HART Kit

Operating Manual

METPAH™

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1 PRECAUTIONS

WARNING !

Observe all standards and procedures when working with the HART Kit in areas where instruments are connected. Failure to do so may result in damage to equipment and/or injury to personnel. Carefully read all sections of this manual and strictly adhere to them.

Before operating the HART Kit, check the following:

- The tablet computer is not damaged;
- The tablet computer battery is secured with a lock;
- Cables and connectors are not damaged.

1.1 Working in Hazardous Areas

WARNING !

Review the markings on the tablet computer and HART modem in the conformity certificates for EAC certification (TP TC 012/2011).

HART kit component	Explosion protection marking	Certificates number
Tablet PC Getac UX10-Ex	2Ex ic op is IIC T4 Gc X	RU C-TW.HA65.B.01604/22
HART-interface Metran-683	[Ex ia Ga] IIC	RU C-RU.АД07.B.05942/23

Connecting the HART Kit to circuits or segments connected to equipment located in Zones 0, 1, 2, Group IIC is permitted.

WARNING !

It is prohibited to install, remove, or charge the lithium-ion (Li-Ion) power module while in a hazardous area.

Mechanical operations with the USB port while in a hazardous area are prohibited. These operations include connecting/disconnecting the USB cable, USB storage media, or any other USB device.

WARNING !

Do not apply protective film/glass to the tablet computer screen. Static discharge may occur.

CAUTION !

An explosion may cause serious injury or death.

The use of the instrument in a hazardous environment must comply with national standards, as well as the norms and rules in effect at the enterprise.

Electric shock may cause serious injury or death.

2 DESCRIPTION AND OPERATION

2.1 Purpose

The HART Kit is used in the process of servicing and configuring measuring instruments: pressure sensors, temperature sensors, flow meters, level meters, and other instruments supporting the HART protocol.

Main functions of the HART Kit:

- Mobile, portable solution for field work;
- Diagnostics of field instruments supporting the HART protocol;
- Configuration of field instruments supporting the HART protocol;
- Support for DD .fm8 files from various manufacturers;
- Ability to install any software required by the customer.

HART Kit software allows you to perform the following main operations with field devices:

- Reading measured variables of the instrument;
- Reading text identifiers;
- Setting the measurement range of the instrument;
- Setting the units of measurement of the instrument;
- Setting the analog output signal 4-20 mA;
- Setting HART variables PV, SV, TV, QV;
- Changing text identifiers of the instrument;
- Checking the operability of the instrument (calibration);
- Reading the current status of the instrument (depending on the manufacturer);
- Visualizing diagnostic information of the instrument (depending on the manufacturer);
- and other operations.

Metran-Configuration software allows you to remotely configure the field instrument.

Metran-Configuration software allows you to load DD files from other manufacturers.

2.2 Kit Contents

HART Kit consists of an industrial tablet computer Getac UX10-Ex with explosion-proof design and a Metran-683 HART modem, combined in a case with a backpack strap. The principle of “all-in-one-bag” is implemented with the possibility of freeing up personnel hands.

HART Kit connects to a sensor supporting the HART protocol using measuring probes with “crocodile” clips.

3 TECHNICAL SPECIFICATIONS

Tablet PC Getac UX10-Ex

Screen	10 inches
Dust and moisture protection	IP65
Ambient temperature	-20 ° … +50 °C
Explosion-proof design	2Ex ic op is IIC T4 Gc X
Operating system	Windows 10, 11
Software	Sensor configuration software included Support for DD sensors from Metran, Rosemount, and other manufacturers.
Additional features	Possibility to install any other software required by the customer – RadarMaster, Pactware, etc.

Tablet computer is equipped with a color liquid crystal touch display, a rechargeable lithium-ion power module (battery), a processor, and memory components.

HART-interface Metran-683

Dust and moisture protection	IP20
Ambient temperature	-20 ° … +50 °C
Explosion-proof design	[Ex ia Ga] IIC
Additional features	Field device power is supplied via the current loop using a two-wire connection. No additional current loop power source is required.

HART interface is equipped with connecting wires with «crocodile» clips.

4 CONNECTING HART KIT TO DEVICE

The connection to the instrument is illustrated by the example of the Metran-150 pressure sensor.

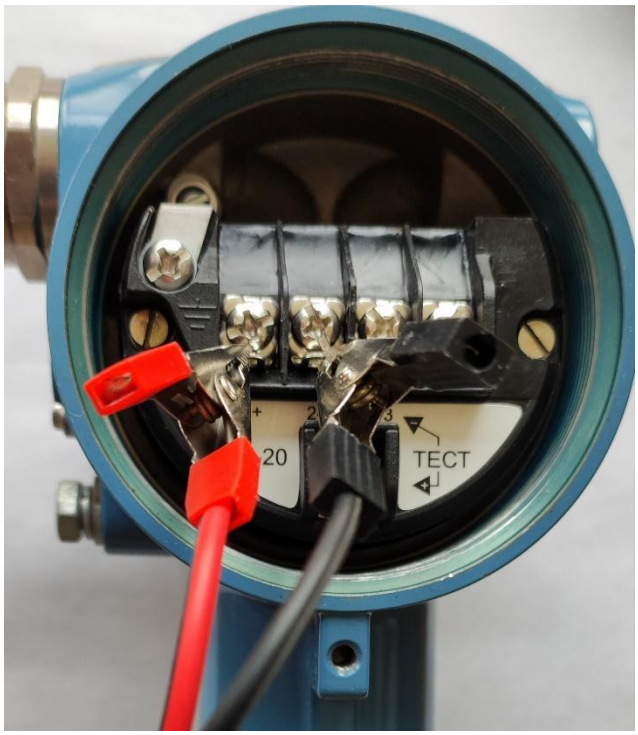


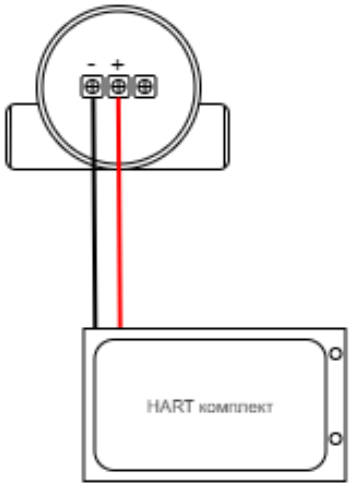
Fig. 1 Example of connecting to the terminals of the Metran-150 pressure sensor

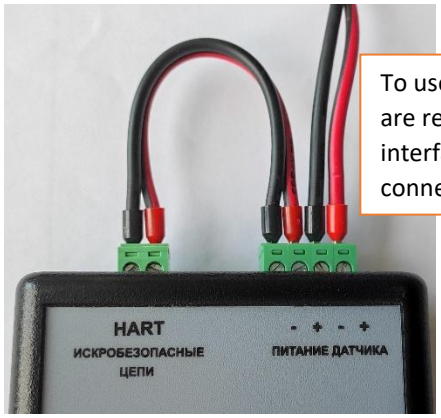
4.1

4.2 Connect the “crocodile” clips extending from the case to the corresponding terminals of the sensor according to the manufacturer’s instructions for sensor.

HART KIT CONNECTION SCHEMES

Scenario 1: Connecting the HART Kit to a sensor using a two-wire current loop with the built-in sensor power supply.

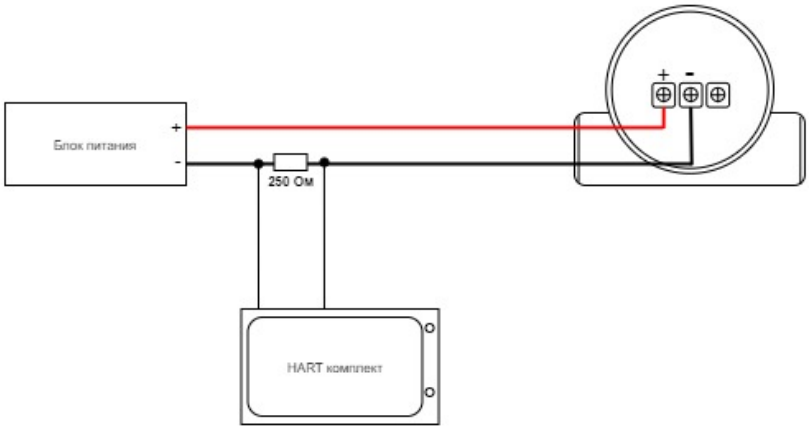


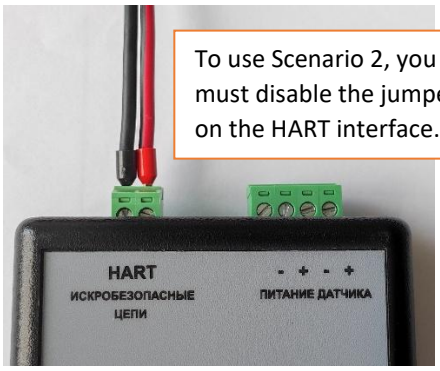


To use Scenario 1, jumpers are required on the HART interface. They are connected by default.

Attention! In this mode of operation, there is no need to use an external 250 Ohm resistor, as it is built into the Metran-683 HART modem.

Scenario 2: Connecting the HART Kit to a sensor using a two-wire current loop without using the built-in sensor power supply.



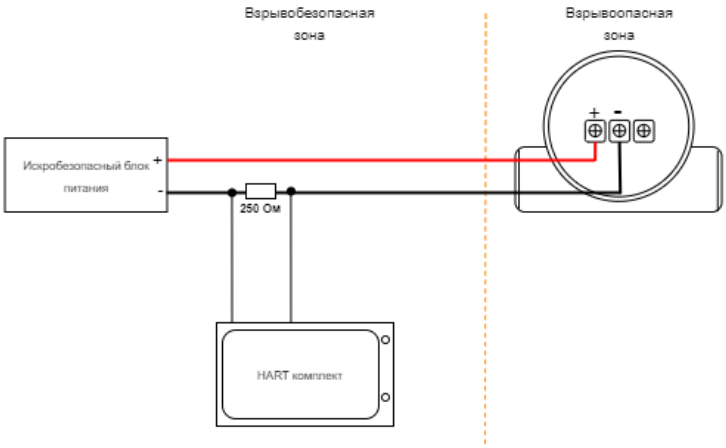


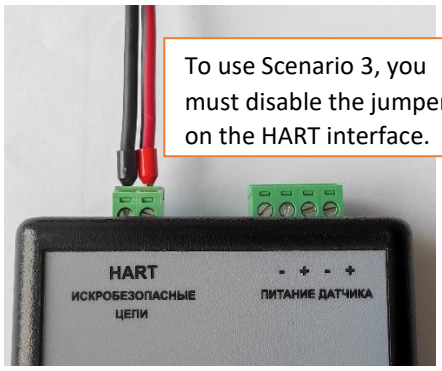
To use Scenario 2, you must disable the jumpers on the HART interface.

Attention! In this mode of operation, an external 250 Ohm resistor is required, as the built-in resistor is only activated in sensor power supply mode via the current loop.

Connections to instruments that operate on a 4-wire scheme (2 wires – power supply and 2 wires – current signal) are also made using this scheme. Flow meters are the most common instruments that operate on a 4-wire scheme

Scenario 3: Connecting the HART Kit to a sensor using a two-wire current loop in a hazardous area.





To use Scenario 3, you must disable the jumpers on the HART interface.

Attention! Connection to a sensor in a hazardous area must be performed according to the instructions of the operating organization.

Attention! When using Scenario 3, the built-in power supply in the HART modem is not used. It is necessary to disconnect the jumpers on the HART modem.

Attention! In this mode of operation, an external 250 Ohm resistor is required, as the built-in resistor is only activated in sensor power supply mode via the current loop.

The total resistance of all loads in the circuit is generally determined by the parameters of the spark arrestor, but must be at least 250 Ohms.

5 OPERATION IN METRAN-CONFIGURATION SOFTWARE

This section is intended for studying the rules of operation of the “Metran-Configuration” software (hereinafter – software, program, application or software).

This User Manual is designed to explore operating rules of Metran-Configuration Software (software, program, application or SW).

The User Manual contains information required for proper software operation.

5.1 References

No.	Name	Identifier / Reference	Revision
1	FieldComm Group Registered HART Products	https://www.fieldcommgroup.org/registered-products?protocol=hart	
2	FieldComm Group EDDL Syntax and Semantics	HCF_SPEC-500	4.1
3	HART Device Description Language Specification	FCG TS61804 - 3	12.0
4	HART Communication Protocol Universal Command Specification	HCF_SPEC-127	7.2

5.2 Terms and Abbreviations

Abbreviation / Term	Definition
COM port	Serial port, RS-232 interface
DD	Device Descriptor
EDD	Electronic Device Descriptor
EDDL	Electronic Device Descriptor Language
IEC	International Electrotechnical Commission
Op. mode	Operation mode
OS	Operating System
PC	Personal Computer
SW	Software
Field device	Industrial devices designed to measure various physical quantities. E.g., flowmeters, level transmitters, pressure and temperature products.
Data controls	Data controls used in programs such as text box, list box, check box

The menu structure, sets of configuration or monitoring parameters shown in Metran-Configuration Software depend on the DD file provided by the field device manufacturer. This document features examples of software interface when operating with field devices by Metran IG, JSC in Windows OS, with *Russian* language and *Light* theme selected in SW settings. Figures included in this document use various SW versions, which in no way affects the described functionality. Figures are for reference only.

Green arrows, next to which a number is displayed in a circle (Fig. 1), indicate the element described in the document. The number corresponds to the reference number described in the document.

Fig. 1. Icon Showing Described Program Item

Names of buttons and other controls, names of used software packages, file paths and names of performed SW actions are highlighted in italics.

5.3 SW Scope

SW is designed for use in various industries where field devices are operated.

SW is a host for receiving information from field devices, processing and sending information to field devices using HART 5, 6 or 7 and unified device description under IEC 61804-3 [3] created by any manufacturer in *.fm8 format for any field device including those registered by FieldComm Group [1].

SW is designed to interpret EDD files to enable remote control of connected HART devices, automate field device configuration and monitor measured physical quantities.

SW supports all HART modems that are recognized by the operating system as a serial or USB port.

5.4 Software Functionality Description

The application has the following functionality:

- Automatically identifies available connection options with the device
- Automatically searches for connected HART devices
- Automatically reads standard device parameters, such as device type, device manufacturer code, unique device identifier and tag
- Configures address range to search for connected devices
- Adds device description using DD files created by any manufacturer for any field device
- Remotely configures parameters of connected field devices
- Monitors and controls measured physical quantities
- Logs information exchange with the device
- Supports Russian and English language
- Supports light and dark theme
- Supports set zoom
- Differentiates access rights to program functionality with a license key

5.5 User Level of Expertise

To operate this software, one qualified user of a personal computer experienced in operating any of supported OS is required (clause 2).

5.6 Product Documentation for SW Operation

Prior to operation, it is required to read the following documents:

- Metran-Configuration Software. User Manual.
- Operation Manual for a connected field device.

6 Software Application Conditions

SW may be used at industrial tablets and PC with a pre-installed operating system.

Supported operating systems: Windows 10, Windows 11, ALT Linux (starting from 10.0), Astra Linux (starting from 1.7).

6.1 System Hardware Requirements

Minimum Hardware	Recommended Hardware
Meets minimum requirements of an installed operating system	Meets recommended requirements of an installed operating system
x86 architecture (64-bit)	x86 architecture (64-bit)
4 GB RAM	4+ GB RAM
500 MB free disk space	500+ MB free disk space
HART modem connectivity	HART modem connectivity
HART modem	HART modem
Keyboard, computer mouse	Keyboard, computer mouse

6.2 Required System Software

Operating System	Note
Windows	Application suite included in basic distribution, Windows
ALT Linux	Application suite included in basic distribution, ALT Workstation
Astra Linux	Application suite included in basic distribution, Astra Workstation

7 Software Overview

7.1 SW and Desktop Shortcut Name

Russian and English are supported during SW installation.

Operating System	SW Name	Desktop Shortcut Name
Windows	Depends on the language selected in the installer. Shown as: - Метран-Конфигурация - Metran-Configuration	Depends on the language selected in the installer. Shown as: - Метран Конфигурация - Metran Configuration
Linux	Depends on the language of installed OS. Shown as: - Метран-Конфигурация - Metran-Configuration	Depends on the language of installed OS. Shown as: - Метран-Конфигурация or Метран Конфигурация (depends on installed Linux OS version) - Metran-Configuration or Metran Configuration (depends on installed Linux OS version)

7.2 Distribution Package

Operating System	Distribution Package
Windows	Executable file *file_name.exe* E.g., *metran-configuration_1.0.0.exe*
ALT Linux	Package *package_name.rpm* E.g., *metran-configuration-1.0.0-1.rpm*
Astra Linux	Package *package_name.deb* E.g., *metran-configuration_1.0.0-1.deb*

where

- 1.0.0 – SW version number

- 1 – package revision.

Metran-Configuration icon will appear on the desktop (Fig. 2) if you ticked the box to perform an additional task (*Create Desktop Icon*) in the installer window (Fig. 5) during SW installation.

Fig. 2. Metran-Configuration Software Icon

7.3 Linux OS

Download installer:
https://metran.ru/catalog/programmnoe_obespechenie/programmnoe_obespechenie_metran_konfiguratsiya/.

To install the software, you may choose any convenient option – install from the package or install with the command line.

OS	Install from Package	Install with Command Line
ALT Linux	- Launch the package installer by double-clicking the package file in the file manager - Follow installer instructions until the process is complete	*# apt-get install <package file path>*
Astra Linux	- Launch the program installer by double-clicking the package file in the file manager - Follow installer instructions - A correct application icon will appear in the start menu after re-logging	*# apt install <package file path>* A correct application icon will appear in the start menu after re-logging

The search box appearance and the application name depend on the installed Linux version and may differ from the display options given below (Fig. 3, 4).

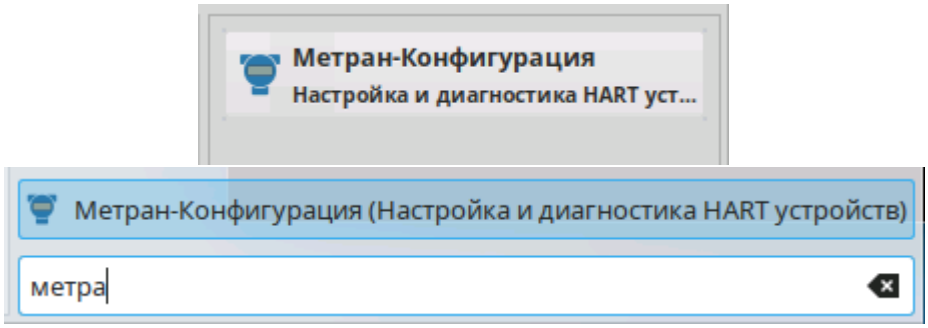


Fig. 3. SW Name Display Options in ALT Linux Searching System

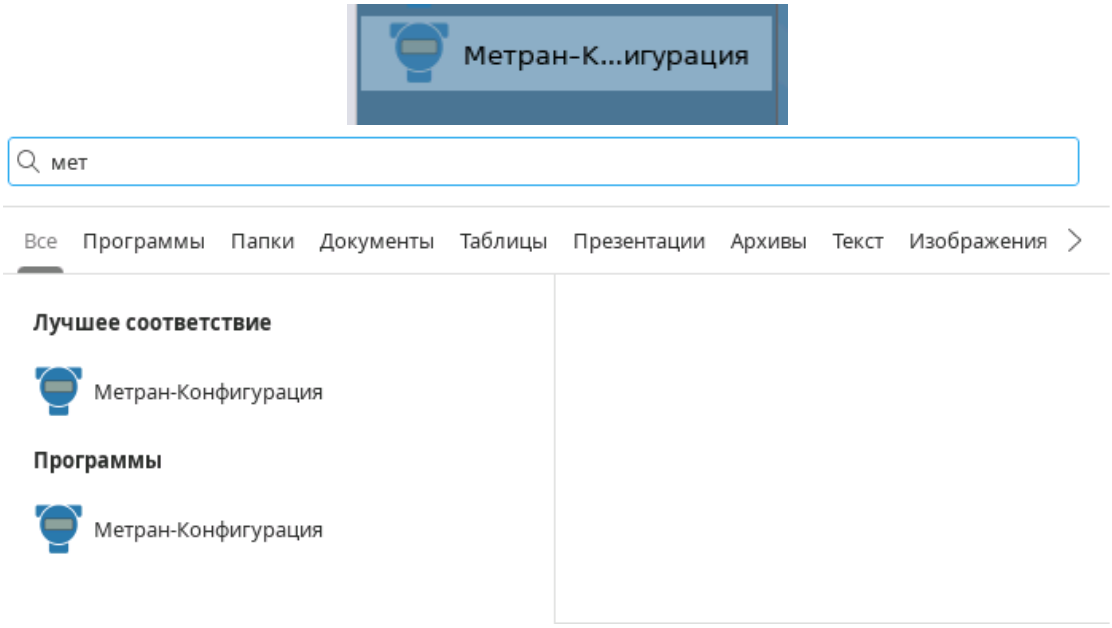


Fig. 4. SW Name Display Options in Astra Linux Searching System

Use context menu to add application icon to the desktop (Fig. 13, 14).

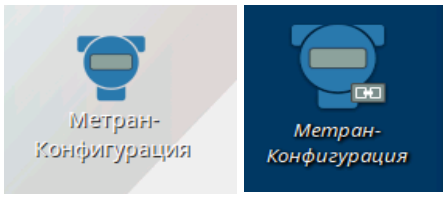


Fig. 5. SW Icon Display Options in ALT Linux OS

Fig. 6. SW Icon Display Options in Astra Linux OS

7.4 Software Update

Install new SW version by following clause 3.3. The previous version will be automatically deleted during SW installation.

7.5 Preparation for Operation

- Power on the field device planned for operation.
- Connect the field device to the tablet or PC via HART modem to COM or USB port
- Launch the program (clause 3.7)

7.6 Software Launch

Software may be launched differently in different OS.

OS	Software Launch Options
Windows	- Use desktop icon - *%Program Files%\Metran- Configuration\MetranConfiguration.exe* - Use the list of installed programs *Start\All Programs\Metran-Configuration*

Linux	- Use desktop icon if it was added - In the OS main menu, type “metran” in any supported language in the search box and run the found application - Search for Metran-Configuration Software in the Programs category of the main menu and run the found application

7.7 Software Operability Test

Software is operable if user activity described in clauses 3.3, 3.6 caused the screen to display the main application window with the waiting indicator. The top line of the launched program will display installed SW version (Fig. 7).

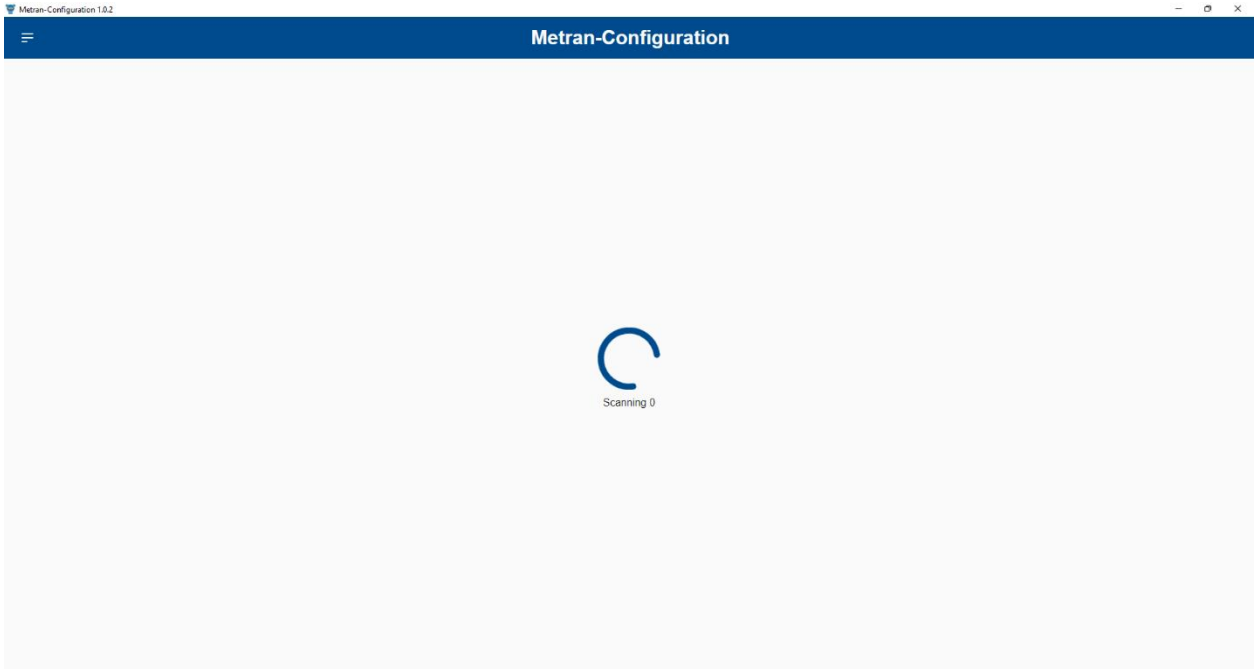


Fig. 7. Examples of Metran-Configuration Main Application Window with Waiting Indicator

8 Software User Interface

Software user interface includes the following elements:

1. Information panel (Fig. 8) (clause 3.9.1)
2. Main window (Fig. 8) (clause 3.9.2)
3. Main menu button (Fig. 8) (clause 3.9.3)

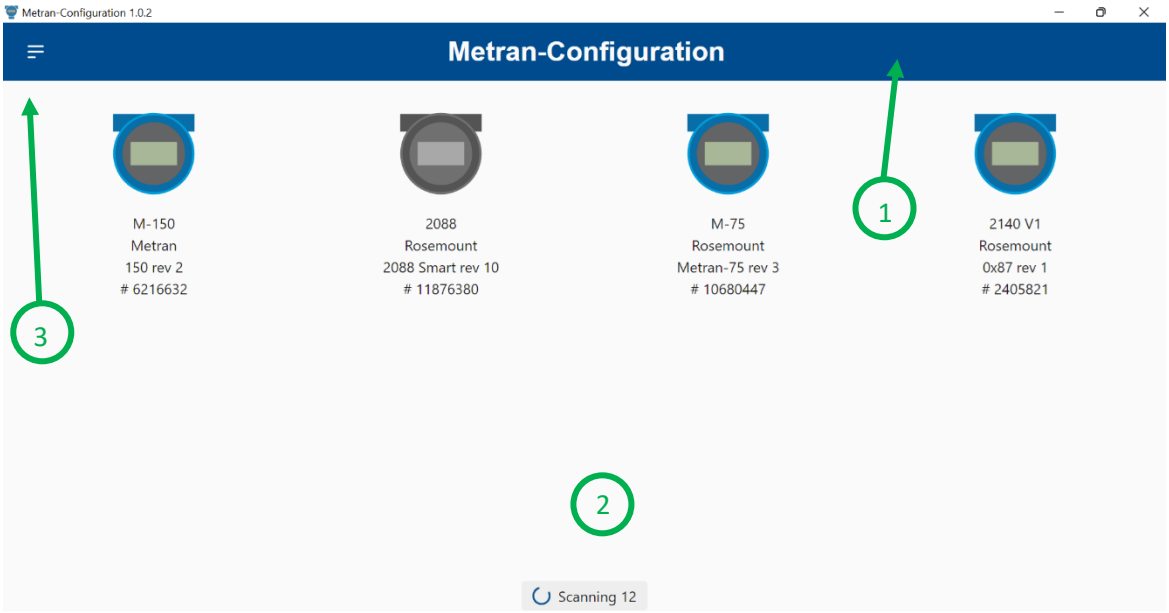


Fig. 8. Main Window Elements

4. Home button used to return to the main window (Fig. 9) (clause 3.9.4)
5. Navigation menu (Fig. 9) (clause 3.9.5)
6. Data processing button (Fig. 9) (clause 3.9.6)
7. Method button (Fig. 9) (clause 3.9.7)
8. Chart and plot (Fig. 9) (clause 3.9.8)
9. Static image (Fig. 9) (clause 3.9.9)
10. Submenu button (Fig. 9) (clause 3.9.10)

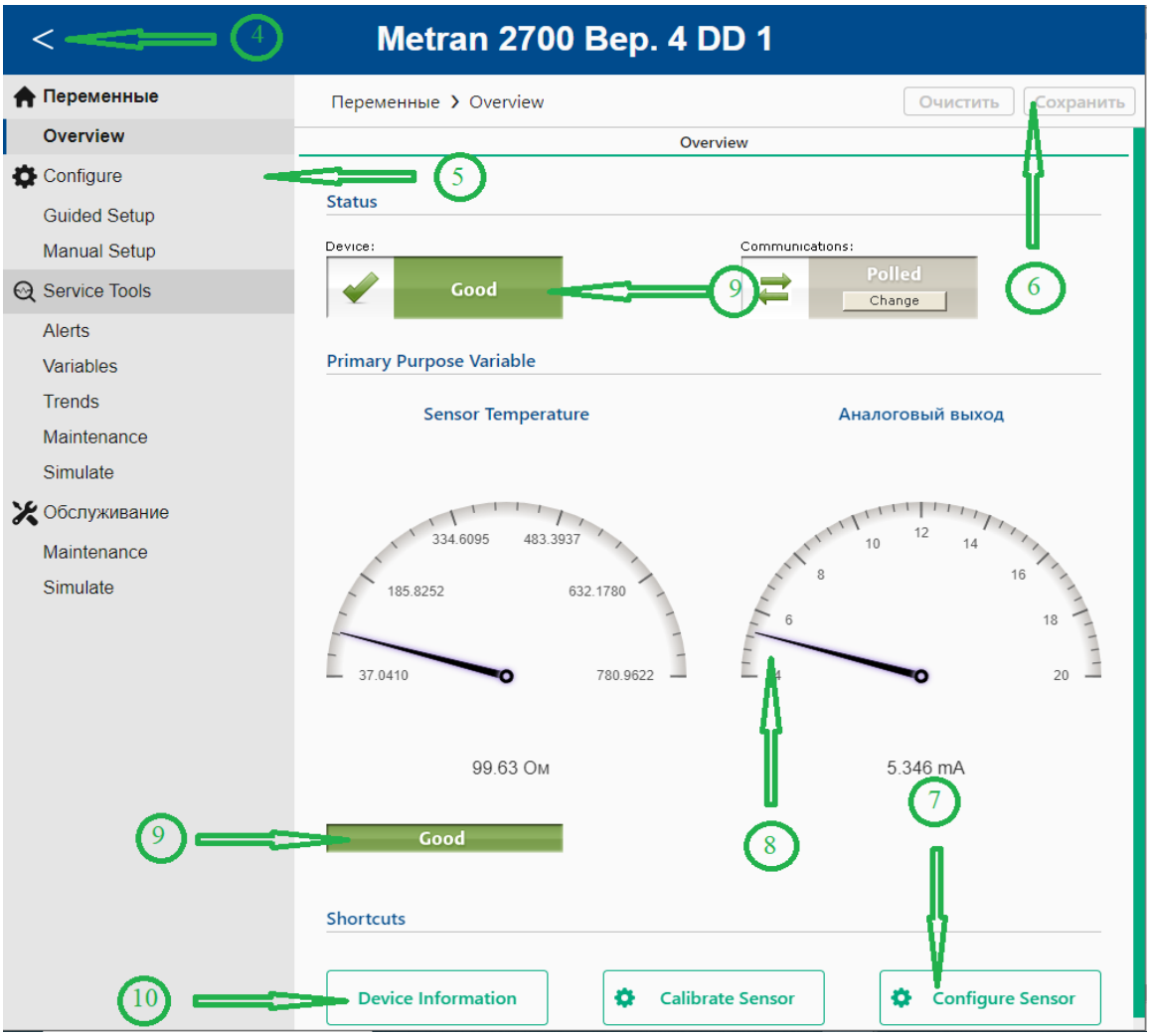


Fig. 9. Configuration Window Elements

11. Data control (Fig. 10) (clause 3.9.11)

12. Tab (Fig. 10) (clause 3.9.12)

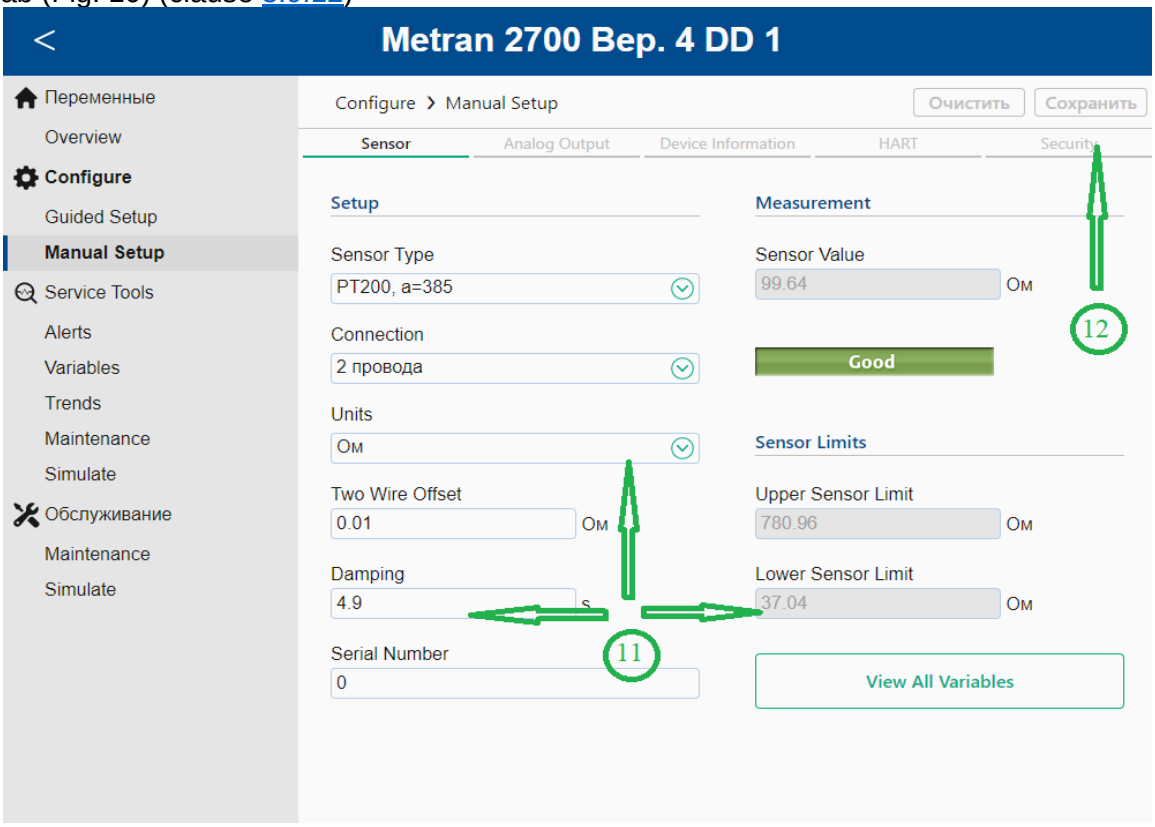


Fig. 10. Configuration Window Elements

13. Scroll bar (Fig. 11) (clause 3.9.13)

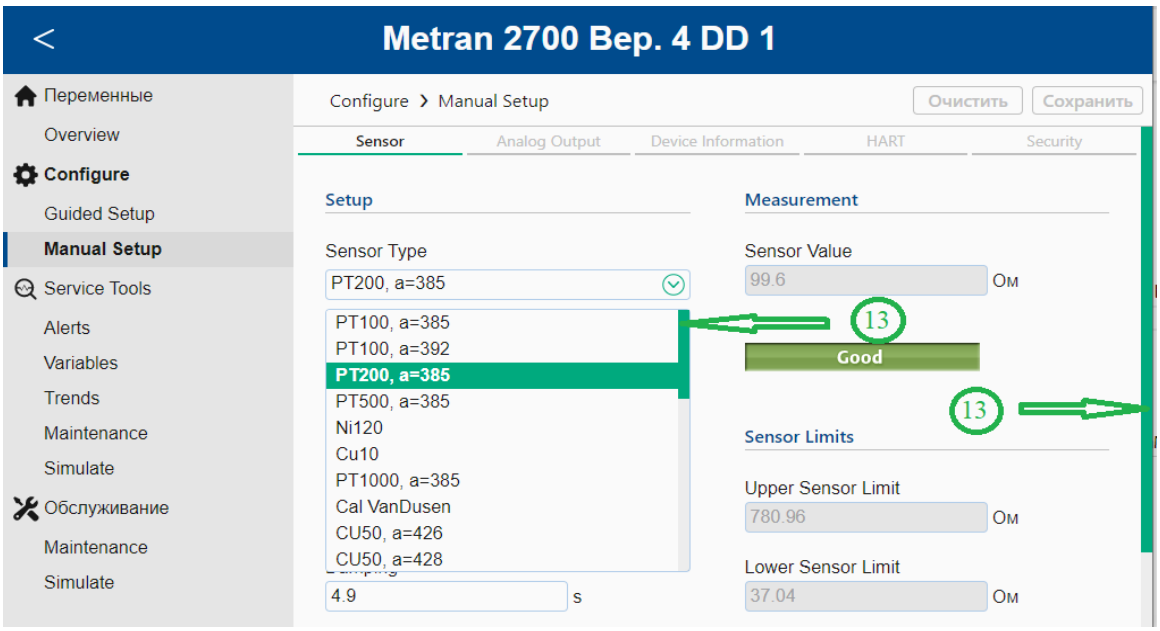


Fig. 11. Configuration Window Elements

14. Waiting indicator (Fig. 12) (clause 3.9.14)

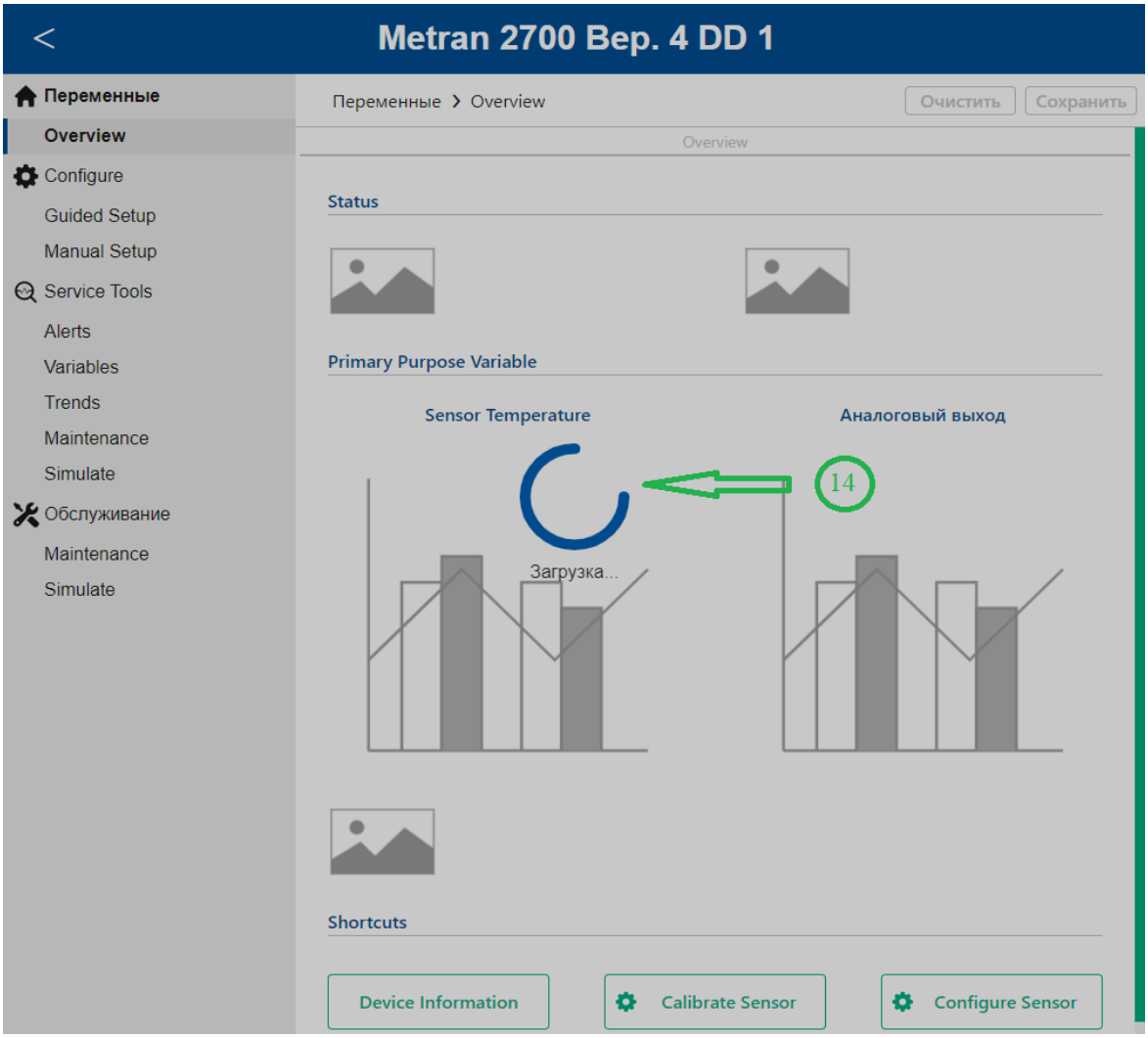


Fig. 12. Configuration Window Elements

15. Control or navigation bar icon (Fig. 13) (clause 3.9.15)
16. Message window (Fig. 13) (clause 3.9.16)

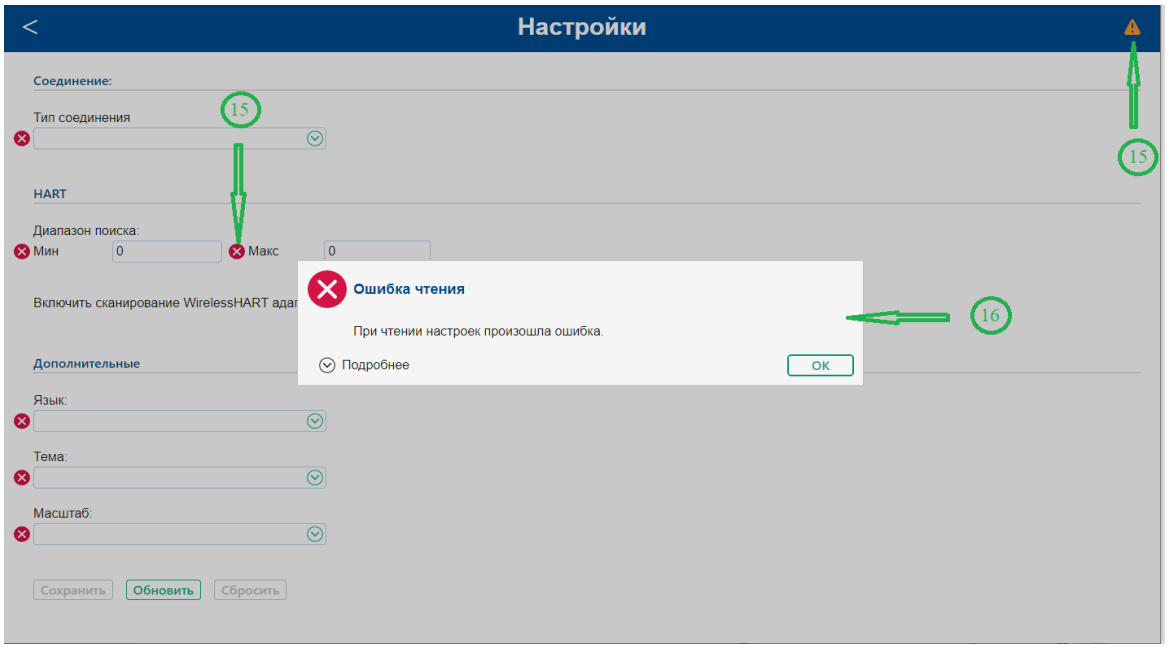


Fig. 13. Configuration Window Elements

17. Breadcrumb trail (Fig. 14) (clause 3.9.17)
18. Submenu exit button (Fig. 14) (clause 3.9.18)

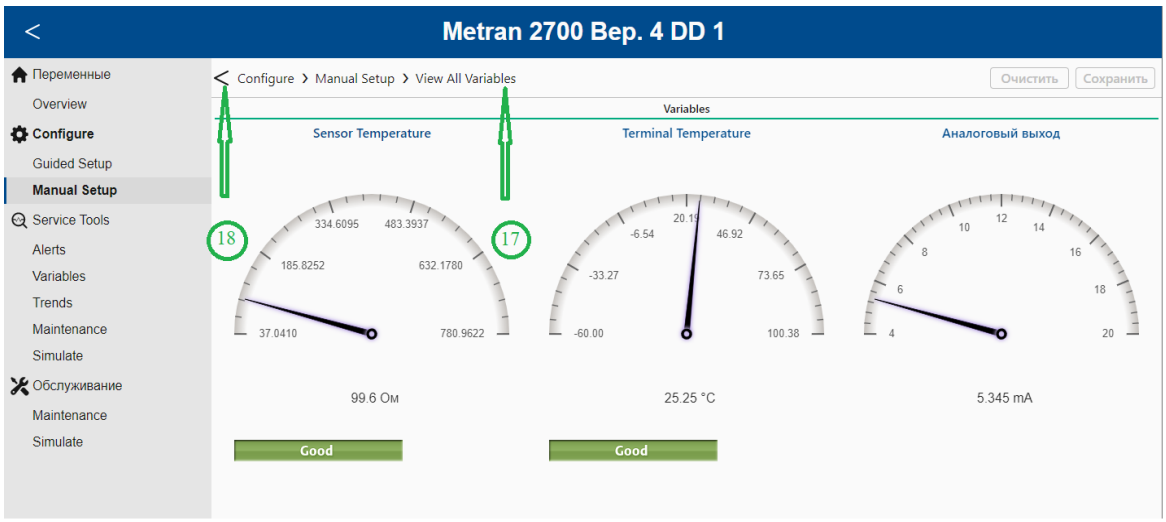


Fig. 14. Configuration Window Elements

19. Close main menu button (Fig. 15) (clause 3.9.19)

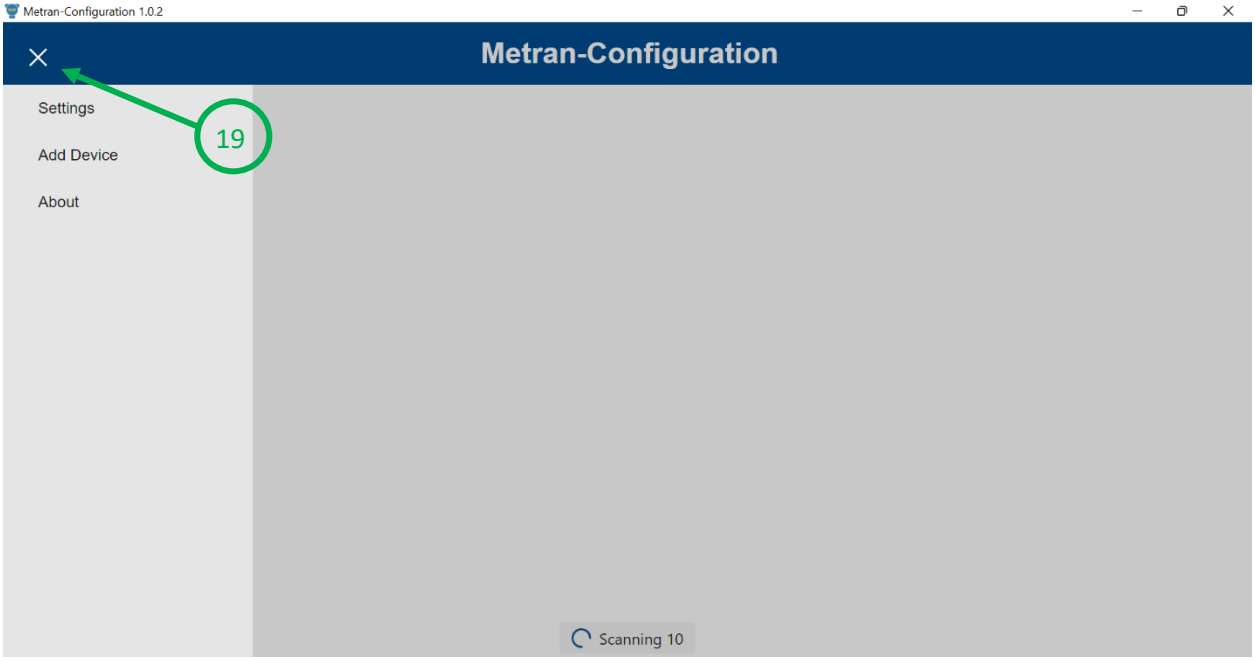


Fig. 15. Main Menu Items

20. Navigation menu button (Fig. 16) (clause 3.9.20)

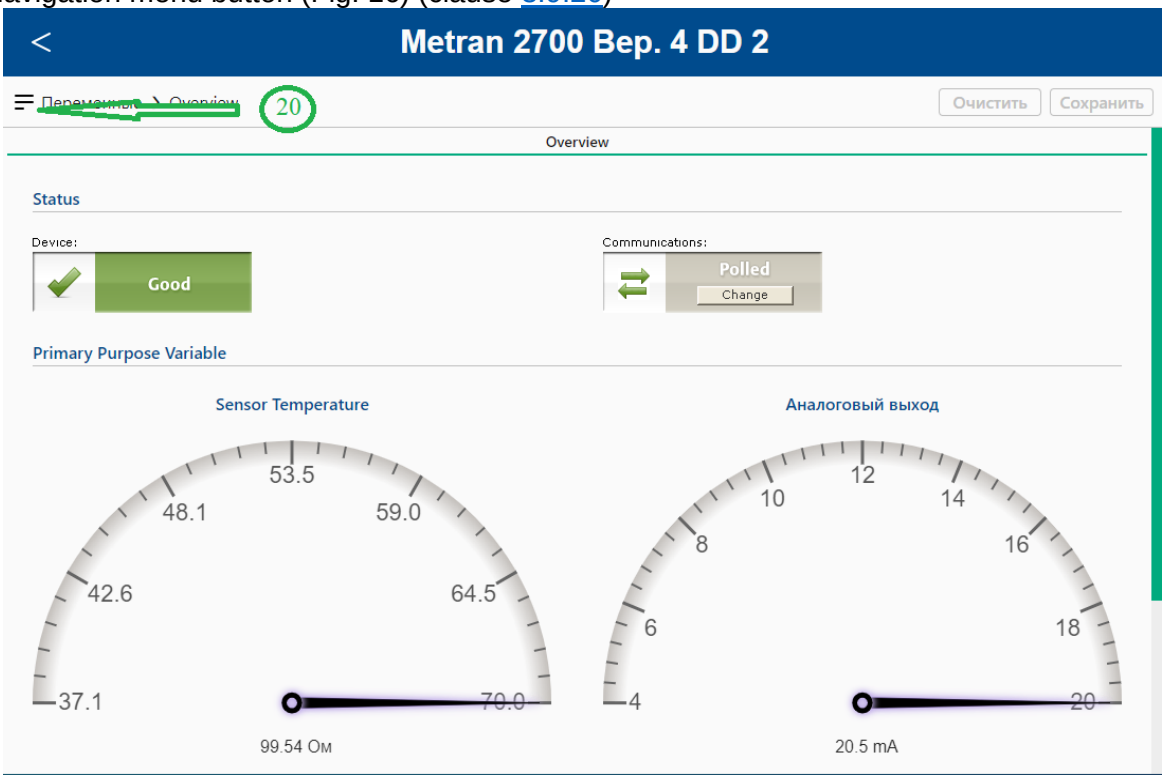


Fig. 16. Configuration Window Elements

9 Information Panel

The information panel is designed to display information about the selected SW operation mode (Fig. 17, 18, 19). The information panel may feature main menu button or home button.

Fig. 17. SW in Metran-Configuration Mode

Fig. 18. SW in About Mode

Fig. 19. SW in Field Device Configuration Mode

Information about the selected field device includes:

- name of field device manufacturer
- field device name
- field device revision
- DD file version.

10 Main Window

Main application window may feature one of the following:

- Waiting indicator (Fig. 20) (clause 3.9.14)
- Information about the selected SW operation mode (Fig. 21) (clause 4)
- Information about connected field devices presented as icons (Fig. 22)
- Configuration window of a selected field based on DD file (Fig. 23).

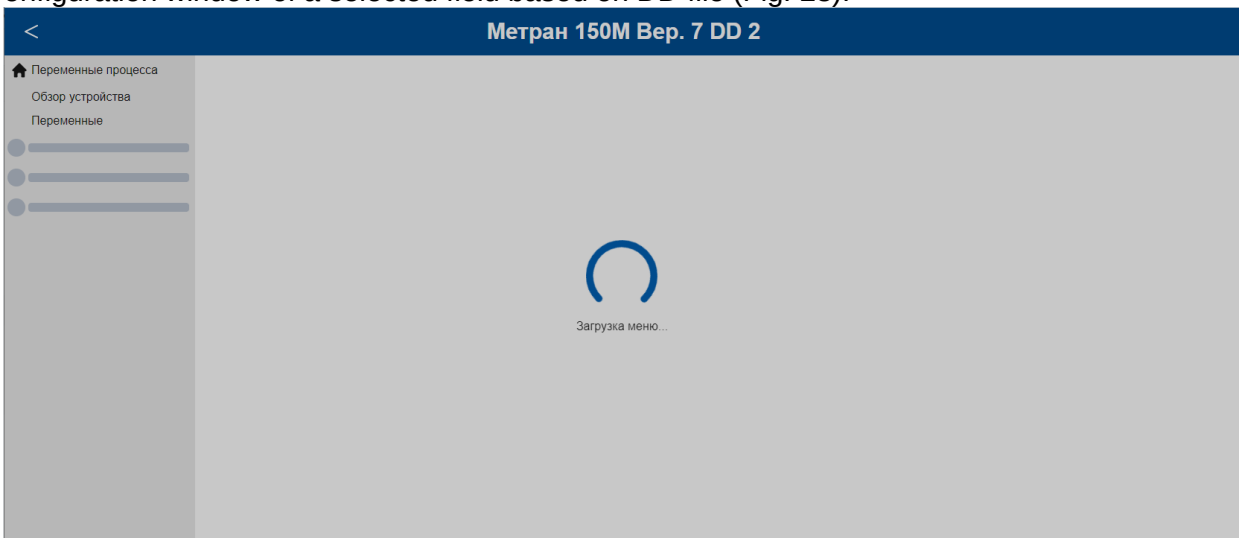


Fig. 20. Waiting Indicator. Metran-Configuration Operation Mode

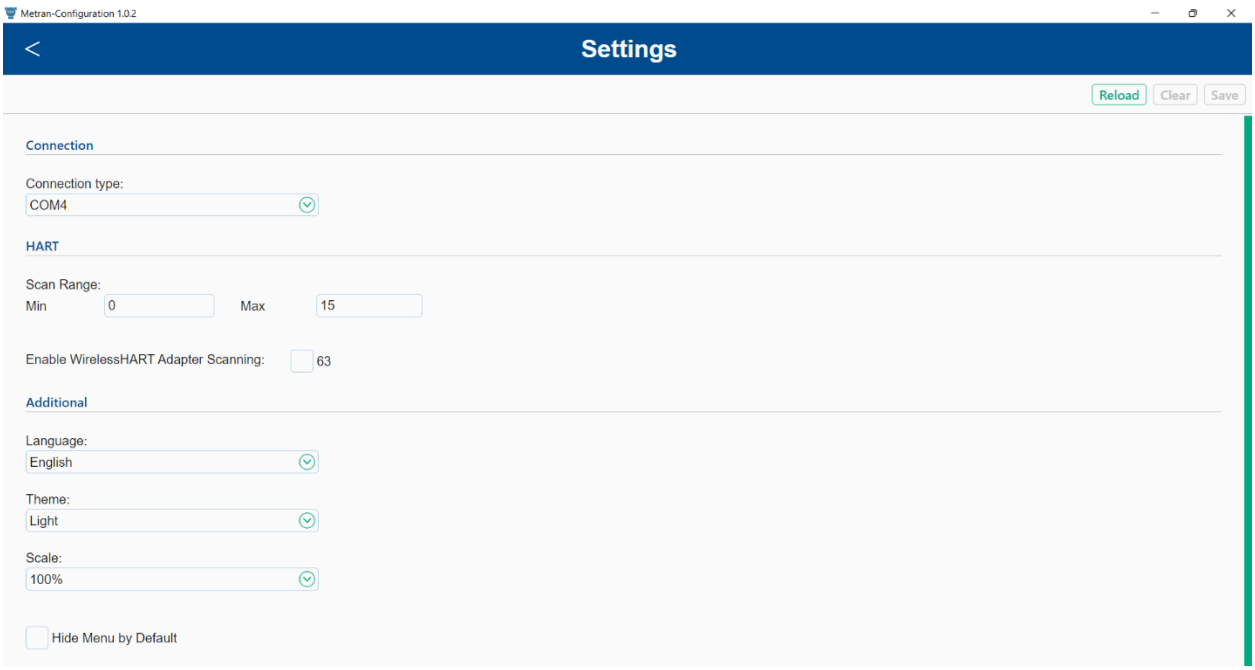


Fig. 21. Settings Operation Mode

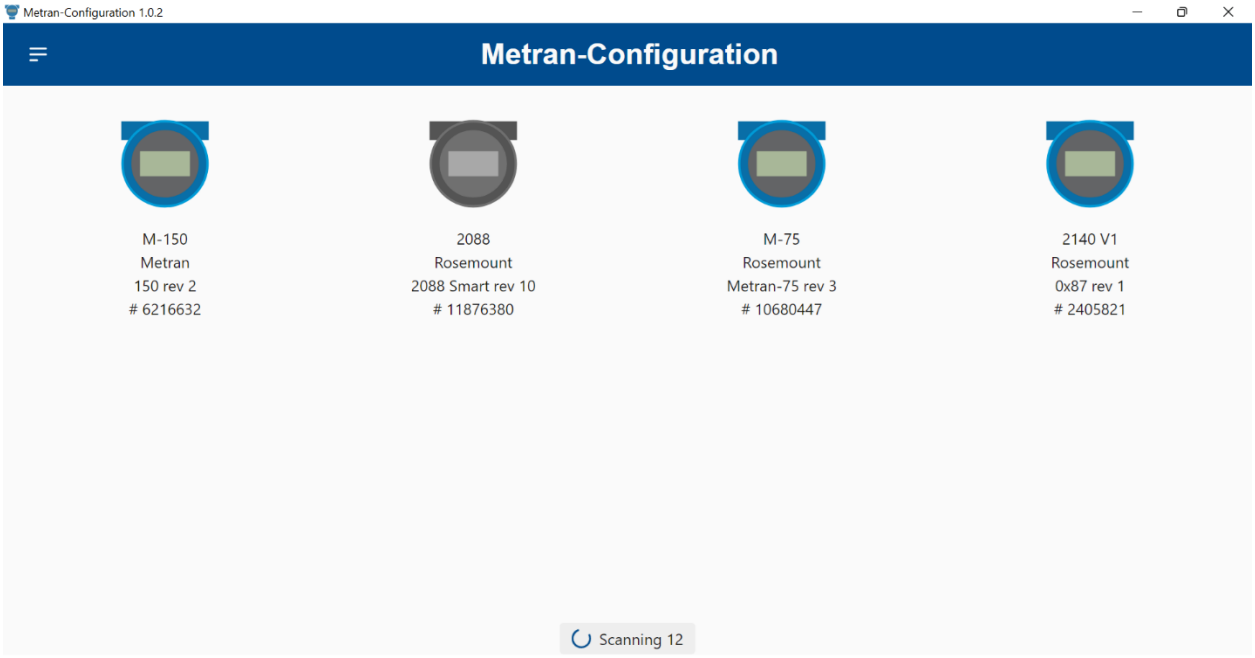


Fig. 22. Example of Main Window with Field Device Icons. Metran-Configuration Operation Mode

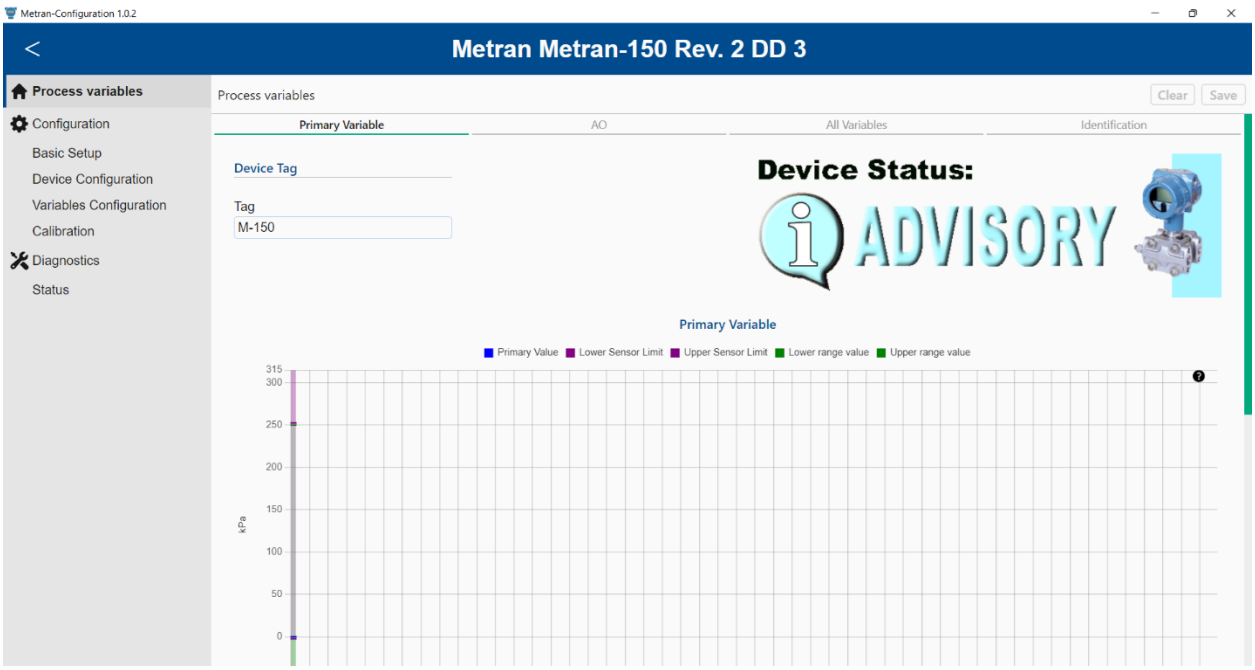


Fig. 23. Example of Configuration Window for Metran-150 Field Device

11 Main Menu Button

Call main program menu by clicking main menu button (Fig. 24) on the navigation bar in the main program window. It contains the following items available for selection:

- Settings (clause 4.2)
- Add device (clause 4.3)
- About (clause 4.4)

The button is always available.

Fig. 24. Main Menu Button on the Navigation Bar

12 Home Button

Home button (Fig. 25) found in the top left corner of the navigation bar allows to exit any SW operation mode to perform automatic search of connected field devices in the main window.

Fig. 25. Home Button on the Navigation Bar

13 Navigation Menu

Navigation menu for field device configuration (Fig. 26) depends on the DD file submitted by the field device manufacturer.

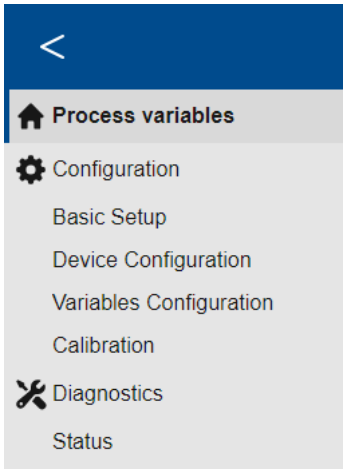


Fig. 26. Navigation Menu Example

14 Data Processing Button

Data processing button allows to process data in the program in a certain way. Data processing buttons include the following:

- *Save*
- *Update*
- *Clear*
- *Browse*
- *Add*
- *Generate query*.

The button may have two states, i.e., unavailable (Fig. 27) and available (Fig. 28) for use.

Fig. 27. Button Unavailable for Use

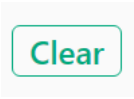


Fig. 28. Button Available for Use

Available button becomes highlighted when the cursor points to it (Fig. 29).

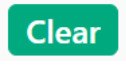


Fig. 29. Highlighted Button

15 Save Button

Save button is used to save changes made to the selected parameter to the field device or to setup program files.

Save button becomes available when parameters are edited in the main or in the field device configuration window. The button in the configuration window displays the number of changed parameters (Fig. 30).

Save button becomes unavailable when *Save*, *Update* or *Clear* button was used. *Save* button becomes unavailable if data control system is triggered when trying to enter incorrect data into the control.

Fig. 30. Button Showing the Number of Parameters Changed in the Configuration Window

16 Clear Button

Clear button is used to cancel changes made to the selected parameters and to return to the previous values.

Clear button becomes available when parameters are edited in the field device configuration window. *Clear* button also becomes available when destination files are added to the file configuration system in the main program window.

Clear button becomes unavailable when *Clear* or *Save* button was used.

17 Update Button

Update button is used to update information in the main window by additionally reading the parameters displayed on the screen.

Update button is always available.

18 Browse Button

Browse button is used to select the destination file in the PC or tablet file system.

Browse button is always available.

19 Add Button

Add button is used to add the destination file to the file configuration system

Add button becomes available only when a destination file is selected from the PC or tablet file system.

Add button becomes unavailable when *Add* or *Clear* button was used.

20 Generate Query Button

Generate Query button is used to generate queries to Metran IG, JSC to get a license key.

Generate Query button becomes available when all fields required for a query are filled.

Generate Query button remains unavailable if any fields required for a query in the main window are left blank.

21 Method Button

Method button has a special icon to the left of the method name (Fig. 31, 32).

Fig. 31. Method Button Icon

Method button is always available.

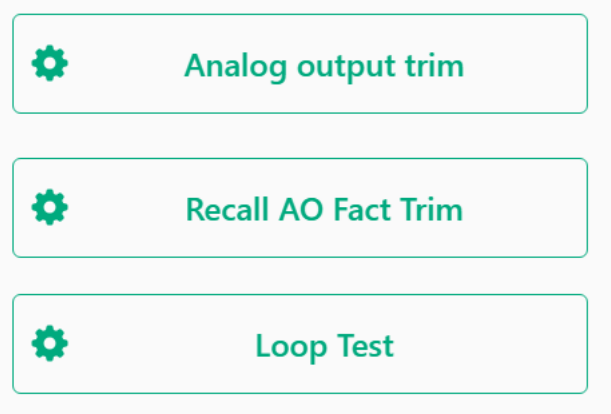


Fig. 32. Example of Method Button

If you hover the mouse cursor over the button, it will highlight in green and a prompt message for this method will appear (Fig. 33) provided that it was set by the EDD developer.

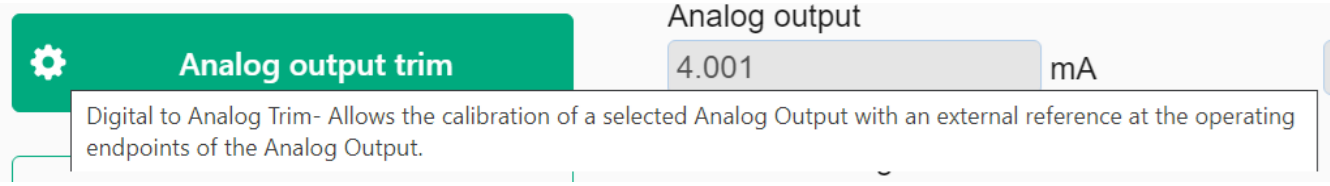


Fig. 33. Example of Highlighted Method Button with a Prompt Message

22 Chart and Plot

Metran-Configuration Software supports all types of charts and plots according to the documentation [2], [3].

Chart or plot display depends on its description in the DD file. A chart may be:

- Gauge
- Bar
- Trend

A plot may be:

- Graph

When the application screen size is reduced or when you zoom in, the chart or plot name may be shortened with the addition of multiple periods at the end. In this case, you may learn the full chart or plot name by hovering over the shortened name.

23 Gauge Chart

Gauge chart has a scale used to count off parameter values read from a field device.

The lower part of the chart features numeric parameter values shown with a color icon corresponding to the color of the arrow in the chart.

If you hover over the parameter value shown at the bottom, the corresponding arrow will feature a prompt with a parameter name, its value and unit provided that they were set in the DD file (Fig. 34). The arrow may be completely painted or transparent, depending on the conditions set by the developer in the DD file.

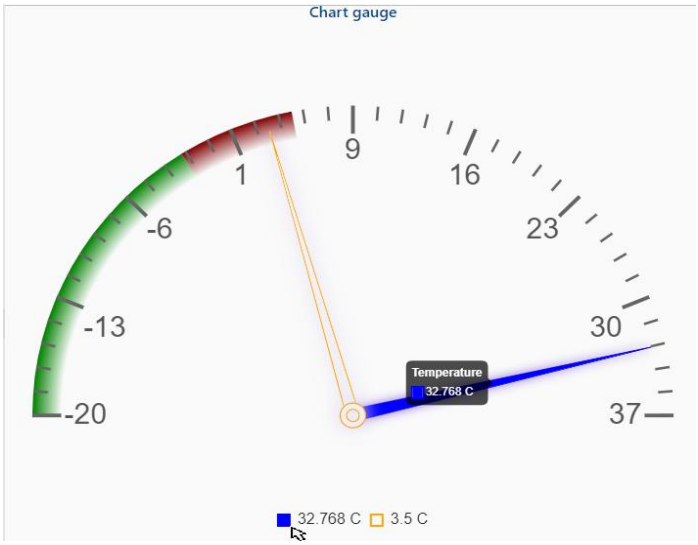


Fig. 34. Example Gauge Chart

The scale has a minimum and maximum value of the reference axis. If the scale has a special description of the lower or the upper range value set by the developer in the DD file, then a part of the scale corresponding to this upper or lower range value is painted with an individual color. In this case, you may hover over the painted scale part and a prompt will appear. It will feature parameter name, value and unit (Fig. 35).

Fig. 35. Example Gauge Chart

24 Bar Chart

A bar chart may be vertical or horizontal. These charts have the same functionality and differ only in the location of the bars showing parameter values – vertical or horizontal.

The top of the chart features names only for lower and upper range value graphs shown in the chart with color icons of a corresponding graph (Fig. 36) if they are set by the developer in the DD file.

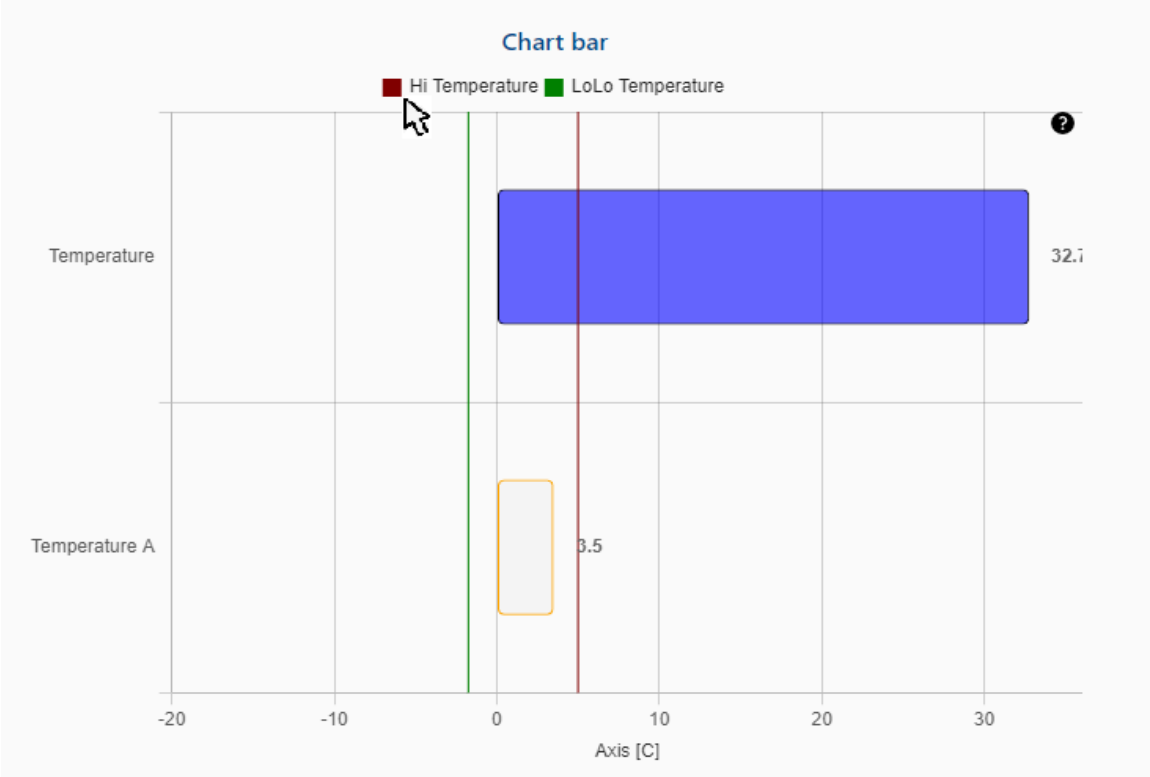


Fig. 36. Example Horizontal Bar Chart

If you hover over the parameter value bar, a prompt will appear showing the bar peak with parameter name, value and unit (Fig. 37) provided that they were set by the developer in the DD file. The bar may be completely painted or transparent, depending on the conditions set by the developer in the DD file.

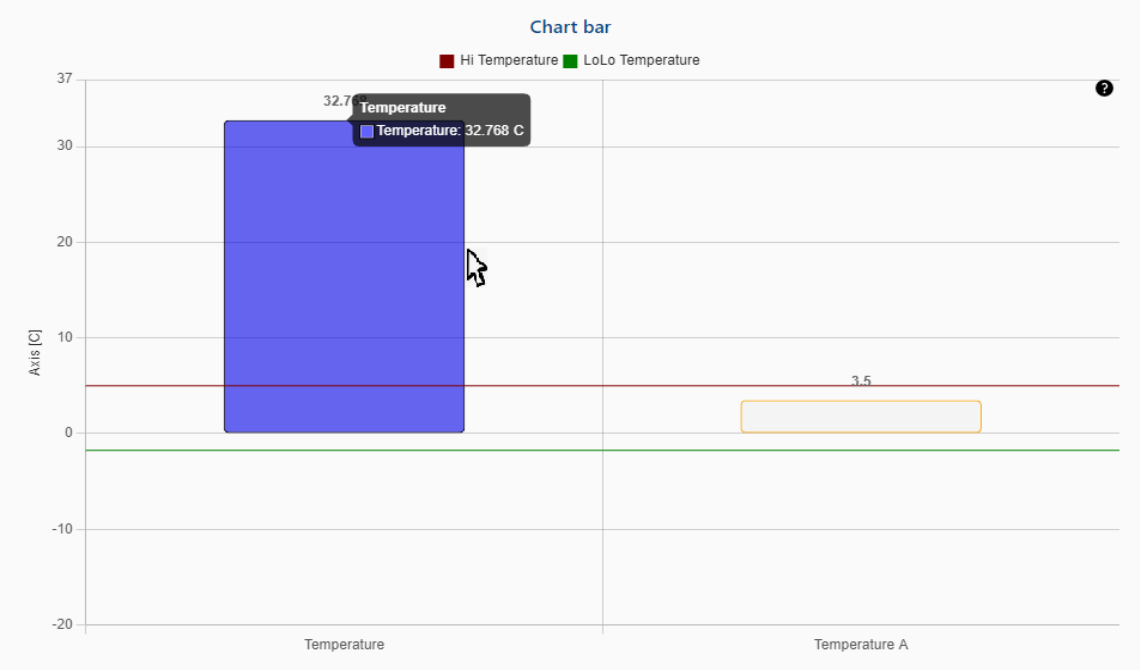


Fig. 37. Example Vertical Bar Chart with a Prompt for Parameter Value Bar

The scale has a name, minimum and maximum value, name of unit if these parameters were set by the DD file developer.

If there is a special description of the parameter lower or upper range value set by the developer in the DD file, such values are shown as horizontal lines for a vertical bar chart (Fig. 38) and vertical lines for a horizontal bar chart. All graphs are painted in individual colors. In this case, you may hover over the horizontal or vertical line and a prompt will appear. It will feature a parameter value and unit.

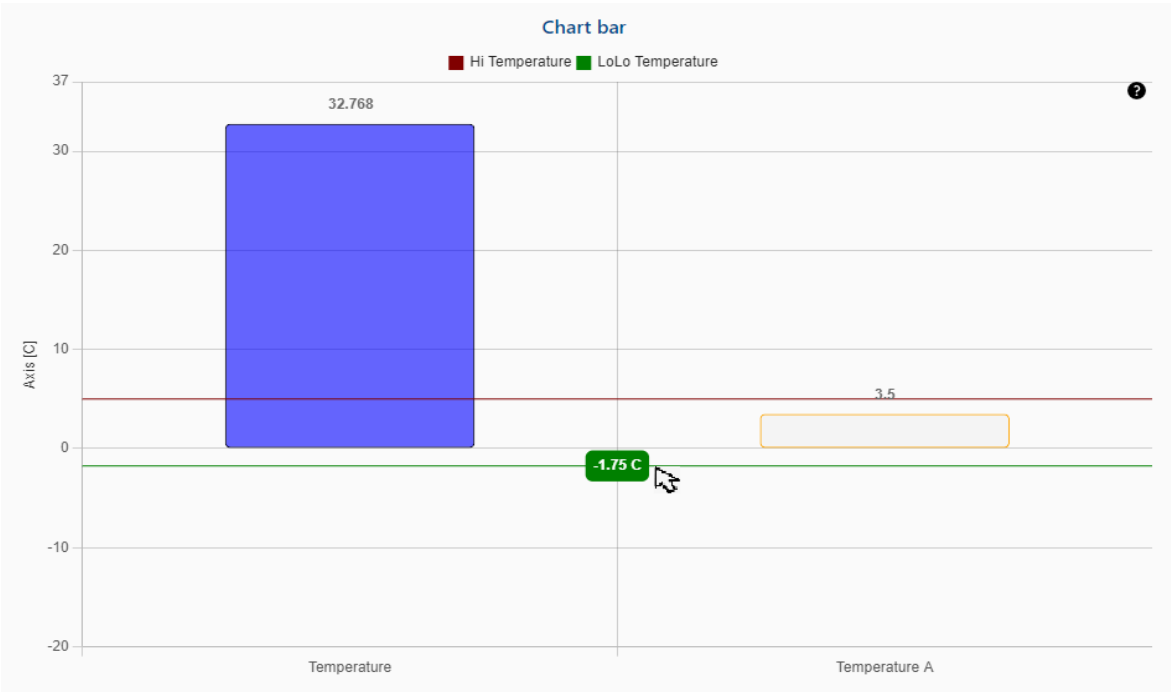


Fig. 38. Example Vertical Bar Chart with Set Parameter Lower and Upper Range Values

The chart can be dragged with the mouse cursor along the axis. You may zoom in and out on the chart using keyboard and mouse shortcuts (Ctrl+mouse wheel) (Fig. 39). In these cases, the top right corner of

the chart will feature an icon button (*magnifying glass with a zoom cancellation sign in the middle*). You may use it to reset the chart (Fig. 40).

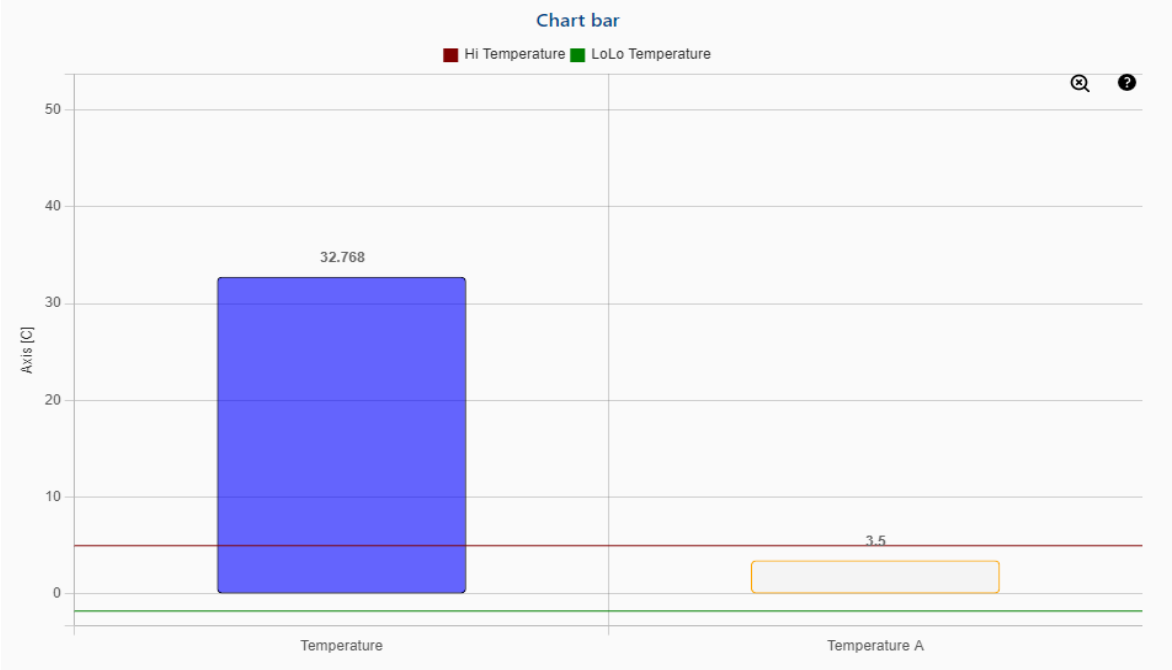


Fig. 39. Example Zoomed in Vertical Bar Chart

Fig. 40. Zoom Cancellation Button Icon

Button with *"?"* icon is a prompt for the user (Fig. 41, 42).

Fig. 41. Prompt Button Icon

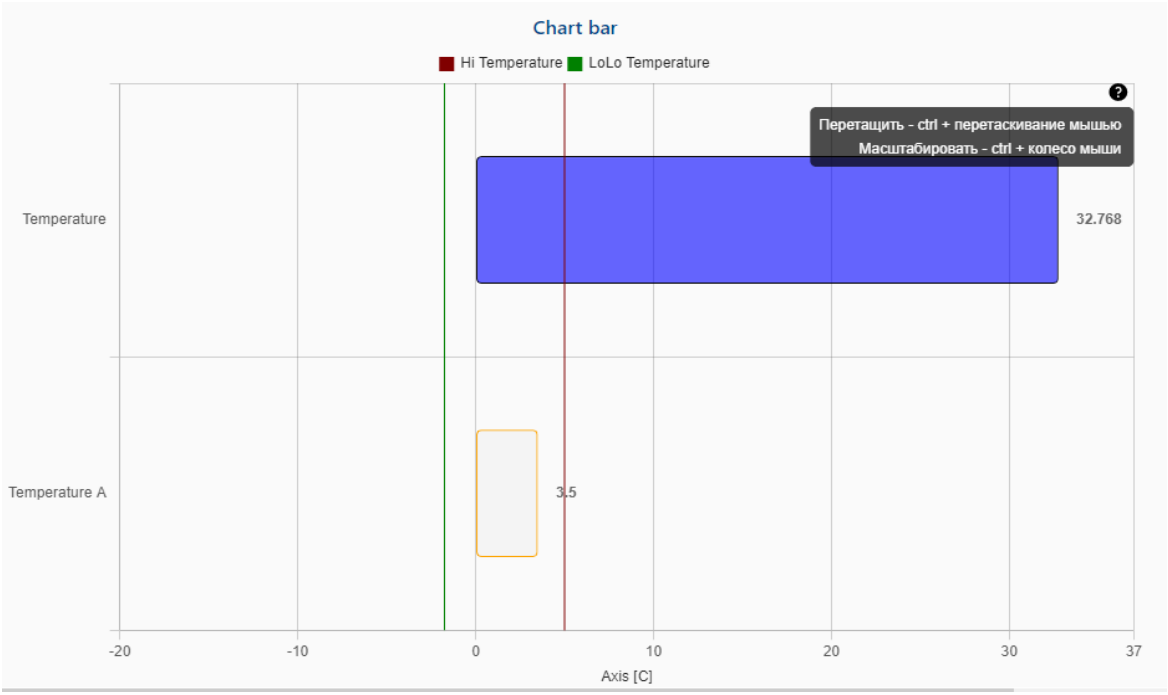


Fig. 42. Example Horizontal Bar Chart with a Prompt Button

25 Trend Chart

Trend chart has an axis used to display parameter values at a given time.

The top of the chart features names of all shown graphs with color icons of corresponding graphs.

If you hover over any point on the chart, a prompt with time when these data were read from the field device, parameter unit value and name (Fig. 43) will appear provided that it was set in the DD file.

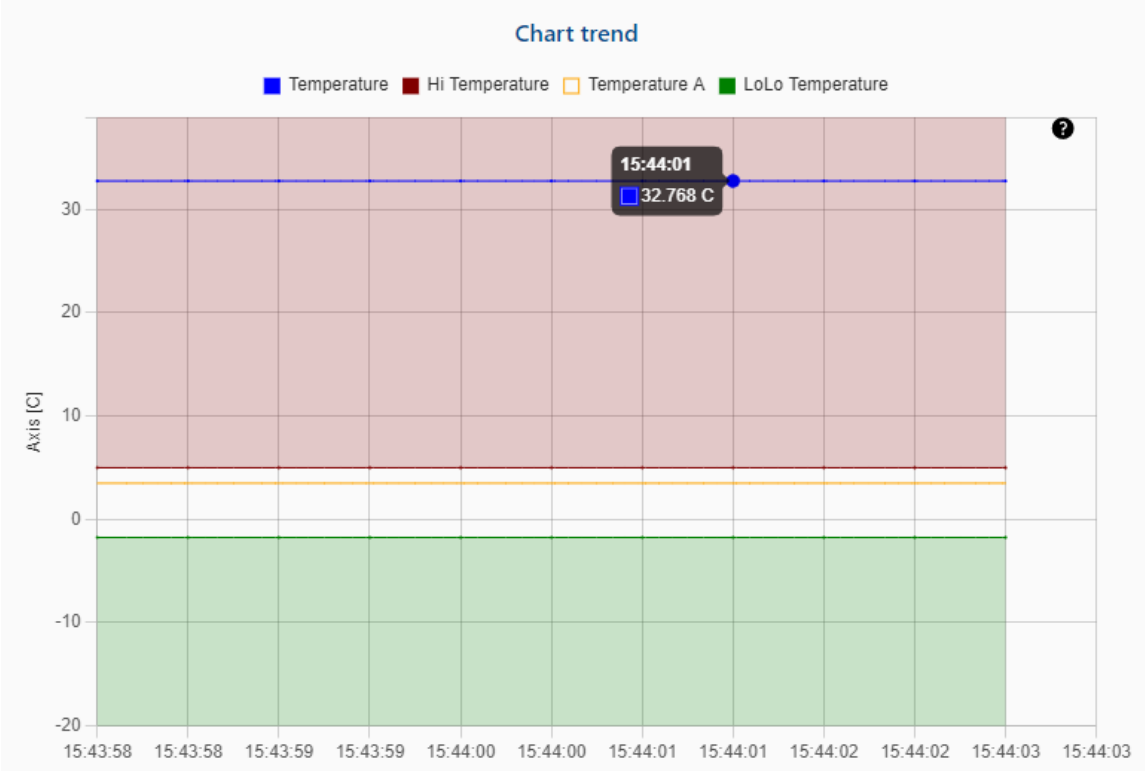


Fig. 42. Example Trend Chart with Highlighted Graph Point

The scale has a name, minimum and maximum value, name of unit if these parameters were set by the DD file developer.

If there is a special description of the parameter lower or upper range value set by the developer in the DD file, such values are shown as horizontal lines, part of the chart above the upper range value has the same color as the upper range value line and part of the chart below the lower range value has the same color as the lower range value line. In this case, you may hover over the horizontal line and a prompt will appear. It will feature a parameter value and unit (Fig. 44).

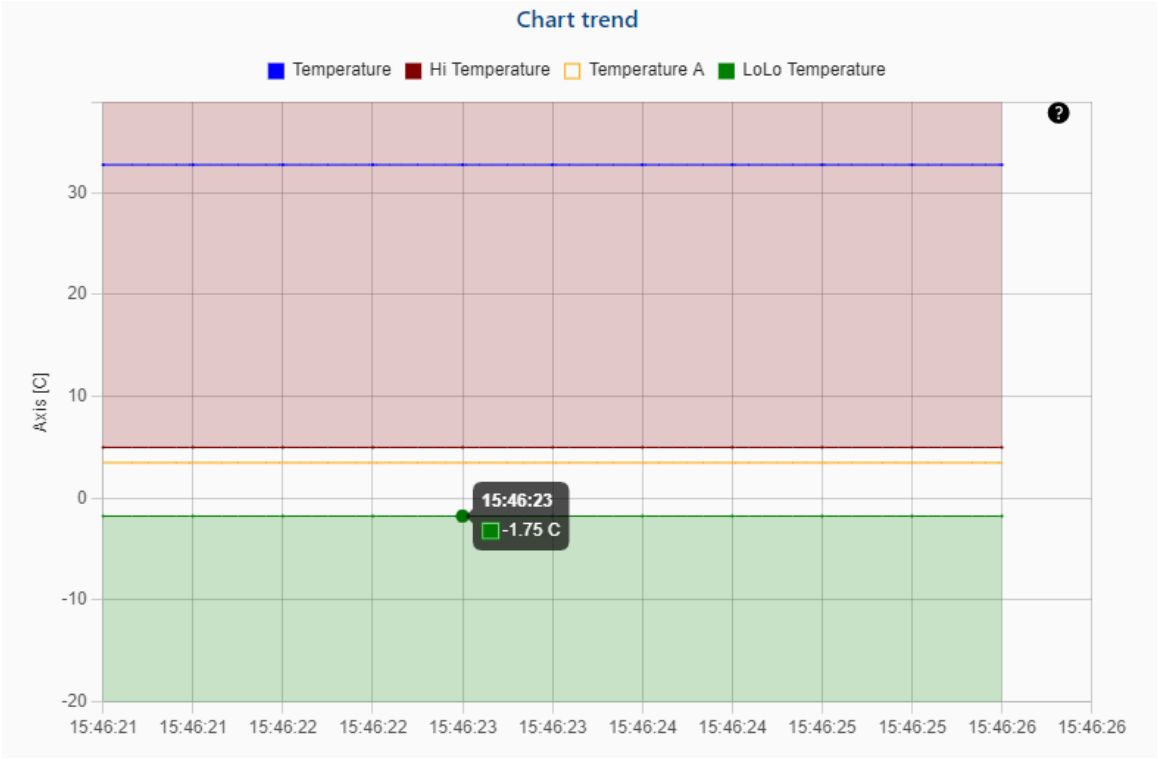


Fig. 43. Example Trend Chart with Set Parameter Upper and Lower Range Values

The chart can be dragged with the mouse cursor along the axis. You may zoom in and out on the chart using keyboard and mouse shortcuts (Ctrl+mouse wheel) (Fig. 45). In these cases, the top right corner of the chart will feature a button, i.e., magnifying glass with a zoom cancellation sign in the middle (Fig. 45). You may use it to reset the chart.

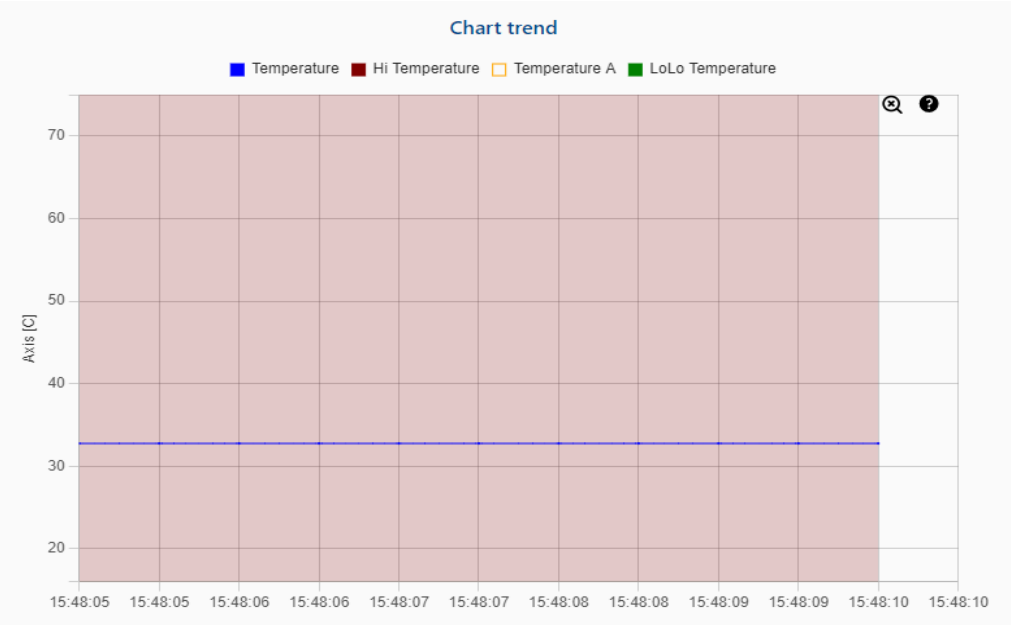


Fig. 44. Example Zoomed in Trend Chart

Any graph may be excluded from the chart by clicking the corresponding parameter name above the chart. In this case, the graph will not be displayed on the chart and its name will be struckthrough (Fig. 46).

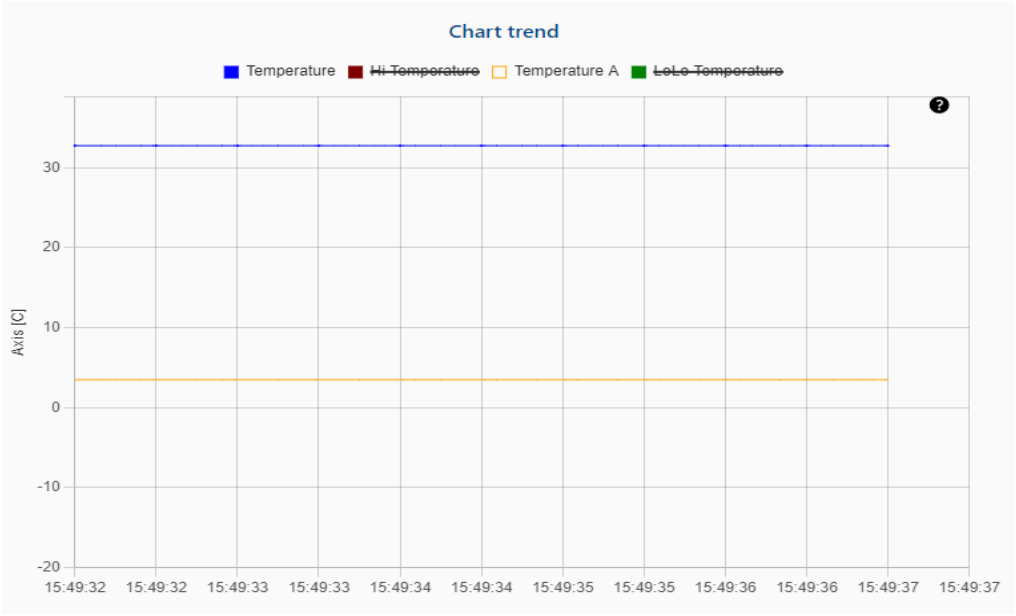


Fig. 45. Example Trend Chart with Excluded Graphs

You may return the graph to the chart by clicking the struckthrough name of a corresponding parameter again. In this case, the graph will appear on the chart and its name will be back to the original. The graph will still show actual values of parameters read from the field device at a given time.

26 Graph Plot

A graph plot is used to display sets of data. Axes may be presented in various forms and may have a name, minimum and maximum value, name of parameter unit that are set by the developer in the DD file.

The top of the chart features names of all shown graphs and key points with color icons of corresponding graphs or key points.

If you hover over any point on the graph or a key point, a prompt with graph or key point name, point location and name of corresponding parameter unit will appear (Fig. 47) provided that they were set in the DD file.

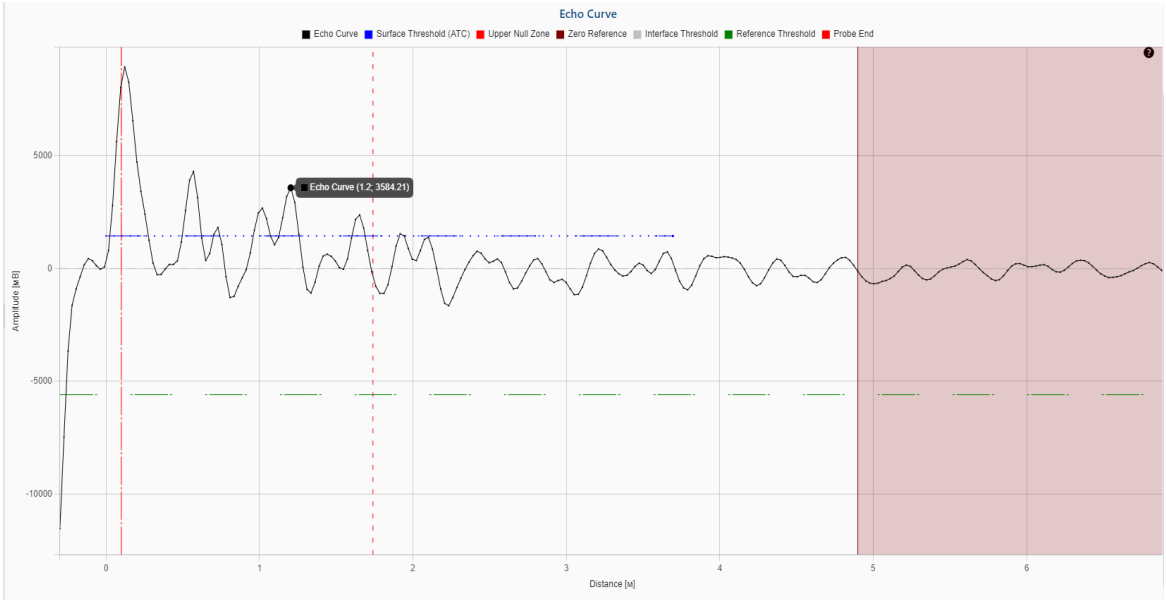


Fig. 46. Example Graph Plot with a Highlighted Point

If there is a special description of horizontal or vertical parameter value display set by the developer in the DD file, this value will be displayed as a horizontal or vertical line. In this case, you may hover over the horizontal or vertical line and a prompt will appear. It will feature a graph name, value and unit of a corresponding parameter (Fig. 48).

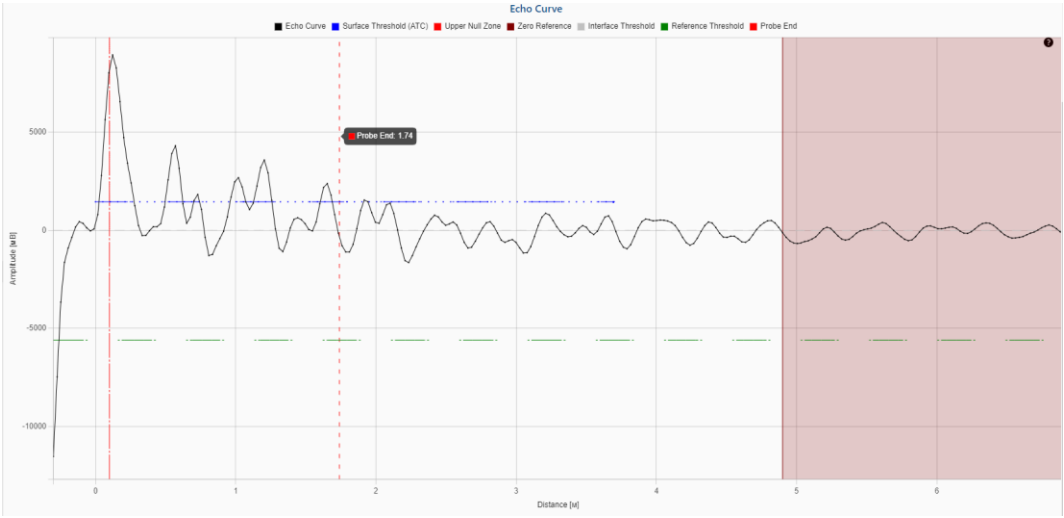


Fig. 47. Example Graph Plot with Set Vertical and Horizontal Display of Parameter Values

If there is a special description of the parameter lower range value set for horizontal or vertical display, this value will be displayed as a horizontal or vertical line. The part of the chart below the horizontal line or to the left of the vertical line will have the same color as the lower range value line.

If there is a special description of the parameter upper range value set for horizontal or vertical display, this value will be displayed as a horizontal or vertical line. The part of the chart above the horizontal line or to the right of the vertical line will have the same color as the upper range value line (Fig. 48).

You may hover over the horizontal or vertical line and a prompt will appear. It will feature a graph name, value and unit of a corresponding parameter (Fig. 49).

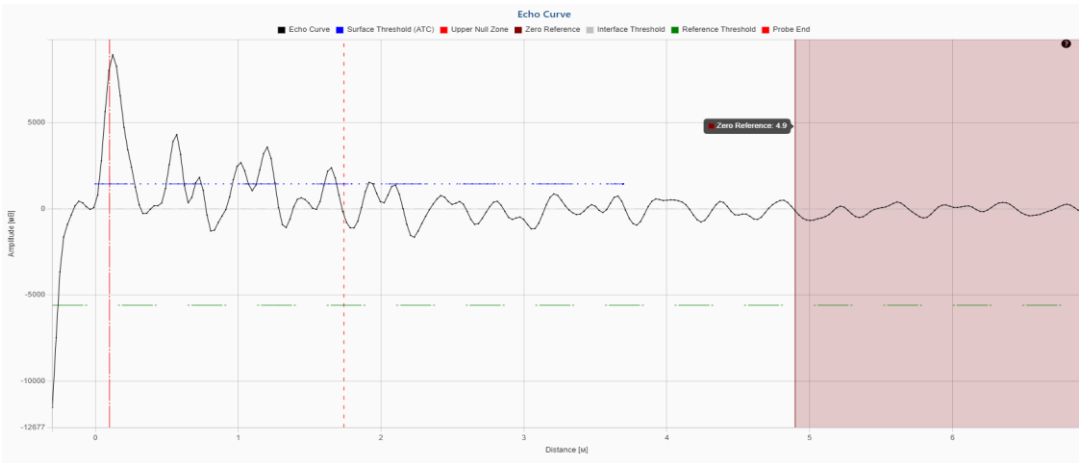


Fig. 48. Example Graph Plot with Set Vertical Display of Parameter Range Value

The graph can be dragged with the mouse cursor along any axis. You may zoom in and out on the graph using keyboard and mouse shortcuts (Ctrl+mouse wheel) (Fig. 50). In these cases, the top right corner of the chart will feature an icon, i.e., *magnifying glass with a zoom cancellation sign in the middle* (Fig. 50). You may use it to reset the chart.

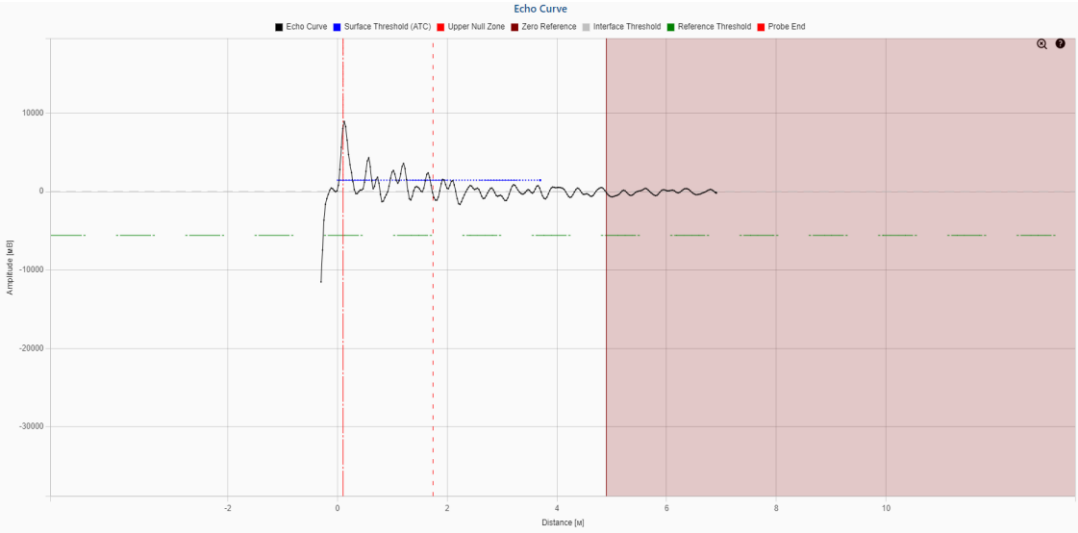


Fig. 49. Example Zoomed in Graph Plot

Any graph may be excluded from the chart by clicking the corresponding parameter name above the chart. In this case, the graph will not be displayed and its name will be struck through (Fig. 51).

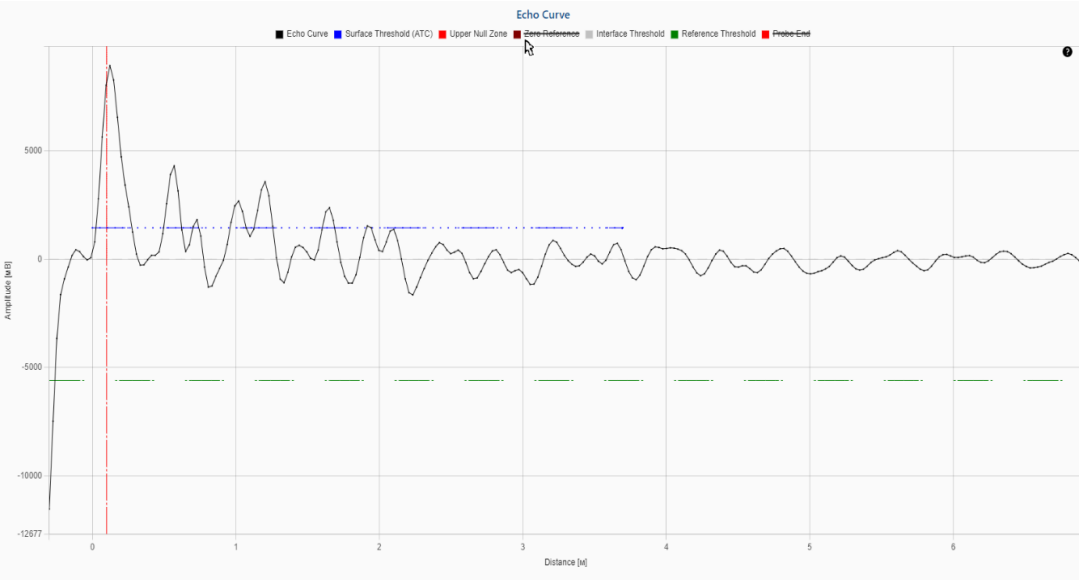


Fig. 50. Example Graph Plot with Graph Excluded from Display

You may return the graph to the chart by clicking the struck through name of a corresponding parameter again. In this case, the graph will appear on the chart and its name will be back to the original. The graph will still show actual values of parameters read from the field device at a given time.

27 Static Images

Static images are shown in the program as they were included in the EDD, without changes (Fig. 63). These images cannot be zoomed.

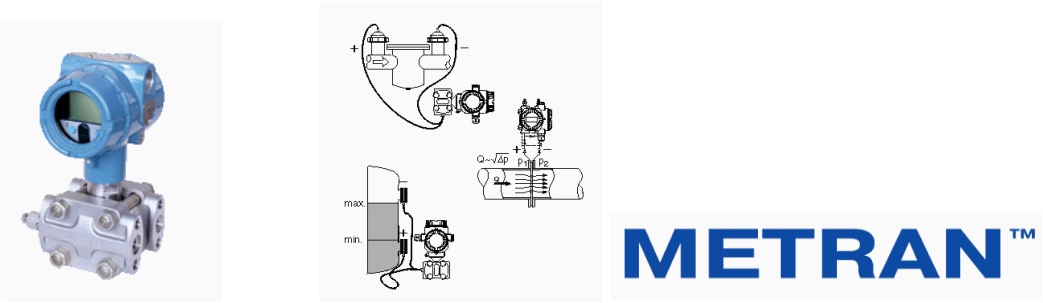


Fig. 51. Example Static Images

28 Submenu Button

Submenu button is used to review field device parameters grouped in a certain way (Fig. 53) as set by the EDD developer.

Name of the submenu button is shown in the breadcrumb trail.

Submenu button is always available.

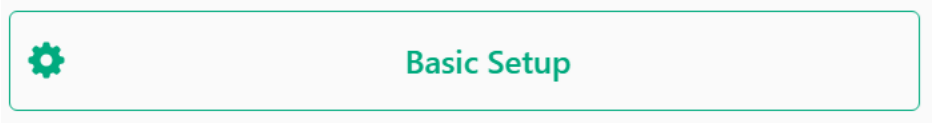


Fig. 52. Example of Submenu Button

The button will highlight in green (Fig. 54) if you hover over it and a prompt for this button will appear provided that it was set by the EDD developer.

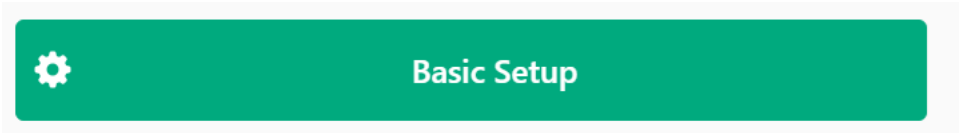


Fig. 53. Example of Highlighted Submenu Button

29 Data Control

Data controls are designed to review and edit parameter values read from the field device.

Data controls may be uneditable (Fig. 55) as set by the EDD developer.

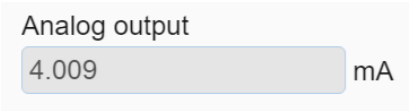


Fig. 54. Example control with Uneditable Parameter Value

Each data control has a name shown above, value of a corresponding parameter, shown in the data control and read from the field device, and unit of a corresponding parameter (Fig. 56) provided that they are set by the EDD developer.

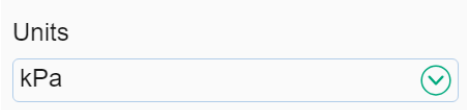


Fig. 55. Example control with Editable Parameter Value

Each data control has a prompt that appears when you hover over the data control (Fig. 57).

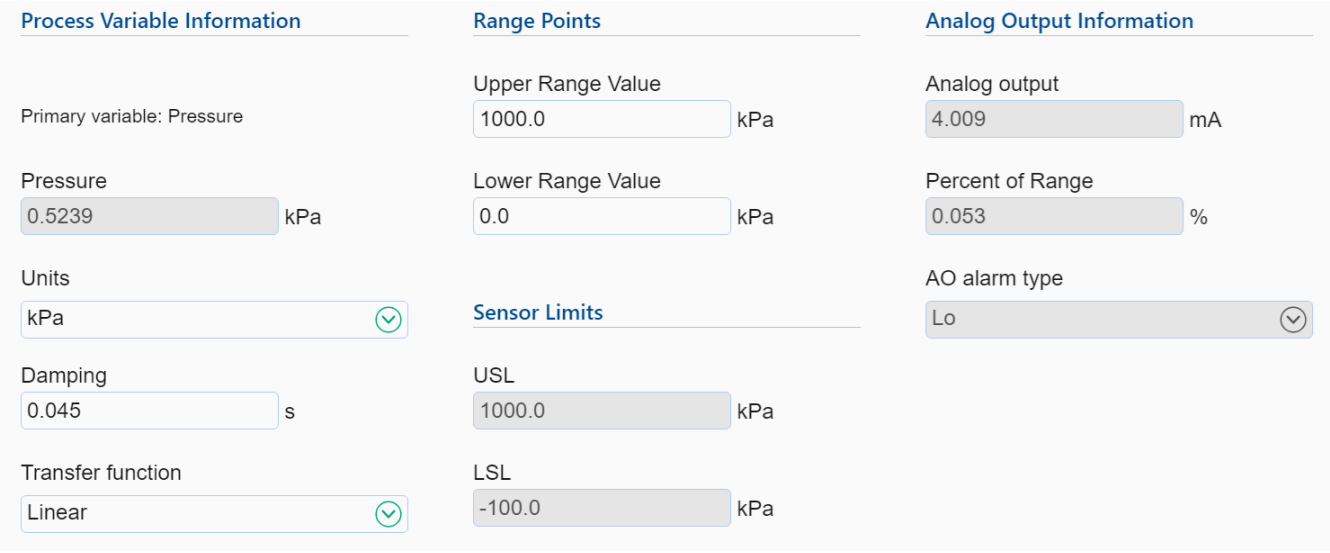


Fig. 56. Example Data Control with a Prompt

When the application screen size is reduced, the data control name, value displayed in the data control and name of the unit may be shortened with the addition of multiple periods at the end (Fig. 58). In this case, you may learn the full data control name, value displayed in the data control and name of the unit by hovering over the shortened name.

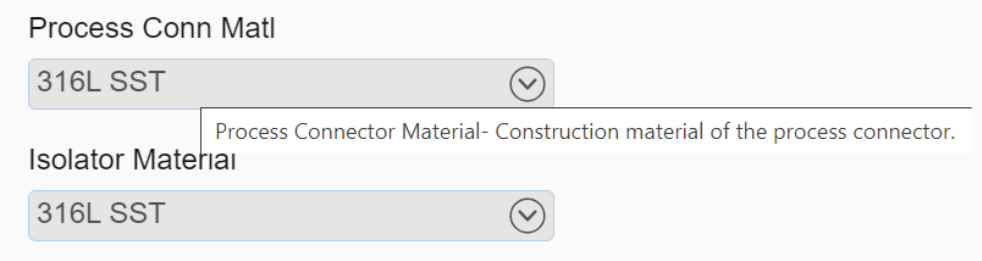


Fig. 57. Example Data Control with Shortened Name and a Prompt

The data control will highlight in green if the cursor is pointed at it and it's available for editing (Fig. 59).

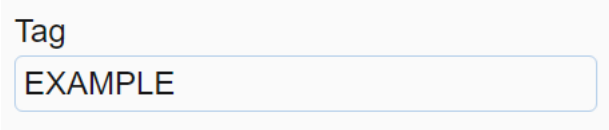


Fig. 58. Example of Highlighted Data Control

The value displayed in the data control becomes bold when editing and afterwards (Fig. 60). When you click *Save*, *Clear* or *Update*, the font will change to regular.

Fig. 59. Example Data Control in the Edit Mode

Data controls have input data control system. If a value that does not correspond to the input format set by the EDD developer is entered, a warning icon will appear to the left of the data control and a message detailing the issue will appear under the data control (Fig. 61).

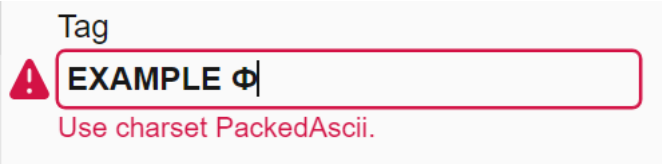


Fig. 60. Example Data Control with Input Data Control

If you edit a parameter whose value may influence other parameters, a warning icon to the left of the data control dependent on the edited parameter and a message under the data control (*The dependent variable is changed*) will appear to draw the user's attention to the changes made (Fig. 62).

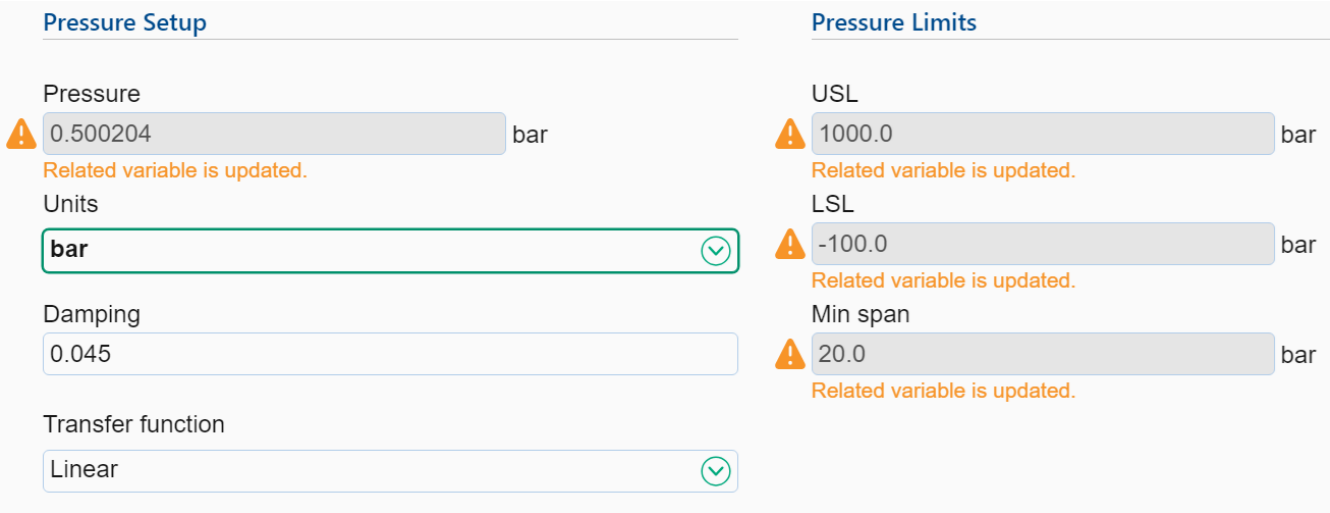


Fig. 61. Example Data Controls with Control of Changed Parameter Dependencies

If you attempt to read a parameter from the DD file whose value is not readable, a corresponding message may appear (Fig. 63). Parameter behavior depends on the field device and EDD developers.

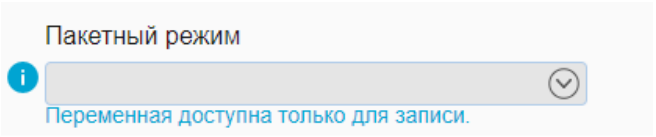


Fig. 62. Example Data Control with Parameter Reading Control

30 Tab

Tabs are described by the developer in the DD file. They are always available. You may switch between tabs by pressing Tab key on the keyboard or by clicking the required tab name with the mouse cursor.

When the screen is reduced in height or width, tabs are moved one by one to the next line of the configuration window (Fig. 64).

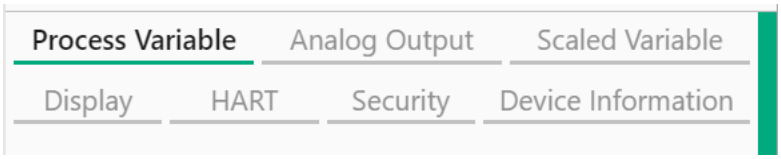


Fig. 63. Example Tab Relocation in the Configuration Window

The tab name whose elements are shown in the configuration window is underlined with a green line. The tab name highlighted by the cursor but whose elements are not shown in the configuration window is underlined with a black line or highlighted with a black box.

31 Scroll Bar

A vertical scroll bar appears on the right of the configuration window if all elements of the configuration window cannot be fully displayed on the user's screen. When the screen is reduced in height or width, data controls will move to the bottom of the configuration window. By scrolling down, you may see all elements located at the bottom of the configuration window.

A vertical scroll bar appears on the right in data controls if the list of all controls or the text cannot be fully displayed in the area.

32 Waiting Indicator

The waiting indicator with a rotating wheel and the name of the operation being performed under the wheel appear in cases where additional time is needed to perform an operation. For example, when a large amount of data is downloaded from the field device to the computer or a connection with the field device is established. At this point, all controls of the main or configuration window become unavailable.

33 Control or Navigation Bar Icon

An icon may appear to the left of the control or to the right of the navigation bar.

An icon may mean the following:

- Information (Fig. 65)
- Warning (Fig. 66)
- Data input error, connection failure (Fig. 67)

Fig. 64. Information Icon

Fig. 65. Warning Icon

Fig. 66. Error Icon

If there is no message detailing reasons for the icon to appear, you may click the icon and corresponding information will appear under the control.

If an icon appears on the information panel, you may click it and additional information will appear in a separate window.

34 Message Window

A message window may contain information (Fig. 68), warning (Fig. 69) or error message (Fig. 70).

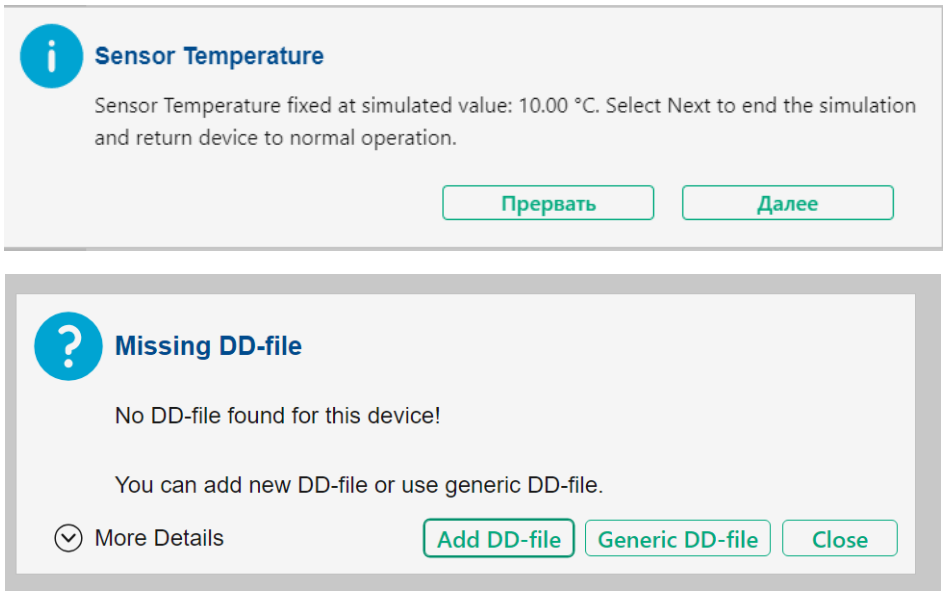


Fig. 67. Example Information Window

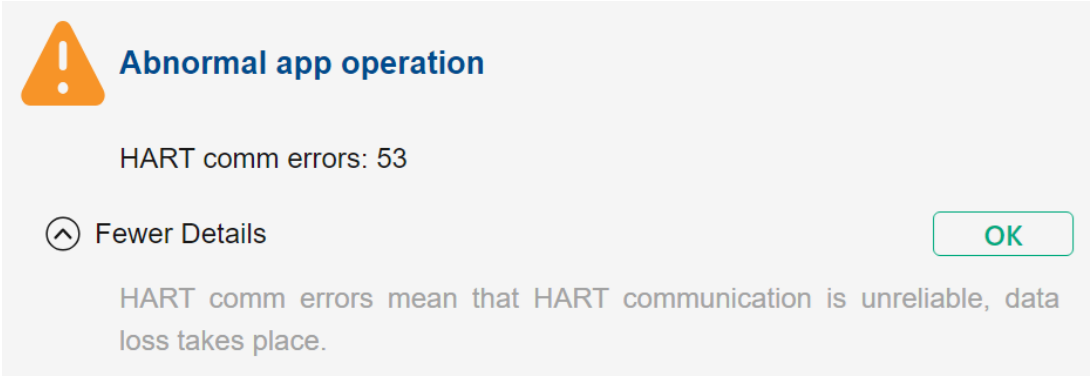


Fig. 68. Example Warning Window

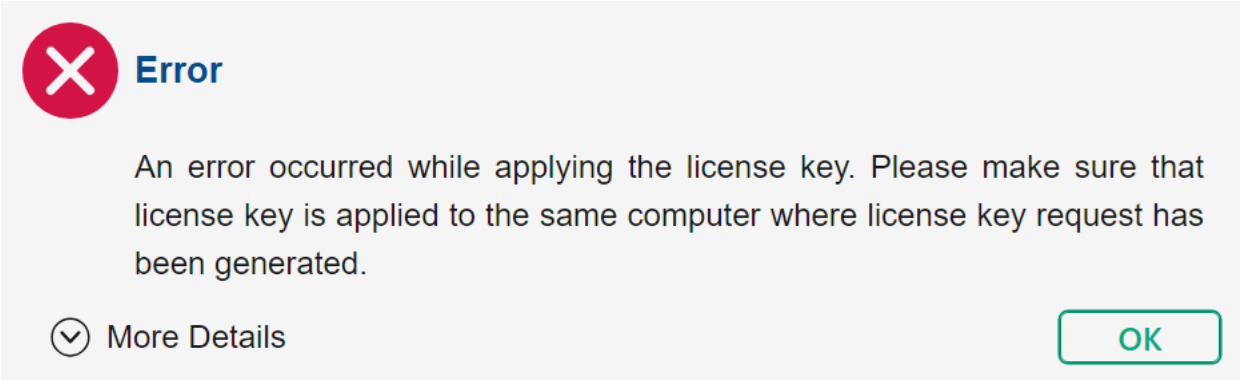


Fig. 69. Example Error Window

The window contains buttons with their number and functionality dependent on the context when this window appeared. It may contain additional information available for reading when you click *View Details* (Fig. 70). You may hide additional information by clicking *Hide* (Fig. 71).

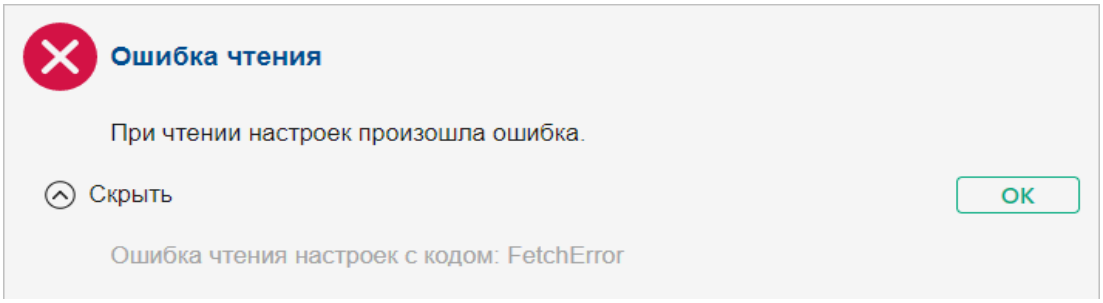


Fig. 70. Example Window with Error Description

If a message window appeared on the screen, all other window elements become unavailable for the user.

35 Breadcrumb Trail

The breadcrumb trail is found in the configuration window under the navigation bar and shows the user's selection sequence. E.g., a breadcrumb trail may consist of an item name selected in the navigation menu, name of the selected submenu button.

The breadcrumb trail has no nesting restrictions and depends on the user's selection.

When the screen is reduced, the breadcrumb trail is cropped to the left with the addition of multiple periods and the last point of the trail left viewable. In this case, you can see the full path in the popup hint by moving the mouse cursor to the breadcrumb trail.

Tab names are not displayed in the breadcrumb trails.

36 Submenu Exit Button

Submenu exit button (Fig. 72) appears only when submenu button is selected. It lets you return to the main navigation menu item in the configuration window.

Fig. 71. Submenu Exit Button Icon

37 Close Main Menu Button

Close main menu button (Fig. 73) found in the top left corner of the navigation bar allows to exit main menu to perform automatic search of connected field devices in the main window.

Fig. 72. Close Main Menu Icon

38 Navigation Menu Button

Navigation menu button (Fig. 74) appears before the breadcrumb trail and allows access to the navigation menu of the configuration window. The button becomes available if *Hide menu by default* option is selected in the Settings operation mode (clause 4.2.6).

Fig. 73. Navigation Menu Button

39 Description of Software Operation Modes

The application has several operation modes:

- Metran-Configuration
- Settings
- Add device
- About
- General DD

39.1 Metran-Configuration Operation Mode

Metran-Configuration operation mode allows to automatically find and configure a connected field device. With HART digital output processing, the software allows remote configuration of connected devices, monitoring and control of measured physical quantities.

Metran-Configuration operation mode is launched at program launch.

This mode operates in two submodes:

- Automatic search of field devices
- Field device configuration

At software launch, automatic search of field devices is started.

40 Automatic Search of Field Devices

Automatic search of field devices is performed according to the connection settings (clause 4.2).

The main window shows field device search indicator including polled HART address numbers from the set up search range (clause 4.2.2).

All field devices connected to the PC via set up *Connection Type* will be automatically found and corresponding icons will appear in the main window showing results of performed action if

- The set up *Connection Type* – name of field device port – corresponds to the *Connection Type* selected in the settings (clause 4.2.1)
- Field device HART address is in the *Search Range* set in the program (clause 4.2.2)
  Standard device parameters are automatically identified and shown:

1. Device tag (long for HART6, HART7; short for HART5) (Fig. 75)

2. Manufacturer name (Fig. 75)
3. Device name and its revision (Fig. 75)
4. Field device serial number (Fig. 75).

Fig. 74. Example Explanation of Field Device Name

The device icon is blue (Fig. 76) if the field device is connected and the application is ready for operation with this device.

Fig. 75. Icon of a Field Device Ready for Operation

The device icon is gray with a red cross (Fig. 77) if device operation is not possible as there is no license key to operate it.

Fig. 76. Field Device Icon in the Absence of License Key

By clicking the icon, you may open a detailed message and go to *About* (clause 4.4) if you choose *Yes* (Fig. 78).

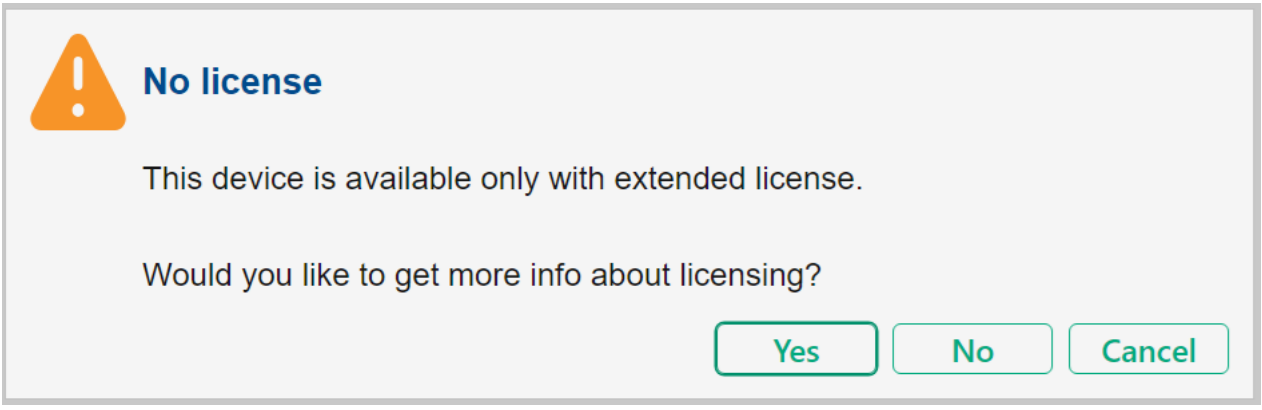


Fig. 77. Example Message Explaining why Field Device Operation Is Impossible

The device icon is gray (Fig. 79) if the field device is connected but the device description in the EDD file format is not added to the application (clause 4.3). The program may not operate with such a device.

Fig. 78. Field Device Icon in the Absence of Device Description in the EDD Format

By clicking the icon, you may open a detailed message and go to *Add Device* (clause 4.3) if you choose *Add DD file* or *General DD* (clause 4.5) if you choose *General DD file* (Fig. 80).

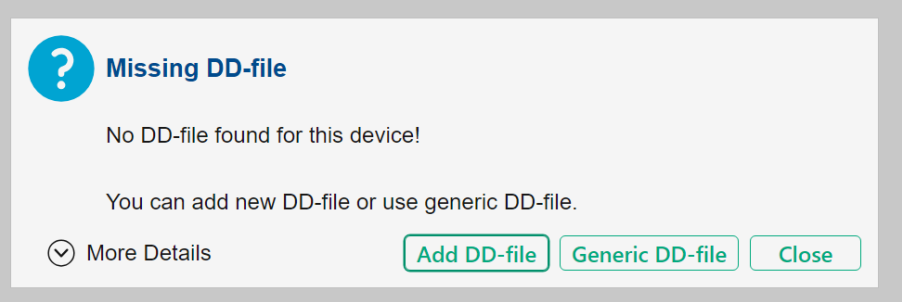


Fig. 79. Example Message Informing of No DD File in the Application Repository

41 Field Device Configuration

Field device configuration is launched by clicking the device icon in the main window.

42 Field Device Description Added to the Application

If the device description is added to the application and the device is connected (field device icon is blue), field device configuration window read from the DD file will appear, with the following elements:

1. Return button used to go back to automatic search of connected field devices (Fig. 81)
2. Navigation menu of the configuration window read from the DD file (Fig. 81)
3. Configuration window showing parameter values read from the field device, parameter statuses, additional methods of parameter configuration, buttons, charts and other controls set by the DD file (Fig. 81).

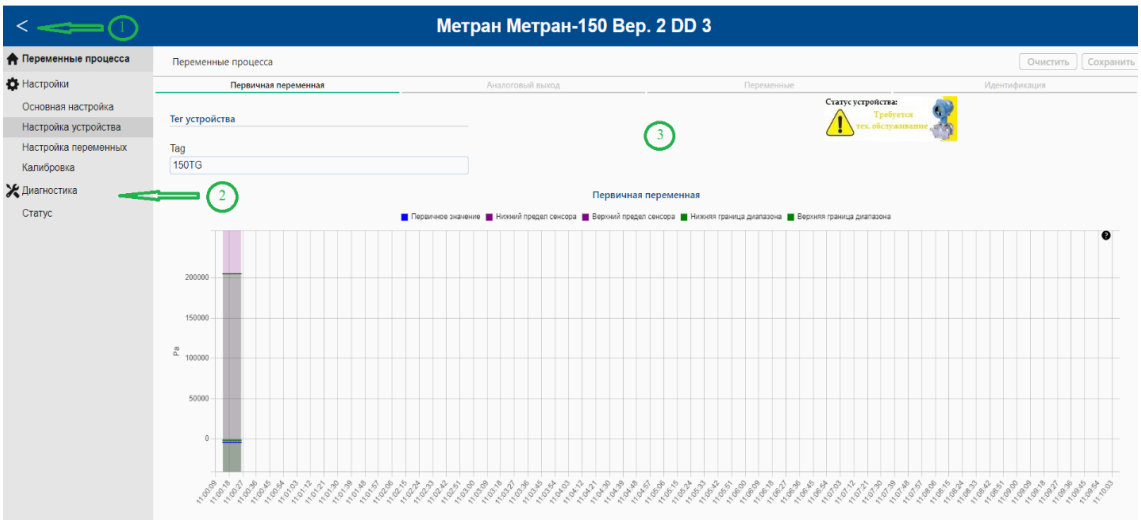


Fig. 80. Example Configuration Window

Configuration window components are described in clause 3.9.

43 No Field Device Description in the Application

If the device description is not added to the application (the icon is gray), it is required to go to Add Device mode (clause 4.3) and add a corresponding field device description to the application.

43.1 Settings Operation Mode

Settings operation mode is used to configure automatic search of field devices.

Settings operation mode is launched from the main program menu by clicking the main menu button (Fig. 24).

Settings window contains the following items (Fig. 82):

- *Connection type* - list of automatically found ports of this PC or industrial tablet (clause 4.2.1)
- *Min, Max* - search range for field device HART addresses (clause 4.2.2)
- *Enable WirelessHART adapter scanning* – enables to include address 63 in the scanning (clause 4.2.2)
- *Language* – program interface language (clause 4.2.3)
- *Theme* – showing window elements on a light or dark background (clause 4.2.4)
- *Zoom* – a list to select program window zoom (clause 4.2.5)
- *Hide menu by default* – hide navigation menu of the configuration window by default (clause 4.2.6)
- Settings mode buttons:
  - *Save* – all changes made on the Settings page will be saved to the settings file and immediately applied to corresponding program parameters
  - *Update* – settings from the settings file will be read. All changes made on the Settings page will be canceled.
  - *Clear* – all changes made on the Settings page will be reset to previous values.

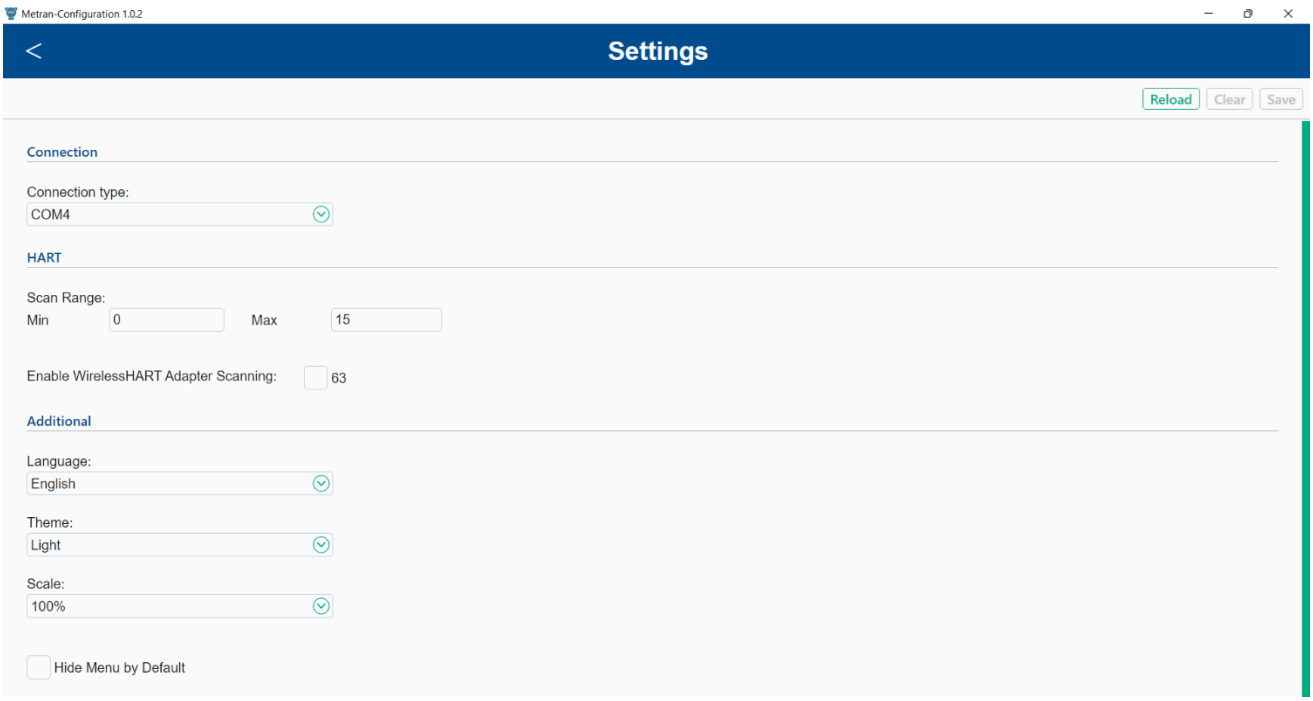


Fig. 81. Settings Operation Mode

44 Connection Type

The set up *Connection Type* is used for automatic search of connected field devices when switching to this mode.

To change *Connection Type*, select number/name of the port connecting the field device to the PC or industrial tablet and click *Save* to save changes to *Connection Type* in the program.

Changes apply immediately.

45 HART Address Search Range

The set up *Search Range* is used to search for HART addresses of connected field devices.

You may increase or decrease (to reduce search time) the *Search Range* for connected field device addresses.

The minimum range value (*Min*) = 0, the maximum range value (*Max*) = 62. Automatic search of connected field devices will be performed by sequentially checking all address values in the selected range from Min to Max.

You can include address 63 in the search range by selecting *Enable WirelessHART adapter scanning* option.

46 Language

You may change the program interface language.

The selected language is immediately applied to all program elements when this setting is saved and is used for the current and future sessions until the next change for:

- Main program menu
- Program operation mode name
- Names of configuration menu and configured parameters read from the DD file if this DD file supports selected language.

47 Theme

You may select light or dark theme to display program elements.

A light theme – dark elements on a light background (Fig. 83)

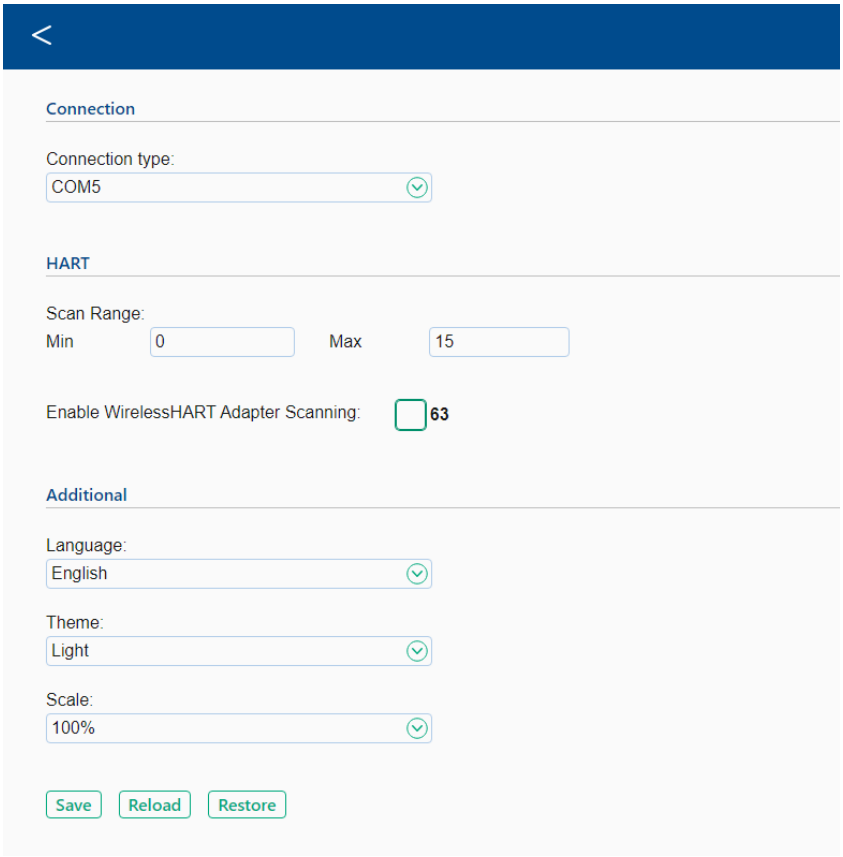


Fig. 82. Settings Operation Mode. Light Theme

A dark theme – light elements on a dark background (Fig. 84)

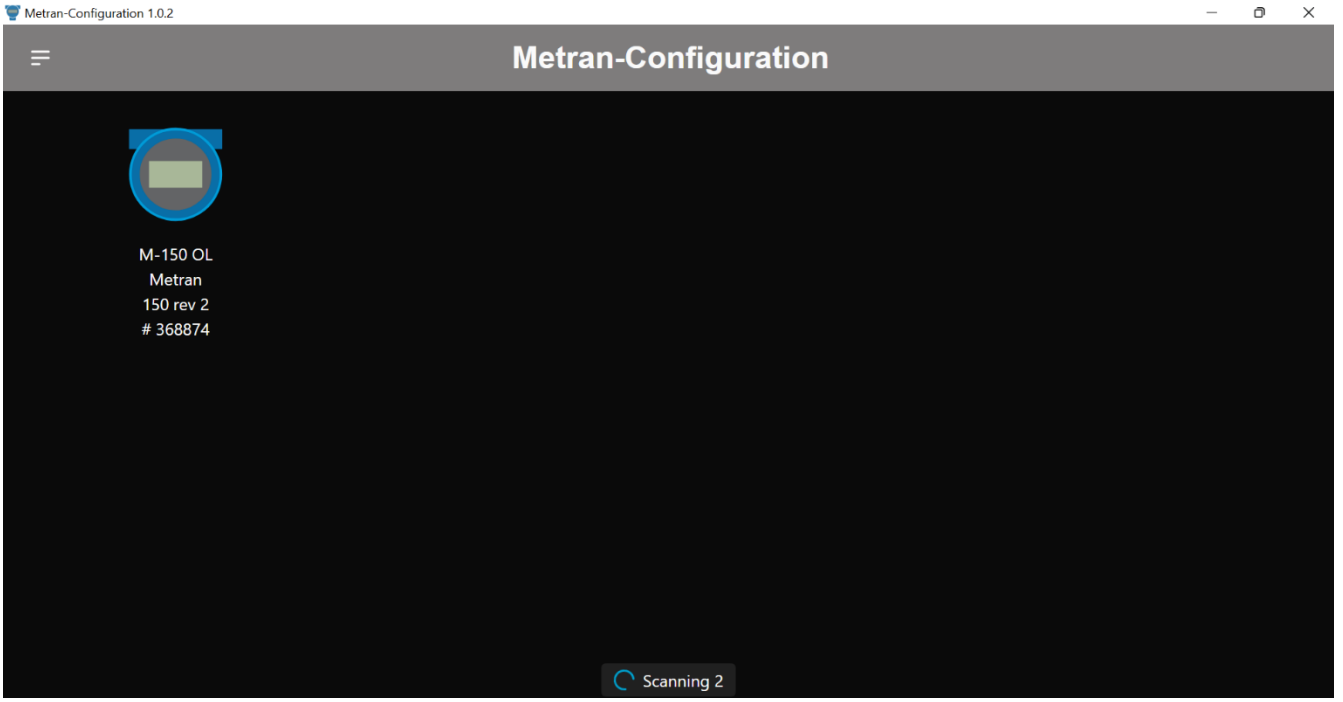


Fig. 83. Settings Operation Mode. Dark Theme

48 Zoom

You may zoom in and zoom out by using *Zoom* parameter (Fig. 85).

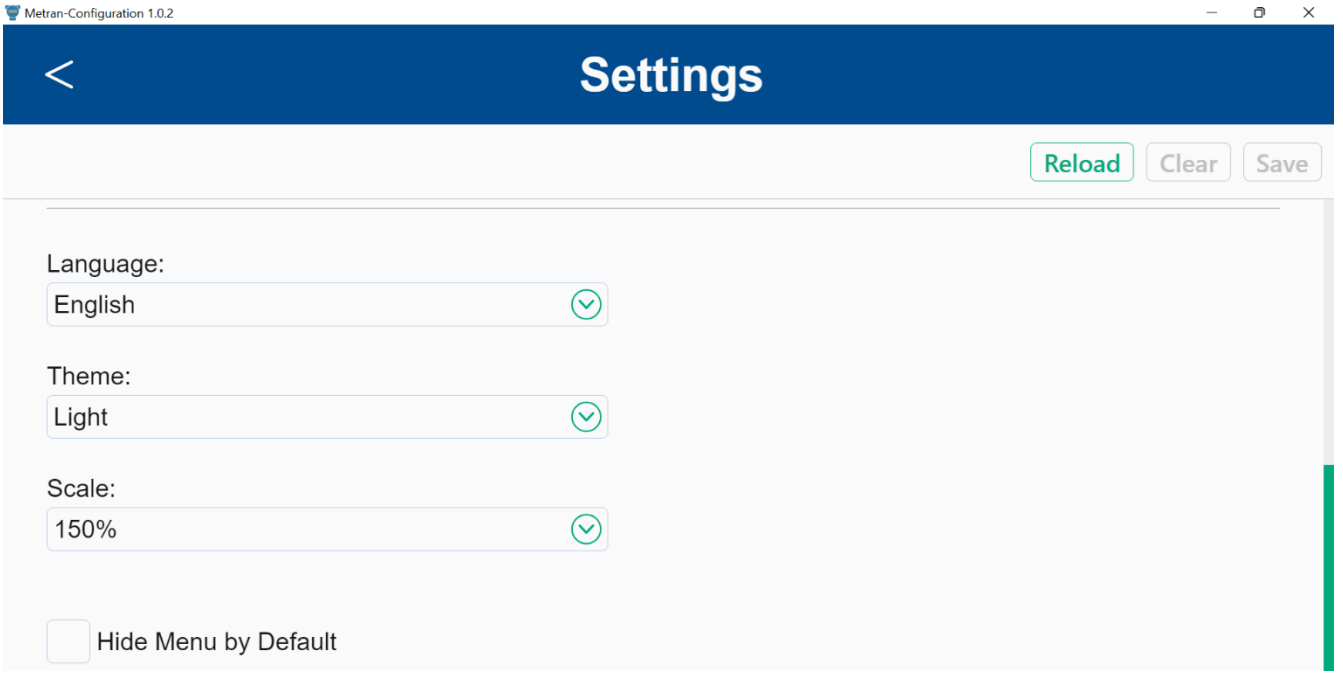


Fig. 84. Settings Operation Mode with 150% Zoom

49 Hide Menu by Default

The navigation menu of the configuration window is by default displayed in the main window (Fig. 86). It may be disabled by selecting *Hide Menu by Default* in the Settings operation mode (Fig. 87).

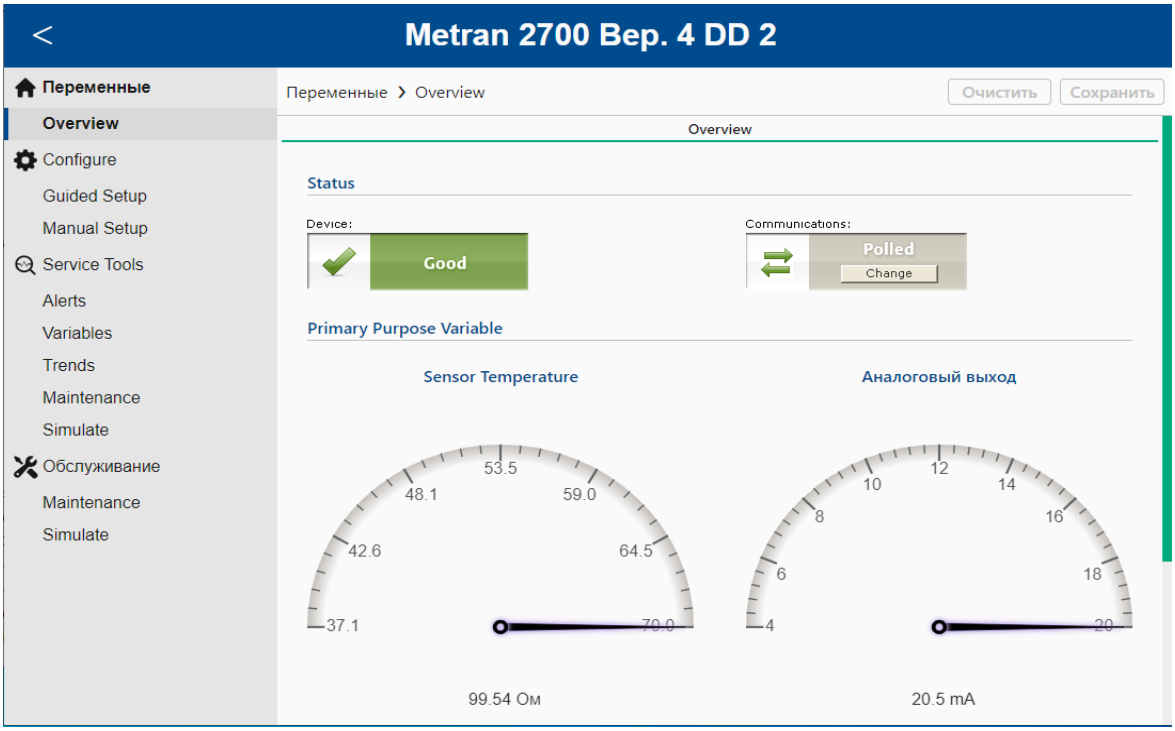


Fig. 85. Example Configuration Window with Navigation Menu Enabled by Default

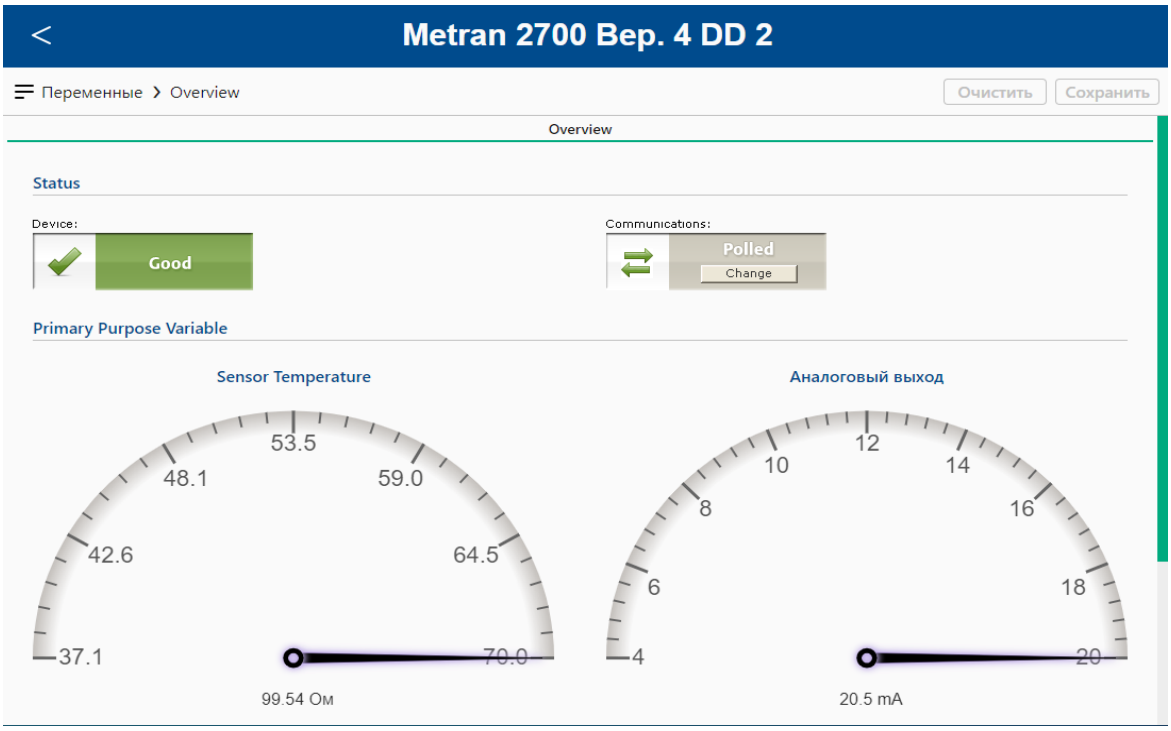


Fig. 86. Example Configuration Window with Navigation Menu Hidden by Default

If the navigation menu is hidden by default, it can be opened by clicking the navigation menu button (clause 3.9.20). The navigation menu will appear in the main window above the configuration window (Fig. 88). In this case, all navigation menu items are available for the user and all other configuration window controls are unavailable.

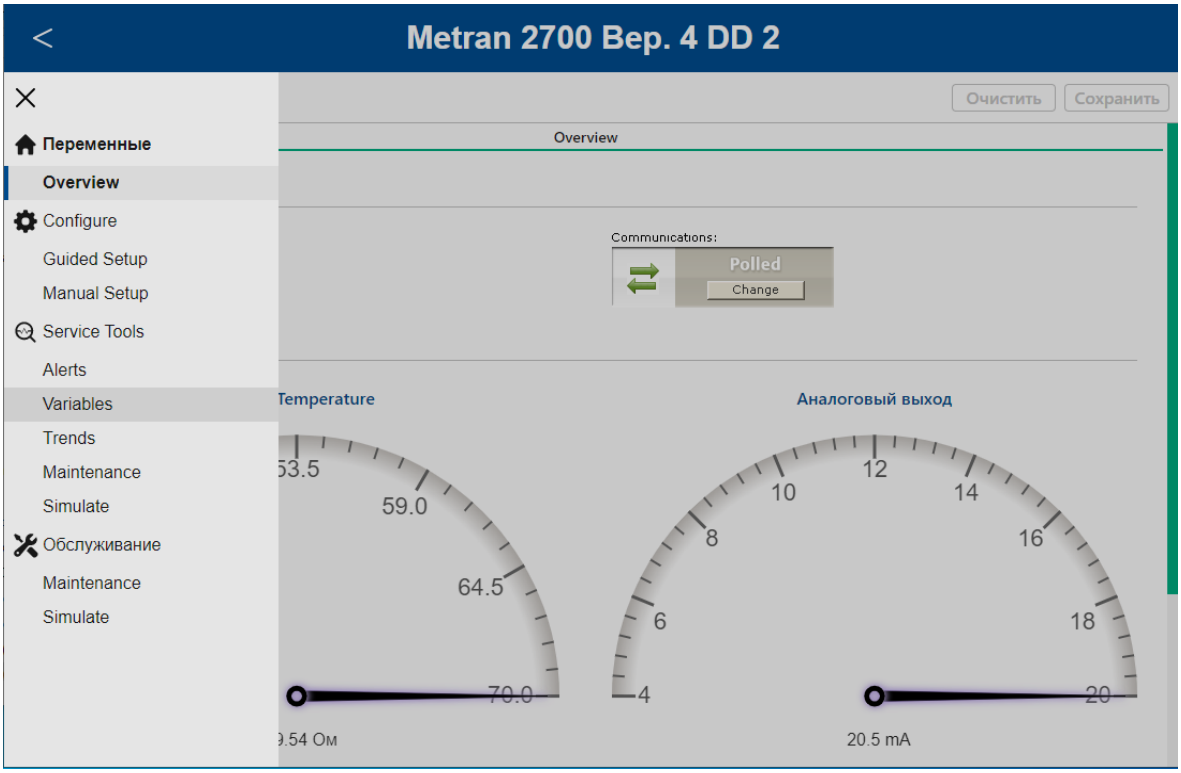


Fig. 87. Example Configuration Window with Navigation Menu Opened by Navigation Menu Button

49.1 Add Device Operation Mode

Add Device operation mode allows adding DD files in the program.

Add Device mode is launched from the main program menu by clicking the main menu button (Fig. 26).

Add DD Files window contains the following elements:

- *Browse* button opens a system window to select DD files on the computer
- A list of files selected to be added to the program
- Add Device mode buttons
  - *Add* – add selected files to the application
  - *Clear* – clear a file list

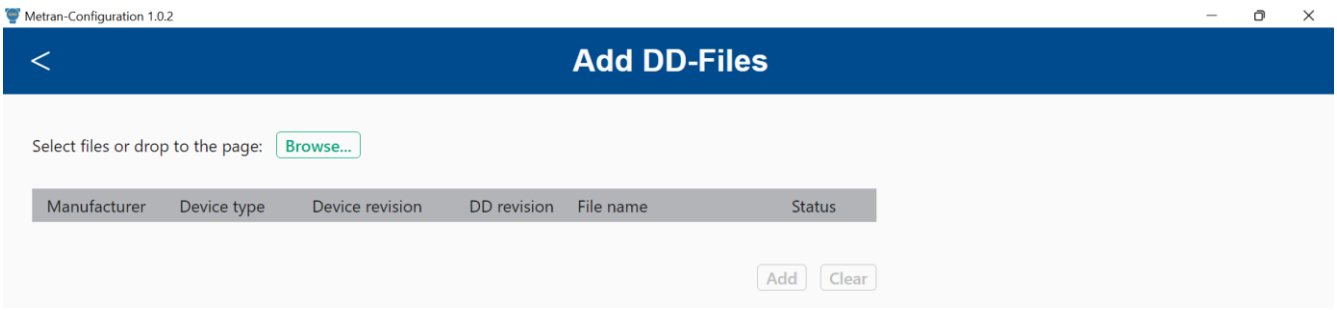


Fig. 88. Add Device Operation Mode

You may add EDD files to the program by:

- Using *Browse* button. Select EDD format files (Fig. 90)

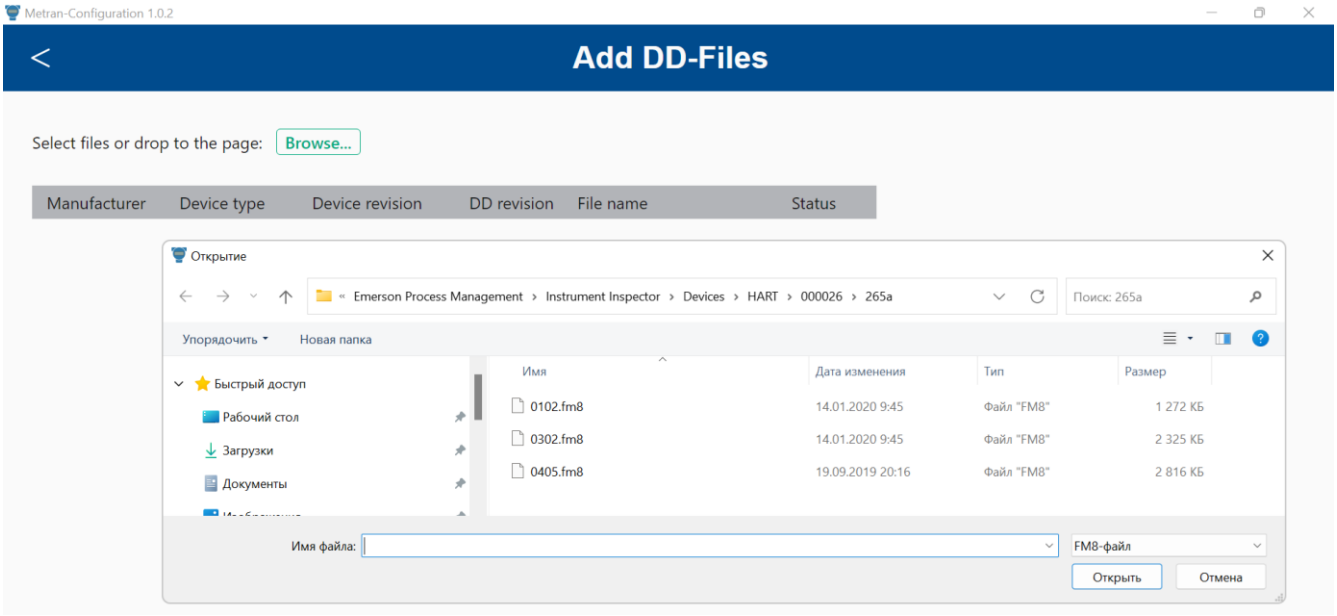


Fig. 89. File Selection Window

- Dragging files to the list on the Add DD Files page (Fig. 91)

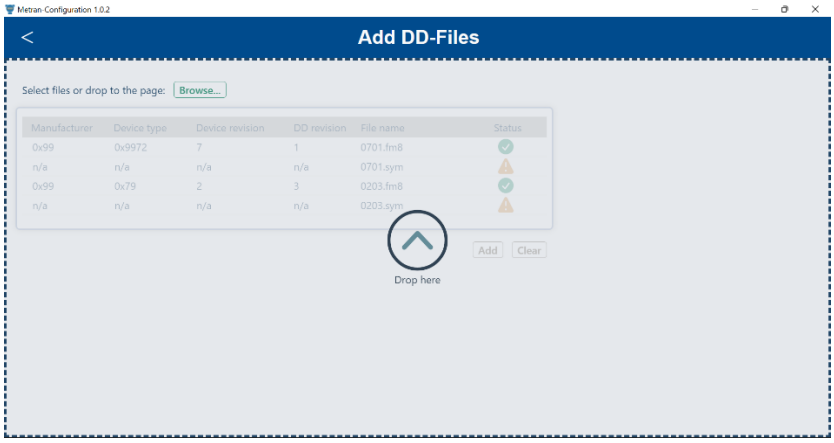


Fig. 90. Dragging Files from the File System to the Application Table

The application automatically checks format of the files added to the table to make sure:

- They do not duplicate files added to the table
- They are compliant with EDD format.

Following such checks, a file status in the line of the file added may change to a warning icon. A prompt for this warning will appear if you hover over the icon (Fig. 92).

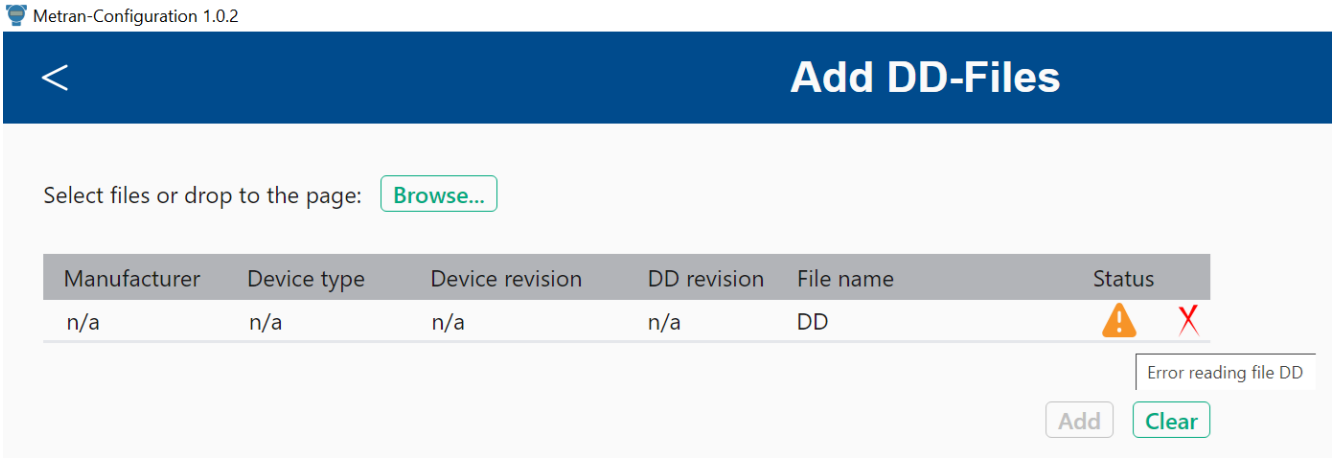


Fig. 91. Example Add DD Files Tables with Prompts

The file added to the table may be deleted by clicking the red cross (Fig. 93).

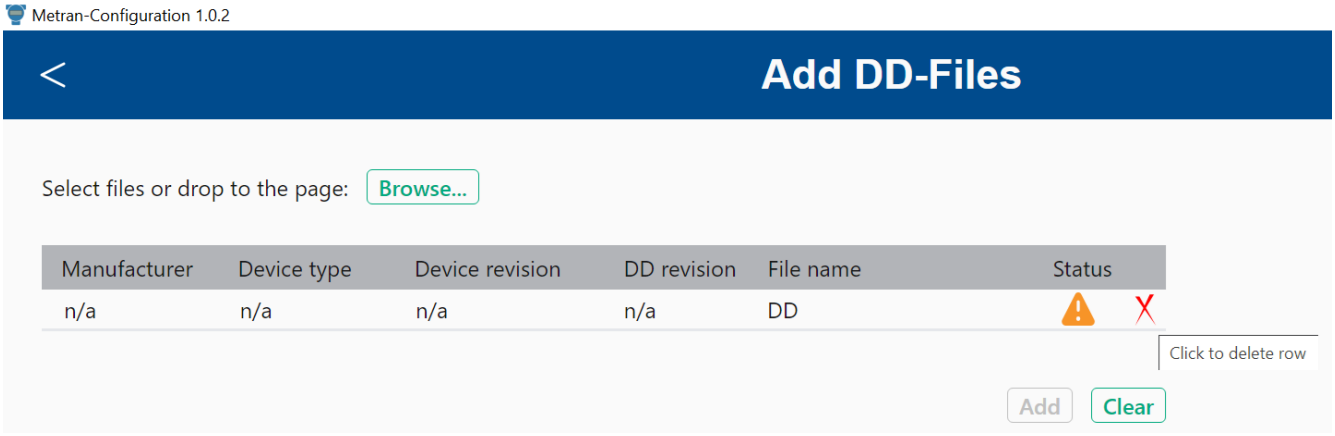


Fig. 92. Example Add DD Files Table with Delete Line Icon

The application may add EDD format device description to the file system only if there are no warning icons in the status. When you click *Add*, all EDD format device descriptions added for further analysis and addition to the program file system change their status to approved (a check mark on the green background) (Fig. 94). For detailed rules of adding DD files in the application file system, refer to clause 6.2.

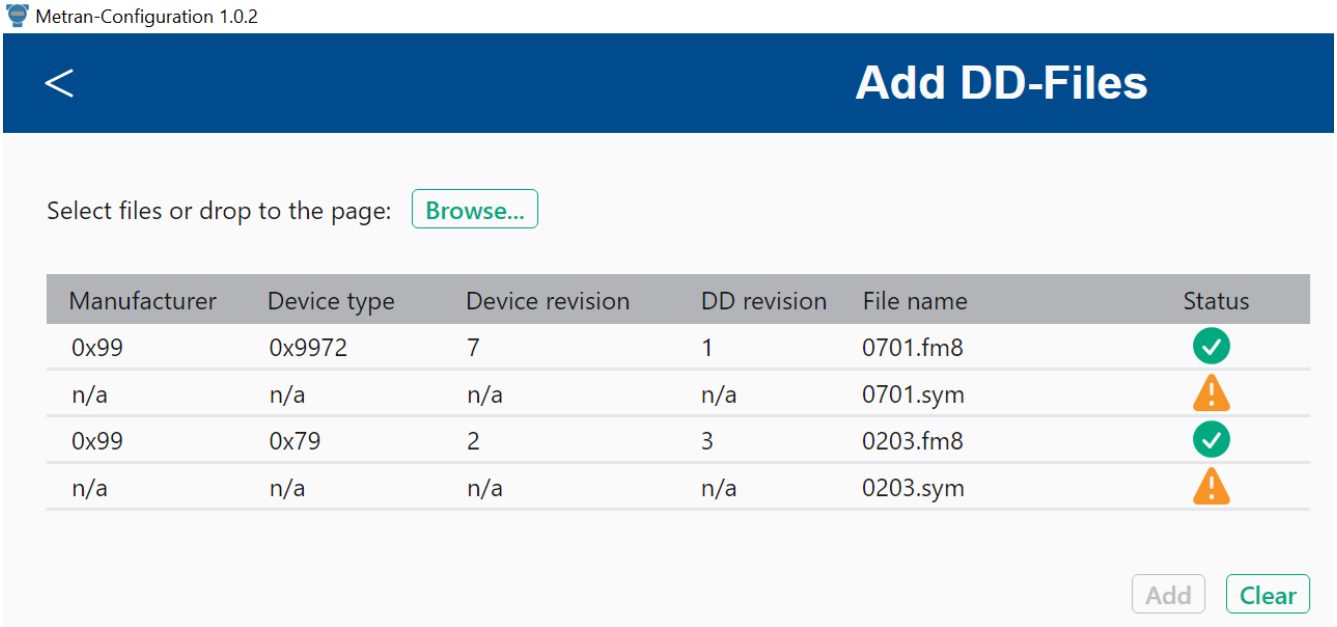


Fig. 93. Example Add DD Files Table with File Added for Further Analysis

49.2 About Operation Mode

About operation mode is used to get more detailed information about the program.

About operation mode is launched from the main menu by clicking the main menu button (Fig. 26).

This mode allows to (Fig. 95):

- Access information about program version
- Access information about Customer Support
- Access information about used license
- Request a license key (clause 4.4.1)
- Apply a license key (clause 4.4.2)
- Access information about the license agreement.

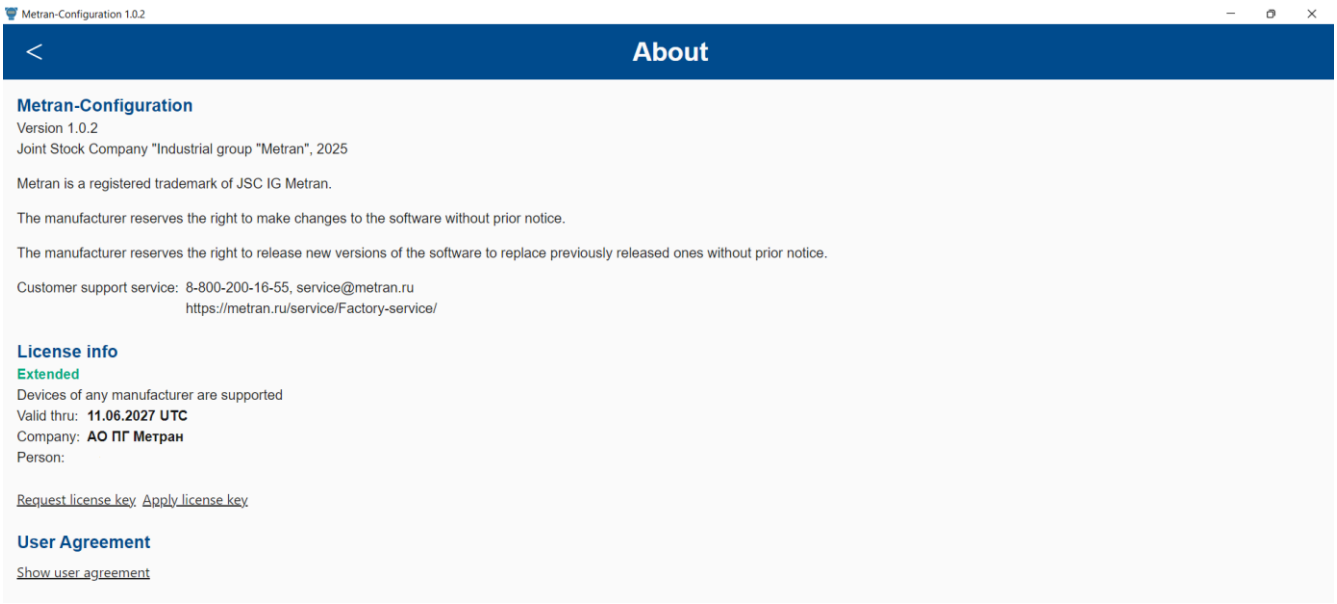


Fig. 94. About Operation Mode

50 Request a License Key

All functions of Metran-Configuration Software are available for configuration of field devices manufactured by Metran IG, JSC.

To configure a field device by any other manufacturer, it is required to request a license key. License key activation limits program misuse. A license key cannot be provided in advance as it is tied to the computer the software is installed to.

To generate query, it is required to click *Request a License Key*. Then fill the form with:

- Name of the requesting company,

- Full name of the requesting employee.

When you fill all fields, the Generate Query button becomes available (Fig. 96).

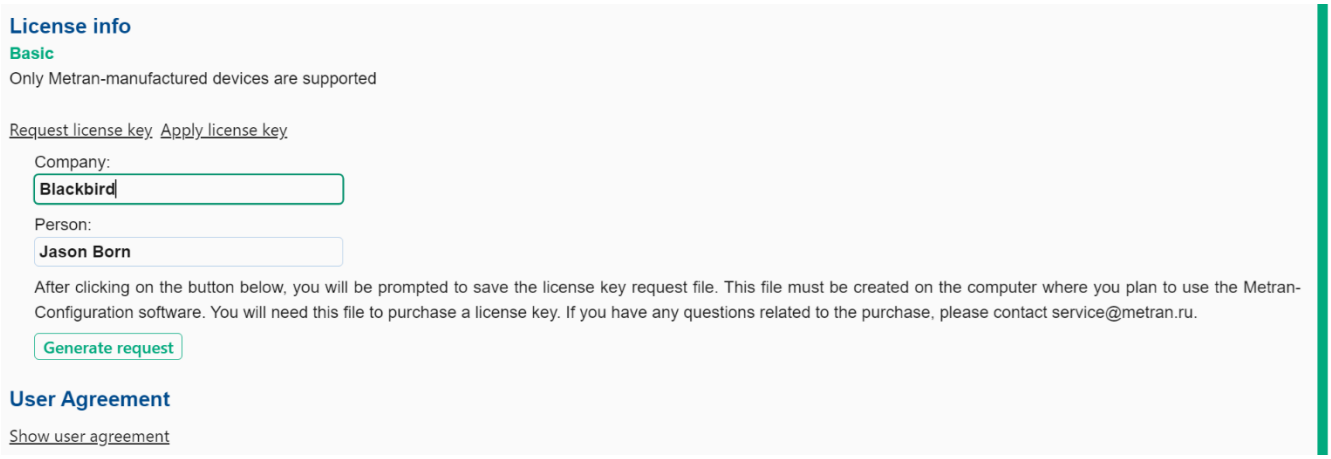


Fig. 95. Example License Information

Follow the instructions found above the Generate Query button.

51 Apply a License Key

You may apply a license key only on the computer the license key was requested from. To do this, click *Apply a License Key*. Use *Browse* button to find a file sent by Metran IG, JSC and open it.

If you attempt to apply a license key on a computer other than the one it was requested from, an error message will appear (Fig. 97), a license key will not be applied and configuration of field devices produced by manufacturers other than Metran IG, JSC will not be possible.

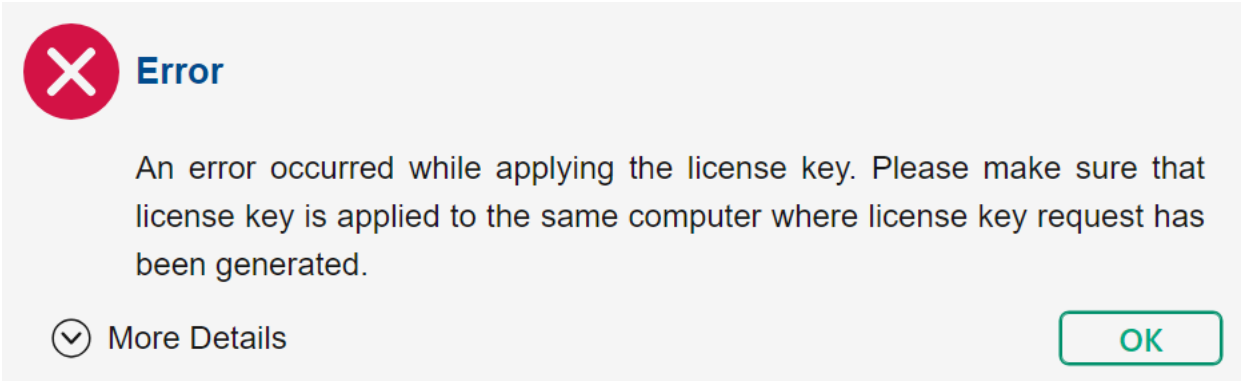


Fig. 96. Example Apply a License Key Error

If the received license key is applied with no errors, the license information will include a license change from *Basic* to *Extended* (Fig. 98) with reference to the expiration date of the license supporting operation with devices by any manufacturer.

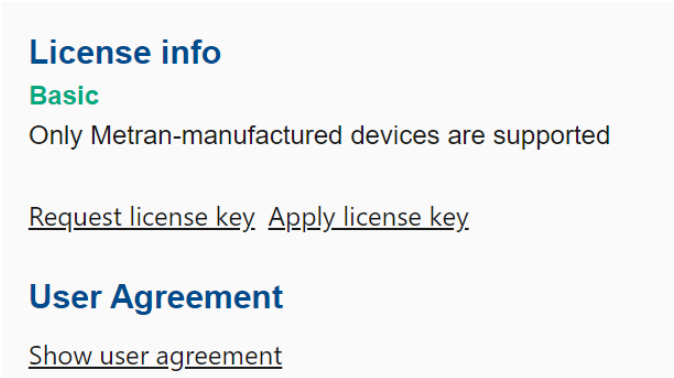


Fig. 97. Example License Information

51.1 Generic DD Operation Mode

General DD operation mode allows operation of a field device if there is no original field device description via the manufacturer's DD file. The operation is limited by the parameters whose values are processed only with HART universal commands [4].

This software mode is launched by clicking **Generic DD-file** (Fig. 91) in the message informing there is no manufacturer's DD file for the selected field device in the repository.

This mode allows to read some basic device parameters, change values of some parameters in the device, use several standard methods to configure and test a field device (Fig. 99), such as:

- Loop test;
- D/A adjustment;
- Zero trim;
- Self-test;
- Device reset.

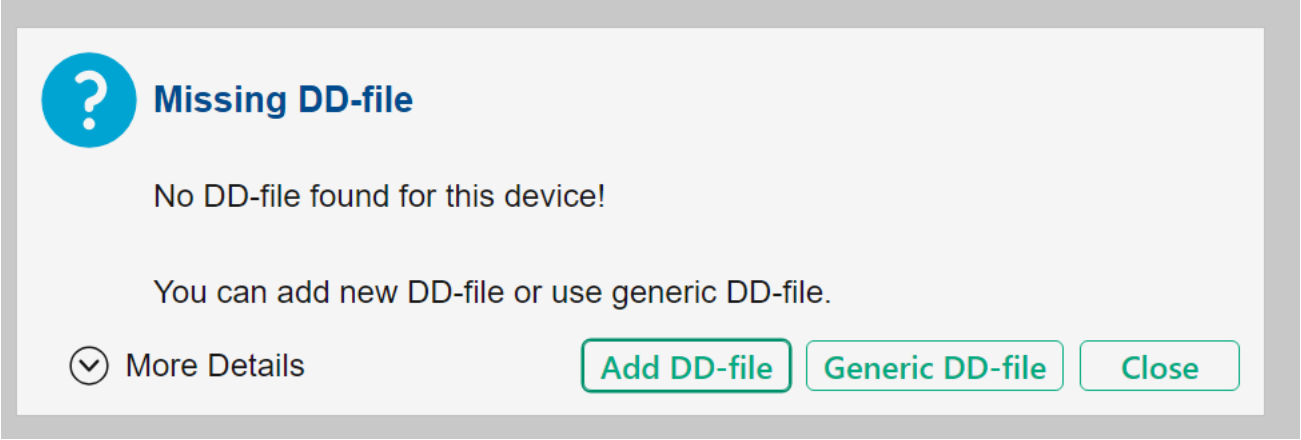


Fig. 98. General DD Operation Mode

52 Abnormal Situations

Abnormal Situation	Cause	Remedy
Field device not found during automatic search of connected field devices.	There was a disconnection.	Check field device connection to the PC and eliminate a disconnection.
	Connection Type that is not in compliance with the physical connection is configured in the application settings.	Check and change *Connection Type* (clause 4.2.1) to comply with the physical connection of a field device and a PC port.
	The *Search Range* in the application settings does not include the HART address of a connected field device.	Check the field device HART address and the *Search Range*. If required, change the *Search Range* (clause 4.2.2).
During operation, error icons appear next to controls.	There was a disconnection.	Check field device connection to a PC port and eliminate a disconnection.
When you select the *Connection Type* and attempt to save the settings,	The modem failed.	Check the modem is in good working order and replace as necessary.

the application says there was a port opening error.	The operating system may be missing a modem driver.	Contact the modem's manufacturer for further information. Install the required modem driver.
	The selected *Connection Type* is used by another application.	Close other applications using this port.
When in *Settings* mode in Linux OS and attempting to save the selected *Connection Type*, the application shows a port opening error.	Required permits to operate the selected port may be missing.	In Linux OS, check which user group has access to the selected port and include the user in this group: # *ls -l /dev/ttyUSB0* crw-rw---- 1 root dialout 188, 0 дек 20 13:25 /dev/ttyUSB0 # *usermod -a -G dialout <user_name>* Log in again to apply changes.
When in Settings mode, the *Connection Type* list misses port name with a connected modem.	The operating system may be missing a modem driver.	Contact the modem's manufacturer for further information. Install the required modem driver.
	The modem failed.	Check the modem is in good working order and replace as necessary.
When in Settings mode in Linux OS, the *Connection Type* list misses port name with a connected USB modem.	USB modem is not identified as a USB port	Check the Braille display driver is installed. If the *brltty* package (Braille display driver) is installed in the system, then some HART modems (for example, on an FTDI chip) may be mistakenly recognized as Braille displays. To avoid this, delete *brltty* package: # *apt-get remove brltty* Reconnect the modem to apply changes. Note. *Brltty* package is supplied by default in ALT Workstation K.
Application does not work in Linux OS.	The application is launched by the root user.	Operation by the root user is not supported. Launch the application by a standard user.

At startup, the application reports a component startup error and suggests making sure that port 8000 is not used by another application.	The network port is used by another application.	Change the port used for communication between the application components. Edit the application launch icon(s) by adding the following arguments separated by space to the launch command: *--port 8001 CswServer — tcpPort=8001* where 8001 is a free port number on your system.
When launching and running the application in Windows OS, a blue background appears with the text containing information about the problem, Windows OS error code (BSOD).	One of the reasons may be the use of a USB HART modem by VIATOR.	Use another modem to connect the field device to the computer, e.g., Metran-683.

53 Additional Software Information

53.1 Application Profile

The application profile containing settings, user-uploaded DD files, logs, and license file (if available) are stored in the following areas of the file system:

Operating System	Profile Path	Note
Windows	*%ProgramData%\MetranConfiguration*	All users of the same PC have a common profile
Linux	*~/.MetranConfiguration/*	Each user has a personal profile

53.2 DD File Repository

DD file repository is a folder tree in the file system arranged according to the information contained in the DD file.

Repository structure:

- Root folder (DDRepo);
- Protocol folder (HART);
- Manufacturer's code folder (manufacturerId) – a number in hexadecimal notation, supplemented with zeros on the left for up to 6 characters
- Device type folder (deviceType) – a number in hexadecimal notation, supplemented with zeros on the left for up to 4 characters
- DD file whose name consists of:
  - Device revision (deviceRevision) – a number in hexadecimal notation, supplemented with zeros on the left for up to 2 characters,
  - EDD revision (ddRevision) – a number in hexadecimal notation, supplemented with zeros on the left for up to 2 characters,
  - .fm8 extension.

The application comes with a basic repository that contains DD files for field devices manufactured by Metran IG, JSC up-to-date at the time of delivery and is read-only. The DD files uploaded by the user during operation end up in the user repository.

When searching for a suitable DD file for a field device, the application will try to find it in both the user and the basic repository. The file with the latest revision of the DD file will be used.

When adding a new DD file, the application checks availability of the selected manufacturer's file for the specified device type with the same device revision.

Adding a new DD file to the repository occurs under the following rules:

- If the DD version of the added file is newer than the version of the DD file existing in the basic or user repository, then such a file will be added to the user repository;
- If the DD version of the added file is older than the version of the DD file existing in the basic or user repository, the file will be ignored by the application;
- If the DD version of the added file is equal to the version of the DD file that exists only in the user repository, the file will be replaced with a new one in the user repository;
- If the DD version of the added file is equal to the version of the DD file that exists only in the basic repository, the file will be ignored by the application.

If the DD file from the basic repository is not suitable for operation for some reason, manually edit the basic repository by deleting or updating the required file.

If you reinstall or update the application, all changes in the basic repository will be lost.

Operating System	Repository Path
Windows	User: *%ProgramData%\MetranConfiguration\DDRepo*
	Basic: *%Program Files%\Metran-Configuration\resources\server\DDRepo*
Linux	User: *~/.MetranConfiguration/DDRepo*
	Basic: */opt/MetranConfiguration/resources\server\DDRepo*

53.3 Device Information Exchange Logging

The application automatically keeps history records of the most significant information about software operation in logs (*.log files). The logs are used by developers to control, monitor, and analyze the program operation.

Operating System	Log Path
Windows	*%ProgramData%\MetranConfiguration\Log*
Linux	*~/.MetranConfiguration/Log*

54 Learning Tips

To learn Metran-Configuration Software, you need to have PC skills and study the following:

- This User Manual
- Operation Manual for a connected field device

55 Feedback

You may send all requests and emergency messages to Customer Support of Metran IG, JSC at *service@metran.ru* or call After-sales Support *8-800-200-16-55* (Mon-Fri from 6:00 to 16:00 Moscow time, except for national holidays)

When contacting Customer Support with information about an error in the application, it is important to fill out the form https://metran.ru/service/Factory-service/ and attach files with the following information:

- A snapshot of the application window, not just the error message itself
- Logs of software operation (clause 6.3) from the computer the application was launched at.

56 Revision History

Revision	Changes
1.1	Changed clauses 3.9, 4, 4.2. Added clauses 3.9.20, 4.2.6, 4.5. Changed Fig. 89, 91.
1.2	Changed clause 3.9.15. Changed clauses 3.9.6, 3.9.6.1, 3.9.11 – deleted references to *Reset* button. Changed clause 4.2 – changed button name from *Reset* to *Clear*. Deleted clause 3.9.6.3 – description of *Reset* button. Added Fig. 74, 76. Changed Fig. 18, 31, 32, 91, 93-96. Changed figure numbering starting from Fig. 74. Changed references to figures. Changed clause 5 – deleted the item about the loading error in Windows system that occurs when *Windows Defender Antivirus* is enabled.