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This Service Information bulletin supersedes SI B13 07 09 **dated June 2009**.

**NEW** designates changes to this revision

#### SUBJECT

### N54 - Diagnosis for "Long Crank" Complaint

#### MODEL

E90, E92 with N54 produced from 06/06

E93, E60, E61 with N54 produced from 03/07

E82, E88 with N54 from start of production

E71 X6 with N54 from start of production

E89 Z4 with N54 from start of production

#### SITUATION

The customer may complain of:

- Excessive cranking time before the engine starts (3-4 seconds) on a cold start or after a hot soak.
- In most cases, diagnosis shows fault code 2FBF stored with SES lamp illumination.

#### CAUSE

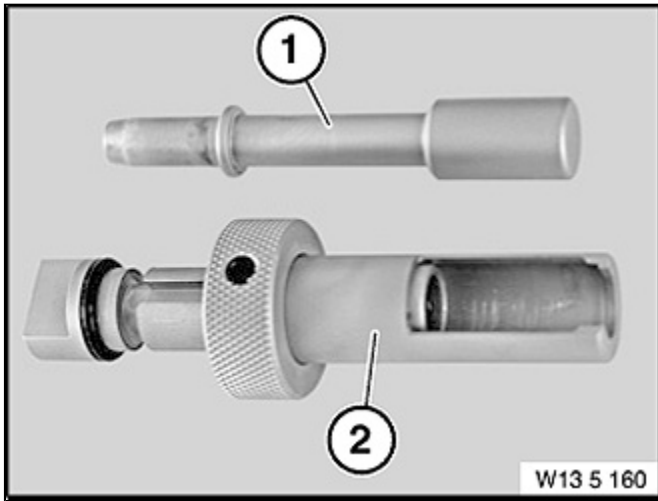
Possible causes may include:

- Failure of an electric fuel pump or a clogged fuel filter
- Defective fuel pressure check - valve/fuel pressure regulator
- Failure of the low or high-pressure sensors
- Internal failure of a High-pressure Injection Pump (HDP)
- Failure of a volume control valve
- Intermittent electrical connection problem (wire and/or connector) in the fuel delivery system.

#### CORRECTION

1. Use the current ISTA diagnosis software **NEW** (2.16 or higher).
2. **NEW** Prior to performing all applicable high/low-pressure pump ISTA test plans, **IT IS NECESSARY TO CHECK** the residual pressure drop in the low-pressure fuel system, using the procedure described below.
  3. The engine must be cooled down

before the test (coolant temperature below 40° C).

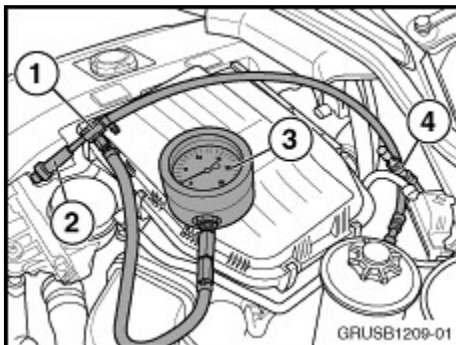


4. Access the quick-disconnect coupling in the fuel feed line. On E82, E88, E89, E90, E92 and E93 vehicles, it is located underneath the car, at the bottom of the driver's side wheel housing. On E60, E61 and E71 vehicles, the coupling is located in the engine compartment, on the driver's side next to the B+ terminal.

5. Disconnect the fuel supply line and install special fuel line plug tool 135 161 (P/N 83 30 0 496 565), item 1, into the fuel hose from the high-pressure side of the system (item 4 on the next illustration).

6. Install three-way adapter tool 135 270 (P/N 83 30 0 491 310), item 1, into the supply line from the fuel tank side.

7. Connect the properly calibrated mechanical pressure gauge, item 3 (e.g., P/N 83 30 0 491 260 - a pressure gauge from K-L-Jetronic special tool kit P/N 83 30 0 491 259) into three-way adapter tool 135 270 (item 1).



8. Plug the open end of the three-way adapter tool using special tool 135 162 (P/N 83 30 0 496 565) – item 2 on both illustrations.

9. In this configuration, the low and high-pressure fuel systems are separated and sealed. The residual pressure measurement will be performed only on the low-pressure side.

#### **IMPORTANT NOTE:**

Three-way adapter tool 135 270 (P/N 83 30 0 491 310 - M62 fuel pressure adapter hose) and the coupling plugs P/N 83 30 0 495 565 ([SI B04 16 09](#)) were previously sent via the Automatic Tool Shipment Program.

10. While observing the fuel pressure, activate the electric fuel pump for 20 seconds using ISTA and the component activation function (after the vehicle test, select: Control unit tree; then DME; Call ECU functions; Component activation; and Fuel pump).

Immediately after electric pump activation, the pressure must reach **at least 4.75 bars**. The residual fuel pressure, **10 minutes** after the fuel pump was deactivated, must be **above 3.75 bars**.

11. In case the minimum threshold of **4.75 bars was not** reached, further diagnose the low-pressure system using test module **B1214\_DI6KNDR**, Low-pressure Fuel System (possibly defective electric fuel pump or fuel filter/pressure regulator).
12. If the minimum threshold system pressure exceeds 4.75 bars and the residual pressure exceeds 3.75 bars after 10 minutes, proceed to step number 15.
13. If the minimum threshold of **4.75 bars was exceeded**, but the residual pressure test **failed** (pressure **dropped below 3.75 bars after 10 minutes**), then the fuel pressure regulator or the pressure check valve may be defective.

In such a case, the following components need to be replaced:

**E82, E88, E90, E92, E93** – Left-hand side fuel filter with pressure regulator (P/N 16 11 7 163 295)

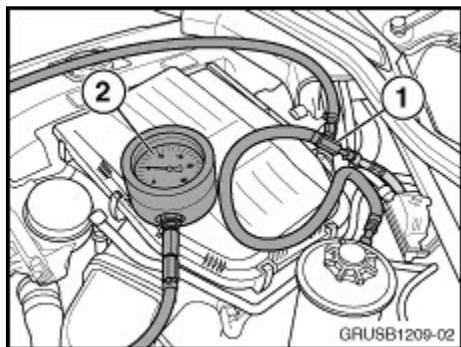
**E89 (Z4)** – Right-hand side fuel supply unit (P/N 16 11 7 210 635) and fuel filter/pressure regulator kit (P/N 16 11 7 168 284)

**E60, E61** - Right-hand side fuel supply unit (P/N 16 14 7 174 893) and fuel filter/pressure regulator kit (P/N 16 14 7 174 895)

**E71 (X6)** – Left-hand side fuel supply unit with fuel sensor (P/N 16 11 7 212 588).

14. In case the residual low-pressure system test did not clearly indicate a root cause, proceed with test module **B1214\_DI6KNDR** (Low-pressure Fuel System).

This test module may be accessed in ISTA using the following path: Activities; Function Structure; Drive; Motor Electronics; Low-pressure system; Low-pressure control; Low-pressure fuel sensor; and Search. Select B1214\_DI6KNDR from the list.



15. Prior to execution of the Low-pressure test module, connect three-way adapter tool 135 270 # 1 (with a calibrated manual fuel pressure gauge # 2 installed - e.g., P/N 83 30 0 491 260 pressure gauge, from the K-L-Jetronic special tool kit P/N 83 30 0 491 259) into the low-pressure fuel supply line going to the high-pressure pump.

16. In this configuration, fuel pressure measurement may be performed on the low-pressure side with the engine running.

17. Perform all applicable steps of the Low-pressure Fuel test module B1214\_DI6KNDR. Pay attention to all questions displayed during diagnosis, and answer them correctly.

After completion of all diagnostic steps, end the test module and enter the "fault feedback" screen. Enter the result of a diagnosis process into the Diagnosis Code dialog box and obtain a "Diagnostic Code". In case no failure can be currently detected in the low-pressure fuel system, enter the last option "No fault found" into the dialog box. The obtained Diagnostic Code should be included in the comment section of the warranty claim.

18. In case the diagnosis of the low-pressure system did not clearly indicate a root cause, proceed with test module **B1214\_DI6KHDR** (High-pressure Fuel System).

This test module may be accessed in ISTA using the following path: Activities; Function Structure; Drive; Motor Electronics; High-pressure system; High-pressure control; and Search. Select B1214\_DI6KHDR from the list.

19. Perform all applicable steps of the High-pressure Fuel test module B1214\_DI6KHDR. Pay attention to all questions being displayed during diagnosis and answer them correctly.

### **Important Note:**

When comparing the measured fuel pressure with the engine running at idle speed, make sure to let the fuel pressure stabilize for approximately 60 seconds prior to the final reading. Otherwise, an implausible value (around 150 bars) is going to be entered into the test, resulting in inaccurate diagnosis (defective high-pressure pump).

20. After completion of all diagnostic steps, end the test module and enter the "fault feedback" screen. Enter the result of a diagnosis process into the Diagnosis Code dialog box and obtain a "Diagnostic Code". In case no failure can be currently detected in the high-pressure fuel system, enter the last option, "No fault found", into the dialog box. The obtained Diagnostic Code should be included in the comment section of the warranty claim.

Make sure that **FASTA data is transmitted** after the completion of all appropriate test modules.

21. **NEW** IMPORTANT:

Effective on Monday, October 5, 2009, a **Part Replacement Authorization is required** (via submission of a TC Case) **for replacement of any of the following N54 engine fuel system components:** High-pressure Pump (HDP), Low-pressure Sensor, High-pressure Rail Sensor, EKP (Fuel Pump), and EKPS (Control Module for the Fuel Pump). For details related to the "N54 Fuel System TC Action", refer to SI B13 08 09.

22. In case the High-pressure Fuel Pump needs to be replaced, use updated part P/N 13 51 7 592 881, which incorporates the latest improvements to internal sealing. For the pump replacement procedure, refer to RA 13 51 017, found in BMW TIS.
23. After replacement, clear the adaptation values of the high-pressure flow control valve in the DME by selecting the path:
  - Activities/Service Functions
  - Drive
  - Motor Electronics
  - Adjustment Programs
  - Delete Adaptations/variants, and then Test plan
  - Reset adaptive values.

**NEW** WARRANTY INFORMATION

**Part Replacement Authorization must be obtained for vehicle repairs requiring replacement of the HDP pump (or other fuel system components affected by the "N54 Fuel System TC Action" listed in SI B13 08 09.**

Any TC part replacement must be preapproved by the TeileClearing process if it is to be paid by BMW NA. **TC part replacement without prior approval will be subject to debit. Claims submitted without prior approval will not be eligible for payment by BMW NA.** When submitting a warranty claim for the replaced part, the PuMA case number must be specified in the comment section.