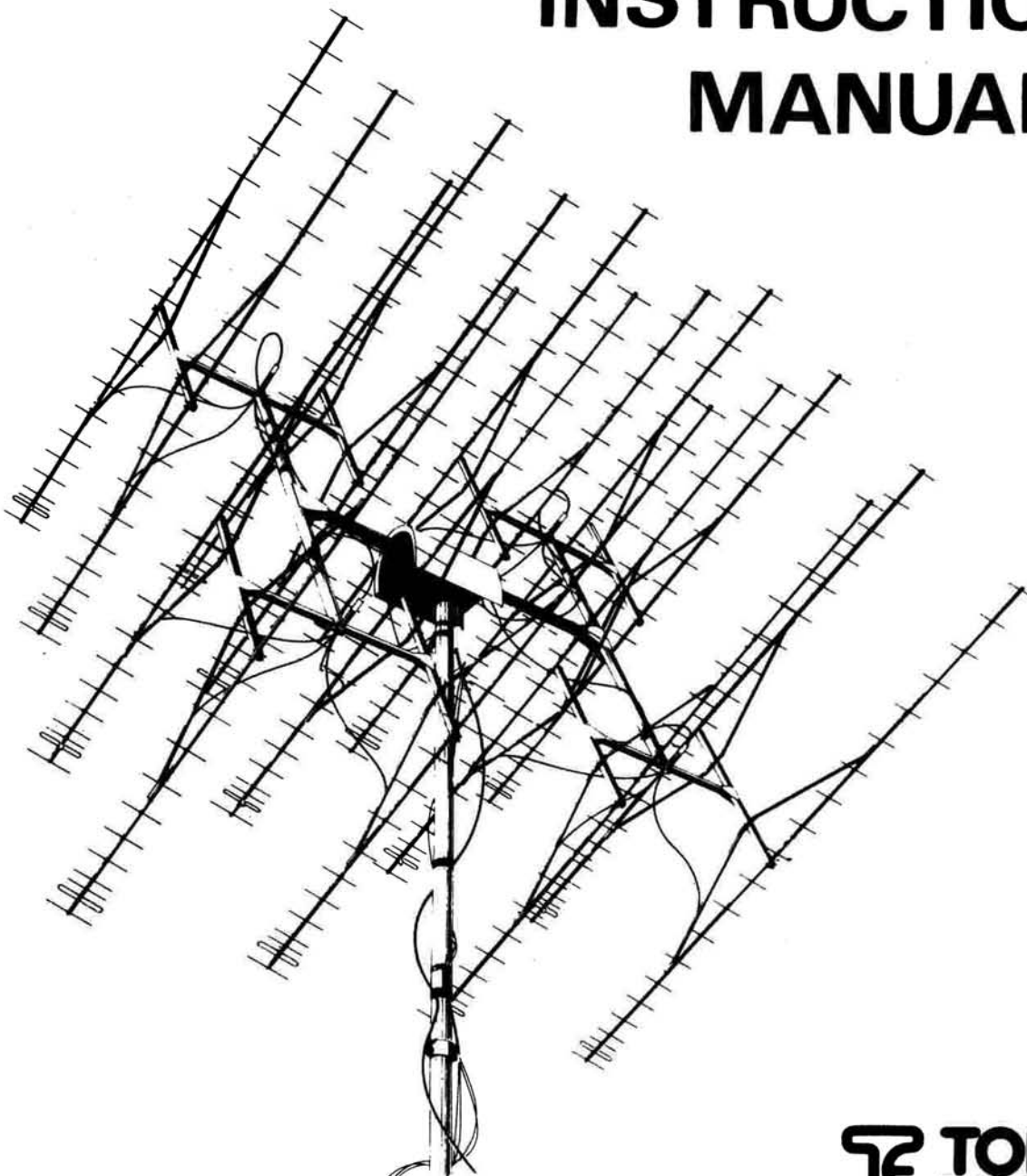




ANTENNES

**TONNA**

**435 MHz 2x19 ELEMENT  
INSTRUCTION  
MANUAL**



## ASSEMBLY INSTRUCTIONS

### 435 MHz 2x19 element crossed F9FT ANTENNA

#### IMPORTANT

When opening the package, check and compare all parts and hardware with enclosed part list. Then, thoroughly and carefully read the instructions.

#### ELEMENT ASSEMBLY

Each element is mounted on the boom with a special holder (#6 on pictorial diagram), made of glass fiber loaded polycarbonate. This holder is provided with a hexagonal print, into which the element attaching nut #7 fits. Tightening is achieved with M5 screw #5.

On each element is provided a centering bump which must fit inside the centering cavity of the holder (See arrow on close-up C). First snap the holder on the element, taking care for proper centering, and mount the holder on the boom, with screw #9. The holder should be mounted as shown on the pictorial diagram (the hole is located on the LEFT side the element, when the rear side of the antenna is at the left of the observer). If not, spacings between directors, driven elements and reflectors may not be correct any longer.

#### CAUTION

The antenna still being on the ground, make sure that all element set lengths decrease, from reflector set Rh/Rv (longer element set) through director set D17h/D17v (shorter element set); each successive element set is either the same or shorter than the prior element set. If not, performance of the antenna may be drastically reduced. Make sure proper centering ( $\pm 0.5$  mm) is achieved for each element, especially for D1 to D4.

#### ATTACHING THE FEED-LINE

Cut the protective boot (#16, close-up B) to allow a tight fit with the coax used, and slide onto coax. Strip off approximately 15 mm (1/2 ") of the outer PVC jacket. Spread apart the braid, and then twist all wires together at a diameter of approximately 3 mm (1/8 ").

Remove about 10 mm (3/8 ") of the center insulator, to expose center lead. With a solder iron, slightly tin the center lead and the twisted braid. After cooling, slight onto them the special female lugs #17, and thoroughly solder. Plug in with care the whole assembly into the driven element lugs.

#### CAUTION:

MAKE SURE THAT ANY LOOSE BRAID WIRE DOES NOT SHORT THE CONNECTION !

Trim off all unsoldered braid wires, to avoid any short.

DO NOT FILL THE DRIVEN ELEMENT CAVITY WITH SILICONE OR ANY OTHER MATERIAL BEFORE COVERING WITH BOOT.

Just coat a thin protective varnish or paint layer on the solders.

After proper checking, slide boot down over the feed connection, and snap boot into place. Tape coax at top of boot, and where boot attaches to driven element. Drill a small hole on lower part of boot, to allow water to drain.

#### IMPORTANT:

THE COAX FEEDING THE REARMOST DRIVEN ELEMENT SHOULD NOT CROSS THE FOREMOST DRIVEN ELEMENT !

Run the coax "above" the driven element, on the side of the boot.

If the coax used is too stiff, then it is recommended to modify the case, as shown as on modification diagram.

## BOOM ASSEMBLY

Loosen the boom attaching gusset (#10), slide the two boom sections into the gap, and then, tighten gusset with M6 screws #13. The purpose of the slashed hole on the gusset is to allow some upward tilt of the antenna, whenever required. Position of the slashed hole is correct when the antenna can move upward from horizontal.

Proper position of the main plate (#11) is when the tightening U-bolt (#15) remains horizontal on the stops provided in that plate (see close-up A2).

## MOUNTING OF ANTENNA TO MAST

The maximum useful mast outer diameter is 54 millimeters (2" 1/8).  
Untighten the M6 nuts #14 and open the clamp #12 as shown on close-up A1.  
Introduce the mast in the U-Bolt #15, close the clamp #12 and firmly tighten the M6 nuts #14 (see threefold close-up A).

## OPERATING HINTS

It is recommended to keep the antenna in local dominant wind direction, when not in use.

## PART AND HARDWARE LIST

Diagram #	Description	Quantity
1	Rear boom section	1
2	Front boom section	1
3	Black cap (rear indicator)	1
4	Red cap (front indicator)	1
5	Element to boom attaching screw (M5x20)	36
6	Element to boom attaching nut (M5)	36
7	Polycarbonate element holder	36
8	Driven element screw, slotted head, (M5x20)	2
9	Driven element attaching nut (M5)	2
10	Boom to mast attaching gusset	1
11	Boom to mast attaching main plate	1
12	Open hole "alligator" clamp	1
13	Gusset to plate attaching screw (M6x15)	2
14	Tightening nut (M6)	2
15	Stainless steel U-bolt M6x80	1
16	Driven element protective boot	2
17	Feed line contact lugs	4
R, D1 thru D17	Parasitic elements	36
Tr	Driven element	2

## ELEMENT LENGTHS

Element		Millimetres	Inches
Reflector	:	350	13" 25/32
Driven element	:	320	12" 19/32
Director 1	:	330	13"
Director 2	:	320	12" 19/32
Director 3	:	305	12"
Director 4	:	300	11" 13/16
Director 5	:	298	11" 23/32
Director 6	:	295	11" 5/8
Director 7	:	295	11" 5/8
Director 8	:	290	11" 13/32
Director 9	:	285	11" 7/32
Director 10	:	285	11" 7/32
Director 11	:	280	11" 1/32
Director 12	:	280	11" 1/32
Director 13	:	275	10" 13/16
Director 14	:	275	10" 13/16
Director 15	:	270	10" 5/8
Director 16	:	270	10" 5/8
Director 17	:	265	10" 7/16

NOTE: Each element length refers to a set of 2 elements, one horizontal, and one vertical.

NOTE: The company ANTENNES TONNA S.A. reserves for itself the right for modifying its products, without notice.

# RIGHT HAND CIRCULAR POLARIZATION

## RECOMMENDED ASSEMBLY FOR PROPER

### OPERATION THROUGH OSCAR13

435 MHz 2x19 ELEMENT CROSSED YAGI, part nr: 20438

#### IMPORTANT

Refer to assembly diagram.

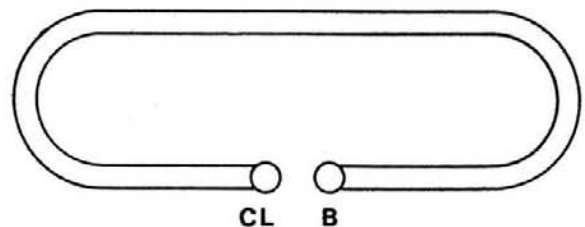
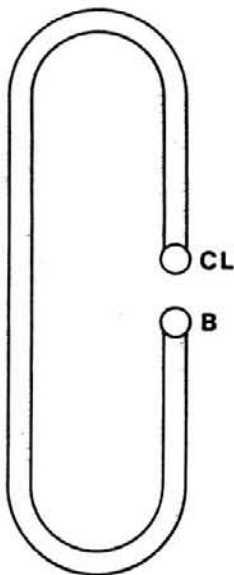
All elements of part "H" have a 20cm (7" 7/8) shift towards the front of the antenna, with respect to the elements of part "V".

This shift must be taken into account, in phasing line calculation.

#### PHASING LINE TO ANTENNA CONNECTION

Antenna is assumed to be seen from the rear.

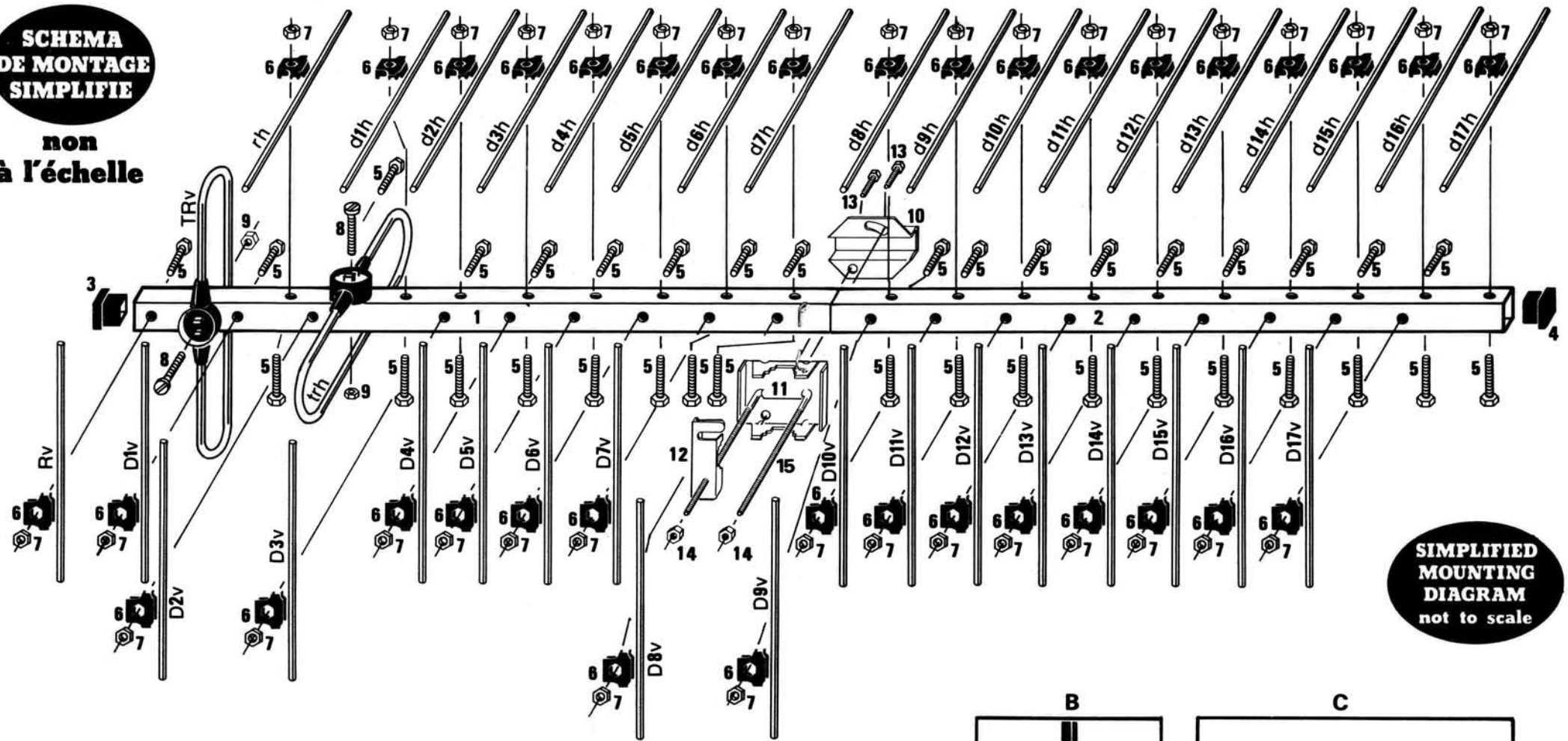
- 1) Part "H":  
Center lead of coax cable is connected to left hand terminal of driven element.
- 2) Part "V":  
Center lead of coax cable is connected to upper terminal of driven element.



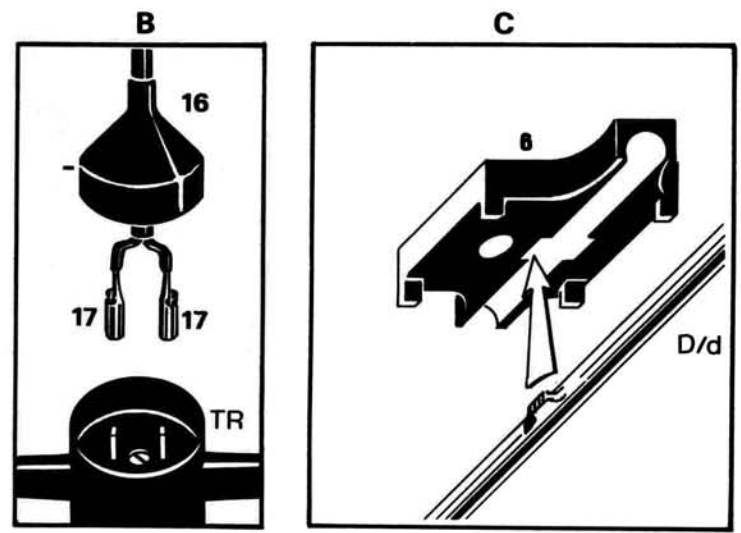
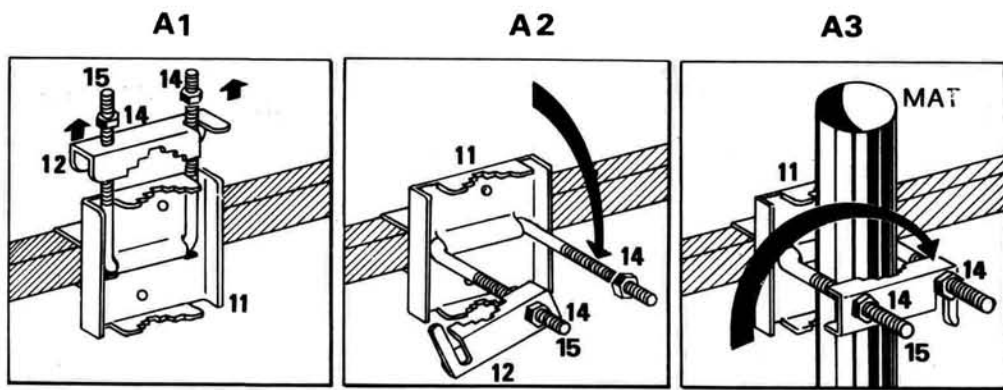
#### PHASING LINE LENGTHS

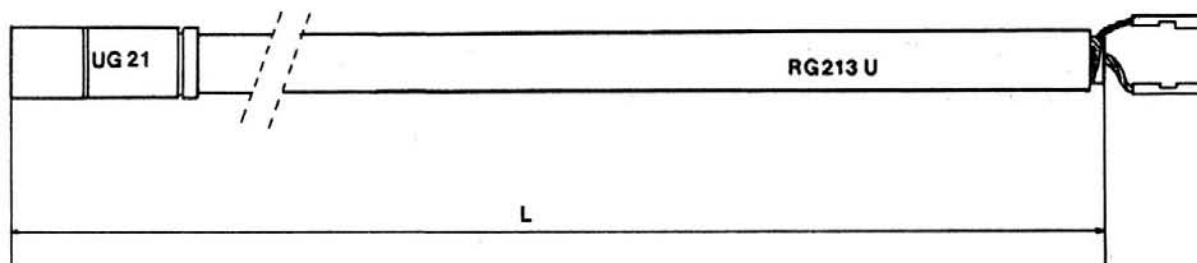
Proposed line length only apply if velocity factor of coax used is 0.66 (RG213/U or equivalent).

**SCHEMA  
DE MONTAGE  
SIMPLIFIE**  
**non  
à l'échelle**



**SIMPLIFIED  
MOUNTING  
DIAGRAM  
not to scale**





"H" line length: 2503 mm (98" 9/16) For top of mast mounting or group of four  
 "V" line length: 2485 mm (97" 13/16) with 1.4m spacing between antennas.

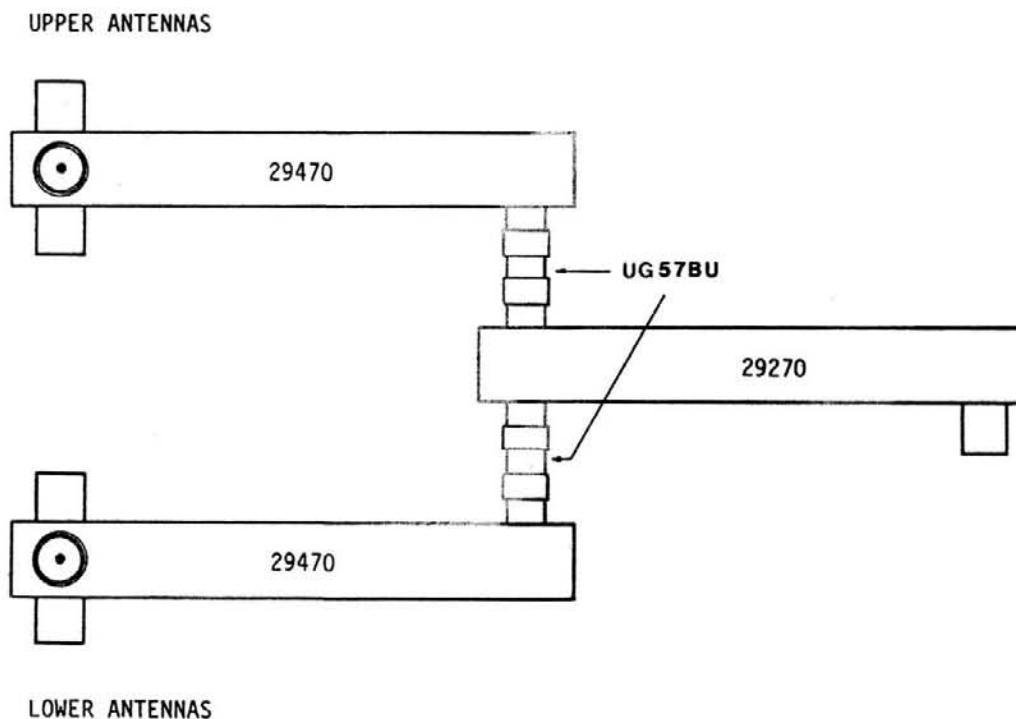
"H" line length: 2958 mm (116" 7/16) For mounting with a 2x9 element crossed  
 "V" line length: 2940 mm (115" 3/4) yagi, on a 3m long horizontal mast.

Care should be taken as to respect the length difference LV - LH:

18mm (0" 7/8)

#### TWO OR FOUR ANTENNA SYSTEM

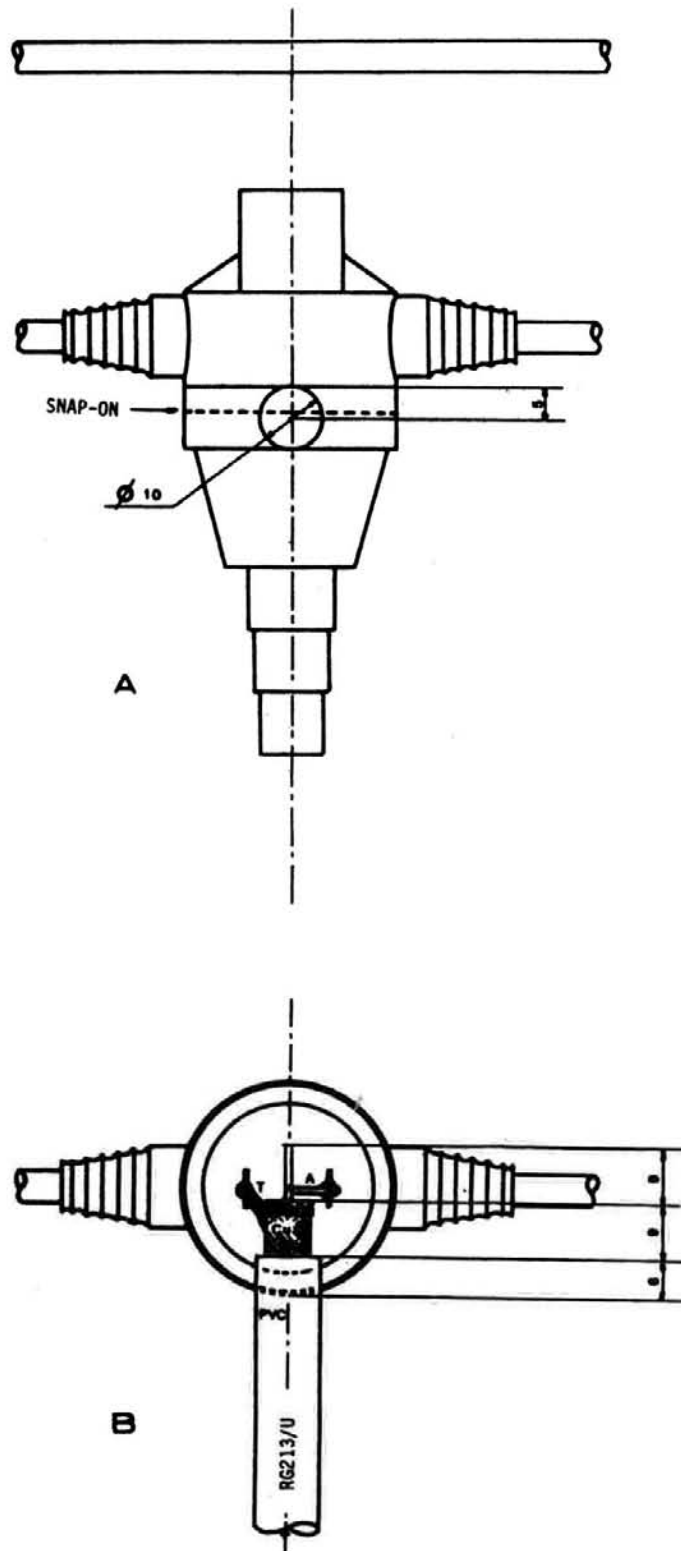
Two antennas can be conveniently phased in with our splitter, part nr: 29470.  
 With four antennas, we recommend to use the following set-up:



#### NOTES

- 1) On the horizon, at AOS and LOS, especially when there are "transhorizon" propagation conditions, circular polarization may be highly distorted, and in some cases, rotation sense can be even reversed. As a result, received may be extremely weak and unstable.  
 All those phenomenons disappear as soon as satellite is above horizon (just a few degrees.)
- 2) Receiving (mode L) can be highly improved by connecting a very low noise preamplifier at antenna feed-point.

PROPOSED SET-UP TO AVOID INTERFERENCE OF COAX LOOP IN ELEMENT PLANE



This set-up is proposed in waiting for a new case, which is presently under development.



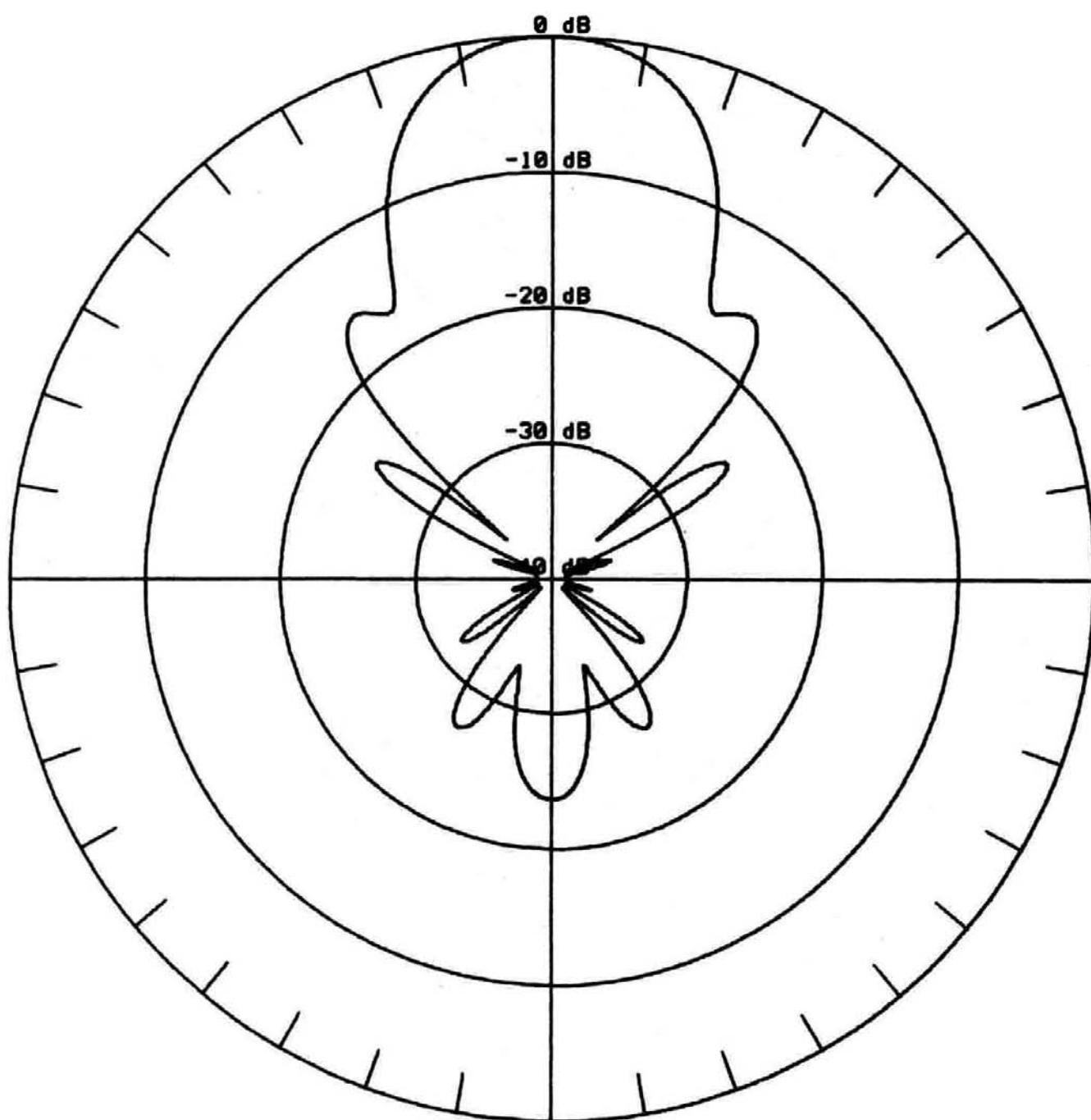
FREQUENCE: 432.0 MHz

PLAN: E

GAIN CALCULE : 16.20 dB Iso

RAPPORT ARR./AV. : -23.56 dB

ANGLE D'OUVERTURE A -3dB :  $2 \times 14.76$  deg.



FREQUENCE: 432.0 MHz

PLAN: H

GAIN CALCULE : 16.20 dB Iso

RAPPORT ARR./AV. : -23.56 dB

ANGLE D'OUVERTURE A -3dB :  $2 \times 15.73$  deg.

