

User Manual

DEUTZ® Engine Display

English Edition



The engine company.

DEUTZ® Engine Display

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i- Document Changes

| Revision | Date | Chapter | Author | Changes |
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| 0.1 | 30.10.2019 | - | Yüksekkaya | Draft is created |
| 0.2 | 04.05.2021 | Multiple | Yüksekkaya | Multiple |
| 1.0 | 11.05.2021 | Multiple | Leier | From draft to completion – V1.0 |
| 1.1 | 14.05.2021 | 1 | Leier | Modified text |
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| 1.2 | 10.06.2021 | Multiple | Leier | New chapter 6 added: Troubleshooting, Chapter numbers changed: (7->8; 8->9; 9->10) |
| | 10.06.2021 | 5.2.3 | Leier | Corrected text: wrong button number |
| | 10.06.2021 | Multiple | Leier | Modified text |
| | 10.06.2021 | 5.8 | Leier | Table 4 corrected: Reduction Levels and Reasons |
| | 10.06.2021 | 8 | Leier | Information added |
| 1.3 | 28.06.2021 | 3.1 | Leier | Exchange Assembly view |
| 1.4 | 27.07.2021 | 5.2.4.3 | Geueke | Image adjustment and text enhancement |
| | 27.07.2021 | 5.4.2 | Geueke | Subchapter "Reset oil change interval" inserted |
| 1.5 | 27.08.2021 | 7.1 | Geueke | Inserted new lamp-symbols (MIL and leakage-lamp) |
| 1.6 | 15.02.2021 | 5.2.5 | Geueke | Measured data page now includes a measured data table with symbols and measured value descriptions |
| 1.7 | 31.03.2021 | Multiple | Geueke | Configuration mode of the main screen |
| 1.8 | 04.08.2022 | 8 | Leier | Rewrite: Software Update via SerDia |
| | 04.08.2022 | 4 | Leier | General description: Actualize table "display features" |
| | 04.08.2022 | 7.1.7 | Leier | Delete HC-Cleaning lamp |
| | 04.08.2022 | 7.2 | Leier | Symbol description: Add hint and symbols, correct some symbols descriptions and add SPN-numbers. |
| | 04.08.2022 | 3.2 | Leier | Add Chapter "Configuration" |
| | 05.08.2022 | 5.9 | Leier | Corrected display texts of power reduction |
| 1.9 | 30.09.2022 | Many | Leier | Small corrections |
| 1.10 | 01.03.2023 | 5.3.1. | Leier | Text correction: Acoustic warning signal via internal buzzer |
| | 01.03.2023 | ii- | Leier | Additions to the foreword |
| | 25.04.2023 | 7, 8 | Geueke | Added new EDEUTZ chapter "Operation instructions - EDEUTZ" and "Lamps and symbols description - EDEUTZ" |
| | 25.04.2023 | Multiple | Geueke | Rearranged chapters to fit new EDEUTZ-chapters in overall structure |
| | -- | 10 | Geueke | Change of the update process |
| | 20.06.2023 | Multiple | Leier | ii Contents added to preface 4.2 Chapter added: Display functions for all systems 5.2.2 Diagnostic window: contents added 5.2.4.1 Chinese language selection added 5.5 Measured value selection also possible for tachometers 5.7 Section added: Dynamic menu bar 5.8 Signal range evaluation: CAN signal raw values in table added 6.2 Symbol description of measured values added 9 Troubleshooting: Supplements 10.4 Release 1.5.0.0 added to table |

| | | | | |
|--|--|--|--|-------------------------------|
| | | | | Formatting of figures changed |
|--|--|--|--|-------------------------------|

The DEUTZ AG reserves changes to this user manual.

ii- Foreword

New Display

A new Display has been developed to increase the usability of Deutz systems with Deutz displays. It is compatible with all current Deutz machines that have an electronic engine control with activated CAN bus. It is called DEUTZ® Engine Display. It shows relevant measurement values and diagnostics of DEUTZ engine and aftertreatments and is compliant with today's and future Human Machine Interface requirements.

The display meets the HMI requirements demanded by Deutz. Specific requirements for an HMI for diesel engines include among other things:

- Show DEF level on the main page.
- Show warning lights with symbols: Diagnostic lamp, SCR lamp / EAT Inducement lamp, DPF lamp, high temperature lamp, ash lamp.
- Show power reduction and cause.

The DEUTZ® Engine Display can be updated via SerDia to benefit from new languages, bugfixes and functional extensions.

The new DEUTZ® Engine Display can replace existing DEUTZ Electronic Display easily, due to its Plug & Play capability in size (same installation space) and connection (identical wiring and pin assignment).

For more information see Deutz Technical Product Information: TPI 0199-51-0812.

Document Improvement

Our aim is to continuously optimize the contents of this document, whereby practical experience from the circle of readers is very valuable. So, if you want any changes, extensions or improvements made, please notify us accordingly (E-Mail: Application.de@deutz.com). We will examine all messages carefully and publish new editions of this document as soon as its content is changed.

Thank you in advance for your kind support.

1 Document Introduction

This document is to contain all the information necessary for installing and using the new DEUTZ® Engine Display (DED).

Please read these instructions fully before the installation and use.

This document assumes knowledge of other Deutz documents:

- Deutz CAN specifications
- Deutz connection diagram / equipment harness
- Assembly Instructions and Installation Guidelines for DEUTZ Exhaust Aftertreatment Systems (chapter Customer Interface EAT system – HMI)

2 Technical Data

The Technical Drawing you can see in chapter 11. The European Declaration of Conformity you can see in chapter 12.

Table 1: Technical Data

| SPECIFICATION | VALUE |
|--------------------------|--|
| Dimensions | 131 mm x 100 mm x 37 mm |
| Installation height | 21 mm |
| Weight | 260g |
| Display | 5.0" TFT LCD |
| Resolution / Ratio | 800 x 480 24-bit / 16:9 |
| Backlighting | Up to 1000cd/m ² (50.000 hr lifetime) |
| Operating voltage | 6 - 32 VDC (nom. 12VDC and 24VDC) |
| Max. current consumption | 1.4 A at 12VDC (of which 0.5 A for digital output) |
| Communication | CAN SAE J1939 interface with 250 kbit/s |
| Digital Output | Low side driver up to 500 mA for ext. alarm |
| Protection | IP67 |
| El. protection | Inverse polarity, Load dump |
| Acoustic alarm | 80 dB at 3,1 kHz |
| Connection Integrated | Deutsch plug 12-pole DT04-12PA with gold contacts |
| Expected connector | DT06-12SA Wedgelock W12S with gold contacts |
| Housing | PC/ABS plastic material in black |
| Buttons | Illuminated buttons with tactile feedback |

| ENVIRONMENTAL RESISTANCE | |
|--|---|
| Operating temperature | -30 °C to 80 °C |
| Storage temperature | -40 °C to 85 °C |
| Thermal shock | IEC 60068-2-14 Na (-35°C (1h) to +80°C (1h), 20 cycles) |
| Single shock | IEC 60068-2-27 (50g, 11ms, 10times) |
| Random vibration | IEC 60068-2-64 (16h/axis) |
| Free fall | to IEC 60068-2-32 (1m, concrete floor) |
| Durability | 1000h 40% - 90% humidity |
| Temperature change | IEC 60068-2-14 Nb (+25°C (9h) ramp up (3h) to +55°C (90% humidity), ramp down (3h), 6 cycles) |
| Temperature hot cold | IEC 60068-2-2 (+80°C (72h) and -30°C) |
| Chemical resistance | ISO16750-5 (brake cleaner, car shampoo, Diesel, ethanol, coolant) |
| Salt spray | IEC 60068-2-11 |
| Sunlight | ISO 4892-2+A1 (4x84h) |
| EMC REQUIREMENTS | |
| Emission narrow broadband | EN 61000-6-3 |
| Immunity to ESD | EN 61000-4-2 to EN 61000-4-5 |
| Conducted Emission | ISO7637-2 (12 V and 24 V system) |
| Conducted Immunity on Supply Lines | ISO7637-2 (12 V and 24 V system) |
| Conducted Immunity except Supply Lines | ISO7637-3 (12 V and 24 V system) |
| EN13309 | compliant |
| EN ISO 14982 | compliant |

3 Installation, Configuration and Compatibility

3.1 Installation

The connection socket of the DEUTZ® Engine Display is of the type of Deutsch DT04 12 PA with gold contacts. The required mating plug is a Deutsch DT06 12SA with gold contacts and Wedgelock W12S. The HDT-48-00 tool from Deutsch company can be used to crimp the cables

The supply voltage must be from 6 to 32V. Its max. power can be up to 16 W.

It is communicating via CAN SAE J1939 with DEUTZ engine ECUs. For details see Deutz CAN specifications. The CAN connection of the display does not contain a terminating resistor. Depending on the CAN topology, a terminating resistor may be required. For more information see connection diagram / equipment harness from DEUTZ engine.

This Display can be updated via SerDia to benefit from new languages, bugfixes and functional extensions. This is only possible if pins M and F of connector X22.2 (it is an ITT Cannon connector 12 pol female housing) are properly connected to the customer CAN (see connection diagram / equipment harness).

3.1.1 Instrument Panel Installation

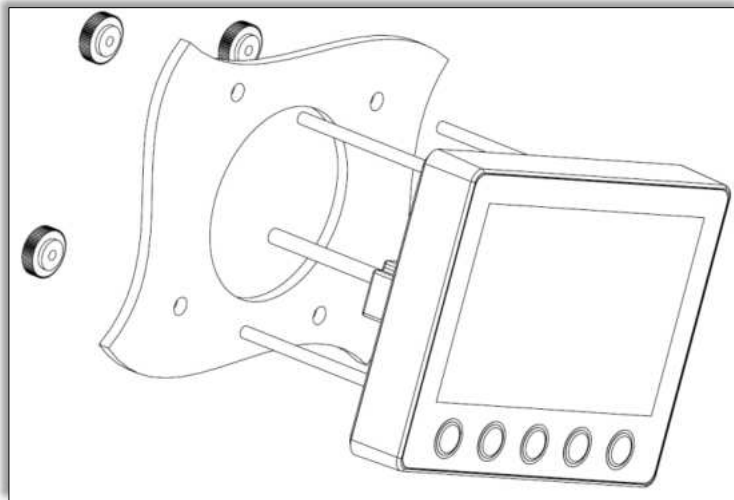


Fig. 1: Assembly view

The Displays are supplied by DEUTZ completely with plug, fastening material and installation template.

Choose suitable location for the installation. Please ensure sufficient clearance behind the Display for the plug connections so that the cables are not kinked unnecessarily. Make sure that cables are sufficiently long to enable the device to be removed for maintenance purposes. Ensure sufficient air circulation behind the Display so that resultant heat can be dissipated. The

installation is carried out as shown in Fig. 1. Use the included template to cut a hole for the device rear and drill four holes $\varnothing 4.3 \text{ mm}$ (0.170") for the threaded bolts.

Screw the four threaded bolts into the rear of the housing. If required, longer screws of dimension M4 can also be used (not in scope of supply).

Connect the cable to the rear of the device.

Move the device into position and secure it by tightening the knurled nuts on the threaded bolts.

3.1.2 Connection

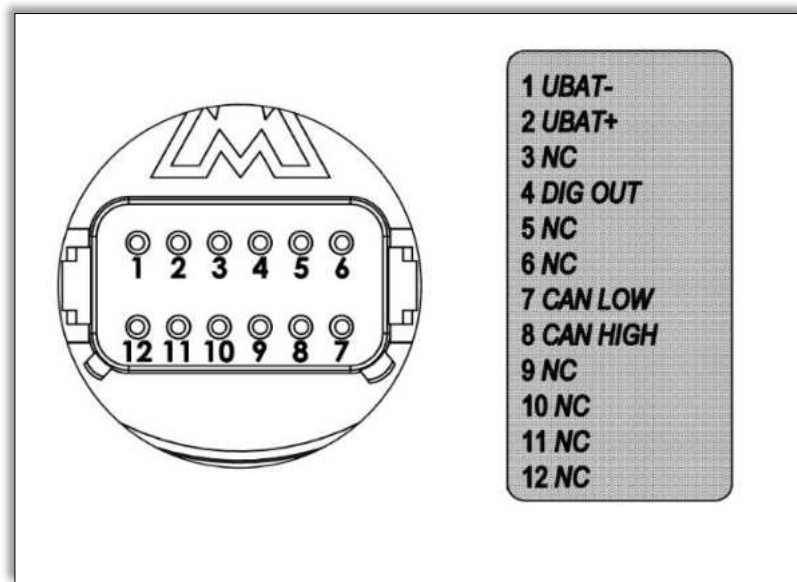


Fig. 2: Connector Layout

3.2 Configuration

3.2.1 Settings

Every user of the display has the option of making configurations in the display. This includes:

- Choice of language
- Selection of the unit system
- Selection of the display brightness
- De- and activation of the buzzer and digital output
- Selection of the measured values on the main output fields on the main page

The selection is saved permanently.

3.2.2 Additional measurements

The scope and number of readings are determined by the display itself depending on the control unit, engine type and type of EAT system. In addition, the display can also show the following measured values:

- Hydraulic Oil Temperature // SPN: 1638
- Hydraulic Oil Pressure // SPN: 1762
- Diesel Tank Level // SPN: 96
- Vehicle Speed (Wheel Based) // SPN: 84
- Vehicle Speed (Navigation Based) // SPN: 517

These measured values are not sent by the engine control unit but can still be shown on the display if they are sent from another source (e. g. the vehicle control unit) on the CAN bus. The specification of these CAN signals can be viewed via the SPN number in the J1939 standard.

3.3 Compatibility

The display supports all current Deutz engines as well as cooperation engines and electric drive systems.

The engines produced in the past with the designation T4i (Tier 4 interim) are not compatible with the display.

4 General Description

The DEUTZ® Engine Display is a compact, robust, and integral module which enables the user to request and display engine data. The device uses an industrial standard CAN bus protocol for this to enable connection to the engine via an SAE J1939 CAN data link. For further information on available CAN messages, please refer to CAN Specification of DEUTZ®.

The DEUTZ® Engine Display enables a highly flexible and intuitive human-machine interface. A graphic menu structure is connected to the function buttons in the visualization area of the display with easy-to-understand symbols that indicates the current function of the buttons.

The DEUTZ® Engine Display is used to display engine system values and error entries. The display enables the standstill regeneration/refresh to be released. Also, the EOL test can be carried out. It also contains an internal buzzer and a digital output for an external warning signal.

The application of the display includes two main sub-applications. The diesel application part is displayed as soon as the display detects a connected diesel control unit. If an EDEUTZ control unit is detected, the display automatically switches to the EDEUTZ-specific application. Detection is based on specific CAN signals and cannot be influenced manually. The two sub-applications are described separately below.

4.1 Feature overview for combustion

Some of the display features described in this document have been developed for specific engines or engine generations. The following Table 2 is a comparison:

Table 2: Display features vs ECU families

| Display-Features vs. ECU families | EMR5 | EMR4 | EMR3 | EMR2 | EMR_LPG | EMR_L1 |
|---|------|------|------|------|---------|--------|
| Main features | | | | | | |
| Displaying engine data: measured values | X | X | X | X | X | X |
| Signal evaluation (Error/Not available) | X | X | X | X | X | X |
| Display of the engine information | X | X | X | X | X | X |
| Display of the DEUTZ Engine Display information | X | X | X | X | X | X |
| Settings (Language, Unit system, Brightness, Buzzer/DO) | X | X | X | X | X | X |
| Favorite signals selectable on main screen | X | X | X | X | X | X |
| Error features | | | | | | |
| Error: Output of the error memory: active and passive errors | X | X | X | X | X | X |
| Error: Deletion of passive errors | X | X | X | X | | X |
| Error: Acoustic warning signal and external alarm | X | X | X | X | X | X |
| Error: Detection and display of CAN loss | X | X | X | X | X | X |
| Lamps: Error lamp | X | X | X | X | X | X |
| Lamps: DPF lamp | X | X | | | | X |
| Lamps: SCR warning lamp / EAT inducement lamp | X | X | | | | X |
| Lamps: High temperature lamp | X | X | | | | X |
| Lamps: Ash lamp | X | X | | | | X |
| Lamps: Gas leakage | | | | | X | |
| Lamps: Malfunction indicator lamp | | | | | X | |
| Lamps: Preheat lamp | X | X | X | | X | X |
| Lamps: HC Cleaning lamp | | | | | | X |
| EAT features | | | | | | |
| EAT: Scheme of the installed exhaust system | X | X | | | | X |
| EAT: Display of the DEF tank level in the main screen, if SCR available | X | X | | | | X |
| EAT: Display of power reduction | X | X | | | | X |
| EAT: Regeneration process | X | X | | | | X |
| Service features | | | | | | |
| Service: EOL-Test (check of the EAT functionality) | X | X | | | | |
| Service: Resetting oil service interval | | | | | | X |

4.2 Display functions for all drive systems

4.2.1 Buzzer and alarm output

The DEUTZ® Engine Display has an integrated buzzer and an alarm output, also referred to in this document only as digital output. These are activated and warn the operator when a fault occurs. The pin number of the external alarm output (DIG OUT, Low Side Switch) can be seen in Fig. 2. When activated, this pin has the same voltage as the display supply voltage.

The buzzer and the external alarm output can be deactivated under Configuration, see section 5.2.4.6 or also section 7.2.5.4.

4.2.2 User guidance through button lamps

For an improved user experience, only the key that can or must be pressed is illuminated. In Fig. 3, for example, an important piece of information is confirmed with key three. Therefore, only key three is illuminated.

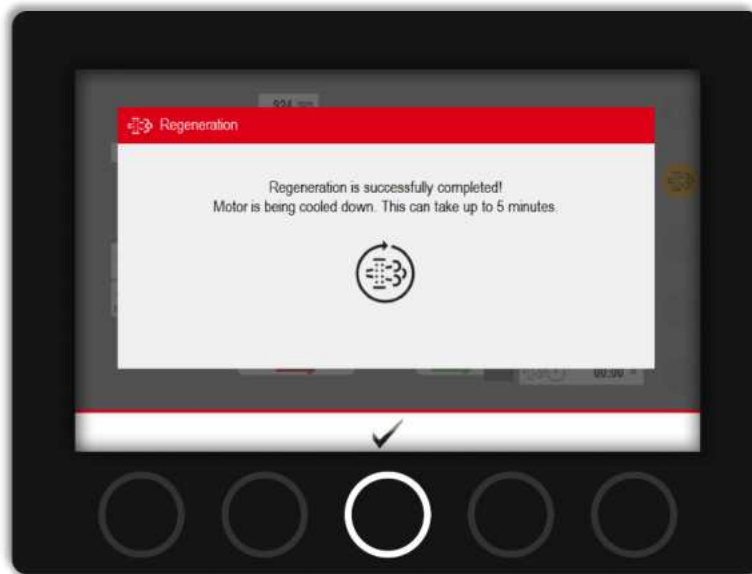


Fig. 3: User guidance through button lamps

5 Operation Instructions - Combustion

Note: All available measuring value displays shown as examples in this documentation depend on the engine control unit connected to the display, the engine control unit configuration and its software status! To illustrate the options of the DEUTZ® Engine Display, it is assumed in this documentation that the CAN message required for a definite display functionality is available.

5.1 General

The DEUTZ® Engine Display executes a series of steps to initiate itself. During this phase the boot picture as in Fig. 4 shown. After this the main screen will be shown (Fig. 5).



Fig. 4: Boot picture

5.2 Screens

5.2.1 Main Screen

On this screen engine speed, engine coolant temperature, oil pressure, fuel consumption, battery voltage and pedal position are shown. Depending on exhaust aftertreatment system either oil pressure or DEF level is shown via the third gauge (Fig. 6).



Fig. 5: Main screen with oil pressure



Fig. 6: Main screen with urea level

On main screen there are five buttons available (Fig. 7). The first element indicates the main screen and is inactive on this screen. The second button switches the display to diagnostic screen. Exhaust after treatment screen will be shown if button three is pressed. The fourth button brings the setting screen. Selected engine measurement data is available on measurement screen, which is accessible via the fifth button from main screen.

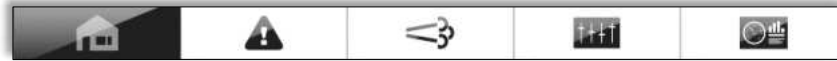


Fig. 7: Main screen menu buttons

5.2.2 Diagnostic Screen


Diagnostic screen works under two different modes, namely active errors and passive errors and displays only the errors of the engine control unit with the source address 0₁₆. (For EMRL1 controllers also the errors with source address 3D₁₆.) Active error diagnostic screen is the default mode for this screen. Error codes are listed here with their descriptions (Fig. 8). The topmost error text displayed is the last error entry in the DM1 CAN message and is usually the most recent error. In the upper right corner the total number of errors is indicated. If there is no error to display, screen shows a text indicating this.

| Error Page | | Active Errors | | | 3 |
|-------------------|---|---------------|-----|----|---|
| Error Description | | SPN | FMI | OC | |
| 1 | Engine - Oil level - Data below normal operational range (Most severe level) | 98 | 1 | 1 | |
| 2 | Engine - Fuel filter differential pressure - Voltage above normal or shorted to high source | 16 | 3 | 1 | |
| 3 | Engine - Oil pressure sensor - Bad intelligent device or component | 100 | 12 | 3 | |

Fig. 8: Active error diagnostic screen with active errors

This screen has four buttons. The first button switches the screen to main screen. The second and the third buttons are to navigate through active errors. The fifth button switches to passive error page.


Passive error diagnostic screen for passive errors is structured exactly like the window for active errors and lists the errors that are stored in the engine control unit and are no longer active. When this screen is active, there are five buttons active (Fig. 9).





Error Page


Passive Errors

| Error Description | SPN | FMI | OC |
|---|-----|-----|----|
| 1 Engine - Oil pressure sensor-Data erratic intermittent or incorrect | 100 | 2 | 1 |












Fig. 9: Passive error diagnostic screen with passive error

All buttons except the button four have the same functionality as for active error diagnostic screen. Button four opens a dialog screen for deleting the passive errors (Fig. 10).

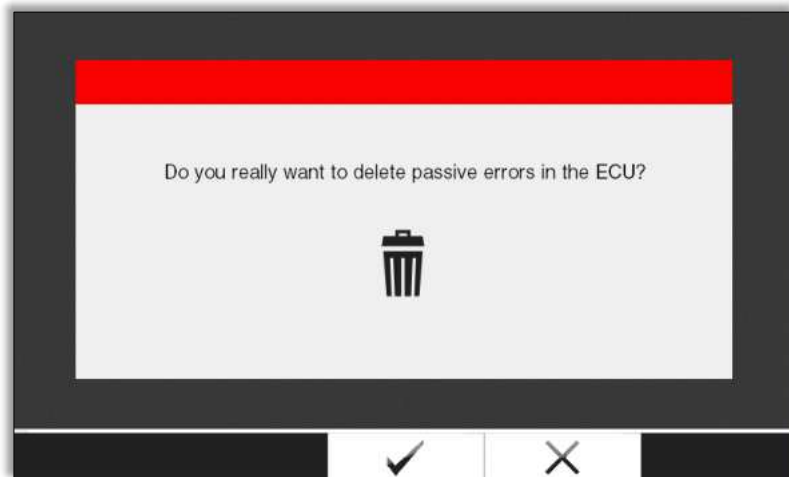


Fig. 10: Dialog Screen to Delete Passive Errors

The CAN Frame Diagnostic Data Clear (DM3) will be sent if button three is pressed. The screen will be closed following the transmission of the message. Button four closes the screen immediately without sending the DM3 message. Please note that a deletion of the passive errors is only possible if passive errors are present. For some engines, deleting the passive errors is only possible when the engine is not running.

5.2.3 Exhaust Aftertreatment Screen

Exhaust after treatment (EAT) screen shows a schematic depiction of the exhaust system. If EAT system is available, the existing components are shown with key data. The system information is acquired via CAN bus at start.

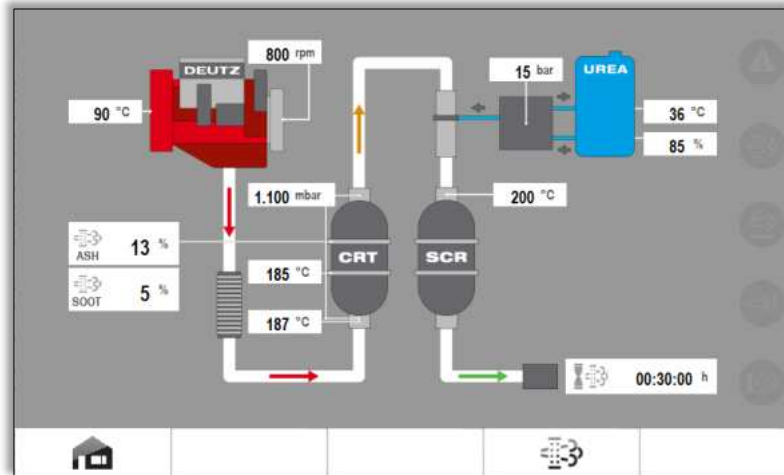


Fig. 11: EAT Screen as no regeneration running

The button layout contains two buttons. The layout of the menu changes according to the regeneration state. As the regeneration is not running, the button actions are as follows: the first button opens the main screen. The fourth button opens regeneration dialog screen.

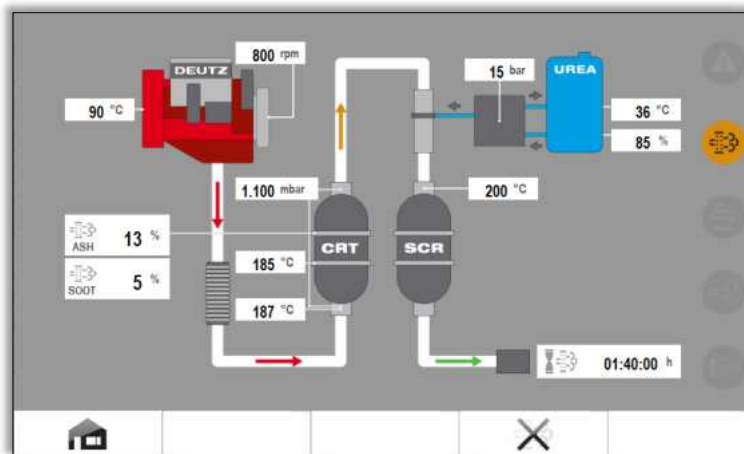


Fig. 12: EAT Screen as regeneration running

In case of a running regeneration, button four opens regeneration dialog screen with the possibility to abort it, when pressed. The other buttons remain unchanged.

5.2.4 Setting Screen

On setting screen, there are various settings and customization options for the customer. The customer can choose the language, and units. Some services such as EOL Test can be started via submenu in setting screen if it is available for the engine type. Software and motor information can be read, and brightness of the screen can be adjusted.

The settings are saved permanently.

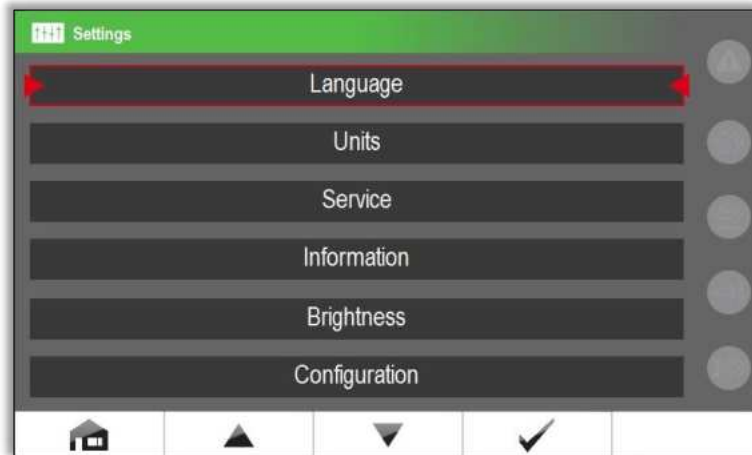


Fig. 13: Setting Screen

5.2.4.1 Language

The display language can be changed from language menu. The available languages are German, English, Spanish, French, Italian, Dutch, Russian, Swedish, Japanese and Chinese. More languages can be added. The active language selection is highlighted in green. Buttons two and three are to navigate to the desired language. Button four is to apply the language. The first button navigates back to the upper menu.



Fig. 14: Language selection

5.2.4.2 Units

Deutz Engine Display can show the measurement values both in metric and United States customary units. By default, the metric units are active. Buttons two and three are to navigate between the options. Button four is to apply the desired change. (Fig. 15)



Fig. 15: Unit Selection

5.2.4.3 Service

Under service menu there are several options. The first option is to open end of line test (EOL-Test) page, where the test can be initiated and observed. For more information about EOL-Test see chapter 5.4.1. With the help of the second option, the oil change interval for EMR-L1 ECUs can be reset to the maximum duration. For more information about resetting oil service interval see chapter 5.4.1. Further options are possible in the future.

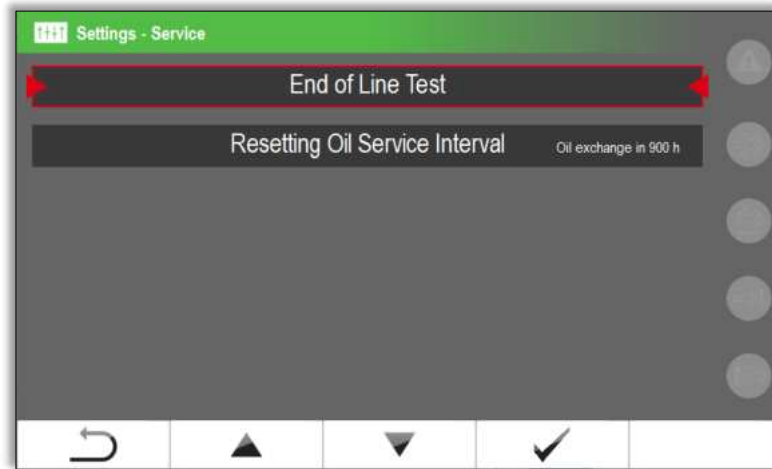


Fig. 16: Services

5.2.4.4 Information

There are two submenu elements on information page (Fig. 17).

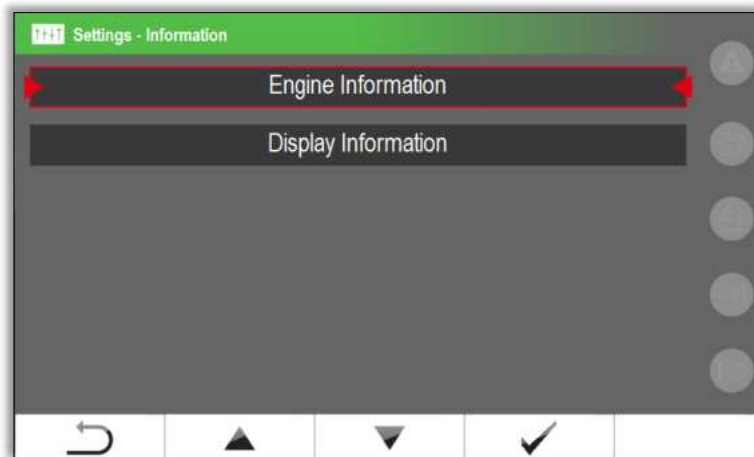


Fig. 17: Information Page

The first element, Engine Information provides information on software version of ECU, engine type and serial number of the engine (Fig. 18).



Fig. 18: Engine Information

The second element, Display Information provides information on production date of the display, software version of the display, language database version of the display, operating hours of the display and serial number of the display as in Fig. 19.

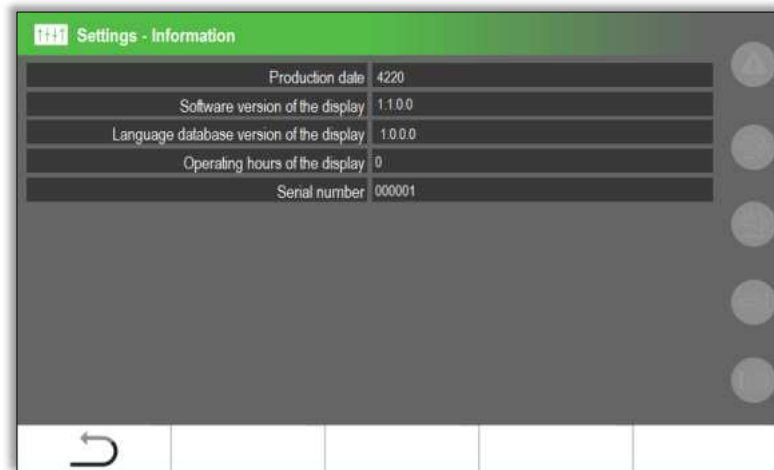


Fig. 19: Display Information

5.2.4.5 Brightness

There are three buttons available on this screen (Fig. 20). The first button switches to setting screen. The other buttons “up” & “down” are to adjust the brightness. The brightness adjustment can be carried out in multiple steps.

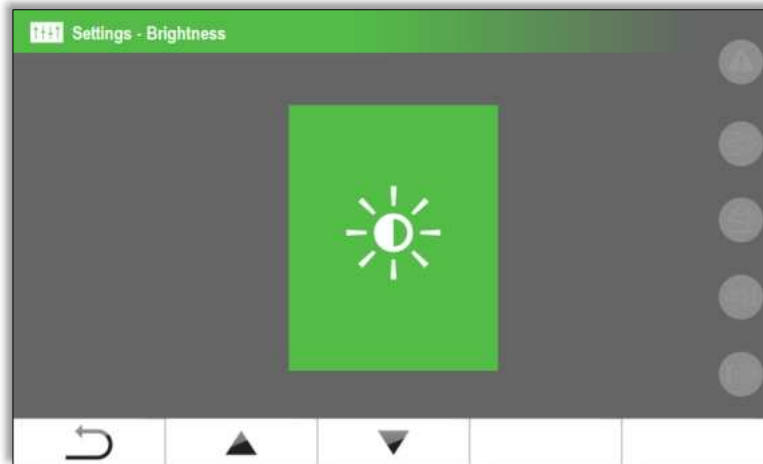


Fig. 20: Brightness Setting

5.2.4.6 Configuration

There are two submenu items on Configuration Page. The first element is to activate/deactivate the buzzer of the display. The buzzer is deactivated if the indicator is gray (Fig. 22). The buzzer is activated if the indicator is green (Fig. 21).

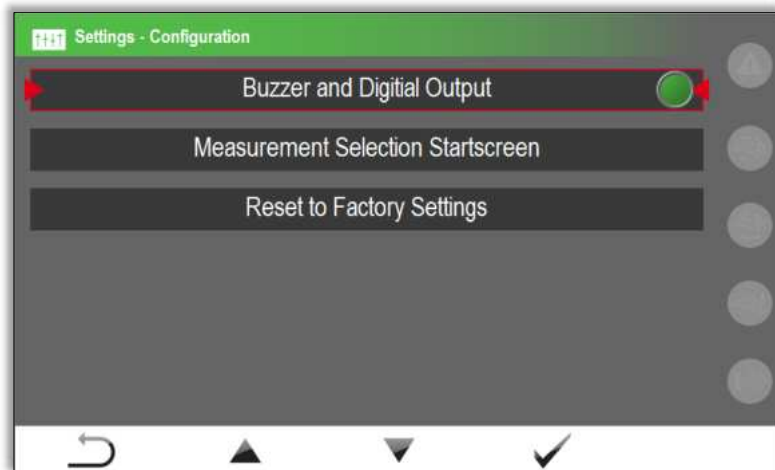


Fig. 21: Configuration – Buzzer Active

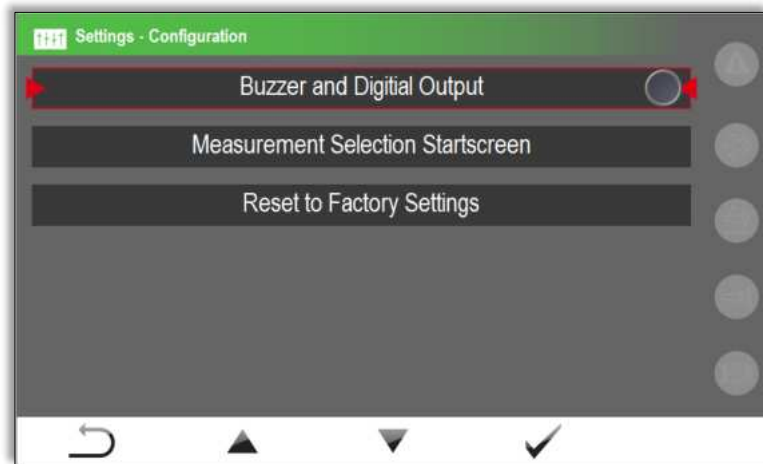


Fig. 22 Configuration – Buzzer Inactive

The second submenu item leads to the configuration mode of the main screen. The configuration of the main screen is only possible with an active CAN connection. A further description of this mode is given in chapter 5.5.

The third element provides a reset to factory settings. The approval of the user is needed as in Fig. 23.

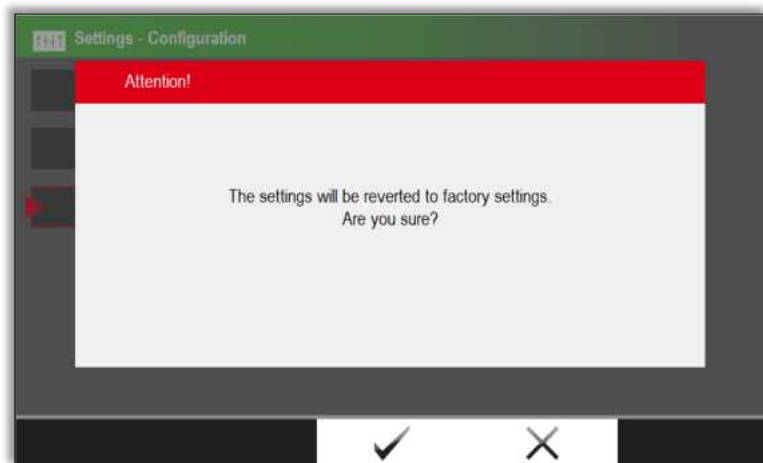
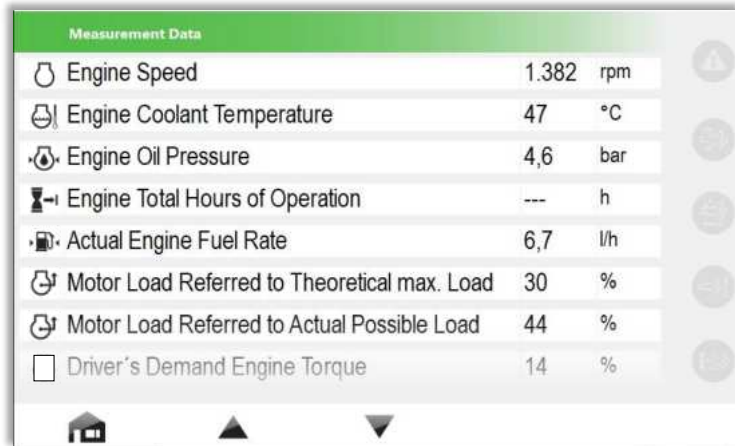


Fig. 23: Back to Factory Settings

When approved, the settings that are changed by the user will be reset to their default values. These include amongst other things language setting, units, buzzer, brightness, measurement selection on startscreen and eventually future options. The software version of the display will not be affected.

5.2.5 Measurement Screen

The DEUTZ® Engine Display can show selected measurement values. These values are listed in chapter 0. The screen has three buttons.











| Measurement Data | | |
|---|--|-----------|
|  | Engine Speed | 1,382 rpm |
|  | Engine Coolant Temperature | 47 °C |
|  | Engine Oil Pressure | 4,6 bar |
|  | Engine Total Hours of Operation | --- h |
|  | Actual Engine Fuel Rate | 6,7 l/h |
|  | Motor Load Referred to Theoretical max. Load | 30 % |
|  | Motor Load Referred to Actual Possible Load | 44 % |
|  | Driver's Demand Engine Torque | 14 % |

Fig. 24: Measurement Screen 1

The first button switches to the main screen. Button 2 and 3 can be used to navigate through the signal list.

The measured value table includes essential measured values, which are always displayed even if the signal indicates "---" or "N/A", and optional measured values, which are only shown in the table if they are active on the CAN bus and do not transmit "N/A". Table 5 shows which measured values are essential.

5.3 Dialog Screens

The DEUTZ® Engine Display shows popup dialog screens under certain conditions. In this chapter these are briefly explained.

5.3.1 Error Dialog Screen

If a new error is detected, the DEUTZ® Engine Display sets an acoustic warning via an internal buzzer and a visual warning via a dialog screen. As soon as the buzzer turned on, the dialog screen can be visible on the display. This screen has only one button as in Fig. 25, which turns off the buzzer. Further information on the new error can be found in diagnostic screen.

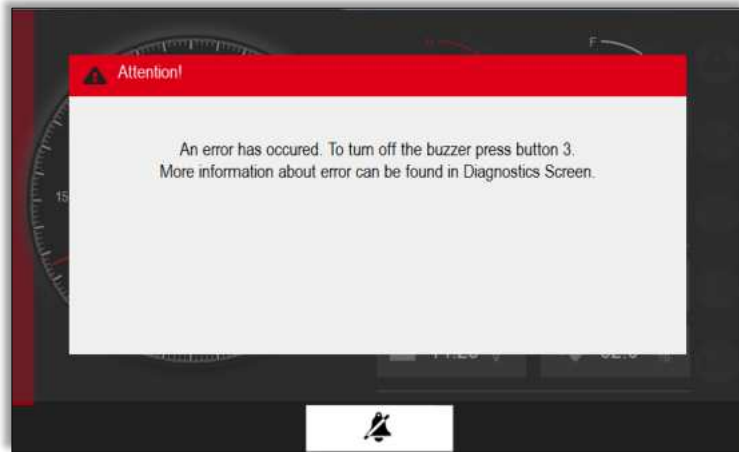


Fig. 25: Error dialog screen

Please also see the section Buzzer and Alarm Output on chapter 5.2.4.6.

5.3.2 Regeneration Dialog Screen

The regeneration process is described in chapter 5.10.

5.4 Services (EOL Test, oil change interval)

5.4.1 EOL Test

For certain motor specifications, the text "Not Available" is displayed when this option is selected. Otherwise, the customer sees the exhaust system page with EOL icon. On this page End of Line Test can be requested.

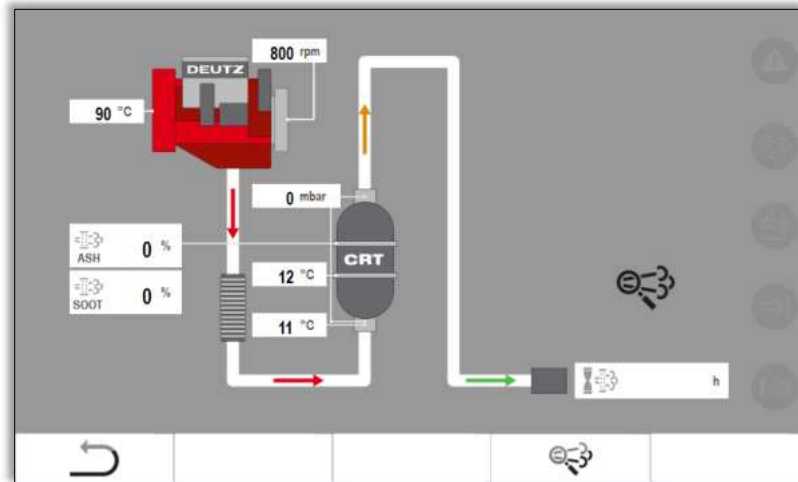


Fig. 26: End of Line Test Screen

The request for end of line test can be sent via button four on the end of line test screen. As the customer presses this button a pop-up screen will be shown, so that the action can be confirmed.

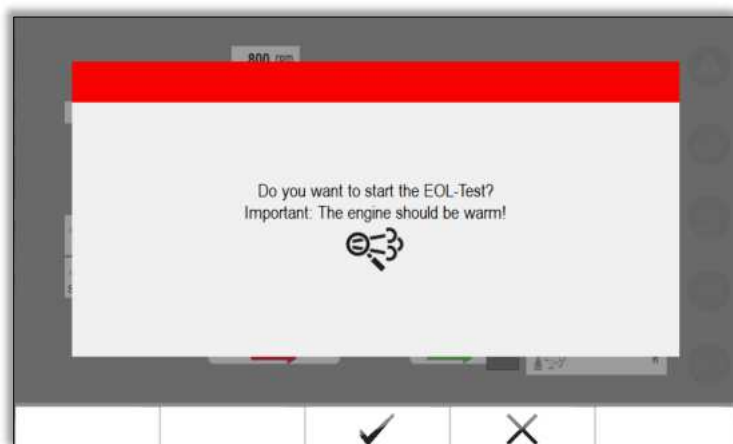


Fig. 27: Confirmation of End of Line Test

As the action is confirmed, the test request will be sent.

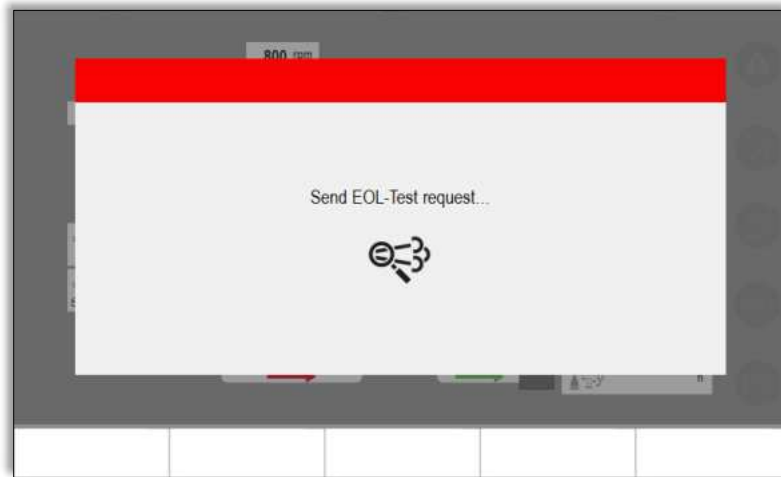


Fig. 28: Sending EOL Test Request

If the preconditions are satisfied, EOL Test will be initiated. The customer can observe the measurement values on the EOL Test screen.

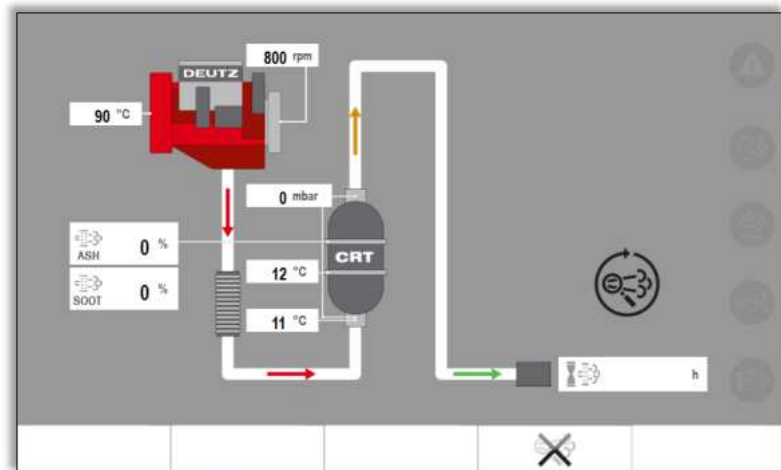


Fig. 29: EOL Test is running

If any precondition is not satisfied before the test or violated during the test, the test progress will be interrupted, and a stop request will be automatically sent. The customer will be informed by the pop-up screen.

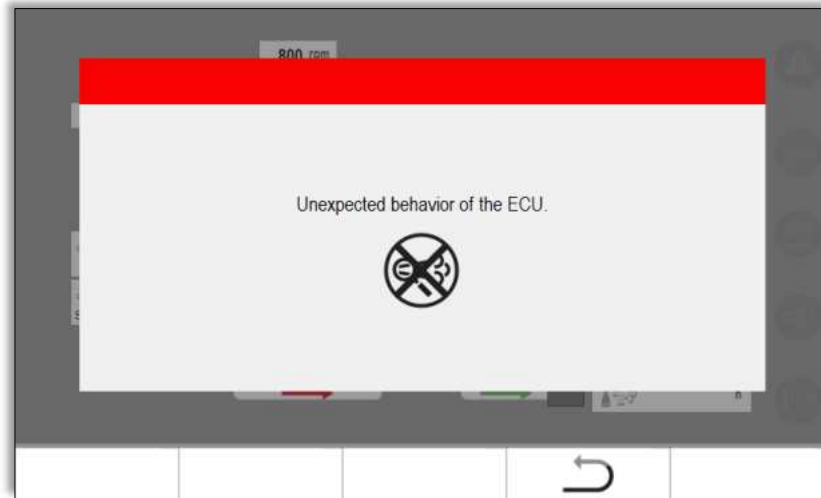


Fig. 30: Test could not be initiated or cancelled due to unexpected behavior

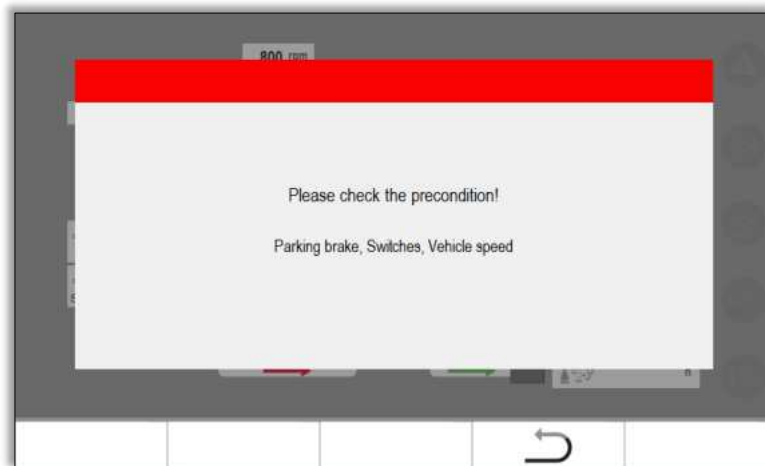


Fig. 31: Test cannot be initiated due to preconditions

EOL Test can be cancelled on the screen in Fig. 29 by pressing button four. The cancellation request will be sent immediately.

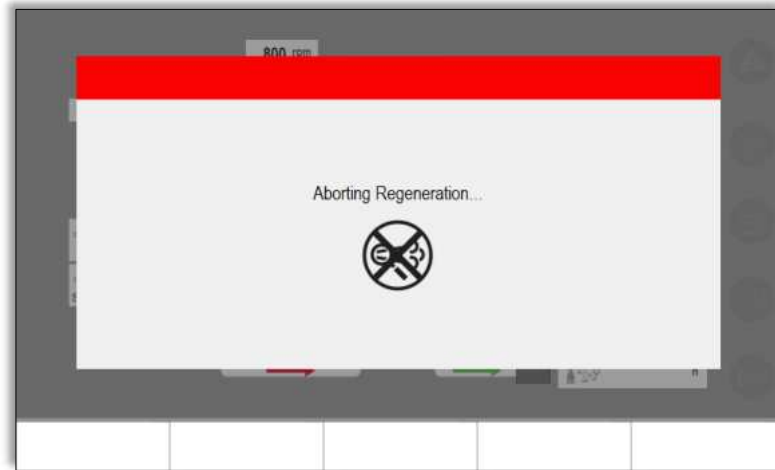


Fig. 32: Aborting Regeneration

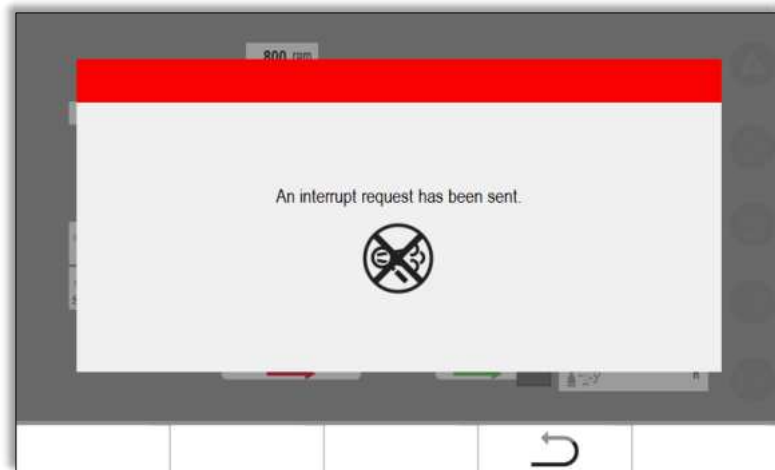


Fig. 33: EOL Test and regeneration are cancelled

If the EOL Test is successfully completed, the customer will be notified with pop-up screen as below.



Fig. 34: EOL Test Successful

5.4.2 Resetting the oil change interval

For certain engine specifications, selecting this option will display the text "Not available" and the button will also be grayed out. In addition, the remaining duration until the next oil exchange is displayed on the button.

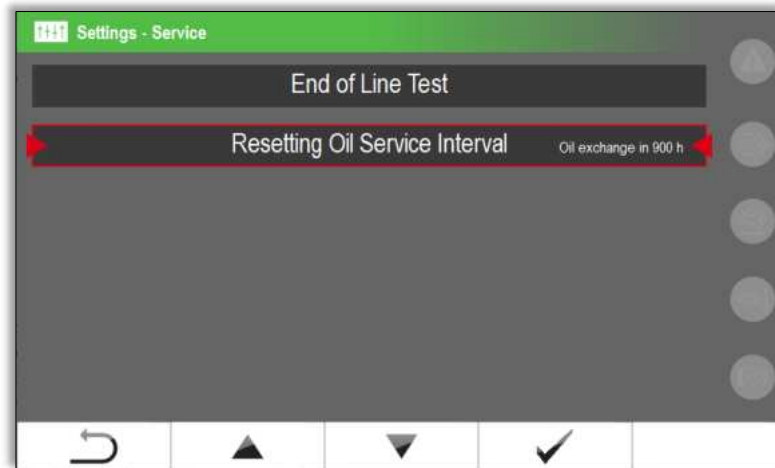


Fig. 35: Service-Menu

If the "Resetting Oil Service Interval"-option is selected, the reset of the interval must be confirmed in a dialog box (Fig. 36).

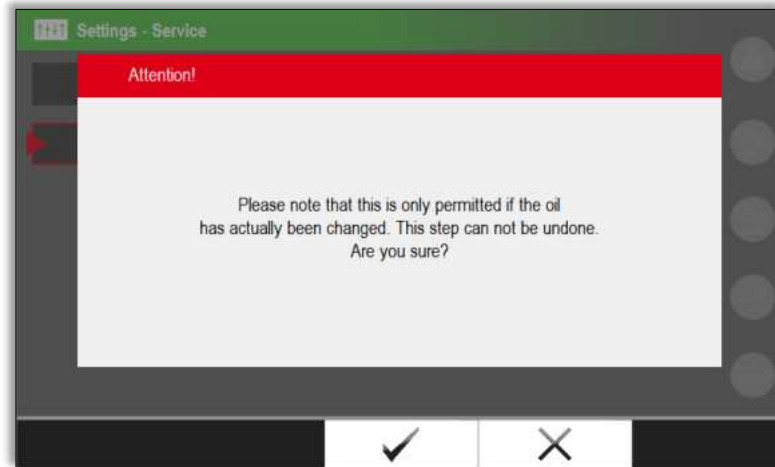


Fig. 36: Dialog box

As soon as the query has been confirmed, the oil change interval is reset, and the remaining time display is updated. In addition, the successful execution of the function is displayed via an info window.

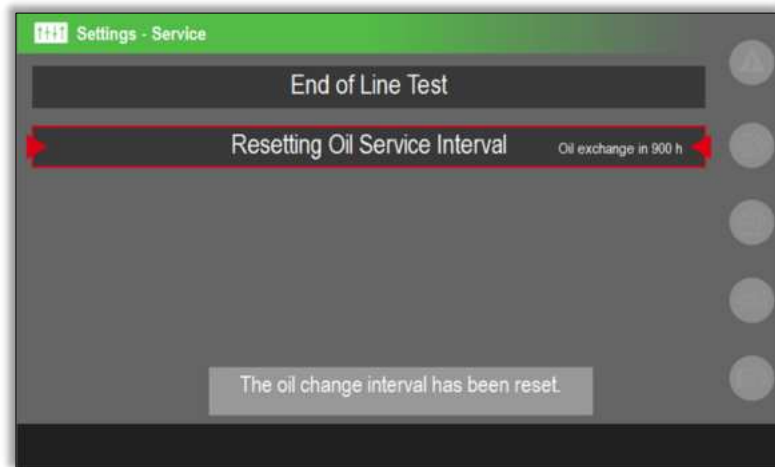


Fig. 37: Reset of the oil change interval successful

5.5 Configuration mode main screen

The configuration mode can be called up via the settings and the submenu item "Configuration" as described in chapter 5.2.4.6. Prerequisite for the setting of the main screen is an active CAN connection.

In the first step, Button 2 can be used to navigate between the output elements of the main screen that are to be configured.



Fig. 38: Selection mode of output elements

Confirming the selection with button 4 opens a list with all currently available and selectable measuring signals on the CAN bus. The currently assigned signal is highlighted in green in the list. With the help of button 2 and 3 it is possible to navigate through the signal list. Button 4 can be used to assign the currently selected signal to the selected output field.

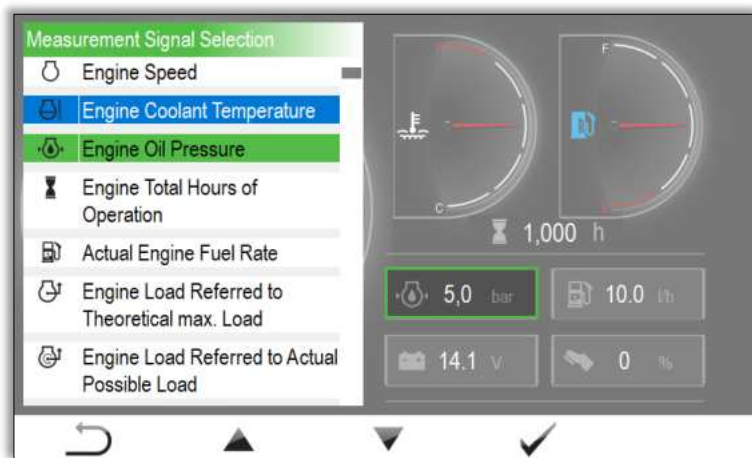


Fig. 39: Assignable signals

The successful assignment is indicated by user feedback at the top of the display. In addition, the correct assignment can be seen from the changed symbol / unit and the displayed measuring signal. The configuration is then permanently stored, so that the set configuration is recalled and displayed at subsequent display starts. The default main screen configuration can be restored by resetting to factory settings.

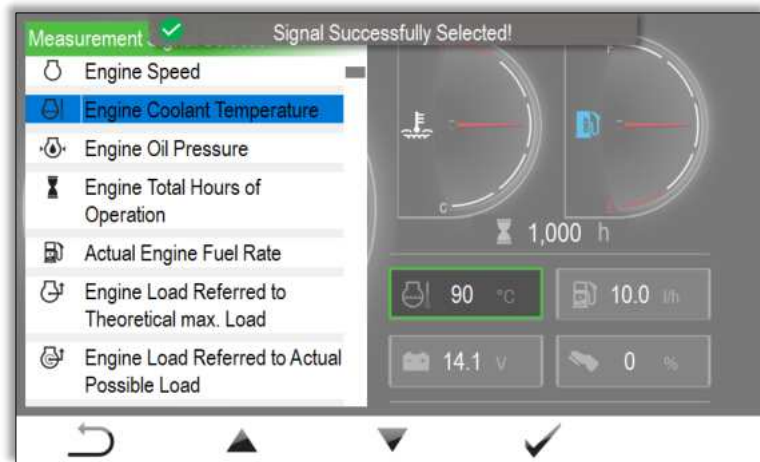


Fig. 40: User feedback after successful assignment

A different measured value can also be assigned to each of the three tachometer elements. The following signals can be placed on the small speedometers (depending on availability): Diesel level, Engine speed, Vehicle speed (navigation-based), Vehicle speed (wheel-based), DEF level, Engine oil pressure or Engine cooling temperature.

On the main tachometer, the following signals can be assigned (depending on availability): Engine speed, Vehicle speed (navigation-based) or Vehicle speed (wheel-based).

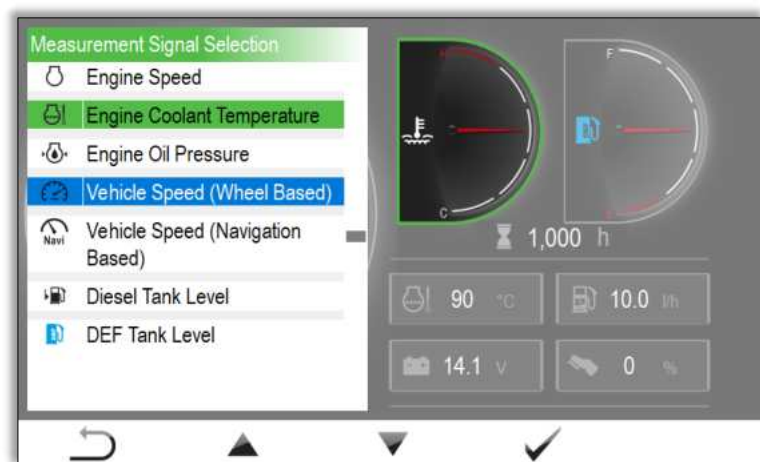


Abb. 41: Assignable signals for small tachometers

5.6 No CAN connection

DEUTZ® Engine Display monitors constantly the reception status of a few critical CAN Frames, namely DM1, EEC1, EEC2 and VEP1. The display will show a dialog screen as in Fig. 42, if none of these frames are received within their timeouts.

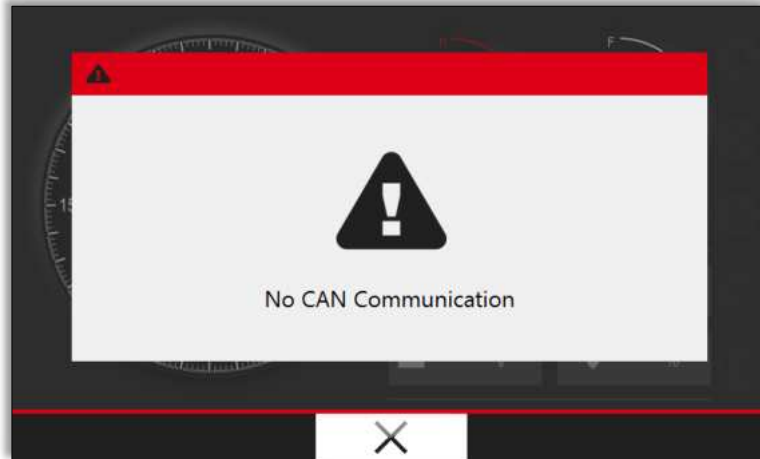


Fig. 42: Dialog screen No CAN Communication

This dialog can be closed by pressing button three.

5.7 Dynamic menu bar

In addition to displaying the various menu buttons in the different windows, the menu bar also serves as an indicator display for present engine errors. The normal condition here is always that the menu keys all have the same hue.

If there is an active error, this is indicated not only by the warning lamp in the main window, but also by the red coloring of the menu button 2 (for the diagnostic page).

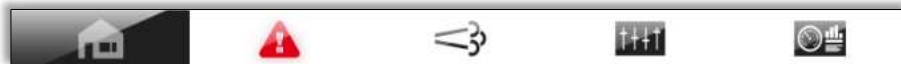






Fig. 43: Main screen menu bar with active error

5.8 Signal Evaluation

If a signal is in range of “error” or “not available” according to J1939 CAN Standard, it will be shown accordingly on the display. In case of no reception of the signal, three dashes will be shown. For further information please refer to Table 3.

Table 3: Signal Evaluation

| Description | Example | CAN-Signal Rohwerte |
|------------------------|---|--|
| Normal Operating Value |  7,0 bar | 1 Byte: 0 ₁₆ to FD ₁₆ 2 Byte: 0 ₁₆ to FDFF ₁₆ |
| Error indicator |  ERR bar | 1 Byte: FE ₁₆ 2 Byte: FE00 ₁₆ to FEFF ₁₆ |
| Not Available |  N/A bar | 1 Byte: FF ₁₆ 2 Byte: FF00 ₁₆ to FDFF ₁₆ |
| No Reception |  -- bar | --- |

5.9 Inducement Information Bar

The information bar is shown under the tachometer when the DEF level is lower than 15 % or if there is another NCD or PCD inducement reason.



Fig. 44: Inducement Information bar

Reduction levels and their reasons are given in Table 4.

Table 4: Reduction Levels and Reasons

| DEF warning level | Text |
|----------------------------------|-----------------------------------|
| 0 | 'No Text' |
| Level 1 | Warning |
| Level 2 | Torque reduction ahead |
| Level 3: Derating Step 1 | Torque reduction active |
| Level 4 | Torque and speed reduction ahead |
| Level 5: Derating Step 2 | Torque and speed reduction active |
| Temporary Override of Inducement | Temporary override of inducement |

| Reason | Text |
|---|----------------------|
| No | No text |
| DEF tank level low | DEF level low |
| NOx emissions poor due to SCR system defective, diluted Adblue, EGR not OK | NOx reduction not OK |
| Attempted manipulation (e.g., pulling off the sensor) | NCD tampering |
| Attempted manipulation (e.g., pulling off the sensor) | PCD tampering |

5.10 Regeneration Process

Regeneration notifications are displayed by regeneration dialog screen. There are namely four cases where regeneration dialog screen is to be shown. These can be listed as: user request, system request, inhibited regeneration and completed regeneration.

5.10.1 System Request

Depending on the filter load, the engine control unit can notify the bus participants about the regeneration need. If such a notification is received, the DEUTZ® Engine Display will initiate the regeneration dialog screen as shown in Fig. 45.

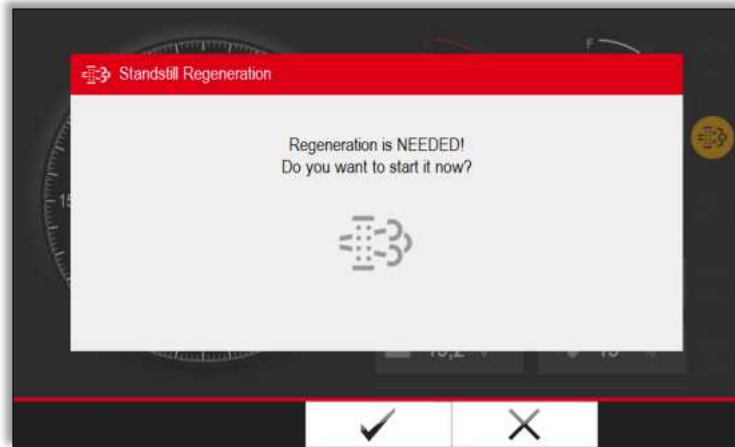


Fig. 45: System request

The user can ignore this by clicking button four or try to initiate the regeneration immediately by pressing button three.

5.10.2 User Request

Regeneration start and abort requests can be sent upon user demand if there is an ongoing regeneration or there is an ignored system request. To do that, regeneration dialog screen should be opened via EAT Screen (Fig. 11 & Fig. 12). Depending on the regeneration state (i. e., no ongoing regeneration or regeneration active), the dialog screen will show an appropriate text for approval of the request.

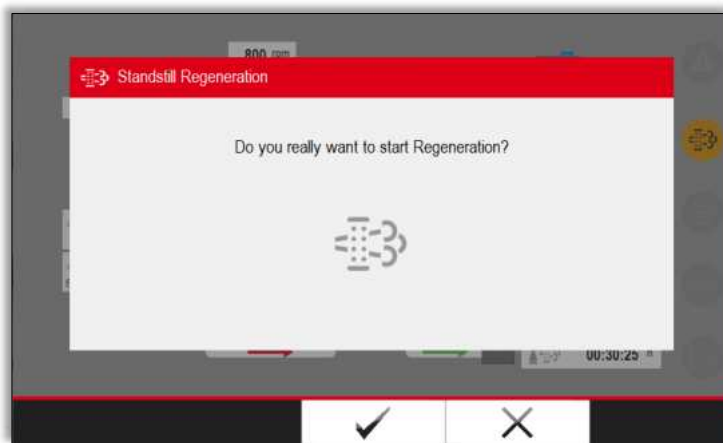


Fig. 46: User request to start regeneration

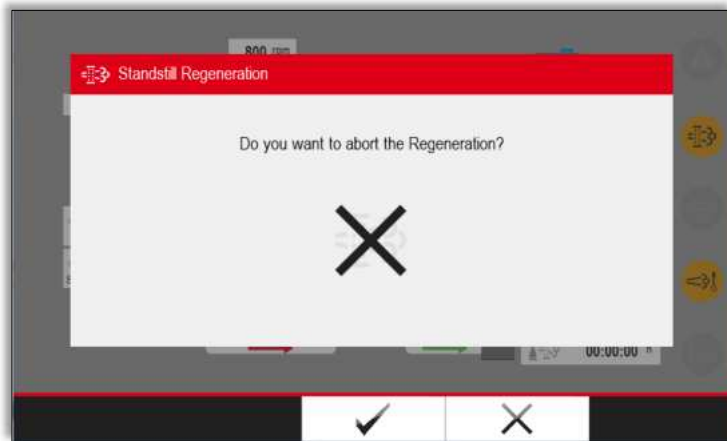


Fig. 47: User request to abort regeneration

As the user approves the request, the display will send CM1 CAN message with appropriate content. During this period the user will be informed about the progress via regeneration dialog screen. During this stage the buttons are inactive.

5.10.3 Inhibited Regeneration

In case of not satisfying the preconditions for regeneration after a regeneration request or during a regeneration process, regeneration dialog screen will be shown with active and passive inhibitors as in Fig. 48.

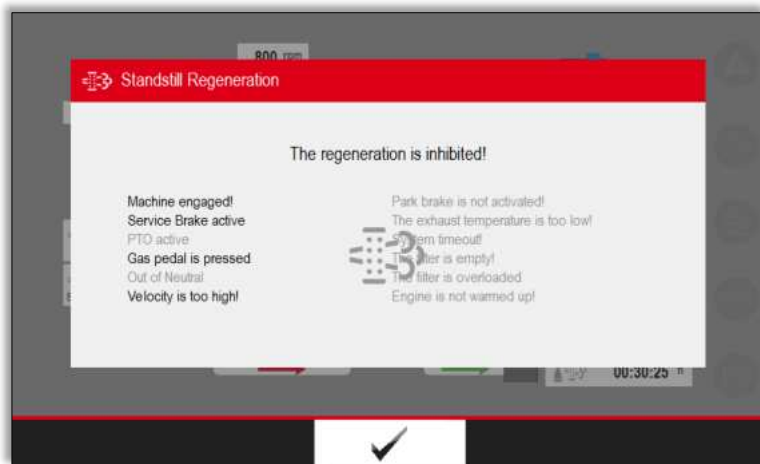


Fig. 48: Inhibited regeneration

As seen in Fig. 48, the active inhibitors are pronounced with darker letters. The passive inhibitors are shown to inform the user with lighter letters. To close the screen, button three must be pressed.

5.10.4 Completed Regeneration

As soon as the regeneration complete flag is set by the engine control unit, the DEUTZ® Engine Display initiates the regeneration dialog screen. This closes if the button three is pressed.

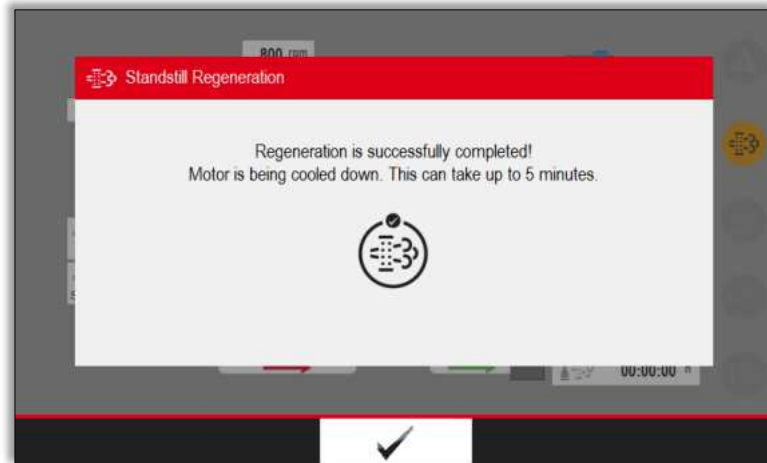


Fig. 49: Completed regeneration

6 Lamps and symbols description - Diesel

6.1 Lamps description

The DEUTZ® Engine Displays utilizes warning lamps. These lamps are aligned on the right of the frame.



Fig. 50: The lamps

6.1.1 Error lamp / Amber warning lamp / Red stop lamp

In case of any engine errors the general error lamp of the engine will be activated. Whenever the error lamp (e. g. Fig. 51) is active a fault code is stored in the error memory. No system reactions like power reduction can become active without error lamp.



Fig. 51: Red Stop Lamp

Two different states are possible:

- Solid on in yellow/orange: Errors that allow continuing engine operation with minor restrictions.
- Blinking in red: Errors that cause an engine shut down or shut down request.

Emission related errors of the EAT system will also be displayed with the diagnostic lamp.

6.1.2 Diesel particulate filter lamp

The Diesel particulate filter (DPF) lamp (e.g., as in Fig. 52) is a multifunctional lamp for standstill regeneration request and active standstill regeneration. The following states for the Diesel particulate filter lamp are possible:

- Off: No regeneration active, no regeneration request active
- On: Regeneration active
- Slow blinking (0.5 Hz): Regeneration required. Operator can start regeneration if the machine is in safe conditions, the engine is stationary, warmed up and the SCR system is ready for normal operation.
- Fast blinking (3 Hz): Regeneration required. Service tool needed to start Regeneration.

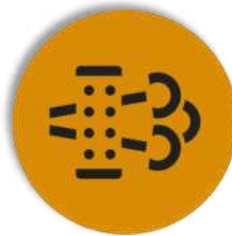


Fig. 52: Diesel particulate filter lamp

If the operator tries to release a regeneration with the push button, but the regeneration is inhibited for any reason (e.g., too low coolant temperature), the lamp will be switched off for 2 seconds before starting the blinking mode again. This provides a confirmation to the operator that the push button was accepted.

6.1.3 SCR warning lamp / EAT inducement lamp

The SCR warning lamp / EAT inducement lamp is used in case of any error in the SCR-system. A flashing SCR lamp is reserved for tank level monitoring. The symbol is shown in Fig. 53.



Fig. 53: SCR lamp

6.1.4 High temperature lamp

High temperature lamp will be shown during an ongoing regeneration. The lamp (Fig. 54) will also be activated if the engine exhaust temperature exceeds a threshold in normal operation mode.



Fig. 54: High temperature lamp

6.1.5 Ash lamp

This lamp (Fig. 55) indicates DPF maintenance request due to ash load of the DPF.



Fig. 55: Ash lamp

6.1.6 Preheat lamp

The symbol (Fig. 56) is shown when the glow plug is active. Note that due to the system, the preheating lamp is only active when the engine is started. If it is important to see the preheat lamp, you must start the display before the engine ECU.

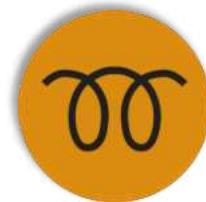


Fig. 56: Preheat lamp

6.1.7 MIL lamp

This lamp (Fig. 57) is necessary for US applications (emissions). This lamp is only available for DEUTZ LPG engines.



Fig. 57: MIL lamp

6.1.8 Leakage lamp

This error lamp (Fig. 58) is displayed when the leakage diagnosis is active or latched. This lamp is only available for DEUTZ LPG engines.



Fig. 58: Leakage lamp







6.2 Symbols description





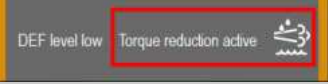







This is a listing of all possible metrics. The scope and number of measured values displayed are determined by the display itself depending on the control unit, engine type and type of EAT system. So, it may happen that your system does not need all measured values. These are then also not displayed.











Hint to following measured values: Hydraulic Temperature, Hydraulic Pressure, Fuel Level, Vehicle Speed (wheel-based), Vehicle Speed (navigation-based) → These measured values are not sent by the engine control unit but can still be shown on the display if they come from another source (e. g., the vehicle control unit).






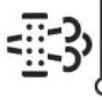





Engines with EMR_LPG, EMR3 and EMR2 control units only have a selection of the measured values listed here.











Table 5: Symbols description

| # | essential | Description | Symbol | Remark | SPN | Related CAN Signal |
|---|-----------|--|---|--|------------|--------------------------------|
| 2 | --- | Amber warning lamp |  | | 624 | DM1 [1.3-1.4] |
| 3 | --- | Protect lamp / red stop lamp |  | | 987 623 | DM1 [1.1-1.2] DM1 [1.5-1.6] |
| 4 | --- | Diesel particulate filter lamp |  | | 3697 | DPFC1 [1.1-1.3] |
| 5 | --- | SCR warning Lamp / EAT inducement Lamp |  | For gasoline engines with EMR_LPG-ECUs: There is no signal. | N/A | STOUT [3.1-3.3] |
| 6 | --- | Exhaust system high temperature lamp |  | For gasoline engines with EMR_LPG-ECUs: There is no signal. | 3698 | DPFC1 [7.3-7.5] |
| 7 | --- | Ash lamp |  | For engines with EMR_L1- and gasoline engines with EMR_LPG-ECUs: | N/A | DPF Test Monitor [3.3-3.4] |

| | | | | | | |
|----|-----|--|---|--|-------------|--|
| 8 | --- | Preheat lamp |  | For gasoline engines with EMR_LPG-ECUs: There is no signal. | N/A 1081 | STOUT [8.5-8.6] For engines with EMR_L1-ECUs: SHUTDN [4.1-4.2] |
| 9 | --- | MIL lamp |  | This signal is only for engines with EMR_LPG-ECUs. | N/A | DM1 [1.7-1.8] |
| 10 | --- | Leakage lamp |  | This signal is only for engines with EMR_LPG-ECUs. | N/A | Monitoring of gas leakage [1.5-1.6] |
| 11 | --- | Aftertreatment NCD/PCD – inducement severity |  | | 5246 N/A | AT1T1I1 [6.6-6.8] PCD1 [1.1-1.3] |
| 12 | --- | Aftertreatment NCD/PCD – inducement reason |  | | N/A N/A | EPA3 [1.1-1.3] PCD1 [1.4-1.7] |
| 13 | ✓ | Engine Oil Pressure |  | | 100 | EFL/P1 [4] |
| 14 | ✓ | Engine Fuel Rate |  | | 183 | LFE [1-2] |
| 15 | | Battery Potential |  | For engines with EMR4, EMR3 and EMR2 ECUs: There is no signal. | 168 | VEP [5-6] |
| 16 | | Battery Potential at Ignition Lock Input Signal of the ECU |  | For engines with EMR_L1-ECUs: There is no signal. | 158 | VEP [7-8] |
| 17 | | Accelerator Position Pedal 1 |  | For gasoline engines with EMR_LPG-ECUs: 0% is always displayed. | 91 | EEC2 [2] |
| 18 | ✓ | Engine Speed |  | | 190 | EEC1 [4-5] |
| 19 | ✓ | Engine Coolant Temperature |  | | 110 | ET1 [1] |

| | | | | | | |
|----|---|---|---|---|-----|------------|
| 20 | ✓ | Motor Load Referred to Theoretical max. Load |  | This torque relates to the maximum torque of the roof curve. | 513 | EEC1 [3] |
| 21 | ✓ | Engine Load Referred to Actual Possible Load |  | This torque refers to the speed-dependent maximum torque of the roof curve. It | 92 | EEC2 [3] |
| 22 | ✓ | Driver's Demand Engine Torque |  | | 512 | EEC1 [2] |
| 23 | ✓ | Engine Coolant Level >95%=Okay; <5%=too low |  | The Engine Coolant Level sensor works as a switch. The level will be sent either as 0% or 100%. | 111 | EFL/P1 [8] |
| 24 | ✓ | Engine Intake Manifold Pressure |  | | 102 | IC1 [2] |
| 25 | ✓ | Engine Intake Manifold Temperature |  | | 105 | IC1 [3] |
| 26 | | Temperature of Combustion Byproducts Leaving the engine |  | Only for engines with EMR4 ECUs | 173 | IC1 [6-7] |
| 27 | | Engine Air Filter Differential Pressure |  | On engines WITH EGR this value is only valid above coolant temperatures above 65°C: <ul style="list-style-type: none"> • 0 kPa Air filter is ok (switch is not closed) • >10 kPa Air filter needs | 107 | IC1 [5] |
| 28 | | Engine Fuel Delivery Pressure |  | For gasoline engines with EMR_LPG-ECUs: Signal cannot be shown. | 94 | EFL/P1 [1] |
| 29 | | Engine Total Fuel Used |  | | 250 | LFC1 [5-8] |

| | | | | | | |
|----|---|------------------------------------|---|--|------|--------------|
| 30 | ✓ | Barometric Pressure |  | | 108 | AMB [1] |
| 31 | | Hydraulic Oil Temperature |  | This signal does not come from the Deutz engine control unit | 1638 | VF [1] |
| 32 | | Hydraulic Oil Pressure |  | This signal does not come from the Deutz engine control unit | 1762 | HPG [1-2] |
| 33 | | Exhaust Gas Temperature SCR Intake |  | | 3241 | AT1IG2 [1-2] |
| 34 | | Exhaust Gas Temperature DOC Intake |  | | 4765 | A1DOC [1-2] |
| 35 | | Exhaust Gas Temperature DOC Outlet |  | | 4766 | A1DOC [3-4] |
| 36 | | Differential Pressure DPF |  | For engines with EMR_L1-ECUs: This signal means the differential pressure of the SCR filter. | 3251 | AT1IMG [5-6] |
| 37 | | DPF Soot Load |  | | 3719 | AT1S [1] |
| 38 | | DPF Ash Load |  | | 3720 | AT1S [2] |
| 39 | ✓ | Engine Total Hours of Operation |  | | 247 | HOURS [1-4] |
| 40 | | DEF Tank Level |  | | 1761 | AT1T1I1 [1] |

| | | | | | | |
|----|--|--|---|--|--------|----------------------|
| 41 | | Diesel Tank Level |  | This signal does not come from the Deutz engine control unit. | 96 | DD1 [2] |
| 42 | | Time Until Next Oil Exchange |  | Only for engines with EMR_L1 ECUs | 519026 | OE [1-2] |
| 43 | | Vehicle Speed (Wheel Based) |  | This signal does not come from the Deutz engine control unit. Not possible for | 84 | CCVS1 [2-3] |
| 44 | | Vehicle Speed (Navigation Based) |  | This signal does not come from the Deutz engine control unit. | 517 | VDS [3-4] |
| 45 | | DEF Tank Temperature |  | | 3031 | AT1T1I1 [2] |
| 46 | | DEF Doser Pressure |  | | 4331 | A1SCRDSI1 [1-2] |
| 47 | | Second DEF Doser Pressure |  | | 4384 | A2SCRDSI1 [1-2] |
| 48 | | Time Since Last Active Regeneration |  | | 3721 | AT1S [3-6] |
| 49 | | Remaining Standstill Regeneration Time |  | | N/A | DPF Test Monitor [5] |
| 50 | | Engine Oil Level |  | Only for engines with EMR_L1 ECUs | 98 | EFL/P1 [3] |

7 Operation Instructions - EDEUTZ

Note: All available measuring value displays shown as examples in this documentation depend on the engine control unit connected to the display, the engine control unit configuration and its software status! To illustrate the options of the DEUTZ® Engine Display, it is assumed in this documentation that the CAN message required for a definite display functionality is available.

7.1 General

The DEUTZ® Engine Display executes a series of steps to initiate itself. During this phase the boot picture as in Fig. 59 shown. After this the main screen will be shown (Fig.59).



Fig. 59: Startbildschirm

7.2 Screens

7.2.1 Main screen

This screen displays the motor speed, state of charge of the high-voltage battery (HVB), system status, relative power display and the gearbox setting. Depending on the drive system present (drive, work or split drive), the layout of the main window automatically adapts to display all relevant measurement data and statuses.



Fig. 60: Main screen for EDEUTZ Drive systems



Fig. 61: Main screen for EDEUTZ Split systems (drive + work system)

The power display in the main window shows the power of three different system states (Fig. 62).

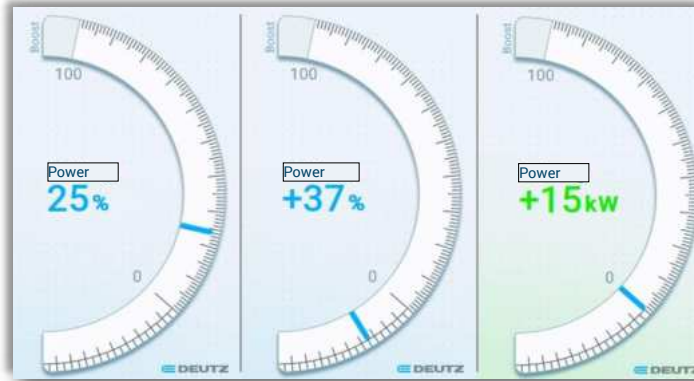


Fig. 62: Comparison of power output right gauge

Normal operation - power output

If power is delivered during operation, the tachometer pointer moves in the range above the zero line and the relative power is output via the digital display (cf. left column in Fig. 62).

Recuperation – power input

If the system recovers or the battery is charged briefly during operation, the gauge needle is in the area below the zero line. Here the relative power is output and additionally marked with a "+" (cf. center column in Fig. 62).

Charging mode - power input

If the system is charged externally and the charging mode is active, the gauge needle is at the zero line and the absolute charging power of the system is displayed (cf. right column in Fig. 62).

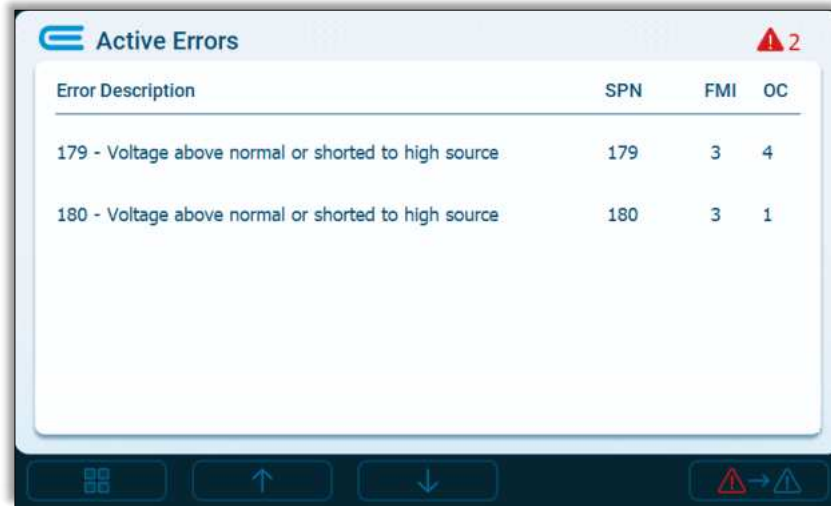
Five buttons are available in the main window (Fig. 63). The first element displays the main window. Clicking button 1 changes the appearance of the EDEUTZ application (more information in chapter 7.2.5.4). The second key switches the display to the diagnostics window. The "System overview" window is displayed when the third key is pressed. The fourth key leads to the measured value window. Settings are available in the settings window, which can be accessed via the fifth key.



Fig. 63: Main screen menu buttons

7.2.2 Diagnostic screen

The diagnostics window works in two different modes, the display of active errors and passive errors. The diagnosis window for active errors is the default mode for this window. Here error codes are listed with their descriptions (Fig. 64). If no error is active, this is indicated by a corresponding note on the diagnostics page (Fig. 65).



The screenshot shows the 'Active Errors' window. At the top left is a blue icon and the text 'Active Errors'. At the top right is a red triangle icon with the number '2'. Below this is a table with four columns: 'Error Description', 'SPN', 'FMI', and 'OC'. The table contains two rows of data. At the bottom of the window is a dark blue bar with several icons: a grid icon, an up arrow, a down arrow, and a red triangle icon with a right arrow.

| Error Description | SPN | FMI | OC |
|--|-----|-----|----|
| 179 - Voltage above normal or shorted to high source | 179 | 3 | 4 |
| 180 - Voltage above normal or shorted to high source | 180 | 3 | 1 |

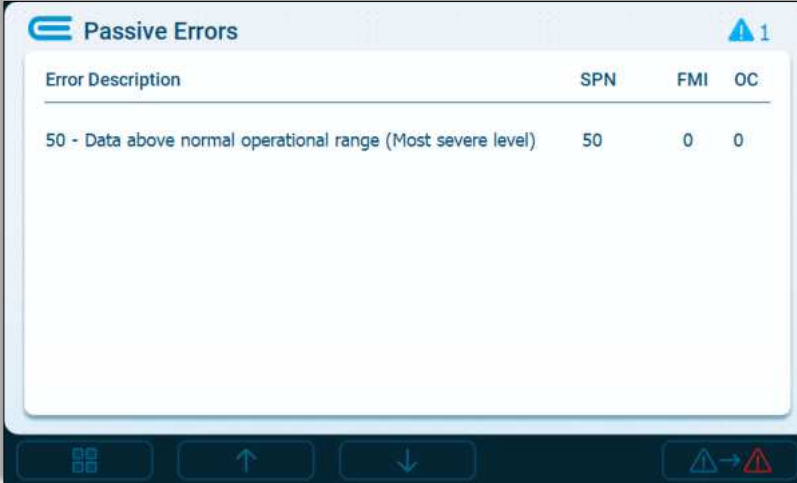
Fig. 64: Active error diagnosis window with two active errors



Fig. 65: Active error diagnosis window without active errors

This screen has four buttons. The first button switches the screen to the main window. The second and third buttons are used to navigate through the error list. The fifth button switches to the passive error page.

The diagnostic screen for passive errors lists the errors that are stored in the engine control unit and are currently not active (Fig. 66).



The image shows a diagnostic screen titled "Passive Errors". It features a table with four columns: "Error Description", "SPN", "FMI", and "OC". There is a single row of data in the table. At the bottom of the screen, there is a navigation bar with four buttons: a grid icon, an up arrow, a down arrow, and a triangle icon with a right arrow.

| Error Description | SPN | FMI | OC |
|--|-----|-----|----|
| 50 - Data above normal operational range (Most severe level) | 50 | 0 | 0 |

Fig. 66: Passive error diagnosis window with passive errors

7.2.3 System overview screen

The system overview screen displays a schematic representation of the existing powertrain topology. This displays the existing components with important measurement values and status of the powertrain system (e. g. consisting of the high-voltage and low-voltage battery, various rectifiers or inverters, and the motors). The system informations are acquired via CAN bus at startup. Example system overview displays for a traction drive system and a split system are shown in Fig. 67 and Fig. 68.

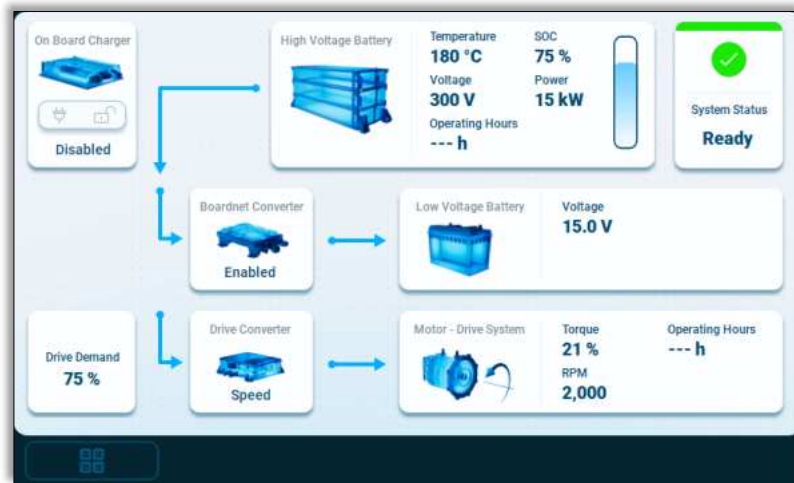


Fig. 67: System overview screen of a travel drive in normal operation

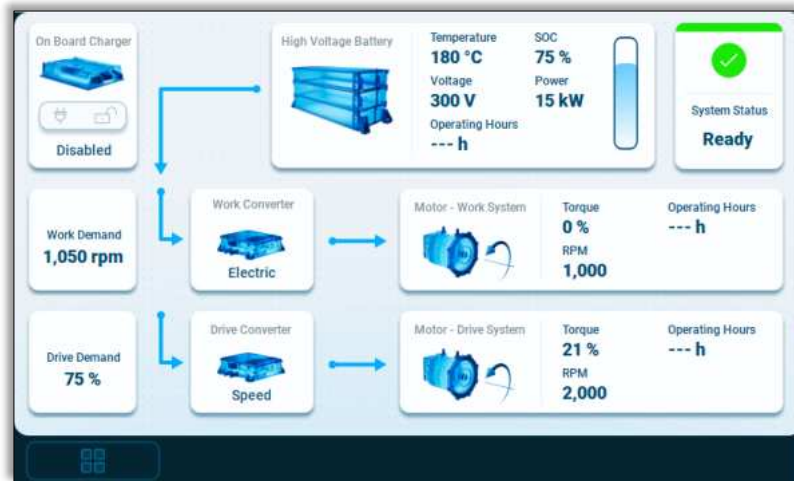


Fig. 68: System overview screen of a split drive in normal operation

In addition to the display of relevant measured values and statuses, error states are also displayed. If one of the components is in error state, a corresponding text is displayed in the status field and the field of the component is framed in red. A blue frame on the other hand symbolizes the loss of the CAN connection to the respective component. Examples for both cases are shown in the following figure (Fig. 69).

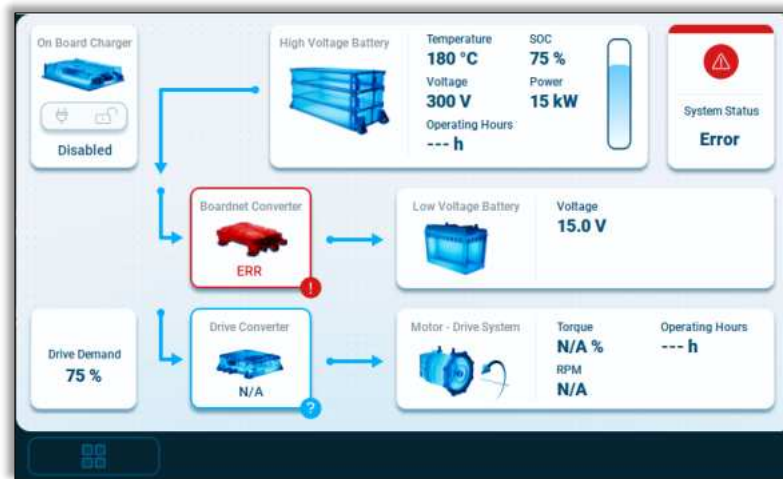


Fig. 69: System overview screen with errors


Furthermore, the charging process of the system is also indicated via green frames as well as via the adaptation of the arrow direction for schematic visualization of the current flow direction.



Fig. 70: System overview with loading process

7.2.4 Measurement screen

The DEUTZ® Engine Display can show selected measured values. A list and detailed description of these symbols and corresponding descriptions can be found in chapter 0. The measurement screen has three buttons.









| Measurement Description | Value |
|---|--------|
|  High voltage battery current | 50 A |
|  State of charge of the high voltage battery | 75 % |
|  High voltage battery temperature | 180 °C |
|  Global state EDEUTZ system | Ready |
|  High voltage system above 60V | ERR |
|  Global LV-charge state | Buck |

Fig. 71: Measurement screen

The first key switches back to the main window. The second and third keys are used to navigate through the measured value table.

The measurement value table includes essential measurement values, which are always displayed even if the signal indicates "---" or "N/A", and optional measurement values, which are only displayed in the table if they are active on the CAN bus and do not transmit "N/A". Table 6 shows whether a measured value is essential.

7.2.5 Settings screen

In the settings window there are various settings and customization options for the user. He can select the language and the units. Display and system information can be read, and the brightness of the screen can be adjusted. The settings consist of the higher-level menu structure on the left side and the submenus on the right side of the display. At the beginning, one navigates through the superordinate menu. By clicking on one of the main tabs, the selector then jumps to navigate through submenus.

7.2.5.1 Language

The display language can be changed via the language menu (Fig. 72). The available languages are German, English, Spanish, French, Italian, Dutch, Russian, Swedish, Japanese and Chinese. More languages can be updated. The active language selection is marked with the checkmark icon. Use keys two and three to navigate to the desired language. Key four is used to select the currently selected language. The first key navigates back to the main menu.



Fig. 72: Language selection

7.2.5.2 Information

The upper area of the information display, Display Information, provides data on the production date, software version, language database version, operating hours, and serial number of the display (Fig. 73). The lower area of the information page shows system information, such as the detected system topology or the software ID of the connected ECU.

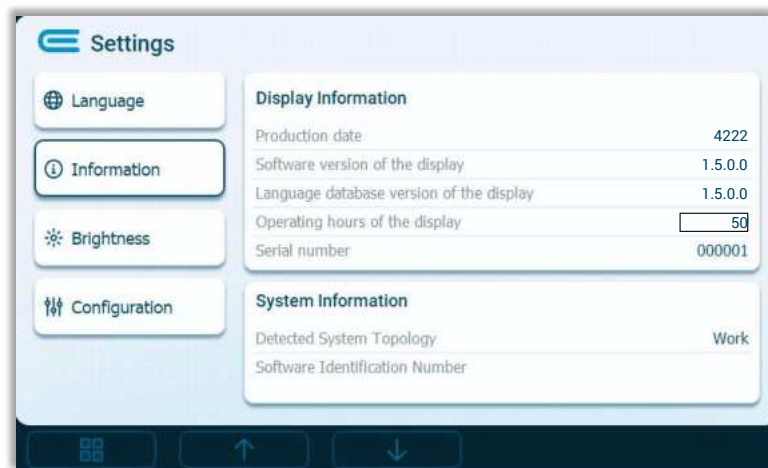


Fig. 73: Information screen

7.2.5.3 Brightness

Three buttons are available in this screen (Fig. 74). The first key switches back to the main menu. The other keys "up" & "down" are used to adjust the brightness. The brightness can be adjusted in several steps.

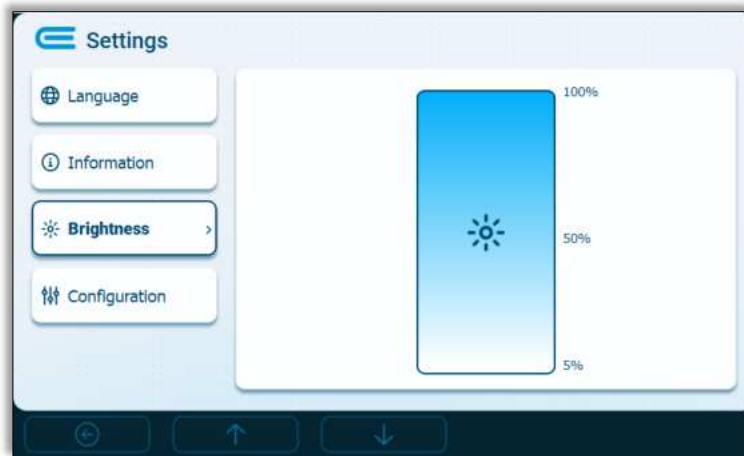


Fig. 74: Brightness setting

7.2.5.4 Configuration

Settings can be adjusted in the configuration settings. The first selection point is for activating/deactivating the buzzer and digital output. An activated/deactivated buzzer is indicated via the blue bordered symbol (Fig. 75).

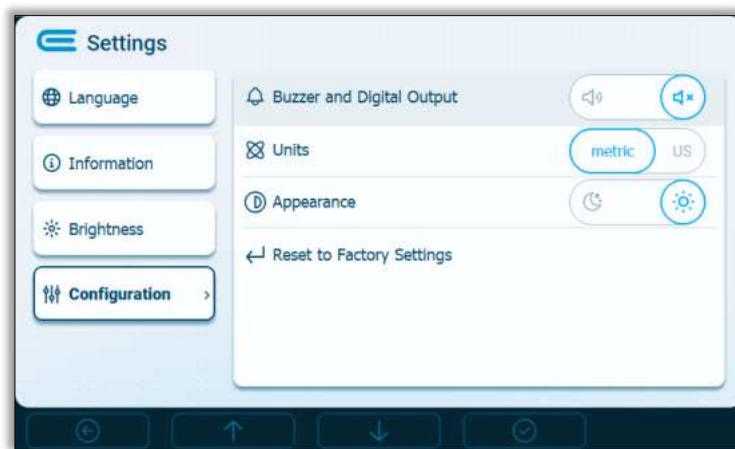


Fig. 75: Configuration settings

The "Units" item can be used to customize the display of the unit system for the entire application. In addition to metric units (set by default), the units can also be displayed in the US system.

The "Appearance" configuration item can be used to customize the appearance of the entire EDEUTZ application. In addition to the default bright display mode, it is possible to switch to the dark mode. The appearance is automatically transferred to all pages and is permanently saved (Fig. 76). It can be additionally changed via button 1 on the main screen.



Fig. 76: Dark mode on main screen

The "Reset to factory settings" item resets the settings changed by the user to their default values. These include language setting, units, buzzer, brightness, appearance and future options. The software version of the display remains unaffected.

7.3 Dialog screens

The DEUTZ® Engine Display shows pop up dialog screens under certain conditions. In this chapter these are briefly explained.

7.3.1 Error Dialog Screen

If a new error is detected, the DEUTZ® Engine Display sets an acoustic warning via an internal buzzer and a visual warning via a dialog screen. As soon as the buzzer turned on, the dialog screen can be visible on the display. This screen has only one button as in Fig. 77, which turns off the buzzer. Further information on the new error can be found in diagnostic screen.

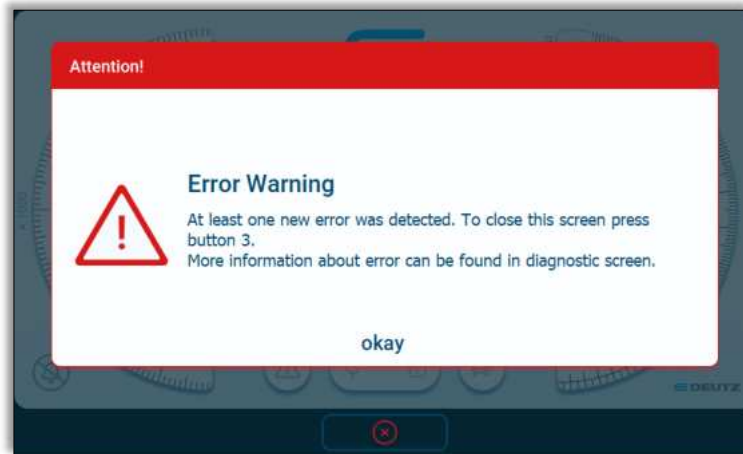


Fig. 77: Error dialog screen

7.4 No CAN connection

Deutz Engine Display monitors constantly the reception status of three critical CAN Frames, namely DM1, Veh_BattData1, Veh_DrvFeedback1 and Veh_WrkFeedback1. The display will show a dialog screen as in Fig. 78 if none of these frames are received within their timeout.

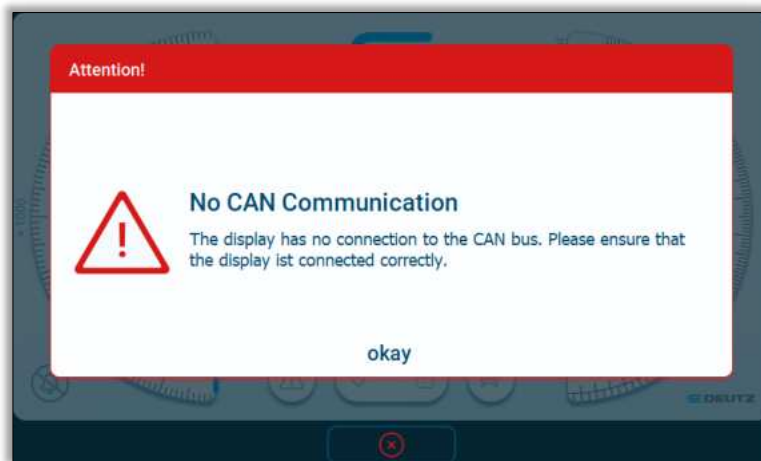


Fig. 78: Dialog screen No CAN Communication

This dialog can be closed by pressing button three.

7.5 Dynamic menu bar

In addition to displaying the various menu buttons in the different windows, the menu bar also serves as an indicator display for various statuses of the system. The normal condition here is always that the menu buttons are enclosed by a light blue frame (Fig. 79)



Fig. 79: Main screen menu buttons normal operation

If there is an active error, this is indicated not only by the warning lamp in the main window, but also by the red color of the diagnostic page. (Fig. 80).



Fig. 80: Main screen menu buttons with active error

If one of the connected components shows an error status (status = "Error"), the menu symbol of the system overview page is colored red (Fig. 81).



Fig. 81: Main screen menu buttons with error state

7.6 Status bar

The status bar is located on all windows of the EDEUTZ application and serves as a global indicator for an active red warning lamp or the charging status. That is: if the red warning lamp is active, the red status bar is displayed on all pages (vgl. Fig. 82). Similarly, the green status bar is displayed as soon as the system is in charging state (vgl. Fig. 83).

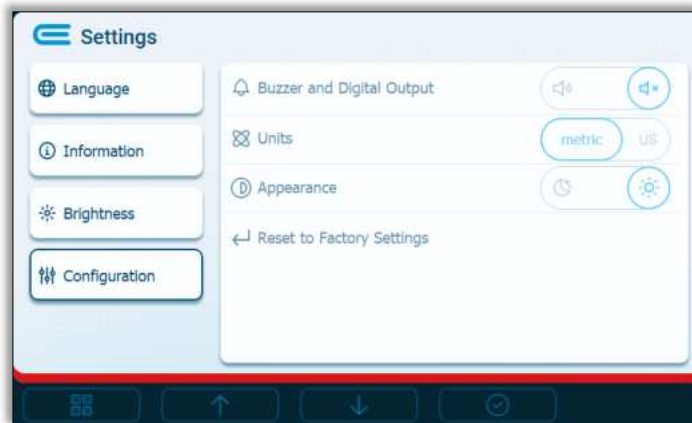


Fig. 82: Example red status bar in the settings window

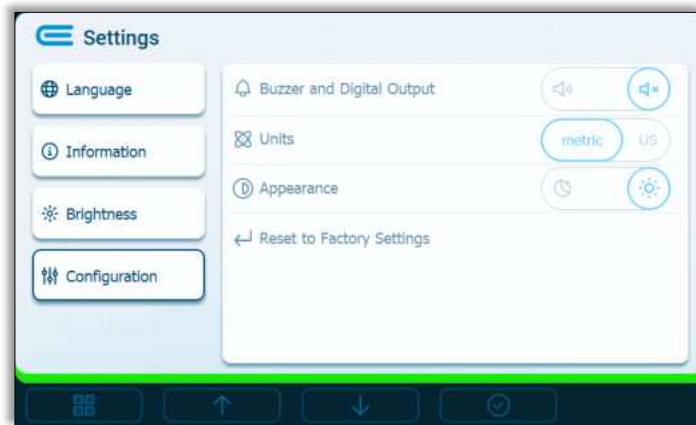


Fig. 83: Example green status bar in the settings window

8 Lamps and symbols description - EDEUTZ

8.1 Lamps description

The DEUTZ® Engine Display is equipped with warning lamps. These lamps are displayed centrally on the main page above the menu bar (cf. Fig. 84).



Fig. 84: Lamp indicator

8.1.1 Error lamp / Amber warning lamp / Red stop lamp

In case of any engine errors the general error lamp of the engine will be activated. Whenever the error lamp (e. g. Fig. 85) is active a fault code is stored in the error memory. No system reactions like power reduction can become active without error lamp.



Fig. 85: Red stop lamp

Two different states are possible:

- Solid on in yellow/orange: Errors that allow continuing engine operation with minor restrictions.
- Blinking in red: Errors that cause an engine shut down or shut down request.

8.1.2 Plug / charging lamp

The composed plug and charging lamp indicate the current status of a connected charging plug and the charging status. If only the plug lamp is lit, this means that the plug is inserted in the charging socket (cf. Fig. 86).



Fig. 86: Plug / charge lamp: State charge plug plugged in

If the entire lamp (plug plus locking lamp cf. Fig. 87) lights up, then the connected charging plug is locked.



Fig. 87: Plug / charge lamp: State charging plug inserted and locked

A green lit lamp symbolizes the active charging process (Fig. 88).



Fig. 88: Plug / charge lamp: State charging process active

8.1.3 Power limitation lamp





An illuminated power limit lamp (Fig. 89) indicates that the system can only call up part of the maximum possible power at the present time.
























Fig. 89: Power limitation lamp





8.2 Symbols description

Table 6: Symbols description EDEUTZ

| # | essential | Description | Symbol | Remark | SPN | Related CAN Signal |
|----|-----------|---|---|--------|-------------|-----------------------------|
| 1 | --- | Amber warning lamp |  | | 624 | DM1 [1.3-1.4] |
| 2 | --- | Red stop lamp |  | | 987 and 623 | DM1 [1.1-1.2 und 1.5-1.6] |
| 3 | --- | Plug lamp |  | | N/A | VehGridConnStatus [3.1-3.2] |
| 4 | --- | Lock lamp |  | | N/A | VehGridConnStatus [3.3-3.5] |
| 5 | --- | Charging lamp |  | | N/A | VehChrgFdbk [1.1-1.4] |
| 6 | --- | Power limitation lamp |  | | N/A | VehBattDat2 [5-6] |
| 7 | | Drive system - speed electric motor |  | | N/A | VehDrvFdbk1 [4-5] |
| 9 | | Drive system – converter state |  | | N/A | VehDrvFdbk1 [6.1-6.4] |
| 10 | | Drive system – Relative torque electric motor |  | | N/A | VehDrvFdbk1 [2.5-3.8] |
| 11 | | Drive system - relative torque setpoint |  | | N/A | VehDrvDem1 [2.5-3.8] |

| | | | | | | |
|----|---|--|---|--|-----|--|
| 12 | | Drive system – Available generating torque |  | | N/A | VehDrvFdbk2 [4.5-5.8] |
| 13 | | Drive system – Available motoring torque |  | | N/A | VehDrvFdbk2 [3.1-4.4] |
| 14 | | High voltage battery – Charging state |  | | N/A | VehChrgFdbk [1.1-1.4] |
| 15 | ✓ | 12V battery – Charging state |  | | N/A | VehLVSpdyDat [3.1-3.3] |
| 16 | ✓ | Global system state |  | | N/A | VehSysDat1 [2.5-2.8] |
| 17 | ✓ | High voltage battery – Current |  | | N/A | VehBattDat1 [5-6] |
| 18 | ✓ | High voltage battery – State of charge |  | | N/A | VehBattDat1 [4] |
| 19 | | High voltage battery – Power |  | | N/A | = VehBattDat1 [5-6] * VehBattDat1 [7-8] / 1000 |
| 20 | ✓ | High voltage battery – Battery temperature |  | | N/A | VehBattDat1 [3] |
| 21 | | High voltage battery – Voltage |  | | N/A | VehBattDat1 [7-8] |
| 22 | | High voltage bus - Current |  | | N/A | VehSysDat1 [2] |

| | | | | | | |
|----|---|--|---|--|-----|------------------------|
| 23 | | High voltage bus – Interlock state |  | | N/A | VehSysDat1 [3.1-3.2] |
| 24 | ✓ | High voltage bus – HV safe state |  | | N/A | VehSysDat1 [3.3-3.4] |
| 25 | ✓ | High voltage bus - Voltage |  | | N/A | VehSysDat1 [7-8] |
| 26 | ✓ | Coolant temperature - low temperature circuit (HV battery) |  | | N/A | VehThermMnmtDat [3] |
| 27 | ✓ | 12V battery - Voltage |  | | N/A | VehLVSpdyDat [4.1-5.2] |
| 28 | ✓ | Coolant temperature - Medium temperature circuit |  | | N/A | VehThermMnmtDat [2] |
| 29 | ✓ | Drive system – Operation hours |  | | N/A | VehOpHours [5-8] |
| 30 | ✓ | Work system – Operation hours |  | | N/A | VehOpHours [9-12] |
| 31 | | High voltage battery – Remaining charging time |  | | N/A | VehChrgFdbk [1.5-2] |
| 32 | | Work system - speed electric motor |  | | N/A | VehWrkFdbk1 [5-6] |

| | | | | | | |
|----|--|---|---|--|-----|-------------------------|
| 33 | | Work system - speed electric motor setpoint |  | | N/A | VehWrkDem [4-5] |
| 34 | | Work system – converter state |  | | N/A | VehWrkFdbk1 [7.1-7.3] |
| 35 | | Work system – Torque |  | | N/A | VehWrkFdbk1 [3.1-4.4] |
| 36 | | Drive system – Available generating torque |  | | N/A | VehWrkFdbk2 [3.1 - 4.4] |

9 Troubleshooting

If you observe a malfunction, we recommend a complete software update with the DEUTZ diagnostic tool SerDia (Chapter 10). If this malfunction persists, please contact your applicator assigned by Deutz. The malfunction is then analyzed immediately.

It is a great help if you look up the serial number and the software version number of the display and pass them on. Both can be found under Settings - Information - Display information (see also chapter 5.2.4.4).

If it is a faulty signal or faulty interaction with the ECU, a recording of the J1939 CAN bus will probably be necessary for an exact analysis.

10 Software Update via SerDia

The DEUTZ® Engine Display can be updated via the DEUTZ diagnostic tool SerDia to benefit from new languages, bug fixes and feature enhancements. An update to the current software is recommended. Here is the short version:

1. Switch on ignition, connect DeCom and start SerDia 4.0.
2. Start Display Updater (SerDia 4.0 -> Applications -> "Display Updater").
3. Wait until display is recognized and connection is established.
4. Select update scope ("Full software update" is recommended).
5. Start update (button: "Start update").
6. After completion, the display restarts automatically.

10.1 Preconditions

With a display installed in the vehicle, a software update is only possible if the diagnostic socket on the device is fully equipped. (The full assembly is a general requirement from Deutz to the vehicle manufacturer. For the software update of the display, pins M and F of the diagnostic socket must be properly connected to the customer CAN. The display is also connected to the customer CAN. The diagnostic socket is plug X22.2 from the DEUTZ circuit diagram of the device-side wiring. It's an ITT Cannon male 12-pin female connector.)

10.2 Detailed procedure of display software update

The Display Updater offers two options for the update, namely: "Full Software Update" and "Language Pack Update". The "Full Software Update" performs a full software update including the "Language Pack Update". The display is up to date after this update. The "Language package update" only updates texts, namely error and corrected display texts. It also adds new languages if any have been added. However, a complete software update is recommended.

A software update preserves the operating hours of the display and the settings of the display.

The complete software update usually takes between 30 and 60 minutes. Depending on the bus communication load and the performance of the computer, it may take longer.

Do not interrupt the power supply of the display during the flash process.

1. Switch on the vehicle ignition.
2. Connect the SerDia-DeCom with the computer and on the motor side with the diagnostic socket. (An ITT Cannon connector with 12-pin socket - connector X22.2 in the wiring diagram).
3. Start the DEUTZ diagnostic tool SerDia on your computer.
4. Navigate to the "Applications" and select the "Display Updater" (Fig. 90). The updater is then started. A new window appears after a few seconds.
5. The updater will now automatically search for a display. Wait until all necessary information has been read out (Fig. 91).

- a. If a display has been detected, the possible update options are automatically displayed (Fig. 92). The following options are possible:
 - i. The display is already up to date and no update is required
 - ii. Complete software update
 - iii. Language package update
 - iv. Image update required
 - b. If the display does not respond successfully, a message appears: "No display found!"
In this case, check the hardware setup and please observe the "Notes" and "Prerequisites" in this chapter. Select "Try again!" to start the search process again.
6. "Complete software update".
With a complete software update, the "language package" is automatically included. With this update you will receive all new functionalities and bug fixes. A complete software update is recommended. The duration of this update process depends largely on the load of the connected bus system and on the version of the display to be updated.
7. "Language package update".
If you want to add only one language or get an update of the error texts, select "Language Pack Update". This update takes only a few minutes.
8. "Image update required" (For software versions < 1.3.0.0).
An important system update is available for your display. This cannot be done via SerDia, but only via a 'Display-to-Display-via-CAN' update.
Please contact the technical customer service for this and for further coordination and open a ticket in the DTS (Deutz Ticket System).
9. After selecting one of the update packages, you will be redirected to a summary page. It is essential to follow the instructions and notes described here. Use the "back" button to navigate back to the update selection. The "Start update" button starts the update process automatically (Fig. 93). The display switches off for the duration of this process and only shows a static image.
Important: The update process must not be stopped or interrupted.
10. After successful completion of the update, the terminal switches on again automatically. The updater can be terminated

10.3 Hints

Displays with a software version lower than 1.3.0.0 (viewing the software version is described in Chapter 5.2.4.4) cannot be updated via SerDia. These displays have a serial number less than 001000 and require a "display-to-display-via-CAN update". To do this, please contact the technical customer service and open a ticket in the DTS system (Deutz Ticket System).

SerDia may not be able to recognize displays with software version 1.0.1.0. With these displays, the display may only be started if it has previously been connected to a CAN participant. The background is the functioning of the CAN driver, which only registers the display with the CAN if it can "speak" with another CAN participant when it starts.

10.4 Important Updates

Table 7: Change Log

| Date | Version no. | New |
|------------|-------------|---|
| 01.07.2023 | 1.5.0.0 | <ul style="list-style-type: none"> ❖ The display brightness can no longer be set until 0%. ❖ Chinese can now be set as language. ❖ Other values for the speedometer elements can now be set on the main page (favorite selection). ❖ Navigation is now supported by dynamic key illumination. ❖ A slight correction of the color display ensures a better contrast ratio. ❖ EDEUTZ systems are now fully supported. ❖ The wheel-based vehicle speed can now be displayed for all engines (CCVS1, SPN 84). ❖ Many minor bugs have been fixed and improvements made. |
| 01.07.2022 | 1.4.0.0 | <p>The viewing of the measurements has been improved significantly:</p> <ul style="list-style-type: none"> ❖ Only existing values are now displayed on the measured data page. ❖ Each measurement now has a description. ❖ On the main page, other values from the measurement data can now be set (favorite selection). ❖ The vehicle speed can now be displayed (VDS, SPN 517). <p>Some errors have been fixed:</p> <ul style="list-style-type: none"> ❖ Now the reason for a power reduction is also displayed when the SCR tank level drops below 10%. ❖ The display brightness can no longer be set until 0%. ❖ The display values are now shown stable and without dropouts. |
| 01.11.2021 | 1.3.0.0 | <ul style="list-style-type: none"> ❖ Reduced start time below 12 sec. ❖ Compatibility for all engines with EMR3 and EMR2 ECUs ❖ Compatibility for TCD18.0 ❖ EOL Test via CAN-Message: Service Receive Message ❖ New lamps (MIL, Gas Leakage) for gasoline engines ❖ Scheme of the installed exhaust system for engines with EMR_L1 ECU ❖ Resetting oil service interval for engines with EMR_L1 ECU ❖ Display power reduction: Add PCD Inducement ❖ Allow ECU start after display start with full display functions ❖ The measured value 'Engine Fuel Delivery Pressure' now works |
| 01.04.2021 | 1.1.0.0 | <ul style="list-style-type: none"> ❖ Compatibility for engines with EMR4 ❖ Signal range evaluation (error / not available) ❖ Display of engine information ❖ Allow display start before CAN connection. ❖ Now the Diesel Tank Level, Hydraulic Öl Temperature and Hydraulic Öl Pressure can be displayed. |

10.5 Pictures

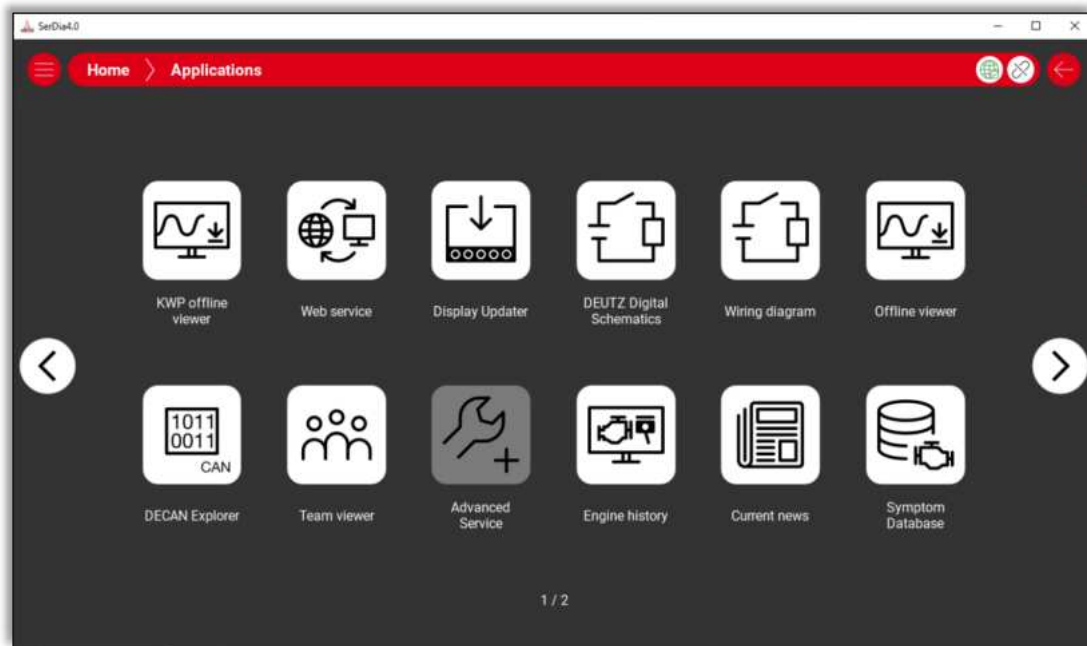


Fig. 90: SerDia 4.0 Application, Display Updater

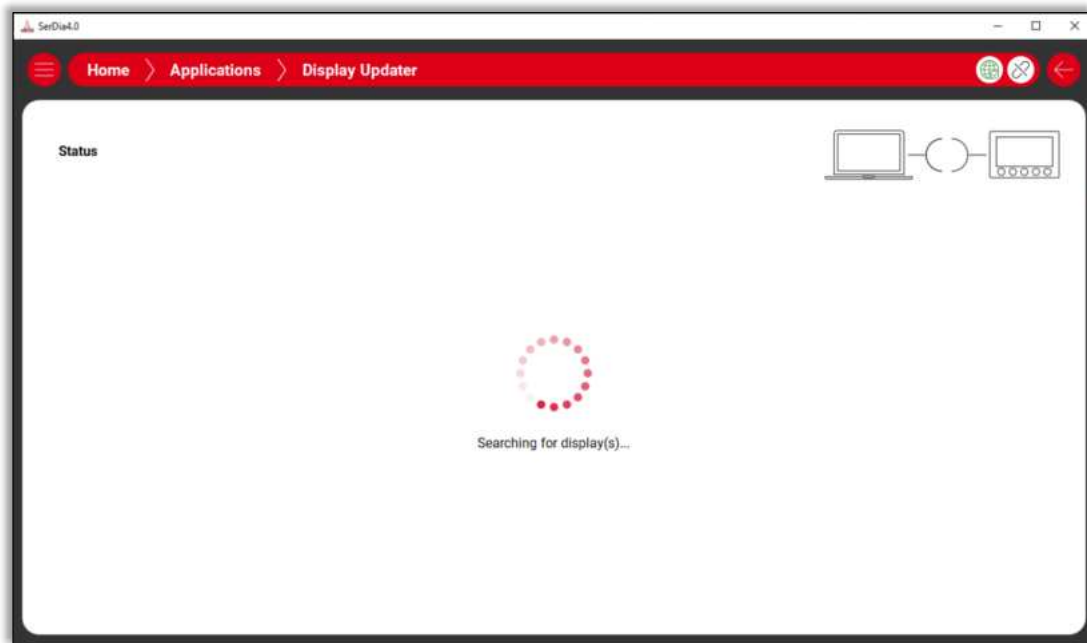


Fig. 91: Display detection

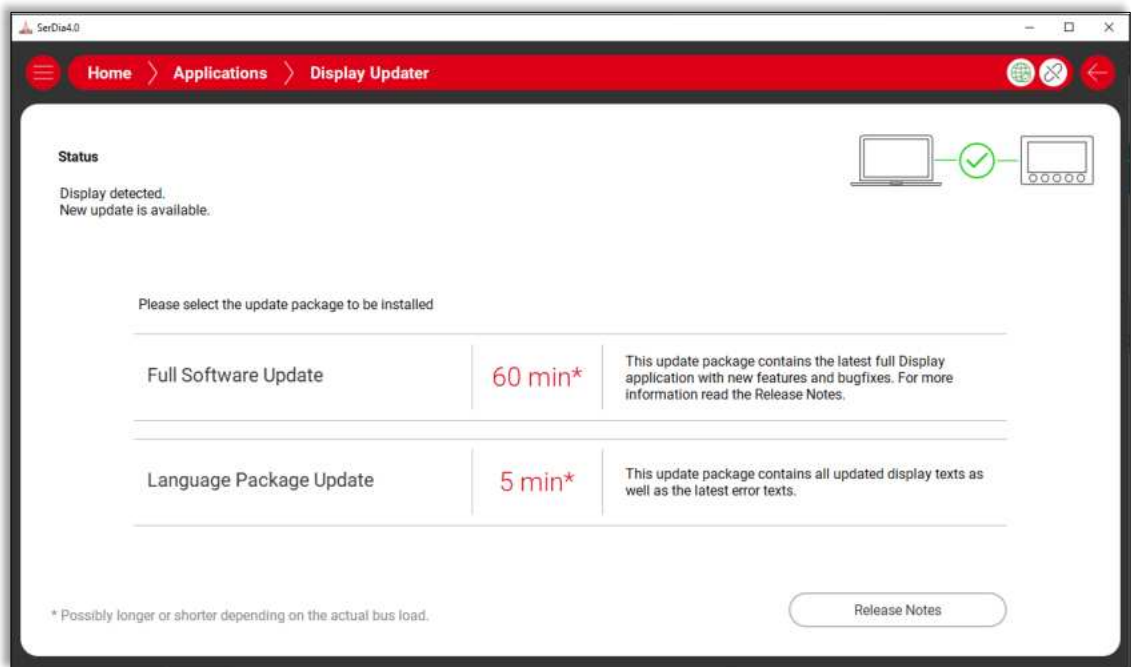


Fig. 92: Update options

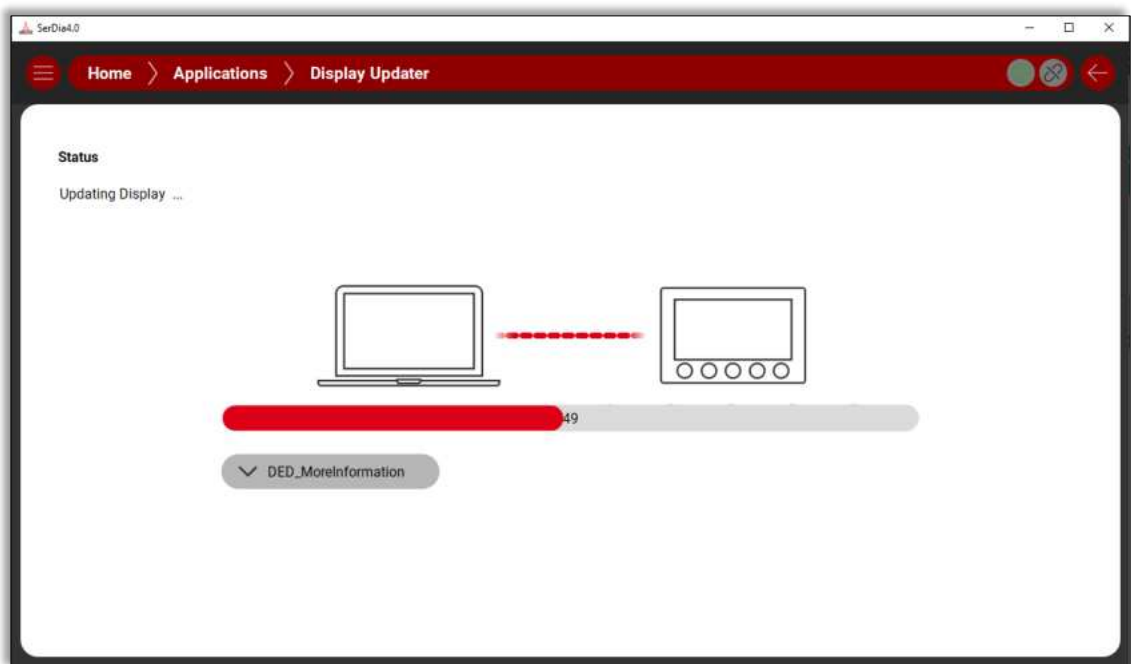


Fig. 93: Update process

11 Technical Drawing

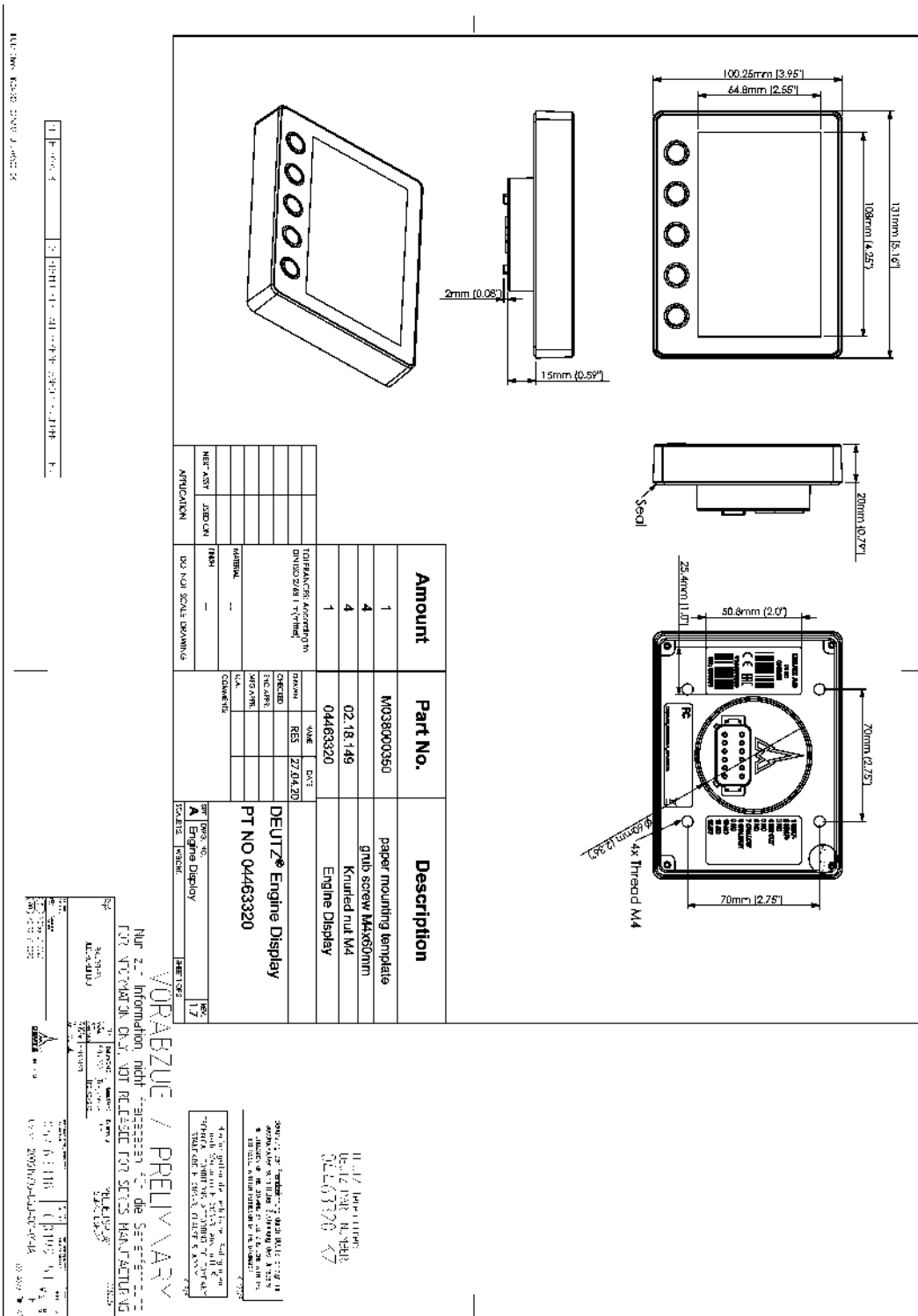


Fig. 94: Technical drawing page 1



12 European Declaration of Conformity

Wir leben Elektronik!
We live electronics!

Sontheim 



EU-Konformitätserklärung
European Declaration of Conformity



Hiermit erklären wir, dass das Produkt
We herewith declare that the product

Produktname

V966370300 Deutz Engine Display (Deutz PN 04463320)

**mit den Vorschriften folgender Europäischen Richtlinien
übereinstimmt:**

complies with the requirements of the following European directives

| | | | |
|----------------------------------|-------------------|------------------------------|-------------------|
| EMV-Richtlinie | 2014/30/EU | EMC-directive | 2014/30/EU |
| Niederspannungsrichtlinie | 2014/35/EU | Low Voltage Directive | 2014/35/EC |
| RoHS-Richtlinie | 2011/65/EU | ROHS-directive | 2011/65/EC |

Hersteller:

manufacturer:

Sontheim Industrie Elektronik GmbH
Georg-Krug-Straße 2
D-87437 Kempten / Germany

Kempten, 23.02.2021

Sontheim Industrie Elektronik GmbH

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Fig. 96: European Declaration of Conformity



The engine company.

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