

# PARTS & SERVICE NEWS

REF NO.	AT03180
DATE	Sep. 18, 2003
(C) Page 1 of 12	

**SUBJECT:** IMPROVED BALL STUD FOR STEERING CYLINDER AND TIE ROD

**PURPOSE:** To introduce improved ball studs for the steering cylinder and for the tie rod on GD500 thru GD675, GS360-2, GC380-1 and GC380F-2

**APPLICATION:** See next page

**FAILURE CODE:** 4A1CMQ

**DESCRIPTION:**

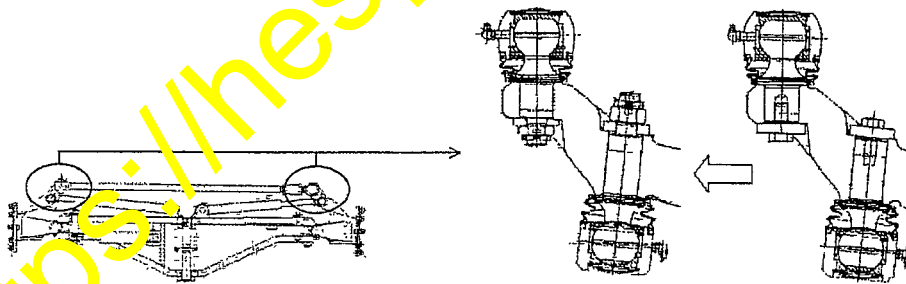
1. Introduction

This Service News will introduce improved ball studs for the steering cylinder and for the tie rod on the GD500 thru GD675, GS360-2, GC380-1 and GC380F-2 motor graders.

Details of the modification

1. The mounting method has been changed:  
Bolt mounting type → Nut and cotter pin mounting type
2. The shaft diameter has been changed:  $\phi 40\text{ m6} \rightarrow \phi 40\text{ p6}$   
(fit tolerance:  $\phi 40\text{H7/m6} \rightarrow \phi 40\text{H7/p6}$ )

(Improved ball stud)      (Current ball stud)



## Table of applicable machine models

The applicable machine models and Serial No. of the applicable machines to the modification per this Service News are as follows.

No.	Group	Model-type	Japan	Over Seas	Qty of Studs/machine		Machine serial Nos.		
					Steering	Tie Rod	Machines already shipped	Machines already modified at plant	
1	GD655/ GD675-3	GD655-3A		●	2	2	#10001 - #	#10013 - 11020, #11001 -	
2		GD655-3C		●	2	2	#50001 - #		
3		GD675-3A		●	2	2	#10001 - #	#11001 -	
4		GD675-3C		●	2	2	#50001 - #		
5	GD555-3	GD555-3A		●	2	2	#10001 - #	#10001 - 10002, #11001 -	
6		GD555-3C		●	2	2	#50001 - #		
7	Group A	GD515A-1, 1C		●	2	2	#10001 - #50022	(Production has been discontinued.)	
8		GD521A-1E		●	2	2	#12001 - #	#10209 -	
9		GD523A-1		●	2	2	#30001 - #30107	(Production has been discontinued.)	
10		GD523R-1		●	2	2	#30001 - #30007	(Production has been discontinued.)	
11		GD525A-1, 1C		●	2	2	#50001 - #60065	(Production has been discontinued.)	
12		GD613A-1		●	2	2	#30001 - #30007	(Production has been discontinued.)	
13		GD613R-1		●	2	2	#30001 - #30022	(Production has been discontinued.)	
14		GD615A-1, 1C		●	2	2	#50001 - #60154	(Production has been discontinued.)	
15		GD623A-1		●	2	2	#30001 - #	#30474 -	
16		GD623R-1		●	2	2	#30001 - #30040	(Production has been discontinued.)	
17		GD625A-1, 1C		●	2	2	#50001 - #		
18		GD663A-1		●	2	2	#30001 - #30001	(Production has been discontinued.)	
19		Group B	GD505A-2T		●	1	2	#53001 - #53325	(Production has been discontinued.)
20			GD510R-1		●	1	2	#15001 - #	
21	GD510R-1F			●	1	2	#15001 - #		
22	GD511A-1			●	1	2	#10001 - #	#11472 -	
23	GD511A-JK-1			●	1	2			
24	GD511R-1			●	1	2	#10001 - #10171		
25	GD521A-1			●	1	2	#10001 -	#10209 -	
26	GD521R-1			●	1	2	#10001 - #10096		
27	GD611A-1			●	1	2	#10001 -	#10678 -	
28	GD611R-1			●	1	2	#10001 - #10078	(Production has been discontinued.)	
29	GD621A-1			●	1	2	#10001 - #10032	(Production has been discontinued.)	
30	GD621R-1			●	1	2	#10001 -	#10247 -	
31	GD655A-5			●	1	2	#65001-#65774	(Production has been discontinued.)	
32	GD661A-1			●	1	2	#10001 -	#10729 -	
33	Stabilizer		GS360-2	●	●	2	2	#12001 -	
34	Road cutter		GC380-1	●		2	2	#10001 - #11026	(Production has been discontinued.)
35		GC380F-2	●	●	2	2	#12001 -	#12087 -	

## 2-1. List of parts

Applicable machine models

GD555-3A, GD655-3A, GD675-3A

GD555-3C, GD655-3C, GD675-3C

(Note)

Modification of the ball stud for the steering section on the GD555-3C, GD655-3C and GD675-3C should be as per a separate Service News.

Part No.	Part Name	Purpose of part	Q'ty	Remarks
23B-27-31430	Ball stud kit, st		1	For the steering cylinder (Parts marked ★ in the list below.) *1
23B-27-31690	Ball stud kit, tie rod		1	For the tie rod (Parts marked ◆ in the list below.) *2
				Numbers in < > are indicating the quantity.
23B-27-31580 (*4: 23B-27-11564) (*5: 23B-27-31560)	Stud, ball (Stud, ball) (Stud, ball)	Replacement	2 (2) (2)	For the steering cylinder ★ <2> *4: GD555-3A, *5: GD655-3, 3A, 3Y GD675-3A
23B-27-31550 (235-27-11240)	Washer (Washer)		2 (2)	
01592-32427	Nut	Addition	2	★ <2>
23B-27-31590 (23B-27-11553)	Stud, ball (Stud, ball)	Replacement	2 (2)	For the tie rod ◆ <2>
23B-27-31550 (235-27-11240)	Washer (Washer)		2 (2)	
01592-32427 ◆	Nut	Addition	2	◆ <2>
04050-150 (5)	Pin		4	★ <2> , ◆ <2>
23B-27-11330 (23B-27-11360)	Plug (Plug)	Replacement	4 (4)	★ <2> , ◆ <2>
23B-27-31670	Manual		2	★ <1> , ◆ <1>
01010-81535	Bolt	Addition	1	Ball stud mounting jigs *3
01643-31032	Washer		1	
23D-27-11571	Plate		1	
23B-27-31550	Washer		1	

Notes:

\*1 and 2 When replacing the ball studs for both of the steering cylinder and for the tie rod, arrange both of the two kits.

\*3 The kit does not include the ball stud mounting jigs.

## 2-2. List of parts

Applicable machine models

GD523A-1, GD523R-1, GD521A-1E, GD515A-1, GD515A-1C, GD525A-1, GD525A-1C, GD613A-1, GD613R-1, GD623A-1, GD623R-1, GD663A-1, GD615A-1, GD615A-1C, GD625A-1, GD625A-1C, GS360-2, GC380-1, GC380F-2

Part No.	Part Name	Purpose of part	Q'ty	Remarks
23B-27-31430	Ball stud kit, st		1	For the steering cylinder (Parts marked ★ in the list below.) *1
23B-27-31440	Ball stud kit, tie rod		1	For the tie rod (Parts marked ★ in the list below.) *2
				Numbers in < > are indicating the quantity.
23B-27-31580 (23B-27-11563)	Stud, ball (Stud, ball)	} Replacement	2 (2)	For the steering cylinder ★ <2>
23B-27-31550 (235-27-11240)	Washer (Washer)		2 (2)	★ <2>
01592-32427	Nut	Addition	2	★ <2>
23B-27-31650 (23B-27-11553)	Stud, ball (Stud, ball)	} Replacement	2 (2)	For the tie rod ◆ <2>
23D-27-11940 (235-27-11240)	Washer (Washer)		2 (2)	◆ <2>
01593-32414	Nut	} Addition	2	◆ <2>
04050-15045	Pin		4	★ <2> , ◆ <2>
23B-27-11360 (23B-27-11360)	Plug (Plug)	Replacement	4 (4)	★ <2> , ◆ <2>
23B-27-31470	Manual	} Addition	2	★ <1> , ◆ <1>
01010-81035	Bolt		1	} Ball stud mounting jigs *3
01010-81545	Bolt		1	
01643-31032	Washer		1	
23D-27-11571	Plate		1	
23B-27-31550	Washer		1	
23D-27-11940	Washer	2		

Notes:

\*1 and 2 When replacing the ball studs for both of the steering cylinder and the tie rod, arrange both of the two kits.

\*3 The kit does not include the ball stud mounting jigs.

## 2-3. List of parts

Applicable machine models

GD505A-2T, GD510R-1, GD511A-1, GD511R-1, GD521A-1, GD521R-1, GD611A-1, GD611R-1, GD621A-1, GD621R-1, GD655A-5, GD661A-1

Local production models by KI

GD510R-1F, GD511A-JK-1

Part No.	Part Name	Purpose of part	Q'ty	Remarks
23B-27-31680	Ball stud kit, st		1	For the steering cylinder (Parts marked ★ in the list below.) *1
23B-27-31440	Ball stud kit, tie rod		1	For the tie rod (Parts marked ◆ in the list below.) *2
				Numbers in < > are indicating the quantity.
23B-27-31580 (23B-27-11563)	Stud, ball (Stud, ball)	Replacement	1 (1)	For the steering cylinder ★ <1>
23B-27-31550 (235-27-11240)	Washer (Washer)		1 (1)	★ <1>
01592-32427	Nut	Addition	1	★ <1>
23B-27-31650 (23B-27-11553)	Stud, ball (Stud, ball)	Replacement	2 (2)	For the tie rod ◆ <2>
23D-27-11940 (235-27-11240)	Washer (Washer)		2 (2)	◆ <2>
01593-32414	Nut	Addition	2	◆ <2>
04050-15045 ◆	Pin		3	★ <1> , ◆ <2>
23B-27-11563 (23B-27-11563)	Plug (Plug)	Replacement	3 (3)	★ <1> , ◆ <2>
23B-27-31670	Manual		2	★ <1> , ◆ <1>
01010-81035	Bolt	Addition	1	} Ball stud mounting jigs *3
01010-81045	Bolt		1	
01643-31032	Washer		1	
23D-27-11571	Plate		1	
23B-27-31550	Washer		1	
23D-27-11940	Washer		1	

Notes:

\*1 and 2 When replacing the ball studs for both of the steering cylinder and the tie rod, arrange both of the two kits.

\*3 The kit does not include the ball stud mounting jigs.

## 3. Regarding arrangements of the necessary parts

## 1. Component parts of the kit

- The part number and component parts of the parts kit for the steering cylinder and for the tie rod are as per the table indicated below. Check the part number of the kit and the component parts before starting the installation work.

Model			GD655-3, 3A, GD675-3A	GD555-3A	GD505A-3, 3A, GD605A-5, 5A, 5Y	Grader Group A	GS360-2	GC380, F-1, 2	Grader Group B
Parts kit for the steering cylinder			23B-27-31430					23B-27-31080	
1	23B-27-31580	Stud, ball		2					1
2	01592-32427	Nut		2					1
3	23B-27-31550	Washer		2					1
4	04050-15045	Pin		2					1
5	23B-27-11360	Plug		2					1
6	23B-27-31670	Manual		1					1
Parts kit for the tie rod			23B-27-31690		23B-27-31440				
1	23B-27-31590	Stud, ball	2					0	
	23B-27-31650	Stud, ball	0					2	
2	01592-32427	Nut	2					0	
	01593-32414	Nut	0					2	
3	23B-27-31550	Washer	2					0	
	23D-27-11940	Washer	0					2	
4	04050-15045	Pin	2					2	
5	23B-27-11360	Plug	2					2	

## Grader Group A

GD513A, R-1, GD523A, R-1, GD613A, R-1, GD623A,  
GD663A-1, GD515A-1, -1C, GD525A-1, -1C,  
GD615A-1, -1C, GD625A-1, -1C, GD531A-1E

## Grader Group B

GD510R-1, GD511A, R-1, GD521A, R-1,  
GD611A, R-1, GD621A, R-1, GD661A-1,  
GD505A-2T, GD655A-5

**[Precautions]**

**When replacing the ball stud for the steering cylinder, be sure to replace both of the ball studs (LH side and RH side). (In case two cylinders are being used.)**

**When replacing the ball stud for the tie rod, be sure to replace both of the ball studs (LH side and RH side).**

## 2. Ball stud mounting jigs

The following parts are necessary to pull up the stud when installing the ball stud and be sure to arrange them before starting the installation work. And, if the substitute parts (refer to the descriptions given below) can be arranged, it is not necessary to order these parts.

Refer to separate sheet regarding the work procedure using these jigs.

No.	Part No. (Part name)	Necessary quantity		Dimensions of the parts	Outline of the substitute parts
		Steering cylinder	Tie rod		
1	23D-27-11571 (Plate)	1	1(*1:1)	Outer dia: $\phi$ 36/Inner dia: $\phi$ 12.2 Thickness: 12 mm	Outer dia: $\phi$ 36 – 56 / Inner dia: $\phi$ 10.5 – 12.5 Thickness: 12 mm
2	23B-27-31550 (Washer)	1	0(*1:1)	Outer dia: $\phi$ 54/Inner dia: $\phi$ 24.5 Thickness: 12 mm	Outer dia: $\phi$ 36 – 56 / Inner dia: $\phi$ 24.5 – 26 Thickness: 12 mm
3	23D-27-11940 (Washer)	0	2(*1:1)	Outer dia: $\phi$ 54/Inner dia: $\phi$ 24.5 Thickness: 8 mm	Outer dia: $\phi$ 36 – 56 / Inner dia: $\phi$ 24.5 – 26 Thickness: 8 mm
4	01010-81035 (Bolt)	1	0(*1:1)	-	-
5	01010-81045 (Bolt)	0	1(*1:0)	-	-
6	01643-31032 (Washer)	1	1(*1:1)	-	-

\*1: GD555/655/675-3, 3A, 3C, 3Y

When replacing the ball studs for the steering cylinder and for the tie rod with the improved ball studs, follow the procedure described in this Service News.

4. Inspection for loosening of the ball stud

4-1. Inspection method for loosening of the ball stud

(1) Preparations

- 1) Park the machine on a flat place, apply the parking brake and fix the front and rear frames by the articulation lock pins.
- 2) Set the wheels in the straight travel direction.
- 3) Lower the blade to touch the ground so that it may be directed in the right angle to the machine.
- 4) Lower the blade to raise the front tires by about 10 cm.
- 5) Insert holding blocks under the front axle.
- 6) Contract the blade lift cylinder little by little for the front axle to sit on the blocks. (Refer to Fig. 2.)
  - Make the tires raised from the ground level by 2 to 3 cm.

(2) Inspections

Shake the tire by hands to make visual inspection if the ball stud section is not loosened. (Refer to Fig. 3.)

- ① In case loosening of the ball stud section is checked visually → Replace the ball stud.
- ② In case loosening of the ball stud section is not checked visually, measure the bolt tightening torque using a torque wrench and:
  - If the bolt tightening torque is less than 245 Nm {25 kgm}
  - If the bolt tightening torque is 245 Nm {25 kgm} or more: However, if the bolt turns while checking the bolt tightening torque, tighten the bolt at the specified bolt tightening torque after applying liquid adhesive (LT-2) to the bolt.

Tightening torque:  $277 \pm 32$  Nm {28.2 - 3.2 kgm}
- ③ Toothed lock type washer and lock out type parts (Refer to Fig. 4.)

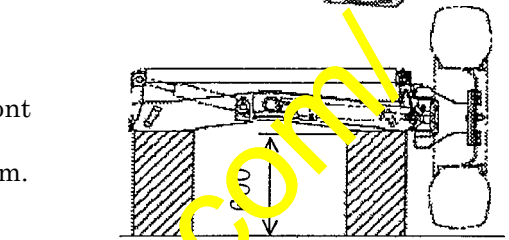
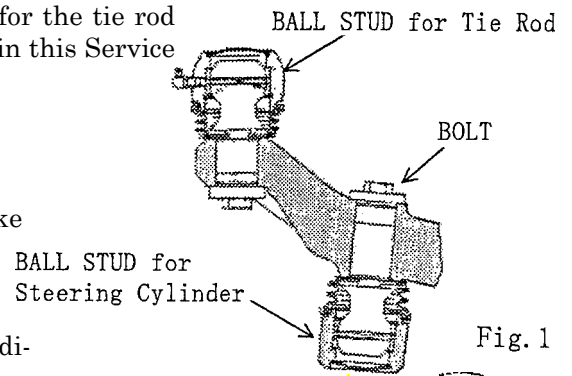


Fig. 2

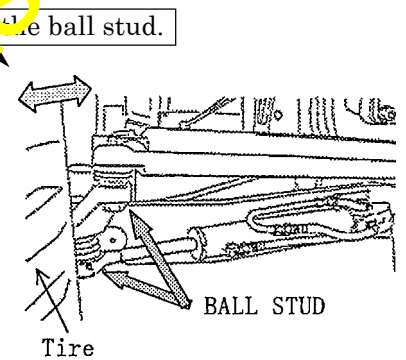


Fig. 3

4-2. Inspection method for fatigue of the housing hole

In case the ball stud is being loosened, there may be fatigue of the housing side hole. Therefore, measure the hole diameter. (Refer to Fig. 5.)

- Measuring point: The dimension marked ☆ in the drawing shown on the R.H side below (Measuring instrument: Micron etc.)
- Hole diameter: 40.025 mm or more → Replace the housing.
- Hole diameter: Less than 40.025 mm → Reuse the housing.

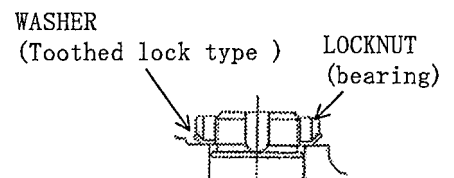


Fig. 4

Part No. of housing

Table 2

Model	Housing, L.H.	Housing R.H.
GD555-3A, -3C	23A-27-31140	23A-27-31150
GD505A-3, 3A, GD521A-1E, GD523A, R-1, GD515A-1, -1C, GD525A-1, -1C	23A-27-11141	23A-27-11151
Other GD500 Series	23A-27-11141	23A-27-12150
GD655-3, 3A, 3C, 3Y, GD675A-3A, 3C GD675A-3A, 3C	23B-27-31140	23B-27-31150
GD605A-5, 5A, 5Y, GS360-2, GC380-1 Other GD600 Series	23B-27-11141	23B-27-11151
GC380F-2	262-27-71220	262-27-71230

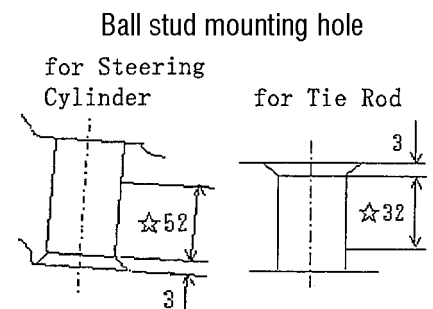


Fig. 5

5. Disassembly and assembly of the ball stud

5-1. Disassembly and assembly of the ball stud for the steering cylinder

(1) Removal of the ball stud

Remove the current type parts No. 1 thru No. 10 (excluding No. 4) shown in Fig. 6.

(2) Installation of the ball stud

Install the parts No. 1 thru No. 10 to the steering cylinder.

Regarding the installation procedure and precautions, refer to the drawing shown below (Fig. 6) and Section 5-1 (3).

Parts list of ball stud for steering cylinder Table 3

No.	Part No.		Part name	Q'ty / set						Remark	
	New	Old		GD655-3, 3Y, 3A, 3C, GD675-3A, 3C	GD555-3A, 3C	GD505A-3, 3A, GD605A-5, 5A, 5Y	Grade Group A	Grade Group B	GS360-2		GC380F-1,2
1	23B-27-31580	23B-27-31560	Stud, ball	2	-	-	-	-	-	-	
		23B-27-11564	Stud, ball	-	2	-	-	-	-	-	
		23B-27-11563	Stud, ball	-	-	2	2	1	2	2	
2	01592-32427	-	Nut	2	2	2	2	1	2	2	
		01010-81635	Bolt	2	2	2	2	1	2	2	
3	23B-27-31550	235-27-11240	Washer	2	2	2	2	1	2	2	
4	04050-15045	-	Pin	2	2	2	2	1	2	2	
5	23B-27-11920	23B-27-11920	Snap, ring	-	-	2	2	1	2	2	Reuse
6	23B-27-11910	23B-27-11910	Snap, ring	-	-	-	2	1	2	2	Reuse
7	23B-27-31570	23B-27-31570	Snap, ring	2	2	-	-	-	-	-	Reuse
	04065-06220	04065-06220	Snap, ring	-	-	2	2	1	2	2	Reuse
8	23B-27-31840	23B-27-31840	Boot	-	2	-	-	-	-	-	Reuse
	23B-27-11841	23B-27-11841	Boot	-	-	2	2	1	2	2	Reuse
9	23B-27-11800	23B-27-11800	Bushing ass'y	2	2	2	2	1	2	2	Reuse
10	23B-27-11360	23B-27-11360	Plug	2	2	2	2	1	2	2	Change to new parts

Grader Group A

GD613A, R-1, GD623A, R-1, GD663A-1, GD515A-1, -1C, GD525A-1, -1C, GD615A-1, -1C, GD625A-1, -1C, GD521A-1E

Grader Group B

GD510R-1, 1F, GD511A, R-1, -JK-1, GD521A, R-1, GD611A, R-1, GD621A, R-1, GD661A-1, GD505A-2T, GD655A-5

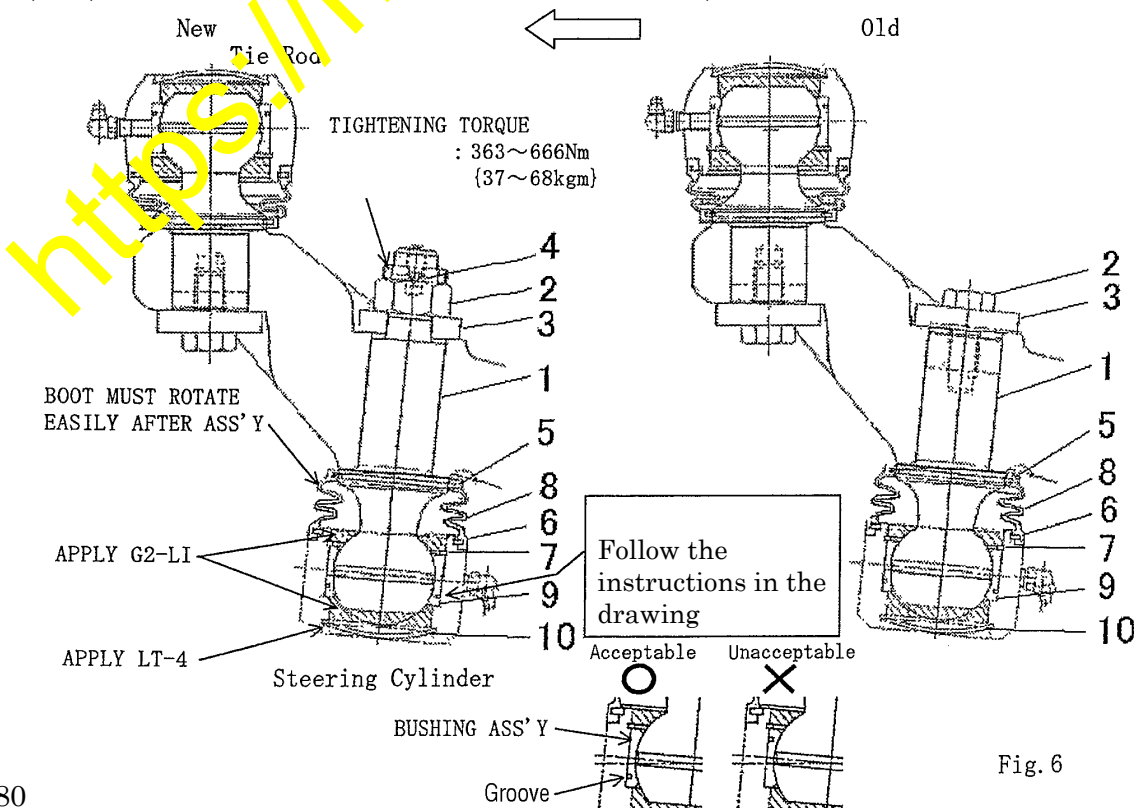


Fig. 6



(3) Installation procedure and precautions

- 1) Precautions before starting press-fitting (hitting) of the ball stud
  - Precaution ①: Do not apply lubricant like grease between the ball stud and the housing.
  - Precaution ②: Match the direction of the width across flat section of the flange of the stud to the right angle direction to the tire (in parallel to the tie-rod). (Refer to Fig. 7.)

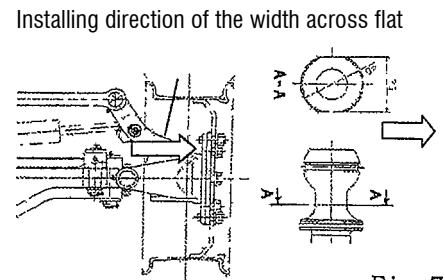


Fig. 7

2) Press-fitting (hitting) of the ball stud

- Hit the ball stud until the tip end of the ball stud comes out to the upper surface of the housing by use of a hammer. (Refer to Fig. 8 and Fig. 9-1.)
- Precaution ③: When hitting the ball stud by the hammer, use the hitting jig in order not to hit the cylinder head section by an error.
- Install the pulling up bolt, etc. (Refer to Fig. 9-2.)
- Tighten the bolt by 7 turns to pull up the ball stud. (Refer to Fig. 9-3.)
- Add the washer. (Refer to Fig. 9-4.)
- Tighten the bolt by 7 turns to pull up the ball stud. (Refer to Fig. 9-5.)
- Remove the bolt and install the nut and washer to pull up the ball stud. (Refer to Fig. 9-6 and 9-7.)

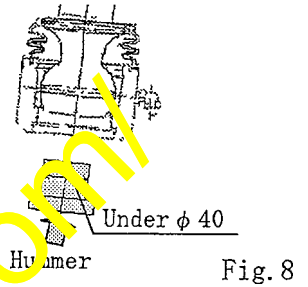


Fig. 8

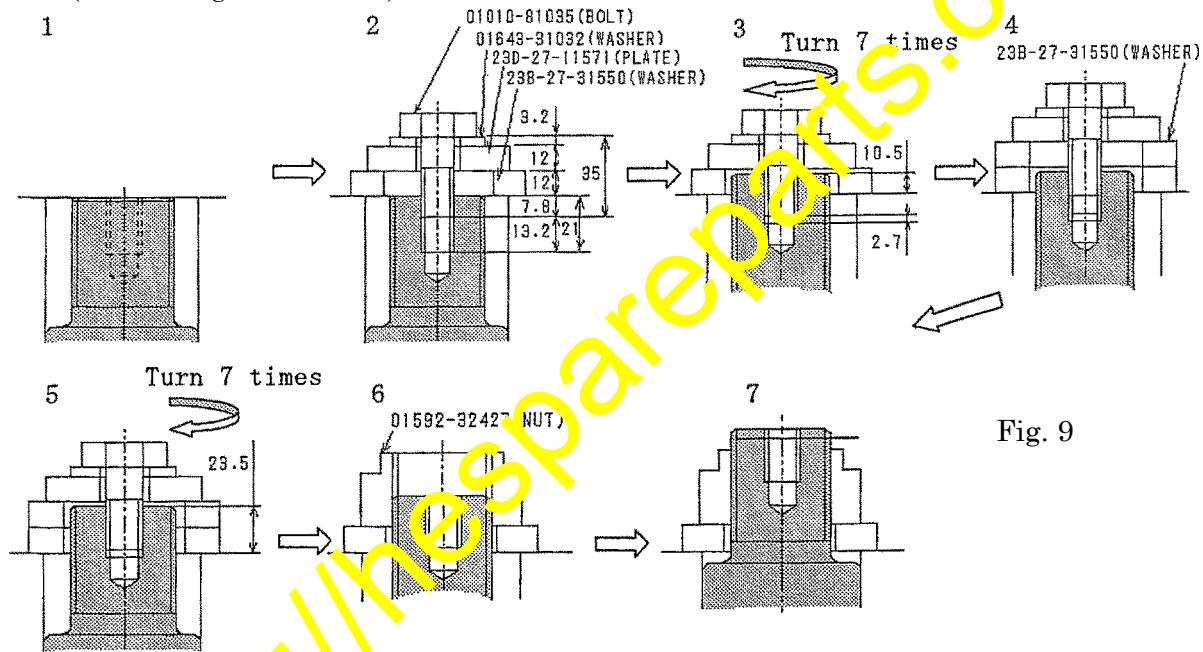


Fig. 9

3) Checking the existence of clearance between the flange section of the ball stud and the housing

Precaution ④: There should not be a clearance between the flange of the ball stud and the housing. (Refer to Fig. 10.)

4) Tightening of the nut and installation of the pin

After tightening the nut at the specified tightening torque, install the cotter pin.  
 Precaution ⑤: The final tightening torque for the nut should be 363 Nm {37 kgm} or more and for matching of the cotter pin hole, tighten within the range of 363 - 666 Nm {37 - 68 kgm}.

Precaution ⑥: When matching the cotter pin hole, match it with the nut rotated to tightening direction. Do not match the cotter pin hole with the nut rotated to loosening direction.

5) Restoration

Apply G2-LI (grease) to the hatched section range indicated in the drawing shown on the RH side.

Install the plug (23B-27-11360).

6) Confirmation of installation

Bring down the front axle from the blocks and turn the steering wheel several times to make sure that there are no problem found.

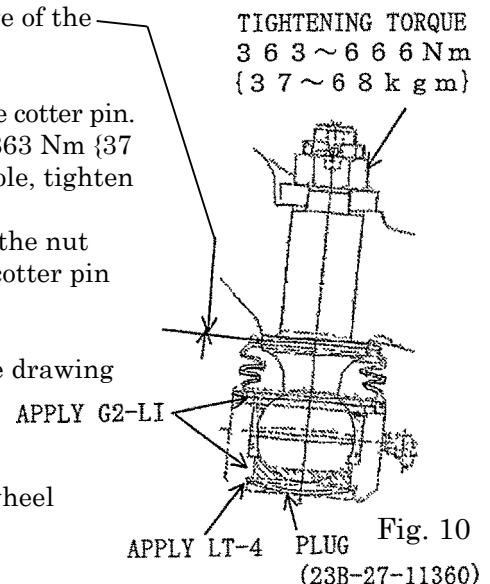


Fig. 10  
(23B-27-11360)

2-2. Disassembly and assembly of the ball stud for the tie rod

(1) Removal of the ball stud

Remove the current type parts No. 1 thru No. 10 (excluding No. 4) shown in Fig. 11.

(2) Installation of the ball stud

Install the parts No. 1 thru No. 10 to the tie rod.

Regarding the installation procedure and precautions, refer to the drawing shown below (Fig. 11) and Section 2-2 (3).

Parts list of ball stud for tie rod

Table 4

No.	Part No.		Part name	Q'ty/set						Remark	
	New	Old		GD655-3, 3Y, 3A, 3C, GD675-3A, 3C	GD555-3A, 3C	GD505A-3, 3A, GD605A-5, 5A, 5Y	Grade Group A	Grade Group B	GS360-2		GC380F-1,2
1	23B-27-31590	23B-27-11553	Stud, ball	2	2	-	-	-	-	-	
	23B-27-31650		Stud, ball	-	-	2	2	2	2	2	
2	01592-32427	-	Nut	2	2	-	-	-	-	-	
	01593-32414		Nut	-	-	2	2	2	2	2	
	-	01010-81635	Bolt	2	2	2	2	2	2	2	
3	23B-27-31550	235-27-11240	Washer	2	2	-	-	-	-	-	
	23D-27-11940		Washer	-	-	2	2	2	2	2	
4	04050-15045	-	Pin	2	2	2	2	2	2	2	
5	23B-27-11920	23B-27-11920	Snap, ring	-	-	2	2	2	2	2	Reuse
6	23B-27-11910	23B-27-11910	Snap, ring	-	-	-	2	2	2	2	Reuse
7	23B-27-31570	23B-27-31570	Snap, ring	2	-	-	-	-	-	-	Reuse
	04065-06220	04065-06220	Snap, ring	-	-	2	2	2	2	2	Reuse
8	23B-27-31840	23B-27-31840	Boot	2	2	-	-	-	-	-	Reuse
	23B-27-11841	23B-27-11841	Boot	-	-	2	2	2	2	2	Reuse
9	23B-27-11800	23B-27-11800	Bushing assy	2	2	2	2	2	2	2	Reuse
10	23B-27-11360	23B-27-11360	Plug	2	2	2	2	2	2	2	Change to new parts

Grader Group A  
 GD613A, R-1, GD623A, R-1, CD663A-1,  
 GD515A-1, -1C, GD525A-1, 1C, GD615A-1, -1C,  
 GD625A-1, -1C, GD521A-1E

Grader Group B  
 GD510R-1, -1F, GD511A, R-1, -JK-1, GD521A, R-1,  
 GD611A, R-1, GD621A, R-1, GD661A-1,  
 GD505A-2T, GD655A-5

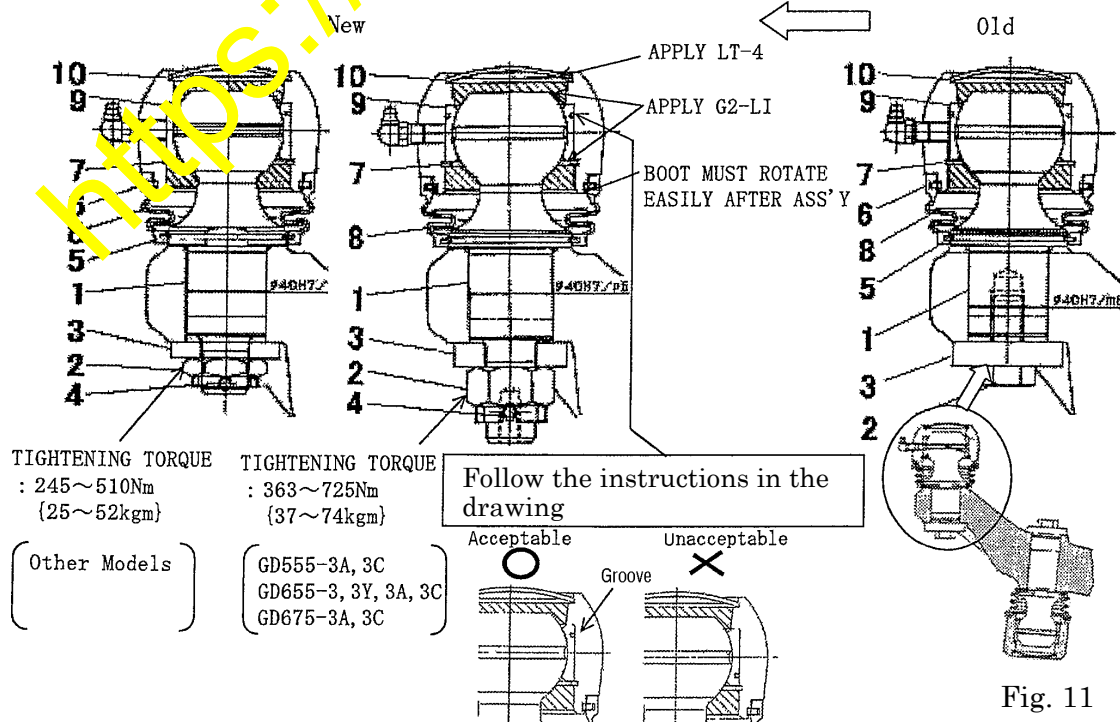


Fig. 11

(3) Installation procedure and precautions

1) Precautions before starting press-fitting (hitting) of the ball stud  
 Precaution ①: Do not apply lubricant like grease between the ball stud and the housing.

Precaution ②: Match the direction of the width across flat section of the flange of the stud to the right angle direction to the tire (in parallel to the tie-rod). (Refer to Fig. 12.)

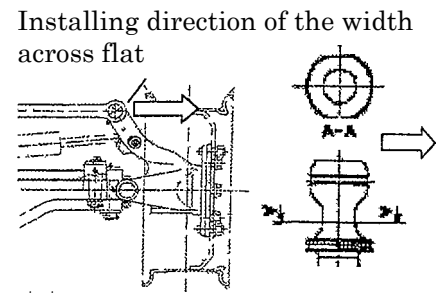


Fig. 12

2) Press-fitting (hitting) of the ball stud

- Hit the ball stud until the tip end of the ball stud comes out to the upper surface of the housing by use of a hammer. (Refer to Fig. 13, 15-1 and 16-1.)

Precaution ③: When hitting the ball stud by the hammer, use the hitting jig in order not to hit the cylinder head section by an error.

- Install the pulling up bolt, etc. (Refer to Fig. 15-2 and 16-2)
- Tighten the bolt to pull up the ball stud. (Refer to Fig. 15-3 and 16-3.)
- Add the washer. (Refer to Fig. 15-4 and 16-4.)
- Tighten the bolt to pull up the ball stud. (Refer to Fig. 15-5 and 16-5.)
- Remove the bolt and install the nut and washer to pull up the ball stud. (Refer to Fig. 15-6, 15-7, 16-6 and 16-7.)

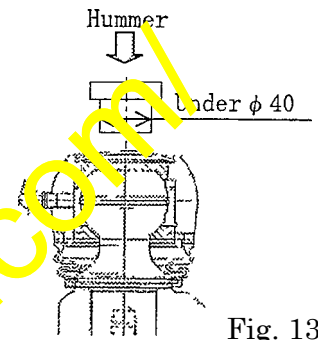


Fig. 13

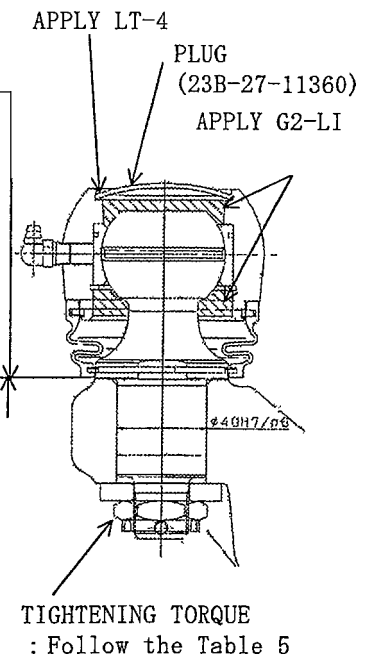
3) Checking the existence of clearance between the flange section of the ball stud and the housing

Precaution ④: There should not be a clearance between the flange of the ball stud and the housing. (Refer to Fig. 14.)

4) Tightening of the nut and installation of the pin

After tightening the nut at the specified tightening torque, install the cotter pin.

Precaution ⑤: The final tightening torque for the nut should be \*1 or more in Table 5 and for matching of the cotter pin hole, tighten within the range of \*2 in Table 5 indicated below.



TIGHTENING TORQUE : Follow the Table 5

Fig. 14

Tightening torque

Table 5

	Model				
	GD555-3A, 3C GD655-3, 3A, 3C, 3Y GD675-3A, 3C	GD505A-3, 3A, GD605A-5, 5A, 5Y	Other GD500-600 class Graders	GS360-2	GC380F-1, 2
Minimum tightening torque (*1)	363 Nm {37 kgm}	245 Nm {25 kgm}			
Tightening torque (*2)	363-725 Nm {37-74 kgm}	245-510 Nm {25-52 kgm}			

Precaution ⑥: When matching the cotter pin hole, match it with the nut rotated to tightening direction. Do not match the cotter pin hole with the nut rotated to loosening direction.

5) Restoration

Apply G2-LI (grease) to the hatched section range being shown in the drawing indicated on the RH side.

Install the plug (23B-27-11360).

6) Confirmation of installation

Bring down the front axle from the blocks and turn the steering wheel several times to make sure that there are no problem found.

Fig. 15

<GD505A-3, 3A, GD605A-5, 5A, 5Y> <GS360-2> <GC380-1, GC380F-2>  
 <GD510R-1, -1F, GD511A, R-1, GD511A-JK-1, GD521A, R-1, GD521A-1E>  
 <GD523A, R-1, GD515A-1, -1C, GD525A-1, -1C, GD505A-2T>  
 <GD611A, R-1, GD621A, R-1, GD661A-1, GD655A-5>  
 <GD613A, R-1, GD623A, R-1, GD663A-1, GD615A-1, -1C, GD625A-1, -1C>

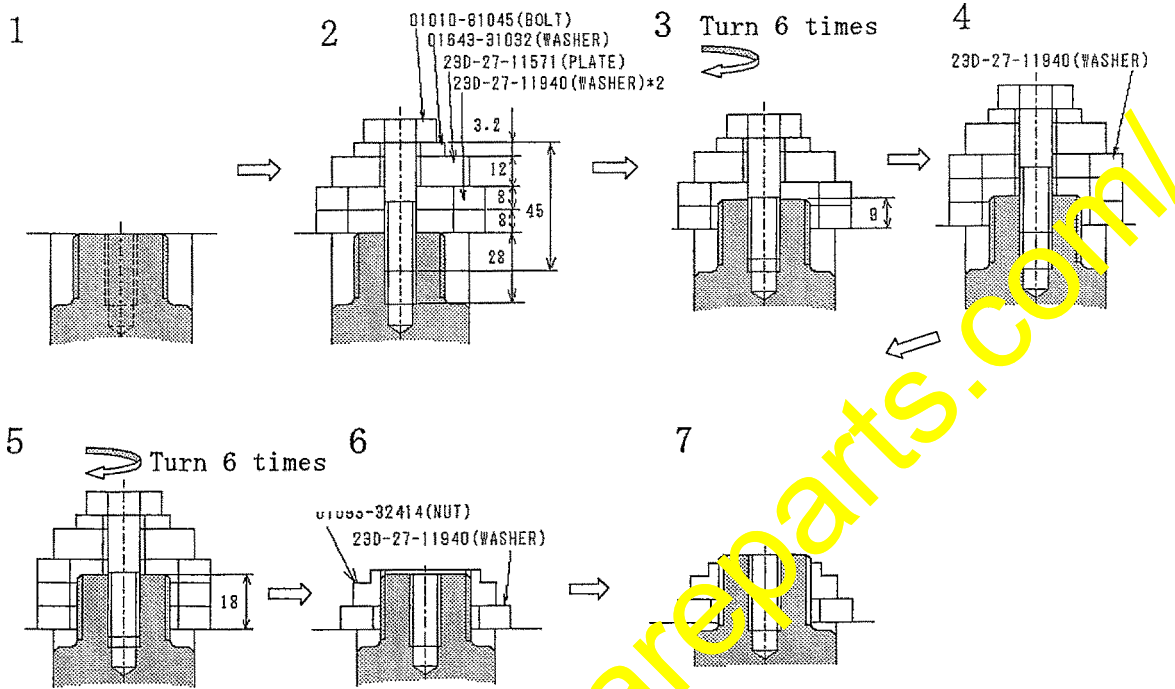


Fig. 16

<GD555-3A, 3C, GD655-3, 3Y, 3A, 3C, GD675-3A, 3C>

