Date:	February 23, 2023
Order No:	LI07.10-N-075862
Group:	07.10

SUBJECT: **Instructions for handling fault codes for 'Position sensor of crankshaft' in combination with fault codes for 'Output stage fuel injector' in the CDI control unit in the following Freightliner Sprinter Vans:**

Model 906 (MY14-16) with engine OM651
Model 907 (MY21) with engine OM642 or engine OM651

Information: MIL Illuminated.
Fault codes for 'position sensor of crankshaft' in combination with fault codes for 'Output stage fuel injector' are set in the CDI control unit (N3/33, N3/47 or N3/28).

Fault Codes:

N3/33 (906), N3/47 (907) - Motor electronics 'CDI43' for combustion engine 'OM651' (CDI):

- (SAE P0336) P033600 - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P0335FA - Component 'Position sensor of crankshaft' has an electrical fault.
- (SAE P0611) P0611E9 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P0611E3 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P0611E2 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P0611E1 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P0611E0 - Component 'Output stage fuel injectors' has a malfunction.

N3/28 (907) - Motor electronics 'CDI61NFZ' for combustion engine 'OM642' (CDI):

- (SAE P0336) P30021F - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P300225 - Component 'Position sensor of crankshaft' has an electrical fault.
- (SAE P0611) P300EE8 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE4 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE6 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE5 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE3 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE2 - Component 'Output stage fuel injectors' has a malfunction.
- (SAE P0611) P300EE1 - Component 'Output stage fuel injectors' has a malfunction.

Please Note:

The fault codes for 'output stage of fuel injectors' are set by mistake when the following fault codes set in the mentioned engine control units:

N3/33 (906), N3/47 (907) - Motor electronics 'CDI43' for combustion engine 'OM651' (CDI):

- (SAE P0336) P033600 - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P0335FA - Component 'Position sensor of crankshaft' has an electrical fault.

N3/28 (907) - Motor electronics 'CDI61NFZ' for combustion engine 'OM642' (CDI):

- (SAE P0336) P30021F - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P300225 - Component 'Position sensor of crankshaft' has an electrical fault.

Remedy:

Note:
Ignore the fault codes for the 'output stage fuel injectors' if fault codes set for 'position sensor of crankshaft'.

Information:
First, fault codes referring to 'position sensor of crankshaft' need to be processed as per the instructions in XENTRY Diagnosis (see AD00.00-D-2000-04SD).
Strict compliance with the operation steps in XENTRY Diagnosis is absolutely essential.

For workshops using Generic Scan Tools:

Model 906 with engine OM651 proceed to page 4
Model 907 with engine OM651 proceed to page 9
Model 907 with engine OM642 proceed to page 14

Information: Please refer to the ISP Portal or XENTRY TIPS for the most up-to-date information. In case of additional questions, please contact us using the “Contact Us” selection on www.startekinfo.com

ISP Portal: https://www.startekinfo.com/home

⚠Warning	**Risk of injury**. Skin or eye injuries may result when handling hot or glowing objects.	Wear protective gloves, protective clothing and safety glasses, if necessary.	AS00.00-Z-0002-01A
⚠Warning	**Risk of accident** from vehicle starting off by itself when engine running. **Risk of injury** (bruises and burns) resulting from working on the engine while it is being started or when it is running. Perform engine test run and check engine in area of high-pressure line (**1**) for lea	Secure vehicle to prevent it from starting off by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts.	AS00.00-Z-0005-01A
⚠Warning	**Risk of injury** to skin and eyes suffering scalding from contact with hot coolantspray. **Risk of poisoning** from swallowing coolant.	Do not open cooling system unless coolant temperature is below 90 °C. Open cap slowly and release the pressure. Do not pour coolant into beverage containers. Wear protective gloves, protective clothing and safety glasses.	AS20.00-Z-0001-01A
⚠Caution	**Risk of injury** caused by scraping or cutting body parts on sharp vehicle parts	Always wear protective gloves when working on or near sharp and non-deburred vehicle parts. Deburr repair panels.	AS00.00-Z-0017-01A

N3/33 - Motor electronics 'CDI43' for combustion engine 'OM651' (CDI) in Model 906:

- (SAE P0336) P033600 - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P0335FA - Component 'Position sensor of crankshaft' has an electrical fault.

1. Test signal voltage of component 'B70/1 (Crankshaft position sensor)'.

Special tools

- HMS Measurement technology
- Socket box 000 589 00 21 00
- Test cable 266 589 01 63 00

Test prerequisites

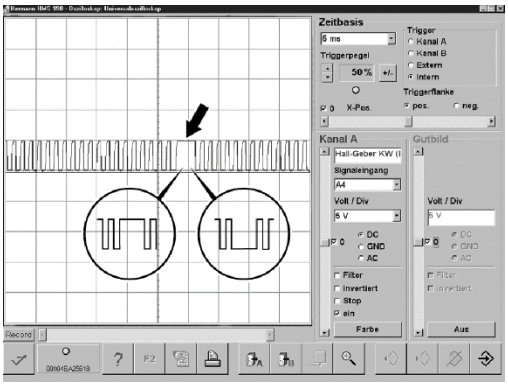
- Switch off ignition.
- Connect 189-pin socket box between engine wiring harness and control unit 'N3/28 (CDI control unit)'.

Note

- If the Measurement Technology 'HMS990' is not available, the subsequent tests can also be performed using alternative measuring instruments such as an Oscilloscope or a Digital Multimeter.

Legend

- Pass image



Settings:

- Trigger Level 50%
- Time Range 5ms

Test procedure

- Switch off ignition
- Connect measurement system.
- (M.84) 84 E e E 39 (M.39)
- Start combustion engine

Specified value

- Compare oscillogram with pass image for component 'B70/1 (Crankshaft position sensor)'
- Signal voltage: [4.70V … 5.30V]
- The variation with time of the signal voltage shown in the picture may also be inverted.

Question:

Is the measured value OK?

YES: **The actual value is OK**

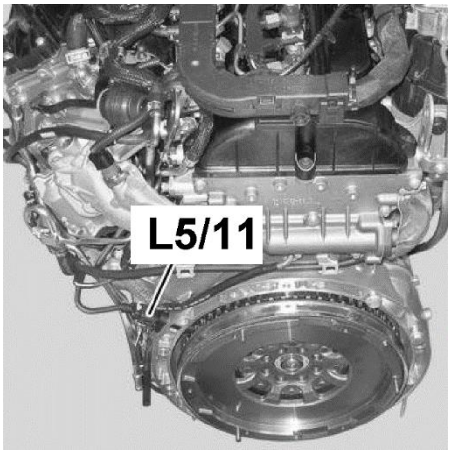
Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.
- Teeth on the sensor rotor may be bent.
- Combustion engine over-revving has occurred.

End of test

NO: The actual value is not OK

2. Check power supply of component 'L5/11 (Crankshaft position sensor)'



Legend

- 'L5/11 (Crankshaft position sensor)'

Special tool

- Adapter cable 220 589 00 99 35

Test procedure

- Switch off ignition.
- Disconnect the 3-pin plug of component
- 'L5/11 (Crankshaft position sensor)'
- Connect adapter cable 220 589 00 99 35 to engine wiring harness of component 'L5/11 (Crankshaft position sensor)'.
- (L5/11) 1 w c L 3 (L5/11)
- Switch on ignition.

Specified value

- The measured value must be between 4.80V and 5.30V.

Question:

Is the measured value OK?

NO: The actual value is not OK

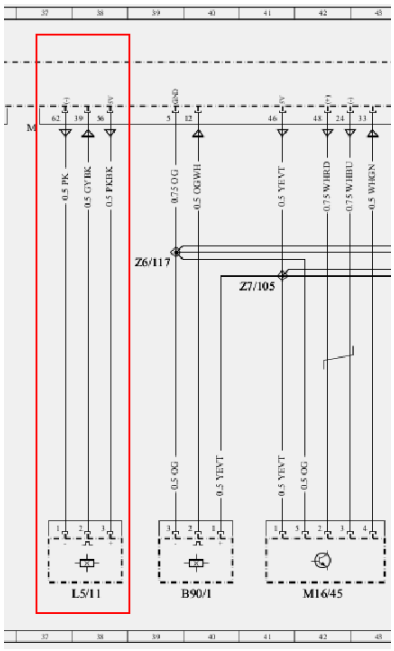
- Proceed with operation step 4

YES: **The actual value is OK**

3. Test signal line of component 'L5/11 (Crankshaft position sensor)'.

Legend

- N3/33 (CDI Control unit)
- L5/11 (Crankshaft position sensor)



Test procedure

- Switch off ignition.
- Disconnect the 3-pin plug of component 'L5/11 (Crankshaft position sensor)'
- Detach connector M from 'N3/33 (CDI control unit)'.
- Connect socket box 000 589 00 21 00 (189-pin) to control unit 'N3/33 (CDI control unit)'.
- (M.39) 39 E b 2 (L5/11)

Specified value:

- The measurement must be <= 1Ω.

Question:

Is the measured value OK?

YES: **The actual value is OK**

Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.
- Teeth on the sensor rotor may be bent.
- Combustion engine over-revving has occurred.
- Component 'L5/11 (Crankshaft position sensor)' is defective.

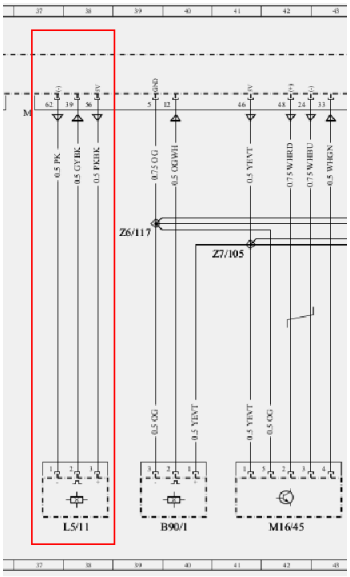
End of test

NO: The actual value is not OK

4. Check electrical lines from component 'L5/11 (Crankshaft position sensor)' to control unit 'N3/33 (CDI control unit)'.

Legend

- N3/33 (CDI Control unit)
- L5/11 (Crankshaft position sensor)



Possible causes and remedies

- Check the electrical lines from component 'L5/11 (Crankshaft position sensor)' to control unit 'N3/33 (CDI control unit)'.

End of test

N3/47 - Motor electronics 'CDI43' for combustion engine 'OM651' (CDI) in Model 907:

- (SAE P0336) P033600 - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P0335FA - Component 'Position sensor of crankshaft' has an electrical fault.

1. Test signal voltage of component 'L5 (Crankshaft position sensor)'.

Special tools

- HMS Measurement technology
- Socket box 000 589 00 21 00
- Test cable 266 589 01 63 00

Test prerequisites

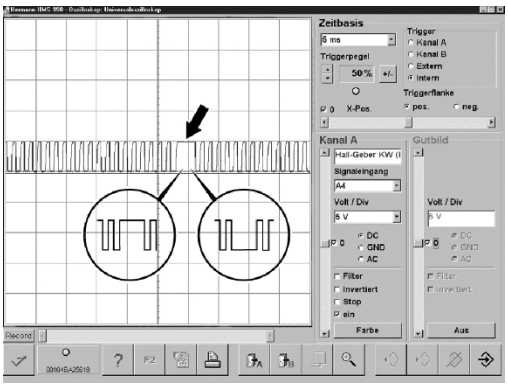
- Switch off ignition.
- Connect 189-pin socket box between engine wiring harness and control unit 'N3/47 (CDI control unit)'.

Note

- If the Measurement Technology 'HMS990' is not available, the subsequent tests can also be performed using alternative measuring instruments such as an Oscilloscope or a Digital Multimeter.

Legend

- Pass image



Settings:

- Trigger Level 50%
- Time Range 5ms

Test procedure

- Switch off ignition
- Connect measurement system.
- (M.62) 62 [A7] E e E [A4] 39 (M.39)
- Start combustion engine

Specified value

- Compare oscillogram with pass image for component 'L5 (Crankshaft position sensor)'
- Signal voltage: [4.70V … 5.30V]
- The variation with time of the signal voltage shown in the picture may also be inverted.

Question:

Is the measured value OK?

YES: **The actual value is OK**

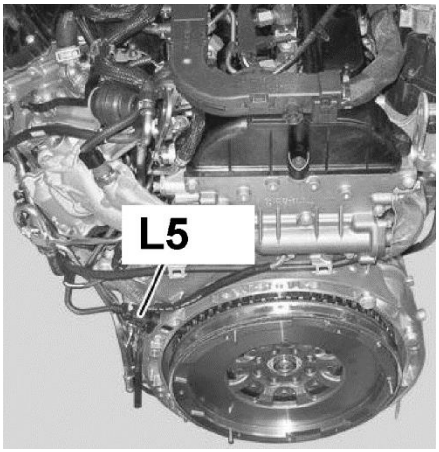
Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.
- Teeth on the sensor rotor may be bent.
- Combustion engine over-revving has occurred.

End of test

NO: The actual value is not OK

2. Check power supply of component 'L5 (Crankshaft position sensor)'



Legend

- 'L5 (Crankshaft position sensor)'

Special tool

- Adapter cable 220 589 00 99 35

Test procedure

- Switch off ignition.
- Disconnect the 3-pin plug of component
- 'L5 (Crankshaft position sensor)'
- Connect adapter cable 220 589 00 99 35 to engine wiring harness of component 'L5 (Crankshaft position sensor)'.
- (L5) 1 w c L 3 (L5)
- Switch on ignition.

Specified value

- The measured value must be between 4.80V and 5.30V.

Question:

Is the measured value OK?

NO: The actual value is not OK

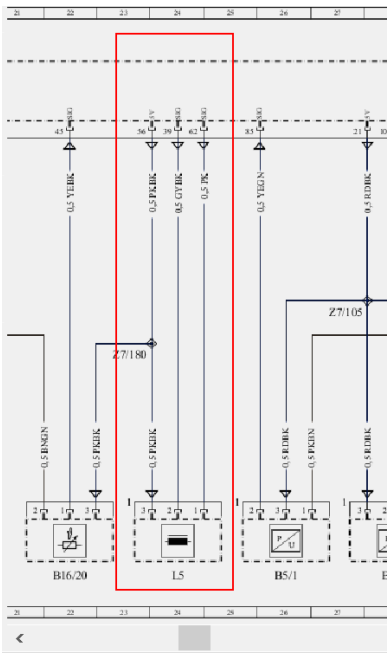
- Proceed with operation step 4

YES: **The actual value is OK**

3. Test signal line of component 'L5 (Crankshaft position sensor)'.

Legend

- N3/47 (CDI Control unit)
- L5 (Crankshaft position sensor)
- Z7/180 (5V output connector sleeve)



Test procedure

- Switch off ignition.
- Disconnect the 3-pin plug of component 'L5 (Crankshaft position sensor)'
- Detach connector M from 'N3/47 (CDI control unit)'.
- Connect socket box 000 589 00 21 00 (189-pin) to control unit 'N3/47 (CDI control unit)'.
- (M.39) 39 E b 2 (L5)

Specified value:

- The measurement must be <= 1Ω.

Question:

Is the measured value OK?

YES: **The actual value is OK**

Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.
- Teeth on the sensor rotor may be bent.

- Combustion engine over-revving has occurred.
- Component 'L5 (Crankshaft position sensor)' is defective.

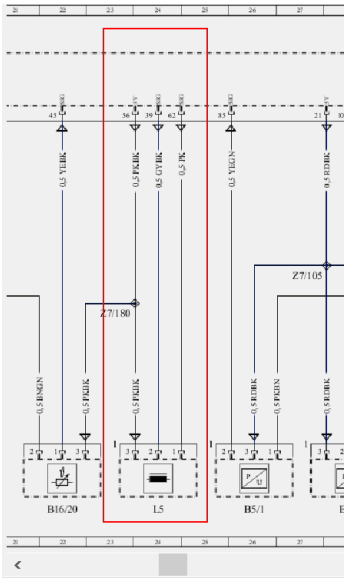
End of test

NO: The actual value is not OK

4. Check electrical lines from component 'L5 (Crankshaft position sensor)' to control unit 'N3/47 (CDI control unit)'.

Legend

- N3/47 (CDI Control unit)
- L5 (Crankshaft position sensor)
- Z7/180 (5V output connector sleeve)



Possible causes and remedies

- Check the electrical lines from component 'L5 (Crankshaft position sensor)' to control unit 'N3/47 (CDI control unit)'.

End of test

N3/28 - Motor electronics 'CDI61NFZ' for combustion engine 'OM642' (CDI) in Model 907:

- (SAE P0336) P30021F - Component 'Position sensor of crankshaft' has a malfunction.
- (SAE P0335) P300225 - Component 'Position sensor of crankshaft' has an electrical fault.

1. Test signal voltage of component 'L5 (Crankshaft position sensor)'.

Special tools

- HMS Measurement technology
- Socket box 000 589 00 21 00
- Test cable 266 589 01 63 00

Test prerequisites

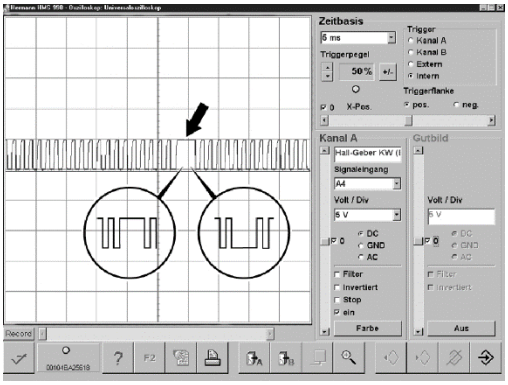
- Switch off ignition.
- Connect 189-pin socket box between engine wiring harness and control unit 'N3/47 (CDI control unit)'.

Note

- If the Measurement Technology 'HMS990' is not available, the subsequent tests can also be performed using alternative measuring instruments such as an Oscilloscope or a Digital Multimeter.

Legend

- Pass image



Settings:

- Trigger Level 50%
- Time Range 5ms

Test procedure

- Switch off ignition
- Connect measurement system.
- (M.62) 62 [A7] E e E [A4] 39 (M.39)
- Start combustion engine

Specified value

- Compare oscillogram with pass image for component 'L5 (Crankshaft position sensor)'
- Signal voltage: [4.70V … 5.30V]
- The variation with time of the signal voltage shown in the picture may also be inverted.

Question:

Is the measured value OK?

YES: **The actual value is OK**

Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.

Important note

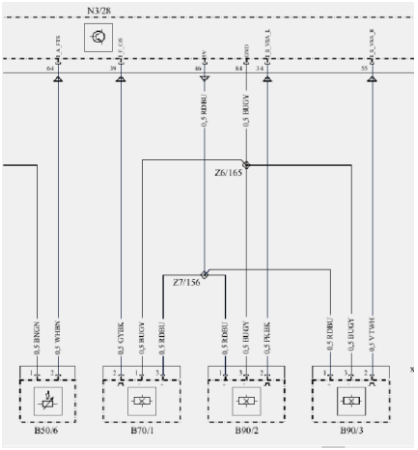
- After replacement of component 'B6/24 (Rpm sensor)', the learned values of component 'B6/24 (Rpm sensor)' must be reset via the menu 'Adaptations'.

- After replacement of component 'Sensor rotor', the learned values of component 'B6/24 (Rpm sensor)' must be reset via the menu 'Adaptations'.

End of test

NO: The actual value is not OK

2. Check power supply of component 'B70/1 (Crankshaft position sensor)'



Legend

- N3/28 (CDI control unit)
- B70/1 (Crankshaft position sensor)
- Z6/165 (Sensor ground connection connector sleeve 7)
- Z7/156 (5V output connector sleeve 5)

Test procedure

- Switch off ignition.
- Disconnect the 3-pin plug of component 'B70/1 (Crankshaft position sensor)'
- (B70/1) 1 w c L 3 (B70/1)
- Switch on ignition.

Specified value

- The measured value must be between 4.80V and 5.30V.

Question:

Is the measured value OK?

NO: The actual value is not OK

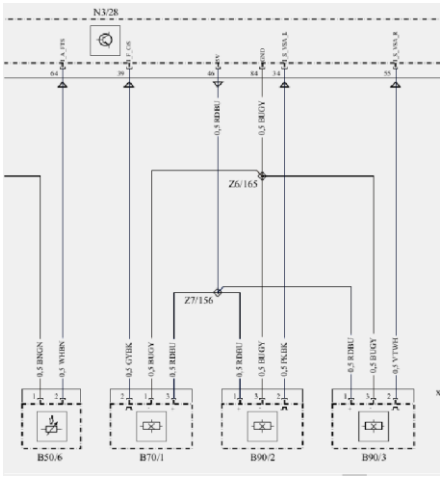
- Proceed with operation step 4

YES: **The actual value is OK**

3. Test signal line of component 'B70/1 (Crankshaft position sensor)'.

Legend

- N3/28 (CDI control unit)
- B70/1 (Crankshaft position sensor)
- Z6/165 (Sensor ground connection connector sleeve 7)
- Z7/156 (5V output connector sleeve 5)



Special tools

- Test cable 266 589 01 63 00
- Socket box 000 589 00 21 00

Test procedure

- Switch off ignition.
- Disconnect plug-in connector from component 'B70/1 (Crankshaft position sensor)' and control unit N3/28 (CDI control unit)
- Connect socket box (189-pin) to the engine wiring harness.
- (M.39) 39 E b 2 (B70/1)

Specified value:

- The measurement must be <= 1Ω.

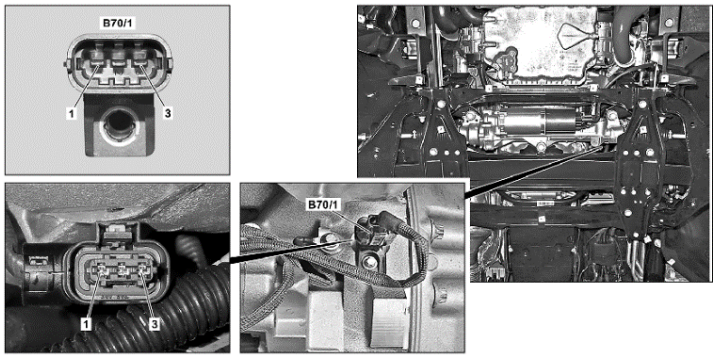
Question:

Is the measured value OK?

YES: **The actual value is OK**

Legend

- B70/1 (Crankshaft position sensor)



Possible causes and remedies

- Check rpm sensor for tight seating, correct installation and mechanical damage.
- Teeth on the sensor rotor may be bent.
- Combustion engine over-revving has occurred.
- Component 'B70/1 (Crankshaft position sensor)' is defective.

Important note

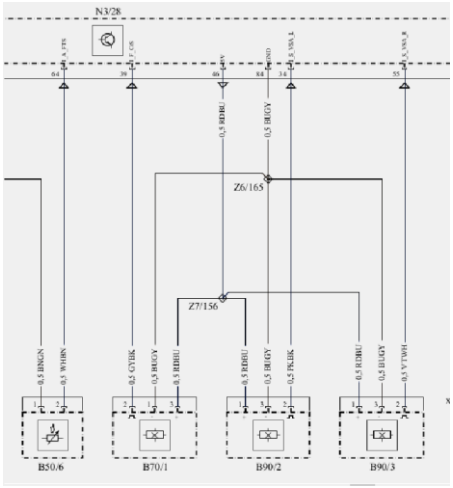
- After replacement of component 'B6/24 (Rpm sensor)', the learned values of component 'B6/24 (Rpm sensor)' must be reset via the menu 'Adaptations'.

- After replacement of component 'Sensor rotor', the learned values of component 'B6/24 (Rpm sensor)' must be reset via the menu 'Adaptations'.

End of test

NO: The actual value is not OK

4. Check electrical lines from component 'B70/1 (Crankshaft position sensor)' to control unit 'N3/28 (CDI control unit)'.



Legend

- N3/28 (CDI control unit)
- B70/1 (Crankshaft position sensor)
- Z6/165 (Sensor ground connection connector sleeve 7)
- Z7/156 (5V output connector sleeve 5)

Possible causes and remedies

- Check the electrical lines from component 'B70/1 (Crankshaft position sensor)' to control unit 'N3/28 (CDI control unit)'.

End of test