

Model 8834 TERMALINE

Coaxial Load Resistor

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INSTALLATION - OPERATION
MAINTENANCE

Instructions
for
INSTALLATION-OPERATION-MAINTENANCE
Model 8834 TERMALINE
Coaxial Load Resistor

GENERAL DESCRIPTION

The Radio Frequency Load, Model 8834, is designed as a low-reflection and non-radiating termination for coaxial RF transmission lines, to assist in tuning and trouble-shooting of transmitting equipment within its rating. Electrical specifications applying to this equipment are as follows.

Characteristic Impedance 70 ohms, nominal
Power Input. 1000 watts average continuous
Frequency Range. DC to 30 MC
VSW Ratio. 1.1 to 1.0 max
Input Connector. 70 ohm, Female N

It may be used in a fixed position or in portable applications.

The Model 8834 RF Load is a self-contained equipment. No additional equipment or outside power source is needed. The radiator unit is rectangular in shape with transverse cooling fins spaced evenly along the entire length. Reinforced fins at front and rear are bent outward 90° at the bottom to form mounting flanges. These flanges act as supports for free standing use, or as mounting brackets for optional fixed mounting. Mounting holes are provided for this purpose. The rf input connector is located on the front face of the unit. This is of a special Quick-Change design, see Installation Section. The Load unit is filled with a specially selected dielectric coolant, and has a vent hole at the top to relieve internal pressure (see Installation Section). The Model 8834 is useful for the following purposes:

- a. As a substitute antenna.
 - (1) For tuning transmitter - under non-radiating conditions.
 - (2) For making routine tests and adjustments.
- b. As a substitute for any circuit loading element.
- c. To measure, with a suitable indicating device, the power output of coaxially transmitted power within its rating.

THEORY OF OPERATION

The Model 8834 equipment consists essentially of a carbon film-on-ceramic resistor immersed in a dielectric coolant. The resistor, individually selected for its accuracy, is enclosed in an exponentially tapered housing. This provides a linear reduction in surge impedance, directly proportional to the distance along the resistor. When surrounded by the dielectric coolant, the characteristic

impedance is therefore approximately 70 ohms at the front (connector end) and 37.5 ohms halfway down, to compensate for resistance already passed over. It is zero ohms at the rear, where the resistor joins the housing, forming the return conductor of the coaxial circuit. This produces the uniform, practically reflectionless line termination over the stated frequencies of the load resistor.

The dielectric coolant, GE 10C Transil Oil, is chosen for its chemical inactivity (to prevent damage to the resistor), high flash point, and its low dielectric constant, to which the diameters of the resistor housing are matched.

A synthetic rubber O-ring around the outside of the resistor housing mount furnishes a seal for the radiator opening. A beveled flange retains the O-ring. This flange, with the O-ring between, is pressed against the radiator face by the resultant action of the drawing up of the radial V-band clamp around opposing beveled flanges of the radiator and the resistor housing.

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

When the coolant oil E-702 (GE 10C Transil) is heated, thermal expansion causes an increase in internal pressure. A vent hole is provided in the top of the radiator tank to relieve this pressure. (See Below)

INSTALLATION

RF Dummy Load, Model 8834 is equipped for either fixed installation or portable use. Mounting brackets are secured to the front and rear faces of the unit. The unit may stand free or be secured to a bench, etc. by means of four suitable fasteners. Four 3/8" holes, for use with screws up to 5/16" diameter, are arranged in a 5-3/8" x 21-1/4" rectangle. The load is designed for operation in a horizontal plane only, with mounting brackets down. NOTE: DO NOT OPERATE IN ANY OTHER MANNER.

CAUTION

Shipping plug 0-706 must be removed before the unit is placed in operation. Use 3/4-inch flat end wrench. Do not lose the O-ring seal, 0-704. This vent hole must remain open at all times when the unit is in operation or is cooling. Failure to do this could result in damage to equipment and danger to safety. Shipping plugs (with O-ring seal) should be replaced whenever the unit is to be shipped.

OPERATION

Connect the Model 8834 to the power source under test by means of applicable 70-ohm coaxial power cable. Check that all coaxial power line connections are properly tightened. Avoid use of adapters and elbows where possible. Proceed according to instructions pertaining to specific equipment involved.

MAINTENANCE

The Model 8834 is rugged and simple and should require only nominal routine attention. It is designed to operate for long periods of time if care is taken not to exceed its power handling capabilities.

The outside surface of the instrument should be wiped free of dust and dirt when necessary. Clean the rf input connector J-701 with Inhibisol*, or its equivalent, or trichlorethylene, on a cotton swab stick. Take special care to clean the metallic contact surface and the exposed face of the teflon insulator. Provide adequate ventilation and observe other normal precautions when using dry cleaning solvents.

LOAD RESISTOR - E-701

Accurate measurement of the dc resistance between the inner and outer conductors of the input coupling will provide a good check of the condition of the load resistor, E-701. For this instrument, use a Resistance Bridge with an accuracy of one percent or better at 70 ohm such as Leeds & Northrup Model 5305 Test Set. Use low resistance leads, preferably a short piece of low resistance cable attached to a mating plug to the input connector. When the resistor is checked at room temperature, the measured resistance should be within a range of 68.6 to 71.4 ohms. If the value obtained materially exceeds this allowance, the load resistor may need replacement.

To change the load resistor assembly E-701, place the unit on its back end (connector up) and loosen the #10-32 x 1/2 screw on the clamping band, O-702. Remove the clamping band, and lift load resistor assembly out of the tank - be careful to allow coolant to drip back into the tank. This unit is not subject to further disassembly by field maintenance, and a defective unit should be replaced in its entirety. Before replacing a load resistor, be sure that the O-ring seal O-701 is in proper place and in good condition. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing.

To replace housing assembly E-701, reverse procedure described in paragraph above.

COOLANT, E-702

The level of the dielectric coolant E-702 should remain constant in the unit after prolonged usage under normal operating conditions. Inspect occasionally around lower portion of the clamping band O-702 for possibility of coolant leakage. Tighten clamping screw if required. Under very unusual conditions it might be necessary to replace the resistor housing seal O-ring O-701. Proceed as described in paragraph above.

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

Check coolant level with shipping plug 0-706 removed from the filler socket (Adapter) on the top surface of the unit. Coolant level should be within 3 to 3-1/4 inches below the top surface of the filler socket. The unit is factory-filled to the proper level with 1.7 gallons of GE 10C Transil Oil. NO OTHER COOLANT MAY BE USED.

RF INPUT CONNECTOR, J-701

The input connector is of a special quick-change (QC) design which permits facile interchange of connectors with only simple tools. This process does not in anyway disturb the coolant seal or interfere with the essential coaxial continuity of the load resistor rf input.

If replacement of the rf input connector J-701 becomes necessary, proceed as follows:

- (1) Remove the four #8-32 x 5/16 round head machine screws from the corners of the rf connector.
- (2) Pull connector straight out.
- (3) Reverse above procedure to install 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.

The QC connector may be readily replaced, as above, with other Standard Type 70 Ohm connectors if specially obtained. Use only 70 ohm connector for best electrical behavior.

TABLE OF REPLACEABLE PARTS

<u>Symbol</u>	<u>Name and Description</u>	<u>Locating Function</u>
A-701	RADIATOR, COOLING : Rectangular shape, 22-1/4 lg x 10-3/4h x 6-3/8w. Transverse vertical fins brazed at 1/2 in. intervals to central tank; integral construction. 4 in. dia opening at front, filler hole at top, with foot brackets front and back. Al alloy. Gray enamel part/dwg #245003	Houses rf load resistor assembly and dielectric coolant.
E-701	LOAD RESISTOR, RF: Tapered coaxial line with 70-ohm load resistor center conductor. 4-1/2 dia x 14-1/4 lg Al Alloy, silv. pl. line fittings. part/dwg #883402	Housed in radiator A-701 non-reflecting terminator for rf power.
E-702	COOLANT: Dielectric fluid, GE 10C Transil Oil. part/dwg #5030	Dielectric coolant - 1.7 gal.
J-701	CONNECTOR, RF INPUT: 70 Ω Female N, 5/8-24 thds, post shape 3/4in.lg with 1-1/4 in. mounting flange. Four 3/16 in. mtg. holes on 15/16 in. square. Brass, silver plate part/dwg #424261	Input connector - 70 ohm Female N (or as ordered)
O-701	O-RING SEAL: 4 x 4-1/4 x 1/8 nominal. Synthetic rubber (black) Linear #11-242 part/dwg #81139	Seal against coolant leakage around edge of rf sub-assembly.
O-702	CLAMPING BAND: 4-5/8 O.D. x 1/4 V-Band with two clamping blocks (one threaded) and 10-32 x 1-1/2 Fil. Hd. Mach. Screw Stainless steel, gray nickel plate. part/dwg #24355	Holds load resistor E-701 to radiator A-701.
O-704	O-RING: 7/16 x 1/16 nominal size Synthetic rubber (black) Linear #11-013 part/dwg #5131	Seals Shipping Plug #O-706.
O-706	PLUG, SHIPPING: 3/4 hex, 1/2 in. overall 9/16 x 18 thd. Brass, gray nickel plate. part/dwg #245049	Plugs vent hole shipping purposes. Must remove during operation.