

Model 8831 TERMALINE

Coaxial Load Resistor

INSTALLATION - OPERATION
MAINTENANCE

Serial No. _____

Instructions
for
INSTALLATION-OPERATION-MAINTENANCE
Model 8831 TERMALINE
Coaxial Load Resistor

GENERAL

This Load Resistor is a general purpose coaxial line termination for use with 50 ohm radio frequency transmission lines. It has a continuous load capacity of 1000 watts in normal ambient temperatures (up to 45°C) and a frequency range from 0 to about 2500 megacycles per second. Under these conditions the Model 8831 therefore provides a very low reflection (non-radiating) line termination. This is useful as a substitute antenna to assist in tuning RF transmitter within its range, and for other routine maintenance or special checks on coaxial transmission equipment. The Model 8831 is equipped with a Female Type LC input connector.

This unit has a thermoswitch placed in the coolant. Interlocked with the transmitter it will provide cutoff protection in the event of over-heating of the load resistor for any reason.

ELECTRICAL CHARACTERISTICS

The Model 8831 is designed to match the most common high frequency transmission media; i.e., 50 or 51.5 ohm coaxial lines. The impedance, in the VSWR (voltage standing wave ratio) language of such transmission, is quite independent of frequency and almost purely resistive. VSWR values are maintained below 1.1 up to 1000 mc and the calibration results of this particular resistor are tabulated below. In the frequency region 1000 to 2500 mc, calibration is not normally performed. However, tests on typical units of this equipment show VSWR's to be less than 1.25 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. The production tolerance of the DC resistance on these equipments is held within close limits, and the value for this particular resistor is inscribed in the table included below.

Power measurements may be made on the dummy load by insertion of a Bird Model 43 THRULINE Wattmeter on the coaxial input circuit. Using the appropriate measuring Elements, readings can be obtained within the operating range of the Model 8831 (up to 1000 mc).

RESISTANCE and VSWR on Model 8831, Serial No. _____

	DC Resistance _____ ohms.				
Frequency	100 Mc.	300 Mc.	500 Mc.	700 Mc.	1000 Mc.
VSWR	_____	_____	_____	_____	_____

VSWR is below 1.25 at frequencies up to 2500 mc.
All VSWR measurements with 50 ohm slotted line.

Max. continuous load power - 1000 watts in still air.
Max. load for 1/2 hour only - 1200 watts.

DESCRIPTION

The Model 8831 equipment consists essentially 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. This provides 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 and zero ohms at the rear, where the resistor joins the housing forming the return conductor. This produces the uniform, practically reflectionless line termination over stated frequencies of the load resistor.

The dielectric oil is chosen for chemical inactivity (to prevent damage to the resistor), high flash point, and its dielectric constant, to which the diameters of the resistor housing are matched. The input connector is constructed with a compressed teflon insulator surrounding the center contact. This connector body, and the resistor housing are both pressed on synthetic rubber O-ring seals, preventing coolant leakage at the front end of the unit. The resistor housing is kept in place by the resultant action of drawing up of the radial V-clamp band.

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

INSTALLATION

The TERMALINE Resistor is intended for operation in a horizontal position only. It may be placed loose on an appropriate surface, or permanently fastened in a level position by means of its base mounting flanges. The flanges have four 3/8-diam holes on a 21-1/4 by 5-3/8 base rectangle, for use with screws up to 5/16-inch size. Position the unit for ample air circulation with at least 6 inches of free air space all around the unit.

SPECIAL CAUTION

Do not apply any electrical power (rf load) to the TERMALINE Load Resistor until the vent plug is removed. It is very essential to do this to allow for expansion of the heated dielectric oil. The vent plug is screwed directly inside the filler plug at the top and front of the radiator tank. It is painted red on top face and has a 3/4-inch hex body. If the equipment should be moved, replace the plug to prevent oil spillage during transit.

NOTE: Certain units may have an automatic relief type filler installed. This is identified by the sintered filler disk in the center of the plug. If this filler disk is present, vent plug removal is not necessary.

It is possible to manage power loads greater than 1 KW by use of auxiliary ventilation of the equipment. If an effective fan or blower is placed transverse to the radiator, it may be permissible to increase the load power to approximately 2 KW under the proper conditions.

OVERLOAD THERMOSWITCH

The Model 8831 is provided with a closed circuit thermoswitch for protection of the load resistor against possible overheating. This thermoswitch should be wired in series with the transmitter interlock. The switch is immersed in the resistor coolant and will open when the coolant temperature reaches 155°C, cutting off the output power of the transmitter.

To make the interlock connection, unscrew (counter clockwise) the larger knurled nut at the face end of the female type plug and pull off the plug assy. Unscrew cable clamp at the back of the plug and thread over interlock cable. Solder wires to prongs and reassemble plug securely, tightening clamp to cable with the two transverse screws.

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 and grime. If the connector contacts or faces should become dirty, wipe off with a little dry solvent on a cotton swab stick. When using carbon tetrachloride, exercise caution to avoid fumes.*

If the Resistor Housing Assy #811203 should need replacement, proceed as follows: To avoid the possibility of coolant spillage, replace Vent Plug #245049 before proceeding. Place the Radiator #245003 on its back end (connector up). Then loosen and remove the 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 oil to drip back into the tank (be sure the radiator unit is properly held). The O-Ring #81139 if fitted on the Telescoping Ring #24316 which will probably remain nested in the cylindrical facing of the radiator tank. Do not re-use the O-ring unless it is in fine condition. When replacing the resistor housing, check that the telescoping ring arrangement is properly set - i.e., with the thin section of the step shoulder fitted inside the radiator nosepiece, and the O-Ring #81139 outside on the thick section, pushed snugly against the adjacent face.

Before reassembling the equipment, check the coolant level - it should be four inches below the bare edge of the cylindrical flange when the radiator is on end. Replace the resistor housing assy by reversing the procedure described above, and tighten the #10-32 clamping screw securely - making sure that the clamping band is on evenly. Then restore the load resistor to a horizontal position, and inspect carefully for oil leakage. Before using equipment, reopen the vent plug, and if deemed necessary recheck the coolant level - see Coolant Section below.

*Use Inhibisol or trichlorethylene if available. Inhibisol is a non-toxic, non-flammable dry cleaning agent, available from the Penetone Co., Tenafly, New Jersey.

COOLANT

The dummy load is factory filled to the proper coolant level (with G.E. LOC Transformer Oil) at room temperature. Expansion of the coolant with rise in temperature is taken care of by means of the vent plug previously discussed. The oil level should be about 2 to 2-1/4 inches below the top face of the filler hole. Reasonable amounts of oil loss will not seriously reduce the capacity of the equipment.

LIST OF REPLACEABLE PARTS

<u>Qty.</u>	<u>Part No.</u>	<u>Name</u>
1	245003	Radiator
1	5131	O-Ring, Vent Plug Linear #11-013
1	245039	Fitting, Adapter 3/4-14
1	245049	Plug, Shipping
1	245040	Thermoswitch Assy.
1	24316	Ring, Telescoping
1	24343	Band, Clamping
1	81139	O-Ring, Resistor Hsg. Linear #11-242
1	811203	Housing Assy, Resistor
-	5030	1.7 Gal. Type B Coolant GE LOC Oil

Bird Electronic Corp.
Cleveland 39, Ohio