

Electric steam generator NDD 18



Original operating instructions

Title	Original operating instructions Electric
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Product	steam generator NDD 18
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Subject to change.

Suggestions and hints ... for this documentation, please contact the address given above.

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1.2 Machine type plate

The machine type plate is mounted on the control panel.



Sample of the machine type plate

Information about the type plate

Title	Value	Explanation
Type	NDD 18	Describes the machine type.
No.	2.001.XXX	This is the machine number
Year of construction	XX-XXXX	Specifies the month and year of construction of the machine.
Operating pressure	3.0 bar	This is the operating pressure with which the machine works.
Test pressure	5.5 bar	This is the pressure with which the system was tested.
Water content	10 Ltr	This is the maximum water content for the pressure vessel.
Voltage	400/50 V/Hz	Describes the electrical chip values.
Performance	18/32 kW/A	Describes the electrical readings.
Steam	24 kg/h	Specifies the maximum amount of steam in kg/h.



Here you can find the EC Declaration under the Pressure Equipment Directive:

Certificate

on the water pressure test of a group 1 — class I/II electric steam generator. The company's electric steam generator, as indicated below on the name plate;

Dino Maschinenbau GmbH, Bremen

Type boiler No. Year
 construction
 Water content
 Betr. overpressure

complies with the requirements of the pressure equipment Directive DGRL 97/23 EC of 29.05.2002 and is in a grouped state a water pressure test with⁸.....³.....bar has been subjected to no complaints.

This certificate is a valid proof form for the Trade Inspectorate (plus the name plate on the appliance) for the class 1/2 electric steam boiler according to DGRL 97/23 EC Annex II/Diagr. 5. The enclosed boiler construction drawing is pre-tested and approved by TÜV-Norddeutschland e.V. Hamburg.

Please keep this certificate carefully and present it at the request of the competent labour inspectorate.

Dino Maschinenbau GmbH

.....
Signature factory

.....
Bremen, date

Model of the EC Declaration under the Pressure Equipment Directive



- Validity (page 10)
- Illustrations (page 10)
- Abbreviations used (page 10)
- Highlighting in the text (page 11)

This product is a machine within the meaning of the Machinery Directive. In accordance with the industry's usual language use, this operating manual speaks of machine.

This original operating manual contains information and rules of conduct for the safe operation of the machine. Read the original operating instructions carefully before operating. Keep the original operating instructions for everyone at hand.

In order to operate the machine effectively, the original operating manual provides you with information on the following topics:

- Transporting, setting up and commissioning machinery
- Working with the machine
- Machine maintenance and maintenance
- Detect and fix faults

This operating manual applies to:

- the operator:
- all persons admitted to work on or with the machine

The pictures in this original operating manual show the machine in a partially simplified presentation.

The following abbreviations are used in the operating instructions:

Abbreviations

VE water full salted water

2.4.4 Action sequence

Sub-objective of the first set of actions



Perform the following steps: = Start of the first action guide.

1. First step in the first sequence of action.
First alternative instruction to the action step.
Second alternative instruction to the action step.
...
Last alternative instruction to the action step.
2. Second step in the first sequence of action.
! Important note on this step of action.

The sub-objective of the first set of actions is achieved.

Sub-objective of the second set of actions



Perform the following steps: = Start of the second action guide.

The only step in the second sequence of action.

? Problem. An expected error occurred.
Cause of the error.
Error rectification measure.

The sub-objective of the second set of actions has been achieved.

- ✓ The sequence of actions is completed, the goal of the action sequence is reached.

2.4.5 Tip

TIP
Further, useful information.

- Safety instructions (page 13)
- Obligations of the operator (page 15)
- Qualification of staff (page 16)
- Safety devices (page 18)
- Residual risk (page 20)
- First Aid Instructions (page 20)

In the following sections you will find basic safety instructions.

The machine is operationally safe. It was built according to the current state of science and technology.

- the machinery is not used as intended;
- the machine is improperly used,
- the machinery is operated under unacceptable conditions.

- All work on the machine shall be carried out in accordance with the provisions laid down for this purpose.
- All protective covers must be mounted.
- Changes in movements or malfunctions must be reported immediately.

Under unacceptable operating conditions, operational safety cannot be guaranteed. Therefore, unlawful operating conditions must in any case be avoided.

- Safety devices do not work or have been removed.
- Malfunctions were detected.
- Damage was detected.
- Maintenance intervals have been exceeded.
- Cycle times and print settings have not been changed.

3.1.3 Information on the operation

Safety-conscious and predictive behaviour of personnel avoids dangerous situations during operation.

Note the following points when dealing with the machine:

- The machine may only be installed and installed by qualified personnel.
- The machine may only be operated by qualified personnel.
- Faults may only be eliminated when the machine is switched off in a “safe off” condition. Turn off the machine and secure the machine against restarting.
- Safety devices shall not be modified, dismantled, circumvented or taken out of service.
- Structural modifications to the machine are not permitted.
- Workspaces must not be changed.
- Areas of work must always be free. Items must not be placed in work areas.
- Any change to the machine must be reported immediately to the responsible person.

3.1.4 Information on environmental protection

Safety-conscious and forward-looking behaviour of staff avoids harmful effects on the environment.

The following principles apply to environmentally conscious action:

- Substances that are hazardous to the environment shall not enter the soil or sewerage system.
- Provisions on the prevention, disposal and recovery of waste must be complied with.
- Substances harmful to the environment shall be stored in suitable containers.
- Containers containing substances hazardous to the environment shall be clearly labelled.

3.1.5 Supplementary provisions

In addition to this guidance, the proper operation of the machine is regulated by laws and regulations.

The following additional requirements shall apply to the operation of the machinery:

- Regulations on the operation of machinery (including laws and regulations not expressly mentioned here),
- Accident prevention rules;
- Intra-corporate rules;
- Hints on the machine.





- Trained as a specialist in order to carry out independent work on the machine.
- Sufficient instruction to carry out work on the machine under the supervision and guidance of a trained professional.

User groups

Staff	Qualification
Operators	Appropriate training in the areas of: <ul style="list-style-type: none"> • Operating procedures of the machine • Operating procedures
	Knowledge in the fields of: <ul style="list-style-type: none"> • Competences and responsibilities in the field of activity • Behaviour in case of incidents
Maintenance staff	In-depth knowledge in the areas of: <ul style="list-style-type: none"> • Mechanical engineering • Electrical engineering • Gas and water technology
	Authorisation for the activities (according to safety engineering standards): <ul style="list-style-type: none"> • Start-up of equipment • Earthing equipment • Marking of devices
	In-depth knowledge of the structure and functioning of the machine

Activities and knowledge

Activity	Qualification
Working on the piping	Special knowledge and experience in the installation of pipework.
Working on electrified facilities	Electrician or Instruction, the work may be carried out under the direction and supervision of an electrician in accordance with the electrotechnical rules.
Working on mechanical facilities	Industrial mechanics or Instruction, the work may only be carried out under the direction and supervision of an industrial mechanic in accordance with the recognised rules of technology.



3.4 Safety devices

In the following sections you will find information about the safety equipment.

3.4.1 Overview

The machine is equipped with safety devices at danger points. Familiarise yourself with all safety devices, thereby preventing or minimising damage to and/or machine failures in the event of an emergency.

Without properly adjusted safety devices, persons on the machine may suffer life-threatening injuries. The safety devices shall not be modified, dismantled or taken out of service. All security devices must be freely accessible at all times.

3.4.2 Fixed safety devices

Fixed safety devices secure dangerous areas on the machine. They have no influence on the movements of the machine.

The fixed safety devices prevent or impede direct access to rotating or moving parts of the machine. They may only be removed for maintenance or repair work and shall be reassembled before recommissioning.

The fixed safety devices of this machine include the protective fittings on the machine frame.

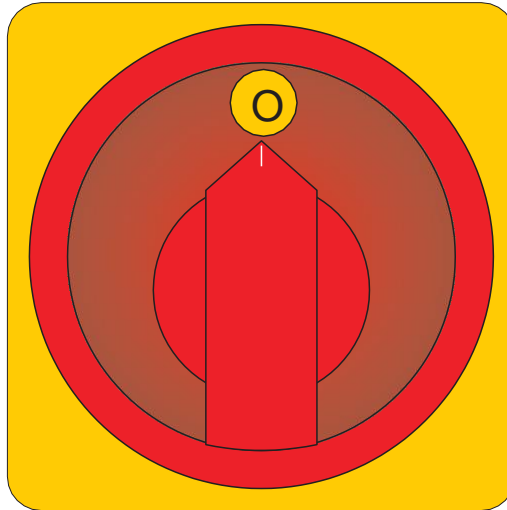


Protective covers on the machine frame



3.4.3 Emergency equipment

The emergency-out equipment secures dangerous areas. When the emergency stop function is triggered, the machine is switched off safely. The machine can be switched off safely via this main switch on the control panel.




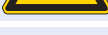
Main switch on the control box

3.4.4 Warning signs on the machine

Warning signs and other information on the machine must always be easy to read. Unreadable safety markings and other information on the machine shall be immediately renewed:

Dangerous places on the machine are marked by warning signs according to DIN 4844 and BGV A8 (VBG 125).

Overview of warning signs

Warning sign	Importance
	Warning: Hot surfaces
	Warning: Parts under electrical voltage

3.5 Residual risk

The safety devices of the machine effectively protect the personnel from injury.

However, for some activities, residence in hazardous areas is not avoidable. Residual risks cannot be completely excluded there. The wearing of personal protective equipment as well as safety-conscious and forward-looking behaviour of the personnel avoids dangerous situations.

Residual hazards on the machine and measures

Danger	Cause	Action
Electrical hazard Electric shock	During maintenance or malfunction, contact with voltage-leading parts may occur.	The electrical connections of the machinery may only be carried out by approved electricians.
Risk of scaling	At leaks, there may be contact with hot water or steam.	The installation of the machine may only be carried out by approved specialists. Leaks must be removed immediately.
Danger from hot piping	The piping on the machine becomes very hot during operation.	The installation of the machine may only be carried out by approved specialists. Leaks must be removed immediately. The pipelines shall be either insulated or protected against contact.

3.6 First Aid Instructions

In this section you will find special first aid measures if something has happened.

You need to make an emergency call think of the following points:

- What happened?
- Where did it happen?
- Who's reporting?
- How many injuries?
- Waiting for questions!

TIP

Get involved with the emergency call system and the rescue equipment at your location familiar, e.g.: What's the emergency number? Where's the next phone? Where's the next fire detector? Where can I find a fire extinguisher? Where can I find the next first aid case?

Attend a first aid course to help immediately in case of emergencies.



4 Transport, installation and connection

In this chapter you will find information about transport, installation and connection of the machine:

- Transporting machine (page 21)
- Unpacking machine (page 23)
- Set up the machine (page 23)
- Connecting machine (page 24)
- First commissioning (page 27)

4.1 Transporting machine

In the following sections you will find information about the transport of the machine.

4.1.1 Applicable principles

Safety-conscious and forward-looking behaviour of personnel avoids dangerous situations during transport.

Transport shall be governed by the following principles:

- Transports may only be carried out by qualified personnel.
- Access must be blocked for unauthorised persons. Where appropriate, signs shall be set up to draw attention to the transport.
- Moving parts shall be properly secured.
- Suitable, impeccable load-mounting devices and anchoring devices shall always be used for transport.
- During transport, the weight of the machine parts and the position of the heavy point shall be taken into account.

Prepare the machine for transport as follows:

- If the machine was in operation before transport, put the machine out of operation as described in “Steam production” > “Long-term decommissioning” (page 40).

Act during transport in accordance with the following instructions:

- Comply with accident prevention regulations and local regulations.
- No stay of persons under suspended loads.
- Use hoists only in a prescribed manner.
- Lifting equipment shall be designed and approved for the weight of the parts of the machinery.
- Use hoists only in perfect condition.
- Transport machine parts carefully. Not on sensitive parts (to lift, push or support).

TIP

Share the dimensions of each system to the forwarder in good time components with.



4.1.2 Requirements for lifting equipment

The machine is delivered on a pallet. To lift the machine you need a low-floor pallet truck or a crane.

There are four adjustable feet on the floor of the machine. Between these feet, the machine can be lifted and transported with a low-floor pallet truck. For this purpose, the machine can be lifted sideways.

The main focus of this machine is in the front area (switchbox).

In the case of a crane transport without a pallet, suitable conveyor belts must be attached to the machine frame.



Permissible positions of transport belts

4.2 Unpacking machine

Before setting up the machine, remove any existing transport packages, transport fuses and transport aids.

Then check the machine as follows:

- Are there any damage caused by transport?
- Is the delivery complete? Compare the delivered parts with the details on the shipping document.

If the machine has been damaged during transport or if the delivery is incomplete, please inform the manufacturer.

Dispose of the packaging material in accordance with the applicable regulations.

4.3 Set up a machine

In the following sections you will find information on how to set up the machine.

4.3.1 Requirements for the environment

The environment shall meet the following requirements:

Requirements for the environment	
Permissible ambient temperatures during operation	frost-free up to 40 °C
Permissible ambient temperatures during storage and transport	frost-free up to 40 °C
Permissible relative humidity	up to a maximum of 80 %

4.3.2 Requirements for the substrate

The substrate shall meet the following requirements:

- level, horizontal and solid surface
- designed according to the country-specific specification for concrete (for Germany: WUB-BN25)

4.3.3 Conditions

Requirements for setting up the machine:

- Familiarise yourself with the establishment plan, if it is available.
- Around the machine you need to plan an area that is always free of objects and easy to walk at any time, see chapter “Machine Overview”
> “Maintenance areas” (page 36).
- A floor drain must be present.
Alternatively, the machine shall be placed in a protective tray. This then ensures drip water and leakage protection.

4.3.4 Set up and align machine

Required:

Low-floor pallet trucks

- Forklift trucks
- Crane

Perform the following steps:

Set up all machine parts according to the hall plan.

✓ The machine is positioned and aligned.

4.4 Connecting machine

Once the machine is properly aligned, you can start the installation.

Condition:

You need standard tools.

- The power supply shall be switched off and secured against reactivation.
- Water connections shall be secured against accidental opening.

Cable platforms



Perform the following steps:

1. Install suitable cable platforms or use suitable cable channels between the machine and the on-site power connection.
2. Find out about the minimum bending radius of cables and hoses.

It's done.

Electric
S



The machine is operated with 3-phase alternating current.

There is a risk of life due to electric current.

Only trained and authorised electrical technicians may carry out the electrical installation.



WARNING

If you turn off the machine, always secure it against unjoined restart.

Perform the following steps:

1. Lay all the necessary cables.
2. Make all the necessary connections.
3. Earth the machine.

It's done.

Water connection



Perform the following steps:

1. Lay all the necessary pipelines.

! Pay attention to the specific requirements for the feed water, see Kapitel "Machinery overview" > "Requirements for feed water" (page 34).

- 2.** Unscrew the tank lid from the feed water tank.

You can now see through the control opening the position of the float in the food water tank.

- 3.** Screw the water supply pipe to the feed water connection.

! When assembling, make sure that the float is vertical in the feed water tank.

- 4.** Screw the tank lid back to the feed water tank.

- 5.** Check the connection for tightness.

It's done.

Steam connection



Perform the following steps:

1. Lay all the necessary pipelines.

Mounting vertically upwards. 1.5 m

Following downhill 5°

- 2.** Assemble the steam line to the steam line connection.

- 3.** Check the connection for tightness.

It's done.

Safety valve at the vapour connection



Perform the following steps:

1. Lay all the necessary pipelines.

! When laying the pipes, make sure that you do not reduce the cross-section of the pipeline and discharge the outlet outwards over the roof.



- 2.** Assemble the pipe to the safety valve.



- 3.** Check the connection for tightness.

It's done.



Perform the following steps:

1. Lay all the necessary pipelines.
 The overflow, draining and sludge pipes must not be merged.
The water-steam mixture can penetrate into the feed water tank via the overflow.
 2. Install the pipe to the sludge connection of the steam boiler.
 Pay attention to the specific requirements, see chapter “Machinery inspection” > “Sewage sewer requirements at sludge connection” (Page 35).
 3. Check the connection for tightness.

 It's done.
-  Machine is connected.



4.5 First entry into service

In the following sections you will find information on the first commissioning of the machine.

4.5.1 Notes

At first commissioning, the machine is adapted to the production process. Pay attention to possible malfunctions. Therefore, the machine should only be introduced gradually to the production process.

A commissioning protocol shall be kept at the time of first commissioning. You will find the start-up protocol in the chapter “Maintenance and repair” > “Protocoll commissioning” (page 53).

Safety note: Risk of injury during operation!

There is a risk of injury during operation of the machine. Pay attention to the following points:

- Read the section “Security” > “Security Instructions” (page 13) before performing the work.
- Do not put the machine into operation until all the covers, intervention protections and safety devices are installed.
- Before commissioning, activate all safety devices. See the section “Security” > “Security” (page 18).
- After commissioning, check that all safety devices work freely.
- If you turn off the machine, always secure it against unjoined restart.

When first commissioning, pay attention to the following points:

- Is the machine positioned correctly?
- Is the machine properly connected?
- Is the machine free of tools and material?

5 Machine overview

In this chapter you will find information on the use of the machine:

- Intended use (page 29)
- Function description (page 29)
- Parts of the machine (page 30)
- Areas (page 35)

5.1 Intended use

The machine is exclusively intended to produce hot steam from suitable water.

Any other or further use shall be deemed to be non-determined.

TTP

The manufacturer shall not be liable for damage caused by non-intentional Use of the machine is created.

5.2 Functional description

The water is passed through the water solenoid valve and the check valves into the pressure vessel. There, the water is heated and evaporated with electric heating elements. The generated steam is fed to the consumer via a steam shut-off valve.

The heating elements of the pressure vessel are automatically switched off when the preset pressure of 300 kPa is reached. After a pressure drop, they are automatically switched on again. The respective heating power can be regulated with multi-stage versions of the steam generator by means of light pressure switches on the control box.



5.3 Parts of the machine

In this chapter you will find information about the parts of the machine.

5.3.1 Overview



Front view

Legend

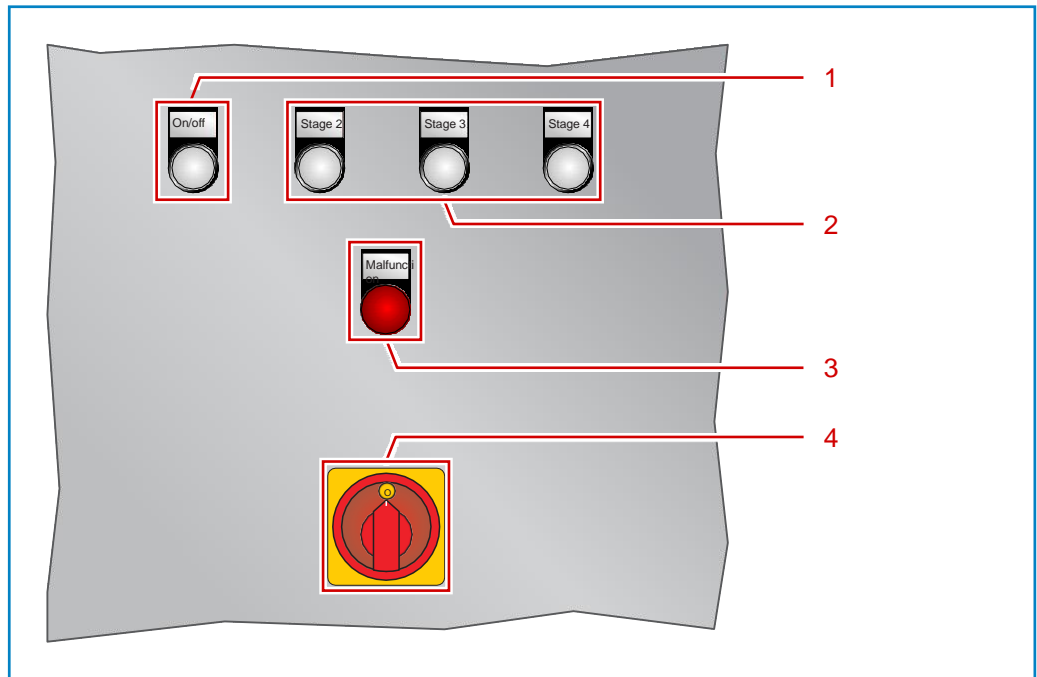
No.	Title	Function
1	Control box	See section “Control box” (page 32).
2	Manometer	Indicates the pressure in the steam boiler of the machine.



Legend

No.	Title	Function
1	Safety valve	In case of overpressure, the safety valve is opened and the steam is blown off.
2	Steam pipe connection with Shut-off tap.	The steam line is connected to the steam line and the steam produced in the boiler is discharged. The steam outlet can be closed via the shut-off valve.
3	Sludge connection with ball valve	<p>Used for emptying the steam boiler. Via the sludge connection, the water-steam mixture is discharged from the steam boiler and discharged into a waste duct.</p> <p>With the ball valve, the sludge connection can be opened or closed.</p> <p>The pipes of the sewer must meet specific requirements, see section "Requirements of the sewer at the sludge connection" (page 35).</p> <p>The sewer shall not be connected to other sewers. Otherwise, there is a risk of steam leaking at the drains of sinks or similar sinks.</p> <p>In principle, you must obtain the appropriate permit for the connection to an urban water connection (city works/waterworks). This also applies if the pipelines are already suitable for construction. If no approval is granted, you can use a mixed water cooler for cooling</p> <p>Dino Maschinenbau GmbH.</p>

5.3.2 Control box



Control box

Legend

No.	Title	Type	Position	Function
1	On/off	Luminous pressure switches	pressed	Launch the feed water pump and pump the feed water into the steam boiler. Starts steam generation: Stage 1-18 kW
2	Levels 2, 3 and 4 are optional and not for all installations available. Stage 2 Level 3 Level 4	Luminous pressure switch	pressed	Increases the electrical power of the Steam generators.
3	Malfunction	Light detectors	from	There is no fault on the machine.
			lights up	A fault occurred on the machine, see chapter "Steam production" > "Disruptions during production" (page 42).
4	Main switch	Circuit breaker	One/OFF	Switches on or off the electrical power supply of the machine. The main switch can be connected with a padlock against unwillingly restarting.
O	Steam	Luminous pressure – pressed switch		Open the vapour valve as long as the release is from the distance.

- Drinking water with a total hardness exceeding 4° dH
- Drinking water with chemical additives (hydrazine, sodium sulphide, etc.)
- Fully softened water (0-grassy).
- Fully salted water (VE water) may only be used in stainless steel steam generators.
- Well water
- Domestic water
- Process water from a production plant



5.3.4 Requirements of the sewer at the sludge connection

Safety note: Get your permission!

The water-steam mixture is very hot. Under pressure, this can cause damage to the sewer. Therefore, the water-steam mixture must not be directly passed through into plastic sewers. Steel or clay sewers may be used.

If the sewer is not heat-resistant, the water temperature must be sufficiently lowered by adding cold water into a sludge mixing water cooler.

In principle, you must obtain the appropriate permit for the connection to an urban water connection (city works/waterworks). This also applies if the pipelines are already suitable for construction.

TIP

You will receive a suitable sludge mixing water cooler as an accessory from DINO Maschinenbau GmbH

5.4 Areas

In the following sections you will find information about the machine's work, hazard and maintenance areas.

5.4.1 Areas of work

The working areas must be kept free for the operator. Do not place objects around the machine in an area of at least 80 cm.

5.4.2 Hazard areas

The mechanical danger points on this machine are secured by structural and technical measures. Nevertheless, some machine parts become very hot. You must not touch these machine parts.

5.4.3 Maintenance areas

Maintenance areas must be kept free for maintenance personnel. Keep an area of 80 cm around the machine free and do not set any counters.

After connecting all cables, all protective covers still have to be, see “Safety” > “Fixed safety devices” (page 18) can be removed from the machine.



6 Steam production

In this chapter you will find information about production with the machine:

- Production with the machine (page 37)
- Daily commissioning (page 37)
- Turn on machine and start production (page 38)
- Controls during production (page 39)
- Decommissioning (page 40)
- Malfunctions during production (page 42)

6.1 Production with the machine

Production with the machine is fully automatic. The operator shall continuously monitor the operation.

Pay particular attention to the following possible malfunctions:

- Is the line system tight?
- Do the valves switch correctly?
- Do unusual noises occur?

If you notice a malfunction, stop the machine immediately. Eliminate the cause of the malfunction, as well as you are authorised to do so. Otherwise, you immediately inform your supervisor. Do not continue to produce until you are sure that the machine works flawlessly.

6.2 Daily commissioning

Before starting the machine, you need to make sure that you can answer the following questions with “yes”:

- Are all safety devices, as intended by the manufacturer, assembled and functioning properly?
- Is the working area free of materials and objects that are not necessary for production?
- Are only authorised persons present in the work area of the machine?
- Can no one be hurt by starting the machine?
- Do I know how to act in case of incidents?

6.5 Decommissioning

In the following sections you will find information on the decommissioning of the machine.

6.5.1 Turn off the machine

At the end of the day, turn off the machine.

Perform the following steps:

1. Connect the shut-off valve to the steam pipe connection.
2. Turn off the light pressure **switches <2>**, **<3>** and **<4>** on the control panel.
! This action step can only be performed if you have **OPTIONAL** heating power.
I'm sorry, sir.
3. Press the light pressure switch **<ON/OFF>** on the control box.
4. Rotate the **< MAIN SWITCH >** on the control panel in position **O OFF**.
The machine is tension-free.
5. Open the ball valve at the sludge connection.

✓ Ready

6.5.2 Long-term decommissioning

Long-term decommissioning means that you take the machine out of service for a longer period of time or move it to another location.

Condition:

Prepare a log during decommissioning.

- Keep this log together with the machine's documentation file.
- The machine is switched on and produces steam.

Emptying machine



Perform the following steps:

1. Connect the shut-off valve to the steam pipe connection.
2. Turn off the light pressure **switches <2>**, **<3>** and **<4>** on the control panel.
! This action step can only be performed if you have **OPTIONAL** heating power.
I'm sorry, sir.
3. Press the light pressure switch **< ON/OFF >** on the control box.
4. Rotate the **< MAIN SWITCH >** on the control panel in position **O OFF**.
The machine is tension-free.
5. Stop the water supply on the built-in shut-off valve.

6. Open the ball valve at the sludge connection.
7. Connect the shut-off valve to the steam pipe connection.

The machine is emptied.

Fill in antifreeze



Perform the following steps:

Carry out appropriate antifreeze measures, see chapter "Maintenance and repair" > "Insert antifreeze" (page 52).

The antifreeze is filled in.

Disconnecting machine from the supply lines



Perform the following steps:

Remove all piping from the machine.

Machine is separated from the supply lines.

Machine conser- four



Perform the following steps:

1. Dry the machine carefully.
2. Pack the machine so that it is protected from moisture and dust.

Machine is conserved.

- ✓ Long-term decommissioning has been completed.

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In addition, please note the following instructions on how to store the machine in case of non—use.

6.5.3 Storage in case of non-use

Store the machine under the following conditions if the machine is to be taken out of service for a long time:

- Store machine parts standing on the feet in order to avoid distortion of the components
- closed, well-ventilated room
- Ambient temperatures between 5 °C and 40 °C
- avoid large temperature fluctuations
- low humidity

6.5.4 Disposal

This section provides information on the disposal of the machine.

The machine may only be completely disassembled by the specialist personnel of DINO Maschinenbau GmbH.



6.6.1 Troubleshooting table

In this section you will find possible causes of malfunction of the machine

Faults on the machine and measures

Malfunction	Cause	Action
The performance is not achieved.	Steam shut-off valve not fully opened.	Open the vapor shut-off valve.
	Heating element failed.	Change the heating element, See chapter "Maintenance and repair" > "Replace heating elements" (page 50).
	Boiler's calcified.	Descaling boilers, see chapter "Maintenance and repair" > "Decaling steam boilers" (page 48).
Light detector does not lapse.	Overheating of the steamer.	See section "Remedie overheating malfunction" (page 44).

6.6.2 Fix overheating failure

The overheating disorder occurs when there is no water in the system. A thermostat monitors the temperature of the heating element installed at the highest point. At 250 °C, the thermostat switches off the system and the light **detector** **SSOULATION** lights permanently.

Condition:

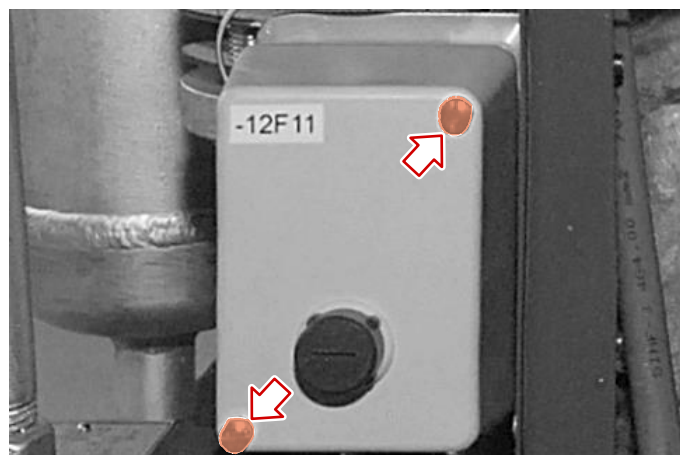
- The main switch is in position **0 OFF** and secured against an unwanted restart.
- The plant is cooled for at least two hours.

Required:

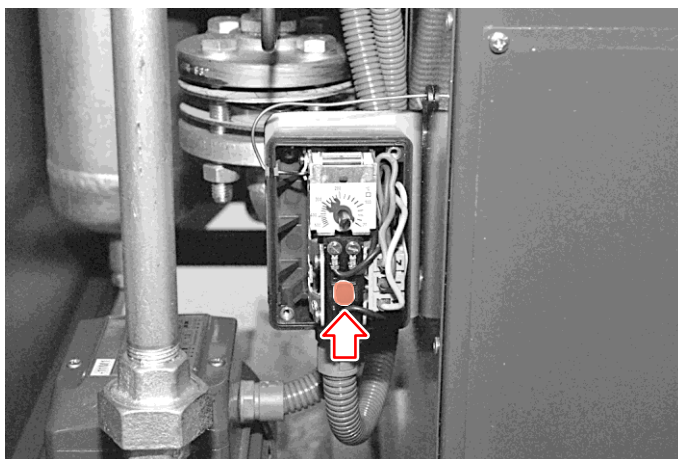
- Slot screwdriver
- Control cabinet key

Perform the following steps:

1. Use the slot screwdriver to release the two slot screws.



2. Remove the housing cover from the thermostat.
! Store the housing cover in a suitable location.
3. Press the red anti-interference button on the thermostat.



An overheating malfunction is reset.

4. Reset the housing cover of the thermostat.
5. Use the slot screwdriver to screw the two slot screws manually.

? Does the thermostat trigger several times in a row?

The plant is either defective or calcified.

Inform the maintenance staff about the incident.

Decalcify the machine, see chapter “Maintenance and repair” > “Decaling steam boilers” (page 48).

✓ It's done.

If you cannot fix the error, then contact DINO Maschinenbau GmbH

Telephone and fax numbers:

- Telephone: + 49 (0)421-58 00 44
- Fax: + 49 (0)421-58 00 46

7 Maintenance and repair

In this chapter you will find information on the maintenance and repair of the steamer:

- Notes on maintenance and repair (page 46)
- Maintenance plan (page 47)
- Spare parts (page 54)

7.1 Notes on maintenance and repair

This section provides information on the maintenance and repair of the machine.

Safety note: Risk of injury due to unwanted start-up of the system!

There is a risk of injury to persons due to unwanted start-up of the machine. Note the following points when waiting for the machine:

- Turn off the system before the start of maintenance.
- Use warning signs to indicate maintenance or repair work.

Safety-conscious and predictive behaviour of personnel avoids dangerous situations during maintenance and repair work.

The following principles apply to maintenance and repair:

- Maintenance or repair work may only be carried out by qualified personnel.
- The intervals prescribed in the maintenance plan shall be respected.
- The machine shall be decommissioned before maintenance and repair work.
- Access must be blocked for unauthorised persons. Where appropriate, signs shall be set up to draw attention to the maintenance or repair work.
- Climbing on the machine or on feeders is prohibited. Instead, suitable tools shall be used, e.g. fixed ladders with handrails.

The complete machine must be regularly cleaned and checked according to its degree of contamination.

In particular, during maintenance work, attention should also be paid to damaged components and components as well as to loose screws, screw fittings and flange screws. Loose connections must be followed immediately.

Damaged components must be replaced immediately to ensure the proper functioning of the machine.

7.2 Maintenance plan

Safety note:

Perform the described maintenance work after initial commissioning. Note the recommended maintenance intervals.

In this section you will find information about the maintenance services to be carried out on the machine.

Perform the following steps regularly to maintain trouble-free operation of the machine.

Maintenance plan — the machine

Who	Machine part	Work steps	Maintenance interval
Operator	Open sludge valve	After turning off the machine, open the ball valve at the sludge connection.	daily
Maintenance staff	Machine in general	Perform the following steps. <ul style="list-style-type: none"> • Drag down all installation connections. • Check all installation connections for tightness. • Check all electrical connections for fixed seat. • Perform a visual inspection of the machine. 	After the first week of operation
Maintenance staff	Machine in general	Perform the following steps. <ul style="list-style-type: none"> • Drag down all installation connections. • Check all installation connections for tightness. • Check all electrical connections for fixed seat. • Perform a visual inspection of the machine. • Decalcify the machine, see section "Decaling steam boilers" (page 48). 	3-monthly

✓ Ready

7.4 Commissioning protocol

In this protocol you will find important information that you need to check and work before the first commissioning of the machine.

The commissioning protocol shown here is a sample and applies to several machine variants.

Points E.01 to E.16 only need to be processed for special variants of this machine.

operating protocol Electric steam generators

Customer: _____

Location: _____

Operators were present at commissioning: ☐ y ☐ No ☐ partial

Annex: _____ Date: _____

Boiler number: _____ Order number: _____

Maintenance interval: _____ Name: _____

1	General	OK	Not OK
1.1	Device is correctly placed and fastened		
1.2	Strength of the load-bearing structure		
1.3	Device is correctly aligned		
1.4	Covers mounted		
2	Steam line		
2.1	Steam pipe mounted correctly		
2.2	Blow-out openings properly mounted		
2.3	Insulation performed correctly		
2.4	Correct insulation material		
2.5	Correct fixing of the steam pipe		
2.6	Elongation taken into account		
3	Water inlet		
3.1	Shut-off valve mounted		
3.2	Water filter mounted (5µ)		
3.3	Pressure adhered to		
3.4	Temperature met		
3.5	Sufficient infeed capacity		
3.6	Correct material		
3.7	Correctly fastened		

4	Water drain	OK	Not OK
4.1	Inner diameter		
4.2	Minimum slope (10 %) observed		
4.3	Right material		
4.4	Correctly fastened		
5	Electrical installation		
5.1	Conformity of device data		
5.2	Correct protection of the lines		
5.3	Direction of rotation checked		
5.4	Service switch installed		
5.5	Components correctly connected		
5.6	Connection cable fixed		
5.7	Connecting cable loaded		
5.8	Encoding correctly set		
5.9	Leak monitoring available		
5.10	All terminal connections retracted		
5.11	All fuse elements retracted		
5.12	Test run		
5.13	Pressure at steam extraction stable		

Settings	Rules	External	Internal
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E.01	Sensor type	Plant	Is:
E.02	Controller signal (4-20 mA/0-10 V)		
E.03	Setpoint [%rF]		
E.04	P-band [%]		
E.05	Intergr. Time [min]		
E.06	Power limitation [%]		
E.07	Softstart (no/yes)		
E.08	Limitation [%]		

E.09	Time [min]	Plant	Is:
E.10	Water conductivity [µs/cm]		
E.11	Water hardness [µs/cm or O dH]		
E.12	Blended water		
E.13	Small maintenance [100 % h]		
E.14	Great maintenance [100 % h]		
E.15	Sludge interval [h]		
E.16	Sludge time [min]		

Comments: _____

Commissioning was carried out properly

Audit confirmed:

Model of the commissioning protocol

7.5 Spare parts

Various spare parts are available for this machine. The information on the spare parts received is in a separate documentation. You can find the spare parts list in the supplier documentation of this machine.







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