

Bogging Benz

This article is a true description of an AECS technical help desk problem and how it was solved.

Vehicle:

E320 Mercedes Benz 1996 3.2 ltr Petrol non turbo

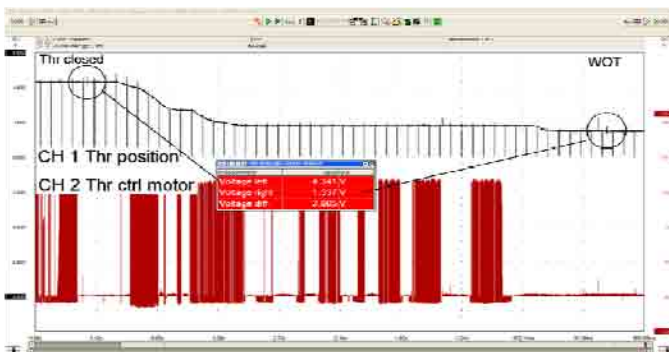
Problem presented to the help desk

The Mercedes was presented to this workshop with a complaint that during firm acceleration it sometimes holds back. Releasing the throttle and depressing it again would often 'clear' the fault and makes the car accelerate firmly. No misfiring or lean/rich sounding engine, that would indicate a lack or over supply of fuel. The vehicle has no fault codes.

The throttle body is of the drive by wire type, and we really suspect that the throttle does not always open all the way. What should we measure first?

Measuring

Well if the throttle is suspect we should measure it, it is that simple!

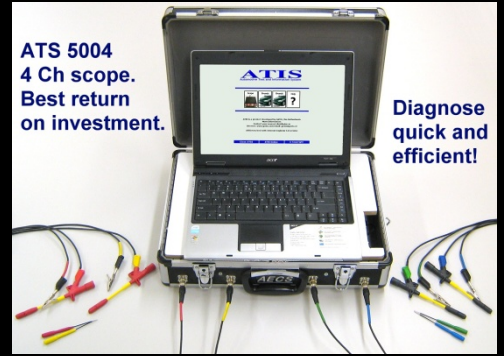


The above ATS 5004D scope recording shows the throttle control motor and one of the throttle position sensors.

Check out the Training Calendar on back page.... If there is a course you'd like us to run but is not advertised, ring us so we can try to arrange one in your area next season.

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Automotive Electronic Control Systems



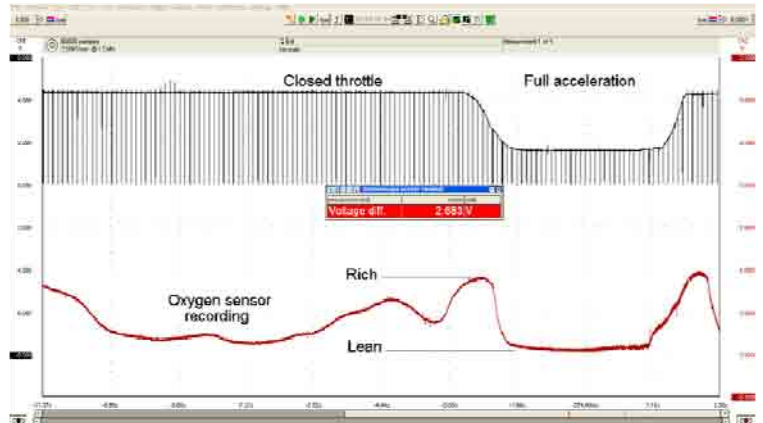
AECS Training, Equipment and Data for Automotive Diagnostic Specialists

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From the recording, it is clear that the throttle opens wide even though the car holds back. It takes about 4 seconds before it is wide open but it does open.

We need to look for another reason why the engine holds back. Let us first look at the fuelling side. I want to know if the oxygen sensor reports a lean or a rich mixture during acceleration; it should be rich as a result of the programmed acceleration enrichment.

The following pattern was recorded and sent to the help desk.



Dual channel measurement of the throttle position sensor

Wrong!

This recording revealed that the mixture went lean during acceleration, now that is wrong! The bogging down is obviously the result of a lack of fuel going into the engine, not a lack of throttle opening.

We asked the diagnostician to check the fuel pressure, as at first the graph shows that the mixture goes rich during acceleration and only leans out further on.

The fuel pressure stayed good, so the next measurement we asked him to make was throttle position vs injector pulse width.

This recording was not saved and send to us, but during acceleration at first there was an increase of injection duration, and further down the pulse width stayed the same.

Air-mass

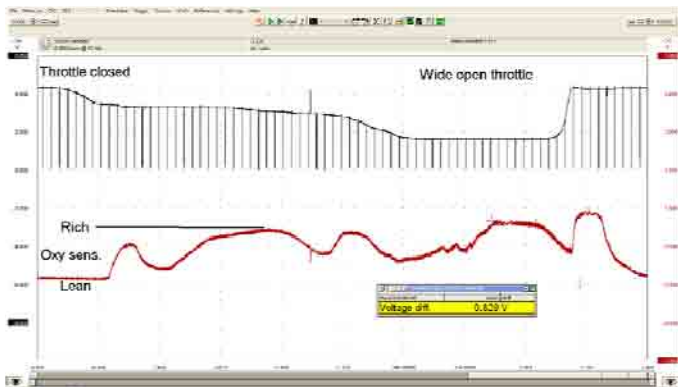
When a throttle opens, and the engine's speed increases, the air-mass increases. The increase in air-mass sensor voltage always results in an increase in injector pulse width.

The lack of injector pulse width indicated to us that the air-mass sensor's signal reading was very

likely too low at times, specifically during high air volume; remember the fault was not always there. Measuring the air-mass sensor showed a beautiful line with no errors on it. This does not mean anything, as it is the outcome of the oxygen sensor signal that really counts!

Fixed

A new air-mass sensor was fitted, which produced the following signals.



Dual channel recording with the ATS 5004D 4 Channel scope while accelerating

In the recording it can be seen that even though the accelerator is depressed full, the throttle opens 'gently' and staged and most of all the mixture goes to rich during acceleration, just like what you would expect.

The car is driving beautiful and has its full performance back.

Conclusion

Complex? Nah... I don't think so! Just realise that modern automotive technology requires skill. In our industry, there is virtually no room for low skilled people anymore.

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Herbert

For **AECS** Ltd:
H.P. Leijen
(trainer/research)
E-Mail: hpleijen@aecs.net

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AECs Training Plan 2010

April	May	June	July	August	Sept
1 Tauranga DMS 1(1)			1 Palmerston North Scan1		1
2 Good Friday			2 Palmerston North Scan1		2 Hawkes Bay EMS1-4
3			3	3 Wellington AED	3 Hawkes Bay EMS1-4
4			4	4 Wellington AED	4
5 Easter Monday			5	5 Private Training AED	5
6			6	6 Private Training AED	6
7			7 Queens Birthday	7	7
8			8 Wellington EMS1-4	8	8
9			9 Wellington EMS1-4	9	9
10			10 Private Training AED	10	10
11			11 Private Training AED	11	11 Private Training - Autome
12			12	12	12 Private Training - Autome
13			13	13	13 Private Training - Autome
14			14	14	14 Private Training - Autome
15	14 Nelson DMS 1(3)		15	15	15 Private Training - Autome
16	15 Nelson DMS 1(3)		16	16	16 Private Training - Autome
17			17	17	17 Private Training - Autome
18			18	18	18 Private Training - Autome
19	19 Christchurch EMS1(4)		19 Auckland EMS 1(1)	19	19
20 Gisborne AED	20 Christchurch EMS1(4)		20 Auckland EMS 1(1)	20	20 Private Training - Autome
21 Gisborne AED	21 Christchurch AED		21 Auckland ATS	21	21 Private Training - Autome
22 Hastings EMS 1(2)	22 Christchurch AED		22 Auckland ATS	22	22 Private Training - Autome
23 Hastings EMS 1(2)			23	23 YES! Meeting	23 Private Training - Autome
24	24 Greymouth AED		24	24 YES! Meeting	24 Private Training - Autome
25 Anzac day	25 Greymouth AED		25	25 YES! Meeting	25 Private Training - Autome
26			26	26 YES! Meeting	26
27			27 Whangarei DMS 1(1)	27 YES! Meeting	27 Private Training - Autome
28			28 Whangarei DMS 1(1)		28 Private Training - Autome
29			29 Auckland AED		29 Private Training - Autome
30		29 New Plymouth AED	30 Auckland AED		30 Private Training - Autome
31		30 New Plymouth AED	31		31 Private Training - Autome

Key:
 Sundays
 Public/school Holidays
 Date Changes
 PRIVATE Training

ABS = ABS/ Traction Control Systems seminar
 EMS1(1) = Engine management Systems 1 (module 1) seminar
 EMS1(2) = Engine management Systems 1 (module 2) seminar
 EMS1(4) = Engine management Systems 1 (module 4) seminar (hybrid)
 SCAN1 = Scan Tool diagnostics
 AED = Automotive Electronic Diagnostic seminar
 DMS1 (1) = Diesel Management Systems 1 Module 1 seminar
 DMS1 (2) = Diesel Management Systems 1 Module 2 seminar
 DMS1 (3) = Diesel Management Systems 1 Module 3 seminar
 AIRCON = Air-conditioning training
 ATS= Comprehensive Scope training
 TBA - To be advised

Created 31...

Please note: All effort has been made to ensure the training & course dates are correct, however please contact us first before publishing information from this calendar.
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