

**ALTRONIC RESEARCH, INC.**

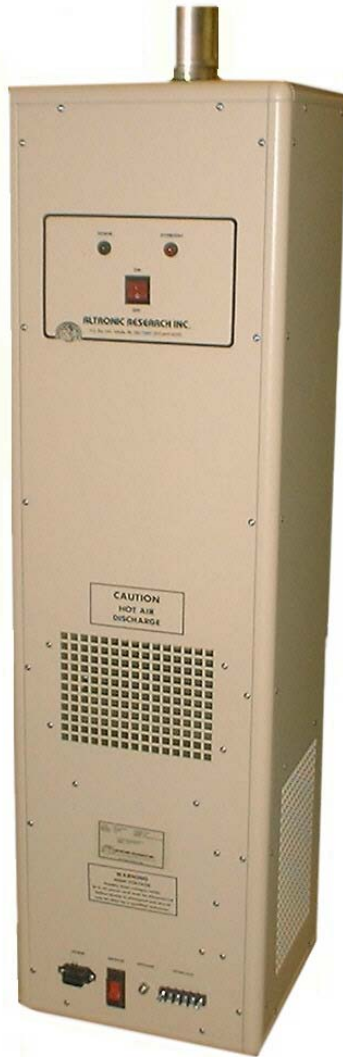
**P.O. BOX 249**

**YELLVILLE, ARKANSAS 72687-0249**

**U.S.A.**

**MODEL 6705**

**COAXIAL LOAD RESISTOR**



**MODEL 6705**  
**AIR COOLED COAXIAL RESISTOR**

# LIMITED WARRANTY

We take pride in manufacturing products of the highest quality and we warrant them to the original purchaser to be free from defects in material and workmanship for the period of one year from date of invoice. Additionally, products of our manufacture repaired by us are warranted against defects in material and workmanship for a period of 90 days from date of invoice, with the provisions described herein.

Should a product, or a portion of a product of our manufacture prove faulty, in material or workmanship, during the life of this warranty, we hereby obligate ourselves, at our own discretion, to repair or replace such portions of the product as required to remedy such defect. If, in our judgment, such repair or replacement fails to be a satisfactory solution, our limit of obligation shall be no more than full refund of the purchase price.

This warranty is limited to products of our own manufacture. Equipment and components originating from other manufacturers are warranted only to the limits of that manufacturer's warranty to us. Furthermore, we shall not be liable for any injury, loss or damage, direct or consequential, arising out of the use, or misuse (by operation above rated capacities, repairs not made by us, or any misapplication) of the equipment. Before using, the user shall determine the suitability of the product for the intended use; and the user assumes all risk and liability whatsoever in connection therewith.

The foregoing is the only warranty of Altronic Research Incorporated and is in lieu of all other warranties expressed or implied.

Warranty returns shall first be authorized by the Customer Service Department and shall be shipped prepaid. **Warranty does not cover freight charges.**

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# OPERATING TEMPERATURE WARNING

CARE SHOULD BE TAKEN TO OPERATE UNIT BELOW  
STATED MAXIMUM AMBIENT OPERATING TEMPERATURE.

OPERATION ABOVE RATED AMBIENT  
TEMPERATURE MAY CAUSE MOTOR  
THERMAL PROTECTION TO SHUT OFF FAN,  
WHICH MAY CAUSE DAMAGE TO UNIT.

PROVISIONS ARE MADE TO TRIP THE INTERLOCK  
IN THE EVENT OF OVERHEAT, BUT THE INTERLOCK  
MUST BE PROPERLY CONNECTED TO THE RF SOURCE  
FOR THIS FUNCTION TO OPERATE.

NEVER OPERATE WITH INTERLOCK  
BYPASSED OR MALFUNCTIONING.  
**TO DO SO WILL VOID THE WARRANTY.**

# PRECAUTIONS

## **⚡WARNING⚡**

This equipment can start automatically. Do not attempt any service or parts replacement without first disconnecting all AC power and RF power. Failure to do so may result in serious or *fatal electrical shock or physical injury*.

## **WARNING**

This unit is designed to operate safely when the ground lug on the panel is attached to station or system ground. Ensure that a proper ground connection is made before applying line or RF power.

## **CAUTION**

Do not block air grills or restrict airflow when ducting inlet and discharge air. Restrictions in airflow limit the load's ability to dissipate RF power and could damage and/or cause the unit to fail.

## **CAUTION**

Do not connect the Model 6705 to an RF power source without first ensuring that the load is connected to the proper line voltage and that the interlock circuit is properly attached to the transmitter. The interlock circuit is designed to indicate a fault and prevent operation when line voltage is not present. Do not apply more than rated power to unit. Damage will occur before thermal protectors can activate interlock circuit.

## **☠CAUTION☠**

When using any cleaning solvents or solutions, assure that there is adequate ventilation to protect personnel from breathing any irritable or possibly toxic fumes.

# INTRODUCTION

This handbook was prepared for technical personnel as an aid in understanding and performing installation, service and maintenance procedures for the OMEGALINE® Model 6705 Air-Cooled Coaxial Load. Personnel are considered to be skilled if they have the necessary knowledge and practical experience of electrical and radio engineering to appreciate the various hazards that can arise from working on radio transmitters, and to take appropriate precautions to ensure the safety of personnel.

## SECTION I

### DESCRIPTION AND LEADING PARTICULARS

**1-1. Purpose and Application of Equipment.** The OMEGALINE® Model 6705 Coaxial Load is designed to safely dissipate a maximum of 5,000 watts of electrical energy over a frequency range of DC to 240 MHz.

**1-2. Equipment Supplied.** The Model 6705 Coaxial Load is supplied with standard RF connectors. Their designations are:

1-5/8" EIA Swivel flange: Model # 6705E1

1-5/8" Unflanged flush: Model # 6705F1

1-5/8" Unflanged recessed: Model # 6705R1

The standard power supply voltages and their designators after the Model # are:

-115: 110-120VAC, single phase

-230: 220-240VAC, single phase

The standard power supply cord has a CCE-22 approved receptacle end to connect to the mating receptacle on the unit.

-115 units have a NEMA 5-15P male plug.

-230 units have 2" stripped and tinned ends.

**1-3. Equipment Required But Not Supplied.** The Model 6705 Coaxial Load is complete as supplied, but the user must furnish RF input, interlock control cable and ground cable appropriate to each installation.

**1-4. General Description.** The Model 6705 Coaxial Load is enclosed in a single aluminum case. Power connection is made through a multi-contact fixed, recessed receptacle on the lower front panel. This panel also contains a 4-screw barrier terminal strip (one normally closed pair and one normally open pair) for connection of the interlock circuit and a 1/4-20 UNC-2B stud for

attachment of the ground. The RF connector is located in the center of the top panel.

**1-5. Electrical Description.** The Model 6705 contains a 50 ohm non-reactive resistor assembly capable of dissipating 5,000 watts of applied electrical energy at frequencies between DC and 220 Mhz with a maximum VSWR of 1.1 to 1 to 110 Mhz and 1.15 to 1 from 110 Mhz to 240 Mhz. No provisions are made for tuning the resistor assembly and all operating controls relate to the operation of the blower assembly. The blower control circuit consists of three switches wired in parallel to control the blower motor relay. Power is supplied to this relay and to the "Blower On" lamp whenever the equipment is attached to the correct power supply and the main power switch is "ON" or when one of the fan thermostats senses a temperature equal to or greater than 120° ( $\pm 7^\circ$ )F. The transmitter interlock circuit consists of two thermal switches wired in series to control the interlock relay. Power is supplied to this relay whenever the equipment is attached to the correct power supply and neither of the overtemperature thermal switches is open. The lower switch opens at 260° ( $\pm 7^\circ$ )F. The upper switch opens at 140°( $\pm 7^\circ$ )F. A lamp is provided to indicate when one or more of the overtemperature switches opens. It is labeled "OVERHEAT", indicating a change in state of the interlock.

**1-6. Mechanical Description.** The Model 6705 RF Coaxial Load is a 50 ohm non-reactive resistor assembly which is cooled by forced ambient air. The blower assembly is a direct-drive centrifugal blower. The blower moves air from floor level into a closed plenum surrounding the resistor assembly. Air then enters the resistor assembly and flows downward through it to the transition duct and then out of the enclosure via the discharge grill. This places the RF input connector at the coolest point in the air stream and affords exceptionally quiet operation.

**1-7. General Principle of Operation.** After ascertaining that the Model 6705 is connected to the correct power supply, connect the transmitter interlock circuit and RF source. Turn the main power switch "ON" to start the fan and enable transmitter. Operate transmitter as desired. To stop operation, it is necessary to first turn off the transmitter, then the main power switch on the Model 6705. The fan may continue to run for some time. This depends upon the power level at which the load was operating and upon the ambient air temperature. This feature is necessary to prevent damage to the load. The Model 6705 can be operated in a "Standby" or "Reject" mode with the blower off. Current draw in this mode is 60 milliamperes. To operate in this mode, connect the unit as before and leave the main power switch on the front panel "Off". It is highly recommended that the normally open pair on the interlock terminal board be used to control a user-supplied alarm circuit. This pair will close on power failure or overheat, and the alarm, if independent of the AC power supply for the unit, will notify the operator of a fault.

**1-8. Operating and Adjustment Controls.** The only operating control is the main power switch. No field adjustments are necessary or possible.

**1-9. Operator Training.** The operator of this equipment must have the following skills/knowledge:

- An understanding of the purpose of the equipment;
- An understanding of the principles of operation of the equipment;
- An understanding of the normal operating procedures for the equipment;
- An understanding of the normal and abnormal indications which may be presented at the control point;
- The proper procedures for starting, using and stopping the equipment under normal conditions;
- The proper procedure for stopping the equipment under abnormal or emergency conditions;
- The proper procedure to lock out and mark controls prior to allowing or commencing maintenance on the equipment;
- The proper procedure to obtain clearance to remove lockouts and out-of-service marks and return the equipment to normal service.

# SECTION II

## TEST EQUIPMENT AND SPECIAL TOOLS

**2-1. Test Equipment Required.** No test equipment is required for routine maintenance. In some circumstances it may be necessary to determine the temperature differential (outlet air minus inlet air) and ambient air temperature which the equipment is experiencing. We recommend the John B. Fluke Mfg. Co. Model 52 or equivalent instrument for this function.

**2-2. Special Tools Required.** Although no non-standard tools are required for routine maintenance, we recommend the technician have the following specialized tools available:

- 1 Tee handle hex key, 3/32" bit
- 1 Tee handle hex key, 7/32" bit
- 1 Tee handle torx T-15 bit
- 1 Power screwdriver with torx T-15 bit

# SECTION III

## PREPARATION FOR USE AND RESHIPMENT

**3-1. Unpacking Equipment.** The unit should be handled and unpacked with care. Inspect outer carton for evidence of damage during shipment. *Claims for damage in shipment must be filed promptly with the transportation company involved.* No internal packaging or bracing is used for domestic shipments and the units should not rattle when being unpacked.

**3-2. Pre-installation Inspection.** Conduct a thorough inspection of the unit, paying particular attention to the following items:

- Screws in place and tight.
- All panels and grills free of dents and scratches.
- AC input receptacle visually OK.
- Interlock terminal strip visually OK.
- RF connector visually OK.

While inspecting RF connector, measure DC resistance of the unit by reading from the center conductor to the outer conductor. Compare this reading to that on the specification sheet at the end of this manual. Reading should be  $\pm 1$  ohm. If not, consult factory.

**3-3. Pre-installation Tests.** Prior to installation, connect the unit to a suitable source of AC power:

- a. Turn main switch on and check for quiet blower operation.
- b. Connect an ohmmeter or a battery operated test lamp across the normally closed terminal pair on the interlock terminal board.
- c. Turn the main power switch off, observing the indicator (ohmmeter or test lamp). It should remain as it was.
- d. Disconnect the AC power from the unit. The indicator should change state (terminals open).

**3-4. Installation.** The Model 6705 must be installed in a location convenient for servicing. Consideration should be given to adequate accessibility for maintenance and unit replacement. No attempt is made in this handbook to present complete installation instructions, since physical differences in plant will determine the installation procedure. General guidelines are outlined in subsequent paragraphs.

**3-5. Location.** The location selected for the Model 6705 should be dry, free of excessive dust and have an ambient temperature below 110°F (40°C). The room should be well ventilated to prevent excessive temperature rise and consequent derating of the unit. The maximum heat dissipation of the unit is 5,000 watts. This is equal to 17,050 Btu/hr., which may be ducted out of the building envelope.

The unit should be oriented to provide a short, direct duct run in order to avoid high static pressure and loss of cooling efficiency. The assistance of a competent heating and air conditioning installer will help avoid over-or-under-specifying the duct system.

**3-6. Mounting.** It is not necessary to mount the Model 6705 which is designed to be a free-standing device. It rests on four adjustable-length leveling feet.

**CAUTION!**

THE UNIT SHOULD BE ATTACHED TO THE PROPER AC POWER SUPPLY WITH INTERLOCK CONNECTED WHENEVER THE RF CONNECTOR IS ATTACHED TO THE SOURCE. INADVERTENT APPLICATION OF RF POWER TO THE UNIT WITHOUT AC POWER MAY DAMAGE OR DESTROY THE RESISTOR ASSEMBLY.

**3-7. Connections.** There are three connectors on the Model 6705: the RF connector, the AC power supply and the transmitter interlock (4 terminal, captive-screw terminal strip).

1. The RF connector is on the top panel of the unit. Connect to the appropriate RF line from the transmitter.
2. The AC power supply connector is on the front panel. Connect with supplied cord.
3. The transmitter interlock is attached to the normally closed terminals of the terminal board. The terminals are closed whenever AC power is supplied to the unit and no overheat condition exists. The normally open terminals are isolated from the normally closed terminals and are provided for an alarm circuit for reject (standby) mode operation or remote installations.

**3-8. Ducting.** In many installations it will be necessary to duct the discharge air from the Model 6705 to the exterior of the building. In some installations it will also be necessary to supply inlet air from outside of the climate controlled portion of the building.

The discharge air flow is approximately 450 SCFM at a maximum temperature of 237°F. Due to the high temperatures involved, non-metallic duct materials should not be used. Design of the ducting and wall or ceiling penetrations should be referred to a competent heating and air conditioning firm.

Replacement air will enter the building to equal the volume actually exhausted, whether or not provision is made for this replacement. However, the actual exhausted volume may not equal the design volume unless an adequate supply of make-up air is provided. "Make-up air" is a ventilation term used to indicate the supply of outdoor replacement air to a building in a controlled manner. It may be provided for the Model 6705 by ducting into the room or by extending a supply duct to either intake grill of the unit and installing a blanking plate on the other grill. The supply duct must be 10 inch x 10 inch square or greater.

**3-9. Adjustments.** No field adjustments are necessary or possible.

**3-10. Preparation for Reshipment.** No special measures are required to prepare the Model 6705 for reshipment. Care must be taken to protect the RF connector and to immobilize the swivel flange, if one is installed. Packaging should provide protection against abrasion and impact. Special containers are available from the factory. Please inquire.

# SECTION IV

## THEORY OF OPERATION

**4-1. General.** The Model 6705 contains a 50 ohm non-reactive resistor assembly (4 @ 200 ohms in parallel) which is cooled by forced air supplied by a centrifugal blower assembly. Control of the blower and of the transmitter interlock circuit is accomplished with a single rocker switch and four thermal switches.

**4-2. Control Circuits.** There are 2 control circuits in the Model 6705. One circuit controls the blower, and the other controls the transmitter interlock circuit.

The blower control circuit derives its power from the 26VAC control transformer. Two thermal switches and one rocker switch are connected to AC Control Line 1. Both thermal switches are SPNO and connect to blower contactor "RY1" terminal 0, as does the SPST rocker switch. Blower contactor "RY1" terminal 1 connects to AC Control Line 2. The blower indicator lamp is connected in parallel with the contactor coil.

The transmitter interlock circuit also derives its power from the 26VAC control transformer. Two SPNC thermal switches are connected in series from Control Line 1 to interlock relay "RY2" terminal 13. The overheat lamp is connected from Line 1 to interlock relay "RY2" terminal 13. Interlock relay "RY2" terminal 14 is connected to Control Line 2.

Interlock relay terminals 5 and 6 are paralleled and are connected to TB1-4. Interlock relay terminals 9 and 10 are paralleled and are connected to TB1-3. This terminal pair is normally closed when AC power is supplied to the unit. Interlock relay terminals 11 and 12 are paralleled and are connected to TB1-2. Interlock relay terminals 3 and 4 are paralleled and are connected to TB1-1. This terminal pair is normally open when AC power is supplied to the unit.

# SECTION V

## MAINTENANCE

### **WARNING!!**

***PERSONNEL WORKING ON THIS LOAD MUST  
BE CONSIDERED SKILLED AS DEFINED BY  
EN60215 SECTION 3.1 AND APPENDIX D***

#### **BEFORE PERFORMING ANY MAINTENANCE:**

- 1. DISCONNECT POWER AND ALLOW MOTOR TO COME TO A FULL STOP.**
- 2. DISCONNECT RF CONNECTOR ASSEMBLY AND LOCK OUT TRANSMITTER OPERATING CONTROLS.**
- 3. DISCONNECT TRANSMITTER INTERLOCK LINE.**

***FAILURE TO FOLLOW THESE DIRECTIONS  
MAY CAUSE FATAL ELECTRICAL SHOCK!***

**5-2. Cleaning** The enclosure of the Model 6705 is finished with an acrylic finish or other durable coating system. It should be cleaned with a neutral plastic and glass cleaner such as Windex or Miller-Stephenson MS-260. The RF connector should be cleaned with a non-residue contact cleaner such as Miller-Stephenson MS-230. Remove dirt accumulations from the fan and motor by vacuuming. Do not use solvents or an air jet, as these can damage the motor. Remove dirt and dust accumulations from the grills and resistor assembly with an air jet and a soft brush.

**5-2. Lubrication.** The only lubrication required is for the sleeve bearings in the fan motor. Units in continuous service should be re-oiled annually, intermittent duty units every two years and occasional duty units every three years. Re-oil by applying 30 to 35 drops of SAE 20 non-detergent motor oil. **DO NOT OVER OIL.**

**5-3. RF Circuit.** The RF circuit does not require any periodic maintenance and the only repairs possible are the replacement of parts in the connector, quick-step or support portions of the resistor assembly or the replacement of resistors.

To replace resistors it is necessary to remove the front and left side panels of the unit:

1. Remove the 8-32 x 3/8" screws holding the front panel and the left side panel (as viewed from front) and set these panels aside.
2. Remove the 8-32 x 3/8" screws from along the vertical sides of the exposed panel of RF circuit, then the 8-32 x 3/8" screws at the bottom followed by the 1/4-20 x 2" bolt at the bottom of the panel.
3. Remove two 8-32 x 3/8" screws from top of unit. You can now remove panel. With this panel removed, you have access to the resistor bank. It is usually not necessary to remove the other side.

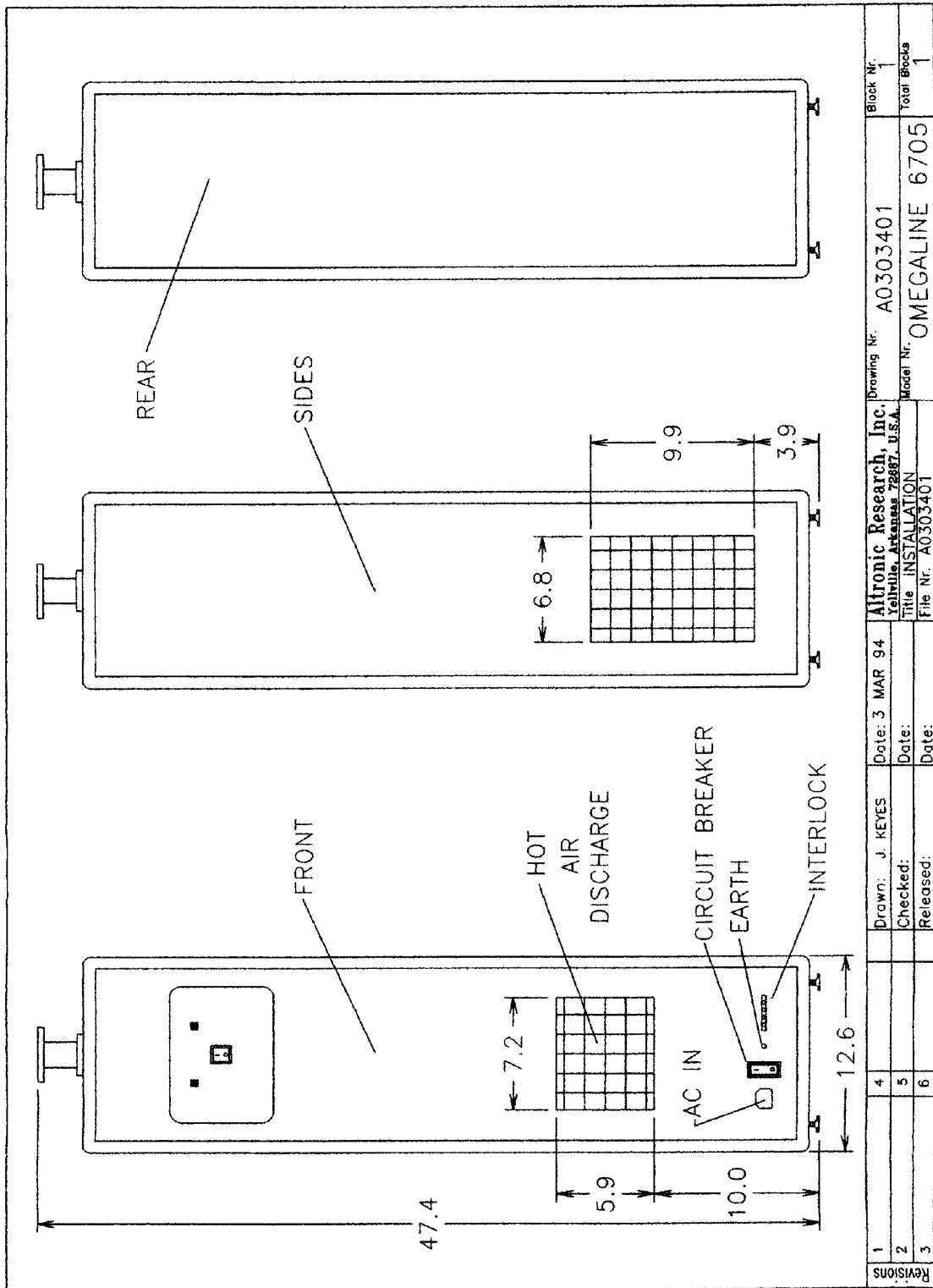
Reverse procedure to reinstall.

**CAUTION!**

**Take care when tightening the 1/4-20 x 2" screws securing the lower resistor bracket to the flex panel. Overtightening can fracture the resistors. The resistors are hard, brittle ceramic material. Avoid impact and excessive force when installing or removing them.**

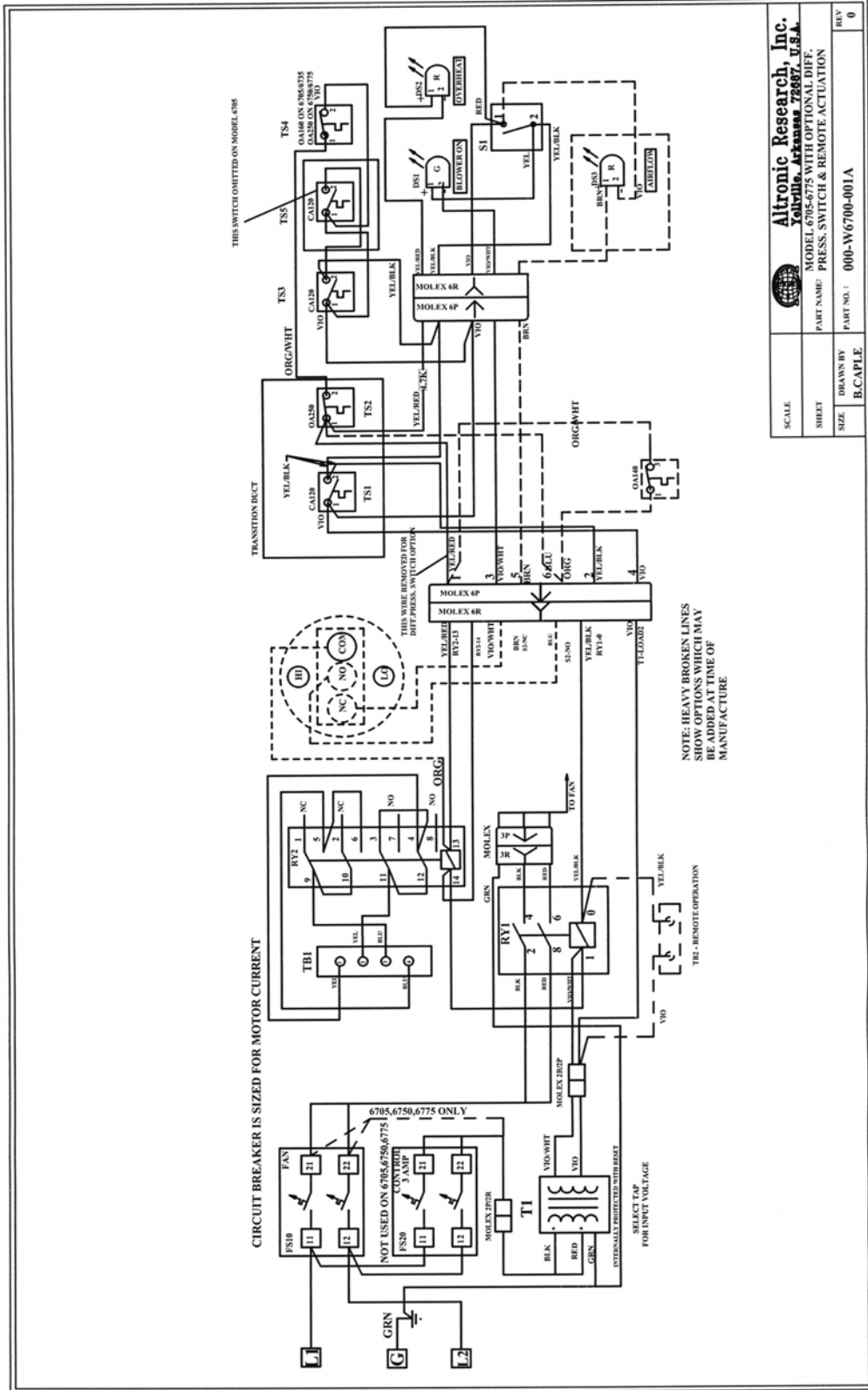
# SECTION VI

## 6-1 OUTLINE AND DIMENSIONS



1		Date: 3 MAR 94	Drawing Nr. A0303401	Block Nr. 1
2	Drawn: J. KEYES	Date:	Altronic Research, Inc. Fayetteville, Arkansas 72887, U.S.A.	Total Blocks
3	Checked:	Date:	Title INSTALLATION	Model Nr. OMEGALINE 6705
4	Released:	Date:	File Nr. A0303401	Block Nr. 1

# 6-2 SCHEMATIC DIAGRAM



SCALE	Altronic Research, Inc. Yellville, Arkansas 72687, U.S.A.		
SHEET	MODEL 6705-6775 WITH OPTIONAL DIFF. PRESS. SWITCH & REMOTE ACTUATION		
SIZE	DRAWN BY	PART NO. 1	REV
	B.CAPLE	000-W6700-001A	0

**REPLACEMENT PARTS LIST**  
**MODEL 6705**

**(CONSULT FACTORY)**

# SPECIFICATIONS

## MODEL 6705

**Impedance** ----- > 50 ohms nominal

**VSWR**

DC to 110Mhz ----- > 1.1:1 max.

110 to 240Mhz----- > 1.15:1 max.

**Connectors:**

Model 6705E1 ----- > 1-5/8" EIA swivel flange

Model 6705F1 ----- > 1-5/8" EIA Unflanged flush

Model 6705R1 ----- > 1-5/8" EIA Unflanged recessed

**Power Rating** ----- > 5 KW Continuous

**Frequency Range** ----- > DC to 220 Mhz

**Cooling Method** ----- > Forced Air Ductable

**Ambient Temperature** ----- > -30°C to +43°C

**Fan Assembly** ----- > Centrifugal direct-drive

**AC Power Requirements:**

115 VAC, 60 Hz, 7 Amp., 1 Phase

230 VAC, 50/60 Hz, 3 Amp., 1 Phase

380 VAC, 50 Hz, 1.4 Amp., 1 Phase

**Finish**----- > Beige Splatter

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Serial No. \_\_\_\_\_ Frequency \_\_\_\_\_ Resistance \_\_\_\_\_ dBA@3ft < 80dBA

Model \_\_\_\_\_ Inspected by \_\_\_\_\_ Date \_\_\_\_\_

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

***CRAFTED WITH PRIDE IN ARKANSAS, U.S.A.***



**Model 6705**  
**Vertical Side Panel Displaced**



**Model 6705**  
**Access Panels Displaced**