



HEIDENHAIN



HEIDENHAIN StateMonitor

Operating Instructions

English (en)
03/2020

Fundamentals

About this manual

These Operating Instructions are for StateMonitor Version 1.3.x.

Would you like any changes, or have you found any errors?

We continuously strive 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:

Format	Meaning
▶ ...	Identifies an action Example: ▶ Click the STORE button
> ...	Identifies the result of an action Example: > StateMonitor lists all defined users in a table.
■ ...	Identifies an item of a list Example: Error groups: <ul style="list-style-type: none"> ■ Machining ■ Programming ■ PLC ■ General information
Bold	Identifies <ul style="list-style-type: none"> ■ 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.

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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.

Table of contents

1	Safety and data protection.....	15
2	Installation.....	21
3	General usage information.....	37
4	Home menu.....	49
5	Machines menu.....	53
6	Messenger menu.....	89
7	Jobs menu.....	101
8	Maintenance menu.....	111
9	Evaluations menu.....	131
10	Settings menu.....	147
11	Software options and licenses.....	187
12	Network integration.....	193
13	Machine parameters.....	223
14	Help, tips and tricks.....	241

1	Safety and data protection.....	15
1.1	Intended use.....	17
1.2	Data security.....	18
1.3	Network connection security.....	19
2	Installation.....	21
2.1	Requirements.....	22
2.2	Installation.....	24
2.3	File structures.....	25
2.4	Uninstalling.....	26
2.5	Licensing.....	27
	Activation.....	28
2.6	Starting and ending.....	29
2.7	ControlCenter.....	32
3	General usage information.....	37
3.1	Target group.....	38
3.2	Opening and closing.....	39
3.3	Login / Logout.....	41
3.4	Password.....	42
3.5	General settings.....	43
3.6	Overview of the menus.....	44
3.7	Functions in tables and charts.....	46
3.8	Extending the functionality with software options.....	47
4	Home menu.....	49
4.1	Home menu.....	50
4.2	Login / Logout.....	51

5	Machines menu.....	53
5.1	Machines menu.....	54
5.2	Tile view submenu.....	55
5.3	Status overview submenu.....	57
5.4	Day view submenu.....	58
5.5	Overview of machine statuses.....	59
5.6	Machine status.....	61
	Displaying the live image.....	62
	Override settings.....	62
	Mode of operation.....	63
	Program status.....	64
	Current job (software option).....	65
	Active messenger status.....	65
	Program statistics.....	66
	Machine messages.....	66
	Maintenance status (software option).....	67
	Machine statuses.....	67
5.7	Edit machine statuses submenu.....	69
5.8	FN38: Edit machine statuses.....	73
5.9	Job terminal submenu (software option).....	75
5.10	Detailed view of the last 3 days submenu.....	79
5.11	Machine alarms submenu.....	80
5.12	Program run times submenu.....	82
5.13	Maintenance & malfunction submenu (software option).....	84
6	Messenger menu.....	89
6.1	Messenger menu.....	90
6.2	Event configurator submenu.....	91
6.3	Notification profiles submenu.....	95
6.4	Notifications submenu.....	97
6.5	FN38: Sending messages from the NC program.....	99

7	Jobs menu	101
7.1	Jobs menu (software option)	102
7.2	Create job submenu (software option)	103
7.3	Assign job submenu (software option)	105
7.4	Adjust machining sequence submenu (software option)	106
7.5	FN38: Job functions in the NC program	107
8	Maintenance menu	111
8.1	Maintenance menu (software option)	112
8.2	Tile view submenu (software option)	113
8.3	Status overview submenu (software option)	115
8.4	Maintenance terminal submenu (software option)	119
8.5	Create maintenance step submenu (software option)	123
8.6	Create maintenance submenu (software option)	126
9	Evaluations menu	131
9.1	Evaluations menu	132
9.2	Machine statuses submenu	134
9.3	Key figures submenu	136
	Availability	137
	Utilization rate	138
9.4	Program run times submenu	139
9.5	Machine reports submenu	140
9.6	Job times submenu (software option)	141
9.7	Signals submenu (software option)	142
9.8	Maintenances submenu (software option)	143
9.9	Time filter submenu	144

10 Settings menu.....	147
10.1 Settings menu.....	148
10.2 User settings submenu.....	149
10.3 User management submenu.....	150
10.4 Machines submenuMachines.....	154
Create machine.....	154
Edit machine.....	158
Deleting machines.....	162
10.5 Add groups submenu.....	163
10.6 Machine mapping submenu.....	165
10.7 Statuses submenu.....	166
10.8 Messenger settings submenu.....	169
10.9 File backup submenu.....	171
10.10 External reporting DB submenu.....	175
Tables.....	177
Table structures.....	178
10.11 Advanced submenu.....	184
10.12 Info submenu.....	185
11 Software options and licenses.....	187
11.1 Software options and licenses.....	188
11.2 Requesting a license.....	189
11.3 Enabling the license.....	190
Enabling the license (online).....	190
Enabling the license (Offline).....	191
12 Network integration.....	193
12.1 Precautions during enabling and network integration.....	194
12.2 SIK menu.....	195
12.3 Enabling Option 18.....	197
12.4 Network integration.....	199
Network integration using fixed IP addresses.....	199

iTNC 530 beginning with software version 34049x-04 (HEROS 4).....	200
iTNC 530 beginning with software version 34049x-05 (HEROS 4).....	201
iTNC 530 beginning with software version 60642x-04 (HEROS 5) with HSCI.....	202
TNC 620 software version 34056x (HEROS 4) and TNC 320 software version 34055x (HEROS 4).....	204
TNC 640 / TNC 620 / TNC 320 / TNC 128 (HEROS 5).....	206
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5).....	208
MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5).....	210
Network integration via DHCP.....	212
iTNC 530 starting with software version 34049x-04 (HEROS 4).....	213
iTNC 530 starting with software version 34049x-05 (HEROS 4).....	214
iTNC 530 starting with software version 60642x-04 (HEROS 5) with HSCI.....	215
TNC 640 / TNC 620 / TNC 320 / TNC 128.....	217
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5).....	219
MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5).....	221

13 Machine parameters.....223

13.1 Control-specific machine parameters.....	224
--	------------

13.2 Parameters for HEIDENHAIN controls.....	225
---	------------

13.3 Parameters for other controls.....	230
--	------------

13.4 Modbus connection parameters.....	233
---	------------

13.5 Example for connecting a control via Modbus.....	234
--	------------

13.6 OPC UA connection parameters.....	235
---	------------

13.7 MTConnect connection parameters.....	237
--	------------

13.8 Example for connecting a control via MTConnect.....	239
---	------------

14 Help, tips and tricks..... 241

14.1 Operating Instructions in StateMonitor.....	242
---	------------

14.2 Special cases.....	243
--------------------------------	------------

14.3 Any questions?.....	244
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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 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 be used only in accordance with its proper and 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.

Compliance with the proper and intended use of StateMonitor is the sole responsibility of the company using it.

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

Access to the data in StateMonitor is available only to those with access to the server or PC on which StateMonitor is installed.

Within StateMonitor, data usage can be limited by means of different rights. Only users with administrator rights have access to all the data.

In order for StateMonitor to be used, the end devices such as smartphones and tablets must be logged into the server as clients.

Because StateMonitor is a local client-server web application, no additional software or app must be installed on the respective end devices.

Further information: "User management submenu", Page 150

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, on account of IT security reasons, your IT department does not permit the integration of the notification function (**Messenger**), then StateMonitor will not be able to send automatic notifications to users by e-mail.

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 90

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 mailbox for StateMonitor
- ▶ Select notifications very carefully

NOTICE

Caution: Data may be lost!

If StateMonitor sends too many notifications to recipients, then the e-mail provider may regard these notifications as spam. In this case, the recipient will no longer receive 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 integration into the local corporate 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

2

Installation

2.1 Requirements

Machine controls

You can use StateMonitor with the following HEIDENHAIN controls:

Control	As of software version
iTNC 530	34049x-03
TNC 620	34056x-01
TNC 128	771841-01
TNC 320	340551-03
TNC 640	34059x-01
CNC PILOT 620	688945-01
CNC PILOT 640	68894x-01
MANUAL Plus 620	548328-05
Mill Plus IT	53895x-03, 73738x-01
Grind Plus IT	510060-04
Grind Plus 640	73502x-01

Depending on your software option, you can integrate other controls into StateMonitor using the following interfaces:

Interface	As of specification version
Modbus	Connect/Read
OPC UA	1.02.x
MTConnect	1.2

Further information: "Machines submenuMachines", Page 154

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 199
- Option #18 (HEIDENHAIN DNC interface) enabled on the HEIDENHAIN control
Further information: "Enabling Option 18", Page 197
or
- The corresponding option must be enabled on other controls

Hardware

For StateMonitor, you need a PC or server that meets the following minimum requirements:

- Dual core processor
- USB interface or network USB hub (dongle for full version)
- 2 GB of RAM and 10 GB of 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 30 GB of hard disk space and 3.5 GB of RAM for StateMonitor.



If you want to connect 20 machine controls or more, HEIDENHAIN recommends that you use a PC or server with quad core processor.

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



Have an IT specialist configure the firewall to enable the required TCP ports.

SMTP server

To use the **Messenger** notification function in StateMonitor, you must connect to an SMTP server acting as the e-mail output server. Contact your e-mail provider for the details needed to access the SMTP server.



Create a separate e-mail address for StateMonitor

Further information: "Messenger settings submenu", Page 169

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 in a temporary storage folder
- > The **Install 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

During the installation, both the StateMonitor application and the PostgreSQL database will be installed on the PC or server.



In order to perform the installation, you need to log in to Microsoft Windows as an administrator.

Proceed as follows in order to install StateMonitor:

- ▶ Double-click the **Install 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
- StateMonitor website

Changing, repairing, and uninstalling StateMonitor

When you start the **Install StateMonitor.exe** installation file again, you are given the following possibilities:

- **Change**
If you want to change the installed program functions, select **Change**.
- **Repair**
Select **Repair** if StateMonitor is not working properly due to installation errors.
- **Remove**
If you want to uninstall StateMonitor, select **Remove**.

2.3 File structures

The installation includes the following components:

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

The installed files are structured as follows if the default settings are used:

- Installation folder
 ..\<Program Files>\HEIDENHAIN\StateMonitor
 - Application
- Work directory ..\<ProgramData>\HEIDENHAIN\StateMonitor
 - Database
 - Machine images
 - Log files



Access to the files depends on the configuration of the access rights on the PC or server.

2.4 Uninstalling

Uninstalling StateMonitor

To uninstall StateMonitor, proceed as follows:

- ▶ Double-click to start the **StateMonitor.exe** installation file in the sm subfolder
- > The Setup Wizard opens.
- ▶ Click the **Remove** button
- ▶ Follow the uninstaller instructions
- > StateMonitor is uninstalled.

2.5 Licensing

Demo version (without dongle)

You can evaluate StateMonitor as a demo version for free for a limited time. The demo 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.
- It is not possible to activate a demo license on a virtual server.
- The demo license cannot be remotely activated over a terminal server. Activation must be performed locally on the terminal server.
- All data collected during the trial period are retained for use in the full version.

A license for the demo version is created during installation. This license can be viewed in the WIBU CodeMeter Control Center.

Full version (with dongle)

Purchasing the licensed version converts the demo version into the full version. Five machines are enabled automatically. More machines can be added in sets of five.



All data saved with the demo version are retained in the full version.

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 full version and the options will only run on a PC or server equipped with a USB port for the dongle.



If StateMonitor is installed on a virtual server, then the dongle must be integrated over a suitable USB server or network USB hub.

Activation

Activating the trial version on a PC or server

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



- ▶ Double-click the **Activate StateMonitor** icon on the desktop
- > The WIBU CodeMeter Control Center opens.
- > The WIBU CodeMeter Control Center updates the import.
- ▶ Click the **OK** button
- > The demo version is now activated.
- ▶ Close the WIBU CodeMeter Control Center



The demo 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 is installed on a virtual server, then the dongle must be integrated over a suitable USB server or network USB hub.

2.6 Starting and ending

Starting the software

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



- ▶ Click the ControlCenter icon in the status bar
- > The ControlCenter window opens.



- ▶ Click the **Start** button
- > StateMonitor starts.



- ▶ Wait until the **Running** status appears on the screen



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

If you also want to open the StateMonitor application on the PC or server on which StateMonitor 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. Google Chrome or Mozilla Firefox
- ▶ In the address line, enter: <Server Name>: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 opens.



If you open StateMonitor in an older browser, then content may be missing or incorrectly displayed.



Add the address to your favorites or bookmarks in your web browser in order to access StateMonitor 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 in the status bar
- > The ControlCenter window opens.



- ▶ Click the **Shutdown** button
- > StateMonitor stops.
- > All clients are disconnected from the server.



- ▶ Wait until the **Stopped** status appears on the screen

NOTICE

Caution: Possible loss of data!

If you exit StateMonitor on the server while users are still accessing StateMonitor 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

When you exit StateMonitor, the missing period of time receives the status "UNDEF". When you restart StateMonitor and collect a new machine status, then the current machine status is displayed.

2.7 ControlCenter

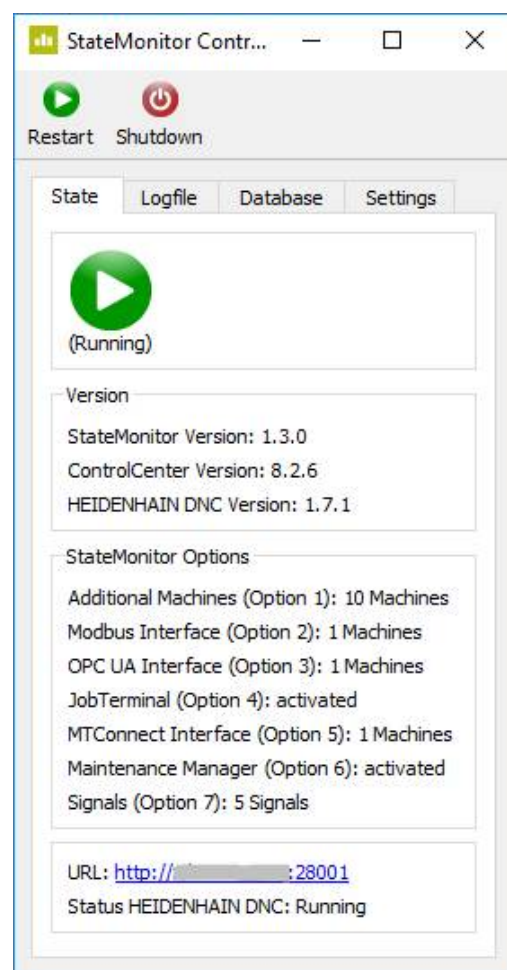
During the installation of StateMonitor, ControlCenter is automatically installed as well and is indicated in the task bar by the StateMonitor symbol.



- ▶ Click the ControlCenter icon
- > The ControlCenter window opens.

ControlCenter provides the following functions and information:

- Starting and exiting of StateMonitor
- Display of the state of StateMonitor (**State** tab)
- Settings for the log files (Logfile tab)
- Settings for the database (Database tab)
- Settings for ControlCenter (Settings tab)



Starting StateMonitor

To start StateMonitor, proceed as follows:





- ▶ Click the **Start** button
- > StateMonitor starts.



- ▶ Wait until the **Running** status appears on the screen

Exiting StateMonitor

To exit StateMonitor, proceed as follows:

- 
 - ▶ Click the **Shutdown** button
 - ▶ StateMonitor stops.
 - ▶ All clients are disconnected from the server.
- 
 - ▶ Wait until the **Stopped** status appears on the screen

NOTICE






Caution: Possible loss of data!

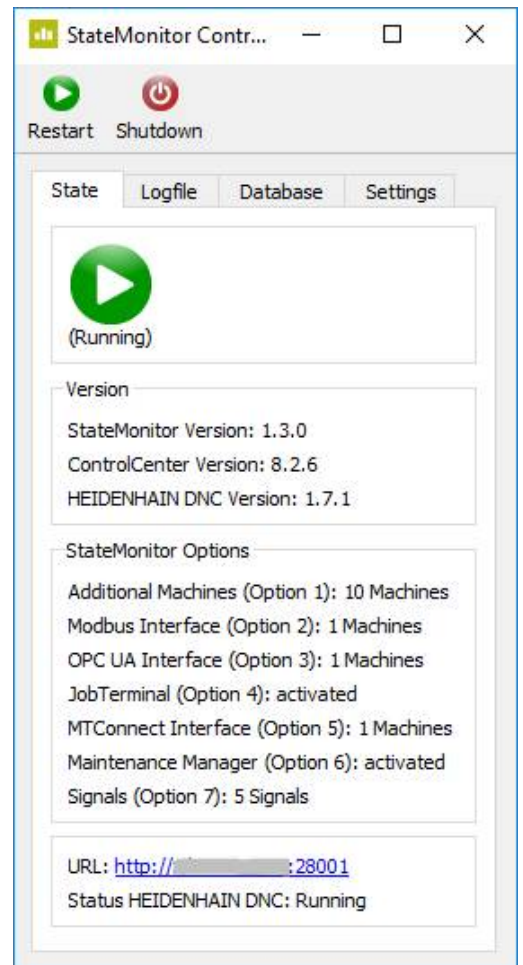
If you exit StateMonitor on the server while users are still accessing StateMonitor from other PCs, tablets, or smartphones, the connection between the clients and the server is interrupted immediately. Any input that the users have not yet saved in StateMonitor will be lost.

- ▶ Before exiting the software, make sure that all users have logged off

State tab

In the **State** tab, you will find the following information:

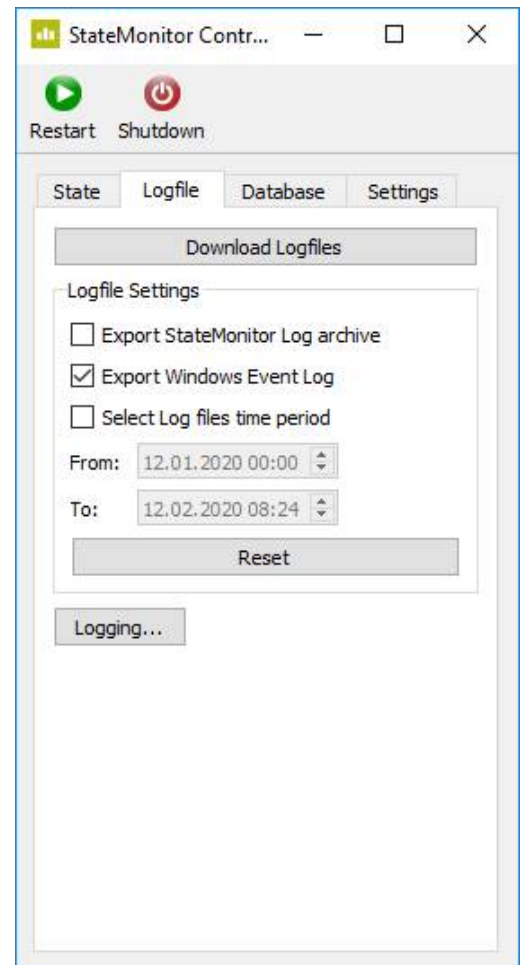
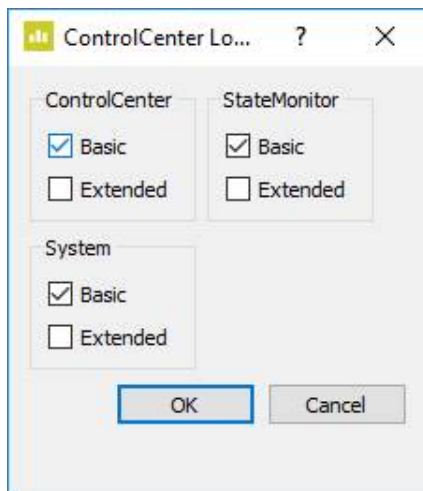
Element	Description
	Information about the state of the application
	Possible states: <ul style="list-style-type: none"> ■ Starting ■ Running ■ Stopping ■ Stopped
	
	
	
Version	Version information about StateMonitor, ControlCenter, and HEIDENHAIN DNC (machine control)
StateMonitor options	Overview of enabled software options Further information: "Extending the functionality with software options", Page 47



Logfile tab

In the **Logfile** tab, you will find the following functions and settings:

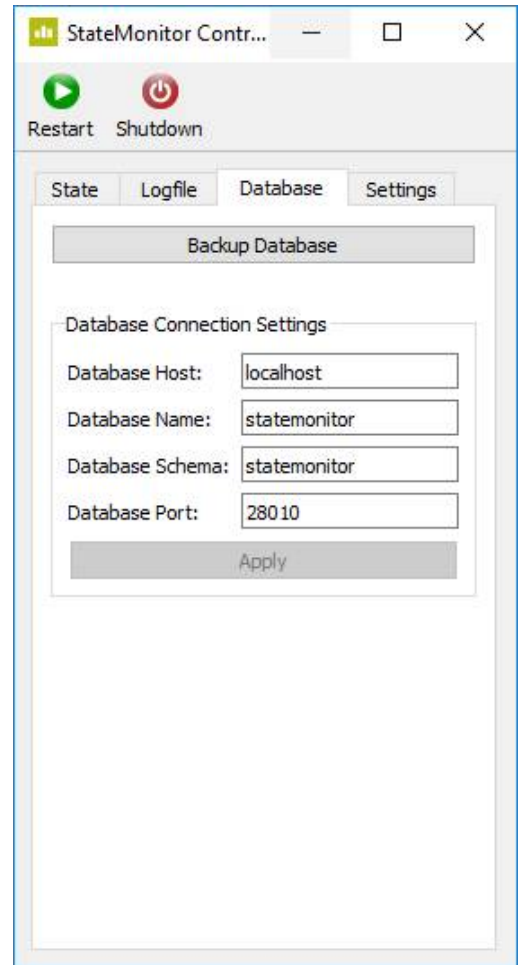
Element	Description
Download Logfiles	Downloading of the current StateMonitor log file as a ZIP file
Logfile Settings	<p>Logfile options:</p> <ul style="list-style-type: none"> ■ Export StateMonitor Log archive Archived log files are exported as well; this may significantly enlarge the log file ■ Export Windows Event Log Additional Export of the Windows Event Log with entries from HEIDENHAIN DNC and StateMonitor ■ Select Log files time period Selection of the time period for the log file ■ Reset Resetting of the options to default values
Logging	Size adjustment of the ControlCenter log file



Database tab

In the **Database** tab, you will find the following functions and settings:

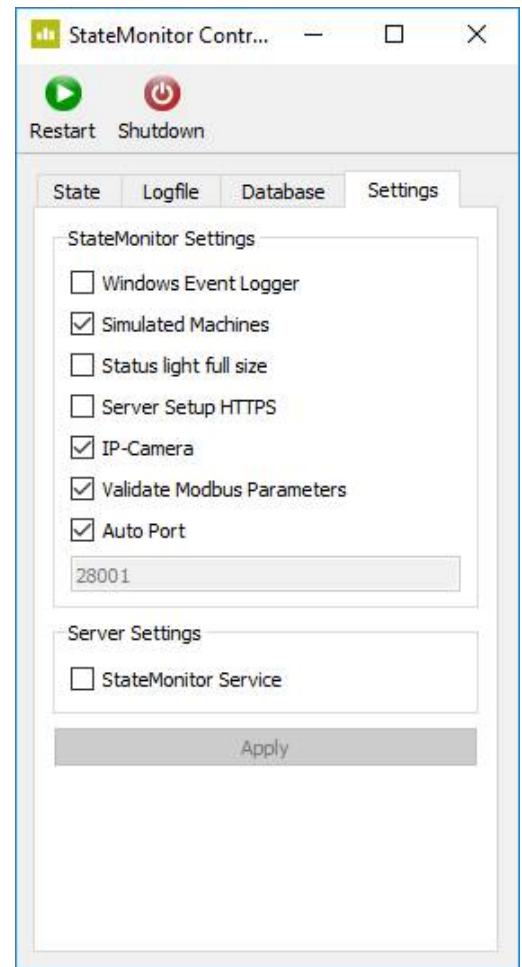
Element	Description
Backup Database	Backup of the current StateMonitor database (including the machine images and PDF documents)
Database Connection Settings	Options for the connection to the database: <ul style="list-style-type: none"> ■ Database Host Host computer with database server (default: "localhost") ■ Database Name Name of the database (default: "statemonitor") ■ Database Schema Database scheme (default: "statemonitor") ■ Database Port Datenbase port (default: "28010") <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>i If the database server is run on a different computer from that of StateMonitor, then the database TCP port must be enabled in the firewall.</p> </div> <ul style="list-style-type: none"> ■ Apply Application of the options



Settings tab

In the **Settings** tab, you will find the following settings:

Element	Description
StateMonitor Settings	<p>Options of the application:</p> <ul style="list-style-type: none"> ■ Windows Event Logger Additional logging of StateMonitor data in the Windows Event Log ■ Simulated Machines Use of simulated machines in StateMonitor ■ Status light full size Display of the machine statuses as background colors in machine park / button view ■ Server Setup HTTPS If StateMonitor is run via HTTPS, then a keystore with a valid certificate must be defined ■ IP-Camera ■ Validate Modbus Parameters ■ Auto Port Port for the application in the browser (default: "28001")
Server Settings	<p>Running StateMonitor as a Windows service To register StateMonitor as a Windows service, proceed as follows:</p> <ul style="list-style-type: none"> ▶ Start ControlCenter with administrator rights ▶ Stop StateMonitor ▶ Click the StateMonitor Service option ▶ Click the Apply button



3

**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
- Maintenance and servicing staff
- 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. Google Chrome or Mozilla Firefox
- ▶ In the address line, enter: <Server Name>: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 opens.

i If you open StateMonitor in an older browser, then content may be missing or incorrectly displayed.

i Add the address to your favorites or bookmarks in your web browser in order to access StateMonitor quickly in future.

Opening the client application on the control

i In order to operate StateMonitor without a touchscreen, you will need a mouse or a touchpad.



To open the client application of StateMonitor 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
- > The saved browser is opened.
- ▶ In the address line, enter:
http:**Servername**:28001
In place of **Servername**, enter the host name or IP address of the PC or server on which StateMonitor is installed
- > StateMonitor appears on the screen.
- ▶ Set the display to full screen
- > With the screen switchover key, you can switch between the control screen and StateMonitor.



i To ensure communication between StateMonitor and the control through a firewall, you must enable the 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 browser window

3.3 Login / Logout

Login

Once StateMonitor has started, 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 in for the first time after installing StateMonitor, and you have not yet defined any users, then you must first create a user.

Further information: "Password", Page 42

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 Password

You must create an initial password when you log on for the first time after the installation.

Proceed as follows to create an initial password:

- ▶ Open the login window
- ▶ Follow the instructions

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

NOTICE

Caution: Possible loss of data!

The password created in StateMonitor can be reset only by a user with administrator rights.

- ▶ Observe your company's current rules regarding passwords.

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: "Advanced submenu", Page 184

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 149

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









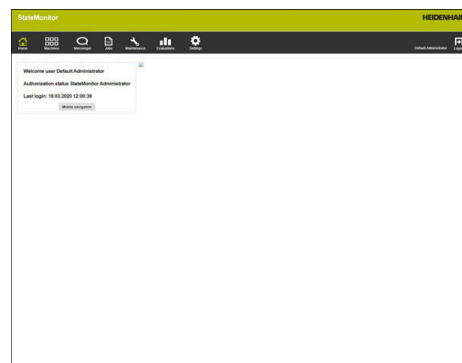
The availability of the individual menus and submenus depends on:


- the activated options
- the role of the corresponding user

Further information: "Roles", Page 150

In StateMonitor, the following menus and submenus are available:

Icon	Menus and submenus
	Home
	Machines <ul style="list-style-type: none"> ■ Tile view ■ Status overview ■ Day view
	Messenger <ul style="list-style-type: none"> ■ Event configurator ■ Notification profiles ■ Notifications
	Jobs (software option) <ul style="list-style-type: none"> ■ Create job ■ Assign job ■ Adjust machining sequence
	Maintenance (software option) <ul style="list-style-type: none"> ■ Tile view ■ Status overview
	Evaluations <ul style="list-style-type: none"> ■ Machine statuses ■ Key figures ■ Program run times ■ Machine alarms ■ Job times (software option) ■ Signals (software option) ■ Maintenances (software option) ■ Time filter



Icon	Menus and submenus
	<p data-bbox="325 365 427 394">Settings</p> <ul data-bbox="325 405 676 833" style="list-style-type: none"><li data-bbox="325 405 528 434">■ User settings<li data-bbox="325 445 592 474">■ User management<li data-bbox="325 486 480 515">■ Machines<li data-bbox="325 526 507 555">■ Add groups<li data-bbox="325 566 584 595">■ Machine mapping<li data-bbox="325 607 676 636">■ Statuses (software-option)<li data-bbox="325 647 600 676">■ Messenger settings<li data-bbox="325 687 512 716">■ File backup<li data-bbox="325 728 635 757">■ External reporting DB<li data-bbox="325 768 485 797">■ Advanced<li data-bbox="325 808 411 837">■ Info

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**.

Gate		Description	Example
AND	"And" operation	The table displays all of the rows containing both of the search terms.	TNC 640 AND 100.0 %
OR	"Or" operation	The table displays all of the rows containing either one of the search terms.	TNC 640 OR iTNC 530

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.



Every time you click the header of a table 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 shows 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 the **Save** button

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:

Option	Extended functionality	ID
1	Five additional machines	1220884-01
2	Modbus Interface	1268670-01
3	OPC UA Interface	1268673-01
4	JobTerminal	1268674-01
5	MTConnect Interface	1268675-01
6	MaintenanceManager	1308520-01
7	Signals	1308521-01

Further information: "Software options and licenses", Page 187

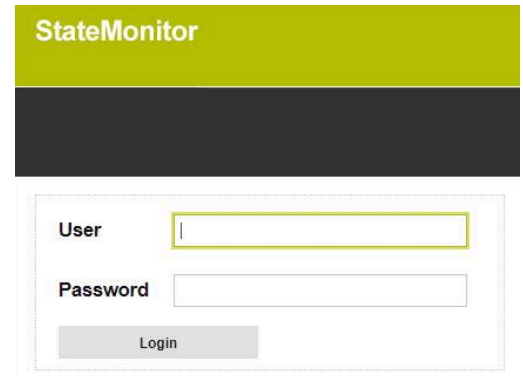
4

Home menu

4.1 Home menu

Enter your user name and password in the **Home** menu.

Further information: "Login / Logout ", Page 51



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\homelimage**
- > 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\homelimage** directory.

4.2 Login / Logout

Login

Once StateMonitor has started, 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 in for the first time after installing StateMonitor, and you have not yet defined any users, then you must first create a user.

Automatic login

Users with the Viewer role can use a special URL to log in 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 in order to access StateMonitor quickly in future.



Saving access data in the address line is possible only for users with the **Viewer** role.

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.

5

Machines menu

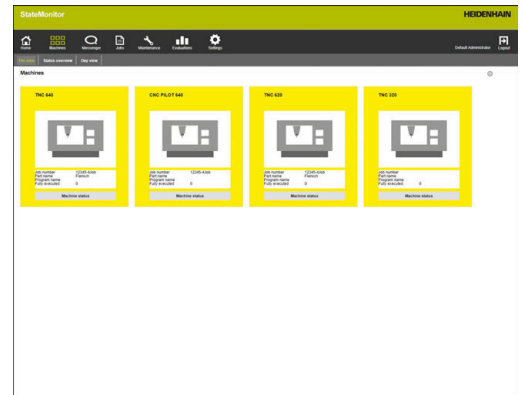
5.1 Machines menu

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

Further information: "Machines submenuMachines", Page 154

The **Machines** menu contains the following submenus:

- **Tile view**
- **Status overview**
- **Daily view**

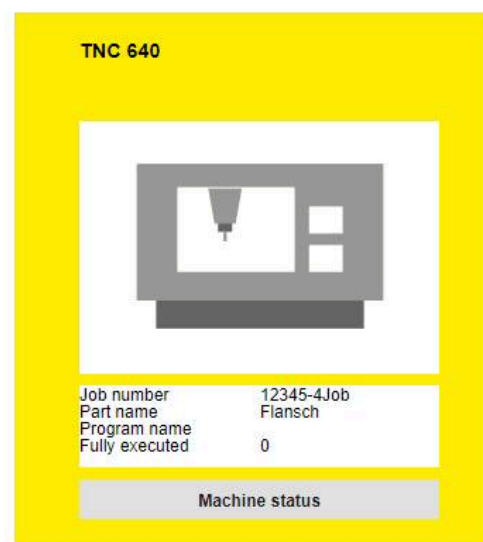
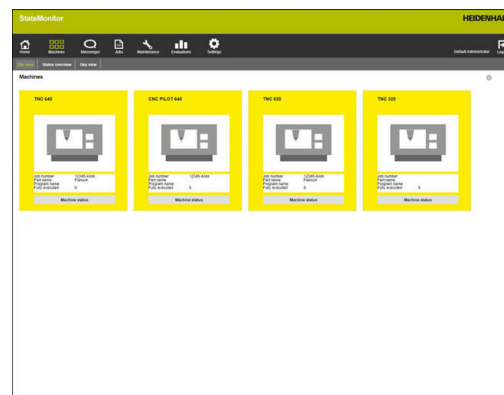


5.2 Tile view submenu

In the **Tile view** submenu, StateMonitor show every activated machine.

The machine status card contains the following information:

Information	Meaning
Machine image	If you upload an image of the machine when adding it, then StateMonitor will show the image here
Status light	Current machine status
Job number	Number of the job being currently machined (software option)
Part name	Name of the currently finished workpiece (software option)
Program name	Name of the NC program currently loaded in Program Run, Full Sequence or Program Run, Single Block mode
Fully executed	Number of complete program runs



Filtering the Tile view

Each user can adapt the **Tile view** as desired. For this purpose, proceed as follows:







- ▶ Click the gear symbol
- > A filter selection window opens. The filter criteria encompass machines and machine groups.
- ▶ To limit the view to certain machines or machine groups, tick the box in front of it with the mouse
- > StateMonitor shows the selected machines.



If no box has been ticked, then StateMonitor will display all of the machines that are assigned to the user (default setting).

Status light

The colors of the status light have the following meanings:

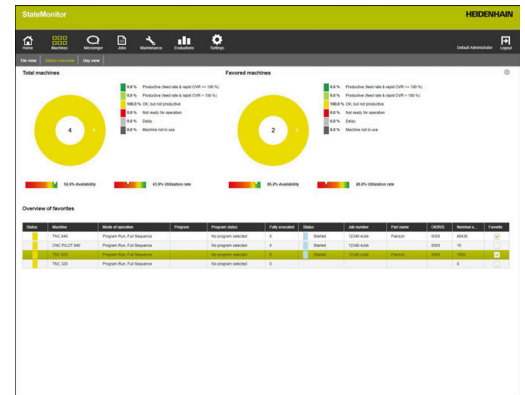
Color	Meaning
Gray 	The machine is not switched on or not connected
Red 	The machine is not ready for operation.
Yellow 	The machine is ready for operation, but not productive.
Dark green/ Light green 	The machine is productive. Dark green = Productive (feed rate & rapid OVR >= 100 %) Light green = Productive (feed rate & rapid OVR < 100 %)

5.3 Status overview submenu

In the **Status overview** submenu, StateMonitor graphically displays the machine statuses in doughnut charts.

In doing so, StateMonitor differentiates between:

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



Total machines

The **Total machines** doughnut 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** parameters as the average of all activated machines in the machine park.

Favored machines

The **Favored machines** doughnut 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:

- Current **Status** of the machine
- **Machine tool** (machine designation)
- Current **Mode of operation** of the machine
- The **Program** currently loaded on the machine **Program**
- **Program status**
- Number of programs that have been **Fully executed**
- **Status** of the current job
- **Job number**
- **Part name**
- **OK/R/S**: returned quantities of Actual amount (OK), Rework (R) and Scrap (S)
- **Nominal amount**
- Designation as **Favorite**

5.4 Day view submenu

In the **Day view** submenu, you can graphically display the machine statuses of the current day for each machine.

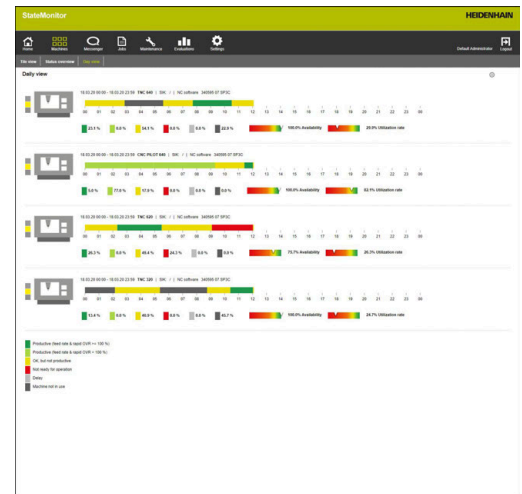
Furthermore, the **Availability** and **Utilization rate** key figures are shown for each machine.

Further information: "Key figures submenu", Page 136

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 71



Showing detailed information

You can show detailed information for each section of the machine status bar. For this purpose, proceed as follows:

- ▶ Click a section of the machine status bar
- > StateMonitor displays a window containing detailed information about the machine status and any comments.

Defining the observation period for the machine status bars

By default, the machine status bars show the period from 00:00 to 24:00 hrs. Each user can set this observation period individually. The maximum length of the viewing period is 24 hours.













To adjust the viewing period, proceed as follows:








- ▶ Click the gear symbol
- > The **User-specific adaptation of machine statuses** window is displayed.
 - ▶ In the **From:** field: select or enter the desired time
 - ▶ In the **to:** field: select or enter the desired time
 - ▶ Click the **Save** button
 - > The machine status bars display the selected period.

5.5 Overview of machine statuses

The following overview shows the machine statuses triggered by the combinations of active **Mode of operation**, **Program status**, and **Override settings**.

Machine status	Mode of operation	Program status	Override settings
 Dark green Productive (feed rate & rapid OVR \geq 100 %)	 Program Run, Full Sequence	In progress	\geq 100 %
 Light green Productive (feed rate & rapid OVR < 100 %)	 Program Run, Full Sequence	In progress	< 100 %
	 Program Run, Single Block	In progress	> 0 %
 Yellow OK, but not productive	 Program Run, Full Sequence	In progress	= 0 %
	 Program Run, Full Sequence	<ul style="list-style-type: none"> ■ Selected ■ Stopped ■ Interrupted 	Any
	 Program Run, Single Block	<ul style="list-style-type: none"> ■ Finished ■ Error ■ No program selected 	
	 Manual Operation		Any
	 Electronic Handwheel		
	 Positioning with Manual Data Input		

Machine status	Mode of operation	Program status	Override settings
 Red Not ready for operation	 Program Run, Full Sequence <hr/>  Program Run, Single Block	Error	Any
 Light gray Delay	The Delay status is not generated directly by the machine. Users can store the Delay status instead of a yellow or dark gray status.		
 Dark gray Machine not in use	<ul style="list-style-type: none"> ■ The machine is switched off or ■ StateMonitor cannot establish a connection to the machine or ■ StateMonitor is temporarily shut down 		

5.6 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** (software option)
- **Active messenger status**
- **Program statistics**
- **Machine reports**
- **Maintenance status** (software option)
- **Machine statuses** with **machine status bar** (resulting from the **Machine status**)
- **Utilization rate**

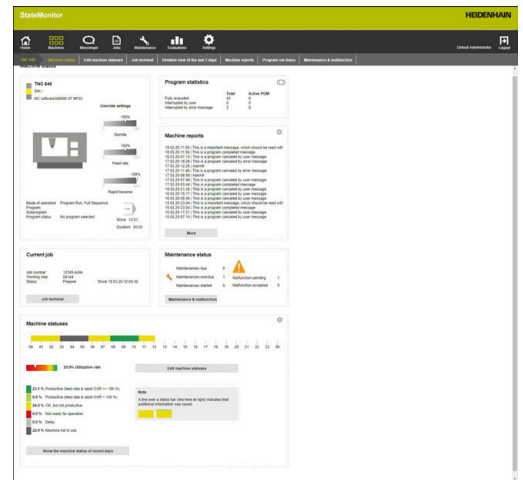
To access the **Machine status** view, proceed as follows:



- ▶ 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 69
- **Job terminal** (software option)
Further information: "Job terminal submenu (software option)", Page 75
- **Detailed view of the last 3 days**
Further information: "Detailed view of the last 3 days submenu", Page 79
- **Machine alarms**
Further information: "Machine alarms submenu", Page 80
- **Program run times**
Further information: "Program run times submenu", Page 82
- **Maintenance & malfunction**
Further information: "Maintenance & malfunction submenu (software option)", Page 84



Displaying the live image

In the **Machine status** submenu, you can call the live image of the camera.

Precondition: An IP camera is configured for the machine.

Further information: "Edit machine", Page 158

For this purpose, proceed as follows:



- ▶ Click the camera symbol next to the machine name
- > The live build is shown in a new tab of the browser.

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

Symbol	Mode of operation
	Manual Operation
	Electronic Handwheel
	Positioning with Manual Data Input (MDI)
	Program Run, Single Block
	Program Run, Full Sequence

Program status

The **Program status** provides information on the current status of the NC program on the machine.

The following program statuses can occur:

Program status	Meaning
In progress	The machine is executing an NC program.
No program selected	The machine is not in an operating mode that executes NC programs.
Inactive	<p>The current Mode of operation on the machine is Program Run, Full Sequence, or Program Run, Single Block.</p> <ul style="list-style-type: none"> ■ No NC program has currently been started or ■ program run was interrupted by an error or ■ The operator stopped the program run with an INTERNAL STOP
Error	<p>The execution of the current NC program was interrupted due to an error.</p> <p>The Error status is shown until it is acknowledged on the machine. Then the status switches to Inactive.</p>
Selected	<p>The current Mode of operation on the machine is Program Run, Full Sequence, or Program Run, Single Block.</p> <p>The operator has selected a program but not started yet.</p>
Stopped	<ul style="list-style-type: none"> ■ The current Mode of operation on the machine is Program Run, Single Block, and the operator has not yet started the next NC block ■ Program run was stopped by an M0 command in the NC program
Interrupted	The operator interrupted the program run with NC Stop .
Finished	The current NC program has been executed until the end. An M30 or M2 command finished the program.

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 75



Active messenger status

Under **Active messenger status**, StateMonitor shows the active **Notifications**.

Further information: "Notifications submenu", Page 97



- ▶ If the **Active messenger status** area is not visible, then click the slider symbol in the **Program statistics** area
- > Instead of showing the **Program statistics** area, StateMonitor shows the **Active messenger status** area.

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:

Dialog	Meaning
Fully executed	Number of fully executed programs
Interrupted by user	Number of programs interrupted by the user
Interrupted by error message	Number of programs that were interrupted due to an error message



- ▶ If the **Program statistics** area is not visible, then click the slider symbol in the **Active messenger status** area
- ▶ Instead of showing the **Active messenger status** area, StateMonitor shows the **Program statistics** area.

Program statistics		
	Total	Active PGM
Fully executed	43	0
Interrupted by user	0	0
Interrupted by error message	2	0

Machine messages

In the **Machine reports** area, StateMonitor shows the last machine messages.

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 80
- ▶ 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.

Machine reports	
18.03.20 11:59	This is an important message, which should be read with
18.03.20 11:59	This is a program completed message
18.03.20 01:15	This is a program canceled by user message
17.03.20 16:29	This is a program canceled by error message
17.03.20 12:26	Alarm9
17.03.20 11:49	This is a program canceled by error message
17.03.20 08:59	Alarm9
17.03.20 07:49	This is a program canceled by user message
17.03.20 03:44	This is a program completed message
16.03.20 21:26	This is a program canceled by user message
16.03.20 15:17	This is a program canceled by user message
16.03.20 05:04	This is a program canceled by user message
15.03.20 23:04	This is an important message, which should be read with
15.03.20 23:04	This is a program completed message
15.03.20 17:21	This is a program canceled by user message
15.03.20 07:10	This is a program canceled by user message

More

To view further machine messages, proceed as follows:

- ▶ Click the **More** button
- ▶ The **Machine reports** submenu opens.
Further information: "Machine alarms submenu", Page 80

Maintenance status (software option)

In the **Maintenance status** area, StateMonitor shows the machine's current maintenance status.

To see details or to report malfunctions, proceed as follows:

- ▶ Click the **Maintenance & malfunction** button
- > The **Maintenance & malfunction** submenu is shown.
Further information: "Maintenance & malfunction submenu (software option)", Page 84

Maintenance status			
Maintenances due	0		
Maintenances overdue	1		Malfunction pending
Maintenances started	0	Malfunction accepted	0
Maintenance & malfunction			

Machine statuses

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



Setting the viewing period

By default, the machine status bar shows the viewing period from 00:00 hrs. to 24:00 hrs. 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.
- ▶ In the **From:** field: select or enter the desired time
- ▶ In the **to:** field: select or enter the desired time
- ▶ Alternatively, after selection of the **Show statuses of the last** option, select the desired time period
- ▶ Click the **Save** button
- > The machine status bar will now display the selected period.



Adjusting 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 79

Editing machine statuses

To replace undetermined machine statuses with others and to specify them more precisely, switch to the **Edit machine statuses** submenu:

- ▶ Click the **Edit machine statuses** button
- > The **Edit machine statuses** submenu is displayed.
Further information: "Edit machine statuses submenu",
Page 69

5.7 Edit machine statuses submenu

Displaying machine statuses

In the **Edit machine statuses** submenu, StateMonitor shows 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 display the machine statuses, proceed as follows:

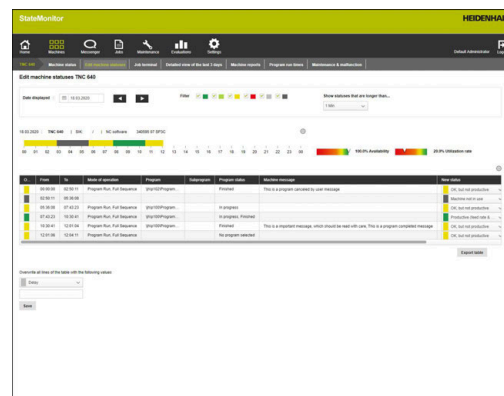
- ▶ Click the calendar symbol next to **Date displayed**
- ▶ Select the desired date
- ▶ Alternatively, enter the desired date in the **Date displayed** field
- ▶ Alternatively, you can browse through the days in reverse
- ▶ Or you can browse through the days in a forward direction



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 46



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 specifications can be defined in the **Settings** menu.

Further information: "Statuses submenu", Page 166

To change a machine status, proceed as follows:






- ▶ Switch to the **Machines** menu
- ▶ Click the **Machine status** button of the desired machine
- ▶ Select the **Edit machine statuses** submenu
- ▶ In the table, click the **New status** column
- ▶ Select the desired status in the selection field
- ▶ Click the **Save the lines** button
- ▶ The machine status is changed in the machine status bar.





With HEIDENHAIN controls, the control function **FN38** can be used in order to edit machine statuses inStateMonitor from the NC program.

Further information: "FN38: Edit machine statuses", Page 73

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

Original status		New status (specification)
 Dark green	Productive	Dark green, light green, yellow, red, or gray
 Light green	Productive, feed rate < 100 %	Dark green, light green, yellow, red, or gray
 Yellow	OK, but not productive	Yellow, red, or gray

Original status		New status (specification)
Red 	Not ready for operation	Red
Dark gray 	Machine not in use	Dark or light gray

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 (dark-gray bar), then you can subsequently set this status in StateMonitor to Delay (light-gray bar).

Saving additional information

A blue line above a section of the machine status bar indicates that the status has been replaced or 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 displays a blue line above the section in the machine status bar.

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

Editing machine statuses

You can manually edit individual machine statuses in the machine status bar at a later time. To do so, you "divide" the time entry of a machine status into two mutually independent parts that you then designate with a relevant machine status.

This gives you the option of subdividing monitored time periods to reflect the actual machine occupation for the calculation of key figures (see "Key figures submenu", Page 136).



For defining planned downtimes (e.g., shift change or breaks) see "Time filter submenu", Page 144.

To edit a machine status, proceed as follows:



- ▶ Switch to the **Machines** menu
- ▶ Click the **Machine status** button of the desired machine
- ▶ Select the **Edit machine statuses** submenu
- ▶ In the table, click the row of the desired section
- ▶ In the field next to the **Split status** button, enter the desired cutting point in the form of **hh:mm**
- ▶ Click the **Split status** buttons
- ▶ The section is divided, with the end of the first part corresponding to the beginning of the second part of the entered cutting point.
- ▶ Select the desired status in the selection field of the desired section
- ▶ Click the **Save the lines** button

5.8 FN38: Edit machine statuses

FN38 control function FN38

With HEIDENHAIN controls, the control function **FN38** can be used in order to edit machine statuses in StateMonitor from the NC program.

FN38 can be used with the following HEIDENHAIN controls:

Control	Starting with software version
iTNC 530	34049x-03, 60642x-01
TNC 640	34059x-05
TNC 620	81760x-01
TNC 320	771851-02
TNC 128	771841-02
CNC PILOT 640	68894x-04
MANUAL Plus 620	54843x-04



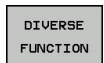
To be able to use the **FN38** function, you have to enter code number 555343 to enable special functions for Q parameter programming.
The TNC as of software version 34059x-07 allows programming of **FN38** without entering a code number.

Programming

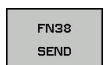
To program the **FN38** control function, proceed as follows:



- ▶ 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 /".
- ▶ Write the desired machine status
Example:
`FN 38 : SEND / "NEW_STATE : STANDBY"`

Commands

Aided by the following **FN38** commands, you can edit the machine statuses in StateMonitor:

Color coding	Syntax	Explanation
Yellow 	"NEW_STATE : IDLE "	The machine is ready for operation, but not productive
Red 	"NEW_STATE : INOPERABLE "	The machine is not ready for operation
Light gray 	"NEW_STATE : STANDBY "	Machine is in the Delay status Delay
	"NEW_STATE : CUTSTATE "	Subdivide the current machine status, see "Editing machine statuses", Page 72
	"NEW_STATE : RESUME "	Restore the original status without editing

Application example

Goal:

To divide and reassign the machine status

BEGIN PGM FN38NEWSTATETEST MM	Program started, PRODUCTIVE machine status
:	
FN 38: SEND /"NEW_STATE:IDLE"	New machine status generated in StateMonitor (PRODUCTIVE -> IDLE)
M-Funktion	M functions executed
FN 38: SEND /"NEW_STATE:CUTSTATE"	Original status (PRODUCTIVE) is divided in StateMonitor, meaning that a new status is generated (PRODUCTIVE -> IDLE)
FN 38: SEND /"NEW_STATE:RESUME"	Original status resorted in StateMonitor (IDLE -> PRODUCTIVE)



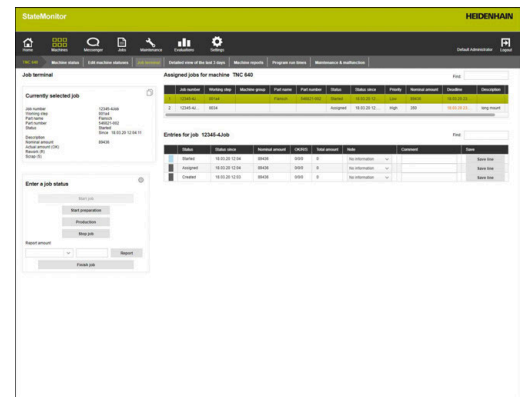
When you enter the command for **FN 38**, you must pay attention to capitalization.

5.9 Job terminal submenu (software option)

In the **Job terminal** submenu, the operator can enter the job status during machining at the machine. The operator can edit the entries at a later time.

In the following tables, StateMonitor shows the uncompleted jobs for the machine:

- **Assigned jobs for machine** table:
This table contains all of the jobs that are assigned to the machine. The jobs are shown in their defined machining sequence. The operator can select and start the jobs in the table.
- **Assigned jobs for machine groups** table:
This table contains all of the jobs that are assigned to a machine group to which the machine belongs. The jobs are shown in their defined machining sequence. The operator can transfer the jobs to the **Assigned jobs for machine** table and then start them. These jobs are then no longer visible for the other machines in the machine group.



i If no uncompleted jobs are available for machine groups, then StateMonitor hides the **Assigned jobs for machine groups** table.

The creation and assignment of jobs is performed in the **Jobs** menu. There, you can also change the order of job execution.

Further information: "Jobs menu (software option)", Page 102

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

Further information: "Job times submenu (software option)", Page 141

i With HEIDENHAIN controls, the control function **FN38** can be used in order to edit machine statuses in StateMonitor from the NC program.
Further information: "FN38: Edit machine statuses", Page 73

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

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 for each job status.
- ▶ To finish or abort editing, click the **Stop job** button
- ▶ This terminates time recording.
- ▶ If desired, you can restart the job.
- ▶ To report the nominal amount, select **Actual amount (OK)** in the selection field
- ▶ Enter the quantity in the input field of the manufactured part
- ▶ Click the **Report** button
- ▶ To report the amount of scrap, select **Scrap (S)** in the selection field
- ▶ Enter the number of scrap parts in the input field
- ▶ Click the **Report** button
- ▶ To report the number of rework parts, select **Rework (R)** in the selection field
- ▶ Enter the number of parts to be reworked in the input field
- ▶ Click the **Report** button
- ▶ The quantities are saved in the job.
- ▶ To complete the job, click the **Finish job** button
- ▶ The job is no longer displayed in the job terminal.
- ▶ The recorded times and quantities can be viewed in the **Evaluations** menu.

Transferring a job from a machine group

To assign a job from the machine group to the machine, proceed as follows:

- ▶ Click the desired job in the **Assigned jobs for machine groups** table
- > The selected job is highlighted in green in the table.
- ▶ Select the desired position in the **Table position for assignment** selection field
- ▶ Click the **Assign working step to the machine** button
- > The job appears in the **Assigned jobs for machine** table at the selected position, and it can be started.

Transferring the job back to the machine group

Precondition: the job has not yet been started.

To transfer a job back to the machine group, proceed as follows:

- ▶ In the **Assigned jobs for machine** table, click the desired job
- > The selected job is highlighted in green in the table.
- ▶ In the **Enter a job status** section, click the gear symbol
- > StateMonitor displays the **Extended job functions** window.
- ▶ Select the desired position under **Transfer selected working step back to the machine group** in the **Table position for back transfer** selection field
- ▶ Click the **Transfer working step back** button
- ▶ The job appears in the **Assigned jobs for machine groups** table at the selected position and can be adopted by any machine from the group.



Retrieving the last completed job

To retrieve the last completed job, proceed as follows:

- ▶ In the **Enter a job status** section, click the gear symbol
- > StateMonitor displays the **Extended job functions** window.
- ▶ Select the desired position under **Retrieve most recently ended job in the job list** in the **Table position for back transfer** selection field
- ▶ Click the **Rescind last completed job** button
- > The job appears in the **Assigned jobs for machine** table at the selected position.
- > The job is again available for entries.



Editing entries

To edit entries, proceed as follows:

- ▶ Retrieve the last completed job
- ▶ Alternatively, click the desired job in the **Assigned jobs for machine** table
- ▶ 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 (specification of the job status)



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

Further information: "Statuses submenu", Page 166

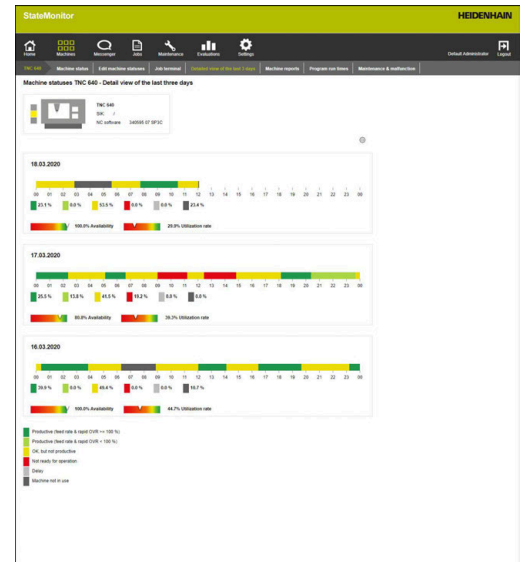
- ▶ If necessary, enter a comment
- ▶ Click the **Save the row** button
- ▶ To complete the job, click the **Finish job** button

5.10 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 136



Setting the viewing period for the machine status bar

By default, the machine status bar shows the viewing period from 00:00 hrs. to 24:00 hrs. Each user can set this period individually.

Further information: "Setting the viewing period", Page 67

5.11 Machine alarms submenu

In the Machine alarms submenu, StateMonitor lists the Machine reports.

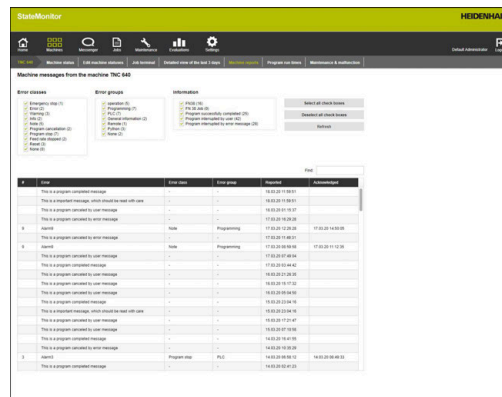
The error messages on the control are divided into Error classes and Error groups:

- **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 99

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 the occurring **Error classes**, **Error groups**, and **Information**.

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 filter the machine messages, proceed as follows:

- ▶ Tick the box in front of the desired filter criteria
- ▶ Click the **Refresh** button
- > The table is updated and contains all of the machine messages that correspond to the selected filter criteria.

Further information: "Functions in tables and charts", Page 46

5.12 Program run times submenu

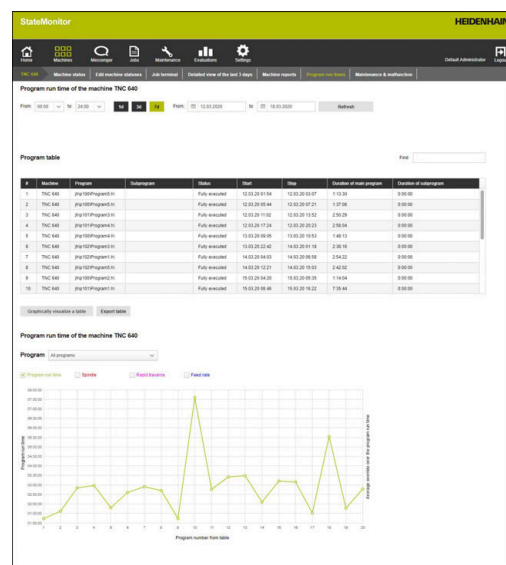
In the **Program run times** submenu, StateMonitor chronologically lists, in a **Program table**, all of the NC programs that were started during within the selected time period.

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 46



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

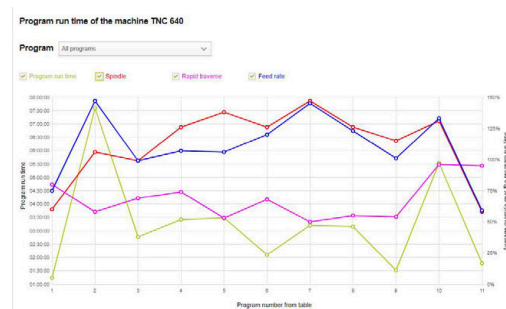
This chart shows the program run times and the average override settings of all programs listed in the table.

- ▶ 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 46



Program analysis chart

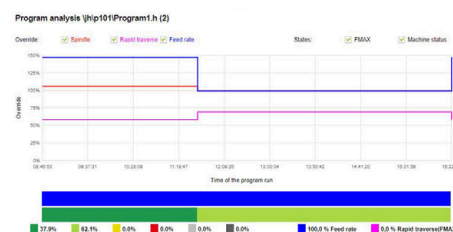
This chart shows the average override settings and machine statuses during the program run time.

To view the chart, proceed as follows:

- ▶ Click the **Graphically visualize a table** button below the table
- > The **Program run time of the machine {0}** 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 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 227

5.13 Maintenance & malfunction submenu (software option)

In the **Maintenance & malfunction** submenu, you can see the current maintenance status of the machine, as well as accept and document maintenance jobs or report occurring malfunctions.

The **Maintenance & malfunction** submenu encompasses the following views.

Symbol	View
	Maintenances
	Malfunctions

Maintenances view

The **Maintenances** view encompasses the following elements:

- **Maintenances** doughnut chart
Further information: "Maintenances doughnut chart", Page 115
- **Malfunctions** warning symbol:
Under the warning symbol, StateMonitor shows the number of the unresolved malfunctions.
- **Maintenances** table
Further information: "Maintenances table", Page 117

If you select a maintenance event in the **Maintenances** table, then StateMonitor also displays the **Entries for maintenance: {0}** tables. The **Entries for maintenance: {0}** table chronologically lists the booked statuses of the selected maintenance event.

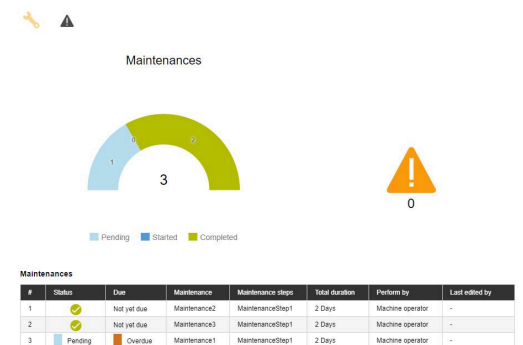
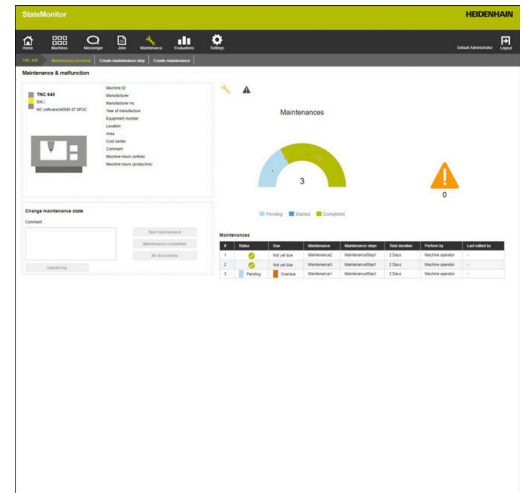
The **Entries for maintenance: {0}** table contains the following information:

- **Status:** Current status of the maintenance job
- **Status since:** Date of the last entry
- **Comment:** Comment of the user
- **User:** The user who made the last entry



The creation and assignment of maintenance jobs is performed in the **Maintenance** menu.

Further information: "Maintenance menu (software option)", Page 112



Malfunctions view

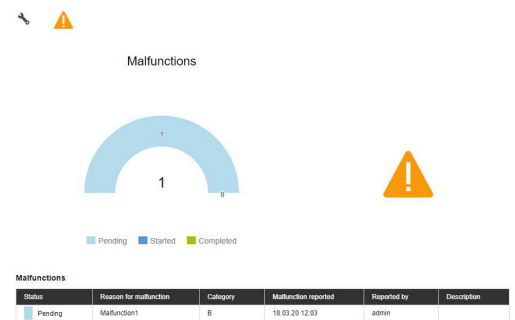
The **Malfunctions** view encompasses the following elements:

- **Malfunctions** doughnut chart
Further information: "Malfunctions doughnut chart", Page 115
- **Malfunctions** warning symbol
- **Malfunctions** table
Further information: "Malfunctions table", Page 118

If you select a malfunction in the **Malfunctions** table, then StateMonitor also shows the **Entries for malfunction {0}** table. The **Entries for malfunction {0}** table chronologically lists the booked statuses of the selected malfunction.

The **Entries for malfunction {0}** table contains the following information:

- **Status:** Current status of the malfunction
- **Status since:** Date of the last entry
- **Comment:** Comment of the user
- **User:** The user who made the last entry



Accepting a maintenance event



Entries cannot be edited at a later time. It is possible to upload a log at a later time.

To accept a maintenance event and record maintenance times, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu
- ▶ Click the desired maintenance job in the **Maintenances** table
- ▶ Call linked documents as needed
Further information: "Displaying linked documents", Page 86
- > The information about the maintenance job appears in the **Maintenance: {0}** section.
- ▶ In the **Change maintenance** section, press the **Start maintenance** button
- > Time recording will start.
- ▶ Once the maintenance tasks on the machine are completed, enter a comment as needed
- ▶ Click the **Maintenance completed** button
- > This terminates time recording.
- > The new maintenance status appears in the **Maintenances** table.
- ▶ If necessary, upload a log in the following manner

Uploading a log

Precondition: the protocol is available as a PDF file.

- ▶ In the **Change maintenance** section, press the **Upload file** button
- > StateMonitor shows the **Upload file for maintenance: {0}** window.
- ▶ In the **File name** field, enter a document name
- ▶ Click the **Upload file** button
- ▶ Select the file in Windows Explorer
- ▶ Click **Open**
- ▶ Close the window
- > The log is loaded and linked to the selected maintenance job.

Displaying linked documents

- ▶ To show all of the documents that are linked to a maintenance job, click the **All files** button
- > StateMonitor displays the **All files of the maintenance: {0}** window containing the following documents:
 - **Maintenance documents**
 - **Documents of all maintenance steps**
 - **Maintenance protocols**
- ▶ To open a document, click in the **pdf** button in the pertinent row
- > StateMonitor opens the document in a new browser tab.

Reporting malfunctions

Precondition: at least one malfunction reason is defined in the **Settings** menu (specification).

Further information: "Statuses submenu", Page 166

To report a malfunction, proceed as follows:



- ▶ To switch to the **Malfunctions** view, click the warning symbol
- ▶ Click the large warning symbol in the **Malfunctions** view
- > StateMonitor displays the **Report malfunction** button.
- ▶ Click the **Report malfunction** button
- > StateMonitor displays the **Report malfunction** window.
- ▶ Select **Reason for malfunction**

i In the drop-down menu, options are available that were defined in the **Settings** menu.

Further information: "Statuses submenu", Page 166

- ▶ If necessary, enter a comment
- ▶ Click the **Report malfunction** button
- > The malfunction appears in the **Malfunctions** table.

Accepting a malfunction



Entries cannot be edited at a later time. It is possible to upload a log at a later time.

To accept a malfunction and record times, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu



- ▶ To switch to the **Malfunctions** view, click the warning symbol
- ▶ In the **Malfunctions** table, click the desired malfunction
- ▶ StateMonitor displays the **Entries for malfunction {0}** table.
- ▶ In the **Change malfunction state** section, click the **Accept malfunction** button
- ▶ Time recording will start.
- ▶ Once the malfunction has been resolved on the machine, enter a comment as needed
- ▶ Click the **Malfunction fixed** button
- ▶ This terminates time recording.
- ▶ The new status appears in the **Malfunctions** table.
- ▶ Upload a log as needed



You can upload the protocol in the **Change malfunction state** section. The procedure corresponds to uploading a file to a maintenance event.

"Uploading a log"

Displaying a log

- ▶ To show linked logs, click the **Show log** button
- ▶ StateMonitor displays the **Logs of the malfunction: {0}** window.
- ▶ To open a log, click the **pdf** button in the pertinent row
- ▶ StateMonitor opens the log in a new tab of the browser.



Entered times appear in the **Maintenance** and **Evaluations** menus.

6

Messenger menu

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 role of the user determines which submenus and functions StateMonitor displays.

Further information: "User management submenu",
Page 150

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 95
- ▶ In the **Event configurator** submenu, configure the events.
(For which machine messages should someone be notified?)
Further information: "Event configurator submenu",
Page 91
- ▶ 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 97

6.2 Event configurator submenu

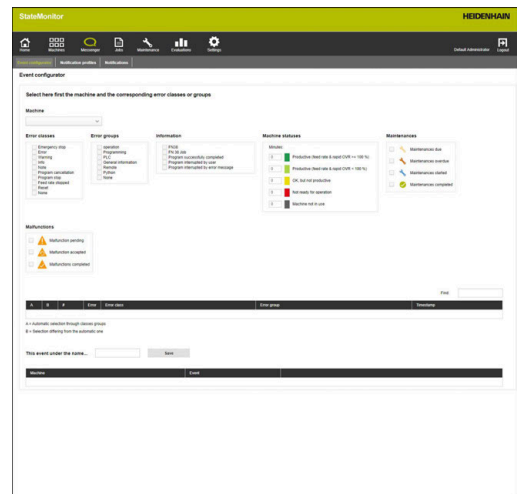
An event is a circumstance that can occur on the machine, such as:

- Warning message
- Machine stop with error message
- Servicing message / maintenance message
- Alarm

StateMonitor directly detects 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** or messages about **Maintenances** or **Malfunctions** can be part of the selection for an event. In the process, the **Information** is either generated in the NC program on the HEIDENHAIN controls (**FN38**) or by StateMonitor from the information of 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 the HEIDENHAIN controls, you can generate notifications via the NC program by means of the **FN38** special function. StateMonitor can receive these notifications and send them by e-mail to the user
- **FN 38 Job**
On the HEIDENHAIN controls, you can report a job status by means of the **FN38** special function via the NC program. StateMonitor can evaluate these statuses
- **Program successfully completed**
StateMonitor generates this notification when the control reads a **PGM END**, **M2**, or **M30** program end
- **Program interrupted by user**
StateMonitor generates this notification when the operator aborts the program with **INTERNAL STOP** or **NOTAUS**
- **Program interrupted by error message**
StateMonitor generates this notification when an error message interrupts the running program



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 after which StateMonitor triggers an event. You can assign a specific value (in minutes) to each machine status.

Maintenances (software option)

Under **Maintenances**, you can define the status of a maintenance event at which StateMonitor triggers an event.

StateMonitor differentiates between the following statuses:

- **Maintenances due**
- **Maintenances overdue**
- **Maintenances started**
- **Maintenances completed**

Malfunctions (software option)

Under **Malfunctions**, you can define the status of a malfunction at which StateMonitor triggers an event.

StateMonitor differentiates between the following statuses:

- **Malfunction pending**
- **Malfunction accepted**
- **Malfunctions completed**

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 46

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 separates mailbox for StateMonitor
- ▶ Select notifications very carefully

NOTICE

Caution: Data may be lost!

If StateMonitor sends too many notifications to recipients, then the e-mail provider may regard these notifications as spam. In this case, the recipient will no longer receive 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 the messages that should 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 box in Column A once you have selected the corresponding error class or error group.

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.

StateMonitor lists all of the added events in a further table.

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

- ▶ Click the event in the table
- > StateMonitor loads the selection of messages to the view.

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

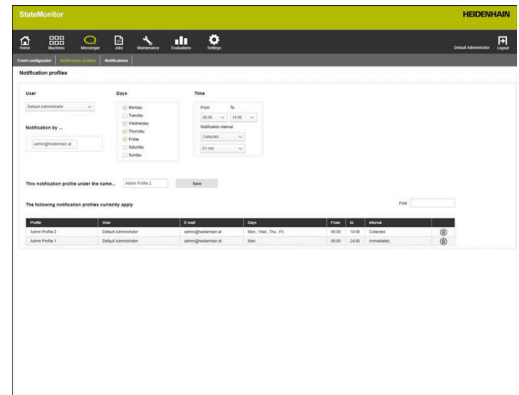
In the **Notification profiles** submenu, you can assign notification information to a defined user and store this information as a notification profile.

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.

The notifications are sent by e-mail. Some e-mail providers also offer the option of forwarding e-mails as instant messages.



Interval notifications

For the transmission period, you enter the following:

- The weekdays on which StateMonitor notifies the user
- The time span in which StateMonitor sends the notification 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:



- ▶ Switch to the **Messenger** menu
- ▶ Select the **Notification profiles** submenu
- ▶ Select the user for whom you wish to create the **Notification profiles**
- ▶ Enter the desired e-mail address
- ▶ Select the days of the week on which the user is to be notified
- ▶ Select the time from ... to ...
- ▶ Select the desired **Notification interval**
- ▶ Select a name for the notification profile
- ▶ 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 46

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:



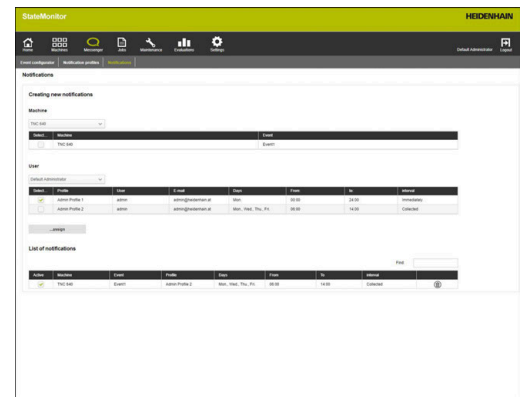
- ▶ Switch to the **Messenger** menu
- ▶ Select the **Notification profiles** submenu
- ▶ Select the **User** for whom you wish to create the **Notification profiles**



- ▶ 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:



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



With HEIDENHAIN controls, the **FN38** control function can generate messages that are processed as notifications in StateMonitor.

Further information: "FN38: Sending messages from the NC program", Page 99

Activating notifications

To activate a notification in the list, tick the box 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:



- ▶ Switch to the **Messenger** menu
- ▶ Select the **Notifications** submenu
- ▶ Click the recycle bin icon in the table
- > StateMonitor removes the selected notification from the table.



Further information: "Functions in tables and charts", Page 46

6.5 FN38: Sending messages from the NC program

FN38 control function

With HEIDENHAIN controls, the **FN38** control function can generate messages that are processed as notifications in StateMonitor.

FN38 can be used with the following HEIDENHAIN controls:

Control	Starting with software version
iTNC 530	34049x-03, 60642x-01
TNC 640	34059x-05
TNC 620	81760x-01
TNC 320	771851-02
TNC 128	771841-02
CNC PILOT 640	68894x-04
MANUAL Plus 620	54843x-04



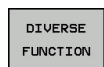
To be able to use the **FN38** function, you have to enter code number 555343 to enable special functions for Q parameter programming.
The TNC as of software version 34059x-07 allows programming of **FN38** without entering a code number.

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 /".
- ▶ Write the text to be sent with output formats for variables
Example:
FN 38: SEND / "Gemessener Durchmesser:
%+3F" / +Q153



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



Further information: The Klartext programming User's Manual of the corresponding control

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 **f** for 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:

Output formats	Meaning
%F	Output of a floating point number in original format
%.0F	Output of a floating point number without decimal places
%.1F	Output of a floating point number with one decimal place
%+.2F	Output of a floating point number with algebraic sign and two decimal places

Application example

Goal:

The quantity is increased by one every time a program is run through (parts counter)

Q1 = Q1 + 1	Parts counter
Q2 = 1000	Total quantity
Q3 = 0815	Job
FN 38: SEND/"Number of Parts: %.0F von %.0F Order: %.0F" /+Q1/+Q2/+Q3	Sending messages

7

Jobs menu

7.1 Jobs menu (software option)

i 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 188

With StateMonitor, you can record and evaluate the execution of production jobs. To this end, you create new jobs in the **Jobs** menu and assign them to a machine or machine group.

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 75

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

Further information: "Statuses submenu", Page 166

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

Further information: "Job times submenu (software option)", Page 141

i The role of the user determines which submenus and functions StateMonitor displays.
Further information: "User management submenu", Page 150

i With HEIDENHAIN controls, the **FN38** control function can be used to edit job functions in StateMonitor in the NC program.
Further information: "FN38: Job functions in the NC program", Page 107

7.2 Create job submenu (software option)

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

- Create new jobs
- Change jobs
- Delete jobs
- Export jobs as a CSV file
- Import jobs from a CSV file

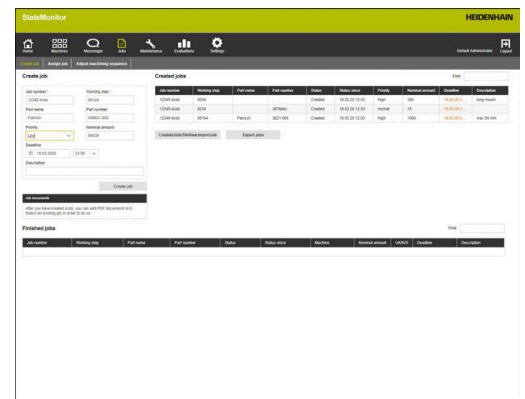
Creating a new job

To create a new job, proceed as follows:



- ▶ Switch to the **Jobs** menu
- ▶ Select the **Create job** submenu
- ▶ Enter the job number in the **Job number** field
- ▶ Enter the working step in the **Working step** field
- ▶ Enter other information on the job, if required
- ▶ Click the **Create job** button
- ▶ The job is displayed in the **Created jobs** table.
- ▶ You can assign the new job to a machine or machine group.

Further information: "Assign job submenu (software option)", Page 105



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

- ▶ Add a job in the manner described
- ▶ Select the job in the **Created jobs** table
- ▶ The data entered for the job is copied to the **Create job** section.
- ▶ Adapt the information, such as the work step
- ▶ Click the **Create job** button
- ▶ 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:

- ▶ In the **Created jobs** table, click the job to be changed
- ▶ The selected job is highlighted in green in the table.
- ▶ The data entered for the job is copied to the **Create job** section.
- ▶ Change the data as required
- ▶ Click the **Change job** button
- ▶ The changes are applied.

Deleting a job

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

To delete a job, proceed as follows:

- ▶ In the **Created jobs** table, click the job to be deleted
- > The selected job is highlighted in green in the table.
- ▶ Click the **Delete job** button
- > The job is deleted from the table.

Export jobs

You can export the jobs in the **Created jobs** table as a CSV file.



If you filter the table, then StateMonitor will export only those jobs corresponding to the filter.

In order to export one of the jobs, proceed as follows:

- ▶ Filter the **Created jobs** table as needed
- Further information:** "Functions in tables and charts", Page 46
- ▶ Click the **Export jobs** button
- ▶ Select the storage location
- ▶ Click the **Save** button
- > StateMonitor saves the table as a CSV file.

Import jobs

From a CSV file, you can import jobs to the **Created jobs** table.

In order to import jobs, proceed as follows:

- ▶ Click the **Import jobs** button
- ▶ Select file
- ▶ Click the **Open** button
- > StateMonitor imports the data from the CSV file to the **Created jobs** table.

7.3 Assign job submenu (software option)

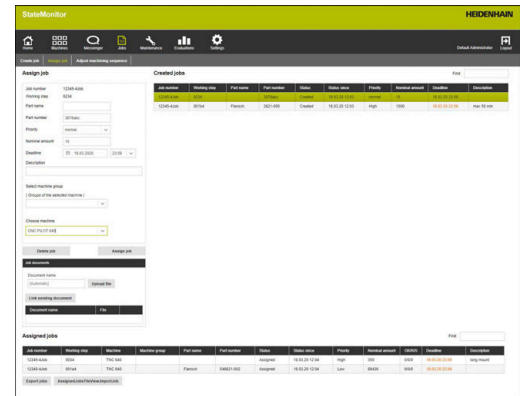
Assign job

You can assign a job to a machine or machine group and thereby release it for machining. Subsequently, the job appears in the **Job terminal** of the corresponding machines. Jobs that you assign to a machine group can be taken by any machine in the machine group. For this purpose, proceed as follows:



- ▶ Switch to the **Jobs** menu
- ▶ Select the **Assign job** submenu
- ▶ Select the job in the **Created jobs** table
- ▶ The selected job is highlighted in green in the table.
- ▶ Make a selection in at least one of the following selection fields:
 - **Select machine group**
 - **Choose 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 75



Changing a job assignment

Precondition: the job has not yet been started in the **Job terminal**.

To assign an assigned job to another machine or machine group, proceed as follows:



- ▶ Switch to the **Jobs** menu
- ▶ Select the **Assign job** submenu
- ▶ Select the job in the **Assigned jobs** table
- ▶ The selected job is highlighted in green in the table.
- ▶ Make the changes
- ▶ Click the **Assign job** button
- ▶ The assignment is changed.

Deleting a job

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

To delete a job, proceed as follows:

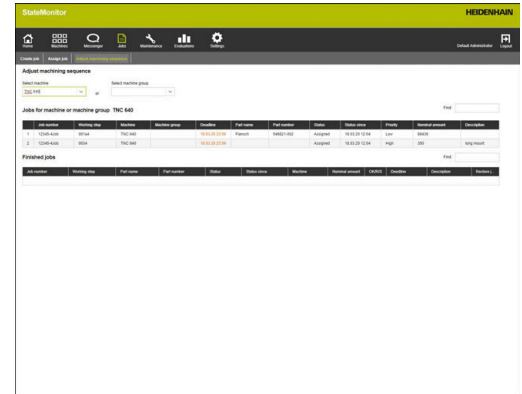
- ▶ In the **Created jobs** table, click the job to be deleted
- ▶ The selected job is highlighted in green in the table.
- ▶ Click the **Delete job** button
- ▶ The job is deleted from the table.

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
 - ▶ In the selection fields, select the machine or machine group for which you would like to adapt the machining sequence
 - ▶ The **Jobs for machine or machine group** table shows all of the jobs that are assigned to the selected machine or machine group.
 - ▶ 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 75



7.5 FN38: Job functions in the NC program

FN38 control function

With HEIDENHAIN controls, the **FN38** control function can be used to edit job functions in StateMonitor in the NC program.

FN38 can be used with the following HEIDENHAIN controls:

Control	Starting with software version
iTNC 530	34049x-03, 60642x-01
TNC 640	34059x-05
TNC 620	81760x-01
TNC 320	771851-02
TNC 128	771841-02
CNC PILOT 640	68894x-04
MANUAL Plus 620	54843x-04



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.

Creating a new job

As an alternative to creation via StateMonitor, you can create a job on the control via a **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
Further information: "FN38: Sending messages from the NC program", Page 99

Application example

Goal:

Job with job number 1234 and working step 1

```
FN 38: SEND /"JOB:1234_STEP:1_CREATE"
```

Create a new job



When you enter the command for **FN 38**, you must pay attention to capitalization.

Entering the job status

Via **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 99
- The job has been set up
- The job has been assigned to the machine

Application example

Goal:

Job with job number 1234 and working step 1

FN 38: SEND /"JOB:1234_STEP:1_START"	Start job
FN 38: SEND /"JOB:1234_STEP:1_PREPARATION"	Start preparation
FN 38: SEND /"JOB:1234_STEP:1_PRODUCTION"	Production
FN 38: SEND /"JOB:1234_STEP:1_STOP"	Stop job
FN 38: SEND /"JOB:1234_STEP:1_FINISH"	Finish job



When you enter the command for **FN 38**, you must pay attention to capitalization.

Reporting quantities

- 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
Further information: "FN38: Sending messages from the NC program", Page 99
- The job has been set up
- The job has been assigned to the machine
- The job is currently being executed

Application example

Goal:

Job with job number 1234 and working step 1; additional provided information of nominal quantity 23, scrap 12, and rework 15, and incremental entries

FN 38: SEND /"JOB:1234_STEP:1_OK_A:23"	Actual amount (OK) absolute value
FN 38: SEND /"JOB:1234_STEP:1_OK_I:1"	Actual amount (OK) incremental value
FN 38: SEND /"JOB:1234_STEP:1_S_A:12"	Scrap (S) absolute value
FN 38: SEND /"JOB:1234_STEP:1_S_I:1"	Scrap (S) incremental value
FN 38: SEND /"JOB:1234_STEP:1_R_A:15"	Rework (R) absolute value
FN 38: SEND /"JOB:1234_STEP:1_R_I:1"	Rework (R) incremental value



When you enter the command for **FN 38**, you must pay attention to capitalization.

8

Maintenance menu

8.1 Maintenance menu (software option)



The recording and documenting of maintenance events is an auxiliary function and is not included in the software's standard range of functions.

Further information: "Software options and licenses", Page 188

With StateMonitor, you can create, document, and analyze maintenance events. In order to do so, create maintenance jobs for individual machines in the **Maintenance** menu.

The **Maintenance** menu contains the following submenus:

- **Tile view**
 - **Maintenance terminal**
 - **Create maintenance step**
 - **Create maintenance**
- **Status overview**

In the **Maintenance** menu, all of the machines are shown that have been created and activated in the **Settings** menu.

Further information: "Machines submenuMachines", Page 154

Active maintenance jobs appear in the **Machines** menu in the status view of the machine. In the **Maintenance & malfunction** submenu, the operator can accept and document maintenance jobs.

Further information: "Maintenance & malfunction submenu (software option)", Page 84

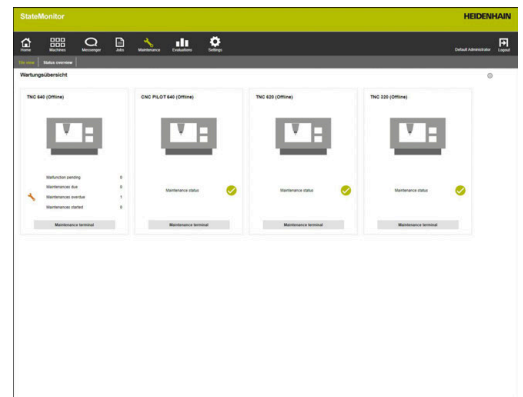
You can analyze completed maintenance events for individual machines in the **Evaluations** menu.

Further information: "Maintenances submenu (software option)", Page 143



The role of the user determines which submenus and functions StateMonitor displays.

Further information: "User management submenu", Page 150

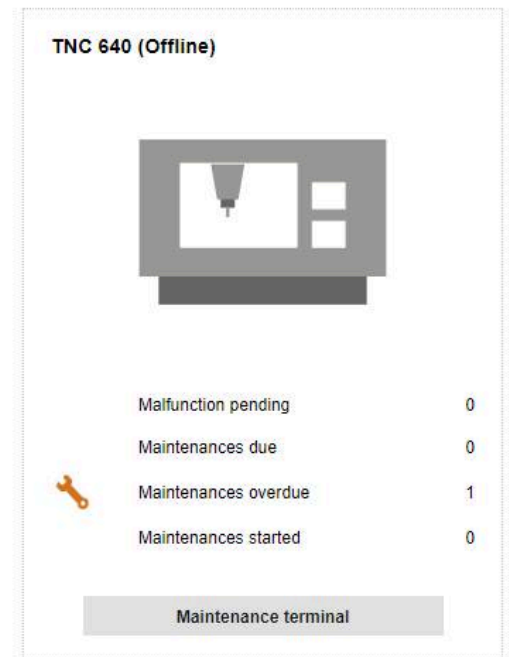


8.2 Tile view submenu (software option)

In the **Tile view** submenu, StateMonitor depicts every activated machine as status card.






The machine status card contains the following information:

Information	Meaning
Machine image	If, in the Settings menu, you have saved an image for the machine, StateMonitor will display the image here
Maintenance status	Current maintenance status of the machine



Symbols

The following symbols indicate the maintenance status:

Symbol	Meaning
Green 	No maintenance event is due
Light orange 	At least one maintenance event is due
Dark orange 	At least one maintenance event is overdue
Light blue 	At least one maintenance event is accepted
	At least one malfunction is pending

Filtering the Tile view

Each user can individually adapt the view. For this purpose, proceed as follows:



- ▶ Click the gear symbol
- > A filter selection window opens. The filter criteria encompass machines and machine groups.
- ▶ To limit the view to certain machines or machine groups, tick the box in front of it with the mouse
- > StateMonitor displays the selected machine.



If no box has been ticked, then StateMonitor shows all of the machines that are assigned to the user (standard setting).

8.3 Status overview submenu (software option)

In the **Status overview** submenu, StateMonitor displays an overview of the maintenance event statuses and due dates of all activated machines.

You can choose from among the following graph views:

- **Doughnut charts:** show the quantity and status of the maintenance events and malfunctions
- **Time-axis chart:** show the due dates of the planned maintenance events

Maintenances doughnut chart

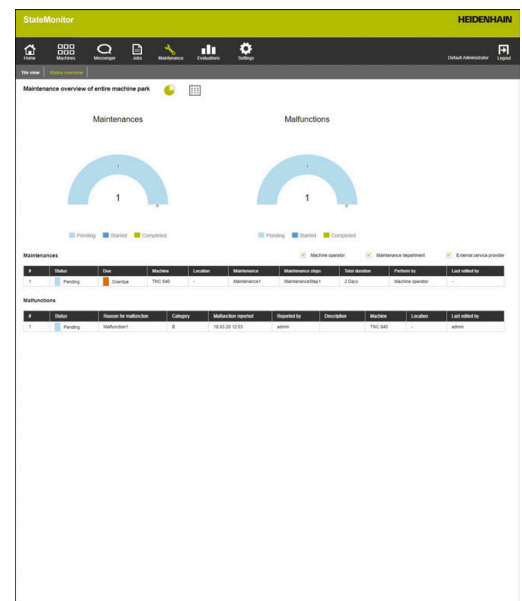
The **Maintenances** doughnut chart depicts the quantity and statuses of all active maintenance events.

StateMonitor differentiates between the following statuses:

- **Pending:** Maintenance events with the status **due** or **overdue**
- **Started:** All accepted maintenance events
- **Completed:** All completed maintenance events from the current day



- ▶ To call the doughnut chart, click the pie chart symbol



Malfunctions doughnut chart

The **Malfunctions** doughnut chart shows the quantity and statuses of the reported malfunctions.

StateMonitor differentiates between the following statuses:

- **Pending:** All of the reported malfunctions
- **Started:** All accepted malfunctions
- **Completed:** Completed malfunctions from the current day



- ▶ To call the doughnut chart, click the pie chart symbol

Planned maintenances (by calendar)

The **Planned maintenances (by calendar)** time-axis chart shows the due dates of all active maintenance jobs based on an interval of time.

StateMonitor differentiates between the following statuses:

- Due
- Overdue



- ▶ To call the **Planned maintenances (by calendar)** time-axis chart, click the calendar symbol



In addition to the **Planned maintenances (by calendar)** time-axis chart, you also can show the following time-axis charts.

Planned maintenances (productive machine hours) time-axis chart

The **Planned maintenances (productive machine hours)** time-axis chart shows the due dates of all active maintenance jobs based on the number of productive machine hours.

StateMonitor differentiates between the following statuses:

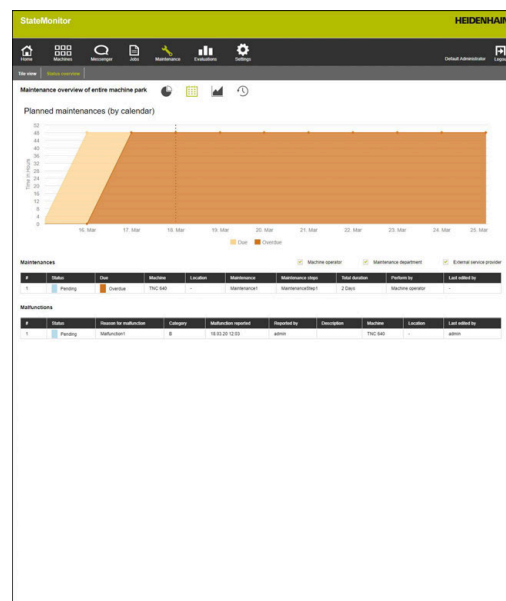
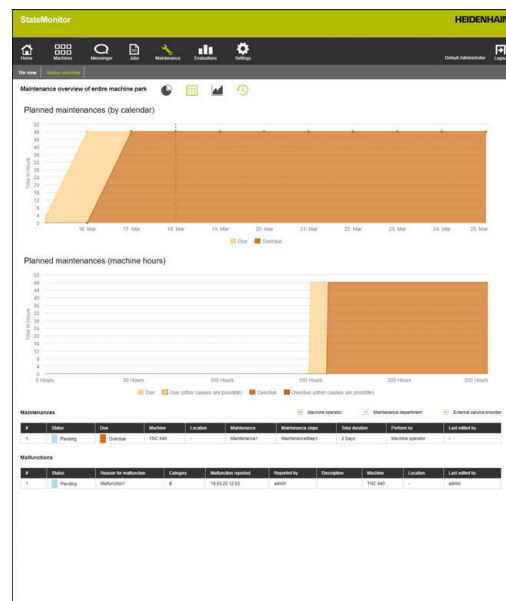
- Due
- Due (other causes are possible)*
- Overdue
- Overdue (other causes are possible)*

* Further due dates are defined for the maintenance event.

Further information: "Create maintenance", Page 127



- ▶ To show or hide the **Planned maintenances (machine hours)** time-axis chart, click the chart symbol



Planned maintenances (machine hours) time-axis chart

The **Planned maintenances (machine hours)** time-axis chart shows the due dates of all active maintenance jobs based on the number of online machine hours.

StateMonitor differentiates between the following statuses:

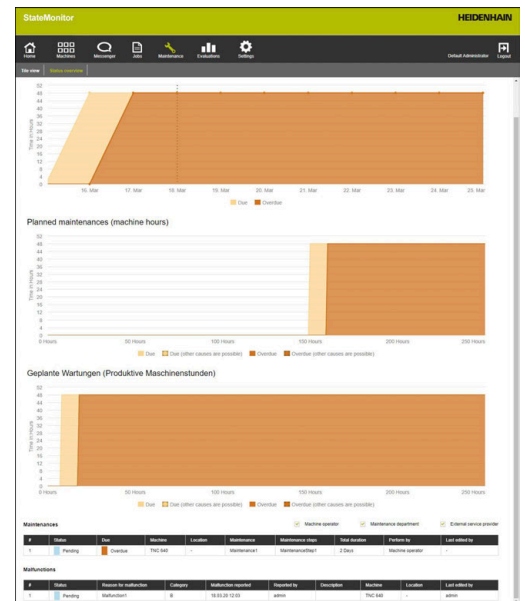
- **Due**
- **Due (other causes are possible)***
- **Overdue**
- **Overdue (other causes are possible)***

* Further due dates are defined for the maintenance event.

Further information: "Create maintenance", Page 127



- ▶ To show or hide the **Planned maintenances (machine hours)** time-axis chart, click the clock symbol



Maintenances table

The **Maintenances** table lists all of the pending, accepted, and completed maintenance events and contains the following information:

- **Status:** Current status of the maintenance event
- **Due:** Due date of the maintenance event
- **Machine tool:** Machine designation
- **Location:** Location of the machine
- **Maintenance:** Name of the maintenance event
- **Maintenance steps:** Name of the maintenance steps encompassed by the maintenance event
- **Total duration:** Duration of all the maintenance steps added together
- **Perform by:** Responsible roles defined when the maintenance steps were created
- **Last edited by:** Name of the user who entered the last status

Malfunctions table



The **Malfunctions** table lists all of the pending and accepted malfunctions and contains the following information:

- **Status:** Current status of the malfunction
- **Reason for malfunction:** From the user when the selected reason for the malfunction is reported
- **Category:** Category of the malfunction to which the selected reason for the malfunction belongs
- **Störung eingegangen:** Time at which the malfunction was reported
- **Gemeldet durch:** Name of the user who reported the malfunction
- **Description:** Comment from the user
- **Machine tool:** Machine designation
- **Location:** Location of the machine
- **Last edited by:** Name of the user who entered the last status


8.4 Maintenance terminal submenu (software option)


In the **Maintenance terminal** submenu, you can see the current maintenance status of the machine, as well as accept and document maintenance jobs during execution on the machine. You can subsequently upload a log.

The **Maintenance terminal** submenu contains the following views.

Symbol	View
	Maintenances
	Malfunctions

► To switch between the views, click the respective symbol

 The **Maintenance terminal** submenu shows the current machine status and the machine's master data.
Further information: "Overview of machine statuses", Page 59
Further information: "Edit machine", Page 158 (master data of the machine)

 To report a malfunction, switch to the **Machines** menu.
Further information: "Maintenance & malfunction submenu (software option)", Page 84

Maintenances view

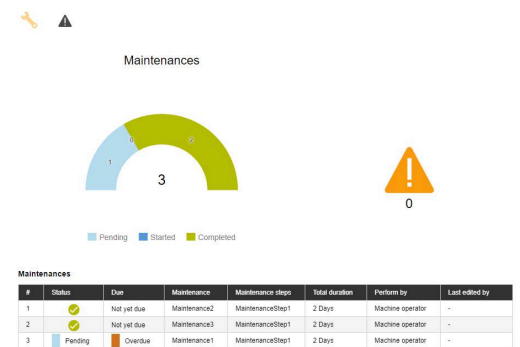
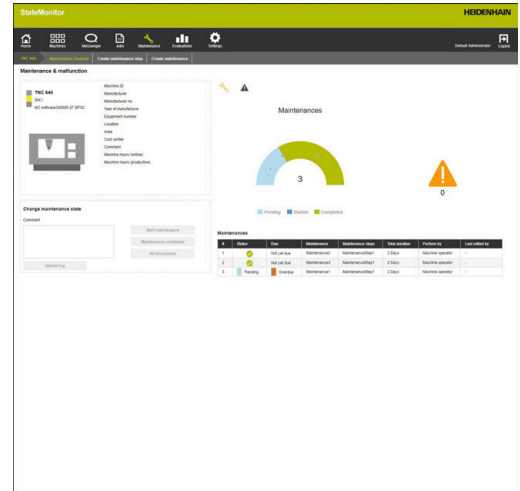
The **Maintenances** view encompasses the following elements:

- **Maintenances** doughnut chart
Further information: "Maintenances doughnut chart", Page 115
- **Malfunctions** warning symbol:
 Under the warning symbol, StateMonitor shows the number of the unresolved malfunctions.
- **Maintenances** table
Further information: "Maintenances table", Page 117

If you select a maintenance event in the **Maintenances** table, then StateMonitor also displays the **Entries for maintenance: {0}** tables. The **Entries for maintenance: {0}** table chronologically lists the booked statuses of the selected maintenance event.

The **Entries for maintenance: {0}** table contains the following information:

- **Status:** Current status of the maintenance job
- **Status since:** Date of the last entry
- **Comment:** Comment of the user
- **User:** The user who made the last entry



Malfunctions view

The **Malfunctions** view encompasses the following elements:

- **Malfunctions** doughnut chart
Further information: "Malfunctions doughnut chart", Page 115
- **Malfunctions** warning symbol
- **Malfunctions** table
Further information: "Malfunctions table", Page 118

If you select a malfunction in the **Malfunctions** table, then StateMonitor also shows the **Entries for malfunction {0}** table. The **Entries for malfunction {0}** table chronologically lists the booked statuses of the selected malfunction.

The **Entries for malfunction {0}** table contains the following information:

- **Status:** Current status of the malfunction
- **Status since:** Date of the last entry
- **Comment:** Comment of the user
- **User:** The user who made the last entry



This reporting of malfunctions is performed in the **Machines** menu.

Further information: "Maintenance & malfunction submenu (software option)", Page 84

Accepting a maintenance event

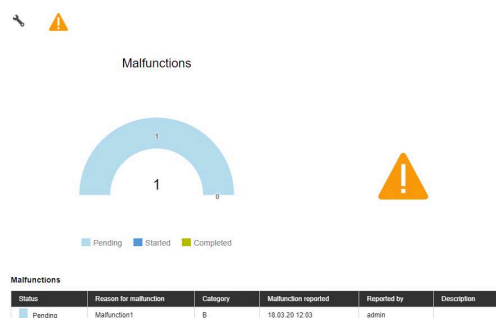


Entries cannot be edited at a later time. It is possible to upload a log at a later time.

To accept a maintenance event and record maintenance times, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu
- ▶ Click the desired maintenance job in the **Maintenances** table
- ▶ Call linked documents as needed
Further information: "Displaying linked documents", Page 86
- > The information about the maintenance job appears in the **Maintenance: {0}** section.
- ▶ In the **Change maintenance** section, press the **Start maintenance** button
- > Time recording will start.
- ▶ Once the maintenance tasks on the machine are completed, enter a comment as needed
- ▶ Click the **Maintenance completed** button
- > This terminates time recording.
- > The new maintenance status appears in the **Maintenances** table.
- ▶ If necessary, upload a log in the following manner



Uploading a log

Precondition: the protocol is available as a PDF file.

- ▶ In the **Change maintenance** section, press the **Upload file** button
- > StateMonitor shows the **Upload file for maintenance: {0}** window.
- ▶ In the **File name** field, enter a document name
- ▶ Click the **Upload file** button
- ▶ Select the file in Windows Explorer
- ▶ Click **Open**
- ▶ Close the window
- > The log is loaded and linked to the selected maintenance job.

Displaying linked documents

- ▶ To show all of the documents that are linked to a maintenance job, click the **All files** button
- > StateMonitor displays the **All files of the maintenance: {0}** window containing the following documents:
 - **Maintenance documents**
 - **Documents of all maintenance steps**
 - **Maintenance protocols**
- ▶ To open a document, click in the **pdf** button in the pertinent row
- > StateMonitor opens the document in a new browser tab.

Accepting a malfunction



Entries cannot be edited at a later time. It is possible to upload a log at a later time.

To accept a malfunction and record times, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu



- ▶ To switch to the **Malfunctions** view, click the warning symbol
- ▶ In the **Malfunctions** table, click the desired malfunction
- ▶ StateMonitor displays the **Entries for malfunction {0}** table.
- ▶ In the **Change malfunction state** section, click the **Accept malfunction** button
- ▶ Time recording will start.
- ▶ Once the malfunction has been resolved on the machine, enter a comment as needed
- ▶ Click the **Malfunction fixed** button
- ▶ This terminates time recording.
- ▶ The new status appears in the **Malfunctions** table.
- ▶ Upload a log as needed



You can upload the protocol in the **Change malfunction state** section. The procedure corresponds to uploading a file to a maintenance event.

"Uploading a log"

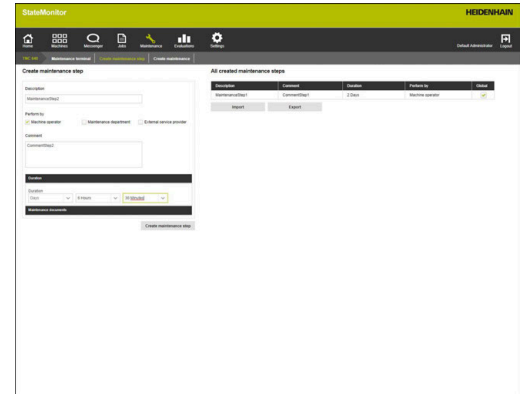
Displaying a log

- ▶ To show linked logs, click the **Show log** button
- ▶ StateMonitor displays the **Logs of the malfunction: {0}** window.
- ▶ To open a log, click the **pdf** button in the pertinent row
- ▶ StateMonitor opens the log in a new tab of the browser.

8.5 Create maintenance step submenu (software option)

In the **Create maintenance step** submenu, you can:

- Create maintenance steps from which you can subsequently generate maintenance jobs
- Change maintenance steps
- Delete maintenance steps
- Export maintenance steps as an XML file
- Import maintenance steps from an XML file



Creating a maintenance step

To create a maintenance step, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu
- ▶ Select the **Create maintenance step** submenu
- ▶ Enter a designation in the **Description** field
- ▶ Select the responsible role under **Perform by** (multiple selections are possible)
- ▶ Enter any additional information as needed in the **Comment** field
- ▶ Enter the duration of the maintenance step as needed in the **Duration** pull-down menu
- ▶ Click the **Create maintenance step** button
- > The maintenance step appears in the **All created maintenance steps** table.
- > You can use the new maintenance step for the creation of maintenance jobs.
Further information: "Create maintenance submenu (software option)", Page 126



If you tick the box in the **Global** column, then the maintenance step is available for all of the machines. If you untick the box, then the maintenance step is available only for the selected machine.

Uploading a document to a maintenance step

To upload documents to a maintenance step, proceed as follows:

- ▶ In the **All created maintenance steps** table, click the maintenance step that you would like to change
- > The selected maintenance step is highlighted in green in the table.
- > The job information is transferred to the **Create maintenance step** section.
- ▶ Select **Maintenance documents** in the pull-down menu
- ▶ In the **File name** field, enter a document name
- ▶ Click **Upload file**
- ▶ Select the file in Windows Explorer
- ▶ Click **Open**
- ▶ Close the window
- > The document is uploaded and linked with the selected maintenance step.

Linking an existing document with a maintenance step

To link uploaded documents with a maintenance step, proceed as follows:

- ▶ In the **All created maintenance steps** table, click the maintenance step that you would like to change
- > The selected maintenance step is highlighted in green in the table.
- > The job information is transferred to the **Create maintenance step** section.
- ▶ Select **Maintenance documents** in the pull-down menu
- ▶ Click the **Link existing file** button
- > StateMonitor displays the available files.
- ▶ Select the desired file
- ▶ Click the **Upload document** button
- > The document is linked with the selected maintenance step.

Deleting a document linkage

To delete the linkage between a maintenance step and a document, proceed as follows:

- ▶ Click the maintenance step in the **All created maintenance steps** table
- > The selected maintenance step is highlighted in green in the table.
- > The job information is transferred to the **Create maintenance step** section.
- ▶ Select **Maintenance documents** in the pull-down menu
- ▶ Click the recycle bin symbol next to the desired document
- ▶ Click the **Yes** button in the dialog box
- > StateMonitor deletes the linkage.



Changing a maintenance step

To change a maintenance step, proceed as follows:

- ▶ In the **All created maintenance steps** table, click the maintenance step that you would like to change
- > The selected maintenance step is highlighted in green in the table.
- > The maintenance step information is transferred to the **Create maintenance step** section.
- ▶ Change the information
- ▶ Click the **Save maintenance step** button
- > The changes are applied.

Deleting a maintenance step



When you delete a maintenance step, StateMonitor removes the maintenance step, even from all of the maintenance jobs. Maintenance jobs containing only the affected maintenance step are deleted as well.

To delete a maintenance step, proceed as follows:

- ▶ In the **All created maintenance steps** table, click the maintenance step you would like to delete
- > The selected maintenance step is highlighted in green in the table.
- ▶ Click the **Delete maintenance step** button
- > If the maintenance step is used in maintenance jobs, then StateMonitor displays a list of the maintenance jobs.
- ▶ To delete the maintenance step, click the **Yes** button
- > The maintenance step is deleted from the table.

Exporting maintenance steps

You can export the maintenance steps in the **All created maintenance steps** table as an XML file.

To export one of the maintenance steps, proceed as follows:

- ▶ Click the **Export** button
- ▶ Select the storage location
- ▶ Click the **Save** button
- > StateMonitor saves the data from the table as an XML file.

Importing maintenance steps

You can import maintenance steps from an XML file into the **All created maintenance steps** table.

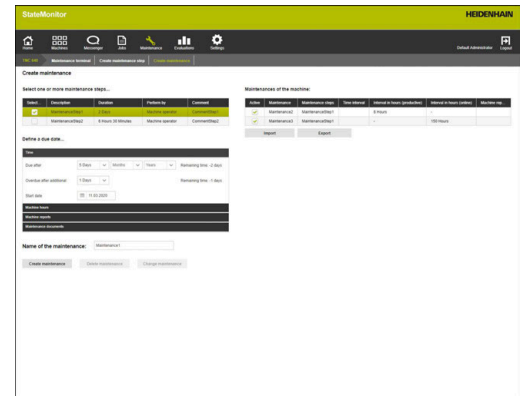
To import maintenance steps, proceed as follows:

- ▶ Click the **Import** button
- ▶ Select file
- ▶ Click the **Open** button
- > StateMonitor imports the data from the XML file into the **All created maintenance steps** table.

8.6 Create maintenance submenu (software option)

In the **Create maintenance** submenu, you can:

- Create maintenance jobs for the selected machine
- Change maintenance jobs
- Delete maintenance jobs



Create maintenance

For a maintenance event, you will need to define at least one due date.

The due date may be based on:

- A point in time
- A certain number of machine hours
- The occurrence of machine messages



If you define multiple due dates, StateMonitor displays the maintenance as due as soon as the earliest condition occurs.

To create a maintenance event, proceed as follows:



- ▶ Switch to the **Maintenance** menu
- ▶ Select the desired machine in the **Tile view of maintenance** submenu
- ▶ Select the **Create maintenance** submenu
- ▶ In the **Select one or more maintenance steps...** table, tick the box in front of the maintenance steps that the maintenance job is to contain
- ▶ Define the due date as follows

Defining the due date based on an interval of time:

- ▶ Select **Time** in the pull-down menu
- ▶ Select the number of days, months, or years after which the maintenance event is due
- ▶ Select the number of post-due-time days after which the maintenance event becomes overdue
- ▶ At **Start date**, click the calendar symbol
- ▶ Select the desired date
- ▶ Alternatively, enter the desired number or the desired date

Defining the due date based on machine hours:

- ▶ Select **Machine hours** in the pull-down menu
- > StateMonitor displays the current number of machine hours:
 - Productive machine hours (sum of the machine hours based on the recorded dark-green and light-green machine states)
 - Online machine hours (sum of the machine hours based on the recorded dark-green, light-green, yellow, and red machine statuses)

Further information: "Statuses submenu", Page 166

- ▶ In the **Due after** field, enter the respective number of machine hours after which the maintenance is due
- ▶ In the **Overdue after additional** field, enter the respective number of post-due-time machine hours after which the maintenance event becomes overdue
- ▶ In the **Start hour counter at machine hour** field overwrite the current number of machine hours as needed (e.g., enter the value "0" in order to have the machine hours counter start at "0")

Defining the due date based on machine messages:

- ▶ Select **Machine reports** in the pull-down menu
- ▶ In the **Due** and **Overdue** columns, select the machine messages that are to trigger the respective status
- ▶ Enter a designation in the **Name of the maintenance:** field
- ▶ Click the **Create maintenance** button
- > The maintenance event appears in the **Maintenances of the machine: {0}** table.
- > The maintenance event is active.
- > The maintenance event appears in the **Maintenance terminal** submenu of the machine.

Further information: "Maintenance terminal submenu (software option)", Page 119



If you tick the box in the **Active** column, then the maintenance event appears in the **Maintenance terminal** submenu of the selected machine.



How to quickly and easily create multiple maintenance jobs:

- ▶ Create a maintenance job as described
- ▶ Select the maintenance job in the **All created maintenance steps** table
- > The maintenance job information is transferred to the **Create maintenance** section.
- ▶ Change the information
- ▶ Click the **Create maintenance** button
- > The new maintenance step is added.

Changing a maintenance step

To change a maintenance step, proceed as follows:

- ▶ In the **Maintenances of the machine: {0}** table, click the maintenance step that you would like to change
- > The selected maintenance step is highlighted in green in the table.
- > The maintenance step information is transferred to the **Create maintenance** section.
- ▶ Change the information
- ▶ Click the **Change maintenance** button
- > The changes are applied.

Uploading a document, linking it with a maintenance event, or deleting a linkage

The procedure for uploading documents and linking them to a maintenance event, or the method for deleting document linkages, are identical to the procedure in the **Create maintenance step** submenu.

Further information: "Create maintenance step submenu (software option)", Page 123

Deleting a maintenance step

To delete a maintenance step, proceed as follows:

- ▶ In the **Maintenances of the machine: {0}** table, click the maintenance step that you would like to delete
- > The selected maintenance step is highlighted in green in the table.
- ▶ Click the **Delete maintenance** button
- ▶ Click the **Yes** button in the dialog box
- > The maintenance step is deleted from the table.

9

Evaluations menu

9.1 Evaluations menu

In the **Evaluations** menu, StateMonitor displays data obtained from the machines in tables and charts.

The **Evaluations** menu includes the following submenus:

- **Machine statuses**
- **Key figures**
- **Program run times**
- **Machine reports**
- **Job times** (software option)
- **Signals** (software option)
- **Maintenances** (software option)
- **Time filter**

In the **Machine statuses** submenu, StateMonitor displays the machine statuses in chronological order in machine status bars and calculates the **Availability** and **Utilization rate** values.

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

In the optional **Job times** submenu, StateMonitor lists the machining times and workpiece quantities that have been entered for the individual jobs. If an hourly rate is stored for the machine, then StateMonitor also displays the costs per job and working step here.

In the optional **Maintenances** submenu, StateMonitor lists the recorded data on performed maintenance events and resolved malfunctions per machine.

In the **Time filter** submenu, you can limit the evaluation to certain periods of time.



The role of the user determines which submenus and functions StateMonitor displays.

Further information: "User management submenu", Page 150

Saving Evaluations

In all of the submenus, with the exception of **Time filter**, you can save the current evaluation under **My evaluations**.

If you tick the box next to **Local**, then this evaluation is visible only with your login information. Other users will not see this evaluation.

If you do not tick the box next to **Local**, then the evaluation is visible for all users with **Authorization status StateMonitor User plus** or **Administrator**.

Proceed as follows to save your evaluation:

- ▶ Click **My evaluations**
- ▶ Enter the **Evaluation name**
- ▶ Tick the box next to **Local** as needed
- ▶ Click the **Save** button
- ▶ StateMonitor saves the current evaluation and enters it in the **Saved evaluations** table.

Evaluation	Local	
statesEvaluation	<input checked="" type="checkbox"/>	
programRuntimesEvaluation	<input checked="" type="checkbox"/>	

Loading saved evaluations

Proceed as follows if you have already saved evaluations:

- ▶ Select the saved evaluations under **My evaluations**
- > StateMonitor loads the selection data from the saved evaluation into the view.

9.2 Machine statuses submenu

In the **Machine statuses** submenu, you can perform an Evaluation of machine statuses.

The following formats are available for evaluation:

- **Key figures of the evaluation period for all machines** graph with the **Availability** and **Utilization rate** bar graphs **Utilization rate**
Further information: "Key figures submenu", Page 136
- Additional graph with the specifications of a selected machine status
- Machine status bars for each machine and day
- Bar graph for every machine status bar

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)
- ▶ Alternatively, select groups (tick the boxes in front of group 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 displays the machine statuses for the selected period.

Key figures of the evaluation period for all machines graph

This graph shows, as percentages, all of the machine statuses of the selected machines within the selected period.

You can show an additional graph that lists the specifications of a machine status. For this purpose, proceed as follows:

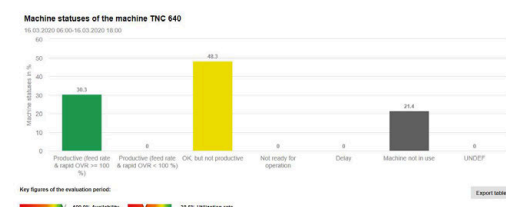
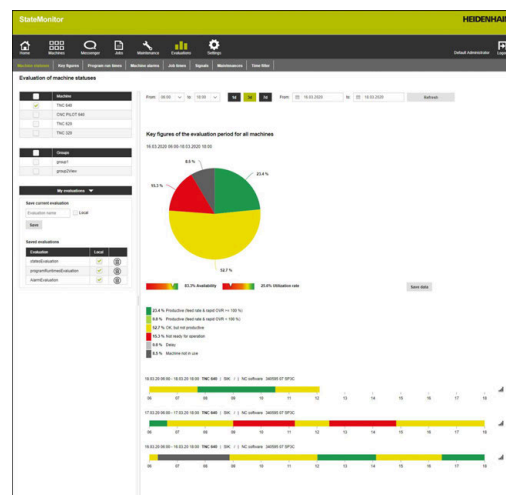
- ▶ Click the desired machine status in the first graph
- ▶ StateMonitor displays the additional graph with the specifications for the machine status.

Further information: "Statuses submenu", Page 166

Showing detailed information

You can show detailed information for each section of the machine status bar. For this purpose, proceed as follows:

- ▶ Click a section of the machine status bar
- ▶ StateMonitor displays a window containing detailed information about the machine status and any comments.



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 70
- ▶ To display the specifications (subcategories), click the bar.
- > The data is displayed as a separate bar.

Further information: "Functions in tables and charts", Page 46

Saving the evaluation

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

Further information: "Saving Evaluations", Page 132

9.3 Key figures submenu

In the **Key figures** submenu, you can evaluate the key figures for selected machines. For a defined period, StateMonitor calculates the **Availability** and **Utilization rate** values based on the incoming machine statuses.

Further information: "Availability", Page 137

Further information: "Utilization rate", Page 138

Displaying key figures

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)
- ▶ Alternatively, select groups (tick the boxes in front of group names)
- ▶ Select a time **from ... until ...**
- ▶ Or
- ▶ Select the **Time filter** (if available)
Further information: "Time filter submenu", Page 144
- ▶ Select the number of days (counting back from the current day)
- ▶ Alternatively, select a date **from ... to ...**
- ▶ For the selected machines and in the selected period, StateMonitor displays the following key figures in the table:
 - **Availability**
 - **Utilization rate**
 - **Productive time**
 - **Scheduled busy time**
 - **Busy time**
 - **Total down time**

Date	Machine	Status	Availability	Utilization rate	Productive time	Scheduled busy time	Busy time	Total down time
19.02.2020	TNC 640	✓	99.9%	21.2%	11:00:00	00:00:00	00:00:00	00:00:00
20.02.2020	TNC 640	✓	99.9%	21.2%	11:00:00	00:00:00	00:00:00	00:00:00
21.02.2020	TNC 640	✓	99.9%	21.2%	11:00:00	00:00:00	00:00:00	00:00:00
22.02.2020	TNC 640	✓	99.9%	21.2%	11:00:00	00:00:00	00:00:00	00:00:00
23.02.2020	TNC 640	✓	99.9%	21.2%	11:00:00	00:00:00	00:00:00	00:00:00

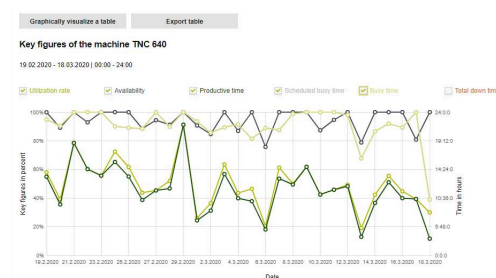
Further information: "Functions in tables and charts", Page 46

Graphically visualize a table

For each selected machine, StateMonitor displays the key figures in a separate graphic.

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

Further information: "Saving Evaluations", Page 132



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.

$$\begin{array}{r} \text{Total period under consideration} \\ - \text{Time during which the machine is not operated} \\ \hline = \text{Scheduled busy time (= time during which the machine is operated)} \end{array}$$

The total down time results from the following sum:

$$\begin{array}{r} \text{Time during which the machine is not operated} \\ + \text{Delay} \\ + \text{Time during which the machine is not ready for operation} \\ \hline = \text{Total down time} \end{array}$$

Thus, the availability is as follows:

$$\text{Availability} = \frac{\text{Total period under consideration} - \text{Time during which the machine is not operated} - \text{Delay} - \text{Time during which the machine is not ready for operation}}{\text{Total period under consideration} - \text{Time during which the machine is not operated}}$$

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.

$$\text{Utilization rate} = \frac{\text{Productive time} \quad \color{green}{\text{█}} \quad + \quad \color{lightgreen}{\text{█}}}{\text{Busy time}}$$

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

$$\begin{array}{r} \text{Total period under consideration} \\ - \quad \color{gray}{\text{█}} \quad \text{Delay} \\ - \quad \color{black}{\text{█}} \quad \text{Time during which the machine is not operated} \\ \hline = \quad \text{Busy time} \end{array}$$

Thus, the utilization rate is as follows:

$$\text{Utilization rate} = \frac{\text{Productive time} \quad \color{green}{\text{█}} \quad + \quad \color{lightgreen}{\text{█}}}{\text{Total period under consideration} \quad - \quad \color{black}{\text{█}} \quad - \quad \color{gray}{\text{█}}}$$



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%.

9.4 Program run times submenu

In the **Program run times** submenu, you can evaluate the run times of the NC programs of selected 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)
- ▶ Alternatively, select groups (tick the boxes in front of group names)
- ▶ Select the time from ... to ...
- ▶ Select the number of days (counting back from the current day)
- ▶ Alternatively, select the date from ... to ...
- ▶ In the table, StateMonitor lists the programs that ran in the selected period.

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

Further information: "Saving Evaluations", Page 132

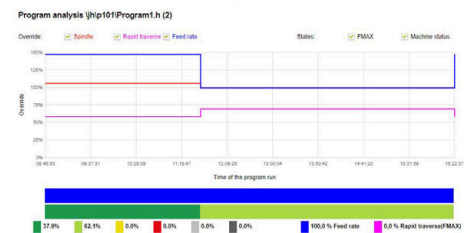
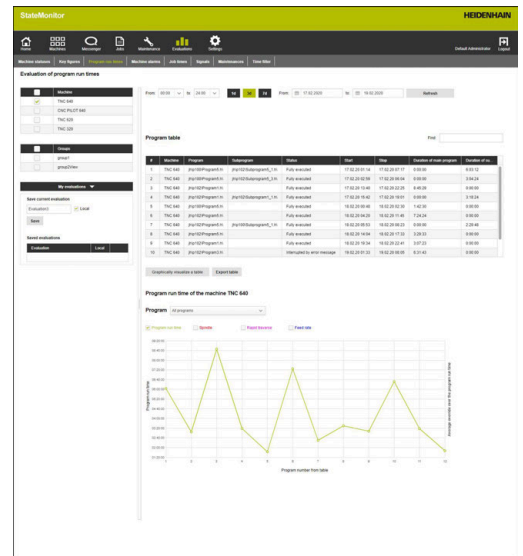
Graphically visualize a table

In terms of their functionality, the program table and its graphical visualizations are equivalent to the **Program run times** submenu in the **Machines** menu under **Machine status**.

Further information: "Program run times submenu", Page 82



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 of the graphs one below the other.



9.5 Machine reports submenu

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

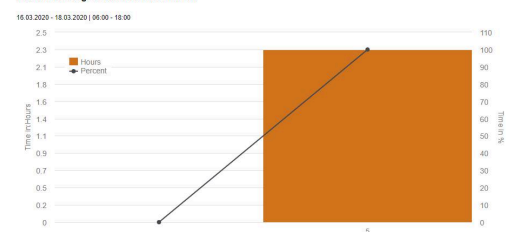
Proceed as follows to list **Machine reports**:



- ▶ Switch to the **Evaluations** menu
- ▶ Select the **Machine reports** submenu
- ▶ Select the desired machines (tick the machine names)
- ▶ Alternatively, select groups (tick the boxes in front of group 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
- ▶ In a table, StateMonitor lists all of the machine messages that occurred in the selected period on the selected machine and that belong to the selected **Error classes, Error groups, or Information**.
- ▶ To show bar graphs for the table, click the **Graphically visualize a table** button
- ▶ StateMonitor visualizes the data from the table in a bar graph for each machine.

Machine	Error	Error class	Error group	Target	Acknowledged
TNC 640	This is a program cancelled by user message	-	-	18.03.2020 17:12	
TNC 640	This is a program cancelled by user message	-	-	17.03.20 07:06:56	
TNC 640	Alarm	None	Program	17.03.20 08:39:58	17.03.20 11:12:19
TNC 640	This is a program cancelled by error message	-	-	17.03.20 11:46:51	
TNC 640	Alarm	None	Program	17.03.20 12:28:28	17.03.20 14:50:00
TNC 640	This is a program cancelled by error message	-	-	17.03.20 14:28:28	
TNC 640	This is a program cancelled by user message, which should be read with care	-	-	18.03.20 11:54:51	
TNC 640	This is a program cancelled message	-	-	18.03.20 11:58:51	
CNC PLDT 6	This is a program cancelled by user message	-	-	18.03.20 11:18:11	
CNC PLDT 6	This is a program cancelled by user message	-	-	17.03.20 07:17:56	
CNC PLDT 6	This is a program cancelled by user message	-	-	17.03.20 11:14:24	
CNC PLDT 6	This is a program cancelled by user message, which should be read with care	-	-	18.03.20 11:20:19	
CNC PLDT 6	This is a program cancelled message	-	-	18.03.20 11:21:18	
TNC 620	This is a program cancelled by user message	-	-	18.03.20 14:16:58	
TNC 620	Alarm	None	Program	18.03.20 15:10:19	18.03.20 17:11:15
TNC 620	This is a program cancelled message	-	-	17.03.20 07:37:46	

Machine messages of the machine TNC 320



Further information: "Functions in tables and charts", Page 46

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

Further information: "Saving Evaluations", Page 132

9.6 Job times submenu (software option)

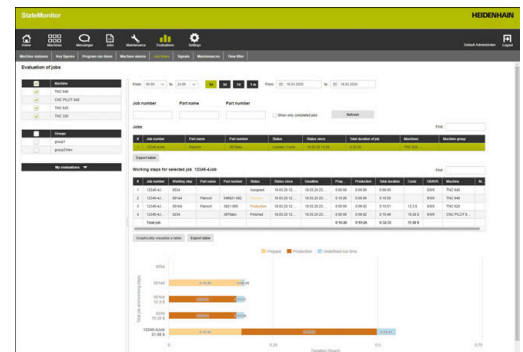
In the **Job times** submenu, you can evaluate recorded data related to your production jobs.

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



If hourly rates are saved for the selected machines in the settings, then StateMonitor also shows the costs per job and working step here.



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)
- ▶ Alternatively, select groups (tick the boxes in front of group 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
- ▶ In the table, StateMonitor lists all of the jobs that correspond to 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 graph for the **Working steps for selected job** table, click the **Graphically visualize a table** button

Further information: "Functions in tables and charts", Page 46

9.7 Signals submenu (software option)

In the **Signals** submenu, you can evaluate machine signals.

Precondition: the affected signals are configured in StateMonitor.

Further information: "Configuring signals", Page 160

To evaluate signals, proceed as follows:

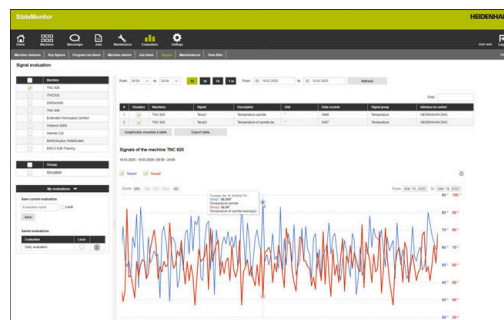


- ▶ Switch to the **Evaluations** menu
- ▶ Select the **Signals** submenu
- ▶ Select the desired machines (tick the boxes in front of machine names)
- ▶ Alternatively, select groups (tick the boxes in front of group names)
- ▶ Select a time from ... to ...
- ▶ Select the number of days (counting back from the current day)
- ▶ Alternatively, select a date from ... to ...
- ▶ Click the **Refresh** button
- > In a table, StateMonitor lists the signals that occurred during the selected period.

Further information: "Functions in tables and charts", Page 46

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

Further information: "Saving Evaluations", Page 132



9.8 Maintenances submenu (software option)

In the **Maintenances** submenu, you can evaluate the recorded data on performed maintenance events and resolved malfunctions.

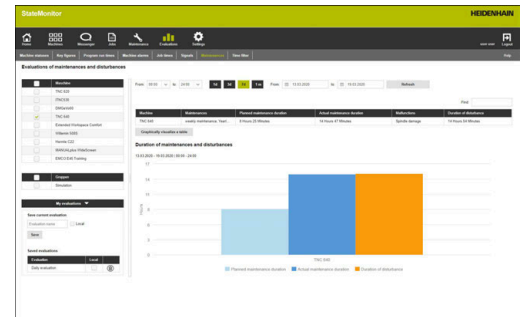
The following formats are available for evaluation:

- The table lists the performed maintenance events and resolved malfunctions that correspond to the search criteria
- The **Duration of maintenances and disturbances** graph visualizes, for each machine, the planned and actual duration of a maintenance event and the duration of a malfunction

To evaluate the recorded data, proceed as follows:



- ▶ Switch to the **Evaluations** menu
- ▶ Select the **Maintenances** submenu
- ▶ Select the desired machines (tick the boxes in front of machine names)
- ▶ Alternatively, select groups (tick the boxes in front of group names)
- ▶ Select a time from ... to ...
- ▶ Select the number of days (counting back from the current day)
- ▶ Alternatively, select a date from ... to ...
- ▶ Click the **Refresh** button
- ▶ In a table, StateMonitor lists all of the maintenance events and malfunctions that correspond to the search criteria.
- ▶ To show the graph, click the desired entry in the table
- ▶ Click the **Graphically visualize a table** button
- ▶ StateMonitor shows the **Duration of maintenances and disturbances** graph.



Further information: "Functions in tables and charts", Page 46

9.9 Time filter submenu

In the **Time filter** submenu, you can define the periods during which the recorded data are to be considered for the evaluation. This makes it possible to exclude planned downtimes (e.g., shift changes or breaks) when calculating the key figures (see "Key figures submenu", Page 136).

In the **Time filter** submenu, you can:

- Create time filters
- Change time filters
- Delete time filters

Create time filters

For each day of the week, you can define up to four periods during which the recorded data are to be considered. You can define these periods separately for every weekday or for the entire week (selection field under **Apply to all days:**).

If you tick the box next to **Local**, then this time filter will be visible only with your login information. Other users will not be able to see this time filter.

If you do not tick the box next to **Local**, then the time filter will be visible for all users with **Authorization status StateMonitor User plus** or **Administrator**.

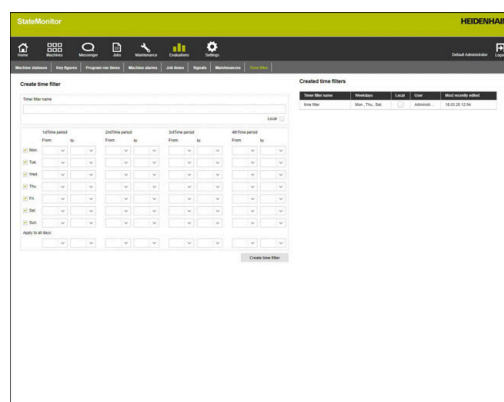
To create a new time filter, proceed as follows:



- ▶ Switch to the **Evaluations** menu
- ▶ Select the **Time filter** submenu
- ▶ Enter the name of the time filter in the **Timer filter name** field
- ▶ Tick the box next to **Local** as needed
- ▶ Define up to four periods per weekday with the **From: ... to: ...** selection fields
- ▶ Alternatively, define up to four periods for the entire week in the **Apply to all days:** selection fields
- ▶ Click the **Add time filter** button
- ▶ The time filter appears in the **Created time filters** table.



StateMonitor offers only complete hours in the **from ... to ...** selection field. To change the minute values, you can edit the offered values directly in the input field.



Changing time filters

To change a time filter, proceed as follows:

- ▶ In the **Created time filters** table, click the time filter that you would like to change
- > The selected time filter is highlighted in green in the table.
- > The time filter's data are transferred to the **Add time filter** section.
- ▶ Change the information
- ▶ Click the **Save time filter** button
- > The changes are applied.

Deleting time filters

To delete a time filter, proceed as follows:

- ▶ In the **Created time filters** table, click the time filter that you would like to delete
- > The selected time filter is highlighted in green in the table.
- ▶ Click the **Delete time filter** button
- > The time filter is deleted from the table.

10

Settings menu

10.1 Settings menu

The **Settings** menu contains the following submenus:

- **User settings**
- **User management**
- **Machines**
- **Add groups**
- **Machine mapping**
- **Statuses**
- **Messenger settings**
- **File backup**
- **External reporting DB**
- **Advanced**
- **Info**



The role of the user determines which submenus and functions StateMonitor displays.

Further information: "User management submenu",
Page 150

10.2 User settings submenu

Changing the password

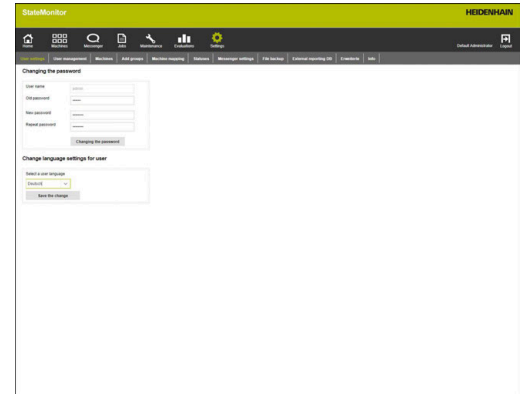


Every user can change his or her user password at any time.

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 **Repeat password** 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 153

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 changes the user language.



The language settings of all the other users remain unaffected by this setting.



You can change the system language in the **Advanced** submenu. The system language applies to all users in whose **User settings** the **System language** setting is selected.

Further information: "Changing the system language", Page 184

10.3 User management submenu

Roles

The users of StateMonitor have different access rights and editing rights based on their role.

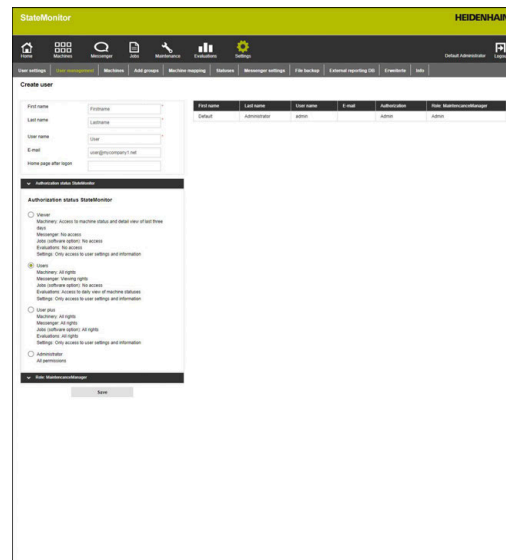
You can assign the following roles to the users:

StateMonitor authorization status

	Menu	Authorization
Viewer	Machines	No editing rights Only access to Machine status , Job terminal (software option), and Detailed view of the last 3 days
	Messenger	No access
	Jobs (software option)	No access
	Evaluations	No access
	Settings	Only access to User settings and Info
Users	Machines	All rights
	Messenger	No editing rights
	Jobs (software option)	No access
	Evaluations	Only access to Day view of the machine statuses
	Settings	Only access to User settings and Info
User plus	Machines	All rights
	Messenger	All rights
	Jobs (software option)	All rights
	Evaluations	All rights
	Settings	Only access to User settings and Info
Admin-istrator	All menus	All rights

MaintenanceManager authorization status (software option)

	Menu/submenu	Authorization
Viewer	Machines	No editing rights Access to Maintenance & malfunction
	Maintenance	Access to Tile view
	Maintenance terminal	No access



	Menu/submenu	Authorization
	Evaluations	No access
Users	Machines	Access to Maintenance & malfunction
	Maintenance	Access to Tile view
	Maintenance terminal	No access
	Evaluations	No access
User plus	Machines	Access to Maintenance & malfunction
	Maintenance	Access to Tile view and Status overview
	Maintenance terminal	Access to Maintenance status
	Evaluations	Access to Maintenance
Administrator Maintenance Manager	All menus	All authorizations in the Maintenance area



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 management** submenu:
 - **First name**
 - **Last name**
 - **User name**
 - **E-mail**
- ▶ Select the desired option in the **Authorization status StateMonitor** pull-down menu
- ▶ If applicable, select the desired option in the **Role: MaintenanceManager** pull-down menu
- ▶ Click the **Save** button
- ▶ StateMonitor writes the created user to the user list.
- ▶ StateMonitor sends the user the password by e-mail.

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

Further information: "User settings submenu", Page 149

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

Further information: "Home menu", Page 50

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

Further information: "Messenger menu", Page 89



If the machine assignment is active, then no machines are initially assigned to the new user. You can perform the assignment in the **Machine mapping** submenu.

Further information: "Machine mapping submenu", Page 165

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 data into the input fields.
- ▶ Make the changes
- ▶ Click the **Save changes** button
- ▶ StateMonitor transfers 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 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 data into the input fields.
- ▶ Click the **Reset the password** button
- > StateMonitor resets the password and sends an e-mail with the new password to the affected user.
- > The user is able to change the password.



If there is no saved e-mail address, then the password appears in a pull-down window and must be communicated to the user in some other way.

10.4 Machines submenuMachines

In the **Machines** submenu, you can create new machines and edit existing machines.



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

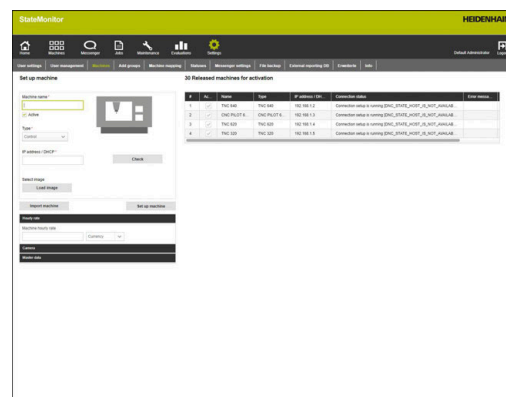
Create machine

Creating a new machine

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)
- ▶ Make the required settings for the selected machine type "Machine parameters"
- ▶ Next to **IP address / DHCP**, enter the IP address (eth0) or the hostname of the machine; for OPC UA, enter the value for **Endpoint URL**
- ▶ Click the **Check** button
- ▶ StateMonitor checks the network connection to the machine.
Further information: "Testing the network connection", Page 155
- ▶ If you have a picture of your machine, click the **Load image** button
- ▶ Select the image file in Windows Explorer
- ▶ StateMonitor loads the selected image into the view.
- ▶ Click the **Set up machine** button
- ▶ The machine is saved in the machine list.
- ▶ Tick the box 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 check the box in the **Active** column, then StateMonitor displays the machines 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 on which StateMonitor is installed connected with the local corporate network?
- ▶ Is the machine connected to the local company network?

Further information: "Network integration", Page 193

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

StateMonitor enters the **SIK** number and the software version of the **NC software** into the corresponding columns of the overview table.

Details on the Connection status columnConnection status

In the **Connection status** column of the machine list, StateMonitor displays the current connection status for each machine.

The following connection statuses may be displayed:

Connection status	Cause
Connection was successfully established	Machine is connected with StateMonitor
Automatic connection setup	Connection setup is running
No connection. Activation is required.	Connection interrupted After three lost connections within five minutes, no new attempt will be made to establish a connection (network is not stable)
Connection separated	No connection between machine and StateMonitor Machine was deactivated in StateMonitor

Following the connection status, StateMonitor shows the associated DNC status message in brackets.

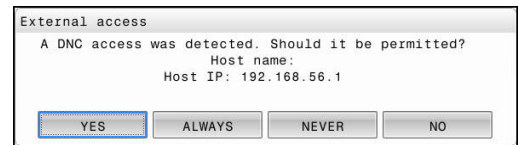
The following DNC status messages may be displayed:

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

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 displays the connection status

No connection. Activation is required.



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 retries to 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 columnError message

In the **Error message** column of the machine list, StateMonitor displays a DNC error message when there are connection problems.

The following DNC error messages may be displayed:

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

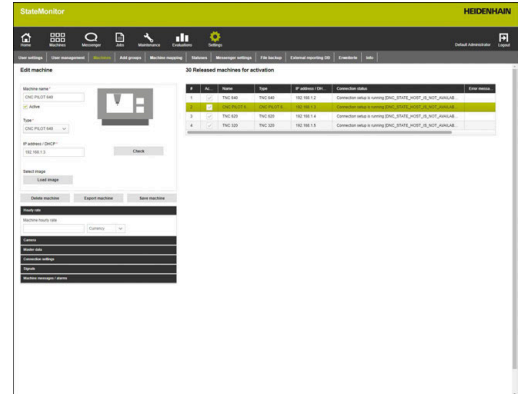
Edit machine

Editing existing machines

To edit the data of an existing machine 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.
- ▶ StateMonitor displays the available machine parameters in the pull-down menu.
- ▶ Change the data
- ▶ Click the **Save machine** button
- ▶ StateMonitor saves the machine with the edited data.



Machine parameters

Depending on the machine type and the control, the following parameters are available:

Parameter	Explanation
Override acquisition (optional)	Only for HEIDENHAIN controls iTNC 530; see "Settings for Override acquisition (only with iTNC 530)", Page 229
PLC password (optional)	Only for HEIDENHAIN controls; see "Settings for PLC password", Page 227
Hourly rate	Value of the hourly rate (with currency); is used for calculating the costs per job and working step in the optional Job times submenu; see "Job times submenu (software option)", Page 141
Camera	IP address of a camera whose live image is displayed in the Machine status submenu
Master data	Administrative information about the machine
Simulation properties (optional)	Only for Simulation type: <ul style="list-style-type: none"> ■ Number of days Past period for which the simulation data are generated ■ Statuses per day The number of the status changes for the generated simulation data ■ Seed for random numbers Starting value for random number generator ■ Generate fake data when saving This option works only during creation of the simulation ■ Continually generate new data Default setting ■ Mean status time in seconds Period for status time
Signals (optional)	Definition of signals for access to PLC variables
Connection settings (optional)	Only for Modbus, OPC UA, and MTConnect
Status parameter for mapping (optional)	Further information: "Parameters for other controls", Page 230
Machine messages / alarms (optional)	Definition of messages based on recorded signals

Configuring signals

Signals are read directly by the PLC and can be evaluated accordingly.

Further information: "Signals submenu (software option)", Page 142

You can use the following parameters for the configuration of the signals:

Parameter	Mandatory field	Explanation
Name	✓	Unique name
Group		Name of a group of signals
Address	✓	Path to the signal that is to be recorded
Description		Additional information
Data type	✓	Possible values: <ul style="list-style-type: none"> ■ Number (number) ■ Text (string) ■ Boolean value (0 or 1)
Factor		Conversion factor for signal value
Decimal places		Number of decimal places used
Text before the value		Specification of a prefix
Text after the value (physical unit)		Specification of the physical unit of the signal value
Threshold value		A threshold value below or above which the new signal value is transferred to the database
Polling interval		Internal for polling

With the **Check the signals** button, you can call the current value of the selected signal.

With the **Export** button, you can save the configured signal parameters as an XML file.

With the **Import** button, you can create new signals in StateMonitor by importing the signal parameters from an XML file. The previously configured signals remain unaffected by this.

Configuring machine alarms

For the signals that you evaluate in StateMonitor, you can configure machine alarms. To do so, you can define conditions for the comparison of the signal value with a comparison value. When a condition is fulfilled, StateMonitor displays a machine alarm in the **Messenger** menu.

The following parameters are required for the configuration of a machine alarm:

Parameter	Mandatory field	Explanation
#	✓	Alarm number
Name	✓	Unique name
Fehlergruppe		Possible values: <ul style="list-style-type: none"> ■ None ■ operation ■ Programming ■ PLC ■ General information ■ Remote ■ Python
Fehlerklasse		Possible values: <ul style="list-style-type: none"> ■ None ■ Warning ■ Feed rate stopped ■ Program stop ■ Program cancellation ■ Emergency stop ■ Reset ■ Info ■ Failure description ■ Note
Link to signal	✓	Selection of the signal
Description		Additional information
Data type		Data type of the signal Possible values: <ul style="list-style-type: none"> ■ Number (number) ■ Text (string) ■ Boolean value (0 or 1)
Operator		Selection of the operator for the comparison of a signal value and a comparison value (based on the selection in the Data type field)

Parameter	Mandatory field	Explanation
		Possible values: <ul style="list-style-type: none"> ■ EQUALS: Signal value is equivalent to comparison value ■ contains: Signal value contains comparison value ■ STARTSWITH: Signal value begins with comparison value ■ LESSTHAN: Signal value is less than comparison value ■ LESSTHANEQUAL: Signal value is less than or equal to comparison value ■ MORETHAN: Signal value is greater than comparison value ■ MORETHANEQUAL: Signal value is greater than or equal to comparison value
Value		Comparison value
Create test notification		If this option is activated, then StateMonitor generates a test machine message when the machine alarm is saved

With the **Check parameter** button, you can call the current value of the selected signal and start the comparison.

With the **Export** button, you can save the configured machine alarms as an XML file.

With the **Import** button, you can create new machine alarms in StateMonitor by importing the parameters from an XML file. The previously configured machine alarms remain unaffected by this.

Deleting machines

To delete a machine in 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 deletes the selected machine from the list.
- > The machine is no longer visible in the **Machines** menu.

10.5 Add groups submenu

Creating a machine group



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

Machines can be collected into machine groups. You can use a machine group in the **Machines** menu as a filter criterion in order to adapt the view. You can also assign jobs to a machine group. The jobs then appear in the **Job terminal** of each machine of the machine group and can be accepted and machined by each of these machines.

To create a new group, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **Add groups** submenu
- ▶ Enter the name of the machine group into the **Group name** field
- ▶ Under **All machines**, select the machines that you would like to add to the machine group
- ▶ Or, for multiple selections, press the Ctrl key, and select the machines



- ▶ Click the **right arrow** button
- ▶ StateMonitor adds the machines to the new machine group and enters them under **Assigned machines**.

To remove machines from the machine group, proceed as follows:

- ▶ Under **Assigned machines**, select the machines that you would like to remove



- ▶ Click the **left arrow** button
- ▶ StateMonitor moves the selected machines back under **All machines**.

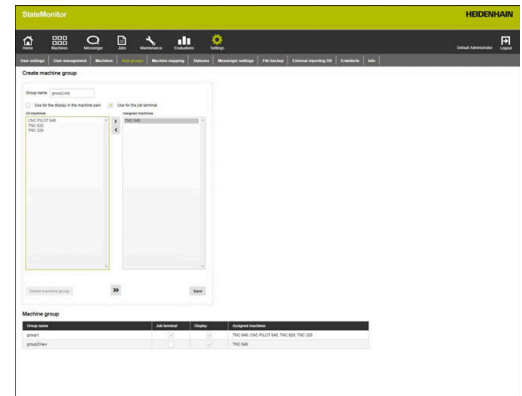
To add all of the machines to the machine group, proceed as follows:




- ▶ Click the **right arrow** button
- ▶ StateMonitor enters all of the machines under **Assigned machines**.

To select the intended use, proceed as follows:

- ▶ If the machine group in the **Machines** menu is to be available as a filter criterion, then tick the box in front of **Use for the display in the machine park**
- ▶ If the machine group is to be available in the menus for assigning and machining jobs, then tick the box in front of **Use for the job terminal**



 At least one intended use must be selected in order for you to be able to save the machine group.

- ▶ Click the **Save** button
- StateMonitor adds the new machine group to the **Machine group** list.


Editing a machine group

In order to edit a machine group, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **Add groups** submenu
- ▶ In the **Machine group** list, select the machine group that you would like to edit
- StateMonitor highlights the machine group and loads the data into the input fields.
- ▶ Make the changes
- ▶ Click the **Save changes** button
- StateMonitor transfers the changed data to the **Machine group** list.

Deleting a machine group

 The deletion of a machine group does not have any effect on the machine data in the **Machines** submenu. Only the grouping is deleted.

To delete a machine group, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **Add groups** submenu
- ▶ In the **Machine group** list, select the machine group that you would like to delete
- StateMonitor highlights the machine group and loads the data into the input fields.
- ▶ Click the **Delete machine group** button
- StateMonitor removes the machine group from the **Machine group** list.

10.6 Machine mapping submenu

In the **Machine mapping** submenu, you can assign the machines to the individual users, who can access these machines in the **Machines**, **Messenger**, and **Evaluations** menus.



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
- ▶ Tick the box in front of **Activate the assignment of users to machines**



If the box next to **Activate the assignment of users to machines** is not ticked, then every user sees all of the activated machines.

- ▶ In the selection field, select **Select the user**
- ▶ Under **All machines** and/or under **All machine groups**, select the machines and machine groups that you would like to assign to the user
- ▶ Or, for multiple selections, press the Ctrl key, and select the machines.
- ▶ Click the **right arrow** button
- ▶ StateMonitor assigns the machines and/or machine groups to the selected user and enters them under **Assigned machines** or **Rejected machine groups**.
- ▶ Click the **Save** button



To remove an assignment, proceed as follows:

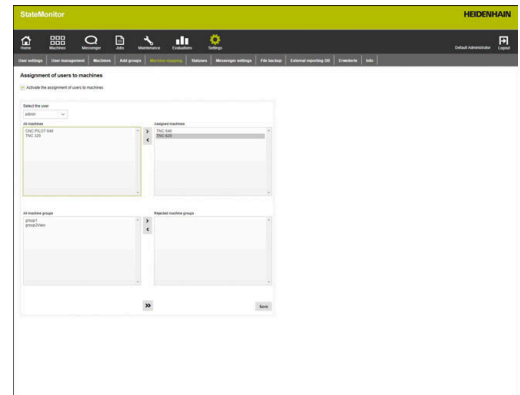


- ▶ Select the assigned machine or machine group
- ▶ Click the **left arrow** button
- ▶ StateMonitor moves the selected machine or machine group back under **All machines** or **All machine groups**.
- ▶ Click the **Save** button

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



- ▶ Click the **double right arrow** button
- ▶ StateMonitor moves all of the machines under **Assigned machines**.
- ▶ Click the **Save** button



10.7 Statuses submenu

In the **Statuses** submenu, you can add specifications that more closely describe a status. The specifications are available for selection in the **Machines** menu, allowing you to describe a machine status, a job status, or a malfunction.







Further information: "Edit machine statuses submenu", Page 69

Further information: "Job terminal submenu (software option)", Page 75

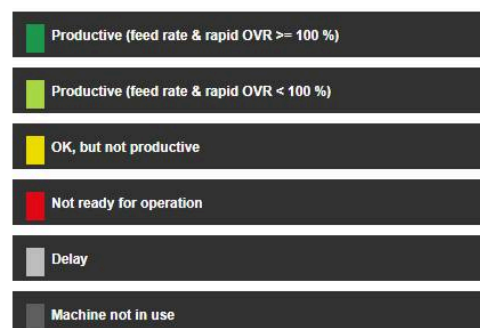
Further information: "Reporting malfunctions", Page 86

Machine statuses

You can more precisely specify machine statuses by adding subcategories:

Color coding	Status	Explanation
	Productive (feed rate & rapid traverse OVR \geq 100%)	The machine is productive. The potentiometers for feed rate and rapid traverse are set to 100 % or more.
	Productive (feed rate & rapid traverse OVR < 100%)	The machine is productive. The potentiometers for feed rate and rapid traverse are set to 100 % or less.
	OK, but not productive	The machine is ready for operation, but not productive.
	Not ready for operation	<ul style="list-style-type: none"> ■ The machine is not ready for operation. ■ An emergency stop was triggered ■ Error messages are pending
	Delay	Can replace a yellow or dark gray machine status and specify it more precisely
	Machine not in use	The machine is switched off

Machine statuses



Job statuses (software option)

You can more precisely define the following job statuses by adding subcategories:

- Created
- Assigned
- Locked / change
- Rejected
- Started
- Prepare
- Production
- Interrupted
- Finished

Reasons for disturbance (software option)

Specifications added in the **Reasons for disturbance** section are subsequently available for selection as reasons for disturbance for the reporting of disturbances. You can use the available categories in order to group specifications.



In order to be able to report disturbances in StateMonitor, at least one specification (reason for disturbance) must be added in the **Reasons for disturbance** section.

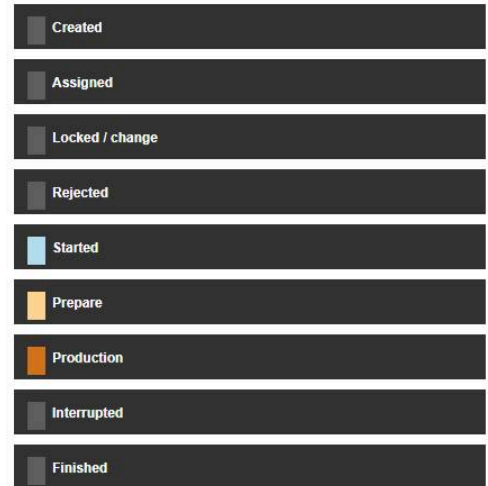
Adding specifications

In order to add a specification, proceed as follows:

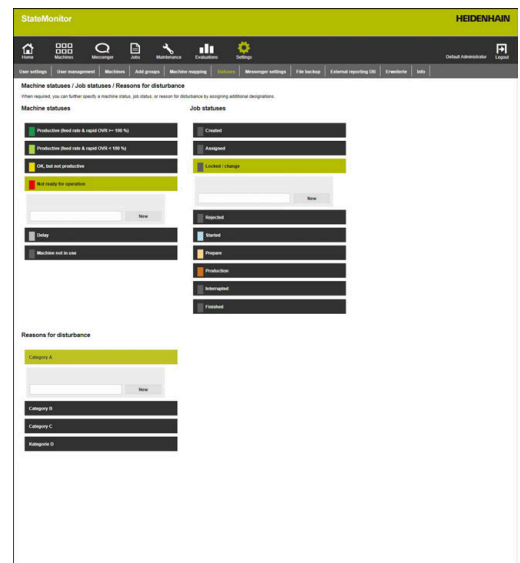


- ▶ Switch to the **Settings** menu
- ▶ Select the **Statuses** submenu
- ▶ Click the desired status or category
- ▶ StateMonitor opens the input field.
- ▶ Enter the designation for the specification
- ▶ Click the **New** button
- ▶ StateMonitor lists the new specification in a list above the input window.
- ▶ The specification is available for selection in the **Machines** menu.

Job statuses



Reasons for disturbance



Changing the sequence of the specifications

By clicking the arrow symbol, you can change the sequence of the specifications.



- ▶ Click the up arrow
- > StateMonitor moves the specification one place up in the list.



- ▶ Click the down arrow
- > StateMonitor moves 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.

10.8 Messenger settings submenu

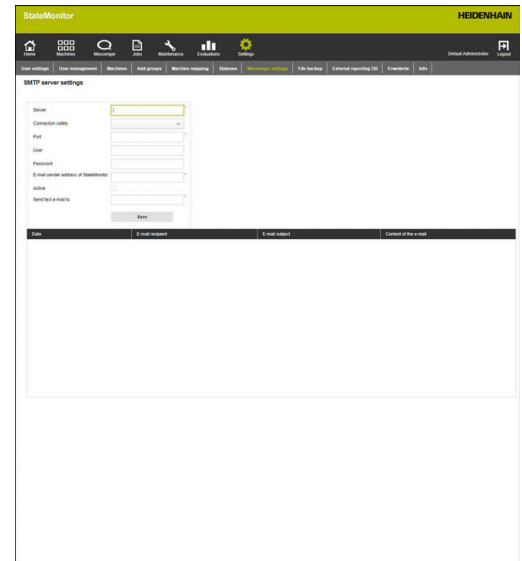
In the **Messenger settings** submenu, enter the connection data for the e-mail server that sends the notifications from StateMonitor to the user.

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 of the connection to the SMTP server.
- ▶ StateMonitor sends a test e-mail to the entered e-mail address.
- ▶ Confirm receiving the test e-mail
- ▶ StateMonitor activates the configuration.



The connected e-mail server must support 8-bit ASCII coding. This also applies to the SMTP sever, which is run through until the goal is reached.

The following parameters are available:

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

Parameter	Explanation
E-mail sender address of State-Monitor	E-mail address that StateMonitor uses for sending
Active	Status of the configuration
Send text e-mail to	E-mail address to which StateMonitor sends a test e-mail

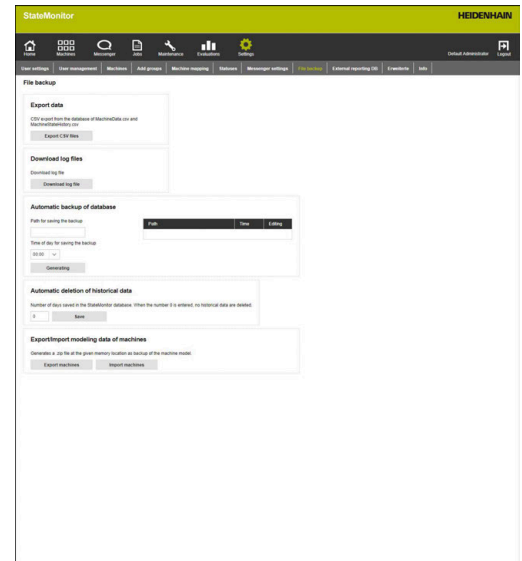


HEIDENHAIN recommends the use of an encrypted connection in order to protect the transferred data. Consult an IT specialist if you are unsure.

10.9 File backup submenu

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

i 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.



Exporting data

This function enables you to export the recorded machine data in CSV files. This allows you to import the machine data into a spreadsheet and further process it.

i The machine data exported with this function cannot be imported back into StateMonitor. For restoring machine data based on a backup, see "Manually restoring the database", Page 174.

To perform a data export, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **File backup** submenu
- ▶ In the **Export data** field, click the **Export CSV files** button
- ▶ Select the storage location
- ▶ Click the **Save** button
- ▶ StateMonitor saves the backup file in the selected location for saving.

The backup file is a ZIP file containing the following CSV files:

- **MachineDate.csv**
- **MachineStateHistory.csv**

i Do **not** rename the CSV files!

Downloading log files

If you consult the HEIDENHAIN Service department, you may require the log file of StateMonitor.

To download the log file, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **File backup** submenu
- ▶ In the **Download log files** field, click the **Download log file** button
- ▶ Select the storage location
- ▶ Click the **Save** button
- ▶ StateMonitor saves the log file in the selected location for saving.

Automatic data backup

To have StateMonitor regularly perform an automatic backup of the database, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **File backup** submenu
- ▶ In the **Automatic backup of database** field in the **Path for saving the backup** input field, enter the desired path where StateMonitor should save the backup (e.g., a server drive: **C:\ProgramData\HEIDENHAIN\StateMonitor\backup**)
- ▶ Select **Time of day for saving the backup** (e.g., 22:00 hrs.)
- ▶ Click the **Generating** button
- ▶ StateMonitor saves the data every day at 22:00 hrs. in the specified path.

Automatic deletion of data

To periodically free up memory space, you can define how long historical data will be saved. Enter the desired number of days. Older data are automatically deleted by StateMonitor.

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



- ▶ Switch to the **Settings** menu
- ▶ Select the **File backup** submenu
- ▶ By default, the value "0" is in the **Number of days ...** input field: StateMonitor continuously saves the data until the memory is full.
- ▶ In the **Automatic deletion of historical data** field, enter the desired number of days that will be saved (e.g., 365 (1 year)) in the input field
- ▶ Click the **Save** button

StateMonitor regularly deletes all data that are older than 365 days.

Importing/exporting modeling data of the machines

When you install StateMonitor with an empty database for the first time, you can use the machine data and user data of an already existing instance of the software. For this purpose, you can export the modeling data of an already existing instance and import these data into the new instance of StateMonitor.

To export the modeling data, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **File backup** submenu
- ▶ In the **Export/Import modeling data of machines** field, click the **Export machines** button
- ▶ Select the storage location
- ▶ Click the **Save** button
- > StateMonitor saves the backup file in the selected location for saving.

The backup file is a ZIP file containing the following CSV files:

- **ConfigData.csv**
- **Machine.csv**
- **ModelingData.csv**
- **User.csv**

To reimport the modeling data, click the **Import machines** button, and select the ZIP file.

Manually restoring the database

If the database of StateMonitor is damaged, then you must manually reinstall the database. To do so, you must delete the damaged database and create a new database with the backup data.



Make sure that you have shut down StateMonitor.

To manually restore the database, proceed as follows:

- ▶ Under C:\ProgramData\HEIDENHAIN\StateMonitor\dat\backups, unpack the archive with the desired date
- ▶ Copy the uploads folder from the unpacked archive to the C:\ProgramData\HEIDENHAIN\StateMonitor\dat folder, overwriting the already existing uploads folder if applicable
- ▶ Start the pgAdmin4 program via the shortcut in the Start menu
- ▶ For connecting with the PostgreSQL server at the PostgreSQL 11 entry, double-click, and enter the password of the instance of StateMonitor
- > The database of StateMonitor is shown in the directory tree of the PostgreSQL server under Databases > statemonitor.
- ▶ In the context menu of the statemonitor entry, select and confirm the Delete/Drop command
- > The damaged database is deleted.
- ▶ In the context menu of the Databases entry, select the Create > Database command
- ▶ In the Database input field, enter the statemonitor value and, in the Owner selection field, select the statemonitor entry
- > The new database is created.
- ▶ In the context menu of the statemonitor entry, select the Restore command
- ▶ In the Filename input field with the ... button, navigate to the unpacked archive
- ▶ Select the PostgreSQL.backup file, and apply it with the Select button
- ▶ Click the Restore button
- ▶ The saved data are imported into the new database
- ▶ Restart StateMonitor as needed.

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 folder, then all previous data up to now, including the machine data, user data, etc., will be lost.

- ▶ Back up the database regularly

10.10 External reporting DB submenu

Through the connection of an external reporting DB (database), StateMonitor can make recorded data available to other systems. StateMonitor supports the Microsoft SQL Server and PostgreSQL database systems.



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

In this manner, you can use the data recorded by StateMonitor for the following purposes:

- Correlation with data from ERP and MES systems
- Providing recorded data for the determination of OEE key figures
- Visualization of machine statuses in proprietary software



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

Precondition: server with a database system (Microsoft SQL Server or PostgreSQL)

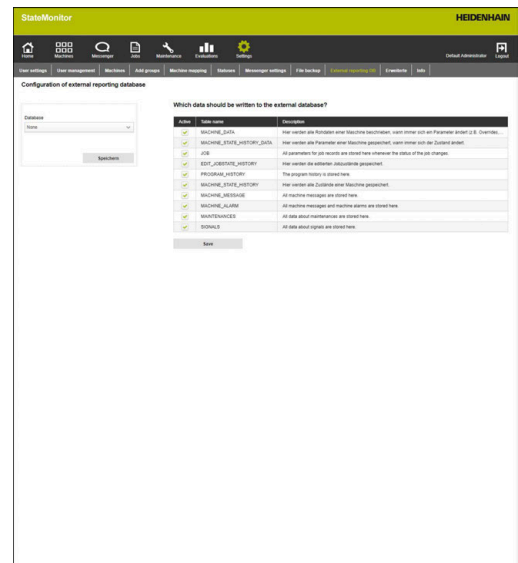
To connect to an external database, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **External reporting DB** submenu
- ▶ In the selection field of the **Database**, select the database system being used
- ▶ Enter the connection parameters depending on the database system to be used
- ▶ Click the **Test** button to test the connection to the external database
- ▶ Click the **Save** button
- ▶ StateMonitor saves the configuration for connecting to the external database.

Based on your selection, StateMonitor creates the following tables in the database when first establishing a connection:

- MACHINE_DATA
- MACHINE_STATE_HISTORY_DATA
- JOB
- EDIT_JOBSTATE_HISTORY
- PROGRAM_HISTORY
- MACHINE_STATE_HISTORY
- MACHINE_MESSAGE
- MACHINE_ALARM
- MAINTENANCES
- SIGNALS



Parameters for Microsoft SQL Server

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

Parameter	Explanation
Database host	IP address or domain name of the database server
Database port	Port-Number, 0 to 65536 Input not necessarily required
Instance name	Individual entry
Database name	Individual entry
Windows authentication	Activate/deactivate
Database users	Entry is required only if
Database password	Windows authentication is deactivated or if StateMonitor is configured as a Windows service

Parameters for PostgreSQL

If you select PostgreSQL as the database system, then the following parameters are available:

Parameter	Explanation
Database host	IP address or domain name of the database server
Database port	Port-Number, 0 to 65536 Input not necessarily required
Database name	Individual entry
Database schema	Individual entry
Database users	Configurable user in PostgreSQL
Database password	Password for the configurable user in PostgreSQL

Tables

The external reporting database has the following tables:

Table	Function
DATABASECHANGELOG	Migration for external reporting database
EDIT_JOBSTATE_HISTORY_V2	Free-text comment for job statuses Details see "Table structure for EDIT_JOBSTATE_HISTORY_V2", Page 178
JOB_V2	Job data Details see "Table structure for JOB_V2", Page 178
MACHINE_V2	Assignment of machine name to ID Details see "Table structure for MACHINE_V2", Page 178
MACHINE_ALARM_V2	Confirmable messages of machine Details see "Table structure for MACHINE_ALARM_V2", Page 179
MACHINE_DATA_V2	Machine data Details see "Table structure and parameters for MACHINE_DATA_V2", Page 180
MACHINE_ID_MAPPING_V2	Mapping of machine IDs to StateMonitor (for version < 1.3) Details see "Table structure for MACHINE_ID_MAPPING_V2", Page 181
MACHINE_MESSAGE_V2	Non-confirmable messages of the machine, generated by StateMonitor and FN 38 Details see "Table structure for MACHINE_MESSAGE_V2", Page 181
MACHINE_STATE_HISTORY_DATA_V2	Machine data at the time of the status change (status light), structure like MACHINE_DATA_V2 Details see "Table structure and parameters for MACHINE_DATA_V2", Page 180
MACHINE_STATE_HISTORY_V2	Status of the machine (status light) Details see "Table structure for MACHINE_STATE_HISTORY_V2", Page 181
MAINTENANCE_EXECUTION_V2	Active maintenance events Details see "Table structure for MAINTENANCE_EXECUTION_V2", Page 181
MAINTENANCE_V2	Maintenance configuration Details see "Table structure for MAINTENANCE_V2", Page 182
MAPPING_MAINTENANCE_PROCESS_STEP_V2	Mapping of PROCESS_STEP_ID to MAINTENANCE_ID Details see "Table structure for MAPPING_MAINTENANCE_PRO- CESS_STEP_V2", Page 182
PROCESS_STEP_V2	Maintenance step configuration Details see "Table structure for PROCESS_STEP_V2", Page 182
PROGRAM_HISTORY_V2	History of the program execution Details see "Table structure for PROGRAM_HISTORY_V2", Page 183
SIGNAL_CONFIGURATION_V2	Signal configuration Details see "Table structure for SIGNAL_CONFIGURATION_V2", Page 183

Table	Function
SIGNAL_DATA_V2	Signal data Details see "Table structure for SIGNAL_DATA_V2", Page 183

Table structures

The tables of the external reporting database exhibit different structures that are described in the following.

Table structure for EDIT_JOBSTATE_HISTORY_V2

Column	Value
ID	ID
JOB_ID	Reference to ID column in JOB_V2 table
NOTE	Explanatory text
COMMENT	Comment
ITEMID	ID number
USER_ID	User who performed the job status change
TIMESTAMP	Timestamp

Table structure for JOB_V2

Column	Value
ID	ID
NUMBER	Job number
WORKSTEP	Working step
ITEMNAME	Part name
ITEMID	ID number
DESCRIPTION	Description of the job
TARGETQUANTITY	Nominal quantity
OKQUANTITY	Actual unit quantity
SCRAP	Scrap quantity
REWORK	Rework quantity
APPOINTMENT	Deadline
TIMESTAMP	Timestamp of the starting time in the DD.MM.YY hh:mm:ss format
PRIORITY	Priority of the job Values: EXTREM_HIGH, HIGH, NORMAL, LOW, EXTREM_LOW
STATE	Status of the job Values: CREATED, ASSIGNED, EDIT, RETURNED, STARTED, MOUNT, IN_PROGRESS, STOPPED, FINISHED

Table structure for MACHINE_V2

Column	Value
ID	ID
NAME	Name of the machine
DELETED	Values: 1 (deleted) or 0 (not deleted)

Table structure for MACHINE_ALARM_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
IS_SET	Replaced by TIMESTAMPCLEARED
NUMBER	Error number in raw format
NUMBER_AUX	Error number displayed as on the control
CHANNEL	Channel on the control
ERROR_GROUP	Error group Values: DNC_EG_NONE, DNC_EG_OPERATING, DNC_EG_PROGRAMING, DNC_EG_PLC, DNC_EG_GENERAL, DNC_EG_REMOTE, DNC_EG_PYTHON
ERROR_CLASS	Error group Values: DNC_EC_NONE, DNC_EC_WARNING, DNC_EC_FEEDHOLD, DNC_EC_PROGRAMHOLD, DNC_EC_PROGRAMABORT, DNC_EC_EMERGENCY_STOP, DNC_EC_RESET, DNC_EC_INFO, DNC_EC_ERROR, DNC_EC_NOTE
DESCRIPTION	Error description
TIMESTAMP	Timestamp when an error occurs
TIMESTAMPCLEARED	Timestamp when the error is acknowledged

Table structure and parameters for MACHINE_DATA_V2

Column	Parameter	Value
ID		ID
MACHINE_ID		Reference to ID column in MACHINE_V2 table
PARAMETER_NAME		Machine parameters with values from the column PARAMETER_VALUE:
	Connected	1 (connected) or 0 (disconnected)
	ExecutionMode	Execution Values: DNC_EXEC_MANUAL, DNC_EXEC_MDI, DNC_EXEC_RPF, DNC_EXEC_SINGLESTEP, DNC_EXEC_AUTOMATIC, DNC_EXEC_OTHER, DNC_EXEC_HANDWHEEL
	FMax	1 (rapid traverse active) or 0 (feed rate active)
	OverrideFeed	Feed rate override
	OverrideRapid	Rapid traverse override
	OverrideSpeed	Spindle override
	Program	Path name, program name
	ProgramCompleted	Total number of successfully completed programs
	ProgramCompletedCurPgm	Number of successfully completed programs of the type Program
	ProgramInterruptedError	Total number of programs ended by errors
	ProgramInterruptedErrorCurPgm	Total number of programs ended by errors, belonging to the type Program
	ProgramInterruptedUser	Total number of programs ended by the operator
	ProgramInterruptedUserCurPgm	Total number of programs ended by the operator, belonging to the type Program
	ProgramStatus	Program status Values: DNC_PRG_STS_IDLE, DNC_PRG_STS_RUNNING, DNC_PRG_STS_STOPPED, DNC_PRG_STS_INTERRUPTED, DNC_PRG_STS_FINISHED, DNC_PRG_STS_ERROR, DNC_PRG_STS_NOT_SELECTED
	ProgramEvent	Events in the program status Values: DNC_PRG_EVT_STARTED, DNC_PRG_EVT_STOPPED, DNC_PRG_EVT_FINISHED, DNC_PRG_EVT_CANCELED, DNC_PRG_EVT_INTERRUPTED, DNC_PRG_EVT_COMPLETED, DNC_PRG_EVT_ERROR, DNC_PRG_EVT_ERROR_CLEARED, DNC_PRG_EVT_SELECTED, DNC_PRG_EVT_SELECT_CLEARED
	ProgramStatusPrevious	Value as with the parameter Program_Status
	SubProgram	List of subprograms, separated by commas
TIMESTAMP		Timestamp

Table structure for MACHINE_ID_MAPPING_V2

Column	Value
OLD_ID	Machine ID for StateMonitor versions < 1.3
NEW_ID	Machine ID for StateMonitor versions ≥ 1.3

Table structure for MACHINE_MESSAGE_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
MESSAGE_TYPE	Type of message Value: PRG_COMPLETED, PRG_CANCELED_BY_USER, PRG_CANCELED_BY_ERROR, FN38
MESSAGE	Free text of the message
TIMESTAMP	Timestamp

Table structure for MACHINE_STATE_HISTORY_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
STATE	Status of the machine Values: PRODUCTIVE, PRODUCTIVE_MIN, IDLE, INOPERABLE, STANDBY, DOWN, UNDEF
COMMENT	Comment on the separation of the status through JobTerminal (status transition in the JobTerminal)
TIMESTAMP	Timestamp

Table structure for MAINTENANCE_EXECUTION_V2

Column	Value
ID	ID
MAINTENANCE_STATUS	Maintenance status Values: PENDING, ACCEPTED, DONE
DUE_DATE	Due date of active maintenance events Values: UNDUE, DUE, OVERDUE
COMMENT	Comment
TRIGGERED_BY	Trigger for triggering the maintenance event Value: TIME, PRODUCTIVE HOURS, ONLINEHOURS, MACHINEALARM
CURRENT_ONLINE_HOURS	Current online machine hours
CURRENT_PRODUCTIVE_HOURS	Current productive machine hours
TIMESTAMP	Timestamp
MACHINE_ID	Reference to ID column in MACHINE_V2 table
MAINTENANCE_ID	Reference to ID column in MAINTENANCE_V2 table
USER_ID	User who performed the maintenance status change
MACHINE_ALARM_ID	Reference to ID column in MACHINE_ALARM_V2 table

Table structure for MAINTENANCE_V2

Column	Value
ID	ID
NAME	Name of the maintenance event
INTERVAL_TIME	Time after which (in ms) due
OVERDUE_TIME	Overdue after INTERVAL_TIME in ms
START_DATE_TIME	Starting time in ms
INTERVAL_PRODUCTIVE_HOURS	Productive machine hours (in ms) after which due
OVERDUE_PRODUCTIVE_HOURS	Overdue after INTERVAL_PRODUCTIVE_HOURS in ms
START_PRODUCTIVE_HOURS	Starting time (in ms) of the productive machine hours
INTERVAL_ONLINE_HOURS	Online machine hours (in ms) after which due
OVERDUE_ONLINE_HOURS	Overdue after INTERVAL_ONLINE_HOURS in ms
START_ONLINE_HOURS	Starting time (in ms) of the online machine hours
MACHINE_ID	Reference to ID column in MACHINE_V2 table
TIMESTAMP	Timestamp

Table structure for MAPPING_MAINTENANCE_PROCESS_STEP_V2

Column	Value
MAINTENANCE_ID	Reference to ID column in MAINTENANCE_V2 table
PROCESS_STEP_ID	Reference to ID column in PROCESS_STEP_V2 table
SET	Timestamp for assignment of PROCESS_STEP_ID to MAINTENANCE_ID
DELETED	Deleted maintenance steps

Table structure for PROCESS_STEP_V2

Column	Value
ID	ID
NAME	Name of the maintenance step
DURATION	Duration in ms
COMMENT	Comment
EXECUTED_BY_OPERATOR	Execution by machine operator (0 or 1)
EXECUTED_BY_EXTERNAL	Execution by external service provider (0 or 1)
EXECUTED_BY_MAINTENANCE	Execution by maintenance technician (0 or 1)
TIMESTAMP	Timestamp

Table structure for PROGRAM_HISTORY_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
PARENT_ID	ID of the parent program
PROGRAM	Program name
PROGRAM_START	Program start
PROGRAM_END	End of program
PROGRAM_STATE	State in which the program was ended Values: RUNNING, COMPLETED, ERROR, INTERRUPTED, STOPPED, INVALID

Table structure for SIGNAL_CONFIGURATION_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
NAME	Signal name
ACTIVE	Status (0 or 1)
POLLINGINTERVAL	Interval for polling Values: SECOND_1, SECOND_5, SECOND_15, SECOND_30, MINUTE_1, MINUTE_5, MINUTE_15, MINUTE_30, HOUR_1
PRETEXT	Text before the value
POSTTEXT	Text after the value
FACTOR	Conversion factor for signal value
DECIMALS	Decimal places used
SIGNAL_GROUP	Signal group
THRESHOLD	Threshold value
DATATYPE	Data type

Table structure for SIGNAL_DATA_V2

Column	Value
ID	ID
SIGNAL_CONFIGURATION_ID	Reference to ID column in SIGNAL_CONFIGURATION_V2 table
MACHINE_ID	Reference to ID column in MACHINE_V2 table
NAME	Signal name
TIMESTAMP	Timestamp
STRINGVALUE	Recorded value
BOOLEANVALUE	Recorded value
NUMBERVALUE	Recorded value

10.11 Advanced submenu

In the **Advanced** submenu, you can perform advance settings for StateMonitor.



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

Changing the system language

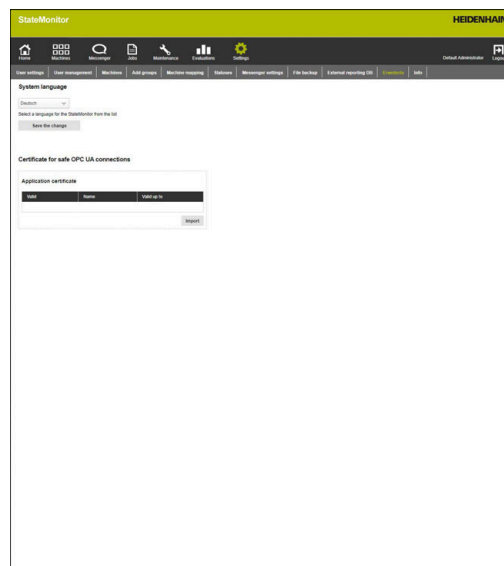


- ▶ Switch to the **Settings** menu
- ▶ Select the **Advanced** submenu
- ▶ In the **System language** section, select the desired language from the list
- ▶ Click the **Save the change** button



Notes:

- The software does not need to be restarted when the system language is changed 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



Managing certificates (only for OPC UA)

If you use an authentication for OPC UA, then you must also select an application certificate.

Further information: "Connection settings", Page 235

In order to use the application certificate, you must first download the public key using the **Download Public Key** button and then import it along with your private key via the **Import** button.

10.12 Info submenu

The **Info** submenu contains the **License information** and legal notes related to the software.

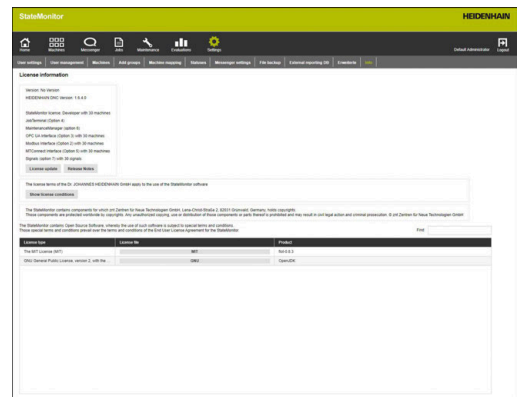
StateMonitor displays the following information:

- StateMonitor version
 - HEIDENHAIN DNC version
 - StateMonitor serial number
 - StateMonitor license
 - Enabled software options
 - Date of last maintenance (with activated software option 6)
 - Release Notes
 - License conditions
 - Table with Open Source license notes
- Further information:** "Functions in tables and charts", Page 46

To access the **Info** submenu, proceed as follows:



- ▶ Switch to the **Settings** menu
- ▶ Select the **Info** submenu



11

**Software options
and licenses**

11.1 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:

Option	Extended functionality	ID
1	Five additional machines	1220884-01
2	Modbus Interface	1268670-01
3	OPC UA Interface	1268673-01
4	JobTerminal	1268674-01
5	MTConnect Interface	1268675-01
6	MaintenanceManager	1308520-01
7	Signals	1308521-01

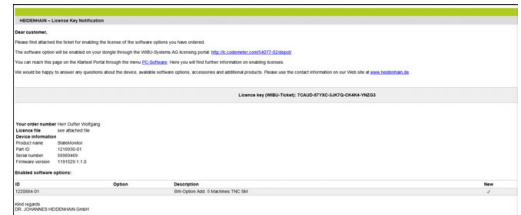
11.2 Requesting a license

You can obtain licenses for software options from HEIDENHAIN after providing your StateMonitor serial number. The StateMonitor serial number is located in the **Info** submenu and on the StateMonitor dongle.

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



11.3 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 190
- 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 191

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 requested via the WIBU ticket is enabled on your dongle.

Enabling the license (Offline)

To generate a license request file, proceed as follows:

- ▶ Open CodeMeter Control Center on the server or PC where StateMonitor is installed
- ▶ Click the **License update** button
- > The CmFAS wizard opens.
- ▶ Click the Generate license request option and then **Next**
- ▶ Click the Extend existing license option and then **Next**
- ▶ Click the DR. JOHANNES HEIDENHAIN GmbH option and then **Next**
- ▶ Enter the desired file name and its path and then click **Apply**
- > The license request file is created at the specified location.
- ▶ 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:

- ▶ Open the following URL:
www.lc.codemeter.com/54077-02/depot
- > 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
- ▶ Click the **Offline license transfer** button and follow the instructions on the page
- > Your license update file is created.
- ▶ 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:

- ▶ Open CodeMeter Control Center on the server or PC where StateMonitor is installed
- ▶ Click the **License update** button
- > The CmFAS wizard opens.
- ▶ Click the Import license update option and then **Next**
- ▶ Specify the file name including its path and then click **Apply**
- > The license update file is imported.
- > The license requested via the WIBU ticket is enabled on your dongle.

12

**Network
integration**

12.1 Precautions during enabling and network integration

NOTICE

Risk of improper operation in the SIK menu

Machine malfunctions all the way up to machine standstill are possible




- Before calling the SIK menu, ensure that the machine is not currently in use
- You may need to restart the machine's control after enabling an option

12.2 SIK menu

The SIK (**S**ystem **I**dentification **K**ey) 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.

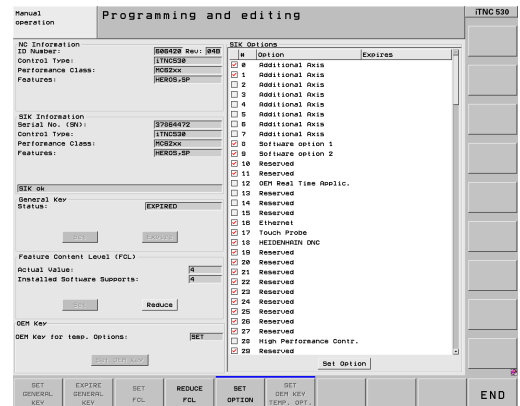
Procedure on iTNC 530:


-  ▶ 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 197



 In order to enable an option, you will need the SIK number of your control. The SIK number is located in the SIK menu under SIK information in the **SIK Information, Serial No. field (SN)**.

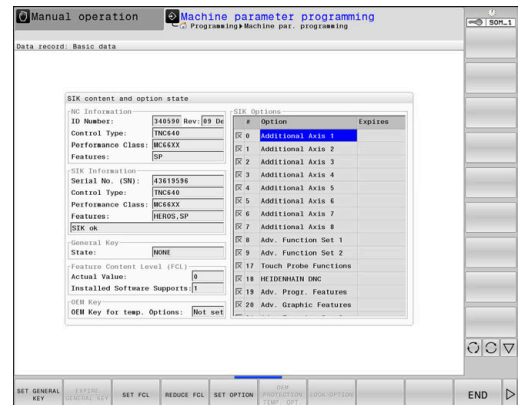
Procedure on TNC 640, TNC 620, TNC 320 and TNC 128:


-  ▶ 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 197

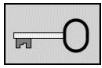


 To enable an option, you need the SIK number of your control. You can find the SIK number in the **Serial No. (SN)** field under "SIK Information" in the SIK menu.

Procedure on CNC PILOT 640 and MANUALplus 620:



- ▶ Select the **Organization** operating mode

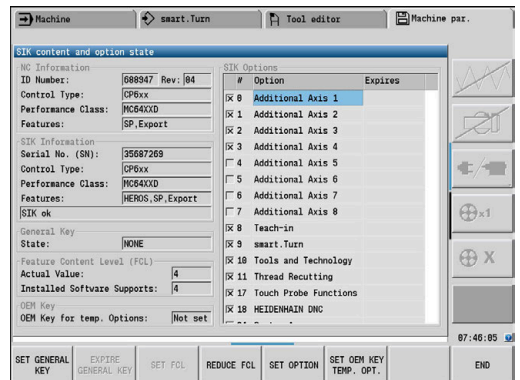


- ▶ Press the Key soft key
- ▶ Enter the code number **SIK**
- ▶ Confirm with **OK**
- ▶ The control switches to the Machine par. programming submode and displays the SIK menu.

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 197



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.

12.3 Enabling Option 18

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

Control	As of software version
iTNC 530	34049x-01
iTNC 530 HSCI	60642x-01
TNC 640 HSCI	34059x-01
TNC 620 HSCI	34056x-01 / 73498x-01
TNC 320	34055x-01 / 771851-01
TNC 128	771841-01
CNC PILOT 640	68894x-01
MANUALplus 620	54843x-01

Option 18 enables the HEIDENHAIN DNC interface.

DNC stands for **D**istributed **N**umerical **C**ontrol. 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 195
- ▶ Contacting HEIDENHAIN Service:
 - By 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 195
- ▶ 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



12.4 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.



The configuration for integration into the network should be performed by a specialist.



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.

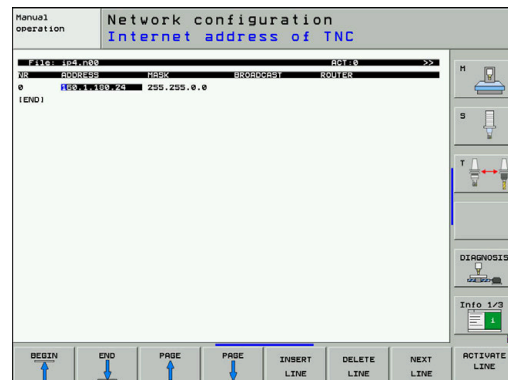
Network integration using fixed IP addresses

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:







Setting	Meaning	Input
ADDRESS	Enter the IP address of the control	Four numerical values separated by periods e.g. 160.1.180.20
MASK	The SUBNET MASK serves to differentiate between the network ID and the host ID in the network.	Four numerical values separated by periods. Ask your network specialist for the values e.g. 255.255.0.0
BROADCAST	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.	e.g. 160.1.255.255
ROUTER	Internet address of your default router. Enter the Internet address only if your network consists of multiple subnets.	Four numerical values separated by periods. Ask your network specialist for the values e.g. 160.1.0.2
HOST	Name under which the TNC identifies itself in the network	e.g. iTNC530_machine1
DOMAIN	Domain name of your company network	If necessary, ask your network specialist
NAMESERVER	Network address of the domain server	If necessary, ask your network specialist

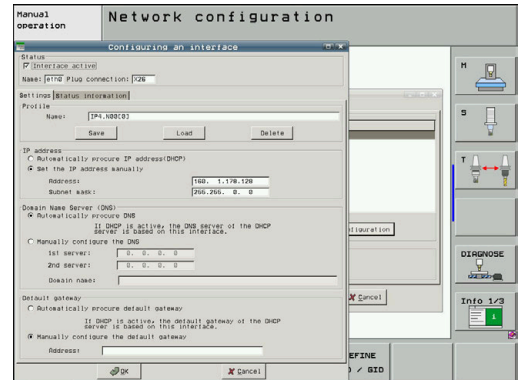
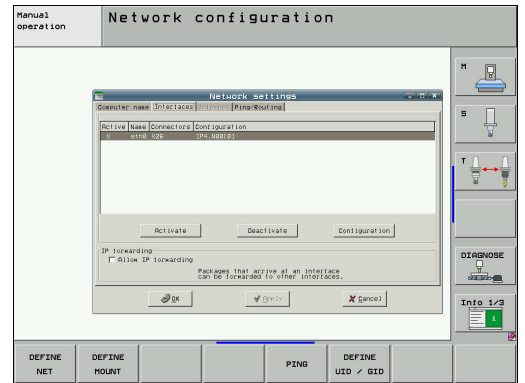


Further information: HEIDENHAIN Conversational Programming User's Manual for iTNC 530


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



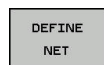
- ▶ Select the **Programming and Editing** mode of operation



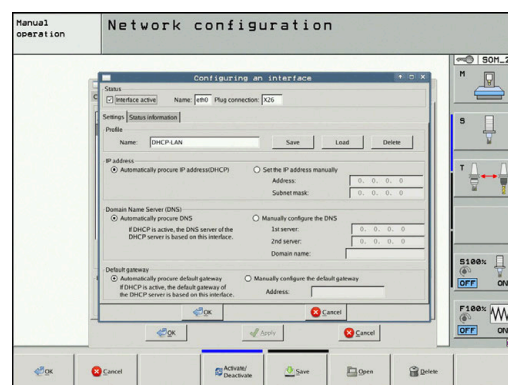
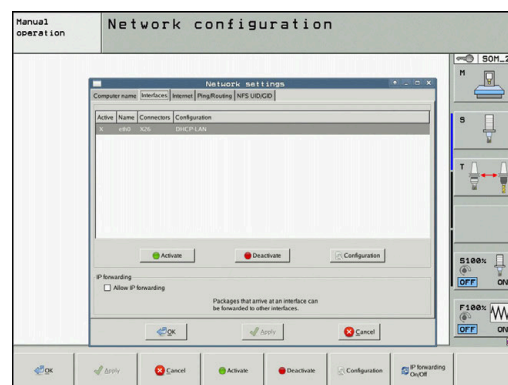
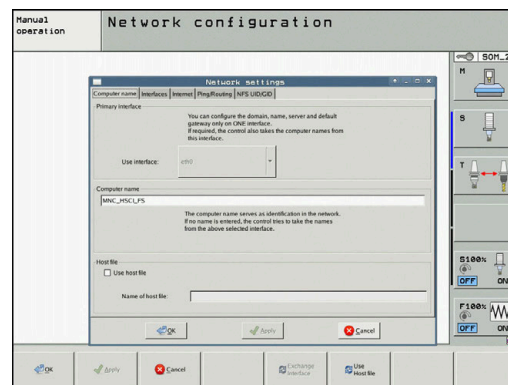
- ▶ Press the **MOD** key
- ▶ Enter the code number **NET123**



- ▶ 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



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 integration into the local corporate 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



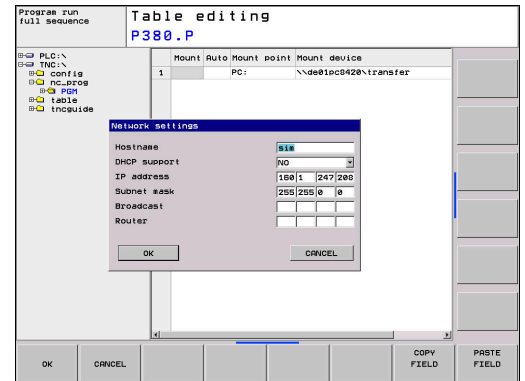
Further information: HEIDENHAIN Conversational Programming User's Manual for iTNC 530

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



Setting	Meaning	Input
IP address	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
Broadcast	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.	e.g. 160.1.255.255
Router	Internet address of your default router. Enter the Internet address only if your network consists of multiple subnets.	Four numerical values separated by periods, e.g. 160.1.0.2 If necessary, ask your network specialist for the proper value



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**



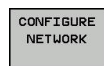
- ▶ Press the **OK** soft key



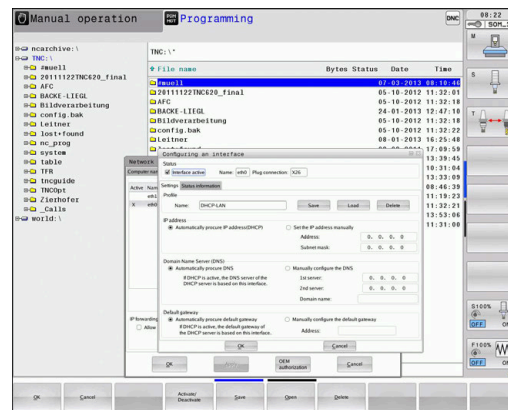
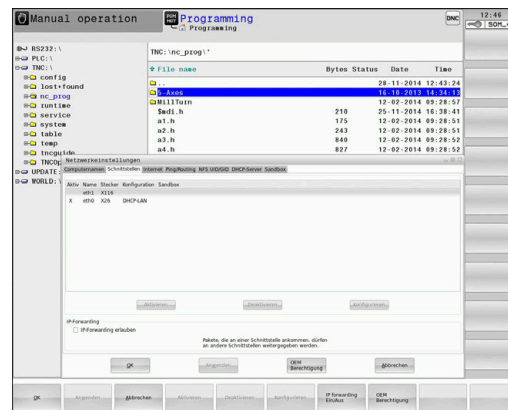
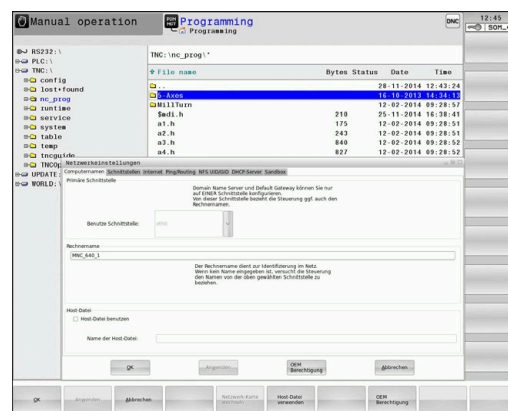
- ▶ Press the **Program Management** key



- ▶ 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



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 integration into the local corporate 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

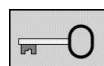
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

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



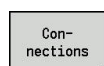
- ▶ Switch to the **Organization** operating mode



- ▶ Press the Key soft key
- ▶ Enter the code number **NET123**
- ▶ Press the **OK** button



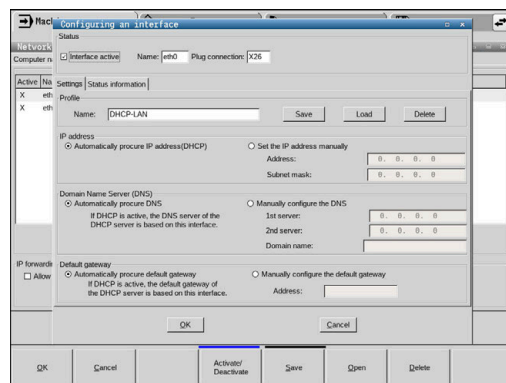
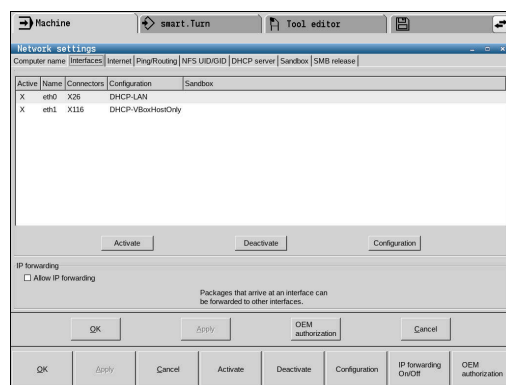
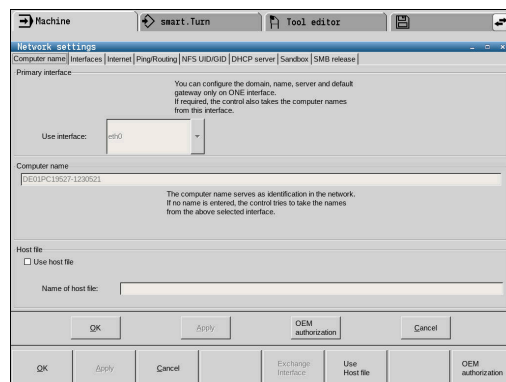
- ▶ Press the **Transfer** soft key



- ▶ 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 ticked
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 integration into the local corporate 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

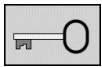
MANUALplus 620 starting with software versions 548328-05 and 54843x-01 (HEROS 5)

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

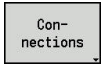
- ▶ Connect the control to the local company network via a network cable



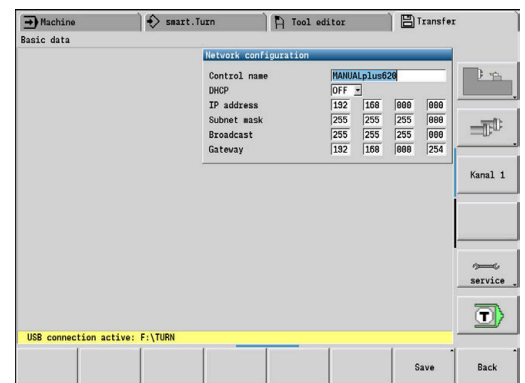
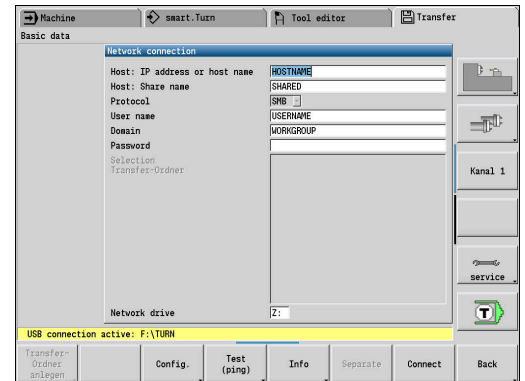
- ▶ Switch to the **Organization** operating mode



- ▶ 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



Setting	Meaning	Input
Control name	Name under which the control is visible in the network	e.g. MANUALplus620
DHCP	<p>OFF: The control has a fixed IP address in the network.</p> <p>ON: The control automatically obtains the following data from a DHCP server:</p> <ul style="list-style-type: none"> ■ IP address ■ Subnet mask ■ Broadcast ■ Gateway 	OFF
IP address	IP address of the control	Four numerical values separated by periods, e.g. 192.168.000.000
Subnet mask	<p>The Subnet mask serves to differentiate between the network ID and the host ID in the network.</p> <p>Enter the Subnet mask</p>	<p>Four numerical values separated by periods, e.g. 255.255.255.0</p> <p>If necessary, ask your network specialist for the proper value</p>
Broadcast	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.	<p>Four numerical values separated by periods, e.g. 255.255.255.0</p> <p>If necessary, ask your network specialist for the proper value</p>
Gateway	The IP address of the default gateway only needs to be entered if you are using more than one network.	<p>Four numerical values separated by periods, e.g. 192.168.000.254</p> <p>If necessary, ask your network specialist for the proper value</p>



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 **D**ynamic **H**ost **C**onfiguration **P**rotocol.

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.

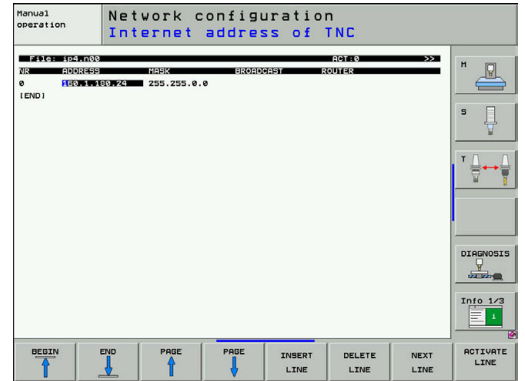


With the iTNC 530 controls, the connection via DHCP is an FCL-2 function.


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

To integrate the control into the company network via DHCP, 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:







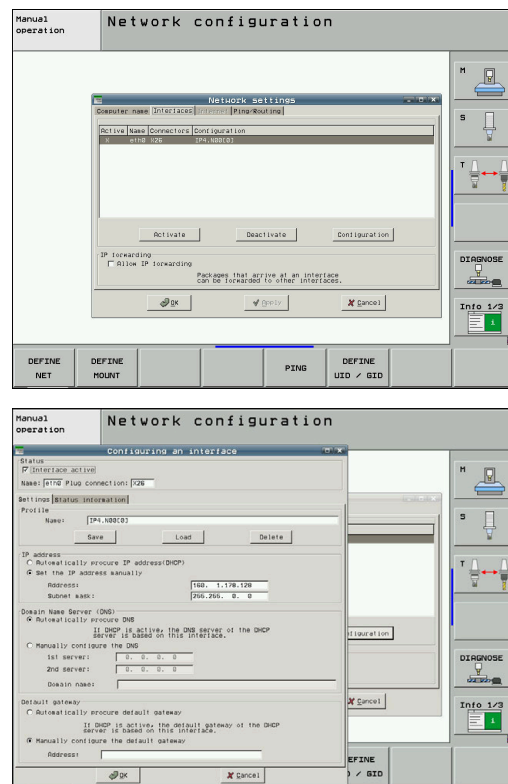
Setting	Meaning	Input
ADDRESS	The control obtains the IP address from a DHCP server.	DHCP
MASK	The control obtains the SUBNET MASK from a DHCP server.	(Leave blank)
BROADCAST	The control obtains the broadcast address from a DHCP server.	(Leave blank)
ROUTER	Internet address of your default router	Enter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

 **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 DHCP, 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:



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 Automatically procure IP address(DHCP) option
Address:	The control automatically obtains the IP address from a DHCP server.	
Subnet mask:	The control automatically obtains the subnet mask from a DHCP server.	

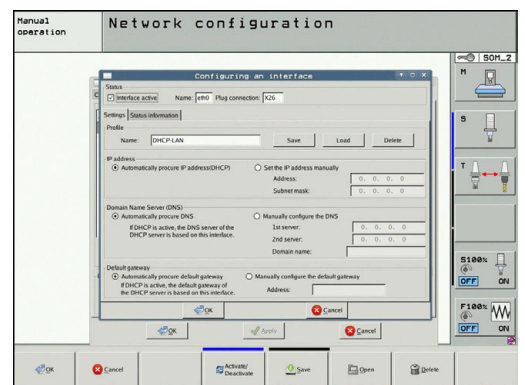
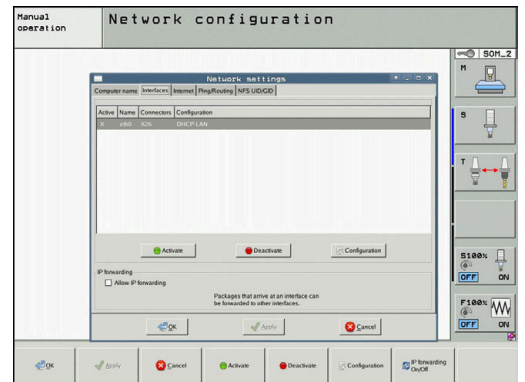
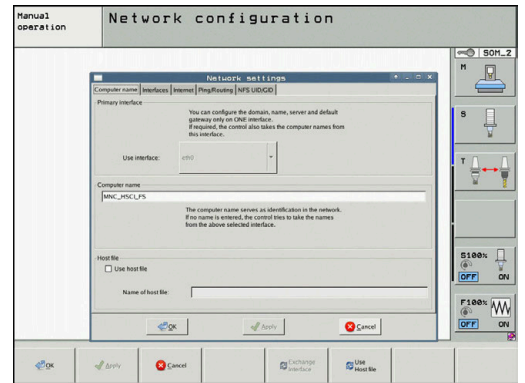
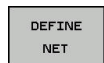
 **Further information:** HEIDENHAIN Conversational Programming User's Manual for iTNC 530

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

To integrate the control into the company network via DHCP, 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:



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 Automatically procure IP address(DHCP) option
Address:	The control automatically obtains the IP address from a DHCP server.	

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 integration into the local corporate 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 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



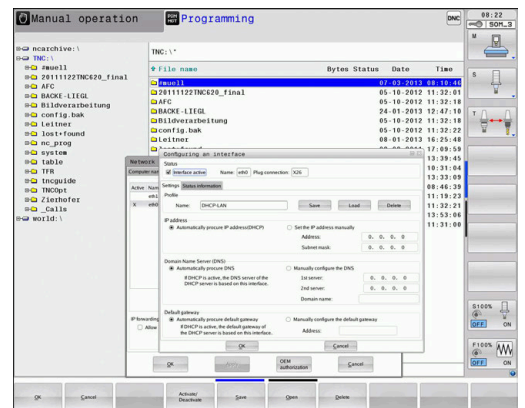
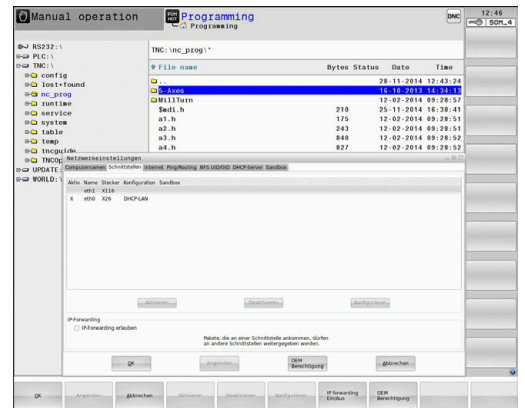
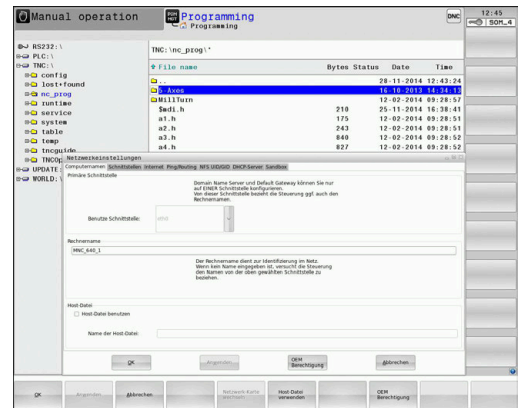
- ▶ Press the **MOD** key
- ▶ Enter code number **NET123**
- ▶ Press the **OK** soft key



- ▶ 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:



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 Automatically procure IP address(DHCP) option
Address:	The control automatically obtains the IP address from a DHCP server.	

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 integration into the local corporate 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 as of software version 34059x-06

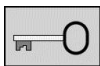
CNC PILOT 640 beginning with software version 688946-01 (HEROS 5)

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

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



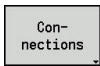
- ▶ Switch to the **Organization** operating mode



- ▶ Press the Key soft key
- ▶ Enter the code number **NET123**



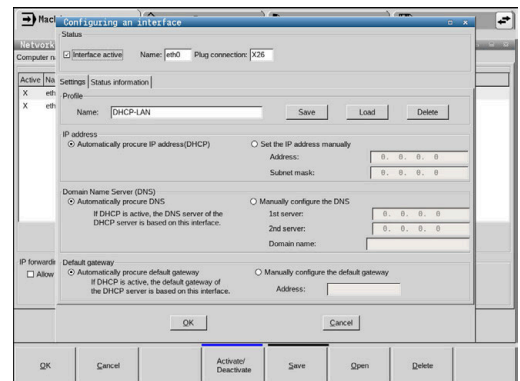
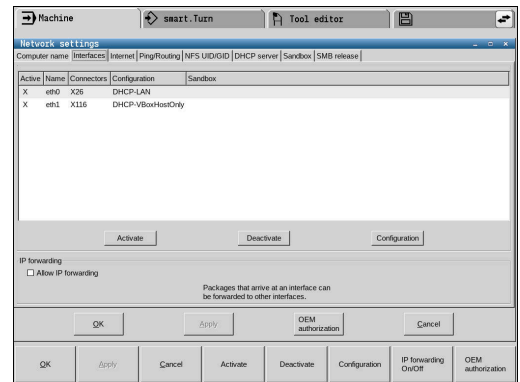
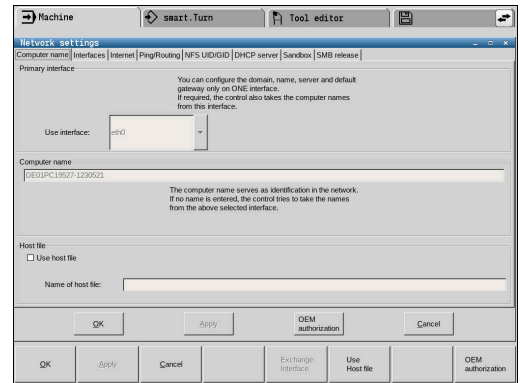
- ▶ Press the **OK** button
- ▶ Press the **Transfer** soft key



- ▶ 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:



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 Automatically procure IP address(DHCP) option
Address:	The control automatically obtains the IP address from a DHCP server.	
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.	

- ▶ 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 integration into the local corporate 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










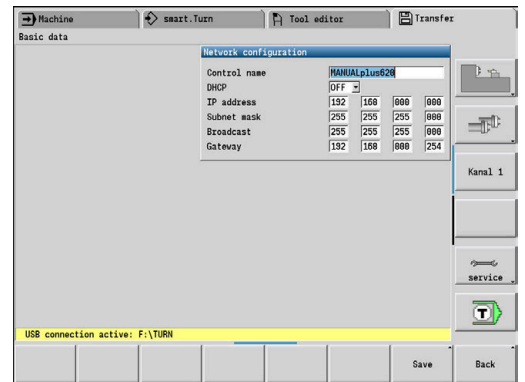
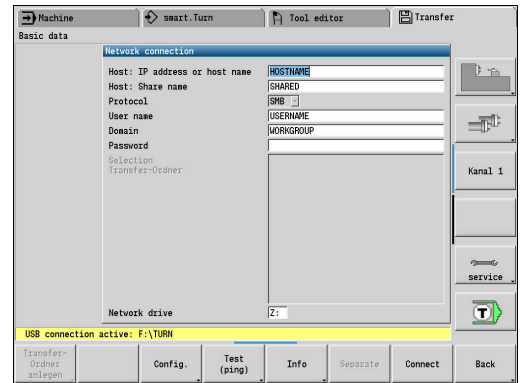
Further information: User's Manual CNC PILOT 640 starting with software version 68894x-04

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


To integrate the control into the company network via DHCP, 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 **NET** 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



Setting	Meaning	Input
Control name	Name under which the control is visible in the network	e.g. MANUALplus620
DHCP	<p>OFF: The control has a fixed IP address in the network.</p> <p>ON: The control automatically obtains the following data from a DHCP server:</p> <ul style="list-style-type: none"> ■ IP address ■ Subnet mask ■ Broadcast ■ Gateway 	ON

 **Further information:** User's Manual MANUALplus 620 starting with software versions 548328-05 and 54843x-01

13

**Machine
parameters**

13.1 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: "Editing existing machines", Page 158

13.2 Parameters for HEIDENHAIN controls

Machine controls

You can use StateMonitor with the following HEIDENHAIN controls:

Control	As of software version
iTNC 530	34049x-03
TNC 620	34056x-01
TNC 128	771841-01
TNC 320	340551-03
TNC 640	34059x-01
CNC PILOT 620	688945-01
CNC PILOT 640	68894x-01
MANUAL Plus 620	548328-05
Mill Plus IT	53895x-03, 73738x-01
Grind Plus IT	510060-04
Grind Plus 640	73502x-01

Depending on your software option, you can integrate other controls into StateMonitor using the following interfaces:

Interface	As of specification version
Modbus	Connect/Read
OPC UA	1.02.x
MTConnect	1.2

Further information: "Machines submenuMachines", Page 154

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 199
- Option #18 (HEIDENHAIN DNC interface) enabled on the HEIDENHAIN control
Further information: "Enabling Option 18", Page 197
or
- The corresponding option must be enabled on other controls

Hardware

For StateMonitor, you need a PC or server that meets the following minimum requirements:

- Dual core processor
- USB interface or network USB hub (dongle for full version)
- 2 GB of RAM and 10 GB of 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 30 GB of hard disk space and 3.5 GB of RAM for StateMonitor.



If you want to connect 20 machine controls or more, HEIDENHAIN recommends that you use a PC or server with quad core processor.

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



Have an IT specialist configure the firewall to enable the required TCP ports.

SMTP server

To use the **Messenger** notification function in StateMonitor, you must connect to an SMTP server acting as the e-mail output server. Contact your e-mail provider for the details needed to access the SMTP server.



Create a separate e-mail address for StateMonitor

Further information: "Messenger settings submenu", Page 169

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

The PLC password is required for access to PLC information: If you permit access to the PLC, StateMonitor reads the status of the rapid traverse override and differentiates 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 83



With the goal of recording additional machine data, StateMonitor has only read access to the PLC.

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

Option	Meaning
PLC Standard	The PLC is protected by the standard PLC password . Access occurs automatically.
No PLC	No access to the PLC.
	<div data-bbox="379 1137 435 1193" data-label="Image"> </div> <p>If the machine manufacturer uses a PLC password of the day, then select No PLC. StateMonitor cannot then record any additional PLC information.</p>
OEM PLC	The machine manufacturer has issued his own PLC password (not with the iTNC 530). If applicable, request it from the machine manufacturer and enter it into the input field.

PLC Standard or OEM PLC options










If you select the **PLC Standard** option or the **OEM PLC** option, then, for the display of the machine statuses for the current block, StateMonitor differentiates between the following options:

- 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 displays a yellow machine status when the feed rate override is = 0 %. The machine status becomes light green if the feed-rate override > 0 % and < 100 %. The machine status is dark green when the feed rate override is at ≥ 100 %.

Rapid-traverse override FMAX	Feed-rate override F = 0%	Feed-rate override 0% < F < 100%	Feed-rate override F ≥ 100%
FMAX = 0%	Machine status: Yellow 	Machine status: Light green 	Machine status: Dark green 
0% < FMAX < 100%	Machine status: Yellow 	Machine status: Light green 	Machine status: Dark green 
FMAX ≥ 100%	Machine status: Yellow 	Machine status: Light green 	Machine status: Dark green 

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 override setting of the feed rate.

StateMonitor displays a yellow machine status when the rapid traverse override is = 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 FMAX	Feed-rate override F = 0%	Feed-rate override 0% < F < 100%	Feed-rate override F ≥ 100%
FMAX = 0%	Machine status: Yellow 	Machine status: Yellow 	Machine status: Yellow 
0% < FMAX < 100%	Machine status: Light green 	Machine status: Light green 	Machine status: Light green 
FMAX ≥ 100%	Machine status: Dark green 	Machine status: Dark green 	Machine status: Dark green 

No PLC option










If you select the **No PLC** option, then 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 $\geq 100\%$.

Example:

An NC block with **FMAX** is active, the override for rapid traverse = 0%, and the override for feed rate > 0%. The machine is then at standstill, but StateMonitor nevertheless displays a green machine status because the rapid traverse override setting is not recorded.

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

Rapid-traverse override FMAX	Feed-rate override F = 0%	Feed-rate override 0 % < F < 100%	Feed-rate override F \geq 100%
FMAX = 0 %	Machine status: Yellow 	Machine status: Light green 	Machine status: Light green 
0% < FMAX < 100%	Machine status: Yellow 	Machine status: Light green 	Machine status: Light green 
FMAX \geq 100%	Machine status: Yellow 	Machine status: Light green 	Machine status: Dark green 

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**:

Option	Meaning
Standard HEIDENHAIN DNC	Select as default when creating a machine for the first time
Import of PLC words	Select only when the Override settings of the machine are incorrectly displayed in StateMonitor

13.3 Parameters for other controls

When connecting a different control, you need to manually assign the control signals to each machine status. For this purpose, StateMonitor uses a definition table that assigns one machine status each to the specific control signals.

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

Communication

The control signals from other controls are periodically polled by StateMonitor. The polling period duration can be configured.

Signal parameters



Despite the open standards of Modbus, OPC UA, and MTConnect, there are numerous differences between the supported controls. For the necessary information regarding addresses, comparison values, and data types, please refer to the documentation of the control or machine manufacturer.

The signal parameters evaluated by StateMonitor are identical for all non-HEIDENHAIN controls. From the transferred signal parameters, StateMonitor creates a status model for the affected machine.

Basic signal parameters for the status model:

Signal parameters	Meaning
Program running (PGM STARTED / PGM RUNNING)	Program has been started or is running
Program interrupted by error (ERROR)	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
Program successfully completed (PGM COMPLETED / END PGM)	Program execution has been completed successfully. This triggers the Fully executed program counter and generates a notification

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:

Signal parameters	Meaning
Machine online	Machine is online
Program stopped (PGM STOPPED)	Program execution has been interrupted, but the program remains active and can be resumed
Program interrupted by user (PGM CANCELED)	Program execution has been aborted, the program cannot be resumed. This triggers the program counter and generates the Program interrupted by user notification
Error acknowledged (ERROR CLEARED)	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)
Rapid traverse override setting in % (0 to 100)	Value in %
Feed rate override setting in % (0 to 150)	Value in %
Spindle override setting in % (0 to 150)	Value in %

Signal parameters	Meaning
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
Operating mode: Automatic	This value is evaluated in the detail view only
Operating mode: Manual	This value is evaluated in the detail view only
Operating mode: Handwheel	This value is evaluated in the detail view only
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".

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
 - A signal parameter with a **Text (string)** data type or **Number (number)** does not have any value
 - Two signal parameters have the same address

13.4 Modbus connection parameters

Connection settings

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

- **Polling interval**

Internal for polling

Status parameter for mapping

In the expanded definition table (**Editing** button), you can map the control signals to status parameters (see "Parameters for other controls", Page 230).

The following information is required for the mapping of the status parameters:

- **Address type**

Indicates the control's address space in which the memory address is located.



For the **COIL_OUTPUT** address type and **DIGITAL_INPUT** address type, Boolean values (0, 1) are usually entered under **Value**.

- **Data type**

Indicates the value's format and thus also how many bits are to be read and processed.

- **Address**

Indicates which location in the selected memory area of the value is to be read.

- **Value**

Comparison values are necessary for the signals that flow directly into the status model of the control. Exceptions to this are numerical values such as override settings or texts, such as the program name, that do not need to be compared.

13.5 Example for connecting a control via Modbus

Reading 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:

Input terminal assignment

Type	Address	Meaning
Digital input	1	Machine is running
Digital input	2	Task interrupted by an error
Digital input	3	Task successfully completed
Digital input	4	Machine stopped
Analog input	23	Feed rate potentiometer
Analog input	25	Spindle potentiometer

Addresses in flag memory

Type	Address	Meaning
Feed-rate override	42	Converted value for feed-rate override
Spindle override	43	Converted value for spindle override

Status model

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

Parameter	Address type	Data type	Address	Value
Program running (PGM STARTED / PGM RUNNING)	DIGITAL_INPUT	BIT	1	1
Program interrupted by error (ERROR)	DIGITAL_INPUT	BIT	2	1
Program successfully completed (PGM COMPLETED / END PGM)	DIGITAL_INPUT	BIT	3	1
Program stopped (PGM STOPPED)	DIGITAL_INPUT	BIT	4	1
Feed rate override setting in % (0 to 150)	HOLDING_REGISTER	INT_16	42	
Spindle override setting in % (0 to 150)	HOLDING_REGISTER	INT_16	43	

13.6 OPC UA connection parameters

Connection settings

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

- **Default Namespace**

Defines the default namespace to be used for the address

- **Security Mode**

Manual input of the authentication, depending on the server.



If you use an authentication, then you must also select an application certificate.

Further information: "Managing certificates (only for OPC UA)", Page 184

- **User**

Manual input of the authentication data

- **Password**

Manual input of the authentication data

- **SIK:**

Manual input

- **NC software**

Manual input

- **Polling interval**

Internal for polling

Status parameter for mapping

In the expanded definition table (**Editing** button), you can map the control signals to status parameters (see "Parameters for other controls", Page 230).

The following information is required for the mapping of the status parameters:

- **Parameter name space**

For each signal parameter, you can define your own namespace. If no parameter-specific value is entered, then, for the namespace, StateMonitor uses the value under **Default Namespace**.

- **Address type**

Indicates the control's address space in which the memory address is located.

- **Address**

Indicates which location in the selected memory area of the value is to be read.

- **Data type**

Defines, among other things, how the value comparison will be performed. StateMonitor differentiates between value parameters (**Text (string)** data type and **Number (number)** data type) and Boolean parameters (**Boolean value (0 or 1)**).

- **Value**

Comparison values are necessary for the signals that flow directly into the status model of the control. Exceptions to this are numerical values such as override settings or texts, such as the program name, that do not need to be compared.

13.7 MTConnect connection parameters

Connection settings

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 the value "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

- **Polling interval**

Internal for polling

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, then StateMonitor opens a new tab in the browser with the XML data that are reported by MTConnect.

Status parameter for mapping

In the expanded definition table (**Editing** button), you can map the control signals to status parameters (see "Parameters for other controls", Page 230).

The following information is required for the mapping of the status parameters:

- **Data type**

Defines, among other things, how the value comparison will be performed. StateMonitor differentiates between value parameters (**Text (string)** data type and **Number (number)** data type) and Boolean parameters (**Boolean value (0 or 1)**).

- **DataItemId**

States, as a reference, the ID attribute for the data values to be called.

- **Value**

Comparison values are necessary for the signals that flow directly into the status model of the control. Exceptions to this are numerical values such as override settings or texts, such as the program name, that do not need to be compared.

13.8 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 `pgm` is used.

For the feed rate potentiometers, the `PATH_FEEDRATE_OVERRIDE` data type with the `RAPID` and `PROGRAMMED` subtypes is defined for rapid traverse and feed rate. For spindle override, the `ROTARY_VELOCITY_OVERRIDE` data type is used.

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 **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 browser: `http:\IP address / DHCP:Port\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:

```
<DeviceStream name="CUT" uuid="002">
```

The `name` attribute of the `DeviceStream` item indicates which machine data will be queried on the MTConnect server.

Status model

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

Parameter	Data type	Address	Value
Program running (PGM STARTED / PGM RUNNING)	Text	exec	ACTIVE
Program interrupted by error (ERROR)	Text	exec	INTERRUPTED
Program successfully completed (PGM COMPLETED / END PGM)	Text	exec	PROGRAM_COMPLETED
Program stopped (PGM STOPPED)	Text	exec	PROGRAM_STOPPED
Program interrupted by user (PGM CANCELED)	Text	exec	OPTIONAL_STOP
Rapid traverse override setting in % (0 to 100)	Number	pfr	
Feed rate override setting in % (0 to 150)	Number	pfo	
Spindle override setting in % (0 to 150)	Number	sovr	
Operating mode: Automatic	Text	mode	AUTOMATIC
Operating mode: Manual	Text	mode	MANUAL
Program name or number	Text	pgm	

14

**Help, tips and
tricks**

14.1 Operating Instructions in StateMonitor

You can call the PDF file with the Operating Instructions of StateMonitor via the **Help** entry in the menu list.

The Operating Instructions are available in various languages. The current version can be downloaded in the downloaded from **www.heidenhain.de**.

To update the Operating Instructions, proceed as follows:

- ▶ Download the current version in the desired language from **www.heidenhain.de**
- ▶ Rename the downloaded PDF file in **StateMonitorHelpFile_XX.pdf** with **XX** as a place placeholder for the ISO language abbreviation (e.g., **1228892-01-A-04_it.pdf** in **StateMonitorHelpFile_it.pdf**)
- ▶ Move the PDF file in the installation folder of StateMonitor to the Documentation folder
- ▶ If applicable, replace the already existing file with the new file
- ▶ The current Operating Instructions are available in the desired language under **Help**

14.2 Special cases

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

Control	Software version	Special feature	Solution
iTNC 530	340492-06 340492-07	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.	▶ Tick the box next to Import of PLC words in the Settings menu, Machines submenu, Machine-specific settings
TNC 620	340560-01 to 340560-04	The operating modes are not displayed correctly in StateMonitor	▶ Update the control software to version 340560-05

14.3 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

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