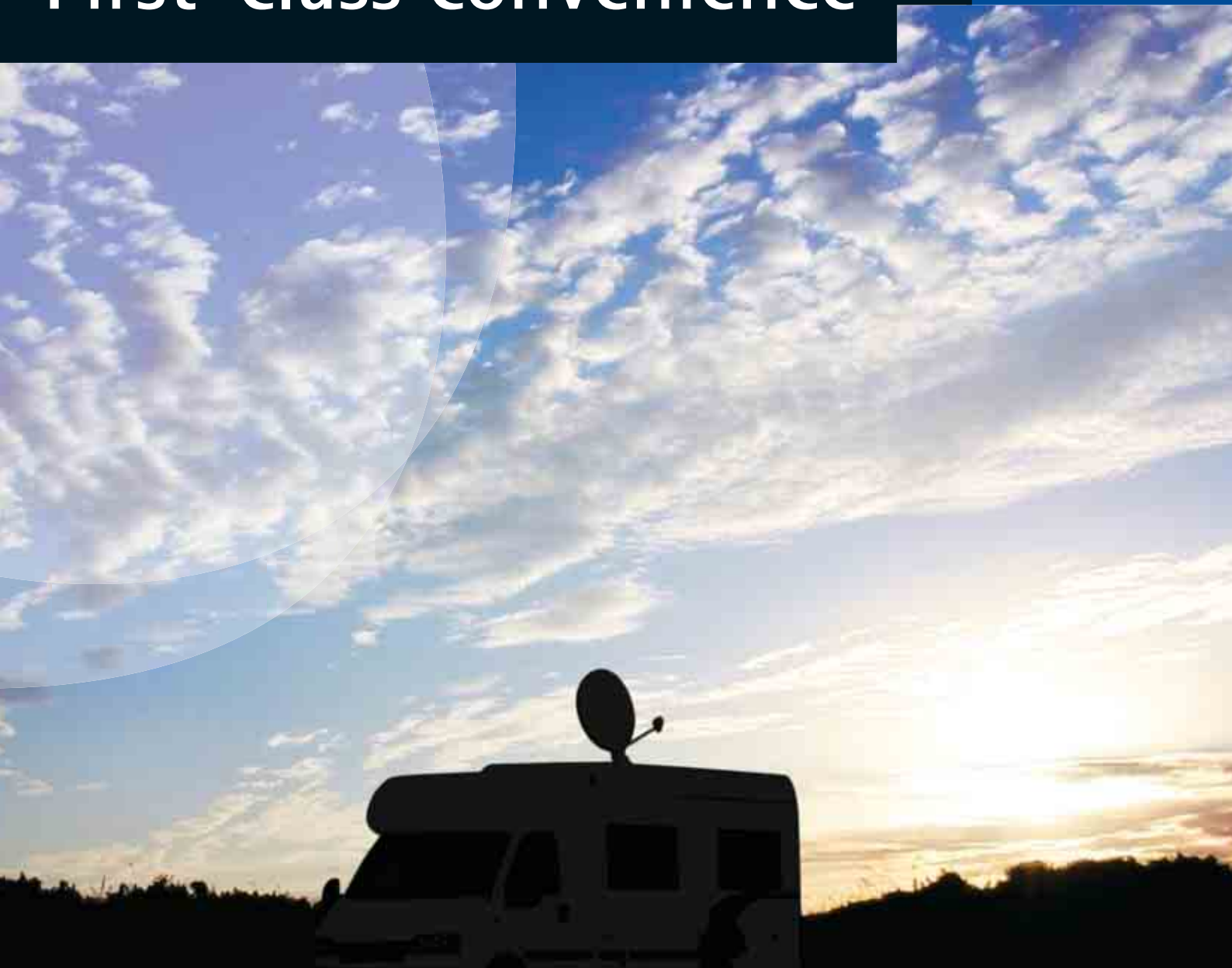




# First-class convenience



**Oyster**<sup>®</sup>  
Sat-Tech Ltd.  
A ten Haaft Company





## Convenience at the touch of a button!

*Satellite reception or solar energy generation - our products offer great convenience of operation at the touch of a single button.*

## Travelling the world - feeling at home wherever you are

Admittedly, a holiday trip should offer more interesting thrills than watching TV. However, at times you may feel like relaxing in front of the TV and then you deserve total ease of control. The best TV show is only half the fun if you have to balance on the roof top or struggle through the pages of a user manual. Most of all, poor reception quality may quickly spoil your good holiday mood. Watching TV while travelling can be as convenient as at home.

In order to meet this requirement, our systems are easy to operate, efficient and fully automatic. This type of intelligent satellite reception is what we call "innovative technology for your convenience". Enjoy TV and radio without any constraints. After all, you're on vacation!

ten Haaft® innovations result in a design and styling concept of comprehensive quality, fully in line with the environment and enhancing travelling convenience. Accordingly, the product design plays a key role and has been in the focus of our team of engineers and designers: Attention to detail, high-quality materials and tried-and-proven quality components. All external components are constructed from stainless steel, aviation grade aluminium and modern UV and weather resistant plastics specifically designed for exterior use.





*Your decision for a ten Haaft® satellite or solar system is not only a decision for a reliable product of a reputable manufacturer, but also a decision for experience and service, intelligent technology and high quality!*

## Mobile Satellite Technology „Made in Germany“

Over the last 20 years, ten Haaft® has earned its position as the leading manufacturer, in the field of mobile satellite technology, by always being at the forefront of new and further development. All satellite systems from the ten Haaft® house are truly quality products "Made in Germany" as is confirmed by ISO 9001 accreditation. Alongside first class materials and sturdy construction, much value is placed on quality and security. Each system automatically retracts itself when turning the vehicle's ignition key. A significant further development was the so-called rotating head technology of the Oyster® system. Instead of the entire antenna system, only the head rotates. This saves a great deal of space and energy. Furthermore, ten Haaft® offers what is believed to be the lowest profile flat antenna, CARO®, with a folded height of just 14 cm. One thing that all fully automatic satellite systems from ten Haaft® have in common: they all lock on to the required satellite in a matter of seconds. Comfort at the push of a button!

Complimenting the extensive range of fully automatic satellite systems, ten Haaft® now also offer manual systems which really are a child's play to operate – even in the digital age!

Also available from the ten Haaft® range are intelligent solar systems which track the sun throughout the day maximising power input. The SamYSolar+® system is unique on the market offering all the advantages of satellite and solar technology combined.

Allow yourself to be surprised at the extensive product range from the manufacturers from Neulingen-Göbriichen. Enjoy reading the following pages!

**Oyster®**

Page 6-7



Weight: approx. 14 kg

Available in two antenna sizes:  
 Ø 65 cm = Reception range 2  
 Ø 85 cm = Reception range 3

**Oyster® Internet**

Page 8-9



Weight: approx. 17 kg

Available in antenna size:  
 Ø 85 cm = Reception range 3

**Oyster® SAT-DOM**

Oyster SAT-DOM 50 GS  
Page 12-13

Oyster SAT-DOM 50 ST  
Page 14-15



Weight: approx. 8 kg

Available in antenna size:  
 Ø 45 cm = Reception range 1

**Cosmo®**

Page 16-17



Weight: approx. 12 kg

Available in antenna size:  
 Ø 65 cm = Reception range 2

## Reception ranges



ASTRA 2 28.2°E „SKY“

Transmits all important Sky programmes in the United Kingdom, Ireland, France, Germany, Denmark and parts of Eastern Europe (Oyster® 85 will be recommended for journeys beyond the British Isles).



ASTRA 2 28.2°E „Freesat“

Transmits all important Freesat programmes in the United Kingdom and Ireland (Oyster® 85 will be recommended for journeys beyond the British Isles). Additionally, several SKY UK channels are on this footprint.

Please note: ASTRA has announced changes in the ASTRA 2 28.2°E satellite fleet until 2014. All shown footprints are indicative and are subject to change.

Reception range 1 =  
 CARO® / CARO® Vision  
 CARO Digital MA® / CARO Vision MA®  
 Oyster® SAT-DOM 50 GS / ST



**CARO®**

Page 18-19



**CARO Digital MA®**

Page 20-21



**CARO**  
Vision MA®  
Page 26-27

**SamY® Vision**

Page 24-25



**SamYSolar+®**

Page 28-29



**SUNMOVER®**  
Page 30-31



Weight: approx. 14 kg  
Available in antenna size:  
50 x 50 cm =  
Reception range 1



Weight: approx. 9 kg  
Available in antenna size:  
50 x 50 cm =  
Reception range 1



Weight: approx. 15 kg  
Available in antenna size:  
Ø 64 cm =  
Reception range 2



Weight: approx. 24 kg  
Available in antenna size:  
Ø 65 cm =  
Reception range 2

**Reception range 2 =**  
Oyster® 65 / Cosmo® /  
SamY® Vision 64 / SamYSolar+®

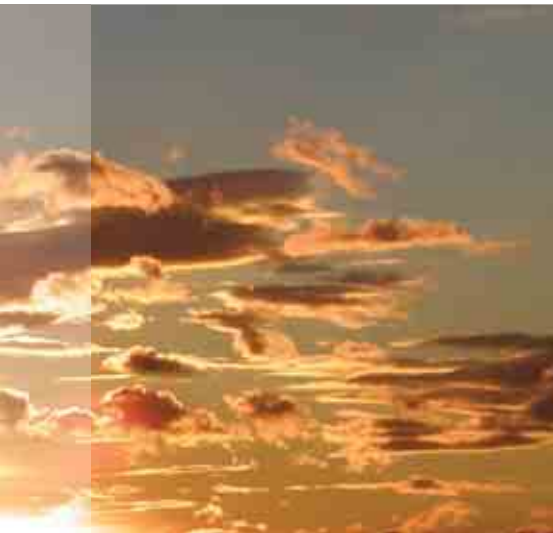


**Reception range 3 =**  
Oyster® 85 / Oyster® Internet



The footprints shown indicate the typical range. Reception may well be possible beyond the footprint with the loss of certain channels. With automatic or manual adjustment of the LNB SKEW angle, particularly in southwest or southeast areas, reception range can be significantly extended.

The reception range of individual channels is beyond the influence of ten Haaft and is the responsibility of the individual satellite operators. ten Haaft cannot be held responsible for actual or future reception ranges which may change without notice.



Reception range 2  
(Oyster® 65 Digital /  
Oyster® Vision 65)

## Oyster® Digital

*The Oyster® Digital satellite system is easy to operate and provides a full range of programmes at utmost convenience.*

*Wide reception range and brilliant image definition combined with fully digital satellite aiming ensure the reception of your favourite programmes in remote locations such as the Canary Islands or Greece.*



## Oyster® - First-class convenience

If you travel to the remote reaches of the world and appreciate satellite reception at the highest level of convenience, the Oyster® Digital is your system of choice.

The 65 cm or 85 cm antenna dish of the Oyster® system provides TV and radio programmes throughout Europe, in Northern Africa and the Middle East. Also, the system is very tolerant against adverse reception conditions in poor weather. This is due to the large size of the antenna dishes, which significantly influences number and reception quality of programmes.

The name Oyster describes the main feature: When closed, the precious internal parts are protected like a pearl in its shell. When open, you can enjoy the benefits - on your TV screen. The intelligent software accelerates the readiness for reception of radio and TV programmes.

### \* Innovative swivel-head technology

Only the head of the antenna rotates. The antenna body remains fixed which has many advantages:

- Reduced power consumption
- Lower space requirement
- Optimised mechanical load



Swivel-head technology \*



Reception range 3  
(Oyster® 85 Digital /  
Oyster® Vision 85)

The Oyster® system is available in 3 models:

#### Oyster® Digital CI

The convenient variant with digital CI receiver for all those who desire maximum operating convenience by remote control.

#### Oyster® Internet

Mobile broadband reception via satellite has been made possible by further development of our Oyster 85 Digital CI system which also offers TV and radio reception in a single unit. (further information on pages 8-9).

#### Oyster® Vision

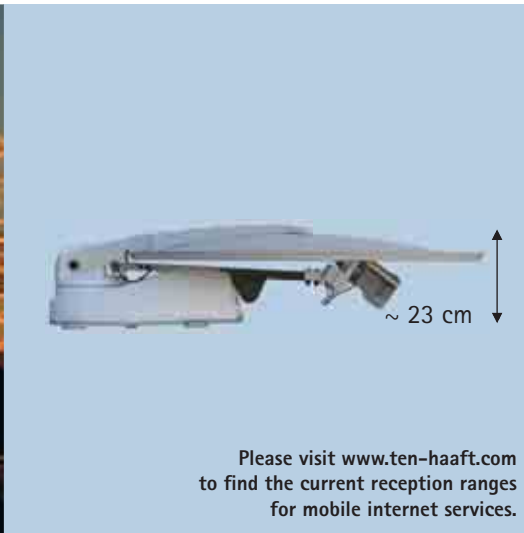
The receiver-independent variant with a separate operator unit which allows you to connect any receiver of your choice (see pages 22-23).

Please also see information regarding „SKEW“ and „TWIN-LNB“ options on page 11.

## Features

- 65 cm or 85 cm antenna dish for optimal reception range
- Digital satellite aiming
- Fully automatic aiming within 30 - 60 seconds (typically)
- High-performance digital receiver with integrated electronic control
- CI card-slot system: 2 CI slots for encrypted programmes (module and card not included)
- On-Screen-Display: simple and convenient control of all functions via on-screen menus: preset TV and radio programmes (selectable languages: DE, GB, NL, FR, IT, ES, PT, SE, NO, FI, DK, CZ, GR, PL)
- 5000 station presets / channels (3500 TV / 1500 radio)
- Software and channel list update free of charge via satellite
- Teletext integrated in digital receiver
- EPG: integrated electronic programme guide for information on current programme and programme overview
- TV-set volume-control by Oyster® remote control
- Satellite mouse with channel display for concealed installation of receiver in a storage compartment
- OBSC system: automatic satellite swap at programme change
- Multiple audio and video inputs and outputs
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- \*Swivel-head technology: Only the head swivels, the antenna body stays fixed
- Aerodynamic design for low wind resistance
- Water repellent design means no freezing in winter
- Space-saving assembly
- Latching swivel-axle when system is retracted: no wear of mechanical parts
- Height: approx. 22 cm / Weight: approx. 14 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service
- Options
  - With hard disc recorder: Receiver with 80 GB hard disc for approx. 40 hours of recording time for your favourite TV shows, time-shift function for viewing programmes while recording, 2.5" shock- and vibration-proof hard disk, 2 CI slots for encrypted programmes (module and card not included)
  - DVB-T: Receiver with integrated DVB-T tuner for digital terrestrial reception. (DVB-T antenna not included)

Specifications are subject to change without notice



Please visit [www.ten-haaft.com](http://www.ten-haaft.com) to find the current reception ranges for mobile internet services.



Reception range 3 (for TV)  
(Oyster® Internet)

## Oyster® Internet

*The Oyster® Internet offers simple operation with fully automatic connectivity. It provides both internet access with Broadband speeds as well as first class TV reception. The two-way technology facilitates web surfing and emailing throughout Europe.*

### Oyster® - Broadband internet and TV reception for motorhomes

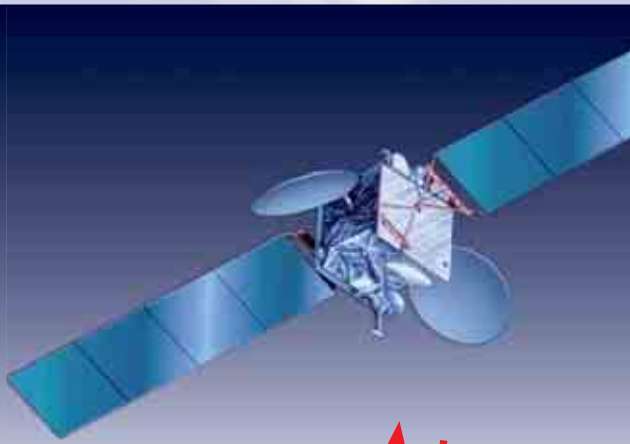
With the Oyster® Internet, ten Haaft® have integrated Internet and TV reception into one single system. At the push of a button, the intelligent system begins searching for the desired satellite. The system will automatically lock on to either the TV Satellite or the internet satellite (typically ASTRA 3) as defined by the user. Changing the function between TV and internet is also as simple as pushing a button.

Dependable, Europe wide internet service and individual contracts are offered from the service providers Hertzinger or IPcopter. The sending of emails or surfing the web is no longer restricted thanks to the comfortable technology of the mobile internet system. Telephoning via the internet is also made possible - independent of any mobile phone network. All the communication comforts of home on the move.

Thanks to the 85 cm parabolic antenna, your favourite TV or radio channels can be enjoyed throughout Europe even as far as North Africa!







*Two-way technology: A pure satellite solution, without the need for a separate return channel, is provided by two-way technology. This means that there is no need for a separate telephone connection. Tariffs and costs can be found at [www.oysterinternet.com](http://www.oysterinternet.com) or [www.ipcopter.com](http://www.ipcopter.com)\*\**



Swivel-head technology\*



## Features

- Digital satellite locating at the simple touch of a button
- Fully automatic search within 30 - 60 seconds (typically)
- Motorised optimum Skew setting
- Interactive LNB (iLNB) offers 2-way internet functionality
- Digital satellite modem
- Strong transmission signal due to 85 cm parabolic antenna
- Superb TV reception range
- CI card slot system: 2 CI slots for encrypted channels (module and card not included)
- Satellite mouse with channel display for concealed installation of receiver in a storage compartment
- Software and channel list update free of charge via satellite
- On-Screen-Display: simple and convenient control of all functions via on-screen menus
- TV-set volume-control by Oyster® remote control
- Multiple audio and video inputs and outputs
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- \*Swivel-head technology: Only the head swivels, the antenna body stays fixed
- Aerodynamic design for low wind resistance
- Water repellent design means no freezing in winter
- Space-saving assembly
- Latching swivel-axle when system is retracted: no wear of mechanical parts
- Height: approx. 23 cm / Weight: approx. 17 kg
- Made in Germany
- 3 year warranty and reliable service
- QM certificated manufacturer with ISO 9001
- Options
  - With hard disc recorder: Receiver with 80 GB hard disc for approx. 40 hours of recording time for your favourite TV shows, time-shift function for viewing programmes while recording, 2.5" shock- and vibration-proof hard disk, 2 CI slots for encrypted programmes (module and card not included)
  - DVB-T: Receiver with integrated DVB-T tuner for digital terrestrial reception. (DVB-T antenna not included)

\*\* **Note:** A contract with an internet service provider (ISP), e. g. Hertzinger or IPcopter, is required to enable the broadband function. The range is set by the ISP. Tariffs and charges are available at [www.oysterinternet.com](http://www.oysterinternet.com) or [www.ipcopter.com](http://www.ipcopter.com)

Specifications are subject to change without notice



## Digital CI receiver



### Digital CI Receiver (standard equipment with all "Digital" systems)

To allow convenient mobile reception of encrypted programmes (e.g. NL, AT, CH), the Oyster® Digital receiver is equipped with two CI slots (module and card not included). Access cards are available from the programme providers of the corresponding countries if proof of residence is provided.

- Dimensions: W x H x D = 27.2 x 6.3 x 15.5 cm
- Specifications: 12/24 Volt digital receiver with 5000 channels
- Equipment: remote control and satellite mouse with channel display
- 2 CI slots for decoder modules

## Digital HDCI receiver



Rear view

### Digital CI receiver with hard disk (Option)

With the digital hard-disk receiver, ten Haafft® has created a system of unsurpassed convenience for unlimited mobility! To make sure that you won't miss your favourite TV show the 80 GB hard disc recorder has a recording capacity of up to 40 hours.

In addition, the receiver is equipped with a time-shift function that allows you to watch a show from its beginning while it is still being recorded.

This digital satellite receiver is available in combination with the ten Haafft® satellite systems with integrated electronic control and also as an option with a receiver-independent system (option 5000 CI + hard disc recorder) - creating mobile satellite systems of utmost convenience and luxury.

## Features

- Time-shift viewing (Time-shift)
- 2.5" hard disk- shock- and vibration-proof for mobile use
- CI: system with two CI slots for Common-Interface modules for encrypted programmes (module and card not included)
- DVB-T: integrated DVB-T tuner (DVB-T antenna not included)
- Low noise level
- On-screen display: simple and convenient operation via on-screen display (selectable languages: DE, GB, NL, FR, IT, ES, PT, SE, NO, FI, DK, CZ, GR, PL)
- 5000 station presets (3500 TV / 1500 radio)
- Software and channel list update free of charge via satellite
- Teletext integrated in digital receiver

- EPG: Electronic Programme Guide
  - Volume-control of TV via receiver remote control
  - Multiple video and audio connections, including Dolby Digital, Scart-Video (Cinch), Y/C (Hosiden), RGB and YUV (Cinch), audio L/R (Cinch), digital audio SPDIF (Cinch: PCM, AC3, dts), modulator output (IEC)
  - Satellite mouse with channel display for concealed installation of receiver in a storage compartment
  - 12/24 V operation
  - Extremely low power consumption (down to 9 W (depending on model) in operation, 0 W in standby mode)
  - Dimensions: W x H x D = 27.2 x 6.3 x 15.5 cm
- Specifications are subject to change without notice

## Satfinder

The Satfinder is a 'smart' satellite search device for the aiming of an antenna at a specific satellite, allowing the use of any receiver.

The device indicates the precise values required to adjust the satellite system to the selected satellite for your current position. During the manual search, the Satfinder immediately identifies the signals received from the correct satellite. A signal strength meter allows the fine-tuning of the system.

Once the satellite is found, the Satfinder may remain connected between antenna and receiver. When switched off, the antenna signal is looped through.



Dimensions: W x H x D = 16.0 x 8.7 x 3.5 cm

Technical changes reserved

## SKEW Option

**NEW:**  
now also for  
Oyster® Vision



### SKEW

(Standard on Oyster® Internet. For Oyster® Digital and Oyster® Vision available)

For optimal reception at the limits of the reception ranges in South-Western and South-Eastern regions, the LNB may have to be rotated in order to compensate the polarisation deviation - or SKEW angle - caused by the earth's curvature. The SKEW option provides a fully automatic adjustment of the LNB in order to obtain maximum reception range. The Oyster® system automatically detects the direction into which the LNB must be rotated and performs the adjustment by means of an electric motor.

## TWIN-LNB Option



### TWIN-LNB (not available for Oyster® Internet)

This option provides 2 connections for the convenient operation of a second receiver, e.g. in the sleeper compartment. The TWIN-LNB allows two different programmes to be viewed using the Oyster® and a second receiver (second receiver not included in standard TWIN-LNB option).

## TWIN-LNB SKEW Option

**NEW:**  
now also for  
Oyster® Vision



### TWIN-LNB SKEW

(for Oyster® Digital and Oyster® Vision available / not for Oyster® Internet)

The combination of TWIN-LNB and SKEW provides maximum convenience. The SKEW feature offers excellent reception at the limits of the reception ranges in South-Western and South-Eastern regions. Thanks to the smart software the earth's curvature will be compensated by automatically rotating the LNB. TWIN provides an additional connection for the convenient operation of a second receiver. This option allows two different programmes to be viewed using the Oyster® and a second receiver (second receiver not included in standard TWIN SKEW option).

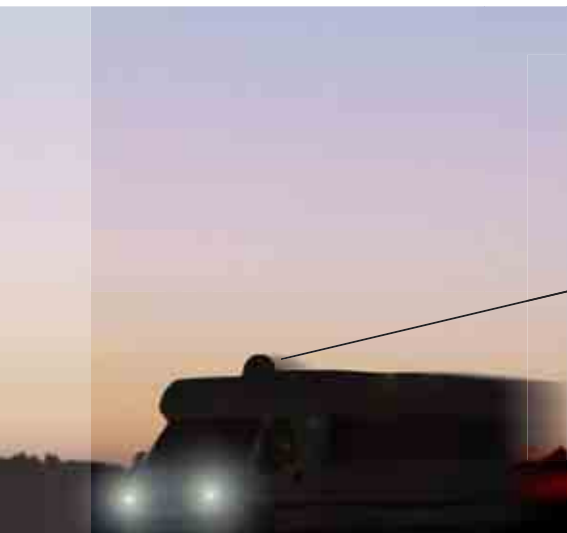
## Ground kit Accessory



### Ground kit

(available for Oyster® Digital and for Oyster® Internet)

If reception is impaired e.g. by a tree, the Oyster® can be removed from the roof and can be set up on the ground. The ground kit comprises a durable stand for stability even on uneven ground. A 15-metre extension cable (also available separately) provides sufficient clearance to the obstacle. An alarm system installed at the receiver provides anti-theft protection by sounding a horn inside the vehicle. The system can also be connected to the vehicle's signal horn.



~ 38 cm



Reception range 1  
(Oyster® SAT-DOM 50 GS)

## Oyster® SAT-DOM 50 GS

*The Oyster® SAT-DOM dome antenna is yet another novelty from ten Haaft which takes fully automatic satellite reception to the next level. The unique feature of this new system is the antenna's continuous tracking of the satellite, which allows uninterrupted reception of your favourite TV or radio channel while the vehicle is in motion.*

### Oyster® SAT-DOM 50 GS - Radio and TV reception while driving

Technically, this is achieved with intelligent gyroscope stabilisation. This system detects even the most minimal changes of the vehicle's direction and immediately adjusts the elevation and azimuth angles of the antenna accordingly. As a result, signal reception is maintained at all times – even in tight turns and fast curves.

Thanks to its single cable, the dome antenna is easy to mount on almost any vehicle roof. The space occupied by the antenna unit while it performs the necessary adjustments does not change, as the dish pivots inside the dome. Roof hatches and other accessories can be used without interfering with the antenna and without any risk of damage.

All hardware components and all drive, control and sensor systems are located inside a weatherproof dome, and are thus protected against gusts of wind and airflow. The dome antenna is elegantly shaped and very lightweight. It comes in two different versions.

Thanks to the unique 42 cm dish, almost all SKY and Freesat channels can be received on the British Isles.



# Oyster® SAT-DOM 50 GS

## Oyster® SAT-DOM 50 GS Digital



- Including **digital** receiver programmed to control the dome antenna
- CI card slot system: 2 CI slots for encrypted programmes (module and card not included)
- OSD menu: easy and convenient control of all functions via on-screen menus
- 5000 channel presets (3500 TV / 1500 radio)
- Free software and channel list updates via satellite
- Teletext integrated in digital receiver
- EPG: integrated Electronic Programme Guide
- OBSC system: automatic satellite swap at channel change
- Weight: approx. 8 kg

## Oyster® SAT-DOM 50 GS Vision Light



- **Vision Light** = receiver-independent variant
- Compatible with any receiver (SDTV / HDTV)
- Ideal for TV's with built in satellite receiver
- Preset on satellite
- Weight: only approx. 7 kg



## Features

- Digital satellite aiming and identification at the touch of a button
- Fully automatic adjustment in 15-20 seconds
- Multitude of channels via ASTRA 2 thanks to an unique 42 cm antenna dish
- Easy to operate
- Satellite-tracking technology for reception whilst travelling
- Continuous reception when clear view towards the South
- Internal gyroscope technology for directional stabilisation
- Directional adjustment: +/- 60° per second
- Elevation range: < 10° to 60°
- Unlimited pivoting
- Dome resistant to hail and UV radiation
- Aerodynamic design
- Water-resistant design prevents freeze-up in winter
- No condensation of moisture inside dome
- Current draw: 1.2 A at 12 V / 0.6 A at 24 V
- Space-saving mounting plate (50 x 37 cm)
- Dimensions: 38 cm (height) / Ø 45 cm
- High-quality craftsmanship and durable materials
- Made in Germany
- Manufacturer is QM-certified in accordance with ISO 9001
- 3 year warranty and reliable service

Specifications are subject to change without notice





Reception range 1  
(Oyster® SAT-DOM 50 ST)

## Oyster® SAT-DOM 50 ST

*Fully automatic parabolic antennas must first be raised on arrival at your destination but the Oyster® SAT-DOM 50 ST is always ready for service!*

### Oyster® SAT-DOM 50 ST - The space-saving alternative for recreational vehicles

The actual antenna is located under a dome, waiting for the command to find the satellite transmitting the selected channel within just a few seconds.

Thanks to its single cable, the dome antenna is easy to mount on almost any vehicle roof. The space occupied by the antenna unit while it performs the necessary adjustments does not change, as the dish pivots inside the dome. Roof hatches and other accessories can be used without interfering with the antenna and without any risk of damage.

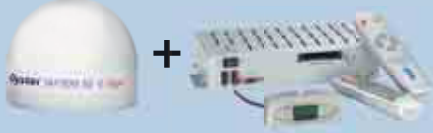
All hardware components and all drive, control and sensor systems are located inside a weatherproof dome, thus being protected against gusts of wind and airflow. The dome antenna is elegantly shaped and very lightweight. It comes in two different versions.

Thanks to the unique 42 cm dish, almost all SKY and Freesat channels can be received on the British Isles.



# Oyster® SAT-DOM 50 ST

## Oyster® SAT-DOM 50 ST Digital



- Including **digital** receiver programmed to control the dome antenna
- CI card slot system: 2 CI slots for encrypted programmes (module and card not included)
- OSD menu: easy and convenient control of all functions via on-screen menus
- 5000 channel presets (3500 TV / 1500 radio)
- Free software and channel list updates via satellite
- Teletext integrated in digital receiver
- EPG: integrated Electronic Programme Guide
- OBSC system: automatic satellite swap at channel change
- Weight: approx. 8 kg

## Oyster® SAT-DOM 50 ST Vision Light



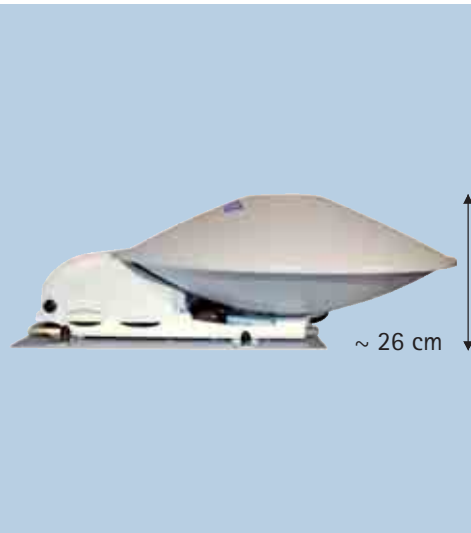
- **Vision Light** = receiver-independent variant
- Compatible with any receiver (SDTV / HDTV)
- Ideal for TV's with built in satellite receiver
- Preset on satellite
- Weight: only approx. 7 kg



## Features

- Digital satellite aiming and identification at the touch of a button
- Fully automatic adjustment in 15–20 seconds
- Multitude of channels via ASTRA 2 thanks to a unique 42 cm antenna dish
- Easy to operate
- Automatic elevation range: < 10° to 60°
- Unlimited pivoting
- Dome resistant to hail and UV radiation
- Aerodynamic design
- Water-resistant design prevents freeze-up in winter
- No condensation of moisture inside dome
- Current draw: 0.5 A at 12 V / 0.3 A at 24 V
- Space-saving mounting plate (50 x 37 cm)
- Dimensions: 38 cm (height) / Ø 45 cm
- High-quality craftsmanship and durable materials
- Made in Germany
- Manufacturer is QM-certified in accordance with ISO 9001
- 3 year warranty and reliable service

Specifications are subject to change without notice



## Cosmo® Digital

*The Cosmo® system is a new dimension of advanced satellite technology. The digital and fully automatic Cosmo® system literally catches the stars in the sky and enables you to conveniently receive TV programmes in your mobile home at the simple touch of a button.*



Reception range 2  
(Cosmo® Digital /  
Cosmo® Vision)

## Cosmo® - A special way of satellite reception

Thanks to its compact and appealing design, the robust 60 cm Cassegrain antenna, protected against the elements by a full encapsulation, blends into its surroundings and provides optimal TV reception. No matter if you are in Southern Spain, France, Italy, Scandinavia or Greece, the Cosmo® system ensures superb satellite reception throughout Europe's major travel regions.

Ingenious and practical details for mobile applications:

- To relieve strain from the mechanical parts, the pivot shaft is securely latched when in rest position, thus preventing the mechanical parts from wearing.
- The encapsulated antenna dish protects the sensitive reception head (LNB) against wind and weather.
- The round Cassegrain antenna only rotates when unfolded and requires the world's presumably smallest actuation radius of a 60 cm antenna on the vehicle roof.

The Cosmo® system is available in 2 models:

### Cosmo® Digital CI

The convenient version with digital CI receiver for all those who desire maximum operating convenience by remote control.

### Cosmo® Vision

The receiver-independent version with a separate control unit which allows you to connect any receiver of your choice.

(see pages 22-23).



Rear view of the Cosmo® antenna: Manual SKEW-angle adjustment for maximum reception range



# Cosmo® Digital



## Digital-Receiver CI

This highly convenient variant of the digital receiver is equipped with an integrated electronic control system - the ideal choice for all those who desire ultimate operating comfort by remote control.

Also available with 80 GB hard disc, Common-Interface (CI) slots for encrypted programmes and DVB-T tuner for digital terrestrial reception (T).

Dimensions: W x H x D = 27.2 x 6.3 x 15.5 cm

Connections: Scart, Video (Cinch), Y/C (Hosiden), RGB and YUV (Cinch), audio L/R (Cinch), digital audio SPDIF (Cinch: PCM, AC3, dts), modulator output (IEC).

## Features

- Digital satellite aiming
- Fully automatic aiming within 30 - 60 seconds (typically)
- High-performance digital receiver with integrated electronic control
- CI card-slot system: 2 CI slots for encrypted programmes (module and card not included)
- On-screen display: simple and convenient control of all functions via on-screen menus: preset TV and radio programmes (selectable languages: DE, GB, NL, FR, IT, ES, PT, SE, NO, FI, DK, CZ, GR, PL)
- 5000 station presets (3500 TV / 1500 radio)
- Software and channel list update free of charge via satellite
- Teletext integrated in digital receiver
- EPG: integrated electronic programme guide for information on current programme and programme overview
- TV-set volume-control by Cosmo® remote control
- Satellite mouse with channel display for concealed installation of receiver in a storage compartment
- OBSC system: automatic satellite swap at programme change
- Multiple audio and video inputs and outputs
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- Height: approx. 26 cm / Weight: approx. 12 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service
- Options
  - With hard disc recorder: Receiver with 80 GB hard disc for approx. 40 hours of recording time for your favourite TV shows, time-shift function for viewing programmes while recording, 2.5" shock- and vibration-proof hard disk, 2 CI slots for encrypted programmes (module and card not included)
  - DVB-T: Receiver with integrated DVB-T tuner for digital terrestrial reception. (DVB-T antenna not included)

Specifications are subject to change without notice



## CARO® Digital

*The elegant 50 x 50 cm antenna of the CARO® system is only about 14 cm high. With its low profile and space requirements, the CARO® system is the right choice for applications where mounting space is limited.*



Reception range 1  
(CARO® Digital /  
CARO® Vision)

## CARO® - Just switch it on and watch TV: at the touch of a button!

The innovative technology of the elegant and durable CARO® satellite system is the result of 20 years of experience in the development and production of fully automatic satellite systems.

Ingenious and practical details characterise the automatic satellite system with the presumably lowest profile worldwide:

- Support arm for additional resistance against strong winds
- Automatic latching of pivot shaft in rest position
- Durable external unit made of cast aluminium only rotates when open, thus requiring only minimal pivot radius on the roof.

The CARO® system is available in 2 models:

### CARO® Digital CI

The convenient version with digital CI receiver for all those who desire maximum operating convenience by remote control.

### CARO® Vision

The receiver-independent version with a separate operator unit which allows you to connect any receiver of your choice (see pages 22-23).



Rear view of the CARO® antenna:  
Manual SKEW-angle adjustment  
for maximum reception range

## CARO® Digital



### Digital-Receiver CI

This highly convenient variant of the digital receiver is equipped with an integrated electronic control system - the ideal choice for all those who desire ultimate operating comfort by remote control.

Also available with 80 GB hard disc, Common-Interface (CI) slots for encrypted programmes and DVB-T tuner for digital terrestrial reception (T).

Dimensions: W x H x D = 27.2 x 6.3 x 15.5 cm

Connections: Scart, Video (Cinch), Y/C (Hosiden), RGB and YUV (Cinch), audio L/R (Cinch), digital audio SPDIF (Cinch: PCM, AC3, dts), modulator output (IEC).



## Features

- Digital satellite aiming
- Fully automatic aiming within 30 - 60 seconds (typically)
- High-performance digital receiver with integrated electronic control
- CI card-slot system: 2 CI slots for encrypted programmes (module and card not included)
- On-screen display: simple and convenient control of all functions via on-screen menus: preset TV and radio programmes (selectable languages: DE, GB, NL, FR, IT, ES, PT, SE, NO, FI, DK, CZ, GR, PL)
- 5000 station presets (3500 TV / 1500 radio)
- Software and channel list update free of charge via satellite
- Teletext integrated in digital receiver
- EPG: integrated electronic programme guide for information on current programme and programme overview
- TV-set volume control by CARO® remote control
- Satellite mouse with channel display for concealed installation of receiver in a storage compartment
- OBSC system: automatic satellite swap at programme change
- Suitable for operation up to 60 degrees of latitude North
- Weatherproof and hail resistant construction
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- Height: approx. 14 cm / Weight: approx. 14 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service
- Options
  - With hard disc recorder: Receiver with 80 GB hard disc for approx. 40 hours of recording time for your favourite TV shows, time-shift function for viewing programmes while recording, 2.5" shock- and vibration-proof hard disc, 2 CI slots for encrypted programmes (module and card not included)
  - DVB-T: Receiver with integrated DVB-T tuner for digital terrestrial reception. (DVB-T antenna not included)

Specifications are subject to change without notice



Reception range 1  
(CARO Digital MA®)

## CARO Digital MA®

*CARO Digital MA® is the entry level model with renowned quality reception. This manual satellite system combines ease of use with good reception in central Europe.*



Multi-Function Receiver  
Dimensions: W x H x D =  
27.2 x 6.3 x 15.5 cm

### CARO Digital MA® - The entry level model for great reception

The digital age for TV transmission via satellite is well and truly with us, providing both picture and sound of outstanding quality. All seasoned motorhome or caravan owners know about how frustrating, not to mention time consuming, setting up a manual satellite system by hand can be.

In the bygone analogue age the process of locating the desired satellite by hand was a little easier. By facing the dish in the approximate direction, a vague signal was easy enough to find with only a little fine tweaking then required. This procedure has become obsolete as the analogue signals were switched off at the end of April 2012.

In the digital age it is extremely difficult to locate a satellite by this traditional method. While adjusting the antenna it is all too easy passing the signal point without even noticing.

Our engineers have developed the perfect compromise. The CARO Digital MA® is a manual satellite system which makes locating the required satellite child's play.

#### Multi-Function Receiver

The innovative multi-function receiver, with integrated sat-finder, makes child's play of locating the satellite. The settings for the required satellite are displayed on your TV screen.

The elevation is set using the precise and easy to read scale and the mast can be turned to point the antenna in the general direction. Both an optical and acoustic signal indicate when the required satellite has been found.

CARO Digital MA® - Steps for operation


- 1** After parking the vehicle on level ground, switch on the TV and the receiver. Satellite location mode is activated by pressing the green button on the remote control.


- 2** As an example, shown on the TV screen.



- 3** Press "+" or "-" on the remote to select the required satellite (e.g. Astra 2). Press "P+" or "P-" to select your current location (e.g. Belgium).


- 4** Using the twist grip, set the given elevation (e.g. 35 ). This will raise the antenna.


- 5** Using the crank mast, turn the antenna to face South-South-East (azimuth).


- 6** If you don't find the satellite straight away, make minor adjustments in both directions (azimuth and elevation – steps 4 & 5) until the satellite is found.



- 7** Assuming the TV volume is turned up, an audible beep will indicate that signal is being received. The signal strength (e.g. 8.0 dB) will be shown on the TV screen.


- 8** The optimum signal can be achieved by fine tuning with an eye on the signal strength. A green signal bar is enough for good reception.


- 9** Tighten the red lever to secure the crank mast.



Press the green button on the remote control to watch TV.  
Happy viewing!



## Features

- Compact flat antenna 50 x 50 cm
- Low profile and minimum space requirement
- Sturdy crank mast, easy to use
- Intelligent satellite recognition through digital receiver with integrated Satfinder (optical and acoustic support)
- Signal strength indicator for optimum setting
- Automatic calculation of satellite position by location
- CI card slot system: 2 CI slots for encrypted channels (module and cards not included)
- Sat-Mouse with channel display – receiver can be hidden away
- 5000 station presets (3500 TV / 1500 radio)
- TV-set volume-control by CARO® remote control
- Multiple audio and video inputs and outputs

- Software and channel list updates free via satellite
- Easy locking and unlocking for adjustment
- Weatherproof and hail resistant construction
- Highest quality construction using robust materials
- Height approx. 19 cm / Weight approx. 9 kg
- Made in Germany
- QM certified manufacturer with ISO 9001
- 3 year warranty and reliable service
- Options
  - With hard disc recorder: Receiver with 80 GB hard disc for approx. 40 hours of recording time for your favourite TV shows, time-shift function for viewing programmes while recording, 2.5" shock- and vibration-proof hard disc, 2 CI slots for encrypted programmes (module and card not included)
  - DVB-T: Receiver with integrated DVB-T tuner for digital terrestrial reception. (DVB-T antenna not included)

Specifications are subject to change without notice

## Oyster® Vision Oyster® Vision SKEW

**NEW:**  
Oyster® Vision now  
also with SKEW



### Oyster® Vision / Oyster® Vision SKEW

The tried-and-proven Oyster® system with 65 cm or 85 cm antenna with an optimal reception range in a receiver-independent version. An especially durable system with swivel-head technology for the highest requirements, are available in the variants:

- Single LNB or TWIN LNB
- Single LNB SKEW or TWIN LNB SKEW (compare page 11)

Further details „Oyster®“: page 6-7.

## CARO® Vision



### CARO® Vision

The elegant 50 x 50 cm flat antenna of the CARO® system is only about 14 cm high when retracted. Thanks to its low profile and little space requirement, the CARO® system is the right choice for applications with limited mounting space.

Further details: page 18-19.

## Cosmo® Vision



### Cosmo® Vision

Thanks to its compact and appealing design, the robust 60 cm Cassegrain antenna, protected against the elements by a full encapsulation, blends into its surroundings and provides an optimal TV reception. The Cosmo® system ensures a reliable satellite reception throughout Europe's major travel regions.

Further details: page 16-17.

## SamY® Vision



### SamY® Vision

The new digital generation of the proven SamY® system is available with an offset antenna dish size of 64 cm to ensure reception across Europe. The new design makes this system extremely flexible.

Further details: page 24-25.

## Vision series



### Fully automatic digital satellites systems – independent of receiver

If you want to see the latest news from all over the world or you don't want to miss your favourite TV show even when travelling in far away regions, you'll need a flexible antenna harmonized to your personal demands. The various fully automatic satellite systems of the Vision series are all digital while their intelligent control unit allows the connection of almost any receiver of your choice. Any appropriate digital satellite receiver or High Definition receiver can be used for satellite reception.

## Features

for Vision systems

### Features of all systems:

- Fully automatic satellite aiming
- Receiver-independent with control unit and user-friendly operator panel in multiple languages: DE, GB, FR, NL, IT, ES, SE, DK, NO, FI and PT
- Operator panel designed for either recessed or surface mounting
- Software updates easy to carry out using standard SD memory card
- All receivers commonly used (in Europe) can be used for satellite aiming. Even receivers integrated in TV sets or provider-specific digital set-top boxes can be used
- LEM technology: Last Elevation Memory for reduced search times (antenna searches at the elevation angle of last reception)
- Weather-proof design
- Automatic retraction at vehicle start
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service

## Control Unit and Operator Panel



Dimensions: W x H x D =

- 1 Control Unit Oyster® Vision SKEW 15,1 x 4,6 x 11,5 cm
- 2 Control Unit Vision 20,0 x 3,0 x 11,2 cm

### Control Unit and Operator Panel

The control unit fully automatic operation centre located inside your vehicle, made for concealed installation, contains all electronics and software. The user-friendly operator panel (dimensions: W x H x D = 14.0 x 7.1 x 3.5 cm, see main picture) will be fitted within your reach and offers a few buttons for simple use. At the touch of a button, the antenna moves into the last reception position (LEM). If no image is received in this position, the automatic search function is started immediately. The backlit display keeps you informed about the various functions.

## Accessories

for SamYSolar+® and Oyster® Digital TWIN

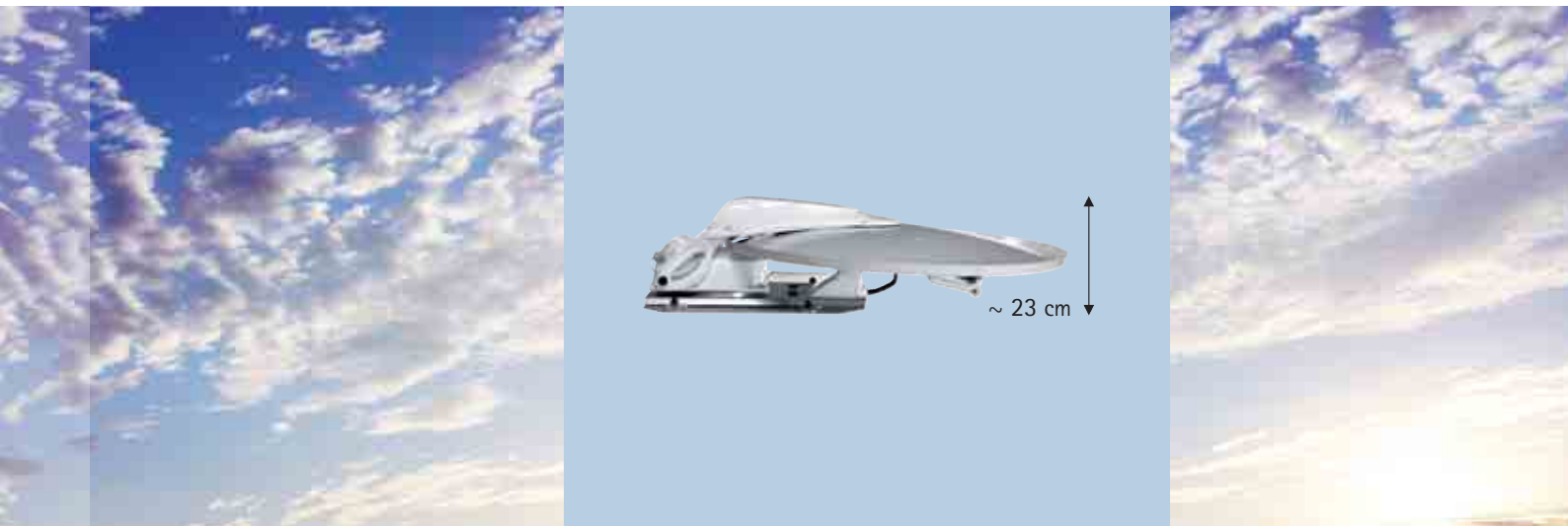
### High-performance digital receivers

D5000	Digital receiver
D5000 CI	Digital receiver with 2 CI slots for encrypted programmes*
D5000 DVB-T	Digital receiver with DVB-T tuner**
D5000 CI + DVB-T	Digital receiver with 2 CI slots for encrypted programmes* and DVB-T tuner**
D5000 CI + hard disc recorder	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes*
D5000 CI + hard disc recorder + DVB-T	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes* and DVB-T tuner**

\*Module and card not included

\*\*DVB-T antenna not included

Specifications are subject to change without notice



## SamY® Vision

*Fully automatic satellite reception made easy: The SamY® Vision, available in antenna dish size of 64 cm, is a low-cost compact satellite system. The new concept is most flexible and hence not only ideal for mobile homes, but also for camper trailers.*

### SamY® Vision - Digital and receiver-independent

If you wish to stay up-to-date with all the news from around the world or you do not want to miss your favourite TV show even when travelling in remote regions, you will want a flexible antenna that is tuned to your personal needs. The SamY® Vision system featuring an intelligent control unit is completely independent of a receiver.

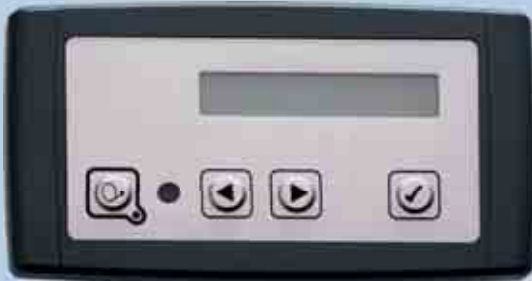
Receiver-independent: the system with its separate control unit can be connected to almost any receiver commonly used in Europe. You are free to use the system with your own receiver. The antenna dish size of 64 cm ensures an optimal reception range.





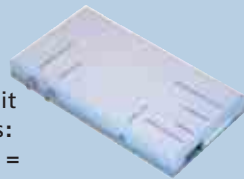


Reception range 2  
(SamY® Vision)



Operator Panel  
Dimensions:  
W x D x H =  
14.0 x 7.1 x 3.5 cm

Control Unit  
Dimensions:  
W x D x H =  
20,0 x 3,0 x 11,2 cm



## Features

- Fully automatic satellite aiming
- Receiver-independent with control unit and user-friendly operator panel for 12/24 V operation (selectable languages: DE, GB, FR, NL, IT, ES, SE, DK, NO, FI and PT)
- Operator panel designed for either recessed or surface mounting
- Software updates easy to carry out using standard SD memory card
- All receivers used in Europe can be used for satellite search. Even receivers integrated in TV sets or provider-specific digital set-top boxes can be used
- LEM technology: Last Elevation Memory for reduced search time (antenna searches at the elevation angle of last reception)
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- Height: approx. 23 cm / Weight: approx. 15 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service

### SamY® Vision Accessories

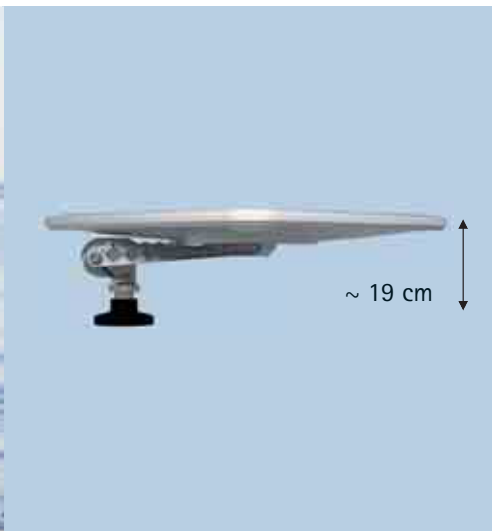
D5000	Digital receiver
D5000 CI	Digital receiver with 2 CI slots for encrypted programmes*
D5000 DVB-T	Digital receiver with DVB-T tuner**
D5000 CI + DVB-T	Digital receiver with 2 CI slots for encrypted programmes* and DVB-T tuner**
D5000 CI + hard disc recorder	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes*
D5000 CI + hard disc recorder + DVB-T	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes* and DVB-T tuner**

\*Module and card not included      \*\*DVB-T antenna not included

Specifications are subject to change without notice

### Control Unit and Operator Panel

The compact and dynamically styled operator panel is mounted in your vehicle. It features a backlit display and indicates all functions in either DE, GB, FR, NL, IT, ES, SE, DK, NO, FI and PT. The touch of a button is enough – the clever system then automatically finds the satellite of your choice. Actually the control unit forms the intelligent link between satellite system and receiver.



Reception range 1  
(CARO Vision MA®)

## CARO Vision MA®

*CARO Vision MA® is the entry level model with renowned quality reception. This manual and receiver - independent satellite system combines ease of use with good reception in central Europe.*

### CARO Vision MA® - The receiver independent entry level model

At the heart of this manual satellite system is the intelligent satfinder.

It couldn't be easier to get the required settings shown in the display. Using the specially developed mast, the antenna can be set up to the displayed settings. The satfinder shows the signal strength in the display whilst emitting an acoustic beep to optimise the reception.

The CARO Vision MA® offers greater flexibility as any commercially available digital satellite receiver or High Definition receiver can be used.



Rear view of the CARO Vision MA®




The Satfinder enables the use of any receiver and gives valuable tips for locating the required satellite.


Dimensions: W x H x D = 16.0 x 8.7 x 3.5 cm

CARO Vision MA® - Steps for operation

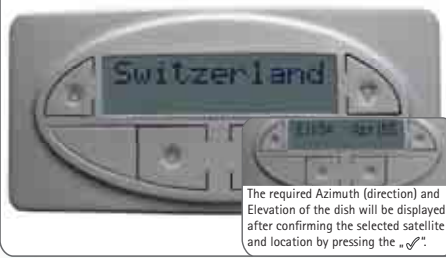
**1** After parking the vehicle on level ground, switch on the TV and the receiver. Activate the Satfinder by pressing the power button "⏻". The last satellite selected will be displayed.



**2** To change the satellite (e.g. to Astra 2), press "▲" or "▼" and confirm selection by pressing "✓".

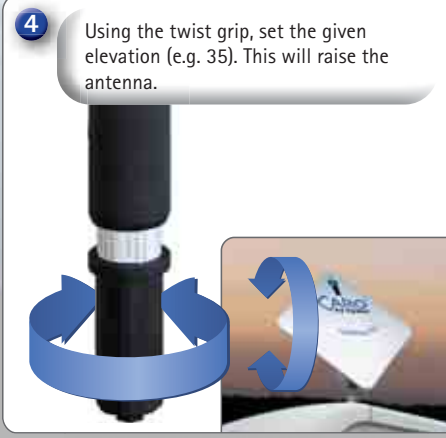


**3** The last location appears in the display (e.g. Switzerland) and can also be changed by pressing "▲" or "▼".

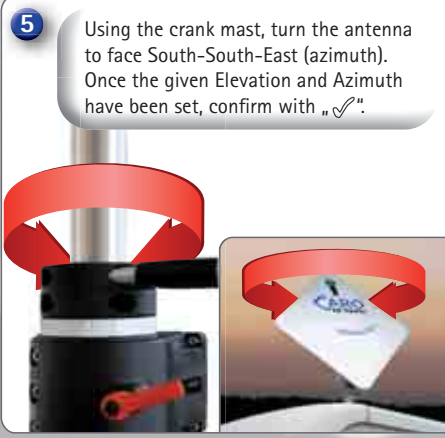


The required Azimuth (direction) and Elevation of the dish will be displayed after confirming the selected satellite and location by pressing the "✓".

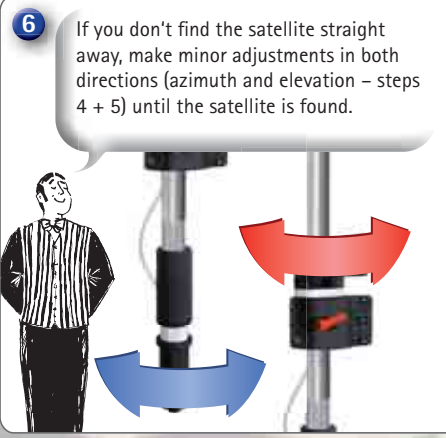
**4** Using the twist grip, set the given elevation (e.g. 35). This will raise the antenna.



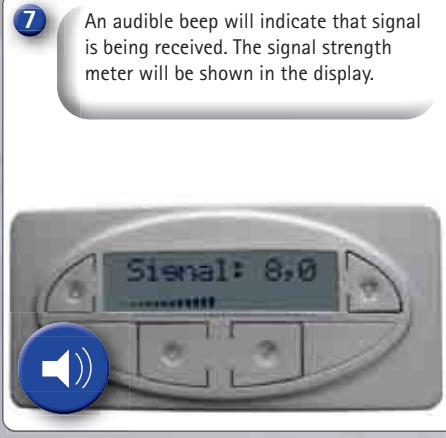
**5** Using the crank mast, turn the antenna to face South-South-East (azimuth). Once the given Elevation and Azimuth have been set, confirm with "✓".



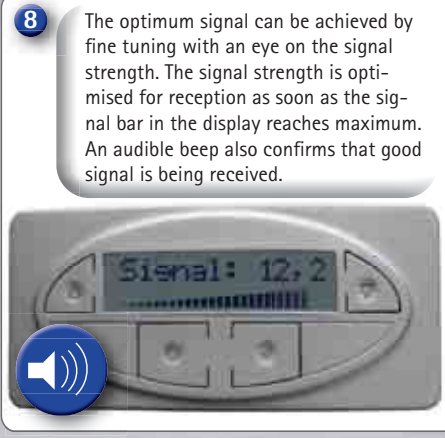
**6** If you don't find the satellite straight away, make minor adjustments in both directions (azimuth and elevation - steps 4 + 5) until the satellite is found.



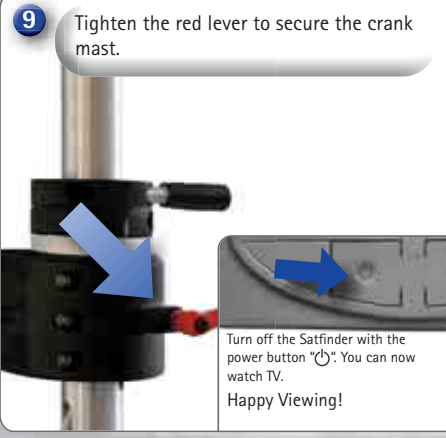
**7** An audible beep will indicate that signal is being received. The signal strength meter will be shown in the display.



**8** The optimum signal can be achieved by fine tuning with an eye on the signal strength. The signal strength is optimised for reception as soon as the signal bar in the display reaches maximum. An audible beep also confirms that good signal is being received.



**9** Tighten the red lever to secure the crank mast.



Turn off the Satfinder with the power button "⏻". You can now watch TV.  
Happy Viewing!

## Features

- Compact flat antenna 50 x 50 cm
- Low profile and minimum space requirement
- Sturdy crank mast, easy to use
- Intelligent satellite recognition with handy Satfinder (optical and acoustic support)
- Signal strength indicator for optimum setting
- Automatic calculation of satellite position by location
- Any receiver can be utilised (e.g. Sky, Freesat)
- Easy locking and unlocking for adjustment
- Weatherproof and hail resistant construction
- Highest quality construction using robust materials
- Height approx. 19 cm / Weight approx. 8 kg
- Made in Germany

- QM certified manufacturer with ISO 9001
- 3 year warranty and reliable service

### CARO Vision MA® Accessories

D5000	Digital receiver
D5000 CI	Digital receiver with 2 CI slots for encrypted programmes*
D5000 DVB-T	Digital receiver with DVB-T tuner**
D5000 CI + DVB-T	Digital receiver with 2 CI slots for encrypted programmes* and DVB-T tuner**
D5000 CI + hard disc recorder	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes*
D5000 CI + hard disc recorder + DVB-T	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes* and DVB-T tuner**

\*Module and card not included    \*\*DVB-T antenna not included  
Specifications are subject to change without notice



## SamYSolar<sup>+</sup>

*The SamYSolar<sup>+</sup> system is the ingenious combination of two applications: solar power generation and satellite reception. This system provides high performance in two ways: in solar mode, its GPS-controlled 50 Wp solar module provides a high energy yield, while in satellite mode, the system's 65 cm offset antenna dish provides a large reception range.*

Reception range 2  
(SamYSolar<sup>+</sup>)

### SamYSolar<sup>+</sup> - Pure mobility

This innovative and patented development combines the convenience of an automatic satellite system with the energy yield of a self-tracking solar module into one integrated unit.

The GPS-controlled system either automatically tracks the course of the sun or uses its 65 cm offset antenna to provide reliable satellite reception even in remote areas and all at the touch of a button.

The SamYSolar<sup>+</sup> system is equipped with a 50 Wp solar module that is always perfectly aimed at the sun and hence provides optimal energy yield.

This is equivalent to about three fixed horizontal 50 Wp single modules (measured over the period of one year in London, depends from season and weather). The SamYSolar<sup>+</sup> system means least possible space requirements at high mobility and convenience.



Rear view of the SamYSolar<sup>+</sup>-antenna



SamYSolar+® Operator Panel

Dimensions: W x D x H = 14.0 x 7.1 x 3.5 cm

## GPS

Why GPS? The term GPS (Global Positioning System) is usually associated with navigation systems. But what has a solar system to do with a navigation system? Usually, nothing. However, the SamYSolar+® system uses GPS data to determine the precise position of the system, date and time. Using this information, the SamYSolar+® system calculates its precise position relative to the sun. Even on cloudy days the solar module is then aimed directly at the sun and provides maximum yield.

## Features

### SamYSolar+® Accessories

D5000	Digital receiver
D5000 CI	Digital receiver with 2 CI slots for encrypted programmes*
D5000 DVB-T	Digital receiver with DVB-T tuner**
D5000 CI + DVB-T	Digital receiver with 2 CI slots for encrypted programmes* and DVB-T tuner**
D5000 CI + hard disc recorder	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes*
D5000 CI + hard disc recorder + DVB-T	Digital hard disc receiver with integrated 80 GB hard disc and 2 CI slots for encrypted programmes* and DVB-T tuner**

\*Module and card not included

\*\*DVB-T antenna not included

- Intelligent solar system with 65 cm offset antenna and 50 Wp solar module mounted on the rear
- Combined solar-satellite operator panel with illuminated display in DE, GB, FR, NL, IT, ES, SE, DK, FI and PT
- Operator panel designed for either recessed or surface mounting
- Software updates easy to carry out using standard SD memory card
- Satellite mode with digital satellite aiming, independent of receiver, allowing almost all receivers as well as provider-supplied digital set-top boxes to be used
- Satellite reception or, alternatively, solar operation at the touch of a button
- Automatic opening at dawn and retraction at dusk (optional, in solar mode)
- GPS control with continuous transfer of date, time, sun position and vehicle position, thus ensuring an optimal aiming at the sun and hence an optimal energy yield
- Weather-proof design
- Low space requirements due to single solar module
- Convenient operation: push-button control, enhanced mobility
- Yield advantage: The self-tracking 50 Wp solar module provides a yield equivalent to about three single horizontal 50 Wp modules (measured over the period of one year in London, depends from season and weather)
- Low power consumption of motor unit
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- A charge controller is included in the scope of supply
- It can be coupled with existing solar systems if the on-board charge controller is compatible
- Height: approx. 20 cm / Weight: approx. 24 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service

Specifications are subject to change without notice



## SunMover®

*The SunMover® revolutionises mobile solar technology. A specifically designed 75 Wp solar module, mounted onto a compact motorised pan-and-tilt unit, is combined with GPS control for maximum energy yield.*

### SunMover® - Pure solar energy

The SunMover® is an intelligent and GPS-controlled solar system which automatically tracks the sun's path during the day. It is equipped with a specifically designed 75 Wp solar module which is always perfectly aimed at the sun - hence providing optimal energy yield.

The average yield is equivalent to that of about three fixed horizontal 75 Wp solar modules (measured over the period of one year in London, depends from season and weather). The SunMover® system thus saves a lot of space on the vehicle roof and is very easy to operate by simply pressing a button.

The enhanced yield of the SunMover® system is even greater in winter. During the winter months, the sun is always low over the horizon, and horizontally positioned modules only generate a minimal yield, accordingly.





SunMover® Operator Panel

Dimensions: W x D x H = 14.0 x 7.1 x 3.5 cm

## GPS

Why GPS? The term GPS (Global Positioning System) is usually associated with navigation systems. But what has a solar system to do with a navigation system? Usually, nothing. However, the SunMover® system uses GPS data to determine the precise position of the system, date and time. Using this information, the SunMover® system calculates its precise position relative to the sun.

Even on cloudy days the solar module is then aimed directly at the sun and provides maximum yield.

## Features

- Intelligent solar system with 75 Wp solar module to automatically track the sun during the day
- Operator panel with illuminated display in DE, GB, FR, NL, IT, ES, SE, DK, FI and PT
- Operator panel designed for either recessed or surface mounting
- Software updates easy to carry out using standard SD memory card
- Automatic opening at dawn and retraction at dusk (optional)
- GPS control with continuous transfer of date, time, sun position and vehicle position. This ensures an optimal position relative to the sun and a constant maximum energy yield
- Convenient operation: push-button control, enhanced mobility
- Yield advantage: The self-tracking 75 Wp solar module provides a yield equivalent to about three single horizontal 75 Wp modules (measured over the period of one year in London, depends from season and weather)
- Low power consumption of motor unit
- Automatic retraction at vehicle start
- Highest quality construction using robust materials
- A charge controller is included in the scope of supply
- It can be coupled with existing solar systems if the on-board charge controller is compatible
- Height: approx. 17 cm / Weight: approx. 24 kg
- Made in Germany
- QM certificated manufacturer with ISO 9001
- 3-year warranty and reliable service

Specifications are subject to change without notice

## General information about satellite technology

### History of satellite technology

The satellite age began with the launch of Sputnik 1 on October 4, 1957. Although Sputnik 1 burnt up on re-entry into the earth's atmosphere after 3 months in orbit, the first telecommunications and TV transmitting satellite was launched soon after in 1962. In 1983, the first directly receivable TV satellite was put in service over Europe. Direct satellite reception only became popular in the early 1990'ies. Today, approximately 50 satellites provide Europe with TV and radio channels. Modern satellites weigh up to 5 tons and have huge solar panels to generate the power for their up to 60 transponders. New satellites have a transmitting power of up to 150 W per transponder. In addition to the solar generators, the satellites are equipped with batteries which ensure uninterrupted operation during eclipses (i.e. when the satellite passes through the earth's shadow). The lifecycle of a satellite is designed to be approximately 12-15 years. At the end of this period, the solar cells, batteries and the transmission booster will have deteriorated to a point where they can no longer be used. Usually, the fuel for the steering jets has also been depleted by then, and the satellite can no longer be kept in position. The last bit of fuel is then used to propel the satellite from its orbit in order to make space for a successor.

### ASTRA

ASTRA 2 is a satellite constellation positioned at 28.2° east and is the most important satellite system for the UK and Ireland. Since the launch of ASTRA 2A in August 1998, 9 individual satellites have been or will soon be grouped directly side-by-side in this position, with a maximum of 5 satellites synchronously operating. All ASTRA satellites are privately owned by SES in Luxembourg. In the beginning all signals to the satellites were transmitted via the headquarters of SES in Betzdorf, Luxembourg. Nowadays many TV companies maintain their own uplink stations. The signals transmitted from earth are converted to another frequency, amplified and then sent back to earth. Since 1988, SES has been operating their first orbital position at 19.2° east, known as ASTRA 1. Meanwhile, SES is operating the satellites Astra 3 and Astra 4 in different orbital positions and for different target groups and nations.

### EUTELSAT

EUTELSAT is a multinational organisation which was established in 1977. The first EUTELSAT I F1 satellite was launched into orbit in June 1983. Today, the EUTELSAT organisation operates numerous satellites in different orbital positions. The most commonly known position is 13°

East, where 3 satellites are co-positioned under the name HOTBIRD. EUTELSAT also operates several other satellites serving whole Europe and many other parts of the world.

### Co-Positioning

Today, it is common practice to position several satellites in close proximity, appearing from earth as a single satellite. These satellites are operated under one common name such as ASTRA I or HOTBIRD and are identified by index numbers or letters. The co-positioned satellites are located in a cube with an edge length of only 40 km. Of course, the satellites must not collide with each other, as this would cause terminal damage and effectively destroy them. This is why the exact position of each satellite is constantly monitored and adjusted with the aid of steering jets.

### Footprint

From their position in orbit, geostationary satellites have a „view“ of almost half of the earth, but the available energy is not sufficient to completely cover this area with receivable signals. In accordance with economic considerations, the signals are focussed on certain regions, forming what is called the satellite's „footprint“. Satellite operators are often quite cautious about the official footprint data they publish, which is why it is often possible to receive a good signal well beyond the limits of the indicated footprint with the aid of a high quality reception system. In reality, the footprints are not as uniform as shown in the graphics, especially not along the edges, which can be rather „ragged“. In such areas, trial and error is the only way to determine if signals can be received.

### Orbital position or satellite position

The satellites are positioned in geostationary or geosynchronous orbit at an altitude of approx. 36,000 km precisely over the equator. At this specific altitude, they permanently retain their position above the same spot on earth. The longitude of this position is hence used to differentiate between the satellites. ASTRA I at 19.2° East is hence approximately right over the town of Mbandaka in Congo. However, the degree value does not directly relate to the orientation of the antenna toward the satellite.

### Transponders

Modern satellites have up to 60 transponders. One transponder can either carry one analogue or up to 12 digital TV channels. The output of current transponders is up to



150 W, but does decrease over the years. The transponder outputs of older satellites is sometimes less than 50 W. In principle, "old" analogue transponders can still be used digitally, but their range of channels is generally smaller than that of newer transponders, and their footprint is narrower.

## Transmission systems

### Digital technology

Today, and even more so in the future, digital transmission technology will play the predominant role in satellite TV. The basic benefit to the programme providers is the fact that several channels can be transmitted on a single transponder, whereby the allocation can be freely selected. Instead of 12 TV channels, broadcasters can also choose to have just radio stations or a mixture of TV and radio. Internet data transmissions and any other types of data service are also possible. As well as additional flexibility, this also offers considerable economic benefits for broadcasters.

### Transponder

The combined total of all digital data transmitted on a transponder is referred to as a "transponder". This includes the individual TV and radio channels. The transponder is what the receiver actually receives. The frequently published frequency, polarisation and symbol rate data always relate to a transponder stream.

### Bandwidth

Other than former analogue transponders, the bandwidth with digital transponders can be operated at almost any value. This makes it possible to operate older, weaker transponders with a reduced bandwidth and still obtain a wider range. Furthermore, a single transponder can carry several independent low-bandwidth signals (transponder streams), an option which is used most commonly by broadcasting vehicles. As a general rule, broadband signals (MCPC - Multiple Channel Per Carrier) tend to be used to supply signals to end customers, while signals with lower bandwidths (SCPC - Single Channel Per Carrier) are mostly used for relay transmissions, so-called „feeds". ASTRA 1 almost exclusively transmits MCPC signals suitable for direct reception.

### Symbol rate

The symbol rate is an important figure to know, as it must be entered correctly into the receiver to ensure a successful channel scan if specific channels are to be searched.

The higher the symbol rate, the higher the bandwidth, and the more channels can be transmitted on one transponder. However, digital technology allows many other ways to configure the transponder stream in addition to the symbol rate. Some providers use this to squeeze a higher number of channels onto one transponder, which results in poor image quality, low range and an increased error rate.

### Digital reception range

The range of each the individual transponders varies slightly. This is sometimes used deliberately to focus the signal onto one area, sometimes this occurs more or less by chance. In addition to the transmitting power, the satellite also plays a role, as does the transponder configuration and the signal bandwidth. It is therefore normal for some channels to be received at the edges of the footprint, while other channels cannot be received there. Of course, modern automatic systems only scan digitally and therefore locate satellites from locations in which only few channels can still be received.

### Interference on digitally received broadcasts

Normally, the TV image collapses almost instantly if the signal strength is insufficient. Interference usually manifests itself in the form of blocky/pixelated images or frozen images. This usually indicates that the signal strength is too weak. Other possible causes can include transmitter errors or an overload of the transponder stream. HOTBIRD often transmits channels which are affected by noticeable interference despite having a very powerful signal.

### Clear view of the satellite

A clear view of the satellite is the key prerequisite for good reception. Buildings within the signal beam always block reception. Trees may, in rare cases, allow the signal to pass through unhindered, but this is not reliable. The geographic location also needs to be taken into account, as the signal is received at a much flatter angle the further north the system is operated. In very northerly regions, the curvature of the earth can cause even topographic obstructions like mountains to prevent reception of satellite channels.

### Antenna size

The larger the antenna is, the larger the reception range will be for a given transponder, and the more tolerant the system will be to poor weather. Damaged, i.e. dented

or warped antenna dishes reduce the range significantly. High-quality LNBs show their increased capacity only at the limits of the footprint. Even in the centre of a footprint, e.g. in Germany, satellite operators recommend a minimum size for the satellite dish in order to ensure good reception even in poor weather.

## Receiver

### HD, HDTV

HD is the acronym for High Definition. HDTV, accordingly, stands for high-definition television, a technical standard providing significantly sharper images and much greater detail than the previous PAL standard. Technically speaking, HDTV means a higher vertical and horizontal resolution than Standard Definition Television (SDTV). Common HDTV image resolutions are 1280 x 720 pixels or 1920 x 1080 pixels. The first resolution e.g. uses 1,280 dots per line (horizontally) and 720 dots per column (vertically). The resolution of the PAL standard is 720 x 576. To create an optimal image from HDTV signals, the display must have a matching physical resolution. TV sets that cannot directly display HDTV signals but convert them into smaller pixel numbers („HD-Ready“) are still available.

### Digital (DVB, FTA)

The digital TV standard is often also called "DVB", which stands for Digital Video Broadcast. In this context, the abbreviation "FTA" is also used, meaning "Free To Air" or "Free View". FTA programmes are non-encrypted, free programmes. These terms are often found on digital receivers. In addition to TV reception, digital receivers also provide DVB radio programmes. Digital satellite receivers are sometimes also called "DVB-S" receivers, where "S" stands for "satellite".

### DVB-S2

DVB-S2 is a further development of the DVB-S standard, allowing the transmission of more channels in a better quality. Compared to DVB-S, the more efficient transmission method allows approx. 30 % more data to be transmitted. Since the high quality of HDTV requires a high data volume, DVB-S2 represents an optimal transmission standard for HD signals. DVB-S2 systems use the same transmission technology as DVB-S, i.e. that antenna, LNB and wiring do not need to be replaced when upgrading the system. The receiver, however, uses a different technology. Any DVB-S2 receiver can also receive DVB-S stations, but DVB-S receivers cannot process DVB-S2 signals.

The DVB extension "DVB-S2" has been available for some time now. It is also called "8PSK", and it allows the transmission of even more channels or the transmission of existing channels at an enhanced quality. Reception of DVB-S2 requires specific receivers.

### Digital CI

Most European countries encrypt (encode) their digitally broadcast channels. To receive such channels either a provider-specific receiver or a receiver with a Common Interface (CI) is required. CI receivers equipped with decoder modules and corresponding smart-cards can receive the programmes encrypted with most of the available encryption methods. External decoder boxes which were common with analogue systems are not compatible with digital TV.

### Common Interface (CI)

CI receivers have 1 or 2 slots for decoder modules. Different modules are required depending on the country and the pay-TV provider. The CI receiver is hence only a platform which facilitates the usage of additional decoder modules. The reception of different pay-TV packages is only possible with CI receivers.

### CI-Module

CI modules are sometime also referred to as „CA" modules, whereby „CA" stands for „Conditional Access". When used together with the corresponding smart card (access card), the modules decode encrypted programmes. Some modules are only capable of decoding a single system (e.g. Viaccess), while others may be compatible with multiple systems. The CI module needs to be inserted into the Common Interface slot. Generally, each country or provider requires a different module. For further information please contact the programme providers.

### Smartcards

Smartcards are available at specialist dealers or directly from the programme providers. Smartcards are usually subject to a charge, and national regulations (residence, nationality) may apply.

### Satellite information

The variety of digital TV and radio stations broadcast across Europe is not only great, but also subject to constant change. Any printed channel list will hence often be outdated by the time it is published. Major channels can usually be received

without changes for long periods, but smaller-scale channels, often providing highly interesting programmes, are often launched and then disappear from the satellite rather quickly. There are numerous printed publications covering the topic of satellite TV. However, the Internet is usually more up-to-date. The websites [www.lyngsat.com](http://www.lyngsat.com) and [www.satcodx.com](http://www.satcodx.com) list the channels available from all directly receivable satellites. These data can be input into the receiver's scan function so new channels can be received.

### **Terrestrial digital TV (DTT or DVB-T) and digital cable TV (DVB-C)**

Terrestrial TV is also due to be converted from analogue to digital technology by the year 2010. However, the DTT network does not yet provide full coverage. Coverage is being widened all the time, but it is already clear that complete coverage of a country will not be possible. The desired reception of terrestrial digital TV signals with a small antenna stick at the back of the receiver can only be realised in the direct vicinity of the transmitters. The major disadvantage to clients is the range - national DTT will of course only be provided in the respective country. TV and radio stations of other countries cannot be expected to invest enormous sums into the broadcast of „foreign“ channels. Digital TV has almost become the standard in many national cable networks and can hence be received at many camping sites. This is not much of a benefit though, as the channel variety is much smaller than that available by satellite. The same problem of coverage that applies to DTT also exists here as well, as cable operators are not likely to feed foreign channels into their networks. Furthermore, DTT, DVB-C and DVB-S always require separate receivers which are different for each system. In principle, DTT and DVB-C cannot match the number of channels and the reception range available with digital satellite TV (DVB-S).

### **DVB-T2**

DVB-T2 is the successor of the DTT standard. The same principle as with the satellite transmission (DVB-S2) applies: Thanks to improved and more efficient transmission technology, more programmes can be transmitted per channel, and HDTV transmission is enabled. Also, the signal is more stable and reliable. DVB-T2 is not downward compatible with DVB-T, i.e. a conventional DTT device cannot process DVB-T2 signals, but DVB-T2 devices can usually process DTT signals. DVB-T2 is already established as transmission standard e.g. in Great Britain and France, but its launch in Germany is still to be determined.



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