



Service Manual

S4S Diesel Engine

180396-up

FD20N

FD25N

FD30N

FD33N

FD35N

FD35AN

For use with FD20N, FD25N, FD30N, FD33N,
FD35N, FD35AN Chassis Service Manual.

99729-77120

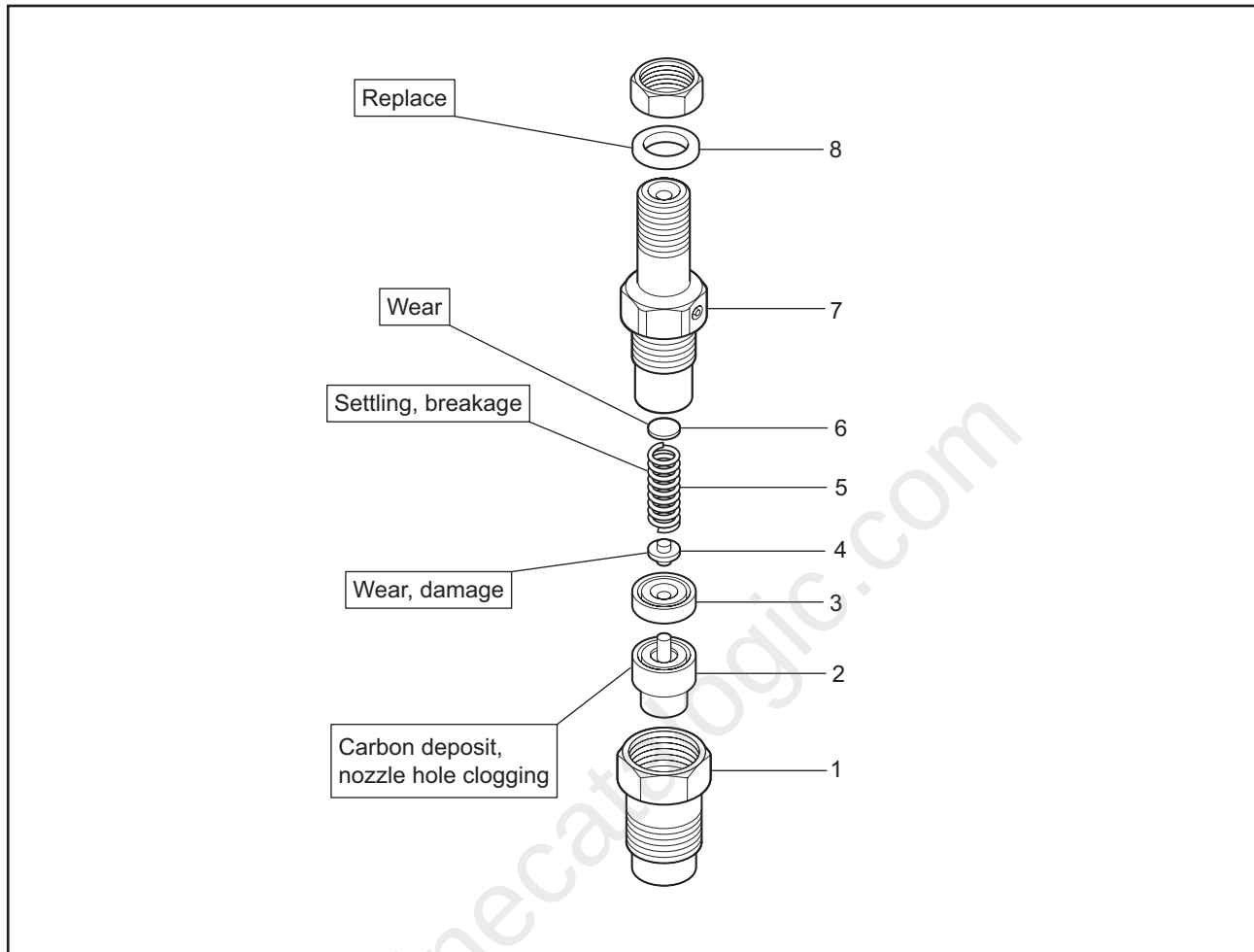
1. Determining overhaul timing

In most cases, the engine should be overhauled when the compression pressure of the engine becomes low. An increase in engine oil consumption and blow-by gas are also considered to evaluate the engine condition. Besides, such symptoms as a decrease in output, increase in fuel consumption, decrease in oil pressure, difficulty of engine starting and increase in noise are also considered for judging the overhaul timing, although those symptoms are often affected by other causes, and are not always effective to judge the overhaul timing. Decreased compression pressure shows a variety of symptoms and engine conditions, thus making it difficult to accurately determine when the engine needs an overhaul. The following shows typical problems caused by reduced compression pressure.

- (1) Decreased output power
- (2) Increased fuel consumption
- (3) Increased engine oil consumption
- (4) Increased blow-by gas through the breather due to worn cylinder liners and piston rings (Visually check the blow-by amount)
- (5) Increased gas leakage due to poor seating of inlet and exhaust valves
- (6) Difficulty in starting
- (7) Increased noise from engine parts
- (8) Abnormal exhaust color after warm-up operation

The engine can exhibit these conditions in various combinations. Some of these problems are directly caused by worn engine parts, while others are not. Phenomena described in items (2) and (6) will result from improper fuel injection volume, fuel injection timing, worn plunger, faulty nozzles and also faulty conditions of electrical devices such as battery and starter. The most valid reason to overhaul an engine is a decrease in compression pressure due to worn cylinder liners and pistons, as described in item (4). In addition to this item, it is reasonable to take other problems into consideration for making the total judgement.

2.3 Disassembling and inspecting fuel injection nozzle

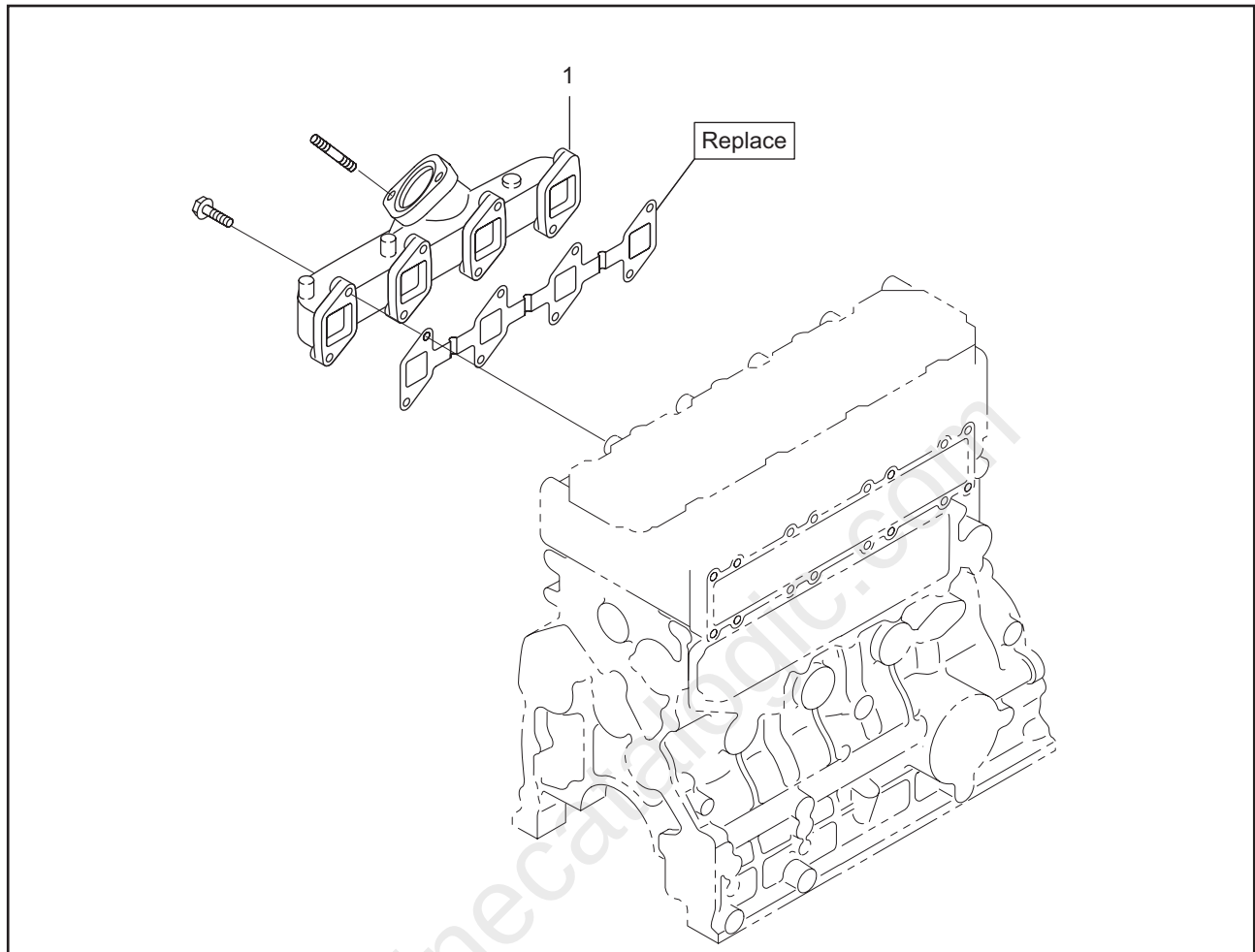


Disassembling and inspecting fuel injection nozzle

Disassembling sequence

- | | | |
|------------------------|-------------------|-----------------|
| 1 Nozzle retaining nut | 4 Pressure pin | 7 Nozzle holder |
| 2 Nozzle tip assembly | 5 Pressure spring | 8 Gasket |
| 3 Distance piece | 6 Washer | |

1.2 Removing exhaust manifold



Removing sequence

- 1 Exhaust manifold

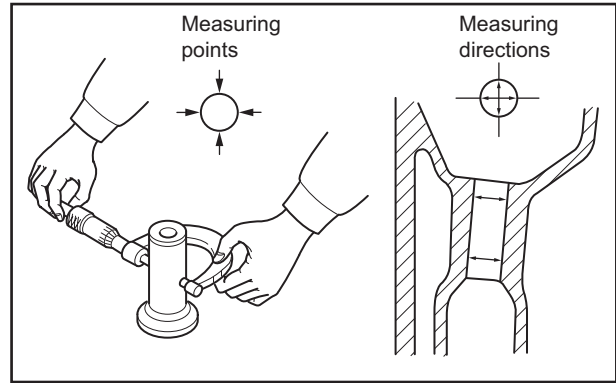
Removing exhaust manifold

3.8 Measuring clearance between tappet and tappet guide hole

Measure clearance between the tappet and tappet hole.

Replace the tappet with a new one if the limit is exceeded.

Item	Standard	Limit
Tappet guide hole inside diameter	14.000 to 14.018 mm [0.5512 to 0.5519 in.]	14.100 mm [0.5551 in.]
Clearance between tappet and tappet guide hole	0.016 to 0.052 mm [0.0006 to 0.0020 in.]	0.08 mm [0.0031 in.]

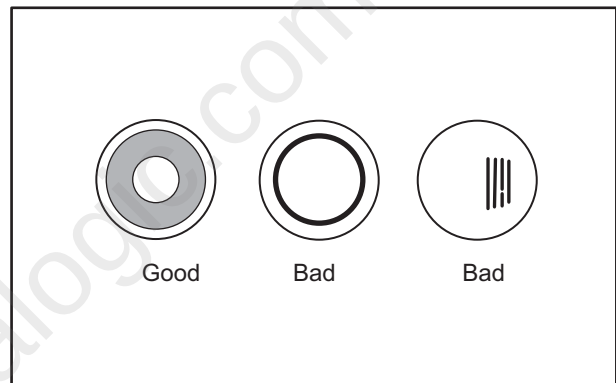


Measuring clearance between tappet and tappet guide hole

3.9 Inspecting tappet

3.9.1 Contact surface of camshaft

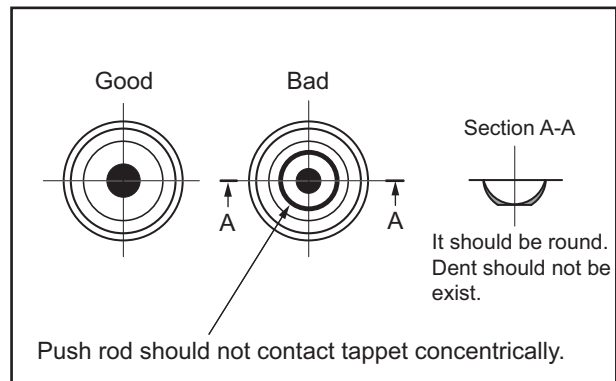
Inspect the cam contact surface of the tappets. Fit new tappets if the surface is excessively worn or damaged.



Contact surface of camshaft

3.9.2 Contact surface of pushrod

- (1) Apply Shinmyoutan or equivalent lead-free coloring paste on the push rod, and check the contacts.
- (2) Check that the push rod contacts the tappet concentrically. If it does, replace the tappet and push rod with new one.



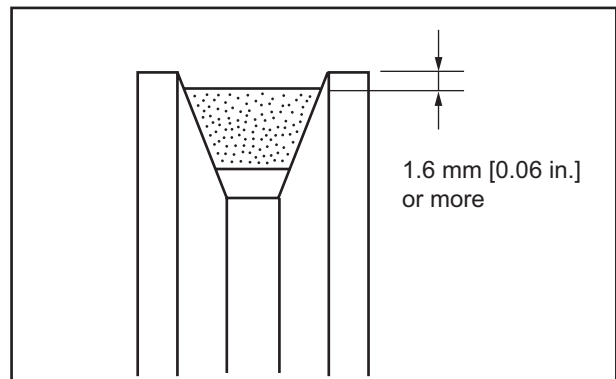
Contact surface of pushrod

3.10 Inspecting V-belt groove wear

Check the V-belt groove of the pulley for wear. Attach a new V-belt around the pulley, apply high tension and measure the sinkage of V-belt.

If the wear appears excessive, and the belt top surface sinks 1.6mm [0.06 in.] or more down from the top edge of groove, replace the pulley with a new one.

If the pulley has two or more grooves for belt, and the difference of the wear amount between grooves is significant, replace the pulley with a new one.



Inspecting V-belt groove wear

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