

Ham 89 - Repeater antenna uhf

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The UHF distributed system is designed for minimum installation. Installation is expected to be adjacent to a barn or similar structure. The repeater consists of mast, antenna, lightning protection, grounding, coax, radios, and connections.

Mast mechanical.

If necessary for weight, concrete foundation supports the mast.

Pivot/tilt base mounted to foundation allows the mast to rotate.

Mast is monopole which should not rise over 10' above support or may be triangular, free-standing tower.

Unless welded, electrical bonds must be made across joints.

Mast must be high enough the top of the antenna is above the building.

Mast should support 100 mph wind loading with the antenna attached.

Building should not block the antenna from seeing control repeater.

An UHF antenna is set 7" to the side of the mast. Antenna is similar to Telewave Ant450D6-9.

Dimension: 71 x 12". Weight: 18 lbs. Exposed area: 1.4 ft². Lateral thrust at 100 mph: 60 lbs.

Winch to pivot the mast down to access the antenna is required, if too heavy for two people to raise.

Pulley is required to redirect the cable from the winch mounted near the base to tower.

Mast attachment for connection of the winch cable.

Lock-in-place building latch holds the tower rigidly in place, but must release for tilting.

If not mechanical winch, a 120-Volt power receptacle, weather proof, in-service. cover

Mast grounding.

Put single-point ground bus near base of antenna for bonding downcomers and grounding conductors.

Electrical ground system must be bonded to the single point ground bus. (#4)

Use three (3) ground rods, spaced >17' apart, with ground wire bonding between each.

If adequate depth is not available for bonding wire, encase in concrete.

Connect lightning rod to closest, mast to one, building metal to one. Bond all to the single point.

If the building is steel, frame is electrically bonded, and to rebar, grid connections may be used.

Two connections are bonded to the steel, at least 20' apart for energy dissipation.

One driven 8' ground rod near the base provides the reference.

Inside structure.

A dedicated 120-Volt circuit with a duplex receptacle is needed.

A wired Ethernet connection is essential.

Make building penetration for coax and ground. Use a 2" sweep elbow or similar PVC conduit.

A mounting shelf for two (2) backup batteries, marine size, can be wherever space available.

Rack 19" x 32" (18U) for 100-W UHF radio, power supply, battery charger, vents, and duplexers.

EGC hams will install the following items.

Place a 18" lightning rod above the top of mast with hemispherical shape lightning-attachment-point.

Run lightning conductor (#1/0) down the mast. Bonded to rod at top, mast mid & bottom, and ground point.

Run lightning conductor (#1/0) from mast near bottom to ground point. Strap conductors to mast like coax.

Install offset brackets from mast to antenna, so top of antenna is 18" below rod top for lightning guard.

UHF antenna uses multi-bay phasing harness similar to www.JagRf.com.

Strap coax from antenna down the mast to control room radio with heavy, black zip-ties every 3'.

Use lightning protector with five ferrite beads at top and protector before enter building.

Run ground wire from common bus to inside rack.

Control with Raspberry Pi, interface board, case, software, and ethernet cable.

Arrange radios, power supply, battery charger, duplexers, coax and batteries.

Caution. Obtain professional assistance for design and installation.

Life is good. Enjoy!

