Induction Heater

IH 040

RS Article number 360-224

SWISS MADE

Bedienungsanleitung
Instructions for use
Mode d'emploi
Manuale d'istruzioni
Manual de instrucciones

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Safety recommendations

- Because the IH 040 generates a magnetic field, people wearing a pacemaker are not allowed to be within 5 m (16ft) of the IH 040 during operation. Electronic equipment, such as wristwatches, may also be affected.
- Follow the operating instructions at all times.
- Ensure that the voltage supply is correct.
- Electrical arcing may occur when a potential difference exists between the IH 040 and the workpiece. This is not dangerous to human beings and will not cause damage to the IH 040 or the workpiece. However, the IH 040 must never be used in areas where there is a risk of explosion.
- Do not expose the heater to high humidity.
- Never operate the IH 040 without a yoke in position.
- Do not modify the IH 040.
- Use proper handling equipment when lifting heavy workpieces v
- Avoid contact with hot workpieces. Wear the heat resistant gloves included in the scope of delivery to handle hot workpieces.

Security note

To protect the user and the RS pro induction heating device, the following safety instructions must be followed.

Forbidden for persons with heart pacemaker or other sensitive implants.

Wearing of metal parts, watches and jewellery forbidden.

Warning of hot surface.

Warning of magnetic fields.

Read the user manual!

Wear heat-resistant gloves!

1 Introduction

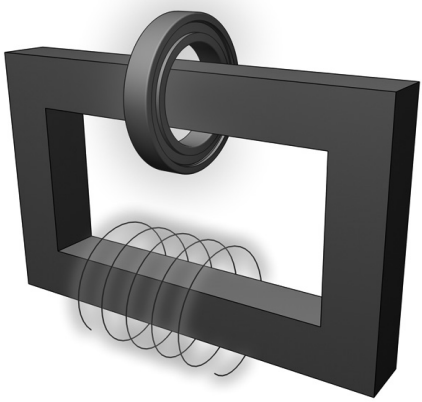
The RS pro IH 040 induction heater is designed to heat bearings or other metallic, ring-shaped workpieces. The heat causes the bearing to expand, which eliminates the need to use force during installation. A 90°C (194°F) temperature difference between the bearing and shaft is generally sufficient to enable installation. At an ambient temperature of 20°C (68°F), the bearing must therefore be heated to 110°C (230°F).

1.1 Intended use

The IH 040 has been designed to heat rolling bearings. However, other metal workpieces that form a closed circuit can also be heated. Examples of acceptable workpieces include bushings, shrink rings, pulleys, and gears. All bearings that fit over the inductive coil and between the vertical supports with the top yoke in place can be heated using the IH 040. In addition, smaller bearings can be placed over either of the three standard yokes. See the illustrations at the beginning of this manual for examples.

1.2 Principle of operation

The IH 040 generates heat by means of a large electrical current that is magnetically induced in the workpiece by a coil within the heater. The high voltage, low current electricity flowing through the large number of windings in the inductive coil induces low voltage, high current electricity in the workpiece. Because the workpiece has the electrical characteristics of a coil with a single, short-circuited winding, the high current generates heat within the workpiece. Because the heat is generated within the workpiece, all of the heater components remain cool.



1.3 Distinguishing feature

The two-probe technology enables stress-free heating for pre-lubricated, sealed and precision rolling bearings. The temperature difference between the bearing inner and outer ring can be adjusted and monitored.
The external induction coil leads to higher efficiency at lower power consumption, which reduces the costs for heating the bearings.

2 Description

The operation of the heater is controlled by the internal electronics in either of the two modes. The operator can either select the desired temperature of the bearing in TEMP MODE or set the length of time that the bearing will be heated in TIME MODE. For the slow heating of sensitive components (such as bearings with C1 or C2 spacing), the power level can be adjusted in steps of 10%. In two-probe mode, the temperature difference between the inner and outer ring can be adjusted. The following applies: The smaller the temperature difference, the lower the mechanical stress that occurs in the bearing, which in turn significantly increases the bearing service life.

2.1 Components

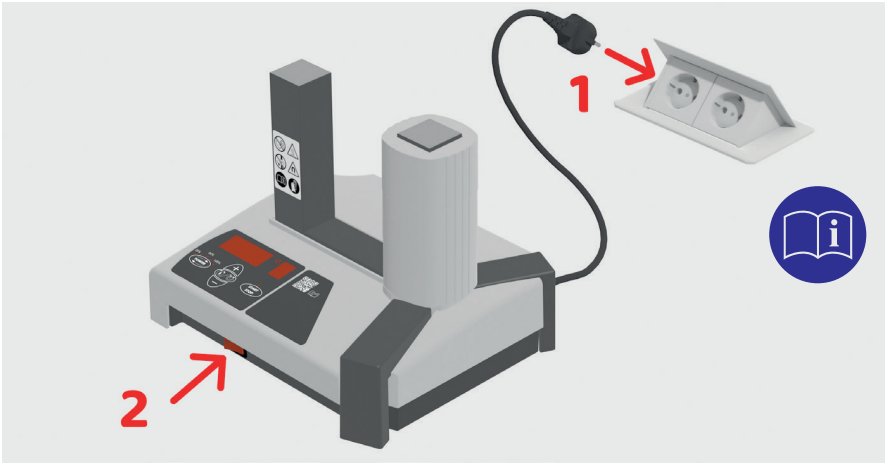
1. User interface
2. Temperature probe
3. Yoke
4. Coil
5. U-Core
6. Extendable bearing support
7. Main switch

2.2 Technical data

IH 040

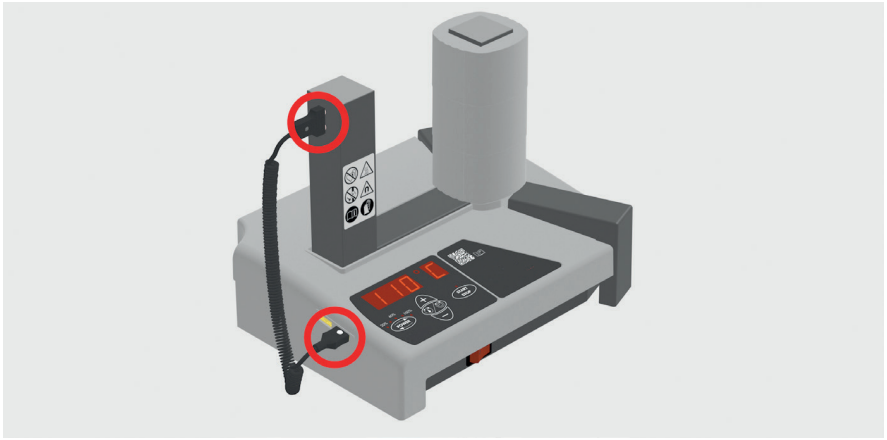
Designation	IH 040 /230 V (Art. 110-12040) IH 040 /120 V (Art. 110-12050) IH 040 /100 V (Art. 110-12060)
Recommended circuit protection	100/120 V: 16A circuit breaker 230 V: 10A circuit breaker
Power	2,1 kVA 1,8 kVA 1,5 kVA
Temperature control	20-180°C (68-356°F) in steps of 1° (1.8°F)
Probe maximum temperature	180°C (356°F)
Time mode	0-60 minutes in steps of 0.1 minute
Power range	10-20-30-40-50-60-80-100%
Demagnetisation, automatic	Residual magnetism < 2A/cm
Overall dimensions	320 x 267 x 293mm
Area between supports (wxh)	114 x 160mm (W x H)
Coil diameter	89.9mm
Weight (with yokes)	17kg
Maximum weight of the bearing	45kg
Maximum heating temperature	180°C (356°F)
Standard yoke dimensions	42,5 x 42,5 x 219mm (for Ø 60mm) 28 x 28 x 219mm (for Ø 40mm) 14 x 14 x 219mm (for Ø 20mm)

3 Preparation for use

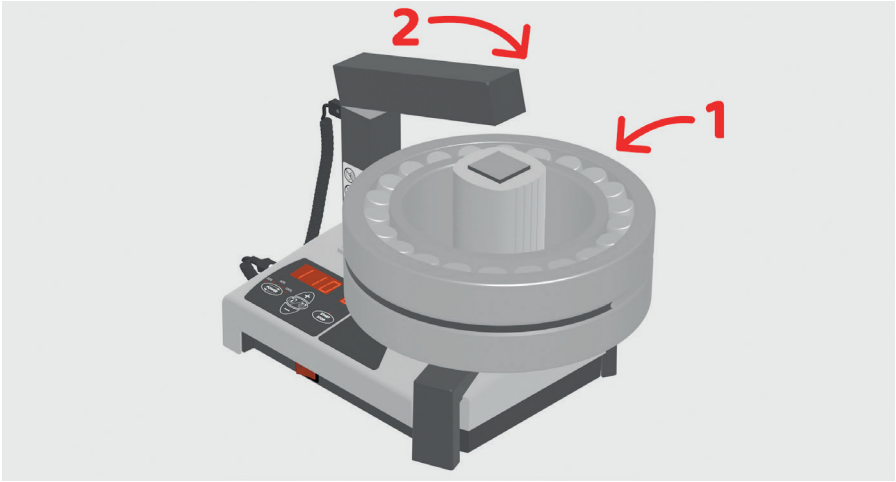


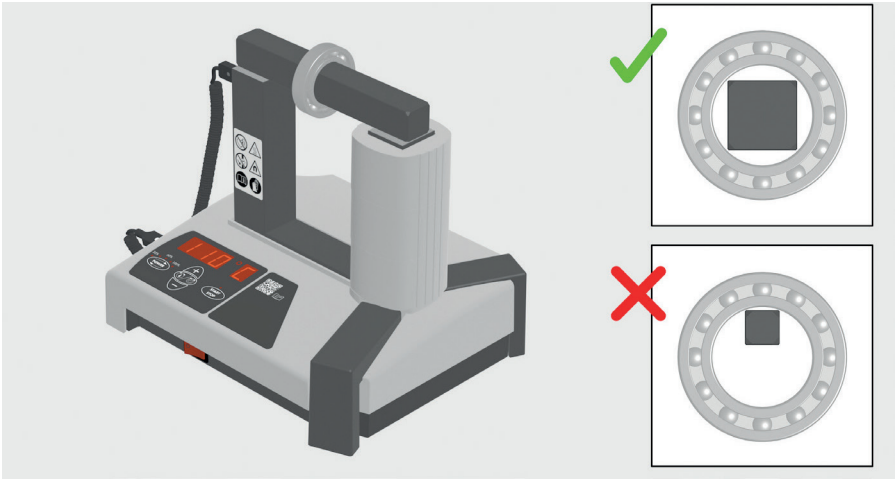
Place the device horizontally on a stable surface.
IMPORTANT: Check the type plate to ensure that the appliance is designed for the appropriate voltage. Connect the mains plug to the power source and press the main switch

Attention: Never operate the IH 040 without a yoke in position.



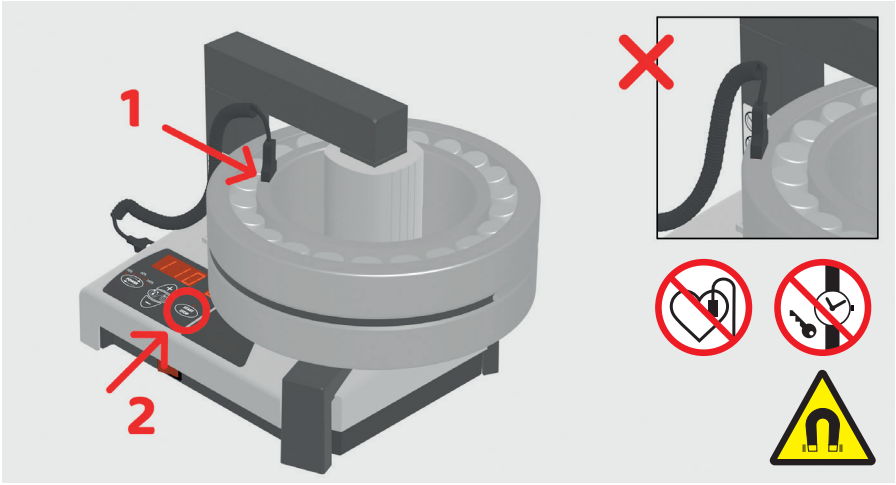
Insert the temperature probe into any socket and place probe head on U-Core. Second temperature probe for Delta-T mode is available as an accessory



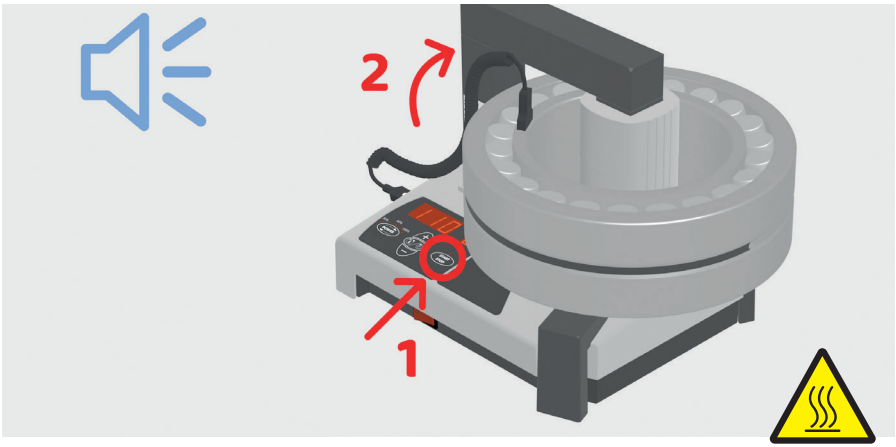


If the workpieces can be placed around the vertical coil, always use the largest support yoke. The optimum efficiency is only achieved when using the largest possible yoke. If the workpieces are heated above the horizontal yoke, make sure that the yoke with the largest possible cross-section is always used. In order to be able to use the units optimally, three standard yokes are available for all units. Additional support yokes in various dimensions are available as an option. Place the yoke on the unit with the bare underside resting evenly on both vertical yokes.

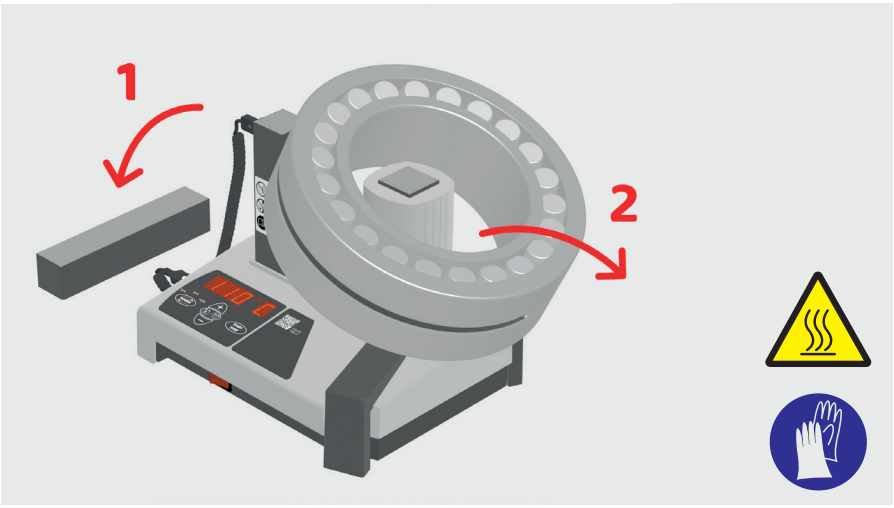
⚠ **Important: The u-core and yokes contact surfaces have been protected by anti-rust treatment. It must be removed before the first use.**



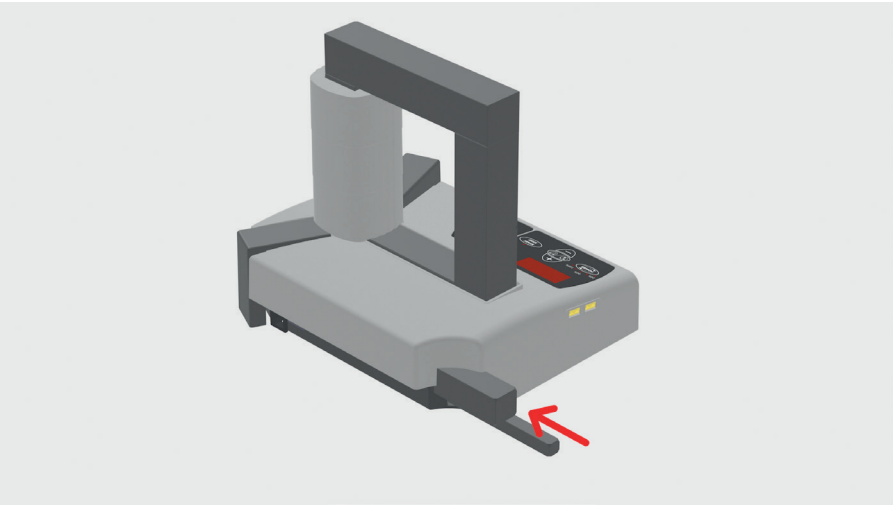
If using TEMPERATURE MODE, insert the temperature probe(s) into the socket on the left of the heater. Place the magnetic end of the probe on the inner ring of the bearing or on the innermost part of the component. When operating with two probes, place one probe on the inner ring and the other probe on the outer ring of the bearing or workpiece. The order does not matter. Initialise the heating process with the START/STOP key.



When the required temperature is reached, an acoustic signal will be heard. Press the START/STOP button to switch off the unit, the bearing is automatically demagnetised.



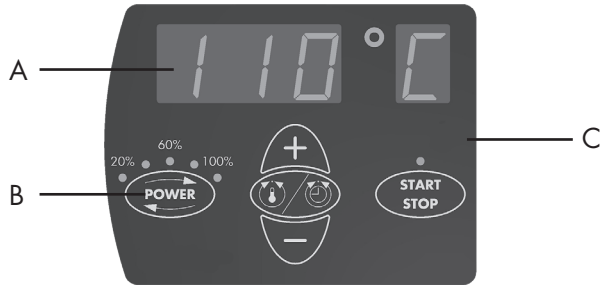
ATTENTION: Hot surface. Always wear the protective gloves provided when removing the hot bearing.



Stow the yokes on the back of the unit.
Important: Avoid exposing the device to high humidity.

4 Operation

4.1 Function of displays



A) The main display shows the selected time or temperature for heating.

Display	Indication
t	time in minutes
°C	temperature in degrees Celsius
°F	temperature in degrees Fahrenheit
°C	temperature probe 1*
°C	temperature probe 2*

*It does not matter in which order the temperature probes are plugged in. The higher temperature always indicates the temperature of the bearing inner ring.

B) The power display shows the selected power setting.

Display	Indication	Display	Indication
•	20% power	• flashing	10 % power
••	40% power	•• flashing	20% power
•••	60% power	••• flashing	30 % power
••••	80% power	•••• flashing	40% power
•••••	100% power	••••• flashing	50% power

4.2 Function of buttons

Button	Function
POWER	Press to adjust the power in steps of 20%. The selected power is indicated on the power display.
Hold POWER for longer than 5s	The LEDs of the power indicator flash when set power is halved. To cancel the power reduction, press the POWER button again and hold for 5 seconds.
MODE	Press to switch between TIME MODE and TEMP MODE.
UP (+)	Press to increase the value shown on the main display.
DOWN (-)	Press to decrease the value shown on the main display.
START/STOP	Press to start or stop the heater. The LED on the START/STOP button is lit when the heater is heating and flashes during temperature measurement.

4.3.1 Temp mode with one probe

- If the main display shows “t”, press MODE to select TEMP MODE. The main display shows °C or °F in TEMP MODE.
- The selected temperature is shown on the main display. The default temperature for bearings is 110°C (230°F). If a different temperature is desired, press UP or DOWN to adjust the temperature in steps of 1°.
- It may be desirable to heat bearings to temperatures above 110°C (230°F) in case the mounting time is longer. Consult the bearing specifications to determine the maximum permitted temperature. Always ensure the bearing does not jam due to an excessive expansion of the inner ring compared to outer ring. See section 4.7.
- All Spherical Roller Bearings (SRBs) are subjected to a special heat treatment. These bearings can be operated at temperatures as high as 200°C (392°F). Heating these bearings above 110°C (230°F) will not cause any damage as long as the bearing is still able to rotate. For other bearings, a temperature of 125°C (257°F) must not be exceeded unless otherwise specified.
- Press POWER to select the power level. Use the guidelines in section 4.7 to determine the correct power setting.
- Make sure the temperature probe is mounted on the bearing inner ring.
- Press START/STOP to start the heater. The main display shows the current temperature of the workpiece.
- When the selected temperature has been reached, the heater demagnetises the workpiece and generates an acoustic signal for 10 seconds until START/STOP is pressed.
- If the workpiece remains on the heater, the heater will start again when the temperature of the workpiece drops 10°C (18°F). Press START/STOP to stop the heater and demagnetise the workpiece.
- Press the START/STOP button to stop the heating process.
- Remove the workpiece with proper handling equipment.
- The IH 040 heater is now ready to heat another workpiece with the same settings.

4.3.2 Temp mode with two probes

- If the main display shows “t”, press MODE to select TEMP MODE. The main display shows °C or °F in TEMP MODE.
- If a second temperature probe is used in TEMPERATURE MODE, the device automatically switches to Delta-T mode.
- In Delta-T mode, a temperature difference between the inner and outer ring of 30°C (54° Fahrenheit) is set as standard.
- Press START/STOP to turn the heater on. The main display will show the current temperature of the workpiece on the bearing inner ring.
- As soon as the maximum temperature difference is reached, the display shows the temperature on the inner and outer ring alternately. The higher temperature always shows the temperature on the bearing inner ring.
- As soon as the selected temperature has been reached, the heater demagnetises the workpiece and generates an acoustic signal for 10 seconds or until the START/STOP button is pressed.
- If the workpiece remains on the heater, it switches on again as soon as the temperature of the workpiece falls 10°C below the setpoint. Press START/STOP to switch off the heater and demagnetise the workpiece.
- Press the START/STOP button to stop the heating process.
- Remove the workpiece with suitable handling equipment.
- The IH 040 unit is now ready to heat another part with the same settings.

4.3.3 Time mode

- If the main display shows °C or °F, press MODE to select TIME MODE. The main display shows “t” in TIME MODE.
- Press UP or DOWN to adjust the time in steps of 0.1 minute.
- Press POWER to select the power level. Use the guidelines in section 4.7 to determine the correct power setting.
- Press START/STOP to start the heater. The main display shows the time that remains.
- When the time has elapsed, the heater demagnetises the workpiece, switches off, and generates an acoustic signal for 10 seconds.
- Press START/STOP to cancel the acoustic signal and stop the heater.
- Remove the workpiece with proper handling equipment.
- The IH 040 heater is now ready to heat another workpiece with the same settings.

4.4 Temperature measurement

If the device is not in heating mode, the temperature of the workpiece can still be measured. If two temperature probes are inserted, the temperatures are displayed alternately. The probe that is plugged in closer to the operator is displayed with C. To do this, press the MODE and START/STOP buttons simultaneously. During the temperature measurement, the LED on the START/STOP button flashes. To cancel the temperature measurement, press the START/STOP button again.

4.5 Change of temperature unit

Press MODE and UP at the same time to switch between °C and °F. The temperature unit setting remains the same even after disconnection from mains power.

4.6 Demagnetisation

The workpiece is automatically demagnetised when heating is complete. Demagnetisation will not occur if the power is interrupted, or the main switch is switched off. To use the IH 040 for demagnetisation only, select TIME MODE and set the time to 0.1 minute (6 seconds).

4.7 Power level selection

When heating bearings with an induction heater, most of the heat will be generated in the inner ring of the bearing. The heat will then be transferred through the bearing. It is therefore important that bearings with small internal clearance or slight preload are heated slowly. Slow heating ensures that the bearing expands evenly, thereby preventing damage to the bearing.

The shape, weight, size, and internal clearances all affect the amount of time required to heat a bearing. The large variety of bearing types precludes the possibility of providing a specific power level setting for each type. Instead, the following guidelines are provided:

- For sensitive precision bearings or hybrid bearings with low bearing clearance, it is always recommended to work with two temperature probes in Delta-T mode. By monitoring, bearing damage can be avoided.
- For sensitive bearings (including bearings with C1 or C2 internal clearance) or bearings with brass cages, do not exceed 20% power when using the small yoke, 40% power when using the medium yoke, or 60% power when using the large yoke.
- When using the small yoke, never exceed 40% power.
- When using the medium yoke, never exceed 60% power.

5 Safety features

The IH 040 is equipped with the following safety features:

- Automatic overheating protection
- Automatic current control
- In the TEMP MODE the heater will switch off if the temperature probe does not register a temperature increase of 1° every 30 seconds. To increase the interval to 60 seconds, press MODE and DOWN at the same time.

6 Troubleshooting

A system fault will be indicated by an acoustic signal and one of the following fault codes on the main display:

Display	Fault	Action
E03 E	Overheated coil	Wait until the inductive coil cools.
E05 E	Temperature increase of less than 1° every 30 seconds (or 1° every 60 seconds)	Check the temperature probe connection. If the connection is OK, select the 60 second interval as described in section 5 or operate the heater in TIME MODE.
E06 E	Temperature probe(s) not connected (or defective)	Check the temperature probe(s).
E07 E	Failure during current measurement	Return IH 040 for repair.
E13 E	Temperature probe pulled out in Delta-T mode	Check the temperature probes.