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## SCOPE OF DELIVERY

Product	Quantity	P/N
EKT <i>Hei-Con</i> or	1	509-88000-00
EKT <i>Hei-Con-G</i>	1	509-88100-00
Holder for EKT	1	11-008-010-17
Clamp Ø 10 mm	2	11-008-010-19
Clamp Ø 13 mm	2	11-008-010-18
Instruction manual	1	01-005-004-61

## GENERAL INFORMATION

-  **Unpack the instrument with care.**  
Inspect for damage and report such damage or missing parts to your supplier right away.
-  **Read the instruction manual with care and ensure that all users read it with care prior to using the instrument.**
-  **Please store the instruction manual in a place easily accessible to every user.**

## SAFETY INFORMATION

-  **Please comply with all safety and accident-prevention regulations applicable to laboratory work.**
-  **Use great caution when working with flammable substances. Observe the relevant safety data sheets.**
-  **Repairs may only be performed by technicians authorised by Heidolph Instruments.**
-  **Use great caution when working in the vicinity of highly flammable or explosive substances.**  
The instrument is not explosion-proof.



Caution! Hazard of serious burns when running with hotplate over 50 °C.

Avoid contact with the hotplate, heating bath and liquid.



**Caution!**

When heating flammable substances, ensure that the nominal temperature of the hotplate is at least 25 °C lower than the substance's flashpoint.



Ensure that the instrument is standing on a solid surface.

### INTENDED USE

EKT Hei-Con and Hei-Con G are electronic temperature controllers for fluids. In the laboratory they replace the conventional mercury contact thermometers and are intended for application with magnetic stirrers and heating devices.

The MP-driven electronics assume the control and guarantee a high degree of linearity and measuring accuracy. The integrated fuzzy control guarantees an optimum heating-up speed without overshooting the temperature.

The control instrument can be positioned away from the heat and steam area as the measuring sensor is not permanently fixed to it.

The temperature controller is protected in a variety of ways:

- Short-circuit fuse sensor
- Fracture protection sensor
- Safety and control circuit in conformity with DIN 12878 Classes 1 and 2
- Security shutdown when the set target temperature is surpassed by 25°C (MAX temperature)
- Security shutdown when the temperature sensor does not submerge in the liquid.

During operation, the measuring sensor and measuring line are continually checked for disconnections and short circuit. If a fault occurs, the heating switches off and the fault is indicated on the display.

### SET-UP

#### 1 Unpacking

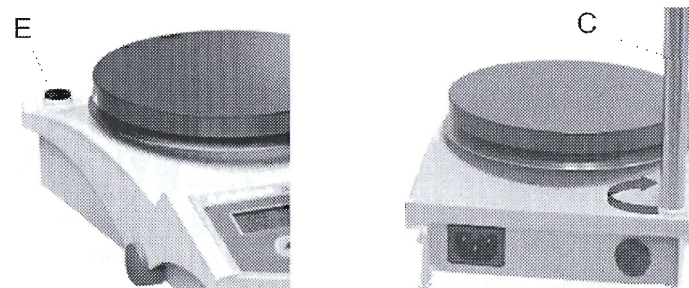
Unpack the instrument with care. Inspect for damage and report such damage or missing parts to your supplier right away.

#### 2 Setting up the EKT Hei-Con

##### 2.1 Mounting the fixation rod on the magnetic stirrer

(Fixation rod: Accessory 509-81000-00)

- Unscrew the black cap (E) on the top of the magnetic stirrer.

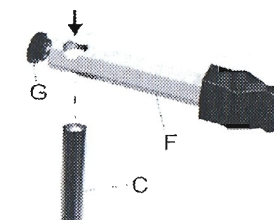


- Screw the fixation rod (C) into the same opening.

##### 2.2 Mounting the holder for the temperature measuring sensor

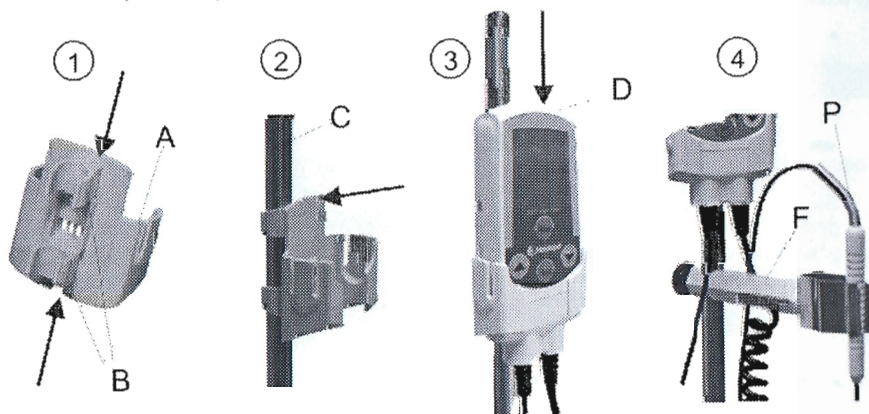
(Accessory 509-67000-00)

- Unscrew the knurled screw (G) on the holder (F)
- Lower the holder opening over the fixation rod
- Tighten the knurled screw, thereby securing the holder in the required position



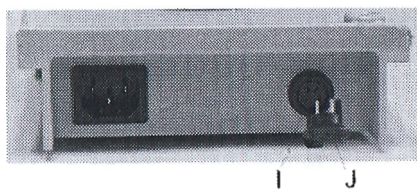
### 2.3 Mounting the temperature controller

- The EKT holder (A) can be mounted using clamps (B) for Ø 10 mm or 13 mm (for holder 509-81000-00 use clamp Ø 13 mm). Store the other clamps in a safe place for later use.
- Push the clamps onto the back of the holder
- Notch the clamps onto the supporting rod (C)
- Insert the EKT *Hei-Con* in the holder from above
- Clamp the temperature measuring sensor (P) in the holder (F)

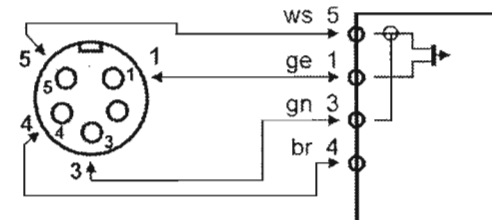
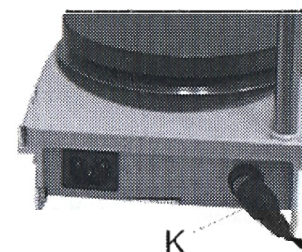


### 2.4 Electrical connection

- Pull out the short-circuit termination (J).



- Insert the 5-pole plug (K) of the spiral EKT cable into socket (I) on the back of the instrument.



PIN configuration of the 5-pole plug

### 2.5 Connecting the power supply



#### Danger

Make sure that the switching function is functioning safely when using the EKT *Hei-Con* with devices other than the magnetic stirrer (MR) *Hei-Tec, Hei-Tec [ ]*.

The instrument requires a direct voltage potential of 9 – 12 V.

**Magnetic stirrers MR *Hei-Standard, Hei-Tec, Hei-Tec [ ]*, MR 3001K, MR 3002 etc.**

These units supply the EKT *Hei-Con* with current. You have thus already connected the power supply as described under section "Electrical connection".

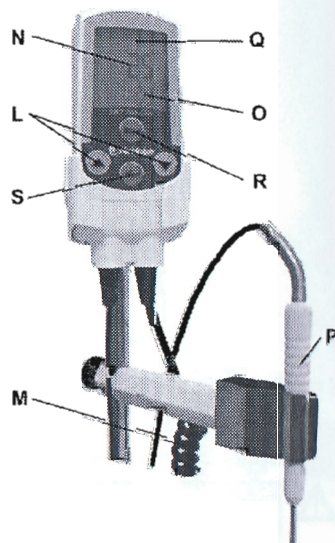
Connect the magnetic stirrer or heating unit to the power supply.

The EKT *Hei-Con* has no switch. It is switched ON and OFF using the ON/OFF switch for the magnetic stirrer. When using a plug power supply unit, disconnect it from the mains.

## OPERATION

## 3 Operating elements

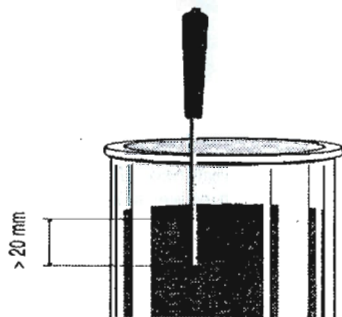
- Q) Multifunction display LCD
- N) Temperature display - actual value
- O) Temperature display - reference value
- S) SET push button for setting the reference value
- L) Push buttons ▲▼ (for higher / lower reference value)
- R) MAX key used to view the maximum temperature, which regulates the security shutdown
- P) Measuring sensor (Pt1000)
- M) Spiral cable with 5-pole plug in conformity with DIN 45322



## 4 Operation

**Note**

Immerse the measuring sensor at least 20 mm into the fluid. Otherwise, measuring errors or overheating may occur.



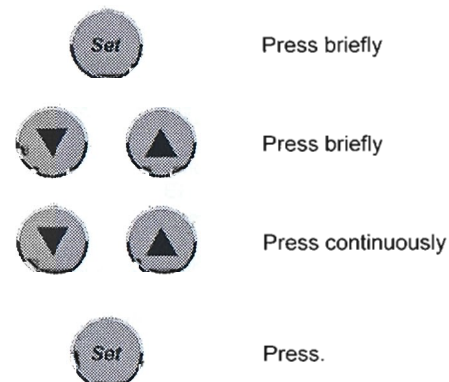
## 4.1 System test

Directly after switching on, all the segments on the digital display are visible for 2 seconds.

## 4.2 Temperature measurement

After performing the system test described above the first temperature measuring value and the °C symbol appear. The EKT *Hei-Con* is ready for operation.

## 4.3 Setting the reference value



In the bottom line of the display the set reference value is indicated. You can now alter this.

Set the required reference value using the arrow buttons.

Fast run-through: after 3 seconds the reference value is changed in steps of 10.

The reference value is taken over. After 3 secs this is also carried out automatically.

## 4.4 Security shutdown temperature max



4.5 With the "Max" key, the security shutdown temperature is displayed.

## 4.6 Regulating procedure

To prevent the temperature from overshooting when a quantity of fluid is heated, a FUZZY logic is used for the EKT *Hei-Con* in order to optimize the control. The heating function of the magnetic stirrer is already switched off before reaching the reference temperature so that heating is only effected by the residual heat from the hotplate.

**Note**

For heating small quantities (<500 ml): Set the temperature of the hotplate to about twice the value of the reference temperature. The maximum temperature should only be used for large quantities.

For reference values over 150 °C a slight control deviation can occur. This can be compensated for by setting a higher reference value.

## 4.7 Display of the controller status

If the reference value is higher than the actual value the heating is switched on. In the top left-hand corner of the display a small rectangle travels from left to right (symbol for heating). As soon as the FUZZY logic is activated and switches the heating off in advance, the symbol goes out.

Modern magnetic stirrers have their own controlling function for the surface temperature of the hotplate. This internal control of the magnetic stirrers always has priority.

#### 4.8 Monitoring the measuring range

When the temperature of the measuring range is exceeded (+300 °C), "HI" appears on the display; if the temperature is below the measuring range (-50 °C) "Lo" appears on the display.

#### 4.9 Monitoring the sensor

If the sensor function is interrupted, "HI" appears on the display; if there is a sensor short circuit, "Lo" appears on the display.

### CLEANING AND MAINTENANCE

The housing and surface of the instrument can be cleaned by wiping with a moist cloth (e.g. mild soap solution).



#### Note

Do not use chlorine bleach or other chlorine-based cleaning products, abrasive cleanser, ammonia, steel wool or cleaning products with metallic components under any circumstances. These will damage the finish of the instrument.

The instrument is maintenance-free. Should repairs become necessary, please contact an authorised Heidolph Instruments repair technician. Please contact your Heidolph Instruments dealer or a Heidolph Instruments representation for more information (see page 27).

### TRANSPORT AND STORAGE

#### Prior to transport

- Switch off the magnetic stirrer.
- Remove the vessel from the hotplate.
- Pull the 5-pole DIN plug (K) out of the socket on the back of the magnetic stirrer.
- Remove the EKT *Hei-Con* and the measuring sensor from the holders.
- Push the holders off the fixation rod.
- Unscrew the fixation rod (C) from the housing of the magnetic stirrer.
- Screw the black cap (E) onto the top of the magnetic stirrer again.

#### Transport and storage

1. The instrument and its components can be stored best in their original packaging or other suitable container to avoid any damage during transport. Close the packaging with adhesive tape.
2. Store the instrument in a dry place.



#### Caution

When transporting the instrument, please avoid any knocks, jolts and vibrations

### TROUBLESHOOTING

#### No heating function:

- EKT *Hei-Con* is not plugged in
- Display "Hi" or "Lo" > security shutdown of the heating due to faulty sensor
- Display "NO SENSR" > security shutdown of the heating when the temperature sensor is not in the liquid. Submerge temperature sensors in the liquid according to chapter 4, page 22.
- Display "Max ERROR" > security shutdown of the heating due to surpassing of security shutdown temperature "Max" (25K over set temperature) Examine the EKT (during servicing)
- Maximum temperature limiter for the heating plate of the magnetic stirrer was activated (allows heating plate to cool down)
- EKT *Hei-Con* is faulty (broken sensor)
- Maximum-temperature limiter of the hotplate has actuated (allow hotplate to cool down)

### DISPOSAL

Please dispose of used instruments and defective components at your local recycling collection point. Prior to disposal, sort according to materials: metal, glass, plastic, etc. Also be sure to dispose of the packaging material in an environmentally-friendly manner.

### REPLACEMENT PARTS AND ACCESSORIES

Product	P/N
Fixation rod (Ø 13 mm), stainless steel 1.4305 (V2A)	509-81000-00
Fixation rod (Ø 13 mm), stainless steel 1.4305 (V2A) (for 4-litre bath attachment)	509-97000-00
Temperature sensor holder	509-67000-00

## SPECIFICATIONS

Temperature measuring range	-50... + 300° C
Resolution	1 °C
Measuring accuracy	+/- 1 digit
Measuring interval	1.5 s
Security shutdown temperature	25 K over set temperature
Measuring sensor of the EKT <i>Hei-Con</i>	Pt 1000, V2A tube, Ø 3 mm
Measuring sensor of the EKT <i>Hei-Con G</i>	Pt 1000, glass tube (Duran), Ø 7 mm
Length of measuring sensor	210 mm
Length of measuring sensor cable	700 mm
Minimum immersion depth of the measuring sensor	20 mm
Switching capacity at output	12 V / 3 mA
Voltage supply	9 – 12 V
Connection cable to the magnetic stirrer	Spiral cable, full extended length approx. 1.5 m
Connection plug to the magnetic stirrer	5-pole DIN plug
Permissible ambient temperature	+5 ... +60 °C
Permissible storage temperature	-40 ... +60 °C
Dimensions (LxWxH)	126 x 54 x 22 mm
Housing material	Polyamide
Weight	250 g

## WARRANTY, LIABILITY & COPYRIGHT

### Warranty

Heidolph Instruments provides a three-year warranty on the products described here (with the exception of consumable parts), starting from the date of shipping from the manufacturer's warehouse. This warranty covers defects in materials and workmanship.

Transit damage is excluded from this warranty.

To obtain such warranty service, contact Heidolph Instruments (phone: (+49) 9122 - 9920-68) or your Heidolph Instruments dealer. If defects in material or workmanship are found, your item will be repaired or replaced at no charge.

Misuse, abuse, neglect or improper installation are not covered by this warranty promise.

Alterations to the present warranty promise need Heidolph Instruments' consent in writing.

### Exclusion of liability

Heidolph Instruments cannot be held liable for damage from improper use or misuse. Remedy for consequential damage is excluded.

### Copyright

Heidolph Instruments is the copyright holder for all texts and images in this manual.

## QUESTIONS, REPAIRS

If any aspect of installation, operation or maintenance remains unanswered in the present manual, please contact us at the following address:

For equipment repair jobs please call Heidolph Instruments (phone: +49 – 9122 - 9920-68) or your local authorised Heidolph Instruments dealer.



#### Note:

Please return instruments to the following address only. Returning instruments is subject to prior approval.

Heidolph Instruments GmbH & Co. KG  
 Vertrieb Labortechnik  
 Walpersdorfer Str. 12  
 D-91126 Schwabach / Germany  
 Tel.: +49 – 9122 - 9920-68  
 Fax: +49 – 9122 - 9920-65  
 E-Mail: [sales@heidolph.de](mailto:sales@heidolph.de)



### Safety information

When returning instruments for repair that have come in contact with hazardous substances, please:

- provide precise information on the relevant medium
- take protective measures to ensure the safety of our receiving and maintenance personnel
- mark the package as appropriate for hazardous materials



## APPLICABLE STANDARDS AND DIRECTIVES

We declare herewith that this product complies with the following standards and directives:

### EMC Directive (89/336/EEC):

EN 55022 2003-09

EN 61000-4-3 2003-11

EN 61000-4-4 2005-07

EN 61000-4-5 2001-12

EN 61000-4-6 2001-12

EN 61000-4-11 2001-12

EN 61000-4-2 2001-12

### Low-voltage Directive (73/23/EEC):

EN 61 010