

# 

# HEIDENHAIN

HEIDENHAIN StateMonitor

**Operating Instructions** 

English (en) 10/2022

# **Fundamentals**

# About this manual

These Operating Instructions are for StateMonitor Version 1.5.x.

#### Have you found any errors or would you like to suggest changes?

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:
	<ul> <li>Click the STORE button</li> </ul>
>	Identifies the result of an action
	Example:
	> StateMonitor lists all defined users in a table.
·	Identifies an item of a list
	Example:
	Error groups:
	Machining
	Programming
	PLC
	<ul> <li>General information</li> </ul>
Bold	Identifies
	Menus
	Tabs
	Screen buttons
	Functions
	Example:
	Switch to the Settings menu

# Legal information

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

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

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StateMonitor contains open-source software that is subject to special terms of use. The terms of use have priority over the license terms applicable to StateMonitor.

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# 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** 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** 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 manufacturer 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.

### NOTICE

#### Caution: Unwanted data transfer is possible!

If the log files need to be transmitted for service purposes or for another reason, the contracting party will be able to view user data contained therein.

In this case, it is your responsibility to ensure that all required data protection provisions have been made at your company.

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 174

#### **Sending notifications**

Prerequisites:

T

- 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 108

### 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

## **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



# 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
TNC7	81762x-16
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
FOCAS	CNC control series 0i <sup>1)</sup> , Model B/C/D/F CNC control series 15i (except turning) CNC control series 16i, 18i, 21i, 30i <sup>1)</sup> , Model A/B

 Full functionality, restricted for all others; for details see "FOCAS parameters", Page 284

Further information: "Machines submenu", Page 178

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

The machine controls must be integrated in the local company network

Further information: "Network integration", Page 229

 Option 18 (HEIDENHAIN DNC interface) must be enabled on the HEIDENHAIN control
 Further information: "Enabling Option 18", Page 227

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)
- 4 GB 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:

- 0.25 GB RAM
- 2 GB hard disk space

Thus, if you want to connect 15 machine controls, for example, the PC or server requires 30 GB of hard disk space and 6.5 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

A Windows operating system (Windows 10 or higher, or Windows Server 2019) is required for running StateMonitor.

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 194

# 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.com
- 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:

- .11
- Activate Trial License
- StateMonitor ControlCenter
- StateMonitor website

### Changing, repairing, and uninstalling StateMonitor

When you start the **Install StateMonitor.exe** installer 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

6

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:

- Double-click the StateMonitor.exe installer in the "sm" subfolder to start it
- > 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:



- 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



**i** 

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:

- 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:

- Click the ControlCenter icon in the status bar
- > The ControlCenter window opens.
- Click the **Start** buttonStateMonitor 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:

- 11
- 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:

- Open a web browser, e.g. Google Chrome or Mozilla Firefox
- In the address line, enter: https://Servername:28001
  - The prefix varies depending on whether the connection to the server is encrypted (https) or not encrypted (http)
  - 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.



2

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

6

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:



- 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:



- 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 icon.



- 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:



- Click the Start button
- > StateMonitor starts.
- Wait until the Running status appears on the screen

#### **Exiting StateMonitor**

To exit StateMonitor:



- 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: Starting Running Stopping Stopped
Version	Version information about StateMonitor, Control- Center and HEIDENHAIN DNC (machine control); in addition: the release date and the end of the maintenance period for the current version and, for rental licenses, also the remaining usage period
StateMonitor options	Overview of enabled software options; for trial licenses, the remaining usage period is also indicated <b>Further information:</b> "Extending the functionality with software options", Page 50

Version         StateMonitor Version:       1.5.0.7         ControlCenter Version:       9.1.2         HEIDENHAIN DNC Version:       1.7.2.0         Release Date:       08 Sep 2022         Maintenance Period End:       31 Dec 2023         Expiration Time:       -         StateMonitor Options       40 Machine         Additional Machines (Option 1):       40 Machine         OPC UA Interface (Option 3):       1 Machines         JobTerminal (Option 4):       activated         Mintenance Manager (Option 5):       1 Machines         Maintenance Manager (Option 6):       activated	Cunning)         ersion         tateMonitor Version:       1.5.0.7         ontrolCenter Version:       9.1.2         EIDENHAIN DNC Version:       1.7.2.0         elease Date:       08 Sep 2022         laintenance Period End:       31 Dec 2023         xpiration Time:       -         tateMonitor Options       40 Machines         dditional Machines (Option 1):       40 Machines         pc UA Interface (Option 2):       1 Machines         pbTerminal (Option 4):       activated         rConnect Interface (Option 5):       1 Machines         iaintenance Manager (Option 6):       activated         gnals (Option 7):       20 Signals         OCAS Interface (Option 8):       6 Machines	tart Shutdown		
Version StateMonitor Version: 1.5.0.7 ControlCenter Version: 9.1.2 HEIDENHAIN DNC Version: 1.7.2.0 Release Date: 08 Sep 2022 Maintenance Period End: 31 Dec 2023 Expiration Time: - StateMonitor Options Additional Machines (Option 1): 40 Machines OPC UA Interface (Option 2): 1 Machines JobTerminal (Option 4): activated MTConnect Interface (Option 5): 1 Machines Maintenance Manager (Option 6): activated Signals (Option 7): 20 Signals	ersion tateMonitor Version: 1.5.0.7 ontrolCenter Version: 9.1.2 EIDENHAIN DNC Version: 1.7.2.0 elease Date: 08 Sep 2022 laintenance Period End: 31 Dec 2023 xpiration Time: - tateMonitor Options dditional Machines (Option 1): 40 Machines lodbus Interface (Option 2): 1 Machines PC UA Interface (Option 3): 1 Machines obTerminal (Option 4): activated ITConnect Interface (Option 5): 1 Machines laintenance Manager (Option 6): activated ignals (Option 7): 20 Signals OCAS Interface (Option 8): 6 Machines	State Logfile Databa	ise	Settings
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	OCAS Interface (Option 8): 6 Machines	Maintenance Manager (Opt	tion 6)	: activated
	10.00 830	Signals (Option 7):		20 Signals
FOCAS Interface (Option 8): 6 Machines	ata Interface (Option 11): 40 Machines	FOCAS Interface (Option 8	):	6 Machines
Data Interface (Option 11): 40 Machine		Data Interface (Option 11)		40 Machines

#### 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	Logfile options:
Settings	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
	Export CodeMeter Log
	Additional export of the WIBU CodeMeter Log with entries regarding the license containers
	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
	ControlCenter ? ×
	ControlCenter StateMonitor Basic Basic
	Extended Extended
	Extended Extended System License
	System License Basic Basic

 Open DNC Connection Window
 Opens the DNC Connection dialog (can be accessed only by users with the Administrator role)

Logfile Settings  Export StateMonitor Log archive Export Windows Event Log Export CodeMeter Log	
Export Windows Event Log	
Export CodeMeter Log	
Select Log files time period	
From: 24.05.2021 00:00 ≑	
To: 24.06.2021 15:20 🗘	
Reset	
Logging Extended logging is activ	ve (i
Logging Extended logging is activ	

#### 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	Options for the connection to the database:
Connection	Database Host
Settings	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")
	If the database server is run on a different computer from that of StateMonitor, then the database TCP port must be enabled in the

Apply

Application of the options

firewall.

Database Connection Settings Database Host: localhost Database Name: statemonitor Database Schema: statemonitor Database Port: 28010 Apply	Database Host:     localhost       Database Name:     statemonitor       Database Schema:     statemonitor       Database Port:     28010	Database Host: localhost	
Database Schema: statemonitor Database Port: 28010	Database Schema: statemonitor Database Port: 28010	Database Name: statemonitor	
Database Port: 28010	Database Port: 28010		
		Database Schema: statemonitor	
Apply	Apply		
		Apply	

### Settings tab

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

Element	Description		
StateMonitor	Options of the application:		
Settings	Windows Event Logger		
	Additional logging of StateMonitor data in the Windows Event Log		
	Simulated Machines		
	Use of simulated machines in StateMonitor		
	<ul> <li>Status light full size</li> </ul>		
	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		
	<ul> <li>Access to IP cameras on machines</li> </ul>		
	Validate Modbus Parameters		
	<ul> <li>Validation of the parameters when adding a machine with Modbus interface</li> </ul>		
	Auto Port		
	Port for the application in the browser (default: "28001")		
Server	Running StateMonitor as a Windows service		
Settings	To register StateMonitor as a Windows service:		
	<ul> <li>Start ControlCenter with administrator rights</li> </ul>		
	<ul> <li>Stop StateMonitor</li> </ul>		
	Click the StateMonitor Service option		
	<ul> <li>Click the Apply button</li> </ul>		

	Logfile	Database	Settings
StateM	onitor Sett	tings	
Win	ndows Eve	nt Logger	
	ulated Ma		
	tus light fu		
	ver Setup	HTTPS	
	Camera	ous Parameters	
		ous Parameters	5
28001			11
103202			1 4 4 1 4 5 1 4 5
	Settings		
Sta	teMonitor	Service	
		Apply	



# 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, oncall 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:

- > Open a web browser, e.g. Google Chrome or Mozilla Firefox
- In the address line, enter: https://Servername:28001
  - The prefix varies depending on whether the connection to the server is encrypted (https) or not encrypted (http)
  - 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.

### Opening the client application on the control



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:

- 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: https://Servername:28001
  - The prefix varies depending on whether the connection to the server is encrypted (https) or not encrypted (http)
  - In place of Servername, enter the hostname or the 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.

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:



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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 44

#### Logout

Before exiting StateMonitor, the users have to log off. To log off:



- 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 213

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 173

#### 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 174

In StateMonitor, the following menus and submenus are available:

lcon	Menus and submenus
Home	Home
888	Machines
Machines	Tile view
	Status overview
	Day view
	Overview of program run-times
	Messenger
Q	Event configurator
Messenger	Notification profiles
	Notifications
	Message groups
	Jobs (software option)
	Create job
0005	<ul> <li>Assign job</li> </ul>
	Adjust machining sequence
	Maintenance (software option)
Maintenance	Tile view
Wallachance	Status overview
	Evaluations
Evaluations	Machine statuses
Evaluations	Key figures
	Program run times
	Machine alarms
	Job times (software option)
	Tool usage times
	Signals (software option)
	Maintenances (software option)
	Time filter

	000			- 84	~		
		<u>5</u> 🗎	Rationarco	Cranadions			Carland Administration
			R				
Welc	ome user Default.Adm	inistrator					
1.0	orization status Stateb	Aonitor Administ	rator				
Lest	login: 18.83.2020 12:00	9.39					
	Multile manip	ation					

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lcon	Menus and submenus
-	Settings
•	User settings
Settings	User management
	Machines
	Add groups
	Machine mapping
	Statuses (software option)
	Messenger settings
	File backup
	External reporting DB

- Advanced
- 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. To do this:

- 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 gate multiple search terms using AND, OR, and NOT.



Gate		Description	Example
AND	"And" operation	The table displays all of the rows containing both of the search terms.	TNC 640 <b>AND</b> 100.0 %
OR	"Or" operation	The table displays all of the rows containing either one of the search terms.	TNC 640 <b>OR</b> iTNC 530
NOT	"Not" operation	The table displays all of the rows that do not contain the search term.	<b>NOT</b> iTNC 530

When gates are combined, the entries are processed in the following

order: NOT ... AND ... OR ....

When parentheses (not supported by StateMonitor) are used, this

order would correspond to [ (NOT  $\ldots$  ) AND  $\ldots$  ] or  $\ldots$ 

### 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 dropdown list boxes (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	5 Signals	1308521-01
8	FOCAS Interface	1385356-01
11	Data Interface	1367514-01

Further information: "Software Options and Licenses", Page 217



# Home Menu

### 4.1 Home menu

Enter your user name and password in the **Home** menu. **Further information:** "Login / Logout ", Page 53

StateMoni	tor
User	1
Password	
Log	jin

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

#### Company-specific start page

If you want to add your company logo or another image file in the **Home** menu, then proceed as follows:

- Copy the desired image file into the directory C:\ProgramData \HEIDENHAIN\StateMonitor\homeImage
- > StateMonitor displays the image in the **Home** menu.



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

### 4.2 Login / Logout

#### Login

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., Google Chrome or Mozilla Firefox)
- In the address line, enter: https://Servername:28001/jh-tnc-sm-app/operator#!login/Username/Password
  - The prefix varies depending on whether the connection to the server is encrypted (https) or not encrypted (http)
  - In place of Servername, 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.

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

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

#### Logout

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Before exiting StateMonitor, the users have to log off. To log off:

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- ► Log off via the **Logout** menu
- > The empty login window will be displayed.

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# Machines Menu

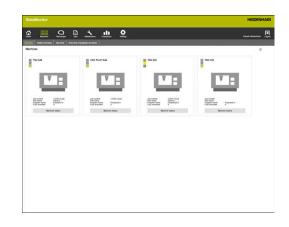
### 5.1 Machines menu

The **Machines** menu shows all machines that are defined and activated in the **Settings** menu.

Further information: "Machines submenu", Page 178

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

- Tile view
- Status overview
- Daily view
- Overview of program run-times

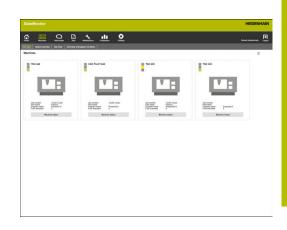


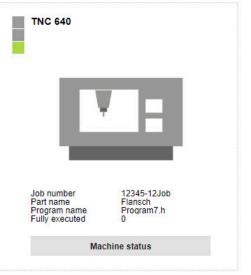
### 5.2 Tile view submenu

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

The status card contains the following information:

Information	<b>Meaning</b> If you upload an image of the machine when adding it, then StateMonitor will show the image here		
Machine image			
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 <b>Program Run, Full Sequence</b> or <b>Program</b> <b>Run, Single Block</b> mode		
Fully executed	Number of complete program runs		





### 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 produc- tive
Dark green/	The machine is productive
Light green	Dark green = Productive (feed rate/rapid OVR >= 100 %)
	Light green = <b>Productive (feed rate/rapid OVR &lt;</b> 100 %)
Further infor	mation: "Customizing the configuration of the default

OVR", Page 191

### Filtering status cards

Each user can customize the filtering of the status cards. To do this:



Click the gear symbol

- > The **User-specific view of existing machinery** window that provides filter criteria for selection is displayed. The filter criteria encompass machines and machine groups.
- To limit the view to certain machines or machine groups, select the respective checkboxes
- > StateMonitor shows the selected machines.



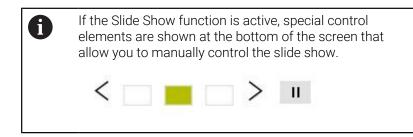
If no checkbox has been selected, then StateMonitor will display all of the machines that are assigned to the user (default setting).

#### Customizing the view of the status cards

If more status cards are shown than can be displayed in a window, the user can split the **Tile view** up into several views by using the Slide function. To do this:



- ► Click the gear icon
- > The User-specific view of existing machinery window is displayed.
- To customize the view, select the following options or the checkboxes in front of them:
  - Number of machines shown per slide
  - Automatic switching of the slides activates the Slide Show function
  - Display time in seconds
- StateMonitor displays the view in the Slide Show function.



### 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** key figures 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
- Program currently loaded on the machine
- Program status
- Active **Tool** (including tool number and tool name) in the tool spindle
- Number of programs that have been Fully executed
- Status of the current job
- Job number
- Part name
- OK/R/S: returned quantities of Actual quantity (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 158

The machine status bar results from the machine status.

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

Further information: "Saving additional information", Page 79



#### Showing detailed information

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

- 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 observation period is 24 hours.

To adjust the observation period:

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	ഹ	•

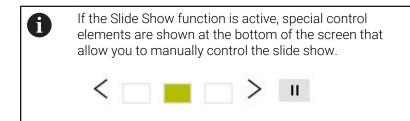
- Click the gear symbol
- The User-specific adaptation of machine statuses window is displayed.
- ▶ In the **From:** field, select or enter the desired time
- In the to: field, select or enter the desired time
- Click the Save button
- The machine status bars display the selected period.

#### Customizing the view of the machine status bars

If more machine status bars are shown than can be displayed in a window, the user can split the **Day view** up into several views by using the Slide function. To do this:



- Click the gear icon
- > The **User-specific view of existing machinery** window is displayed.
- To customize the view, select the following options or the checkboxes in front of them:
  - Number of machines shown per slide
  - Automatic switching of the slides activates the Slide Show function
  - Display time in seconds
- StateMonitor displays the view in the Slide Show function.



### 5.5 Overview of program run-times submenu

In the **Overview of program run-times** submenu, StateMonitor displays a status card with the currently active NC program and its progress for every machine.

To customize the display of the program run times:

63

- On the desired status card, click the gear icon that is shown at left below the status bar
- StateMonitor displays the Program run-time configuration window.
- To use an NC program that has already been recorded, enter the corresponding search criteria in the Search the captured machining times pull-down menu:
  - Time period
    - Time from ... to ...
    - Number of days (counting back from the current day)
      - 1 day
      - 3 days
      - 7 days
    - Date from ... to ...
  - Machine
  - Program
- If a program that you would like to use has been found, click the corresponding time information.
- The time information is added to the Configure program run-time pull-down menu as Machining time.
- In the Configure program run-time pull-down menu, select the program name in the drop-down list or enter the program name including the path
- Select the desired recording method in the Machining time for monitoring drop-down list
  - Define fixed time
  - Default time from FN38 function

**Further information:** "Configuring the default time", Page 105

- In the Early warning time field, enter the desired reminder time prior to the start of the program
- Click the Save configuration button
- > StateMonitor displays the configuration in the list.

In addition, you can use the **Notifications** function to be informed about when the early warning time and/or the machining time of all active programs have/has been reached.



The **Notifications** function is always effective for all active program run-time configurations.

			Colland Administratio
Program run-times	Dag view Constants of program and dimension		0
	T4C 640 Propert Propert23.8	Program status RandoneMonito/Machine/Tevtines/RUNNING	
		00.49	
	Maching time Carly saming time-washed Maching time accesses	I III Methodg Sine without default Sine	
	CNC PL01 641 Propert Propertia	Program datus Russianekkostankka-tievitiew/IU/NNNG	
	00.00		
	Mechanics time Carly saming time reached. No active on time configuration	E III Starborg time site of default time	
	TEC 620 Propuls Propandita	Program datus Rendered Andrea Tartine RUNNING	
	00:00		
	Maching time Carly sering time wathed Maching time accede Na active can time cardiguation	Weshing the site of deal the	
	THC 124 Proper Programments	Program status Rentined Analysis (Rentine DONNY)	

To customize the notifications:

3

- On one of the status cards, click the gear icon that is shown at left below the status bar
- StateMonitor displays the Program run-time configuration window.
- In the Notification pull-down menu, select the checkboxes of the desired time periods
  - Early warning time reached
  - Specified machining time reached
- To activate the notification, select the Active checkbox
- Select the desired user and the corresponding notification profile in the User name and Notification profiles drop-down lists
- Click the button
- > StateMonitor displays the notification in the list.

Further information: "Messenger menu", Page 108

### Filtering status cards

Each user can customize the filtering of the status cards. To do this, proceed as follows:



i

- Click the gear symbol
- The User-specific view of existing machinery window that provides filter criteria for selection is displayed. The filter criteria encompass machines and machine groups.
- To limit the view to certain machines or machine groups, select the respective checkboxes
- > StateMonitor shows the selected machines.

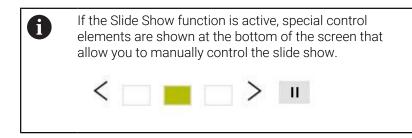
If no checkbox has been selected, then StateMonitor will display all of the machines that are assigned to the user (default setting).

#### Customizing the view of the status cards

If more status cards are shown than can be displayed in a window, the user can split the **Tile view** up into several views by using the Slide function. To do this, proceed as follows:



- Click the gear icon
- > The User-specific view of existing machinery window is displayed.
- To customize the view, select the following options or the checkboxes in front of them:
  - Number of machines shown per slide
  - Automatic switching of the slides activates the Slide Show function
  - Display time in seconds
- StateMonitor displays the view in the Slide Show function.



### 5.6 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 >= 100 %)	-	Program Run, Full Sequence	In progress	≥ 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><li>Selected</li><li>Stopped</li><li>Interrupted</li></ul>	Any
			Program Run, Single Block	<ul> <li>Finished</li> <li>Error</li> <li>No program selected</li> </ul>	
		(M)	Manual Operation	selected	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	Error	Any
			Program Run, Single Block		
	Light gray <b>Delay</b>	The <b>Delay</b> status is not generated directly by the machine. Users can store the <b>Delay</b> status instead of a yellow or dark gray status.			
	Dark gray <b>Machine not in use</b>	<ul> <li>The machine is switched off or</li> <li>StateMonitor cannot establish a connection to the machine or</li> <li>StateMonitor is temporarily shut down</li> </ul>			nachine

### 5.7 Machine status

The Machine status view shows the following information:

- Machine name
  - Machine status light
  - **SIK** number and control of the machine
  - NC software version of the control
  - Override settings
  - Mode of operation, Program, Subprogram and Program status that are currently active on the machine
  - Program status with starting time and Duration of the current program
  - Tool number, Tool name, Dimensions and Comment for the current tool
- Current job (software option)
  - Job number and Working step
  - Status of the current job, including the starting time
- Active messenger status
- Program statistics
- Signal status
- Machine reports
- Maintenance status (software option)
- Machine statuses
  - Machine status bar (resulting from the Machine status)
  - Utilization rate

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Machine status		
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Norm         Norm           Norm         Norm		
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Machine statuses	•	

#### To open the Machine status view:



- 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 77
- Job terminal (software option)
   Further information: "Job terminal submenu (software option)", Page 82
- Detailed view of the last 3 days
   Further information: "Detailed view of the last 3 days submenu", Page 88
- Machine alarms
   Further information: "Machine alarms submenu", Page 89
- Program run times
   Further information: "Program run times submenu", Page 92
- Maintenance & malfunction
   Further information: "Maintenance & malfunction submenu (software option)", Page 94

### 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 184

For this purpose:

- Click the camera symbol next to the machine name
- The live image 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**.

### **Tool information**

StateMonitor displays a schematic tool icon and information about the tool that is currently being used.



This function is only available for machines that are connected via the HEIDENHAIN DNC or the MTConnect interface.

#### Program Program6.h Subprogram Program status In progress



### 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
(m)	Manual Operation
	Electronic Handwheel
	<b>Positioning with Manual Data Input</b> (MDI)
	Program Run, Single Block
-	Program Run, Full Sequence

### Program status

**The Program status** provides information about the current status of the NC program that is being run on the machine.

The following program statuses can occur:

Program status	<b>Meaning</b> The machine is executing an NC program.			
In progress				
No program selected	The machine is not in an operating mode that executes NC programs.			
Inactive	The current <b>Mode of operation</b> on the machine is <b>Program Run, Full Sequence</b> , or <b>Program Run, Single Block</b> .			
	<ul> <li>No NC program has currently been started</li> </ul>			
	or Program run was interrupted by an error			
	<ul><li>or</li><li>The operator stopped the program run with an INTERNAL STOP</li></ul>			
Error	The execution of the current NC program was interrupted due to an error.			
	The <b>Error</b> status is shown until it is acknowledged on the machine. Then the status switches to <b>Inactive</b> .			
Selected	The current <b>Mode of operation</b> on the machine is <b>Program Run, Full Sequence</b> , or <b>Program Run, Single Block</b> .			
	The operator has selected a program but not started yet.			
Stopped	<ul> <li>The current Mode of operation on the machine is Program Run, Single Block, and the operator has not yet started the next NC block</li> </ul>			
	<ul> <li>Program run was stopped by an MO command in the NC program</li> </ul>			
Interrupted	The operator interrupted the program run with <b>NC Stop</b> .			
Finished	The current NC program has been execut- ed until the end. An <b>M30</b> or <b>M2</b> 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:

- Click the Job terminal button
- The Jobs submenu is displayed.
   Further information: "Job terminal submenu (software option)", Page 82

### Active messenger status

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

Further information: "Notifications submenu", Page 116

- []]
- If the Active messenger status area is not visible, then click the slider icon in the Program statistics area
- Instead of showing the Program statistics area, StateMonitor shows the Active messenger status area.

Tool number Tool name Dimensions Comment	16 MILL_D12_ROUGH L 50.0 / R 6.0 / R2 (	
Current job		
Job number Working step	12345-3Job 001a3 -	 

[]]

Active messenger status

User App, Admin Profile 2

### **Program statistics**

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



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

The following is counted:

- All programs (Total)
- The current program (Active PGM)

StateMonitor distinguishes the following cases:

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

Program statistics			[]]
	Total	Active PGM	
Fully executed	73	0	
Canceled by user	0	0	
Canceled by error message	2	0	
Interrupted by user	0	0	
Interrupted by error message	e 0	0	

#### **Machine reports**

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

- []]
- If the Machine reports area is not visible, then click the slider icon in the Signal status area
  - Instead of showing the Signal status area, StateMonitor shows the Machine reports area.

Each user can define individually which messages are to be displayed under **Machine reports**. To do this:



- Click the gear icon
- A filter selection window opens. The filter criteria encompass error classes, error groups, and information.

Further information: "Machine alarms submenu", Page 89

- To add a filter criterion to the selection, select the checkbox in front of it
- Click the **Save** button
- > Under Machine reports, StateMonitor will only show the messages that match the selected filter criteria.
- > Filtering only applies to the **Machine reports** section in the **Machine status** submenu.

To view further machine messages:

- Click the More button
- The Machine reports submenu opens.
   Further information: "Machine alarms submenu", Page 89

8.03.20 11:59   This is a important message, which should be read with 8.03.20 11:59   This is a program completed message 8.03.20 01:15   This is a program canceled by user message 7.03.20 16:29   This is a program canceled by error message 7.03.20 12:26   Alarm9 7.03.20 11:49   This is a program canceled by error message 7.03.20 Alarm9
8.03.20 11:59   This is a program completed message 8.03.20 01:15   This is a program canceled by user message 7.03.20 16:29   This is a program canceled by error message 7.03.20 12:26   Alarm9 7.03.20 11:49   This is a program canceled by error message
8.03.20 01:15   This is a program canceled by user message 7.03.20 16:29   This is a program canceled by error message 7.03.20 12:26   Alarm9 7.03.20 11:49   This is a program canceled by error message
7.03.20 16:29 This is a program canceled by error message 7.03.20 12:26   Alarm9 7.03.20 11:49   This is a program canceled by error message
7.03.20 12:26   Alarm9 7.03.20 11:49   This is a program canceled by error message
7.03.20 11:49   This is a program canceled by error message
7.03.20 08:59   Alarm9
7.03.20 07:49   This is a program canceled by user message
7.03.20 03:44   This is a program completed message
6.03.20 21:26 This is a program canceled by user message
6.03.20 15:17   This is a program canceled by user message
6.03.20 05:04   This is a program canceled by user message
5.03.20 23:04   This is a important message, which should be read with
5.03.20 23:04   This is a program completed message
5.03.20 17:21 This is a program canceled by user message
5.03.20 07:10   This is a program canceled by user message
More

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#### Signal status (software option)

In the **Signal status** area, StateMonitor shows the status of the machine's currently recorded signals.



- If the Signal status area is not visible, then click the slider icon in the Machine reports area
- Instead of showing the Machine reports area, StateMonitor shows the Signal status area.

Each user can define individually which signals are to be displayed under **Signal status**. To do this:



- Click the gear icon
- A window with the defined signals is displayed.
   Further information: "Defining control signals", Page 182
- To display a signal, select the checkbox in front of it
- Click the Save button
- Only the selected signals are displayed in the Signal status area.

Signalstatus			Ø	[[]]
Signal1 70	0	_	_	60
Signal2 74		10	50	

#### Maintenance status (software option)

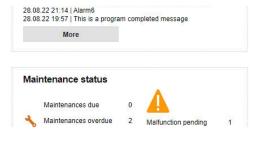
In the **Maintenance status** area, StateMonitor shows the machine's current maintenance status.

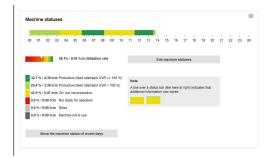
To see details or to report malfunctions:

- Click the Maintenance & malfunction button
- > The Maintenance & malfunction submenu is shown. Further information: "Maintenance & malfunction submenu (software option)", Page 94

#### Machine statuses

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





#### Setting the observation period

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

To adjust the observation period:



- ► 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
- 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 observation period there, too.

#### **Detail view**

To see the Detailed view of the last 3 days:

- 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 88

#### **Editing machine statuses**

To replace certain 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 77

## 5.8 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:

- Click the calendar icon 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

The available time for the machine statuses depends on the user's role. These settings are defined in the [Installationsordner]\config\properties \application.properties file in the following properties and can be modified:
AppConfig. MaxDaysMachineStateEditingUser=0 AppConfig. MaxDaysMachineStateEditingUserPlus=5 AppConfig. MaxDaysMachineStateEditingAdmin=365

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 48

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-	-	fuses TN			d Hennelsond Hite	And Description of Heat		Received Control of Co	_
Date of	- beyaige	II 1944	2824			Show statuses that are to 1 Min v			
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			5 05 07 08 08 1			22 23 44			
						11 13 98			
		1005/93	2 km Availability	54.85 / 548 kps Utilization rate					
0	Tites		Mole of specifice	Program	Dutyrogram	Program status	Mable nettain	New data	Cananat
-	20 37 56	00.06.55	Propert Rut, Full Sequence	yiel@Paper3.h		Frankel	This is a important	OK, but not productive	
	00.06.58	01.22.36						Nachra nd. nuce	
	01.22.36	041725	Propan Run, Full Sequence	Vio/00Prepari21		in progress		CK, but not productive	
	040725	010729	Program Run, Full Dequence	(naritithispan2.)		In progress, Finished		Productive (head rationapid OVR ++ 100 1	N)
	010729	08,28,29	Program. Run. Full Deguarca	(re10Pepar2A, (re10Pepar1A)		Finance, in property	The N aimportant	CK, but not productive	
	08 28 23	10 23 47	Program Run, Full Sequence	(reli2Papant)	(re1005uterspars)_3.h	in programs		Productive (held rate/rapid CVR ++ 100 1	ú
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#### Replacing and specifying machine statuses

In the **Edit machine statuses** submenu, you can replace machine statuses with other ones and specify them more precisely.



Additional specifications for machine statuses can be defined in the **Settings** menu. **Further information:** "Statuses submenu", Page 189

To change a machine status:

- 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 machine status
- In the New status drop-down list below the table, select the desired status
- Enter a comment in the **Comment** field as needed
- Click the Save button
- The machine status is changed in the machine status bar.

6

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

Further information: "Editing machine statuses", Page 104

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

Original stat	us	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 stat	al status New status (specification)							
Red	Not ready for operation	Red						
Dark gray	Machine not in use	Dark or light gray						
Light gray	Delay	Dark gray 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).

#### **Customizing columns**

To customize the display of the columns:

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- Click the gear icon
- > The **Show/Hide columns in the table** window opens.
- To remove a column from the selection, clear the checkbox in front of it
- ► Click the **Save** button
- > The table shows the selected columns.

#### 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
- In the table, click the row of the desired machine status
- Enter additional information in the Comment field below the table
- Click the Save 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 158).



For defining planned downtimes (e.g., shift change or breaks) see "Time filter submenu", Page 168.

To edit a machine status:

- 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

If a machine status extends over several days, you must additionally indicate the day on which you want the division to take place.

- Click the Split status button
- 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

#### Configuring machine statuses with QuickEdit

If you want to access StateMonitor from tablets or smartphones, you can also configure the machine statuses in the QuickEdit view. QuickEdit is optimized for operation with a touch panel and provides the required functions.

The QuickEdit view is only accessible via a special link and is shown as a page without navigation in the menu; the currently active status has already been selected for editing.

- In the address line, enter: https://Servername:28001/jh-tnc-sm-app/operator#!status/ Machine ID/quickedit
  - The prefix varies depending on whether the connection to the server is encrypted (https) or not encrypted (http)
  - In place of Servername, enter the hostname or the IP address of the PC or server on which StateMonitor is installed
  - In place of Machine ID, enter your machine address in StateMonitor

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In order to speed up opening of the QuickEdit view of a machine, you can define the link as a start page. **Further information:** "Create user", Page 176



## 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.

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

Further information: "Job times submenu (software option)", Page 163



With HEIDENHAIN controls, the **FN38** control function allows you to edit jobs in StateMonitor from within the NC program.

Further information: "FN38: Job functions", Page 129

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

Connexty selected job () () () () () () () () () () () () ()	Assigned jobs for Jab sunter 1 12345 Lore	Number State         Not           BT63         BEE3           SEE3         SEE3           SEE3         SEE3	640 when your	Petrans Petra Person Seal	rter Data	5946 9409 91 89 22 11 22 91 89 22 11 22	Paulo Lov High	Prented an Profil 350 Comment	Fiel and Edds 1 1 Fiel		
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And and an	2 12965-500 2 12965-500 Entries for job 13 5560 35640 Assgned Created	8153 345-3300 30568 89008 91:06:22 11:22 91:06:22 11:22 91:06:22 11:22	Normal BHOR BHOR	Parson 5482	100 Daniel Assigned Med answel 0 0	91 86 32 11 22 91 86 32 11 22 91 86 32 11 22 Nationalize Nationalize Nationalize	Lev High	250	1	0 0 Seet	nee line
Managing Bill Marken Strategy	2 12345-300 Entries for job 13 Bartel Assgrad Gradad	345-330b 395-330b 01.06.22 11.22 01.06.22 11.22 01.06.22 11.22 01.06.22 11.22	Burned BACK BACK	anouel 000819 000 000	Assigned End propert 0 0	91.09.22 11.22 Note No information No information	Hp	353		500	nes line
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Report amount											
Actual quantity (DR) v Report											
Adual exercity (DK) 0											
Revolt (R) 0											
fow(t) 0											
Finish job											

#### Adapting the times specified for working steps

You can assign additional time specifications, such as setup time, unit times or transport times, to a working step as required. You can also distribute a working step onto various batches. Based on the times specified and the batch quantity, the execution time and the busy time are calculated as follows:

- Execution time = unit time x batch quantity (If there is only one batch, then the batch quantity corresponds to the target quantity)
- Busy time = Setup time + Execution time

To edit the limit value for the representation of the time specifications in the table:

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In the Enter a job status section, click the gear icon

- StateMonitor displays the Extended job functions window.
- Select the desired limit value for the color intensity from the Limit value in percent dropdown list
- Click the Save the limit value button
- > The limit value is applied to the representation

#### Entering the job status

To enter the job status and to record machining times:

- 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 complete or abort execution, click the Stop job button
- > This terminates time recording.
- > If desired, you can restart the job.
- To report the actual quantity of parts, select
   Actual quantity (OK) in the drop-down list box
- Enter the quantity in the input field of the manufactured parts
- Click the **Report** button
- To report the quantity of scrap parts, select Scrap
   (S) in the drop-down list box
- Enter the number of scrap parts in the input field
- Click the **Report** button
- To report the quantity of rework parts, select Rework (R) in the drop-down list box
- 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:

- 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 drop-down list box
- 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

Prerequisite: the job has not been started yet. To transfer a job back to the machine group:

- 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 icon
- 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 drop-down list box
- 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:

- 3
- In the Enter a job status section, click the gear icon
- 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 drop-down list box
- 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:

- 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 189

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

#### Editing working steps of entries

You can edit the working steps of entries retroactively:

- Divide the recorded status time
- Adjust the recorded status time
- Enter a new status if an entry is missing

To divide the recorded status times:

- In the Assigned jobs for machine table, click the desired job
- The job information will be displayed in the Currently selected job section.
- > The Entries for job table opens.
- Click the Edit booked worksteps button
- In the overview, click the row of the desired working step
- In the field next to the **Divide status** button, enter the desired cutting point in the form of **hh:mm**
- Click the **Divide status** button
- The working step is divided, with the end of the first part and the beginning of the second part corresponding to the entered cutting point.
- > The second part is given Not defined status.

To adjust recorded status times:

- Click the Edit booked worksteps button
- In the overview, click the row of the desired working step
- Click the Adjust status time button
- Enter the new start and end times for the working step
- > The working step is adjusted.



The times must be selected such that no other working step is overwritten.

Click the Save the lines button

To assign a new status:

- Click the Edit booked worksteps button
- In the overview, click the row of the desired working step
- Click the Change status button
- ▶ Enter the desired status from the drop-down list
- Click the Save the lines 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 158

lachine	statuses TNC					and the owner of the				-					Maintenance & malfunction	
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Product Product OK, but	tive (feed rate & rapid tive (feed rate & rapid not productive dy for operation	OVR >= 100 %)														

#### Setting the observation period for the machine status bar

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

Further information: "Setting the observation period", Page 76

## 5.11 Machine alarms submenu

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

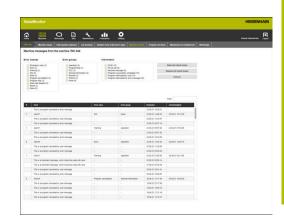
The error messages on the control are divided into **Error classes** and **Error groups**:

- 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: Send messages", Page 120

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
- Machine messages
- Program successfully completed
- Program canceled by user
- Program canceled by error message

To filter the machine messages:

- Select the checkbox 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 48

#### **Exporting and importing messages**



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

In the **Machine alarms** submenu, the **Import of machine messages** table lists all machine messages recorded so far.

You can export this table as an XML file via the **Export** button.

Using the **Import** button, you can then import this XML file again in another StateMonitor or for another machine. Thus you can use the imported machine messages to define notifications although they have not yet occurred on the new machine.

## 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 on the machine during 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 48

#### 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 48



Program	All programs V	
Program i	un time 📄 Productive sham 💟 Spindle 🔍 Rapid havense 🔍 Feed rate	
03:29.45		19
0		- 12
•		
£		
E		
03.29.44		

#### Program analysis chart

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

To view the chart:

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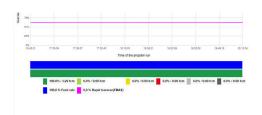
- Click the Graphically visualize a table button below the table
- > The Program run time of the machine {0} chart is displayed.
- Click any data point on the vertical line of the program
- > The Program analysis chart is displayed.

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:** "Parameters for HEIDENHAIN controls", Page 253



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Maintenances

# 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	
Δ	Malfunctions	



#### Maintenances view

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The Maintenances view encompasses the following items:

- Maintenances doughnut chart
   Further information: "Maintenances doughnut chart", Page 139
- Malfunctions warning symbol: Under the warning symbol, StateMonitor shows the number of the unresolved malfunctions.
- Maintenances table
   Further information: "Maintenances table", Page 141

If you select a maintenance event in the **Maintenances** table, then StateMonitor also displays the **Entries for maintenance: {0}** table. The **Entries for maintenance: {0}** table chronologically lists the entered 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 136



	Status	Due	Maintenance	Maintenance steps	Total duration	Perform by	Last edited by
1	0	Not yet due	Maintenance2	MaintenanceStep1	2 Days	Machine operator	
2	0	Not yet due	Maintenance3	MaintenanceStep1	2 Days	Machine operator	
3	Pending	Overdue	Maintenance1	MaintenanceStep1	2 Days	Machine operator	142

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#### Malfunctions view

The Malfunctions view encompasses the following items:

- Malfunctions doughnut chart
   Further information: "Malfunctions doughnut chart", Page 139
- Malfunctions warning symbol
- Malfunctions table
   Further information: "Malfunctions table", Page 141

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 entered 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

Malfunctions are reported in the **Machines** menu. **Further information:** "Maintenance & malfunction submenu (software option)", Page 94

۰ 🔥		
	Malfunctions	
	Pending Started Completed	

#### 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:



- 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 97
- > The information about the maintenance job appears in the **Maintenance: {0}** section.
- In the Change maintenance section, click 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.
- Upload a log as needed

If a maintenance event is not pending yet, you can manually enable this maintenance event by clicking the **Accept maintenance event early** button.

#### Uploading a log

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Prerequisite: the log is available as a PDF file. To upload a log:

- ► In the **Change maintenance** section, click the **Upload file** button
- StateMonitor shows the Upload file for maintenance: {0} window.
- Enter a document name in the File name field
- 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.

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#### **Displaying linked documents**

To display 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**

Prerequisite: at least one malfunction reason (specification) is defined in the **Settings** menu. To report a malfunction:

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- 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

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

**Further information:** "Statuses submenu", Page 189

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

Further information: "Statuses submenu", Page 189

#### 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:



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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 log in the **Change malfunction state** section. The procedure corresponds to uploading a file to a maintenance event.

Further information: "Uploading a log", Page 96

#### Displaying a log

- ► To show linked logs, click the **Show log** button
- > StateMonitor shows 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 browser tab.



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

## 5.14 Tools submenu

In the **Tools** submenu, you can view the tool data of the machine and save them in StateMonitor, as well as export tool tables from StateMonitor.



This function is only available for machines that are connected via the HEIDENHAIN DNC or the MTConnect interface.

The **Tools** submenu contains the following information:

- Currently selected tool on the machine {0}
   A schematic tool icon and information about the tool that is currently being used
- Tool data of the machine {0}
   Tool table with filtering and editing functions
- List of tool differences for NC program(s) Information on the difference between the available and the required tools for an uploaded NC program

#### **Filtering columns**

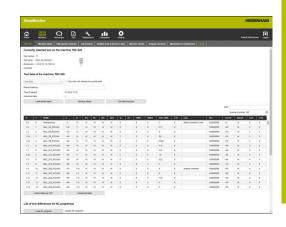
Each user can customize the filtering of the tool table columns. To do this:



- Click the gear icon
- > The **Show/Hide columns in the table** window with the columns available for selection is shown.
- To limit the view to certain columns, select the checkboxes in front of them
- > StateMonitor displays the selected columns.



If no checkbox has been selected, then StateMonitor shows all columns of the tool table (default setting).



#### **Displaying tool data**

In the Tool data of the machine  $\{0\}$  area, you can view the desired tool data.

To customize the tool table:

- ø
- Switch to the **Settings** menu
- Select the **Tools** submenu
- In the drop-down list, select the desired table type:
  - Tool table
     List of all tools defined on the machine

     Pocket table
    - List of all tools defined in the tool magazine
- To show only the tools that are currently available on the machine, select the Only tools with reference to pocket table checkbox
- StateMonitor displays the tool table with the selected options.

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You can also export the customized tool table to a CSV file.

Further information: "Export table as CSV", Page 102

#### Manually uploading the tool table

When you open the **Tools** submenu, the most recently uploaded status of the tool table is shown. When a new machine is connected, this status will initially be uploaded from the machine control.

To refresh the view in StateMonitor after making changes to the tool table, click the **Load tables again** button in the **Tools** submenu.

#### Backing up the tool table

You can save the tool table that has been uploaded from the machine control in StateMonitor as a backup file. You are allowed to create various backup versions and upload individual backup versions to StateMonitor again or delete them. To back up the uploaded tool table:

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- Settings

- Switch to the Settings menu
- Select the Tools submenu
- Enter a unique name in the Name of backup field
- Click the Save button
- StateMonitor saves the backup version of the tool table.

To upload a backup version to StateMonitor:

- Switch to the **Settings** menu
- Select the **Tools** submenu
- Click the Call data backups button
- StateMonitor displays the Tool-data backups window.
- Select the desired backup version and click the Load data backup button
- StateMonitor loads the selected backup version and displays the tool table.

To delete a backup version from StateMonitor:

- Switch to the Settings menu
- Select the **Tools** submenu
- Click the Call data backups button
- StateMonitor displays the Tool-data backups window.
- Select the desired backup version and click the Delete data backup button
- > StateMonitor deletes the selected backup version.

#### Downloading the tool table

The tool table that has been uploaded from the machine control to StateMonitor can be downloaded in the original format.

To download the tool table:



- Switch to the Settings menu
- Select the Tools submenu
- Select the desired table type in the drop-down list in the **Tool data of the machine {0}** area
- Click the **Download table** button
- Select the storage location
- Click the Save button
- StateMonitor saves the tool table to the selected location.

#### List of tool differences for NC program(s)

StateMonitor uses this function to identify the tools being used based on an uploaded NC program. StateMonitor compares this list with the table under **Tool data of the machine {0}** and then generates a list of the tools that are still missing.

When selecting tools in the tool difference list, these tools are shown in the selected tool table.

To generate a tool difference list:

- Switch to the **Settings** menu
- Select the **Tools** submenu
- Under List of tool differences for NC program(s), click the Load NC program button
- StateMonitor displays the Upload NC programs window.
- Click the Load NC program button
- Select an \*.h file or ISO file in Windows Explorer
- Click the Close, and parse NC programs button
- Click the Create list of tool differences button
- > The tool difference list is created
- If necessary, select a filter from the drop-down list via the Create list of tool differences button

#### Export table as CSV

This function exports the table that has previously been edited and filtered in the **Tools** submenu to a CSV file. This allows you to import the tool data or the tool difference list into a spreadsheet and further process it.

To export the tool table or the tool difference list:

Settings

**Č** Settings

- Switch to the Settings menu
- Select the Tools submenu
- Edit and/or filter the table being displayed
- Click the Export table as CSV button
- Select the storage location
- ► Click the Save button
- StateMonitor saves the table to the selected location.

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## 5.15 FN38: Machine functions

#### **FN38 control function**

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

FN38 can be used with the following HEIDENHAIN controls:

Control	As of software version
iTNC 530	34049x-03, 60642x-01
TNC 620	81760x-01
TNC 128	771841-02
TNC 320	771851-02
TNC 640	34059x-05
TNC7	81762x-16
CNC PILOT 640 <sup>1)</sup>	68894x-05
MANUAL Plus 6201)	54843x-05

<sup>1)</sup> These controls offer the G function G491 instead of the **FN38** Klartext commands for the transfer of messages via DNC.

- To be able to use the FN38 function, you need to enter the code number 555343 for enabling special functions for Q parameter programming.
- The TNC with software version 34059x-07 and later allows you to program FN38 without entering a code number.
- StateMonitor can also interpret messages from other controls, such as FN38 messages, provided that these messages use the correct syntax.

#### Programming

To program the **FN38** control function:



A

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"

## **Editing machine statuses**

Using the following **FN38** commands, you can edit the machine statuses as well as the corresponding specifications in StateMonitor:

	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 <b>Delay</b> status
-	"NEW_STATE:CUTSTATE"	Subdivide the current machine status, see "Editing machine statuses", Page 80
	"NEW_STATE:RESUME"	Restore the original status without editing
Further information	on: "Statuses submenu", Page 189	
Application exam		
Goal:	ssign the machine status	
Goal: To divide and reas	-	Program started, PRODUCTIVE machine status
Goal: To divide and reas	ssign the machine status	Program started, PRODUCTIVE machine status
Goal: To divide and reas	ssign the machine status	<ul> <li>Program started, PRODUCTIVE machine status</li> <li>New machine status generated in StateMonitor (PRODUCTIVE -&gt; IDLE)</li> </ul>
Goal: To divide and reas BEGIN PGM FN38	ssign the machine status	New machine status generated in StateMonitor (PRODUCTIVE
Goal: To divide and reas BEGIN PGM FN38 : FN 38: SEND /"NI M-Funktion	ssign the machine status	New machine status generated in StateMonitor (PRODUCTIVE -> IDLE)
Goal: To divide and reas BEGIN PGM FN38 : FN 38: SEND /"NI M-Funktion FN 38: SEND /"NI	Solution in the machine status International	<ul> <li>New machine status generated in StateMonitor (PRODUCTIVE -&gt; IDLE)</li> <li>M function executed</li> <li>Original status (PRODUCTIVE) is divided in StateMonitor, meaning that a new status is generated (PRODUCTIVE -&gt;</li> </ul>
Goal: To divide and reas BEGIN PGM FN38 : FN 38: SEND /"NI M-Funktion FN 38: SEND /"NI FN 38: SEND /"NI	EW_STATE:CUTSTATE	<ul> <li>New machine status generated in StateMonitor (PRODUCTIVE -&gt; IDLE)</li> <li>M function executed</li> <li>Original status (PRODUCTIVE) is divided in StateMonitor, meaning that a new status is generated (PRODUCTIVE -&gt; IDLE)</li> <li>Original status restored in StateMonitor (IDLE -&gt;</li> </ul>



When you enter the command text for **FN38**, you must pay attention to capitalization.

#### Configuring the default time

As an alternative to the definition via StateMonitor, you can also define the default time in the overview of the program run-time using an **FN38** message from the control.

The **Default time from FN38 function** option also requires you to first enter a fixed machining time because the machining time is not yet known at program start. StateMonitor needs this time information in order to start generating the time bar. Once the corresponding **FN38** message has been received, the time bar will be updated.

The FN38 message must have the following syntax:

FN 38: SEND / "RUNTIME\_timeMIN:timeSEC"

#### Application example

Goal: To enter a default time of 10 minutes and 20 seconds

FN 38: SEND /"RUNTIME\_10MIN:20SEC"

Definition of the time interval



When you enter the command text for **FN38**, you must pay attention to capitalization.

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:

- Messenger overview
- Event configurator
- Notification profiles
- Notifications

Ð

Message groups

Proceed in the following sequence:

- In the Notification profiles submenu, create a notification profile.
   (Who needs to be notified and when?)
   Further information: "Notification profiles submenu", Page 114
- In the Event configurator submenu, configure the events. (For which machine messages should someone be notified?)
   Further information: "Event configurator submenu", Page 110
- 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 116
- In the Message groups submenu, you can combine the created notifications in notification groups as needed and then use them as a filter criterion for customizing the view.

Further information: "Message groups submenu", Page 118

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

Further information: "User management submenu", Page 174

# 6.2 Messenger overview submenu

In the **Messenger overview** submenu, StateMonitor shows the current notifications and the most recently sent notifications. You can filter the table entries according to:

- Machine/Machine group
- User
- Message group

Further information: "Functions in tables and charts", Page 48



# 6.3 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. The **Information** is either generated in the NC program of the HEIDENHAIN controls (**FN38**) or by StateMonitor, based on the information provided by the control.

# Error classes

On the control, the error messages are assigned to the following **Error classes**:

- Emergency stop
- Failure description
- Warning
- Info
- Note
- Program cancellation
- Program stop
- Feed rate stopped
- Reset
- None

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

# Error groups

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

The controls distinguish between the following Error groups:

- operation
- Programming
- PLC
- General information
- Remote
- Python
- None

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

		ng error classes or groups ine proup 🛛 🗸 🗸		
Error classes	Error groups	Information	Machine statuses	Maintenances
Emerganics stop Essai Transing Dolls Program stop Fred namopel Fred namopel Fred namopel Fred namopel Fred namopel	operation Programming PLC Devress information Remittle None None	PX38 PX32 A8 Bib/Ne reincage Program accentrate Program interrupted by start Program interrupted by entry message	Minuter 3 Productive (Net rotanispic CVR == 100 %) 8 Productive (Net rotanispic CVR == 100 %) 9 CK bit nd productive 4 Normado Y expertition	Sumbaruci Lue     Nortinance Lue     Nortinance averbae     Nortinance sortice     Nortinance conjuited
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This event under the name		Save		
			Madate group	

#### Information

The following options are available under Information:

FN38

On the HEIDENHAIN controls, you can generate notifications by means of the **FN38** special function via the NC program. StateMonitor can receive these notifications and send them by email 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.

#### Machine message

Here, StateMonitor collects the machine messages from non-HEIDENHAIN controls

Program successfully completed

StateMonitor generates this notification when the control reads a **PGM END**, **M2**, or **M30** program end

Program canceled by user

StateMonitor generates this notification when the operator aborts the program with **INTERNAL STOP** or **EMERGENCY STOP** 

Program canceled by error message

StateMonitor generates this notification whenever an error message interrupts the program run.

- Program interrupted by user StateMonitor generates this notification when the operator aborts the program with INTERNAL STOP
- Program interrupted by error message StateMonitor generates this potification when an error

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 will trigger 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 will trigger 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 will trigger 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 48

# 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

# To create an event:



- Switch to the **Messenger** menu
- Select the **Event configurator** submenu
- Select the Machine, for which you would like to create the event
- Select the messages that should trigger the event
- Enter an appropriate name in 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:
- Click the event in the table
- > StateMonitor loads the selection of messages to the view.

# **Deleting an event**

To delete an event:

- Q
- Switch to the **Messenger** menu
- Select the **Event configurator** submenu
- Select the Machine for which you would like to delete the event
- Click the recycle bin icon in the table
- StateMonitor deletes the event and removes it from the table.

# 6.4 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 drop-down list.

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 (interval of 1 min to 60 min selectable)

# **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).

To create a notification profile for a user:

- Switch to the **Messenger** menu
- Select the Notification profiles submenu
- Select the user for whom you would like 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.

ey - Ays User	Days Skinkay Tanskay Charloskay Charloskay Friday Sanday Sunday Sunday	Tase         Tase           Fass         Tase           Statistical minute         Colored           Colored         V           61 mm         V		
This notification profile under the nam The following notification profiles cur Public		Sere C-nal Days	Free To: Rimed .	
Admit Public 1	kap User	adminghedeman at Mox.	00.00 24.00 Intradiulary	۲

### **Finding Notification profiles**

In the table, StateMonitor lists all profiles for the user selected above. The **Find:** input field allows you to specifically look for notification profiles. All columns of the selection list will be searched.

Further information: "Functions in tables and charts", Page 48

#### **Changing Notification profiles**

To change an existing notification profile:

- Switch to the Messenger menu
- ► Select the Notification profiles submenu
- Select the user for whom you would like to create the Notification profiles
- Select the notification profile in the table
- > StateMonitor loads the entered data into the view.
- Make the desired changes
- Click the Save button
- StateMonitor saves the changed notification profile.

# **Deleting Notification profiles**

To delete a notification profile:



Q

- Switch to the **Messenger** menu
- Select the Notification profiles submenu
- Select the User for whom you would like to create the Notification profiles
- Click the recycle bin icon in the table
- > StateMonitor removes the notification profile from the table.

# 6.5 Notifications submenu

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

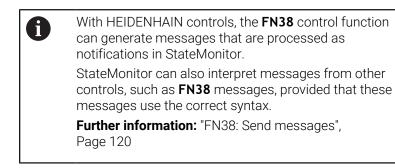
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	EverQ		CNC PLOT 640					
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MachineMa				~			End	
	~							
			sage group Event	Profile Admin Profile 2	Days F		Ellenad Collected 21 min (Q)	

# **Creating a notification**

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

To create a notification:

- Q
- Switch to the **Messenger** menu
- Select the **Notifications** submenu
- Under Machine, select the desired machine
- A table that contains the events available for this machine is displayed.
- Tick the desired events.
- Select the desired user under User
- A table that contains the notification profiles available for this user is displayed.
- Tick the desired notification profiles.
- Click the ...assign button
- StateMonitor adds a row containing the new notification to the List of notifications.



# Activating notifications

To activate a notification in the list, select the checkbox of the **Active** column.



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

# **Deleting notifications**

Proceed as follows to delete a notification from the list:

Q Messenger	
٦	

- 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 48

# 6.6 Message groups submenu



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

In the **Message groups** submenu, you can combine notifications in notification groups. You can use a notification group in the **Messenger overview** or **Notifications** submenu as a filter criterion in order to customize the view.

To create a new notification group:



- Switch to the Messenger menu
- Select the **Message groups** submenu
- Enter the name of the notification group in the Group name field
- Click the **Create a group** button
- > The new notification group is created.

# **Editing** Message groups

To add a notification to an existing notification group:



- Switch to the Messenger menu
- Select the **Message groups** submenu
- In the drop-down list under the Group name field, select the notification group to be edited.
- Select the desired notification in the Notifications table
- Click the Assign message button
- StateMonitor saves the changed notification group.
- > StateMonitor adds a row containing the assigned notification to the **Assigned messages** table.

To delete a notification from an existing notification group:

- Q
- Switch to the Messenger menu
- Select the **Message groups** submenu
- In the drop-down list under the Group name field, select the notification group to be edited.
- Select the desired notification in the Assigned messages table
- Click the Cancel assignment button
- StateMonitor saves the changed notification group.
- StateMonitor adds a row with the corresponding assignment to the **Notifications** table.

#### **Deleting** Message groups



If you want to delete a notification group, you first have to cancel all assignments for this group.

To delete an existing notification group:



Switch to the **Messenger** menu

- Select the **Message groups** submenu
- In the drop-down list under the Group name field, select the notification group to be deleted.
- Click the **Delete** button
- StateMonitor deletes the selected notification group.

# 6.7 FN38: Send messages

# **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	As of software version
iTNC 530	34049x-03, 60642x-01
TNC 620	81760x-01
TNC 128	771841-02
TNC 320	771851-02
TNC 640	34059x-05
TNC7	81762x-16
CNC PILOT 640 <sup>1)</sup>	68894x-05
MANUAL Plus 6201)	54843x-05

<sup>1)</sup> These controls offer the G function G491 instead of the **FN38** Klartext commands for the transfer of messages via DNC.

6

To be able to use the FN38 function, you need to enter the code number 555343 for enabling special functions for Q parameter programming.

- The TNC with software version 34059x-07 and later allows you to program FN38 without entering a code number.
- StateMonitor can also interpret messages from other controls, such as FN38 messages, provided that these messages use the correct syntax.

#### Programming

To program the FN38 control function:



Press the Q key at the control

- Press the FN38 SEND soft key
- > The control writes the line FN38: SEND /".

Press the DIVERSE FUNCTION soft key

 Write the text to be sent with output formats for variables
 Example:
 FN 38: SEND / "measured diameter: %
 +3f" / +Q153

6

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  ${\bf f}$  to indicate floating point numbers in decimal notation.

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

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

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

Output formats	Meaning
%f	Output of a floating point number in original format
%.Of	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



When you enter the command text for **FN38**, you must pay attention to capitalization.



# Jobs Menu

# 7.1 Jobs menu (software option)

Recording and evaluation of jobs is an additional function that is not included in the standard software functionality. **Further information:** "Software options and licenses", Page 218

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

A

- 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 82

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 189

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

**Further information:** "Job times submenu (software option)", Page 163



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

Further information: "User management submenu", Page 174



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

Further information: "FN38: Job functions", Page 129

# 7.2 Create job submenu (software option)

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

- Create new jobs
- Change jobs
- Delete jobs
- Distribute jobs over several batches
- Export jobs as a CSV file
- Import jobs from a CSV file

### Creating a new job

To create a new job:

- P
- 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 127

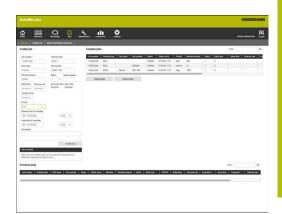
To quickly and easily create multiple working steps for a job:

- 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:

- ▶ 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:

- ▶ 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.

# Distributing a job over several batches

To distribute a job over several batches:

- ▶ 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.
- Select a new batch number from the **Batch** drop-down list
- > Enter the desired value in the **Batch quantity** field
- Click the Create job button
- A job with the available information and the new batch number is created.

# Export jobs

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



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

To export the jobs:

- Filter the Created jobs table as needed
   Further information: "Functions in tables and charts", Page 48
- 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:

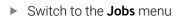
- ► Click the **Import jobs** button
- Select file
- Click the Open button
- StateMonitor imports the data from the CSV file to the Created jobs table.

# 7.3 Assign job submenu (software option)

# Assign job

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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:



- 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 82

# Changing a job assignment

Prerequisite: the job has not yet been started in the **Job terminal**. To assign an assigned job to another machine or machine group:

- 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:

- ▶ 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.

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# 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:



- 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 82

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# 7.5 FN38: Job functions

# **FN38 control function**

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

FN38 can be used with the following HEIDENHAIN controls:

Control	As of software version
iTNC 530	34049x-03, 60642x-01
TNC 620	81760x-01
TNC 128	771841-02
TNC 320	771851-02
TNC 640	34059x-05
TNC7	81762x-16
CNC PILOT 6401)	68894x-05
MANUAL Plus 6201)	54843x-05

<sup>1)</sup> These controls offer the G function G491 instead of the **FN38** Klartext commands for the transfer of messages via DNC.

- 6
- To be able to use the FN38 function, you need to enter the code number 555343 for enabling special functions for Q parameter programming.
- The TNC with software version 34059x-07 and later allows you to program FN38 without entering a code number.
- StateMonitor can also interpret messages from other controls, such as FN38 messages, provided that these messages use the correct syntax.

# Creating a new job

As an alternative to creation via StateMonitor you can create a job on the control using an **FN38** message.

The FN38 message must have the following syntax:

FN 38: SEND / "JOB: jobnumber\_STEP:workingstep\_CREATE" The parameters JOB: jobnumber and STEP:workingstep MUSt be entered; the following parameters can optionally be used as

- needed:
- LOT:lot number for the batch number
- ITEMNAME:partname for the part name
- ITEMID:partnumber for the part number
- TARGETQ:nominalquantity for the nominal number of parts



If no lot number is specified, StateMonitor by default uses the value "Lot 1."

# Prerequisites:

The control is able to send FN38 messages Further information: "FN38: Send messages", Page 120

# **Application example**

Goal: Job with job number 1234 and working step 1

Create job
art name
Create job
must
Assign string parameters
QS2 string variable for job number
QS3 string variable for working step
QS4 string variable for part name

DECLARE STRING QS5 = "13314-01"	QS5 string variable for part number
DECLARE STRING QS6 = "100"	QS6 string variable for quantity to be produced
QS10 = "JOB:"    QS2    "STEP:"    QS3    ""    QS1    "_"    "_ITEMNAME:"    QS4    "_ITEMID:"    QS5    "_TARGETQ:"    QS6	Chain-link string variables
FN 38: SEND / QS10	Send result parameters via FN38

# Entering the job status

Using FN38 messages, you can report a job status to StateMonitor.

The **FN38** message must have the following syntax:

FN 38: SEND /"JOB:jobnumber\_STEP:workingstep\_LOT:lotnumber\_status"
Prerequisites:

- The control is able to send FN38 messages
   Further information: "FN38: Send messages", Page 120
- The job has been set up
- The job has been assigned to the machine

#### **Application example**

Goal:

Job with job number 1234, working step 1234 and lot number 2

FN 38: SEND /"JOB:1234_STEP:1_LOT:2_START"	Start job
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_PREPARATION"	Start preparation
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_PRODUCTION"	Production
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_STOP"	Stop job
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_FINISH"	Finish job



When you enter the command text for **FN38**, 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\_LOT:lotnumber\_category\_quantity"
Prerequisites:

- The control is able to send FN38 messages Further information: "FN38: Send messages", Page 120
- 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, working step 1 and lot number 2; additionally provided information of actual quantity 23, scrap parts 12, and rework parts 15, and incremental entries

FN 38: SEND /"JOB:1234_STEP:1_LOT:2_OK_A:23"	Actual quantity (OK) absolute
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_OK_I:1"	Actual quantity (OK) incremental value
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_S_A:12"	Scrap (S) absolute value
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_S_I:1"	Scrap (S) incremental value
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_R_A:15"	Rework (R) absolute value
FN 38: SEND /"JOB:1234_STEP:1_LOT:2_R_I:1"	Rework (R) incremental value

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When you enter the command text for **FN38**, you must pay attention to capitalization.

# Booking the current job step

Using **FN38** messages, you can book a current job step in StateMonitor.

The FN38 message must have the following syntax:

FN 38: SEND / "JOB:CURRENT\_STEP:CURRENT\_LOT:CURRENT\_status"



The LOT: CURRENT information is optional and can also be omitted.

Prerequisites:

- The control is able to send FN38 messages Further information: "FN38: Send messages", Page 120
- The job has been set up
- The job has been assigned to the machine

# **Application example**

Goal: Booking the current job step

FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_PREPARATION"	Start preparation
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_PRODUCTION"	Production
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_STOP"	Stop job
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_FINISH"	Finish job



When you enter the command text for **FN38**, you must pay attention to capitalization.

# Reporting the current quantities

Using **FN38** messages, you can interrogate the quantities of the current job in StateMonitor.

The FN38 message must have the following syntax:

FN 38: SEND /"JOB:CURRENT\_STEP:CURRENT\_LOT:CURRENT"
Prerequisites:

- The control is able to send FN38 messages Further information: "FN38: Send messages", Page 120
- The job has been set up
- The job has been assigned to the machine
- The job is currently being executed

# **Application example**

Goal:

(I)

Current job; additionally provided information of actual quantity 23, scrap parts 12, and rework parts 15, and incremental entries

FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _OK_A:23"	Actual quantity (OK) absolute
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _OK_I:1"	Actual quantity (OK) Incremental
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _S_A:12"	Scrap (S) absolute value
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _S_I:1"	Scrap (S) incremental value
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _R_A:15"	Rework (R) absolute value
FN 38: SEND /"JOB:CURRENT_STEP:CURRENT_LOT:CURRENT _R_I:1"	Rework (R) incremental value
When you enter the command text for <b>FN38</b> , you	must

pay attention to capitalization.



# 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 218

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

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- 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 submenu", Page 178

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 94

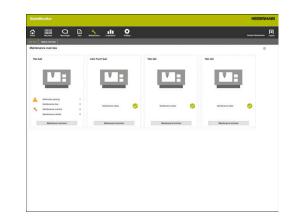
You can analyze completed maintenance events for individual machines in the **Evaluations** menu.

Further information: "Maintenances submenu (software option)", Page 167

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

**Further information:** "User management submenu", Page 174

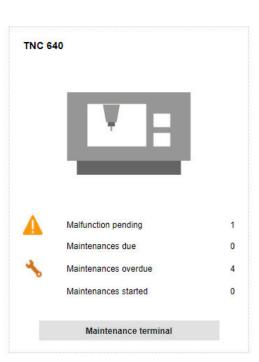


# 8.2 Tile view submenu (software option)

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

The status card contains the following information:

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



# Symbols

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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

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# Filtering the Tile view

Each user can individually adapt the view. For this purpose:



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- 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

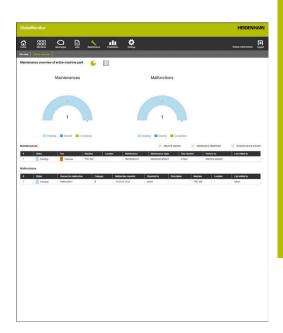
The **Maintenances** doughnut chart depicts the quantity and statuses of all active maintenance events.

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

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 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)

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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

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

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.

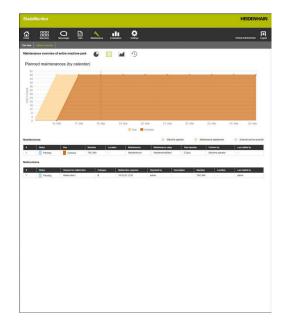
StateMonitor differentiates between the following statuses:

- 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 149



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



### 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 149



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



### 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 job
- Maintenance steps: Name of the maintenance steps encompassed by the maintenance job
- 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: Reason for malfunction that is selected by the user when reporting the malfunction
- Category: Category of the malfunction to which the selected reason for the malfunction belongs
- Malfunction reported: Time at which the malfunction was reported
- Reported by: 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

#### Maintenance terminal submenu (software 8.4 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
4	Malfunctions
To sv	vitch between the views, click the respective symbol
6	The <b>Maintenance terminal</b> submenu shows the current machine status and the machine's master data.
	<b>Further information:</b> "Overview of machine statuses", Page 66
	Further information: "Edit machine". Page 184 (master

Further Information: Edit machine , Page 184 (master

data of the machine)

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To report a malfunction, switch to the **Machines** menu. Further information: "Maintenance & malfunction submenu (software option)", Page 94



#### Maintenances view

The Maintenances view encompasses the following items:

- Maintenances doughnut chart
   Further information: "Maintenances doughnut chart", Page 139
- Malfunctions warning symbol: Under the warning symbol, StateMonitor shows the number of the unresolved malfunctions.
- Maintenances table
   Further information: "Maintenances table", Page 141

If you select a maintenance event in the **Maintenances** table, then StateMonitor also displays the **Entries for maintenance: {0}** table. The **Entries for maintenance: {0}** table chronologically lists the entered 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 136

#### Malfunctions view

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The Malfunctions view encompasses the following items:

- Malfunctions doughnut chart
   Further information: "Malfunctions doughnut chart", Page 139
- Malfunctions warning symbol
- Malfunctions table
   Further information: "Malfunctions table", Page 141

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 entered 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



Malfunctions are reported in the **Machines** menu. **Further information:** "Maintenance & malfunction

submenu (software option)", Page 94





# 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:



- 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 97
- > The information about the maintenance job appears in the **Maintenance: {0}** section.
- In the Change maintenance section, click 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.
- Upload a log as needed

If a maintenance event is not pending yet, you can manually enable this maintenance event by clicking the **Accept maintenance event early** button.

# Uploading a log

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Prerequisite: the log is available as a PDF file. To upload a log:

- ► In the **Change maintenance** section, click the **Upload file** button
- StateMonitor shows the Upload file for maintenance: {0} window.
- Enter a document name in the File name field
- 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 display 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

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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:



- Switch to the Maintenance menu
- Select the desired machine in the Tile view of maintenance submenu
- A
- 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 log in the Change malfunction state section. The procedure corresponds to uploading a file to a maintenance event.
```

Further information: "Uploading a log", Page 96

### **Displaying a log**

- To show linked logs, click the Show log button
- > StateMonitor shows 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 browser tab.



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

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# 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

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Create maintena	nce step			All created maintena	nce steps			
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		0	nate maintanance step					

### Creating a maintenance step

To create a maintenance step:

- 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 149

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:

- ► 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
- Enter a document name in the File name field
- 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:

- ► 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 **Link 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:

- 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:

- ► 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:

- ► 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 to an XML file.

To export the maintenance steps:

- 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.

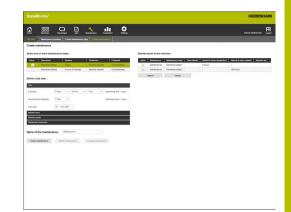
To import maintenance steps:

- 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:

- Maintananca
- 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, select the checkbox 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 icon
- 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 189

- 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 142

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If you select the checkbox of 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:

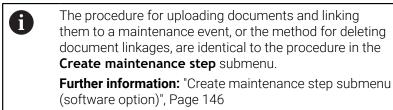
- Create a maintenance job as described
- Select the maintenance job in the All created maintenance steps table
- The maintenance job information is transferred to the Create maintenance section.
- Change the information
- Click the Create maintenance button
- > The new maintenance step is added.

#### Changing a maintenance step

To change a maintenance step:

- 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



### Deleting a maintenance step

To delete a maintenance step:

- 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.



## **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)
- Tool usage times
- 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**, **Tool usage times**, 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.

The **Time filter** submenu allows you to 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 174

### Saving Evaluations

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

If you select the **Local** checkbox, then this evaluation is visible only with your login information. Other users will not see this evaluation.

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

To save your evaluation:

- Click My evaluations
- Enter the Evaluation name
- Select the Local checkbox as needed
- Click the Save button
- StateMonitor saves the current evaluation and enters it in the Saved evaluations table.

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Saved evaluations Evaluation	Local	
statesEvaluation		
		9

### 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 chart with the Availability and Utilization rate bar graphs
   Further information: "Key figures submenu", Page 158
- 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 a time (from ... to ...)
- Select the number of days (counting back from the current day)
- Alternatively, select a date (from ... to ...)
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- Click the **Refresh** button
- > StateMonitor displays the machine statuses for the selected period.

### Key figures of the evaluation period for all machines chart

This graphs 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:

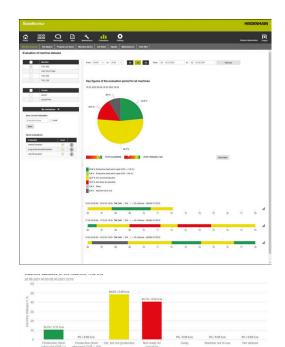
- Click the desired machine status in the first graph
- StateMonitor displays the additional graph with the specifications for the machine status.

Further information: "Statuses submenu", Page 189

### Showing detailed information

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

- 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:



- 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 78
- To display the specifications (subcategories), click the bar.
- > The data is displayed as a separate bar.

Further information: "Functions in tables and charts", Page 48

### Saving the evaluation

### 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 159 **Further information:** "Utilization rate", Page 160

### **Displaying key figures**

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

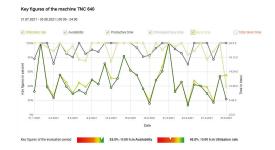
- ....
- Switch to the **Evaluations** menu
- Select the Key figures submenu
- Select the desired machines (tick the machine names)
- Alternatively, select groups (tick the boxes in front of group names)
- Select a time from ... until ...
- Select the number of days (counting back from the current day)
- Alternatively, select a date from ... to ...
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- ▶ Click the **Refresh** button
- 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

Further information: "Functions in tables and charts", Page 48

### Graphically visualize a table

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





### Saving the evaluation

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### Availability

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

Availability

Main usage time Scheduled busy time

The *main usage time* is the total time minus the total down time. The main total time is as follows:

		Total time
-		Time during which the machine is not operated
_	l.	Delay
_		Time during which the machine is not ready for opera- tion
=		Main usage time

The *scheduled busy time* is the total time minus the time during which the machine is switched off. The scheduled busy time is calculated as follows:

Total time

was active.

-	Time during which the machine is not operated
_	Scheduled busy time (= time during which the machine

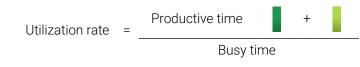
= is operated)

0	If, within the period under consideration, StateMonitor was not active at some point, this non-recorded interval is assigned the <b>UNDEF</b> status in StateMonitor and is displayed as a white segment in the status bar.
	These <b>UNDEF</b> periods are not taken into account in the availability calculation. The calculated parameters thus refer only to the time periods during which StateMonitor

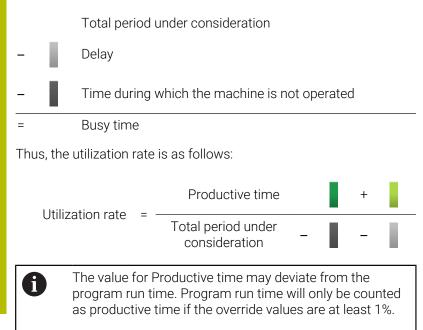
### **Utilization rate**

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.



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



### 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.

To evaluate the **Program run times**:

- Evaluation
- 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 a time (from ... to ...)
- Select the number of days (counting back from the current day)
- Alternatively, select a date (from ... to ...)
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- You can additionally filter by the following program parameters as needed:
  - Program
  - Subprogram
  - Only fully executed programs
  - No subprograms
- Click the **Refresh** button
- In the table, StateMonitor lists the programs that ran in the selected period.

### 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 92



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 charts one below the other.

### Saving the evaluation

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### 9.5 Machine reports submenu

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

### 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 a time (from ... to ...)
- Select the number of days (counting back from the current day)
- Alternatively, select a date (from ... to ...)
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- Select Error classes, Error groups, Information
- ▶ Click the **Refresh** button
- In a table, StateMonitor lists all of the machine messages that occurred within 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.

Further information: "Functions in tables and charts", Page 48

### Saving the evaluation

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### 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 for each working step: preparation time, production time and undefined run 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:



- 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 a time (from ... to ...)
- Select the number of days (counting back from the current day)
- Alternatively, select a date (from ... to ...)
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- Enter the Job number, Part name, or Part number in the Find field as needed.
- To restrict the search to fully completed jobs, select the Show only completed jobs checkbox
- 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 is displayed.
- 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 48

working	1         Cliff-k1.         Mill         Angel         HIG3 51.2.           2         Cliff-k1.         Minut         Filesco         Mill 51.2.           3         Cliff-k1.         Minut         Filesco         Mill 51.2.           4         Cliff-k1.         Minut         Mill 51.4.         Mill 51.2.           4         Cliff-k1.         Minut         Mill 51.4.         Mill 51.2.           4         Cliff-k1.         Alf 144.         Mill 51.4.         Mill 51.2.           Mill 51.4.         Mill 51.4.         Mill 51.4.         Mill 51.2.         Mill 51.2.	1612/25.         6010         6010           1612/25.         6128         6010           1612/25.         6010         60.0           1612/25.         6010         60.0           1612/25.         6010         60.0           1612/25.         6010         60.0           1612/25.         6010         60.0           1612/25.         6010         60.0           1612/25.         6010         60.0
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### Saving the evaluation

### 9.7 Tool usage times submenu

In the **Tool usage times** submenu, you can evaluate the tool usage data for the selected machines.

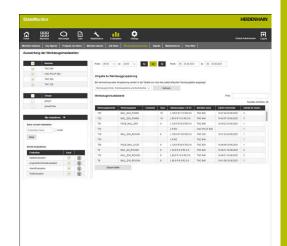
For this purpose, StateMonitor records the tool data of the respectively active tool when it is inserted in the tool spindle and when it is removed.

#### To evaluate Tool usage times:

- Switch to the **Evaluations** menu
- Select the Tool usage times submenu
- Select the desired machines (select the checkbox in front of the machine names)
- Alternatively, select groups (select the checkboxes in front of the group name)
- Select a time (from ... to ...)
- Select the number of days (counting back from the current day)
- Alternatively, select a date (from ... to ...)
- Alternatively, select a Time filter (if available)
   Further information: "Time filter submenu", Page 168
- Select the desired group in the Default tool grouping field:
  - Tool number
  - Tool name
  - Comment
  - Tool number and tool name
  - Tool number and comment
  - Tool number, tool name, and comment
- Click the **Refresh** button
- In the Tool-usage table, StateMonitor lists the tool groups that were being used during the selected period.
- In the table, click the row containing the desired tool
- StateMonitor shows all of the recorded data records in the Usage of selected tool table.
- To show a bar graph for the Usage of selected tool table, click the Graphically visualize a table button

Further information: "Functions in tables and charts", Page 48

#### Saving the evaluation



### 9.8 Signals submenu (software option)

The **Signals** submenu allows you to evaluate machine signals. Prerequisite: the affected signals are configured in StateMonitor. **Further information:** "Defining control signals", Page 182

To evaluate signals:

- 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 48

### Saving the evaluation

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### 9.9 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 chart visualizes, for each machine, the planned and actual duration of a maintenance event and the duration of a malfunction

To evaluate the recorded data:



- 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 chart.

Further information: "Functions in tables and charts", Page 48

### Saving the evaluation

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### 9.10 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 158).

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 (drop-down list boxes under **Apply to all days:**).

If you select the **Local** checkbox, 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 select the **Local** checkbox, then the time filter will be visible for all users with **Authorization status StateMonitor User plus** or **Administrator**.

To create a new time filter:

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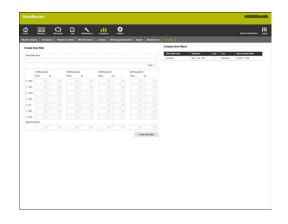
- Switch to the **Evaluations** menu
- Select the **Time filter** submenu
- Enter the name of the time filter in the Timer filter name field
- Select the Local checkbox as needed
- Define up to four periods per weekday with the
   From: ... to: ... selection fields
- Alternatively, define up to four periods for the entire week in the **Apply to all days:** drop-down list boxes
- 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:

- 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:

- 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

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

Further information: "User management submenu", Page 174

### 10.2 User settings submenu

#### Changing the password



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

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 177

### Change language settings for user

Each user can individually set the language in StateMonitor.

Proceed as follows to set the language setting for users:

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- 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 213

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### 10.3 User management submenu

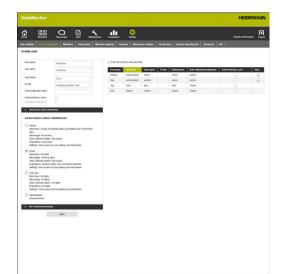
### Roles

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

You can assign the following roles to the users:

### Permission status for StateMonitor

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



 The Automatic notifications function allows you to notify users with the Administrator role by e-mail when connection problems occur at one or more active machines.

> Only users with the Administrator role can enter, change, or delete user data.

	Menu/submenu	Authorization	
Viewer	Machines	No editing rights Access to <b>Maintenance &amp;</b> malfunction	
	Maintenance	Access to Tile view	
	Maintenance terminal	No access	
	Evaluations	No access	
Users	Machines	Access to <b>Maintenance &amp;</b> malfunction	
	Maintenance	Access to Tile view	
	Maintenance terminal	No access	
	Evaluations	No access	
User plus	Machines	Access to <b>Maintenance &amp;</b> malfunction	
	Maintenance	Access to <b>Tile view</b> and <b>Status</b> overview	
	Maintenance terminal	Access to Maintenance status	
	Evaluations	Access to Maintenance	
Admin- istrator Mainte- nance Manager	All menus	All authorizations in the <b>Mainte-</b> nance area	

#### Create user

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Settings

By clearing the option **The user name is case-sensitive**, you can deactivate the uppercase/lowercase check for user names.

#### To create a user in StateMonitor:

- 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
  - Deactivate the Automatic notifications option for users with the Administrator role by mouse click as needed
  - Additionally select the desired option in the Role: MaintenanceManager pull-down menu as needed
- Enter the URL of the desired page or QuickEdit view in the Home page after logon field as needed
- Select the Active Directory users checkbox as needed

**Further information:** "Active Directory settings", Page 215

- Click the Save button
- StateMonitor shows the created user in the user list.
- StateMonitor sends the user the password by email.

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

Further information: "User settings submenu", Page 173

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

Further information: "Home menu", Page 52

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

Further information: "Messenger Menu", Page 107

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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",

Further information: "Machine mapping submenu", Page 188



#### **Editing user data**

To change user data later:



- 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:

- ö
- 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 only a user with administrator role can reset the user's password.

Proceed as follows to reset a password:

- Ø
- 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 submenu

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:

- ₽
- Switch to the Settings menu
- Select the **Machines** submenu
- Enter the name of the machine in the Machine name field
- Select the **Type** (of control)
- For IP address / DHCP, enter the IP address (eth0) or the host name of the machine; for OPC UA, enter the value for Endpoint URL
- Click the Check button
- StateMonitor checks the network connection to the machine.
  Eurther information: "Testing the network

**Further information:** "Testing the network connection", Page 179

- 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.
- Depending on the selection in the Type field, make the necessary settings in the pull-down menus

Further information: "Machine parameters", Page 184

- Click the Set up machine button
- > The machine is saved in the machine list.
- The machine is now shown 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 223

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.

With HEIDENHAIN controls, 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 column

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		
Connected	Machine is connected with StateMonitor		
Connection setup is running	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 estab- lished
DNC STATE HOST IS NOT AVAILABLE	Machine cannot be reached via PING	Machine is switched off or discon- nected 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 fo <b>External access</b>
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 <b>CE</b>
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 initiat- ed
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	<b>External access</b> is blocked (MOD function)
		Permission request for <b>External</b> access was denied
		Permission request for <b>External</b> <b>access</b> 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 column

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:

A	DNC	access	was	detected. Host n		be	permitted?
			Но	st IP: 192	2.168.56.1		

DNC error message	Meaning	Cause
DNC_E_DNC_PROHIBITED	DNC blocked	<b>External access</b> is blocked (MOD function)
		Permission request for <b>External</b> 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)

## **Defining control signals**

Most of the machine parameters depend on the selected type (see "Machine Parameters", Page 251). The evaluation of the control signals in the **Signals** tab is largely identical for all types, however. In the expanded definition table (**Create** button), you can map the control signals to status parameters.

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

Parameter		HAIN			lect	
		HEIDENHAIN	ModBus	OPC UA	MTConnect	FOCAS
	Explanation	뽀	Ĕ	Р	Ξ	Б
Name	Unique name	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Group	Name of a group of signals	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
	Possible values:					
	Boolean					
	String					
	Temperature					
Address type	Address space in which the memory address is located		$\checkmark$			
	Possible values:					
	COIL_OUTPUT					
	DIGITAL_INPUT					
	HOLDING_REGISTER					
	ANALOG_INPUT					
Modbus data type	Data type		$\checkmark$			
	Possible values:					
	■ BIT					
	BYTE					
	■ INT_16					
	■ INT_32					
	FLOAT_32					
	FLOAT_64					
Address type	Address space in which the memory address is located			$\checkmark$		
	Possible values:					
	Numerical					
	String					
	Guid					
	Opaque					
Namespace	Definition of personal name space			$\checkmark$		
Address	Path to the signal that is to be recorded	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Description	Additional information	✓	$\checkmark$	$\checkmark$	$\checkmark$	

Parameter		NHAIN	SI	A	nect	(0)
	Explanation	HEIDENHAIN	ModBus	OPC UA	MTConnect	FOCAS
Data type	Data type			$\checkmark$	$\checkmark$	
	Possible values:					
	Number (number)					
	Text (string)					
	Boolean value (0 or 1)					
Factor	Conversion factor for signal value	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Decimal places	Number of decimal places used	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Text before the value	Specification of a prefix	$\checkmark$	$\checkmark$	$\checkmark$	✓	
Text after the value (physical unit)	Specification of the physical unit of the signal value	1	~	√	√	
Threshold value	A threshold value above which the new signal value is transferred to the database	1	√	√	√	
Min. display	Minimum display value for the chart in the <b>Machine status</b> view	1	$\checkmark$	$\checkmark$	1	
Max. display	Maximum display value for the chart in the <b>Machine status</b> view	1	√	√	√	
Reference range min	Minimum reference range for the chart in the <b>Machine status</b> view	√	√	√	√	
Reference range max	Maximum reference range for the chart in the <b>Machine status</b> view	1	√	√	1	
Boolean reference value	Reference value; only if the <b>Boolean value (0 or</b> 1) option has been selected for <b>Data type</b>			√	1	
Polling interval	Interval for polling	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
	Possible values: 1 second to 1 hour					
Display in machine view	Activates the display in the <b>Machine status</b> view "Machine status"	1	√	√	1	
Subscription	Activates subscription to OPC UA signals			$\checkmark$		
Subscription sampling interval (in ms)	Interval for updating OPC UA signals (default 15 ms)			√		

The **Check the signals** button allows you to call the current value of the selected signal.

The **Export** button allows you to save the configured signal parameters to an XML file.

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

## Edit machine

To edit the data of an existing machine in StateMonitor:

- **C**
- 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 tabs 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 model and the control, the following parameter groups are available in the pull-down menus:



Parameter	Explanation	HEIDENHAIN	Modbus	OPC UA	MTConnect	FOCAS
Hourly rate	Value of the hourly rate (with currency); is used for calculating the costs per job and working step in the optional <b>Job times</b> submenu	1	1	1	1	✓
Camera	IP address of a camera whose live image is displayed in the <b>Machine status</b> submenu	√	√	√	√	1
Master data	Administrative information about the machine				$\checkmark$	$\checkmark$
Override acquisition	Only for HEIDENHAIN iTNC 530 control					
(optional)	<b>Further information:</b> "Settings for Override acqui- sition (only with iTNC 530)", Page 256					
Simulation properties	Only for <b>Simulation</b> type:					
(optional)	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 is effective only during creation of the simulation					
	Continually generate new data					
	Default setting for continuously new simulation data					
	Mean status time in seconds					
	Recommended value for random generator for generating machine statuses					

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Parameter	Explanation	HEIDENHAIN	Modbus	OPC UA	MTConnect	FOCAS
Connection settings	Parameter depends on the machine model	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Security settings	Parameter for authentication	$\checkmark$		$\checkmark$		
Signals (optional)	Definition of signals for access to PLC variables	1	√	1	1	
Status parameters for mapping (optional)	Definition of assignments to other controls <b>Further information:</b> "Mapping of status parame- ters for different controls", Page 261		1	√	1	1
Signal alarms (optional)	Definition of alarms based on recorded signals	√		√	√	
Machine messages (optional)	Definition of messages based on recorded signals <b>Further information:</b> "Mapping of status parame- ters for different controls", Page 261			√	√	

## **Deleting machines**

To delete a machine in StateMonitor:

- Settings
- 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 shown 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:



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:

 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:



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

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er utings Une management	Ballion All groups	Machine mapping	Anaroger settings   File backup   External reporting 20   Adva	aund   540
Create machine group				
Only name groupling				
🔅 Lise for the display in the machine				
ChC PL01540	· > INCH			
TNC 620 TNO 330				
Delete machine proce	39	Save		
Machine group				
Group Name		Jak Serviced Chipkey	Antiped nuclines	
group!		22 Cites	Thickell, Chic PEOT 648, Thic 628, Thic 329	
poabler			ThC 640	

To select the intended use:

- If the machine group is to be available as a filter criterion in the Machines menu, 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

To edit a machine group:

- **Ö**
- 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**

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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:

- 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.

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.

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- 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:

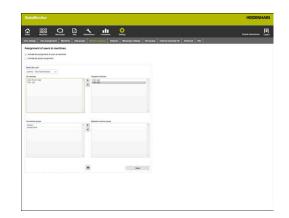
1.1		
-		
	<	<

- 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:



- 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 77

**Further information:** "Job terminal submenu (software option)", Page 82

Further information: "Reporting malfunctions", Page 97

#### **Machine statuses**

You can more precisely describe machine statuses by adding specifications:

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

#### Productive (feed rate/rapid OVR >= 100 %)

Productive (feed rate/rapid OVR < 100 %)

OK, but not productive

Not ready for operation

Delay

Machine not in use

#### Job statuses (software option)

You can more precisely describe the following job statuses by adding specifications:

- 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 malfunctions for the reporting of malfunctions. You can use the available categories in order to group specifications.

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

#### Adding specifications

#### To add a specification:

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- Switch to the **Settings** menu
- Select the Statuses submenu
- Click the desired status or category
- > StateMonitor opens the input field.
- Enter a name for the specification; for machine statuses you can also enter a unique number
- 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

Created
Assigned
Locked / change
Rejected
Started
Prepare
Production
Interrupted
Finished

#### Reasons for disturbance

Category A
Category B
Category C
Category D



#### 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.

#### Exporting and importing machine statuses

In the **Statuses** submenu, you can export the machine statuses with their specifications as a CSV file via the **Export** button.

This CSV file can then be imported again to another StateMonitor via the **Import** button, in order to use the defined machine statuses again.

#### Customizing the configuration of the default OVR

To help you adapt StateMonitor to customer-specific scenarios, you can customize the configuration of the default OVR for the Productive machine status (transition between the display of light green and dark green).

To customize the default OVR:

- In the area Define default OVR for productive status (dark green), select the Individual configuration for productive status (feed rate / rapid OVR >= option
- Enter the new recommended value for the Productive machine status in the input field
- Click the Save button

Define default OVR for productive status (dark green)

For the default OVR of the productive machine status (dark preen) you can define a value that affers from the standard co Standard configuration for productive status (leef rate / rapid OVR >= 100%) individual configuration for productive status (leef rate / rapid OVR >= \_\_\_\_\_\_% Let change - \_\_\_\_\_\_%

#### Customizing the configuration of the machine status changes

To help you adapt StateMonitor to customer-specific scenarios, you can customize the configuration of the machine status changes as follows:

Changing machine statuses based on defined user groups

**Rescind change limitations for machine statuses** allows you to define which machines statuses are permitted to be changed without restrictions and by whom, regardless of the standard behavior of StateMonitor.

Editing machine statuses automatically

Use **Automatic machine status changes** to define conditions that change a machine status. This may be a time interval, but also the occurrence of a specific machine alarm, a signal alarm or a machine message. Except for the time interval, you can also define the specific trigger and whether the current status will be changed as of the detection of the trigger or whether the entire status will be changed retroactively.

Thus you can define that, for example, after the machine status has been yellow (**OK**, **but not productive**) for two hours, the machine status will automatically change to gray (**Delay**).

Further information: "Edit machine statuses submenu", Page 77

To define user groups for machine status changes:

- In the area Rescind change limitations for machine statuses, select the desired user role
- Select the type of machine status changes to which the change is to apply
- Click the Save button

To define automated machine status changes:

- In the area Automatic machine status changes, click the Create button
- > StateMonitor opens the **Configure automatic machine status changes** window.
- Select the initial status and the final status in the Original status and New status drop-down lists
- Select the desired trigger from the **Rule criteria** drop-down list The following rule criteria are available:
  - Time
  - Machine alarm
  - Signal alarm
  - Machine message
- Select further parameters, depending on the selected trigger
- Select the desired machine or machine group
- Select the desired time for the status change from the Point in time for editing drop-down list
- Click the Save button
- > The defined machine status change is displayed in the table and the checkbox of the **Active** column is selected.

To delete an automated machine status change:



- Click the recycle bin icon
- > StateMonitor deletes the machine status change from the table.

onfigure automatic machine state	us changes	+	
Original status	Productive (feed rate/rapid OVR < 100 %)	~	
New status	Productive (feed rate/rapid OVR >= 100 %)	~	
Comment	Productive (feed rate/rapid OVR >= 100 %) Productive (feed rate/rapid OVR < 100 %)		
Rule criteria	OK, but not productive Not ready for operation	~	
Trigger	Delay	~	
Delay time for change (in minutes)	10		
Machine/Machine group	All machines	~	
Save			

## 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

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To specify Messenger settings:

- 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 email 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 server, 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> <li>None: Communication is not encrypted</li> </ul>			
	<ul> <li>STARTTLS: The communication starts in an unencrypted state until the e-mail server suggests transport encryption. Only then, an encrypted communication will be established</li> </ul>			
	<ul> <li>SSL/TLS: The communication is encrypted end-to- end</li> </ul>			
Port	SMTP port for communication; depends on the selected <b>Connection safety</b> :			
	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			

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SMTP s	erver settings										
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Date			Enat	ncpand		te	val edged		Content of Pa + mail		
Date			Engli	equed		t.	sal object		Coder of Two evant		

Parameter E-mail sender address of State- Monitor		<b>Explanation</b> E-mail address that StateMonitor uses for sending		
Send tes to	t e-mail	E-mail address to which StateMonitor sends a test e-mail		
URL (inserted in e-mail)		The defined URL is added to sent e-mails in order to allow a user to call the StateMoni- tor login screen directly from the e-mail, for example.		
connection		AIN recommends the use of an encrypted n in order to protect the transferred data. n 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.



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.

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### Export data

Using this function, you can export the recorded machine data to a CSV file. This allows you to import the machine data into a spreadsheet and further process it.



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 200.

To perform a data export:



- 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

#### Download log files

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

I o download the log file

- **Ö**
- Switch to the **Settings** menu
- Select the File backup submenu
- In the Download log files window, click the Generate log file button
- > The log file is generated.
- Click the Download log file button in the window
- Select the storage location
- Click the Save button
- StateMonitor saves the log file in the selected location for saving.

#### Automatic database backup

To have StateMonitor regularly perform an automatic backup of the database:

- Settings
- 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 in the drop-down list (e.g., 22:00 hrs.)
- Under Days, select the desired days (e.g., Monday to Friday)
- Click the Generating button
- StateMonitor displays the created backup in the list
- StateMonitor backs up the data every workday at 22:00 hrs. and stores the data in the specified path.

#### Automatic deletion of data

To periodically free up memory space, you can define how long backup data will be stored. The following functions are available:

- Automatic deletion of database backups
   Once the specified number has been reached, creating a new backup will delete the oldest backup
- Automatic deletion of database backups created when shutting down

The default value is five backups, but the value can be adjusted

You can also define for how long StateMonitor will save the recorded machine data.

The **Automatic deletion of historical data** function deletes the corresponding database content when the specified time has passed.

## NOTICE

#### Caution: Data may be lost!

If you have not backed up these data elsewhere, the recorded machine data will be lost irretrievably after expiration of the specified period.



If you enter a value of 0, then no backup data will be deleted.

#### To configure the deletion of data:



- Switch to the **Settings** menu
- Select the File backup submenu
- Deletion after a certain number of backups: In the Automatic deletion of database backups field, enter the desired number of backups that will be saved (e.g., 10) in the input field
- Editing the number of automatic backups: In the Automatic deletion of database backups created when shutting down field, enter the desired number of backups that will be saved (e.g., 3) in the input field
- Deletion of machine data after a certain period: 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 deletes all data based on the defined criteria.

#### 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:

- 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

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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:

- 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 following database systems:

- Microsoft SQL Server
- PostgreSQL
- MySQL
- Oracle Database



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



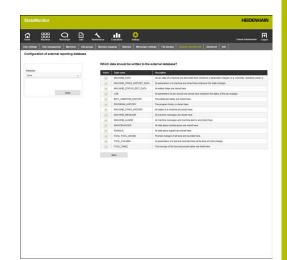
This function is only accessible to users with the Administrator role.

Requirement: Server with supported database system

To connect to an external database:



- 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
- MACHINE\_STATUS\_EDIT\_DATA
- JOB
- EDIT\_JOBSTATE\_HISTORY
- PROGRAM\_HISTORY
- MACHINE\_STATE\_HISTORY
- MACHINE\_MESSAGE
- MACHINE\_ALARM
- MAINTENANCES
- SIGNALS
- TOOL, TOOL\_USAGE
- TOOL\_COLUMN
- TOOL\_TABLE

#### 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 deactivat- ed 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 204
JOB_V2	Job data
	Details see "Table structure for JOB_V2", Page 205
MACHINE_V2	Assignment of machine name to ID
	Details see "Table structure for MACHINE_V2", Page 205
MACHINE_ALARM_V2	Confirmable messages of machine
	Details see "Table structure for MACHINE_ALARM_V2", Page 206
MACHINE_DATA_V2	Machine data
	Details see "Table structure and parameters for MACHINE_DATA_V2", Page 207
MACHINE_ID_MAPPING_V2	Mapping of machine IDs to StateMonitor (for version < 1.3)
	Details see "Table structure for MACHINE_ID_MAPPING_V2", Page 208
MACHINE_MESSAGE_V2	Non-confirmable messages of the machine, generated by StateMonitor and FN 38
	Details see "Table structure for MACHINE_MESSAGE_V2", Page 208
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 207
MACHINE_STATE_	Status of the machine (status light)
HISTORY_V2	Details see "Table structure for MACHINE_STATE_HISTORY_V2", Page 208
MAINTENANCE_EXECUTION_V2	Active maintenance events
	Details see "Table structure for MAINTENANCE_EXECUTION_V2", Page 208
MAINTENANCE_V2	Maintenance configuration
	Details see "Table structure for MAINTENANCE_V2", Page 209
MAPPING_MAINTENANCE_	Mapping of process_step_id to maintenance_id
PROCESS_STEP_V2	Details see "Table structure for MAPPING_MAINTENANCE_PRO- CESS_STEP_V2", Page 209
PROCESS_STEP_V2	Maintenance step configuration
	Details see "Table structure for PROCESS_STEP_V2", Page 209
PROGRAM_HISTORY_V2	History of the program execution
	Details see "Table structure for PROGRAM_HISTORY_V2", Page 210
SIGNAL_CONFIGURATION_V2	Signal configuration
	Details see "Table structure for SIGNAL_CONFIGURATION_V2", Page 210
SIGNAL_DATA_V2	Signal data
	Details see "Table structure for SIGNAL_DATA_V2", Page 210

Table	Function
TOOL_V2	Mapping of the internal tool ID to the tool name and the tool number of the tool table
	For details, see "Table structure for TOOL_V2", Page 211
TOOL_COLUMN_V2	Parameters identified for each tool ID
	For details, see "Table structure for TOOL_COLUMN_V2", Page 211
TOOL_TABLE_V2	Information (path, table version, type, time stamp, name, status) on the file backups of the tool table
	For details, see "Table structure for TOOL_TABLE_V2", Page 211
TOOL_USAGE_V2	Information on every tool usage; the time of the tool change and the inter- nal tool ID of the insertion and removal is recorded For details, see "Table structure for TOOL_USAGE_V2", Page 212

## **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: <pre>extrem_high, high, normal, low, extrem_low</pre>
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_pro- graming, 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_emer- gency_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
	ProgramCompleted CurPgm	Number of successfully completed programs of the type Program
	ProgramInterrupted Error	Total number of programs ended by errors
	ProgramInterrupted ErrorCurPgm	Total number of programs ended by errors, belonging to the type <code>Program</code>
	ProgramInterrupted User	Total number of programs ended by the operator
	ProgramInterrupted UserCurPgm	Total number of programs ended by the operator, belonging to the type <code>Program</code>
	ProgramStatus	Program status Values: DNC_PRG_STS_IDLE, DNC_PRG_STS_RUN- NING, 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_S- TOPPED, DNC_PRG_EVT_FINISHED, DNC_PRG_EVT_CANCELED, DNC_PRG_EVT_IN- TERRUPTED, DNC_PRG_EVT_COMPLETED, DNC_PRG_EVT_ERROR, DNC_PRG_EVT_ER- ROR_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	SubProgram	List of subprograms, separated by commas 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 $\geq$ 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_can- celed_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, 
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



The following tables TOOL\_V2, TOOL\_COLUMN\_V2, TOOL\_TABLE\_V2 and TOOL\_USAGE\_V2 can be interconnected via the tool ID for individual evaluations with SQL queries.

#### Table structure for TOOL\_V2

Column	Value				
ID	ID of the tool				
NAME	Tool name from the tool table				
TOOL_NUMBER	Tool number from the tool table				

#### Table structure for TOOL\_COLUMN\_V2

Column	Value
ID	ID
TOOL_ID	Reference to $ID$ column in the $TOOL_V2$ table
NAME	Name of the parameter from the tool table
VALUE	Value of the parameter at the moment of saving

### Table structure for TOOL\_TABLE\_V2

Column	Value				
ID	ID				
MACHINE_ID	Reference to ID column in MACHINE_V2 table				
NAME	User-defined name of the backup				
FILE	File path on the StateMonitor server				
TYPE	Type of tool table Values: MILLING, POSITION, TURNING				
TIMESTAMP	Time stamp of the performance of the backup				



The specified paths are valid exclusively on the StateMonitor server and only after a manual backup; for details, see "Backing up the tool table", Page 101.

## Table structure for TOOL\_USAGE\_V2

Column	Value
ID	ID
MACHINE_ID	Reference to ID column in MACHINE_V2 table
TOOL_IN	Reference to id column in the тоог_v2 table for gating with the tool parameters from the тоог_corumn_v2 table at the time of insertion
TOOL_OUT	Reference to id column in the тоог_v2 table for gating with the tool parameters from the тоог_согими_v2 table at the time of removal
STARTTIME	Time stamp at the time of tool insertion into the spindle
ENDTIME	Time stamp at the time of tool removal from the spindle
have changed can For this purpose, and [Installations \application.p file:	dd the following entry in the ordner]\config\properties

## 10.11 Advanced submenu

In the **Advanced** submenu, you can define advanced settings for StateMonitor.



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

#### Changing the system language

To change the system language in StateMonitor:

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- Switch to the Settings menu
- Select the Advanced submenu
   In the System language section, select the
- desired language in 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

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#### Managing certificates (only for OPC UA)

If you use an authentication for OPC UA, then you must also specify an appropriate application certificate in the **Certificate for safe OPC UA connections** section.

An application certificate can be used as follows:

- In order to use an existing application certificate, you first need to separately generate a certificate and a private key and then import them into StateMonitor. StateMonitor will then generate the corresponding public key.
- In order to use a new application certificate, enter a name and a password in StateMonitor. StateMonitor will then generate a corresponding public key along with a certificate and a private key.

To use an application certificate:

- Switch to the Settings menu
- Select the **Advanced** submenu
- In the Certificate for safe OPC UA connections section, click the Import button
- The Import application certificate window opens.
- Enter an internal name in the Certificate name (internal) field
- To use an existing application certificate, select the corresponding certificate file (\*.der) and the private-key file (\*perm/\*.key) in Windows Explorer and drag them to the marked field
- Click the Import certificate button
- To use a new application certificate, enter a new password in the Password for private key field
- Click the Generate certificate button
- StateMonitor displays the application certificate in the list.

Once the application certificate is available, you can use the **Download Public Key** button to export the public key from StateMonitor and use the public key for the OPC UA server to be connected.

#### **Active Directory settings**

StateMonitor also supports user logon via Active Directory, thus allowing mixed mode.



It is advisable to create a minimum of one user with the Administrator role locally in StateMonitor. This ensures that StateMonitor continues to be accessible even if problems occur with the Active Directory server.

To use Active Directory in StateMonitor:



- Switch to the Settings menu
- Select the Advanced submenu
- In the Active Directory settings section, select the Activate support for ActiveDirectory checkbox
- In the input fields, enter the settings for the Active Directory being used
- Click the Save button



The settings for the Active Directory should be made by an IT specialist.

#### ActiveMQ settings (software option)

StateMonitor supports the functionality of ActiveMQ for connection to other networks. For identification in the ActiveMQ Broker, the unique identifier (UUID) of the StateMonitor instance is additionally shown.



The support for ActiveMQ is an additional function that requires option 11 Data Interface to be enabled. Option 11 must be licensed for each enabled machine.

**Further information:** "Software options and licenses", Page 218

To activate ActiveMQ in StateMonitor:



- Switch to the Settings menu
- Select the Advanced submenu
- In the ActiveMQ settings section, enter the URL of the corresponding AMQ Broker into the AktiveMQ Broker URL field
- Select the Active checkbox
- Click the Save button

Certificate for safe OPC UA connections

Application certificate



## 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

Settings

- License conditions
- Table with Open Source license notes
   Further information: "Functions in tables and charts", Page 48

To access the **Info** submenu:

- Switch to the Settings menu
  - Select the Info submenu

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# 

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	5 Signals	1308521-01
8	FOCAS Interface	1385356-01
11	Data Interface	1367514-01

## 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:

**Ö** 

- 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 220

 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 221

## Enabling the license (online)

To enable the license on your dongle (online procedure):

Open the following URL on the server or PC where StateMonitor is installed:

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:

- 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:

- Open the following URL: Ic.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:

- 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.



# **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 (System Identification Key) contains the NC software license for enabling control loops and software options.

The SIK number provides the control with a unique identification.

Before you proceed, open the SIK menu of your control to check whether option 18 is enabled.

#### Procedure on iTNC 530:

⇒	

- Select the Programming and Editing operating mode
- MOD
- Press the MOD key Enter the code number SIK
- ENT
- 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 227

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:

⇒	

ī

Select the **Programming** operating mode

MOD

ENT

Press the MOD key

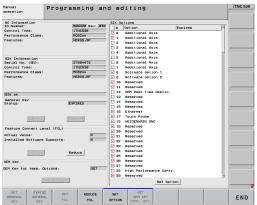
- ► Enter the code number SIK
- Press the ENT key
- > The TNC displays the SIK menu on the screen.

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 227

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



SIK content and opt	ion state				-
NC Information-		SIK 0	ptions		
ID Number:	340590 Rev: 09 De		Option	Expires	
Control Type:	TNC640	区 0	Additional Axis 1		
Performance Class:	MC66XX	区 1	Additional Axis 2		
Features:	SP	区 2	Additional Axis 3		
SIK Information Serial No. (SN):	43619596	区 3	Additional Axis 4		
Control Type:	43619596 TNC640	区 4	Additional Axis 5		
Control Type: Performance Class:		反 5	Additional Axis 6		
Features:	HEROS, SP	反 6	Additional Axis 7		
SIK ok	prenes, or	<b>x</b> 7	Additional Axis 8		
General Key			Adv. Function Set 1		
State:	NONE	17.9	Adv. Function Set 2		
-Feature Content Le	vel (FCL)	17	Touch Probe Functions		
Actual Value:	0	17 10	HEIDENHAIN DNC		
Installed Software	Supports: 1		Adv. Progr. Features		
OEN Key			Adv. Graphic Features		
OEM Key for temp.	Options: Not set				
					1

tanual D m c						iTNC 530
Pro	gramming an	d	ec	11119		11140 030
NC Information		SIN	( 0p	tions		-
ID Number:	505428 Rev: 048		H	Option	Expires	
Control Type:	iTNC530	17	e	Additional Axis		
Performance Class: Teatures:	MCB2xx HEROS SP		1	Additional Axis		
reatures:	HEROSISH		2	Additional Axis		
				Additional Axis		
				Additional Axis	1	
SIK Information			5	Additional Axis		
Serial No. (SN):	37864472		в	Additional Axis		
Control Type:	LTNC538		7	Additional Axis		
Performance Class:	MC62××	2	8	Software option 1		
Features	HEROS, SP	2		Software option 2		
				Reserved		
				Reserved		
SIK ok				OEM Real Time Applic.		
General Key				Reserved		
Status:	EXPIRED			Reserved		
				Reserved		
				Ethernet		
(Sec.)	Exected			Touch Probe		
				HEIDENHAIN DNC		
Feature Content Level (F)	DL)			Reserved		
Actual Value:	4			Reserved		
Tostalled Software Suppor				Reserved		
instantia sorthare suppor	, ist			Reserved		
				Reserved		
Set	Reduce			Reserved		

#### 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 227



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.

→ Machine	smart.Turr	Tool editor	e par.
SIK content and opti	on state		-
NC Information ID Number: Control Type: Performance Class:	688947 Rev: 04 CP6xx MC64XXD	SIK Options           #         Option         Expires           IX 0         Additional Axis 1	AA
Features:	SP,Export	X 1     Additional Axis 2       X 2     Additional Axis 3	15
Serial No. (SN): Control Type: Performance Class:	35687269 CP6xx MC64XXD	IX 3     Additional Axis 4       I 4     Additional Axis 5       I 5     Additional Axis 6       I 6     Additional Axis 7	⊄/4
Features: SIK ok General Key	HEROS, SP, Export	□     7     Additional Axis 8       □     X 8     Teach-in	⊕x1
State: Feature Content Lev Actual Value: Installed Software	4	IX 9     smart.Turn       IX 10     Tools and Technology       IX 11     Thread Recutting	θx
OEM Key OEM Key for temp. O		IX 17 Touch Probe Functions       IX 18 HEIDENHAIN DNC	07:46:05
SET GENERAL EXPIR		EDUCE FCL SET OPTION SET OFM KEY	END

## 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:

- Write down the SIK number of the control Further information: "SIK menu", Page 225
- 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:

i

- 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 with software version 34049x-04 or later.

#### Paid activation (unlimited)

To purchase option 18 and activate it for unlimited use:

- ► 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 225
- ▶ Place the cursor on Option 18

#### SET OPTION

- 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 specialists.



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.

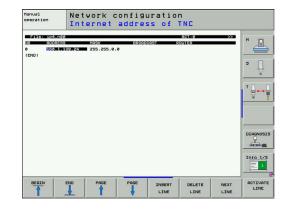
#### Network integration using fixed IP addresses

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 with software version 34049x-04 or later (HEROS 4)

To integrate the control into the company network via a fixed IP address:

Setting	Meaning
	Enter the following information into the columns:
NET	<ul> <li>The control displays the main network configuration screen</li> </ul>
DEFINE	Press the <b>DEFINE NET</b> soft key
ENT	<ul> <li>Press the ENT key</li> </ul>
MOD	<ul> <li>Press the MOD key</li> <li>Enter the code number NET123</li> </ul>
$\widehat{ \Rightarrow  }$	<ul> <li>Select the Programming and Editing mode of operation</li> </ul>



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		

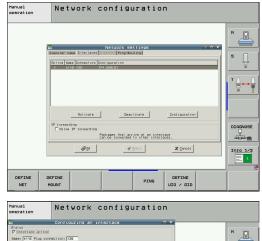
Programming User's Manual for iTNC 530

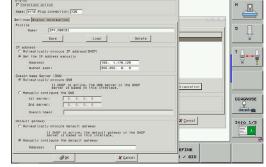
# iTNC 530 with software version 34049x-05 or later (HEROS 4)

To integrate the control into the company network via a fixed IP address:

of
w for
w for
nto

► Press the **OK** button





terface active	Check box must be selected
	Oncor box must be selected
ame of the interface	(Leave unchanged)
esignation of the connector: X26	(Leave unchanged)
address of the control	Select the <b>Set the IP address manually</b> option
nter the IP address of the control	Four numerical values separated by periods, e.g. 160.1.180.20
he <b>Subnet mask</b> serves to differentiate etween the network ID and the host ID in he network. Inter the <b>Subnet mask</b>	Four numerical values separated by periods, e.g. 255.255.0.0 If necessary, ask your network specialist for the proper value
	esignation of the connector: X26 address of the control ater the IP address of the control the <b>Subnet mask</b> serves to differentiate etween the network ID and the host ID in e network.



ŝ

MOD

DEFINE

NET

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

# iTNC 530 with software version 60642x-04 or later (HEROS 5) with HSCI

To integrate the control into the company network via a fixed IP address:

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

$\Rightarrow$		Select the <b>Programming and Editing</b> mode of operation
MOD		Press the <b>MOD</b> key
		Enter the code number <b>NET123</b>
ENT		Press the <b>ENT</b> key
DEFINE		Press the <b>DEFINE NET</b> soft key
NET	>	The control displays the pop-up window for the network settings.
	•	On the <b>Computer name</b> 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 <b>Configuration</b> button
	>	The control then displays the pop-up window for configuring the interface.
		On the <b>Settings</b> tab of the pop-up window, enter the information from the table below
		Press the <b>OK</b> button

	Computer name	• Interfaces Internet	Network sett	ings co		• _ = ×
	- Primary interfa		can configure the doma way only on ONE interfa quired, the control also to interface.		elault es frons	
	Use	interface: eth0	INCINE.	-		
	Computer nam	nt UFS				
		If no from	computer name serves ar name is entered, the con the above selected interf	adentification in the nation of the second sec	Hwork. Res	
	Host file	st file				
	Nam	e of host file				
		¢дак	41	isply		
щ	of arry			Cochange Interface	Use Host Sie	
Manual Operation	Net	twork o	configu	Jratio	п	
	C	e Interfaces Internet	Network set t ProgRouting NFS UID/	50		
	Active Name X eth0	2 Connectors Configur X26 DHCP-L	ation			
		😝 Activate	Dea	civate	Configuration	
	IP forwarding		1		Configuration	
	IP towarding	? forwarding	Packages that arriv be forwarded to off	e at an interface can er interfaces.		
	- EP forwarding Allow F		1	e at an interface can er interfaces.	Configuration	
€ <sup>8</sup> 0×	P lowarding	? forwarding	Packages that arriv be forwarded to off	e at an interface can er interfaces.		Dayoff
	Allow F	° forwarding প্রেরুম্ব ত্রি Cancel	Packages that arm be forwarded to of	e at an interface can rer interfaces. sply	Configuration	S P Ionau D Octor
Manual	Allow F	° forwarding প্রেরুম্ব ত্রি Cancel	Packages that any be forwarded to off	e at an interface can rer interfaces. sply	Configuration	S P Ionato Octor
Manual	Allow F af Arety Net	Streading	Packages that arm be forwarded to of	e atan imenface can er imenfaces. soly Deactivate	Configuration	S Plonat Octor
Manual	Allow F	*brwanding *brwanding Sancet twork co co co active Name (r	Packages that arm be towarded to of Activate Configu	e at an interface can ter interfaces. Order Deactwate Jratio	Configuration	P lonas Octor
Manual	Alco F	breading	Packapes that amm be towarded to of Activate configuring an	e at an instribute can be reinstructure. confy Disactivate <u>Interface</u> XX6	Content of Contents	P foreas
Manual	Alexe F	Vernanding	Perclayes that sum be foreacted with Activate configure for any foreacted the Perg connection:	e gi an hendrace can er instructions. orf/ Deactivate In Tatio In Land doce X26 Save Save Sette P address main		elete
Manual	Alexe #	*knasting  *knasting	Peckages that any Peckages that any Activate Configuration and Pays constants (1990 constants) (1990 constan	e at an interface can ar interface. Deactive UT at io Sinterface Z26 Save	Consporter      Least     D      Least     D      Least     D	+ (C) X
Manual	Allow F Allow F N to 1 Setting S Palae Palae Name Palae Name Palae Name Palae Palae Name Pala	*knowling	Peckage that any broaded wat Activate Configuretory out igute ing one out igute ing one two ing controls weather in a control of weather in a control of weather in a control of weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control of the weather in a control	e et an merice can er insolater. Deactour in tart doce in tart doce save Save Save Save Save Save	Consporter      Least     D      Least     D      Least     D	+ (C) X
€ <sup>®</sup> 9×   Hanual operation	Alter F		Processes that any internet of the second second Active configuration of the second configuration of the second co	a diabatica cin	Contgrador           Image: Contgrador	+ (C) X
Manual	Alter F	*knasting	Processes that any internet of the second second Actives configuration and configuration and configura	e gi an merfece can er inschoel. Dractware Ur at i o Dractware Ur at i o Santer Face Santer Face Santer Face Santer Face Santer Face Santer Face Santer Face Santer Face	Contgrador           Image: Contgrador	+ (C) X

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 <b>Set the IP address manually</b> option
Address:	Enter the IP address of the control	Four numerical values separated by periods, e.g. 160.1.180.20
Subnet mask	The <b>Subnet mask</b> serves to differentiate between the network ID and the host ID in the network. Enter the <b>Subnet mask</b>	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:

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

$\widehat{ \Rightarrow  }$	<ul> <li>Select the <b>Programming</b> operating mode</li> </ul>
мор	<ul> <li>Press the MOD key</li> <li>Enter the code number NET123</li> <li>Press the OK soft key</li> </ul>
PGM MGT	<ul> <li>Press the Program Management key</li> </ul>
NET	<ul> <li>Press the Network soft key</li> </ul>
CONFIGURE	Press the Configure Network soft key
NETWORK	> 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
ENT	<ul> <li>Press the ENT key</li> </ul>
	> The control then displays the <b>Network settings</b> pop-up window.
	<ul> <li>Enter the information from the table below into the pop-up window</li> </ul>
	<ul> <li>Press the <b>OK</b> button</li> </ul>

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 <b>Subnet mask</b> serves to differentiate between the network ID and the host ID in	Four numerical values separated by periods, e.g. 255.255.0.0
	the network.	If necessary, ask your network specialist for
	Enter the <b>Subnet mask</b>	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.	Four numerical values separated by periods,
	Enter the Internet address only if your network consists of multiple subnets.	e.g. 160.1.0.2 If necessary, ask your network specialist for
	network consists of multiple subjets.	the proper value
Changes the contr	to the network settings will cause a restart of ol.	

Program run full sequence	Tabl P380		di	tin⊆	3						
Sa PLC:N Sa TRC:N Sa TRC:N Sa Config Sa	1 Network se Hostname DHCP suppo I P address Subnet ass Broadcast Router	tings rt	Auto	Mount I PC:	51m NO	\\del	81pc84	120	transf	er	
ок ся			[	_		-	[			COPY FIELD	PASTE

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

To integrate the control into the company network via a fixed IP address:

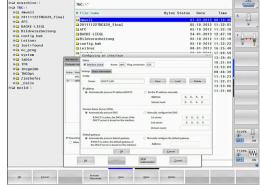
Connect the control to the local company network via a network cable

$\Rightarrow$	<ul> <li>Select the <b>Programming</b> operating mode</li> </ul>
MOD	<ul> <li>Press the MOD key</li> <li>Enter the code number NET123</li> </ul>
ок	<ul> <li>Press the OK soft key</li> </ul>
PGM MGT	Press the Program Management key
NET	<ul> <li>Press the NET soft key</li> </ul>
CONFIGURE	Press the CONFIGURE NETWORK soft key
NETWORK	<ul> <li>The control displays the pop-up window for the network settings.</li> </ul>
	In the Computer name tab, enter the computer name under which the control is displayed in the company network
	Switch to the Interfaces tab
	<ul> <li>Select the interface (eth0)</li> </ul>
	<ul> <li>Click the Configuration button</li> </ul>
	> The control then displays the pop-up window for

- Enter the information from the table below into the pop-up window
- ▶ Press the **OK** button

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Manual operation



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 <b>Set the IP address manually</b> option
Address:	Enter the IP address of the control	Four numerical values separated by periods, e.g. 160.1.180.20
Subnet mask	The <b>Subnet mask</b> serves to differentiate between the network ID and the host ID in the network. Enter the <b>Subnet mask</b>	Four numerical values separated by periods, e.g. 255.255.0.0 If necessary, ask your network specialist for the proper value

DNC 12:45

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 with software version 688946-01 or later (HEROS 5)

To integrate the control into the company network via a fixed IP address:

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

B	

Switch to the Organization operating mode



TRANSFER

- 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.
- In 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

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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 <b>Set the IP address manually</b> option
Address:	Enter the IP address of the control	Four numerical values separated by periods, e.g. 160.1.180.20
Subnet mask	The <b>Subnet mask</b> serves to differentiate between the network ID and the host ID in the network. Enter the <b>Subnet mask</b>	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 with software versions 548328-05 and 54843x-01 or later (HEROS 5)

To integrate the control into the company network via a fixed IP address:

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

		Switch to the <b>Organization</b> operating mode
0	<b>A A</b>	Press the Key soft key Enter the code number <b>NET123</b> Press the <b>OK</b> button
ISFER		Press the <b>Transfer</b> soft key
on- cions		Press the <b>Connections</b> soft key
		Press the <b>Network</b> soft key
work	>	The control displays the <b>Network connection</b> pop-up window.
fig.	►	Press the <b>Config.</b> soft key
11g.	>	The control displays the Network configuratio

- y 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

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#### Save

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Con nect:

Netw

Setting	Meaning	Input
Control name	Name under which the control is visible in the network	e.g. MANUALplus620
DHCP	OFF: The control has a fixed IP address in the network.	OFF
	ON: The control automatically obtains the following data from a DHCP server:	
	IP address	
	Subnet mask	
	<ul> <li>Broadcast</li> </ul>	
	<ul> <li>Gateway</li> </ul>	
IP address	IP address of the control	Four numerical values separated by periods, e.g. 192.168.000.000
Subnet mask	The <b>Subnet mask</b> serves to differentiate between the network ID and the host ID in	Four numerical values separated by periods, e.g. 255.255.255.0
	the network.	If necessary, ask your network specialist for
	Enter the <b>Subnet mask</b>	the proper value
Broadcast	The broadcast address of the control is required only if it differs from the default	Four numerical values separated by periods, e.g. 255.255.255.0
	setting. The default setting is formed from the network ID and the host ID, where all bits are set to 1.	If necessary, ask your network specialist for the proper value
Gateway	The IP address of the default gateway only needs to be entered if you are using more	Four numerical values separated by periods, e.g. 192.168.000.254
	than one network.	If necessary, ask your network specialist for the proper value
	<b>formation:</b> User's Manual MANUALplus 620 ith software versions 548328-05 and 1	

#### **Network integration via DHCP**

In large networks, clients are usually connected to the network via  $\ensuremath{\mathsf{DHCP}}$  .

DHCP stands for Dynamic Host Configuration Protocol.

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

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

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



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

# iTNC 530 with software version 34049x-04 or later (HEROS 4)

To integrate the control into the company network via DCHP:

- 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
  - Enter the following information into the columns:
- Manual Generation Internet address of TNC

   Internet address of TNC
   </tr

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

€

MOD

DEFINE NET

# iTNC 530 with software version 34049x-05 or later (HEROS 4)

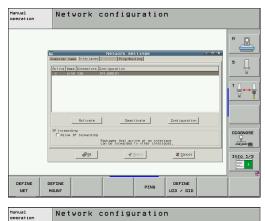
To integrate the control into the company network via DHCP:

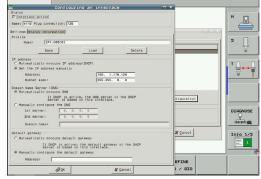
- Select the Programming and Editing mode of operation
- Press the MOD key
  - Enter the code number NET123
  - Press the ENT key
- DEFINE NET

⇒

MOD

- 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:





Interface active	Check box must be selected
Name of the interface	(Leave unchanged)
Designation of the connector: X26	(Leave unchanged)
IP address of the control	Select the Automatically procure IP address(DHCP) option
The control automatically obtains the IP a	ddress from a DHCP server.
The control automatically obtains the sub	net mask from a DHCP server.
	Name of the interface Designation of the connector: X26 IP address of the control The control automatically obtains the IP a

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

# iTNC 530 with software version 60642x-04 or later (HEROS 5) with HSCI

To integrate the control into the company network via DHCP:

Connect the control to the local company network via a network cable Select the Programming and Editing mode of ⋺ operation Press the MOD key MOD Enter the code number NET123 Press the ENT key ENT Press the DEFINE NET soft key DEFINE NET > 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:

	Network configuration
	Computer name Interfaces Internet PingReuting NFS UDIGD
	Primary interface You can configure the domain, name, server and default
	You can could be domain, same, server and default gateways only on CMP immedian. If required, the control also takes the computer names from this issurface.
	Use interface: ctv0 *
	Computer name MNC_HSCLPS
	The computer name serves as identification in the network. If no name is entered, the control tries to take the names from the above selected interface.
	FOR SR 2004 SPECIES INFERICE.
	Host file Use host file
	Name of host lie:
	🧟 Sk 📲 Versiv 🙆 Sawcel
1	
щ	Aprily Scancel Schnop Hast Ne
Manual	Network configuration
operation	
	Network settings + ×
	Computer name Interfaces Internet ProgResultrg NFS UID/GD
	Active         Name         Connectors         Centiguration           X         etb0         X25         DHCP LAN
	Activate     Configuration
	P forwarding
	Packages that arrive at an interface can be lowarded to other interfaces.
	Arshy Qancel
фок	
	O/OI
	Network configuration
Manual	Network configuration
Manual operation	Network configuration
Manual operation	
Manual operation	■ Configuring an interface ▼ ☉ X
Manual operation	Configuring an interface Configuring an interface
Manual operation	Configuring an interface Configuring an interface
Manual operation	Contideuring an Interface * * * *  Contideuring an Interface * * * *  Contideuring Ann Programmedia Los
Manual operation	Contiguistica en Interface  Contiguistica en Interface Contiguistica en Int
Manual operation	Configuring an interface         * * * *           State         * * * *           State         * * * *           State         * * * *           Main         * * * *           Main         State           Main         State           Main         State           Main         State           Main         State           Output         State           Main         State           State         State           State         State           Output         State           State         State
Manual operation	Contitiuring an interface         Contitiuring           Data         Total         Total           Total         Total         Total
Manual operation	Configuring an interface           Omericanity         Plag connection           Omericanity         Name           Name         Omericanity           Name         Same           Name         Same           Omericanity         Same           Name         Same           Omericanity         Same           Same         Lead           Omericanity         Same           Same         Same           Same         Same           Same         Same           Same         Same           Same         Same
Manual operation	Confit Gjuring an Uniterface           Ormetecamin Name (init) Plag connection U.S.           Participanti (initiality)           One of the participanti (initiality)           One o
Manual operation	Confit Gjuring an Uniterface           Ormetecamin Name (init) Plag connection U.S.           Participanti (initiality)           One of the participanti (initiality)           One o
Manual operation	Cont Light fing an Interface         Cont           Statut         The product of the pro
Manual operation	Confit Gjuring an Uniterface           Ormetecamin Name (init) Plag connection U.S.           Participanti (initiality)           One of the participanti (initiality)           One o

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 different network.	tiate between the network ID and the host ID in the
	The control automatically obtains th	ne subnet mask.
Domain Name	Automatically procure DNS option	:
Server (DNS)	The TNC automatically obtains the	IP address of the domain name server.
	Manually configure the DNS option	n:
	Manually enter the IP address of the	e server and the domain name.
Default gateway	Automatically procure default ga	teway option:
	The TNC automatically obtains the	IP address of the default gateway.
	Manually configure the default ga	ateway option:
	Manually enter the IP address of the	e default gateway.
<ul> <li>Apply the changes</li> <li>Cancel button</li> </ul>	with the <b>OK</b> button, or discard them w	ith the
The control can have has its own IP address	two network interfaces. Each network s.	interface
If two network interfact them as follows:	ces exist, HEIDENHAIN controls preass	sign
<ul> <li>X26 for integration to StateMonitor)</li> </ul>	into the local corporate network (conr	nection
<ul> <li>X116 for the mach</li> </ul>	ine's internal use only	
Refer to you	r machine manual.	
The machin	e tool builder may define a different of network interfaces than that predef	ined by

## 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:

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.
- In 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:

PLC:	1	TNC: \nc_prog\*			
TNC:\		✤ File name		Date	Time
Conf:	10	9 File name	Bytes Status	Date	11mo
lost-		<b>Q</b>		28-11-2014	12:43:24
a nc p		🗀 S - Axes		16-10-2013	
a runt		G MillTurn		12-02-2014	09:28:57
a serv		Smdi.h	210	25-11-2014	16:38:41
a syste		a1.h	175	12-02-2014	09:28:51
table		a2.h	243	12-02-2014	09:28:51
temp		a3.h	840	12-02-2014	09:28:52
the the		a4.h	827	12-02-2014	09:28:52
O TNCO	Netzwerkeinstellungen				
UPDATE	Computernamen Schnittstellen I	internet Ping/Routing NES UID/GID DHCP-Serv	ver Sandbox		
		Von dieser Schrittstelle be Rechnemamen.	eient die Steuerung gyf, auch den		
	Benutze Schnittstelle: Rechnemame	Ven dieser Schnittstelle be Rechnemanien	zieht die Stevenung gyl auch den		
		Rechnemamer.	deht die Stevenung ggt auch den		
	Rechnemame	Rechnemannen.			
	Rechnemame	Pechnemanee.	to Manufalarung im Netz.		
	Rechtername MNC_640_1	Pechnemanee.	to Manufalarung im Netz.		
	Rechtername (MNC_640_1	Pechnemanee.	to Manufalarung im Netz.		
	Rechtername (MNC_640_1	Pechnemanee.	to Manufalarung im Netz.		

232:\	TNC:\nc_prog\*			
C: \	✤ File name	Bytes Status	Date	Time
config			28-11-2014	12-43-24
lost+found	G 5 - Axes		16-10-2013	
nc_prog runtime	G WillTurn		12-02-2014	09:28:57
service	\$mdi.h	210	25-11-2014	16:38:41
system	a1.h	175	12-02-2014	09:28:51
table	a2.h	243	12-02-2014	
temp	a3.h	840	12-02-2014	
Incguide	a4.h	827	12-02-2014	
INCOR Netzwerkeinstel	ungen			w 80.53
	Izzelen (izbernet PingRouting NFS UDDROD DHCPServer Konfiguration Sandhox DHCP-LAN	( Sandox		
RLD: \ Aktiv Name Stecker eth1 X116	Konfiguration Sandbox	Santhai		
RLD: \ Aktiv Name Stecker eth1 X116	forfyarlin Sardiss	Canadiana Ana Francisco Ana Francisco	ren.	
RLD: \ Aktiv Name Stecker eth1 X116	torkporten Sanhar DIC/AN	norm, jedapa		



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.

NET

CONFIGURE NETWORK

Setting	Meaning	Input
Subnet mask:	The subnet mask serves to differentiate b network.	between the network ID and the host ID in the
	The control automatically obtains the sub	net mask.
Domain Name	Automatically procure DNS option:	
Server (DNS)	The TNC automatically obtains the IP add	lress of the domain name server.
	Manually configure the DNS option:	
	Manually enter the IP address of the serv	er and the domain name.
Default gateway	Automatically procure default gatewa	option:
	The TNC automatically obtains the defau	lt gateway.
	Manually configure the default gatewa	<b>y</b> option:
	Manually enter the IP address of the defa	ult gateway.
<ul> <li>Apply the change</li> <li>Cancel button</li> </ul>	s with the <b>OK</b> button, or discard them with th	2
The control can have has its own IP addre	e two network interfaces. Each network interfaces.	ace
f two network interfa them as follows:	aces exist, HEIDENHAIN controls preassign	
<ul> <li>X26 for integratic to StateMonitor)</li> </ul>	n into the local corporate network (connectio	n
<ul> <li>X116 for the mac</li> </ul>	hine's internal use only	
Refer to yo	pur machine manual.	
The machi	ne tool builder may define a different	
	nt of network interfaces than that predefined I	у
HEIDENHA	IN.	
	NOTICE	
Caution: Malfunction	on!	
If you change the IF	address of the machine's internal interface,	
	he communication to other machine	
components and ca	ause the control to malfunction.	
<ul> <li>Do not change t interface</li> </ul>	he settings for the machine's internally used	
Intenace		
Further inf	ormation: Conversational Programming Use	's
	IC 640 / TNC 620 / TNC 320 / TNC 128 as of	

# CNC PILOT 640 with software version 688946-01 or later (HEROS 5)

To integrate the control into the company network via DHCP:

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

Switch to the Organization operating mode

h

 $\cap$ 

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



Network Config.

TRANSFER

- Press the Connections soft key
- Press the Network Config. soft key
- The control displays the pop-up window for the network settings.
- In 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:

→ Mach:	ine	🚯 smart.Turn	🎦 Tool edito	r 🗎		Į
Network omputer nar	settings me Interfaces Inter	net Ping/Routing NFS UID/GID	DHCP server Sandbox SMB n	lease	_	
Primary inter						
		gateway only on If required, the co from this interfac	e the domain, name, server and d ONE interface. ontrol also takes the computer nar e.	165		
Use	interface: eth.					
Computer na	ame					
DE01PC1	9527-1230521	-				
		The computer nam If no name is entere from the above sele	e serves as identification in the ne ed, the control tries to take the nar ected interface.	hvork. 1es		
Host file						
Use ho	stfie					
Nam	ne of host file:					
	QK	Apply	OEM authorization		Gancel	
<u>O</u> K	Apply	Cancel	Exchange Interface	Use Host file	01	EM thorizati
<b>.</b>	*				<u></u>	
→) Nach:		🗞 smart.Turn	🎦 Tool edito	r   🗄		
letwozk omputer nar	settings me Interfaces Inter	net Ping/Routing NFS UID/GID	DHCP server Sandbox SMB n	lease		
	ne Connectors Cor X26 DH	figuration Sandbox CP-LAN				
		CP-VBoxHostOnly				
X eth1	X116 DH	CP-VBoxHostUniy				
x eth1	X116 DH	CIP-VB00HostUniy				
x eth1	X116 DH	CP-VB00H0stUniy				
x eth1	X116 DH	CP-VBacHostOny				
x eth1	I X116 DH	CP-VB00H05TUNy				
x eth1	L X116 DH	CP-VB00H05TUNY				
x eth1	1 X116 DH	CP- VEXXHostUny				
x eth1	1 X116 DH	LY- VEXXHOSTUNY				
x eth1	1 X116 DH	LH-YBooHostUny				
x ethl	1 X116 DH	LH-YBoorHostUny				
x ethl	L X116 DH	LiViscor-IostUniy				
x ethl	L X116 DH	LiViscondostumy				
x eth1	L X116 DH	LiViscor-IostUny				
x ethl		Liv-Viscor-HostUniy	Desclivate	Configurati	ion	
x eth1			Deactivate	Configurati	ion	
	A		Deactivate	Configurati	ion	
2 forwarding	Ax		Descivate	Configurati	ion	
2 forwarding	A	tivate		Configurati	ion	
2 forwarding	Ax	tivate	Desctivate	Configurati	ion	
P forwarding	Ax	tivate		Configurat	Gancel	
2 forwarding Allow IF	g 9 P forwarding 	Pictage Pictage (dip)	is that arrive at an interface can rded to other interfaces.		Gancel	
P forwarding	9 P forwarding	Pictage Pictage (dip)	is that arrive at an interface can rded to other interfaces.		Gancel	EM
P torwarding □ Allow IF 	9 9 Proventing <u>OK</u> <u>Archy</u>	these Processors for the second secon	is that arrive at an interface can rded to other interfaces.		Gancel	
P forwarding □ Allow IF ΩK → Macl	g 9 P forwarding 	these Processors for the second secon	is that arrive at an interface can rded to other interfaces.		Gancel	
<sup>9</sup> forwarding	0 0 P forwarding QK doply Conf System	Pictage Distance (Arthough Arthough A	In that service at an interface can reled to other interfaces.		Gancel	EM
P tonwarding Adow IP QK QK QK Carrons Amples n Active Na	P Converting	The state of the s	In that service at an interface can reled to other interfaces.		Gancel	
P forwarding ☐ Alow IP QK QK QK QK QK QK QK QK QK QK QK QK	Accord      Accord      Accord      Accord      Accord      Status     Cond Equations acclosed     Status	The state of the s	In that service at an interface can reled to other interfaces.		Gancel	
P forwarding □ Alow IF ΩK ΩK Alow IF Alow IF ΩK Alow IF Alow IF	0 0 0 0 0 0 0 0 0 0 0 0 0 0	tivele Pictage between Store Cancel Act Name etc. Plag come Name CPUNI	ss har antive at an interface can code to other interface.	Configuration P On	Cancel forwarding Of au	EM
P forwarding □ Alow IF ΩK ΩK Alow IF Alow IF ΩK Alow IF Alow IF	0 0 0 0 0 0 0 0 0 0 0 0 0 0	tives Pictage between betwe	Is that active at an interface can close to other interfaces.	Configuration P On	Cancel forwarding Of au	
P forwarding □ Alow IF ΩK ΩK Alow IF Alow IF ΩK Alow IF Alow IF	Contracting     Contracti	tives	s har antre at an interface can code to other interface. Subscription of the interface. Store Description of the interface	Configuration P On Load J 0 0. 0. 0. 0.	Cancel forwarding Ol Ol Ol Ol Delete	
P forwarding ☐ Alow IF	Considering     Constanting     Constant	tivete	es but anive at an interface can chart's other relations.	Configuration [P] On Load ] ady 0.0.0 NS	Cancel Garcel Ga	
P forwarding □ Alow IF ΩK ΩK Alow IF Alow IF ΩK Alow IF Alow IF	Considering     Constanting     Constant	tives	es that anive at an interface can cheft or other relations.	Configuration P On Load J 0 0. 0. 0. 0.	Cancel forwarding Ol Ol Ol Ol Delete	EM thorizat
P forwarding QK QK QK QK QK QK Active [Na X eth X eth	Arrowsking     OK     OK	Strate         Pictage	es that anive at an interface can chart's other relations.	Load Configuration P 0	Carcel  Carcel  forwarding O  C  C  C  C  C  C  C  C  C  C  C  C	
QK QK QK QK QK QK QK QK QK QK QK QK QK Q	Arrowsking     OK     OK	tivete	es that anive at an interface can chart's other relations.	Load Configuration P 0	Carcel  Carcel  forwarding O  C  C  C  C  C  C  C  C  C  C  C  C	EM
P forwarding QK QK → Haci CUTOTS A definition A def	Arrowsking     OK     OK	Strate         Pictage	es that annue at an interface can control other relations.	Load Configuration P 0	Carcel  Carcel  forwarding O  C  C  C  C  C  C  C  C  C  C  C  C	EM Morizati

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 Cancel

QK

Activate/ Deactivate Save

<u>O</u>pen

Delete

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 with software versions 548328-05 and 54843x-01 or later (HEROS 5)

To integrate the control into the company network via DHCP:

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

	<ul> <li>Switch to the Organization operating mode</li> </ul>
	<ul> <li>Press the Key soft key</li> <li>Enter the code number NET123</li> <li>Press the OK button</li> <li>Press the Transfer soft key</li> </ul>
TRANSFER Con- nections	<ul> <li>Press the <b>Connections</b> soft key</li> </ul>
Network	<ul> <li>Press the NET soft key</li> <li>The control displays the Network connection pop-up window.</li> </ul>
Config.	<ul> <li>Press the Config. soft key</li> <li>The control displays the Network configuration pop-up window.</li> <li>Enter the information from the table below into</li> </ul>
Save	<ul> <li>Press the Save soft key</li> </ul>

➡ Machine		smart.T	uin	A Tool ed		_	ransfer	
Basic data	Noturn	k connection						
				(				
		IP address of Share name	r host name	HOSTNAME			-1	P.P
	Protoc			SMB -				
	User n			USERNAME			_	-
	Domain	1		WORKGROUP				Ē
	Passwo							
	Select Transf	ion er-Ordner						Kanal
								servic
	Netvor	k drive		Z:				T
USB connectio				1			_	
Transfer-	on active:	r: (TORN	1	1	1	1	_	
Ordner		Config.	Test	Info	Separate	Con	nect	Back
		Config.	Test (ping)	Info	Separate	Con	nect	Back
Ordner		Config.		Info	Separate	Conr	nect	Back
Ordner	_	Config.	(ping)	Info			nect	Back
Ordner anlegen	_	],	(ping)					Back
Ordner anlegen	_	],	(ping)	Tool ec				Back
Ordner anlegen	_	],	(ping) urn	Tool ec		) 🖹 1		
Ordner anlegen		],	(ping) urn Network conf Control nam DHCP	Tool ec	jitor MANUALplus OFF -	620	ransfer	
Ordner anlegen		],	(ping) UIN Network conf Control nam DHCP IP address	Tool ec	iitor MANUALplus OFF _ 192 168	620 (888	ransfer	
Ordner anlegen		],	(ping) urn Network conf Control nam DHCP IP address Subnet mask	Tool ec	iitor MANUALplus OFF - 192 168 255 255	620 680 255	ransfer  000  000	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) urn Network conf Control nam DHCP IP address Subnet mask	Tool ec	iitor MANUALplus OFF - 192 168 255 255	620 680 255	ransfer  000  000	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	Kanal
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	Kanal
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	Kanal
Ordner anlegen		],	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	Kanal
Ordner anlegen	on active:	Smart. T	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	(000)	Back
Ordner anlegen	on active:	Smart. T	(ping) UITN Network conf Control nam DHCP IP address Subnet mask Broadcast	Tool ec	iitor MANUALplus OFF • 192 168 255 255 255 255	800 255 255	000 000 254	Kanal

Setting	Meaning	Input
Control name	Name under which the control is visible in the network	e.g. MANUALplus620
DHCP	OFF: The control has a fixed IP address in the network.	ON
	ON: The control automatically obtains the following data from a DHCP server:	
	IP address	
	Subnet mask	
	Broadcast	
	<ul> <li>Gateway</li> </ul>	
	i <b>nformation:</b> User's Manual MANUALplus 620 with software versions 548328-05 and 01	



Machine Parameters

## 13.1 Control-specific machine parameters

StateMonitor supports both the connection of HEIDENHAIN controls and of non-HEIDENHAIN controls.

When creating a new machine in StateMonitor, make sure to set the machine parameters required for the connection. The available parameters vary depending on the machine model and the control.

Further information: "Machine parameters", Page 184

### **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
TNC7	81762x-16
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

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

 The machine controls must be integrated in the local company network

Further information: "Network integration", Page 229

 Option 18 (HEIDENHAIN DNC interface) must be enabled on the HEIDENHAIN control

Further information: "Enabling Option 18", Page 227

#### Connection settings pull-down menu

In the definition table, you can define settings for the **PLC password** for HEIDENHAIN controls.

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.

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If you allow PLC access, the  $\ensuremath{\text{Program}}$  analysis chart will include the  $\ensuremath{\text{FMAX}}$  status bar.

Further information: "Program analysis chart", Page 93



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

Option	Meaning		
PLC Standard	The PLC is protected by the standard <b>PLC password</b> .		
	Access occurs automatically.		
No PLC	No access to the PLC.		
	If the machine manufacturer uses a PLC password of the day, then select <b>No PLC</b> . StateMonitor cannot then record any additional PLC information.		
OEM PLC	The machine manufacturer has issued his own PLC password (not with the iTNC 530).		

PLC Standard or OEM PLC options

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

If applicable, request it from the machine manufacturer and enter it into the input field.

- 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  $\geq$  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 =  $\geq$  100 %, then the machine status becomes dark green.

Rapid-traverse override	Feed-rate override	Feed-rate override	Feed-rate override
FMAX	F = 0%	0% < F < 100%	F ≥ 100%
FMAX = 0%	Machine	Machine	Machine
	status: Yellow	status: Yellow	status: Yellow
0% < FMAX < 100%	Machine	Machine	Machine
	status: Light	status: Light	status: Light
	green	green	green
FMAX ≥ 100%	Machine	Machine	Machine
	status: Dark	status: Dark	status: Dark
	green	green	green
scenarios, you ca default OVR for t	ot StateMonitor to customer an customize the configurati he Productive machine statu alay of light green and dark g	on of the us (transition	
Further informat	tion: "Customizing the config	guration of	

the default OVR", Page 191

#### No PLC option

If you select the  $\ensuremath{\text{No}}\xspace$  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 ≥ 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 ≥ 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 ≥ 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 HEIDEN- HAIN DNC	Select as default when creating a machine for the first time
Import of PLC words	Select only when the <b>Override settings</b> of the machine are incorrectly displayed in StateMonitor

#### Security settings pull-down menu

The configuration in the **Security settings** pull-down menu is optional and can be performed only if the user administration function is supported by the following HEIDENHAIN controls:

- TNC 128
- TNC 320
- TNC 620
- TNC 640
- TNC7
- CNC PILOT 620
- CNC PILOT 640
- MANUAL Plus 620
- Grind Plus 640

If you use an authentication for HEIDENHAIN controls, you first need to generate a key pair in StateMonitor.

The IP address and the remote user (e.g., oem) that has been created in the machine control are required for the generation of the key pair. After the new key pair has been generated, it is stored in StateMonitor.

To generate a key pair:

- In the Security settings pull-down menu, click the Generate key button
- > StateMonitor displays the Generate SSH key window.
- > Enter an internal name in the Key name (internal) field
- ► In the **Remote username** field, enter the name of the appropriately authorized remote user.
- Enter the password for the key pair in the Password field
- Click the Generate key button
- > StateMonitor generates the new key pair.

The oem user has access permission. However, this permission grants more rights than required for the access of StateMonitor to the control. It is therefore advisable to create a specific user with only the absolutely required permissions. The NC.DataAccessOEMRead right must be assigned to this user. The PLC.DataAccessOEMRead role or the PLC.DataAccessOEMRead role includes this right. In order to create a user with the appropriate permissions in the machine control, you need to consult your OEM because your OEM must enable these roles. After generation, you need to export the public key (\*.pub) of your new key pair from StateMonitor and import it into the respective machine control.

To export the public key:

- > In the **Key** drop-down list, select the key pair of the respective machine.
- Click the Download Public Key button
- Select the storage location
- Click the Save button
- > StateMonitor saves the public key to the selected location.
- Import the public key into the respective machine control



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

Since more than one key may have been stored in StateMonitor, an encrypted connection requires that you select the key pair that has been created for the respective machine.

To select a key pair:

- To activate the encryption, select the Activate SSH encryption checkbox in the Security settings pull-down menu
- > In the **Key** drop-down list, select the key pair of the respective machine.
- StateMonitor will encrypt the communication using the specified key pair.

#### Signal alarms pull-down menu

You can configure signal alarms for the signals that you evaluate in StateMonitor. To do so, you can define conditions for the comparison of the signal value with a comparison value. If a condition is met, then StateMonitor displays a signal alarm in the **Messenger** menu.

You can use the following parameters for the configuration of the signal alarms:

Parameter	Manda- tory field	Explanation	
#	$\checkmark$	Alarm number	
Name	1	Unique name	
Error group		Possible values:	
		None	
		operation	
		Programming	
		= PLC	
		General information	
		Remote	
		Python	
Error class		Possible values:	
		None	
		Warning	
		Feed rate stopped	
		Program stop	
		Program cancellation	
		Emergency stop	
		Reset	
		Info	
		Failure description	
		Note	
Link to signal	$\checkmark$	Selection of the signal	
Description		Additional information	
Data type		Data type of the signal	
		Possible values:	
		Number (number)	
		Text (string)	
		Boolean value (0 or 1)	

Parameter	Manda- tory field	Explanation	
Operator		<ul> <li>Selection of the operator for the comparison of a signal value and a comparison value (based on the selection in the Data type field)</li> <li>Possible values:</li> <li>EQUALS: Signal value is equivalent to comparison value</li> <li>CONTAINS: Signal value contains comparison value</li> <li>STARTSWITH: Signal value begins with comparison value</li> <li>LESSTHAN: Signal value is less than comparison value</li> <li>LESSTHANEQUAL: Signal value is greater than comparison value</li> <li>MORETHANEQUAL: Signal value is greater than or equal to comparison value</li> </ul>	
Value		Comparison value	
Create test notification		If this option is activated, then State- Monitor generates a test machine message when the machine alarm is saved	

The **Check parameter** button allows you to call the current value of the selected signal and start the comparison.

The **Export** button allows you to save the configured signal alarms to an XML file.

The **Import** button allows you to create new signal alarms in StateMonitor by importing the parameters from an XML file. The previously configured signal alarms remain unaffected by this.

## 13.3 Mapping of status parameters for different controls

When connecting a different control, you need to manually assign the control signals to each machine status. To do this, StateMonitor uses a definition table that assigns the respective machine status to the specifice control signals.

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 respective machine.



Despite the open standards of Modbus, OPC UA, and MTConnect, there 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.

When creating a new machine, make sure to set up this definition table with the corresponding parameters in the **Status parameters for mapping** pull-down menu.

#### 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 <b>Program interrupted by user</b> ( <b>PGM CANCELED</b> ) is defined, <b>Program</b> <b>interrupted by error (ERROR)</b> will terminate the current program. This triggers the <b>Interrupted by error</b> <b>message</b> counter and generates a notification
Program successful- ly completed (PGM COMPLETED / END PGM)	Program execution has been complet- ed successfully. This triggers the <b>Fully</b> <b>executed</b> program counter and gener- ates 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 interrupt- ed, but the program remains active and can be resumed
Program interrupted by user (PGM CANCELED)	Program execution has been abort- ed, the program cannot be resumed. This triggers the program counter and generates the <b>Program canceled by</b> <b>user</b> notification
Error acknowledged (ERROR CLEARED)	An error triggered with <b>Program inter-</b> <b>rupted by error (ERROR)</b> has been acknowledged again. The program status changes to <b>Interrupted</b> . The program can be resumed with <b>Program running (PGM START-</b> <b>ED / PGM RUNNING)</b> or aborted with <b>Program interrupted by user (PGM</b> <b>CANCELED)</b>
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 %
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 chang- ing to another program and restart- ing, 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 have saved the definition table in the **Status parameters for mapping** tab 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) data type does not have any value
  - Two signal parameters have the same address

## 13.4 Modbus parameters

#### Connection settings pull-down menu

In the definition table, you can define the following connection settings 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 parameters for mapping pull-down menu

For general information about the status parameters, please refer to see "Mapping of status parameters for different controls", Page 261.

In the expanded definition table (**Editing** button), you can map the control signals to status parameters.

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.

#### Editing the prioritization

In the **Status parameters for mapping** window of the expanded definition table (**Editing** button), you can edit the prioritization of the received program statuses and operating modes.

Prioritization will be considered only if more than one status parameter is pending. The defined prioritization determines which of the status parameters will have priority and will be taken into account in this case.

To edit prioritization:

- Click the Change priorities button
- StateMonitor opens the Prioritization for status parameter mapping window.
- In the drop-down list, select the status parameters for Mode of operation or Program status
- Enter the priority of the desired parameter in the respective field in the **Priority** column (values: 0 to 9)
- Close the window
- > The edited priorities are applied.

#### Signal alarms pull-down menu

You can configure signal alarms for the signals that you evaluate in StateMonitor. To do so, you can define conditions for the comparison of the signal value with a comparison value. If a condition is met, then StateMonitor displays a signal alarm in the **Messenger** menu.

You can use the following parameters for the configuration of the signal alarms:

Manda- tory field	Explanation
1	Alarm number
1	Unique name
	Possible values: None operation Programming PLC General information Remote Python
	tory field ✓

Parameter	Manda- tory field	Explanation	
Error class		Possible values: 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: Number (number) Text (string) Boolean value (0 or 1)	
Operator		<ul> <li>Selection of the operator for the comparison of a signal value and a comparison value (based on the selection in the Data type field)</li> <li>Possible values:</li> <li>EQUALS: Signal value is equivalent to comparison value</li> <li>CONTAINS: Signal value contains comparison value</li> <li>STARTSWITH: Signal value begins with comparison value</li> <li>LESSTHAN: Signal value is less than comparison value</li> <li>LESSTHANEQUAL: Signal value is less than or equal to comparison value</li> <li>MORETHAN: Signal value is greater than comparison value</li> <li>MORETHANEQUAL: Signal value is greater than comparison value</li> </ul>	
Value		Comparison value	
Create test notification		If this option is activated, then State- Monitor generates a test machine message when the machine alarm is saved	

The **Check parameter** button allows you to call the current value of the selected signal and start the comparison.

The **Export** button allows you to save the configured signal alarms to an XML file.

The **Import** button allows you to create new signal alarms in StateMonitor by importing the parameters from an XML file. The previously configured signal alarms remain unaffected by this.

# 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

Туре	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

Туре	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 COMPLET- ED / 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 parameters

#### Connection settings pull-down menu

In the definition table, you can define the following connection settings for OPC UA:

Default Namespace

Defines the default namespace to be used for the address

SIK:

Manual input

- NC software: Manual input
- Polling interval Interval for polling

#### Security settings pull-down menu

In the definition table, you can define the following connection settings for OPC UA:

#### Security Mode

Selection of authentication method, 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 214

#### User

Manual input of the authentication data

Password

Manual input of the authentication data

#### Endpoint Validation

Verification of the endpoint; deactivate only if connection problems occur

#### Status parameters for mapping pull-down menu

For general information about the status parameters, please refer to see "Mapping of status parameters for different controls", Page 261. In the expanded definition table (**Editing** button), you can map the control signals to status parameters.

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

#### BrowseType

Specifies the method being used for accessing the respective OPC UA parameter. StateMonitor distinguishes between the following methods:

- Unique ID with IdType
- Defined path with BrowsePath
- Unique ID with NodeldRef, which is entered in combination with the namespace

#### 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 the location in the selected memory area from which the value is to be read.

- If the BrowsePath option of BrowseType is selected, then you can use the Configure button to define the path to the memory area level by level. You need to make sure that the value of the Namespace parameter matches the value of the preceding BrowseName parameter in each case.
- If the NodeldRef option of BrowseType is selected, the address must be entered with the syntax ns='NamespaceIndex';'IdentifierType'='Identifier'. If the type of identifier is a number, an i is used; for a string, an s is used.

Examples: ns=2; i=3432 Of ns=5; s=Int16DataItem

#### Data type

Defines, among other things, how the value comparison will be performed. StateMonitor distinguishes between the following parameters:

- Value parameter of **Text (string)** data type
- Value parameter of Number (number) data type
- Boolean parameter of Boolean value (0 or 1) data type
- Calculated parameter of **Calculated value** data type

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For mapping, you can use calculated values to compile complex queries for parameters and formed constants.

**Further information:** "Formation of your own constants using the calculated values", Page 272

#### 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.

#### Formation of your own constants using the calculated values

In the Status parameters for mapping window in the expanded definition table (Editing button), you can use calculated values to define your own constants and compile complex gueries.

StateMonitor supports the following types of values:

Constant

Definition of a constant value for a calculation. You can use a constant for threshold values or comparisons.

Term

i

A logic operation combining Constant value types and/or controlspecific values types, resulting in a new value of a potentially different data type.

Possible logic operations are PLUS, MINUS, TIMES, DIVIDEBY, AND, OR, EQUALS, CONTAINS, STARTSWITH, and LESSTHAN

Control-specific value types

For assignment in the definition table, a calculated **Term** must be a term of the **Boolean** data type to ensure that a TRUE or FALSE guery can be used. If the calculated Term permits a different result, then the result must be simplified to the **Boolean** data type by processing it in another Term.

To define **Constant** value types or control-specific value types:

- Click the New calculated value button
- > StateMonitor opens the **Configure value** window.
- Specify the name of the new value
- Select the desired value type in the drop-down list
- Enter the parameters needed for the desired value type ►
- ► Click the **Create** button
- > The new value is added to the value table.

To define calculated values of the **Term** value type:

- Click the New calculated value button
- > StateMonitor opens the **Configure value** window.
- Specify the name of the new value
- Select the **Term** value type in the drop-down list ►
- Select the desired logic operation in the Values of operation ► drop-down list
- Select the desired operands for the operation in the list ►
- Click the **Create** button ►
- > The new value is added to the value table.

To use calculated values in the definition table:

- Select Calculated value in the Data type drop-down list in the row containing the desired parameter
- Select the desired calculated value in the Address drop-down list
- Click the **Close window and apply values** button

#### Editing the prioritization

In the **Status parameters for mapping** window of the expanded definition table (**Editing** button), you can edit the prioritization of the received program statuses and operating modes.

Prioritization will be considered only if more than one status parameter is pending. The defined prioritization determines which of the status parameters will have priority and will be taken into account in this case.

To edit prioritization:

- Click the Change priorities button
- StateMonitor opens the Prioritization for status parameter mapping window.
- In the drop-down list, select the status parameters for Mode of operation or Program status
- Enter the priority of the desired parameter in the respective field in the **Priority** column (values: 0 to 9)
- Close the window
- > The edited priorities are applied.

#### Signal alarms pull-down menu

You can configure signal alarms for the signals that you evaluate in StateMonitor. To do so, you can define conditions for the comparison of the signal value with a comparison value. If a condition is met, then StateMonitor displays a signal alarm in the **Messenger** menu.

You can use the following parameters for the configuration of the signal alarms:

Manda- tory field	Explanation
1	Alarm number
1	Unique name
	Possible values: None operation Programming PLC General information Remote Python
	tory field ✓

Parameter	Manda- tory field	Explanation
Error class Link to signal Description Data type	√	Possible values: None Warning Feed rate stopped Program stop Program cancellation Emergency stop Reset Info Failure description Note Selection of the signal Additional information Data type of the signal
		Possible values: Number (number) Text (string) Boolean value (0 or 1)
Operator		<ul> <li>Selection of the operator for the comparison of a signal value and a comparison value (based on the selection in the Data type field)</li> <li>Possible values:</li> <li>EQUALS: Signal value is equivalent to comparison value</li> <li>CONTAINS: Signal value contains comparison value</li> <li>STARTSWITH: Signal value begins with comparison value</li> <li>LESSTHAN: Signal value is less than comparison value</li> <li>LESSTHANEQUAL: Signal value is greater than comparison value</li> <li>MORETHAN: Signal value is greater than comparison value</li> <li>MORETHANEQUAL: Signal value is greater than comparison value</li> </ul>
Value		Comparison value
Create test notification		If this option is activated, then State- Monitor generates a test machine message when the machine alarm is saved

The **Check parameter** button allows you to call the current value of the selected signal and start the comparison.

The **Export** button allows you to save the configured signal alarms to an XML file.

The **Import** button allows you to create new signal alarms in StateMonitor by importing the parameters from an XML file. The previously configured signal alarms remain unaffected by this.

#### Machine reports pull-down menu

The **Machine reports** allow you to define the point at which machine messages are to be read out and recorded.

With OPC UA, you can also subscribe to machine signals.

Under Value subscriptions, you can subscribe to changes of an OPC UA node value. If there are new values, a machine message is displayed. With OPC UA, an address can even refer to an entire list (array) of messages. In this case, you need to define a separate machine message for each message of this list. To specify the address, you need to enclose each of the arrays to be read out within square brackets and append it to the address name.

Example of address: VSTR\_OPCMsgTexts[2]

- Under Machine event subscriptions, you can subscribe to a machine event that will then be displayed as a machine message. This includes a default event with the following parameters that subscribes to all events of the OPC UA server.
  - Name: Opcuaserver
  - BrowseType: IdType
  - Address: 2253
  - Namespace: http://opcfoundation.org/ua/
  - Address type: Numerical

Alternatively, you can also configure your own events, stating all parameters; thus, you always subscribe to the configured node and all subordinate nodes.

## 13.7 MTConnect parameters

#### Connection settings pull-down menu

In the definition table, you can define the following connection settings 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 the 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 with version 1.2 and later supports MT Connect schemas.

SIK:

Manual input

NC software:

Manual input

Polling interval

Interval 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 parameters for mapping pull-down menu

For general information about the status parameters, please refer to see "Mapping of status parameters for different controls", Page 261. In the expanded definition table (**Editing** button), you can map the control signals to status parameters.

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 distinguishes between the following parameters:

- Value parameter of **Text (string)** data type
- Value parameter of Number (number) data type
- Boolean parameter of Boolean value (0 or 1) data type
- Calculated parameter of Calculated value data type



For mapping, you can use calculated values to compile complex queries for parameters and formed constants.

**Further information:** "Formation of your own constants using the calculated values", Page 272

#### DataltemId

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.

#### Formation of your own constants using the calculated values

In the **Status parameters for mapping** window in the expanded definition table (**Editing** button), you can use calculated values to define your own constants and compile complex queries.

StateMonitor supports the following types of values:

Constant

Definition of a constant value for a calculation. You can use a constant for threshold values or comparisons.

Term

**i** `

A logic operation combining **Constant** value types and/or controlspecific values types, resulting in a new value of a potentially different data type.

Possible logic operations are PLUS, MINUS, TIMES, DIVIDEBY, AND, OR, EQUALS, CONTAINS, STARTSWITH, and LESSTHAN

Control-specific value types

For assignment in the definition table, a calculated **Term** must be a term of the **Boolean** data type to ensure that a TRUE or FALSE query can be used. If the calculated **Term** permits a different result, then the result must be simplified to the **Boolean** data type by processing it in another **Term**.

To define **Constant** value types or control-specific value types:

- Click the New calculated value button
- > StateMonitor opens the **Configure value** window.
- Specify the name of the new value
- Select the desired value type in the drop-down list
- Enter the parameters needed for the desired value type
- ▶ Click the **Create** button
- > The new value is added to the value table.

To define calculated values of the Term value type:

- Click the New calculated value button
- > StateMonitor opens the **Configure value** window.
- Specify the name of the new value
- Select the Term value type in the drop-down list
- Select the desired logic operation in the Values of operation drop-down list
- Select the desired operands for the operation in the list
- Click the Create button
- > The new value is added to the value table.

To use calculated values in the definition table:

- Select Calculated value in the Data type drop-down list in the row containing the desired parameter
- Select the desired calculated value in the **DataItemId** drop-down list
- Click the Close window and apply values button

#### Editing the prioritization

In the **Status parameters for mapping** window of the expanded definition table (**Editing** button), you can edit the prioritization of the received program statuses and operating modes.

Prioritization will be considered only if more than one status parameter is pending. The defined prioritization determines which of the status parameters will have priority and will be taken into account in this case.

To edit prioritization:

- Click the Change priorities button
- StateMonitor opens the Prioritization for status parameter mapping window.
- In the drop-down list, select the status parameters for Mode of operation or Program status
- Enter the priority of the desired parameter in the respective field in the **Priority** column (values: 0 to 9)
- Close the window
- > The edited priorities are applied.

#### Editing tools, Mapping pull-down menu

In the expanded definition table (**Editing** button), you can map the tool life-cycle data data to status parameters.

The following information is required for the mapping of the editing tools:

#### Source

Defines where the DataItemId is read. StateMonitor distinguishes the following source options:

- Capturing value parameters from an event Event
- Capturing value parameters from an asset Asset

#### DataltemId

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

#### Signal alarms pull-down menu

You can configure signal alarms for the signals that you evaluate in StateMonitor. To do so, you can define conditions for the comparison of the signal value with a comparison value. If a condition is met, then StateMonitor displays a signal alarm in the **Messenger** menu.

You can use the following parameters for the configuration of the signal alarms:

Parameter	Manda- tory field	Explanation
#	$\checkmark$	Alarm number
Name	$\checkmark$	Unique name

-
_

Parameter	Manda- tory field	Explanation
Error group		Possible values:
		None
		operation
		Programming
		= PLC
		General information
		Remote
		Python
Error class		Possible values:
		None
		Warning
		Feed rate stopped
		Program stop
		Program cancellation
		Emergency stop
		Reset
		■ Info
		Failure description
		Note
Link to signal	$\checkmark$	Selection of the signal
Description		Additional information
Data type		Data type of the signal
		Possible values:
		Number (number)
		Text (string)
		Boolean value (0 or 1)

Parameter	Manda- tory field	Explanation	
Operator		Selection of the operator for the comparison of a signal value and a comparison value (based on the selec- tion in the <b>Data type</b> field) Possible values:	
		<ul> <li>EQUALS: Signal value is equivalent to comparison value</li> </ul>	
		<ul> <li>CONTAINS: Signal value contains comparison value</li> </ul>	
		<ul> <li>STARTSWITH: Signal value begins with comparison value</li> </ul>	
		<ul> <li>LESSTHAN: Signal value is less than comparison value</li> </ul>	
		<ul> <li>LESSTHANEQUAL: Signal value is less than or equal to comparison value</li> </ul>	
		<ul> <li>MORETHAN: Signal value is greater than comparison value</li> </ul>	
		<ul> <li>MORETHANEQUAL: Signal value is greater than or equal to comparison value</li> </ul>	
Value		Comparison value	
Create test notification		If this option is activated, then State- Monitor generates a test machine message when the machine alarm is saved	

The **Check parameter** button allows you to call the current value of the selected signal and start the comparison.

The **Export** button allows you to save the configured signal alarms to an XML file.

The **Import** button allows you to create new signal alarms in StateMonitor by importing the parameters from an XML file. The previously configured signal alarms remain unaffected by this.

#### Machine reports pull-down menu

The **Machine reports** allow you to define the point at which machine messages are to be read out and recorded.

In the expanded definition table (**Create** button), you can map the corresponding address to the machine messages.

## 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 information, 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

MTConnect allows you to 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, then StateMonitor opens a new tab in the browser with the XML data that are 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 will be queried on theMTConnect 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 COMPLET- ED / 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	

## 13.9 FOCAS parameters

For the use of FOCAS you need access to the control via Ethernet (TCP). StateMonitor uses the following methods to determine the status:

- statinfo method (for the status)
   CNC control series 0i, Model B/C/D/F
   CNC control series 15i (except turning)
   CNC control series 16i, 18i, 21i, 30i, Model A/B
- rdpmcrng method (for overrides)
   CNC control series 0i, Model B/C/D/F
   CNC control series 15i (except turning)
   CNC control series 16i, 18i, 21i, 30i, Model A/B
- exeprgname method (for the program name)
   CNC control series 0i, Model D/F
   CNC control series 30i, Model A/B

#### Connection settings pull-down menu

In the definition table, you can define the following connection settings for FOCAS:

Port

Number of the network port over which the FOCAS service of the 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 Interval for polling

#### Status parameters for mapping pull-down menu

For general information about the status parameters, please refer to see "Mapping of status parameters for different controls", Page 261. In the expanded definition table (**Editing** button), you can map the control signals to status parameters.

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

#### Address type

Indicates the number of the PNC address. 0: G (Signal to PNC -> CNC)

#### Data type

Indicates the characteristics of a variable. The following values are possible:

- BYTE
- WORD
- LONG
- REAL
- LREAL
- Start address, End address States the start and end PNC addresses

#### Address length

Specifies the address length.

#### Comparison value for operating mode

States the operating modes and is possible only for operating modes. The following values are possible:

- 0: MDI
- 1: Memory (default)
- 3: Edit
- 4: Handle (default)
- 5: Jog (default)
- 6: Teach in Jog
- 7: Teach in Handle
- 8: INC Feed
- 9: Reference
- 10: Remote
- Current value



Help, Tips and Tricks

## 14.1 Operating Instructions in StateMonitor

You can call the PDF file with the Operating Instructions of StateMonitor by selecting **Help** on the submenu bar.

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

To update the Operating Instructions:

- Download the current version in the desired language from www.heidenhain.com
- 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	All	The execution of a program line in MDI mode is registered as <b>Productive</b> . This behavior is not compatible with NCK controls, such as the TNC 620 or TNC 640 because these do not transfer program executions in MDI mode as <b>Productive</b> . The behavior of the iTNC 530 can be adapted to the NCK controls by means of a property in the application.properties file.	<ul> <li>For this purpose, add the following entry in the [Installationsordner]\config \properties\application.properties file:</li> <li>AppConfig.DisableDataForTncInMDI = true</li> <li>To apply the change, restart StateMonitor</li> </ul>
iTNC 530	340492-06 340492-07	The override settings of the machine are not transmitted in detail to StateMonitor. StateMonitor always shows the <b>Productive</b> machine status in light green, no matter whether the feed- rate override is larger than or equal to 100% or less.	Select the checkbox for the Import of PLC words option 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	<ul> <li>Update the control software to version 340560-05</li> </ul>

## 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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