INSTRUCTION BOOK

for

Model 8253 TERMALINE

Coaxial Load Resistor

Litho U.S.A.

Instructions
for
INSTALLATION-OPERATION-MAINTENANCE
Model 8253 TERMALINE
Coaxial Load Resistor

GENERAL DESCRIPTION

The RF Dummy Load, Model 8253, is designed as a low-reflection non-radiating termination for coaxial RF transmission lines, to assist in tuning and trouble-shooting transmitting equipment within its rating. Electrical specifications applying to this equipment are as follows:

Characteristic Impedance	50 ohms, nominal
Power Input	1000 watts average continuous
Frequency Range	DC to 1000 MHz
VSWR	1.1 max. dc to 1000 MHz 1.25 max. 1000 to 2500 MHz
Input Connector	1-5/8" EIA Swivel Flange
Operating Position	Horizontal only

The Model 8253 RF Load is a self-contained unit. No additional equipment or outside power source is needed. The load 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 input connector is located on the front face of the unit. This connector is a special Quick-Change design, see Installation section. The Load Unit is filled with a specially selected dielectric coolant, and vented at the top with a pressure relief valve. The Model 8253 is useful for the following purposes:

a. As a substitute antenna.
   (1) For tuning transmitters - 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 8253 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 50.0 ohms at the front (connector end) and 25.0 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, Monsanto OS-59, is chosen for 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. A special cover, containing the overflow tube described below, is used to close the rear end of the coolant tank in essentially the same manner.

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

When the coolant oil (Monsanto OS-59) is heated, thermal expansion causes this oil to flow up into an expansion tank mounted on the upper side of the rear of the radiator. The overflow tank is fed by a copper tube leading from the rear cover of the radiator cylinder into the bottom of the expansion tank. The system is arranged such that no oil will be trapped outside of the main cylinder when the oil again contracts on cooling to room temperature. The overflow coolant tube, fitted to the back cover of the radiator cylinder, is protected against external damage by a strong steel box-type cover.

INSTALLATION

RF Dummy Load, Model 8253, 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 9/32" holes, for use with screws up to 1/4" diameter, are arranged in a 5-1/8" x 15" rectangle. The load is designed for operation in a horizontal plane only, with mounting brackets down. NOTE: DO NOT OPERATE IN ANY OTHER MANNER. Allow room for air circulation around and above the radiator unit when the load resistor is in use. For power over 300 watts, keep at least six inches of free air space on sides and top of the unit.

OPERATION

Connect the Model 8253 to the power source under test by means of a suitable coaxial power cable. Use patch cord of 50-ohm cable, such as RG-218/U or RG-219/U, with a type LC plug such as the UG-154/U Series. Check that all coaxial power line connections are properly tightened. Proceed according to instructions pertaining to specific equipment involved.

MAINTENANCE

The Model 8253 is rugged and simple, requiring only nominal routine care. 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 with Inhibisol, its equivalent, or trichlorethylene on a cotton swab stick. Take special care to clean the metallic contact surface and exposed face of the teflon insulator. Provide adequate ventilation and observe normal precaution when using solvents.

LOAD RESISTOR

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. For this instrument, use a Resistance Bridge with an accuracy of one percent or better at 50 ohms, such as Leeds & Northrup Model 5305 Test Set. Use low resistance leads, preferably a short piece of RG-58/U cable attached to an appropriate plug. When the resistor is checked at room temperature, the measured resistance should be within one ohm of the value stamped on the blue tag. If the value obtained is in excess of this allowance, the load resistor should be replaced.

To change the load resistor assembly (RF Section), place the unit on its back end (connector up) and loosen the #10-32 x 1-1/2 screw on the clamping band. 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 is in proper place and is in good condition. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing.

To replace load resistor assembly, reverse procedure described in paragraph above.

COOLANT

The level of the dielectric cooling fluid should remain constant in the unit after prolonged usage under normal operating conditions. In spect occasionally around lower portion of the both clamping bands 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.

To check coolant level, remove vent plug from the socket on the top surface of the expansion tank. Unscrew the plug with a 3/4-inch wrench. The coolant, at room temperature should not come more than 1/8-inch above the bottom surface of the expansion tank. This may be

checked by carefully tilting up the front of the load and noting presence of coolant on bottom surface. The coolant quantity should be sufficient to fill the radiator cylinder. The unit is factory-filled to the proper level with 1.1 gallons of Monsanto OS-59. NO OTHER COOLANT MAY BE USED.

MISCELLANEOUS

Other portions of the equipment may be replaced for purely mechanical reasons. Handling of this should be relatively easy for anyone accustomed to mechanical assemblies. The important items follow hereunder:

Rear cover and seal on radiator tank: Before loosening rear end (if the coolant is not drained from the tank) the radiator should be stood on end with nose pointed down. Unscrew the four #10-32 truss head screws at the corners of the Guard Cover #2430-078 and remove guard box. Unscrew clamp screw from bottom of V-band (same type as at front) and remove V-band clamp. This releases the rear Cover #2340-088 (which includes attached escape tube with captive nut) and the Diaphragm Seal #2430-089.

The expansion tank is vented through the Relief Valve #2430-081 screwed into the top. The unit unscrews from the socket, but is not itself subject to disassembly. The seat is sealed by the compressed O-ring #5-502 which should be included when replacing the vent valve.

Radiator Handle: The radiator handle slides and is held captive on the two retaining studs riveted to the fins. It may be removed or replaced by hand methods. With a large screwdriver covered with a rag, or a suitable wooden stick, gently pry apart the fins adjacent to each of the respective studs just enough to clear the handle thickness, and slide each leg over the end of the respective stud.

LIST OF REPLACEABLE PARTS

Qty	Description	Part Number
1	RF Section	8892-002
1	O-Ring, RF Section	5-230
1	Guard, Diaphragm, Cover	2430-078
1	Cover, Assy, Diaphragm	2430-088
1	Seal, Diaphragm	2430-089
2	Clamping Band	2430-055
1	Coolant, OS-59 (1.1 gallon)	5-267
1	O-Ring, (Vent Valve)	5-502
1	Valve, Vent	2430-081
1	Radiator	2430-123
1	Tank Expansion, p/o radiator	2430-080
1	Handle, Radiator	2430-028

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