1. REMOVAL AND INSTALL

1) BUCKET CYLINDER

(1) Removal

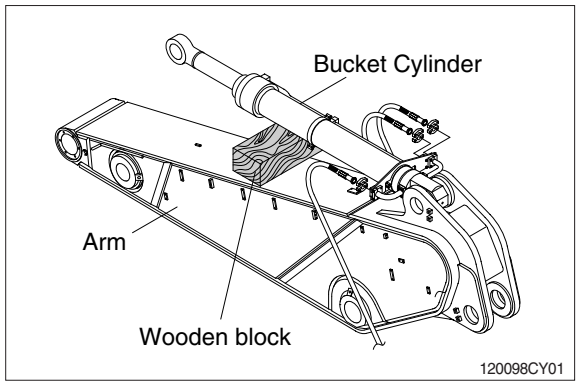
※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ **Loosen the breather slowly to release the pressure inside the hydraulic tank.**

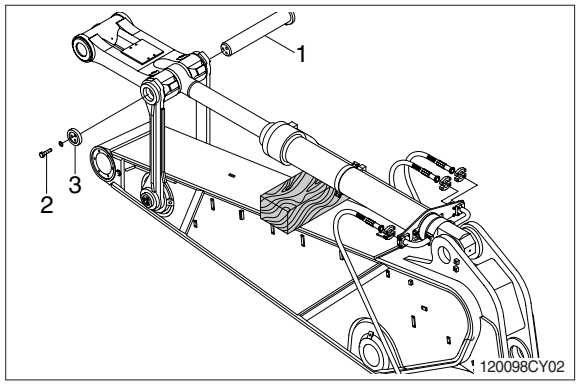
※ Escaping fluid under pressure can penetrate the skin causing serious injury.
Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Set block between bucket cylinder and arm.

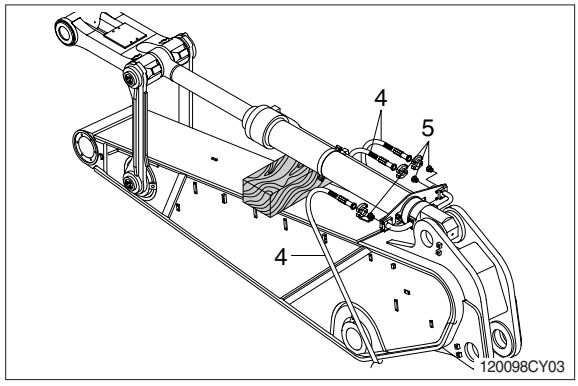


② Remove bolt (2), stopper (3) and pull out pin (1).

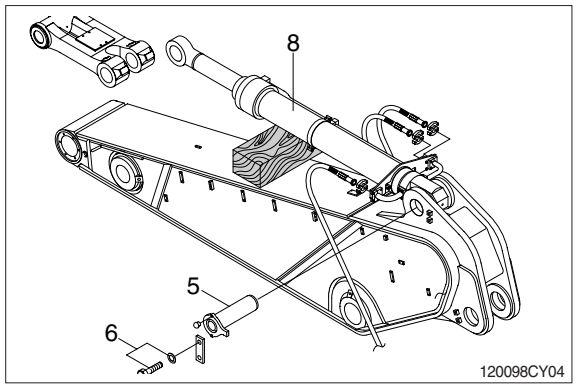
※ Tie the rod with wire to prevent it from coming out.



③ Disconnect bucket cylinder hoses (4) and put plugs (5) on cylinder pipe.



④ Sling bucket cylinder assembly (8) and remove bolt (6) then pull out pin (5).
⑤ Remove bucket cylinder assembly (8).
· Weight : 1050 kg (2310 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

※ Bleed the air from the bucket cylinder.

※ Confirm the hydraulic oil level and check the hydraulic oil leak or not.

2) ARM CYLINDER

(1) Removal

※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

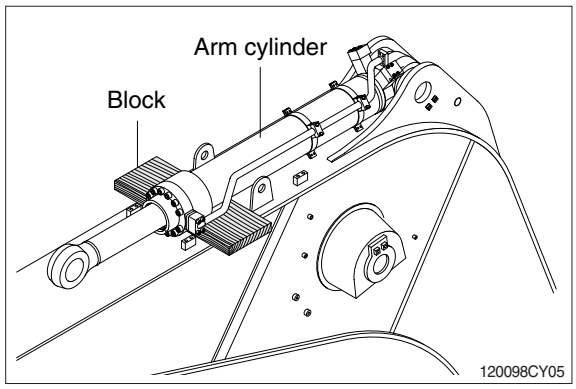
※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ Loosen the breather slowly to release the pressure inside the hydraulic tank.

※ Escaping fluid under pressure can penetrate the skin causing serious injury.

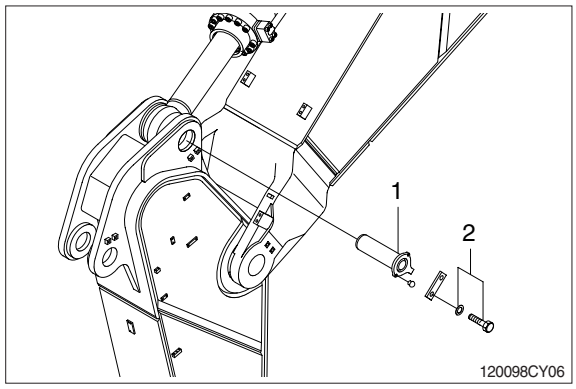
Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Set block between arm cylinder and boom.



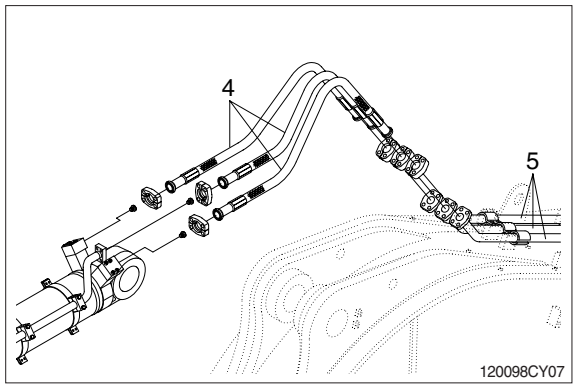
② Remove bolt (2) and pull out pin (1).

※ Tie the rod with wire to prevent it from coming out.

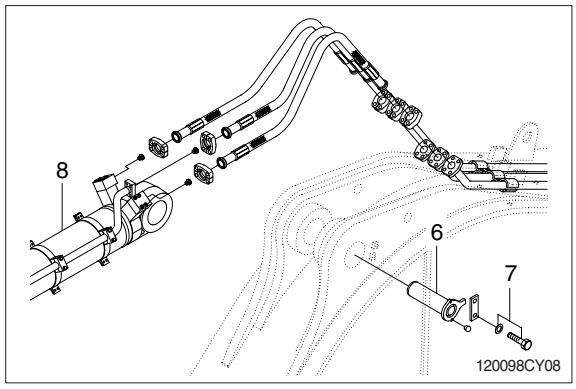


③ Disconnect arm cylinder hoses (4) and put plugs on cylinder pipe.

④ Disconnect greasing pipings (5).



⑤ Sling arm assembly (8) and remove bolt (7) then pull out pin (6).
⑥ Remove arm cylinder assembly (8).
· Weight : 1510 kg (3330 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

※ Bleed the air from the arm cylinder.

※ Confirm the hydraulic oil level and check the hydraulic oil leak or not.

3) BOOM CYLINDER

(1) Removal

※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

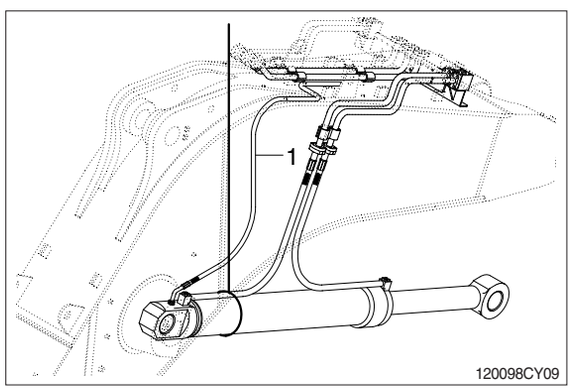
⚠ **Loosen the breather slowly to release the pressure inside the hydraulic tank.**

※ Escaping fluid under pressure can penetrate the skin causing serious injury.

Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

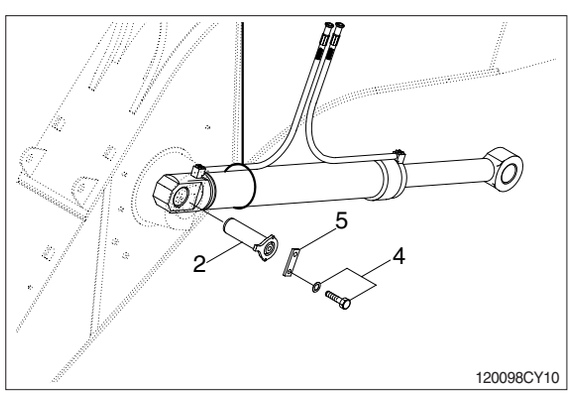
① Disconnect greasing hoses (1).

② Sling boom cylinder assembly.

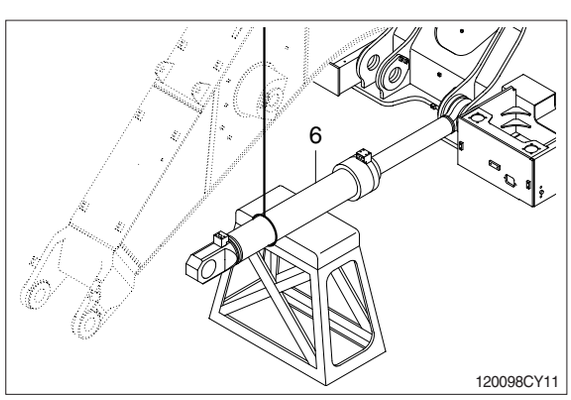


③ Remove bolt (4), pin plate (5) and pull out pin (2).

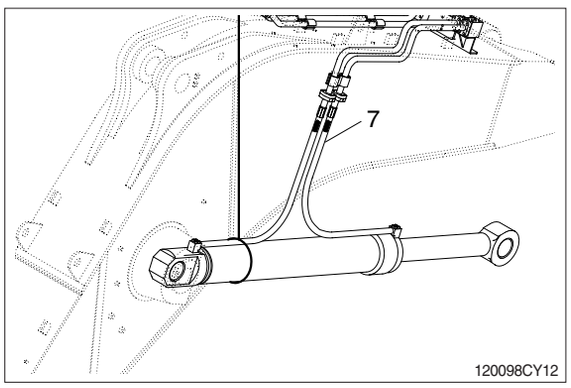
※ Tie the rod with wire to prevent it from coming out.



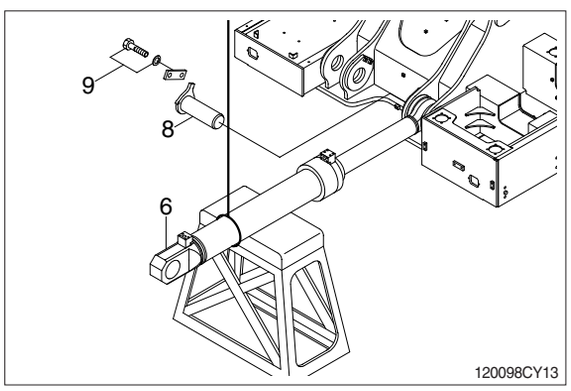
④ Lower the boom cylinder assembly (6) on a stand.



⑤ Disconnect boom cylinder hoses (7) and put plugs on cylinder pipe.



⑥ Remove bolt (9) and pull out pin (8).
⑦ Remove boom cylinder assembly (6).
· Weight : 1190 kg (2620 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

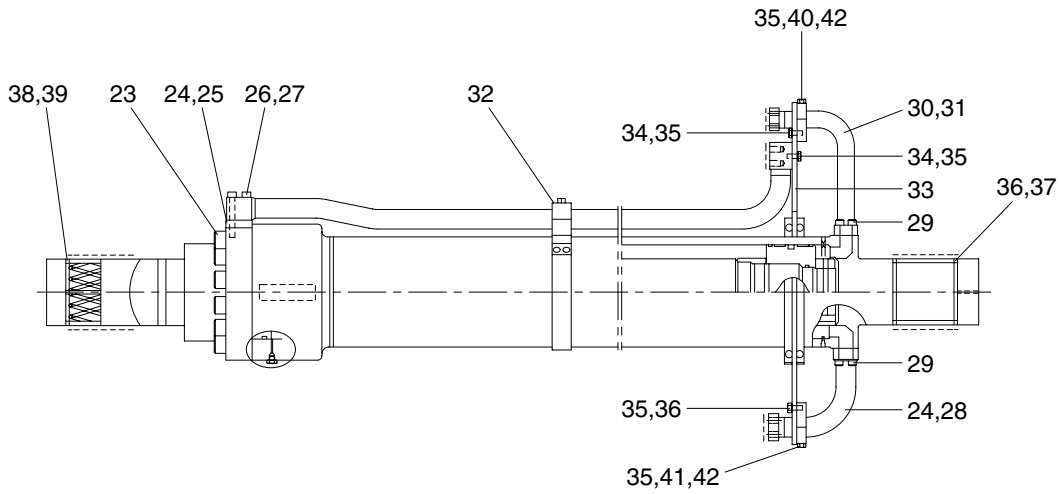
※ Bleed the air from the boom cylinder.

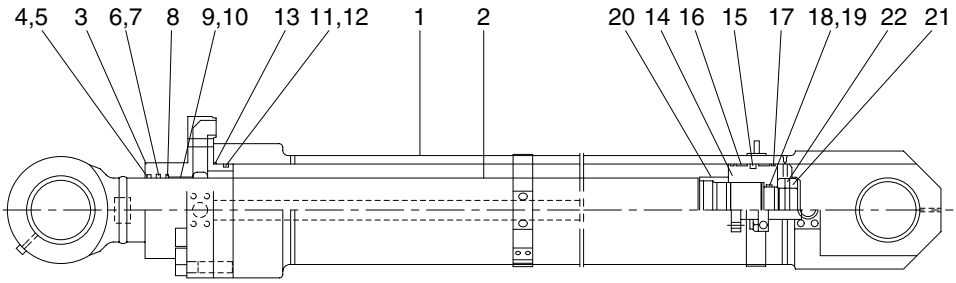
※ Conformed the hydraulic oil level and check the hydraulic oil leak or not.

2. DISASSEMBLY AND ASSEMBLY

1) STRUCTURE

(1) Bucket cylinder

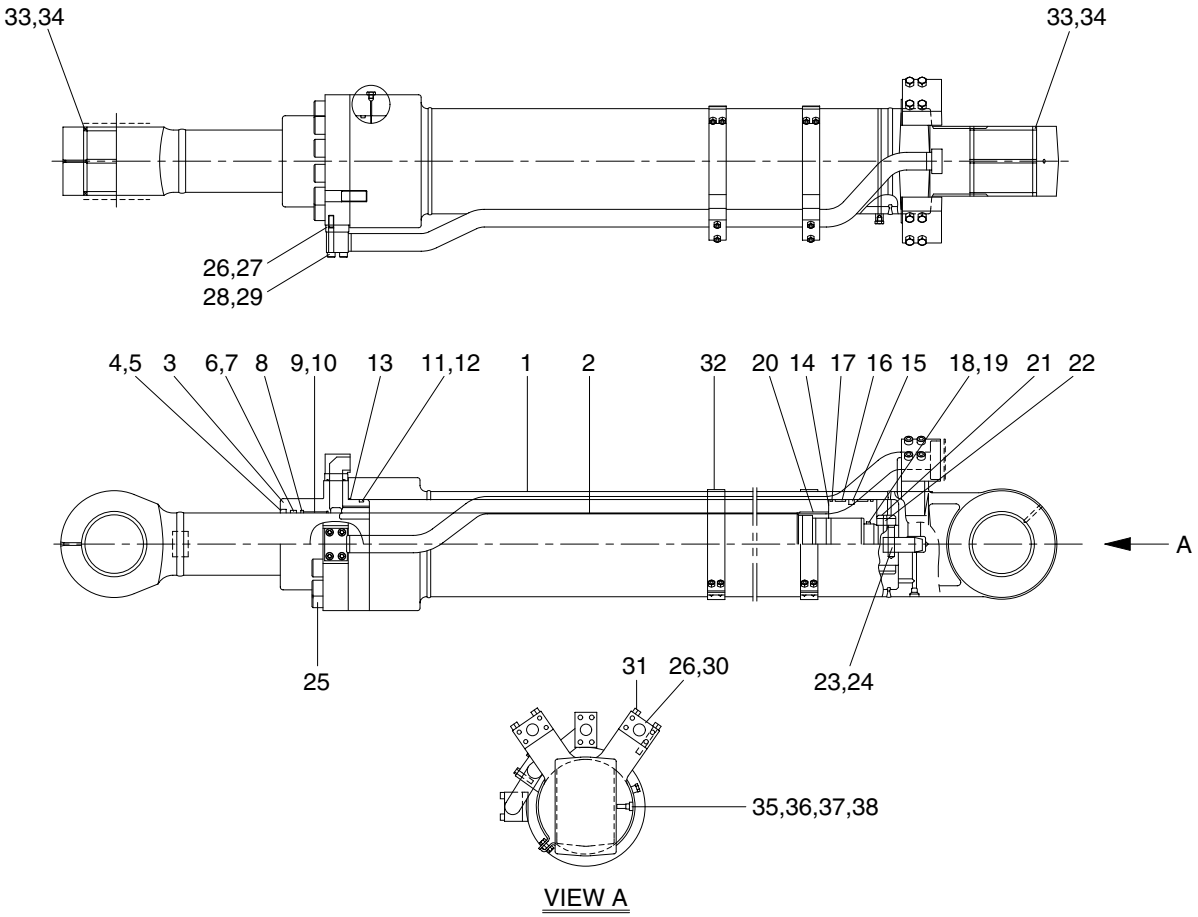




120098CY14

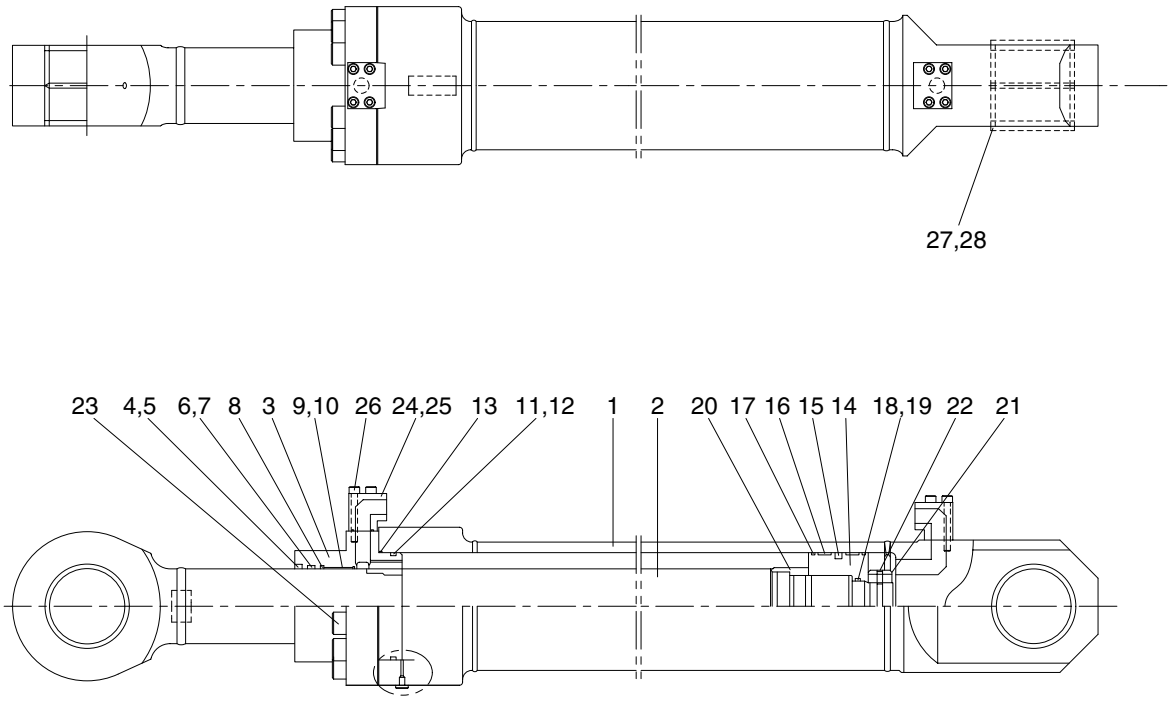
1	Tube assembly	15	Piston seal	29	Hexagon socket head bolt
2	Rod assembly	16	Wear ring	30	O-ring
3	Gland	17	Dust ring	31	Pipe assembly
4	Dust wiper	18	O-ring	32	Band assembly
5	Retain ring	19	Back up ring	33	Band assembly
6	Rod seal	20	Cushion ring	34	Hexagon socket head bolt
7	Back up ring	21	Piston nut	35	Plain washer
8	Buffer ring	22	Set screw	36	Oilless bearing
9	Dry bearing	23	Hexagon socket head bolt	37	Dust seal
10	Retain ring	24	O-ring	38	Pin bushing
11	O-ring	25	Flange	39	Dust seal
12	Back up ring	26	Pipe assembly	40	Clamp assembly
13	O-ring	27	Hexagon socket head bolt	41	Clamp assembly
14	Piston	28	Pipe assembly	42	Hexagon socket head bolt

(2) Arm cylinder



1	Tube assembly	14	Piston	27	Flange
2	Rod assembly	15	Piston seal	28	Pipe assembly
3	Gland	16	Wear ring	29	Hexagon socket head bolt
4	Dust wiper	17	Dust ring	30	Block
5	Retain ring	18	O-ring	31	Hexagon socket head bolt
6	Rod seal	19	Back up ring	32	Band assembly
7	Back up ring	20	Cushion ring	33	Oilless bushing
8	Buffer ring	21	Piston pin	34	Dust seal
9	Dry bearing	22	Set screw	35	Check valve
10	Retain ring	23	Cushion spear	36	Spring
11	O-ring	24	Parallel pin	37	O-ring
12	Back up ring	25	Hexagon socket head bolt	38	Socket plug
13	O-ring	26	O-ring		

(3) Boom cylinder

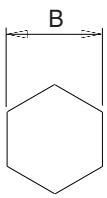


120098CY16

1	Tube assembly	11	O-ring	21	Piston nut
2	Rod assembly	12	Back up ring	22	Set screw
3	Gland	13	O-ring	23	Hexagon socket head bolt
4	Dust wiper	14	Piston	24	O-ring
5	Retain ring	15	Piston seat	25	Flange
6	Rod seal	16	Wear ring	26	Hexagon socket head bolt
7	Back up ring	17	Dust ring	27	Oilless bushing
8	Buffer ring	18	O-ring	28	Dust seal
9	Dry bearing	19	Back up ring		
10	Retain ring	20	Cushion ring		

2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Allen wrench	10 14 16 30 33	
(-) Driver	Small and large sizes	
Torque wrench	Capable of tightening with the specified torques	

(2) Tightening torque

Part name		Item	Size	Torque	
				kgf · m	lbf · ft
Piston	Bucket cylinder	14	-	210±21	1520±152
	Boom cylinder	14	-	250±25	1810±181
	Arm cylinder	14	-	200±20	1447±145
Piston lock nut	Bucket cylinder	20	-	280±28	2025±203
	Boom cylinder	20	-	290±29	2100±210
	Arm cylinder	20	-	260±26	1881±188
Socket head bolt	Bucket cylinder	23	M30	157±16	1136±116
		27	M14	15±1.5	108±10.8
	Boom cylinder	25	M33	215±21.5	1555±156
		31	M16	23±2.3	166±16.6
	Arm cylinder	23	M30	157±16	1136±116
		26	M14	15±1.5	108±10.8

3) DISASSEMBLY

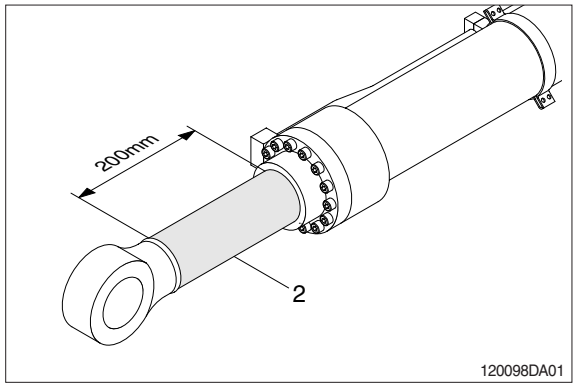
(1) Remove cylinder head and piston rod

※ Procedures are based on the bucket cylinder.

① Hold the clevis section of the tube in a vise.

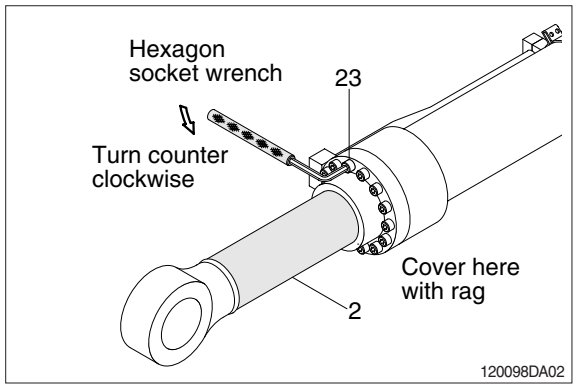
※ Use mouth pieces so as not to damage the machined surface of the cylinder tube. Do not make use of the outside piping as a locking means.

② Pull out rod assembly (2) about 200 ㎜ (7.1in). Because the rod assembly is rather heavy, finish extending it with air pressure after the oil draining operation.



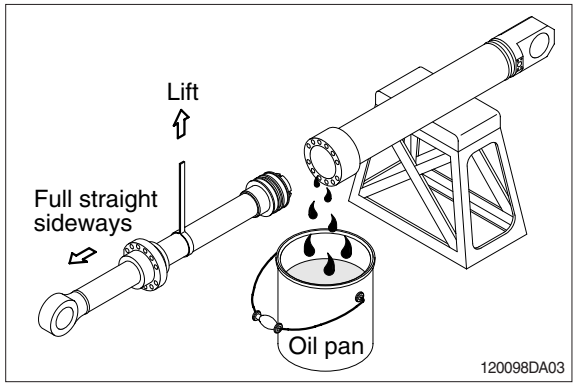
③ Loosen and remove socket bolts (23) of the gland in sequence.

※ Cover the extracted rod assembly (2) with rag to prevent it from being accidentally damaged during operation.



④ Draw out cylinder head and rod assembly together from tube assembly (1).

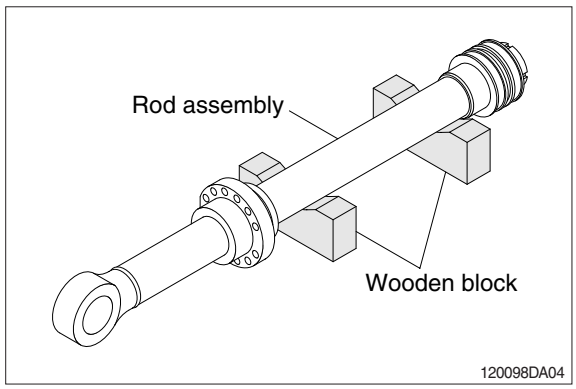
※ Since the rod assembly is heavy in this case, lift the tip of the rod assembly (2) with a crane or some means and draw it out. However, when rod assembly (2) has been drawn out to approximately two thirds of its length, lift it in its center to draw it completely.



Note that the plated surface of rod assembly (2) is to be lifted. For this reason, do not use a wire sling and others that may damage it, but use a strong cloth belt or a rope.

⑤ Place the removed rod assembly on a wooden V-block that is set level.

※ Cover a V-block with soft rag.

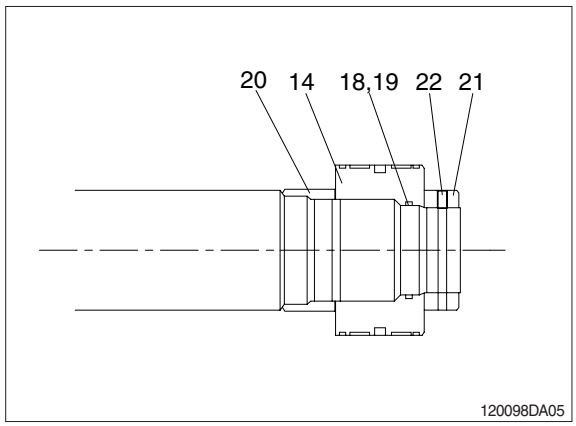


(3) Remove piston and cylinder head

① Loosen socket set screw (22) and remove piston nut (21).

※ Since piston nut (21) is tightened to a high torque use a hydraulic and power wrench that utilizers a hydraulic cylinder, to remove piston nut (21).

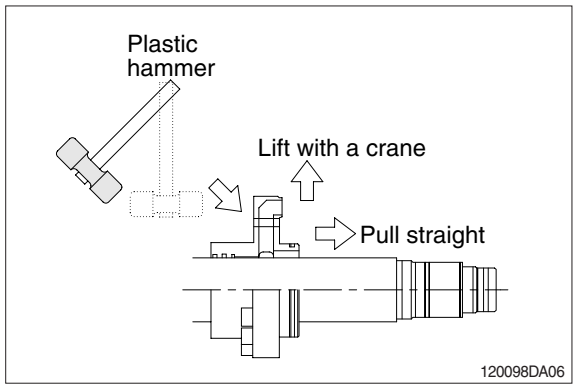
② Remove piston assembly (14), back up ring (19), and O-ring (18).



③ Remove the cylinder head assembly from rod assembly (2).

※ If it is too heavy to move, move it by striking the flanged part of cylinder head with a plastic hammer.

※ Pull it straight with cylinder head assembly lifted with a crane.
Exercise care so as not to damage the lip of rod dry bearing (9) and packing (4, 5, 6, 7, 8, 10) by the threads of rod assembly (2).

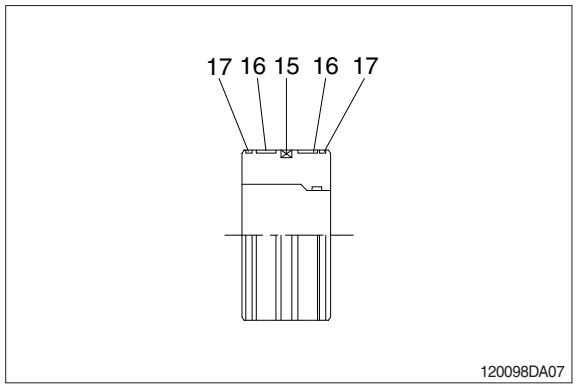


(3) Disassemble the piston assembly

① Remove wear ring (16).

② Remove dust ring (17) and piston seal (15).

※ Exercise care in this operation not to damage the grooves.



(4) Disassemble cylinder head assembly

① Remove back up ring (12) and O-ring (11).

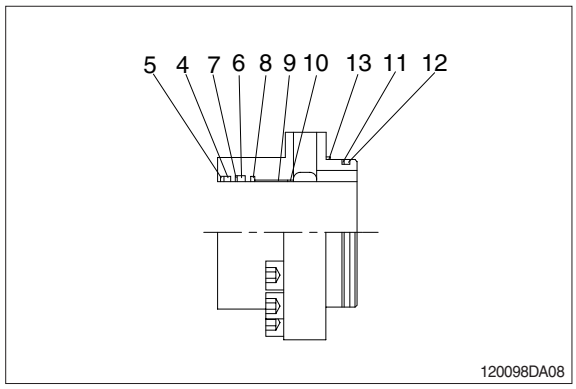
② Remove snap ring (5), dust wiper (4).

③ Remove back up ring (7), rod seal (6) and buffer ring (8) and snap ring (10).

※ Exercise care in this operation not to damage the grooves.

※ Do not remove seal and ring, if does not damaged.

※ Do not remove dry bearing (9).

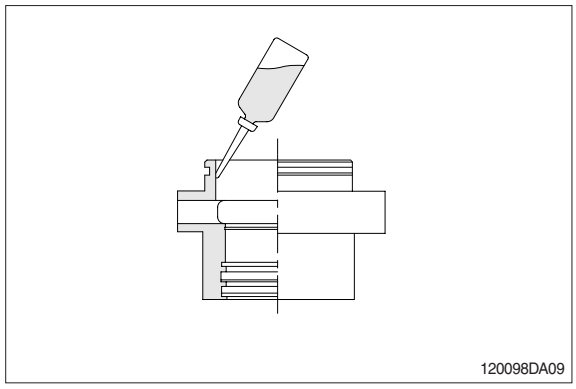


3) ASSEMBLY

(1) Assemble cylinder head assembly

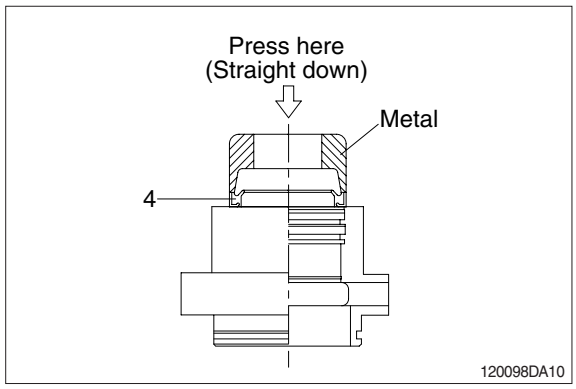
※ Check for scratches or rough surfaces if found smooth with an oil stone.

① Coat the inner face of gland (3) with hydraulic oil.



② Coat dust wiper (4) with grease and fit dust wiper (4) to the bottom of the hole of dust seal.
At this time, press a pad metal to the metal ring of dust seal.

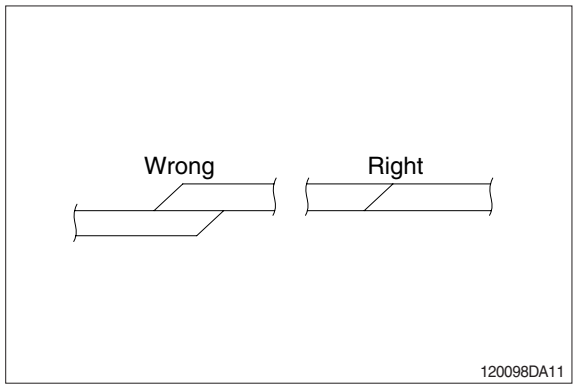
③ Fit snap ring (5) to the stop face.



④ Fit back up ring (7), rod seal (6), buffer ring (8) and snap ring (5) to corresponding grooves, in that order.

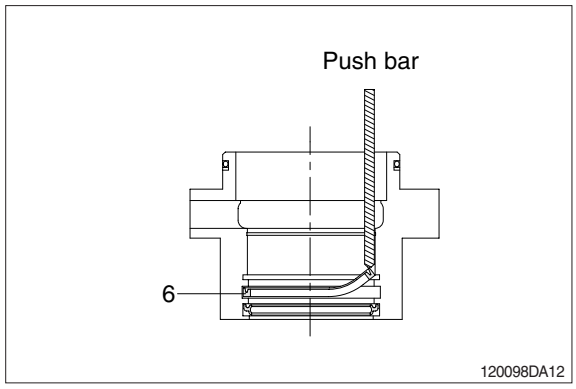
※ Coat each packing with hydraulic oil before fitting it.

※ Insert the backup ring until one side of it is inserted into groove.



※ Rod seal (6) has its own fitting direction. Therefore, confirm it before fitting them.

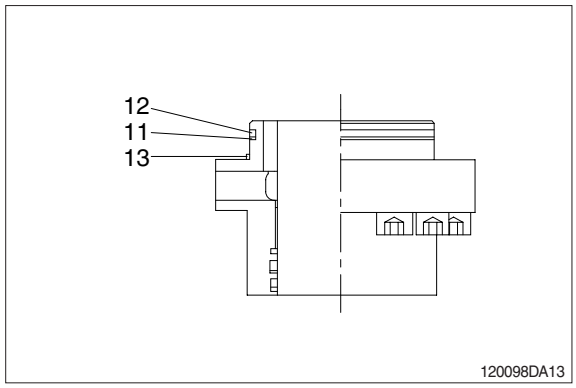
※ Fitting rod seal (6) upside down may damage its lip. Therefore check the correct direction that is shown in fig.



⑤ Fit back up ring (12) to gland (3).

※ Put the backup ring in the warm water of 30~50˚C.

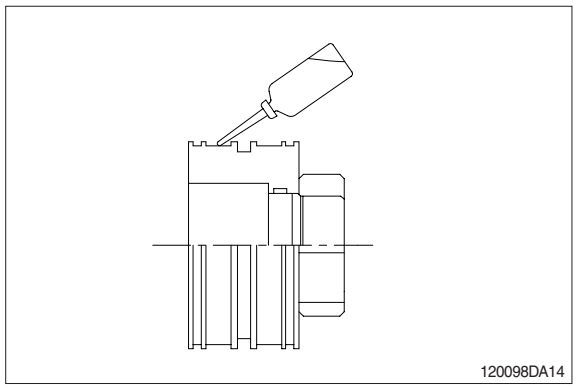
⑥ Fit O-ring (11, 13) to gland (3).



(2) Assemble piston assembly

※ Check for scratches or rough surfaces. If found smooth with an oil stone.

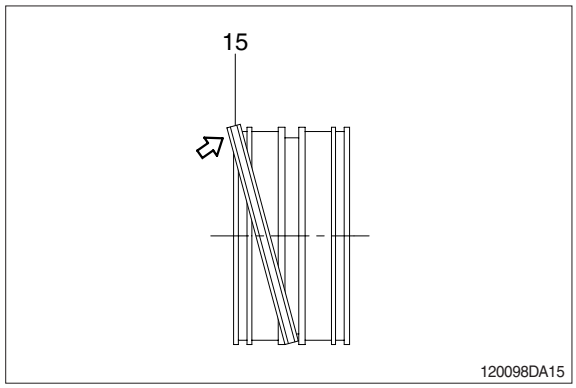
① Coat the outer face of piston (14) with hydraulic oil.



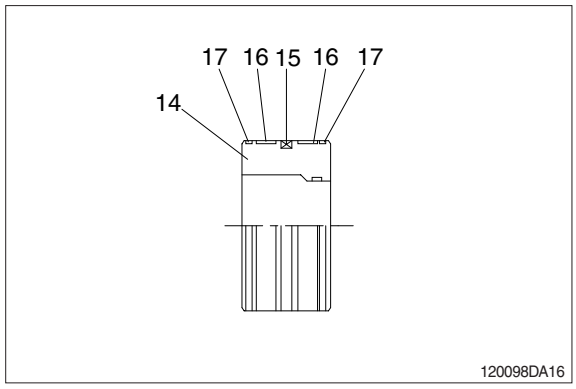
② Fit piston seal (15) to piston.

※ Put the piston seal in the warm water of 60~100˚C for more than 5 minutes.

※ After assembling the piston seal, press its outer diameter to fit in.



③ Fit wear ring (16) and dust ring (17) to piston (14).

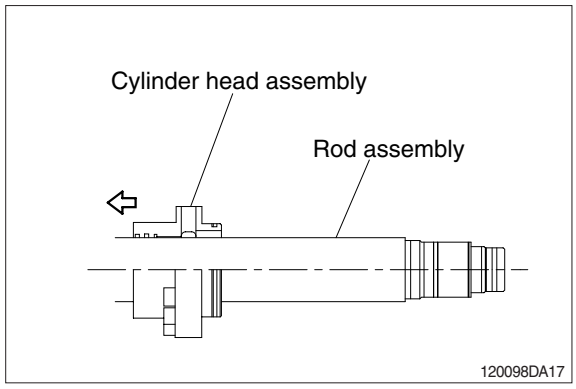


(3) Install piston and cylinder head

① Fix the rod assembly to the work bench.

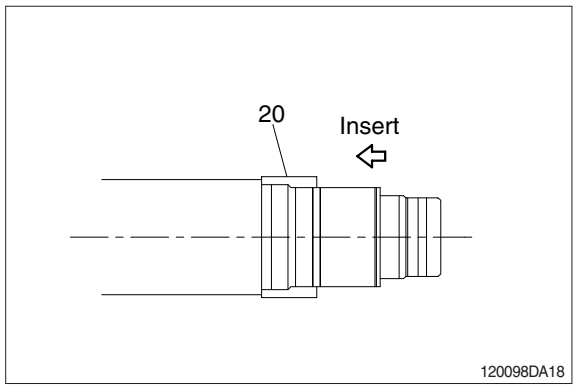
② Apply hydraulic oil to the outer surface of rod assembly (2), the inner surface of piston and cylinder head.

③ Insert cylinder head assembly to rod assembly.



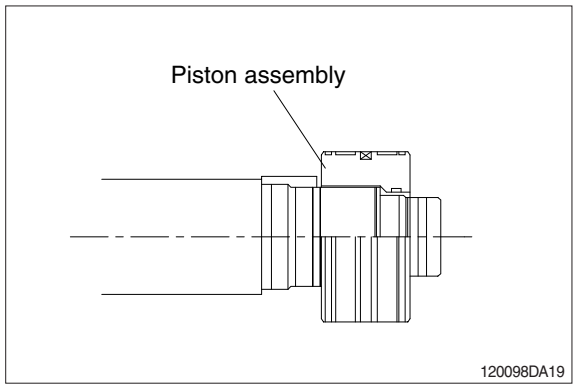
④ Insert cushion ring (20) to rod assembly.

※ Note that cushion ring (20) has a direction in which it should be fitted.



⑤ Fit piston assembly to rod assembly.

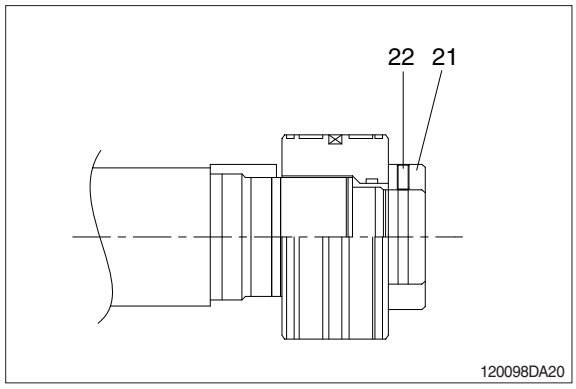
· Tightening torque : 210±21 kgf · m
(1520±152 lbf · ft)



⑥ Fit piston nut (21) and tighten the set screw (22).

· Tightening torque :

Item		kgf · m	lbf · ft
Bucket	21	280±28	2025±203
	22	3.2±0.3	23.1±2.2
Boom	21	260±26	1881±188
	22	3.0±0.3	21.7±3.6
Arm	21	290±29	2100±210
	22	3.0±0.3	21.7±3.6



(3) Overall assemble

① Place a V-block on a rigid work bench. Mount the tube assembly (1) on it and fix the assembly by passing a bar through the clevis pin hole to lock the assembly.

② Insert the rod assembly in to the tube assembly, while lifting and moving the rod assembly with a crane.

※ Be careful not to damage piston seal by thread of tube assembly.

③ Match the bolt holes in the cylinder head flange to the tapped holes in the tube assembly and tighten socket bolts to a specified torque.

※ Refer to the table of tightening torque.