

CBEA/CJAA Timing belt procedure

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Required tools:

1. Securing pin 3359 (you need two of them!)
2. Crankshaft stop T10050
3. Counter-hold tool T10172
4. Special wrench, long reach T10264
5. Locking tool T10265
 - Security key for lug nuts
 - Set of torx bits
 - Set of XZN (Triple square) bits
 - Jack stands
 - Torque wrench(es) 10Nm-120Nm capacity
 - Floor jack or fender mounted engine hanger



If you have a Metalnerd BEW timing belt tool kit and an ALH timing belt tool kit (only need the 3359 and counterhold) you're covered on the special tools!

Required parts:

Part	Part number
1 Timing belt	03L 109 119 D
2 Water pump	03L 121 011 B
3 Timing belt tensioner	03L 109 243 E
4 Large roller	03G 109 244
5 Small upper roller	03L 109 244 C
6 Small lower roller	038 109 244 J
7 Accessory belt	03L 903 137 E

Required hardware:

Part	Part number	Description	Qty
8 Camshaft sprocket bolt	N 107 158 01	M8x23	3
9 Engine mount bracket bolt, front	N 106 802 03	M10x75	1
10 Engine mount bracket bolt, lower	N 910 077 03	M10x90	1
11 Engine mount bracket bolt, upper rear	N 106 833 01	M10x115	1
12 Harmonic balancer bolt	N 910 488 02	M8x37	4
13 HPFP sprocket bolt	N 107 209 01	M8x28	3
14 Large roller bolt	N 106 999 01	M10x45	1
15 Mount to body bolt	N 105 167 02	M10x55	1
16 Mount to body bolt with threaded stud	N 910 296 01	M10x55	1
17 Mount to engine bracket bolt	N 105 524 02	M12x70	2
18 Small lower roller nut	N 015 083 15	M8 x 1.25, 13mm hex	1
19 Small upper roller bolt	N 106 756 02	optional - need not replace	1
20 Tensioner lock nut	038 109 454 A	M8 x 1.25, 15mm hex	1
21 Water pump bolt	N 909 450 02	optional - need not replace	3



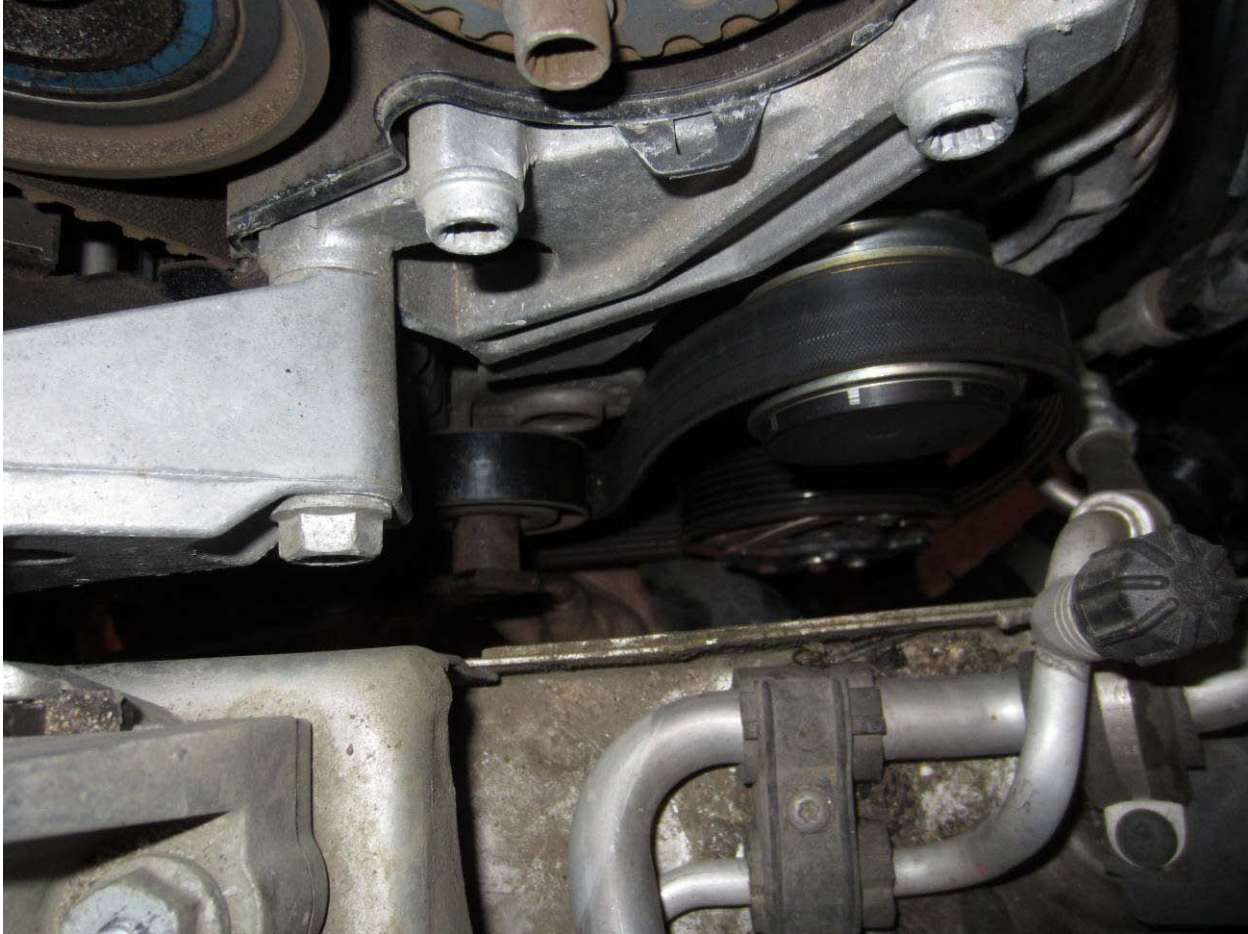
Procedure:

*Adjustments to the tension of the toothed belt tension must be done with the engine cold.

1. Remove engine cover. Gently pull straight up at the four corners of the engine cover.
2. Remove coolant reservoir cap and remove coolant level sensor connector.
3. Remove belly pan (9 x T25, 3 x T30)
4. Remove passenger wheel well liner, lower (3 x T25)
5. Remove passenger wheel well liner & mudflap (T25)
6. Remove oil pan surround (Torx or clips)



7. Remove ribbed belt (16mm on the tensioner). Rotate tensioner clockwise to release tension on belt.



8. Disconnect lower radiator hose (passenger side, above charge air tubing) and drain coolant.
9. Disconnect coolant return line from coolant reservoir, unclip from harness and lay onto top of engine.
10. Unbolt coolant reservoir (2 x T25)
11. Recap coolant reservoir
12. Unbolt washer fluid reservoir fill neck (1 x 10mm)

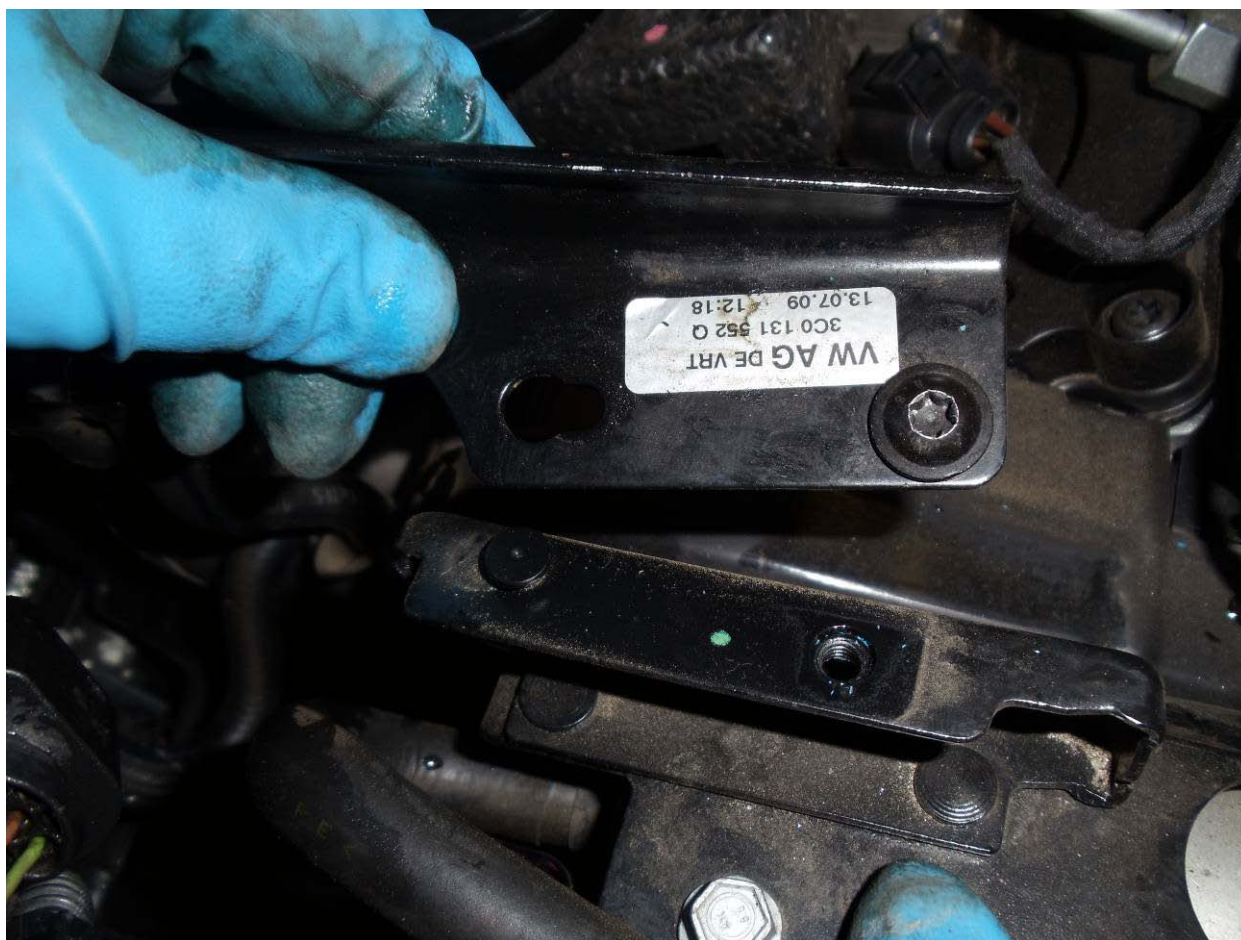
13. Remove two bolts holding auxiliary pump surround to aux pump bracket (2 x 10mm) and separate the case slightly. Using a pick, depress button and slide vertically to remove the line retainer from aux pump bracket. Remove fuel lines from plastic clip. Put the case back together and reinstall the two bolts.



14. Disconnect connector for exhaust pressure sensor (A)
15. Disconnect connector for auxiliary fuel pump (B)



16. Remove bolt (1 x T30) and slide exhaust pressure sensor bracket to front of car. Sensor will stay connected to hoses and bracket. Lay out of the way near the rear of the head.



17. Remove bolts holding aux pump bracket to motor mount (2 x 10mm XZN)



18. Unbolt fuel filter (2 x 10mm bolt and 1 x 10mm nut)

19. Unclip coolant line from plastic bracket attached to fuel filter



20. While lifting the aux fuel pump and the fuel filter, slide the coolant reservoir and supply line out from underneath and place onto the engine (can also remove reservoir if you prefer)



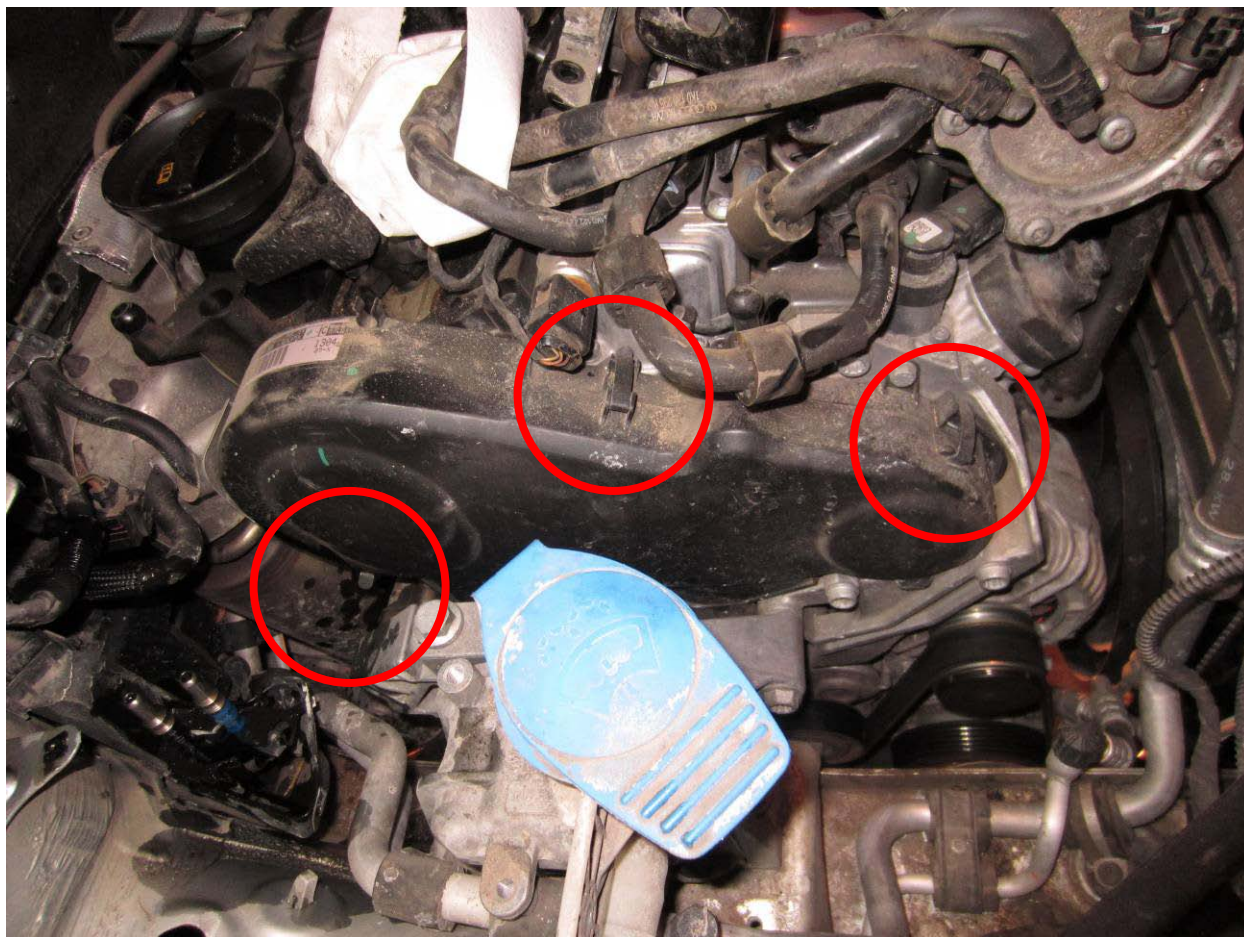
21. Remove fuel lines from clips by squeezing two small buttons on each side. Loop a piece of fuel line onto the exposed metal lines and place the hose ends in a rag. Notice the hose clamps on the lines are color coordinated with the hard line to which they attach. Supply = black hard line and hose clamp Return = blue hard line and hose clamp.



22. Place aux fuel pump and filter over onto the engine



23. Remove timing belt cover (3 clips)

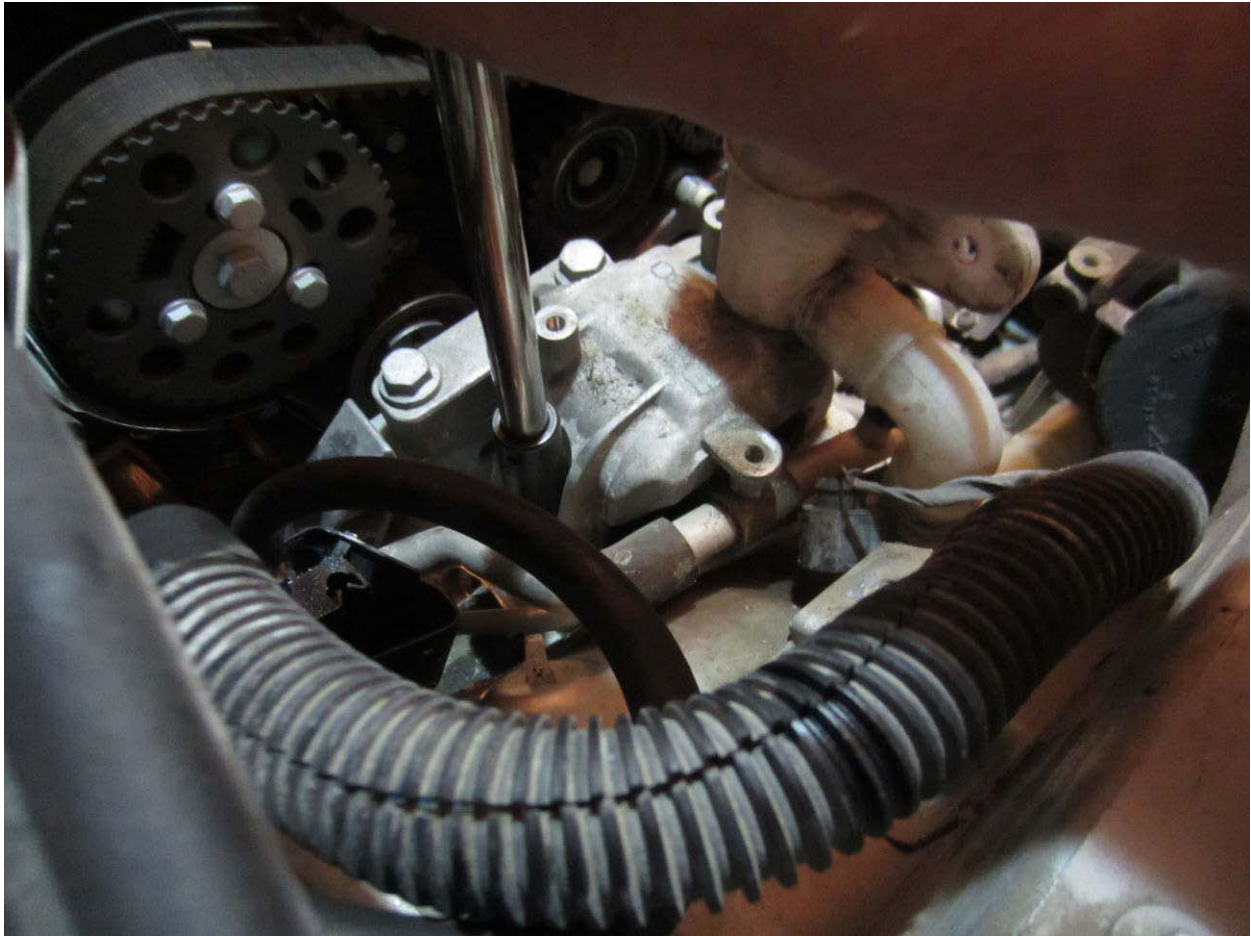


24. Remove body to engine mount bracket (2 x 13mm)



25. Support engine (floor jack and large block or fender-mounted engine support) and lift slightly to take weight of engine off passenger mount

26. Remove engine mount to body bolts (2 x 16mm)



27. If the mount does not rise slightly off the body once these bolts are removed, raise higher with your support of choice (#25).

28. Remove engine mount to engine bracket bolts (2 x 18mm)

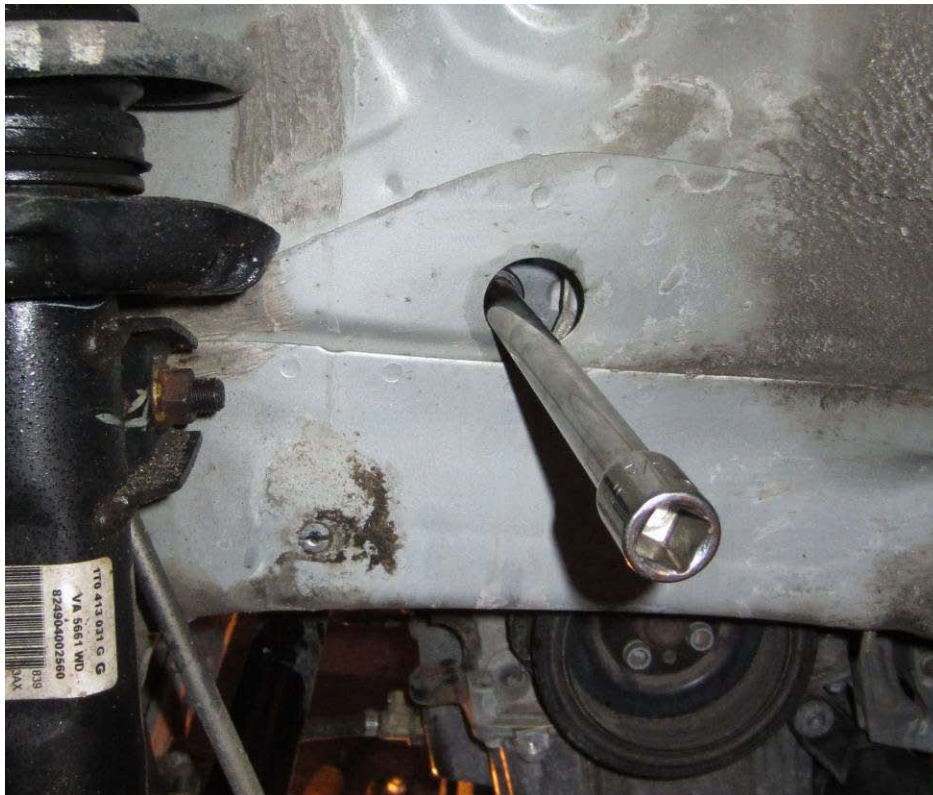


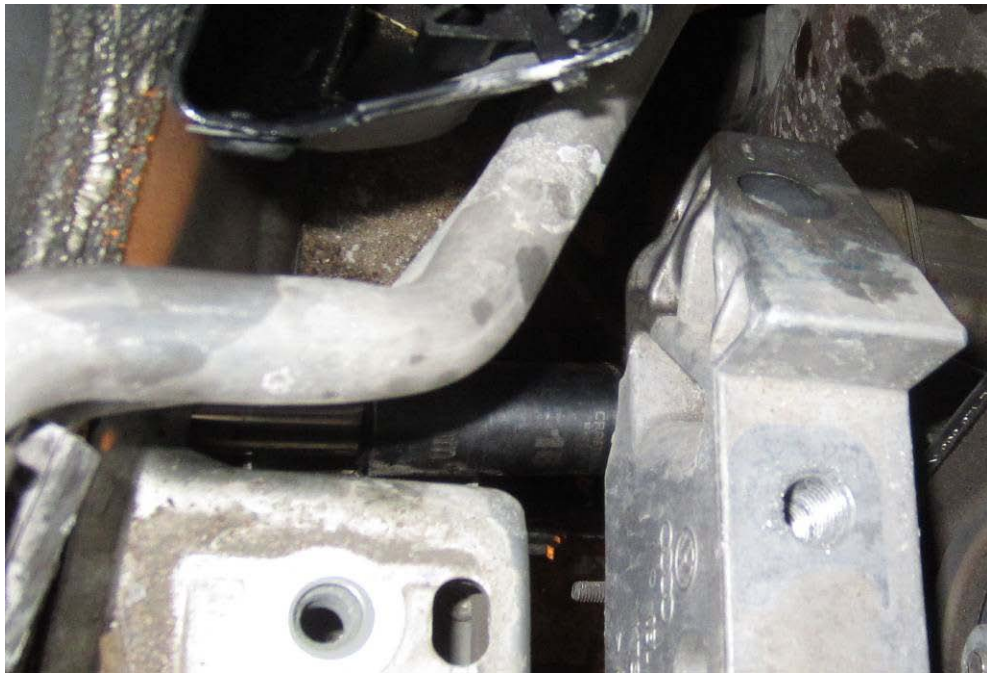
29. Remove engine mount from car.

30. Jack engine up until front horizontal bolt is accessible on the engine mount bracket. Remove bolt (16mm)



31. Lower engine until rear horizontal bolt is accessible through the hole in the fender. Remove bolt (16mm)



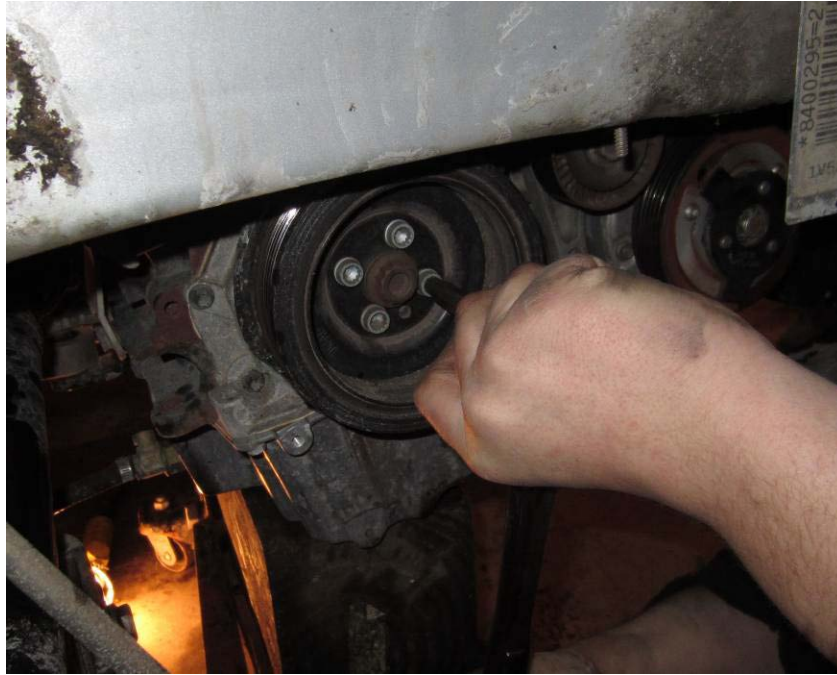


- 32.** Lower engine again until lower bolt is accessible from below the frame rail. Remove bolt (16mm deepwell) and remove bracket from car.

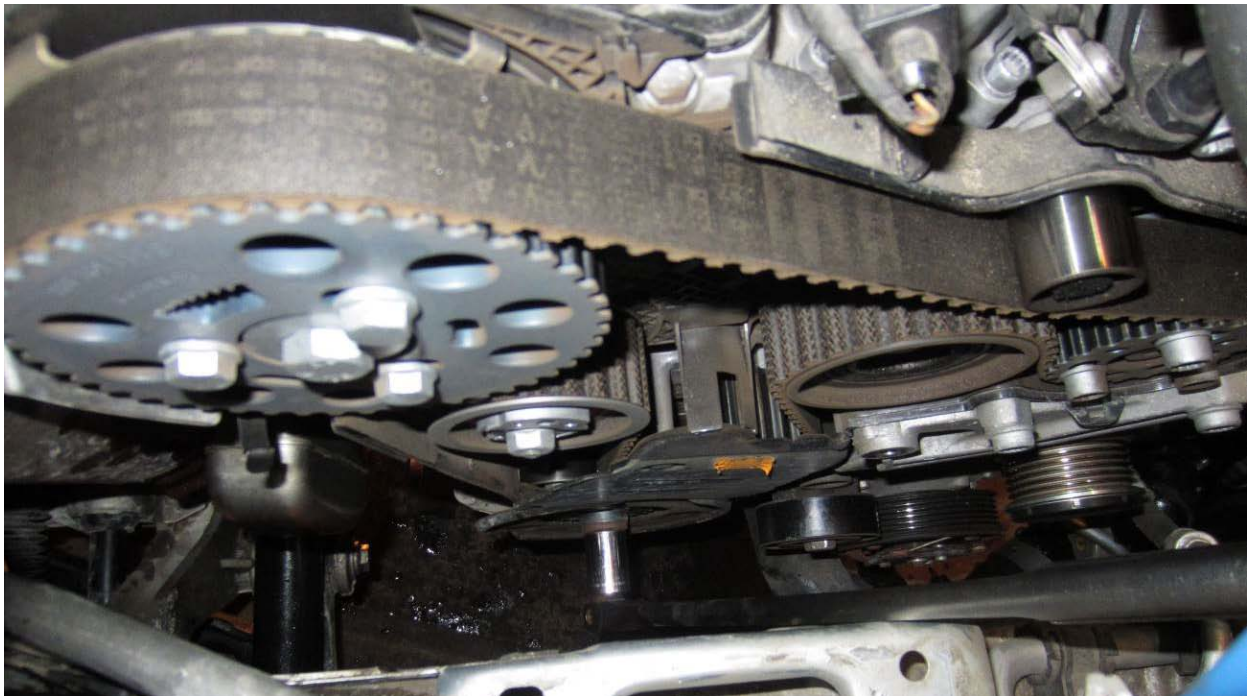


- 33.** Once out, tap bracket on the ground while holding upside down to empty any aluminum shavings in the two vertical bolt holes

- 34.** Remove vibration damper (4 x 10mm XZN)

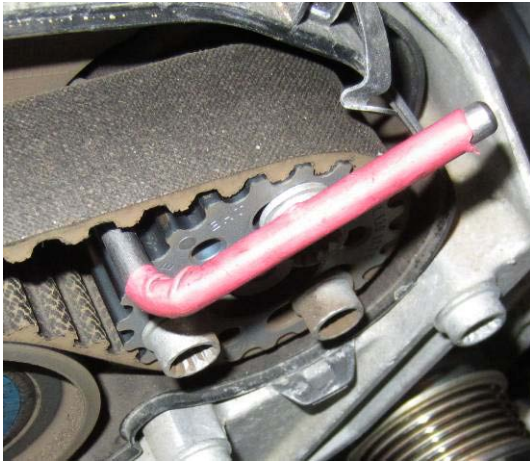


- 35.** Remove lower and center sections of the timing belt cover (5 x 10mm)
36. From above, rotate engine clockwise via the crankshaft center bolt (19mm, 12pt) until cam is shown as below and insert 3359 pin. Camshafts are now locked at TDC





- 37. Loosen cam sprocket bolts (3 x 13mm) but do not remove
- 38. Again using the crankshaft center bolt, rotate the engine until the second 3359 pin can be inserted into the HPFP sprocket



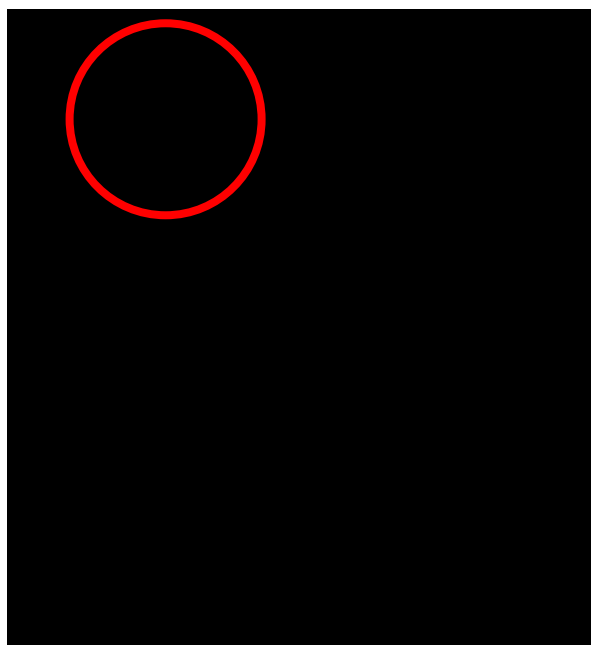
- 39. Loosen HPFP bolts (3 x 10mm XZN)



40. Loosen tensioner nut (15mm) but do not remove
41. Using the T10264, rotate the tensioner counterclockwise until the pin hole can be seen. Insert T10265 into pin hole.
42. With T10265 inserted now use T10264 to rotate the tensioner clockwise until it stops. Tighten tensioner nut by hand.



Make note of tension indicator relative to slot. With the pin inserted and the tensioner rotated fully clockwise, the indicator should be far to the right of the slot. In this condition, the tensioner is rotated out of the way to provide as much slack in the belt as possible and DOES NOT require you to remove a roller to get the belt off.

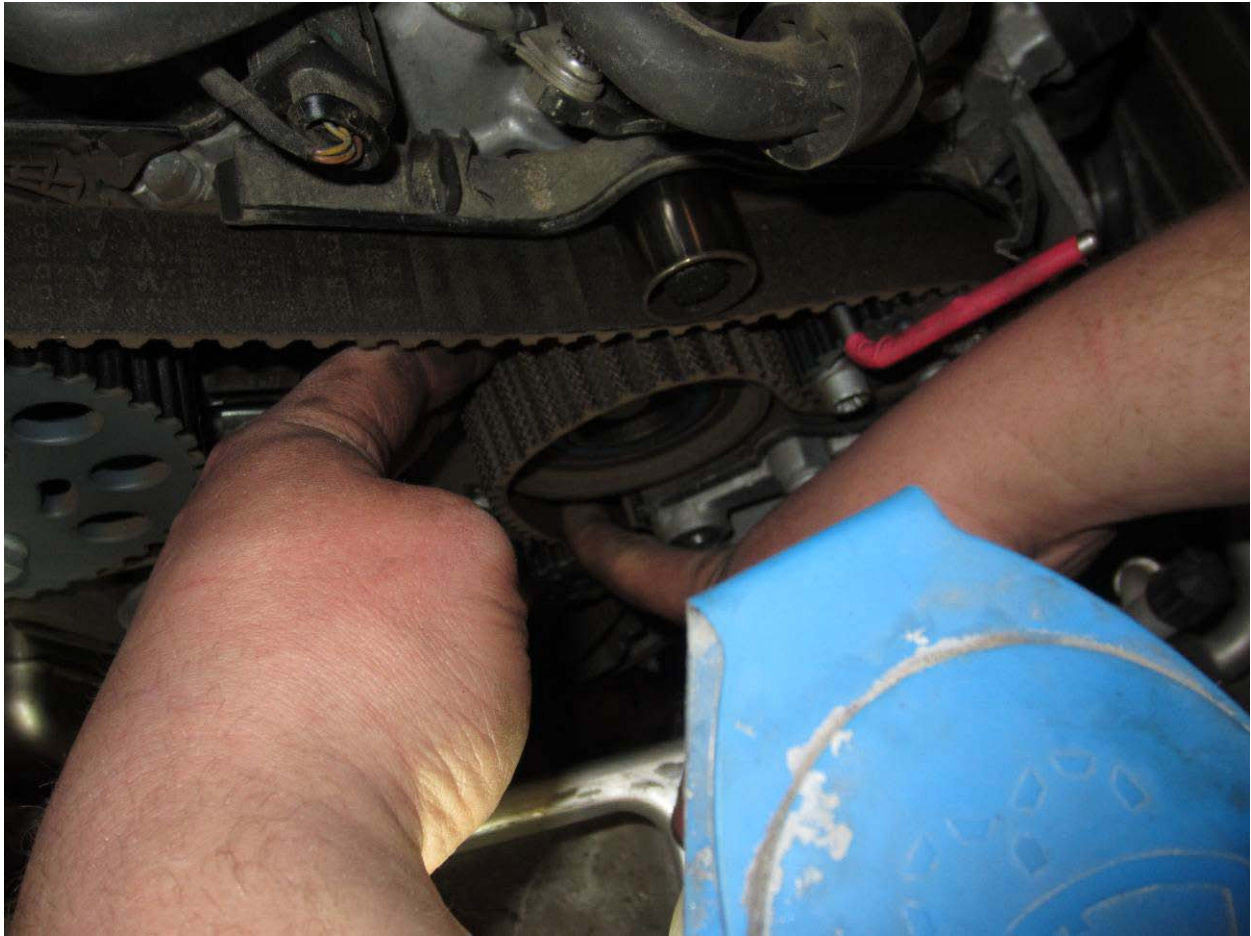


This is the wrong way to use the pin method. As you can see the pin has been inserted but the tensioner has not been rotated clockwise to the stop (indicator is as far left as it can be to the slot). Do it this way and you will not be able to get the belt on or off without removing a component in the timing belt path.

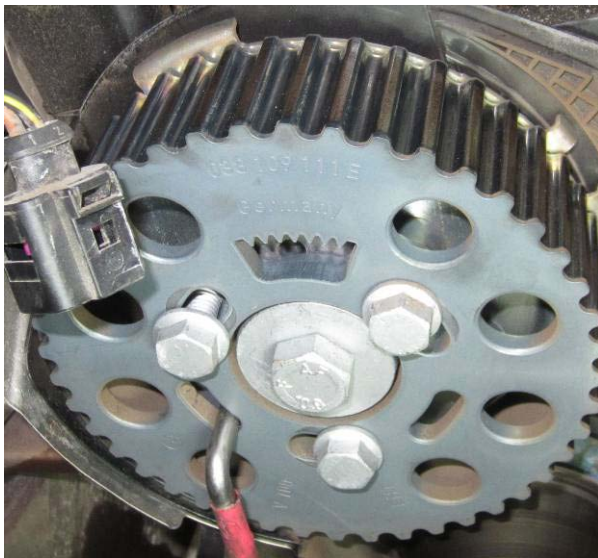
43. Press on the belt just below the large idler to create slack in the belt.



44. Slip belt off the large idler first and remove timing belt.



45. Rotate camshaft and HPFP sprockets clockwise to their stops.



- 46.** Remove small upper idler (13mm), smaller lower idler (13mm), large idler (16mm), tensioner (15mm), water pump (10mm). Here is the setup I used to pry the water pump out. Be ready with a catch can for remaining coolant in block to drain out.

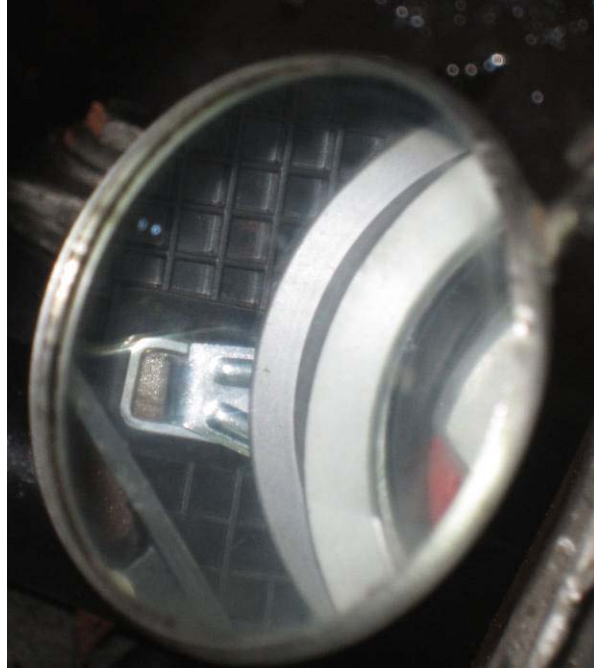


- 47.** Check for any residue at the sealing surface of the water pump. If present clean with fine grit sand paper.



- 48.** Install water pump (3x 10mm) 15Nm and clean up any residual coolant left over from water pump removal.
49. Install small upper roller (13mm) 25Nm, smaller lower roller (13mm) 20Nm, large roller (16mm) 50Nm + 90°.

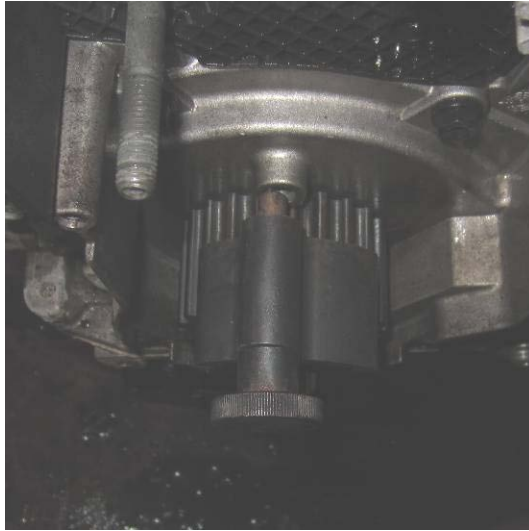
- 50.** Install tensioner and thread the nut down enough to engage the tensioner tab – ensure this is inserted into the slot (7 O'clock position)



- 51.** Using the T10264, rotate the tensioner counterclockwise until the pin hole can be seen. Insert T10265 into pin hole.
- 52.** With T10265 inserted, now use T10264 to rotate the tensioner clockwise until it stops. Tighten tensioner nut by hand. Again, make note of indicator.



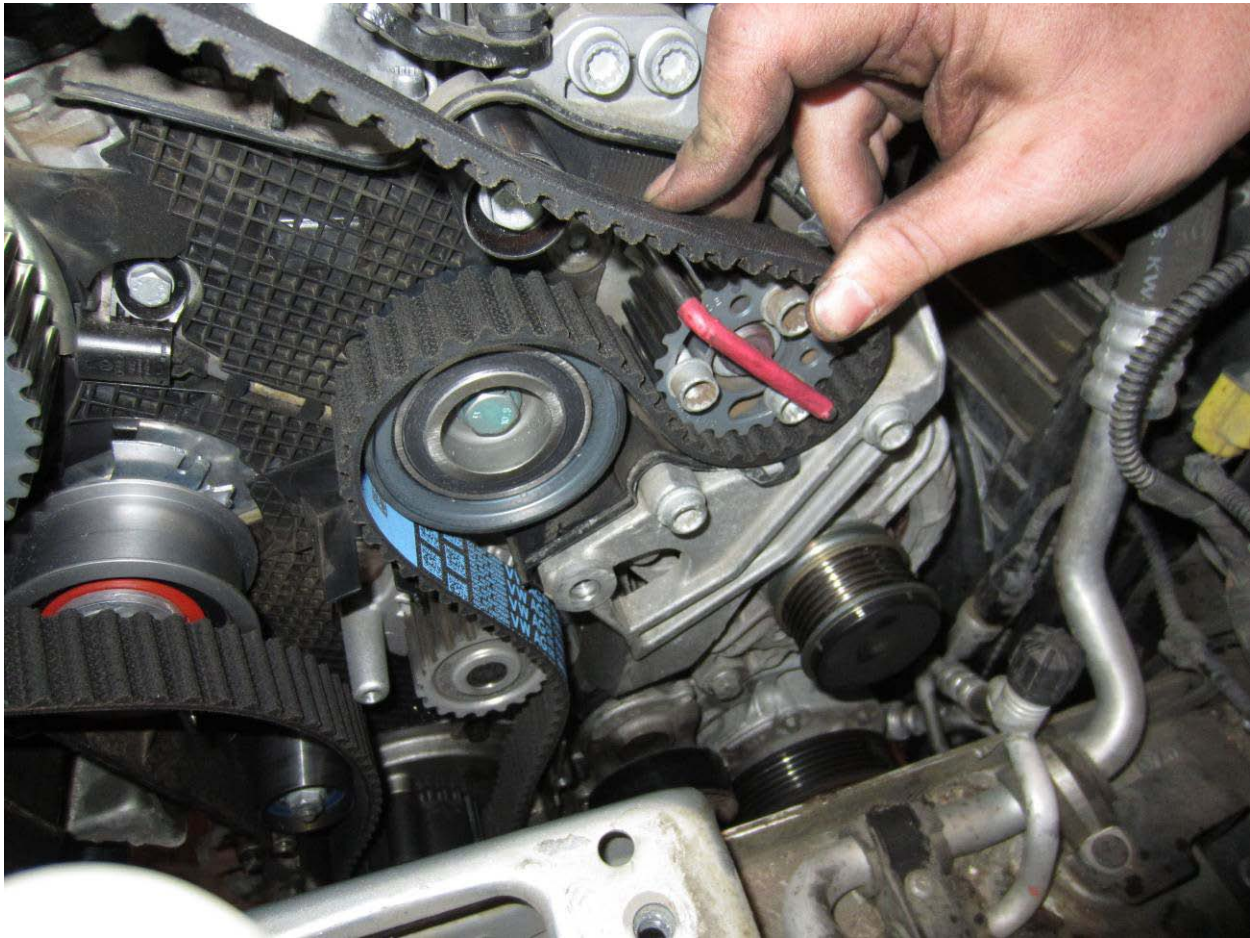
53. Insert crank lock T10050 so the marks align as shown (line on crank gear matches up with arrow on lock) and slide in the majority of the way.
- 54.



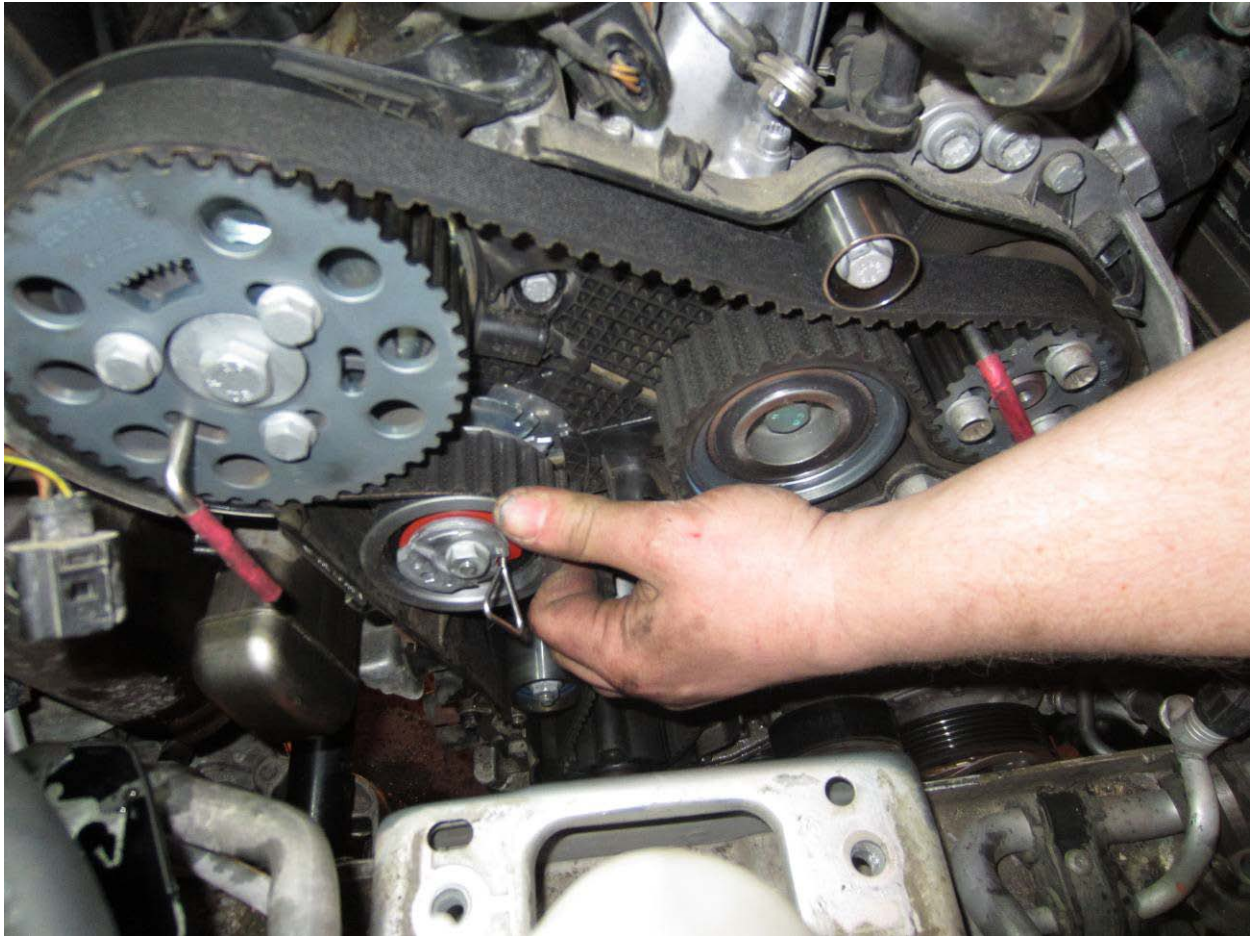
55. Rotate crankshaft until T10050 lock can be inserted into hole on the sealing flange.

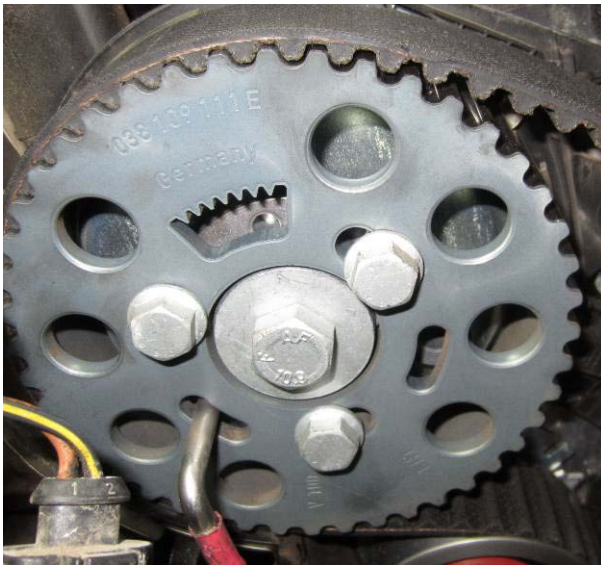


56. Install timing belt by starting at the crankshaft working your way to the water pump, large idler, HPFP, small idler, camshaft and tensioner.

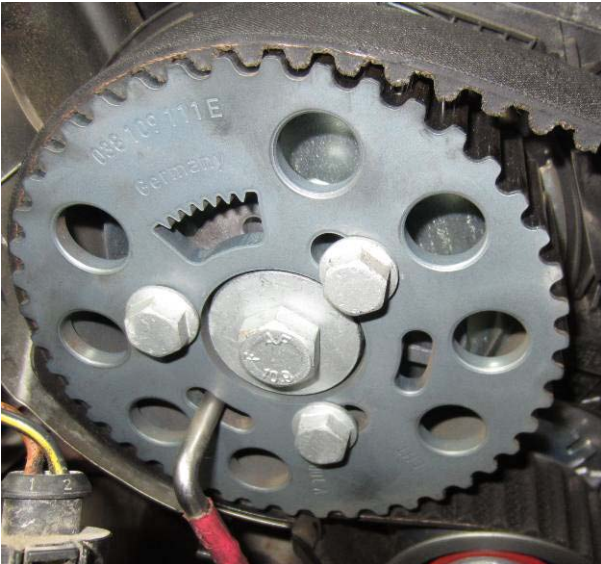


57. With your finger put some tension on the belt near the tensioner. Both camshaft and HPFP sprockets will rotate counterclockwise and the bolts should center in their slots. If they don't, remove belt and adjust the sprockets accordingly.





Notice in the above photos the cam sprocket bolts are near the center of their slots but the HPFP bolts are at the limit – no good.



Good to go.

58. Once the bolts are centered, loosen the tensioner nut and rotate counterclockwise until pin can be removed.

59. Rotate tensioner clockwise until indicator aligns with the slot on the tensioner backplate and tighten tensioner nut to 20Nm ONLY. Verify that tab is still in the slot (7 o'clock position).



60. Insert the Metalnerd counterhold into the holes of the camshaft sprocket and gently rotate the camshaft sprocket counterclockwise. Ensure your tension has not changed (it likely will) and correct if it does. While rotating the camshaft sprocket, torque the bolts on the camshaft and then the HPFP to 20Nm ONLY.

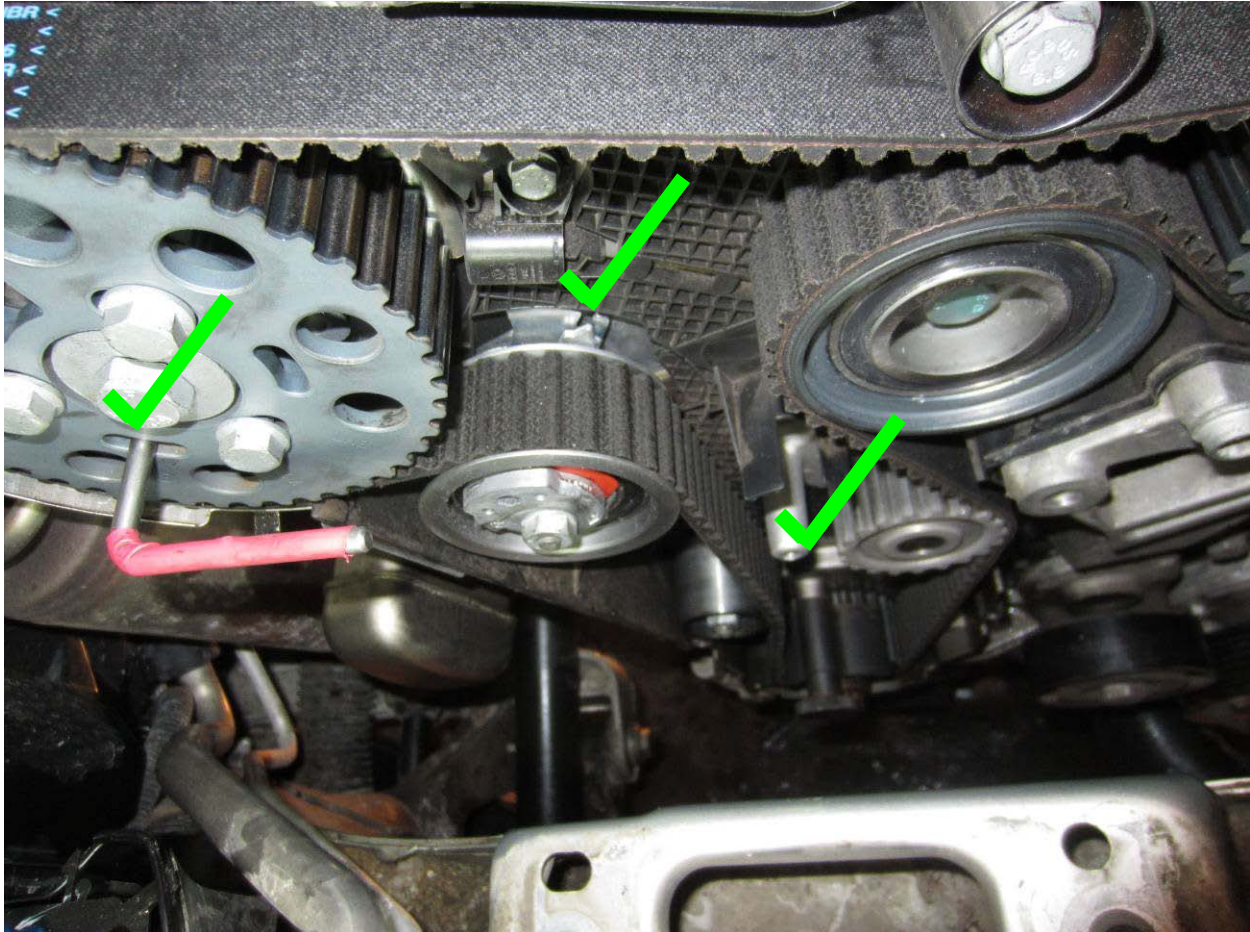


61. Remove 3359 pins in cam and HPFP as well as crank stop T10050.
62. Using the crankshaft center bolt, rotate the engine at least two rotations (clockwise) and stop just before you get to TDC.
63. Insert T10050 into crankshaft and rotate slowly until the tool just slides into the hole.
64. Check that tension is correct (within slot or a max of 5mm to the right of the slot)

65. Check that the slot on the HPFP is close to the hole (does not have to line up perfectly)



66. Check that 3359 pin can be inserted into camshaft



67. If 3359 pin cannot be inserted, loosen cam and HPFP bolts and repeat steps 59-65.
68. If 3359 pin can be inserted, remove it and counterhold camshaft sprocket with Metalnerd spanner and perform the TTY operations on the camshaft bolts (13mm) + 90°, HPFP bolts (10mm ZZN) + 90°, tensioner nut (15mm) + 45°.
69. Install center and lower timing belt covers (5 x 10mm) 10 Nm.

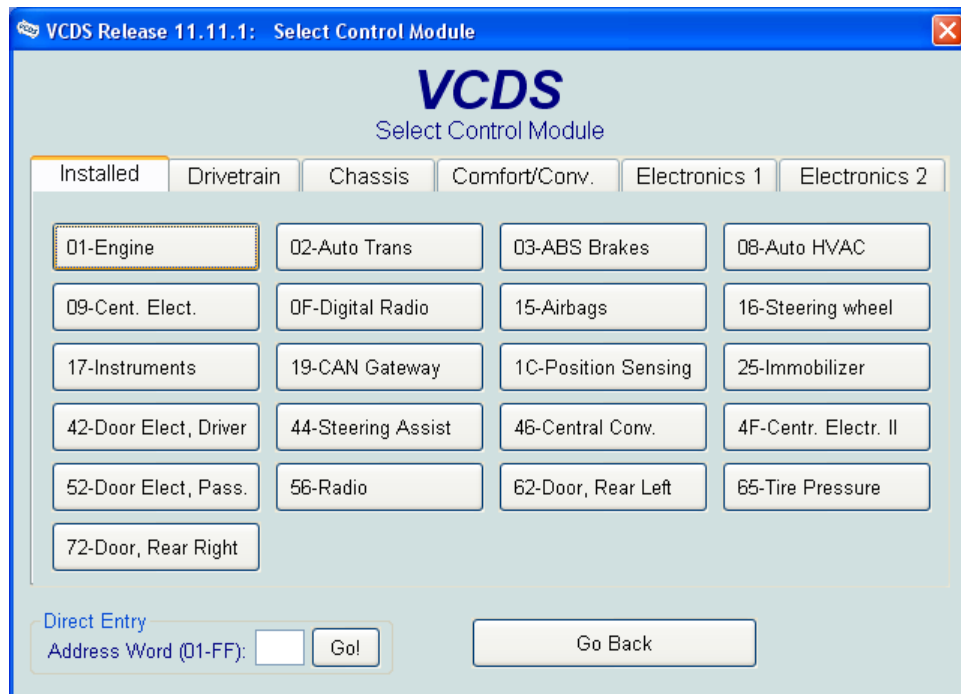
70. Install motor mount (3 x 16mm) 40Nm + 180°
71. Install harmonic balancer (4 x 10mm XZN) 10Nm + 90°
72. Install accessory belt.
73. Reconnect lower radiator hose
74. Install upper timing belt cover. Ensure lower tabs mate with the middle timing belt cover and clip all three clips.
75. Install motor mount into car. First thread in the two 18mm bolts by hand (engine must be sitting slightly higher than the normal height). Align the shoulders of the bolts to the edge of the mount and snug down. Torque to 60Nm + 90°. Install two 16mm bolts (one with the stud goes in the front hole) and thread in by hand – you may need to maneuver the engine to get the bolts to line up. Once started, lower engine until it is fully supported by the mount. Torque to 40Nm + 90°. Install the small motor mount bracket and torque the two 13mm bolts to 20Nm + 90° **
 * I don't understand why they are using this old torque spec and prefer the straight 100Nm (74 ft-lb).
 * Good n' tight is fine for these two bolts. They are not usually included in bolt kits so I wouldn't do the full TTY spec as you run the risk of breaking them.
76. Swing the coolant reservoir into place and reinstall into fuel-filter bracket (Step #19)
77. Swing the auxiliary fuel pump and fuel filter back into place and reconnect the fuel lines. Remember to match the hose clamps to the color of the hard lines! Bolt the auxiliary pump bracket down to the motor mount (2 x 10mm XZN). Ensure no fuel lines are twisted.
78. Install plastic clip holding fuel lines and clip the fuel lines into place.
79. Connect the reservoir return line.
80. Install exhaust pressure sensor bracket and reconnect auxiliary fuel pump connector and exhaust pressure sensor. Make sure you clip the harness to the reservoir return line.
81. Bolt down fuel filter (2 x 10mm bolts, 1 x 10mm nut)
82. Bolt down washer fluid reservoir fill tube (1 x 10mm bolt)
83. Bolt down coolant reservoir (2 x T15) and connect reservoir level sensor connector.
84. Refill coolant.
85. Prime fuel system – see supplemental instructions.

Torque Values

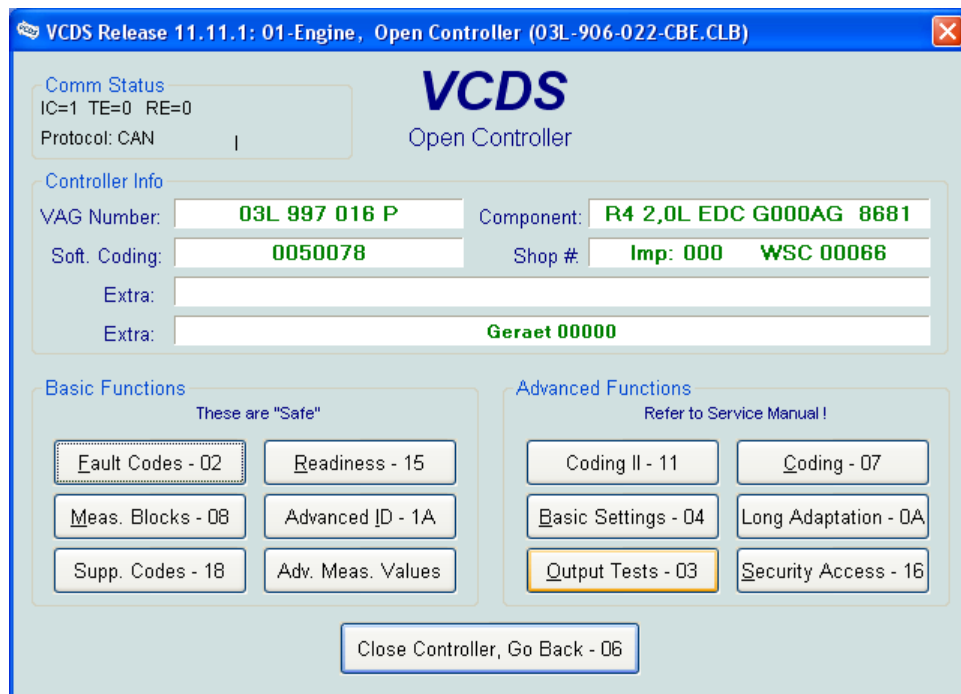
Part	Qty	Torque (Nm)	Torque (ft-lb)	Torque (in-lb)	TTY angle
Camshaft sprocket bolt	3	20	15	177	+ 90°
Engine mount bracket bolt, front	1	40	29		+ 180°
Engine mount bracket bolt, lower	1	40	29		+ 180°
Engine mount bracket bolt, upper rear	1	40	29		+ 180°
Harmonic balancer bolt	4	10	7	88	+ 90°
HPFP sprocket bolt	3	20	15	177	+ 90°
Large roller bolt	1	50	37		+ 90°
Mount to body bolt	1	40	29		+ 90°
Mount to body bolt with threaded stud	1	40	29		+ 90°
Mount to engine bracket bolt	2	60	44		+ 90°
Small lower roller nut	1	20	15	177	
Small upper roller bolt	1	25	18	221	
Tensioner lock nut	1	20	15	177	+ 45°
Water pump bolt	3	15	11	133	

Lift pump output test

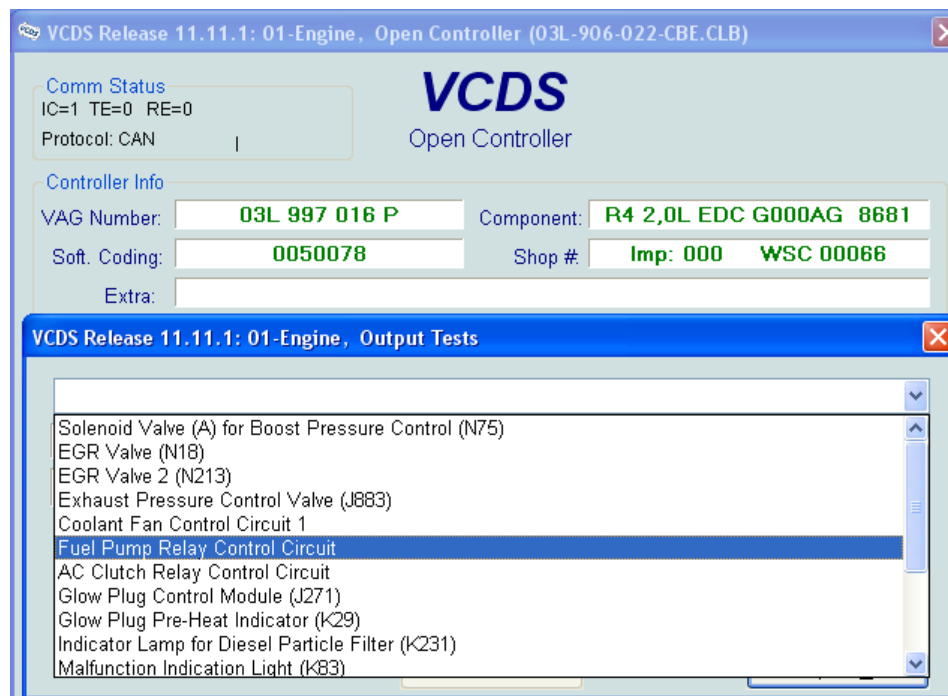
1. Connect Ross-Tech cable to computer and car (just above the hood release) and fire up the newest version of VCDS.
2. Click on '01 – Engine'



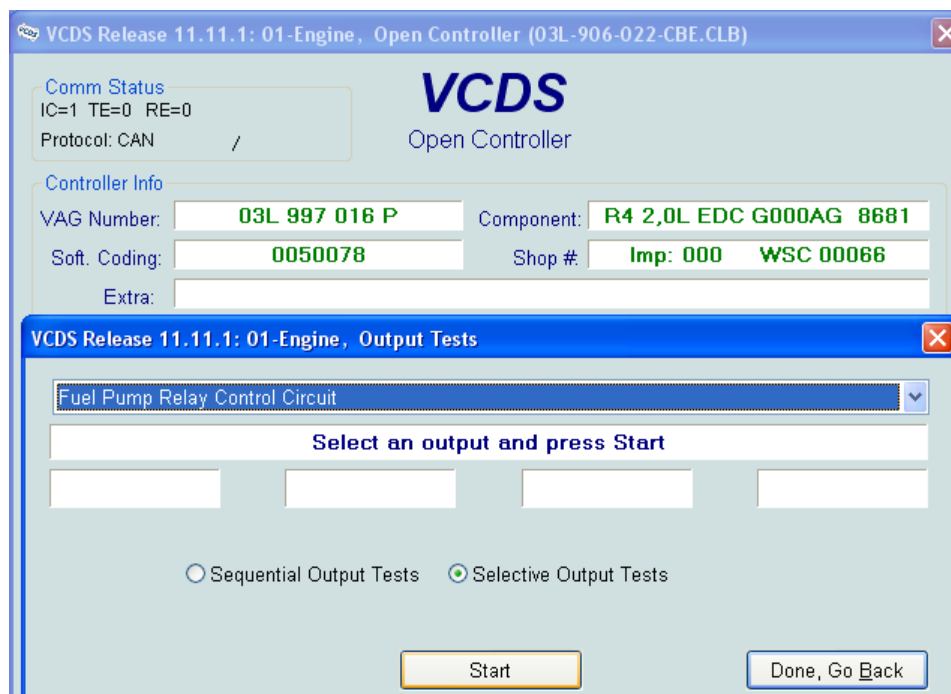
3. Click on 'Output Tests – 03'



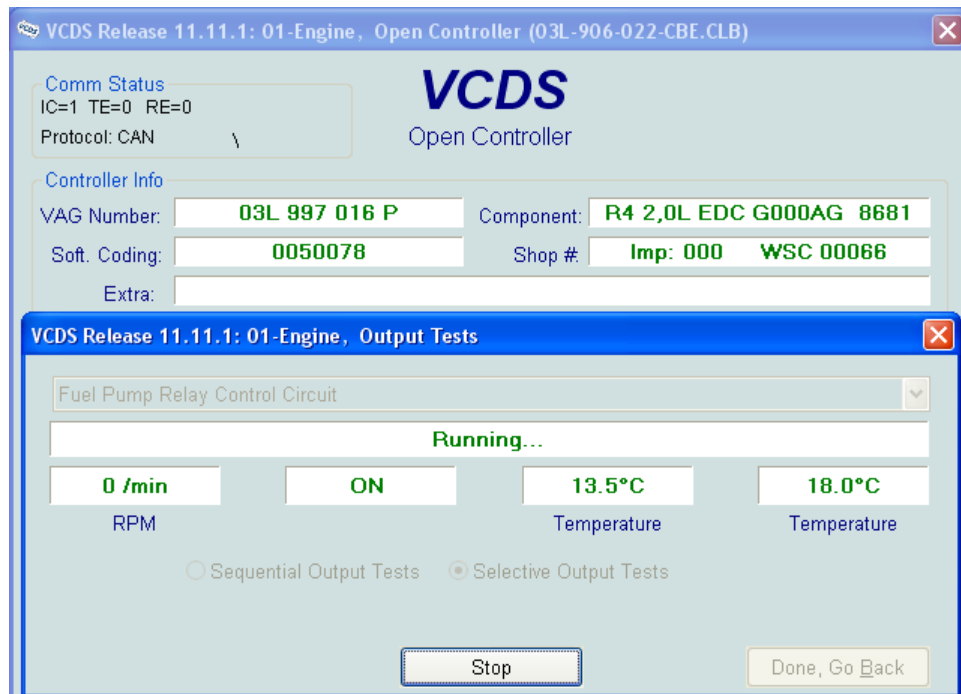
4. In the drop down menu select 'Fuel Pump Relay Control Circuit'



5. Click 'Start'.

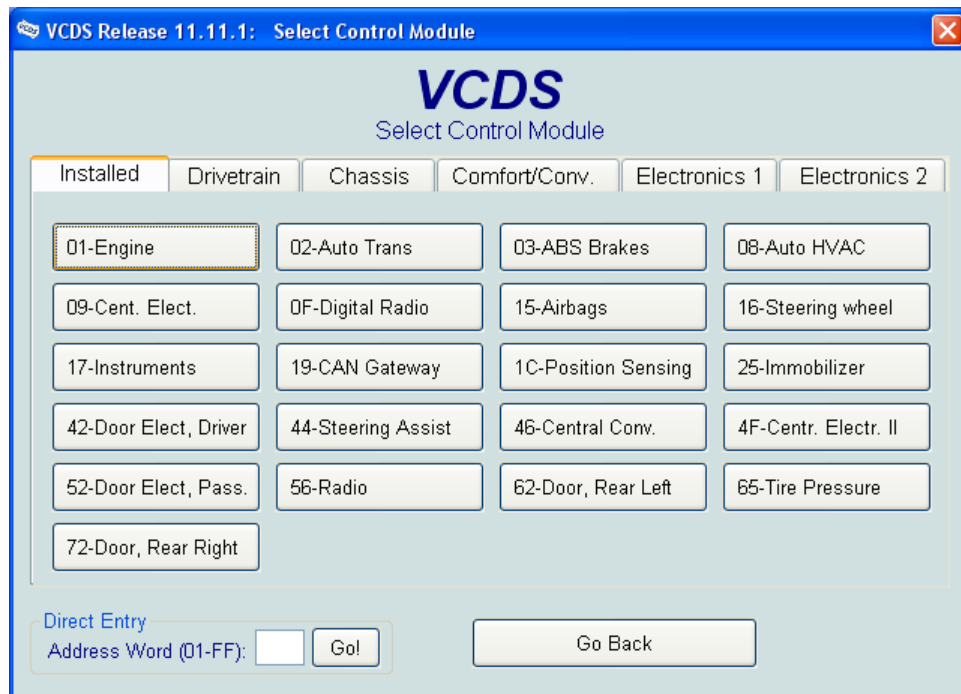


6. The in-tank lift pump will now run, two seconds on – two seconds off. Run this for 30 seconds a total of three times.

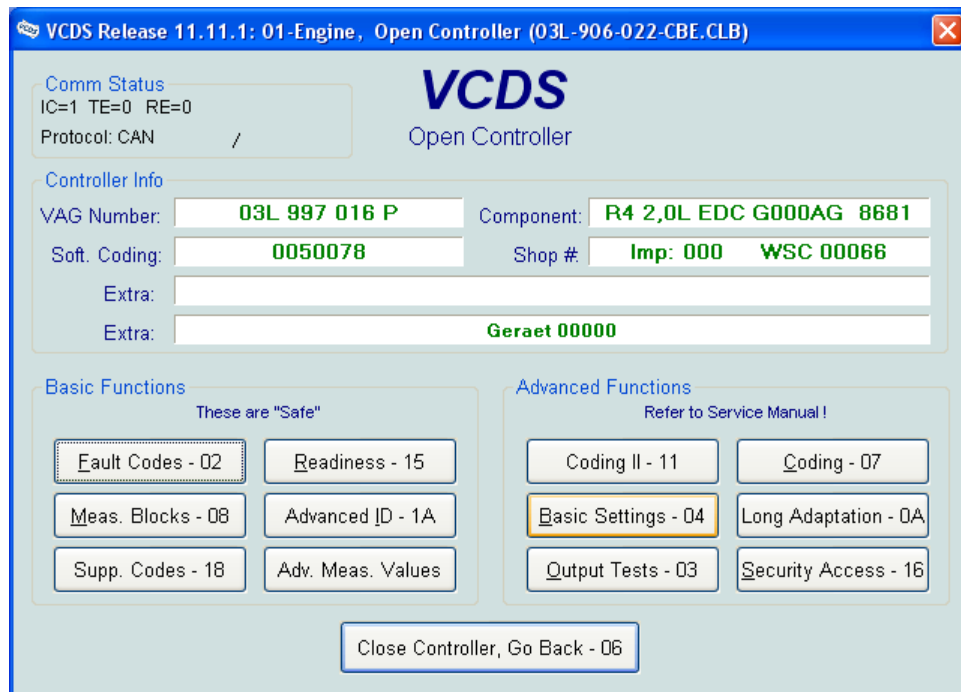


Basic Settings Priming

1. Click on '01 – Engine'



2. Click on 'Basic Settings – 04'



3. In the upper field type in **35** and press 'Go!'. In the drop down menu select 'Fuel Supply Pump Activation'.

VCDS Release 11.11.1: 01-Engine, Measuring Blocks / Basic Settings

Sample Rate: 8.7 \

Label File: 03L-906-022-CBE.CLB **Basic Settings: OFF** ON/OFF/Next

Group 035 Up Go! 0 /min 11.93 V 13.5°C 18.0°C

Engine Speed (G28) Fuel Pump Status Fuel Temperature (G81) Coolant Temperature (G62)

Group Up Go!

Documented basic settings groups can be selected here

Documented basic settings groups can be selected here

Exhaust Gas Recirculation (EGR)

Charge Pressure Control

Fuel Supply Pump Activation

Exhaust Pressure Control Valve (J883) Function Test/Alignment

Add to Log

Switch To Meas. Blocks Done, Go Back Graph Log

4. Press the 'ON/OFF/Next' button.

VCDS Release 11.11.1: 01-Engine, Measuring Blocks / Basic Settings

Sample Rate: 8.7 I

Label File: 03L-906-022-CBE.CLB **Basic Settings: OFF** ON/OFF/Next

Group 035 Up Go! 0 /min 11.93 V 11.7°C 17.1°C

Engine Speed (G28) Fuel Pump Status Fuel Temperature (G81) Coolant Temperature (G62)

Group Up Go!

Fuel Supply Pump Activation

Prerequisites: Ignition ON / Engine OFF / Test Duration ca. 30 Seconds Required after Repairs where the Fuel System was drained. After extensive Repairs such as Injector Replacement and/or Fuel System Flushing this Process should be repeated at least 3 Times. There must be NO open Fuel Supply Lines!

Add to Log

Switch To Meas. Blocks Done, Go Back Graph Log

5. This time both the in-tank lift pump and the auxiliary pump are going to run. Same as last time, 3 cycles of 30 seconds.

VCDS Release 11.11.1: 01-Engine, Measuring Blocks / Basic Settings

Sample Rate: 7.7 I

Label File: 03L-906-022-CBE.CLB

VCDS

Measuring Blocks

Turbo!

Group 051

Up

Go!

828 /min

410 /min

48.0

0.0°KW

RPM

RPM

(no units)

Idle Stabilization

Group 002

Up

Go!

Group 003

Up

Go!

Refer to Service Manual!

Add to Log

Switch To Basic Settings

Done, Go Back

Graph

Log