

Model 81 TERMALINE

Coaxial Load Resistor

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INSTALLATION - OPERATION

MAINTENANCE

Instructions  
for  
INSTALLATION - OPERATION - MAINTENANCE  
Model 81 TERMALINE  
Coaxial Load Resistor

GENERAL - The Model 81 is a general purpose coaxial resistor for use with 50/51.5 ohm RF transmission lines. It has a continuous load capacity of 50 watts up to 45°C ambient temperature. At 50 ohms characteristic impedance, the VSWR of these terminations does not exceed 1.1 to 1.0 from 0 to 1000 mc, and 1.2 to 1.0 from 1000 to 4000 mc. The Model 81 Resistor therefore provides a very low reflection (non-radiating) line termination. This is useful as a substitute antenna to assist in tuning RF transmitters within its range and for other routine maintenance or special checks on coaxial transmission equipment. The TERMALINE is equipped with a Female N Type input connector.

ELECTRICAL CHARACTERISTICS - The Model 81 Load Resistors are designed to match the most common high frequency transmission media; i.e. 50 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. Below 50 mc, the input impedance of the coaxial load is very nearly a pure resistance equal to the DC resistance value. The production tolerance on the DC resistance of these equipments is maintained  $\pm 3\%$  from the nominal 50 ohms.

DESCRIPTION - This equipment consists essentially of a carbon-film-on-ceramic cylindrical resistor immersed in a dielectric coolant. The cooling oil and the tapered conical resistor housing provide the proper electrical characteristics for the coaxial line termination. By convection, the oil carries the generated heat to the walls of the coolant case, which transmit it to the outside air. The case is rectilinear, with the conical portion of the resistor unit (with input connector) at the front of the box. A hinged carrying handle is provided on top.

INSTALLATION - The load resistor should be operated only with the axis of the input connector horizontal, preferably with the case standing upright (the handle on top). If the case is laid on (either) side, the termination properties of the resistor are not impaired, but the load power capacity is reduced. The equipment may be placed on any convenient surface, making sure there is at least several inches of free air space around and above the unit. Do not operate with input connector pointing up, as the input section of the resistor will be air filled and the RF impedance badly disturbed - see Coolant section.

MAINTENANCE - This equipment is rugged and simple, requiring only nominal routine care. Keep the case dusted off and the electrical parts free of dirt and grime. If the Connector contacts of faces should become dirty, wipe off with a little dry solvent (Inhibisol\* or its equivalent or trichlorethylene) on a cotton swab stick. Exercise caution to avoid fumes if carbon tetrachloride or other noxious material is used.

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

If the Resistor Unit needs to be changed, place the load on its back end, with the connector end up. Loosen and remove the screw on the clamping band at the top of the front cone. Remove clamping band and carefully lift the Resistor Unit straight up, allowing the oil to drip back into the tank. Inspect the O-ring on the resistor housing just inside the sloped clamping flange. Do not re-use the O-ring unless it is in good condition. Replace resistor assembly by reversing the foregoing procedure. Be sure the O-ring is properly placed, and tighten the clamping screw securely. Place the assembled equipment in its usual horizontal position and inspect for oil leakage.

The resistor is held in its housing by mechanical means. It may be changed by special techniques, but this work is critical and is not recommended for field personnel. The Load Resistor Assembly #76007 should be changed as a unit.

INPUT CONNECTOR - The Model 81 Load Resistor is supplied with a Female N Type Connector. This input jack mates with the standard Male N Plugs, enabling the equipment to be directly coupled to RG-8A/U and RG-9B/U (or RG-213/U and RG-214/U) type cables.

COOLANT - The Dummy Load is factory filled at room temperature with precisely one quart of coolant, GE type 10C Transil dielectric oil, Bird part #5030. Under normal conditions, the quantity of coolant will remain constant. However, if it should become necessary to add coolant, position the unit with the filler plug (located on the lower surface of the front cone) facing up. Remove filler plug, empty the existing liquid into a clean container, then pour in exactly one quart of coolant, and replace plug (with a O-ring seal). The quantity of coolant oil is important, over or under-filling will endanger the unit. If the unit is filled with the front cone removed (as Maintenance Section above), one quart will bring the fluid level to about 7/8 to 15/16 inches from the edge of the lip on tank aperture.

Use only GE Type 10C (Bird part #5030); the characteristics of this coolant are important with respect to rf impedance and power rating of the load resistor.

TRANSMITTER LOADING - As a dummy load for transmitters the Model 81 TERMALINE provides a standardized load resistance, while conveniently dissipating power within its rating. Used with RG-8A/U cables, the standard load impedance becomes available at the end of any desired cable length. For most transmitter loading work, RG-8A/U and similar 51 to 52 ohm cables can be used with UG-21D/U plugs without concern as to the exact constants of the particular piece of cable. However, for close measurement work with slotted line, it should be realized that flexible, solid dielectric cables vary in characteristic impedance, not only from piece to piece, but from point to point along a single length. Rigid fittings must be properly tapered, and of uniform  $Z_0$  throughout, if the low VSWR of the Model 81 is to be measured.

Coaxwitch Model 74 or Model 72-2 is useful for rapid comparison of load impedance, say when it is desired to compare an antenna to the Model 81 TERMALINE.

INSERTION LOSS MEASUREMENT AND VSWR MEASUREMENT OF INSERTION COMPONENTS - The Model 81 TERMALINE has proven useful as a termination for connectors being investigated for insertion VSWR properties, by comparison of VSWR's measured with and without the connector in the slotted circuit.

For insertion loss measurements on filters, cables, etc. the Model 81 TERMALINE, which provides a consistent and virtually non-reflective termination, is an important adjunct. A coupling device, such as the Bird Model 43 THRULINE Wattmeter, may be progressively inserted directly before and after the measured equipment. Nothing the respective power flow readings in the two positions, the insertion loss of the subject filter, cable, etc. may be readily determined. With proper care as to the insertion characteristics of the coupler, loss measurements may be made under almost ideal conditions.

As a termination, the Model 81 is quite useful in checking the VSWR of filters. In pass bands particularly, the termination must be correct to get useful answers.

#### LIST OF REPLACEABLE PARTS

<u>Qty</u>	<u>Name</u>	<u>Part No.</u>
1	RF Load Resistor Assembly	76007
1	O-Ring, Seal - Linear #11-226	75065
1	Clamping Band Assembly	750254
1	Filler Plug	75040
1	O-Ring, Seal - Linear #11-012	81141
1 qt.	Coolant - GE 10C Transil Oil	5030

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