

ALTRONIC RESEARCH, INC.

P.O. BOX 249

YELLVILLE, ARKANSAS 72687-0249

U.S.A.

MODEL 6715VX

COAXIAL LOAD RESISTOR

MODEL 6715VX



15KW 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.**

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Warranty	3
Warnings and Precautions	6,7
Introduction	8
I. Description and Leading Particulars	
1-1 Purpose and Application of Equipment	8
1-2 Equipment Supplied	8
1-3 Equipment Required But Not Supplied	8
1-4 General Description	9
1-5 Electrical Description	9
1-6 Mechanical Description	9
1-7 General Principle of Operation	9
1-8 Operating and Adjustment Controls	9
1-9 Δ P Adjust	10
1-10 Operator Training	10
II. Test Equipment and Special Tools	
2-1 Test Equipment Required	11
2-2 Special Tools Required	11
2-3 Materials Required	11
III. Preparation for Use and Reshipment	
3-1 Unpacking Equipment	12
3-2 Pre-Installation Inspection	12
3-3 Pre-Installation Test	12
3-4 Installation	12
3-5 Location	13
3-6 Mounting	13
3-7 Connections	13
3-8 Ducting	14
3-9 Adjustments	14
IV. Theory of Operation	
4-1 General	15
4-2 Control Circuits	15

SECTION

PAGE

V. Maintenance

- 5-1 Cleaning16
- 5-2 Lubrication..... 16
- 5-3 RF Circuit (including resistor replacement).....16

VI. Diagrams

- 6-1 Outline and Dimensions18
- 6-2 Schematic Diagram.....19
- 6-3 Parts List.....20

VII.Specifications.....21

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*.

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 apply more than rated power to unit. Damage will occur before thermal protectors can activate interlock circuit if large overloads are applied.

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 6715VX 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 6715VX Coaxial Load is designed to safely dissipate a maximum of 15,000 watts of electrical energy over a frequency range of DC to 2 MHz.

1-2. Equipment Supplied. The Model 6715VX Coaxial Load is supplied with standard RF connectors. The designation is:

1 5/8" Swivel flange: Model 6715VXE1

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

-230: 208-230VAC, three-phase, 50/60 Hz

-460: 380-460VAC, three-phase, 50/60 Hz

1-3. Equipment Required But Not Supplied. The Model 6715VX Coaxial Load is complete as supplied, but the user must furnish AC Mains input, RF input, interlock control cable and ground cable appropriate to each installation. Where ordered with an RF Ammeter assembly, it is necessary for the installer to furnish conduit space for the RF Ammeter instrumentation cable (if remote operation and reading of the ammeter is desired.)

CAUTION: THIS DEVICE IS NOT EQUIPPED WITH A SAFETY SWITCH. MOST JURISDICTIONS REQUIRE THAT A SAFETY SWITCH WHICH REMOVES ALL AC

POWER TO THIS DEVICE BE PLACED WITHIN SIGHT OF THE OPERATING POSITION.

- 1-4. General Description.** The Model 6715VX Coaxial Load is enclosed in a single aluminum case which is painted with a durable acrylic finish. The enclosure contains one belt-driven 1½ HP 24" diameter fan assembly and one resistor assembly, plus necessary sensors and controls.
- 1-5. Electrical Description.** The Model 6715VX contains a 50 ohm non-reactive resistor assembly capable of dissipating 15,000 watts of applied electrical energy at sea level at frequencies between DC and 2 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 one switch wired in series with the blower motor contactor. Power is supplied to this contactor whenever the equipment is attached to the correct power supply and the Fan Switch is "ON" or, when the autostart thermal switch senses a temperature of 160°F. ***CAUTION: The autostart feature is designed to prevent damage to the load. It is not intended for standby operation. Always switch fan "ON" before applying RF power.*** The transmitter interlock circuit consists of 1 thermal switch wired in series with the airflow switch to control the interlock relay. Power is supplied to this relay whenever the equipment is attached to the correct power supply, the airflow switch is closed and the over-temperature thermal switch senses a temperature equal to or less than 250°F(±7°F). The OVERHEAT lamp is controlled by a single 250°F thermal switch. This circuit is independent of the control circuits.
- 1-6. Mechanical Description.** The Model 6715VX RF Coaxial Load is a 50-ohm non-reactive resistor assembly which is cooled by forced ambient air. The fan assembly is a 1½ HP belt-driven, 24-inch diameter device. Air is drawn in through grill assemblies near the floor, flows through the fan, enters the resistor assembly, flows vertically through it and then out of the enclosure via the top perforated panel.
- 1-7. General Principle of Operation.** After ascertaining that the Model 6715VX is connected to the correct power supply, connect the transmitter interlock circuit and RF source. Turn the FAN switch "ON" to start the fans and enable transmitter. Operate as desired. To stop operation, turn off the transmitter, then turn the FAN switch "OFF" after the discharge air temperature has cooled to ambient.
- 1-8. Operating and Adjustment Controls.** The only operating control is the main power switch. Differential pressure switch adjustment instructions are

covered in section 1-9. The motors and fans require periodic maintenance and the drive belts must be adjusted to maintain proper tension. See para.3-9.

1-9. ΔP Adjust. The differential pressure switch is adjusted through a plastic bushing on the rear of the load (lower panel). A corresponding hole is provided in the switch enclosure for entry of the adjusting tool. There is a slotted screw inside the switch enclosure which adjusts the set point of the switch. A 6mm screwdriver is appropriate for this adjustment. To decrease the set point pressure, turn the screw anti-clockwise. To increase the set point pressure, turn the screw clockwise. The procedure recommended:

1. Turn the unit fan ON.
2. Observe the LOW FLOW lamp. It should turn OFF in 4-10 seconds.
3. If it does not turn OFF, lower the set point pressure until the lamp is OFF.
4. Turn the unit fan OFF and repeat steps 1 thru 3 until reliable operation of the lamp is obtained.

See the differential switch manufacturer's application sheet in the appendix to this manual.

1-10. 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 desirable 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:

Torx T-15 driver

Tee handle hex key, 7/32" bit

Power screwdriver with 7/32" hex key & Torx T-15 bit

2-3. Materials Required. One type of grease is required for routine servicing of fans. Use any quality lithium-based grease.

SECTION III

PREPARATION FOR USE AND RESHIPMENT

3-1. Unpacking Equipment. The unit should be handled and unpacked with care. Inspect outer cartons 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 shipments and the units should not rattle when being unpacked.

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

- All screws in place and tight.
- All panels and grills free of dents and scratches.
- Base assembly visually OK.
- RF connector visually OK.

While inspecting RF connector, measure D.C. resistance of the unit by reading from the center conductor to the outer conductor. Compare this reading with that listed in the specification sheet at the end of this manual. Reading should be ± 1 ohm. If not, consult factory.

3-3. Pre-installation Tests. Prior to installation, connect the load to AC Mains power for the following tests:

- a. Read data plate on lower rear panel of resistor enclosure and connect to a suitable source of AC power.
- b. Turn main switch on and check for quiet blower operation.
- c. Connect an ohmmeter or a battery operated test lamp across the normally closed terminal pair on the interlock terminal board.
- d. Turn the main power switch off, observing the indicator (ohmmeter or test lamp). It should remain as it was.

3-4. Installation. The Model 6715VX 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 6715VX should have an ambient temperature below 122°F(50°C). The room should be well ventilated to prevent excessive temperature rise and consequent derating of the unit. The maximum dissipation of the unit is 15,000 watts. This is equal to 51,195 Btu/hr, which ordinarily will 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. Exterior installation is not recommended.

3-6. Mounting. The Model 6715VX is designed to be mounted on concrete and should be securely attached to the floor.

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 connections on the Model 6715VX: the RF connector, the AC power supply, and the transmitter interlock terminal strip. A remote control terminal strip is a fourth optional connection.

- a. The RF connector is on the side panel of the unit. Connect to the appropriate RF line from the transmitter.
- b. The AC power supply connector is a 4 terminal pressure-style female receptacle located in the wiring channel accessed through the removable panel on the front of the enclosure.
- c. The transmitter interlock is attached to both pair of the normally closed terminals of the 4-position terminal strip located on the inner panel of the wiring channel which is on the RF connector side of the enclosure. The terminals are isolated, dry contacts which are closed whenever AC power is supplied to the unit, no overheat condition exists, and the airflow switch is closed. There are 2 independent pair of contacts to accommodate multi-transmitter installations.
- d. It is possible to control the fan operation remotely. If included, connect a SPST switch to the one pair of terminals on the remote control terminal strip.

3-8. Ducting. It will be necessary to duct the discharge air from the Model 6715VX 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 airflow is approximately 9,600 SCFM at a maximum temperature of 250° F.

3-9. Adjustments. No field adjustments of the electronics or electrical controls are necessary or possible. The drive belts for the fans must be periodically adjusted to maintain proper tension. It is important not to over-tension the belts. See para. 1-8.

Tension belt to require a force of 6.1 pounds (~ 3 kg) to deflect center of belt 13/64 inch (0.503 cm).
--

SECTION IV

THEORY OF OPERATION

4-1. General. The Model 6715VX contains a 50 ohm non-reactive resistor assembly (20 @ 1000 ohms in parallel) which is cooled by forced air supplied by a belt-driven fan assembly. Control of the fan, the overheat lamp and the transmitter interlock circuit is accomplished with a single-pole switch, an airflow switch and three thermal switches.

4-2. Control Circuits. There are two control circuits and one indicator circuit in the Model 6715VX. One control circuit controls the fan and the other controls the interlock circuit. The indicator circuit controls the OVERHEAT lamp. All circuits derive their power from the control transformer. The control transformer secondary is connected to the VIOLET and VIOLET/WHITE lines. FAN SWITCH Terminal 1 is connected to the VIOLET line. FAN SWITCH Terminal 2 is connected to A2 on the FAN CONTACTOR. FAN CONTACTOR A1 is connected to the VIOLET/WHITE line. The CA160 thermal switch is the AUTOSTART thermal switch. It is connected in parallel with the FAN SWITCH. It will start the fan when the temperature it sees is 160°F(±7°F). AO250 thermal switch terminal 2 is connected to the VIOLET line. Terminal 1 is connected to the normally open terminal of the differential pressure switch. When the differential pressure switch closes, power is applied to Terminal 13 of the INTERLOCK RELAY. This is the coil terminal. The other coil terminal is 14. It is attached to the VIOLET/WHITE line. One terminal of the OVERHEAT lamp is attached to the VIOLET line. The other terminal is attached to the CA250 thermal switch at terminal 2. Terminal 1 is connected to the VIOLET/WHITE line. When the thermal switch senses a temperature of 250°F(±7°F), it closes, turning the OVERHEAT lamp ON. THE INTERLOCK RELAY contacts are wired in 2 parallel pairs. The pairs are connected to the terminal block in the wiring channel. Terminals 1 and 2 are one pair. Terminals 3 and 4 are the second pair. Both pairs open on fault. They are only closed when the differential pressure switch and the OA250 thermal switch are closed. If a NORMALLY OPEN pair is required, it is easily obtained by moving the blue wires from the INTERLOCK RELAY SOCKET terminal 5 and 6 to terminals 1 and 2. This will make terminals 3 and 4 NORMALLY OPEN and terminals 1 and 2 NORMALLY CLOSED when there is no fault.

The logic of operation is:

1. If AC power is applied to the load, the OA250 switch is closed (cool) and the airflow switch is closed, the interlock relay will close and enable the transmitter.
2. If AC power is not applied to the load, the airflow switch is open or any overtemperature thermal switch senses excessive temperatures, the interlock relay will open, disabling the transmitter.

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!

5-1. Cleaning. The enclosure of the Model 6715VX 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 Glass Plus. The RF connector should be cleaned with a non-residue contact cleaner such as Miller-Stephenson MS-171/CO2. Remove dirt accumulations from the fans, enclosure and motors by vacuuming. Do not use solvents to clean the motors or fan pillow block assemblies. Remove dirt and dust accumulations from the grills and resistor assembly with an air jet and a soft brush.

5-2. Lubrication. The fan pillow blocks are lubricated at the factory with a quality lithium-based high temperature grease. They should be lubricated once each year in the field.

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.

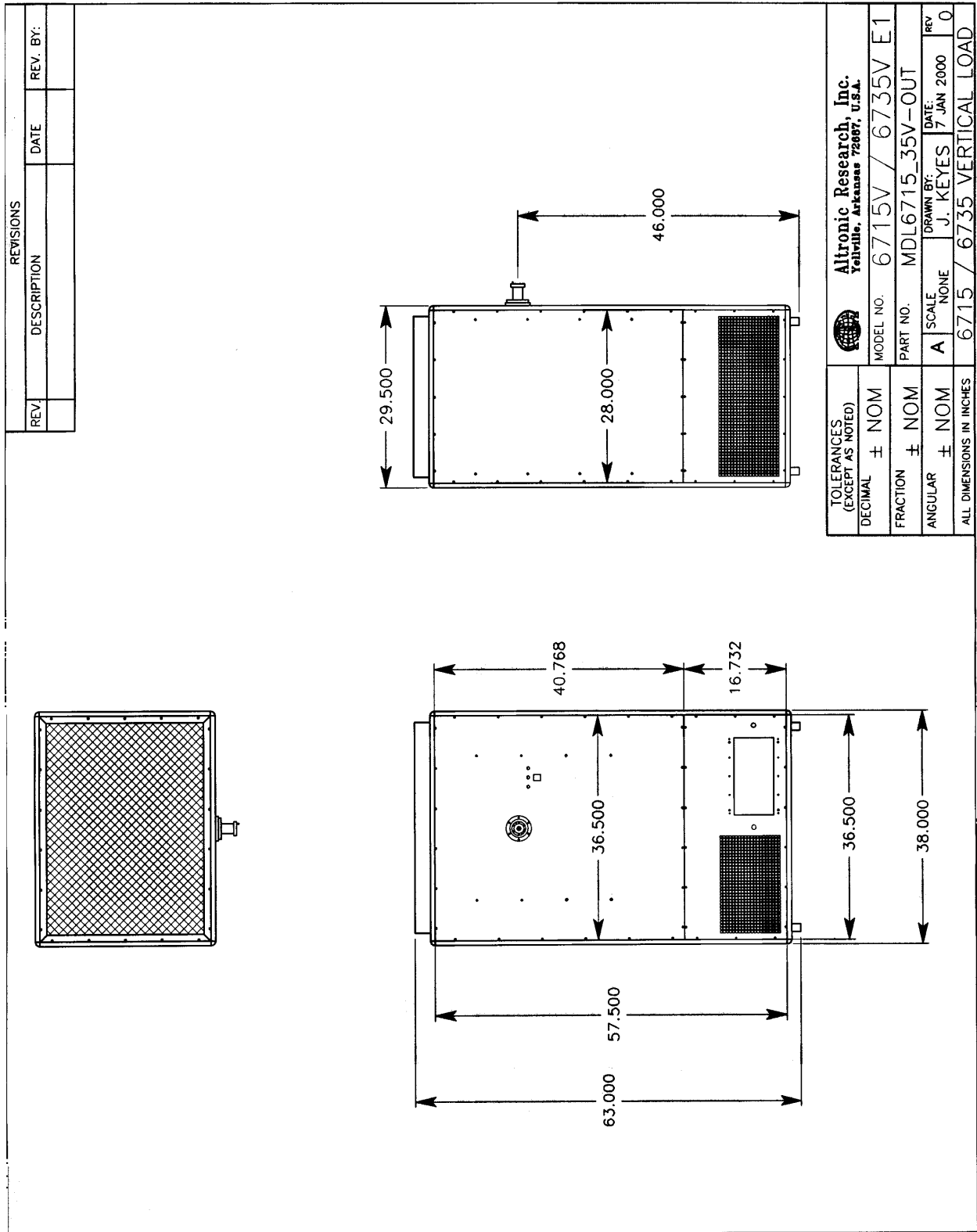
Resistor Replacement

Prior to attempting resistor replacement, you must make the load safe for servicing. Begin by placing the user-supplied Safety Switch in the OFF position and locking the handle with a padlock. Next, remove all power from the transmitter and exciter and lock them out.

To replace resistors it is necessary to remove the side panels from the load and set them aside.

Resistor replacement is tedious, but not difficult. It will probably be necessary to remove many resistors in order to replace a few. Therefore, allow at least four hours to accomplish this task. The resistors are made of a durable ceramic and will withstand normal handling, but they must not be struck with any tool.

6-1. OUTLINE AND DIMENSIONS



6-3. REPLACEMENT PARTS LIST

MODEL 6715VX

(CONSULT FACTORY)

SPECIFICATIONS

MODEL 6715VX

Impedance..... >50 ohms nominal

VSWR @ DC to 2 MHz.....>1.15:1 max.

Connectors:

Model 6715VX.....>CUSTOMER SPECIFIED

Power Rating @ Sea Level.....>15 KW

Frequency Range>DC to 2 MHz

Cooling Method.....>Forced Air

Ambient Temperature.....> -30° C to 50° C

Fan Assembly>1½ hp belt-drive 4-bladed

AC Power Requirements:

230 VAC @ 14 Amp., 3 phase, 60/50 Hz

400 VAC @ 2.6 Amp., 3 phase, 60/50 Hz

Finish>Beige Splatter

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

Serial No. _____ Frequency _____ Resistance _____ dBA@3ft < 80dBA

Model _____ Inspected by _____ Date _____

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