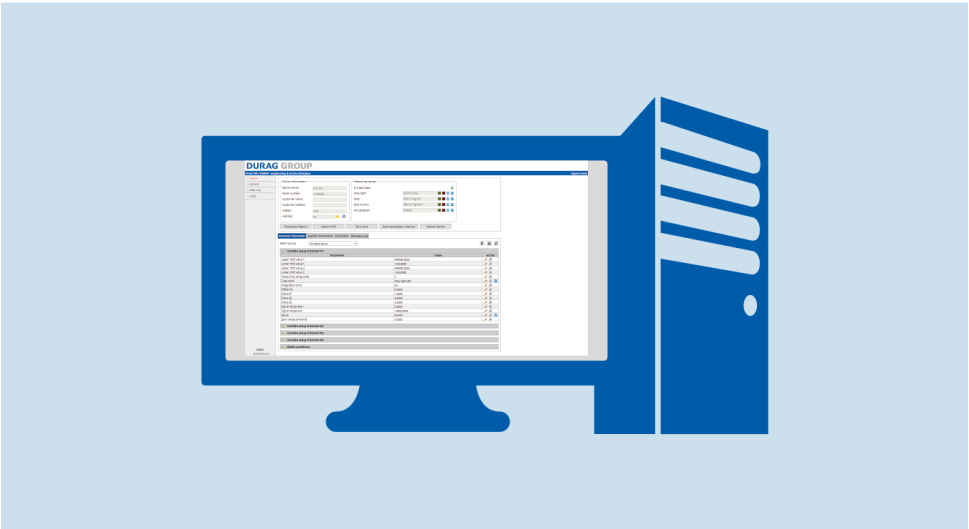
Software manual

DURAG

D-ESI 100 (Version 01.11)

DURAG Engineering and Service Interface



Before starting any work please read the operating manual!

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DURAG

Software manual DURAG Engineering and Service Interface D-ESI 100 (Version 01.11)

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1 General information

1.1 Information about this manual

This manual provides a general overview of operation of the software. Specific, device-dependent functions are described in detail in the operating instructions for each of the devices. This manual should therefore always be used together with the other relevant operating instructions.

1.2 Customer Service

If you require support or further technical information, DURAG Service is at your disposal. For contacts and manufacturer addresses, visit **www.durag.com**.

Our employees are also always interested in hearing about your experience with the use of our products. Your experience provides us with important information for the further development and improvement of our products.

1.3 Limitation of liability

A condition for the use of the D-ESI 100 software is acceptance of the end user license agreement, which governs the rights and obligations of the contracting parties and sets out liability limitations.
The valid and binding version of the contract is displayed when the program is installed. Please read it carefully. Installation on a computer is allowed only after acceptance of the binding contract.

1.4 Scope of delivery

The D-ESI 100 SET consists of:

- One licence for one workplace
- The software on a USB memory stick
- A USB cable (type A to Mini B).

You can find further details on the delivery note.

2 Product description

D-ESI 100 is application software for parameter configuration, maintenance and management of DURAG sensor devices.

The software can be installed quickly and easily on a computer. Once connected to at least one device, the software can be used immediately.

For mobile use with a laptop, all you need is the USB cable included in delivery to quickly and easily access a single device, for example directly at the installation location.

Simultaneous access to multiple devices from a central control station is also possible. This eliminates the need to always carry out frequently recurring maintenance work on the device itself, which is particularly advantageous if access to the device is possible only under difficult conditions, for example if installed at a high-altitude location.

In addition, measuring values and the device status can be viewed at any time. The software can be used to define and execute automatic control cycles. All user settings can be saved, ensuring for example that connected devices are detected automatically.

If required, remote maintenance of the devices over TCP/IP-based networks is also possible.

2.1 User modes

Depending on requirements, the software can be used either in **Basic mode** or **Expert mode**. The main difference between the user modes is the availability of options and executable functions.

Basic mode is designed primarily for normal operation and maintenance work. The functions available in this mode are therefore limited to the minimum necessary for this work.

In Expert mode, all setting options and functions required for parameter configuration of DURAG devices are also available, for example for starting up a device.

Options / functions	Basic mode	Expert mode
Measuring values	x	x
Status and messages	x	x
Maintenance functions	x	x
Parameter configuration		x

The mode in use is represented graphically as follows:

Icon		

Additional information

To find out how to change the user mode, see section 5.1 Changing user data [▶ 14].

2.2 Data transfer

Connection types

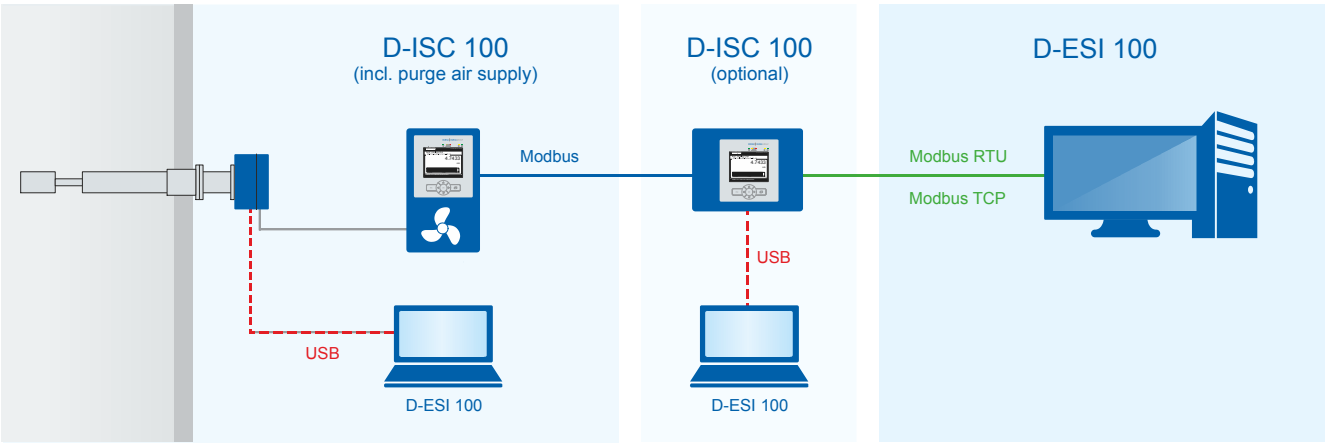
For the transfer of data between software and device, these three **connection types** are available:

- **USB**
- **Modbus RTU**
- **Modbus TCP**

USB is the default connection type. It can be used to establish a direct connection to a specific device. The USB cable required to do this connects the interface on the device with the one on the laptop.

Modbus is used for the administration of multiple devices from a central monitoring station. DURAG devices in a network can be addressed directly via their IP address or in a bus via their bus address.

The following figure shows an example of how data transfer can be performed.



Additional information

To find out how to change the connection type, see section 5.1 Changing user data [▶ 14].

3 System requirements

Minimum requirements:

- 1 GHz processor or faster
- 1 GB RAM
- 1 GB of free hard disk space
- Monitor resolution: 1024 x 768
- USB interface (from version 1.1)

Additional requirements:

- RS-485 interface (for Modbus RTU)
- Network connection (for Modbus TCP and remote access)

Compatible operating systems:

- Windows 7 SP1 Home Basic, Home Premium, Professional, Ultimate or Enterprise, (32-bit and 64-bit)
- Windows 8.1 Pro or Enterprise (32-bit and 64-bit)
- Windows 10 Home, Pro or Enterprise (32-bit and 64-bit).

4 First steps

4.1 Installation

Installation of the software requires:

✓ Administrator rights.

✓ Fulfilment of the system requirements.

- We recommend that you back up your data before installation.
- If you have any questions, please contact your system administrator.

☐ You have connected the USB memory stick containing the installation file to the PC.

1. Run the .exe file and follow the instructions in the installation wizard.
   Please note that for 64-bit systems, the default installation path should not be changed.
2. Complete the installation.

✓ D-ESI 100 is now available from the Start menu and via an icon on the desktop.

Software update

For a software update, proceed as described above. To ensure that no errors occur, please also note the following.

Before starting a software update, the application must be closed and should not be running.

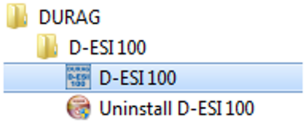
Unattended installation

If required, system administrators can integrate D-ESI 100 into a software distribution system with command line commands. The commands required can be displayed in the command line with "/?".

4.2 Program start

☐ You have installed the software and connected the PC to at least one DURAG sensor device.

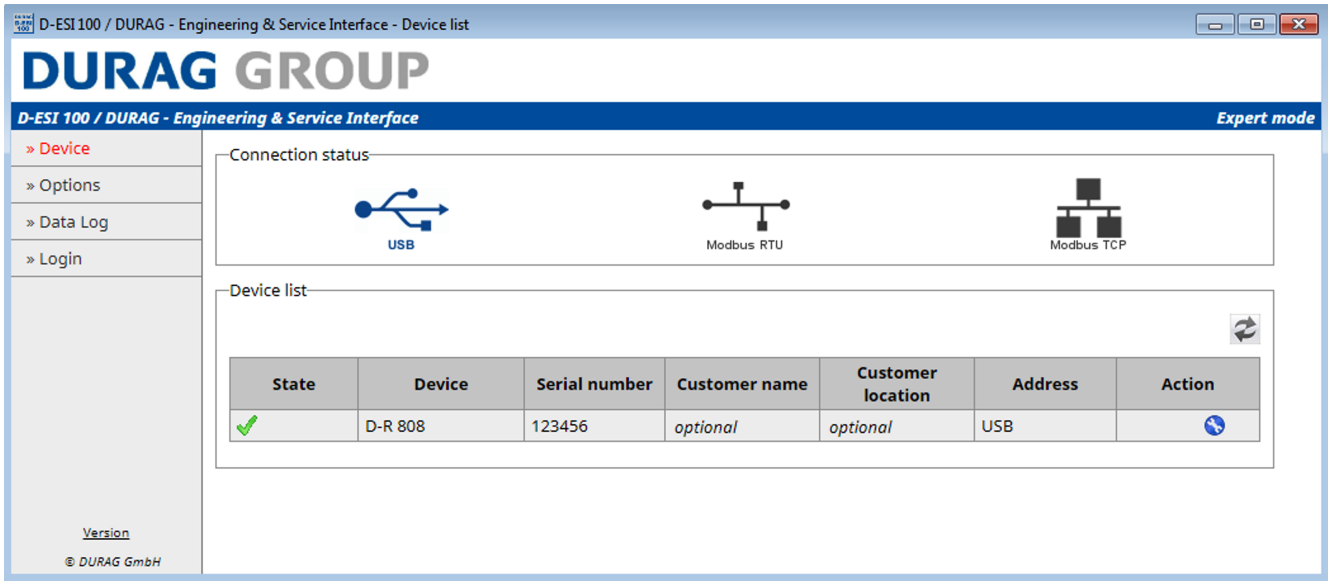
1. Start the software by clicking the desktop shortcut created by default.



Alternatively, you can access the software from the Windows Start menu. Navigate to the Start menu entry created during installation.

4.3 Home

After the software has been successfully installed and started, the page for the **Device** menu item opens by default.



Menu

The menu is located at the left of the window and is always visible. The active menu item is highlighted in red.

Menu item	Contents
Device	Connection status and device list with access to device details and parameters
Options	Software configuration
Data log	Download area for measuring value records
Login	Login to locked devices

Connection status

The **Connection status** area shows the three possible connection types. The active connection type is highlighted in blue.
To find out how to change the connection type, see the relevant paragraph in section 5.1 Changing user data [▶ 14].

Device list

The **Device list** is displayed below the connection status. It shows all devices that have been connected to the software and have already been detected by it.
To find out how to add new devices to your device list, see “Add devices” in section 6.1 Device list [▶ 18].

Version information

Pop-up information about the D-ESI 100 version used is available below the menu.

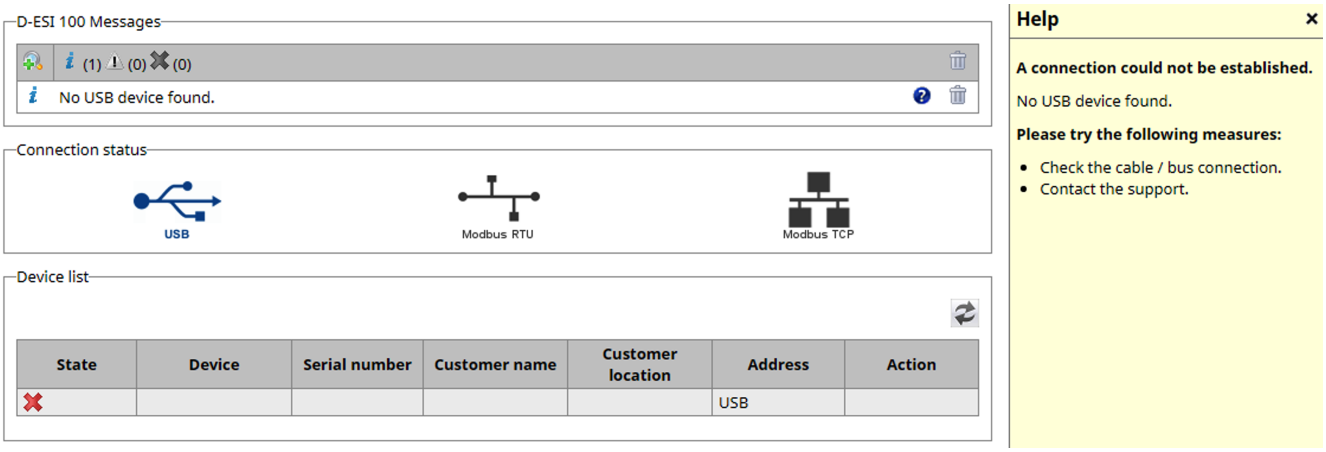
User mode

The active user mode is displayed on the upper right of the window in the blue bar.

D-ESI 100 Messages

The **D-ESI 100 Messages** area is displayed only when the software outputs a message (**information**, **warning** or **error**).
D-ESI messages are displayed either in the upper part of the active window or for example in a dialogue.

The icon indicates that additional information and help are available for a message. Clicking the icon shows this information at the right of the window.



Individual messages or the whole area can be permanently deleted by clicking the icon . D-ESI 100 messages are not saved.

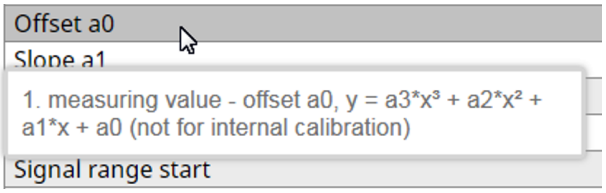
4.4 Operation

Input devices

To operate the application, a mouse or equivalent input device is required. Actions are executed with single clicks (left mouse button), which open menus, start functions, open help texts etc. Text and numeric values are entered with the PC keyboard.

Pop-up information

The application provides support with numerous help texts and explanations, which are displayed as pop-up texts when you hover the mouse pointer over icons, buttons and parameters.



Changing parameters

As a rule, parameters whose values can be edited are marked in the **Action** column with this icon .

To change them, click either on the icon shown above or directly on the associated **Value**. A blue frame indicates that write mode is active. Confirmed your input with the Enter key.

Variable setup (Channel #1)		
Parameter	**Value**	**Action**
Upper limit value 1	999999.0000	

The units for the values are usually based on the set measuring variable. Otherwise, they are stored in the parameter or as pop-up information.

Selecting parameters

Some parameters are assigned fixed values, one or more of which can be selected from a list. These lists are also found in the **Action** column. You can open them by clicking the icon.

As a rule, list icons are blue (for example:) if at least one entry is active in the associated list. An entry is active when its check box is selected. The list icons are grey if none of the listed entries are selected.

State	Message
☒	Termination ON

In some cases, two or more values are also controlled by a check box. The information for the check box is then added to each of these values.

Message
2 Stop bits (active) else 1 Stop bit (inactive)

The check box for values with the information **Active** must therefore be selected (alternatively, the information can also be **On** or **1**).

It must not be selected for **Inactive** (or alternatively for **Off** or **0**).

Desired value	Information	Check box status
2 **stop bits**	**Active**	☒
1 **stop bit**	**Inactive**	☐

Each change is applied by clicking **Send**. Clicking **Close** closes the list without applying any changes.

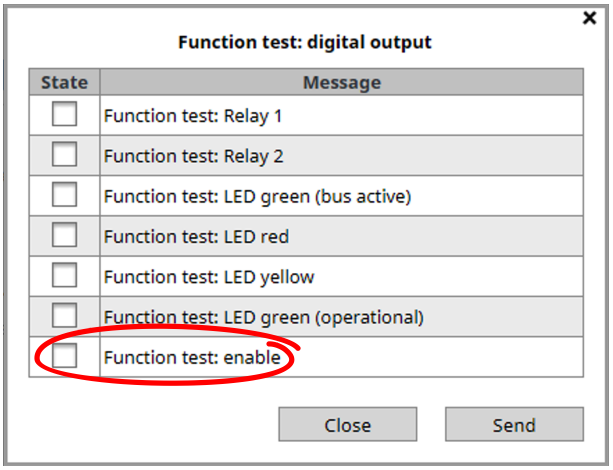
If you want to change parameters permanently, then the changed values must also be stored in the devices.
To do this, click **Save parameters** (see section 6.2 Device details [▶ 21]).

Executing functions

Functions (for example maintenance or tests) are usually executed by clicking .

Some functions, such as **Function test: digital output** are executed using the lists described above.

Selection of the components to be tested and activation of the test are both done by selecting the relevant check boxes and then clicking **Send**.



After the test, all entries must be deactivated.

Updating display values (manual / automatic)

Many values, particularly measuring values, are constantly changing. To ensure that the current measuring value is displayed in the software, the display must be refreshed. In most cases, this can be done automatically. The colour of the buttons indicates which mode is active:

Manual refresh

Automatic refresh

Activate or deactivate automatic refresh by clicking the icon and holding the mouse button down until the colour changes.

next to a value indicates that it is being refreshed.

Magnifying glass icon in lists

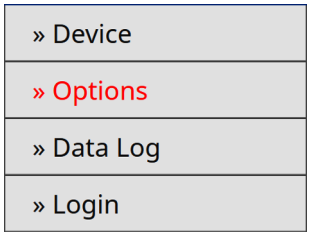
For list entries, you can click the following icons to:

Hide

Show

5 Configuring the software

5.1 Changing user data



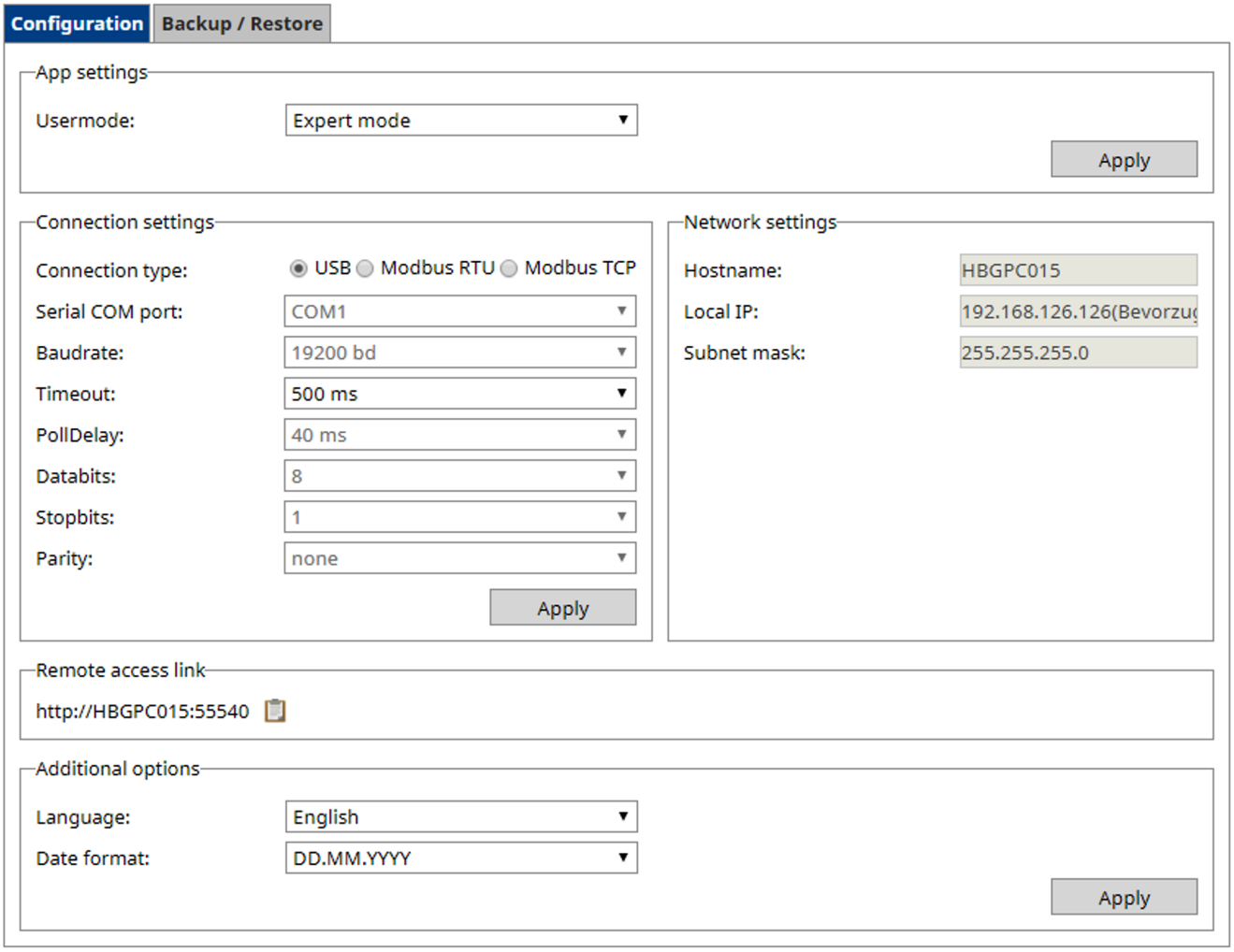
You can use the **Options** menu to make the settings required for your software. It is also possible to save these settings.

On the **Configuration** page, you can change the settings for the following options as required:

- **User mode**
- **Connection type** and, if required, advanced **Connection settings**
- **Language**
- **Date format**

Here you can also find all information required for remote access:

- **Network settings**
- **Remote access link**



Changing the connection type

1. In the **Connection settings** area, select the **Connection type** you require.
2. Click **Apply** to save your selection.

✓ The connection type has been changed.

✓ Depending on the connection type selected, some or all of the following connection settings are active.

Name	Description	Availability		
		USB	Modbus RTU	Modbus TCP
Serial COM port	Selects the serial port on the PC		x	
Baud rate	Speed of data communication to the connected devices		x	
Timeout	Defines the maximum duration for a query. If exceeded, a message is generated.	x	x	x
Poll delay	Delay between two communication cycles		x	x
Data bits	Number of bits used to represent a data character (transfer protocol)		x	
Stop bits	Used for synchronisation of sender and receiver (transfer protocol)		x	
Parity	Determines even or odd supplementary bit in a bit sequence. Can also be deactivated (transfer protocol).		x	

Changing connection settings

1. In the **Connection settings** area, open the drop-down menu for the variable to be changed.
2. Select the value you require.
3. Click **Apply** to save your selection.
4. Make sure that the connection settings in the device are correct, see section 6.4 Modbus RTU settings [▶ 25].

To ensure continuous data communication, the factory-set values for the advanced connection settings should not be changed.

If you change the values, please note the following:

- All devices in the bus must be set to the same baud rate.
- The values for data bits, stop bits and parity must be the same in the software and device.

Changing the user mode

1. In the **App settings** area, select the **User mode** you require from the drop-down menu.
2. Click **Apply** to save your selection.

Setting the language and date format

1. In the **Additional options** area, select the **Language** and/or **Date format** you require from the drop-down menus.
2. Click **Apply** to save your selection.

Using the remote access link

1. If you want to copy the **Remote access link** to the clipboard, click .
2. If necessary, enable the TCP ports required for remote access. You can find these in the following note.

Security measures for remote access

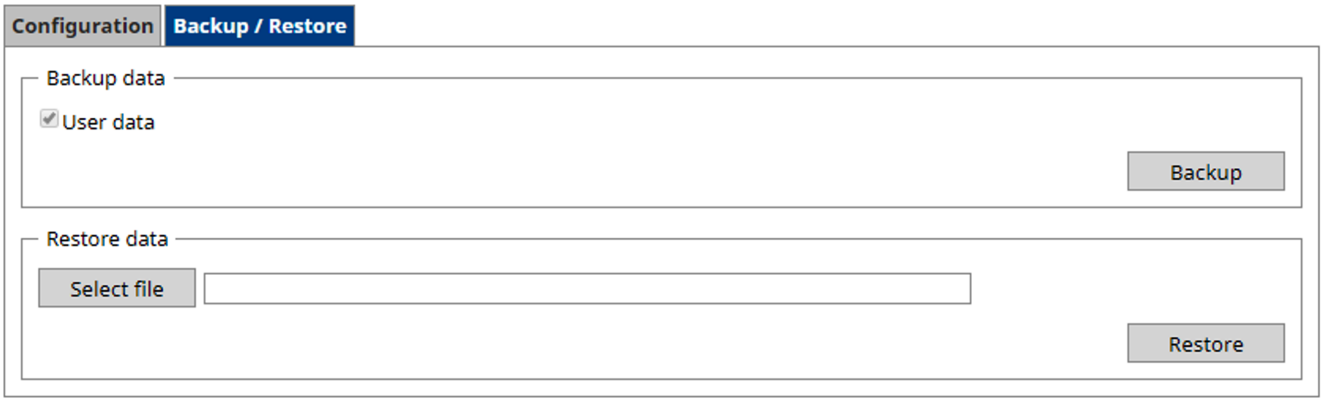
If you operate the D-ESI 100 on your system in a network that is not secure or a public network, you should take appropriate measures to protect it, for example with a firewall or VPN network.

The TCP ports to block are 55540, 56540 and 57540.

5.2 Backing up and restoring user data

You can save your D-ESI 100 settings on a PC and load them from the PC if required.

In the **Options** menu, open the **Backup / Restore** tab.



Backing up data

1. In the **Backup data** area, click **Backup**.

✓ A .db file is stored in the download folder on the PC.

The name of this file is generated automatically.

Restoring data

☐ The .db file required to restore your data is on your PC.

1. In the **Restore data** area, click **Select file**.

   ✓ A browser window opens.
2. If necessary, navigate to the file location.

3. Select the file to be imported and confirm your selection.
   ✓ The file is now displayed in the **Restore data** area.
4. Check your selection.
5. Click **Restore**.

✓ The current data has been replaced.

Restoring user data overwrites the current data in the target system.

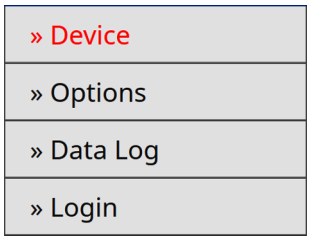
Additional information

To find out how to save or load device parameters, see section 6.3.1 Importing / exporting device parameters [▶ 22].

6 Configuring the devices

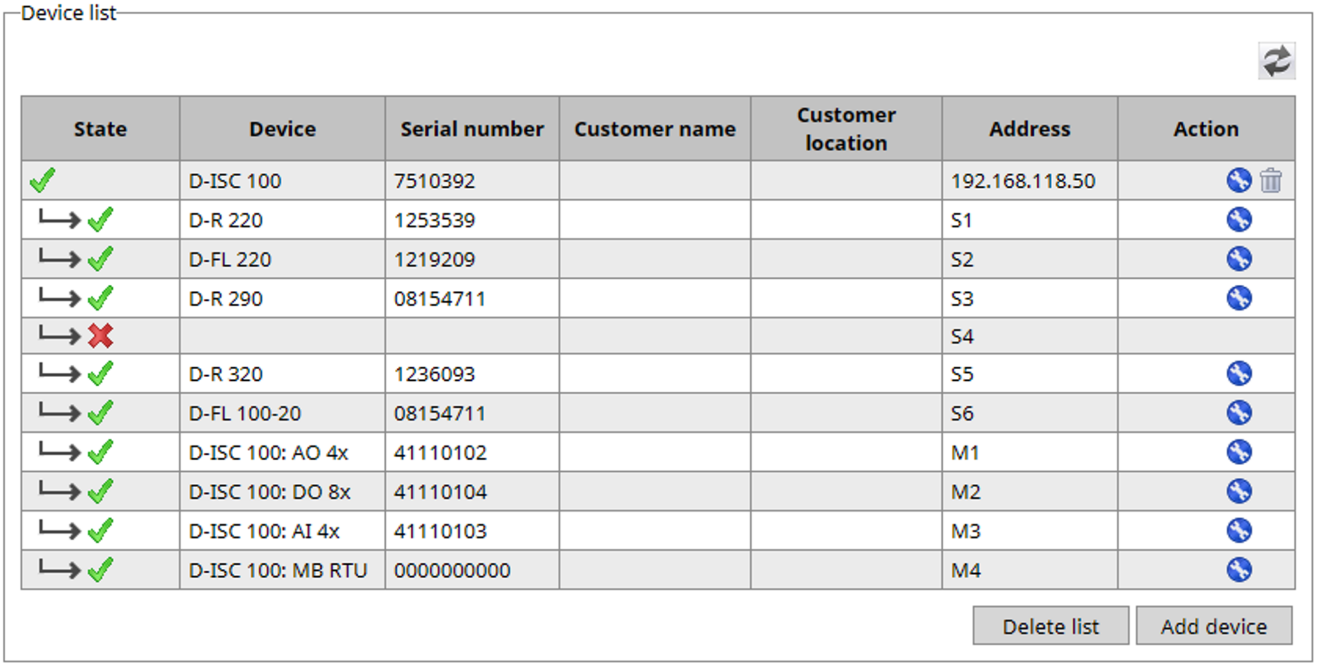
Before the parameters for a device can be configured with the software, it must be added to the **Device list**. Once a device is listed, you can view its **device details** and configure all parameters as required.

6.1 Device list



In the **Device** menu, the start page with the **Device list** opens. A device connected via USB is usually detected automatically by the software and displayed in the device list.

Devices connected via Modbus must be registered once. This is done with the **Add device** button. You can use the **Delete list** button to empty the list if required. To remove individual devices from the list, click .



Connection status

Status	Description
✓	The device is online.
✗	The device is offline or a communication error is displayed. Consult the help for the D-ESI 100 messages if available.
?	The device is unknown. Please note the information below.
→	The device is connected indirectly (for example via upstream D-ISC 100).

Unknown devices

If a device is not detected or is displayed as **Unknown** in the device list, it may be a third-party device or a new DURAG sensor device that is not yet included in the installed D-ESI 100 version.

We therefore recommend switching to the latest D-ESI 100 version when you purchase new devices. The devices should then be detected properly.

D-ESI 100 is designed only for use with DURAG devices.

Write access to third-party devices may cause serious damage to these devices.

Adding devices

New devices or new TCP/IP servers (for example D-ISC 100 with activated TCP/IP module) that are connected via Modbus must be added to the device list. Their parameters can then be configured with the software.

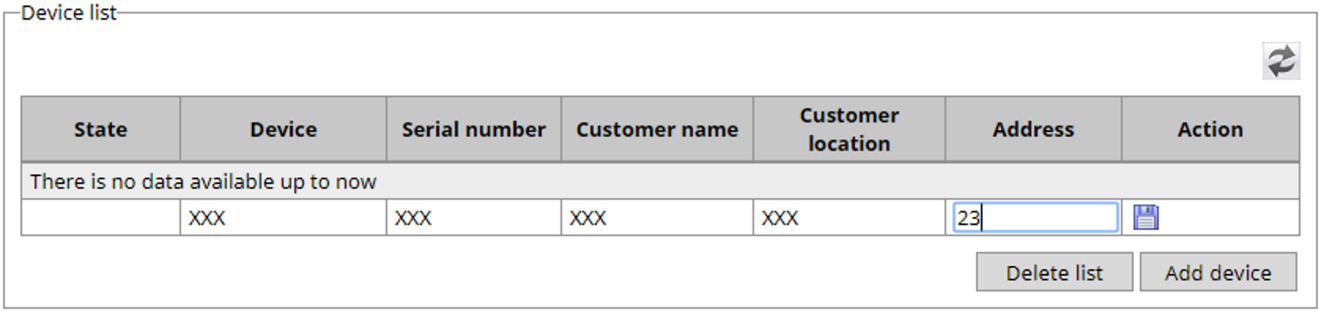
There are two ways to add devices to the list.

If the bus address / IP address is known:

- ☐ The **Connection type** is set to **Modbus RTU** or **Modbus TCP**.

1. Click **Add device** below the device list.
   - ✓ A new line is generated at the end of the list.
2. In the **Address** cell, enter the bus address or IP address for the new device or a TCP/IP server.
3. Click .

- ✓ The new device is displayed in the list.



If the bus address is not known (Modbus RTU only):

- ☐ The **Connection type** is set to **Modbus RTU**.

1. In the **Modbus RTU** area, click **Bus scan**.
   - ✓ A progress bar is displayed. During the scan, the device name and serial number are read from the device and the corresponding bus address is determined.
   - ✓ The device list updates automatically when the bus address has been determined.
2. When devices have been determined on the bus, click **Stop**.

- ✓ The search stops.

Other possible actions:

Clicking **Bus scan** resumes the search.

Clicking **Reset** restarts the search at 1.

Deleting a device

Clicking  for a device in the **Action** column deletes the device from the list.

Assigning customer-specific information

Each device can be assigned a **Customer name** and **Customer location**.

1. Click in the relevant cell and enter the information you require.
2. Confirm with the Enter key.
3. Click  .

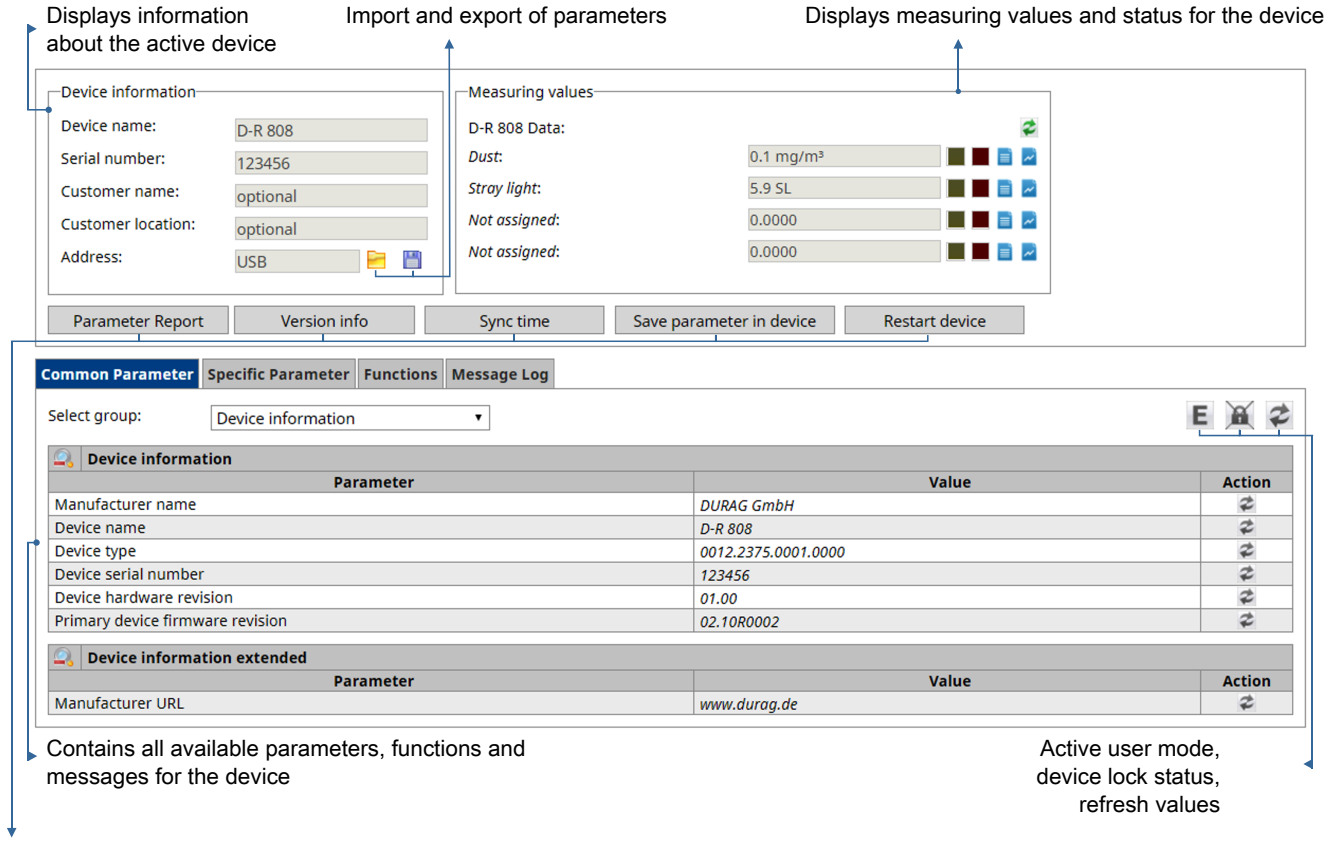
Accessing device details and parameters

Clicking  in the **Action** column opens the device details page with the parameters for the device.

6.2 Device details

Overview

In the **Device list**, click for the device required to display its **Device details**.



Function of the buttons

Name	Function
Parameter Report	Generates a PDF file with the current parameters for the device. The last page of the report contains the current version information for the software and device.
Version info	Opens a pop-up window with this device information: - General and specific protocol revision of the device description and devices - Device name
Sync time	Synchronises the system time for the current device with the time on the PC used. Prevents diverging time information in measuring value records and protocols.
Save parameter in device	Transfers changes to the device memory on an ongoing basis. Each save generates a message that must be confirmed.
Restart device	Forces a device restart and discards all changes that have not been transferred to device memory on an ongoing basis.

6.3 Device parameters

You can access the parameters for a device on the device details page via the two tabs **Common Parameter** and **Specific Parameter**.

The parameters are combined into groups which can be displayed from a drop-down menu. Depending on the number of parameters, they are also further subdivided into subgroups.

Common Parameter

Common Parameter include all parameters that are usually identical for each DURAG device. However, depending on the device and user mode, some parameters or parameter groups may not be available.

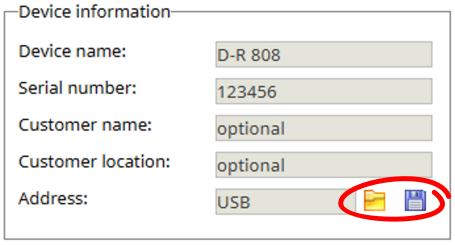
Common Parameter usually include these groups:

- **Device information**
- **Bus information**
- **Variable output**
- **Variable setup**
- **Current output and relays setup**
- **Maintenance setup**
- **Messages**

Specific parameters

These parameters are device-specific and therefore vary widely. Here you will find for example parameters for the installation and calibration of the device.
You can find detailed information on the specific parameters in the operating instruction for specific devices. To find out how to adjust specific parameters, see section 4.4 Operation [▶ 11].

6.3.1 Importing / exporting device parameters



The parameters for a device can not only be stored in the device itself, but also as an export file on a PC, which can also be read back into the device or another device of the same type using the software.

The buttons for exporting and importing device parameters can be found in the **Device information** area on the device details page for each device.

When exporting, all parameters for a device are always saved. When importing, you can group, compare and select the parameters. Parameters can be imported in full or individually.

Exporting parameters

- ☐ The device details page for the device required is displayed.
- ☐ All current parameters are stored in the device.

1. In the **Device information** area, click .
✓ A parameter file (*.par) is generated and saved automatically in the download folder on the PC.

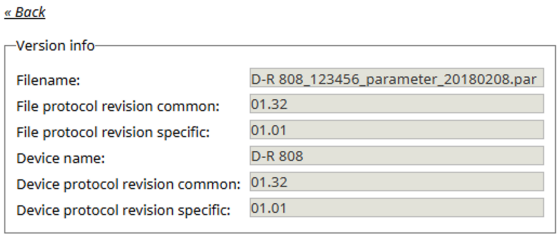
Importing parameters

Displaying import parameters

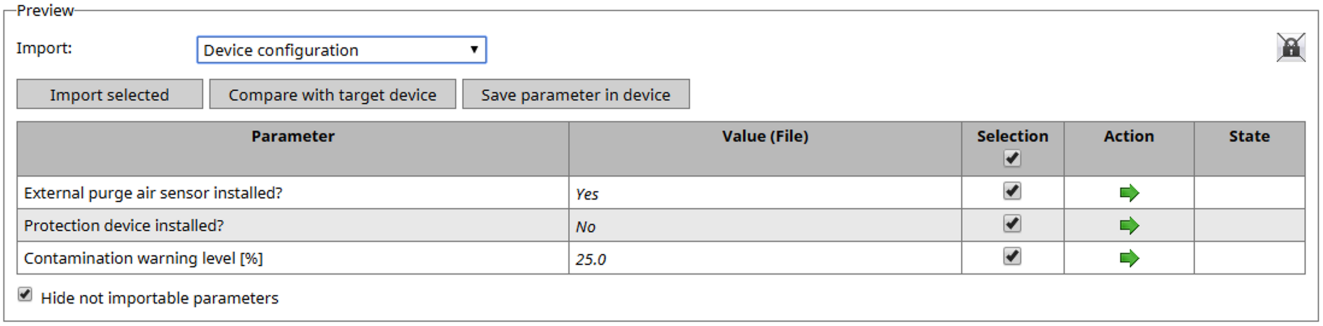
☐ The device details page for the device required is displayed.

1. In the **Device information** area, click .
   ✓ The “Open File” browser window opens.
2. Navigate to the location where the parameter file (*.par) is stored.
3. Select the file you require and confirm your selection.

✓ The **Version info** area is displayed.



✓ Below it, the preview list with all importable parameters appears.



If you uncheck the check box **Hide not importable parameters**, parameters that for example can only be factory set are also displayed. These are marked in the **Action** column with this icon: .

Grouping parameters

All parameters are always displayed in the preview list. They can be filtered by group using the drop-down menu.

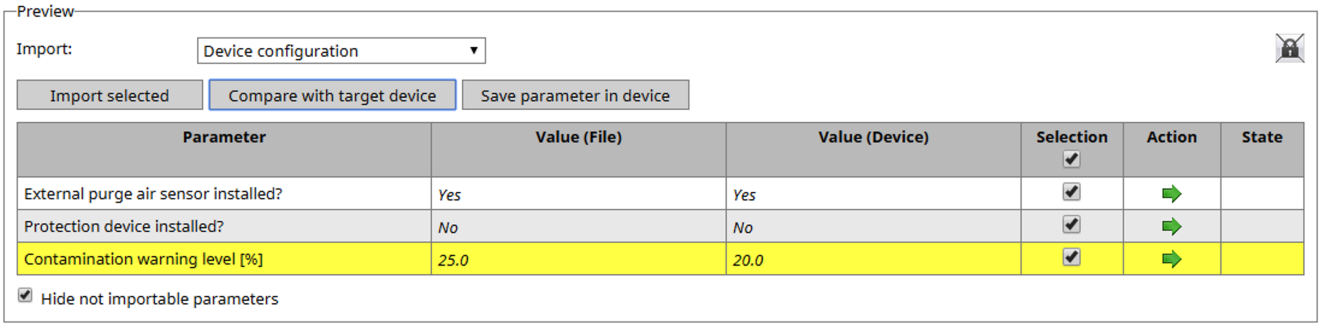
Comparing parameters (file vs. device)

You can compare the current parameters with the parameters to be imported. Differences are highlighted in colour.

☐ The import parameters have been loaded and are displayed.

☐ You have set any filter you require.

1. Click **Compare with target device**.
✓ After the comparison, the **Value (Device)** column is displayed next to the **Value (File)** column. Diverging values for a parameter are highlighted in yellow.



Importing selected parameters

- ☐ The import parameters have been loaded and are displayed.
- ☐ You have run a parameter comparison if required.

1. In the **Selection** column, check the parameters you require or uncheck the parameters you do not require.
2. Click **Import selected**.

✓ The selected parameters have been transferred to the device and marked in the **State** column as follows: ✓.

Note: Alternatively, you can transfer individual parameters to the device by clicking ➡.

Importing all parameters

- ☐ The import parameters have been loaded and are displayed.
- ☐ You have run a parameter comparison if required.

1. Click **Import selected**.

✓ The selected parameters have been transferred to the device and marked in the **State** column as follows: ✓.

- ▸ Devices locked with a PIN code must be unlocked before the import, otherwise not all parameters can be imported (see 6.5 Locking / unlocking devices with a PIN code [▸ 26]).
- ▸ The existing data in the device is overwritten, but only temporarily. To apply it permanently, it must be saved after the import. Otherwise, a device restart will discard the imported data.
- ▸ The .par files are not intended for editing. They are used only for backup and for subsequent imports.

6.4 Modbus RTU settings

Modbus basics

Basic information about Modbus, including for example the Modbus Protocol Specification, is available at the website http://www.modbus.org/specs.php.

Before starting up a new device

All DURAG sensor devices in a product line are assigned the same factory-set address. If you want to integrate multiple devices of one type into the same process, the devices must be assigned a new, individual address. Otherwise, communication problems may occur.

We therefore recommend configuring new devices via a USB connection before starting them up.

Changing the device Modbus address

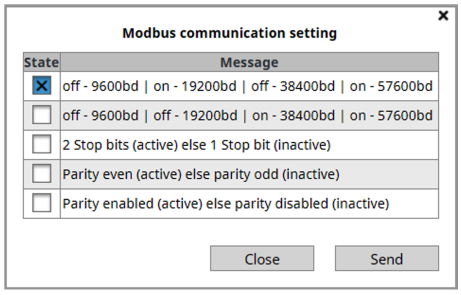
- ☐ You have opened the device details page for the required device.
- ☐ Under **Common Parameter**, you have selected the **Bus information** group.

1. Change the value for the parameter **Modbus address**.
2. Confirm your input with the Enter key.
3. Click **Save parameter in device**.

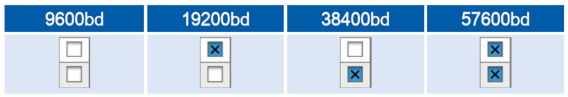
Setting the baud rate, stop bits and parity

- ☐ You have opened the device details page for the required device.
- ☐ Under **Common Parameter**, you have selected the **Bus information** group.

1. In the **Action** column for the **Modbus communication setting** parameter, click .
   ✓ The list of Modbus settings opens.



2. Set the required baud rate:



3. Set the stop bits and parity. To do this, select the check boxes if the required setting is followed by **active**.
   - or -
   Uncheck if followed by **inactive**.
4. Click **Send** to apply your selection.
5. Click **Save parameter in device**.

Switching Modbus termination on/off

- ☐ You have opened the device details page for the required device.
- ☐ Under **Common Parameter**, you have selected the **Bus information** group.

1. In the **Action** column for the **Modbus termination** parameter, click .
   ✓ The list opens.
2. Check the check box to switch on termination.
   - or-
   Uncheck to switch off termination.
3. Click **Send** to apply your selection.
4. Click **Save parameter in device**.

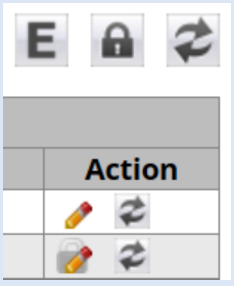
Changes in the **Bus information** group are applied only after a device restart.

6.5 Locking / unlocking devices with a PIN code

General information

DURAG sensor devices can be protected against unintentional changes to critical parameters with a **PIN code**. If protection is activated, these parameters can only be changed after entering the PIN code.

Both single and multiple devices can be protected with the same PIN code. The lock status is displayed for each individual device on the device details page.

PIN lock deactivated	Device locked with PIN code
	
→ All parameters can be changed	→ Only some parameters can be changed

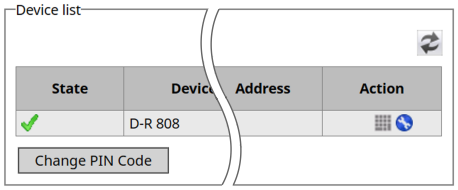
Factory setting

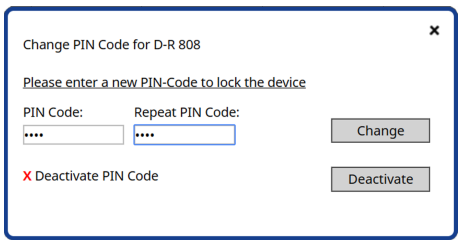
The device lock for DURAG sensor devices is deactivated as delivered. However, all devices are assigned the **PIN code** “0000” (four zeros).

This has no lock function, but it is required to set up a lock.

Login name:	User
PIN / password:	0000

Setting up a PIN code





- ☐ The device is not yet protected with a **PIN code**.

1. Click **Login** in the menu.
   - ✓ The login window opens.
2. Log in with the data specified under Factory setting.
   - ✓ The **Device list** is displayed and now includes buttons for setting the PIN code.
3. Click:
   the icon to lock the selected device
   - or -
   The **Change PIN code** button to lock all listed devices with the same PIN code.
   - ✓ The dialogue for setting up, changing and deactivating the PIN code is displayed.
4. Enter a four-digit PIN code (≠ 0000) and repeat the entry. In addition, make a note of your PIN code somewhere convenient.
5. Click **Change**.
   - ✓ The result is displayed in the lower part of the dialogue.
6. Close the dialogue by clicking ×.
7. Click **Logout** in the menu.

✓ The device is locked.

Logging into a protected device

- ☐ The device is protected with a **PIN code**.

1. Click **Login** in the menu.
   - ✓ The login window opens.
2. Log in:
   Login name: User
   PIN: Current PIN code for the device.

✓ The lock is unlocked and the icon indicates the new status:

	Login successful

If the login was unsuccessful after entering an invalid PIN code, proceed as follows:

	Log out and repeat the login with the correct PIN code.

Changing a PIN code

- ☐ The device is protected with a **PIN code**.
- ☐ You have logged in as described above.

1. Click **Device** in the menu.
2. In the **Device list**, click (one device) or **Change PIN code** (multiple devices).
3. Enter the new PIN code in the dialogue and repeat it.

4. Click **Change**.
   ✓ A change message appears in the lower part of the dialogue.
5. Close the dialogue by clicking ×.

After changing a PIN code, you must first log out of the affected devices and then log back in with the new PIN code before you can change their parameters.

Deactivating a PIN code

- ☐ The device is protected with a **PIN code**.
- ☐ You have logged in as described above.

1. Click **Device** in the menu.
2. In the **Device list**, click  (one device) or **Change PIN code** (multiple devices).
3. Click **Deactivate** in the dialogue.
   ✓ A change message appears in the lower part of the dialogue.
4. Close the dialogue by clicking ×.

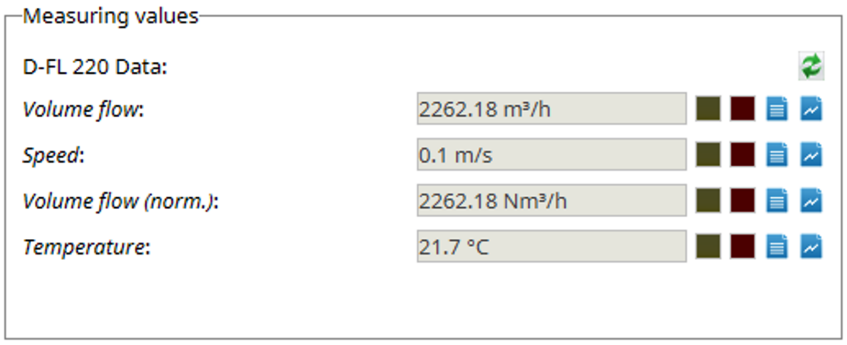
If you have forgotten a **PIN code** and need to have it reset, please contact **service@durag.com**.

7 Measuring values

Measuring values display

The measuring values for a device are displayed on its device details page in the **Measuring values** area.

For each available measuring channel, the measuring variable (if assigned) and the corresponding measuring value are output.



The measuring value display for a D-ISC 100 also has arrow keys (not shown here), which you can use to switch between the measuring channels for the downstream devices.

Alternatively, the measuring valuescan be viewed on the **Common Parameter** tab in the **Variable output** group.

Assigning a measuring variable

Depending on the device type, different measuring values can be output. Four channels per device are available for this purpose. Each of these channels can be assigned a measuring variable.

- ☐ You have selected the **Variable setup** group under **Common Parameter**.

1. Scroll to the **Type code** parameter for the required channel.
2. Open the associated code table by clicking the icon in the **Action** column.
   - ✓ The table opens and displays all measuring variables available for the device.
3. Select the variable and click **Send**.
4. Click **Save parameter in device**.

Prerequisite for output of normalised measuring values

If you want a device to output normalised measuring values, make sure that the data required is available in the **Media conditions** area. This area can be found in the **Variable setup** group on the **Common Parameter** tab.

The data can be entered manually or automatically (for example using a D-ISC 100 with activated software module).

Setting the signal range

- ☐ You have selected the **Variable setup** group under **Common Parameter**.

1. Scroll to **Variable setup (channel #x)** for the required channel.

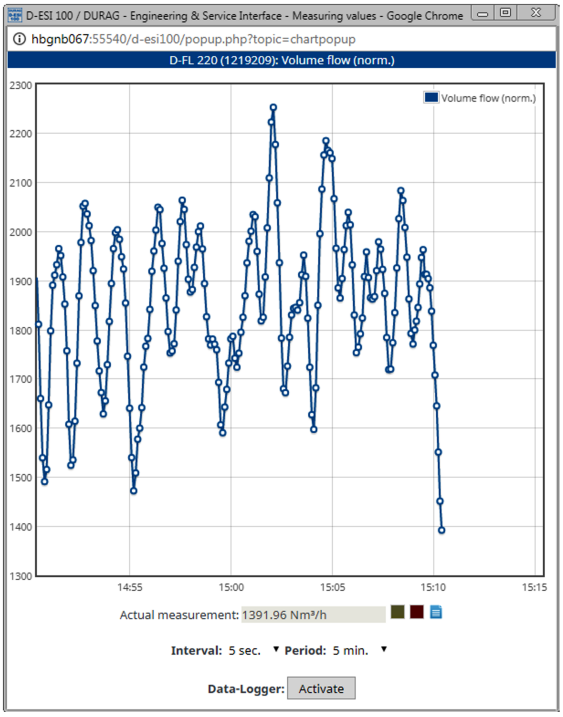
2. Assign the required values to the **Signal range start** and **Signal range end** parameters.
3. Click **Save parameter in device**.

Visualising measuring values

The measuring values for a measuring channel can be displayed as a graph and also recorded.

- ☐ The device details page for the device concerned is displayed.

1. In the **Measuring values** area, click next to the required measuring variable.
   - ✓ This window opens:



2. Adjust the **Interval** as required to change the interval between measurements.
3. Adjust the **Period** as required to change the intervals shown.
4. Close the window by clicking ×.

The graph display of measuring values does not meet any real-time requirements. High PC usage, a slow network or other similar factors can affect the display.

Recording measuring values

- ☐ The graph display for the required measuring value channel for the required device is open.
- ☐ The interval is defined.

1. Click **Activate** below the graph.
   ✓ The button caption has changed. A red dot next to the button indicates that recording is active:
   

2. To stop recording, click **Deactivate**.

✓ The recorded data is made available for download in the **Data log** menu item.

Exporting measuring values

All measuring values recorded with the data logger are stored in the **Data log** menu item. The entries are sorted chronologically. The most recent record is at the top of the table.

Data log table

Device	Serial number	Type	Interval in sec.	Date / Time	Count	Action
D-R220	1253539	Current output (0..20 mA)	5	31.01.2018 / 13:56:42	34	
D-R220	1253539	Dust	3	31.01.2018 / 13:50:33	155	
D-R220	1253539	Optical density	10	31.01.2018 / 13:50:16	59	
D-R220	1253539	Opacity	2	31.01.2018 / 13:49:57	204	
D-FL 220	1219209	Speed	5	31.01.2018 / 12:24:58	525	
D-FL 220	1219209	Temperature	5	31.01.2018 / 12:24:15	532	
D-R220	1253539	Dust	5	31.01.2018 / 12:22:56	547	
D-FL 220	1219209	Volume flow	5	31.01.2018 / 12:21:11	564	
D-R 808	13001	Dust	2	12.10.2017 / 15:08:59	2	

In the **Action** column, click:

- to save the selected record as an .xlsx file in the download folder on the PC
- to delete the selected record

The **Data log table** contains a maximum of 20 entries. If a greater number of records are created, the oldest records will be deleted.

All records older than 6 months are deleted automatically.

Outputting measuring values to current output (analogue output) / activating failure signalling

You can output a measuring channel to current output (analogue output).
If failure signalling is also activated, possible device or measuring channel failures are also output.

☐ Under **Common Parameter**, you have selected the **Current output and relays setup** group.

☐ The signal range is defined.

1. In the **Current output setup** area, set the **channel for current output**.
2. Define the **Failure value** to be output in the event of a failure.

3. In the **Action** column for the **Failure information setup** parameter, click .
   ✓ The selection list opens.
4. Activate failure value output. To do this, select the first entry in the list.
5. Also select the case in which you want to output the failure.
6. Click **Send**.
7. Click **Save parameter in device**.

✓ Failure signalling and measuring value output to current output are activated.

The procedure described applies to sensors in individual operation. If an upstream D-ISC 100 is in place, the settings for current output are made using the D-ISC 100.

Assigning limit values

For each channel, two upper and two lower limit values can be defined.

- ☐ You have assigned a measuring variable to the relevant channel.
- ☐ You have selected the **Variable setup** group under **Common Parameter**.

1. Scroll to **Variable setup (channel #x)** for the required channel.
2. Assign the required values to the **Upper limit value 1 / 2** and **Lower limit value 1 / 2** parameters.
3. Confirm your input with the Enter key.
4. Click **Save parameter in device**.

Monitoring measuring values / Outputting messages to relay contacts

You can configure the relays so that specific device messages trigger signals on your evaluation system, for example when limits are exceeded.

- ☐ You have selected the **Current output and relays setup** group under **Common Parameter**.
- ☐ If required, the relevant limit values have been assigned.

1. In the **Relay setup** area, assign the required messages to relay 1 and/or 2. To do this, execute the action **Display relay x setup**.
   ✓ A table with all available messages opens.
2. Select the required messages.
3. Click **Send**.
4. Define the relay logic for the activated relays. In the **Action** column for the **Relay logic** parameter, click .
   ✓ The selection list opens.

5. Check the check box for a relay to apply positive logic.
   - or -
   Uncheck to apply negative logic.
6. Click **Send**.
7. Click **Save parameter in device**.

Correcting measuring values

To correct measuring values, this formula is used:
$y = a3 \cdot x^3 + a2 \cdot x^2 + a1 \cdot x + a0$.

- ☐ You have selected the **Variable setup** group under **Common Parameter**.

1. Scroll to **Variable setup (channel #x)** for the required channel.
2. Assign the relevant values to the **Offset a0**, **Slope a1**, **Slope a2** and/or **Slope a3** parameters.
3. Confirm your input with the Enter key.
4. Click **Save parameter in device**.

No device calibration is carried out with the parameters for measuring value correction.

Calibration, if available, is carried out under **Specific Parameter**.

Zero range

An additional correction function for measuring values is adjustment of the zero range.

- ☐ You have selected the **Variable setup** group under **Common Parameter**.

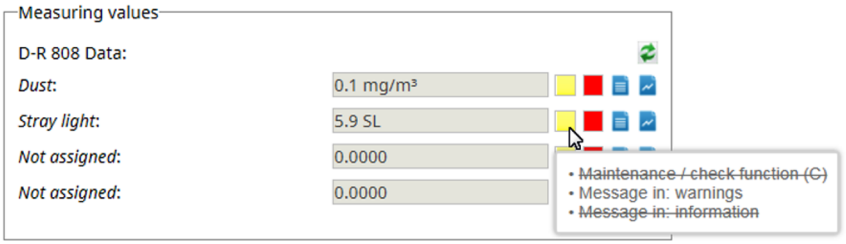
1. Scroll to **Variable setup (channel #x)** for the required channel.
2. Assign the required value to the **Zero range** parameter.
3. Confirm your input with the Enter key.
4. In the **Action** column for the **Setup** parameter, click .
   - ✓ The selection list opens.
5. Define whether the zero range should be positive active and/or negative active.
6. Click **Send**.
7. Click **Save parameter in device**.

8 Device status and error messages

Status display

The fastest way to view the status of a device in the software is in the **Measuring values** *area on the device details page.*

Certain status changes for devices switch on the yellow or red LED. The LEDs can be flashing or lit continuously. Their behaviour is based on the LEDs installed in the device. You can find a detailed description in the operating instructions for each device.



The full device status overview can be opened by clicking the icon **Show status**, which indicates all currently applicable statuses.

This overview is available at various places in the software, including for example in the **Variable output** group on the **Common Parameter** tab.

Identifying errors

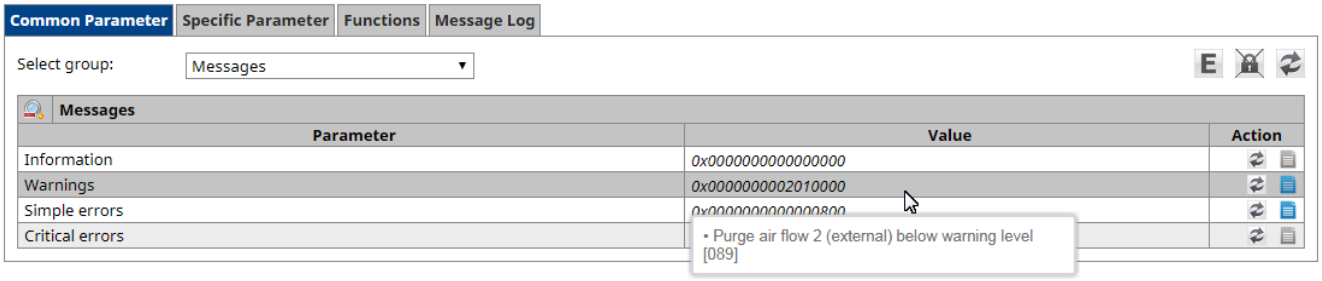
The pop-up above the activated LED indicates whether there are any messages. To determine whether any action is required, check the current messages.

These are available on the **Common Parameter** tab in the **Messages** group.

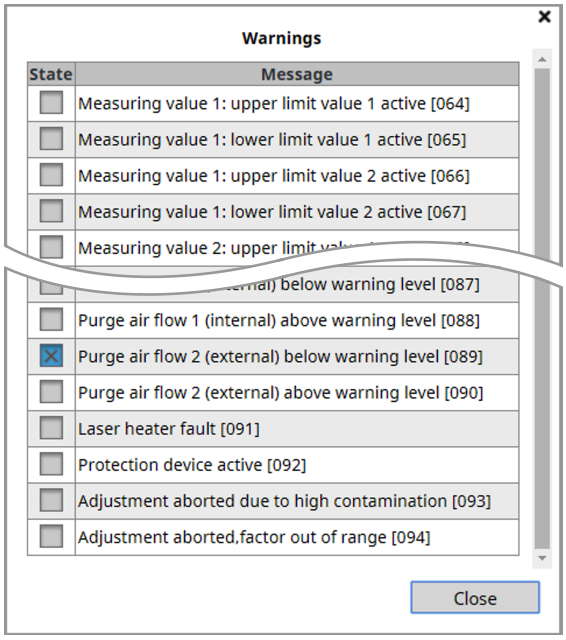
There are four types of messages:

Type of message	Description
Information	General information about the device (for example: parameter change saved).
Warnings	For example if upper or lower limit values are exceeded. As a rule, warnings have no effect on the measurement.
Simple errors	As a rule, these are errors that can occur during operation and prevent the measurement from being carried out correctly.
Critical errors	These are typically errors that prevent correct operation of the device.

You can display the current message directly as pop-up information on the **Value** cell.



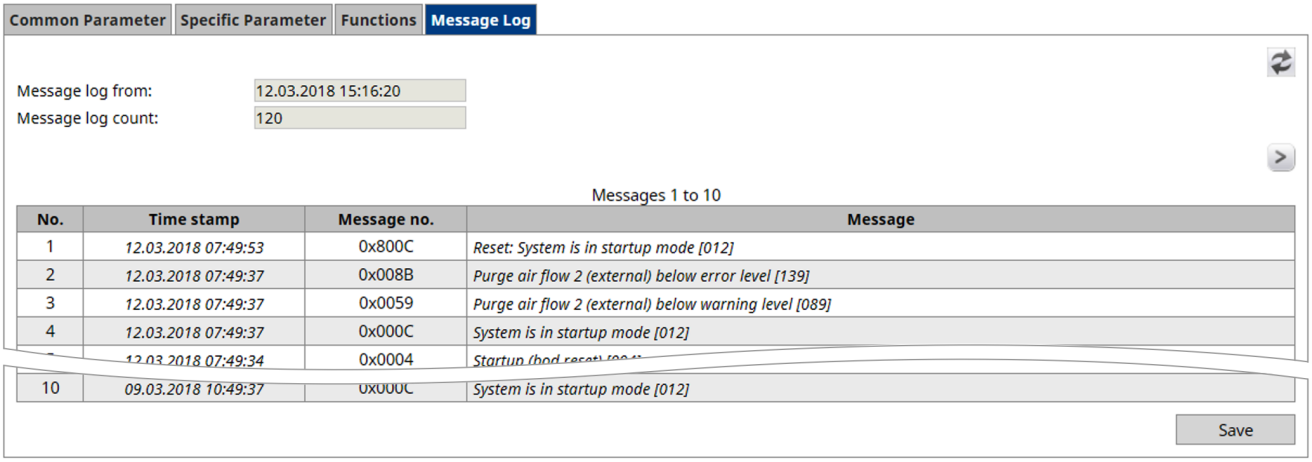
Alternatively, you can open the complete list of all messages by clicking the icon in the **Action** column, where the messages are marked.
The icons are blue if there are messages and grey if there are no messages.



Current messages are displayed in the **Messages** group. They are only available here for the duration of the reported status.

Viewing saved messages

In addition, messages are saved on the **Message log** tab. You can use the arrow keys to go to the next or previous page.



The contents of the message log can be saved as an .xlsx file.

1. Click **Save**.

✓ The file is stored in the download folder on the PC.

9 Maintenance

All maintenance functions available for a device, including for example a contamination check or reference point measurement are displayed in the software and can be executed with it.

The maintenance functions for a device are managed on the **Functions** tab in the **Maintenance functions** group.

Whenever a maintenance function or similar function is executed, the device is not in normal measuring mode. This is usually indicated by the yellow LED.

9.1 Maintenance functions

Maintenance functions can be executed manually or automatically. A prerequisite for starting a function is that the device is in normal measuring mode (**Device state**: **Normal measurement in progress**). If a function is already running, it must be stopped before another function can start.

Starting normal measurement / Stopping maintenance functions

Running maintenance functions can be stopped as required.

- ☐ You have opened the **Functions** tab on the device details page.
- ☐ In the **Maintenance functions** group, you have selected the **Maintenance** area.

1. Execute the function **Start normal measurement**. In the **Action** column, click ▶.

✓ The device returns to normal measuring mode.

Manual execution

All listed maintenance functions can be executed individually. They must be both started and stopped manually. This is done by clicking the icon ▶ in the **Action** column.

Each action automatically updates the **Device state** displayed in each of the areas.

In addition, the last value determined for each maintenance function is displayed in each area.

Contamination check

Parameter	Value	Action
Start contamination check		▶
Stop contamination check		▶
Device state	*Normal measurement in progress*	⟳
Contamination [%]	*7.3*	⟳

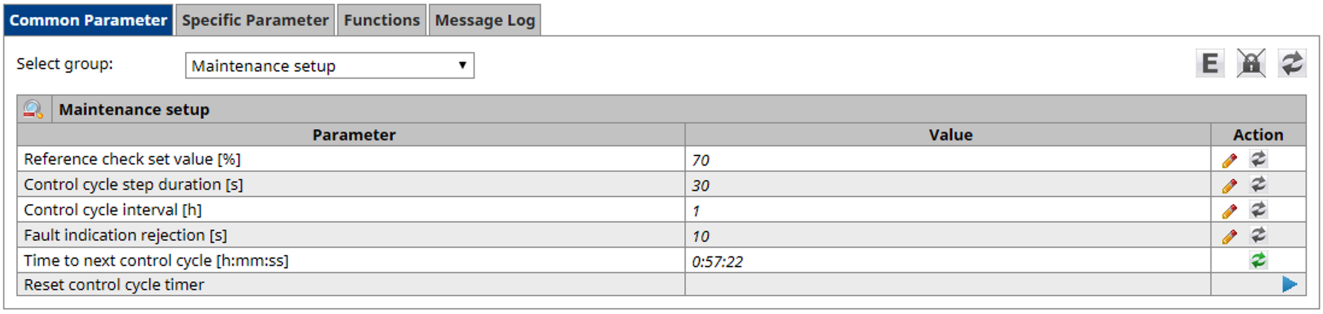
Automatic control cycle

You can execute functions automatically at defined intervals. This automatic control cycle feature must be activated as required.

- ☐ The device details page for the device concerned is displayed.
- ☐ On the **Common Parameter** tab, you have selected the **Maintenance setup** group.

1. For the **Control cycle interval [h]** parameter, select a value > 0 (0 = Automatic control cycle deactivated).
   - ✓ The time remaining until the next control cycle is displayed.
2. If required, change the **Control cycle step duration [s]** parameter.
3. Click **Save parameter in device**.

✓ The automatic control cycle is activated.



Details about the automatic control cycle and the control values can be viewed on the **Functions** tab in the **Maintenance functions** group.

Outputting control cycle values to a measuring channel

If you want to output the values determined in a control cycle to a measuring channel, the function must be activated.

- ☐ The device details page for the device concerned is displayed.
- ☐ On the **Common Parameter** tab, you have selected the **Variable setup** group.

1. In the **Action** column for the **Setup** parameter in the **Variable setup (channel #x)** area, click .
   - ✓ The selection list is displayed.
2. Check the check box for **Output of control cycle values** and click **Send**.
3. Click **Save parameter in device**.

✓ The control values are output and scaled in the signal range for the relevant channel.

Settings for the reference point measurement

The parameters for a reference point measurement can be defined on the **Common Parameter** tab.

The **Set value** is set in the **Maintenance setup** group.

If you want to output the control cycle values to a measuring channel, the **Signal range** must be set (see “Setting the signal range” in section 7 Measuring values [▶ 29]). The reference point value determined is output here and scaled.

9.2 Maintenance work

Maintenance requirements reported by the device are displayed in the software using the yellow LED in the **Measuring values** area on the device details page. In addition, **Maintenance requirement (M)** is marked in the device status.

The type of maintenance required can be viewed in the device details under **Common Parameter** in the **Messages** area.

Setting / removing the maintenance status

Before starting maintenance work, for example before cleaning, the device should be set to the maintenance status to indicate that the device is not ready for operation. This is then reset after maintenance.

- ☐ The device details page for the device to be maintained is displayed.
- ☐ You have selected the **Maintenance functions** group on the **Functions** tab.

1. In the **Maintenance** area, execute the **Set maintenance** action. In the **Action** column, click ▶.
   ✓ The device is in the maintenance status.
2. Carry out the maintenance work on the device.
3. After completing the maintenance work, select the **Maintenance functions** group on the **Functions** tab again.
4. In the **Maintenance** area, execute the **Reset maintenance** action. In the **Action** column, click ▶.

✓ The maintenance status has been removed. The device is ready for operation again.

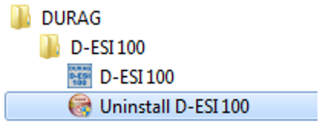
10 Tests and simulation functions

The tests, simulation and service functions available for a device can also be executed using the software.

You can access the required function on the **Functions** tab on the device details page.

Please note that you may have to activate some functions from a selection list and deactivate them again after the test or simulation.
For the action icons used to do this, see section 4.4 Operation [▶ 11].

11 Uninstalling



1. You can start the uninstall by default from the Windows Start menu. Navigate to the Start menu entry created during installation.
2. Click **Uninstall D-ESI 100** to start the process.
   ✓ The uninstall starts and a progress bar is displayed.
3. After completing the uninstall, exit the program with **Close**.

✓ The software has been removed from your computer.

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DURAG

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