

INSTRUCTION MANUAL

CARON MODEL 2050W

CONSTANT TEMPERATURE BATH

HEATED AND REFRIGERATED

SPECIFICATIONS

Standard Features

Temperature Range	-18°C to 90°C
Temperature Control	±0.1°C
Temperature Controller	Watlow SD (dual digital display)
Cooling Capacity	1050 BTU/Hr or 300W @ 20°C
External Pumping	6.5 LPM at 0' head
Work Area Dimensions	8"W x 2"F-B x 6.5"D
External Dimensions	13.5"W x 13.5"F-B x 14"H
Heater	750W
Fittings	Quick disconnects
Safeties	Over temperature shutoff (factory set)
Alarms	Over temperature and low fluid (visual and audio)
Reservoir Capacity	1.4 Gallons
Reservoir Lid	Stainless Steel
Bath Material	Stainless Steel
Shipping Weight	49 lbs
Cabinet Material	Stainless Steel, powder coated metal
Power	115V, 60Hz, 10A <i>or</i> 230V, 50/60Hz, 5A
Feet	6 vinyl
Warranty	12 months parts & labor
Approvals	CE Marked (230V only)

Optional

Communications	RS-485, modbus protocol
Ramp & Soak	Ramp & soak controller (profile)

SYMBOLS AND WARNINGS



Warning of hazardous area



Warning of dangerous electric voltage



Earth (ground) protective conductor



Local government may require proper electrical component disposal

INSTALLATION

Unpacking: This CARON product has been completely tested, cleaned and carefully packed for shipment. Please be careful when unpacking.

Please examine the bath carefully. Should any damage be found, notify the delivering carrier immediately. Report any shortages to the CARON Service Department at 800-648-3042.

Location: The bath must be located in a dry, clean and level area. It is also very important that air is allowed to move from the top of the bath through the unit and out the back freely. This will help provide years of trouble-free operation.

Power: PLEASE READ CAREFULLY! For personal safety this bath must be properly grounded. The power cord of this bath is equipped with a grounded plug which mates with a standard grounded wall outlet.

Communications (optional)

Connect the 9 pin D-sub connector located in the back of the unit to a PC or other communicating electronic device. Connect pin #2 to T-/R- and pin #4 to T+/R+ wires. An RS-232 to RS-485 converter maybe needed is the PC doesn't have RS-485 capabilities. To use an existing application software package, install Watview software (SFT-102) on a PC. Default baud rate is 19.2K and address is 1; protocol is Modbus. See controller manual for details.

SYSTEM

WARNING: DO NOT OPERATE THIS BATH WITHOUT SUFFICIENT LIQUID IN THE RESERVOIR OR SEVERE DAMAGE COULD OCCUR.
Please read operating instructions before operating the bath.

Note: Do not overfill bath; please allow for the addition of product.

1. Power Switch: This switch controls power to the CARON Model 2050W Bath.

2. Refrigeration Switch:

When in the "on" position, a built-in refrigeration unit will also be energized. **Do not operate this bath before reading operation instructions of this manual.**

3. High Temperature and Low Liquid Level Safety Sensors:

An over-temperature safety thermostat protects against an over-temperature condition. This not only removes power to the heaters but also signals the over-temperature condition to the user via an audible sound and red warning light. A float switch trips when the fluid level is not high enough. It also shuts off power to the heater, sounds an alarm and illuminates a red warning light.

4. Main Temperature Control:

The CARON Series 2050W Bath has been equipped with an extremely sensitive and accurate temperature control. This control is sensitive to $\pm 0.1^{\circ}\text{C}$. A 1/32 DIN panel-mounted, dual digital indicating temperature controller is used. It uses a 100Ω RTD immersion probe to sense process fluid temperature. The controller is microprocessor based with a PID control algorithm that drives a switched DC output in a pulse-width-modulated fashion.

5. External Circulation:

Provided by an independent full flow stainless steel pump. This pump will deliver in excess of 6 LPM while adequately maintaining internal circulation.

6. Ramp & Soak (optional)

The controller is equipped with Ramp & Soak (profiling) capabilities with up to four profiles with forty steps. See controller manual for details.

OPERATION

WARNING: DO NOT OPERATE THIS BATH WITHOUT ADEQUATE LIQUID OR SEVERE DAMAGE COULD OCCUR.

**WARNING: DO NOT OVERFILL THE BATH - damage to the bath could occur!
ALLOW FOR THE ADDITION OF PRODUCT!**

1. Filling the bath reservoir

Fill the bath with an appropriate fluid. 2050W models should be filled until the low liquid level alarm shuts off. Water is recommended as the fluid medium for applications requiring temperatures above 10°C. To help keep the bath clean, add 5 milliliters of bleach or algacide to the bath before starting. Methanol or a solution of antifreeze and water are recommended for temperatures below 10°C. Follow the directions on the antifreeze container for the proper mix.

NOTE: Observe liquid level of bath to safeguard against overflow: damage to the unit could occur!

NOTE: Operation of the unit in temperature ranges at or near 0°C may cause the hygroscopic antifreeze or ethylene Glycol to attract water into the reservoir. In areas of high ambient humidity this could cause the reservoir fluid to overflow.

1. Control System

The control system is comprised of a dual display Watlow SD 1/32 DIN Controller. The display panel consists of a power and refrigeration switch with low liquid level and over-temperature indicator lights.

2. Emptying the bath

To empty the bath, simply remove the 1/8" plug located on the lower left side of the bath.

3. Connecting Power:

Check all switches to be sure they are in the "off" position. Plug the line cord into a suitable outlet (verify correct voltage).

4. Setting Controls:

Set main control to the desired operating temperature. Turn on power switch. Turn on the refrigeration switch (REF) for operating at temperatures below 60°C. Allow the reservoir to stabilize 1 hour before adjusting the operating temperature. The safety control has been mounted behind the control panel and calibrated at 90°C. For re-calibration of the controller please see Field Calibration Section, pg. 9.

Note: External circulation begins immediately when power is turned ON!

5. Making External Circulation Connections:

With the unit turned off, connect your external instrument to the male quick disconnects. Insert the male quick disconnects into the female quick disconnects mounted on the bath's reservoir. **When quick disconnects are in place and the unit is turned on, the external circulation pump will function and externally pump liquid at the outlet side of the pump. Be certain to connect the circulator's male quick-disconnects to your instrument's inlet and outlet circulation lines before turning the unit on.**

2050W CONTROLLER PARAMETERS (Watlow SD controller)

Temperature Control Field Calibration

Execute the following procedures to adjust the temperature calibration (not to change set point).

1. Press the *Advance* key (green button) two times or until “CAL” is displayed (green letters).
2. Use the *Up* and *Down* arrow keys to adjust the temperature calibration to the desired offset.
3. Press the *Infinity* key once to return to the main display.

Restore factory default parameters

To restore controller factory default parameters, perform the following sequence of operations.

1. Hold down the *Up* and *Down* arrow keys for 6 seconds until “FAct PAge” is displayed. (If buttons are not held down for the full 6 seconds and “SEt PAge” is displayed, press the *Infinity* button and repeat Step 1.)
2. Press the *Advance* key six time or until “no USr.r” is displayed.
3. Press the *Down* arrow key until “SEt 1” appears (red letters).
4. Quickly, press and hold the *Advance* key for approximately 1 second or until “no USr.S” appears. (If the *Advance* key is not pressed soon enough after step 3 or the display reads “no USr.r”, go to Step 3.)
5. Press the *Infinity* key once to return to the main display.

Key default parameters (partial list)

SETUP PAGE

Modbus Device Address	Addr	1	(Communications only)
Baud Rate	bAud	19.2	(Communications only)

OPERATIONS PAGE

Calibration Offset	CAL	0.0
Heat Control Method	ht.M	Pid
Proportional Band Heat	Pb.ht	5.0
Integral Heat	It.ht	1.75
Derivative Heat	dE.ht	0.00

ROUTINE MAINTENANCE

Cleaning the bath: The bath interior should be cleaned with a general purpose laboratory disinfectant such as Cole-Parmer #G-08796-00 lab algaecide.

Cleaning the refrigeration unit: Twice a year the dirt that has built up on the outside of the compressor and fan should be vacuumed or blown off. This permits a free flow of air around the refrigeration unit and allows it to operate more efficiently. In areas where there is a high particulate content in the air, the refrigeration unit should be cleaned more often.

TROUBLE SHOOTING

Problem: Bath power will not energize

- Possible Causes:**
1. Line cord not plugged in
 2. No current at receptacle
 3. Defective line cord
 4. Defective power switch
 5. Built-in fuse defective

Problem: Bath will not cool

- Possible Causes:**
1. Control set incorrectly
 2. Thermal overload on compressor
 3. Defective starting relay on compressor
 4. Defective refrigeration circuit
 5. No circulation in bath
 6. Refrigeration Switch not on

Problem: Bath will not heat

- Possible Causes:**
1. Control set incorrectly
 2. Defective temperature control
 3. Heater burned out
 4. Over temperature alarms
 5. Low liquid level

Problem: Over-temperature safety energized

- Possible Causes:**
1. Incorrectly set
 2. Liquid temperature too high
 3. Defective control

Problem: Erratic Control

- Possible Causes:**
1. Inadequate circulation
 2. Bad sensor
 3. Defective control
 4. Heater defective
 5. Bath going in and out of alarm condition

Problem: Low Liquid Level Energized

- Possible Causes:**
1. Low liquid level
 2. Defective control

Problem: Alarm Energized

- Possible Cause:**
1. Over temperature situation
 2. Low liquid level

CE Compliant Product

Declaration of Conformity



Caron Products and Services, Inc.
P.O. Box 715
Marietta, OH 45750 USA

Declares that the following product:

Designation: Series 2050

Model Number 2050W 230V
Classification: Electrical equipment intended for residential, commercial and light industrial environments.
Rated Voltage: 220-240 ~ (ac)
Rated Frequency: 50/60 Hz
Rated Power Consumption: 5 amps

Meets the essential requirements of the following European Union Directive(s) using the relevant section(s) of the normalized standards and related documents shown:

89/336/EEC Electromagnetic Compatibility Directive

EN 50082-1 1992 EMC Generic immunity standard, Part 1: Light industrial environment.

IEC 801-2 1984 Electrostatic discharge

IEC 801-3 1984 Radiated susceptibility
IEC 801-4 1988 Electrical fast transients

EN 55011 1998 Group 1, Class B Emissions Requirements for Industrial, Scientific or Medical equipment.

73/23/EEC Low-Voltage Directive

EN 61010-1 1993 Safety requirements for electrical equipment for measurement, control, and laboratory use.