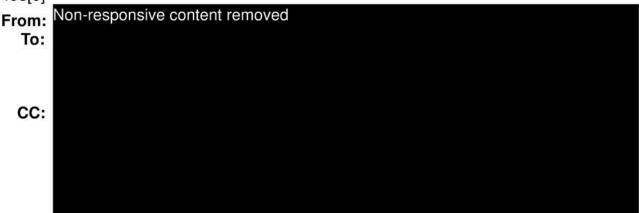
EA11003EN-00493[0]



Date: 6/22/2009, 6:04:03 PM

Subject: RE: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)



The following is a short summary of our telephone conversation on the unusual features of the disassembly audit of 06.19.2009

The discussion on 06.23.09 was canceled. The photos will be discussed internally within Audi to begin with. I would add the following information, which we have already discussed:

Fig. 1 ID plate - purely for information about pump data

Fig.2 Shavings / burr pressed tight between tension pin and camshaft: Shavings occur when the tension pin is pressed into the camshaft. The shavings come from the tension pin. Bosch is aware of the matter and is currently

working on it; the pressing geometry - chamfer on the camshaft - will be improved for this purpose Loose shavings and shavings that protrude laterally, preventing the hub wheel from being pressed on, are not permitted, fixed shavings

in the base material are permitted according to the visual inspection catalog and are not critical

- Fig. 3: Abrasion of the locking screw coating non-critical
- Fig. 4: Brown discoloration on the base of the outer surface of the cylinder head (transition with the cylinder head support surface piston guide diameter, outer edge) not functionally critical, however rust should generally be avoided. Topic under consideration
- Fig. 5: Minor scratches on the roller in axial direction approx. $350 \, \mu m$ familiar pattern, may be caused when the roller is manually inserted into the roller support. The roller can easily drop off in this area not functionally critical
- Fig. 6: Intermediate space / faces of the spacer ring or bushing of the flange bearing surface structure shown is current state of production non-critical. Loose burr/shavings not permitted Area is cleaned in the housing's high-pressure washing system.
- Fig. 7: Very minor traces in axial direction on the running surface of the high-pressure piston not functionally critical may have occurred when joining or dismantling components
- Fig. 8: Very minor burr on the injection well of the roller support new subject. Details of the deburring process and preliminary processing will be discussed with you.
- Fig. 9: Edge geometry on housing well intake in pump interior 09:00 (inlet connector 12:00) loose burrs not permitted photo shows sharp edge, topic will be examined.
- Fig. 10: Run-in marks on the mantle surface of the tappet body normal run-in pattern, non-critical

You will receive further information on photos 2, 4, 8 and 9 by 26.06.09.

EA11003EN-00493[1]

Best regards / mit freundlichen Grüßen

Non-responsive content r emoved

Robert Bosch GmbH

Non-responsive content removed

Domicile: Stuttgart, Court of Registry: Local District Court Stuttgart, HRB 14000; Chairman of the Supervisory Board Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard K $\tilde{A}f$ Â 1 4mmel, Wolfgang Malchow, Peter Marks, Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Monday, June 22, 2009, 10:14 AM

To: Non-responsive content removed

Cc:

Subject: RE: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)

Importance: High

Hello Non-responsive content removed

The invitation is now cancelled.

We will discuss the matter again internally.

I will contact you later about when the meeting should take place with you.

Regards

From: Non-responsive content removed
Sent: Friday, June 19, 2009 2:02 PM

Non-responsive content removed

Subject: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)

Importance: High

Hello gentlemen,

Attached please find the results from Györ (I also included the results from Salzgitter)

I would like to invite Bosch to visit us on 06.23.2009 from 9 a.m. to 12 p.m. to discuss this. Invitation will also be issued via Outlook

Please let me have your feedback and confirmation. (unfortunately no other time suits us in Wk 26)

Have a nice weekend.

<< File: 1618-2009 Zerlegung und Begutachtung einer R4 CR Bosch HP fuel pump 03L 130 755.pdf >> << Message: HPP disassembly audit for particles, photos for appointment RB cleanliness on 04_27_09 >>

Best regards

Non-responsive content removed

EA11003EN-00493[2] Non-responsive content removed

AUDI HUNGARIA MOTOR Kft.

Non-responsive content removed

<< OLE Object: KÃf©p (metafÃfÂįjl) >>

EA11003EN-00494[0]__

From: Non-responsive content removed

To:

CC:

Date: 6/23/2009, 1:07:05 PM

Subject: RE: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)

Attachments: 1618-2009 Zerlegung und Begutachtung einer R4 CR Bosch HP fuel pump 03L 130

755.pdf

i»¿
Hello gentlemen,

Sorry, I need to correct myself. Fig. 8 in the PDF relates to the tappet bore in the pump housing (see the photo captioned "Additional photo for Fig. 8", the bore of the tappet in which the pump moves) not the injection well of the roller support.

Please let me have your feedback. I have received more JPG images for a better understanding of the problem areas.

Regards,

From: Non-responsive content removed

Sent: Monday, June 22, 2009 7:04 PM

Non-responsive content removed

Cc:

Subject: RE: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)

Ã-»Â; Hello Mrt removed

The following is a short summary of our telephone conversation on the unusual features of the disassembly audit of 06.19.2009

The discussion on 06.23.09 was canceled. The photos will be discussed internally within Audi to begin with. I would add the following information, which we have already discussed:

Fig. 1 ID plate - purely for information about pump data

Fig.2 Shavings / burr pressed tight between tension pin and camshaft: The shavings occur when the tension pin is pressed into the camshaft. The shavings come from the tension pin. Bosch is aware of the matter and is currently working on it; the pressing geometry - chamfer on the camshaft - will be improved for this purpose Loose shavings and shavings that protrude laterally, preventing the hub wheel from being pressed on, are not permitted, fixed shavings in the base material are permitted according to the visual inspection catalog and are not critical.

Fig. 3: Abrasion of the locking screw coating - non-critical

Fig. 4: Brown discoloration on the base of the outer surface of the cylinder head (transition with the cylinder head support surface - piston guide diameter, outer edge) - not functionally critical, however rust should generally be avoided. Topic under consideration

EA11003EN-00494[1]

Fig. 5: Minor scratches on the roller in axial direction approx. 350 μm - familiar pattern, may be caused when the roller is manually inserted into the roller support. The roller can easily drop off in this area - not functionally critical

Fig. 6: Intermediate space / faces of the spacer ring or bushing of the flange bearing - surface structure shown is current state of production - non-critical. Loose burr/splinters not permitted Area is cleaned in the housing's high-pressure washing system.

Fig. 7: Very minor traces in axial direction on the running surface of the high-pressure piston - not functionally critical - may have occurred when joining or dismantling components

Fig. 8: Very minor burr on the injection well of the roller support - new subject. Details of the deburring process and preliminary processing will be discussed with you.

Fig. 9: Edge geometry on housing well - intake in pump interior 09:00 (inlet connector 12:00) - lose bur not permitted - photo shows sharp edge, topic will be examined.

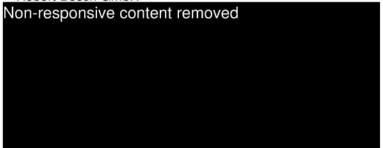
Fig. 10: Run-in marks on the mantle surface of the tappet body - normal run-in pattern, non-critical

You will receive further information on photos 2, 4, 8 and 9 by 26.06.09.

Best regards / mit freundlichen Grüßen

Non-responsive content removed

Robert Bosch GmbH



Domcile: Stuttgart, Court of Registry: Local District Court Stuttgart, HRB 14000; Chairman of the Supervisory Board Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard K $\tilde{\rm A}f$ $\hat{\rm A}^{1/4}$ mmel, Wolfgang Malchow, Peter Marks, Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Monday, June 22, 2009, 10:14 AM

To: Non-responsive content removed

Subject: RE: CP4.1 assessment (R4 CR high pressure fuel pump from Bosch)

Importance: High

Hellont removed

The invitation is now cancelled.

We will discuss the matter again internally.

will contact you later about when the meeting should take place with you.

Regards

From: Non-responsive content rem

EA11003EN-00494[2]

Sent: Friday, June 19, 2009 2:02 PM

Non-responsive content removed

CP4.1 assessment (R4 CR high pressure fuel pump from Bosch) Subject:

Importance: High

Hello gentlemen,

Attached please find the results from Györ (I also included the results from Salzgitter)

I would like to invite Bosch to visit us on 06.23.2009 from 9 a.m. to 12 p.m. to discuss this. An invitation will be issued in Outlook

too.

Please let me have your feedback and confirmation. (unfortunately no other time suits us in Wk 26)

Have a nice weekend.

<< File: 1618-2009 Zerlegung und Begutachtung einer R4 CR Bosch HP fuel pump 03L 130 755.pdf >> << Message: High pressure fuel pump disassembly audit

for particles, photos for appointment RB cleanliness on 04_27_09 >>

Best regards

Non-responsive content removed

Non-responsive content removed

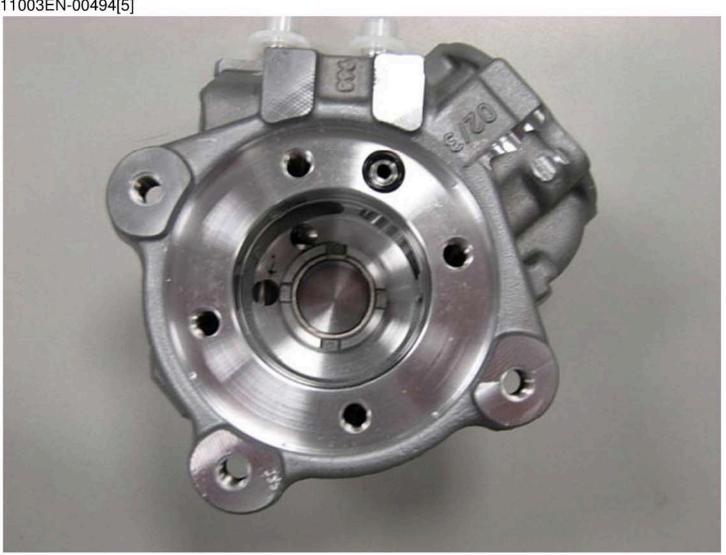
<< OLE Object: KÃf ©p (metafÃf Âjil) >>

EA11003EN-00494[3]





EA11003EN-00494[5]





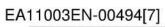






Fig. name: 1618 2009 0011



Fig. 1:
Pump no. 1 Data plate



Fig. 2:

Pump no. 1 Extrusion from the pressing process No particles in thread



Fig. name: 1618 2009 0003



Fig. 3: Pump no. 1 O-ring CH abrasion from the locking ring coating, non-critical

Fig. name: 1618 2009 0004



Fig. 4: Pump no. 1 External mantle, piston bore. Rust



Fig. name: 1618 2009 0005

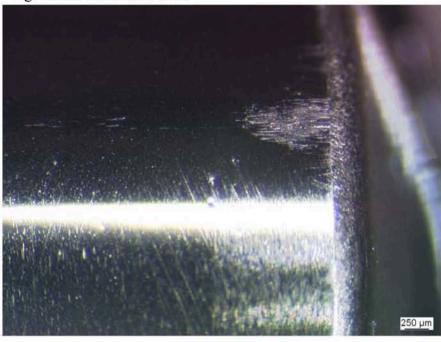


Fig. 5: Pump no. 1 Roller, minor cracks on edge

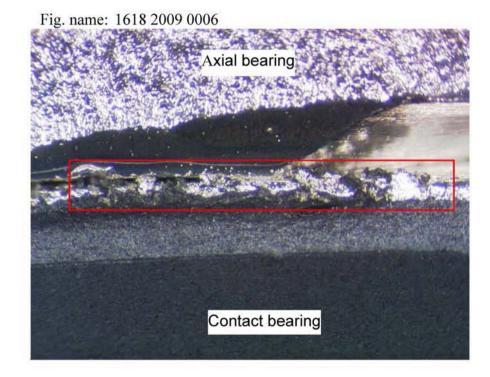


Fig. 6: Pump no. 1 Space between compensating disk, contact bearing flange



Fig. name: 1618 2009 0007

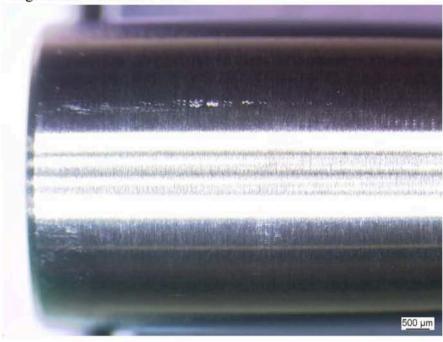


Fig. 7:

Pump no. 1 Very slight traces on piston

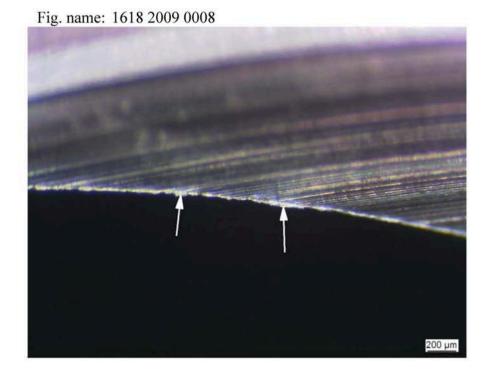


Fig. 8:

Pump no. 1 Tappet bore bottom edge, very small burr (sharp edge)



Fig. name: 1618 2009 0009



Fig. 9:

Pump no. 1 Cross bore inlet edge to interior, burr (sharp edge)

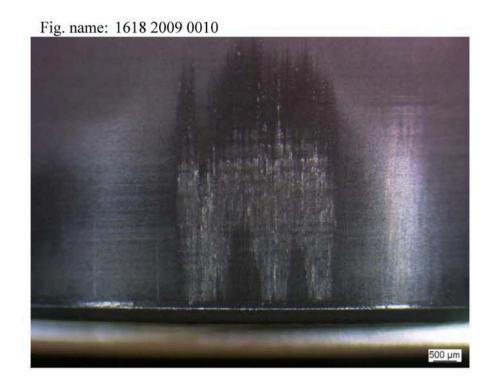


Fig. 10:

Pump no. 1 Tappet body run marks

Non-responsive content removed

From:
To:
Cc:

Date: 13 July 2009 10:07:24

Topic: Re: V6-TDI Gen.I fuel system drainage



It's naturally very confusing when you sometimes cite measured values and sometimes command values / nominal values without any commentary.

Additional questions on point:

- * Please show the rail pressure over the entire course of the test.
- * How can the drop in rail pressure to < 100 bar upon acceleration to 2000 rpm be prevented?
- * Why is it taking 2 weeks to say what rpm gradient is being used?

Sincerely,

Non-responsive content remove d

Non-responsive content removed

Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Amtsgericht Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn

Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen,

Michael Dick, Frank Dreves, Peter Schwarzenbauer, Axel Strotbek, Werner Widuckel

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Von: Non-responsive content removed

Sent: Monday, 13 July 2009 09:55

To: Non-responsive content removed

Cc:

(N/EA-621); Kahrstedt, Joern (N/EA-62)

Subject: Re: V6-TDI Gen.I fuel system drainage

Hello Non-responsive content rem

You misunderstood the last slide. The curve that you see there is only about the command values / nominal values.

So from the diagram you can only read out the stage limit. There is a defined parameter setting in Indramat drive train as to the gradient with which it must accelerate the engine. I have to date been unable to clarify what parameter is currently set in the system.

I'll let you know in 2 weeks.

I can say for sure that the gradients are not as high as you wrote!

Sincerely,

Non-responsive content removed

AUDI HUNGARIA MOTOR Kft.

Non-responsive content removed

From:

Non-responsive content removed

Sent: Friday, July 10, 2009 11:14 AM

Non-responsive content removed

Subject: FW: V6-TDI Gen.I fuel system drainage

Hello



The presentation is now plausible and comprehensible.

However, if I am correctly interpreting everything, I am quite shocked at how you folks are doing the tests/checks.

SECTION CONFIDENTIAL

I see the rpm gradients as shown in Diagram 3 as being the most critical. Based on rough measurements from the diagram, I arrived at the following gradients:

- * 0-400 rpm: ca. 1500 rpm per sec
- * 400-800 rpm: ca. 2800 rpm per sec
- * 800-2000 rpm: ca. 6500 rpm per sec

According to Bosch specifications (see attachment p. 11), the maximum permissible is 400 rpm per sec.

<< Message: WG: Erstinbetriebnahme V6 EU5 2. Gen. und V8 EU5 im Motorenwerk - Vorschlag zur zügigen Entlüftung im Hottest >> [Message: FW: First-time operation V6 EU5 2nd Gen. and V8 EU5 in engine plant - Suggestion for speedy hot test deaeration]

I see the additional drop in rail pressure when revving up to 2,000 rpm as being especially critical. In my estimation, considerable slippage between the cam lobe and the roller is possible at this operating point, which can do initial damage to the pump. This could be one explanation for the relatively high number of drive train failures in the field.

Please check whether my interpretation is correct. If so, we have to change the testing process as soon as possible to avoid initial damage. We should mutually coordinate the change.

Sincerely,

Non-responsive content removed

AUDI AG

Non-responsive content removed

Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Amtsgericht Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn

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Von: Non-responsive content removed

Sent: Friday, 10 July 2009 08:49 To: Non-responsive content removed

Cc:

FW: V6-TDI Gen.I fuel system drainage Subject:

Hello colleague,

Attached please find corrected presentation (with time data in slide 2):

<< File: crt.ppt >> Regards:

Sincerely,

Non-responsive content removed

AUDI HUNGÁRIA MOTOR Kft.

Non-responsive content removed

<< OLE Object: Kep (metaraji) >>

From Non-responsive content removed

Sent: Tuesday, July 07, 2009 10:34 AM

To: Non-responsive content removed

Cc:

Subject: Re: V6-TDI Gen.I fuel system drainage

Non-responsive Hellotent removed

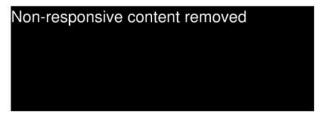
I can't do that because these values are not exportable in UPS.

I can only send a summary:

Regards:

Non-responsive content removed

AUDI HUNGÁRIA MOTOR Kft.



http://www.audi.hu

<< OLE Object: Kép (metafájl) >>

From: Non-responsive content removed

Sent: Friday, July 03, 2009 8:43 AM

To Non-responsive content removed Cc:

Subject: Re: V6-TDI Gen.I fuel system drainage

Hello

Could you please show the desired data in a diagram / graph over time? In the depiction / presentation that was sent, the time scales / units are always different.

Sincerely,

Non-responsive conte nt removed From:
To:

CC:

Non-responsive content removed

CC:

Date: 15 Oct. 2009 13:26:05

Topic: Re: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Hellont removed

We have looked into your approach.

I have no fault log entries on the cylinder pressure sensor for the two vehicles with HPFP failure in EG endurance testing (Q7 xxx229, Q7 xxx390).

Some info on the correct interpretation of the function "Cylinder-Pressure-Guided Combustion Timing Control":

- 1) This function is used to compensate for the impact of "bad fuel" on combustion. The term "bad fuel" refers to a low cetane number.
- 2) A fault log entry only results if there is a faulty signal due to an electrical or mechanical cause. Operation with a low cetane number is thus not recorded as a fault log entry.

It is not possible to discern any correlation whatsoever between cetane number and other characteristics such as water content and lubricity from the fuel analyses that I am aware of, 2008 Fuel Survey etc.

Bottom line: This function unfortunately does not help us in the analysis.

Sincerely,

Non-responsive content removed

AUDI AG

Non-responsive content removed

www.audi.com

Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Amtsgericht Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn

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From: Non-responsive content removed

Sent: Tuesday, 13 October 2009 14:29

Non-responsive content removed

Subject: FW: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Good day Non-responsive content removed

The use of "bad" fuel (water, cetane ...) can trigger a fault message in the [engine] control unit. (I have understood that the application of this label is up to the customer)

In my opinion, it would be worthwhile to check whether there is any correlation between fault code (where available) and CP4 drive train failure.

At the moment, I don't know whether the fault [code] is erased or is documented as to time. If so, the fault log entry at time X and failure at time Y would give us an understanding of the late failures.

Can you check out / discuss this approach?

Many thanks,

Best regards,

Non-responsive content removed

Robert Bosch GmbH

Non-responsive content removed

Non-responsive content removed

Domicile: Stuttgart, Court of Registry: Amtsgericht Stuttgart, Commercial Register no. 14000; Chairman of the Supervisory Board: Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard Kümmel, Wolfgang Malchow, Peter Marks, Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Friday, 9 October 2009 11:24

Non-responsive content removed

Subject: Re: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Hello everybody,

In the current Diesel System, the fault path DTC_PosMCCtlDvtMax is activated for the two cylinders (4 and 5) that are equipped with cylinder pressure sensors. However, only fault category 1 is used. That is, a fault is registered in the control unit, but the light is not activated. Such faults are thus only discovered in the workshop and are not recognized by the driver.

Best regards,

Non-responsive content remov ed

Robert Bosch GmbH Non-responsive content removed

Domicile: Stuttgart, Court of Registry: Amtsgericht Stuttgart, Commercial Register no. 14000; Chairman of the Supervisory Board: Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard Kümmel, Wolfgang Malchow, Peter Marks, Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Friday, 9 October 2009 10:37 **To:** Non-responsive content removed

Subject: FW: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

From:

Non-responsive content removed

Sent: Friday, 2 October 2009 10:01

Non-responsive content removed

Subject:

FW: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

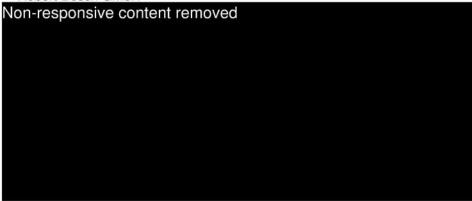
Hello emoved content r

For the current U.S. failures (field, testing), can you folks also read out these "fault codes" and draw inferences as to fuel quality?

Best regards,

Non-responsive content removed

Robert Bosch GmbH



Domicile: Stuttgart, Court of Registry: Amtsgericht Stuttgart, Commercial Register no. 14000; Chairman of the Supervisory Board: Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard Kümmel, Wolfgang Malchow, Peter Marks, Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Thursday, 24 September 2009 09:13

To Non-responsive content removed

Cc

FW: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf Subject:

Hello N

Your query:

See below for reply.

Best regards,

BeQIK

Non-responsive content removed

Von: Non-responsive content removed

Sent: Thursday, 24 September 2009 8:49 AM

To: Non-responsive content removed

Subject: FW: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Hello

Here is the info from the IAV diagnostics experts.

Your suspicion as to water in the diesel fuel seems to bear out.

The customer should try switching gas stations ...

As background info:

Because of the questionable fuel quality in the United States, we have 4 BERU cylinder pressure sensors in the 4-cylinder BIN5 engine (integrated in the glow plug) which can sense and track the combustion timing.

In this case, however, the fuel seems to be so bad that the regulator is stretched to the limit (triggered fault path DTC PosMCCtlDvtMax 0 - 3).

Regards.

From: Non-responsive content removed

Sent: Wednesday, 23 September 2009 16:45

To: Non-responsive content removed

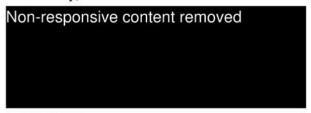
Subject: Reply: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Hello

P020A - D = Cylinder 1 (2, 3, 4) injection timing out of tolerance The DTC is: PosMCCtlDvtMax 0 - 3 PosMCCtlDvtMin 0 - 3

Fault possibilities: fuel type / quality (if all values measured in measured value block 143 are outside of the limit values (ca. -5...-25°); carbon-fouled or leaky injector; lack of compression

Sincerely,



IAV GmbH



IAV GmbH, Sitz/Registered Office: Berlin, Registergericht/Registration Court: Amtsgericht Charlottenburg, Registernummer/Company Registration Number: HRB 21 280, Geschäftsführer/Managing Directors: Kurt Blumenröder, Michael Schubert, Dr. Rüdiger Goyk

Non-responsive content removed

23 Sept. 2009 11:23

Topic: VW Jetta BIN5 SW K3NH: Fehlereintrag Fault log 1.pdf

Hello Non-responsive content

Do you know the fault code?

I unfortunately can't find it in your April list; could I have a more recent one?

Background:

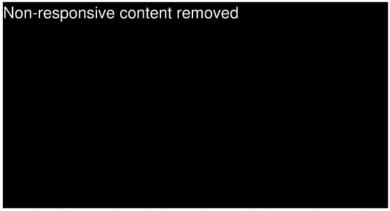
Fault log entry encountered by a BOSCH employee in the USA in a Jetta with SW K3NH.

Cause of fault = ? (water in the fuel, wiring harness, CSC-P)

Mit freundlichen Grüßen / Best regards / Sincères Salutation / Selamlar

Non-responsive conte nt removed

Robert Bosch GmbH



Registered office: Stuttgart, Court of Registry: Amtsgericht Stuttgart, Commercial Register No. HRB 14000:

Chairman of the Supervisory Board: Hermann Scholl; Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Wolfgang Chur, Rudolf Colm, Gerhard Kümmel, Wolfgang Malchow, Peter Marks; Volkmar Denner, Peter Tyroller