CLB30 and CLB50

Portable Calibration Baths

User Manual

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Palmer Wahl Instruments, Inc. Warranty

Manufacturer warrants all products listed in this catalog to be free from defects in material or workmanship under normal use and service. The Manufacturer agrees to repair or replace any product, which upon examination is revealed to have been defective due to faulty workmanship or material if returned to our factory, transportation charges prepaid, within the product specific warranty period stated in the catalog by the manufacturer. This warranty is in lieu of all other warranties, expressed or implied and of all obligations or liabilities on its part for damages including but not limited to consequential damages, following the use or misuse of instruments sold by the Manufacturer.
No agent is authorized to assume for manufacturer any liability except as set forth above.

Table of Contents

1. General Information

- Models CLB30E and CLB50E are identical to CLB30 and CLB50 with exception to the power cord provided. All information and references to CLB30 pertain to CLB30E and all references to CLB50 pertain to CLB50E.

- This instruction manual provides important information about the instrument operation. In order to work with this instrument safely it is essential to comply with all safety and handling instructions provided.

- Always comply with the regulations on accident prevention and safety rules in force at the place of use of the instrument.

- The instruction manual is an integral part of the instrument and must be near the equipment, so that specialized staff can refer to it at any time.

- The qualified staff must have read and understood the instruction manual before starting any work.

- The manufacturer is discharged from any liability for damages caused by usage not according to the intended purpose of use, non-observance of this manual, handling by non-qualified personnel as well as unauthorized modification of the instrument.

- General conditions of sale included in the sales documentation apply.

- Technical modifications are reserved without notice.

- For more information refer to:

Website:	www.palmerwahl.com
Relevant Technical Sheet:	CLB30, CLB50
Technical Service:	(800) 421-2853
	info@palmerwahl.com

2. Symbol Definition

	**DANGER** Indicates an immediately dangerous situation which causes death or serious injury if not avoided.
	**WARNING** Indicates a potentially dangerous situation which may cause death or serious injury if not avoided.

	**CAUTION** Indicates a potentially dangerous situation which may cause death or minor or medium injury or material or environmental damage if not avoided.
	**INFORMATION** Marks useful tips and recommendations as well as information for efficient and fault-free use.
	**DANGER** Indicates hazards caused by electric current. There is a risk of serious or deadly injuries if safety instructions are not observed.
	**WARNING** Indicates a possibly dangerous situation which may cause burns due to hot surfaces or liquids if not avoided.

2.1. Use as planned

	**WARNING** Before installation commissioning and operation make sure you have selected the appropriate calibration bath with respect to measuring range, version and specific measurement conditions. Risk of serious injury and / or property damage if not avoided.
	The different chapters of this manual contain other important safety instructions.

The portable calibration bath is a portable unit for technical service, industrial and laboratory tasks. Palmer Wahl Instruments, Inc.'s temperature baths or calibration baths are provided for calibrating thermometers, temperature switches, thermostats, resistive and thermocouple temperature sensors.

The product has been designed and built only for the purpose described here and should be used in accordance to it.

Operate in accordance with the technical specifications of this manual. Any inappropriate handling or use of the equipment not in accordance with the technical specifications requires the immediate service and verification by an authorized Palmer Wahl Instruments, Inc. technician.

Handle this electronic precision instrument with due diligence (protect against humidity, strong impacts, magnetic fields, static electricity, extreme temperatures. Do not introduce any objects into the ventilation openings of the instrument). Connector pins must be protected against contamination.
If the instrument is moved from a cold to a warm environment, a malfunction due to condensation can occur. In this case you have to wait until the temperature of the instrument equilibrates to the room temperature before putting it back into operation.

Palmer Wahl is not responsible for any damages caused by inappropriate handling or misuse of this equipment.

2.2. Staff Qualification

	**WARNING - Risk of injury due to insufficient staff qualification!** Improper handling and use may cause considerable personal and property damage. The activities described in this manual should be performed only by qualified personnel with the appropriate qualifications.

Qualified Staff

Because of their professional training and their knowledge of control and measurement technologies, as well as their experience and knowledge of regulations, standards and guidelines in the country of use, specialized staff are able to perform the works described and recognize potential dangers, themselves.

Some specific usage conditions require additional knowledge, such as aggressive environments. This equipment is not designed or intended to be used in Explosive or Hazardous Locations.

2.3. Personal protective equipment

The personal protective equipment protects qualified staff from hazards which may harm their health and safety during work. The specialized staff must wear personal protective equipment during the operation and use of this instrument.

Comply with the specific requirements for personal protective equipment in the work area!

The owner must provide personal protective equipment. In addition to eye protection, lab coats and work gloves are recommended.

	**WEARING PROTECTIVE GLASSES** These protect the eyes from projected parts and splashes.

2.4. Specific Risks

	**WARNING** In the case of dangerous substances to be measured, e.g. oxygen, acetylene, flammable toxic substances, as well as in refrigeration premises, compressors, etc., the relevant provisions must be observed in each case plus all general rules.

	**DANGER** Risk of death, by electric current. There is direct danger of death from touching live parts. • The installation and assembly of electric products must only be performed by a qualified electrician. • Before replacing any fuses, cleaning or maintenance, disconnect the portable calibration bath from the AC Mains by removing the power cord from the electrical outlet.
	**WARNING** Residual liquid in instruments removed from service may cause risks to people, the environment and future use. Take appropriate precautions by emptying and cleaning the instruments calibration well.

2.5. Overheating protection

	**WARNING** For your safety the calibration bath is equipped with an independent over-temperature protection device that disconnects the power supply from the heating elements in the event of excessive temperature inside the housing. After cooling, the calibration bath must be returned to Palmer Wahl Instruments, Inc. for servicing. The portable calibration bath is designed to be used for temperature calibration. You may need to take further protective measures if the calibration bath is used for applications not explicitly mentioned in this manual.
	**WARNING** Do not use the calibration bath in hazardous atmospheres (flammable or explosive atmospheres)! If a malfunction of the calibration bath can cause personal injury or property damage, it may be necessary to install additional electromechanical protection devices.

2.6. Safety Instructions for using calibration liquids

2.6.1. Calibration liquid – Water

	Use only distilled water, to prevent mineral deposits from forming in and on the calibration bath.

2.6.2. Calibration liquid – Silicone Oil

	**WARNING** • Only use the silicone oil recommended in this manual. • Read the safety data sheet before starting to work with silicone oil. The data sheet is available from the manufacturer or distributor. • Ensure that the room is well ventilated when working with silicone oil as harmful substances may be given off.

	• Because the silicone oil is hygroscopic, always close the portable calibration bath with the transport cover after use and sufficient cooling of the calibration bath. • The transportation cover should be removed prior to heating. If the calibration bath is closed when heated, unacceptable pressures may occur. To avoid overpressures the transportation cover is equipped with a pressure safety valve. The safety valve is activated at approximately 2.5 bar of pressure. Hot vapor or steam may escape when the valve activates.
	**WEAR SAFETY GLASSES!** Make sure that the silicone oil does not come in contact with the eyes or skin.
	**WARNING** **Risk of burns** Before transporting or touching the -bath it is necessary to ensure that it is to sufficiently cool, otherwise there is a risk of burns.

2.7. Explanation of Symbols

	It is absolutely necessary to read the instruction manual before installation and commissioning of the equipment.
	**CE, European Community** Instruments with this mark comply with applicable European directives.

3. Technical Specification and Information

3.1. Approval data and certificates

Approval and certificates, CLB Series CE compliance	
Low Voltage Directive	2004/108 CE, EN 61326 Emission (Group 1, Class B) and resistance to interference (industrial locations).
Low Voltage Directive	2006/95 / EC, EN 61010-1, safety regulation for electrical measuring, control, regulation and laboratory instruments.
Certificate Calibration	Our Certificate of Conformance is a statement that our product meets published specifications, included on the packing list with every product. Optional “Long Form” Certificate of Conformance is available upon request, confirming PO number, items shipped, and serial numbers for all products included in the shipment.

3.2. CLB30 and CLB50 Calibration Bath Specifications

Specifications				
	CLB30C	**CLB30F**	**CLB50C**	**CLB50F**
	Low Temp ° Celsius	Low Temp ° Fahrenheit	High Temp ° Celsius	High Temp ° Fahrenheit
Temperature Range:	-35˚ to 165˚C [1]	-31° to 329°F [1]	30˚ to 225˚C	86° to 437°F
Temperature Stability:	± 0.03˚C	± 0.05˚F	± 0.03˚C	± 0.05˚F
Temperature Uniformity:	± 0.05˚C	± 0.09˚F	± 0.05˚C	± 0.09˚F
Screen Resolution:	0.1°C	0.1°F	0.1˚C	0.1˚F
Accuracy:	± 0.3˚C	± 0.54˚F	± 0.3˚C	± 0.54˚F
Heating Time:	0˚ to 100˚C: 15 min. 32˚ to 212˚F: 15 min.		25˚ to 220˚C: 42 min. 77˚ to 428˚F: 42 min.	
Cooling Time:	25˚ to -25˚C: 35 min. 77˚ to -13˚F: 35 min.		220˚ to 100˚C: 35 min. 428˚ to 212˚F: 35 min.	
Immersion Depth:	7.48 in. / 190 mm			
Well Diameter:	2.36 in. / 60 mm			
Well Capacity:	0.7 liters			
Housing and Assembly:	Portable			
Tank Dimensions:	2.36 x 7.48 in. / 60 x 190 mm			
Dimensions W x D x H:	11.02 x 11.02 x 16.92 in. / 280 x 280 x 430 mm (with handle)			
Weight:	28.29 lbs. / 12.8 kg		25.13 lbs. / 11.4 kg	
Power Supply:	100 to 234 Vac, 50 to 60 Hz			
Power Consumption:	310 W Max		320 W Max	

[1] Minimum Temperature is 55˚C / 99°F below Ambient, Absolute Minimum -35˚C / -31°F.

Specifications subject to change without notice.

3.3. Accessories

12457-02 - Hermetic Methacrylate lid with 6 positions to hold probes, 1/8" G female thread, eliminates condensation in the oil and prevents entry and exit of vapors.

12457-03 - Trolley transport case for CLB30/CLB50/CDW30, high density foam, wheels and handle.

12457-05 - Silicone Oil - 10cSt or 50cSt, 0.7 liters, -35° to 160°C (Recommended for CLB30/CLB31)

12457-06 - Silicone Oil - 50cSt or 50cSt, 0.7 liters, 30° to 225°C (Recommended for CLB50/CLB51)

Oil Selection Guide

	CLB30	CLB50
12457-05, Silicone oil, 10cSt -30 ... 160 ºC / FP = 163ºC -22 ... 320 ºF / FP = 325 ºF	Recommended	Not Recommended
12457-06, Silicone oil, 50cSt 30 ... 220 ºC / FP = 285 ºC 86 ... 428 ºF / FP = 545 ºF	Not Recommended	Recommended
FP = Flashpoint		

4. Design and function

4.1. Description

The portable calibration bath is designed for use on the factory floor or in the calibration laboratory. Palmer Wahl's calibration baths are provided for calibrating thermometers, switches / thermostats, electrical resistance pyrometers and thermocouples. The operational safety of the equipment is only guaranteed when used as planned (calibration of temperature sensors).
The temperature limit values specified should not be exceeded under any circumstances (see Chapter 3 "Technical Specifications and Information"). The corresponding equipment, such as reference thermometer or reference probe, must be selected according to the application. The product is then properly connected and tests must be conducted. Routing maintenance is recommended.
The product is manufactured in several versions. The version is indicated on the nameplate on the portable calibration bath.

4.2. Scope of Delivery

The portable calibration bath is shipped in specially designed packaging, which should be kept for future shipping, in the event the portable calibration bath needs to be returned to the manufacturer for repair or recalibration.

Standard supply list for models CLB30 and CLB50

- Portable calibration bath
- Stainless Steel screw-on lid for fluid basket
- Sensor Basket
- Magnetic stirrer capsule
- Liquid removal syringe
- Power cord (1.5m) (North American plug is standard, European plug on "E" models)
- Certificate of Conformance
- User Manual (available online at palmerwahl.com/downloads)

Inspect contents to the packing list to make sure all parts have been delivered.

	**WARNING** Use only the supplied power cable

4.3. Overview of the different models

Portable Calibration Baths

- CLB30 (heat and cool)
- CLB50 (heat only)
- CLB30E and CLB50E are identical to the CLB30 and CLB50 with exception of the power cord provided. "E" versions are supplied with a European plug on the power cord.

4.4. Physical Description – CLB30 (heat and cool) and CLB50 (heat only)

- The portable calibration bath is comprised of sturdy steel with a painted exterior and provided with a carrying handle.
- The back section of the housing contains the thermally insulated liquid tank. The tank opening is located on top, behind the handle.
- The front section of the housing contains the temperature controller for adjusting the target temperature and a potentiometer for adjusting the magnetic stirrer speed.
- The portable calibration bath includes heating and cooling (cooling on CLB30 only) circuits for realization of the target temperature. Heating and cooling are controlled via Solid State Relays.
- The temperature controller is equipped with a 7-segment LED Display consisting of two 4-digit displays to indicate the Set Value (SV) and Process Value (PV).

4.5. Isometric views of the portable calibration baths CLB30/50

Front and top view, models CLB30/50

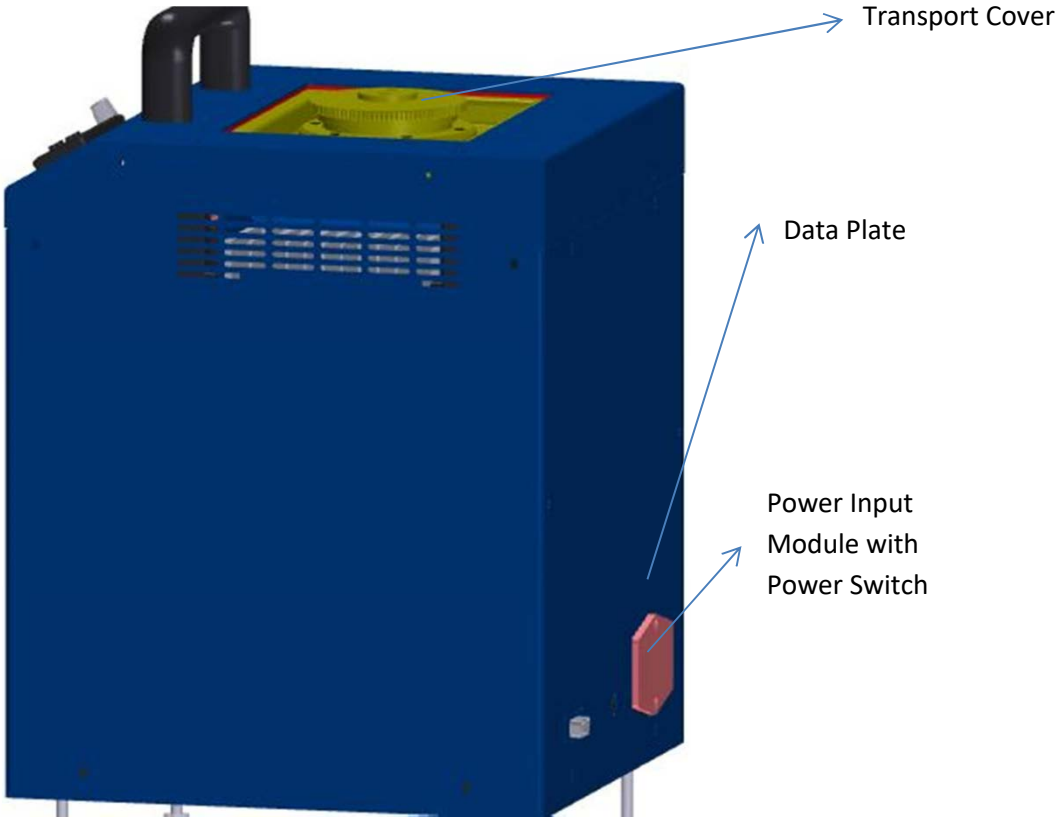
At the top of the calibration bath is the liquid well (60 mm x 110m / 2.36 x 4.33 in).
The temperature controller and magnetic stirrer speed potentiometer are located on the front of the calibration bath.

Rear view, models CLB30/50

The rear panel of the instrument contains:

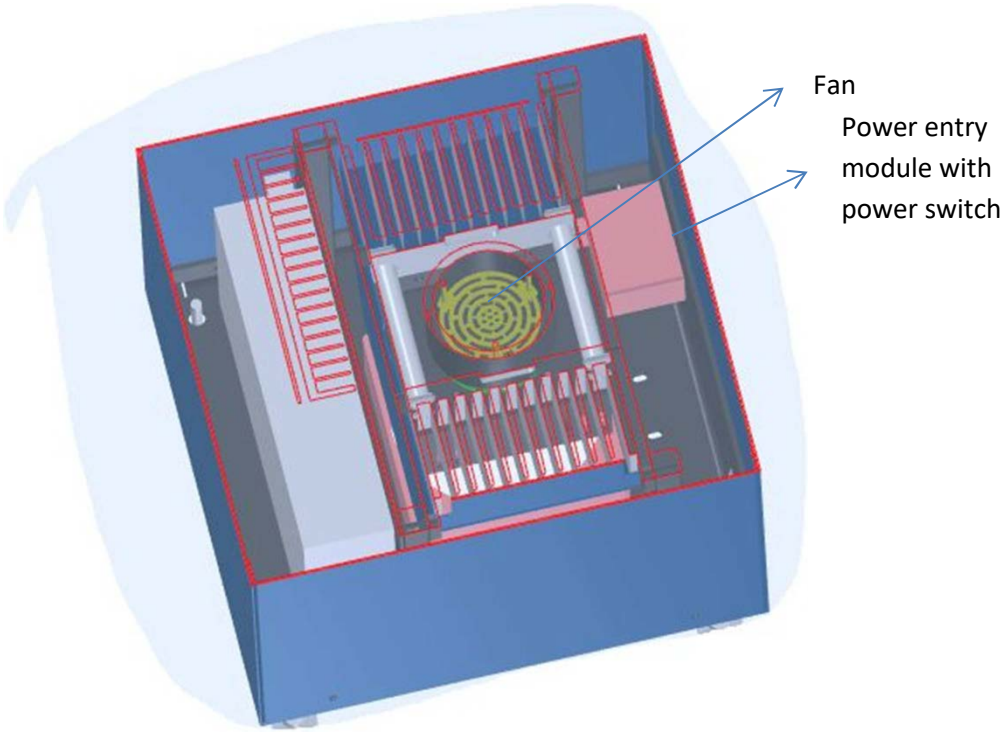
Power Input Module with Power ON/OFF switch, for connection to the AC Mains supply;

Data Plate with Model Number, Serial Number, Temperature Range, Power requirements, Fuse requirements



Bottom View, Models CLB30/50

⚠	**CAUTION** Do not block the air inlet opening on the bottom or any of the ventilation openings on the instrument.



4.6. Controls Description

4.6.1. Front View of PID Controller

4.6.2. Description of the PID Controller, Operator Interface

1) P Key

- Access to the defined nominal temperature.
- Access to menu items and parameters.
- Confirmation of change.

2) Down Arrow Key

- Reduction of the adjustable values.

3) Up Arrow Key

- Increase of the adjustable values.
- Selection of each menu item.
- It goes back 1 level in the menu.
- In normal mode, momentarily displays H for heat and C for cool with % of energy being applied.

4) U Key

- Scrolls through menu items.
- When held for 5 seconds, exits program mode.

5) LED Out

- Indicates the status of the output for temperature regulation.
- LED OUT 1 “ON” indicates the bath’s heater is ON.
- LED OUT 1 “OFF” indicates the bath’s heater is OFF.

6) LED Out

a) CLB50 – Heat Only

- Indicates the status of the output for fan control.
- LED OUT 2 “ON” indicates the fan is running at High Speed.
- LED OUT 2 “OFF” indicates the fan is running at Slow Speed.

b) CLB30 – Heating and Cooling

- Indicates the status of the output for temperature regulation.
- LED OUT 2 “ON” indicates the bath’s cooler is ON.
- LED OUT 2 “OFF” indicates the baths cooler is OFF.

7) PV Indicator

- Indicates the current bath temperature on top line of display in red, as measured by the internal temperature sensor.

- In Program or Menu mode displays the modes and parameters menu items.

8) SV Indicator

- Indicates the Set Value of the temperature controller on bottom line of display in green.
- In Program or Menu mode displays current settings for the selected mode or parameter.

9) LED SET

- When flashing, indicates controller is in Program or Menu mode.

5. Transport, packaging, and storage

5.1. Transport

Check if the portable calibration bath shows any damage caused during transport. Report any evident damages immediately to the carrier.

5.2. Packaging

Do not remove the packaging until just before installation. Keep the packaging as it is the ideal protection during transport (e.g., if the installation site changes or if the product is shipped for service or calibration).

5.3. Storage

Permissible conditions for storage

- Storage temperature: - 10 … 60 ºC / 14 … 140°F
- Humidity: 30….95% relative humidity (non-condensing)

Avoid the following

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock
- Soot, steam, dust and corrosive gases
- Potentially explosive environment, flammable atmospheres

6. Commissioning / Operation

6.1. Scope of use – Calibrating temperature sensors

Calibration of temperature sensors is accomplished by placing a Reference Temperature Device (Reference Device) into the liquid at the same depth of the Device Under Test (DUT). By comparing the temperature indicated on the Reference Device with the DUT, you can determine the calibration accuracy of the DUT sensor. It is recommended that the Reference Device and DUTs be suspended off the bottom so as not to contact with the sensor basket. This may be accomplished by use of laboratory stands and test tube clamps.

	**WARNING** Grounded Thermocouples may display erroneous measurements due to ground loops. Grounded thermocouple measurements must be validated to determine if erroneous measurements from ground loops are present.

6.2. Operating Position

The portable calibration bath must be operated in a vertical position.

6.3. Magnetic stirrer installation

Install the magnetic stirrer capsule by gently placing it in the bottom of the liquid tank. The magnet will self-align once power is turned on.

6.4. Sensor basket installation

Install the sensor basket with the plate toward the bottom of the liquid tank. When not in use for long periods of time, remove the sensor basket and then clean the basket. This prevents the basket from adhering to the calibration bath's liquid tank bottom or walls.

6.5. Calibration Liquids

To achieve maximum accuracy of the portable calibration bath, fill with an appropriate calibration liquid.

6.6. Properties of Calibration Liquids

Due to the specific features of the different calibration liquids, calibration results may vary depending on the liquid used. A compensation of calibration liquids should be performed.

Only use clean calibration liquids. Before operation, check that the liquid is clean, as debris or dirt may reduce the effectiveness of the magnetic stirrer and may reduce stability and uniformity in the bath. Always clean temperature sensors before inserting into the bath and upon removal from the bath.

Recommended calibration liquids for the different temperature ranges:

Water as calibration liquid

Use only distilled or demineralized water; otherwise mineral deposits may be formed.

Silicone Oil as calibration liquid

	• Only use the silicone oil recommended in this manual • Ensure that the room is well ventilated when working with silicone oil as harmful substances may escape • Because the silicone oil is hygroscopic, always close the calibration bath after use with the transport cover • Silicone oils degrade over time and at high temperatures. Typically the viscosity will increase as the oil ages. When not using the bath keep the bath near ambient temperature if possible, to extend the life of the silicone oil. Periodic changing of the liquid may be required.
	**Wear protective glasses! – Ensure that the silicone oil does not come into contact with eyes!** • Keep the baths outer surfaces clean and free from the bath liquid • Clean sensors before performing the calibration • Replace worn-out magnetic stirrer • Replace contaminated or degraded calibration liquid

Recommended Liquids

	Calibration Range	Flash Point
12457-05, Silicone Oil, 10cSt	-30 ... +160°C	163°C
	-22 ... +320°F	325°F
12457-06, Silicone Oil, 50cSt	30 ... 220°C	285°C
	86 ... 428°F	545°F

6.7. Filling the portable calibration bath

- Remove the transport cover from the liquid tank.
- Ensure the liquid tank is clean and free from debris.
- Insert the sensor basket.
- Fill the liquid tank with calibration liquid, ensuring enough room for expansion of the liquid at high temperatures. The following table is provided to use as a guide.

The following maximum filling heights recommended are:

Calibration Bath Type	Maximum filling height
CLB30	150 mm / 5.91 in
CLB50	150 mm / 5.91 in

The following aspects must be considered regarding the maximum filling height:

- Measure from the bottom of the sensor basket.
- Liquid tank must not be full, to allow for expansion and liquid displacement due to sensors.

	The transportation cover is equipped with a safety valve. If the portable calibration bath is closed in a hot state, inadmissible pressures may be produced. To avoid overpressure that can destroy the liquid bath, the safety valve is activated at a pressure of approximately 2.5 bars.
	**WARNING** Hot vapors may escape during venting.

6.8. Starting the portable calibration bath

- Connect the provided power cord to the power input module located on the rear of the instrument. Connect the power cord to the AC Mains supply.
- Set the Power On/Off switch to the ON position. The Power On/Off switch is located on the Power Input Module on the rear panel. The Controller will turn on and the top PV display will show the word “TEST”. On the lower SV display the version number is displayed, for example “rL 2.7”.
- After about 10 seconds, activation will be completed and the normal operating mode is automatically displayed. The controller will then regulate the portable calibration bath’s temperature to match the selected Set Value displayed on the temperature controller.

	**CAUTION** If the calibration bath is not used for a long period, it is possible that moisture penetrates into the heating elements due to the materials used (magnesium oxide). After transportation or storage of the portable calibration bath in humid environments, the heating elements must be preheated slowly. During the drying process it is assumed that the calibration bath has not yet reached the required electrical isolation voltage for the stated protection class.

6.9. Viewing the current temperature and the set point temperature

Upper Display

The 4-digit seven segment red display shows the current temperature of the calibration bath.

Lower Display

The 4-digit seven segment green display shows the Set Point temperature of the calibration bath. After reaching the set point temperature, the PID controller will maintain a stable temperature by delivering short pulses of heating or cooling energy to the calibration bath.

LED Indicators

The red LED OUT 1 indicates the heating status. During the heating phase a constant LED OUT 1 "ON" indicates the continuous input of heat energy. A flashing LED means that the Set Point temperature will be reached soon or has been reached and the controller is cycling power to the heater by delivering short pulses of energy, in order to maintain stability.

The red LED OUT 2 indicates cooling status. For the CLB30 series, a constant LED OUT 2 "ON" indicates the continuous input of cooling energy. A flashing LED means that the Set Point temperature will be reached soon or has been reached and the controller is cycling power to the heater by delivering short pulses of energy, in order to maintain stability.
For the CLB50 series a constant LED OUT 2 "ON" indicates the cooling fan is on high speed and an LED OUT 2 "OFF" indicates the cooling fan is on low speed.

To ensure proper temperature stability the cycle time of the controller is set to a low level and the control output is activated with high frequency.

6.10. Operating the Magnetic Stirrer

Best calibration bath uniformity is obtained by stirring the calibration liquid using the magnetic stirrer. Adjust the stirring speed by turning the knob clockwise to increase and counterclockwise to decrease.

Stirrer control potentiometer shown to the left of the temperature controller

i	Note that the magnetic stirrer may require routine cleaning, maintenance or replacement.

7. Calibration bath temperature controller operation

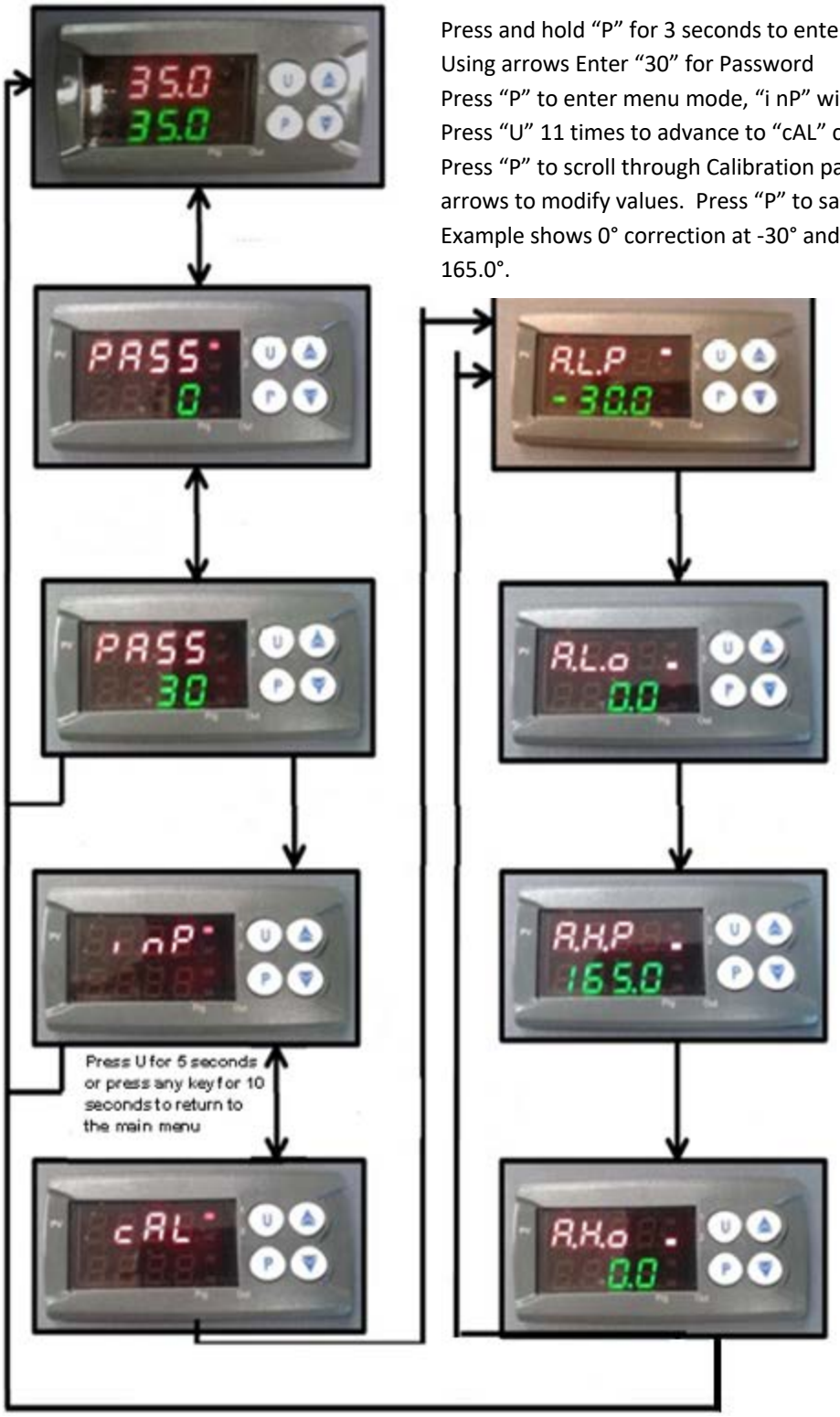
7.1. Temperature controller modes of operation

Normal operating mode: The bath will heat or cool until the set point temperature is reached. When the bath stabilizes it will be ready for use.

Set Point Adjustment mode: see Section 7.3, allows manual adjustment of set point.

Menu mode, Calibration mode example: This mode allows setting of calibration offsets. See section 9.3 and 7.2.

7.2. Temperature controller calibration settings



Press and hold “P” for 3 seconds to enter Menu Mode
Using arrows Enter “30” for Password
Press “P” to enter menu mode, “i nP” will show first.
Press “U” 11 times to advance to “cAL” calibration menu.
Press “P” to scroll through Calibration parameters. Use arrows to modify values. Press “P” to save new value.
Example shows 0° correction at -30° and 0° correction at 165.0°.

A.L.P: This parameter indicates the Adjustment Low Point

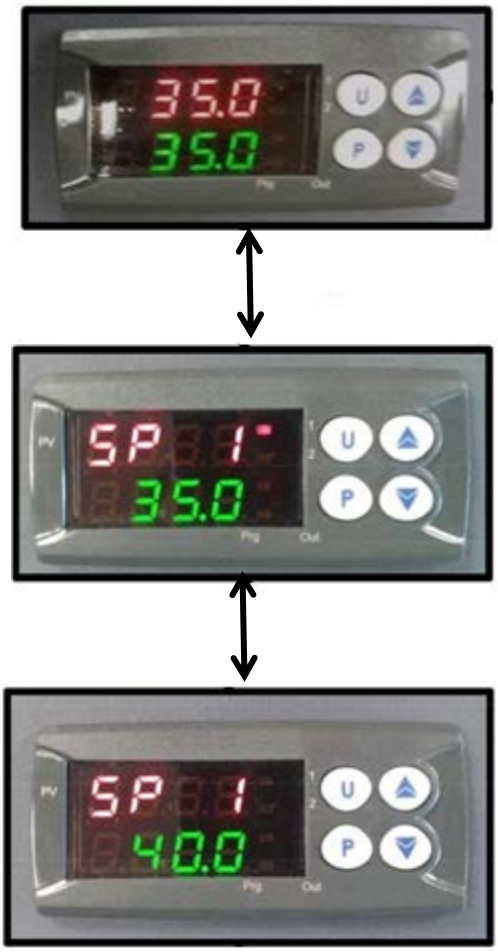
A.L.o: This parameter indicates the Adjustment Low Offset in degrees

A.H.P: This parameter indicates the Adjustment High Point

A.H.o: This parameter indicates the Adjustment High Offset in degrees

To return to normal operation, press U for 5 seconds or wait 10 seconds and unit will return to normal operation automatically.

7.3. Set Point Adjustment



Press P to enter Set Point Adjustment mode indicated by SP 1 on top display.

Using the up and down arrows, scroll to the desired set point value. This example shows 40.0° as the new set point.

Press P to save the new set point.

To return to normal operation, press U for 5 seconds or wait 10 seconds and unit will return to normal operation automatically.

7.4. Normal operating mode (Calibration Mode) – Reference section 7.1

7.4.1. CLB30 Series

The CLB30 series provides above and below ambient temperature control. Once the set point is set via the up/down arrows or from the programmed list, the controller will ramp the bath temperature to the selected temperature and then control it for stability. In this mode the LED indicators are as follows:

- LED 1 indicates when the heater is on.
- Solid “ON” means heat is being applied continuously, which occurs when the PV (process value or bath temperature) is well below the SV (set value).
- Flashing “ON” means heat is being pulsed for regulating the temperature, which occurs when the PV is close to or at the SV.
- “OFF” means no heat is applied.
- LED 2 indicates when active cooling is applied.

- Solid “ON” means active cooling is being applied continuously, which occurs when the PV (process value or bath temperature) is well above the SV (set value).
- Flashing “ON” means active cooling is being pulsed for regulating the temperature, which occurs when the PV is close to or at the SV.
- “OFF” means no active cooling is applied.

7.4.2. CLB50 Series

The CLB50 series provides above ambient temperature control. Once the set point is set via the up/down arrows or from the programmed list, the controller will ramp the bath temperature to the selected temporary set temperature and then control it for stability.
In this mode the LED indicators are as follows:

- LED 1 indicates when the heater is on.
- Solid “ON” indicates heat is being applied continuously, which occurs when the PV (process value or bath temperature) is well below the SV (set value).
- Flashing “ON” indicates heat is being pulsed for regulating the temperature, which occurs when the PV is close to or at the SV.
- “OFF” indicates no heat is applied.
- LED 2 indicates the cooling fan speed.
- Solid “ON” indicates the cooling fan is on “High Speed”, which occurs when the PV (process value or bath temperature) is well above the SV (set value).
- Solid “Off” indicates the cooling fan is on “Low Speed”, which occurs when the PV is close to or at the SV.
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7.4.3. Setting a temporary set point

To set a temporary set point:

- Briefly press the “P” Key. The upper display will show the process value and the lower display will show the current set value.
- Press the △ “Up Arrow” to increase the nominal temperature or the ▽ “Down Arrow” to decrease the set value.
- Briefly press the “P” Key to confirm the new value as the new set value.

8. Cooling the portable calibration unit

	**WARNING – RISK OF BURNS** Before transporting or touching the portable calibration bath it is necessary to ensure that it is sufficiently cooled, otherwise there is a risk of burns to the operator and possible damage to the portable calibration bath. To bring the portable calibration bath from a high temperature to a low temperature as quickly as possible, the nominal temperature must be set to a temperature lower than or near ambient temperature. The CLB30 will turn on the active cooling, which will cool faster. The CLB50 will turn the fan to high speed, but will take a slightly longer time to cool.

	**ATTENTION** If AC Power is removed from the unit, neither the active cooling nor the fan will operate, which will slow the cooling significantly. However, there is sufficient insulation to ensure no damage to the calibration bath or its surroundings will occur.

9. Maintenance, Cleaning, and Re-Calibration

9.1. Maintenance

IT IS ADVISABLE TO TURN OFF THE CALIBRATION BATH WITH A SET POINT OF 25° C AND THAT IT IS AT THE INDICATED TEMPERATURE, TO INCREASE THE LIFE OF THE EQUIPMENT.

The equipment described here requires minimal maintenance. All repairs must be performed only by the manufacturer. Changing the fuse is excluded. Before changing fuses, disconnect the power to the portable calibration bath by removing the power cord from the electrical outlet and the power input module.

9.2. Cleaning

	**ATTENTION** • Cool the portable calibration bath before cleaning. • Power off and disconnect the power cord from the AC Mains supply. • Clean the product with a damp cloth. • Ensure that the electrical connections do not get wet. • When removed from service for storage or shipment, the product should be cleaned thoroughly, rinsed and dried. • Residual liquid in instruments removed from service may cause risks to people, the environment and the instrument. It is recommended to thoroughly clean all residual liquid from the calibration well.
	See section 11.2 "Returns" for more information about the return of the instrument.

9.2.1. Calibration well cleaning

Remove all silicone oil or liquid from the calibration well using the provided syringe. Remove the sensor basket and magnetic stirrer and clean thoroughly with mild detergents and water, rinsing with clean water. Let all components dry. If plain distilled water is used, remove the calibration liquid, sensor basket and magnetic stirrer and allow to dry.

9.2.2. External Cleaning

Clean the outside of the portable calibration bath with a damp cloth and a mild solvent-free detergent.

9.3. Re-calibration

The portable calibration bath has been adjusted and tested before shipment using standard internationally recognized quality measurement instruments.

If adjustment is needed, you may return the portable calibration bath to Palmer Wahl Instruments, Inc. Contact our Customer Service Department at 1-800-421-2853 or 1-828-658-3131 and request a Return Material Authorization (RMA) number.

If you prefer to calibrate it yourself and have the appropriate equipment, the temperature controller has Low and High temperature offsets available for calibration of the internal temperature sensor, which drives the PV display.

To calibrate the internal temperature sensor, install an independent Reference Measuring Instrument (Reference Device) into the bath at the approximate depth that your calibrations will be performed. Set the temperature to the lowest temperature that you will be calibrating at, or near the lowest setting for the bath. Record the value of the PV on the controllers display and the Reference Device. Calculate the difference between the two measurements and adjust the value located in the A.L.o register in the controller per section 7.2. Repeat at the highest temperature of calibration or near the highest temperature of the bath/liquid and enter the correction into the A.H.o register in the controller per section 7.2.

10. Troubleshooting

Failure Code / Symptom	Possible Cause	Action to take
Displays "- - - "	The reference sensor is open or defective	Return the instrument to the manufacturer for repair
Displays "uuu"	Under range indication - Reference sensor is below range	Return the instrument to the manufacturer for repair
Displays "ooo"	Over range indication - Reference sensor is open or over range	Return the instrument to the manufacturer for repair
Displays "EREP"	Possible failure in the EEPROM memory of the controller	Press the "P" key. Power off unit and restart
Fan does not work	Fan is blocked or defective	Clear any obstructions. Return the instrument to the manufacturer for repair.
PV does not reach SV	The solid state relay is defective or the heating/cooling elements are defective	Return the instrument to the manufacturer for repair.
No Display	The controller is defective	Return the instrument to the manufacturer for repair.
No Functionality at all	AC power not connected Fuse blown	Check power connections on both ends of the cord and check the fuse.

ATTENTION

If the defect cannot be corrected by the actions detailed above the instrument must be put out of service immediately and prevented from erroneous powering up. In this case you must consult the manufacturer. If you wish to return the instrument please see section 11.2 Return.

11. Dismantling, return and waste disposal

	**WARNING** Residual media in disassembled instrument can cause risk to people, the environment and premises. Take appropriate protective measures.

11.1. Dismantling

	**WARNING** Risk of burns! Cool the product sufficiently before dismantling. Danger potentially exists due to hot liquids being used. <u>To avoid damage:</u> • Cool the instrument as described in Section 8, “Cooling the portable calibration bath”. • Turn off the portable calibration bath and pull out the plug. • Remove remains of calibration liquid from the portable calibration bath. See Section 9.2, “Cleaning”.

11.2. Returns

	**WARNING** It is essential to observe the following for shipping the instrument: All instruments sent to Palmer Wahl Instruments, Inc. must be free of hazardous substances (acids, alkalis, solutions, etc.). Use the original packaging or a suitable packaging for returning the product.

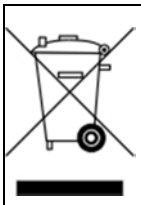
<u>To avoid damages:</u>

- Place the product together with the isolating material in the packaging. Isolate all sides of the transport packaging evenly.
- If possible, enclose in a plastic bag with desiccant material.
- Apply a label indicating that it is a shipment of a highly sensitive measuring instrument.

11.3. Waste Disposal

Improper disposal may cause dangers to the environment. Eliminate the components of the products and packaging materials in accordance with the regulations relating to waste treatment and disposal of the country of use.

	Dispose of the silicone oil as described in the safety data sheet.

	Instruments with this label warn that they must not be disposed in a household waste. For removal they must be returned to the manufacturer or delivered to the local community waste disposal agency or recycler.

12. Accessories for CLB30 and CLB50

12.1. Additional Options

12457-02 - Hermetic Methacrylate lid with 6 positions to hold probes, 1/8" G female thread, eliminates condensation in the oil and prevents entry and exit of vapors.

12457-03 - Trolley transport case for CLB30/CLB50, with high density foam, wheels and handle

12457-05 - Silicone Oil - 10cSt or 50cSt, 7 liters, -35° to 160°C (Recommended for CLB30/CLB31)

12457-06 - Silicone Oil - 10cSt or 50cSt, 7 liters, 30° to 225°C (Recommended for CLB50/CLB51)

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BEYOND THE SCALE

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