



TERMALINE<sup>®</sup> SEMICONDUCTOR  
LOAD RESISTOR  
SERIES 8940SC

OPERATION MANUAL

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INSTRUCTION BOOK PART NUMBER 920-8940-SEMICON REV. A

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## Safety Precautions

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The following are general safety precautions that are not necessarily related to any specific part or procedure, and do not necessarily appear elsewhere in this publication. These precautions must be thoroughly understood and apply to all phases of operation and maintenance.

**WARNING**

**Keep Away From Live Circuits**

Operating Personnel must at all times observe general safety precautions. Do not replace components or make adjustments to the inside of the test equipment with the high voltage supply turned on. To avoid casualties, always remove power.

**WARNING**

**Shock Hazard**

Do not attempt to remove the RF transmission line while RF power is present. Capacitors can store a dangerous electrical charge. Avoid contact with all system capacitors. If it is necessary to perform work near a system capacitor, be sure to discharge the capacitor through a low resistance.

**WARNING**

**Do Not Service Or Adjust Alone**

Under no circumstances should any person reach into an enclosure for the purpose of service or adjustment of equipment except in the presence of someone who is capable of rendering aid.

**WARNING**

**Safety Earth Ground**

An uninterruptible earth safety ground must be supplied from the main power source to test instruments. Grounding one conductor of a two conductor power cable is not sufficient protection. Serious injury or death can occur if this grounding is not properly supplied.

**WARNING**

**Resuscitation**

Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

**WARNING**

**Remove Power**

Observe general safety precautions. Do not open the instrument with the power on.

## Safety Symbols

### WARNING

Warning notes call attention to a procedure, which if not correctly performed could result in personal injury.

### CAUTION

Caution notes call attention to a procedure, which if not correctly performed could result in damage to the instrument.



The caution symbol appears on the equipment indicating there is important information in the instruction manual regarding that particular area.

**Note:** Calls attention to supplemental information.

## Warning Statements

The following safety warnings appear in the text where there is danger to operating and maintenance personnel and are repeated here for emphasis.

### WARNING

The vent plug must be used at all times when the unit is operating or cooling. Failure to do so could result in an explosion or severe burns.

See pages 3 and 4.

### WARNING

Turn off AC power and RF power when attaching the power cable.

See page 5.

### WARNING

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

See pages 5, 6, 7, and 9.

### WARNING

Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

See pages 7, 8, 10, 10, 11, and 13.

### WARNING

Do not operate with side panel removed. Doing so could result in personal injury.

See page 8.

**WARNING**

This load weighs 236 (107 kg). More than one person may be required to safely tip it on its end.

See page 11.

## Caution Statements

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The following equipment cautions appear in the text whenever the equipment is in danger of damage and are repeated here for emphasis.

**CAUTION**

Do not block airflow. The air intake vent on the bottom of the load must not be obstructed.

See page 3.

**CAUTION**

This load is designed for operation in a horizontal position only, with the vent plugs up. Do not use in any other manner.

See page 3.

**CAUTION**

If installed, connect optional interlock before applying RF power.

See page 4.

**CAUTION**

Check the local electrical code for proper AC hookup prior to operation of the unit. Make sure the neutral or return hookup is only used for that purpose.

See page 5.

**CAUTION**

Maximum power is 3,700 W when the blower is not running. If the indicator light should turn off, immediately reduce RF power to less than 3,700 W.

See page 6.

**CAUTION**

Use only Bird coolant, P/N 5-1070, to prevent damage to the load.

See page 10.

## Safety Statements

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### USAGE

ANY USE OF THIS INSTRUMENT IN A MANNER NOT SPECIFIED BY THE MANUFACTURER MAY IMPAIR THE INSTRUMENT'S SAFETY PROTECTION.

### USO

EL USO DE ESTE INSTRUMENTO DE MANERA NO ESPECIFICADA POR EL FABRICANTE, PUEDE ANULAR LA PROTECCIÓN DE SEGURIDAD DEL INSTRUMENTO.

### BENUTZUNG

WIRD DAS GERÄT AUF ANDERE WEISE VERWENDET ALS VOM HERSTELLER BESCHRIEBEN, KANN DIE GERÄTESICHERHEIT BEEINTRÄCHTIGT WERDEN.

### UTILISATION

TOUTE UTILISATION DE CET INSTRUMENT QUI N'EST PAS EXPLICITEMENT PRÉVUE PAR LE FABRICANT PEUT ENDOMMAGER LE DISPOSITIF DE PROTECTION DE L'INSTRUMENT.

### IMPIEGO

QUALORA QUESTO STRUMENTO VENISSE UTILIZZATO IN MODO DIVERSO DA COME SPECIFICATO DAL PRODUTTORE LA PROZIONE DI SICUREZZA POTREBBE VENIRNE COMPROMESSA.

## **SERVICE**

SERVICING INSTRUCTIONS ARE FOR USE BY SERVICE - TRAINED PERSONNEL ONLY. TO AVOID DANGEROUS ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING UNLESS QUALIFIED TO DO SO.

## **SERVICIO**

LAS INSTRUCCIONES DE SERVICIO SON PARA USO EXCLUSIVO DEL PERSONAL DE SERVICIO CAPACITADO. PARA EVITAR EL PELIGRO DE DESCARGAS ELÉCTRICAS, NO REALICE NINGÚN SERVICIO A MENOS QUE ESTÉ CAPACITADO PARA HACERLO.

## **WARTUNG**

ANWEISUNGEN FÜR DIE WARTUNG DES GERÄTES GELTEN NUR FÜR GESCHULTES FACHPERSONAL.

ZUR VERMEIDUNG GEFÄHRLICHE, ELEKTRISCHE SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

## **ENTRETIEN**

L'EMPLOI DES INSTRUCTIONS D'ENTRETIEN DOIT ÊTRE RÉSERVÉ AU PERSONNEL FORMÉ AUX OPÉRATIONS D'ENTRETIEN. POUR PRÉVENIR UN CHOC ÉLECTRIQUE DANGEREUX, NE PAS EFFECTUER D'ENTRETIEN SI L'ON N'A PAS ÉTÉ QUALIFIÉ POUR CE FAIRE.

## **ASSISTENZA TECNICA**

LE ISTRUZIONI RELATIVE ALL'ASSISTENZA SONO PREVISTE ESCLUSIVAMENTE PER IL PERSONALE OPPORTUNAMENTE ADDESTRATO. PER EVITARE PERICOLOSE SCOSSE ELETTRICHE NON EFFETTUARE ALCUNA RIPARAZIONE A MENO CHE QUALIFICATI A FARLA.

**CONNECT INTERLOCK TO TRANSMITTER/GENERATOR/AMPLIFIER BEFORE OPERATING.**

**BRANCHER LE VERROUILLAGE À L'ÉMETTEUR/GÉNÉRATEUR/AMPLIFICATEUR AVANT EMPLOI.**

**CONECTE EL INTERBLOQUEO AL TRANSMISOR/GENERADOR/AMPLIFICADOR ANTES DE LA OPERACION.**

**VOR INBETRIEBNAHME VERRIEGELUNG AM SENDER/GENERATOR/VERSTÄRKER ANSCHLIESSEN.**

**PRIMA DI METTERE IN FUNZIONE L'APPARECCHIO, COLLEGARE IL DISPOSITIVO DI BLOCCO AL TRASMETTITORE/GENERATORE/AMPLIFICATORE.**

## About This Manual

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This instruction book covers the models listed below:

115 VAC	230 VAC
8941-115SC13	8941-230SC13

## Changes to this Manual

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We have made every effort to ensure this manual is accurate. If you discover any errors, or if you have suggestions for improving this manual, please send your comments to our Solon, Ohio factory. This manual may be periodically updated. When inquiring about updates to this manual refer to the part number and revision on the title page.

## Chapter Layout

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**Introduction** — Describes the features of the Bird Termaline RF Load Resistor lists equipment supplied and optional equipment, and provides power-up instructions.

**Theory of Operation** — Describes how the Termaline RF Load Resistor works and its functions.

**Installation** — Describes the how to install the Termaline RF Load Resistor.

**Operating Instructions** — Describes procedures require for operating the load resistor equipped with a blower unit.

**Maintenance** — Lists routine maintenance tasks as well as troubleshooting for common problems. Specifications and parts information are also included.



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Bird 8940 Series Semiconductor Loads are general purpose, 50 ohm, coaxial RF transmission line terminations, useful as standby reject loads. They provide accurate, dependable, and low reflection line terminations over a frequency range of DC – 20 MHz, specially calibrated for great stability at 13.56 MHz. Up to 15,000 watts can be dissipated.

The loads have a coolant chamber surrounded by radiator fins. The front and rear fins form mounting flanges which can be used as supports for freestanding use or as brackets for fixed mounting. A vent plug at the top of the unit relieves internal pressure from coolant expansion. A blower with five axial fans is on the bottom of the load. The load's simple and rugged design minimizes maintenance requirements.

## Items Supplied

- Load Resistor: Pre-filled with coolant at the factory
- Detachable 3-wire power cable
- Shipping Plug-
- Vent Plug
- Instruction Manual

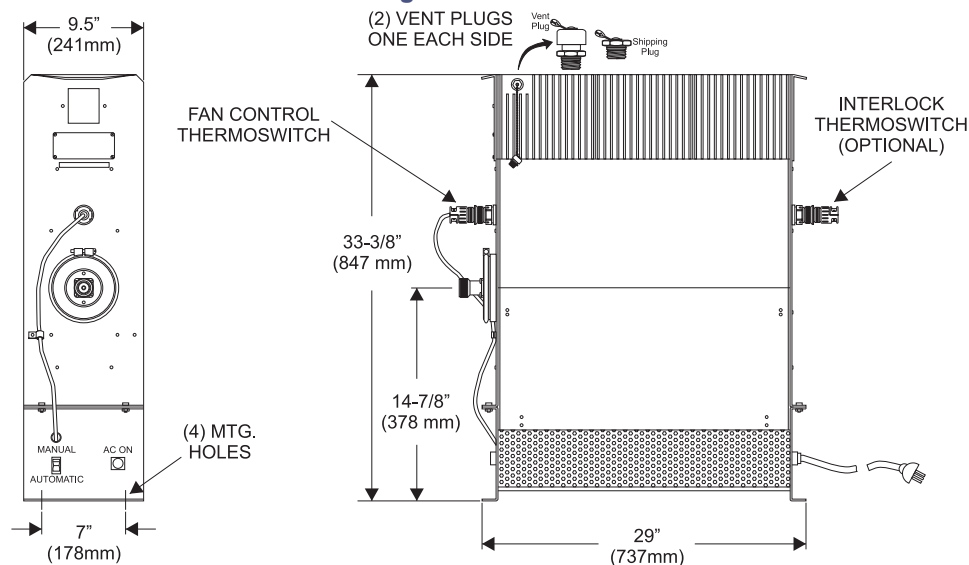
## Items Required but not Supplied

- Coupling Kit: Connects the load to the RF line
- Male plug for the power cable (230 VAC only)

## Optional Accessories

- Interlock Thermoswitch: Automatically shuts off the generator to prevent overheating of the load

**Figure 1 Bird 8940 Series Outline Drawing**



## Load Resistor

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Bird 8940 Loads consist of two thin-film-on-ceramic resistors immersed in a dielectric coolant. The resistors, individually selected for accuracy, are enclosed in special housings. When surrounded by the coolant, this produces a uniform, practically reflectionless line termination over the specified frequencies.

## Coolant

---

The load is cooled by forced air and natural fluid convection currents. The coolant, chosen for its desirable dielectric and thermal characteristics, carries heat from the resistor to the walls of the cooling tank, where radiator fins surrounding the tank transfer the heat to the forced air flow.

When the coolant is heated, thermal expansion causes an increase in the internal pressure. A vent plug relieves this pressure while protecting the opening from dirt or other contaminants.

## Fans

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Forced airflow is provided by five axial fans beneath the heat exchanger. Baffles direct the air over the radiator fins for more efficient cooling. A passive, normally open control thermostwitch closes when the coolant reaches 60 °C (140 °F), turning the fans on.

## Power Rating Reduction

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The baffles interfere with the free flow of normal air currents, causing a 75% reduction in heat transfer efficiency if the forced airflow is stopped. The maximum power dissipation when the fans are not functioning is 3.75 kW.

## Thermal Interlock

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When installed, a passive, normally closed over-temperature thermostwitch opens above the maximum safe load temperature of 226 °C (439 °F), turning off generator power. The interlock will not permit use of the generator until the load has reached a safe temperature.

This chapter provides information for on-site requirements, unpacking, inspection, and preparing the load for use.

## Unpacking and Inspection

---

1. Carefully inspect shipping container for signs of damage.
  - If the shipping container is damaged, do not unpack the unit. Immediately notify the shipping carrier and Bird Technologies.
  - If the shipping container is not damaged, unpack the unit. Save shipping materials for repackaging.
2. Inspect unit for visual signs of damage.

**Note:** *If there is damage, immediately notify the shipping carrier and Bird Technologies.*

## Mounting

---

**CAUTION**

Do not block airflow. The air intake vent on the bottom of the load must not be obstructed.

Place the load in a dry, dust and vibration free environment. Do not use outdoors or in areas of condensing humidity. Allow at least 15" (40 cm) of clearance on all sides of the load, or mount it over a suitably reinforced opening measuring 42"L x 7"W x 5"D (660 x 178 x 127 mm).

**CAUTION**

This load is designed for operation in a horizontal position only, with the vent plug up.  
Do not use in any other manner.

Bird 8940 Loads are intended for stationary or fixed use. The mounting brackets on front and rear faces have four mounting holes arranged in a 7" x 40-23/32" (177.8 x 1031.3 mm) rectangle. Use a screw with a 3/8" (9.5 mm) diameter max.

## Setup

---

**WARNING**

The vent plug must be used at all times when the unit is operating or cooling. Failure to do so could result in an explosion or severe burns.

- Before first using the load, get a resistance baseline for future maintenance. Refer to "[RF Assembly Resistance Test](#)" on [page 9](#) for instructions.
1. Remove the shipping plug from the load and replace it with the vent plug. Refer to [Figure 1](#) to identify the plug.

## Thermoswitch

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Bird 8940 Loads can be equipped with an optional interlock thermoswitch, P/N 8890-017. It is normally closed, opening at 226 °C (439 °F), with a rating of 10 A @ 120 VAC and 5 A @ 230 VAC.

A control thermoswitch, P/N 8892-333, is used to control the blower assembly. It is normally open, closing at 60 °C (140 °F), with a rating of 10 A @ 120 VAC and 5 A @ 230 VAC.

**WARNING**

The vent plug must be used at all times when the unit is operating or cooling. Failure to do so could result in an explosion or severe burns.

To install or replace a thermoswitch, follow these instructions:

1. Replace the vent plug with the shipping plug.
  - a. **Interlock Thermoswitch:** Supporting the load to prevent damage to the RF connector, stand the unit on its front with the connector down. In this position there is no danger of coolant spillage.
  - b. **Control Thermoswitch:** Stand the unit on its back end, with the connector up. In this position there is no danger of coolant spillage.
2. Remove the socket plug (or old thermoswitch), using a  $\frac{9}{16}$ " hex wrench.
3. Insert the new thermoswitch. Sparingly apply pipe sealing compound to the external threads, only, of the thermoswitch. Do not contaminate the coolant with pipe sealant.
4. Check for coolant leaks upon completion.

## Interlock Connection

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If installed, connect the optional interlock thermoswitch to the interlock as follows (see [Figure 2](#)):

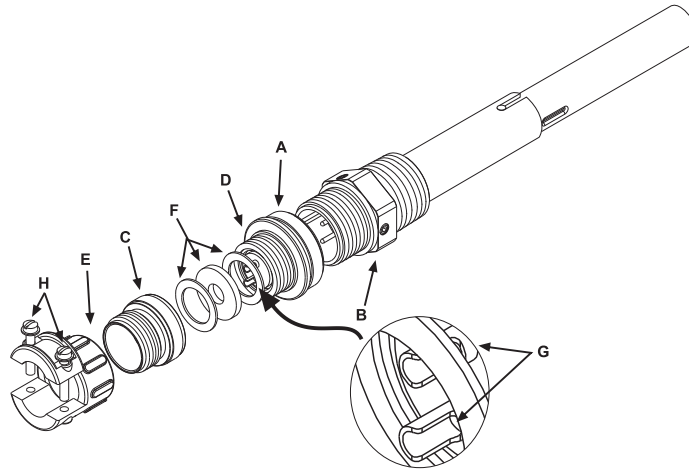
**CAUTION**

If installed, connect optional interlock before applying RF power.

1. Unscrew the larger knurled ring-nut (A) at the lower end of the coupling jack assembly. Pull it off the thermoswitch jack (B). Unscrew the small knurled cover fitting (C) from the base plug (D) of the connector to release the base.
2. Thread the interlock wires through the clamp (E) with the washers (F) inside and with its threaded fitting in place. Service the interlock wires with short tips and put spaghetti sleeves over the wire ends if necessary.
3. Securely solder the interlock leads to the lugs (G) of the connector base.

**Note:** *The ring-nut (A) must be in place over the base plug (D) with the knurled end facing out.*
4. Screw on the cover fitting (C), then fasten the cable clamp (E) in place and tighten both yoke screws (H).
5. Put the plug back on the thermoswitch and tighten the nut (A).

Figure 2 Thermoswitch Assembly



## AC Power Connection

### CAUTION

Check the local electrical code for proper AC hookup prior to operation of the unit. Make sure the neutral or return hookup is only used for that purpose.

### WARNING

Turn off AC power and RF power when attaching the power cable.

The AC power supply required for this unit is 115/230 V, depending on the model, @ 50/60 Hz, 1 $\phi$ . The blower is equipped with an IEC 320 “cold” (65 °C) AC inlet.

## Connecting RF Power

After installing the load, the RF transmission line can be attached using standard coaxial line coupling kits.

### WARNING

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

**“QC” Connector Coupling** — Use 50 ohm coaxial cable such as RG-218/U or -220/U (-17A or -19A), appropriate for the frequency and power level of operation. Use a cable connector which will mate with the one on the load.

**CAUTION**

Maximum power is 3,750 W when the blower is not running. If the indicator light should turn off, immediately reduce RF power to less than 3,750 W.

**WARNING**

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

## Blower Controls

---

Bird 8940 Loads are equipped with a control switch and indicator light on the front of the blower, underneath the RF connector. The switch is labeled "MANUAL/AUTOMATIC". When the switch is set to MANUAL, the fans will run continuously. When set to AUTOMATIC, the fans will be turned on when the coolant reaches a preset temperature. The indicator light, labeled "AC ON", will turn on whenever the unit is connected to AC power.

## Normal Operation

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1. Check that the indicator light is on.
2. Set the switch to MANUAL momentarily to check that the fans are working properly, then set the switch back to AUTOMATIC.
3. Apply RF power.

## Operation Under Abnormal Conditions

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If the indicator light turns off or the fans stop unexpectedly, immediately turn off RF power or reduce it to less than 3,750 W. Refer to "[Troubleshooting](#)" on page 7 to correct the problem. A properly connected interlock will prevent overload.

The load can be subjected to higher power levels for short intervals. If this is likely, make sure the interlock is properly connected to prevent damage to the load.

## Shutdown

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1. Turn off RF power at the source.
2. Wait approximately 15 minutes, or for the fans to stop running. This will allow the load to cool without causing heat stress.
3. Turn off the blower.

## Emergency Shutdown

---

Turn off RF power at the source.

If the interlock thermostwitch is properly connected, RF power will be automatically turned off when the coolant temperature reaches an unsafe level.



This chapter covers routine maintenance, troubleshooting, specifications, and replacement parts for Bird 8940 Loads.

**WARNING**  
 Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

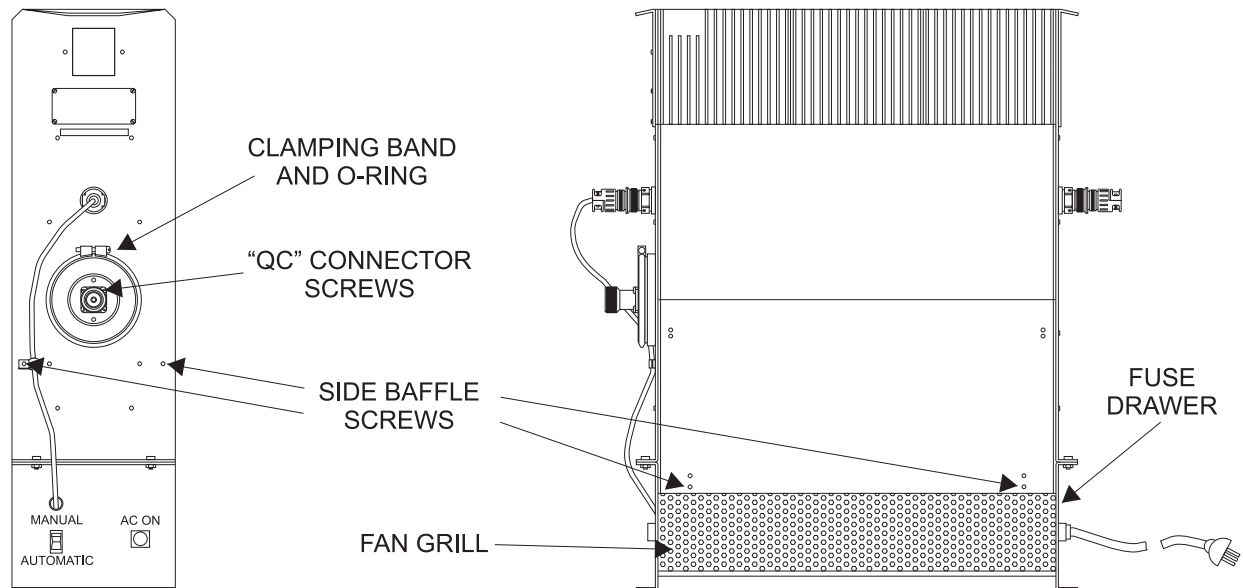
**WARNING**  
 Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

## Troubleshooting

The table below contains troubleshooting information for problems which can occur during normal operation. This manual cannot list all malfunctions that may occur, or their corrective actions. If a problem is not listed or is not corrected by the listed actions, notify a qualified service center.

PROBLEM	POSSIBLE CAUSE	CORRECTION
No air flow from blowers; "BLOWER ON" light off	Unplugged power cable	Connect the power cable
	No AC power	Make sure AC power is properly connected and turned on
	Fuse burnout	Replace fuse after correcting the burnout cause (See <a href="#">"Fuse" on page 11</a> )
No air flow from blowers; "BLOWER ON" light on	Fan obstructed by bent grill	Straighten the grill
	Fan motors overheated	Clean the grill and fan blades (See <a href="#">"Cleaning" on page 8</a> )
	Fan motors burnt out	Replace fan (See <a href="#">"Fans" on page 13</a> )
Air flow from blowers; "BLOWER ON" light off	Lamp burnout	Replace lamp (See <a href="#">"Indicator Light" on page 11</a> )
Leaking coolant	Loose clamping band	Tighten the clamping band
	Defective or improperly installed O-ring	Replace the O-ring (See <a href="#">"Load Resistor" on page 11</a> )
High or low DC resistance	Loose RF input connector	Tighten connector
	Faulty RF input connector	Replace connector (See <a href="#">"RF Connector" on page 10</a> )
	Faulty resistor	Replace the resistor (See <a href="#">"Load Resistor" on page 11</a> )
Overheating radiator	RF power too high	Lower RF power (See <a href="#">"Specifications" on page 15</a> for maximum RF power)
	Coolant level too low	Check the coolant level. Add coolant if necessary (See <a href="#">"Coolant" on page 10</a> )
	Coolant degraded	Replace coolant (See <a href="#">"Coolant" on page 10</a> )
	Faulty control thermoswitch	Replace control thermoswitch (See <a href="#">"Thermoswitch" on page 4</a> )
	Faulty resistor	Replace the load resistor (See <a href="#">"Load Resistor" on page 11</a> )

Figure 3 Maintenance and Repair Locations



## Maintenance

**Note:** [Figure 3 on page 8](#) shows the location of components which may be referred to in this section.

## Cleaning

The outside surface of the unit should be wiped free of dust and dirt when necessary. Excessive dust on the cooling fins will interfere with heat dissipation. Clean the RF connector, both metallic and insulating surfaces, with a dry, non-residue forming solvent.

**WARNING**

Disconnect the unit from all power sources before servicing.  
The unit may be energized from multiple sources.  
The potential for electric shock exists.

**WARNING**

Do not operate with side panel removed. Doing so could result in personal injury.

## Radiator

To clean the radiator fins, partial disassembly of the load will be required. Follow the instructions below:

1. Unscrew the unpainted 10-32 x  $\frac{3}{4}$ " Phillips head screws on the front and rear radiator faces, just below the RF connector.
2. Unscrew all six pairs of 10-32 x  $\frac{5}{8}$ " Phillips head screws on the sides of the radiator, just above the fan grill.
3. Remove the side panels and clean the fins.
4. Replace the side panels and screw into place.

## Fans

Follow these steps to clean the fans:

1. Remove the fan. See "[Fans](#)" on page 2.
2. Use a soft, damp cloth to remove dust from both sides of the fan blades.

### CAUTION

Do not use a cleaning solution that will attack the plastic parts of the fan.

3. Replace the fan grill.

## Inspection

Inspect the unit every six months. Check for coolant leakage around the clamping band and the thermoswitch. Also check for corrosion.

## RF Assembly Resistance Test

**Note:** *These tests are by no means a necessity to the operation of the load but merely guidelines for the users information.*

Accurate measurement of the DC resistance between the inner and outer conductors of the RF input connector will provide a good check of the condition of the load resistor.

Checking the DC resistance is simply used to measure a change in the resistance over time. Tracking the DC resistance should start *before* the unit is first put into service. Perform the following steps and record the value for future comparison. The resistor should provide at least 5,000 hours of operation before requiring any additional service. DC resistance should be measured annually.

Preparation:

- Tools: Common hand tools.
- Ohmmeter with an accuracy of  $\pm 1\%$  at 50 ohms (or use a resistance bridge).
- Use low resistance leads, preferably a short piece of 50 ohm coaxial cable fitted with an appropriate connector or alligator clips.
- Temperature of the load should be stabilized between 20°C to 25°C (68°F to 77°F).

## DC Resistance Measurement

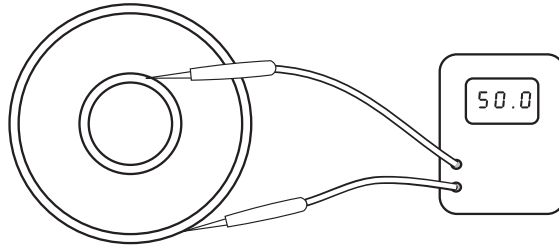
### WARNING

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied.  
Leaking RF energy is a potential health hazard.

**Note:** *It is recommended that this resistance check be performed each time the load is to be used.*

1. Turn off RF power and interlock circuitry before making any disconnections.
2. Disconnect the RF coaxial line.
3. Connect the multimeter test leads across the center and outer conductor of the load resistor. See [Figure 4](#).
4. Record the value of the resistance *before* the load is put into service. Compare subsequent values with the latest reading. If the values vary more than 1 ohm this could be an indication of a failing resistive element.

**Figure 4 Measuring DC Resistance**



### Coolant

Coolant lifetime will vary greatly depending on the operating temperature. For heavy use (full RF power for long times, high ambient temperature, 50 Hz AC supply), check the coolant every 500 hours. If the load has only had light duty (fraction of full power, low ambient temperature, 60 Hz AC supply), then coolant inspection may only be necessary every 2,000 hours.

**Note:** *Correct any coolant leakage before inspection. (See “Troubleshooting” on page 11)*

**WARNING**  
Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

To inspect the coolant:

- Remove the load resistor (Refer to “Load Resistor” on page 18).

**CAUTION**  
Use only Bird coolant, P/N 5-1070, to prevent damage to the load.

- The coolant should be clear, with a faint yellow tinge, and have a slightly sweet smell. If it is black with a burnt or acrid smell, drain it and add about 9.5 gal (36 L) of coolant.
- With the load still on end, the coolant level should be 8 inches (203 mm) below the top of the resistor assembly mounting ring, at ambient temperature. Add coolant if necessary.

### Repair

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**Note:** *Figure 3 on page 8 shows the location of components which may be referred to in this section.*

**WARNING**  
Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

### RF Connector

The 8941-115SC13 has a Bird “QC” connector which allows easy changing of the RF connector. This does not disturb the coolant seal or affect the electrical continuity of the load. To change the connector:

- Remove the four screws at the corners of the RF connector.
- Pull the connector straight out.
- Push the new connector in. Make sure that the center pin on the connector is properly seated in the mating socket on the load.
- Replace the screws.

**Note:** *If not using the 7/16 DIN connector normally supplied, frequency and power must be limited to the capabilities of the connector.*

## Load Resistor

To change the load resistor assembly:

1. Remove the vent plug and install the shipping plug.

**WARNING**

This load weighs 236 (107 kg). More than one person may be required to safely tip it on it's end.

2. Stand the unit on its back with the connector end up. In this position there is no danger of the coolant pouring out through the socket plug hole.
3. Unscrew and remove the clamping band.
4. Lift the load resistor assembly out of the tank and allow any coolant to drip back into the tank.
5. Check the O-Ring. It should be free of twists and positioned evenly around the flange of the resistor housing. If the O-ring shows signs of deterioration (e.g. is no longer pliable or has surface cracks) replace it.
6. Replace the entire load resistor assembly. It cannot be further disassembled.

**Note:** *When replacing the RF assembly, ensure that the end of the RF assembly fits into the support rod on the rear panel in the load. This rod supports the end of the resistor assembly when the load is horizontal.*

7. Put the clamping band in place and tighten it.
8. Remove the shipping plugs and install the vent plugs.

## Indicator Light

**WARNING**

Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

1. Locate the indentation in the side of the clear plastic lens at the end of the indicator light.
2. Gently pry the lens off the indicator base.
3. Pry up and remove the clear back-up lens from the base.
4. Carefully grasp the end of the neon bulb with small pliers and pull it out of the indicator base.
5. Replace the neon bulb assembly.
6. Push it into the housing until it snaps into place.
7. Replace the back-up lens and the lens, snapping them into place.

## Fuse

The fuse is located in the AC module on the back of the blower.

To replace the fuse:

**WARNING**

Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

1. Correct the fuse burnout cause.

**Note:** *Common causes include stuck or blocked fans or a short circuit in the motor or blower wiring.*

2. Press the locking tab on the fuse drawer and remove the drawer.
3. Replace the fuse. See "[Specifications](#)" on page 15 for fuse type and current rating.
4. Press the drawer into the AC module until it locks into place.
5. If the fans still do not run or if the fuse burns out again, return the unit to Bird for service.



## Fans

When ordering a replacement fan, be sure to specify the model, the fan part number, AC voltage, and fan position. The fan will be provided with lugs and leads of the right length for direct attachment to the terminal block.

**Note:** *Different fans are used in the 115V and 230V loads. Also, the fan style depends on its position in the blower; A is in front with B, C, D, and E fans consecutively down the line towards the rear with E nearest the terminal block.*

To replace a fan, follow these instructions:

**WARNING**

Disconnect the unit from all power sources before servicing. The unit may be energized from multiple sources. The potential for electric shock exists.

1. Remove the load and side panels from the blower assembly by:
  - a. Remove the (12) 10-32 x 5/8 Phillips truss head screws and lock washers that hold the blower side panels to the blower housing.
  - b. Remove the (4) 10-32 x 3/4 Phillips truss head screws and internal lock washers that hold the side panels to the front and rear panels.
  - c. Remove the side panels.
  - d. Loosen and remove the (4) 3/8" nut, bolt and washer sets that secure the load base flange to the top flanges of the blower assembly.
  - e. Unscrew and remove the thermoswitch cable from the thermoswitch on the front panel of the load.
  - f. Lift the load off the blower assembly.
2. Remove the (2) 10-32 x 1/2 Phillips truss head screws and internal lock washers that hold the support rod to the front and rear panels of the blower assembly near the flanges at the bottom.
3. Remove the support rod.
4. Remove the fan grill from the blower housing.
5. On the terminal block, remove the screws holding the leads of the defective fan.

**Note:** *It may be necessary to cut the wire ties binding the fan wires to the harness and the side panels to trace and remove the wires.*
6. Remove the (4) 10-32 x 5/8 socket head cap screws and lock washers that secure the fan to the fan panel.
7. Remove the fan.
8. Insert the replacement fan in the same position and orientation.
9. Replace and tighten the mounting screws.
10. Reconnect the fan leads to the terminal block terminals.
11. Replace the wire ties on the fan wires and cable harness.
12. Replace the fan grill and the support rod.
13. Connect the unit to AC power.
14. Set the fan control switch to "manual" to test the operation of the fans.
15. Remove power from the unit.
16. Reassemble the blower assembly to the load by reversing steps a thru e above.

## Storage and Shipment

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Cover the load before storing to keep out dust and dirt. It is not necessary to install the shipping plugs. Store in a dry, dust-free environment where the ambient temperature will remain between –40 and +45 °C (–40 to +113 °F).

To ship the load, take the following precautions:

- Remove the vent plugs and install the shipping plugs. Wrap the vent plugs with padding and tape them to the side of the load for protection.

**Note:** *With the shipping plugs installed, it is not necessary to empty out the coolant.*

- Wrap the connector in padding.
- Pack and brace the load in a sturdy wooden crate for shipment.

## Customer Service

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Any maintenance or service procedure beyond the scope of those in this chapter should be referred to a qualified service center.

If the unit needs to be returned for any reason, request an Return Material Authorization (RMA) through the Bird Technologies website. All instruments returned must be shipped prepaid and to the attention of the RMA number.

### **Bird Service Center**

30303 Aurora Road  
Cleveland (Solon), Ohio 44139-2794  
Fax: (440) 248-5426  
E-mail: [bsc@birdrf.com](mailto:bsc@birdrf.com)

For the location of the Sales Office nearest you, visit our Web site at:

<http://www.birdrf.com>



## Specifications

Frequency Range	DC – 20 MHz
Power Rating	15 kW continuous duty
Impedance, Nominal	50 ohms
VSWR	1.10 max
Connector	“QC” Type, Female 7/16 DIN normally supplied
<b>AC Power</b>	
–115	115 V +10, –6% @ 50/60 Hz ±3%
–230	230 V +10, –6% @ 50/60 Hz ±3%
AC Line Power Rating	460 W max
<b>Fuse Rating</b>	IEC (5 x 20 mm) Type T
115 VAC	6.3 A
230 VAC	3.15 A
<b>Thermoswitch</b>	
Interlock (Optional)	Normally closed. Opens at 226 °C (439 °F)
Fan Control	Normally open. Closes at 60 °C (140 °F)
<b>Thermoswitch Rating</b>	
115 VAC	10 A
230 VAC	5 A
Temperature, Operating	+5 to +40 °C (+41 to +104 °F)
Temperature, Storage	–40 to +45 °C (–40 to +113 °F)
<b>Altitude*</b>	1520 m (5000 ft.)
Humidity	95% non-condensing max
Cooling method	Oil dielectric and forced air convection
Dimensions	42”L x 9.5”W x 33 <sup>3</sup> / <sub>8</sub> ”H (1067 x 241 x 847 mm)
Weight, Nominal	236 lb. (107 kg)
Finish	Black Powder Coat

\* Derate RF power by 250 W for every 305 m (1,000 ft.) above 1,520 m (5,000 ft.), up to a maximum of 3,050 m (10,000 ft.).

## Replacement Parts

Description	Qty	Part Number
<b>RF Load Resistor</b>	1	8941-117
Resistor O-Ring	1	5-230
Clamping Band Assembly	1	2430-055
<b>Plugs</b>		
Vent	2	2450-094
Shipping		2450-049
<b>Interlock Thermoswitch</b>	1	8890-017
Thermoswitch Body	1	8890-015
Thermoswitch Connector Jack	1	2450-018
<b>Control Thermoswitch</b>	1	8892-333
Thermoswitch Body	1	8892-334
Thermoswitch Connector Jack	1	2450-018
Coolant, 9.5 gal (36 L)	1	5-1070-3
Radiator Assembly	1	8921-002-2
<b>Blower Assembly</b>	1	
115 V		8941A101-3
230 V		8941A101-4
Blower Control Cable	1	8941-135-2
Blower Fan, 76 W	3	
Fan only, without leads		5B740-1
115 V		5B740-2
230 V		
With Leads		
115 V, (A) 1st		8941A131-1
115 V, (B) 2nd		8941A130-1
115 V, (C) 3rd		8941A127-1
115 V (D) 4th		8931A128-1
115 V (E) 5th		8931A129-1
230 V (D) 4th		8931A128-2
230 V (E) 5th		8931A129-2
230 V, (A) 1st		8941A131-2
230 V, (B) 2nd		8941A130-2
230 V, (C) 3rd		8941A127-2
Blower Base Grille Guard	1	8941A106-1
Side Panel Assembly	2	8941A103-1

<b>Fuse</b> 115 V, 5x20mm Type T, 6.3 A 230 V, 5x20mm Type T, 3.15A	1	5A2257-24
	2	5A2257-21
<b>Neon Lamp</b> 115 V 230 V	1	5A2409-1 5A2409-2
Switch, Toggle	1	5A2312
<b>AC Line Supply Cable</b> 115 V 230 V	1	Contact Bird Technologies for the correct power cord for your unit.

### Available QC Connectors

Connector	Part Number
BNC-Female	4240-125
BNC-Male	4240-132
C-Female	4240-100
C-Male	4240-110
HN-Female	4240-268
HN-Male	4240-278
LC-Female	4240-031
LC-Male	4240-025
Open Term. # 10-32 Nut	4240-080
Mini UHF-Female	4240-346
UHF-Female	4240-050
UHF-Male	4240-179
1-5/8" EIA Fixed	4240-096
1-5/8" EIA Swivel	4240-208
7/8" EIA	4240-002
TNC-Female	4240-156
TNC-Male	4240-160
LT-Female	4240-018
LT-Male	4240-012
N-Female	4240-062
N-Male	4240-063
SC-Female	4240-090
SMA-Female	4240-336
SMA-Male	4240-334
7/16 Jack, IEC Type 169-4	4240-344
7/16 Plug, IEC Type 169-4	4240-363

## LIMITED WARRANTY

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of one (1) year, unless otherwise specified, from date of shipment and to conform to applicable specifications, drawings, blueprints and/or samples. Seller's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by Seller.

If Seller's products are claimed to be defective in material or workmanship or not to conform to specifications, drawings, blueprints and/or samples, Seller shall, upon prompt notice thereof, either examine the products where they are located or issue shipping instructions for return to Seller (transportation charges prepaid by Buyer). In the event any of our products are proved to be other than as warranted, transportation costs (cheapest way) to and from Seller's plant, will be borne by Seller and reimbursement or credit will be made for amounts so expended by Buyer. Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing within ten days from the date of discovery of the defect.

The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's request and/or to Buyer's specifications. Routine (regularly required) calibration is not covered under this limited warranty. In addition, Seller's warranties do not extend to the failure of tubes, transistors, fuses and batteries, or to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to Seller.

The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR SELLER ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.