OPERATING INSTRUCTIONS

NetBee

- Original operating instructions -

NOTE

In case of doubt, the original German version of the operating instructions applies.

Controller NetBee
Issue date: September 2023

Table of contents

1 Operating principles

Dear customers,

thank you for choosing a HS-Technik GmbH product.

This quality product „Made in Germany“ fulfils the highest requirements with regard to performance, quality and accuracy. When used correctly the product will undoubtedly perform very well for many years.

This operating instructions contains information on safety and for the operation of the NetBee. In addition it contains information on the dimensions and technical data. Our team will be happy to assist you with any questions or additional information needed.

1.1 Scope of delivery

- NetBee
- Ferrite
- Charging cable
- Operating instructions

1.2 General information

Read the device operating manual before initial operation. **Please pay particular attention to Chapter 2 „General safety information for power tools“.**

This manual should make it easier for the operator to get used to the device and of its intended application possibilities. The operating instructions include important information related to the safe and proper operation of the device. Compliance with these instructions helps you to:

- Avoid hazards
- Avoid repair costs and downtimes
- Increase the reliability and the lifespan of the product

This manual must be read and applied by every person who is assigned to conduct work using this device.

In addition to this operating instructions the applicable regulations on accident prevention and environmental protection should be observed.

NOTE
After reading, keep the operating instructions in a place accessible to every operator. If you have any further questions, please feel free to contact us.

1.4 Structure of the warnings

The warnings are structured as follows:

DANGER
Indicates an immediate dangerous situation that can lead to serious or even deadly injuries and/or that could seriously damage or even destroy the device.

WARNING
Indicates a potentially dangerous situation that can lead to serious injuries and/or damage to the device.

NOTE
Important and useful information on using this device.

1.5 Technical terms and abbreviations used

Abbreviation	Meaning
AC	Alternate current
CCW	Counter clockwise
CW	Clockwise
DB	Database
Diff.	Difference
ID	Identification
I/O	Input/Output
IP	Internet Protocol
Mb	Megabit
MB	Megabyte
Max	Maximum
Min	Minimum

Abbreviation	Meaning
ms	Millisecond
MU	Measurement Unit
N.A.	Not Applicable
Nm	Newton meter
Nr.	Number
OK	Approved
NOK	Not approved
PC	Personal Computer
SC	Statistic Control
SW	Software
USB	Universal Serial Bus

1.6 Intended use

This device was designed to interface with the production line tools and to the production system.

WARNING

Intended use also includes

- following all indications of the operating instructions and
- observance of inspection and maintenance works.

Any other use or use beyond that is considered improper use. HS-Technik GmbH is not liable for any damage resulting from this.

1.7 Improper use

DANGER
The use of this device for other purposes is not permitted. Improper use or incorrect accessories can lead to dangers with unforeseeable consequences.

We do not assume any liability for damage and malfunctions resulting from non-observance of these operating instructions and improper use.

1.8 Duties of the operator

The operator commits to only allow people to work with this device, with the basic regulations on work safety and accident prevention and who have been trained on how to use this device at the workplace.

The safety awareness of the personnel while working will be reviewed at regular intervals.

1.9 Duties of personnel

Prior to its use all people who work with this device are obligated to inform themselves of the applicable workplace safety and accident prevention regulations for this device and to observe them.

1.10 Training of personnel

Only trained and instructed personnel should work with this device. The responsibilities of the personnel must be clearly defined. Trainees may only work with this device under the supervision of an experienced person.

1.11 Guarantee and liability

Guarantee and liability claims for personal injury and property damage are excluded, if caused by one or more of the following:

- improper use
- failure to observe these operating instructions
- improper installation, commissioning, operation and maintenance of the device
- operating the device with defective safety devices or improperly installed, or non-functioning safety and protective devices
- failure to observe the information in the operating instructions regarding transport, storage, assembly, commissioning, operation and maintenance of the device
- unauthorized structural modifications to the device
- improperly performed repairs
- catastrophes due to external influences and acts of God

1.12 Copyright

These operating instructions are intended solely for the operator and its personnel.

They contain guidelines and information which may not be fully, or partially

- reproduced
- distributed or
- otherwise shared.

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2 General safety information for power tools

DANGER

Read all the safety information, instructions, illustrations and technical data which is provided with this device. Failure to follow the instructions below may result in electric shock, fire and/or serious injury.

WARNING

This device was manufactured in according with current state-of-the-art technology and recognized technological safety guidelines. However, its use may jeopardise the health and life of the user or third parties, or risk damage to other property.

WARNING

The workplace must only be used in accordance with its intended use and in technically perfect condition.

NOTE

Keep all safety information and instructions for the future.

NOTE

Only have your device repaired by qualified professional staff and only with original replacement parts which are available at HS-Technik GmbH. This ensures that the safety of the device is maintained.

3 Important information about this device

3.1 Structural modifications

No changes, additions or conversions to the device may be made without the approval of the manufacturer.

All conversion measures require written permission and confirmation by **HS-Technik GmbH.**

WARNING
In the event of the replacement of wear and tear parts only original replacement parts may be used.

3.2 Cleaning the device and disposal

WARNING
Do not open the NetBee internal parts. Maintenance must be done by HS-Technik authorized personnel only.

It is OK to use common disinfectants to clean HS-Technik products in order to follow their decontamination protocols that they have put together for their facility. Therefore, wiping the exterior surface with a cloth or wipe that contains a disinfectant is reasonable. If a disinfectant must be sprayed onto the product, care should be taken not to spray the disinfectant in points where it could enter the inside of the product.

Information on Waste of Electrical and Electronic Equipment:
This product and its information meet the requirements of the WEEE Directive (2002/96/EC) and successive modifications. At end of life the products must be treated as WEEE. The product is marked with a crossed trashcan. See picture below:

In the European Union, this symbol indicates that products must not be disposed of as

unsorted municipal waste but must be dealt with separately, in accordance with the WEEE Directive (2012/19/EU). At the end of its life, this product must be wasted according to local regulations. Collecting properly equipment to be wasted for consequent environmental compatible dismissing, recycling, and treatment processes contributes to prevent possible negative effects on the environment, on health and helps re-using and/or recycling of the equipment raw materials.

3.3 Information on Waste of Batteries

This product and its manuals meet the requirements of the Battery Directive (2006/66/EC) and successive modifications. At end of life the internal wasted battery must be dismissed according local regulations. The abusive product dismissing by the user implicates administrative sanctions according to the above indicated Directives.

DANGER

Risk of injury from damaged devices

Damaged devices can lead to injuries or damages.

- All damaged parts must be repaired before use.

Risk of injury from falling devices

Falling devices can lead to injuries or damages.

- Avoid dropping the device.

Risk of injury due to improper use

Improper use can lead to injuries or damage.

- Use the device only for the intended purposes.

NOTE

Maintain your device with care. Follow the operating instructions during maintenance and cleaning.

NOTE

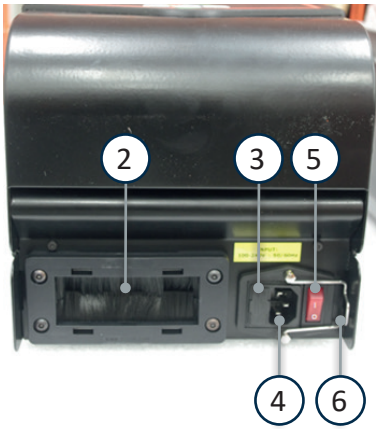
Do not drop the device, and do not let any other objects fall onto the device. Protect it from impacts.

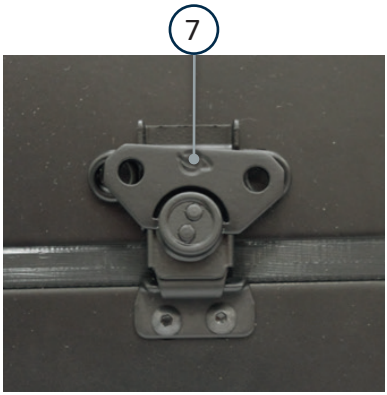
NOTE

Ensure that the device does not come into contact with splashing water or oil.

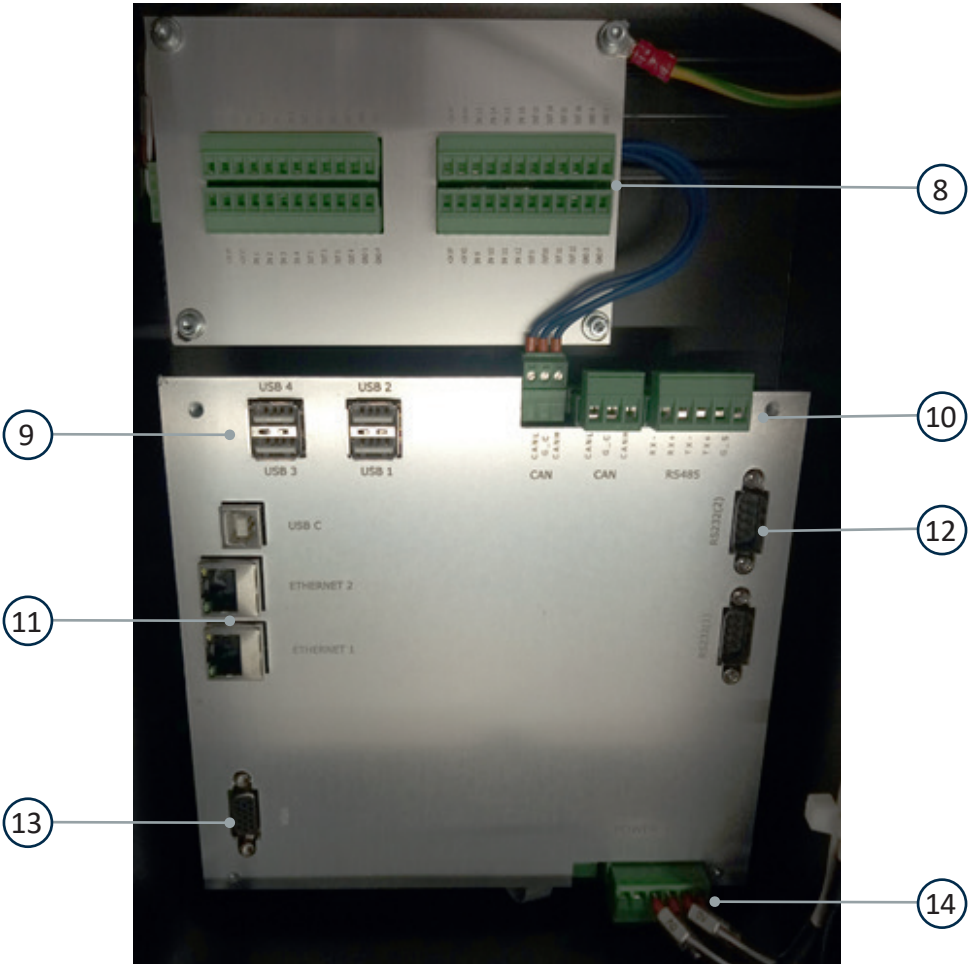
4.1 Device structure

1. Touchscreen
2. Passage for cable tray
3. AC Power fuse
4. Input AC power
5. Main switch
6. Clamp for AC power cable
7. Locking mechanism

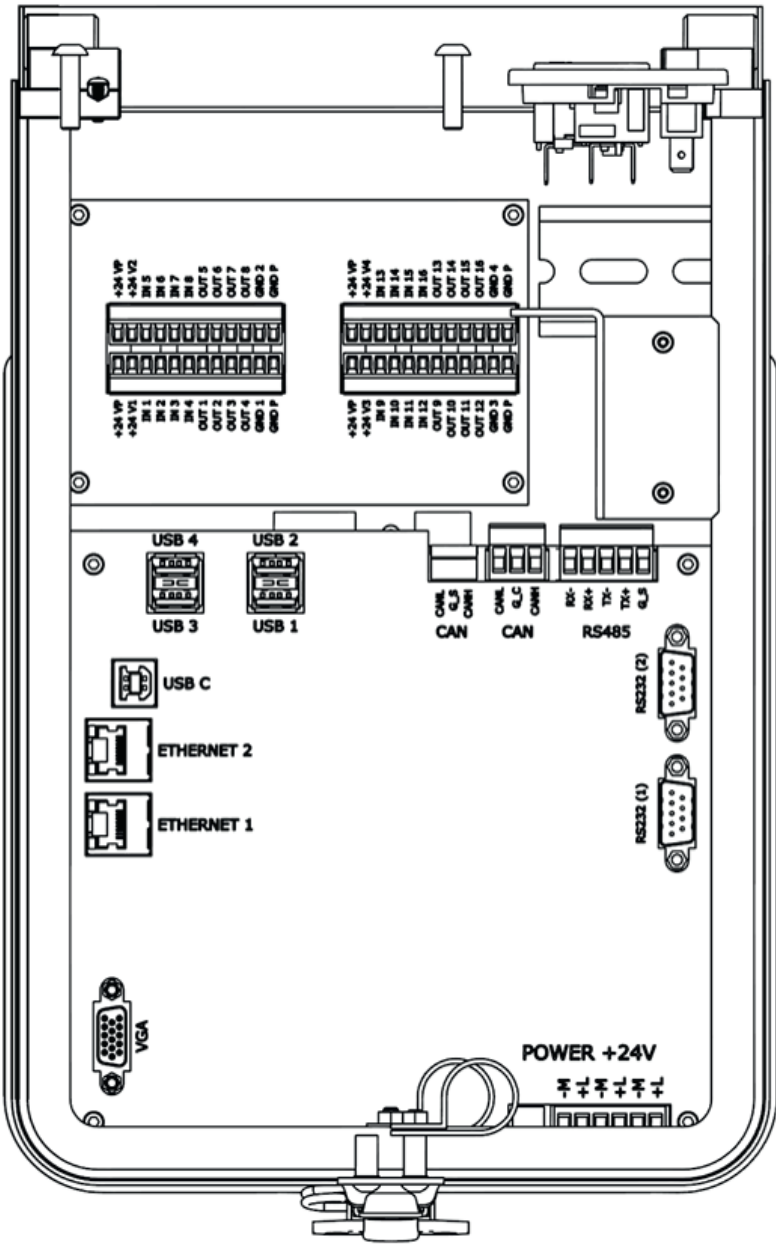




8. Inputs/Outputs
9. USB ports
10. RS 485 port
11. Ethernet ports
12. RS 232 ports
13. VGA port
14. Internal 24 VDC



NetBee-16IO


USB 4
USB 2
USB 3
USB 1
USB C
ETHERNET 2
ETHERNET 1
VGA
CAN
CAN
RS485
RS232 (2)
RS232 (1)
POWER +24V

Touchscreen	NetBee monitor providing information on the tightening operation.
Input AC power	Connect input AC power cable (ensure that the power line is properly grounded). Use the clamp to lock the power cable to avoid unwanted disconnection. To main switch turns on/off the NetBee. In the fuse box, there is one spare fuse.
Locking mechanism	The locking mechanism must always be closed after the NetBee installation.

WARNING
Make sure to properly lock the device again after opening.

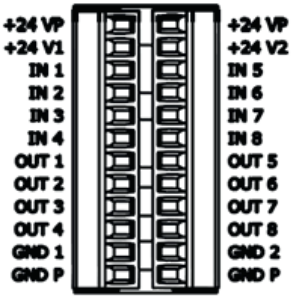
During installation or maintenance, unlock to open the NetBee and access the connectors.

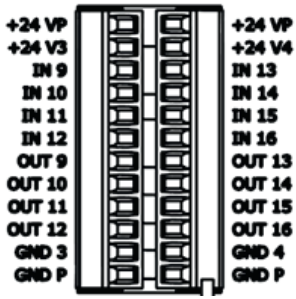
WARNING
When unlocking, hold onto the NetBee housing to prevent it from falling over.

DANGER
Disconnect power cable before release of the locking mechanism.

Internal 24 VDC	Internal NetBee power

Inputs / Output connectors	Number of inputs/outputs depending on the NetBee option chosen. Connectors for I/O.





Each output provides, when activated, +24 VDC, 0.7A maximum.
+24 VP / GND P is the NetBee internal voltage.
For each group of outputs (Out 1 to Out 4, Out 5 to Out 8, Out 9 to Out 12, Out 13 to Out 16), the power +24 V1 / GND 1, +24 V2 / GND 2, +24 V3 / GND 3, +24 V4 / GND 4 can be taken from + 24 VP and GND P (with jumpers between the pins), or can be from an external system.

Inputs are opto-isolated:
- Low: 0 VDC
- High: 24 VDC

Inputs and outputs must be connected in a coherent way to the external system (see the example below).

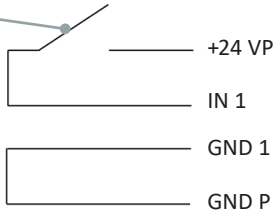
0 V = input low
24 VDC = input high

Example of connection:
- Input from external system which provides the input voltage

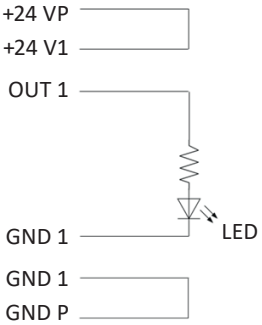
+0V or 24 VDC ---------- IN 1
External device **NetBee Input**
GND ----------GND 1

- Input from a switch

open = input low
closed = input high



- Output driving a LED with internal NetBee power:



- Output to a remote system (for exampe PLC) with its own power:

Ethernet ports

One port is used to connect to plant network , and the other is available to connect to tools.

RS 232 ports

RS 232 Serial ports are for:
- Barcode reader (up to 2)
- Printer
- Serial Out (to send results via serial interface)
- **COM 2 only:** Fieldbus communication

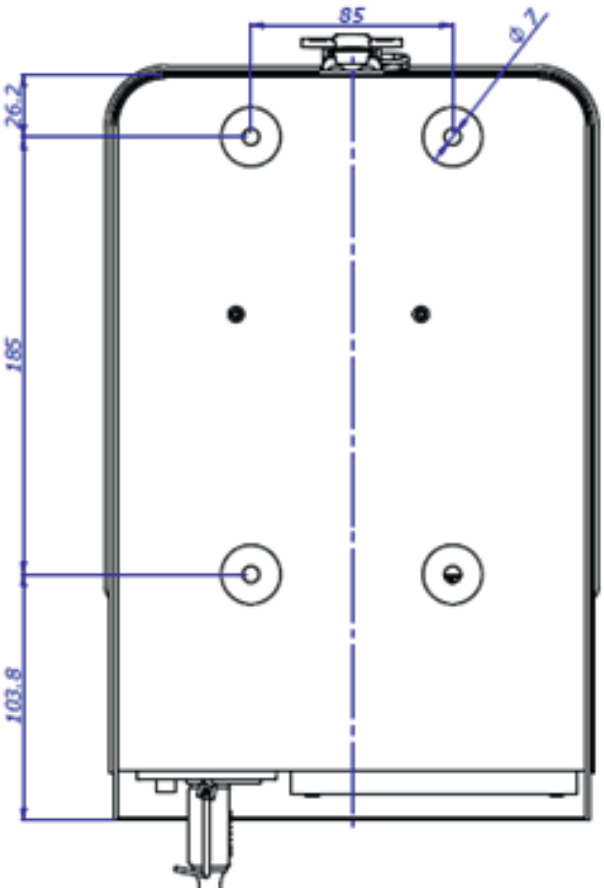
NOTE

When the serial (COM) ports are used for a certain function, they are not available for others. For example, if one serial port is used for barcode and one for Fieldbus, it is not possible to use a port for serial out, and vice versa.

CAN BUS	Can Bus interface, not active in this version
RS485/RS422	Serial port, not used in this version
USB ports	USB can be used e.g. for a barcode reader
110 - 230 VAC power cable	Power cable, compliant with electrical standards of respective destination countries.

4.2 Assembly of the NetBee

The NetBee is intended for wall mounting.

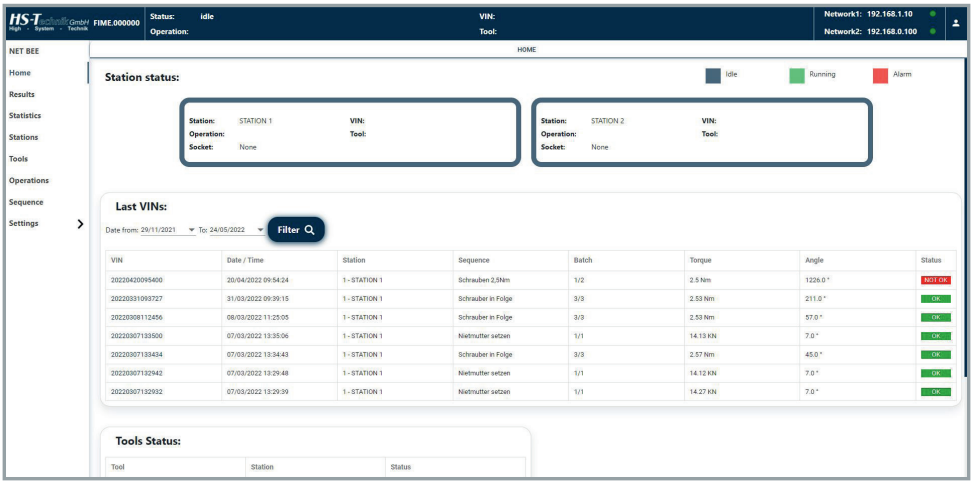


Specifications in mm
Not shown to scale

NOTE
Please install the controller so that the connection socket is easily accessible in order to ensure a quick and safe disconnection from the network in an case of emergency.

4.3 NetBee programming with Web interface

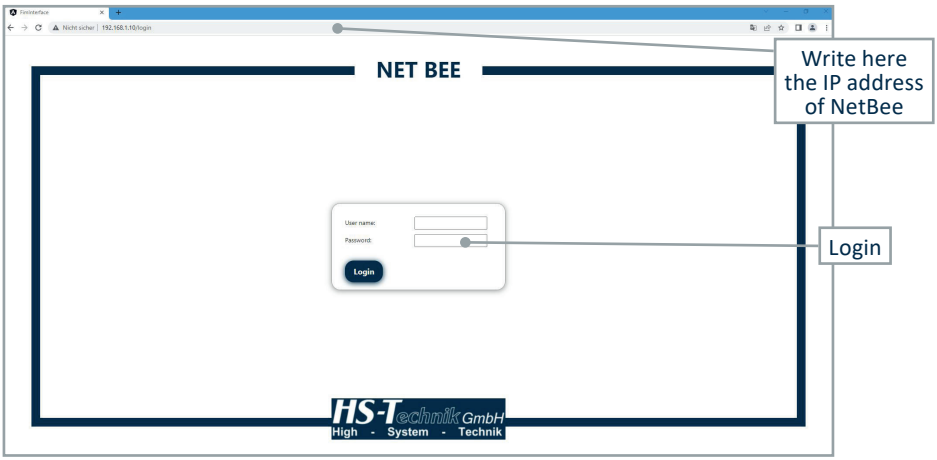
Simply connect to the Netbee from any remote computer on the same network.



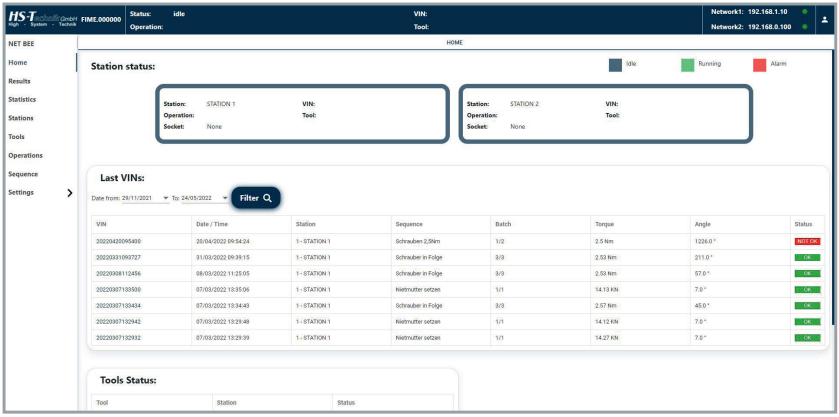
4.3.1 Connecting to the NetBee

The NetBee is delivered with a default network setting (192.168.1.10 for Network 1. DHCP for network 2), provided with the NetBee documents.

Open the internet browser and connect to the NetBee IP Address:

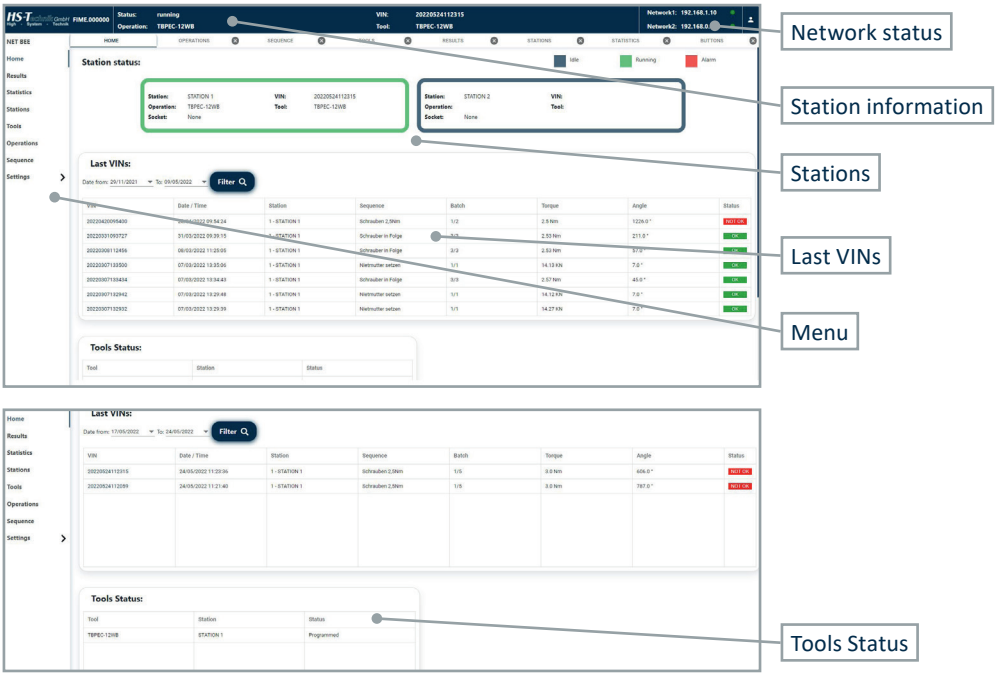


Enter the default **User Name** and **Password**, provided with the NetBee documents. Click on **Login** to connect. The main menu is shown:



4.3.2 Main menu

In the main menu, the active stations are shown:



Stations

Here the stations are shown (one or more), with the ongoing operation information displayed.

The square around the station is colored as following:
Orange: NetBee in idle (waiting) mode
Green: NetBee running
Red: Alarm. In that case a detailed warning message is shown

Upper bar

Here the information about the status of the first station is shown (updated every 3 seconds):

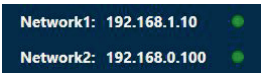
Menu

The menu on the left gives access to the following functions:

Results: View the results
Statistics: View the statistics on the operation executed
Stations: Programming the stations
Tools: Define the for each station
Operations: Define all the tightening operations
Sequence: Define the sequence of the operations performed to execute the assembly procedure
Settings: Define the NetBee settings

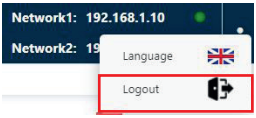
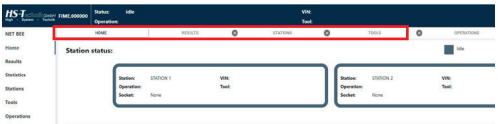
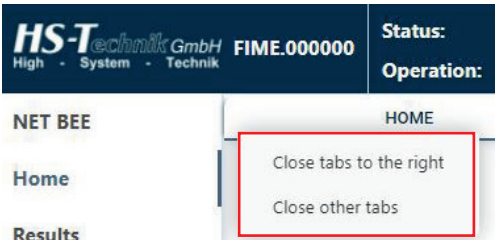
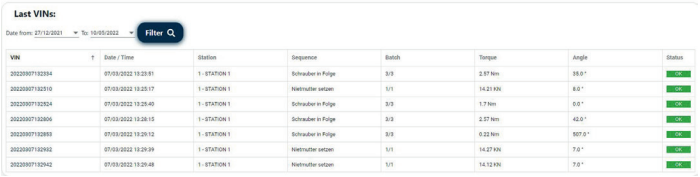
Network status

This box shows the status of the 2 network ports of the NetBee



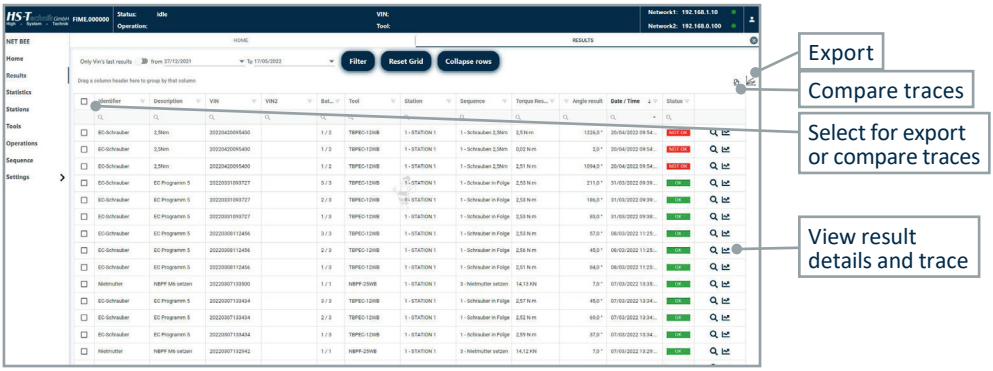
Language

To select the interface language, click on the icon on the top-right

Logout	To logout from the interface, click on the icon on the top-right 
Last visited menu	In this bar the last visited menu are shown  Click on the × icon to delete one item. Right-click to close the tabs on the right or all tabs except the current tab: 
Tools status	List of the tools defined, and their status (online or offline).
Last VINs	Last operations executed are visible here, grouped by VIN.  Click on a VIN to open the results associated to that VIN. It is possible to filter the items in this window with the date filter on the top.

4.3.3 Result view

In this menu the results are shown:

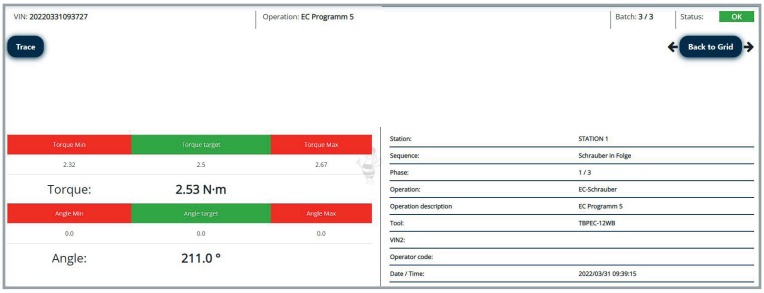


Click on the icons on the right to view the result details.

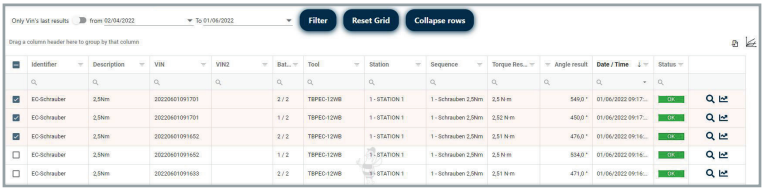
Reset Grid: Reset filtering and grouping options

Refresh Data: Refresh this window with latest results available

The 🔍 icon shows more information on the result:

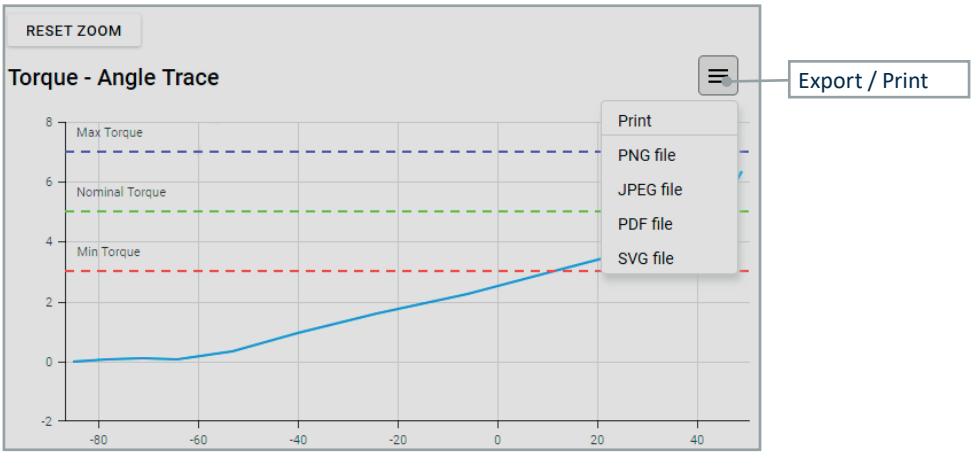


The icon shows the trace:



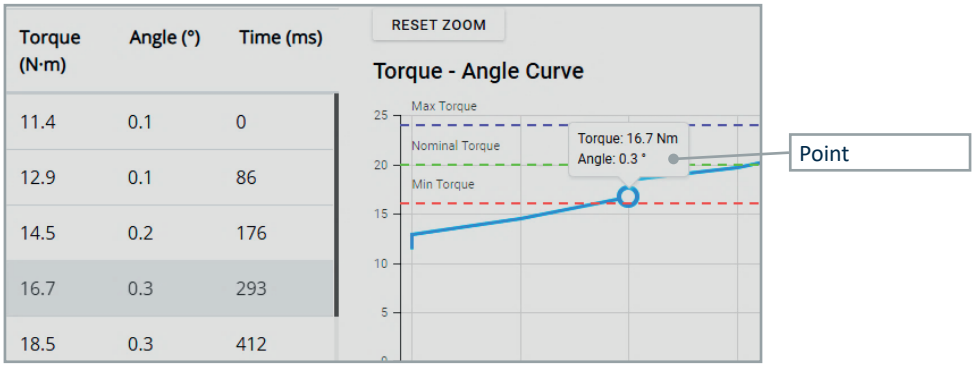
Click on **Switch to Torque - Time Trace** or **Switch to Torque – Angle Trace** to change the chart type.

Click on the **Exporting / Printing** menu to export the trace in PNG, JPEG, PDF or SVG file:

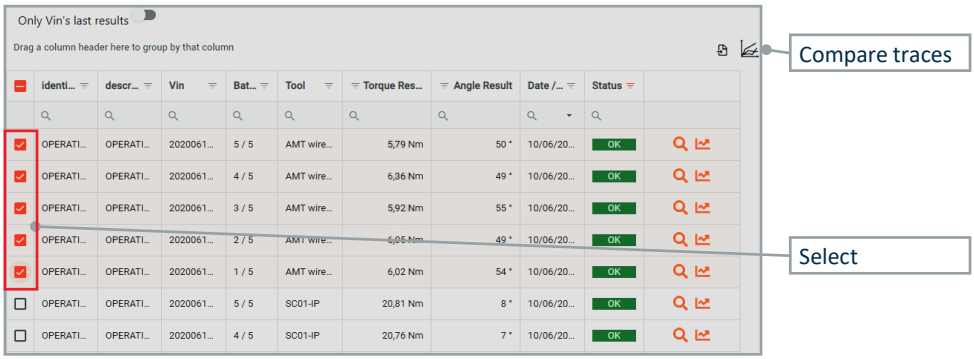


In the trace, it is possible to zoom selecting the area with the mouse. Click on **Reset Zoom** to restore whole trace.

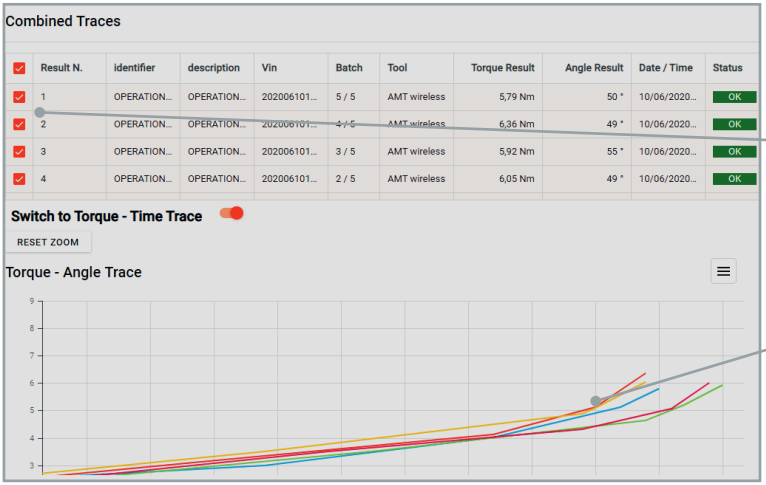
Click on a point to view it on the trace:



Traces can be compared (maximum 10 at a time) selecting more results and clicking on the **Compare traces** icon:



The following window is shown:

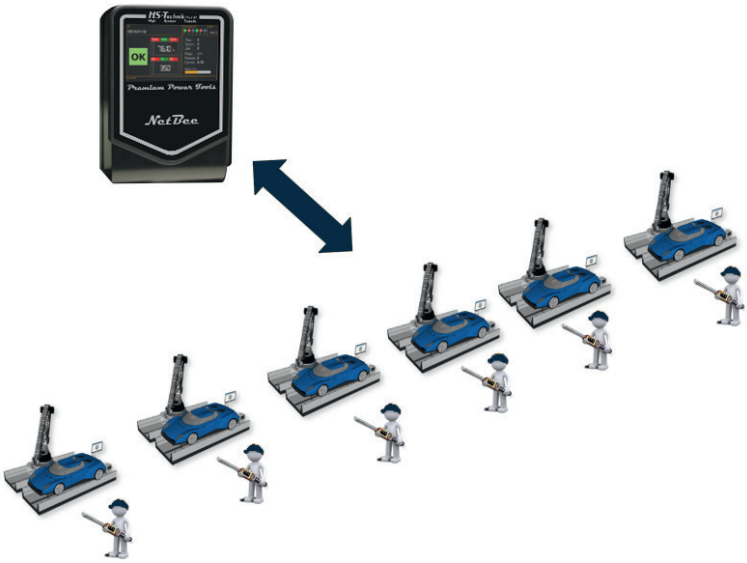


Select/Deselect

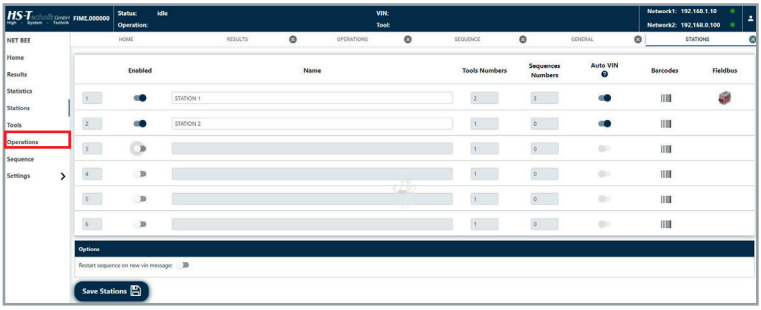
Superimposed traces

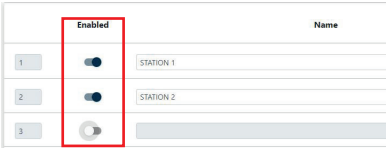
4.3.4 Stations

In this menu it is possible to add up to 6 stations:



Attention: 6 stations only with NetBee-UH.



Active	 For each station, enable this flag to activate it. If enabled, it is shown in the home page.
Name	Enter the station name
Tools Numbers	This shows how many tools are associated to the station. See the Tools chapter for more information.
Sequences numbers	This shows how many sequences are defined for the station. See the Sequence chapter for more information.
Auto VIN	It is possible to auto generate a VIN (with the time stamp, in the format YYYY-MM-DD-hh.mm.ss), useful in case the production system of the customer would not provide it.

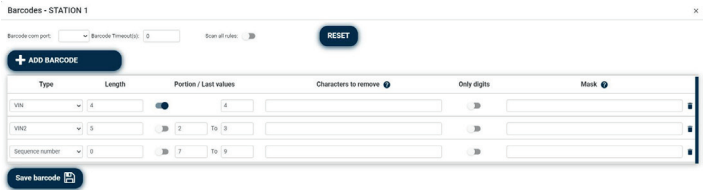
Barcodes

 Red icon: Barcode data present

 Black icon: Barcode data empty

A barcode string can be scanned by:
- A barcode scanner connected to NetBee via serial port
- A tool having barcode scanner (for example TorqBee, WrenchBee, ...) connected to the NetBee

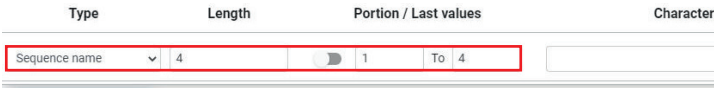
Here the barcode strings to be scanned are specified. Using the sequence name and number fields, it is possible to start automatically a sequence scanning a certain barcode string:



- **Barcode redirect:** This allows to associate the barcode to a port COM of the NetBee
- **Barcode timeout:** Timeout to read all the barcodes (maximum 4)
- **Type:** Select between **VIN, VIN2, Sequence name, Sequence number** or **Operator** depending from which information is contained in the barcode

Selecting **Sequence name** or **Sequence number**, the sequence is activated when the barcode containing the sequence name or number is scanned

For example, if the sequence name is PR02, it will be activated in cases like:

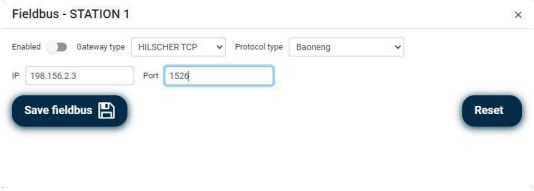


Barcode scanned: PR02

Barcode scanned: XXXXPR02

If the sequence number is 3, it might be activated with:

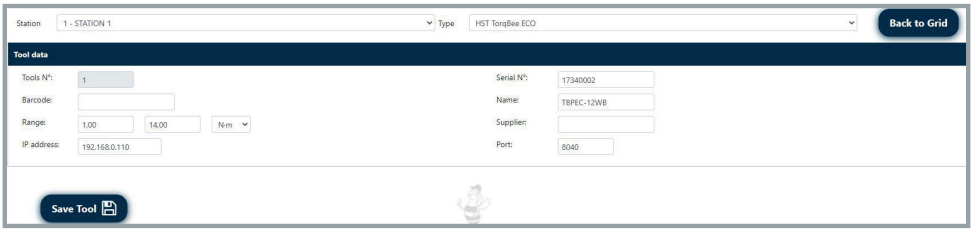
Barcode scanned: 3XXXXXXX

	- **Length:** barcode length - **Only digit:** Enable if the barcode is composed only by digits - **Portion From To:** Extract one section of the barcode - **Mask:** Mask the selected portion of the string, with the following rules: ? all characters # only digits ! only letters * any string with any length Note: If Only digit is enabled, it is possible to use only # or * - **Characters to remove:** Remove one or more characters from the selected portion of the string. Example: 1,3 → A9B99 will turn into 999 Click on **ADD BARCODE** and **Save Barcode** to add a barcode and save the configuration.
Fieldbus	Activate Fieldbus interface for the station. It can be enabled only in the first station.  - **Active:** activate the fieldbus - **Gateway type:** Select the mode (TCP or Serial) - **Protocol type:** Select one of the protocol available - **IP and Port:** Parameters for TCP - **Connector and Baud Rate:** Parameters for Serial
Restart sequence on new VIN message	If enabled, the sequence is restarted if a new VIN is received
Save Stations	Click to save the stations
Apply configuration changes	After saving, this command restarts the NetBee application to make the changes effective.

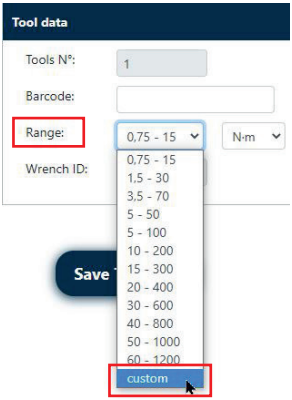
4.3.5 Tools

In this menu it is possible to define up to 12 tools:

Click on **Add tool** (or **Edit** icon) to define a tool. The following window is shown. The parameters shown depends from the tool type:

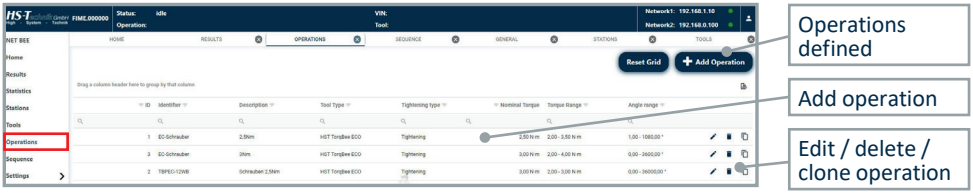


Station	Associate the tool to the station. See the Stations chapter for more information
Type	Select the tool type from the list
Tools N°	Tool number, progressive (1 to 12) and not modifiable
Serial Number	Tool serial number
Barcode	Tool ID
Name	Tool description

Range	Torque range and measurement unit. For customized HS-Technik tools, it is possible to define a customized range: 
Manufacturer	Tool manufacturer
Other parameters	The other parameters depend on the tool type. Refer to the tool user manual for more information about how those parameters are used. NOTE: For HST tools, the IP address must be entered even if not necessary (the important parameter is the port). The communication protocol allows to select a Program/Sequence and collect data.
Save Tool	Save the tool data
Apply configuration changes	After saving, this command restarts the NetBee application to make the changes effective.

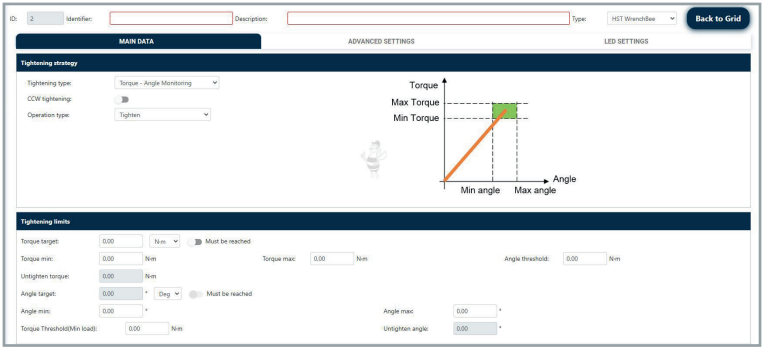
4.3.6 Operations

In this menu it is possible to define all the tightening operations, that will be used then to define the sequences:

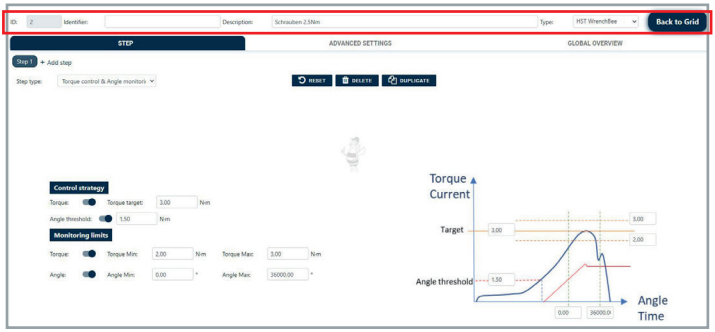


In the figure above, for each operation its most important data are shown.

Click on **Add operation** (or **Edit** or **Clone** icon) to define a operation. The following window is shown. The parameters shown depends from the tool type:



Identifier	Operation identifier
Description	Operation description
Type	Every operation must be assigned to a tool type, since each tool can perform its own operations with the relevant parameters. The parameters shown in the figure above depends on the type selected here.

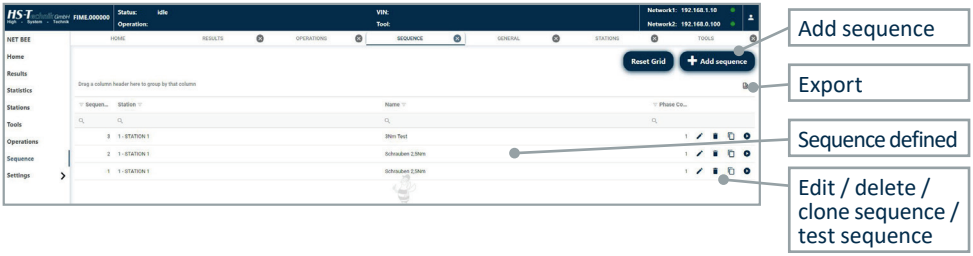
Tightening parameters	All the parameters shown in the figure above are strictly related to the tool type. For WrenchBee, data are grouped in different tabs:  For more information about how they are used by the specific tool, please refer to the tool user manual (for example, HS-Technik manuals for NetBee).
Save operation	Save the operation data
Apply configuration changes	After saving, this command restarts the NetBee application to make the changes effective

NOTE

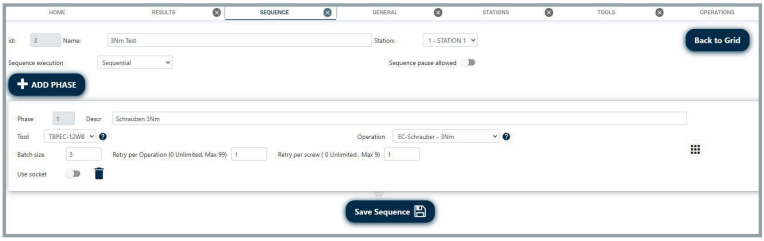
The Minimum torque value must be ≥ the minimum torque range of the tool. For example: Tool range is 5 to 50 N·m × Minimum torque value must be ≥ to 5 N·m.

4.3.7 Sequence

In this menu it is possible to define the sequences (assembly procedures). Each sequence is composed by phases, that are the operations defined in the Operations menu.



In the figure above, for each sequence its most important data are shown.
Click on **Add sequence** (or **Edit** or **Clone** icon) to define a sequence. The following window is shown:

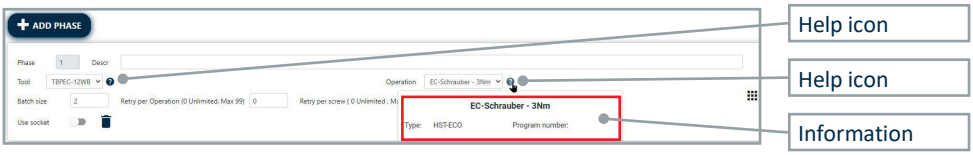


Click and drag on the icon on the right to move the phases in different position.

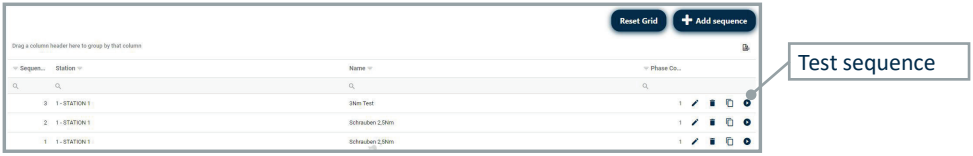
Sequence name	Name of the sequence. It can be used to start it with the barcode reader.
Station	Assign the sequence to the relevant station
Sequence execution	- **Sequential:** The phases must be executed in the specified order. - **Parallel:** The phases can be executed in parallel at the same time (the order is not important)
Add phase	Add the operations to the sequence. At least one operation must be added to have a sequence.
Phase	Progressive number automatically created
Descr	Phase description

Tool	Tool used to execute the tightening. See the Tools chapter to define tools.
Operation	Select the operation to execute in this point of the sequence. See the Operations chapter to define operation.
Batch size	Number or times that the operation must be repeated (number or screws).
Use Socket	If enabled, it specifies the socket number to use (for application with the NetBee Socket Tray by HS-Technik). Sockets available depend from the Socket Tray configuration. See the Socket Tray settings chapter for more information.
🗑	Remove phase from the sequence
Save Sequence	Save the sequence
Apply configuration changes	After saving, this command restarts the NetBee application to make the changes effective.

Positioning the mouse on the help icon ? for tools or operations, a pop-up window shows the relevant information:



When a sequence is defined, it is possible to execute it, in order to test the sequence. Click on the test sequence icon on the right:

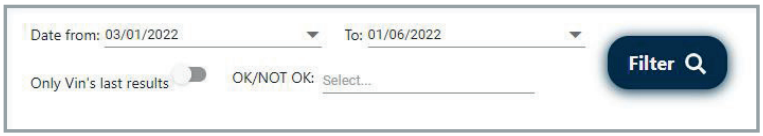


4.3.8 Statistics

In this menu it is possible to open statistics on the operations executed.

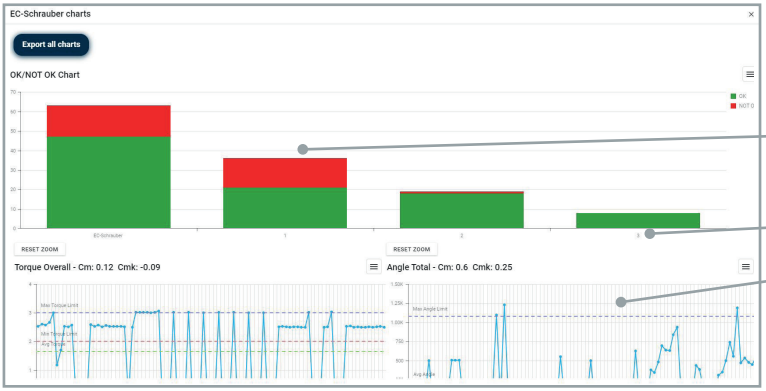
In this windows, all operations with results are shown. For each operation, the following information are shown:
Screw nr: Screw number
Results: number of results present
% OK: Percentage of OK results on the total number of results
% NOT OK: Percentage of NOT OK results on the total number of results
Torque min/Avg/Max and Torque min/Avg/Max: Torque statistics (minimum, average and maximum values)
Torque Cm, Torque Cmk, Angle Cm, Angele Cmk: Machine capability indexes calculated on torque results and angle results

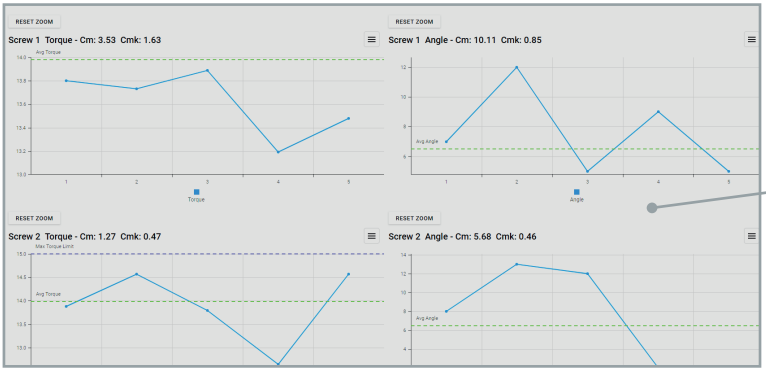
In the upper area of this window, filters are available to search for specific results:



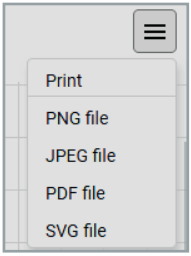
Click on the left to expand and view results for each operation.

Click on the chart icon on the right to open the following chart:



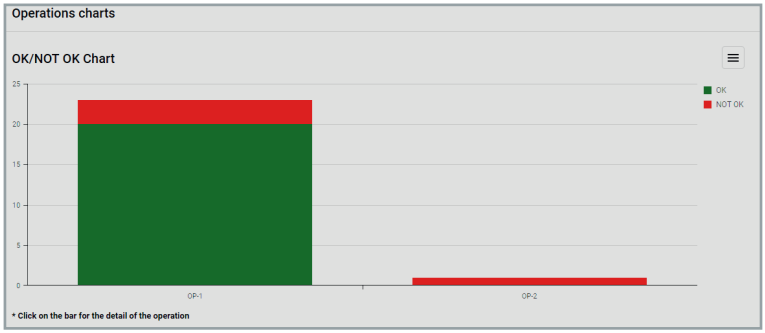


Click on the icon on the right to export the chart in PNG. JPEG, PDF or SVG file

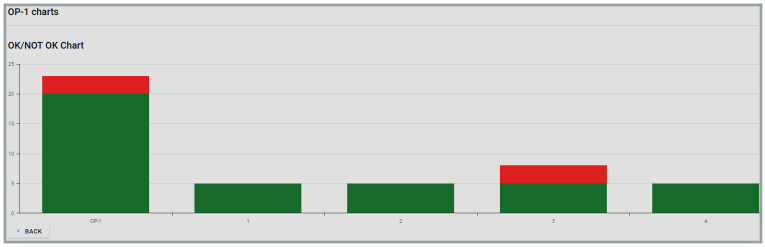


Click on **Export all charts** on the top-left to export all the charts.

Select more operation and click on **Compare Operations** to view the following chart comparing the operations statistics about OK and NOT OK percentages:



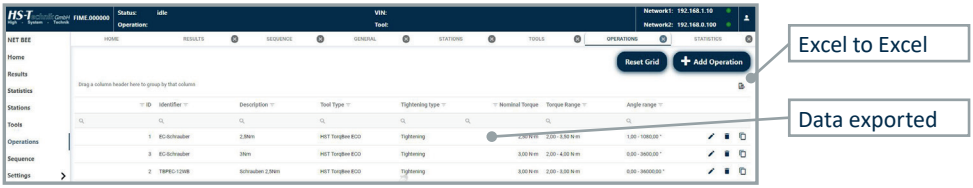
Click on a single operation to open its detailed statistics:



4.3.9 Common functions

4.3.9.1 Export data

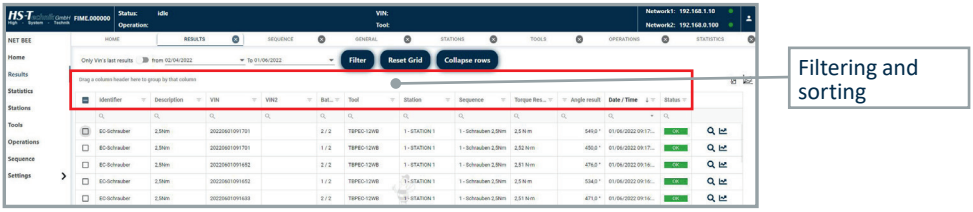
In several screens of the software, the icon exports the data shown in the current window to an Excel file:



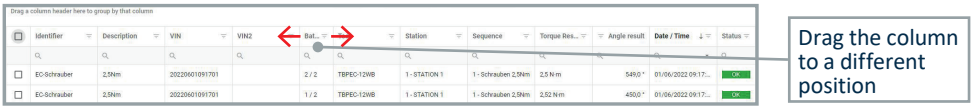
Data are exported as they are shown in the window. For example, if rows are hidden with the filters above, they are not exported.

4.3.9.2 Filtering and sorting tables

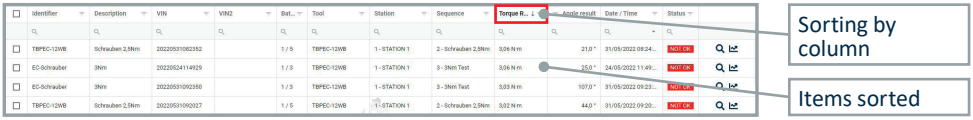
In several screens of the software, it is possible to filter and sort the data.



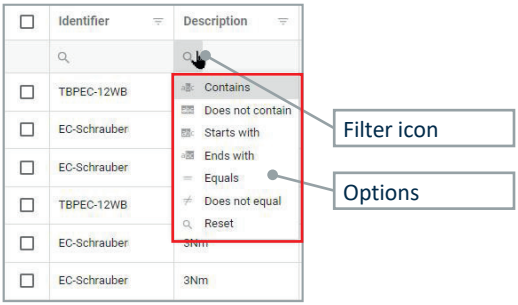
The columns position can be changed simply dragging the columns in the preferred position:



Click on the row header to sort the items (click twice to reverse the order):

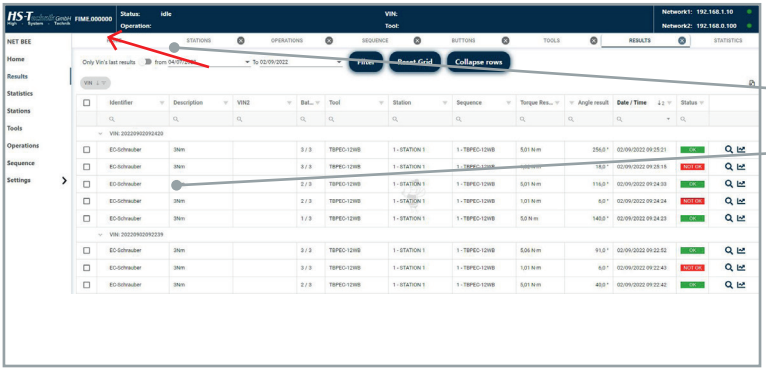


Click on to filter the items:

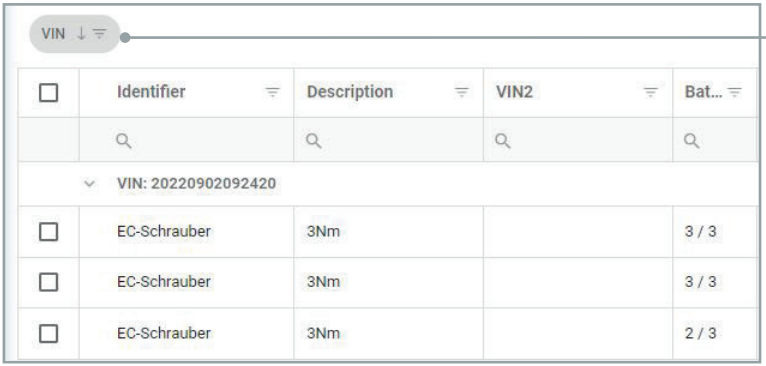


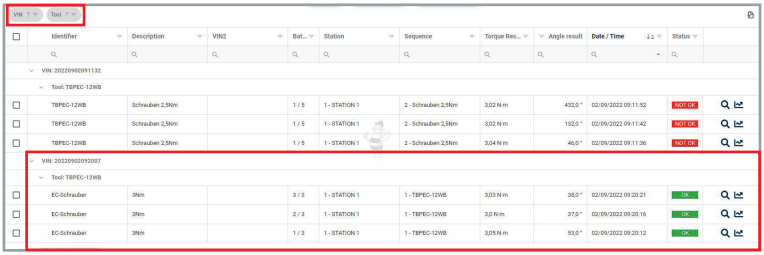
Select **Contains, Does not contain, Starts with, Ends with, Equals** or **Does not equal** and enter the criteria, then press enter to apply:

Drag the columns to group the items:

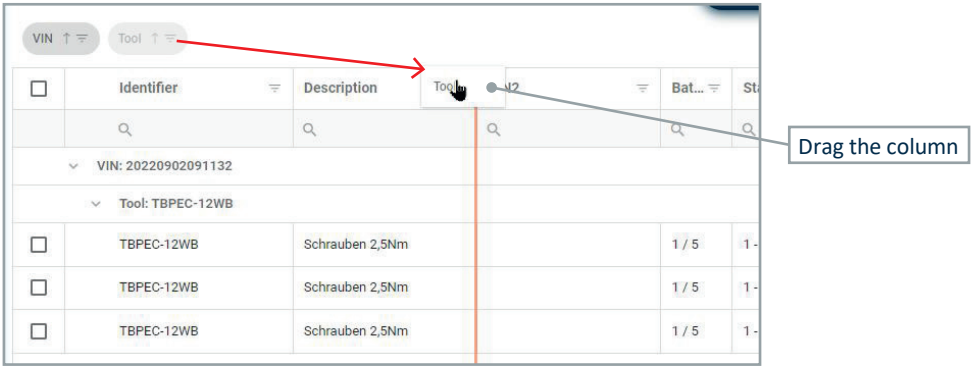


Click on the icon to reverse the order:



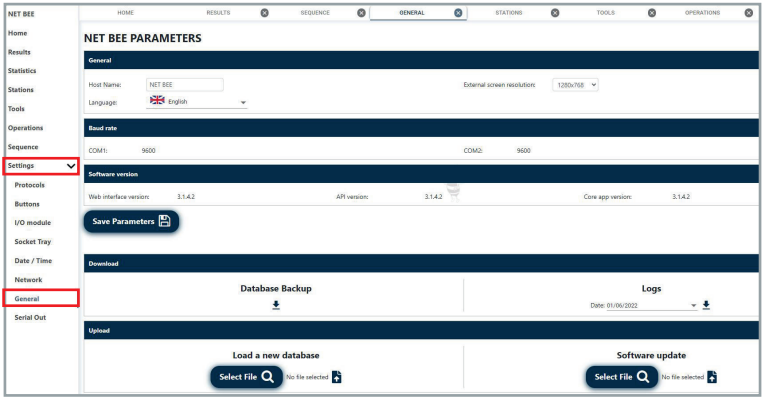


Drag the column to the table header to remove it:



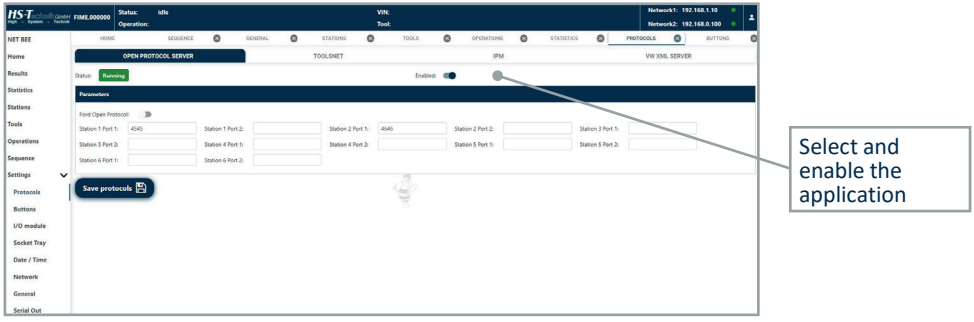
4.3.10 Settings

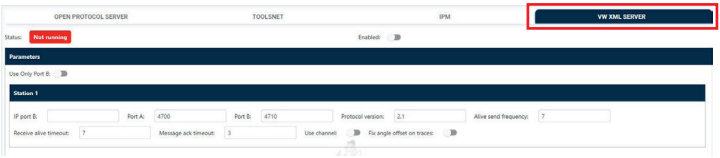
4.3.10.1 General



Host name	Host name of the NetBee
External screen resolution	If a monitor is connected to the NetBee (for instance to have a duplicate of the NetBee display connecting a monitor to the VGA port), here the resolution is set.
Language	Select the language of this software
Software version	Current software version of: - **Web interface:** this software - **API:** module for communication with external devices - **Core app:** software running on the NetBee
Programming mode	**Standalone:** NetBee working alone
Download	**Database backup:** Save all the NetBee data. It is possible to save a certain configuration to be restored then at a later time. Also, it is possible to copy the database (sqlite) from one NetBee to another one (software version must be the same). **Logs:** save the log file. Useful for troubleshooting activities.
Upload	**Load a new database:** Restore a database (sqlite) previously saved
Software update	Select a file to update the software version (web interface, API, Core App).

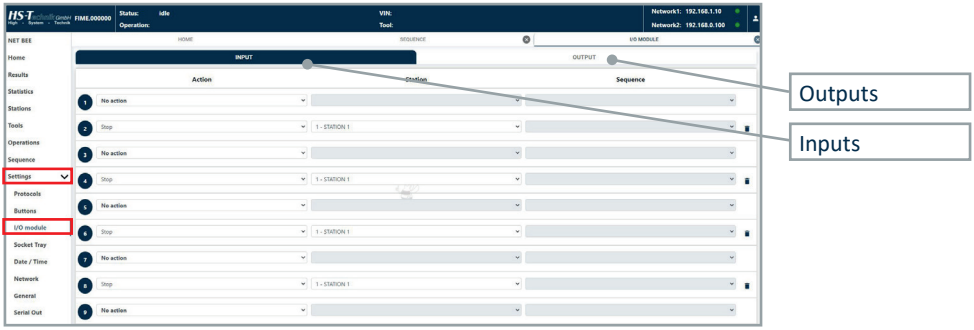
4.3.10.2 Applications



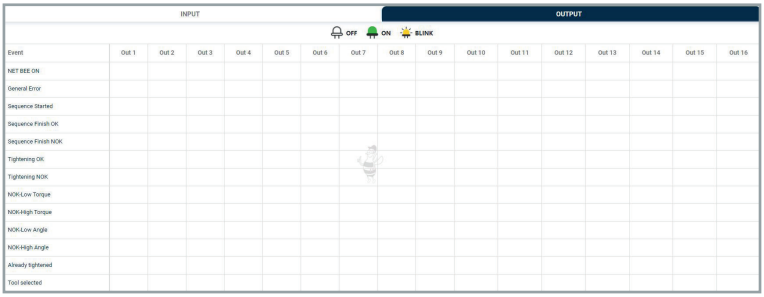
Open protocol server	Interface with customer system via Open Protocol Server. See the Working with Open Protocol chapter for more information.
Toolsnet	Interface with Toolsnet. See the Working with Toolsnet chapter for more information.
IPM	Interface with IPM. **IP address** and **Port** must be entered here.
VW XML server	Interface with VW XML Server. Enter the parameters, depending on your XML server configuration, in the following window: 
Status	Indicates if the application is **Running** or **Not Running**
Active	Enable the application
Apply configuration changes	After saving, this command restarts the NetBee service. Restart then the NetBee to make the saved configuration effective (for example, press the button on the NetBee with the Reboot option assigned. Otherwise, if the reboot option is not active, switch off and then switch on the NetBee).

4.3.10.3 I/O Module

In this menu you can define the actions for the NetBee inputs and outputs (number of inputs and output depending from the NetBee hardware configuration):

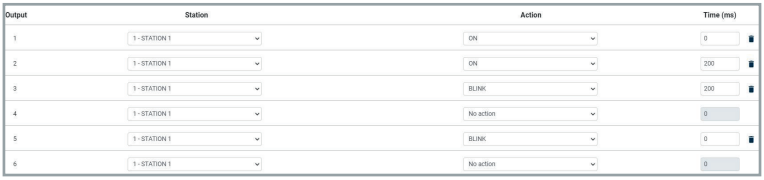


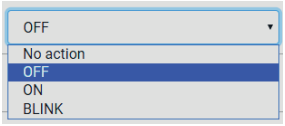
OUTPUTS



	Output OFF
	Output ON
	Output BLINK
Empty	No action

Click on each event shown on the left to define which output to activated:



Station	Select on which station you want to monitor the event
Action	 - **OFF:** Turn off output (useful to turn on an output which was turned ON before) - **ON:** Turn on output - **BLINK:** Blink the output (ON/OFF)
Time	Specify for how long the output is ON or BLINK. If set to zero, the output remains active until another event is set to turn if off.

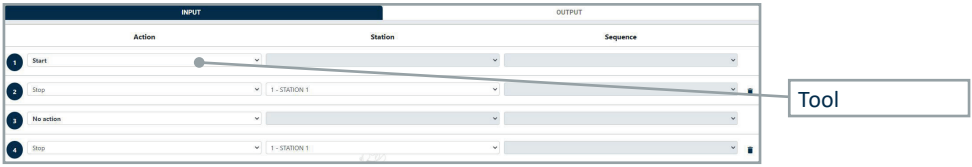
NOTE

When an event activates an output without a timer, the output will remain active for an undefined time. It is important to check that the outputs are enabled and disabled properly for the assembly cycle.

Example: The event Sequence Started is set to turn on output number 1 (with no timer). In this case would be recommended to set the Sequence Finish OK and Sequence Finish NOK with to turn off the output number 1, so that output number 1 will not remain active all the time.

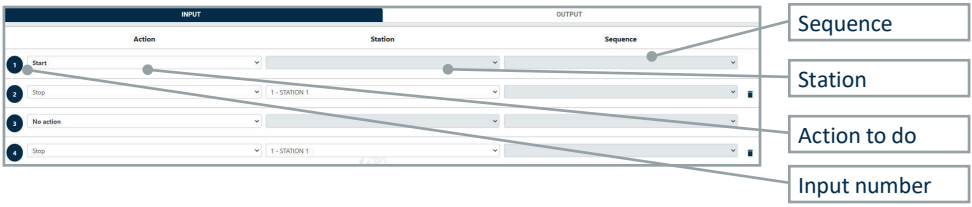
Events	The events available are: **NetBee ON:** NetBee switched on **General Error:** Error. The specific error message will be shown on the NetBee display **Sequence Started:** Sequence started **Sequence Finish OK:** Sequence completed with OK result

Events	**Sequence Finish NOK:** Sequence completed with Not OK result **Tightening OK:** Last tightening operation completed with OK result **Tightening NOK:** Last tightening operation completed with OK result **NOK-Low Torque:** Last tightening operation completed with low torque **NOK-High Torque:** Last tightening operation completed with high torque **NOK-Low Angle:** Last tightening operation completed with low angle **NOK-High Angle:** Last tightening operation completed with high angle **Already tightened:** Last tightening operation executed and detected as “screw already tightened” **Tool selected:** Here you can activate an output when a specific tool is selected (for example, to activate a light on the tool to be used by the operator)

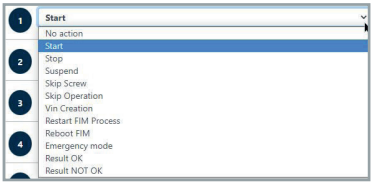


INPUTS

In this window you can set the action to be taken when an input is activated:



Action



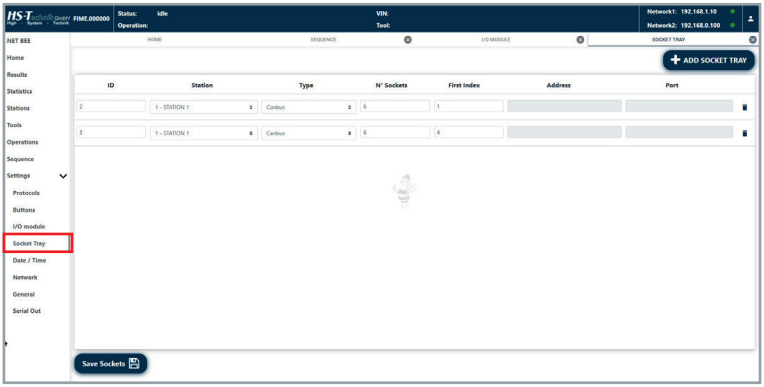
Action	**No action:** Input disabled **Start:** Start a specific sequence on a specific station **Stop:** Stop the ongoing sequence on a specific station **Suspend:** Suspend (pause) a station. To resume, the „start“ event must be generated again **Skip Screw:** Skip a single tightening operation **Skip Operation:** Skip the whole batch for an operation in the sequence **Vin creation:** Create a VIN to be associated to the sequence (Time stamp in the format date and time as following: YYYY-MM-DD-hh.mm.ss) **Reboot NetBee:** Restart the NetBee **Emergency mode:** In this mode, select a station and a sequence. The specified sequence will be always activated again when it is completed

STATION
Some of the actions defined for the inputs (Start, Stop, Suspend, Skip Screw, Skip Operation, VIN Creation), are applicable for a specific station. Here you can define to which station the action is taken.

SEQUENCE
The Start action is applicable for a specific sequence. Here you can define to which sequence to start.

4.3.10.4 Socket Tray

In this menu you can configure the NetBee Socket Tray (by HS-Technik).
Refer to the NetBee Socket Tray user manual for more information about the product.



ID	Identification number. It must be different for each socket tray, and it does not have effect in the operations.
Station	Select the station on which the NetBee Socket Tray is working.
Type	Select the type according to your NetBee Socket Tray type: - **Canbus** - **WiFi**
Sockets	Number of sockets of the NetBee Socket Tray.
Index	This can be used if, for example, there is a NetBee Socket Tray with 6 sockets but only 3 are used. In that case, the index starts to 1, and the next NetBee Socket Tray will start from 4:

ID	Station	Type	N° Sockets	First Index
2	1 - STATION	Canbus	3	1
3	1 - STATION	Canbus	6	4

If the NetBee Socket Tray (6 sockets) is used with all sockets, index will be 1 and the second from 7:

ID	Station	Type	N° Sockets	First Index
2	1 - STATION	Canbus	6	1
3	1 - STATION	Canbus	6	7

Address Port	Network parameters, for the WiFi type only
Add socket tray	Add a new socket tray
Save sockets	Save the configuration

4.3.10.5 Date/Time

In this window you can set the NetBee date and time:

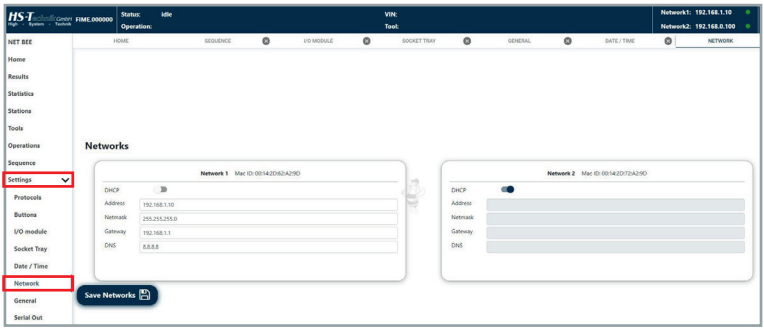
Manual: Manual setting of the date / time
Auto: NetBee will take the date and time automatically from the network. This option is recommended.

If the NetBee is connected to a internet network, the date and time are always automatically taken from the network.

Save Date: Save the settings

4.3.10.6 Network

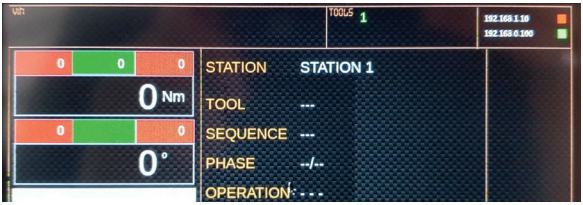
In this window you can set the NetBee network parameters:



DHCP: Enable / disable the DHCP mode
Other parameters: Set according to your network

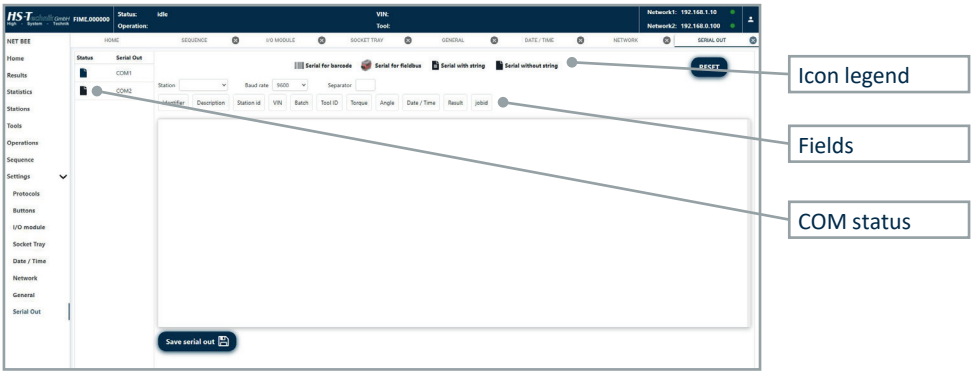
NOTE

After changing the default settings, make sure to take note of the new settings, in order to be able to connect to the NetBee with this programming software. IP address is shown anyway on the NetBee display:



4.3.10.7 Serial Out

In this window you can set the format of the results, which will be sent after each tightening operation:

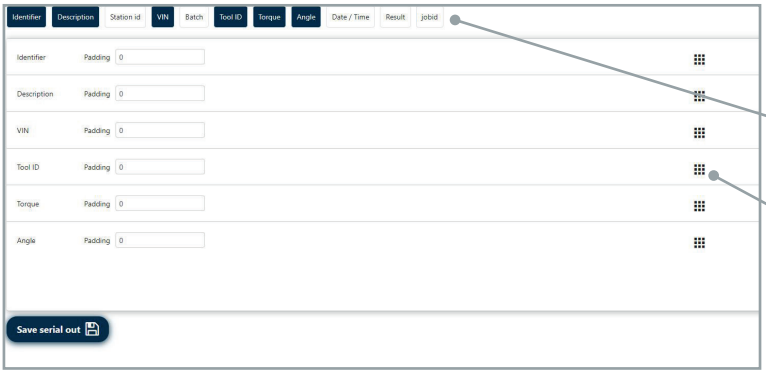


The status of the COM ports is shown as following:

	COM used for barcode (not available for Serial Out)
	COM used for fielbus (not available for Serial Out)
	COM already defined for Serial Out
	COM not used

Station: Select the station associated to Serial Out
Baud Rate: Baud rate of the serial port
Separator: Separator for the fields

Select the fields (click to enable/disable each field) to use and arrange them in the desired order:



Padding: This can be used to have a fixed number of characters for the field. Padding is the minimum length of the field.

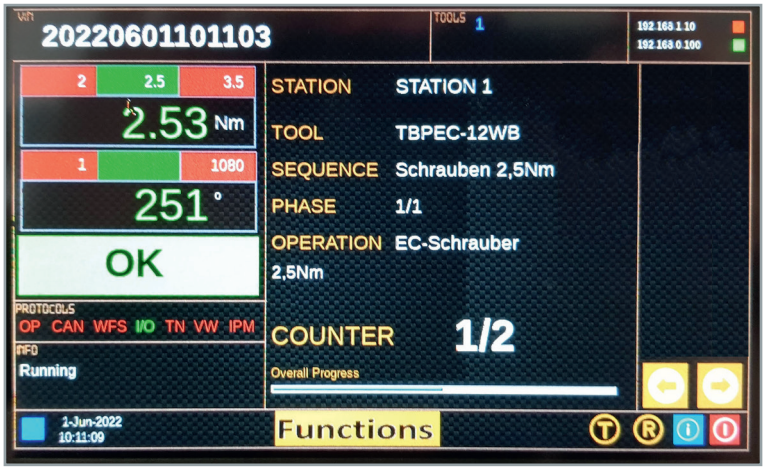
For example, with padding = 10 and comma as separator

Fields =	12	→ 8 blank characters will be added
	tightening1	→ no blank characters will be added
	2	→ 9 blank characters will be added
	15.26	→ 5 blank characters will be added
Formatted string =	12,tightening1,	2, 15.26

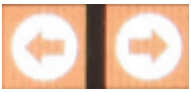
Blank characters added to reach the specified padding

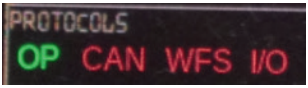
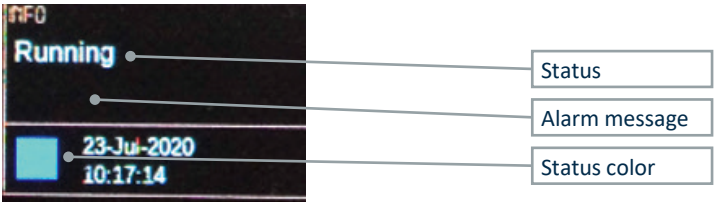
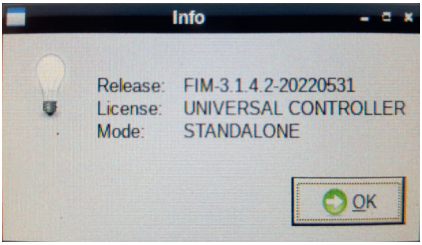
4.4 Operations/Sequences Execution

When the NetBee is programmed and running, the display shows the data:



VIN	VIN number associated with the current operation
Tools	Tools numbers. Colors are as following: **Blue:** Active **Red:** Offline **Green:** Online
IP addresses	IP addresses of the two ethernet ports. The icon on the right is green or red if the network port is connected or not.

Torque / angle results	Torque and angle data, with limits shown above the measurement.  The result OK or NOK is shown in green or red color.  
Operation data	**STATION:** Station name **TOOL:** Tool connected **SEQ:** Sequence name **PHASE:** Phase number / number of phases **OPERATION:** Operation description **COUNTER:** Batch counter **OVERALL PROGRESS:** Progress of the complete sequence The arrows change the station, when more stations are defined on the NetBee: 

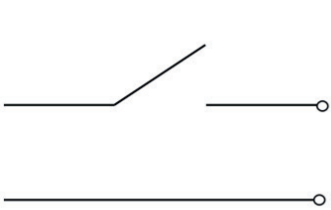
Protocols	Interfaces with other devices are shown here:  Each item is green in these cases: **OP:** Open Protocol communication active **CAN:** NetBee Socket Tray, canbus version, connected **WFS:** NetBee Socket Tray, WiFi version, connected **I/O:** 16 I/O module installed in the NetBee
Info	Status if the NetBee: **Running:** NetBee operating (Blue) **Idle:** Idle mode (Green) **Waiting VIN:** Waiting for VIN to start (Yellow) **Waiting Job:** Waiting for Job to start (Yellow) **Suspended:** NetBee in suspend mode (Yellow) **Alarm:** Error (Red)  In the second row, alarm messages might be displayed in certain conditions, for example “Tool <number> not active” or “Socket interrupt” (in case the NetBee Socket Tray is not connected or socket not in proper position).
Date / time	Date and time
	Click to view the software versions: NetBee software, WEB interface, API 
	Restart the NetBee

4.4.1 Starting a sequence

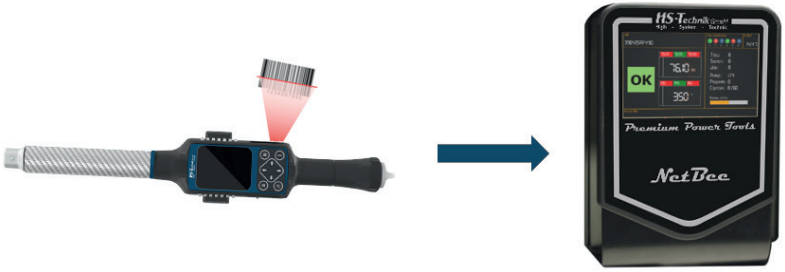
A sequence on NetBee can be started as following:

- Pressing the button „Functions“ on the touchdisplay of the NetBee.

- Receiving an input from an external device (PLC, switch or others). See the Inputs chapter for more information.



- Scanning a specific barcode string. See the Stations chapter for more information.



- Receiving a command via Open Protocol. See the Working with Open Protocol chapter for more information.

In all cases, the VIN number must always be scanned. It is possible to select the “Auto VIN” option to create automatically a VIN if it is not scanned by barcode (See the Stations chapter for more information).

4.5 Working with Open Protocol

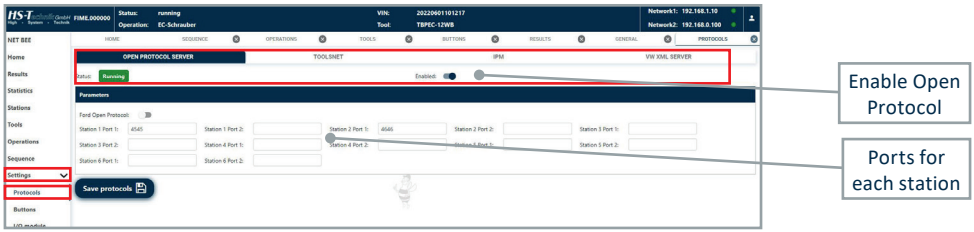
Open Protocol can be used to:

- Interface the NetBee with customer system (Open Protocol Server)
- Interface the NetBee with open protocol power tools

4.5.1 Open Protocol server

When NetBee is used to communicate with a remote system via Open Protocol (server), it must be properly configured. Communication is via Ethernet.

When NetBee is used with Open Protocol, the following configuration in the NetBee is needed (See the NetBee Programming with Web Interface chapter for more information about the programming interface):
Applications in the settings → General must be set to Open Protocol:



For each station, the communication port must be specified (default value 4545).

MID supported by open protocol server:

MID_JOB_ID_UPLOAD_REQUEST	0030
MID_JOB_ID_UPLOAD_REPLY	0031
MID_JOB_INFO_SUBSCRIBE	0034
MID_JOB_INFO	0035
MID_SELECT_JOB	0038
MID_RESTART_JOB	0039
MID_DISABLE_TOOL	0042
MID_SEND_VIN_STD	0050
OP_MID_VIN_SCANNED_SUBSCRIBE	0051
OP_MID_VIN_NUMBER_SCANNED	0052
MID_RESULT_UPLOAD_SUBSCRIBE	0060
MID_RESULT_UPLOAD	0061 rev1 to rev6 (rev 3-6 are filled with default values)
MID_ABORT_JOB	0127

4.5.2 Open Protocol power server

Tools with Open Protocol can be interfaced with NetBee.

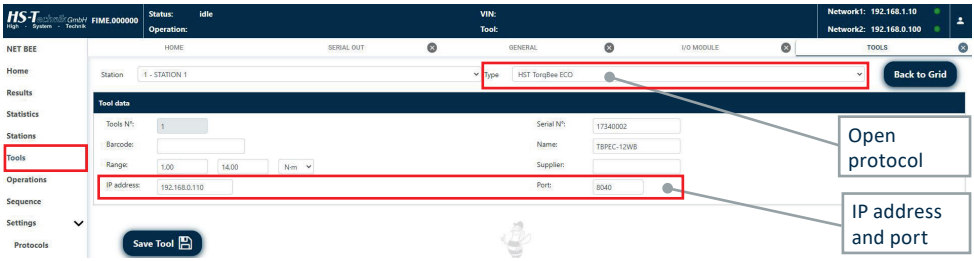
MID supported:

MID_COMMUNICATION_START	0001
MID_COMMUNICATION_START_ ACKNOWLEDGE	0002 (rev 1-4)
MID_COMMUNICATION_STOP	0003
MID_PSET_ID_UPLOAD_REQUEST	0010
MID_PSET_ID_UPLOAD_REPLY	0011

MID_PSET_ID_PSET_PARMS_ REQUEST	0012
MID_PSET_ID_ PSET_PARMS_REPLY	0013
OP_MID_PSET_SELECTED_SUBSCRIBE	0014
MID_PSET_SELECTED	0015
MID_PSET_SELECTED_ACKNOW-LEDGE	0016
OP_MID_PSET_SELECTED_UNSUB-SCRIBE	0017
MID_SELECT_PSET	0018
MID_SET_BATCH_SIZE	0019
MID_RESET_BATCH_SIZE	0020
MID_JOB_ID_UPLOAD_REQUEST	0030
MID_JOB_ID_UPLOAD_REPLY	0031
MID_JOB_INFO_SUBSCRIBE	0034
MID_JOB_INFO	0035
MID_JOB_INFO_ACKNOWLEDGE	0036
MID_JOB_INFO_UNSUBSCRIBE	0037
MID_SELECT_JOB	0038
MID_RESTART_JOB	0039
MID_TOOL_DATA_UPLOAD_REQUEST	0040
MID_TOOL_DATA_UPLOAD_REPLY	0041
MID_DISABLE_TOOL	0042
MID_ENABLE_TOOL	0043
MID_SEND_VIN_STD	0050
OP_MID_VIN_SCANNED_SUBSCRIBE	0051
OP_MID_VIN_NUMBER_SCANNED	0052

OP_MID_VIN_SCANNED_UNSUB-SCRIBE	0054
MID_SEND_VIN_EX	0150
MID_RESULT_UPLOAD_SUBSCRIBE	0060
MID_RESULT_UPLOAD	0061 rev1 to rev6 (rev 3-6 are filled with default values)
OP_MID_RESULT_UPLOAD_ACKNOW-LEDGE	0062
OP_MID_RESULTS_UNSUBSCRIBE	0063
MID_GET_OLD_RESULT	0064
MID_OLD_RESULT_UPLOAD_REPLY	0065
MID_ALARMS_SUBSCRIBE	0070
MID_ALARM_EVENT	0071 (HST wrenches reply with OK but without alarm) currently implemented)
MID_ALARM_ACK	0072
MID_ALARMS_UNSUBSCRIBE	0073
MID_READ_TIME_UPLOAD_REQUEST	0080
MID_READ_TIME_UPLOAD_REPLY	0081
MID_SET_TIME	0082
MID_TXT_USER_GRAPH	0111 //Text to show to user
MID_ABORT_JOB	0127
MID LIMITS FOR GRAPH	0901
MID_KEEPALIVE	9999

The open protocol power tools must be defined in the Tools menu of the NetBee programming interface (See the NetBee Programming with Web Interface and Tools chapter for more information):

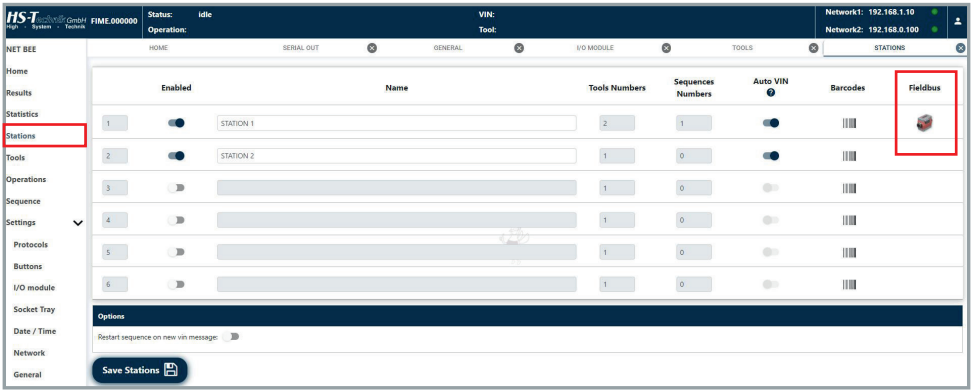


For open protocol communication, **IP address** and **Port** must be specified, together with the other tools parameters in the window above.

4.6 Working with Fieldbus

Fieldbus can be used to connect the NetBee with a customer system.
Communication is performed via Ethernet or serial (COM 2 port of NetBee).

Fieldbus communication is enabled (on the first station), with proper parameters, via the webserver programming interface:



INPUT CARD

Byte size	Description	Notes
2	Job Number to Start	
60	VIN Number	
2	Stop Job	Stop if <> 0

OUTPUT CARD

Standard NetBee job

NOTE
Sent at Job End (only Job number is written when the cycle is started for inform the master that is running the cycle).

Byte size	Description	Notes
2	Job Number	Written when the cycle is started
4	Screw Bitmap	Map of maximum 32 screw results, where the bitmap is 0 for NOK and 1 for OK
1	Job Completed	Completed if <>0
1	Job Result	1 OK - 0 NOK
2	NetBee Ready	NetBee in not in error if <>0
2	Result Number	Result number in the next field
128	Results	Block of 4 bytes for every result, 2 byte for the torque and 2 for the angle (Max 32 results) values are multiplied X 10

Standard NetBee base

Byte size	Bits	Type	Description	Notes
	1	Bit	NetBee connected	1 when the NetBee is connected on Ethernet
	2	Bit	Ready	0 Not Ready / 1 Ready if the tool is connected to the controller and ready
	3	Bit	Sequence in progress	0 No sequence start / 1 sequence started
	4	Bit	Not used	
	5	Bit	Tightening status	0 NOT OK / 1 OK
	6	Bit	Operation status	0 NOT OK / 1 OK
	7	Bit	Sequence status	0 NOT OK / 1 OK
1	8	Bit	Not used	
2		Unsigned16	Echo sequence number	
4		Unsigned16	Torque result	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal"
2		Unsigned16	Angle result	1 word (2 Byte) for Angle Integer

2		Unsigned16	Batch count
2		Unsigned16	Rundown year
2		Unsigned16	Rundown month
2		Unsigned16	Rundown day
2		Unsigned16	Rundown hour
2		Unsigned16	Rundown minute
2		Unsigned16	Rundown second
1		BitField	Keep alive

Standard NetBee full

Byte size	Bits	Type	Description	Notes
	1	Bit	NetBee connected	1 when the NetBee is connected on Ethernet
	2	Bit	Ready	0 Not Ready / 1 Ready if the tool is connected to the controller and ready
	3	Bit	Sequence in progress	0 No sequence start / 1 sequence started
	4	Bit	Not used	
	5	Bit	Tightening status	0 NOT OK / 1 OK
	6	Bit	Operation status	0 NOT OK / 1 OK
	7	Bit	Sequence status	0 NOT OK / 1 OK
1	8	Bit	Not used	
2		Unsigned16	Echo sequence number	
4		Unsigned16	Torque result	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
2		Unsigned16	Angle result	1 word (2 Byte) for Angle Integer
2		Unsigned16	Batch count	

2	Unsigned16	Rundown year	
2	Unsigned16	Rundown month	
2	Unsigned16	Rundown day	
2	Unsigned16	Rundown hour	
2	Unsigned16	Rundown minute	
2	Unsigned16	Rundown second	
1	BitField	Keep alive	
1	Character	Angle status	L = Low Angle / H = High Angle
1	Character	Torque status	L = Low Torque / H = High Torque
4	Fixed Point Number	Prevailing torque result	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Rate torque result	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Low torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Max torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Target torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
2	Unsigned16	Low angle setup	1 word (2 Byte) for Angle Integer
2	Unsigned16	High angle setup	1 word (2 Byte) for Angle Integer
2	Unsigned16	Target angle setup	1 word (2 Byte) for Angle Integer
4	Fixed Point Number	Low prevailing torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Max prevailing torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Low rate torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal

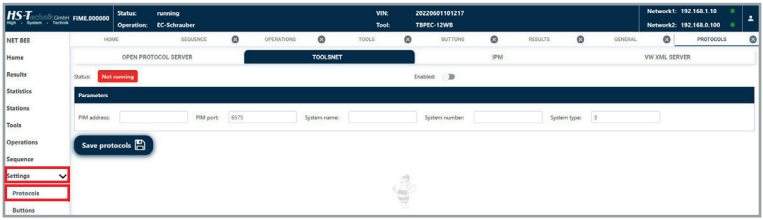
4	Fixed Point Number	Max rate torque setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Torque threshold setup	1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal 1 word (2 Byte) for Torque Integer 1 word (2 Byte) for Torque decimal
4	Fixed Point Number	Angle threshold setup	
60	Character	Rundown VIN 1	
60	Character	Rundown VIN 2	
20	Character	Rundown operator	
10	Character	Rundown tool name	
22	Character	Rundown serial tool nr	
2	Unsigned16	Rundown operation nr	

4.6.1 Fieldbus settings

Fieldbus nodes must be configured via Sycon software by Hilscher.
Refer to the hilscher.com website for more information.

4.7 Working with Toolsnet

NetBee can be connected to Toolsnet to send each result.
Communication is performed via Ethernet.
Toolsnet communication must be enabled, with proper parameters, via the web programming interface.
Select **Settings → Application:**



Active	Enable the communication with Toolsnet
Status	Connection status
PIM address PIM port System name System number	Parameters of Toolsnet, that must be set according the specific Toolsnet installation
Save Application	Save the parameters

See the NetBee Programming with Web Interface chapter for more information of the webserver application.

5 Storage

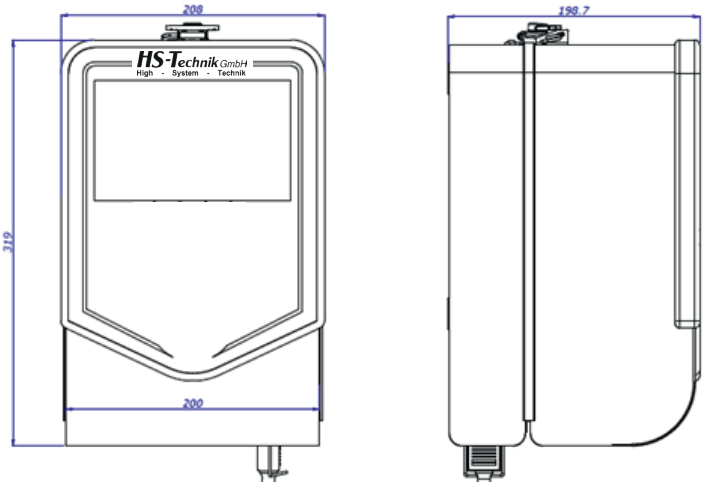
Observe the following information when storing the NetBee:

- Store the device in a dry environment protected against splashing water.
- Store the device in a well ventilated space and protected against exposure to dust.
- Ensure that the storage environment is free of aggressive chemicals and vapours.

6 Technical data

Description	NetBee
Power supply	100 - 240 VAC, 50/60 Hz
AC input power	100 W
AC Fuse	T3.15A L250V
Overvoltage category	II
Tools managed	max. 12
Supported tools	- TorqBee - NutBee - RivBee - WrenchBee
Results memory	100 000
Traces memory	100 000
Printer support	USB / serial for printing, a custom application must be provided by HS-Technik
Socket tray	Compatible with HS-Technik NetBee Socket Tray
Barcode management	Yes (2 on serial port and 1 on USB port)
Communcation protocols	Open Protocol, Toolsnet, IPM, XML, PFCS, XML VW Fieldbus (optional): Profibus DP master, Profibus DP slave, DeviceNet master, DeviceNet slave, CC-Link slave, CANopen master, CANopen slave, Profinet IO device, Profinet IO controller, EtherNet/IP scanner, EtherNet/IP adapter, Open Modbus/TCP
Input / Output	4 outputs 16 inputs / outputs optional
Sequences / Operations managed	Unlimited
Display	7" touchscreen, resolution 800 × 480 pixel
Ethernet	2 ports, one for connection to plant network, and 1 available to connect to a controller

Description	NetBee
USB	USB ports are used to: - Connect external keyboard and mouse - Connect a barcode reader - Connect a USB-Stick to export reports from the NetBee - Software communication NOTE: Radio adapter 868 / 915 MHz for CL – CLS wrenches must be connected to USB 1
RS 232 Serial Port	2 ports, one for printer and one for barcode reader. Results can be also exported via serial interface (Serial Out function)
CAN BUS port	Interface for NetBee Socket Tray by HS-Technik (CAN BUS version).



Specifications in mm
Not shown to scale

CE Declaration of conformity

We, the manufacturer, hereby declare that the named device complies with the essential protection requirements of the listed EU directives regarding design and construction type.

The prerequisite for this is the intended use of the device as well as compliance with the installation and commissioning instructions.

If the product or its accessories are modified without our permission, this declaration becomes invalid.

Device description:	Industrial Universal Controller for tightening tools
Type designation:	NetBee
Manufacturer:	HS-Technik GmbH Im Martelacker 12 D-79588 Efringen-Kirchen
Directives:	2014/35/EU 2014/30/EU 2011/65/EU
Applied standards:	EN 61010-1:2010+A1:2019 EN 61326-1:2013 EN 50581:2012

HS-Technik GmbH
Im Martelacker 12, D-79588 Efringen-Kirchen

January 2023

Florian Hanke
CEO

HS-Technik GmbH
High - System - Technik

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