SCHAEFFLER

# Induction Heating Devices

## MF-GENERATOR3.0

User Manual

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# 1 About the manual

This manual is part of the product and contains important information. Read the manual thoroughly prior to use and follow the instructions precisely.

The original language of the manual is German. All other languages are translations from the original language.

## 1.1 Symbols

The warning and hazard symbols are defined in accordance with ANSI Z535.6-2011.

1 Warning and hazard symbols

| Signs and descriptions | |
|---|---|
| ⚠ DANGER | In case of non-compliance, death or serious injury will occur. |
| ⚠ WARNING | In case of non-compliance, death or serious injury may occur. |
| ⚠ CAUTION | In case of non-compliance, minor or moderate injury may occur. |
| NOTICE | In case of non-compliance, damage or malfunctions in the product or the adjacent construction may occur. |

## 1.2 Signs

The warning, prohibition and mandatory signs are defined in accordance with DIN EN ISO 7010 or DIN 4844-2.

2 Warning, prohibition and mandatory signs

| Signs and descriptions | |
|---|---|
|  | General warning |
|  | Electrical voltage warning |
|  | Warning of magnetic field |
|  | Warning of hot surface |
|  | Heavy load warning |
|  | Floor-level obstacle warning |
|  | Prohibited for persons with pacemakers or implanted defibrillators |
|  | Prohibited for persons with metallic implants |
|  | Carrying of metallic parts or watches prohibited |
|  | Carrying of magnetic or electronic data carriers prohibited |
|  | Observe the manual |

| Signs and descriptions | |
|---|---|
|  | Wear safety gloves |
|  | Wear safety shoes |
|  | General mandatory sign |

## 1.3 Availability

A current version of this manual can be found at:
https://www.schaeffler.de/std/2031

Ensure that this manual is always complete and legible and is available to all persons engaged in transporting, fitting, dismantling, commissioning, operating or maintaining the product.

Keep the manual in a safe place for immediate reference.

## 1.4 Legal guidelines

The information in this manual reflects the status at the time of publication.

Unauthorised modifications to or improper use of the product are not permitted. Schaeffler accepts no liability in these cases.

## 1.5 Images

The images in this manual may be schematic representations and may differ from the delivered device.

## 1.6 Further information

Address any questions on fitting to your local contact at Schaeffler.

# 2 General safety regulations



## 2.1 Intended use

The generator MF-GENERATOR may only be used with inductors that are offered by Schaeffler for operation with this generator. An induction unit comprises a generator and an inductor.

The induction system may only be used for the heating of ferromagnetic workpieces.

## 2.2 Improper use

Do not operate the device in a potentially explosive environment.

Do not operate the generator with multiple inductors connected in series.

## 2.3 Qualified personnel

Obligations of the operator:

- Ensure that only qualified and authorised personnel perform the activities described in this manual.
- Ensure that personal protective equipment is used.

Qualified personnel must:

- Ensure adequate product knowledge, e.g. through training on proper handling and use of the product
- be fully familiar with the contents of this manual, particularly all safety instructions
- be aware of any relevant country-specific regulations

## 2.4 Protective equipment

For certain work on the product, suitable protective equipment must be worn. Personal protective equipment consists of:

3 Required personal protective equipment

| Personal protective equipment | Mandatory signs in accordance with DIN EN ISO 7010 |
|---|---|
| Protective gloves |  |
| Safety shoes |  |
| Eye protection |  |

## 2.5 Safety equipment

In order to protect the user and the generator from damage, the following safety equipment is present:

- The generator only runs when the inductor is fully connected.
- If the generator overheats, the generator power is automatically reduced or the generator is completely switched off.
- The generator power is automatically reduced if the inductor's power output is too high.
- The generator automatically switches off if no workpiece is present in the inductor.
- The generator switches off automatically if there has been no increase in workpiece temperature within a predefined time period.
- The generator switches off automatically as soon as the ambient temperature rises above +70 °C.

## 2.6 Hazards

In the operation of induction units, the principle used means that hazards can occur as a result of electromagnetic fields, electrical voltage and hot components.

### 2.6.1 Danger of death

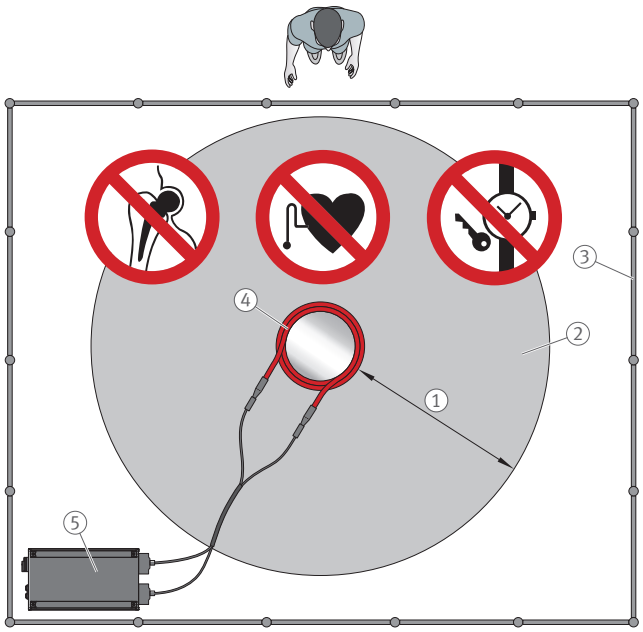
#### Danger of death due to electromagnetic field

**Persons fitted with a pacemaker are at risk of cardiac arrest**

Persons fitted with a pacemaker are not permitted to work with induction systems.

1. Secure the hazard area by setting a safety distance of 1 m around the inductor.
2. Mark the hazard area.
3. Avoid remaining in the hazard area during operation.

1 Hazard area




| | | | |
|---|---|---|---|
| 1 | Safety distance | 2 | Hazard area |
| 3 | Barrier | 4 | Inductor |
| 5 | Generator | | |

## 2.6.2 Risk of injury

### Risk of injury due to electromagnetic field

**Risk of cardiac arrhythmias and tissue damage from remaining in the hazard area for long periods**

1. Minimise time spent in the electromagnetic field.
2. Exit the hazard area immediately after switching on the generator.

**Wearers of ferromagnetic objects are at risk of burns**

1. Wearers of ferromagnetic objects must not remain in the hazard area.
2. Wearers of ferromagnetic implants must not remain in the hazard area.
3. Mark the hazard area.

### Risk of injury from directly or indirectly heated workpieces

**Risk of burns**

1. Do not place the inductor on or around ferromagnetic objects that are not to be heated.
2. Wear protective gloves resistant up to +300 °C during operation.

### Risk of injury due to electric current

**Risk of nerve irritation from contact with the inductor during operation**

1. Wear protective gloves resistant up to +300 °C during operation.
2. Do not touch the inductor during operation.

#### Risk of injury from heating contaminated workpieces

**Danger from splashes, smoke and vapour formation**

1. Clean contaminated workpieces prior to heating.
2. Wear eye protection.
3. Avoid inhaling smoke and vapours. Where necessary, use a suitable extraction system.

#### Risk of injury due to laid cables

**Danger of tripping**

1. Lay cables, the inductor, and inductor feed cables securely on the floor.

### 2.6.3 Material damage

#### Material damage caused by electromagnetic field

**Risk of damage to electronic items**

1. Keep electronic items away from the hazard area.

**Risk of damage to magnetic and electronic data carriers**

1. Keep magnetic and electronic data carriers away from the hazard area.

## 2.7 Safety regulations

This section summarises the most important safety regulations relating to working with the generator. Further guidelines on hazards and specific operating procedures can be found in the individual chapters of this user manual.

Since the generator is always operated in conjunction with an inductor, there are also some regulations covering work with the inductor. The operating instructions for the inductor used need to be observed.

### 2.7.1 Transport and storage

In transport, the relevant safety and accident prevention regulations must be observed.

The ambient conditions specified for storage must be observed.

### 2.7.2 Operation

National regulations relating to work with electromagnetic fields must be observed.

The workplace must be kept clean and organised during the entire operation.

The generator may only be used with inductors offered by Schaeffler for operation with these generators.

### 2.7.3 Maintenance and repair

The activities described in the maintenance plan are fundamental for the preservation of operational security and must be carried out as stated in the maintenance plan.

Maintenance work and repairs may only be carried out by qualified personnel.

For all maintenance and repair work, the generator must be switched off and disconnected from the mains voltage. It must be ensured that it cannot be switched on again without authorisation or unintentionally, for example by persons who have not been informed of the maintenance work.

### 2.7.4 Disposal

Observe the locally applicable regulations for disposal.

### 2.7.5 Conversion

For safety reasons, unauthorised modifications and conversions to the generator are not permitted in any form.

# 3 Scope of delivery

The product is supplied as a complete set containing the following:

- MF-GENERATOR (1×)
- mains connection cable, 5 m (1×)
- temperature sensor MF-GENERATOR.MPROBE-GREEN (1×)
- temperature sensor MF-GENERATOR.MPROBE-RED (1×)
- protective gloves, heat-resistant up to +300 °C (1 pair)
- dongle for operation with flexible inductors (1×)
- equipotential bonding cable, 6,5 m (1×)
- user manual

For models with 450 V, a mains connection plug is not included in the scope of delivery.

Inductors are not included in the scope of delivery but can be ordered as accessories ➤68|14.

## 3.1 Check for transport damage

1. Check the product immediately upon delivery for transport damage.
2. Report any transport damage promptly to the carrier.

## 3.2 Check for defects

1. Check the product immediately upon delivery for any visible defects.
2. Report any defects promptly to the distributor of the product.
3. Do not put damaged products into operation.

# 4 Product description

Medium-frequency induction systems are suitable for thermal mounting and dismounting. Even large and heavy workpieces can be heated using the systems.

A component can be mounted on a shaft with a tight fit. This is achieved by heating the component and sliding it onto the shaft. Once cooled, the component is mounted. A heating device can be used to heat solid ferromagnetic parts which are of a closed design. Examples include gears, bushings and rolling bearings.

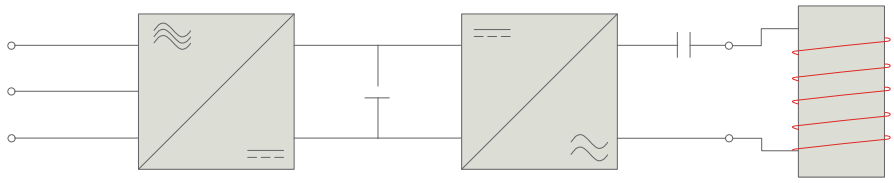
The induction system, comprising a generator and inductor, is designed for the induction heating of ferromagnetic workpieces. Inductors may only be connected to the generator that are specifically offered by Schaeffler for this purpose.

## 4.1 Functional principle

The generator supplies the connected inductor with an alternating voltage. As a result, an alternating electromagnetic field is created around the inductor. If the ferromagnetic workpiece to be heated is present in this field, an eddy current is induced in the workpiece. Heating of the workpiece is caused by the eddy current and hysteresis losses.

The mains voltage is rectified and smoothed. The direct voltage is converted into an alternating voltage with a frequency of between 10 kHz and 25 kHz by means of an inverter. The power is transmitted magnetically to the workpiece to be heated by a resonance capacitor via an inductor (coil).

2 Functional principle




As a result of the high frequency, the penetration depth of the magnetic field into the workpiece too be heated is small, leading to heating of the outer layer of the workpiece.

At the end of the heating operation, the residual magnetism in the workpiece is automatically reduced to the level that was present before induction heating.

## 4.2 Connections

3 Generator front view


001C2E92

| | | | |
|---|---|---|---|
| 1 | Touchscreen | 2 | Temperature sensor connection |
| 3 | Main switch with emergency stop function | 4 | Signal tower connection |
| 5 | USB port | | |

4 Description of signals

| Colour | | Description |
|---|---|---|
| Green | Flashing | Heating process in progress |
| Green | Continuous light | Heating process completed |
| Red | Continuous light | Malfunction ➤57\|8 |

4 Rear of the generator


001C2EA2

| | | | |
|---|---|---|---|
| 1 | Terminal for thermal cut-out and inductor recognition | 2 | Inductor connection |
| 3 | Equipotential bonding cable connection | 4 | Air filter |
| 5 | Mains plug | | |

## 4.3 Inductor

### 4.3.1 Flexible inductors

The inductor is the induction coil that is used to transfer the energy to the workpiece to be heated. Flexible inductors are made from a special cable and have a wide variety of uses. Depending on the application, they are positioned in the bore or on the outside diameter of the workpiece.

The flexible inductor designs differ in terms of their dimensions, permissible temperature range and the resulting technical data.

#### Further information

BA 86 | Flexible inductors |
https://www.schaeffler.de/std/1FD6

### 4.3.2 Rigid inductor

The inductor is the induction coil through which the energy is transferred to the workpiece to be heated. Rigid inductors are application-specific in design and adapted to a particular workpiece type. They are primarily used in series assembly or in cases where a flexible inductor is not suitable, such as for very small components.

Rigid inductors are usually equipped with inductor recognition and a thermal cut-out.

5 Rigid inductor


001C2EF2

### 4.3.3 Cage inductor

In a cage inductor, a flexible inductor is wound into an auxiliary frame. Cage inductors are application-specific solutions and are specially designed for the respective application.

Contact Schaeffler for a customised design of the induction system for your application.

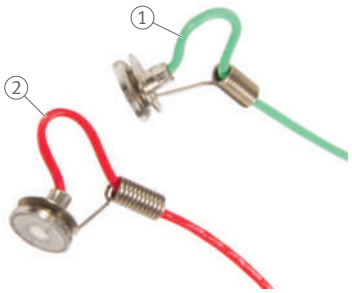
6 Flexible inductor in auxiliary frame

001C15DF

## 4.4 Temperature sensors

Temperature sensors are available to reorder as replacement parts ➤70 | 14.3.

7 Temperature sensors




001A5304

| | | | |
|---|---|---|---|
| 1 | MF-GENERATOR.MPROBE-GREEN | 2 | MF-GENERATOR.MPROBE-RED |

The temperature sensors are technically identical and differ only in colour. The colour coding facilitates the placement of the respective temperature sensor on the workpiece.

5 Temperature sensors

| Temperature sensor | | Information |
|---|---|---|
| T1 | Red | This temperature sensor controls the heating process as the main sensor. |
| T2 | Green | This temperature sensor controls the lower temperature threshold. |

Use:

- The temperature sensor is equipped with a magnetic clamp for easy attachment to the workpiece.
- The temperature sensors are used during heating in temperature mode.
- The temperature sensors may be used in time mode to assist with temperature control during heating.
- The temperature sensors are connected to the generator via sensor connections T1 and T2.
- Temperature sensor 1 at sensor connection T1 is the main sensor that controls the heating process.
- Temperature sensor 2 at sensor connection T2 is also used for the following cases:
  - activated Delta-T function [ΔT enabled]: monitoring a temperature difference ΔT between 2 points on the workpiece
  - additional control

6 Operating conditions for temperature sensors

| Designation | Value |
|---|---|
| Operating temperature | 0 °C ... +350 °C<br>At temperatures > +350 °C, the connection between the magnet and the temperature sensor is interrupted. |

## 4.5 Signal tower

A signal tower is optional and can be ordered as a spare part ➤71|14.6.

8 Signal tower MF-GENERATOR.LIGHTS

0019F671

7 Description of signals

| Colour | | Description |
|---|---|---|
| Green | Flashing | Heating process in progress |
| Green | Continuous light | Heating process completed |
| Red | Continuous light | Malfunction ➤57\|8 |

## 4.6 Touchscreen

During operation, various screens are displayed on the touchscreen complete with different buttons, setting options and operating functions.

8 Explanation of the buttons

| Button | Description of the function | |
|---|---|---|
|  | [Start] | Starts the heating process. |
|  | [Stop] | Stops the heating process. |
|  | [System settings] | Switches to the “System settings” menu. |
|  | [Admin settings] | Switches to “Administrator settings” and “Factory settings”. Not accessible to the end user. |
|  | [Back] | Moves one step back in the setting process or switches to the previous page. |
|  | [Next page] | Switches to the next settings page. |
|  | [Previous page] | Goes back to the previous screen. |
|  | [Default mode] | Resets the device to default settings. |
|  | [Info] | Calls up system information. |
|  | [Test] | Test tone of the signal transmitter. |
|  | [Additional information] | Retrieves additional heating information. |

| Button | Description of the function | |
|---|---|---|
|  | [Adjust Heating Target] | Allows adjustment of temperature or time during the heating process. |
|  | [Log summary] | Access to logged data from the heating process. |
|   | [On/Off selector switch] | Activates or deactivates the associated option. |
|  | [Selector switch not available] | The associated option cannot be activated or deactivated as other settings are being performed. |

Variables can be set to a desired value at the touch of a button.

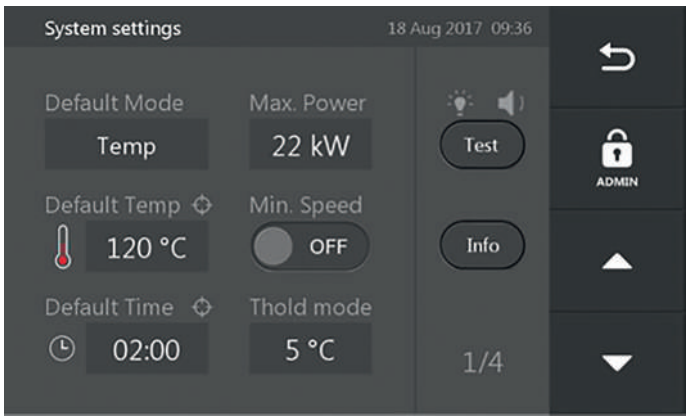
## 4.7 System settings

The generator allows parameters to be set and adjusted according to the requirements of the heating process.

1. Tap [System settings] to access the settings.

» The [System settings] window opens.

9 [System settings]




Use the [Next page], [Previous page] and [Back] buttons to navigate through the various settings pages. Select an element to change the respective setting.

### Administrator settings

The [Admin settings] button is located in the [System settings] window:

- In the [Admin settings], key settings for the generator are preset.
- The settings are protected by a password.
- The settings are not available at user level and, as a result, are not accessible to the user.

### Testing signal functions

The [Test] button is located in the [System settings] window. Use this button to check the function of the signals.

2. Tap [Test] to perform a signal test.

» An acoustic signal is emitted.

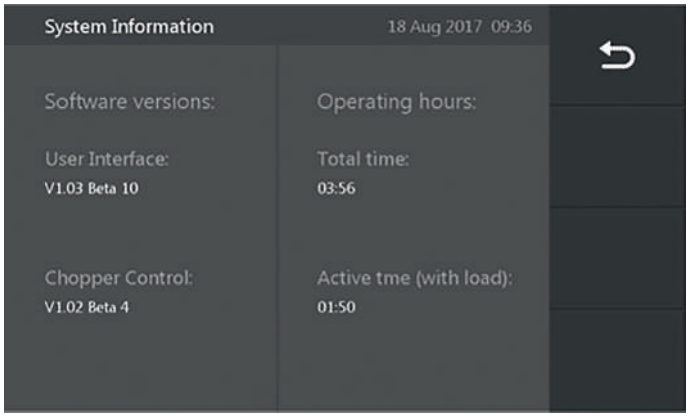
» The signals of the signal tower light up if a signal tower is connected.

### 4.7.1 [System Information]

1. Tap [Info] to access the system information.

» The [System Information] window opens.

10 [System Information]



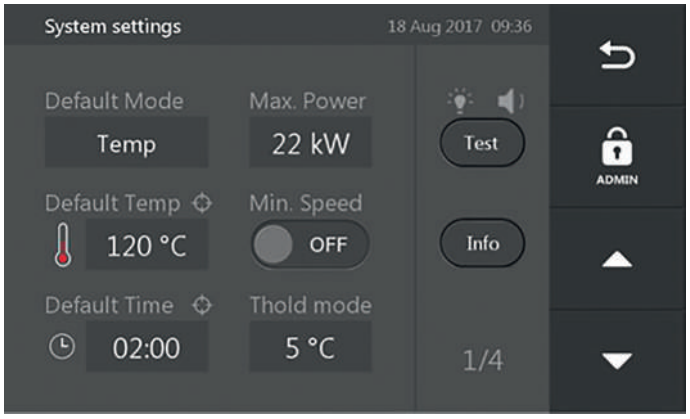

9 [System Information]

| Field | | Description |
|---|---|---|
| [Software versions] | [User Interface] | Software for display |
| | [Chopper Control] | Software for power controller |
| [Operating hours] | [Total time] | Total switch-on time |
| | [Active time (with load)] | Switch-on time under load, heating time |

2. Press [Back] to return to the previous menu.

### 4.7.2 [System settings], window 1

11 [System settings], window 1



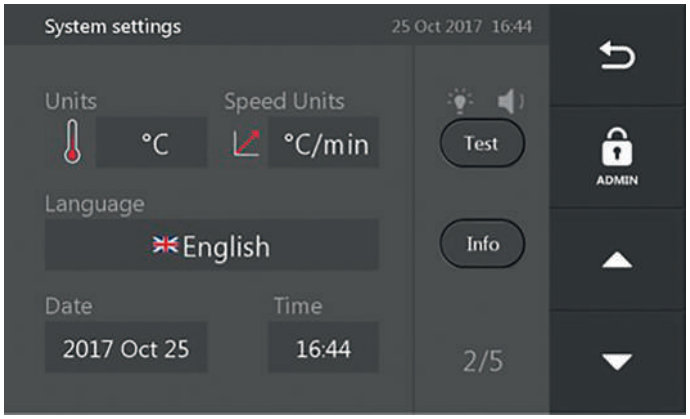

10 Setting options

| Field | Setting option |
|---|---|
| [Default Mode] | Heating function to which the generator is set, and in which it starts the first time or returns when [Default Mode] is pressed. |
| [Default Temp] | Temperature setpoint at which the generator starts or to which it returns when [Default Mode] is pressed. |
| [Default Time] | Time setpoint at which the generator starts or to which it returns when [Default Mode] is pressed. |

| Field | Setting option |
|---|---|
| [Max. Power] | Setpoint for the maximum generator power during the heating process. |
| [Min. Speed] | Activation and deactivation of minimum temperature rise monitoring during the heating process.<br>The limit value of 1 °C/min is predefined in the [Admin settings] ➤25\|4.7.7. |
| [Thold mode] | Temperature by which the component may cool when the temperature hold function is activated ➤33\|4.10.1. |

### 4.7.3 [System settings], window 2

12 [System settings], window 2

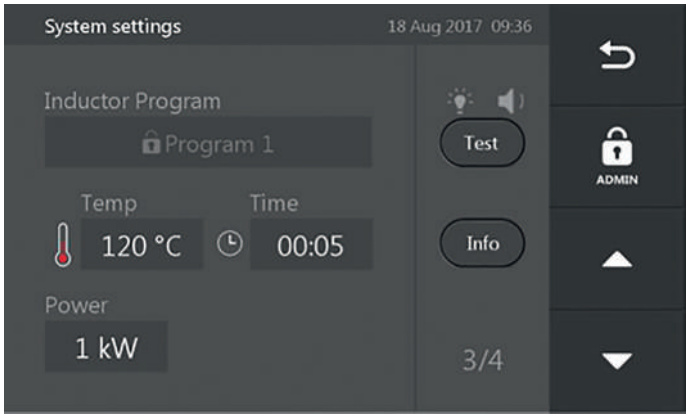



11 Setting options

| Field | Setting option |
|---|---|
| [Unit] | Setting for the unit of temperature measurement: °C or °F. |
| [Speed Units] | Setting for the unit of maximum heating rate: °C/min, °C/h, °F/min or °F/h |
| [Language] | Setting of the display language.<br>• English<br>• German<br>• Dutch<br>• Italian |
| [Date] | Setting of the system date |
| [Time] | Setting of the system time |

### 4.7.4 [System settings], window 3

13 [System settings], window 3




12 Setting options

| Field | Setting option |
|---|---|
| [Inductor Program] | Selection of the inductor program for which settings are to be defined.<br>Up to 3 programs can be defined. |
| [Temp] | Setting of the target temperature for the inductor program. |
| [Time] | Setting of the target time for the inductor program. |
| [Power] | Setpoint for the maximum generator power during heating for the inductor program. |

The inductor programs are linked to a rigid inductor. The connected rigid inductor is automatically recognised.

#### Adjusting an inductor program

✓ Rigid inductor is connected.

✓ Inductor recognition of the rigid inductor is connected.

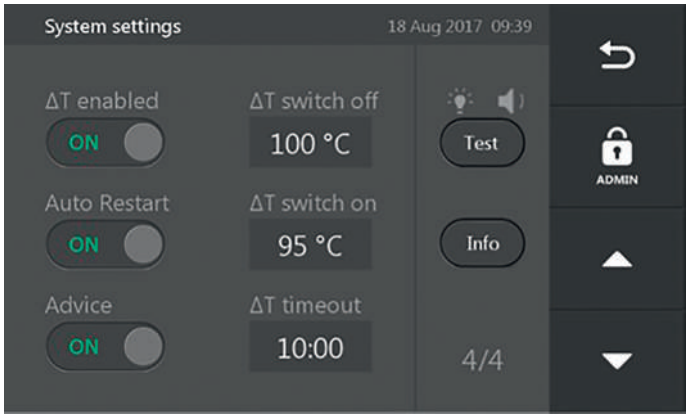
1. Call up the [System settings] in window 3
2. Select the [Inductor Program] linked to the inductor.
3. Tap [Temp] to change the target temperature of the inductor program.
4. Tap [Time] to change the target time of the inductor program.
5. Tap [Power] to change the maximum power of the inductor program.

» The selected settings are assigned to the rigid inductor

### 4.7.5 [System settings], window 4

The display and setting options in this menu are determined by the applied [Admin settings]. If a selector switch is deactivated, these settings have been disabled via the [Admin settings] ➤25|4.7.7.

14 [System settings], window 4




13 Setting options

| Field | Setting option |
|---|---|
| [ΔT enabled] | Activate Delta-T function, if required ➤34\|4.10.2. |
| [ΔT switch off] | Temperature difference between 2 measurement points on a workpiece at which heating is stopped. |
| [ΔT switch on] | The temperature difference between 2 measurement points on a workpiece at which reactivation of heating is permitted following prior deactivation due to the limit value for ΔT being exceeded. |
| [Auto restart] | Activate or deactivate to automatically restart heating when ΔT has returned to the permissible range below [ΔT switch on]. |
| [Advice] | The recommendation function is an aid for flexible inductors to determine the optimum number of turns ➤36\|4.10.4.<br>This function is not relevant for rigid inductors. |
| [ΔT timeout] | Setting of the time within which heating is automatically started when [ΔT switch on] is not reached. |

### 4.7.6 [System settings], window 5

The display and setting options in this menu are determined by the applied [Admin settings]. If a selector switch is deactivated, these settings have been disabled via the [Admin settings] ➤25|4.7.7.

15 [System settings], window 5

14 Setting options

| Field | Setting option |
|---|---|
| [Network ID] | Entry of the network ID ➤36|4.11. |

To connect 2 or more generators, follow the instructions ➤36|4.11.

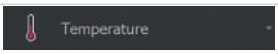
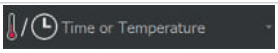
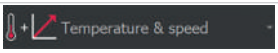
### 4.7.7 [Admin settings]

The [Admin settings] area is locked. Changes may only be carried out by the manufacturer.

## 4.8 Heating methods

The device offers various heating methods to suit every application.

15 Overview of heating methods

| [Heating mode] | Field | Function |
|---|---|---|
| Temperature mode |  | Controlled heating to the required temperature.<br>The temperature hold function is available for use. |
| Time mode |  | Suitable for volume production: Heat in time mode if the time required to reach a certain temperature is known.<br>Workaround if the temperature sensor is defective: Heat in time mode and monitor the temperature using an external thermometer. |
| Temperature mode or time mode |  | Controlled heating to the required temperature or over a required time period. The heating device switches off as soon as one of the two values is reached. |
| Temperature mode and speed mode |  | Controlled heating to the required temperature. The maximum rate at which the temperature increases per unit of time can be entered so that the workpiece is heated along a specified curve.<br>The temperature hold function is available for use. |

### 4.8.1 Temperature mode

- Setting of the required heating temperature
- Heating of the workpiece to the set temperature
- Monitoring of the workpiece temperature throughout the entire process
- Choice of simple measurement and Delta T measurement under [System settings]
- Requires the use of 1 or more temperature sensors, which are attached to the workpiece. T1 (temperature sensor 1) is the main sensor and controls the heating process.
- The temperature hold function can be activated under [Temp. Hold]. If the workpiece temperature drops below the heating temperature, the workpiece is heated again. The limit for the permissible drop in temperature can be set in [T hold hysteresis] under [System settings]. The temperature hold function keeps the workpiece at the required heating temperature until the time set under [Hold time] has elapsed.

### 4.8.2 Temperature mode or time mode

- Setting of the required workpiece temperature and the required heating period. The device switches off automatically once the set temperature is reached or the set time has elapsed.
- Setting of the required heating temperature
- Heating of the workpiece to the set temperature
- Monitoring of the workpiece temperature throughout the entire process
- Choice of simple measurement and Delta T measurement under [System settings]
- Requires the use of 1 or more temperature sensors, which are attached to the workpiece. T1 (temperature sensor 1) is the main sensor and controls the heating process.

### 4.8.3 Temperature mode and speed mode

- Setting of the rate of permissible temperature increase during the heating process
  Example: Workpiece is heated to +120 °C at a rate of increase of 5 °C/min
- Heating of the workpiece to the set temperature
- Monitoring of the workpiece temperature throughout the entire process
- Choice of simple measurement and Delta T measurement under [System settings]
- Requires the use of 1 or more temperature sensors, which are attached to the workpiece. T1 (temperature sensor 1) is the main sensor and controls the heating process.
- The temperature hold function can be activated under [Temp. Hold]. If the workpiece temperature drops below the heating temperature, the workpiece is heated again. The limit for the permissible drop in temperature can be set in [T hold hysteresis] under [System settings]. The temperature hold function keeps the workpiece at the required heating temperature until the time set under [Hold time] has elapsed.

After the process is activated, the device controls the power output so that the heating curve for the workpiece runs parallel to the set rate of increase. A white dashed line is displayed in the graphic during heating, along which the heating process should ideally proceed. The actual curve will sit just above this line, as the controller initially seeks to achieve a balance between increase in temperature and corresponding power output.

Temperature mode and speed mode will only be executed correctly if the rate of increase is set at a realistic value. Additionally, the rate of increase must be proportional to the maximum power the device can deliver and transfer to the workpiece.

### 4.8.4 Time mode

- Setting of the required heating time
- Heating of the workpiece over the defined time period
- Operating mode available for use if the time required to heat a specific workpiece to a specific temperature is already known
- No temperature sensor required as the temperature is not monitored
- If 1 or more temperature sensors are connected, the workpiece temperature is displayed but not monitored.

## 4.9 Logging function

This function is available for the following heating methods:

- [Temperature]
- [Time]
- [Temperature / Time]
- [Temperature / Speed]

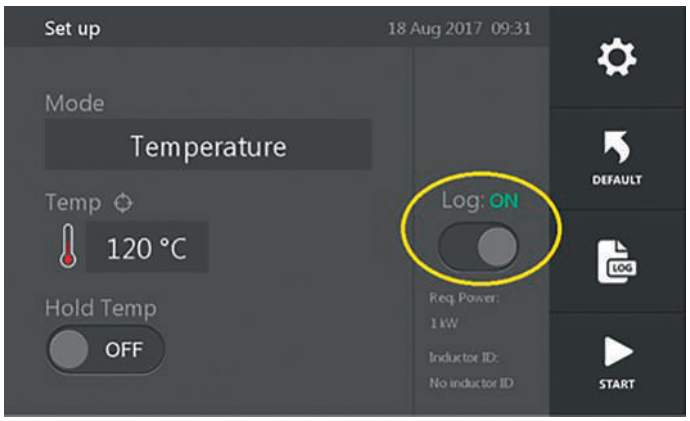
▸ To record and export the logs, insert an empty USB data storage device in FAT32 format into the USB port.

A USB data storage device is not included in the delivery.

### 4.9.1 Logging

The device automatically logs data during the heating process.

16 Activating the logging function




1. Activate the logging function by enabling the [Log] selector switch.
2. Press [Start].

› An input window opens for entering for the logging information.

3. Heating cannot start until all information has been entered.
4. Enter the operator name [Name operator] and the designation of the workpiece [workpiece data].
5. Tap the field that needs to be changed.

› An input keyboard will appear.

6. Enter the required information.
7. Press [Enter] to confirm the entry.

› The keyboard is hidden.

› The entered data is transferred to the corresponding field.

17 Completed logging information


8. Heating can start once all input fields have been completed.
9. Press [Start] to begin heating.

› The heating process starts.

» Once the heating process has finished, an overview of the heating data is displayed.

It is not necessary to export the log file immediately after each heating cycle. The information is stored in the generator and can be exported at a later date.

### 4.9.2 Accessing log files

The device automatically stores the following data during the heating process:

16 Automatically saved log files

| Log type | Description |
|---|---|
| [Crash Log] | Data obtained from the process shortly before a generator failure (crash) |
| [Last Heating] | Data from the last heating process carried out |
| [Alarms] | Alarms triggered |

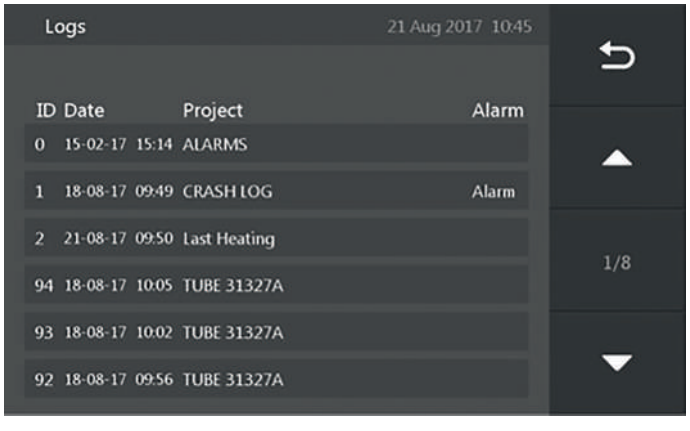
1. Press the [Log summary] button to display stored logs.

› An overview window opens.

› The log entries for [Alarms], [Crash Log] and [Last Heating] are always displayed first.

2. The other log entries are sorted by date and time.

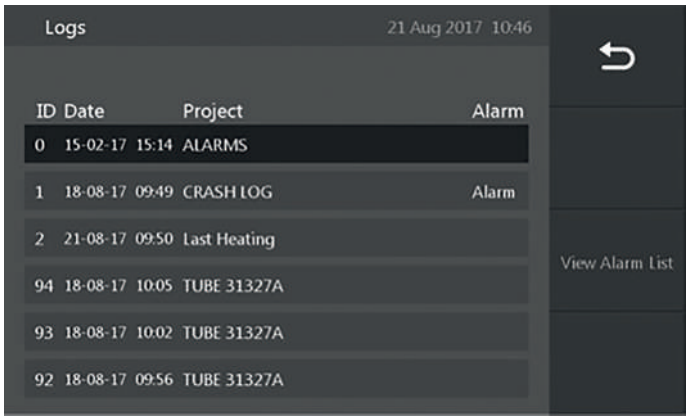
18 Log overview



### 4.9.3 [Alarms]

An overview of triggered alarm messages is displayed under [Alarms].

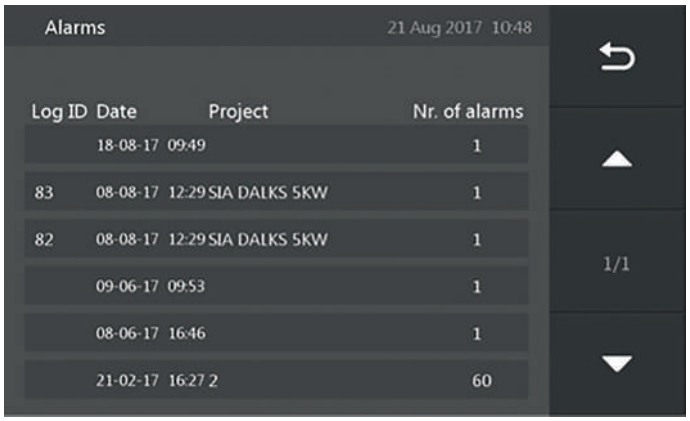
19 Log overview [Alarms]




1. Use the arrow keys to scroll through the overview.
2. Highlight the log type [Alarms] by pressing the corresponding line.
3. Open the desired log type by pressing [View Alarm List].

» A window for the desired log type opens.

20 [Alarms]




4. Use the arrow keys to scroll through the overview.
5. Highlight the desired log by pressing the corresponding line.
6. Open the desired log by pressing [View Alarm].

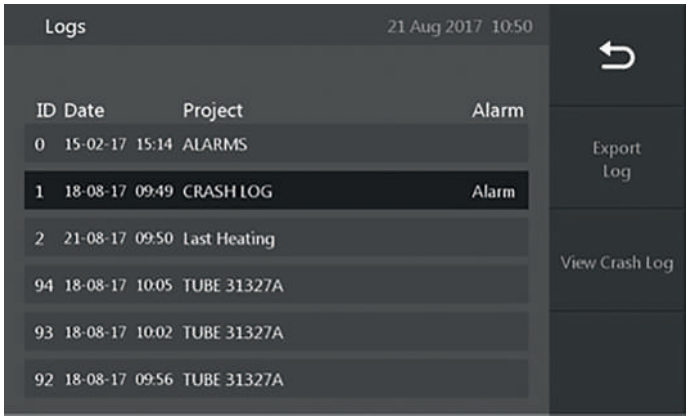
» The error message relating to the alarm is displayed ➤57|8.

7. Press [Back] to return to the previous menu.

### 4.9.4 [Crash Log]

Under [Crash Log], the heating data valid shortly before a generator crash or failure is displayed.

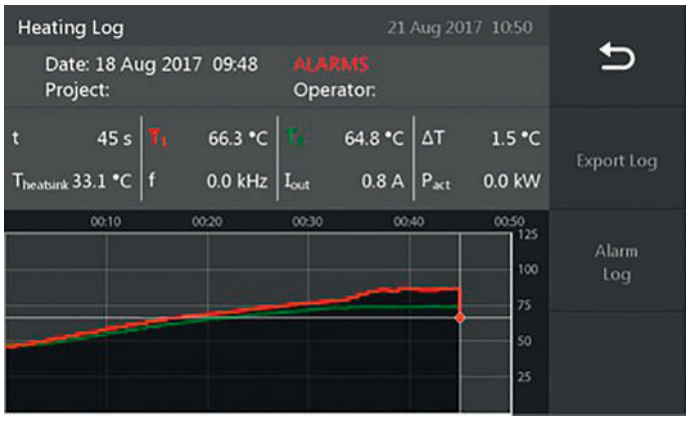
21 Log overview [Crash Log]




1. Use the arrow keys to scroll through the overview.
2. Highlight the log type [Crash Log] by pressing the corresponding line.
3. Open the desired log type by pressing [View Crash Log].

» A window for the desired log type opens.

22 [Crash Log]




✓ If a USB storage device is inserted, the heating data can be exported as a CSV file.

4. Press [Export Log].

› A message appears confirming that the export has been successful.

5. Press [OK] to close the message.

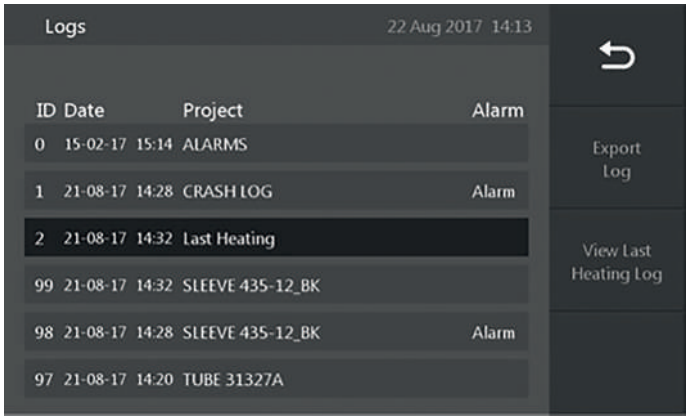
» The log is saved as a CSV file on the USB storage device.

6. Press [Back] to return to the previous menu.

### 4.9.5 [Last Heating]

Under [Last Heating], the data from the last heating process carried out is displayed.

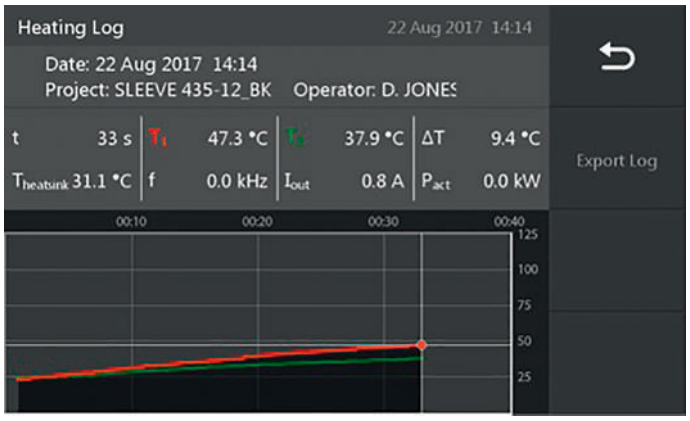
23 Log overview [Last Heating]




1. Use the arrow keys to scroll through the overview.
2. Highlight the log type [Last Heating] by pressing the corresponding line.
3. Open the desired log type by pressing [View last Heating Log].

» A window for the desired log type opens.

24 [Last Heating]




✓ If a USB storage device is inserted, the heating data can be exported as a CSV file.

4. Press [Export Log].

› A message appears confirming that the export has been successful.

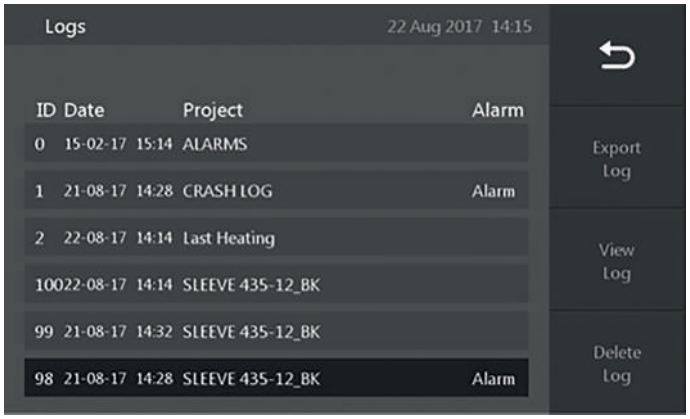
5. Press [OK] to close the message.

» The log is saved as a CSV file on the USB storage device.

6. Press [Back] to return to the previous menu.

### 4.9.6 [Logs]

25 Log overview [Logs]




1. Use the arrow keys to scroll through the overview.
2. Highlight the desired log by pressing the corresponding line.
3. Tap [Export Log] to export the log.
4. Tap [View Log] to open the log.
5. Tap [Delete Log] to delete the log.

#### 4.9.6.1 [Export Log]

✓ If a USB storage device is inserted, the heating data can be exported as a CSV file.

1. Press [Export Log].

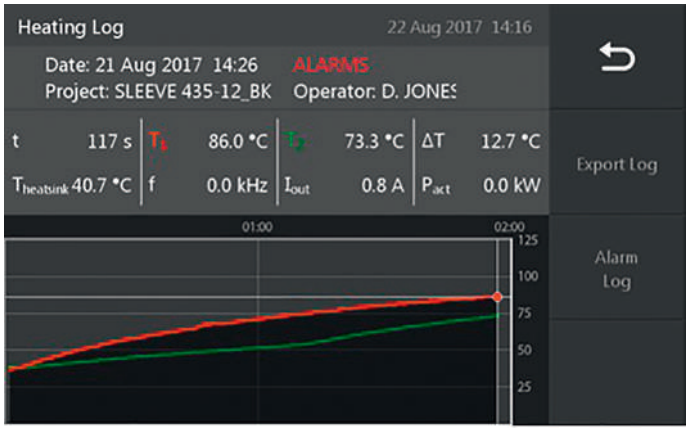
› A message appears confirming that the export has been successful.

2. Press [OK] to close the message.

» The log is saved as a CSV file on the USB storage device.

#### 4.9.6.2 [View Log]

26 Display [Logs]



✓ If a USB storage device is inserted, the heating data can be exported as a CSV file.

1. Press [Export Log].

› A message appears confirming that the export has been successful.

2. Press [OK] to close the message.

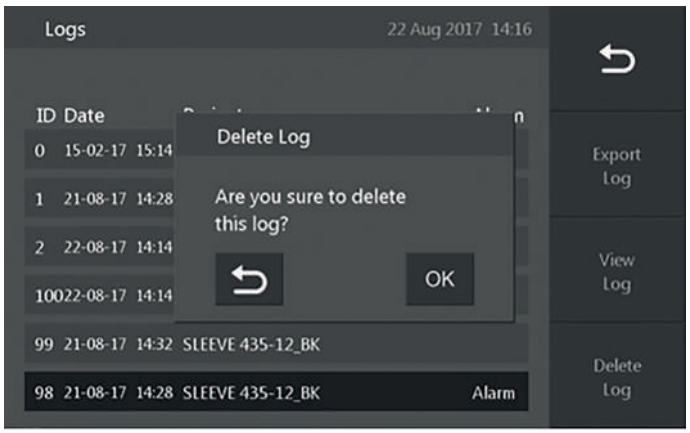
» The log is saved as a CSV file on the USB storage device.

3. Press [Back] to return to the previous menu.



#### 4.9.6.3 [Delete Log]

27 Display [Delete Log]




1. Press [Delete Log].

› A final confirmation message is displayed.

2. Press [OK] to delete the log permanently.

3. Press [Back] to cancel the operation.

## 4.10 Further functions

### 4.10.1 Temperature hold function

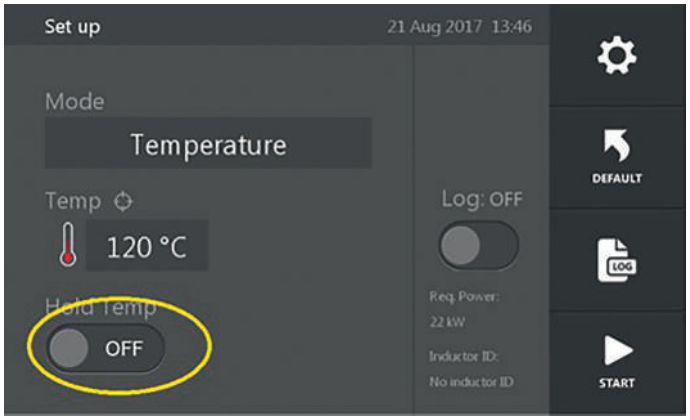
This function is available for the following heating methods:

- [Temperature]
- [Temperature / Time]
- [Temperature / Speed]

This function is used to hold the workpiece at a specific temperature once the set target temperature has been reached.

The switching hysteresis [Thold mode] for the temperature hold function can be set in the system settings ➤21|4.7.2.

28 Selector switch [Hold Temp]




1. Activate the selector switch [Hold Temp] to enable the temperature hold function.

› The selector switch is highlighted in green.

› The input field [Hold Time] is displayed

2. Set the [Hold Time], the duration for which the component is to be held at temperature.

› A keyboard entry window appears.

› The time is set in mm:ss and can range from 00:01 to 99:00

3. Select [OK] to confirm the entry.

» The [Hold Time] for the temperature hold function has been set.

» Upon reaching the target temperature, the component is held at temperature for the defined time.

### 4.10.2 Delta-T function

This function is available for the following heating methods:

- [Temperature]
- [Temperature / Time]
- [Temperature / Speed]

This function is used when the temperatures in a material must be kept from deviating beyond a certain point in order to avoid stresses in the material. Check with the supplier of the workpiece to establish the extent of the permitted temperature difference.

The ΔT control system is used when heating bearings where a significant difference in the temperatures of the inner and outer ring is not permitted.

During heating, temperatures T1 and T2 are measured. The difference between these two temperatures is calculated on an ongoing basis.

Enquire with the supplier of the workpiece about the extent of the permitted temperature difference.

✓ Both temperature sensors are connected.

1. Open the [System settings].
2. Activate the Delta-T function by pressing [ΔT enabled].

› Fields [ΔT switch off], [ΔT switch on] and [ΔT timeout] are displayed.

› Selector switch [Auto restart] is displayed.

3. Set [ΔT switch off] by tapping the desired value.
4. Set [ΔT switch on] by tapping the desired value.
5. Activate [Auto restart] to allow heating to restart automatically.

› If the measured temperature difference between T1 and T2 exceeds the set temperature [ΔT switch off], heating is switched off or paused.

6. If [Auto restart] is not activated, heating must be restarted manually.

› If the measured temperature difference between T1 and T2 exceeds the set temperature [ΔT switch on] within the time set under [ΔT timeout], heating is started automatically.

17 Description of [Auto restart]

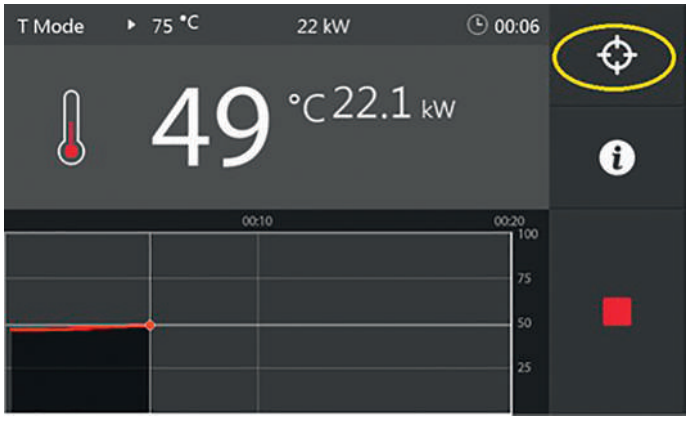
| [Auto restart] | Description |
|---|---|
| Deactivated | Heating will not resume automatically. |
| | Heating must be restarted manually. |
| Activated | Heating will resume automatically if the temperature difference is smaller than the temperature set under [ΔT switch on]. |
| | The temperature difference must be reached within [ΔT timeout]. |

### 4.10.3 Adjust heating target

This function is available for the following heating methods:

- [Temperature]
- [Time]
- [Temperature / Time]
- [Temperature / Speed]

29 Example [Adjust Heating Target]




1. Press the [Adjust Heating Target] button.

› A window opens showing the currently set heating target.

› The heating target can be increased or decreased in increments of 5 °C or 5 s, depending on the selected heating method.

2. Tap +5 to increase the heating target by 5 °C or 5 s.
3. Tap −5 to reduce the heating target by 5 °C or 5 s.
4. Confirm the new heating target by pressing [OK].

» The heating target has been adjusted.

The heating target can only be increased up to the maximum values defined in the system settings.

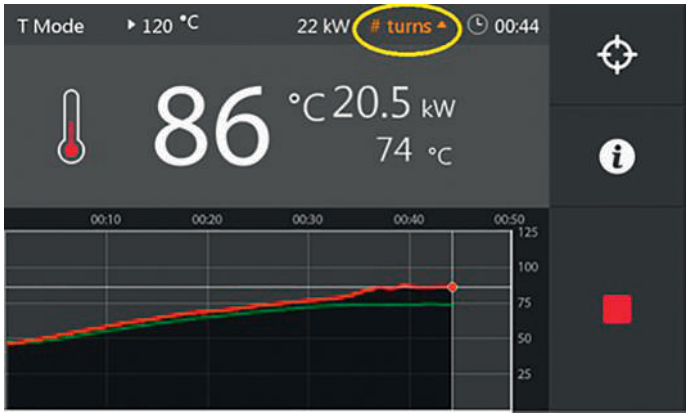
### 4.10.4 Winding assistant

The winding assistant is a recommendation function for flexible inductors to determine the optimum number of turns. This function is not relevant for rigid inductors.

1. Open the [System settings].
2. Activate the recommendation function by pressing [Advice].

» During the heating process, the generator provides a recommendation for the number of turns.

30 Example of winding assistant with higher number of turns.




18 Winding assistant display

| Display | Colour | Description |
|---|---|---|
| #[turns]▲ | Orange, flashing | Increase the number of turns |
| #[turns]– | White | Optimum number of turns |
| #[turns]▼ | Orange, flashing | Reduce the number of turns |

## 4.11 Connecting generators

It is possible to connect 2 to 10 generators of the 3.0 series. The generators can have different power ratings.

Connection is optional and is not standard on every generator. If this function is required, it can also be retrofitted at a later stage.

### 4.11.1 Connecting the generators

The connection is made via the network cable port on the front of the generator.

19 Requirements for connecting generators

| Number of generators | Connection | Requirements |
|---|---|---|
| 2 | Ethernet cable | CAT5 Ethernet cable, CAT6 Ethernet cable |
| 2 ... 10 | Ethernet cable | CAT5 Ethernet cable, CAT6 Ethernet cable |
| | Network switch | Standard design |

1. Insert the Ethernet cable into the designated port on the generator.
2. Insert the Ethernet cable into the switch or another generator.

› When generators are connected, a network symbol appears at the top of the display.

20 Meaning of the network symbol

| Symbol | Meaning | Remedy |
|---|---|---|
|  | Network operational | – |
|  | Network failure | 1. Generator attempts to re-establish the connection automatically<br>2. If the failure persists, check the network connection |



## 4.11.2 Setting the network connection

21 Description [Network ID]

| [Network ID] | Description |
|---|---|
| 0 | No coupling |
| 1 | Generator is server |
| 2 ... 10 | Generators are clients |

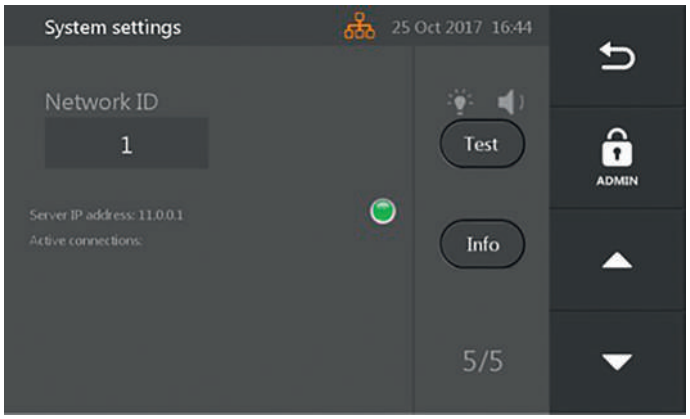
### 4.11.2.1 Configuring a generator as a server

✓ The generators are coupled.

1. In the system settings, navigate to window 5 ➤24|4.7.6.
2. Tap [Network ID] to set the ID.
3. Enter 1
4. Select [OK] to confirm

» If the network indicator is lit green, the network function is activated.

31 Generator is configured as server




If the network symbol is lit orange and the indicator red, the network function has not yet been activated on one of the connected generators.

### 4.11.2.2 Configuring a generator as client

The following steps must be carried out for each generator to be connected. Each number may only be used once.

✓ The generators are coupled.

1. In the system settings, navigate to window 5 ➤24|4.7.6.
2. Tap [Network ID] to set the ID.
3. Enter a number between 2 and 10
4. Select [OK] to confirm

» If the network indicator is lit green, the network function is activated.

If the network symbol is lit orange and the indicator red, the network function has not yet been activated on one of the connected generators.

### 4.11.3 Influence on operating mode

Each generator follows its own settings. All generators must be operated in the same operating mode.

If one of the generators reaches its target and stops, the other generators stop automatically.

#### Temperature mode

- The heating process starts on all generators as soon as [Start] is pressed on one of the generators.
- The heating process ends on all generators as soon as [Stop] is pressed on one of the generators.
- All generators operate independently of each other with their own settings.
- No synchronisation of data takes place between the generators.
- The temperature hold function can be used.
- The Delta-T function can be used.
- In the event of a fault, only the heating process of the affected generator stops.

#### Time mode

- The heating process starts on all generators as soon as [Start] is pressed on one of the generators.
- The heating process ends on all generators as soon as [Stop] is pressed on one of the generators.
- All generators operate independently of each other with their own settings.
- No synchronisation of data takes place between the generators.
- The temperature hold function can be used.
- In the event of a fault, only the heating process of the affected generator stops.

#### Temperature mode or time mode

- The heating process starts on all generators as soon as [Start] is pressed on one of the generators.
- The heating process ends on all generators as soon as [Stop] is pressed on one of the generators.
- All generators operate independently of each other with their own settings.
- No synchronisation of data takes place between the generators.

- The temperature hold function can be used.
- The Delta-T function can be used.
- In the event of a fault, only the heating process of the affected generator stops.

### Temperature mode and speed mode

- The heating process starts on all generators as soon as [Start] is pressed on one of the generators.
- The heating process ends on all generators as soon as [Stop] is pressed on one of the generators.
- Data is synchronised between the generators.
- All generators heat the component based on their individual settings.
- The settings must be performed separately on each generator.
- The slowest generator determines the rate of the heating process.
- In the event of a fault, all generators automatically stop the heating process.

# 5 Transport and storage

## 5.1 Transport

**⚠ WARNING**

**Heavy product**

Risk of herniated disc or back injury.

- Only lift without the use of support aids if the product weighs less than 23 kg.
- Use appropriate support aids where necessary.



22 Transport

| Variant | m | Transport |
|---|---|---|
| kW | kg | |
| 10 | 46 | • Use the carrying handle on the top of the device. |
| 22 | 46 | • The device must be lifted using 2 people.<br>• Use suitable lifting gear. |
| 44 | 78 | • Use the lifting eyes on the top of the device.<br>• Use suitable lifting gear. |

## 5.2 Storage

Wherever possible, the device should be stored in the transport packaging that it was delivered in.

23 Storage conditions

| Designation | Value |
|---|---|
| Ambient temperature | –5 °C ... +55 °C |
| Humidity | 5 % ... 95 %, non-condensing |

# 6 Commissioning

## 6.1 First steps

1. Remove the device from the transport box or storage box.
2. Check the housing for damage.
3. Place the device in a suitable workplace.
4. Activate the brakes whenever using a rollable transport device.
5. When using multiple generators, maintain a clearance of 1 m between the generators.



Characteristics of a suitable workstation:

- The surface is stable, level and non-metallic.
- The device is standing on all four adjustable feet.
- There is a clearance of 20 mm at the rear.
- There is a clearance of 20 mm at the bottom.

## 6.2 Connecting the power supply

### Connection with mains plug

✓ The device is equipped with a mains plug.

✓ The mains cable and mains plug must not show any signs of damage.

✓ The power supply must correspond to the technical data.

1. Insert the mains plug into a suitable socket.
2. Lay the connection cable in such a way as to prevent a trip hazard.

### Connection without mains plug

✓ The device is not equipped with a mains plug.

✓ The power supply corresponds to the technical data.

✓ Connection to the mains must be performed by qualified personnel.

1. Use a suitable plug.
2. Connect the mains supply via 3 phases and protective earth.
3. Lay the connection cable in such a way as to prevent a trip hazard.

32 Connecting the mains supply via 3 phases and protective earth

## 6.3 Connecting the inductor

- ✓ Only use inductors that comply with the manufacturer's specifications.
- ✓ Observe the regulations and instructions set down in the corresponding inductor operating manual.
- ✓ The inductor shows no signs of damage.
- ✓ Connect no more than 2 inductor feed cables in series. The maximum total length of the inductor feed cable must not exceed 6 m.
- ✓ The nominal output of the inductor used must match the nominal output of the generator.
- ✓ Wear protective gloves resistant to temperatures up to +300 °C.

1. Align the plug with the socket so that the white markings face each other.
2. Insert the plug all the way into the socket, until it stops.

33 Correctly aligned plug


3. Applying axial pressure, press the plug deeper into the socket and turn the plug to the right, until it stops.

34 Plug turned until it stops


4. Release the plug.

» The plug is secured by the bayonet lock.

### 6.3.1 Connecting the inductor recognition

If an inductor is equipped with inductor recognition and a thermal cut-out, it is connected to the terminal for the thermal cut-out and inductor recognition at the rear of the device.

#### Rigid inductor with inductor recognition and thermal cut-out

✓ The inductor is equipped with inductor recognition.

1. Remove the cover from the terminal for the thermal cut-out and inductor recognition.
2. Connect the inductor recognition to the terminal for the thermal cut-out and inductor recognition.
3. Press the lever on the socket over the plug to lock the connection.

» Inductor recognition is connected.

#### Flexible inductor without inductor recognition and thermal cut-out

✓ The inductor is not equipped with inductor recognition.

1. Remove the cover from the terminal for the thermal cut-out and inductor recognition.
2. Connect the dongle to the terminal for the thermal cut-out and inductor recognition.
3. Press the lever on the socket over the plug to lock the connection.

» The dongle is connected.

35 Connecting the dongle

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## 6.4 Mounting the inductor on the workpiece

✓ Wear protective gloves resistant to temperatures up to +300 °C.

✓ Inductor is connected to the generator.

1. Attach the flexible inductor to the workpiece in accordance with the relevant operating instructions.
2. Mount the inductor on one single workpiece only.
3. Lay the inductor in such a way as to prevent a trip hazard.

» The inductor is ready for operation.

### Further information

BA 86 | Flexible inductors |
https://www.schaeffler.de/std/1FD6

## 6.5 Connecting the temperature sensor

✓ Use temperature sensors in accordance with the manufacturer's specification.

✓ The temperature sensors show no signs of damage.

✓ The magnetic surface of the temperature sensors is contaminant-free.

1. Connect the plug of temperature sensor T1 (red) to designated connection T1.
2. Place temperature sensor T1 as close as possible to the inductor windings on the workpiece.
3. Connect the plug of temperature sensor T2 (green) to designated connection T2.
4. Place temperature sensor T2 at the point where the temperature in the workpiece is expected to be at its lowest.
5. Lay the temperature sensor cables in such a way as to prevent a trip hazard.

» The temperature sensors are ready for operation.

When removing the temperature sensor, do not pull it by the cable. Pull on the plug and sensor head only.

## 6.6 Connecting the equipotential bonding cable

To prevent distortion of the temperature measurement, an equipotential bonding cable is used. The equipotential bonding cable connects the generator to the workpiece to be heated.

✓ Only use equipotential bonding cables that comply with the manufacturer's specifications.

✓ The equipotential bonding cable shows no signs of damage.

✓ The magnetic surface of the equipotential bonding cable and of the workpiece are free from contamination.

1. Check whether the high magnetic force may cause damage to the workpiece. The magnetisation introduced by the magnet is > 2 A/cm.
2. Select a location on the workpiece for the magnet of the equipotential bonding cable, as close as possible to the temperature sensor.
3. Position the magnet of the equipotential bonding cable on the workpiece.
4. Connect the equipotential bonding cable to the designated terminal on the rear of the generator ➤16|⧉4.
5. Lay equipotential bonding cables in such a way as to prevent a trip hazard.

» The equipotential bonding cable is ready for operation.

In the case of very small or difficult-to-access workpieces, it may not always be possible to attach the equipotential bonding cable to the workpiece.

## 6.7 Connecting the signal tower

A signal tower is optional and can be ordered as a spare part ➤71|14.6.

▸ If required, connect the signal tower to the designated terminal on the top of the device.

# 7 Operation

## 7.1 General requirements

Only start a heating operation if there is a workpiece in the inductor. The workpiece must not be removed from the inductor during the heating process.

A rolling bearing may be heated to a maximum of +120 °C (+248 °F). A precision bearing may be heated to a maximum of +70 °C (+158 °F). Higher temperatures can have a negative effect on the metallurgical structure and lubrication, leading to instability and failure.



The maximum permissible temperatures may be different for lubricated bearings with seals.

Depending on the design, the maximum temperature of the connected inductor must not exceed +180 °C or +300 °C. It is essential to observe the maximum operating time of the connected inductor.

Do not suspend a workpiece from ropes or chains made from ferromagnetic materials while it is being heated. Suspend the workpiece from a sling that does not contain metal and is temperature-resistant.

## 7.2 Carrying out protective measures

1. Mark and secure the hazard area in accordance with the general safety regulations ➤8|2.
2. Ensure that the operating site complies with the operating conditions ➤65|13.1.
3. Clean the workpiece to be heated to avoid smoke formation.
4. Any smoke or vapour produced during the heating process must not be inhaled. A suitable extraction system must be installed if smoke or vapour is produced during the heating process.
5. Provide the workpiece with a fixed earth connection. If this is not possible, ensure that the workpiece cannot be touched by persons.
6. Wear protective gloves resistant to temperatures up to +300 °C.
7. Wear safety shoes.
8. Wear eye protection.

## 7.3 Switching on the generator

✓ The inductor is connected.

✓ The required temperature sensors are connected. For a single measurement: T1, for Delta T measurement: T1 and T2.

✓ The power supply is connected.

‣ Turn the main switch on the front of the device to position 1.

› The device will commence the start-up operation.

› The startup operation takes some time to complete, ~20 s.

› A loading screen is displayed whilst the startup operation is in progress.

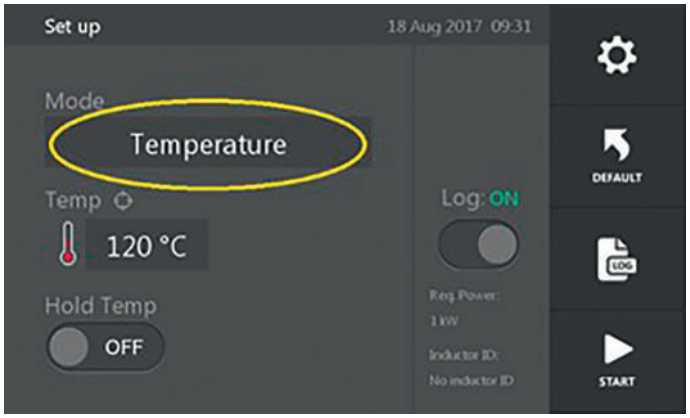
» The [Main menu] appears with the settings from the last use.

## 7.4 Selecting the heating method

1. Tap [Mode].

› The selection menu is displayed.

36 Heating method selection menu



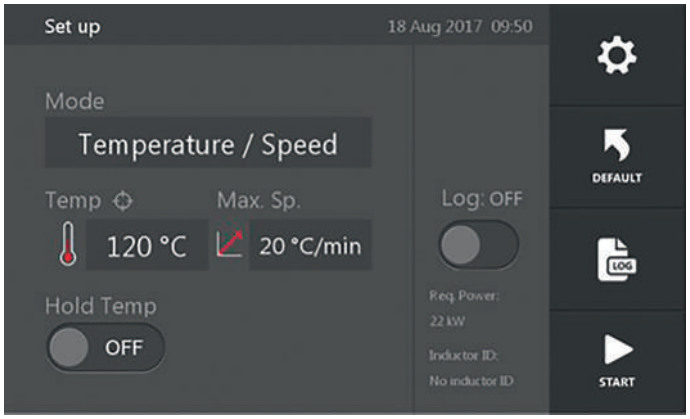

2. Select the desired heating method.

› The selection is applied as [Mode].

› The selection menu is hidden.

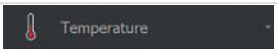
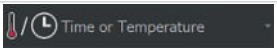
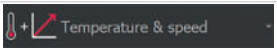
› The setting parameters are displayed in the window according to the selection made.

37 Example heating method window [Temperature / Speed]




3. Press [Default Mode] to reset the displayed settings to the default settings defined in the settings menu, if required ➤21|4.7.2.

24 Overview of heating methods

| [Heating mode] | Field | Function |
|---|---|---|
| Temperature mode |  | Controlled heating to the required temperature.<br>The temperature hold function is available for use. |
| Time mode |  | Suitable for volume production: Heat in time mode if the time required to reach a certain temperature is known.<br>Workaround if the temperature sensor is defective: Heat in time mode and monitor the temperature using an external thermometer. |
| Temperature mode or time mode |  | Controlled heating to the required temperature or over a required time period. The heating device switches off as soon as one of the two values is reached. |
| Temperature mode and speed mode |  | Controlled heating to the required temperature. The maximum rate at which the temperature increases per unit of time can be entered so that the workpiece is heated along a specified curve.<br>The temperature hold function is available for use. |

## 7.5 Heating the workpiece

- Ensure that all protective measures have been carried out.

**DANGER**

**Strong electromagnetic field**

Persons fitted with a pacemaker are at risk of death from cardiac arrest.

- Erect a barrier.
- Attach clearly visible warning signs to alert persons fitted with pacemakers to the hazard area.

**DANGER**

**Strong electromagnetic field**

Danger of death due to heated metallic implant.

Risk of burns from carrying metallic parts.

- Erect a barrier.
- Attach clearly visible warning signs to alert persons fitted with implants to the hazard area.
- Attach clearly visible warning signs to alert persons carrying metal parts to the hazard area.

**WARNING**

**Strong electromagnetic field**

Risk of cardiac arrhythmias and tissue damage from spending longer periods in a strong electromagnetic field.

- Minimise the amount of time spent in the electromagnetic field.
- Exit the hazard area immediately after switching on the device.

### 7.5.1 Setting the generator power according to the application

The required generator power setting is application-specific and depends on the inductor type and several factors:

- rigid inductor
  - application-specific
  - power setting recommended by the manufacturer
- flexible inductor
  - workpiece size and weight
  - required target temperature
  - cross-section and length of the inductor
  - disassembly: heating of the workpiece must take place very quickly, requiring higher power than for assembly.
  - fit: tight fits require higher target temperatures and power.

The optimum power setting is individual and is determined by means of tests, particularly when using flexible inductors. For support with the design of the medium-frequency induction system, contact Schaeffler.

#### Setting the generator power

1. Tap [System settings] to access the settings.

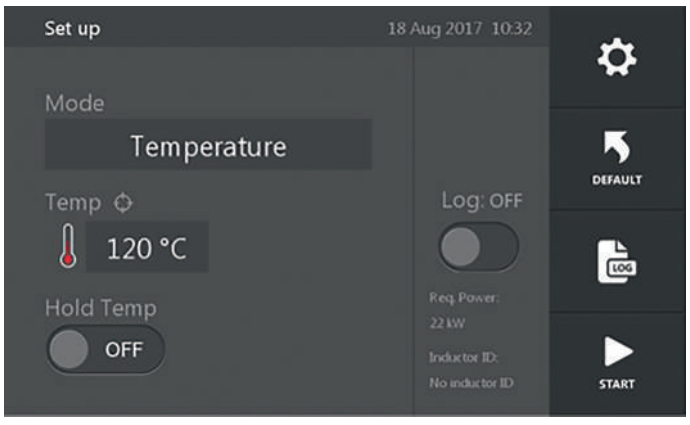
» The [System settings] window opens.

2. Navigate to [System settings], window 1.
3. Tap [Max. Power] to change the maximum power.
4. Set the desired maximum power.
5. Press [Back] to return to the previous menu.

### 7.5.2 Heating in temperature mode

If an inductor with inductor recognition is connected, the stored settings of the inductor program are automatically preset ➤23|4.7.4.

38 Heating in temperature mode



✓ The inductor is connected.

✓ The required temperature sensors are connected. For a single measurement: T1, for Delta T measurement: T1 and T2.

1. Select [Temperature] as the [Mode].
2. Touch [Temp] and set the target temperature for the heating process.
3. Activate the [Hold Temp] selector switch and set the desired hold time [Hold Time] if the temperature hold function is required
4. Activate the [Log] selector switch if logging of the heating process is required.
5. Press [Start] to start the heating process.

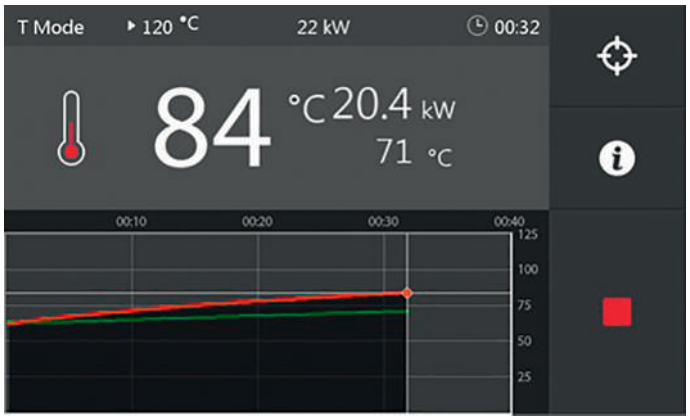
› The heating process starts.

› If a signal tower is connected, the indicator flashes green.

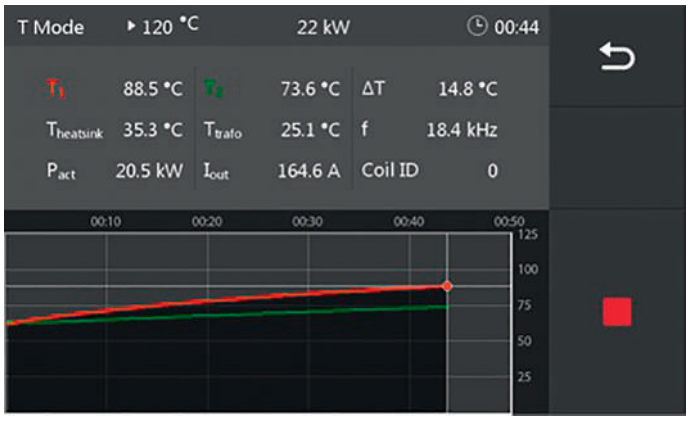
› The display shows the current workpiece temperature at temperature sensor T1.

› If a second temperature sensor T2 is attached, its temperature will also be shown on the display.

39 Display of the workpiece temperatures




40 Expanded data overview




6. Press [Additional information] to toggle between a graphical display and an extended data overview

» Once the workpiece has reached the target temperature, a loud beep will sound.

7. To cancel the beep, press [Stop].

The heating operation can be terminated at any time by pressing [Stop].

25 Deviations with or without temperature hold function

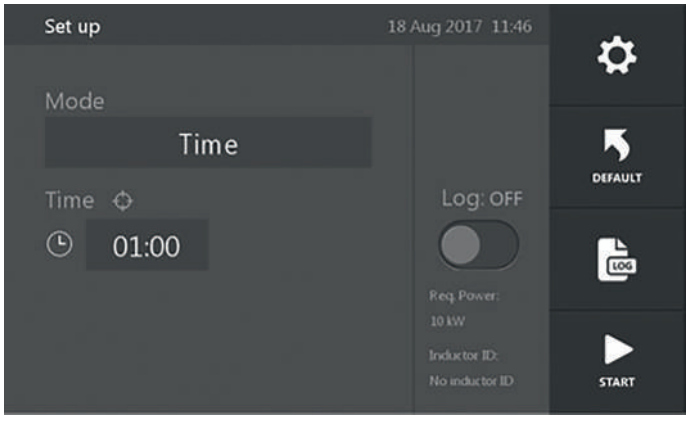
| [Hold Temp] | Target temperature reached |
|---|---|
| Deactivated | Heating finishes automatically. |
| Activated | Heating finishes automatically. |
| | Heating recommences automatically if the workpiece temperature falls below the value in [Thold mode]. |
| | The time remaining in the temperature hold function is indicated by a clock on the screen. |
| | A message appears and a loud continuous beep is emitted once the set time has elapsed. |



### 7.5.3 Heating in time mode

If an inductor with inductor recognition is connected, the stored settings of the inductor program are automatically preset ➤23|4.7.4.

41 Heating in time mode




✓ The inductor is connected.

✓ The required temperature sensors are connected. For a single measurement: T1, for Delta T measurement: T1 and T2.

1. Select [Time] as the [Mode].
2. Touch [Time] and set the duration of the heating process.
3. Activate the [Log] selector switch if logging of the heating process is required.
4. Press [Start] to start the heating process.

› The heating process starts.

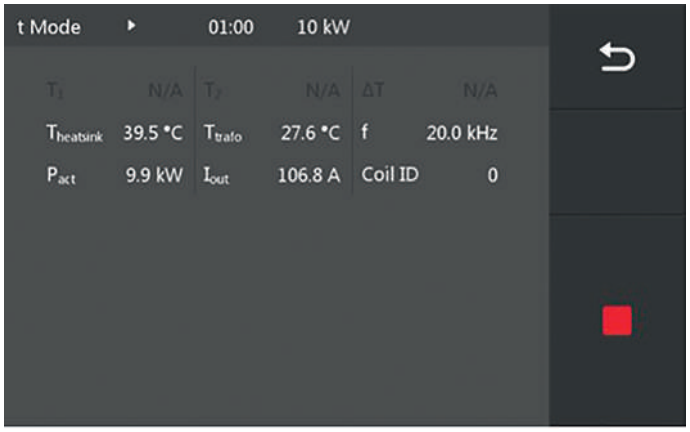
› If a signal tower is connected, the indicator flashes green.

› The display shows the current workpiece temperature at temperature sensor T1.

› If a second temperature sensor T2 is attached, its temperature will also be shown on the display.

42 Display of the workpiece temperatures


43 Expanded data overview




5. Press [Additional information] to toggle between a graphical display and an expanded data overview.

» The device switches off automatically once the set time has elapsed. A loud beep is emitted.

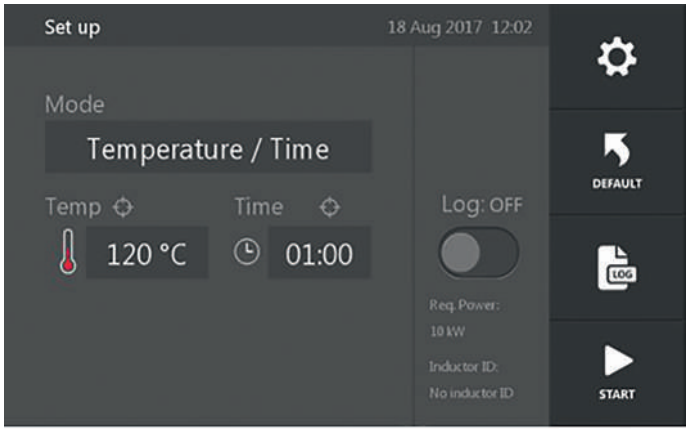
6. To cancel the beep, press [Stop].

The heating operation can be terminated at any time by pressing [Stop].

### 7.5.4 Heating in temperature mode or time mode

If an inductor with inductor recognition is connected, the stored settings of the inductor program are automatically preset ➤23|4.7.4.

44 Heating in temperature mode or time mode

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✓ The inductor is connected.

✓ The required temperature sensors are connected. For a single measurement: T1, for Delta T measurement: T1 and T2.

1. Select [Temperature / Time] as the [Mode].
2. Touch [Temp] and set the target temperature for the heating process.
3. Touch [Time] and set the duration of the heating process.
4. Activate the [Hold Temp] selector switch and set the desired hold time [Hold Time] if the temperature hold function is required
5. Activate the [Log] selector switch if logging of the heating process is required.
6. Press [Start] to start the heating process.

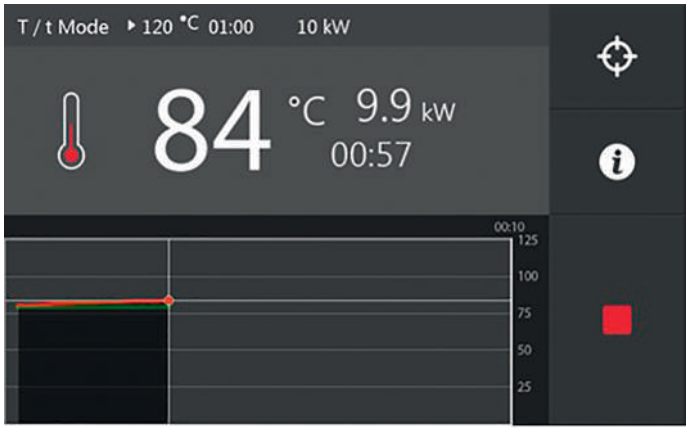
› The heating process starts.

› If a signal tower is connected, the indicator flashes green.

› The display shows the current workpiece temperature at temperature sensor T1.

› If a second temperature sensor T2 is attached, its temperature will also be shown on the display.

45 Display of the workpiece temperatures

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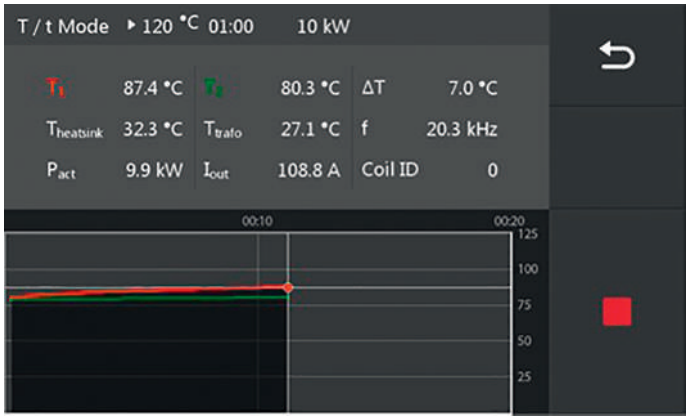
46 Expanded data overview

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7. Press [Additional information] to toggle between a graphical display and an extended data overview

» The generator switches off automatically once the set time has elapsed or the target temperature has been reached. A loud beep is emitted.

8. To cancel the beep, press [Stop].

The heating operation can be terminated at any time by pressing [Stop].

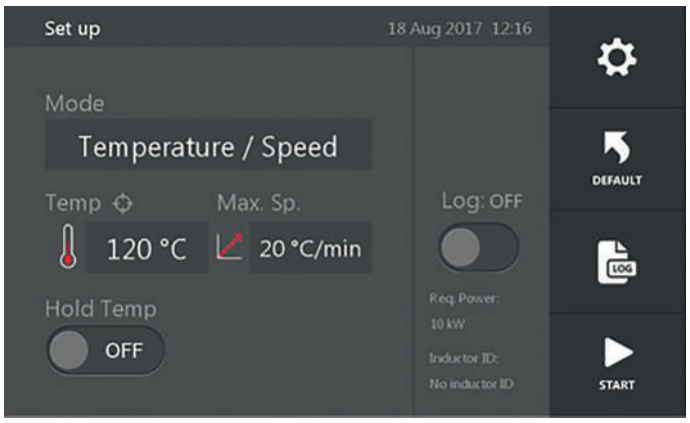
26 Deviations with or without temperature hold function

| [Hold Temp] | Target temperature reached |
|---|---|
| Deactivated | Heating finishes automatically. |
| Activated | Heating finishes automatically. |
| | Heating recommences automatically if the workpiece temperature falls below the value in [Thold mode]. |
| | The time remaining in the temperature hold function is indicated by a clock on the screen. |
| | A message appears and a loud continuous beep is emitted once the set time has elapsed. |

### 7.5.5 Heating in temperature mode and speed mode

If an inductor with inductor recognition is connected, the stored settings of the inductor program are automatically preset ➤23|4.7.4.

47 Heating in temperature mode and speed mode

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✓ The inductor is connected.

✓ The required temperature sensors are connected. For a single measurement: T1, for Delta T measurement: T1 and T2.

1. Select [Temperature / Speed] as the [Mode].
2. Touch [Temp] and set the target temperature for the heating process.
3. Touch [Max. Sp.] and set the maximum rate of increase for the heating process.
4. Activate the [Hold Temp] selector switch and set the desired hold time [Hold Time] if the temperature hold function is required
5. Activate the [Log] selector switch if logging of the heating process is required.
6. Press [Start] to start the heating process.

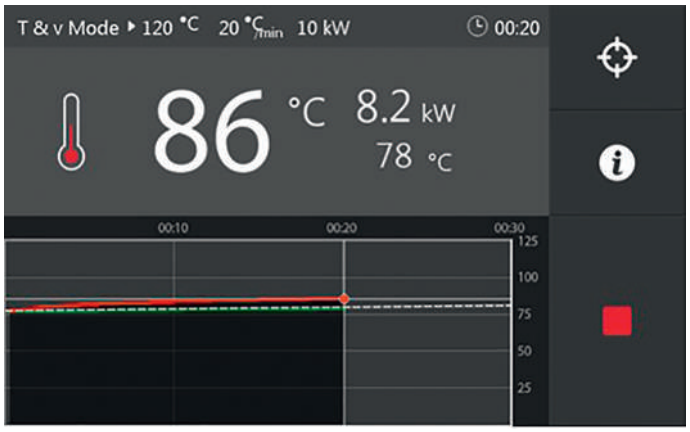
› The heating process starts.

› If a signal tower is connected, the indicator flashes green.

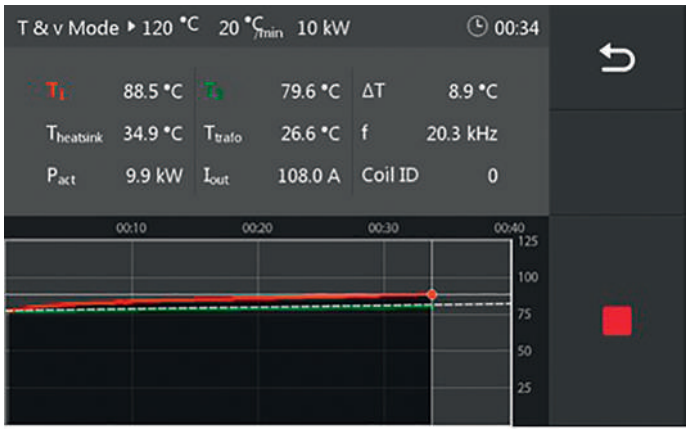
› The display shows the current workpiece temperature at temperature sensor T1.

› If a second temperature sensor T2 is attached, its temperature will also be shown on the display.

48 Display of the workpiece temperatures




49 Expanded data overview



7. Press [Additional information] to toggle between a graphical display and an extended data overview

» The dashed white line in the graphical representation shows the specified rate of increase.

» Once the workpiece has reached the target temperature, a loud beep will sound.

8. To cancel the beep, press [Stop].

The heating operation can be terminated at any time by pressing [Stop].

27 Deviations with or without temperature hold function

| [Hold Temp] | Target temperature reached |
|---|---|
| Deactivated | Heating finishes automatically. |
| Activated | Heating finishes automatically. |
| | Heating recommences automatically if the workpiece temperature falls below the value in [Thold mode]. |
| | The time remaining in the temperature hold function is indicated by a clock on the screen. |
| | A message appears and a loud continuous beep is emitted once the set time has elapsed. |

## 7.6 Removing the inductor from the workpiece

Once the heating operation has finished, the inductor can be removed from the workpiece.

✓ Wear protective gloves resistant to temperatures up to +300 °C.

1. Remove all temperature sensors from the heated workpiece.
2. Remove the inductor from the heated workpiece.

» The heated workpiece is available for further use.

Mount or dismount the heated workpiece as quickly as possible, before the workpiece begins to cool.

When removing the temperature sensor, do not pull it by the cable. Pull on the plug and sensor head only.

# 8 Troubleshooting

The device continuously monitors process parameters and other factors that are key to the heating process running as smoothly as possible. In the event of a malfunction, the heating process usually stops and a pop-up window complete with error message is displayed.

28 Error messages

| Error message | Possible cause | Remedy |
|---|---|---|
| [module NOT loaded] | Configuration file, admin file or setup file cannot be found or loaded | 1. Contact the manufacturer |
| [Export of CSV file failed. Please try again.] | Log file cannot be saved | 1. Insert the USB storage device into the designated port<br>2. Check whether the USB storage device is writable |
| [No temperature increase measured] | Insufficient temperature increase within the set time | 1. Check whether the temperature sensor is mounted on the workpiece<br>2. Check whether the temperature sensor is connected to the generator<br>3. Check whether the set power is sufficient |
| [Communication timeout] | Software problem that could not be remedied automatically | 1. Switch off the device using the main switch<br>2. Wait 30 s and switch the device back on<br>3. If the error persists, contact Schaeffler |
| [Slave interlink alarm] | Software problem that could not be remedied automatically | 1. Switch off the device using the main switch<br>2. Wait 30 s and switch the device back on<br>3. If the error persists, contact Schaeffler |
| [Thermocouple 1 disconnected] | Temperature sensor T1 not connected or defective | 1. Connect temperature sensor<br>2. Connect a different temperature sensor |
| [Thermocouple 2 disconnected] | Temperature sensor T2 not connected or defective | 1. Connect temperature sensor<br>2. Connect a different temperature sensor |
| [Theatsink PCB 1 too low]<br>[Theatsink PCB 2 too low] | The ambient temperature is below 0 °C (+32 °F) | 1. Switch off the device using the main switch<br>2. Wait until the ambient temperature has risen above 0 °C (+32 °F)<br>3. If the temperature is within the limit value and the error still occurs, contact the manufacturer |
| [Udc PCB 1 too low]<br>[Udc PCB 2 too low] | Input voltage (DC) too low | 1. Check the mains connection<br>2. Check the fuses in the mains supply |
| [Upower PCB 1 too low]<br>[Upower PCB 2 too low] | Output voltage is below 10 V | 1. Contact the manufacturer |
| [High current PCB 1 Alarm]<br>[High current PCB 2 Alarm] | Occurrence of a peak current | 1. When using a flexible inductor, reduce the number of turns |
| [No inductor connected on PCB 1]<br>[No inductor connected on PCB 2] | No inductor connected to the generator | 1. Connect inductor to the generator<br>2. Connect inductor recognition ➤43\|6.3.1 |
| [Transformer overheated PCB 1]<br>[Transformer overheated PCB 2] | The temperature in the generator is above +140 °C (+284 °F) | 1. Switch off the device using the main switch<br>2. Wait until the ambient temperature has dropped below +140 °C (+284 °F)<br>3. Clean the air filter ➤59\|9.1<br>4. If the temperature is within the limit value and the error still occurs, contact the manufacturer |
| [Inductor 1 thermal off PCB 1] | The inductor has overheated or the dongle is not connected | 1. Allow the inductor to cool until the thermal cut-out resets automatically<br>2. Connect inductor recognition ➤43\|6.3.1<br>3. Connect dongle |
| [Current sensor failure PCB 1]<br>[Current sensor failure PCB 2] | Fault in the current sensor | 1. Contact the manufacturer |

29 Malfunctions and corrective measures

| Malfunctions | Possible cause | Remedy |
|---|---|---|
| Display remains black after switching on | The display remains black for some time during the start-up phase | 1. Wait 1 min after start to see if the start screen appears.<br>2. Check the mains connection<br>3. Check emergency stop switch<br>4. Check the fuses in the mains supply |
| Heating process stops although the set temperature has not yet been reached | Delta-T function is activated | 1. Check whether Delta-T function is deactivated.<br>2. Deactivate Delta-T function ➤34\|4.10.2 |
| Heating process does not start | Delta-T function is activated or incorrectly set | 1. Check Delta-T function settings.<br>2. Check whether Delta-T function is deactivated.<br>3. Deactivate Delta-T function ➤34\|4.10.2 |
| | Inductor recognition is incorrectly connected | 1. Check inductor recognition connection.<br>2. Connect inductor recognition ➤43\|6.3.1. |
| The component does not heat up | Component not ferromagnetic | 1. Check whether component is ferromagnetic. |
| The maximum power is not reached | Mains voltage insufficient | 1. Check the mains voltage<br>2. Check the mains connection |
| | Inductor not suitable for component | 1. Select a suitable inductor<br>2. Use recommendation function ➤36\|4.10.4. |
| Temperature measurement deviates | Temperature sensor not correctly connected | 1. Check whether temperature sensors are correctly connected. |
| | Temperature sensor contaminated | 1. Check sensor head for contamination. |

# 9 Maintenance

Maintenance work and repairs may only be carried out by qualified personnel.

Regular maintenance of the generator and inductor is a prerequisite for reliable operation of the induction system.

Do not use solvents. These can damage the device or impair its function.

✓ The device is switched off and disconnected from the mains voltage.

✓ Ensured that the device cannot be switched on again without authorisation or unintentionally.

1. Do not open the device until 5 min after disconnecting it from the mains supply.
2. Clean the device with a dry cloth.
3. Carry out maintenance pursuant to the maintenance schedule.



30 Maintenance plan

| Activity | Before operation | Monthly |
|---|---|---|
| Check the device for visible damage | ✓ | |
| Clean the device with a dry cloth | ✓ | |
| Check temperature sensors for external damage and contamination of the magnetic head | ✓ | |
| Check cables for damage, replace if necessary | ✓ | |
| Clean the air filter.<br>The cleaning frequency is determined by the degree of contamination in the surrounding area and the operating time. | | ✓ |

## 9.1 Cleaning the air filter

1. Pull the blue handle forwards to release the lock.
2. Tilt the grille forwards.

› The air filter can be removed.

50 Removing the air filter

001C15DA

3. Check the air filter for contamination and replace if necessary.
4. Insert the air filter.
5. Tilt the grille back.
6. Lock the grille with the blue handle.

31 Original air filter

| Property | Description |
|---|---|
| Manufacturer | Rittal |
| Product designation | SK 3322.R700 |
| Dimensions | 120 mm×120 mm×12 mm |

## 9.2 Updating firmware

Updating the firmware may result in stored settings being lost.

Updating the firmware may result in stored log data being deleted.

### Preparing the USB storage device with firmware

✓ Updated firmware has been provided by Schaeffler.

✓ Empty USB storage device

1. Copy the new firmware to the root directory of the USB storage device.

» The USB storage device can then be used for updating the firmware.

### Updating firmware

✓ Log files saved.

2. Check current version number ➤21|4.7.1.
3. Switch off the generator using the main switch.
4. Insert USB storage device.
5. Switch on the generator using the main switch.

› The generator starts automatically.

› The firmware is updated automatically.

› Once the update has finished, the start screen appears.

6. Check version number ➤21|4.7.1.
7. Check system settings.

» The firmware has updated

# 10 Repair

Repairs may only be carried out by the manufacturer or by the manufacturer's authorised specialist dealer.

Contact your distributor if you feel that the device is not working properly.

# 11 Decommissioning

If the heating device is no longer used regularly, remove it from service.

✓ The device is switched off and disconnected from the mains voltage.

✓ Ensured that the device cannot be switched on again without authorisation or unintentionally.

‣ Disconnect the inductor plug from the generator ➤62|11.1.

» The device is out of operation

Adhere to the ambient conditions stipulated for storage.

When removing the temperature sensor, do not pull it by the cable. Pull on the plug and sensor head only.

## 11.1 Disconnecting the inductor from the heating device

✓ Ensure that the generator is not currently running through a heating process. Observe the status display on the generator. Observe the status display for the signal tower, where present.

✓ Ensure that the power output is not carrying current.

1. Switch of the device using the main switch.
2. Applying axial pressure, press the plug deeper into the socket and turn the plug to the left until the white markings are aligned.
3. Remove the plug from the socket.

» The inductor is disconnected from the generator.

# 12 Disposal

Disposal must be carried out in accordance with locally applicable regulations.

# 13 Technical data

32 Available models

| Model | P max. kW | Ordering designation | Certification |
|---|---|---|---|
| MF-GENERATOR3.0-3.5KW-230V | 3,5 | 097975176-0000-10 | CE |
| MF-GENERATOR3.0-10KW-400V | 10 | 097332968-0000-01 | CE |
| MF-GENERATOR3.0-10KW-450V | 10 | 097333247-0000-01 | CE |
| MF-GENERATOR3.0-10KW-500V | 10 | 097333220-0000-01 | CE |
| MF-GENERATOR3.0-10KW-600V | 10 | 097333212-0000-01 | CE |
| MF-GENERATOR3.0-22KW-400V | 22 | 097332003-0000-01 | CE |
| MF-GENERATOR3.0-22KW-450V | 22 | 097331996-0000-01 | CE |
| MF-GENERATOR3.0-22KW-500V | 22 | 097333050-0000-01 | CE |
| MF-GENERATOR3.0-22KW-600V | 22 | 097333034-0000-01 | CE |
| MF-GENERATOR3.0-44KW-400V | 44 | 097247456-0000-01 | CE |
| MF-GENERATOR3.0-44KW-450V | 44 | 097333026-0000-01 | CE |
| MF-GENERATOR3.0-44KW-500V | 44 | 097331872-0000-01 | CE |
| MF-GENERATOR3.0-44KW-600V | 44 | 097331473-0000-01 | CE |
| MF-GENERATOR3.0-10KW-600V-UL/CSA | 10 | 305346792-0000-10 | UL/CSA |
| MF-GENERATOR3.0-22KW-600V-UL/CSA | 22 | 305346806-0000-10 | UL/CSA |
| MF-GENERATOR3.0-44KW-600V-UL/CSA | 44 | 305346814-0000-10 | UL/CSA |

13

33 Technical data

| Model | P max. | U | I | f | | $f_o$ | | Mains connection plug | L | B | H | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | from | up to | from | up to | | | | | |
| | kW | V | A | Hz | Hz | kHz | kHz | | mm | mm | mm | kg |
| MF-GENERATOR3.0-10KW-400V | 10 | 400 | 16 | 50 | 60 | 10 | 25 | CEE-516P6W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-10KW-450V | 10 | 450 | 14 | 50 | 60 | 10 | 25 | – | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-10KW-500V | 10 | 500 | 12 | 50 | 60 | 10 | 25 | CEE-520P7W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-10KW-600V | 10 | 600 | 10 | 50 | 60 | 10 | 25 | CEE-520P5W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-22KW-400V | 22 | 400 | 32 | 50 | 60 | 10 | 25 | CEE-432P6W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-22KW-450V | 22 | 450 | 30 | 50 | 60 | 10 | 25 | – | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-22KW-500V | 22 | 500 | 28 | 50 | 60 | 10 | 25 | CEE-530P7W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-22KW-600V | 22 | 600 | 23 | 50 | 60 | 10 | 25 | CEE-530P5W | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-44KW-400V | 44 | 400 | 63 | 50 | 60 | 10 | 25 | CEE-463P6W | 600 | 650 | 580 | 78 |
| MF-GENERATOR3.0-44KW-450V | 44 | 450 | 59 | 50 | 60 | 10 | 25 | – | 600 | 650 | 580 | 78 |
| MF-GENERATOR3.0-44KW-500V | 44 | 500 | 55 | 50 | 60 | 10 | 25 | CEE-560P7W | 600 | 650 | 580 | 78 |
| MF-GENERATOR3.0-44KW-600V | 44 | 600 | 45 | 50 | 60 | 10 | 25 | CEE-560P5W | 600 | 650 | 580 | 78 |
| MF-GENERATOR3.0-10KW-600V-UL/CSA | 10 | 600 | 10 | 50 | 60 | 10 | 25 | – | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-22KW-600V-UL/CSA | 22 | 600 | 10 | 50 | 60 | 10 | 25 | – | 600 | 300 | 600 | 46 |
| MF-GENERATOR3.0-44KW-600V-UL/CSA | 44 | 600 | 10 | 50 | 60 | 10 | 25 | – | 600 | 650 | 580 | 78 |

| | | |
|---|---|---|
| B | mm | Width |
| f | Hz | Frequency |
| $f_o$ | kHz | Output frequency |
| H | mm | Height |
| I | A | Amperage |
| L | mm | Length |
| m | kg | Mass |
| P | kW | Power |
| U | V | Voltage |

## 13.1 Operating conditions

The product may only be operated under the following ambient conditions.

34 Operating conditions

| Designation | Value |
|---|---|
| Ambient temperature | 0 °C ... +40 °C |
| Humidity | 5 % ... 90 %, non-condensing |
| Operating location | In closed rooms only. |
| | No explosion risk in the environment. |
| | Clean environment |

## 13.2 Declaration of Conformity

# CE Declaration of Conformity

| | |
|---|---|
| Manufacturer's name: | Schaeffler Smart Maintenance Tools BV |
| Manufacturer's address: | Schorsweg 15, 8171 ME Vaassen, NL<br>www.schaeffler-smart-maintenance-tools.com |

**This declaration of conformity is issued under the sole responsibility of the manufacturer.**

| | |
|---|---|
| **Brand:** | Schaeffler |
| **Product description:** | Inductive generator |
| **Product name/type:** | • MF-GENERATOR-3.0-10KW-400V<br>• MF-GENERATOR-3.0-10KW-450V<br>• MF-GENERATOR-3.0-10KW-500V<br>• MF-GENERATOR-3.0-22KW-400V<br>• MF-GENERATOR-3.0-22KW-450V<br>• MF-GENERATOR-3.0-22KW-500V<br>• MF-GENERATOR-3.0-44KW-400V<br>• MF-GENERATOR-3.0-44KW-450V<br>• MF-GENERATOR-3.0-44KW-500V |
| **Comply with the requirements of:** | • Low Voltage Directive 2014/35/EU<br>• EMC Directive 2014/30/EU<br>• RoHS / RoHS 2 / RoHS 3 Directive 2011/65/EU, annex II amended by directive 2015/863/EU |
| **Applicable harmonized standards:** | Electric Safety<br>• EN 60204-1:2018<br><br>EMC Emission<br>• EN 55011:2016<br>• EN 61000-3-11:2019<br>• EN 61000-3-12:2011 + A1:2021<br><br>EMC Immunity<br>• EN 61000-6-2:2019 |

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**Any modifications made to the product without consulting us and without our written approval will render this declaration invalid.**

H. van Essen
Managing Director
Schaeffler Smart Maintenance Tools BV

Place, Date:
Vaassen, 10-11-2025

CE

# UKCA Declaration of Conformity

| | |
|---|---|
| Manufacturer's name: | Schaeffler Smart Maintenance Tools BV |
| Manufacturer's address: | Schorsweg 15, 8171 ME Vaassen, NL<br>www.schaeffler-smart-maintenance-tools.com |

**This declaration of conformity is issued under the sole responsibility of the manufacturer.**

| | |
|---|---|
| **Brand:** | Schaeffler |
| **Product description:** | Inductive generator |
| **Product name/type:** | ■ MF-GENERATOR-3.0-10KW-400V<br>■ MF-GENERATOR-3.0-10KW-450V<br>■ MF-GENERATOR-3.0-10KW-500V<br>■ MF-GENERATOR-3.0-22KW-400V<br>■ MF-GENERATOR-3.0-22KW-450V<br>■ MF-GENERATOR-3.0-22KW-500V<br>■ MF-GENERATOR-3.0-44KW-400V<br>■ MF-GENERATOR-3.0-44KW-450V<br>■ MF-GENERATOR-3.0-44KW-500V |
| **Comply with the requirements of:** | ■ Electromagnetic Compatibility Regulations 2016 S.I. 2016:1091<br>■ Electrical Equipment (Safety) Regulations 2016 S.I. 2016:1101<br>■ The Restriction of the use of certain Hazardous Substances Regulations 2012 (SI 2012/3032) |
| **Applicable harmonized standards:** | Electric Safety<br>■ EN 60204-1:2018<br><br>EMC Emission<br>■ EN 55011:2016<br>■ EN 61000-3-11:2019<br>■ EN 61000-3-12:2011 + A1:2021<br><br>EMC Immunity<br>■ EN 61000-6-2:2019 |

**Any modifications made to the product without consulting us and without our written approval will render this declaration invalid.**

H. van Essen
Managing Director
Schaeffler Smart Maintenance Tools BV

Place, Date:
Vaassen, 10-11-2025

UK CA

# 14 Accessories

## 14.1 Flexible inductors

51 Flexible inductor MF-INDUCTOR-44KW

0019F6F2

35 Technical data MF-INDUCTOR

| Ordering designation | P | $t_{max}$ | L | D | $d_{min}$ | $T_{max}$ | | m | Ordering number |
|---|---|---|---|---|---|---|---|---|---|
| | kW | min | m | mm | mm | °C | °F | kg | |
| MF-INDUCTOR-22KW-10M-D12-180C-SLIM | 10, 22 | 10 | 10 | 12 | 75 | +180 | +356 | 3 | 097557501-0000-01 |
| MF-INDUCTOR-22KW-15M-D12-180C-SLIM | 10, 22 | 10 | 15 | 12 | 75 | +180 | +356 | 5 | 097330582-0000-01 |
| MF-INDUCTOR-22KW-20M-D12-180C-SLIM | 10, 22 | 10 | 20 | 12 | 75 | +180 | +356 | 7 | 097330809-0000-01 |
| MF-INDUCTOR-22KW-25M-D12-180C-SLIM | 10, 22 | 10 | 25 | 12 | 75 | +180 | +356 | 9 | 097330787-0000-01 |
| MF-INDUCTOR-22KW-30M-D12-180C-SLIM | 10, 22 | 10 | 30 | 12 | 75 | +180 | +356 | 11 | 097330574-0000-01 |
| MF-INDUCTOR-22KW-15M-D15-180C | 10, 22 | – | 15 | 15 | 100 | +180 | +356 | 7 | 097334618-0000-01 |
| MF-INDUCTOR-22KW-20M-D15-180C | 10, 22 | – | 20 | 15 | 100 | +180 | +356 | 9 | 097333999-0000-01 |
| MF-INDUCTOR-22KW-25M-D15-180C | 10, 22 | – | 25 | 15 | 100 | +180 | +356 | 11 | 097334529-0000-01 |
| MF-INDUCTOR-22KW-30M-D15-180C | 10, 22 | – | 30 | 15 | 100 | +180 | +356 | 14 | 097334006-0000-01 |
| MF-INDUCTOR-22KW-35M-D15-180C | 10, 22 | – | 35 | 15 | 100 | +180 | +356 | 17 | 097427500-0000-01 |
| MF-INDUCTOR-22KW-40M-D15-180C | 10, 22 | – | 40 | 15 | 100 | +180 | +356 | 20 | 097427497-0000-01 |
| MF-INDUCTOR-22KW-10M-D20-300C | 10, 22 | – | 10 | 20 | 120 | +300 | +572 | 6 | 097555398-0000-01 |
| MF-INDUCTOR-22KW-15M-D20-300C | 10, 22 | – | 15 | 20 | 120 | +300 | +572 | 9 | 097334626-0000-01 |
| MF-INDUCTOR-22KW-20M-D20-300C | 10, 22 | – | 20 | 20 | 120 | +300 | +572 | 12 | 097334634-0000-01 |
| MF-INDUCTOR-22KW-25M-D20-300C | 10, 22 | – | 25 | 20 | 120 | +300 | +572 | 16 | 097334537-0000-01 |
| MF-INDUCTOR-22KW-30M-D20-300C | 10, 22 | – | 30 | 20 | 120 | +300 | +572 | 18 | 097334545-0000-01 |
| MF-INDUCTOR-44KW-15M-D19-180C | 44 | – | 15 | 19 | 140 | +180 | +356 | 16 | 097334812-0000-01 |
| MF-INDUCTOR-44KW-20M-D19-180C | 44 | – | 20 | 19 | 140 | +180 | +356 | 20 | 097334642-0000-01 |
| MF-INDUCTOR-44KW-25M-D19-180C | 44 | – | 25 | 19 | 140 | +180 | +356 | 24 | 097292168-0000-01 |
| MF-INDUCTOR-44KW-30M-D19-180C | 44 | – | 30 | 19 | 140 | +180 | +356 | 28 | 097293512-0000-01 |
| MF-INDUCTOR-44KW-35M-D19-180C | 44 | – | 35 | 19 | 140 | +180 | +356 | 32 | 097420344-0000-01 |
| MF-INDUCTOR-44KW-40M-D19-180C | 44 | – | 40 | 19 | 140 | +180 | +356 | 36 | 097419966-0000-10 |
| MF-INDUCTOR-44KW-15M-D28-300C | 44 | – | 15 | 28 | 220 | +300 | +572 | 17 | 097406775-0000-01 |
| MF-INDUCTOR-44KW-20M-D28-300C | 44 | – | 20 | 28 | 220 | +300 | +572 | 23 | 097406783-0000-01 |
| MF-INDUCTOR-44KW-25M-D28-300C | 44 | – | 25 | 28 | 220 | +300 | +572 | 29 | 097407054-0000-01 |
| MF-INDUCTOR-44KW-30M-D28-300C | 44 | – | 30 | 28 | 220 | +300 | +572 | 34 | 097407062-0000-01 |

| | | |
|---|---|---|
| $d_{min}$ | mm | Min. workpiece diameter |
| D | mm | Outside diameter |
| L | m | Length |
| m | kg | Mass |
| P | kW | Generator output |
| $t_{max}$ | min | Max. operating period |
| $T_{max}$ | °C or °F | Max. temperature |

## 14.2 Inductor feed cable

The inductor feed cables MF-GENERATOR.CONNECT-22KW-3M for generators with an output of 10 kW and 22 kW, and MF-GENERATOR.CONNECT-44KW-3M for generators with an output of 44 kW can be used to connect a flexible inductor to the corresponding generators.

The inductor feed cable has two single-pin round plug connectors for connection to the generator and the inductor. The round plug connectors have a bayonet lock to prevent detachment.

52 Inductor feed cable MF-GENERATOR.CONNECT-22KW-3M

0019F641

53 Inductor feed cable with inductor recognition MF-GENERATOR.CONNECT-22KW-3M-IR

001C2F52



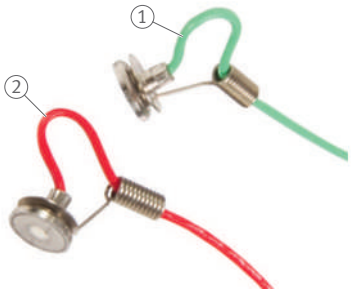
36 Inductor feed cables

| Ordering designation | P | L | Inductor detection | Ordering number |
|---|---|---|---|---|
| | kW | m | | |
| MF-GENERATOR.CONNECT-22KW-3M | 10, 22 | 3 | – | 097335037-0000-01 |
| MF-GENERATOR.CONNECT-44KW-3M | 44 | 3 | – | 097292885-0000-01 |
| MF-GENERATOR.CONNECT-22KW-3M-IR | 10, 22 | 3 | ✓ | 302109706-0000-10 |
| MF-GENERATOR.CONNECT-44KW-3M-IR | 44 | 3 | ✓ | 302110160-0000-10 |

| | | |
|---|---|---|
| L | m | Length |
| P | kW | Generator output |

## 14.3 Temperature sensors

54 Temperature sensors




001A5304

| | | | |
|---|---|---|---|
| 1 | MF-GENERATOR.MPROBE-GREEN | 2 | MF-GENERATOR.MPROBE-RED |

37 Temperature sensors

| Ordering designation | Colour | L | $T_{max}$ | | Ordering number |
|---|---|---|---|---|---|
| | | m | °C | °F | |
| MF-GENERATOR.MPROBE-GREEN | Green | 3,5 | +350 | +662 | 097334561-0000-01 |
| MF-GENERATOR.MPROBE-RED | Red | 3,5 | +350 | +662 | 097335029-0000-01 |

| | | |
|---|---|---|
| L | m | Length |
| $T_{max}$ | °C or °F | Max. temperature |

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## 14.4 Equipotential bonding cable

To prevent distortion of the temperature measurement, an equipotential bonding cable is used. The equipotential bonding cable connects the generator to the workpiece to be heated.

55 Equipotential bonding cable

001C2F22

Before use, check whether the high force of the magnet can cause damage to the workpiece. The magnetisation introduced by the magnet is > 2 A/cm.

38 Equipotential bonding cable

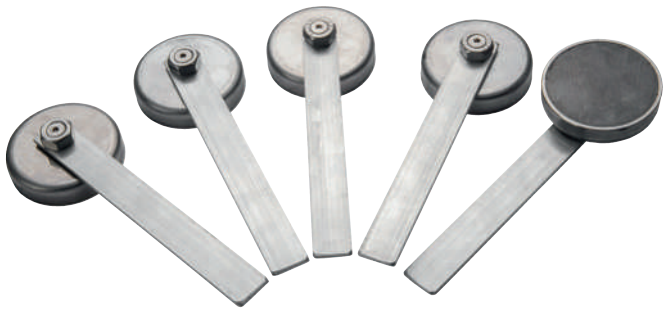
| Ordering designation | P | L | Ordering number |
|---|---|---|---|
| | kW | m | |
| MF-GENERATOR.CABLE-6.5M-PE | 10, 22, 44 | 6,5 | 301572690-0000-10 |

| | | |
|---|---|---|
| L | m | Length |
| P | kW | Generator output |

## 14.5 Magnetic holders

The magnetic holders for flexible inductors provide a rapid means of attaching a flexible inductor.

56 Magnetic holders MF-INDUCTOR.MAGNET



0019F601

Before use, check whether the high force of the magnet can cause damage to the workpiece. The magnetisation introduced by the magnet is > 2 A/cm.

Due to the introduced magnetisation, the magnetic holders may not be placed on rolling bearings that are to be used further.

39 Magnetic holder

| Ordering designation | D | $T_{max}$ | | Ordering number |
|---|---|---|---|---|
| | mm | °C | °F | |
| MF-INDUCTOR.MAGNET | 15 ... 28 | +200 | +392 | 097555258-0000-01 |
| MF-INDUCTOR.MAGNET-D12 | 12 | +200 | +392 | 300258089-0000-10 |

| | | |
|---|---|---|
| D | mm | Outside diameter of the flexible inductors |
| $T_{max}$ | °C or °F | Max. temperature |

## 14.6 Signal tower

Connection of a signal tower is optional.

57 Signal tower MF-GENERATOR.LIGHTS

0019F671

40 Signal tower

| Ordering designation | Ordering number |
|---|---|
| MF-GENERATOR.LIGHTS | 097568864-0000-01 |

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## 14.7 Dongle

If an inductor without inductor recognition and thermal cut-out is used, a dongle must be connected to the device terminal.

58 Dongle

001C15E1

41 Dongle

| Ordering designation | Ordering number |
|---|---|
| MF-GENERATOR.DNG | 306233193-0000-10 |

## 14.8 Protective gloves

59 Protective gloves, heat-resistant up to 300 °C

001A7813

42 Protective gloves, heat-resistant

| Ordering designation | Description | $T_{max}$ | | Ordering number |
|---|---|---|---|---|
| | | °C | °F | |
| GLOVES-300C | protective gloves, heat-resistant | 300 | 572 | 300966911-0000-10 |

| | | |
|---|---|---|
| $T_{max}$ | °C or °F | Max. temperature |

# 15 Replacement parts

## 15.1 Plugs for inductors and inductor feed cables

60 Plugs for inductors and inductor feed cables


| | | | |
|---|---|---|---|
| 1 | MF.SOCKET-M25 | 2 | MF.SOCKET-M32 |

43 Plugs for inductors and inductor feed cables

| Ordering designation | Ordering number | Suitable for inductors and inductor feed cable |
|---|---|---|
| MF.SOCKET-M25 | 305031996-0000-10 | MF-INDUCTOR-22KW-10M-D12-180C-SLIM |
| | | MF-INDUCTOR-22KW-15M-D12-180C-SLIM |
| | | MF-INDUCTOR-22KW-20M-D12-180C-SLIM |
| | | MF-INDUCTOR-22KW-25M-D12-180C-SLIM |
| | | MF-INDUCTOR-22KW-30M-D12-180C-SLIM |
| | | MF-INDUCTOR-22KW-15M-D15-180C |
| | | MF-INDUCTOR-22KW-20M-D15-180C |
| | | MF-INDUCTOR-22KW-25M-D15-180C |
| | | MF-INDUCTOR-22KW-30M-D15-180C |
| | | MF-INDUCTOR-22KW-35M-D15-180C |
| | | MF-INDUCTOR-22KW-40M-D15-180C |
| | | MF-INDUCTOR-22KW-30M-D20-300C |
| | | MF-GENERATOR.CONNECT-22KW-3M |
| | | MF-GENERATOR.CONNECT-22KW-3M-IR |
| | | Rigid inductors ≤ 22 kW |
| MF.SOCKET-M32 | 305032003-0000-10 | MF-INDUCTOR-22KW-10M-D20-300C |
| | | MF-INDUCTOR-22KW-15M-D20-300C |
| | | MF-INDUCTOR-22KW-20M-D20-300C |
| | | MF-INDUCTOR-22KW-25M-D20-300C |
| | | MF-INDUCTOR-44KW-15M-D19-180C |
| | | MF-INDUCTOR-44KW-20M-D19-180C |
| | | MF-INDUCTOR-44KW-25M-D19-180C |
| | | MF-INDUCTOR-44KW-30M-D19-180C |
| | | MF-INDUCTOR-44KW-35M-D19-180C |
| | | MF-INDUCTOR-44KW-40M-D19-180C |
| | | MF-INDUCTOR-44KW-15M-D28-300C |
| | | MF-INDUCTOR-44KW-20M-D28-300C |
| | | MF-INDUCTOR-44KW-25M-D28-300C |
| | | MF-INDUCTOR-44KW-30M-D28-300C |
| | | MF-GENERATOR.CONNECT-44KW-3M |
| | | MF-GENERATOR.CONNECT-44KW-3M-IR |
| | | Rigid inductors 44 kW |

## 15.2 Sockets for inductor feed cables

61 Sockets for inductor feed cables


| | | | |
|---|---|---|---|
| 1 | MF.PLUG-M25 | 2 | MF.PLUG-M32 |

44 Sockets for inductor feed cables

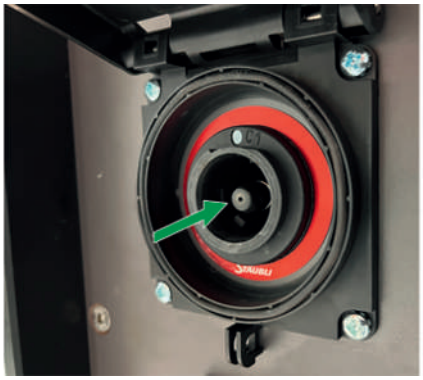
| Ordering designation | Ordering number | Suitable for inductor feed cable |
|---|---|---|
| MF.PLUG-M25 | 305032526-0000-10 | MF-GENERATOR.CONNECT-22KW-3M |
| | | MF-GENERATOR.CONNECT-22KW-3M-IR |
| MF.PLUG-M32 | 305032534-0000-10 | MF-GENERATOR.CONNECT-44KW-3M |
| | | MF-GENERATOR.CONNECT-44KW-3M-IR |

15

## 15.3 Socket for inductor connection on the generator

Socket on the generator for connecting inductors and inductor feed cables.

62 Socket for inductor connection on the generator




45 Socket on the generator for connecting inductors and inductor feed cables

| Ordering designation | Ordering number | Suitable for generators |
|---|---|---|
| MF-GENERATOR.SOCKET | 303151021-0000-10 | MF-GENERATOR2.5 |
| | | MF-GENERATOR3.1 |

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