
INSTRUCTION BOOK

**TERMALINE® COAXIAL
LOAD RESISTOR
MODEL 8130**



Electronic Corporation

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SAFETY PRECAUTIONS

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.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe normal safety regulations. Do not attempt to replace parts or disconnect an RF transmission or any other high voltage line while power is applied. When working with high voltage always have someone present who is capable of rendering aid if necessary. Personnel working with or near high voltage should be familiar with modern methods of resuscitation.

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.

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.

SHOCK HAZARD

Do not attempt to remove an RF transmission line while power is present.

CHEMICAL HAZARD

Dry cleaning solvents used to clean parts may be potentially dangerous to your health. Avoid inhalation of fumes and also prolonged contact with skin.

RESUSCITATION

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

SAFETY SYMBOLS

WARNING

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

CAUTION

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

The following safety warnings appear in the text where there is procedures, that if not carefully followed, could be detrimental to operating and maintenance personnel and are repeated here for emphasis.

WARNING

Using this load in the upper end of its power dissipation range will cause the housing to become hot! Care should be exercised in touching it.

WARNING

Because there is no provision for pressure relief by venting, be very cautious about overloading to avoid damage to the load and possible injury to the operator. Allow adequate time between intervals for cooling down.

WARNING

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

WARNING

Do not overfill the coolant chamber. As stated, the proper level is one (1) inch below the top surface to allow room for expansion of the heated coolant.

The following cautions appear in the text whenever a procedure, if not properly followed, could put the equipment in danger of damage and are repeated here for emphasis.

CAUTION

Do not exceed its 50 watt rating for continuous operation.

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SECTION I. INTRODUCTION

1.1. PURPOSE AND FUNCTION

The Bird Model 8130 TERMALINE® Load Resistor is a liquid cooled RF line termination that furnishes an excellent termination for low power transmission systems during, maintenance, and adjustment phases. The load resistor may also be used in conjunction with a Bird Model 43 THRULINE® Wattmeter.

1.2. PERFORMANCE CHARACTERISTICS AND CAPABILITIES

The Model 8130 is capable of dissipating 50 watts of RF power continuously in 50 ohm coaxial circuits. It is designed to have a very low reflectivity over a wide frequency range. The VSWR is 1.1 to 1.0 maximum from DC to 1000 MHz, 1.2 to 1.0 from 1000 to 2500 MHz and 1.3 to 1.0 from 2500 MHz to 4000 MHz.

1.3. DIMENSIONS AND WEIGHT

The load is 7-9/64" long, 4-1/2" high and 2-11/16" wide (181 x 114 x 68 mm). Its weight is 4 lbs. (1.8 kg net and it has a shipping weight of approximately 6 lbs. (2.7 kg).

1.4. POWER AND UTILITY REQUIREMENTS

The Model 8130 is a passive electronic device and therefore requires no source of power or any utilities to operate.

1.5. ENVIRONMENTAL REQUIREMENTS

Although the Model 8130 is a rugged and self-contained device, it should only be used in a clean, dry, dust and vibration free environment. The ambient temperature should remain within a range of -40°C (-40°F) to +45°C (+113°F) for proper operation. Allow at least six (6) inches of clearance around the load to provide satisfactory access by convection air currents for cooling.

1.6. ITEMS FURNISHED

The Model 8130 is designed for coaxial power input using the Bird "Quick-Change" connectors. Normally supplied with a Female N type, any Male or Female Bird QC connector may be used to give complete flexibility in the use of the Model 8130. This instruction book is the only other item furnished.

1.7. ITEMS REQUIRED

No additional equipment is needed except for having the proper mating connector (normally a male N type) on the coaxial transmission line.

1.8. TOOLS AND TEST EQUIPMENT

Only simple tools such as screwdrivers are needed for disassembling the Model 8130. A resistance bridge, or an ohmmeter with an accuracy of one percent or better at 50 ohms is useful for checking the RF section assembly.

1.9. UNIT SPECIFICATIONS

8130 TERMALINE® Coaxial Load Resistor

Impedance	50 ohms nominal
VSWR	1.1:1.0 maximum dc-1000
MHz	1.2:1.0 maximum 1000-2500
MHz	1.3:1.0 maximum 2500-4000
MHz	
Connectors	Bird "QC" Type Female N (Normally Supplied)
Power Range	50 watts continuous
Frequency Range	DC-4000 MHz
Dimensions	7-9/64"L x 4-1/2"H x 2-11/16"W (181 x 114 x 68mm)
Ambient Temperature	-40°C to +45°C (-40°F to +113°F)
Cooling Method	Oil Dielectric and Convection Currents
Weight	4 lb (1.8 kg)
Operating Position	Horizontal or Vertical with connector down only
Finish	Grey Wrinkle

SECTION II. INSTALLATION

2.1. GENERAL

No special installation procedures are necessary. Be sure the RF connector is clean. See Section IV, Maintenance, before connecting the load to the coaxial transmission line. The Model 8130 is designed to be used in a horizontal position or a vertical position with the connector down. Do not use in any other position.

SECTION III. THEORY OF OPERATION

3.1. GENERAL

The resistive element of the Model 8130, individually selected for its accuracy, is enclosed in a special tapered housing to provide a linear reduction in surge impedance directly proportional to the distance along the resistor. The dielectric coolant oil transfers the heat generated by the load resistor to the walls of the rectangular metal case. The external surfaces of the case dissipate the heat into the surrounding air.

SECTION IV. OPERATING INSTRUCTIONS

4.1. USE AND FUNCTION OF CONTROLS

The Model 8130 is a passive electronic device and therefore has no controls.

4.2. INITIAL ADJUSTMENTS AND CONTROL SETTINGS

No adjustments or settings are required.

4.3. START-UP

Attach the load to the RF generator with a short piece of 50 ohm cable such as RG-58A/U or RG-58C/U. Make sure the cable plugs mate with the transmitter and load resistor connectors.

4.4. NORMAL OPERATION

Operate the Model 8130 in a horizontal position or vertically with the connector end down.

Locate it to permit adequate air circulation around the unit.

CAUTION

Do not exceed its 50 watt rating for continuous operation.

WARNING

Using this load in the upper end of its power dissipation range will cause the housing to become hot! Care should be exercised in touching it.

4.5. OPERATION UNDER ABNORMAL CONDITIONS

The Model 8130 can be subjected to only very moderate overloads for very limited intervals.

WARNING

Because there is no provision for pressure relief by venting, be very cautious about overloading to avoid damage to the load and possible injury to the operator. Allow adequate time between intervals for cooling down.

4.6. SHUTDOWN

Because the Model 8130 is a passive device there is no way to turn it off except by cutting off power to the RF source.

4.7. EMERGENCY SHUTDOWN

As in paragraph 4.6 above, turn off the RF source.

WARNING

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

SECTION V. MAINTENANCE

5.1. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Overheating	Overloading	Reduce RF power
	Insufficient dielectric coolant	Add more coolant (See paragraph 5.9)
Excessive Reflected Power	Damaged RF section assembly	Check resistance of load (See paragraph 5.11) before replacing (See paragraph 5.14)
	Insufficient dielectric coolant	Add more coolant (See paragraph 5.9)
Oil Leak	Loose clamping band	Tighten
	Defective O-Ring seal	Replace O-Ring and check coolant level

5.2. CLEANING

The Model 8130 Coaxial Load Resistor is rugged and simple. The principle maintenance required will be the cleaning of the RF input connector. Wipe the insulator and metallic contact surfaces using a soft clean cloth. Use a self-drying non-residue forming contact cleaner on the inaccessible portions. Also, periodically wipe off the exterior housing so that accumulated dust and grime does not interfere with the efficient transfer of heat to the ambient air.

5.3. INSPECTION

Check the Model 8130 for oil leaks (See paragraph 5.1, Troubleshooting) and cleanliness. (See paragraph 5.3, Cleaning).

5.4. PREVENTIVE MAINTENANCE

Except for cleanliness (See paragraph 5.3, Cleaning), the only other maintenance required is a periodic check of the coolant level.

The dielectric coolant, 10C transformer oil, is factory filled to about one (1) inch below the surface of the case (connector end up). This level should remain constant even after prolonged usage under normal operating conditions. It is not

critical, and may fall to two (2) inches below the top before affecting the RF impedance.

Should replacement of the dielectric coolant become necessary, remove the RF section assembly. (See paragraph 5.14, Disassembly). Fill the case to a level one (1) inch below the top surface of case opening flange with coolant oil. (Total volume is approximately one (1) quart.) Use only Bird #5-030 coolant oil.

WARNING

Do not overfill the coolant chamber. As stated, the proper level is one (1) inch below the top surface to allow room for expansion of the heated coolant.

5.5. CALIBRATION

An accurate measurement of the dc resistance between the RF input connector and ground will provide a good check of the Model 8130 Load Resistor condition. For this measurement, use a resistance bridge or ohmmeter with an accuracy of one percent or better at 50 ohms. Use low resistance leads, preferably a short piece of 50 ohm cable (RG-58A/U or RG-58C/U) attached to a plug which mates with the input connector on the load resistor. When the resistance is checked at room temperature, the reading should be 50 ohms \pm 2 ohms.

Should replacement of the RF section assembly become necessary, see paragraph 5.14.

5.6. DISASSEMBLY

RF Section Assembly -

- a. Place the load resistor on its back (connector end up) and remove the 8-32 x 1" machine screw from the radial V-Band clamp. Remove the V-Band clamp.

- b. Carefully lift the RF section assembly (with the connector attached) straight up from the case, allowing the oil to drip back into it.
- c. Inspect the O-Ring seal (Bird P/N 7500-065). Replace it if it is no longer pliable or shows signs of surface cracks.

The RF section is not subject to further disassembly. It must be replaced in its entirety.

QC Connectors - the RF input connector is of the Bird "Quick-Change" design which permits easy interchange of connectors with only a screwdriver. This process does not, in any way, disturb the coolant seal or interfere with the essential coaxial continuity of the load resistor RF input. To change or replace the RF input connector, follow the procedure below:

- a. Remove the four (4) 8-32 x 1/4" pan head machine screws from the corners of the RF connector.
- b. Pull the connector straight out.

The "QC" connector may be readily replaced, as above, with other AN standard type connectors obtained from Bird Electronic Corporation.

5.7. REASSEMBLY

RF section assembly - Reverse the procedure in paragraph 5.14.

"QC" connector - Reverse the procedure in paragraph 5.17 to install a new connector, making certain that the projecting center contact pin of the QC connector is carefully engaged and properly aligned with the mating socket of the load resistor.

5.8. REPAIRS

If any repairs beyond what has been covered so far are required, the unit must be returned to Bird Electronic Corp. for service. Consult with the factory.

SECTION VI. PREPARATION FOR RESHIPMENT

6.1. GENERAL

Wrap the "QC" connector with padding and tape securely.

Pack and brace the load in a suitable corrugated paper shipping container. It is not necessary to remove the dielectric coolant oil for shipment, the oil is sealed inside the load.

SECTION VII. STORAGE

7.1. GENERAL

No special preparation is needed for storage. Cover the load to keep off the dust and store in as clean dry and dust free an area as possible. The ambient temperature should preferably be kept within the working range of -40°C and +45°C (-40°F and +113°F).

SECTION VIII. REPLACEMENT PARTS LIST

8.1. MODEL 8130

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	RF load resistor assembly	8130-015
2	1	O-Ring seal	7500-065
3	1	Clamp band assembly	7500-254
4	1	Case	3-183
5	1	Handle	3-115
6	1	"QC" connector	*See Below
7	2	Coolant oil, 1/2 gallon	5-030-2

*Available QC Type Connectors

N-Female	4240-062	LT-Female	4240-018
N-Male	4240-063	LT-Male	4240-012
HN-Female	4240-268	C-Female	4240-100
HN-Male	4240-278	C-Male	4240-110
LC-Female	4240-031	UHF-Female (SO-239)	4240-050
LC-Male	4240-025	UHF-Male (PL-259)	4240-179
	7/8" EIA Air Line	4240-002	