VEHICLE DIAGNOSTICS SOLUTIONS

User Manual

Startrace-Diagnostic Tester

Developed for the Powertrain Systems of the Mercedes-Benz-Group:

OM900, OM934, OM936, OM460, OM470, OM471, OM473

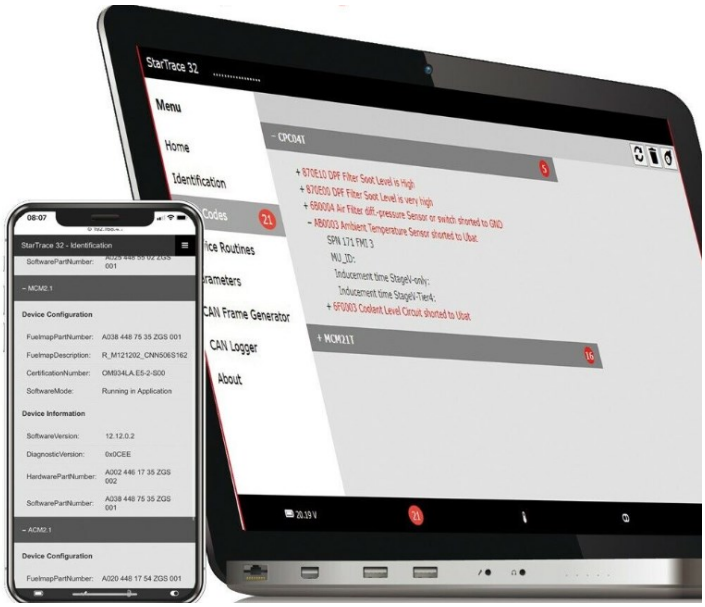

Figure 1: Example Usage

STARTRACE next gen

1 Contents

2 Introduction

The Startrace vehicle diagnostic device is designed to extract data from the engine systems of Mercedes-Benz models OM900, OM934, OM936, OM460, OM470, OM471, and OM473. The basic functional chain is shown in Figure 2.

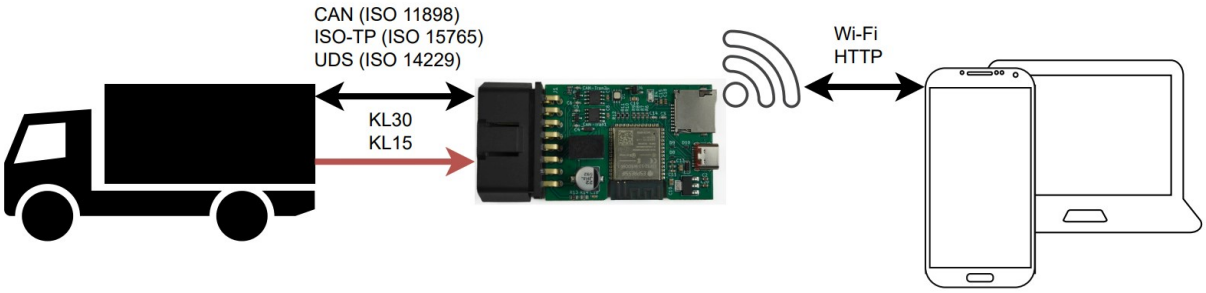

Figure 2: Functional Chain Startrace

Once the Startrace device is plugged into the vehicle's OBD2 socket, it is powered and boots up. Subsequently, the Wi-Fi network **Startrace_WIFI** is created.

The user then can connect their device, any mobile phone or PC, to the Wi-Fi network. Over the web browser of the device, the user can access the diagnostic vehicle data.

2.1 About

Device of interest	Startrace NextGen Diagnostic Tool
Manufacturer:	Vehicle Diagnostics Solutions – Julian Beck
Brand name:	Vehicle Diagnostics Solutions
Manufacturer Address	Vehicle Diagnostics Solutions Sparbruck 22 88045 Friedrichshafen
E-Mail	startrace.32@gmail.com
Model:	Startrace NextGen
Serial number:	13.8402.00643
Hardware Version:	4.1
Software Version:	1.0.22
Manufacturing Date:	2025
Modifications:	No modifications were carried out during testing
Temperature range:	0-50 °C
Intended Environment:	In door

2.2 Electrical Specifications

Type of supply connection:	OBD-II 16-pin diagnostic connector (SAE J1962)	
Nominal voltage rating:	24 V DC	
Nominal amperage rating:	300 mA	
Max. Voltage rating:	36 V	
Highest internal frequency:	2450 MHz	
Accessible fuse value:	Not applicable	
Altitude during operation	<2000 m above sea level	
Accessible fuse value:	Peak pulse power (tp=10/1000µs waveform):	200 W
	Peak pulse power (tp=8/20µs waveform):	1000 W

2.3 Disclaimer

The Equipment Under Test (EUT) is powered via an external battery (PS3).
The user manual currently does not include a statement regarding the disconnect device.
Please note that the plug of the EUT functions as the disconnect device and must remain easily accessible at all times to ensure safe disconnection of power.

- The use of certain diagnostic services may have an impact on the target system.
- The responsibility for selecting, applying, and performing such diagnostic services lies solely with the user.
- The provider assumes no liability for any damage caused to the target system by the use of diagnostic services with this device, including but not limited to impairments of system functions, data loss, or hardware failures.
- There is no entitlement to support for commissioning, configuration issues, or in cases of malfunctions or damage related to the use of this device.

Don’t exceed the maximum input voltage of 36 V !

2.4 Disposal and Recycling Information (WEEE Compliance)

This product has been designed and manufactured in accordance with the requirements for environmentally responsible end-of-life management of electrical and electronic equipment, referencing the standards related to the **WEEE Directive** and associated technical norms:

Relevant Standards:

- **IEC 62321** – Determination of certain substances in electrotechnical products (RoHS/REACH relevant hazardous substances).
- **IEC 62635** – Marking of electrical and electronic equipment to facilitate environmentally safe disposal and recycling.
- **EN 50419** – Environmental marking for waste electrical and electronic equipment (WEEE) and related waste management.

Environmental and Safety Considerations:

- The product **does not contain hazardous materials** beyond those permitted by international safety and environmental standards.
- All materials and components are selected to facilitate **safe disassembly, recovery, and recycling** at end-of-life.
- The enclosure, electronic assemblies, and connectors are fully compatible with recycling processes for electronic equipment.

Disposal Instructions for Users:

- This product must **not be disposed of with household waste**. Improper disposal may lead to environmental contamination or regulatory non-compliance.
- End-users should return the product to **designated collection points, authorized recycling facilities, or the manufacturer's take-back system** for environmentally responsible processing.
- Take-back procedures ensure that metals, plastics, and electronic components are properly **recovered, segregated, and treated**, minimizing exposure to potentially hazardous substances.

Old Device Return / Take-Back:

- In accordance with **EN 50419**, users have the right to return used equipment free of charge to authorized collection or take-back systems.
- The manufacturer supports collection, disassembly, and recycling processes in full compliance with current environmental and safety standards.

Technical Rationale:

- By following these disposal and take-back procedures, the product ensures **compliance with international standards for sustainable electronics**, reduces the risk of environmental contamination, and facilitates **resource recovery**.

- The design and material selection are aligned with IEC norms to guarantee that, even at the end of life, no hazardous reactions or thermal or chemical risks arise during recycling or handling.

Recommendation to Users:

- Always separate electronic equipment from general waste streams.
- Follow local regulations and collection systems to ensure environmentally safe disposal.
- Consult the manufacturer or authorized recyclers for guidance on proper handling of end-of-life devices.

3 Initial Setup

3.1 Connect over the local Wi-Fi Network

The following steps describe how you can **connect to the Startrace device** over its **local Wi-Fi** network.

- Turn on the vehicle ignition
- Plug the Startrace device into the vehicle's OBD2 socket
- Connect your terminal device (PC or mobile phone) to the Wi-Fi network **Startrace_WIFI**
- Open **any** web browser
- Access the web server of the Startrace device by entering the address **http://192.168.4.1**

3.2 Connect over an external Wi-Fi Network

This chapter describes the steps to log the Startrace device into an **external Wi-Fi** and then **connect to the device** over the external Wi-Fi.

The **following steps** can only be carried out **after** the steps described in Chapter **3.1** are done

1. Go to **Setup** in the left side menu
2. Go to the **WIFI** Tab
3. Extend the menu for **External WIFI Configuration**
4. Type in the WIFI Name under **SSID**
5. Type in the password under **Password**
6. Press the **Save Button** and **Refresh** the web page
    a. Connect your terminal device (PC or mobile phone) to the external Wi-Fi
7. **Click** on the **IP-Address** next to your external Wi-Fi
    a. Access the diagnostic data

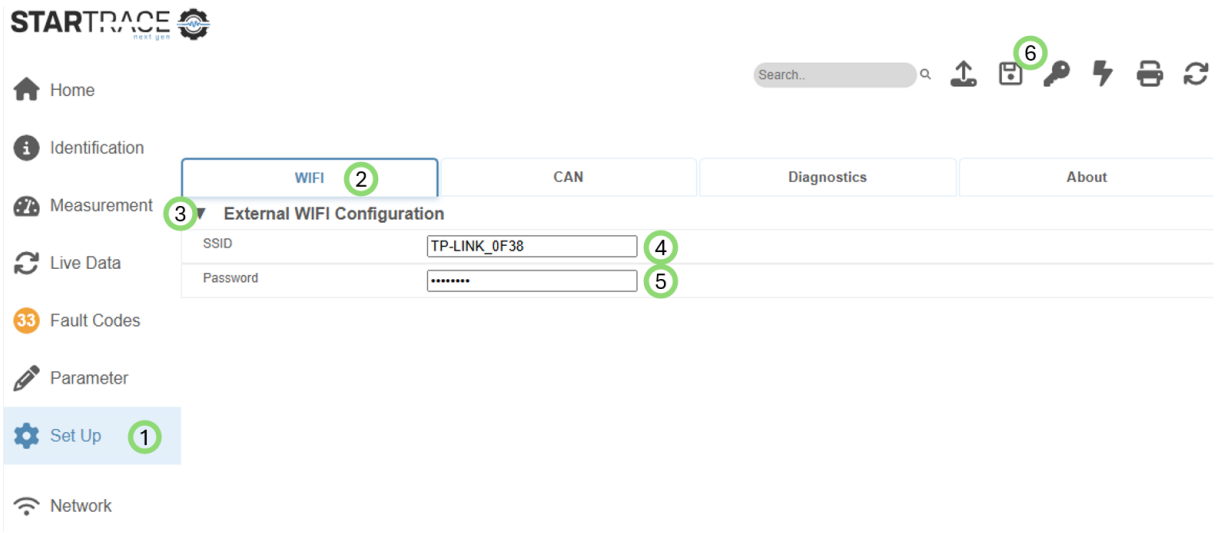

Figure 3: Step by Step Guide to connect over an external Wi-Fi Network

4 Functionality

4.1 Home

Under the menu point **Home** you can view all **detected ECUs** and a short description of them.

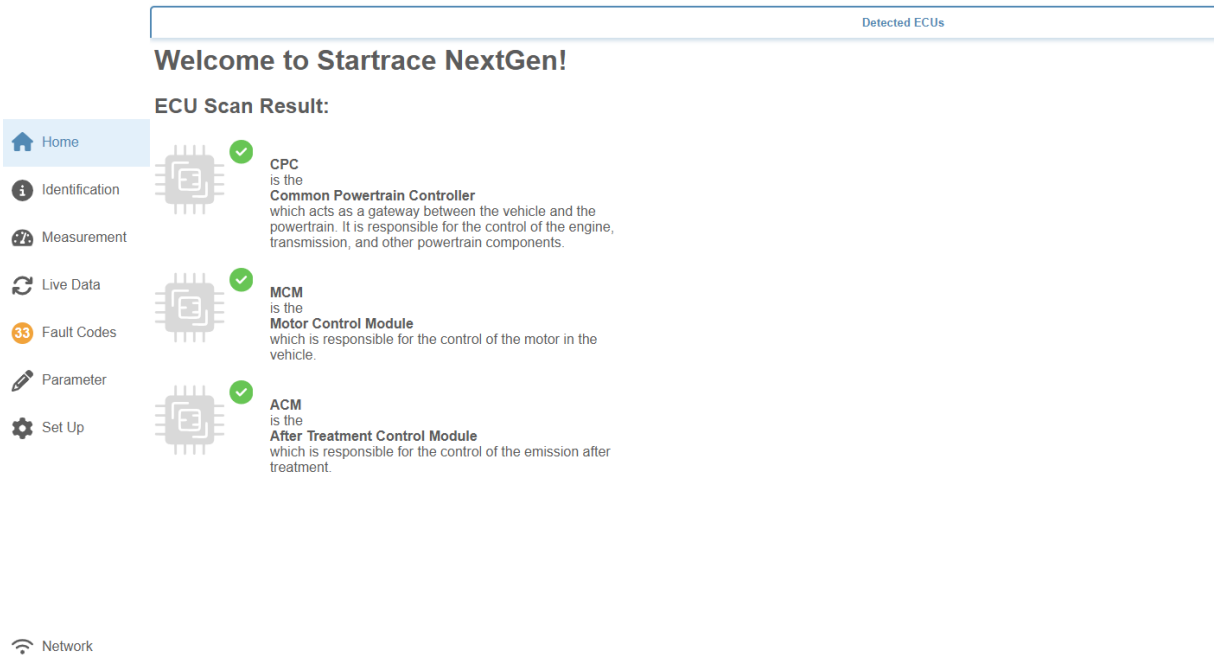

Figure 4: Home

4.2 Button Bar

The **Button Bar** at the top of the screen shows buttons, which **can be applied** to the **content which is currently shown.**

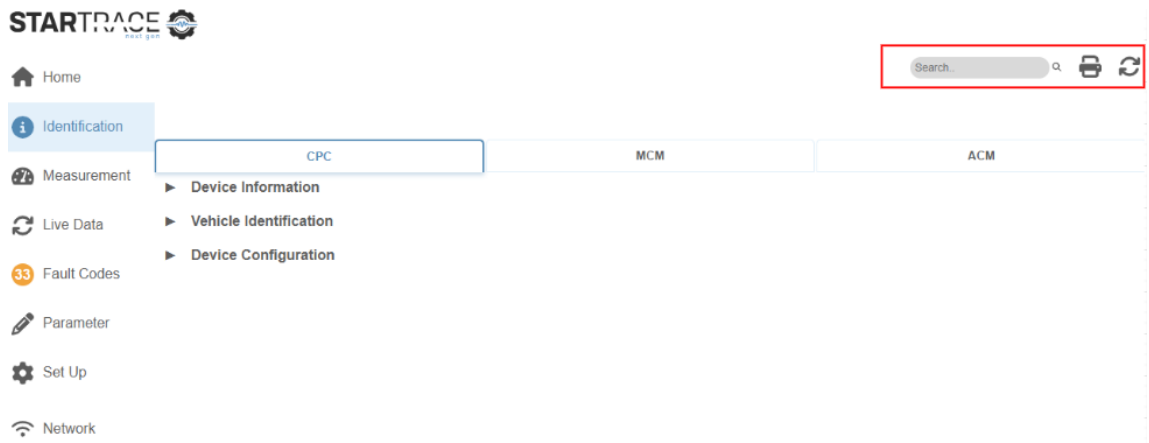

Figure 5: Button Bar

Search Bar

The **Search Bar** can look for data in the **currently shown tab**.

Refresh Button

The **Refresh Button** refreshes the **currently shown menu**. When you are in the identification menu, the identification menu is refreshed upon pressing the button.

Print Button

The **Print Button** creates a PDF-document, which contains identification and fault code data, and downloads the file directly into your download's directory**. In chapter 6 an example of a StarTrace Health Report** can be found.

4.3 Identification

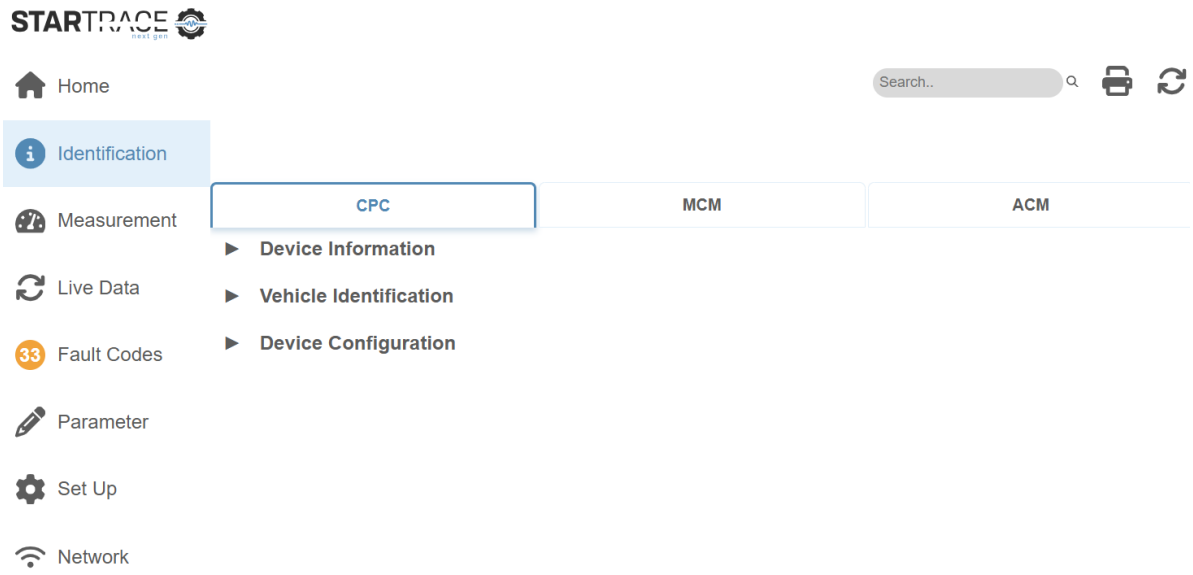

Figure 6: Menu Identification

In the menu **Identification** you can view identification from each detected ECU. The data is separated into 3 headings

Device Information

Here data about the device and its software and diagnostic versions as well as part numbers are displayed

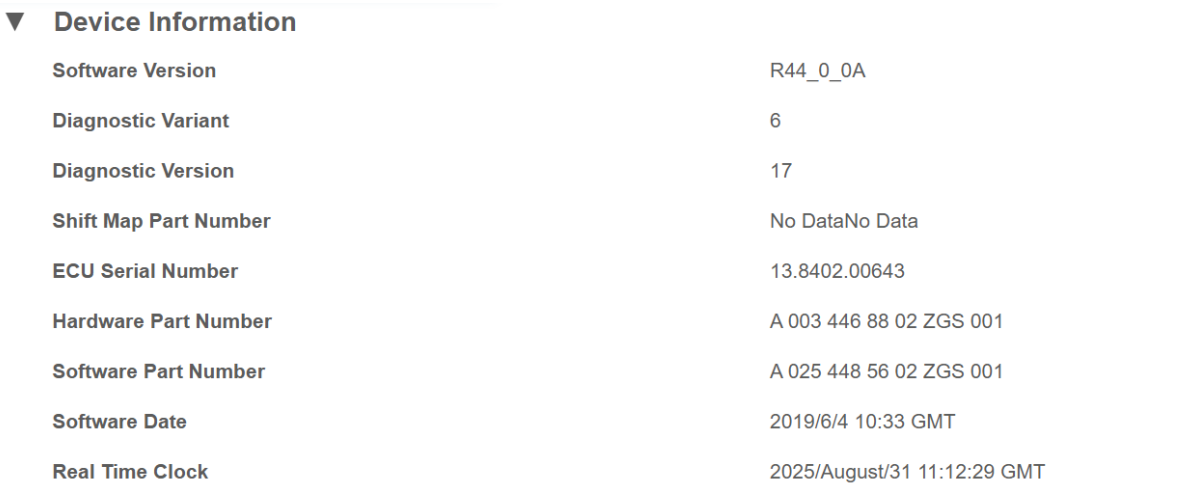

Figure 7: Device Information

Vehicle Identification

Under Vehicle Identification the Vehicle Identification Number, the Engine Serial Number and the value in km of the Odometer are displayed.

Figure 8: Vehicle Identification

Device Configuration

Under Device Configuration, data concerning the setup of the device are displayed.

Figure 9: Device Configuration

4.4 Measurement

Figure 10: Measurement

In the menu **Measurement** actual measured data from the ECUs can be shown. For example:

- Actual Torque
- Battery Voltage
- Tank Level
- Inlet Air Temperature
- Rounds per Minute

4.5 Live Data

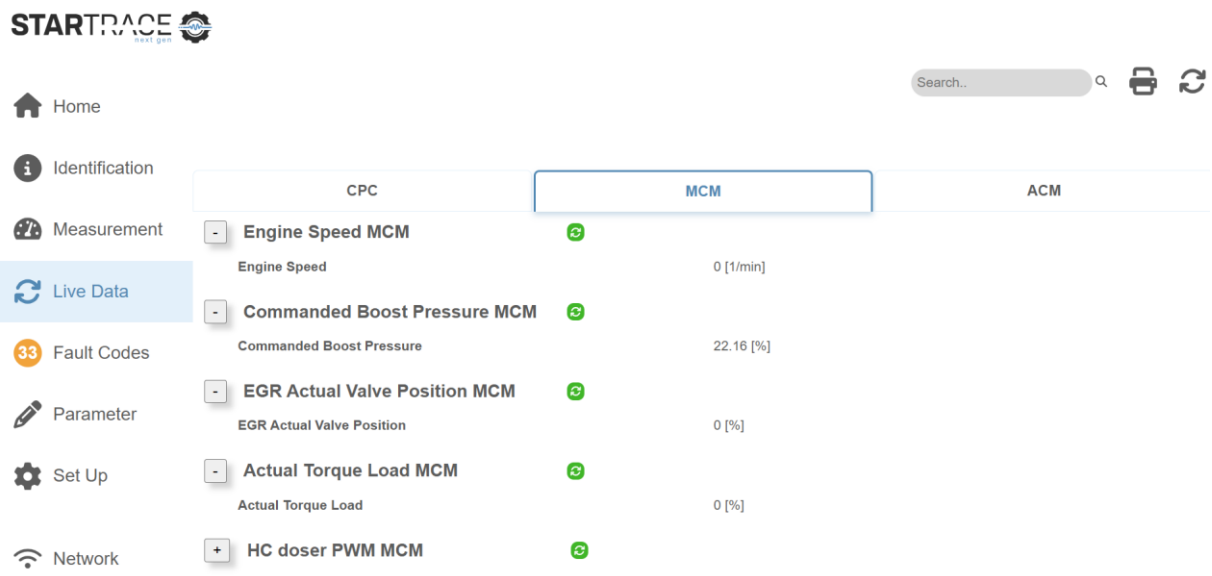

Figure 11: Live Data

In the **Live Data** menu, a selection of measurements is displayed. A cyclical refresh of this data can be activated by pressing the refresh button.

It can be deactivated by pressing it again

!Attention!
Only 5 Live Data Measurements at once can be activated

4.6 Fault Codes

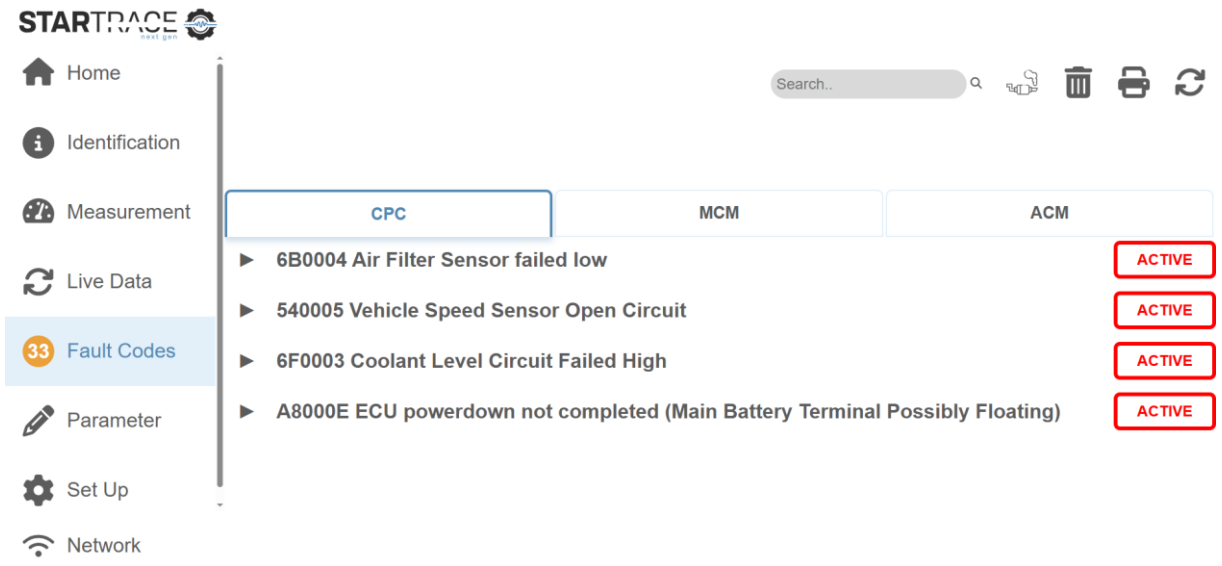

Figure 12: Fault Codes

The menu **Fault Codes** offers some more functionalities

- Display of detected Fault Codes
- Indication if Fault Codes are active (error condition still active) or passive (error condition not active anymore)
- Deletion of regular Fault Codes
- Deletion of emission related Fault Codes

The **deletion of regular Fault Codes** can be performed by pressing this button:

The **deletion of emissions related Fault Codes** can be performed by pressing this button:

After deleting the Fault Codes, refresh the data by pressing this button:

4.7 Parameter

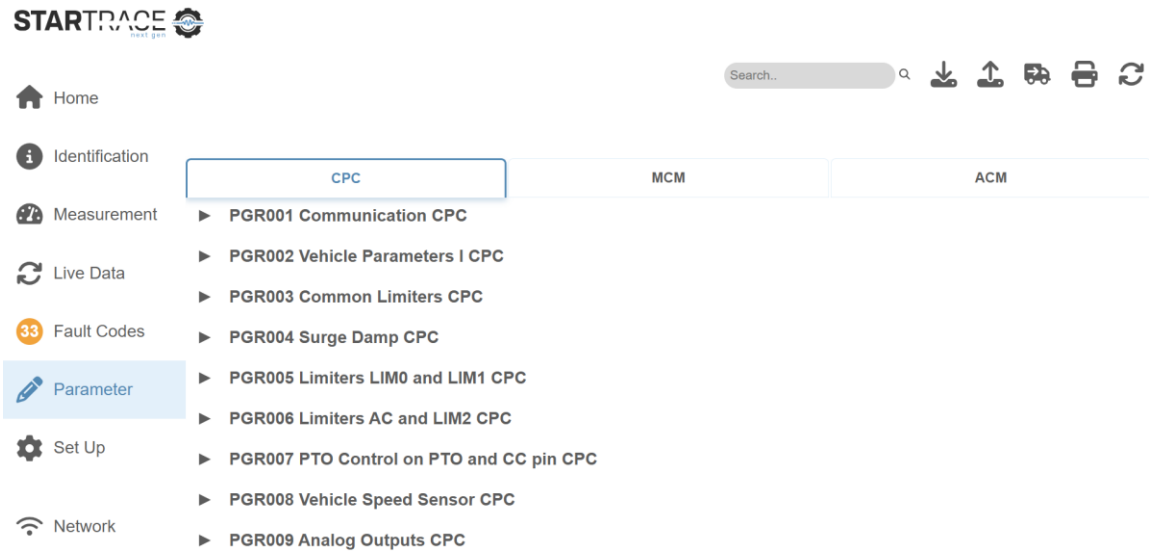

Figure 13: Parameter

The menu **Parameter** provides several functionalities to handle the calibration and variant coding of the ECUs.

- Save Parameter configuration to your device
- Load Parameter configuration from your device
- Write Parameters to the ECUs in the vehicle

4.7.1 Save Parameters Configuration to your Device

Parameter values can be changed by expanding the headings, and by typing in the new value or choosing it from a drop-down menu as shown in Figure 14.

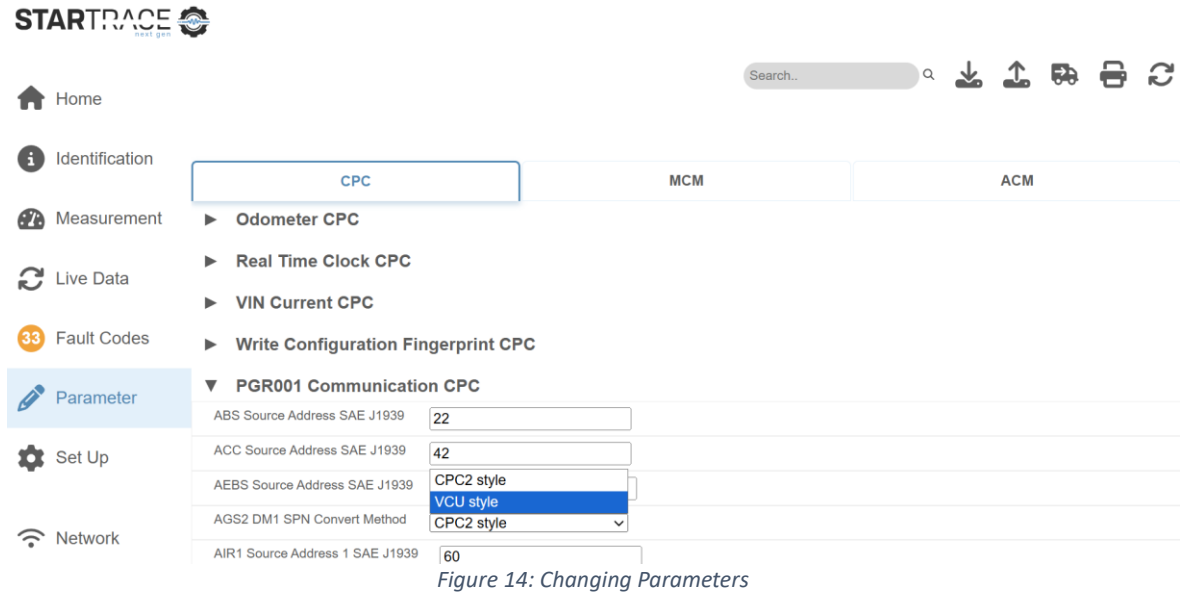

Figure 14: Changing Parameters

A success message will be shown:

Figure 15: Success Message for saving a parameter value

By pressing this button..

…the changes are saved in the **Downloads** folder of your device.

4.7.2 Load Parameter Configuration from your Device

By pressing this button...

… a file explorer dialog is opened, where you have to choose the corresponding parameter file.

4.7.3 Write Parameters to the ECUs

By pressing this button…

…a dialog shows up, where the user is confronted with the changes made, as depicted in Figure 16.

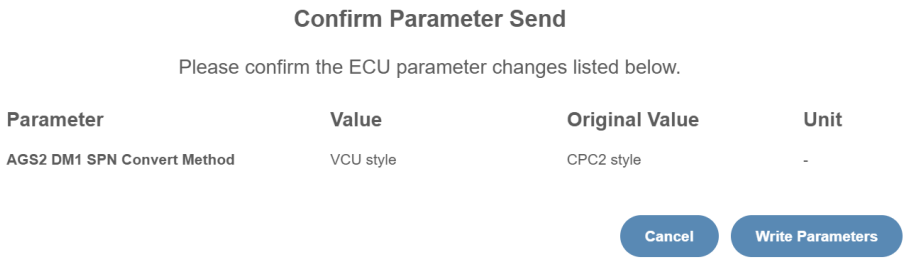

Figure 16: Dialog for changed Parameters

By pressing the button **Write Parameters** the shown parameters are written to the ECU, which is shown with a success message.

Figure 17: Success message for written parameter

!Attention!
All buttons related to parameter functionalities, only work for the ECU, which is shown currently in the tab.

4.8 Setup

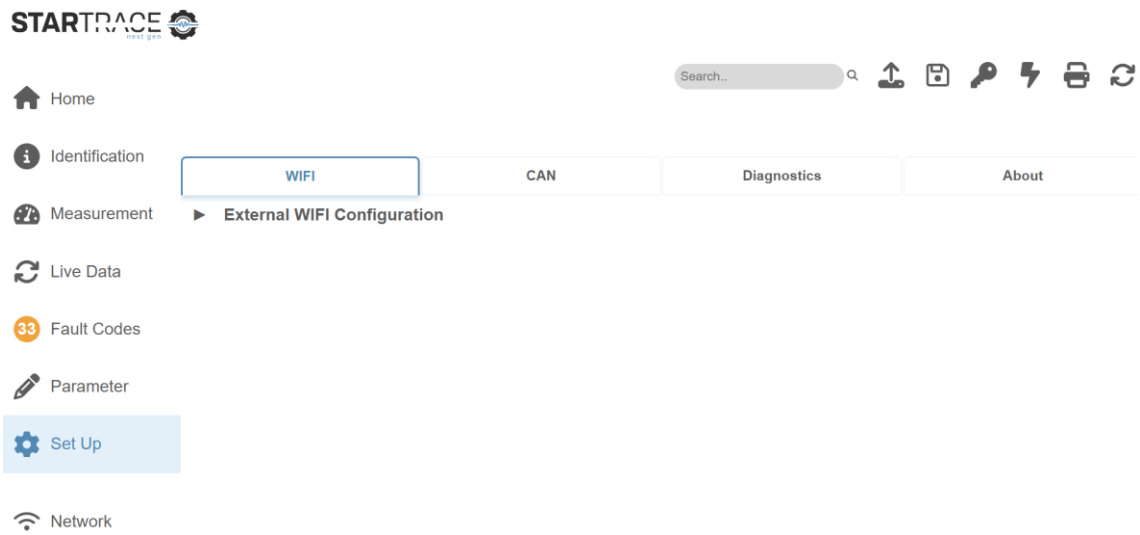

Figure 18. Setup

In the **Setup** menu, the configurations for the following topics can be viewed or edited:

- WIFI
- CAN
- Diagnostics
- About

4.8.1 WIFI

The Wi-Fi settings were already explained in Chapter 3.2.

4.8.2 CAN

The CAN Bus properties can be changed regarding:

- Pin Configuration
- Baudrate

The **Pin Configruation** can be changed from the combination:

- RX GPIO: Pin 44
- TX GPIO: Pin 43

To the combination:

- RX GPIO: Pin 17
- TX GPIO: Pin 18

This is needed, since some vehicles have their CAN interface on different pins on the OBD-2 socket.

The **Baudrate** is the data transfer rate of the CAN Bus, and it can be chosen from the following options:

- 125 kBit/s
- 250 kBit/s
- 500 kBit/s
- 1000 kBit/s

4.8.3 Diagnostics

The diagnostic properties can be changed regarding:

- P2 Client
- Tester Present Refresh Rate
- Live Data Refresh Rate

The **P2 Client** specifies a time value, which is the timeout for receiving messages from the ECUs. It can be chosen between 500 and 5000 ms.

The **Tester Present Refresh Rate** specifies the time between Tester Present messages, which represent an alive ping in vehicle diagnostics. Again, it can be chosen between 500 and 5000 ms.

The **Live Data Refresh Rate** represents the time intervals between the refreshment of the data in the menu **Live Data**. Again, it can be chosen between 500 and 5000 ms.

4.8.4 Saving the Setup

By pressing this button…

…the new data is written to your Startrace device. The device is rebooting directly afterwards.

Figure 19: Rebooting after saving setup

After the reboot has finished, the following and the connection is established once again, the following sign is shown.

Figure 20: Rebooted Successfully

4.8.5 Adding a new license to the device

4.8.6 Updating the software of your StarTrace Device

5 LED Indications

The LED, which can be seen from outside the housing, indicates the status of the device.

Color	Status
Red	Device is starting up
Magenta	Start-up has finished
Yellow	User device is connected to the local **Startrace_WIFI**
Blue	User device is connected to the webserver

6 StarTrace Health Report Example

StarTrace Health Report

CPC			0611
Device Information			
Software Version	R44_0_0A	Diagnostic Variant	6
Diagnostic Version	17	Shift Map Part Number	No DataNo Data
ECU Serial Number	13.8402.00643	Hardware Part Number	A 003 446 88 02 ZGS 001
Software Part Number	A 025 448 56 02 ZGS 001	Software Date	2019/6/4 10:33 GMT
Real Time Clock	2025/August/31 11:12:29 GMT		
Vehicle Identification			
VIN	AAAAAAAAAAAAAAAAA	Engine Serial Number	935912C1234566
Odometer	0		
Device Configuration			
Software Mode	Running in Application		
Fault codes	**Total: 4**	**Active: 4**	**Stored: 0**

6B0004	Air Filter Sensor failed low			ACTIVE
Counter	Frequency Counter	2	Healing Timer	80 hr
Time Stamp	First Occurrence	14.07.2025 16:47:13		
	Last Occurrence	14.07.2025 16:47:13		
	Seconds Active	7392 sec	Seconds Inactive	2 sec
Physical Data	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	-10 °C	Intake Manifold Boost Pressure	0 bar
	Engine Percent Load	0 %	Vehicle Speed	0 km/h
	Extreme Parameter	0x0		

540005	Vehicle Speed Sensor Open Circuit			ACTIVE
Counter	Frequency Counter	1	Healing Timer	255 hr
Time Stamp	First Occurrence	14.07.2025 16:47:14		
	Last Occurrence	14.07.2025 16:47:14		
	Seconds Active	7390 sec	Seconds Inactive	0 sec
Physical Data	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	-10 °C	Intake Manifold Boost Pressure	0 bar
	Engine Percent Load	0 %	Vehicle Speed	0 km/h
	Extreme Parameter	0x0		

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6F0003	Coolant Level Circuit Failed High			ACTIVE
Counter	Frequency Counter	1	Healing Timer	255 hr
Time Stamp	First Occurrence	14.07.2025 16:47:41		
	Last Occurrence	14.07.2025 16:47:41		
	Seconds Active	7337 sec	Seconds Inactive	0 sec
Physical Data	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	-10 °C	Intake Manifold Boost Pressure	0 bar
	Engine Percent Load	0 %	Vehicle Speed	0 km/h
	Extreme Parameter	0x0		

A8000E	ECU powerdown not completed (Main Battery Terminal Possibly Floating)			ACTIVE
Counter	Frequency Counter	1	Healing Timer	32 hr
Time Stamp	First Occurrence	31.08.2025 09:50:45		
	Last Occurrence	31.08.2025 09:50:45		
	Seconds Active	4908 sec	Seconds Inactive	0 sec
Physical Data	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	-10 °C	Intake Manifold Boost Pressure	0 bar
	Engine Percent Load	0 %	Vehicle Speed	0 km/h
	Extreme Parameter	0x0		

MCM			0BEE
Device Information			
Software Version	12.12.0.3	Diagnostic Variant	11
Diagnostic Version	238	ECU Serial Number	0037182031
Hardware Part Number	A 001 446 34 35 ZGS 002	Software Part Number	A 038 448 86 35 ZGS 001
Vehicle Identification			
VIN	HOLMER	Engine Serial Number	935912C1234566
Engine Type	S	Engine Operating Hours	641h
Device Configuration			
Fuelmap Part Number		Fuel Map Description	R_M121203_3TL555S085
Certification Number	OM473LA.E5-1-S00	Software Mode	Running in Application
Rating Code	No Data	Application Code	No Data
Application Code Part Number	WDA800210C40027790		
OBD			
Calibration ID	4CC03 0000000	Calibration Verification Number	0xCA6F0606
Fault codes	**Total: 13**	**Active: 0**	**Stored: 13**

56F3FF	MU_SCM_E2P_DATA_INVALID			ACTIVE
Counter	Occurence Counter	1	Seconds Active Counter	65535 s
	DC Hours Inactive Counter Healing	0 h		
Time Stamp	First Occurrence	17.08.2025 08:52:53		
	Last Occurrence	17.08.2025 08:52:53		
Physical Data	env cpc first seconds	53 SEC	env cpc last seconds	53 SEC
	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	Signal not available °C	Boost Pressure	Signal not available mbar
	Calculated Load Value	0 %	Vehicle Speed	Signal not available km/h
	Last vehicle speed	Signal not available km/h	Reserved for Extreme Parameter	-1
	Ambient Air Temperature	-25.5 °C		

46F0E9	**FBS3 Injection Inhibit due to Keyline Lock**			**ACTIVE**
Counter	Occurence Counter	1	Seconds Active Counter	65535 s
	DC Hours Inactive Counter Healing	0 h		
Time Stamp	First Occurrence	17.08.2025 08:52:53		
	Last Occurrence	17.08.2025 08:52:53		
Physical Data	env cpc first seconds	53 SEC	env cpc last seconds	53 SEC
	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	Signal not available °C	Boost Pressure	Signal not available mbar
	Calculated Load Value	0 %	Vehicle Speed	Signal not available km/h
	Last vehicle speed	Signal not available km/h	Reserved for Extreme Parameter	-1
	Ambient Air Temperature	-25.5 °C		
46F0F3	**FBS3 Injection Inhibit due to Missing EIS CAN Signals**			**ACTIVE**
Counter	Occurence Counter	1	Seconds Active Counter	65535 s
	DC Hours Inactive Counter Healing	0 h		
Time Stamp	First Occurrence	17.08.2025 08:52:53		
	Last Occurrence	17.08.2025 08:52:53		
Physical Data	env cpc first seconds	53 SEC	env cpc last seconds	53 SEC
	Engine Speed	0 rpm	Engine Torque	0 Nm
	Engine Coolant Temperature	Signal not available °C	Boost Pressure	Signal not available mbar
	Calculated Load Value	0 %	Vehicle Speed	Signal not available km/h
	Last vehicle speed	Signal not available km/h	Reserved for Extreme Parameter	-1
	Ambient Air Temperature	-25.5 °C		
2A1504	**FMU Low Side Short-Circuit to Ground**			**ACTIVE**
Counter	Occurence Counter	1	Seconds Active Counter	65535 s
	DC Hours Inactive Counter Healing	0 h		

ACM			0F52
Device Information			
Software Version	...	Diagnostic Variant	15
Diagnostic Version	82	ECU Serial Number	00
Hardware Part Number	A 000 446 44 54 ZGS 001	Software Part Number	
Vehicle Identification			
VIN	PONS42ECCAA020014		
Device Configuration			
Fuelmap Part Number	A 026 448 76 54 ZGS 001	Certification Number	No Data
Application Code	0000000000	Application Code Part Number	123456789
OBD			
Calibration ID	2Et70MDEG0000000	Calibration Verification Number	0xC423E5D5
Fault codes	**Total: 16**	**Active: 0**	**Stored: 16**

210D05	DEF Dosing Valve Circuit Failed Open			ACTIVE
Counter	DTC Occurence Counter	1	Seconds Active Counter	65535
	DC Hours Inactive Counter	0 h	CAN Torque Lim Nox State	CAN error, SNA is active
	CAN Ambient Air Temperature	CAN is running	CAN Exgas Mass Flow Rate	CAN is running
	CAN Torque Current	CAN is running	CAN Vehicle Speed first occurence	CAN error, SNA is active
	CAN Vehicle Speed last occurence	CAN error, SNA is active	CAN Thermomanagement status	CAN is running
	CAN Engine Speed	CAN is running	CAN EOM State	CAN is running
	CAN Inhibit Regenration	CAN is running	CAN Regeneration Activation Request	CAN is running
	CAN Torque Actual	CAN is running	CAN Engine Hours first occurence	CAN is running
	CAN Engine Hours last occurence	CAN is running	CAN Total Vehicle Distance first occurence	CAN is running
	CAN Total Vehicle Distance last occurence	CAN is running		

Time Stamp	First Occurrence	17.08.2025 08:52:58		
	Last Occurrence	17.08.2025 08:52:58		
Physical Data	env first seconds	58 s	env last seconds	58 s
	Actuator State	0	DPF CAN condition idle	0x3
	DPF staus	2	DPF HC flag	0x0
	DPF Regeneration flag	0x0	DPF SP thermo status	No TM
	DPF State status	2	Reserved	255
	Ext Environment Data	65535	Ambient air temperature	-28 °C
	Vehicle Speed first occurance	0 km/h	Vehicle Speed last occurance	0 km/h
h Data Record B1 Counter	B1 Counter	Unknown h		
AA0C03	**DOC Inlet Temperature Circuit Failed High**			**ACTIVE**
Counter	DTC Occurence Counter	1	Seconds Active Counter	64322
	DC Hours Inactive Counter	0 h	CAN Torque Lim Nox State	CAN error, SNA is active
	CAN Ambient Air Temperature	CAN is running	CAN Exgas Mass Flow Rate	CAN is running
	CAN Torque Current	CAN is running	CAN Vehicle Speed first occurence	CAN is running
	CAN Vehicle Speed last occurence	CAN is running	CAN Thermomanagement status	CAN is running
	CAN Engine Speed	CAN is running	CAN EOM State	CAN is running
	CAN Inhibit Regenration	CAN is running	CAN Regeneration Activation Request	CAN is running
	CAN Torque Actual	CAN is running	CAN Engine Hours first occurence	CAN is running
	CAN Engine Hours last occurence	CAN is running	CAN Total Vehicle Distance first occurence	CAN is running
	CAN Total Vehicle Distance last occurence	CAN is running		
Time Stamp	First Occurrence	17.08.2025 18:02:38		
	Last Occurrence	17.08.2025 18:02:38		
	env first seconds	38 s	env last seconds	38 s

7 About

This user manual applies to the software release 1.0.29

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