

PARTS & SERVICE NEWS

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SUBJECT: REPAIR OF NOZZLE SLEEVE CRACK ON 170-ENGINE

PURPOSE: To introduce how to repair cracks in the nozzle sleeves on 170-Engine.

APPLICATION: Refer to page 10 thru 11

FAILURE CODE: A1KDHA

DESCRIPTION:

1. Introduction

The nozzle sleeve mounted on the cylinder head of the 170-engine may be cracked due to interference with the injection nozzle and coolant may mix into engine oil. If water leaks from the nozzle sleeve were found after coolant mixes into engine oil, repair the nozzle sleeve according to the procedures detailed in this Service News. Also, the improved injection nozzle introduced in this Service News is interchangeable with the old nozzle assembly. When replacing the injection nozzle, replace it with the nozzle of the new part number whether the nozzle sleeve is cracked or not.

2. List of parts

※ This list applies to 6D170.

Part No.	Part Name	Purpose of part	Q'ty	Remarks
DK150651-5201	Nut	Replacement	6	
DK150651-8201	Nut		6	
6162-13-1812 (6162-13-1812)	Gasket (Gasket)		6 (6)	Head gasket
6162-13-7813 (6162-13-7813)	Gasket (Gasket)		6 (6)	Rocker case
6162-13-7823 (6162-13-7823)	Grommet (Grommet)		6 (6)	Rocker case
6162-13-8812 (6162-13-8812)	Gasket (Gasket)		6 (6)	Head cover
6162-13-8181 (6162-13-8181)	Packing (Packing)		6 (6)	Head cover upper portion (where the nozzle is inserted)
07000-G5065 (07000-G5065)	O-ring (O-ring)		12 (12)	Water manifold
6162-13-3510 (6162-13-3510)	Bolt (Bolt)		12 (12)	For mounting injection nozzle
6162-13-1130 (6162-13-1130)	Sleeve (Sleeve)		6 (6)	Nozzle sleeve
6162-12-1152 (6162-12-1152)	O-ring (O-ring)		6 (6)	Nozzle sleeve
6162-13-4812 (6162-13-4812)	Gasket (Gasket)		6 (6)	Air intake manifold
6162-13-5810 (6162-13-5810)	Gasket (Gasket)		6 (6)	Exhaust manifold
See Attachment Page 5.	N/H. ass'y (N/H. ass'y)		6 (6)	Nozzle holder assembly
See Attachment Page 5.	Nozzle H. (Nozzle H.)		6 (6)	Nozzle holder assembly component
See Attachment Page 5.	Nut (Nut)	6 (6)	Nozzle holder assembly component (when only the nut is replaced)	

These parts apply to the 6D170 engine.

For changes of Nozzle Holder Assembly and its components, see Attachment Page 5.

※ This list applies to 12VD170 engines excluding JR.

Part No.	Part Name	Purpose of part	Q'ty	Remarks
See Attachment Page 5.	N/H. ass'y (N/H. ass'y)	Replacement	12 (12)	Nozzle holder assembly
See Attachment Page 5.	Nozzle H. (Nozzle H.)		12 (12)	Nozzle holder assembly component
See Attachment Page 5.	Nut (Nut)		12 (12)	Nozzle holder assembly component (when only the nut is replaced)
6164-11-1814 (6164-11-1814)	Gasket (Gasket)		12 (12)	Head gasket
6164-11-7813 (6164-11-7813)	Gasket (Gasket)		12 (12)	Rocker case
6162-13-7823 (6162-13-7823)	Grommet (Grommet)		12 (12)	Rocker case
6162-13-8812 (6162-13-8812)	Gasket (Gasket)		12 (12)	Head cover
6162-13-8181 (6162-13-8181)	Packing (Packing)		12 (12)	Head cover upper portion (where the nozzle is inserted)
07000-G5056 (07000-G5056)	O-ring (O-ring)		24 (24)	Water manifold
6162-13-3510 (6162-13-3510)	Bolt (Bolt)		24 (24)	For mounting injection nozzle
07005-00812 (07005-00812)	Gasket (Gasket)		35 (35)	For spill tube
6162-13-1130 (6162-13-1130)	Sleeve (Sleeve)		12 (12)	Nozzle sleeve
6162-12-1152 (6162-12-1152)	O-ring (O-ring)		12 (12)	For nozzle sleeve
6164-11-4850 (6164-11-4850)	O-ring (O-ring)		12 (12)	For air intake manifold
6164-11-4871 (6164-11-4871)	O-ring (O-ring)		12 (12)	For air intake manifold
6162-13-5810 (6162-13-5810)	Gasket (Gasket)		24 (24)	For exhaust manifold

For changes of Nozzle Holder Assembly and its components, see Attachment Page 5.

※ This list applies to 12VD170 engines for JR.

Part No.	Part Name	Purpose of part	Q'ty	Remarks
See Attachment Page 5.	N/H. ass'y (N/H. ass'y)	Replacement	12 (12)	Nozzle holder assembly
See Attachment Page 5.	Nozzle H. (Nozzle H.)		12 (12)	Nozzle holder assembly component
See Attachment Page 5.	Nut (Nut)		12 (12)	Nozzle holder assembly component (when only the nut is replaced)
6166-13-1811 (6166-13-1811)	Gasket (Gasket)		12 (12)	Head gasket
6164-11-7813 (6164-11-7813)	Gasket (Gasket)		12 (12)	Rocker case
6162-13-7823 (6162-13-7823)	Grommet (Grommet)		12 (12)	Rocker case
6162-13-8812 (6162-13-8812)	Gasket (Gasket)		12 (12)	Head cover
6162-13-8181 (6162-13-8181)	Packing (Packing)		12 (12)	Head cover upper portion (where the nozzle is inserted)
07000-G5056 (07000-G5056)	O-ring (O-ring)		24 (24)	Water manifold
6162-13-3510 (6162-13-3510)	Bolt (Bolt)		24 (24)	For mounting injection nozzle
07005-00812 (07005-00812)	Gasket (Gasket)		35 (35)	For spill tube
6162-13-1130 (6162-13-1130)	Sleeve (Sleeve)		12 (12)	Nozzle sleeve
6162-12-1152 (6162-12-1152)	O-ring (O-ring)		12 (12)	For nozzle sleeve
6164-11-4850 (6164-11-4850)	O-ring (O-ring)		12 (12)	For air intake manifold
6164-11-4871 (6164-11-4871)	O-ring (O-ring)		12 (12)	For air intake manifold
6162-13-5810 (6162-13-5810)	Gasket (Gasket)		24 (24)	For exhaust manifold

For changes of Nozzle Holder Assembly and its components, see Attachment Page 5.

Parts Number of Injection Nozzles for 170 Engine (Shape Change of Retaining Nut)

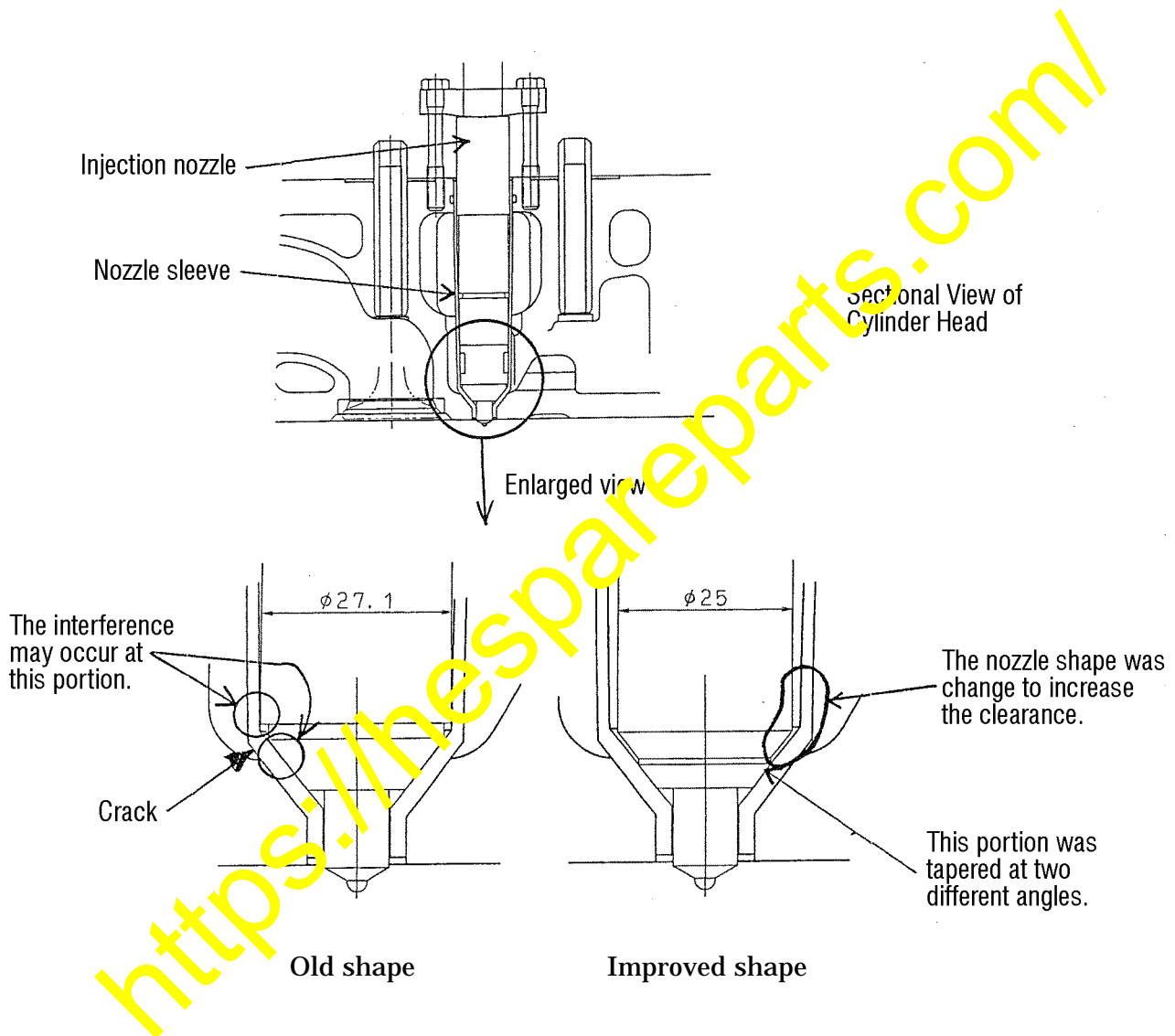
Old Parts Numbers				New Parts Number			Applicable Models								
Nozzle holder assembly	△	Nozzle holder	△	Retaining nut	Nozzle holder assembly	△	Nozzle holder	△	Retaining nut						
6162-13-3201	1	6162-13-3111	1	DK150651-5200	6162-13-3202		6162-13-3112		DK150651-5201	EG480-1	EG480B-1	SA6D170B-G1-1	SA6D170B-P-1	EG480B-1	
6162-13-3302	1	6162-13-3111	1	DK150651-5200	6162-13-3303		6162-13-3112		DK150651-5201	D155A-1B BE-D155A-1	D355A-3B BE-D355A-3	S6D170-G3-1	WD600-1	S6D170-G2-1	S6D170-G3-1
6162-13-3402	1	6162-13-3111	1	DK150651-5200	6162-13-3403		6162-13-3112		DK150651-5201	SA6D170-A-1	SA6D170A-GH-1	SA6D170A-G3-1	SA6D170A-M-1	SA12V170-G2-1	
6162-13-3502	1	6162-13-3111	1	DK150651-5200	6162-13-3503		6162-13-3112		DK150651-5201	EG480-L-2 SA6D170B-G2-1	EG480A-L-2	EG480E-L-2	SA6D170-B-1	SA6D170B-GA-1	SA6D170B-GH-1
6162-13-3701	1	6162-13-3711	1	DK150651-5200	6162-13-3702		6162-13-3712		DK150651-5201	D375A-1 WA600-1	D375A-2 BE-PC1000-1	PC1000-1	SA6D170-B-1	SA6D170-C2-1	SAD6170B-C2-1
6162-13-3801	1	6162-13-3711	1	DK150651-5200	6162-13-3802		6162-13-3712		DK150651-5201	HD465-3C					
6162-13-3902	1	6162-13-3711	1	DK150651-5200	6162-13-3903		6162-13-3712		DK150651-5201	WA700-1 SA6D170A-M-1	EM680A-1	6M170B-1	6M170BC-1	EM680A-A-00	EM679A-A-00
6162-13-8100		6162-13-3711	1	DK150651-5200	6162-13-8101		6162-13-3712		DK150651-5201	6M170A-2					
6162-13-8901		6162-13-3711	1	DK150651-5200	6162-13-8902		6162-13-3712		DK150651-5201	SA6D170-M-1	6M160A-1	6M170A-1			
6162-14-3100		6162-13-3711	1	DK150651-5200	6162-14-3101		6162-13-3712		DK150651-5201	SA6D170A-G3-1	SA6D170A-GN-1	SA6D170A-G2-1	SA12V170-G2-1		
6162-14-3300		6162-13-3711	1	DK150651-5200	6162-14-3301		6162-13-3712		DK150651-5201	SA6D170B-G1-1	SA12V170-G1-1				
6162-14-3401	1	6162-13-3711	1	DK150651-5200	6162-14-3402		6162-13-3712		DK150651-5201	SA6D170-G3-1	SA12V170-G3-1	D12V170-G1-1			
6162-14-3700	1	6162-13-3711	1	DK150651-5200	6162-14-3701		6162-13-3712		DK150651-5201	D275A-2	D375A-2	PC1000-1	WD600-1	D575A-2	
6162-14-7300	1	6162-13-3111	1	DK150651-5200	6162-14-7301		6162-13-3112		DK150651-5201	EG500-1 SA6D170-B-1 SA12V170-G3-1	EG500B-1	EG500BS-1	EPSA6D170-A-1	EPSA6D170-B-1	J6D170BE-GD-1 SA6D170B-R-1
6162-14-7500	1	6162-13-3111	1	DK150651-5200	6162-14-7501		6162-13-3112		DK150651-5201	EG580-1 SA6D170A-C2-1 SA12V170-G3-1	EG580B-1	EG600-1	EG600B-1	EG600BS-1	ESA6D170-A-1 SA6D170A-P-1
6162-14-7600		6162-13-3111	1	DK150651-5200	6162-14-7601		6162-13-3112		DK150651-5201	J6D170AE-GD-1					
6162-15-3100		6162-15-3110		DK150651-8200	6162-15-3101		6162-15-3111		DK150651-8201	D275A-2	D375A-3	PC1000-1	WA600-3	WA600-DZ-3	
6162-15-3300		6162-15-3110		DK150651-8200	6162-15-3301		6162-15-3111		DK150651-8201	A6D170E-WJK-2 WA700-AP-3	A6D170E-W2-2	HD465-5	HD465-JK-5	WA700-3	WA700-AP-1
6162-15-3900		6162-15-3110		DK150651-8200	6162-15-3901		6162-15-3111		DK150651-8201	BR1600JG-1	PC1100-6	PC1100-HA-6			
6164-11-3101	1	6162-13-3711	1	DK150651-5200	6164-11-3102		6162-13-3712		DK150651-5201	HD465-3	HD465-5	SAA6D170-G3-1	SA6D170-W1-1	EM680A-A-00	BE-B60-1
6165-11-3301	1	6162-13-3711	1	DK150651-5200	6165-11-3302		6162-13-3712		DK150651-5201	EG580B-L-1	SA6D170-A-1	SA6D170A-GA-1	SA6D170A-G3-1	SA6D170A-KC-1	BE-SA170AG-1
6165-11-3400	1	6162-13-3711	1	DK150651-5200	6165-11-3401		6162-13-3712		DK150651-5201	SA12V170-R-1					
6166-11-3100	1	6162-13-3111	1	DK150651-5200	6166-11-3101		6162-13-3112		DK150651-5201	SA6D170B-G2-1	SA6D170B-G3-1				
6166-13-3101		6162-13-3711	1	DK150651-5200	6166-13-3102		6162-13-3712		DK150651-5201	SDA12V170-R-1					
6166-15-3101		6162-15-3110		DK150651-8200	6166-15-3101	1	6162-15-3111		DK150651-8201	D575A-3					

3. Details of Change

The nozzle sleeve at the injection nozzle insert portion on the cylinder head of the 170-engine may be cracked and coolant may mix into engine oil.

The cause of the crack is stress applied to the nozzle holder as a result of interference of the nozzle upper taper or the nozzle outer periphery with the nozzle holder due to uneven machining of the injection nozzle or the nozzle holder or due to nozzle inclination at the time of insertion.

So, the shape of the injection nozzle at the tip has been changed so that the nozzle holder does not interfere with the injection nozzle.



[Reference]

When coolant in the reservoir reduces, or when coolant mixed in oil is found in checking oil, remove the head cover of the engine and check if coolant remains around the injection nozzle.

If any cylinder contains coolant, the nozzle sleeve is judged cracked. (Make this check before starting engine.)

If there is no coolant around the nozzle, another cause (aftercooler, etc.) is considered.

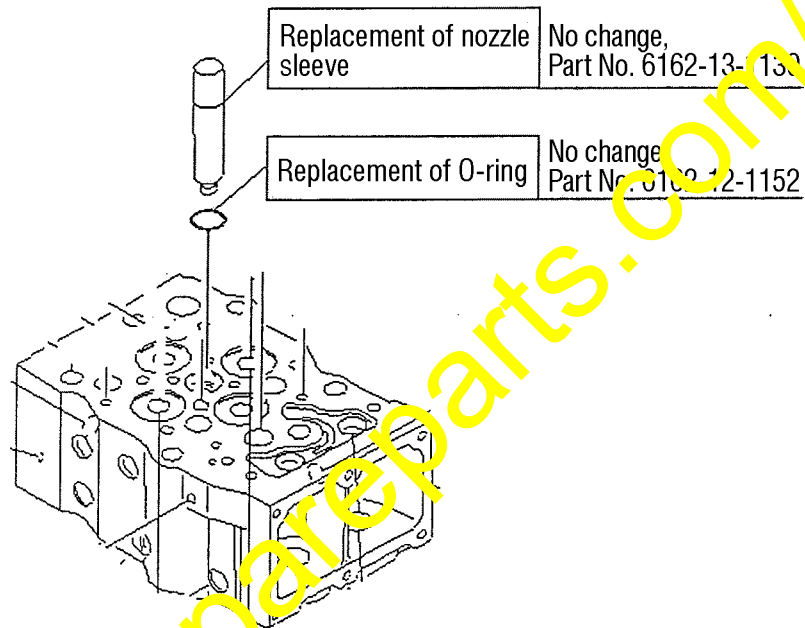
4. How to Repair

Repair the nozzle sleeve as explained hereunder:

4.1 Replacement of Nozzle Sleeve

Remove the cylinder head first and replace the nozzle sleeve with a new one. The part number of the nozzle sleeve and the mounting method (rolling method, machined shape, etc.) remains unchanged before and after the repair.

After replacing the nozzle sleeve, re-assemble the head as per the Shop Manual.



4.2 Repair of Injection Nozzle (when injection nozzle assembly is not replaced)

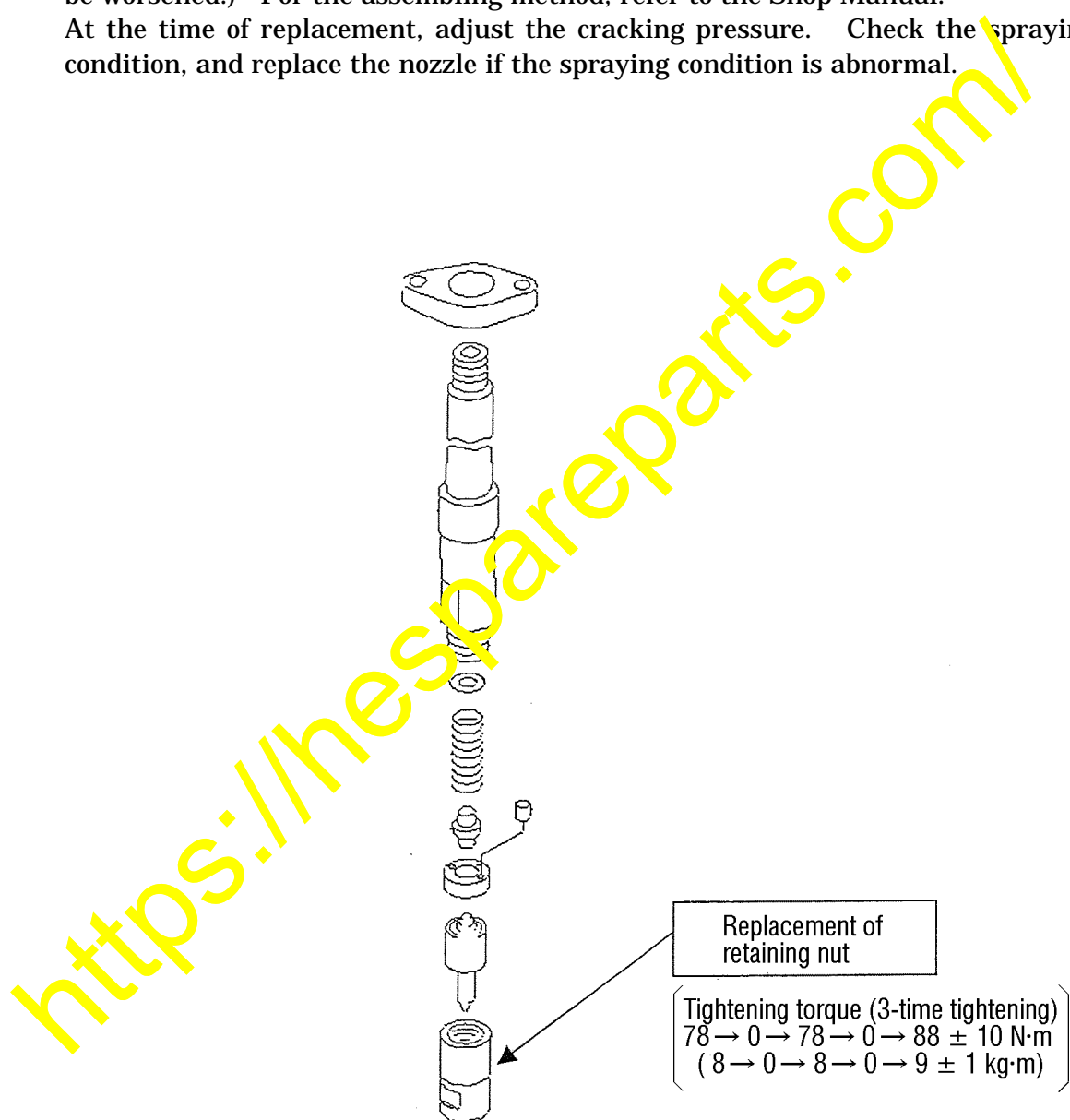
- 1) Remove the injection nozzle and then take off the retaining nut.

(Part ① in the figure below)

At the time, be careful not to lose the internal parts (spring, shim, etc.) and to prevent dusts from entering inside.

- 2) Replace the retaining nut with a new one. (See the attached list for the part number. Keep it in mind that the part number of the new retaining nut varies with the part number of the injection nozzle. If a retaining nut of a different part number is assembled, the performance will be deteriorated and exhaust color will be worsened.) For the assembling method, refer to the Shop Manual.

At the time of replacement, adjust the cracking pressure. Check the spraying condition, and replace the nozzle if the spraying condition is abnormal.

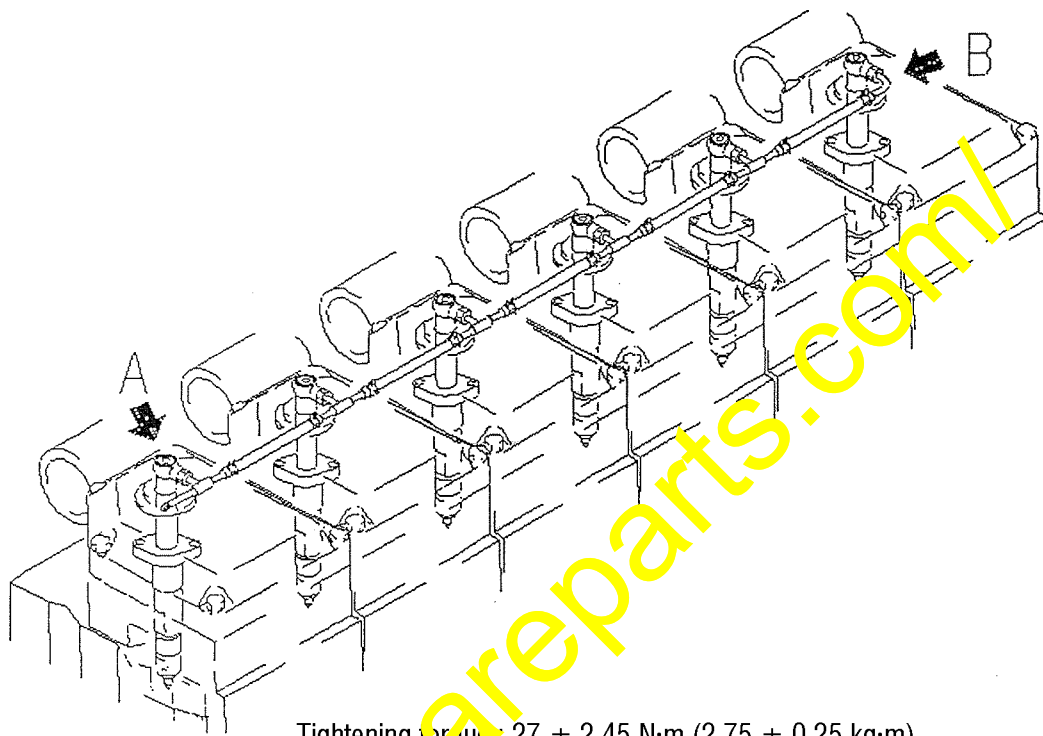


4.3 Replacement of Injection Nozzle

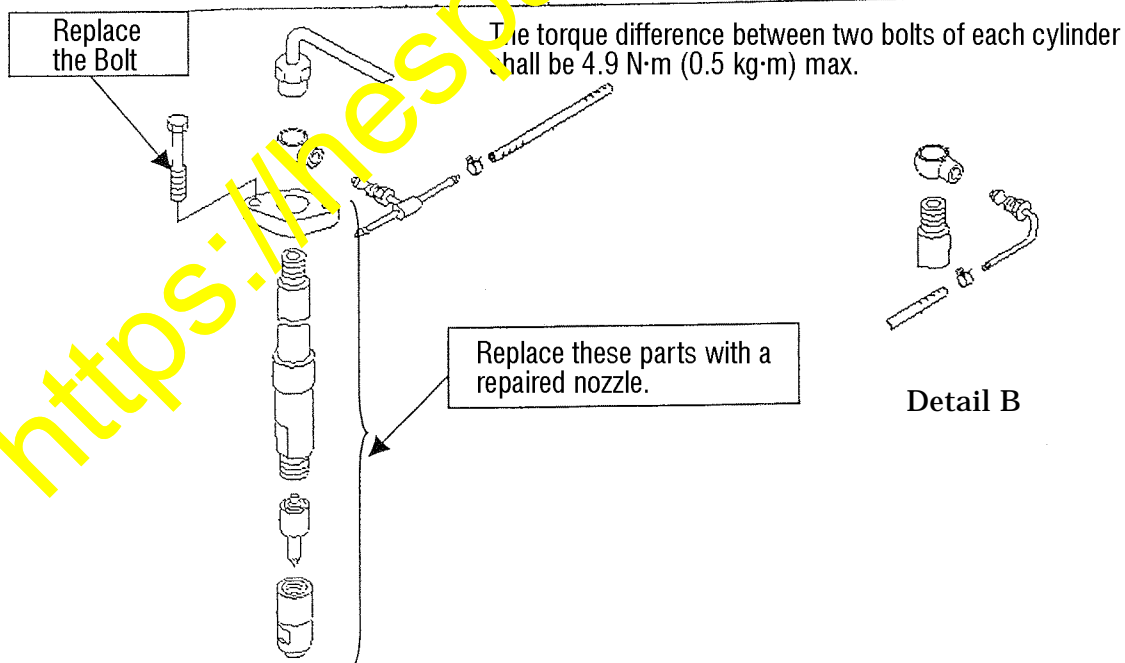
Assemble the repaired injection nozzles according to the Shop Manual.

(Tightening torque of injection nozzle mounting bolt : 27 ± 2.45 N·m (2.75 ± 0.25 kg·m))

Replace the nozzle mounting bolt with a new one.



Tightening torque : 27 ± 2.45 N·m (2.75 ± 0.25 kg·m)



Detail A

Detail B

Implementation Serial Number Checklist

No.	Applicable Model	Serial Number for Engine		Serial Number for Machine	
		Shipped Machine	Machine Produced in Plant	Shipped Machine	Machine Produced in Plant
1	6M160A-1		Next time		
2	6M170A-1	- # 10024	Next time		
3	6M170A-2	- # 10042	Next time		
4	6M170B-1		Next time		
5	6M170BC-1	- # 10004	Next time		
6	A6D170E-W2-2	- # 20129	Next time		
7	A6D170E-WJK-2	- # 18606	Next time		
8	BE-B60-1	} CKD			
9	BE-D155A-1				
10	BE-D355A-3				
11	BE-PC1000-1				
12	BE-SA170AG-1				
13	BR1600JG-1	- # 18953	Next time		
14	D12V170-G1-1	- # 10130	Next time		
15					
16	D275A-2	- # 20474	Next time	- # 10167	Next time
17	D275A-2 (Emission)	- # 21369	# 21383 -	- # 10406	# 10407 -
18					
19	D375A-1	- # 21310	Next time	- # 16384	Next time
20	D375A-2	- # 21291	Next time	- # 17179	Next time
21	D375A-3	- # 21378	# 21406 -	- # 17713	# 17713 -
22	D575A-2	# 10024 - # 10204	Next time	# 10001 - # 10043	Next time
23	D575A-3	# 10196 - # 10110	Next time	# 10101 - # 10103	# 10104 -
24					
25	EG480-1	- # 16863	Next time		
26	EG480A-L-2	- # 15926	Next time		
27	EG480B-1	- # 16863	Next time		
28	EG480B-L-2	- # 17798	Next time		
29					
30	EG500-1	- # 16863	Next time		
31	EG500B-1	- # 16863	Next time		
32	EG500BS-1	- # 16839	Next time		
33	EG580-1	- # 17684	Next time		
34	EG580B-1	- # 17684	Next time		
35	EG580B-L-1	- # 17684	Next time		
36	EG600-1	- # 17684	Next time		
37	EG600B-1	- # 17684	Next time		
38	EG600BS-1	- # 17495	Next time		
39	EM679A-A-00	- # 14832	Next time		
40	EM680A-1	- # 15492	Next time		
41	EM680A-A-00	- # 14758	Next time		
42	EPSA6D170-A-1	- # 21282	Next time		
43	EPSA6D170-B-1	-	Next time		
44					
45	HD465-3	- # 20853	Next time	- # 2440	Next time
46	HD465-3C	- # 17267	Next time	- # 2132	Next time
47	HD465-5	- # 21275	# 21367 -	- # 4405	Next time
48	HD465-5 (Emission)	- # 21370	Next time	- # 4938	# 4939 -
49					
50	J6D170AE-GD-1	- # 20993	Next time		

No.	Applicable Model	Serial Number for Engine		Serial Number for Machine	
		Shipped Machines	Machine Produced in Plant	Shipped Machines	Machines Produced in Plant
51	J6D170BE-GD-1		NEXT TIME		
52	PC1000-1	- 21180	NEXT TIME	-10461	NEXT TIME
53	PC1000-1 (Emissionized)	-20842	NEXT TIME	-10461	NEXT TIME
54	PC1100-6	-21336	21401 -	-10205	10206 -
55	PC1100-HA-6	- 21306	21392 -		
56	S6D170-G2-1	-19282	NEXT TIME		
57	S6D170-G3-1	-11656	NEXT TIME		
58	SA12V170-G1-1	-10130	NEXT TIME		
59	SA12V170-G2-1	-10206	NEXT TIME		
60	SA12V170-G3-1	-10209	NEXT TIME		
61	SA12V170-GT-1	-10130	NEXT TIM		
62	SA12V170-R-1	-10189	NEXT TIME		
63	SDA12V170R-1	-10231	10212-		
64	SA6D170A-C2-1	-21364	NEXT TIME		
65	SA6D170A-G1-1	-21341	21382-		
66	SA6D170A-G2-1	-21363	NEXT TIME		
67	SA6D170A-G3-1	-21368	21393-		
68	SA6D170A-GA-1	-17684	NEXT TIME		
69	SA6D170A-GD-1	-21364	NEXT TIME		
70	SA6D170A-GH-1	-18259	NEXT TIME		
71	SA6D170A-GN-1	-21092	NEXT TIME		
72	SA6D170A-GT-1	-21314	NEXT TIME		
73	SA6D170A-KC-1		NEXT TIME		
74	SA6D170A-M-1	-20902	21404-		
75	SA6D170A-P-1	-21368	21392-		
76	SA6D170B-G1-1	-21295	NEXT TIME		
77	SA6D170B-G2-1	-21375	21403-		
78	SA6D170B-G3-1	-17185	NEXT TIME		
79	SA6D170B-G4-1	-15226	NEXT TIME		
80	SA6D170B-G5-1	-21322	21376-		
81	SA6D170B-G6-1	-19853	NEXT TIME		
82	SA6D170B-GT-1	-21295	NEXT TIME		
83	SA6D170B-P-1	-18077	NEXT TIME		
84	SA6D170B-R-1	-21322	21376-		
85	SA6D170-C2-1	-17635	NEXT TIME		
86	S6D170-W1-1	-17638	NEXT TIME		
87	SAA6D170-G3-1	-20922	NEXT TIME		
88	SAD6170B-C2-1	-17635	NEXT TIME		
89	WA600-1	-21206	NEXT TIME	-11596	NEXT TIME

No.	Applicable Model	Serial Nंबर for Engine		Serial Number for Machine	
		Shipped Machines	Machine Produced in Plant	Shipped Machines	Machines Produced in Plant
90	WA600-3 7/26	-21380	21388-	-50337	50338-
91	WA600-DZ-3	-21068	NEXT TIME		
92	WA700-1	-20681	NEXT TIME	-10139	NEXT TIME
93	WA700-1L	A20001 - A20015			
94	WA700-3	021343	NEXT TIME	-50045	50046-
95	WA700-3L	A50001 -			
96	WA700-AP-1	-20947	NEXT TIME		
97	WA700-AP-3	-18606	NEXT TIME		
98	WD600-1	-21346	21398-	-10164	10165-

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