

Thermo Scientific
Orion COD125 Thermoreactor
User Guide

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This publication supersedes all previous publications on this subject.

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WARNING – SET COD125 TO PROPER VOLTAGE!

Please set the voltage switch to the proper voltage setting for your location before plugging in the COD125 to a power source. Incorrect voltage setting can damage instrument!

警告 – 设置对适当的电压!

请设置电压开关对适当的电压设置为你的位置在塞住在COD125 之前对电源。 不正确电压设置可能损坏仪器!

¡C A D V E R T E N C I A – F I J E A L V O L T A J E A P R O P I A D O !

Fije por favor el interruptor del voltaje al voltaje apropiado que fija para su localización antes de tapar en el COD125 a la fuente de energía. ¡El ajuste incorrecto del voltaje puede dañar el instrumento!

A V E R T I S S E M E N T – P L A C E Z À L A T E N S I O N A P P R O P R I É E !

Veillez placer le commutateur de tension à la tension appropriée plaçant pour votre endroit avant le branchement dans le COD125 à la source d'énergie. L'arrangement incorrect de tension peut endommager l'instrument !

W A R N I N G – S T E L L E N S I E A U F K O R R E K T E S P A N N U N G E I N !

Vor der Verstopfung im COD125 stellen Sie bitte den Spannung Schalter auf die korrekte Spannung, die für Ihre Position, auf die Energiequelle einstellt. Falsche Spannung Einstellung kann Instrument beschädigen!

A V V E R T I M E N T O – R E G O L I S I A T E N S I O N E A D E G U A T A !

Regoli prego l'interruttore di tensione alla tensione adeguata che si regola per la vostra posizione prima del tappo nel COD125 alla fonte di energia. La regolazione errata di tensione può danneggiare lo strumento!

A V I S O – A J U S T E À T E N S ã O A P R O P R I A D A !

Ajuste por favor o interruptor da tensão à tensão apropriada que ajusta-se para sua posição antes de plugging no COD125 à fonte de poder. O ajuste incorreto da tensão pode danificar o instrumento!

Chapter 1 Introduction



Important Note: Read the information in this user guide completely before using the COD125 thermoreactor. The manufacturer does not acknowledge any responsibility for improper use of the equipment.



Important Note: The labels on to the COD125 thermoreactor warn users of the dangers to which they are exposed to during use or maintenance. The labels must not be removed from the COD125 thermoreactor.



Warning: The COD125 thermoreactor operates at high temperatures and special care is required during use.

Safety Rules

The heating plate may reach temperatures of 150 °C during the heating and cooling phases.

Only glass containers that can withstand a temperature greater than 150 °C should be used with the COD125 thermoreactor.

The instrument is equipped to operate at either 115 or 230 volts. Before plugging in the COD125 thermoreactor, verify that the correct voltage setting is selected on the rear panel selector switch.

Cleaning

Always unplug the COD125 thermoreactor before cleaning it. The heating plate must be cool before the instrument is cleaned. Use a damp cloth with nonflammable, non-abrasive detergents.

Personal Protection Equipment (PPE)

The COD125 thermoreactor operates at high temperatures and is designed for use with glass vials containing concentrated acid. Appropriate PPE should be worn at all times during operation.

Repair and Maintenance

For repair and maintenance, contact Technical Support. Within the United States call 1.800.225.1480 and outside the United States call 978.232.6000 or fax 978.232.6031. In Europe, the Middle East and Africa, contact your local authorized dealer. For the most current contact information, visit www.thermo.com/contactwater.

General Information

The COD125 thermoreactor will hold 25 round glass vials with 16 mm external diameter. It is designed for sample preparation in determining COD, total phosphorus, total chromium and other parameters in water and sludge analysis. The COD125 thermoreactor, paired with the Thermo Scientific Orion COD reagents and the Thermo Scientific Orion AQ4000 advanced colorimeter or Thermo Scientific Orion AQ2040 colorimeter, provide the user with a complete analytical setup for COD analysis.

The COD125 thermoreactor is designed to be highly resistant to chemical and mechanical corrosion. The heating block that holds the COD vials allows for very good thermal homogeneity at the selected temperatures. The temperature of the heating block is microprocessor controlled. The Pt100 temperature probe does not require any calibration, because when the instrument is turned on, a self test is performed.

The COD125 thermoreactor is equipped with a voltage selector for either 115 V or 230 V. It is accessible on the rear panel of the instrument. Always check the voltage setting before plugging the instrument into a power outlet.

The COD125 thermoreactor has four preset work temperatures of 70 °C, 100 °C, 120 °C and 150 °C and four preset run times of 30 minutes, 60 minutes, 120 minutes or continuous time.

The heating block is equipped with over-temperature protection by a thermostat, which turns off heating when the temperature exceeds 180 °C.



Note: The COD125 thermoreactor is delivered complete with two power cords; one for 110 to 120 V standard US outlets and one for 220 to 240 V European outlets.

Assembly and Installation



The instrument is equipped with a voltage selector accessible on the rear panel, which allows the connection to either 115 V or 230 V outlets.

Important Note: Before connecting the instrument to electric supply, verify that the voltage changer is in the position corresponding to the supplied voltage. The instrument is normally delivered with voltage selector on the 115 V position.

Instrument Features

Connect the instrument to the electric supply only after verifying the position of voltage selector.

Operation Controls

Control	Description
Power Switch	The switch lights up when the instrument is turned on.
Start/Temp Key	<p>When the Start/Temp key is pressed, the work cycle is started with the selected temperature and time values, which are indicated by their corresponding LEDs.</p> <p>To change the temperature, press the Start/Temp key and select desired temperature. The temperature setting will scroll down through the four temperatures and the corresponding LED will light.</p> <p>Note: It is possible to select different temperatures if the programmed temperature has not been reached and the timer is not started. Once timer has started this key is not operative.</p> <p>If the selected temperature is lower than the actual temperature of the heating block when the Start/Temp key is pressed, the cycle will not start and all the LEDs will turn on intermittently, indicating an error.</p> <p>To correct this error, select a higher temperature setting or allow the block to cool to a temp below the set point temperature.</p>
Time Key	The timer starts when the block reaches the selected temperature. While the timer is running, the LED will blink and the Time key is not operative.
Temperature LED	<p>When the instrument is turned on the temperature LEDs are not lit. Once the Start/Temp key is pressed, the selected temperature LED will light.</p> <p>All four LEDs will blink if the selected temperature is lower than the current block temperature.</p>
Time LED	When the instrument is turned on the time LEDs are not lit. Select the desired run time by pressing the Time key. A blinking time LED indicates that the timer has started.

Auto Shutoff Feature

The COD125 thermoreactor will shut down once the timer cycle is complete. If the power to the instrument is interrupted, the instrument will automatically end the program that is running and a manual restart is required.

Safety Features

The COD125 thermoreactor is equipped with an internal thermostat that will not allow the temperature of the block to exceed 180 °C. If this temperature is reached the unit will automatically shutdown. The COD125 thermoreactor continuously monitors the block of temperature and if inconsistent or anomalous readings are observed, the instrument will go into an alarm mode in which all eight LEDs blink and a beeper sounds.

Chapter 2 Operation



Important Note: Before connecting the instrument to electric supply, verify that the voltage changer is in the position corresponding to the supplied voltage. The instrument is normally delivered with voltage selector on the 115 V position.

Running a Cycle

To initiate a cycle on the COD125 thermoreactor, power on the instrument and press the **Start/Temp** key.

The default settings are a temperature of 150 °C and a run time of 120 minutes, which will be indicated with the temperature and time LEDs. Use the **Temp** or **Time** key to change the temperature or time setting.

The selected temperature and time settings are shown by the temperature and time LEDs. It is possible to change both the temperature and time if the selected temperature has not been reached yet and the timer has not started. Once the selected temperature has been reached, a beep will sound intermittently for five seconds. After the beep, the LED corresponding to the selected time will start to blink, indicating that the timer has started. The end of the cycle will be indicated when the beeper sounds continuously for five seconds. At the completion of the cycle, the heater is turned off and the temperature and time LEDs turn off.

A new cycle can be run if the temperature of the heating block is not greater than the new selected temperature. If this occurs, the instrument will enter an alarm mode and all of the temperature LEDs will illuminate.

Maintenance

All the maintenance operations should be performed only after the instrument has been disconnected from the power supply.

The COD125 thermoreactor is designed to be maintenance-free and only occasional cleaning needs to be performed with a damp cloth and non-flammable, non-abrasive detergent.

Replacing the Fuses

The heating block is equipped with two fuses connected to the socket, located on the rear panel. If a fuse replacement is required, the power supply should be removed and then the fuse panel can be opened with a screwdriver. See the **Electrical Schematic** section for the fuse type.

Disposing of the Instrument

Disposal of this unit should comply with all local, state, and federal regulations.

Verification of the Heating Block Temperature

The electronic temperature controls within the COD125 thermoreactor are designed to provide excellent stability and eliminate temperature overruns or oscillations. The temperature sensor does not require calibration, as a self-calibration is performed upon power up of the instrument.

The temperature may be monitored using a standard NIST-traceable thermometer with a range of 0 to 250 °C. Place the thermometer in a hole within the heating block and monitor the temperature.

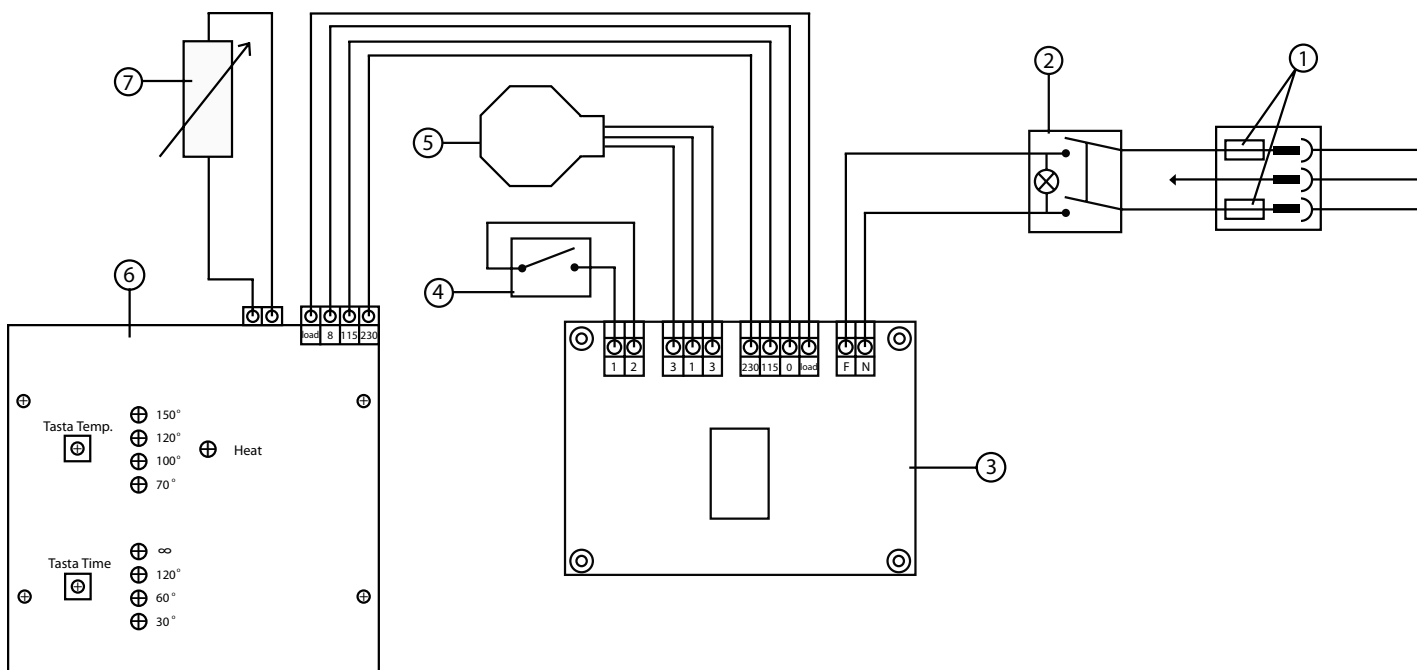
Chapter 3 Customer Services

Specifications

Description	Code 10.0125
Power Supply	110 to 120 V / 50 to 60 Hz 220 to 240 V / 50 to 60 Hz
Power	400 W
Weight	3.6 kg
Dimensions (W x H x D)	155 mm x 95 mm x 275 mm
Selectable Temperatures	70 °C, 100 C, 120 C or 150 °C
Selectable Times	30 minutes, 60 minutes, 120 minutes or continuous
Diameter of Holes	16 mm x 25 mm
Thermoregulator	PID microprocessor
Precision	± 0.2 % end of scale
Temperature Probe	Pt100 class A
Temperature Probe Calibration	Automatic by software
Heating Block Temperature Stability	±0.3 °C
Heating Block Temperature Homogeneity	±0.3 °C
Heating Block Temperature Precision	±0.3 °C
Over-temperature Protection	On the block
Performance from 20 °C to 150 °C	10 minutes
Reaching of Set Temperature Signal	Acoustic
During Time Count Signal	Visual
End of Cycle Signal	Acoustic
Set Temperature less than Block Temperature Error Signals	Visual and acoustic
Broken Temperature Probe Alarm Signals	Visual and acoustic

Electrical Schematic

1. 5 x 20 mm slow blow fuse, 5 A
2. General switch
3. Voltage changer electronic card
4. Safety thermostat
5. Electrical resistance
6. Electronics card
7. Pt100 temperature probe



Notice of Compliance

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

“The digital apparatus does not exceed Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.”

“Le present appareil numerique n’emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le Reglement sur le brouillage radioelectrique edite par le ministere des Communications du Canada.”

Assistance

After troubleshooting all components of your measurement system, contact Technical Support. Within the United States call 1.800.225.1480 and outside the United States call 978.232.6000 or fax 978.232.6031. In Europe, the Middle East and Africa, contact your local authorized dealer. For the most current contact information, visit www.thermo.com/contactwater.

For the latest application and technical resources for Thermo Scientific Orion products, visit www.thermo.com/waterapps.

Warranty

For the most current warranty information, visit www.thermo.com/water.

Ordering Information

Cat. No.	Description
COD125	COD125 thermoreactor, holds up to 25 vials, 110 V / 220 V
CODS01	COD standard, 1000 mg/L, 475 mL bottle
CODS10	COD standard, 10000 mg/L, 475 mL bottle
CODL00	COD test kit, 0 to 150 ppm, 25 tests, EPA approved
CODH00	COD test kit, 0 to 1500 ppm, 25 tests, EPA approved
CODHP0	COD test kit, 0 to 15000 ppm, 25 tests
AC2V16	16 mm vials, 10 pack
AQ4000	AQUAfast IV advanced colorimeter
AQ2040	AQUAfast II COD colorimeter

Environmental Instruments

Water Analysis Instruments



North America

166 Cummings Center
Beverly, MA 01915 USA
Toll Free: 1-800-225-1480
Tel: 1-978-232-6000
Dom. Fax: 1-978-232-6015
Int'l Fax: 978-232-6031

Europe

Denmark House, Angel Drove
Ely, Cambridgeshire
England, CB7 4ET
Tel: 44-1353-666111
Fax: 44-1353-666001

Asia Pacific

Blk 55, Ayer Rajah Crescent
#04-16/24, Singapore 139949
Tel: 65-6778-6876
Fax: 65-6773-0836

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