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Operation Manual

(Version 2.0.0)

VWR Gravity Convection General Incubator

414005-128, 414005-129, 414005-130, 414005-131
414005-132, 414005-133, 414005-134, 414005-135



"414005-134" VWR Gravity Convection General Incubator, 155Lit(5.4cuft)

Man. V123 (29 Nov. 2010)

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1 Safety Instructions

Please read this manual carefully before using this product for optimal use. The indicated cautions are related to safety and you should observe all safety and warning instructions to avoid potential damage to product and injury to operators. Keep this manual for future reference.

Note: Use this product only in the way described in the product literature and this manual. Before using the product, verify that this product is suitable for its intended use.

Do not modify the system components or use the unauthorized parts as this will void the product warranty.

Symbols (Pictograms) and the meaning

	This symbol indicates caution.		This symbol indicates prohibition.
	This symbol indicates prohibition regarding modification.		This symbol indicates caution regarding heat.
	This symbol indicates risk of explosion or fire.		This symbol indicates the user must be kept away while in operation.
	This symbol indicates Protective earth (ground).	N	This symbol indicates the connection point of the neutral conductor on the installed unit.
	This symbol indicates power "OFF" on the power on/off switch.	I	This symbol indicates power "ON" on the power on/off switch.
~	This symbol indicates alternating current Voltage.		

Please read below following warnings regarding Safety and Proper Use.

 **WARNING**	
	Do not use a power supply other than the one the unit is designed to operate on. Inappropriate power supply may result in damage to the equipment. Adhere to all electrical codes.
	Please do not touch with wet hands. It may cause an electric shock.
	Do not mishandle the power cord. Disconnection or a short circuit may occur if power cord is bent or a heavy object is placed on the cord.

	Insert the plug securely into an appropriate wall socket. Loose connections result in excessive heat generation to the device and may cause arcing to occur at the connection.
	Unplug the unit from the wall socket if the unit is not going to be used for an extended period of time.

Installing the Product (Refer to Section 5 for Installation Instructions)

 **WARNING**	
	Place the product on a level, horizontal surface to support the weight of the product without vibration.
	Do not operate the product in the presence of flammables. It could cause explosion or fire.
	Do not operate the product outdoors. Avoid areas where the sun shines directly on the product. It could cause an overheating condition or a short circuit.
	Do not install the product where it can get damp or in a dusty environment. It may cause overheating or short circuit. – Pollution Degree 2
	Do not use this product in a location where the ambient room temperature falls below 5°C and rises above 40°C.
	Do not install the product in a location at an altitude of over 2,000 meters (6,562 feet).
	Do not operate this product near a heater or an air-conditioner.
	The device should be located in a well ventilated location. Be sure the ventilation holes on the side or rear surface of the body are not blocked by a wall or an object. It may cause fire or damage if the product is not to able to properly reject heat or insufficient ventilation may result.
	The fluctuation of main power voltage should be lower than +/-10% of the nominal voltage.
	The maximum relative humidity is 80% at 31°C and 50% at 40°C.
	Use only a power outlet which has a ground (earth) terminal. Do not earth to gas pipe, plastic tap water pipe or phone line. It may cause an electrical shock, a fire, breakdown or explosion of the unit.
	The product should be connected to the rated power supply as specified on the label on the rear side of the unit, AC 120V/60Hz, 15A. If the product is connected to wrong power source or electricity, it may cause overheating, an electrical shock or shortage of a component.

	If a product was transported or stored in high humidity condition, please check packaging condition before use. If the carton or wooden box is waterlogged, please contact the deliverer or our technical service engineer. Do not operate the unit before checking with an engineer, otherwise it may cause an electrical shock or a fire.
	Do not put any object in the space between the outer and inner chamber. When an object like stone, metal or paper which is easily combusted is inserted in the space, it may cause a fire, an electrical shock or breakdown of the unit. If this happens, pull the main plug out from the socket immediately and contact Equipment & Instrument Services 1-888-793-2300.

Operating the device (Refer to Section 7 for Operation Instructions)

 **WARNING**	
	Clean the bottom of inner chamber and install the shelves properly before use.
	The inner chamber is hot during operation, do not touch the inner chamber without proper hand protection during operation as burns may occur.
	Place only metal, glass or ceramic material in the chamber. Do not place plastic ware in the chamber.
	Do not close your face, hands or body into a chamber. It may cause an injury or burn by high temperature.
	Only operate unit after checking the safety of the unit. If a slight shock or poisonous gas from a sample is generated use proper safety precautions.
	If unexpected sound, smell or smog is generated, pull the main plug out from the wall socket and contact VWR Equipment & Instrument Services 1-888-793-2300.

 **CAUTION**	
	This product must be connected to a properly grounded power supply.
	If irradiated or contaminated samples are placed in the chamber, the warranty is voided. Do not use this product to sterilize or disinfect objects or samples.
	The Sound Level of the buzzer is maximum 60dB in 1 meter distance when an error is detected.

2 Introduction

VWR Gravity Convection General Incubators combine microprocessor controlled temperature with a state-of-the-art design that delivers a true naturally-occurring gravity convection.
VWR Gravity Convection General Incubators are designed for convenient and safe use in many applications such as Animal & Plant Cell Culture, Constant Temperature, Germination Test and B.O.D. Test.

Key features include;

- Advanced, Adaptive, Microprocessor Control resulting in Superior Temperature Accuracy
- High-Quality LCD Display with Back-Light
- Simplest Control by Rotary Knob
- RS232C Interface for Remote Monitoring and Controlling with PC(Optional)
- Ambient+6°C to 70℃ range with Fluctuation of ±0.2℃ at 37℃
- Compact Body Design
- Corrosion Resistant 304 Stainless Steel Chamber and Shelves
- Over Temperature & Over Current Protection, Sensor Error Detection
- 2 Stainless Steel Shelves are included
- UL/CUL Approved
- 2-year Warranty

3 Package Contents

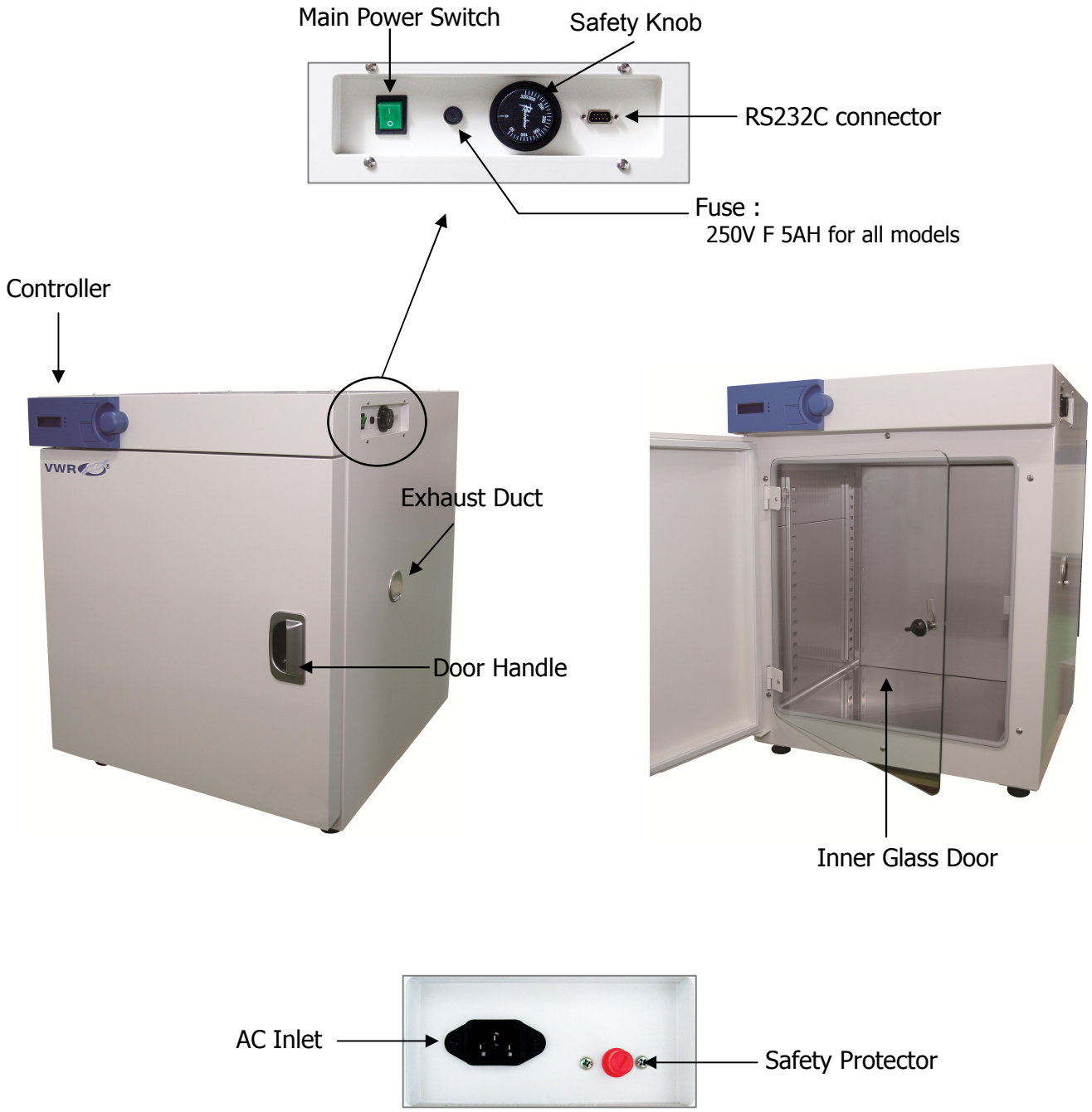
	Qty
General Incubator	[1]
Power Cord	[1]
Stainless Steel Shelves	[2]
Stainless Steel Rails	[4]
Operation Manual	[1]
Warranty Card	[1]

Models

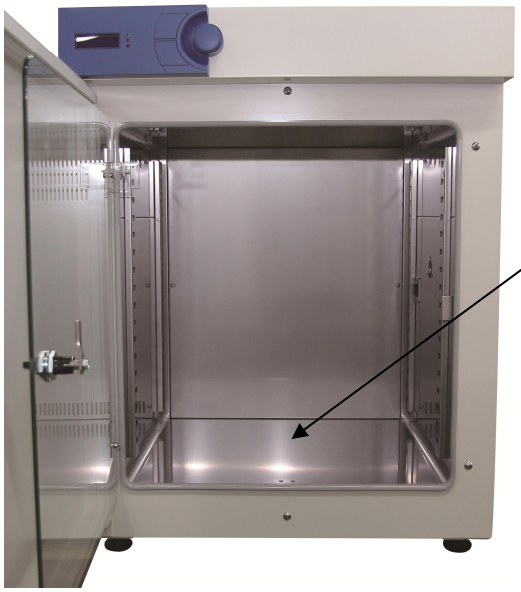
(a) 414005-128 : Gravity Convection General Incubator, 32L(1.1cuft), 120V, 60Hz
(b) 414005-129* : Gravity Convection General Incubator, 32L(1.1cuft), 230V, 50/60Hz
(c) 414005-130 : Gravity Convection General Incubator, 50L(1.75cuft), 120V, 60Hz
(d) 414005-131* : Gravity Convection General Incubator, 50L(1.75cuft), 230V, 50/60Hz
(e) 414005-132 : Gravity Convection General Incubator, 105L(3.7cuft), 120V, 60Hz
(f) 414005-133* : Gravity Convection General Incubator, 105L(3.7cuft), 230V, 50/60Hz
(g) 414005-134 : Gravity Convection General Incubator, 155L(5.4cuft), 120V, 60Hz
(h) 414005-135* : Gravity Convection General Incubator, 155L(5.4cuft), 230V, 50/60Hz

* 230V models are not UL certified.

4 Description of Key Parts and Functions



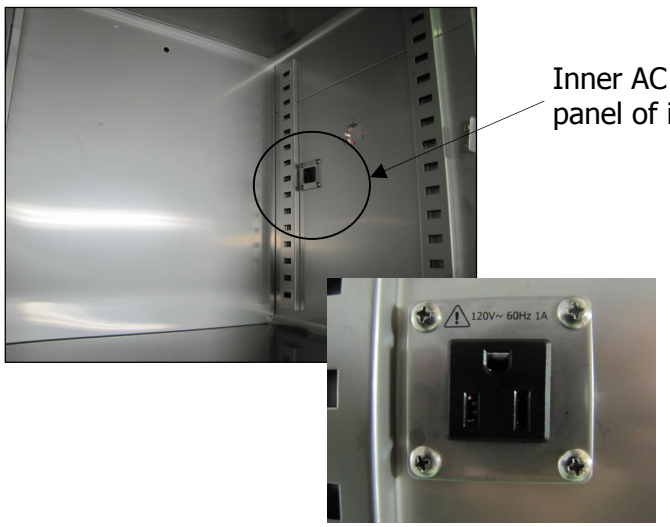
<Figure 1> VWR Gravity Convection General Incubator 414005-128,129,130,131,132,133,134,135



Heater is equipped in the bottom and two sides of the chamber.
Do not put any object on the bottom.

<Figure 2> Inner chamber of Gravity Convection General Incubator

* Inner AC Outlet (The inner AC Outlet is applied to the units having 120V, 60Hz only.)
- Rating: 120Vac, 60Hz, 1A
- Fuse: 250V F1AH



Inner AC Outlet is located on the right panel of inner chamber.

<Figure 3> Inner AC Outlet

Rating

The rating of inner AC Outlet is 120Vac, 60Hz, 1A. Before plugging any device into the inner outlet, insure that the device has the proper rating. If a device is plugged into the inner outlet without the proper rating, the fuse will be blown and it may cause a fire or shock. If this happens, disconnect the main power cord from the wall socket and contact VWR Equipment & Instrument Services 1-888-793-2300.

5 Installation

1. Please read Section 1 Safety Instructions carefully for your safety before use.
2. After receiving the unit and locating it in the specified location, remove the packaging.
3. Check the unit for any transport damages. If any such damages are found, please contact the deliverer of the product.
4. Movement and placement method of the product
   - VWR Gravity Convection General Incubators are not equipped with casters. Units should be moved using a cart. Ensure that no damage is sustained by the units during transport. It is recommended that units are moved by at least 2 people and by lifting units up holding the indicated positions in the figure below.

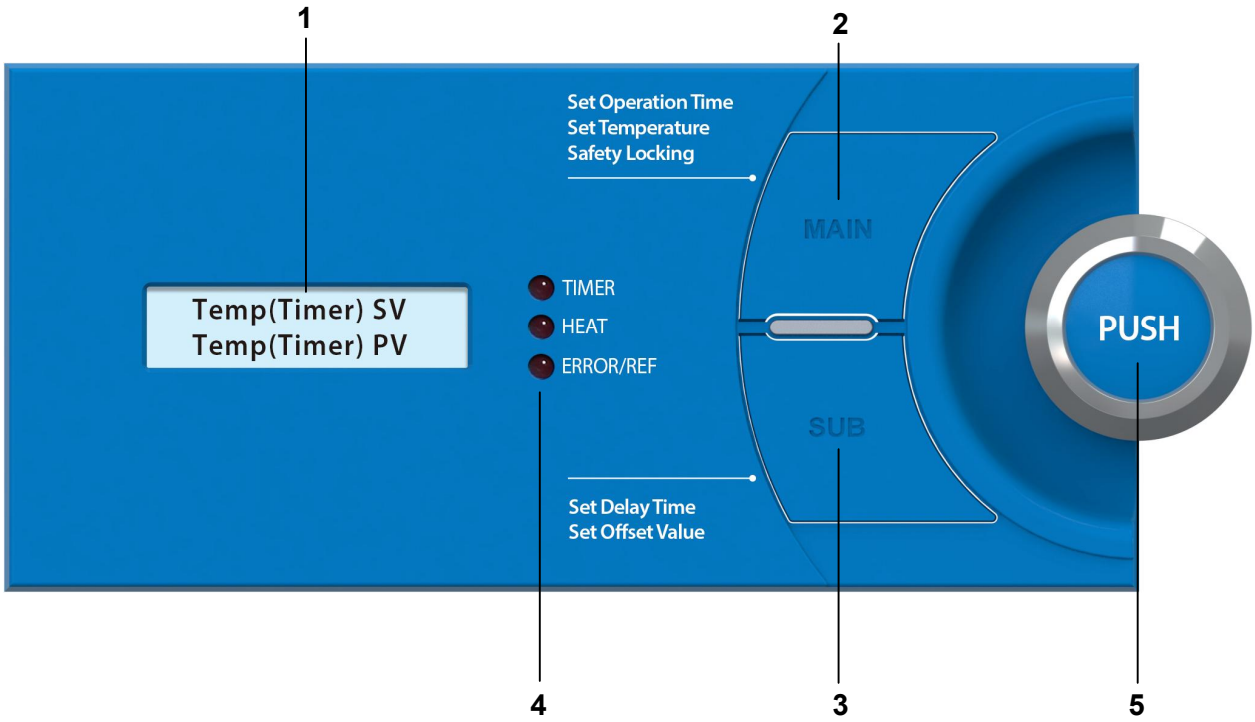


5. The product should be positioned in a location where it has enough space for ventilation and prevention from fire. The recommended distance of each side is minimum 20cm from the back wall, 100cm from the side walls and ceiling respectively.
6. Place the device on a level, horizontal surface to support the capacity of the device without vibration.
7. Once the unit is placed in its installation location, let the unit stand for 15-30 minutes so that all the internal parts of the unit stabilize.
8. Connect the power cord to the wall socket.
9. When installing the device, ensure the wall socket is easily accessible.

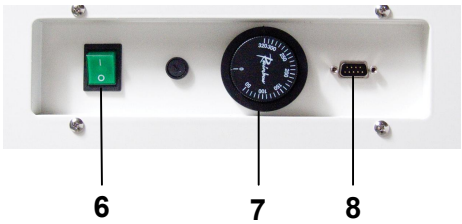
*** Grounding**

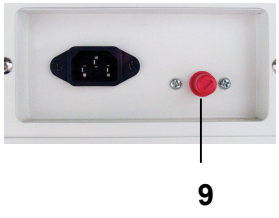
This product must be connected to a proper grounded power supply.
You should connect to the power socket having the ground and over 5A for all models. Do not earth to gas pipe, plastic tap water pipe or phone line. It may cause an electrical shock, a fire, breakdown or explosion of the unit.

6 Controller Details



1. **Digital LCD Display** – Indicates SV (Set Value) and PV (Present Value) of temperature and/or timer
2. **MAIN** Button – Used to change MODE 'Set Operation Time', 'Set Temperature', and 'Safety Locking'
3. **SUB** Button – Used to change the SUB MODE 'Set Delay Time' and 'Set Offset Value'
4. **TIMER**, **HEAT**, **ERROR** LED Indicators – Indicate operation of Timer/Heater, Current Status and Error by flickering or lighting, respectively
5. **Rotary** Knob – Used to set Temperature and/or Time by turning and then START/STOP by pushing in the knob. Also, used to save the Set Values by pushing the knob in each mode.





6. **Main POWER Switch** – Used to turn the unit on and off
7. **SAFETY** Knob – Safety device which protects against uncontrolled overheating of the unit

8. **RS232C Connector** – Port for the cable connection to PC

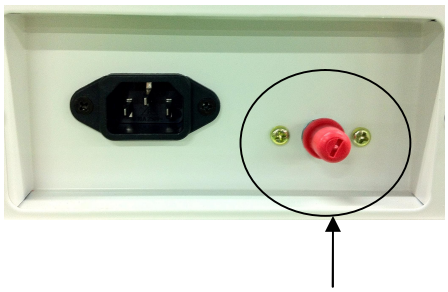
- Monitoring and Controlling with PC by connecting RS232C cable



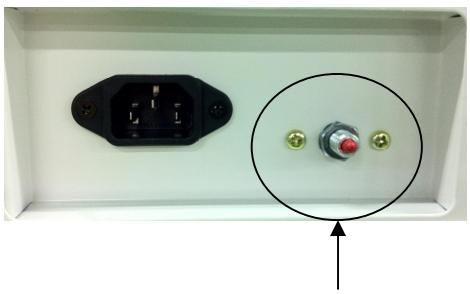
9. **SAFETY Protector**

Protects the product by cutting the power to the heater when the unit operates abnormally and overheats(over 80°C). If the SAFETY Protector has been activated, the heater will not auto-recover, and must be reset manually to recover. (The safety protector is applied to the units having 120V, 60Hz only.)

- To reset the SAFETY Protector



1) Check the location of the SAFETY Protector



2) Remove the red cap of the Protector by turning it to the left and press the switch once. Then, you should hear the 'click' sound, the protection will be released and the unit will work.

Caution !

If the SAFETY Protection is activated, it means that the product was run over the temperature limit, please contact Equipment & Instrument Service 1-888-793-2300.

7 Operation

1. Preparation for Use

- Connect the power cord to the proper power socket.
- Turn the Main Power Switch to the on position.
- Set the SAFETY Knob to 20~30°C higher than operation temperature.
- Before operation, check that the door is completely closed. If the door is not completely closed, the LCD Display shows "Error 3 Door Open!" error message and the buzzer sounds.

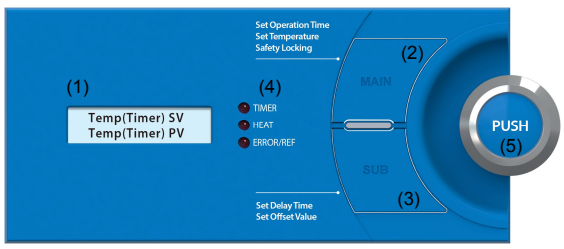
2. Setting the Timer

2.1 Set Operation Timer

- The initial mode after power up is "Set Operation Timer" mode, the TIMER indicator flashes.
- "Tim SV" on the LCD display indicates the set value of the timer and "Tim PV" indicates the present value (remaining time) of the timer.
- Initial value (SV) of the time is 00:00, which means infinite time. That means this unit will operate (heat) continuously once the operation is started.
- Turn the Rotary Knob, the SV and PV change together. SV can be set in 1 minute increments and the maximum value is 99:59 (99 hours and 59 minutes).
- Set the required time using the Rotary Knob and push it to complete the timer setting. Then timer is started and TIMER indicator is lit. The unit continues to operate (heat) until the SV of the timer has expired.

❖ When Operation Timer ends, Alarm beeps three times.

❖ When the Timer activates, Timer Indicator is lit on Temperature Mode or Locking Mode. In Timer Mode, the Timer Indicator flashes regardless the Timer activation.



(1) Digital LCD Display

(2) MAIN Button

(3) SUB Button

(4) TIMER, HEAT, ERROR LED Indicators

(5) Rotary Knob

2.2 Set Delay Timer

- Go to "Set Delay Timer" mode by pushing the SUB button while in the Set Operation Timer mode. TIMER indicator flashes.
- "DTim SV" on the LCD display indicates set value of the delay timer and "DTim PV" indicates the present value (remaining time) of the timer.

- Set required delay time using the Rotary Knob and push it in to complete the timer setting. The timer is started and the TIMER lamp indicator is lit. The unit starts operation (heating) after the delay time has expired.
- Return to the Set Operation Timer mode by pushing the MAIN button.

❖ After setting Operation Timer and/or Delay Timer, push the Rotary Knob to operation of the Timers.

❖ To change the Delay Timer Setting during operation, push the Rotary Knob once to stop operation and set Timer accordingly. After completion of setting, push the Rotary Knob once to restart operation.
Operation Timer can be set during operation without stopping the unit.

3. Set Temperature

3.1 Set Temperature

- Go to "Set Temperature" mode by pushing the MAIN button while in the Set Operation Timer mode.
- "Temp SV" on the LCD display indicates the set value of the operation temperature and "Temp PV" indicates the present value (measured value by temperature sensor in the chamber) of the chamber temperature.
- Turn the Rotary Knob, the SV changes. The SV can be set in 0.1°C increments. The maximum value is 70°C.
- Set the required operating temperature using the Rotary Knob and push it in to complete the temperature setting. The controller starts operation of the heater to reach the set temperature.

❖ To change the Set Temperature during operation, push the Rotary Knob once to stop operation and set Temperature accordingly. After completion of setting, push the Rotary Knob once to restart operation.

❖ During heating, HEAT Indicator is flickering upon the heater operation.

❖ During operation, PV Temp and Running are shown on the lower line by turns.

3.2 Temperature Offset (Calibration)

VWR Gravity Convection General Incubators intelligently and precisely control the temperature inside the chamber by Advanced, Adaptive Microprocessor Control, so high precision with low over/undershoot is assured. Some users may want to 'synchronize' the PV temperature of the unit to the temperature value measured by a thermometer that is used as a reference point for the process. To accomplish this, the VWR Gravity Convection General Incubators offer a function to adjust the PV temperature within –10.0 ~ +10.0°C
⇒ User's self-compensation function.

- Go to "Set Offset Value" mode by pushing the SUB button while in the Set Temperature mode.
- "Temp PV" on the LCD display indicates current temperature and "Offset" indicates the value to be added to the PV temperature (compensation value).
- Turn the Rotary Knob, the Offset and the Temp PV change together. Offset can be set in 0.1°C increments, and the input range is –10.0 to +10.0°C. Temp PV, now shows the

temperature value with the added or subtracted offset value.

- Return to the Set Temperature mode by pushing the MAIN button.
- If Set Temperature Offset is accessed during operation (heating) heating will be stopped. Operation can be restarted by pushing the Main Button then the Rotary Knob.

❖ After the adjustment, hold the Rotary Knob for 1 second to save the set value and see the LCD display flickers twice (refer to 5. Storage Function). We recommend to store the offset value when you used a calibrated validator/thermometer or the unit is used for the personal application only. But, if the unit is for public use or the adjustment is for temporary application, do not save the value. Otherwise, it may affect to other applications.

4. Locking Mode

- It is recommended that while unit is in operation (heating) that the unit is set to Locking Mode.
- Go to "Locking" mode by pushing the MAIN button while in the Set Temperature mode. In this mode, turning or pushing the Rotary Knob has no effect on the unit, to avoid any unintended changes.
- Operation Timer PV and Temp PV are shown on the LCD display.
- Return to Set Operation Timer mode by pushing MAIN button.
- If you need to set Temperature, push the MAIN button again while in the Set Operation Timer mode.

5. Storage Function

In each setting mode (Set Operation Timer mode, Set Delay Timer mode, Set Temperature mode, and Set Offset Value mode), you can store the set values by simply pushing and holding the Rotary Knob for 1 second. To show the value is successfully stored, the set value on the LCD display flashes twice. Even though the unit is turned off, the set values are stored permanently, so you can reuse the values for the next operation.

❖ If you need to set Temperature during running the unit, push the Rotary Knob once to stop running and then adjust the temperature. Push the Rotary Knob once to restart the unit.

6. Function of Auto Recovery at Power Failure

In the event of an unexpected disruption of the power supply to the product caused by power loss or by accidental removal of the power cord from the power socket when power is restored to the unit, VWR Gravity Convection Ovens have a function to automatically recover the status of the last operation as follows:

- **Activating the function**: If you save the currently operating Temp SV value, to a non-zero value as set in "5. Storage Function" above, the unit will start operation with the saved Temp SV automatically without manually setting/starting again at the next power up of the unit. If you want the unit to start operation automatically again after sudden power loss situation, save the current Temp SV by pushing in the Rotary Knob for 1 second while operating.

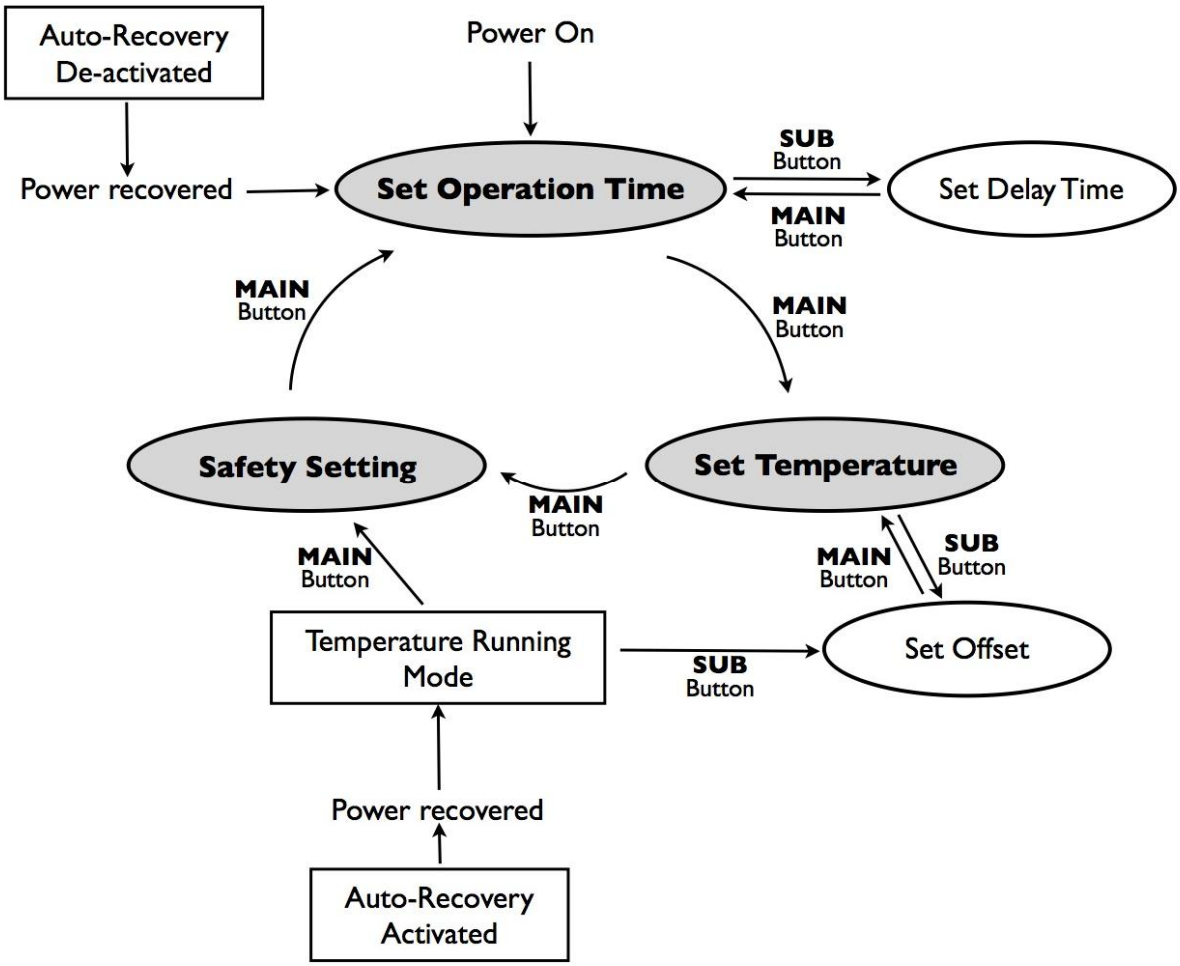
* Timer and Delay Timer values are not activated after auto recovery.
* Once power recovered, the display automatically shows the Temperature Running mode.

- **Deactivating the function**: If you turn the Rotary Knob counterclockwise maximally in Set Temperature mode, 0°C will be displayed after 25°C. If you save this 0 value of Temp SV by pushing the Rotary Knob for 1 second, the unit will stay at the initial status without operating automatically at the next power up of the unit. Please use this mode only when you don't need automatic recovery of operation after power loss.
  * After power recovered, the LCD Display automatically goes into the Timer Setting Mode for adjustment.

7. Summarization of Mode Transition

By the simple combination of MAIN, SUB buttons and Rotary Knob, VWR Gravity Convection General Incubators offer outstanding user-interface with maximum efficiency and convenience for controlling overall functions of the unit.

The following diagram briefly shows the overall mode transition mechanism.



8 Specifications

Model Name		414005-128,129	414005-130,131	414005-132,133	414005-134,135
Capacity		32L(1.1cuft)	50L(1.75cuft)	105L (3.7cuft)	155L(5.4cuft)
Dimension (L×W×H)	Internal(mm)	290 x 310 x 360	350 x 370 x 420	410 x 485 x 535	475 x 550 x 600
	(inch)	11.4 × 12.2 × 14.2	13.8 × 14.6 × 16.5	16.1 × 19.1 × 21.1	18.7 × 21.7 × 23.6
	External(mm)	485 × 481 × 624	545 × 541 × 701	603 × 644 × 841	668 × 709 × 906
	(inch)	19.1 × 18.9 × 24.6	21.5 ×21.3 ×27.6	23.7 × 25.4 × 33.1	26.3 × 27.9 × 35.7
Heater		150W	200W	300W	400W
Temp.	Range	Ambient Temperature +8°C to 70°C			
	Fluctuation	±0.3°C at 37°C / 50°C			
	Variation	±0.7°C at 37°C ±1.2°C at 50°C			
	Sensor	PT 100			
Control Sensitivity		±0.1°C			
Heating-up Time		25 min. to 37℃ 45 min. to 50℃			30 min. to 37℃ 45 min. to 50℃
Recovery (Door open 30 sec)		8 ~ 11 min. to 37℃ 12 ~ 16 min. to 50℃			
Controller		Advanced, Adaptive Microprocessor Control with Rotary Knob (Turn & Push)			
RS232 Port		Available to connect with PC			
Display		Digital LCD Display with 1/10 of one degree			
Timer		99hr 59 min (delay/continuous function)			
Material	Internal	Stainless Steel (#304)			
	External	Powder Coated Steel			
	Inner Door	Inner Tempered Glass Door			
Shelves		2 ea of Stainless Steel Shelves			
Ventilation		1ea of Ventilation hole with Stainless Steel Cap, Hole Diameter 40mm			
Circulation		Gravity Convection Type			
Safety device		Over Temp. and Over Current Protector, Sensor Error Detector			
Others		UL Certified, CE Certified RS232C Interface for Monitoring and Controlling with PC Storage Function (Temp. and Time) Locking Mode (Rotary Knob Input Disabled) Alarm (Error Status and Timer-end)			
Net Weight (kg)		32	40	59	71
(lbs)		70.7	88.9	130.1	157.4
Packing Dimension (mm)		592 x 568 x 698	652 x 628 x 775	710 x 731 x 1018	775 x 796 x 1083
(L×W×H) (inch)		23.3 x 22.4 x 27.5	29.7 x 24.7 x 30.5	28.0 x 28.8 x 40.1	30.5 x 31.3 x 42.6
Shipping Weight(kg)		39	53	67	78
(lbs)		86.2	117.6	147.7	172.8
Power Consumption		159 W	169.9 W	292.9 W	420.5 W
Energy Consumption, at 37°C		34 Wh	41 Wh	63 Wh	99 Wh
, at 50°C		81 Wh	103 Wh	152 Wh	212 Wh
Power Supply		120V, 60Hz or 230V, 50/60Hz*			

* 230V models are not UL certified.

* Environment of Performance Test : Ambient Temp: 24~ 27℃ (Keep +/- 1.5℃ in 1 hour cycle)

9 Maintenance

1. If the unit is not to be used for an extended period of time, disconnect the power cord from the wall socket.
2. If service is needed please contact VWR Equipment and Instrument Services 1-888-793-2300.
3. VWR is not responsible for damage to the unit caused by abnormal use or by not heeding warnings and cautions in the manual or unauthorized modifications of the unit.

CLEANING

1. Before cleaning the unit, disconnect the power cord from the wall socket. Otherwise, it may cause an electric shock or fire.
2. To clean the unit, a neutral detergent and soft cloth is recommended. Do not use coarse cloth, strong chemicals or organic solutions.
3. Do not use water, Benzene, Thinner or any alcohol for cleaning the product. It may cause discoloration, damage, an electric shock or fire.
4. If you expect damage by a chemical during cleaning, call VWR technical support team.
5. Do not pour water directly into the unit. It may cause an electric shock or fire.
6. During cleaning of the chamber, be careful cleaning the corners to avoid injury.

- Cleaning Method of the Inner Chamber

- Remove the shelves equipped in the chamber. Clean the contaminated part using a neutral detergent and soft cloth.
- After cleaning, reassemble the shelves properly.
- Do not clean the unit aggressively. Otherwise, the coating or painting of the product could be damaged.

- Cleaning Method of the Exterior

- Clean the exterior using a neutral detergent and soft cloth.
- Do not clean the display or Rotary Knob aggressively as they may be damaged.
- Do not clean the unit aggressively. Otherwise, the coating or painting could be damaged.

- Cleaning Method of the Parts

- Clean the parts using a neutral detergent and soft cloth.
- Do not clean the unit aggressively. Otherwise, the coating or painting could be damaged.

Troubleshooting Guide 10

Situation	Confirmations and Solutions
Unit Not Heating	Check the Temp SV and confirm operation by pushing in the Rotary Knob. Check the MAIN Power Switch is on. Check the SAFETY Knob is set to a value higher than the operating temperature. Check the Safety Protector is not activated.
Power Failure	Check the power cord is plugged into wall socket. Check the supplied voltage is proper and regulated.
Heating, but unit not reaching temperature	Check the Set Temperature is higher than ambient temperature (recommended min set temp: 10C higher than ambient temp). Problem in the sensor or main controller. Please contact VWR Equipment & Instrument Services 1-888-793-2300.
Heating, but temperature is fluctuated	Check the SAFETY Knob is set to a value higher than the operating temperature. Check the Ventilation hole is well sealed.
Fuse is blown OR circuit breaker is flickered.	Check power source of wall socket and see what other loads are on wall circuit.
Error 1	Temperature Sensor Reading Error. Check whether the unit is heating properly or not when the Error 1 develops. Please contact VWR Equipment & Instrument services 1-888-793-2300.
Error 3	Door open alarm and appears when you open the door. If Error 3 develops during door closed, check the Limit Switch is pressed properly. The Limit Switch is located beneath the upper right corner of the unit. The Limit Switch works well but still Error 3 develops, please contact VWR Equipment & Instrument service 1-888-793-2300.

※If you have any problem other than above, please contact VWR Equipment & Instrument Services 1-888-793-2300