HEIDENHAIN

Programming Station for Milling Controls

Operating Instructions

NC Software
iTNC 530: 606425-04 SP20
TNC 320: 771855-18
TNC 620: 817605-18
TNC 640: 340595-18
TNC7 go: 817625-20
TNC7 basic: 817625-20
TNC7: 817625-20

English (en)
01/2026

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Documentation

1.1 About this documentation

This documentation provides all relevant information in connection with programming stations for HEIDENHAIN milling controls:

- Installing
- Configuration
- Operation
- Uninstalling

This documentation applies to the programming stations of the following controls:

TNC model	NC software
TNC7 programming station	817625-20
TNC7 basic programming station	817625-20
TNC7 go programming station	817625-20
TNC 640 programming station	340595-18
TNC 620 programming station	817605-18
TNC 320 programming station	771855-18
iTNC 530 programming station	606425-04 SP20

In the corresponding User's Manuals, you will find information about the functions of HEIDENHAIN controls and NC programming.
More Information: "More detailed documentation", Page 13

1.1.1 Notes in this documentation

Comply with all safety precautions indicated in this document and in your machine manufacturer's documentation!

Precautionary statements warn of hazards in handling software and devices and provide information on their prevention. They are classified by hazard severity and divided into the following groups:

⚠DANGERANSI

Danger indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **will result in death or severe injury.**

⚠WARNINGANSI

Warning indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **could result in death or serious injury**.

⚠CAUTIONANSI

Caution indicates hazards for persons. If you do not follow the avoidance instructions, the hazard **could result in minor or moderate injury.**

NOTICEANSI

Caution indicates danger to material or data. If you do not follow the avoidance instructions, the hazard **could result in things other than personal injury, such as property damage**.

All precautionary statements comprise the following four sections:

- Signal word indicating the hazard severity
- Type and source of hazard
- Consequences of ignoring the hazard, e.g.: "There is danger of collision during subsequent machining operations"
- Escape – Hazard prevention measures

Observe the informational notes provided in these instructions to ensure reliable and efficient operation of the software.
In these instructions, you will find the following informational notes:

The information symbol indicates a **tip**.
A tip provides important additional or supplementary information.

This symbol prompts you to follow the safety precautions of your machine manufacturer. This symbol also indicates machine-dependent functions. Possible hazards for the operator and the machine are described in the machine manual.

The book symbol indicates a **cross reference**.
A cross reference leads to external documentation, for example the documentation of your machine manufacturer or other supplier.

1.1.2 Designations used

Designation	Definition
Programming station	Contents: ■ Programming station software ■ Software release module ■ Virtual keyboard or ■ Operating panel
Programming station software	The programming station software is based on the same software as the corresponding HEIDENHAIN control. Thus, operation is identical, and the results are compatible. Contents: ■ Programming station software ■ Extension package: TNCvbBase Common software for the installation and operation of all programming stations. ■ VirtualBox virtualization software from ORACLE ⓘ The programming station software is available for download from the HEIDENHAIN Filebase.
Operating panel	Programming station keyboard without software release module
Software release module (optional)	A software release module is supplementary hardware or software that functions as a license key for PC applications.  HEIDENHAIN uses USB dongles from MARX as software release modules.
License server	A license server (master PC) is a PC that controls the license accesses in the network. Example: In a classroom, the instructor's PC might function as the license server, and the students' PCs would be the PC workstations.

1.1.3 More detailed documentation

See the corresponding User's Manuals for all information about the functions of HEIDENHAIN controls and NC programming.

You'll find the corresponding User's Manuals for the NC software on the HEIDENHAIN website.

Further information: **HEIDENHAIN worldwide**

Please contact HEIDENHAIN if you require a printed copy of a User's Manual.

Control	User's Manual	ID number of the User's Manual
TNC7	■ Complete edition of all User's Manuals	1369999-xx
	■ Programming and Testing	1358773-xx
	■ Setup and Program Run	1358774-xx
	■ Machining Cycles	1358775-xx
	■ Measuring Cycles for Workpieces and Tools	1358777-xx
TNC7 basic	■ Complete edition of all User's Manuals	1411730-xx
	■ Programming and Testing	1409856-xx
	■ Setup and Program Run	1410286-xx
	■ Machining Cycles	1410289-xx
	■ Measuring Cycles for Workpieces and Tools	1410290-xx
TNC7 go	■ Complete edition of all User's Manuals	1441440-xx
	■ Programming and Testing	1441438-xx
	■ Setup and Program Run	1441439-xx
TNC 640	■ Klartext Programming	892903-xx
	■ Setup, Testing, and Running NC Programs	1261174-xx
	■ Programming of Machining Cycles	1303406-xx
	■ Programming of Measuring Cycles for Workpieces and Tools	1303409-xx
	■ ISO Programming	892909-xx
TNC 620	■ Klartext Programming	1096883-xx
	■ Setup, Testing, and Running NC Programs	1263172-xx
	■ Programming of Machining Cycles	1303427-xx
	■ Programming of Measuring Cycles for Workpieces and Tools	1303431-xx
	■ ISO Programming	1096887-xx
TNC 320	■ Klartext Programming	1096950-xx
	■ Setup, Testing, and Running NC Programs	1263173-xx
	■ Programming of Machining Cycles	1303429-xx
	■ Programming of Measuring Cycles for Workpieces and Tools	1303435-xx
	■ ISO Programming	1096983-xx
iTNC 530	■ Klartext Programming	737759-xx
	■ ISO Programming	737760-xx
	■ Cycle Programming	670388-xx

xx) Placeholder for specifying the language version

HEIDENHAIN recommends that you participate in NC programming courses to become familiar with the entire functionality of your programming station.

- HEIDENHAIN, HEIDENHAIN training partners, and many machine manufacturers offer corresponding NC programming courses

Further information: **Training portal**

- You can learn specific control functions with HEIDENHAIN Interactive Training

Further information: **HIT**

2

Programming station

2.1 About the programming station

The programming station's capabilities include:

- Creation of NC programs by using all the functions of HEIDENHAIN milling controls, for example by loading data from standardized CAD formats (DXF, STEP, IGES)
- Testing and simulation of NC programs without machine downtime
- Testing of new control functions without risk or cost
- Practical training of new employees without interfering in running production processes

The following features are available only if the vTNC7 is enabled:

- Feature-Based Programming
- **Klartext Converter**
- AI chatbot (HEIDENHAIN Digital Intelligence)

2.1.1 Licensing and regulations for use

The programming station software may be run on open-source software whose use is subject to explicit license conditions. These terms of use have priority.

To get to the license conditions:

- ▶ Start the **Control Panel**
- ▶ Right-click the **title bar**
- ▶ Select **About...**
- ▶ Select the **About OpenSource** button
- > The open-source software being used is displayed. You can call the associated licenses.

License versions

The programming station is available either as a free **trial version** with limited functionality or as a paid **full version** with full functionality.

Limitations of the **trial version**:

- No more than 100 program lines per NC program can be run in the simulation or edited
- No more than 10 elements can be selected in CAD Viewer and loaded from there

Available license versions of the **full version**:

- Programming station with operating panel
- Single station license for one PC workstation
- Network license for one PC workstation
- Network license for 14 PC workstations
- Network license for 20 PC workstations

When using the network license, a license server must also be configured.
More Information: "Setting up the license server", Page 28

- You can run multiple programming stations in parallel on your PC. A license is required for every application. If no more licenses are available, any additional programming stations will start in trial mode.
- Due to the type of licensing that uses a hardware-based software release module, the licenses are not bound to individual PCs.

Rules of use

All information concerning the legal use of HEIDENHAIN products and services can be found on the Internet at:

- **Terms of use**
- **Terms of business**
- **Privacy Statement**

2.1.2 Items supplied

The programming station is available in two different versions:

- **Programming station with operating panel**
- **Programming station with virtual keyboard**

Various types of operating panels are available as **accessories** that can be included to extend a programming station with virtual keyboard.

The programming station software is available free of charge on the HEIDENHAIN website. It is required for any version of the programming station.

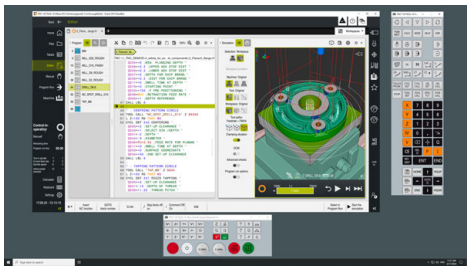
The following programming station software is available:

- TNC7
- TNC 640
- TNC 620
- TNC 320
- iTNC 530

Select the programming station software that matches the software version of your TNC control. For example, the programming station software 817625-18 matches the NC software version 81762x-18.

Programming station with operating panel or virtual keyboard

1: The programming station with TNC 6xx operating panel



2: The programming station with virtual keyboard

Programming station	License	ID
Programming station with TNC 6xx operating panel (1)	Local single-station license: integrated USB dongle	1113967-03
Programming station with virtual keyboard (2)	Single-station license: separate USB dongle	1113924-xx
	1 network license: USB dongle	1125955-xx
	14 network licenses: USB dongle	1113926-xx
	20 network licenses: USB dongle	1113928-xx

xx) Placeholder for specifying the product version

These versions include:

- Information sheet providing safety precautions and download information for programming station software, drivers, and documentation
- Programming station with TNC 6xx operating panel and software release module, including one USB cable (2 m) and two cable clips (1)

  or
- Programming station with virtual keyboard and software release module (2)

For the TNC 6xx operating panel, use the accompanying cable clips that serve to relieve strain on the USB port.

Accessory

The following operating panels are shipped without a software release module and serve the purpose of extending a **programming station with virtual keyboard**. They work with both the network licenses and the USB dongle.

The operating panels provide a USB port. You can use the USB port for the software release module if needed. The TNC7 operating panel provides an installation slot at the bottom of its housing for securely connecting your USB dongle.

3: The TNC 6xx operating panel

4: The TNC7 operating panel

Operating panel	ID	Programming station software
TNC 6xx operating panel (**3**)	1113967-52	■ TNC7, TNC 640, TNC 620, TNC 320, iTNC 530
TNC7 operating panel (**4**)	1380256-01	■ TNC7 ■ TNC 640, TNC 620, TNC 320, iTNC 530 [1]

[1] Operating panel without soft-key buttons; operation via mouse or touchscreen

This version includes:

- Information sheet with safety precautions and download information for programming station software, drivers and documentation
- Operating panel without software release module
- Only with TNC 6xx operating panel (**3**): one USB cable (2 m) and two cable clips

For the TNC 6xx operating panel, use the accompanying cable clips that serve to relieve strain on the USB port.

2.1.3 System requirements of the PC

Administrator rights are required in order to install the programming station software.

System component	Requirement
Operating system	Windows 11* (64-bit) with the respectively recommended system requirements The **Microsoft Visual C + + Redistributable Package** is required in order to install the programming station software.
Processor	Processor with virtualization support The VT-x or AMD-V instruction set must be available.
RAM	At least 8 GB of RAM (3 GB of RAM for each started programming station) TNC7: At least 16 GB of RAM (6 GB of RAM for each started programming station)
Graphics	■ Graphics board: A dedicated graphics board with at least 2 GB of graphics memory is recommended for graphics-intensive applications. ■ Color depth: At least 16 bits
Hard disk	At least 20 GB of available RAM for each programming station
Monitor	If you already have a touchscreen, you can also use it for the TNC7 programming stations. You may need to enable the touch driver separately in the virtual machine. Resolution: ■ TNC7: At least 1920x1080 pixels ■ TNC 640: At least 1280x1024 pixels ■ Other: At least 1024x768 pixels
Interfaces	■ USB interface: With hardware dongle if you are using a local license ■ LAN interface: If you are using a network license

*) Windows is a trademark of Microsoft Corporation.

Efficiently using the programming station

Support for hardware virtualization must be available to ensure that the programming station can be used efficiently with the VirtualBox virtualization application.

The availability depends on the CPU, the BIOS settings, and the Windows operating system of your PC. The processor must support the VT-x or AMD-V instruction set extension.

Please refer to the information provided by the manufacturer!

If no hardware virtualization is available, a warning will be displayed when starting an already installed programming station.

Preallocated instruction set extensions for virtualization support

The VirtualBox and VMware Workstation hardware virtualizations require the Intel VT-x or AMD-V instruction set extensions.

If Microsoft uses these instruction set extensions for its own functions, such as Hyper-V, WSL2, or virtualization-based security, then they are no longer fully available to the virtualization software.

- Deactivate the functions

Using VirtualBox while Hyper-V is active may reduce performance and limit functionality.

- HEIDENHAIN has no influence on which applications are installed on a PC or which Windows features are needed, and therefore cannot generally recommend disabling these functions.

VMware Workstation as an alternative if Hyper-V is enabled

If Hyper-V is enabled, you can use the VMware Workstation as an alternative.

Updates and current versions

Windows updates may require the updating of applications. If, after an update, the programming station doesn't work as usual, then verify that the current versions of TNCmanager and of the virtualization software are installed. This information is displayed on the website before downloading.

TNCmanager must support the installed version of VirtualBox.

- If you suspect reduced performance, check whether the graphics board driver is current.
- No more than half of a PC's RAM should be allocated to a programming station.

More Information: "Alternative installation using VMware Workstation Pro", Page 27

2.1.4 Compatibility

HEIDENHAIN is continually developing new functions for its NC controls and improvements to functions. A new software version is released after a development step has been completed. On this basis, HEIDENHAIN offers a programming station with an updated software ID.

The programming station provides almost the same functions as the NC control. You work with the original NC software.

When the programs created on the programming station match the NC program execution on the control, then the programming station and control are compatible. This means that you can transfer the created programs directly to the control.

> The 3D mesh (#152 / #1-04-1) function in CAD Viewer is not available in the programming station. To make it available, you have the enable the vTNC7 features.

Ensuring compatibility:

- During programming, take into account the actual performance range of the control (e.g., with regard to the NC software version and the available software options).
- Verify that the control provides the functions used on the programming station.
- Configure the programming station in accordance with the machine tool (e.g., concerning the machine axes).

2.1.5 Downward compatibility

If you want to use the programming station to create programs for earlier controls, then use only functions that are available on the earlier controls.

Some cycles feature additional parameters that are not available in earlier controls or software versions. You can use the **NO ENT** key to delete these parameters from the cycle definition.

Proceed as follows:

- ▶ Call the **cycle definition**
- ▶ Select the **right arrow key** until the new Q parameters are displayed
- ▶ Press the **NO ENT** key
- > The programming station deletes the additional parameters from the cycle. Now you can use this cycle on earlier controls.

> If there are any uncertainties, compare the program created on the programming station with the block formatting of your control as it is described in its User's Manual.

2.1.6 Number stickers for TNC 6xx operating panel

The included self-adhesive number stickers help the user assign the soft keys to be pressed on the operating panel to the soft keys displayed on the PC's screen. You can attach the number stickers to your PC screen so that they match the soft-key numbers of your operating panel.

2.2 Installing the software

- You need to install the programming station separately on every PC workstation, regardless of the type of licensing.
  More Information: "Installing the programming station", Page 23
- If you are using a software release module, you additionally need to install the appropriate driver on every PC.
  More Information: "Installing the drivers", Page 28
- If you are using the network license, you also need to configure a license server.
  More Information: "Setting up the license server", Page 28

2.2.1 Installing the programming station

You can also install the programming station in TNCmanager. For more information, please refer to the programming system documentation for the vTNC7.

You will find the current programming stations in the **Downloads** area, under PC Software.

The conversational language of the installation is based on the system language setting in Windows.

The installation package includes:

- Programming station software
- VirtualBox virtualization software
- TNCvbBase programming station extension package

The programming station can be installed in VMware Workstation instead of in VirtualBox.
More Information: "Alternative installation using VMware Workstation Pro", Page 27

To install the programming station:

- ▶ Unpack the downloaded ZIP file
- ▶ Navigate to the installation file, for example
  81762517 ▶ 817625_17_SP4 ▶ Setup ▶ Install TNC7 (817625).exe
- ▶ Start the installation file
- ▶ Follow the installation step instructions
  More Information: "Default installation", Page 24
  More Information: "Custom installation", Page 25

Default installation

If you install VirtualBox over a network drive, then the system will briefly separate all of the network connections and will then reconnect them.

For the default installation:

- Select the **Install.exe** file
- Select **Next >**
- Select the **Default (largely automated)** install type

> All listed applications will be automatically installed sequentially.
>
> - **VirtualBox**
> - **TNCvbBase**
> - **Programming station software**

- If an application is already installed on the target system (e.g., VirtualBox), then it is usually not displayed.
- If a similar software version is already installed on the target system, then the wizard might skip some of the installation steps.

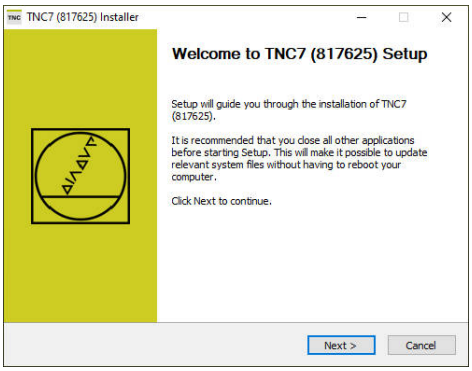
- Select **Install**

> VirtualBox and the TNCvbBase extension will be automatically installed with the default settings.

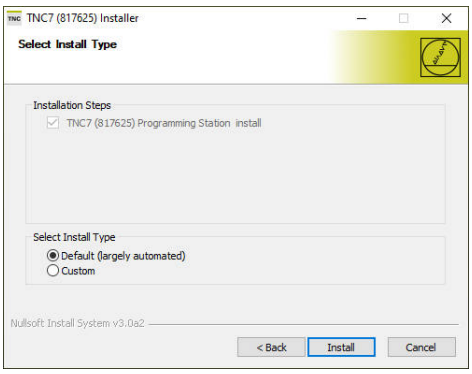
- Confirm the Virtual Box license conditions by clicking **I Agree**
- Confirm the TNCvbBase license conditions by clicking **I Agree**
- Confirm the license conditions of the programming station software by clicking **I Agree**

> During installation, the programming station software will be set up as a setup file.
>
> When the software is first started, the setup file is unpacked, installed, and automatically started.

- Close the installation wizard by clicking **Finish**



Welcome window



Default install type

Installation process

Custom installation

If you have selected the Custom install type, different programming station versions can be created for a family of controls. The installation wizard creates a virtual machine for the respective programming station.

- The installation can be run in Vmware Workstation

  More Information: "Alternative installation using VMware Workstation Pro", Page 27
- You can assign a custom name to the virtual machine.

> - If you create different programming station versions for a family of controls, then you must change the name that is suggested for the virtual machine during the installation process.
> - If you install VirtualBox over a network drive, then the system will briefly separate all of the network connections and will then reconnect them.

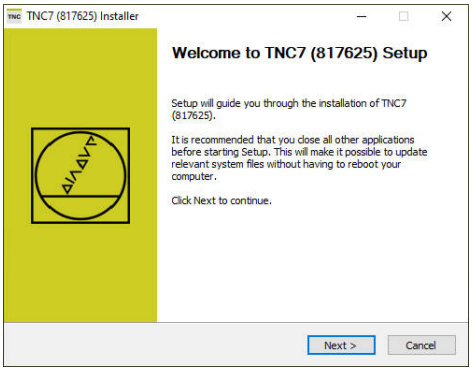
For the custom installation:

- ▶ Run the **Install.exe** file
- ▶ Select **Next >**
- ▶ Select the **Custom** install type
- > All of the listed applications will be individually installed during the process.
  - **VirtualBox**
  - **TNCvbBase**
  - **Programming station software**

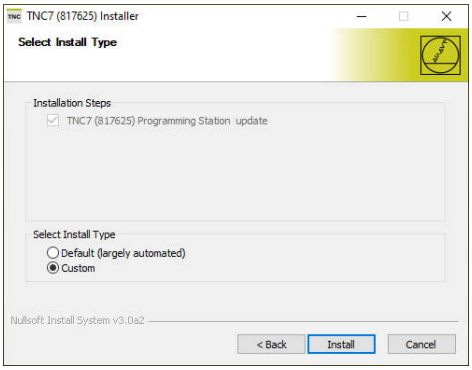
> If an application is already installed on the target system (e.g., VirtualBox), then it is usually not displayed.

- ▶ Select **Install**
- > If Virtual Box has not been installed yet, then the Virtual Box Setup Wizard will be displayed.
- ▶ Follow the Virtual Box installation instructions
- > Virtual Box will now be installed.
- ▶ Select **Next**
- ▶ Select the TNCvbBase license conditions by selecting **I accept the terms in the License Agreement**, and then selecting **Next**
- ▶ Enter the TNCvbBase installation path
- ▶ Select **Next**
- ▶ Select **Install**
- > TNCvbBase will now be installed.
- ▶ Select **Finish**

> If a similar software version is already installed on the target system, then the wizard might skip some of the installation steps.



Welcome window



Custom install type

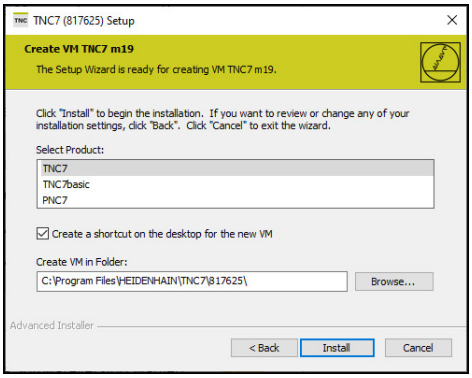
- Select **Next**
- Confirm the license conditions of the programming station software by selecting **I accept the terms in the License Agreement** and then clicking **Next**
- Select **Next**
- Enter the installation path for the programming station software
- Select **Next**

  If a virtual machine is already installed on your PC, then you can select one of two options:
  - **Create a new virtual machine**: Create a new virtual machine and assign a custom name.
  - **Update an existing virtual machine**: Overwrite an existing machine

> If VMware Workstation is already installed, you can optionally install the programming station software on VMware Workstation.

- Select **Next**
- Select the software version
- Select the file path if applicable

> The following option is no longer available during the installation of the current programming station. This option is still available for selection in earlier software versions.
>
> Required device software:
> - USB controller
> - Network service
> - Network adapter



Select the software version

- Select **Install**

> During installation, the programming station software will be set up as a setup file.

> When the software is first started, the setup file is unpacked, installed and automatically started.

- Select **Finish**
- Close the installation wizard by clicking **Finish**

> The installation of the programming station will be finished.


Installation process

2.2.2 Alternative installation using VMware Workstation Pro

As an alternative to the VirtualBox virtualization client, you can install the programming station software for VMware Workstation Pro. Please note the following:

- Not all of the programming station software versions are compatible with VMware Workstation.
- VMware Workstation is not included in the installation package.
- For the alternative installation option to be displayed, VMware Workstation must be installed before the programming station software.
- The installation for VMware Workstation instead of VirtualBox without TNCmanager is possible only with the custom installation.

> VMware Workstation Pro may have to be paid for. Please note the applicable license conditions.

Connecting a local dongle

There are two ways to connect a local dongle:

- Connecting the dongle during start-up
- Storing the dongle in the .vmx file

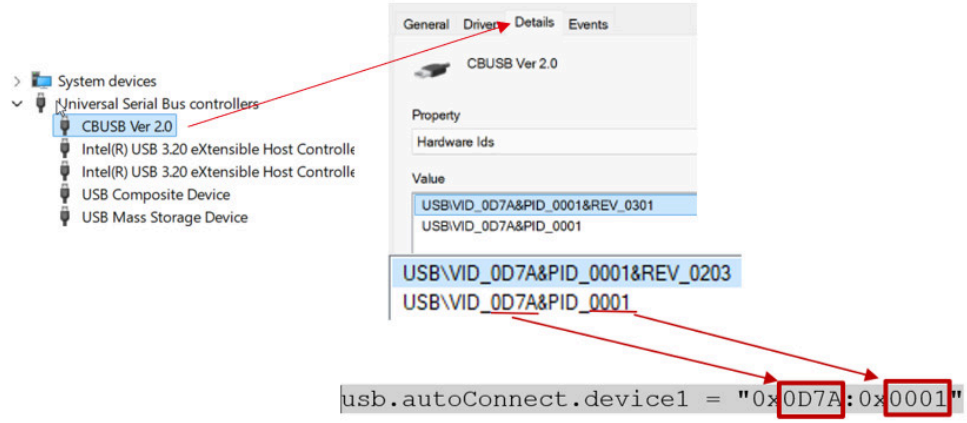
To connect a local dongle during start-up:

- ▶ Disconnect the dongle or the operating panel
- ▶ Start the VMware Workstation programming station
- ▶ Connect the dongle during start-up of the programming station
- > A context window appears
- ▶ **Connect to a virtual Machine**
- ▶ Select **Remember my choice and do not ask again**
- ▶ Select **OK**

> This procedure must be repeated for every programming station.

To store a local dongle in the .vmx file:

- ▶ First of all, create a backup copy of the .vmx file
- ▶ Open the Windows Device Manager
  USB Controller ▶ CBUSB Ver 2.0 ▶ Properties ▶ Details ▶ Hardware Ids
- ▶ Add the following line to the .vmx file: **usb.autoConnect.device1 = "0x___:0x___**
- ▶ Transfer the VID and PID to the command as shown in Figure 1



1: Storing a local dongle in the .vmx file

2.2.3 Installing the drivers

You will find the current drivers in the **Downloads** area, under PC Software.

> Please note that different drivers are available depending on the software release module being used and the license version.

Proceed as follows:

- Download the files and unpack them
- Navigate to the installation file **CBUSetup.exe**
- Start the installation file

2.2.4 Setting up the license server

A software release module connected to the license server makes available the number of purchased licenses in the network.

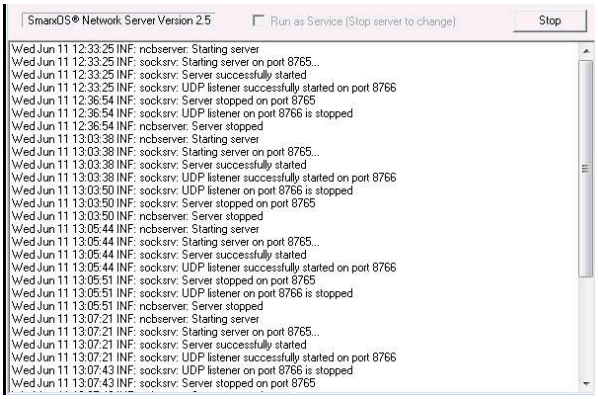
The license server requires the SmarxOS Network Server in order to control the license accesses via the individual PC workstations.

> The installation file is located in the driver folder for the network license. "Installing drivers"

Installing the license server

Proceed as follows:

- Copy the complete content of the CBServer folder to the hard disk of the license server
- Navigate to the CBIOS Network Server.msi installation file
- Start the installation file
- Double-click the ✗ icon in the taskbar
- Stop the application with the **Stop** button
- Select the **Run as Service (Stop Server to change)** option
- Restart the application with the **Start** button
- > The application has started and is configured as a service.
- > The service starts automatically in the background when the PC is restarted.



License server that has been successfully set up

Configuring the license server

If you configure the application as a service, then the application will automatically start upon each restart of the PC. Thus, the PC workstations can always access the licenses.

You can check or alter the settings for the service contained in the following path at any time:

Control Panel ▶ Administrative Tools area ▶ Services group

- Depending on the firewall settings of the license server, it may be necessary to permit execution of the CBIOS Network Server.msi file.
- You can carry out further server settings and administrative functions by using the AdminApp.exe application.

If you do not configure the application as a service, then you must repeat the following steps after each restart of the PC:

- ▶ Navigate to the installation file **CBIOS Network Server.msi**
- ▶ Start the installation file

Server settings and administrative functions

- Description of the application in the readme.txt file
- Both files are located in the driver folder for the network license

After setting up the license server, you must configure the programming station software for use with a network license.

Possible causes of a programming station starting in trial mode even though a license is available:

With single-station license	With network license
■ The software release module has not been connected to the PC workstation ■ The software release module is being used by a running programming station ■ The driver for the software release module has not been installed	■ No license server has been assigned to the programming station of the PC workstation ■ The license server is off ■ The software release module has not been connected to the license server ■ No driver has been installed for the software release module ■ The SmarxOS Network Server software has not been started on the license server ■ The network connection between the license server and PC workstation does not work ■ All network licenses are being used

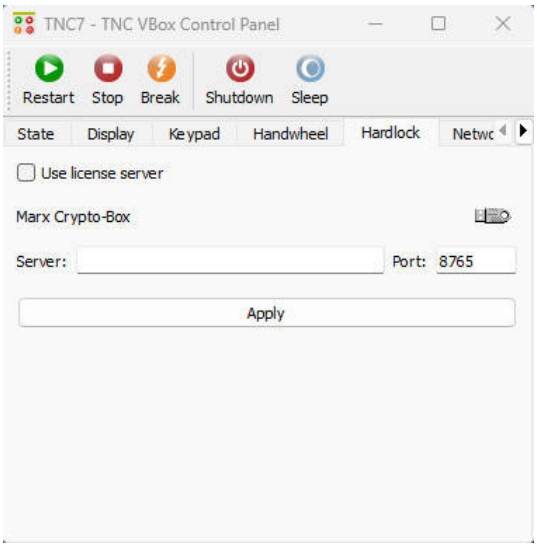
More Information: "Configuration for using a USB network dongle", Page 30

2.2.5 Configuration for using a USB network dongle

For all of the virtual machines that are to have access to the network dongle, you must perform this configuration after setting up the license server.

Proceed as follows:

- Start the **Control Panel**
- Select the **Hardlock** button
- > Additional configuration options for the USB network dongle are now shown (1).
- Select the **Use license Server** option
- In the **Server** input field, enter the IP address or the network name of the PC for which you are using the USB network dongle
- Confirm your settings with the **Apply** button
- > The programming station now restarts.
- > The changes are effective.



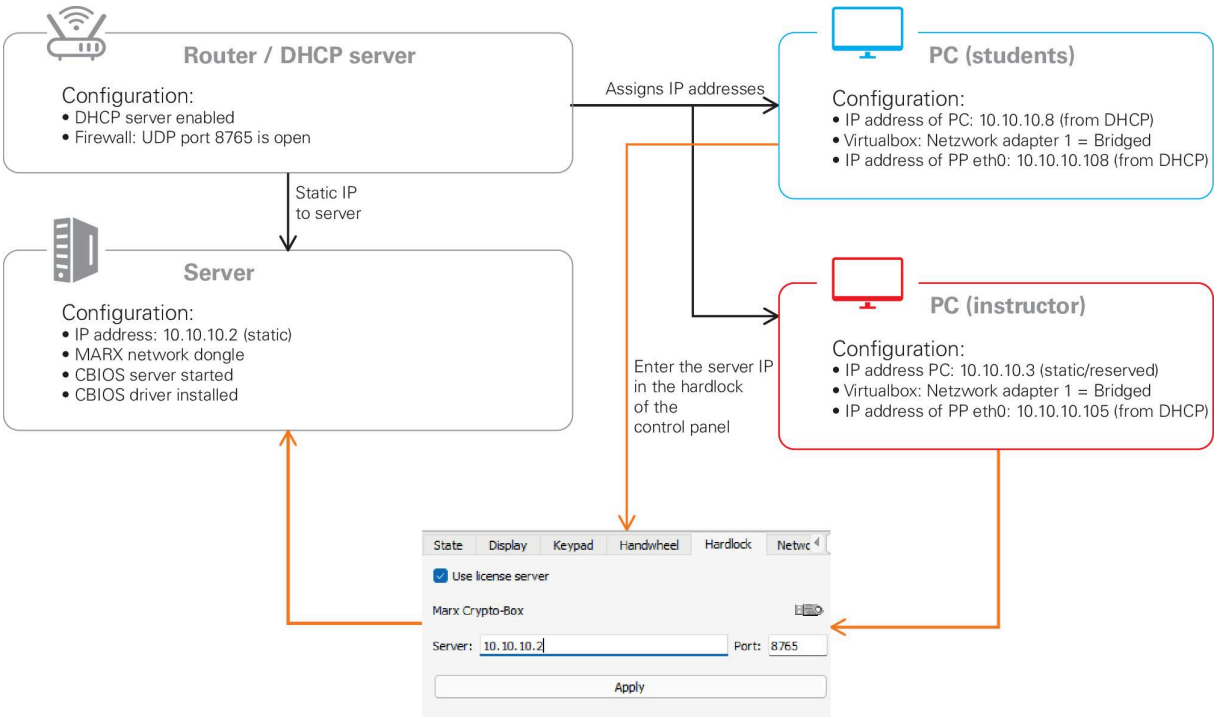
1: Settings options for the USB network dongle

No additional driver is needed on the client PC in order to access the USB network dongle.

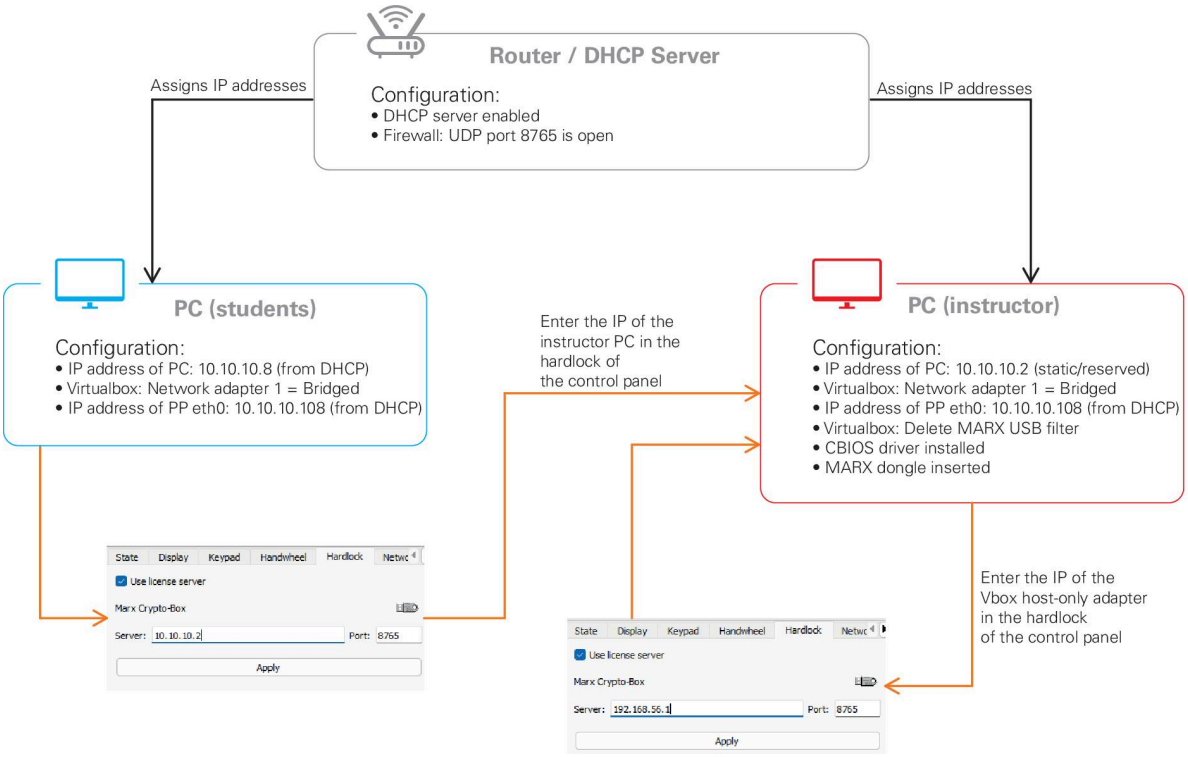
More Information: "Setting up the license server", Page 28

Configuration of MARX network release modules

Ideal configuration



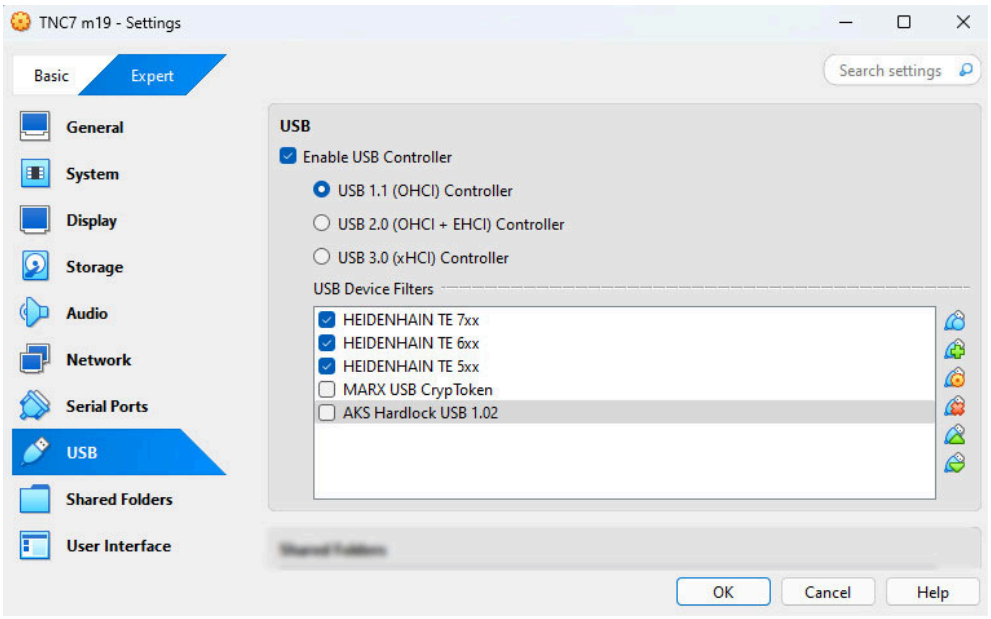
Classroom configuration



The instructor's PC settings for classroom configuration

If you are using the classroom configuration, you must disable the USB filter for the dongle in the VirtualBox Manager. Otherwise, the dongle will be used by VirtualBox and will not be available in the CBIOS Server.

- Select **Settings** in the VirtualBox menu
- Select **USB** (2)
- Switch to Expert for more recent VirtualBox versions
- Deselect **Marx USB CrypToken**
- Deselect **AKS Hardlock USB 1.02**
- Apply your selection with **OK**



2: The instructor's PC settings

Installing the server

You will find the current drivers in the **Downloads** area, under PC Software.

To install the server:

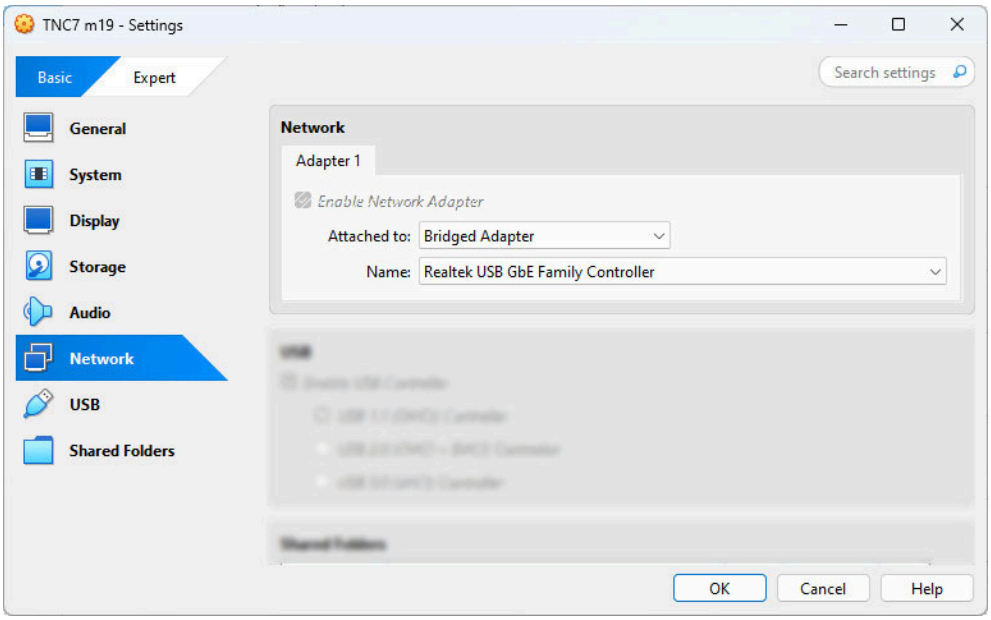
- Download the **Hardlock Driver MARX Network License** and unpack it
- Run the **CBIOS Network Server.msi** file with administrator rights
- Carry out additional steps if needed:
  C:\Program Files(x86) ▶ MARX Cryptotech ▶ CBIOS Network Server
  - CBIOSSrv64: Start or stop the server (as a service)
  - AdminApp64: Manage the keys, view the active connections, lease times
  - readme.txt: Detailed instructions

Network adapter settings

The programming station must be assigned an IP address by the network so that a license can be relayed from the network to the programming station.

Define the following settings for network adapter 1:

- Select **Settings** in the VirtualBox menu
- Select **Network**
- Switch to Basic for more recent VirtualBox versions
- Select the **Adapter 1** tab
- Configure the settings as shown in Figure 3
- Apply your selection with **OK**



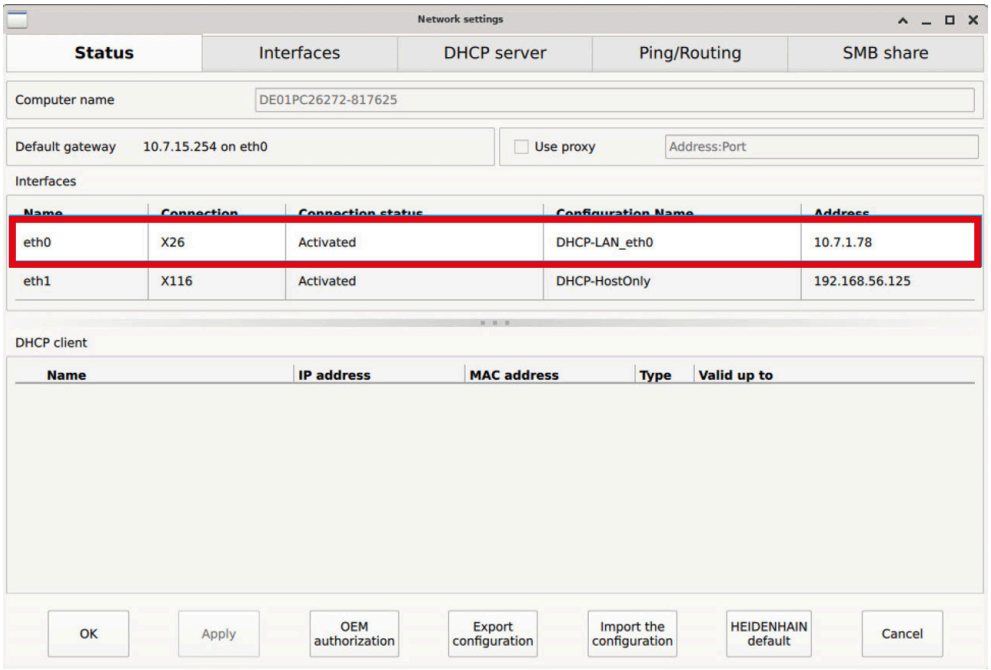
3: The network adapter settings

Make the following settings in the programming station:

- Open the **HEROS menu**
- Select **Settings**
- Select **Network** (4)

  The programming station must be assigned an address by the network.

  If the network has been set up correctly, then a ping can be sent from the programming station to the server.



4: The HEROS network settings

Additional applications with a MARX dongle

If, in addition to the programming station, you require further applications with a MARX dongle on your PC , then unwanted overlaps may arise.

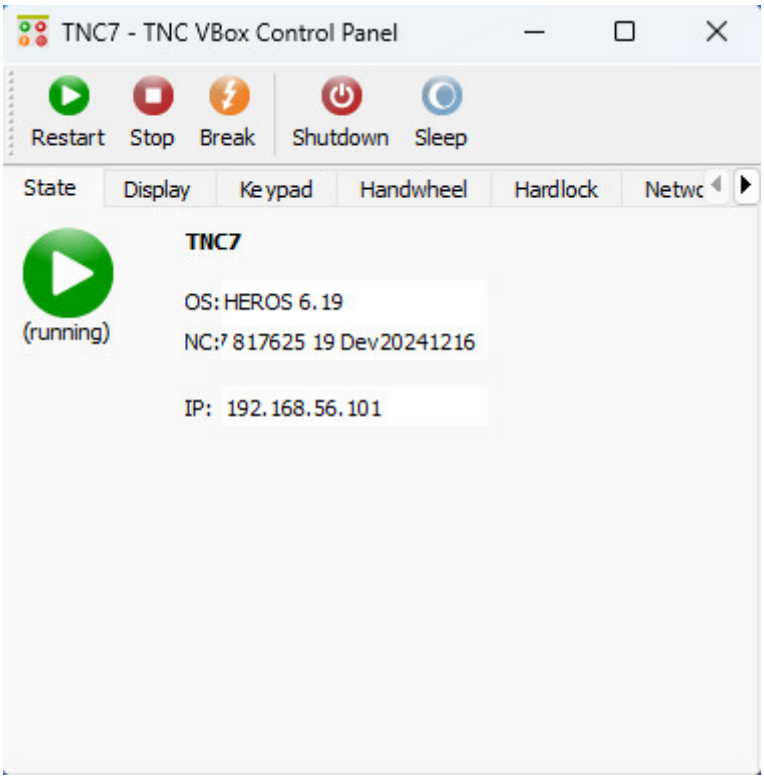
- The PC relays all connected MARX dongles to the virtualization software for evaluation.
- The PC removes the dongle from other applications, such as RemoteAccess or KinematicsDesign.

In order to avoid unwanted overlaps, install a local license server on your PC. The dongle is then checked by the license server, and other applications are no longer affected.

You can use the SmarxOS Network Server as the license server.

2.3 Configuring the programming station

2.3.1 Control Panel



In the TNC VBox Control Panel, you can define settings for the programming station or shut down the programming station.

- Showing the license conditions
  More Information: "Licensing and regulations for use", Page 16
- USB network dongle settings
  More Information: "Configuration for using a USB network dongle", Page 30
- Showing the virtual keyboard
  More Information: "Showing the virtual keyboard", Page 38
- Showing the virtual handwheel
  More Information: "Showing the virtual handwheel", Page 39
- Display settings
  More Information: "Display settings", Page 42
- Establishing a connection between the programming station and HEIDENHAIN-PC software
  More Information: "Establishing a connection between the programming station and HEIDENHAIN PC software applications", Page 83
- Shutting down the programming station
  More Information: "Shutting down the programming station via the Control Panel", Page 70

To start the Control Panel:

- Start the programming station: Double-click the shortcut on your desktop or in the Windows Start Menu

  or

- Click the **HEIDENHAIN VirtualBox icon** in the bottom right of the taskbar

> Depending on your PC settings, you must press the Windows key on the ASCII keyboard in order to show the taskbar

> The Control Panel window now starts.

2.3.2 Connecting the operating panel

The operating panel is designed for connection to a PC system.

To connect the keyboard:

- Connect the operating panel to a free USB port of your PC
- If you are using a USB dongle, install the driver

  More Information: "Installing the drivers", Page 28

> The programming station software detects the connected operating panel automatically.

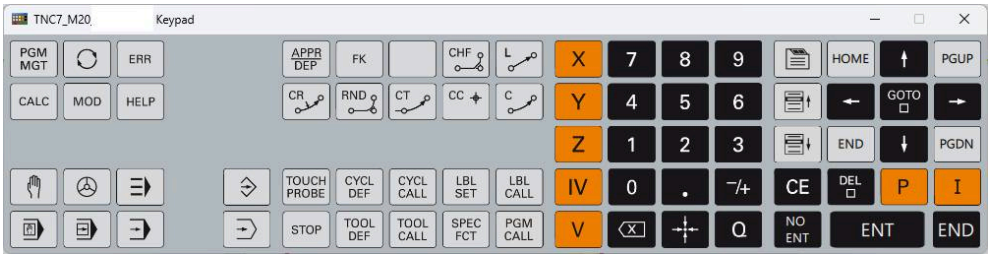
> You must not connect the operating panel to a control.

Additional USB port

The rear of the operating panel has a USB port, to which you can connect another USB device.

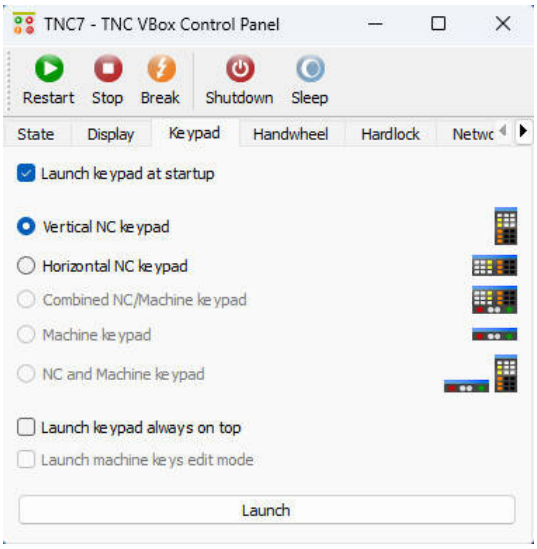
> The device may draw no more than 200 mA of current.

2.3.3 Showing the virtual keyboard



To show the virtual keyboard:

- ▶ Start the **Control Panel**
- ▶ Select the **Keypad** tab
- > Additional settings are now displayed (1).
- ▶ Select **Launch keypad at startup**
- ▶ Select the keypad layout (e.g., **Vertical NC keypad**)
- ▶ Select the **Launch** button
- > The virtual keyboard is now shown.



1: View of the window

2.3.4 Showing the virtual handwheel

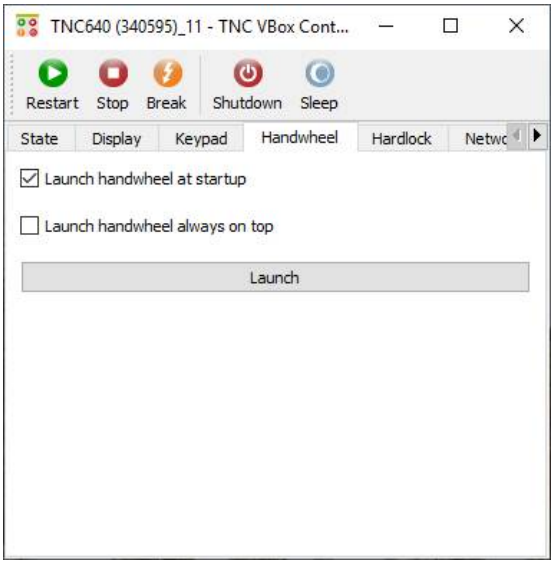
To show the virtual handwheel:

- Start the **Control Panel**
- Select the **Handwheel** tab

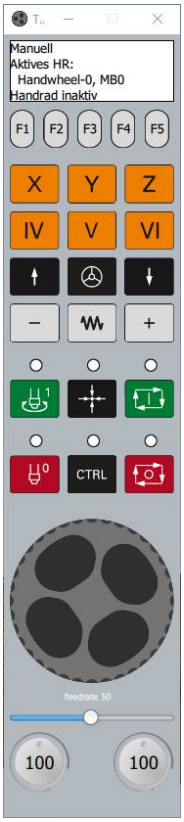
> The display for additional possible settings appears **1**.

- Select **Launch handwheel at startup**
- Select **Launch handwheel always on top** to always display the virtual handwheel in the foreground of the screen
- Select the **Launch** button

> The virtual handwheel is now shown.



1: View of the window



2.3.5 Country-specific conversational language and keyboard

Changing the conversational language

TNC 640	TNC7
To change the conversational language:	▶ Select the **Settings** application
MOD ▶ Press the **MOD** key	▶ Enter the code number **123**
▶ Enter **123** in the field for entering the code number	▶ Select **OK**
▶ Select **OK**	▶ Select **Machine Parameters**
> The programming station now opens the list of machine parameters.	▶ Double-tap or double-click **MPs for setters**
FIND ▶ Press the **Find** soft key	> The programming station now opens the **MPs for setters** application.
▶ Enter the machine parameter **CfgDisplayLanguage** (no. 101300)	▶ Navigate to the machine parameter **ncLanguage** (no. 101301) DisplaySettings ▶ Definition of the NC conversational language and PLC conversational language
▶ Open the folder with the **ENT** key	▶ Select the NC conversational language
▶ Select the desired conversational language	▶ Select **Save**
▶ Select **OK**	> The programming station opens the Configuration data changed window.
END ▶ Press the **END** soft key	▶ All changes: Select **Save**
STORE ▶ Press the **STORE** soft key	> The programming station now opens a dialog with options.
> The programming station now opens a dialog with options.	▶ Select **CLOSE CONTROL**
▶ Select **CLOSE CONTROL**	> The programming station now restarts.
> The programming station now restarts.	> Once the programming station has restarted, the NC conversational language and the HEROS conversational language are changed.
> Once the programming station has restarted, the NC conversational language and the HEROS conversational language are changed.	

You can also change the following machine parameters:

- **CfgDisplayLanguage** (no. 101301) for the **NC conversational language**
- **CfgDisplayLanguage** (no. 101302) for the **PLC conversational language**
- **CfgDisplayLanguage** (no. 101303) for the **PLC error message language**
- **CfgDisplayLanguage** (no. 101304) for the **help language**

In the corresponding User's Manual, you will find a detailed description.

More Information: "More detailed documentation", Page 13

Country-specific keyboard

The programming stations of the TNC7, TNC7 basic, TNC 640, TNC 620, and TNC 320 can be operated with a country-specific keyboard.

Proceed as follows:

- Open the **HEROS menu**
- Select **Settings**
- Select **Language/Keyboards**
- > The programming station opens a dialog window.
- Select the **Keyboards** tab
- Select **Change**
- > The programming station opens a new tab.
- Select the desired language
- Press **OK**
- Press **OK**

2.3.6 Display settings

In the Control Panel, you can select the resolution and configure various programming station display settings.

Proceed as follows:

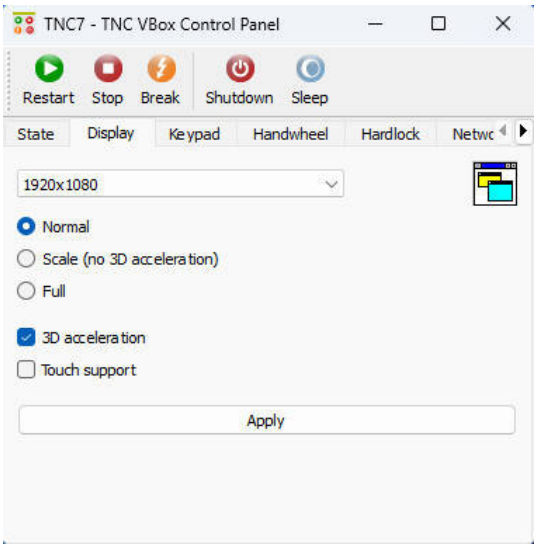
- Open the **Control Panel**
- Select the **Display** tab (1)

> The programming station displays the following options:

- **Normal**: Opens the programming station in window mode with the selected resolution
- **Scale (no 3D acceleration)**: Opens the programming station in a window, the size of which can be adjusted. You can use the mouse to drag the programming station window to the desired size
- **Full**: Opens the programming station in full-screen mode
- **3D-acceleration**: Activates or deactivates the 3D hardware acceleration of the graphics card

- Confirm the selected setting with **Apply**

> The programming station now restarts.



1: View of the window

The resolutions that can be selected depend on the control model.

2.3.7 Adapting the kinematics for the programming station

On the programming station, you can set the kinematics of your machine. The programming station provides default machines for this purpose.

TNC 640

- Press the **MOD** key
- Select Machine Settings, and then select Kinematics
- Select Active kinematics under NC
- Select Active kinematics under SIM
- Confirm with **Apply**

TNC7

- Select the **Home** operating mode
- Select the **Settings** application
- Select **Machine Settings**
- Select the active kinematic model in the channel settings of the Machine area
- Select the active kinematic model in the channel settings of the Simulation area
- Confirm with **Apply**

The desired machine might not be contained in the selection list.

To modify the list of available kinematics:

TNC 640

- Select **Programming station adaptation** in the OEM bar
- > A pop-up window appears.
- Select the desired machine
- Select **Apply selection**
- Adapt the software limit switches for rotary axes
- Adapt the orange axis keys of the 4th axis and the 5th axis
- Set the conversational language
- Select **OK**
- > A message window appears.
- Select **OK**
- > The programming station now restarts.
- > The machine is now available in the selection menu.

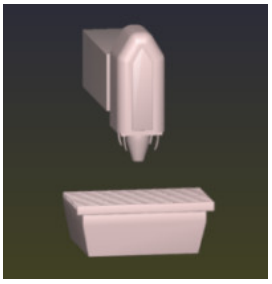
TNC7

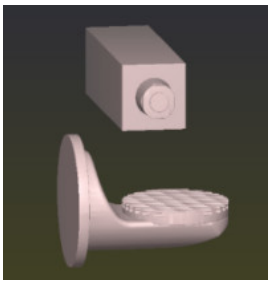
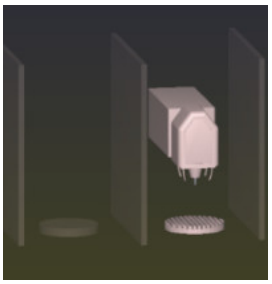
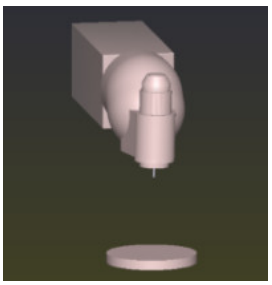
- Select **Programming station adaptation** in the OEM bar
- > A pop-up window appears.
- Select the desired machine
- Select **Apply selection**
- Adapt the software limit switches for rotary axes
- Adapt the orange axis keys of the 4th axis and the 5th axis
- Set the conversational language
- Select **Take over configuration**
- Select **OK**
- > The programming station now restarts.
- > The machine is now available in the selection menu.

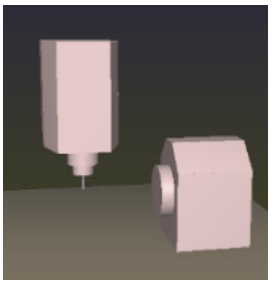
There is a maximum number of machines that must not be exceeded.

Overview of machine kinematics

The machine kinematics shown below are available for selection.

	Name of the kinematic model	Milling	Turning	Figure
1.	XYZ	X		
2.	B_HEAD	X		
3.	B_HEAD_C_TABLE	X	X	
4.	B_HEAD_C_TAB_SHAPE	X	X	
5.	AC_TABLE	X	X	
6.	AC_SHAPING	X	X	
7.	BC_TABLE	X		

	Name of the kinematic model	Milling	Turning	Figure
8.	BC_TABLE_45_35	X		
9.	AC_FORK_HEAD	X		
10.	AB_TABLE	X	X	
11.	B_HEAD_C1_TABLE			
12.	B_HEAD_C2_TABLE			
13.	AB_45_HEAD_C_TABLE	X	X	

	Name of the kinematic model	Milling	Turning	Figure
14.	AB_45_U_FACING_H	X	X	
15.	W_AX_BV_TABLE	X		
16.	AB_SWIV_HEAD	X		
17.	A_TABLE	X	X	

2.3.8 Preparing the workpiece and the tool for simulation

Preparing the workpiece for simulation

In order to simulate a workpiece, the following data are needed:

- BLK FORM
- Preset
- Fixtures

Preparing the tools for simulation

In order to simulate the tools, the following data are needed:

- Tool data
- Tool holder
- Tool shape

In the User's Manual, you will find detailed information about setting up a workpiece and the tools.

Further information: Programming and Testing User's Manual

2.4 Operating the programming station

2.4.1 Operating elements

The programming station is operated using the operating panel, a PC keyboard, or a mouse.

The TNC7 software supports multi-touch operation.

More Information: "TNC7 icons of the programming station user interface and touchscreen gestures", Page 53

- Functions for vertical soft keys are available only if you use a special PLC program for the programming station.
- Soft keys are no longer available on the TNC7 operating panel.
- Some of the keys are arranged differently if you use a PC keyboard with an US keyboard layout.

Keys for functions

Control key	PC keyboard		Function
	F1 to **F10**	TNC 640	Select the function in the horizontal soft-key row
		TNC7	Currently no function
◁	**F9**	TNC 640	Shift soft-key row left
		TNC7	Currently no function
▷	**F10**	TNC 640	Shift soft-key row right
		TNC7	Currently no function
	F11	TNC 640	Select the screen layout
		TNC7	Currently no function
	F12	TNC 640	Toggle the display between machine and programming operating modes
		TNC7	Currently no function
PGM MGT	**CTRL**+**ALT**+**P**	TNC 640	Select or delete programs and files, external data transfer
		TNC7	Open the workspace in the **Editor** and **Program Run** operating modes
CALC	**CTRL**+**ALT**+**N**		Open and close the calculator
MOD	**CTRL**+**ALT**+**M**	TNC 640	Select MOD functions
		TNC7	Open the **Settings** application
HELP	**CTRL**+**ALT**+**H**	TNC 640	Display help texts for NC error messages, call TNCguide
		TNC7	Open the **Help** workspace
ERR	**CTRL**+**ALT**+**L**	TNC 640	Display all pending error messages
		TNC7	Open and close the message menu

Control key	PC keyboard		Function
	**Windows key**		The **DIADUR** keys provide the following functions: ■ Left **DIADUR** key: Open the **HEROS menu** ■ Right **DIADUR** key: Open the **Remote Desktop Manager** connection in the defined desktop
			Receipt of focus in the respective operating mode
	**CTRL**+**ALT**+**5**		Approach or departure function
	**CTRL**+**ALT**+**6** US layout: **CTRL**+**ALT**+**6**	TNC 640	FK free contour programming
		TNC7	Open the **Contour** workspace (e.g., to draw a milling contour)
	**CTRL**+**ALT**+**8** US layout: **CTRL**+**ALT**+**8**		Program a chamfer
	**CTRL**+**ALT**+**9** US layout: **CTRL**+**ALT**+**9**		Program a straight line segment
	**CTRL**+**ALT**+**T**		Program a circular arc with radius
	**CTRL**+**ALT**+**Z** US layout: **CTRL**+**ALT**+**Y**		Program a corner rounding
	**CTRL**+**ALT**+**U**		Program a circular arc with tangential transition to the preceding contour element
	**CTRL**+**ALT**+**I**		Program a circle center or pole
	**CTRL**+**ALT**+**O**		Program a circular arc with reference to the circle center
	**CTRL**+**ALT**+**1**	TNC 640	Select the Manual operating mode
		TNC7	Open the **Manual operation** application in the **Manual** operating mode
		TNC 640	Select the smarT.NC operating mode (not for TNC 320, TNC 620, TNC 640, and TNC7)
		TNC7	
	**CTRL**+**ALT**+**2** US layout: **CTRL**+**ALT**+**2**	TNC 640	Select the Handwheel operating mode
		TNC7	Activate and deactivate the electronic handwheel in the **Manual** operating mode
	**CTRL**+**ALT**+**3**	TNC 640	No function
		TNC7	Open the **Tool Management** tab in the **Tables** operating mode

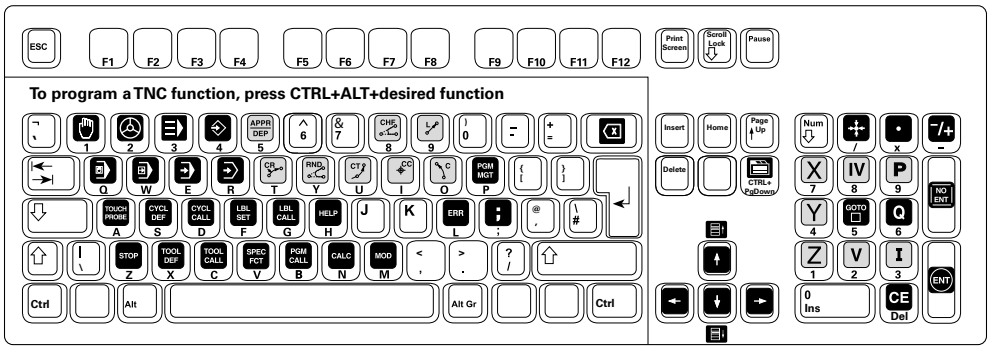
Control key	PC keyboard		Function
	CTRL+**ALT**+**Q**	TNC 640	Select the Positioning with MDI operating mode
		TNC7	Open the **MDI** application in the **Manual** operating mode
	CTRL+**ALT**+**W**	TNC 640	Select the Program Run, Single Block operating mode
		TNC7	Open the **Program Run** operating mode in the **Single Block** mode
	CTRL+**ALT**+**E**	TNC 640	Select the Program Run, Full Sequence operating mode
		TNC7	Open the **Program Run** operating mode
	CTRL+**ALT**+**4**		Open the **Editor** operating mode
	CTRL+**ALT**+**R**	TNC 640	Select the Test Run operating mode
		TNC7	When the NC program is already open, open the **Simulation** workspace in the **Editor** operating mode
TOUCH PROBE	**CTRL**+**ALT**+**A**		Define touch probe cycles
CYCL DEF	**CTRL**+**ALT**+**S**		Define machining cycles
CYCL CALL	**CTRL**+**ALT**+**D**		Call machining cycles
LBL SET	**CTRL**+**ALT**+**F**		Define subprograms and program section repeats
LBL CALL	**CTRL**+**ALT**+**G**		Call subprograms and program section repeats
STOP	**CTRL**+**ALT**+**Y** US layout: **CTRL**+**ALT**+**Z**		Program a program stop
TOOL DEF	**CTRL**+**ALT**+**X**		Pre-select a tool in the NC program
TOOL CALL	**CTRL**+**ALT**+**C**		Call a tool in the NC program
SPEC FCT	**CTRL**+**ALT**+**V**		Call special functions
PGM CALL	**CTRL**+**ALT**+**B**		Enter a program call
	Backspace key		Delete values during entry
DEL	**CTRL**+**ALT**+**,**		Delete NC block or cancel a dialog during programming
END	**CTRL**+**ALT**+**.**		Conclude entry (e.g., finish an NC block)
	CTRL+**PgDn**	TNC 640	Select the next tab in forms
		TNC7	Mark the active application in order to navigate between applications
	Up arrow key		Position the cursor

Control key	PC keyboard	Function
	**Left arrow key**	Position the cursor
	**Right arrow key**	Position the cursor
	**Down arrow key**	Position the cursor
 	**CTRL+ALT+up/ down arrow key**	Navigate between areas of an application
	Numeric keypad: **/**	Apply actual position
	Numeric keypad: *****	Decimal separator
	Numeric keypad: **-**	Change arithmetic sign
 	X: Numeric keypad: **7** Y: Numeric keypad: **4** Z: Numeric keypad: **1** IV: Numeric keypad: **8** V: Numeric keypad: **2**	Select the axes or enter them in the NC program
	Numeric keypad: **9**	Switch between entry of polar and Cartesian coordinates
	Numeric keypad: **3**	Switch between entry of incremental and absolute coordinates
	Numeric keypad: **6**	Q parameter programming / Q parameter status
	Numeric keypad: **5**	Directly select NC blocks, cycles, and parameter functions
		Jump to first line of an NC program or first column of a table
		Jump to last line of an NC program or last column of a table
		Go one page up in an NC program or table
		Go one page down in an NC program or table
	Numeric keypad: **+**	Skip or remove optional syntax elements during programming
	Numeric keypad: **Enter**	Confirm entries and continue dialogs

Control key	PC keyboard	Function
CE	Numeric keypad: ,	Clear entries or delete messages

You use certain key combinations to send the control functions (such as L, C, CC) to the programming station software. Remember that such key combinations are also used by other Windows programs, which can result in undesired effects.

These keys are summarized on a keyboard template:



Refer to the Appendix for a printout of the keyboard template.
More Information: "Overview of keyboard assignment", Page 88

2.4.2 TNC7 icons of the programming station user interface and touchscreen gestures

Icons of the programming station user interface

This overview describes icons that are used in more than one operating mode or that are available regardless of operating mode.

Icon or shortcut	Meaning
	**Back**
	Select the **Home** operating mode
	Select the **Files** operating mode
	Select the **Tables** operating mode
	Select the **Editor** operating mode
	Select the **Manual** operating mode
	Select the **Program Run** operating mode
	Select the **Machine** operating mode
	Open or close the **Calculator**
	Open or close the **Screen keyboard**
	Open or close the **Settings** selection menu
»	**Open or close** ■ White: Expand the TNC bar or OEM bar ■ Green: Collapse the TNC bar or OEM bar ■ Gray: Confirm message
	**Add**
	**Open**
	**Close**
	**Maximize**
	**Reduce**
	Move Change the position of workspaces or windows
	Activate or deactivate **Remember position** The programming station remembers the position of the window until it is shut down.

Icon or shortcut	Meaning
	Activate or deactivate **Change column width** You can change the width of the currently selected column.
	Scale Resize windows
	File functions are available
	■ Black: **Add favorite** ■ Yellow: **Remove favorite**
 **[CTRL] + [S]**	**Save**
	**Save as**
 **[CTRL] + [F]**	**Find**
 **[CTRL] + [X]**	**Cut**
 **[CTRL] + [C]**	**Copy**
 **[CTRL] + [V]**	**Paste**
 **[CTRL] + [Z]**	**Undo**
 **[CTRL] + [Y]**	**Redo**
 **Note** The programming station groups the icons of the title bar in a selection menu depending on the size of the workspace. 	Open or close the selection menu
	Open or close the **Workspaces** selection menu
	Show **Message menu**
	Call context-sensitive help
	**Window manager** Select active applications in the background (e.g., windows of HEROS functions)

General touchscreen gestures

The TNC7 programming station software provides multi-touch capability. That means the programming station can distinguish various gestures, even with two or more fingers at once.

You can use the following gestures:

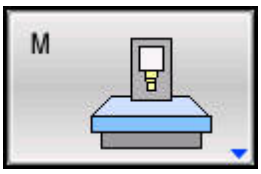
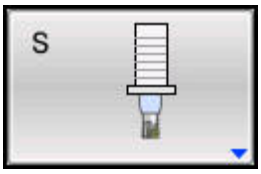
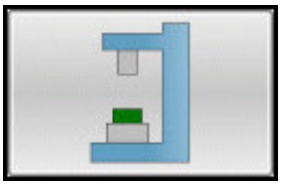
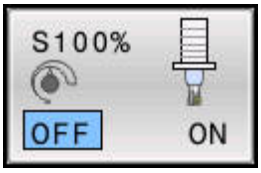
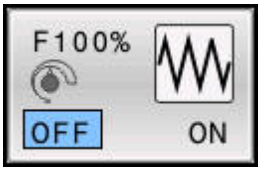
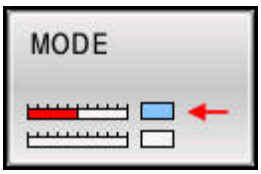
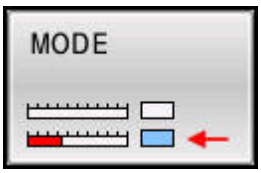
Icon	Gesture	Meaning
	Tap	Select element
	Double tap	■ Open an element (e.g., window in the **Settings** application) ■ Edit an NC block ■ Reset the graphic or 3D model to its original size
	Long press	Open the context menu ■ If you are working with a mouse, click with the right mouse key. ■ If you do not stop holding, the programming station will automatically cancel the holding gesture after approximately ten seconds.
	Swipe	■ Scroll ■ Rotate the graphic or 3D model
	Drag	■ Adjust the selected area ■ Shift elements
	Two-finger drag	■ Move a graphic or 3D model ■ Move the drawing view in the **Contour graphics** workspace
	Spread	■ Increase the font size ■ Enlarge a graphic or 3D model
	Pinch	■ Reduce the font size ■ Reduce a graphic or 3D model

2.4.3 Working with the HEIDENHAIN basic PLC program

After you have started the programming station, the most important programming station functions for operating the machine will be available to you.

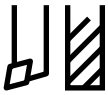
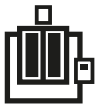
TNC 640 soft-key row

The horizontal soft-key row allows you to simulate various machine functions of the basic PLC program by means of a mouse:

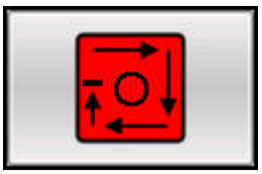
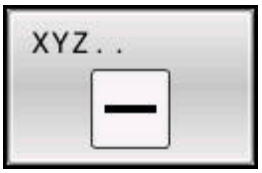
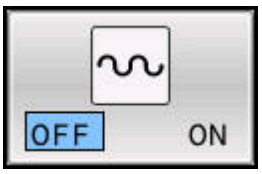
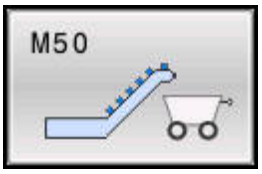
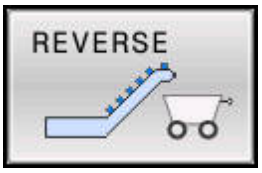
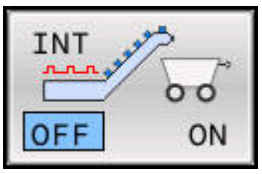
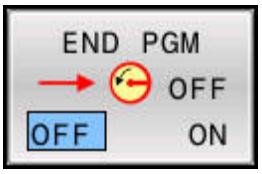
TNC 640 soft key	Keys
	Machine functions
	Spindle functions
	Adaptation for the programming station
	Spindle override 100 %
	Feed rate override 100 %
	Switch function of upper bar display in small PLC window
	Switch function of lower bar display in small PLC window

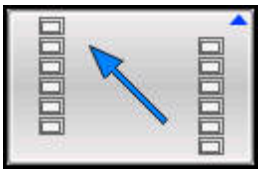
TNC7 OEM bar

The OEM bar allows you to simulate various machine functions of the basic PLC program by means of a mouse:

Soft key	Keys
	Axes
	Spindles
	Cooling method
	Tool
	Machine
	Favorites
	Feed rate override 100%
	Spindle override 100%
	Adaptation for the programming station

TNC 640 machine functions

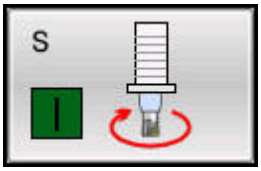
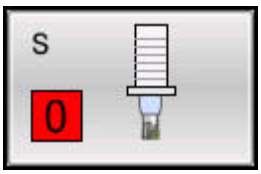
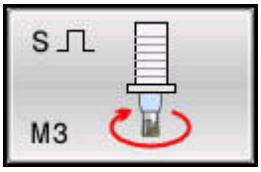
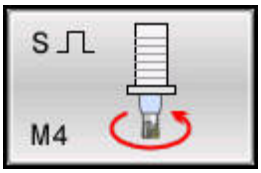
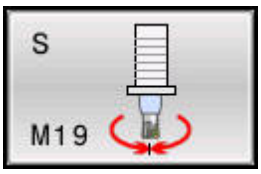
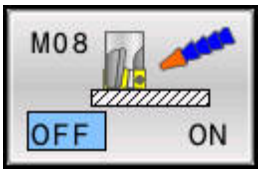
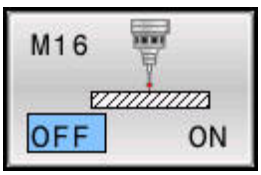
Soft key	Keys
	NC start
	NC stop
	Move axes in positive direction
	Move axes in negative direction
	Rapid traverse
	Chip conveyor ON/OFF M50/M51
	Chip conveyor reverse direction
	Chip conveyor interval
	Automatic switch-off after end of program

Soft key	Keys
	Back

TNC7 axis functions

Soft key	Keys
	NC start
	NC stop
+	Move axes in positive direction
—	Move axes in negative direction
	Rapid traverse

TNC 640 spindle functions

Soft key	Keys
	Spindle start M03
	Spindle stop M05
	Spindle jog mode in M03 direction
	Spindle jog mode in M04 direction
	Spindle orientation (M19)
	External coolant ON/OFF M08/M09
	Internal coolant ON/OFF M07/M09
	Additional coolant ON/OFF M17/M09
	Blow-clean TSxxx touch probe M16 (timer)

TNC7 spindle functions

Soft key	Keys
	Spindle ON
	Spindle OFF
	Spindle jog mode in M03 direction
	Spindle jog mode in M04 direction
	Spindle orientation M19
	Blow-clean TSxxx touch probe M16
	Active spindle

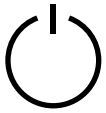
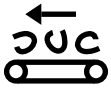
TNC7 cooling functions

Soft key	Keys
	Internal cooling M07
	External cooling M08
	Jet M17
	Dry machining

TNC7 tool functions

Soft key	Keys
	Select tool change
	Clamp the tool
	Magazine

TNC7 machine functions

Soft key	Keys
	Auto power OFF
	Chip conveyor
	Reverse the chip conveyor
	Chip conveyor interval

2.4.4 Working with a machine-specific PLC program

Some machine manufacturers offer PLC programs that have been adapted to the requirements of a programming station. Ask your machine manufacturer for a description of the functions.

- In order to protect data and files from read accesses, the machine manufacturer can encrypt the PLC.
- HEIDENHAIN points out that no data encryption is able to provide perfect protection. HEIDENHAIN cannot provide a guarantee or assume liability for the impairment of data stored there, nor for the damages that arise therefrom.

2.4.5 Directory structure and file types

Directory structure

During installation you can enter an installation path.

More Information: "Installing the programming station", Page 23

The following directory structure of the programming station will be automatically created in the virtual machine.

- **LOG:** Contains the LOG files
- **PLC:** Contains the PLC files
- **SF:** Contains the SF files
- **TNC:** Contains the end user files

- In TNCremo*, the end user directory is displayed as **TNC:** and **SF:**.
- You can gain access to the **PLC:** and **LOG:** directories with TNCremo only after you have entered the required code number or the daily password.

*TNCremo is a HEIDENHAIN software solution for the transfer of data between the control and the PC workstation, among other things.

TNC: end user directories

Subdirectory	Content
config	Configuration files
lost+found	Collective folder for data or links that can no longer be associated.
nc_prog	NC programs organized by file types.
system	Folder for all files and tables (e.g., tool kinematics or text files)
table	Tables
temp	Buffer (clipboard); for example, the DXF converter doesn't need any special rights in order to copy its elements to this buffer.
tncguide	Files of the TNCguide context-sensitive help system

HEIDENHAIN-specific file types

The programming station software can open the following HEIDENHAIN-specific file types:

File type	Application
H	NC program written in HEIDENHAIN Klartext
I	NC program with ISO commands
HC	Contour definition in the smarT.NC format of the iTNC 530
HU	Main program in the smarT.NC format of the iTNC 530
3DTC	Table with 3D tool compensations that depend on the contact angle
D	Table with workpiece datums
DEP	Automatically generated table with data that depend on the NC program (e.g., the tool usage file)
P	Table for pallet-oriented machining

File type	Application
PNT	Table with machining positions (e.g., for the machining of irregular point patterns)
PR	Table with workpiece presets
TAB	Freely definable table (e.g., for protocol files or as WMAT and TMAT tables for automatic calculation of cutting data)
TCH	Table with the assignment of the tool magazine
T	Table with tools for all technologies
TP	Table with touch probes
TRN	Table with turning tools
GRD	Table with grinding tools
DRS	Table with dressing tools
TNCDRW	Contour description as a 2D drawing
M3D	Format for tool carriers or collision objects, for example
TNCBCK	File for data backup and restoration
EXP	Configuration file for saving and importing configurations of the control's user interface

Standardized file types

The programming station software can open the following standardized file types:

File type	Application
CSV	Text file for saving or exchanging simple structured data
XLSX (XLS)	File type for various spreadsheet programs (e.g., Microsoft Excel)
STL	3D model created with triangular facets (e.g., fixtures)
DXF	2D CAD files
IGS/IGES STP/STEP	3D CAD files
CHM	Help files in compiled or compressed format
CFG	Configuration files of the control
CFT	3D data of a parameterizable tool-carrier template
CFX	3D data of a geometrically determined tool carrier
HTM/HTML	Text file with structured content of a website that can be opened in a browser (e.g., the integrated product aid)
XML	Text file with hierarchically-structured data
PDF	Document format that visually reproduces the original file identically, regardless of the source application
BAK	Data-backup file
INI	Initialization file (e.g., can contain program settings)
A	Format file (e.g., for defining the screen output format in connection with **FN 16**)
TXT	Text file (e.g., for saving the results of measuring cycles in connection with **FN 16**)

File type	Application
SVG	Picture format for vector graphics
BMP GIF JPG/JPEG PNG	Picture formats for pixel graphics By default, the programming station uses the PNG format for screenshots
OGG	Container file format for the OGA, OGV, and OGX media file types
ZIP	Container file format that collects multiple compressed files.

The programming station software opens some of these file types with the HEROS tools.

2.4.6 Starting the programming station

There are two ways to start the programming station:

- Starting using the shortcut on the desktop
- Starting using the shortcut in the Windows Start Menu

To start the programming station:

- Double-click the shortcut on the desktop

  or

- Double-click the shortcut in the Windows Start Menu

When starting the programming station with the virtualization software VirtualBox, then the virtual machine contained therein is also started.

You can also start the programming station directly in VirtualBox; however, the Control Panel will then not be included in the startup.

2.4.7 Updating the programming station

NOTICEANSI

Caution: Data may be lost!

System data are overwritten during updates of the virtual control.

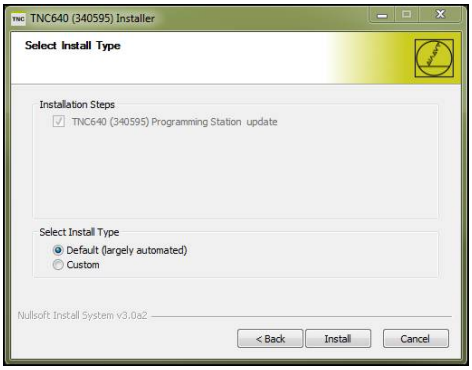
- Create a backup

In order to update the programming station, use the installation files you have downloaded.

You will find the current programming stations in the **Downloads** area, under PC Software.

To update the programming station:

- Extract the downloaded files
- Navigate to the installation file
  81762517 ▶ 817625_17_SP4 ▶ Setup ▶ Install TNC7 (817625).exe
- Start the installation file **Install TNC7 (817625).exe**
- > The installation wizard now opens.
- Select **Next**
- > The installation wizard now displays the applications to be installed:
  - VirtualBox virtualization software
  - TNCVbBase extension package for VirtualBox (Control Panel and keypad)
  - NC software
- Select the desired applications
- Select **Install**
- > The programming station will now be updated.



2.4.8 Using the TNCguide help system

TNC 640 help system

The **TNCguide** help system is the context-sensitive online help for HEIDENHAIN milling controls.

The help system contains the following documentation:

- **BHBoperate.chm** contains information on setup, testing, and running of NC programs
- **BHBKlartext.chm** contains information about Klartext, the conversational programming language from HEIDENHAIN
- **BHBtchprobe.chm** contains information about the measuring cycles
- **errors.chm** contains a list of all NC error messages
- **BHBcycle.chm** contains information about the machining cycles

Individual documents are grouped and organized in the **main.chm** book file.

The **main.chm** book file may also contain further documentation of the machine manufacturer.

TNC7 help system

The integrated product aid **TNCguide** offers the full content of all User's Manuals.

The User's Manuals are available as HTML files for use as the integrated product aid **TNCguide** directly on the programming station.

Opening the TNCguide help system

The TNC 640 provides two ways to open the TNCguide help system, and the TNC7 additionally provides a third way:

- Opening TNCguide with the HELP key
- Opening TNCguide with the **?** button
- TNC7: Opening TNCguide via the Help application

Opening TNCguide with the HELP key

Proceed as follows:

HELP

- ▶ Press the **HELP** key.
- > The programming station now opens the help system.

Opening TNCguide with the ? button

Proceed as follows:

TNC 640	TNC7
▶ Select the **?** button that is shown between the vertical soft-key row and horizontal soft-key row > The cursor changes into a question mark. ▶ Select the desired soft key with the mouse pointer > The programming station now opens the help system.	▶ Select the **?** button in the information bar > The cursor changes into a question mark. ▶ Select the desired area with the mouse pointer > The programming station now opens the help system.

TNC7: Opening TNCguide via the Help application

The TNC7 provides the following additional way.

Proceed as follows:

- In the **Home** operating mode, select the **Help** application

  or
- In the **Editor** operating mode, select the **Help** workspace

  or
- In the **Editor** operating mode, select the Show TNCguide button during parameter input in the help graphics pop-up window

> In the corresponding User's Manual, you will find a detailed description of navigating and searching in the TNCguide help system and downloading the required language version.
>
> **More Information:** "More detailed documentation", Page 13

2.4.9 Checking the software version

- In the event of servicing: unambiguous identification of the programming station
- Ordering or downloading the appropriate documentation for your programming station

To check the software version:

TNC 640

MOD

- Press the **MOD** key
- A pop-up window appears.
- Select General Information
- Select Version Information
- Check the software version

TNC7

MOD

- Press the **MOD** key

  or
- Select the **Settings** application
- The settings are opened.
- Select the machine settings
- Select General Information
- Check the software version

2.4.10 Shutting down the programming station

In order to avoid losing data when shutting down the programming station, you must exit it correctly. There are several ways available for doing this, and these will be described in the following sections.

NOTICEANSI

Caution: Data may be lost!

You can force the programming station to shut down by using the **Break** function.
This corresponds to a "hard" shutdown of a real machine. The most recently made changes will not be saved if you do this.

The four following ways to shut down the programming station are described below:

- Shutting down the programming station directly in the programming station software
- Shutting down the programming station via the HEROS menu
- Shutting down the programming station via the Switch off and restart dialog window (TNC 640 only)
- Shutting down the programming station via the Control Panel

Shutting down the programming station directly in the programming station software

TNC 640	TNC7
▶ Select the **Manual Operation** operating mode	 ▶ Select the **Home** operating mode
 ▶ Scroll through the soft-key row	▶ Select **Shut down**
▶ Press the **OFF** soft key	> The programming station opens the **Shut down** window.
 ▶ Press the **SHUT DOWN** soft key	 ▶ Select **Shut down**
> The programming station now shuts down.	> If NC programs or contours contain any unsaved changes, the programming station displays the **Close file** window.
	▶ If necessary, save unsaved NC programs and contours with **Save** or **Save as**
	> The programming station now shuts down.

Shutting down the programming station via the HEROS menu

▶ Open the **HEROS menu**

▶ Select the **switch-off icon**
> A window displaying a warning opens.
▶ Select **Yes**
> The programming station now shuts down.

Shutting down the programming station via the Switch off and restart dialog window (TNC 640 only)

The TNC 640 provides the following additional way.

Proceed as follows:

- Hover the mouse pointer over the bottom of the soft-key row
- The programming station displays the taskbar.

- Press the **switch-off icon**
- The programming station opens the **Switch off and restart** dialog window.
- Select the **Switch-off** function
- Select **OK**

Shutting down the programming station via the Control Panel

- Start the **Control Panel**

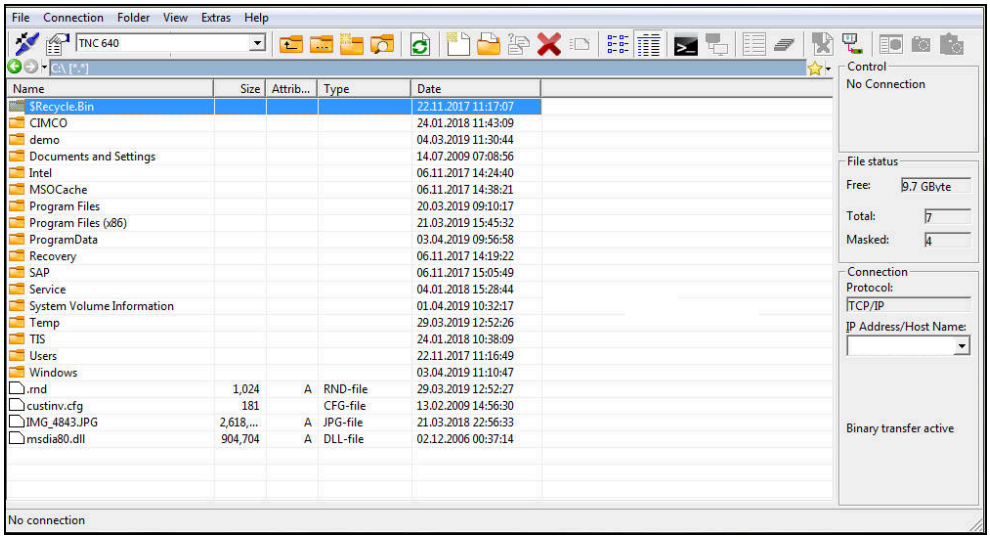
- Press the **Stop** button
- The programming station now shuts down.
- The Control Panel remains active.

The **Shutdown** function shuts down the programming station and the Control Panel.

2.5 TNCremo and secure connection

2.5.1 Introduction to TNCremo

The TNCremo data transfer software enables access to your HEIDENHAIN programming station in order to transfer data.



The most recent version of TNCremo is available for free download from the HEIDENHAIN website.

System requirements for TNCremo:

- Supported operating systems
  - Windows 11
  - Windows 10
- 2 GB RAM
- 15 MB hard disk space

Please follow the TNCremo installation instructions provided on the HEIDENHAIN website to ensure successful installation of the software.

Starting TNCremo

To start TNCremo:

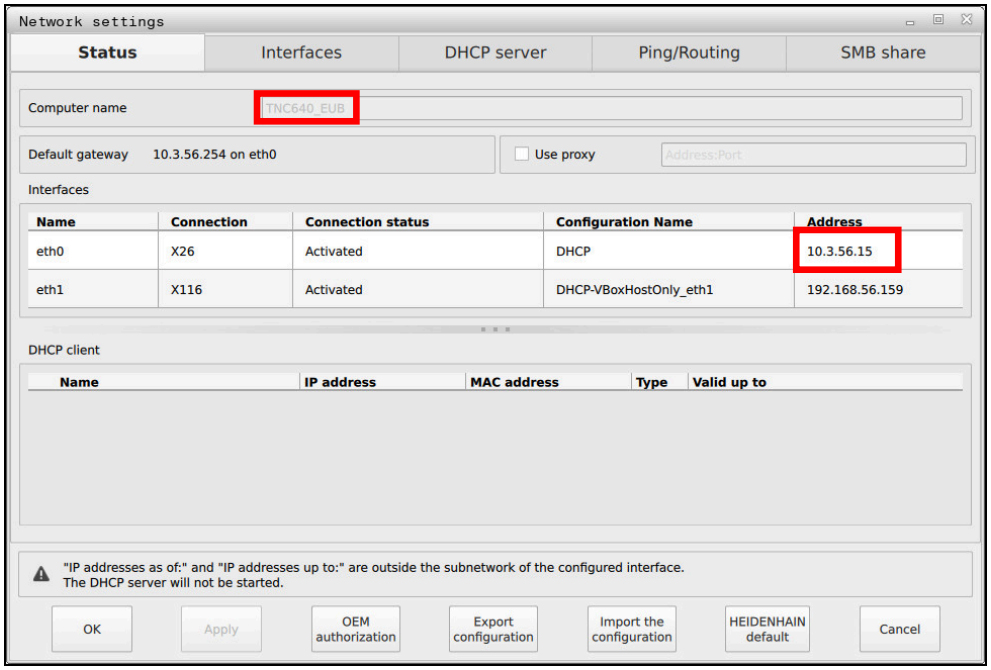
- ▶ Select the Windows Start icon
- ▶ Select All Programs
- ▶ Select HEIDENHAIN
- ▶ Select TNCremo
- > The TNCremo application will be started.

- You can also start TNCremo by double-clicking the TNCremo icon on your desktop.
- The software's context-sensitive help system provides all of the information needed for installing, setting up, and using TNCremo. Press **F1** to open the help.

2.5.2 Ascertaining the data of the control

In order to establish a connection to your programming station by means of TNCremo, you need to know the IP address or the host name of your programming station.

This information is provided in the **Network settings** of the programming station.



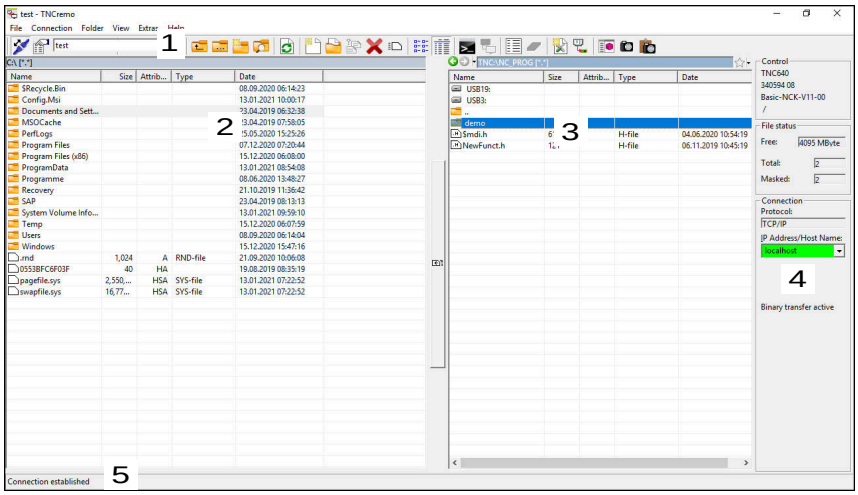
To find the host name and IP address of the programming station:

- ▶ Open the **HEROS menu**
- ▶ Select **Settings**
- ▶ Select **Network**
- > The programming station opens the **Network settings** window.
- > The programming station displays the host name in the **Computer name** area.
- > The programming station displays the IP address in the **Interfaces** area.

HEIDENHAIN recommends defining the connection via the host name.

2.5.3 TNCremo screen layout

The TNCremo data transfer software provides the following areas:



1 Toolbar

This area provides the most important TNCremo functions.

2 File list of the PC

In this area, TNCremo displays all of the folders and files of the connected drive (e.g., hard disk of a Windows PC or a USB flash drive).

3 File list of the programming station

In this area, TNCremo displays all of the folders and files of the connected programming station drive.

4 Status display

In the status display, TNCremo shows information about the current connection.

5 Connection status

The connection status indicates whether a connection is currently active.

2.5.4 Setting up a secure connection to the programming station

HEIDENHAIN recommends using secure connections via an SSH tunnel.

With TNCremo **v3.3** and later versions, you can easily set up secure connections to the programming station.

The following steps are required:

- Preparing the programming station
- Setting up and establishing the connection in TNCremo

Preparing the programming station

To prepare the programming station for a secure connection:

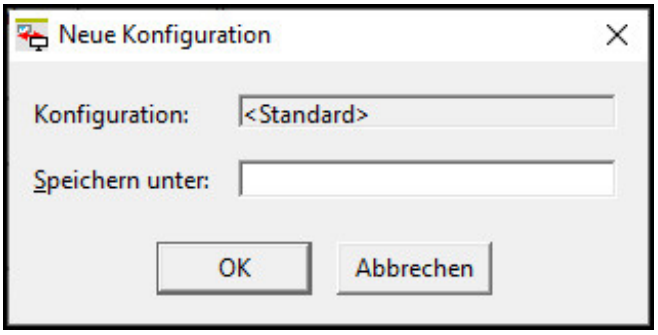
TNC 640	TNC7
 ▶ Open the **HEROS menu**	 ▶ Open the **HEROS menu**
 ▶ Select **Settings**	 ▶ Select **Settings**
 ▶ Select **Current User** > The programming station opens the **Active user** window.	 ▶ Select **Current User** > The programming station opens the **Active user** window.
 ▶ Press the **Certificate and keys** soft key > The programming station opens a pop-up window. ▶ Select the **Allow password authentication** check box	▶ Select **SSH keys and certificates** > The programming station opens a pop-up window. ▶ Select the **SSH** tab ▶ Select the **Allow password authentication** check box
 ▶ Press the **Store and restart server now** soft key	▶ Select **Store and restart server now**
 ▶ Press the **END** soft key	▶ Select **Exit**
 ▶ Open the **HEROS menu**	 ▶ Open the **HEROS menu**
 ▶ Select **Settings**	 ▶ Select **Settings**
 ▶ Select **Firewall** > The programming station opens the **Firewall settings** window. ▶ Double-tap or double-click the **Method** cell at **SSH** service ▶ Select **Permit all** in the selection menu ▶ Select **Apply** > The programming station saves your change. ▶ Select **OK** > The programming station closes the window.	 ▶ Select **Firewall** > The programming station opens the **hefwconfig** window. ▶ Select the **SSH** check box ▶ Select **OK** > The programming station closes the window.

Setting up and establishing the connection in TNCremo

To set up the connection in TNCremo:

- Open TNCremo
- Open the selection menu in the toolbar
- Select **< New Configuration... >**

> TNCremo opens the **New configuration** window (1).

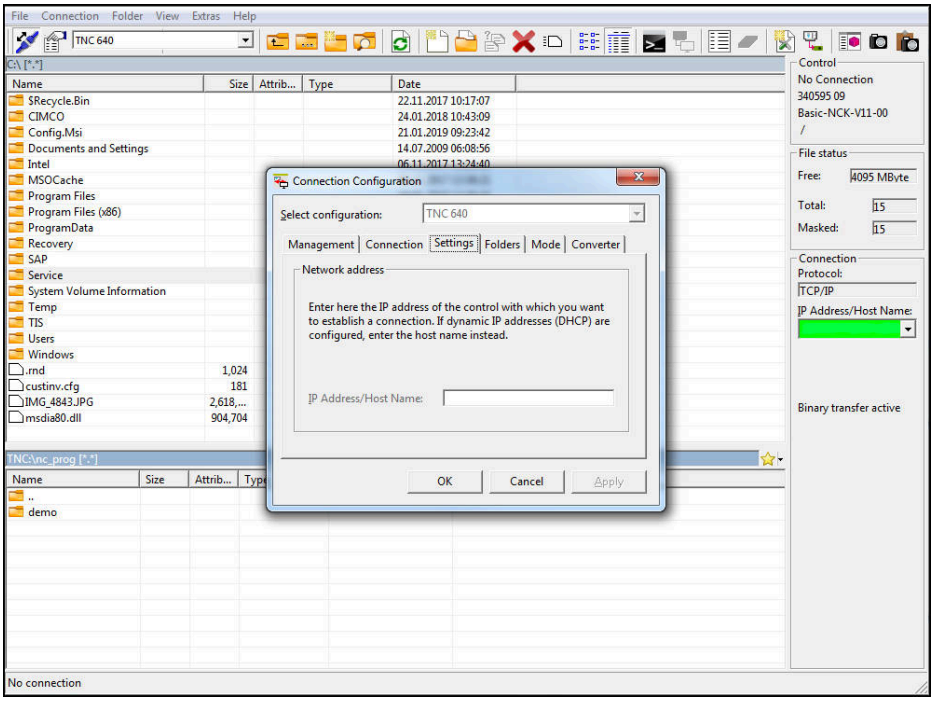


1

- Enter the desired name
- Select **OK**
- Select the **Connection** tab (2)
- Select the **Secure connection to control** check box
- Select the **Settings** tab
- Enter the IP address or host name of the programming station
- Enter the user name

> If user administration is not active, enter **user** as user type.

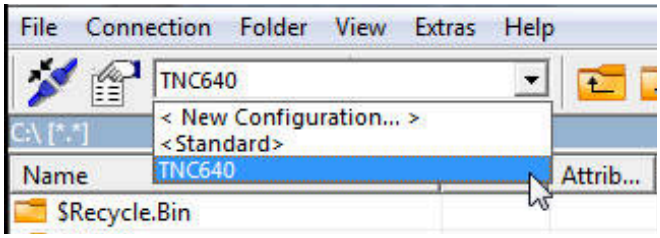
- Select **OK**



2

Selecting the connection in the selection menu

- Select the connection in the selection menu (3)



3

- Select **Establish connection**
- > TNCremo opens the **Establish secure connection** window.
- Enter the password for the user

> If user administration is not active, enter **user** as password.

- Select **OK**
- > TNCremo sets up and establishes the secure connection.

> You need to set up the connection only once; after that, you can directly select **Establish connection**.

2.5.5 Defining default directories

TNCremo allows you to define frequently used folders as default directories to give you fast access to your data. TNCremo directly opens the default directory while connecting.

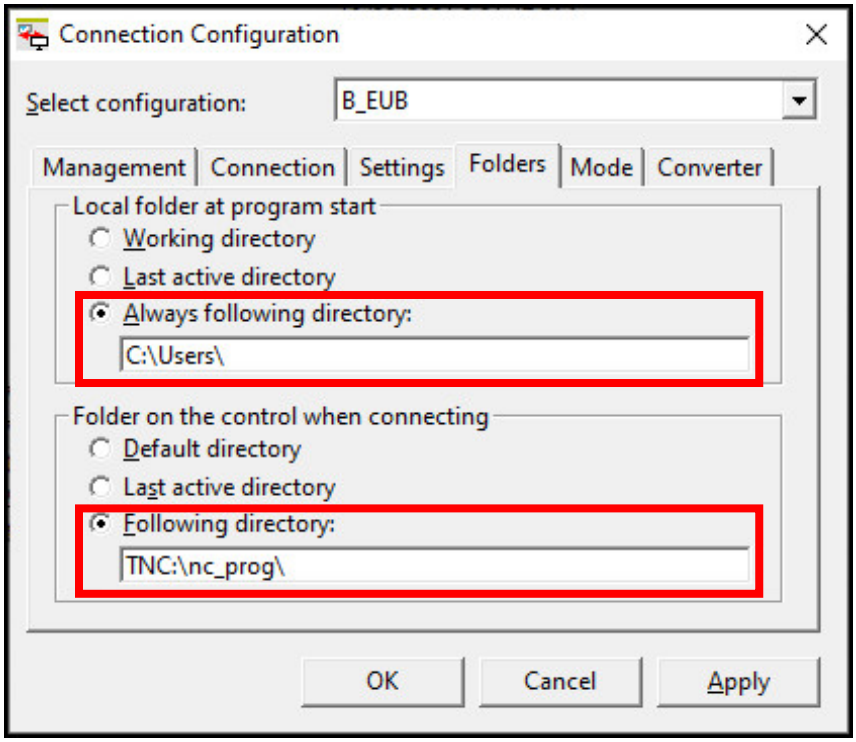
By default, the TNCremo opens the **C:** drive on the PC, and the **TNC:** drive on the programming station.

You can change the default directory for both the PC and the programming station.

To change the default directory:

- Select the desired connection in the selection menu

- Select **Configure**
> TNCremo opens the **Connection Configuration** window.
- Select the **Folder** tab
- Select the **Always following directory** check box
- Enter the desired PC directory
- Select the **Following directory** check box
- Enter the desired programming station directory
- Select **Apply**
- Select **OK**
> TNCremo saves the default directories.



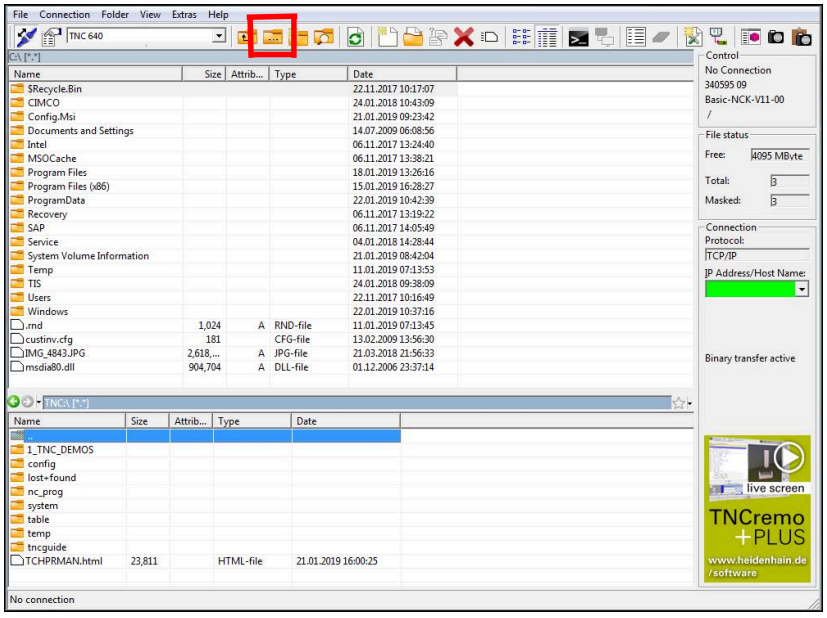
2.5.6 Changing the TNCremo folder

You can change the PC folder or the programming station folder shown in the file list.

To change the PC folder shown in the list:

- Select the file list of the PC
- Select **Select folder in favorites list**
- > TNCremo opens the **Change folder on the PC** window.
- Select the desired folder
- Select **OK**
- > TNCremo displays the selected folder.

To change the programming station folder being shown, select the file list of the programming station and proceed as described above.



2.5.7 Making a backup

HEIDENHAIN recommends making regular backups of the programming station data. This enables you to restore data quickly after losing data or if servicing becomes necessary.

TNCremo can create backups of the following data:

- Contents of the TNC drive
- Contents of the PLC drive (machine manufacturer's code number required)

> If you do not know the machine manufacturer's code number, make regular backups of the TNC drive contents.

To create a backup of the TNC drive:

- ▶ Establish a connection to the programming station
- ▶ Select the file list of the programming station
- ▶ Double-click the drive to be backed up
- > TNCremo displays the path to the selected drive.

- ▶ Select **Start TNCbackup**
- > TNCremo opens the **TNCbackup [Scan]** window.

- ▶ Select **Scan directory tree**
- > TNCremo creates a list containing all of the files of the selected folder structure.
- ▶ Select the **Run** tab

- ▶ Select **Back up files**
- > TNCremo opens the **Save backup file** window.
- ▶ Select the storage location for the file
- ▶ Select **Save**
- > TNCremo saves the backup file with the file extension ***.tncbck**.

> If there already are previous backup files, you can use the **Back-up modified files** function as an alternative to **Back-up files**. TNCremo will then create a quicker backup of the files that have not yet been saved.

2.6 Transferring data from the programming station to the machine

2.6.1 Requirements

- Before transferring data, connect the PC on which you have installed the programming station to the machine.
  In the corresponding User's Manual, you will find a detailed description. **More Information:** "More detailed documentation", Page 13
- You can start a data transfer only from your machine.

2.6.2 Preparations for transferring data

There are various ways to transfer data:

- Transfer directory
- Install folder and IOsim folder
- NC Share
- Data transfer over the network

Transfer directory

In order to transfer programs created with the programming station to your machine, you can create a transfer directory on the PC. In the transfer directory, you can temporarily store the programs to be transferred.

Proceed as follows:

- ▶ Use the Windows Explorer to create a new directory on your PC or on any network drive desired (e.g., **<c:\pgmtransfer>**)
- ▶ Select **Settings** in the VirtualBox menu
- ▶ Select **Shared Folders**
- ▶ Select the icon for **adding a new shared folder**
- > The programming station opens the Add Share window.
- ▶ Select the transfer folder under **Folder Path**
- ▶ Select the desired options (e.g., **Read-only**)
- ▶ Apply your selection with **OK**
- ▶ Restart the programming station to apply the setting

If you add a transfer directory, then you can configure various settings:

- **Read-only**: Read access only
- **Auto-mount**: The programming station will automatically set up the connection

- A new transfer directory or a shared folder will not be shown in the file management of the programming station until a restart has been carried out.
- The **Devices** VirtualBox menu is available only if you activate it in the VirtualBox settings and if you select the **Normal** display setting in the Control Panel

Functions for managing shared folders:

Icon	Function
	Create a new folder
	Edit folder
	Remove folder

The programming station shows the transfer directory in the **SF** (**S**hared **F**older) drive.

To transfer a program via the file management of the programming station:

- ▶ Select the **Editor** operating mode
- ▶ TNC 640: Press the **PGM MGT** key

  or
- ▶ TNC7: Select the **Files** operating mode

> File management is called.

- ▶ Select the program that you want to transfer to the machine
- ▶ Select the two-window view
- ▶ In the right-hand window, select the transfer directory as the target path
- ▶ Copy the program into the transfer directory

Install folder and IOsim folder

In the programming station, the **Install** folder and **IOsim** folder are contained in the **SF** (**S**hared **F**older) drive. You will also find these folders in the installation folder of the programming station in the Windows File Manager. You can use the two folders for data transfer without needing to specifically connect them.

The folders can generally be found in the following file paths:

- Install

  C: ▶ Program Files ▶ HEIDENHAIN ▶ <control> ▶ <version> ▶ <installation name> ▶Install
- IOsim

  C: ▶ Program Files ▶ HEIDENHAIN ▶ <control> ▶ <version> ▶ <installation name> ▶ IOsim

NC Share

NC Share allows you to create the TNC drive in the Windows File Manager, in order to transfer programs from the programming station to your PC.

- ▶ Start the **Control Panel**
- ▶ Navigate to the **NC Share** menu
- ▶ **Under TNC:**, assign a free drive letter
- ▶ Select **Connect NC-Shares (s) automatically**
- ▶ Select **Connect**

> The drive will automatically be connected upon startup of the programming station.

You need to have the permission for creating drives on your PC.

Data transfer over the network

You can use remote tools to transfer data via the network. HEIDENHAIN uses **TNCremo** for this purpose.

More Information: "TNCremo and secure connection", Page 71

2.6.3 Calling a program from the machine tool

- Select the **Editor** operating mode
- TNC 640: Press the **PGM MGT** key

  or
- TNC7: Select the **Files** operating mode

> The file management is called.

- Select the target directory to which you wish to copy the program that has been created on the programming station
- Select the two-window view
- In the right-hand window, select the **<c:\pgmtransfer>** directory of the programming station PC.
- Select the program to be transferred, and transfer it to the machine tool

In the corresponding User's Manual you will find a detailed description of how to copy files.

More Information: "More detailed documentation", Page 13

2.6.4 Establishing a connection between the programming station and HEIDENHAIN PC software applications

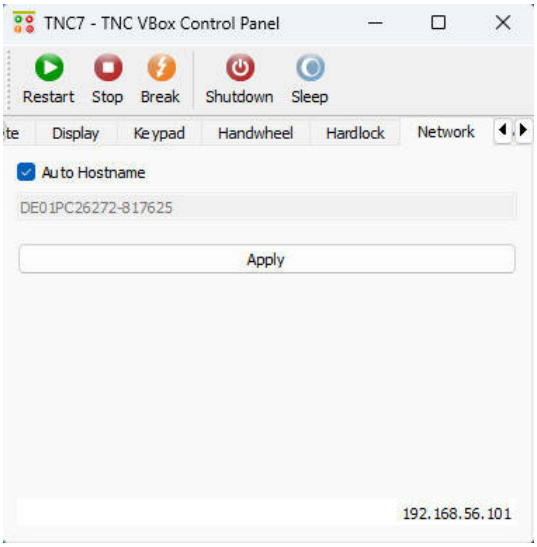
In the connection settings of the PC software, enter the network address or the automatically generated host name of the programming station, in order to connect the HEIDENHAIN PC software to the programming station. The programming station automatically generates a host name based on the PC name and the software number.

Proceed as follows:

- Start the **Control Panel**
- Select **Auto Hostname** in the **Network** menu (1)
- Enter the **Hostname** in the corresponding configuration menu of the HEIDENHAIN PC software

  or
- Enter the IP address displayed in the Control Panel

> The programming station can be connected to the PC software like a machine.



1: View of the window

2.7 Uninstalling the software

- You need to uninstall the programming station separately on every PC workstation, regardless of the type of licensing.
  More Information: "Uninstalling the programming station", Page 84
- If you are using a software release module, you additionally need to uninstall the corresponding driver on every PC.
  More Information: "Uninstalling the drivers", Page 85
- If you are using the network license, you also need to clear the license server.
  More Information: "Clearing the license server", Page 85

2.7.1 Uninstalling the programming station

NOTICEANSI

Caution: Data may be lost!

When uninstalling, all of the files of the virtual control are deleted!

- ▶ Create a backup

Proceed as follows:

- ▶ Open the Windows Start Menu
- ▶ Navigate to the desired function. For example:
  All Programs ▶ HEIDENHAIN ▶ Programming station folder ▶ Folder with software ID ▶ Uninstall TNC7 (817625).exe
- ▶ Start the uninstall file **Uninstall TNC7 (817625).exe**
- > The uninstallation wizard will now start.
- ▶ Select **Next >**
- > The uninstallation wizard now displays the installed applications.
  - VirtualBox virtualization software
  - TNCVbBase extension package for VirtualBox (Control Panel and keypad)
  - NC software
- ▶ Select the desired applications
- ▶ Select **Uninstall**

Pay attention to which applications you are uninstalling.

- The programming station is, for example, no longer executable without virtualization software.
- During uninstallation, all programming stations contained in a folder are deleted.
- If multiple programming stations of the same type are contained in a directory, then use the VirtualBox Manager to uninstall a single installation.

2.7.2 Uninstalling the drivers

- With multiple installations of the programming station, the driver is shared by all programming stations.
- Deleting the driver affects all programming stations.

For uninstallation, use the same file as for installation.

Proceed as follows:

- Extract the downloaded files
- Navigate to the installation file **CBUSetup.exe**
- Start the uninstall file **CBUSetup.exe**
- Select the **Uninstall** option
- Select **OK**
- Carry out the uninstallation step instructions

2.7.3 Clearing the license server

Proceed as follows:

- Double-click the icon in the taskbar
- Select the **Stop** button
- Close the window
- Modify implemented settings as needed (e.g., the firewall settings)

  More Information: "Setting up the license server", Page 28
- Delete the CBServer folder from the hard disk of the license server

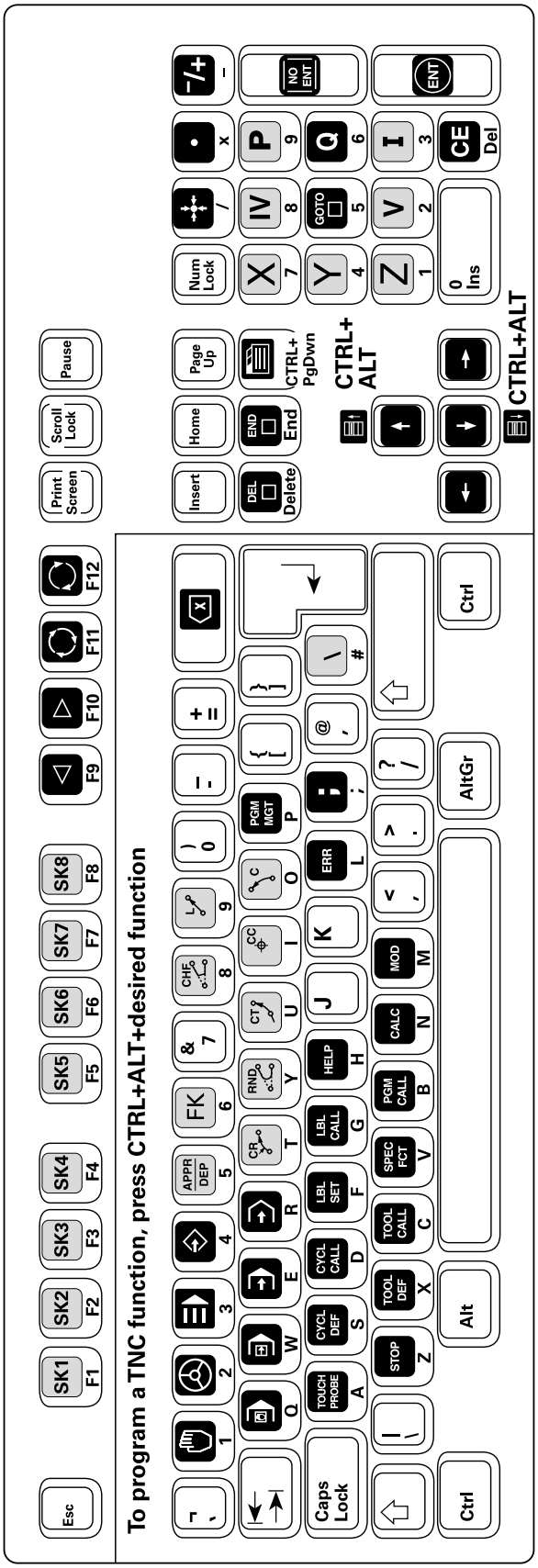
If you made no settings, then deleting the CBServer folder is sufficient.

3

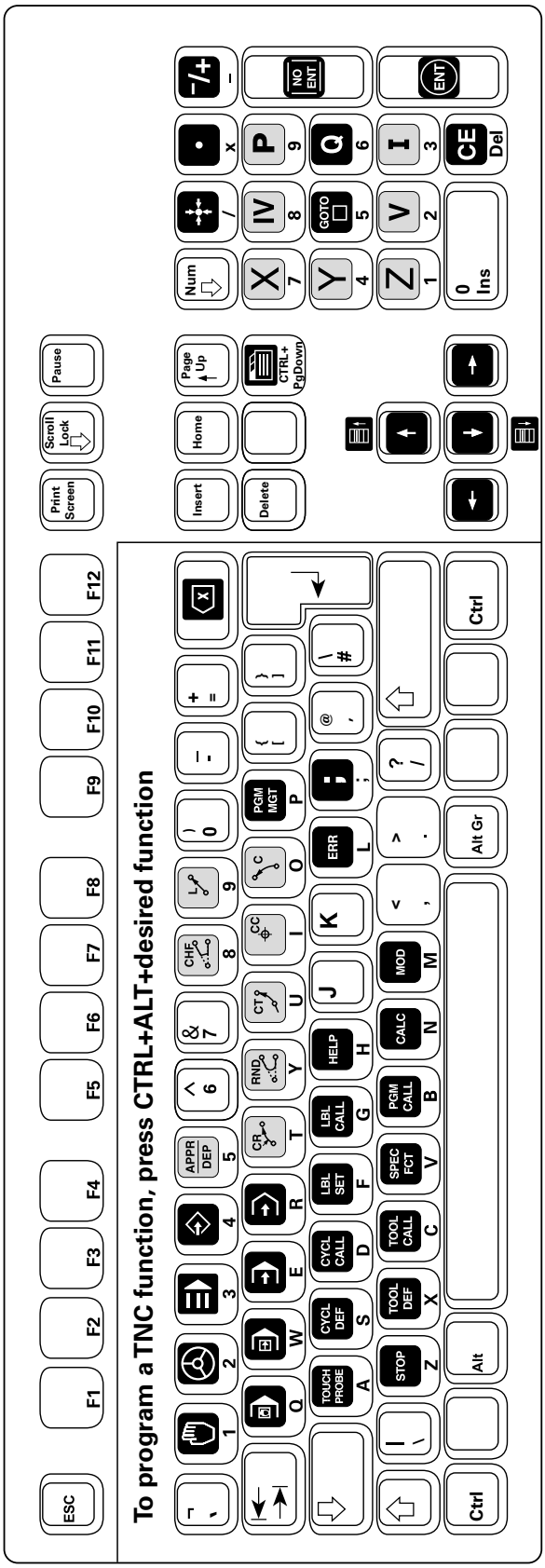
Appendix

3.1 Overview of keyboard assignment

TNC 640



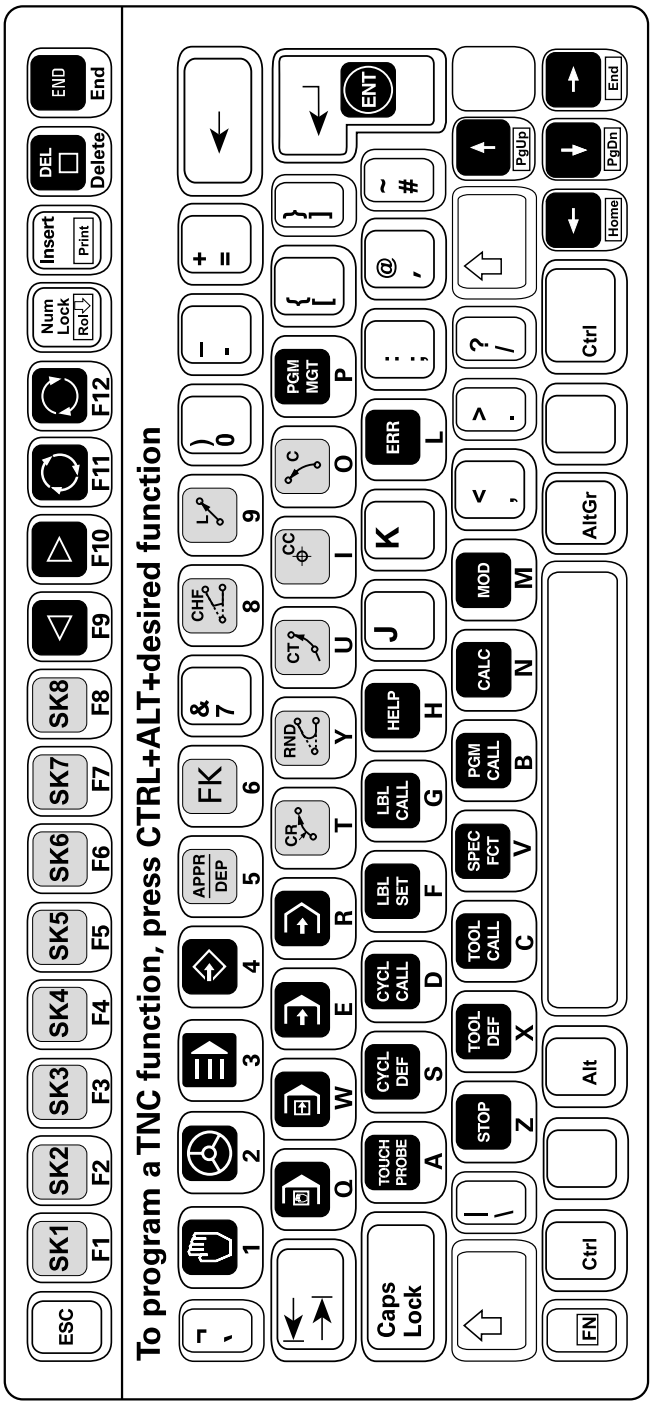
TNC7



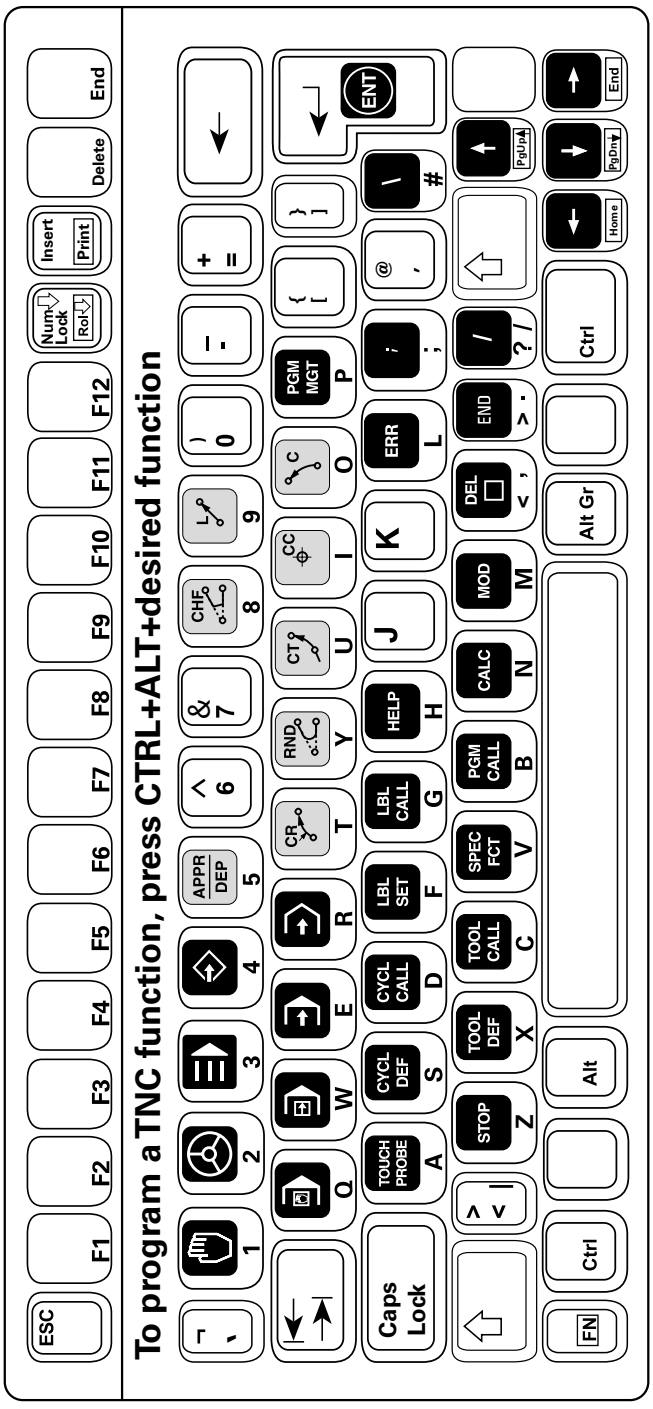
3.2 Key assignments without numeric keypad

On keyboards without numeric keypad, some functions such as DEL (delete) or the cursor keys can be activated with an FN key. Refer also to the operating instructions of your keyboard.

TNC 640



TNC7



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