



Important!

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Technical Bulletin

**Subject: Diagnosis of Driveability Complaints on Turbo
Charged Engines**

Group: 01

Number: 02-07

**Model(s): TT, S4 A6, Turbo (Drive by wire)
A4 with 1.8T (Drive by wire)**

**2000 ➤ 2003
2000 ➤ 2003**

Date: Sept. 30, 2002

Condition

Mass Air Flow (MAF) sensor incorrectly replaced due to rough idling, vehicle hesitation, car lacks power, multiple misfires or the following DTCs stored in DTC memory:

P0103, P1111, P1112, P1128, P1130, P1144, P1145, P1146, P1147, P1148 or P1557

All of the listed DTCs except P1144, P1145 and P1146 may be caused by air leaks in the pressure side air duct.

Service:

Before replacing the (MAF) sensor, on turbocharged vehicles with Electronic Throttle Control (Drive by Wire), check the following according to DTC:

| DTC Code | DTC text | Corrective action |
|----------|--|--|
| P1144 | Mass or Volume Air Flow Circ. open/short to Ground | Check Electrical Connections of MAF sensor and harness. |
| P1145 | Mass or Volume Air Flow Circ. open/short to B+ | |
| P1146 | Mass or Volume Air Flow Circ. Power supply malfunction | |
| P0103 | Mass or Volume Air Flow Circ. High Input | Check for Air Leaks in Pressure Side Air Duct |
| P1557 | Charge Pressure Contr. Positive Deviation | |
| P1111 | O2 Control (Bank1) System too lean | Check Air Duct for Air Leaks between MAF sensor and turbo charger inlet and downstream throttle (intake manifold). |
| P1147 | O2 Control (Bank2) (BiTurbo only!) System too lean | |



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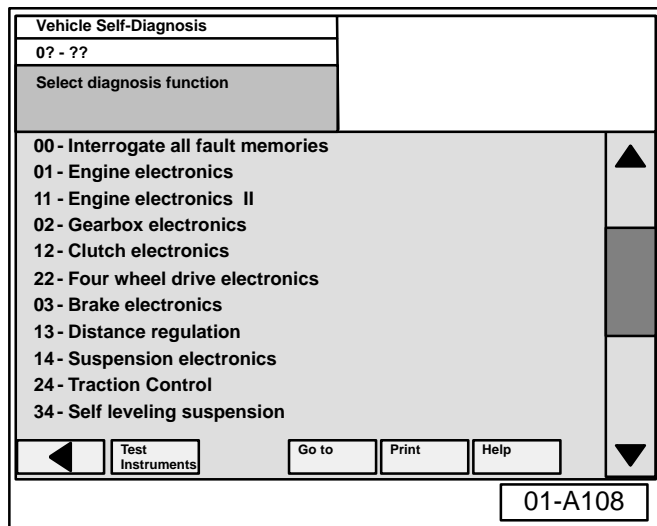
| | | |
|-------|--|---|
| P1112 | O2 Control (Bank1) System too rich | Check for Air Leaks in Pressure Side Air Duct. |
| P1148 | O2 Control (Bank2) (BiTurbo only!) System too rich | |
| P1128 | Long Term Fuel Trim mult. (Bank1) System too Lean | Check Air Duct for Air Leaks between MAF and turbo charger inlet and down- stream throttle (intake manifold). |
| P1130 | Long term fuel trim mult. (Bank 2) (BiTurbo only!) System too lean | |

To help determine if an air leak exists on vehicles with Electronic Throttle Control (Drive by Wire only):

- Check Measuring Value Block Display groups 032 (for 2.7L BiTurbo and 1.8L Turbo) and Display group 204 (Biturbo only) with the VAS 5051 or VAS 5052 Diagnostic tool as follows:

For 2.7L BiTurbo and 1.8L Turbo

- From VAS 5051 Start-up screen, select “Vehicle self diagnosis”.
- Select Diagnosis function “01-Engine electronics”.



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| | |
|--|---|
| Vehicle Self-Diagnosis | 01 - Engine electronics ECM Part Number ECM description & software level Coding XXXXX Dealership number XXXXX |
| Select diagnosis function | |
| 02 - Interrogate fault memory 03 - Final control diagnosis 04 - Basic settings 05 - Erase fault memory 06 - End output 07 - Code control unit 08 - Read data block 10 - Adaption 11 - Coding II 15 - Readiness code 16 - Access permission | |
| ◀ Test Instruments | Go to Print Help |
| 01-A124 | |

◀ – Select Diagnosis function “04-Basic settings”.

| | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicle Self-Diagnosis | 01 - Engine electronics ECM Part Number ECM description & software level Coding XXXXX Dealership number XXXXX | | | | | | | | | | | | |
| Enter channel number max. input value = 254 | | | | | | | | | | | | | |
| <div>XX</div> <table border="1"><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td></tr><tr><td>7</td><td>8</td><td>9</td></tr><tr><td>C</td><td>0</td><td>Q</td></tr></table> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | C | 0 | Q |
| 1 | 2 | 3 | | | | | | | | | | | |
| 4 | 5 | 6 | | | | | | | | | | | |
| 7 | 8 | 9 | | | | | | | | | | | |
| C | 0 | Q | | | | | | | | | | | |
| ◀ Test Instruments | Go to Print Help | | | | | | | | | | | | |
| 01-A125 | | | | | | | | | | | | | |

◀ – Input 032 on keypad to select “Display group 032”
– Select “Q” button to confirm.

| | |
|---------------------------------|---|
| Vehicle Self-Diagnosis | 01 - Engine electronics ECM Part Number ECM description & software level Coding XXXXX Dealership number XXXXX |
| 04 - Basic settings | |
| Read data block | Data Block |
| | |
| Basic settingsng | Display Group 32 |
| 0.0% -7.0% -0.4% -7.0% | ▼ ▲ |
| ◀ Test Instruments | Go to Print Help |
| 01-A126 | |

For 2.7L BiTurbo

◀ Channels 2/4 (adaptation values) are normally between -7% and +7%.

if channels 2/4 are below -7% (e.g. -10%):

These values indicate system is richer than normal (due to the engine getting less air than measured by the MAF sensor)

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| | | |
|------------------------|--|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| 04 - Basic settings | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Read data block | | |
| | | Data Block |
| | | Display Group |
| Basic settingsng | | 32 |
| | | 0.0% |
| | | -10.0% |
| | | ▼ ▲ |
| | | Basic Settings |
| ◀ Test Instruments | | Go to Print Help |
| 01-A127 | | |

For 1.8L Turbo

◀ Channel 2 (adaptation value) is normally between -10% and +10%.

If channel 2 is below -10% (e.g. -15%):

These values indicate system is richer than normal (due to the engine getting less air than measured by the MAF sensor)

- Check for air leaks in pressure side air duct using VAG 1687 Diagnostic Tool as outlined in Technical Bulletin Group 01 Number 01-01 dated Oct. 26, 2001.

| | | |
|-------------------------------|--|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Select diagnosis function | | |
| 02 - Interrogate fault memory | | |
| 03 - Final control diagnosis | | |
| 04 - Basic settings | | |
| 05 - Erase fault memory | | |
| 06 - End output | | |
| 07 - Code control unit | | |
| 08 - Read data block | | |
| 10 - Adaption | | |
| 11 - Coding II | | |
| 15 - Readiness code | | |
| 16 - Access permission | | |
| ◀ Test Instruments | | Go to Print Help |
| 01-A108 | | |

For 2.7L BiTurbo only

- ◀ - Select Diagnosis function "04-Basic settings".

CAUTION!

Use a second Technician when performing the following road test!

| | | |
|------------------------|--|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Enter channel number | | |
| max. input value = 254 | | |
| | | XX |
| | | 1 2 3 |
| | | 4 5 6 |
| | | 7 8 9 |
| | | C 0 Q |
| ◀ Test Instruments | | Go to Print Help |
| 01-A125 | | |

- ◀ - Input 204 on keypad to select "Display group 204".

◆ Road test vehicle at full load between 2500 and 4000RPM in 3rd or 4th gear.

- Select "Q" button to confirm.

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| | | |
|---|--|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| 04 - Basic settings | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Read data block | | Data Block |
| | | Display Group |
| Basic settingsng | | 204 |
| | | 3500 |
| | | ➡ 1680mbar |
| | | 1600mbar |
| | | ➡ 1600mbar |
| <input type="button" value="Test Instruments"/> <input type="button" value="Go to"/> <input type="button" value="Print"/> <input type="button" value="Help"/> | | Basic Settings |
| 01-A128 | | |

◀ If channel 2 (black arrow) is more than 70mbar higher than channel 4(white arrow):

- Check for air leaks in pressure side air duct using VAG 1687 Diagnostic Tool as outlined in Technical Bulletin Group 01 Number 01–01 dated Oct. 26, 2001.

If no leaks are found:

- Check fuel quality, drain fuel and replace with a quality Premium fuel as necessary (only with engine running rough).
- Check connection and condition of vacuum hose to fuel pressure regulator (located in fuel rail).
- Check fuel pressure regulator and replace if necessary (see Repair Manual, Repair group 24).
- Check coolant temperature sensor -G62- and replace if necessary (see Repair Manual Fuel Injection & Ignition Repair Group 01).
- Inspect air filter for proper installation and replace if damaged.
- Check flange connection between turbo charger and exhaust pipe for leaks.
- Check for sufficient fuel supply (consider DTC P1250).

If No leaks are found in the pressure side air duct and additional checks have been performed with No cause found and:

◀ In Display group 032:

- ◆ If channels 2/4 (arrows) are over +7%
- ◆ Symptom indicates the MAF sensor requires replacement:

| | | |
|---|--|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| 04 - Basic settings | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Read data block | | Data Block |
| | | Display Group |
| Basic settingsng | | 32 |
| | | 0.0% |
| | | ➡ 8.0% |
| | | –0.4% |
| | | ➡ 8.0% |
| <input type="button" value="Test Instruments"/> <input type="button" value="Go to"/> <input type="button" value="Print"/> <input type="button" value="Help"/> | | Basic Settings |
| 01-A129 | | |

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| | | |
|------------------------|------------------|----------------------------------|
| Vehicle Self-Diagnosis | | 01 - Engine electronics |
| 04 - Basic settings | | ECM Part Number |
| | | ECM description & software level |
| | | Coding XXXXX |
| | | Dealership number XXXXX |
| Read data block | | Data Block |
| | | Display Group |
| Basic settingsng | | 204 |
| | | 3500 |
| ➡ 1520mbar | | ▼ ▲ |
| 1600mbar | | Basic Settings |
| ➡ 1600mbar | | |
| ◀ | Test Instruments | Go to Print Help |
| 01-A130 | | |

If No leaks are found in the pressure side air duct and additional checks have been performed with No cause found and:

In Display group 204 (Biturbo only!):

If Channel 2 (black arrow) is more than 70mbar less than channel 4 (white arrow).

◀ If channel 2 (black arrow) is over 70mbar less than channel 4 (white arrow):

◆ Symptom indicates the MAF sensor requires replacement:

If No leaks are found in the pressure side air duct and additional checks have been performed with No cause found and:

If the following DTCs still exist.

| DTC Code | DTC text | Corrective action |
|----------|--|------------------------------------|
| P0102 | Mass or Volume Air Flow Circ. Low Input | Replace Mass Air Flow (MAF) sensor |
| P1111 | O2 Control (Bank1) System too lean | |
| P1147 | O2 Control (Bank2) (Biturbo only) System too lean | |
| P1112 | O2 Control (Bank1) System too rich | |
| P1148 | O2 Control (Bank2) (Biturbo only) System too rich | |
| P1128 | Long Term Fuel Trim mult.,(Bank1) System too Lean ⁴⁾ | |
| P1130 | Long term fuel trim (mult.), (Bank 2) (Biturbo only) System too lean | |