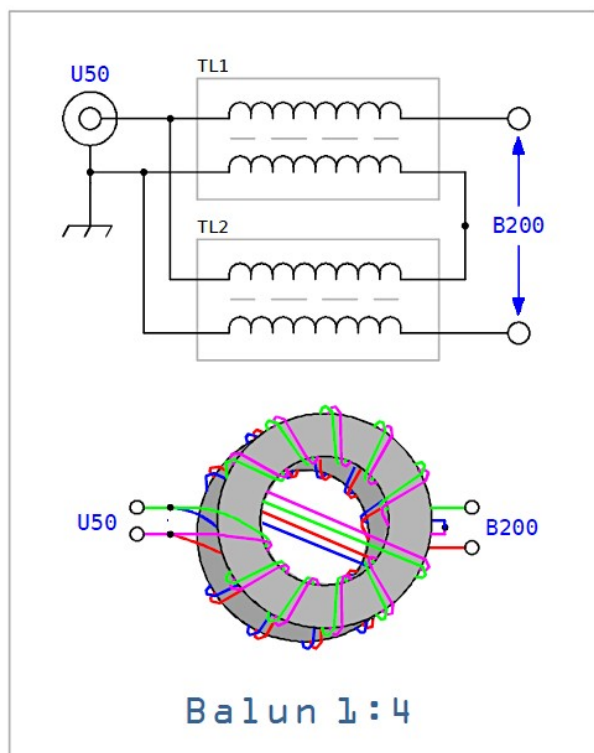


### Dual coil current balun 1:4

This is a traditional Guanella-type current balun, used as impedance transformer with high impedance balanced transmitting antennas. This medium power balun can handle far over 100W of power.

- Unbalanced to balanced, impedance **1 : 4, 50 Ω to 200 Ω**.
- Typical frequency range **1...55 MHz** with SWR less than **1,1**.
- Full usable range **1...80 MHz** with SWR less than **2**.
- Power handling far over **100 W** (carrier) with proper antenna.

### Circuit Diagram



### Toroid Cores and Winding

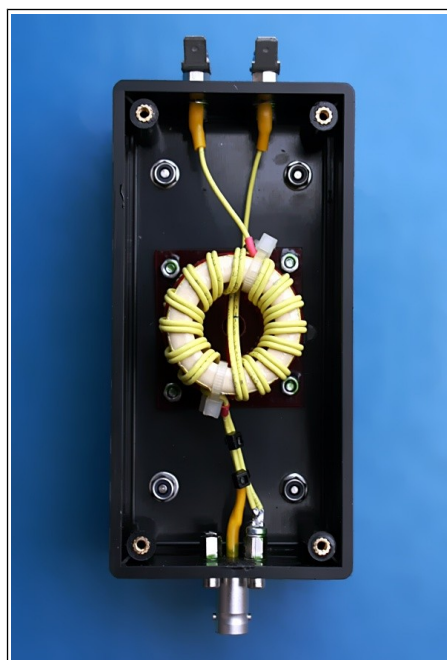
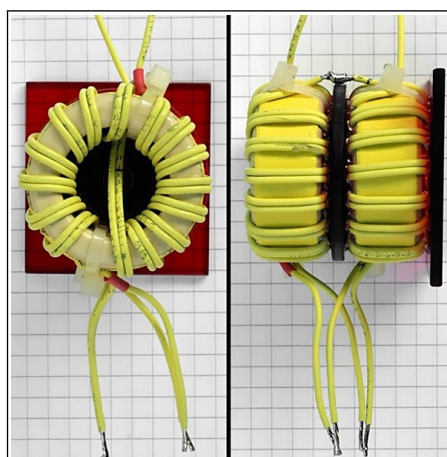
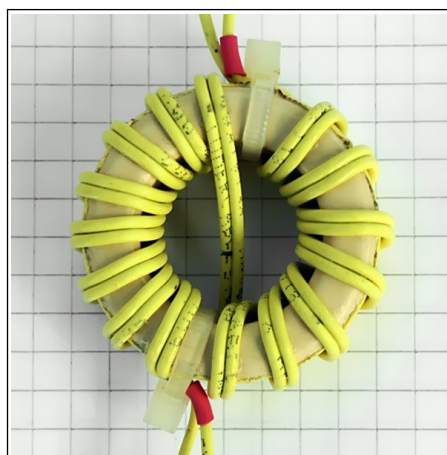
Each toroid forms a 100Ω transmission line. Lines are connected parallel at the 50Ω transmitter side and serial at the antenna side, forming 200Ω output impedance.

With proto we used **Ferroxcube TX36/23/15-4C65** toroid, material **4C65**,  $Al=170nH$ ,  $u=125$ . Similar toroid is **FT140-xx**, with material **61**, or **31** for lower frequencies. We also tested **Epcos B64290-L48-X830** toroid, material **N30**,  $Al=5460nH$ ,  $u=4300$ . The results were similar.

The wire is now 0,5mm<sup>2</sup> BetaTrans stranded high temperature industrial wire; conductor diameter 0,8mm, insulator diameter 1,45mm. With tight wire pairs the line impedance is near 130Ω and as wound over toroid, the impedance becomes 104Ω (80%), which seems to be close enough.

On each toroid we wind **7+1+7** turns of wire pairs.

The toroids were then stacked, isolated, and connected as shown on the circuit diagram and pictures. The wire pairs must be kept tight together when connecting to the 50Ω coaxial connector.



This balun is boxed into ABS enclosure. *Do not use metal enclosure for high-impedance baluns!* Output connectors are 6,3mm Abiko terminals and the coaxial connector is a standard BNC female with flange. The enclosure may be potted with beeswax or epoxy.

**SWR measurements**

We measured the following SWR results with Mini VNA Pro instrument. The 200Ω low-inductance load resistor (thick film) was connected directly across the short output wires and the balun was without a box. *The efficiency of this balun was not measured.*

**HF 1-55 MHz VSWR and Return Loss**

