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**optimale Kurzwellen-Antennen**

**computer-designed / computer-optimiert**

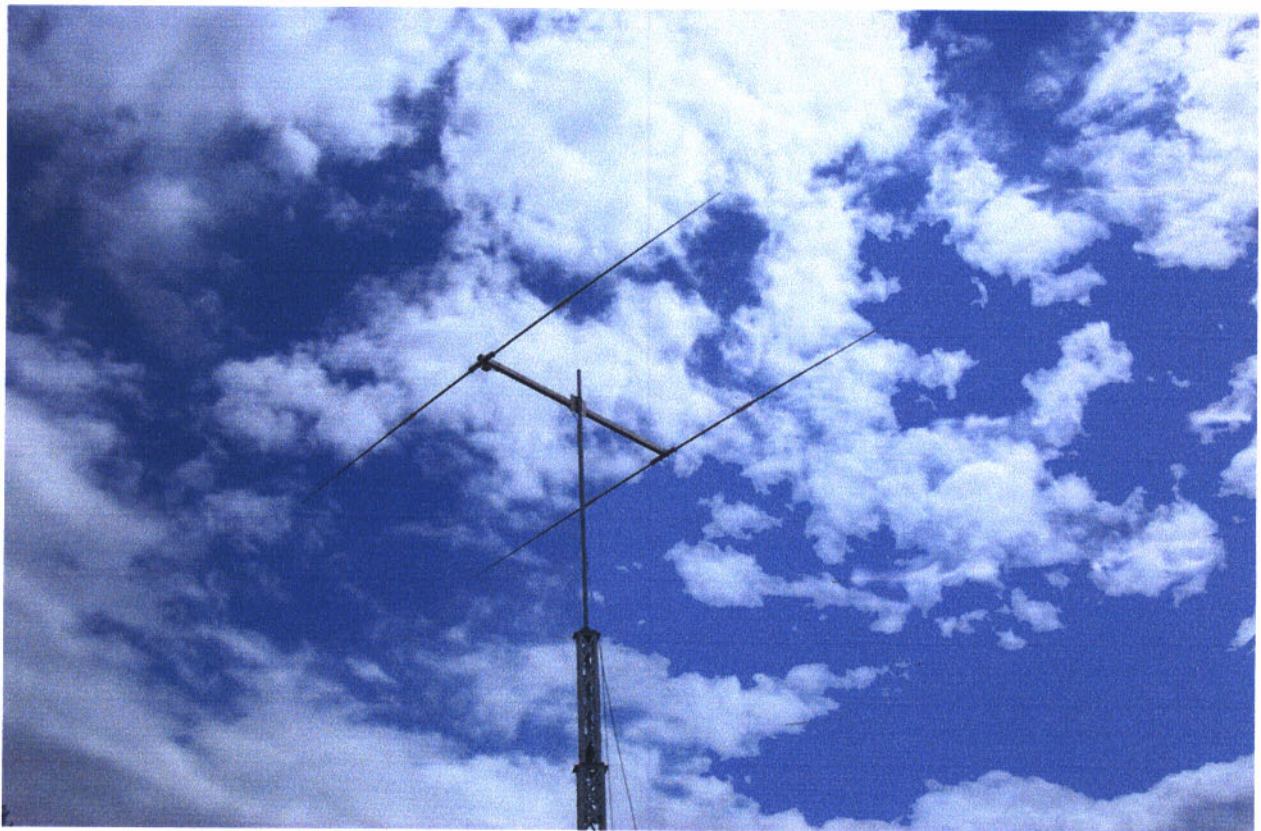
**entwickelt von Funkamateuren für Funkamateure**

**optimum short-wave antennas**

**computer-designed / computer-optimized**

**developed by hams for hams**

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**O B 2 - 30**

**2 Element Yagi 30m**

**!!! Quality made in Germany !!!**

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## 1. Introduction

The OB2-30 is a high performing 2el Yagi antenna for the 30m band.

OptiBeam shortwave antennas are designed and optimised by support of modern techniques such as computerised antenna simulation and are finally adjusted by extensive tests in practice.

To reduce the rather big wing span of a 30m element high Q coils (no traps), carefully fabricated by OptiBeam, are used. Hereby achieved is an almost loss free shortening of the element lengths. So a gain is realised which is only about 0.3 dbd less than that of a considerably larger full size Yagi.

In the following table the essential electrical and mechanical data can be seen:

Bands	30m
Gain (dBd)*	3,8
Gain (dBi)**	11,2
F/B (dB)	20
SWR	
10,100 - 10,125 - 10,150	1,3 - 1,1 - 1,3
Impedance (Ohm)	50
Elements	2
Max. element length (m)	9,20
Boom length (m)	3,60
Turning radius	4,94
Weight (kg)	21
Windload at 130 km/h	350 N / 0,44 m <sup>2</sup> / 4,8 feet <sup>2</sup>

- \* = average gain over a dipole in free space  
gain of monobanders for comparison: 2-element Yagi: 4 dbd, 3-element Yagi: 5-6 dbd  
 \*\* = average gain at 20m above ground

## 2. Assembly

The included schematic diagram is needed for the assembly and the following information is given:

- > type of element (R=Reflector, S=Driver) and the position on the boom
- > measurements of the element sections (length and diameter)
- > lengths of the element halves
- > distances between the elements.

The lengths are given in m (meters) and the diameters are given in mm (millimeters).

### 2.1 Sorting the parts

The antenna to a high amount consists of already pre assembled parts.

All parts of the antenna are marked.

For faster and easier assembly it is recommended to sort the parts for reflector and director.



## 2.2 Assembly of the boom

The square boom consists of two parts which have to be assembled by two coupling pieces that are already installed at one side of the boom parts.

For each coupling piece 4 screws are needed. The screws have to be tightened finally not before the parts of the boom really **fit** to each other perfectly.

## 2.3 Element-Platforms

For the element-to-boom brackets 4-cornered angle profiles in a length of 500 mm are used. The insulation and solid fixing of the elements is realised by 4 special UV stabilised tube holders, mounted on each of the platforms.

The driver and reflector middle section ( $d = 40\text{mm}$ ) is already inserted into the platforms (see picture on 3<sup>rd</sup> picture page).

The elements fixed on the plates have to be mounted at the **underside** of the boom in a way that the outer edge of the platform is located 1 cm in front of the tip of the boom.

The connecting screws of the boom have to remain horizontal.

The plates are attached to the boom by 2 square brackets (already inserted into the platform by us) which embrace the boom from the top and 4 self securing nuts (see 3<sup>rd</sup> picture page). When finally tightening the square brackets pay attention that the elements are **parallel** to each other.

The square boom makes a straightening of the elements in the vertical plane unnecessary.

For the tightening procedure use the included special tool (nut driver M10/13).

In case the antenna cannot be reached easily while assembling naturally the elements can be assembled completely and then be mounted below the boom in one piece.

## 2.4 Screw connections of the element sections

While assembling the element sections the following segments have to be inserted into the previous segments with their side which has two drill-holes **equal in size**. The tubes have to be put in until the drill-holes of both segments overlap perfectly. The enlarged drill hole of the previous segment has to point **upwards**.

Then the corresponding ss screws have to be pushed through **from the side of the enlarged drill-hole** of the previous segment.

There are **screws of two different diameters** (6mm and 4mm) and of different lengths.

The longer **6mm screws** are used for the 40/35mm, the shorter ones for the 35/30 and the 30/25mm transitions (please orientate by the included schematic diagram of the antenna).

The **4mm screws** have to be used as follows: 25/20mm transition = longest screw, 20/16mm transition = second longest screw, 16/12mm transition = shortest screw.

On the opposite side the washers have to be inserted and the self securing nuts have to be screwed on and **tightened solidly** (hold the screw heads with the included special screw-driver against turning, depending on the screw diameter use the thicker or thinner screw-driver, do it carefully, don't break the screws, the screw heads dive into the enlarged drill-hole, see picture page). This method results in an extremely solid mechanical connection and rattle sounds inside the segment overlaps are totally avoided.

By this way of assembling the required lengths of the sections and the element halves are achieved automatically.

While mounting the elements pay attention that all screw heads show **upwards**.

Keep in mind that the elements hang below the boom. Therefore the screw heads have to be on the same side of the elements where the element plates are located at.



## 2.5 Assembly of the element sections

We start with the already pre assembled middle section ( $d = 40\text{mm}$ ) which is already fixed onto the element platform.

The following segment is the one with the coil (already pre assembled) with a diameter of 35mm (see picture on 3<sup>rd</sup> picture page).

The next one following has a diameter of 30mm etc. (please orientate by the included schematic diagram of the antenna).

When inserting the 12mm tips of the 30m driver take the **middle** hole of the three drill holes.

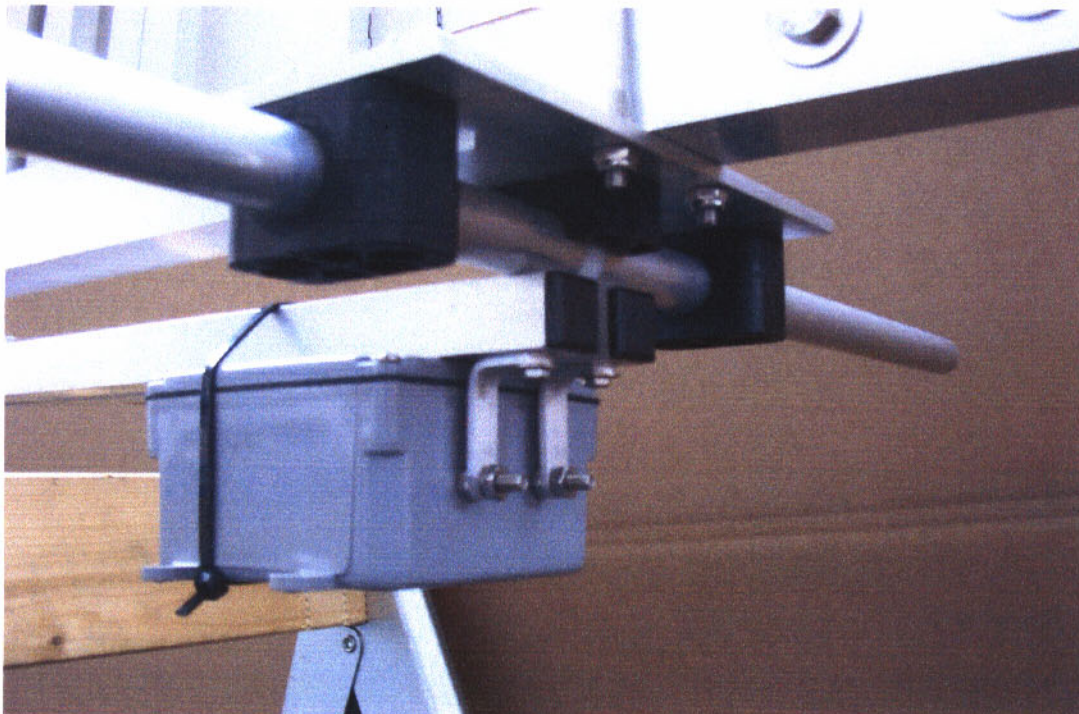
## 2.6 Installation of the balun

The OB2-30 is fed through a high quality 1 : 2 balun.

Mount the balun at S30. The balun has two right angle aluminium connection straps which have to be inserted on the driver screws in between the two big washers each. They have to be tightened to the element by means of the two driver screws.

Furthermore the balun has to be tightened to the boom by means of the included ty wrap.

The entire assembly can be seen on the picture pages and on the picture below (just with the difference that the OB2-30 has no phase line tubes).



## 2.7 Installation of the boom to mast plate

The boom to mast plate is a completely pre assembled part (see picture page) with four horizontal square-bolts which embrace the boom and four vertical U-bolts (depending on the corresponding installation 54mm, 65mm or 75mm) which embrace the mast.

It now can be fixed at the **balance point** of the antenna (about the centre of the boom).

## 3. Connection of coax cable

The feeding of the antenna is done by 50 Ohm coax cable.

For connection a PL-259 connector is required which has to be screwed on to the balun housing. The connector should be sealed against water entry.

#### 4. Adjustment of the antenna

An adjustment of the antenna is not necessary if the given dimensions are exactly observed.

By some influences of the direct surroundings it may happen that the resonance of the antenna (= point of best SWR) shifts slightly.

By minimum changes of the driver length (=shortening or lengthening of the outer 12mm sections) the resonant frequency can be shifted to the desired point.

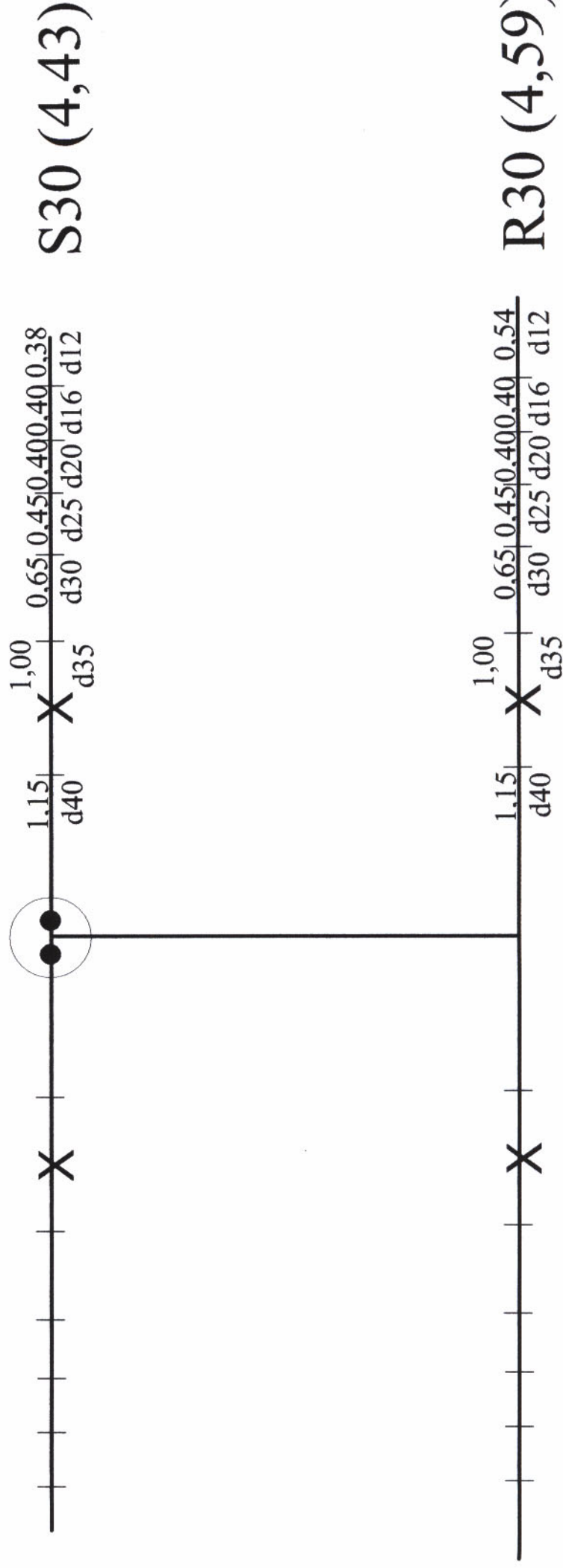
By a slight decrease of the lengths of both element halves (put outer section in to the last drill-hole) the resonant frequency will be shifted upwards, by an increase (pull final section out to the first drill-hole) it will be shifted downwards.

#### 5. Position of the antenna at strong winds

At strong winds the antenna should be placed in a way that the tips of the elements **show straight into the wind** which means that the boom stands broadside to it.

Hereby physical stress to the elements is avoided and their duration is enlarged.

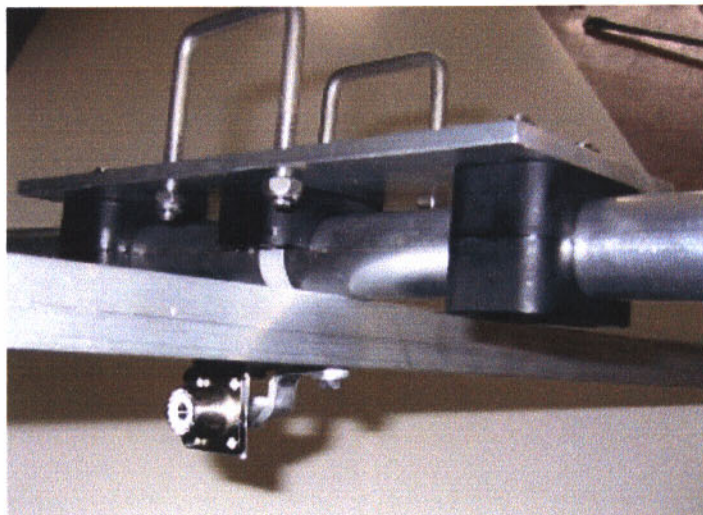
# OptiBeam OB2-30



**X** = Spule / Coil

alle Längenmaße in m ; alle Durchmesser in mm

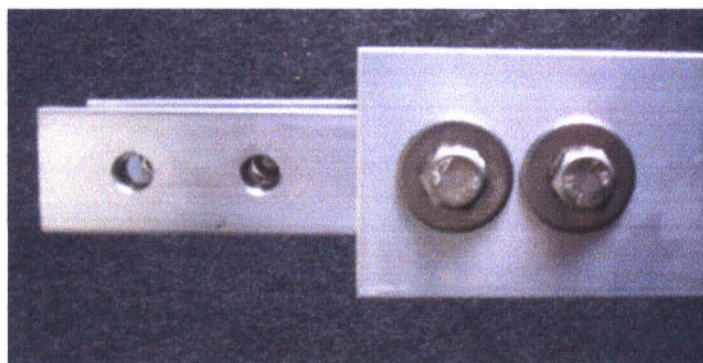




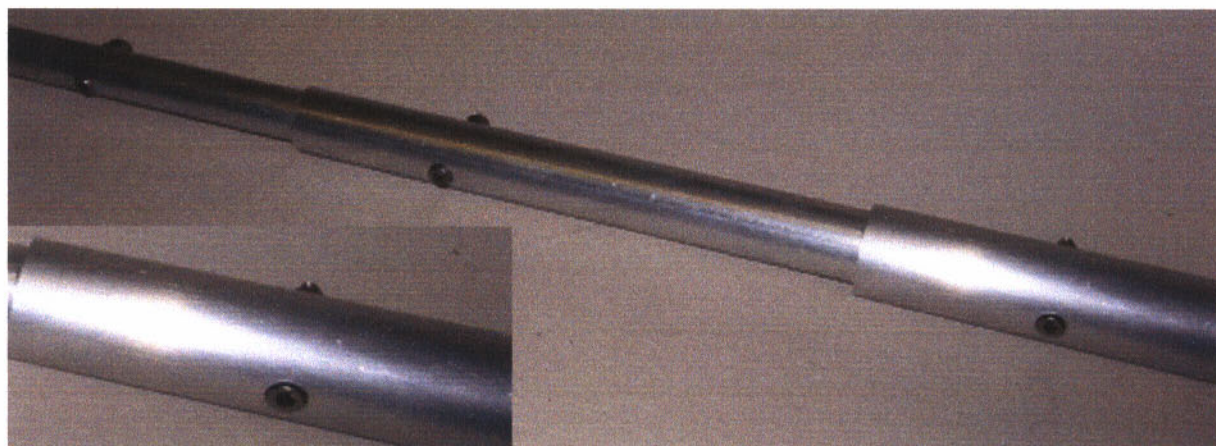
Ansicht Element-Plattform Strahlerelement  
mit Phasenleitung und Mittenunterstützung /  
view element platform driven element with  
phaseline and centre support



Ansicht Koax-Anschlußbuchse SO239 mit Strahler-  
element und Phasenleitung /  
view coax connector SO239 with driven element and  
phaseline

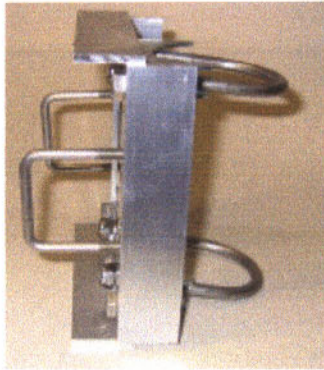


Ansicht Boomkopplung bei Vierkantboom /  
view boom coupler at square boom

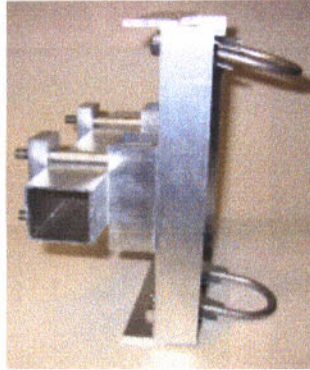


Detailansicht Elementübergänge / close up view element transitions

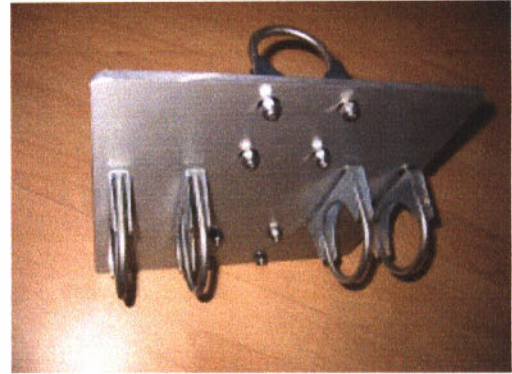




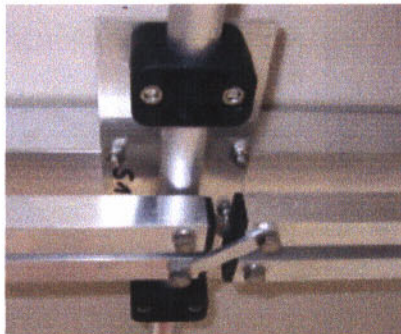
Boom-Masthalterung für kleinere Modelle /  
 boom to mast mounting for smaller models



Boom-Masthalterung für mittlere Modelle /  
 boom to mast mounting for medium size models



Boom-Masthalterung für große Modelle /  
 boom to mast mounting for big models



Seitenansicht Überkreuzung  
 Phasenleitung bei Modell 9-5  
 u. 4-40 /  
 side view crossing of phase  
 line at model 9-5  
 and 4-40



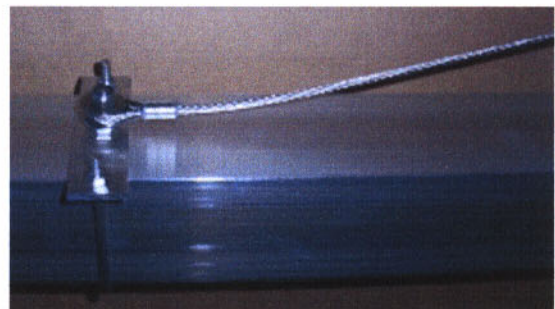
Ansicht zentrale und  
 äußere Boomabspannung  
 für OB11-3 /  
 view centre and outer  
 boom truss for OB11-3



Ansicht variable äußere Boomabspannung div. Modelle /  
 view variable outer boom truss diverse models



Gesamtansicht Abschlußstüb mit Isolatoraufhängung an Boom  
 bei diversen Modellen /  
 total view termination stub with insulated fixing to the boom  
 at diverse models



Äußere Seilabspannung für große Modelle, Rundboom dto. /  
 outer boom truss for big models, round boom equivalent



Zentrale Seilabspannung für Modelle über 6 Meter Boomlänge /  
 centre boom truss for models over 6 meter boom length

