

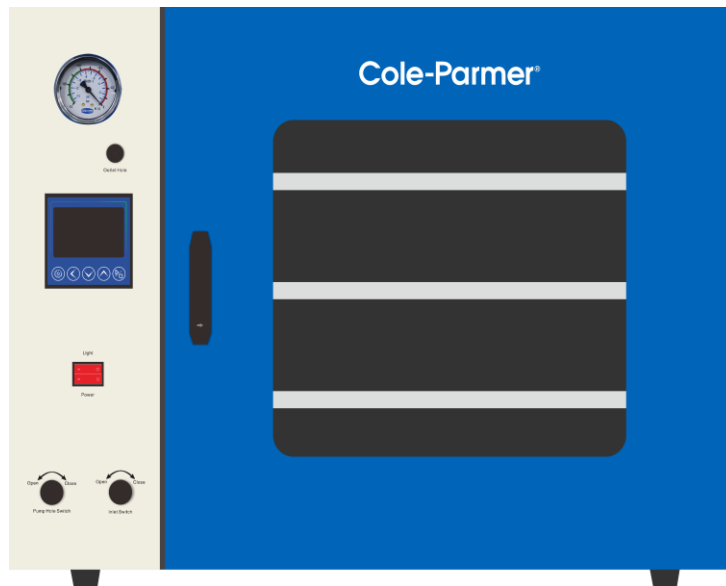
Cole-Parmer®

52411Vacuumoven0.9_1.9_ver_1.0 as version

Vacuum Oven

Model: 52411-22,-23,-24,-25

User Manual



Maximum Theoretical Vacuum / Elevation Chart

Elevation (Feet)	Vacuum Level				
	inHg	mmHg	PSI	kPa	Torr
10,000	20.58	522.7	10.10	69.64	522
9,000	21.39	543.3	10.50	72.40	543
8,000	22.23	564.6	10.91	75.22	564
7,000	23.1	586.7	11.34	78.19	586
6,000	23.99	609.3	11.78	81.22	609
5,000	24.90	632.5	12.23	84.33	633
4,500	25.37	644.4	12.46	85.91	644
4,000	25.84	656.3	12.69	87.49	656
3,500	26.33	668.8	12.93	89.15	669
3,000	26.82	681.2	13.17	90.81	681
2,500	27.32	693.9	13.41	92.46	694
2,000	27.82	706.6	13.66	94.19	706
1,500	28.33	719.6	13.91	95.91	719
1,000	28.86	733	14.16	97.63	732
500	29.38	746.3	14.43	99.49	746
Sea Level	29.92	760	14.696	101.33	760

1. User Warning



WARNING

Failure to follow all warnings and instructions could result in serious injury. Your safety is very important to us, so we urge you to take the following precautions when using this product.

We are not responsible for injury or damage caused by misuse.

- Always use eye protection and appropriate thermal gloves during use.
- Always unplug the oven when performing maintenance or moving the oven.
- Do not heat flammable materials or materials that may outgas corrosive compounds.
- Ensure that items and materials heated by the oven are heated below their flash or ignition point.
- Do not unplug the oven when it is running. You must switch the unit off using the power switch located on the front of the unit, then unplug.
- Oven must be used in a stable environment (77°F @ ≤85%RH).
- Oven must not be stored around corrosive chemicals or moist environments that could damage the electronics and hardware.

- **Never use a damaged or modified power cable. Do not use on an ungrounded circuit. Failure to follow warning could result in electric shock.**
- **Always close the vacuum valve PRIOR to turning off the vacuum pump. As with our other vacuum products, this could result in pump oil being pulled into the oven.**
- **Avoid corrosive chemicals when cleaning the gasket, or oven chamber.**
- **Take caution when removing items as the oven, door, and sample will be hot. Always use proper personal protection.**
- **A high temp 212F+ run will burn out any residue left from the assembly process.**

1.2 Electrical Installation



THIS EQUIPMENT MUST BE EARTHED

Before connection please ensure that the line supply corresponds to that shown on the rating plate located on the back of the unit.

Power requirements

Model	Wattage	Model	Wattage
52411-22	550W	52411-24	650W
52411-23	550W	52411-25	650W

Cord Connected Models

The unit will be supplied with a mains lead fitted with either US, EU, UK or Indian plug. Should the lead not be suitable for connecting to the mains power supply, replace the plug with a suitable alternative.

THIS OPERATION SHOULD ONLY BE UNDERTAKEN BY A QUALIFIED ELECTRICIAN

NOTE: Refer to the equipment rating plate to ensure that the plug and fusing are suitable for the voltage and wattage stated

UK / EU mains cable wiring is colored as follows:

Brown – Live

Blue – Neutral

Green/Yellow - Earth

US mains cable wiring is colored as follows:

Black – Live

White – Neutral

Green – Earth

Should the mains lead require replacement, cable of 1 mm²/18 AWG of harmonized code HO5VV-F should be selected. This is dependent upon the power rating of the unit, see Section 3.

Hard Wired Models

The unit is fitted with a suitable cable which should be directly connected to a suitable rated supply terminal. (See wire colors above).

IF IN DOUBT CONSULT A QUALIFIED ELECTRICIAN

2. Components

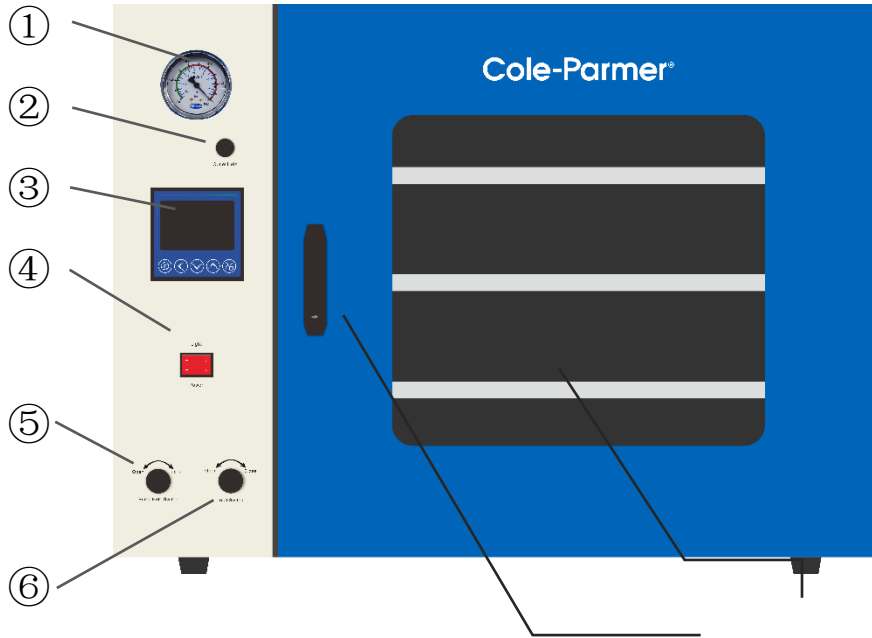


Fig.1. Oven Front

⑦ ⑧

① Vacuum Gauge(inHg)

② Vacuum Release

③ Temperature Controller

④ Light&Power Switch

⑤ Vacuum Valve

⑥ Inert Gas purge Valve

⑦ Door Lock Handle

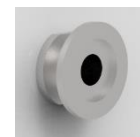
⑧ Shelves Standard

⑨ Circuit Breaker

⑩ Vacuum Port KF25 Flange Included & Inert Gas Purge Port 3/8" Barbed



⑨



⑩

Fig.2. Oven Rear

3. Product Specifications

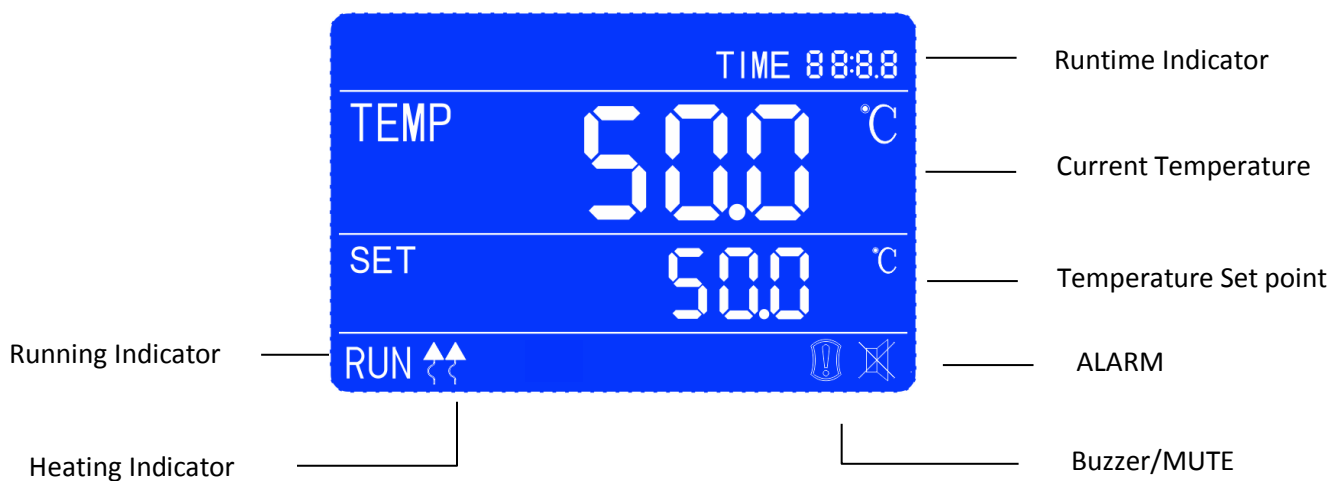
Item	52411-22 52411-23			52411-24 52411-25		
Interior Capacity (volume)	1853 in ³			3181 in ³		
Total Shelves	8			11		
Shelf Capacity (area)	129 in ²			195 in ²		
Total Shelf Capacity	1035 in ²	7.2 ft ²		2145 in ²	14.9 ft ²	
Temperature Range	RT+18 – 212°F		RT+10 – 100°C	RT+18 – 212°F		RT+10– 100°C
Temperature Stability	± 1.8°F		± 1°C	± 1.8°F		± 1°C
Electrical Characteristics	120 VAC 220 VAC	60 Hz 50 Hz	550W 550W	120 VAC 220 VAC	60 Hz 50 Hz	650 W 650W
Gasket	Silicone			Silicone		
Fuse/Circuit breaker	120V-10A Circuit Breaker, 220V - 5A, 5 x 20 mm, glass fast blow			120V-10A Circuit Breaker, 220V - 5A, 5 x 20 mm, glass fast blow		
Window	½" Tempered Glass			½" Tempered Glass		
Maximum Vacuum Level	-29.9" Hg			-29.9" Hg		
	-75.4 cmHg			-75.4 cmHg		
	-1 MPa			-1 MPa		
	<1 torr			<1 torr		
Interior Material	Polished Stainless Steel			Polished Stainless Steel		
Weight	115 lbs			160 lbs		
Outside Dimensions	24.5"w x 22"d x 21"h			28.5"w x 23"d x 22"h		

*RT = Room Temperature

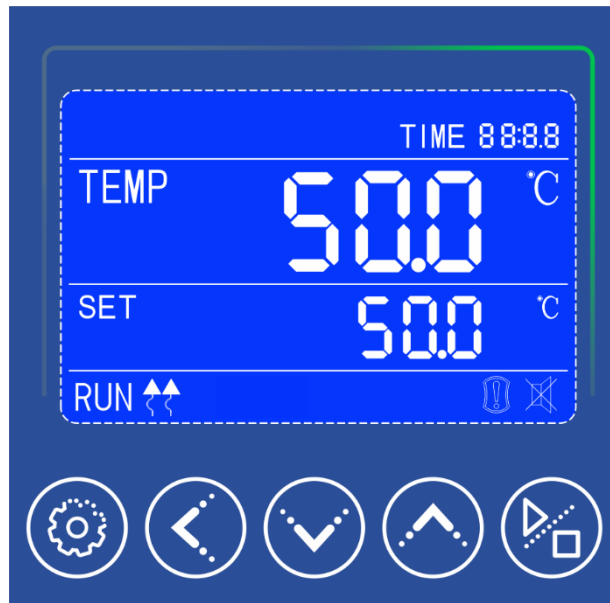
4. Operating Instructions







- a. Place the sample in the oven and lock the door by rotating the handle downwards.
- b. Close the **Vacuum Valve** and **Inert Gas Purge Valve** by rotating the dials clockwise.
 - a. Check the **Vacuum Release Valve**, and rotate closed if necessary.
- c. Turn on your pump and open the **Vacuum Valve** by twisting counterclockwise.
- d. When your desired vacuum level has been reached, close the **Vacuum Valve**, then, power off your vacuum pump.
- e. Turn on the oven and set your desired temperature. The oven may take 30 – 60 mins to reach initial temperature, depending on settings.
- f. We recommend letting your oven sit for 10 – 20 minutes upon reaching temperature to allow for optimal heat distribution. For detailed controller instructions, please see the next section.
- g. To release vacuum upon completion, first power off the oven.
 - a. Rotate the **Vacuum Release Valve** to release your vacuum using atmospheric pressure. Or,
 - b. Connect an inert gas source to the **Inert Gas Purge Port**, and open the **Inert Gas Purge Valve** to release your vacuum using an inert gas such as nitrogen.
- h. When ambient pressure has been restored inside the oven, the door will open. You must wait until pressure is completely restored, or a vacuum seal will hold the door closed.
 - a. Sometimes, it may be necessary to use your thumb or a flat screwdriver to separate a small section of the Door Gasket from the glass window. A small “flick” will be enough to break the seal- do not pierce the gasket! Please contact our support if you require assistance.
- i. Take proper precaution when removing items from the oven as the contents will be hot!

4.1 Display introduction







4.2 COMMANDS and DESCRIPTION




1. The  button permits the working parameters setting and to enter/escape from the programs (PRO version only).
2. The  button permits to quickly change the digit (Program, units, tens, etc.) of the value of the parameter you are editing.
3. In combination with the  key allows access to menus with password.
4.  and  adjustment buttons allow users to increase or decrease the value of the operating parameter being edited.
5. The  button permits to start / stop a cycle operation or a program (PRO version only).
6. The ON/OFF button allows to turn on and turn off the instrument

5. Temperature Controller Detailed Operation

5.1. Time Settings


1 . When the instrument is switched on, pressing one time the  button, the last value of the set time (timer) starts flashing. Set the desired value (hh:mm) by pressing  or  keys. It's possible a quick movement between the digits using the  button.


2 . Confirm the set value with another press of  button.


NOTE: the value "00:00" indicates the operating mode "continuous", that means once you start the operating cycle by the START / STOP button, it continues maintaining the set temperature until it is stopped manually (START/STOP)

3 . If you set a value of time, such as 1 hour, the instrument will reach the set temperature and maintain it for an hour.


5.2. Temperature Setting


1 . When the instrument is switched on, pressing one time the  button, the set temperature value starts to blink. Set the desired temperature value (in Celsius degrees) pressing keys.

2 . It's possible a quick movement between the digits using the  button.

3 . Confirm the set value with another press of  button

5.3. Start / Stop Operation

1. After setting the operating parameters, pressing  button with long pressure (4-5 seconds), the heating cycle starts for the defined time in hh:mm or continuous (00:00). The word "end" at the top right corner of display disappears, the message RUN appears in the bottom left corner and display shows contemporary: timer, temperature measured inside the chamber, set temperature a if present









2. At any time, you can always manually stop the cycle by pressing the  button with long pressure (4-5 seconds).

3. Once the set time or after manual stop, the instrument beeps intermittently, the icon of visual alarm and the word "end" appear on the display. Pressing any button, it's possible to silence the audible signal and the icon appears.

NOTE: the acoustic signal will not end until it is stopped by the operator, but the heating cycle is terminated so for the samples inside the instrument will remain exposed to the internal temperature the chamber.

5.4 Delay of Heating Cycle Start

It's possible to set a delay (hour and minutes) of heating cycle start.

1. Simultaneously Press  and  for few seconds until the time position shows "LK 0000" confirm the "0000" password pressing shortly one time . On the top right part of display the parameter "dy" (delay) appears close to value 00:00.
2. Set the desired delay value (hh:mm) pressing  or  keys. It's possible a quick movement between the digits using the  button. Confirm the set value with another press of  button. The display comes back to the standby screen.
3. Pressing the  button with long pressure (4-5 seconds) the instrument starts the work cycle but it doesn't immediately heat: the word "end" and the set delay time alternately blink on the top right part of display, counting the wait time until the real starting of heating. Once the delayed time is passed the instrument starts to heat and the regular timer appears on display.




5.5. Alarm / Faults

The oven has a built-in overtemperature protection circuit. If the oven's temperature overshoots, the controller will enter an Alarm Mode that disables all heating elements to protect your samples. When in Alarm Mode, a red alarm indicator will display on the screen. The oven will automatically resume operation when the temperature has dropped back below the overshoot threshold. Setting the temperature setpoint higher will also resume heating function.

If your oven alarm is sounding due to an elapsed timer, press the Any key to mute!

6. Troubleshooting

Issue	Symptom	Cause	Solution
Unit does not switch on	No lights, no display when switched on	Circuit breaker has tripped	Reset breaker, located on oven rear. See Fig. 4.
No temperature reading	Controller displays "----"	Loose electrical connection	Check connections on circuit board
		Faulty probe	Replace probe. RTD 100Ω.
Oven does not heat	Oven remains at room temperature	Temperature setting is too low	See section 5.1. Temperature Setting
		Timer has expired	See section 5.2. Additional Timer Information
Oven does not heat	Oven remains at room temperature	Faulty controller. Check controller for solid or blinking Heat Indicator icon (yellow). See Fig.5.	If temperature is correctly set and still no Heat Indicator, replace controller
		Faulty heating relay	Check heating relay. LED on relay will blink in sync with controller Heat Indicator. Replace if faulty.
Oven significantly overheats	Oven constantly heating	Temperature set too high	See section 5.1. Temperature Setting
		Faulty heating relay	Replace if R < 1MΩ
Inaccurate temperature reading	Controller readout does not match real-world temperature	Check preheat duration	Allow proper time for heat to saturate oven internals
		Check measurement method	Releasing vacuum pressure will temporarily cool oven due to colder atmosphere It is not recommended to use a laser probe to check temperature without compensating for reflective emissivity. Use conventional thermometer with direct physical contact to shelf.
		Perform probe calibration	See section 6.1. Calibration
Poor temperature maintenance	Temperature regulation does not meet $\pm 1^{\circ}$ stability	Check environmental operating conditions	Oven operational environment must be from 0 - 30°C and < 30% RH
		Perform automated PID-tuning routine	**Must contact technical support for detailed instructions. Doing this operation without contacting technical support will VOID any warranty.
Cannot initiate vacuum		Check vacuum connection	Be sure all pump and hose fittings are secured

	<p>Vacuum gauge needle does not move, door can open easily</p>		<p>Ensure vacuum valve, purge valve, and release dial are in appropriate position</p>
		<p>Check door seal</p>	<p>Remove and clean door gasket with warm water to remove potential dust or debris</p>
<p>Cannot initiate vacuum (continued)</p>	<p>Vacuum gauge needle does not move, door can open easily</p>	<p>The door is not closed well The door does not create a complete seal between gasket and glass</p>	<div style="display: flex; flex-direction: column; align-items: center;">  <p style="text-align: right;">Loosen nut 3-5 turns counterclockwise.</p>  <p style="text-align: right;">Tighten door pin 1 full turn clockwise.</p>  <p style="text-align: right;">Using a wrench to maintain upright position of door pin, tighten nut clockwise with 2nd wrench, locking door pin. Repeat steps until door handle firmly latches against pin.</p> </div>
<p>Cannot pull full vacuum</p>	<p>Vacuum gauge cannot reach desired pressure</p>	<p>Check elevation</p>	<p>Maximum vacuum level is limited by operating elevation</p>






			Check elevation chart to confirm maximum possible vacuum
		A pipe connection or fitting is loose	Tighten and secure vacuum connections Check release dial and purge valve
		The vacuum gauge is damaged	Replace vacuum gauge
Oven vacuum leak	Vacuum loss of >1”Hg within 24 hours	Door gasket is worn	Replace door gasket
		Valves improperly closed	Check valve positions
		A pipe connection or fitting is loose	Tighten and secure vacuum connections
		Vacuum valve is leaking	Replace vacuum valve

6.1. Calibration

While the oven arrives pre-calibrated from the factory, certain adjustments may be necessary for optimal performance. Please note these adjustments will affect your oven settings! We recommend writing down any factory settings prior to adjustment so they may be reset in the event of undesirable operation.

Probe Calibration

Follow the instructions below to adjust the temperature readout. These steps are only necessary in the event there is a discrepancy between the display and measurements taken with an alternate device. For example: a thermometer placed inside the oven with a different measurement than the controller. Please note: laser probe measurements will be inaccurate without compensating for emissivity. Refer to your laser probe’s user manual.

1. Simultaneously Press  and  for few seconds until the time position shows “LK 0000”
2. Press  to set LK 0003
3. Press  three times, you can see Pb, this is Temperature offset on single point.
4. After set the Pb value, Press  to exit.

7. Packing List

Name	Quantity
User Manual	Included, 1
Vacuum Hose	φ 16mm
Vacuum Pump Flare Fitting	KF25 centering ring and gasket, 1 KF25 clamp, 1 KF25 x φ 16mm /Flare adapter, 1

8. Contact

United States – Cole-Parmer, 625 East Bunker Ct, Vernon Hills IL, 60061

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