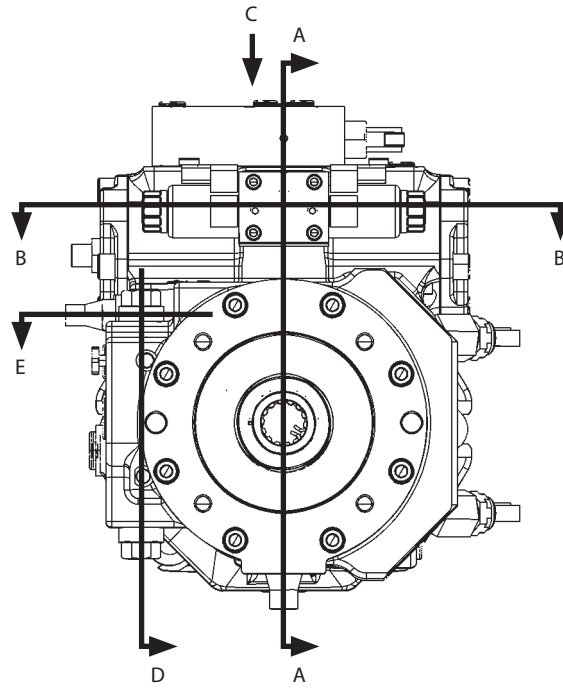
 : 17 mm

35. Remove the adapters with pump device (2) attached if necessary.

# SECTION 3 BODY

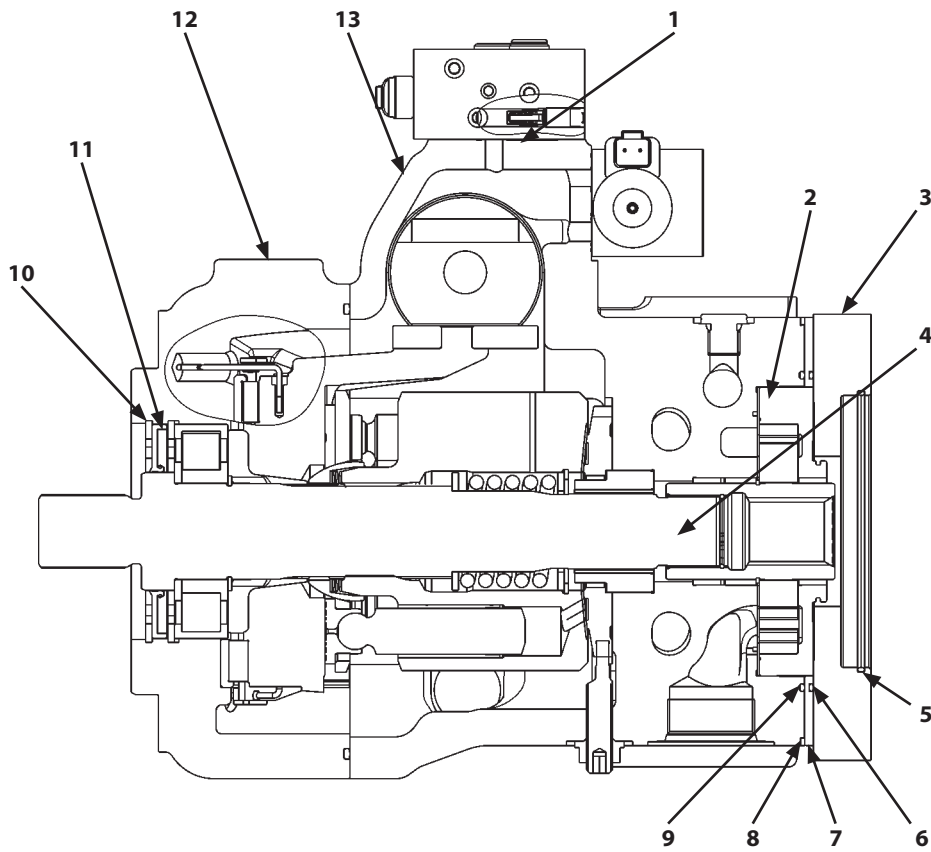
## Group 8 Pump Device

### Disassembly of HST Pump



WMDF-03-08-032

Section A-A



WMDF-03-08-033

## SECTION 3 BODY

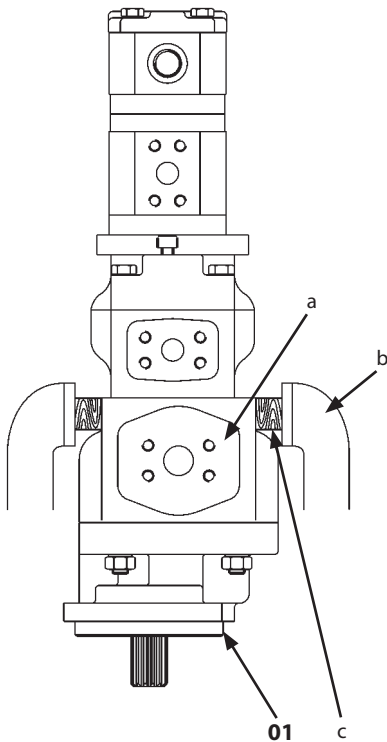
### Group 8 Pump Device

#### Disassembly of 4-Gear Pump Unit

**CAUTION:** 4-gear pump unit weight: 43 kg (95 lb)

**IMPORTANT:** When securing the 4-gear pump unit, do not fasten port part (a).

1. Attach nylon slings onto the 4-gear pump unit. Hoist the 4-gear pump unit. Secure the 4-gear pump unit in vise (b) by using wooden pieces (c) with flange (01) down.



WMDF-03-08-022

a- Port Part      b- Vise      c- Wooden Pieces

2. Put the matching marks on cover (02), body (32), housings (50, 49), body (06), spacers (14, 13), cover (05), bodies (04, 03), and flange (01).

- Disassembly of Transmission Charge Pump (d)  
**IMPORTANT:** Cover (02), body (32), housings (50, 49), body (06), and spacer (14) are secured to spacer (13) by bolts (42) (4 used). Prevent the parts from carelessly disassembling.

**IMPORTANT:** Do not damage the mating surfaces of cover (02) and body (32) when removing cover (02).

3. Remove bolts (42) (4 used) and washers (41) (4 used). Remove cover (02) from body (32).

: 17 mm

4. Remove seal (46) from body (32).

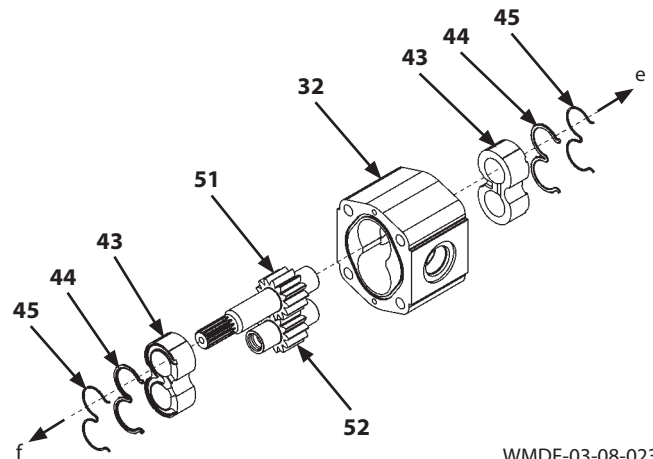
**IMPORTANT:** Do not damage the mating surfaces of body (32) and housing (50) when removing body (32).

**IMPORTANT:** Do not remove dowel pins (39) (2 used).

5. Remove body (32) from housing (50).
6. Remove seal (46) from body (32).

**IMPORTANT:** If bushings (43) (2 used) are not installed to the original position, the pump may be damaged.

7. Put the matching marks on bushings (43) (2 used). Remove bushings (43) at the cover (02) side from gears (51, 52).



WMDF-03-08-023

e- Cover (02) Side

f- Housing (50) Side

## SECTION 3 BODY

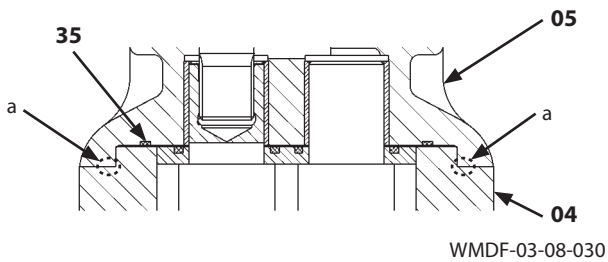
### Group 8 Pump Device

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20. Apply grease to seal (35). Install seal (35) to cover (05).


**IMPORTANT: Do not drop seal (35) from cover (05).**


21. Apply LOCTITE #518 to the circumference on the cover (05) mating surface of body (04). Install cover (05) to body (04).



a- Mating Surface


22. Secure cover (05) and body (04) with bolts (19) (4 used) and washers (18) (4 used).


 : 19 mm

 :  $48 \pm 4$  N·m ( $4.8 \pm 0.4$  kgf·m,  $35 \pm 3$  lbf·ft)

23. Install O-ring (34) to cover (05).

24. Install spacer (13) to cover (05) with socket bolts (20) (2 used).

 : 8 mm

 :  $40 \pm 4$  N·m ( $4 \pm 0.4$  kgf·m,  $29.5 \pm 3$  lbf·ft)

25. Install shaft (37) to gear (09).

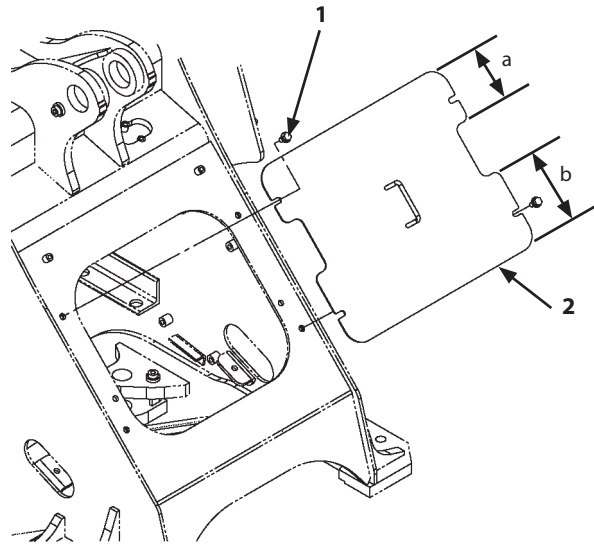
26. Install O-ring (34) to spacer (13).

27. Install spacer (14) to spacer (13).

## SECTION 3 BODY

### Group 9 Control Valve

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a- 155 mm (6.1 in)


b- 210 mm (8.3 in)


WMDF-03-09-005

**IMPORTANT: Check the direction to install cover (2).**

18. Install cover (2) with bolts, washers (1) (4 used).

 : 19 mm

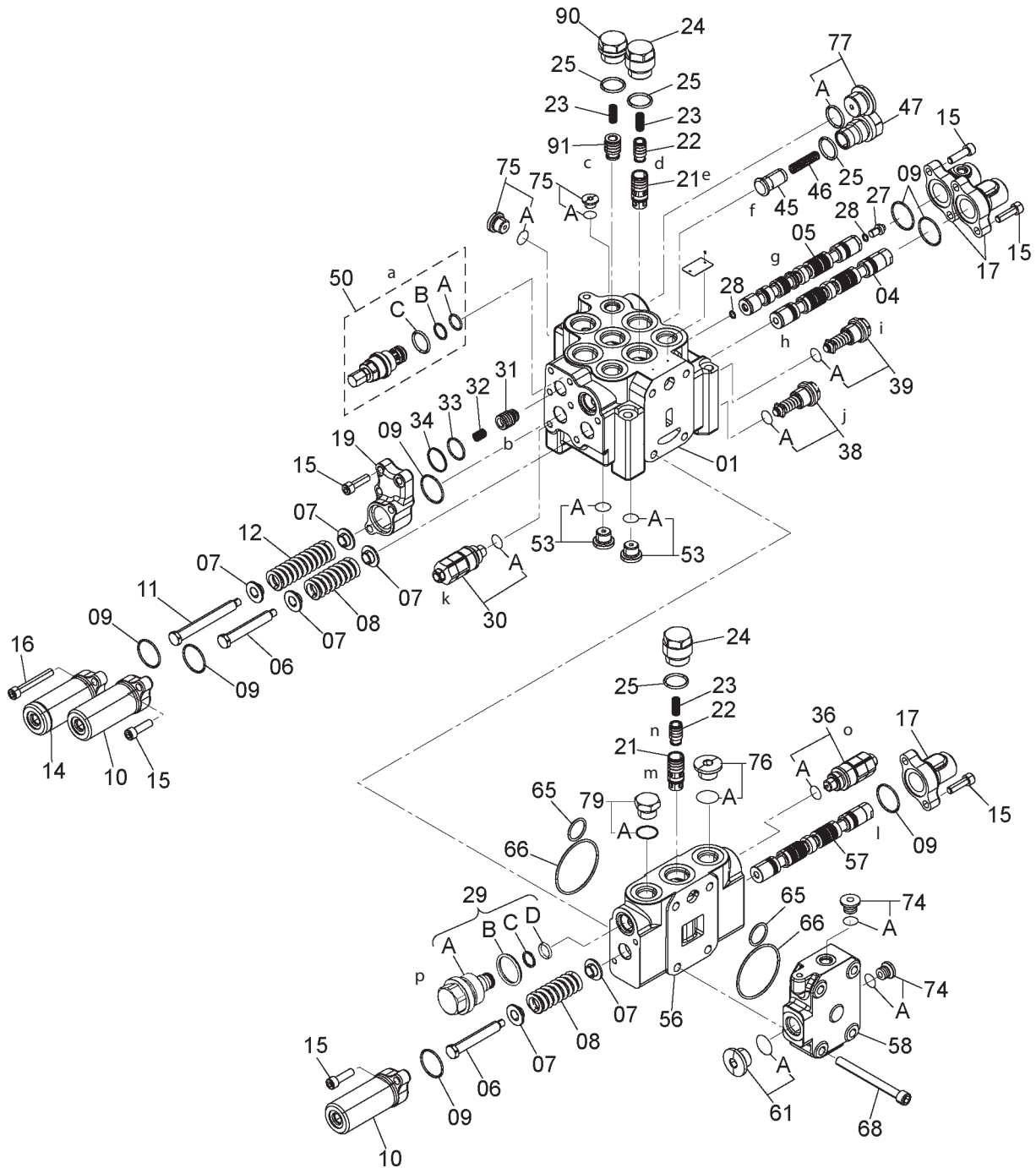
 : 90 N·m (9 kgf·m, 66 lbf·ft)

 **NOTE:** Turn cover (2) by 180 degrees and install it in case of the machine with the quick coupler.

# SECTION 3 BODY

## Group 9 Control Valve

### Disassembly of Control Valve



WMDf-03-09-011

## SECTION 3 BODY


### Group 9 Control Valve


- Assembly of Main Relief Valve (a)

**IMPORTANT: If the main relief valve has been disassembled, pressure should be adjusted. (Refer to TROUBLESHOOTING / Operational Performance Test in the separated volume, T/M.)**

**IMPORTANT: Attach a spanner onto the hexagonal part of the relief valve case.**


10. Install O-rings (50A, 50C) and backup ring (50B) to main relief valve (50). Install main relief valve (50) to housing (01).


 : 27 mm

 : 177 to 206 N·m (17.7 to 20.6 kgf·m, 131 to 152 lbf·ft)

- Assembly of Make-Up Valve (Lift Arm: Rod Side) (b)


11. Install poppet (31) and spring (32) to housing (01).
12. Install O-rings (09, 33) and backup ring (34) to pilot housing (19). Install pilot housing (19) to housing (01) with socket bolts (15) (3 used).


 : 8 mm

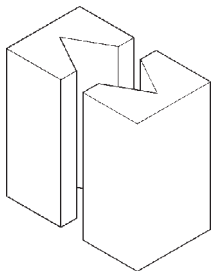
 : 49 to 54 N·m (4.9 to 5.4 kgf·m, 36 to 40 lbf·ft)

- Assembly of Muffler Filter Regeneration/Quick Coupler Spool (l)

13. Secure spool (57) in a vise by using wooden pieces as illustrated. Install spring seats (07) (2 used) and spring (08) to spool (57) with bolt (06).

 : 19 mm


 : 25 to 30 N·m (2.5 to 3 kgf·m, 18.5 to 22 lbf·ft)




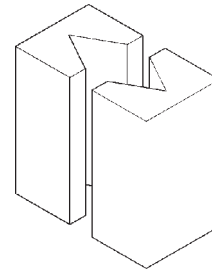
W4GB-02-05-002

- Assembly of Bucket Spool (h)

14. Secure spool (04) in a vise by using wooden pieces as illustrated. Install spring seats (07) (2 used) and spring (08) to spool (04) with bolt (06).

 : 19 mm


 : 25 to 30 N·m (2.5 to 3 kgf·m, 18.5 to 22 lbf·ft)




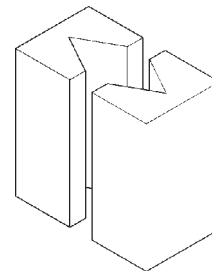
W4GB-02-05-002

- Assembly of Lift Arm Spool (g)

15. Secure spool (05) in a vise by using wooden pieces as illustrated. Install spring seats (07) (2 used), spring (12), and O-ring (28) to spool (05) with bolt (11).

 : 19 mm


 : 25 to 30 N·m (2.5 to 3 kgf·m, 18.5 to 22 lbf·ft)



W4GB-02-05-002

16. Install O-ring (28) to plug (27). Install plug (27) to spool (05).

 : 8 mm


 : 25 to 30 N·m (2.5 to 3 kgf·m, 18.5 to 22 lbf·ft)

## SECTION 3 BODY


### Group 9 Control Valve

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- Disassembly of Load Check Valve (Lift Arm Circuit) (c)
  26. Remove plug (90) from housing (01). Remove spring (23) and poppet (91) from housing (01) by using a magnet. Remove O-ring (25) from plug (90).

 : 36 mm


- Disassembly of Check Valve (Quick Coupler Flow Rate Control Valve) and Load Check Valve (Muffler Filter Regeneration and Quick Coupler) (l)
  27. Remove plug (24) from housing (56). Remove spring (23) and poppets (21, 22) from housing (56) by using a magnet. Remove O-ring (25) from plug (24).

 : 36 mm


- Disassembly of Check Valve (Auxiliary Flow Rate Control Valve) and Load Check Valve (Auxiliary Circuit) (p)
  28. Remove plug (24) from housing (55). Remove spring (23) and poppets (21, 22) from housing (55) by using a magnet. Remove O-ring (25) from plug (24).

 : 36 mm


29. Remove socket bolts (68) (4 used) from end plate (58). Separate housing (01), housings (55, 56), and end plate (58). Remove O-rings (65, 66) (3 used for each) from housings (55, 56) and end plate (58).

 : 10 mm


30. Remove plugs (53, 75) (2 used for each) from housing (01). Remove O-rings (53A, 75A) (2 used for each) from plugs (53, 75) (2 used for each).

 : 10 mm


31. Remove plug (79) from housing (56). Remove plug (79). Remove O-ring (79A) from plug (79).

 : 36 mm


32. Remove plug (76) from housing (56). Remove O-ring (76A) from plug (76).

 : 12 mm


33. Remove plugs (79) (2 used) from housing (55). Remove O-rings (79A) (2 used) from plugs (79) (2 used).

 : 36 mm

34. Remove plug (61) from end plate (58). Remove O-ring (61A) from plug (61).

 : 12 mm

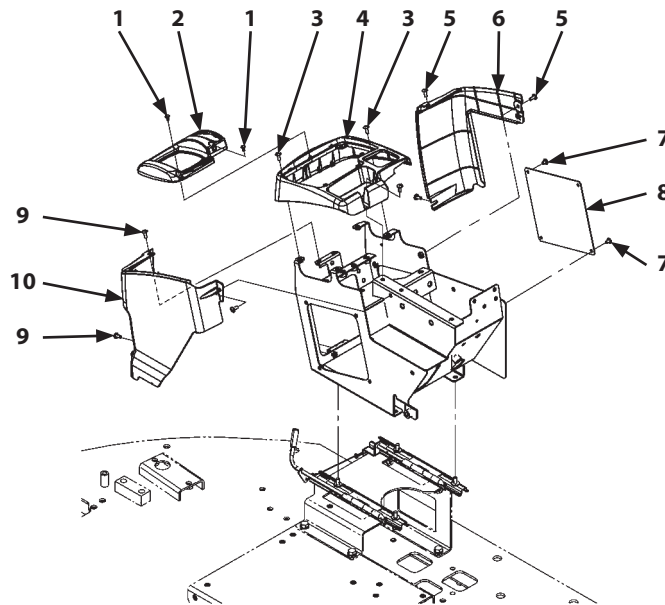
35. Remove plugs (74) (2 used) from end plate (58). Remove O-rings (74A) (2 used) from plugs (74) (2 used).

 : 8 mm

## SECTION 3 BODY

### Group 10 Pilot Valve

#### Removal and Installation of Pilot Valve



WNEC-03-10-010

**IMPORTANT:** 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. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

5. Remove cover (10) and screws (9) (3 used).

6. Remove cover (8) and screws (7) (4 used).

#### Removal

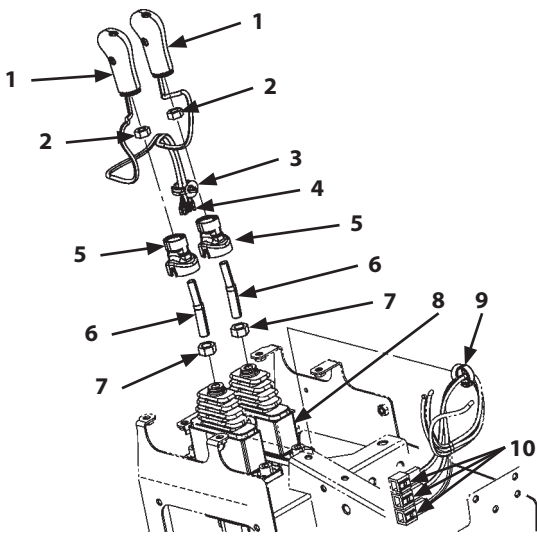
1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)

**CAUTION:** Bleeding air from the hydraulic oil tank. (Refer to W1-4-1.)

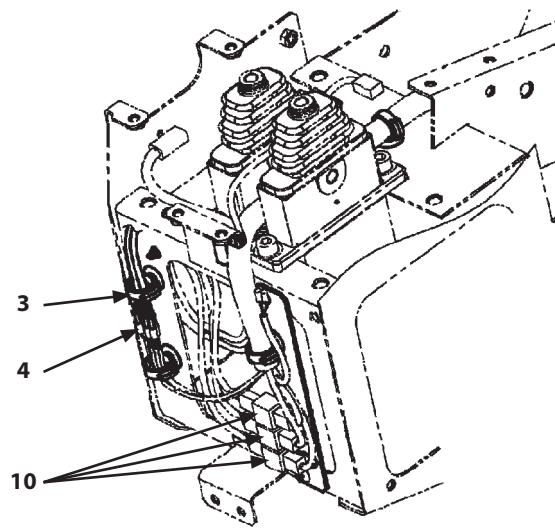
2. Remove cover (2) and screws (1) (2 used).
3. Remove cover (4) and screws (3) (5 used).
4. Remove cover (6) and screws (5) (3 used).

## SECTION 3 BODY

### Group 10 Pilot Valve




WNEC-03-10-015





WNEC-03-10-017

4. Temporarily tighten nuts (7) (2 used) to levers (6) (2 used).


 : 19 mm

5. Install levers (6) (2 used) to pilot valve (8). Tighten nuts (7) (2 used) to the specified torque.

 : 19 mm


 : 40 N·m (4 kgf·m, 30 lbf·ft)


6. Install covers (5) (2 used). Temporarily tighten nuts (2) (2 used).


 : 17 mm

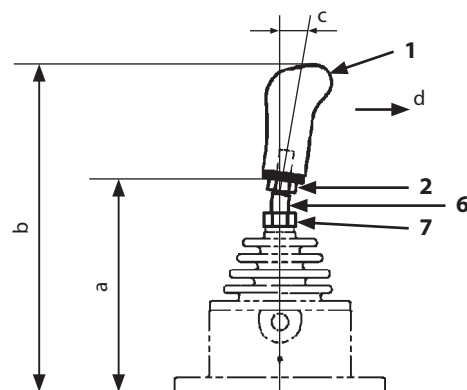
**IMPORTANT: Check the mounting dimension to install grip (1).**

7. Install harnesses of grips (1) (2 used) through covers (5) (2 used). Install grips (1) (2 used). Tighten nuts (2) (2 used) to the specified torque.

 : 17 mm

 : 20 N·m (2 kgf·m, 15 lbf·ft)

 **NOTE:** Install grip (1) while turning cover (5).



WNEC-03-10-020

a- 146 mm (5.7 in)

b- 223 mm (8.8 in)

c- (8°)

d- Machine Front

8. Connect connectors (4) (8 used) and connectors (10) (3 used).

9. Install clips (3, 9).


10. Bleed air from the hydraulic system. (Refer to W1-4-1.)


**IMPORTANT: Check the hydraulic oil level. Start the engine and check for any oil leaks.**


## SECTION 3 BODY

### Group 10 Pilot Valve

12. Remove universal joint (35I) from casing (80) by using a wrench.

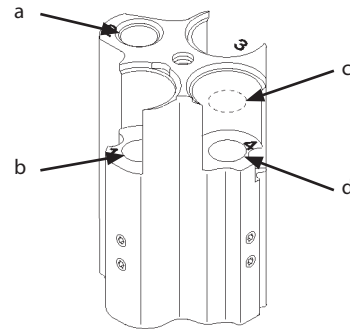
 : 8 mm

 **NOTE:** *LOCTITE #262 has been applied on universal joint (35I).*

 **NOTE:** *Hold plate (51) against spring (65) when removing universal joint (35I).*

13. Remove plate (51) from casing (80).
14. Remove plate (60C) and the guide (60A) assembly from casing (80) by using a screwdriver.
15. Remove the solenoid (53C) assemblies (3 used) from casing (80) by using a screwdriver.
16. Remove pusher (60B), retaining ring (60D), and O-ring (60E) from guide (60A).
17. Remove pushers (53B) (3 used) and O-rings (53D) (3 used) from solenoids (53C) (3 used).

18. Remove spool (62) and spring (65) from hole (a) on port 2 of casing (80) by using a pair of pliers.



WNEC-03-10-003

a- Hole on Port 2  
b- Hole on Port 1

c- Hole on Port 3  
d- Hole on Port 4

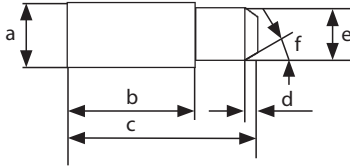
**IMPORTANT: Keep the disassembled parts together by each port in order not to confuse.**

19. Remove spools (63) (3 used), springs (65) (3 used), sockets (66A) (3 used), and springs (66B) (3 used) from hole (b) on port 1, hole (c) on port 3, and hole (d) on port 4 of casing (80) by using a pair of pliers.

## SECTION 3 BODY

### Group 10 Pilot Valve

21. Remove the detent bushing (15) assemblies (2 used) from the mounting side by using the special tools as illustrated.



W4GB-02-06-012

- |  |   |
|--|---|
| a - Dia. $10^{+0.3}_{-0.4}$ mm<br>(Dia. $0.39^{+0.012}_{-0.016}$ in) | d - 2 mm (0.079 in)   |
| b - 30 mm (1.18 in)  | e - Dia. $8^{+0.2}_{-0.3}$ mm<br>(Dia. $0.32^{+0.008}_{-0.012}$ in) |
| c - 40 mm (1.58 in)  | f - $30^\circ$  |

22. Remove O-rings (13) (2 used) from cover (9).

**IMPORTANT: Keep the disassembled parts together by each port in order not to confuse.**

**IMPORTANT: Do not drop steel ball (16).**

23. Compress springs (11) (2 used) while holding detent rings (10) (2 used). Remove steel balls (16) (8 used) from detent bushings (15) (2 used).

24. Remove push rods (12) (2 used) from detent bushings (15) (2 used).

25. Remove detent rings (10) (2 used) and springs (11) (2 used) from detent bushings (15) (2 used).

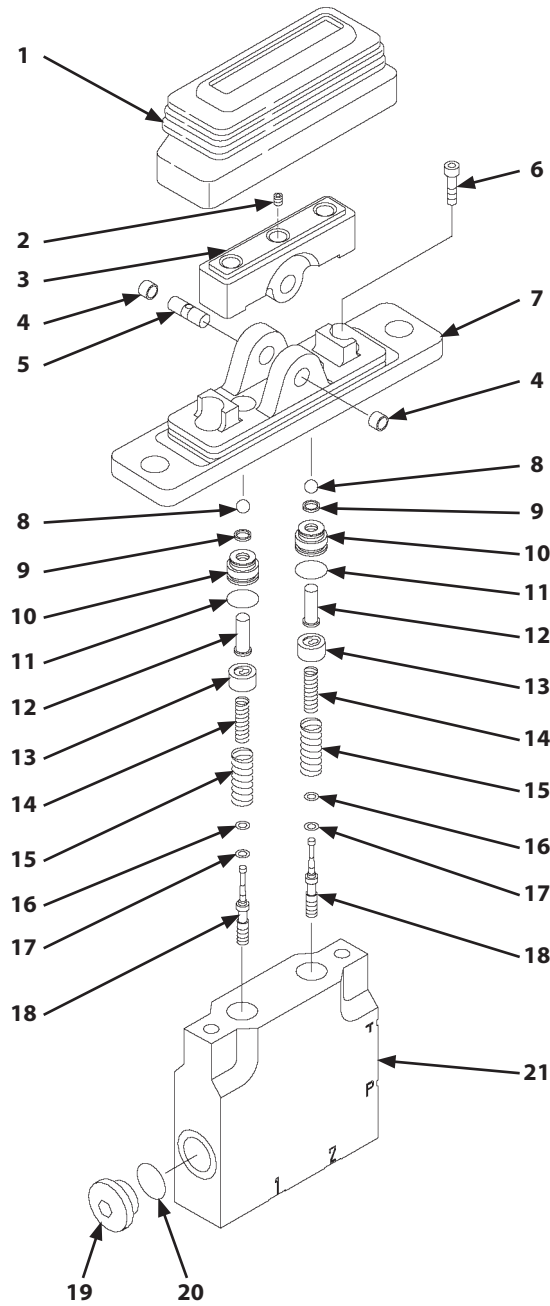
**IMPORTANT: Do not damage the inner surface of detent bushing (15) when removing scraper (17).**

26. Remove scrapers (17) (2 used) from detent bushings (15) (2 used).

## SECTION 3 BODY

### Group 10 Pilot Valve

#### Disassembly of Auxiliary Pilot Valve



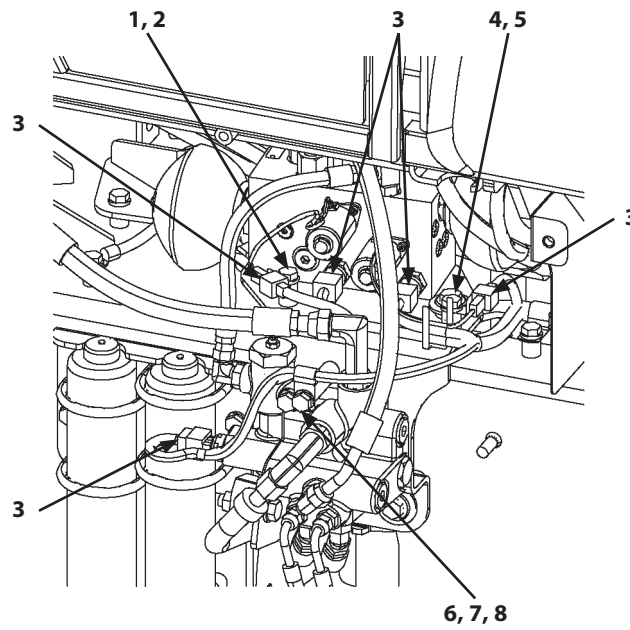
WNDF-03-10-001

- |                         |                        |                          |            |
|-------------------------|------------------------|--------------------------|------------|
| 1- Boot                 | 7- Cover               | 13- Spring Seat (2 Used) | 19- Plug   |
| 2- Set Screw            | 8- Steel Ball (2 Used) | 14- Spring (2 Used)      | 20- O-Ring |
| 3- Cam                  | 9- Seal (2 Used)       | 15- Spring (2 Used)      | 21- Casing |
| 4- Bushing (2 Used)     | 10- Plug (2 Used)      | 16- Shim (2 Used)        |            |
| 5- Shaft                | 11- O-Ring (2 Used)    | 17- Washer (2 Used)      |            |
| 6- Socket Bolt (2 Used) | 12- Push Rod (2 Used)  | 18- Spool (2 Used)       |            |

## SECTION 3 BODY


### Group 11 Brake Charge Valve

---




WMDF-03-12-001

6. Disconnect connectors (3) (5 used).
7. Remove bolts, washers (1, 4) and brackets (2, 5).

 : 17 mm

8. Remove bolt, washer (6), clip (7), and collar (8).

 : 17 mm

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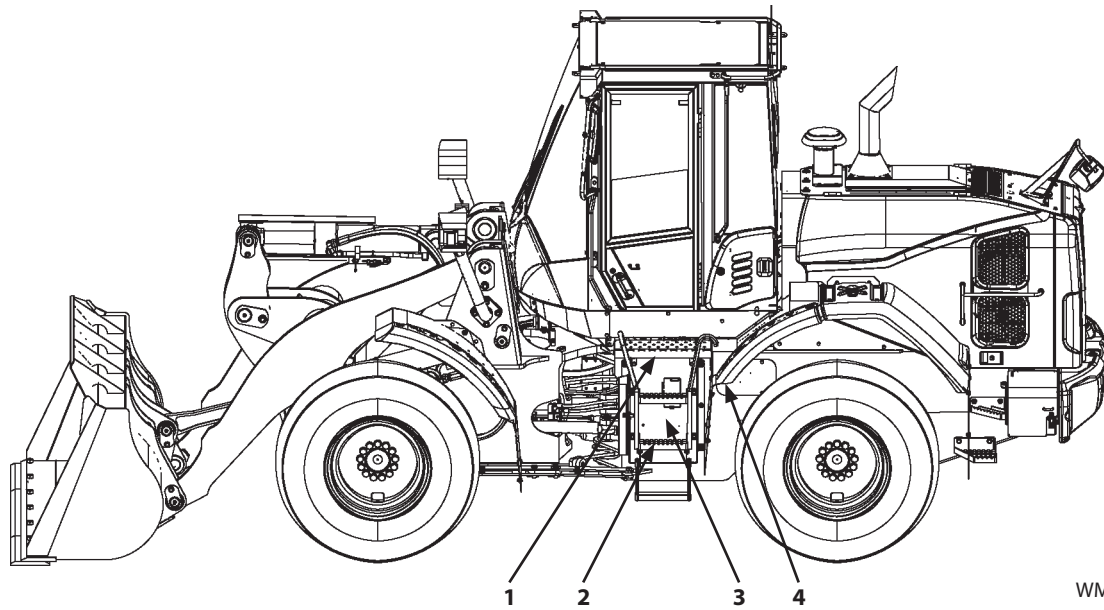
- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

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## SECTION 3 BODY

### Group 11 Brake Charge Valve

---



WMDF-03-04-001

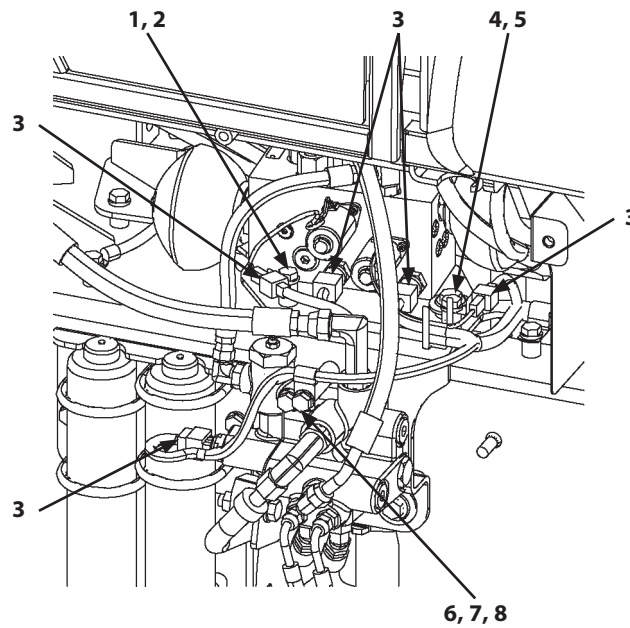
25. Install the following parts. (Refer to W3-4-2.)

- Cover (3)
- Deck (1)
- Step (Front) (2)
- Rear Fender (Front) (4)

## SECTION 3 BODY


### Group 12 Manifold Valve

---




WMDF-03-12-001

6. Disconnect connectors (3) (5 used).
7. Remove bolts, washers (1, 4) and brackets (2, 5).

 : 17 mm

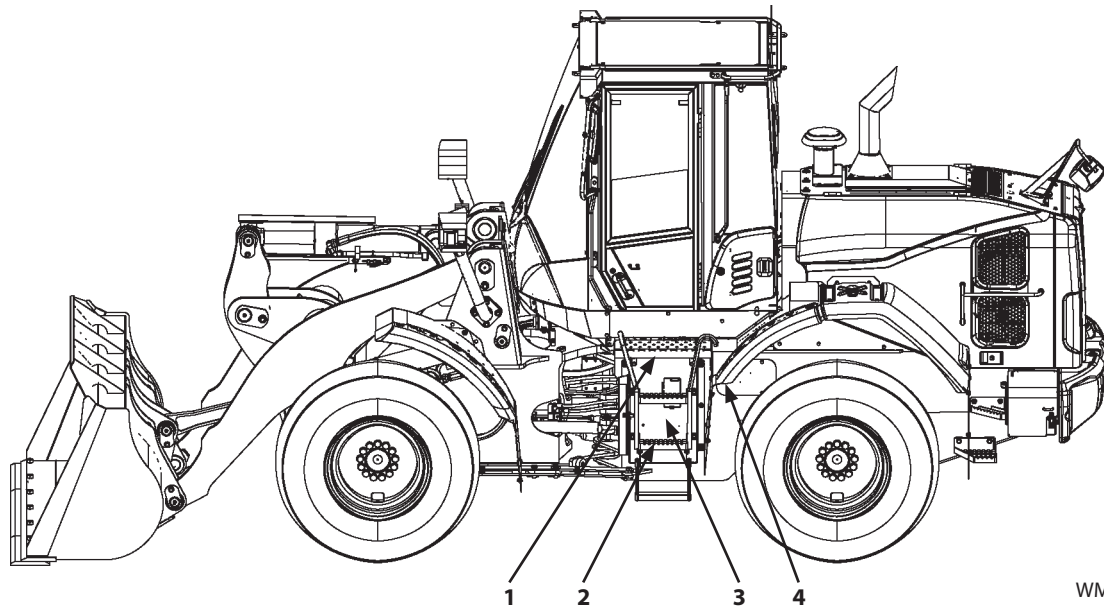
8. Remove bolt, washer (6), clip (7), and collar (8).

 : 17 mm

## SECTION 3 BODY

### Group 12 Manifold Valve

---



WMDF-03-04-001

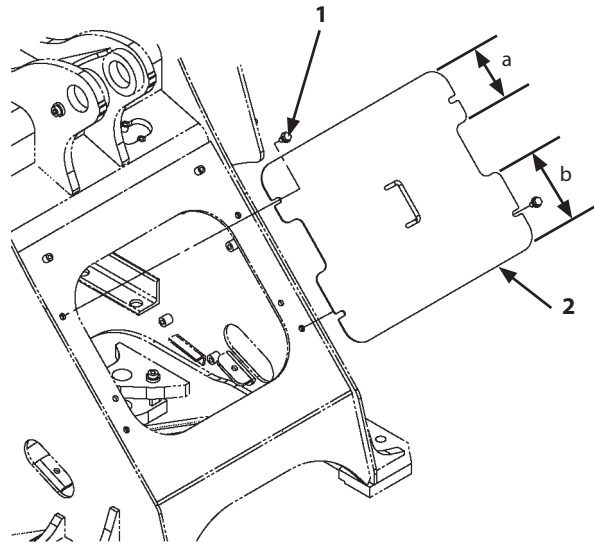
24. Install the following parts. (Refer to W3-4-2.)

- Cover (3)
- Deck (1)
- Step (Front) (2)
- Rear Fender (Front) (4)

## SECTION 3 BODY

### Group 13 Solenoid Valve

---




a- 155 mm (6.1 in)


b- 210 mm (8.3 in)


WMDF-03-09-005

**IMPORTANT: Check the direction to install cover (2).**

9. Install cover (2) with bolts, washers (1) (4 used).

 : 19 mm

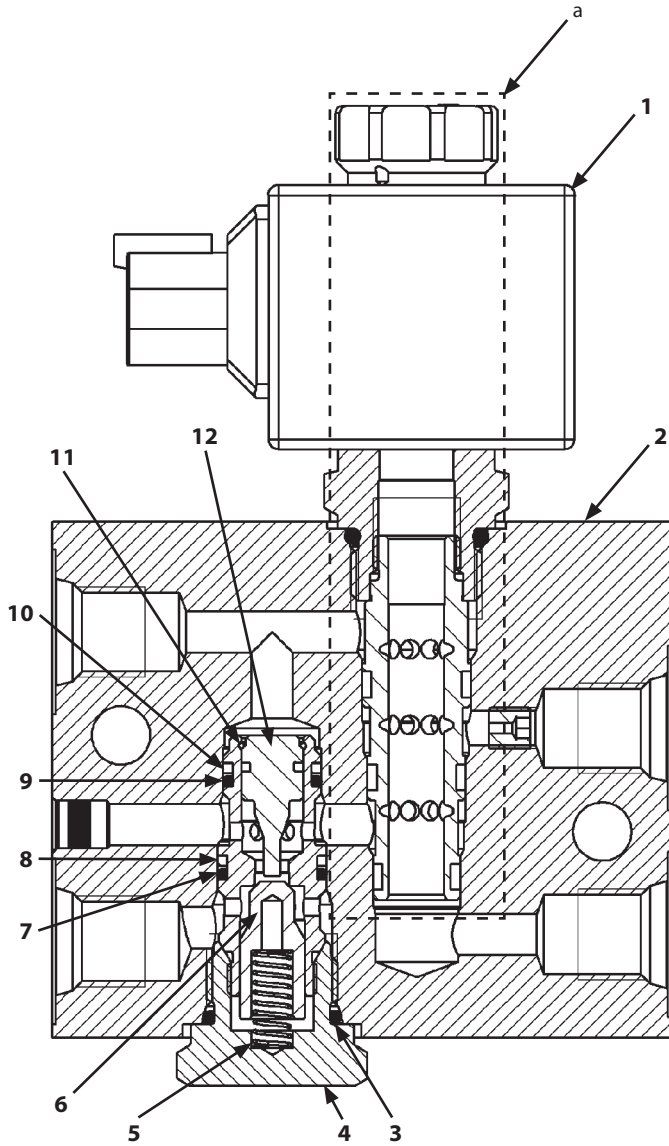
 : 90 N·m (9 kgf·m, 66 lbf·ft)

 **NOTE:** Turn cover (2) by 180 degrees and install it in case of the machine with the quick coupler.

# SECTION 3 BODY

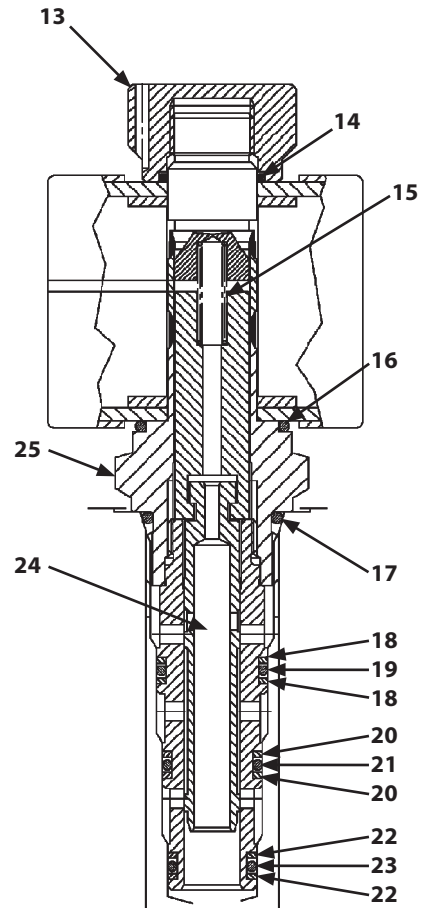
## Group 13 Solenoid Valve

### Structure of Coupler Cylinder Selector Solenoid Valve



WPDF-03-13-007

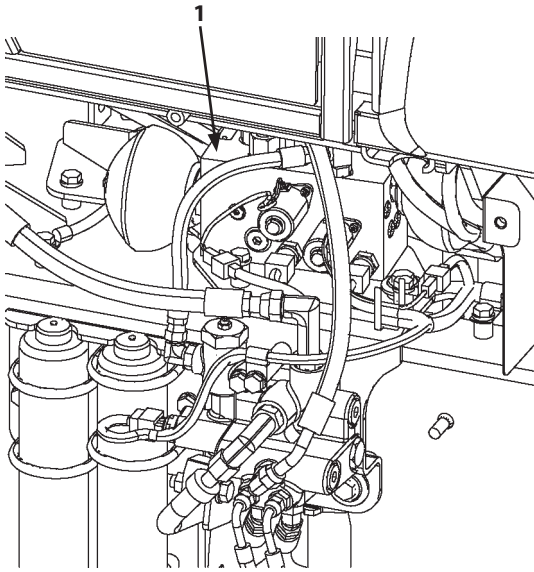
Detail of Spool Assembly (a)



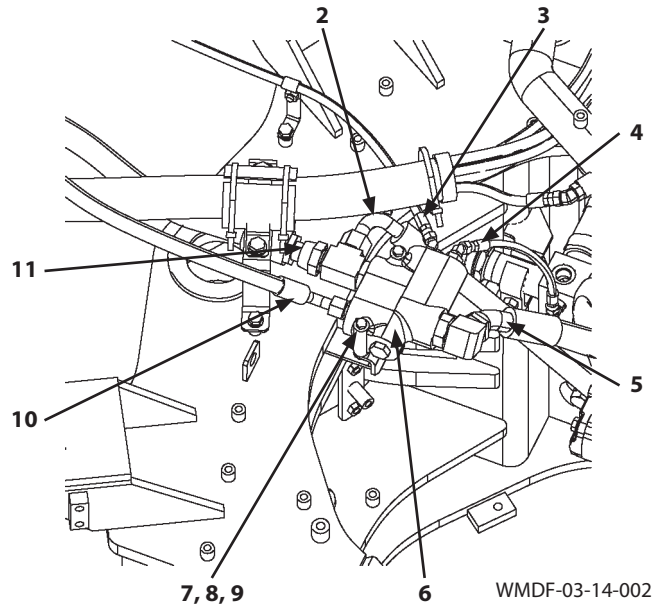
WPDF-03-13-008

## SECTION 3 BODY







### Group 14 Priority Valve



WMDF-03-12-001



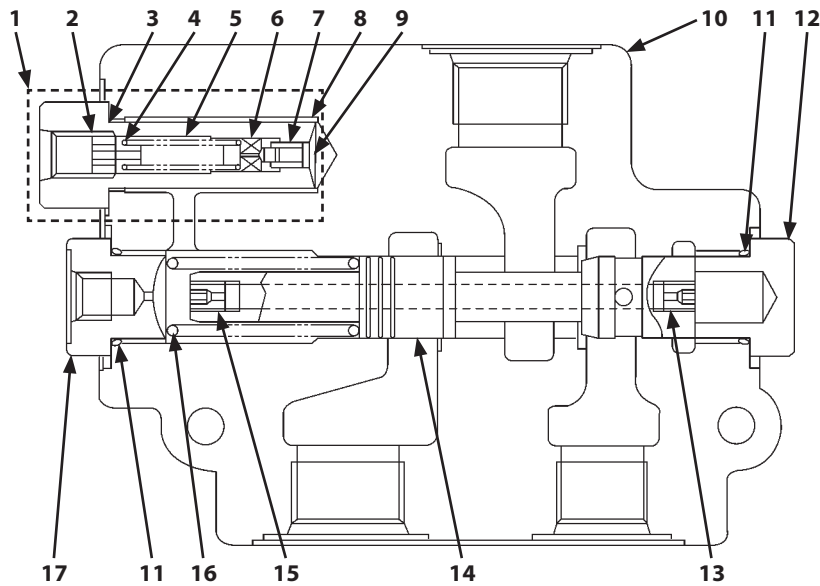
WMDF-03-14-002

6. Remove the manifold valve (1) assembly. (Refer to W3-12-1.)
7. Disconnect hose (10).  
 : 27 mm
8. Disconnect hoses (5, 11).  
 : 41 mm
9. Disconnect hose (2).  
 : 36 mm
10. Disconnect hose (3).  
 : 19 mm
11. Disconnect hose (4).  
 : 17 mm
12. Remove bolts (7) (2 used), washers (8) (2 used), and nuts (9) (2 used). Remove priority valve (6).  
 : 13 mm
13. Remove the adapters with priority valve (6) attached if necessary.

## SECTION 3 BODY

### Group 14 Priority Valve

#### Structure of Priority Valve



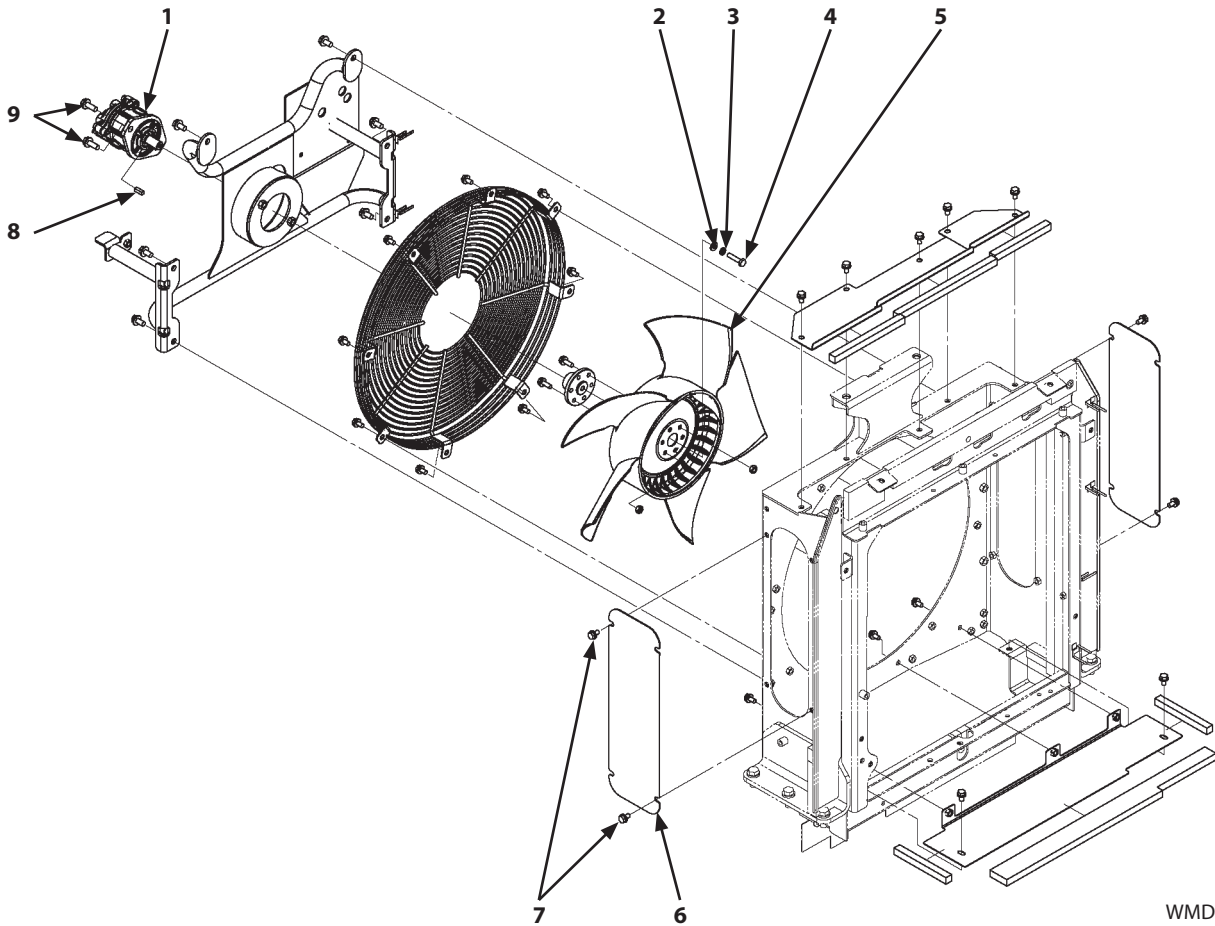
W4FC-03-11-003

No.	Part Name	Q'ty	Wrench Size (mm)	Tightening Torque			Remark
				N·m	kgf·m	lbf·ft	
1	Relief Valve	1	: 24	21	2.1	15.5	
2	Adjusting Screw	1					
3	O-Ring	1					
4	Spring Guide	1					
5	Spring	1					
6	Poppet	1					
7	Valve Seat	1					
8	Ring	1					
9	Screen	1					
10	Housing	1					
11	O-Ring	2					
12	Plug	1	: 26	44	4.5	32.5	
13	Orifice	1					Diameter of Orifice: $\phi 0.8$
14	Spool	1					
15	Orifice	1					Diameter of Orifice: $\phi 0.65$
16	Spring	1					
17	Plug	1	: 26	44	4.5	32.5	Diameter of Orifice: $\phi 1.5$

NOTE: Replace the parts except for O-rings (3, 11), plugs (12, 17), spring (16), and relief valve (1) as the priority valve assembly.

## SECTION 3 BODY


### Group 15 Cooling Fan System




WMDF-03-15-003

#### Installation

1. Install all removed adapters to fan motor (1).
2. Install fan motor (1) with bolts, washers (9) (2 used).

 : 19 mm

 : 90 N·m (9 kgf·m, 66 lbf·ft)


3. Install key (8) to fan motor (1).


**IMPORTANT: Do not contact the radiator, oil cooler, and intercooler when removing and installing the fan (5) assembly.**

**IMPORTANT: Do not tap the fan (5) assembly when installing it.**

4. Fit the fan (5) assembly to key (8). Install it.


5. Apply LOCTITE #262 onto bolt (4). Install washer (2), spring washer (3), and bolt (4).

 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

6. Install cover (6) with bolts, washers (7) (4 used).

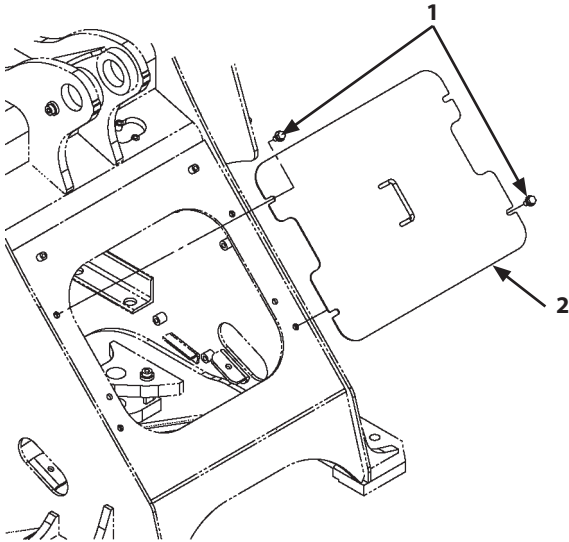
 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

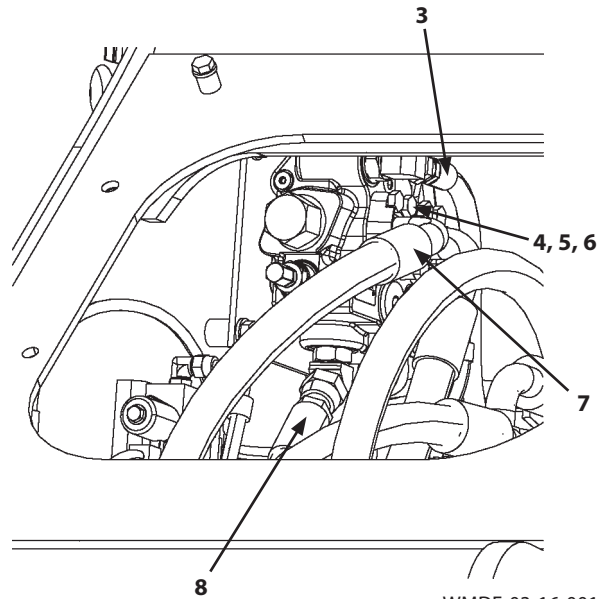
## SECTION 3 BODY

### Group 16 Ride Control Device

#### Removal and Installation of Ride Control Valve (Parallel Link)



WMDF-03-09-005



WMDF-03-16-001

**IMPORTANT:** The hoses and pipes contain hydraulic oil. When removing the hoses and pipes, receive oil with a container in order to avoid spilling oil.

**IMPORTANT:** Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.


#### Removal

1. Set the machine position (lift arm raise) for inspection and maintenance. (Refer to W1-6-1.)


**CAUTION:** Bleed air from the hydraulic oil tank. (Refer to W1-4-1.)

**CAUTION:** Release any pressure in the hydraulic circuit and the ride control accumulator. (Refer to W1-5-1.)


2. Remove bolts, washers (1) (4 used). Remove cover (2).

 : 19 mm


3. Remove bolts (4) (4 used) and flanges (5) (2 used). Disconnect hose (7). Remove O-ring (6).

 : 17 mm

4. Disconnect hose (8).

 : 36 mm

5. Disconnect hose (3).

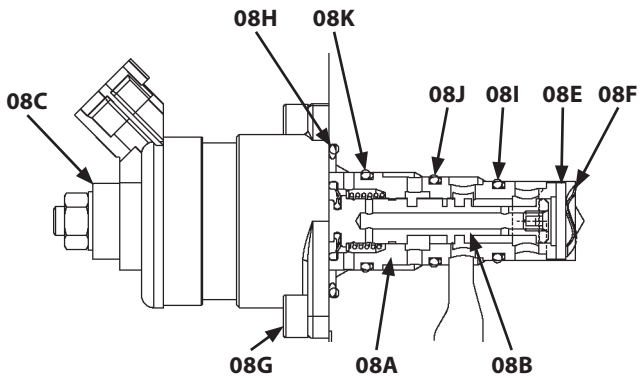
 : 27 mm

## SECTION 3 BODY

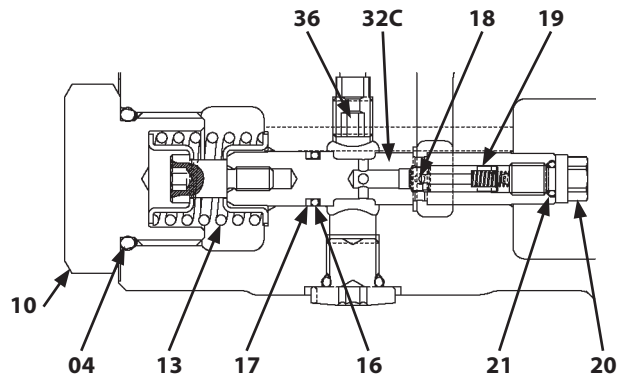
### Group 16 Ride Control Device

Detail a (Solenoid Valve (08) Assembly)

Detail b



WNDB-03-16-003



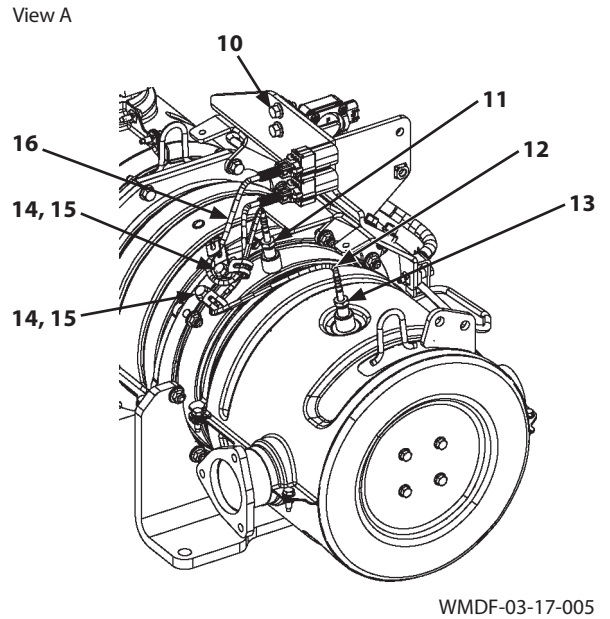
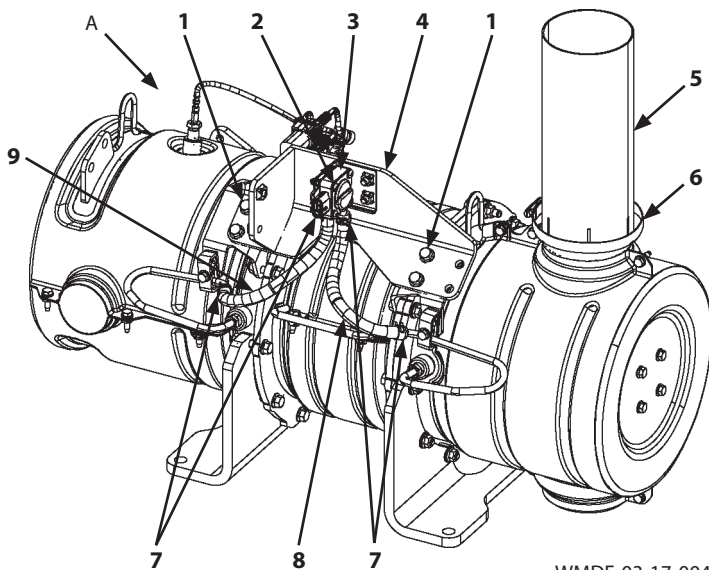
WNDB-03-16-004

- |                     |                           |                |                  |
|---------------------|---------------------------|----------------|------------------|
| 02- Spring          | 08F- Washer               | 20- Plug       | 28A- O-Ring      |
| 03- Plug            | 08G- Socket Bolt (2 Used) | 21- O-Ring     | 32A- Housing     |
| 04- O-Ring (2 Used) | 08H- O-Ring               | 22- Drain Plug | 32B- Spool       |
| 05- Plug            | 08I- O-Ring               | 23- O-Ring     | 32C- Spool       |
| 05A- O-Ring         | 08J- O-Ring               | 24- Nut        | 34- Relief Valve |
| 07- Plug            | 08K- O-Ring               | 25- Plug       | 34A- O-Ring      |
| 08- Solenoid Valve  | 10- Plug                  | 25A- O-Ring    | 34B- Backup Ring |
| 08A- Sleeve         | 13- Spring                | 26- Plug       | 34C- O-Ring      |
| 08B- Spool          | 16- O-Ring                | 26A- O-Ring    | 36- Orifice      |
| 08C- Solenoid       | 17- Backup Ring           | 27- Plug       |                  |
| 08D*- Spring        | 18- Check Valve           | 27A- O-Ring    |                  |
| 08E- Plate          | 19- Spring                | 28- Plug       |                  |

 **NOTE:** As for the item with mark\*, refer to W3-16-2-1.

## SECTION 3 BODY

### Group 17 Muffler Filter




14. Remove clamp (6). Remove exhaust pipe (5).

 : 7 mm


**IMPORTANT:** Do not loosen screws (2) (4 used). If screw (2) has been loosened, differential pressure sensor (3) should be replaced.

**IMPORTANT:** When disconnecting hoses (8, 9), differential pressure sensor (3) may be damaged by the force except for the force applied to the disconnecting direction.

15. Remove clips (7) (4 used). Disconnect hoses (8, 9).  
 16. Remove harnesses (12, 16) from clips (15) (3 used).  
 17. Remove bolts (14) (3 used) and clips (15) (3 used).


 : 12 mm

18. Remove sensors (11, 13).

 : 14 mm

**IMPORTANT:** Do not remove bolt (10) unless necessary.

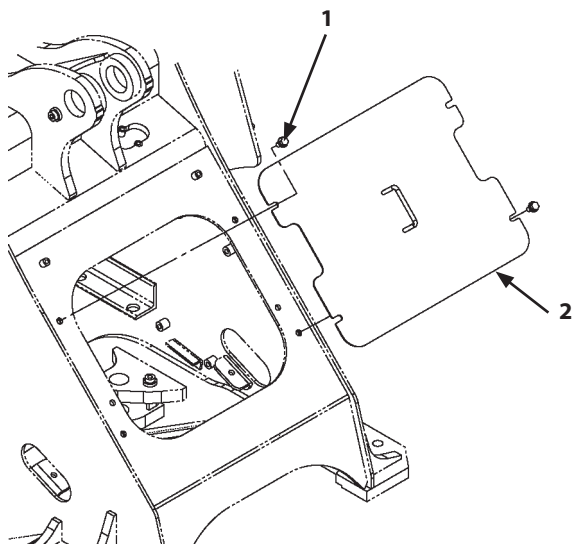
19. Remove bolts (1) (4 used). Remove bracket (4).

 : 13 mm

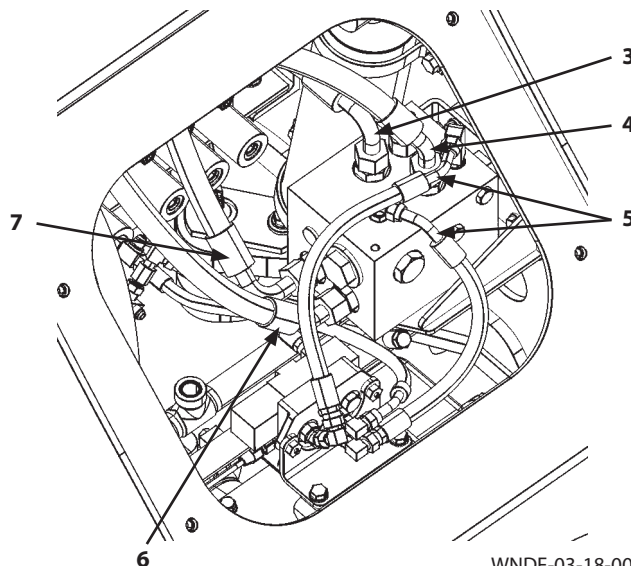
## SECTION 3 BODY

### Group 18 Parallel Link (Special Parts)

#### Removal and Installation of Bucket Regenerative Valve



WMDF-03-09-005



WNDF-03-18-001

**IMPORTANT:** The hose and pipe contain hydraulic oil. When removing the hose and pipe, receive oil with a container in order to avoid spilling oil.

**IMPORTANT:** Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.


#### Removal

1. Set the machine position (lift arm raise) for inspection and maintenance. (Refer to W1-6-1.)


**CAUTION:** Bleed air from the hydraulic oil tank. (Refer to W1-4-1.)

**CAUTION:** Release any pressure in the front attachment hydraulic circuit. (Refer to W1-5-1.)


2. Remove bolts, washers (1) (4 used). Remove cover (2).

 : 19 mm


3. Disconnect hoses (5) (2 used).

 : 22 mm

4. Disconnect hoses (3, 4).

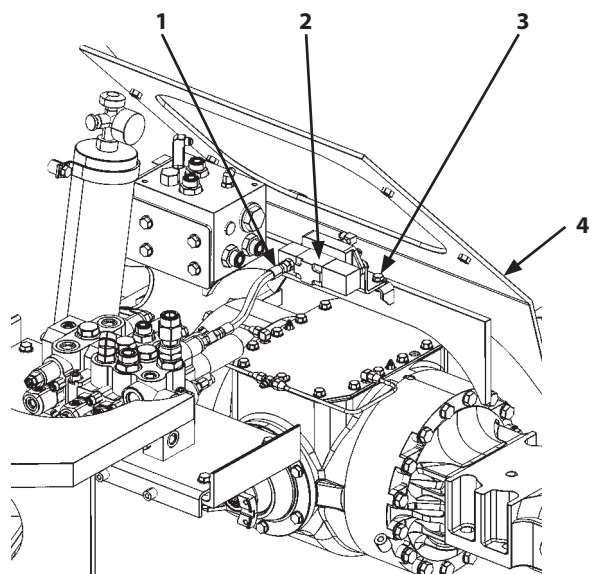
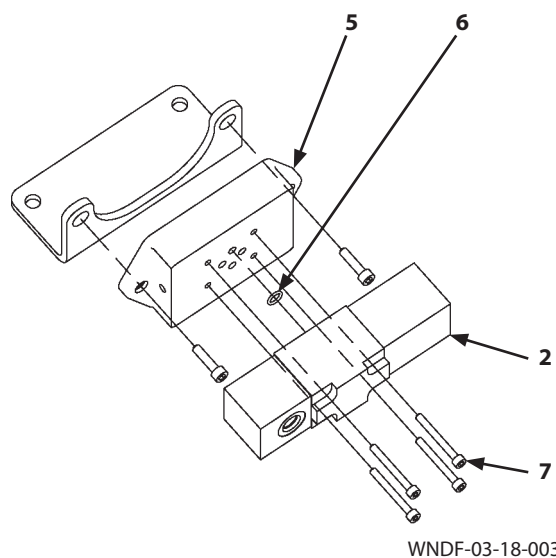
 : 36 mm

5. Disconnect hoses (6, 7).

 : 36 mm


## SECTION 3 BODY


### Group 18 Parallel Link (Special Parts)




#### Installation


1. Install O-rings (6) (4 used) to bucket regenerative selector valve (2).
2. Install bucket regenerative selector valve (2) to valve plate (5) with socket bolts (7) (4 used).

 : 4 mm


 :  $6.9 \pm 1$  N·m ( $0.7 \pm 0.1$  kgf·m,  $5.1 \pm 0.7$  lbf·ft)


3. Install all removed adapters to the bucket regenerative selector valve (2) assembly.
4. Install the bucket regenerative selector valve (2) assembly to front frame (4) with bolts, washers (3) (2 used).

 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

5. Connect hose (1).


 : 19 mm

 : 30 N·m (3 kgf·m, 22 lbf·ft)


## SECTION 4 TRAVEL SYSTEM

### Group 1 Tire

#### Applicable Tire Size

 *NOTE: The machine may vibrate while driving depending on the tread pattern of tires. This is a sympathetic vibration due to tread pattern, not a malfunction.*

Tire Size	Structure of Tire	Standard Air Pressure	Air Pressure Adjustment Range
20.5 R 25	Radial Tires	400 kPa (4.00 kgf/cm <sup>2</sup> , 58 PSI)	400 to 450 kPa (4.00 to 4.50 kgf/cm <sup>2</sup> , 58 to 65 PSI)

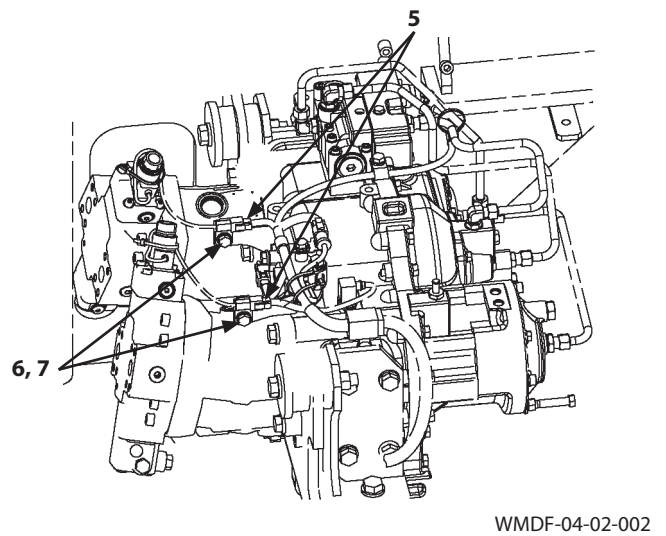
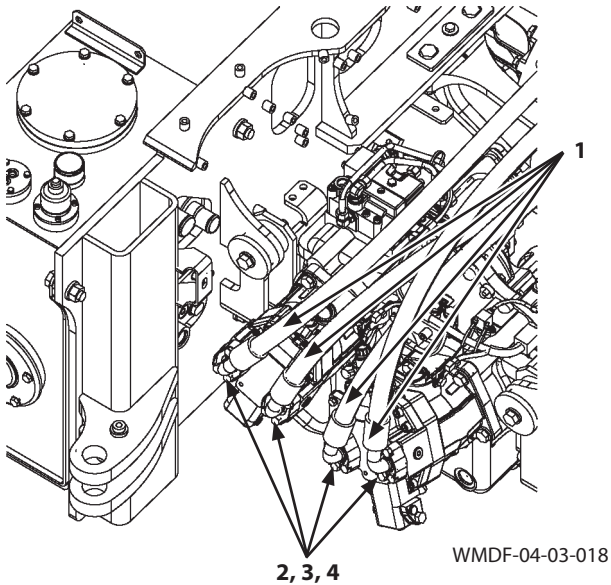
 *NOTE: Adjust air pressure according to the size and type of tires provided in the table above regardless of the tread pattern.*

Adjust tire pressure in conformity with the work mode the machine is engaged in.


- Driving on Public Roads: ... Standard pressure
- Loading/excavation on normal ... Standard or slightly higher than standard pressure
- Heavy-duty excavation: ... Higher pressure in the standard pressure range
- Operation on soft terrain or sandy territory: ... Radial Tires: Standard pressure

## SECTION 4 TRAVEL SYSTEM

### Group 2 HST Motor




7. Remove bolts (2) (16 used) and flanges (3) (8 used). Disconnect hoses (1) (4 used). Remove O-rings (4) (4 used).


 : 19 mm

8. Disconnect connectors (5) (2 used).


9. Remove bolts, washers (6) (2 used) and brackets (7) (2 used).

 : 17 mm


10. Remove bolt, washer (8), nut (9), and clips (10) (2 used).

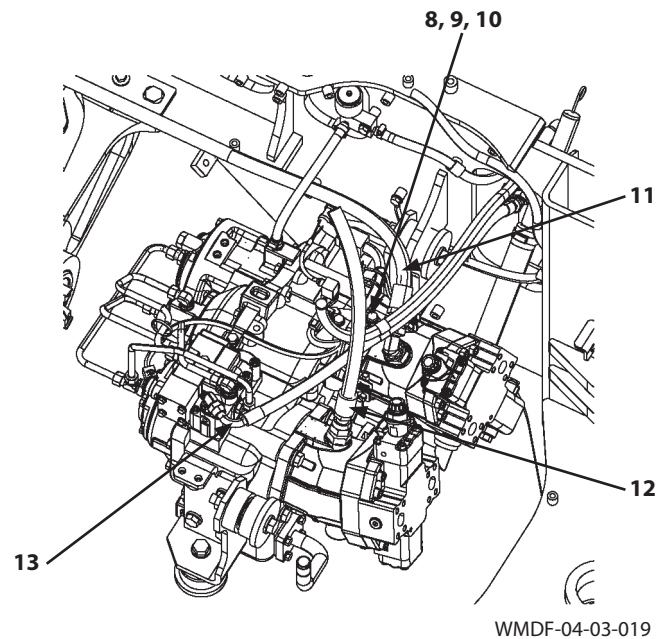
 : 17 mm

11. Disconnect hose (13).

 : 27 mm

12. Disconnect hoses (11, 12).

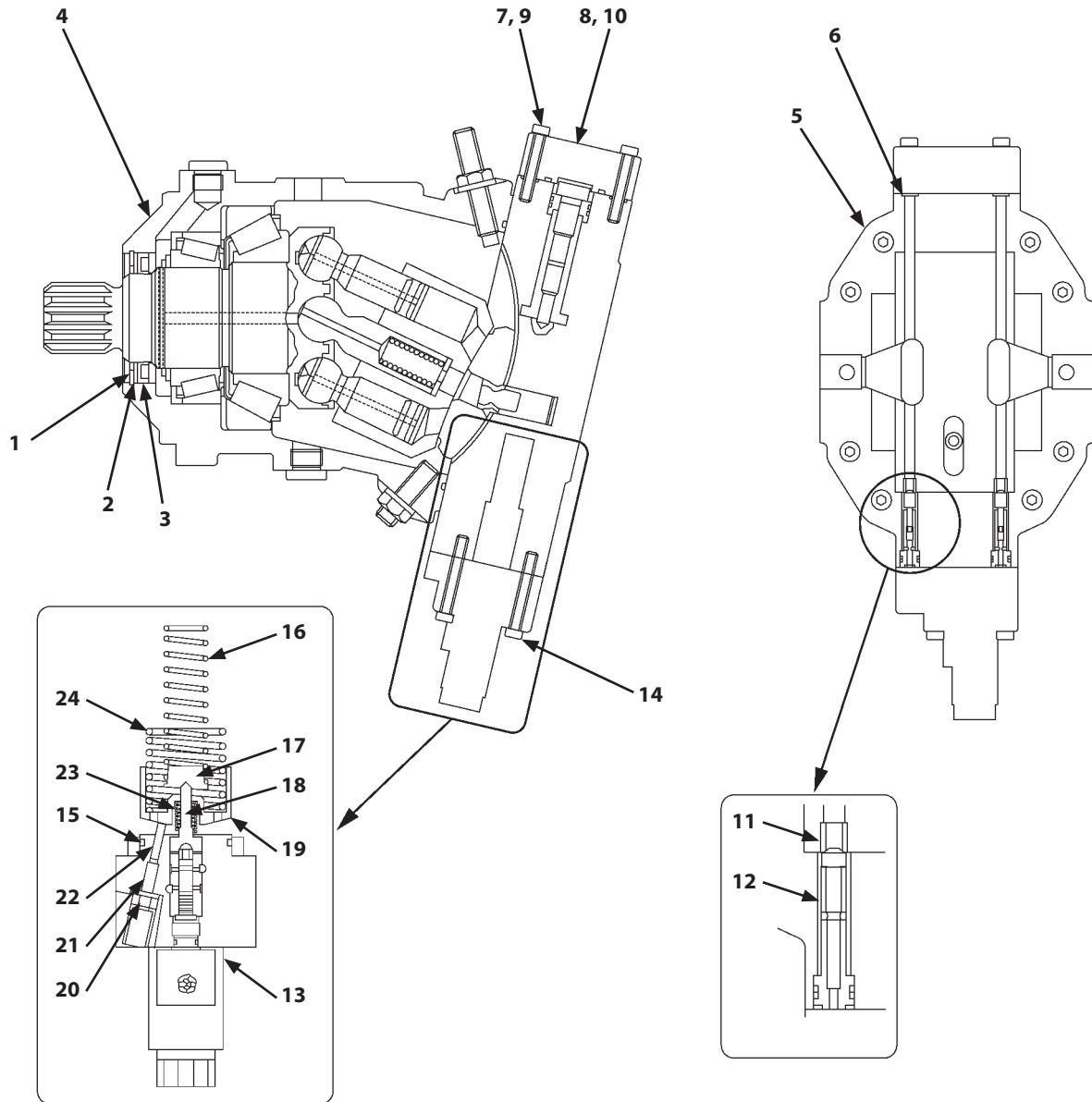
 : 36 mm



# SECTION 4 TRAVEL SYSTEM

## Group 2 HST Motor

### Assembly of HST Motors 1, 2

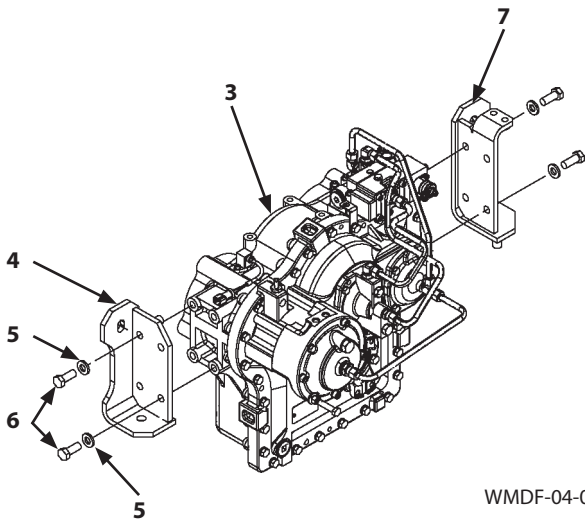


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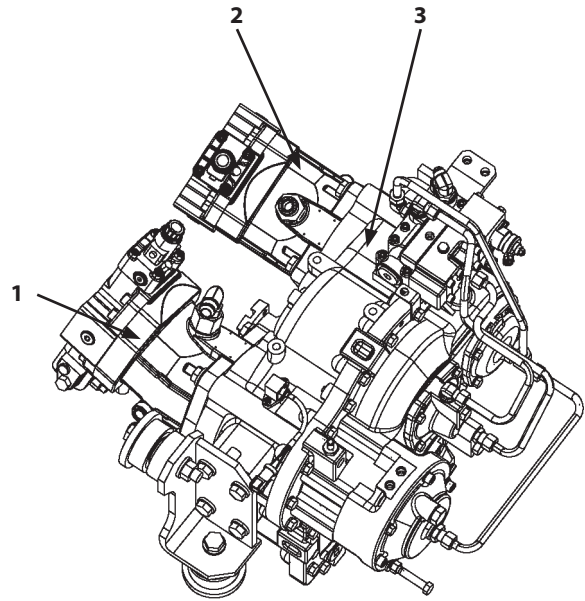
- |  |                          |   |             |
|--|--------------------------|---|-------------|
| 1- Retaining Ring                        | 7- Socket Bolt (4 Used)  | 13- Motor Displacement Angle Control Solenoid Valve | 19- Bushing |
| 2- Plate                                 | 8- Cover Block           | 14- Socket Bolt (4 Used)                            | 20- Nut     |
| 3- Shaft Seal Ring                       | 9- Socket Bolt (4 Used)  | 15- O-Ring  | 21- Screw   |
| 4- Housing                               | 10- Cover Block          | 16- Spring  | 22- Pin     |
| 5- Valve Block                           | 11- Valve Seat (2 Used)  | 17- Collar  | 23- Spring  |
| 6- O-Ring (3 Used) (HST Motor 2: 6 Used) | 12- Check Valve (2 Used) | 18- Collar  | 24- Spring  |

## SECTION 4 TRAVEL SYSTEM

### Group 3 Transmission




WMDF-04-03-024




WMDF-04-03-021

#### Installation

1. Apply LOCTITE #262 onto bolts (6) (4 used). Install bracket (4) to transmission (3) with bolts (6) (4 used) and washers (5) (4 used).

 : 24 mm

 : 210 N·m (21 kgf·m, 155 lbf·ft)


2. Install another bracket (7) in the same way as step 1.
3. Install HST motor 1 (2) and HST motor 2 (1) to transmission (3). (Refer to W4-2-1.)

## SECTION 4 TRAVEL SYSTEM


### Group 3 Transmission

**CAUTION:** Spring (55) may fly out if loosening bolts (62) (2 used) quickly. Loosen bolts (62) (2 used) alternately.


9. Remove bolts (62) (2 used) and washers (63) (2 used). Remove brake cap (68) and O-ring (69) from piston housing (71).

 : 17 mm

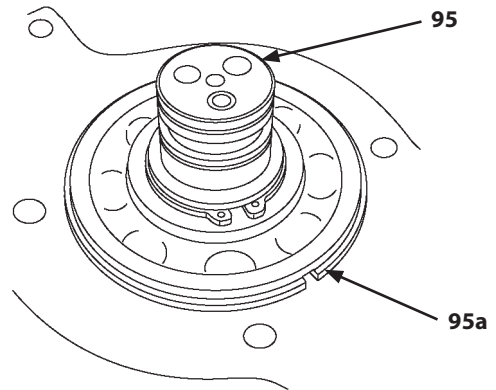
10. Remove springs (55) (24 used) from piston (70).
11. Remove piston (70) from piston housing (71). Remove D-rings (52, 53) from piston (70).
12. Remove O-ring (46) and end plate (72) from the piston housing (71) side of brake housing (47).
13. Remove socket bolts (75) (2 used). Remove brake housing (47) from transmission cover (80).

 : 8 mm

14. Remove O-ring (46) from the transmission cover (80) side of brake housing (47).
15. Remove plates (49) (7 used) and discs (73) (6 used) from disc hub (119).
16. Remove retaining ring (120) and disc hub (119) from the input gear 2 (116) assembly.
17. Remove bolts (36) (4 used). Remove distributor cap (38) and gasket (39) from transmission cover (80).


 : 17 mm

18. Remove retaining ring (95a) from clutch assembly (95).



W4FC-03-04-004

19. Remove bolts (20) (4 used). Remove bearing cap (19) and gasket (39) from transmission cover (80).

 : 17 mm

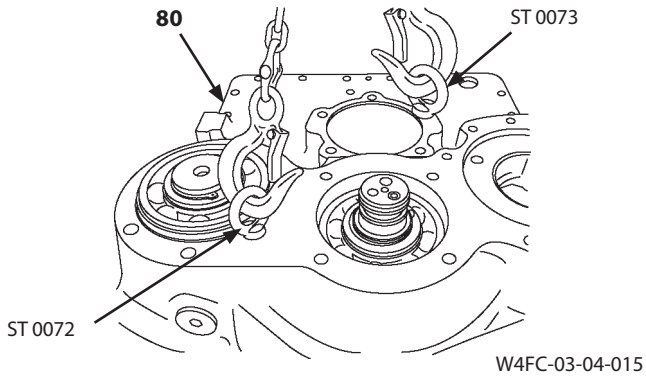
20. Remove flange (42) from the output shaft (107) assembly. Remove retaining ring (44) and plug (43) from flange (42).

## SECTION 4 TRAVEL SYSTEM

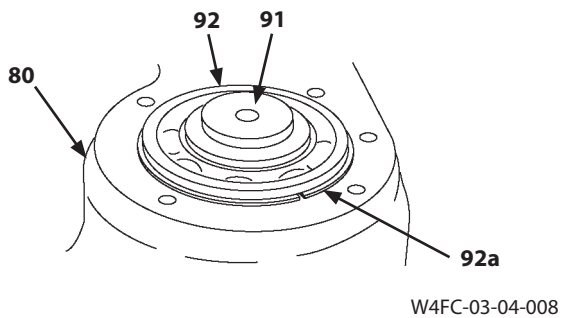
### Group 3 Transmission

**CAUTION:** Transmission cover (80) weight: 35 kg (78 lb)

12. Install the special tools (ST 0072, ST 0073) to transmission cover (80). Attach the nylon slings onto the special tools (ST 0072, ST 0073).

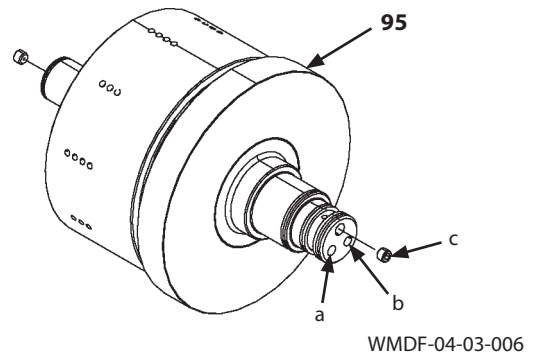


13. Hoist transmission cover (80) with the transmission case (10) mounting surface down.
14. Install transmission cover (80) to the input gear 1 (91) assembly. Install retaining ring (92a) to the input gear 1 (91) assembly.



**CAUTION:** Clutch assembly (95) weight: 29 kg (64 lb)

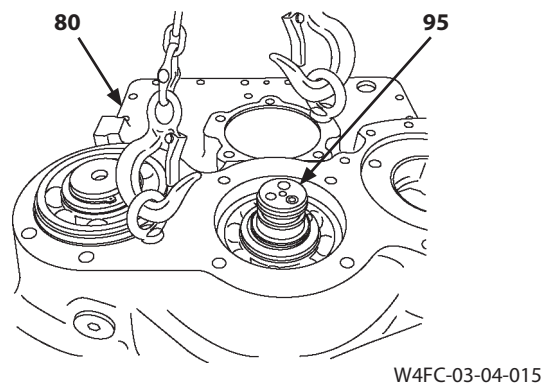
15. Install the special tool (ST 0071) to lifting hole (b) of clutch assembly (95). Attach the nylon slings onto the special tool (ST 0071). Hoist clutch assembly (95). Place clutch assembly (95) with the retaining ring (95a) mounting side up.



a- Drilled Hole  
b- Lifting Hole

c- Plug

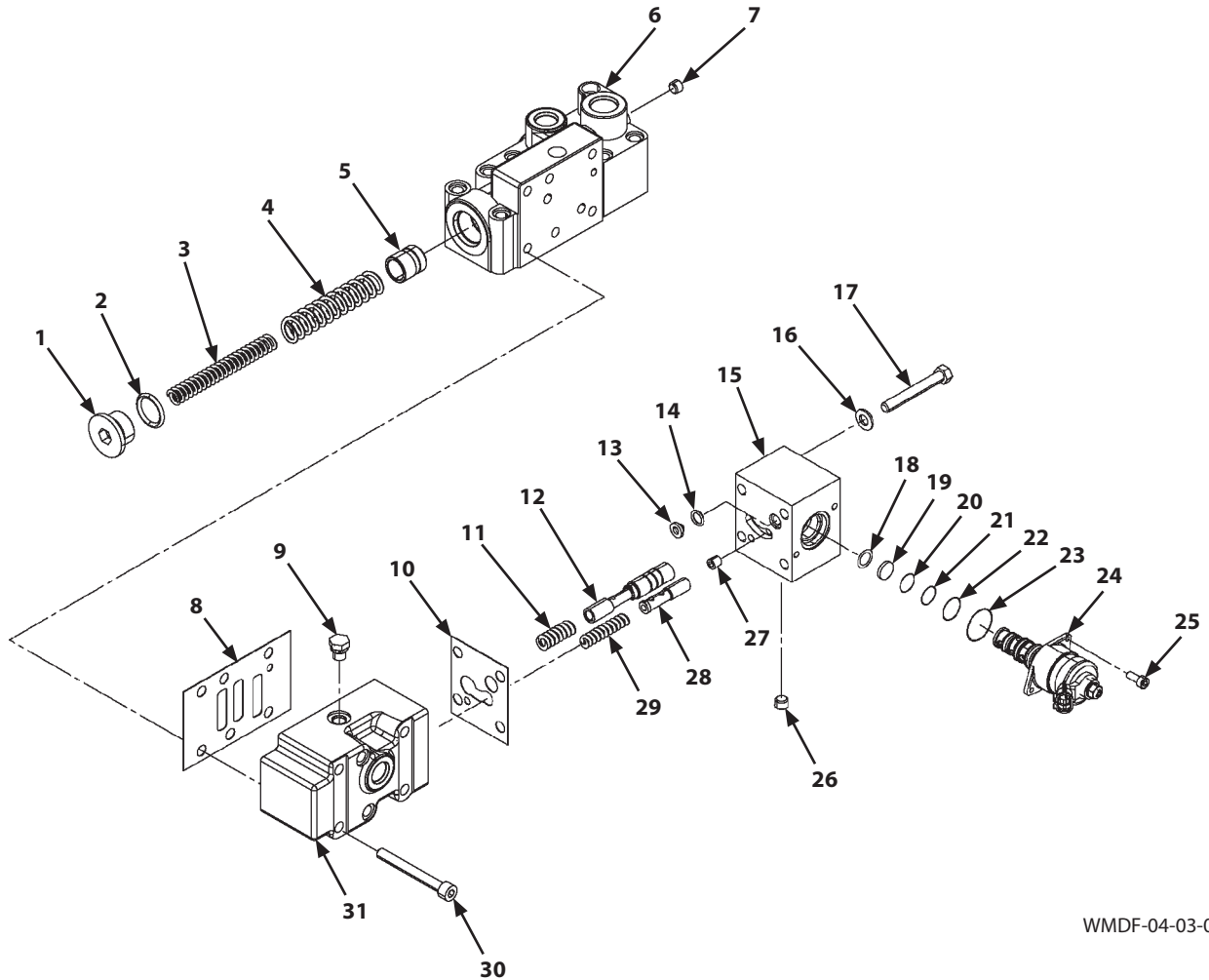
16. Install transmission cover (80) to clutch assembly (95). Install retaining ring (95a) to clutch assembly (95).



# SECTION 4 TRAVEL SYSTEM

## Group 3 Transmission

### Disassembly of Clutch Pressure Control Solenoid Valve

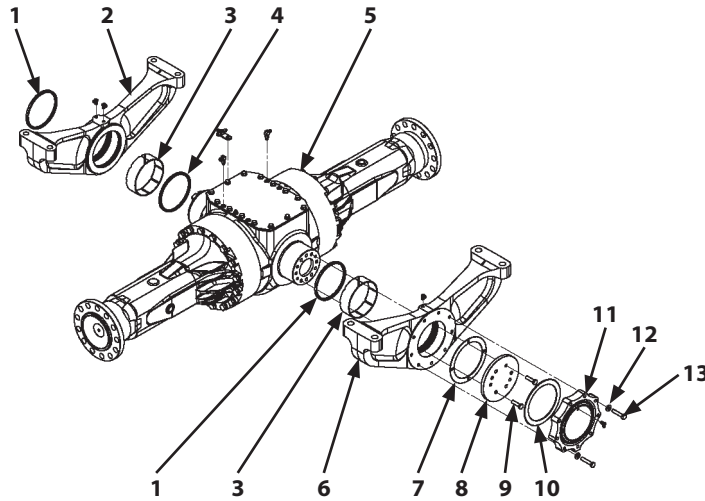


WMDF-04-03-001

- |                 |                         |                             |                          |
|-----------------|-------------------------|-----------------------------|--------------------------|
| 1- Plug         | 10- Gasket              | 19- Plate                   | 28- Piston               |
| 2- O-Ring       | 11- Spring              | 20- O-Ring                  | 29- Spring               |
| 3- Spring       | 12- Spool               | 21- O-Ring                  | 30- Socket Bolt (6 Used) |
| 4- Spring       | 13- Filter              | 22- O-Ring                  | 31- Valve Body           |
| 5- Valve Piston | 14- O-Ring              | 23- O-Ring                  |                          |
| 6- Valve Body   | 15- Solenoid Valve Body | 24- Solenoid Valve Assembly |                          |
| 7- Plug         | 16- Washer (4 Used)     | 25- Socket Bolt (2 Used)    |                          |
| 8- Gasket       | 17- Bolt (4 Used)       | 26- Plug                    |                          |
| 9- Plug         | 18- Washer              | 27- Orifice                 |                          |

## SECTION 4 TRAVEL SYSTEM

### Group 4 Axle




WMDF-04-04-008


**CAUTION:** Support (2) weight: 43 kg (95 lb)

13. Attach nylon slings onto support (2). Hoist and hold support (2). Remove the wires for fastening support (2) that have been installed in step 8.
14. Remove support (2) from rear axle (5).
15. Remove dust seals (1, 4) and bushing (3) from support (2).

**CAUTION:** Support (6) weight: 55 kg (125 lb)


16. Attach nylon slings onto support (6). Hoist and hold support (6).
17. Remove bolts (13) (9 used) and washers (12) (9 used). Remove cap (11).


 : 19 mm

 **NOTE:** LOCTITE #262 has been applied on the thread part of bolts (13) (9 used).

18. Remove thrust washer (10).

19. Remove bolts (9) (8 used). Remove thrust plate (8) and thrust washer (7).

 : 19 mm

 **NOTE:** LOCTITE #262 has been applied on the thread part of bolts (9) (8 used).

20. Remove support (6) from rear axle (5).

21. Remove dust seal (1) and bushing (3) from support (6).

## SECTION 4 TRAVEL SYSTEM

### Group 4 Axle

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01- Differential	22- Wear Ring (12 Used)	45- Spider	65- Bolt (8 Used)
02- Housing	23- Needle Cage (12 Used)	46- Flange (2 Used)	66- Bolt (4 Used)
03- Housing	24- Seal (2 Used)	47- Nut (2 Used)	67- Bolt (8 Used)
04- Internal Gear (2 Used)	25- Plug (2 Used)	48- Bearing (2 Used)	68- Bolt (14 Used)
05- Spider (2 Used)	26- Seal (2 Used)	49- Air Bleed Plug (2 Used)	69- Nut (18 Used)
06- Shaft (2 Used)	27- Bolt (32 Used)	50- O-Ring (2 Used)	70- Washer (12 Used) (Front Axle: 6 Used)
07- Piston (2 Used)	28- Washer (32 Used)	51- O-Ring	71- Ring Gear
08- Sun Gear (2 Used)	29- Bolt (2 Used)	52- Plate	72- Housing B
09- Planetary Gear (6 Used)	32- Nut	53- Gasket	73- Housing B
10- Separation Disc (2 Used)	33- O-Ring	54- Seal	74- Friction Disc (2 Used)
11- Pin (6 Used)	34- Yoke	55- Magnet Plug (3 Used)	75- Separation Disc (2 Used)
12- Friction Disc (2 Used)	35- Sleeve	56- Seal (3 Used)	76- Friction Disc (2 Used)
13- Bearing (2 Used)	36- Gear (2 Used)	57- Ring	77- Gear (2 Used)
14- Bearing (2 Used)	37- Housing	58- Plate (2 Used)	78- Pin (4 Used)
15- Pin (8 Used)	38- Shim	59- Gear (4 Used)	79- Housing A
16- Spring Pin (6 Used)	39- Housing	60- Housing A	80- Socket Bolt (8 Used)
17- Washer (2 Used)	40- Bearing (2 Used)	61- Retaining Ring	
18- Shim	41- Bearing	62- Bolt (12 Used) (Front Axle: 6 Used)	
19- O-Ring (2 Used)	42- Pinion	63- Bolt (18 Used)	
20- O-Ring (2 Used)	43- Wear Ring (4 Used)	64- Bolt (4 Used)	
21- Retainer	44- Wear Ring (2 Used)		

 **NOTE:** The quantity of parts is the quantity per one axle.


## SECTION 4 TRAVEL SYSTEM

### Group 4 Axle

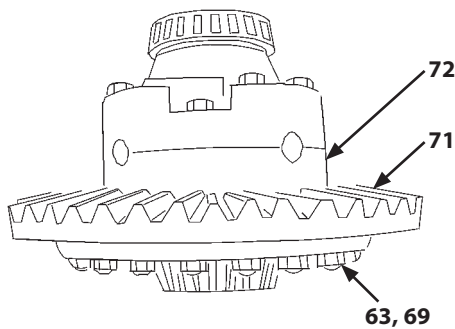
#### Disassembly of Differential Housing (Axle Equipped with TPD)

**CAUTION:** The differential housing weight: 73 kg (165 lb)

53. Place the differential housing vertically with housing A (60) up.
54. Remove bolts (63) (18 used) and nuts (69) (18 used). Remove ring gear (71) from housing B (72).


 : 19 mm

**NOTE:** *THREEBOND #1327 has been applied on the thread part of bolts (63) (18 used).*

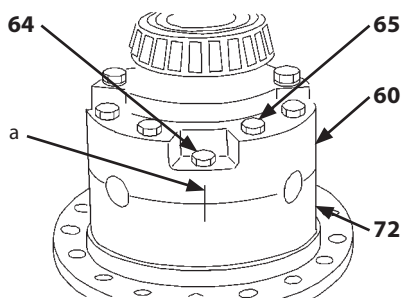


WMDF-04-04-037

55. Put matching marks (a) at the jointed part between housing B (72) and housing A (60). Remove bolts (64) (4 used) and bolts (65) (8 used).

 : 19 mm

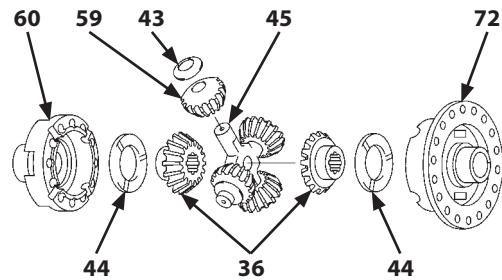
**NOTE:** *THREEBOND #1327 has been applied on the thread part of bolts (64) (4 used) and bolts (65) (8 used).*



WMDF-04-04-038

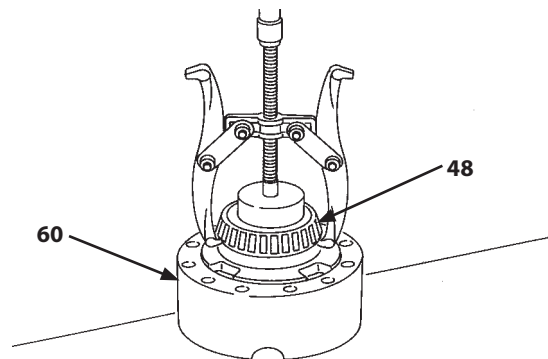
a- Matching Mark

56. Tap the center of spider (45) by using a plastic hammer. Remove housing A (60) from housing B (72).
57. Remove gears (36) (2 used), spider (45), gears (59) (4 used), wear rings (44) (2 used), and wear rings (43) (4 used) from housing B (72) and housing A (60).



WMDF-04-04-039

58. Remove the inner races (2 used) of bearings (48) (2 used) from housing B (72) and housing A (60) by using a bearing puller.

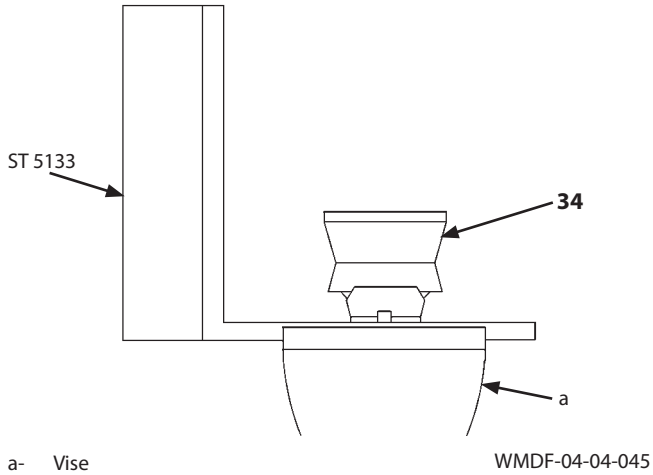


W4GB-03-03-027

## SECTION 4 TRAVEL SYSTEM


### Group 4 Axle

31. Install the special tool (ST 5133) to yoke (34) with the bolts (M10, Pitch 1.25 mm) (4 used). Secure yoke (34) in vise (a) by using the special tool (ST 5133).

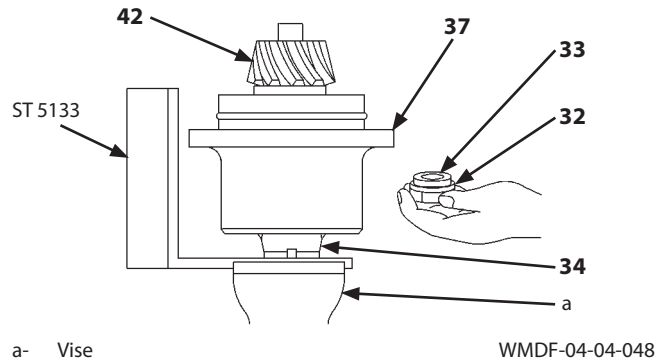


a- Vise

33. Install O-ring (33) and nut (32) to pinion (42). Remove the housing (37) assembly from vise (a). Remove the special tool (ST 5133) and the bolts (M10, Pitch 1.25 mm) (4 used) from yoke (34).


 : 38.1 mm

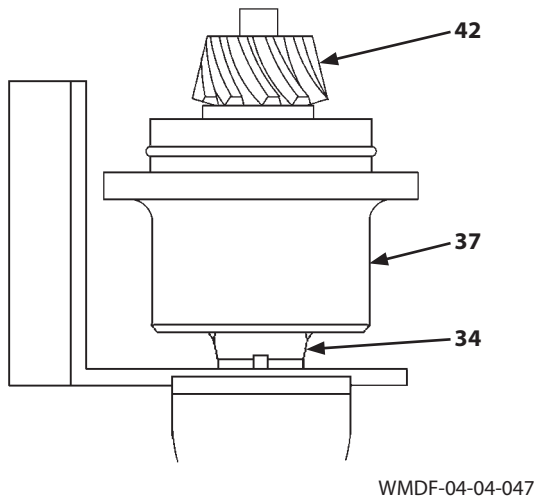
 : 363 N·m (37 kgf·m, 270 lbf·ft)



a- Vise

32. Install the housing (37) assembly to yoke (34).

 **NOTE:** When adjusting the rotation resistance of pinion (42), removal and installation of pinion (42) are required. Therefore, seal (54) should be installed after adjusting the rotation resistance of pinion (42).

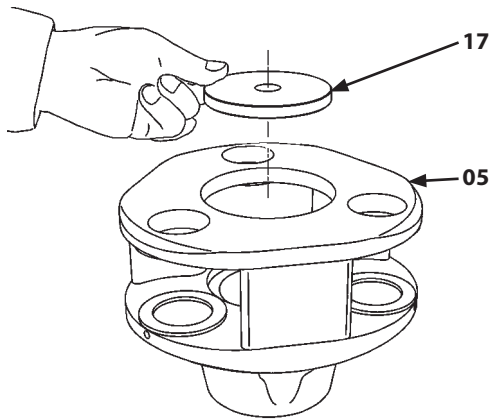


## SECTION 4 TRAVEL SYSTEM

### Group 4 Axle

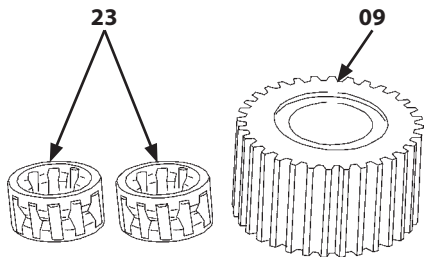
#### Assembly of Spider (05) Assembly

65. Install washer (17) to spider (05).



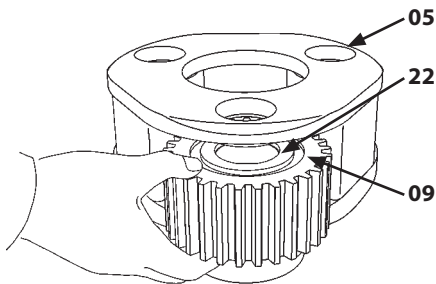
WMDF-04-04-066

66. Install needle cages (23) (2 used) to planetary gear (09).



WMDF-04-04-026

67. Install wear rings (22) (2 used) to the both sides of planetary gear (09). Install the planetary gear (09) assembly to spider (05).

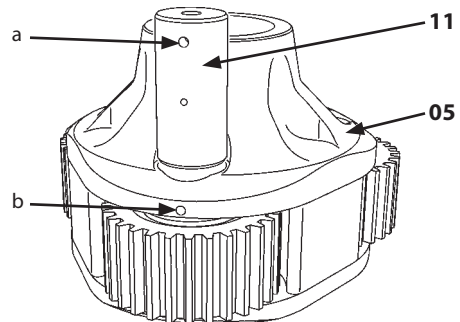


WMDF-04-04-057

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

**IMPORTANT:** Do not stick out spring pin (16) from spider (05) when installing.

68. Fit pin hole (a) of pin (11) to pin hole (b) of spider (05). Install pin (11) to spider (05). Install spring pin (16) to pin holes (a, b) by using the special tool (ST 1801) and a hammer.



WMDF-04-04-058

a- Pin Hole

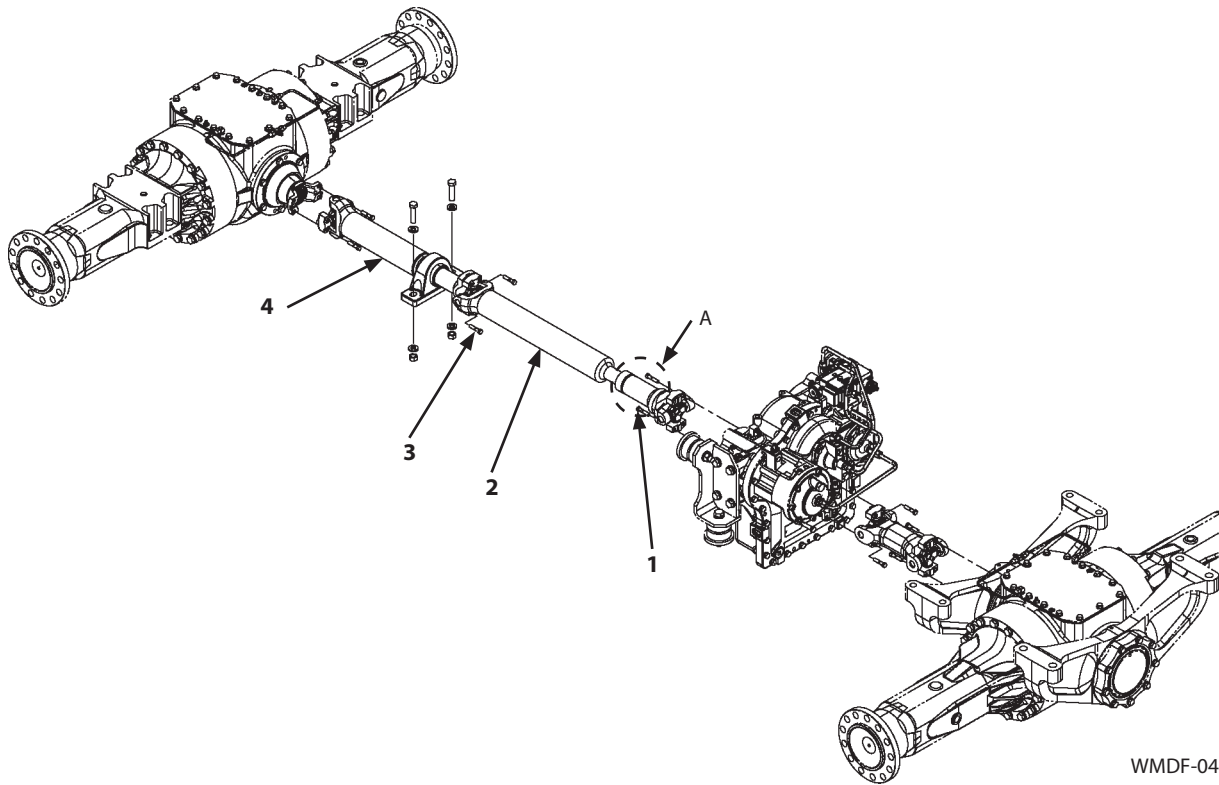
b- Pin Hole

69. Install other planetary gear (09) assemblies (2 used) in the same way as step 66 to step 68.

70. Assemble the spider (05) assembly at the opposite side in the same way as step 65 to step 69.


## SECTION 4 TRAVEL SYSTEM


### Group 5 Propeller Shaft



WMDF-04-04-002

9. Remove grease fitting (5).

 : 10 mm


 **NOTE:** Remove grease fitting (5) in order to drain grease.

 **CAUTION:** Remove propeller shaft (2) while holding it. Do not drop propeller shaft (2).

 **CAUTION:** The propeller shaft (2) assembly weight: 22 kg (49 lb)

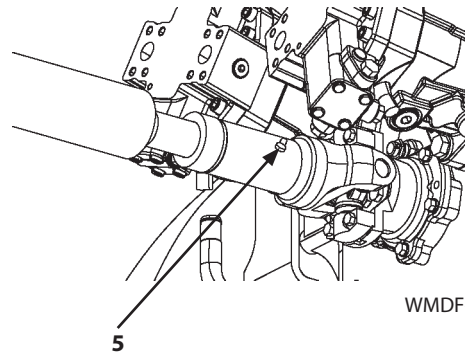
**IMPORTANT:** If removing propeller shaft (2) individually, the spline seal is damaged. Propeller shaft (2) should be removed as an assembly.

10. Set a stand and a jack under propeller shaft (2). Hold propeller shaft (2).
11. Put the matching marks at the mating part between propeller shaft (2) and propeller shaft (4).
12. Remove bolts (1) (4 used).

 : 17 mm


 **NOTE:** LOCTITE #262 has been applied on bolt (1).

Detail A



WMDF-04-04-003

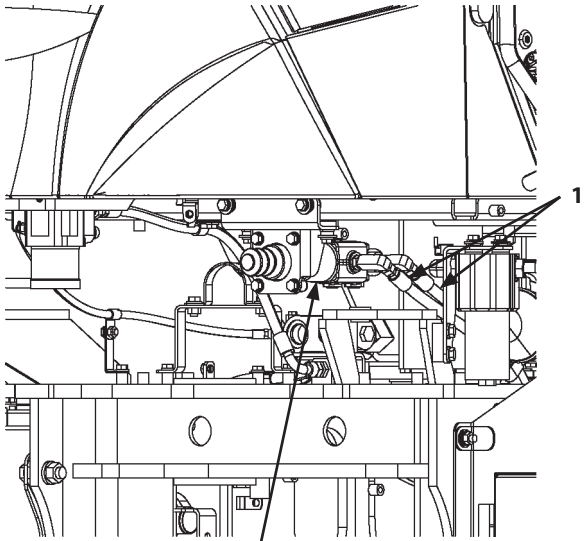
13. Remove bolts (3) (4 used). Remove propeller shaft (2).

 : 17 mm

 **NOTE:** LOCTITE #262 has been applied on bolt (3).

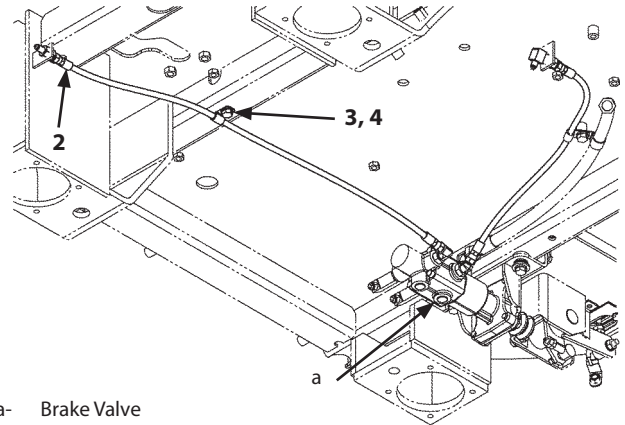
## SECTION 4 TRAVEL SYSTEM

### Group 6 Brake Valve



a- Brake Valve


WMDF-03-01-008




a- Brake Valve

WMDF-04-06-100


9. Disconnect hoses (1) (2 used).

 : 22 mm

10. Remove bolt, washer (3) and clip (4).

 : 17 mm

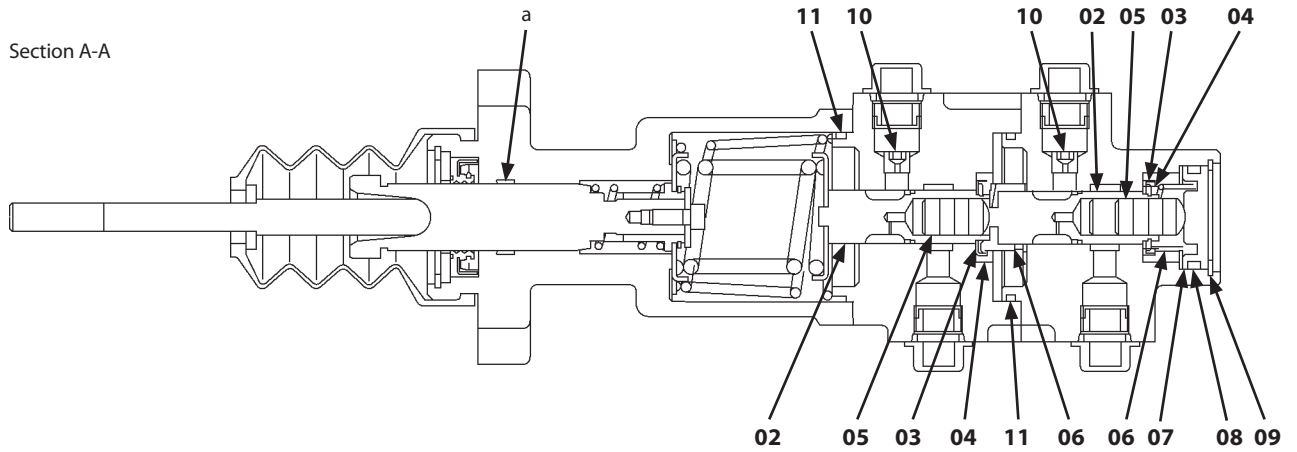
11. Disconnect hose (2).

 : 17 mm

# SECTION 4 TRAVEL SYSTEM

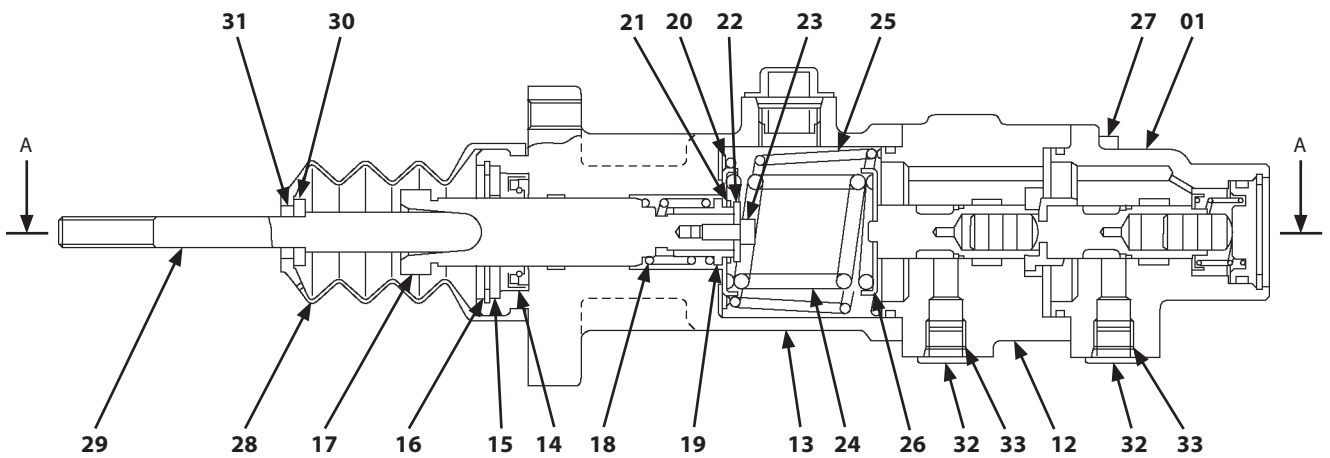
## Group 6 Brake Valve

### Assembly of Brake Valve



a- Lithium Grease Applying Position

WMDF-04-06-103



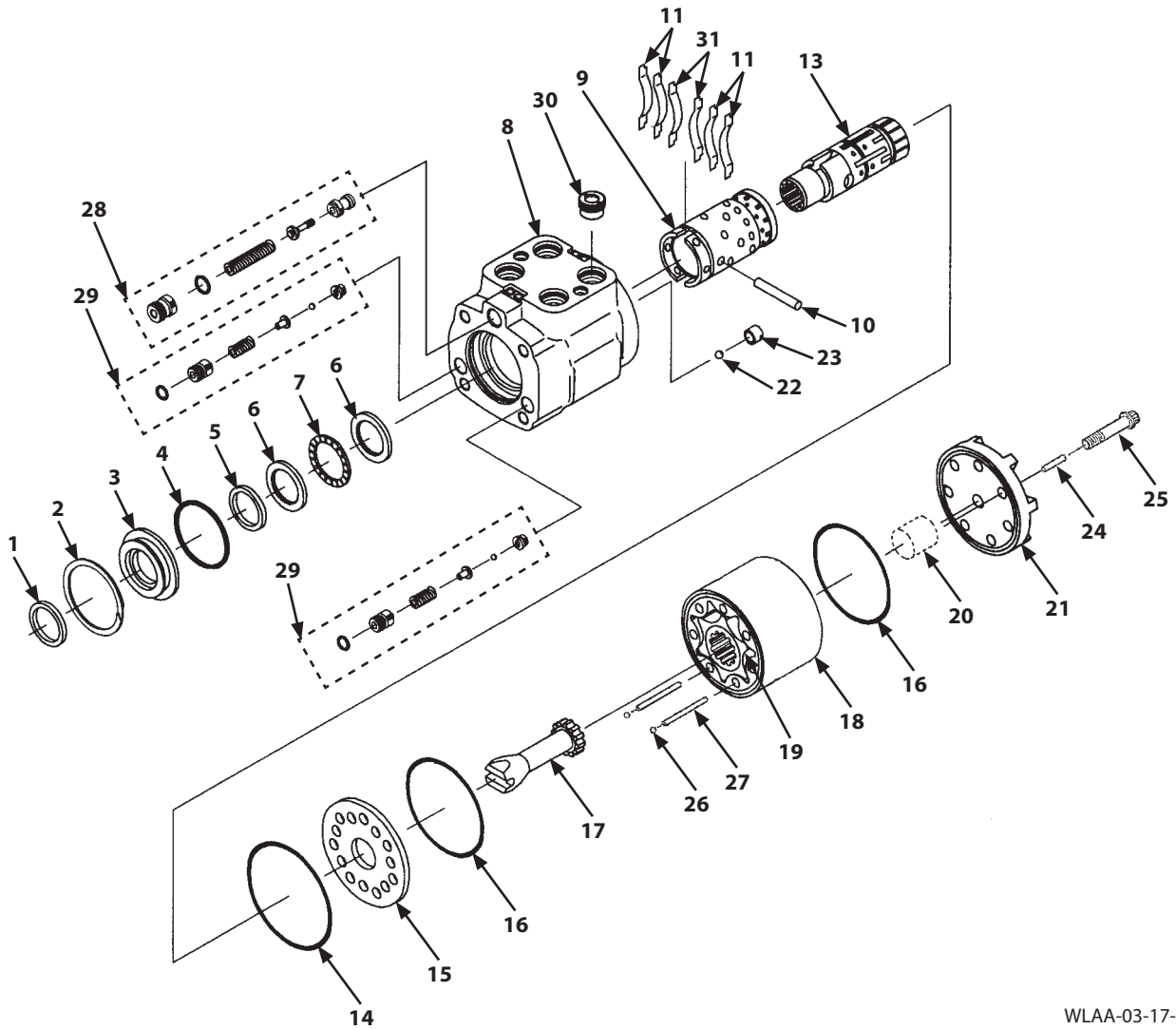
WMDF-04-06-104

- |                             |                      |                          |                     |
|-----------------------------|----------------------|--------------------------|---------------------|
| 01- Body                    | 10- Orifice (2 Used) | 19- Guide                | 28- Boot            |
| 02- Spool (2 Used)          | 11- O-Ring (2 Used)  | 20- Spring Seat          | 29- Push Rod        |
| 03- Spring Seat (2 Used)    | 12- Body             | 21- Retaining Ring       | 30- Washer          |
| 04- Retaining Ring (2 Used) | 13- Cover            | 22- End Plate            | 31- Retaining Ring  |
| 05- Plunger (2 Used)        | 14- Oil Seal         | 23- Socket Bolt          | 32- Plug (2 Used)   |
| 06- Spring (2 Used)         | 15- End Plate        | 24- Spring               | 33- O-Ring (2 Used) |
| 07- Plug                    | 16- Retaining Ring   | 25- Spring               |                     |
| 08- O-Ring                  | 17- Piston           | 26- Spring Seat          |                     |
| 09- Retaining Ring          | 18- Spring           | 27- Socket Bolt (4 Used) |                     |

# SECTION 4 TRAVEL SYSTEM

## Group 7 Steering Device

### Disassembly of Steering Valve

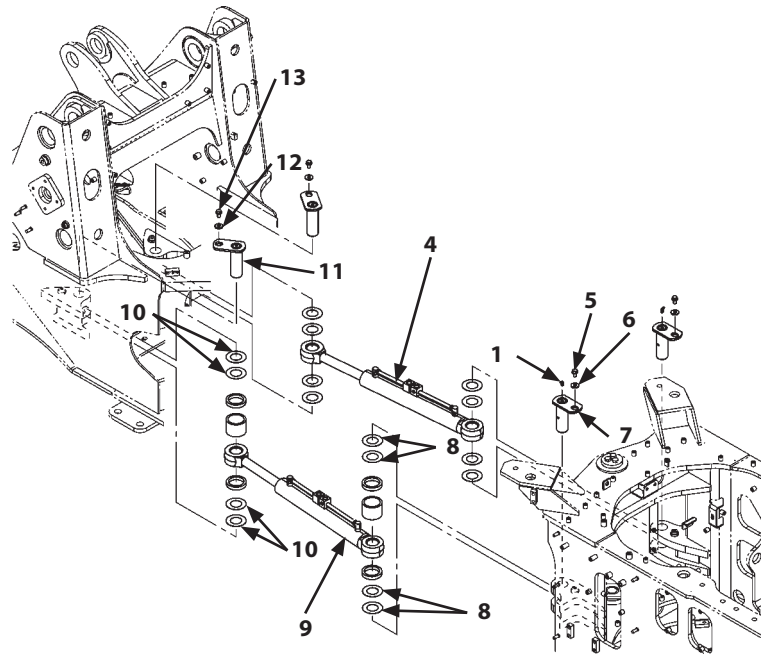


WLAA-03-17-001

- |                          |                               |                    |                                    |
|--------------------------|-------------------------------|--------------------|------------------------------------|
| 1- Dust Seal             | 9- Sleeve                     | 18- Gerotor Ring   | 26- Ball (2 Used)                  |
| 2- Retaining Ring        | 10- Pin                       | 19- Star           | 27- Spring Pin (2 Used)            |
| 3- Bushing               | 11- Centering Spring (4 Used) | 20- Spacer         | 28- Relief Valve                   |
| 4- O-Ring                | 13- Spool                     | 21- Cap            | 29- Overload Relief Valve (2 Used) |
| 5- Seal                  | 14- O-Ring                    | 22- Ball           | 30- Check Valve                    |
| 6- Bearing Race (2 Used) | 15- Plate                     | 23- Adapter Screw  | 31- Centering Spring (2 Used)      |
| 7- Thrust Needle         | 16- O-Ring (2 Used)           | 24- Spring Pin     |                                    |
| 8- Housing               | 17- Drive                     | 25- Screw (7 Used) |                                    |


## SECTION 4 TRAVEL SYSTEM

### Group 7 Steering Device




WMDF-04-07-106

10. Remove grease fitting (1).

 : 10 mm

11. Attach nylon slings onto steering cylinder (9). Hoist and hold steering cylinder (9).


12. Remove bolt, washer (5) and washer (6).

 : 19 mm

**⚠ CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.**

13. Remove pin (7) and shim (8) by using a bar and a hammer.

14. Remove bolt, washer (13) and washer (12).

 : 19 mm

**⚠ CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.**

15. Remove pin (11) and shim (10) by using a bar and a hammer.

16. Remove steering cylinder (9).

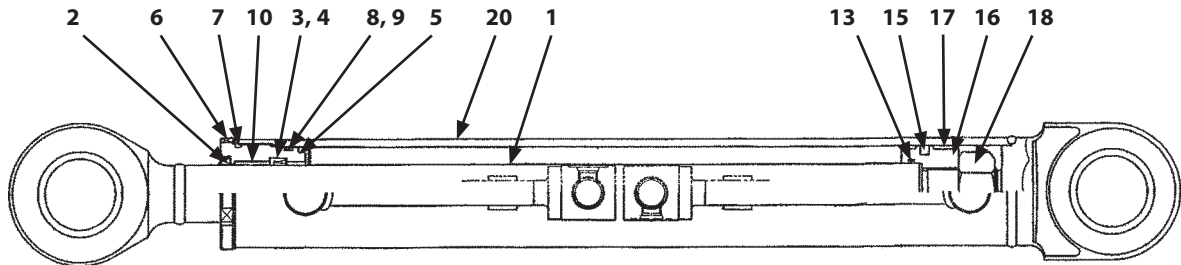
17. Remove the adapters with steering cylinder (9) attached if necessary.

18. Remove another steering cylinder (4) in the same way as step 10 to step 17.

## SECTION 4 TRAVEL SYSTEM

### Group 7 Steering Device

#### Assembly of Steering Cylinder

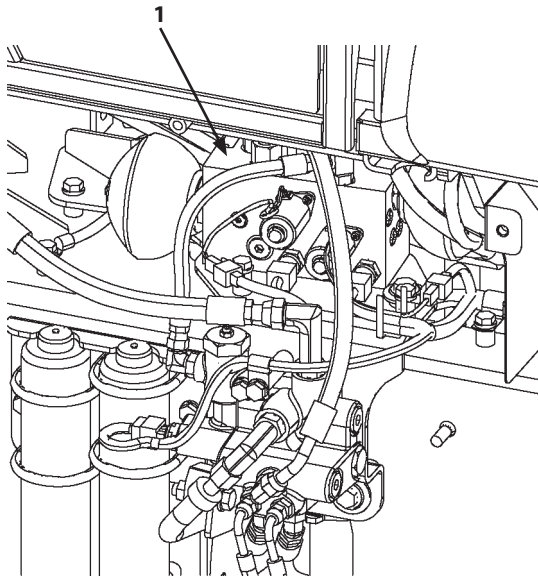


WMDF-04-07-101

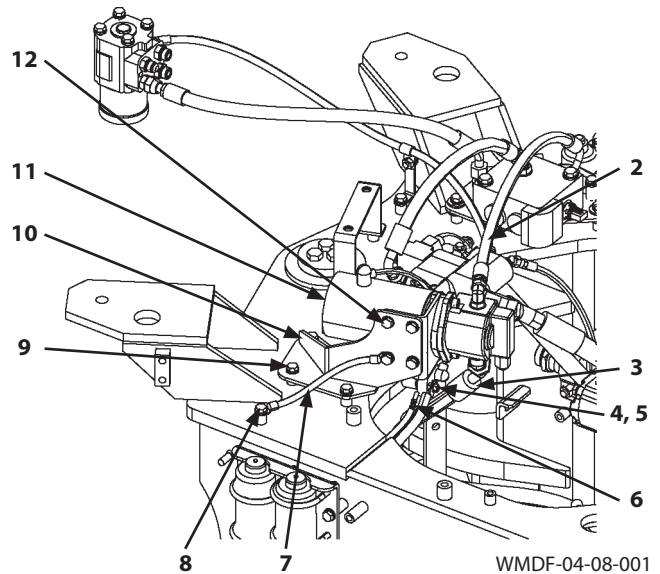
- |                 |                  |                |                   |
|-----------------|------------------|----------------|-------------------|
| 1- Cylinder Rod | 5- Cylinder Head | 9- Backup Ring | 16- Piston        |
| 2- Dust Seal    | 6- Washer        | 10- Bushing    | 17- Wear Ring     |
| 3- U-Ring       | 7- O-Ring        | 13- O-Ring     | 18- Nut           |
| 4- Backup Ring  | 8- O-Ring        | 15- Seal Ring  | 20- Cylinder Tube |

## SECTION 4 TRAVEL SYSTEM





### Group 8 Emergency Steering Device





WMDF-03-12-001



WMDF-04-08-001

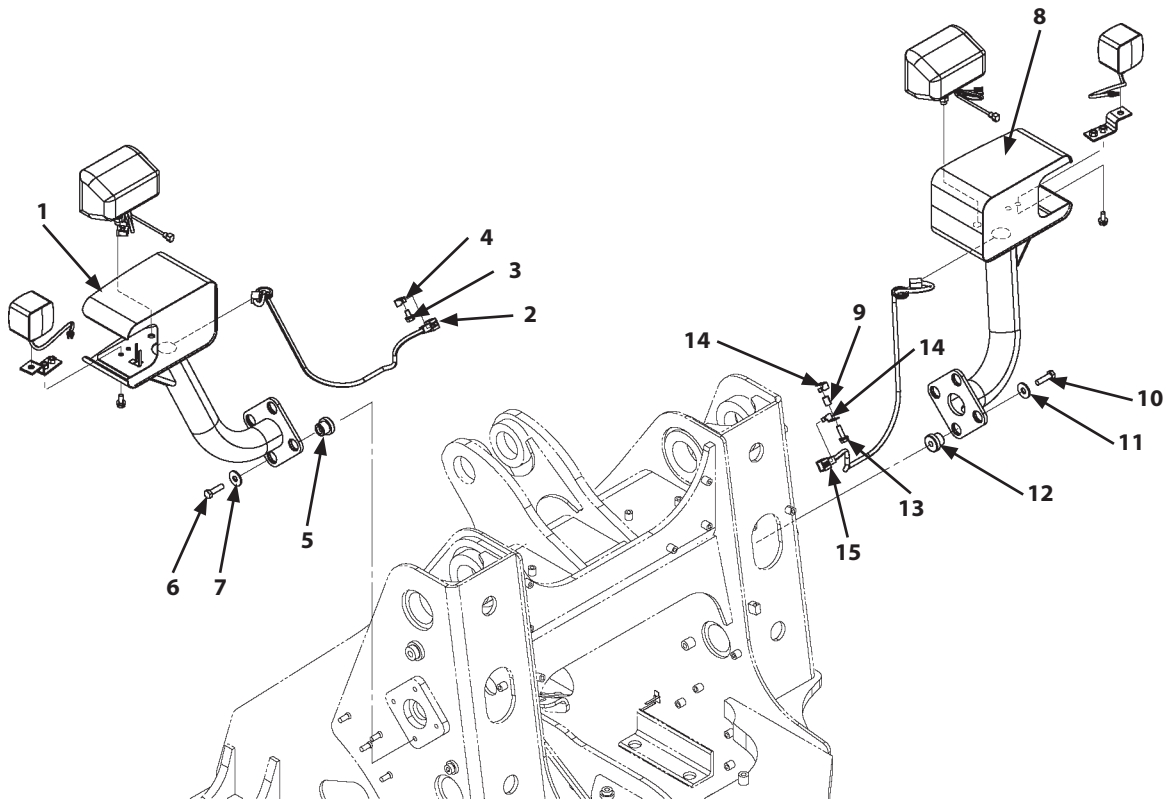
8. Remove the manifold valve (1) assembly. (Refer to W3-12-1.)
9. Remove bolt, washer (8). Disconnect ground (7).  
 : 17 mm
10. Remove nut (4). Disconnect terminal (5).  
 : 12 mm
11. Disconnect connector (6).
12. Disconnect hose (3).  
 : 36 mm
13. Disconnect hose (2).  
 : 22 mm

14. Remove bolts, washers (9) (3 used). Remove the emergency steering pump (11) assembly.  
 : 17 mm
15. Remove bolts, washers (12) (4 used) and ground (7). Remove emergency steering pump (11) from bracket (10).  
 : 17 mm
16. Remove the adapters with emergency steering pump (11) attached if necessary.

## SECTION 5 FRONT ATTACHMENT

### Group 1 Front Attachment

#### Removal and Installation of Front Attachment




WMDF-05-01-100

**IMPORTANT:** The hose and pipe contain hydraulic oil. When removing the hose and pipe, receive oils with a container in order to avoid spilling oils.

**IMPORTANT:** Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.


#### Removal

1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)
2. Remove bolt, washer (3) and bracket (4).


 : 17 mm

3. Disconnect connector (2).

4. Remove bolts (6) (4 used) and washers (7) (4 used). Remove the head light (1) assembly and rubber cushions (5) (4 used).


 : 19 mm

5. Remove bolt, washer (13), brackets (14) (2 used) and tube (9).

 : 17 mm

6. Disconnect connector (15).

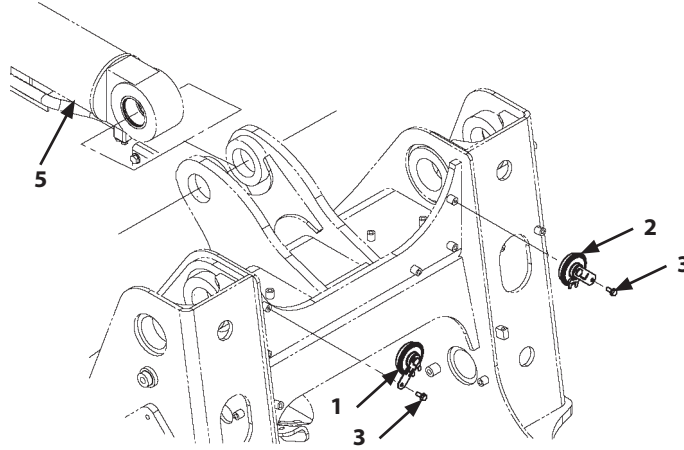
7. Remove bolts (10) (4 used) and washers (11) (4 used). Remove the head light (8) assembly and rubber cushions (12) (4 used).

 : 19 mm

## SECTION 5 FRONT ATTACHMENT

### Group 1 Front Attachment


---




WMDF-05-01-102

16. Install bucket cylinder (5). (Refer to W5-2-2.)

17. Install horn (2) with bolt, washer (3).

 : 13 mm

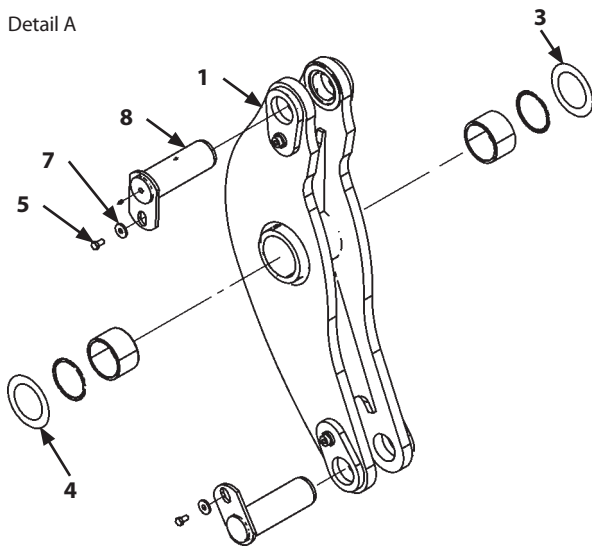
 : 10 N·m (1 kgf·m, 7.4 lbf·ft)

18. Install another horn (1) in the same way as step 17.

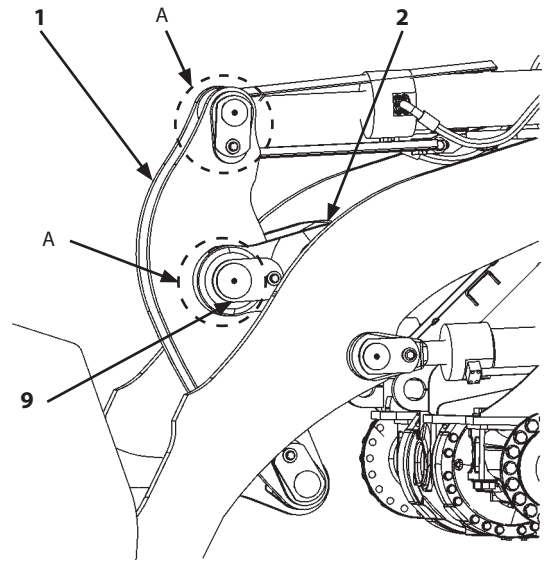
## SECTION 5 FRONT ATTACHMENT

### Group 1 Front Attachment

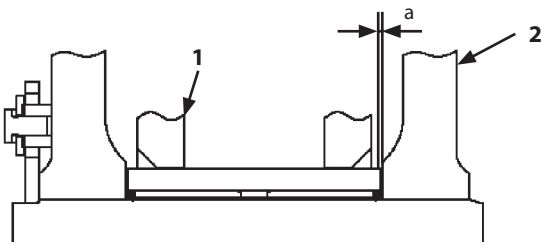
Detail A



WMDF-05-01-103



WNEC-05-01-016





WNEC-05-01-021

a- Clearance

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

1. Install pin (8) to bell crank (1) by using a hammer. Install washer (7) and bolt, washer (5).

 : 19 mm

 : 90 N·m (9 kgf·m, 66 lbf·ft)


**CAUTION:** Bell crank (1) weight: 150 kg (335 lbf-ft)


2. Attach nylon slings onto pin (8) which has been installed in step 2. Hoist and hold bell crank (1). Fit bell crank (1) mounting holes to lift arm (2).

**CAUTION:** Pin (9) weight: 21 kg (47 lb)

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

3. Fit spacer (3) and shim (4) to bell crank (1) mounting holes so that clearance (a) is adjusted within 1.5 mm (0.059 in). Install pin (9) to lift arm (2) by using a hammer.

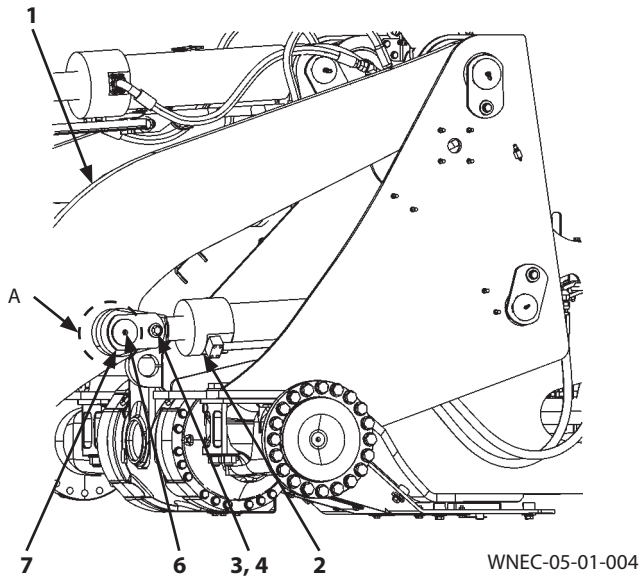
 **NOTE:** Fit at least one spacer (3) or shim (4) to the both side of bell crank (1) mounting hole.

 **NOTE:** Thickness of spacer (3): 2.3 mm (0.091 in), thickness of shim (4): 1.6 mm (0.063 in)

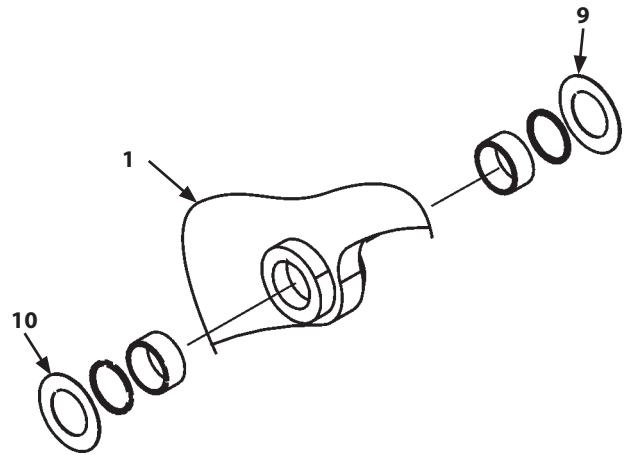
## SECTION 5 FRONT ATTACHMENT

### Group 2 Cylinder

#### Removal and Installation of Lift Arm Cylinder



Detail A



WMDF-05-02-115

**IMPORTANT:** The hose and pipe contain hydraulic oil. When removing the hose and pipe, receive oils with a container in order to avoid spilling oils.


**IMPORTANT:** 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. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

#### Removal

1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)
2. Start the engine. Raise lift arm (1). Set lift arm cylinder (2) in the horizontal position. Operate the bucket cylinder. Dump and place the bucket on wooden blocks. Stop the engine.


**CAUTION:** Lift arm cylinder (2) weight: 120 kg (265 lb)

3. Attach nylon slings onto lift arm cylinder (2). Hoist and hold lift arm cylinder (2).
4. Remove grease fitting (6).

 : 10 mm

**CAUTION:** Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

5. Remove bolt, washer (3) and washer (4). Remove pin (7) from lift arm cylinder (2) by using a round bar and a hammer.

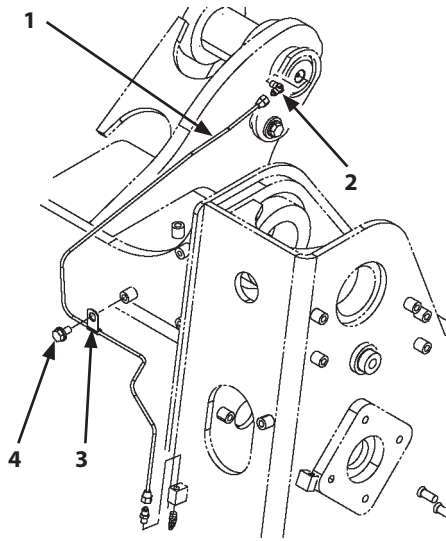
 : 19 mm

6. Remove spacer (9) and shim (10) from lift arm (1).
7. Remove another lift arm cylinder (2) from lift arm (1) in the same way as step 3 to step 6.
8. Start the engine. Retract lift arm cylinders (2) in the right and left sides. Remove lift arm cylinders (2) in the right and left sides from lift arm (1).
9. Stop the engine. In order not to extend the rod, pass the wires through the rod hole of lift arm cylinders (2) in the right and left sides and secure the rod to the cylinder tube.

## SECTION 5 FRONT ATTACHMENT


### Group 2 Cylinder

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WMDF-05-02-103


7. Remove bolt, washer (4) and clip (3).

 : 17 mm

8. Disconnect the both ends of pipe (1).

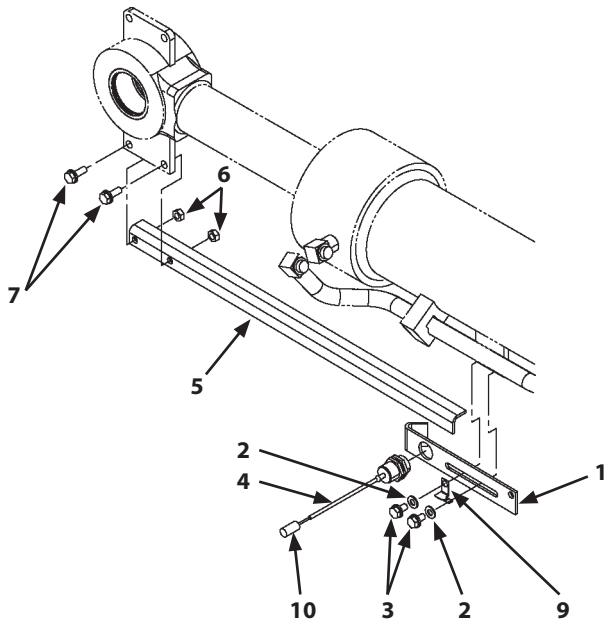
 : 17 mm

9. Remove elbow (2).

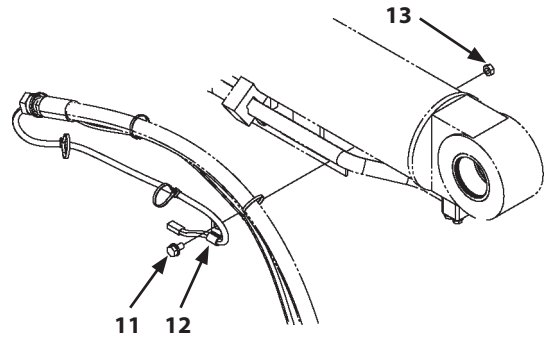
 : 12 mm

## SECTION 5 FRONT ATTACHMENT

### Group 2 Cylinder




WMDF-05-02-102




WMDF-05-02-108


13. Temporary tighten the proximity switch (4) assembly and brackets (1, 9) with washers (2) (2 used) and bolts, washers (3) (2 used).

 : 17 mm


14. Connect connector (10).


15. Install clip (12) with bolt, washer (11) and nut (13).

 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

16. Install bracket (5) with nuts (6) (2 used) and bolts, washers (7) (2 used).

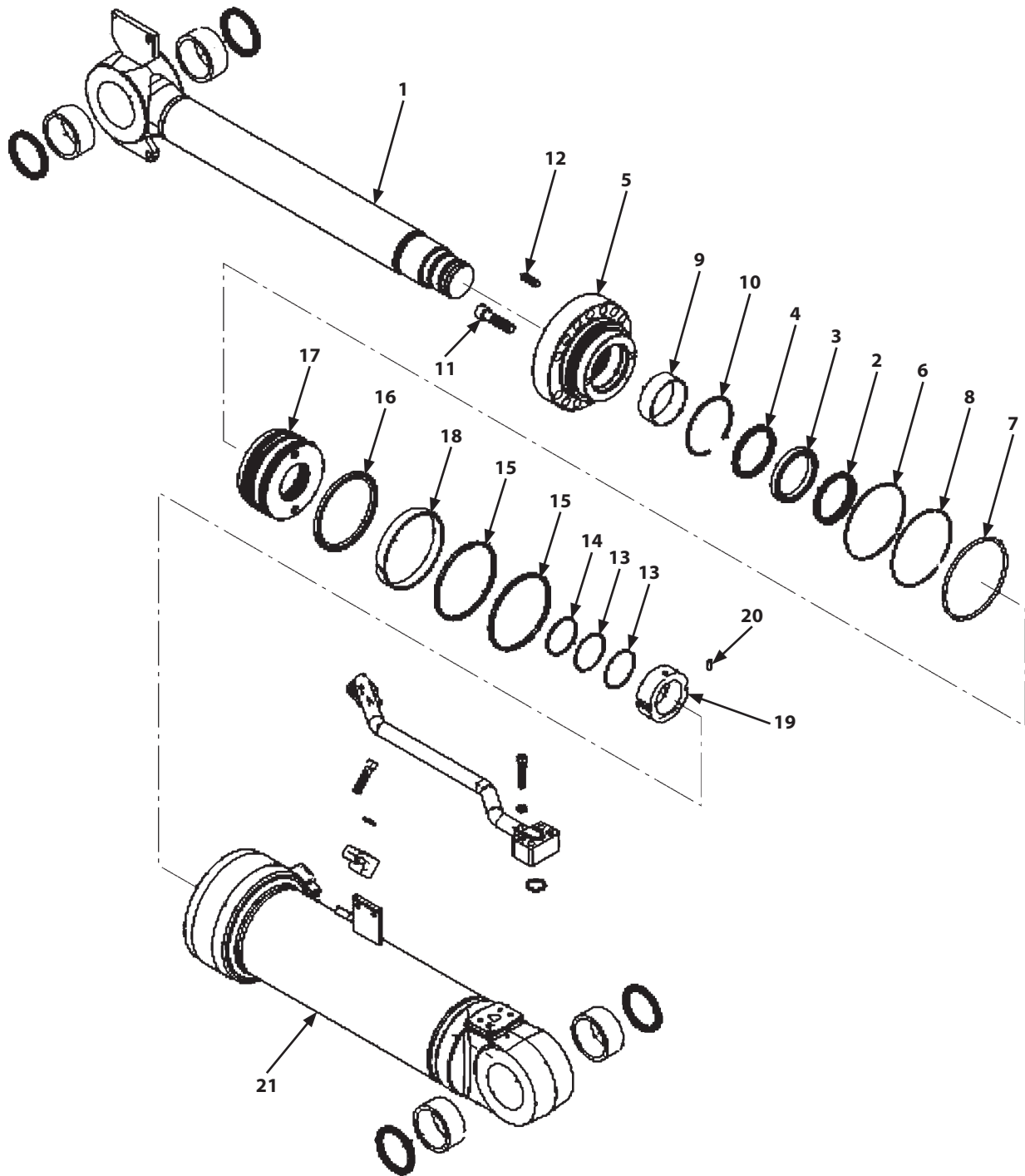
 : 17 mm

 : 50 N·m (5 kgf·m, 37 lbf·ft)

# SECTION 5 FRONT ATTACHMENT

## Group 2 Cylinder

### Disassembly of Bucket Cylinder



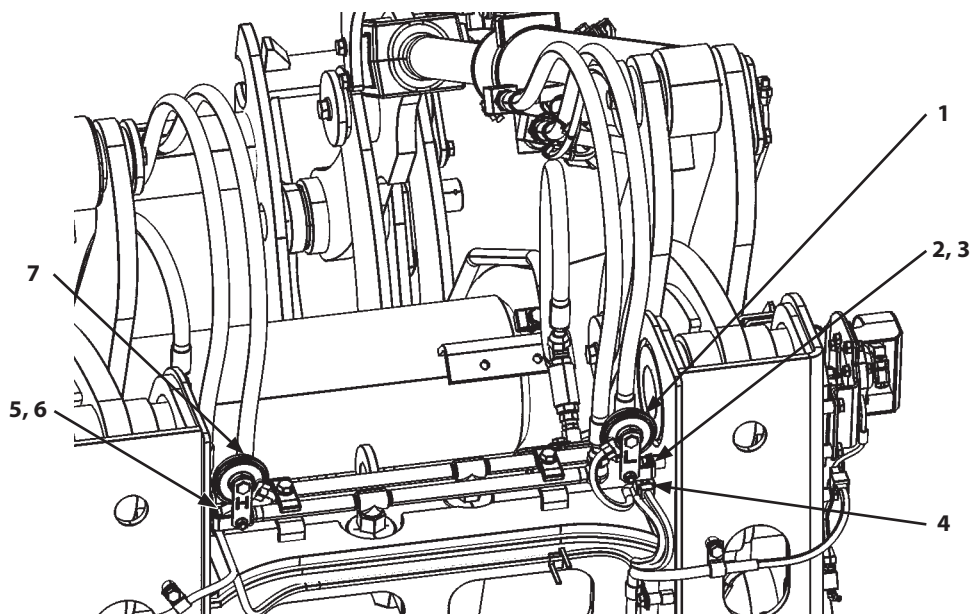
- |                  |                           |                          |                   |
|------------------|---------------------------|--------------------------|-------------------|
| 1- Cylinder Rod  | 7- O-Ring                 | 13- Backup Ring (2 Used) | 19- Nut           |
| 2- Dust Seal     | 8- Backup Ring            | 14- O-Ring               | 20- Set Screw     |
| 3- U-Ring        | 9- Bushing                | 15- Dust Seal (2 Used)   | 21- Cylinder Tube |
| 4- Buffer Ring   | 10- Retaining Ring        | 16- Seal Ring            |                   |
| 5- Cylinder Head | 11- Socket Bolt (14 Used) | 17- Piston               |                   |
| 6- O-Ring        | 12- Screw                 | 18- Wear Ring            |                   |

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## SECTION 5 FRONT ATTACHMENT


### Group 3 Front Attachment (Parallel Link)

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WPDF-05-03-008

9. Remove bolt, washer (5) and bracket (6). Remove and place the horn (7) assembly outside of the work area.

 : 17 mm

10. Disconnect connector (4).

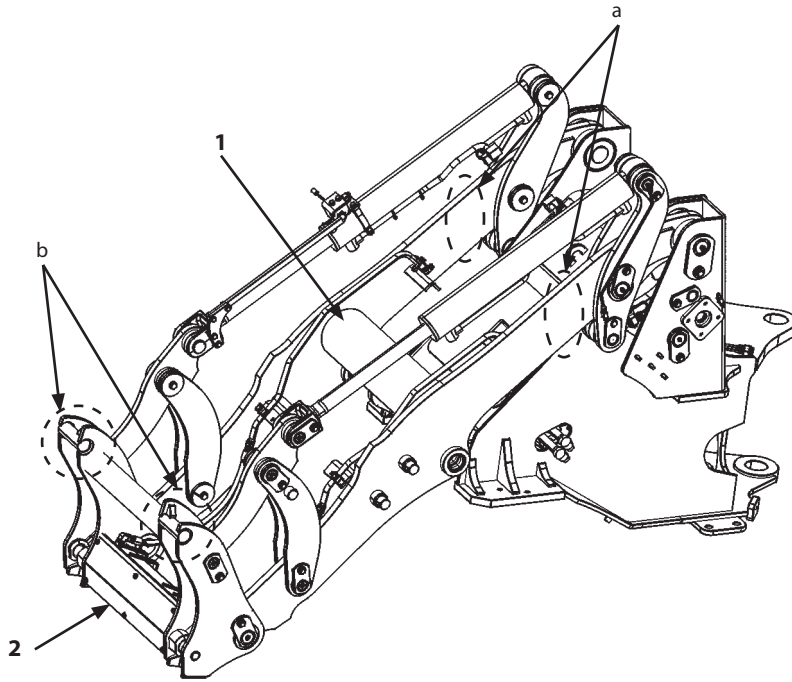
11. Remove bolt, washer (2) and bracket (3). Remove and place the horn (1) assembly outside of the work area.

 : 17 mm

## SECTION 5 FRONT ATTACHMENT

### Group 3 Front Attachment (Parallel Link)

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WNUF-05-03-013

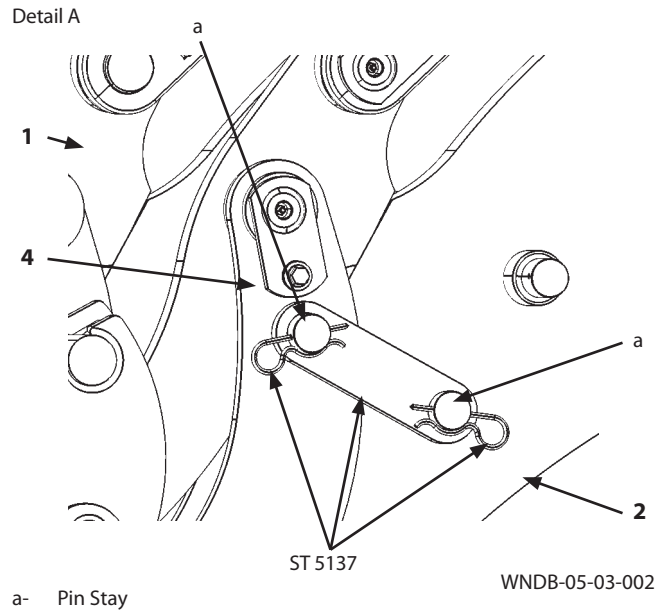
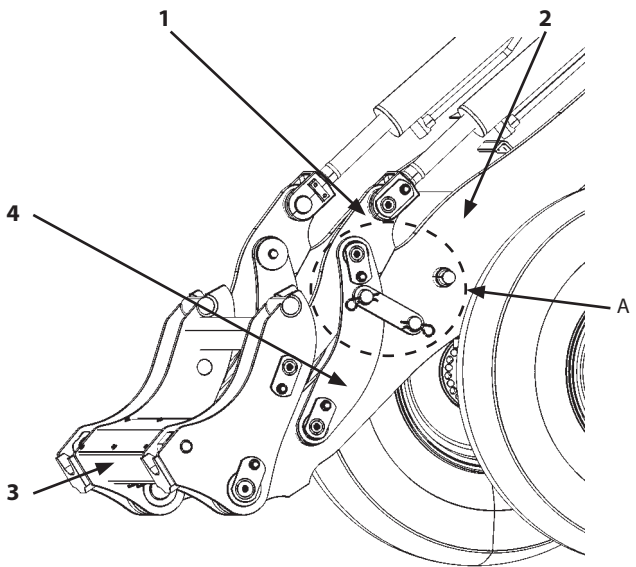
**⚠ CAUTION:** The front attachment assembly weight: 1520 kg (3360 lb)

1. Attach nylon slings onto parts (a) (2 places) of lift arm (1) and parts (b) (2 places) of quick coupler (2). Hoist the front attachment assembly.

## SECTION 5 FRONT ATTACHMENT

### Group 3 Front Attachment (Parallel Link)

#### Removal and Installation of Quick Coupler



**IMPORTANT:** The hoses and pipes contain hydraulic oil. When removing the hoses and pipes, receive oil with a container in order to avoid spilling oil.

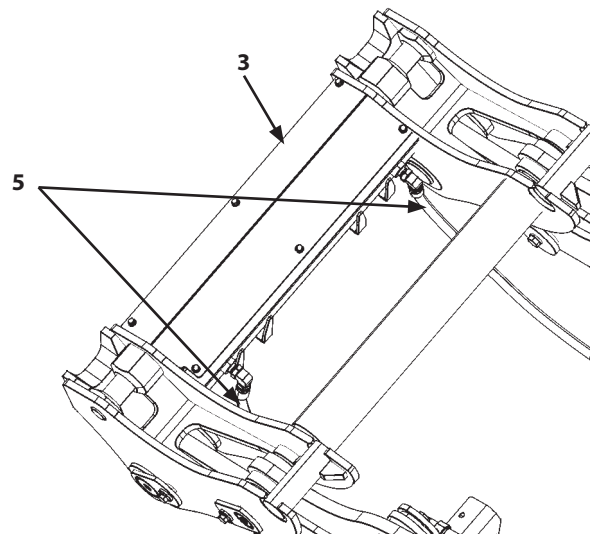
**IMPORTANT:** Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags onto the connectors, hoses, and pipes for assembling. If the clips which secure the hoses have been removed, install the clips after connecting the hoses.

#### Removal

1. Start the engine.
2. Operate quick coupler (3). Remove the bucket. (Refer to Operator's Manual.)
3. Lower the lift arm (2) to the lowest position. Set quick coupler (3) to the maximum-backward-tilting position.

**⚠ CAUTION:** When doing the work without securing bucket link (1), bucket link (1) may move and serious hazard may occur.

4. Install special tool (ST 5137) to pin stays (a) of guide (4) and lift arm (2) in one side. Secure bucket link (1).



5. Secure other bucket link (1) in the same way as step 4.
6. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)

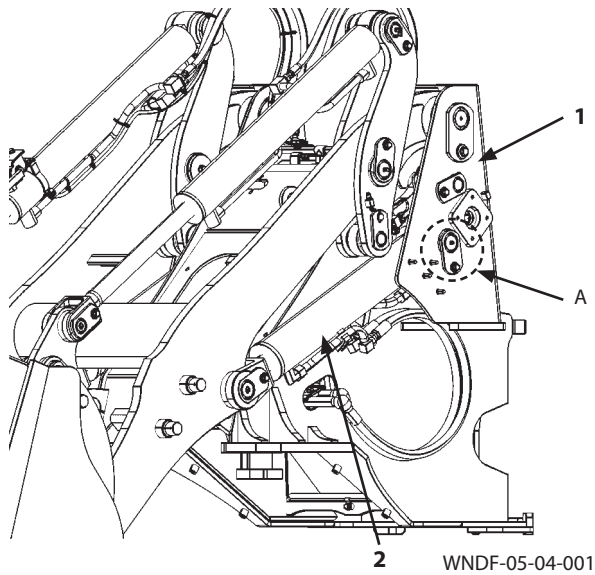
**⚠ CAUTION:** Bleed air (release pressure) from the hydraulic oil tank. (Refer to W1-4-1.)

7. Disconnect hoses (5) (2 used).

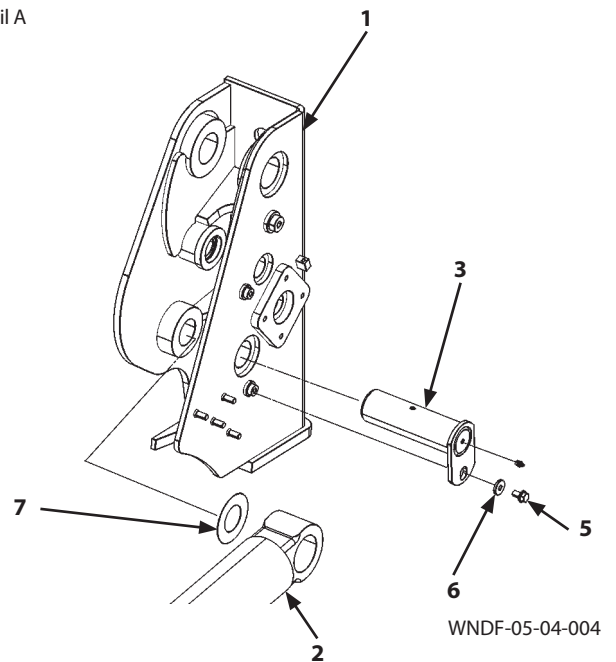
: 27 mm

## SECTION 5 FRONT ATTACHMENT

### Group 4 Cylinder (Parallel Link)




Detail A



12. Attach nylon slings onto lift arm cylinder (2). Hoist and hold lift arm cylinder (2).

**⚠ CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.**

13. Remove bolt, washer (5) and washer (6). Remove pin (3) from front frame (1) by using a round bar and a hammer.

 : 19 mm

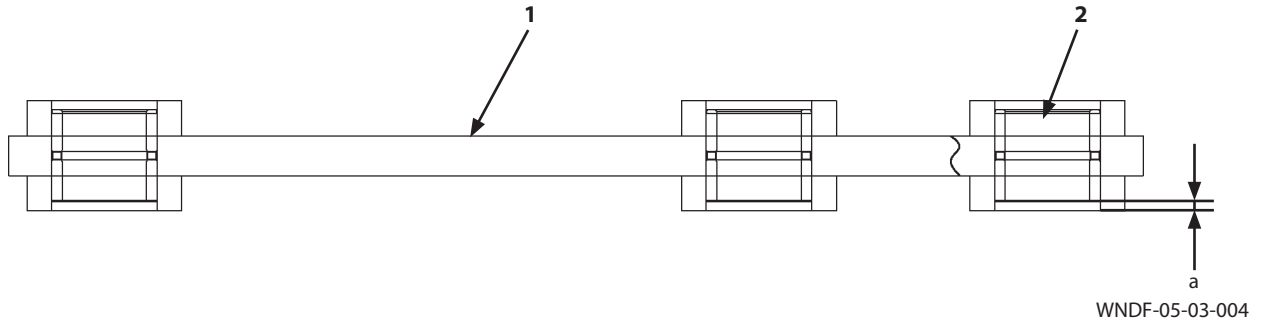
14. Remove spacer (7).

15. Remove lift arm cylinder (2) from front frame (1).
16. Remove another lift arm cylinder (2) in the same way as step 12 to step 15.

## SECTION 5 FRONT ATTACHMENT

### Group 4 Cylinder (Parallel Link)

#### Position to Install (Bucket Link)



- 1- Bucket Link (2 Used)      a- 5.5 mm (0.22 in)  
2- Bushing (2 Used)

#### Installation

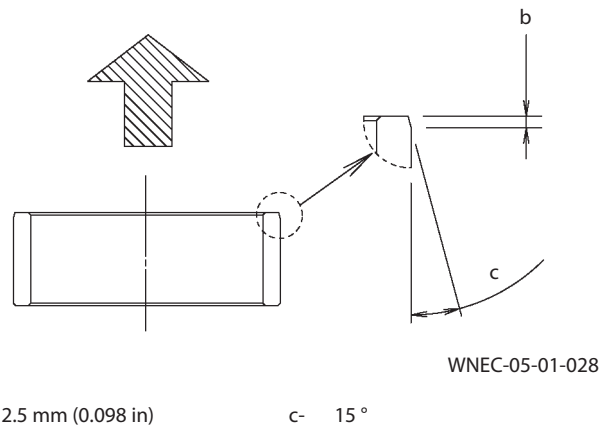
**IMPORTANT:** Check outer diameter, inner diameter, wear, and damage of all pins and bushings before installation. Replace them if there are some defects. (Refer to W2-4-1.)

**IMPORTANT:** Apply grease to the inner circumference of bushings and dust seals when installing the pin. In addition, apply anti-rust oil to the inner circumference of the boss.

**IMPORTANT:** Refer to the illustration when installing the bushing of bucket link.

**IMPORTANT:** For handling of HN bushing for the front attachment, check the followings.

#### Direction to Install (Bucket Link)



- b- 2.5 mm (0.098 in)      c- 15°

Precautions when installing the bushing

If a hammer is used to install the bushing, the bushing may be damaged. Use a press for installing bushing. Install the dust seal after installing the bushing.

Special tool when installing the bushing (bushing inner diameter)

(ST 7365, ST 8081): 60 mm

(ST 7692, ST 7859, ST 8084): 75 mm

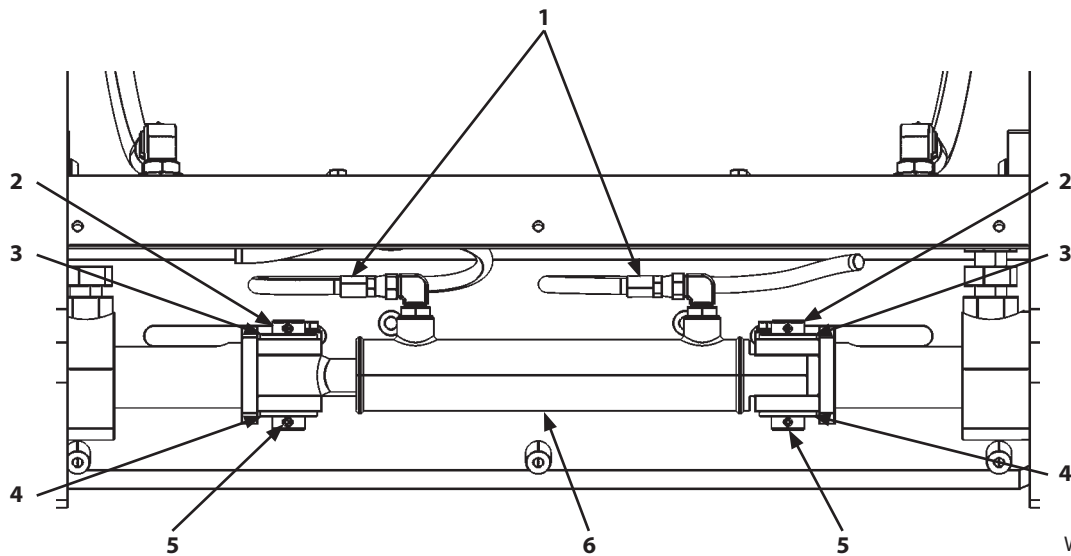
(ST 7691): 85 mm

Precautions when reinforcing the bucket link

The heat when welding in order to reinforce the bucket link may cause oil leakage and decrease lubrication performance. When lubrication oil leaks, replace the bushing.


## SECTION 5 FRONT ATTACHMENT


### Group 4 Cylinder (Parallel Link)



#### Installation

1. Install all removed adapters to quick coupler cylinder (6).
2. Install quick coupler cylinder (6) with washers (3) (2 used) and pins (2) (2 used).
3. Install washers (4) (2 used) and pins (5) (2 used). Push pins (5) (2 used) in pins (2) (2 used) by using a plastic hammer.
4. Connect hoses (1) (2 used).

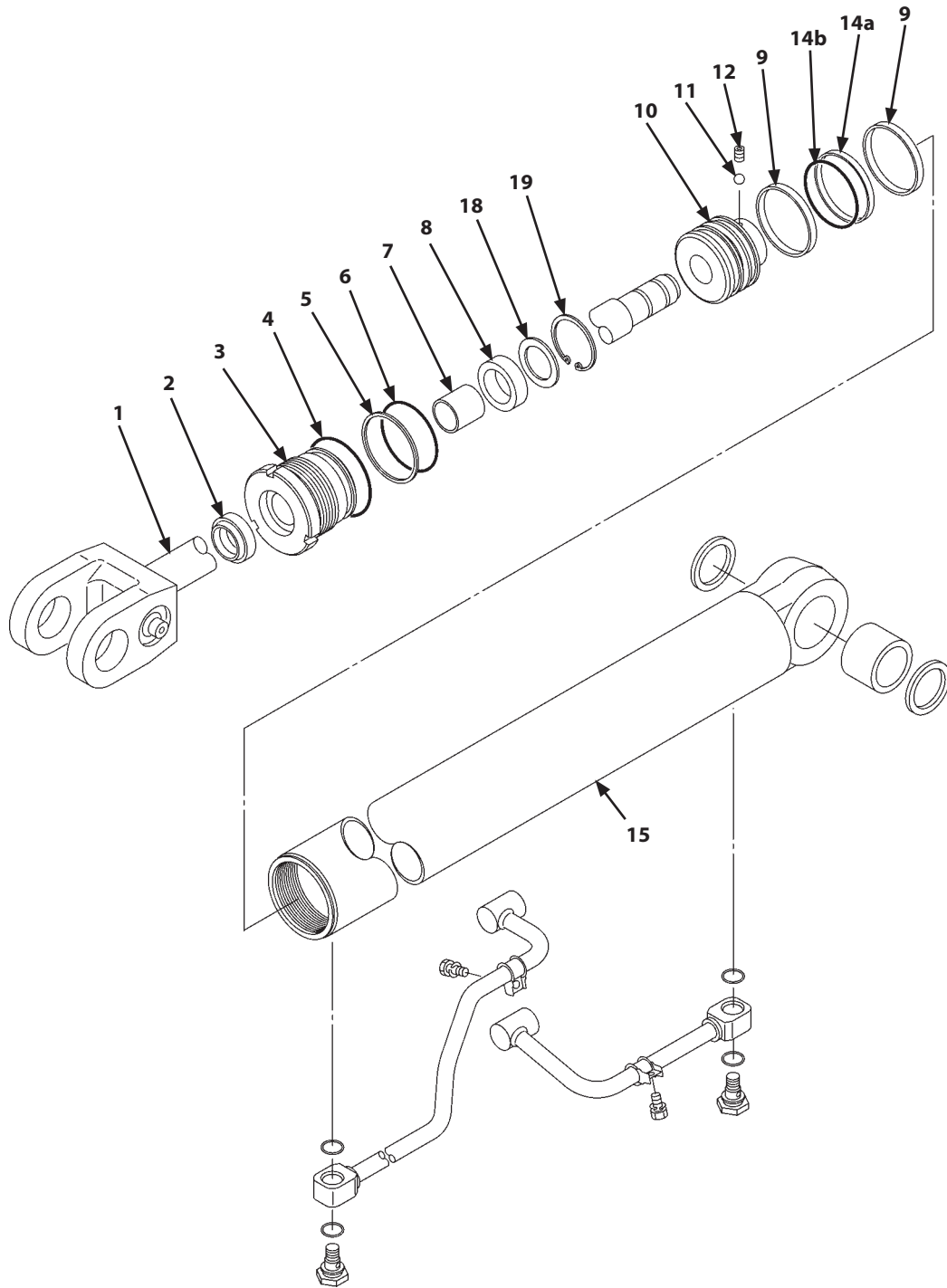
 : 19 mm

 : 30 N·m (3 kgf·m, 22 lbf·ft)

# SECTION 5 FRONT ATTACHMENT

## Group 4 Cylinder (Parallel Link)

### Disassembly of Bucket Cylinder



WPDF-05-04-101

- |                  |                        |                   |                    |
|------------------|------------------------|-------------------|--------------------|
| 1- Cylinder Rod  | 6- O-Ring              | 11- Steel Ball    | 18- Packing Head   |
| 2- Wiper Ring    | 7- Bushing             | 12- Set Screw     | 19- Retaining Ring |
| 3- Cylinder Head | 8- U-Ring              | 14a- Seal Ring    |                    |
| 4- O-Ring        | 9- Slide Ring (2 Used) | 14b- O-Ring       |                    |
| 5- Backup Ring   | 10- Piston             | 15- Cylinder Tube |                    |

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