

Twin Planar antenna for mobile use

Features

- To receive analogue and digital TV and radio programmes and other satellite signals
- Frequency range: 10.70-12.75 GHz
- Power supply over drop cable
- To be used when the mobile home, caravan or lorry is not in motion
- Integrated Twin LNB (two outputs)
- Can be mounted onto the HDM 14x jointed masts
- Admissible Vmax.: 130 km/h (lowered antenna)



Proper use (designated use)

The BAS 66 skew is designed for satellite reception from mobile locations, i.e. stationary caravans, motorhomes, HGVs or non-commercial boats on inland waterways. The arrangement for attaching the antenna is compatible with the jointed tripod masts HDM 140, HDM 141 and HDM 143 (Fig. 1), which allows the antenna to be rotated and aligned by crank and mast rotation from within the vehicle.

Any other use, or failure to comply with these user instructions and the documentation and instructions accompanying the equipment, will result in voiding of warranty cover.

The following circumstances result in the loss of all warranty and liability claims towards the manufacturer:

- Improper installation
- Use of non-specified mounting materials, which cannot guarantee the mechanical reliability of the antenna system
- Non-permissible use, e.g. use of the planar antenna for storage
- Structural changes or interference with the components and mounting accessories in the set, which could endanger both the mechanical and functional reliability
- Forced opening of the antenna (can produce function failure)
- Use of cleaners containing solvents, such as acetone, nitro-cellulose combination thinners, petrol etc.
- Failure to observe further instructions in this manual



Important NOTE:

In some cases, it may happen that the film surface of the BAS 66 Skew is slightly wavy. However, this does not affect the reception and is therefore not a reason for complaint.

Road Traffic Licensing Regulations (StVZO)

The applicable regulations of the StVZO must be observed in respect of fixed installation of the turntable on a vehicle which is driven on public highways. In particular, §§ 19/2; 30 C; 32 (2) and the EC directive 74/483 EEC are applicable. Briefly, they state that no endorsement of the vehicle documentation is required unless the antenna unit causes the height of the laden vehicle to exceed 2 m, or the antenna unit projects beyond the outer lateral outline of the vehicle. The maximum permissible height of 4 m (vehicle and antenna unit) may not be exceeded.

Tip: Keep these instructions safe for future reference and give them to the next owner if the antenna is sold.

Accessories required

Sat jointed masts to mount BAS 66 Skew.

- HDM 140 BN: 218456 All three types include laid
- HDM 141 BN: 218457 cables and plugs.
- HDM 143 BN: 218458

BAS 66 Skew Sat jointed mast

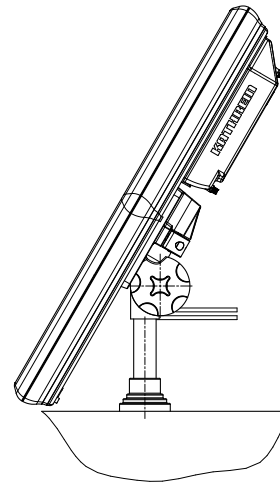


Fig. 1

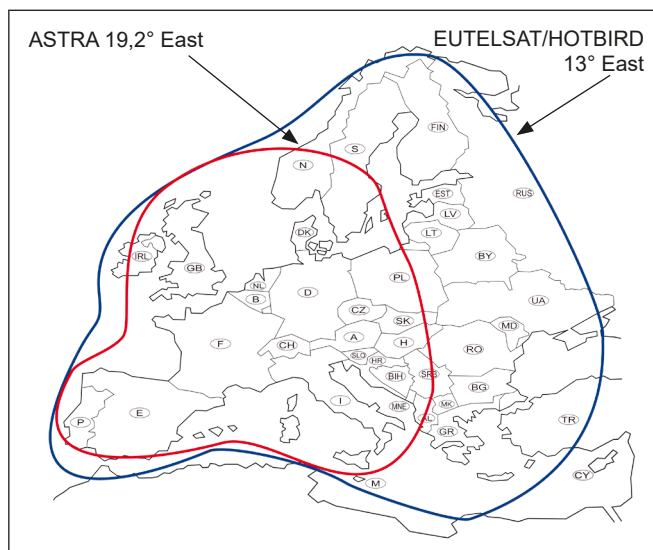
Scope of delivery

The BAS 66 Skew planar antenna is preassembled in the factory before delivery.

Reception area/Footprints

The footprint is the reception area on the earth that a satellite covers with its transmission beam (spot), within which satellite reception is possible. The transmission power is at its greatest in the centre of this spot – it becomes progressively weaker moving outwards. You should preferably align your antenna to the position of the ASTRA satellite 19.2° East or EUTELSAT/HOTBIRD 13° East. The spots for these satellites are shown below.

The red line of the footprint here shows the area covered with digital signals by the ASTRA satellites.



The satellites broadcast the various channel packages in different footprints. The respective channel packages can normally be received within these footprint zones. In the marginal zones, reception is possible, although because of a variety of influencing factors this cannot be guaranteed. The quality of the channels received can vary considerably (for instance due to environmental factors).

Reception site

In order to guarantee satellite signal reception, it is absolutely imperative to make sure that there are no obstacles between the antenna and the satellite at the reception site. You should therefore ensure that the antenna is not shadowed by rooftop elements such as roof boxes, air conditions, solar panels, trees, buildings, etc. Please note that the reception system requires a general clear line of sight to the south. No trees or buildings should interrupt this line of sight between the reception dish and the satellite.

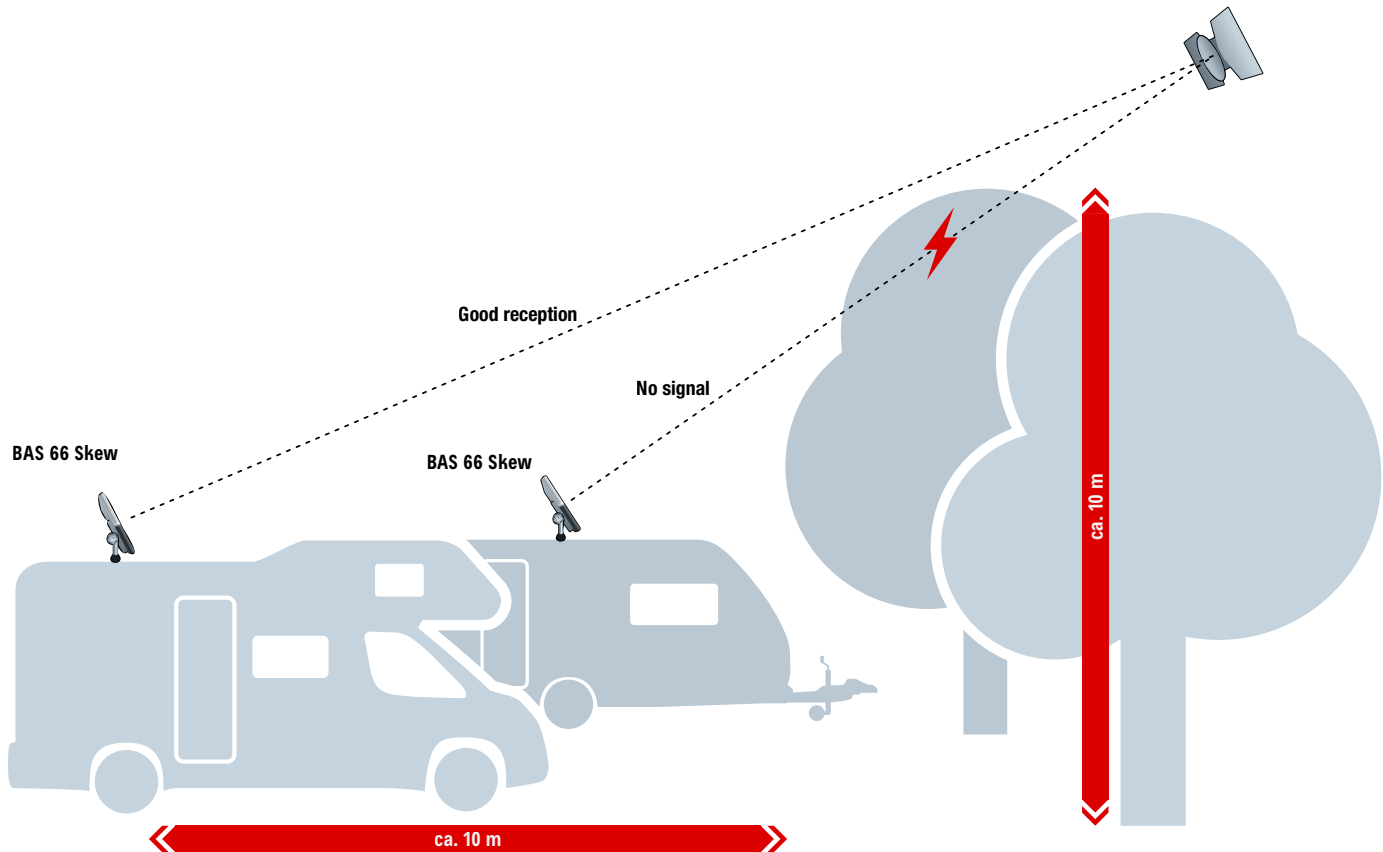


Fig. 4

Important Information

Before you mount, connect or use the planar antenna, make sure that you observe the information in these instructions for use.

Warning:



If you do not observe this information:

- The antenna or installation site could be damaged by errors in installation or connection, or by changes to the components or the use of other components
- Improper conduct can lead to health and safety dangers for you and other persons
- The manufacturer is not liable for any functioning errors or damage resulting from this

When performing work on antenna systems, please act responsibly towards yourself and others.

Tip: Keep these instructions safe for future reference and give them to the next owner if the antenna is sold.

Selection of the installation site

Danger!



- This may cause the required minimum safety clearances to be violated. Maintain a minimum clearance of 1 m from all other electrical devices on every side! There is a danger to life if you or any of the antenna parts come into contact with electrical devices!
- Never work on antenna systems during a thunderstorm - serious danger to life!

Safety during installation work

Warning:



When carrying out installation work in locations where there is a risk of falling, take appropriate safety precautions, e.g. use of a working platform. Make sure that the vehicle roof is sufficiently strong and stable to carry out the installation work (risk of damage or collapsing of roof).

In case of doubt, contact a qualified specialist dealer or the manufacturer of your vehicle to find an appropriate installation location.

Make sure that:

- All connected units are disconnected from the power supply
- The person carrying out the installation or repair does not suffer from vertigo and can move around safely on the roof of the caravan or motor home
- The person carrying out the installation or repair is wearing sturdy and non-slip shoes
- The person carrying out the installation or repair has a secure position to stand and hold on while working
- The roof and the climbing equipment used (e.g. ladder) are dry, clean and non-slip
- The roof can withstand the weight of the person carrying out the repairs

Caution! Risk of death or injury due to falling or the roof collapsing!

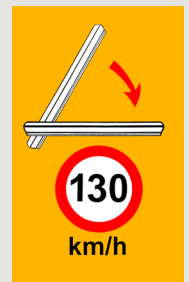
- Nobody should be inside the caravan/motor home underneath the antenna during dismantling/installation

Caution! Risk of death or injury due to possible roof collapse and falling parts!

- If you tied the cables together with wire or similar materials, remove this to prevent the risk of fire!
- Lay all cables such that nobody can tread on them or trip over them.
- To prevent parasitic induction or interference emissions, when extending the antenna cable use 75 Ω coaxial cable with a screening factor of at least 75 dB.
- Modifications to the electrical installations in the vehicle should only be carried out by a specialist in vehicle electrics.

Additional safety precautions

- Before commencing a journey, the antenna must always be lowered into horizontal position (park position). The jointed mast must be lowered as far as it will go (the swivel head will then rest upon the sealing collar). As a reminder, attach the sticker shown on the right where it can easily be seen by the person operating the ignition switch.
- Exceeding the normal vehicle height by failing to lower the antenna increases the risk of accidents! The driver is responsible for the condition of the superstructure and external fittings!
- If the antenna has collided with a fixed or movable object, check that it is still securely attached.



- As the antenna is subjected to vibration loads during driving, you should check at regular intervals, depending on the frequency of driving, that the system is still securely attached and tighten any parts that have worked loose.

- The maximum permissible speed for vehicles with an antenna unit mounted on the roof and the antenna lowered is 130 km/h.

- Lower the antenna if it will not be used for a long period. This makes the securing bolts more difficult to access (protection against theft).

In addition the instructions in the installation and operating manuals for these devices and for the attachments and superstructures must be complied with at all times!

- The safety provisions for the currently applicable laws and standards specific to the country of use must be complied with.

- The antenna and its accessories are not toys for children to play with! Keep any spare installation accessory items away from children (danger of choking on small parts).

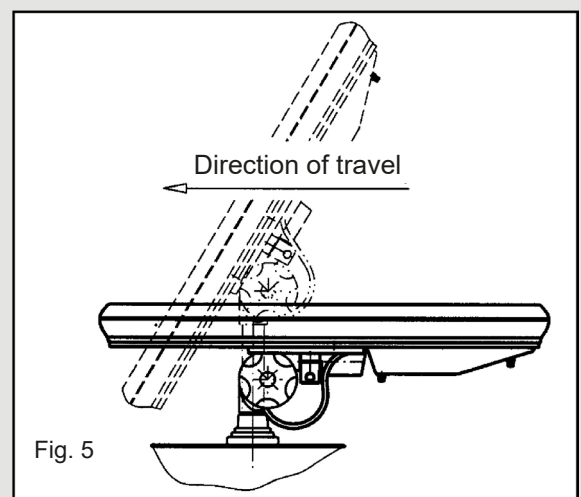


Fig. 5

Mounting the antenna (Fig. 6)

Install the mast according to the instructions of the mast manufacturer. For installation in caravans or mobile homes, the Sat jointed mast HDM 140 can be used. For installation on a truck, use the HDM 141.

If you wish to convert your terrestrial reception system composed of the HD 35 and the Shapeg mast HDM 135 to a satellite reception system, please use the jointed mast HDM 143.

The roof duct and fixing console of the HDM 135 can continue to be used.

These masts allow an easy and quick alignment of the antenna from the interior of the vehicle.

Detailed mounting instructions are supplied with the mast.

When mounting the mast, proceed as follows:

1. Prepare the mast swivel head as shown in Fig. 6
2. Slide the antenna into the swivel head as far as possible
3. Fasten the antenna with the clamp; torque for the two M 6 screws: $M = 6.5 + 1 \text{ Nm}$

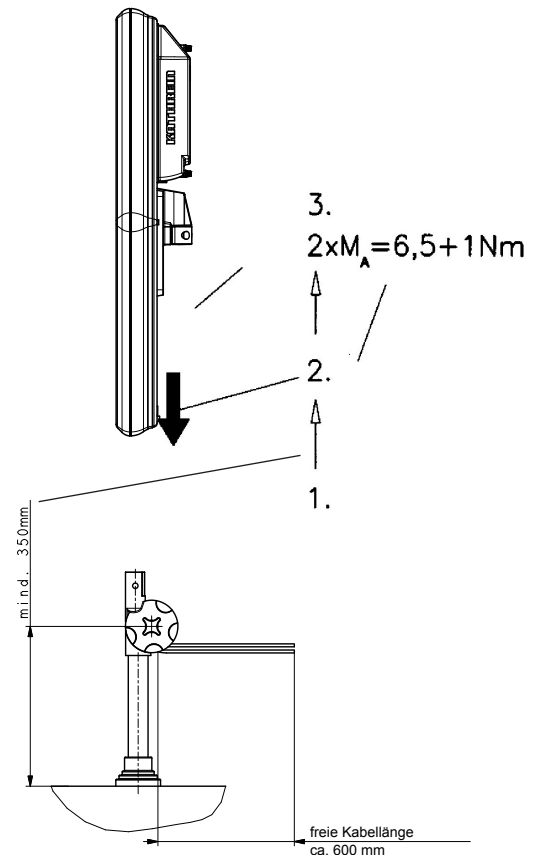


Fig. 6

Connecting the cable

Connecting the cable to the antenna (Fig. 7)

1. Loosen the two knurled screws and remove the LNB cover.
2. Connect the F-type plugs as shown.
3. Connect the cables to the LNB.
4. Now press the cables (outer diameter 6.8 mm) into the cable support. If you use the thinner cables (e.g. for Sat jointed masts HDM xxx with integrated cables), first put the supplied sleeves on the cables in order to compensate the diameter.
5. Re-fit the LNB cover.

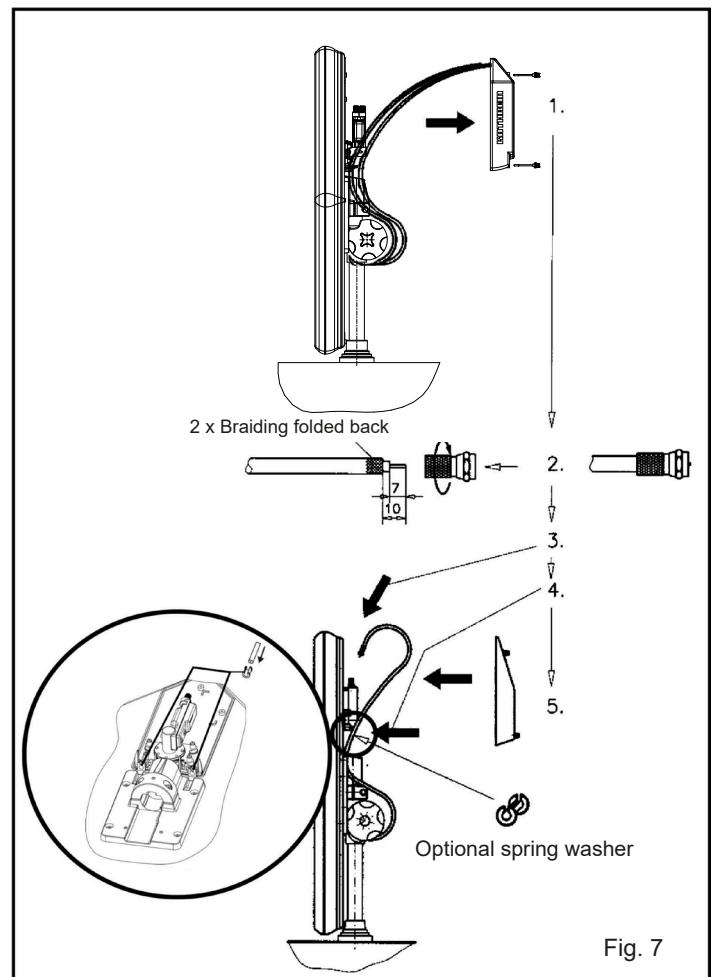


Fig. 7

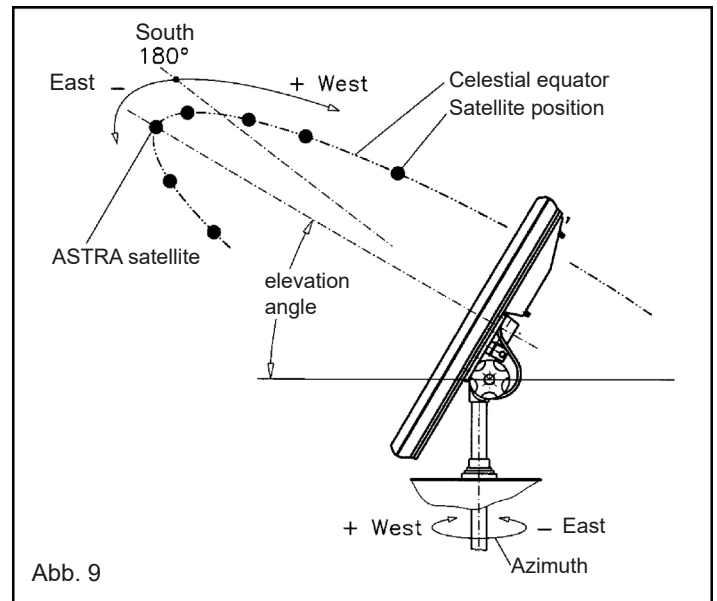
Aligning the satellite reception system

Prerequisites

- The antenna must have an imaginary "line of sight" of the satellite (the visibility must not be obstructed by trees, buildings, etc.) towards the south at an angle of 15° to 55° relative to the horizon.
- The vehicle has to be positioned horizontally. The antenna must be in the driving position.

Alignment procedure for the use of Sat jointed mast

1. Loosen the cross grip screw of the mast console and the cone nut on the roof duct. Slide the antenna mast (HDM 140, HDM 143) from its lowered position at least 13 cm up, in order to prevent it from colliding with the roof when it is swivelled.



2. Elevation adjustment

- Switch to the program position 1 on the receiver. This program position is assigned to the program ARD at ASTRA 19.2° East for Kathrein receivers and for most of the other receivers which are on the market in Germany.
- The antenna must be aligned to the south. Turn the crank handle of the jointed mast clockwise until the antenna has reached the elevation position required for the reception site. The number of the necessary rotations can be gathered from the Azimuth/Elevation table or the graph on page 12.

For the following steps you may need an assistant, if you yourself are unable whilst performing the setting to read the results of the alignment work on an antenna meter or screen connected to the satellite receiver.

3. Setting the azimuth

After you have set the elevation angle correctly as described under "2. Setting the Elevation", turn the antenna mast slowly clockwise or anti-clockwise to the position that gives the best values for signal strength and quality.

4. After the alignment is finished, do not forget to screw on the cross grip screw on the mast console and the cone nut on the roof duct.
5. A graph for quick alignment of the antenna is found on page 12.

Tip: Put the user guides in a clear plastic folder and fasten the folder to the door of a wardrobe ensuring they are at hand whenever they are needed.

Maintenance

- The BAS 66 Skew as well as the mounting accessories (HDM jointed masts) are maintenance-free.

Attention!

Before your start the journey, make sure that no parts of the antenna system are loose. Parts that are loose must be fastened.

- Cleaning

Only clean the antenna with water and, if necessary, with standard cleaning agents for motor vehicles. Never use steam jet or high pressure cleaners or solvent-containing cleaners such as acetone, nitro-paint thinners, benzine etc. These could damage the antenna.

Skew Adjustment

Explanation

The BAS 66 Skew planar antenna is mounted centrally on the skew adapter plate when delivered. This setting does not necessarily have to be changed in Central Europe to receive satellites with orbital positions in Central Europe.

In the peripheral regions of the southwestern and southeastern regions, the reception can be improved by adjusting the skew.

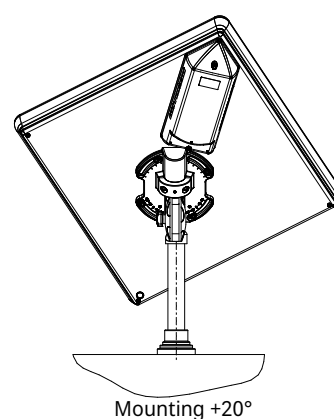
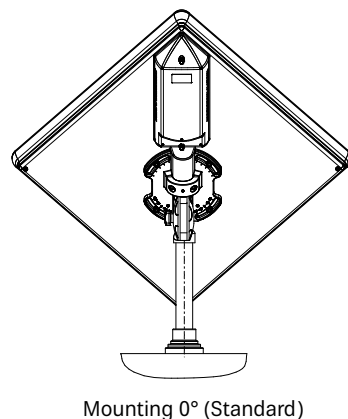
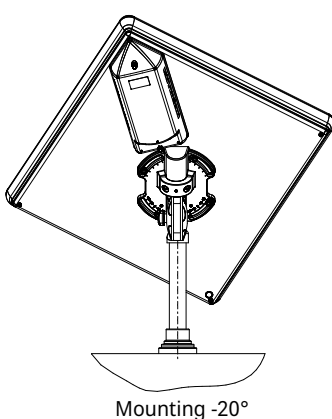
Change the skew settings of the satellite antenna as follows:

| Country of stay | ASTRA 19.2° East | HOTBIRD 13° East | ASTRA 23.5° East | ASTRA 28.2° East |
|-----------------|------------------|------------------|------------------|------------------|
| Albania | 8 | 8 | 3 | -2 |
| Belgium | -5 | -7 | -8 | -11 |
| Bulgaria | 14 | 13 | 9 | 4 |
| Germany | 0 | -2 | -4 | -4 |
| England | -7 | -3 | -10 | -12 |
| France | -9 | -10 | -11 | -15 |
| Greece | 14 | 14 | 8 | 3 |
| Italy | -3 | -2 | -5 | -10 |
| Norway | 7 | 2 | 5 | 3 |
| Austria | 2 | 0 | -2 | -6 |
| Portugal | -20 | -20 | -20 | -20 |
| Sweden | 6 | 3 | 4 | 1 |
| Spain | -17 | -18 | -20 | -20 |
| Turkey | 20 | 18 | 18 | 12 |

How to adjust the skew

In the following description, it is assumed that the BAS 66 Skew has been correctly erected and mounted.

1. Loosen the fixing screws of the antenna with a suitable hex key (size 5).
2. Set the planar antenna to the desired degree
3. Retighten the hexagon socket screws with a torque of 7 Nm



Using the HDZ 66 inclinometer

The determination of the planar antenna's inclination is currently only supported in the standard setting (mounted centrally on the skew adapter plate -0°). To adjust the elevation using the inclinometer, the planar antenna must first be positioned centrally. Once the satellite has been found, the reception can be optimised by adjusting the skew.

Operating failures

| Defect | Possible causes |
|--|--|
| <ul style="list-style-type: none"> - No picture - Freeze frame for digital reception | <ul style="list-style-type: none"> - Obstacle between antenna and satellite - The reception site is outside the coverage area - TV set or receiver faulty or no power - The plug of the antenna cable is loose |
| <ul style="list-style-type: none"> - Bad picture quality - Block formation for digital reception | <ul style="list-style-type: none"> - Obstacle between antenna and the satellite - partial shadowing of the antenna signal - Leaves, snow or ice cover the antenna. The reception site is in a fringe area of the footprints. Perhaps you can find a more powerful programme. - The plug of the antenna cable is loose |

Note!

In the event that you could not find the cause of the defect and the remedy for it, contact your specialist dealer or our service centre. Do not under any circumstance open the antenna!

The address of our service centre (Germany):

CSS Caravan-Sat-Service GmbH
Bahnhofstr. 110
83224 Grassau/GERMANY

Tel. (0 86 41) 69 98 42-7
Fax (0 86 41) 69 98 42-9
E-mail: service@css-grassau.de

Technical data

| Type | | BAS 66 Skew |
|-------------------------------------|--------|---|
| Order no. | | 2000000001 |
| Usability | | Mobile use |
| Installation on | | HDM 140, 141, 143 |
| Reception range | GHz | Switchable: 10.70-11.70 (0 kHz); 11.70-12.75 (22 kHz) |
| Polarization | | Switchable: Vertikal (14 V); Horizontal (18 V) |
| Gain | dB | > 50 |
| Half power beam width ¹⁾ | ° | Typ. 3 |
| LNB | | 2 outputs switchable |
| Output frequency | MHz | 950-1,950/1,100-2,150 |
| Oscillator frequency (L.O.) | GHz | 9.75/10.6 |
| Supply voltage LNB | V | Vertical: 11.5-14.0; horizontal: 16.0-19.0 |
| Max. current drain | mA | 220 |
| Wind load ²⁾ | N | 240 |
| Mast clamp range | mm | - |
| Setting range Elevation | ° | 0-90 (HDM 14x) |
| Setting range Azimuth | ° | 360 |
| Dimensions | mm | 500 x 500 x 109 (without support) |
| Packing unit/weight | pc./kg | 1/6.5 |

¹⁾ At mid-band

²⁾ At a dynamic pressure of 800 N/m² acc. to EN 60728-11 (see page 63 and 78, "wind load indications")

Disposal



Electronic equipment

Electronic equipment is not domestic waste – in accordance with directive 2012/19/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL dated 04th July 2012 concerning used electrical and electronic appliances, it must be disposed of properly. At the end of its service life, take this unit for disposal at a designated public collection point.

Azimuth/Elevation table

For the first approach towards the satellites EUTELSAT 10° and EUTELSAT 16° you can take the values for EUTELSAT 13° shown in the table.

The values in column „U“ refer to the crank handle rotations in connection with the mobile antenna BAS 66 Skew.

| | ASTRA 19.2° East | | | EUTELSAT 13.0° East | | | Atlantic Bird 3 5.0° West | | |
|--------------------|------------------|-----------|----------|---------------------|-----------|----------|---------------------------|-----------|----------|
| Germany | Az | EI | U | Az | EI | U | Az | EI | U |
| Bad Reichenhall | 11.5 | 34.9 | 4 3/4 | 179.9 | 35.2 | 4 3/4 | 203.6 | 32.5 | 5 1/4 |
| Berlin | 172.7 | 29.7 | 5 1/4 | 180.5 | 30.0 | 5 1/4 | 202.8 | 27.6 | 5 1/4 |
| Bremen | 167.1 | 28.6 | 5 1/4 | 174.8 | 29.2 | 5 1/4 | 197.1 | 28.0 | 5 1/4 |
| Cottbus | 173.8 | 30.6 | 5 | 181.7 | 30.8 | 5 | 204.1 | 28.1 | 5 1/4 |
| Dortmund | 165.1 | 30.0 | 5 1/4 | 172.9 | 30.8 | 5 | 195.8 | 29.9 | 5 1/4 |
| Dresden | 173.0 | 31.3 | 5 | 180.9 | 31.6 | 5 | 203.6 | 28.9 | 5 1/4 |
| Emden | 165.2 | 28.1 | 5 1/4 | 172.8 | 28.8 | 5 1/4 | 195.1 | 28.0 | 5 1/4 |
| Erfurt | 169.5 | 31.1 | 5 1/2 | 175.7 | 27.4 | 5 1/2 | 197.5 | 26.2 | 5 1/2 |
| Flensburg | 168.1 | 26.9 | 5 1/2 | 175.7 | 27.4 | 5 1/2 | 197.5 | 26.2 | 5 1/2 |
| Frankfurt/Main | 166.4 | 31.7 | 5 | 174.4 | 32.4 | 5 | 197.6 | 31.1 | 5 |
| Freiburg | 164.9 | 33.8 | 4 3/4 | 173.1 | 34.7 | 4 3/4 | 197.0 | 33.5 | 4 3/4 |
| Greifswald | 172.8 | 28.0 | 5 1/4 | 180.5 | 28.3 | 5 1/4 | 202.3 | 26.0 | 5 1/2 |
| Hamburg | 168.6 | 28.3 | 5 1/4 | 176.3 | 28.8 | 5 1/4 | 198.4 | 27.3 | 5 1/2 |
| Hannover | 168.2 | 29.5 | 5 1/4 | 175.9 | 30.1 | 5 1/4 | 198.4 | 28.6 | 5 1/4 |
| Kassel | 167.6 | 30.6 | 5 | 175.4 | 31.2 | 5 | 198.3 | 29.7 | 5 1/4 |
| Kiel | 168.89 | 27.47 | 5 1/2 | 176.47 | 27.97 | 5 1/4 | 198.42 | 26.50 | 5 1/2 |
| Koblenz | 164.94 | 31.27 | 5 | 172.87 | 32.10 | 5 | 196.07 | 31.12 | 5 |
| Leipzig | 171.27 | 30.93 | 5 | 179.19 | 31.28 | 5 | 201.84 | 29.05 | 5 1/4 |
| Magdeburg | 170.45 | 29.98 | 5 1/4 | 178.27 | 30.39 | 5 1/4 | 200.73 | 28.41 | 5 1/4 |
| M'gladbach | 163.81 | 30.19 | 5 1/4 | 171.62 | 31.09 | 5 | 194.57 | 30.42 | 5 1/4 |
| München | 169.80 | 34.24 | 4 3/4 | 178.08 | 34.72 | 4 3/4 | 201.77 | 32.45 | 5 |
| Neubrandenb. | 172.62 | 28.60 | 5 1/4 | 180.31 | 28.85 | 5 1/4 | 202.29 | 26.59 | 5 1/2 |
| Nürnberg | 169.33 | 32.76 | 5 | 177.43 | 33.27 | 5 | 200.74 | 31.25 | 5 |
| Osnabrück | 166.01 | 29.32 | 5 1/4 | 173.75 | 30.04 | 5 1/4 | 196.33 | 28.99 | 5 1/4 |
| Passau | 172.37 | 33.99 | 4 3/4 | 180.62 | 34.26 | 4 3/4 | 204.01 | 31.48 | 5 |
| Pirmasens | 164.83 | 32.48 | 5 | 172.88 | 33.33 | 5 | 196.45 | 32.29 | 5 |
| Plauen | 170.87 | 31.77 | 5 | 178.88 | 32.15 | 5 | 201.78 | 29.91 | 5 1/4 |
| Ravensburg | 167.13 | 34.45 | 4 3/4 | 175.41 | 35.04 | 4 3/4 | 199.38 | 33.33 | 5 |
| Regensburg | 10.63 | 33.36 | 5 | 178.81 | 33.77 | 4 3/4 | 202.17 | 31.41 | 5 |
| Rostock | 171.30 | 27.94 | 5 1/4 | 178.93 | 28.27 | 5 1/4 | 200.84 | 26.32 | 5 1/2 |
| Stuttgart | 166.79 | 33.18 | 5 | 174.93 | 33.89 | 4 3/4 | 198.57 | 32.36 | 5 |
| Trier | 163.72 | 31.72 | 5 | 171.68 | 32.65 | 5 | 195.10 | 31.90 | 5 |
| Ulm | 167.13 | 33.75 | 4 3/4 | 175.95 | 34.39 | 4 3/4 | 199.68 | 32.60 | 5 |
| Austria | Az | EI | U | Az | EI | U | Az | EI | U |
| Bregenz | 167.28 | 34.66 | 4 3/4 | 175.60 | 35.34 | 4 3/4 | 199.65 | 33.56 | 4 3/4 |
| Graz | 174.88 | 35.78 | 4 3/4 | 183.34 | 35.85 | 4 3/4 | 206.99 | 32.33 | 5 |
| Innsbruck | 169.41 | 35.78 | 4 3/4 | 177.80 | 35.67 | 4 3/4 | 201.81 | 33.38 | 5 |
| Klagenfurt | 173.32 | 36.17 | 4 3/4 | 181.83 | 36.37 | 4 3/4 | 205.76 | 33.12 | 5 |
| Lienz | 171.21 | 35.79 | 4 3/4 | 179.68 | 36.16 | 4 3/4 | 204.72 | 33.41 | 4 3/4 |
| Linz | 173.45 | 34.35 | 4 3/4 | 181.74 | 34.45 | 4 3/4 | 205.13 | 31.49 | 5 |
| Salzburg | 171.70 | 34.78 | 4 3/4 | 180.04 | 35.10 | 4 3/4 | 203.72 | 32.37 | 5 |
| Wien | 176.20 | 34.60 | 4 3/4 | 184.51 | 34.57 | 4 3/4 | 207.69 | 30.93 | 5 |
| Switzerland | Az | EI | U | Az | EI | U | Az | EI | U |
| Bern | 164.13 | 34.82 | 4 3/4 | 172.45 | 35.76 | 4 3/4 | 196.83 | 34.67 | 4 3/4 |
| Genève | 162.20 | 30.10 | 4 3/4 | 170.55 | 36.43 | 4 1/2 | 195.27 | 35.73 | 4 3/4 |
| Locarno | 165.70 | 35.91 | 4 3/4 | 173.94 | 35.40 | 4 3/4 | 198.12 | 33.99 | 4 3/4 |
| Zürich | 165.64 | 34.59 | 4 3/4 | 173.94 | 35.40 | 4 3/4 | 198.12 | 33.99 | 4 3/4 |

| | ASTRA 19.2° East | | | EUTELSAT 13.0° East | | | Atlantic Bird 3 5.0° West | | |
|-----------------|------------------|-------|-------|---------------------|-------|-------|---------------------------|-------|-------|
| Benelux-countr. | Az | EI | U | Az | EI | U | Az | EI | U |
| Brugge | 159.82 | 29.47 | 5 1/4 | 167.53 | 30.65 | 5 | 190.49 | 30.86 | 5 |
| Bruxelles | 161.12 | 30.10 | 5 1/4 | 168.90 | 31.20 | 5 | 191.99 | 31.10 | 5 |
| Den Haag | 161.35 | 28.79 | 5 1/4 | 169.01 | 29.84 | 5 1/4 | 191.70 | 29.77 | 5 1/4 |
| Eindhoven | 162.64 | 29.74 | 5 1/4 | 170.40 | 30.71 | 5 | 193.29 | 30.32 | 5 1/4 |
| Enschede | 164.56 | 29.19 | 5 1/4 | 172.28 | 30.02 | 5 1/4 | 194.91 | 29.37 | 5 1/4 |
| Groningen | 164.39 | 28.07 | 5 1/4 | 172.01 | 28.88 | 5 1/4 | 194.35 | 28.24 | 5 1/4 |
| Luxembourg | 163.08 | 31.76 | 5 | 171.04 | 32.74 | 5 | 194.51 | 32.12 | 5 |
| Maastrich | 162.75 | 30.40 | 5 1/4 | 170.58 | 31.38 | 5 | 193.65 | 30.92 | 5 |
| France | Az | EI | U | Az | EI | U | Az | EI | U |
| Bastia | 165.84 | 39.79 | 4 1/4 | 174.84 | 40.64 | 4 1/4 | 20.89 | 38.61 | 4 1/2 |
| Bayonne | 151.28 | 35.70 | 4 3/4 | 159.45 | 37.76 | 4 1/2 | 185.13 | 39.72 | 4 1/4 |
| Bordeaux | 152.95 | 34.72 | 4 3/4 | 161.06 | 36.61 | 4 1/2 | 186.23 | 38.18 | 4 1/2 |
| Brest | 149.57 | 29.91 | 5 1/4 | 157.12 | 31.92 | 5 | 180.65 | 34.44 | 4 3/4 |
| Calais | 158.19 | 29.43 | 5 1/4 | 165.86 | 30.73 | 5 | 188.90 | 31.30 | 5 |
| Clermont-Ferr. | 158.02 | 34.97 | 4 3/4 | 166.27 | 36.42 | 4 1/2 | 191.19 | 31.30 | 5 |
| Dijon | 161.08 | 33.88 | 4 3/4 | 169.25 | 35.06 | 4 3/4 | 193.55 | 34.73 | 4 3/4 |
| Le Havre | 155.50 | 30.37 | 5 1/4 | 163.22 | 31.91 | 5 | 186.67 | 33.04 | 5 |
| Limoges | 155.70 | 34.36 | 4 3/4 | 163.83 | 35.99 | 4 3/4 | 188.68 | 36.90 | 4 1/2 |
| Lyon | 160.33 | 35.45 | 4 3/4 | 168.67 | 36.72 | 4 1/2 | 193.60 | 36.44 | 4 1/2 |
| Marseille | 160.27 | 38.15 | 4 1/2 | 168.97 | 39.47 | 4 1/4 | 194.69 | 38.97 | 4 1/2 |
| Metz | 162.98 | 32.27 | 5 | 171.00 | 33.26 | 5 | 194.63 | 32.63 | 5 |
| Nantes | 152.69 | 32.10 | 5 | 160.52 | 33.92 | 4 3/4 | 184.70 | 35.66 | 4 3/4 |
| Nizza | 162.95 | 38.20 | 4 1/2 | 171.68 | 39.29 | 4 1/4 | 197.42 | 38.13 | 4 1/2 |
| Orléans | 157.19 | 32.47 | 5 | 165.15 | 33.94 | 4 3/4 | 189.22 | 34.59 | 4 3/4 |
| Paris | 158.06 | 31.66 | 5 | 165.95 | 33.03 | 5 | 189.70 | 33.53 | 4 3/4 |
| Reims | 160.29 | 31.66 | 5 | 168.21 | 32.86 | 5 | 191.83 | 32.86 | 5 |
| Rennes | 152.87 | 31.17 | 5 | 160.61 | 32.95 | 5 | 184.45 | 34.66 | 4 3/4 |
| Toulouse | 155.11 | 36.63 | 4 1/2 | 163.50 | 38.38 | 4 1/2 | 189.31 | 39.29 | 4 1/4 |
| Tours | 155.50 | 32.65 | 5 | 163.45 | 34.26 | 4 3/4 | 187.68 | 35.30 | 4 3/4 |
| Great Britain | Az | EI | U | Az | EI | U | Az | EI | U |
| Aberdeen | 155.10 | 22.33 | 5 3/4 | 162.19 | 23.63 | 5 3/4 | 183.45 | 24.93 | 5 1/2 |
| Belfast | 150.07 | 23.70 | 5 3/4 | 157.17 | 25.40 | 5 1/2 | 178.85 | 27.73 | 5 1/4 |
| Birmingham | 154.04 | 26.86 | 5 1/2 | 161.44 | 28.40 | 5 1/4 | 183.88 | 29.92 | 5 1/4 |
| Bristol | 152.93 | 27.69 | 5 1/2 | 160.37 | 29.34 | 5 1/4 | 183.09 | 31.10 | 5 |
| Glasgow | 152.36 | 23.00 | 5 3/4 | 159.46 | 24.51 | 5 3/4 | 180.93 | 26.35 | 5 1/2 |
| London | 155.91 | 28.35 | 5 1/4 | 163.46 | 29.80 | 5 1/4 | 186.27 | 30.89 | 5 |
| Manchester | 153.95 | 25.80 | 5 1/2 | 161.27 | 27.31 | 5 1/2 | 183.42 | 28.85 | 5 1/4 |
| Newcastle | 150.00 | 24.05 | 5 3/4 | 157.12 | 25.77 | 5 1/2 | 178.89 | 28.13 | 5 1/4 |
| Norwich | 157.86 | 27.58 | 5 1/4 | 165.37 | 28.86 | 5 1/4 | 187.89 | 29.56 | 5 1/4 |
| Plymouth | 150.73 | 28.18 | 5 1/4 | 158.17 | 30.03 | 5 1/4 | 181.10 | 32.28 | 5 |
| Portugal | Az | EI | U | Az | EI | U | Az | EI | U |
| Beja | 140.31 | 37.66 | 4 1/2 | 148.23 | 40.82 | 4 1/4 | 175.33 | 45.84 | 3 3/4 |
| Braganca | 143.77 | 34.94 | 4 3/4 | 151.58 | 37.66 | 4 1/2 | 177.25 | 41.69 | 4 1/4 |
| Coimbra | 140.96 | 35.47 | 4 3/4 | 148.70 | 38.48 | 4 1/2 | 174.67 | 32.32 | 4 |
| Faro | 139.63 | 38.49 | 4 1/2 | 147.60 | 41.75 | 4 1/4 | 175.16 | 46.95 | 3 3/4 |
| Lisboa | 139.19 | 36.39 | 4 1/2 | 146.91 | 39.60 | 4 1/4 | 173.35 | 44.98 | 4 |
| Porto | 141.21 | 34.61 | 4 3/4 | 148.87 | 37.55 | 4 1/2 | 174.44 | 42.32 | 4 |

| | ASTRA 19.2° East | | | EUTELSAT 13.0° East | | | Atlantic Bird 3 5.0° West | | |
|------------------|------------------|-------|-------|---------------------|-------|-------|---------------------------|--------|-------|
| Italy | Az | EI | U | Az | EI | U | Az | EI | U |
| Ancona | 171.77 | 39.38 | 4 1/4 | 180.72 | 39.71 | 4 1/4 | 205.88 | 36.38 | 4 1/2 |
| Bari | 176.45 | 42.45 | 4 | 185.87 | 42.34 | 4 | 211.40 | 37.49 | 4 1/2 |
| Bologna | 168.85 | 38.13 | 4 1/2 | 177.62 | 38.71 | 4 1/2 | 202.69 | 36.19 | 4 3/4 |
| Bolzano | 169.22 | 35.97 | 4 1/2 | 177.70 | 36.51 | 4 1/2 | 202.00 | 34.17 | 4 3/4 |
| Calgliari | 164.28 | 43.37 | 4 | 173.85 | 44.39 | 4 | 201.65 | 42.27 | 4 |
| Catania | 173.23 | 46.30 | 3 3/4 | 183.39 | 46.46 | 3 3/4 | 210.96 | 41.69 | 4 1/4 |
| Cosenza | 175.32 | 44.43 | 4 | 185.10 | 44.41 | 4 | 211.54 | 39.48 | 4 1/4 |
| Firenze | 168.59 | 38.90 | 4 1/2 | 177.47 | 39.50 | 4 1/4 | 202.84 | 36.95 | 4 1/2 |
| Fóggia | 174.45 | 41.95 | 4 1/4 | 183.80 | 42.03 | 4 1/4 | 209.47 | 37.71 | 4 1/2 |
| Genova | 165.49 | 37.82 | 4 1/2 | 174.20 | 36.86 | 4 1/2 | 199.52 | 36.98 | 4 1/2 |
| Milano | 166.06 | 36.73 | 4 1/2 | 174.63 | 37.53 | 4 1/2 | 199.50 | 35.81 | 4 3/4 |
| Napoli | 172.51 | 42.53 | 4 | 181.96 | 42.79 | 4 | 208.15 | 38.82 | 4 1/2 |
| Palermo | 170.55 | 45.40 | 3 3/4 | 180.54 | 45.83 | 3 3/4 | 208.22 | 41.84 | 4 1/4 |
| Pescara | 172.64 | 40.73 | 4 1/4 | 181.80 | 40.97 | 4 1/4 | 207.31 | 37.25 | 4 1/2 |
| Rimini | 170.48 | 38.79 | 4 1/2 | 179.35 | 39.23 | 4 1/4 | 204.46 | 36.26 | 4 3/4 |
| Roma | 170.02 | 41.14 | 4 1/4 | 179.25 | 41.62 | 4 1/4 | 205.27 | 38.43 | 4 1/2 |
| Sassari | 163.92 | 41.66 | 4 1/4 | 173.20 | 42.69 | 4 | 200.27 | 40.89 | 4 1/4 |
| Taranto | 176.90 | 43.13 | 4 | 186.43 | 42.98 | 4 | 212.12 | 37.92 | 4 1/2 |
| Torino | 163.92 | 36.85 | 4 1/2 | 172.49 | 37.84 | 4 1/2 | 197.61 | 36.60 | 4 1/2 |
| Trieste | 172.40 | 37.19 | 4 1/2 | 181.05 | 37.46 | 4 1/2 | 205.39 | 343.28 | 4 3/4 |
| Venecia | 170.41 | 37.24 | 4 1/2 | 179.06 | 37.68 | 4 1/2 | 203.65 | 34.93 | 4 3/4 |
| Verona | 168.57 | 37.05 | 4 1/2 | 177.19 | 37.65 | 4 1/2 | 201.92 | 35.33 | 4 3/4 |
| Spain | Az | EI | U | Az | EI | U | Az | EI | U |
| Albacete | 148.57 | 39.84 | 4 1/4 | 157.18 | 42.28 | 4 | 185.02 | 44.73 | 4 |
| Algeciras | 142.10 | 40.62 | 4 1/4 | 150.49 | 43.72 | 4 | 179.21 | 48.05 | 3 1/2 |
| Alicante | 150.03 | 41.02 | 4 1/4 | 158.86 | 43.36 | 4 | 187.22 | 45.30 | 3 3/4 |
| Almería | 146.51 | 41.55 | 4 1/4 | 155.27 | 44.24 | 4 | 184.25 | 47.17 | 3 3/4 |
| Avila | 145.75 | 36.98 | 4 1/2 | 153.88 | 39.60 | 4 1/4 | 180.43 | 43.01 | 4 |
| Badajoz | 141.90 | 37.47 | 4 1/2 | 149.89 | 40.46 | 4 1/4 | 176.84 | 44.99 | 4 |
| Barcelona | 155.12 | 39.14 | 4 1/2 | 163.85 | 40.95 | 4 1/4 | 190.78 | 41.67 | 4 1/4 |
| Burgos | 147.93 | 35.89 | 4 3/4 | 156.02 | 38.26 | 4 1/2 | 181.95 | 41.10 | 4 1/4 |
| Cádiz | 141.23 | 39.84 | 4 1/4 | 149.47 | 42.99 | 4 | 177.76 | 47.64 | 3 3/4 |
| Cartagena | 148.95 | 41.52 | 4 1/4 | 157.81 | 43.98 | 4 | 186.56 | 46.18 | 3 3/4 |
| Córdoba | 143.98 | 39.47 | 4 1/4 | 152.32 | 42.34 | 4 | 180.27 | 46.16 | 3 3/4 |
| Gijon | 146.02 | 33.92 | 4 3/4 | 153.83 | 36.39 | 4 1/2 | 178.98 | 39.80 | 4 1/4 |
| Granada | 145.19 | 40.71 | 4 1/4 | 153.76 | 43.51 | 4 | 182.34 | 46.89 | 3 3/4 |
| Ibiza | 152.97 | 41.32 | 4 1/4 | 161.95 | 43.38 | 4 | 190.18 | 44.47 | 4 |
| La Coruna | 142.68 | 32.84 | 5 | 150.25 | 35.57 | 4 3/4 | 175.03 | 39.91 | 4 1/4 |
| Las Palmas | 124.31 | 39.87 | 4 1/4 | 131.04 | 44.70 | 4 | 158.66 | 55.22 | 3 |
| Madrid | 146.85 | 37.65 | 4 1/2 | 155.10 | 40.18 | 4 1/4 | 181.93 | 43.25 | 4 |
| Málaga | 143.86 | 40.70 | 4 1/4 | 152.36 | 43.63 | 4 | 181.03 | 47.41 | 3 3/4 |
| P. de Mallorca | 155.00 | 41.09 | 4 1/4 | 164.01 | 42.96 | 4 | 101.90 | 43.52 | 4 |
| Salamanca | 144.76 | 36.26 | 4 3/4 | 152.76 | 38.93 | 4 1/2 | 179.01 | 42.65 | 4 |
| San Sebastian | 150.54 | 35.71 | 4 3/4 | 158.70 | 37.84 | 4 1/2 | 184.42 | 39.99 | 4 1/4 |
| Santa Cruz d. R. | 146.72 | 36.58 | 4 1/2 | 154.84 | 39.09 | 4 1/2 | 181.16 | 42.24 | 4 |
| Santander | 148.25 | 34.79 | 4 3/4 | 156.23 | 37.09 | 4 1/2 | 181.67 | 39.88 | 4 1/4 |
| Sevilla | 142.22 | 39.25 | 4 1/4 | 150.44 | 42.29 | 4 | 178.35 | 46.66 | 3 3/4 |
| Valencia | 150.76 | 40.04 | 4 1/4 | 159.47 | 42.28 | 4 | 187.24 | 44.10 | 4 |
| Valladolid | 146.28 | 36.09 | 4 3/4 | 154.32 | 38.62 | 4 1/2 | 180.43 | 41.91 | 4 1/4 |
| Vigo | 141.77 | 33.69 | 4 3/4 | 149.38 | 36.53 | 4 1/2 | 174.53 | 41.14 | 4 1/4 |
| Zaragoza | 151.18 | 37.71 | 4 1/2 | 159.60 | 39.84 | 4 1/4 | 186.18 | 41.71 | 4 1/4 |



Important NOTE:

Please note the following illustrations and possibly cut out the page and put it to the papers!

