

# FRITZEL TRAPS, BALUNS AND ELEMENTS



## MAINTENANCE

If there is a reason for an antenna to get down, I inspect the antenna and do the necessary maintenance.



Many hams sometimes neglect the maintenance of an antenna, but it is essential for your antenna system. As an example see above a Fritzel's trap. My more than 35 years old Fritzel antenna elements look new after a thorough maintenance. Oxidation created pits and bumps on the elements. By regular "polishing" the surface becomes smoother and oxidation has less chance to penetrate the elements. Even dirt will not stick easily on the outside. The cleaning should be done with (fig») metal soap pads such as "Brillo"



Use a soap pad.

Other publishers on the internet don't advise cleaning with metal sponges because residual fibers would cause a short circuit. That has never happened during the more than 40 years that I did maintenance on the antennas. It is a matter of good finishing by degreasing, for example with Dreft detergent and then rinsing with warm water and drying with a hair dryer.

## ALUMINIUM WIRE

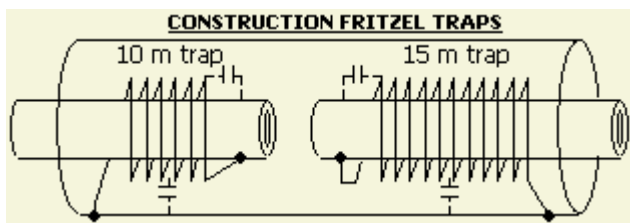


The traps are made with soft aluminium wire. After some time the wires are covered with cobwebs and oxidation, especially against the vent of the outer tube. If you want to replace the aluminium look for companies that provide fencing for farmers. Cleaning of coil wire with a Brillo pad is possible, but it pretty much removes aluminium. The wire becomes flatter if you do the cleaning regularly. It is better to clean (fig») with an anti scratch sponge (Spontex) used for cleaning pans. To protect the wire I



sprayed it with a lacquer that was used for making sparking cables water-resistant. It may be removed with thinner. Even a treatment with silicone spray works preservative on the coils and antenna rods.

## TRAP



In principle, a trap is a capacitance in parallel with a coil. In Fritzel types [you don't see a capacitor](#) («fig) because the coil and the aluminium tubes works as an "capacitance".

With two screws the interior may be removed. Further in this article describes how with a dipper the dismantled trap is measured. This can be useful in detecting a defect if on a particular band the SWR of your antenna is not good anymore.

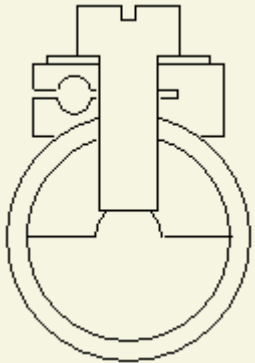
## CORROSION

Corrosion caused white crystals inside the coil case, on the wire and aluminium rod. If that process has taken a long time it may be difficult to push the trap out of the case. With back and forth motion the crystals works as sandpaper so you may manage it (usually). I have not (yet) tried, but maybe it goes better with a spray of WD40 or Ballistol oil.



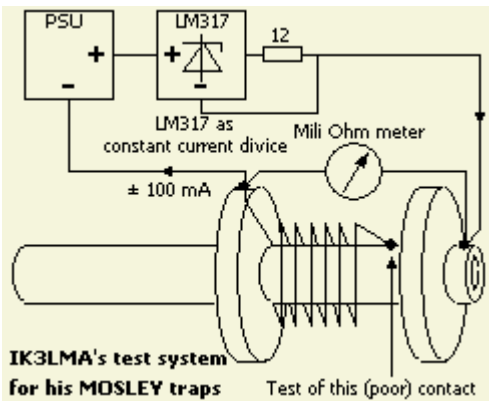
Everything of my vintage 1970/71 traps is fixed with screws but it shows that in later types they were partly replaced by rivets. The riveted joints are not always perfect and together with the aforementioned crystallization create a poor contact or even a break.

For example the antenna resonates only on two bands, but does not work on the third one. The contact is apparently sufficient for the current through 15 m coil (for the 20 m band), but insufficient as parallel circuit (trap) for the 15 m band. Drilling of the



rivet and replaced by screw or bolt with nut is than the only cure.

Shortly after the acquisition of Fritzel by HOFI HF-Technik the company has patented a new clamp. The contact surface is 45 times increased compared with a wire eyelet plus rivet. DO1YWF received this message in response to HOFI after he had reported his bad experience with the contact. I have drawn («fig) the clamp as best as possible from his enclosed PDF file.



Despite my article in Dutch, [IK3LMA](#) clearly understand the text, because he wrote me that the problem occurs also with his traps of two Mosley beams. They are almost similar to the types of Fritzel. In contrast to the contact of coil with tube, is visual inspection of the connection to the rod antenna not to perform. To measure accurately he uses a digital mΩ meter in conjunction with an LM317 as an approximately 100 mA constant current source. The meter indication is almost correct in mΩ. He was shocked by the result and therefore recommends to one another to really measure and not rely on a visual inspection.



The rivets replaced by stainless steel bolt and nut.





Drilling of the rivets and replaced by stainless steel bolts and nuts is the surest way to be spared from (future) malfunction of the traps.

Remember when replacing the traps that the coils with the least windings are for 10 m. They should be assembled directed to the feed point of the antenna. When the antenna is remounted you're not the first to discover that the SWR is poor due to a wrong installed trap.

The screwed fastening (fig») at the other side of the coil also require maintenance. Remove oxidation, dirt and apply silicone grease as a protection to.

**DIAMETER TRAPS**

The production of antennas by Mr. Fritzel is ceased because he is deceased. His company produced many types of antennas and later then 1982 they made antennas for more power. If you want to buy something 2nd hand, look at the size of the traps, the diameter of the tubes and the version of the balun. The case of the older type trap has a diameter of 4 cm and the diameter of the newer model is 5 cm. The thickest aluminium rod in the new model has a diameter of 28 mm.

**COVER CAPS**



Damage due to a dirty (vintage) trap and power exceeding.

The black plastic caps will sometimes crack or split and a replacement are not easy to find.

TIGER PLASTIC had suitable caps (for broomsticks and chair legs), but are apparently no longer for sale.

From Germany I am reported that HOFI [www.hofi.de](http://www.hofi.de) sales caps. HOFI continued the production or sale of Fritzel products.



Top: Fritzel model 83 trap, Bottom: arcing and damage in a 1970/71 trap.



By first removing the burned part with a cutter, ON4LN successfully restored a staircase with two-component epoxy.

ON4LN wrote to me: "Thanks to your very good article about the Fritzel coils, I managed to repair my antenna." There was flashover on a coil, I milled the carbon residue and repaired with epoxy resin". Furthermore, I can report that black caps for the 5 cm diameter cover were for sale at the HOFI stand in Friedrichshaffen.



I used («fig) standard plastic (PVC?) caps as replacement for the original types. The are suited for the present 5 cm diameter traps and with a punch I made an appropriate hole in the centre. So it fits exactly on the aluminium cover of the trap. If only the tip of the plastic coil form is applied with some silicone grease you ensure that the construction remains "water resistant". Because weather the grey colour of the caps become almost white.

IK3LMA wrote about this subject: "For sealing the plastic end cover is very useful the polyurethane foam used by car body repair, tested by myself over 10 years on my location, with very good result".

Anything: "Last suggestion born after looking the external aluminium tube cover. If this tube are short as on classical 10 to 20 meter band traps ( $\pm$  20-25 cm length) the overall design appear good. Vice versa with the longer traps as used for the 40 meter band (length 45 cm)I have observed which the tube aren't round but are oval. I think which the blowing wind flexed the element and the repeat movement modified the tube just with localised stress just where the electrical contact are made. This can be the reason for future failure or reduced efficiency. My proposal fix (not tried) is to add two extra screws at 120 degree each to the other so to distribute the stress along the circumference insulator".

## HEAT SHRINK TUBING CAP



Luuk Timmerman used heat shrink tubing as a cover cap for 40 mm  $\varnothing$  traps. At the time I tried that too, but my shrink sleeve was not able to shrink to 16 mm for properly covering the hole in the antenna rod. Luuk wrote: "Because the end caps had to be replaced, I found another (nice) solution by using shrink tubing, it fits tightly around it, can withstand great temperature fluctuations ( $-50^{\circ}$  -  $+90^{\circ}$  C) and remains flexible, nice stuff! The shrink tube has a shrinkage ratio of about 3: 1 and because my traps are 40 mm, it is a perfect stocking. It was bought for around 12-13 Euro (excluding VAT) at RS components, lengt ca 1.2 m and it shrinks from 1.7" to 0.5" or 43 mm to 12.7 mm ".



Shrink tubing as cover cap for 40 mm diameter traps.

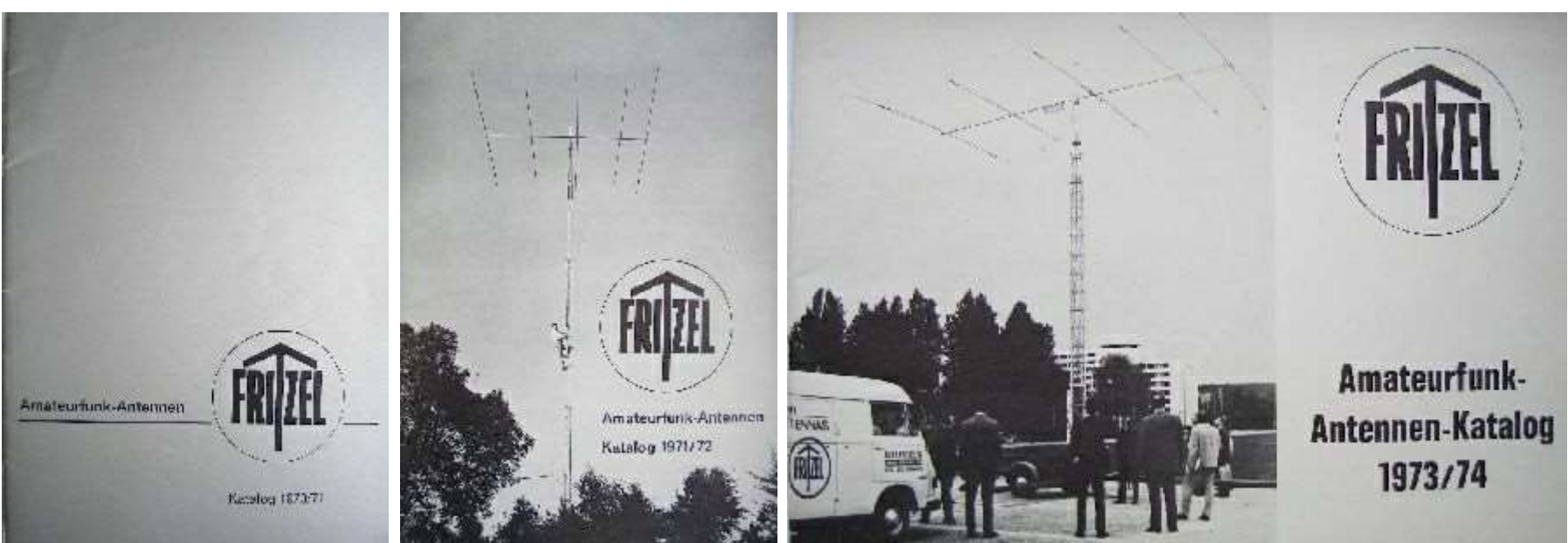
The tubing must be well heated and we both use an electric hot air gun. For a 100% watertight seal at first grease the metal parts with contact adhesive before the shrinking process.

## PWR TRAPS 4 cm $\varnothing$





The photo shows how many windings the 4 cm Ø traps have for the radiator, director and reflector. If there are no more marks for assembling the image will help you to recover the antenna. Some very old antennas have equal sizes for traps, radiator and director.

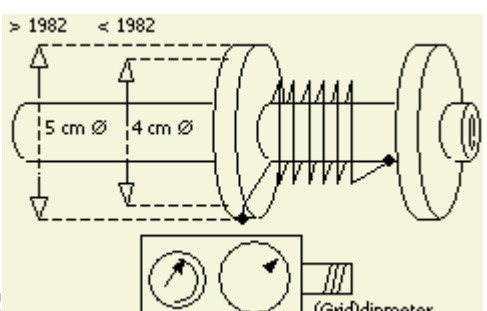


**NOTE:** In my oldest Fritzel Catalogue 1970/71 the 4 cm diameter traps of the (<1983) antennas FB-13 FB-23 FB-33 were only suitable for an PA-input: 1 kW AM / CW and 2 kW. That means about 500 W/CW and 1 KW/CW, SSB transmit power. Momentary more power is possible, but if they are oxidized or contaminated by insects, arcing may occur.

In 1973 Fritzel specified his antennas and traps for an PA (input!): 1 kW input/AM, CW, RTTY, SSTV and 2 kW/SSB (without speech processor).

Later > 1973, the folders specified the HF output: 0.6 kW/AM, CW, RTTY, SSTV and 1.2 kW/SSB (without speech processor).

It's about the traps with a diameter of 4 cm, not the newer type with a diameter of 5 cm.



**RESONANCE DISMANTLED TRAPS**

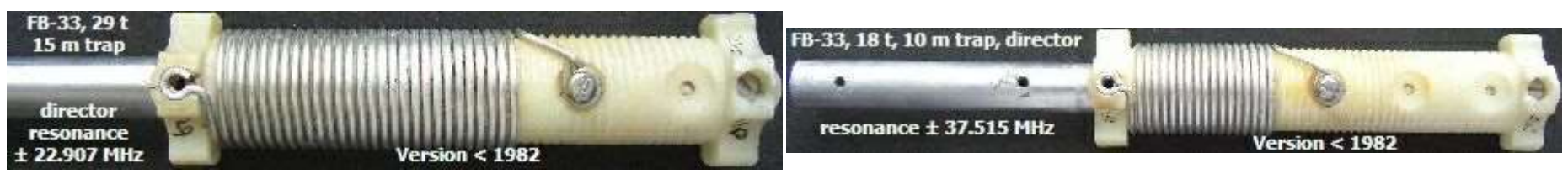
I measured my stock Fritzel bare traps with a grid dipper (fig ») or spectrum analyzer and monitored the frequency with a 450 kHz - 30 MHz receiver. The results are about, ie ± because a dip is not 100 % accurate. Note that all measurements were done on a bare (= dismantled) trap. That means without cover and some with a not to dismantle antenna tube. Of the latter, the length depends on the year of production.

**FB-13, FB -23, FB-33 RADIATOR (koker 4 cm Ø, versie < 1982)**



The antenna tube for 20 m (connected to 15 m trap) is not removed. By measuring the resonance it is part of the total capacitance.

**FB-33 DIRECTOR (koker 4 cm Ø versie < 1982)**



Here the director trap is the same as the FB-13 and FB-23 radiator trap. Only my director was available for measurement. The antenna tube for 20 m (connected to 15 m trap) is not removed. By measuring the resonance it is part of the total capacitance.

**FB-13, FB-23, FB-33 RADIATOR (koker 5 cm Ø versie > 1982)**



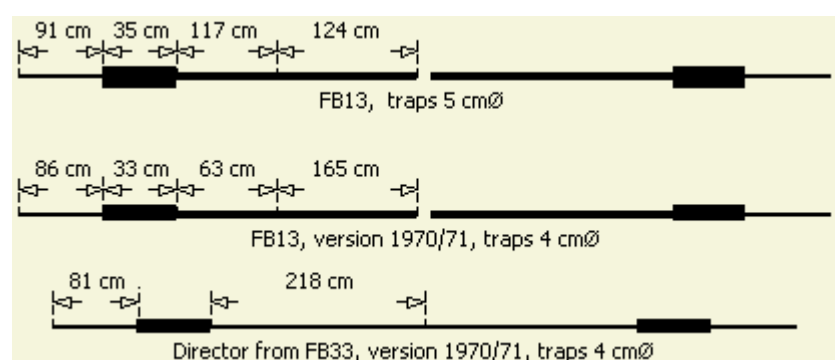
The traps of this antenna are qua, construction, size and number of turns identical to that of the next vertical antenna GPA-4. The resonance's are not so far apart.

**GPA-3, GPA-4 (koker 5 cm Ø versie > 1982)**



The 15 m traps of a GPA-3 and GPA-4 are the same in terms of construction, size and number of turns. The resonance's are respectively 24.175 MHz and 24.425 MHz. The 10 m traps of both antennas were identical in terms of construction, etc., only the GPA-3 had 15 windings with a resonance of ± 36.300 MHz and the resonance of a GPA-5 was ± 35.328 MHz with 16 windings.

**SIZES FRITZEL ELEMENTS**

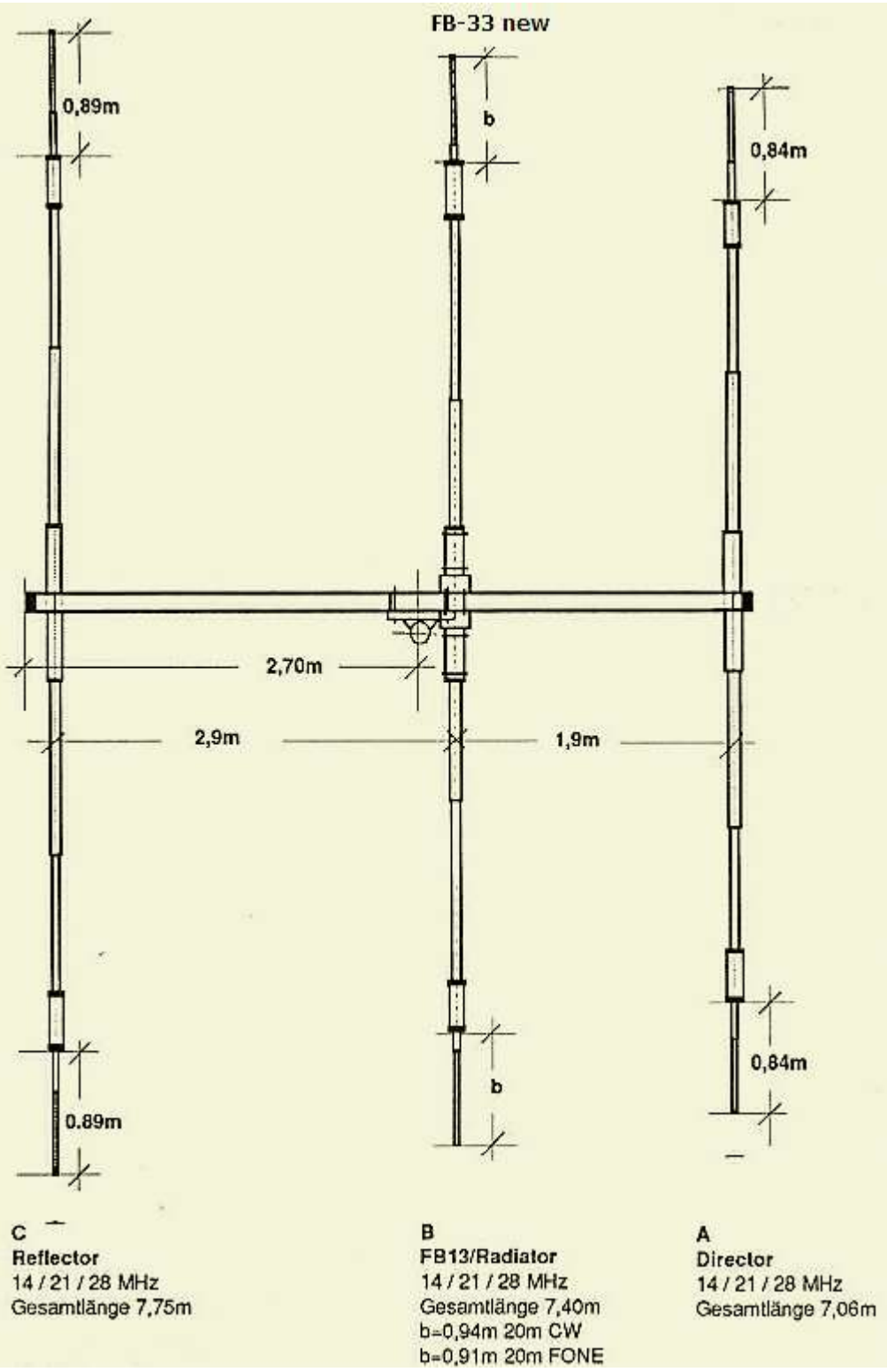
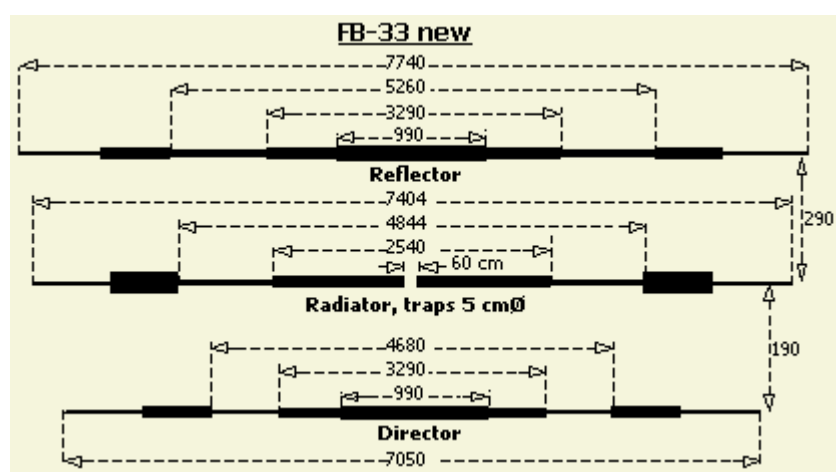


Sometimes there are for sale non-original elements of Fritzel antennas and restore antennas without the right size is a problem. Often people ask me the size of the elements.

Because they are here not used for some time, it was possible to measure my stock elements.

My FB-13 dipole and a 1970/71 director both with 4 cm Ø traps worked successfully for decades as a 2 element Yagi. Later the dipole was replaced by a newer FB-13 with 5 cm Ø traps.

Unfortunately I never had a reflector so that the sizes are missing in this article.

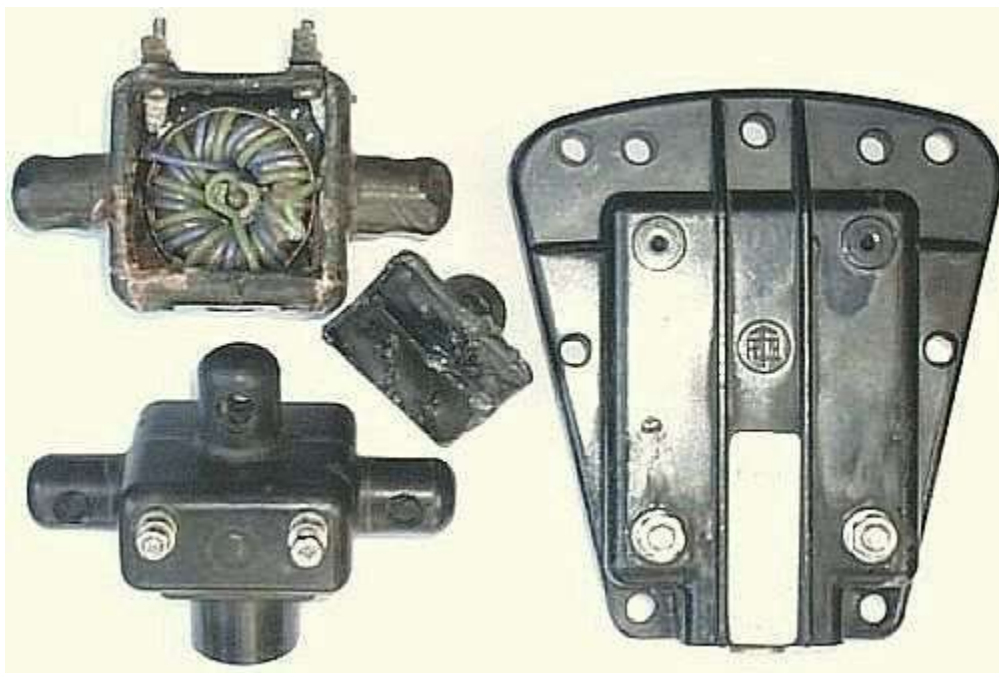


Furthermore I found in my archives the lengths between the elements of an FB-33, whose production year is unknown to me.

This PDF file contains the most recent sizes of radiator, director, reflector and mounting examples.

**FRITZEL BALUNS**





After 1982 the format of the baluns has also been changed.

Top left shows what happens when the old model balun is overloaded with too much power or if a FD3 is used for 80 m and a FB4 used for 160 m. Apart from the permanent damage caused to the hot toroid, the shell partially melted and changed shape. The damage appears low on the picture because I restored the plastic with hot air and I glued the cracks a bit. The windings with Teflon insulation remained intact.



On the right an dismantled model of the 1 ÷ 1 balun.

A («fig) 6 ÷ 1 balun of FD3 and FD4 antenna's has the same size as a 1 ÷ 1 balun. One should use an extra 1 ÷ 1 balun or choke balun to prevent radiation of the coax screen.

The power was also limited to 500 W PA input. The newer baluns are suited for more power, output 700 W/CW and 1400 W/SSB.

The larger case (right) contains a 6 ÷ 1 transformer and a 1 ÷ 1 balun. ÷ 1 balun also January 1 jacket flows appear to be so. There are baluns for even more power in the market.





Gemeinsame Daten der Balun Serie 83AMA Gehäuse: 2 Halbschalen aus Polystyrol, verklebt, schlagfest, schwarz, uv-fest  
Bruchlast: 4.500 N Anschluß: PL Ausgang Antenne: M6×20 Gewindeschrauben Edelstahl Ringmaterial: Ferrit Ringgröße: 63 × 13 mm Amplitudenabweichung 30 MHz <3dB bei 1 ÷ 1 übrige: <0.8dB SWR-Bandbreite <1.2 ÷ 1, 1 - 35 MHz bei 1 ÷ 1 übrige: 2 - 30 MHz Max. HF-Belastbarkeit bei <2 ÷ 1 SWR: SSB 1.4 kW, RTTY: 0.5 kW, CW: 0.7 kW Gewicht: ca. 0.43 kg Balun ist gebraucht, aber voll funktionstüchtig! Kpl. mit Unterlagen und Halterung in OVP.

