CR 25

COD Reactor

ROCKER

Important Notice

This instrument is designed for laboratory usage only. Please read this manual carefully before installing and operating. The instrument shall not be modified in any way. Any modification will void the warranty and may result in potential hazard. We are not responsible for any injury or damage caused by any non-intended purposes and modifying the instrument without authorization.

1. Check the voltage specified on the name plate and ensure it matches the line voltage in your location.

2. Please operate the instrument in well ventilated area and keep away from inflammables.

3. The surface temperature of the instrument is very high after or during work, please do NOT touch it to avoid serious burns.

4. Operating condition

   (a) Ambient temperature: 5~ 40 °C

   (b) Relative humidity: 80% RH Max.

   (c) Power supply: 100~120V, 50/60Hz or 200~240V, 50/60Hz

   (d) Fuse: T4A, 250V for 100~120V or T2A, 250V for 200~240V

   (e) Altitude: up to 2000 m   (f) IP20

   (g) Pollution degree: II   (h) Overvoltages category: I

   (i) Indoor use

   Caution: Hot surface

   The equipment must be disconnected from the mains supply before replacing the fuse link.

Unpacking

Please check if the package is complete without any damage before unpacking. When unpacking the instrument, please make sure you have all accessories that indicated on the list. If there is any problem, please keep the serial number along with packing case and contact your local distributor immediately for assistance.

Item	Content
1	CR 25 Main Unit
2	Power Cord
3	Instrument Manual

Main Part Diagram

(1). Main Part
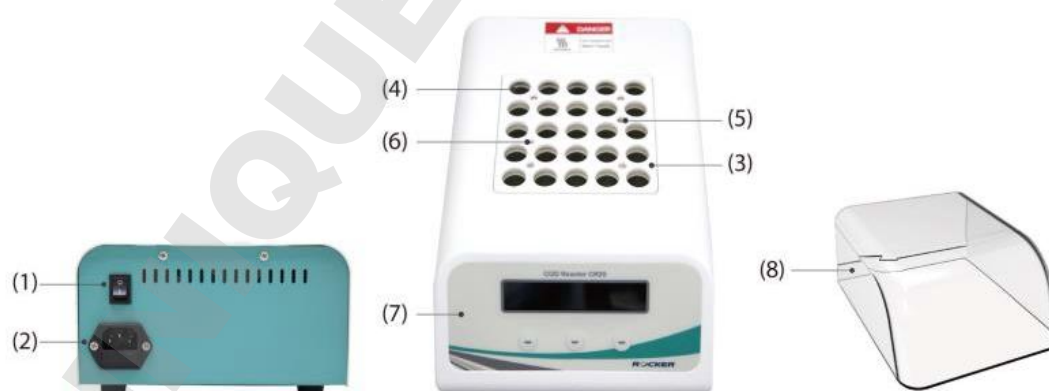
Position	Designation	Position	Designation
1	Power Switch	5	Hole for Mercury Thermometer
2	Power Plug and Fuse Holder	6	Hole for Digital Thermometer Probe
3	Anti-heat PTFE Plate	7	Operation Panel
4	Hole for 16 mm Digestion Vials	8	Protective Lid (Optional)

(2). Operation Panel
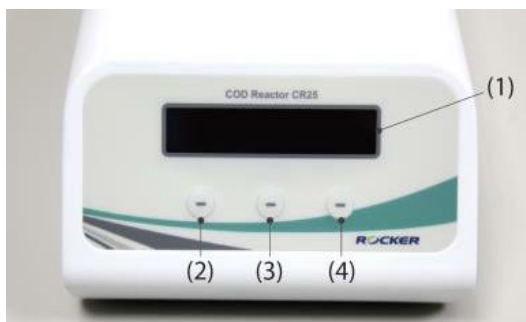
Item	Designation	Item	Designation
1	Display	3	Middle Key
2	Left Key	4	Right Key

Note: The function of each key will be displayed on the bottom of the screen.

Symbols Explication

Symbols

Symbol	Description
T1 / T2	Hold down the key to switch Standard Timing Mode (T1) or Preheated Timing Mode (T2)
⏲	When reach to set temperature, the clock symbol will show up
T↑	Heats the block to set temperature
\ | / -	Timing state indication
T1T1.T1:T1↑	Heating state indication

1. Program Menu

Item	Description	Remark
1: COD	Heats for 2 hours at 150 °C.	Standard Timing Mode (T1)
2: COD2	Heats for 20 mins at 165 °C.	Preheated Timing Mode (T2).
3: TP	Heats for 30 mins at 150 °C.	Standard Timing Mode (T1)
4: TN	Heats for 30 mins at 105 °C.	Standard Timing Mode (T1)
5: TPN2	Heats for 30 mins at 120 °C.	Preheated Timing Mode (T2).
6: TOC	Heats for 2 hours at 105 °C.	Standard Timing Mode (T1)
7: USR1	User can set program name, temperature and heating time	User Program
8: USR2	User can set program name, temperature and heating time	User Program

2. Program Operation

A. COD Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	C O D R e a c t o r
2	Program menu shows on the screen in 2 seconds.	S e l e c t p r o g r a m ◄ C O D ►
3	Select COD program on program menu.	S e l e c t p r o g r a m ◄ C O D ►
4	Press middle key to enter COD initial screen. [(1)] COD： Program name 150℃：Heating temperature 120′ ：Heating time 26℃： Current temperature of heating block.	C O D : 1 5 0 ° C 1 2 0 ′ ▲ 2 6 ° C O K
5	After confirming the temperature and time, press OK to start heating [(2)]. T1 represents currently selected timing mode [(3)]	C O D : 1 5 0 ° C 1 2 0 ′ ▲ 2 7 ° C T 1 ↑
6	One beep indicates set temperature has been reached, and time will automatically count down to zero [(4)].	C O D : 1 5 0 ° C 1 1 9 / ▲ 1 5 0 ° C
7	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	C O D : 1 5 0 ° C 0 0 0 ′ ▲ 1 4 7 ° C

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T1 represents "Standard Timing Mode", the time automatically counts down to zero when the instrument reaches to set temperature. You can hold down the right key to switch to T2 "Preheated Timing Mode".

(4) **How to calibrate temperature during the heating phase:**

Hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature.

B. COD2 Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	C O D R e a c t o r
2	Program menu shows on the screen in 2 seconds.	S e l e c t p r o g r a m ◄ C O D ►
3	Select COD2 program on program menu.	S e l e c t p r o g r a m ◄ C O D 2 ►
4	Press middle key to enter COD2 initial screen. [1] COD 2： Program name 150℃：Heating temperature 20′ ：Heating time 26℃： Current temperature of heating block.	C O D 2 ： 1 6 5 ° C 2 0 ′ ▲ 2 6 ° C O K
5	After confirming the temperature and time, press OK to start heating [2]. T2 represents currently selected timing mode [3]	C O D 2 ： 1 6 5 ° C 2 0 ′ ▲ 2 7 ° C T 2 ↑
6	The instrument will beep two times and the clock symbol will show up to indicate the set temperature is reached	C O D 2 ： 1 6 5 ° C 2 0 ′ ▲ 1 6 5 ° C 🕐
7	Place the test vials into the heating block, then press the right key. The instrument will detect current temperature of heating block and heats the block to set temperature [4].	C O D 2 ： 1 6 5 ° C 2 0 ′ ▲ 1 6 2 ° C T ↑

8	After reaching the set temperature or press right key, the instrument will beep and timer will automatically count down to zero[5].	C O D 2 : 1 6 5 ° C 2 0 \ ▲ 1 6 5 ° C
9	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	C O D 2 : 1 6 5 ° C 0 0 0 ' ▲ 1 5 7 ° C

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T2 represents "Preheated Timing Mode". When the instrument reaches to set temperature, the timer WON'T start without user's permission. Hold down the right key to switch to "T1 Standard Timing Mode".

(4) The temperature of heating block will slightly decline because the affection of inserting the test vials. Normally, the timer will start after the heating block reach to set temperature. If you don't want to wait, press the right key one more time to cancel the waiting of reaching set temperature and the timer will start immediately.

(5) **How to calibrate temperature during the heating phase:**

hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature.

C. TP Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	C O D R e a c t o r
2	Program menu shows on the screen in 2 seconds.	S e l e c t p r o g r a m ◄ C O D ►
3	Select TP program on program menu.	S e l e c t p r o g r a m ◄ T P ►
4	Press middle key to enter TP initial screen. [1] TP： Program name 150℃：Heating temperature 30′ ：Heating time 26℃： Current temperature of heating block.	T P : 1 5 0 ˚ C 3 0 ' ▲ 2 6 ˚ C O K
5	After confirming the temperature and time, press OK to start heating [2]. T1 represents currently selected timing mode [3]	T P : 1 5 0 ˚ C 3 0 ' ▲ 2 7 ˚ C T 1 ↑
6	One beep indicates set temperature has been reached, and time will automatically count down to zero [4].	T P : 1 5 0 ˚ C 3 0 / ▲ 1 5 0 ˚ C
7	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	T P : 1 5 0 ˚ C 0 0 0 ' ▲ 1 4 7 ˚ C

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T1 represents "Standard Timing Mode", the time automatically counts down to zero when the instrument reaches to set temperature. You can hold down the right key to switch to T2 "Preheated Timing Mode".

(4) **How to calibrate temperature during the heating phase:**

Hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature .

D. TN Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	C O D R e a c t o r
2	Program menu shows on the screen in 2 seconds.	S e l e c t p r o g r a m ◄ C O D ►
3	Select TN program on program menu.	S e l e c t p r o g r a m ◄ T N ►
4	Press middle key to enter TN initial screen. [1] TN： Program name 105℃：Heating temperature 30′ ：Heating time 26℃： Current temperature of heating block.	T N : 1 0 5 ˚ C 3 0 ' ▲ 2 6 ˚ C O K
5	After confirming the temperature and time, press OK to start heating [2]. T1 represents currently selected timing mode [3]	T N : 1 0 5 ˚ C 3 0 ' ▲ 2 7 ˚ C T 1 ↑
6	One beep indicates set temperature has been reached, and time will automatically count down to zero [4].	T N : 1 0 5 ˚ C 3 0 / ▲ 1 0 5 ˚ C
7	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	T N : 1 0 5 ˚ C 0 0 0 ' ▲ 1 0 1 ˚ C

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T1 represents "Standard Timing Mode", the time automatically counts down to zero when the instrument reaches to set temperature. You can hold down the right key to switch to T2 "Preheated Timing Mode".

(4) **How to calibrate temperature during the heating phase:**

Hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature .

E. TPN2 Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	ＣＯＤ　Ｒｅａｃｔｏｒ
2	Program menu shows on the screen in 2 seconds.	Ｓｅｌｅｃｔ　ｐｒｏｇｒａｍ ◀　　　ＣＯＤ　　　　▶
3	Select TPN2 program on program menu.	Ｓｅｌｅｃｔ　ｐｒｏｇｒａｍ ◀　　　　ＴＰＮ２　　　▶
4	Press middle key to enter TPN 2 initial screen. [1] TPN 2： Program name 120℃：Heating temperature 30′ ：Heating time 26℃： Current temperature of heating block.	ＴＰＮ２：　１２０°Ｃ　　３０′ ▲　　　２６°Ｃ　　ＯＫ
5	After confirming the temperature and time, press OK to start heating [2]. T2 represents currently selected timing mode [3]	ＴＰＮ２：　１２０°Ｃ　　３０′ ▲　　　２７°Ｃ　Ｔ２↑
6	The instrument will beep two times and the clock symbol will show up to indicate the set temperature is reached	ＴＰＮ２：　１２０°Ｃ　　３０′ ▲　　　１２０°Ｃ　　🕐
7	Place the test vials into the heating block, then press the right key. The instrument will detect current temperature of heating block and heats the block to set temperature [4].	ＴＰＮ２：　１２０°Ｃ　　３０′ ▲　　　１１９°Ｃ　　Ｔ↑

8	After reaching the set temperature or press right key, the instrument will beep 1 time and timer will automatically count down to zero[5].	`T P N 2 :  1 2 0 ˚ C   3 0 \` `▲   1 2 0 ˚ C`
9	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	`T P N 2 :  1 2 0 ˚ C  0 0 0 ’` `▲   1 1 7 ˚ C`

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T2 represents "Preheated Timing Mode". When the instrument reaches to set temperature, the timer WON'T start Without user's permission. Hold down the right key to switch to "T1 Standard Timing Mode".

(4) The temperature of heating block will slightly decline because the affection of inserting the test vials. Normally, the timer will start after the heating block reach to set temperature. If you don't want to wait, press the right key one more time to cancel the waiting of reaching set temperature and the timer will start immediately.

(5) **How to calibrate temperature during the heating phase:**

hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature .

F. TOC Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	`C O D   R e a c t o r`
2	Program menu shows on the screen in 2 seconds.	`S e l e c t   p r o g r a m` `◄     C O D     ►`
3	Select TOC program on program menu.	`S e l e c t   p r o g r a m` `◄     T O C     ►`
4	Press middle key to enter TOC initial screen. [1] TOC ： Program name 150℃：Heating temperature 120′ ：Heating time 26℃ ： Current temperature of heating block.	`T O C :     1 0 5 ° C   1 2 0 ’` `▲      2 6 ° C    O K`
5	After confirming the temperature and time, press OK to start heating [2]. T1 represents currently selected timing mode [3]	`T O C :     1 0 5 ° C   1 2 0 ’` `▲      2 7 ° C   T 1 ↑`
6	One beep indicates set temperature has been reached, and time will automatically count down to zero [4].	`T O C :     1 0 5 ° C   1 1 9 /` `▲      1 0 5 ° C`
7	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop	`T O C :     1 0 5 ° C   0 0 0 ’` `▲      1 0 1 ° C`

	the audio alarm. Press the left key to return to the program menu for another new program.	

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

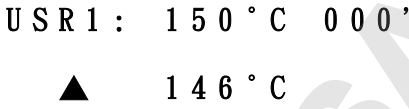(3) **How to switch Timing Mode:**

T1 represents "Standard Timing Mode", the time automatically counts down to zero when the instrument reaches to set temperature. You can hold down the right key to switch to T2 "Preheated Timing Mode".

(4) **How to calibrate temperature during the heating phase:**

Hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature .

G. USER Program

Step	Operation	Screen Display
1	Switch on the instrument, and LOGO shows on the screen.	`COD Reactor`
2	Program menu shows on the screen in 2 seconds.	`Select program` `◄    COD    ►`
3	Select USR1/USR2 on program menu.	`Select program` `◄    USR1    ►`
4	Press middle key to enter the selected program. Start the following setting by press the **SET** key. Name：program name, 4-character most. Temp.：heating temperature, 30 ~ 200 ℃ Time：heating time 1~999 min and infinite heating Use up and down arrow keys to switch character and number. Use the right arrow key to switch the input position. Hold down the right key to save the settings and return to last page.	`USR1: 150˚C 120'` `▲    SET    OK`
5	After confirming the temperature and time, press OK to start heating [2]. T1 represents currently selected timing mode [3]	`USR1: 150˚C 120'` `▲    26˚C    T1↑`
6	One beep indicates set temperature has been reached, and time will automatically count down to zero [4].	`USR1: 150˚C 118/` `▲    150˚C`

7	The instrument will beep for 15 seconds to indicate the program is complete and stop automatically. Press any key to stop the audio alarm. Press the left key to return to the program menu for another new program.	U S R 1 : 1 5 0 ° C 0 0 0 ' ▲ 1 4 6 ° C

Note:

(1) **How to change the program:**

Press left key to return to the program selection screen

(2) **How to stop heating during heating phase:**

Press left key. The screen will show 『Stop Program?』, select 『Yes』, then you can stop heating and return to the program selection screen.

(3) **How to switch Timing Mode:**

T1 represents "Standard Timing Mode", the time automatically counts down to zero when the instrument reaches to set temperature. You can hold down the right key to switch to T2 "Preheated Timing Mode".

(4) **How to calibrate temperature during the heating phase:**

Hold down the middle key to enter temperature calibration mode for current program. Please refer to "Procedure for Temperature Calibration" to calibrate the temperature .

H.   Procedure for Temperature Calibration

Insert thermometer into 16 mm vial which filled with nearly 5 mL glycerol and touches the bottom of vial. Insert the vail on center of heating block as shown on the right. Calibrate temperature as following procedure.

Digital or mercury thermometer can be used for calibration, please make sure thermometer is calibrated regularly or certified by standard organization to ensure the accuracy.
General lab thermometers are often not accurate enough for calibration.

Step	Operation	Display
1	During heating phase, hold down the middle key to enter temperature calibration mode for current program.	C O D : 1 5 0 ˚ C 1 2 0 ' ▲ 1 0 0 ˚ C T ↑
2	The calibration program[1][2] will proceed calibration based on set temperature of current program, and screen shows heating state at same time.	C A L 1 5 0 ˚ C : 1 0 1 ˚ C ▲ H e a t i n g T ↑
3	There shows a 30-min timer for temperature stabilization after set temperature has been reached, and temperature adjusting page appears after timer is complete.	C A L 1 5 0 ˚ C : 1 5 0 ˚ C ▲ W a i t i n g 3 0 \

4	150℃ represents the current temperature of heating block, and please enter the correct temperature(2) showed on the thermometer as following: Use up and down arrow key to switch the number. Hold down the key for continuous number change. Press the right key to save the setting parameters and return to initial screen.	C A L : A D J 1 5 0 ° C ↑ ↓ ↵

Note:

(1) The calibration parameters of each program are independent; they do not influence each other when executing temperature calibration procedure for specific program.

(2) There shows a waiting page for temperature declining when heating block is hotter than set temperature.

Maintenance

1. Please operate the instrument in well ventilated area.

2. If a vial overflows, or liquid is spilled, please switch off the instrument, unplug the power cord immediately. Clean the instrument as soon as possible while it cools down to prevent corrosion.

3. Incorrect power source may cause fuse blew. A spare fuse is available in fuse holder and can be taken out with flathead screwdriver.

Troubleshooting

Problem	Reason and Solution
Fail to start or Abnormal Display	• Loose plug → Reconnect plug to power supply. • Fuse blew → Replace a new fuse. • Instrument is Over temperature → Cool the instrument down and operate in well-ventilated circumstance. • Display or components failure → Contact distributor for assistance.
Liquid spilled during heating process	• Incorrect temperature setting → Reset heating temperature. • Incorrect temperature of block → Calibrate the temperature. • Loose vial cap → Change vial and tighten the cap • Incorrect sample volume → Change new vial and fill right volume • Improper reagent → Change new reagent, world renowned brand is suggested.
Other problems	Please contact distributor for assistance

Ordering Information

179250-11(22)   CR 25, COD Reactor, AC110V,60Hz (AC220V,50Hz)

198200-01(02)   CD 200, COD Detector, AC100~240V adaptor, US plug (EU plug)

191100-01(02)   WD 100, Multiparameter Colorimeter, AC100~240V adaptor, US plug (EU plug)

179250-43   Protective Lid

AWE770110   1000~5000 ul Pipette (Adjustable)

SSI 5000-50   5ml Pipette Tip (50/PK)