

The 2-Element-HB9CV-Beam

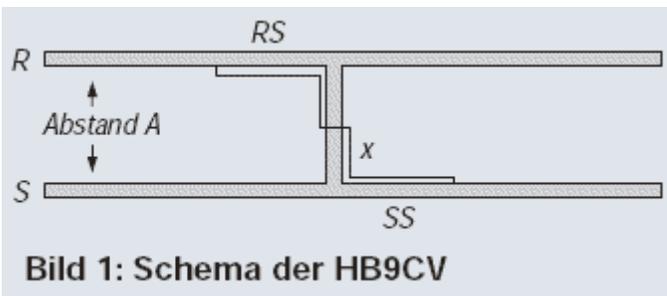
Construction by DK7ZB for 2m, 6m and 10m

The HB9CV-Beam is a 2-Element-Yagi with two driven elements and was introduced by Rudolf Baumgartner, HB9CV in the 1950ies. The Beam is a coax-fed version of the ZL-Special. The reflector is feeded 225° out of phase. The distance between the two elements is $1/8$ -Lambda (45°), with the two crossed phase lines of 180° results the 225° .

It is astonishing that this antenna is not well known in many countries, the ARRL-Antenna-Book does not mention this type of antenna.

You will get the beam very easy to work, because the influence of the element-diameters is much less critical than by parasitic Yagis, where the tapering and the element diameters are very important for the mechanical length of the elements. The gain is in the range of 4,1-4,2dBd. The HB9CV has a great bandwidth and a very good F/B, which are more dependent on the phase shift and the two driven elements than on the physical lengths of the elements and there individual lengths. The mechanical construction is a little bit difficult for the phasing lines and you need a compensation-C for tuning the SWR. For tuning use a variable capacitor (max. C see below), tune for best SWR ($<1,2$) and use then a fixed capacitor with the same value.

Principle of the HB9CV and dimensions for 2m, 6m and 10m

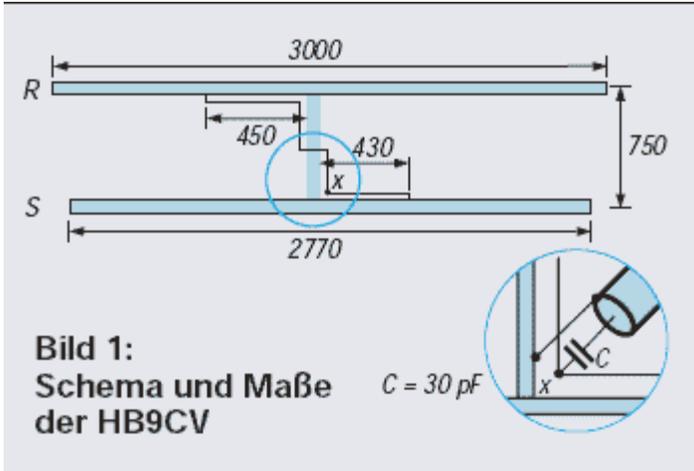


Band	R	S	A	RS	SS	C an x
[m]	[mm]	[mm]	[mm]	[mm]	[mm]	[pF]
10	5300	4900	1330	800	760	56
6	3000	2770	750	450	430	30
2	1020	945	260	190	190	12

For other bands use the following formulas:

$$\text{Reflector (R)} : l = 150/f \quad \text{Radiator (S)} : l = 139/f \quad l \text{ (m), } f \text{ (MHz)}$$

$$\text{Feeding pois for the phasing lines: } RS = 0,076 \times \text{lambd}a \text{ (m), } SS = 0,072 \times \text{lambd}a \text{ (m)}$$



The 50MHz-HB9CV

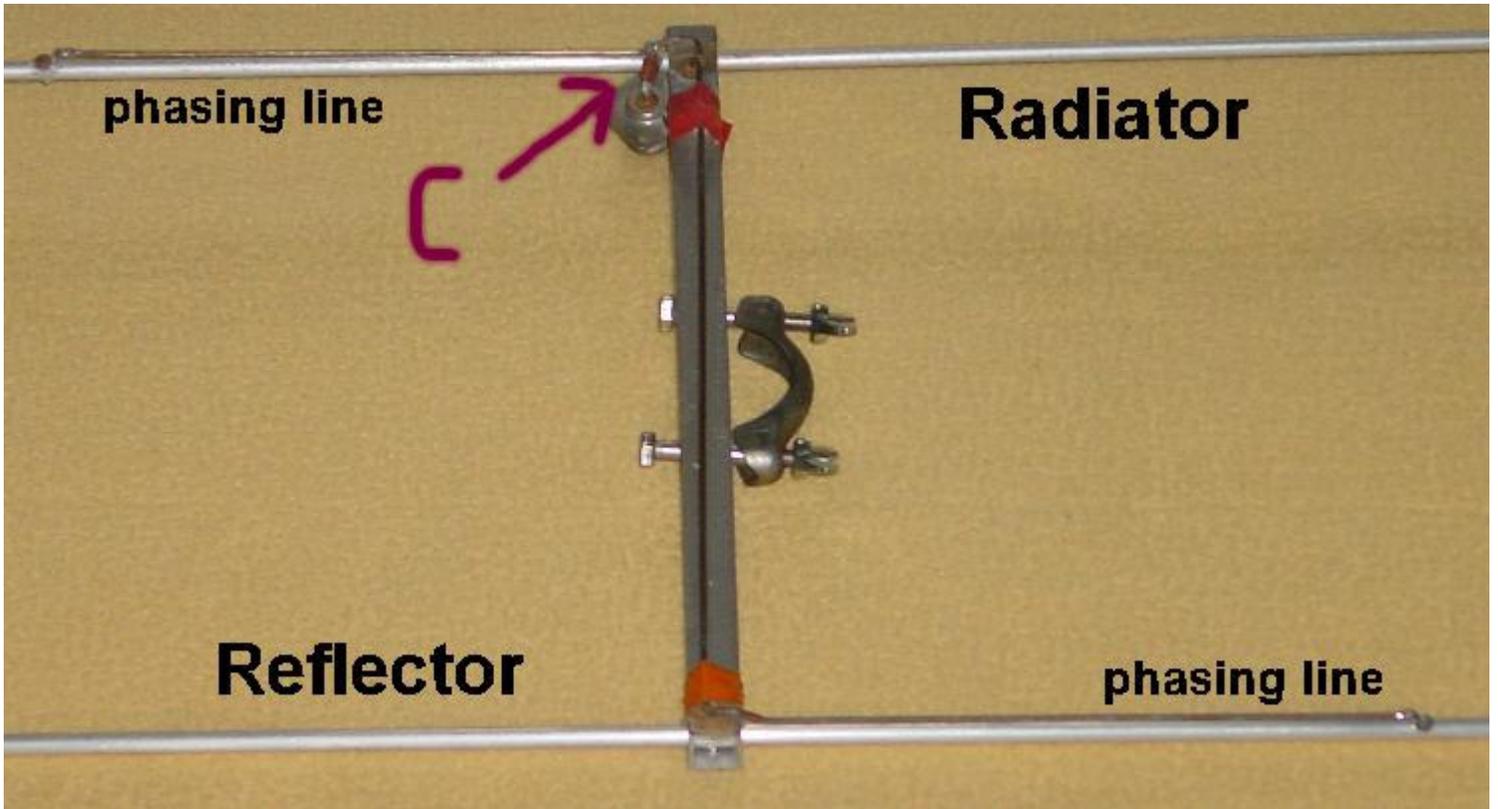
Boom 25x25mm square-Aluminium

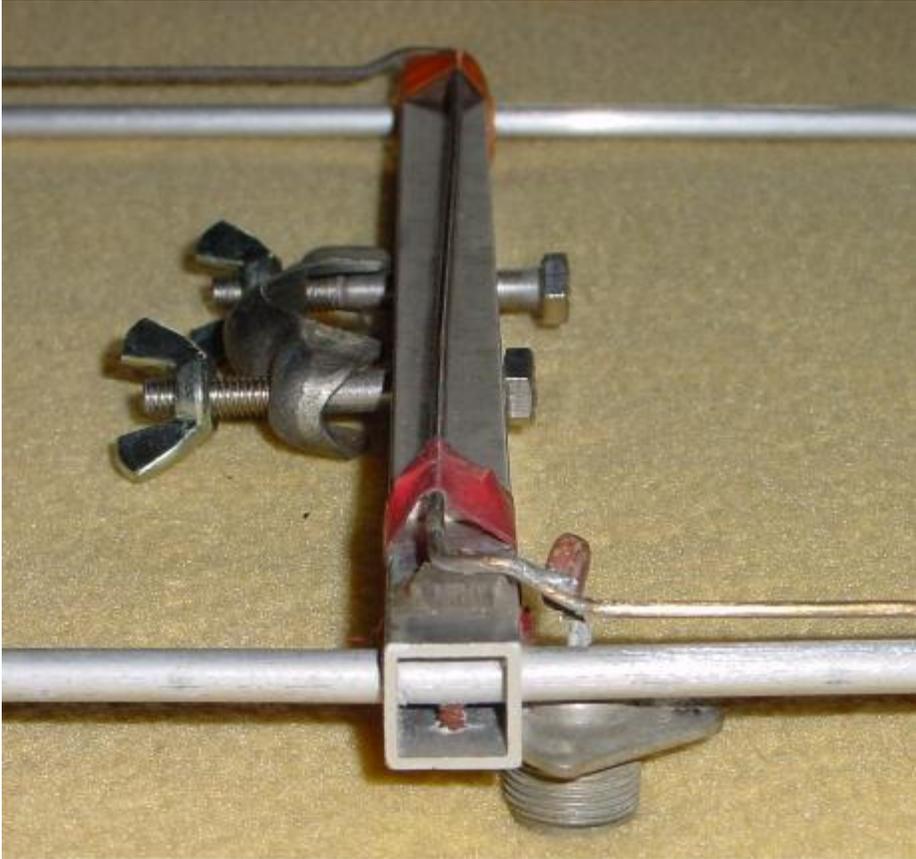
Elements 12x1mm round Aluminium

Lengths in mm

The 2m-HB9CV

From the coax-socket goes a capacitor to the point X, here 15pF (try out for best SWR) The phasing line is made of 2mm brass wire and has a distance of 5mm to the elements (uncritical).



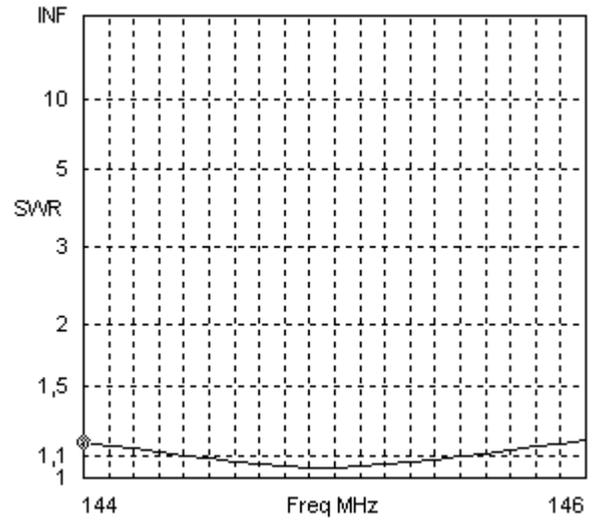


The picture shows the construction of a 2m-HB9CV-Beam better than a long description.

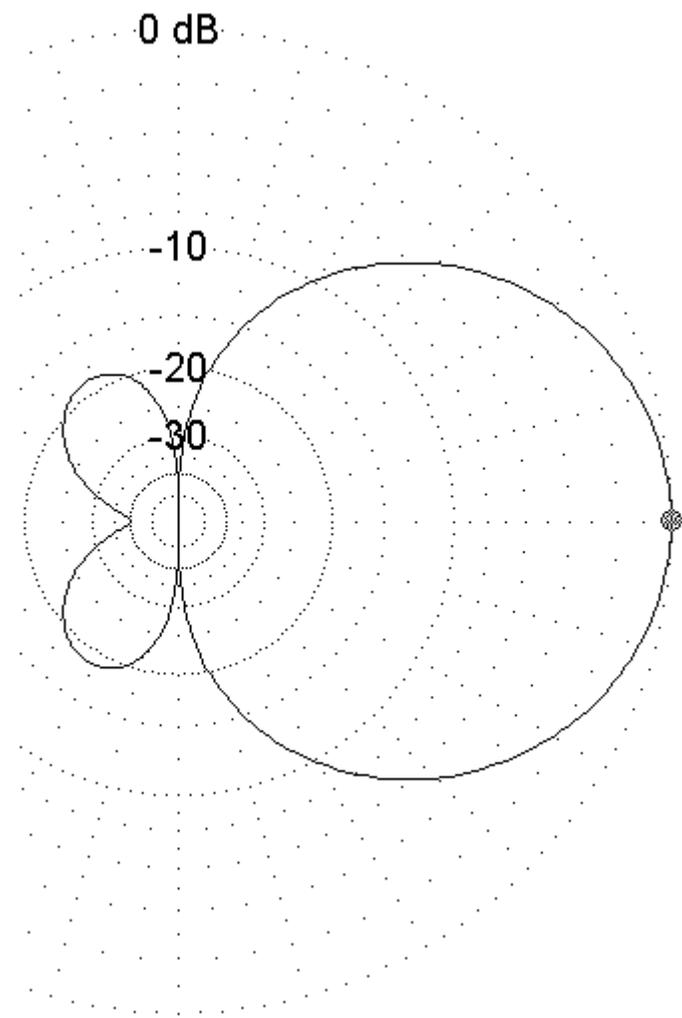
Here you see the details of the 2m-HB9CV with the point X, the $C=15\text{pF}$ and the coax socket. The phasing line is fixed with 5mm distance to the boom.



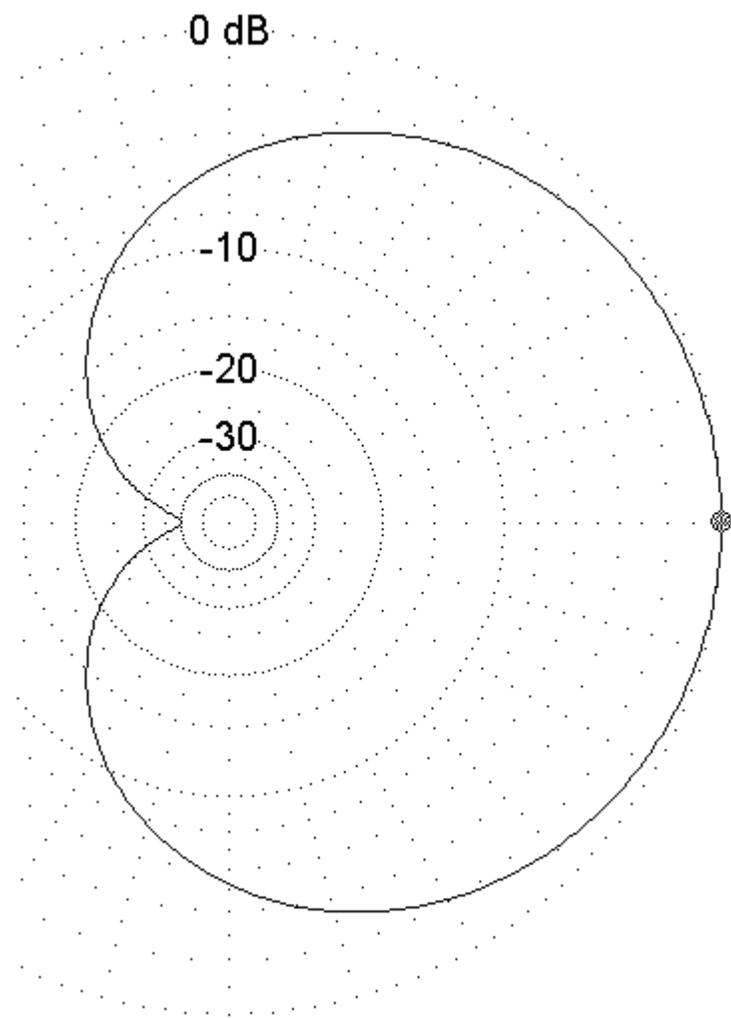
2-Element-HB9CV for 144-146MHz



Gain	F/B	3dB hor	3dB ver
4,1dBd	>20dB	69,2°	141,8°



HB9CV, horizontal pattern, 0dB = 4,17dBd



HB9CV, vertical pattern, 0dB = 4,17dBd