KINTRONIC LABS™

An ISO 9001 registered company

KTL FM DUMMY LOAD DL-10K-FM

INSTALLATION INSTRUCTIONS

INSTALLATION INSTRUCTIONS – KTL DUMMY LOAD DL-10K-FM

MAILING ADDRESS: PO Box 845, Bristol, TN 37621-0845

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INTRODUCTION

The DL-10K-FM is a low reflection and non-radiating forced-air cooled test load for coaxial RF transmission line. It is used primarily to assist in tuning and troubleshooting of transmitting equipment. An interlock is provided to protect the load from overheating.

The load can be used for the following specific purposes:

- tuning of transmitters under non-radiating conditions,
- making routine tests and adjustments, and
- substituting for any circuit loading element.

Kintronic Labs Inc. has prepared this manual to ensure the most effective use of the RF test load DL-25K-FM. However, before attempting to use this product, it is important that this manual be carefully reviewed. Particular attention should be given to cautionary remarks and statements which involve the proper operation of the product and the safety of the operator.

Please carefully read over the following:

*****WARNING*****
VERTICAL CABINET HOUSING WILL BECOME
HOT DURING OPERATION – DO NOT TOUCH

This unit may be operated at full power rating only when ambient air temperature is not above 110°F (43.33°C).

*****CAUTION*****
THE INTERLOCK SHOULD BE PROPERLY
CONNECTED TO RF POWER SOURCE TO PREVENT
DAMAGE IN THE EVENT OF MALFUNCTION

Loss of air flow for even a short period of time can result in resistor failure. The interlock will enable the transmitter to be shut down instantly and automatically in case of insufficient air flow or excessive temperature.

*****WARNING*****
DISCONNECT AC POWER
BEFORE SERVICING THE UNIT

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INSTALLATION

1. Unpack unit from shipping container and inspect for possible shipping damage. *Claims for damage in shipment must be filed promptly with the transportation company.*

2. Place unit in operating location. Be sure that there is sufficient clearance on each side for free flow of air through intake and outlet grates—exhaust air must not be directed back to intake. Do not install unit near other heat sources.

3. Use unit grounding stud to provide a secure electrical ground separate from AC power cord.

4. Check that AC power switch is ***OFF*** and connect power cord to a 120 VAC +/- 10% 50/60 Hz source.

5. Use connector provided to prepare an interlock cable for the associated RF transmitter.

6. Connect transmission line to the RF termination input.

--- NOTE ---

Connection of the transmission line to the RF input connector should be performed carefully to prevent damage to the mounting studs. Avoid any bending or shearing stress to the RF input connector studs.

--- The RF Test Load DL-10K-FM is now ready for operation ---

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OPERATION

1. Check that installation requirements were properly carried out, particularly with regards to the following:

    a. Be sure that there is no obstruction to air flow at both intake and exhaust grating.

    b. Be sure that there exists an electrical ground to unit frame which is separate from ac power line ground.

***** CAUTION *****
THE INTERLOCK SHOULD BE PROPERLY CONNECTED TO RF POWER SOURCE TO PREVENT DAMAGE IN THE EVENT OF MALFUNCTION

2. Connect ac power source of transmitter to interlock receptacle so that RF output will be disabled in event of malfunction. Normal condition (safe) is AB closed, and in a fault condition AB is open.

3. Connect transmitter RF cable to load RF input. If necessary, provide support to prevent any shearing or bending stress to connector.

***** CAUTION *****
DO NOT APPLY RF TO LOAD UNLESS FAN IS RUNNING

4. Apply AC power to fan by moving the switch to ***ON***. The pilot light should illuminate and the fan should start.

5. Check that air is flowing freely into and out of the gratings.

6. While performing the following steps, be sure that transmitter power output, including modulation, does not exceed 10 kW continuous.

***** WARNING *****
VERTICAL CABINET HOUSING WILL BECOME HOT DURING OPERATION – DO NOT TOUCH

7. Apply power to the transmitter and proceed with normal operation.

8. To discontinue operation:

    a. Shut down transmitter.

    b. Allow fan to run until exhaust air is close to ambient temperature.

    c. Move load power switch to ***OFF***.

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TROUBLESHOOTING

SYMPTOM OR TROUBLE	POSSIBLE CAUSE
No indication of AC power	Defective Switch. Open Fuse. Low or no line voltage.
Fan will not start.	Defective fan circuit wiring. Defective fan motor.
Unit overheats.	Panel not secured. Excessive RF input. Low line voltage. Ambient air too hot.
Interlock will not close.	Excessive heat. Defective sensor switch.

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MAINTENANCE

***** WARNING *****
DISCONNECT AC POWER BEFORE SERVICING UNIT

Access to components can be gained by removal of blank panels.

PERIODIC INSPECTION AND SERVICING

1. The RF input connector should be kept clean at all times. It is recommended that a protective cover be placed over the RF connector when the coaxial cable is not installed.

2. The following should be performed at intervals of one to six months depending upon usage:

    a. Remove accumulations of dust, dirt and other obstructions to air flow.

    b. Fan blades should be inspected and brushed clean.

    c. Inspect and tighten hardware as required.

3. Cabinet may be cleaned with mild detergent and warm water.

4. Fan motor bearings are permanently lubricated and should need no servicing.

5. The over-temperature switch is factory set to 175°F (79.4°C).

LOAD TESTS AND REPAIRS

1. The load should be stabilized at room temperature before making any measurements.

2. A vector-impedance meter should be used to measure VSWR across resistive load at RF input connector.

3. Use 50 Ω coaxial adapters between vector-impedance meter and RF input to load.

4. Impedance measurements should be made at frequencies that fall within the frequency range of particular load used.

5. If high VSWR is noted, the DC resistance of the load may be checked at the RF connector. A bridge-type (Wheatstone) ohmmeter should be used for DC resistance measurements.

6. Individual resistors should measure within 10% of indicated value.

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THEORY OF OPERATION

The DL-10K-FM Dummy Load consists of sixteen 200Ω resistors. The associated transmitter output is applied to the resistor load at the 3-1/8 EIA (or optional 1-5/8 EIA) coaxial connector. This same output power is dissipated as resistive heat. The heat is then removed by forced air. An interlock circuit provides protection for load resistors against excessive high temperature.

The resistor load assembly consists of sixteen resistors and resistor shield. The resistor load assembly is designed to maintain a 1.1:1 or less VSWR through 110 MHz. When RF energy is applied to the coaxial connector, most of the RF energy is converted to heat energy.

The resultant heat energy is dissipated into the surrounding air. The fan, located beneath the load resistors, causes a higher volume of air to pass over the resistors than would be possible by convection cooling alone. The increased volume of air removes heat at a higher rate thereby permitting the load to operate with higher input power levels.

Figure 1 is the schematic diagram for the DL-10K-FM AC circuit. The circuit is protected by a 5 amp slow blow fuse (F1) and controlled by switch S1. The power indicator lamp DS1 and fan motor B1 comprise separate parallel sub-circuits.

Figure 1 also shows operation of the Interlock relay circuit. The interlock thermostat is set for 175°F.

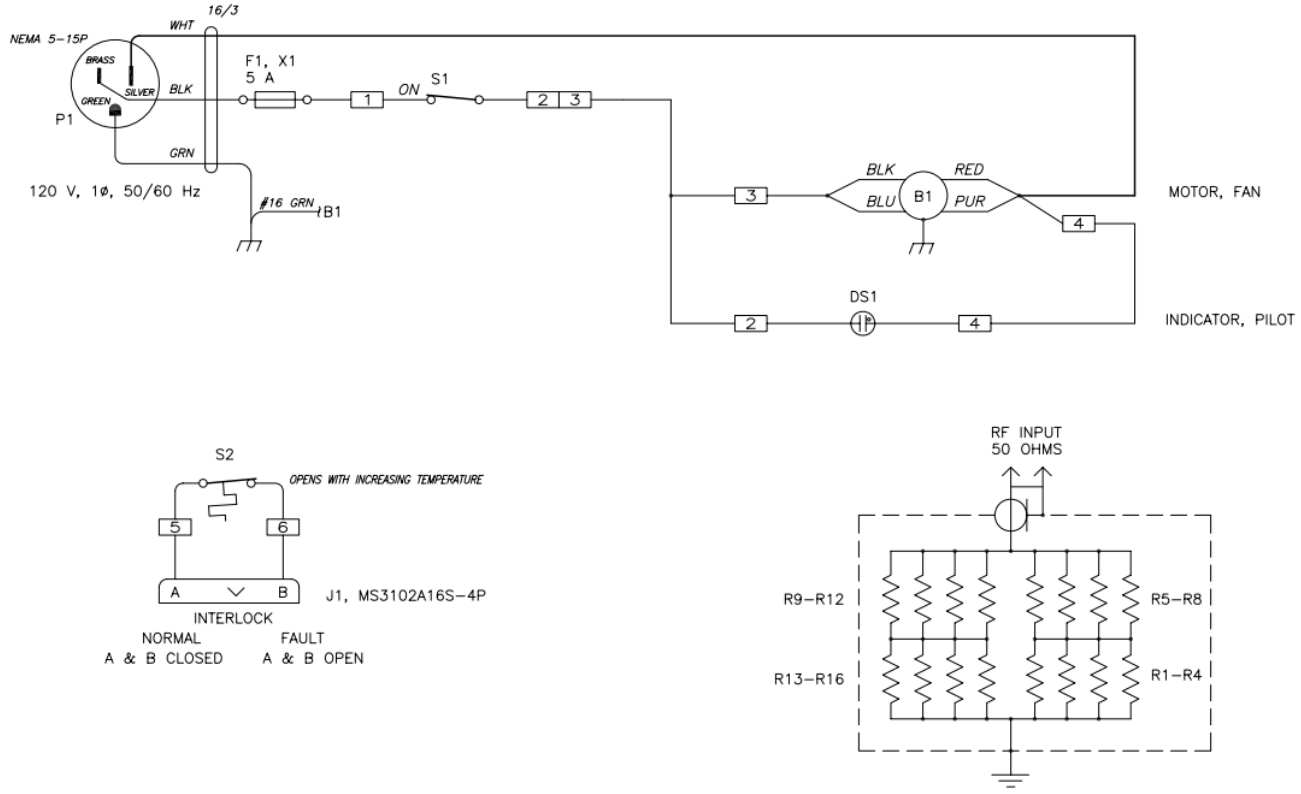

Figure 1. Power Circuit Schematic

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APPENDICES

Recommended Spare Parts

Reference No.	Description	Part No.
R1 – R16	200Ω resistor	KTL-FM200
S1	ON / OFF Switch	W28-XQ1A-5
S2	Over-temperature Switch	STO-175
B1	Fan Motor	4WT44
DS1	Pilot Indicator	1052A5
J1	Interlock Plug	MS3102A16S-4P

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SPECIFICATIONS

RF CHARACTERISTICS

Rated power, continuous	10 kW
Frequency range	DC to 110 MHz
VSWR (maximum)	1.1:1
Impedance, nominal	50 Ω
Input connector	3-1/8 EIA, male
(Optional)	1-5/8 EIA
	1-5/8 unflanged

POWER REQUIREMENTS

Voltage	120 Vac, 50/60Hz, 1Φ
Current	5 Amps

COOLING UNIT

Type	Forced air
Fan Motor	1/10 hp, 1550 RPM
Displacement	480/580 CFM
Ambient Temperature	
(maximum permitted)	104°F (40°C)

DIMENSIONS

Width	16-3/4 inches
Depth	15-3/4 inches
Height	35-1/8 inches
Weight	75 pounds

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FACTORY SERVICE

Kintronic Laboratories, Inc.

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12 MONTH LIMITED WARRANTY

Kintronic Laboratories, Inc. warrants each unit of its manufacture to be free from defects in material and workmanship for a period of 12 months. Our obligation under this Warranty is limited to servicing and/or replacing defective parts of any unit returned to our factory for that purpose, and to making good at our factory any part or parts thereof, except those parts which normally wear out and have a short life, such as, but not limited to, bulbs, fuses, belts, filter cartridges, semi-conductor devices, seals and wear items, within 12 months after shipment from our plant as determined by original invoice to the original purchaser.

Repaired materials and associated labor are covered for a 6 month period only on the work performed. Similarly, repair parts sold separately are covered for a six month period and are limited to repair or replacement of the part(s) at our plant.

The defective equipment must be brought to our attention in writing and must be returned to us only if we have so authorized in writing, with round-trip transportation charges having been prepaid by buyer, for examination and correction by us, if the defect is covered under this Warranty, as determined by our inspection. If the defect has been caused by misuse, customer installation error, abnormal conditions of operation, neglect, repair or attempted repair by anyone not authorized by **Kintronic Laboratories, Inc.**, or if the repairs are for ordinary, minor adjustments, calibration adjustments, and/or ordinary maintenance items, the same are deemed not to be covered by this Warranty and will be repaired, corrected and/or replaced and will be billed under the normal rate schedules of **Kintronic Laboratories, Inc.** In such case, an estimate will be submitted by **Kintronic Laboratories, Inc.** to customer before such work is undertaken and a written authorization to proceed will be required of buyer prior to initiation of repair functions.

If any fault develops, the following steps should be taken:

1. Notify us, giving full details of the difficulty, and include the model number and serial number, your name, email, and telephone number. On receipt of this information, we will give you service instructions and/or shipping instructions.

2. On receipt of shipping instructions, forward the unit, round-trip freight prepaid and insured to the factory and repairs will be made at the factory subject to the foregoing.

Kintronic Laboratories, Inc. reserves the right to make changes in design at any time without incurring any obligation to install same on units previously sold.

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This Warranty is expressly in lieu of all other obligations or liabilities on the part of **Kintronic Laboratories, Inc.** and **Kintronic Laboratories, Inc.** neither assumes nor authorizes any other person to assume for them, any other liability in connection with the sale of **Kintronic Laboratories, Inc.** products.

This Warranty applies regardless of conditions to the contrary that are included as part of the buyer's purchase order.

THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE AND THE SAME ARE HEREBY DISCLAIMED IN WHOLE OR IN PART, BY THE SELLER, AS BUYER HAS THOROUGHLY EXAMINED AND INSPECTED THE SUBJECT EQUIPMENT AND HAS ACCEPTED THE SAME IN "AS IS" CONDITION. IN THE EVENT LOCAL LAWS PROHIBIT THIS DISCLAIMER, THE DURATION OF THESE WARRANTIES SHALL BE LIMITED TO THE LENGTH OF TIME OF THIS WARRANTY.

The obligation of **Kintronic Laboratories, Inc.** under this Warranty is limited strictly to the terms set forth herein above and buyer, consumer or user of the products shall claim no setoff or counterclaim from any monies which may be due and owing **Kintronic Laboratories, Inc.** as a result of the sale of such product to such buyer, consumer or user, and **Kintronic Laboratories, Inc.** shall not be liable for any damages of any kind, whether incidental or consequential or otherwise, except for repair or replacement as set forth above.

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