

# DIAGNOSIS

## MEASUREMENTS AND FAILURE CODES



Self diagnostic:

- LC8 EFI ECU
- LC4 EFI ECU
- LC4 EPT ECU

Revision: 01 - E  
Issue : March 2007

Values & DTC's

## Legend:

### 1. Throttle Valve Potentiometer Voltage → THAD

System: LC8: EFI ✓

✓ = Function is supported by the ECU

✗ = Function is not supported by the ECU

#### DISPLAY

Measurement: Throttle Valve Potentiometer

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Device Operation: Fully Closed 0,56V – 0,64V

Device Operation = Select Device Operation in the DIA

LC8 990 SD: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa

Measurement = Select Current Label in the DIA

#### DTC

P0122 Throttle position sensor circuit low voltage

**DTC = Failure Code**

#### MIL

P0122 → 06

**MIL = Blink Code**

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ID 0000

## 1. Throttle Position Voltage → THAD

System: **LC8: EFI** ✓  
**LC4: EFI** ✓ **EPT** ✓

### DISPLAY

Measurement: Throttle Valve Potentiometer

Unit: Volts (V)

### TARGET VALUE

**LC8 990 SD:** Device Operation: Fully Closed 0,56V – 0,64V

**LC8 990 Adv:** Device Operation: Fully Closed 0,56V – 0,64V

**LC4 690:** Device Operation: Fully Closed 0,52V ± 0,02V

### DTC

P0122 Throttle position sensor circuit low voltage

P0123 Throttle position sensor circuit high voltage

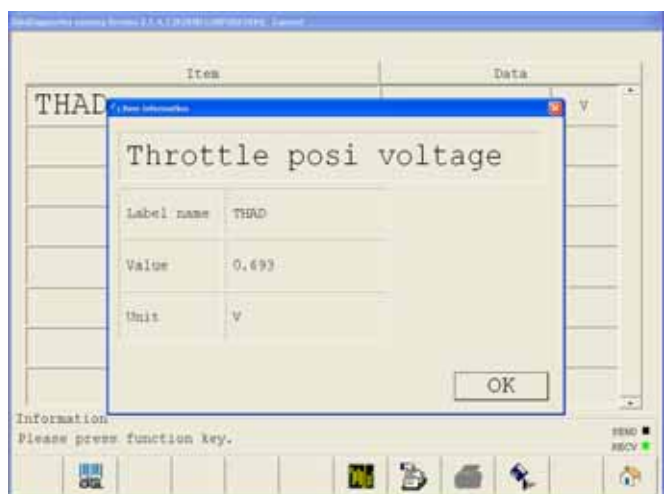
### MIL

P0122 → 06

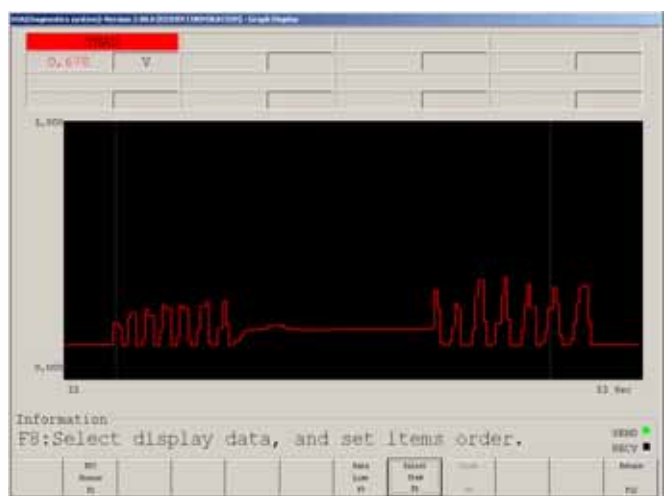
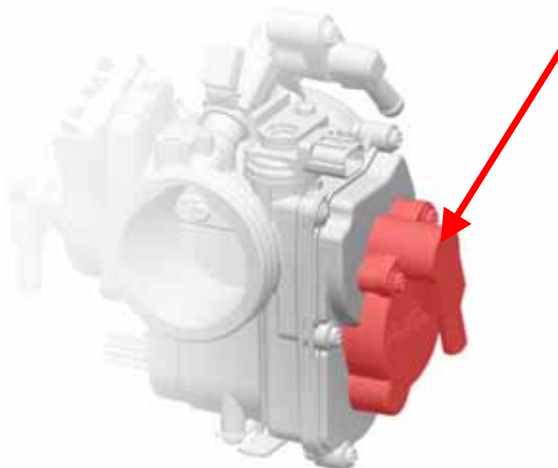
P0123 → 06

### Component Location

#### LC8



#### LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0001

#### 2. Throttle Position → ATP

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✓

#### DISPLAY

Measurement: Throttle Position  
Unit: Percent (%)

#### TARGET VALUE

LC8 990 SD: Min. 0,0 %; Max. 100,00 %

LC8 990 Adv: Min. 0,0 %; Max. 100,00 %

LC4 690: Min. 0,0 %; Max. 100,00 %

#### DTC

P0122 Throttle position sensor circuit low voltage

P0123 Throttle position sensor circuit high voltage

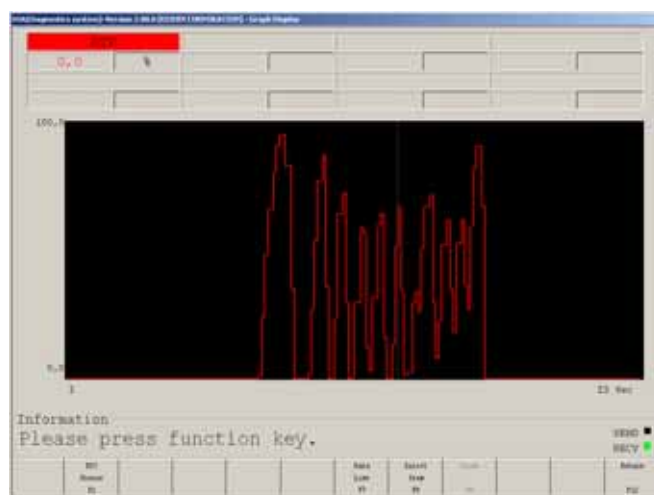
#### MIL

P0122 → 06

P0123 → 06

#### Component Location

See THAD!



ID 0002

### 3. Manifold Press 1 Voltage → PM1AD

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Manifold Pressure Sensor

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Min. 1,0 V; Max. 4,2 V

LC8 990 Adv: Min. 1,0 V; Max. 4,2 V

LC4 690: Min. 1,0 V; Max. 4,2 V

#### DTC

P0107 Manifold absolute pressure 1 sensor circuit low voltage (bank 1)

P0108 Manifold absolute pressure 1 sensor circuit high voltage (bank 1)

P1105 Manifold absolute pressure 1 sensor pipe malfunction (bank 1)

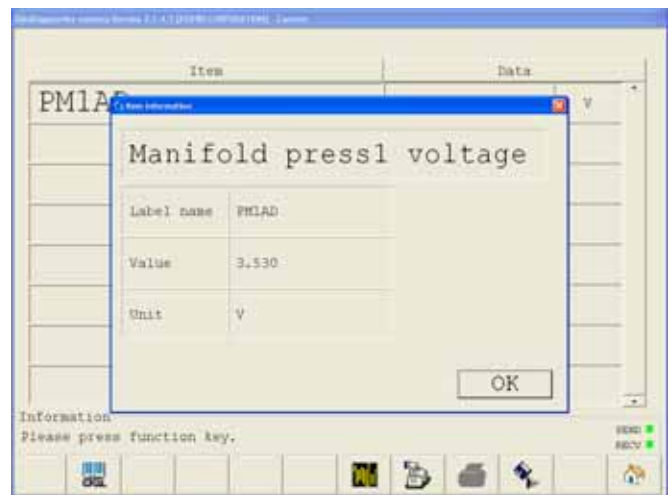
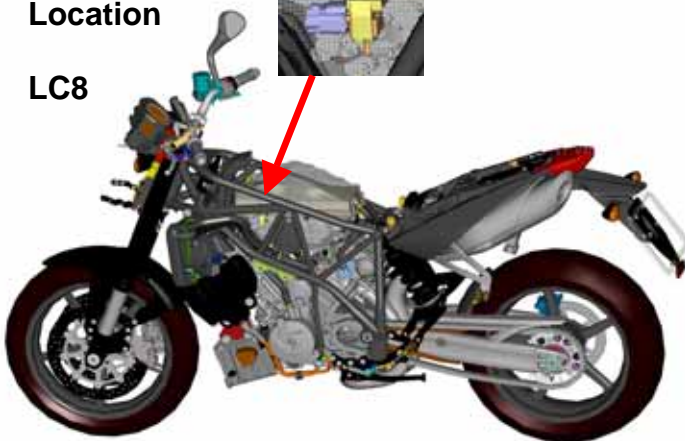
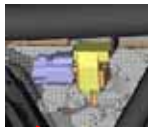
#### MIL

P0107 → 09

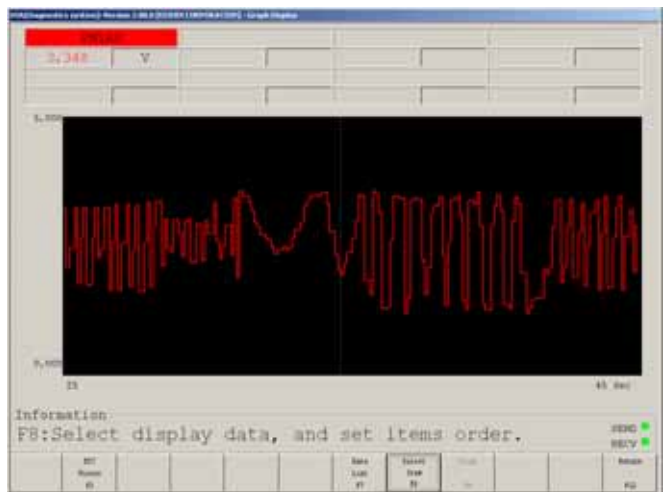
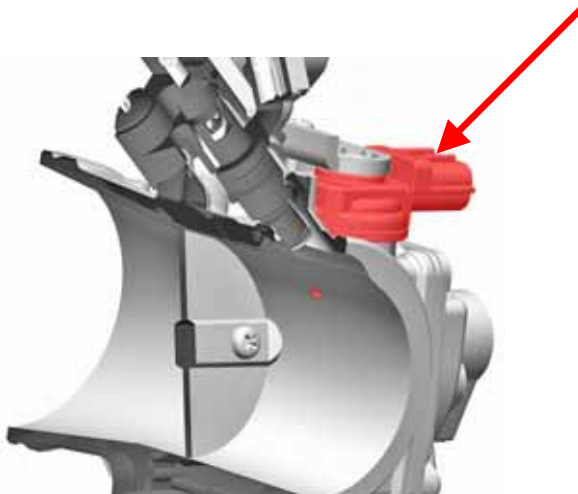
P0108 → 09

#### Component Location

LC8



LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0003

#### 4. Manifold Press 1 → PM1M

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Manifold Pressure  
Unit: Kilo Pascal (kPa)

#### TARGET VALUE

LC8 990 SD: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa

LC8 990 Adv: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa

LC4 690: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa

#### DTC

P0107 Manifold absolute pressure 1 sensor circuit low voltage (bank 1)

P0108 Manifold absolute pressure 1 sensor circuit high voltage (bank 1)

#### MIL

P0107 → 09

P0108 → 09

#### Component Location

See PM1AD!





ID 0004

### 5. ATM Press Voltage → PAAD

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Ambient Air Pressure Sensor  
Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Min. 1,0 V; Max. 4,2 V  
LC8 990 Adv: Min. 1,0 V; Max. 4,2 V  
LC4 690: Min. 1,0 V; Max. 4,2 V

#### DTC

P1107 Ambient air pressure sensor circuit low voltage  
P0108 Ambient air pressure sensor circuit high voltage

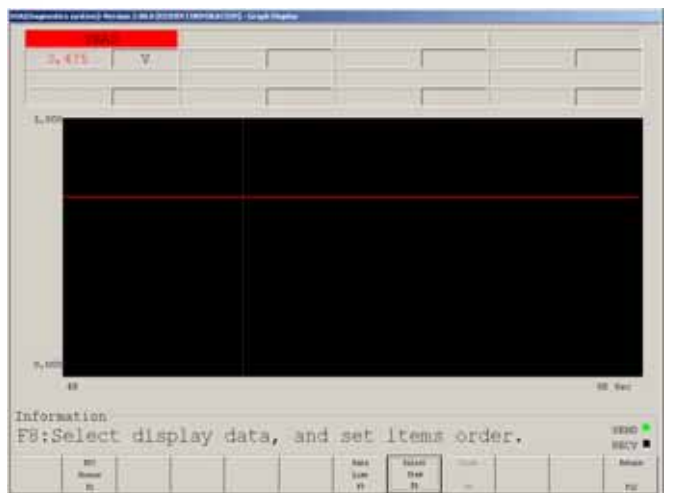
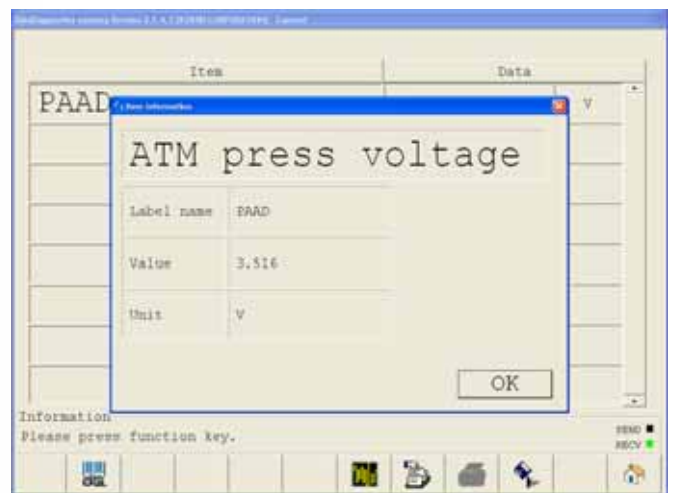
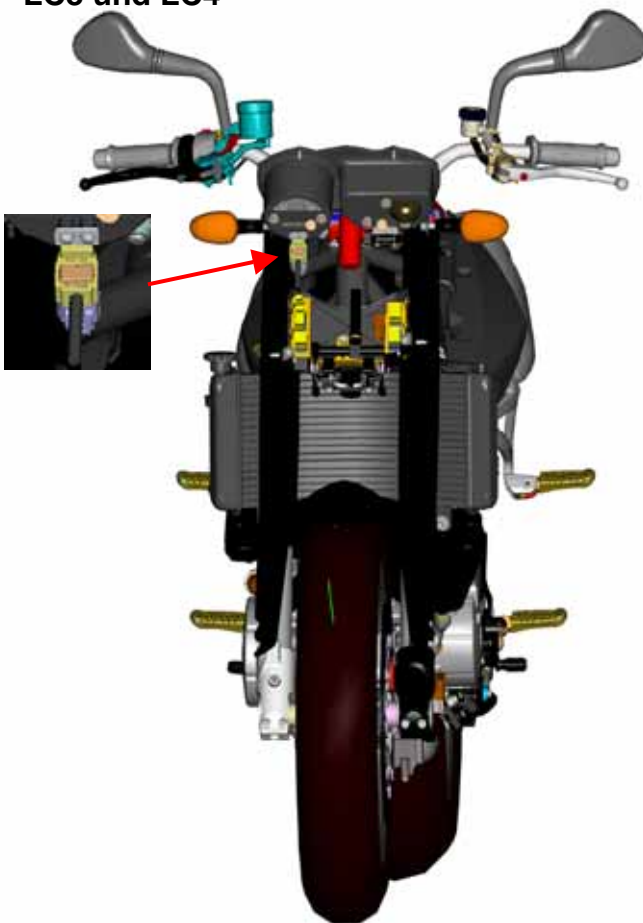
#### MIL

P1107 → 09

P1108 → 09

#### Component Location

#### LC8 und LC4





## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0005

#### 6. ATM Press → PA

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Ambient Air Pressure

Unit: Kilo Pascal (kPa)

#### TARGET VALUE

LC8 990 SD: Min. 13,0 kPa; Max. 119,99 kPa

LC8 990 Adv: Min. 13,3 kPa; Max. 119,99 kPa

LC4 690: Min. 13,3 kPa; Max. 119,99 kPa

#### DTC

P1107 Ambient air pressure sensor circuit low voltage

P0108 Ambient air pressure sensor circuit high voltage

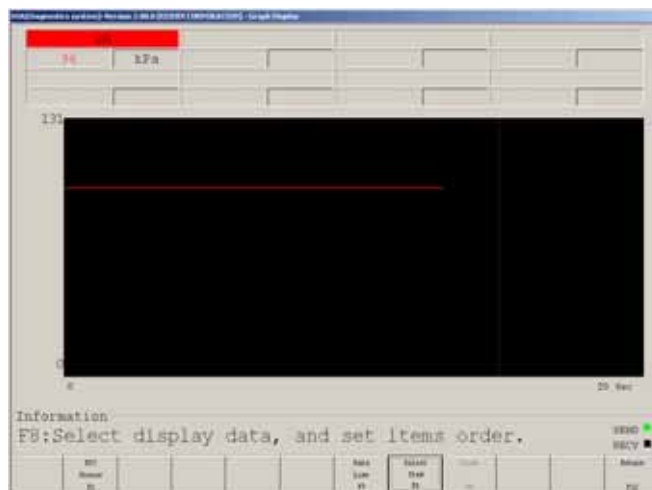
#### MIL

P1107 → 09

P1108 → 09

#### Component location

See PAAD!



ID 0006

## 7. Battery Scalling → VBAT

System:      **LC8: EFI** ✓  
                 **LC4: EFI** ✓    **EPT** ✓

### DISPLAY

Measurement:      Battery Voltage  
Unit:                  Volts (V)

### TARGET VALUE

**LC8 990 SD:**              Min. 6,5 V; Max. 16,0 V

**LC8 990 Adv:**             Min. 6,5 V; Max. 16,0 V

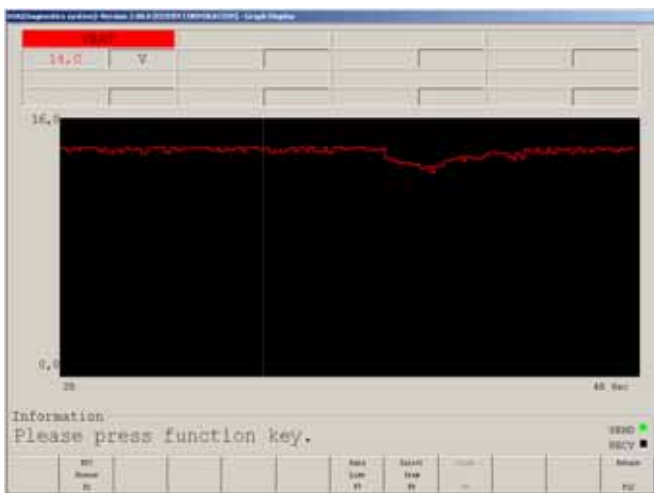
**LC4 690:**                  Min. 6,5 V; Max. 16,0 V

**DTC**

N/A

**MIL**

N/A



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0008

#### 8. Coolant Temperature Voltage → TWAD

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Coolant Temperature

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Min. 4,5 V; Max. 0,3 V

LC8 990 Adv: Min. 4,5 V; Max. 0,3 V

LC4 690: Min. 4,5 V; Max. 0,3 V

#### DTC

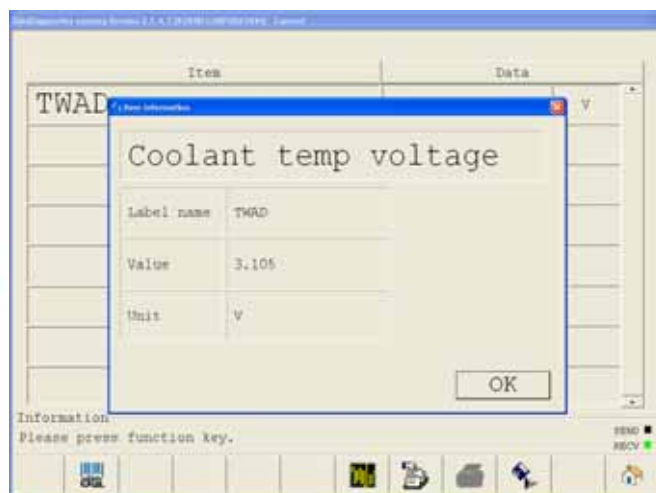
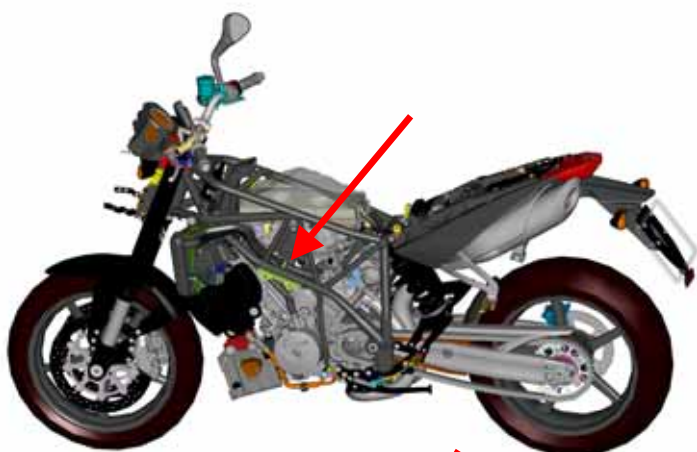
P0117 Engine coolant temperature sensor circuit low voltage

P0118 Engine coolant temperature sensor circuit high voltage

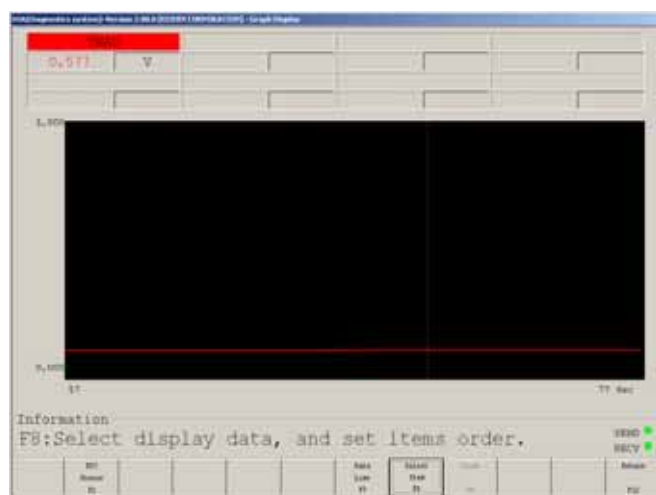
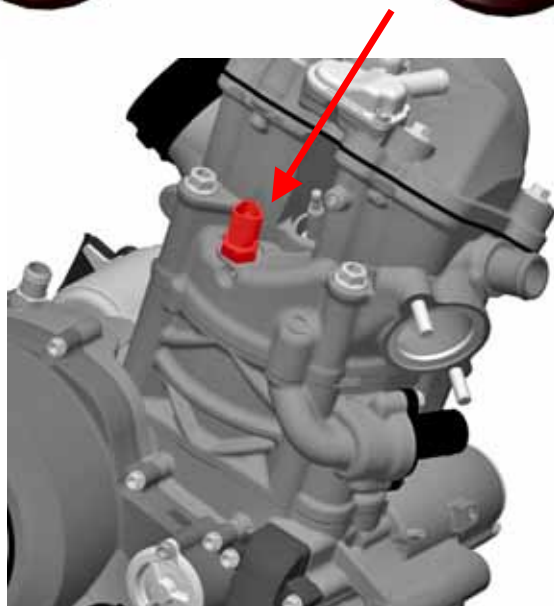
#### MIL

P0117 → 12

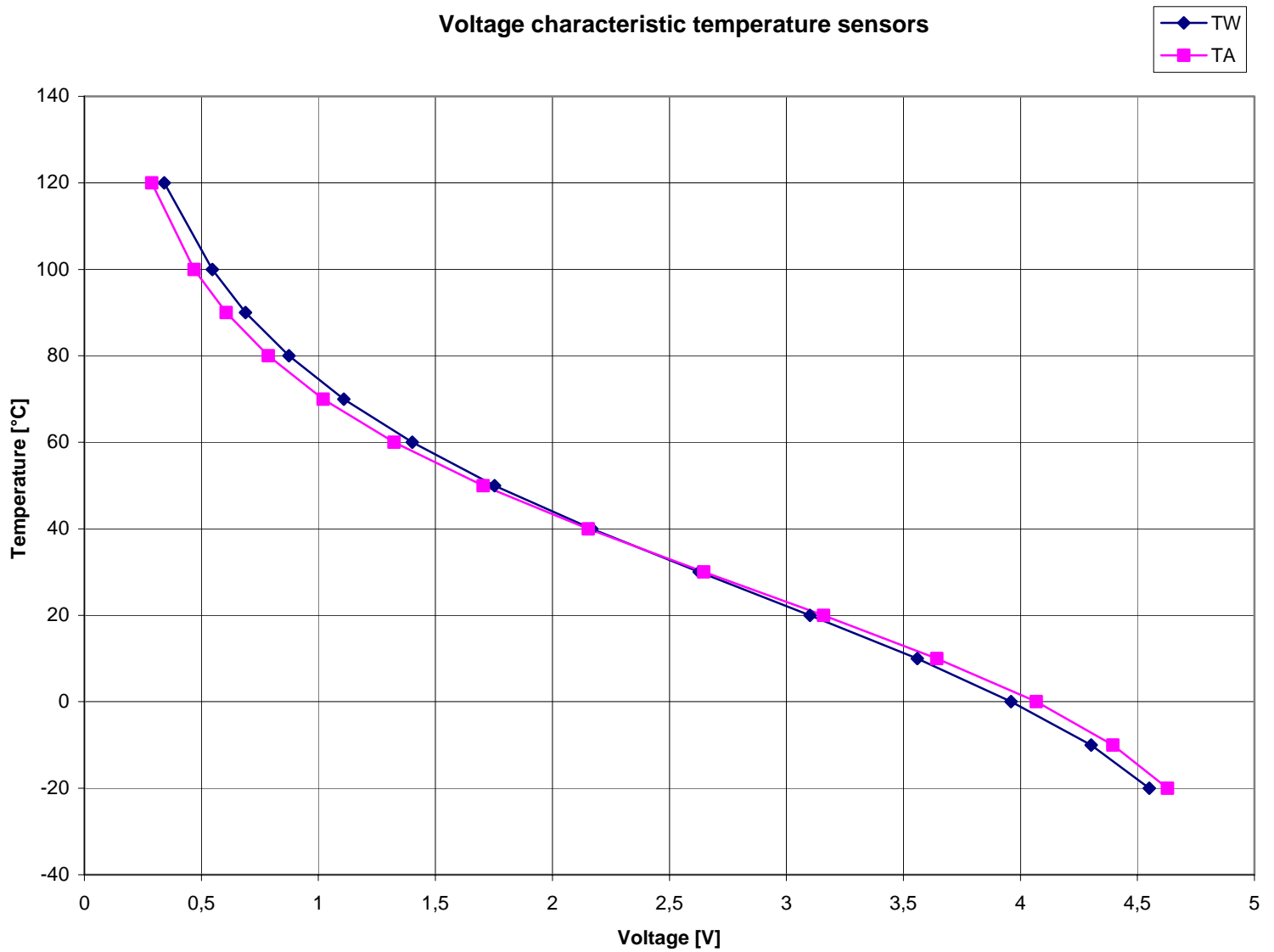
P0118 → 12



LC4



Voltage characteristic temperature sensors



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0009

#### 9. Coolant Temperature → TW

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Coolant Temperature  
Unit: Degrees Celsius

#### TARGET VALUE

LC8 990 SD: Min. -20 °C; Max. 120,0 °C

LC8 990 Adv: Min. -20 °C; Max. 120,0 °C

LC4 690: Min. -20 °C; Max. 120,0 °C

#### DTC

P0117 Engine coolant temperature sensor circuit low voltage

P0118 Engine coolant temperature sensor circuit high voltage

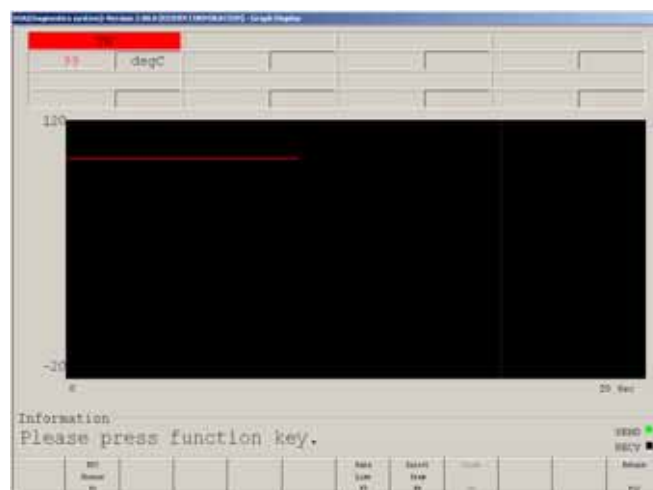
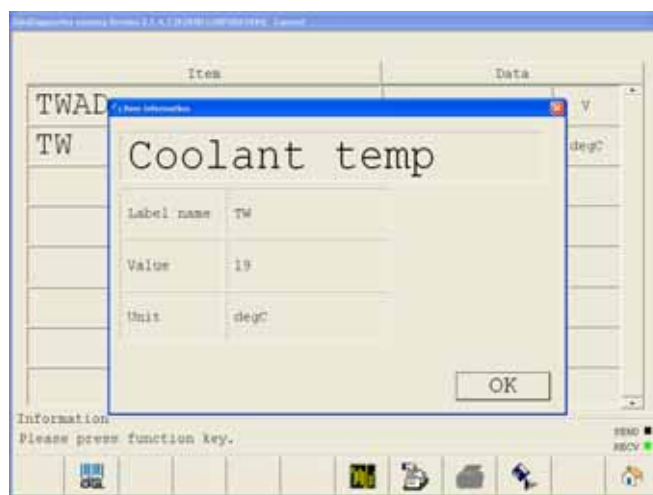
#### MIL

P0117 → 12

P0118 → 12

#### Component Location

See TWAD!



ID 0010

## 10. Air Temperature Voltage → TAAD

System: **LC8: EFI** ✓

**LC4: EFI** ✓ **EPT** ✗

### DISPLAY

Measurement: Air Temperature

Unit: Volts (V)

### TARGET VALUE

**LC8 990 SD:** Min. 4,6 V; Max. 0,3 V

**LC8 990 Adv:** Min. 4,6 V; Max. 0,3 V

**LC4 690:** Min. 4,6 V; Max. 0,3 V

### DTC

P0112 Intake air temperature sensor circuit low voltage

P0113 Intake air temperature sensor circuit high voltage

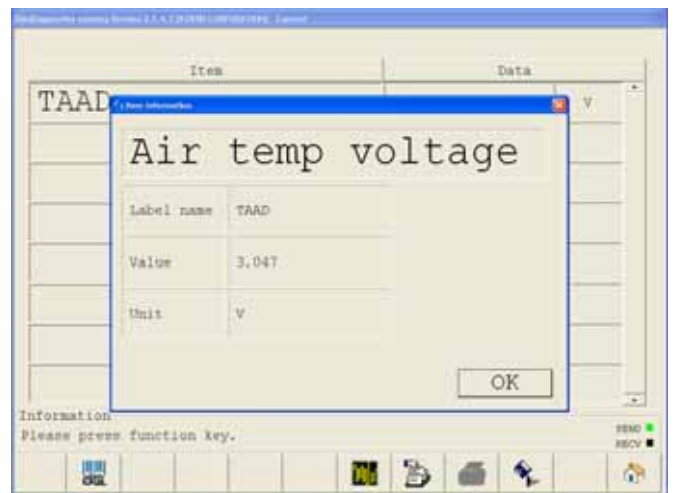
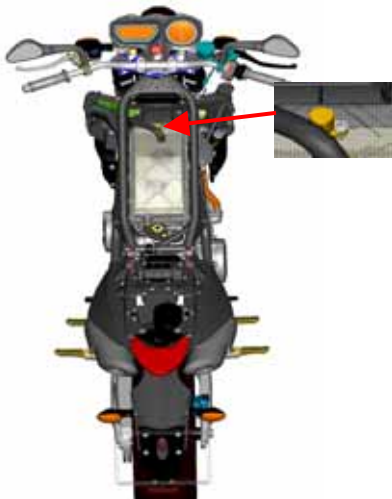
### MIL

P1107 → 13

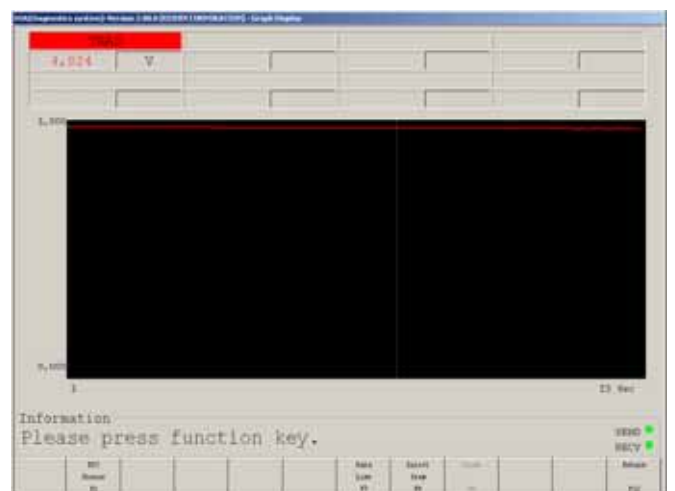
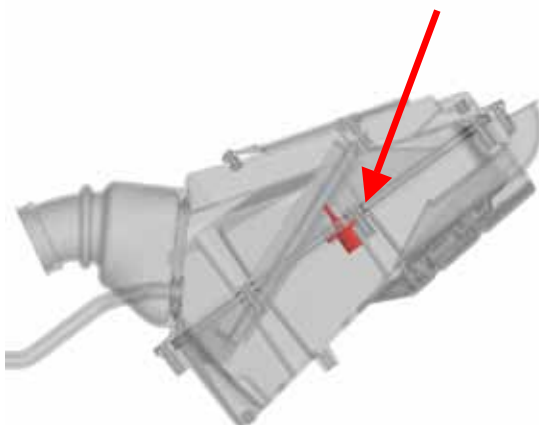
P1108 → 13

### Component Location

#### LC8



#### LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0011

#### 11. Air Temperature → TA

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Air Temperature

Unit: Degrees Celsius

#### TARGET VALUE

LC8 990 SD: Min. -20,0 °C; Max. 140,0 °C

LC8 990 Adv: Min. -20,0 °C; Max. 140,0 °C

LC4 690: Min. -20,0 °C; Max. 140,0 °C

#### DTC

P0112 Intake air temperature sensor circuit low voltage

P0113 Intake air temperature sensor circuit high voltage

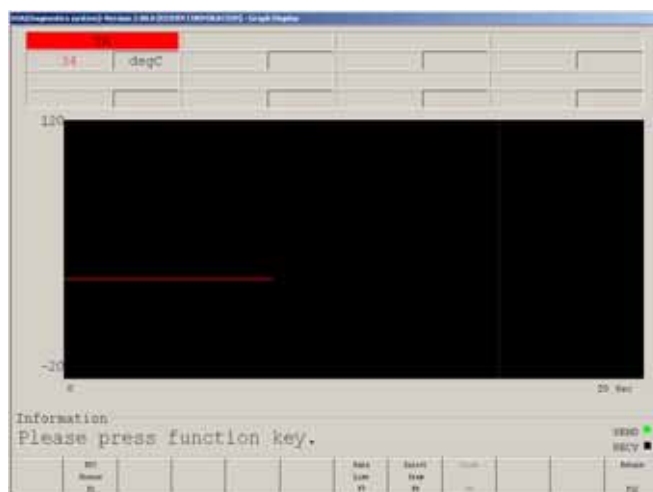
#### MIL

P1107 → 13

P1108 → 13

#### Component Location

See TAAD!





ID 0012

## 12. Hego 1 Voltage → HEGO1AD

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

### DISPLAY

Measurement: Hego 1 Voltage

Unit: Volts (V)

### TARGET VALUE

LC8 990 SD: Min. 0,0 V; Max. 5,0 V; rich: 0,8 V, lean: 0,1 V

LC8 990 Adv: Min. 0,0 V; Max. 5,0 V; rich: 0,8 V, lean: 0,1 V

LC4 690: Min. 0,0 V; Max. 5,0 V; rich: 0,8 V, lean: 0,1 V

### DTC

P0130 Hego 1 Sensor circuit malfunction (bank 1)

### MIL

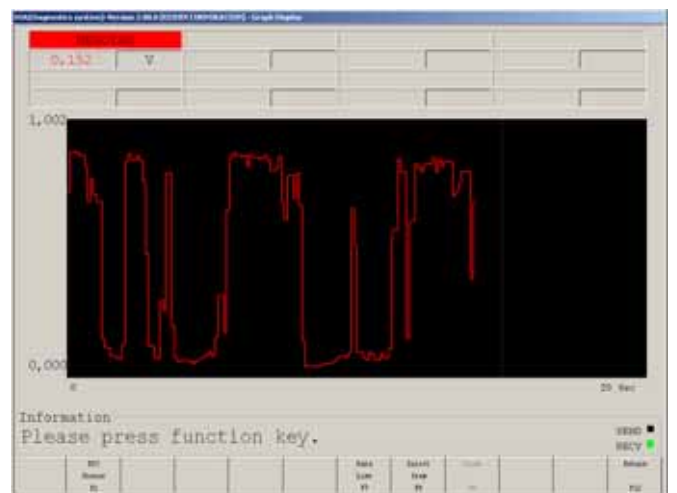
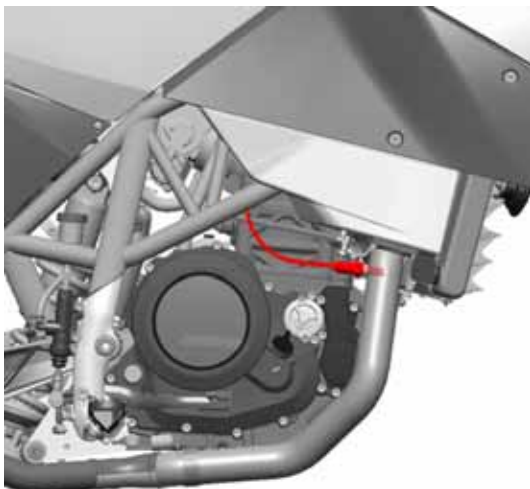
P0130 → 17

### Component Location

#### LC8



#### LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

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ID 0014

#### 13. Hego 2 Voltage → HEGO2AD

System: LC8: EFI ✓

LC4: EFI ✗ EPT ✗

#### DISPLAY

Measurement: Hego 2 Voltage

Unit: Volts (V)

#### TARGET VALUE

*LC8 990 SD:* Min. 0,0 V; Max. 5,0 V; rich: 0,8 V, lean: 0,1 V

*LC8 990 Adv:* Min. 0,0 V; Max. 5,0 V; rich: 0,8 V, lean: 0,1 V

*LC4 690:* Not available!

#### DTC

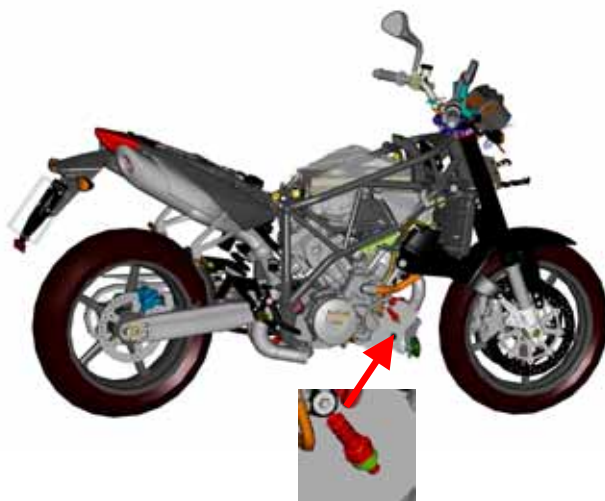
P0150 Hego 2 sensor circuit malfunction (bank 2)

#### MIL

P0150 → 18

#### Component Location

#### LC8



ID 0016

#### 14. Manifold Pressure 2 Voltage → PM2AD

System: LC8: EFI ✓

LC4: EFI ✗ EPT ✗

##### DISPLAY

Measurement: Manifold Absolute Pressure Sensor

Unit: Volts (V)

##### TARGET VALUE

LC8 990 SD: Min. 1,0 V; Max. 4,2 V

LC8 990 Adv: Min. 1,0 V; Max. 4,2 V

LC4 690: Not available!

##### DTC

P1687 Manifold absolute pressure 2 sensor circuit low voltage (bank2)

P1688 Manifold absolute pressure 2 sensor circuit high voltage (bank2)

P1106 Manifold absolute pressure 2 sensor pipe malfunction (bank2)

##### MIL

P1687 → 11

P1688 → 11

P1106 → 69

##### Component Location

LC8



ID 0017

#### 15. Manifold Pressure 2 → PM2M

System:      **LC8: EFI** ✓  
                 **LC4: EFI** ✗ **EPT** ✗

#### DISPLAY

Measurement:      Manifold Pressure  
Unit:                  Kilo Pascal (kPa)

#### TARGET VALUE

**LC8 990 SD: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa**

**LC8 990 Adv: Min. 13,3 kPa; Max. 119,99 kPa ; Idle, Motor min. 80°C: 36 – 40kPa**

**LC4 690: Not Available!**

#### DTC

P1687 Manifold absolute pressure 2 sensor circuit low voltage (bank2)  
P1688 Manifold absolute pressure 2 sensor circuit high voltage (bank2)  
P1106 Manifold absolute pressure 2 sensor pipe malfunction (bank2)

#### MIL

P1687 → 11  
P1688 → 11  
P1106 → 69

#### Component Location

See PM2AD!

ID 0018

### 16. 2nd Throttle Position Voltage → TAPAD

System: LC8: EFI ✓

LC4: EFI ✗ EPT ✗

#### DISPLAY

Measurement: 2nd Throttle Position Voltage

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Min. 0,3 V; Max. 4,5 V; Closed: 1V, Open: 4,3V

LC8 990 Adv: Min. 1,0 V; Max. 4,2 V; Closed: 1V, Open: 4,3V

#### DTC

P0222 2nd throttle position sensor circuit low voltage

P0223 2nd throttle position sensor circuit high voltage

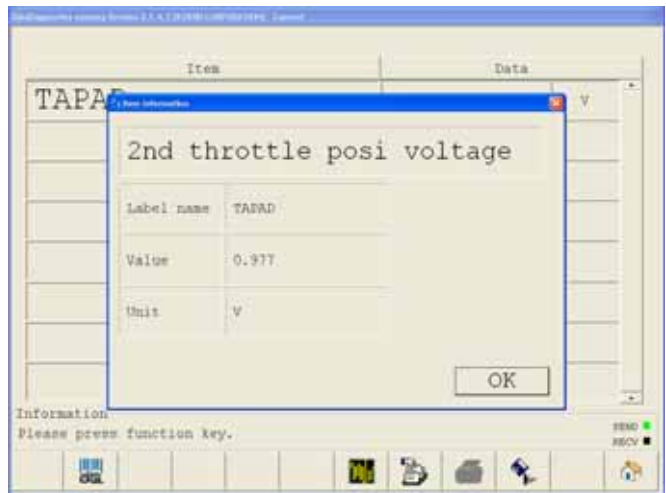
#### MIL

P0222 → 07

P0223 → 07

#### Component Location

#### LC8



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0021

#### 17. Side Stand Voltage → Side Stand AD

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Side Stand Voltage  
Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: Min. 1,0 V; Max. 5,0 V; SS up: 2-3V, SS down: 4-5V  
LC8 990 Adv: Min. 1,0 V; Max. 5,0 V; SS up: 2-3V, SS down: 4-5V  
LC4 690: Min. 1,0 V; Max. 5,0 V; SS up: 2-3V, SS down: 4-5V

#### DTC

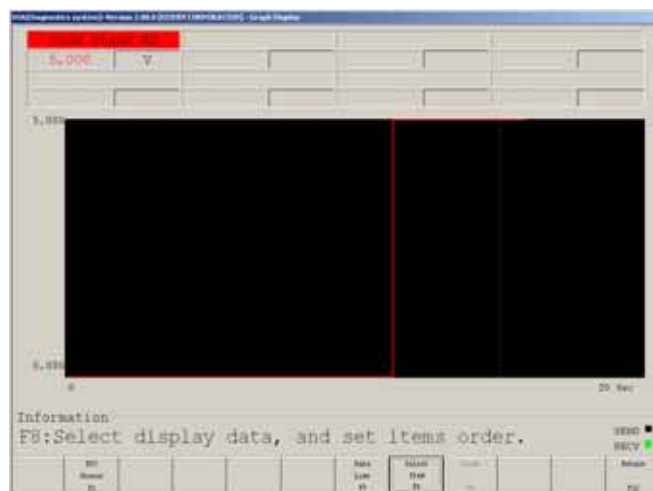
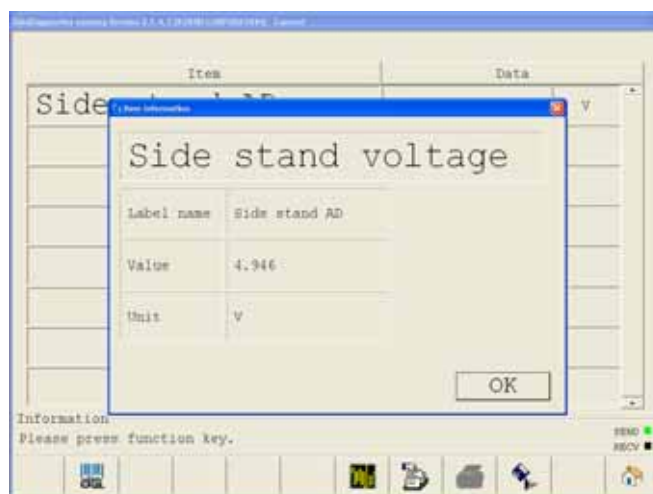
P1590 Side stand switch (A/D type) circuit malfunction

#### MIL

P1590 → 25

#### Component Location

#### LC8 und LC4



ID 0028

### 18. Rollover Voltage

System: **LC8: EFI** ✓  
**LC4: EFI** ✓ **EPT** ✗

#### DISPLAY

Measurement: Rollover Voltage  
 Unit: Volts (V)

#### TARGET VALUE

**LC8 990 SD:** Min. 0,4 – 1,4 V; Max. 3,7 – 4,1 V; Normal Operation: 0,4-1,4V,  
 Fall Recognized: 3,7-4,1V, Error < 0,352 > 4,8, Disconnected Wire: 2-3V

**LC8 990 Adv:** Min. 0,4 – 1,4 V; Max. 3,7 – 4,1 V; Normal Operation: 0,4-1,4V,  
 Fall Recognized: 3,7-4,1V, Error < 0,352 > 4,8, Disconnected Wire: 2-3V

**LC4 690:** Min. 0,4 – 1,4 V; Max. 3,7 – 4,1 V; Normal Operation: 0,4-1,4V,  
 Fall Recognized: 3,7-4,1V, Error < 0,352 > 4,8, Disconnected Wire: 2-3V

#### DTC

P1631 Roll Over Sensor (A/D type) circuit low voltage

P1632 Roll Over Sensor (A/D type) circuit high voltage

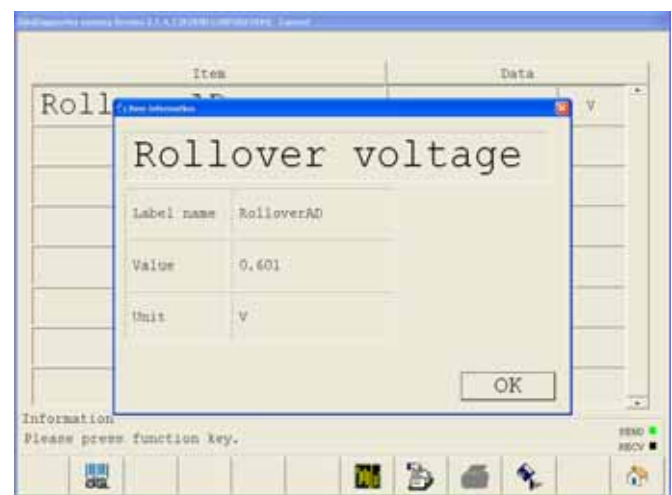
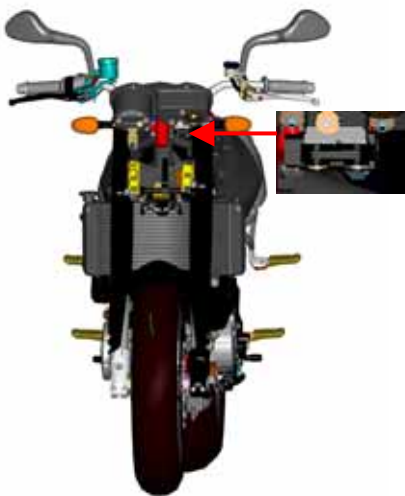
#### MIL

P1631 → 15

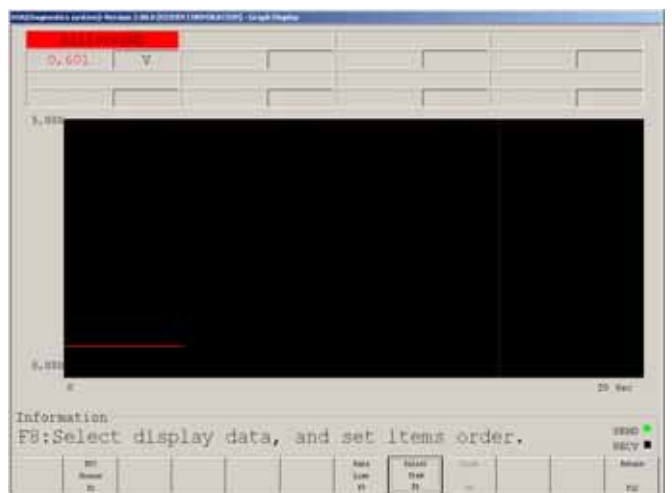
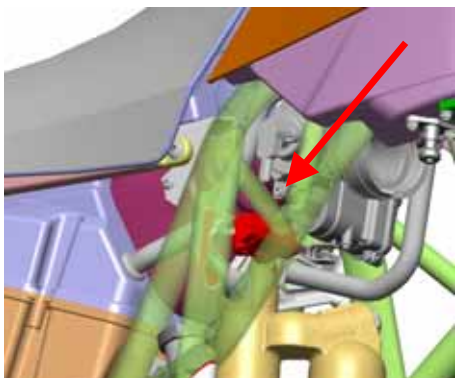
P1632 → 15

#### Component Location

**LC8**



**LC4**





# FI & EPT DIAGNOSIS

## MEASUREMENTS AND FAILURE CODES

ID 0041

### 19. Clutch

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Activated, Not Activated

Unit: No Physical Unit

#### TARGET VALUE

LC8 990 SD: Activated: Clutch pulled; Not Activated: Clutch not pulled

LC8 990 Adv: Activated: Clutch pulled; Not Activated: Clutch not pulled

LC4 690: Activated: Clutch pulled; Not Activated: Clutch not pulled

#### DTC

N/A

#### MIL

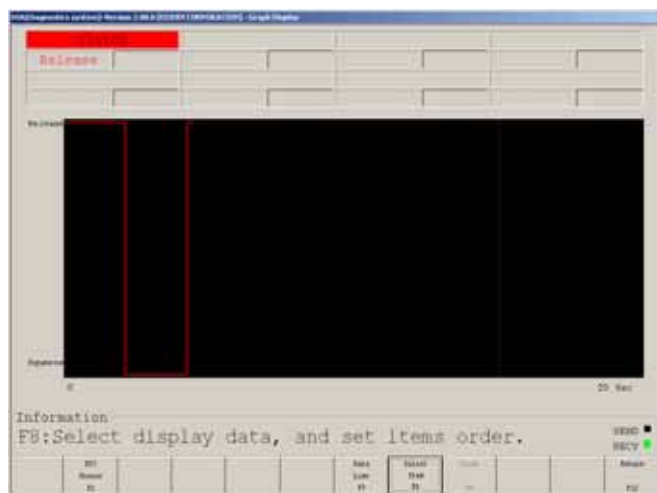
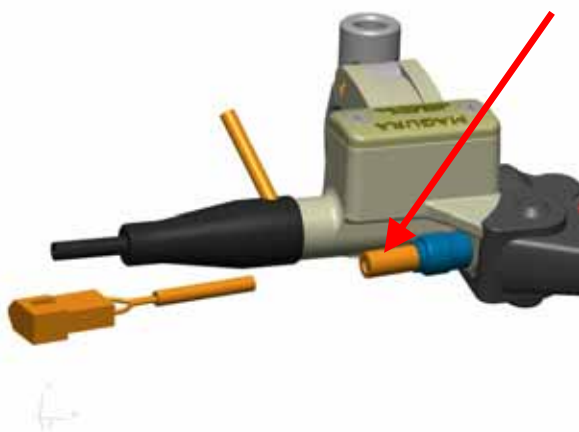
N/A

#### Component Location

##### LC8



##### LC4



ID 0040/43/45

## 20. Gear Identification Sensor → Neutral/GP2..3

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

### DISPLAY

Measurement: Gear Identification

Unit: No Physical Unit

### TARGET VALUE

LC8 990 SD: Switched / No / Gear Engaged / Neutral

LC8 990 Adv: Switched / No / Gear Engaged / Neutral

LC4 690: Switched / No / Gear Engaged / Neutral

### DTC

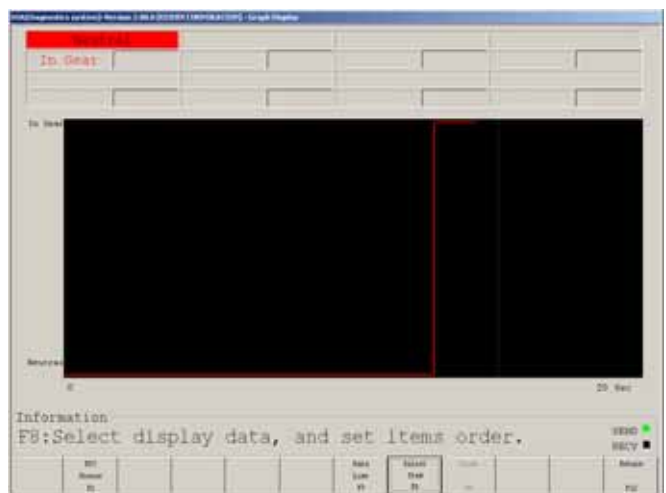
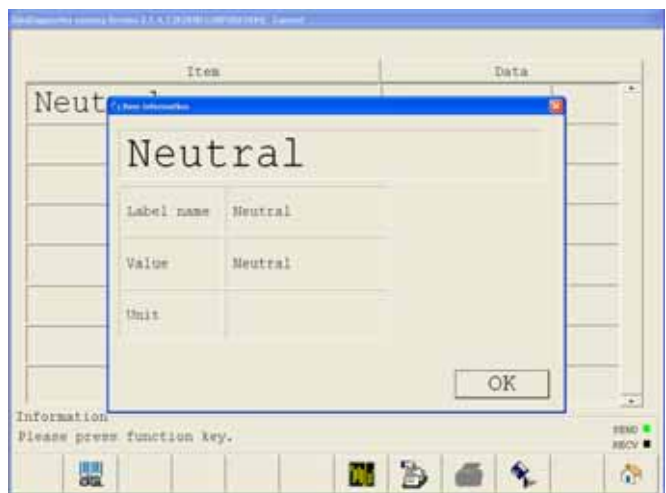
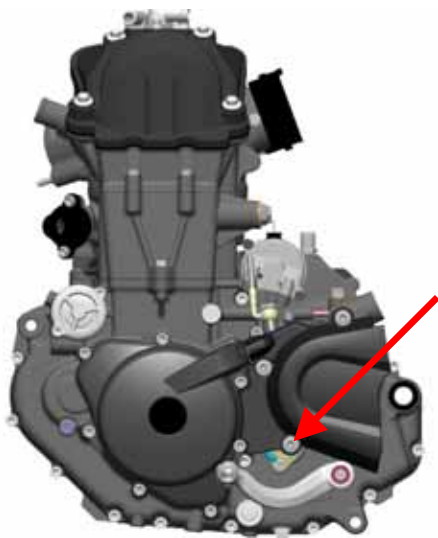
N/A

### MIL

N/A

### Component Location

LC8 und LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0050

#### 21. Bad Fuel Switch/Octane Selector → BFSW

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Octane Selection  
Unit: No Physical Unit

#### TARGET VALUE

LC8 990 SD: Not Available!

LC8 990 Adv: Plug Disconnected: On; Plug Connected: Off

LC4 690: Not Available!

#### DTC

N/A

#### MIL

N/A

#### Component Location

LC8 Adventure



ID 0060

## 22. Fuel Pump Relay → FLPR

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

### DISPLAY

Measurement: On, Off  
Unit: No Physical Unit

### TARGET VALUE

LC8 990 SD: Pump runs: On; Pump off: Off  
LC8 990 Adv: Pump runs: On; Pump off: Off  
LC4 690: Pump runs: On; Pump off: Off

### DTC

P1231 Fuel pump relay circuit short to GND or open

P1232 Fuel pump relay circuit short to vbatt

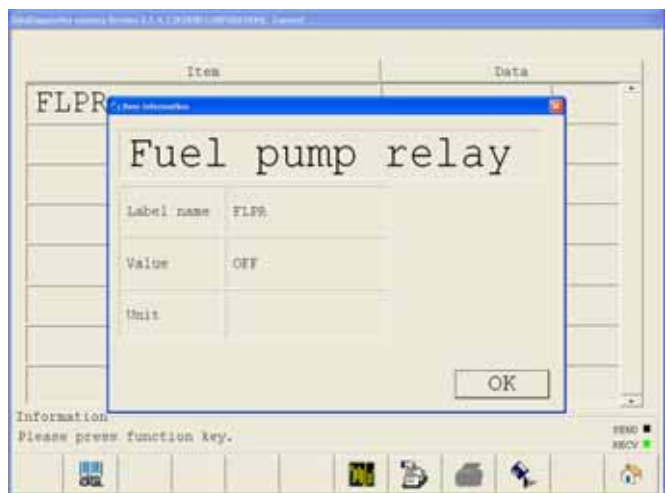
### MIL

P1231 → 41

P1232 → 41

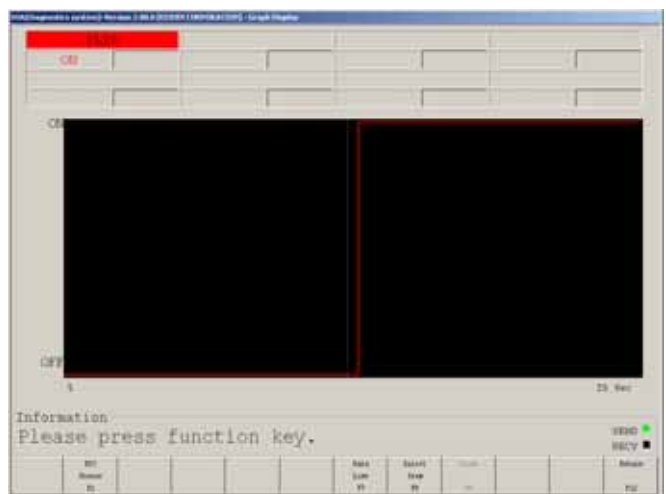
### Component Location

#### LC8



#### LC4

Controlled by the ECU!



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

---

ID 0064/65

#### 23. HEGO Heater → HGHT1/2

System:      **LC8: EFI** ✓  
                 **LC4: EFI** ✓✗      **EPT** ✗

#### DISPLAY

Measurement:      On, Off  
Unit:                No Physical Unit

#### TARGET VALUE

**LC8 990 SD:**      Heater Active: On; Heater Inactive: Off  
**LC8 990 Adv:**     Heater Active: On; Heater Inactive: Off  
**LC4 690:**         Heater Active: On; Heater Inactive: Off

#### DTC

P0031 HEGO 1 sensor heater circuit short to GND or open (bank 1)  
P0032 HEGO 1 sensor heater circuit short to vbatt (bank 1)  
P0051 HEGO 1 sensor heater circuit short to GND or open (bank 2)  
P0052 HEGO 1 sensor heater circuit short to vbatt (bank 2)

#### MIL

P0031/0032 → 45  
P0051/0052 → 46

#### Component Location

See HEGO!



ID 0066

### 24. Secondary Air System Ventilation → SLS

System: LC8: EFI ✓  
LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: On, Off  
Unit: No Physical Unit

#### TARGET VALUE

LC8 990 SD: Open: On; Closed: Off  
LC8 990 Adv: Open: On; Closed: Off  
LC4 690: Open: On; Closed: Off

#### DTC

P0413 Exhaust air injection circuit short to GND or open

P0414 Exhaust air injection circuit short to vbatt

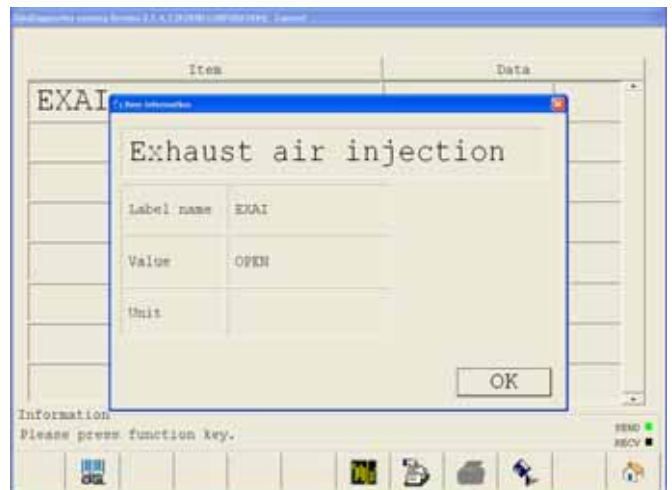
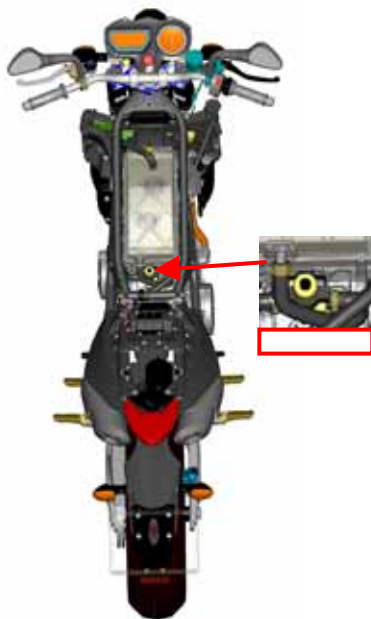
#### MIL

P0413 → 54

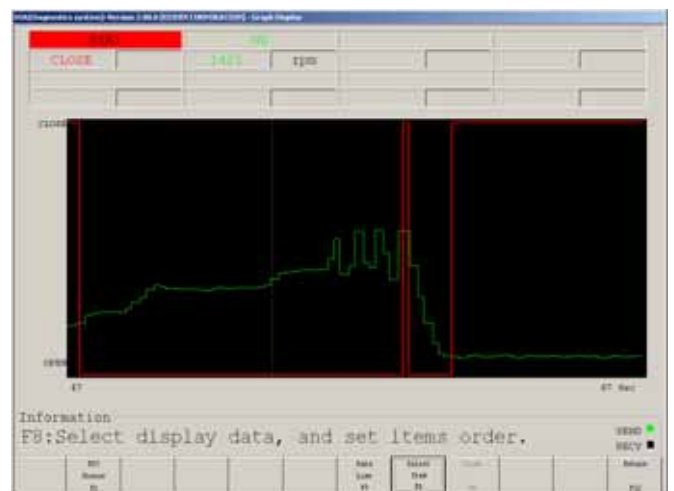
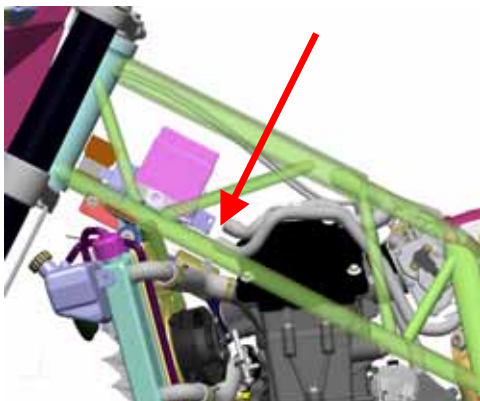
P0414 → 54

#### Component Location

#### LC8



#### LC4



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0070

#### 25. Throttle Position Target Voltage → TPTRGAD

System: LC8: EFI ✗

LC4: EFI ✗ EPT ✓

#### DISPLAY

Measurement: Throttle Position Target Voltage

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

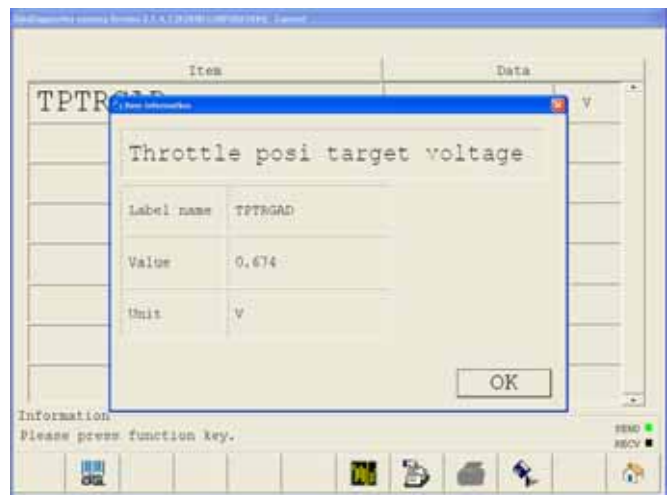
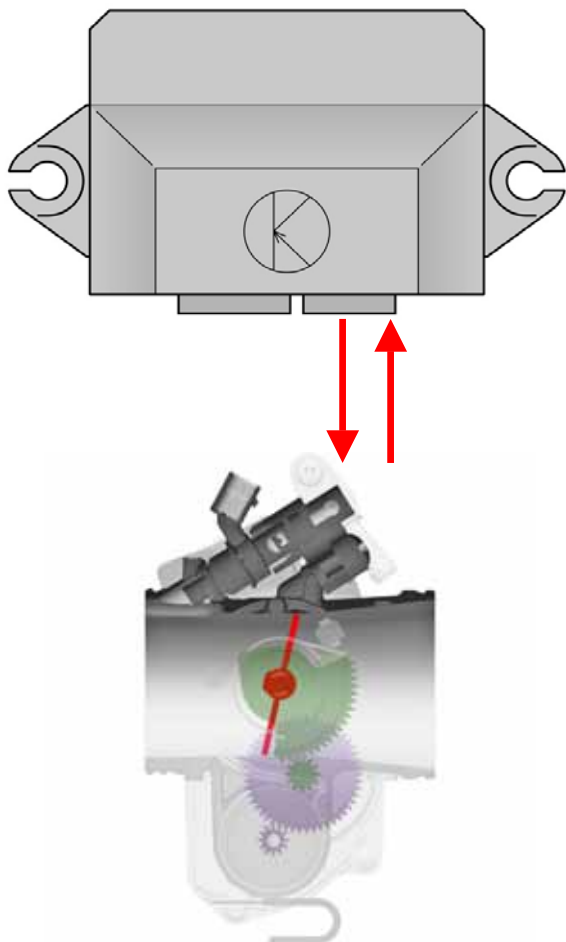
LC4 690: At coolant temperature 20°C ca. 0,649 V

#### DTC

P2119 Valve drive system malfunction

#### MIL

P2119 → 90





ID 0071

## 26. Throttle Position Target → TPTRG

System: LC8: EFI ❌

LC4: EFI ❌ EPT ✓

### DISPLAY

Measurement: Throttle Position Target Opening Angle

Unit: Opening in (%)

### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

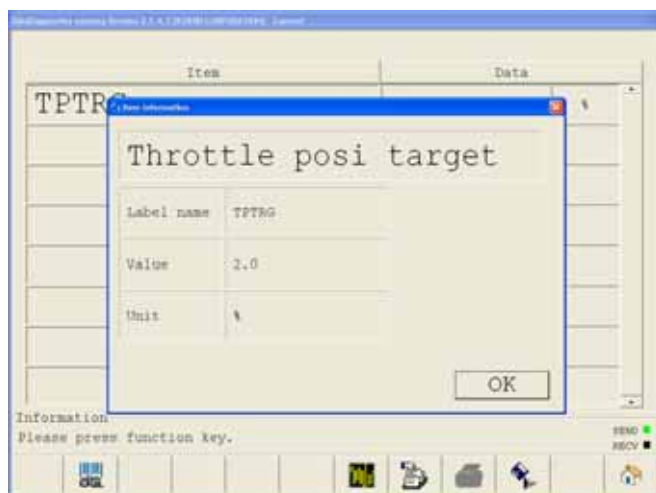
LC4 690: At Coolant Temperature 20°C, VBAT > 9,5 V: TPTRGAD = 0,649 V → TPTRG ca. 1,6% - 2,0%

### DTC

P2119 Valve drive system malfunction

### MIL

P2119 → 90



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0072/73/74

#### 27. Motor Drive Voltage → MDVAD/MDV/MDIAD

System: LC8: EFI 

LC4: EFI  EPT 

#### DISPLAY

Measurement: Motor Drive Voltage

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

LC4 690: With ignition on, VBAT > 9,5 V : MDVAD ca. 2,3 V → MDV ca. 0,54 V → MDIA ca. 0,78 V

#### DTC

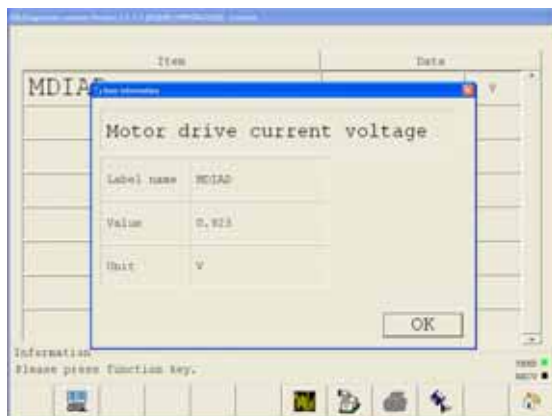
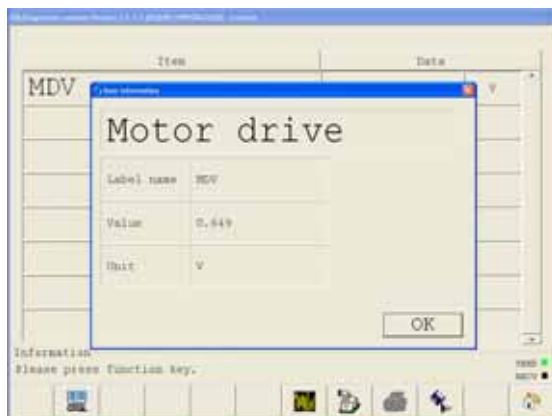
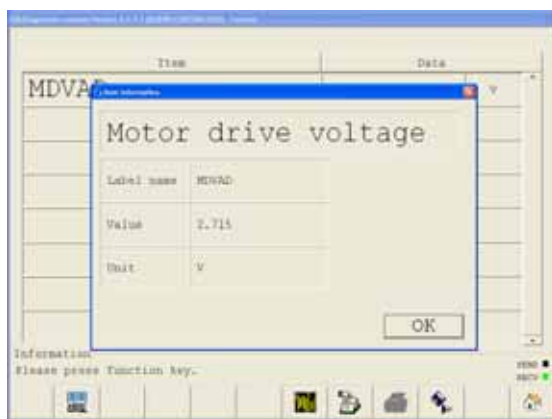
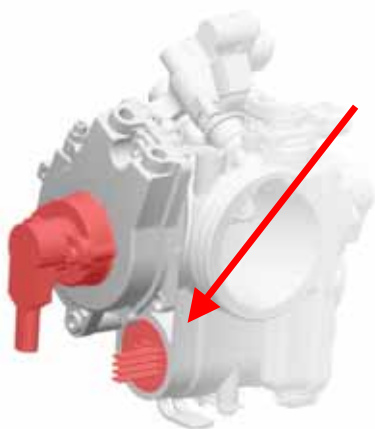
P2118 Brushless DC motor malfunction

#### MIL

P2118 → 60

#### Component Location

#### LC4



ID 0075

## 28. Motor Drive Current → MDI

System: LC8: EFI ❌

LC4: EFI ❌ EPT ✓

### DISPLAY

Measurement: Motor Drive Voltage/ Motor Drive Current

Unit: Current in Amps (A)

### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

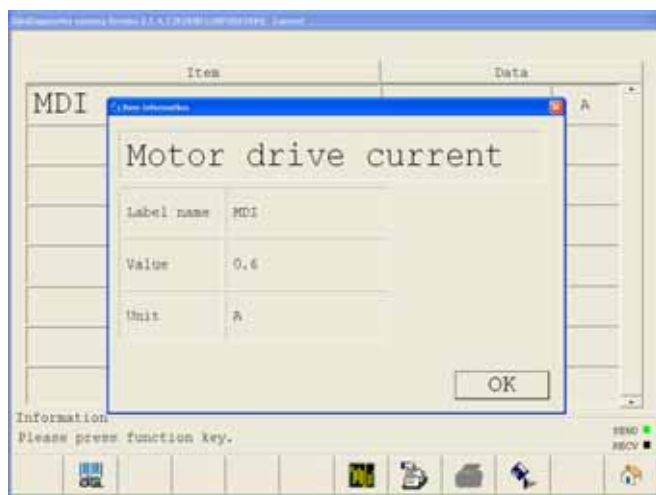
LC4 690: With Ignition On : MDVAD ca. 2,3 V → MDV ca. 0,54 V → MDIA ca. 0,78 V → MDI ca. 0,4 A

### DTC

P2118 Brushless DC motor malfunction

### MIL

P2118 → 60



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0076

#### 29. Accelerator Position Voltage → APAD

System: LC8: EFI 

LC4: EFI  EPT 

#### DISPLAY

Measurement: Accelerator Position Voltage

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!!**

LC4 690: With ignition on, VBAT > 9,5 V, no acceleration command  
APAD 0,72V ± 0,02V, at Device operation EPT motor fully open or EPT motor disconnected (Limp Home Mode) → THAD = APAD !

#### DTC

P0227 Accelerator position sensor circuit low voltage

P0228 Accelerator position sensor circuit high voltage

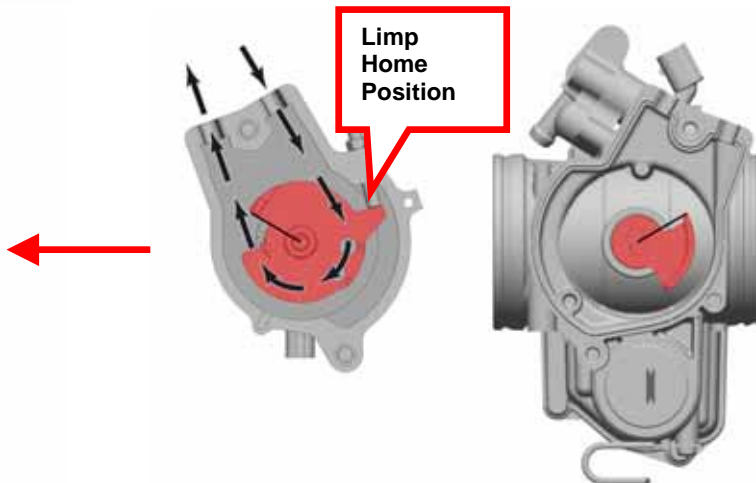
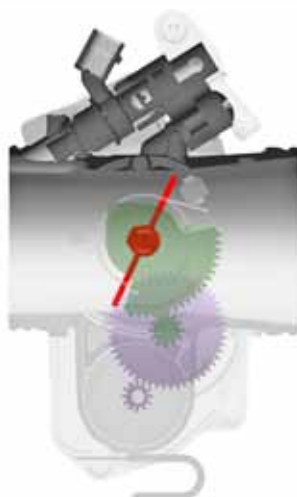
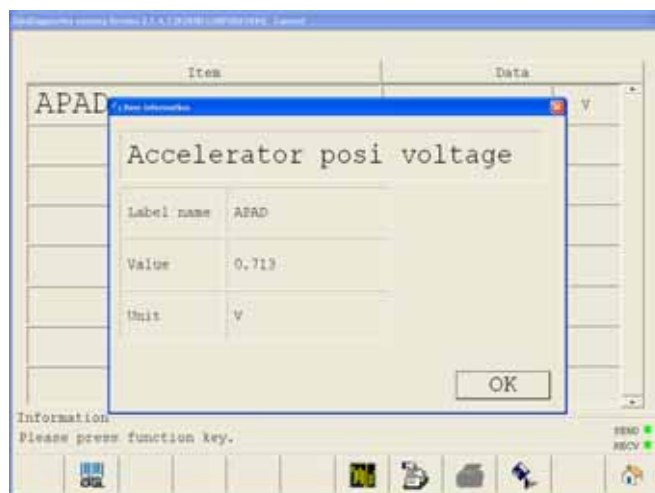
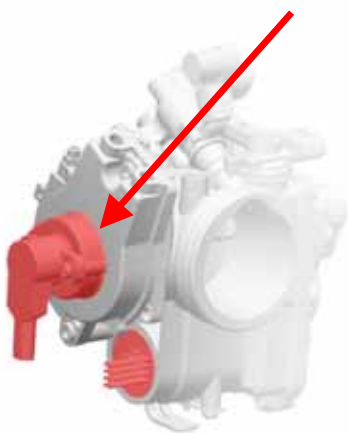
#### MIL

P0227 → 08

P0228 → 08

#### Component Location

#### LC4



ID 0077

### 30. Accelerator Position → AP

System: LC8: EFI 

LC4: EFI  EPT 

#### DISPLAY

Measurement: Acceleration command

Unit: Percent (%)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

LC4 690: With ignition On , without acceleration command AP 0,0%

#### DTC

P0227 Accelerator position sensor circuit low voltage

P0228 Accelerator position sensor circuit high voltage

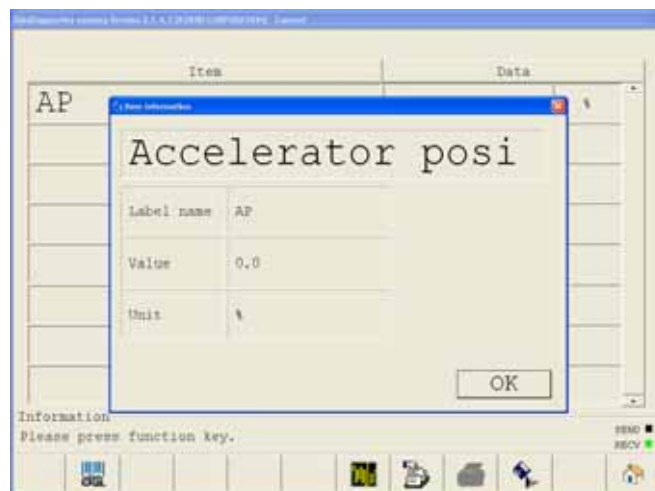
#### MIL

P0227 → 08

P0228 → 08

#### Component Location

See APAD



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0110/0111

#### 31. Injector 1 and 2 → TIOUT

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✗

#### DISPLAY

Measurement: Valve Opening Time

Unit: Time in Milliseconds (Msec)

#### TARGET VALUE

LC8 990 SD: Min. 0,0 Msec; Max. 65,5 Msec

LC8 990 Adv: Min. 0,0 Msec; Max. 65,5 Msec

LC4 690: Min. 0,0 Msec; Max. 65,5 Msec

#### DTC

P0201 Injector 1 circuit malfunction (bank 1)

P0202 Injector 2 circuit malfunction (bank 2)

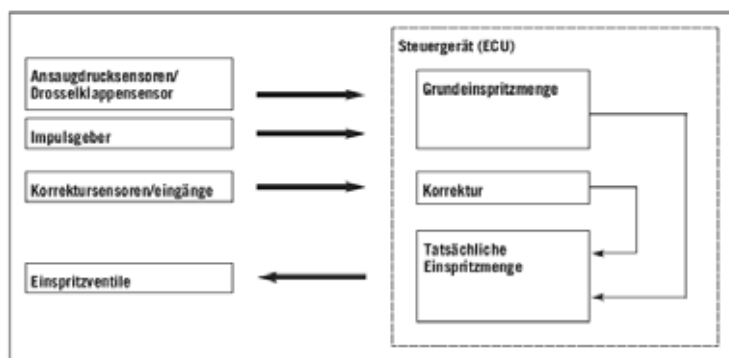
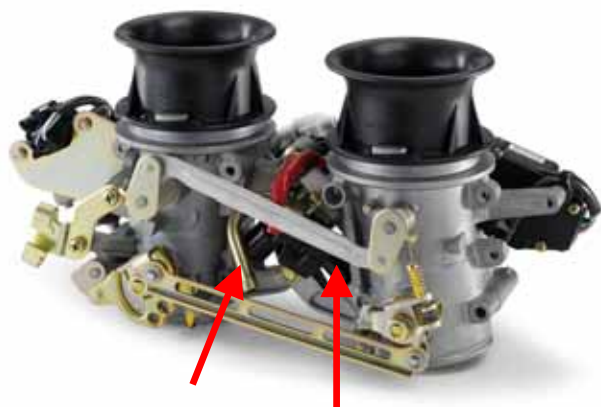
#### MIL

P0201 → 33

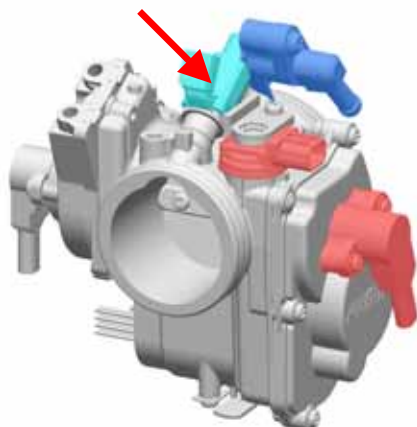
P0202 → 34

#### Component Location

##### LC8



##### LC4



ID 0140

### 32. Throttle Valve Reference Level → THREF

System: LC8: EFI ✓

LC4: EFI ✓ EPT ✓

#### DISPLAY

Measurement: Throttle Valve Reference Level Adjustment / Tolerance Compensation

Unit: Opening in Degrees (°)

#### TARGET VALUE

LC8 990 SD: Min. 13,0 °; Max. 20,0 °

LC8 990 Adv: Min. 13,0 °; Max. 20,0 °

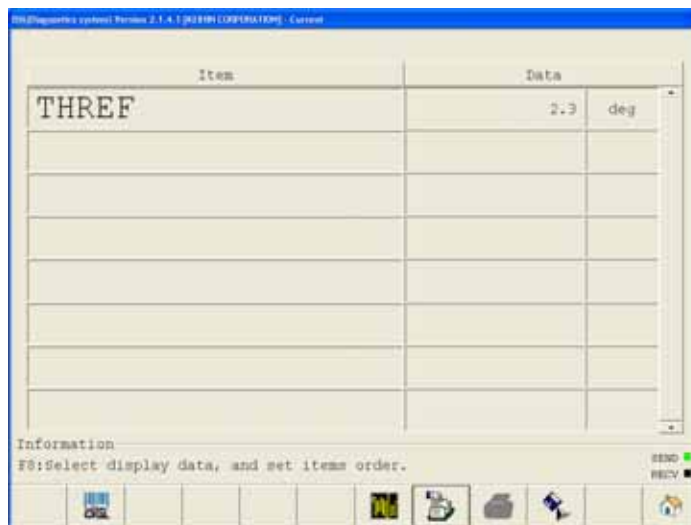
LC4 690: Min. 0,0 °; Max. 5,0 °

#### DTC

N/A

#### MIL

N/A





## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

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ID 0151

#### 33. AP Sensor Reference → APREF

System: LC8: EFI 

LC4: EFI  EPT 

#### DISPLAY

Measurement: Throttle Valve AP Reference Position

Unit: Opening in Degrees (°)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

LC4 690: **Min. 0,0 °; Max. 80,0 °**

#### DTC

N/A

#### MIL

N/A



ID 0152

### 34. TPAD Initialization Reference value / Base setting → TPADLLREF

System:     **LC8: EFI** ✗  
              **LC4: EFI** ✓   **EPT** ✓

#### DISPLAY

Measurement:     ECU Initialization Reference value TP Sensor  
Unit:               Volts (V)

#### TARGET VALUE

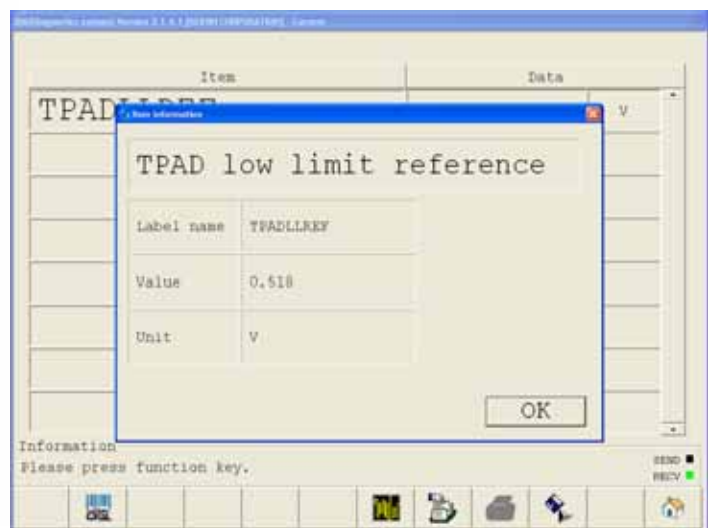
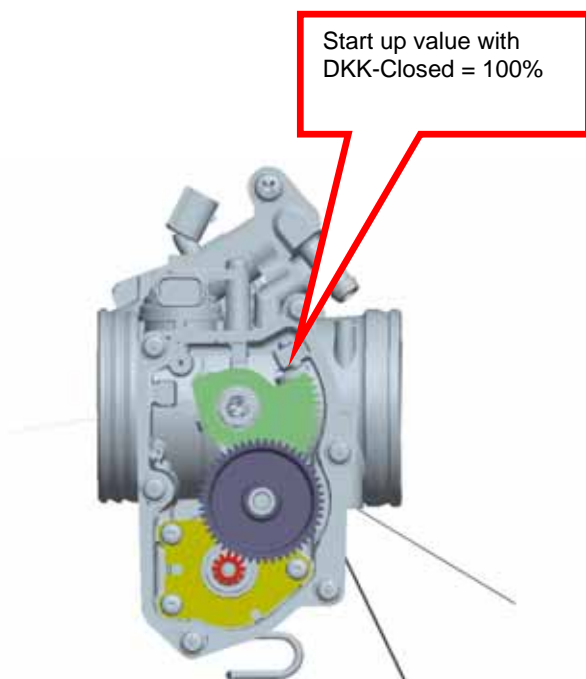
**LC8 990 SD:**       **Not Available!**  
**LC8 990 Adv:**     **Not Available!**  
**LC4 690:**         **0,52V ± 0,02V**

#### DTC

N/A

#### MIL

N/A






## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0153/0158

#### 35. APAD Low Limit Reference/TPAD Default Reference → APADLLREF/TPADDFREF

System: LC8: EFI   
LC4: EFI  EPT 

#### DISPLAY

Measurement: ECU Initialization Reference value AP Sensor, alignment AP- sensor - TP-  
sensor  
Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: **Not Available!**

LC8 990 Adv: **Not Available!**

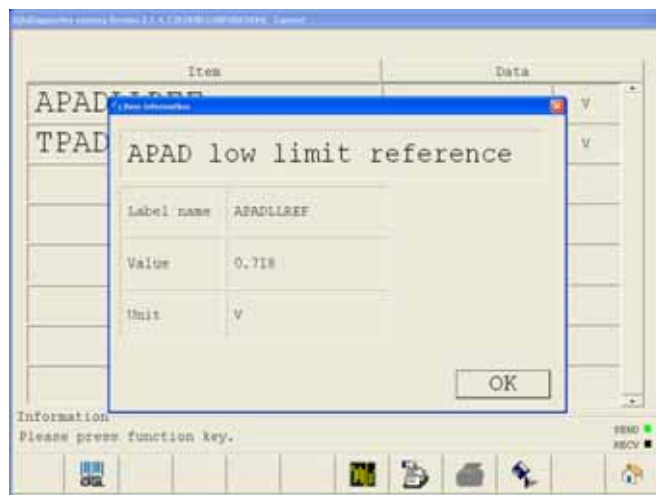
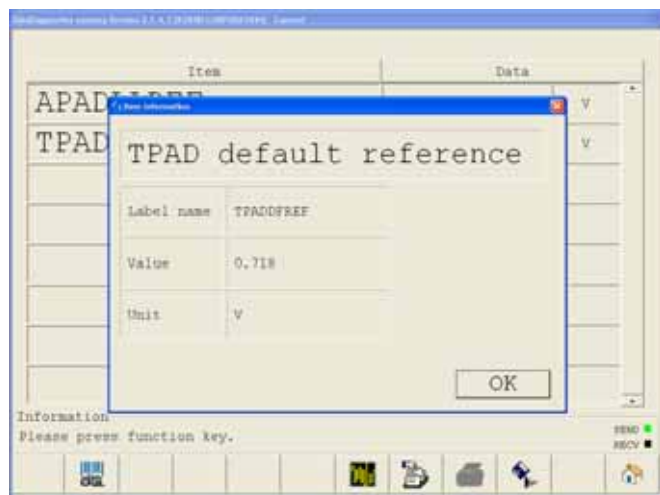
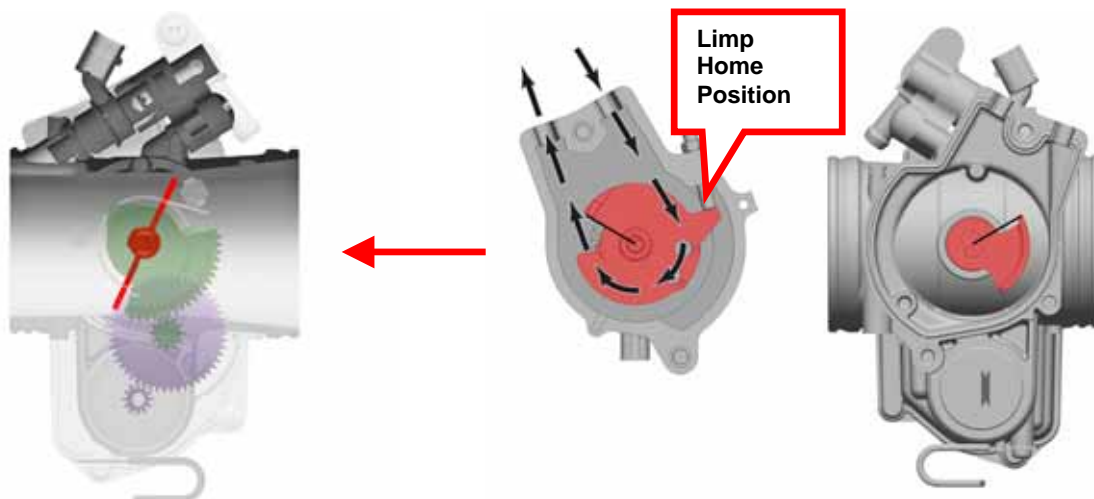
LC4 690: **0,72V ± 0,02V**

#### DTC

N/A

#### MIL

N/A



ID 0160/0161

## 36. ISC Current Steps/ISC Target Steps → ISCSTEP/OSTEP

System: LC8: EFI ✓  
LC4: EFI ✗ EPT ✗

### DISPLAY

Measurement: Idle Speed Step Motor  
Unit: Step(e)

### TARGET VALUE

LC8 990 SD: Min. 0 ; Max. 1500

LC8 990 Adv: Min. 0 ; Max. 1500

LC4 690: Not Available!

### DTC

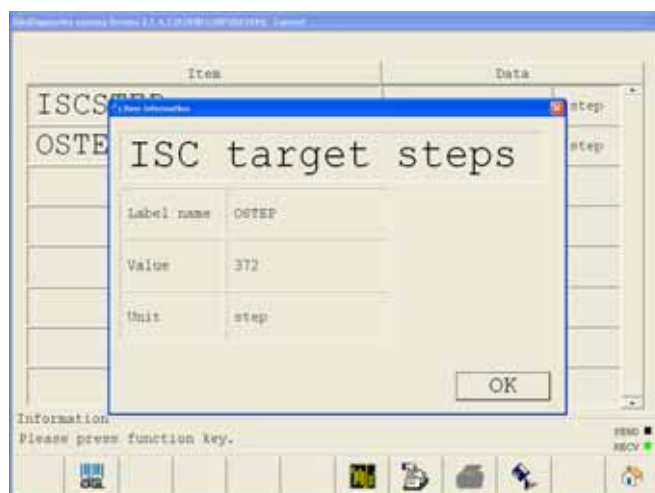
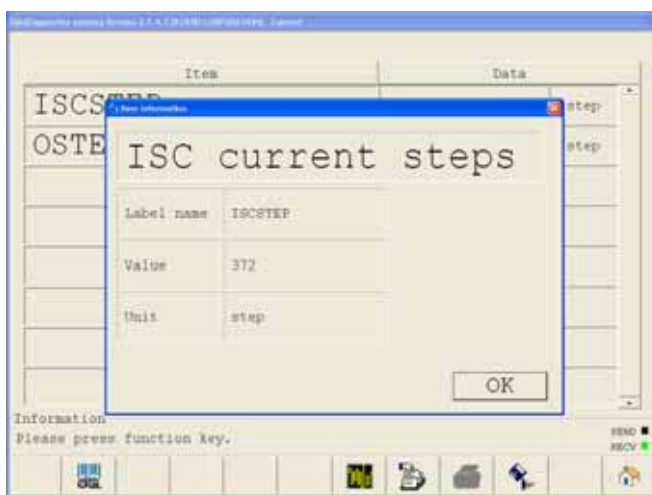
P0505 Idle speed control circuit malfunction

### MIL

P0505 → 49

### Component Location

#### LC8



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0170/0171

#### 37. 2nd Throttle Current Angle/2nd Throttle Target Angle → 2ndTHAngle/STHTRG

System: LC8: EFI ✓  
LC4: EFI ✗ EPT ✗

#### DISPLAY

Measurement: 2nd Throttle Valve Control  
Unit: Percent (%)

#### TARGET VALUE

LC8 990 SD: Min. 0 % ; Max. 100 %

LC8 990 Adv: Min. 0 % ; Max. 100 %

LC4 690: Not Available!

#### DTC

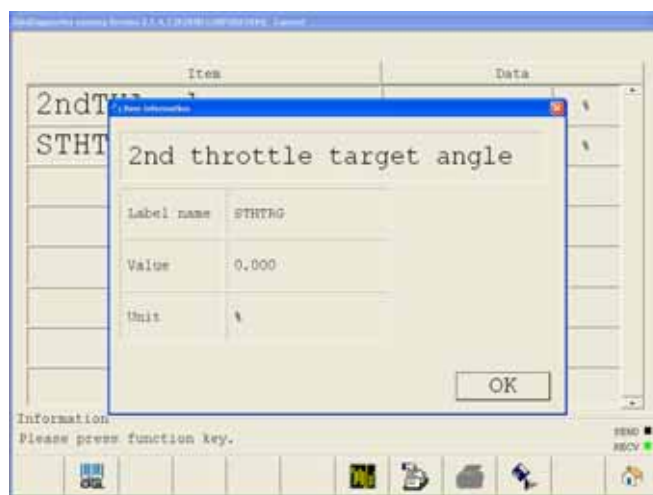
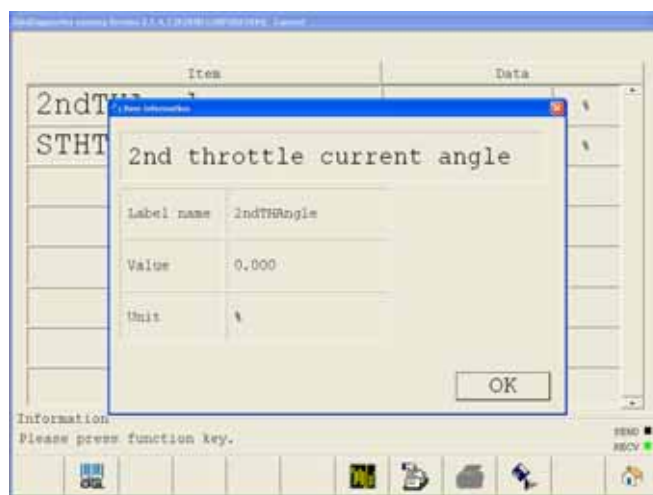
P0638 2nd throttle actuator control circuit malfunction

#### MIL

P0638 → 72

#### Component Location

#### LC8



ID 0172/0173

## 38. 2nd Throttle ADLL/2nd Throttle ADHH → STHADLL/STHADHH

System: LC8: EFI ✓  
LC4: EFI ✗ EPT ✗

### DISPLAY

Measurement: Voltage of the 2nd Throttle Valve  
Unit: Volts (V)

### TARGET VALUE

LC8 990 SD: Min. ca. 0,97 V ; Max. ca. 4,3V

LC8 990 Adv: Min. ca. 0,97 V ; Max. ca. 4,3V

LC4 690: Not Available!

### DTC

P0222 2nd throttle position sensor circuit low voltage

P0223 2nd throttle position sensor circuit high voltage

### MIL

P0222 → 07

P0223 → 07

### Component Location

#### LC8



## FI & EPT DIAGNOSIS

### MEASUREMENTS AND FAILURE CODES

ID 0186

#### 39. Idle speed stepper motor Initialization voltage → ISCTHMIN

System: LC8: EFI ✓

LC4: EFI ✗ EPT ✗

#### DISPLAY

Measurement: ECU Initialization Reference value TPS sensor by fully closed throttle valve

Unit: Volts (V)

#### TARGET VALUE

LC8 990 SD: 0,56V – 0,64V

LC8 990 Adv: 0,56V – 0,64V

LC4 690: Not Available!

#### DTC

P0222 2nd throttle position sensor circuit low voltage

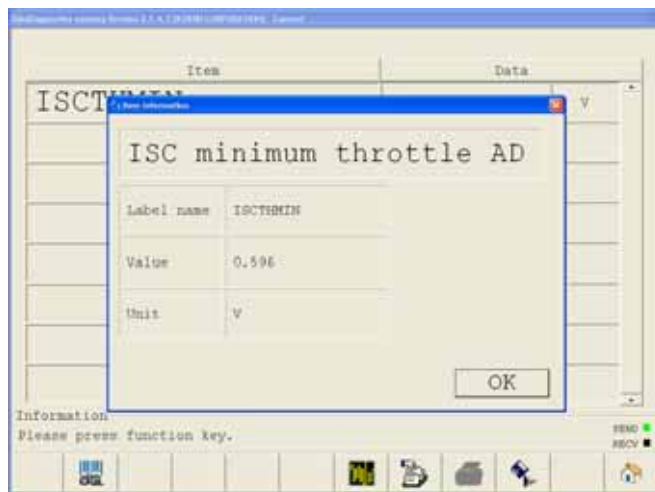
P0223 2nd throttle position sensor circuit high voltage

#### MIL

P0222 → 07

P0223 → 07

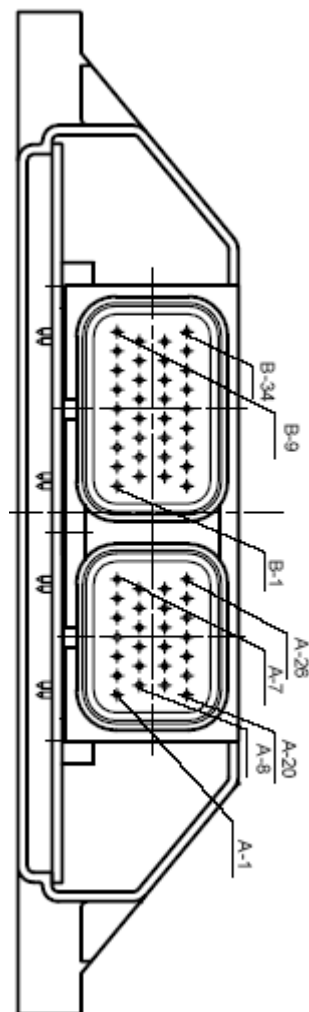
#### Component Location





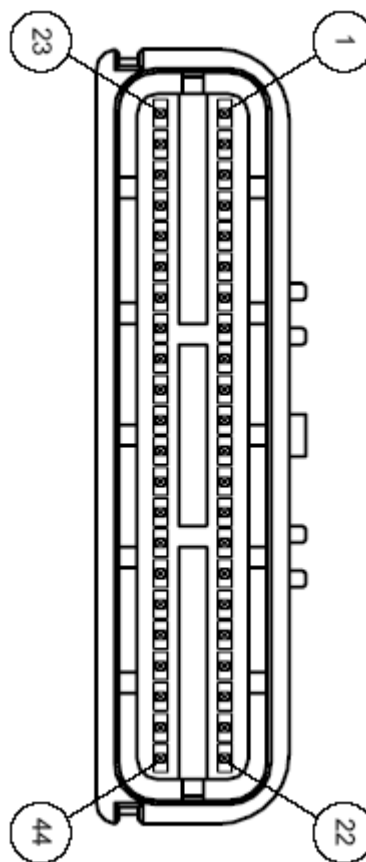
## 40. PIN Layout LC8 ECU

Pin No.	Name	Function
A -1	Vcc	Sensor power output
A -2	TAP	2nd Throttle Valve Position Sensor
A -3	PM#1	Manifold Pressure Sensor 1
A -4	ROLL	Rollover Sensor
A -5	-	-
A -6	LG	Ground
A -7	SG	Sensor Ground
A -8	ISCINH	Start Interlock output signal
A -9	TW	Coolant Temperature
A -10	TH	Throttle Position Sensor
A -11	HG#1	HEGO 1
A -12	HG#2	HEGO 2
A -13	CRK M	Crank sensor return
A -14	CRK P	Crank sensor
A -15	GP#3	Gear position #3 (A/D)
A -16	-	-
A -17	K-Line	K-Line (ISO 9141)
A -18	GP#2	Gear position #2
A -19	NLSW	Neutral
A -20	IGP	Battery
A -21	BFSW	Octane Selector
A -22	TA	Air Temperature
A -23	PA	Absolute or Barometric Air pressure
A -24	PM#2	Manifold Pressure Sensor 2
A -25	CLUTCH	Clutch
A -26	SSTAND	Side Stand Switch
B -1	-	-
B -2	FLPR	Fuel Pump relay
B -3	ISC BN	Idle Step Motor BN
B -4	TAC BN	2nd Throttle Valve Actuator BN
B -5	INJ#1	Injector #1
B -6	INJ#2	Injector #2
B -7	ISC AN	Idle Step Motor AN
B -8	PG#1	Power ground #1
B -9	PG#2	Power ground #2
B -10	-	-
B -11	ISC BP	Idle Step Motor BP
B -12	TAC BP	2nd Throttle Valve Actuator BP
B -13	EXAI	SLS Valve
B -14	TACHO	Tachometer
B -15	HGHT#2	HEGO #2 Heater
B -16	MIL	MIL
B -17	-	-
B -18	-	-
B -19	-	-
B -20	-	-
B -21	TAC AP	2nd Throttle Valve Actuator AP
B -22	TAC AN	2nd Throttle Valve Actuator
B -23	ISC AP	Idle Step Motor AP
B -24	-	-
B -25	-	-
B -26	IG#2	StickCoil #2
B -27	-	-
B -28	-	-
B -29	IG#1	StickCoil #1
B -30	-	-
B -31	PVC	Evaporative-Emissions Control System
B -32	INI	Start Interlock Signal
B -33	HGHT#1	HEGO #1 Heater
B -34	Meter-line	K-Line Dashboard



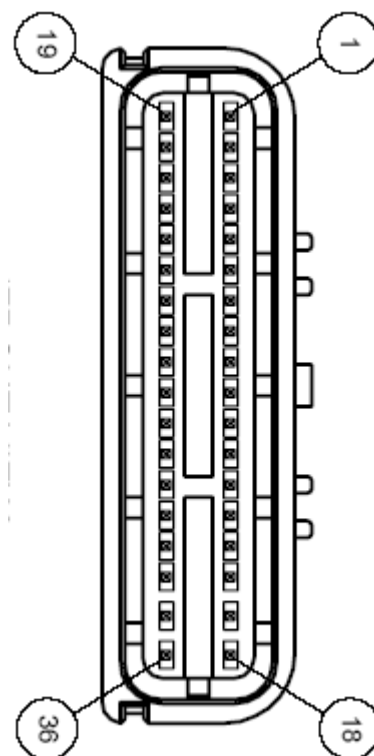
### 41. PIN Layout 690 EFI ECU

Pin N°	Name	Function
A-1	IGP	Battery (NOT OFF)
A-2	CLUTCH	Clutch
A-3	LG	Ground
A-4	Vcc	Sensor Ground
A-5	CANH	CAN H (ISO 11898)
A-6	BATT	Battery (Relay)
A-7	(VSP)	Speed Sensor
A-8	MAR	Main relay control
A-9	-	-
A-10	NLSW	Neutral
A-11	APS	APS Sensor
A-12	HG	HEGO
A-13	TH(TPS)	TPS Sensor
A-14	PA	Absolute or Barometric Air pressure
A-15	Roll	Rollover Sensor
A-16	FLP	Fuel Pump
A-17	PVC	Evaporative-Emissions Control System
A-18	EXAI	SLS Valve
A-19	-	-
A-20	PG#1	Power Ground #1
A-21	FIRO	EPT Voltage Supply Monitor
A-22	IG	Ignition coil
A-23	CRK P	Crank sensor
A-24	CRK M	Crank sensor return
A-25	SG	Ground Sensor
A-26	SSTAND	Side Stand Switch
A-27	K-Line	K-Line (ISO 11898)
A-28	CANL	CAN L (ISO 11898)
A-29	-	-
A-30	-	-
A-31	GP#2	Gear position #2 (SW)
A-32	GP#3	Gear position #3 (A/D)
A-33	BFSW	Octane Selector
A-34	TA	Air Temperature
A-35	PM	Manifold Pressure Sensor
A-36	TW	Coolant Temperature
A-37	Meter-line	K-Line Dashboard
A-38	MIL	MIL
A-39	E-PLS	EPT output Signal
A-40	(TACHO)	(Tachometer)
A-41	INJ_P	Injector
A-42	HGHT	HEGO Heater
A-43	STR	Start Relay
A-44	PG#2	Power Ground #2



## 42. PIN Layout 690 EPT ECU

Pin N°	Name	Funktion	EPT
CN-1	IGP	Battery (NOT OFF)	O
CN-2	-	-	-
CN-3	-	-	-
CN-4	-	-	-
CN-5	-	-	-
CN-6	-	-	-
CN-7	-	-	-
CN-8	LG	Logic Ground	O
CN-9	-	-	-
CN-10	K-Line	K-Line (ISO 9141)	O
CN-11	CANH	CAN H (ISO 11898)	O
CN-12	CANL	CAN L (ISO 11898)	O
CN-13	Vcc	Sensor Voltage output	O
CN-14	MO_U	EPT motor control U	O
CN-15	MO_W	EPT motor control W	O
CN-16	MO_V	EPT motor control V	O
CN-17	FIRO	EPT Voltage Supply Monitor	O
CN-18	-	-	-
CN-19	BATT	Battery (Relay)	O
CN-20	E-PLS	EPT output Signal	O
CN-21	-	-	-
CN-22	-	-	-
CN-23	-	-	-
CN-24	SG	Ground Sensor	O
CN-25	-	-	-
CN-26	-	-	-
CN-27	-	-	-
CN-28	-	-	-
CN-29	HU	HALL Sensor output U	O
CN-30	HV	HALL Sensor output V	O
CN-31	HW	HALL Sensor output W	O
CN-32	-	-	-
CN-33	-	-	-
CN-34	-	-	-
CN-35	PG#1	Power Ground #1	O
CN-36	PG#2	Power Ground#2	O



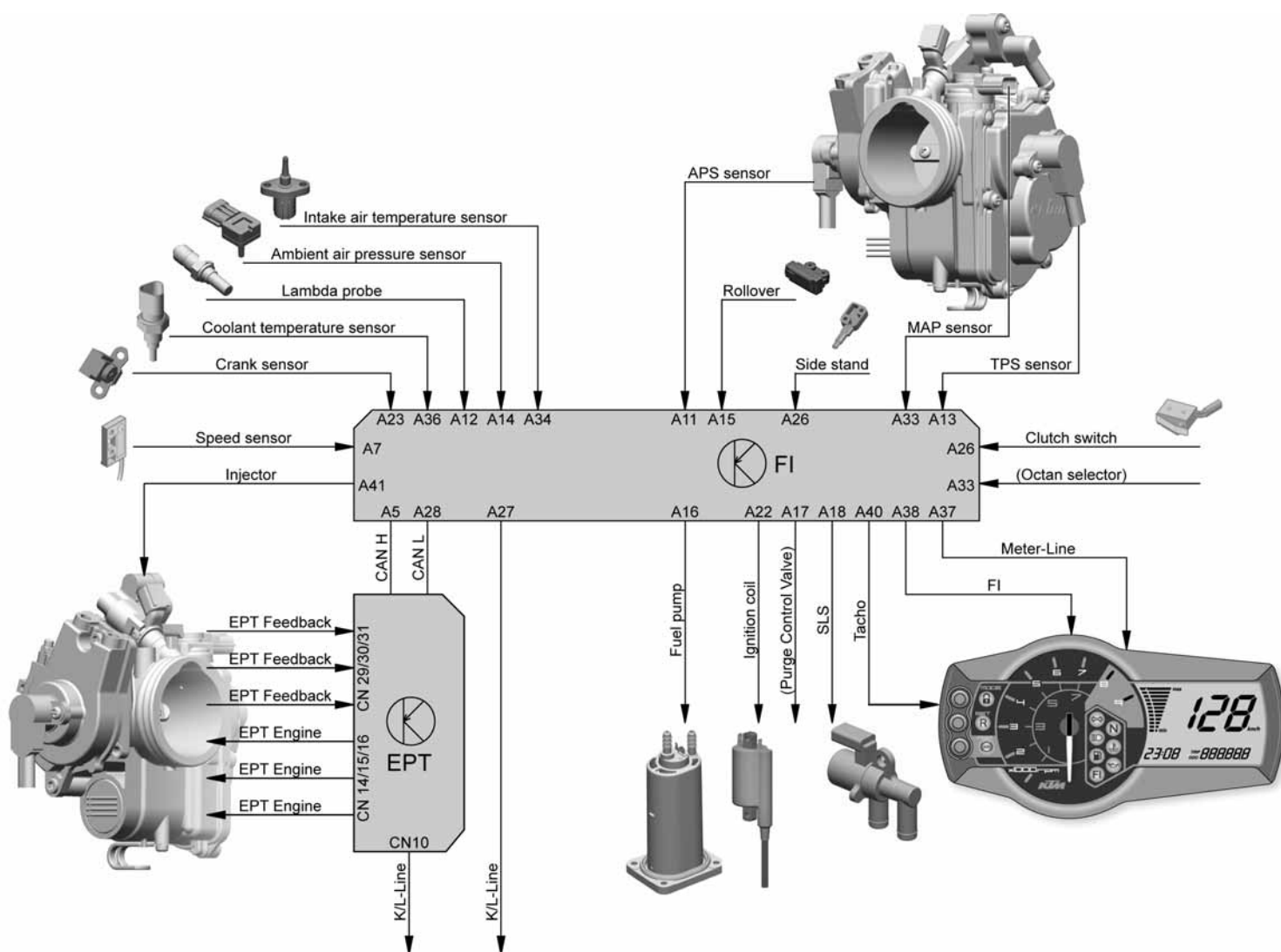
# FI & EPT DIAGNOSIS

## MEASUREMENTS AND FAILURE CODES

### 43. Pcodes

DTC (Diagnostic Trouble Codes) LC8 / LC4 690							
P Code	Description	LC8		LC4			
		EFI		EFI		EPT	
		Support	Limp HomeSW Engine	Support	Limp HomeSW Engine	Support	Limp HomeSW Engine
P0031	HEGO1 sensor heater circuit short to GND or open (bank1)	O	Run	O	Run	x	
P0032	HEGO1 sensor heater circuit short to vbatt (bank1)	O	Run	O	Run	x	
P0051	HEGO2 sensor heater circuit short to GND or open (bank2)	O	Run	x	-	x	
P0052	HEGO2 sensor heater circuit short to vbatt (bank2)	O	Run	x	-	x	
P0107	Manifold absolute pressure1 sensor circuit low voltage (bank1)	O	Stop	O	Stop	x	
P0108	Manifold absolute pressure1 sensor circuit high voltage (bank1)	O	Stop	O	Stop	x	
P0112	Intake air temperature sensor circuit low voltage	O	Run	O	Run	x	
P0113	Intake air temperature sensor circuit high voltage	O	Run	O	Run	x	
P0117	Engine coolant temperature sensor circuit low voltage	O	Run	O	Run	x	
P0118	Engine coolant temperature sensor circuit high voltage	O	Run	O	Run	x	
P0122	Throttle position sensor circuit low voltage	O	Run	O	Run	x	
P0123	Throttle position sensor circuit high voltage	O	Run	O	Run	x	
P0130	HEGO1 sensor circuit malfunction (bank1)	O	Run	O	Run	x	
P0150	HEGO2 sensor circuit malfunction (bank2)	O	Run	x	-	x	
P0201	Injector1 circuit malfunction (bank1)	O	Stop	O	Stop	x	
P0202	Injector2 circuit malfunction (bank2)	O	Stop	x	-	x	
P0222	2nd throttle position sensor circuit low voltage	O	Run	x	-	x	
P0223	2nd throttle position sensor circuit high voltage	O	Run	x	-	x	
P0227	Accelerator position sensor circuit low voltage	x	-	O	Run	x	
P0228	Accelerator position sensor circuit high voltage	x	-	O	Run	x	
P0335	Crankshaft sensor circuit malfunction, open and short circuit can't be distinguished.	O	Stop	O	Stop	x	
P0351	Ignition coil 1 circuit malfunction (bank1)	O	Stop	O	Stop	x	
P0352	Ignition coil 2 circuit malfunction (bank2)	O	Stop	x	-	x	
P0413	Exhaust air injection circuit short to GND or open	O	Run	O	Run	x	
P0414	Exhaust air injection circuit short to vbatt	O	Run	O	Run	x	
P0444	Purge valve control circuit short to GND or open	O	Run	O	Run	x	
P0445	Purge valve control circuit short to vbatt	O	Run	O	Run	x	
P0505	Idle speed control circuit malfunction	O	Run	x	-	x	
P0560	System voltage circuit malfunction	O	Run	O	Run	O	Run
P0603	EEPROM error	O	Run	O	Run	O	Run
P0638	2nd throttle actuator control circuit malfunction	O	Run	x	-	x	
P1105	Manifold absolute pressure1 sensor pipe malfunction (Bank1)	O	Stop	O	Stop	x	
P1106	Manifold absolute pressure2 sensor pipe malfunction (Bank2)	O	Stop	x	-	x	
P1107	Ambient air pressure sensor circuit low voltage	O	Run	O	Run	x	
P1108	Ambient air pressure sensor circuit high voltage	O	Run	O	Run	x	
P1231	Fuel pump relay circuit short to GND or open	O	Stop	O	Stop	x	
P1232	Fuel pump relay circuit short to vbatt	O	Stop	O	Stop	x	
P1530	Hole sensor malfunction	x	-	x	-	O	Run
P1531	Motor drive relay malfunction	x	-	x	-	O	Läuft
P1532	EFI motor drive relay permission signal malfunction	x	-	O	Run	x	
P1533	EPT motor drive relay permission signal malfunction	x	-	x	-	O	Run
P1590	Side Stand switch (A/D type) circuit malfunction	O	Stop	O	Stop	x	
P1631	Roll over sensor (A/D type) circuit low voltage	O	Run	O	Run	x	
P1632	Roll over sensor (A/D type) circuit high voltage	O	Run	O	Run	x	
P1687	Manifold absolute pressure2 sensor circuit low voltage (Bank2)	O	Run	x	-	x	
P1688	Manifold absolute pressure2 sensor circuit high voltage (Bank2)	O	Run	x	-	x	
P1690	Communication error or wrong instrument	x	-	O	Run	O	Run
P2118	Brush less DC motor malfunction	x	-	x	-	O	Run
P2119	Valve drive system malfunction	x	-	x	-	O	Run

## 44. Scheme LC4 690



45. Scheme LC8 990

