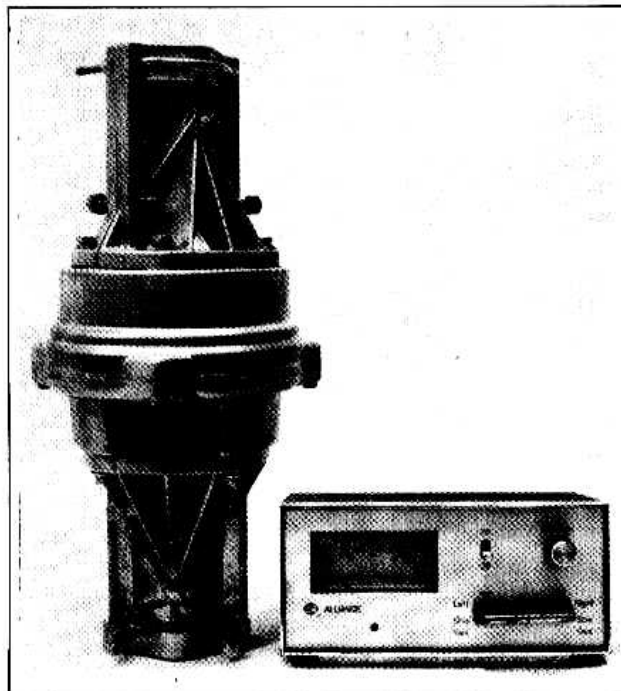


# OWNER'S MANUAL

## **ALLIANCE HD-73 HEAVY DUTY ROTATOR**

FOR DIRECTIONAL PERSONAL COMMUNICATION ANTENNAS



**ALLIANCE**  
MANUFACTURING CO. INC.

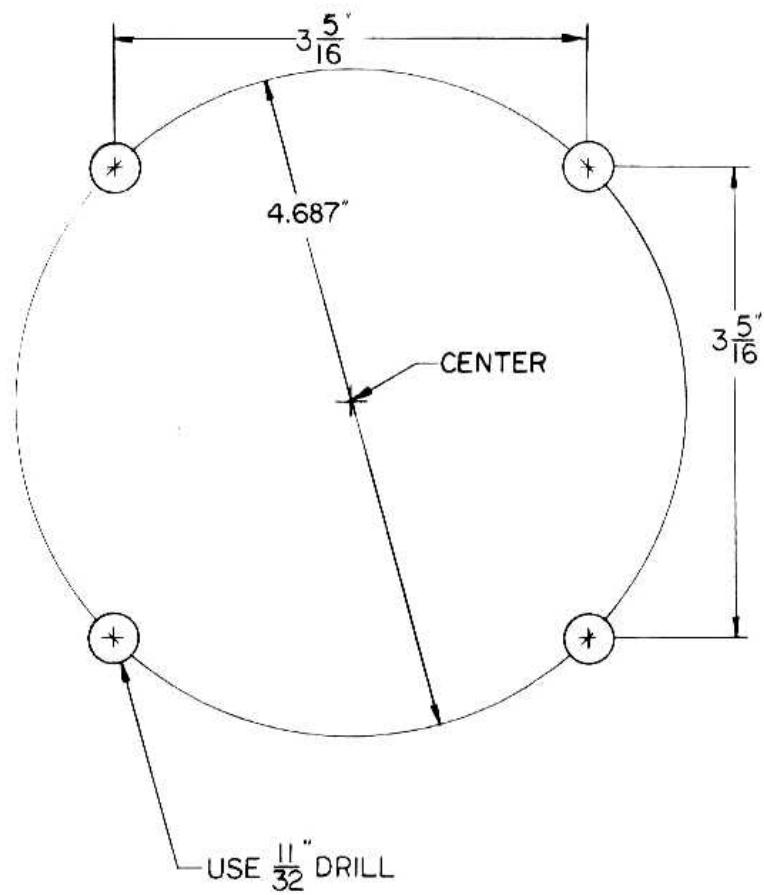
22790 LAKE PARK BLVD.  
ALLIANCE, OHIO 44601

A NORTH AMERICAN PHILIPS COMPANY

Scanned by IW1AXR

Downloaded by   
Amateur Radio Directory

HD-73  
IN TOWER PLATE DRILLING TEMPLATE



X-19521-A

## CONGRATULATIONS

You are now the owner of the most recently designed, United States manufactured, antenna rotator for personal communications service. Made by Alliance, the makers of the famous Genie Garage Door Opener Systems, and Tenna-Rotor, TV's better color getter.

### HD-73 CARTON CONTENTS

- |                                     |           |
|-------------------------------------|-----------|
| 1. Owner's Manual .....             | X-19522-A |
| 2. Rotator Motor Drive Unit .....   | W-19400-R |
| 3. Four Mast Support Brackets ..... | Z-19405-B |
| 4. Control Case .....               | Z-19531-R |
| 5. Loose Hardware Bag .....         | X-19452-R |

If short any items, or if there is hidden damage resulting from rough handling in transportation, contact your dealer immediately.

### CONTENTS OF HARDWARE BAG

Qty.	Name and Description	Part No.
8	Hex head machine screws $\frac{3}{16}$ "-18 x 1" .....	X-5973-F
12	Lockwashers $\frac{3}{16}$ " (split) .....	X-2128-M
8	Flat Washers $\frac{3}{16}$ " .....	X-8184-A
4	Hex head machine screws $\frac{3}{16}$ "-18 x 2 $\frac{1}{2}$ " .....	X-5973-M
2	"V" clamps .....	X-19434-A
2	"U" bolts .....	X-19433-A
4	Hex nuts $\frac{1}{4}$ " .....	X-8100-E
4	Square head set screw .....	X-3770-B
4	Lockwashers $\frac{1}{4}$ " (split) .....	X-2128-N
2	Cable clamps $\frac{3}{8}$ " (plastic) .....	X-3263-A
2	Cable clamps $\frac{1}{4}$ " (plastic) .....	X-3263-B
1	Terminal cover .....	X-19419-A
2	Self-threading screw #8 x $\frac{3}{8}$ " .....	X-8627-B
4	Hex head machine screw $\frac{3}{16}$ "-18 x $\frac{3}{8}$ " .....	X-5973-N
1	Flat washer $\frac{3}{16}$ " .....	X-2715-P
1	Hex nut 6-32 .....	X-601-P

## FEATURES AND SPECIFICATIONS

The HD-73 rotator incorporates all features that contribute to strength, durability and ease of installation without special tools or equipment as well as simple foolproof operation of the control box.

The HD-73 rotator is constructed of heavy duty aluminum castings selected for their excellent strength capability and favorable weight characteristic, contributing to ease of erection and resistance to severe wind and adverse weather conditions that exist throughout the world.

The HD-73 unit is factory lubricated with a lifetime high quality lubricant that will withstand temperature ranges of 120° Fahrenheit to -20° Fahrenheit.

The HD-73 mast support bracket design permits a centering procedure for in-tower application without shims or difficult trial and error adjustments and the base design permits easy four bolt in-tower mounting without spacers. The mast support bracket design also provides a positive drive no-slip option.

The HD-73 rotator unit has two full raceways of 100 ball bearings which give it excellent balanced weight bearing capacity.

The HD-73 has an improved automatic brake action for simplified operating procedure which also reduces risk of antenna damage by sudden stops imposing high inertia stresses on the antenna, tower and rotator.

The HD-73 has the heaviest pitch gear teeth (steel hardened) of any rotator in its size and price range.

The HD-73 control unit features TWO-SPEED rotation with one five-position switch. This presents a one revolution per minute speed for rotating over an extended arc and a slower speed for adjustment of, say, several degrees one way or the other for fine adjustments for the best signal on receiving and transmitting.

The rotator not only has a readily accessible externally located fuse for total unit protection, it also has an internally mounted automatic reset thermal protector for the motor and transformer against shorts or possible connection error or prolonged operation.

A large, back-illuminated 3½" Weston D'Arsonval, Taut Band, linear, full scale, 90° swing meter is calibrated in bold S-W-N-E-S as well as a degree-graduated scale.

The meter direction indicating voltage supply is solid state voltage regulated for meter indication accuracy regardless of wide line voltage or load variation; the regulating range is 105 to 129 volts.

The HD-73 rotor was designed to operate antennas with a maximum of 10.7 square feet of wind load area when properly installed.

Mast mounting size range — 1¾" O.D. to 2½" O.D.

Mounting Option — In tower (preferred), or on tower or mast.

Cable — 6 conductor.

Voltage input — 117 volts A.C., 60 hertz, ±12 volts.

Rotator weight (bare) — 6¼ lbs.

Rotator with 1 pair antenna brackets — 9¼ lbs.

Rotator with 2 pair brackets — 11½ lbs.

Shipping weight — 17 lbs.

Rotator speed — Dual — 1 R.P.M. and a pinpoint slower speed.

Motor — capacitor split phase, reversible. Motor voltage — 20 volts A.C. No voltage on motor or leads exceeds U.L. safety limits.

Transformer, power — Double protected — fuse and thermal protectors.

Meter — D.C. D'Arsonval, taut band. Meter scale — S.W.N.E.S. and degree scale.

## WIND LOAD INFORMATION

Severe installation and duty requirements are placed upon antenna rotators and supports by communication antenna arrays. The factors involved in such installations have been under investigation for many years to determine the effect of such requirements on antenna rotators, and how to design and manufacture rotators that will support and operate antennas under the very adverse conditions that exist in some localities. These locations are not only those of high wind velocity but also those of additional ice loading and severe conditions that exist during periods of blizzard and peak gusts of wind that occur in many areas.

The United States Weather Bureau furnished fastest mile per hour velocity figures from many recording stations around the United States. Measurements have been made of the relationship of gusts for fastest miles per hour data by the Bureau showing that gusts exceed fastest wind velocity data generally by 30%.

As a result of the above, the Electronic Industry Association (EIA) has recommended a wind loading standard of 30#/sq. ft. of projected surface for the purpose of design by United States manufacturers. This corresponds to a wind velocity of 110 mph. The use of this standard in design procedures will consistently yield products better able to withstand successfully most prevailing wind conditions in U.S.A.

This brings us to the subject of Bending Moment, also called Side Thrust Overturning. Wind loading or wind pressure acting on an antenna, rotator and tower are essentially the same as those acting on buildings, water towers and other structures. Wind loading is by far the most critical and severe item to be considered for antennas, rotators and tower life. A typical 3 element vertical C.B. antenna creates a bending moment of 1700 lb. ft. and necessitates in-tower mounting. Other C.B. antennas are vertically polarized and can exceed these values.

When considering the extreme wind loads against the antenna which in turn is supported by the rotator, it is necessary to give consideration to the bending moment and to mount the antenna (boom) as close to the rotator as possible (12" is desirable) or by mounting the rotator on a plate within the tower legs or structure about three to four feet down from the top tower sleeve. The drive shaft on a mast stub is free to rotate through this sleeve or bearing at the top of the tower. This gives the most favorable condition for the rotator to withstand the severe bending moment to which your antenna installation might be exposed. An example, if top of tower installation is used and the antenna boom is mounted one foot above the rotator, the wind pressure against the antenna could result in a bending moment of 300 pound-feet. If the same wind condition existed and the antenna was mounted 2 feet above the rotator, the bending moment would be twice as great at the rotator or 600 pound-feet, or, 1200 pound-feet at four feet above the rotator. Thus, it is important to keep the antenna boom as close as practical to the rotator if mounted on top of tower. Better yet, consider mounting the rotator in-tower.

## **GROUNDING, LIGHTNING, AND POWER LINE SAFETY CONSIDERATIONS**

Antenna masts, tower, lightning arresters, antenna discharge units, cable shields and other devices associated with radio equipment should be attached to an "effective" ground. (An effective ground is one which is in compliance with NEC Article 800-31 and 810-26).

To obtain maximum lightning protection for an antenna system we suggest that the antenna tower or mast be connected using a heavy gauge copper wire to an extremely low impedance path to earth ground. A low impedance ground may be obtained by driving a continuous rod approximately  $\frac{3}{8}$ " in diameter a minimum of eight feet into the earth or by connecting to a continuous, metallic underground water piping system, or a combination of both. A properly grounded antenna system (low impedance path to earth) will minimize the possibility of serious damage due to a direct stroke of lightning and the equalization of the difference in potential between the antenna system and storm clouds will be improved.

## **WARNING**

Lightning is not the only electrical consideration you must make. You must realize that the 120/240 volt line run into your home as well as the 7,200 volt line run by your utility company to the transformer in your immediate neighborhood are lethal voltages and must not be contacted by your antenna, tower, mast guy wires, coaxial cable or 6 conductor cable under any condition. All construction must be undertaken with a **100% safe plan before it starts.**

The United States Consumer Product Safety Commission (CPSC for short) says that according to their records and statistics CB radio operators are killing themselves at an increasing and alarming rate by accidentally running their base station antennas, masts and towers into nearby high voltage power lines.

## **DETAILED INSTALLATION PROCEDURE**

### **Tools suggested:**

- Screwdrivers,  $\frac{1}{8}$ " blade and  $\frac{1}{4}$ " blade
- Pen knife
- Open end wrench,  $\frac{3}{16}$ "
- Open end wrench or box wrench,  $\frac{3}{16}$ "
- Open end wrench or box wrench,  $\frac{1}{2}$ "
- Soldering iron
- Solder, resin core

### **Cable Purchase:**

Procure one appropriate length of cable to reach from the top of your tower or mast to your operating location.

Cable to be six conductor, each conductor to be insulated with a different color insulation and with an outer vinyl jacket. The conductor should be #20 (AWG) stranded, which is ample size for a length up to 125 feet. See chart at right for other lengths and cable gauges.

**IMPORTANT**  
FOR PROPER PERFORMANCE

AWG	STRAINS/INCH	DO NOT EXCEED THE MAXIMUM LENGTHS FOR WIRE SIZE AWG. CHART					
		10 FT.	20 FT.	30 FT.	40 FT.	50 FT.	60 FT.
22	7 x .00						
20	7 x .08						
18	COMB. 13 7 x .18						
16	10 x .20						
14	10 x .22						
12	10 x .24						
10	10 x .26						
8	10 x .28						
6	10 x .30						

### AVAILABLE CABLES

Alpha	#1896/6	6 conductors #20 ga.
Alpha	#1176	6 conductors #22 ga.
Alpha	#1898/6	6 conductors #18 ga.
Columbia	#04066	6 conductors #22 ga.
*Belden	#8446	6 conductors 2/18 ga., 4/22 ga.
*Columbia	#04081	6 conductors 2/18 ga., 4/22 ga.
**Belden	#8448	8 conductors 2/18 ga., 6/22 ga.
**Columbia	#04080	8 conductors 2/18 ga., 6/22 ga.
**Columbia	#04083	8 conductors 2/18 ga., 6/22 ga.

\*Use the 18 gauge conductors for connections to terminals 1 and 6.

\*\*When using 8-conductor cable, three of the smaller (22 ga.) wires can be joined together to make one heavier wire at terminal 3 on each end.

### PRELIMINARY TRIAL HOOK-UP

**NOTE:** It is recommended that the system be interconnected and tested on the ground using the intended cable before installing the rotator high above ground.

Cable preparation — Top End:

- (1) With a pen knife, cut out the thin web of plastic in the terminal cover just large enough for your cable to pass snugly through it.
- (2) Before cutting away any cable jacket, pass the jacketed cable through the hole made above.
- (3) Next, remove 1½ inches of the cable jacket, to expose the wires. See illustration #1.
- (4) Next, strip ½ inch of insulation from each wire. Then twist and solder-coat (tin) the wires to keep any strands from fraying. This is important, since the most difficult place to make repairs to connections is at the top of the tower. See illustration #2.
- (5) Connect a wire to each of the six terminals of the Rotator Motor Drive Unit. Form each wire snugly around the terminal screw and tighten screw securely making certain that no loose strands touch any other terminals. See illustration #3.
- (6) Do not attach terminal cover in place yet, as you will need to double-check the wire colors connected to each terminal when you connect the other end of the cable.

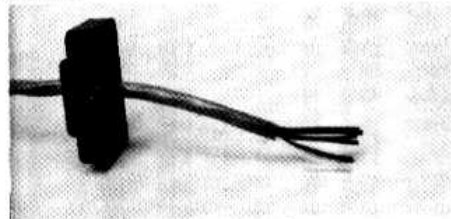


Figure #1

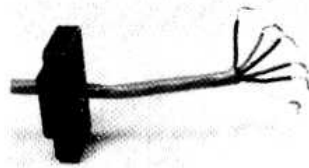


Figure #2



Figure #3

#### Cable preparation — Bottom End:

- (1) Remove 3½" of jacket.
- (2) After looking at figure #4, cut the length of each of the wires so that they will reach the terminals in the same color sequence that you used at the top end. If you connected black to terminal one at the top, then you must connect black to terminal one at the bottom. If red wire goes to terminal two at the top, then red goes to terminal two at the bottom, and so forth through all six connections.



Figure #4

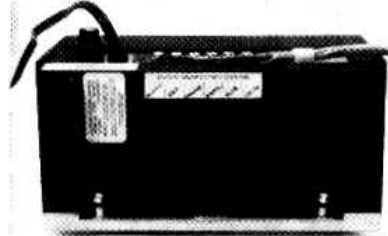


Figure #5

**WARNING:** FAILURE TO KEEP THESE COLORS STRAIGHT WILL LIKELY DESTROY THE METER OR OTHER INTERNAL PARTS.

Record the colors used on the chart on the bottom of control case for future reference. See fig. #5.

- (3) Strip the insulation off the wires ½ inch, twist the strands together and solder-coat them.
- (4) Connect the wires to the terminals in the proper color sequence wrapping the tinned ends carefully around the terminal screws and making certain that no loose strands of wire touch adjacent terminals or other metal parts.
- (5) Attach cable clamp, using the size clamp supplied which fits snugly to your cable. Use washer and #6 nut supplied. See figure #4.
- (6) Now go back to the Rotator Motor Drive Unit and attach the terminal cover with the two #8 x ⅜ inch screws, mounting a cable clamp under one of these screws. See fig. #6. Use the cable clamp supplied that fits snugly around your cable.



Figure #6

### TESTING THE SYSTEM

You are now ready to try out your rotator and its connections on your bench.

- (1) Set the Rotator Motor Drive Unit upright on the base (the end with the cable attached). Plug the power cord into power outlet and turn on the power switch on the front panel. The meter should now be illuminated.
- (2) Press the right end of the control switch down and observe that the rotator turns clockwise when looking down on it, and that the meter moves to the right. Press the left end of the switch down and the rotator will turn counter-clockwise and the meter will move to the left.
- (3) Observe that pressing the switch down half-way turns the rotator at slow speed, and pressing switch all the way turns the rotator at normal speed. It should require about one minute for the rotator to make a full 360 degree rotation (from S to S on the dial) at normal speed, and somewhat longer at slow speed.
- (4) If you run the rotator continuously and repeatedly back and forth for a considerable time it is normal for the thermal protector in the control to shut down the system for perhaps a half-hour to allow it to cool off. When the meter light comes back on, the system is ready to operate again.

## CALIBRATION OF METER

- (1) Run the unit full counter-clockwise by pressing the left side of control switch. When rotator reaches stop, release the control switch. Leave main power switch "on". If meter pointer is not on left-hand "S" adjust it to read exactly on left "S" with a small screw-driver through the hole beneath the meter. See figure #7.
- (2) Now run rotator to clockwise stop by pressing right side of control switch. Release switch. Using "Calibrate" knob on panel, adjust meter pointer to read on right-hand "S". Your HD-73 is now calibrated.

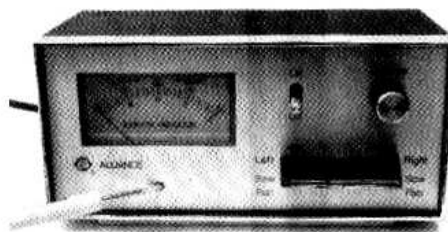


Figure #7

## PREPARATION FOR INSTALLATION

- (1) Depress control switch to set rotator to due North position, that is, so that meter points exactly at the "N". Turn off power switch. Do not operate rotator again until you have antenna mounted.
- (2) Make certain that you have recorded on the bottom of the control unit the color of the wire attached to each terminal screw. (You must do this or otherwise you will be unable to re-attach the wires correctly later since the rotator end connections will no longer be visible after it is installed above ground.) Disconnect the wires from the control unit.
- (3) You are now ready to make your installation with your **antenna pointed north**.

## IN-TOWER INSTALLATION

(This is the best method)

You may have purchased a triangular plate with U-bolts for in-tower mounting. If so, use the hole-drilling template supplied to provide matching holes for your rotator base mounting.

If a tower mounting plate is not available, you can construct one of either  $\frac{3}{16}$ " thick aluminum or  $\frac{1}{4}$ " thick steel. Purchase also three  $\frac{1}{4}$ " U-bolts which are of a size to pass around the tower cross braces. See figure #8 for suggested design.

- (1) Attach the plate to the top side of the tower cross braces which are about 3 feet from the bearing at the very top of the tower.
- (2) Attach the base of the rotator (the end with the cable attached) to the above plate securely with the four  $\frac{3}{16}$ -18 x  $\frac{1}{2}$ " long hex head screws and lock washers.
- (3) Take a pair of mast supports (all 4 are alike) and attach them to each other with two (2)  $\frac{3}{16}$ -18 x  $2\frac{1}{2}$ " long hex head bolts and lockwashers through the large hole of each support and into the smaller threaded hole of the other (do not run the bolts and parts clear together as the short mast that will extend vertically out the top of your tower must enter the open end).
- (4) Place a "U" bolt from the parts kit supplied through the end holes in the supports. Place "V" clamp on the projecting threaded ends of the "U" bolt. Place  $\frac{1}{4}$ " lockwashers and nuts on the U-bolt. Do not tighten.
- (5) Attach the mast supports to the top of the rotator with four (4)  $\frac{3}{16}$ -18 x 1" hex head screws, four (4) lock washers, and four (4) flat washers **finger tight**.
- (6) Center the mast supports by eye comparison of the two sets of four  $\frac{1}{8}$ " round bosses that show at the base of the two clamps. This centering is necessary so mast stub will turn freely (not bind) in tower top sleeve or bearing.



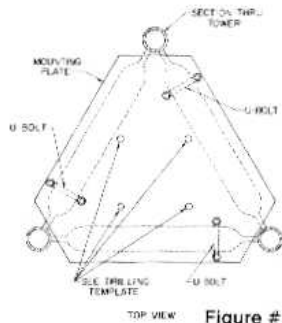


Figure #8

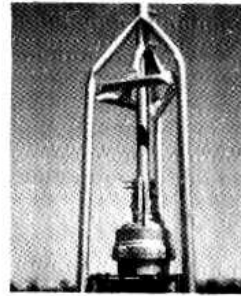


Figure #9

- (7) Place your mast through the top bearing of the tower and then into the open end of the loosely assembled mast supports as far as possible.
- (8) Tighten the two  $\frac{3}{16}$ -18 x  $2\frac{1}{2}$ " long hex head screws evenly (so space between mast supports is the same on both sides).
- (9) Tighten the two  $\frac{1}{4}$ " hex nuts on "U" bolt evenly.
- (10) With assembly centered, tighten the four screws securing the mast supports to the rotator top.
- (11) Place two square-head cone-point set screws into the threaded center holes of the mast supports. Tighten into the mast to lock the assembly. Optional increased locking strength is obtained by drilling  $\frac{3}{16}$ " holes through both mast support center holes and tower extension and using a  $\frac{3}{16}$ " screw placed through the holes held by a lockwasher and nut (not furnished). See figure #9.
- (12) You are now ready to place your antenna onto the mast. **BE SURE ANTENNA IS MOUNTED ON THE MAST SO IT WILL BE POINTED NORTH WHEN TOWER IS RAISED.**

### TOP OF TOWER OR MAST MOUNTING

(Alternate method when antenna cross boom is no more than 2 feet above rotator top. Not suitable for vertically stacked antennas.)

- (1) Take a pair of mast supports (all 4 are alike) and attach them to each other with two  $\frac{3}{16}$ " x  $2\frac{1}{2}$ " hex head screws and lockwashers, by placing the screws through the larger unthreaded hole of each support and screw partially into the smaller threaded hole of the other support (do not run the screws and parts clear together as your tower extension or mast must enter later).
- (2) Place a "U" bolt through the two corner end holes of both mast supports. Place the "V" shaped clamp over the "U" bolt ends. Place one  $\frac{1}{4}$ " lockwasher and nut on each "U" bolt threaded end.
- (3) Place the open end of the mast support assembly onto the end of the tower extension or mast all the way so that it bottoms in the mast clamp assembly.
- (4) Tighten the  $\frac{3}{16}$ -18 x  $2\frac{1}{2}$ " bolts alternately and moderately.
- (5) Tighten the  $\frac{1}{4}$ " "U" bolt nuts, alternately and securely.
- (6) Go back and tighten the  $\frac{3}{16}$ " x  $2\frac{1}{2}$ " bolts securely. See figure #10.
- (7) Attach the rotator unit bottom (end with the terminals) with four (4)  $\frac{3}{16}$ -18 x 1" long hex head screws with  $\frac{3}{16}$ " lockwashers and  $\frac{3}{16}$ " plain flat washers to the pair of mast supports (just attached to the top of tower stud or mast). Tighten screws securely.
- (8) Place a square-head cone-point set screw into each of the two threaded center holes. Tighten securely into your tower extension or mast to lock the assembly. Optional increased locking strength is obtained by drilling  $\frac{3}{16}$ " holes through both mast support center holes and tower extension and using a  $\frac{3}{16}$ " screw placed through the holes held by a lockwasher and nut (not furnished). See figure #11.



Figure #10



Figure #11

- (9) Assemble upper mast supports in a similar fashion and attach to top of rotator. Install upper mast section into supports and tighten all screws.
- (10) Place antenna on mast so that it will be pointed North when the tower is raised.

### COMPLETING CONNECTIONS

- (1) Run 6 conductor control cable and antenna lead-in down the tower to your operating position, securing both to the tower but leaving enough slack in the antenna lead-in to permit antenna rotation.
- (2) Reconnect the six wires in the cable to the control case using the colors as you recorded them on the bottom of the case. Reattach the plastic cable clamp with the washer and nut supplied.
- (3) Attach your antenna lead-in to the radio, plug the control case power cord into a grounded wall outlet, and you are ready to use your Alliance HD-73 rotator for many years of satisfaction.

**NOTE:** Do not leave the antenna pointed due South against the rotator stop in either direction to avoid wear and chatter against the stop in high winds. Your rotator will then be held in position by its brake rather than against either of its stops at all times when not in use.

PLEASE FILL OUT AND MAIL THE WARRANTY CARD.

Repairs and adjustments may be taken care of by any of the many Alliance Dealers or Jobbers scattered throughout the U.S.A. and Canada, or you may mail directly to our Service Department.

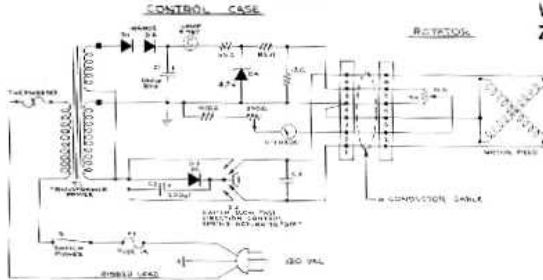
You may naturally order repair parts directly from the Company by listing the quantity, name and part number with your order addressed to:

Service Department  
The Alliance Manufacturing Co., Inc.  
2435 South Union Avenue  
Alliance, Ohio 44601

The product described herein is made in accordance with the specifications at the time of publication. The manufacturer reserves the right to change specifications as manufacturing and use requirements change.

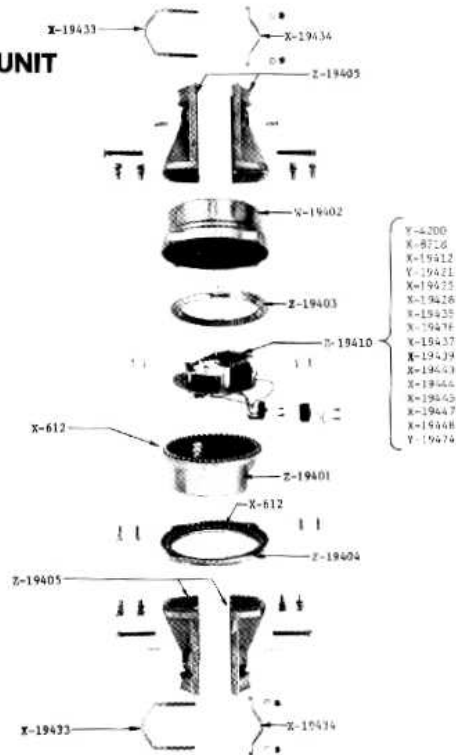
## CONTROL CASE UNIT

PART NO.	NAME	PART NO.	NAME
Z-19531-R	Control Case Assembly	X-19455-R	Slide Switch Assembly
X-19458-A	Knob	Y-19453-A	Name Plate
X-19418-R	Cord & Plug Assembly	W-19472-A	Chassis
X-9541-D	Strain Relief	Y-19487-R	Transformer
X-19390-R	Fuse Holder Assembly	X-19467-R	Switch Base & Tab Assembly
X-19389-B	Fuse, 1 Amp, 3AG	Y-19393-A	Actuator, Switch
X-18061-C	Capacitor	X-19460-A	Cam, Slide Stop
Y-19459-R	Meter Assembly	X-19462-A	Slide, Stop
X-19464-A	Mounting Stud, Threaded	X-8130-A	Retainer, Pushnut
W-19461-B	Control Panel (tapped)	X-19537-A	Spring, Return
X-19468-R	Potentiometer Assy. (control case)	Y-19469-R	Circuit Board & Components Assy.
		W-19452-A	Case, Control
		Z-19454-A	Bezel



## ROTATOR UNIT

PART NO.	NAME
W-19400-R	Rotator Assembly
Z-19401-B	Housing, Lower (tapped)
Z-19410-R	Motor & Drive Assembly
X-19437-R	Gear & Pinion Assembly
X-19436-B	Shaft, 1st. stage (copper flash)
X-8718-A	Retaining Ring (bowed)
X-19412-B	Shaft, Gear (copper flash)
X-19435-B	Shaft, Gear (copper flash)
X-19443-R	Gear & Pinion Assembly
X-19443-S	Gear & Pinion Assembly
X-19444-R	Gear & Pinion Assembly
X-19445-R	Gear & Bushing Assembly
X-19447-A	Spacer
X-19447-B	Spacer
X-19448-R	Potentiometer Assy. (rotator)
Y-19428-A	Gear & Pinion (molded)
X-19439-R	Gear & Hub Assembly
X-19425-R	Brake Disc & Pinion Assembly
Y-19421-R	Rotor Assembly
Y-19474-R	Field & Terminal Assembly
Y-4200-U	End Bracket Assembly
X-612-D	Ball
Z-19403-A	Gear, Internal
X-19409-B	Lever, Stop
X-8129-A	Retainer, Pushnut
W-19402-B	Housing, Upper (machine)
Z-19404-A	Ring, Clamp (cast)
X-8062-Q	Screw, Taptite Hex. Head
Z-19405-B	Mast Clamp (tapped)
X-19434-A	"V" Clamp
X-19433-A	U-Bolt



## TROUBLE SHOOTING

The most frequent cause of rotator problems has been in the cable connections. It is vital that the wires in the cable be connected with each colored wire attached to the same numbered terminal at each end. Also extreme care must be taken to avoid broken wires, wires shorting accidentally to adjacent terminals, and bared wires touching anything metallic except the intended terminals. Extra care in preparing the cable ends by stripping, tinning, forming the tinned ends around the terminal screws, and using properly the cable strain reliefs supplied will lead to long, trouble-free service.

Another possible cause of trouble in a heavy, gusting wind condition would be undesired antenna rotation. The mast support clamps must be tight, and set screws or through bolts must be used to prevent rotation.

The most likely cause of weakened rotational power is a faulty motor capacitor in the control box.

It is normal for the thermostat in the power transformer in the control box to shut down the system if the rotator is run continuously back and forth for several complete end-to-end rotations. Allowing the system to cool for 20 to 30 minutes will restore service.

Short circuits in the external connections to the control box can blow the fuse. Replace it only with the same type (3AG) one ampere fuse.

The meter lamp should last for a very long time, however, if it needs replacement, use type #757 only.

Before deciding that it will be necessary to bring the Rotator Motor Drive Unit down to the ground for service, it would be well to check the resistances of this unit as follows:

- A) Disconnect the six wires from the control box.
- B) With an ohmmeter, check the resistance from wire to wire in the cable leading to the rotator. You should find about 5 ohms from lead 1 to 6, 3 ohms from lead 3 to lead 1 and lead 3 to lead 6, 75 ohms from lead 4 to lead 5, and a value from 0 to 75 ohms from lead 4 to lead 2. None of the leads should show continuity to the tower or mast which supports the rotator. Also, leads 1, 3, and 6 should not show continuity to leads 2, 4, or 5. Readings other than these mean shorts or opens in the cable, the cable terminations, or lastly inside the rotator unit itself.