

MODEL **CHV-5 α** alpha

HF - 50MHz multi-band
Compact Dipole Antenna
for 7, 14 or 18, 21, 28, 50 MHz

COMET ANTENNA

Instruction Manual

Thank you for purchasing our products.

For your safety :

Read this manual carefully for proper handling and operation before using.
Keep this manual in a safe place for future reference.

【Features】

- ◆ Easily assembled in "V", Ground-Plane or horizontal configuration
- ◆ It can also be used for carrying operations with lightweight design
- ◆ Easy to adjust frequency with wideband Balun
- ◆ New 18 MHz band element is added plus a 14 MHz band selective installation type
- ◆ Now mounted on horizontal masts such as veranda handrails

【Specifications】

- Freq.Band : 7, 14 or 18, 21, 28, 50MHz / 5 Band
- Antenna Type : Center loading half wave dipole
- Gain : approx. 2.15dBi (All-band)
- Max Power : 150 W(SSB) [7/14 or 18MHz],
220 W(SSB) [21/28/50MHz]
- VSWR : 1.5 or less (at center freq. each band)
- Impedance : 50 Ω
- Connector : M-J (SO-239) type
- Mounting Mast Diameter : Round Pipe Φ 30~62mm
Square Pipe \square 25~60mm
- Max Wind Survival : 30m/sec
- Horizontal Length : approx. 4.0m
- Weight : approx. 2.8kg (each element : approx.0.9kg)



Warnings must be followed carefully to avoid serious bodily injury.



Cautions must be observed to avoid minor injury to your self or damage to your equipment.

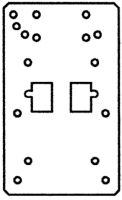


You might be killed or injured if you don't follow the below instructions.

- ① Choose a safe place to erect this antenna, complying with the laws and regulations in your country.
- ② Choose a calm, dry day to erect the antenna.
- ③ Do not erect this antenna while lightning.
- ④ Do not touch the antenna while transmitting.
- ⑤ Do not erect this antenna near any electric wires and street lamps.
- ⑥ Make sure to tighten the screws, nuts and bolts securely. Otherwise the antenna falls very easily.
- ⑦ Be careful not to drop down any tools or screws when mounting this antenna on a high place.
- ⑧ Fix the coax cable securely, otherwise this antenna could be collapsed by heavy wind.

Parts List

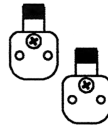
★Before assembling, please check whether the parts are included as shown in the parts list below.



Balun mounting plate ... 1



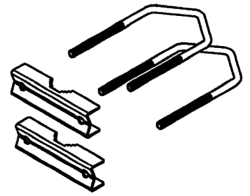
Balun CBL-2500 ... 1



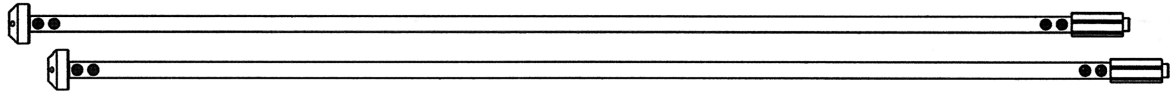
Element
Spacer ... 2



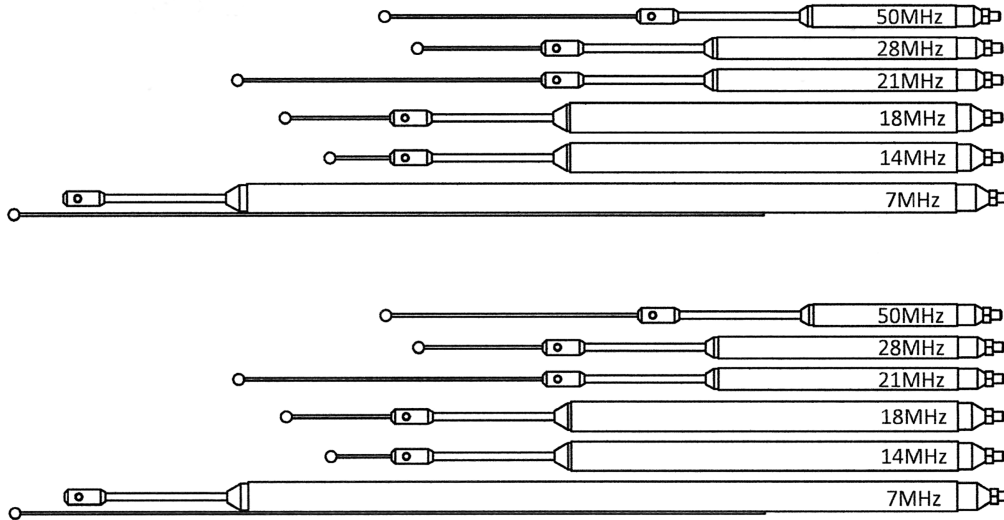
Feeder line ... 2



Mount bracket ... 2
U-Shaped bolt ... 2



Aluminum element pipe assembly ... 2 sets



Loading coil element Assy ... 2 each band
(With one spring washer for each coil element [12 total])

The hexagon socket set screw (hollow-set screw) used for adjusting the element length is already built in. The size is M4 x 3.

Other accessory screws

	Parts Name	Qty.	Place of use
1	M6 Hex.Nut	10	M6 screw (bolt) Place to be used
2	M6 Spring Washer	10	
3	M6 Flat Washer	12	
4	M6x30 Hex.Bolt	2	For balun fixing [Fig.2]
5	M6x40 Hex.Bolt	4	For fixing element spacers [Fig.3]
6	M4x20 Pan-head screw (w/ SW)	2	For fixing the spacer and the feeder line [Fig.4]
7	M4x10 Pan-head screw (w/ SW)	2	For fixing the balun and the feeder [Fig.4] At the time of shipment it is attached to the terminal of the balun.
8	Ring Spacer (Length:6mm)	2	Spacer for filling the gap between the balun and the mounting plate [Fig.2]
9	Self-fusing tape (20cm)	1	Waterproof coaxial connector [Fig.8]
10	Hexagonal wrench (opposite side 2 mm)	1	For adjustment of top element length [Page 6]

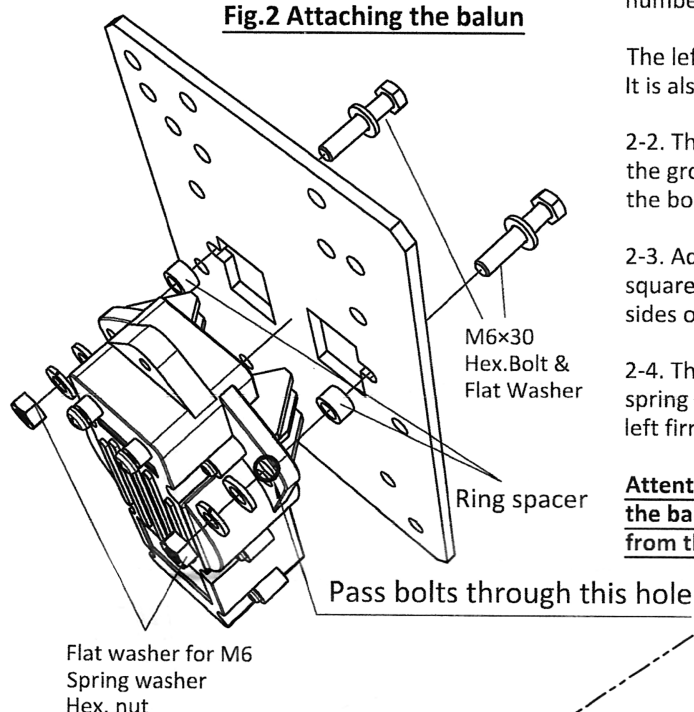


PRECAUTIONS for Installation

- Always wear a safety hat and a life line when you mount this antenna on a high place, such as roof top.
- Check if the Cable Connector fits into this antenna.
- Be sure to tighten all screws, nuts and bolts to prevent them from coming loose by vehicle vibration or earthquake.
- Do not erect this antenna near any overhead wires, steel towers, buildings or any other obstacles. Otherwise, SWR could be higher or cause significant performance degradation.
- Waterproofing is highly recommended, especially for long-term use.

Procedure for assembling the antenna

Fig.2 Attaching the balun



【Assembling procedure】

2-1. Determine the orientation of the balun mounting plate.

There is a difference in the variable angle of the mounting plate, the number of holes is different on the left and right.

The left figure shows the arrangement with many holes on the left side. It is also possible to flip the plate upside down.

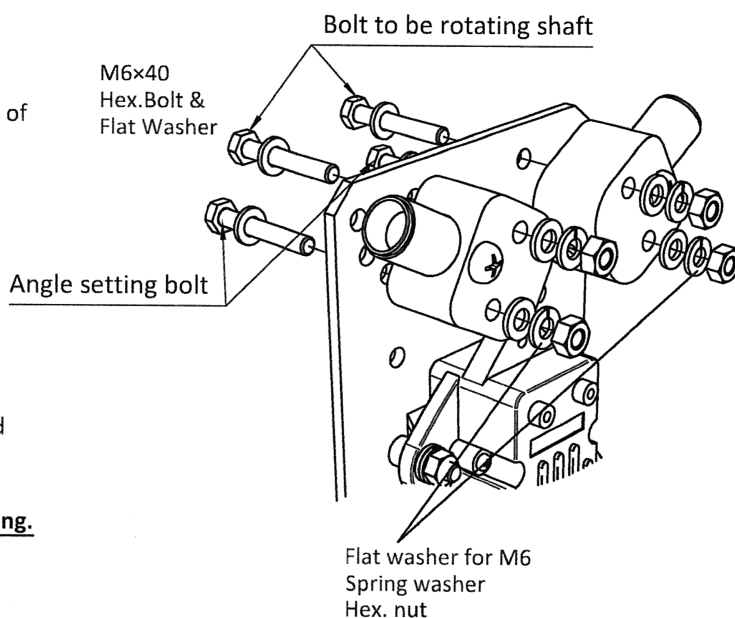
2-2. Thread the M6 × 30 bolts, M6 flat washer from the back side through the groove of the square hole and let the ring-shaped spacer pass through the bolt from the front side.

2-3. Adjust the mountain-shaped part on the back of the balun to the square cutout part of the board. There are four holes on the left and right sides of the balun, but use the upper two of the holes.

2-4. Thread the bolt screw through the hole, then pass the flat washer, the spring washer and the hexagon nut in that order, tighten the both right and left firmly.

Attention: If the bolts and nuts are tightened too much, the housing of the balun may be deformed, causing resin cracking, water infiltration, etc. from the deformed part.

Fig.3 Attaching element spacers



【Assembling procedure】

3-1. Thread the M6 × 40 bolts, M6 flat washer from the back side of the plate through the hole at the top of the plate.

At this point, the opening angle of the left and right antennas is decided (see Fig. 9).

3-2. Attach the element spacers to the left and right. Since there is a direction in which the screw head appears in one place, make that side the front side.

3-3. Thread in the order of the flat washer, the spring washer and the hexagon nut, tighten firmly to the left and right firmly.

Attention: Overtightening bolts and nuts may cause resin cracking.

The figure below is an illustration of only the left side. In fact it will be assembled to the left and right.

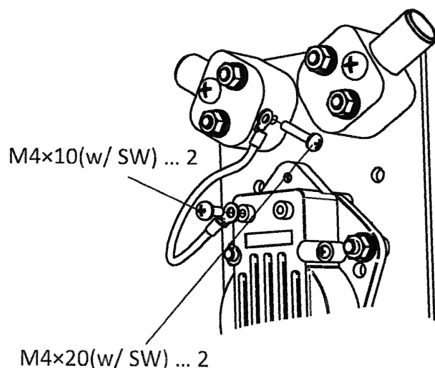


Fig.4 Installation of feeder line

【Assembly procedure】

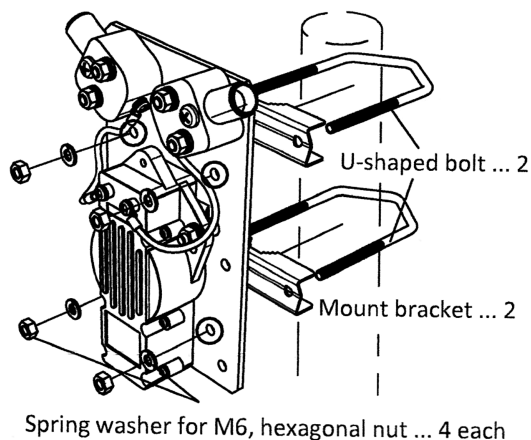
4-1. Secure the feeder terminals and element spacers with M4 × 20 screws.

4-2. Bend the feeder in the direction of the terminal of the balun with a large Round, and align the hole position of the terminal with the terminal position of the balun.

4-3. Mount the feeder line at the left and right two terminals of the balun with reference to the figure on the right. M4 × 10 screws used

* Depending on the direction, the driver etc may not enter, so in that case please attach the feeder line before fixing the element spacer with bolts.

**Fig.5-1 Installation of 2 mount brackets
(Vertical Mast)**



When mounted on a vertical mast

[Assembly procedure]

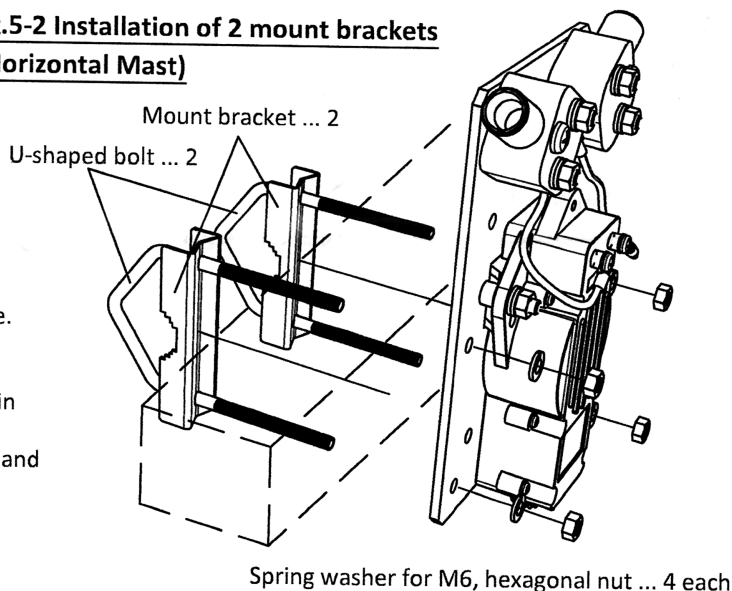
5-1. On the other side of the surface where the balun is attached, align the U-shaped bracket and the hole of the aluminum plate, and pass the screw of the square U-shaped bolt. Secure with spring washers and hex nuts on the balun side. Attach the top and bottom 2 types as shown in [Fig. 5-1], and fix it to the mast on hand so that it can be held between the mount bracket and the U-shaped bolt.

•Mountable range [Round pipe] : $\phi 30$ to 62 mm

Note : We do not recommend square pipe because convex part of the back of balun interferes.

Tighten the fixing nut firmly so that there is no rattling.

**Fig.5-2 Installation of 2 mount brackets
(Horizontal Mast)**



When mounted on a Horizontal mast

5-2. If you want to install on a horizontal pipe such as veranda handrail, align the hole positions of the bracket and aluminum plate with the hole positions indicated in the right figure. Insert the U-shaped bolt thread through the mount bracket hole. Secure with spring washers and hex nuts on the balun side.

When fixing a square pipe, the left and right two sets as shown in [Fig. 5-2] Fix it by sandwiching it with a balun mounting plate. In the case of a round pipe, insert it between the U-shaped bolt and the mount bracket.

•Mountable range [Round pipe] : $\phi 30$ to 62 mm
[Square pipe] : $\square 25$ to 60 mm

Tighten the fixing nut firmly so that there is no rattling.

Attention point: The part where U-shaped bolt and mount bracket hit , It may deform or damage the contacts, so Please protect it with a backing plate or backing cloth.

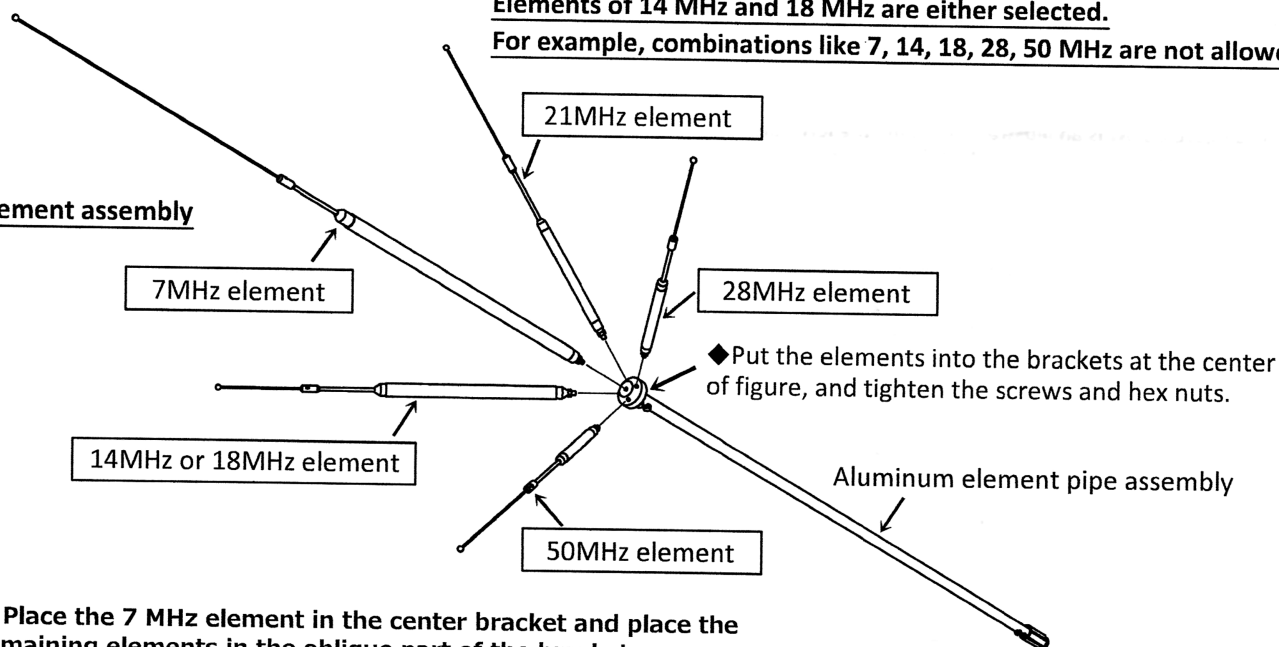
[Assembly procedure]

6-1. Attach the elements of each band to the position shown in Fig.6 (for both of them). The 7 MHz element is the center, and the elements of the other bands are parts to be mounted diagonally. Since there is no designation of the position on the oblique mounting part, please install it in the position of your choice.

Elements of 14 MHz and 18 MHz are either selected.

For example, combinations like 7, 14, 18, 28, 50 MHz are not allowed.

Fig.6 Element assembly

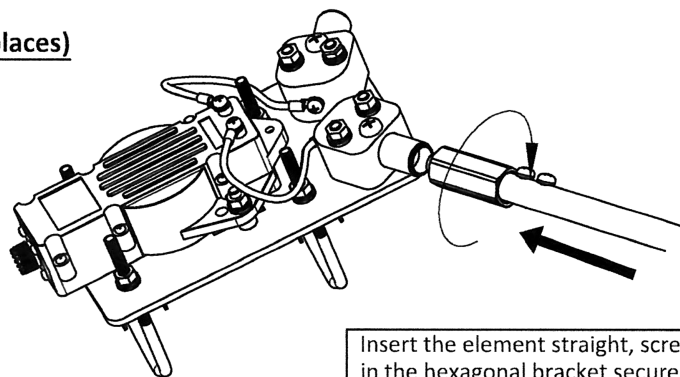


■ Place the 7 MHz element in the center bracket and place the remaining elements in the oblique part of the bracket.

Fig.7 Fixation on the lower side of the element (2 places)

7-1. Attach the assembled element to the bracket threaded out from the element spacer.

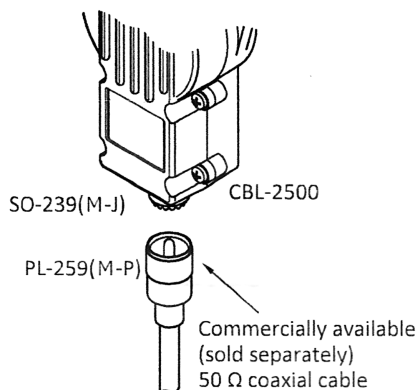
Tighten and secure the bracket tightly to the end so that there is no rattling in the element.



Insert the element straight, screw in the hexagonal bracket securely

◆ If you attempt to fix it while inserting it obliquely it will be locked before the screw is tightened to the end, so be careful as the element will rattle.

Fig.8 Connection of balun connector



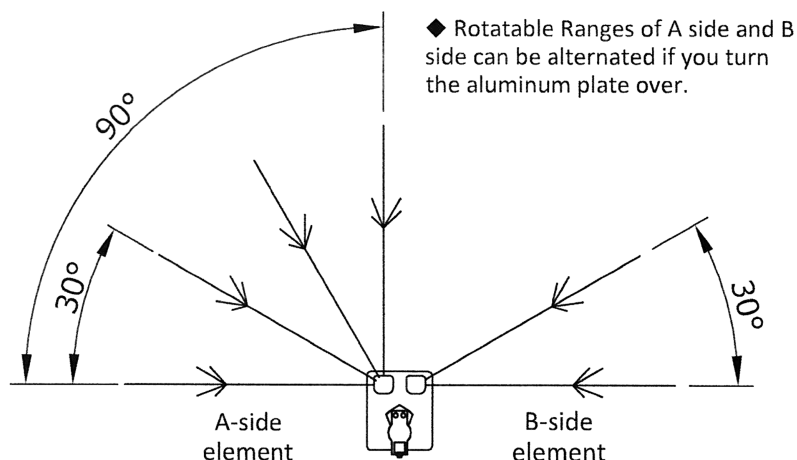
▼ Connect the optional 50 Ω coaxial cable with PL-259 connector to the connector of the balun.

Please note the type of connector.

Please use waterproof treatment with the attached self-fusing tape for the connector part.

■ Self-fusing tape during waterproofing Please roll up so that half of the tape width overlaps while extending to 1.5 to 2 times the original length.
For long-term installation, protect vinyl tape (commercially available) from the top to ensure weather resistance.

Fig.9 Element Rotatable Range

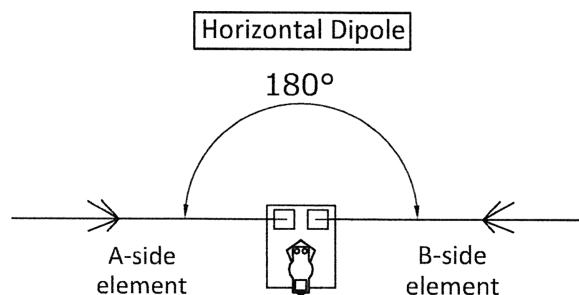
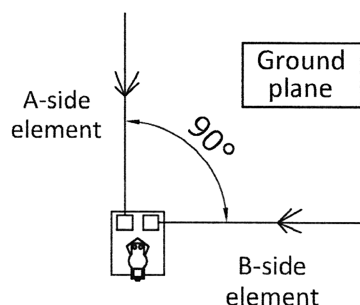
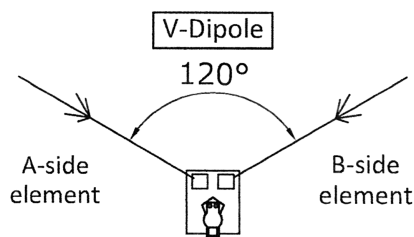


◆ Rotatable Ranges of A side and B side can be alternated if you turn the aluminum plate over.

■ Element Rotatable Range

A-side element : Elevation 0~90° 30° pitch / 4 directions
B-side element : Elevation 0~30° 2 directions

Examples of antenna configurable with CHV-5α



Tuning Procedure

★ Start tuning VSWR at 7MHz, then, followed by 14 or 18, 21, 28, 50MHz.

1. Check VSWR with SWR meter etc. SWR should be 1.5 or less.

Always check VSWR with the minimum power of your SWR meter.

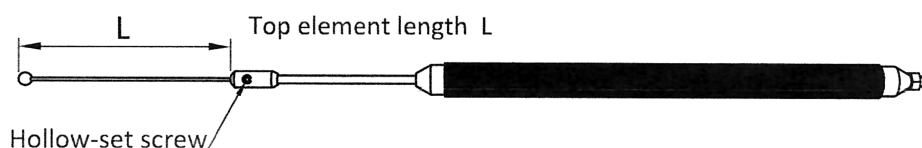
2. Adjust the top element length when the resonant frequency not matching.

The longer the element is, the resonant freq becomes low.

The shorter the element is, the resonant freq becomes high.

When you want to shorten the length more than variable length limit, you can cut the top element. However, please note that the length won't be enough when you adjust the direction to extend.

★ both top elements are the same in length, but you can adjust the one 10mm longer, and the other 10mm shorter.



3. Start operating if VSWR is normal. Correspondence Table for the basic element L length

Table for basis length L of element

Condition : V-shape , Ground clearance : 3.5 m

	L (mm)	fo Set frequency	Frequency change per 1cm (reference data)
7MHz element	330	7.05 MHz	42 kHz/cm
14MHz element	20	14.17 MHz	150 kHz/cm
18MHz element	A 51 / B 32	18.1 MHz	160 kHz/cm
21MHz element	138	21.3 MHz	190 kHz/cm
28MHz element	74	28.9 MHz	300 kHz/cm
50MHz element	116	51.2 MHz	420 kHz/cm

CAUTION : The figures in this table are those of our experiment. Please note that fo may not match even in accordance with this numerical value due to manufacturing variations etc.

Only the 18 MHz element, it is necessary to change the balance of the length of the left and right. The A side here means the A side element in Figure 9.

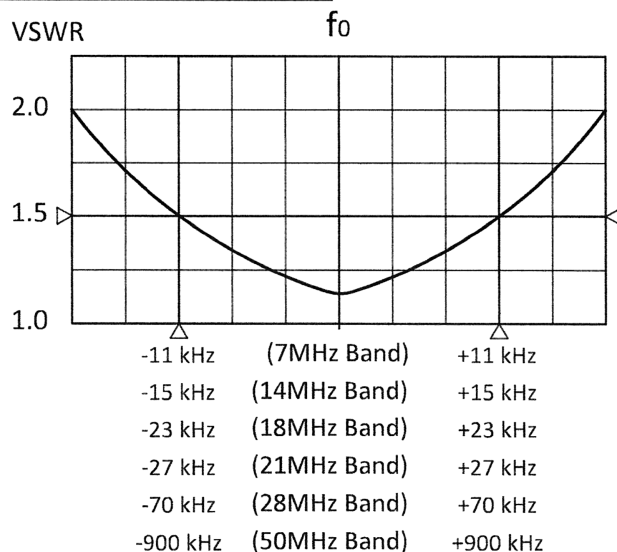
If the right side opposite to the table on the left is long installation, the VSWR will be difficult to fall down.

Note 1. The frequency change per 1cm is determined by changing 1cm each of both elements.

Note 2. For 50 MHz, even if the top element is bumped and the length L is shortened, it can not cover up to 54 MHz. In that case we recommend using element cut or antenna tuner.

■ Fine-tune the length of each element ends and/or the angle of the elements, according to installation environment.

◆ VSWR bandwidth Reference data



◆ Target VSWR is 1.5 or less
(Depend on our experiment value.)

About antenna adjustment

Changing the installation configuration of the antenna will result in resonance frequency shift and VSWR change in each form.

Trend of change

1. If the ground height becomes lower or obstacles such as veranda handrails get close to each other, the resonance frequency moves to the lower side.

Change ratio: several 10 kHz

2. If the installation shape is changed, if the V type is used as the reference, the horizontal type will move to the lower resonance frequency and the GP type will move to the higher side.

Change ratio: several 10 kHz

3. In the horizontal type, the VSWR is somewhat worse in the frequency band of the loading coil element facing obliquely downward than when installed on the diagonally upper side.

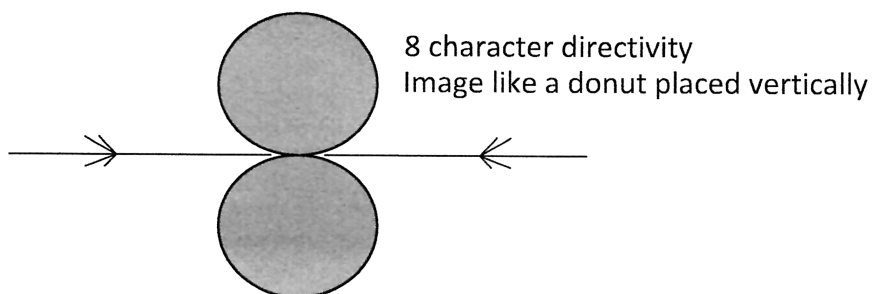
(The resonance frequency is hardly moves)

Since the table of the top element length of the previous page is of the V type installation, please adjust the top element length with reference to the above trend according to the installation state.

◆ If the antenna is installed at a high place where fine adjustment becomes difficult, it is recommended to perform temporary assembly and adjustment in a place that is easy to adjust in advance, and make sure that there are no problems before installing.

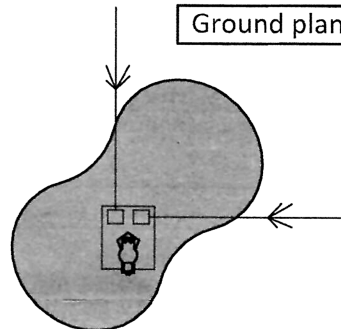
Directional Pattern image

Horizontal dipole type arrangement



V dipole type arrangement is almost the same trend.

Ground plane arrangement



Directivity that character 8 is close to cocoon type
An image like a donut is placed diagonally



Usage notes

Please do not touch the antenna during transmission. There is a possibility of burns especially when operating at high power.

- If you touch an antenna or a coaxial cable at the time of lightning occurrence, there is a possibility of electric shock by direct thunder or induced thunder. In order to minimize the damage and to protect the radio, we recommend that you disconnect the wiring in case thunder comes near.
- Do not operate with power exceeding specifications. There is a possibility of an unexpected accident or malfunction.
- Please correct the adjustment, confirm the SWR and operate it. If SWR is used with bad use, there is a possibility of heat generation or malfunction.
- Do not modify or repair by yourself. There is a possibility of an unexpected accident.

Troubleshooting

In such cases?

Q. VSWR is not good.

Ans.1

Since it will change in the surrounding environment (building, ground level, etc.), change the mounting position or change the mounting angle of the element. When changing the angle, you will loosen the nut, so please be careful of falling and losing.

Ans.2

If there is a direct lightning strike (including induction thunder), there is a high possibility that it is damaged, so please visit the antenna if there is doubt.

Ans.3

The weather, rain fog, snow cover, etc. may cause the resonance frequency to deviate slightly, possibly making VSWR matching impossible. This phenomenon is common in all antennas, it is not abnormal. Since this product is narrowband due to the product concept, it can not be used in any weather / environment. Be aware of the VSWR change before or during operation.

Ans.4

There is a possibility that there may be a band that can not be matched with compatibility with auto antenna tuner. In that case, please use it in the through state, please use without passing through the auto antenna tuner.

Ans.5

Since the top element length of the 6th page is at the time of our experiment, the optimum value of L may be shifted due to slight variation at the time of manufacturing.

Please confirm in which VSWR analyzer etc the resonance frequency is around. Also, please be careful because it may be hard to find by jumping over the best point when roughly scanning because the bandwidth is narrow.

Q. Since 7 MHz is not used, I want to remove the 7 MHz element and use it.

Ans. We are sorry, but we do not guarantee the operation with the element removed, so please use it with all the elements attached.

It is confirmed by our experiment that changing the element of 7 MHz will cause a change in 18 MHz adjustment.

Q. Just is not good a particular band

Ans. First of all, please check whether there is continuity at both ends of the loading coil of the band. If there is continuity, replace the mounting position of the loading coil with another band and confirm.

Q. I have elements of other products (our CHA-88B, UHV-6, HV-R etc.) but can I use it?

Ans. Since the elements of each band are dedicated to this product, please do not use elements of similar structure used for other products. Also, please do not divert the elements of this product to other products.

Q. Which of horizontal, V type, GP type is recommended?

Ans. If there are no particular problems in the installation environment, we recommend the V-type, which is easy to adjust VSWR.



Precautions for operation

- Do not touch the antenna while transmitting, otherwise you would get burned.
- Do not touch the antenna or coax cables while lightning. Checking SWR after lightning is highly recommended.
- Do not use this antenna outside its specification. Failure to follow this would damage the antenna.
- Make sure to adjust the antenna in a right way. Higher SWR could cause the performance degradation.
- Never attempt to fix or modify this antenna by yourself.

【After-Sales Service】

We provide the replacement parts for the damages by unintentional accidents or for deterioration with long-term use. Please ask the local shop you purchased this product.

This product is made under the stringent quality control. Should there be any breakage in transit, please do not hesitate to contact the shop you purchased this product.

【Maintenance】

☆ If any unusual situation happens, stop using immediately and ask the local shop you purchased this product. Confirm if the product works normally before operating.
Be sure to change the parts which have strength poverty or deformation across the ages etc.

■ Specifications or appearance is subject to change without notice.

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