

Instruction Sheet
for
INSTALLATION - OPERATION - MAINTENANCE
Bird Model 8221
TERMALINE LOAD RESISTOR

GENERAL - The Model 8221 is a coaxial load resistor (dummy load) for use with transmitting equipment producing up to 500 watts output and in a frequency range from DC to 2000 megacycles per second and above. This TERMALINE Load Resistor is designed to match nominal 50 ohm coaxial transmission lines. The input jack is a standard AN Type LT Female which mates directly with the Type UG-532A/U (Male LT) cable plug. The radio frequency power absorption of the Model 8221 is nearly reflectionless, and the equipment does not radiate rf energy into space during dummy load operation. The VSWR values (voltage standing wave ratio) are designated to be below 1.2 to 1.0 up to a frequency of 2000 mc.

ELECTRICAL CHARACTERISTICS - The Model 8221 is designed to match the most common high frequency transmission media; i.e. 50 ohm coaxial lines. The impedance, in the voltage standing wave ratio language of such transmission, is quite independent of frequency and is almost purely resistive. The VSWR values are maintained 1.1 to 1 up to 1000 mc, and below 1.2 to 1 from 1000 to 2000 mc, with the actual calibration results of this particular resistor being tabulated in the spaces below. In the frequency region 2000 to 3000 mc, calibration is not normally performed. However, tests on typical units of this equipment show VSWR's to be less than 1.3 to 1 in this range. Below 50 mc, the input impedance of the Dummy Load is very nearly a pure resistance to equal to the DC resistance. Close tolerance is maintained on the value of the dc resistance on the production units.

The continuous load power rating is 500 watts in still air (up to 45°C ambient).

Results of VSWR checks on Model 8221, Serial No. _____

Frequency	100 Mc.	300 Mc.	500 Mc.	700 Mc.
VSWR	_____	_____	_____	_____
Frequency	1000 Mc.	1300 Mc.	1600 Mc.	2000 Mc.
VSWR	_____	_____	_____	_____

All VSWR measurements are taken with a slotted line of 50 ohm impedance.

INSTALLATION - The Model 8221 Load Resistor should be operated in a horizontal position only. The radiator has flanged feet at both ends, with a mounting hole at each corner. The Load Resistor may be used free-standing on any convenient flat surface. If it is desired to fasten the load by means of its base mounting flanges, use the four 9/32-inch holes, which are on a 12-23/32 x 5-1/8 rectangle. Fasten with suitable 1/4-inch machine screws and nuts or #12 wood screws, keeping the major axis of the load horizontal and the radiator upright. Do not tilt upward at the connector end. Be sure that there is ample provision for air circulation of at least 6 inches of free space all around and above the unit.

DESCRIPTION - The equipment consists of a carbon-film-on-ceramic resistor immersed in dielectric coolant. The resistor, particularly selected for its uniform accuracy, is enclosed in a specially tapered housing, providing a reduction in surge impedance directly proportional to the distance along the resistor. When surrounded by the dielectric coolant, the characteristic impedance is therefore 50 ohms at the front, 25 ohms halfway down the resistor and zero ohms at the rear.

The dielectric fluid (10C Transil) is chosen for its chemical inactivity (to prevent damage to the resistor), its heat capacity, and its low dielectric constant, to which the diameters of the resistor housing are matched. A teflon insulator supports the central resistor, with only a very slight interruption to the coaxial line impedance. The insulator seals in the coolant by precise longitudinal compression and a radial O-ring. The front tank opening has another synthetic rubber O-ring placed between a projecting lip of the radiator cylinder and the flange of the resistor housing. Drawing up the radial V-clamp around the beveled faces of these opposed flanges presses them evenly against the O-ring to seal.

When input power is applied, the resistor generates heat in the adjacent coolant. By convection, the heated oil flows thru slotted openings in the coaxial shell to the walls of the tank. The series of the radiating fins pressed on this cylinder transmit the heat of the dielectric oil into the surrounding air.

The Model 8221 is equipped with a type LT connector which mates with type UG-532A/U plug (for RG-117/U or RG-118/U cable).

COOLANT - The Model 8221 is entirely filled with GE 10C Transformer Oil at room temperature. Expansion of the coolant with rise in temperature is taken care of by synthetic rubber diaphragm (not visible) in the rear dome of the tank. Breather holes are apparent in the dome. Do not probe inside with any pointed instrument.

MAINTENANCE - This equipment is rugged and simple and should require only nominal routine care. Keep the radiator dusted off and the electrical parts free of dirt. If the connector face or contacts should become dirty or grimy, wipe carefully with a dry solvent on a cotton swab stick. Inhibisol* or its equivalent is recommended, or trichlorethylene. If carbon tetrachloride must be used, take very careful precautions to avoid excessive skin contact or inhalation of fumes.

If the Resistor Housing Assy (Bird Electronic part #822102) should need replacement, proceed as follows: Turn the load resistor unit over and position it so that the small filler plug #75040 on the underside of the front cone is level and faced straight upward. Obtain a clean container, and unscrew the filler plug with a 3/16-inch hex socket wrench. Pour out about two pints of coolant, then lift the nose-piece end up. Place the radiator on its back end (connector up) by positioning on a suitable box, or holding the radiator firmly upright. Now loosen and remove the

* A non-toxic, non-flammable dry cleaning agent manufactured by Penetone Company, Tenafly, New Jersey.

screw on the clamping band #24343 at the base of the front cone. Remove clamping band and carefully lift out the Resistor Housing unit in a vertical direction, allowing the coolant to drip back into the tank (be sure the radiator unit is properly held).

With the exception of the circumferential O-ring #81139, and the filler plug and seal, this unit is not subject to further disassembly. Replace a defective Resistor Housing Assembly in its entirety. Do not re-use the O-ring unless it is in good condition. Before replacing the resistor, check that the O-ring is placed on the projecting lip of the radiator cylinder, and against flat face or beveled flange. Have the coolant level about an inch below the top edge of the cylinder. Replace the Resistor Housing Assy by reversing the procedure described above. Position housing so that the Filler Plug is again at the bottom, and tighten the #10-32 clamping screw securely - making sure that the clamping band is on evenly.

Return the reassembled load resistor (being careful not to allow coolant to spill from the filler hole) to the original position at the start of the paragraph above. Pour the oil back in the tank to fill. Screw the filler plug (be sure the O-ring #81141 is in place) back into its socket securely. Then restore the Load Resistor to a horizontal position, and inspect carefully for coolant leakage. Diaphragm at the rear may be changed by similar procedures (in changing diaphragm it is of course not necessary to open front cone filler plug).

LIST OF REPLACEABLE PARTS

<u>Qty</u>	<u>Part No.</u>	<u>Name</u>
1	822102	Resistor Housing Assy.
2	24343	Clamping Band Assy.
2	Std.	#10-32 x 1-1/2 Fil. Hd. M.S.
1	81139	O-Ring, Front Cone Seal
1	81141	O-Ring, Filler Plug
1	75040	Filler Plug
1	24315	Diaphragm, Rubber
1	24335-2	Cover, Diaphragm
.85 Gal.	5030	GE 10C Transformer Oil

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