H50TICD Diagnose

with Hatz HDS² Tool

Hatz H50TICD

Diagnose function with the Hatz Diagnose Software 2 (HDS²)

Diagnose - Identification

Hatz 4H50TICD
1651019000065

- Identification
- Current values
- Error memory
- Actuator test
- Diagnostic tests
- Data set
- Engine protocol
- Data recording
- Help
- Settings

Identification

Description	Current Values
Operating hours	21
Hardware-Version	EDC17_C81
Software-Version	P1715_V600R
Engine number	1651019000065
Manufacturing date	..
Remaining time to service	479
Last programming date	08.08.19
Dataset description	D165C81##V600R03###

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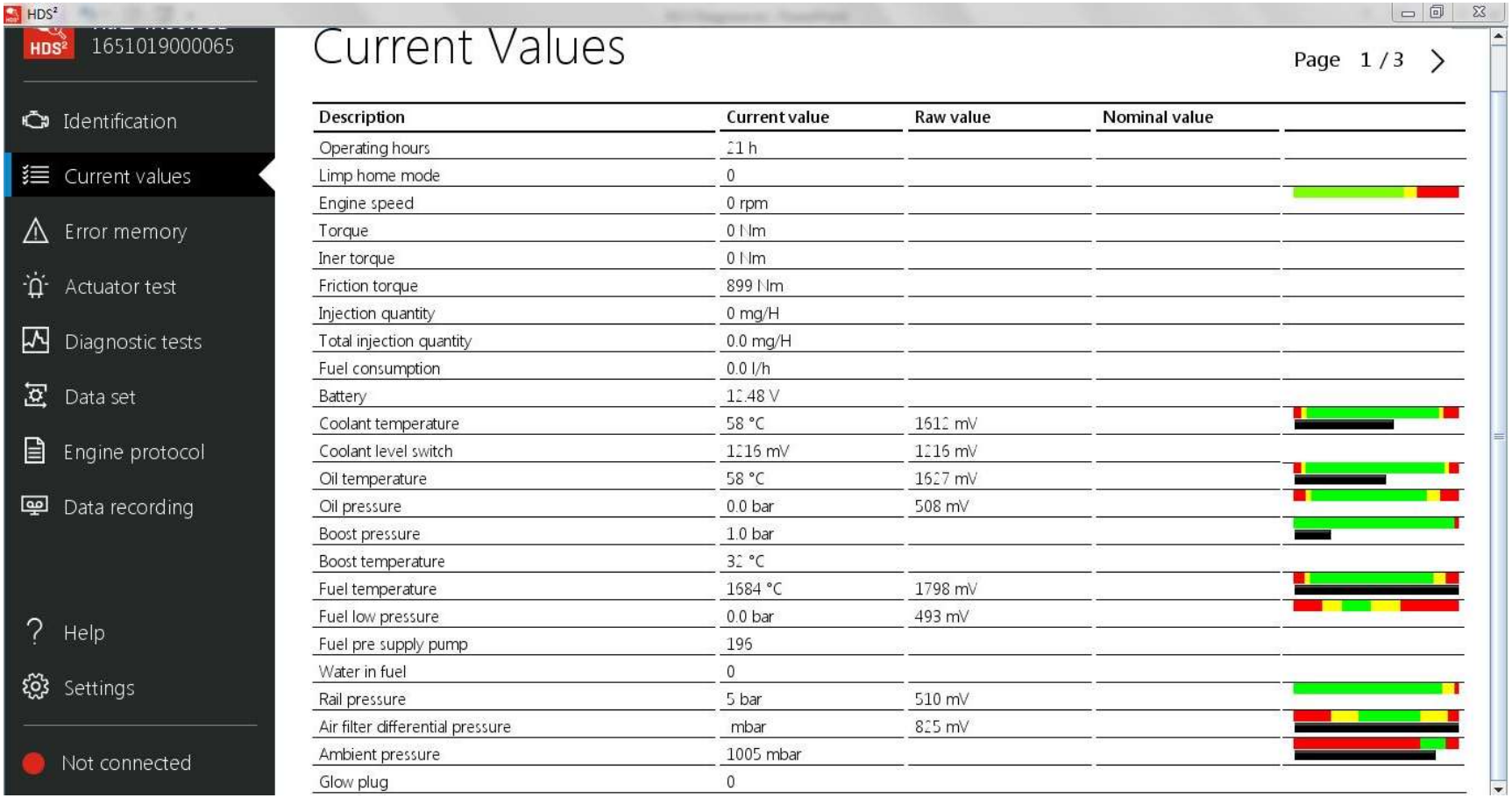
Current Values



Description	Current value	Raw value	Nominal value
Operating hours	21 h		
Limp home mode	0		
Engine speed	0 rpm		
Torque	0 Nm		
Iner torque	0 Nm		
Friction torque	899 Nm		
Injection quantity	0 mg/H		
Total injection quantity	0.0 mg/H		
Fuel consumption	0.0 l/h		
Battery	12.48 V		
Coolant temperature	58 °C	1612 mV	
Coolant level switch	1216 mV	1216 mV	
Oil temperature	58 °C	1627 mV	
Oil pressure	0.0 bar	508 mV	
Boost pressure	1.0 bar		
Boost temperature	32 °C		
Fuel temperature	1684 °C	1798 mV	
Fuel low pressure	0.0 bar	493 mV	
Fuel pre supply pump	196		
Water in fuel	0		
Rail pressure	5 bar	510 mV	
Air filter differential pressure	mbar	825 mV	
Ambient pressure	1005 mbar		
Glow plug	0		

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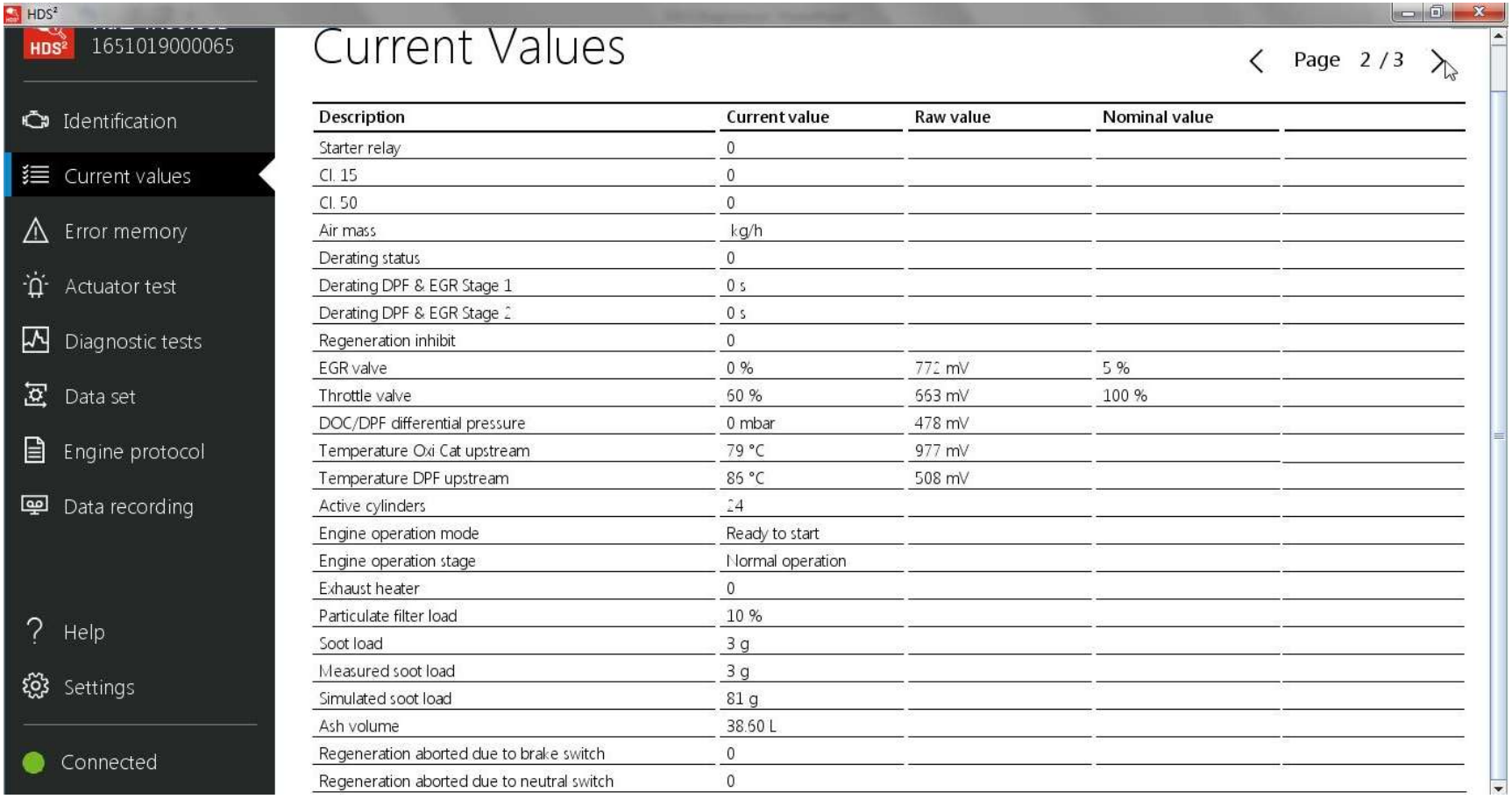
Current Values



Description	Current value	Raw value	Nominal value	
Starter relay	0			
Cl. 15	0			
Cl. 50	0			
Air mass	kg/h			
Derating status	0			
Derating DPF & EGR Stage 1	0 s			
Derating DPF & EGR Stage 2	0 s			
Regeneration inhibit	0			
EGR valve	0 %	772 mV	5 %	
Throttle valve	60 %	663 mV	100 %	
DOC/DPF differential pressure	0 mbar	478 mV		
Temperature Oxi Cat upstream	79 °C	977 mV		
Temperature DPF upstream	86 °C	508 mV		
Active cylinders	4			
Engine operation mode	Ready to start			
Engine operation stage	Normal operation			
Exhaust heater	0			
Particulate filter load	10 %			
Soot load	3 g			
Measured soot load	3 g			
Simulated soot load	81 g			
Ash volume	38.60 L			
Regeneration aborted due to brake switch	0			
Regeneration aborted due to neutral switch	0			

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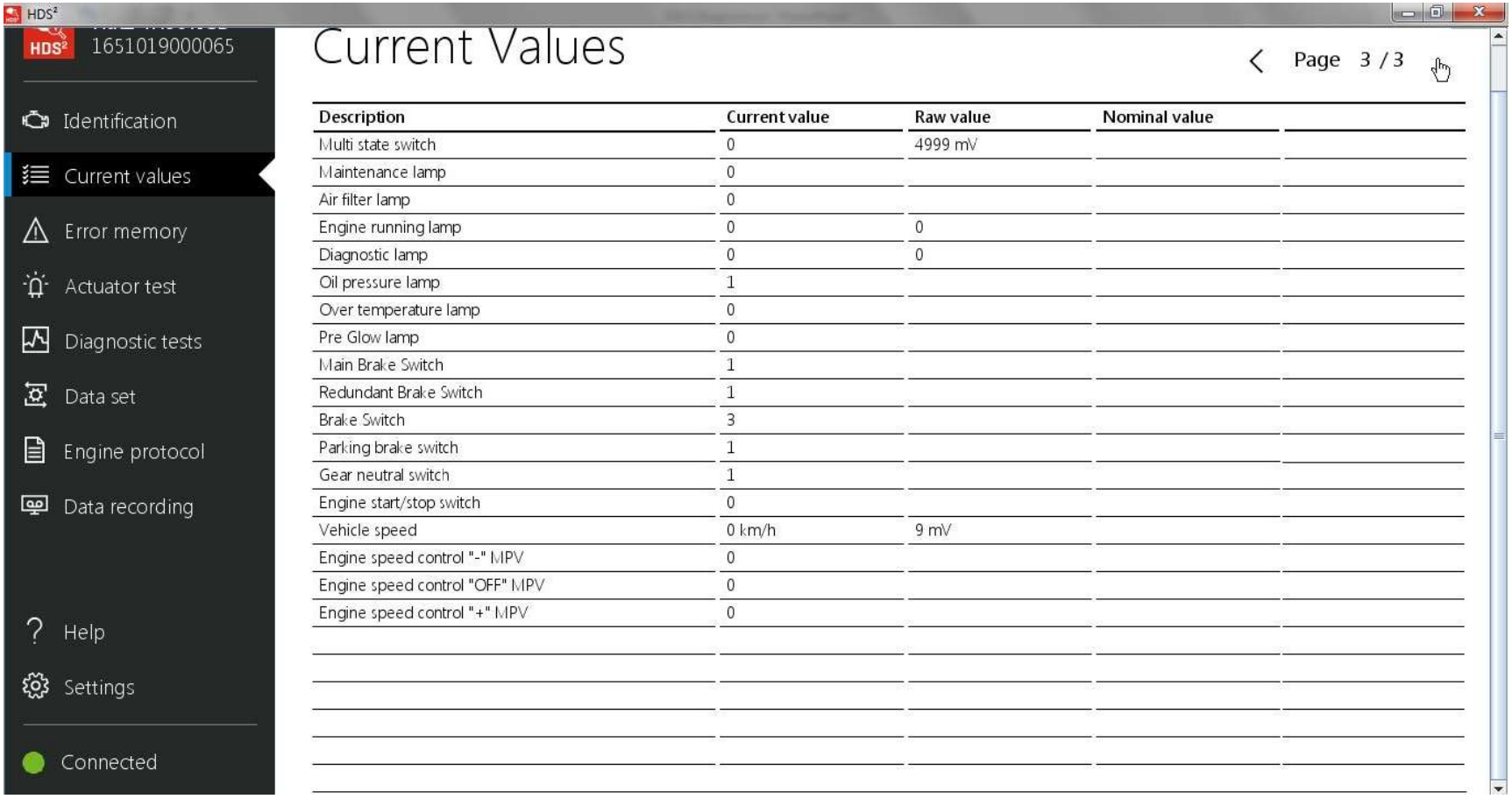
Current Values



Description	Current value	Raw value	Nominal value	
Multi state switch	0	4999 mV		
Maintenance lamp	0			
Air filter lamp	0			
Engine running lamp	0	0		
Diagnostic lamp	0	0		
Oil pressure lamp	1			
Over temperature lamp	0			
Pre Glow lamp	0			
Main Brake Switch	1			
Redundant Brake Switch	1			
Brake Switch	3			
Parking brake switch	1			
Gear neutral switch	1			
Engine start/stop switch	0			
Vehicle speed	0 km/h	9 mV		
Engine speed control "-" MPV	0			
Engine speed control "OFF" MPV	0			
Engine speed control "+" MPV	0			

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Read error memory

1. Connect diagnostic device.
2. Start the vehicle and select the diagnosis function HDS².
4. Read out fault memory, eliminate the error number with the description
5. Only replace components after excluding all test options!

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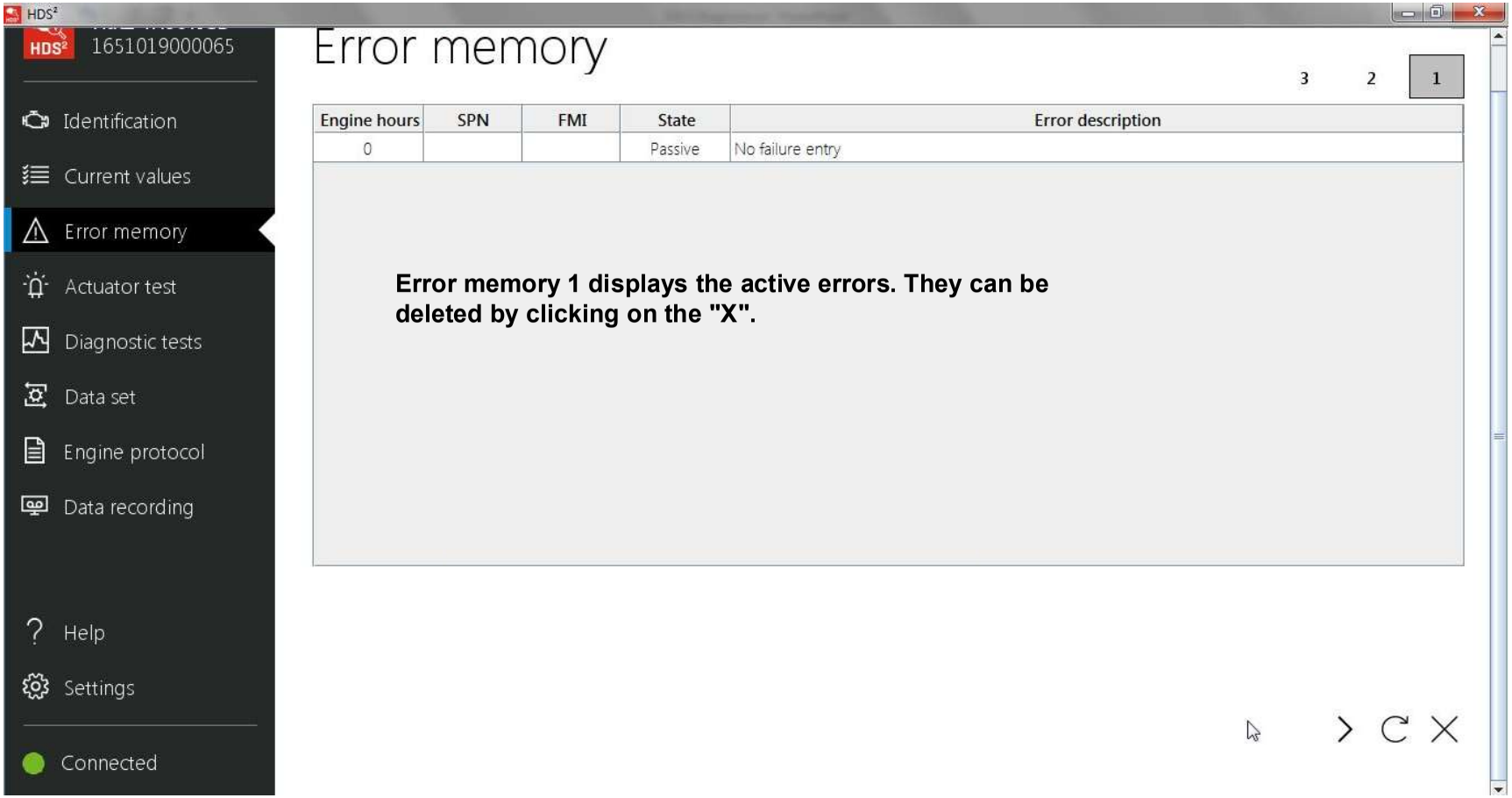
Read error memory



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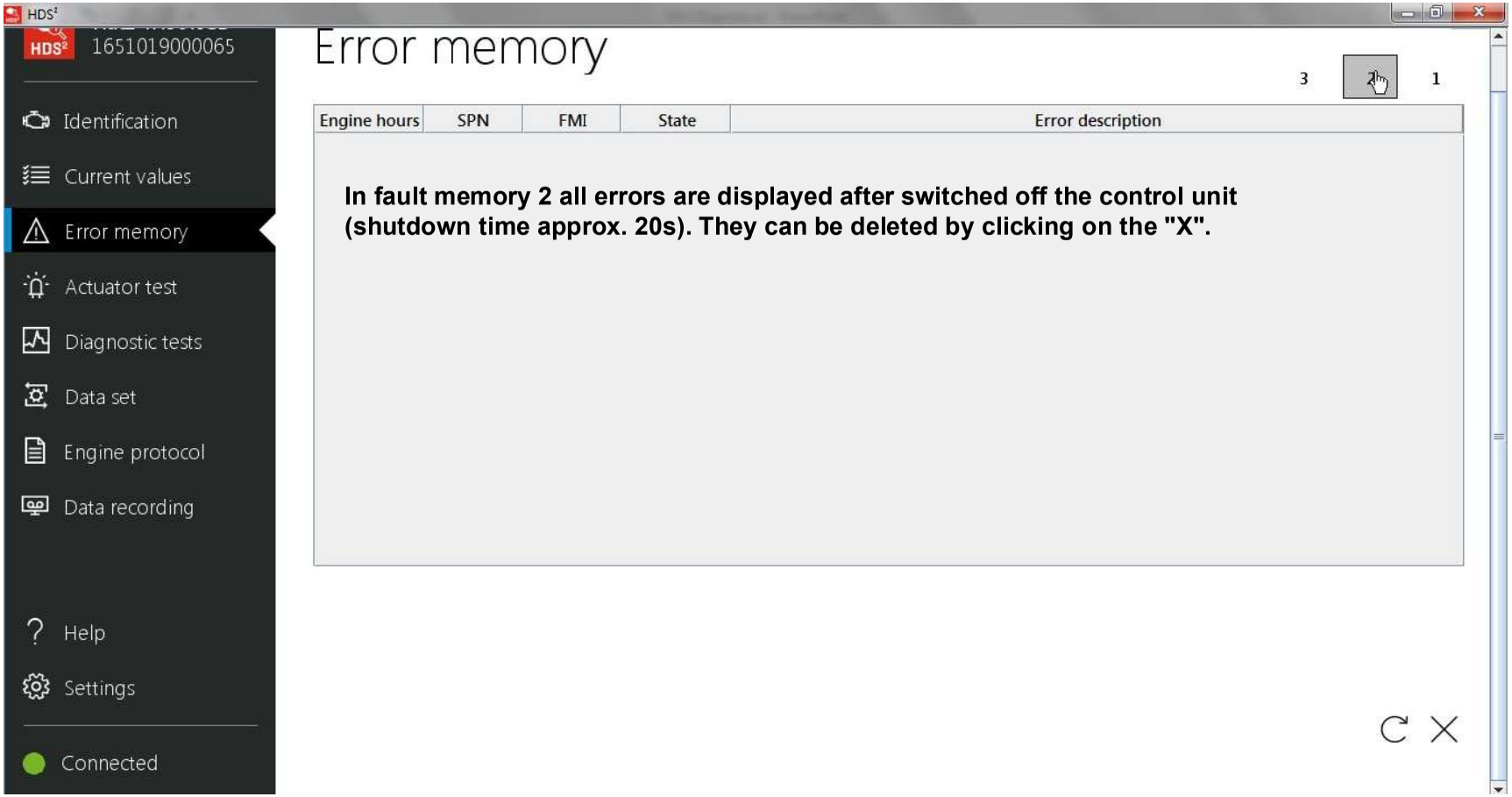
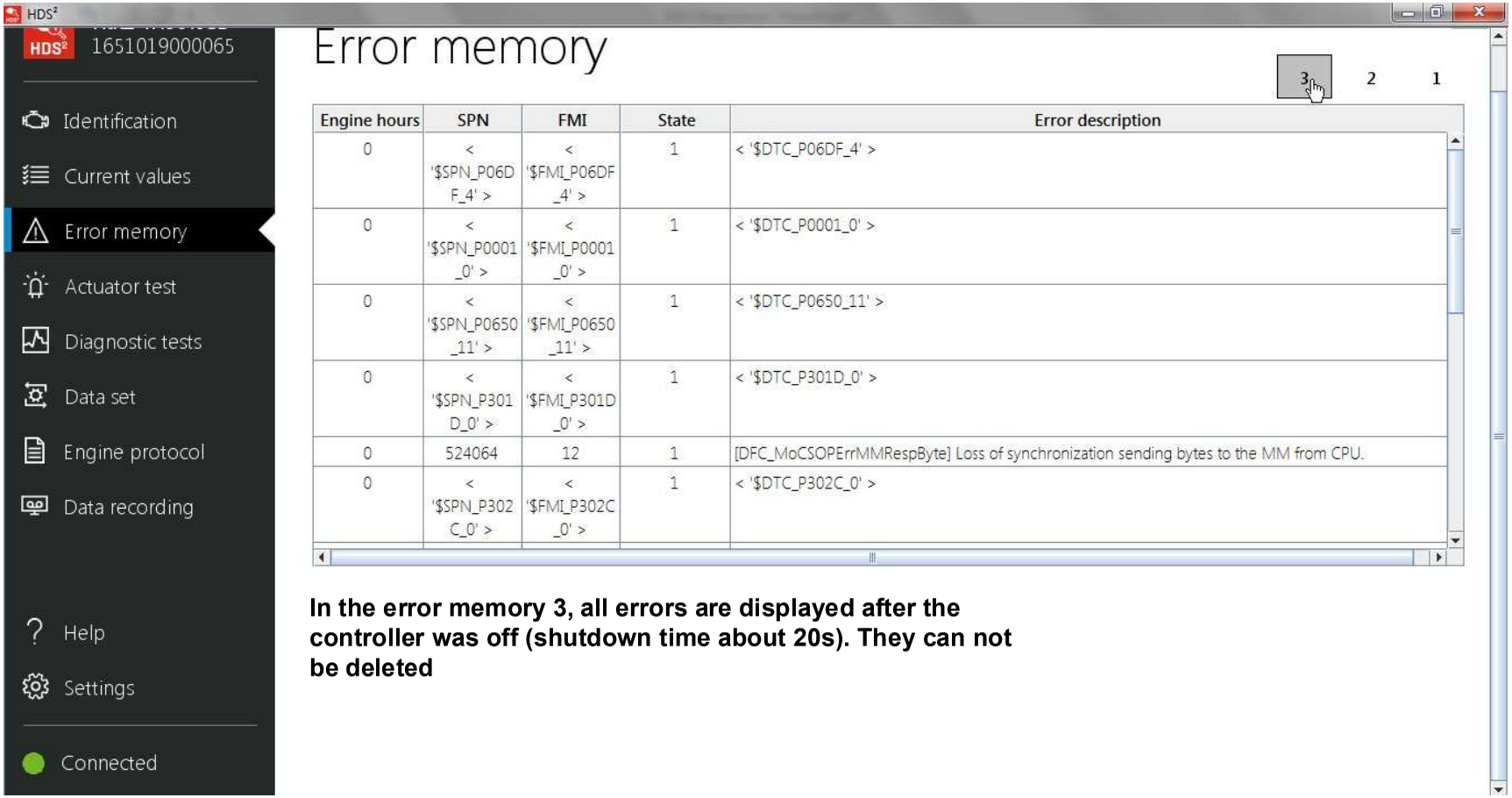
Read error memory



Read error memory



Engine hours	SPN	FMI	State	Error description
0	< '$SPN_P06DF_4' >	< '$FMI_P06DF_4' >	1	< '$DTC_P06DF_4' >
0	< '$SPN_P0001_0' >	< '$FMI_P0001_0' >	1	< '$DTC_P0001_0' >
0	< '$SPN_P0650_11' >	< '$FMI_P0650_11' >	1	< '$DTC_P0650_11' >
0	< '$SPN_P301D_0' >	< '$FMI_P301D_0' >	1	< '$DTC_P301D_0' >
0	524064	12	1	[DFC_MoCSOPErrMMRespByte] Loss of synchronization sending bytes to the MM from CPU.
0	< '$SPN_P302C_0' >	< '$FMI_P302C_0' >	1	< '$DTC_P302C_0' >

In the error memory 3, all errors are displayed after the controller was off (shutdown time about 20s). They can not be deleted

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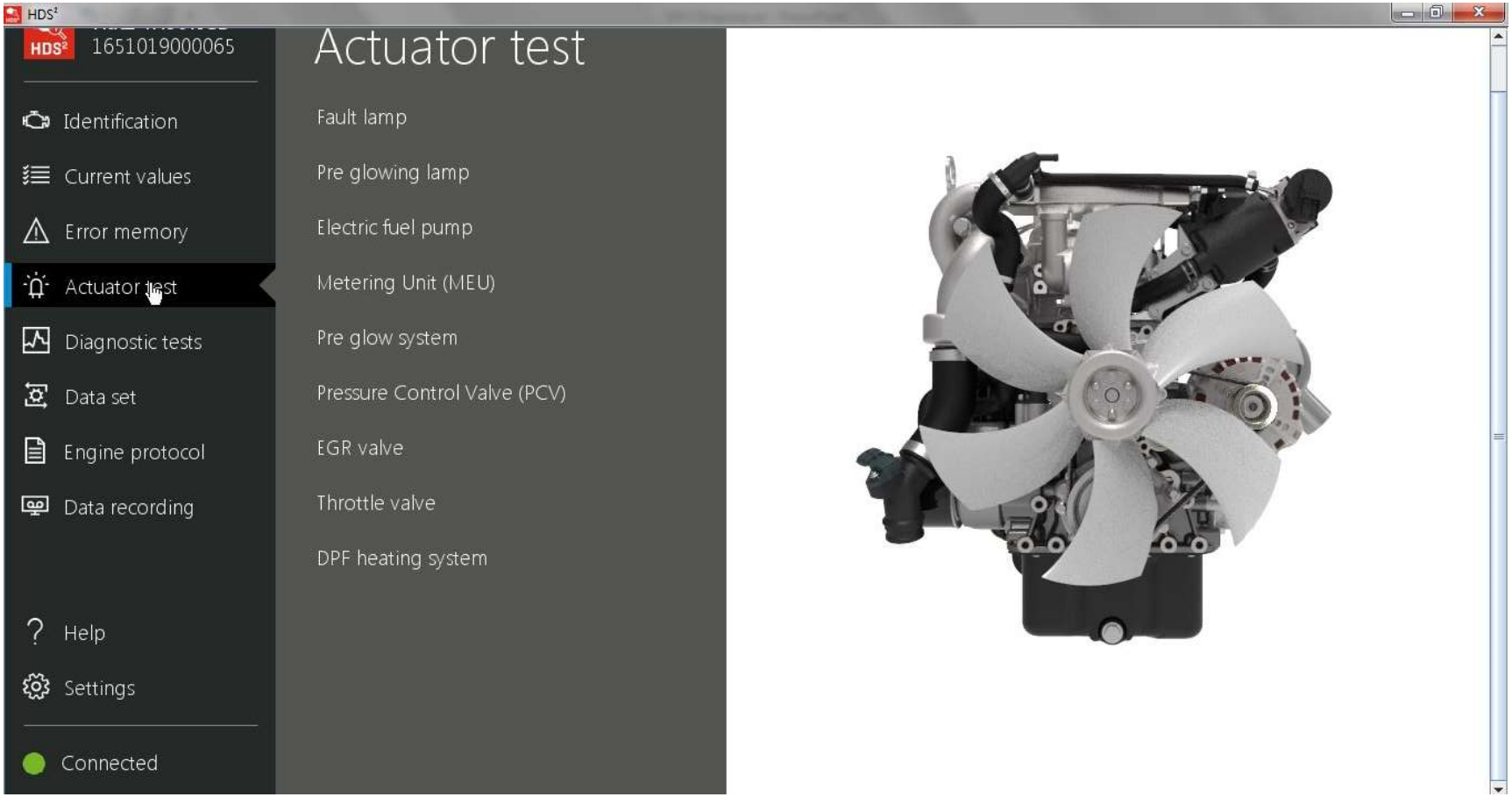
Actuator test



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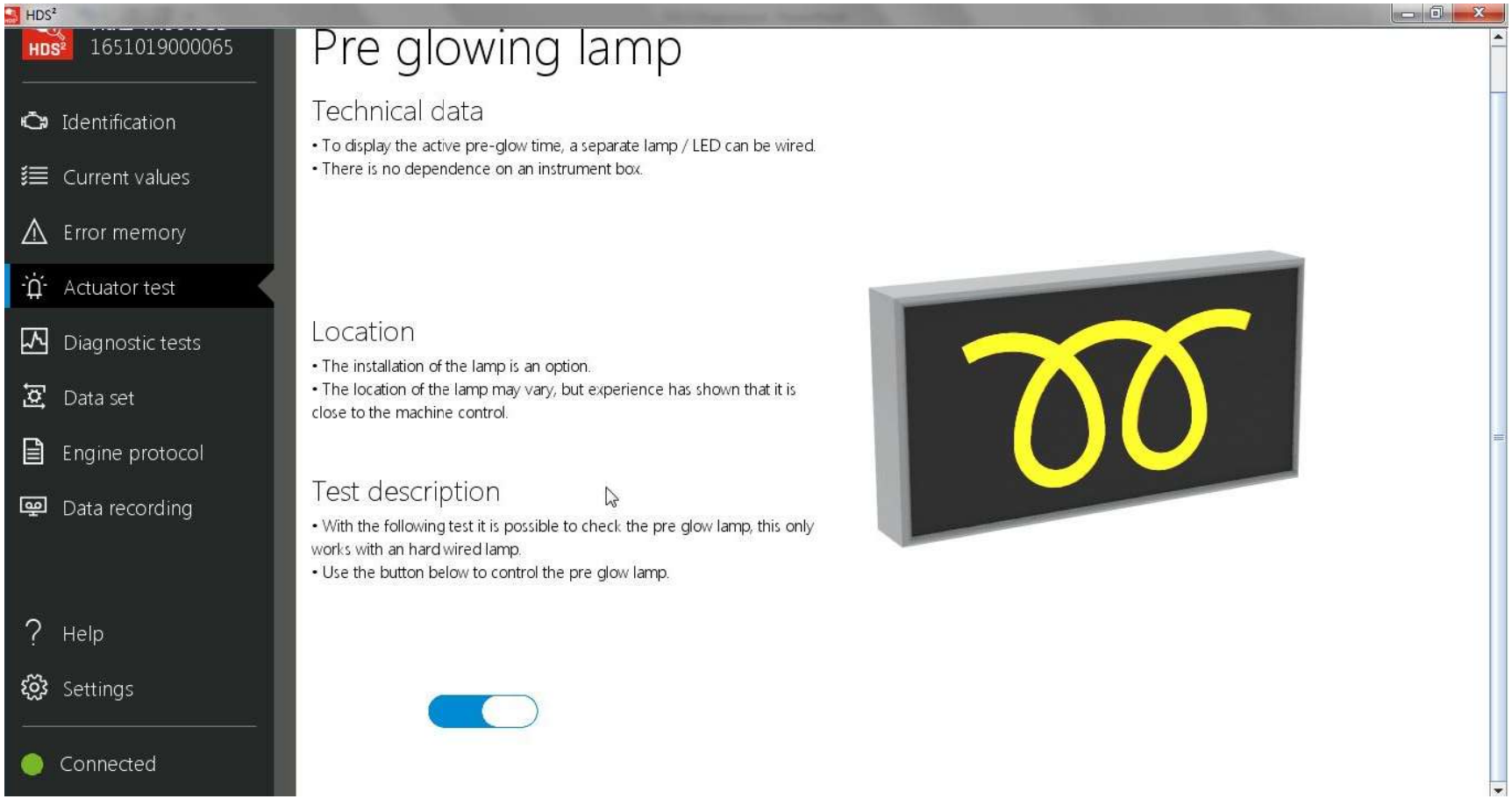
Pre glowing lamp



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Electric fuel pump

HDS²

HDS² 1651019000065

- Identification
- Current values
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- Help
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- Connected

Electric fuel pump

Technical data

- The pressure side of the pump is located at the electrical connections.
- The fuel system has to be free from copper, zinc and existing alloys (e.g. brass).

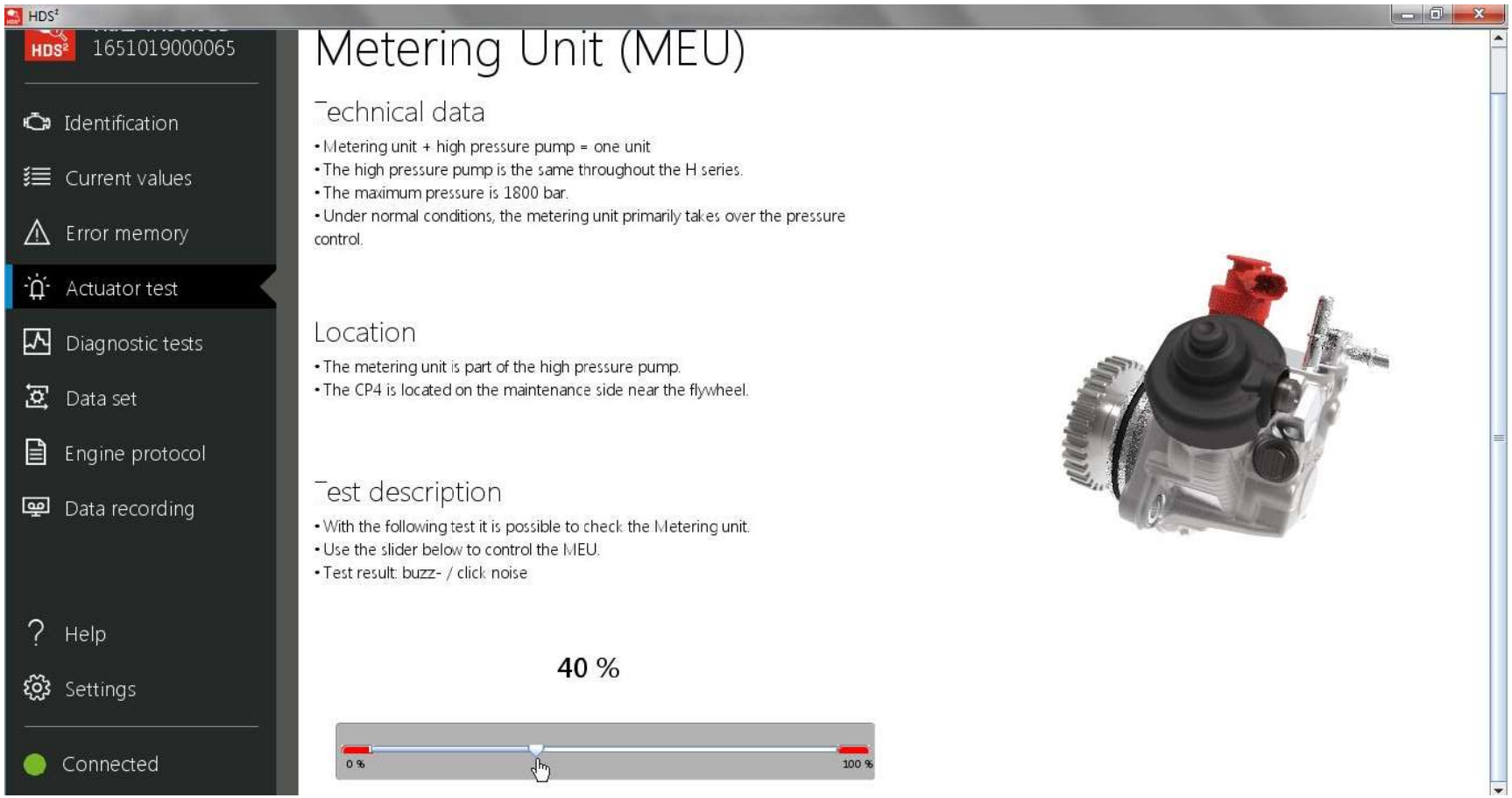
Location

- The pump is located between the fuel pre- and main filter.
- Chassis side attachment.

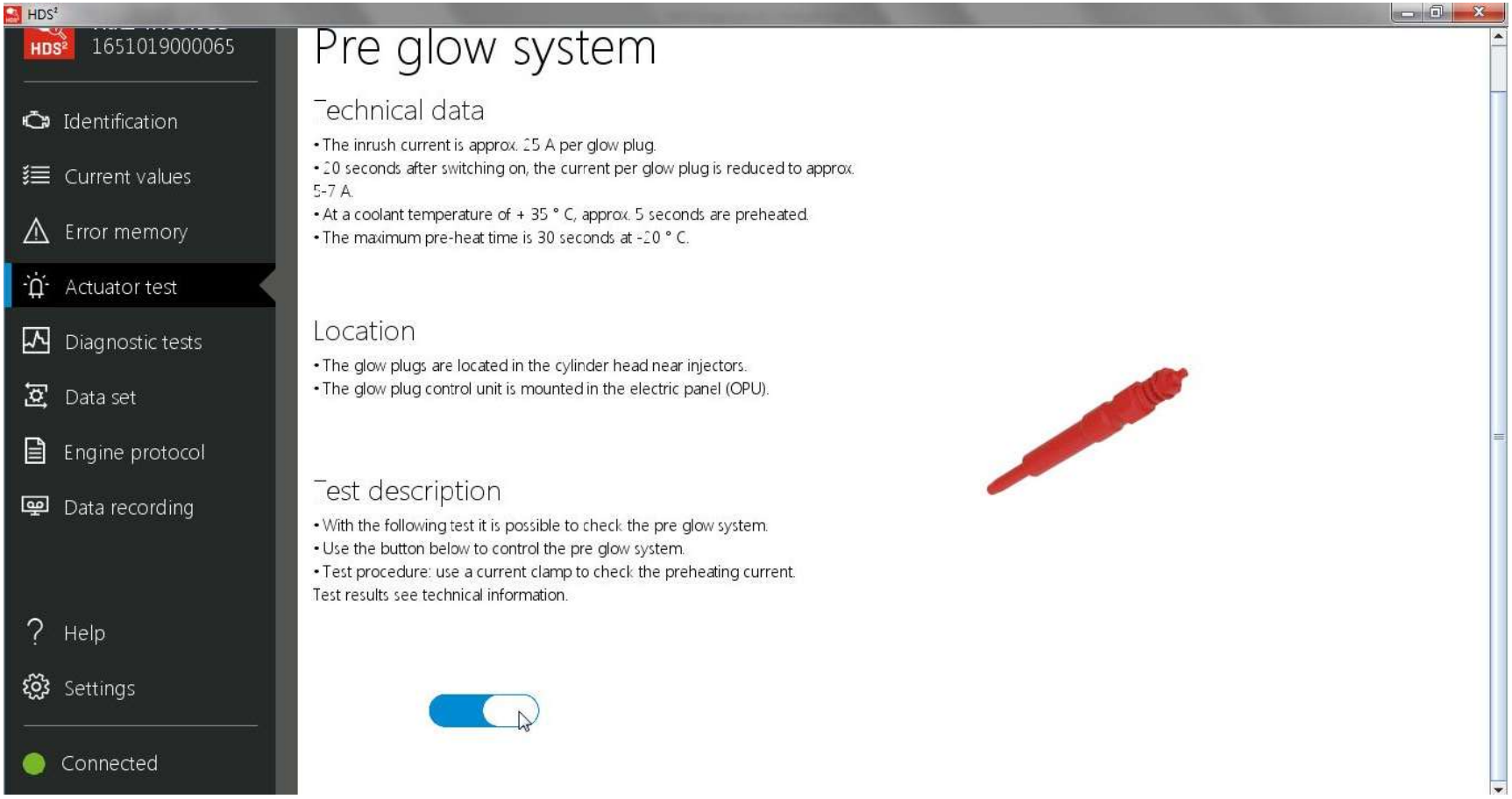
Test description

- With the following test it is possible to check the electrical fuel pump.
- Use the button below to control the electrical fuel pump.
- Test result: the is activated for approx. 30 seconds.

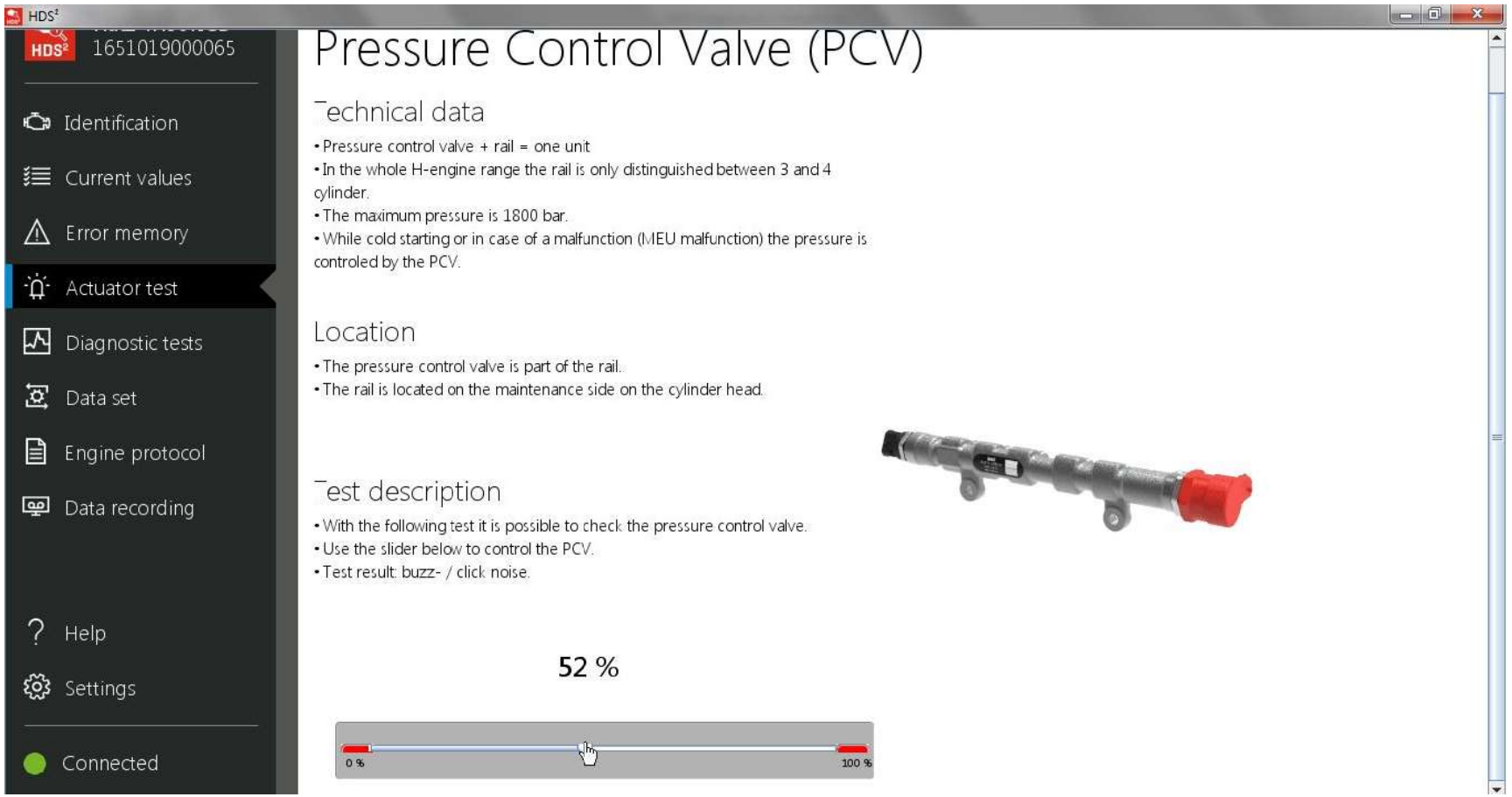
Metering Unit (MEU)



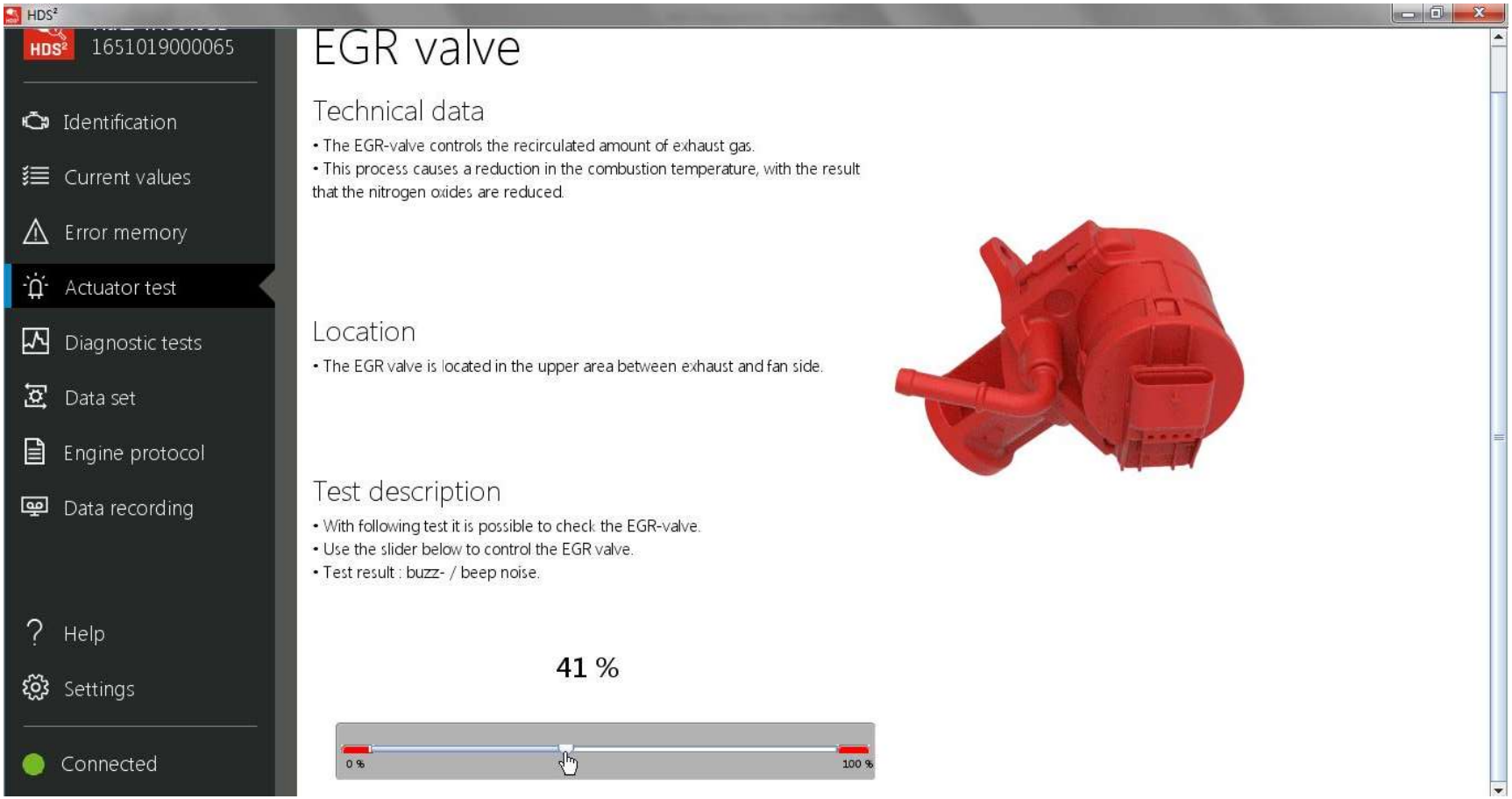
Pre glow system



Pressure Control Valve (PCV)



EGR valve


HDS²
1651019000065
Identification
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EGR valve
Technical data
• The EGR-valve controls the recirculated amount of exhaust gas.
• This process causes a reduction in the combustion temperature, with the result that the nitrogen oxides are reduced.
Location
• The EGR valve is located in the upper area between exhaust and fan side.
Test description
• With following test it is possible to check the EGR-valve.
• Use the slider below to control the EGR valve.
• Test result : buzz- / beep noise.
41 %
0 %
100 %

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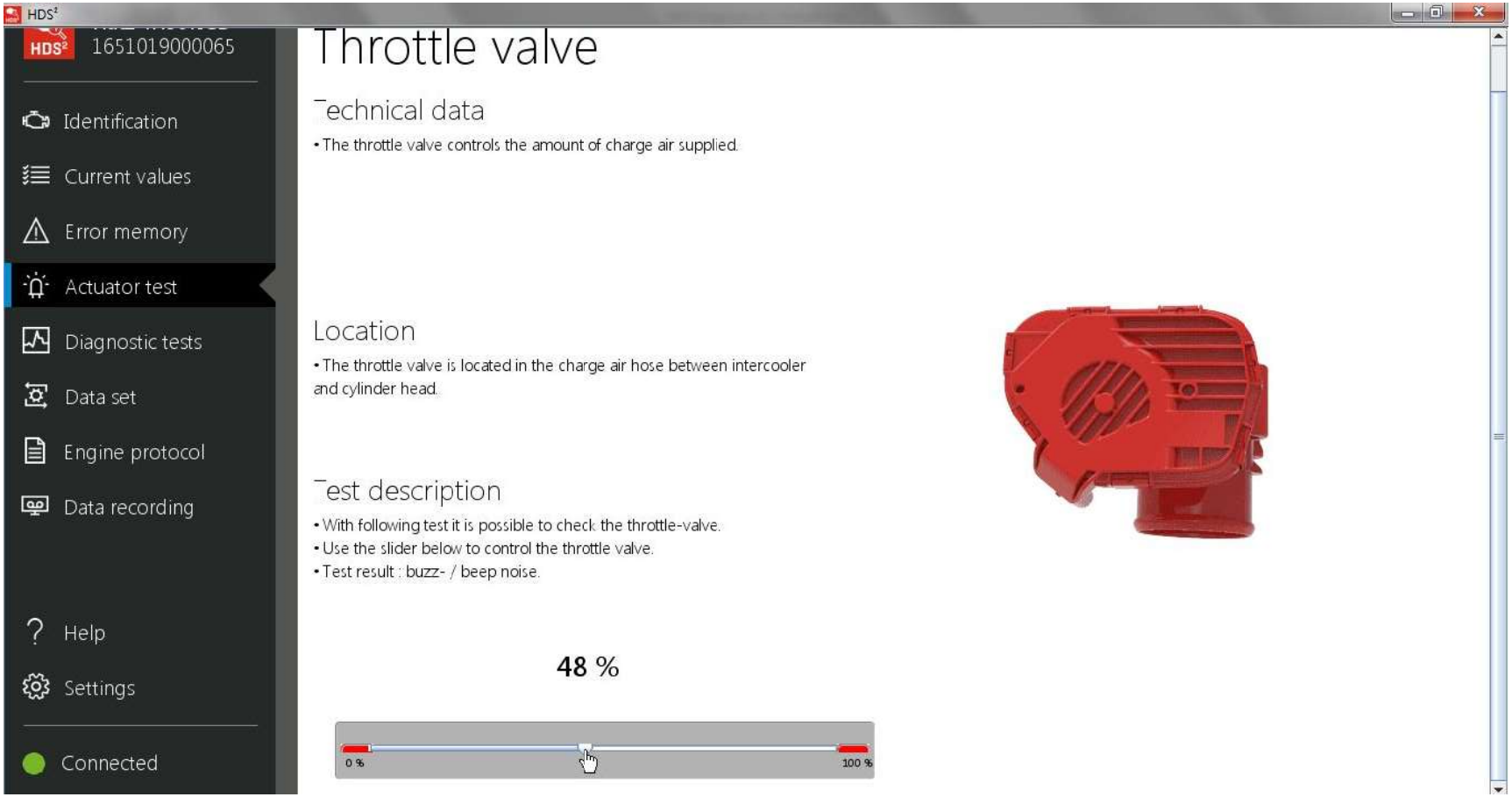

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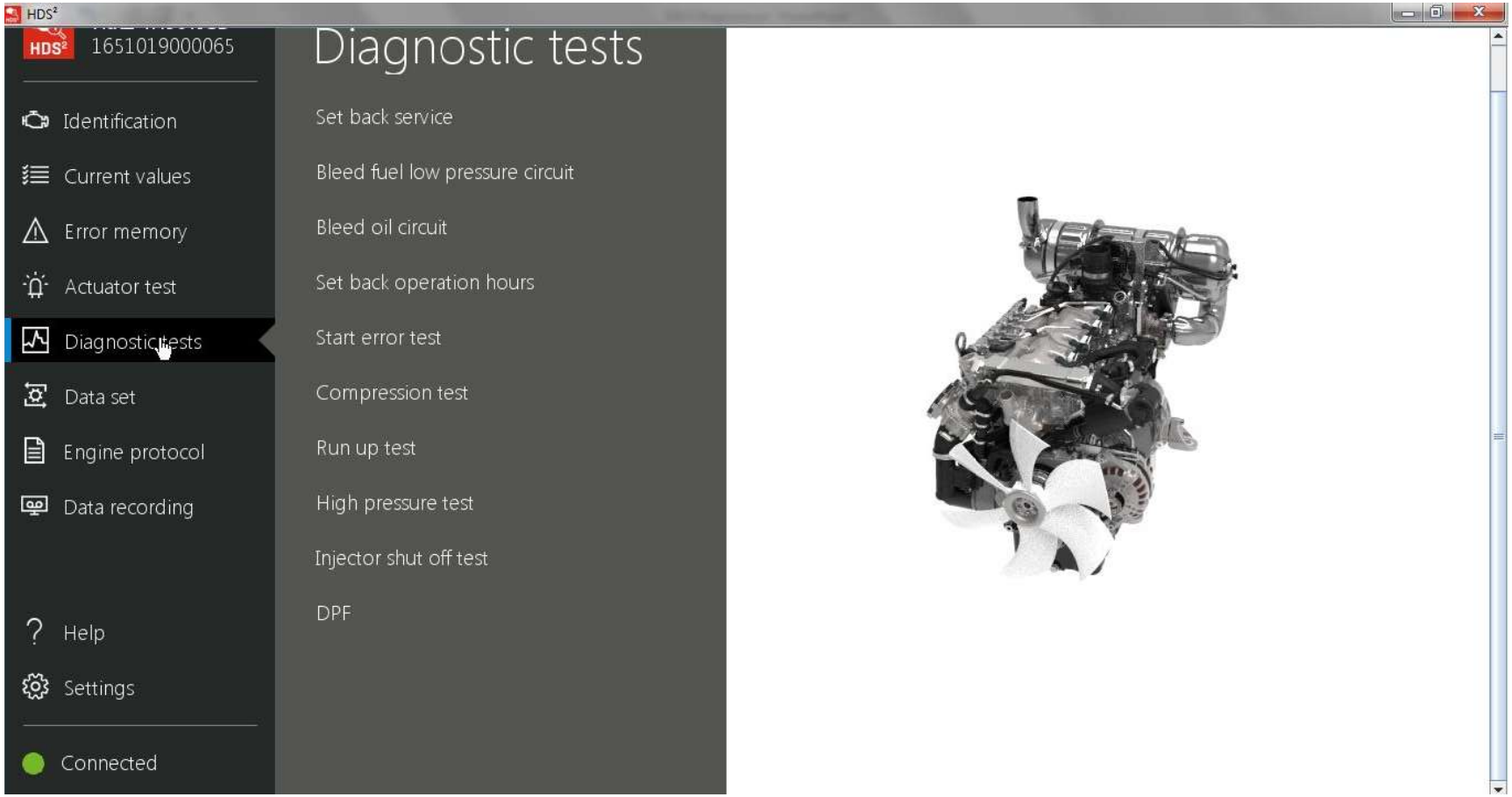
Diagnose function with the Hatz diagnose software



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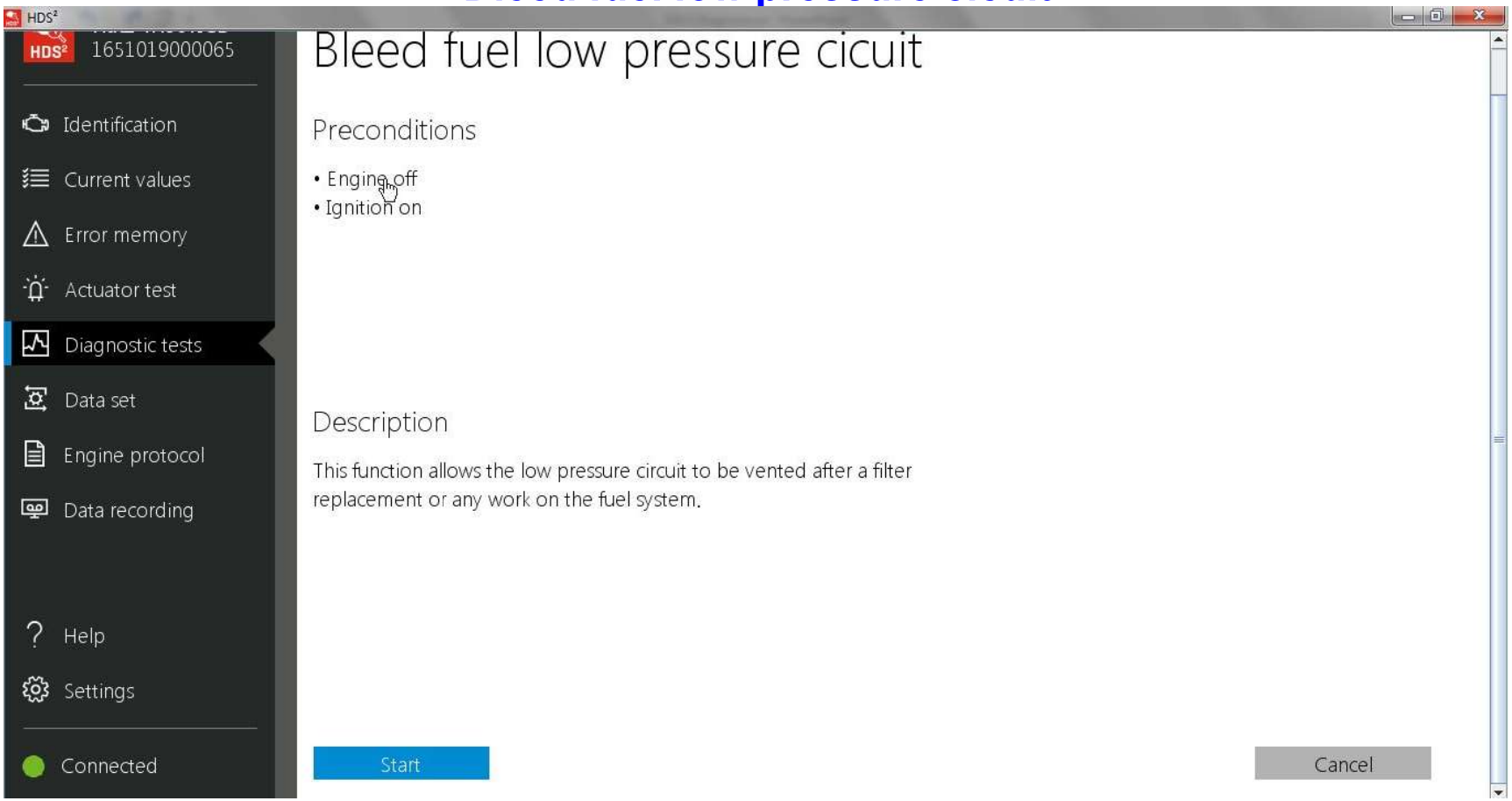
Bleed fuel low pressure cicuit



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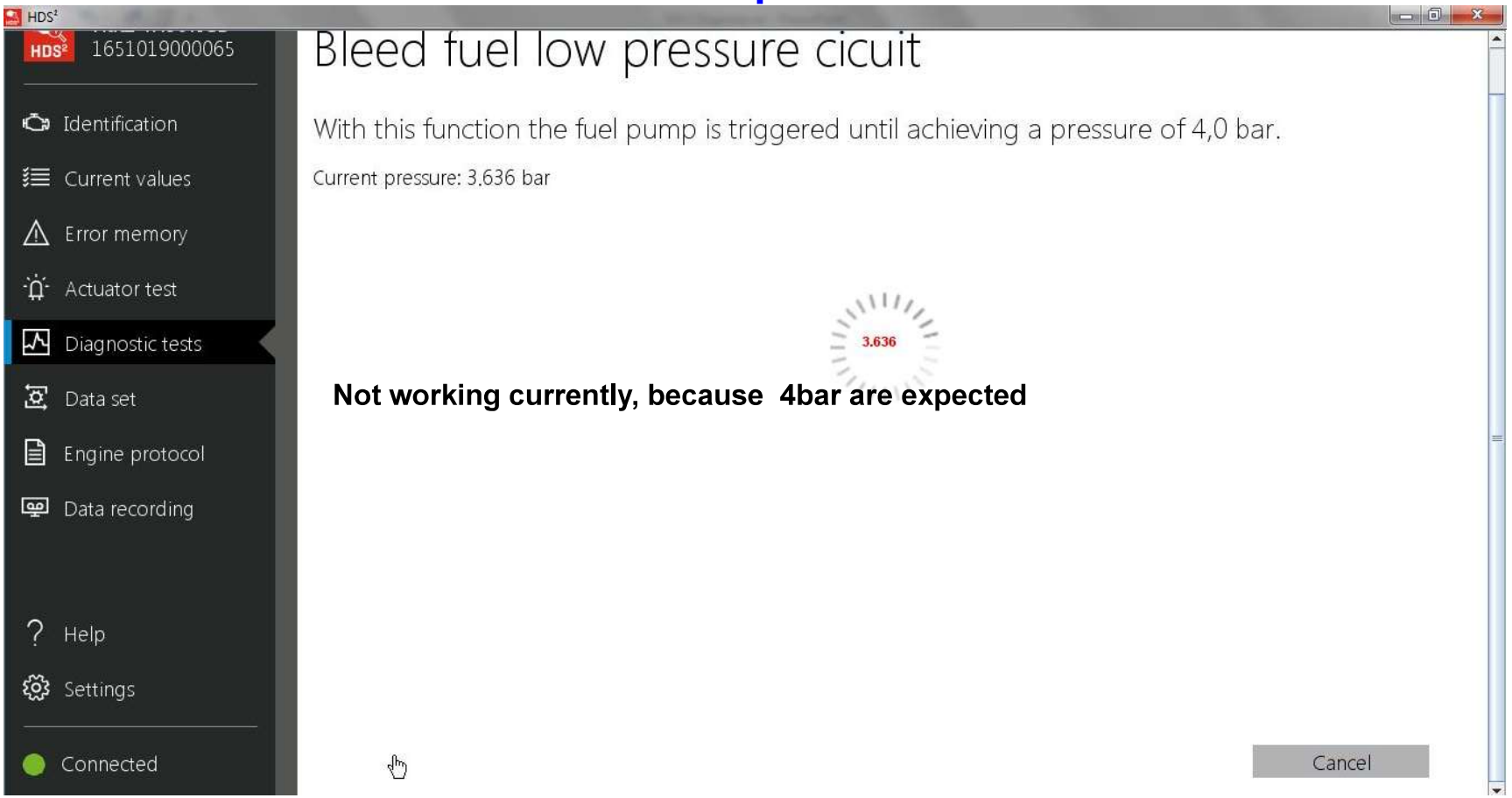
Bleed fuel low pressure cicuit



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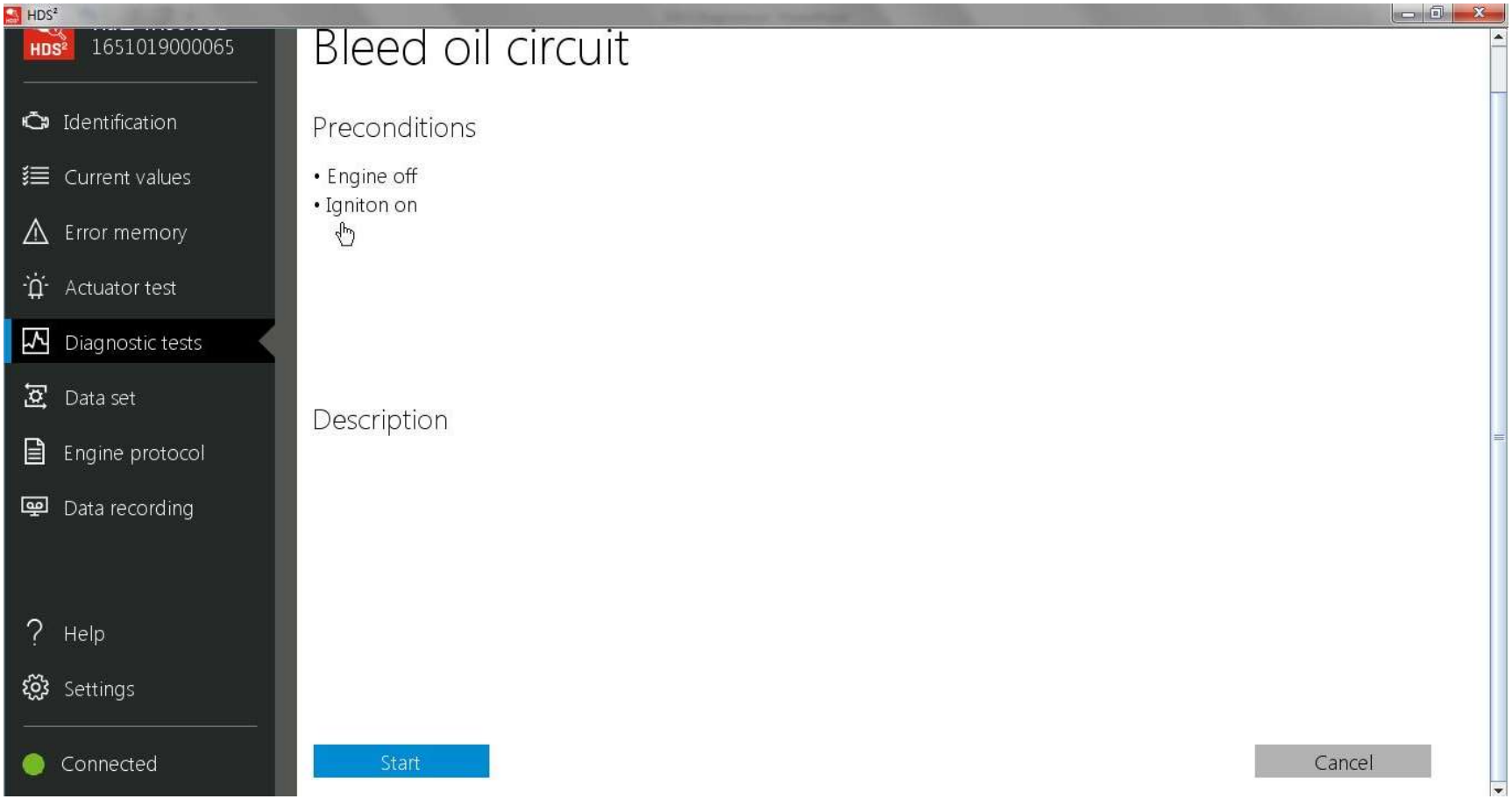
Bleed oil cicuit



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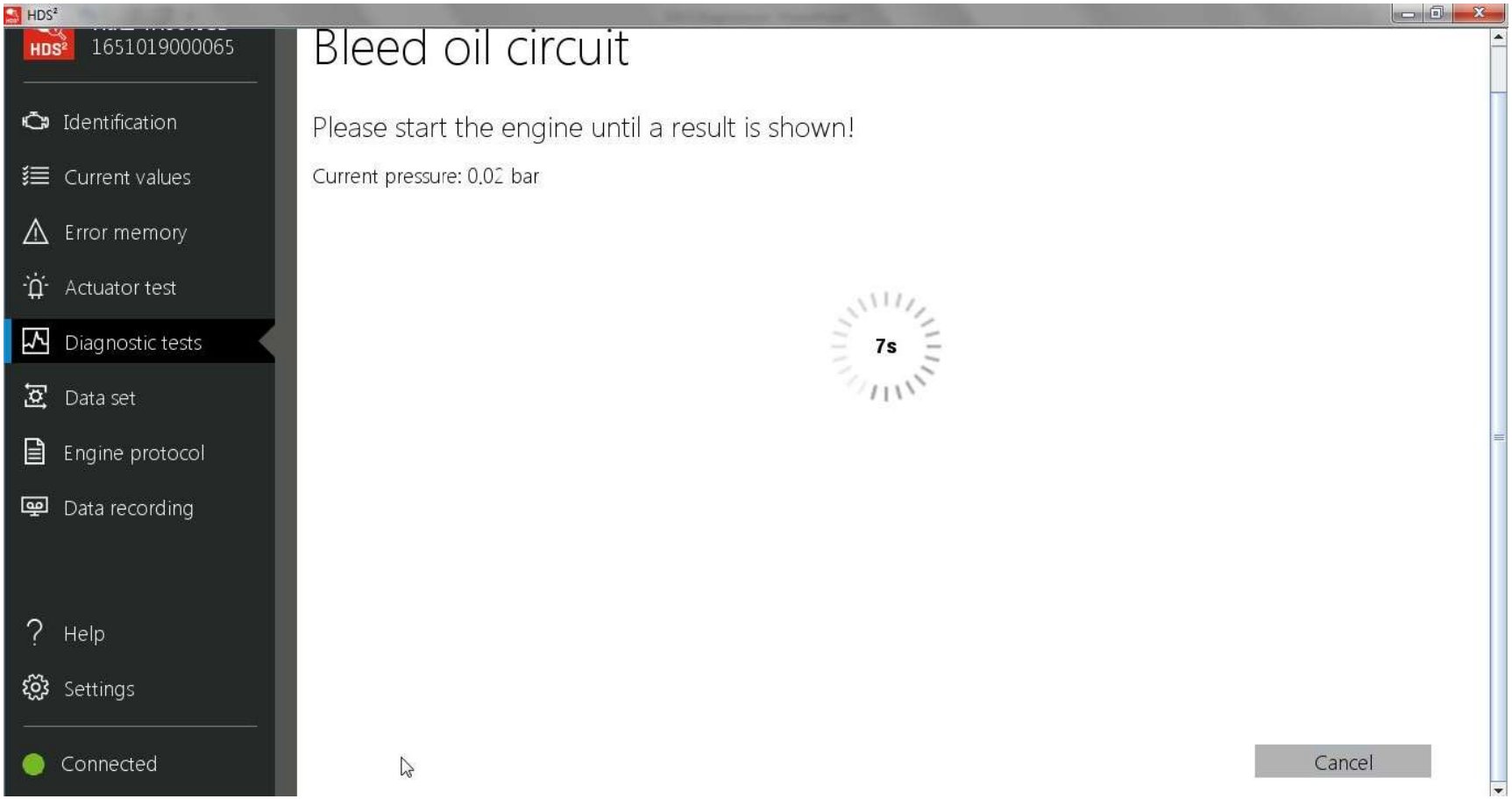
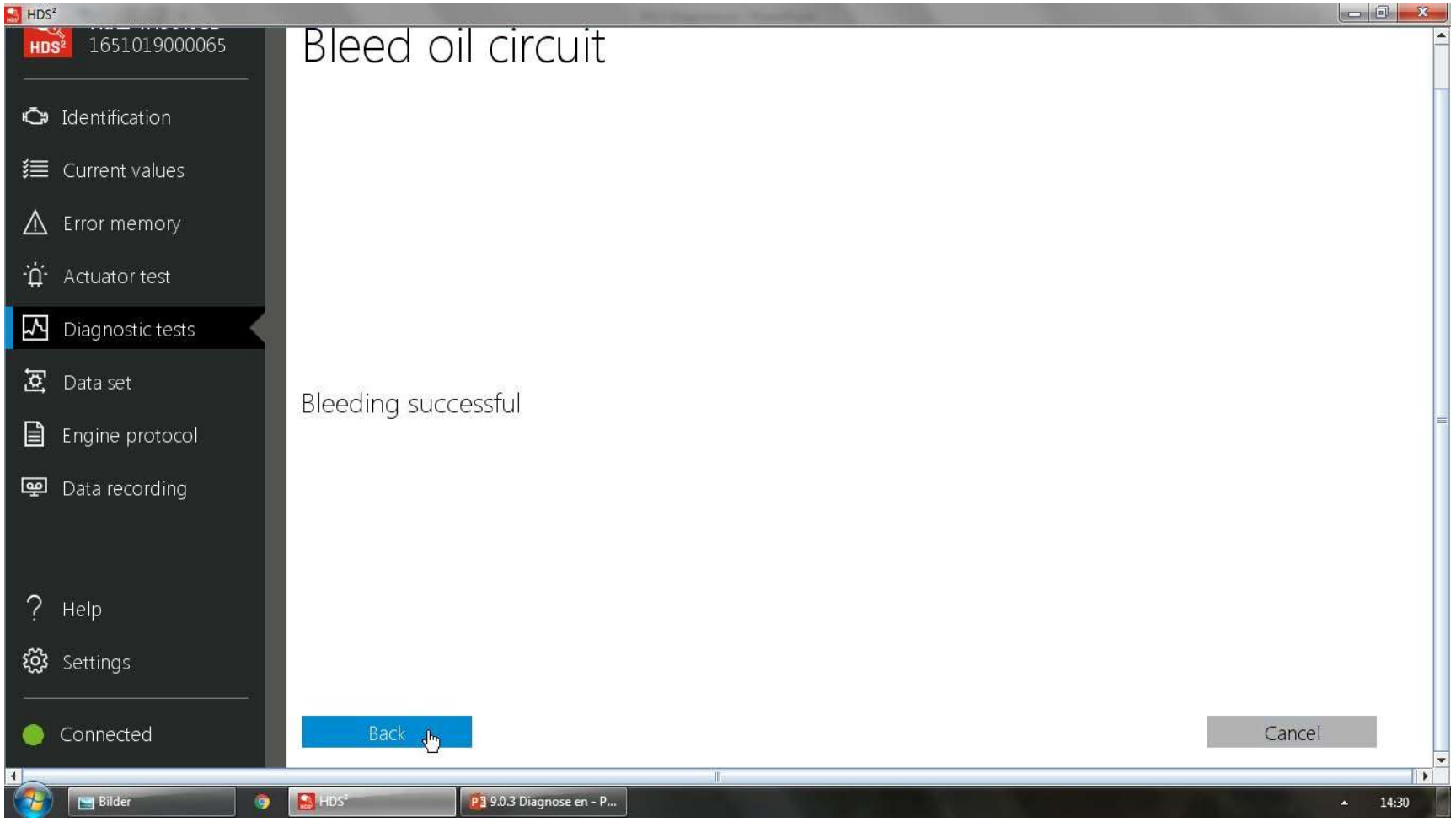
Bleed oil cicuit



Bleed oil cicuit



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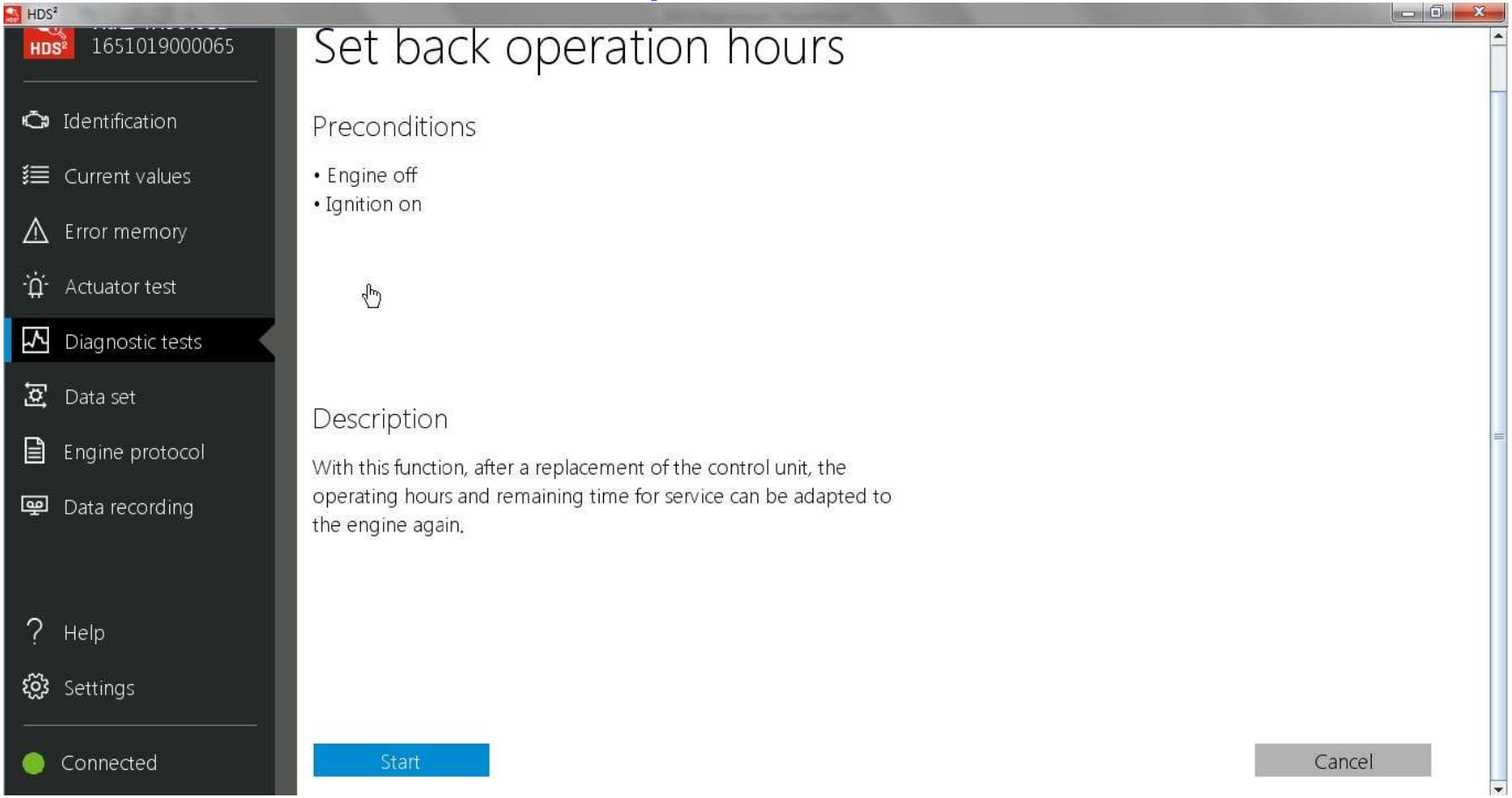
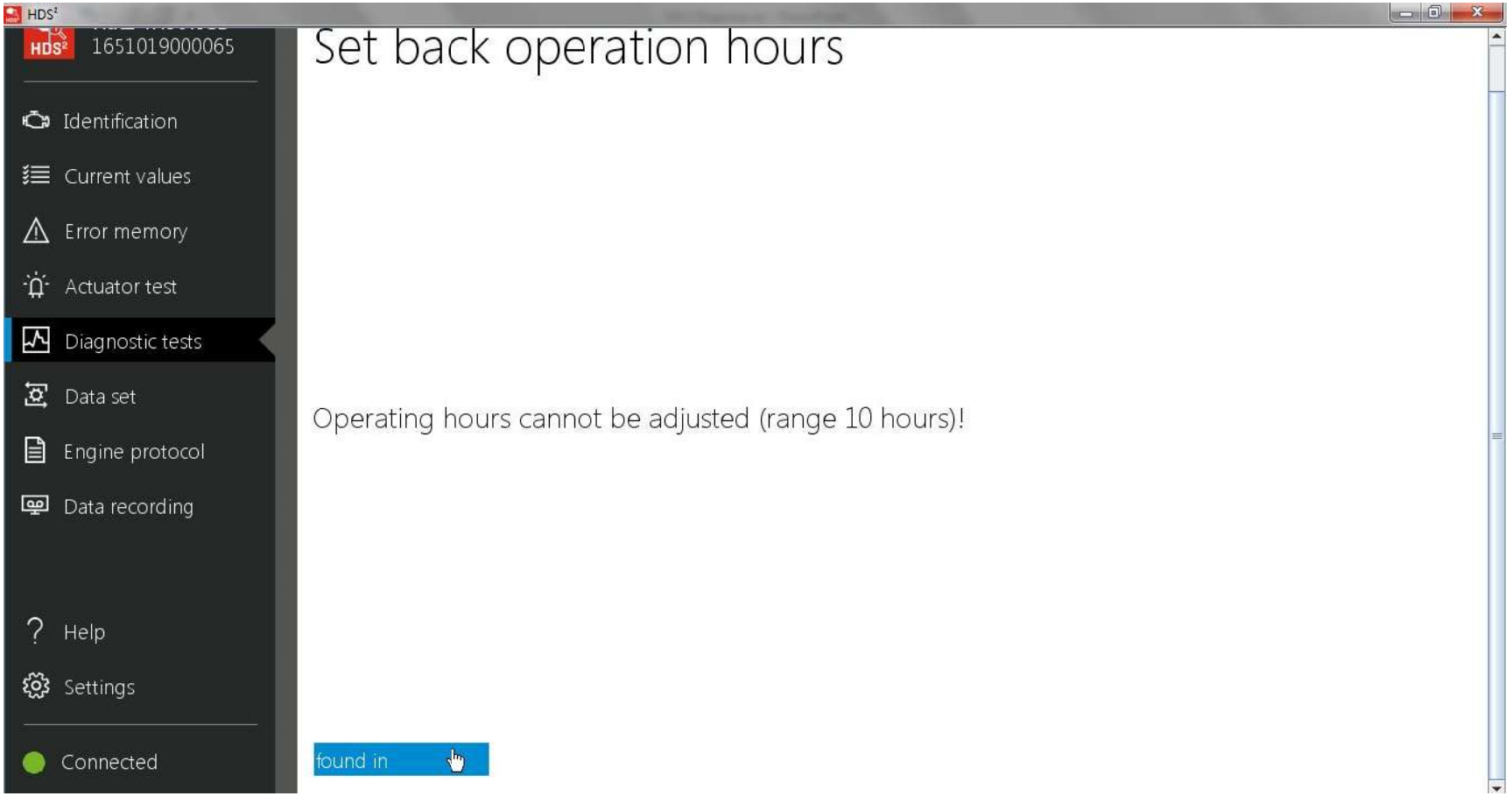
Set back operation hours



Set back operation hours



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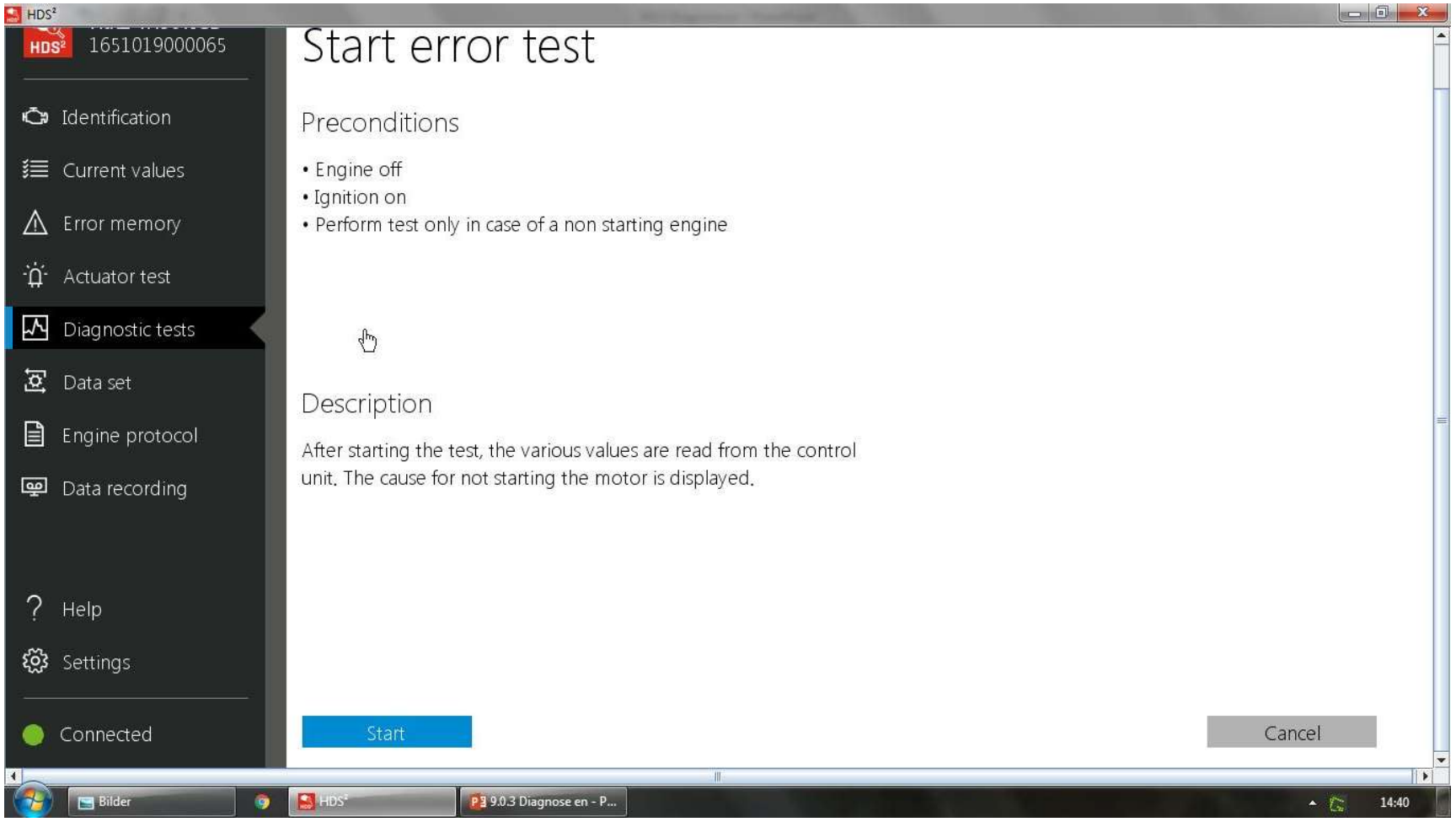
Start error test



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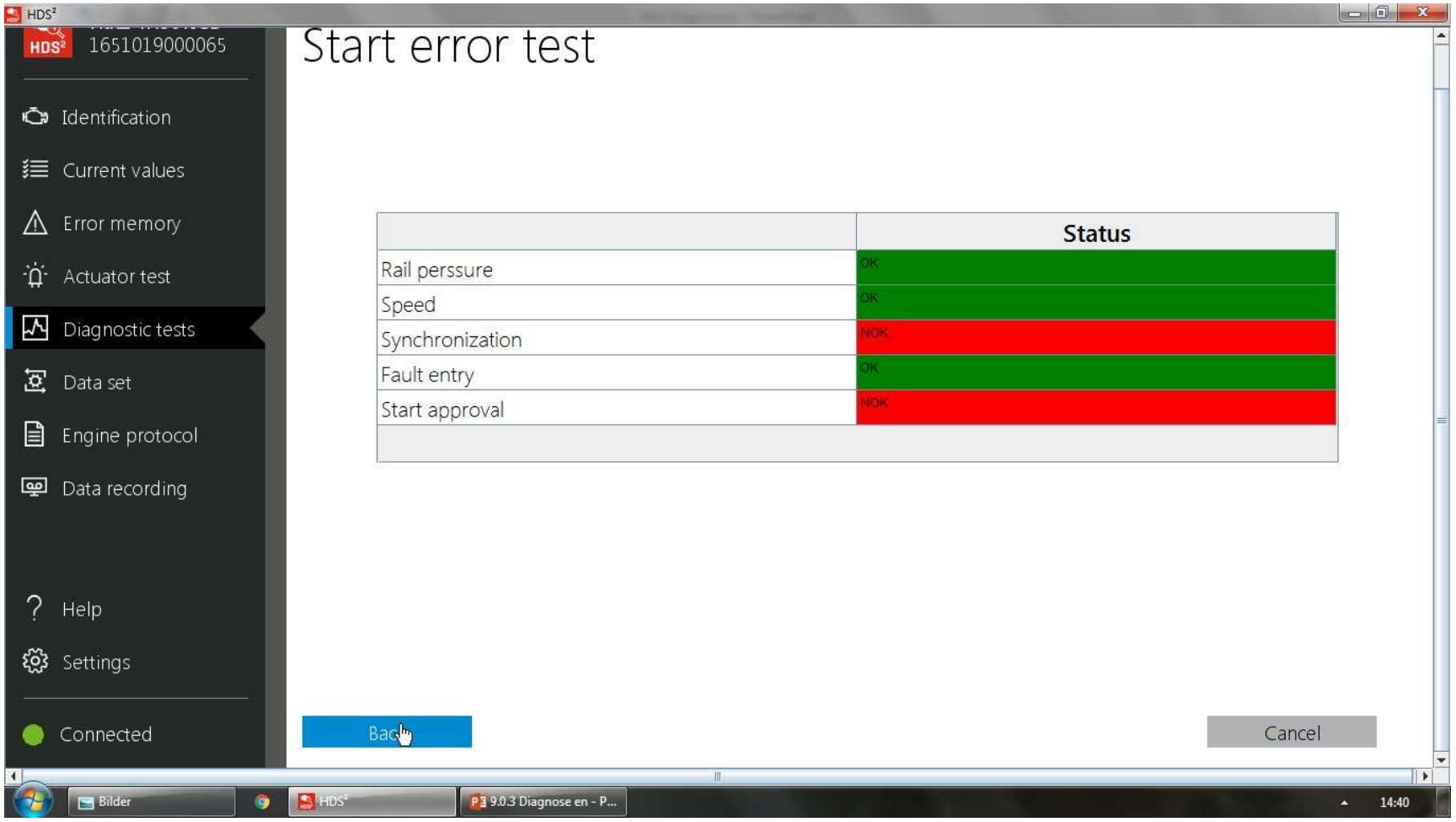
Start error test



Start error test

Start trouble Information

Detectable defects

- Status starter approval
- Set shut off requirements
- Missing/too low engine speed signal
- No rail pressure generation
- Optional/ customer specific: Fuel low pressure sensor defect

Advantages

- Quick localization of failure in case of start problems
- Analysis of starting conditions across systems

Experience level

- Applied in high volume productions

Start error test

Actuate starter

Rail pressure detection

Speed detection

Synchronization

Fault memory entry

Waiting until tester displays results

Diagnostic results

Detection: Reason for start problems

Purpose:

Display of the start conditions in bit coded label.

Examples of bits set:

0 – no pressure increase

1 – no speed detection

2 – synchronization problems

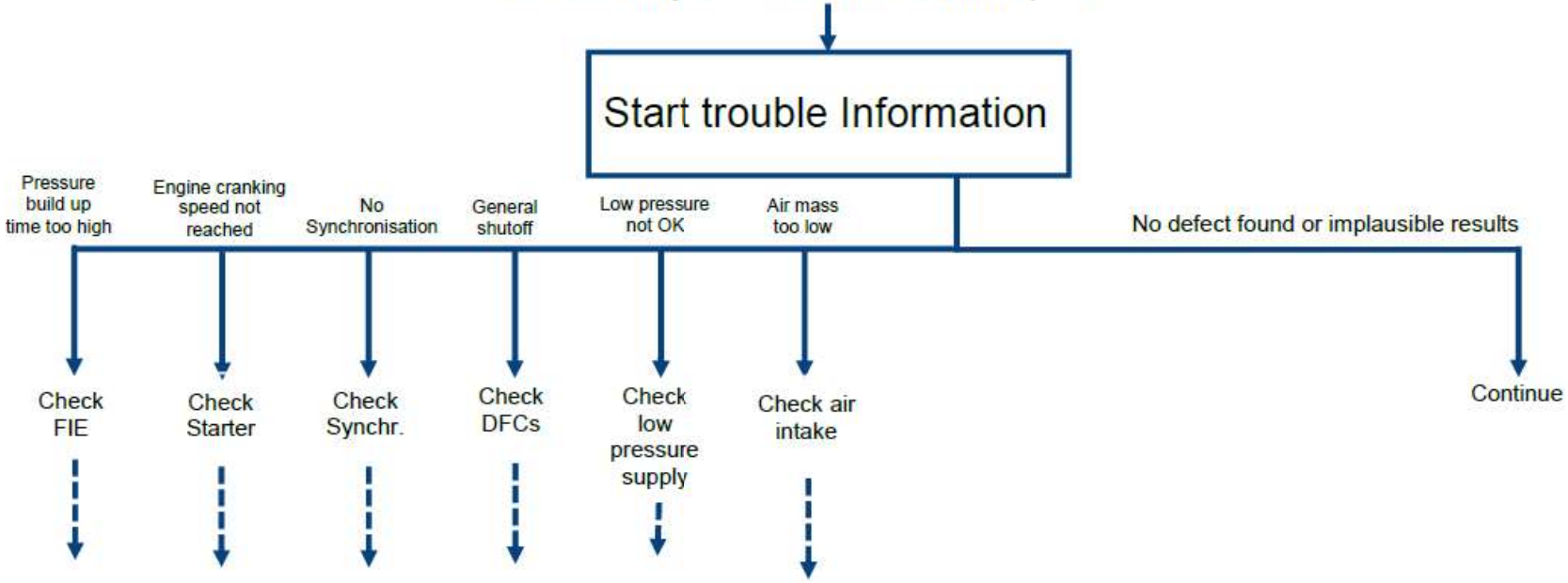
3 – shut off request

4 – no starter release (optional)

Start error test

Symptoms
➔ Engine does not start

Additional use case by DFC:
➔ Engine did not start in the past
➔ Goal: analyze reason for no start in the past



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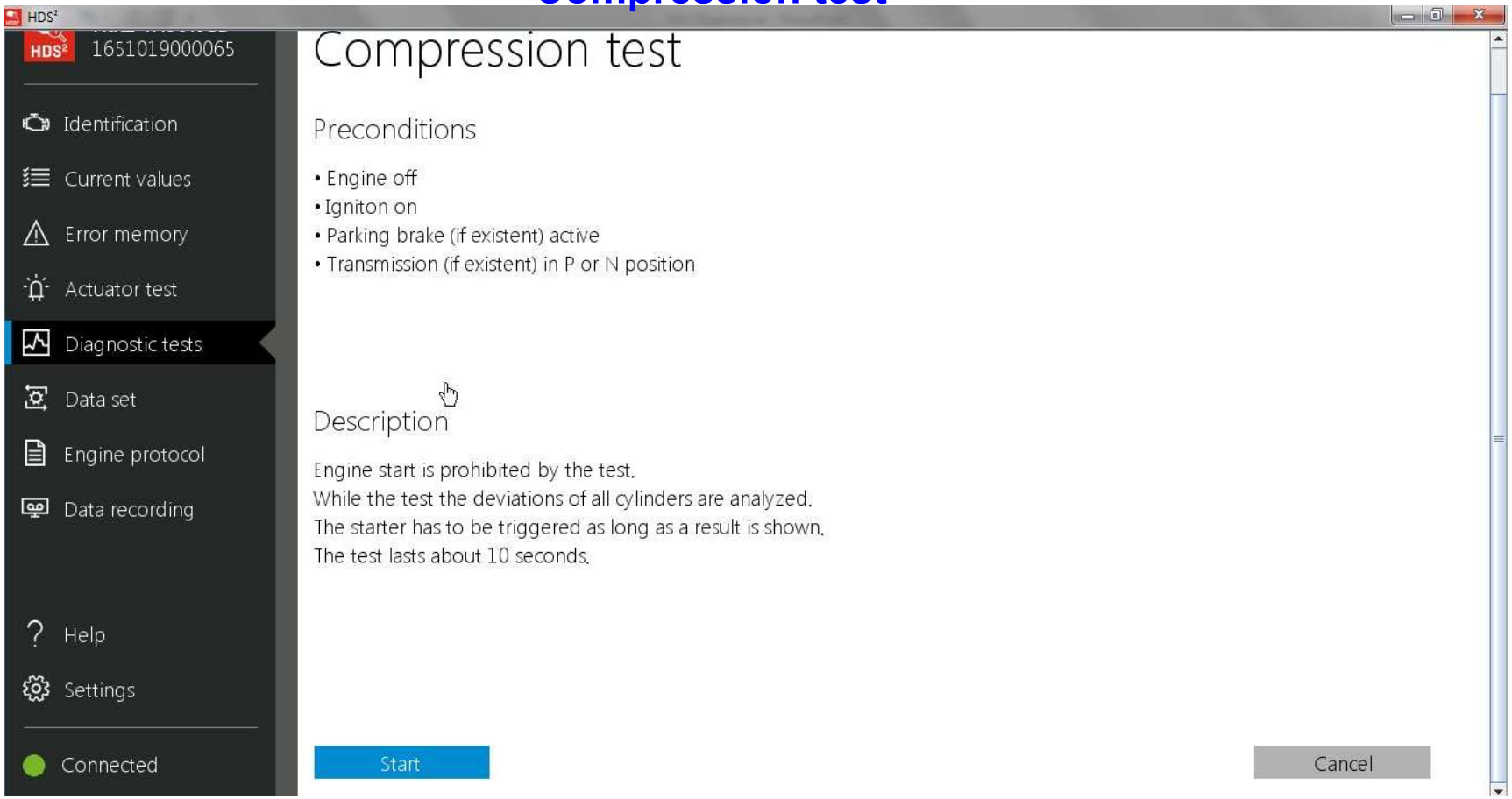
Compression test



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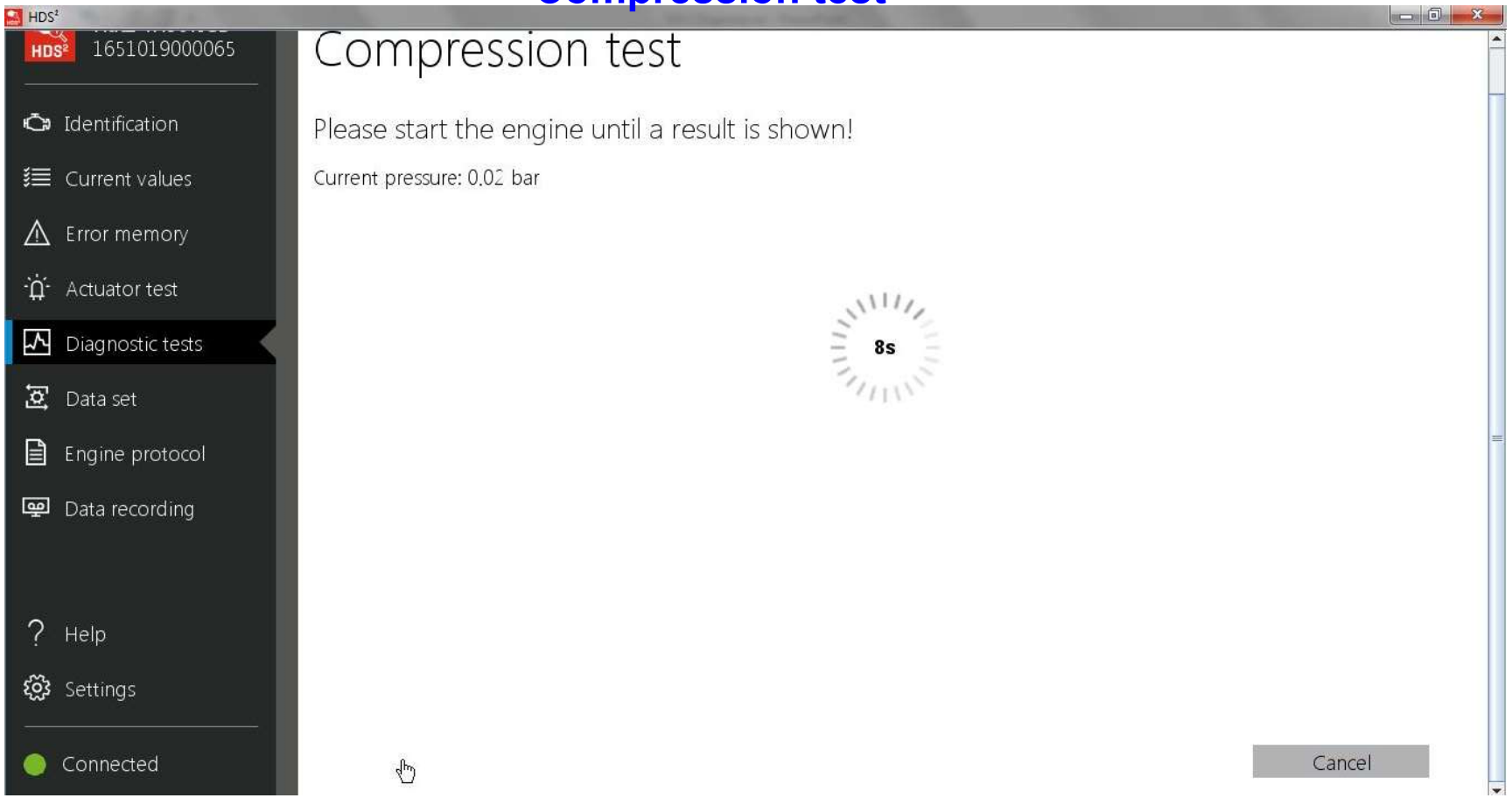
Compression test



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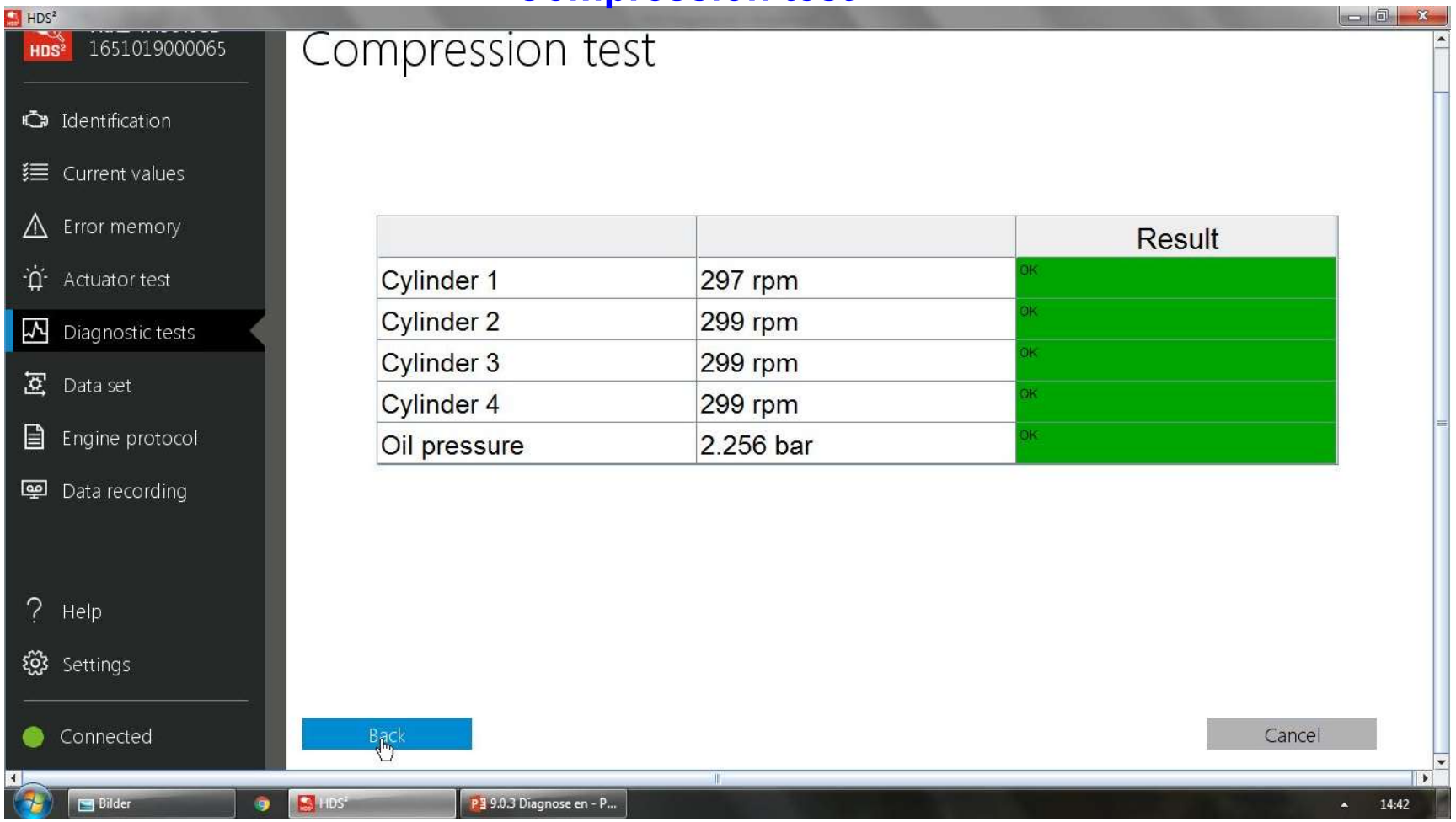
Compression test



Compression test

Detectable defects

- Reduced compression by mechanical defects at cylinder (e.g. piston ring abrasion)
- Detection of deviation between cylinders

Advantages

- No mechanical work necessary
- Quick test with simultaneous measurement of all cylinders

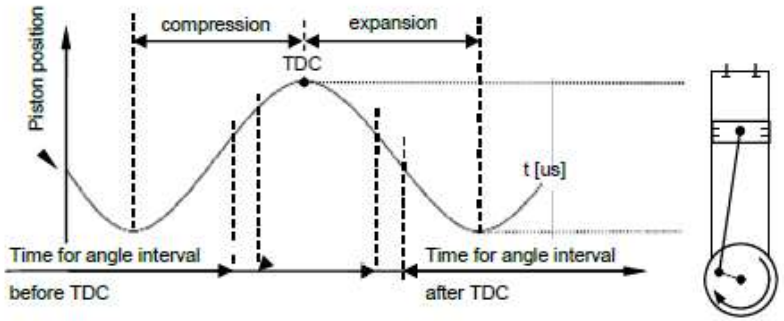
Experience level

- Applied for combustion engines with up to 6 cylinders and compression ratio > 12

Compression test

- Start test
- Deactivate injections/open throttle valve
- Actuate starter
- Time measurement for angle interval before / after TDC
- Diagnostic results

TDC = Top Dead Center



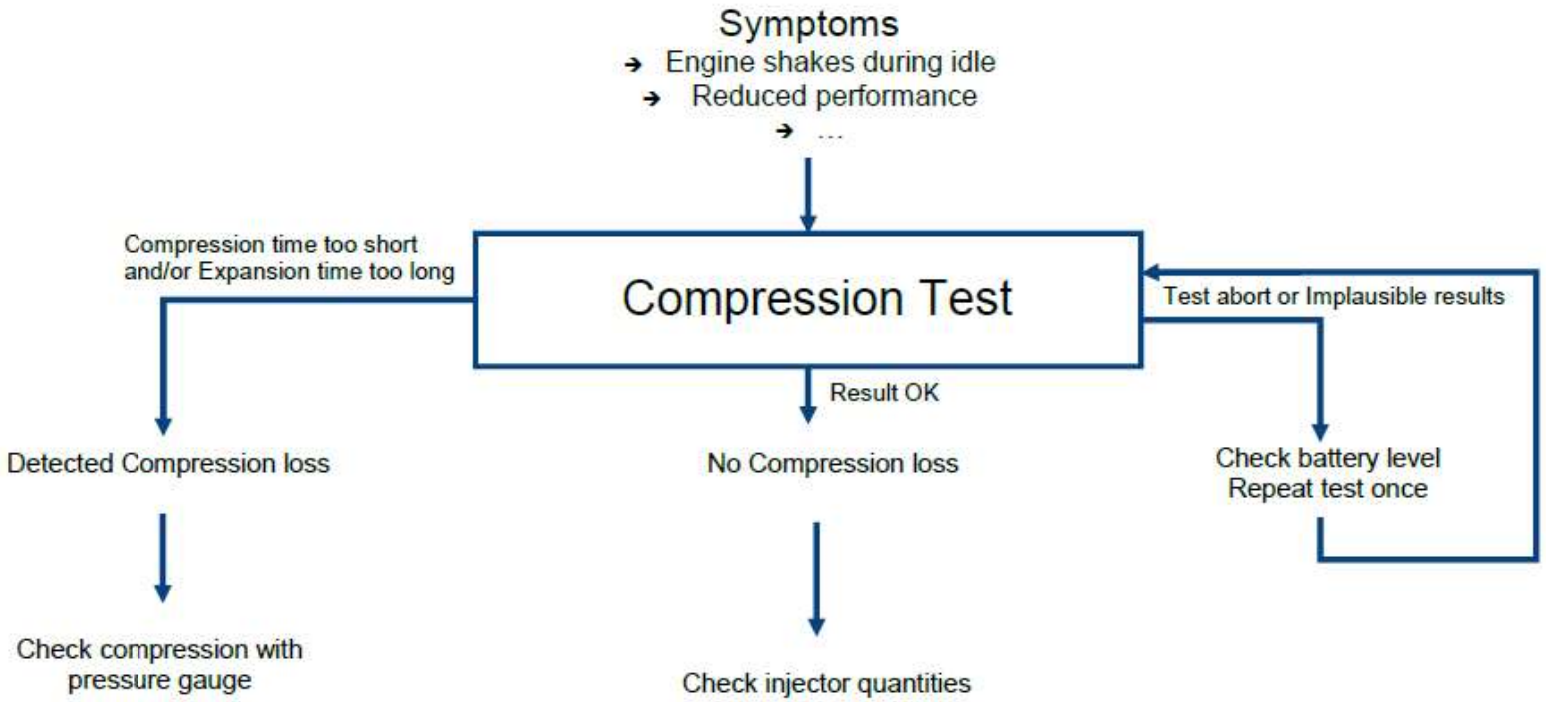
Method:

- Capture times of expansion and compression:
- In case of leakage faster piston stroke before TDC
- In case of leakage slower piston stroke after TDC

Interpretation:

- Relative comparison of cylinder individual times

Compression test

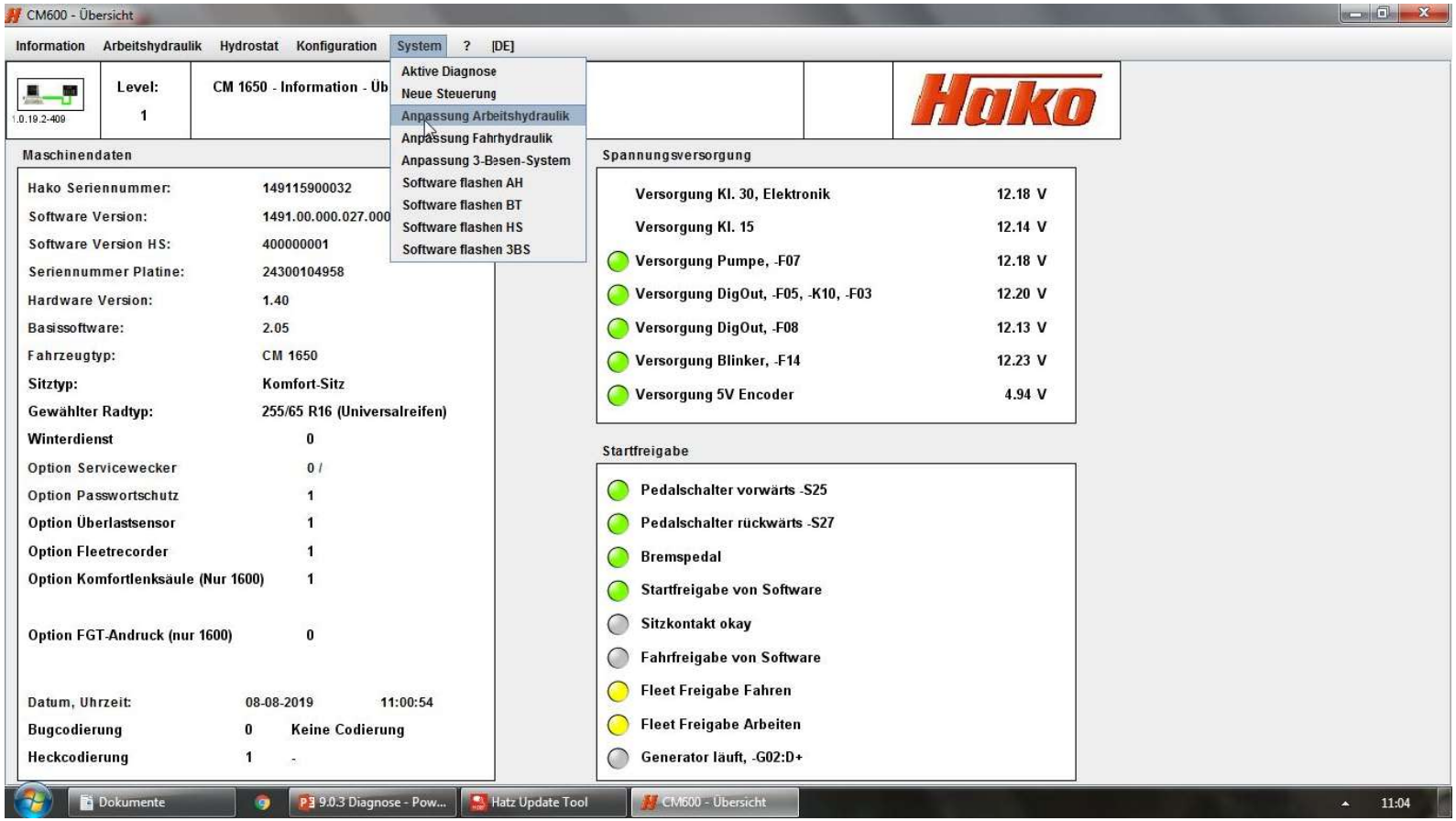


Diagnosefunktionen mit Hatz Diagnose Software

For some diagnostic functions, the idle speed must be reduced to 900 rpm before using the Hatz diagnostic tool. Adjust the Idle speed with the Hako diagnostics under System / Adjustment of working hydraulics / engine speed

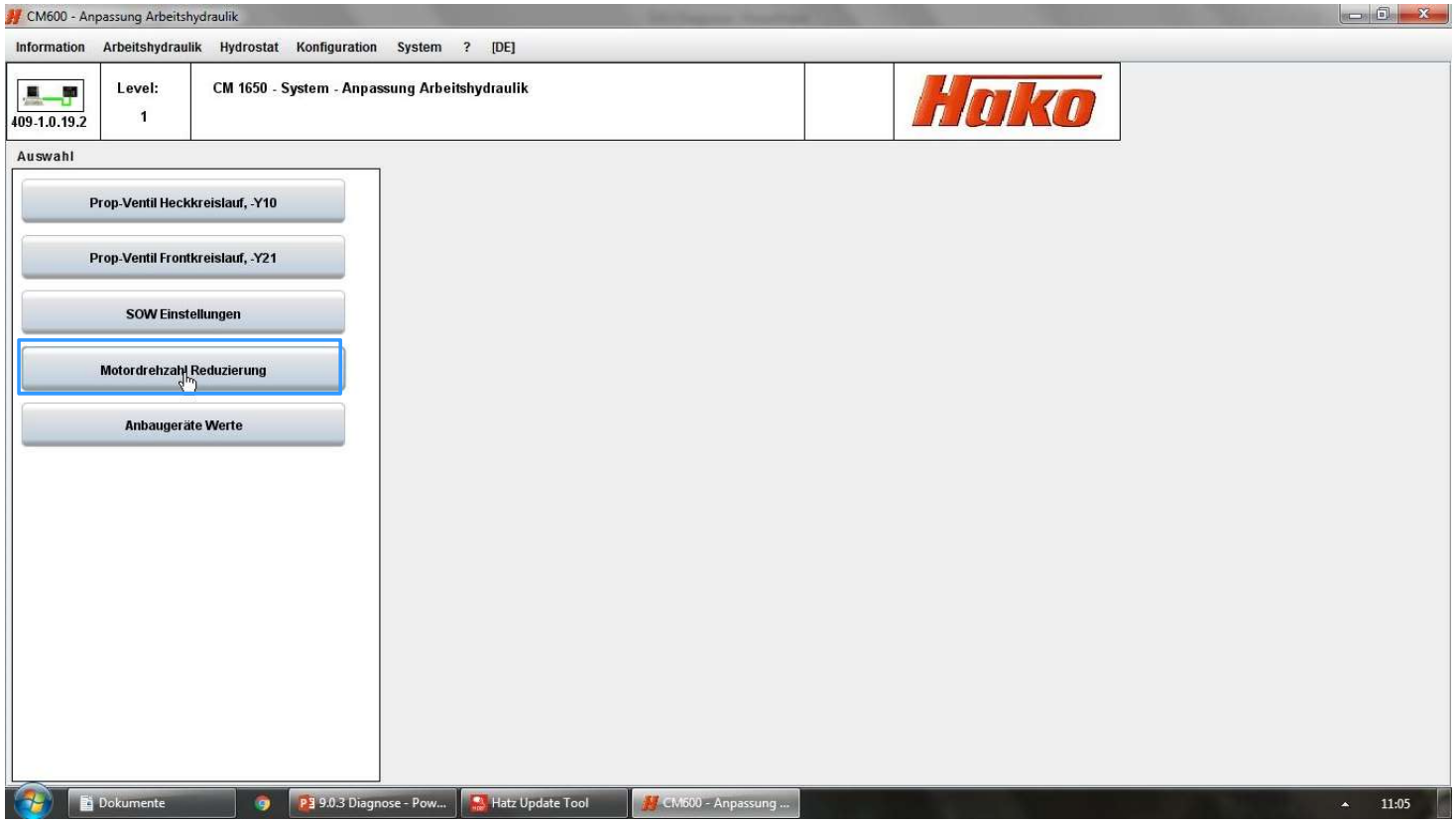
Change idle speed into 900rpm

For some diagnostic functions, the idle speed must be reduced to 900 rpm before using the Hatz diagnostic tool. For the adjustment the engine must run in idle speed ca. 1150rpm. Adjust the Idle speed with the Hako diagnostics under System -> Adjustment of working hydraulics.



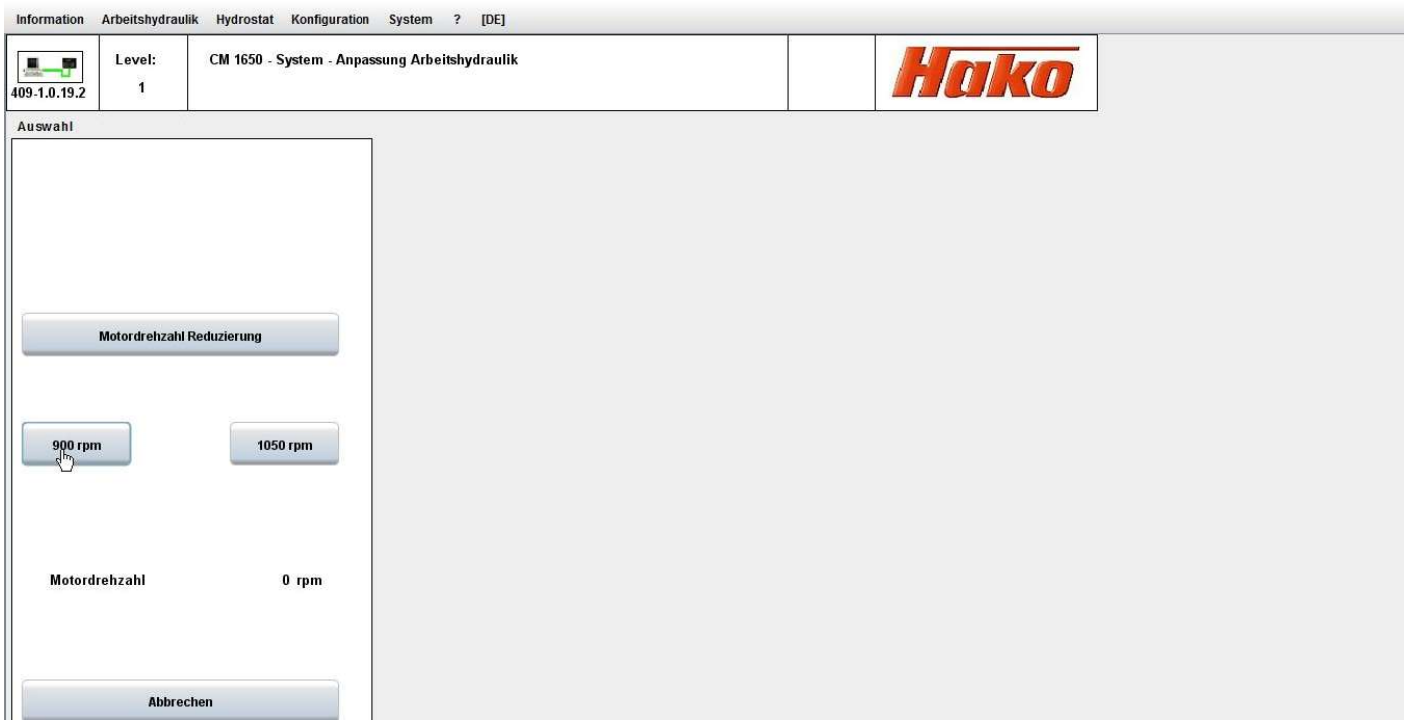
Change idle speed into 900rpm

Choose reduce engine speed



Change idle speed into 900rpm

Choose 900 rpm to reset the idle speed tp 1050 rpm choose the button 150 rpm or switch of the engine.



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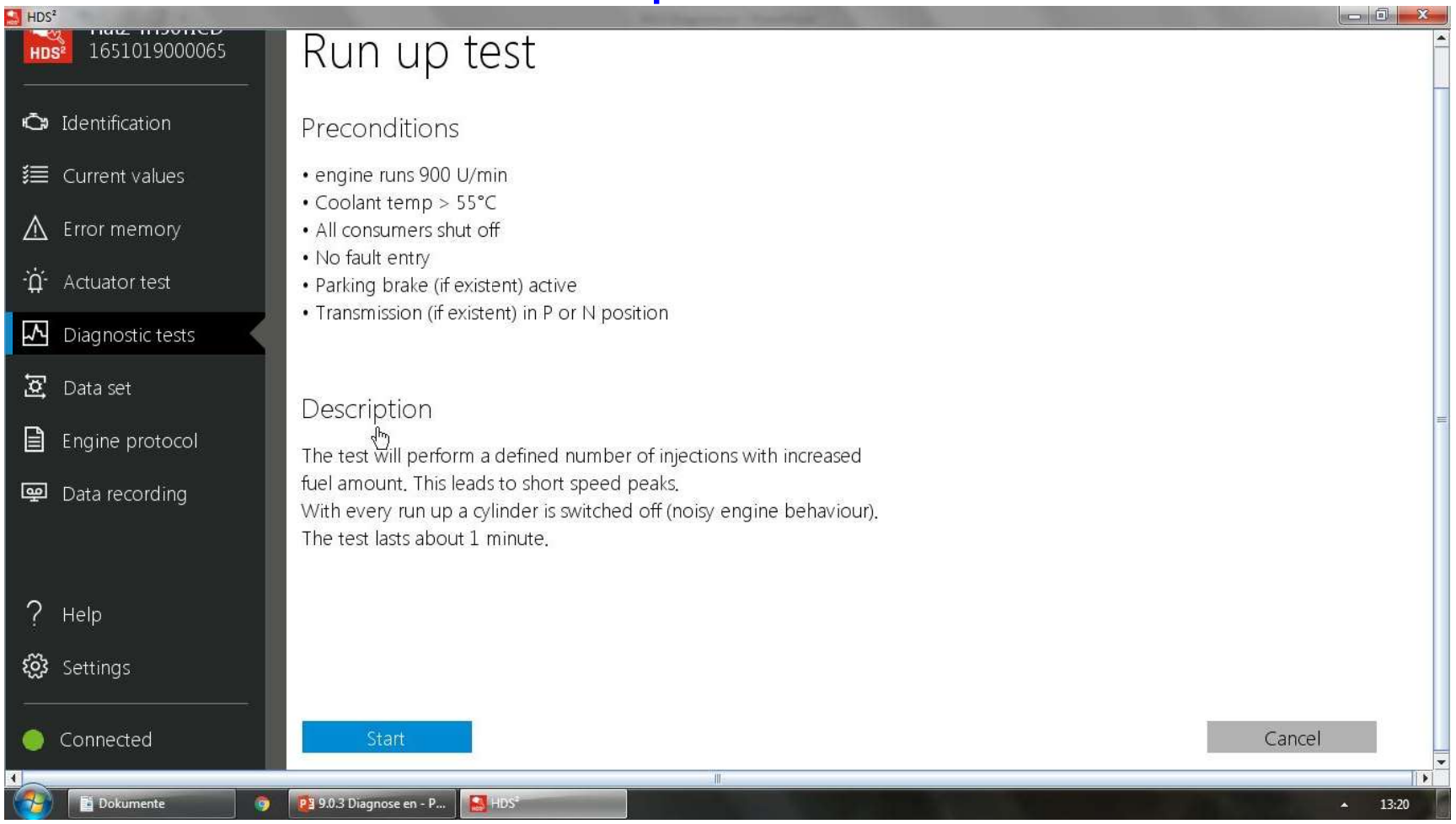
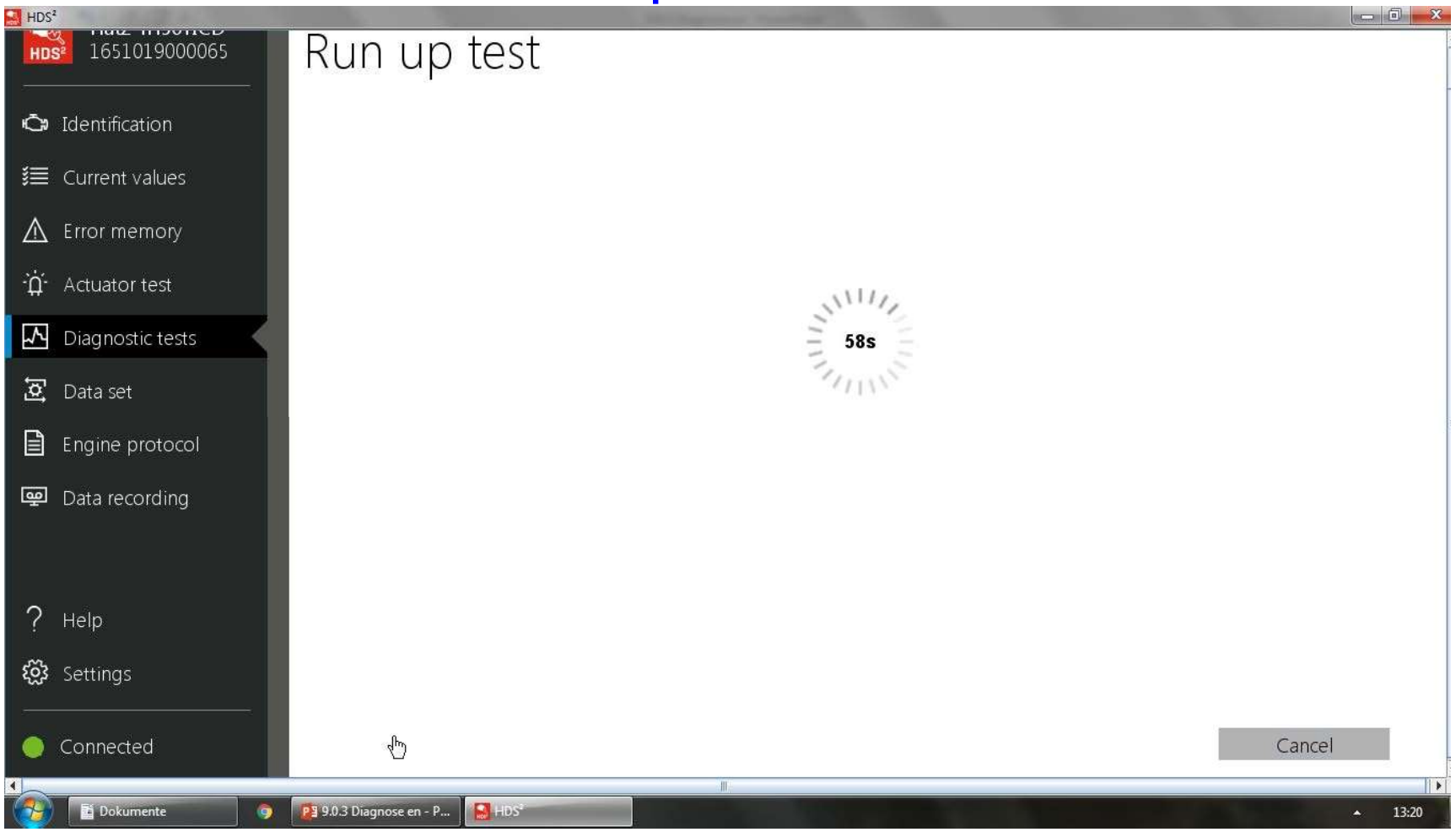
Run up test



Hatz H50TICD

Run up test



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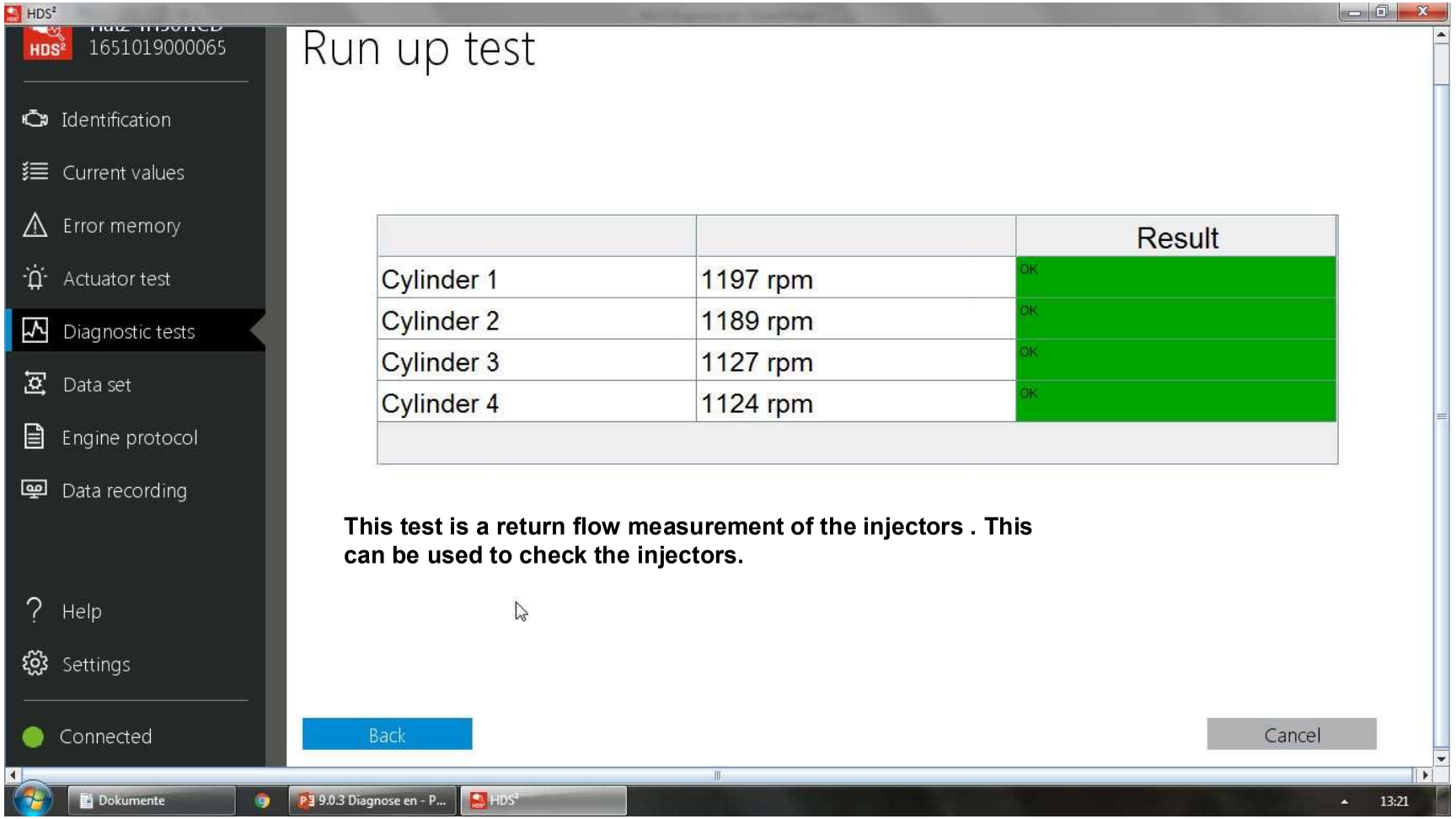
Run up test



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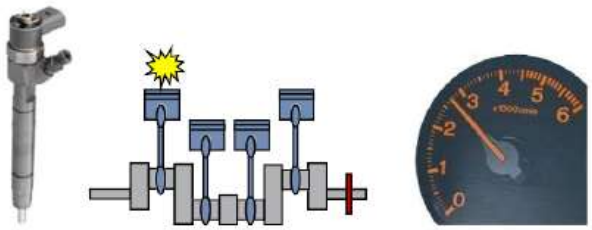
Run up test



Application – ECU based function

- Check of injector hydraulic behavior
- Diagnostic module for solenoid and piezo injectors

Detectable defects

- Detection of torque-effective injector defects (e.g. caused by quantity defects, altered spray pattern) under load
- Detection of defects of individual injectors

Conditions

- Reliable (constant) engine compression necessary
- Engines with 3 cylinders or more

Exemplary symptoms

- Reduced power
- Irregular engine running under load

Diagnostic method

- Sequentially shut off single injectors
- Set rail pressure, injection quantity and numbers of segments for all active injectors
- Measure maximum reached engine speed
- Repetition for each injector
- Evaluation of captured values

Advantages

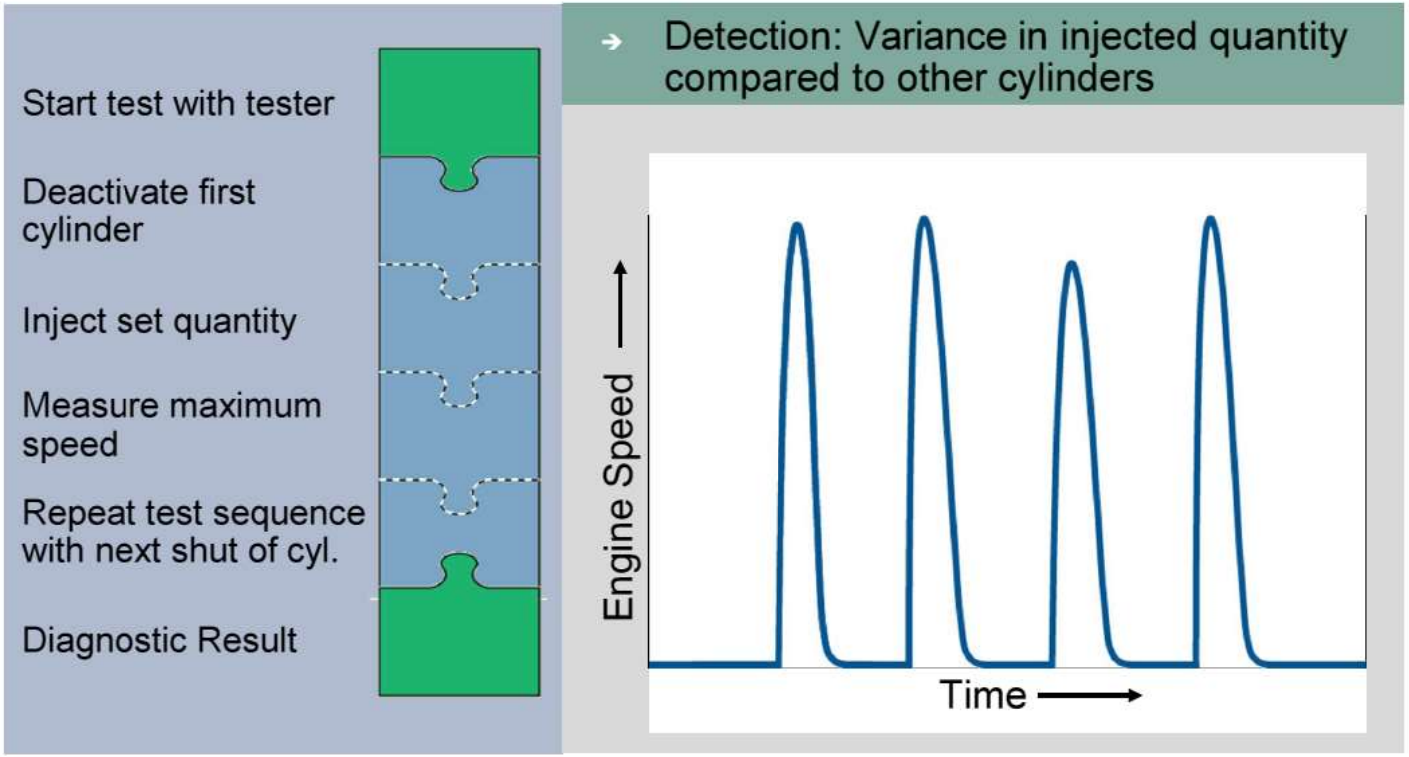
- Detection of injector defects in partial load during idle
- Check without disassembling of parts
- No further offboard tools necessary

Maturity level

- Applied in high volume productions
- Please consult DS/EPD before quotations

Hatz H50TICD

Run up test



The run-up test mainly serves to check the function of the injectors (injection quantity, spray pattern, etc.). This requires reliable compression, i.e. the compression test should be performed first at diagnosis. After "starting" the engine is accelerated with an increased injection quantity shortly for conditioning (same boundary conditions). Subsequently, this process is repeated with one cylinder turned off. In this process, the number of injections and the time are fixed. The result is only the briefly reached speed peak of each individual cylinder.

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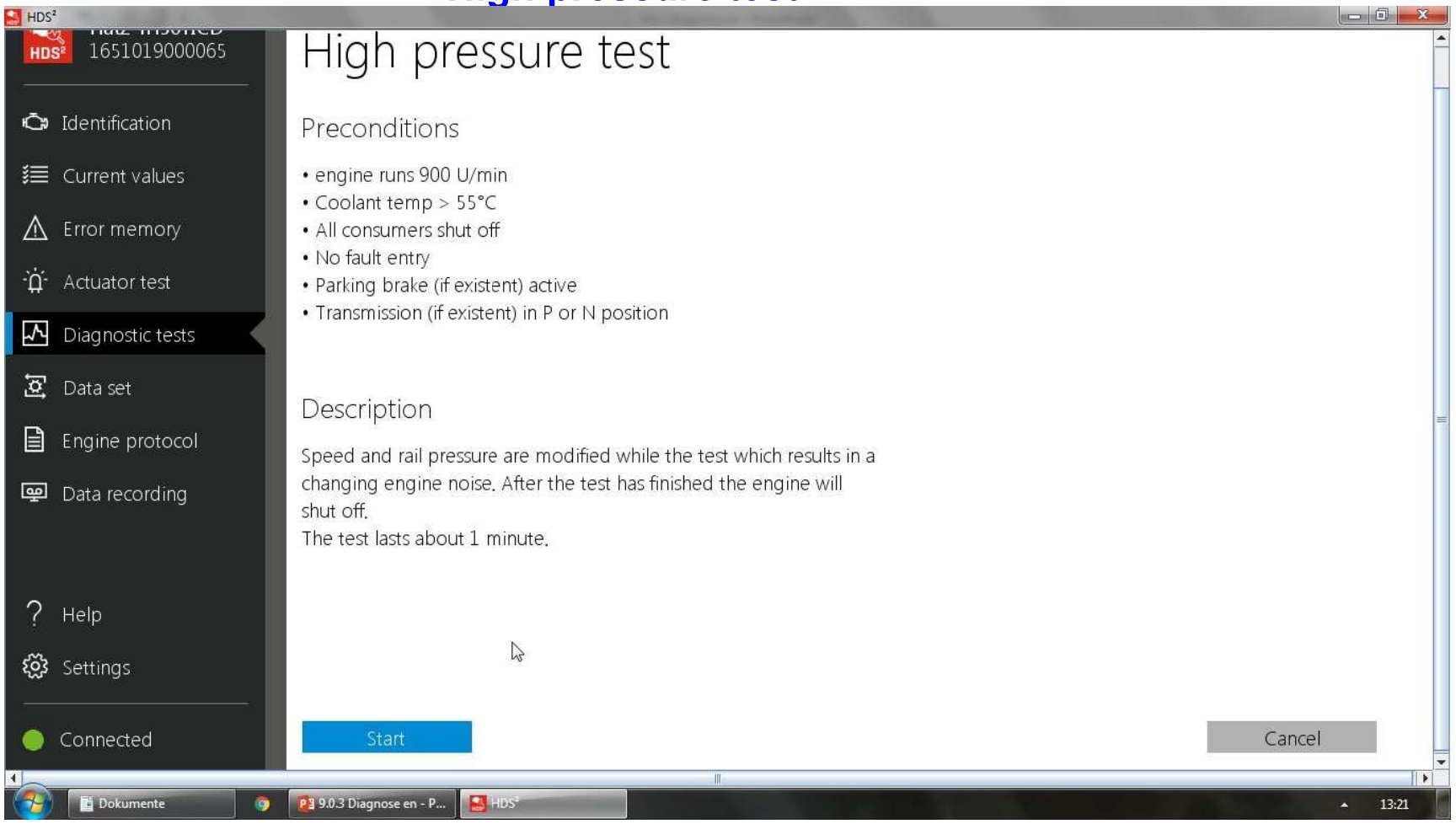
High pressure test



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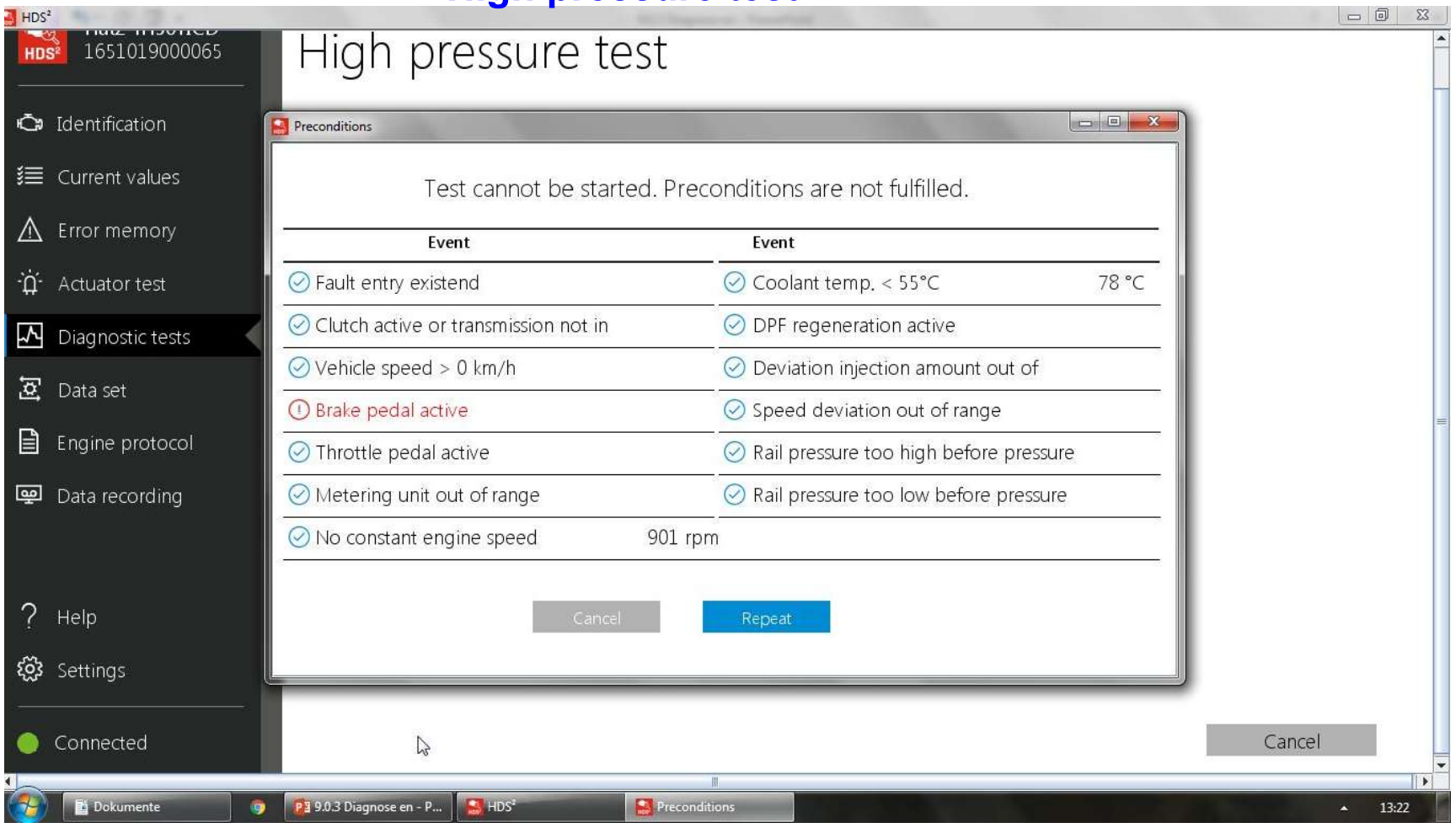
High pressure test



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High pressure test

Detectable defects

- Internal/external leakage in the high pressure circuit
- Efficiency of high pressure build up (if applicable)

Advantages

- Quick system check to exclude defects in the injection system without additional tools
- The fuel injection system has not to be opened for diagnostic purpose

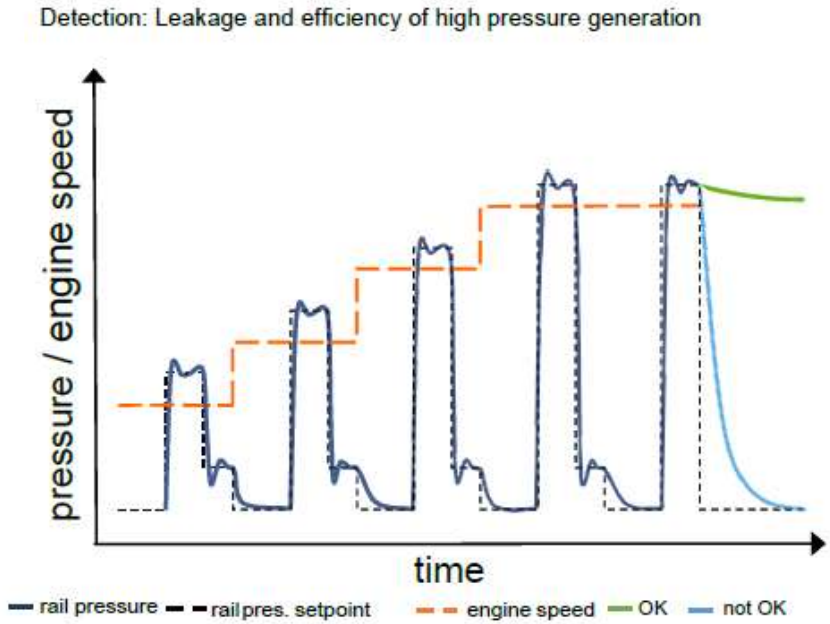
Experience level

- Applied in high volume productions

Hatz H50TICD

High pressure test

- Start test
- Raise pressure setpoint
- Measure pressure build up time
- Reduce pressure setpoint
- Measure pressure reduction time
- Variation speed, pressure
- Diagnostic results



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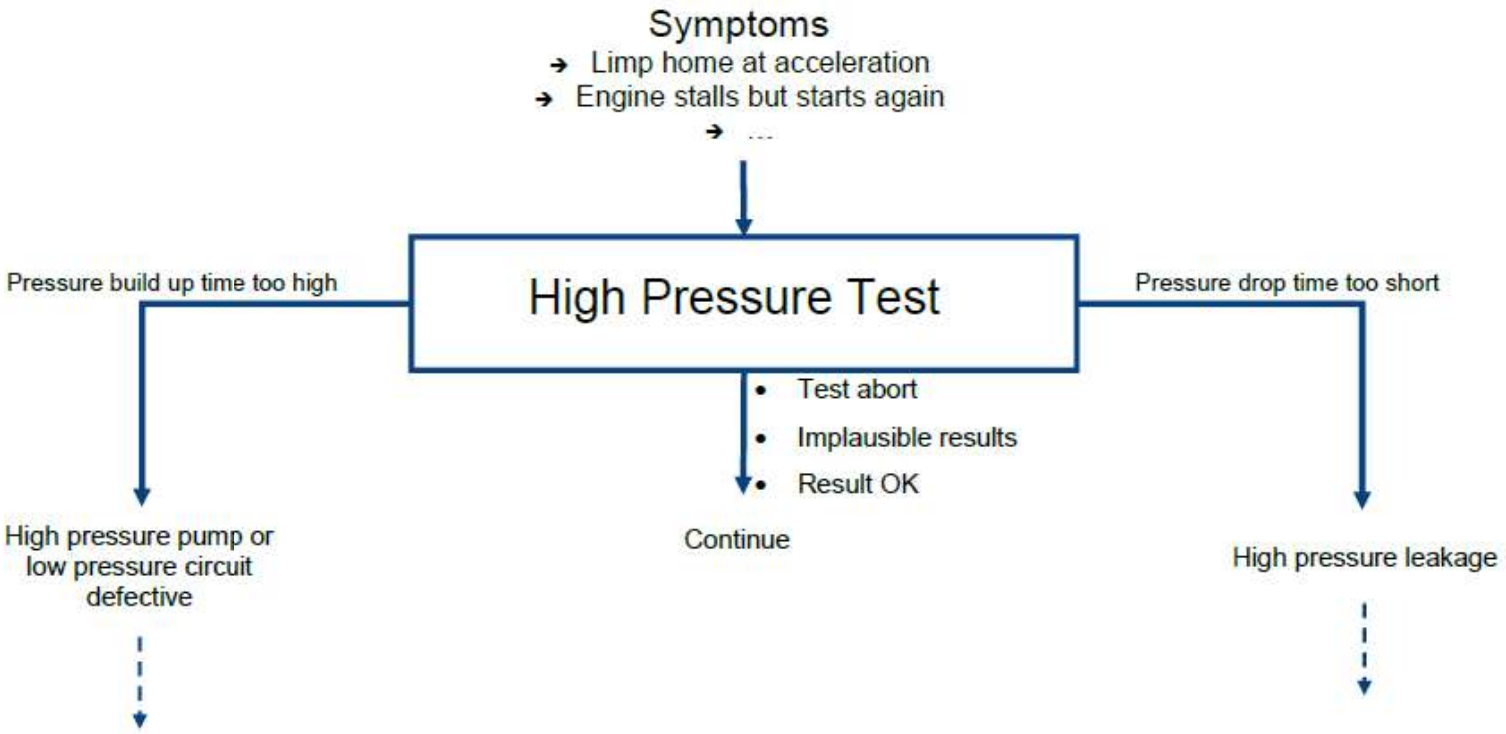
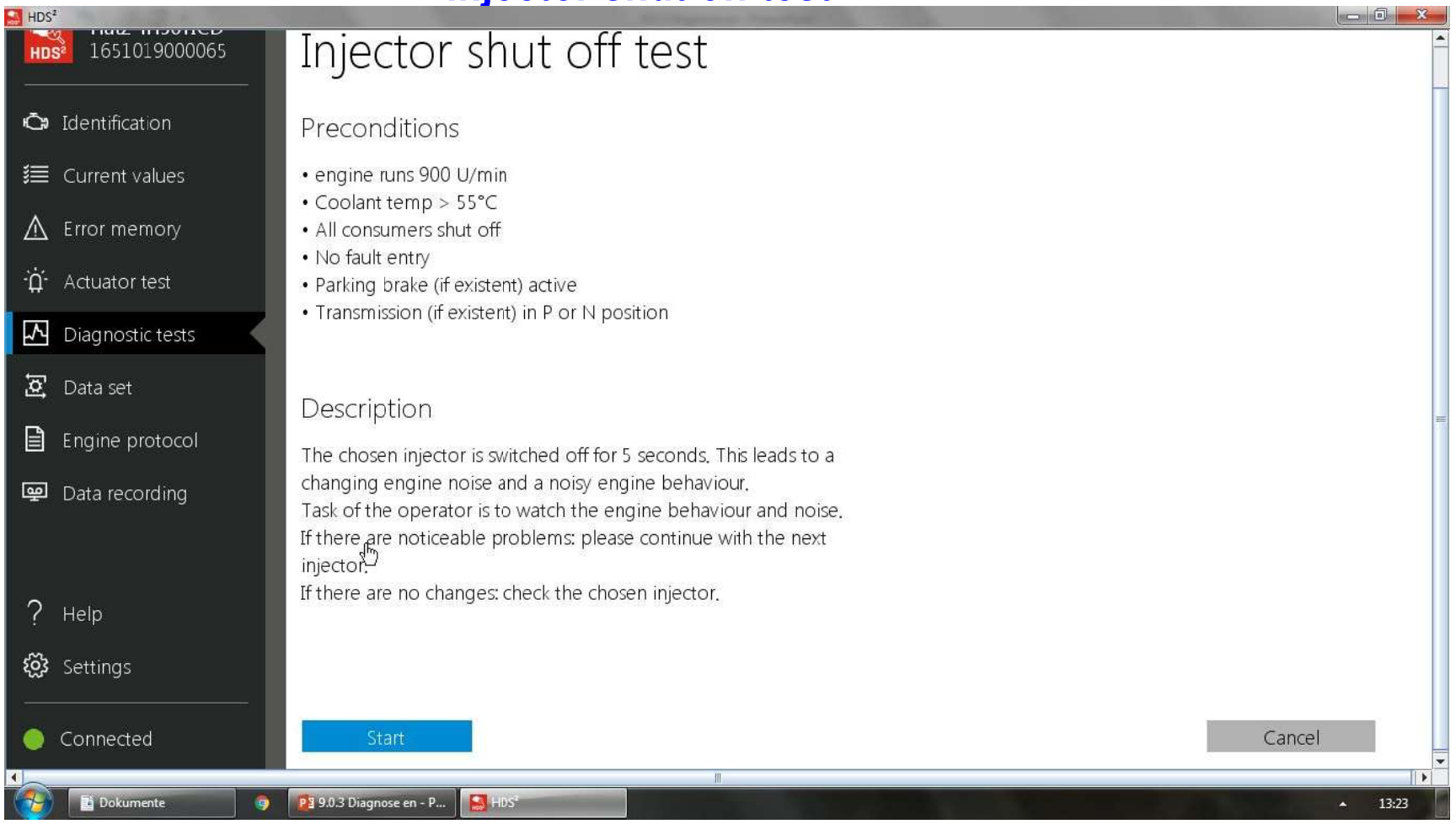
High pressure test



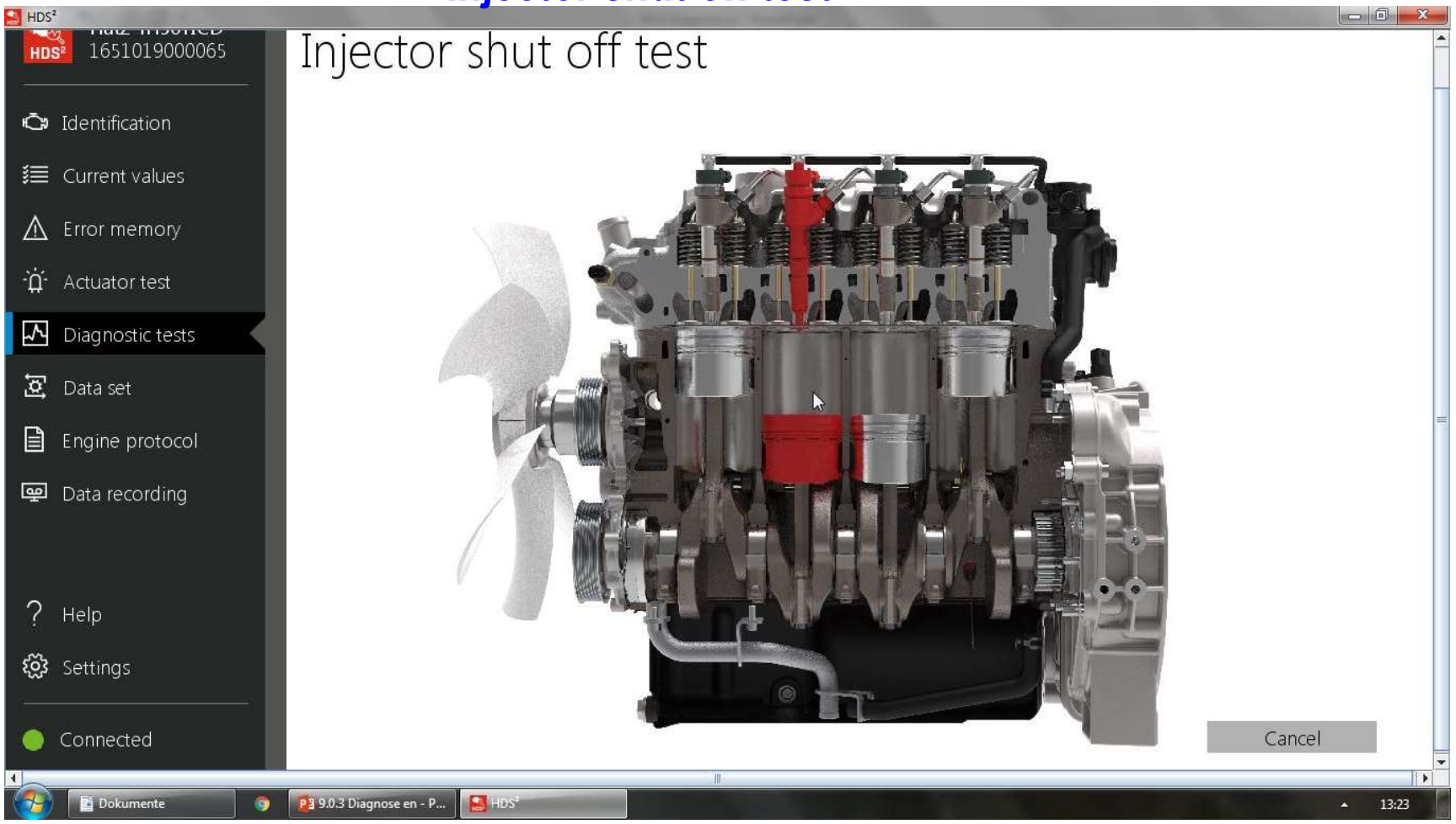
Hatz H50TICD

Injector shut off test



Hatz H50TICD

Injector shut off test



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Injector shut off test

Detectable defects

- Detection of missing injection by non-recognizable changes in noise or engine behavior when shut off

Advantages

- Fast detection of missing injections
- Very low calibration effort
- No fault memory entry due to unplugging of injectors

Experience level

- Applied in high volume productions

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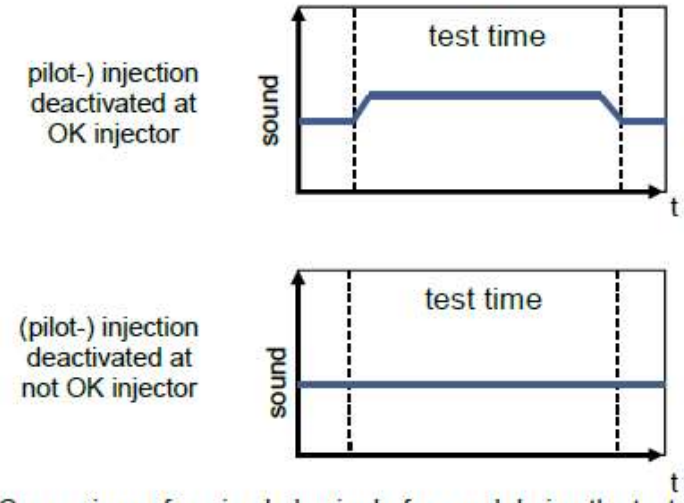
Injector shut off test

- Start test
- Optionally activation of quantity compensation
- Definition of injection pattern
- Deactivation of injection at one Injector
- Acoustic comparison before / after shut off

Detection: Missing injections



Comparison of engine behavior before and during the test

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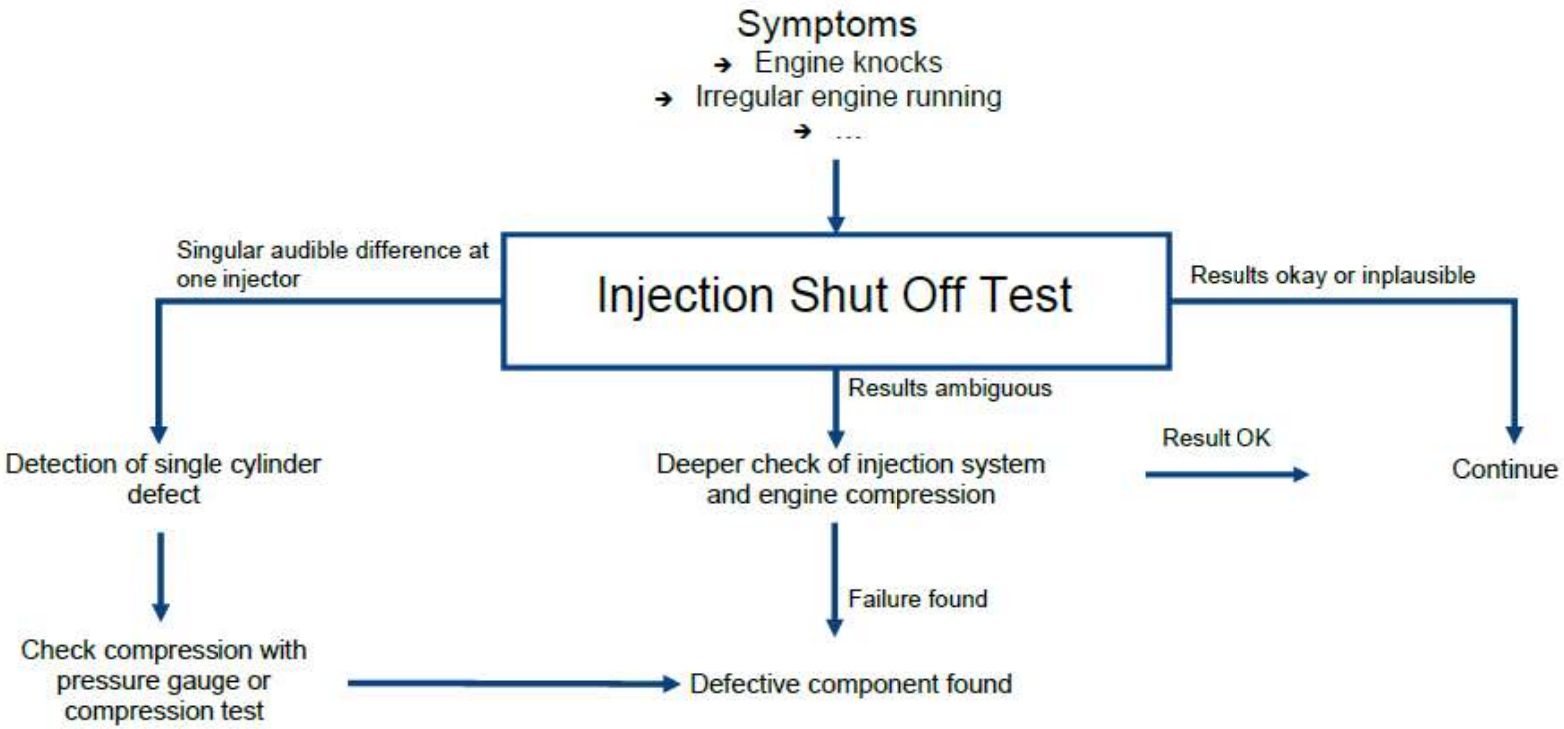
Injector shut off test



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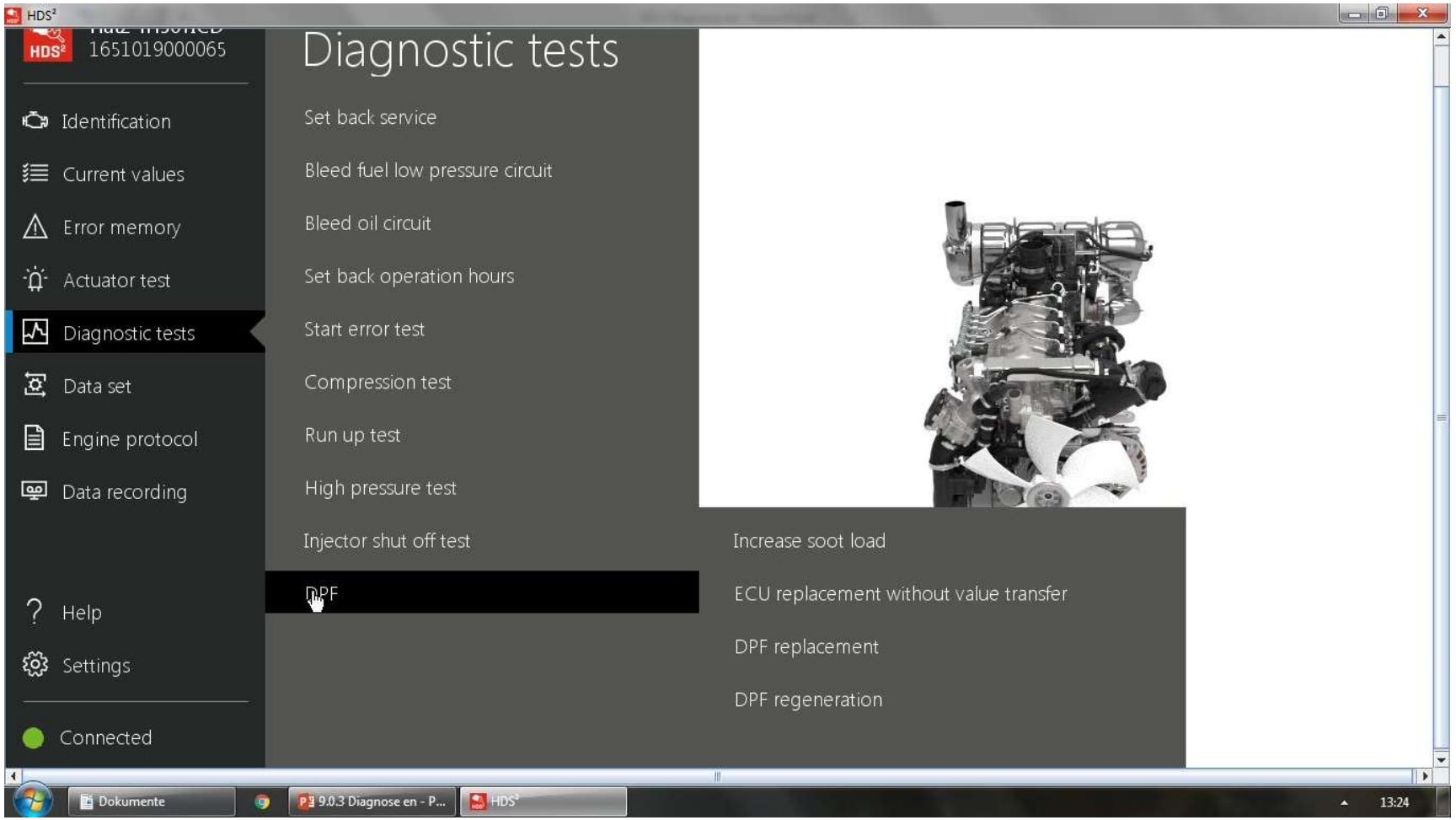
Diesel particle filter



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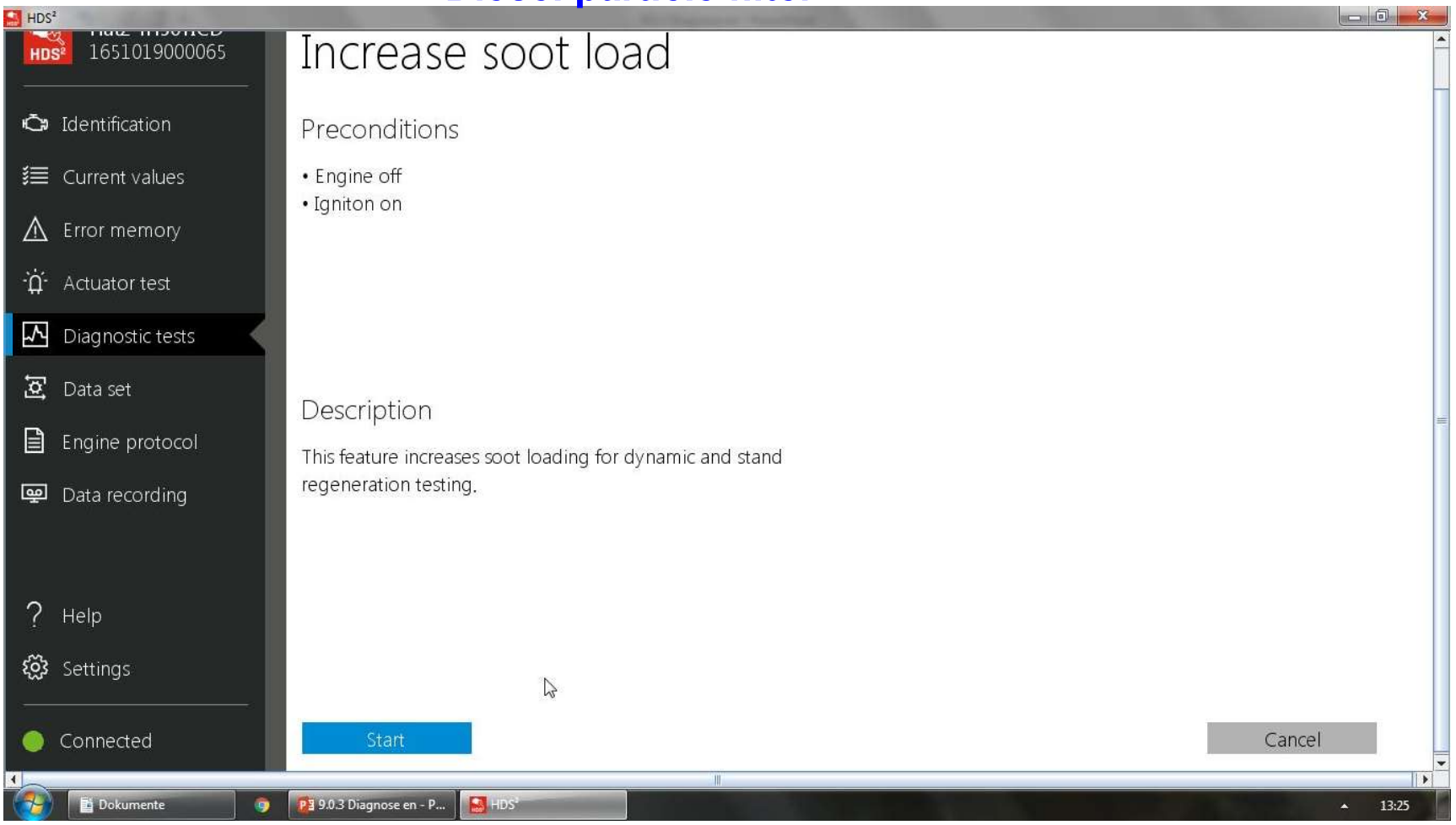
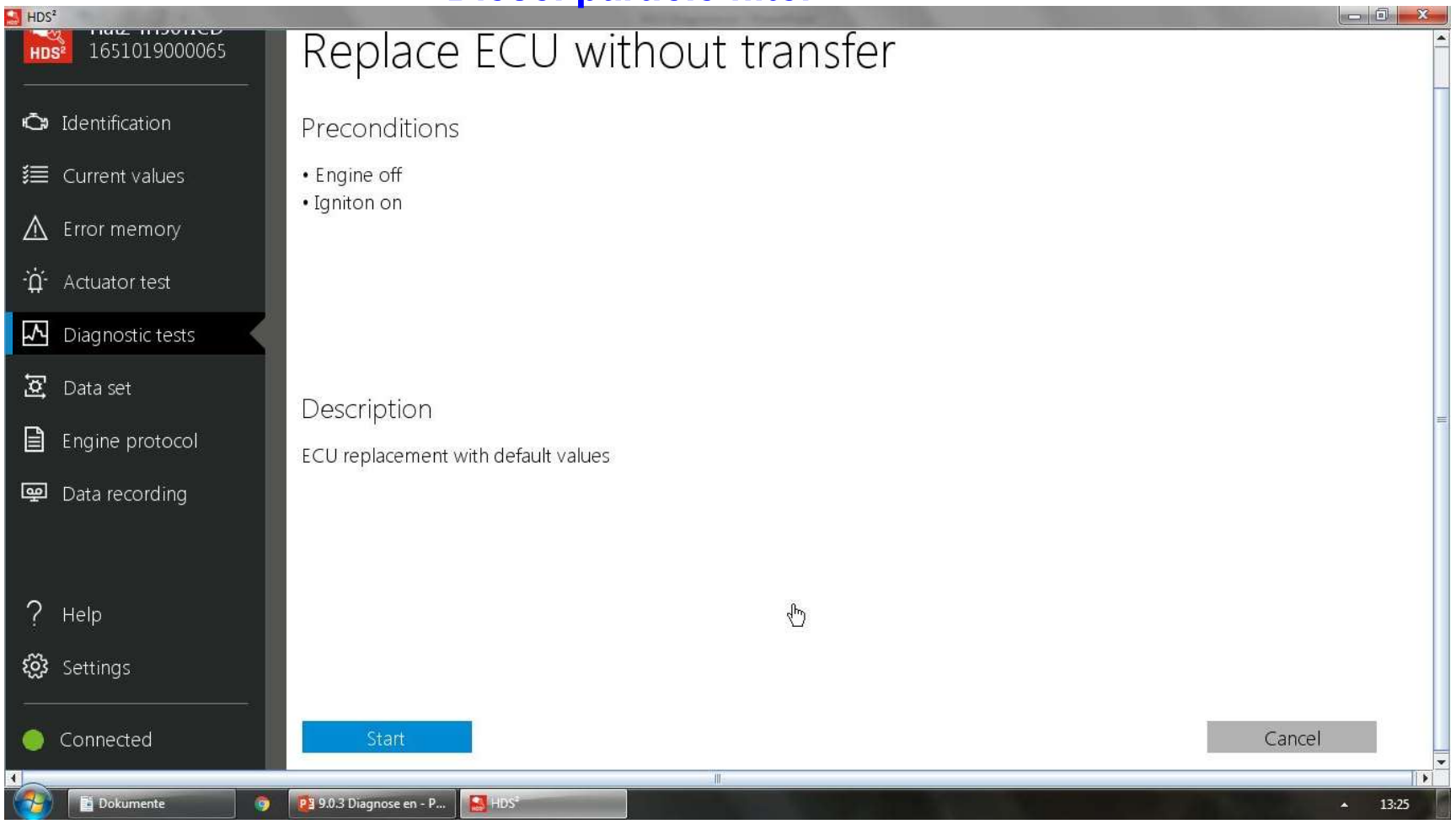
Diesel particle filter



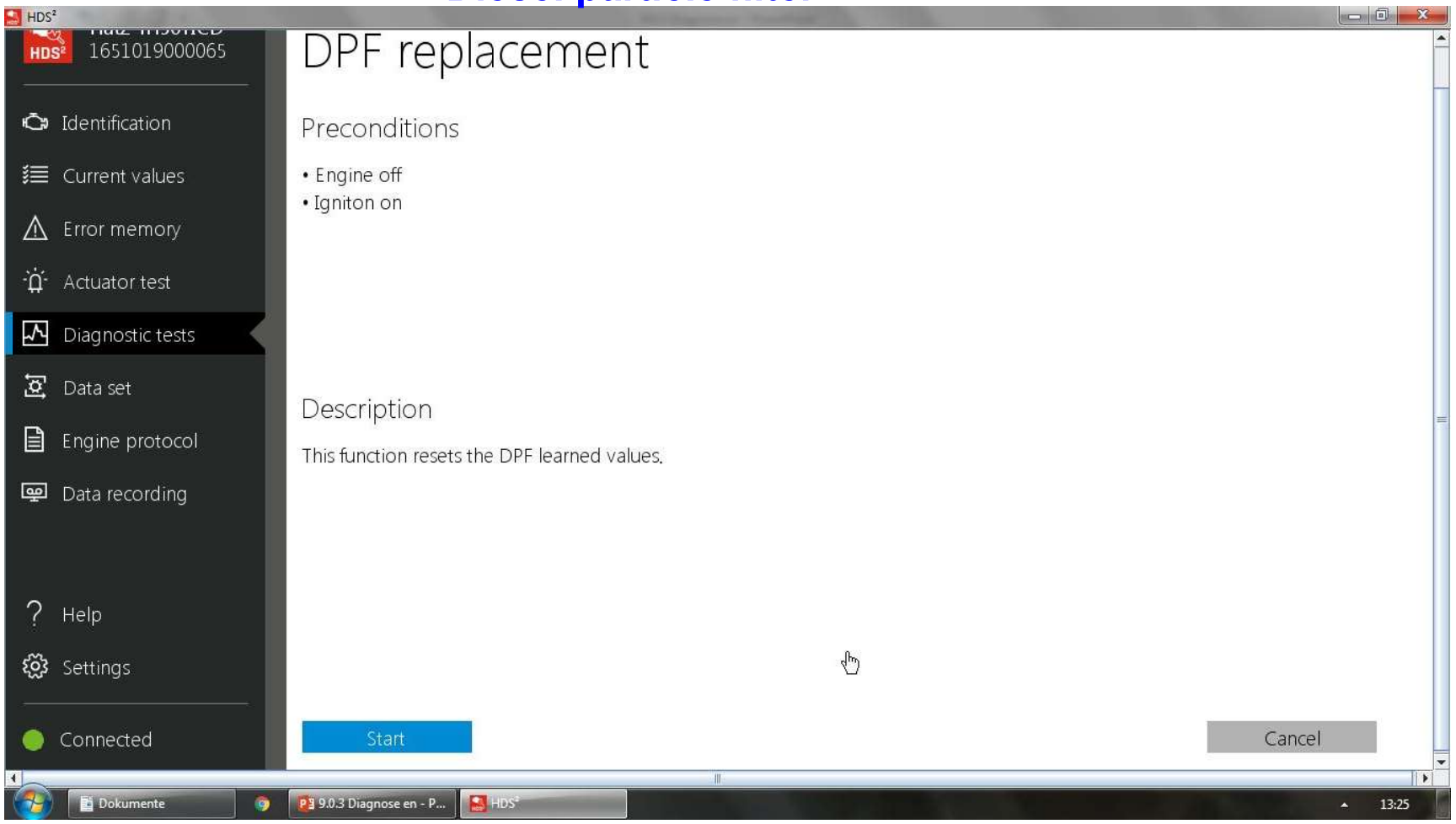
Hatz H50TICD

Diesel particle filter



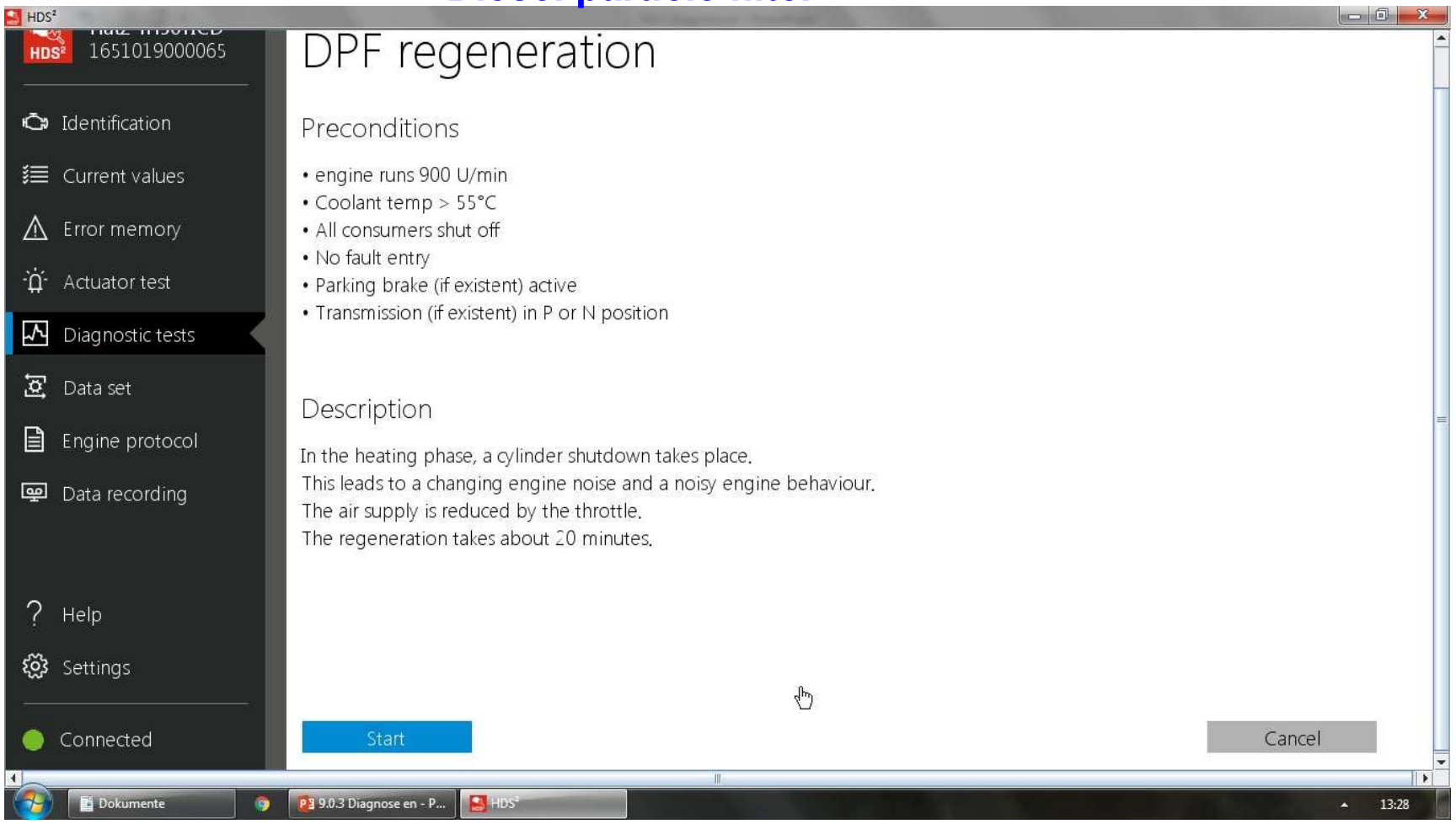
Hatz H50TICD

Diesel particle filter



Hatz H50TICD

Diesel particle filter



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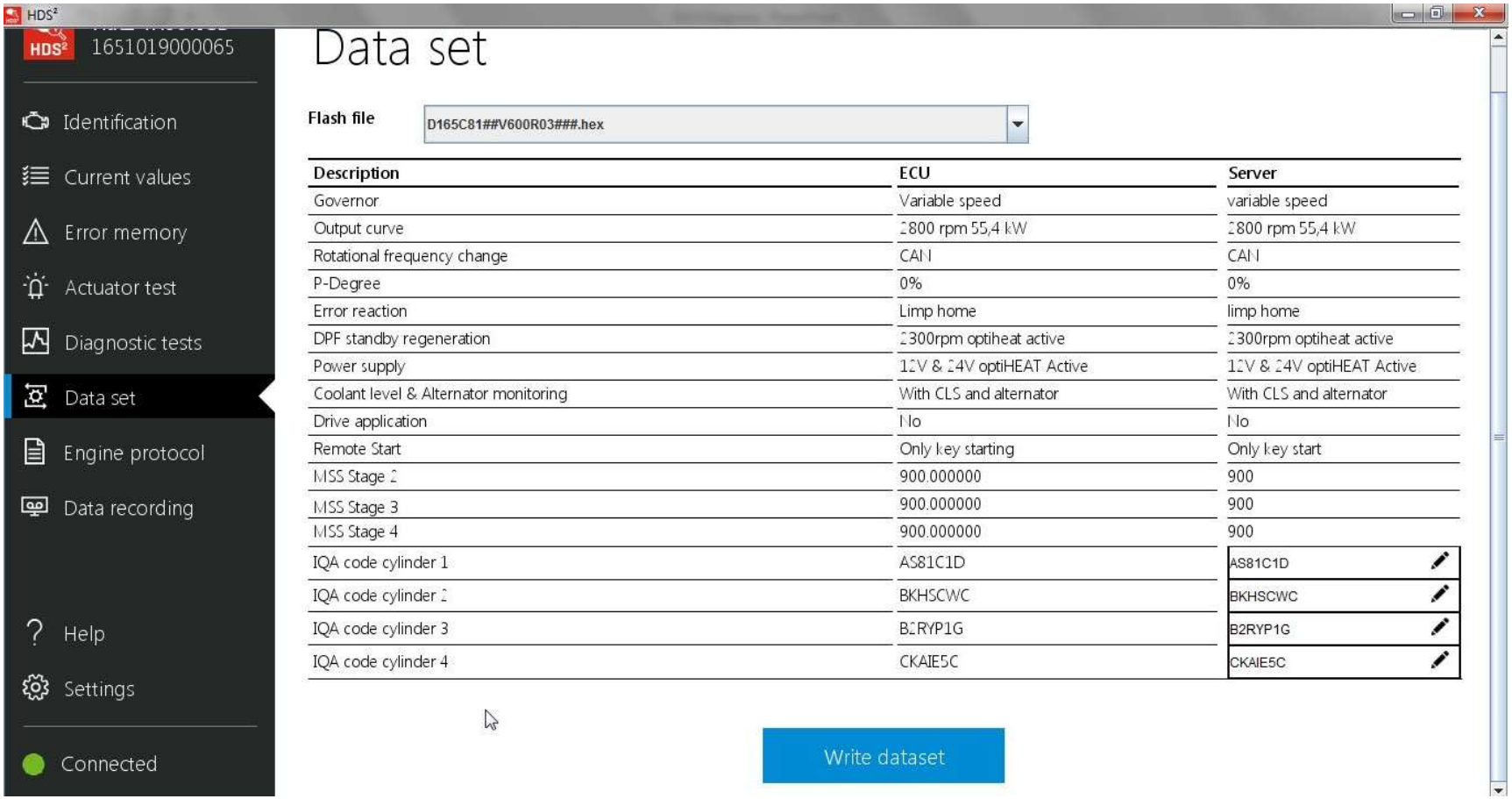
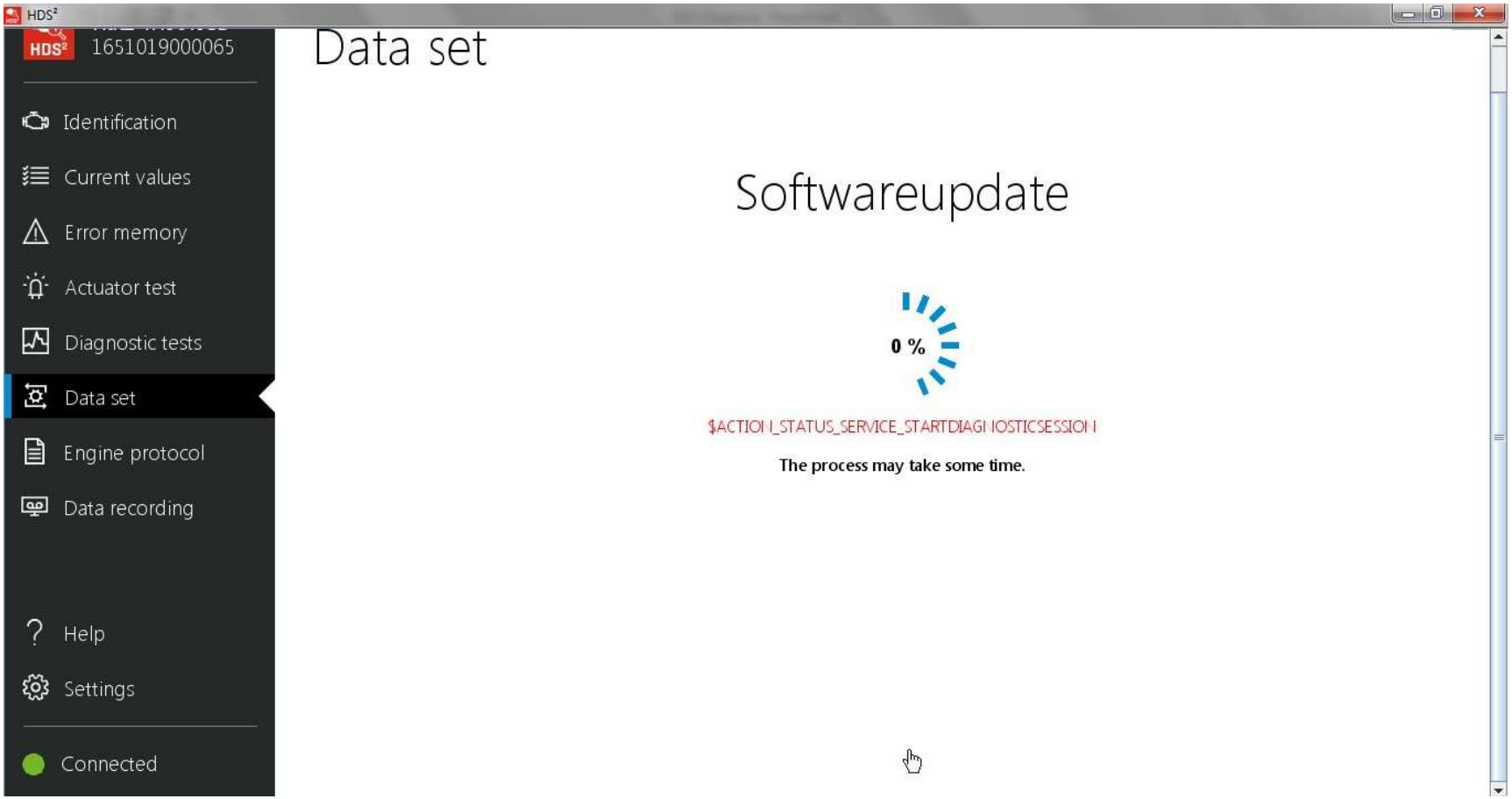
Software flashen



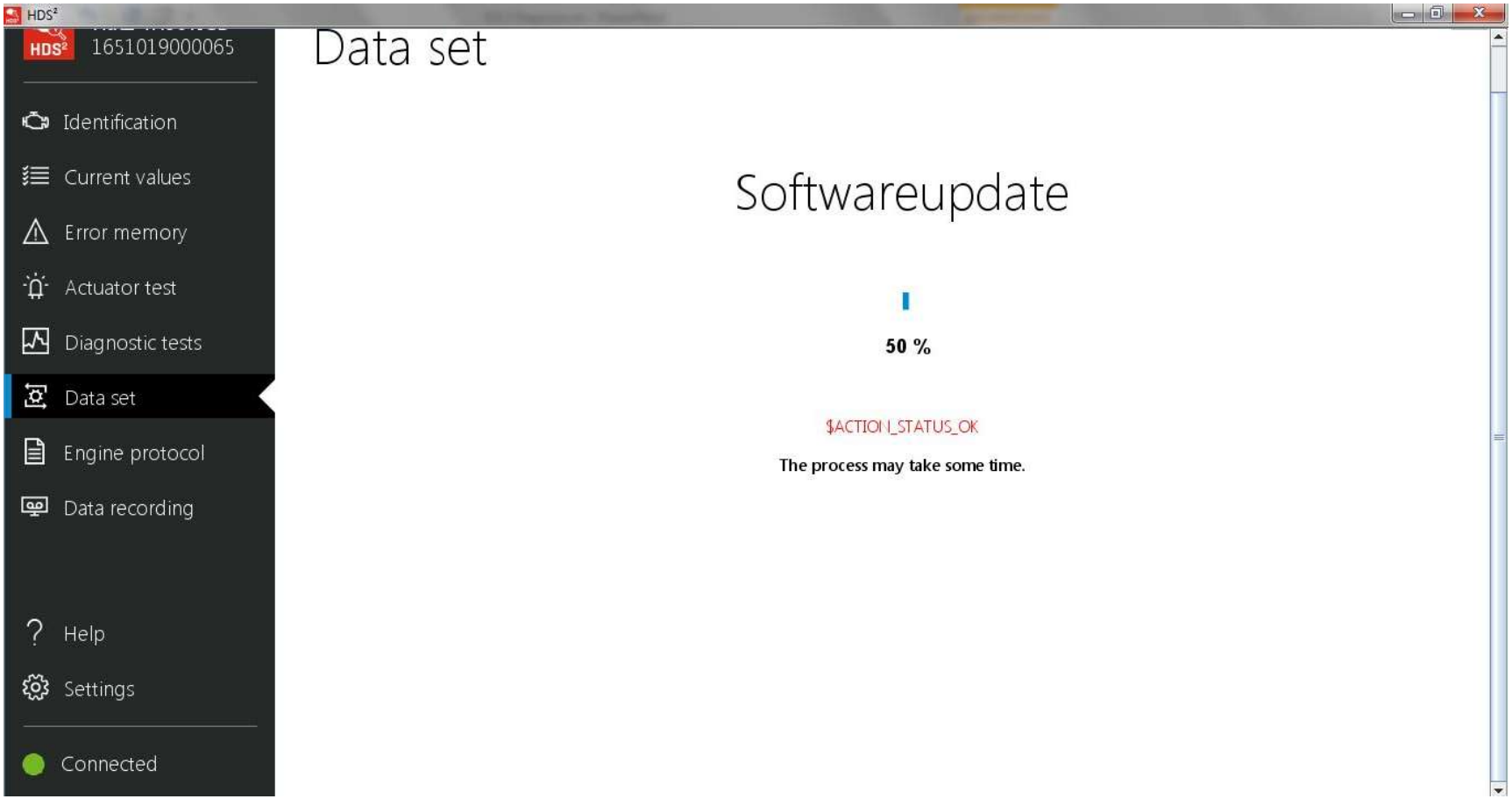
Hatz H50TICD

Software flashen



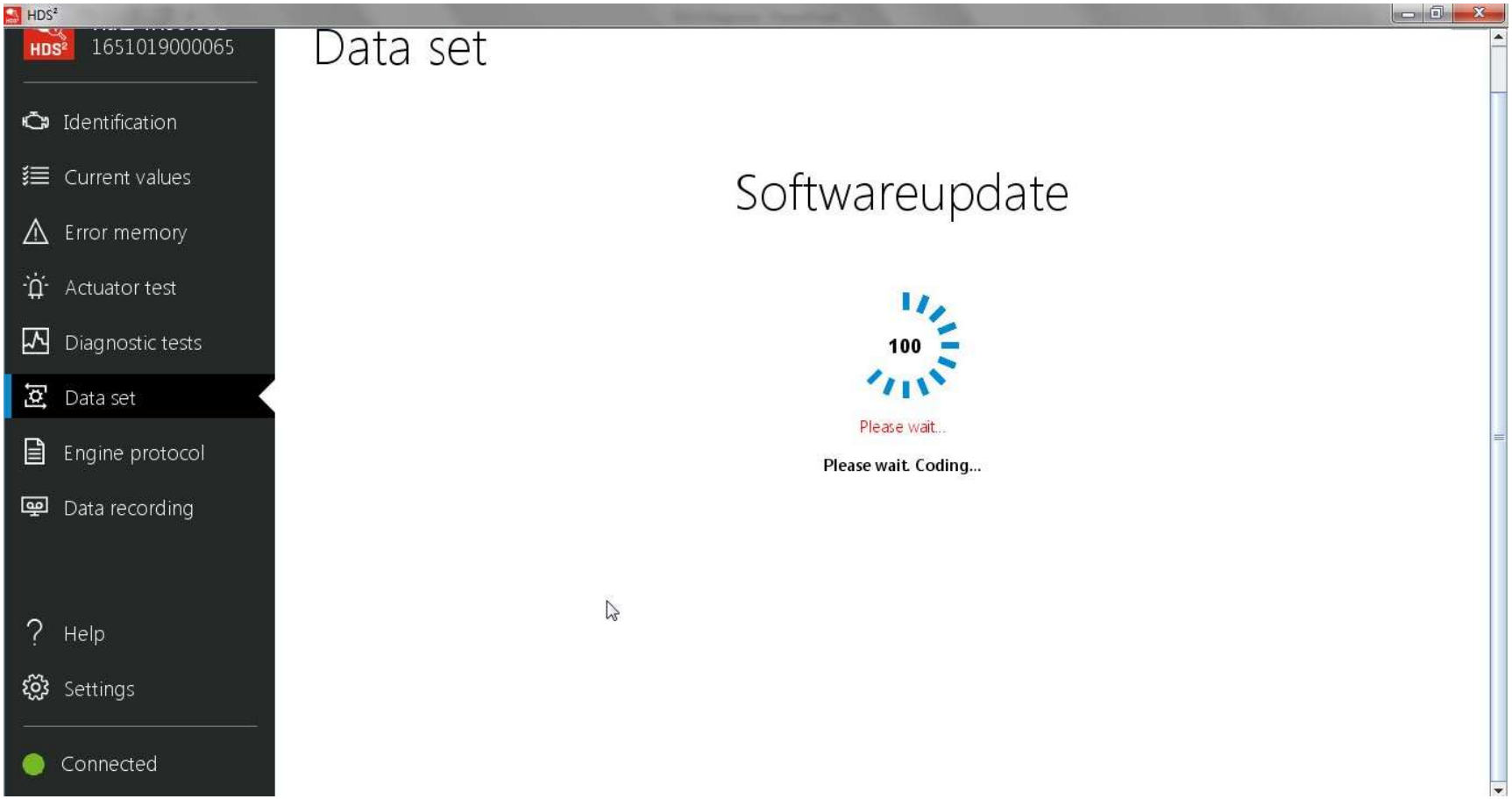
Hatz H50TICD

Software flashen



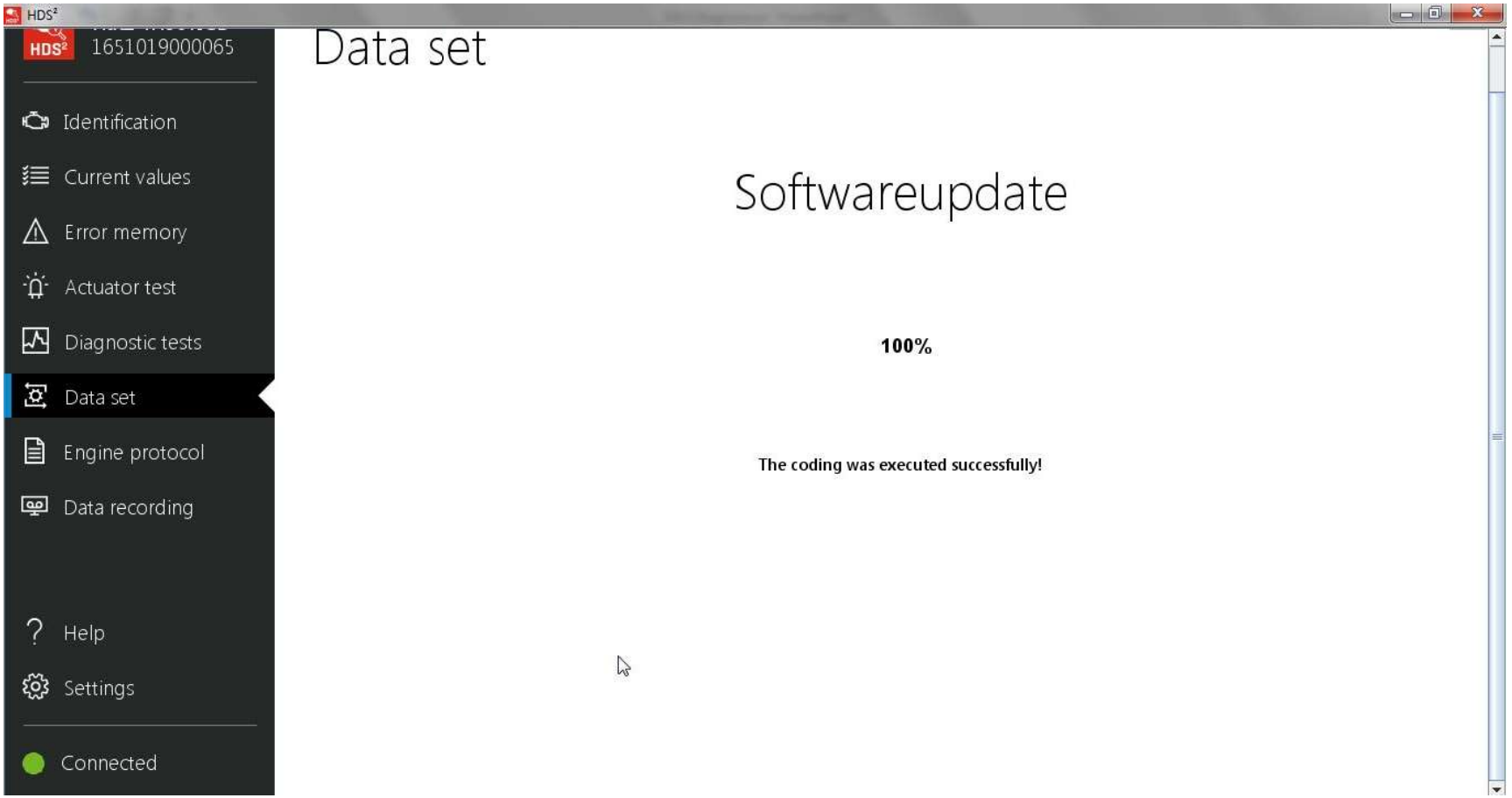
Hatz H50TICD

Software flashen



Hatz H50TICD

Software flashen



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Engine protocoll

HDS²

1651019000065

- Identification
- Current values
- Error memory
- Actuator test
- Diagnostic tests
- Data set
- Engine protocol
- Data recording
- Help
- Settings

Connected

Identification

Description	Current Values
Operating hours	21
Hardware-Version	EDC17_C81
Software-Version	P1715_V600R
Engine number	1651019000065
Manufacturing date	..
Remaining time to service	479
Last programming date	08.08.19
Dataset description	D165C81##V600R03###

Hatz H50TICD

Engine protocoll

Motorenfabrik Hatz GmbH & Co. KG
Ernst-Hatz-Str. 16
94099 Ruhstorf a. d. Rott

+49 8531 319 -4372
www.hatz-diesel.de
hds@hatz-diesel.de

Motornummer 1651019000065 **Datum** 08.08.2019 **Zeit** 13:49:09

Identifikationsdaten

Herstellungsdatum	--	**Betriebsstunden**	20
Hardware Nummer	EDC17_C81	**SW Versionsnummer**	P1715_V600R
Restzeit zum Service	480	**Datum letzte Programmierung**	02.05.19
Datensatz Bezeichnung	165023.hex000000000		

ECU Einstellungen

Leistungskurve		**Kühlmittelstandsensor**	
Spannung	12V & 24V optiHEAT Acti	**Fahranwendung**	Ja
Abgas-Nachbehandlung	2300rpm optiheat active	**Fernstart**	
P-Grad	0%	**Drehzahlverstellung**	Kein Aktor
Fehlerersatzreaktion		**MSS Stufen**	9, 9, 10

Fehlerspeicher

\- 0

Kein Fehlereintrag vorhanden

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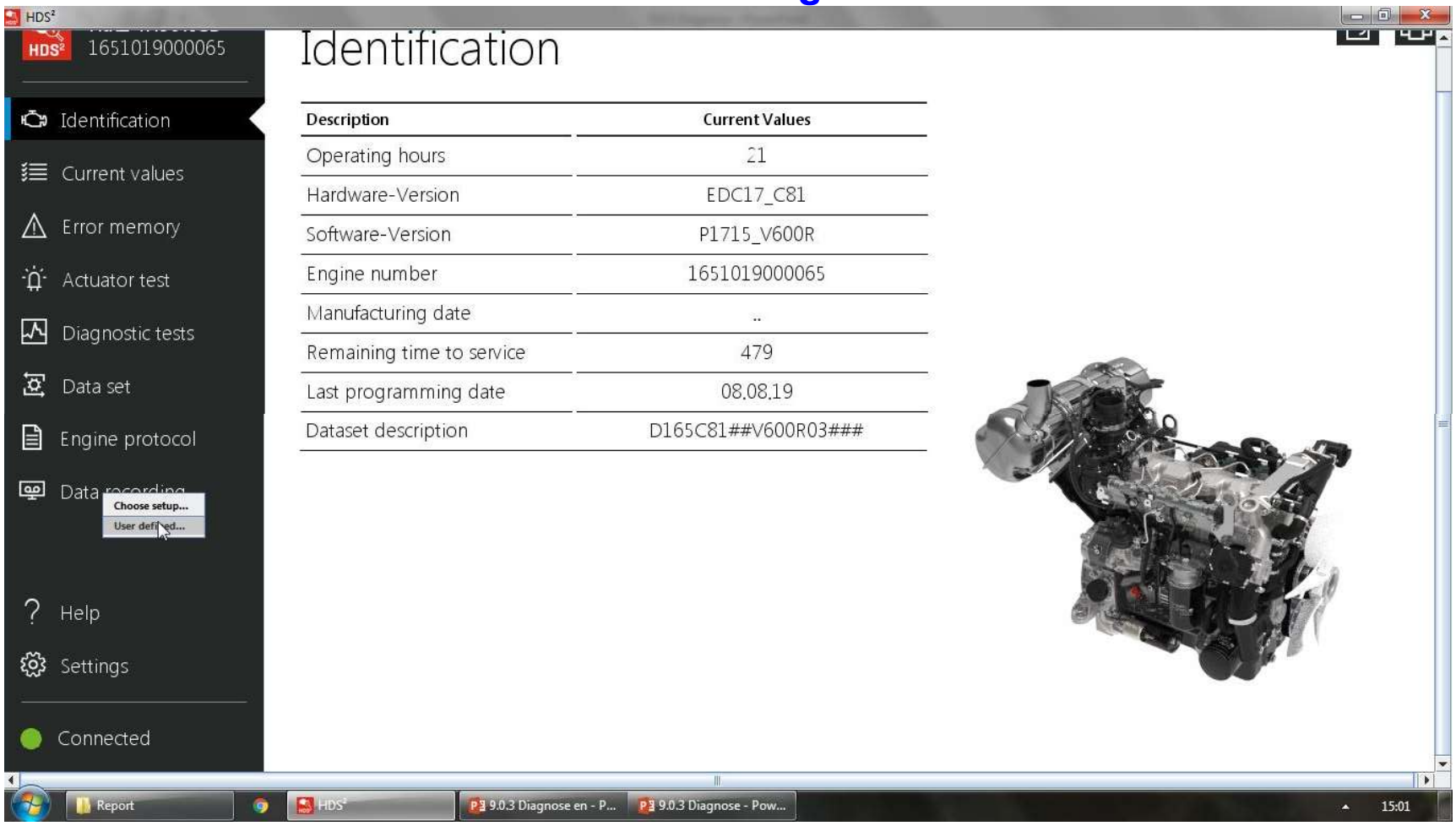
Data recording



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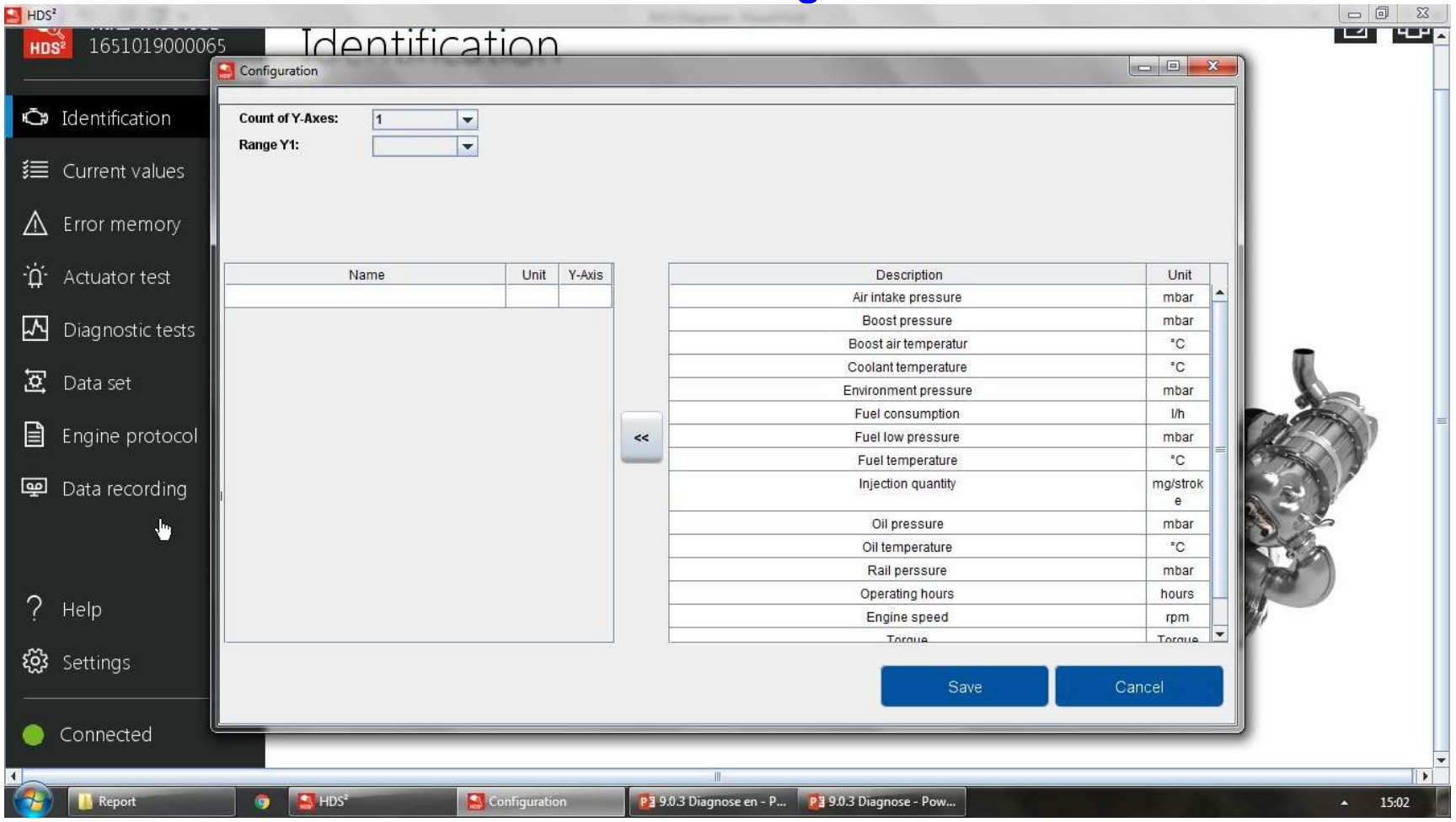
Data recording



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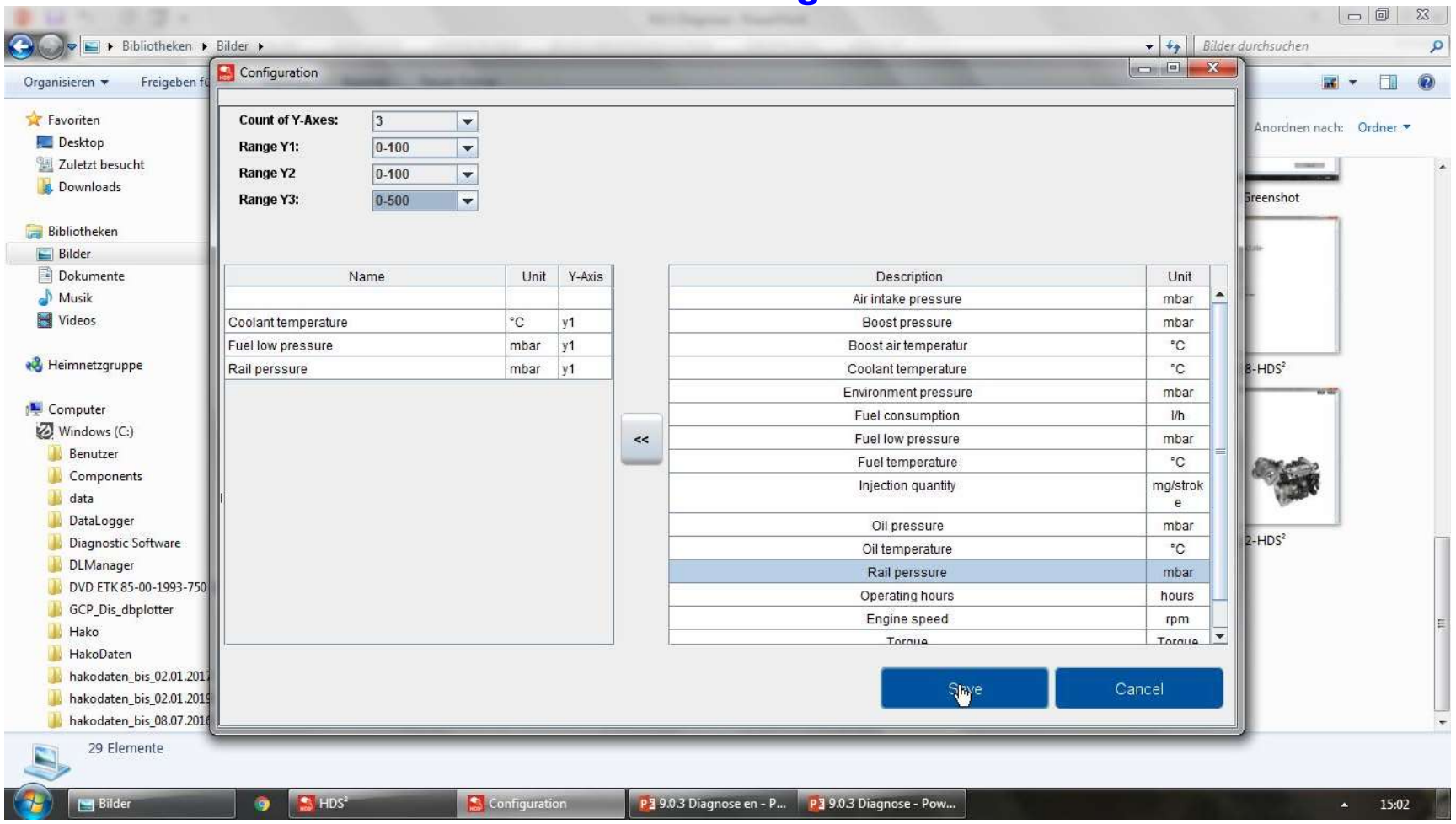
Data recording



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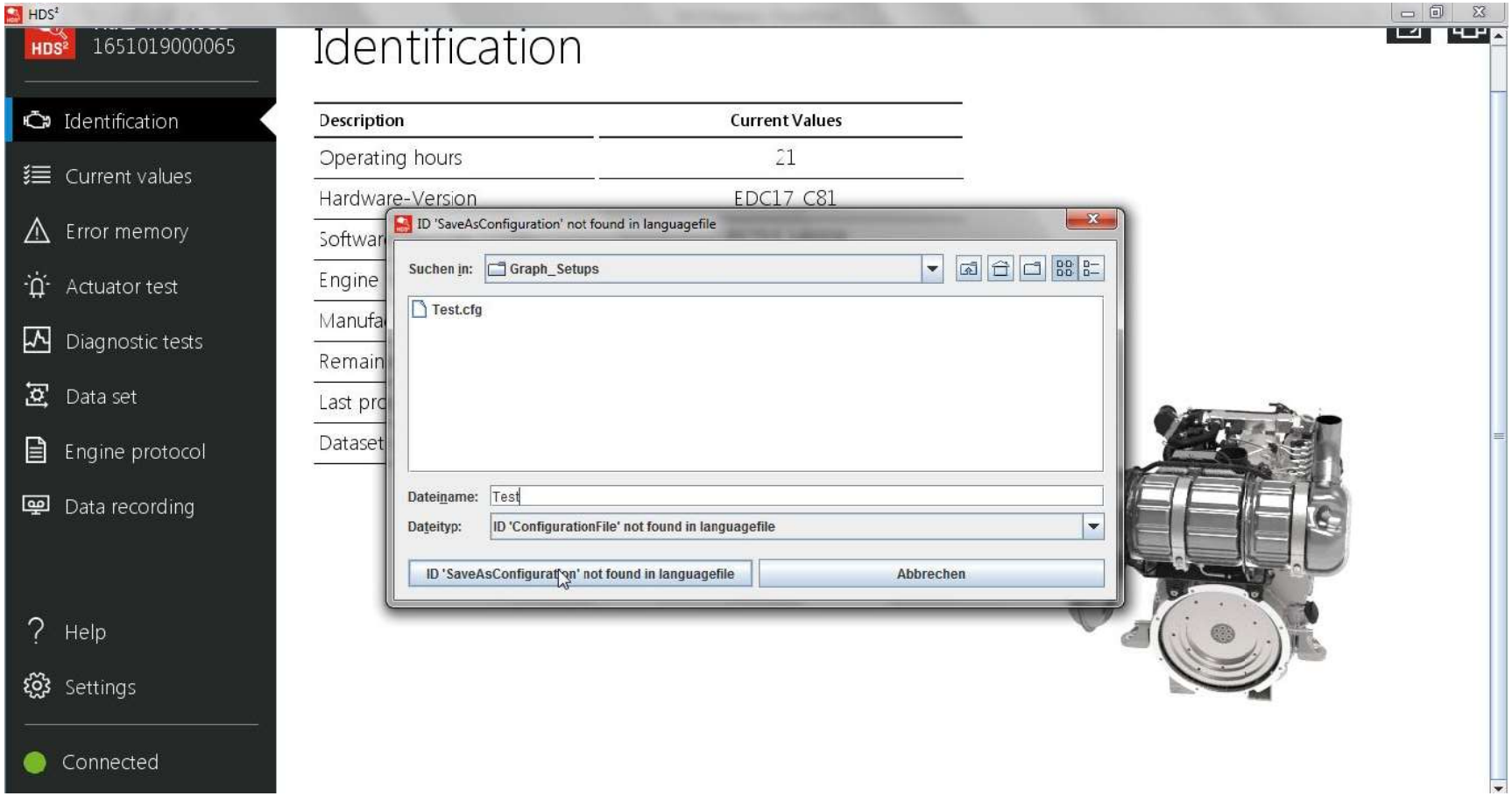
Data recording



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Data recording