

# User Manual

Magnetic Stirrer PCE-MSR 350



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski, русский, 中文) can be found by using our product search on: [www.pce-instruments.com](http://www.pce-instruments.com)

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## 1 Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. Damage or injuries caused by non-observance of the manual are excluded from our liability and not covered by our warranty.

- The device must only be used as described in this instruction manual. If used otherwise, this can cause dangerous situations for the user and damage to the meter.
- The instrument may only be used if the environmental conditions (temperature, relative humidity, ...) are within the ranges stated in the technical specifications. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- Do not expose the device to shocks or strong vibrations.
- The case should only be opened by qualified PCE Instruments personnel.
- Never use the instrument when your hands are wet.
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth. Use only pH-neutral cleaner, no abrasives or solvents.
- The device must only be used with accessories from PCE Instruments or equivalent.
- Before each use, inspect the case for visible damage. If any damage is visible, do not use the device.
- Do not use the instrument in explosive atmospheres.
- The measurement range as stated in the specifications must not be exceeded under any circumstances.
- Place the device on a flat, stable, clean, non-slippery and fire-proof surface.
- Ensure that only trained staff uses the device. Keep the instructions manual in a place where it can be accessed easily.
- Beware of the possible effects of magnetic field on pacemakers, data media, etc.
- Do not touch the hotplate surface when temperature of hotplate is over 50 °C, this could result in serious burns or injury. Pay attention to the residual heat after switching off.
- Properly lift the device with both hands while moving or installing. Also, the device should only be moved from its position once it attains the room temperature.
- Make sure that power supply cord or temperature sensor cable must not come in contact with the heated mounting plate.
- Do not place any steel or magnetic material on the top surface except the recommended magnetic stirring bar with beaker or flask in **WARNING** between. Doing this can affect the magnetism of device.
- Wear your personal protective equipment in accordance with the hazardous category of the media to be processed. Otherwise, there is a risk from:  
Splashing and evaporation of liquids.  
Ejection of parts  
The release of toxic or combustible gases.
- The top surface must be clean and kept intact. Wear protective gloves while cleaning the device. Use a soft mild cloth to clean.
- Do not use damaged beaker, flask, stirring bar or any other component for operation. It may affect the efficiency of the device.
- Reduce the speed if:  
If the medium splashes out of the vessel due to high speed.  
If the appliance is not running smoothly.  
If the container moves on the base plate.

- Do not move the device when it's connected to power supply or during its operation.
- Ensure that the product is used only for specified operation. It should not be used for shaking hazardous or reactive solutions.
- Give specific attention to the risks associated with:
  - Flammable materials
  - Flammable media with low steam pressure
  - Overfilling of medium
  - Incorrect vessel size
  - Unstable vessel
  - Glass breakage
- Note that, there is a possibility of contamination or unwanted chemical reaction.
- The RTD (PT 1000) sensor must always be immersed in the medium by at least 20 mm.
- The rating of power supply must match with the specified rating.
- The top surface will be hot after any heating operation. Do not touch the top surface till the hot LED indication glows.
- Process pathogenic materials only in a closed vessel under a suitable extractor hood. Do not operate the appliance in explosive atmospheres, with the hazardous substance or under water.
- Only that liquid should be used for mixing which does not react dangerously to the extra energy produced through processing. This also applies to any extra energy produced in other ways. For example: Through light irradiation, through surrounding temperature etc.
- Abrasion of the dispersion equipment or the rotating accessories can get into the medium you are working on.
- The chemical reaction of PTFE can occur when in contact with molten or dissolved alkaline earth metals, as well as with fine partied powders of metals of the 2 and 3 group of the periodical system at temperatures above 300-400 °C. Only elementary fluorine, chlorine trifluoride and alkaline metals do attack PTFE, halogen hydrocarbons have a reversible swelling effect. Only glass-coated magnetic rods should be used in combination with solute alkali metals or alkaline earth metals or at the temperature above 250°C.
- To protect do not cover the device, even partially, with elements such as metallic plates or sheets otherwise it may overheat. Ensure that mounting plate remains clean.
- The socket must be earthed (protective ground contact)
- Do not use the device if the ceramic set-up surface is damaged, e. g. scratches, splinters or corrosion. A damaged set-up surface could break if used.
- Non-observance of the safety notes can cause damage to the device and injuries to the user.

We do not assume liability for printing errors or any other mistakes in this manual.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments. The contact details can be found at the end of this manual.

## 2 Introduction

This manual provides important safety information for this Hot Plate Magnetic Stirrer. It should be kept near the equipment for quick & easy reference. This stirrer is specially designed for precise control of stirring speed and temperature which allows gentle to vigorous mixing with speed ranging from 200 to 2200 RPM with a maximum capacity of 10 l. The multipurpose digital display assists users by displaying various parameters like actual & set temperature, speed, mode of operation, etc.

## 3 Intended use

The hotplate stirrer is suitable to use for mixing and/or heating the liquids with the maximum capacity of 10 l. It is designed for use in general laboratories, pharmacies, schools and universities.

**Note:** Before using the instrument, please read this user manual carefully. This user manual is intended to assist with the operation and care of the unit only and not its repair. For repair please contact the supplier.

## 4 Technical specifications

Motor	DC
Number of stirring position	1
Max Stirring Quantity on Equip(H <sub>2</sub> O)	10 l
Speed range	200 ... 2200 RPM
Speed control	10 RPM / Step
Temp. range	Room Temp. ... 320 °C
Safe Temp	345
Temperature control	1°C / Step
Time range	1 ... 999 minutes & Infinite
Temp Accuracy [+/-K]	1
Recommended Stirring bar length	25 mm
Set-up plate dimensions	140 mm
Dimensions (L x W x H)	156 x 248 x 104 mm
Heat output	600 W
Protection class according to DIN EN	IP 21
Permissible ambient temp.	5 ... 40 °C
Permissible relative humidity	80 %
Weight	2.2 kg
Input Voltage	110 V / 2.65 A, 220 V / 2.65 A
Motor rating input & Output	5 ... 7 W
Total Power Consumption	610 W

## 5 Features

- Powerful motor delivers constant speed under varying load conditions.
- A same instrument with 3 different setup plates. SS top with chrome plating, SS top with ceramic coating and aluminium top
- Temperature setting from ambient to 320°C
- Variable speed setting from 200 to 2200 RPM in steps of 10 RPM & long timer range from 1-999 mins & infinite mode
- Microprocessor controlled with last run memory feature
- Large & clear display shows critical parameters for easy reading
- Comes with PT-1000 temperature probe to accurately measure temperature of medium
- Small footprint saving valuable bench space

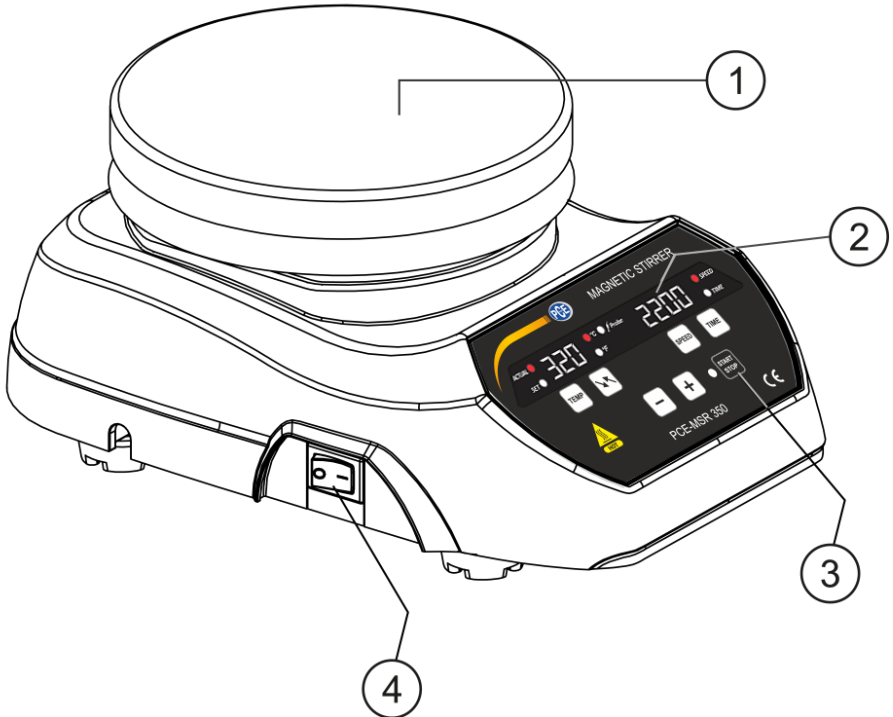


## 6 Delivery contents

- 1 x magnetic stirrer PCE-MSR 350
- 1 x PT 1000 Temperature probe and Probe Attachment Stand
- 1 x Magnetic Stirring Bar
- 1 x Power Cord
- 1 x User Manual

## 7 Device description

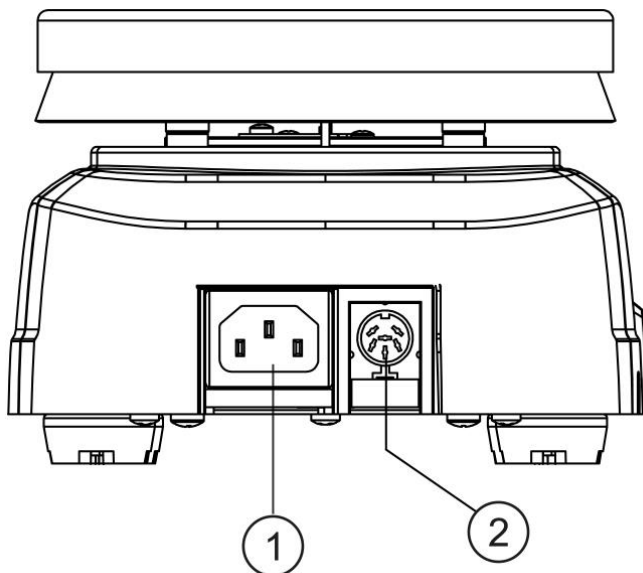
Front side



1 Ceramic hotplate  
2 Digital display

3 Start / Stop button  
4 On / off button

## Rear side



1 Power port and fuse

2 Port for external temperature sensor PT1000

## 8 Installation

The hot plate stirrer is provided in a box. Open the box, then remove the packaging and gently place the device on the firm and levelled surface. Take care while unpacking & removing all accessories. The user manual should be kept with the device for easy access. Please keep all packaging in safe storage for at least two years for warranty purpose.

### 8.1 Location and mounting

Place the stirrer on a flat and levelled surface & ensure that all the four legs of this stirrer stands on the surface firmly. Avoid installing on a slippery surface or surface prone to vibration.

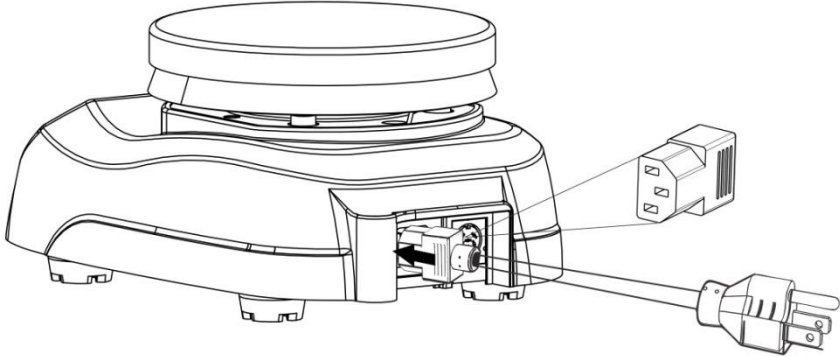
1. Ideal ambient temperature is  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ; avoid placing the unit in direct sunlight.
2. Keep clearance of at least 20 cm from all side to increase the cooling efficiency.
3. Keep the unit away from heated solution to avoid sample temperature issues.
4. Do not place the equipment at a place where it becomes difficult to operate it.

### 8.2 Assembling support rod stand

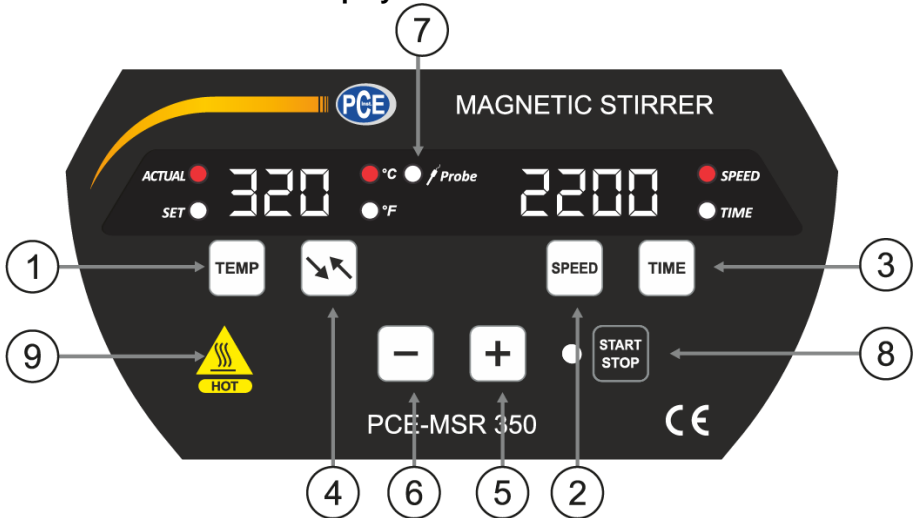
1. Screw in the support rod manually until it cannot be tightened any further.
2. Assemble the accessories mentioned in Section 6 using a clamp.

### 8.3 Connecting power cord

1. Connect one end of the power cord to the rear side of the stirrer and another end to the power supply as shown in the figure below.
2. Push the power cord firmly for proper connection and turn ON the main switch.
3. Make sure that input power source is according to stirrer requirement.



## 9 User interface and display



### Display

RPM	Mins	°C °F	ACTUAL	SET	PROBE
2200	999	°C °F	200	320	PROBE
Display shows current speed and time values	LEDs indicates in which unit temperature is displayed	Display shows Set and Actual Temperature value	LEDs indicates temp. displayed is of PROBE		

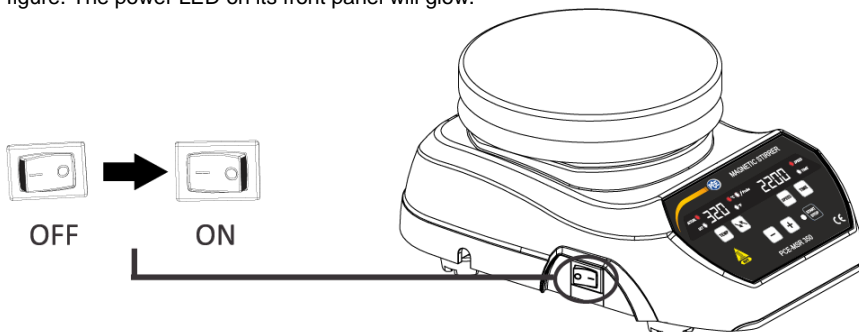


Item	Name	Function
1	Temp	Press "Temp" to select Temperature value. Then press "+/-" to set Temp value in °C
2	Speed	Press "Speed" to select Speed value. Then press "+/-" to set Speed value in RPM
3	Time	Press "Time" to select time value. Then press "+/-" to set Time value in minutes
4	Temp. Selection	Press "°C/°F" to change the unit in which Temp. is displayed
5	Increment	Press "+" to increase values
6	Decrement	Press "-" to decrease values
7	Probe	To display Temperature of probe at Actual Temp Display
8	Start/Stop	Press "Start/Stop" to Start or Stop any operation
9	HOT LED	Glows when top plate of the stirrer is HOT equal or above 50°C

## 10 Operation

### 10.1 Switching on the device

Plug the power cord into its socket on the rear panel, now connect the power cord to AC power output. Now switch ON the mains and switch ON the stirrer from the front side, as shown in the figure. The power LED on its front panel will glow.



**Important note:** Values of any parameter will get set saved only after the respective display blinks for multiple times.

### 10.2 Setting the safe temperature

This is a safety feature which makes operation (heating and stirring) stop if the temperature of the heater exceeds the value saved in safe mode.

The safe temperature limit must always be set to at least 25 °C lower than the fire point of the medium stirred.

Immediately after Switching ON the unit, Safe Temperature Setting mode will be initialized. The "ACTUAL" display of device will display "safe" and "SPEED/TIMER" display will show the respective value of safe temperature to be set.

By pressing +/- buttons, you can set the value of safe temperature. The maximum value of safe temperature can be set up to 345 °C. After selecting the desired safe temperature value, the value is saved automatically after blinking 5 times in the display panel.

**IMPORTANT NOTE:** The safe temperature must not be less than 25 °C from ambient and it should be more than 25 °C from operational temperature for optimum performance.



### 10.3 Setting time

The time in the display will show in minutes. The stirrer timer set for operation is in between 1min to 999 mins and infinite. Infinite time is seen as ")("). To set time, press "TIME" button and then set the value by pressing "+/-" button. When time button is pressed, the "Mins" display will blink indicating the time value is selected. Once time value is selected, single press "+/-" will increase or decrease time value by 1min.

Long press increment or decrement button to quickly increase or decrease time value. Time value gets saved after multiple blinks. The timer is a countdown timer showing remaining time left. Once time is over, the stirrer stops.

### 10.4 Setting speed

Speed is displayed as RPM. The minimum and maximum speed of stirrer is 200 RPM and 2200 RPM respectively. When the equipment is used for the 1st time, the speed will be set to zero and shown as "0". Once speed value is selected, single press "+/-" will increase or decrease speed value by 10 RPM. Long press "+/-" to quickly increase or decrease speed value. Speed value get saved after 5 blinks.

To operate the device as a heater set the time and temperature as informed in the previous section and set the speed of the stirrer to zero by pressing "+/-".

### 10.5 Setting temperature

Initially, on every startup, the temperature function will be in OFF state. To set Temperature, Single press "Temp" button to select Temperature value and then press "+/-" to set temperature value. SET temperature gets saved after display blinks for multiple times.

Temperature value can be set from Ambient temperature to 320°C. Once Temperature value is selected, pressing "+/-" to will increase or decrease temperature value by 1°C. Long press "+/-" to quickly increase or decrease of the temperature value. Temperature value gets saved after multiple blinks.

One can select units of temperature (°C) OR (°F) by pressing the "°C/°F", whichever temperature is selected its respective LED will glow. As per the selected unit, the Actual Value and Set value of temperature will change accordingly.

To operate the device only in stirring mode select the speed and time as mentioned in previous sections, for temperature single press the temperature button to select temperature then press "+/-" until the SET temp display show "ABT" (Ambient Temperature) then press the start button to start the stirrer.

### 10.6 Working with External Temperature Sensor

Plug the connector of the temperature sensor to the temperature sensor socket on the rear side of the instrument. The PROBE LED will glow indicating that probe is selected and an ACTUAL display will automatically show the temperature of probe.

Never remove or insert PT 1000 probe when the equipment is in running mode.

To insert or remove PT 1000 probe, first stop the operation, switch off the equipment, insert or remove PT 1000 probe and then switch on the equipment to carry out the operation. If this is not done, equipment will display ERROR 55 ( see troubleshooting for all the errors)

## 11 Troubleshooting

Any type of malfunction during operation can be identified by error a message on display. Proceed as follows in such cases.

### 1. Problem : No Display

#### Root Cause : No main power connection

- Solution :
1. Check main power is available.
  2. Check that power adaptor is working properly and it is properly connected at both ends.
  3. If the problem still persists then contact PCE Instruments.

### 2. Problem : Err 2

#### Root Cause : Motor blockage/over load/fail, Encoder sensor fail

- Solution :
1. First switch off the equipment, plug it out and Plug it in again.
  2. If the problem still persists then contact PCE Instruments.

### 3. Problem : Err 4

#### Root Cause : Actual temp. more than SET temp/temp measurement, not in range

- Solution :
1. First switch off the equipment, plug it out and Plug it in again.
  2. If the problem still persists then contact PCE Instruments.

### 4. Problem : Err 5

#### Root Cause : External Temperature Sensor(PT 1000) not connected/Probe not in medium

- Solution :
1. Plug-out and Plug-in the external temp. sensor.
  2. If the problem still persists then contact PCE Instruments.

### 5. Problem : Err 6

#### Root Cause : Heater not working

- Solution :
1. Restart device.
  2. If the problem still persists then contact PCE Instruments.

### 6. Problem : Err 7

#### Root Cause : Internal Temperature of device exceeds 80°C

- Solution :
1. Switch off the device and allow it to cool down then Switch On.
  2. If the problem still persists then contact PCE Instruments.

## 12 Maintenance and cleaning

1. Before cleaning the device, allow the instrument to attain room temperature remove the power cord from the mains.
2. To clean the housing of the device from dyes, building materials or cosmetic materials use isopropyl alcohol as a cleaning agent.
3. To clean the housing of the device from food materials or fuels, use water containing detergent as cleaning agent.
4. Wear proper protective gloves while cleaning the instrument.
5. Be careful that no liquid enters the device during cleaning.
6. Kindly contact PCE Instruments before using any other methods for cleaning.



### 13 Contact

If you have any questions, suggestions or technical problems, please do not hesitate to contact us. You will find the relevant contact information at the end of this user manual.

### 14 Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.



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