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Brummer
Elektromaschinenbau GmbH

Operating instructions / Operating manual

AB20-0255 Mohn GmbH

DLWA-280 BS2

Machine number 20-64705/1482

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1 FOREWORD / SAFETY INSTRUCTIONS

Preface

The craft business Brummer Elektromaschinenbau GmbH is a traditional family company and your competent partner for drive and control technology. Moreover, we realise software solutions for automation technology through the application of innovative technologies.

Apart from processing, planning and construction of PLC controls, we also take care of process visualisation and can implement remote maintenance. The software solution for system and machine controls is developed by us using various engineering tools (e.g. Step 7 classic, Step 7 TIA Portal, Graph...) thus making possible project implementation from one provider.

We always strive to use new technologies and to realise optimisation of our processes.

Content and purpose of this document

This user manual helps to clearly show the menus and possibilities of the control system which are possible to operate and observe the processes of the washing system. Likewise, any notes which are useful for the safety with regard to status and error messages can be taken from this document.

Targeted persons

This user manual is intended for the respectively qualified, trained and instructed operating personnel. It serves to professionally and safely operate the control systems described in this document. In addition, this user manual can be used by authorised personnel to complement already existing documents to provide training in the operation of the system.

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Warranty

Guarantee, warranty or liability claims going beyond the contractually agreed scope cannot be made based on the following description.

Storage

This document must be stored carefully. During the entire operation time of the control system, it must be made available and accessible to the operating personnel.

Maintenance

Notice	For maintenance and servicing of individual components we refer to the documentation of respective manufacturers in the equipment manual.
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Further assistance / contact

In case of questions about the usage of the control system described in the user manual please contact the company Brummer Elektromaschinenbau GmbH.

Tel: +49 4638 89 88 11

Fax: +49 4638 89 88 12

Ferdinand-Porsche-Ring 13

24963 Tarp

Email: info@brummer-tarp.de

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2 GENERAL SAFETY NOTES

2.1 Fundamental safety instructions

Notice	The safety instructions covered in the following chapters are complementary and part of the superordinate overall operation safety instructions by the operating company.
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2.2 Warning instructions and symbols

In the user manual, the following designations and symbols are used for reference to particular important information:

Notice	General information and instructions about the correct, appropriate application for the operation and usage of the system
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<p>SAFETY INSTRUCTIONS</p> 	Special particulars or obligations and prohibitions on damage prevention
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2.3 Principle, intended use

Basically, all safety rules and standards of the national authorities and their bodies are binding.

This control is designed according to the latest state of the art and recognized safety-related rules. However, a risk to life and limb of the user or of third parties or impairments of the system and other material assets may occur.

Therefore it has to be observed that the control has to be used in a technically perfect condition both as intended and safely and aware of the dangers taking into consideration this user manual. In particular, malfunctions which may impair safety must be rectified immediately.

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The control has to be used only for its intended purpose with the corresponding components. Any other or exceeding use is considered to be improper use. The manufacturer / supplier does not take any liability of damages resulting from improper use. In case of improper use, the operator is solely responsible for the risk. Intended use also includes compliance with the operating manual and adherence to any inspection and maintenance conditions.

2.4 Organisational measures

The operating manual has to be always and completely kept readily available at the place of use. In addition to the operating manual, generally valid, legal and other binding regulations on accident prevention and environment protection are to be complied with by the operating company. The operating manual is complemented through the operating company by instructions, including surveillance and reporting duties for consideration of operational specifics.

Prior to starting work on the system, the assigned personnel must have **read** and **understood** the operating manual, especially the chapters on safety instructions. This applies in particular to personnel working only occasionally on the system, e.g. for maintenance and cleaning.

Without prior approval by the supplier, no changes affecting the safety or extensions or conversions of the control must not be carried out. This also applies to the installation and adjustment of safety devices and valves. Any programme changes (software) to programmable control systems are forbidden.

2.5 Selection of personnel and qualifications, basic duties

Works on or with the control may be carried out only by reliable, trained personnel. The minimum legal age has to be observed. Only trained and instructed personnel may be used for the operation and control. Responsibilities of the personnel for operation, maintenance and repair must be clearly specified by the operating company. Only assigned personnel may work on the system.

A person responsible for the control must be determined. It must be made possible for this person to deny any third party instructions that impair safety.

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Personnel who have to be trained, instructed or who are undergoing general training may only work on the system under constant supervision of an experienced person. Work on electrical installations of the system may only be carried out by a qualified electrician or by instructed persons under the guidance and supervision of a qualified electrician, in accordance with the electro-technical regulations.

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3 SYSTEM DESCRIPTION

All operating steps of the system control and the corresponding visualisation take place in an individually set up user interface.

The following programme versions have been used:

Siemens Step 7 Professional V16 and WinCC flexible V16

3.1 System start

A Siemens CPU 1214C DC/DC/DC is in use for the control of the system. The SIMATIC SIEMENS TP700 Comfort enables monitoring and control of all control systems and processes of the system.

3.2 Operating competencies

Depending on the assigned rights, various comprehensive control processes can be carried out on the user interface. These include both the mere system monitoring, the usual control processes and control operations for normal operation, the administration functions of manual operation and the settings for the touch panel.

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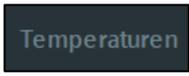
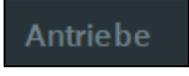
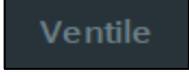
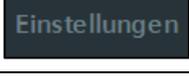
4 PROGRAMME FUNCTIONS

The individual programme elements, masks, symbols, buttons as well as operation/function windows are described. Tapping the touch display with a finger or a touch display pen enables selection / deselection of function windows, function buttons and operating buttons.

4.1 Operating buttons and functions

Table 1 explains the used operating buttons of the programme and the corresponding functions. The functions are triggered by touching the operating buttons.

Table 1: Explanation of the operating buttons and the corresponding functions, triggered by touching them.

Operating button	Function
	Opens the general overview of the system
	Opens the overview of temperatures
	Opens the overview of drives
	Opens the overview of valves
	Opens the overview of dosage
	Opens the overview of general settings
	Resets the day counter of the box counter
	Opens the Slide-down menu
	Opens the overview of the diagnosis

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	Opens further settings
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4.2 Background colour

The background colours used for status displays in the programme and their meaning are explained in Table 2.

Table 2: Status colours used and their meaning

Symbol	Meaning
	Status colour for “in production”
	Status colour for “paused”
	Status colour for “stopped/malfunction”

4.3 Status bar

The status bar shows the customer name and thereunder the items of status and operator.



Figure 1: Display of the status bar.

Via the three menu items next to the displays you get to the next level in order to select the operating mode or the user login.

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4.4 Operating mode and operating mode selection

Via the three menu items next to the status in the status bar, the pop-up window “Operating mode” will open. Here it has to be selected in which operation the system shall be run. Via the button Start, Stop and Reset, the operation can be controlled. The same buttons are located also as hardware on the control cabinet.

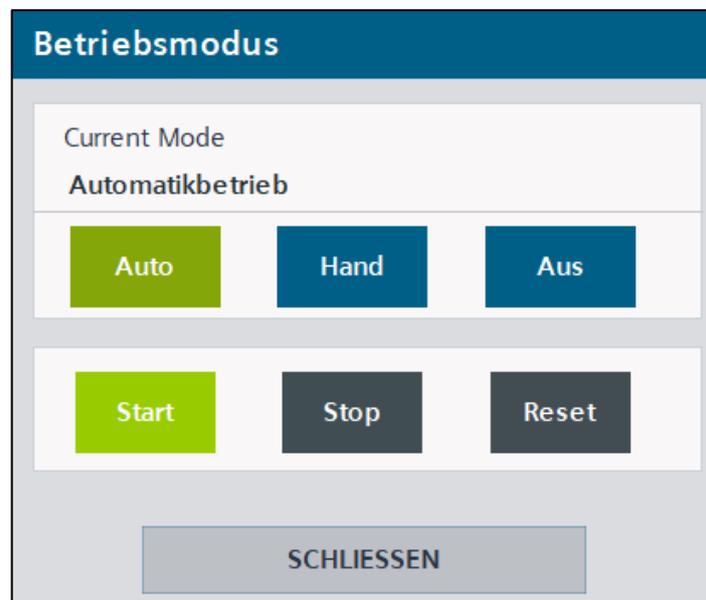


Figure 2: The pop-up window “Operating mode” shows in which mode the system is currently in and it can also be used to adjust and control the system.

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It is particularly important that between swapping the operating mode the system is always turned off via the button “Off”.

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4.5 Overview

The overview mask provides a general overview about the tank, boiler and some general information. In the upper part, the current temperatures of the tank and boiler can be read. Furthermore, the field “ON” appears in the tank if the tank is currently being heated. The same applies to the boiler heater.

Beneath are the status displays which indicate what processes are currently running or what preconditions are fulfilled for the operation.

On the right part of the overview, the current time as well as the number of the total and day counter are located in the information field. Via the three points you get to the further overview of the counters.

Below this field it can be recognised what operating mode is currently selected and if the system is correspondingly switch On or Off.

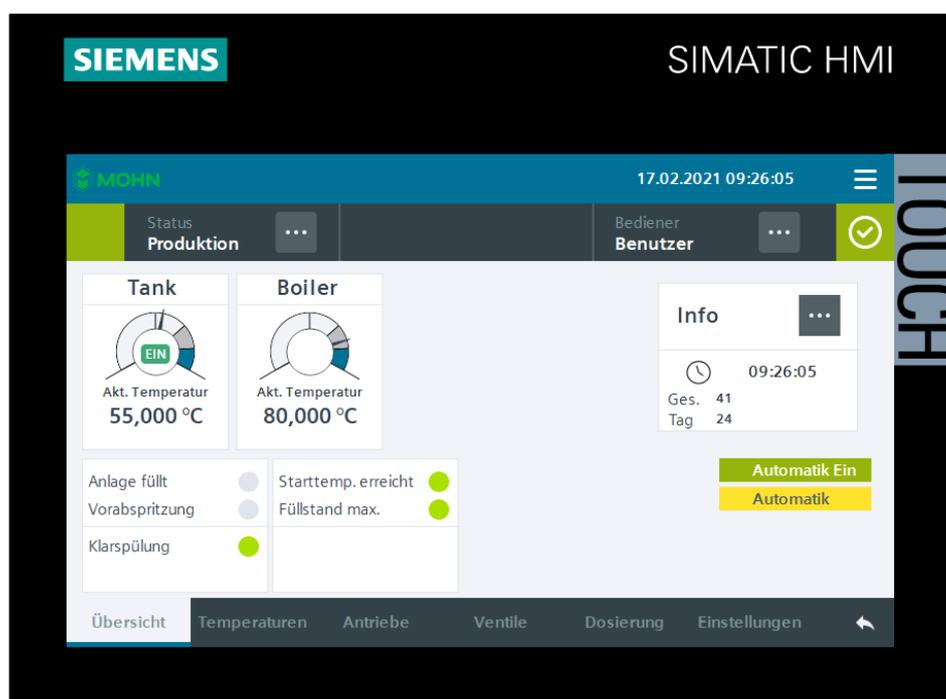


Figure 3: General overview of the system.

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4.6 Temperatures

Via the temperatures tab, you get to the temperature overview for the tank and boiler. Here you can read off the respectively current temperatures, and the target and hysteresis temperatures can be set. If the heating function for the tank is currently active, the field “ON” will appear in the tank. The same applies to the boiler.

Via the three points in the tank field, a pop-up window appears to set the alert thresholds. So once the temperature is outside this range, an error message appears on the system. The alert thresholds are in function in the active automatic mode only.

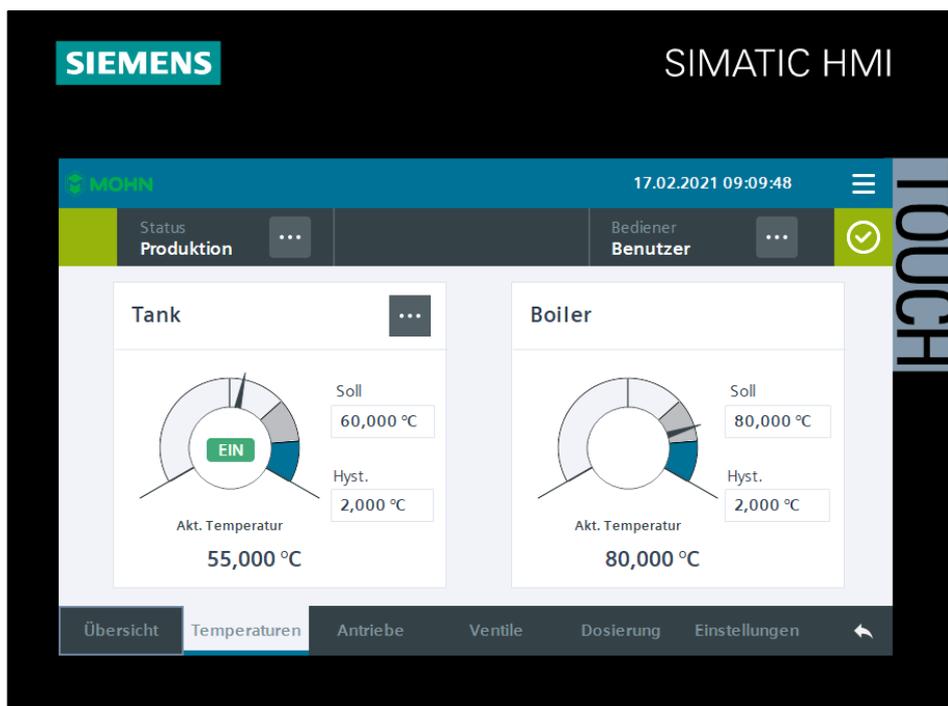


Figure 4: Overview of temperatures.

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The system can only be started when the target temperature of the tank does not fall below more than 10°C.

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4.7 Drives

Via the drives tab, the overview of the drives opens. Here the respectively further settings of the desired drive can then be called up.

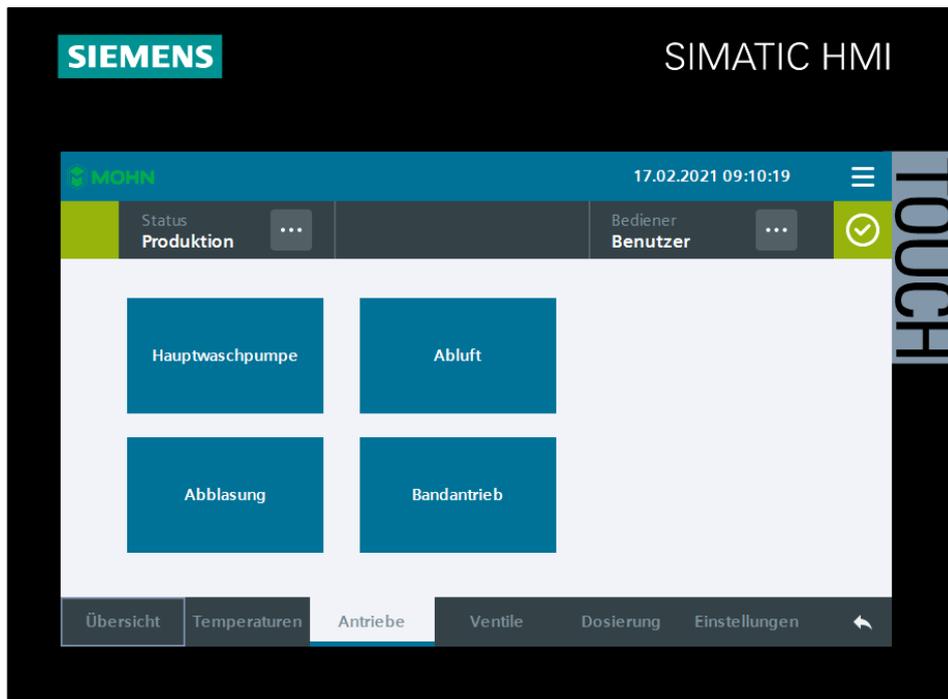


Figure 5: Overview of the drives.

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4.7.1 Main washing pump

In the overview of the main washing pump, the current speed as well as the target speed can be recognised. The reference speed is a manufacturer-specific speed which can also be changed by the manufacturer only. Moreover, the current status of the converter and the achieved operating hours can be read off.

Depending on whether the drive is released, the switch-on inhibit is set or a defect is present, the corresponding field is highlighted in colour.

Via the Start and Stop buttons, the drive can be controlled in manual mode.

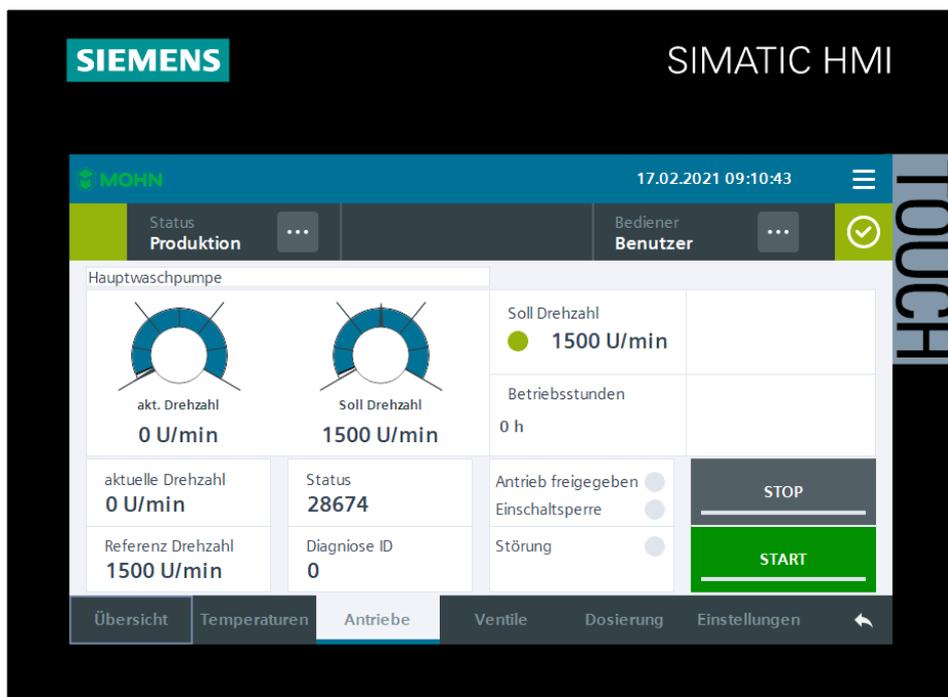


Figure 6: Further information about the main washing pump.

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4.7.2 Exhaust air

The same information as with the main washing pump (see 4.7.1) can be taken from the overview of exhaust air.

Via the selection area of the left margin, you can select between exhaust air 1 and exhaust air 2.

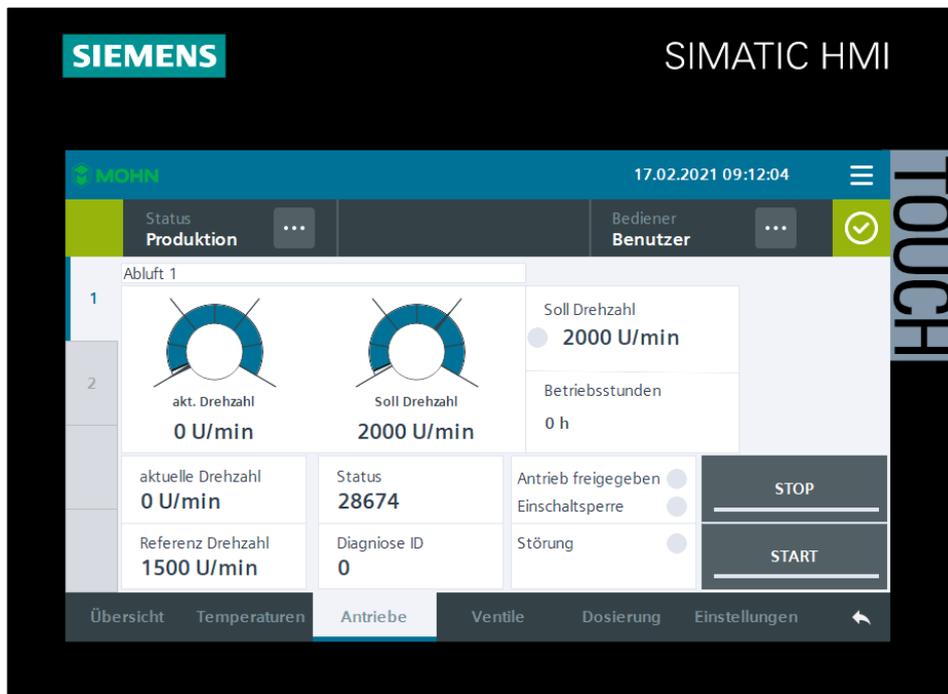


Figure 7: Further information about exhaust air.

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4.7.3 Blow down

The same information as with the main washing pump (see 4.7.1) can be taken from the overview of blow down.

Via the selection area of the left margin, you can select between blow down 1 and blow down 2.

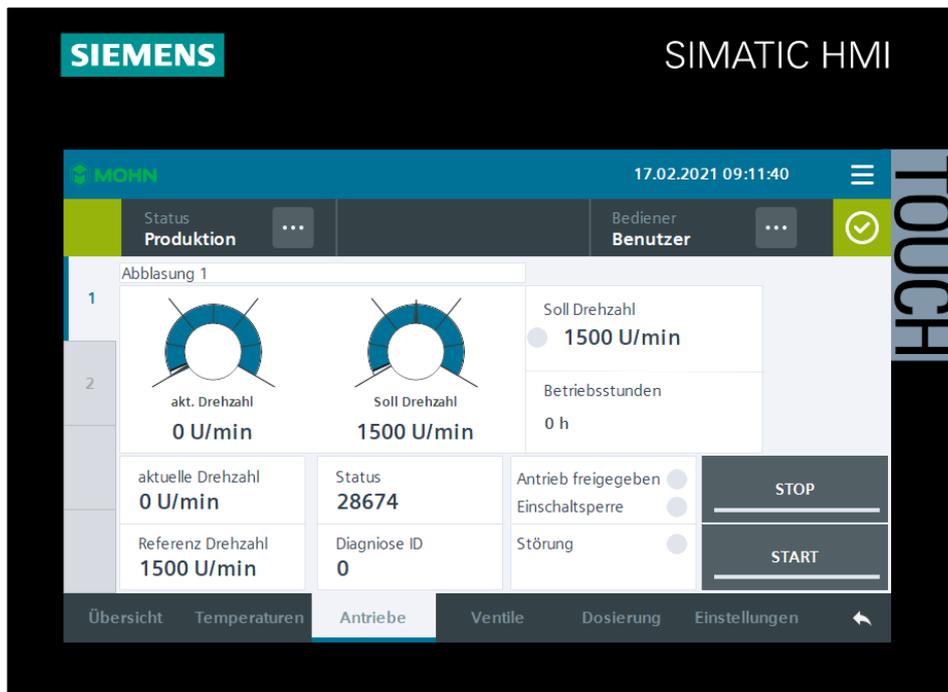


Figure 8: Further information about blow down.

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4.7.4 Belt drive

The same information as with the main washing pump (see 4.7.1) can be taken from the overview of belt drive.

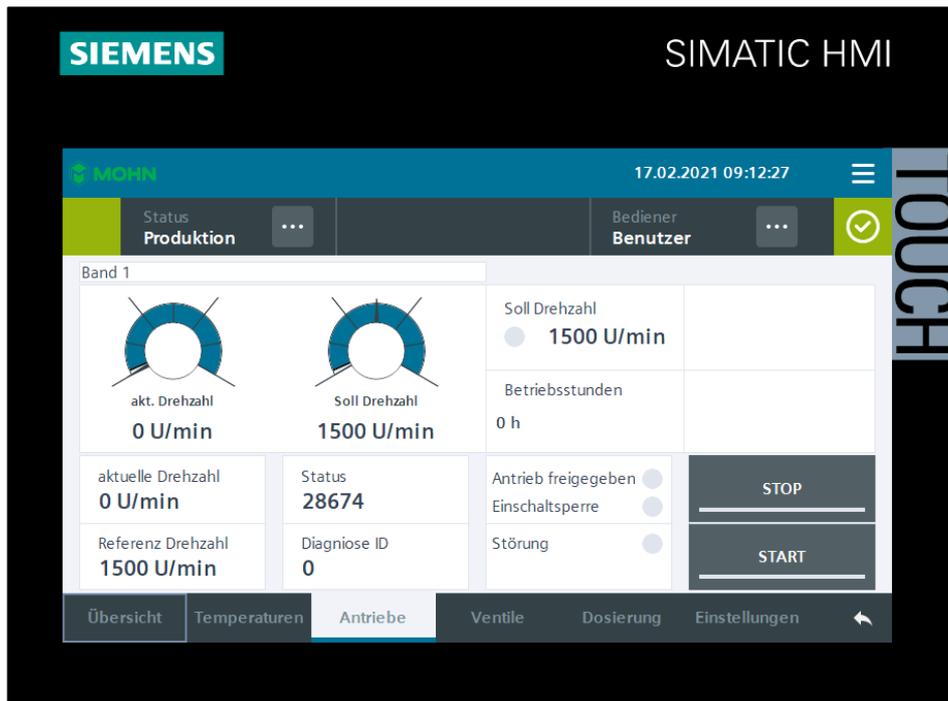


Figure 9: Further information about belt drive.

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4.8 Valves

In the overview of valves, the relevant status of pre-jetting, fill function of the tank and clear rinsing is shown. Moreover, these three can be operated via the overview in manual operation.

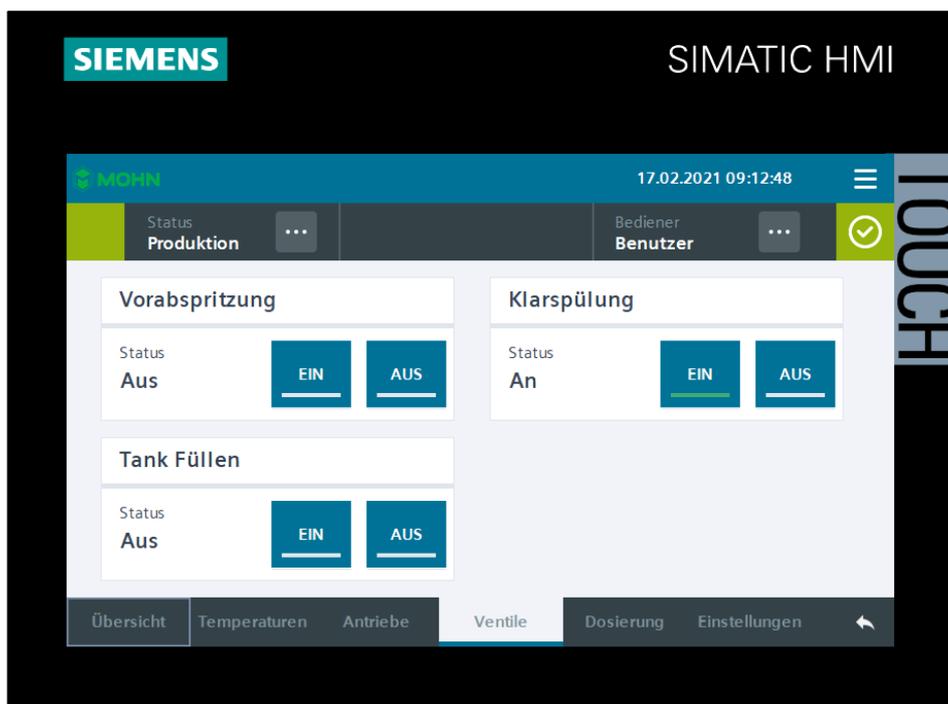


Figure 10: Overview of valves.

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4.9 Dosing

Via the overview of dosing, the current guide value of the tank can be read off. Moreover, the upper and lower threshold of the value can be set. Once the minimum value has been achieved, the rinsing agent pump doses correspondingly until the maximum value has been achieved again.

In the right section of dosing there is the display of the additive pump. In order to start it there is the prerequisite that the maximum filling level is present. Via the Start and Stop buttons, the pump can be correspondingly started, with the total running time and the relevant remaining time given in full minutes when the pump was started. Operation of the additive pump can be interrupted at any time. Should it then be started again, the running time will start from the beginning, however.

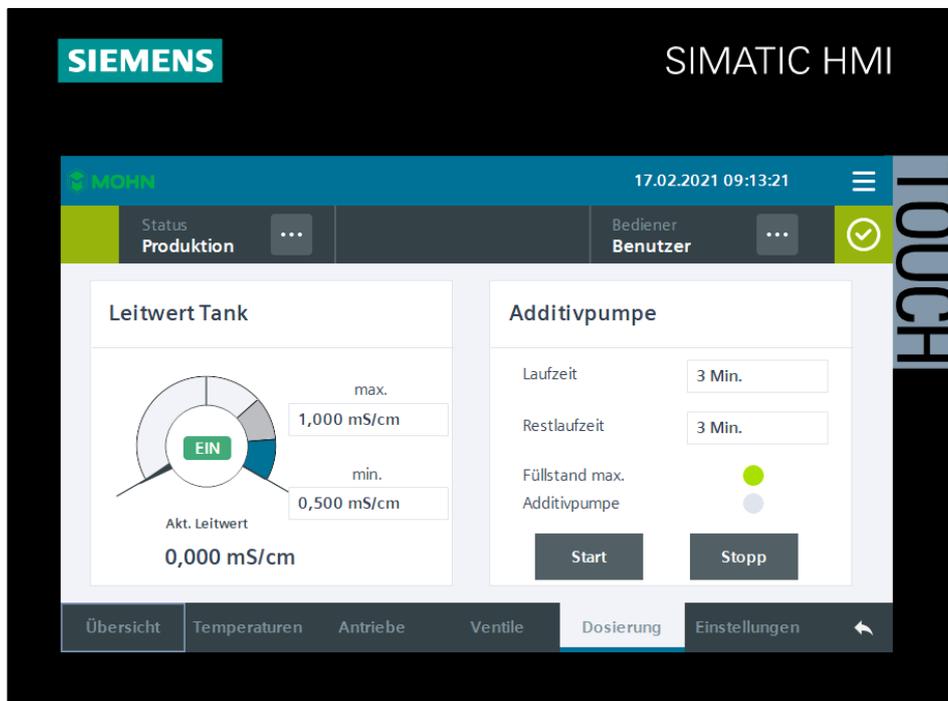


Figure 11: Overview of dosing.

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4.10 General settings

Via the settings tab, the general settings will open. Here it has to be selected whether the rinsing agent pump, the pre-jetting and clear rinsing shall be in operation while automatic mode is running.



Figure 12: General settings.

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4.11 Counter setting

In the general settings, “CT” can be selected in the left margin. About this, the settings of the counters will open. On the one hand, the total number of the box counter can be read off and the day counter on the other hand. Via the reset button, the day counter can be correspondingly reset.

On the right side, there are located the operating hours of the individual drives. Should one of the drives be replaced, for example, the operating hours have to be reset by the manufacturer.

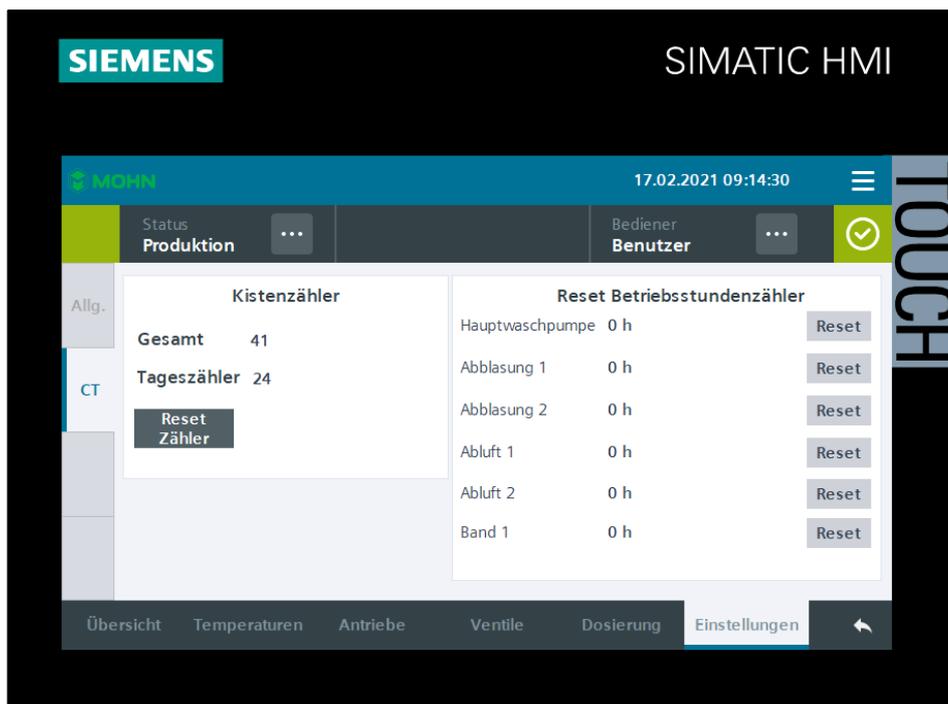


Figure 13: Settings of the counters.

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4.12 System settings

Via the button with the 3 bars, the slide-down menu will open. About this, the system settings for the display, the message history and the user administration can be opened.

4.12.1 Display

In this mask, the brightness of the display and the current time as well as the date can be set. The option of language conversion is not available.

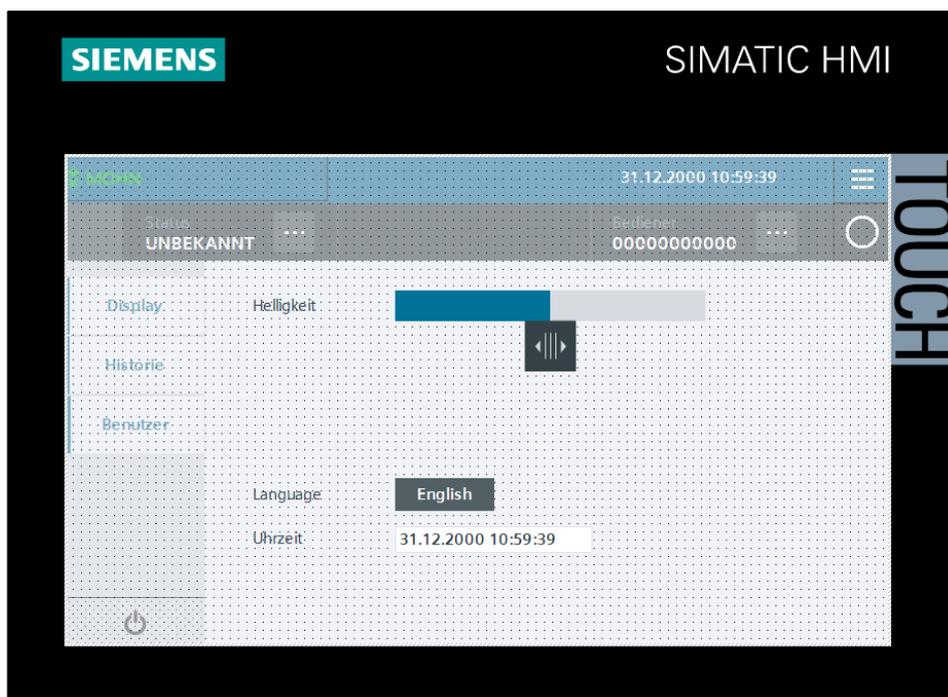


Figure 14: Overview of display settings.

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4.12.2 History

The History tab contains an overview of all activities of the system.

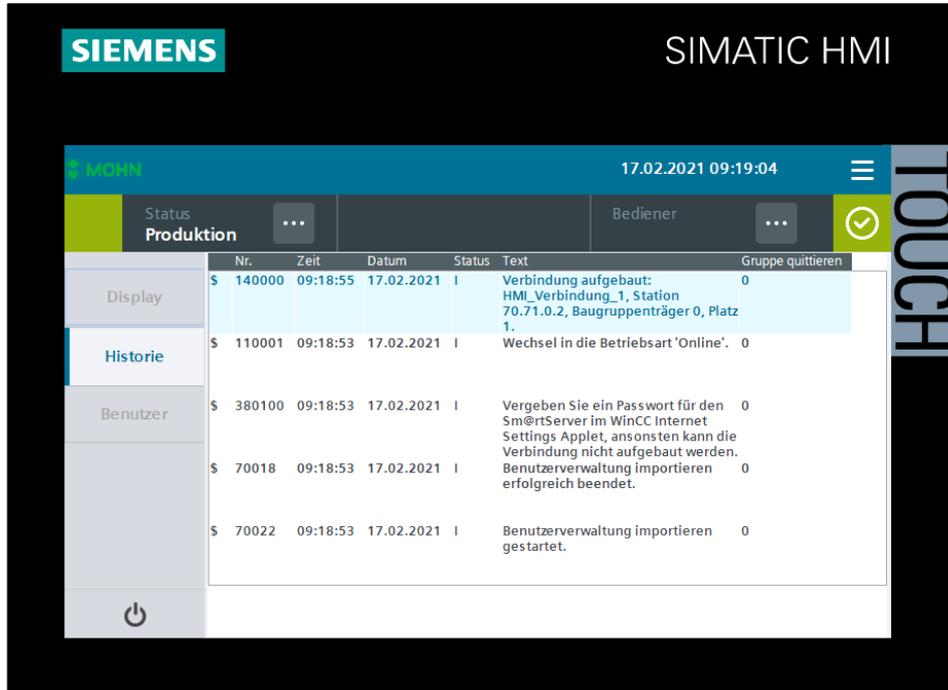


Figure 15: Overview of malfunctions and messages.

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4.12.3 Users

The Users tab opens the user administration. Here the various users for operating the system are listed. Here you can manage rights, create new users or delete users. This is only possible, however, as long as one is logged in with administrator rights.

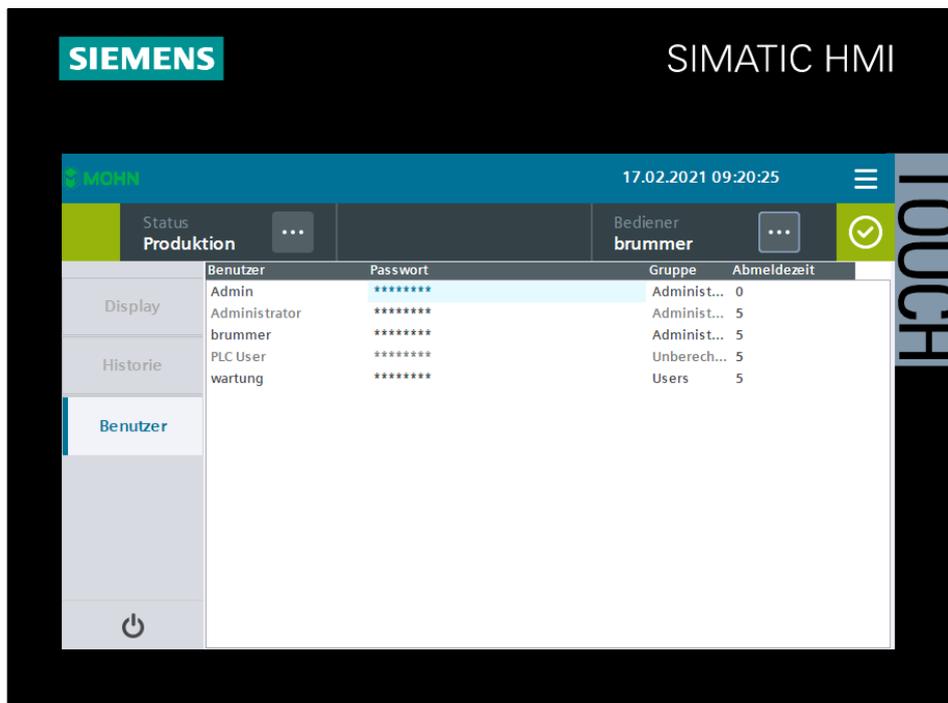


Figure 16: Overview of user administration.

Users: maintenance

PW: 1482

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4.13 Messages

In the overview of malfunctions and messages, you get an info text about the malfunction via the question mark. Once the error is solved and the system reset, the message will be removed.

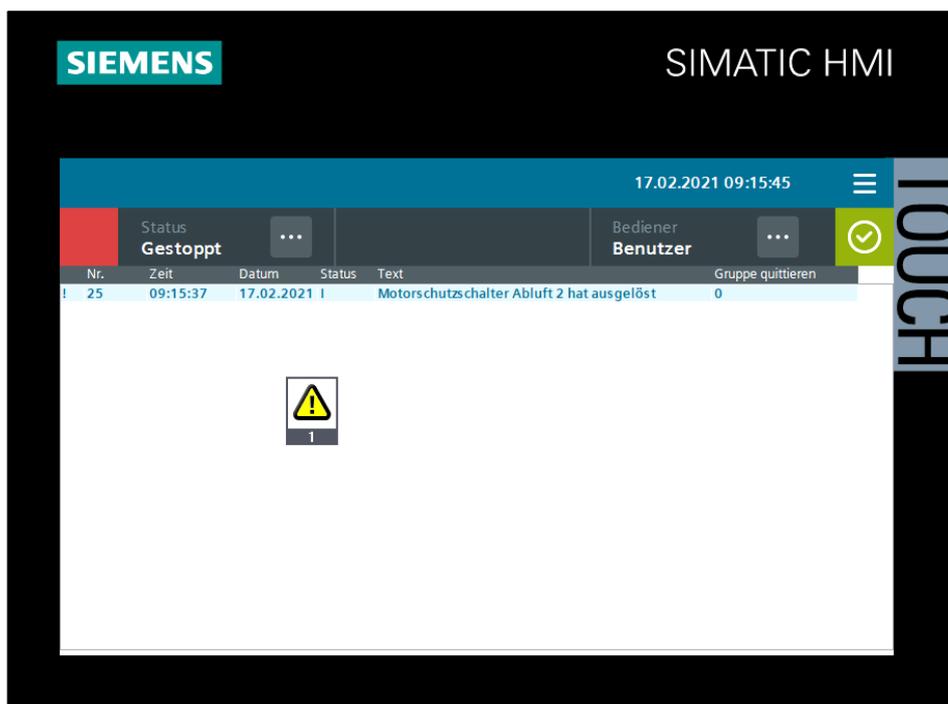


Figure 17: Overview of messages with an active malfunction.

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4.14 Diagnosis

Via the item "Diagnosis", the overview of diagnosis opens. Via this function, a system diagnosis of the hardware can be found which is not relevant for the operator.

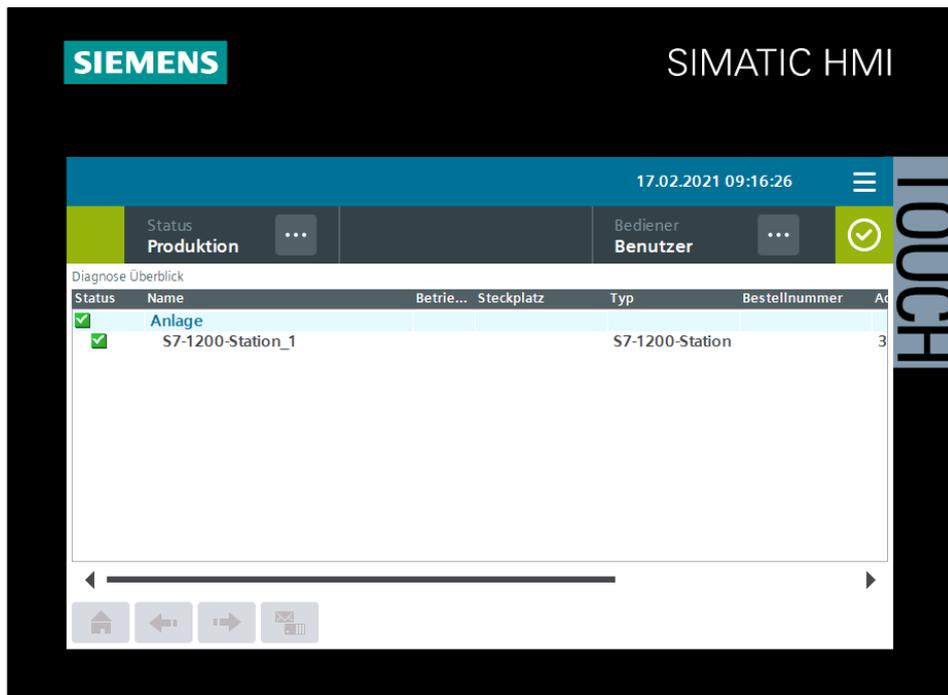


Figure 18: Overview of the hardware diagnosis.

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5 DISPLAY OF FAULTS AND MESSAGES INCLUDING TROUBLESHOOTING

Table 3: Alarm texts in case of malfunctions/faults with corresponding possible causes and remedial action to be done

No.	Alarm text	Info text	Remedial action
1	Emergency-stop button is operated.	Possible for: Outlet Roof Infeed Control cabinet	Ensure that no danger exists. Unlock the emergency-stop button and switch on the system again.
2	Emergency-stop window 1 / 2 is open.		Close window. Switch on the system.
3	Control voltage missing		Close the cover or switch on the control voltage via the blue button.
4	Malfunction of rinsing agent pump	The rinsing agent pump does not report a ready for operation signal.	Check the rinsing agent pump and eliminate the malfunction, if necessary. After that, the fault can be acknowledged and the system be started up again.
5	Motor protection switch has triggered	Possible for: Blow down 1 + 2 Exhaust air 1 + 2 Belt 1 Main washing pump	Check the motor and frequency converter and eliminate the malfunction, if necessary. After that, the fault can be acknowledged and the system be started up again.
6	Frequency converter malfunction	Possible for: Blow down 1 + 2 Exhaust air 1 + 2 Belt 1 Main washing pump	Check the motor and frequency converter and eliminate the malfunction, if necessary. After that, the fault can be acknowledged and the system be started up again.

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7	Dry-run protection tank	There is not sufficient water in the tank.	Close all drains on the tank. Check water supply and filler valve. After eliminating the fault, it can be acknowledged and the system be started up again.
8	Fuse blow	Possible for: Heater 1 Boiler 1 Heater 1 Tank 1 Heater 2 Boiler 1 Heater 2 Tank 1 Heater 3 Tank 1 Rinsing agent pump	Check the heater or the rinsing agent pump. Switch on the fuse again. After eliminating the fault, it can be acknowledged and the system be started up again.
9	Start temperature has undershot for more than 4 minutes		Check the heater and heating valves. After eliminating the fault, it can be acknowledged and the system be started up again.
10	Alert threshold for temperature alarm "min"/"max" has been reached	The alert thresholds deposited in the temperature settings have been exceeded or fallen short of.	Check the heater and heating valves. After eliminating the fault, it can be acknowledged and the system be started up again.
11	Excess voltage device has triggered	The excess voltage device has triggered.	Check the power supply of the system. Measures on the excess voltage device have to be carried out, if necessary. For this purpose, the manufacturer specifications have to be observed.
12	Belt overload belt 1	The mechanical belt overload rocker has triggered.	Remove possible mechanical blockages on the belt drive and the chain. Check the proximity switch of the belt overload rocker. After that, the malfunction can be reset and the system restarted.