Fundamentals
About this manual

These operating instructions refer to StateMonitor version 1.2.x.

Would you like any changes, or have you found any errors?
We are continuously striving to improve our documentation for you. Please help us by sending your suggestions to the following e-mail address:

tnc-userdoc@heidenhain.de
Symbols and fonts used for marking text

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

<table>
<thead>
<tr>
<th>Format</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ➔ ... | Identifies an action  
Example:  
▶ Click the **STORE** button |
| ➔ ... | Identifies the result of an action  
Example:  
▶ **StateMonitor** lists all of the defined users in a table. |
| ■ ... | Identifies an item of a list  
Example:  
Error groups:  
■ Machining  
■ Programming  
■ PLC  
■ General information |

**Bold**

Identifies  
■ Menus  
■ Tabs  
■ Screen buttons  
■ Functions  
Example:  
▶ Switch to the **Settings** menu
Legal information

The license terms of Dr. JOHANNES HEIDENHAIN GmbH apply to the use of the StateMonitor software.

StateMonitor contains components that are subject to copyrights held by znt Zentren für Neue Technologien GmbH, Lena-Christ-Straße 2, 82031 Grünwald, Germany. They are protected worldwide by copyright. Any unauthorized reproduction, use, or distribution of the components or parts thereof is not permitted and is subject to prosecution by criminal and civil law.

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StateMonitor contains open-source software that is subject to special terms of use. The terms of use have priority over the license terms applicable to StateMonitor.
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Network integration using fixed IP addresses

iTNC 530 beginning with software version 34049x-04 (HEROS 4)

iTNC 530 beginning with software version 34049x-05 (HEROS 4)

iTNC 530 beginning with software version 60642x-04 (HEROS 5) with HSCI

TNC 620 software version 34056x (HEROS 4) and TNC 320 software version 34055x (HEROS 4)

iTNC 530 beginning with software version 60642x-04 (HEROS 5)

TNC 640 / TNC 620 / TNC 320 / TNC 128 (HEROS 5)

iTNC 530 beginning with software version 60642x-04 (HEROS 5) with HSCI

CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5)

Network integration via DHCP

iTNC 530 beginning with software version 34049x-04 (HEROS 4)

iTNC 530 beginning with software version 34049x-05 (HEROS 4)

iTNC 530 beginning with software version 60642x-04 (HEROS 5) with HSCI

TNC 640 / TNC 620 / TNC 320 / TNC 128 (HEROS 5)

CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5)

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1

Safety and data protection
Notes in this documentation

Safety precautions
Comply with all safety precautions indicated in these instructions and in your machine tool builder's documentation!

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

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

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

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

⚠️ NOTICE
Notice 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.

Informational notes
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 additional or supplementary information.

🔧 The gear symbol indicates that the function described depends on the machine, e.g.
- Your machine must feature a certain software or hardware option
- The behavior of the functions depends on the configurable machine settings

📚 The book symbol represents a cross reference to external documentation, e.g. the documentation of your machine tool builder or other supplier.
1.1 Intended use

The StateMonitor software may only be used in accordance with its intended purpose.

The intended purpose is to centrally evaluate machine data in order to facilitate quick troubleshooting and to be able to use capacities more effectively.

Responsibility for the proper and intended use of StateMonitor lies with the company in which it is used.

Personal data and communication channels are subject to data protection. They must not be used for any other purposes or disclosed to third parties.
1.2 Data security

Access rights
Only persons who have access to the server or PC on which StateMonitor is installed can access the data in StateMonitor. Data usage within StateMonitor can be restricted by means of various permissions. Only users with administrator rights have access to all the data.

To be able to use StateMonitor, devices such as smartphones and tablets have to log on to the server as clients.

As StateMonitor is a local client-server web application, no other software or app needs to be installed on the respective devices.

Further information: "User management submenu", Page 108

Sending notifications
Prerequisites:
- Enable TCP Ports 19000 to 19034 and 28001 in the Firewall
- Connection to an SMTP server

Further information: "Requirements", Page 22

> If your IT Department does not permit the integration of the notification function (Messenger) for reasons of IT security, automatic distribution of notifications by e-mail from StateMonitor to the users is not possible.

In the Messenger menu, you can configure the events that trigger a notification and assign them to a notification profile.

Further information: "Messenger menu", Page 74

**NOTICE**

Caution: Data may be lost!
If you add too many notifications to the selection, the recipient’s e-mail inbox may overflow. Further e-mails will then no longer be delivered.

- Create a separate inbox for StateMonitor
- Select notifications very carefully

**NOTICE**

Caution: Data may be lost!
If StateMonitor sends too many messages to the recipients, the e-mail provider may treat them as SPAM, meaning that the recipient no longer gets the notifications in his inbox.

- Select notifications very carefully
1.3 Network connection security

Network connection of your controls should only be performed by IT specialists.

The control can have two network interfaces. Each network interface has its own IP address.
If two network interfaces exist, HEIDENHAIN controls preassign them as follows:
- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

Refer to your machine manual.
The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

NOTICE

Caution: Malfunction!
If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.
- Do not change the settings for the machine’s internally used interface
Installation
2.1 Requirements

**Machine controls**
You can use StateMonitor with the following HEIDENHAIN controls:

<table>
<thead>
<tr>
<th>Control</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>iTNC 530</td>
<td>34049x-03</td>
</tr>
<tr>
<td>TNC 640</td>
<td>34059x-01</td>
</tr>
<tr>
<td>TNC 620</td>
<td>34056x-01</td>
</tr>
<tr>
<td>TNC 320</td>
<td>340551-03</td>
</tr>
<tr>
<td>TNC 128</td>
<td>771841-01</td>
</tr>
<tr>
<td>CNC PILOT 620</td>
<td>688945-01</td>
</tr>
<tr>
<td>CNC PILOT 640</td>
<td>68894x-01</td>
</tr>
<tr>
<td>MANUAL Plus 620</td>
<td>548328-05</td>
</tr>
</tbody>
</table>

Depending on your software option, you can use the following interfaces to integrate StateMonitor with other controls:

<table>
<thead>
<tr>
<th>Interface</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus</td>
<td>Connect/Read</td>
</tr>
<tr>
<td>OPC UA</td>
<td>1.02.x</td>
</tr>
<tr>
<td>MTConnect</td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Further information:** "Machines submenu", Page 111

In order to use StateMonitor, the following prerequisites must be met:

- The machine controls must be connected to the local company network
  **Further information:** "Network integration", Page 138
- Option 18 (HEIDENHAIN DNC interface) must be enabled at the HEIDENHAIN control
  **Further information:** "Enabling Option 18", Page 136
- The corresponding option must be enabled at other controls
Hardware
For StateMonitor, you need a PC or server that meets the following minimum requirements:
- Dual core processor
- USB interface (dongle for full version)
- 2GB RAM and 10GB hard disk space for the StateMonitor application (basic version for five machine controls)
For each further machine control, you additionally need:
- 0.25GB RAM
- 2GB hard disk space
Thus, if you want to connect e.g. 15 machine controls, the PC or server requires 30GB hard disk space and 4.5GB RAM.

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you want to connect 20 machine controls or more, HEIDENHAIN recommends that you use a PC or server with quad core processor.</td>
</tr>
</tbody>
</table>

Software
For StateMonitor, a Windows operating system (Windows 7 or higher or Windows Server 2008 R2) is required.
For communication, the following Firewall settings are required:
- Enable TCP ports 19000 to 19034 for communication with the machine controls
- Enable TCP port 28001 for communication with a PC, tablet, or smartphone

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have an IT specialist configure the firewall to enable the required TCP ports.</td>
</tr>
</tbody>
</table>

SMTP server
To use the (Messenger) notification function in StateMonitor, you have to connect to an SMTP server to be used as the e-mail output server. Contact your e-mail provider for the details needed to access the SMTP server

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a separate e-mail address for StateMonitor</td>
</tr>
</tbody>
</table>

Further information: “Messenger settings submenu”, Page 119
2.2 Installation

Downloading the installer
To install StateMonitor, you need to download the installer from the HEIDENHAIN website www.heidenhain.de.
- Download the current version from: www.heidenhain.de
- Navigate to the Download folder of your web browser
- Unpack the downloaded file (with the extension.zip into a temporary storage folder
- The StateMonitor.exe installer is unpacked and available in the temporary folder.

StateMonitor is dongle-protected. The dongle and the installation instructions will be sent to you by mail.
Further information: “Licensing”, Page 27

Installing StateMonitor under Microsoft Windows

To install StateMonitor on the PC or server, proceed as follows:
- Double-click the StateMonitor.exe installer to start the installation.
- The Setup Wizard opens.
- Select the setup language.
- Follow the setup wizard instructions.
- Accept the license conditions.
- Click the Finish button to complete the installation process.
- StateMonitor has been installed successfully.

The following desktop icons are created during installation:
- Activate StateMonitor 90 Days Trial
- Start StateMonitor
- StateMonitor Website

Changing, repairing and removing StateMonitor

When you start the StateMonitor.exe installer again, the following options are displayed:
- Change
  If you want to change the program functions to be installed, select Change.
- Repair
  Select Repair if StateMonitor is not working properly due to installation errors.
- Remove
  If you want to uninstall StateMonitor, then select Remove.
Further information: “Uninstalling”, Page 26
2.3 File structures

The StateMonitor installation includes the following components:

- StateMonitor (application)
- ControlCenter
- HEIDENHAIN DNC
- WIBU CodeMeter
- OpenJDK (Java)

The files are structured as follows:

- StateMonitor and OpenJDK are stored in the \Program Files(x86)\HEIDENHAIN\StateMonitor folder. This folder also contains other files that can only be accessed by a user with administrator role.
- The \ProgramData\HEIDENHAIN\StateMonitor contains the following data:
  - Database
  - Machine images
  - Log files

This data can also be accessed by users who have no administrator role.
2.4 Uninstalling

Uninstalling StateMonitor

To uninstall StateMonitor, proceed as follows:

1. Double-click the **StateMonitor.exe** installer to start the installation.
2. The Setup Wizard opens.
3. Press the **Remove** button.
4. Follow the uninstaller instructions.
5. StateMonitor is uninstalled.
2.5 Licensing

Demo version (without dongle)
You can test a trial version of StateMonitor for free for 90 days. The trial version is fully-featured, i.e. it includes the software’s full range of functions, but it is limited to five machines.
The trial period starts on installation of the software. To continue using StateMonitor after the trial period has expired, you need to purchase the software.

- StateMonitor is dongle-protected. After the trial period has expired, StateMonitor will only run with a valid dongle.
- The trial version cannot be installed on a virtual server.

A license for the demo version is created during installation. This license can be viewed via the CodeMeter control center.

Full version (with dongle)
Purchasing the licensed version converts the demo version into the full version. Five machines are automatically enabled, and additional machines can be added in sets of five.

- Data saved from the demo version are retained in the full version.

The full version will only run on a PC/server equipped with a USB interface for the dongle.

- If StateMonitor has been installed on a virtual server, the dongle must be connected via a suitable USB server.
Activation

Activating the trial version on a PC or server
To activate the StateMonitor trial version on the PC or server on which it is installed, proceed as follows:

- Double-click the **Activate StateMonitor 90 Days Trial** icon on the desktop
- The CodeMeter Control Center opens.
- The CodeMeter Control Center updates the import.
- Click the **OK** button
- The trial version is now activated for 90 days.
- Close the CodeMeter Control Center

The trial version of StateMonitor can only be activated once.
If you click the **Activate StateMonitor** icon again, an error message will be displayed.

Activating the full version on a PC or server
To activate the full version of StateMonitor on the PC or server on which it is installed, proceed as follows:

- Connect the USB dongle to an available USB port.
- Restart StateMonitor.
- The full version of StateMonitor is now activated.

If StateMonitor has been installed on a virtual server, the dongle must be connected via a suitable USB server.
2.6 Starting and ending

Starting the software
To start StateMonitor on the PC or server on which it is installed, proceed as follows:

- Double-click the **Start StateMonitor** icon on the desktop
  
  or

- Start ControlCenter from the taskbar and click **Restart**

*Further information:* "ControlCenter", Page 32

You have to start StateMonitor on the PC or server in order to access it from other PCs, tablets, or smartphones.

If you also want to open the StateMonitor application on the PC or server on which it is installed, proceed as follows:

- Double-click the **StateMonitor Website** icon on the desktop
  
  StateMonitor opens in the default web browser.
Opening the client application on a PC, tablet, or smartphone
To open the StateMonitor client application on a PC, tablet, or smartphone, proceed as follows:

- Open a Web browser, e.g.:
  - Microsoft Edge
  - Google Chrome
  - Mozilla Firefox
- In the address line, enter: http:\Servername:28001.
  In place of Servername, enter the hostname or the IP address of the PC or server on which StateMonitor is installed.
- Press the Enter key
- StateMonitor is opened.

Add the address to your favorites or bookmarks in your web browser to be able to access StateMonitor more quickly in future.

Exiting the software
To exit StateMonitor on the PC or server, proceed as follows:

- Log off via the Logout menu.
- Click the ControlCenter icon
  > The ControlCenter window opens.
- Click Shutdown.
  > All clients are disconnected from the server.

NOTICE

Caution: Data may be lost!
If you exit StateMonitor on the server while users are still accessing it from other PCs, tablets, or smartphones, the connection between the clients and the server is interrupted immediately. Any input that the users have not yet saved in StateMonitor will be lost.

- Before exiting the software, make sure that all users have logged off
Closing the client application
To close the StateMonitor client application, proceed as follows:

- Log off via the Logout menu.
- Close the web browser window

The next time you start StateMonitor after you closed it, the program shows the machines with the last machine status recorded in the database.

The current machine status will only be displayed after StateMonitor has recorded a new machine status.
2.7 ControlCenter

The ControlCenter is automatically installed together with StateMonitor and accessible via the StateMonitor icon in the task bar.

- Click the ControlCenter icon
- The ControlCenter window opens.

ControlCenter provides the following functions and information:

- **Restart**: Restart StateMonitor
- **Shutdown**: Shut down StateMonitor
- **State**: Display status information on StateMonitor
- **Logfile**: Save the current StateMonitor log files in a zip file
- **Logfile**: Save the current StateMonitor database in a zip file
- **Port**: Change the GUI web server port and restart StateMonitor
General usage information
3.1 Target group

The purpose of StateMonitor is to centrally evaluate machine data in order to use machine capacities more effectively.

The intended target groups of StateMonitor are:

- Machine operators (e.g. for operation of multiple machines, on-call duty, weekend operation)
- Employees in the foreman's office and in production planning
- Controllers and management
### 3.2 Opening and closing

#### Opening the client application on a PC, tablet, or smartphone

To open the StateMonitor client application on a PC, tablet, or smartphone, proceed as follows:

- Open a Web browser, e.g.:
  - Microsoft Edge
  - Google Chrome
  - Mozilla Firefox
- In the address line, enter: `http://Servername:28001`.
  - In place of `Servername`, enter the hostname or the IP address of the PC or server on which StateMonitor is installed.
- Press the `Enter` key.
- StateMonitor is opened.

> Add the address to your favorites or bookmarks in your web browser to be able to access StateMonitor more quickly in future.

#### Opening the client application on the control

In order to operate StateMonitor on a control without a touchscreen, you absolutely need a mouse or a touchpad.

To open the StateMonitor client application on a HEIDENHAIN control, proceed as follows:

- Move the cursor to the bottom of the control screen.
- The HEROS task bar is displayed.
- Click the Diadur icon.
- Select the **Web Browser** menu item.
- Mozilla Firefox is opened.
- In the address line, enter: `http://Servername:28001`.
  - In place of `Servername`, enter the hostname or the IP address of the PC or server on which StateMonitor is installed.
- StateMonitor is displayed on the screen.
- Set the display to full screen.
- With the screen switchover key, you can switch between the control screen and StateMonitor.

To enable StateMonitor to communicate with the control through a firewall, you have to enable TCP port 28001 in the firewall.
Closing the client application

To close the StateMonitor client application, proceed as follows:

- Log off via the Logout menu.
- Close the web browser window

The next time you start StateMonitor after you closed it, the program shows the machines with the last machine status recorded in the database.

The current machine status will only be displayed after StateMonitor has recorded a new machine status.
3.3 Login / Logout

Login
When StateMonitor has started up, users have to log on with their user name and password.

Multiple users can be logged on at the same time.

If you are logging on for the first time after installing StateMonitor and you have not defined any users yet, then log on with the default password.

Further information: “Default password”, Page 38

Logout
Before exiting StateMonitor, the users have to log off.
To log off, proceed as follows:

- Log off via the Logout menu.
- The empty login window will be displayed.
3.4 Default password

The following default credentials are available for the first login after installing StateMonitor:

<table>
<thead>
<tr>
<th>User</th>
<th>admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
<td>Admin</td>
</tr>
</tbody>
</table>

StateMonitor displays the logged-in user as the default administrator.

Notes:
- The first time you log in with the default password, you need to be logged in to Windows as an administrator.
- To prevent unauthorized use of the default password, change it after logging in for the first time.
- Only the administrator should know the changed default password.
3.5 General settings

Display
StateMonitor is a web application that you can use on various devices such as PCs, tablets, and smartphones.
The display is automatically adapted to the respective terminal.

Language
The global language setting can only be changed by a user with the Administrator role.

Further information: "System language submenu", Page 123
In the User settings submenu, every user can set the language individually without affecting the global language setting.

Further information: "Change language settings for user", Page 107

Time zone
Based on the time zone, StateMonitor determines the valid time for the machine data display.
The correct time zone must therefore be set on the server on which StateMonitor is installed.
The correct time must also be set on the machine so that StateMonitor can correctly process and display the times.
### 3.6 Overview of the menus

The availability of the individual menus and submenus depends on:
- the activated options
- the role of the corresponding user

**Further information**: "Roles", Page 108

The following menus and submenus are available in StateMonitor:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Menus and submenus</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Home" /></td>
<td><strong>Home</strong></td>
</tr>
</tbody>
</table>

#### Machines
- **Tile view**
  - Machine status
  - Edit machine statuses
  - Detailed view of the last 3 days
  - Machine alarms
  - Program run times
- **Status overview**

#### Messenger
- Event configurator
- Notification profiles
- Notifications

#### Jobs (software option)
- Create job
- Assign job
- Adjust machining sequence

#### Evaluations
- Day view
- Machine statuses
- Key figures
- Program run times
- Machine alarms
### Menus and Submenus

<table>
<thead>
<tr>
<th>Icon</th>
<th>Menus and Submenus</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Settings Icon" /></td>
<td>Settings</td>
</tr>
<tr>
<td><img src="image" alt="User Settings" /></td>
<td>User settings</td>
</tr>
<tr>
<td><img src="image" alt="User" /></td>
<td>User</td>
</tr>
<tr>
<td><img src="image" alt="Machines" /></td>
<td>Machines</td>
</tr>
<tr>
<td><img src="image" alt="Machine Mapping" /></td>
<td>Machine mapping</td>
</tr>
<tr>
<td><img src="image" alt="Machine Statuses / Job Statuses" /></td>
<td>Machine statuses / Job statuses (software option)</td>
</tr>
<tr>
<td><img src="image" alt="Messenger Settings" /></td>
<td>Messenger settings</td>
</tr>
<tr>
<td><img src="image" alt="File Backup" /></td>
<td>File backup</td>
</tr>
<tr>
<td><img src="image" alt="System Language" /></td>
<td>System language</td>
</tr>
<tr>
<td><img src="image" alt="External Reporting DB" /></td>
<td>External reporting DB</td>
</tr>
<tr>
<td><img src="image" alt="Info" /></td>
<td>Info</td>
</tr>
</tbody>
</table>
3.7 Functions in tables and charts

In tables and charts, various functions are available. These depend on the submenu you have opened.

Finding text in tables

Using the Find: input field, you can search the table for the desired character string. For this purpose, proceed as follows:

- Enter the search term in the Find: input field
- The table only displays the rows containing the search term.

The search term can contain letters, numbers, and special characters.
You can connect multiple search terms using AND or OR.

<table>
<thead>
<tr>
<th>Gate</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND</td>
<td>“And” operation</td>
<td>The table displays all of the rows containing both of the search terms.</td>
</tr>
<tr>
<td>OR</td>
<td>“Or” operation</td>
<td>The table displays all of the rows containing either one of the search terms.</td>
</tr>
</tbody>
</table>

Sorting table entries

You can sort the table entries by column. Proceed as follows:

- Click the header of the column in question
- StateMonitor sorts the table entries in descending order based on this column.

This is a toggle function: Every time you click the header of the column, StateMonitor switches between ascending and descending order.

Adjusting the column width

- To adjust the column width, drag the separation line with the mouse to the desired position.

Showing the chart related to a table

In many cases, you can display a chart in addition to the table view to represent the table data graphically.

- Click the chart symbol or the Graphically visualize a table button
- StateMonitor displays a chart below the table.
- To display details on a point, bar, or section (if available), click the corresponding item.
- Adjust the display using the checkboxes or selection fields (if available)

Saving table or chart data as CSV files

In many cases, it is possible to save the data from a table or chart as a CSV file. You can import the CSV file e.g. into Microsoft Excel and further process it there.

- Click the Export table button
- Select the desired location
- Click Save
3.8 Extending the functionality with software options

The StateMonitor functionality can be extended using additional software options.

You can purchase licenses for software options from your HEIDENHAIN sales representative. You will then obtain a license key that activates the software option on the dongle.

The following software options are available:

<table>
<thead>
<tr>
<th>Option</th>
<th>Extended functionality</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 additional machine controls</td>
<td>1220884-01</td>
</tr>
<tr>
<td>2</td>
<td>Modbus Interface</td>
<td>1268670-01</td>
</tr>
<tr>
<td>3</td>
<td>OPC UA Interface</td>
<td>1268673-01</td>
</tr>
<tr>
<td>4</td>
<td>JobTerminal</td>
<td>1268674-01</td>
</tr>
<tr>
<td>5</td>
<td>MTConnect Interface</td>
<td>1268675-01</td>
</tr>
</tbody>
</table>

Further information: "Software options and licenses", Page 127
4.1 Home menu

Enter your user name and password in the Home menu.
Further information: "Login / Logout", Page 47

If a user is logged on, then StateMonitor displays the authorization status of the logged-on user as well as the time of the last login.

Company-specific start page
If you want to add your company logo or another image file in the Home menu, then proceed as follows:
- Copy the desired image file into the directory C:\ProgramData\HEIDENHAIN\StateMonitor\homeImage
- StateMonitor displays the image in the Home menu.

StateMonitor can only show one image at a time. Therefore, copy only one image file to the C:\ProgramData\HEIDENHAIN\StateMonitor\homeImage directory.
4.2 Login / Logout

Login
When StateMonitor has started up, users have to log on with their user name and password.

Multiple users can be logged on at the same time.

If you are logging on for the first time after installing StateMonitor and you have not defined any users yet, then log on with the default password.

Further information: "Default password", Page 38

Automatic logon
Users with the Viewer role can use a special URL to log on from the web browser.

- Open a web browser, e.g.:
  - Microsoft Edge
  - Google Chrome
  - Mozilla Firefox

- In the address line, enter the following:
  http:\Servername:28001/jh-tnc-sm-app/operator#!login/Username/Password

  - In the Servername field, enter the hostname or the IP address of the PC or server on which StateMonitor is installed.
  - In the Username and Password fields, enter your user name and your password.

- Press the Enter key
- StateMonitor opens without displaying the login window.

Add the address to your favorites or bookmarks in your web browser to be able to access StateMonitor more quickly in future.

Logout
Before exiting StateMonitor, the users have to log off.

To log off, proceed as follows:

- Log off via the Logout menu.
- The empty login window will be displayed.
Existing machinery menu
5.1 Machines menu

In the Machines menu, StateMonitor displays all machines that have been set up in the Settings menu and have been activated.

**Further information:** "Machines submenu", Page 111

The Machines menu contains the following submenus:
- Tile view
- Status overview
5.2  **Tile view submenu**

In the **Tile view** submenu, StateMonitor shows each activated machine as a machine status card. The machine status card contains the following information:

<table>
<thead>
<tr>
<th>Information</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine image</td>
<td>If you uploaded an image of the machine while setting it up, StateMonitor will show it here</td>
</tr>
<tr>
<td>Status light</td>
<td>Current machine status</td>
</tr>
<tr>
<td>Job number</td>
<td>Number of the job being currently machined (software option)</td>
</tr>
<tr>
<td>Part number</td>
<td>Number of the part being currently machined (software option)</td>
</tr>
<tr>
<td>Program name</td>
<td>Name of the NC program currently loaded in <strong>Program Run, Full Sequence</strong> or <strong>Program Run, Single Block</strong> mode</td>
</tr>
<tr>
<td>Fully executed</td>
<td>Number of complete program runs</td>
</tr>
</tbody>
</table>

**Status light**

The colors of the status light have the following meanings:

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray</td>
<td>The machine is not switched on or not connected</td>
</tr>
<tr>
<td>Red</td>
<td>The machine is not ready for operation.</td>
</tr>
<tr>
<td>Yellow</td>
<td>The machine is ready for operation, but not productive.</td>
</tr>
</tbody>
</table>
| Dark green/Light green | The machine is productive.  
Dark green = **Productive** (feed rate & rapid OVR >= 100 %)  
Light green = **Productive** (feed rate & rapid OVR < 100 %) |
5.3 Status overview submenu

In the Status overview submenu, StateMonitor displays the machine statuses graphically in the form of pie charts. StateMonitor shows two different charts:

- **Total machines**
- **Favored machines**

**Total machines**

The **Total machines** pie chart summarizes the machine statuses of all of the activated machines in the machine park. In addition, StateMonitor displays the calculated **Availability** and **Utilization rate** key figures as an average of all of the activated machines in the machine park.

**Favored machines**

The **Favored machines** pie chart contains only the machine statuses of machines that have been marked as **Favorite** in the **Overview of favorites**.

**Overview of favorites**

The **Overview of favorites** table lists all of the activated machines in the machine park and contains the following information:

- The current **Status**
- The **Machine tool** (machine designation)
- The **Mode of operation** currently active on the machine
- The **Program** currently loaded on the machine
- The **Program status**
- The number of programs that have been **Fully executed**
- The designation as **Favorite**
### 5.4 Overview of machine statuses

The overview below shows which combinations of the active **Mode of operation**, **Program status**, and **Override settings** result in which machine status:

<table>
<thead>
<tr>
<th>Machine status</th>
<th>Mode of operation</th>
<th>Program status</th>
<th>Override settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark green = Productive (feed rate &amp; rapid OVR &gt;= 100 %)</td>
<td>Program Run, Full Sequence</td>
<td>In progress</td>
<td>&gt;= 100 %</td>
</tr>
<tr>
<td>Light green = Productive (feed rate &amp; rapid OVR &lt; 100 %)</td>
<td>Program Run, Full Sequence</td>
<td>In progress</td>
<td>&lt; 100 %</td>
</tr>
<tr>
<td></td>
<td>Program Run, Single Block</td>
<td>In progress</td>
<td>&gt; 0 %</td>
</tr>
<tr>
<td>Yellow = OK, but not productive</td>
<td>Program Run, Full Sequence</td>
<td>In progress</td>
<td>= 0 %</td>
</tr>
<tr>
<td></td>
<td>Program Run, Full Sequence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program Run, Single Block</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic Handwheel</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positioning with Manual Data Input</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Existing machinery menu | Overview of machine statuses

<table>
<thead>
<tr>
<th>Machine status</th>
<th>Mode of operation</th>
<th>Program status</th>
<th>Override settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red = Not ready for operation</td>
<td>Program Run, Full Sequence</td>
<td>Error</td>
<td>Any</td>
</tr>
<tr>
<td>Light gray = Delay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark gray = Machine not in use</td>
<td>Program Run, Single Block</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The *Delay* status does not come from the machine. Users can store the *Delay* status instead of a yellow or dark gray status.

The machine is switched off or StateMonitor cannot connect to the machine.

StateMonitor shows the machine status colors in chronological order in the machine status bar. The user can thus see the machine status and run time at a glance.
5.5 Machine status

The **Machine status** view shows the following information:

- **Machine status light**
- **Machine name**
- **SIK number and control of the machine**
- **NC software version of the control**
- **Override settings**
- **Mode of operation**
- **Program** that is currently active on the machine
- **Subprogram** that is currently active on the machine
- **Program status**, **Starting time**, and **Duration** of the current program
- **Current job**
- **Program statistics**
- **Machine reports**
- **Active messenger status**
- **Current job** (software option)
- **Machine statuses** with **machine status bar** (resulting from the **Machine status**)
- **Utilization rate**

To access the **Machine status** view, proceed as follows:

- Switch to the **Machines** menu
- Click the **Machine status** button of the desired machine
  - StateMonitor opens the **Machine status** view.

From the **Machine status** view, you can access additional submenus:

- **Edit machine statuses**
  - **Further information**: "Edit machine statuses submenu", Page 62
- **Detailed view of the last 3 days**
  - **Further information**: "Detailed view of the last 3 days submenu", Page 67
- **Machine alarms**
  - **Further information**: "Machine alarms submenu", Page 68
- **Program run times**
  - **Further information**: "Program run times submenu", Page 70
- **Jobs** (software option)
  - **Further information**: "Job terminal submenu (software option)", Page 65
Override settings

StateMonitor graphically displays the Override settings for the Spindle (speed), the Feed rate, and the Rapid traverse as percentages.

The display corresponds to the actual potentiometer setting on the control, regardless of the current operating mode.

If rapid traverse and feed rate are on the same potentiometer on your machine, StateMonitor shows the same values for both Override settings.
Mode of operation

StateMonitor displays the **Mode of operation** that is currently selected on the machine.

Only the machine operating modes and the associated symbols are displayed. StateMonitor does not show the programming modes of operation.

### Machine operating modes

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Mode of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="symbol.png" alt="Manual Operation" /></td>
<td><strong>Manual Operation</strong></td>
</tr>
<tr>
<td><img src="symbol.png" alt="Electronic Handwheel" /></td>
<td><strong>Electronic Handwheel</strong></td>
</tr>
<tr>
<td><img src="symbol.png" alt="Positioning with Manual Data Input (MDI)" /></td>
<td><strong>Positioning with Manual Data Input (MDI)</strong></td>
</tr>
<tr>
<td><img src="symbol.png" alt="Program Run, Single Block" /></td>
<td><strong>Program Run, Single Block</strong></td>
</tr>
<tr>
<td><img src="symbol.png" alt="Program Run, Full Sequence" /></td>
<td><strong>Program Run, Full Sequence</strong></td>
</tr>
</tbody>
</table>
Program status

The Program status provides information on the current status of the NC program on the machine. The following program statuses can occur:

<table>
<thead>
<tr>
<th>Program status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>In progress</td>
<td>The machine is executing an NC program.</td>
</tr>
<tr>
<td>No program selected</td>
<td>The machine is not in an operating mode that executes NC programs.</td>
</tr>
<tr>
<td>Inactive</td>
<td>The current Mode of operation on the machine is Program Run, Full Sequence, or Program Run, Single Block.</td>
</tr>
<tr>
<td></td>
<td>- No NC program has currently been started or</td>
</tr>
<tr>
<td></td>
<td>- program run was interrupted by an error or</td>
</tr>
<tr>
<td></td>
<td>- The operator stopped the program run with an INTERNAL STOP</td>
</tr>
<tr>
<td>Error</td>
<td>The execution of the current NC program was interrupted due to an error.</td>
</tr>
<tr>
<td></td>
<td>The Error status is only shown briefly, then the status changes to Inactive.</td>
</tr>
<tr>
<td>Selected</td>
<td>The current Mode of operation on the machine is Program Run, Full Sequence, or Program Run, Single Block.</td>
</tr>
<tr>
<td></td>
<td>The operator has selected a program but not started yet.</td>
</tr>
<tr>
<td>Stopped</td>
<td>The current Mode of operation on the machine is Program Run, Single Block, and the operator has not yet started the next NC block</td>
</tr>
<tr>
<td></td>
<td>- Program run was stopped by an M0 command in the NC program</td>
</tr>
<tr>
<td>Interrupted</td>
<td>The operator interrupted the program run with NC Stop.</td>
</tr>
<tr>
<td>Finished</td>
<td>The current NC program has been executed until the end. An M30 or M2 command finished the program.</td>
</tr>
</tbody>
</table>

When the machine is switched off, no Program status is displayed.
Current job (software option)

Under Current job, StateMonitor displays information on the job that is currently executed on the respective machine.

Prerequisites:
- The job has been set up
- The job has been assigned to the machine
- The job is currently being executed

To edit jobs, proceed as follows:
- Click the Job terminal button
- The Jobs submenu is displayed.

Further information: "Job terminal submenu (software option)" Page 66

Program statistics

Under Program statistics, StateMonitor logs the number of fully executed and aborted NC programs.

Counting includes:
- All programs (Total)
- For the current program (Active PGM)

StateMonitor distinguishes the following cases:

<table>
<thead>
<tr>
<th>Dialog</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully executed</td>
<td>Number of fully executed programs</td>
</tr>
<tr>
<td>Interrupted by user</td>
<td>Number of programs interrupted by the user</td>
</tr>
<tr>
<td>Interrupted by error message</td>
<td>Number of programs that were interrupted due to an error message</td>
</tr>
</tbody>
</table>
Machine messages

Under Machine reports, StateMonitor shows the last six messages issued by the machine.

Each user can define individually which messages are to be displayed under Machine reports. For this purpose, proceed as follows:

- Click the gear icon
- A filter selection window opens. The filter criteria are error classes, error groups, and messages. Further information: ‘Machine alarms submenu’, Page 68
- To add a filter criterion to the selection, enable the checkbox in front of it
- Click the Save button
- Under Machine reports, StateMonitor will only show the messages that match the selected filter criteria.
- Filtering only applies to the Machine reports section in the Machine status submenu.

To view further machine messages, proceed as follows:

- Click the More button

Active messenger status

Under Active messenger status, StateMonitor shows the active Notifications.

Further information: ‘Notifications submenu’, Page 81
Machine statuses

Under **Machine statuses**, StateMonitor shows the machine status bar of the current day as well as the current **Utilization rate**.

To replace certain machine statuses with other ones and to specify them more precisely, proceed as follows:

- Click the **Edit machine statuses** button
- The **Edit machine statuses** submenu is displayed.
  
  **Further information:** “Edit machine statuses submenu”, Page 62

Setting the viewing period

By default, the machine status bar shows the viewing period from 0 to 24 o’clock. Each user can set this period individually. The maximum length of the viewing period is 24 hours.

To adjust the viewing period, proceed as follows:

- Click the gear icon
- The **User-specific adaptation of machine statuses** window is displayed.
- Select the desired period (time from ... to ...)
- Click the **Save** button
- The machine status bar will now display the selected period.

Adj. the viewing period also affects the **Edit machine statuses** and **Detailed view of the last 3 days** submenus. You can adjust the viewing period there, too.

Detail view

To see the **Detailed view of the last 3 days**, proceed as follows:

- Click the **Show the machine status of recent days** button
- The **Detailed view of the last 3 days** submenu is displayed.
  
  **Further information:** “Detailed view of the last 3 days submenu”, Page 67
5.6 Edit machine statuses submenu

Displaying machine statuses
In the Edit machine statuses submenu, StateMonitor first displays the machine statuses of the current day in a machine status bar and lists them in chronological order in a table. To select a day for which StateMonitor should show the machine statuses, proceed as follows:

- Click the calendar icon next to Date displayed
- Select the desired date
- Alternatively, you can browse through the days in reverse
- Or you can browse through the days in a forward direction

You can filter the table entries according to:
- The machine status colors (Filter)
- The duration of the individual machine statuses (Show statuses that are longer than...)

Further information: "Functions in tables and charts", Page 42
Replacing and specifying machine statuses

In the **Edit machine statuses** submenu, you have the option of replacing machine statuses with other ones and of specifying them more precisely.

Additional machine statuses can be defined in the **Settings** menu.

**Further information:** “Machine statuses / Job statuses submenu”, Page 117

To change a machine status, proceed as follows:

1. Switch to the **Machines** menu
2. Click the **Machine status** button of the desired machine
3. Select the **Edit machine statuses** submenu
4. In the table, click the **New status** column
5. Select the desired status in the pull-down menu
6. Click the **Save the lines** button
7. The machine status is changed in the machine status bar.

The table below shows which original machine statuses can be replaced by which specifications:

<table>
<thead>
<tr>
<th>Original status</th>
<th>New status (specification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark green</td>
<td>Productive, Dark green, light green, yellow, red, or gray</td>
</tr>
<tr>
<td>Light green</td>
<td>Productive, feed rate &lt; 100 %, Dark green, light green, yellow, red, or gray</td>
</tr>
<tr>
<td>Yellow</td>
<td>OK, but not productive, Yellow, red, or gray</td>
</tr>
<tr>
<td>Red</td>
<td>Not ready for operation, Red</td>
</tr>
<tr>
<td>Dark gray</td>
<td>Machine not in use, Dark or light gray</td>
</tr>
</tbody>
</table>

The light-gray **Delay** status does not originally come from the machine and is therefore not an original status.

The light-gray status can replace a yellow original status or a dark-gray original status and specify it more precisely.

Example:

If a machine is switched off for maintenance work (status: dark gray), you can subsequently set this status to Delay (status: light gray) in StateMonitor.
Saving additional information
A blue line above a section of the status bar indicates that the section contains additional information.

Proceed as follows to save additional information:

- Switch to the Machines menu
- Click the Machine status button of the desired machine
- Select the Edit machine statuses submenu
- Enter additional information in the Comment column of the table
- Click the Save the lines button
- StateMonitor shows a blue line above the respective section in the machine status bar.

If you click a section with a blue line, StateMonitor displays a pop-up window with the added comment and any information on changed or specified machine statuses.

Setting the viewing period for the machine status bar
By default, the machine status bar shows the viewing period from 0 to 24 o’clock. Each user can set this period individually.

Further information: "Setting the viewing period", Page 61
5.7 Job terminal submenu (software option)

Under **Job terminal**, StateMonitor displays all open jobs assigned to the machine. While the job is executed at the machine, users can enter the job status here and edit the entries later, if required. Jobs can be set up and assigned to a machine in the **Jobs** menu. There, you can also change the order of job execution.

**Further information:** "Jobs menu (software option)", Page 86

Specified machining times and numbers of parts will be included in the job evaluation.

**Further information:** "Job times (software option)". Page 103

**Entering the job status**
To enter the job status and to record machining times, proceed as follows:

- Switch to the **Machines** menu
- Click the **Machine status** button of the desired machine
- Select the **Job terminal** submenu
- In the **Assigned jobs for machine** table, click the desired job
- The job information will be displayed in the **Currently selected job** section.
- Under **Enter a job status**, click the **Start job** button
- Time recording will start.
- Successively click the buttons that correspond to the respective job status at the machine.
- StateMonitor records the times per job status.
- To stop or abort editing, click the **Stop job** button
- This terminates time recording.
- If desired, you can restart the job.
- Report the actual amount: Select **Actual amount** in the dropdown field
- Enter the number of parts produced in the input field.
- Click the **Report** button
- Report scrap: Select **Scrap** in the dropdown field
- Enter the number of parts considered as scrap in the input field.
- Click the **Report** button
- The actual amount and the number of scrap parts are stored with the job.
- To complete the job, click the **Finish job** button
- The job is no longer listed in the **Assigned jobs for machine** table.
- Recorded times and quantities can be viewed in the **Evaluations** menu.
Editing entries
To edit the data entered for the current job, proceed as follows:

- To edit the job finished last, click the Rescind last completed job button
- or
- In the Assigned jobs for machine table, click the desired job
- The job information will be displayed in the Currently selected job section.
- The Entries for job table opens.
- If necessary, restart the job
- If necessary, report a different amount
- In the Entries for job table, click the desired row
- If necessary, select a note (specifying the job status)

Additional specifications for job statuses can be defined in the Settings menu.

Further information: "Machine statuses / Job statuses submenu", Page 117

- If necessary, enter a comment
- Click the Save line button
- To complete the job, click the Finish job button

Deadline display
The preset deadline is color-coded in the table. The color indicates whether the deadline is met:

- **Green**: Deadline is more than 24 hours ahead
- **Orange**: Deadline will be reached in less than 24 hours
- **Red**: Deadline has been exceeded
5.8 Detailed view of the last 3 days submenu

The Detailed view of the last 3 days submenu contains the following information:

- The machine status bars of the past three days
- Availability of the machine during the past three days
- Utilization rate of the machine during the past three days

Further information: “Key figures submenu”, Page 98

Setting the viewing period for the machine status bar

By default, the machine status bar shows the viewing period from 0 to 24 o’clock. Each user can set this period individually.

Further information: “Setting the viewing period”, Page 61
5.9  Machine alarms submenu

In the **Machine alarms** submenu, StateMonitor lists the **Machine reports** of the past four weeks.

The error messages on the control are divided into **Error classes** and **Error groups**:

- **Error classes** indicate the cause of the error message.
- **Error groups** provide information on the origin of the error messages.

On HEIDENHAIN controls, users can generate their own messages in the NC program using the **FN38** special function.

**Further information**: "FN38: Sending messages from the NC program", Page 82

StateMonitor displays these messages as **Information**.
Filtering messages
To find certain messages more quickly, you can filter by Error classes, Error groups, and Information. In the filter selection, StateMonitor displays only the Error classes, Error groups, and Information that have occurred over the past four weeks.

You can filter by the following Error classes:
- Emergency stop
- Failure description
- Warning
- Info
- Note
- Program cancellation
- Program stop
- Feed rate stopped
- Reset
- None
The None error class contains all error messages that do not belong to any other error class.

You can filter by the following Error groups:
- operation
- Programming
- PLC
- General information
- Remote
- Python
- None
The None error group contains all error messages that do not belong to any other error group.

Filtering by Information:
- FN38
- FN 38 Job
- Program successfully completed
- Program interrupted by user
- Program interrupted by error message

To show specific messages in the list, check the corresponding filter criteria by mouse click.
To show the filtered messages in the list, click the Refresh button.

Further information: "Functions in tables and charts", Page 42
5.10 Program run times submenu

In the Program run times submenu, the Program table chronologically lists the NC programs that were started on the machine during the selected period.

The following options are available for delimiting the time frame:
- Time from ... to ...
- Number of days (counting back from the current day)
  - 1 day
  - 3 days
  - 7 days
- Date from ... to ...

The search function within the table (Find: input field) searches the Program, Subprogram and Status columns.

Further information: “Functions in tables and charts”, Page 42

Graphical visualization

In addition to the Program table, you can display two charts:

- Program run time of the machine {0} chart: Total evaluation of all programs listed in the table
- Program analysis chart: Detailed evaluation of a single program

Program run time of the machine {0} chart

This chart shows the program run times and the average override settings of all programs listed in the table.

- To display the chart, click the Graphically visualize a table button below the table.
- The chart includes the following information:
  - Each vertical line in the grid represents a program
  - The value on the horizontal axis represents the program number in the table.
  - The green data point visualizes the run time of the program (value on the Program run time axis)
  - The other data points represent the average override settings of the program for Spindle, Rapid trav, and Feed rate (values on the Average override over the program run time axis)

- To display detailed information on a program, hover the mouse over the desired data point.
- The chart values, program status, and a percentage evaluation of the machine statuses are displayed in a pop-up window.
- To filter the chart on a program, select that program in the dropdown field.
- The chart will then only display the values of the selected program.

Further information: “Showing the chart related to a table”, Page 42
Program analysis chart

This chart shows the average override settings and machine statuses during the program run time.

To view the chart, proceed as follows:

- Click the **Graphically visualize a table** button below the table.
- The **Program run time of the machine** chart is displayed
- Click any data point on the vertical line of the program.
- The **Program analysis** chart is displayed.

The chart includes the following information:

- The horizontal axis shows the program run time
- The vertical axis shows the average override setting
- The lines visualize the override settings for **Spindle**, **Rapid trav**, and **Feed rate** at the respective point in time
- The **FMAX** status bar visualizes **feed rate** and **rapid traverse (FMAX)** during the program run time.
- The machine status bar shows the machine statuses during the program run time.

The **FMAX** status bar is only displayed if you allow access to the PLC.

Further information: “Settings for PLC password”, Page 164
6.1 **Messenger menu**

In the **Messenger** menu, you can define which users are to be notified at what times and for which machine messages. The **Messenger** menu contains the following submenus:

- Event configurator
- Notification profiles
- Notifications

The submenus and functions displayed by StateMonitor depend on role of the user.

Proceed in the following sequence:

- In the **Notification profiles** submenu, create a notification profile.
  (Who is to be notified when?)
  Further information: "Notification profiles submenu", Page 79

- In the **Event configurator** submenu, configure the events.
  (For which machine messages should someone be notified?)
  Further information: "Event configurator submenu", Page 75

- In the **Notifications** submenu, assign the defined events and notification profiles to each other.
  (Which event triggers which notification profile?)
  Further information: "Notifications submenu", Page 81
6.2 Event configurator submenu

An event is a circumstance that can occur on the machine, such as:
- Warning
- a machine stop with error message
- a service message / maintenance message
- an alarm

StateMonitor directly gets the messages occurring on the control and lists them in the Machine status view in the Machines menu.

The messages on the control are divided into Error classes and Error groups. When configuring the events, you can add entire Error classes or Error groups to the selection.

In addition, Information and Machine statuses can be part of the selection for an event. The Information is either generated in the NC program of the HEIDENHAIN control (FN38) or by StateMonitor, based on the information provided by the control.

Error classes

On the control, the error messages are assigned to the following Error classes:
- Emergency stop
- Failure description
- Warning
- Info
- Note
- Program cancellation
- Program stop
- Feed rate stopped
- Reset
- None

The None error class contains all error messages that do not belong to any other error class.

Error groups

Error groups provide information on the origin of the error messages.

The controls distinguish between the following Error groups:
- operation
- Programming
- PLC
- General information
- Remote
- Python
- None

The None error group contains all error messages that do not belong to any other error group.
Information
The following options are available under Information:

- **FN38**
  On HEIDENHAIN controls, you can generate messages in the NC program using the **FN38** special function. StateMonitor receives these messages and sends them by e-mail to the users.

- **FN 38 Job**
  On HEIDENHAIN controls, you can report the job status in the NC program using the **FN38** special function. StateMonitor can evaluate these statuses.

- **Program successfully completed**
  StateMonitor generates this message whenever the control reads a **PGM END** end of program.

- **Program interrupted by user**
  StateMonitor generates this message whenever the user aborts the program with **INTERNAL STOP** or **EMERGENCY STOP**.

- **Program interrupted by error message**
  StateMonitor generates this message whenever an error message interrupts the program run.

Refer to your machine manual.
The information sent by the control depends on the configurable settings of the machine.

**Machine statuses**
Under **Machine statuses**, you can define the period of time after which StateMonitor should trigger an event. You can assign a specific value (in minutes) to each machine status.

**Individual messages**
Add existing machine messages to the selection for the event by ticking them in the table.

**Further information:** “Functions in tables and charts”, Page 42
Creating an event
Be very careful when choosing the messages that are supposed to trigger an event.

NOTICE

Caution: Data may be lost!
If you add too many notifications to the selection, the recipient’s e-mail inbox may overflow. Further e-mails will then no longer be delivered.
▶ Create a separate inbox for StateMonitor
▶ Select notifications very carefully

NOTICE

Caution: Data may be lost!
If StateMonitor sends too many messages to the recipients, the e-mail provider may treat them as SPAM, meaning that the recipient no longer gets the notifications in his inbox.
▶ Select notifications very carefully

Proceed as follows to create an event:

▶ Switch to the Messenger menu
▶ Select the Event configurator submenu
▶ Select the Machine, for which you want to create the event
▶ Select items from the Error classes, Error groups, Information, Machine statuses, and individual messages that are to trigger the event.
▶ Enter an appropriate name under This event under the name…
▶ Click the Save button

By means of the selection list you define the machine messages that lead to a notification.

The table contains the columns A and B:
- A = Automatic selection through classes groups
- B = Selection differing from the automatic one

Column A in the selection list shows whether the error messages trigger an event through automatic selection via the Error classes or Error groups.
StateMonitor ticks the items in column A if you have selected the corresponding error class or error groups.
In column B, you can specifically deselect individual messages that are included in the selection through the Error classes and Error groups.
However, you can also select individual messages in column B if not all of the messages that belong to this error class or group are to trigger the event.

In another table, StateMonitor lists all events that have been defined.

To view the content of existing events, proceed as follows:

- Click the event in the table
- StateMonitor displays the selection of Error classes, Error groups, Information, and individual messages.

**Deleting an event**

Proceed as follows to delete an event:

- Switch to the Messenger menu
- Select the Event configurator submenu
- Select the Machine for which you want to delete the event
- Click the recycle bin icon in the table
- StateMonitor deletes the event and removes it from the table.
6.3 Notification profiles submenu

In the Notification profiles submenu, you can assign notification information to a defined user and store this information as a notification profile.

A notification profile contains the following information:
- A reference to the User
- Transmission information for sending the e-mail (Notification by ...)
- Transmission time frame (Days, Time)
- The Notification interval

All defined users are listed in the User dropdown field. Notifications are made exclusively by e-mail.

Interval notifications

For the transmission period, you enter the following:
- On which days of the week StateMonitor will notify the user
- The time during which StateMonitor will send notifications to the user

Possible notification intervals:
- **Immediately**
- **Once a day**
- **Collected** (set an interval between 1 and 60 mins)

Creating Notification profiles

You can create multiple Notification profiles for a user (e.g. one profile for the time that the employee is present and one profile for the employee’s on-call duty times).

Proceed as follows to create a notification profile for a user:

1. Switch to the Messenger menu
2. Select the Notification profiles submenu
3. Select the user for whom you wish to create the Notification profiles
4. Select communication by e-mail (set a check mark)
5. Enter the e-mail address
6. Select the days of the week on which the user is to be notified
7. Select the time from ... to ...
8. Select the desired Notification interval
9. Select a name for the notification profile
10. Click the Save button

StateMonitor saves the notification profile and lists it in the table.
Finding Notification profiles
In the table, StateMonitor lists all profiles for the user selected above.
Via the Find: input field, you can specifically look for notification profiles. All columns of the selection list will be searched.
Further information: “Functions in tables and charts”, Page 42

Changing Notification profiles
Proceed as follows to change an existing notification profile:

- Switch to the Messenger menu
- Select the Notification profiles submenu
- Select the user for whom you wish to create the Notification profiles
- Select the notification profile in the table
- StateMonitor displays the data matching your input.
- Make the desired changes
- Click the Save button
- StateMonitor saves the changed notification profile.

Deleting Notification profiles
Proceed as follows to delete a notification profile:

- Switch to the Messenger menu
- Select the Notification profiles submenu
- Select the User for whom you want to delete the Notification profiles
- Click the recycle bin icon in the table
- StateMonitor removes the notification profile from the table.
6.4 Notifications submenu

In the Notifications submenu, you can define which events lead to which notifications. Here, you can create, activate, or delete notifications.

Creating a notification

You can create a new notification by assigning an event to a notification profile.

To create a notification, proceed as follows:

1. Switch to the Messenger menu
2. Select the Notifications submenu
3. Under Machine, select the desired machine
   - A table opens, showing the events available for this machine.
4. Tick the desired events.
5. Select the desired user under User
   - A table opens, showing the notification profiles available for this user.
6. Tick the desired notification profiles.
7. Click the ...assign button
   - StateMonitor adds a line with the new notification to the List of notifications.

Activating notifications

To activate a notification in the list, set the check mark in the Active column.

StateMonitor will only send notifications after this function has been activated.

Deleting

Proceed as follows to delete a notification from the list:

1. Switch to the Messenger menu
2. Select the Notifications submenu
3. Click the recycle bin icon in the table
   - StateMonitor removes the selected notification from the table.

Further information: “Functions in tables and charts”, Page 42
6.5  FN38: Sending messages from the NC program

FN38 control function

In HEIDENHAIN controls, the FN38 control function can generate messages that can be processed as notifications in StateMonitor. FN38 can be used with the following HEIDENHAIN controls:

<table>
<thead>
<tr>
<th>Control</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>iTNC 530</td>
<td>34049x-03, 60642x-01</td>
</tr>
<tr>
<td>TNC 640</td>
<td>34059x-05</td>
</tr>
<tr>
<td>TNC 620</td>
<td>81760x-01</td>
</tr>
<tr>
<td>TNC 320</td>
<td>771851-02</td>
</tr>
<tr>
<td>TNC 128</td>
<td>771841-02</td>
</tr>
<tr>
<td>CNC PILOT 640</td>
<td>68894x-04</td>
</tr>
<tr>
<td>MANUAL Plus 620</td>
<td>54843x-04</td>
</tr>
</tbody>
</table>

To be able to use the FN38 function, you have to enter code number 555343 to enable special functions for Q parameter programming. The TNC as of software version 34059x-07 allows programming of FN38 without entering a code number.

Programming

To program the FN38 control function, proceed as follows:

- Press the Q key at the control
- Press the DIVERSE FUNCTION soft key
- Press the FN38 SEND soft key
- The control writes the line FN38: SEND /”.
- Program the text to be sent using the appropriate variables output formats
  
  Example:
  
  FN 38: SEND "Measured diameter: % +3f"/+Q153

The number of formatting instructions has to correspond to the number of formatted values.
**Output format**

You can define the output format of numerical values by means of a formatting operator.

The formatting descriptions are introduced with a percentage sign, followed by the letter \texttt{f} to indicate floating point numbers in decimal notation.

You can add further information between the percentage sign and the code letter:

- A plus sign after the percentage sign means that numerical values are always output with their algebraic sign
- The period and a number define the number of decimal places to be displayed

The following table gives some syntax examples of the output formats of variables:

<table>
<thead>
<tr>
<th>Output formats</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>%\texttt{f}</td>
<td>Output of a floating point number in original format</td>
</tr>
<tr>
<td>%.0\texttt{f}</td>
<td>Output of a floating point number without decimal places</td>
</tr>
<tr>
<td>%.1\texttt{f}</td>
<td>Output of a floating point number with one decimal place</td>
</tr>
<tr>
<td>++.2\texttt{f}</td>
<td>Output of a floating point number with algebraic sign and two decimal places</td>
</tr>
</tbody>
</table>

**Application example: Parts counter**

Target: With every program run, the quantity is incremented by one.

| \texttt{Q1} = Q1 + 1 | Parts counter |
| \texttt{Q2} = 1000 | Total quantity |
| \texttt{Q3} = 0815 | Job |
| \texttt{FN 38: SEND/"Number of Parts: %.0f of %.0f Order: %.0f" / +Q1/+Q2/+Q3} | Sending messages |
7.1 Jobs menu (software option)

Recording and evaluation of jobs is an additional function that is not included in the standard software functionality.

Further information: “Software options and licenses”, Page 128

With StateMonitor, you can record and evaluate the execution of production jobs. For this purpose, create new jobs in the Jobs menu and assign them to a machine.

The Jobs menu contains the following submenus:

- Create job
- Assign job
- Adjust machining sequence

Assigned jobs are displayed in the Job terminal submenu of the machine. The operator can enter machining times for a job and report the number of parts produced.

Further information: “Job terminal submenu (software option)”, Page 65

For entering machining times, the operator can use the predefined job statuses. Job statuses can be specified in detail in the Settings menu.

Further information: “Machine statuses / Job statuses submenu”, Page 117

Specified machining times and numbers of parts will be included in the job evaluation.

Further information: “Job times (software option)”, Page 103

The submenus and functions displayed by StateMonitor depend on role of the user.
7.2 Create job submenu (software option)

In the Create job submenu, you can do the following:

- Create new jobs
- Change jobs
- Delete jobs

Creating a new job

To create a new job, proceed as follows:

1. Switch to the Jobs menu
2. Select the Create job submenu
3. Enter the job number in the Job number field
4. Enter the working step in the Working step field
5. Enter other information on the job, if required
6. Click the Create job button
7. The job is displayed in the Created jobs table.
8. You can now assign the new job to a machine.

Further information: “Assign job submenu (software option)”, Page 88

To create multiple working steps for a job, proceed as follows:

1. Create a working step as described above
2. Select the working step in the Created jobs table
3. The data entered for the job is copied to the Create job section.
4. Change the data as required
5. Click the Create job button
6. The new working step is added.

Changing a job

Prerequisite: The job has not been assigned to any machine.

To change a job, proceed as follows:

1. In the Created jobs table, click the job to be changed.
2. The selected job is highlighted in green in the table.
3. The data entered for the job is copied to the Create job section.
4. Change the data as required
5. Click the Change job button
6. The changes are applied.

Deleting a job

Prerequisite: The job has not been assigned to any machine.

To delete a job, proceed as follows:

1. In the Created jobs table, click the job to be deleted.
2. The selected job is highlighted in green in the table.
3. Click the Delete job button
4. The job is deleted from the table.
7.3 Assign job submenu (software option)

Assigning a job
To assign a job to a machine and enable it for machining, proceed as follows:

- Switch to the Jobs menu
- Select the Assign job submenu
- In the Created jobs table, click the desired job
- The selected job is highlighted in green in the table.
- In the Select machine dropdown field, select the desired machine
- Enter other job-relevant information, if required
- Click the Assign job button
- The job is displayed in the Assigned jobs table.
- You can start machining this job.

Further information: “Job terminal submenu (software option)”, Page 65

Changing a job assignment
Prerequisite: The job has not been started yet in the job terminal.
To reassign an assigned job to a different machine, proceed as follows:

- In the Assigned jobs table, click the job to be reassigned to a different machine.
- The selected job is highlighted in green in the table.
- In the Select machine dropdown field, select the machine you want to reassign the job to
- Click the Assign job button
- The assignment is changed.

Deleting a job
Further information: “Deleting a job”, Page 87
7.4 Adjust machining sequence submenu (software option)

In the job terminal of each machine, StateMonitor lists the assigned jobs in chronological order. You can change this order manually. For this purpose, proceed as follows:

- Switch to the Jobs menu
- Select the Adjust machining sequence submenu
- The Jobs for machine table lists all jobs that have been assigned to the selected machine.
- Use the mouse to drag each job to the desired position
- The jobs are listed in the defined order in the Job terminal submenu.

Further information: “Job terminal submenu (software option)”, Page 65
7.5 FN38: Job functions in the NC program

FN38 control function
In HEIDENHAIN controls, the FN38 control function can generate messages that can be processed as notifications in StateMonitor. FN38 can be used with the following HEIDENHAIN controls:

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</table>

To be able to use the FN38 function, you have to enter code number 555343 to enable special functions for Q parameter programming. The TNC as of software version 34059x-07 allows programming of FN38 without entering a code number.

Entering the job status
Using FN38 messages, you can report a job status to StateMonitor. The FN38 message must have the following syntax:

```
FN 38:
SEND /"JOB:jobnumber_STEP:workingstep_status"
```

Prerequisites:
- The control is able to send FN38 messages
- Further information: ‘FN38: Sending messages from the NC program’, Page 82
- The job has been set up
- The job has been assigned to the machine

Example:
Job with job number 1234 and working step 1

<table>
<thead>
<tr>
<th>FN 38: SEND /&quot;JOB:1234_STEP:1_START&quot;</th>
<th>Start job</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 38: SEND /&quot;JOB:1234_STEP:1_PREPARATION&quot;</td>
<td>Start preparation</td>
</tr>
<tr>
<td>FN 38: SEND /&quot;JOB:1234_STEP:1_PRODUCTION&quot;</td>
<td>Production</td>
</tr>
<tr>
<td>FN 38: SEND /&quot;JOB:1234_STEP:1_STOP&quot;</td>
<td>Stop job</td>
</tr>
<tr>
<td>FN 38: SEND /&quot;JOB:1234_STEP:1_FINISH&quot;</td>
<td>Finish job</td>
</tr>
</tbody>
</table>
Reporting quantities

Using FN38 messages, you can report job quantities back to StateMonitor. The quantity can be indicated as an incremental or absolute value:

- If you enter an incremental value, the quantity is incremented by the value you specify.
- If you enter an absolute value, the old value is overwritten by the new one.

The FN38 message must have the following syntax:

```
FN 38: SEND */"JOB:jobnumber_STEP:workingstep_category_quantity"
```

Prerequisites:

- The control is able to send FN38 messages
- The job has been set up
- The job has been assigned to the machine
- The job is currently being executed

Example:

Job with job number 1234 and working step 1; additionally specifying: actual number 23, scrap 12, and rework 15

| FN38: SEND */"JOB:1234_STEP:1_OK_A:23" | Actual amount (OK) absolute value |
| FN38: SEND */"JOB:1234_STEP:1_OK_I:1" | Actual amount (OK) incremental value |
| FN38: SEND */"JOB:1234_STEP:1_S_A:12" | Scrap (S) absolute value |
| FN38: SEND */"JOB:1234_STEP:1_S_I:1" | Scrap (S) incremental value |
| FN38: SEND */"JOB:1234_STEP:1_R_A:15" | Rework (R) absolute value |
| FN38: SEND */"JOB:1234_STEP:1_R_I:1" | Rework (R) incremental value |

Creating a new job

As an alternative to using StateMonitor, you can create new jobs in the control using an FN38 message.

The FN38 message must have the following syntax:

```
FN 38: SEND */"JOB:jobnumber_STEP:workingstep_CREATE"
```

Prerequisites:

- The control is able to send FN38 messages

Example:

Job with job number 1234 and working step 1

| FN38: SEND */"JOB:1234_STEP:1_CREATE" | Create a new job |
8

Evaluations menu
8.1 Evaluations menu

In the Evaluations menu, StateMonitor graphically depicts the data drawn from the machine in the form of a table. The Evaluations menu includes the following submenus:

- Day view
- Machine statuses
- Key figures
- Program run times
- Machine reports
- Job times

In the Day view and Machine statuses submenus, StateMonitor displays the machine statuses chronologically as machine status bars and calculates the Availability and Utilization rate key figures.

In the Key figures, Program run times, and Machine reports submenus, StateMonitor lists the corresponding data in tables.

In the Job times submenu, StateMonitor lists the machining times and quantities entered for each job.

The submenus and functions displayed by StateMonitor depend on role of the user.

Saving Evaluations

From the Machine statuses, Key figures, Program run times, Machine reports, and Job times submenus, you can save the current evaluation under My evaluations.

If you check the box next to Private, this evaluation is only visible with your own log-on data. Other users will not see this evaluation.

If you do not check the box next to Private, then the evaluation is visible for all users with Authorization status: User plus or Administrator.

Proceed as follows to save your evaluation:

- Enter the Evaluation name
- Check the box next to Private, if needed
- Click the Save button
- StateMonitor saves the current evaluation and adds it to the Saved evaluations table.

Load saved evaluations

Proceed as follows if you have already saved evaluations:

- Select the saved evaluations under My evaluations
- StateMonitor displays the selected data from the saved evaluation.
8.2 Day view submenu

In the **Day view** submenu, StateMonitor graphically displays the machine statuses of each machine for the current day. Furthermore, the **Availability** and **Utilization rate** key figures are shown for each machine.

**Further information:** 'Key figures submenu', Page 98

The machine status bar results from the machine status. A blue line above a section of the status bar indicates that the section contains additional information.

**Further information:** “Saving additional information”, Page 64

---

**Showing detailed information**

You can show detailed information for each section of the machine status bar.

To display detailed information, proceed as follows:

- Click a section of the machine status bar
- StateMonitor displays a window that shows detailed information on the machine status and comments, if available.
8.3 Machine statuses submenu

The **Machine statuses** submenu contains the Evaluation of machine statuses for a defined period of time. The following selection possibilities are available:

- Time from ... to ...
- Number of days (counting back from the current day)
  - 1 day
  - 3 days
  - 7 days
- Date from ... to ...

Proceed as follows to display the machine statuses for a specific time:

- Switch to the **Evaluations** menu
- Select the **Machine statuses** submenu
- Select the desired machines (tick the machine names)
- Select the time from ... to ...
- Select the number of days (counting back from the current day)
- Alternatively, select the date from ... to ...
- Click the **Refresh** button
- StateMonitor shows the machine status bars as well as the **Availability** and **Utilization rate** for the selected period of time.

**Further information:** "Key figures submenu", Page 98

**Showing detailed information**

You can show detailed information for each section of the machine status bar.

**Further information:** "Showing detailed information", Page 95

**Showing the bar chart**

For each machine status bar, a bar chart is available. The bar chart is grouped by key figures and indicates the percentage of the respective machine statuses.

To view a bar chart, proceed as follows:

- Click the chart icon next to the machine status bar.
- The bar chart is displayed.
- If an additional machine status specification exists, StateMonitor highlights that bar in bold.

**Further information:** "Replacing and specifying machine statuses", Page 63

- To display the specifications (subcategories), click the bar.
- The data is displayed as a separate bar.

**Further information:** "Functions in tables and charts", Page 42
**Saving the evaluation**
You can save the current evaluation under *My evaluations*

**Further information:** “Saving Evaluations”, Page 94
8.4 Key figures submenu

StateMonitor calculates the Availability and Utilization rate key figures on the basis of the incoming machine statuses.

Further information: "Availability", Page 99
Further information: "Utilization rate", Page 100

Proceed as follows to select the key figures for selected machines:

- Switch to the Evaluations menu
- Select the Key figures submenu
- Select the desired machines (tick the machine names)
- Select the time from ... to ...
- Select the number of days (counting back from the current day)
- Alternatively, select the date from ... to ...
- StateMonitor displays the following key figures for the selected machines over the specified time period in the table:
  - Availability
  - Utilization rate
  - Productive time
  - Scheduled busy time
  - Busy time
  - Total down time

Further information: "Functions in tables and charts", Page 42

Graphically visualize a table
StateMonitor shows an separate graph for each selected machine. You can save the current evaluation under My evaluations

Further information: "Saving Evaluations", Page 94
**Availability**

Generally, the availability is the time during which a system is available.

The availability of the machine is calculated from the ratio of the main usage time relative to the scheduled busy time.

The main usage time is the total time minus all down times.

\[
\text{Availability} = \frac{\text{Total period under consideration} - \text{Total down time}}{\text{Scheduled busy time}}
\]

The scheduled busy time is the total time minus the time during which the machine is switched off.

\[
\text{Scheduled busy time} = \text{Total period under consideration} - \text{Time during which the machine is not operated}
\]

The total down time results from the following sum:

\[
\begin{align*}
\text{Time during which the machine is not operated} + \text{Delay} + \text{Time during which the machine is not ready for operation} &= \text{Total down time}
\end{align*}
\]

Thus, the availability is as follows:

\[
\text{Availability} = \frac{\text{Total period under consideration} - \text{Total down time}}{\text{Total period under consideration}}
\]
**Utilization rate**

The utilization rate basically is the ratio of the actually attainable value of a reference value relative to the maximum possible value of this reference value.

In respect of the machine utilization, the utilization rate is the ratio of the productive time relative to the busy time of the machine.

\[
\text{Utilization rate} = \frac{\text{Productive time}}{\text{Busy time}}
\]

The busy time is the total time minus the delay time and minus the time during which the machine is not in operation.

\[
\text{Total period under consideration} - \text{Delay} - \text{Time during which the machine is not operated} = \text{Busy time}
\]

Thus, the utilization rate is as follows:

\[
\text{Utilization rate} = \frac{\text{Productive time}}{\text{Total period under consideration} - \text{Delay} - \text{Time during which the machine is not operated}}
\]

The value for Productive time may deviate from the program run time. Program run time will only be counted as productive time if the override values are at least 1%. 

---

**NOTE:**

The value for Productive time may deviate from the program run time. Program run time will only be counted as productive time if the override values are at least 1%.
8.5 Program run times submenu

In the Program run times submenu, you can evaluate the NC program run times of multiple machines.

Proceed as follows to evaluate Program run times:

- Switch to the Evaluations menu
- Select the Program run times submenu
- Select the desired machines (tick the machine names)
- Select the time from ... to ...
- Select the number of days (counting back from the current day)
- Alternatively, select the date from ... to ...
- StateMonitor lists the programs that were executed within the selected period in the table.

You can save the current evaluation under My evaluations

Further information: “Saving Evaluations”, Page 94

Graphically visualize a table

The program table and the graphical visualizations of its contents correspond in their functionality to the Program run times submenu found in the Machines menu under Machine status.

Further information: “Program run times submenu”, Page 70

In contrast to the Machines menu, the Evaluations menu allows you to visualize and compare the charts of multiple machines at the same time. StateMonitor lists all charts one below the other.
8.6 Machine reports submenu

In the **Machine reports** submenu, you can list certain messages in a defined period for selected machines.

Proceed as follows to list **Machine reports**:

- Switch to the **Evaluations** menu
- Select the **Machine reports** submenu
- Select the desired machines (tick the machine names)
- Select the time from ... to ...
- Select the number of days (counting back from the current day)
- Alternatively, select the date from ... to ...
- Select **Error classes**, **Error groups**, **Information**
- Click the **Refresh** button
- StateMonitor lists all machine messages in a table that occurred within the selected period on the selected machine and which belong to the selected **Error classes**, **Error groups** or **Information**.

**Further information:** "Functions in tables and charts", Page 42

You can save the current evaluation under **My evaluations**

**Further information:** "Saving Evaluations", Page 94
8.7 Job times (software option)

In the Job times submenu, you can evaluate recorded data related to your production jobs.

The following formats are available for evaluation:

- The Jobs table lists all jobs corresponding to the search criteria with their total duration.
- The Working steps for selected job table contains all working steps for the selected job as well as the associated durations, the actual parts and scrap counts for produced parts and the machine on which the step was performed.
- The bar chart visualizes the following durations: preparation time, production time and undefined time.
- The Entries for working step table contains detailed information on each job status that occurred in the selected working step.

To evaluate the recorded data, proceed as follows:

- Switch to the Evaluations menu
- Select the Job times submenu
- Select the desired machines (tick the machine names)
- Select the time from ... to ...
- Select the number of days (counting back from the current day)
- Alternatively, select the date from ... to ...
- If required, enter the Job number, Part name, or Part number in the Find field
- To restrict the search to fully completed jobs, tick the Show only completed jobs option
- Click the Refresh button
- StateMonitor lists all jobs in the table that match the search criteria.
- Click a job in the Jobs table.
- The Working steps for selected job table opens.
- Click a working step in the Working steps for selected job table
- The Entries for working step table opens.
- To show a bar chart for the Working steps for selected job table, click the Graphically visualize a table button

Further information: “Functions in tables and charts”, Page 42
9.1 Settings menu

The Settings menu contains the following submenus:

- User settings
- User
- Machines
- Machine mapping
- Machine statuses
- Messenger settings
- File backup
- System language
- External reporting DB
- Info

The submenus and functions displayed by StateMonitor depend on role of the user.
9.2 User settings submenu

Changing the password

Every user can change his or her user password at any time.

Proceed as follows to change your user password:

- Switch to the Settings menu
- Select the User settings submenu
- Your user name is shown in the User name field.
- Enter your current password in the Old password field
- Enter your new password in the New password field
- Re-enter your new password in the field.
- Click the Changing the password button
- StateMonitor changes the password.

Forgot your password?
If user has lost his or her password, the administrator can reset it.
Further information: "Resetting passwords", Page 110

Change language settings for user
Each user can individually set the language in StateMonitor.

Proceed as follows to set the language setting for users:

- Switch to the Settings menu
- Select the User settings submenu
- Select the user language#
- Click the Save the change button
- StateMonitor then changes the user language.

The language settings of all the other users remain unaffected by this setting.
9.3 User management submenu

Roles
Depending on their role, the users of StateMonitor have different access and editing rights.
You can assign the following roles to the users:

<table>
<thead>
<tr>
<th>Role</th>
<th>Menu</th>
<th>Authorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewer</td>
<td>Machines</td>
<td>No editing rights</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only access to <strong>Machine status</strong>, <strong>Job terminal</strong> (software option), and <strong>Detailed view of the last 3 days</strong></td>
</tr>
<tr>
<td>Messenger</td>
<td></td>
<td>No access</td>
</tr>
<tr>
<td>Jobs</td>
<td>(software option)</td>
<td>No access</td>
</tr>
<tr>
<td>Evaluations</td>
<td></td>
<td>No access</td>
</tr>
<tr>
<td>Settings</td>
<td></td>
<td>Only access to <strong>User settings</strong> and <strong>Info</strong></td>
</tr>
<tr>
<td>Users</td>
<td>Machines</td>
<td>All rights</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Messenger</strong> No editing rights</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Jobs</strong> (software option) No access</td>
</tr>
<tr>
<td></td>
<td>Evaluations</td>
<td>Only access to <strong>Day view</strong> of the machine statuses</td>
</tr>
<tr>
<td></td>
<td>Settings</td>
<td>Only access to <strong>User settings</strong> and <strong>Info</strong></td>
</tr>
<tr>
<td>User plus</td>
<td>Machines</td>
<td>All rights</td>
</tr>
<tr>
<td></td>
<td><strong>Messenger</strong></td>
<td>All rights</td>
</tr>
<tr>
<td></td>
<td><strong>Jobs</strong> (software option)</td>
<td>All rights</td>
</tr>
<tr>
<td></td>
<td>Evaluations</td>
<td>All rights</td>
</tr>
<tr>
<td></td>
<td>Settings</td>
<td>Only access to <strong>User settings</strong> and <strong>Info</strong></td>
</tr>
<tr>
<td>Administrator</td>
<td>All menus</td>
<td>All rights</td>
</tr>
</tbody>
</table>

Only users with the administrator role can enter, change, and delete user data.
Create user
To create a user in StateMonitor, proceed as follows:

- Switch to the Settings menu
- Enter the following data in the User submenu:
  - First name
  - Last name
  - User name
  - E-mail
- Assign the desired Authorization status:
- Click the Save button
- StateMonitor adds the newly created user to the user list.
- StateMonitor sends the user a password by e-mail.

Every user can change his or her password at any time.

**Further information:** *User settings submenu*, Page 107

Both the User name and the Password are required for Login.

**Further information:** *Home menu*, Page 46

Users receive notifications at their stated e-mail address, as specified in the Messenger menu.

**Further information:** *Messenger menu*, Page 74

Editing user data
To change user data later, proceed as follows:

- Switch to the Settings menu
- Select the User submenu
- In the list of users, select the user whose data you want to edit
- StateMonitor highlights the user and loads the associated data into the input fields.
- Make the changes
- Click the Save changes button
- StateMonitor copies the edited data to the user list.

Deleting users
To delete a user in StateMonitor, proceed as follows:

- Switch to the Settings menu
- Select the User submenu
- In the user list, select the user whom you would like to delete
- StateMonitor highlights the user and loads the associated data into the input fields.
- Click the Deleting users button
- StateMonitor removes the user from the list.
Resetting passwords

If a user has forgotten his or her password, then a user with administrator role can reset the user’s password.

Proceed as follows to reset a password:

- Switch to the Settings menu
- Select the User submenu
- In the list of users, select the user whose password you want to reset
  ➤ StateMonitor highlights the user and loads the associated data into the input fields.
- Click the Reset the password button
  ➤ StateMonitor resets the password and sends an e-mail to the respective user.
  ➤ The user can change the password again.

If the notification function (Messenger) of StateMonitor is not enabled at your company, then StateMonitor will be unable to send an e-mail with the reset password.
9.4 **Machines submenu**

**Create machine**

This function is only accessible to users with the Administrator role.

To create a new machine in StateMonitor, proceed as follows:

- Switch to the Settings menu
- Select the Machines submenu
- Enter the name of the machine in the **Machine name** field
- Select the **Type** (control)
- Depending on that selection, StateMonitor displays **Machine-specific settings**.
- Make the required settings for the selected machine type
  - **Further information**: "Control-specific machine parameters", Page 162
- Under **IP address / DHCP**, enter the IP address (eth0) or the host name of the machine.
- Click the **Check** button
- StateMonitor checks the network connection to the machine.
  - **Further information**: "Testing the network connection", Page 112
- If you have a picture of your machine, click the **Load image** button
- Select the image file in Windows Explorer
- StateMonitor loads the selected picture into the view.
- Click the **Set up machine** button
- The machine is saved in the machine list.
- Set a check mark in the **Active** column
- Select the created machine in the machine list.
- StateMonitor highlights the machine.
- Click the **Save machine** button
- The machine is now visible in the **Machines** menu.

If you do not set the check mark in the **Active** column, StateMonitor will not show the machine in the **Machines** menu.
Testing the network connection

If the network connection test is not successful, the following error message will be displayed:

‘Invalid IP address’

If the network connection could not be established, check the following:

- Has the machine’s IP address been entered correctly?
- Is the server or PC where StateMonitor is installed connected to the local company network?
- Is the machine connected to the local company network?

Further information: ‘Network integration’, Page 133

Once a network connection has been established between the machine and StateMonitor, the control transmits the SIK number and the NC software version to StateMonitor.

StateMonitor enters the SIK number and the NC software version of the control in the corresponding columns of the overview table.

Details on the Connection status column

In the machine list, StateMonitor shows the current Connection status for every machine.

The following connection statuses may be displayed:

<table>
<thead>
<tr>
<th>Connection status</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection was successfully established</td>
<td>The machine is connected with StateMonitor</td>
</tr>
<tr>
<td>Automatic connection setup</td>
<td>Connection setup is running</td>
</tr>
<tr>
<td>No connection. Activation is required.</td>
<td>Connection interrupted After three lost connections within five minutes, no new attempt will be made to establish a connection (network is not stable).</td>
</tr>
<tr>
<td>Connection separated</td>
<td>No connection between the machine and StateMonitor Machine has been deactivated in StateMonitor</td>
</tr>
</tbody>
</table>
StateMonitor displays the corresponding DNC status message in brackets after the connection status.

The following DNC status messages may be displayed:

<table>
<thead>
<tr>
<th>DNC status message</th>
<th>Meaning</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNC STATE NOT INITIALIZED</strong></td>
<td>Machine is in the start status</td>
<td>Connection has not yet been established</td>
</tr>
<tr>
<td></td>
<td>Machine has not yet been initialized</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE HOST IS NOT AVAILABLE</strong></td>
<td>Machine cannot be reached via PING</td>
<td>Machine is switched off or disconnected from the network</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE HOST IS AVAILABLE</strong></td>
<td>Machine can be reached via PING</td>
<td>Machine is starting, NC is starting, DNC is already available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE DNC IS AVAILABLE</strong></td>
<td>DNC is available</td>
<td>Machine is starting, NC and DNC have not yet been started</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE WAITING PERMISSION</strong></td>
<td>Waiting for permission</td>
<td>Client is waiting for a permission for <strong>External access</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE MACHINE IS BOOTTED</strong></td>
<td>Machine has booted</td>
<td>Machine has booted and is waiting for acknowledgement of the power interruption with CE</td>
</tr>
<tr>
<td></td>
<td>NC software has been loaded, PLC program has not yet been compiled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE MACHINE IS INITIALIZING</strong></td>
<td>Machine is being initialized</td>
<td>PLC program is being compiled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE MACHINE IS AVAILABLE</strong></td>
<td>Machine is fully booted and ready</td>
<td>Machine is ready, all DNC functions are available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE MACHINE IS SHUTTING DOWN</strong></td>
<td>Machine is shutting down</td>
<td>Machine shutdown has been initiated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE DNC IS STOPPED</strong></td>
<td>Machine is shutting down, DNC has stopped</td>
<td>DNC has been ended as part of shutting down</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE HOST IS STOPPED</strong></td>
<td>Machine has shut down</td>
<td>Connection has been lost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Machine has shut down and is no longer available</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DNC STATE NO PERMISSION</strong></td>
<td>No permission</td>
<td><strong>External access</strong> is blocked (MOD function)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permission request for <strong>External access</strong> was denied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permission request for <strong>External access</strong> is pending but has not been acknowledged</td>
</tr>
</tbody>
</table>
Troubleshooting connecting problems

If three lost connections occur within five minutes, this is an indication that the network is unstable. In this case, no further connection attempts will be made. StateMonitor then displays the **No connection. Activation is required.** connection status.

Proceed as follows to initiate the establishment of a new connection:
- Deactivate the machine
- Click the **Save machine** button
- Reactivate the machine
- Click the **Save machine** button
- StateMonitor will then attempt to re-establish the connection.

If a client sends a permission request for **External access**, then the window shown to the right appears on the control.

**Details on the Error message column**

In the **Error message** column of the machine list, StateMonitor shows a DNC error message in case there are connection problems.

The following DNC error messages may be displayed:

<table>
<thead>
<tr>
<th>DNC error message</th>
<th>Meaning</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNC_E_DNC_PROHIBITED</strong></td>
<td>DNC blocked</td>
<td>External access is blocked (MOD function)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permission request for External access was denied</td>
</tr>
<tr>
<td><strong>DNC_E_FAIL</strong></td>
<td>DNC failure</td>
<td>Firewall is blocked</td>
</tr>
<tr>
<td><strong>DNC_E_OPTION_NOTAVAILABLE</strong></td>
<td>DNC option is not available</td>
<td>Option 18, HEIDENHAIN DNC, is not available</td>
</tr>
<tr>
<td><strong>DNC_E_NOT_POS_NOW</strong></td>
<td>DNC is presently not possible</td>
<td>Currently, DNC connections cannot be established (e.g. if the machine is shutting down)</td>
</tr>
<tr>
<td><strong>DNC32_E_NOT_CONN</strong></td>
<td>No connection to the machine</td>
<td>Machine is switched off or not connected to the network</td>
</tr>
<tr>
<td><strong>TIMEOUT</strong></td>
<td>Timeout in the network</td>
<td>StateMonitor has sent a request, but the control is not responding (check connection)</td>
</tr>
</tbody>
</table>

**Edit machine**

To edit the machine data in StateMonitor, proceed as follows:

- Switch to the **Settings** menu
- Select the **Machines** submenu
- Select the machine in the machine list
- StateMonitor loads the data into the input fields.
- Change the data
- Click the **Save machine** button
- StateMonitor saves the machine with the edited data.
Deleting machines
To delete a machine from StateMonitor, proceed as follows:

- Switch to the Settings menu
- Select the Machines submenu
- Select the machine in the machine list
- Click the Delete machine button
- StateMonitor removes the selected machine from the list.
- The machine is no longer visible in the Machines menu.
9.5 Machine mapping submenu

In the Machine mapping submenu, individual users can be assigned the machines that should be visible to them.

This function is only accessible to users with the Administrator role.

Proceed as follows to assign selected machines to a user:

- Switch to the Settings menu
- Select the Machine mapping submenu
- Check the box next to Activate the assignment of users to machines
- In the Select the user pull-down menu, select the user you want to assign the machines to.
- Under All machines, select the machine that you want to assign to the selected user.
- Or, for multiple selections, press the Ctrl key, and select the machines.
- Click the right arrow button
- StateMonitor then assigns the machines to the selected user and enters them under Assigned machines.
- Click the Save button

To remove an assignment, proceed as follows:

- Select the assigned machine
- Click the left arrow button
- StateMonitor then moves the selected machine back to All machines.
- Click the Save button

To assign all of the machine to one user, proceed as follows:

- Click the double right arrow button
- StateMonitor then moves all of the machines to Assigned machines.
- Click the Save button

If no checkmark has been placed in the box next to Activate the assignment of users to machines, then all users are able to see all activated machines.
9.6 Machine statuses / Job statuses submenu

In the **Machine statuses / Job statuses** submenu, you can create new specifications (subcategories) that describe a status in detail. You can assign these specifications to a machine or job via the **Machines** menu. Assigned specifications are shown in the **Evaluations** menu.

**Machine statuses**
The following machine statuses can occur:

<table>
<thead>
<tr>
<th>Color coding</th>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark green</td>
<td>Productive (feed rate &amp; rapid traverse OVR &gt;= 100%)</td>
<td>The machine is productive. The potentiometers for feed rate and rapid traverse are set to 100% or more.</td>
</tr>
<tr>
<td>Light green</td>
<td>Productive (feed rate &amp; rapid traverse OVR &lt; 100%)</td>
<td>The machine is productive. The potentiometers for feed rate and rapid traverse are set to 100% or less.</td>
</tr>
<tr>
<td>Yellow</td>
<td>OK, but not productive</td>
<td>The machine is ready for operation, but not productive.</td>
</tr>
</tbody>
</table>
| Red          | Not ready for operation | - The machine is not ready for operation. 
- An emergency stop was triggered 
- Error messages are pending |
| Light gray   | Delay | Can replace a yellow or dark gray machine status and specify it more precisely |
| Dark gray    | Machine not in use | The machine is switched off |

**Job statuses (software option)**
The following job statuses can occur:
- Created
- Assigned
- Locked / change
- Started
- Prepare
- Production
- Interrupted
- Finished
Specifying statuses
To specify a status or add another specification, proceed as follows:

- Switch to the **Settings** menu
- Select the **Machine statuses / Job statuses** submenu
- Click the machine status to be specified
- StateMonitor opens an input window below the selected machine status.
- Add an additional designation (specification)
- Click the **New** button
- The StateMonitor shows the new specification in a list above the input window.

You can assign new specifications to a machine or job status via the **Machines** menu.

**Further information:** "Edit machine statuses submenu", Page 62
**Further information:** "Job terminal submenu (software option)", Page 65

Changing the sequence of specifications
Click the arrow icons to change the order of specifications.

- Click the up arrow
  - StateMonitor shifts the specification one place up in the list.
- Click the down arrow
  - StateMonitor shifts the specification one place down in the list.

Deleting specifications
Proceed as follows to delete a specification:

- Click the recycle bin icon
  - StateMonitor deletes the specification from the list.
9.7 Messenger settings submenu

In the Messenger settings submenu, you can enter the connection data to the e-mail server that sends StateMonitor notifications to the users.

Prerequisite: e-mail server

To specify Messenger settings, proceed as follows:

- Switch to the Settings menu
- Select the Messenger settings submenu
- Specify the connection parameters
- Click the Save button
- StateMonitor saves the configuration for the SMTP server connection.

The following parameters are available:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server</td>
<td>Server name of the e-mail server</td>
</tr>
<tr>
<td>User</td>
<td>User name of the SMTP user</td>
</tr>
<tr>
<td></td>
<td>If necessary, ask your e-mail provider</td>
</tr>
<tr>
<td>Password</td>
<td>Password of the SMTP user</td>
</tr>
<tr>
<td></td>
<td>If necessary, ask your e-mail provider</td>
</tr>
<tr>
<td>Connection</td>
<td>Type of encryption to be used for the communication, depends on the default</td>
</tr>
<tr>
<td>safety</td>
<td>setting made by the e-mail provider:</td>
</tr>
<tr>
<td></td>
<td>- None: Communication is not encrypted</td>
</tr>
<tr>
<td></td>
<td>- STARTTLS: The communication starts in an unencrypted state until the e-mail</td>
</tr>
<tr>
<td></td>
<td>server suggests transport encryption Only then, an encrypted communication</td>
</tr>
<tr>
<td></td>
<td>will be established</td>
</tr>
<tr>
<td></td>
<td>- SSL/TLS: The communication is encrypted end-to-end</td>
</tr>
<tr>
<td>Port</td>
<td>SMTP port for communication, depends on the selected Connection safety setting:</td>
</tr>
<tr>
<td></td>
<td>- 25 for None</td>
</tr>
<tr>
<td></td>
<td>- 587 for STARTTLS</td>
</tr>
<tr>
<td></td>
<td>- 465 for SSL/TLS</td>
</tr>
</tbody>
</table>

HEIDENHAIN recommends the use of an encrypted connection in order to protect the transferred data. Consult an IT specialist if you are unsure.
9.8  File backup submenu

Saving and deleting data automatically
By default, StateMonitor saves the data continuously until the
memory is full. A corresponding message will then be sent to the
administrator.

To periodically free memory capacity, you can define how long
historical data will be stored. Enter the desired number of days.
StateMonitor automatically deletes any data that is older.

To configure automatic deletion of the data, proceed as follows:

- Switch to the Settings menu
- Select the File backup submenu
- The Number of days ... field defaults to 0:
  StateMonitor will save the data continuously
  until the memory is full.
- Enter the number of days you want the data to
  be stored in the Number of days ... field, e.g.
  365 (1 year)
- Click the Save button

StateMonitor periodically deletes any data that is
older than 365 days.

Irrespective of the automatic saving processes,
HEIDENHAIN recommends running a daily data backup
on the server or PC. In this way, you can prevent serious
loss of data in the event of malfunctions.

There are two ways to run a backup of the StateMonitor data in
CSV format on your server or PC:
- Automatically (e.g., daily at 10:00 a.m.)
- Manually

Automatic data backup

To have StateMonitor perform periodic backups automatically,
proceed as follows:

- Switch to the Settings menu
- Select the File backup submenu
- Enter the desired path where StateMonitor
  should save the backup in the Path for saving
  the backup input field, (e.g. a drive on the
  server:
  C:\ProgramData\HEIDENHAIN\StateMonitor
  \backup)
- Select Time of day for saving the
  backup (e.g., 10:00 a.m.)
- Click the Generating button
- StateMonitor then performs a backup every
day at 10:00 a.m. and stores the data under the
specified path.
Manual data backup

Proceed as follows to perform a manual data backup:

- Switch to the Settings menu
- Select the File backup submenu
- Click the Export CSV files button
- A window opens where you can select the storage location.
- Select the storage location
- Click the Save button
- StateMonitor saves the backup file at the selected location.

The backup file is a zip file containing two CSV files:
- MachineDate.csv
- MachineStateHistory.csv

Do not rename the two CSV files!

Manually restoring the database

If the StateMonitor database has been damaged, then you must manually restore it.

To manually restore the database, proceed as follows:

- Under C:\ProgramData\HEIDENHAIN\StateMonitor\dat\backups, look for the folder with the desired date and copy the tncsmdb subfolder
- Paste the tncsmdb folder to the C:\ProgramData\HEIDENHAIN\StateMonitor\dat folder (overwrite the existing folder when prompted)

After restoring the data, you may have to restart StateMonitor.

If you delete the tncsmdb folder under C:\ProgramData\HEIDENHAIN\StateMonitor\dat, then StateMonitor will create a new, empty database during the next restart.

NOTICE

Caution: Data may be lost!

If you have not created a backup of the database and you delete the current database in the C:\ProgramData\HEIDENHAIN\StateMonitor\dat directory, then all existing data will be lost (e.g., machine data, user data, etc.).
- Back up the database regularly
Downloading the log file

If you seek help from the HEIDENHAIN Service department, you may require the StateMonitor log file.

To create a log file, proceed as follows:

- Switch to the **Settings** menu
- Select the **File backup** submenu
- Click the **Download log file** button
- A window opens where you can select the storage location.
- Select the storage location
- Click the **Save** button
- StateMonitor saves the log file at the selected location.
9.9 System language submenu

In the System language submenu, you can select the global language for StateMonitor.

This function is only accessible to users with the Administrator role.

To set the system language in StateMonitor, proceed as follows:

- Switch to the Settings menu
- Select the System language submenu
- A pop-up window in which you can change the language settings is displayed on the screen.
- Choose a language from the list.
- Click the Save the change button

Notes:
- You do not have to restart the software in order to change the language in StateMonitor
- In the User settings submenu, every user can set the language individually without affecting the global system language setting
- The language setting in the User settings submenu overrides the global system language setting
- For newly created users, the user language setting is the same as the system language setting until he or she selects a different language.
9.10 External reporting DB submenu

An external reporting DB (database) can be used to export saved StateMonitor data and evaluate them for corporate reporting. StateMonitor supports the Apache Derby and Microsoft SQL Server database systems.

StateMonitor will not export history data from the StateMonitor database to the external database.

This feature allows you to use machine data from StateMonitor for the following purposes:

- Correlation with data from ERP and MES systems
- Provision of data for OEE software
- Visualization of machine statuses in proprietary software

This function is only accessible to users with the Administrator role.

Prerequisite: Server with a database system (Apache Derby or Microsoft SQL Server)

To connect to an external database, proceed as follows:

1. Switch to the Settings menu
2. Select the External reporting DB submenu
3. Select the database system to be used from the Database pull-down menu
4. Enter the connection parameters depending on the database system to be used
5. Click the Test button to test the connection to the external database
6. Click the Save button

StateMonitor saves the configuration for connecting to the external database.

When connecting to the database for the first time, StateMonitor will create the following tables:

- MACHINE
- MACHINE_ALARM
- MACHINE_MESSAGE
- MACHINE_STATE_HISTORY
- PROGRAM_HISTORY
- JOB
**Parameters for Apache Derby**
If you select **Derby** as your database system, then the following parameters are available:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database host</td>
<td>IP address or domain name of the database server</td>
</tr>
<tr>
<td>Database port</td>
<td>Port-Number, 0 to 65536</td>
</tr>
<tr>
<td></td>
<td>Input not necessarily required</td>
</tr>
<tr>
<td>Database name</td>
<td>Customized input</td>
</tr>
<tr>
<td>Database users</td>
<td>Customized input</td>
</tr>
<tr>
<td>Database password</td>
<td>Customized input</td>
</tr>
</tbody>
</table>

**Parameters for Microsoft SQL Server**
If you select **Microsoft SQL Server** as your database system, then the following parameters are available:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database host</td>
<td>IP address or domain name of the database server</td>
</tr>
<tr>
<td>Database port</td>
<td>Port-Number, 0 to 65536</td>
</tr>
<tr>
<td>Instance name</td>
<td>Customized input</td>
</tr>
<tr>
<td>Database name</td>
<td>Customized input</td>
</tr>
<tr>
<td>Windows authentication</td>
<td>Activate/deactivate</td>
</tr>
<tr>
<td>Database users</td>
<td>Input only required if <a href="#">Windows authentication</a> is deactivated</td>
</tr>
<tr>
<td>Database password</td>
<td>Input only required if <a href="#">Windows authentication</a> is deactivated</td>
</tr>
</tbody>
</table>
9.11 Info submenu

The Info submenu contains the License information and legal notes related to the software.
StateMonitor shows the following information:
- StateMonitor version
- HEIDENHAIN DNC version
- StateMonitor license
- License conditions
- Table with Open Source license notes

Further information: "Functions in tables and charts", Page 42

To access the Info submenu, proceed as follows:
- Switch to the Settings menu
- Select the Info submenu
Software options and licenses
10.1 Software options and licenses

The StateMonitor functionality can be extended using additional software options.

You can purchase licenses for software options from your HEIDENHAIN sales representative. You will then obtain a license key that activates the software option on the dongle.

The following software options are available:

<table>
<thead>
<tr>
<th>Option</th>
<th>Extended functionality</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 additional machine controls</td>
<td>1220884-01</td>
</tr>
<tr>
<td>2</td>
<td>Modbus Interface</td>
<td>1268670-01</td>
</tr>
<tr>
<td>3</td>
<td>OPC UA Interface</td>
<td>1268673-01</td>
</tr>
<tr>
<td>4</td>
<td>JobTerminal</td>
<td>1268674-01</td>
</tr>
<tr>
<td>5</td>
<td>MTConnect Interface</td>
<td>1268675-01</td>
</tr>
</tbody>
</table>

10.2 Requesting a license

You can request a license from HEIDENHAIN by specifying the serial number. This serial number is displayed in the Info submenu.

To access the Info submenu, proceed as follows:

- Switch to the Settings menu
- Select the Info submenu
- An overview appears
- The program version and serial number are displayed
- Contact a HEIDENHAIN service agency and submit the displayed serial number in order to request a license for the product
- The license is generated by the HEIDENHAIN service agency and sent by e-mail
10.3 Enabling the license

In order to use the license, it must be enabled on your dongle.

The procedure depends on your configuration:

- **Online**: The server or PC where the StateMonitor application is installed has Internet access:
  
  You can directly enable your dongle-protected license.

  **Further information**: “Enabling the license (online)”, Page 130

- **Offline**: The server or PC where the StateMonitor application is installed has no Internet access:
  
  You first need to generate a request file and copy it to a PC with Internet access. Using this request file, you can then generate an update file to enable your license. The update file generated for this license must then be transferred to the server or PC where the StateMonitor application is installed so that you can enable your license there.

  **Further information**: “Enabling the license (Offline)”, Page 131

---

**Enabling the license (online)**

To enable the license on your dongle (online procedure), proceed as follows:

- Open the following URL on the server or PC where StateMonitor is installed:
  
  www.lc.codemeter.com/54077-02/depot

  or

- Click the **License update** button

  > The StateMonitor license portal is displayed.

  > Copy the license key (WIBU ticket) from the e-mail to the WIBU Ticket field

  > Click the Next button

  > The License overview page opens.

  > Click the Enable license button

  > The Available licenses page opens.

  > Click the **Activate Selected Licenses Now** button and follow the instructions on the page

  > The license for five additional machine controls will be enabled on your dongle.
Enabling the license (Offline)

To generate a license request file, proceed as follows:

1. Open CodeMeter Control Center on the server or PC where StateMonitor is installed.
2. Click the License update button.
3. The CmFAS wizard opens.
4. Click the Generate license request option and then Next.
5. Click the Extend existing license option and then Next.
6. Click the DR. JOHANNES HEIDENHAIN GmbH option and then Next.
7. Enter the desired file name and its path and then click Apply.
   > The license request file is created at the specified location.
8. Transfer the license request file to a PC with Internet access (e.g. using a USB stick).

To generate a license update file, proceed as follows:

1. Open the following URL: www.lc.codemeter.com/54077-02/depot
2. The StateMonitor license portal is displayed.
3. Copy the license key (WIBU ticket) from the e-mail to the WIBU Ticket field.
4. Click the Next button.
5. The License overview page opens.
6. Click the Enable license button.
7. Click the Offline license transfer button and follow the instructions on the page.
   > Your license update file is created.
8. Transfer the license update file to the server or PC where StateMonitor is installed (e.g. using a USB stick).

To activate the license update file, proceed as follows:

1. Open CodeMeter Control Center on the server or PC where StateMonitor is installed.
2. Click the License update button.
3. The CmFAS wizard opens.
4. Click the Import license update option and then Next.
5. Specify the file name including its path and then click Apply.
   > The license update file is imported.
6. The license for five additional machine controls will be enabled on your dongle.
Network integration
11.1 SIK menu

The SIK (System Identification Key) contains the NC software license for enabling control loops and software options. The SIK number provides the control with a unique identification. Before you proceed, open the SIK menu of your control to check whether option 18 is enabled.

Procedure on iTNC 530:
- Select the Programming and Editing operating mode
- Press the MOD key
- Enter the code number SIK
- Press the ENT key
- The TNC displays the SIK menu on the screen.

If there is a check mark next to option 18, the HEIDENHAIN DNC interface is enabled on your control. If there is no check mark next to option 18, you have to enable option 18.

Further information: "Enabling Option 18", Page 136

Procedure on TNC 640, TNC 620, TNC 320 and TNC 128:
- Select the Programming operating mode
- Press the MOD key
- Enter the code number SIK
- Press the ENT key
- The TNC displays the SIK menu on the screen.

If there is a check mark next to option 18, the HEIDENHAIN DNC interface is enabled on your control. If there is no check mark next to option 18, you have to enable option 18.

Further information: "Enabling Option 18", Page 136

To enable an option, you need the SIK number of your control. You can find the SIK number in the Identifier (SIK ID) field under “SIK Information” in the SIK menu.
Procedure on CNC PILOT 640 and MANUALplus 620:

- Select the Organization operating mode
- Press the Key soft key
- Enter the code number **SIK**
- Confirm with **OK**
- The control switches to the Machine par. programming submode and displays the SIK menu.

If there is a check mark next to option 18, the HEIDENHAIN DNC interface is enabled on your control.

If there is no check mark next to option 18, you have to enable option 18.

**Further information:** "Enabling Option 18", Page 136

To enable an option, you need the SIK number of your control. You can find the SIK number in the **Serial No. (SN)** field under "SIK Information" in the SIK menu.
11.2 Enabling Option 18

Option 18 is available on HEIDENHAIN controls as of the following software versions:

<table>
<thead>
<tr>
<th>Control</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>iTNC 530</td>
<td>34049x-01</td>
</tr>
<tr>
<td>iTNC 530 HSCI</td>
<td>60642x-01</td>
</tr>
<tr>
<td>TNC 640 HSCI</td>
<td>34059x-01</td>
</tr>
<tr>
<td>TNC 620 HSCI</td>
<td>34056x-01 / 73498x-01</td>
</tr>
<tr>
<td>TNC 320</td>
<td>34055x-01 / 771851-01</td>
</tr>
<tr>
<td>TNC 128</td>
<td>771841-01</td>
</tr>
<tr>
<td>CNC PILOT 640</td>
<td>68894x-01</td>
</tr>
<tr>
<td>MANUALplus 620</td>
<td>54843x-01</td>
</tr>
</tbody>
</table>

Option 18 enables the HEIDENHAIN DNC interface. DNC stands for Distributed Numerical Control. It is used for integrating computer-controlled machine tools (CNC machines) into a computer network.

Activation for a 90-day trial period

To activate option 18 for a 90-day trial period, proceed as follows:

- Write down the SIK number of the control
- Further information: “SIK menu”, Page 134
- Contacting HEIDENHAIN Service:
  - Per e-mail at this address: service.nc-pgm@heidenhain.de
  - Or by phone under the number: +49 8669 31-3103
- Indicate your SIK number. You will then receive the required code number for activating the desired option for a 90-day trial period.

Notes:
- Individual options can be activated free of charge one time for a trial period of 90 days. After this trial period, activation is subject to a charge
- A free-of-charge activation of Option 18 on a trial basis is possible for the iTNC 530 beginning with software version 34049x-04.
Paid activation (unlimited)
To purchase option 18 and activate it for unlimited use, proceed as follows:

- Contacting HEIDENHAIN:
  - Per e-mail to: info@heidenhain.de
  - Or via the contact form on the homepage: www.heidenhain.de
  - Or via the HEIDENHAIN Klartext Portal: www.klartext-portal.de

- Provide the following mandatory information:
  - The SIK number of your control
  - Your contact details
  - Your phone number in case we need to contact you

The department responsible will promptly get in touch with you.
You will receive a five-digit activation code.

Procedure
If you have received the activation code, then proceed as follows:

- Open the SIK menu
  Further information: “SIK menu”, Page 134

- Place the cursor on Option 18

  - Press the SET OPTION soft key
  - A pop-up window for entering the activation code then appears.
  - Enter the activation code
  - Confirm with OK.
  - Option 18 is then activated on the control and in the SIK menu.

  - Restart the control if required
11.3 Network integration

StateMonitor can only be used if the machine controls have been integrated into the network.
Standard HEIDENHAIN controls are equipped with an Ethernet card. This enables you to connect the controls to your network as clients.

Have a network specialist configure the controls.

For the iTNC 530 with software versions prior to 34049x-05:
If you change the IP address of the TNC, the control will restart automatically.

Network integration using fixed IP addresses
If the IP addresses are not obtained dynamically from a DHCP server, fixed IP addresses within a subnet must be entered into the interface configuration of the controls.
iTNC 530 beginning with software version 34049x-04 (HEROS 4)

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Select the **Programming and Editing** mode of operation
- Press the **MOD** key
- Enter the code number **NET123**
- Press the **ENT** key
- Press the **DEFINE NET** soft key
- The control displays the main network configuration screen
- Enter the following information into the columns:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS</td>
<td>Enter the IP address of the control</td>
<td>Four numerical values separated by periods</td>
</tr>
<tr>
<td>MASK</td>
<td>The SUBNET MASK serves to differentiate between the network ID and the host ID in the network.</td>
<td>Four numerical values separated by periods. Ask your network specialist for the values</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>The broadcast address of the control is required only if it differs from the default setting. The default setting is formed from the network ID and the host ID, where all bits are set to 1.</td>
<td></td>
</tr>
<tr>
<td>ROUTER</td>
<td>Internet address of your default router. Enter the Internet address only if your network consists of multiple subnets.</td>
<td>Four numerical values separated by periods. Ask your network specialist for the values</td>
</tr>
<tr>
<td>HOST</td>
<td>Name under which the TNC identifies itself in the network</td>
<td>e.g. iTNC530_machine1</td>
</tr>
<tr>
<td>DOMAIN</td>
<td>Domain name of your company network</td>
<td>If necessary, ask your network specialist</td>
</tr>
<tr>
<td>NAMESERVER</td>
<td>Network address of the domain server</td>
<td>If necessary, ask your network specialist</td>
</tr>
</tbody>
</table>

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
iTNC 530 beginning with software version 34049x-05 (HEROS 4)

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Select the **Programming and Editing** mode of operation
- Press the **MOD** key
- Enter the code number **NET123**
- Press the **ENT** key

- Press the **DEFINE NET** soft key
- The control then displays the pop-up window for the network settings.
- Click the **Configuration** button
- The control then displays the pop-up window for configuring the interface.
- Enter the information from the table below into the pop-up window
- Press the **OK** button

### Setting | Meaning | Input
--- | --- | ---
**Status** | Interface active | Check box must be selected
**Name:** | Name of the interface | (Leave unchanged)
**Plug connection:** | Designation of the connector: X26 | (Leave unchanged)
**IP address** | IP address of the control | Select the **Set the IP address manually** option
**Address:** | Enter the IP address of the control | Four numerical values separated by periods, e.g. 160.1.180.20
**Subnet mask** | The **Subnet mask** serves to differentiate between the network ID and the host ID in the network. Enter the **Subnet mask** | Four numerical values separated by periods, e.g. 255.255.0.0
If necessary, ask your network specialist for the proper value

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
iTNC 530 beginning with software version 60642x-04 (HEROS 5) with HSCI

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Connect the control to the local company network via a network cable
  - Select the Programming and Editing mode of operation
  - Press the MOD key
  - Enter the code number NET123
  - Press the ENT key
  - Press the DEFINE NET soft key
  - The control displays the pop-up window for the network settings.
  - On the Computer name tab, enter the computer name under which the control is displayed in the company network
  - Switch to the Interfaces tab
  - Select the interface (eth0)
  - Click the Configuration button
  - The control then displays the pop-up window for configuring the interface.
  - On the Settings tab of the pop-up window, enter the information from the table below
  - Press the OK button

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td>Name:</td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>Plug connection:</td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Select the Set the IP address manually option</td>
</tr>
<tr>
<td>Address:</td>
<td>Enter the IP address of the control</td>
<td>Four numerical values separated by periods, e.g. 160.1.180.20</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>The Subnet mask serves to differentiate between the network ID and the host ID in the network. Enter the Subnet mask</td>
<td>Four numerical values separated by periods, e.g. 255.255.0.0</td>
</tr>
</tbody>
</table>
The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:

- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

Refer to your machine manual.
The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

**NOTICE**

**Caution: Malfunction!**

If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
TNC 620 software version 34056x (HEROS 4) and TNC 320 software version 34055x (HEROS 4)

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Connect the control to the local company network via a network cable

  - Select the Programming operating mode
  - Press the MOD key
  - Enter the code number NET123
  - Press the OK soft key

  - Press the Program Management key

  - Press the Network soft key

  - Press the Configure Network soft key

  - The control then displays the pop-up window for the network settings.

  - In the Hostname field, enter the computer name under which the control is displayed in the company network

  - Select NO for DHCP support

  - Press the ENT key

  - The control then displays the Network settings pop-up window.

  - Enter the information from the table below into the pop-up window

  - Press the OK button
<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Four numerical values separated by periods, e.g. 160.1.180.20</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>The <strong>Subnet mask</strong> serves to differentiate between the network ID and the host ID in the network. Enter the <strong>Subnet mask</strong></td>
<td>Four numerical values separated by periods, e.g. 255.255.0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, ask your network specialist for the proper value</td>
</tr>
<tr>
<td>Broadcast</td>
<td>The broadcast address of the control is required only if it differs from the default setting. The default setting is formed from the network ID and the host ID, where all bits are set to 1.</td>
<td>e.g. 160.1.255.255</td>
</tr>
<tr>
<td>Router</td>
<td>Internet address of your default router. Enter the Internet address only if your network consists of multiple subnets.</td>
<td>Four numerical values separated by periods, e.g. 160.1.0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, ask your network specialist for the proper value</td>
</tr>
</tbody>
</table>

Changes to the network settings will cause a restart of the control.
**TNC 640 / TNC 620 / TNC 320 / TNC 128 (HEROS 5)**

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Connect the control to the local company network via a network cable
  - Select the **Programming** operating mode
  - Press the **MOD** key
  - Enter the code number **NET123**
  - Press the **OK** soft key
- Press the **Program Management** key
  - Press the **NET** soft key
  - Press the **CONFIGURE NETWORK** soft key
  - The control displays the pop-up window for the network settings.
  - On the **Computer name** tab, enter the computer name under which the control is displayed in the company network
  - Switch to the **Interfaces** tab
  - Select the interface (eth0)
  - Click the **Configuration** button
  - The control then displays the pop-up window for configuring the interface.
  - Enter the information from the table below into the pop-up window
  - Press the **OK** button

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td><strong>Name:</strong></td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td><strong>Plug connection:</strong></td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td><strong>IP address</strong></td>
<td>IP address of the control</td>
<td>Select the <strong>Set the IP address manually</strong> option</td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td>Enter the IP address of the control</td>
<td>Four numerical values separated by periods, e.g. 160.1.180.20</td>
</tr>
<tr>
<td><strong>Subnet mask</strong></td>
<td>The <strong>Subnet mask</strong> serves to differentiate between the network ID and the host ID in the network. Enter the <strong>Subnet mask</strong></td>
<td>Four numerical values separated by periods, e.g. 255.255.0.0 If necessary, ask your network specialist for the proper value</td>
</tr>
</tbody>
</table>
The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:

- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

Refer to your machine manual.
The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

**NOTICE**

**Caution: Malfunction!**
If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface

**Further information:** Conversational Programming
User’s Manual TNC 640 / TNC 620 / TNC 320 / TNC 128
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

To integrate the control into the company network via a fixed IP address, proceed as follows:

- Connect the control to the local company network via a network cable
  - Switch to the **Organization** operating mode
  - Press the Key soft key
  - Enter the code number **NET123**
  - Press the **OK** button
  - Press the **Transfer** soft key
  - Press the **Connections** soft key
  - Press the **Network Config.** soft key
  - The control displays the pop-up window for the network settings.
  - On the **Computer name** tab, enter the computer name under which the control is displayed in the company network
  - Switch to the **Interfaces** tab
  - Select the interface (eth0)
  - Click the **Configuration** button
  - The control then displays the pop-up window for configuring the interface.
  - Enter the information from the table below into the pop-up window
  - Press the **OK** button

### Setting | Meaning | Input
---|---|---
**Status** | Interface active | Check box must be selected
**Name:** | Name of the interface | (Leave unchanged)
**Plug connection:** | Designation of the connector: X26 | (Leave unchanged)
**IP address** | IP address of the control | Select the **Set the IP address manually** option
**Address:** | Enter the IP address of the control | Four numerical values separated by periods, e.g. 160.1.180.20
**Subnet mask** | The **Subnet mask** serves to differentiate between the network ID and the host ID in the network. Enter the **Subnet mask** | Four numerical values separated by periods, e.g. 255.255.0.0
If necessary, ask your network specialist for the proper value
The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:

- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

Refer to your machine manual. The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

**NOTICE**

**Caution: Malfunction!**

If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface

**Further information:** User’s Manual CNC PILOT 640 starting with software version 68894x-04
MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5)

To integrate the control into the company network via a fixed IP address, proceed as follows:

1. Connect the control to the local company network via a network cable.
   - Switch to the **Organization** operating mode.
   - Press the **Key** soft key.
   - Enter the code number **NET123**.
   - Press the **OK** button.
   - Press the **Transfer** soft key.
   - Press the **Connections** soft key.
   - Press the **Network** soft key.
   - The control displays the **Network connection** pop-up window.
   - Press the **Config.** soft key.
   - The control displays the **Network configuration** pop-up window.
   - Enter the information from the table below into the pop-up window.
   - Press the **Save** soft key.
<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control name</td>
<td>Name under which the control is visible in the network</td>
<td>e.g. MANUALplus620</td>
</tr>
<tr>
<td>DHCP</td>
<td>OFF: The control has a fixed IP address in the network.</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>ON: The control automatically obtains the following data from a DHCP server:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- IP address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Subnet mask</td>
<td>Four numerical values separated by periods, e.g. 255.255.255.0</td>
</tr>
<tr>
<td></td>
<td>- Broadcast</td>
<td>Four numerical values separated by periods, e.g. 255.255.255.0</td>
</tr>
<tr>
<td></td>
<td>- Gateway</td>
<td>Four numerical values separated by periods, e.g. 192.168.000.254</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Four numerical values separated by periods, e.g. 192.168.000.000</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>The Subnet mask serves to differentiate between the network ID and the host ID in the network. Enter the Subnet mask</td>
<td>Four numerical values separated by periods, e.g. 255.255.255.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, ask your network specialist for the proper value</td>
</tr>
<tr>
<td>Broadcast</td>
<td>The broadcast address of the control is required only if it differs from the default setting. The default setting is formed from the network ID and the host ID, where all bits are set to 1.</td>
<td>Four numerical values separated by periods, e.g. 255.255.255.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, ask your network specialist for the proper value</td>
</tr>
<tr>
<td>Gateway</td>
<td>The IP address of the default gateway only needs to be entered if you are using more than one network.</td>
<td>Four numerical values separated by periods, e.g. 192.168.000.254</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If necessary, ask your network specialist for the proper value</td>
</tr>
</tbody>
</table>

**Further information:** User’s Manual MANUALplus 620 starting with software versions 548328-05 and 54843x-01
Network integration via DHCP

In large networks, clients are usually connected to the network via DHCP.

DHCP stands for Dynamic Host Configuration Protocol.

DHCP is a communication protocol or Internet protocol used by servers to assign the network configuration to clients. The clients automatically obtain IP addresses and other parameters from a DHCP server.

A client is a terminal device that requests services from a server via a network.

A network with more clients than available IP addresses can, by using the DHCP connection, manage with fewer IP addresses, since not all clients are logged-on at the same time. This prevents IP addresses from being blocked by clients that are not logged on. The available IP addresses are assigned dynamically to the clients logged on to the network.

The DHCP connection is an FCL 2 function.
iTNC 530 starting with software version 34049x-04 (HEROS 4)

To integrate the control into the company network via DCHP, proceed as follows:

- Select the Programming and Editing mode of operation
- Press the MOD key
- Enter the code number NET123
- Press the ENT key
- Press the DEFINE NET soft key
- The control displays the main network configuration screen
- Enter the following information into the columns:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS</td>
<td>The control obtains the IP address from a DHCP server.</td>
<td>DHCP</td>
</tr>
<tr>
<td>MASK</td>
<td>The control obtains the SUBNET MASK from a DHCP server.</td>
<td>(Leave blank)</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>The control obtains the broadcast address from a DHCP server.</td>
<td>(Leave blank)</td>
</tr>
<tr>
<td>ROUTER</td>
<td>Internet address of your default router</td>
<td>Enter the Internet address only if your network consists of multiple subnets.</td>
</tr>
<tr>
<td>HOST</td>
<td>Name under which the TNC identifies itself in the network</td>
<td>Enter the computer name</td>
</tr>
<tr>
<td>DOMAIN</td>
<td>Domain name of your company network</td>
<td>DHCP</td>
</tr>
<tr>
<td>NAME SERVER</td>
<td>Dynamic assignment of the domain server address</td>
<td>(Leave blank)</td>
</tr>
</tbody>
</table>

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
iTNC 530 starting with software version 34049x-05 (HEROS 4)

To integrate the control into the company network via DCHP, proceed as follows:

- Select the **Programming and Editing** mode of operation
- Press the **MOD** key
- Enter the code number **NET123**
- Press the **ENT** key
- Press the **DEFINE NET** soft key
- The control displays the pop-up window for the network settings.
- On the **Computer name** tab, enter the computer name under which the control is displayed in the company network
- Select the **Interfaces** tab and click the **Configuration** button
- The control then displays the pop-up window for configuring the interface.
- Enter the following information into the pop-up window:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td>Name:</td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>Plug connection:</td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Select the <strong>Automatically procure IP address (DHCP)</strong> option</td>
</tr>
<tr>
<td>Address:</td>
<td>The control automatically obtains the IP address from a DHCP server.</td>
<td></td>
</tr>
<tr>
<td>Subnet mask:</td>
<td>The control automatically obtains the subnet mask from a DHCP server.</td>
<td></td>
</tr>
</tbody>
</table>

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
iTNC 530 starting with software version 60642x-04 (HEROS 5) with HSCI

To integrate the control into the company network via DCHP, proceed as follows:

- Connect the control to the local company network via a network cable
  - Select the Programming and Editing mode of operation
  - Press the MOD key
  - Enter the code number NET123
  - Press the ENT key
  - Press the DEFINE NET soft key
  - The control displays the pop-up window for the network settings.
  - On the Computer name tab, enter the computer name under which the control is displayed in the company network
  - Switch to the Interfaces tab
  - Select the interface (eth0)
  - Click the Configuration button
  - The control then displays the pop-up window for configuring the interface.
  - On the Settings tab of the pop-up window, enter the following information:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td>Name:</td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>Plug connection:</td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Select the Automatically procure IP address(DHCP) option</td>
</tr>
<tr>
<td>Address:</td>
<td>The control automatically obtains the IP address from a DHCP server.</td>
<td></td>
</tr>
</tbody>
</table>
### Setting | Meaning | Input
--- | --- | ---
**Subnet mask:** | The subnet mask serves to differentiate between the network ID and the host ID in the network. The control automatically obtains the subnet mask. | **Domain Name Server (DNS)**

- **Automatically procure DNS option:** The TNC automatically obtains the IP address of the domain name server.
- **Manually configure the DNS option:** Manually enter the IP address of the server and the domain name.

- **Default gateway**

- **Automatically procure default gateway option:** The TNC automatically obtains the IP address of the default gateway.
- **Manually configure the default gateway option:** Manually enter the IP address of the default gateway.

- Apply the changes with the **OK** button, or discard them with the **Cancel** button.

The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:

- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

**NOTICE**

**Caution: Malfunction!**

If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface

---

- Refer to your machine manual. The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

---

**Further information:** HEIDENHAIN Conversational Programming User’s Manual for iTNC 530
TNC 640 / TNC 620 / TNC 320 / TNC 128

To integrate the control into the company network via DHCP, proceed as follows:

- Connect the control to the local company network via a network cable
- Select the **Programming** operating mode
- Press the **MOD** key
- Enter code number **NET123**
- Press the **OK** soft key
- Press the **Program Management** key
- Press the **NET** soft key
- Press the **Configure Network** soft key
- The control displays the Network configuration pop-up window.
- On the **Computer name** tab, enter the computer name under which the control is displayed in the company network
- Switch to the **Interfaces** tab
- Select the interface (eth0)
- Click the **Configuration** button
- The control then displays the pop-up window for configuring the interface.
- Enter the following information in the pop-up window:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td>Name:</td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>Plug connection:</td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the control</td>
<td>Select the <strong>Automatically procure IP address (DHCP)</strong> option</td>
</tr>
<tr>
<td>Address:</td>
<td>The control automatically obtains the IP address from a DHCP server.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Network configuration pop-up window:**

- **Computer name** tab: Enter the computer name under which the control is displayed in the company network.
- **Interfaces** tab: Select the interface (eth0). Configure the interface using the **Configuration** button.
- **Configure Network** soft key: Press to access the configuration pop-up window.
### Setting | Meaning | Input
--- | --- | ---
Subnet mask: | The subnet mask serves to differentiate between the network ID and the host ID in the network. The control automatically obtains the subnet mask. |  
Domain Name Server (DNS) | **Automatically procure DNS** option: The TNC automatically obtains the IP address of the domain name server. **Manually configure the DNS** option: Manually enter the IP address of the server and the domain name. |  
Default gateway | **Automatically procure default gateway** option: The TNC automatically obtains the default gateway. **Manually configure the default gateway** option: Manually enter the IP address of the default gateway. |  

- Apply the changes with the **OK** button, or discard them with the **Cancel** button.

The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:
- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

---

**NOTICE**

**Caution: Malfunction!**

If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface.

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**Further information:** Conversational Programming
User’s Manual TNC 640 / TNC 620 / TNC 320 / TNC 128 as of software version 34059x-06
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

To integrate the control into the company network via DCHP, proceed as follows:

- Connect the control to the local company network via a network cable
- Switch to the **Organization** operating mode
- Press the Key soft key
- Enter the code number **NET123**
- Press the **OK** button
- Press the **Transfer** soft key
- Press the **Connections** soft key
- Press the **Network Config.** soft key
- The control displays the pop-up window for the network settings.
- On the **Computer name** tab, enter the computer name under which the control is displayed in the company network
- Switch to the **Interfaces** tab
- Select the interface (eth0)
- Click the **Configuration** button
- The control then displays the pop-up window for configuring the interface.
- Enter the following information into the pop-up window:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td>Interface active</td>
<td>Check box must be selected</td>
</tr>
<tr>
<td>Name:</td>
<td>Name of the interface</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td>Plug connection:</td>
<td>Designation of the connector: X26</td>
<td>(Leave unchanged)</td>
</tr>
<tr>
<td><strong>IP address</strong></td>
<td>IP address of the control</td>
<td>Select the <strong>Automatically procure IP address(DHCP)</strong> option</td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td>The control automatically obtains the IP address from a DHCP server.</td>
<td></td>
</tr>
<tr>
<td><strong>Subnet mask:</strong></td>
<td>The subnet mask serves to differentiate between the network ID and the host ID in the network. The control automatically obtains the subnet mask.</td>
<td></td>
</tr>
</tbody>
</table>

- Apply the changes with the **OK** button, or discard them with the **Cancel** button
The control can have two network interfaces. Each network interface has its own IP address.

If two network interfaces exist, HEIDENHAIN controls preassign them as follows:

- X26 for connection to the local company network (connection to StateMonitor)
- X116 for the machine’s internal use only

Refer to your machine manual. The machine tool builder may define a different assignment of network interfaces than that predefined by HEIDENHAIN.

**NOTICE**

Caution: Malfunction!

If you change the IP address of the machine’s internal interface, then you interrupt the communication to other machine components and cause the control to malfunction.

- Do not change the settings for the machine’s internally used interface

Further information: User’s Manual CNC PILOT 640 starting with software version 68894x-04
MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5)

To integrate the control into the company network via DCHP, proceed as follows:

1. Connect the control to the local company network via a network cable

2. Switch to the Organization operating mode

3. Press the Key soft key

4. Enter the code number NET123

5. Press the OK button

6. Press the Transfer soft key

7. Press the Connections soft key

8. Press the Network soft key

9. The control displays the Network connection pop-up window.

10. Press the Config. soft key

11. The control displays the Network configuration pop-up window.

12. Enter the information from the table below into the pop-up window

13. Press the Save soft key

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control name</td>
<td>Name under which the control is visible in the network</td>
<td>e.g. MANUALplus620</td>
</tr>
<tr>
<td>DHCP</td>
<td>OFF: The control has a fixed IP address in the network. ON: The control automatically obtains the following data from a DHCP server:</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>- IP address</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Subnet mask</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Broadcast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Gateway</td>
<td></td>
</tr>
</tbody>
</table>

Further information: User’s Manual MANUALplus 620 starting with software versions 548328-05 and 54843x-01
Machine parameters
12.1 Control-specific machine parameters

StateMonitor supports both the connection to HEIDENHAIN controls and to third-party controls.

When creating a new machine in StateMonitor, make sure to set the machine parameters required for the connection under Machine-specific settings. The available parameters depend on the type of control selected.

Further information: “Create machine”, Page 111
12.2 Parameters for HEIDENHAIN controls

Machine controls
You can use StateMonitor with the following HEIDENHAIN controls:

<table>
<thead>
<tr>
<th>Control</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>iTNC 530</td>
<td>34049x-03</td>
</tr>
<tr>
<td>TNC 640</td>
<td>34059x-01</td>
</tr>
<tr>
<td>TNC 620</td>
<td>34056x-01</td>
</tr>
<tr>
<td>TNC 320</td>
<td>340551-03</td>
</tr>
<tr>
<td>TNC 128</td>
<td>771841-01</td>
</tr>
<tr>
<td>CNC PILOT 620</td>
<td>688945-01</td>
</tr>
<tr>
<td>CNC PILOT 640</td>
<td>68894x-01</td>
</tr>
<tr>
<td>MANUAL Plus 620</td>
<td>548328-05</td>
</tr>
</tbody>
</table>

When creating a new machine with a HEIDENHAIN control, you can set the following machine parameters under Machine-specific settings:

- PLC password
- Override acquisition (only with iTNC 530)
Settings for PLC password
As its name suggests, the PLC password is required for access to the PLC: If you allow PLC access, StateMonitor reads the status of the rapid-traverse override and can distinguish between NC blocks with feed rate and NC blocks with rapid traverse.

If you allow PLC access, the Program analysis chart will include the FMAX status bar.

Further information: "Program analysis chart", Page 71

StateMonitor has only read access to the PLC as it is supposed to evaluate machine data.

If you select a control other than iTNC 530 under Type, the following PLC password options are available under Machine-specific settings:

<table>
<thead>
<tr>
<th>Option</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC Standard</td>
<td>The PLC is protected by the default PLC password</td>
</tr>
<tr>
<td></td>
<td>Access occurs automatically</td>
</tr>
<tr>
<td>No PLC</td>
<td>No access to the PLC</td>
</tr>
</tbody>
</table>

If the machine tool builder uses a PLC password of the day, then select No PLC.

OEM PLC
The machine tool builder defined a custom PLC password (not for iTNC 530)
If you need that password, contact the machine tool builder and enter the password in the input field

PLC Standard or OEM PLC options
If you select PLC Standard or OEM PLC, then StateMonitor will differentiate between the following options when displaying the machine statuses during execution of the current block:
- NC block with feed rate
- NC block with rapid traverse
**NC block with feed rate is active**

If an NC block with feed rate is active, then the display of the machine status is independent of the rapid-traverse override setting.

StateMonitor shows a yellow machine status if the feed-rate override = 0%. The machine status becomes light green if the feed-rate override > 0% and < 100%. If the feed-rate override is ≥ 100%, then the machine status becomes dark green.

**Rapid-traverse override**

<table>
<thead>
<tr>
<th>FMAX</th>
<th>Feed-rate override F = 0%</th>
<th>Feed-rate override 0% &lt; F &lt; 100%</th>
<th>Feed-rate override F ≥ 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMAX = 0%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Dark green</td>
</tr>
<tr>
<td>0% &lt; FMAX &lt; 100%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Dark green</td>
</tr>
<tr>
<td>FMAX ≥ 100%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Dark green</td>
</tr>
</tbody>
</table>

**NC block with rapid traverse is active**

If an NC block with rapid traverse is active, then the display of the machine status is independent of the feed-rate override setting.

StateMonitor shows a yellow machine status if the rapid-traverse override = 0%. The machine status becomes light green if the rapid-traverse override > 0% and < 100%. If the rapid-traverse override is ≥ 100%, then the machine status becomes dark green.

**Rapid-traverse override**

<table>
<thead>
<tr>
<th>FMAX</th>
<th>Feed-rate override F = 0%</th>
<th>Feed-rate override 0% &lt; F &lt; 100%</th>
<th>Feed-rate override F ≥ 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMAX = 0%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Yellow</td>
<td>Machine status: Yellow</td>
</tr>
<tr>
<td>0% &lt; FMAX &lt; 100%</td>
<td>Machine status: Light green</td>
<td>Machine status: Light green</td>
<td>Machine status: Light green</td>
</tr>
<tr>
<td>FMAX ≥ 100%</td>
<td>Machine status: Dark green</td>
<td>Machine status: Dark green</td>
<td>Machine status: Dark green</td>
</tr>
</tbody>
</table>
No PLC option

If you select the No PLC option, StateMonitor displays the machine statuses as follows:

- The machine status is yellow if the feed-rate override in Program Run, Full Sequence operating mode = 0 %
- The machine status is light green if the feed-rate override > 0%
- The machine status is dark green if the overrides for feed rate and rapid traverse are ≥ 100%.

Example:
An NC block with FMAX is active; override for rapid traverse = 0% and override for feed rate > 0%. Although the machine is at standstill in this case, StateMonitor nevertheless displays a green machine status.

The table below shows which combinations of feed-rate override and rapid-traverse override lead to which machine status:

<table>
<thead>
<tr>
<th>Rapid-traverse override</th>
<th>Feed-rate override F = 0%</th>
<th>Feed-rate override 0 % &lt; F &lt; 100%</th>
<th>Feed-rate override F ≥ 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMAX = 0 %</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Light green</td>
</tr>
<tr>
<td>0% &lt; FMAX &lt; 100%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Light green</td>
</tr>
<tr>
<td>FMAX ≥ 100%</td>
<td>Machine status: Yellow</td>
<td>Machine status: Light green</td>
<td>Machine status: Dark green</td>
</tr>
</tbody>
</table>

Settings for Override acquisition (only with iTNC 530)

If you select the control iTNC 530 under Type, the following Override acquisition options are available under Machine-specific settings:

<table>
<thead>
<tr>
<th>Option</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard HEIDEN-</td>
<td>Select as default when creating a machine for the first time</td>
</tr>
<tr>
<td>HAIN DNC</td>
<td></td>
</tr>
<tr>
<td>Import of PLC</td>
<td>Only select this setting if the Override settings of the machine are</td>
</tr>
<tr>
<td>words</td>
<td>not correctly displayed in StateMonitor</td>
</tr>
</tbody>
</table>
### 12.3 Parameters for other controls

Depending on your software option, you can use the following interfaces to integrate StateMonitor with other controls:

<table>
<thead>
<tr>
<th>Interface</th>
<th>As of software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus</td>
<td>Connect/Read</td>
</tr>
<tr>
<td>OPC UA</td>
<td>1.02.x</td>
</tr>
<tr>
<td>MTConnect</td>
<td>1.2</td>
</tr>
</tbody>
</table>

When connecting a different control, you need to manually assign the control signals to each machine status. For this purpose, you can use a corresponding definition table in StateMonitor.

When creating a new machine, make sure to set up this definition table with the corresponding parameters under **Machine-specific settings**.

**Communication**

StateMonitor will periodically poll the control signals coming from third-party controls. The polling period duration is 1 second.

**Signal parameters**

> Despite the fact that the Modbus, OPC UA, and MTConnect standards use open standards, there are many differences between the supported controls. For information on addresses, comparison values, and data types, please refer to the documentation supplied by the control or machine manufacturer.

The signal parameters evaluated by StateMonitor are identical for all non-HEIDENHAIN controls. Based on the transferred signal parameters, StateMonitor creates a status model for the respective machine.
### Basic signal parameters for the status model:

<table>
<thead>
<tr>
<th>Signal parameters</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program running (PGM STARTED / PGM RUNNING)</td>
<td>Program has been started or is running</td>
</tr>
<tr>
<td>Program interrupted by error (ERROR)</td>
<td>An error occurred or is pending. If no Program interrupted by user (PGM CANCELED) is defined, Program interrupted by error (ERROR) will terminate the current program. This triggers the Interrupted by error message counter and generates a notification.</td>
</tr>
<tr>
<td>Program successfully completed (PGM COMPLETED / END PGM)</td>
<td>Program execution has been completed successfully. This triggers the Fully executed program counter and generates a notification.</td>
</tr>
</tbody>
</table>

These three signal parameters must always be defined in order to support basic functionality such as the status lights and a basic machine status bar.

### Additional signal parameters for the status model:

<table>
<thead>
<tr>
<th>Signal parameters</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program stopped (PGM STOPPED)</td>
<td>Program execution has been interrupted, but the program remains active and can be resumed</td>
</tr>
<tr>
<td>Program interrupted by user (PGM CANCELED)</td>
<td>Program execution has been aborted, the program cannot be resumed. This triggers the program counter and generates the Program interrupted by user notification.</td>
</tr>
<tr>
<td>Error acknowledged (ERROR CLEARED)</td>
<td>An error triggered with Program interrupted by error (ERROR) has been acknowledged. The program status changes to Interrupted. The program can be resumed with Program running (PGM STARTED / PGM RUNNING) or aborted with Program interrupted by user (PGM CANCELED)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rapid traverse override setting in % (0 to 100)</th>
<th>Value in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed rate override setting in % (0 to 150)</td>
<td>Value in %</td>
</tr>
<tr>
<td>Spindle override setting in % (0 to 150)</td>
<td>Value in %</td>
</tr>
</tbody>
</table>
### Rapid traverse (FMAX) active
This value specifies whether, for status determination in a running program, the rapid-traverse override (FMAX = false) or the feed rate (FMAX = true) is evaluated.

<table>
<thead>
<tr>
<th>Operating mode:</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic</td>
<td>This value is evaluated in the detail view only</td>
</tr>
<tr>
<td>Manual</td>
<td>This value is evaluated in the detail view only</td>
</tr>
<tr>
<td>Handwheel</td>
<td>This value is evaluated in the detail view only</td>
</tr>
</tbody>
</table>

### Program name or number
This value can be evaluated in the program run times view. When changing to another program and restarting, the program counters for the current program will be reset to 0. If this parameter is not active, the default value will be “Program”.

For each signal, the following information is required:

- **(Memory) address**
  Using this address, the StateMonitor interface can access the corresponding value.

  For Modbus controls, you also need to specify the address type. It indicates the control’s address space that holds the memory address.

- **Signal data type**
  The data type determines, among others, how the values will be compared. StateMonitor distinguishes between value parameters (Text (string) and Number (number) data types) and Boolean parameters (Boolean value (0 or 1) data type).

- **Comparison value**
  Comparison values are required for signals that go directly into the control’s status model. Exceptions are numerical values such as override settings or texts such as program names that need not be compared.
Validation
Once you save the definition table under **Machine-specific settings** by clicking the **Set up machine** button, the entries will be validated. This ensures that no typos etc. invalidate the assignment.

An error message will be displayed in the following cases:

- An address entry is missing (Boolean parameters and value parameters)
- **Boolean parameters**
  - Two Boolean values have the same address
  - Two signal parameters have the same data type, the same address, and the same value
- **Value parameters**
  - Signal parameters of the **Text (string) or Number (number)** data type have no value
  - Two signal parameters have the same address
12.4 Modbus connection parameters

Connection
In the definition table, you can set the following connection parameters for Modbus:

- **Port**
  Number of the network port over which the Modbus control can be reached.

  Please refer to the documentation supplied by the control or machine manufacturer.

- **SIK:**
  Manual input

- **NC software**
  Manual input

Addressing
For Modbus, enter the address as a numerical value. The address consists of the following items:

- The address type specifies the selected memory area (address space)
- The address itself indicates the position in the selected memory area from which the value is to be read
- The data type indicates the format of the value and thus how many bits will be read and processed

For the **COIL_OUTPUT** and **DIGITAL_INPUT** address types, usually Boolean values (0, 1) are entered.
12.5 Example for connecting a control via Modbus

Read-out of the signals
For Modbus controls, StateMonitor is able to read out the signals directly at the control’s input terminals. Between the analog inputs, usually a voltage between 0V and 10V is measured. For override values, the control must convert the voltage to a numerical value between 0 and 150. The result of this conversion can be read out from an address in the flag memory.

The following signals are present at the input terminals:

<table>
<thead>
<tr>
<th>Type</th>
<th>Address</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital input</td>
<td>1</td>
<td>Machine is running</td>
</tr>
<tr>
<td>Digital input</td>
<td>2</td>
<td>Task interrupted by an error</td>
</tr>
<tr>
<td>Digital input</td>
<td>3</td>
<td>Task successfully completed</td>
</tr>
<tr>
<td>Digital input</td>
<td>4</td>
<td>Machine stopped</td>
</tr>
<tr>
<td>Analog input</td>
<td>23</td>
<td>Feed rate potentiometer</td>
</tr>
<tr>
<td>Analog input</td>
<td>25</td>
<td>Spindle potentiometer</td>
</tr>
</tbody>
</table>

Addresses in flag memory

<table>
<thead>
<tr>
<th>Type</th>
<th>Address</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed-rate override</td>
<td>42</td>
<td>Converted value for feed-rate override</td>
</tr>
<tr>
<td>Spindle override</td>
<td>43</td>
<td>Converted value for spindle override</td>
</tr>
</tbody>
</table>

Status model

The following table shows a status model for a control connected via Modbus:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Address type</th>
<th>Data type</th>
<th>Address</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program running (PGM STARTED / PGM RUNNING)</td>
<td>DIGITAL_INPUT</td>
<td>BIT</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Program interrupted by error (ERROR)</td>
<td>DIGITAL_INPUT</td>
<td>BIT</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Program successfully completed (PGM COMPLETED / END PGM)</td>
<td>DIGITAL_INPUT</td>
<td>BIT</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Program stopped (PGM STOPPED)</td>
<td>DIGITAL_INPUT</td>
<td>BIT</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Feed rate override setting in % (0 to 150)</td>
<td>HOLDING_REGISTER</td>
<td>INT_16</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Spindle override setting in % (0 to 150)</td>
<td>HOLDING_REGISTER</td>
<td>INT_16</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>
12.6 OPC UA connection parameters

Connection
In the definition table, you can set the following connection parameters for OPC UA:

- **Port**
  Number of the network port over which the OPC UA server on the machine can be reached.

  Please refer to the documentation supplied by the control or machine manufacturer.

- **Default Namespace**
  Defines the default namespace to be used for the address

- **Security Mode**
  Manual input of the authentication data, depends on the server

- **User**
  Manual input of the authentication data

- **Password**
  Manual input of the authentication data

- **SIK:**
  Manual input

- **NC software**
  Manual input

Addressing
For OPC UA, the address consists of a namespace and the actual address.

You can define a separate **Namespace** parameter for each signal parameter. If you do not enter a specific value, StateMonitor uses the value under **Default Namespace** for the namespace.
12.7 MTConnect connection parameters

Connection
In the definition table, you can set the following connection parameters for MTConnect:

- **Port**
  Number of the network port over which the MTConnect service of the control can be reached.
  Please refer to the documentation supplied by the control or machine manufacturer.

- **Prefix (http or https)**
  Defines whether the control provides encrypted machine data or not. For an encrypted connection, enter "https"

- **DeviceStream name**
  Unique identifier used to find correct machine data among the XML files. With MTConnect, you can transmit information for multiple machines in a single request. Therefore, a unique identifier is required for distinction.
  StateMonitor supports MT Connect schemas as of version 1.2.

- **SIK:**
  Manual input

- **NC software**
  Manual input

Test
After entering the data for **IP address / DHCP**, **Port**, and **Prefix (http or https)**, you can test the connection by clicking the **Current-Request** button.

If the connection parameters are correct, StateMonitor opens a new tab in the web browser that shows the XML data reported by MTConnect.
12.8 Example for connecting a control via MTConnect

Provision of the machine parameters
For testing, the company MAZAK offers to provide a server that can be used to test MTConnect connections to a machine. For more details, please refer to http://mtconnect.mazakcorp.com. Based on this test server, the provision of machine parameters for MTConnect is shown.

Under the test server URL, there are two relevant addresses:
- Assignment of MTConnect data types to addresses:
  http://mtconnect.mazakcorp.com:5611/probe
- Current values in the control:
  http://mtconnect.mazakcorp.com:5611/current

To map status information, MTConnect uses the EVENT data type that is subdivided into further subtypes. The EXECUTION subtype maps the program execution status, the operating modes are included in the CONTROLLER_MODE subtype. By default, certain values are predefined for both types.

Values for the EXECUTION subtype (program execution):
- READY
- ACTIVE
- INTERRUPTED
- FEED_HOLD
- STOPPED
- OPTIONAL_STOP
- PROGRAM_STOPPED
- PROGRAM_COMPLETED

Values for the CONTROLLER_MODE subtype (operating modes):
- AUTOMATIC
- MANUAL
- MANUAL_DATA_INPUT
- SEMI_AUTOMATIC
- EDIT

In the XML file available at http://mtconnect.mazakcorp.com:5611/probe, you can find out how the addresses of these types are defined on the control.

By searching for the string "execution" in the XML file, you can find the following variable definition:
<DataItem category="EVENT" id="exec" name="execution" type="EXECUTION"/>

This defines a variable of the EXECUTION type with the address exec. The operating modes are defined here as follows:
<DataItem category="EVENT" id="mode" name="mode" type="CONTROLLER_MODE"/>

This information can be used to derive the status model. The parameters for the program name and the override setting can be found in the same way. For the program name, the PROGRAM data type has been defined.

When searching for "program" in the XML file, you will find two definitions of this data type:
<DataItem category="EVENT" id="pgm" name="program" type="PROGRAM"/>
<DataItem category="EVENT" id="spgm" name="subprogram" subType="x:SUB" type="PROGRAM"/>
From the name, you can see that in the first case, the definition refers to the actual program name and in the second case, to the name of the subprogram. In this example, the parameter with the ID \textit{pgm} is used.

For the feed rate potentiometers, the \texttt{PATH\_FEEDRATE\_OVERRIDE} data type with the \texttt{RAPID} and \texttt{PROGRAMMED} subtypes is defined for rapid traverse and feed rate. For spindle override, the \texttt{ROTARY\_VELOCITY\_OVERRIDE} data type is used.

\textbf{Identifiers for machine data}

With MTConnect, you can transmit information for multiple machines in a single request. For this reason, a unique machine data identifier is required. The corresponding values can be found in the XML data that is accessible as follows:

- By clicking the \textbf{Current-Request} button after having specified the IP address / DHCP, Port, and Prefix (http or https)
- By entering the following address directly in the address line of your web browser: http:\textbackslash IP address / DHCP:Port\textbackslash current

If the connection parameters are correct, StateMonitor opens a new tab in the web browser that shows the XML data reported by MTConnect.

By searching for "DeviceStream", you will find an entry similar to the following:

\begin{verbatim}
<DeviceStream name="CUT" uuid="002">
\end{verbatim}

The \texttt{name} attribute of the \texttt{DeviceStream} item indicates which machine data will be queried on the MTConnect server.

\textbf{Status model}

The following table shows a status model for a control connected via MTConnect.

\begin{table}[H]
\centering
\begin{tabular}{|l|l|l|l|}
\hline
\textbf{Parameter} & \textbf{Data type} & \textbf{Address} & \textbf{Value} \\
\hline
Program running (PGM STARTED / PGM RUNNING) & Text & exec & ACTIVE \\
\hline
Program interrupted by error (ERROR) & Text & exec & INTERRUPTED \\
\hline
Program successfully completed (PGM COMPLETED / END PGM) & Text & exec & PROGRAM\_COMPLETED \\
\hline
Program stopped (PGM STOPPED) & Text & exec & PROGRAM\_STOPPED \\
\hline
Program interrupted by user (PGM CANCELED) & Text & exec & OPTIONAL\_STOP \\
\hline
Rapid traverse override setting in \% (0 to 100) & Number & pfr & \\
\hline
Feed rate override setting in \% (0 to 150) & Number & pfo & \\
\hline
Spindle override setting in \% (0 to 150) & Number & sovr & \\
\hline
Operating mode: Automatic & Text & mode & AUTOMATIC \\
\hline
Operating mode: Manual & Text & mode & MANUAL \\
\hline
Program name or number & Text & pgm & \\
\hline
\end{tabular}
\end{table}
Help, tips and tricks
13.1 Special cases

On some controls, certain software versions may lead to special cases or conditions.

<table>
<thead>
<tr>
<th>Control</th>
<th>Software version</th>
<th>Special feature</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>iTNC 530</td>
<td>340492-06, 340492-07</td>
<td>The override settings of the machine are not transmitted in detail to StateMonitor. StateMonitor always shows the Productive machine status in light green, no matter whether the feed-rate override is larger than or equal to 100% or less.</td>
<td>Tick the box next to Import of PLC words in the Settings menu, Machines submenu, Machine-specific settings</td>
</tr>
<tr>
<td>TNC 620</td>
<td>340560-01 to 340560-04</td>
<td>The operating modes are not displayed correctly in StateMonitor</td>
<td>Update the control software to version 340560-05</td>
</tr>
</tbody>
</table>
13.2 Any questions?

If you have any questions on the installation or operation of StateMonitor:

▶ First read the installation and operating instructions for the software

▶ Contact the HEIDENHAIN NC programming helpline:
  ▪ Per e-mail at: service.nc-pgm@heidenhain.de
  ▪ By phone at: +49 8669 31-3103