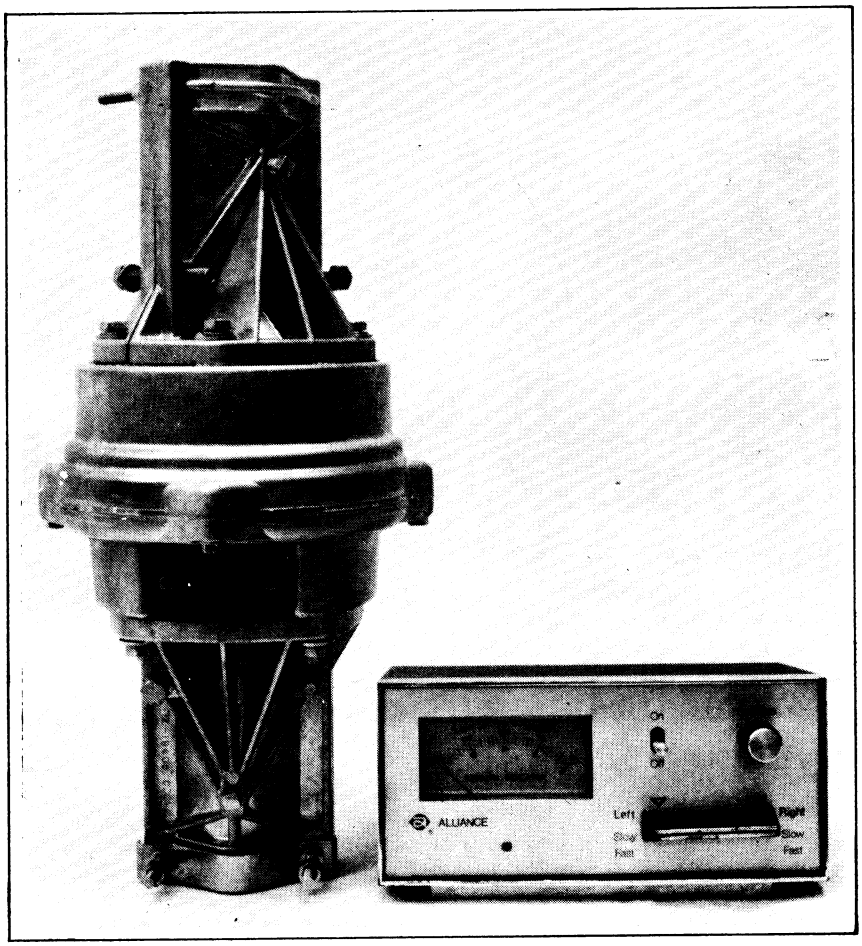
OWNER'S MANUAL

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

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 5/16-18 x 1"	X-5973-F
12	Lockwashers 5/16" (split)	X-2128-M
8	Flat Washers 5/16"	X-8184-A
4	Hex head machine screws 5/16-18 x 2 1/2"	X-5973-M
2	"V" clamps	X-19434-A
2	"U" bolts	X-19433-A
4	Hex nuts 1/4"	X-8100-E
4	Square head set screw	X-3770-B
4	Lockwashers 1/4" (split)	X-2128-N
2	Cable clamps 3/16" (plastic)	X-3263-A
2	Cable clamps 1/4" (plastic)	X-3263-B
1	Terminal cover	X-19419-A
2	Self-threading screw #8 x 5/8"	X-8627-B
4	Hex head machine screw 5/16-18 x 5/8"	X-5973-N
1	Flat washer 9/64"	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 — 1⅜" 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) — 6¾ lbs.
Rotator with 1 pair antenna brackets — 9⅛ 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 ⅝″ 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, ⅛″ blade and ¼″ blade
Pen knife
Open end wrench, 5/16″
Open end wrench or box wrench, 7/16″
Open end wrench or box wrench, ½″
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
DO NOT EXCEED THE MAXIMUM LENGTHS PER WIRE SIZE (AWG) ON CHART

AWG	STRANDING	50 FT.	100 FT.	150 FT.	200 FT.	250 FT.	300 FT.	350 FT.	400 FT.
22	7 x 30								
20	7 x 28								
20	DOUBLED 7 x 28								
20	10 x 30								
20	DOUBLED 10 x 30								
18	16 x 30								
18	DOUBLED 16 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.

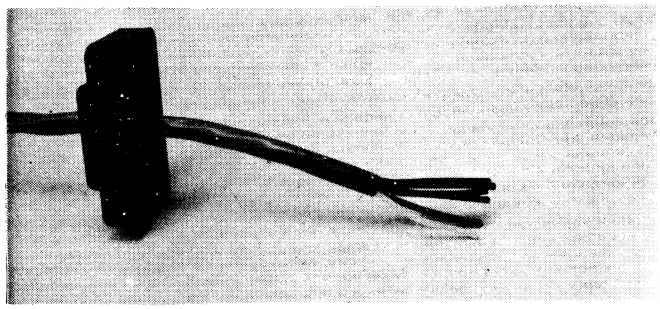


Figure #1

(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.

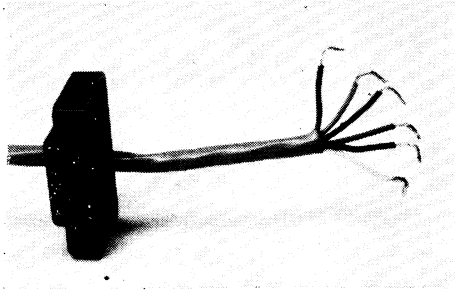


Figure #2

Figure #3