INSTRUCTION MANUAL
for
Model 8841-300 TERMALINE ®
-
Coaxial Load Resistor

Model 8841-300 TERMALINE ®

RF Load Resistor

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SUMMARY SPECIFICATIONS

Power Rating	1000 watts continuous duty
RF Input Impedance	50 ohms nominal
Input Connector	Bird "QC" Type Female LT (normally supplied)
Frequency Range	DC to 2.5 GHz
VSWR	1.10 to 1.0 - DC to 1 GHz 1.25 to 1.0 - 1 to 2.5 GHz 1.35 to 1.0 - 2.5 to 3.5 GHz 1.50 to 1.0 - 3.5 to 4.1 GHz
Ambient Temperature	-40°C to +45°C
Dimensions	17-3/16" h x 7-1/8" w x 27-29/32" lg. (437 x 181 x 709 mm)
Weight	54 lbs 10 oz (24.78 kg)
Finish	Light Navy Gray (MIL-E-15090B)
Operating Position	Horizontal only

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Model 8841-300 TERMALINE Load Resistor

TABLE OF CONTENTS

Section	Subject	Page
I	General Description	1
II	Theory of Operation	2
III	Installation	4
IV	Operation	6
V	Maintenance	7
VI	Replacement Parts List	11

Illustration

Figure 1	Outline	12

Model 8841-300 RF Load Resistor

SECTION I - General Description

The Model 8841-300 TERMALINE ® Dummy Load is designed as a low reflection and non-radiating termination for coaxial transmission lines, to aid in the tuning and trouble-shooting of transmission equipment within its rating. The specifications pertaining to the Model 8841-300 are given on the Summary Sheet, Page "A". Also included are listings of RF input connector types available, see page nine.

The 8841-300 RF Load is fully self-contained. No additional equipment or outside power source is required. The radiator unit is rhombic in shape with transverse cooling fins spaced evenly along the entire length of the unit.

Attached to the front and rear panels of the rhombic-shaped radiator are mounting flanges. These flanges act as supports for free standing use in portable applications, or as mounting brackets for optional fixed installation. There are elongated mounting holes provided in the flanges for this purpose, (see Installation, Section III). Convenient carrying tabs are also provided at each end of the radiator.

The RF input connection is on the lower front face of the unit, on the conical reducer section. The Model 8841-300 is designed for use with coaxial cable using large (LT or LC) connectors. Connection arrangements are described in Operation Section; Bird **Quick**-Change "QC" connectors (with their method of change) are described in Section V, Maintenance. The Load unit is filled with a specially selected dielectric coolant. At the upper front end of the Dummy

Load fin structure is a vent plug which relieves internal pressure resulting from expansion of heated coolant. A special vent plug must be installed before applying power to the Load.

SECTION II - THEORY OF OPERATION

The Model 8841-300 RF Load consists essentially of a carbon-film-on-ceramic resistor immersed in a dielectric coolant. The resistor, which is individually selected for its uniform film accuracy is enclosed in an exponentially tapered housing, providing a reduction in surge impedance directly proportional to the distance along the resistor. When the resistor unit is immersed in the dielectric liquid, the characteristic impedance will be 50.0 ohms at the connector end and graduate down from there to zero ohms at the rear, where the resistor joins the housing forming the return conductor of the coaxial circuit. This produces a uniform, practically reflectionless line termination over the stated frequencies of the load resistor.

The dielectric coolant, a low volatility, high-flash point synthetic oil, is chosen for its desirable thermal characteristics and dielectric properties, 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 raidator opening. A beveled flange retains the O-ring. The O-ring is pressed against the radiator face by the action of drawing up of radial V-band clamp around the enclosing beveled flanges.

SECTION II - THEORY OF OPERATION (Continued)

When input power is applied, it is absorbed by the resistive element and transformed into heat which is given off to the adjacent dielectric coolant. By convection, the heated liquid flows through holes in the coaxial shell to the walls of the radiator tank. This radiator is a fabricated single-unit construction, and is carefully designed of heat-sink sections on a unique vertical rhombic form. This provides a very high efficiency of heat transfer from the dielectric coolant into the surrounding air.

SECTION III - INSTALLATION

The Model 8841-300 Dummy Load is equipped for either fixed installation or portable use. There are mounting brackets on the front and rear faces of the unit. The Load may stand free or be attached to a bench, etc., by means of suitable fasteners. Four 3/8" (9.525 mm) mounting slots, to be used with appropriate screw sets up to 3/8" diameter, are arranged in a 4-1/2" x 20-23/32 rectangle. (114.3 x 526.3 mm).

This equipment is designed for operation in a horizontal position only, with mounting brackets down. NOTE: DO NOT OPERATE IN ANY OTHER MANNER.

WARNING

Before placing the unit into operation, remove the shipping plug at the top of radiator, near front, and substitute with the specially shielded breather plug. Use a 3/4" flat wrench for this purpose - do not lose the O-ring seal.

This vent hole must remain open at all times when the unit is in operation or cooling. Failure to do this could result in damage to the equipment and endanger the operator's safety. The use of the vent plug also protects the filler opening against intrusion of foreign material while allowing unobstructed venting of the tank. The shipping plug (with O-ring seal) should be replaced whenever the unit is to be transported. Be sure to check this plug.

As an optional item, the Dummy Load may be provided with a Thermoswitch Assy., (Bird P/N 2450-056). When installed in the radiator, it will prevent possible damage occuring from accidental transmitter power overload or equipment malfunction. Being normally closed, the thermoswitch opens at a maximum safe temperature. Connected in series with the transmitter interlock, it cuts off transmitter power if load temperature exceeds this value. The assembly consists of Thermoswitch Body (P/N 2450-040) with Coupling Jack (P/N 2450-018) attached.

If a thermoswitch is to be field installed, proceed as follows:

a. Stand unit on its back end with connector end up. In this position there is no danger of coolant spillage.

b. Using a 9/16" allen wrench, remove the socket plug on the front face of the radiator.

c. Replace the plug with the Thermoswitch. Use an acceptable pipe sealing compound spairingly on the external threads, of the thermoswitch, only. Do not contaminate coolant with pipe sealing compound. Observe closely for coolant leaks upon completion.

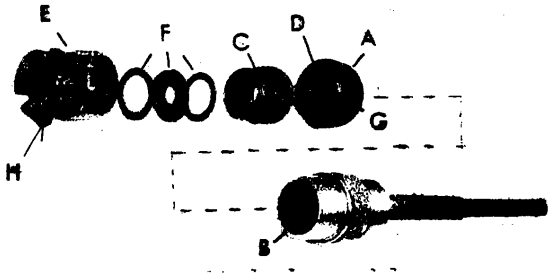
Connect the thermoswitch as follows: (see reference photo)

a. Unscrew the larger knurled ring-nut (A) at the lower end of the Coupling Jack Assy. and pull off from the Thermoswitch Jack (B). Unscrew small knurled cover fitting (C) from base plug (D) of the connector to release the base.

b. Thread interlock wires thru the clamp (E) (with washers (F) inside) and with its threaded fitting in place. Service the interlock wire with short tips, use spaghetti sleeves over wire ends if needed, then securely solder the interlock leads to lugs (G) of the connector base. Note: Be sure that the larger captive clamping nut (A) is in place over the base plug (D) with the knurled end outward (towards face).

c. Screw on cover ring (C) first, then fasten the cable clamp (E) in place, and tighten the two yoke screws (H) on cable. Push plug back on Thermoswitch, and tighten captive knurled connecting ring. Do not attempt to operate the equipment without interlock attached.

Thermoswitch Assembly
(P/N 4250-056)



SECTION IV - OPERATION

1. Load Resistor Connection

a. The Load is ready for connection as received from the factory. It may be useful to check 50-ohm input resistance of the Load (before attachment), see Maintenance, Section V. Be sure vent plug is installed.

b. Clean all conductor and insulator surfaces on transmission line face and check RF input connector. Use a dry cleaning solvent on a cotton swab stick, if necessary.

c. Attach the 8841-300 Load Resistor to the RF line with a 50-ohm coaxial cable such as RG-218/U or -220/U (-17A or 19A) with suitable LT or LC plug attached. Check that all coaxial power line connections are properly tightened. Avoid the use of adapters and elbows when ever possible.

2. Load Resistor Operation

Proceed according to the instructions pertaining to the specific transmitting equipment.

Due to the difference in VSWR between the Dummy Load and the transmitter's antenna, re-adjustment of the transmitter may be required when returning to the original antenna.

SECTION V - MAINTENANCE

1. General

The Model 8841-300 RF Load is very rugged and simple. It should require only nominal routine attention. The Load will operate for long periods of time without failure if its power handling capabilities are not exceeded.

The outside surface of the instrument should be wiped free of dust and dirt when necessary. Clean the RF input connector with dry cleaning solvent, on a cotton swab stick. Take special care to clean the metallic contact surface and the exposed faces of the teflon insulator.

CAUTION

Provide adequate ventilation and observe normal precautions when using dry cleaning solvents.

2. Load Resistor

Accurate dc measurement of the input resistance will provide a good check of the condition of the load resistor. For this measurement, a Resistance Bridge (such as Leeds and Northrup Model 5305 Test Set) with an accuracy of one percent or better at 50 ohms should be used. Use low resistance leads, preferably a short piece of 50-ohm cable equipped with a plug which mates with the input connector of the Dummy Load. When the resistor is checked at room temperature, the measured resistance should be within a range of 49.0 to 52.5-ohms. If the value materially exceeds this allowance, the load resistor may need replacement. If the Resistor Housing Assembly P/N 8112-002 should need replacement, proceed as follows.

2. Load Resistor (Continued)

Place the unit on its back end (connector up). When lifting the radiator be careful that its front side always faces up. The vent hole at the radiator top is so placed that, when the equipment is up-ended at the front, the coolant level will be just below the vent hole and will not spill out. Loosen the #10-32 x 1-1/2" screw on the clamping band at the base of the front cone and remove the clamping band. Lift the load resistor assembly out of the tank allowing the 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 good condition. The O-ring is fitted on the telescope ring which will probably remain nested in the cylindrical facing of the radiator tank. Do not re-use the O-ring unless it is in good condition.

When replacing the resistor housing, check that the telescoping ring arrangement is properly set - i.e., with thin section of the step shoulder fitted inside the radiator nosepiece, and the O-ring outside on the thick section, pushed snugly against the adjacent face. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing.

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

3. Coolant

The level of the dielectric coolant should remain constant in the unit after prolonged usage under normal operating conditions. Inspect occasionally around lower portion of the clamping band, for possible coolant leakage. Tighten clamping screw if required.

3. Coolant (Continued)

Under very unusual conditions it might become necessary to replace the resistor housing seal O-ring. Proceed as described in paragraph 2, Load Resistor.

Check coolant level by placing load on end with input connector up and, remove the load resistor assembly as described above. When the unit is at ambient (room) temperature, the coolant level should be 4-3/4 inches (120 mm) below the top surface of the load resistor assembly mounting ring. The unit is factory-filled to this level with 2.9 gallons (11 liters) of a specially selected dielectric fluid (Bird #5-030) NO OTHER COOLANT SHOULD BE USED.

When the coolant oil is heated, thermal expansion would cause an increase in internal pressure. The breather plug installed on the topside of the radiator tank is provided to relieve this while protecting the opening from possible entry of dirt or other contamination.

4. RF Input Connector

The input connector on the Model 8841-300, is of a special Bird Quick-Change "QC" design which permits easy interchange of connectors with only simple tools. This process does not in any way disturb the coolant seal or interfere with the essential coaxial continuity of the Load Resistor input. Normally a Female LT connector is supplied with the Model 8841-300.

It must be clearly understood that at the full power and frequency capability of this Model, see Summary Sheet, page -A-, only Type LC or LT (Female or Male) or 7/8" EIA (Air Line) connectors will be adequate. Even though connectors are easily

4. RF Input Connector (Continued)

changed, as described below, for any of the other connector types listed herein, input power values must be limited to the specified parameters of the selected type. Consult the Company.

If replacement of the RF input connector 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 the 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 replaced with other Standard AN Type connectors if specially obtained from Bird Electronic Corporation. See list below for available types.

Available "QC" Connector Types

N - Female	4240-062	LC - Female	4240-031
N - Male	4240-063	LC - Male	4240-025
HN - Female	4240-268	LT - Female	4240-018
HN - Male	4240-278	LT - Male	4240-012
C - Female	4240-100	UHF - Female (SO-239)	4240-050
C - Male	4240-110	UHF - Male (PL-259)	4240-179

7/8" EIA Air Line - 4240-002

SECTION VI - REPLACEMENT PARTS LIST
Model 8841-300 Load Resistor

ITEM	REQ.	DESCRIPTION	PART NO.
1	1	RF Load Resistor	8110-202
2	-1-	O-Ring, Resistor Housing Seal P/O Item 1, above	8110-039
3	1	Clamping Band Assy (2430-043 & Scr.)	2430-055
4	1	O-Ring, Breather Seal	5-502
5	1	Vent, Breather (In use - Replaces Item &)	5-835
6	1	O-Ring, Shipping Plug	5-502
7	1	Plug, Shipping	2450-049
8*	1	Thermoswitch Assy., Overtemp.	2450-056
9*	-1-	Body, Thermoswitch (Item 8)	2450-040
10*	-1-	Jack, Thermoswitch (Item 8)	2450-018
11	-	Dielectric Liquid, 2.9 gal. (11 liter) (1 gal. container)	5-030
12	1	Radiator, Assy.	2450-301
13	1	Ring Telescoping	2430-016

*Optional items

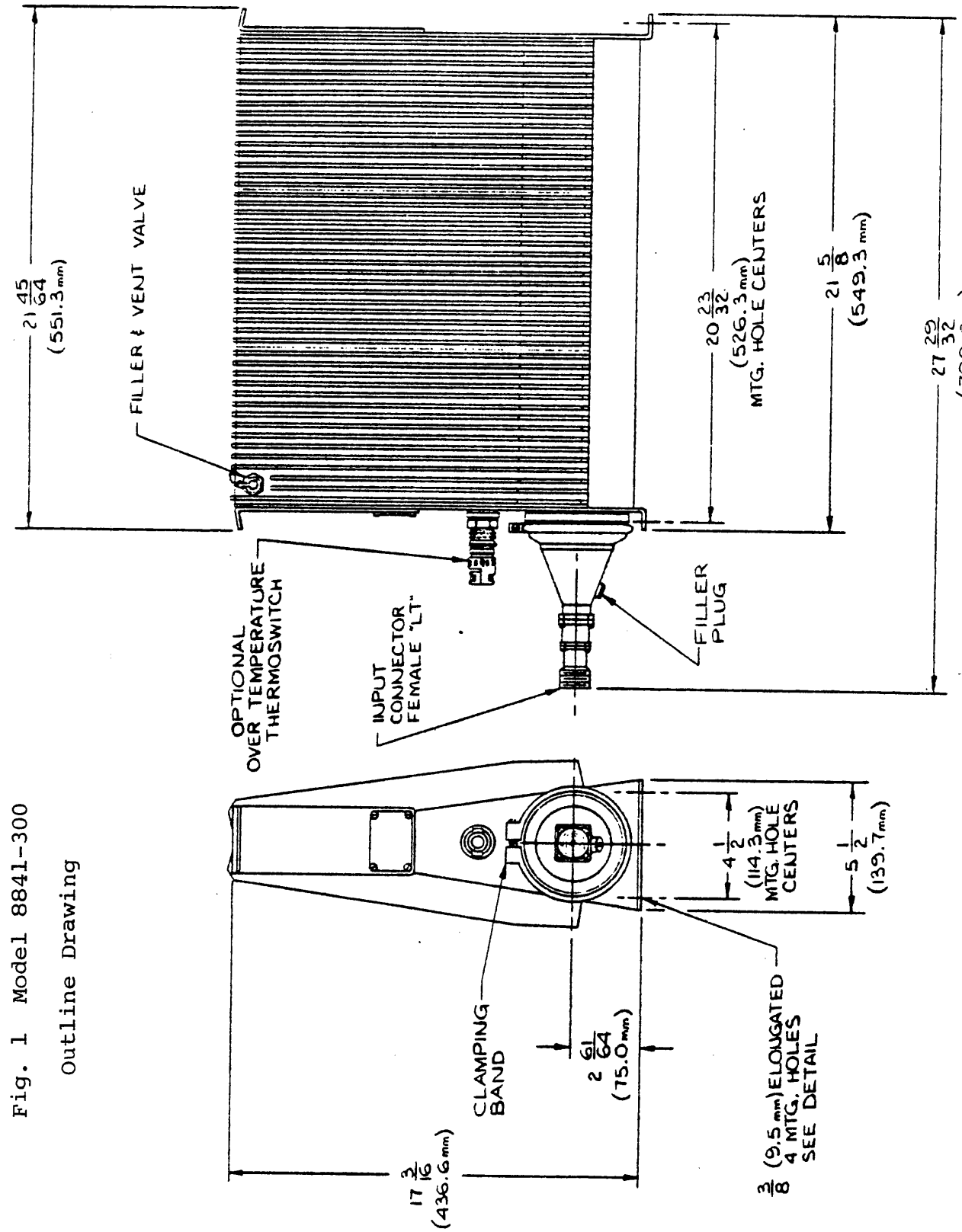


Fig. 1 Model 8841-300

Outline Drawing