



Model 2050
CONSTANT TEMPERATURE CIRCULATOR
OPERATIONS MANUAL



PO Box 715
Marietta, OH 45750
800-648-3042 • 740-373-6809
Fax 740-374-3760
www.caronproducts.com
service@caronproducts.com

Dear Valued Customer:

Thank you for purchasing CARON Products & Services equipment. We appreciate your business and look forward to being your preferred supplier of controlled environment equipment products in the future.

At CARON, we are committed to continuous quality improvement. Our goal is to supply our customers with highly reliable equipment at a fair price. In order to openly monitor our performance, we would appreciate your feedback on our products and services.

If you have questions, or any suggestions for improvement based on the installation or operation of the equipment you have purchased, please email us at service@caronproducts.com or contact

Dave Figel, Vice President of Engineering/Operations Phone: 800-648-3042 x216
Jim Lang, Director of Service/Quality Phone: 800-648-3042 x203

Thanks again for your business!

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SECTION 1- WARRANTY INFORMATION

Please review this section before requesting warranty service. At CARON, one of our primary goals is to provide customers with high levels of personal service and top quality products, delivered on time, and backed by technical service and support for the life of the product.

Before contacting us for warranty service, please be aware that there are repairs that are not covered under warranty. These include:

- 1) Calibration of control parameters.
- 2) Damage resulting from improper use.
- 3) Service calls for improper installation including electrical service, gas and water supply tubing, gas supplies, room ventilation, unit leveling, or ambient conditions that are out of specification.
- 4) Customer modifications made to parts or subsystems.
- 5) Shipping damage either obvious or concealed as a result of freight handling.

WARRANTY DEFINED

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 shipment (first six digits of serial number tag contain date of shipment).
- Any part found defective would 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, or failures, and may 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 requires further service, dependent of the model involved, CARON may, at its sole discretion, provide a service technician to correct the problem, or return the unit to the factory. If a unit is to be shipped back to the factory, 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 would 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 such as Federal Express, UPS Next Day Air, UPS Second Day Air, or any other express shipment charges.
- Any customer modifications 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 or for other than its intended use.
- Repair or replacement of parts due to the customer's failure to follow normal maintenance instructions.
- Parts considered consumable such as: light bulbs, filters, gases, etc ...
- Damage from use of improper water quality.
- Damage from chemicals or cleaning agents detrimental to equipment materials.
- Force Majeure or Acts of God.

This writing is a final and complete integration of the agreement between CARON and the customer. 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 cannot be altered unless CARON agrees to an alteration in writing and expressly stated herein, shall be recognized to vary or modify this contract.

Ohio Law governs this warranty.

Caron Products & Services, Inc.
PO Box 715 • Marietta, OH 45750
740-373-6809

INTERNATIONAL SYMBOLS AND DEFINITIONS



Help



Information



Warning of hazardous area



Warning of hot surface



Warning of dangerous electric voltage



Earth (ground) protective conductor

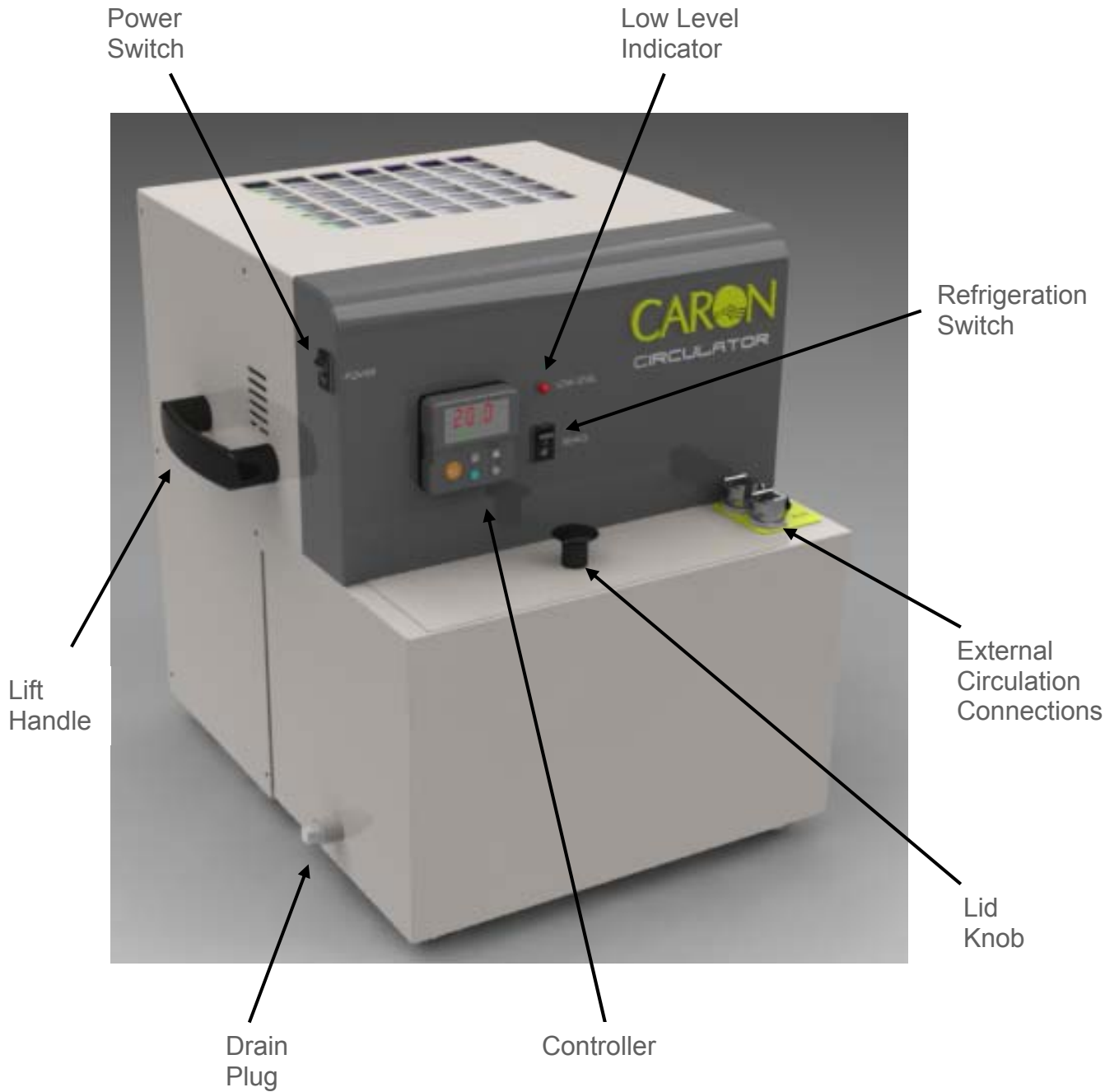
WARNINGS



Local government may require proper disposal

SECTION 2 – EQUIPMENT OVERVIEW

Congratulations! You have just purchased the latest technology in constant temperature circulators. Before using the equipment, familiarize yourself with key components of the product and thoroughly read this manual.



SECTION 3 -- INSTALLATION

Unpacking

Your unit has been packaged to avoid shipping damage. However, the unit should be fully inspected upon arrival before signing for receipt. If the package has visual damage, notes should be made on the freight bill and signed by the delivery company. In the event of concealed damage after the unit is uncrated, keep the carton and packaging material. Call the shipping company within 7 days of receipt, request inspection & retain a copy of the inspection report.

Choosing a Location

To ensure proper operation, the unit must be located on a firm level surface. The unit should be located in an area where there is no direct airflow from heating and cooling ducts and out of direct sunlight. Allow four inches of clearance on the top and back of unit for airflow. Do NOT cover up the air vent holes. Verify proper electrical power is available.

External Circulation

To use the external circulation, connect inlet and outlet quick-disconnect fittings to circulator. Be sure external loop is sealed & able to withstand 10 psig. Insert the male quick disconnects into the female quick disconnects. When quick disconnects are in place and the unit on, the external circulation pump will function and pump liquid at the OUTLET connection.

Selecting a Fluid

Water is recommended for applications requiring temperatures above 10°C. Add 5 mL of bleach or algaecide to circulator 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.

Connecting Electrical Power

The unit requires an electrical connection that must be properly grounded. The power cord of this circulator is equipped with a grounded plug which mates with a standard grounded wall outlet.

Electrical power required is:

2050-1	115V, 60Hz, 10A
2050-4	230V, 50/60Hz, 5A

Filling the circulator



Do not operate circulator without sufficient liquid in the reservoir or severe damage could occur.



Do not overflow circulator. Allow for addition of product.

Be sure the drain plug is properly installed before filling with fluid. Fill the circulator with water, ethylene glycol or other non-flammable appropriate thermal fluid. Circulator should be filled approximately 0.5" from top or until the low liquid level alarm shuts off. Additional fluid may be needed after the unit is turned on to compensate for external tubing volume.

Operation of the unit in temperature ranges near or below 0°C may cause the fluid to attract water into the reservoir, especially in areas of high ambient humidity. Overtime, this can cause the reservoir to overflow.

Emptying the circulator

Before draining the circulator, be sure the unit is at room temperature. To empty the circulator, remove the 1/8" MPT plug (unscrew by turning counter-clockwise) located on the lower left side of the circulator.



Be sure fluid is at room temperature before draining. Contact with hot fluid can cause sever burns

SECTION 4 – OPERATION

Turn both switches to the 'off' position. External circulation begins immediately when power is turn on. With the circulator properly installed and the appropriate utilities connected, the power switch on the left side of the control bezel can be turned on. Within minutes, the temperature will begin to approach set-point.

Changing the Temperature Set-point



To set the temperature set-point, press the UP arrow to increase the temperature set-point by 0.1°C. Press the DOWN arrow to decrease the temperature set-point by 0.1°C. Pressing and holding either button will cause the set-point to scroll rapidly in either direction.

Refrigeration Switch

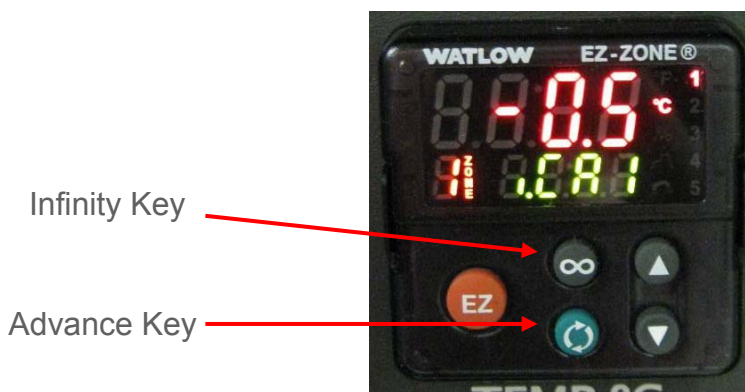
The refrigeration switch turns on cooling and should be used to maintain temperatures below 40°C. For temperatures above 40°C, turn the refrigeration switch off.

SECTION 5 – CALIBRATION

The temperature can be calibrated as necessary. CARON recommends an annual calibration check. Before making a calibration adjustment, allow the circulator to stabilize.

Calibrating the Temperature

If calibration is needed, the following steps can be taken:



Place the reference instrument's temperature sensor in the tank or circulating loop at the desired control location. Press the advance key until the green display reads i.CAL (calibrate). Pressing the UP arrow will increase the Temperature calibration offset by 0.1°C. Pressing the down arrow will decrease the Temperature calibration offset by 0.1°C. Pressing and holding either button will rapidly scroll the calibration offset. When finished, press the infinity key to return to the main menu. If no keys are pressed, the controller will return to the main menu in one minute.

Temperature calibration example

If the chamber temperature display reads 40.0°C and the calibrated independent sensor shows 40.3°C, set the i.CAL offset value to 0.3°C. If the calibrated independent sensor shows 39.6°C, then the entered offset should be negative. In this example the required offset to i.CAL would be -0.4°C.

SECTION 6 – ALARM

Low Level Alarm

The circulator is equipped with an alarm system that alerts the operator of a low fluid level condition. When more fluid is needed, an audible buzzer will sound and the red low level light on the control panel will illuminate. While in alarm mode, the circulator will not properly control fluid temperature. External circulation and cooling (if refrigeration switch is on) will continue.

Add fluid per instructions in INSTALLATION section. When the fluid returns to an appropriate level, the alarm will turn off and control fluid temperature as set.

High Temperature Safety

The high temperature safety shut-off switch is preset from the factory just above 90°C. In the unlikely situation that the fluid temperature would exceed the circulator rated temperature of 90°C, an independent temperature sensor will turn off the heater. External circulation and cooling (if refrigeration switch is on) will continue. When the fluid temperature drops below 90°C, the heater function is enabled.

Contact a service representative immediately to correct the problem. The circulator should not be used until it is repaired.

SECTION 7 – PREVENTATIVE MAINTENANCE

The CARON circulator has been robustly designed to minimize performance problems. However, regular maintenance is very important for continuous trouble free operation.

Recommended Daily Maintenance Checks

- Check the Temperature display versus set-points.
- Check for and correct any alarm condition.

Recommended Monthly Maintenance Checks

- Check condenser air intake on top of unit. If it is dirty, vacuum or blow out condenser coils.

Recommended Annual Maintenance Checks

- Disinfect all interior surfaces with a general purpose laboratory cleaning agent such as Cole-Parmer #G-08796-00.
- Vacuum or blow out fan and internal components.
- Perform a temperature calibration

R-134a refrigerant

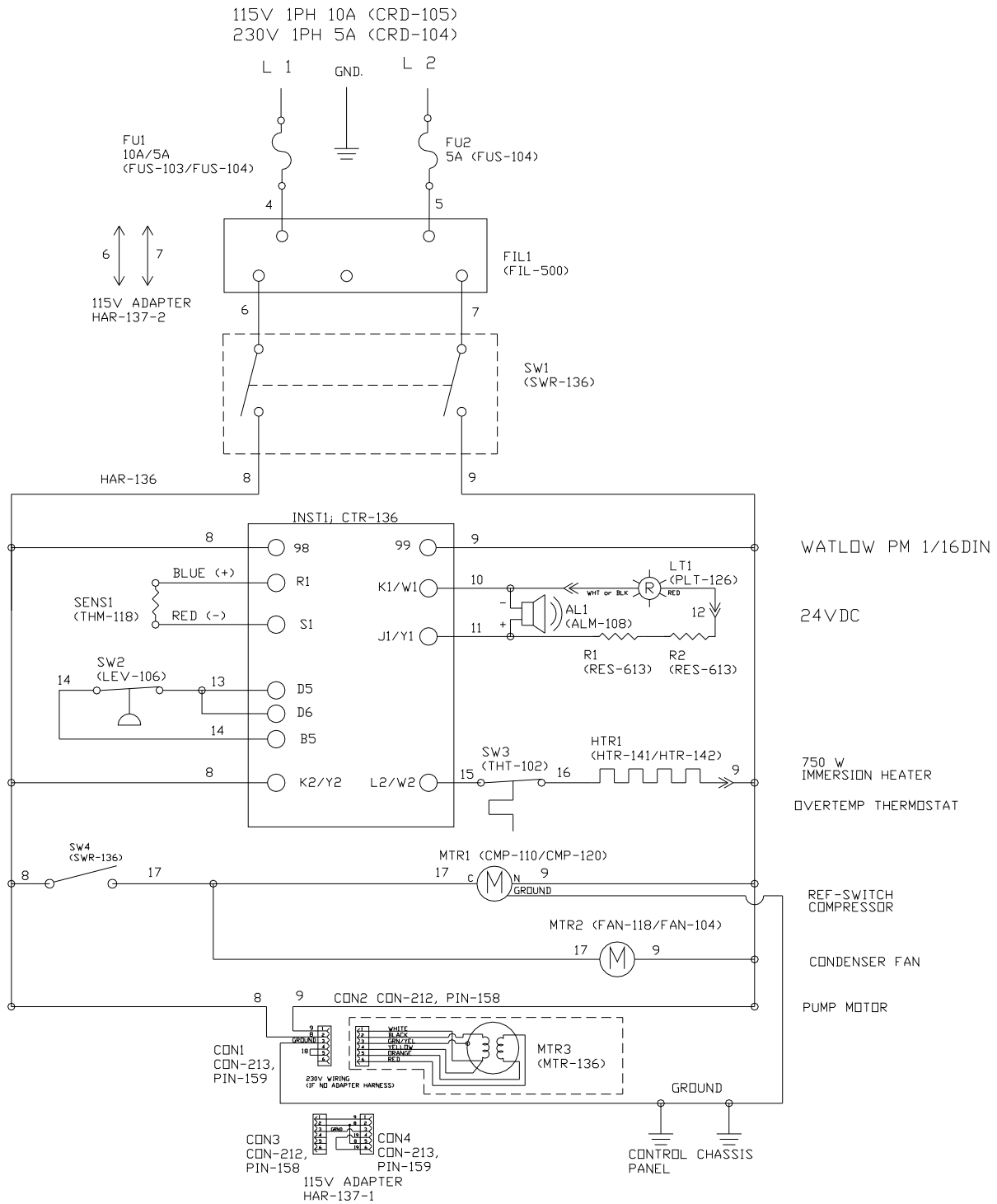
- This unit contains R-134a which is a fluorinated greenhouse gas covered by the Kyoto Protocol (Regulation EC No 842/2006) with a GWP of 1,300. Quantity of R-134a is less than 0.2 kg.

SECTION 8 – SPECIFICATIONS

MODEL	2050-1	2050-4
Temperature Range	-15°C to 90°C	
Temperature Control	± 0.1°C	
Temperature Controller	Digital display, PID control 1/16 DIN	
Cooling Capacity @ 20C	300 Watts	
External Pumping	6.5 LPM at 0' head	
Work Area Dimensions	6.0" W x 2.0" F-B x 6.5" D	
External Dimensions	13.5" W x 13.5" F-B x 14.0" H	
Heater	750 Watts	
Safeties	Over-temperature shutoff and low level alarm	
Reservoir Capacity	1.4 gallons (5.3 liters)	
Circulator Reservoir / Lid Material	Stainless steel	
Cabinet Material	Stainless steel & powder coated metal	
Electrical	115, 60 Hz 10A	230V, 50/60 Hz, 5A
Shipping Weight	53 lbs. (24.0 kg)	

*Specifications are subject to change without notice.
230V 50/60 Hz unit is CE Marked*

SECTION 9 – ELECTRICAL SCHEMATICS



SECTION 10 – TROUBLESHOOTING

Problem -- Unit will not turn on

- Is the unit connected to a electrical circuit as defined in the installation section?
- Is there power at the electric outlet the unit is plugged into?
- Is the unit's power switch turned on?
- Is the fuse blown?

Problem -- Temperature is above set-point

- Is the refrigeration switch turned on?
- Is the condenser filter on the top of the unit clean?
- Is the pump agitating fluid inside the reservoir?
- Is the fluid rated for the temperature being set (ie. water only at temperatures above 10°C)

Problem -- Temperature is below set-point

- Is the refrigeration switch turned off?
- Has the over temperature safety shut-off tripped?
- Is the pump agitating fluid inside the reservoir?
- Is there sufficient fluid inside the reservoir (low level alarm on)?

Problem – No external circulation

- Are the external circulation fittings connected properly?
- Is the pump agitating fluid inside the reservoir?
- Does the fluid have free-flow though the external tubing (<2 psig pressure drop)

SECTION 11 – SPARE / REPLACEMENT PARTS

General

Part Number	Description
ALM-108	Alarm buzzer
CMP-110	Refrigeration compressor, 115V
CMP-120	Refrigeration compressor, 230V
CRD-104	Power Line Cord, 230V, European style
CRD-105	Power line cord, 115V, North American style
CTR-136	Temperature controller
DRI-101	Refrigeration filter / dryer
FAN-104	Condenser fan, 230V
FAN-118	Condenser fan, 115V
FIT-101	Drain pipe plug
FUS-103	Fuse, 10A, for 115V models
FUS-104	Fuse, 5A, for 230V models
HTR-141	Heater, 115V
HTR-142	Heater, 230V
LEV-106	Level float switch
MTR-136	Pump motor
PLT-126	Red alarm light
QDC-101	Inlet / outlet female fittings in tank top
QDC-103	Male quick-disconnects for external circulation
SWR-136	Rocker switch
THT-102	Over temperature thermostat
THM-118	Temperature sensor
TUB-175	Internal silicone tubing

Caron Products and Services, Inc.
27640 State Route 7
Marietta, OH 45750 USA



Declares that the following product:

Designation: Series 2050

Model Number: 2050 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.