HEIDENHAIN

ND 7000 Demo

User's Manual

Digital Readout

English (en)
11/2018

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1

Fundamentals

1.1 Overview

This chapter contains information about the product and these instructions.

1.2 Information on the product

1.2.1 Demo software for demonstration of the device functions

ND 7000 Demo is a software application you can install on a computer independently of the device. ND 7000 Demo helps you to become familiar with, try out or present the functions of the device.

1.2.2 Demo software features

Because of the missing hardware environment, the range of features of the demo software does not correspond to the complete functional range of the device. However, you can use the descriptions to familiarize yourself with the most important functions and the user interface.

1.3 Intended use

The products of the ND 7000 series are advanced digital readouts for use on manually operated machine tools. In combination with linear and angle encoders, digital readouts of this series return the position of the tool in more than one axis and provide further functions for operating the machine tool.

ND 7000 Demo is a software product for demonstration of the basic features of the ND 7000 series products. ND 7000 Demo may be used only for presentation, training or testing purposes.

1.4 Improper use

ND 7000 Demo is not intended for any use other than the intended use. Any use for other purposes is prohibited, specifically:

- For productive purposes in production systems
- As part of production systems

1.5 Notes on reading the documentation

Would you like to see any changes made, or have you found any errors?

We are continuously striving to improve our documentation for you. Please help us by sending your requests to the following e-mail address:

userdoc@heidenhain.de

1.6 Symbols and fonts used for marking text

In these instructions the following symbols and fonts are used for marking text:

Depiction	Meaning
▶ ... > ...	Identifies an action and the result of this action Example: ▶ Tap **OK** > The message is closed
■ ... ■ ...	Identifies an item of a list Example: ■ TTL interface ■ EnDat interface ■ ...
Bold	Identifies menus, displays and buttons Example: ▶ Tap **Shut down** > The operating system shuts down ▶ Turn the power switch off

2

Software installation

2.1 Overview

This chapter provides all of the information needed for downloading and properly installing ND 7000 Demo on a computer.

2.2 Downloading the installation file

Before you can install the demo software on a computer, you need to download an installation file from the HEIDENHAIN Portal.

> To download the installation file from the HEIDENHAIN Portal, you need access rights to the **Software** portal folder in the directory of the appropriate product.
>
> If you do not have access rights to the Portal's **Software** folder, you can request the access rights from your HEIDENHAIN contact person.

- Download the latest version of ND 7000 Demo here: **www.heidenhain.de**
- Select the download folder of your browser
- Unpack the downloaded file with the extension **.zip** into a temporary storage folder

> The following files will be unpacked into the temporary storage folder:
  - Installation file with the extension **.exe**
  - File **DemoBackup.mcc**

2.3 System requirements

If you want to install ND 7000 Demo on a computer, the computer system must meet the following requirements:

- Microsoft Windows 7 or higher
- Screen resolution of at least 1280 × 800 recommended

2.4 Installing ND 7000 Demo under Microsoft Windows

- Select the temporary storage folder into which you unpacked the downloaded file with the **.zip** extension
  Further information: "Downloading the installation file", Page 12
- Run the installation file with the extension **.exe**

> The installation wizard is opened:

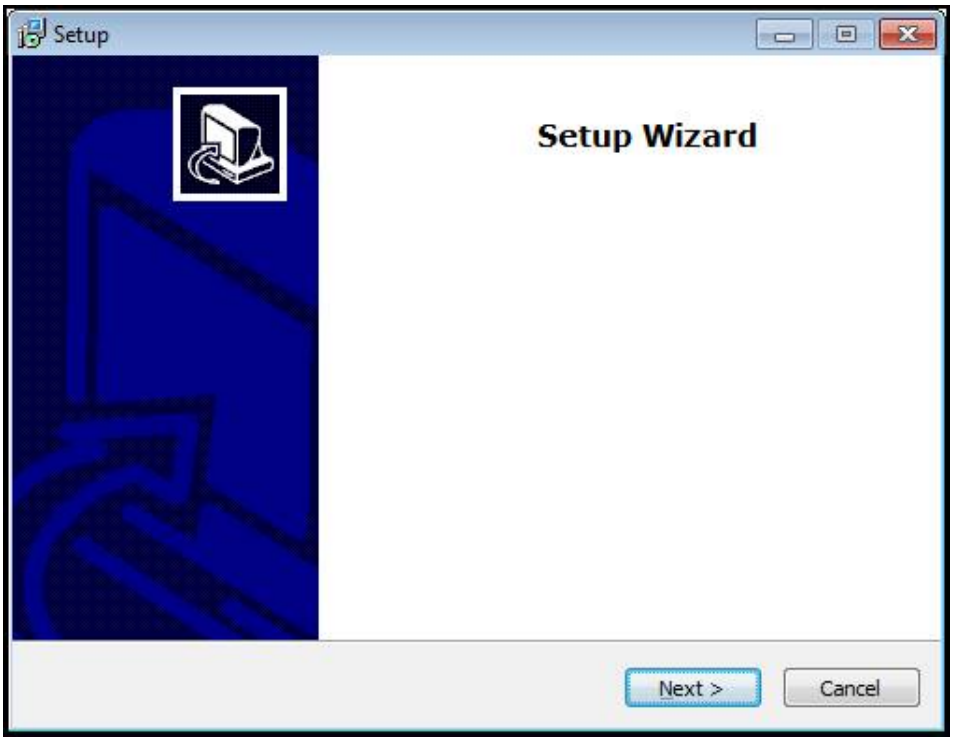


Figure 1: **Installation wizard**

- Tap **Next**
- In the **License Agreement** installation step, accept the terms of the license
- Tap **Next**

> In the **Select Destination Location** installation step, the installation wizard suggests a storage location. We recommend retaining the suggested storage location.

- In the **Select Destination Location** installation step, select the storage location to which you want to save ND 7000 Demo
- Tap **Next**

> In the **Select Components** installation step, the ScreenshotClient program is also installed by default. ScreenshotClient enables you to take screenshots of the active screen.
>
> If you want to install ScreenshotClient
>
> - In the **Select Components** installation step, leave the default settings unchanged
>
> **Further information:** "ScreenshotClient", Page 67

- In the **Select Components** installation step:
  - Select the type of installation
  - Activate or deactivate the option **Screenshot Utility**

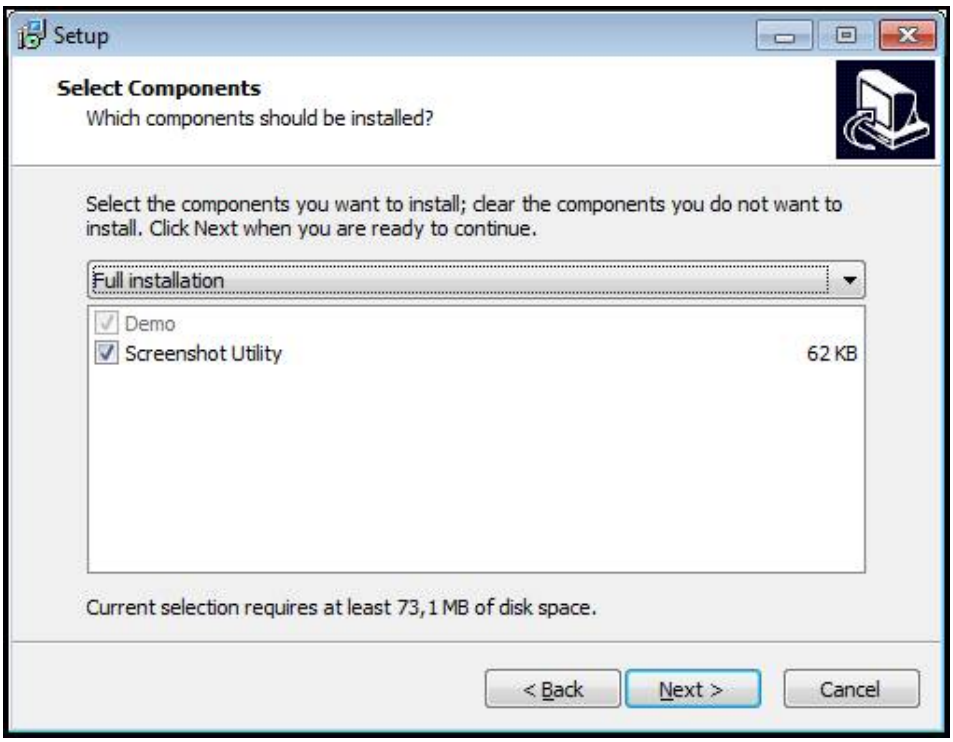


Figure 2: Installation wizard with activated **demo software** option and **Screenshot Utility**

- Tap **Next**
- In the **Select Start Menu Folder** installation step, select the storage location at which you want to create the start menu folder
- Tap **Next**
- In the **Select Additional Tasks** installation step, select or deselect **Desktop icon**
- Tap **Next**
- Tap **Install**

> Installation starts—the status of installation is shown in the progress bar

- After installation has been completed successfully, use **Finish** to close the installation wizard

> The program has been successfully installed on your computer

2.5 Uninstalling ND 7000 Demo

- Select in succession in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **ND 7000 Demo**
- Tap **Uninstall**

> The uninstallation wizard opens

- To confirm unistallation, tap **Ja**

> Unistallation starts, and the progress bar indicates the status of the unistallation process

- After uninstallation has been completed successfully, close the uninstallation wizard with **OK**

> The program has been successfully removed from your computer

3

Basic operation

3.1 Overview

This chapter describes the user interface, operating elements, and basic functions of ND 7000 Demo.

3.2 Using the touchscreen and input devices

3.2.1 Touchscreen and input devices

The operating elements on the user interface from ND 7000 Demo are operated via a touchscreen or a connected mouse.

To enter data, you can use the screen keyboard of the touchscreen or a connected keyboard.

3.2.2 Gestures and mouse actions

To activate, switch or move the operating elements of the user interface, you can use ND 7000 Demo's touchscreen or a mouse. Gestures are used to operate the touchscreen and the mouse.

The gestures for operating the touchscreen may differ from the gestures for operating the mouse.

If the gestures for operating the touchscreen differ from those for operating the mouse, then these instructions describe both operating options as alternative actions.

The alternative actions for operating the touchscreen or the mouse are identified by the following symbols:

Operation using the touchscreen

Operation using the mouse

The following overview describes the different gestures for operating the touchscreen or the mouse:

Tapping
Means touching the screen briefly with your fingertip
Means pressing the left mouse button once

The actions initiated by tapping include

- Selection of menus, features or parameters
- Entering characters with the screen keyboard
- Closing dialogs

Holding (long press)
Means touching the screen and holding your finger(s) on it for a few seconds
Means pressing the left mouse button once and holding it down

The actions initiated by holding are

- Quickly changing the values in input fields with plus and minus buttons

Dragging	
	Is a combination of long press and then swipe, moving a finger over the touchscreen when at least the starting point of motion is defined
	Means pressing the left mouse button once and holding it down while moving the mouse; at least the starting point of the motion is defined

The actions initiated by dragging include

- Scrolling through lists and texts

3.3 General operating elements and functions

The operating elements described below are available for configuration and operating the product via the touchscreen or input devices.

Screen keyboard

With the screen keyboard, you can enter text into the input fields of the user interface. The displayed screen keyboard is either numeric or alphanumeric, depending on the input field.

- ▶ To enter values, tap an input field
- > The input field is highlighted
- > The screen keyboard is displayed
- ▶ Enter text or numbers
- > In some input fields, a green check mark indicates that the entry is correct
- > If the entry is incomplete or incorrect, a red exclamation mark is displayed. The entry cannot be concluded in this case
- ▶ To apply the values, confirm the entry with **RET**
- > The values are displayed
- > The screen keyboard disappears

Input fields with plus and minus buttons

To adjust a numerical value, use the **+** (plus) and **-** (minus) buttons to the left and right of the numerical value.

- ▶ Tap **+** or **-** until the desired value is displayed
- ▶ Long-press **+** or **-** to scroll through the values more quickly
- > The selected value is displayed

Toggle switch

Use the toggle switch to switch between functions.

- ▶ Tap the desired function
- > The active function is shown in green
- > The inactive function is shown in light gray

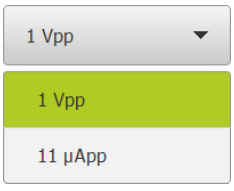
Slide switch

With the sliding switch, you can activate or deactivate a function.

- ▶ Drag the sliding switch to the desired position or tap the sliding switch
- > The function is activated or deactivated

Drop-down list

Buttons that open drop-down lists are indicated by a triangle pointing down.



- ▶ Tap the button
- > The drop-down list opens
- > The active entry is highlighted in green
- ▶ Tap the desired entry
- > The selected entry is applied

Undo

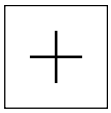
With this button, you can undo the last action.

Processes that have already been concluded cannot be undone.

- Tap **Undo**

> The last action is undone

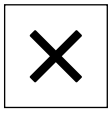
Add



- To add a feature, tap **Add**

> The new feature is added

Close

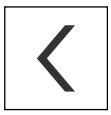


- Tap **Close** to close a dialog

Confirm

- Tap **Confirm** to conclude an activity

Back



- Tap **Back** to return to the higher level in the menu structure

3.4 ND 7000 Demo – startup and shut-down

3.4.1 Starting ND 7000 Demo

Before using ND 7000 Demo, you need to perform the steps for configuring the software.

- Tap **ND 7000 Demo** on the Microsoft Windows desktop

or

- Select in succession in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **ND 7000 Demo**

Two executable files with different modes of appearance are available:

- **ND 7000 Demo**: starts within a Microsoft Windows window
- **ND 7000 Demo (full screen)**: starts in full-screen mode

- Tap **ND 7000 Demo** or **ND 7000 Demo (full screen)**

> ND 7000 Demo starts an output window in the background. The output window is not relevant for operation and is closed again when ND 7000 Demo is shut down

> ND 7000 Demo starts the user interface with the **User login** menu

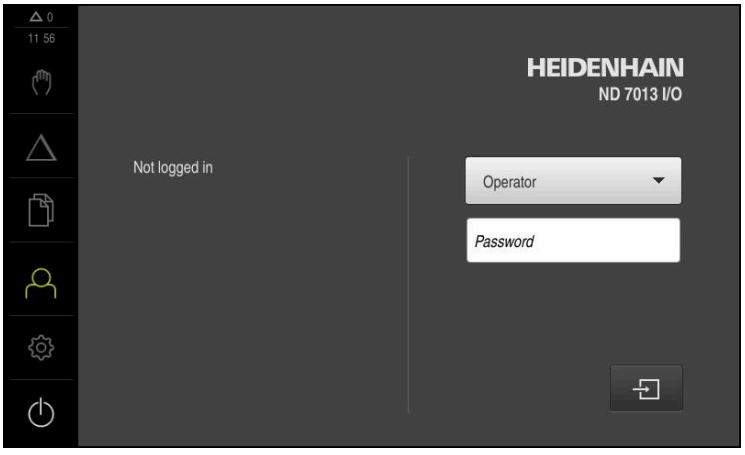


Figure 3: **User login** menu

3.4.2 Shutting down ND 7000 Demo

- Tap **Switch off** in the main menu

- Tap **Shut down**
> ND 7000 Demo is shut down

> To shut down ND 7000 Demo in the Microsoft Windows window, also use the **Switch-off** menu.
>
> If you use **Close** to close the Microsoft Windows window, all settings will be lost.

3.5 User login and logout

In the **User login** menu, you can log in and out of the product as a user.

Only one user can be logged in to the product at a time. The logged-in user is displayed. Before a new user can log in, the logged-in user has to log out.

> The product provides various authorization levels that grant the user full or restricted access to management and operation functionality.

3.5.1 User login

- Tap **User login** in the main menu
- In the drop-down list, select the **OEM** user
- Tap the **Password** input field
- Enter the password "**oem**" of the **OEM** user
- Confirm entry with **RET**

- Tap **Log in**
> The user is logged in and the **Manual operation** menu is displayed

3.5.2 User logout

- Tap **User login** in the main menu

- Tap **Log out**
> The user is logged out
> All functions of the main menu are inactive, except for **Switch off**
> The product can only be used again after a user has logged in

3.6 Setting the language

The default language for the user interface is English. You can switch the user interface to the desired language.

- Tap **Settings** in the main menu

- Tap **User**
- > The logged-in user is indicated by a check mark
- Select the logged-in user
- > The language selected for the user is indicated by a national flag in the **Language** drop-down list
- Select the flag for the desired language in the **Language** drop-down list
- > The user interface is displayed in the selected language

3.7 User interface

The unit is available in different versions, which are variously equipped. The user interface and available functions may vary depending on the version.

3.7.1 User interface after Startup

User interface after startup

If automatic user login is active and the last user who logged in was of the **Operator** type, the **Manual operation** menu is displayed after the product has started up.

If automatic user login is not active, the product opens the **User login** menu.

Further information: "User login menu", Page 34

3.7.2 Main menu of the user interface

User interface (in Manual operation mode)

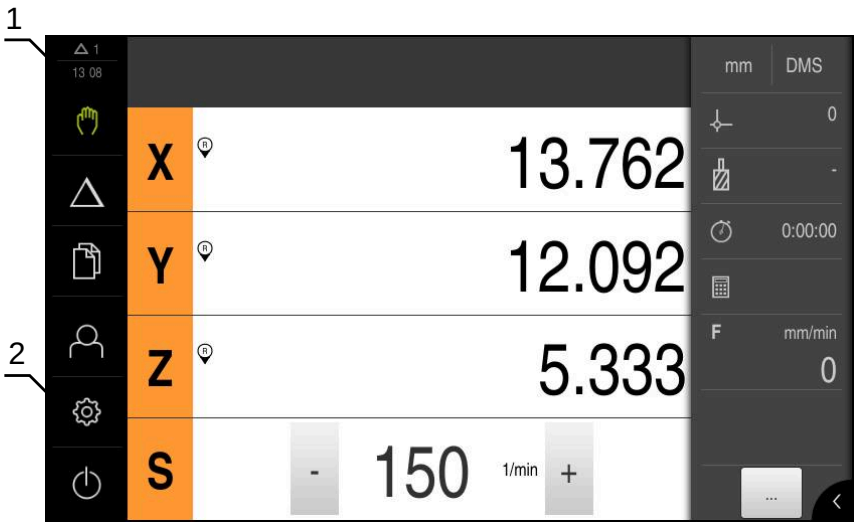


Figure 4: User interface (in Manual operation mode)

1 Message display area, displays the time and the number of unclosed messages
2 Main menu with operating elements

Operating elements of the main menu

The main menu is displayed independently of activated software options.

Operating element	Function
△3	**Message** Display of an overview of all messages as well as the number of messages that have not been closed
	Manual operation Manual positioning of machine axes **Further information:** "Manual operation menu", Page 28
	MDI mode Direct input of the desired axis movements (Manual Data Input); the distance-to-go is calculated and displayed **Further information:** "MDI menu", Page 30
	File management Management of the files that are available on the product **Further information:** "File management menu", Page 32

Operating element	Function
	User login Login and logout of the user **Further information:** "User login menu", Page 34
	Settings Settings of the product, such as setting up users, configuring sensors or updating the firmware **Further information:** "Settings menu ", Page 35
	Switch-off Shutdown of the operating system or activation of energy-saving mode **Further information:** "Switch-off menu", Page 36

3.7.3 Manual operation menu

Activation

- ▶ Tap **Manual operation** in the main menu
- > The user interface for manual operation is displayed

Manual operation menu (in the Milling application mode)

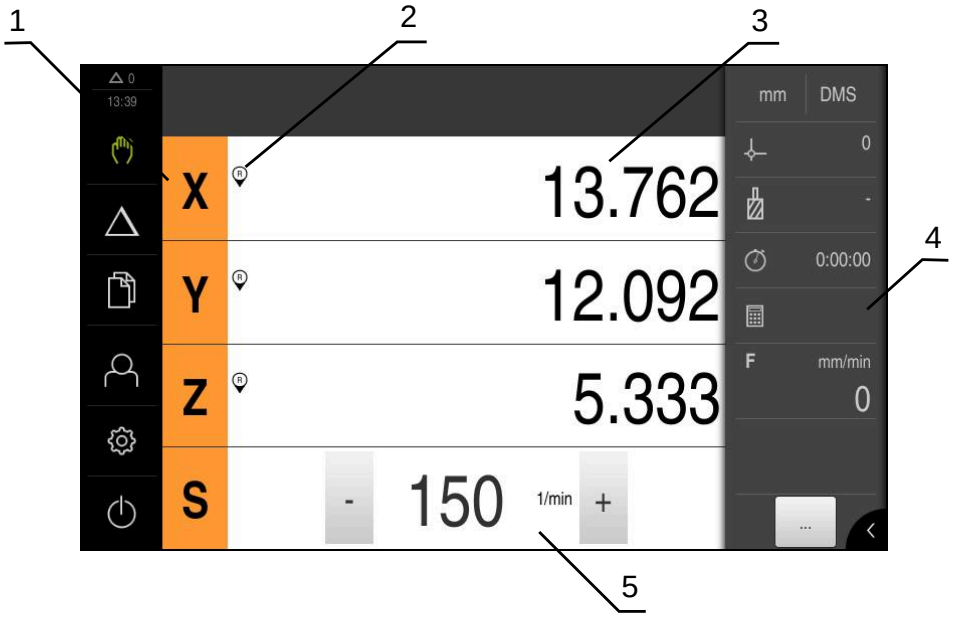


Figure 5: **Manual operation** menu in the milling application mode

1 Axis key
2 Reference
3 Position display
4 Status bar
5 Spindle speed (machine tool)

Manual operation menu (in the Turning application mode)

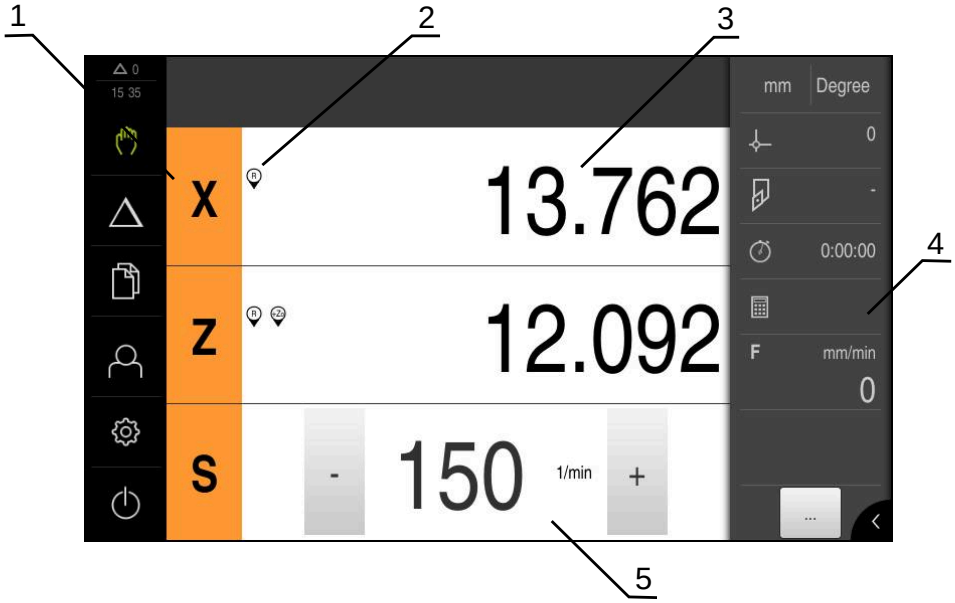


Figure 6: **Manual operation** menu in the turning application mode

1 Axis key
2 Reference
3 Position display
4 Status bar
5 Spindle speed (machine tool)

In the **Manual operation** menu, the workspace shows the position values measured at the machine axes.

The status bar provides auxiliary functions.

3.7.4 MDI menu

Activation

- Tap **MDI** in the main menu

MDI mode menu (in the Milling application mode)

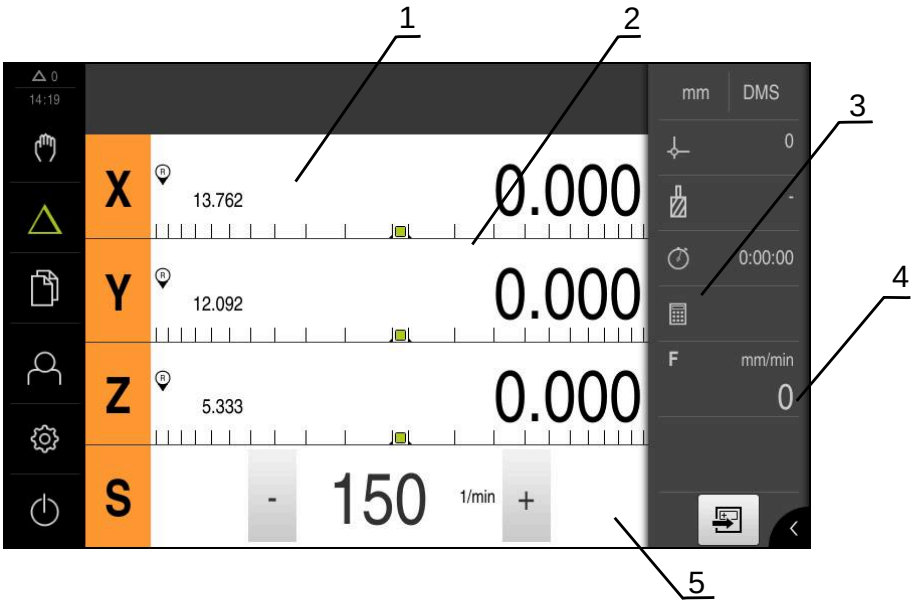


Figure 7: **MDI mode** menu in the milling application mode

1 Axis key
2 Actual position
3 Distance-to-go
4 Status bar
5 Spindle speed (machine tool)

MDI mode menu (in the Turning application mode)

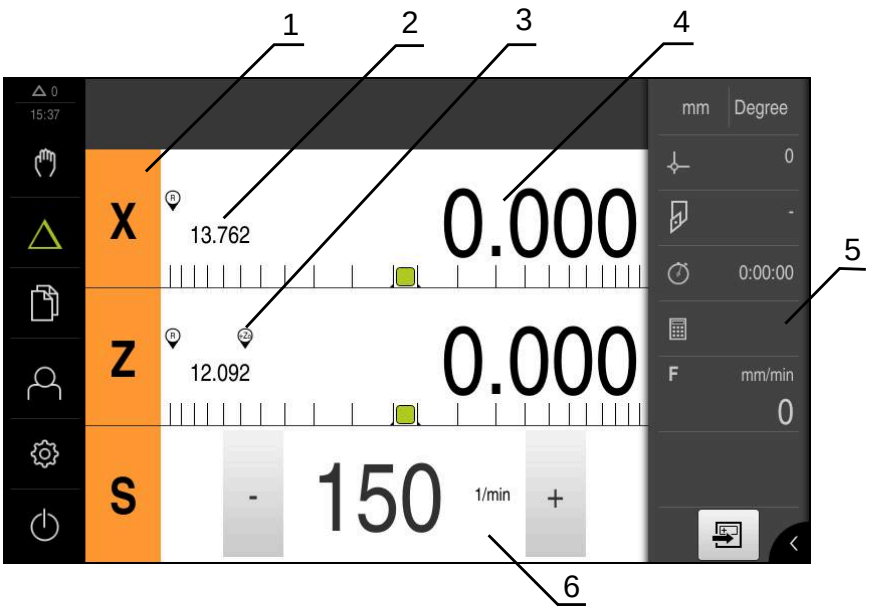


Figure 8: **MDI mode** menu in the turning application mode

1 Axis key
2 Actual position
3 Coupled axes
4 Distance-to-go
5 Status bar
6 Spindle speed (machine tool)

MDI block dialog

- Tap **MDI** in the main menu

- Tap **Create** on the status bar

> The user interface for the MDI mode is displayed

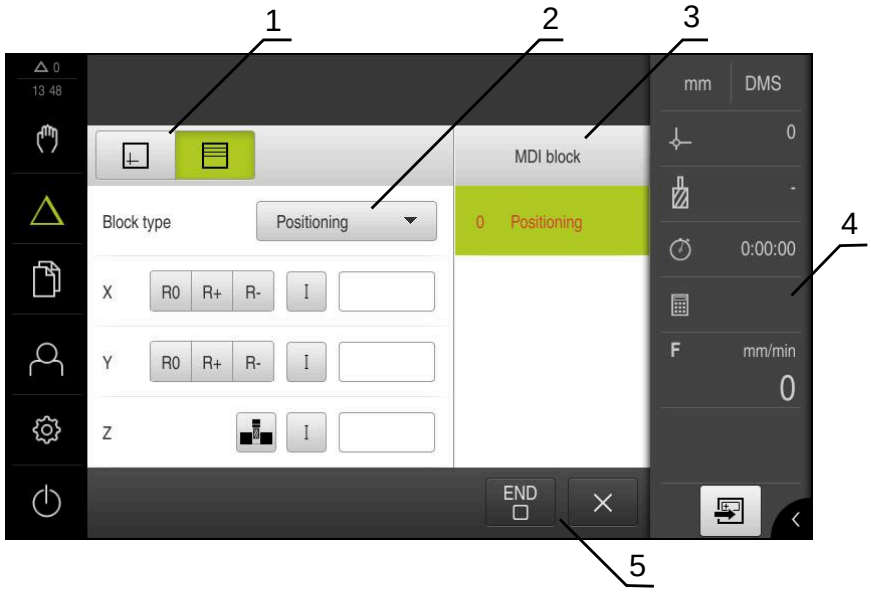


Figure 9: **MDI block** dialog

1 View bar
2 Block parameters
3 MDI block
4 Status bar
5 Block tools

The **MDI** (Manual Data Input) menu enables you to enter the desired axis movements directly. You specify the distance to the target point, and the distance to go is then calculated and displayed.

The status bar provides additional measured values and functions.

3.7.5 File management menu

Activation

- Tap **File management** in the main menu

> The user interface for file management is displayed

Short description

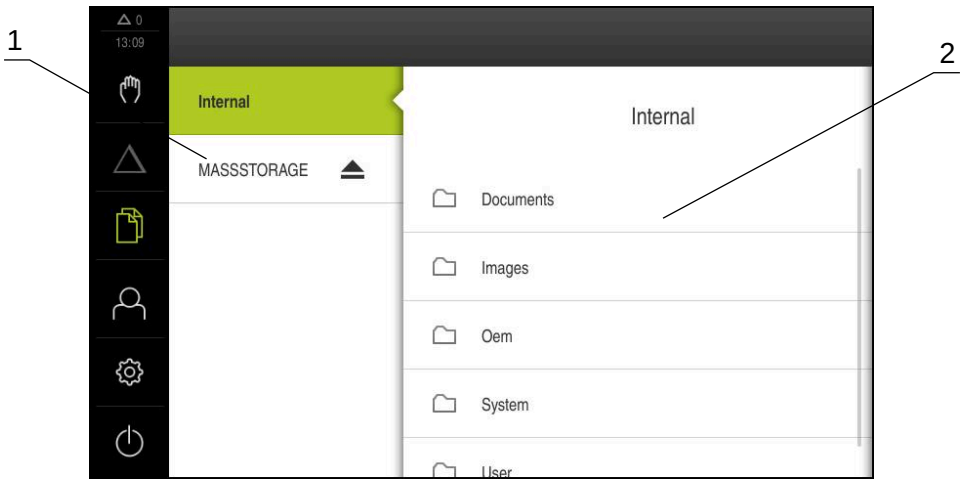


Figure 10: **File management** menu

1 List of available storage locations
2 List of folders in the selected storage location

The **File management** menu shows an overview of the files stored in the product's memory.

3.7.6 User login menu

Activation

- ▶ Tap **User login** in the main menu
- > The user interface for user login and logout is displayed

Short description

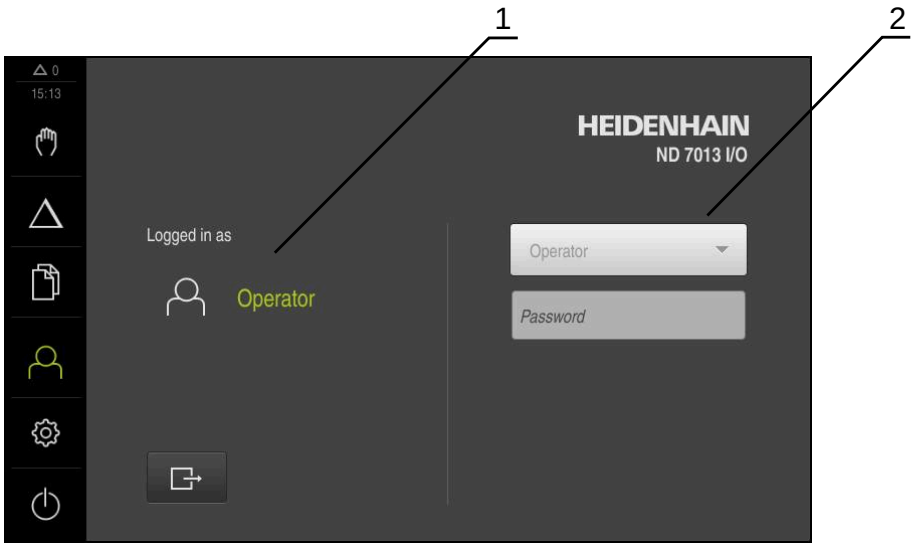


Figure 11: **User login** menu

1 Display of the logged-in user
2 User login

The **User login** menu shows the logged-in user in the column on the left. The login of a new user is displayed in the column on the right.

To log in another user, the logged-in user must log out.

Further information: "User login and logout", Page 24

3.7.7 Settings menu

Activation

- ▶ Tap **Settings** in the main menu
- > The user interface for the device settings is displayed

Short description

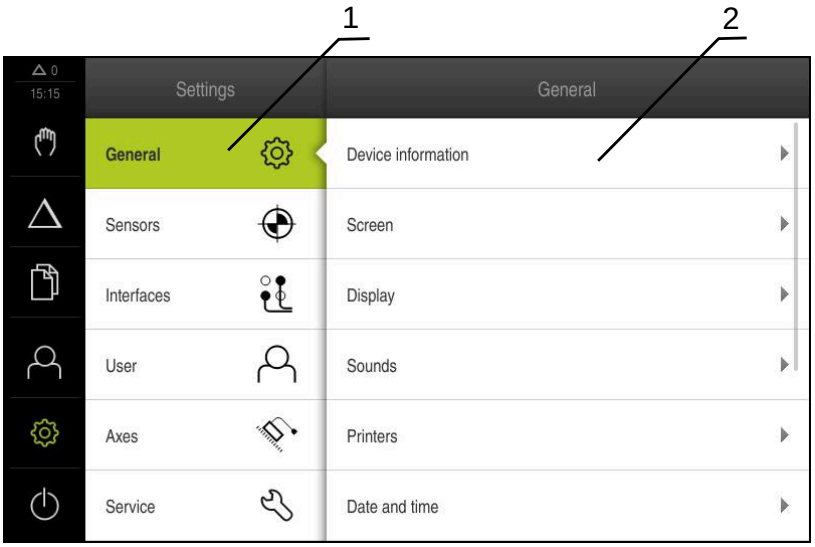


Figure 12: **Settings** menu

1 List of setting options
2 List of setting parameters

The **Settings** menu shows all options for configuring the product. With the setting parameters, you can adapt the product to on-site requirements.

The product provides various authorization levels that grant the user full or restricted access to management and operation functionality.

3.7.8 Switch-off menu

Activation

- Tap **Switch off** in the main menu

> The operating elements for shutting down the operating system, for activating the energy-saving mode and for activating the cleaning mode are displayed

Short description

The **Switch off** menu provides the following options:

Operating element	Function
	Shut down Shuts down ND 7000 Demo
	Energy saving mode Switches the screen off and puts the operating system into energy-saving mode
	Cleaning mode Switches the screen off; the operating system continues unchanged

Further information: "ND 7000 Demo – startup and shut-down", Page 23

3.8 Position display

The unit's position display shows the axis positions and additional information about the configured axes (if applicable).

You can also couple the display of axes and have access to the spindle functions.

3.8.1 Operating elements of the position display

Symbol	Meaning
	Axis key **Axis key functions:** ■ Tapping the axis key: opens input field for position value (Manual mode) or dialog **MDI block** (MDI mode) ■ Holding down the axis key: sets the current position as zero point ■ Dragging the axis key to the right: opens menu if functions are available for the axis
	In the turning application mode: The position display shows the diameter of the radial machining axis **X**
	Reference mark search performed successfully
	Reference mark search not performed or no reference mark detected

Symbol	Meaning
	Zo axis is coupled with the Z axis. Position display shows the sum of both position values **Further information:** "Coupling of axes (in the Turning application mode)", Page 37
	Z axis is coupled with the Zo axis. Position display shows the sum of both position values
	Selected gear stage of the gear spindle **Further information:** "Setting the gear stage for gear spindles", Page 38
	Spindle speed cannot be achieved with selected gear stage ▶ Select a higher gear stage
	Spindle speed cannot be achieved with selected gear stage ▶ Select a lower gear stage
	The **CSS** (constant surface speed) spindle mode is activated **Further information:** "Setting the spindle mode (in the Turning application mode)", Page 39 If the icon is flashing, then the calculated spindle speed lies outside of the defined speed range. The desired surface speed cannot be attained. The spindle will continue to turn at the maximum or minimum speed
	In MDI mode , a scaling factor is applied to the axis

3.8.2 Position display functions

Coupling of axes (in the Turning application mode)

In the **Turning** application mode, you can alternately couple the display of the **Z** axis and the **Zo** axis. For coupled axes, the position display shows the sum of the position values of both axes.

Coupling is identical for the **Z** axis and **Zo** axis. The following describes only the coupling of the **Z** axis.

Coupling axes

▶ In the working space, drag the **Z axis key** to the right

▶ Tap **Couple**

> The **Zo** axis is now coupled with the **Z** axis

> The icon for the coupled axes is shown next to the **Z axis key**

> The position value for the coupled axes is shown as a sum

Decoupling axes

- In the working space, drag the **Z axis key** to the right

- Tap **Decouple**
- > The position value of both axes are shown independently of each other

Setting the spindle speed

	The following information applies only to units with ID number 1089179-xx.

You can control the spindle speed depending on the configuration of the connected machine tool.

- Tap or long-press **+** or **-** to set the spindle speed to the desired value

or

- Tap the **Spindle speed** input field, enter the value and tap **RET** to confirm
- > The product applies the entered spindle speed as the nominal value and controls the spindle of the machine tool accordingly

Setting the gear stage for gear spindles

	The following information applies only to units with ID number 1089179-xx.

If your machine tool uses a gear spindle, then you can select the gear stage used.

	The selection of the gear stages can also be controlled via an external signal.

- In the working space, drag the **S axis key** to the right

- Tap **Gear stage**
- > The **Set gear stage** dialog appears
- Tap the desired gear stage

- Tap **Confirm**
- > The selected gear stage is now adopted as the new value
- Drag the **S axis key** to the left

- > The icon for the selected gear stage appears next to the **S axis key**

	If the desired spindle speed cannot be attained with the selected gear stage, then the gear stage icon will flash with an upward pointing arrow (higher gear stage) or with a downward pointing arrow (lower gear stage).

Setting the spindle mode (in the Turning application mode)

The following information applies only to units with ID number 1089179-xx.

In the **Turning** application mode, you can decide whether the unit uses the standard speed mode or **CSS** (constant surface speed) for the spindle mode.

In the **CSS** spindle mode, the unit calculates the spindle speed such that the surface speed of the turning tool remains constant regardless of the workpiece geometry.

Activating the CSS spindle mode

- In the working space, drag the **S axis key** to the right

- Tap **CSS mode**
- > The **Activate CSS** dialog appears
- Enter the value for **Maximum spindle speed**

- Tap **Confirm**
- > The **CSS** spindle mode is activated
- > The spindle speed is shown in the unit of measure **m/min**
- Drag the **S axis key** to the left

- > The icon for the **CSS** spindle mode appears next to the **S axis key**

Activating the speed mode

- In the working space, drag the **S axis key** to the right

- Tap **Speed mode**
- > The **Activate speed mode** dialog appears
- Enter the value for **Maximum spindle speed**

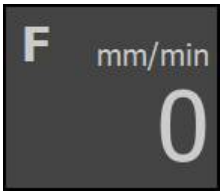
- Tap **Confirm**
- > The speed mode is activated
- > The spindle speed is shown in the unit of measure **rpm**
- Drag the **S axis key** to the left

3.9 Status bar

The status bar displays the feed rate and the traversing speed. The operating elements of the status bar also give you direct access to the preset table and tool table, as well as to the stopwatch and calculator features.

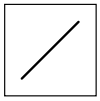
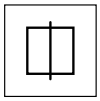
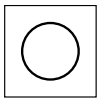
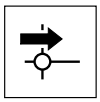
3.9.1 Operating elements of the status bar

The status bar provides the following operating elements:

Operating element	Function
	Quick access menu For setting the units of measure for linear and angular values, configuring a scaling factor, and configuring the position display for radial machining axes (in the **Turning** application mode); tapping it opens the quick access menu
	Preset table Display of the current preset; tapping opens the preset table
	Tool table Display of the current tool; tapping opens the tool table
	Stopwatch Time display with Start / Stop function in h:mm:ss format
	Calculator Calculator with the most important mathematical functions, speed calculator, and taper calculator
	**Feed rate** Display of the actual feed rate of the currently fastest axis
	Auxiliary functions Auxiliary functions in Manual operation mode, depending on the configured application mode
	MDI block For creating machining blocks in MDI mode

3.9.2 Auxiliary functions in Manual operation mode

Depending on the configured application mode, the following operating elements are available:

Operating element	Function
	Reference marks For starting the reference mark search
	**Probing** For probing the edge of a workpiece
	**Probing** For finding the centerline of a workpiece
	**Probing** For finding the center point of a circular feature (hole or cylinder)
	**Presets** For setting presets
	Tool data For tool setting (touch-off)

3.10 OEM bar

The optional OEM bar allows you to control the configuration of the functions of the connected machine tool, independently of its configuration.

3.10.1 Operating elements of the OEM bar

> The operating elements that are available on the OEM bar depend on the configuration of the device and of the connected machine tool.

The **OEM bar** usually provides the following operating elements:

Operating element	Function
	Tapping the tab shows or hides the OEM bar
	Logo Displays the configured OEM logo

4

Software configuration

4.1 Overview

Make sure that you have read and understood the "Basic operation" chapter before carrying out the actions described below.

Further information: "Basic operation", Page 17

Before you can use ND 7000 Demo correctly after successful installation, you need to configure ND 7000 Demo. This chapter describes how to perform the following settings:

- Copying the configuration file
- Uploading the configuration file
- Setting the language
- Selecting the product version (optional)

4.2 Copying the configuration file

Before you can load the configuration data in ND 7000 Demo, you must first copy the downloaded configuration file **DemoBackup.mcc** to an area that can be accessed by ND 7000 Demo.

- Move to the temporary storage folder
- For example, copy the configuration file **DemoBackup.mcc** to the following folders:**C:** ▶ **HEIDENHAIN** ▶ **[product name]** ▶ **Mom** ▶ **ProductsMGE5** ▶ **[product designation]** ▶ **user** ▶ **User**

> In order for ND 7000 Demo to access the configuration file **DemoBackup.mcc**, you must retain the following part of the path when you save the file: ▶ **[product name]** ▶ **ProductsMGE5** ▶ **Mom** ▶ **[product abbreviation]** ▶ **user** ▶ **User**.

> The configuration file can be accessed by ND 7000 Demo

4.3 Uploading the configuration file

In order to configure ND 7000 Demo for the application on the computer, you must upload the configuration file **DemoBackup.mcc**.

- ▶ Tap **Settings** in the main menu
- > The product settings are displayed

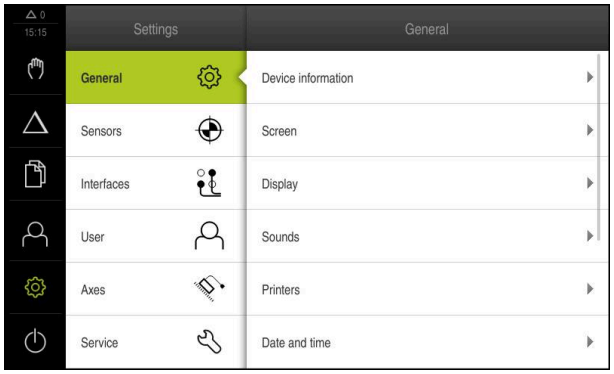


Figure 13: **Settings** menu

- ▶ Tap **Service**
- ▶ Open in the sequence
  - **Back up and restore**
  - **Restore settings**
  - **Complete restoration**
- ▶ Select the storage location in the dialog:
  - **Internal**
  - **User**
- ▶ Select the **DemoBackup.mcc** configuration file
- ▶ Confirm your selection with **OK**
- > The settings are applied
- > You are prompted to shut down the application
- ▶ Tap **OK**
- > ND 7000 Demo is shut down, and the Microsoft Windows window is closed
- ▶ Restart ND 7000 Demo
- > ND 7000 Demo is ready for use

4.4 Setting the language

The default language for the user interface is English. You can switch the user interface to the desired language.

- ▶ Tap **Settings** in the main menu

- ▶ Tap **User**
- > The logged-in user is indicated by a check mark
- ▶ Select the logged-in user
- > The language selected for the user is indicated by a national flag in the **Language** drop-down list
- ▶ Select the flag for the desired language in the **Language** drop-down list
- > The user interface is displayed in the selected language

4.5 Selecting the product version (optional)

ND 7000 is available in different versions. These versions differ in their interfaces for connectible encoders:

- The ND 7013 version
- The ND 7013 I/O version with additional inputs and outputs for switching functions

In the **Settings** menu, you can select the version that is to be simulated with ND 7000 Demo

- ▶ Tap **Settings** in the main menu

- ▶ Tap **Service**
- ▶ Tap **Product designation**
- ▶ Select the desired version
- > You are now prompted to perform a restart
- > ND 7000 Demo is ready for use in the desired version

5

Milling – Quick Start

5.1 Overview

This chapter describes the machining of an example workpiece and will guide you step by step through the unit's different operating modes. You need to carry out the following machining steps for successful production of the flange:

Machining step	Mode of operation
Determine preset 0	Manual operation
Machine a through hole	Manual operation
Machine a rectangular pocket	MDI mode
Machine a fit	MDI mode
Determine preset 1	Manual operation
Machine a bolt hole circle	MDI mode
Machine a row of holes	MDI mode

The machining steps described here cannot be completely simulated with ND 7000 Demo. However, you can use the descriptions to familiarize yourself with the most important functions and the user interface.

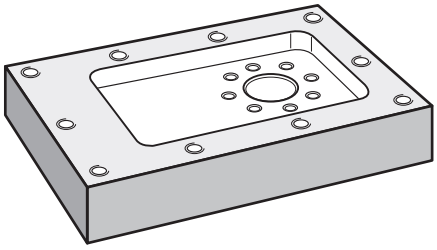


Figure 14: Example workpiece

This chapter does not describe machining of the outside contour of the example workpiece. It is presumed that the outside contour is already machined.

For a detailed description of the individual activities, please refer to the "Manual operation" and "MDI mode" chapters in the operating instructions ND 7000.

Make sure that you have read and understood the "Basic operation" chapter before carrying out the actions described below.

Further information: "Basic operation", Page 17

5.2 Logging in for Quick Start

User login

For Quick Start, the **Operator** user must log in.

- Tap **User login** in the main menu
- If required, log out the user who is currently logged in
- Select the **Operator** user
- Tap the **Password** input field
- Enter the password "operator"

> If the password does not match the default password, ask a **Setup** user or **OEM** user for the assigned password.
>
> If the password is no longer known, contact a HEIDENHAIN service agency.

- Confirm entry with **RET**

- Tap **Log in**

5.3 Requirements

To manufacture the aluminum flange, use a manually operated machine tool. The following dimensioned technical drawing is available for the flange:

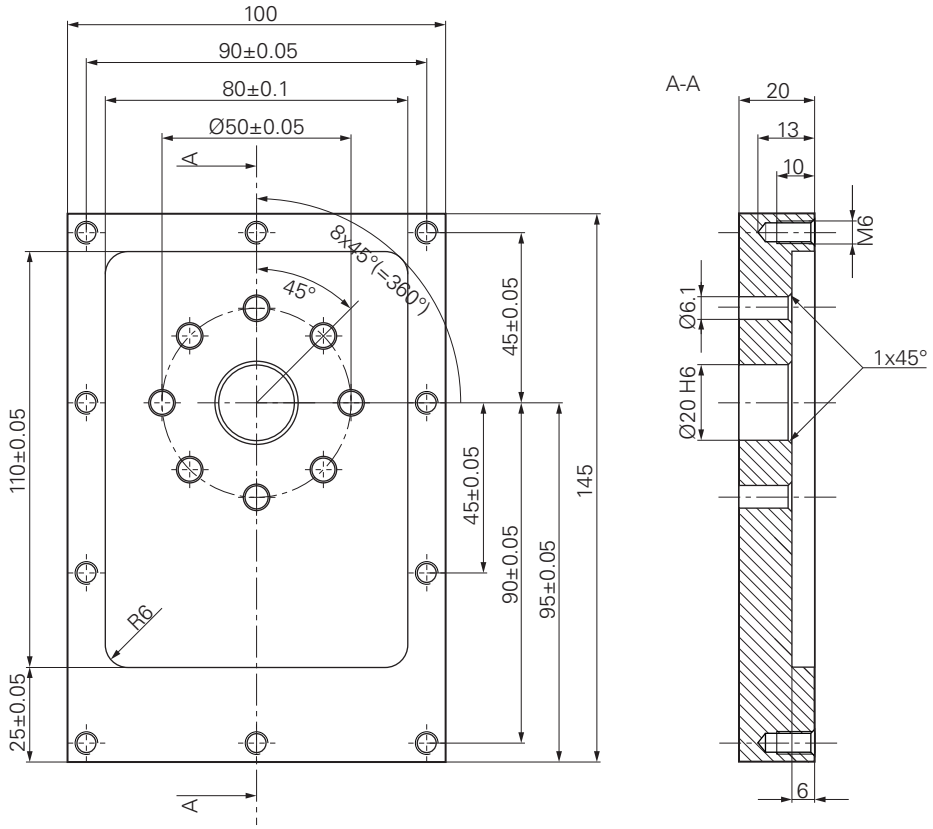


Figure 15: Example workpiece– technical drawing

Machine tool

- The machine tool is switched on
- A pre-processed workpiece blank is clamped on the machine tool

Product

- A unit with the ID number 1089179-xx and configured spindle axis
- The reference mark search has been performed

- A HEIDENHAINKT 130 Edge Finder is available

Tools

The following tools are available:

- Drill Ø 5.0 mm
- Drill Ø 6.1 mm
- Drill Ø 19.8 mm
- Reamer Ø 20 mm H6
- End mill Ø 12 mm
- Countersink Ø 25 mm 90°
- Tap M6

Tool table

For the example it is presumed that the tools for machining are not yet defined.

For each tool used, you must therefore define the specific parameters in the tool table of the product. During subsequent machining you can access the parameters in the tool table via the status bar.

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears

- ▶ Tap **Open table**
- > The **Tool table** dialog appears

- ▶ Tap **Add**
- ▶ In the **Tool type** input field enter the name **Drill 5.0**
- ▶ Confirm the entry with **RET**
- ▶ In the **Diameter** input field, enter the value **5.0**
- ▶ Confirm the entry with **RET**
- ▶ In the **Length** input field enter the length of the drill
- ▶ Confirm the entry with **RET**
- > The defined Ø 5.0 mm drill is added to the tool table
- ▶ Repeat the sequence for the other tools using the naming convention **[type] [diameter]**

- ▶ Tap **Close**
- > The **Tool table** dialog is closed

5.4 Determining the preset (manual operation mode)

Initially you need to determine the first preset. Based on this preset the product then calculates all values for the relative coordinate system. Ascertain the preset with the HEIDENHAIN KT 130 Edge Finder.

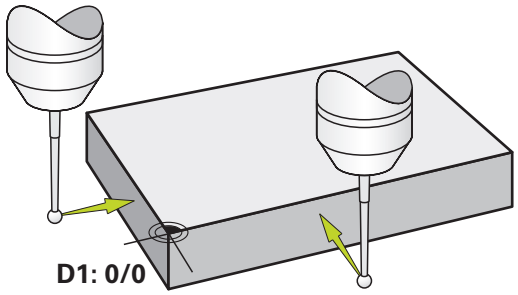


Figure 16: Example workpiece – finding preset D1

Activation

- ▶ Tap **Manual operation** in the main menu
- > The user interface for manual operation is displayed

Probing the preset D1

- ▶ On the machine tool, insert the HEIDENHAINKT 130 Edge Finder into the spindle and connect it to the product

- ▶ Tap **Auxiliary functions** in the status bar

- ▶ In the dialog, tap **Probe edge**
- > The **Select the tool** dialog box appears
- ▶ In the **Select the tool** dialog, activate the **Use touch probe** option
- ▶ Follow the wizard's instructions and define the preset by probing in the X direction
- ▶ Move the edge finder toward the workpiece edge until the red LED on the edge finder lights up
- > The **Select preset** dialog box opens
- ▶ Retract the edge finder from the workpiece edge
- ▶ In the **Selected preset** field, select the preset **0** from the preset table
- ▶ In the **Set position values** field enter the value **0** for the X direction and confirm with **RET**

- ▶ Tap **Confirm** in the wizard
- > The probed coordinate is loaded in preset **0**
- ▶ Repeat the procedure and define the preset in the Y direction via probing

5.5 Machining a through hole (manual operation mode)

In the first machining step you drill the through hole in manual operation mode using the Ø 5.0 mm drill. You then drill the through hole with the Ø 19.8 mm drill. The values to be entered into the input fields can be taken directly from the dimensioned production drawing.

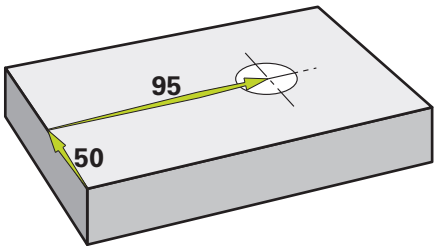


Figure 17: Example workpiece – drilling a through hole

Activation

- ▶ Tap **Manual operation** in the main menu
- > The user interface for manual operation is displayed

5.5.1 Predrilling the through hole

- ▶ On the machine tool, insert the Ø 5.0 mm drill into the spindle

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears
- ▶ Tap **Drill 5.0**

- ▶ Tap **Confirm**
- > The associated tool parameters are applied automatically
- > The **Tools** dialog is closed

- ▶ On the product, set a spindle speed of 3500 rpm
- ▶ On the machine tool move the spindles as follows:
  - X direction: 95 mm
  - Y direction: 50 mm
- ▶ Predrill the through hole and retract the spindle
- ▶ Keep positions X and Y
- > You have successfully predrilled the through hole

5.5.2 Boring the through hole

- On the machine tool, insert the Ø 19.8 mm drill into the spindle

- Tap **Tools** on the status bar

> The **Tools** dialog appears

- Tap **Drill 19.8**

- Tap **Confirm**

> The associated tool parameters are applied automatically

> The **Tools** dialog is closed

- On the product, set a spindle speed of 400 rpm

- Bore the through hole and retract the spindle

> You have successfully bored the through hole

5.6 Machining a rectangular pocket (MDI mode of operation)

Machine the rectangular pocket in MDI mode of operation. The values to be entered into the input fields can be taken directly from the dimensioned production drawing.

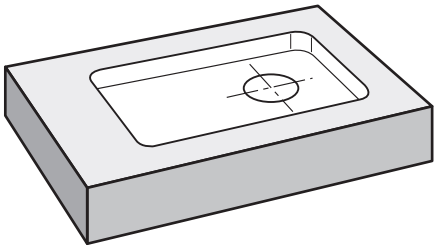


Figure 18: Example workpiece – machining a rectangular pocket

Activation

- ▶ Tap **MDI** in the main menu
- > The user interface for the MDI mode is displayed

5.6.1 Defining the rectangular pocket

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears
- ▶ Tap **End mill**
- ▶ Tap **Confirm**

- > The associated tool parameters are applied automatically
- > The **Tools** dialog is closed

- ▶ Move the tool until it touches the surface of the flange
- ▶ Hold down **Z** in the position display
- > The product displays 0 with the Z axis

- ▶ Tap **Create** on the status bar
- > A new block is displayed
- ▶ Select the **Rectangular pocket** block type in the **Block type** drop-down list
- ▶ Enter the following parameters according to the dimensional data:
  - **Clearance height**: 10
  - **Depth**: -6
  - **X coordinate of center**: 80
  - **Y coordinate of center**: 50
  - **Side length in X**: 110
  - **Side length in Y**: 80
  - **Direction**: clockwise
  - **Finishing allowance**: 0.2
- ▶ Confirm each entry with **RET**

- ▶ To run the block, tap **END**
- > The positioning aid is displayed
- > If the simulation window is active, the rectangular pocket is visualized

5.6.2 Milling a rectangular pocket

The values for spindle speed, milling depth and feed rate depend on the end mill's metal-removal rate and the machine tool.

- ▶ On the machine tool, insert the Ø 12 mm end mill into the spindle
- ▶ On the product, set the spindle speed to a suitable value
- ▶ Start the machining process—follow the instructions of the wizard
- > The product executes the individual steps of the milling operation

- ▶ Tap **Close**
- > Program run is terminated
- > The wizard closes
- > You have successfully machined the rectangular pocket

5.7 Machining a fit (MDI mode of operation)

Machine the fit in MDI mode of operation. The values to be entered into the input fields can be taken directly from the dimensioned production drawing.

	You should chamfer the through hole before reaming. The chamfer enables a better first cut of the reamer and prevents burr formation.

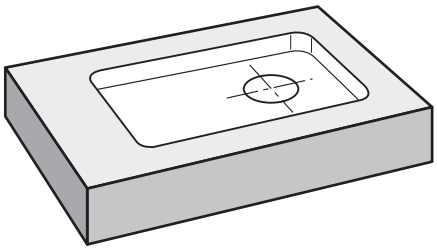


Figure 19: Example workpiece – machining a fit

Activation

- ▶ Tap **MDI** in the main menu
- > The user interface for the MDI mode is displayed

5.7.1 Defining the fit

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears
- ▶ Tap **Reamer**

- ▶ Tap **Confirm**
- > The associated tool parameters are applied automatically
- > The **Tools** dialog is closed

- ▶ Tap **Create** on the status bar
- > A new block is displayed
- ▶ Select the **Positioning** block type in the **Block type** drop-down list
- ▶ Enter the following parameters according to the dimensional data:
  - **X coordinate:** 95
  - **Y coordinate:** 50
  - **Z coordinate:** drill through
- ▶ Confirm each entry with **RET**

- ▶ To run the block, tap **END**
- > The positioning aid is displayed
- > If the simulation window is active, the position and traverse path are visualized

5.7.2 Reaming the fit

- On the machine tool, insert the Ø 20 mm H6 reamer into the spindle
- On the product, set a spindle speed of 250 rpm

- Start the machining process—follow the instructions of the wizard
- Tap **Close**

> Program run is terminated
> The wizard closes
> You have successfully machined the fit

5.8 Determining the preset (manual operation mode)

To align the bolt hole circle and frame of holes you must set the circle center of the fit as the preset. Based on this preset the product then calculates all values for the relative coordinate system. Ascertain the preset with the HEIDENHAIN KT 130 Edge Finder.

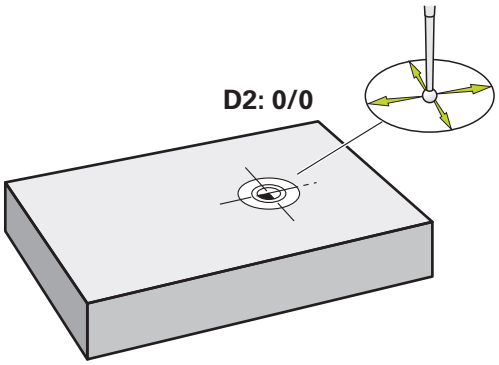


Figure 20: Example workpiece – finding preset D2

Activation

- ▶ Tap **Manual operation** in the main menu
- > The user interface for manual operation is displayed

Probing preset D2

- ▶ On the machine tool, insert the HEIDENHAIN KT 130 Edge Finder into spindle and connect to the product

- ▶ Tap **Auxiliary functions** in the status bar

- ▶ Tap **Find circle center** in the dialog
- > The **Select the tool** dialog box opens
- ▶ In the **Select the tool** dialog, activate the **Use touch probe** option
- ▶ Follow the instructions of the wizard
- ▶ Move the edge finder toward the workpiece edge until the red LED on the edge finder lights up
- > The **Select preset** dialog box opens
- ▶ Retract the edge finder from the workpiece edge
- ▶ In the **Selected preset** field, select preset **1**
- ▶ In the **Set position values** field, enter the value **0** for position value X and position value Y and confirm with **RET**

- ▶ Tap **Confirm** in the wizard
- > The probed coordinates are loaded in preset **1**

Activating the preset

- ▶ Tap **Presets** on the status bar
- > The **Presets** dialog box opens
- ▶ Tap preset **1**

- ▶ Tap **Confirm**
- > The preset is set
- > On the status bar **1** is displayed with preset

5.9 Drilling a circular hole pattern (MDI mode)

Drill the circular hole pattern in MDI mode. The values to be entered into the input fields can be taken directly from the dimensioned production drawing.

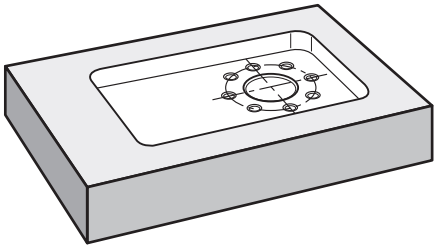


Figure 21: Example workpiece – drilling a circular hole pattern

Activation

- ▶ Tap **MDI** in the main menu
- > The user interface for the MDI mode is displayed

5.9.1 Defining the circular hole pattern

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears
- ▶ Tap **Drill 6.1**

- ▶ Tap **Confirm**
- > The associated tool parameters are applied automatically
- > The **Tools** dialog is closed

- ▶ Tap **Create** on the status bar
- > A new block is displayed
- ▶ Select the **Bolt hole circle** block type in the **Block type** drop-down list
- ▶ Enter the following parameters according to the dimensional data:
  - **Number of holes:** 8
  - **X coordinate of center:** 0
  - **Y coordinate of center:** 0
  - **Radius:** 25
- ▶ Confirm each entry with **RET**
- ▶ Leave all the other values as defaults

- ▶ To run the block, tap **END**
- > The positioning aid is displayed
- > If the simulation window is active, the rectangular pocket is visualized

5.9.2 Drilling the circular hole pattern

- ▶ On the machine tool, insert the Ø 6.1 mm drill into the spindle

- ▶ On the product, set a spindle speed of 3500 rpm

- ▶ Drill the circular hole pattern and retract the spindle

- ▶ Tap **Close**
- > Program run is terminated
- > The wizard closes
- > You have successfully completed the circular hole pattern

5.10 Drilling a circular hole pattern (MDI operation)

Drill the circular hole pattern in MDI mode. The values to be entered into the input fields can be taken directly from the dimensioned production drawing.

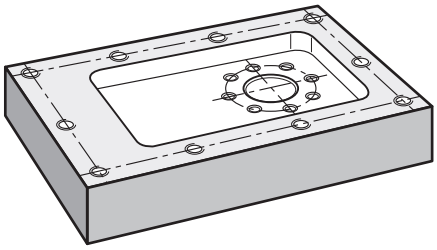


Figure 22: Example workpiece – drilling a circular hole pattern

Activation

- ▶ Tap **MDI** in the main menu
- > The user interface for the MDI mode is displayed

5.10.1 Defining the circular hole pattern

- ▶ Tap **Tools** on the status bar
- > The **Tools** dialog appears
- ▶ Tap **Drill 5.0**

- ▶ Tap **Confirm**
- > The associated tool parameters are applied automatically
- > The **Tools** dialog is closed

- ▶ Tap **Create** on the status bar
- > A new block is displayed
- ▶ Select the **Row of holes** block type in the **Block type** drop-down list
- ▶ Enter the following parameters according to the dimensional data:
  - **X coordinate of 1st hole**: -90
  - **Y coordinate of 1st hole**: -45
  - **Holes per row**: 4
  - **Hole spacing**: 45
  - **Angle**: 0°
  - **Depth**: -13
  - **Number of rows**: 3
  - **Row spacing**: 45
  - **Fill mode**: frame of holes
- ▶ Confirm each entry with **RET**

- ▶ To run the block, tap **END**
- > The positioning aid is displayed
- > If the simulation window is active, the rectangular pocket is visualized

5.10.2 Drilling the row of holes

- On the machine tool, insert the Ø 5.0 mm drill into the spindle
- On the product, set a spindle speed of 3500 rpm

- Drill the row of holes and retract the spindle

- Tap **Close**

> Program run is terminated

> The wizard closes

> You have successfully completed the row of holes

6

ScreenshotClient

6.1 Overview

The standard installation of ND 7000 Demo also contains the ScreenshotClient program. With ScreenshotClient, you can take screenshots of the demo software or the unit.

This chapter describes how ScreenshotClient is configured and used.

6.2 Informationen about ScreenshotClient

With ScreenshotClient, you can take screenshots of the active screen of the demo software or the unit from a computer. Before taking a screenshot, select the desired user interface language, as well as the file name and the location where you want to store the screenshots.

ScreenshotClient creates image files of the desired screen:

- In .PNG format
- With the configured name
- With the appropriate language code
- With the time information of year, month, day, hour, minute, and second

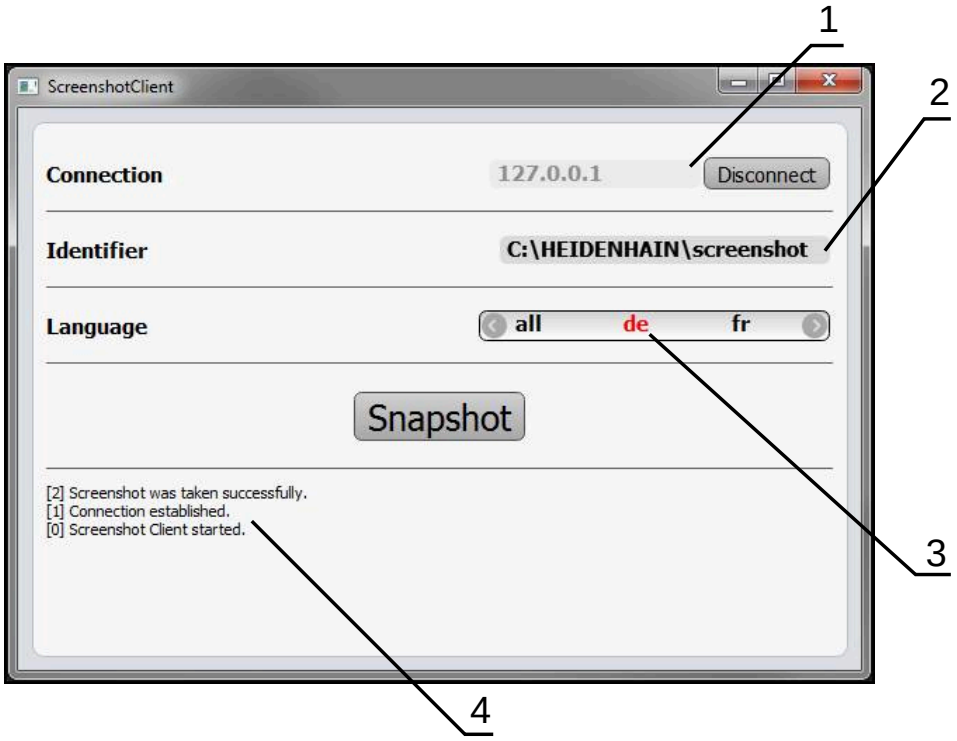


Figure 23: ScreenshotClient user interface

1 Connection status
2 File path and file name
3 Language selection
4 Status messages

6.3 Starting ScreenshotClient

- Select in succession in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **ND 7000 Demo**
  - **ScreenshotClient**

> ScreenshotClient is started:

Figure 24: ScreenshotClient has been started (not connected yet)

> You can now connect ScreenshotClient with the demo software or the product

6.4 Connecting ScreenshotClient with the demo software

Before establishing a connection with ScreenshotClient, first start the demo software or switch on the unit. Otherwise ScreenshotClient will show the status message **Connection close.** when trying to connect.

- Start the demo software if you have not already done so
  Further information: "Starting ND 7000 Demo", Page 23
- Tap **Connect**

> A connection with the demo software is established

> The status message is updated

> The **Identifier** and **Language** input fields become active

6.5 Connecting ScreenshotClient with the unit

Prerequisite: The network must be configured on the device.

For detailed information on configuring the network at the unit, please refer to the "Setup" chapter in the operating instructions of ND 7000.

Before establishing a connection with ScreenshotClient, first start the demo software or switch on the unit. Otherwise ScreenshotClient will show the status message **Connection close.** when trying to connect.

- Switch on the unit if you have not already done so
- Enter the **IPv4 address** of the interface in the **Connection** input field.
  You will find the address in the unit settings under:
  Interfaces ► Network ► X116
- Tap **Connect**

> A connection with the unit is established
> The status message is updated
> The **Identifier** and **Language** input fields become active

6.6 Configuring ScreenshotClient for taking screenshots

Once you have started ScreenshotClient, you can make the following configurations:

- Location at which screenshots are stored, and what the file names are
- User interface language in which the screenshots are created

6.6.1 Configuring the storage location and file name for screenshots

By default, ScreenshotClient saves screenshots to the following storage location:

C: ▸ HEIDENHAIN ▸ [product designation] ▸ ProductsMGE5 ▸ Mom ▸ [product code] ▸ sources ▸ [file name]

You can define a different storage location, if necessary.

- Tap the **Identifier** input field
- Enter the path to the storage location and the name for the screenshots into the **Identifier** input field

Use the following syntax to enter the path and file name for screenshots:
[drive]:\[folder]\[file name]

> ScreenshotClient will save all screenshots to the storage location entered

6.6.2 Configuring the user interface language of screenshots

The **Language** input field shows all of the user interface languages available for the demo software or the unit. Once you have selected a language code, ScreenshotClient will take screenshots in the corresponding language.

> The user interface language you are using in the demo software or on the unit does not have any effect on the screenshots. Screenshots are always created in the language that you have selected in ScreenshotClient.

Screenshots in the desired user interface language

To take screenshots in a desired user interface language

- ▶ Use the arrow keys to select the desired language code in the **Language** input field
- > The selected language code is shown in red
- > ScreenshotClient creates the screenshots in the desired user interface language

Screenshots of all available user interface languages

To create screenshots in all available user interface languages

- ▶ Use the arrow keys to select **all** in the **Language** input field
- > The **all** language code is shown in red
- > ScreenshotClient creates the screenshots in all available user interface languages

6.7 Creating screenshots

- In the demo software or on the unit, call the view from which you would like to take a screenshot
- Switch to **ScreenshotClient**
- Tap **Snapshot**

> The screenshot is created and saved to the configured storage location

> The screenshot is saved in the format [file name]_[language code]_[YYYYMMDDhhmmss] (e.g. **screenshot_en_20170125114100**)

> The status message is updated:

Figure 25: ScreenshotClient after screenshot has been created successfully

6.8 Exiting ScreenshotClient

- Tap **Disconnect**

> The connection to the demo software or the unit is terminated

- Tap **Close**

> ScreenshotClient is exited

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