
HMI User Manual

E-Truck



Translation of the original document

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	Failure to comply with this instruction may result in damage to the product.	
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Validity

This manual only applies to the units listed in the following table:

Model	Type	Version
E-TRUCK	LOW CAB	V2.2
E-TRUCK	MID CAB	V2.2
E-TRUCK	MID CAB X	V2.2
E-TRUCK	HIGH CAB	V2.2

Table of content

1	Foreword	5
2	General information.....	6
2.1	Page description	6
2.2	Information bar	6
3	Views.....	7
3.1	Main view	7
3.1.1	Power scale.....	7
3.1.2	State of charge (SoC) of the battery.....	8
3.1.3	Driving status graph.....	8
3.1.4	Charging status graph	9
3.2	App dashboard.....	9
3.3	Battery.....	10
3.3.1	Overview Battery	10
3.3.2	Detail view battery	10
3.4	Drive.....	11
3.4.1	Overview Drivetrain	11
3.4.2	Detail view	11
3.5	Charging	12
3.5.1	Overview Charging	12
3.5.2	Detail view charging	12
3.6	System.....	13
3.6.1	Overview System	13
3.6.2	Detail view system	14
3.7	Messages	15
3.7.1	Overview messages	15
3.7.2	Specific messages.....	16
3.8	Pop-ups	16
3.9	Settings	17
3.9.1	Driver settings	17
3.9.2	Owner settings	18
4	Description of functions.....	20
4.1	Limited permanent brake warning	20
4.2	Gear change indication.....	20

1 Foreword

This user manual explains the use and functions of the e-truck HMI (driver display). System-relevant information is shown via the HMI.

All values shown in the screenshots are sample values and not real values. They serve to illustrate the various functions of the HMI.

2 General information

2.1 Page description

Each page has an information bar at the top of the screen. Most views have a graphical overview and a detailed view. You can navigate between both views.

The following table lists all views:

Main views ->	<-App-view	<- View 1 ->	<- View 2 ->	<- View 3
Driving	App overview	Overview Battery	Detail view Battery	-
		Overview Drive	Detail view Antrieb	
		Overview Charge	Detail view Laden	
		Overview System	Detail view System	
Charging		Overview Messages	Specific messages	
		Settings	Settings driver	Settings driver
			Settings owner	Settings owner
			Settings service	Settings service

2.2 Information bar

The information bar (see illustration below) can be found at the top edge of the screen on each page. Here, the information about vehicle status (2) and messages (4) are displayed. The vehicle status shows whether the high voltage has already been switched on or not. If HV is not switched on, a cross is shown after the designation "HV". As soon as HV is switched on, the icon changes from a cross to a tick.

The message icon (4) shows the pending messages of the vehicle control and their message type. The function of the icon is described in more detail in chapter 3.8.

The arrows (1 & 6) can be used to navigate between the different pages. The table in the previous sub-chapter shows how the pages are arranged in relation to each other. The DW logo (3) can be used to jump from the views back to the app overview.

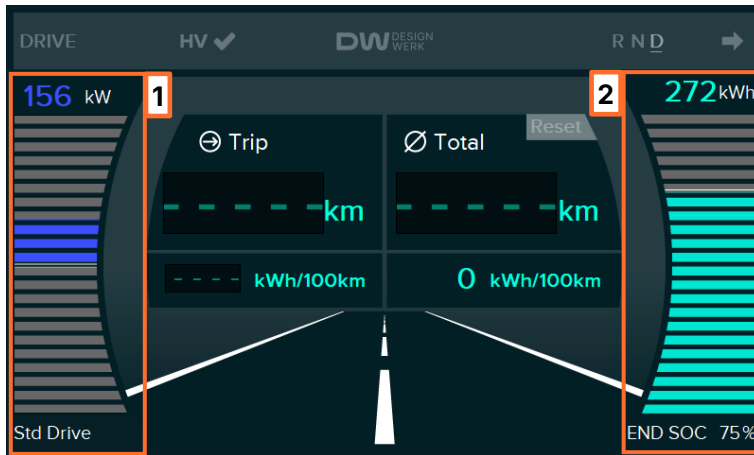
The status of the gear selection (5) is also shown on the main view. "R" stands for backwards, "N" for neutral and "D" for forwards.



3 Views

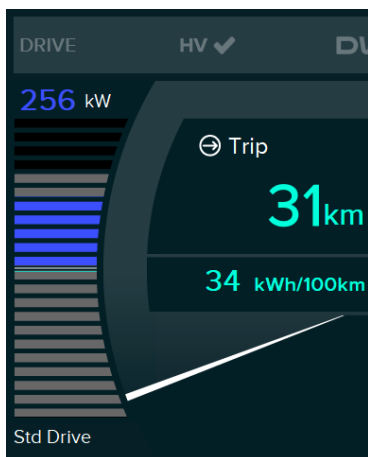
3.1 Main view

The main view displays the most important information about the vehicle. There are three areas: On the left the power scale (1), on the right the battery charge level (2), and in the middle information about the current vehicle condition is displayed. There are two different displays for the view in the middle. One contains information about driving, the other about charging.



3.1.1 Power scale

The power scale shows the current consumption of the vehicle, whereby the centre of the power scale means 0 kW consumption. Above the graphic power display, the value is shown as a number in kW. When power is drawn by the vehicle, this is shown as a positive number and therefore blue, and the power scale is visualised in blue according to the power. This is the case when power is drawn by components (e.g. traction motors, PTO, power steering, etc.). If power is drawn from the vehicle, this is shown as a negative number and therefore green, and the power scale is visualised green according to the power. Power is absorbed either during charging or during recuperation.



If the full power of the vehicle is not available, the corresponding area of the power scale is coloured black. This can occur with low SoC (consumption power is limited), or high SoC (charging and recuperation power is limited). Other factors, such as the temperature of the components or the set power mode, can also influence this power limitation. In the illustration, the consumption power of the vehicle is limited by the low SoC.

3.1.2 State of charge (SoC) of the battery

The set final charge level (END SOC) is shown in percent as a number (3) and graphically with a white line (1). The value can be adjusted in the "Charging overview" view.

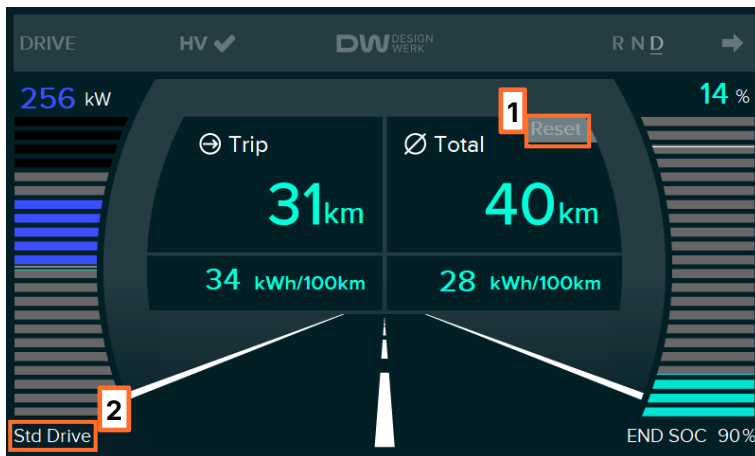
Tapping the graphic SoC display (2) changes whether the value is displayed in percent or in kWh.



3.1.3 Driving status graph

The driving information in the centre shows the current, average consumption of the last kilometres and the corresponding range. In addition, a consumption and range value is displayed under "Total", which can be reset via the "Reset" button (1).

On the left under the power scale, the currently used power mode (2) of the e-truck is displayed. A distinction is made between three different modes: "Standard mode" is preset, "Reduced mode" can be used for loading and unloading trailers or containers and "Eco mode" can be used for finer driving behaviour.

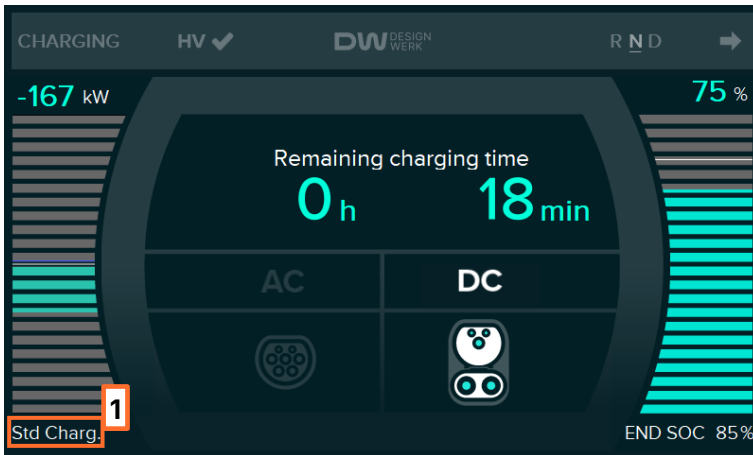


As long as the truck is not in charging mode, the driving information is displayed. By tapping the centre of the screen, you can switch between driving and charging information.

3.1.4 Charging status graph

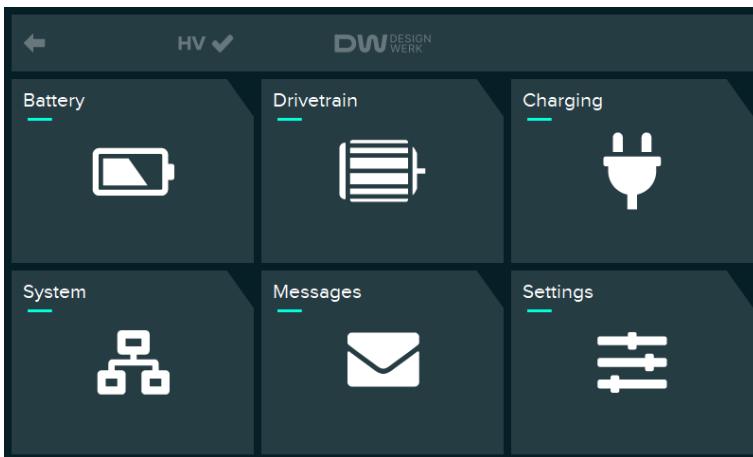
As soon as the vehicle is connected to a charging system, the status graphic automatically switches to charging information. A graphic shows whether charging is taking place with a "Type 2" plug (AC) or with a CCS plug (DC). Depending on the current charging power, the remaining charging time is displayed.

On the left under the power scale, the DC charging mode (1) currently in use is displayed. By default, charging takes place with 400 volts (Std Charg.). If the option is installed in the vehicle, high-performance charging with 800 volts (High Charg.) can be activated via the "Detailed view charging" view.



3.2 App dashboard

In the app overview, you can select between the different tabs. If no selection has been made for 30 seconds, the display switches back to the main view.

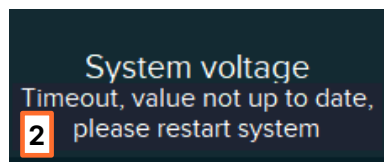
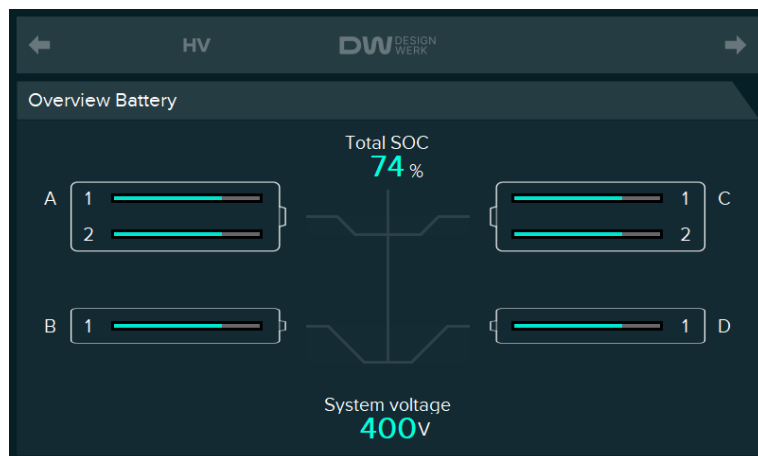


3.3 Battery

3.3.1 Overview Battery

The "Battery" tab takes you to the graphic overview of the battery. The installed high-voltage batteries are displayed here with their strings. The SoC of the individual strings is displayed graphically. As soon as a battery is connected, the line to the "Total SoC" is shown in green (1).

The system voltage is displayed at the bottom edge of the screen. This view is used for decommissioning. If the HMI no longer receives a value from the vehicle control, a corresponding information is displayed instead of the value (2).



3.3.2 Detail view battery

The arrow at the top right of the "Overview Battery" view switches to the detailed view of the battery. Here, information about the entire system on the cell voltages and the cell and coolant temperatures is listed. In addition, there is a list of all installed batteries and their strings. For each string, the voltage, the SoC and the status are displayed.

The colours of the string names indicate the status of the individual strings. The meaning is as follows:

- grey → configured in the system, but not available
- blue → available
- green → connected
- red → error status

The SoC values are displayed in green by default. Low SoC values are signalled with the colour. Values from 10 to 15 % are displayed orange, values below 10 % are displayed red.

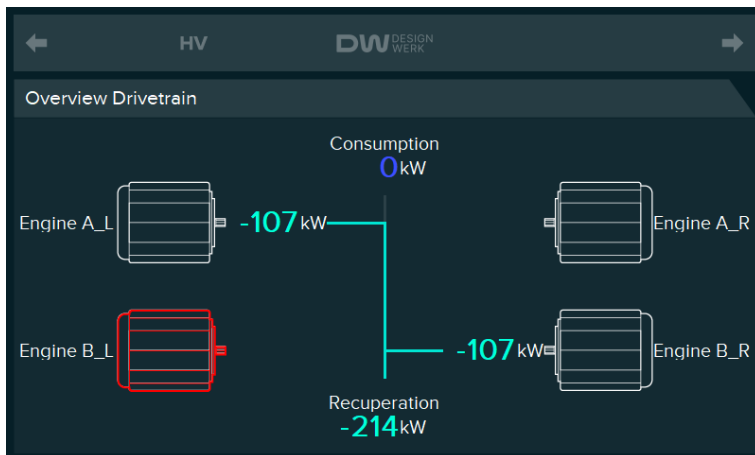
Cell general		Battery A		Battery C	
Min. cell voltage	3152 mV	String A 1	376 V 63 %	String C 1	373 V 63 %
Max. cell voltage	3765 mV	String A 2	375 V 63 %	String C 2	376 V 63 %
Min. cell temp.	29 °C	String A 3	376 V 63 %	String C 3	375 V 63 %
Max. cell temp.	34 °C	String A 4	374 V 63 %	String C 4	372 V 63 %
Coolant temp.		Battery B		Battery D	
In	24 °C	String B 1	375 V 63 %	String D 1	330 V 25 %
Out	31 °C	String B 2	376 V 63 %	String D 2	328 V 25 %
		String B 3	329 V 25 %	String D 3	315 V 10 %
		String B 4	328 V 25 %	String D 4	0 V 0 %

3.4 Drive

3.4.1 Overview Drivetrain

The "Drivetrain" tab takes you to the graphic overview of the drive. The individual motors and their status are shown here.

As soon as a motor is switched on, its power consumption and the green energy flow line are shown. If a motor is configured but not switched on, no energy flow line is shown. If a motor is in error status, it is shown in red.



3.4.2 Detail view

The arrow at the top right of the "Overview Drivetrain" view is used to switch to the detailed view of the drive. The temperature and pressure of the gear oil as well as the temperatures of the motors and the associated inverters are listed here.

The colour of the drive unit title shows its status. The same colour code is used for this as for the strings of the high-voltage battery:

- grey → configured in the system, but not available
- blue → available
- green → connected
- red → error state

HV		DW DESIGN WERK	
Gearbox		Motor A_L	Motor A_R
Temperature	28 °C	Motor	29 °C
Pressure	0.0 bar	Inverter	28 °C
		Motor B_L	Motor B_R
		Motor	72 °C
		Inverter	83 °C
		Motor B_R	Motor B_R
		Motor	21 °C
		Inverter	26 °C

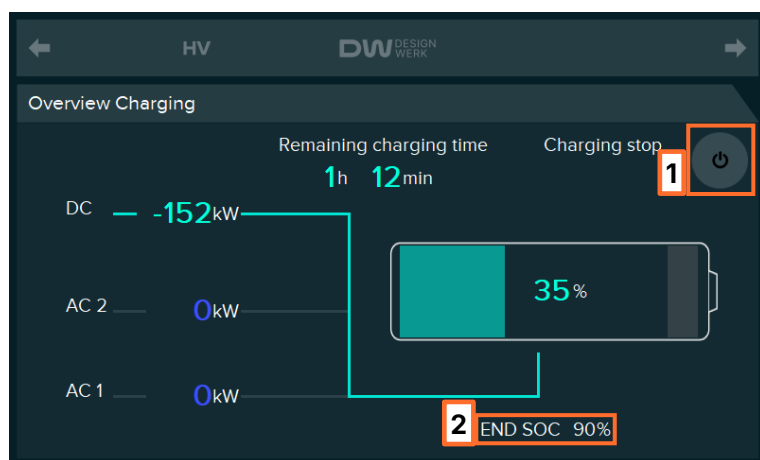
3.5 Charging

3.5.1 Overview Charging

The "Charging" tab takes you to the graphic overview of the charging systems. All charging options installed in the vehicle are displayed here. If one or more charging systems are active, the power consumption and the green energy flow line to the corresponding system are displayed.

By tapping on "End SoC" (2), this can be temporarily adjusted. The set value is visualised on the battery graphic with the greyed-out area. After a system restart, the End SoC is reset to the default value.

The charging process can be stopped via the button at the top right (1). With the DC charging socket on the vehicle, it can happen that the locking mechanism is activated too early and the DC plug can no longer be plugged in. In this case, the DC charging socket can be unlocked via this button.



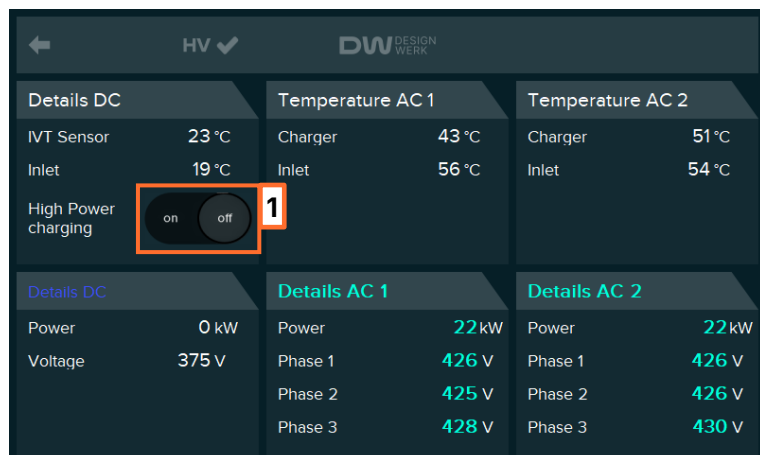
3.5.2 Detail view charging

The arrow at the top right of the "Overview Charging" display switches to the detailed view of the charging systems. Temperatures, voltages and power ratings of the installed systems are listed here.

Relevant temperatures of the individual systems are displayed in the upper half of the screen. If a system is not active, it is possible that no values are available yet. In this case, the value "0 °C" or "-" is displayed.

If the option for High Power charging with 800 volts is installed in the vehicle, a button (1) is also displayed in the "Details DC" tab, via which this function can be switched on. After a system restart, this setting is reset to the default value. The default value can be adjusted via the owner settings.

In the lower half of the screen, the power and voltage of the individual systems are displayed.

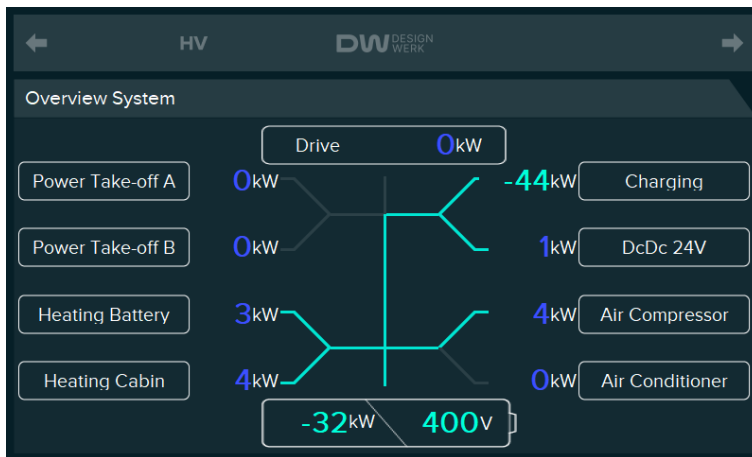


3.6 System

3.6.1 Overview System

The "System" tab takes you to the graphical overview of the system. The installed high-voltage components are displayed here. Energy flow lines visualise where the energy is distributed in the vehicle. As soon as a component either draws power or delivers power to the system, the energy flow line of this component turns green. The power values are positive and are shown in blue if energy is flowing out of the battery or into the components. Negative power values are shown in green.

The system voltage is displayed at the bottom edge of the screen in the battery symbol. This display is used for shutdown. If the HMI no longer receives a value from the vehicle control, a corresponding information is displayed instead of the value (1).



Timeout, value not up to date
please restart system 1

3.6.2 Detail view system

The arrow at the top right of the "Overview System" display switches to the detailed view of the system. Temperatures for various components are listed here. For the DCDC converter, voltage and current are also displayed.

If the Operating Hours view (1) is enabled, up to four different durations are displayed in hours and minutes.

- Total: High voltage active, excluding charging processes
- Drivetrain: Truck in motion
- PTO A/B: PTO in operation

HV		DW DESIGN WERK			
System		STE & DCDC		ACP & CCP	
Coolant	24 °C	STE Motor	22 °C	ACP Motor	23 °C
		STE Inverter	23 °C	ACP Inverter	28 °C
		DCDC	31 °C	ACP Compressor	26 °C
		DCDC	24 V 85 kWh	CCP	19 °C
HV Heating A & B		Power Take-off A & B		1 Operating Hours	
HVH A	75 °C	PTO A Motor	23 °C	Total	1'304:08 h
HVH B	81 °C	Inverter	30 °C	Drivetrain	1'240:51 h
		PTO B Motor	22 °C	PTO A	305:00 h
		Inverter	24 °C	PTO B	50:47 h

3.7 Messages

3.7.1 Overview messages

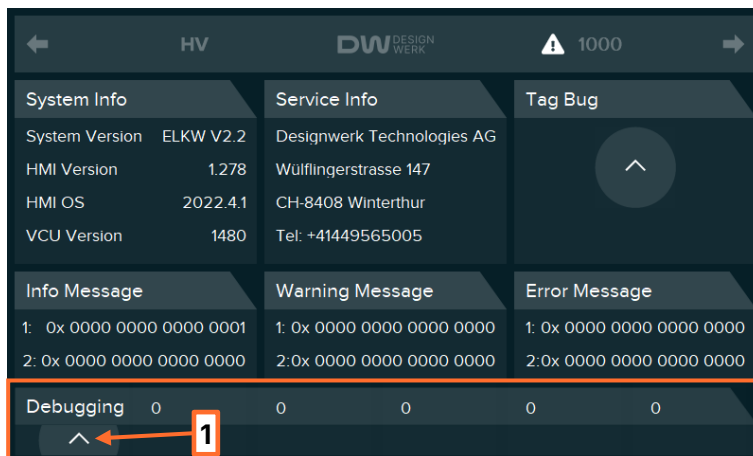
The "Messages" tab takes you to the overview of messages. In the event of an error, this information helps the Designwerk service department to find the cause of the error or to narrow it down.

The "System Info" tab lists the E-LKW version, the software and OS version of this HMI and the VCU version (software E-LKW). Under "Service Info", the contact details of the Designwerk service department are noted.

In the three middle tabs, the current messages of the vehicle are summarised and displayed in hexadecimal notation. All messages are also displayed as a pop-up (see chapter 3.8).

Using the button "Tag Bug", the driver can mark the time of the error on the log file during vehicle operation. This helps to narrow down errors described by the driver if the data on the HMI is not sufficient for an analysis and the detailed log data must be consulted. The log data is stored locally on the vehicle.

In the "Debugging" tab, the service department can view additional troubleshooting information. Tapping on the five items increments or decrements the corresponding signal number. The arrow button (1) determines the direction of the count.



3.7.2 Specific messages

The arrow at the top right of the "Message overview" display switches to the view of the specific messages. Messages and error values of individual components are listed here. In the event of an error, this information helps the Designwerk service department to find the cause of the error or to narrow it down.

The button "Show active Pop-ups" can be used to display pop-ups that have already been confirmed but are still pending. This can be useful to re-read the message descriptions on the pop-ups. Messages that are no longer active can no longer be displayed via this button.

Warning Drivetrain		Error Drivetrain		Error Charging	
A_L:0x 0000 0000 0000 0000		A_L:0x 0000 0000 0000 0000		AC1	0x 0
A_R:0x 0000 0000 0000 0000		A_R:0x 0000 0000 0000 0000		AC2	0x 0
B_L:0x 0000 0000 0000 0000		B_L:0x 0000 0000 0000 0000		DC1	0x 0
B_R:0x 0000 0000 0000 0000		B_R:0x 0000 0000 0000 0000			
Error auxiliary		Error auxiliary		 Show active Pop-ups	
DCDC:	0x 0	PTO_A:	0x 0000 0000 0000 0000		
STE:	0x 0	PTO_B:	0x 0000 0000 0000 0000		
CCP:	0x 0	HVH_A:	0x 0		
ACP0x 0000 0000 0000 0000		HVH_B:	0x 0		

3.8 Pop-ups

The pop-ups display messages about the vehicle and its components collected by the vehicle control unit (VCU). These messages are divided into three categories: Information (white), Warning (orange) and Error (red). A pop-up contains a unique Msg ID, a description and a confirmation button. The Designwerk service department can use the Msg ID to look up detailed information about the corresponding message.

As soon as a message is present, the corresponding pop-up is displayed. A warning or error is also announced acoustically. If there are several messages, the one with the highest Msg-ID is displayed. This Msg ID is also displayed in the information bar at the top edge of the screen as an icon (white, orange, red) and in the views of the messages with icon and ID.

The pop-ups can be closed via the confirmation button. The icon in the information bar remains visible as long as the corresponding message is present (independent of the pop-up).



3.9 Settings

Via the "Settings" tab, one jumps to the overview of the different settings areas. There are settings for the driver, the owner, the service staff and the factory settings. The "Owner settings" area is password-protected, whereby the password is transferred to the customer by Designwerk. The "Factory settings" are also password-protected and reserved for Designwerk.

3.9.1 Driver settings

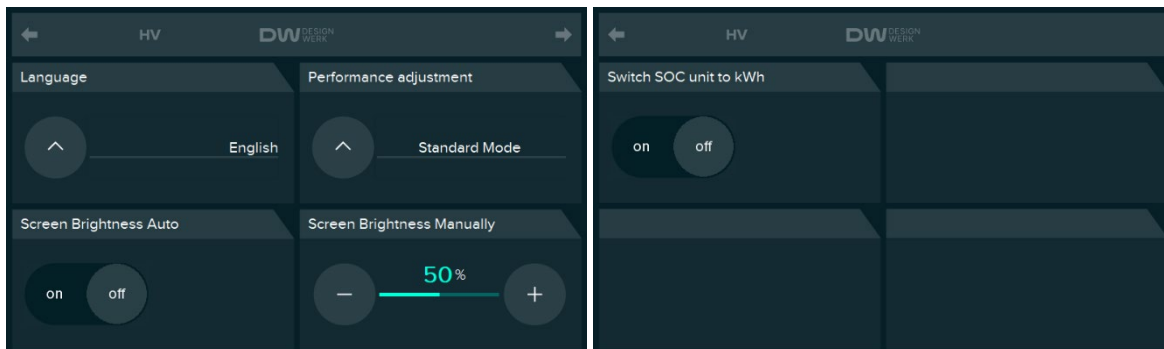
In the driver settings, adjustments can be made to the display. The languages German, French and English are available. The screen brightness can be set manually or automatically adjusted to the ambient brightness.

In addition, the power mode can be changed. The following modes are available:

- Standard mode
- Eco mode → Power reduction
- Reduced Mode → Power and Torque Reduction

After a system restart, the power mode is reset to the default value. The default value can be adjusted via the owner settings.

On the second page of these settings, it can be switched whether the value of the battery charge level is displayed on the main view in percent or in kWh. This change is also possible directly on the main view by tapping the graphical SoC display.



3.9.2 Owner settings

The settings for the owner are password protected. The password is transferred to the customer by Designwerk. Default settings can be defined here and telephone numbers for charge termination notifications can be saved.

Performance adjustment

Under "Performance adjustment", the default value to the power modes can be defined in the driver settings.

Default charging mode

If the option for high-performance charging with 800 volts is installed in the vehicle, it is defined under "Default charging mode" whether charging with 800 volts is to be carried out by default. After a system restart, these default values are loaded.

Monitoring phone number directory

On the second page of these settings, telephone numbers for a charge termination warning via SMIS can be stored.

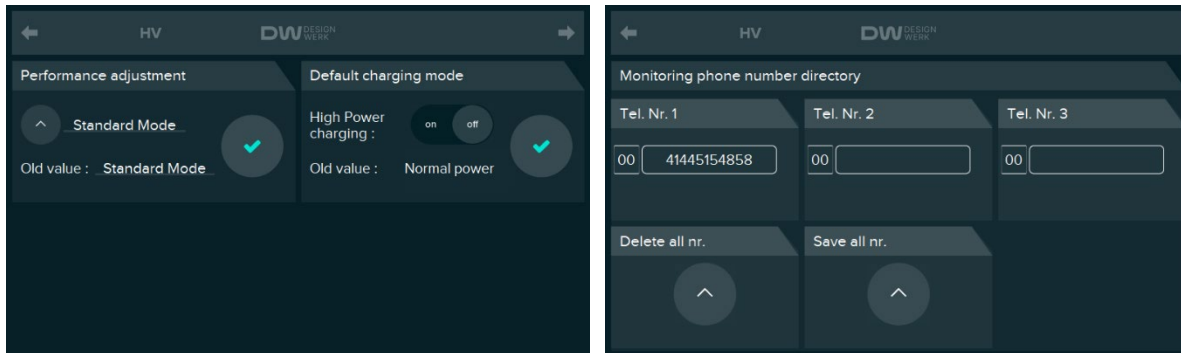
	INFORMATION
	Enabling the "SMS notification of charge interruption" option The option for notification of a charge interruption via SMS is not configured by default. In order to use this option, it must be explicitly enabled by Designwerk. To do this, please contact Designwerk directly.

In the event of a premature charge termination, e.g. in the event of a power failure, information can be sent by SMS. Up to three telephone numbers can be saved. The unused fields are left blank. When entering the telephone numbers, the following points must be observed:

- Only numbers from the EU area are accepted.
- The number must consist of 6 - 15 digits.
- The international country code is included, but the "00" or the "+" at the beginning of the number is omitted.

If a number does not meet these criteria, a corresponding note is shown in the lower right corner of the display.

With the button "Delete all nr." all stored numbers are removed from the directory. If a single number is no longer to be used, it can be deleted from the input field. Subsequently, the directory is overwritten with the current view with "Save all nr.". After successfully saving a number, a tick is displayed behind the number.

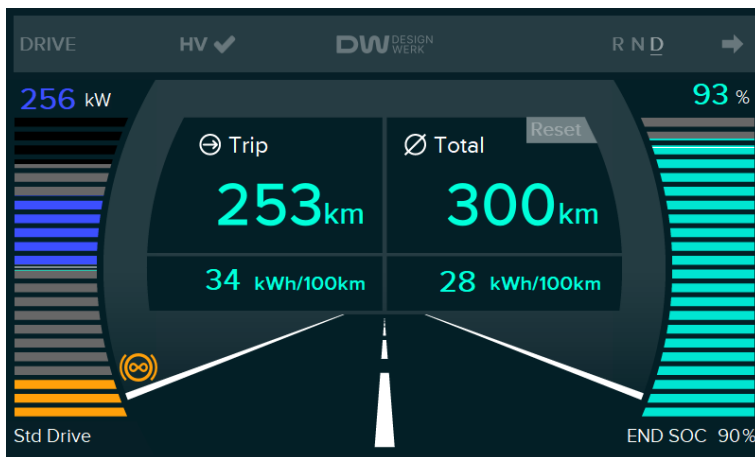


4 Description of functions

4.1 Limited permanent brake warning

If the SoC is high ($> 90\%$), it may no longer be possible to call up the full continuous braking power. For this reason, this is indicated with pop-ups and the graphic display.

- With a SoC of over 90% , the non-usable power is no longer displayed in black but in orange in the power scale. In addition, an orange continuous brake symbol is displayed.
- When the final SoC is changed to over 90% , a warning pop-up indicates that limited continuous braking power is to be expected.
- If recuperation effectively takes place for several seconds and the necessary power for continuous braking cannot be absorbed, a warning pop-up indicates the reduced continuous braking power.



4.2 Gear change indication

In addition to the gear selection status display on the main view, the gear selected is displayed in large for 5 seconds when a gear is changed. This display is shown every time a gear is changed, regardless of which view is currently displayed.

Example:

