INSTRUCTION MANUAL CARON MODEL 2050 CONSTANT TEMPERATURE BATH HEATED AND REFRIGERATED

Revised 5/15/00, Rev B

SPECIFICATIONS

Standard Features

-15°C to 90°C
±0.1°C
Watlow 935 (digital display)
1050 BTU/Hr or 300W @ 20°C
12 LPM at 0' head
8"W x 2"F-B x 6.5"D
13.5"W x 13.5"F-B x 14"H
750W
Quick disconnects
Over temperature shutoff (factory set)
1.4 Gallons
Stainless Steel
Stainless Steel
49 lbs
Stainless Steel, powder coated metal
6 vinyl
12 months parts & labor

Features	2050B 115V	2050W 115V	2050W 230V
Compressor size	110W	110W	170W
Power	115V, 60Hz, 10A	115V, 60Hz, 10A	230V, 50/60Hz, 5A
Over temperature alarm	-	Audio & visual	Audio & visual
Low fluid level alarm		Audio & visual	Audio & visual
Approvals	-	-	CE Marked

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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.

Locating the 2050 Series Bath: 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.

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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 2050 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 on pg. 5 of this manual.

3. High Temperature and Low Liquid Level Safety Sensors:

- A. (2050B Models only) A temperature sensor located on the heater sheath and independent control circuit act as an over-temperature safety shut-off. Strategically located, this sensor *may* also trip if the fluid is low. However, it will not detect an empty or low reservoir upon startup!
- B. (2050W Models only) An over-temperature safety thermostat protects against an overtemperature condition. This not only removes power to the heaters but also signals the overtemperature 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 2050 Bath has been equipped with an extremely sensitive and accurate temperature control. This control is sensitive to $\pm 0.1^{\circ}$ C. A 1/32 DIN panel-mounted, digital indicating temperature controller is used. It uses a 100 Ω 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. A second output is set as a $\pm 5^{\circ}$ C tracking alarm about the process set point. Outputs for this alarm are both an indicator light on the controller and a switched DC voltage that can be used to drive an optional remote alarm relay.

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5. Heat Pilot Lamp:

When the main temperature control is injecting heat into the bath for control purposes, the controller signals a light for output 1 of the controller.

6. External Circulation:

Provided by an independent full flow stainless steel pump. This pump will deliver in excess of 11 LPM while adequately maintaining internal circulation.

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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 algaecide 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.

Control System

The control system is comprised of a Watlow 935 1/32 DIN Controller. The display panel consists of a power and refrigeration switch. 2050W models also have a low liquid level indicator light and over-temperature indicator light.

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:

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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. <u>When quick</u> <u>disconnects are in place</u> and the unit is turned on, <u>the external circulation pump will function and</u> <u>externally pump liquid at the outlet side of the pump</u>. Be certain to connect the circulator's male quick-disconnects to your instrument's inlet and outlet circulation lines before turning the unit on.

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CONTROLLER PARAMETERS

Operations Menu

Set	=	20°C	Setpoint
Aut	=	по	Auto-tune
ALO	=	-5	Alarm Low
AhI	*	5	Alarm High
CnF9	#	no	Configuration Menu

PID Menu

Pbc	==	7.5	Proportional Band I
Cte	=	1.7	Cycle Time Cool1
It	=	2.0	Integral Function
dE	-	.75	Derivative Function
CAL	=	0	Calibration Offset

Configuration Menu

In	=	Rtd	Input Type
C_F	#	°C	Celsius/Fahrenheit
rĹ	Ξ	-17.0	Input Range Low
rh	=	90.0	Input Range High
Ot1	=	Heat	Output 1 Function
Ot2	=	ALM	Output 2 Function
dISP	=	Ac	Display Default
ALtY	=	dEnc	Alarm Type
AbYS	=	5	Alarm Hysteresis
LAt	=	no	Alarm Latch
SIL	=	no	Alarm Silencing
FAIL	=	0	Failure Mode
SLOC	; ≠	ПО	Set Point Lock
tA9	=	(Blank)	Lockout Tag

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.

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TROUBLE SHOOTING

Possible Causes:

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Problem: Bath power will not energize

- 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

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

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:

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Possible Causes:

- Incorrectly set
- 2. Liquid temperature too high
- 3. Defective control
- 4. Low fluid level (2050B model only)

Problem: Erratic Control

- 1. Inadequate circulation
- 2. Bad sensor
- 3. Defective control
- 4. Heater defective
- 5. Bath going in and ourt of alarm condition

Problem: Low Liquid Level Energized (2050W models only)

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

Problem: Alarm Energized (2050W models only)Possible Cause:1. Overtemperaure situaion

2. Low liquid level

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TEMPERATURE CONTROL FIELD CALIBRATION

<u>Note</u>: This CARON Bath has been completely calibrated and tested in every aspect of its capabilities. Please call the CARON Service Department should any problem or question develop regarding this product's operation.

Go to the PID Menu on your WATLOW 935 User's Manual

- 1. Go first to the Operations Menu by pressing up A and down Y
- 2. Scroll through the Operations Menu with up and down arrow keys until you see the PID prompt.
- 3. While pressing SET to display NO choose YES with the up and down arrow keys.

4. Release the SET key to see the first PID prompt.

5. Using the down arrow, scroll through the PID menu until you see the CAL prompt.

6. To view and change the calibration setting, push and hold in the SET button. Use the up or down arrows to acheive the desired calibration.

7. To exit simultaneously, press and hold up and down arrow keys for three seconds or refer to pg 14 of your WATLOW 935 User's Manual.

8. Refer to your WATLOW 935 user Manual for additional assistance or call CARON Service at **740-373-6809.**

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CARON PRODUCTS Limited Warranty

CARON PRODUCTS & SERVICES, INC. (herein after CARON) hereby warrants that equipment manufactured by CARON is free from defects in materials and workmanship when the equipment is used under normal operating conditions in accordance with the instructions provided by CARON, as follows: COVERED:

- Parts and labor for a period of one (1) year from date of delivery, expiring on $\underline{12-12-0}$ Any part found defective will be either repaired or replaced at CARON's discretion, free of charge by CARON in Marietta, OH. Parts that are replaced will become the property of CARON.

This service includes diagnosis and correction of individual CARON product malfunctions, failures and ma consist of temporary procedures to be followed by the customer while a permanent solution is sought.
If CARON factory service personnel determine that the customer's unit must be returned to the factory, CARON, at its sole discretion, could provide a loaner unit for the customer's use while the customer's unit is being serviced. CARON would ship the loaner to the customer, and back, plus ship the customer's unit to the factory and back. CARON will pay all ground shipping charges via UPS or other common carrier.
CARON will have the right to inspect the equipment and determine the repairs or replacement parts necessary. The customer will be notified within a reasonable time after inspection of any costs incurred that are not covered by this warranty prior to initiation of any such repairs.

NOT COVERED:

- Cost of express shipments; Federal Express, UPS next day air, UPS second day air or any other express shipment charges.

- Any customer modification of this equipment or any repairs undertaken without the prior written consent of CARON will render this limited warranty void.

- CARON is not responsible for consequential, incidental or special damages. In no event will CARON be responsible for damages more than the price of the product.

- Repairs necessary because of the equipment being used under other than normal operating conditions of for other than its intended use.

- Repairs or replacements of parts due to the customer's failure to follow normal maintenance instructions.

- Force Majeure or acts of God.

This writing is a final and complete integration of the agreement between CARON and the custome CARON makes no other warranties, express or implied, of

merchantability, fitness for a particular purpose or otherwise, with respect to the goods sold under this agreement. This warranty can not be altered unless CARON agrees to an alteration in writing. Any changes or modifications to this limited warranty must be in writing and signed by both partie No course of dealing, course of performance or trade usage, except as expressly stated herein, sh be recognized to vary or modify this contract.

THIS WARRANTY IS GOVERNED BY OHIO LAW CARON PRODUCTS & SERVICES, INC. PRODUCTS LANE

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CE Compliant Product

Declaration of Conformity

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

Declares that the following product:

Designation:	Series 2050
Model Number	2050W JT
Classification:	Electrical equipment intended for residential, commercial
	and light industrial environments.
Rated Voltage:	$220-240 \sim (ac)$
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.