

INDUCTION HEATERS

DHI-160/190E

DHI-160/190F HD



Operating and Maintenance Manual

ENGLISH

1 INTRODUCTION

Dear customer, thank you for purchasing our product. We believe that you will be fully satisfied and will choose us again in the future. If you have any questions or comments, please contact us via our website or your business representative.

By using the equipment for the first time, the user confirms that they have read this Manual carefully, fully understood its meaning and been informed of all associated risks.

2 SAFETY INSTRUCTIONS



This manual contains safety and operating instructions that must be followed for your safety. Read it carefully before using the equipment for the first time and keep it in a safe place for future reference. The latest version of the manual can be found on the manufacturer's website.

Read these safety instructions carefully before using or maintaining the equipment.



The manufacturer is not responsible for any damage or injury caused by failure to follow the instructions in this manual. Any modifications or maintenance not specified in this manual must not be performed. The appliance must only be used for heating ferrous materials in accordance with these instructions.

2.1 Individual protection



Persons with other metallic or electronic surgical implants are not allowed to work with this device and have to keep a safe distance of at least 1 m. Because of the contact currents, they should not approach or touch the heated parts. Consult a doctor and assess the risks before approaching the equipment.



When working with this device, do not wear any metal objects such as jewellery, rings, watches, necklaces, identification plates, belt buckles, piercings or clothes with metal components such as metal rivets, buttons, zip fasteners, etc.



Always wear safety goggles or a face shield when using this device.



Always use protective gloves that provide adequate protection when working with the device.



Wear protective clothing when working with the equipment.

2.2 Danger of burns



The high temperatures produced by using this device may cause serious burns if contact is made with the heated part. Do not touch any objects located near the heating inductor unless you have checked that it has cooled down.

Make sure that jewellery and other metal parts do not come near the switched-on inductor. They will heat up quickly and could cause burns.

2.3 Risk of fire and explosion



Do not overheat components, particularly surfaces coated with adhesives or similar substances. Do not place the equipment on or near flammable surfaces. Do not place equipment near combustible materials. Always keep a fire extinguisher near the equipment.



Do not use the equipment in an explosive environment. Do not heat gas or other pressure vessels or containers containing flammable gases or liquids with the equipment and keep them well away from the induction heating equipment.

2.4 Gas fume hazards

Keep your distance from the equipment to avoid breathing in fumes.

If using the equipment in a confined space, ventilate the area or use an extractor to extract gases and fumes. If ventilation is inadequate, use a respirator. Make sure you are supervised by a qualified person when working. Check the quality of the air you breathe.

Heating certain materials such as paints, adhesives, fluxes, etc. can produce fumes and gases. Inhaling these fumes can be a health hazard and can cause death. Therefore, read the appropriate safety data sheets and instructions for heated materials such as metals and their finishes, adhesives, fluxes, paints, cleaners, corrosives, paint removers, etc.

Do not use the equipment on parts that have been degreased or sprayed, as heat may react with the fumes and produce highly toxic gases.

Do not heat metals such as galvanized steel and metals coated with cadmium, lead or similar substances unless the coating has been removed before heating. Proceed only if the area is well ventilated or use an approved filtration unit. Cast components and all metals containing the above-mentioned elements may produce toxic fumes when heated.

2.5 Electromagnetic field emissions



During use, the inductor generates a strong electromagnetic field that is not visible. The device is designed to minimise the risks from electromagnetic fields, but residual risks remain.

The recommended safe distance between the inductor and head or body of the operator is at least 30 cm.

Never leave the inductor near the head or vital organs or wrap the induction heating cable around the body.

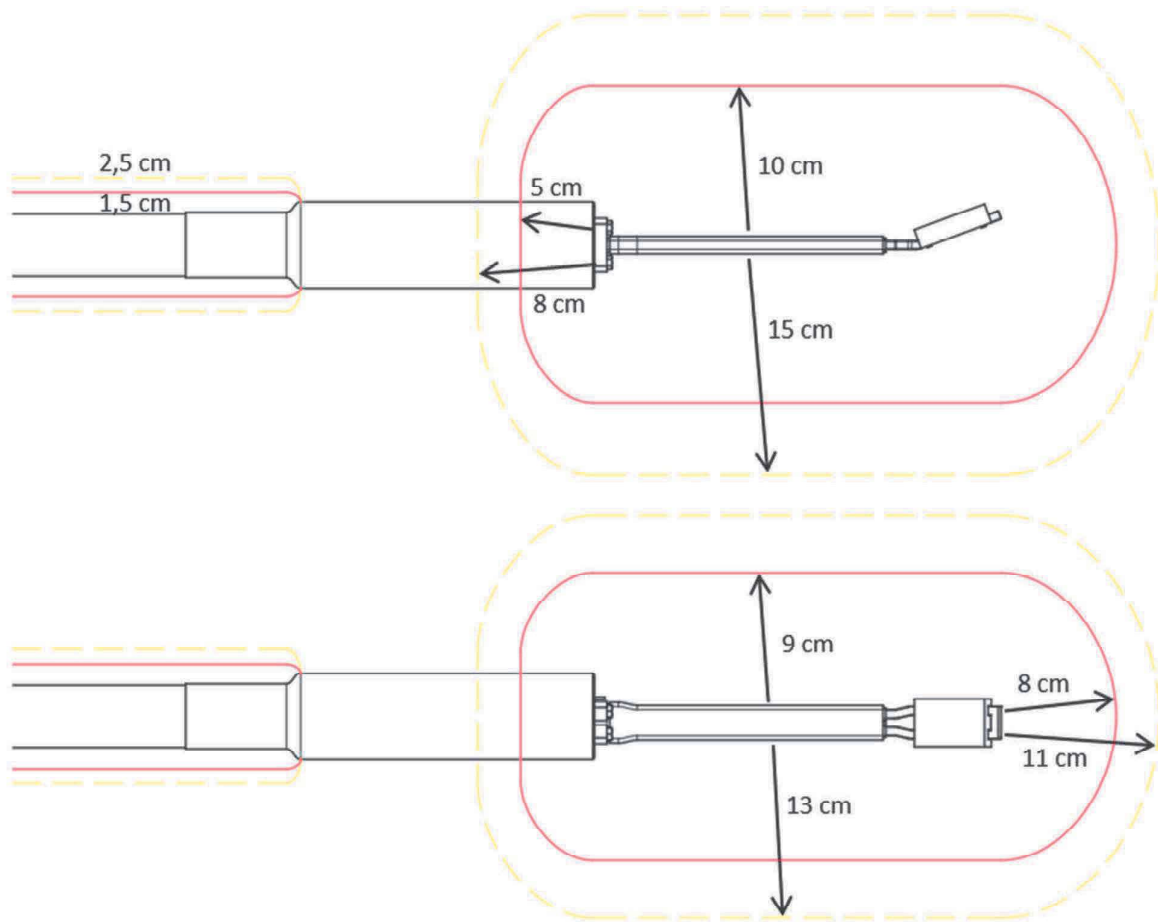
Nearby electromagnetic fields generated by the device may adversely affect the operation of electronic devices located near the device during operation.

Dangerous zones of the electromagnetic field

Measurements made on DHI-190F HD according to EMF Directive 2013/35/EU.

Yellow dashed - danger zone for head and body

Red continuous - danger zone for limbs



2.6 Optical radiation



Infrared and optical radiation is generated due to the heating of the workpiece.

2.7 Electrical risk



WARNING! Electrical hazard. Do not use the device if the device is damaged in any way, especially the power cord, the applicator lead or the mains plug.

Electrical shock can cause serious injury or potentially fatal injury.



WARNING! The device has safe touch currents of up to 35 kHz when operating on parts accessible to touch when using the protective cover of the connection terminals, which can cause an uncontrollable painful reaction due to the passage of high frequency current when interacting with tissue.

2.8 Transport



When moving the device, it must be in a vertical position.

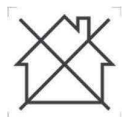
Do not use the power cord or applicator cable to move or lift the device.

3 CONNECTION



The device is a Class I appliance and must be connected to an earthed outlet.

The device is protected by a fuse.



This Class A, Group 2 device is not intended for use in dwellings where the electricity is supplied from the public mains with a low-voltage source. Electromagnetic compatibility problems may arise in these areas due to interference and radio frequencies.

4 ENVIRONMENT

Operating temperature: 0 to +40 °C

Storage temperature: -10 to +55 °C

Humidity: ≤ 50% up to 40 °C, ≤ 90% at 20 °C

Altitude: up to 2000 m above sea level

5 MAINTENANCE



If the power cord or applicator cable is damaged, it must be replaced by the manufacturer or a qualified person to avoid danger.

Maintenance must only be carried out by a qualified person. An annual maintenance cycle is recommended. Warranty service may only be performed by a service technician trained and authorised by the manufacturer.



WARNING! Always disconnect the unit from the mains and wait at least 2 minutes before carrying out maintenance. High voltages are present inside the equipment and residual dangerous voltages may remain on the capacitors!

When performing maintenance, remove the cover and any excess dust inside the device. On this occasion, a qualified person must use a measuring instrument to check the electrical insulation, protective earth and the device connections, including the applicator insulation!

Clean the surfaces of the device with a dry cloth. Do not use aggressive chemical cleaners, solvents or thinners.

Do not block the air supply to the device.

6 REGULATIONS

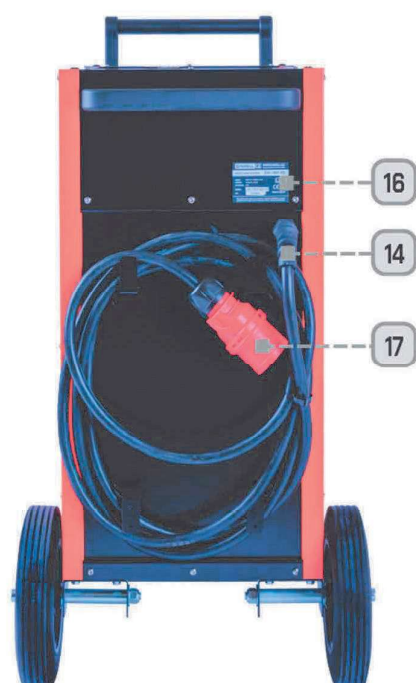
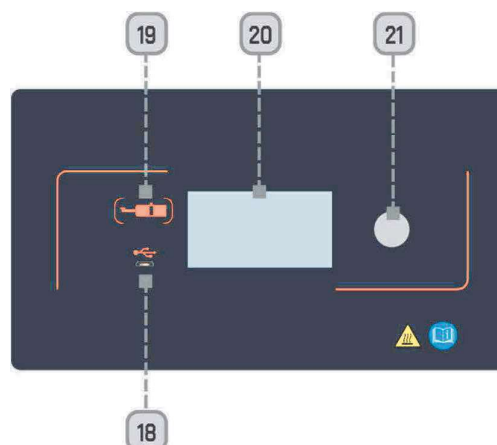


The equipment complies with European directives, AS 3820:2020 and IEC 60513

7 TECHNICAL PARAMETERS

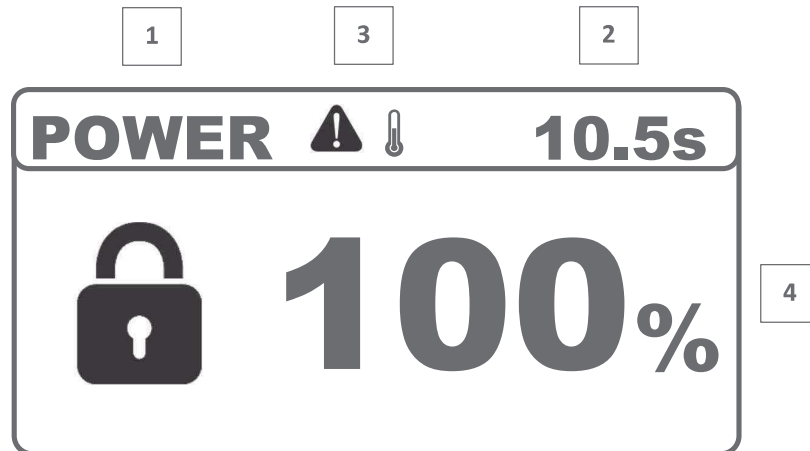
Type	DHI-160E/F HD 6M	DHI-160E/F HD 10M	DHI-190E/F HD 6M	DHI-190E/F HD 10M
Power supply requirements	400 V		400 V	
Frequency	50/60 Hz		50/60 Hz	
Number of wires	3 phase + PE		3 phase + PE	
Rated input current	23 A		30 A	
Operating frequency	16 kW		19 kW	
Apparent output power	18-35 kHz		18-35 kHz	
Power cable length	5 m		5 m	
Applicator length	6 m	10 m	6 m	10 m
Coolant capacity	19 l	20 l	19 l	20 l
Coolant	Special coolant			
Protective system	IP21		IP21	
Internal fuses	3× F32 A, 1× T2A, 6.3×32, 500 V		3× F32 A, 1× T2A, 6.3×32, 500 V	
Dimensions (w × h × d)	540 × 960 × 850 mm		540 × 960 × 850 mm	
Weight	96 kg	100 kg	96 kg	100 kg

8 DESCRIPTION OF DEVICE



Pos.	Description
1	Handle
2	Induction the applicator cable
3	Connector - remote control
4	Connector - pedal
5	Control panel
6	Storage area
7	Control cable
8	Applicator control button
9	Induction focus attachment
10	Cooling holes
11	Coolant level gauge
12	Mains switch
13	Front wheel brake
14	Mains power cable
15	LED indicator
16	Nameplate
17	Plug 3 × 400 VAC
18	USB connector
19	Heating activation button Inductor change button
20	OLED
21	Encoder
22	Coolant funnel

8.1 Main screen



- 5. Parameter / screen name
- 6. Set / remaining timer value
- 7. Status icons
- 8. Parameter value

-  LOCK - device safety lock
-  HEAT - heating in progress
-  TIMER - timer
-  PRE-HEAT - preheating
-  PRE-TIMER-HEAT - preheating timer
-  TIMER-POST-HEAT - post-heating
-  PRE-TIMER-POST-HEAT - post-heating timer
-  WARNING
 -  FAN - fan failure or low fan speed
 -  VOLTAGE - approaching outside operating range
 -  TEMP LIMIT - approaching the overtemperature power limit.

9 PUTTING INTO OPERATION

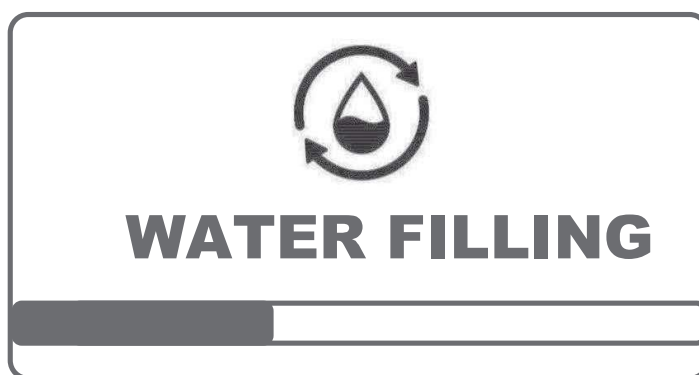
1. Unpack the device and any accessories supplied and check that the device and accessories are in good condition and undamaged. If you find any defects, do not use the device.
2. If an inductor is not installed in the process applicator, install it according to chapter **13.1 Replacing the inductor**.
3. Check that the tank is filled to the maximum. If not, unscrew the tank cap, insert the filler neck and fill the tank to the maximum with the special coolant.
4. Connect the device to a 3 × 400 V socket and turn it on using the switch at the front of the device (12).
5. The cooling-circuit priming cycle is activated automatically (the letters "WATER FILLING" flash on the display during this). If the machine has not been used for an extended period of time, place the applicator in an upright position with the inductor facing upwards during the priming cycle to ensure that it fills correctly with coolant.
6. When filling the machine with coolant for the first time, it is necessary to top up the coolant several times. In this case, turn the unit off and return to step 3.
7. Put on the tank cap. The device is ready to use.

10 DEVICE CONTROL

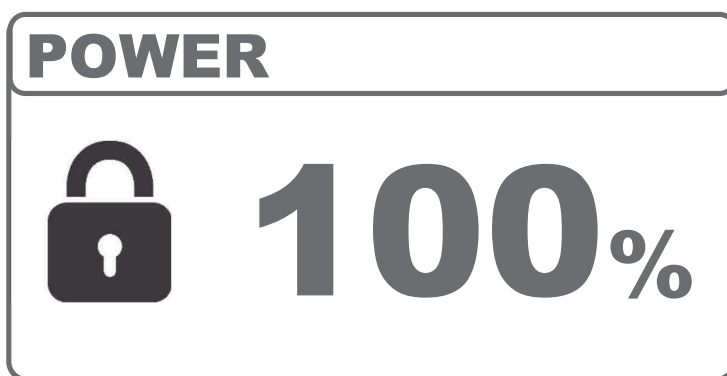
1. Connect the device to a 3 × 400 V socket and turn it on using the main switch (12).



2. The device starts automatic priming of the cooling circuit. Wait for the process to finish.
Note: The priming cycle can be paused by pressing the encoder.



3. When the process is complete, the main screen will appear. The device is ready for use.



4. Before starting heating, the device must be activated by pressing the activation button (19) on the panel. The lock symbol will disappear on the display and the option to start heating by pressing the button on the applicator will be activated.

POWER

100%

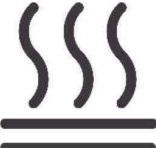
Turn the encoder to set the desired heating power in percentage.

- Place the inductor (9) with the open part of the ferrite on the workpiece and then start heating by pressing the heating button on the applicator (8) or by pressing the pedal. Move the inductor smoothly over the area to be heated and do not leave it in one place for a long time to avoid overheating the material and the inductor.



The ongoing heating is indicated by a symbol  on the display and an LED light (15) on the applicator.

POWER

 **100%**

Note: The power output can also be changed during heating.



Do not heat the same area for too long to prevent the heated material from melting. The heating is strong and fast and without the correct power setting, the material being heated may be damaged.

The equipment has been designed to minimise the risks caused by electromagnetic fields. Some residual risks remain, and it is recommended that a safety distance between the inductor and the operator's head/body be maintained.

10.1 Standby mode

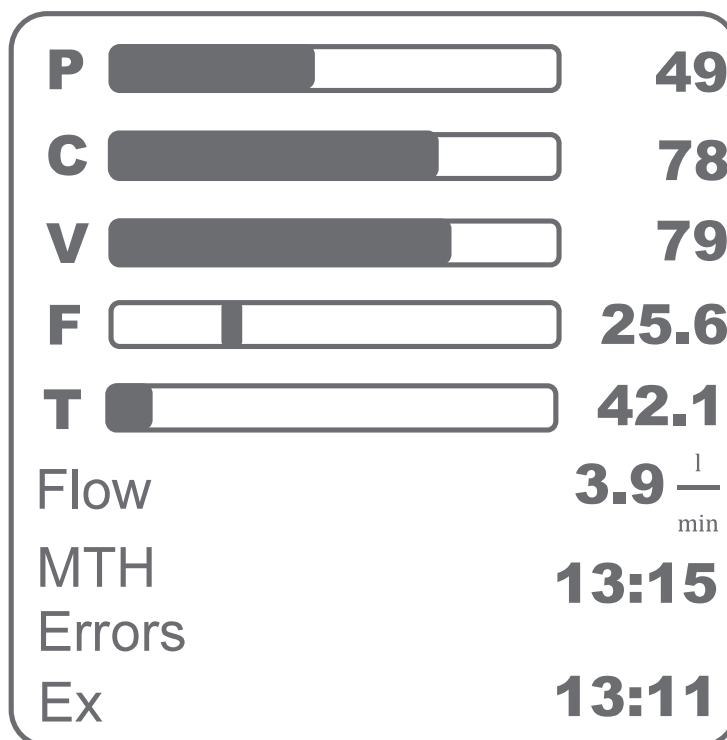
For safety reasons, after 5 minutes of inactivity, the option to start heating is deactivated and the device enters standby mode, which is indicated by the LOCK symbol on the display.

To activate the machine, press the heating activation button (19).

Within 15 minutes of locking, the machine can also be activated by pressing the button (8) on the applicator for 1 s, allowing the user to remain in the working position without having to walk to the machine.

11 INFORMATION DISPLAY

Briefly press the encoder (21) on the main screen to display the operating parameters of the heater. Rotate the encoder to scroll through the items.



Note: Flashing of a parameter indicates the current power limit of the current heating process.

Meaning of parameters:

Parameter	Description
P	Output power as a percentage.
C	Output current as a percentage.
V	Output voltage as a percentage.
Frequency	Output frequency in kHz. The indicator should not approach the edges when heated.
Temp.	Coolant temperature in °C, with a cooling-status indicator up to the maximum temperature.
Flow	Coolant flow rate in l/min.
MTH	Operating time (hh:mm)
Errors	Displays the history of the last 4 errors that have occurred in the device (error number and time of occurrence in MTH).

12 SETTING THE PARAMETERS

Open the SETTINGS menu by pressing and holding the encoder (3 s). Rotate the encoder to select the desired parameter and confirm the selection by pressing the encoder. The selected parameter will flash and by rotating the encoder set the desired value, then press the encoder again to confirm the value. Exit the SETTINGS menu by pressing and holding the encoder (3 s).

Note: If the parameter takes the value "---" it means that it is not available in the given configuration.

Note: The Settings menu is not available on machines in the **2E2** variant. On machines in the **2E2** variant, a long press on the encoder will take you straight to the **2Advanced menu2**.

Timer	10.5 s
Pre.Time	1.5 s
Pre.Power	50 %
Post.Time	1.5 s
Post.Power	30 %
Rmt.Control	2T
Comm.Addr.	---
Advanced menu	

Meaning of parameters:

Parameter	Description
Timer	TIMER function: setting the time from 1 to 300 s activates the function, setting it to OFF deactivates it.
Pre.Time	PREHEATING function: Setting the preheating time from 1 to 300 s activates the function, setting it to OFF deactivates it.
Pre.Power	PREHEATING: Setting the preheating power in percentage.
Post.Time	POSTHEATING function: Setting the post-heating time from 1 to 300 s activates the function, setting it to OFF deactivates it.
Post.Power	POSTHEATING: Setting the post-heating power in percentage.
Rmt.Control	Setting the control for activating the preheating: 2T - button on the applicator (standard mode) 4T - button on the applicator (four-step mode) PED - via foot pedal PEA - via analogue input (0/4-20 mA) TEA - control via temperature controller MBUS - control via RS-485
Comm.Addr	Communication address for RS-485
Advanced menu	Go to advanced menu. To return, long press the encoder (>3 s).

Back	
Heat.Lock	20 min
Standby	OFF
Cooling	STD
Repl.coolant	NO
Bus Volt.	524 V
In.Curr	8.1 A
In.Curr.Max	MAX
Factory reset	NO
Firmware	

The following parameters are available:

Parameter	Description
Back	Return to the main settings menu
Heat.Lock	Heating start lockout time
Standby	Standby time (cooling off)
Cooling	Cooling mode setting: STD (standard) / MAX (maximum output)
Repl. coolant	Activates coolant change mode
Bus Volt.	Internal DC voltage in Volts
In. Curr	Input current drawn in Amps
In.Curr.Max	Maximum input current draw limit (6 A - 30 A)
Factory reset	Restore factory settings
Firmware	Device version view

12.1 Function TIMER

The timer is a function that allows the heating to stop automatically after a certain (set) time. The function thus enables the dosing of the transferred energy (heat) into the material, e.g. for repeated spot heating to the required temperature.

The timer function is activated when the desired time is set in the TIMER parameter and is indicated on the display by the symbol and the set time. It is deactivated by setting to OFF.



During heating, the display shows the bar graph and the time remaining until the heating is switched off. When the set time has elapsed, heating is automatically terminated, indicated by the disappearance of the heating symbol and the expiry of the countdown.



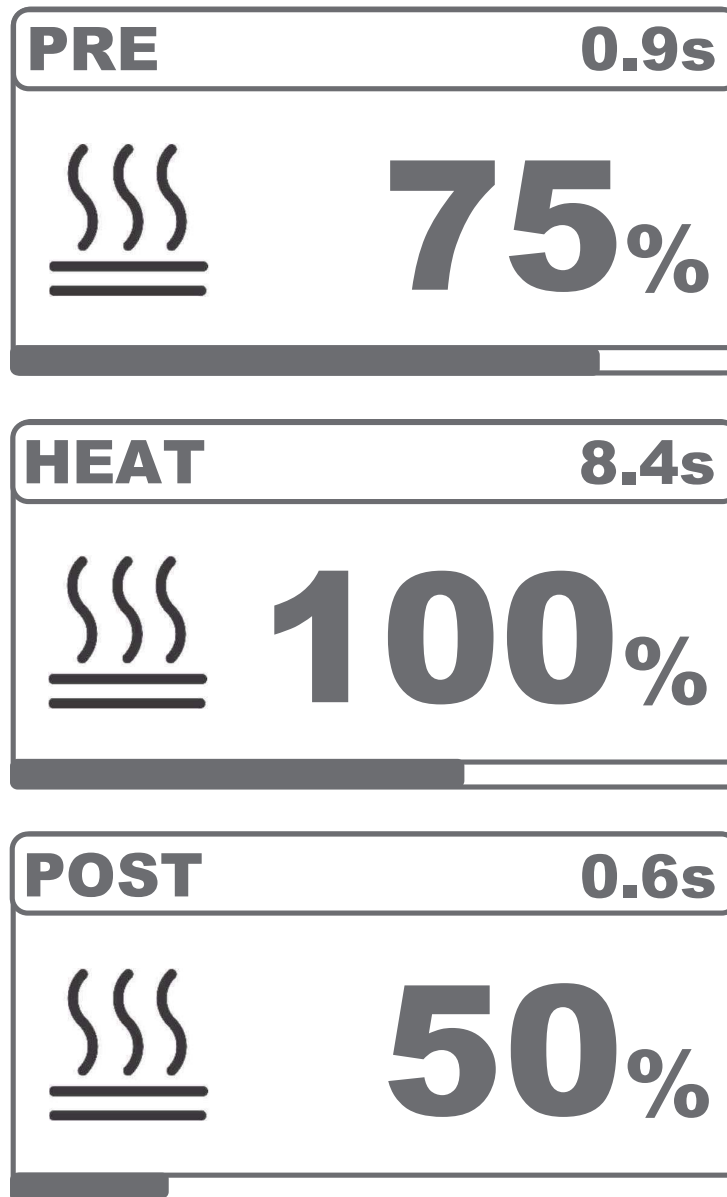
12.2 Functions Pre- and Post- Heating

The *Pre-Heating* function allows the automatic insertion of a user-set preheating phase, which is performed before the main heating cycle starts. The function is activated by setting the *Pre.Time* parameter to the desired non-zero value and the desired *Pre.Power* of this phase. Pre-Heating can be used, for example, to preheat the material and bring it to a lower temperature than the soldering temperature before starting the main soldering cycle.

Conversely, the *Post-Heating* function allows for the automatic insertion of a user-set heating phase, which is automatically executed after the main heating cycle is completed. It is activated similarly by setting the *Post.Time* and *Post.Power* of this heating phase. It is used for subsequent warming up or slower cooling of the heated material.



In the Pre- and Post- Heating phase, the segment inscription is displayed. The time on the top right counts down each section separately. The bar graph reads the total heating time.



12.3 Function four step

In the SETTINGS menu, select **Rmt.Control** and choose **4T**. This will switch the machine to inductor calibration mode. On the 4T calibration screen, unlock the process by pressing the **heating button** (19) on the control panel. Then place the applicator with the inductor "in the air", i.e. keep the inductor at least 1 metre away from any ferromagnetic material **during the entire process of calibration**. Press and hold the control button (8) on the applicator until the calibration process is complete. Once calibration is complete, four-step mode is ready for use.

Four-Step Control Mode

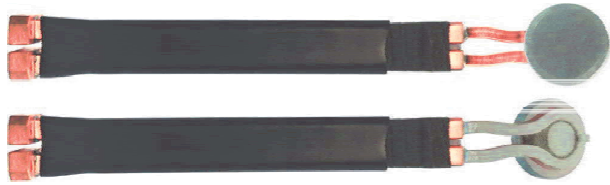
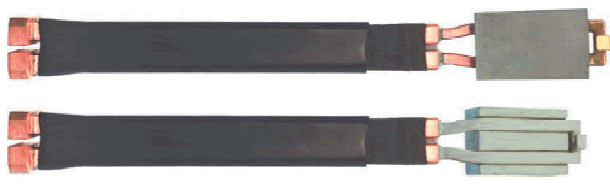
Warning: Never leave the device unattended in four-step mode. If you are not working with the machine, turn off the four-step mode. Do not place the inductor near materials that you do not want to heat, especially the machine itself.

1. Place the inductor (9) on the material you want to heat.
2. Then start heating by pressing the heat button on the applicator (8).
3. It is not necessary to hold down the heat button while the material is heating.
4. To stop heating, press the heat button on the applicator again.
5. If the inductor is moved away from the heated material, heating will stop automatically.

13 INDUCTORS

DHI-160E/F HD and DHI-190E/F HD are supplied as standard with the rectangular inductor.

Inductors and other accessories are optional and provide additional heating options for different applications.

Inductor designation for DHI-160/190	
Focusing inductor round 38 mm (12-102-01)	Focusing inductor rectangular 33x52 mm (12-101-01)
	



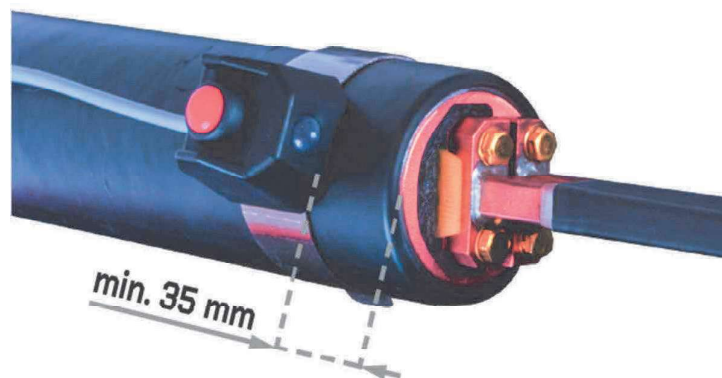
ATTENTION! Use only the original accessories for the device! If non-original accessories are used, the manufacturer is not liable for any damage caused by the use of unsuitable or non-original accessories.

Heated metal radiates heat into the inductor, and the inductor is subjected to high temperatures. Excessive heating of the inductor (e.g. by heating to a high temperature, leaving the inductor on the molten material, etc.) shortens its life and it is up to the user to avoid such excessive heating.

When the metal is dark red, its temperature is below 850 °C, when it turns bright red to orange, its temperature exceeds 1000 °C and when it turns white, its temperature exceeds 1200 °C.

Position of the heating button

The control button must be located at least 35 mm from the front edge of the applicator.



13.1 Replacing the heating inductor

It is recommended to replace the inductor when the device is switched off, however, it is possible to do it according to the following procedure with the device switched on:

1. Press and hold the activation button (19) until "REPLACE INDUCTOR" appears on the display.

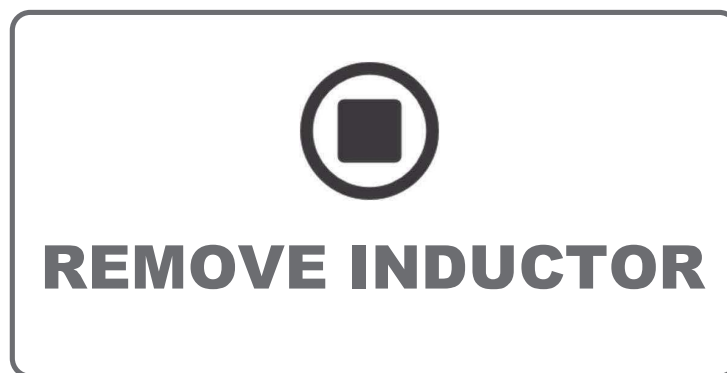


2. Grip the handle so that it is vertical with the attachment upwards and above the top edge of the main unit, to avoid liquid leakage.
3. Unscrew the heating inductor attachment using a suitable tool.
4. Clean the contact surfaces on the applicator and inductor.
5. Check that sealing rings are present on the applicator to prevent coolant leakage.
6. Attach the desired inductor, screw it in lightly and then tighten it (tightening torque 2.5-3 Nm).
7. Press and hold the activation button (19) to activate the cooling-circuit priming cycle and wait for it to complete.
Note: If, for example, incorrect installation causes a coolant leak, press the activation button (19) or the encoder (21) to pause the watering process, correct the problem and press again to complete the cycle.
8. When the priming cycle is complete, the unit is ready for use.

14 COOLANT CHANGE

It is recommended to change the coolant regularly (once a year) to prevent degradation and damage to the heater. To change the coolant:

1. From the SETTINGS menu, select ADVANCED MENU, then REPLACE COOLANT. The screen will appear:



Note: The fluid change process can be cancelled by long pressing the activation button (19).

2. Unscrew the inductor (9) from the process applicator. Then place the applicator in a suitable container and allow the coolant to flow out of it.
3. Press and hold the button on the applicator (8) until the coolant flows out.



Repeat the discharge cycle until the device is empty.

4. To drain as much coolant as possible, then tilt the device backwards at an angle of approx. 30° (raise the handle of the device). Press and hold the button on the applicator (8) until the remaining coolant is drained.
5. Switch off the device.
6. Reinstall the inductor on the process applicator as described in "Replacing the Inductor" and proceed to fill with new coolant as described in "PUTTING INTO OPERATION".

14.1 Coolant



Use only the coolant approved by the manufacturer. Use of unsuitable coolant may damage the equipment and cause electric shock. The manufacturer is not responsible for any damage if unsuitable coolant is used.

Attribute	Value
pH (for 20 °C)	7.5 (100 %)
Relative density	≈ 1.01

Note: For safe handling and use of coolant, follow the coolant manufacturer's instructions. Refer to the manufacturer's website for the Safety Data Sheet and more information.

15 LIST OF ERROR MESSAGES

If a device error occurs, the display will show its code:

Error code	Error description	Possible causes
E1	Grid undervoltage	Undervoltage in the power supply network, or failure of one of the phases.
E2	Grid overvoltage	Overvoltage in the power supply network.
E3	Input overcurrent	Caused by short-term overload.
E4, E5	Output overcurrent	Caused by connection of an incorrect inductor, short circuit due to insulation damage, etc.
E6	Overload	Caused by an unexpected change in the nature of the workpiece
E7	Too low frequency	Minimum operating frequency exceeded, e.g. due to connection of too large an inductor.
E8	Too high frequency	Maximum operating frequency exceeded, e.g. due to connection of too small inductor.
E9, E11	Resonance circuit and frequency control error	Caused by connection of a non-original heating inductor or short-circuiting of the inductor due to insulation damage
E12	Cooling error	Cooling circuit failure, coolant flow not detected. No coolant, pinched or blocked hose, etc.
E14 - E18	Device overheating	Overheating of the equipment. E.g. air flow restriction, dust blockage in cooling exchangers, prolonged overloading of the unit, etc.
E20 - E256	Device servicing errors	Errors in the instrument hardware, please contact service.

Errors E3,4,6,7,8,9,11,12 can be reset by the user by pressing applicator control button or encoder.

Errors E1,2,14,15,16,17,18 reset automatically after the error condition is resolved.

The machine has several protective systems, particularly against electrical and thermal damage. In case of an error, the heating does not work.

If the thermal protection is activated, simply wait until the cooling phase is over.

If error E12 occurs, first check that there is sufficient coolant in the tank and that there is no leakage. Visually inspect the process applicator line for breaks or pinching.

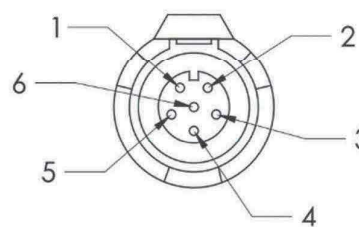
If any other errors occur, turn the unit off with the main switch and turn it back on.

16 REMOTE CONTROL

Note: neither the function nor the remote-control connector is available on machines in the 2EE variant.

The remote control is activated in the SETTINGS menu, parameter *Rmt.Control*.

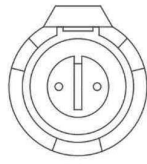
Mode	Description
2T	Remote control off. Heating is started by a button on the applicator.
PED	Heating is activated by the connected foot switch.
PEA	Heating control via 0/4-20 mA current loop.
TEA	Activation of the control via the temperature controller.
MBUS	Remote control via RS-485 bus



The remote-control circuitry is not galvanically isolated from the internal circuits and is connected to ground, therefore galvanically isolated transducers must be used when connecting the heater to the control systems to prevent damage to the equipment. **If this is not observed, the manufacturer will not be liable for any damage.**

16.1 Activating the heating with the foot pedal

The heating can also be activated using the foot pedal. Connect the foot pedal to the PED connector (see DESCRIPTION OF DEVICE, position 4) and set the "Rmt.Control" parameter to "PED" in the SETTINGS menu.



Pin	Description
1	GND (0 V)
2	NO contact

16.2 Current loop control

The heating output can be controlled remotely using a **0/4-20 mA** current loop.

Connect the control system to the RMT connector (see 9 DEVICE DESCRIPTION, position 3) and set the parameter "Rmt.Control" in the SETTINGS menu to "PEA". The connector wiring (device view) is as follows:

Designation of individual pin functions for 6 pin connectors			
1	GND	Joint	Common ground 0 V
2	0/4-20 mA	Access	Positive input of the current loop (relative to GND). 0 mA - off; 4-20 mA - on with continuous power control from min (4 mA) to 100% (20 mA)
3	HEAT	Output	Active heating indication (NO contact, type OC, max. 24 V, 100 mA)
4	OK	Output	Device readiness signal (NO contact, type OC, max. 24 V, 100 mA)
5	12 V	Power	Power supply 12 V, max. 0.5 A
6	SH		Shielding

16.3 Temperature regulator control

This remote-control mode is designed to control the heating to a set temperature using the optional external temperature controller, which can be simply connected to the RMT connector and activated by setting the "Rmt.Control" parameter to "TEA" in the SETTINGS menu. Set the desired temperature or temperature profile on the controller and activate the heating by pressing the button on the applicator.

16.4 Bus RS-485 control

Activates basic heating control via RS-485 bus. To activate, set the "Rmt.Control" parameter in the SETTINGS menu to "MBUS".

Pin	Description	
1	GND	Common ground
3	RS485B	Communication
4	RS485A	Communication
5	12 V	Power supply 12 V / 0.5 A
6	SH	Shielding

17 WARRANTY TERMS

1. Unless otherwise stated, the warranty period for the devices is set by the manufacturer to 24 months from the date of sale to the buyer. The warranty period for the induction the applicator is 6 months. Consumable parts such as attachments, inductors, etc. are covered by a warranty period of 3 months.
2. When claiming a warranty repair, it is necessary to present the warranty certificate, which is valid only if it bears the date of sale, the serial number, the stamp of the relevant shop and the signature of the seller, who hereby confirms the proper demonstration and an explanation of the functions of the product.