

Citymaster 1650 1491.15



H50TICD Diagnose

with Hatz HDS² Tool

Citymaster 1650 1491.15

Hatz H50TICD



Diagnose function with the Hatz Diagnose Software 2 (HDS²)

Diagnose - Identification

Hatz 4H50TICD
1651019000065

HDS²

- 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	PL1715_V600R
Engine number	1651019000065
Manufacturing date	..
Remaining time to service	479
Last programming date	08.08.19
Dataset description	D165C81##V600R03###



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		

HDS² 1651019000065

- Identification
- Current values**
- Error memory
- Actuator test
- Diagnostic tests
- Data set
- Engine protocol
- Data recording
- Help
- Settings
- Not connected

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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	50 %	563 mV	100 %
DOC/DPF differential pressure	0 mbar	478 mV	
Temperature Ox Cat upstream	79 °C	977 mV	
Temperature DPF upstream	85 °C	508 mV	
Active cylinders	-4		
Engine operation mode	Ready to start		
Engine operation stage	I 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	38.50 L		
Regeneration aborted due to brake switch	0		
Regeneration aborted due to neutral switch	0		

HDS² 1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

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Hatz H50TICD



Current Values

HDS² 1651019000065

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

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 "-" I/PV	0		
Engine speed control "OFF" I/PV	0		
Engine speed control "+" I/PV	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!



Read error memory

Error memory

Engine hours	SPN	FMI	State	Error description
0			Passive	No failure entry

Error memory 1 displays the active errors. They can be deleted by clicking on the "X".

Navigation icons: Home, Back, Forward, Refresh, Close (X)



Read error memory

The screenshot shows the HDS diagnostic software interface. At the top, the HDS logo and the vehicle identification number 1651019000065 are visible. A navigation menu on the left includes options like Identification, Current values, Error memory (selected), Actuator test, Diagnostic tests, Data set, Engine protocol, and Data recording. At the bottom, there are icons for Help, Settings, and a green 'Connected' indicator.

The main content area is titled "Error memory" and contains a table with the following columns: Engine hours, SPN, FMI, State, and Error description. The table is currently empty, and a message is displayed below it: "In fault memory 2 all errors are displayed after switched off the control unit (shutdown time approx. 20s). They can be deleted by clicking on the "X"."

At the bottom right of the interface, there are icons for a refresh function (a circular arrow) and a close function (an 'X').



Read error memory

1651019000065

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

Error memory

Engine hours	SPN	FMI	State	Error description
0	< '\$SPN_P06D F_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_MoCSOPErMMRespByte] 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

The screenshot displays the HDS diagnostic software interface. At the top, the title bar shows 'HDS' and the vehicle ID '1651019000065'. The main menu on the left includes: Identification, Current values, Error memory, Actuator test (highlighted), Diagnostic tests, Data set, Engine protocol, Data recording, Help, Settings, and Connected. The central area is titled 'Actuator test' and lists the following components: Fault lamp, Pre glowing lamp, Electric fuel pump, Metering Unit (MEU), Pre glow system, Pressure Control Valve (PCV), EGR valve, Throttle valve, and DPF heating system. On the right side of the interface, there is a 3D model of the engine with a large cooling fan.



Pre glowing lamp

The screenshot shows a software window titled 'HDS' with a version number '1651019000065'. The interface is divided into several sections:

- Navigation Menu (Left):** A vertical list of icons and labels: Identification, Current values, Error memory, Actuator test (highlighted in blue), Diagnostic tests, Data set, Engine protocol, Data recording, Help, Settings, and Connected (with a green dot).
- Section Header:** 'Pre glowing lamp' in a large font.
- Technical data:** A sub-section with a list of two bullet points:
 - To display the active pre-glow time, a separate lamp / LED can be wired.
 - There is no dependence on an instrument box.
- Location:** A sub-section with a list of two bullet points:
 - The installation of the lamp is an option.
 - The location of the lamp may vary, but experience has shown that it is close to the machine control.
- Test description:** A sub-section with a list of two bullet points:
 - With the following test it is possible to check the pre glow lamp, this only works with an hard wired lamp.
 - Use the button below to control the pre glow lamp.
- Image:** A 3D rendering of a rectangular lamp housing with a black face and a yellow stylized logo.
- Control:** A blue and white toggle switch, currently in the 'off' position.



Electric fuel pump

1651019000065

Identification
Current values
Error memory
Actuator test

Diagnostic tests
Data set
Engine protocol
Data recording

? Help
 ⚙️ Settings
 ● 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)

HDS²
1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Metering Unit (MEU)

Technical data

- Metering unit + high pressure pump = one unit
- The high pressure pump is the same throughout the H series.
- The maximum pressure is 1800 bar.
- Under normal conditions, the metering unit primarily takes over the pressure control.

Location

- The metering unit is part of the high pressure pump.
- The CP4 is located on the maintenance side near the flywheel.

Test description

- With the following test it is possible to check the Metering unit.
- Use the slider below to control the MEU.
- Test result: buzz- / click noise

40 %





Pre glow system

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Pre glow system

Technical data



- The inrush current is approx. 25 A per glow plug.
- 10 seconds after switching on, the current per glow plug is reduced to approx. 5-7 A.
- At a coolant temperature of + 35 ° C, approx. 5 seconds are preheated.
- The maximum pre-heat time is 30 seconds at -20 ° C.

Location

- The glow plugs are located in the cylinder head near injectors.
- The glow plug control unit is mounted in the electric panel (OPU).

Test description

- With the following test it is possible to check the pre glow system.
- Use the button below to control the pre glow system.
- Test procedure: use a current clamp to check the preheating current. Test results: see technical information.





Pressure Control Valve (PCV)

HDS² 1651019000065

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

Pressure Control Valve (PCV)

Technical data


- Pressure control valve + rail = one unit
- In the whole H-engine range the rail is only distinguished between 3 and 4 cylinder.
- The maximum pressure is 1800 bar.
- While cold starting or in case of a malfunction (MEU malfunction) the pressure is controlled by the PCV.

Location


- The pressure control valve is part of the rail.
- The rail is located on the maintenance side on the cylinder head.

Test description

- With the following test it is possible to check the pressure control valve.
- Use the slider below to control the PCV.
- Test result: buzz- / click noise.



52 %





EGR valve

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 %**

Connected



HDS² 1651019000065

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

Throttle valve

Technical data

- The throttle valve controls the amount of charge air supplied.



Location

- The throttle valve is located in the charge air hose between intercooler and cylinder head.

Test description

- With following test it is possible to check the throttle-valve.
- Use the slider below to control the throttle valve.
- Test result : buzz- / beep noise.

48 %





Diagnose function with the Hatz diagnose software





Bleed fuel low pressure circuit

The screenshot shows a diagnostic software window with a dark sidebar on the left containing various menu items: Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The main content area displays the test name 'Bleed fuel low pressure circuit' and its preconditions: 'Engining off' and 'Ignition on'. A description follows: 'This function allows the low pressure circuit to be vented after a filter replacement or any work on the fuel system.' At the bottom of the window, there are 'Start' and 'Cancel' buttons.

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Bleed fuel low pressure circuit

Preconditions

- Engining off
- Ignition on

Description

This function allows the low pressure circuit to be vented after a filter replacement or any work on the fuel system.

Start

Cancel



Bleed fuel low pressure circuit

Bleed fuel low pressure circuit

With this function the fuel pump is triggered until achieving a pressure of 4,0 bar.

Current pressure: 3.636 bar



Not working currently, because 4bar are expected

The screenshot shows a software window with a dark theme. At the top, there is a navigation bar with icons for Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted), Data set, Engine protocol, and Data recording. Below the navigation bar, the main content area displays the test title, instructions, and the current pressure value. At the bottom, there is a status bar with icons for Help, Settings, and Connected. A 'Cancel' button is located in the bottom right corner of the window.



Bleed oil circuit

The screenshot shows a diagnostic software window titled "Bleed oil circuit". The window has a dark grey header bar with the following menu items: Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The main content area is divided into two sections: "Preconditions" and "Description". The "Preconditions" section lists two items: "Engine off" and "Igniton on" (with a mouse cursor pointing to it). The "Description" section is currently empty. At the bottom of the window, there are two buttons: a blue "Start" button and a grey "Cancel" button.

Bleed oil circuit

Preconditions

- Engine off
- Igniton on

Description

Start

Cancel



Bleed oil circuit

The screenshot shows a software window titled "Bleed oil circuit". At the top left, the HDS logo and vehicle ID "1651019000065" are visible. A navigation menu on the left includes: Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The main area contains the text: "Please start the engine until a result is shown!" and "Current pressure: 0.02 bar". A circular progress indicator in the center shows "7s". A mouse cursor is positioned over a "Cancel" button at the bottom right.



Bleed oil circuit

The screenshot shows the HDS diagnostic software interface. At the top, the title bar reads "Bleed oil circuit". Below the title bar, the main display area shows the text "Bleeding successful". At the bottom of the screen, there is a navigation bar with several icons and labels: "Identification", "Current values", "Error memory", "Actuator test", "Diagnostic tests", "Data set", "Engine protocol", "Data recording", "Help", "Settings", and "Connected". A blue "Back" button is visible on the right side of the screen, and a grey "Cancel" button is at the bottom right. The status bar at the very bottom shows the HDS logo, the version number "9.0.3", and the time "14:30".



Set back operation hours

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Set back operation hours

Preconditions

- Engine off
- Ignition on

Description

With this function, after a replacement of the control unit, the operating hours and remaining time for service can be adapted to the engine again.

Start

Cancel



Set back operation hours

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Set back operation hours

Operating hours cannot be adjusted (range 10 hours)!

found in



Start error test

1651019000065

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

Help
Settings
Connected

Start error test

Preconditions

- Engine off
- Ignition on
- Perform test only in case of a non starting engine

Description

After starting the test, the various values are read from the control unit. The cause for not starting the motor is displayed.

Start

Cancel

14:40



Start error test

Start error test

	Status
Rail pressure	OK
Speed	OK
Synchronization	NOK
Fault entry	OK
Start approval	NOK

Back

Cancel

1651019000065

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

HDS* 1651019000065

Diagnose en - P...

14:40

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

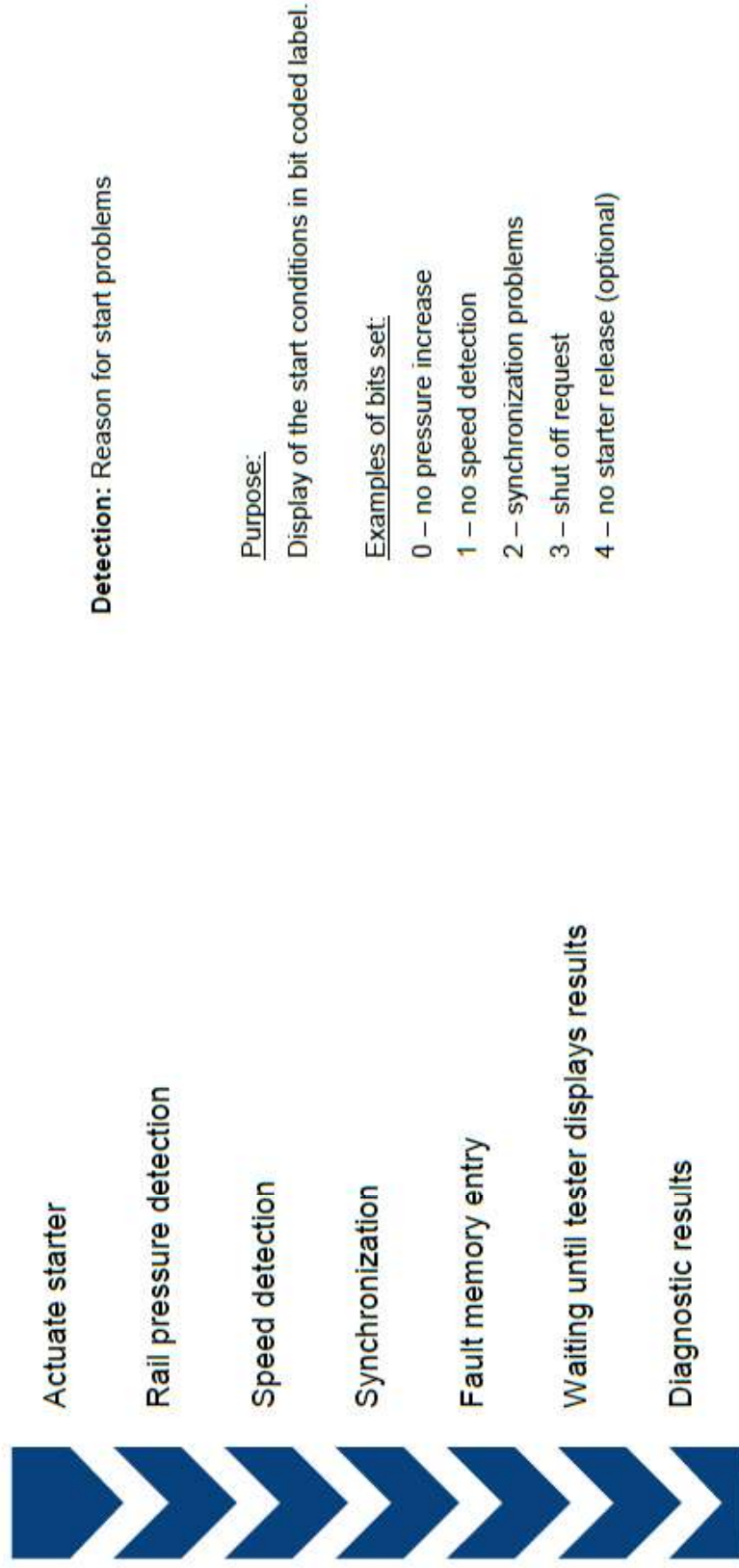
Advantages

- ▶ 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





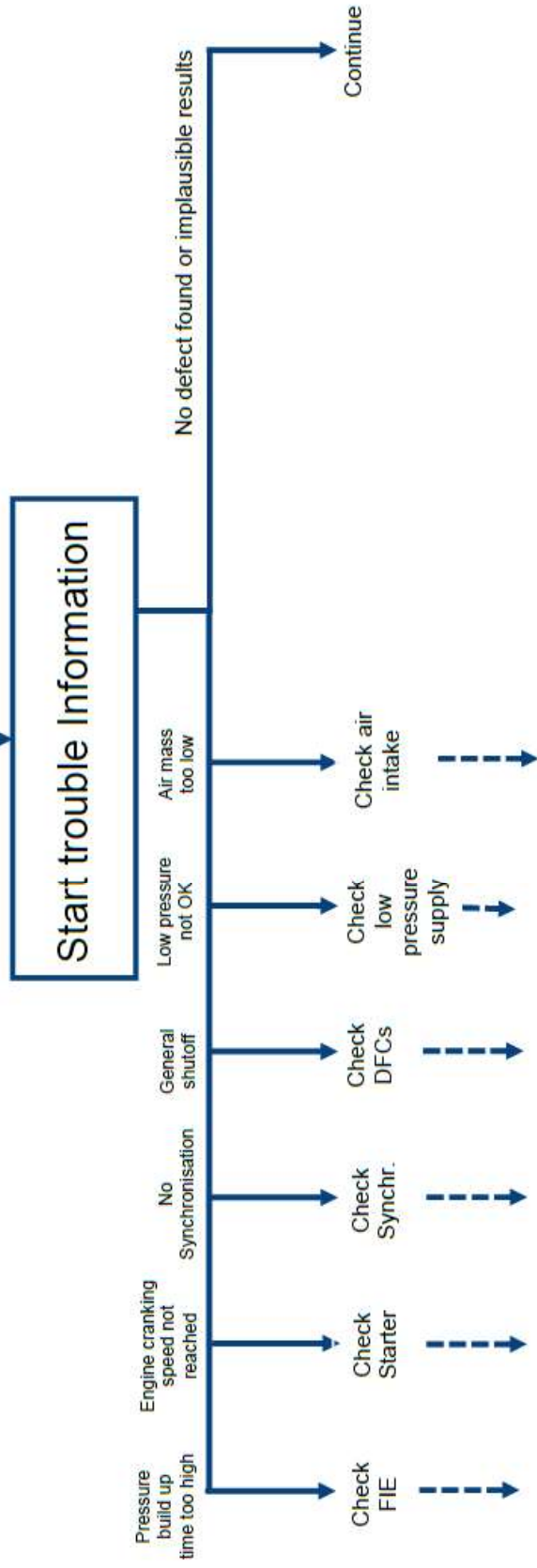
Start error test

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





Compression test

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording

Help

Settings

Connected

Compression test

Preconditions

- Engine off
- Ignition on
- Parking brake (if existent) active
- Transmission (if existent) in P or N position

Description

Engine start is prohibited by the test.
While the test the deviations of all cylinders are analyzed.
The starter has to be triggered as long as a result is shown.
The test lasts about 10 seconds.

Start

Cancel



Compression test

The screenshot shows a software window titled "HDS" with the address "1651019000065". The interface includes a sidebar menu with the following items: Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The main display area shows the title "Compression test" and the instruction "Please start the engine until a result is shown!". Below this, it displays "Current pressure: 0.02 bar". A circular progress indicator in the center shows "8s". A mouse cursor is visible near the bottom right of the main area, and a "Cancel" button is located at the bottom right of the window.



Compression test

Compression test

		Result
Cylinder 1	297 rpm	OK
Cylinder 2	299 rpm	OK
Cylinder 3	299 rpm	OK
Cylinder 4	299 rpm	OK
Oil pressure	2.256 bar	OK

Back

Cancel

1651019000065

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

HDS* 9.0.3 Diagnose en - P... 14:42

Compression test

Compression Test



Detectable defects

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

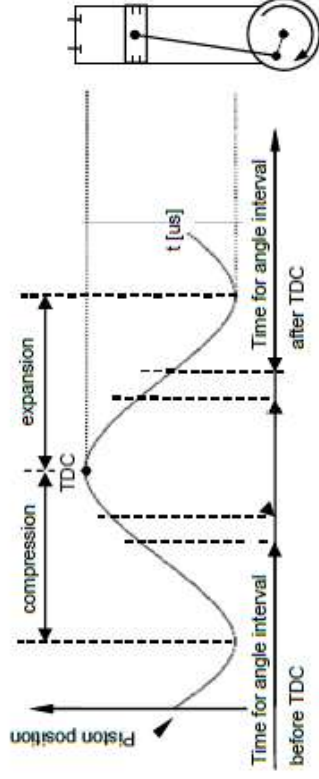
Advantages

- ▶ 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



Method:

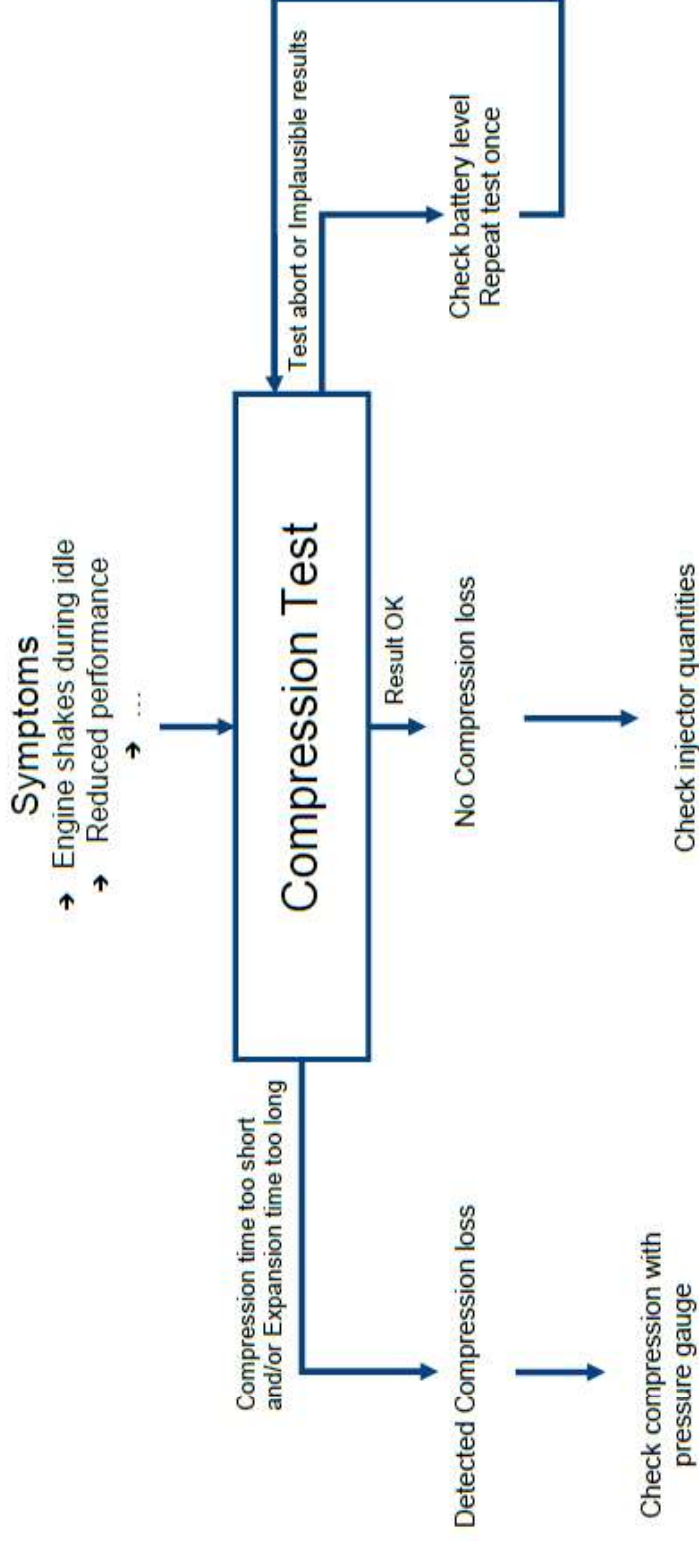
- ▶ Capture times of expansion and compression:
- ▶ In case of leakage faster piston stroke before TDC
- ▶ In case of leakage slower piston stroke after TDC

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

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Hatz H50TICD



Change idle speed into 900rpm

For some diagnostic functions, the idle speed must be reduced to 900 rpm before using the Hatz diagnostics 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.

The screenshot displays the Hako diagnostic software interface. At the top, there is a navigation bar with 'System' selected. Below it, a menu shows 'Anpassung Arbeitshydraulik' as the active selection. The main area is divided into several sections:

- Maschinendaten:** A table listing machine specifications such as Hako Seriennummer (149115900032), Software Version (1491.00.000.027.000), and Hardware Version (1.40).
- System:** A list of system components including 'Anpassung Arbeitshydraulik', 'Software flashen AH', and 'Software flashen BT'.
- Spannungsversorgung:** A list of voltage supply points with their respective voltages, such as 'Versorgung Kl. 30, Elektronik' at 12.18 V.
- Startfreigabe:** A list of start release functions, including 'Pedalschalter vorwärts -S25' and 'Pedalschalter rückwärts -S27'.

The interface also features a 'Hako' logo in the top right corner and a status bar at the bottom with system information like '9.0.3 Diagnose - Pow...' and '11:04'.

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Change idle speed into 900rpm

Choose reduce engine speed



The screenshot shows a software window titled "CM600 - Anpassung Arbeitshydraulik". The menu bar includes "Information", "Arbeitshydraulik", "Hydrostat", "Konfiguration", "System", and "? [DE]". Below the menu bar, there is a header area with the Hako logo and a title bar "CM 1650 - System - Anpassung Arbeitshydraulik". On the left, there is a "Level:" dropdown set to "1" and a "409-1.0.19.2" version indicator. The main content area is titled "Auswahl" and contains a list of options: "Prop.Ventil Heckkreislauf, -Y10", "Prop.Ventil Frontkreislauf, -Y21", "SOW Einstellungen", "Motordrehzahl Reduzierung" (highlighted with a blue border), and "Anbaugeräte Werte". The Windows taskbar at the bottom shows the time as 11:05 and several open applications, including "Hatz Update Tool" and "CM600 - Anpassung ...".



Change idle speed into 900rpm

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

Information Arbeitshydraulik Hydraulik Konfiguration System ? [DE]

 409.1.0.19.2	Level: 1	CM 1650 - System - Anpassung Arbeitshydraulik	
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Auswahl

Motor Drehzahl Reduzierung

900 rpm

1050 rpm

Motor Drehzahl

0 rpm

Abbrechen



Run up test

Run up test

Preconditions

- engine runs 900 U/min
- Coolant temp > 55°C
- All consumers shut off
- No fault entry
- Parking brake (if existent) active
- Transmission (if existent) in P or N position

Description

The test will perform a defined number of injections with increased fuel amount. This leads to short speed peaks.
With every run up a cylinder is switched off (noisy engine behaviour).
The test lasts about 1 minute.

Start

Cancel

Navigation menu: Identification, Current values, Error memory, Actuator test, **Diagnostic tests**, Data set, Engine protocol, Data recording, Help, Settings, Connected.

System tray: HDS² 1651019000065, HDS², 9.0.3 Diagnose en - P..., HDS², 13.20

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Hatz H50TICD



Run up test

The screenshot shows the HDS diagnostic software interface. At the top, the title bar reads "Run up test". Below the title bar, the software version "HDS 9.0.3 Diagnose en - P..." is visible. The main area of the interface is a dark grey sidebar with a list of diagnostic functions: Identification, Current values, Error memory, Actuator test, Diagnostic tests (highlighted in blue), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The "Diagnostic tests" menu item is expanded, showing a sub-menu with a circular progress indicator and the text "58s". A mouse cursor is positioned over the "Cancel" button in the bottom right corner of the window. The Windows taskbar at the bottom shows the "Dokumente" folder and the system clock displaying "13:20".



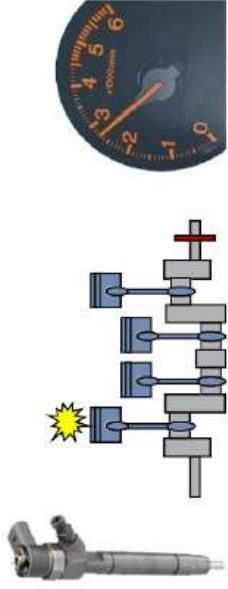
Run up test

		Result
Cylinder 1	1197 rpm	OK
Cylinder 2	1189 rpm	OK
Cylinder 3	1127 rpm	OK
Cylinder 4	1124 rpm	OK

This test is a return flow measurement of the injectors . This can be used to check the injectors.

Back Cancel

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

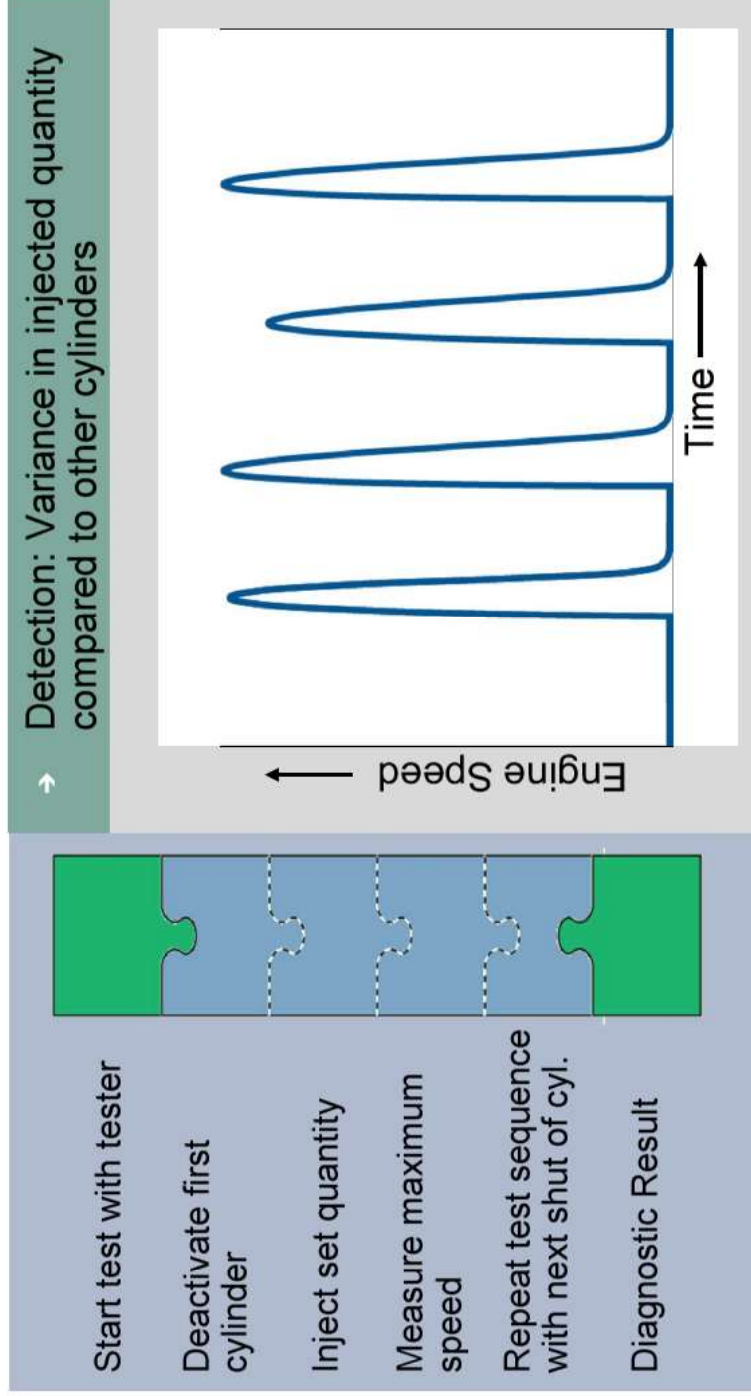
Advantages

- 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

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.



High pressure test

High pressure test

Preconditions

- engine runs 900 U/min
- Coolant temp > 55°C
- All consumers shut off
- No fault entry
- Parking brake (if existent) active
- Transmission (if existent) in P or N position

Description

Speed and rail pressure are modified while the test which results in a changing engine noise. After the test has finished the engine will shut off.
The test lasts about 1 minute.

Start **Cancel**



High pressure test

High pressure test

Preconditions

Test cannot be started. Preconditions are not fulfilled.

Event	Event
<input checked="" type="checkbox"/> Fault entry existend	<input checked="" type="checkbox"/> Coolant temp. < 55°C
<input checked="" type="checkbox"/> Clutch active or transmission not in	<input checked="" type="checkbox"/> DPF regeneration active
<input checked="" type="checkbox"/> Vehicle speed > 0 km/h	<input checked="" type="checkbox"/> Deviation injection amount out of
<input checked="" type="checkbox"/> Brake pedal active	<input checked="" type="checkbox"/> Speed deviation out of range
<input checked="" type="checkbox"/> Throttle pedal active	<input checked="" type="checkbox"/> Rail pressure too high before pressure
<input checked="" type="checkbox"/> Metering unit out of range	<input checked="" type="checkbox"/> Rail pressure too low before pressure
<input checked="" type="checkbox"/> No constant engine speed	901 rpm

Cancel Repeat

Cancel

1651019000065

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

9.0.3 Diagnose en - P... HDS² Preconditions

1322

High pressure test



Detectable defects

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

Advantages

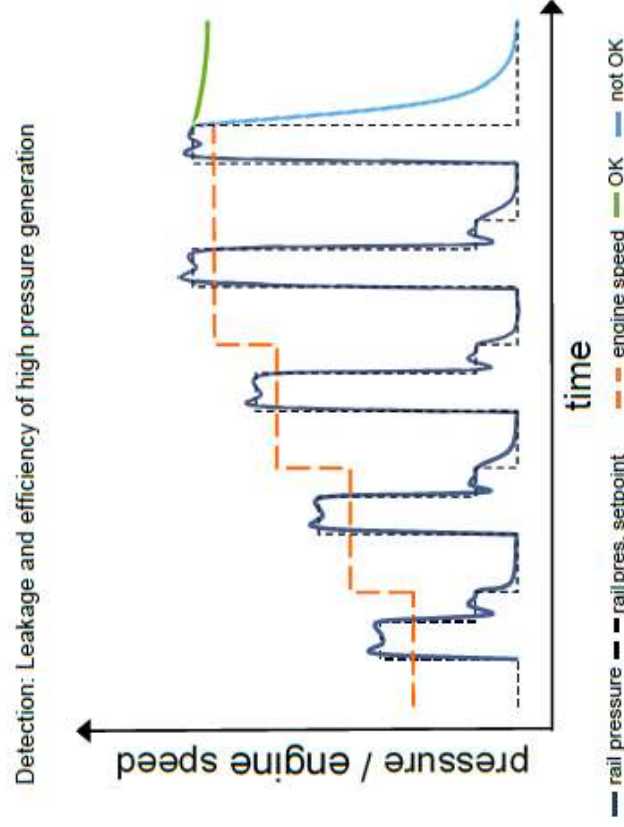
- ▶ Quick system check to exclude defects in the injection system without additional tools
- ▶ The fuel injection system has not to be opened for diagnostic purpose

Experience level

- ▶ Applied in high volume productions

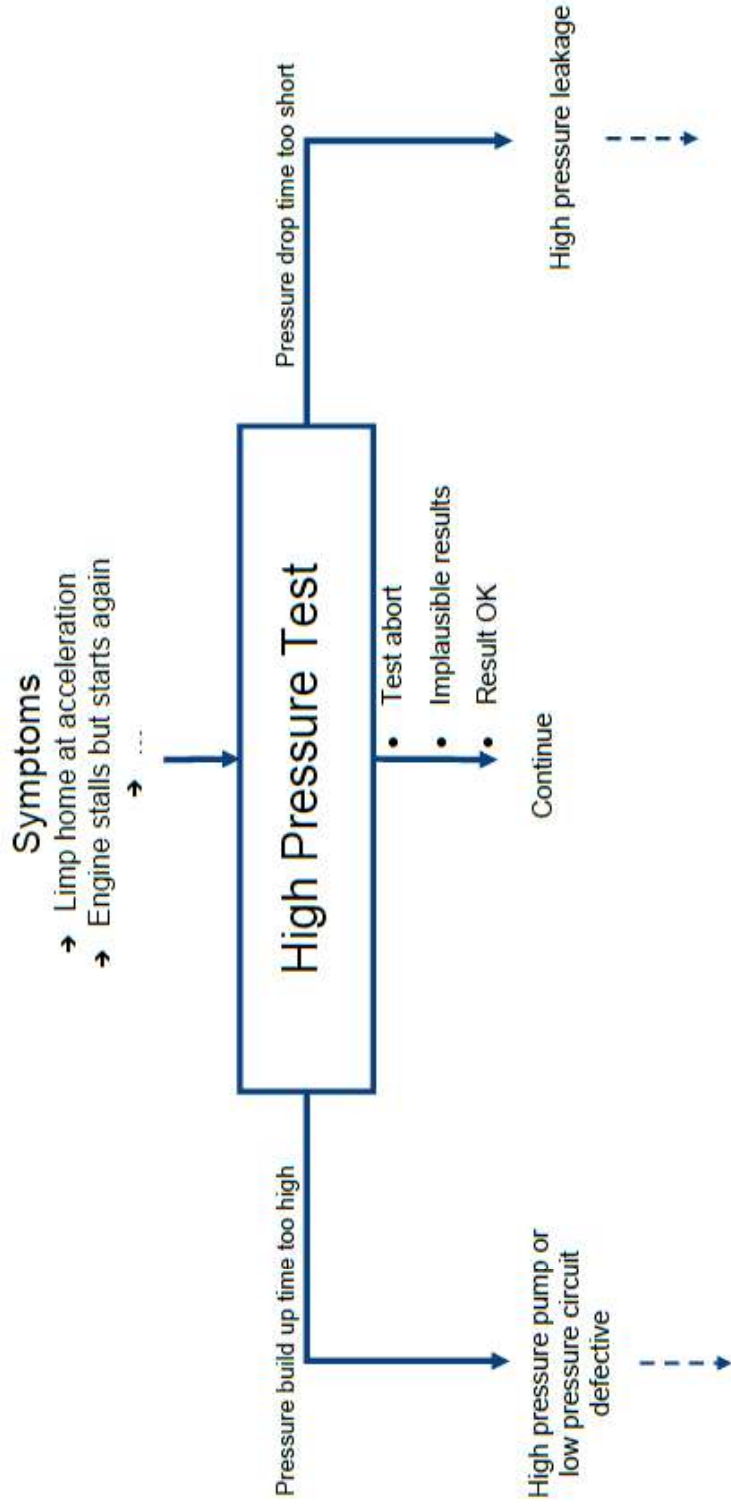


High pressure test





High pressure test





Injector shut off test

Injector shut off test

Preconditions

- engine runs 900 U/min
- Coolant temp > 55°C
- All consumers shut off
- No fault entry
- Parking brake (if existent) active
- Transmission (if existent) in P or N position

Description

The chosen injector is switched off for 5 seconds. This leads to a changing engine noise and a noisy engine behaviour. Task of the operator is to watch the engine behaviour and noise. If there are noticeable problems: please continue with the next injector. If there are no changes: check the chosen injector.

Start

Cancel

Citymaster 1650 1491.15

Hatz H50TICD



Injector shut off test

Injector shut off test

1651019000065

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

Cancel

13.23

Injector shut off test



Detectable defects

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

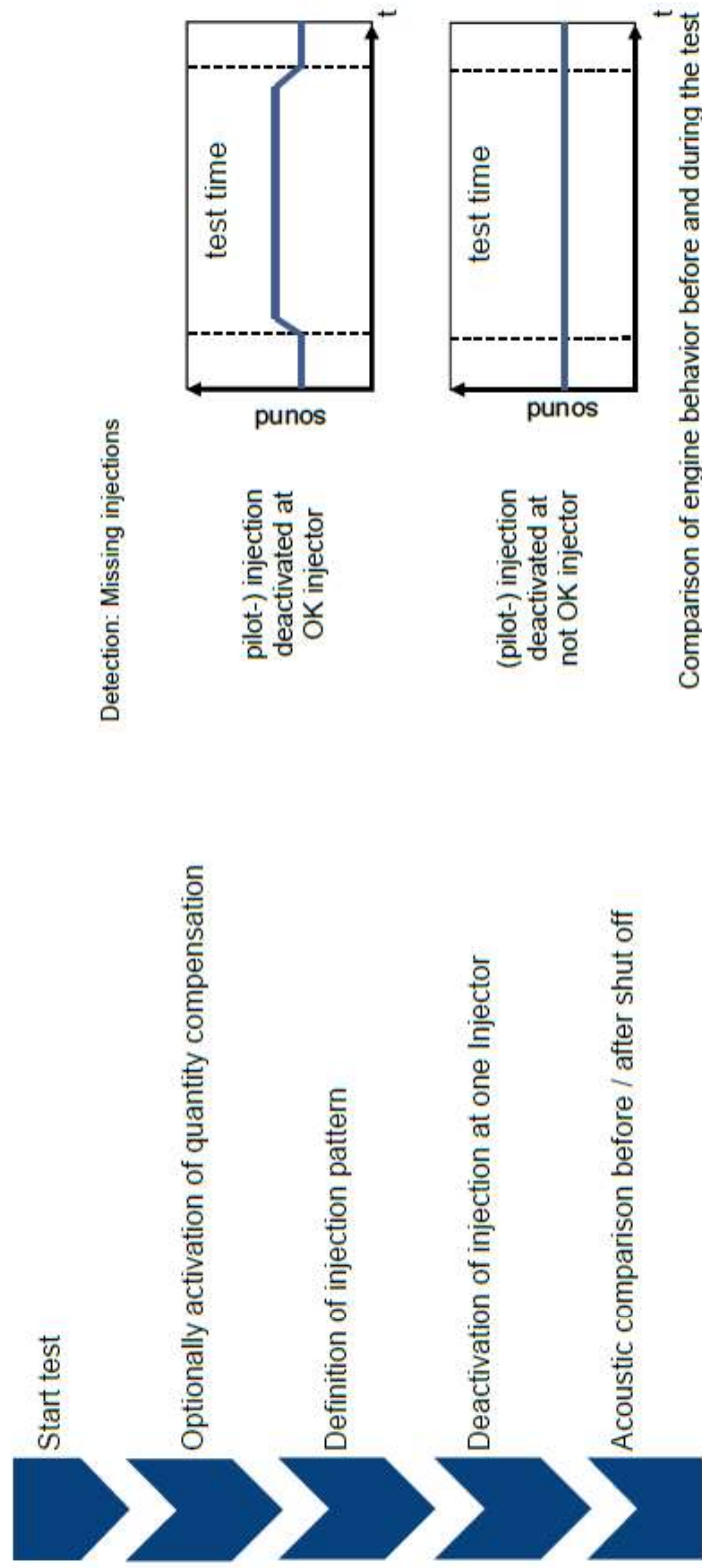
Advantages

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

Experience level

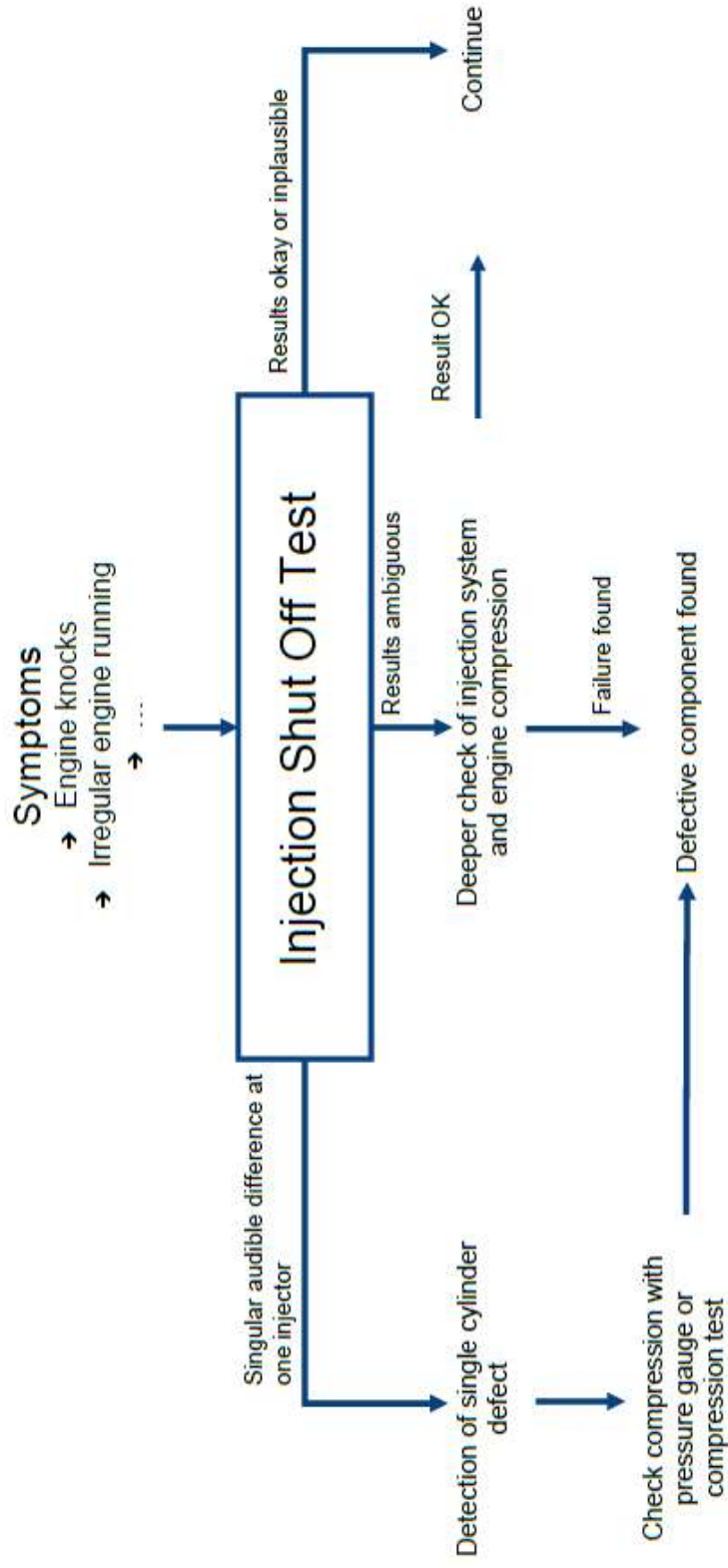
- ▶ Applied in high volume productions

Injector shut off test





Injector shut off test





Diesel particle filter

HDS² 1651019000065

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

Diagnostic tests

- Set back service
- Bleed fuel low pressure circuit
- Bleed oil circuit
- Set back operation hours
- Start error test
- Compression test
- Run up test
- High pressure test
- Injector shut off test
- DPF**

- Increase soot load
- ECU replacement without value transfer
- DPF replacement
- DPF regeneration

Dokumente HDS² 9.0.3 Diagnose en - P... 13:24



Diesel particle filter

The screenshot shows the HDS diagnostic software interface. At the top, the vehicle information is displayed: Citymaster 1650 1491.15 and Hatz H50TICD. The main title is 'Diesel particle filter'. The test name is 'Increase soot load'. The interface is divided into several sections:

- Preconditions:**
 - Engine off
 - Ignition on
- Description:**

This feature increases soot loading for dynamic and stand regeneration testing.

At the bottom of the test configuration area, there are two buttons: 'Start' (blue) and 'Cancel' (grey). The bottom navigation bar includes icons for Identification, Current values, Error memory, Actuator test, Diagnostic tests (selected), Data set, Engine protocol, Data recording, Help, Settings, and Connected. The system tray at the very bottom shows the taskbar with 'Dokumente', 'HDS', and '9.0.3 Diagnose en - P...' open, and the system clock showing 13:25.



Diesel particle filter

Replace ECU without transfer

Preconditions

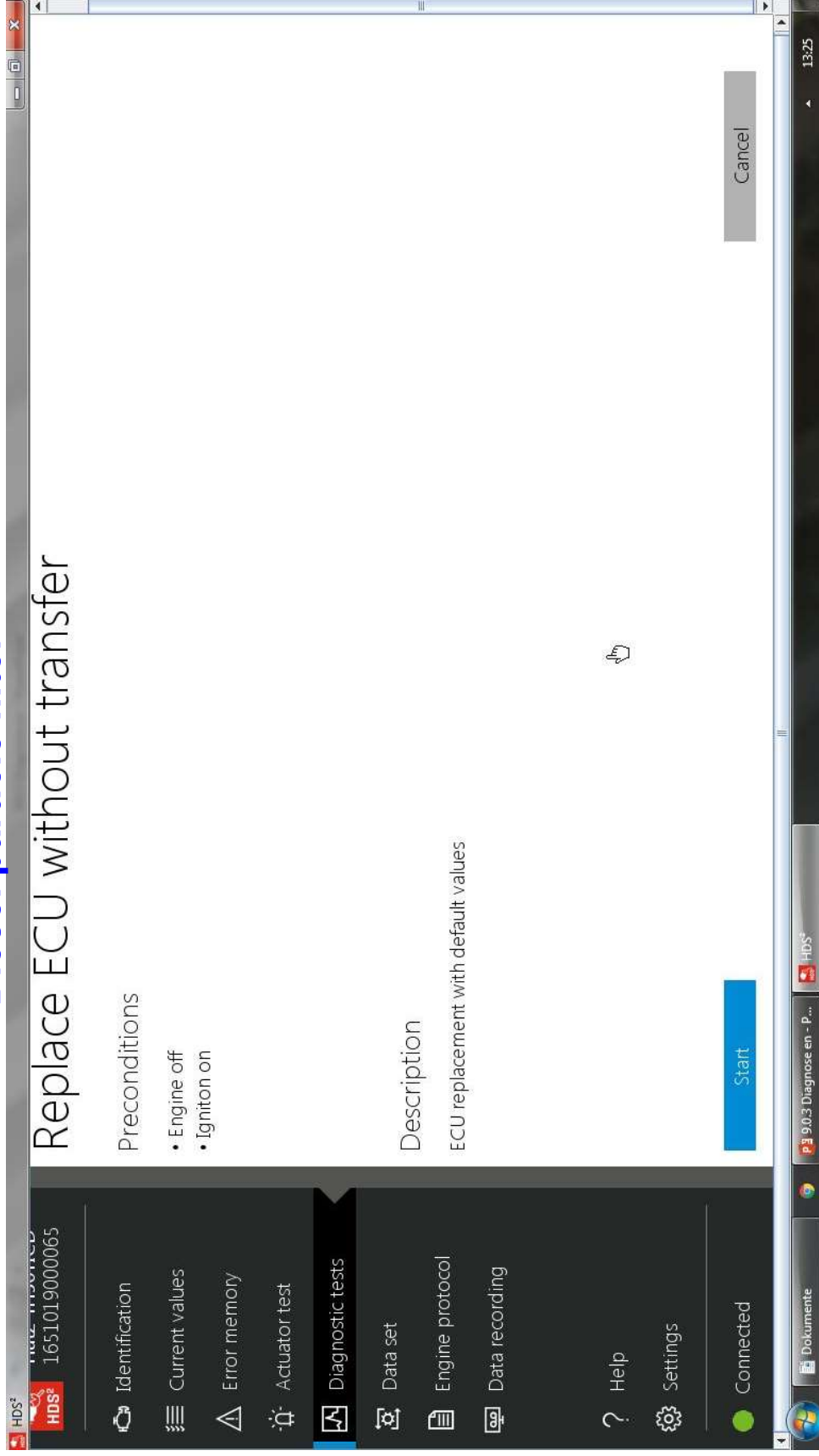
- Engine off
- Igniton on

Description

ECU replacement with default values

Start

Cancel





Diesel particle filter

The screenshot shows a software window titled "HDS²" with a navigation menu on the left. The main content area is titled "DPF replacement" and contains the following sections:

- Preconditions**
 - Engine off
 - Igniton on
- Description**

This function resets the DPF learned values.

At the bottom of the main content area, there is a blue "Start" button and a grey "Cancel" button. The taskbar at the bottom of the window shows the HDS² application icon, a taskbar icon for "9.0.3 Diagnose en - P...", and the system clock showing "13:25".



Diesel particle filter

DPF regeneration

Preconditions

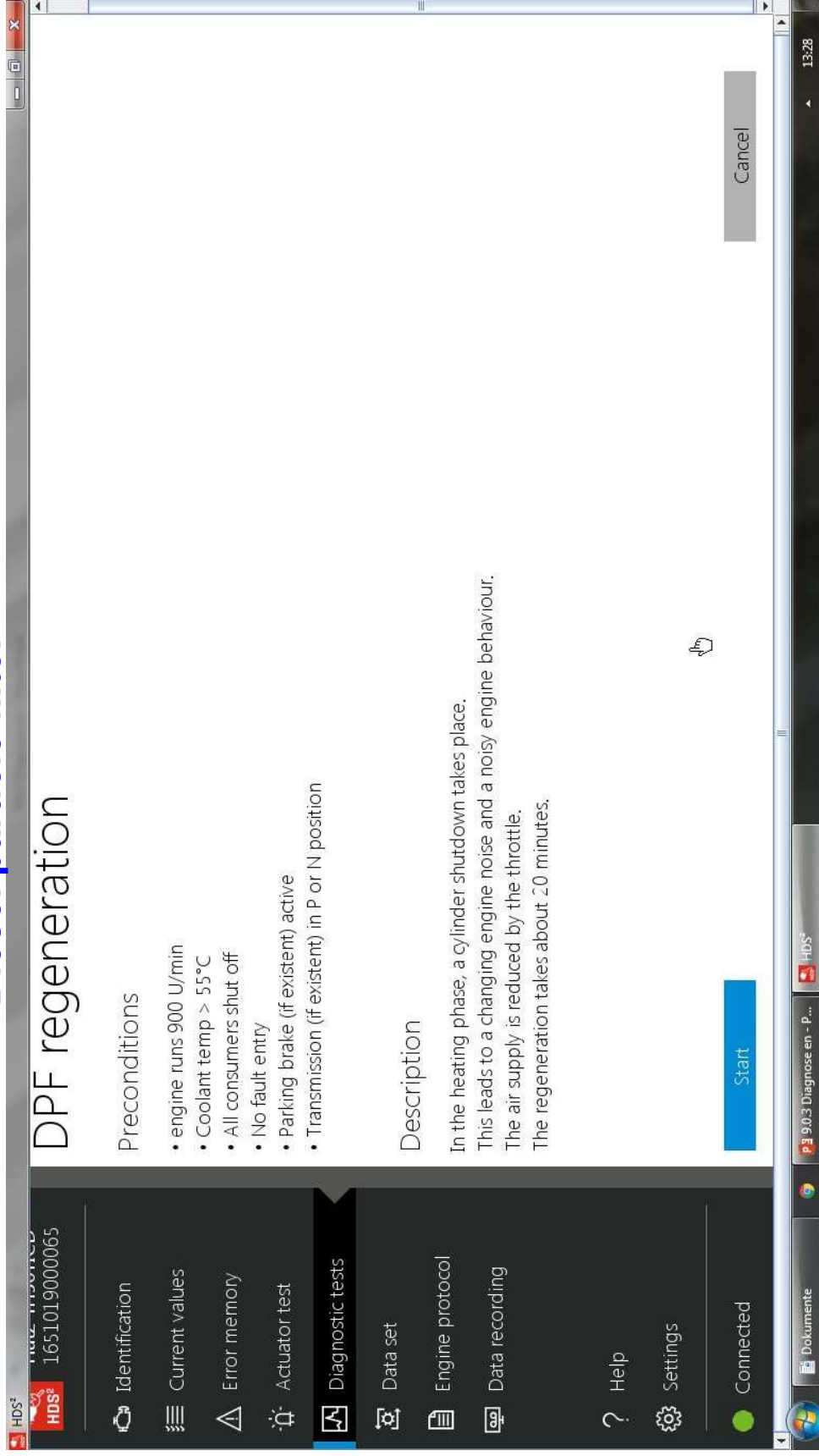
- engine runs 900 U/min
- Coolant temp > 55°C
- All consumers shut off
- No fault entry
- Parking brake (if existent) active
- Transmission (if existent) in P or N position

Description

In the heating phase, a cylinder shutdown takes place. This leads to a changing engine noise and a noisy engine behaviour. The air supply is reduced by the throttle. The regeneration takes about 20 minutes.

Start

Cancel





Software flashen

HDS² 1651019000065

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

Data set

Flash file: D165C81##V600R03###.hex

Description	ECU	Server
Governor	Variable speed	variable speed
Output curve	2800 rpm 55,4 kW	2800 rpm 55,4 kW
Rotational frequency change	CA11	CA11
P-Degree	0%	0%
Error reaction	Limp home	limp home
DPF standby regeneration	2300rpm optiheat active	2300rpm optiheat active
Power supply	12V & 24V optiHEAT Active	12V & 24V optiHEAT Active
Coolant level & Alternator monitoring	With CLS and alternator	With CLS and alternator
Drive application	llo	llo
Remote Start	Only key starting	Only key start
MSS Stage 2	900.000000	900
MSS Stage 3	900.000000	900
MSS Stage 4	900.000000	900
IQA code cylinder 1	AS81CID	AS81CID
IQA code cylinder 2	BKHSCWC	BKHSCWC
IQA code cylinder 3	B2RYP1G	B2RYP1G
IQA code cylinder 4	CKAIE5C	CKAIE5C

Write dataset

Citymaster 1650 1491.15

Hatz H50TICD



Software flashen

The screenshot shows a software update window with the following elements:

- Header:** "Data set" on the left.
- Progress:** A circular progress indicator at 0%.
- Text:** "Softwareupdate" in the center.
- Code:** "\$ACTION_STATUS_SERVICE_STARTDIAGNOSTICSESSION |" in red.
- Message:** "The process may take some time." below the code.
- Footer:** A dark navigation bar with icons for Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set (selected), Engine protocol, Data recording, Help, Settings, and Connected.

Citymaster 1650 1491.15

Hatz H50TICD



Software flashen

The screenshot shows a software update window with the following elements:

- Header:** "Data set" on the left and "Softwareupdate" in the center.
- Progress:** A blue progress bar is at 50%.
- Status:** "50 %" is displayed next to the bar.
- Message:** "The process may take some time." is shown below the progress bar.
- Footer:** A dark navigation bar with icons for Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set (active), Engine protocol, Data recording, Help, Settings, and Connected.

Citymaster 1650 1491.15

Hatz H50TICD



Software flashen

The screenshot shows a diagnostic software interface. At the top, the text "Data set" is displayed. Below it, a progress bar indicates that the software update is 100% complete. The progress bar is a semi-circle of blue dashes with the number "100" in the center. Below the progress bar, the text "Please wait. Coding..." is displayed. In the bottom left corner, there is a dark grey menu with several options: Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set (highlighted), Engine protocol, Data recording, Help, Settings, and Connected. The "Data set" option is highlighted with a blue bar. The "Connected" option has a green dot next to it.

Citymaster 1650 1491.15

Hatz H50TICD



Software flashen

The screenshot shows a software flashing interface. At the top, the text "Data set" is displayed. Below it, a progress bar is shown at 100%. The main text reads "Softwareupdate" and "The coding was executed successfully!". At the bottom, there is a navigation menu with the following items: Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set (highlighted), Engine protocol, Data recording, Help, Settings, and Connected.



Engine protocol

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	PL1715_V600R
Engine number	1651019000065
Manufacturing date	..
Remaining time to service	479
Last programming date	08.08.19
Dataset description	D165C81##V600R03###

Citymaster 1650 1491.15

Hatz H50TICD



Engine protocoll

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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.hex0000000000

ECU Einstellungen

Leistungskurve
Spannung 12V & 24V opt/HEAT Acti Kühlmittelstandsensor
Abgas-Nachbehandlung 2300rpm opt/heat active Fahrmanwendung Ja
P-Grad 0% Fernstart
Fehlerversatzreaktion Drehzahlverstellung Kein Aktor
MSS Stufen 9, 9, 10

Fehlerspeicher

- 0
Kein Fehlereintrag vorhanden

Citymaster 1650 1491.15

Hatz H50TICD



Data recording

1651019000065

Identification

Current values

Error memory

Actuator test

Diagnostic tests

Data set

Engine protocol

Data recording
Choose setup...
User defined...

Help

Settings

Connected

Report

9.0.3 Diagnose - P...

9.0.3 Diagnose - Pow...

15:01

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###

Citymaster 1650 1491.15

Hatz H50TICD



Data recording

The screenshot shows the HDS software interface with the 'Identification' configuration window open. The window title is 'Identification' and it has a 'Configuration' icon in the top-left corner. The main content area is divided into two sections: a configuration area on the left and a list of parameters on the right.

Configuration Area:

- Count of Y-Axes: 1
- Range Y1: [empty]

Parameter List:

Name	Unit	Y-Axis
Air intake pressure	mbar	
Boost pressure	mbar	
Boost air temperatur	°C	
Coolant temperature	°C	
Environment pressure	mbar	
Fuel consumption	l/h	
Fuel low pressure	mbar	
Fuel temperature	°C	
Injection quantity	mg/stroke	
Oil pressure	mbar	
Oil temperature	°C	
Rail pressure	mbar	
Operating hours	hours	
Engine speed	rpm	
Torque		

Navigation buttons: Save, Cancel

Taskbar: HDS 1651019000065, Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set, Engine protocol, Data recording (selected), Help, Settings, Connected, Report, P 9.0.3 Diagnose - P..., P 9.0.3 Diagnose - Pow..., 1502

Citymaster 1650 1491.15

Hatz H50TICD



Data recording

Configuration

Count of Y-Axes: 3
Range Y1: 0-100
Range Y2: 0-100
Range Y3: 0-500

Name	Unit	Y-Axis
Coolant temperature	°C	y1
Fuel low pressure	mbar	y1
Rail perssure	mbar	y1

Description	Unit	Torque
Air intake pressure	mbar	
Boost pressure	mbar	
Boost air temperatur	°C	
Coolant temperature	°C	
Environment pressure	mbar	
Fuel consumption	l/h	
Fuel low pressure	mbar	
Fuel temperature	°C	
Injection quantity	mg/stroke	
Oil pressure	mbar	
Oil temperature	°C	
Rail perssure	mbar	
Operating hours	hours	
Engine speed	rpm	

Apply Cancel

29 Elemente

15:02



Data recording

The screenshot shows the HDS software interface. At the top, a dark navigation bar contains the following items from left to right: HDS logo, ID 1651019000065, a menu icon, and a 'Connected' status indicator with a green dot. Below the navigation bar is a list of menu items: Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set, Engine protocol, and Data recording. The 'Identification' menu item is selected, and a dialog box is open over it. The dialog box has a title bar with 'HDS' and '1651019000065'. It contains a search field with the text 'Suchen in: Graph_Setups' and a file list with 'Test.cfg'. Below the file list are fields for 'Dateiname: Test' and 'Dateityp: ID 'ConfigurationFile' not found in languagefile'. At the bottom of the dialog box are two buttons: 'ID 'SaveAsConfiguration' not found in languagefile' and 'Abbrechen'. In the background, a table is visible with the following columns: Description, Current Values, Operating hours, Hardware-Version, Software, Engine, Manufa, Remain, Last pro, and Dataset. The 'Current Values' column shows the value '21' and 'EDC17 C81'. A 3D engine model is visible in the top right corner of the software window.



Data recording

The screenshot displays the HDS diagnostic software interface for a Hatz H50TICD engine. The main window is titled "Graph display" and shows a large empty graph area with axes labeled "y1", "y2", "y3" and "00.000", "100.000", "500.0". A "Sampling rate in ms:" input field is present with a "set" button. Below the graph, there are two configuration panels, each with a "set" button and a "New configuration" button. The left panel has dropdowns for "Coolant temperature" (°C), "Fuel low pressure" (mbar), and "Rail pressure" (mbar). The right panel has dropdowns for "Coolant temperature", "Fuel low pressure", and "Rail pressure". A navigation menu on the left includes: Identification, Current values, Error memory, Actuator test, Diagnostic tests, Data set, Engine protocol, Data recording, Help, Settings, and Connected. The top status bar shows "HDS² 16510190000".