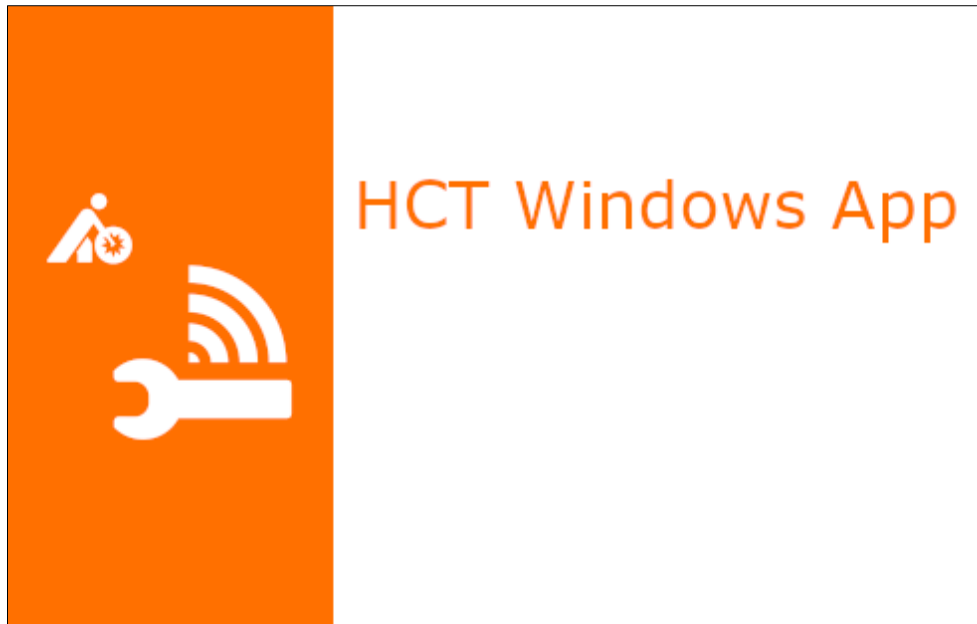


# HCT Windows App



## User Manual

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Change History:

Version	Date	Author	Changes
V0010	28.07.2022	M. Denzle	First published version

## 1 Identification data

Product: HCT Windows App  
Version: 0010 original user manual  
Creation Date: 07/2022

## 2 Safety instructions

Please read and follow these instructions to avoid hazards.

### 2.1 Target group

All activities described in this user manual may only be carried out by trained and qualified personnel authorized by the plant operator.

### 2.2 User Guide

Please read this user manual carefully before use to prevent failures in the handling of the software or the HCT dongle. This ensures safe handling. The user manual must be stored carefully and must be always available for the user.

### 2.3 Proper use

The HCT dongle must only be connected to a suitable free USB port of a PC with Windows operating system. After use, unplug the HCT dongle to prevent it from being left unattended. The HCT dongle must only be used in dry rooms and must be protected from heat, cold and wet conditions.

The HCT dongle is not suitable for children. The HCT dongle must never be operated and left unattended.

The HCT dongle may only be used for the use described in the user manual.

### 2.4 Accessories

The HCT dongle, item no. 498999, is required to operate the HCT Windows App. This dongle provides the Bluetooth wireless technology.

### 3 The HCT Windows App - An overview

The HCT Windows App allows you to connect your HCT tools to a computer system via Bluetooth and transfer the generated measurement data to it. In addition to the system requirements, your computer system only needs to have an available USB slot where you can plug in the HCT dongle.

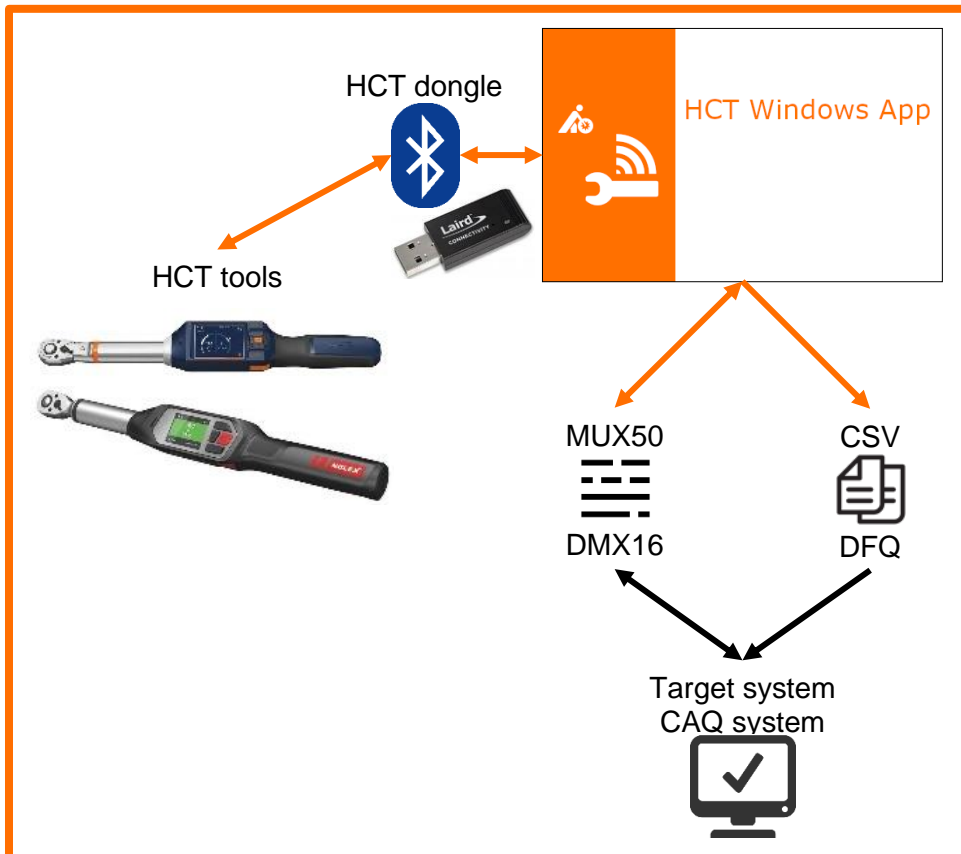
You can connect up to 16 HCT tools to the HCT Windows app. The measured values are displayed on the screen and saved in measurement protocols in CSV file format.

In addition, you can create and store measurement cases in the HCT Windows App and assign them to a suitable HCT tool whenever needed. Even if you are adding or replacing an HCT tool, the measurement cases already created are available for the new HCT tool.

You can use working plans to run recurring measuring case sequences and link them to workpiece IDs. You can support your staff through the sequences by integrating pictures, drawings etc. for each working step. This avoids errors and ensures complete and seamless documentation.

The HCT Windows App can of course transfer the measurement data directly to other systems, such as CAQ systems, or pass it on via files. For this purpose, the well-established and widely used data transmission protocols MUX50 and DMX16 are available. The HCT Windows App uses the CSV and DFQ format (also known as AQDEF) for file transfer.

### 3.1 System overview



### 3.2 System requirements

The computer system on which you want to install the HCT Windows App must have the following system requirements:

- PC with Windows 10 or later operating system installed, and .NET **Desktop** Runtime 5.0.17 for **x86** installed:

#### .NET Desktop Runtime 5.0.17

The .NET Desktop Runtime enables you to run existing Windows desktop applications. **This release includes the .NET Runtime; you don't need to install it separately.**

OS	Installers	Binaries
Windows	Arm64   x64   <b>x86</b>	

You will find this under the following link:

<https://dotnet.microsoft.com/en-us/download/dotnet/5.0>

- One available USB slot for the HCT dongle. Since the HCT dongle includes Bluetooth wireless technology, make sure that the HCT dongle is not shielded by sheet metal parts, cabinet walls, etc.
- You must have local administrator rights to install the HCT Windows App. These are no longer required to operate the HCT Windows App.

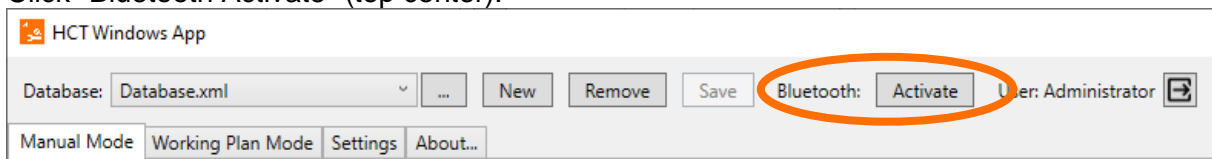
## 4 Quick Start

### 4.1 Installation

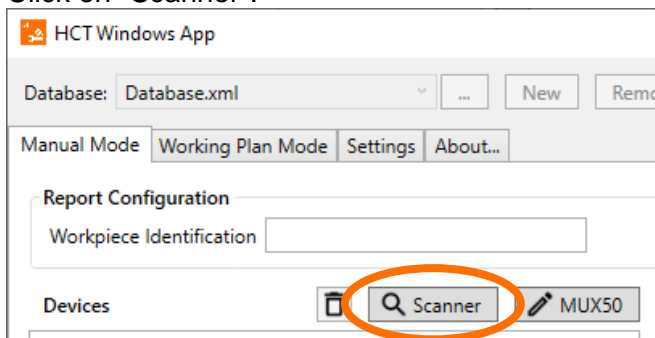
Plug the HCT dongle into an available USB slot on your computer.  
Do you have local administrator rights? If not, contact your system administrator.  
Download the installation package to your computer.  
Unzip the installation package.  
Double-click "HCT Windows App Setup vx.xx.msi" (x.xx = version number).  
Follow the installation instructions.

### 4.2 Start and connect HCT tools

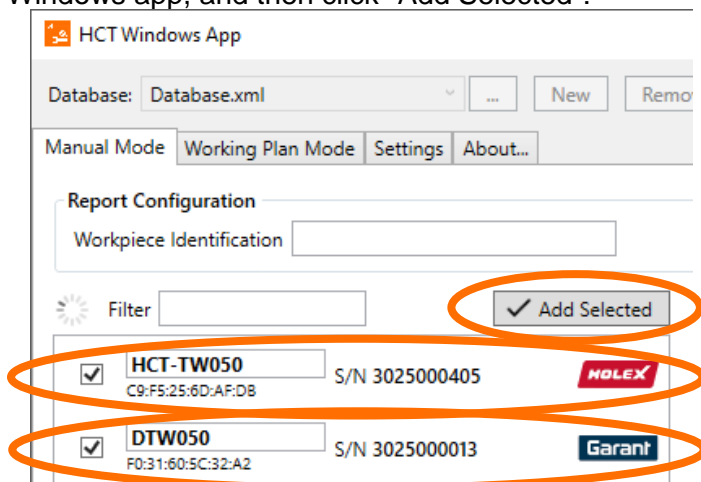
Launch the HCT Windows app as a local administrator.  
Click "Bluetooth Activate" (top center):



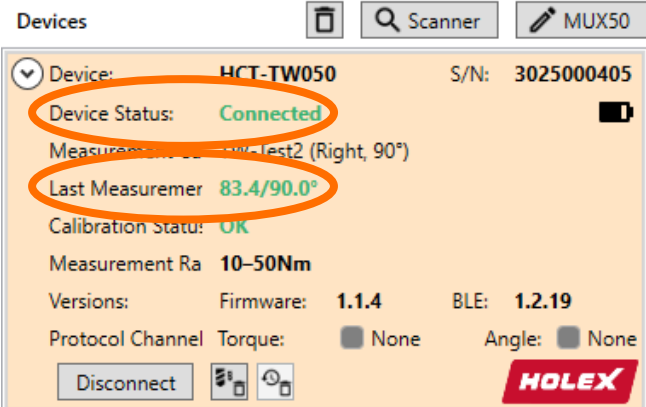
Turn on your HCT tools and make sure their Bluetooth wireless technology is turned on.  
Click on "Scanner":



The nearby HCT tools are now listed. Check the HCT tools you want to connect to the HCT Windows app, and then click "Add Selected":



Once your HCT tools are displayed as connected, you can transfer measurement values:



For more detailed information, see the detailed description of the HCT Windows App.

## 5 Installation

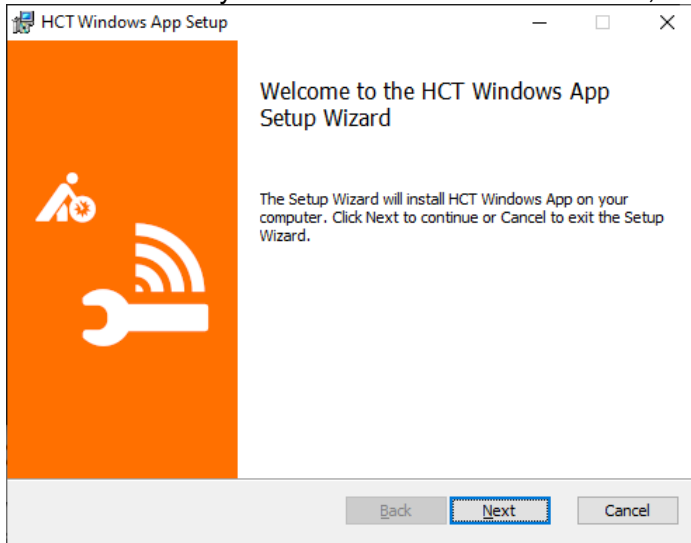
You must have local administrator rights to install the HCT Windows App. If you do not have them, please contact your system administrator.

Download the installation package onto the computer on which you want to install the HCT Windows App.

Unzip the installation package into a suitable folder (for example, "Downloads\HCT Windows App\").

Install the HCT Windows app by double-clicking the installation file "HCT Windows App Setup vx.xx.msi" (x.xx is the version number of the HCT Windows App) in the above folder.

The installation wizard starts and guides you through the installation. You can cancel the installation at any time with "Cancel". To continue, click "Next".



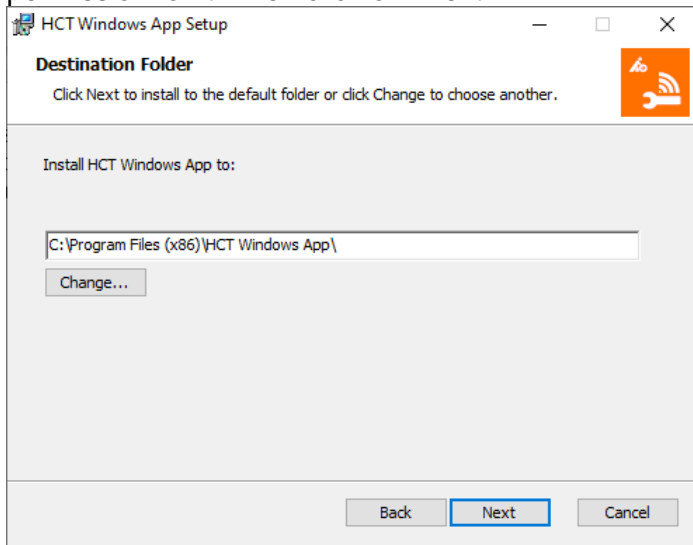
In the next step, select the language in which you want to read the Terms of Use. You can print the Terms of Use by clicking "Print" and following the instructions. To continue with the installation, you must accept the terms of use and tick the box before "I accept the terms in the License Agreement". Then click on "Next".



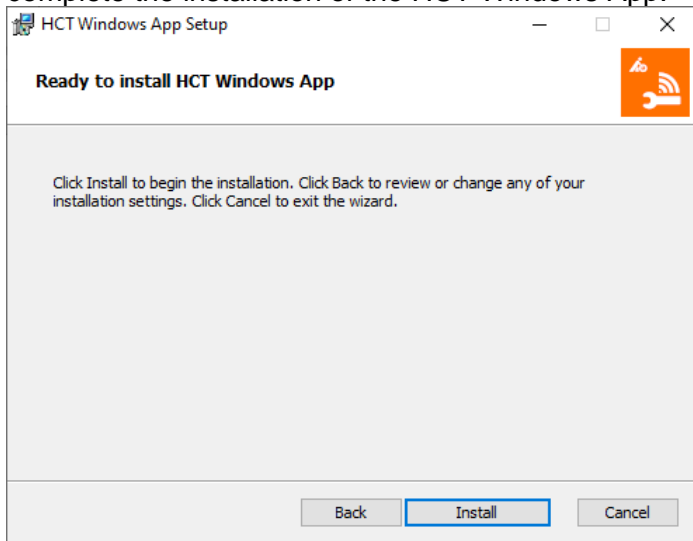


Hoffmann Supply Chain GmbH  
HCT Windows App

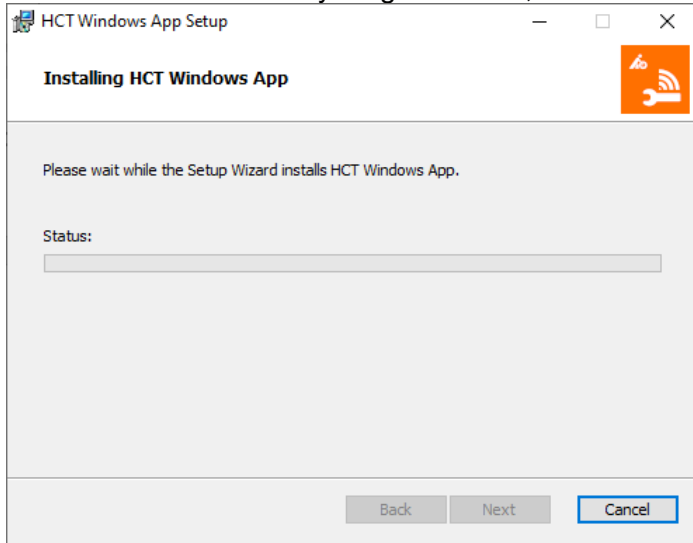
You will now be asked in which folder to install the HCT Windows App. If you want to use a folder other than the one proposed, make sure that the installation wizard has write permission for it. Then click on "Next".



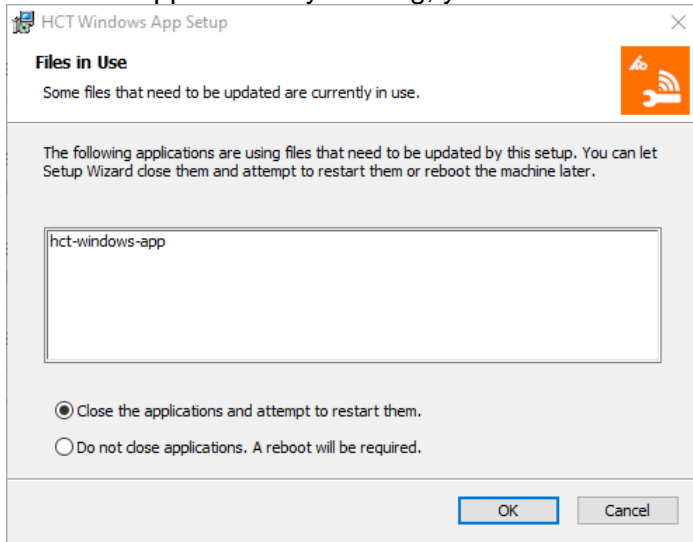
You have now completed all the settings and the installation wizard is ready. Click "Install" to complete the installation of the HCT Windows App.



You don't need to do anything else here, the installation wizard shows you the progress:

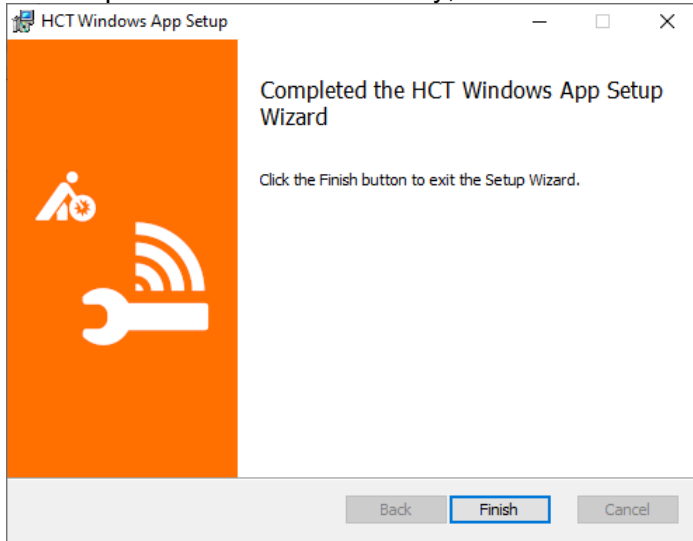


If you install a new version on the PC on which an installation already exists and the HCT Windows App is already running, you will receive the following message:



We recommend that you let the installation wizard close the running HCT Windows App and let the installation continue. Leave the selection to "Close the applications and attempt to restart them.". If you cannot close the HCT Windows App that is already running, select "Do not close applications. A reboot will be required." However, keep in mind that in this case a restart of the computer is required after the installation. Click "OK".

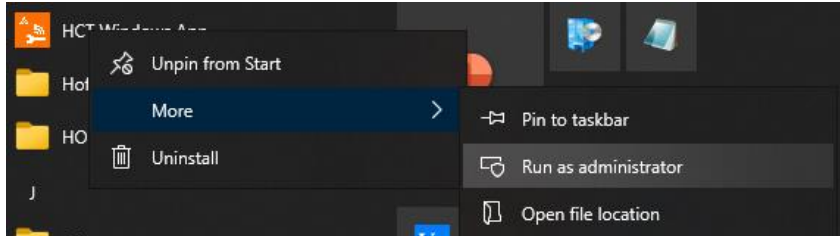
To complete the installation finally, click on "Finish":



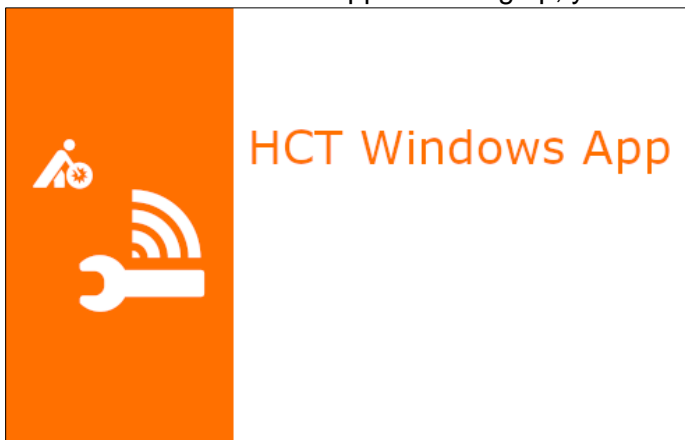
Plug the HCT dongle into an available USB slot on your computer. Note that the HCT dongle includes the Bluetooth wireless technology. Therefore, make sure that the dongle is not shielded by sheet metal parts, control cabinet walls or the like, as otherwise you will not be able to establish connections, or the range of the wireless connections will be severely restricted.

## 6 First launch of the HCT Windows App

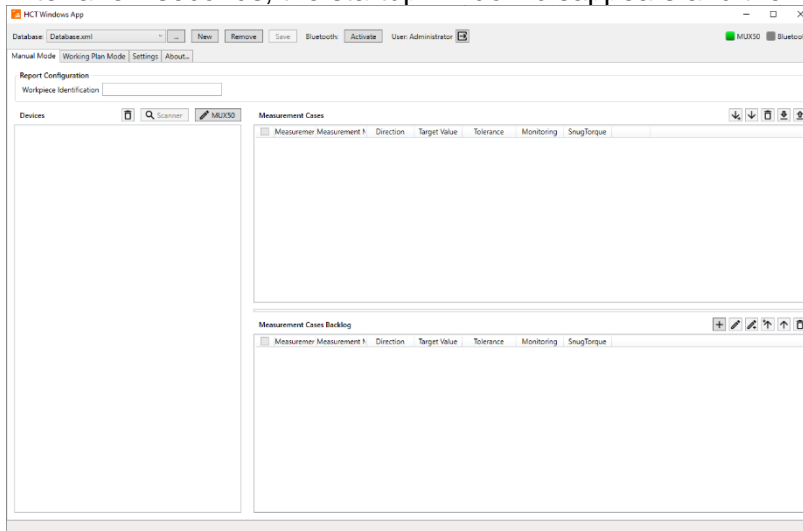
The first time you start, you must run the HCT Windows App as administrator. During installation, an entry is created in the start menu. To launch the HCT Windows app, click the Windows Start icon in the taskbar, and then right-click the HCT Windows App entry under H. Select "More" and "Run as administrator":



While the HCT Windows App is starting up, you will see the startup window:



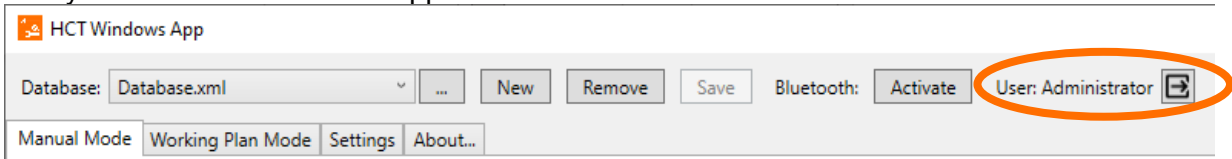
After a few seconds, the startup window disappears and the HCT Windows App opens:



## 6.1 Manage Users

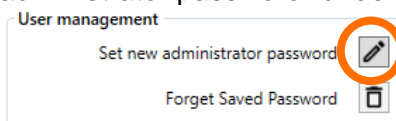
### 6.1.1 Set administrator password

Verify that the HCT Windows App has selected "Administrator" as the user:

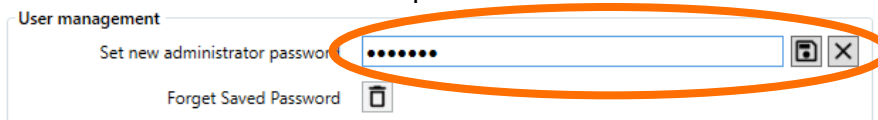


If not, click the icon to the right.

Now switch to the "Settings" tab and click on the edit icon to the right of "Set new administrator password" under "User management"



Enter your password in the text field that appears and save it by clicking on the disk icon. Use the "X" icon to cancel the operation:



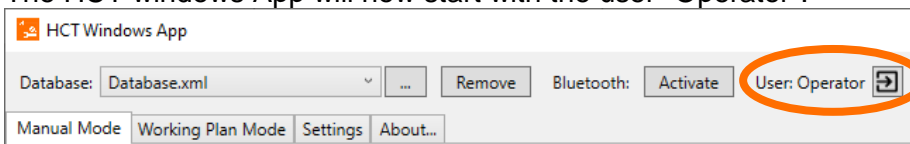
Please note that your settings are saved separately when running the HCT Windows App as an administrator. If you later launch the HCT Windows App without administrator rights on your PC, the settings are not applied, but are saved separately. However, the password you set as described above will remain valid.

You can now close the HCT Windows App.

To restart, you can launch the HCT Windows App directly from the "HCT Windows App" entry in the Start menu.

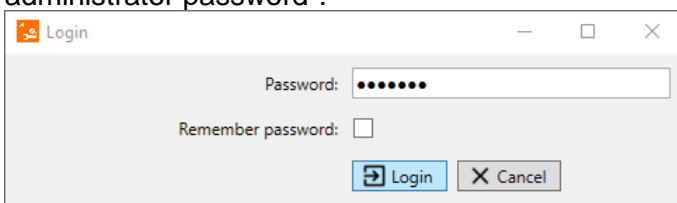
### 6.1.2 Set up the HCT Windows App as user "Administrator"

The HCT windows App will now start with the user "Operator":



The user "Operator" is intended later for working plan mode where no changes are to be made to the HCT windows App.

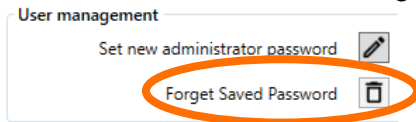
To set up the HCT Windows App and make far-reaching settings, you must switch to the user "Administrator". Click the icon to the right of "Operator". You will now be prompted for your administrator password, that you defined before as described in the chapter "6.1.1 Set administrator password":



To switch between "Administrator" and "Operator" without entering the password during setup, check "Remember password"

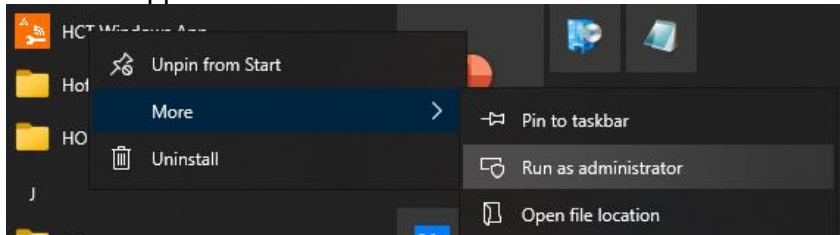
Click "Login".

You can remove the remembered password so that the users "Operator" cannot change anything. As the user "Administrator", switch to the "Settings" tab. In "User management", click the trashcan icon to the right of "Forgot Saved Password":



### 6.1.3 Set administrator password newly

Run the HCT Windows App as administrator. To do this, right-click on the entry "HCT windows App" under H. Select "More" and "Run as administrator":



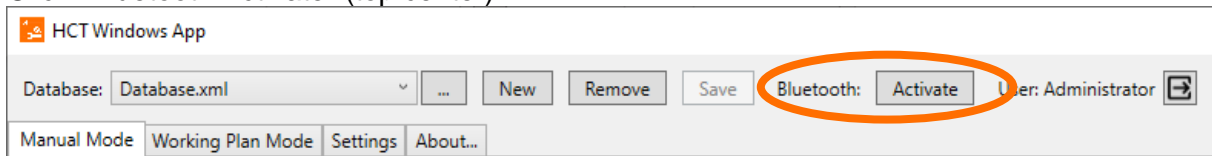
Proceed as described in chapter "6.1.1 Set administrator password" to set a new password. You do not need to know the previous password for this procedure.

## 6.2 Connect HCT tools



Launch the HCT Windows App.

You must be logged in as user "Administrator" to connect HCT tools.

Click "Bluetooth Activate" (top center):

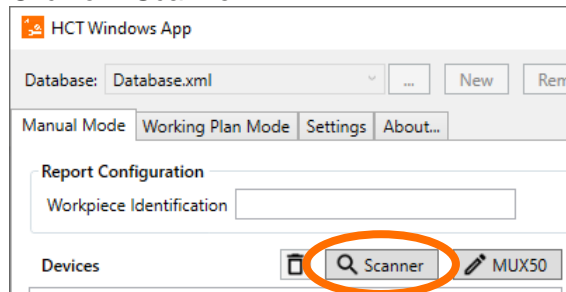


Turn on your HCT tools and make sure their Bluetooth wireless technology is turned on. You can see this from the Bluetooth icons,

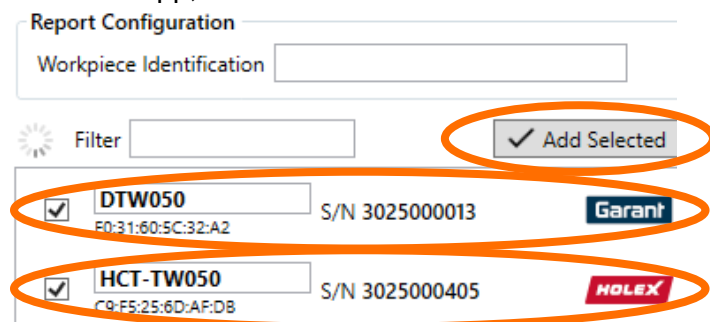
 or  or similar,

in the displays of the HCT tools. If necessary, switch on the wireless modules in accordance with the operating instructions.

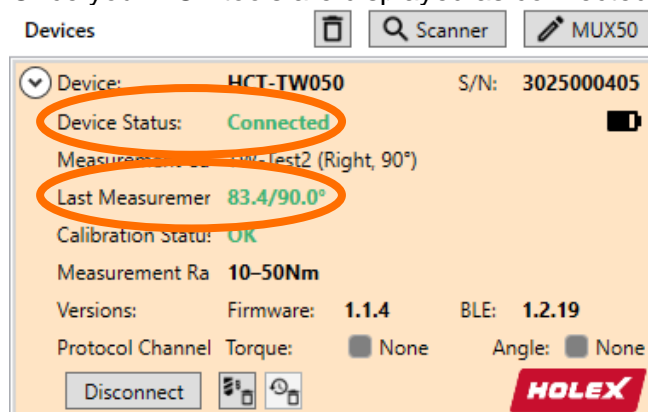
Click on "Scanner":



The nearby HCT tools are now listed. Check the HCT tools you want to connect to the HCT Windows App, and then click "Add Selected":



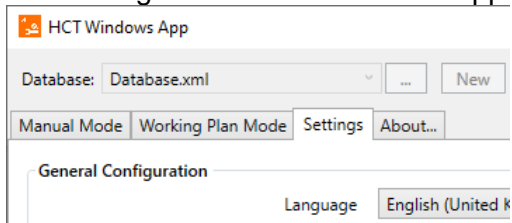
Once your HCT tools are displayed as connected, you can transfer measurement values:



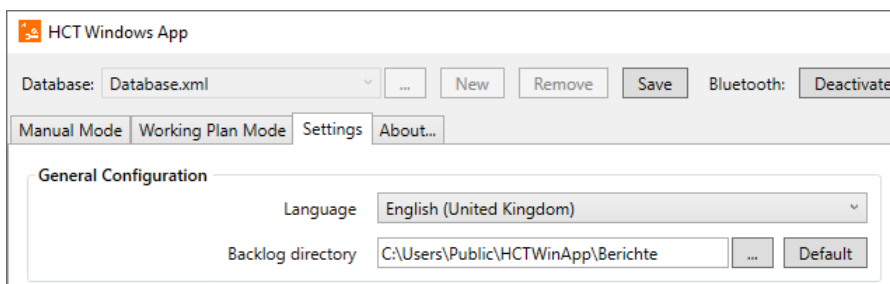
The HCT Windows App and the Bluetooth wireless technology used allow you to connect a maximum of 16 HCT tools. Please note, however, that the connection setup and data transfer is delayed with so many HCT tools. We therefore recommend that you do not connect more than 10 HCT tools to the HCT Windows App. If you use more HCT tools, distribute them to several workstations and thus to several PCs with the HCT Windows App and HCT dongles.

## 7 Settings

The settings of the HCT Windows App are made in the "Settings" tab:

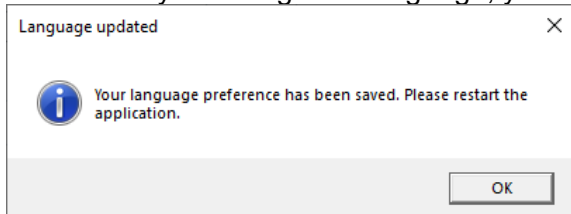


### 7.1 General Configuration



#### 7.1.1 Language

Under Language, select the language in which you want to work with the HCT Windows App. Note that if you change the language, you must exit and restart the HCT Windows App:



In this window, click "OK", exit and restart the HCT Windows App, your preferred language will now be used.

#### 7.1.2 Backlog directory

You must be logged in as user "Administrator" to change the backlog directory. Assign a folder as backlog directory. Click on "..." to open the dialog for selecting a folder. This folder stores the database of the HCT Windows App. Note that the HCT Windows App requires full access to this folder. As default the folder "C:\Users\Public\Documents\hct-windows-app" is set.



## 7.2 Report Configuration

You must be logged in as the user "Administrator" to change the Report Configuration.

Report Configuration

Report Directory: C:\Users\Public\Documents\hct-windows-app\ ... Default

File name: \$(DATE yyyy-MM-dd)\_Report\_\$(IDENT) Default

The following substitutions are supported:

- \$(IDENT) - Work piece identification
- \$(DATE format) - Date, e.g.: \$(DATE yyyy-MM-dd)

The preview shows that the file name will look like:

Preview: 2022-07-27\_Report\_Workpiece#1.csv

Generate DFQ report

### 7.2.1 Report Directory

Assign a folder as a report directory. Click on "." to open the dialog for selecting a folder. This folder stores the measurement reports of the HCT Windows App in CSV or DFQ file format. Note that the HCT Windows App requires full access to this folder. As default the folder "C:\Users\Public\Documents\hct-windows-app\Customer Files" is set. This folder usually provides full read and write access on standard Windows systems.

### 7.2.2 File names

You can configure the file names of the measurement reports here.

You can use the "\$ (DATE format)" placeholder for the date by specifying for "format" how the date should be entered, where dd is the day, MM is the month, and yy is the year

Examples:

yyyy-MM-dd results in 2022-06-30

yy-MM-dd results in 22-06-30

dd.MM.yy results in 30.06.22

dd.MM.yyyy results in 30.06.2022

and so on.

You can embed the workpiece identification in the file name with the placeholder "\$ (IDENT)". You will find further information on this topic in the chapter "8.2.3 Start and use working plan".

In addition, you can add any text. However, make sure that you only use special characters that are allowed for file names and that the file names do not become too long. Depending on the location and the associated path, access can be denied if the string is too long. The preview in the bottom line of the report settings shows an example of how your compilation affects the file name. If you want to return to the file name we have suggested, click on "Default" next to the file name input field.

Report Directory: C:\Users\Public\Documents\hct-windows-app\ ... Default

File name: \$(DATE yyyy-MM-dd)\_Report\_\$(IDENT) Default

The following substitutions are supported:

### 7.2.3 Generate DFQ report

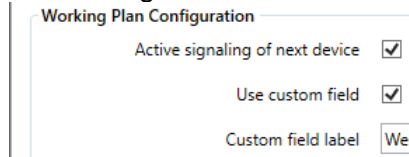
Check "Generate DFQ report" if you want to save the measurement values in context of a working plan via DFQ file. For details on this file format, see the chapter "9.2 DFQ files".

Remove the check if you do not need these reports. This avoids the creation of unnecessary data.

## 7.3 Working Plan Configuration

You must be logged in as user "Administrator" to change the working plan configuration. The only exception in this area is the setting "Active signaling of next device", which can also be changed by the user "Operator".

The settings in this area refer to the working plan mode.



Working Plan Configuration

Active signaling of next device

Use custom field

Custom field label

### 7.3.1 Active signaling of next device

Check here if the HCT tool in question shall actively signal that it shall be used in the active step. The Garant HCT torque wrenches signal this by the light ring flashing green and vibrating when the vibration in the torque wrenches is set to "ON". The HOLEX HCT torque wrenches only vibrate because they do not have a light ring, but again the vibration in the key must be set to "ON".

Remove the checkmark from this setting if you do not want the active signaling.

### 7.3.2 Use custom field

You can add another column to the CSV files generated by the HCT Windows app by checking this box. Only then are the fields "Custom field label" and "Custom field values" activated.

### 7.3.3 Custom field label

If you want to use the custom field, enter a label for it here. In the CSV files created later, this label is assigned to the additional column in the header.

### 7.3.4 Custom field values

Use the custom field values to create a selection for the working plan mode from which you can then select the entries in the additional column. Click the "+" under Custom field values to add entries. Use the arrows "↑" and "↓" to change the order of the entries in the list. Use the trash can icon to delete entries.

Example of using the custom field:

In this example we want to use the additional field to have the worker entered in the CSV files.

To do this, we activate "Use custom field" by checking it.

For the explanation for the workers, we enter a meaningful name in the "Customer field label", in our example "Werker: Innen/Aussen".

Our colleagues who later work with the working plan are entered one by one in "Customer field values".

**Working Plan Configuration**

Active signaling of next device

Use custom field

Custom field label

Custom field values

+	Werkerin Drehe Momente	↓	↑	🗑️
	Monteur Mon Tages	↓	↑	🗑️
	Schrauber Em Siebener	↓	↑	🗑️
	Kontrolleurin Nache Zieher	↓	↑	🗑️

If we now switch to the "Working Plan Mode" tab, we see our additional field with the name "Werker: Innen/Aussen" assigned by us in the upper right-hand area between "Workpiece identification" and "Start" and the selection option with the entries of our "Customer field values":

Workpiece Identification  Werker: Innen/Außen  Start  Aut

ing Steps

Name	Image	Device	Measureme	get Value	Last M
stlayer1		(No repetition)			

## 7.4 Bluetooth Configuration

**Bluetooth Configuration**

Choose automatically

COM port HCT dongle

Activate automatically

### 7.4.1 Choose automatically

Check here to find the HCT dongle automatically. The HCT Windows App searches for the HCT dongle after it has been started and connects to it via a virtual COM port.

### 7.4.2 COM port HCT dongle

Specify the virtual COM port via which the HCT dongle communicates with the HCT Windows App. You only need to set it if the automatic detection of the HCT dongle does not work. You can use the Windows Device Manager to determine the COM port. Remove the HCT dongle from the USB port and start the device manager. Insert the HCT dongle back into the USB port and check which COM port has been added in the Device Manager under "Ports (COM & LPT)". Then enter this COM port.

### 7.4.3 Activate automatically

Check this box if you want the HCT Windows App to activate the Bluetooth wireless technology of the HCT dongle directly at startup. This makes sense in the operation of the HCT Windows App for users "operator", because the HCT Windows App then immediately connects the set up HCT tools and is ready to receive the measured values. To set up the HCT Windows App, it is a good idea to turn off the automatic activation because many settings are only possible with Bluetooth wireless technology disabled.

## 7.5 Output protocol settings

You must be logged in as user "Administrator" to change the output protocol settings. These settings allow you to activate and adapt the transmission of measured values to other systems. A detailed explanation of this can be found in chapter "10 Transfer measurement values to other systems".

Output protocol settings	
Activate MUX50/ DMX16	<input checked="" type="checkbox"/>
Compatibility Options	Mode: MUX50 Unit: HCT
Serial port	COM11 (com0com - serial port emulator)
Serial settings	Baud rate: 9600 Data bits: 8
	Stop bits: 1 Parity: None

### 7.5.1 Activate MUX50/DMX16

Check this box to activate the output protocol in principle.

### 7.5.2 Compatibility options

Use "Mode" to decide which protocol shall be used: MUX50 or DMX16. Select "Unit" to select whether and which units are to be appended to the measured values in the report: HCT, no units or always millimeters "mm". For more details, see chapter "10 Transfer measurement values to other systems".

### 7.5.3 Serial port

Set here the COM port via which the measured values shall be transmitted. For more details, refer to the chapter "10 Transfer measurement values to other systems".

### 7.5.4 Serial settings

These settings are used to set the parameters for baud rate, number of data bits, number of stop bits, and the parity. For more details, refer to the chapter "10 Transfer measurement values to other systems".

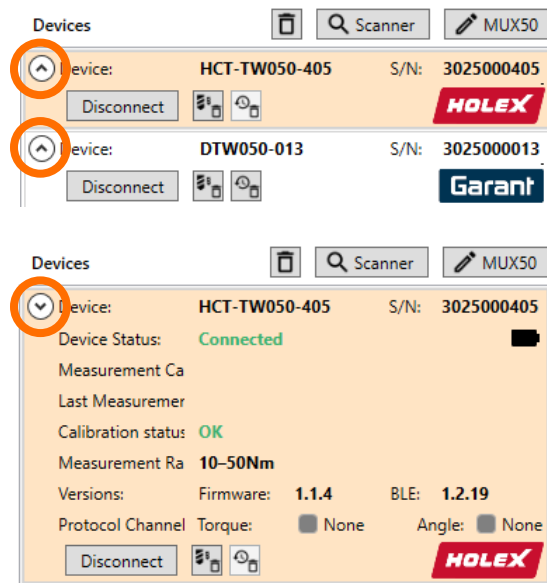
## 7.6 Device view settings

The individual fields allow you to set the information that displays your HCT tools in the Devices view in the tabs "Manual Mode" and "Working Plan Mode".

Device Status	Show when Bluetooth active	Default
Measurement Case	Show when selected	Default
Last Measurement	Show when selected	Default
Protocol Channels	Show	Default
Calibration status	Show when selected	Default
Measurement Range	Show in details	Default
Versions	Show in details	Default

For each information listed here, you can select the following setting:  
"Hide": The information is not displayed at all.  
"Show": The information is always displayed.

"Show in details": You can only see the information if you click on the small circle with the arrow in the device view.



"Show when Bluetooth active": The information is only displayed if you have activated Bluetooth in the HCT Windows App.

"Show when selected": The information is only displayed if you have selected the HCT tool in the Devices view by clicking on it.

You cannot hide the device name and serial number; this information is essential and always displayed. By clicking "Default" to the right of the selection fields, you can reset the settings to our recommendation.

For several HCT tools, we recommend that you always display only the information that is most important to you, as otherwise the Devices view will no longer provide an overview. Display the information that is helpful when working directly with the HCT tool in question with "Show when selected" and click the HCT tool before you want to use it.

## 8 Operating mode tips

The Manual Mode is provided when you have constantly changing measurement tasks and want to log the measured values. However, you can still use the measurement cases you have created and assign them to the relevant HCT tool as required. For more detailed information on using this mode, refer to the chapter "8.1 Manual Mode".

The Working Plan Mode is suitable for recurring operations such as those usually found in production, for example when fitting a cylinder head whose screws must be tightened in a defined sequence with defined torques. The mechanics can be guided step by step through the assembly task using pictures and instructions in the working plan.

### 8.1 Manual Mode

Select the tab "Manual Mode" to use it. In the field "Workpiece Identification", specify which workpiece you want to process. This designation is used for the file names of the CSV and DFQ files in the \$(IDENT) placeholder, see section "7.2.2 File names".

In the CSV file, the identification is filled in the column "Workpiece Identification" and only in working plan mode the identification is filled in the K field K1001/1 "Part number" of the DFQ file.

### 8.1.1 Create measurement case

You must be logged in as user "Administrator" to create measurement cases. To create a new measurement case, click the "+" to the right of "Measurement Cases Backlog".



You can enter the data in the now opened measurement case editor. Missing or incorrect entries are indicated by fields highlighted in red.

Name:

Password Protected:

Measurement Mode:

Unit torque:

Target Value:  Nm

Tolerance Min.:  %

Tolerance Max.:  %

Direction:

Monitoring:

SnugTorque:  Nm

Monitoring Min.:  °

Monitoring Max.:  °

#### Name:

Enter the name of the measurement case. Note that the name can be a maximum of 10 characters long. This name is displayed in the tables "Measurement Cases" and "Measurement Case Backlog" in the column "Measuring Case". In addition, the name is filled in the column "Name" of the CSV file and only in working plan mode the name is filled in the K field K2003/x of the DFQ file.

#### Password protected:

Check here if you want to protect the measurement case against accidental or intentional changes by means of a password. However, password protection only refers to the torque wrench to which the measuring case is transferred and only if a master password has been assigned on the torque wrench.

#### Measurement Mode:

Select the appropriate measurement mode here. Note, however, that you cannot load a measurement case with measuring mode "Angle" into a HOLEX torque wrench without angle measurement. Always select "Torque" for these torque wrenches.

#### Unit torque:

Set the desired torque unit. Note that this unit is valid for the target value, the snug torque, and in the angle measurement mode for the monitoring Min and Max.

#### Target Value:

Enter the desired setpoint here depending on the measuring mode. If torque is selected, enter the setpoint with the unit selected above, if angle is selected, enter the setpoint in "°". Note that the target value must always be greater than or equal to 0, and in angle measurement mode it must not be greater than 999.9. If you want to make measurements counterclockwise, set the direction of rotation to left, see below.

#### Tolerance Min. and Tolerance Max.:

In the torque measuring mode, you set the upper and lower tolerance limits here as a percentage of the target value. Note that the lower tolerance must not be less than -10.00% and the upper tolerance must not exceed 10.00%.

In the angle measuring mode, enter the tolerance limits in "°". Note that the lower tolerance must not be less than -99.90° and the upper tolerance must not exceed 99.90°.

#### Direction (of rotation):

Select the direction of rotation for measuring of the measurement case. "Right" means that you turn the torque wrench clockwise around its square drive, "Left" means counterclockwise. With the Garant torque wrenches, note that you can insert the tool holder with the square drive facing up, for example to tighten a screw pointing down and you can still look upon the display. In such a case, you would tighten a bolt with a left-hand thread by turning it to the right (clockwise). The rotation direction always refers to the torque wrench when you look upon the display.

#### Monitoring:

This function only makes sense for Garant torque wrenches, since only these have it, Horex torque wrenches, also with angle measurement, do not support the function. If you create a measurement case for a Garant torque wrench, check to activate the function.

#### Snug Torque:

Enter the value for the snug torque here. This is the torque threshold from which the monitoring or angle measurement starts.

#### Monitoring Min. and Monitoring Max.:

In the torque measuring mode, enter the lower and upper limits of the angle of rotation within which the target value is to be reached. The angle monitoring starts when the snug torque is reached.

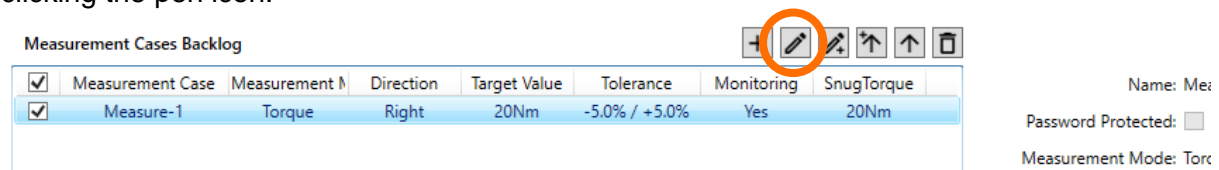
In the angle measuring mode, enter the lower and upper limits of the torque within which the torque shall be until the target angle of rotation is reached. The torque monitoring starts when the snug torque is reached.

When you have made all the settings for the measuring case, click "Save" to save the data and place the measuring case in the measurement cases backlog, or click "Discard" to delete all entries.

### 8.1.2 Edit measurement case

You must be logged on as user "Administrator" to edit measurement cases.

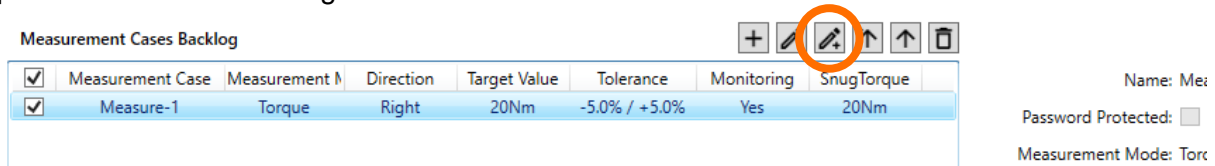
You can edit a measurement case by selecting the concerning measurement case and clicking the pen icon.



The measurement case editor opens, and you can change the name and values.

### 8.1.3 Copy measurement case

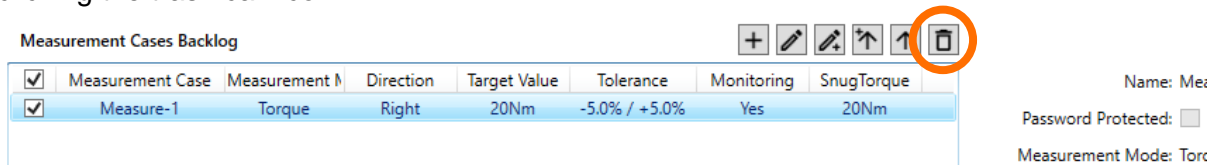
You must be logged in as user "Administrator" to copy measurement cases. If you want to create several identical measuring cases, you can use the function copy measurement case. To do this, select the measurement case to be copied and click on the pencil icon with the "+" sign.



All values of the selected measurement case have now been accepted in the measurement case editor except for its name because there must not be two or more measurement cases with the same name. Assign a new unique name for your new measurement case.

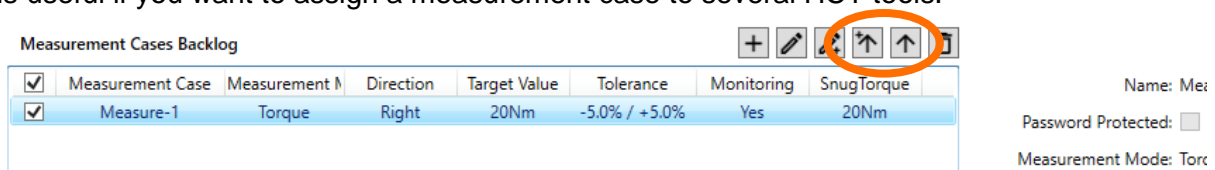
### 8.1.4 Delete measurement case

You must be logged in as user "Administrator" to delete measurement cases. You can delete a measurement case by selecting the concerned measurement case and clicking the trash can icon.

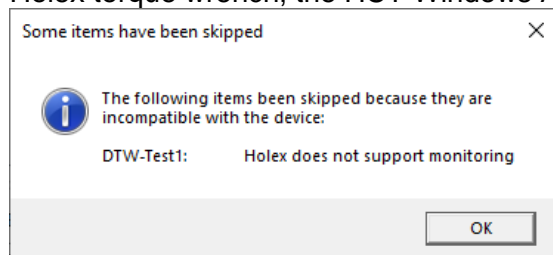


### 8.1.5 Assign a measurement case to an HCT tool

You must be logged in as user "Administrator" to assign measurement cases. You can now assign the measurement cases created and located in the measurement case backlog to your connected HCT tools. First, select the HCT tool in the devices view with one click. Check the measurement case in the measurement case backlog that you want to assign to the HCT tool. Now click on the arrow icon to assign the measurement case and remove it from the measurement case backlog. The measurement case is transferred to the database and is not lost. Click the arrow icon with the "+" symbol to assign the measurement case and keep it in the measurement case backlog. The measurement case is copied to the database. This function is useful if you want to assign a measurement case to several HCT tools.



Note that not every measurement case can be assigned to each HCT tool. If, for example, you want to assign a measurement case with angle measurement and angle monitoring to a Hoxlec torque wrench, the HCT Windows App displays the following error message:



In this case, confirm the error message and then select a suitable measurement case.



### 8.1.6 Activate measurement case

You can now activate a measurement case in the HCT tool that you have assigned to your connected HCT tool. To do this, click "Activate" in the "Measurement Cases" table to the right of the values of the concerned measurement case:

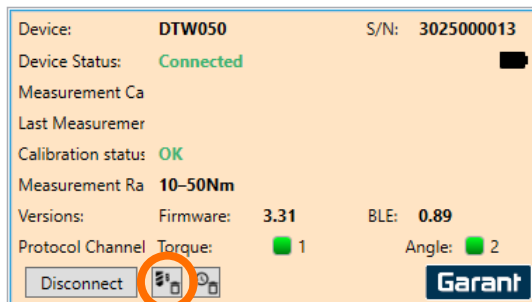
Measurement Cases

<input type="checkbox"/>	Measuremer	Measurement M	Direction	Target Value	Tolerance	Monitoring	SnugTorque	
<input type="checkbox"/>	<b>TW-Test1</b>	<b>Torque</b>	<b>Right</b>	<b>11Nm</b>	<b>10.0% / +10.0'</b>	<b>No</b>		<a href="#">Activate</a>
<input type="checkbox"/>	TW-Test2	Angle	Right	90°	-60° / +60°	No	12Nm	<a href="#">Activate</a>

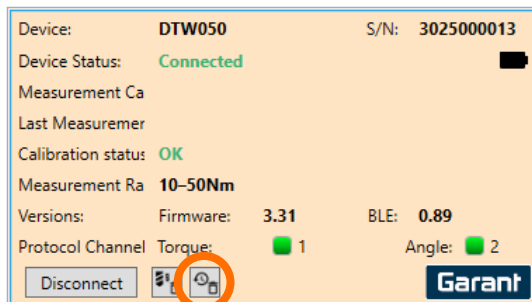
The activated measurement case is now displayed in bold and the relevant HCT tool has adopted the measurement case.

### 8.1.7 Delete measurement cases and history from the HCT tool

You must be logged in as user "Administrator" to delete measurement cases or histories. Some HCT tools, such as the Garant torque wrench, can store measurement cases and history on the tool, independent of the HCT Windows App. However, if the memory for the measurement cases on the HCT tool is full, you can no longer transfer measurement cases to the HCT tool. In this case, delete all measurement cases on the HCT tool with the measurement case icon marked below to the right of "Disconnect":



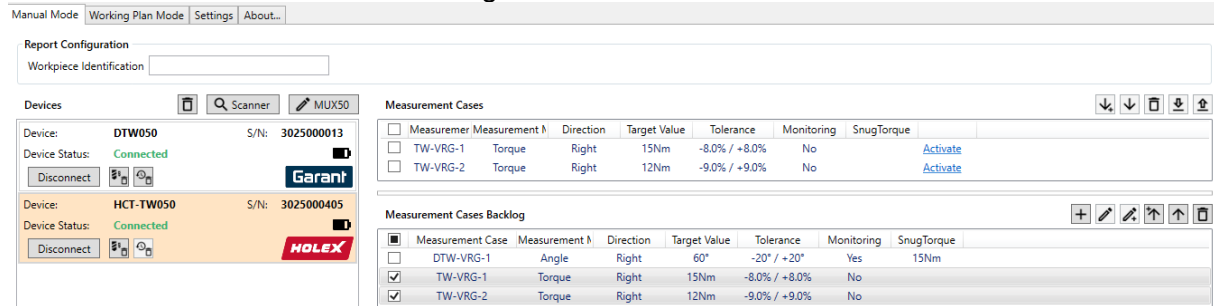
To delete the history on the HCT tool, use the history icon marked below to the right of the measurement case icon:



Note that you always delete all measurement cases and the entire history on the HCT tool. If you want to delete individual measurement cases, you must do this directly on the HCT tool.

## 8.2 Working Plan Mode

For a working plan, you first create all measurement cases in manual mode. Connect your HCT tools you want to use for the working plan to the HCT Windows App. Copy or move your created measurement cases from the "Measurement Cases Backlog" to the table "Measurement Cases" and thus assign the measurement cases to the HCT tools.



Switch to the tab "Working Plan Mode". Under "Working Plan Configuration", click "New" next to the field "Name". Enter a name for the working plan you want to create. To save, click "Save" in the top line of the HCT Windows App.

### 8.2.1 Create working plan layers

You must be logged in as user "Administrator" to create working plans.

A working plan consists of one or more working plan layers. These layers are to be understood as groups of working steps.

For example:

The front wheel and brake calipers are to be assembled to the front fork of a motorcycle. In this case, the following working plan layers are useful:

1<sup>st</sup> layer: Mount the front wheel

2<sup>nd</sup> layer: Mount the brake caliper on the left-hand side

3<sup>rd</sup> layer: Mount the brake caliper on the right-hand side

In the first level, three steps must be carried out:

1<sup>st</sup> step: Tighten the nut of the thrust axle

2<sup>nd</sup> step: Tighten the clamping screw on the left fork dip tube

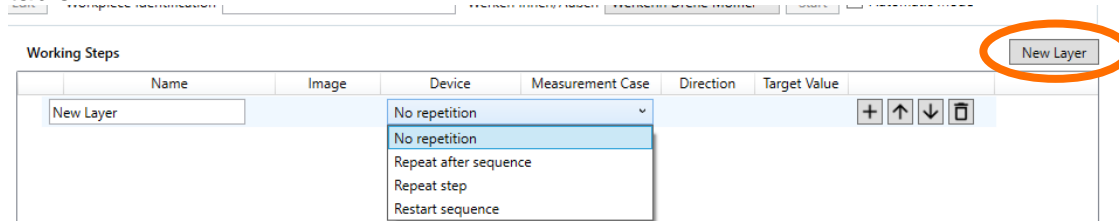
3<sup>rd</sup> step: Tighten the clamping screw on the right fork dip tube

The second and third layers are practically identical, and each has two steps:

1<sup>st</sup> step: Tighten the upper brake caliper bolt

2<sup>nd</sup> step: Tighten the lower brake caliper bolt

Click "New Layer" above the table "Working Steps" on the right. A new row is inserted in the table.



Enter a name for this layer, for our example "Mount front wheel".

Select how a test case should be processed after the incorrect execution:

- No repetition: An incorrectly executed measurement case is registered, but no repetition occurs.
- Repeat after sequence: An incorrectly executed measurement case is registered and the measurement case is only repeated after the steps in this working plan layer have been completed.
- Repeat step: An incorrectly executed measurement case must be repeated immediately

- Abort and repeat sequence: An incorrectly executed measurement case results in the cancellation of the steps in this working plan layer and in a direct restart of all steps within this layer.

To add more layers, click "New Layer" again at the top right of the table. In our example, we add two additional layers "Brake caliper left" and "Brake caliper right".

You can change the order of the layers using the arrow icons next to the concerned layer on the right side of the table:

Working Steps

Name	Image	Device	Measurement Case	Direction	Target Value	
Mount front wheel		No repetition				[-] [↑] [↓] [🗑️]

You can delete a layer by clicking the trash can icon next to that layer on the right side of the table:

Working Steps

Name	Image	Device	Measurement Case	Direction	Target Value	
Mount front wheel		No repetition				[+] [↑] [↓] [🗑️]

## 8.2.2 Create working steps

You must be logged in as user "Administrator" to create working plans.

A working step is a measurement case inserted in a working plan.

Insert a step with the "+" icon next to the concerned layer on the right side of the table:

Working Steps

Name	Image	Device	Measurement Case	Direction	Target Value	
Mount front wheel		No repetition				[+] [↑] [↓] [🗑️]
Nut thrust axle		DTW050	DTW-VRG-1	Right	60°	[↑] [↓] [🗑️]

A new row "New Step" is inserted in the table.

Enter a name for this step, for our example "Nut thrust axle".

If you want to attach a picture to explain the step, click "..." and select your picture.

In the "Device" column, select the HCT tool that shall be used in this step, for our example a Garant DTW050.




In the "Measurement case" column, select the appropriate measurement case for this step. Note that you can only select measurement cases that are assigned to the previously selected HCT tool. For our example, we have selected the measurement case "DTW-VRG-1".

To add additional steps, click the "+" icon next to the concerned layer on the right side of the table. In our example we add two further steps "Clamping screw left" and "Clamping screw right".

You can change the order of the working steps using the arrow icons next to the relevant working steps on the right side of the table:

Nut thrust axle		DTW050	DTW-VRG-1	Right	60°	[↑] [↓] [🗑️]
Clamping screw left	...	HCT-TW050	TW-VRG-1	Right	15Nm	[↑] [↓] [🗑️]
Clamping screw right	...	HCT-TW050	TW-VRG-1	Right	15Nm	[↑] [↓] [🗑️]
















You can delete a step by clicking the trash can icon next to the concerned step on the right side of the table:

Nut thrust axle		...	DTW050	DTW-VRG-1	Right	60°	↑	↓	
Clamping screw left		...	HCT-TW050	TW-VRG-1	Right	15Nm	↑	↓	
Clamping screw right		...	HCT-TW050	TW-VRG-1	Right	15Nm	↑	↓	

For our example, we add the steps "Brake caliper upper bolt left" and "Brake caliper lower bolt left" to the level "Brake caliper left" and the corresponding steps to the level "Brake caliper right".

Our working plan is now completed:

Working Steps

Name	Image	Device	Measurement Case	Direction	Target Value		
Mount front wheel		Repeat step				+ ↑ ↓ 	
Nut thrust axle		...	DTW050	DTW-VRG-1	Right	60°	↑ ↓ 
Clamping screw left		...	HCT-TW050	TW-VRG-1	Right	15Nm	↑ ↓ 
Clamping screw right		...	HCT-TW050	TW-VRG-1	Right	15Nm	↑ ↓ 
Brake caliper left		Repeat after sequence				+ ↑ ↓ 	
Brake caliper upper bolt left		...	HCT-TW050	TW-VRG-2	Right	12Nm	↑ ↓ 
Brake caliper lower bolt left		...	HCT-TW050	TW-VRG-2	Right	12Nm	↑ ↓ 
Brake caliper right		Repeat after sequence				+ ↑ ↓ 	
Brake caliper upper bolt right		...	HCT-TW050	TW-VRG-2	Right	12Nm	↑ ↓ 
Brake caliper lower bolt right		...	HCT-TW050	TW-VRG-2	Right	12Nm	↑ ↓ 

Finally, save the working plan to the database by clicking "Save" in the top line of the HCT Windows App.

### 8.2.3 Start and use working plan

To start the working plan, enter a name in the field "Workpiece Identification", in our example "Motorcycle-1". If you use the custom field and have entered values for it, as in our example in the chapter "7.3.4 Custom field values", select the appropriate entry, in our example worker "Werkerin Drehe Momente" from the list "Werker: Innen/Außen".

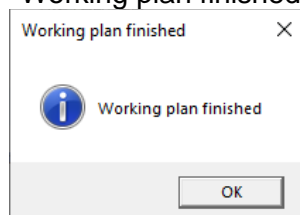
In the HCT Windows App, make sure Bluetooth is activated and your HCT tools are turned on and connected.

Click "Start".

The screenshot displays the 'Working Plan Configuration' window. At the top, there are fields for 'Workpiece Identification' (Motorcycle-1) and 'Werker: Innen/Außen' (Werkerin Drehe Momente). Below this is a 'Working Steps' table with columns for Name, Image, Device, Measurement Case, Direction, Target Value, and Last Measurement. The steps include 'Mount front wheel' (a repeat step), 'Nut thrust axle', 'Clamping screw left', 'Clamping screw right', 'Brake caliper left' (a repeat after sequence), and 'Brake caliper right' (a repeat after sequence). Each step lists specific actions like 'Brake caliper upper bolt left' and 'Brake caliper lower bolt left/right' with their respective target values (60° and 12Nm). On the left side, two devices are listed: DTW050 (Garant) and HCT-TW050 (HOLEX), both showing 'Connected' status. A large image at the bottom shows a close-up of a motorcycle front wheel assembly.

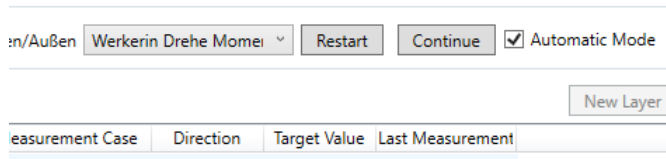
The measuring cases are now transferred step by step to the HCT tools according to the working plan and the HCT Windows App waits for the execution of the measurement case and its confirmation with the send button. Then the HCT Windows App jumps to the next measurement case etc.

After the working plan has been completed, the HCT Windows App displays the message "Working plan finished".



Click "OK". You can now start the working plan again with a new workpiece identification. If you check "Automatic Mode" next to "Start", this message is not displayed. Instead, the working plan is immediately ready to start again. The cursor is in the field "Workpiece Identification" and expects the next entry there. Then click "Start" again. This allows the implementation of a smooth workflow.

You can interrupt the already started working plan with "Stop" (at the point where "Start" was previously) and then "Restart" or "Continue" at the point where you clicked "Stop":



## 9 Data output to files

### 9.1 CSV files

The HCT Windows App generates reports from the measurement cases carried out in the form of CSV files or enters the results there if the file name has not changed. The composition of the file name can be set as in section "7.2.2 File names".

If the file name does not contain any variables such as date or workpiece identification, the HCT Windows App always appends all results to the same file. In some cases, this may make sense, but the file may become very large if you forget to set a new file name. We therefore advise against this.

It is better to use a variable in the file name. If the value of this variable changes, the HCT Windows App creates a new CSV file and enters the results there until the value of the variable changes again.

Example variable date "\$(DATE yyyy-MM-dd)":

As soon as the date changes, a new CSV file with the current date is generated, i.e., latest after 24 hours.

Example of variable workpiece identification "\$(IDENT)":

A new CSV file with the workpiece identification is created with each new workpiece identification. This means that you have one log file per workpiece, especially in the work plan mode, but with the disadvantage that a large number of files may be generated.

Our standard "\$(DATE yyyy-MM-dd)\_REPORT\_\$(IDENT)" generates a new file with each new workpiece identification, but at the latest when the date changes. This ensures that no file of any size is created even if no new workpiece identification is entered.

#### 9.1.1 Data in the CSV file

In addition to the measured values that the HCT tools determine, further data is written to the CSV file for each measurement case.

In "Manual Mode", these include:

Date and time stamp

Tolerance limits

Name of the measurement case

Serial number of the HCT tool used

Name of the device

Workpiece identification

The following additional data is entered in "Working Plan Mode":

Name of the working plan

Name of the working plan layer

Name of the working step

Custom field value if enabled in the "Use custom field" settings

Get an overview by using our examples or your own measurement cases so that CSV files can be created and open them with a suitable application.

## 9.2 DFQ files

DFQ files are structured in the AQDEF format. Most CAQ systems can read and process such files.

DFQ files only make sense together with a working plan, because only in this way it is defined beforehand what is to be measured with what kind of device and in which limits. The HCT Windows App therefore only generates such files in working plan mode and only if you have activated the generation. In the chapter "7.2.3 Generate DFQ report" you will find information on how to switch the generation on or off. The file name settings are the same as for the CSV files, so in working plan mode you get two files of the same name, which differ only in their extensions (.CSV or .DFQ). The DFQ file is readable with a simple editor without conversion, but it does not contain any explanatory comments, only the K fields and the associated values.

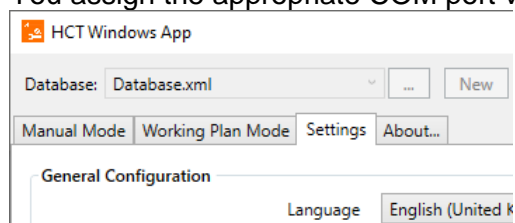
# 10 Transfer measurement values to other systems

## 10.1 COM port

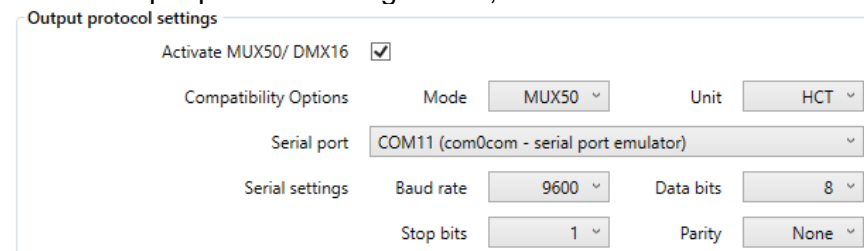
The HCT Windows App can send the measured values generated by the measurement tools to other systems, such as CAQ software systems. The data is transmitted via COM ports in the MUX50 or DMX16 format. The COM ports must be provided by a virtual COM port driver with null modem functionality. We recommend using the com0com Nullmodem emulator, whose link you can find on our HCT website. After installing the emulator, it provides pairs of COM ports that function as a null modem.

### 10.1.1 Assignment of the COM port to output the data

You assign the appropriate COM port via the tab "Settings" in the HCT Windows App:



In the "Output protocol settings" area, check the box for "Activate MUX50/DMX16":



Then make further settings according to your requirements.

Mode: Select the appropriate protocol, MUX50 or DMX16. Note that the MUX50 protocol can only transmit channels with numbers 1 through 9. If you want to use channels greater than 9 to a maximum of 99, use the DMX16 protocol. Make sure that your target system can process this protocol.

Unit: Here you select the unit with which the measured values are to be assigned.

"HCT": The measured values are assigned the units provided in the measuring tools

"No Units": The measured values are transmitted without units. Use this setting if your target system cannot handle the devices and generates error messages due to incorrect format.

"mm": The measured values are always assigned the unit "mm". Some target systems expect all measured values with this unit, other formats are simply ignored or generate error messages. Note, however, that even for example, angle measurements or measurements in inches are marked with the unit "mm" in the protocol.

Serial port: Set the COM port on which the HCT Windows App shall output the data. This is NOT the COM port on which your target system receives the data. To do this, set the paired COM port there. In the case shown above, COM11 includes the COM12 to be used for the target system.

Serial settings: These are the transmission parameters for the serial interface, so to say for the COM port. Set the parameters exactly as you have set them in your target system.

## 10.2 Description of the MUX50 and DMX16 protocols

The MUX50 and DMX16 protocols are used to transmit the measured values acquired by the HCT Windows App to other applications, such as CAQ software or other devices, via a COM port. The protocol is NOT used to communicate with the tools and measuring devices associated with the HCT Windows App, this is done by the HCT protocol.

### 10.2.1 Details of the MUX50 and DMX16 protocols

The protocols consist of ASCII characters and can be read by most CAQ software systems. They also provide some control commands so that the connected application, the so-called host, can control the HCT Windows app.

### 10.2.2 Send and receive measured values

A measured value is always output with 24 ASCII characters in the MUX50 protocol and 25 ASCII characters in the DMX16 protocol and is terminated with the characters "carriage return", here represented as "<CR>" and "line feed", here represented as "<LF>". The difference between the MUX50 and the DMX16 is that the first can only work with single-digit channel numbers from 1 to 9, while the second can handle two-digit channel numbers up to 99. With the DMX16, single-digit channel numbers are preceded by a word space (space). The word spaces, the "spaces", are represented here with the underscore "\_".

Examples include:

MUX50: 3\_MW\_+12345.67\_NM\_\_<CR><LF>

DMX16: Single-digit channel numbers: \_3\_MW\_+12345.67\_Nm\_\_<CR><LF>

DMX16: Two-digit channel numbers: 26\_MW\_+12345.67\_Nm\_\_<CR><LF>



### 10.2.3 Explanation MUX50:

1 <sup>st</sup> character	Channel number	This is the channel on which the measured value is sent or received. The channel numbers can be 1 to 9.
2 <sup>nd</sup> characters	Space	Word space
3 <sup>rd</sup> to 4 <sup>th</sup> characters	Value type	This is the type of measurement. The HCT windows app always uses the MW characters for measured values.
5 <sup>th</sup> character	Space	Word space
6 <sup>th</sup> character	Sign	+ or -
7 <sup>th</sup> to 15 <sup>th</sup> characters	Measured value	The decimal point in the measured value is variable, leading zeros are not suppressed.
16 <sup>th</sup> character	Spaces	Word space
17 <sup>th</sup> to 22 <sup>nd</sup> characters	Unit of the measured value	The unit depends on the protocol settings, see chapter "10.1.1 Assignment of the COM port to output the data". The remaining characters are filled with word spaces.
23 <sup>rd</sup> character	<CR>	Carriage return
24 <sup>th</sup> character	<LF>	Line feed

### 10.2.4 Explanation DMX16:

1 <sup>st</sup> and 2 <sup>nd</sup> characters	Channel number	This is the channel on which the measured value is sent or received. The channel numbers can be 1 to 99. For single-digit channel numbers, the first character is a word space.
3 <sup>rd</sup> character	Space	Word space
4 <sup>th</sup> to 5 <sup>th</sup> characters	Value type	This is the type of measurement. The HCT windows app always uses the MW characters for measured values.
6 <sup>th</sup> character	Space	Word space
7 <sup>th</sup> character	Sign	+ or -
8 <sup>th</sup> to 16 <sup>th</sup> characters	Measured value	The decimal point in the measured value is variable, leading zeros are not suppressed.
17 <sup>th</sup> character	Space	Word space
18 <sup>th</sup> to 23 <sup>rd</sup> characters	Unit of the measured value	The unit depends on the protocol settings, see chapter "10.1.1 Assignment of the COM port to output the data". The remaining characters are filled with word spaces.
24 <sup>th</sup> character	<CR>	Carriage return
25 <sup>th</sup> character	<LF>	Line feed

The following example transmission of the executed measurement case with a Garant HCT torque wrench was sent by the HCT Windows App in MUX50 format to a terminal program and received there:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1		M	W		+	0	0	0	0	1	6	.	4	2		N	m						
31	20	4D	57	20	2B	30	30	30	30	31	36	2E	34	32	20	4E	6D	20	20	20	20	0D	0A
2		M	W		+	0	0	0	0	8	8	.	5	0		d	e	g					
32	20	4D	57	20	2B	30	30	30	30	38	38	2E	35	30	20	64	65	67	20	20	20	0D	0A

The first line with green background shows the torque measured value with the unit "Nm", the second line with green background shows the angle measured value with the unit "deg". The two lines with a purple background represent the characters as hexadecimal values (according to ASCII).

The second sample transmission was sent and received in DMX16 format:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	1		M	W		+	0	0	0	0	1	6	.	9	8		N	m						
20	31	20	4D	57	20	2B	30	30	30	30	31	36	2E	39	38	20	4E	6D	20	20	20	20	0D	0A
	2		M	W		+	0	0	0	1	0	0	.	2	0		d	e	g					
20	32	20	4D	57	20	2B	30	30	30	31	30	30	2E	32	30	20	64	65	67	20	20	20	0D	0A

In this case, you can see the spaces in front of the channel number in column 1.

The third sample transmission was sent and received in DMX16 format with two-digit channel numbers and without units:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2	5		M	W		+	0	0	0	0	1	8	.	0	8									
32	35	20	4D	57	20	2B	30	30	30	30	31	38	2E	30	38	20	20	20	20	20	20	20	0D	0A
2	6		M	W		+	0	0	0	0	9	6	.	9	0									
32	36	20	4D	57	20	2B	30	30	30	30	39	36	2E	39	30	20	20	20	20	20	20	20	0D	0A

You can see the two-digit channel numbers with no spaces in front of them and the spaces instead of the units in columns 18 to 20.

### 10.2.5 Query the HCT Windows App using the MUX50 and DMX16 protocol

The target system or host can send specific commands to the HCT Windows App, which in turn responds accordingly:

Query identification:

Host: I<CR> or I<CR><LF>

HCT Windows App: Hct-windows-app\_0.15.0<cr><lf>

Hexadecimal:

68 63 74 2D 77 69 6E 64 6F 77 73 2D 61 70 70 20 30 2E 31 35 2E 30 0D 0A

Host: D0<CR> or D0<CR><LF> or D00<CR> or D00<CR><LF>

With one of these commands, the HCT Windows App disables all channels and therefore does not send measurement values.

Host: E0<CR> or E0<CR><LF> or E00<CR> or E00<CR><LF>

With one of these commands, the HCT Windows App activates all channels and sends measured values as soon as a measurement case has been carried out.

The HCT Windows App does not currently allow a channel to be queried by the host, the HCT Windows App ignores these requests.

### 10.2.6 Tips

Many CAQ systems only offer the MUX50 protocol, but still can handle the DMX16 format and understand the two-digit channel numbers. First, set the DMX16 protocol in the HCT Windows App, assign two-digit channels to an HCT tool in the Device View, and verify that your target application receives and processes the measurements correctly.

Some CAQ systems interpret channel numbers above 89 as a sender error, in this case assign channel numbers below this limit.

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