



**Instruction Manual  
106223-001 – Rev B**

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<b>Revision History</b>				
<b>Revision</b>	<b>Description</b>	<b>ECN Number</b>	<b>By</b>	<b>Date</b>
A	Initial Release	19336	NRC	06/06/01
B	Mixture ratio Phone / fax		KJN	05/09/08

## Section 1 - Introduction

The Model C100 cooling system is designed to provide water-cooling for small Research Inc. aluminum-reflector heaters. The photograph to the left shows the C100 providing cooling for a Model 5305 heater. (Note: Heater and lamp are sold separately.) The unit includes a self-contained pump, coil, blower unit, and 6 gallon (23 liter) reservoir. A kit with quick disconnect fittings is available to provide cooling requirements for the following heaters:

- StripIR® 5305 / 5306 (all sizes)
- LineIR® 5193 / 5194 (all sizes)
- ChambIR® E4 (up to 10 inch lamp – may require 2 – C100 units)



**Figure 1 - C100-120 with 5305 Heater**

A water/glycol mixture is circulated through the closed system. As the liquid is heated as it passes through the heater. The liquid is cooled by the self-contained blower/coil unit in the C100. The C100 kit comes with quick disconnect fittings and plastic tubing for quick installation and maintenance.

## Section 2 - Installation and Operation:

### Safety

The maximum water/glycol temperature is 140°F (60°C). Precaution should be taken to ensure this temperature is not exceeded. Refer to the installation section for proper sizing instructions.

#### **WARNING!**

Hazardous voltages are present within the heating/cooling/control system. Setting the set point potentiometer or control signal to minimum does NOT eliminate these hazardous voltages.

Always remove AC line voltage from the system before making contact with internal assemblies, line or load wiring, or fuses.

#### **CAUTION!**

- Up to 480 volts AC may be present with longer heater length (25" and 38").
- Do not make any wiring connections when power is applied.
- Disconnect power before performing any maintenance or service to the system.
- Use extreme caution when adjusting calibration potentiometers on modules when power is applied.
- Always use an isolated oscilloscope for checking waveforms.

### Sizing

The C100 can handle up to 3.3 KW of cooling load. The amount of cooling load is dependent upon the heater style, lamp wattage, and heating application. Table 1 shows how to size the C100. These steps are outlined below:

1. Determine heater wattage – This is a simple calculation based upon the wattage of the lamps in the heater times the number of lamps in the system.
2. Determine the cooling factor (Fc). This takes into account how much heat is going into the reflector that will be carried away by the cooling system.
3. Determine the number of C100 units required. Each C100 can handle up to 3.3 KW. If the calculated cooling load is less than 3.3 KW, then one unit will work. Multiple C100 units can be used in parallel. Consult factory.

### Size C100 CoolIR

1. Determine heater(s) wattage

Example: E4-05 w/500 watt lamps  
Wattage = 4 x 500 = 2000 watts

2. Determine cooling factor (Fc)

Model	Fc	Description
E4	0.9	All
5193	0.9	Multiple 5193's facing each other
5193	0.7	5193(s) facing target > 800 °C
5193	0.5	5193(s) facing target from 400 °C to 800 °C
5193	0.3	5193(s) facing target < 400 °C
5305	0.9	Multiple 5305's facing each other
5305	0.6	5305(s) facing target > 800 °C
5305	0.4	5305(s) facing target from 400 °C to 800 °C
5305	0.2	5305(s) facing target < 400 °C

3. Calculate cooling load (Lc)

$Lc = \text{Heater wattage} \times Fc$   
Example:  $Lc = 2000 \times 0.9 = 1800$  watts

4. Determine number of C100's needed

C100 rating = 3300 watts  
Lc = 1800 watts

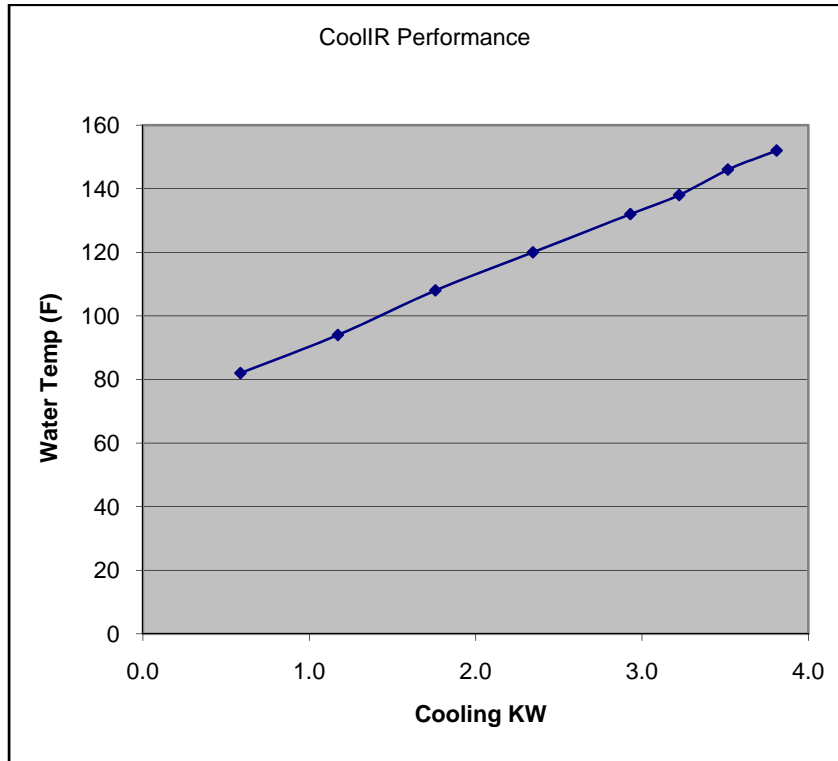
1 - Model C100-1 required

**Table 1 - C100 Heater/Cooler Sizing**

## Installation

1. Connect the water fittings to the cooling unit and the heater. Use Teflon tape thread lubricant around the pipe thread fittings. Refer to the figures in the back of this manual for installation with various heater configurations.
2. Connect water hoses to fittings marked "Water From Welding Equipment" and "Water To Welding Equipment". The "Welding Equipment" is the IR heater. Flow direction through the heater does not matter.

3. Remove filler cap and fill reservoir with mixture of 4 gallons distilled water and 1 gallon propylene glycol (RV type, pink color) solution. Do not use anti-freeze with stop leak additive, which will clog the filter screen and damage the pump. Replace the filler plug.



**Table 2 - C100 Cooling Performance**

**Caution:**

- Water should be allowed to flow through the system continuously. Pump will run hot, shortening its life, if allowed to operate for more than a short period against a closed or plugged discharge. When used with automatic equipment having a water solenoid valve, bypass the solenoid or, wire the cooler into the equipment so that it operates only during operation.
- Do not transport or attempt repair unless unit is disconnected from power source.
- Operation of the pump without coolant will cause serious damage.
- Pump warranty is void if user opens or disassembles the pump.
- Pump life and fitting life will be reduced if water temperature in tank exceeds 140°F (60°C). Table 2 shows the water temperature as a function of cooling KW.
- Operate the cooler only at the voltage and frequency stamped on the serial nameplate (120V, 50/60 Hz), (230V, 50/60 Hz)

**Operation**

The C100 system needs to run when the heater is being run. After the heater is shut off, the user should continue to run the C100 system for 3 – 5 minutes to allowing the heater to cool.

## Section 3 - Specifications

### **Dimensions:**

21 1/4" long x 13 1/8" wide x 20 3/4" high  
(54.0cm x 33.3cm x 52.7 cm)

### **Reservoir:**

6-gallons capacity - stainless steel

### **Pump Capacity:**

100 psi max.  
1.5 gpm (5.68 lpm) @ 50 psi.

### **Heat Exchanger:**

High efficiency, copper core, rustproof

### **Motor Voltage:**

115 Volt AC, single phase, 50/60 Hz  
230 volt AC, single phase, 50/60 Hz

### **Amperage:**

115 volts: 5.0 amps  
230 volt: 3.0 amps

### **Water Connections:**

1/4" N.P.T. supplied with 5/8"-18 UNC left hand thread fitting

### **Net Weight:**

56 lbs. (25.4 kg)

## Section 4 - Maintenance and Parts

### Routine Maintenance

Perform the following maintenance on a minimum of 3 month time cycle:

- Remove dust from radiator by means of compressed air, in order to insure optimum cooler performance.
- Check the filter screen for sediment, by removing the 15/16" acorn nut on the pump. Clean the filter or replace as necessary.
- Empty and flush water reservoir yearly. Remove filler cap and fill reservoir with mixture of distilled water (4 gallons) and propylene glycol (1 gallon, RV type, pink color) solution. Do not use anti-freeze with stop leak additive, which will clog the filter screen and damage the pump.

### Parts

Part Number	Product Description
086813-004	C100 Base Unit (cooling unit only)
106217-001	Fitting and Hose Kit (connect 1st heater)
106218-001	Tee Kit (connect additional heaters)
099076-001	Spare water pump
120034-001	Anti-freeze, water conditioner

**Table 3 - C100 Parts and Kits**