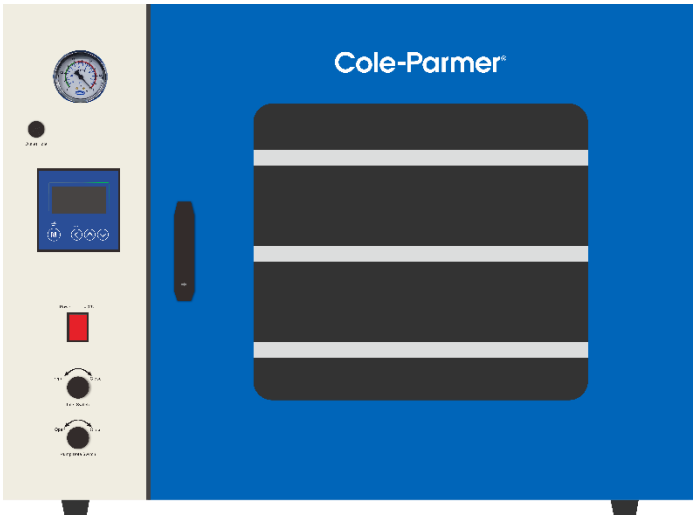
Cole-Parmer®

52411Vacuumoven_ver_1.0 as version

Vacuum Oven

Model: 52411-26,-27,-28,-29

User Manual



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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
52411-26	1050W	52411-28	1960W
52411-27	1050W	52411-29	1960W

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 mm^2 /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

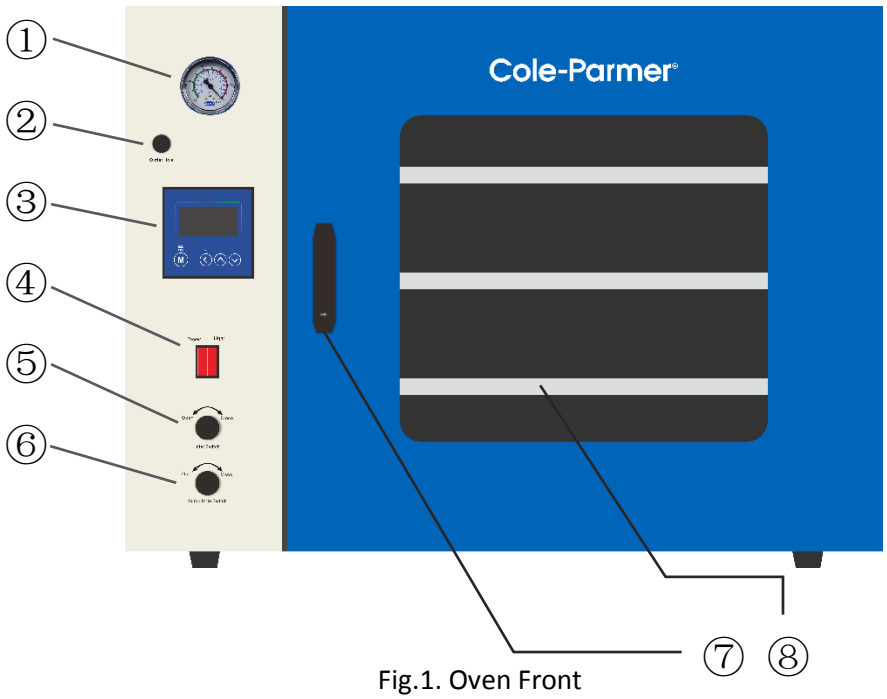


Fig.1. Oven Front

① Vacuum Gauge(inHg)

② Vacuum Release

③ Temperature Controller

④ Light&Power Switch

⑤ Vacuum Valve

⑥ Inert Gas purge Valve

⑦ Turn to Lock Handle

⑧ Shelves Standard

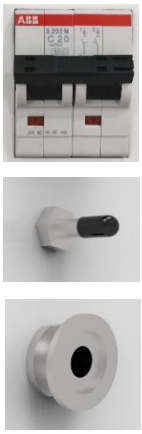


Fig.2. Oven Rear

⑨ Circuit Breaker

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

3. Product Specifications

Item	**52411-26 52411-27**			**52411-28 52411-29**		
Interior Capacity (volume)	5560 in^3			13181 in^3		
Total Shelves	4			4		
Shelf Capacity (area)	276 in^2			507 in^2		
Total Shelf Capacity	1104 in^2	7.7 ft^2		2028 in^2	14.1 ft^2	
Temperature Range	AT+18--392℉	RT+10 -200 ℃		AT+18--392℉	RT+10 -200 ℃	
Temperature Stability	± 1.8°F	± 1.0°C		± 1.8°F	± 1.0°C	
Electrical Characteristics	120 VAC 220 VAC	60 Hz 50 Hz	1050W	120 VAC 220 VAC	60 Hz 50 Hz	1960 W
Gasket	Silicone			Silicone		
Window	½” Tempered Glass			½” Tempered Glass		
Fuse/Circuit breaker	120V-16A Circuit Breaker, 220V - 7A, 5 x 20 mm, glass fast blow			120V-16A Circuit Breaker, 220V - 7A, 5 x 20 mm, glass fast blow		
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			P olished Stainless Steel		
Weight	305 lbs			492 lbs		
Outside Dimensions	30”w x 23”d x 24”h			37”w x 29”d x 30”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!

5. Temperature Controller Detailed Operation

5.1 controller panel layout

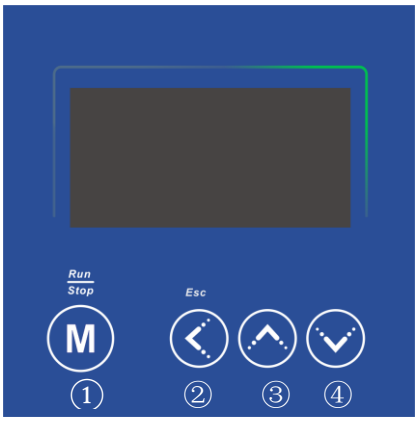


Fig.3. Controller Details

① Set button: used to set the target temperature value and enter the internal parameter layer.

② ESC return key: used to return when operating.

③ Add key: used to move the cursor or change the value.

④ Decrease button: used to move the cursor or haircut value.

5.2 Setting of experimental target value

5.2.1 Tap“ ” Set key, SET value backlit display in Figure 4.

5.2.2 With“ ” increase key or “ ” decrease key to change the value to the target value.

5.2.3 After the value becomes the target value， tap“ ”Set key， save the target value.

Note: Pressing the button once will only increase or decrease 0.1. by long pressing “ ” increase button or“ ” drop button to change the value quickly.

Fig. 4

5.2.4 Figure 4 screen function introduction

F1: the first layer measures the temperature; F2: the second layer measures the temperature;

F3: third layer measures temperature; F4: fourth layer measures temperature;

（Note: When "==" is displayed, it means that the sensor is not connected.）

RUN/STOP: Operating status display.

8 ： 16: Controller system time display.

SET: Set value display.

℉/℃: Temperature unit symbol display.

5.3 Alarm temperature value and timing function setting

5.3.1 In the standard screen (Figure 4), long press" M " The setting button appears as shown in Figure 5.

Fig.5

5.3.2 Click the " M " setting button again, and the screen shown in Figure 6 appears.

Fig. 6

5.3.3 Figure 6 screen function introduction

TIMER WAIT: Timing function standby temperature switch, there is standby temperature when ON, and no when OFF. (Note: Standby temperature (default is 0.5°F/°C) refers to the temperature waiting for timing. When the timing time is set and running, when the measured value differs from the set value by more than 0.5°F/°C, the timing time is not counted).

ALM Temp: Alarm temperature setting, that is when measuring temperature >SET+ALM TEMP, alarm。

RH Temp: Upper temperature control setting, the maximum value is 572 °F (300 °C).

Timer: Timing time when timing function. (Note: setting 0 to not count).

5.4 Start time setting .

5.4.1 In the standard screen (Figure 4), long press“ M ” setting button appears as shown in Figure 5.

5.4.2 Click“ ”decrease key， Move the cursor to “START SETUP”， click“ M ” setting button appears in Figure 7.

Fig. 7

5.4.3 Figure 7 screen function introduction

START TIMER ： Appointment start switch, ON enabled, OFF is not enabled.

YEAR MONTH; DAY HOUR

MINUTE

5.4.4 After setting the scheduled power-on time, set START TIMER to ON, that is, start standby, when the time is up, start running.

5.5 PID parameter adjustment operation

5.5.1 In the standard screen (Figure 4), long press“ M ” setting button appears as shown in Figure 5.

5.5.2 Click“ ”decrease key， Move the cursor to “ENGINEER SETUP”, click“ M ” setting button appears in Figure 8.

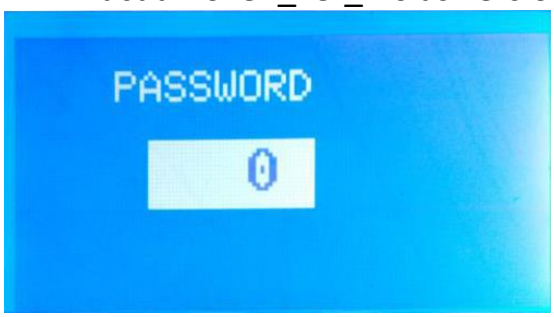


Fig. 8

5.5.3 Click“ M ” Set key twice (since the password is set to 0, so double click into the parameter layer), enter the parameter layer, as shown in Figure 9.

Fig.9

5.5.4 Figure 9 screen function introduction

P1: first layer P value; I1: first layer I value; D1: first layer D value; Ar1: first layer overshoot suppression parameter. Other analogies. [Note: There is currently no PID automatic calculation function.

5.6 Calibration

5.6.1 In Figure 9, Keep pressing“ M ”decrease key until the screen shown in Figure 10.

Fig. 10

5.6.2 Figure 10 screen function introduction

Pb1：First layer overall correction; Pk1: first layer linear correction; other analogy.

YY：Year；MM：Month；DD：Day；HH：Hour；MM：Minute；SS：Second；

（Here is the instrument system time setting）

PASSWORD：Password modification, directly enter a new password. (Note: Please remember to set the password, if you forget, you will not be able to enter the parameter layer)

Linear correction formula：

PK={（Measured value H-measured value L）/（Set value H - set value L）-1}*4000

（Note: Due to the fact that the current instrument program is not perfect, the correction function is still defective.）

5.7 Other operations 11

5.7.1 In Figure 9, keep click “ ”decrease key, until the picture shown in Figure 11.

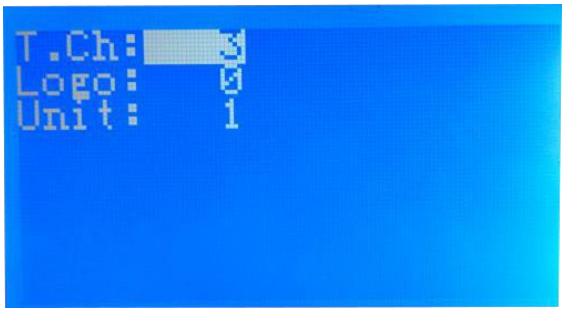


Fig. 11

5.7.2 Figure 11 screen function introduction

T.Ch: Control layer selection, 1 only controls F1, 4 controls F1~F4;

Logo: LOGO switch, 0 is not displayed when the controller is started, 1 is displayed;

Unit: Temperature symbol selection, 0 is °C, 1 is °F.

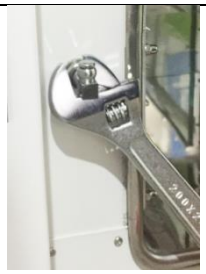
5.8. Alarm / Faults

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
		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 ±1° 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	Vacuum gauge needle does not move, door can open easily	Check vacuum connection	Be sure all pump and hose fittings are secured Ensure vacuum valve, purge valve, and release dial are in appropriate position
		Check door seal	Remove and clean door gasket with warm water to remove potential dust or debris
Issue	**Symptom**	**Cause**	**Solution**
Cannot initiate vacuum (continued)	Vacuum gauge needle does not move, door can open easily	The door is not closed well The door does not create a complete seal between gasket and glass	 Loosen nut 3-5 turns counterclockwise.  Tighten door pin 1 full turn clockwise.  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.
Cannot pull full vacuum	Vacuum gauge cannot reach desired pressure	Check elevation	Maximum vacuum level is limited by operating elevation 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

7. Packing List

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

8. Contact

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