20m Fibreglass Vertical Mobile Antenna -EA5AVL

EA5AVL 20m Telescopic Fibreglass Fishing Pole Antenna

Total weight 3Lbs (1.5 Kg)

3 Nylon guys may be necessary to stabilise the antenna in high winds .

Height at 14.00MHz 11'-1" (3.38m)

Length for transportation 6'-9" (2.1m) and will fit inside a car easily

A fibreglass fishing pole that is nominally 4-5 metres long is required for this design. You may have to shortened it to open up the throat to take the end of the Whip section

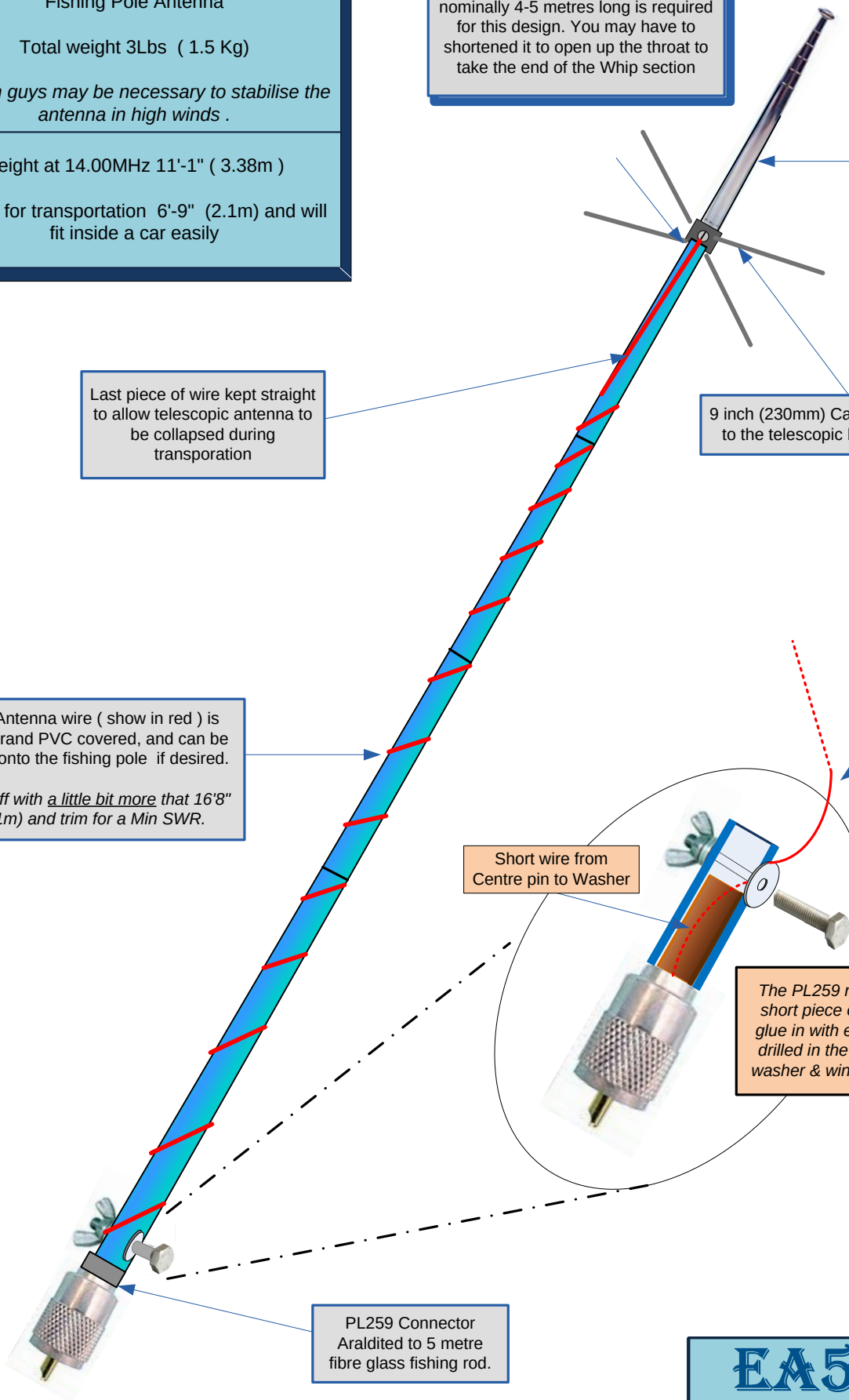
Fold-over ex-transistor radio Telescopic antenna
4 inch (100mm) adjustment covers 14.00-14.35 MHz

Last piece of wire kept straight to allow telescopic antenna to be collapsed during transporation

9 inch (230mm) Capacity Hat clamped to the telescopic hinge fixing clamp

The Antenna wire (show in red) is multistrand PVC covered, and can be taped onto the fishing pole if desired.

Start off with a little bit more that 16'8" (5.1m) and trim for a Min SWR.



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Readings taken with an MFJ 296 Antenna Analyser 13Aug/2008

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Freq MHz	SWR	Match Ohms	Efficiency %
14.00	1.2	56	99
14.10	1.1	50	99
14.20	1.1	46	99
14.30	1.2	45	99
14.350	1.3	43	98

Tuning the Antenna

This is best done with an Antenna Analyser, but with care a transceiver on low power and a good quality SWR meter will suffice. If using and SWR meter then a Cross-Needle meter is recommended, other types need the Forward Power resetting to full scale every time the antenna is shortened and its impedance changes, causing the forward power to change.

Using the Formula for a 1/ 4 wave = 234/ Frequency (MHz)

14.000 MHz = 16' 8" (5.1m approx)
14.350 MHz = 16' 4 " (5.0m approx)

Thus 4" (100mm) change in antenna length will shift the frequency by 350 KHz. The incorporated small telescopic antenna will easily accommodate this change and ensure the SWR is always kept to a minimum.

With the Telescopic antenna fully extended and Antenna Analyser or Transceiver set to 14.000MHz.

Starting with a slightly oversize length of wire carefully spiral this around the fibre glass fishing pole and attach ias shown in the diagram. Secure the wire to the telescopic whip, and wing nut and washer at the base of the antenna have been provided to facilitate tuning. Check the SWR, and start to trim the wire by about ½ inch (10mm) at a time. After the wire is re-secured recheck the SWR. Continue until the SWR is close to 1.3:1 or better.

As the tuning progresses it will also be necessary to re-adjust the spiralling of the wire on the fishing rod.

Finally set the frequency to 14.350MHz and lower the Telescopic antenna by 4" (100mm),

Re-check that the SWR is still somewhere close to 1.3:1 or better.

However the telescopic whip top section can be replaced with a stiff wire, and the antenna simply tuned up to mid band on 14.175MHz. The SWR will still be less than 1.3 between 14.000MHz to 14.350 MHz.

If used on a car the addition of good earth spike from body car chassis to earth will improve VSWR readings and performance.

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"Here's one I made earlier" EA5AVL

Demonstrating how to Stabilise the boot mounted antenna for static operation in windy conditions

Close-up of the antenna mounting. The antenna is basically self supporting and can be used like this when the weather conditions are calm.

Photograph showing the four spoke of the "Top-Hat" capacitor . The joint to the antenna wire is protected with silicone bath sealant.

The 20m and the 5-Band Vertical antenna prior being loaded for the holiday in Andorra Sept 08.

Photographs supplied by EA5AVL Sept 2008

The 20m antenna is simple and cheap to make, and has a performance that matches commercial antennas but at cost considerably lower. The design was purposely based on a telescoping fibre glass fishing rod as this allows it to be easily stowed away in the car.

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Modification to Attach PL259 to the end of the Fishing Rod

Unscrew the nylon end cap with a rubber disc off the fishing rod. The rubber disc is discarded and replaced with a thick brass washer. The washer's hole is enlarged to be very slightly larger than the diameter of the PL259 cable end. Carefully position the PL259 connector in the washer ready for soldering. Flow solder over the top of the washer and into the gap between the washer and connector to firmly secure the PL259 connector. Remove any flux residue and insert the washer & PL259 connector into the end cap. Complete the modification by firmly screwing on the end cap.

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