

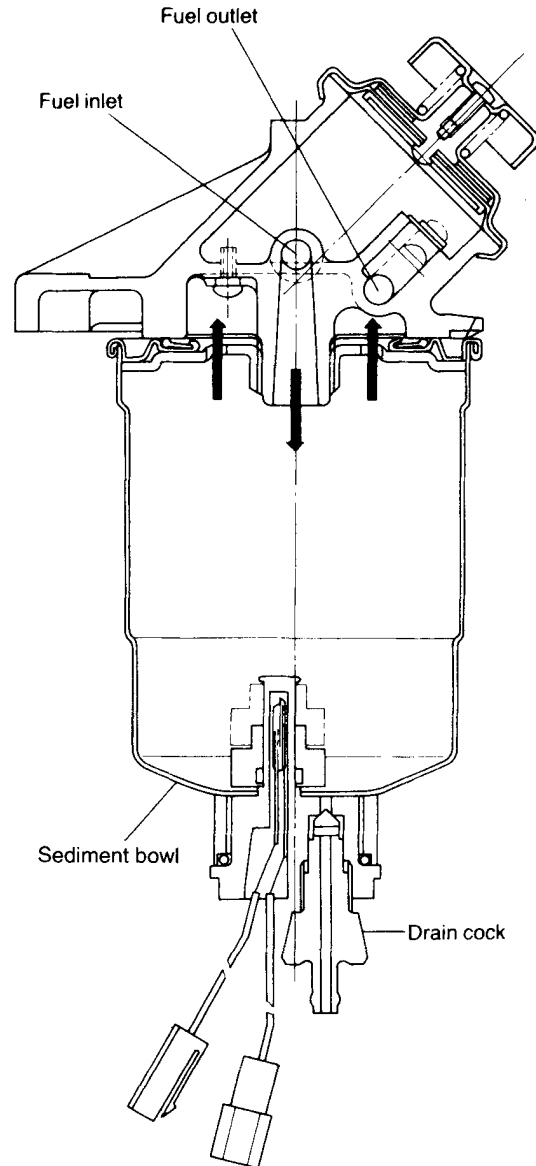
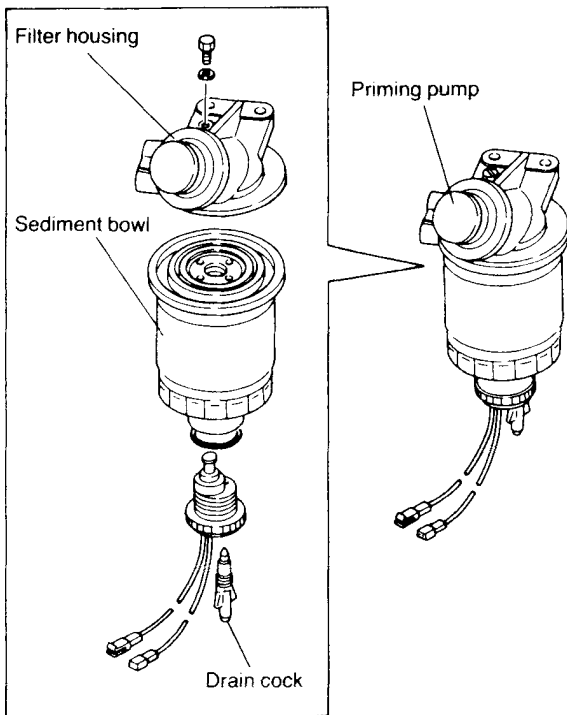
13. Fuel Filter

The fuel filter is installed between the fuel tank and fuel injection pump, and removes dirt/foreign matter and water from the fuel from the fuel tank.

Fuel from the tank enters filter housing inlet and fills the sediment bowl. The fuel is filtered as it passes through the filter element, leaves the housing at outlet, and flows to the fuel injection pump. Sediment and water settle to the bottom of the sediment bowl.

13-1 Maintenance

Every 50 hours operation, remove drain cock and drain sediment bowl.



4LHA-HTE/HTZE/HTP/HTZP

Pre-stroke		0.2			
1. Settings	Pump Speed (rpm)	Settings	Charge-air Press (mmAg)	Difference in delivery (cc)	
1.1 Timing device travel	1000	1.1 - 1.5mm	—	—	
1.2 Supply pump pressure	1000	0.36-0.42(3.7-4.3) MPa(kgf/cm ²)		—	
1.3	Full load delivery without charge-air pressure	1000		80.0 - 81.0 cc/100st	4.7
	Full load delivery with charge-air pressure	—		— cm ³ /1000st	—
1.4 Idle speed regulation	400	11.0 - 15.0 cm ³ /1000st		2.5	
1.5 Start	100	100.0 - 140.0 cm ³ /1000st		—	
1.6 Full-load speed regulation	1840	13.0 - 19.0 cm ³ /1000st		—	
1.7 Load Timer Adjustment	—	— cm ³ /1000st		—	

2. Test Specifications					
2.1 Timing device	N = rpm mm	1000 1.1 - 1.5	1500 2.0 - 2.9		
2.2 Supply pump	N = rpm MPa(kgf/cm ²)	1000 0.36-0.42(3.7 - 4.3)	1500 0.47-0.53(4.8 - 5.4)		
Overflow delivery	N = rpm cm ³ /10s	1000 45.0 - 88.0			
2.3 Fuel deliveries				3. Dimensions	
Speed control lever	Pump Speed (rpm)	Fuel delivery cm ³ /1000sts	Charge-air press.(mmAg)	Designation	for assembly and adjustment mm
End stop	1900	Max. 40	—	K KF MS	3.0 - 3.2 5.4 - 5.6 0.9 - 1.1
	1840	12.5 - 19.5			
	1650	83.5 - 90.5			
	1500	84.8 - 91.8			
	1000	79.5 - 81.5			
Switch-off	100	0	—	α A	21 - 29 deg. mm
	400	0			
Idle stop	400	11.0 - 15.0	—	β B	35 - 45 deg. mm
	500	Max. 8.0			
Partial load	—	—	—	γ C	deg. mm
	—	—			
2.4 Solenoid	max. cut-in voltage: 8V 16V test voltage: 12V-14V 24V-26V		Observations: —		

For detail, ask the ZEXEL.

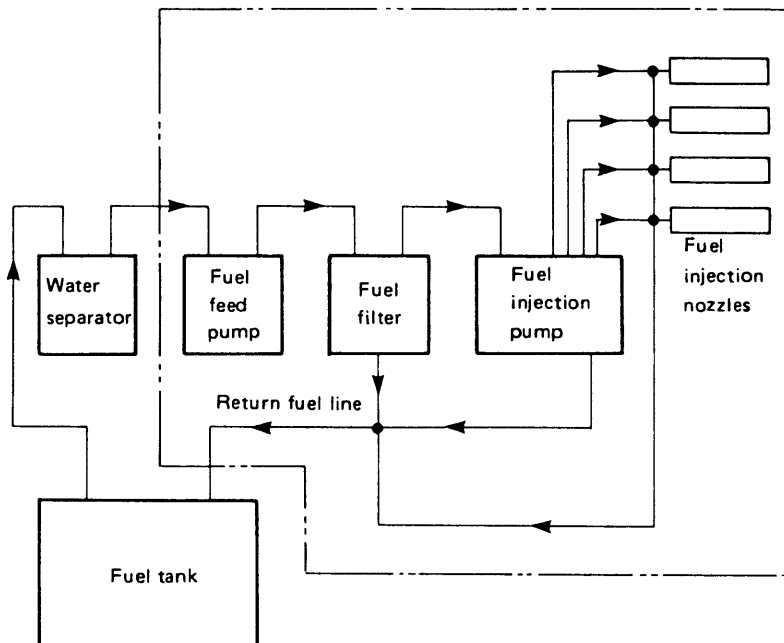
3-2. YPES-AL TYPE

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1. Fuel Supply System

1-1 Fuel supply system

The YPES-AL fuel injection pumps are in-line. The engine gears drive the camshaft via the timing gears. The camshaft then drives the feed pump, pumping fuel from the tank to the filter at a pressure of 0.118(1.2)MPa(kg·f/cm²). The filtered fuel is fed to the reservoir in the pump housing, where the plunger raises its pressure. The fuel then passes through the injection pipe for injection into each cylinder via the fuel injection nozzle.



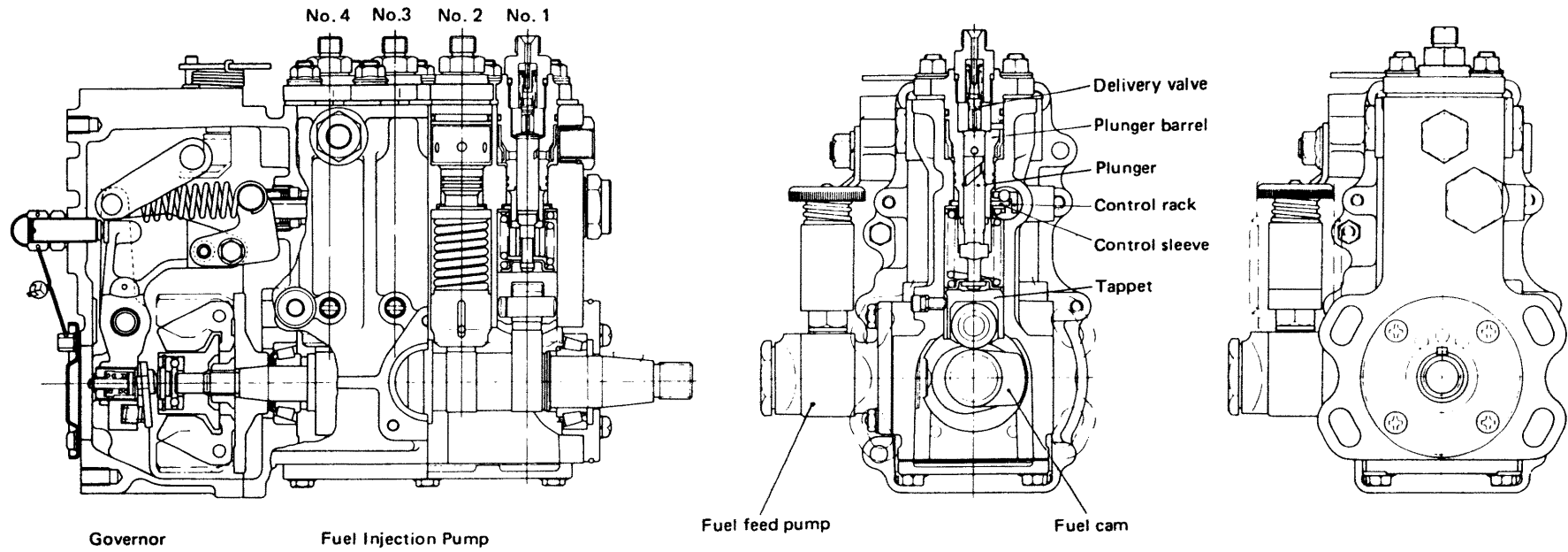
The Model YPES-AL fuel injection pump is an in-line pump with a governor. A camshaft is built into the pump. There are a drive cam for the fuel feed pump and tappet-drive cams for the plunger. A pump driving gear is mounted on the drive side of the camshaft, and a governor weight on the opposite side. As the plunger rises, the fuel oil opens the delivery valve and passes through the high pressure pipe to the fuel injection nozzle. When the control rack is connected to the governor lever moves, the control sleeve turns the plunger. This changes the point at which the helix (lead groove) opens the port and thereby controls the amount of fuel injected.

1-2 Fuel injection pump specifications

Type	YPES-AL
Specifications	<i>See separate service data</i>

Fuel Injection Pump Construction

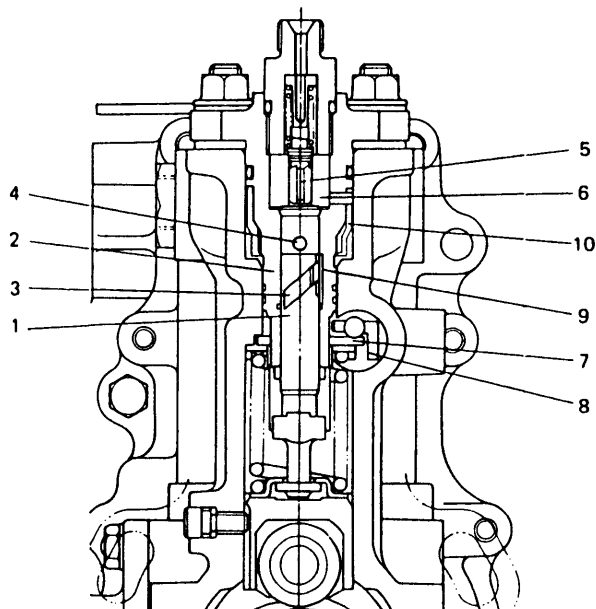
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1-3 Functioning of fuel injection pump

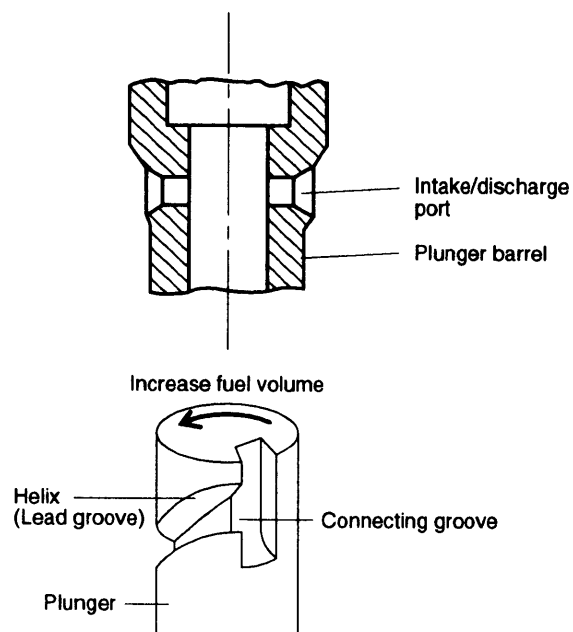
Operator side

Engine side



- | | |
|-------------------|----------------------------|
| 1. Plunger | 6. Delivery valve seat |
| 2. Plunger barrel | 7. Control sleeve |
| 3. Lead groove | 8. Control rack |
| 4. Intake port | 9. Fuel leak return groove |
| 5. Delivery valve | 10. Protector |

leak return hole is provided in the plunger barrel. This returns fuel which leaks through the gap between the plunger and the barrel to the fuel lines, preventing dilution of the lubricant in the cam chamber.



The fuel injection pump supplies pressurized fuel to the injection nozzles through the action of the plunger. The plunger reciprocates in the plunger barrel with a fixed stroke and is lapped for a precise fit. A lead groove is helically cut in the plunger, and this leads to a connecting groove which rises to the top of the plunger.

The integrate plunger barrel, the plunger barrel and the flange case for the delivery valve holder, equips a port for intake and discharge. The injection volume of individual cylinders can therefore be adjusted by rotating the integrate plunger barrel. The fuel comes through this port into the plunger chamber, is pressurized by the plunger, opens the delivery valve, flows to the fuel injection nozzle through the fuel injection pipe and is injected into the combustion chamber. Fuel injection ends when the pressurized fuel has been discharged. This happens when the lead groove lines up with the port, (as the plunger rises and the pressure in the fuel injection pipe drops).

The control sleeve groove is fitted to the plunger flange. The control knob of the control sleeve is inserted in the control rack groove.

The rack controls the plunger, allowing continuous changes in the volume of fuel injected from zero to maximum. A fuel