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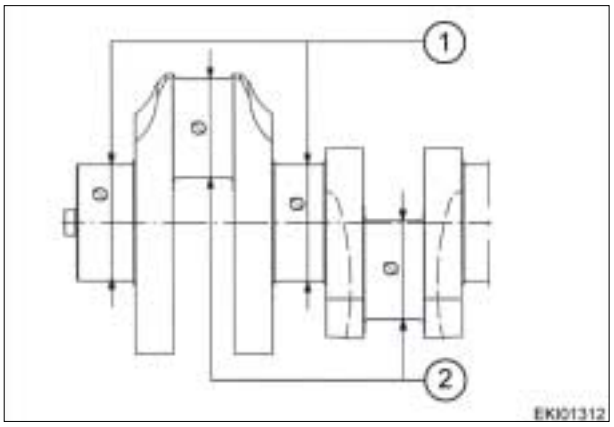
Fav 900	Engine / Generalities **Service Data**	**A**

Crankshaft



1. Dimensions:

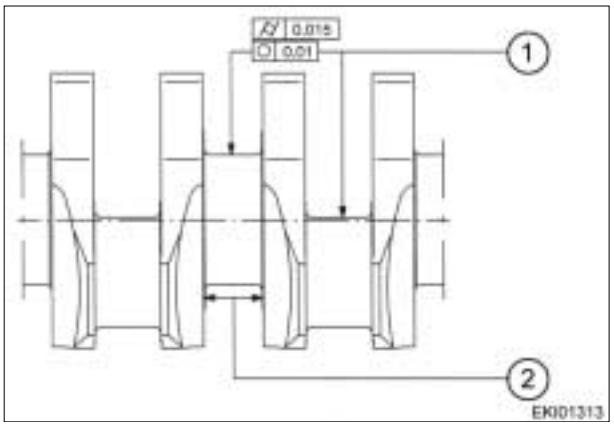
Standard: 76,981-77,000 mm (3.031 - 3.032“)

Under size: 0,10 mm (.004"): 76,881-76,900 mm (3.027 - 3.028")

2. Con-rod bearing journal diameter:

Standard : 69,981-70,000 mm (2.755 - 2.756")

Under size: 0,10 mm (.004"): 69,881-69,900 mm (2.751 - 2.752")



1. For all crankshaft journals:

maximal permissible runout

maximal deviation from conical form

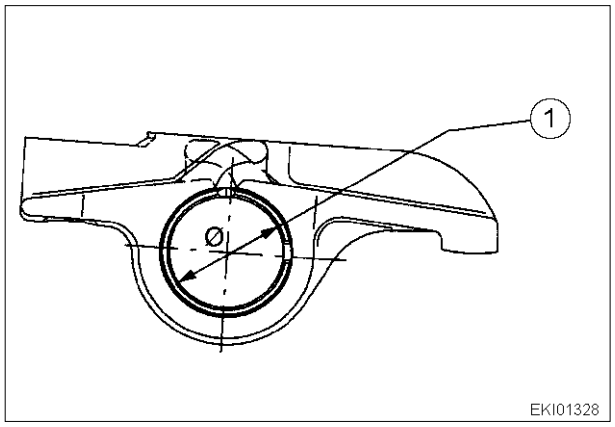
2. Thrust bearing journal width:

Standard size: 34,000-34,062 mm (1.339 - 1.341")

Repair sizes: 34,500-34,562 mm (1.358 - 1.361")

Fav 900	Engine / Generalities **Service Data**	**A**

Valve operation

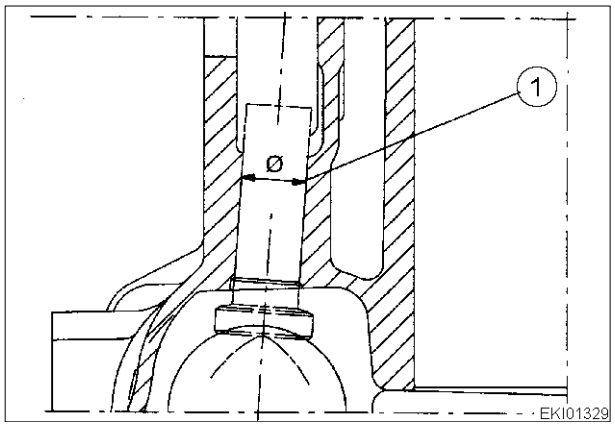


Rocker arm

1. 20,000-20,001 mm (.78740 - .78744")

Diameter of rocker arm bearing: 19,957-19,970 mm (.7857 - 7862")

Wear limit: 0,08 mm (.003")



Valve tappets

1. Tappet housing bore:

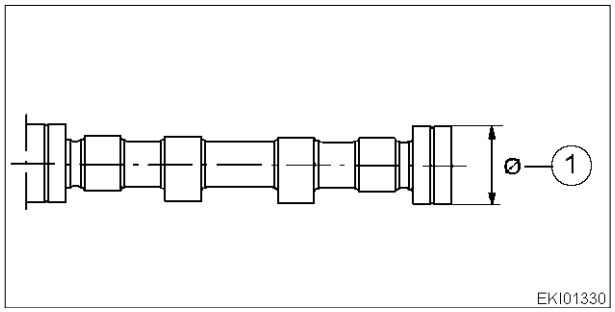
Standard size: 20,000-20,021 mm (.787 - .788")

Oversize: 20,250-20,271 mm (.797 - .798")

Tappet outer diameter:

Standard size: 19,944-19,965 mm (.785 - .786")

Oversize: 20,194-20,215 mm (.795 - .796")



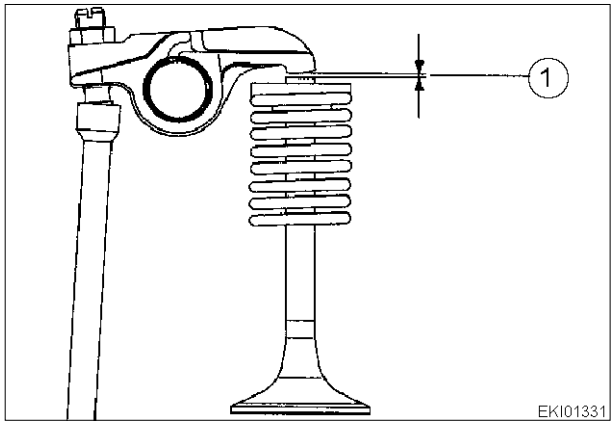
Camshaft

Camshaft bush inner diameter: 55,07-55,14 mm (2.168 - 2.170")

1. 1. 54,91-54,94 mm (2.162 - 2.163")

Camshaft axial diameter: 0,14-0,27 mm (.0055 - .0106")

Wear limit: 1,5 mm (.059")



Valve clearance

1. Adjust when engine is cold.

Intake valve: 0,5 mm (.020")

Exhaust valve: 0,5 mm (.020")

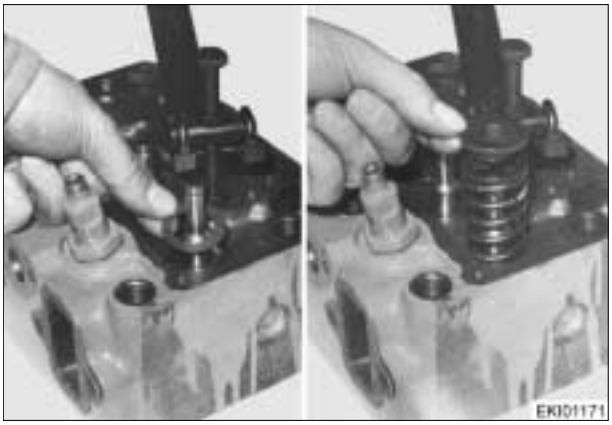
Fav 900	Engine / Generalities **Tightening Torque values**	**A**

Assembly tightening torques to works standard M 3059

External or internal hexagon nuts and bolts, heads without collar or flange.

Tread size * Pitch	Property class / Tightening torque in Nm (lbf-ft)		
	at 8,8/8	at 10,9/10	at 12,9/12
M4	2,5 (1,84)	4,0 (2,95)	4,5 (3,32)
M5	5,0 (3,69)	7,5 (5,53)	9,0 (6,64)
M6	9,0 (6,64)	13,0 (9,59)	15,0 (11,06)
M7	14,0 (10,33)	20,0 (14,75)	25,0 (18,44)
M8	22,0 (16,23)	30,0 (22,13)	35,0 (25,81)
M8*1	23,0 (16,96)	35,0 (25,81)	40,0 (29,50)
M10	45,0 (33,19)	65,0 (47,94)	75,0 (55,32)
M10*1,25	45,0 (33,19)	65,0 (47,94)	75,0 (55,32)
M10*1	50,0 (36,88)	70,0 (51,63)	85,0 (62,62)
M12	75,0 (55,32)	105,0 (77,44)	125,0 (92,20)
M12*1,5	75,0 (55,32)	110,0 (81,13)	130,0 (95,88)
M12*1,25	80,0 (59,00)	115,0 (84,20)	135,0 (99,57)
M14	115,0 (84,20)	170,0 (125,39)	200,0 (147,51)
M14*1,5	125,0 (92,20)	185,0 (136,45)	215,0 (158,58)
M16	180,0 (132,76)	260,0 (191,77)	310,0 (228,64)
M16*1,5	190,0 (140,14)	280,0 (206,52)	330,0 (243,40)
M18	260,0 (191,77)	370,0 (272,90)	430,0 (317,15)
M18*2	270,0 (199,14)	290,0 (213,89)	450,0 (331,90)
M18*1,5	290,0 (213,89)	410,0 (302,40)	480,0 (354,03)
M20	360,0 (265,52)	520,0 (383,53)	600,0 (442,54)
M20*2	380,0 (280,27)	540,0 (398,28)	630,0 (464,66)
M20*1,5	400,0 (295,02)	570,0 (420,41)	670,0 (494,17)
M22	490,0 (361,40)	700,0 (516,29)	820,0 (604,80)
M22*2	510,0 (376,16)	730,0 (538,42)	860,0 (634,30)
M22*1,5	540,0 (398,28)	770,0 (567,92)	900,0 (663,80)
M24	620,0 (457,29)	890,0 (656,43)	1040,0 (767,06)
M24*2	680,0 (501,54)	960,0 (708,06)	1130,0 (833,44)
M24*1,5	740,0 (545,8)	1030,0 (759,69)	1220,0 (899,82)

Fav 900	Engine / Cylinder head **Removing and refitting valves**	**G**



Turn cylinder head over.

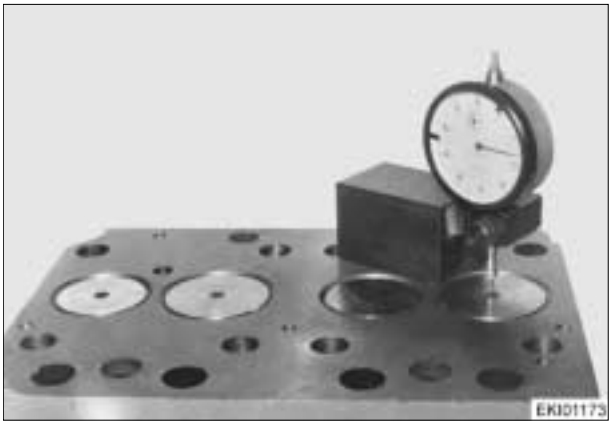
Place valve fitting lever.

Fit washer, valve spring and upper spring plate.

Compress spring with fitting lever and insert collets.

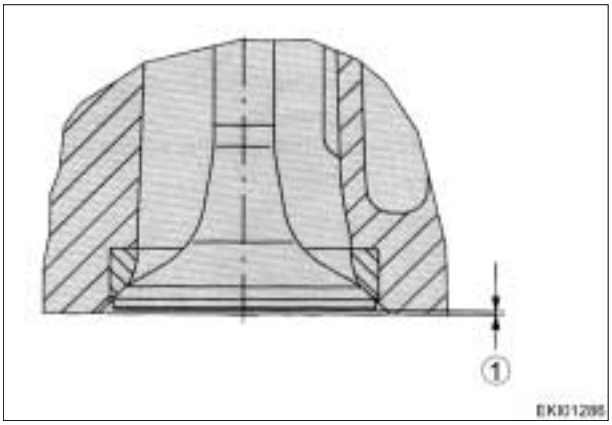
Note:

Make sure collets fit properly: they can cause severe damage by springing out.



Measuring valve recess

- Position gauge holder with dial gauge at the cylinder head.
- Press tip of gauge onto cylinder head.
- Set dial gauge at "0".
- Swing gauge towards valve head and read recess.



If after skimming the cylinder head faces, valve recess is inadequte or valve projection is excessive, the valve seat insert must be re-ground.

1 Valve recess

Note:

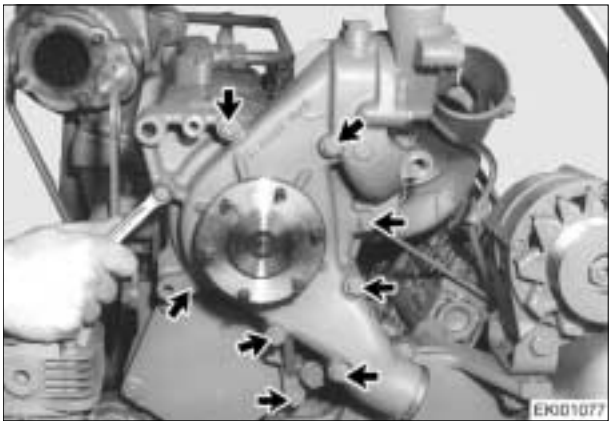
- When skimming the cylinder head sealing face, the max. dimension must not exceed 1 mm (0.039“).

- After skimming, observe injection nozzle projection. Replace standard - copper sealing ring with a thicker one.

Fav 900	Engine /Cooling system **Removing and refitting water pump**	G

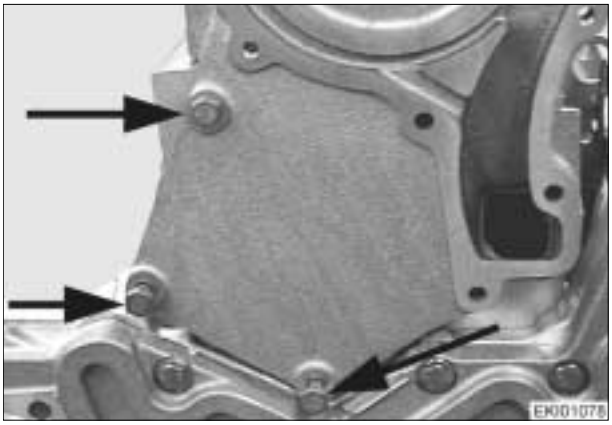
Removing the pump lift section

- Drain coolant.
- Unscrew fan
- Remove feed and drain lines.
- Remove V-belt.
- Remove cooling lines to air compressor
- Remove generator belt tensioner screw (1) top left
- Remove generator pod (2) on the top left
- Remove hub of Viscosity clutch



Unsrew and remove pump lift section.

Clean sealing faces of pump lift- and delivery sections.



Removing the pump lift section

Remove three screws (arrows) and remove the pump lift section.

Clean sealing faces of pump lift section and engine block.

Refitting the water pump lift section

Install pump lift section with new gasket.

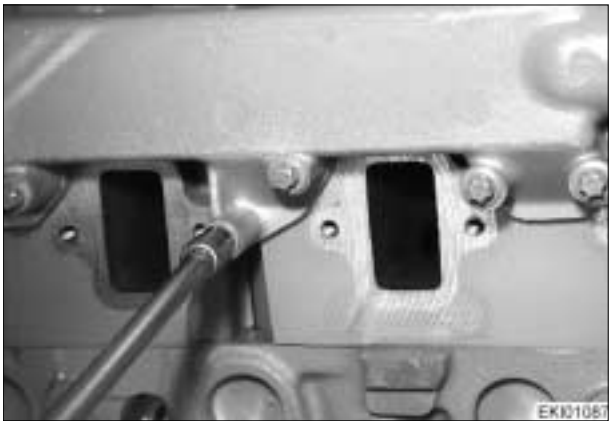
Tighten screws to specified torque.

Fav 900	Engine / Cooling system **Removing and refitting coolant pipe**	**G**

Removing the coolant pipe

Drain coolant while engine is cold. Use a clean pan with sufficient capacity

- Remove injection lines
- Remove intake pipe
- Disconnect temperature sensor

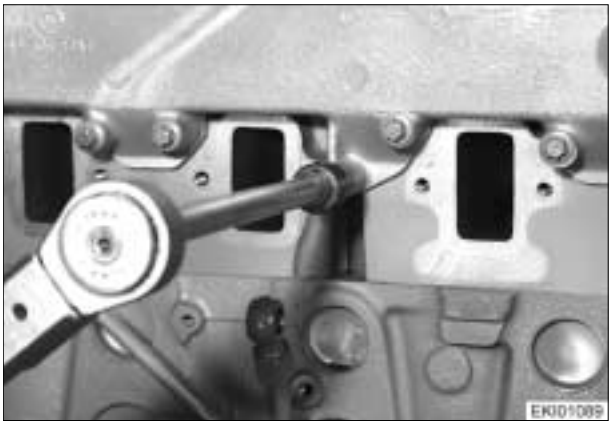


Unscrew and remove coolant pipe.

Remove gasket and clean all sealing faces.

Refitting the coolant pipe

Replace O-Rings of connecting pipe. Fit coolant pipe using new gaskets.



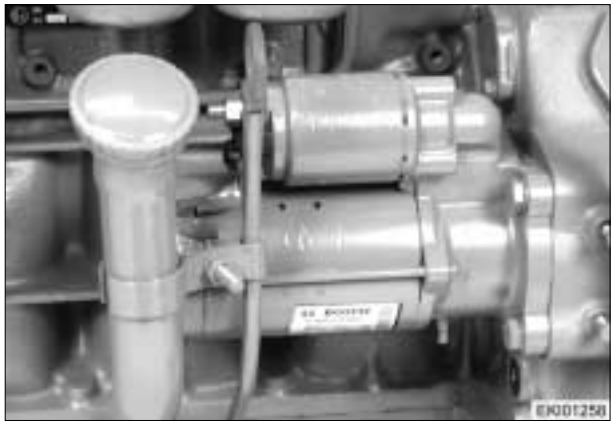
Insert screws and tighten to specified torque.

Note:

Insert the longer screws into the brackets for injectors.

- Reconnect temperature sensor,
- Refit intake pipe.
- Refit injection lines.
- Fill up with coolant.

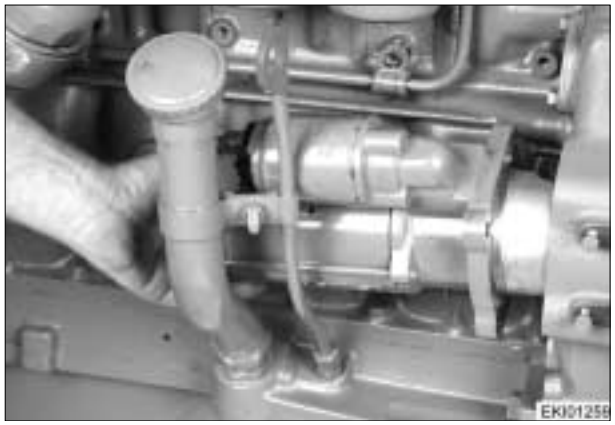
Fav 900	Engine / Short block **Removing and refitting the starter engine**	**G**



Removing the starter

Disconnect earth terminal from battery.

Remove cables terminal 30 (thick cable) and terminal 50 from the starter.



Unscrew the screws and a nut from the starter motor flange and remove the starter motor.

Clean exterior of starter engine and check for damage.

Check flywheel ring gear for wear and damage by actuating the crankshaft by hand.

Check in particular the points which final engine oscillations occur ; i.e. when turned off, there are points where the engine comes to rest.

The starter engine pinion engages in these positions during start up.

On 6-cylinder engines these points are staggered by 180° ; i.e. threre are 3 points.

To replace the starter ring gear see chapter 2000 Reg G.

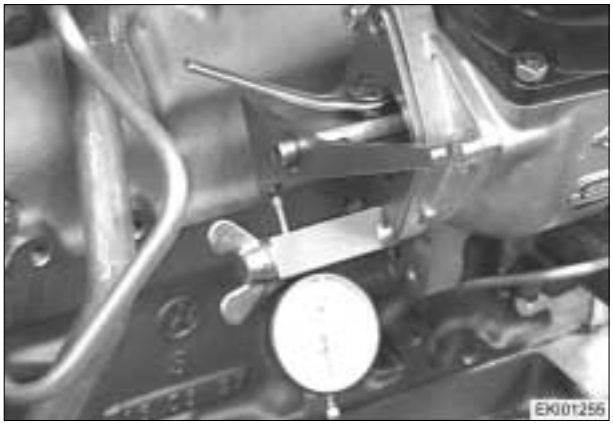
Refitting the starter

Refit the starter in reverse order of removing, making sure cables are connected correctly. Observe torque values.

Reconnect battery.

On completion, check starter for correct functionning.

Fav 900	Engine / Short block **Removing and refitting air compressor**	**G**



- Mount dial gauge onto the rear part of the compressor.
- Place shaft extension with dial gauge lever onto drive fork and tighten it in such a manner that the scanning finger of the dial gauge rests without clearance on the gauge lever.
- Turn softly lever with slight pressure axially toward the compressor shaft from one end to the other.

The pinion clearance can be read on the dial gauge.

If the pinion clearance is not OK , then it needs to be adjusted.

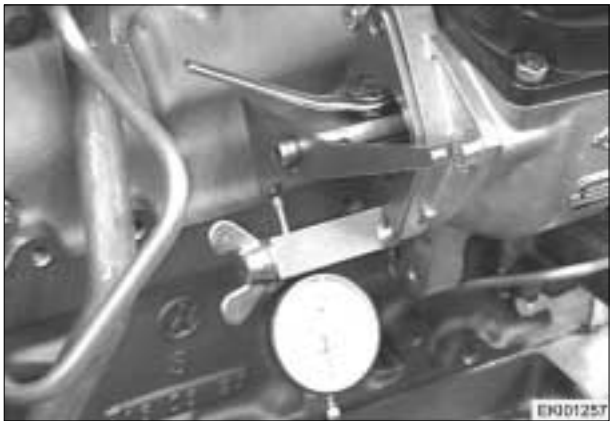
Checking backlash

Check backlash between drive wheel and camshaft timing gear by manually turning the knurled collar.

Read off result on the gauge and compare with admissible value.

- Unscrew screws as long as the bearing flange and position over drive shaft until the compressor can be actuated easily by turning the flange on the lever .
- By turning the eccentric the pinion clearance must be adjusted between 0,1 - 0,15 mm .

Note:
Position of level
upper = max clearance
down = minimum clearance

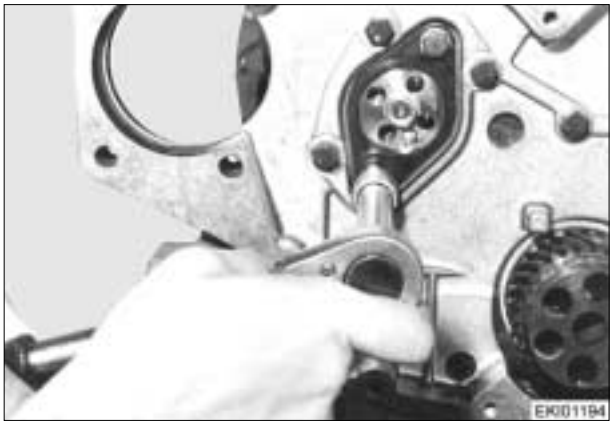


- Screw in 3 front screws and rear screws in three steps at the specified torque.
- Refit oil feed line, air intake line and compressor air line.

Screw the frame support bracket.

Refit hydraulic pump or rear end cover.

Fav 900	Engine / Short block **Removing and refitting camshaft**	**G**

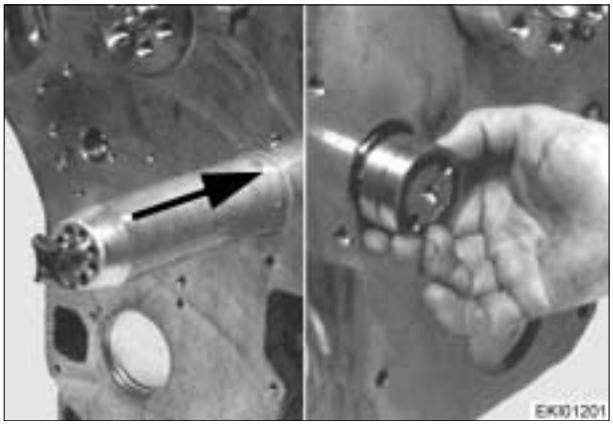


Removing camshaft

- Remove oil pan
- Remove timing case cover, idler gear and camshaft gear.
- Remove flywheel housing
- Remove rocker arm assembly and pushrods.

Unscrew axial stop screws and remove axial stop.

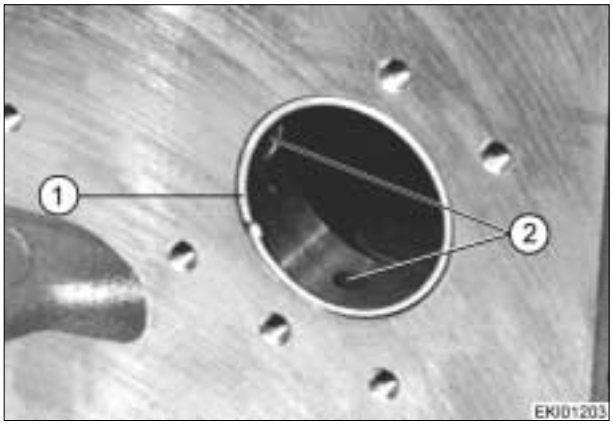
Note:
Following photographs show the driving gears and timig case removed. The camshaft can be replaced without removing these parts.



Put engine upside down in order to have the pushrods sliding toward the cylinder head in such a manner that they will not disturb the removing operation of the camshaft!

With a special mandrel push out camshaft from the timing case end, at the same time guiding it at the flywheel end.

Check tappets, replace if necessary.



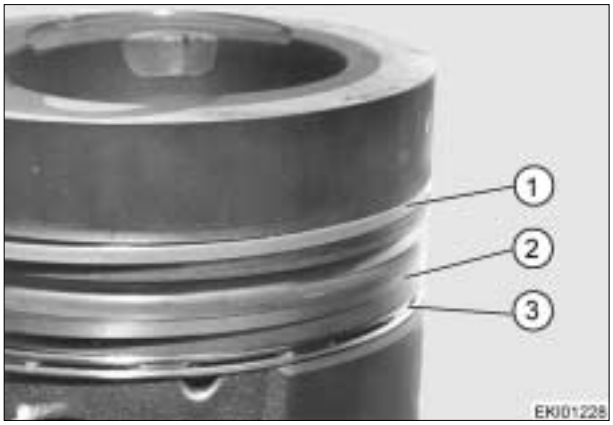
Replacing camshaft bearings

Using a mandrel, drive out camshaft bushes.

Note:
Crankshaft must be removed.

Note:
On the new bushes the notch must be facing the fan end, and the oil channels should be aligned with those in the timing case.

Fav 900	Engine / Short block **Removing and refitting the piston rings**	G



Piston ring arrangement

1. Compression ring (keystone ring)
2. Compression ring (chamfered ring)
3. Oil scraper ring (D-ring)

Removing piston rings

Remove piston and con-rod assembly.

Clamp con-rod in a vise, using non-metallic jaws.

Set piston ring pliers to piston diameter.

Position pliers at piston ring gap and pry rings out of the piston ring grooves.

Note:

The spring insert of the oil scraper ring causes greater tangential stress.

Carefully clean piston ring with a small piece of wood.

Avoid damage to piston ring grooves.

Checking end clearance

Fit piston rings to respective cylinder and determine end clearance with a feeler gauge.

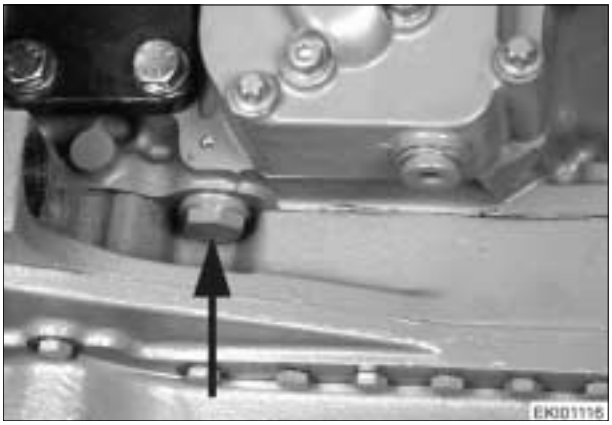
If this is excessive, piston rings must be replaced.

Fav 900	Engine / Lubrication **Removing and refitting oil pump**	**G**

Refitting the oil pump gear.

With the inner core free of grease, slide oil pump gear onto the ungreased drive shaft cone.Fit washer, screw on nut and tighten to specified torque.

Remove the fan frame, Power-belt, vibration damper, air compressor, alternator and the timing case cover.

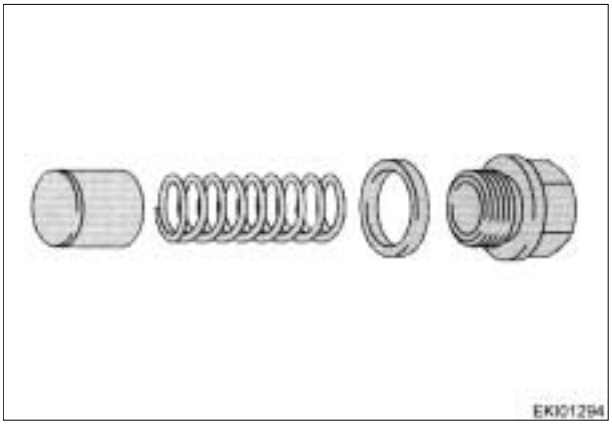


Removing and refitting the pressure regulating valve

Note:
The pressure regulating valve is acessible from the outside.

Unscrew and remove screw plug.

Remove sealing ring, compression spring and piston.

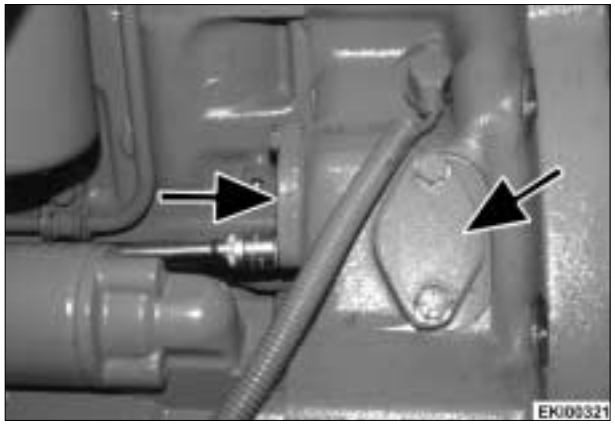


Check valve as illustrated and refit using a new seal.

Assemble valve as illustrated and refit using a new seal.

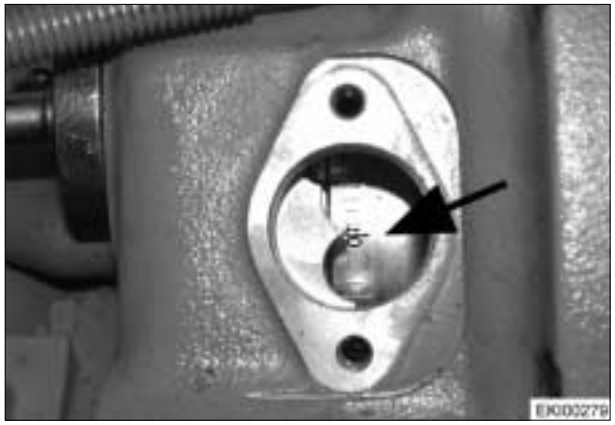
Tighten screw plug to the specified torque.

Fav 900	Engine / Injection Pump **Fuel Injection Pump VP 44 - Mounting - Dismounting**	**G**

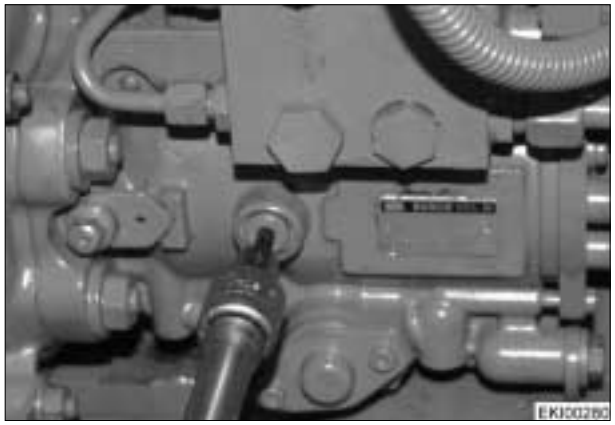


Remove cover (arrows - left engine side).

Put actuation tool (X 899.980.220.000) into place

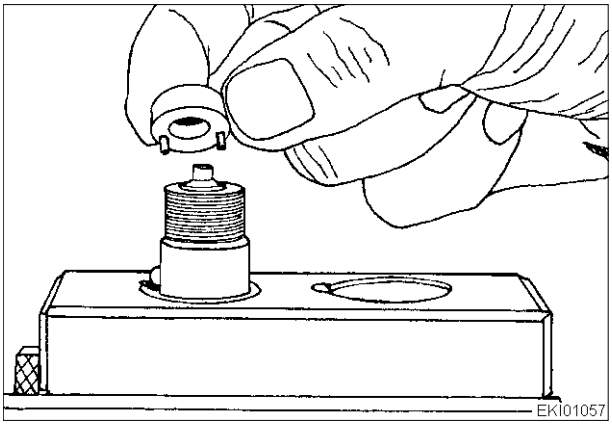


Set first cylinder into Top Dead Point position (TDP) (Arrow) using actuation tool.



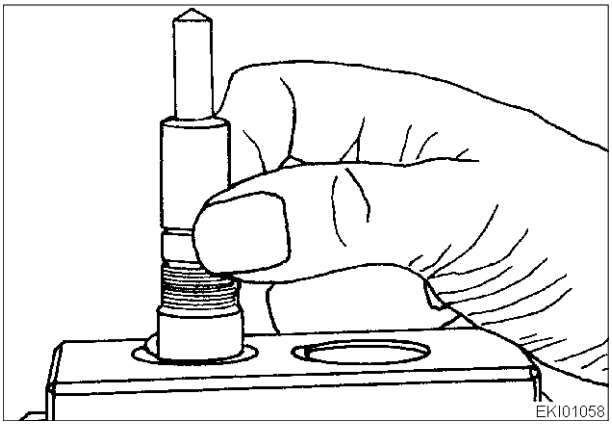
Remove screw TDP Measuring Point.

Fav 900	Engine / Injection valves **Checking injection nozzles**	**E**



Terst intermediate washer for wear.

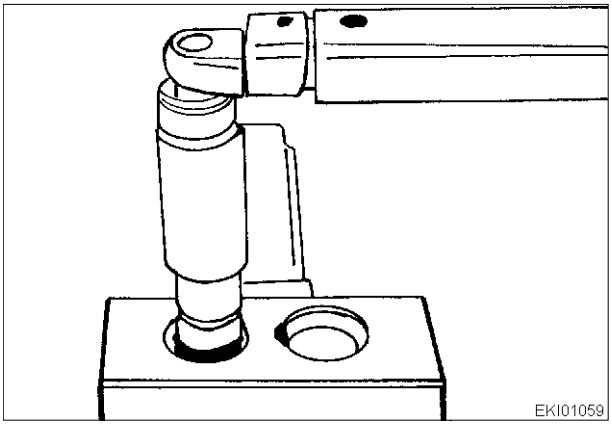
Fit pressure pin and intermediate washer.



Dip nozzle and needle separately into filtered diesel fuel, and check slide resistance.

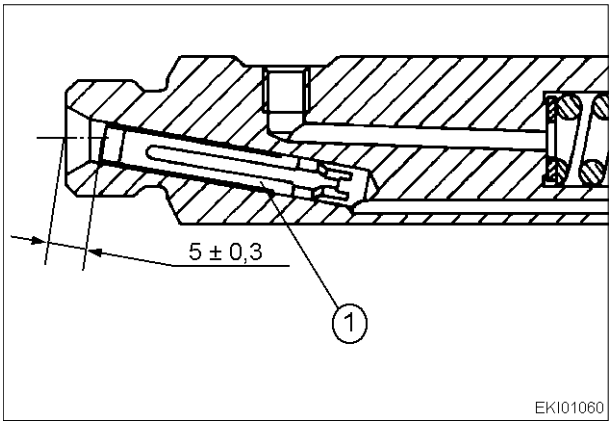
When the needle is withdrawn from the nozzle body by one third and released, it must drop back into the position by its own weight.

Fit injection nozzle observing the location of pins.



Screw on threated union and tighten to specified torque.

Check injection nozzle on the test appliance.



Observe correct seating of filter in the nozzle holder.

The cause for these problems may well be due to an off-center filter in the nozzle holder. The injection flow is throttled and slowed down, leading to engine problems.

Always measure the press-in depth of the filter in the nozzle holder inlet.

The permissible press-in depth is approx. 5 mm (.197").

If the filter can be inserted further, the nozzle holder must be replaced.