

Starwin 1.2m Vehicle Mounted Antenna User Manual (SMC)

Cautions

Symbol	Contents
	In case of controlling antenna electrically, take away manual handle, otherwise the handle will toss out and cause accidental injury.
	When the antenna is at stow condition, do not step or squeeze the main reflector so to avoid deformation and influence on electrical performance of antenna.
	When operating antenna, do not close software stroke limit. If needs closing in the special cases, assure that the operation will not damage the antenna after the closing.
	Stow the antenna before shipment; check the tightening condition the connection screw between the rack and top of the vehicle. In case of loose, tighten them so to assure the antenna is at good shipment condition.
	After applying the power to the antenna, check the status indication light in front of chassis panel, if the status indication light is not light up, please enter into manual interface to check whether the actual angle of the antenna is normal; if the angle is abnormal, do not deploy the antenna automatically.
	In case of not applying power and if adjust the antenna's attitude manually and then start the electrical control mode, adjust the antenna manually to deployment or stow condition, start the antenna system again to reset the antenna angle.
	The power supply at site is 220VAC.
	During power off and then power on period, the interval between power off and power on shall be 5 seconds.
	When the user rotates antenna with manual command, especially in the deployment and stow manually, one specially-assigned person must be responsible for observing the antenna in the motion and the interference situation between feed rod and vehicle, command the people in the vehicle to operate the rotation direction so to stop antenna rotation and prevent occurrence of accident in case of interference.
	Do not plug and pull the cable plug from the rear of the antenna's control unit and driving unit at live condition, so to prevent damage of system components and operation fault of system.
	In case of finding main fault during operation period of the antenna, shut down the antenna and isolate the fault.

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1 General

1.1 Name and Model

Name: 1.2m Ku Band Single Offset Vehicle Mounted Antenna.

Model: SW-ACC-1200.

1.2 Features

- Without breaking roof can be easily installed in commercial vehicles, off-road vehicles, SUV, MPV and top military shelter;
- Configuration of the GPS with high accuracy, the electronic compass has a strong anti-interference ability, which can ensure the accuracy of the environment adaptability and point to the satellite
- Antenna automatically acquisition time does not exceed 3 minutes (RMS);
- With automatic alarm, mechanical limit, software limit, and other multiple protection functions, antenna operation more safe.

1.3 Main Purpose and Application

This antenna is suitable for Ku-band satellite communication requirements, and is widely used in national defense security, government emergency communication departments, telecommunications, news media, public security, border defense, armed police, military, scientific research and exploration and other fields.

1.4 Environmental Conditions

Table 1 Environmental Conditions

Item	Specifications
Operational Wind	≤72m/s
Survival Wind	≤161m/s
Temperature Operational	-30℃~+60℃
Temperature Store	-40℃~+70℃
Ingress Protection	IP65

Humidity	98% (20°C)
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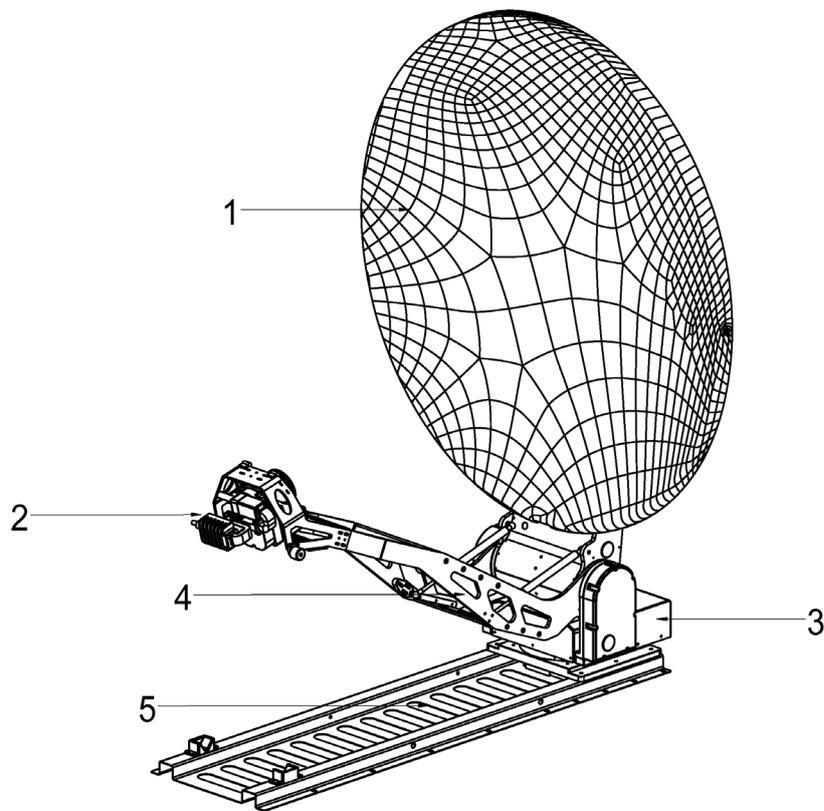
1.5 Working Conditions

In order to ensure that the antenna can be normally aligned, please check that there is no obstruction in front of the antenna when the antenna is running, and there is no magnetic field around it.

2 Antenna Structure

2.1 Overall Structure

This antenna is mainly composed of antenna surface, feed system, azimuth and rotary table, support arm, antenna control box, roof fixing bracket, etc. The structure is shown in Figure 2-1.



1-Antenna Surface 2-Feed System 3-Turntable

4-Support Arm 5- Roof Fixing Bracket

Fig 2-1 Structure of antenna

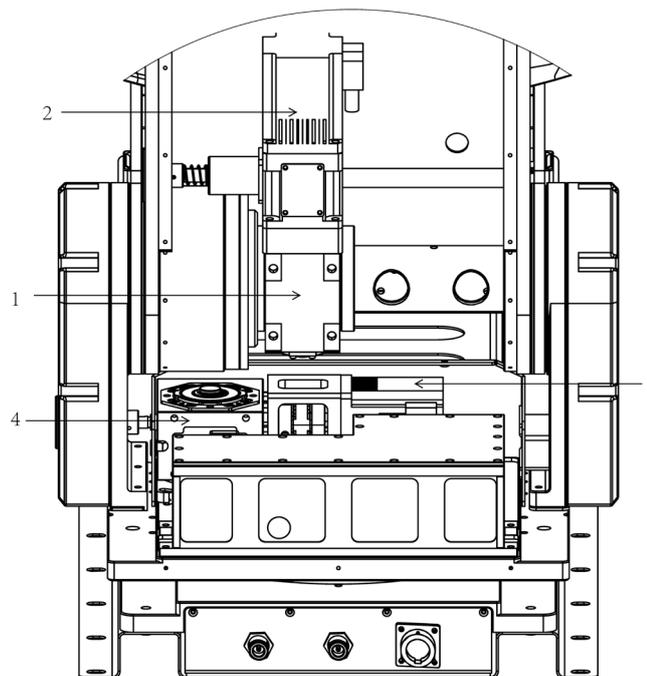
2.2 Structure Introduction of Each Component

2.2.1 Azimuth and Elevation Rotation Module

The Azimuth and Elevation rotation module is mainly consist of two parts, as shown in Fig 2.2;

AZ rotation module: It consists of Az motor, Az worm gear box and Az gear drive etc. The Az drive has mechanical self-lock function.

EL rotation drive module: It consists of EL motor, EL worm gear box and EL swinging reducer.



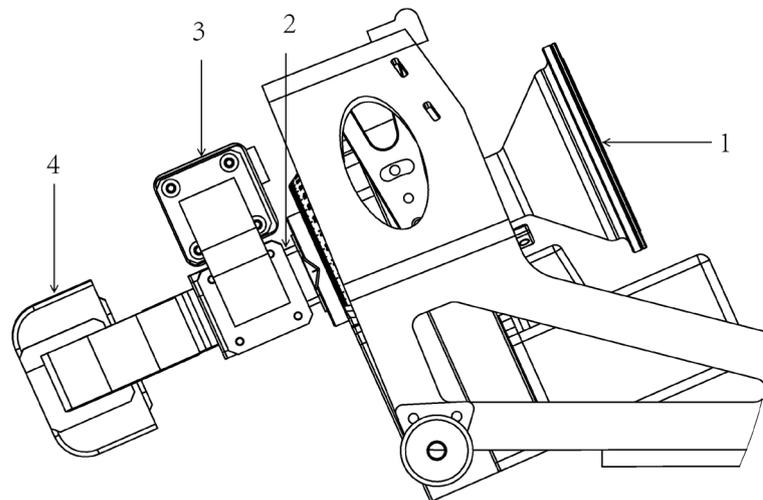
1- EL worm gear box 2- EL motor 3- Az motor 4- Az worm gear box

Fig 2-2 AZ and EL rotation module

2.2.2 Polarization Module

The feed module consists of POL motor, feed, POL drive mechanism, OMT, filter and LNB etc. The POL module is the main part of antenna which, during operation, mainly achieves adjustment of POL angle and receives and transmit signal at isolation condition.

The installation position of POL module has been adjusted before delivery to keep the feed at ideal receive and transmission position. During operation period, do not conduct motion or adjustment. If you need to disassemble the POL module, please make a mark before such disassembly so to assemble again to its original position. The constitution of the POL module is shown in Fig 2.3.



Feed system 2- Diplexer 3-High frequency tuner(LNB)
4- Power amplifier (BUC)

Fig 2-3 Schematic diagram of polarization structure

2.2.3 GPS Receiver

GPS is installed at the side of rotation platform of the antenna and is used mainly to gather the longitude and latitude at the position where communication vehicle is located. The antenna, throughout the information provided by GPS, can calculate correctly the satellite position.

In case of operation of GPS, it feeds the gathered longitude and latitude information through series port, the operation indication light in the GPS can be seen through GPS case. When the light lights up, it means GPS is searching signal; when the light is normally light, it means GPS has positioned. The protection cover is installed outside the

GPS and, in case of observing operation condition of GPS, the cover shall be removed. The installation diagram of the GPS is shown in Fig 2-4.

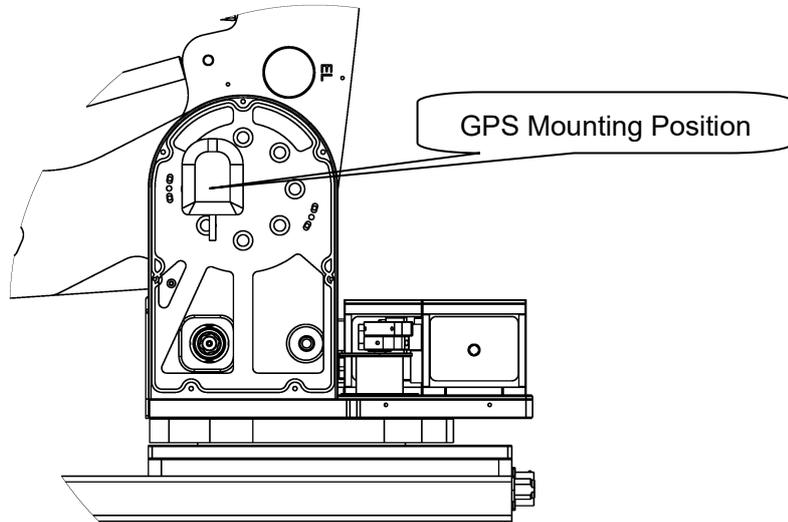


Fig 2-4 GPS Installation position schematic diagram of GPS

In case of initially using GPS, do not conduct the point to the satellite work until GPS locks. The locking of GPS antenna is about 1 min. When is using the satellite communication vehicle still at the place next time, the local longitude and latitude procedure has been recorded, the GPS antenna does not lock and the antenna can operate.

2.2.4 3-Dimensional Digital Compass

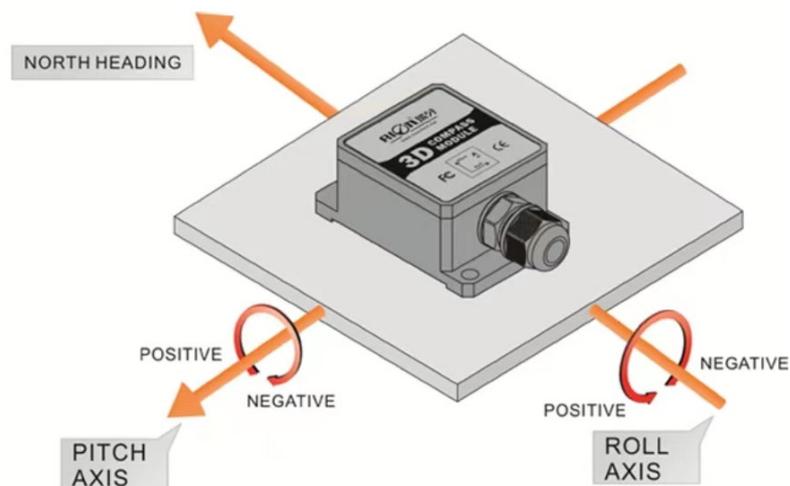


Fig 2-5 3D Digital Compass

The high accuracy 3-dimensional digital compass is installed on the antenna back structure and can reflect real attitude at real time.

The high accuracy 3-dimensional digital compass adopts advanced hard and soft iron calibration method, so to keep it still provide high accuracy heading information at critical magnetic field environment, and its output information has indicated accurate attitude position of the module. It has such features as smart and low power loss and can also provide accurate heading data at very severe environment.

The data gathered by the compass is provided to the antenna control unit by the series port and the antenna control unit achieves position of target in accordance with the compass's attitude and displays the data of compass on the software interface.

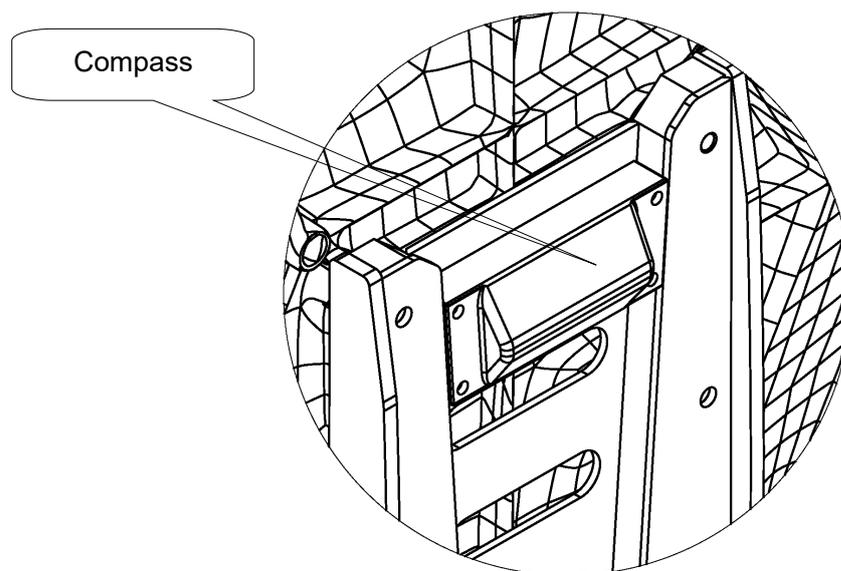
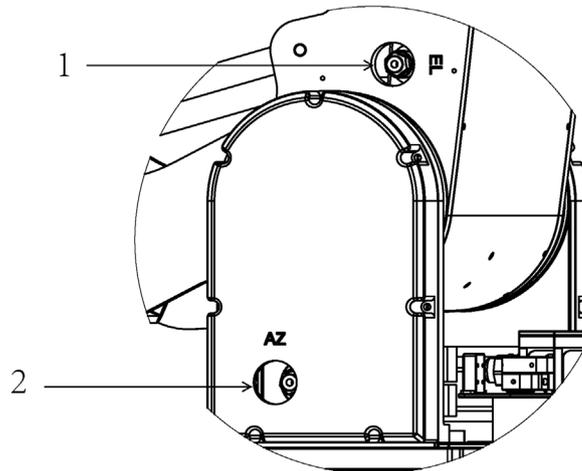


Fig 2-6 Schematic diagram of compass position

Remove the four round-head screws from the case with hexagonal wrench and remove the case from the back structure and the compass can be seen, as shown in Fig 2.6. The compass adopts push and pull type plug for connection.

2.2.5 Hand Crank

The hand crank is used to drive antenna by person for emergency situation. The hand crank is shown in Fig 2.7.



1- EL manual position 2- AZ manual position

Fig2-7 Schematic diagram of handle

3 Installation Methods

3.1 Antenna Dimension Diagram

3.1.1 Antenna Mounting Dimension Drawing

The antenna is connected to the vehicle through the top of the vehicle by way of 18 pieces of (18×M8) stainless steel screws and the dimension of aluminum channel is shown in Fig 3-1;

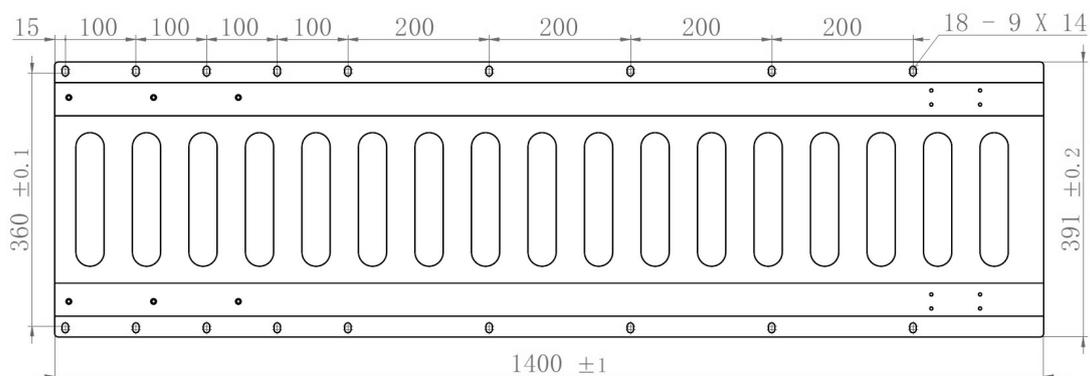


Fig 3-1 Schematic diagram of installation of antenna

3.1.2 Antenna Stowing Dimension Drawing

The appearance dimension of the antenna describes the length, width and height of the antenna at stow condition and also describes the dimension of aluminum frame etc for the convenience of need of the antenna in the loading and the stow dimension of the antenna is shown in Fig 3-2, 3-3.

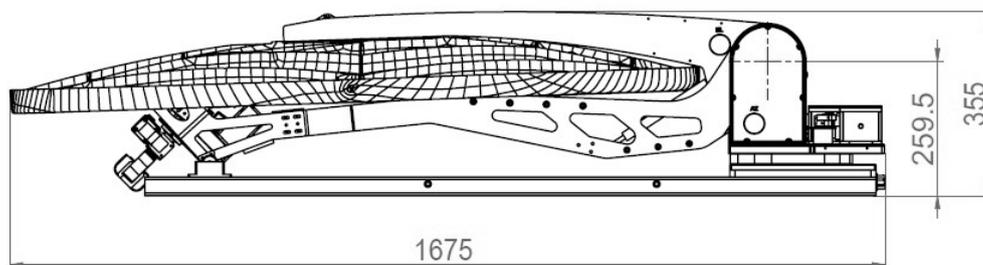


Fig 3-2 Schematic diagram of stow of antenna (side view)

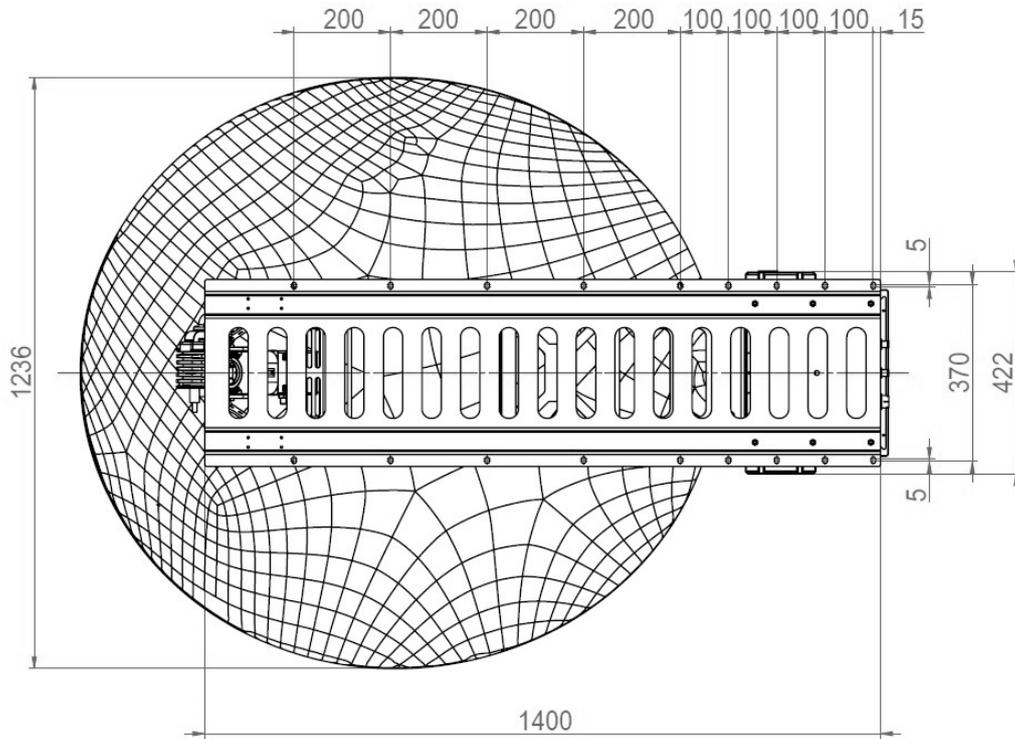


Fig 3-3 Schematic diagram of stow of antenna (top view)

3.1.3 Antenna Operating Dimension Drawing

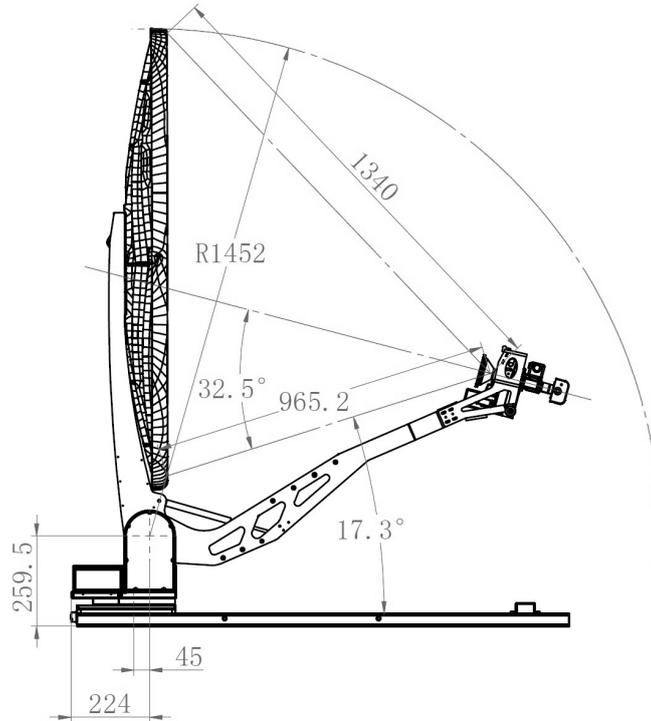


Fig 3-4 Antenna Operating Dimension (side view)

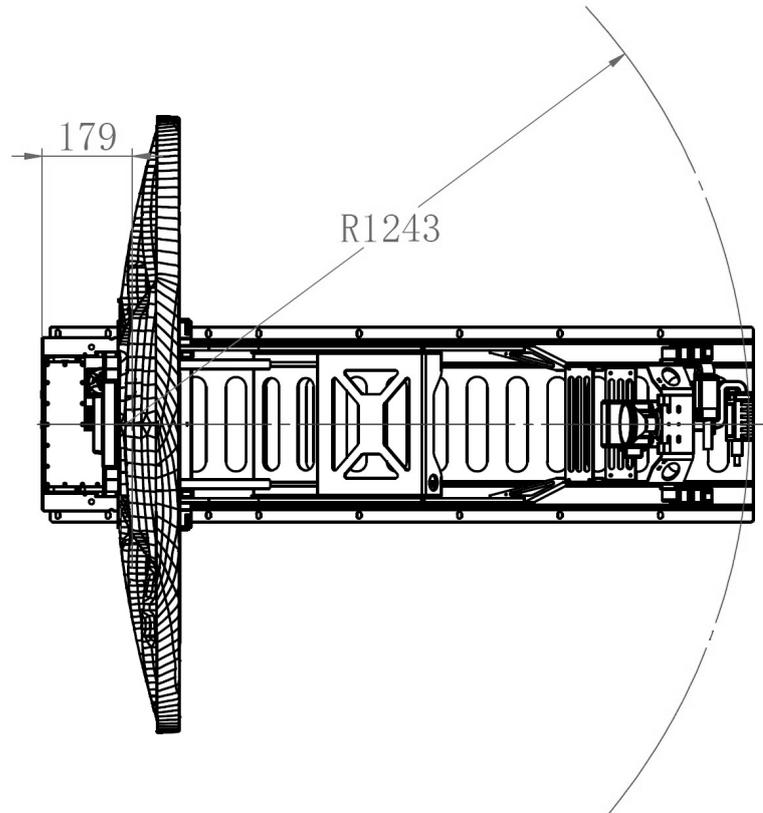


Fig 3-5 Antenna Operating Dimension (top view)

The operating dimension of the antenna describes the length, width and height of the antenna at operating condition and also the range of rotation etc for the convenience of need of the antenna in the loading and the operating dimension of the antenna is shown in Fig 3-4, 3-5.

3.2 Antenna Unpack Solution

3.2.1 Installation Conditions

- 1) The antenna is packed in the wood case and delivered to the customer's site, check whether the box is excellent without damage. If there is no damage, take away the top plate and side wall of the case and maintain bottom pallet and antenna;
- 2) Remove the internal support carefully and check condition of the antenna (For example, whether the antenna surface is complete and whether the parts fall off.). In case of damage, please contact the manufacturer as soon as possible.

3.2.2 Unpacking Steps

The detailed unpacking process is shown in Figure 3-6.

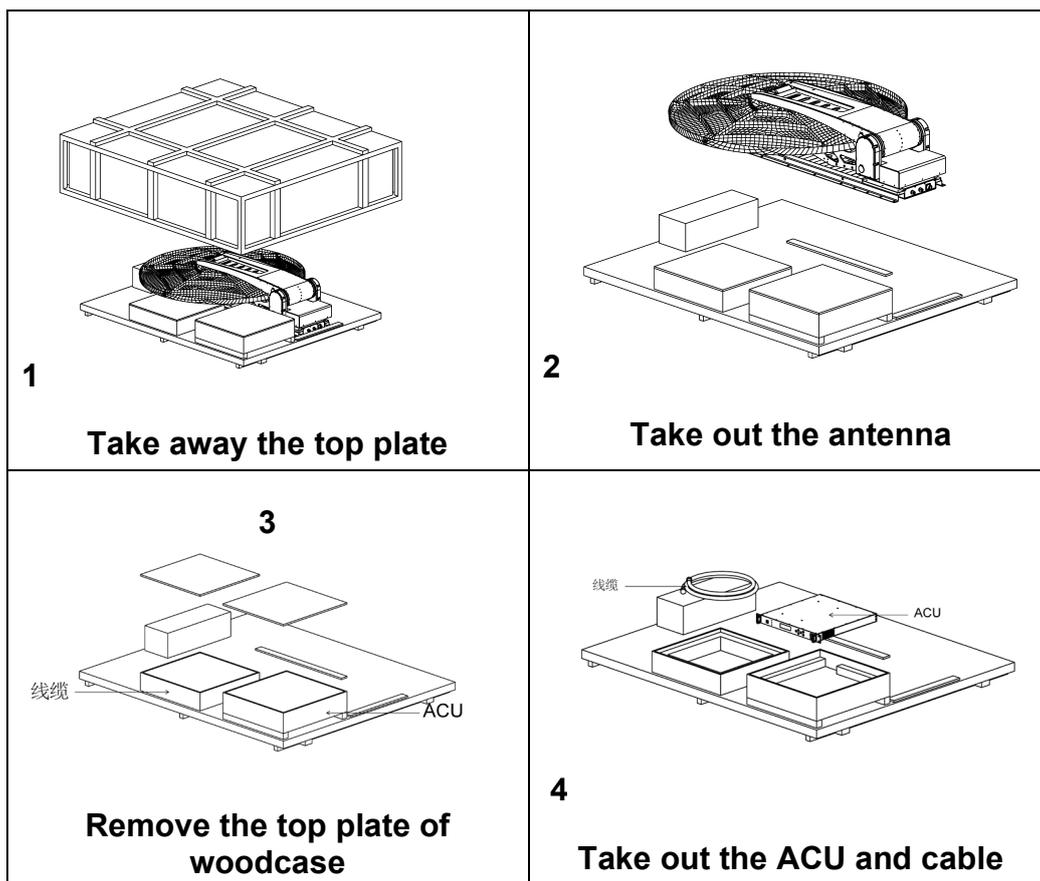


Fig 3-6 Schematic diagram of antenna unpacking steps

Note: when taking out the antenna, it is necessary to shake the antenna elevation axis to remove the screws fixing the antenna.

4 Electrical Connection

4.1 Electrical Connection Drawing

This antenna includes the whole antenna, antenna control unit (ACU) and related cables and its connection is shown in Figure 4-1.

Cautions:

1. The power divider is connected to the ACU all the way through, and the other is straight through;
2. The remote monitoring interface is not necessarily an Ethernet port.



Fig 4-1 Connection diagram of cable

4.2 Power Supply

The system is powered by mains AC, and the chassis power socket has a built-in 6A fuse, which can effectively protect the equipment from overcurrent. The antenna control unit can directly feed to LNB, and also feed the LNB independently through external equipment. In case of externally connecting BUC, take care to distinguish the connection end between the feed end and isolation, so to assure correct connection of wire.

4.3 Antenna Control Unit

The antenna control unit is a standard 1U case, which integrates power, drive, control and signal acquisition and has such features as compact design, convenient installation and simple operation.

a) Front Panel

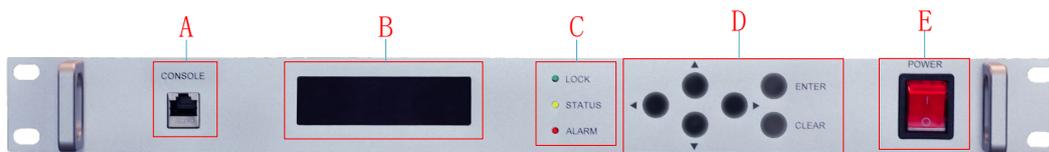


Fig 4-2 The front panel of ACU

As shown in Fig 4-2, the front panel consists of following parts.

No	Name	Instruction
A	System upgrade	It is used to upgrade system program;
B	Display	It is used to display system interface;
C	Indication light	It is used for indication of antenna at lock, stow and alarm status;
D	Key	It includes upward, downward, leftward, rightward, enter and clear key;
E	Power switch	It is sued to open and close the power of system;

b) Rear Panel

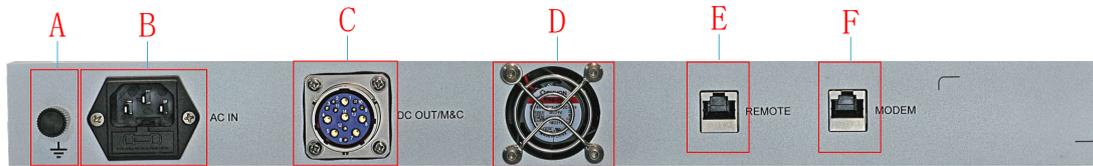


Fig 4-3 Rear panel of ACU

As shown in Fig 4-3, the rear panel consists mainly of following parts.

No	Name	Instruction
A	Earthing terminal	It is used to earth ACU;
B	AC IN	220VAC power input, with 5A fuse set inside;
C	DC OUT/M&C	It is used to output servo power at 24V DC to antenna;
D	Fan	It is used to ventilate and radiate the system;
E	REMOTE	It is used to perform remote monitor to the antenna;
F	MODEM	It is for connecting modem;

c) Press Key

The control key for the front panel is used to control the equipment and the function of each key is as follows.

Button Icon	Function	Button Function
▲	Upward	Choose, change the selection option or character at the cursor activation and keep the number at the cursor activation increase upward;
▼	Downward	Choose, change the selection item or character at the cursor activation and keep the number at the cursor activation downward;
◀	Leftward	Switch the cursor leftward, or select the left or previous option;
▶	Rightward	Switch the cursor right, or select the left or next option;
ENTER	Enter	Menu icon: Enter into the menu activated by the cursor; Set interface: Save the data of present interface; Motion interface: Initiate the motion;
CLEAR	Clear	Set interface: Cancel operation; Motion interface: Motion stops; Other: Clear to precious menu;

4.4 Antenna Interface

The antenna unit and externally connected outlet are integrated at rear of the panel, as shown in the Fig 4-4:

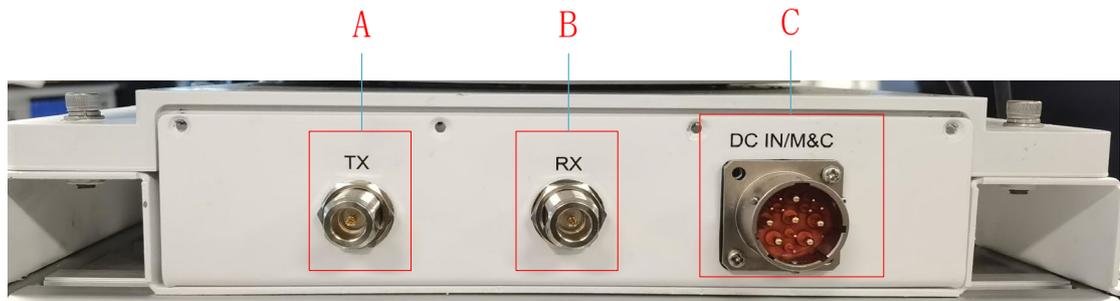


Fig 4-4 Schematic diagram of rear panel of antenna

The instruction of antenna panel is shown in the Fig 4-4.

No	Name	Instruction
A	TX	RF transmitter interface
B	RX	RF receiving interface
C	DC IN/M&C	Power and Control Cable Interfaces

5 Antenna Operation

5.1 Antenna Operation

5.1.1 Menu Structure

The system adopts a hierarchical menu structure, which is divided into three parts: antenna control, system setting and monitoring display according to functions. The control menu mainly completes the motion control operation of the antenna, including resetting, manual acquisition, satellite alignment, stow and tracking. The common operation of the antenna can be quickly completed through the control menu. The setting menu is mainly used for the selection and management of system parameters. It can quickly select the required satellite parameters, or modify the parameters related to satellites and antennas, making the antenna application flexible and convenient. The information menu is mainly to check the status of the system, including limit information, sensor information and alarm information. The menu structure is shown in Fig 5.1.



Fig 5-1 Structure diagram of menu

5.1.2 Antenna Control Interface

Press the power switch in the front panel, start antenna controller and the system enters into main interface after system initialization.

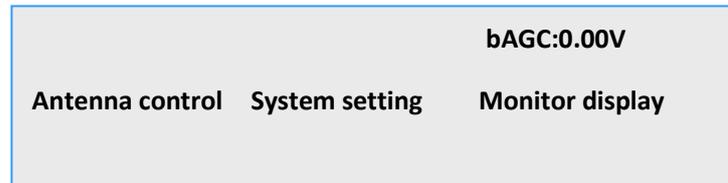


Fig 5-2 Main interface of antenna controller

Name	Description	Parameters
Main interface	Menu of main interface	No

5.1.2.1 Enter into Antenna Control Interface

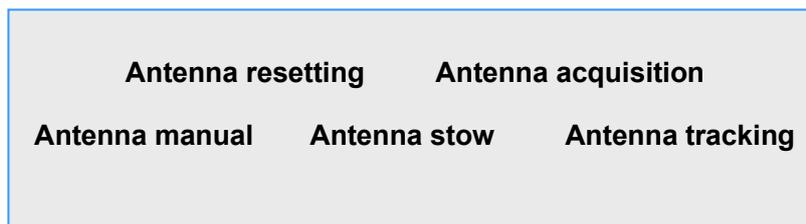


Fig 5-3 Sub-menu of antenna control

Name	Description	Parameters
Resetting of antenna	This option is to expand the antenna to the initial position and initialize the three-axis angle, press the enter key to start, and the return key to stop.	No
Point to satellite	After selecting the option, the antenna will search the set antenna automatically. Start by pressing enter key and stop by pressing return key. After finishing the satellite alignment, at the same time, the "lock" light on the control panel lights up.	No
Manual operation of antenna	This option can control 3-axis of the antenna to move at different speed.	No
Stow of antenna	Select this option when antenna is at any condition, the antenna will stow automatically to delivery condition. Start by pressing enter key and stop by pressing return key. After finishing stow of antenna, at the same time, the "status" light on the control panel	No

	lights up.	
Antenna tracking	Select the option after finishing satellite alignment, the antenna can track the maximum value automatically. Start by pressing enter key and stop by pressing return key.	No

① Enter into Antenna resetting

Antenna is under reset...	
AZ angle: Preset: 180.00	Present: 180.00
EL angle: preset: 32.00	present: -67.99
POI angle: prese: 0.00	present: -90.00

Fig 5-4 Resetting menu

Name	Description	Parameters
Antenna resetting	When the resetting finishes, it will change into "antenna resetting finish"	No
AZ angle	Displayed AZ preset angle and presently actual angle of antenna	0~360 degree
EL angle	Displayed EL preset angle and presently actual angle of antenna	-68~90 degree
POL angle	Displayed POL preset angle and presently actual angle of antenna	-95~95 degree

② Enter into "Point to satellite of antenna"

Asia No.7H under pointing...	bAGC 0.00V
AZ angle: preset: 180.00	present: 180.00
El angle: preset: 32.00	present: -67.99
Pol angle: Preset: 0.00	Present: -90.00

Fig5-5 Point to satellite interface of antenna

Name	Description	Parameters
Point to satellite of antenna	When the point to satellite finishes, it will change automatically into "pointing to satellite finish" and, at the same time, the "lock" light on the control panel lights up.	No

Asia No.7	Name of satellite presently pointed to	Preset 10 geostationary satellites
bAGC	Present signal strength	0~10V
AZ angle	Displayed AZ preset angle and presently actual angle of antenna	0~360 degree
EL angle	Displayed EL preset angle and presently actual angle of antenna	-68~90 degree
POL angle	Displayed POL preset angle and presently actual angle of antenna	-95~95 degree

③ Enter into Manual operation of antenna

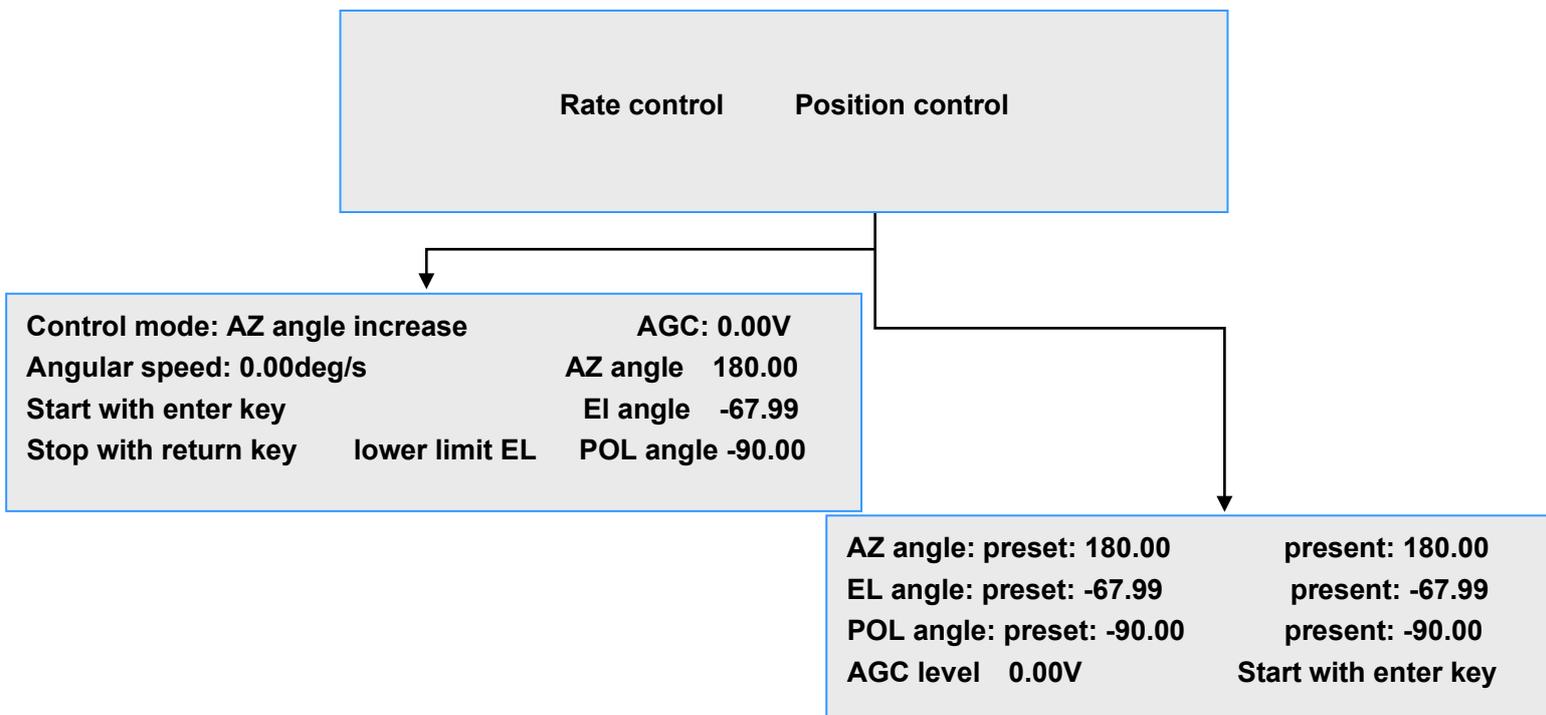


Fig5-6 Manual Control Interface

Name	Description	Parameters
Antenna in manual	The antenna in manual is classified into "rate control" and "position control".	No
Rate control	It can manually control the 3 axes of antenna to rotate at different speed, the modified option is: "control mode" and "angle rate", press enter key to start and return key to stop.	No

Position control	This option can modify preset angle, press enter key to start, the antenna will rotate to the preset angle, the interface has following modified options: "AZ angle", "EL angle" and "POL angle", press enter key to start and return key to stop.	No
Control mode	Select present motion mode of antenna (it has 6 modes)	AZ angle, EL angle, POL angle increase/decrease
Angular speed	Display the rotation speed of present control antenna	0~3degree/s
AGC	Signal strength at present	0~10V
EL lower limit	Display present limit information	See monitor display-limit information
AZ angle	Display AZ preset angle and present actual angle of antenna	0~360degree
EL angle	Display EL preset angle and present actual angle of antenna	-68~90degree
POL angle	Display POL preset angle and present actual angle of antenna	-95~95degree

⑦ Enter into Antenna stow

Antenna under stow...	
AZ angle: Preset: 180.00	Present: 180.00
EL angle: Preset: 32.00	Present: -67.99
POL angle: Preset: 0.00	Present: -90.00

Fig5-7 Stow interface of antenna

Name	Description	Data
Antenna stow	When the stow finishes, it turns automatically into "antenna stow finish" and, at the same time, the "status" indication light on the controller panel light up.	Data
AZ angle	Display AZ preset angle and present actual angle of antenna	0~360 degree
EL angle	Display EL preset angle and present actual angle of antenna	-68~90 degree
POL angle	Display POL preset angle and present actual angle of antenna	-95~95 degree

⑧ Enter into Antenna tracking

Asia No.7 H under tracking...	bAGC 0.00V
AZ angle: Preset :180.00	Present: 180.00
EL angle: Preset: 32.00	Present: -67.99
POL angle: Preset: 0.00	Present: -90.00

Fig 5-8 Tracking interface of antenna

Name	Description	Data
Antenna tracking	When the tracking finishes, it turns automatically into “antenna tracking finish”	No
Asia No.7	Name of satellite to be pointed at present	Preset 10 geostationary satellites
bAGC	Signal strength at present	0~10V
AZ angle	Display AZ preset angle and present actual angle of antenna	0~360 degree
EL angle	Display EL preset angle and present actual angle of antenna	-68~90 degree
POL angle	Display POL preset angle and present actual angle of antenna	-95~95 degree

5.1.2.2 Enter into system setting interface

Satellite selection	Input position	Limit enable
Data setting	language	Receiver tracking

Fig 5-9 Submenu of “system setting”

Name	Description	Data
Satellite selection	This option can modify the satellite searched by the antenna and POL mode	No
Manual input position	This option can input manually longitude and latitude at the place where antenna is located	No
Limit enable	Entering this option needs code, which is	No

	<p>“up down left and right” of the key, in which two parameters are “software limitation” and “overspeed stow”. “software limitation” is used in normal situation. In case of abnormal problems of the antenna, select “limitation prohibit”. At this time, all the limit switches of antenna will be disabled. Be cautious in selecting this option, otherwise it will cause antenna to be damaged. "overspeed stow" is the situation that the car is driving over a certain speed, in order to avoid damage to the antenna, select "Enable" during normal use, and select "Prohibit" when the vehicle speed is not too fast.</p>	
Data setting	<p>Entering this option needs code, which is “left left left left” of the key, which mainly includes antenna calibration, compass calibration, advanced settings, network settings, and some important parameters calibration of receiver setting and advanced setting. Those parameters are important parameters and the calibration has been finished before delivery of antenna and the customer is not allowed to modify.</p>	No
Language	<p>This option can select language display of control interface, which includes both “Chinese” and “English”.</p>	No
Receiver	<p>This option can select different mode of satellite alignment with “beacon receiver” and “DVB”. Note: “DVB” mode can only be used when DVB module is mounted.</p>	No
Tracking	<p>Code is needed for entering the option, it is “left left left left” of the key. This option can select “Tracking on” and “Tracking off”.</p>	No

① Enter into Satellite selection

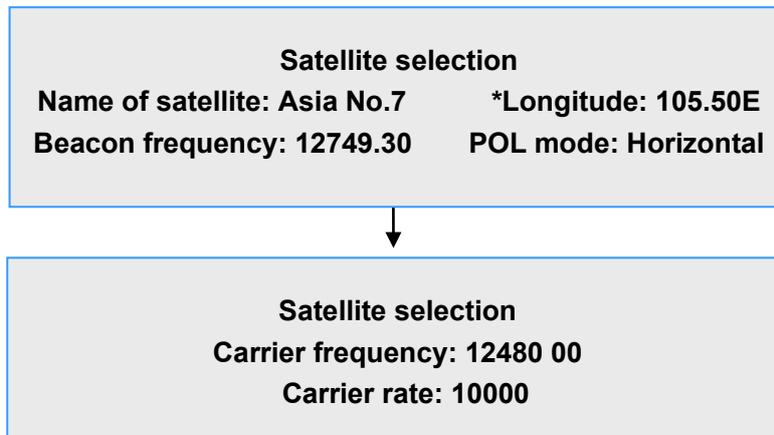


Fig5-10 Satellite selection interface

Name	Description	Data
Satellite selection	The following four data can be modified, press key “up” “down”, move cursor, the “right” enters into edit mode, “Enter key” saves data, “return key” exits from the interface.	No
Name of satellite	Name of presently aligned satellite	Preset 10 geostationary satellites
Longitude	Longitude located by the present satellite , “E” means east longitude, “W”means west longitude	0°~180°
Beacon frequency	Beacon frequency of presently pointed satellite	The present display prevails
POL mode	POL mode of presently pointed satellite	Horizontal/vertical
Carrier frequency	Carrier frequency of present satellite under DVB mode	Can modify as per the need
Carrier rate	Carrier rate of present satellite under DVB mode	Can modify as per the need
Operating frequency	The range of antenna’s operating frequency	Ku/Ka/C

② Enter into Manual input position

Manual input position: Longitude: 108.90E Latitude: 34.10N Resetting forward: 180.00 (0-359)
--

Satellite selection Carrier frequency: 12480 00 Carrier rate: 10000
--

Fig5-11 Key interface of position

Name	Description	Data
Manual input position	Press “right” to enter into edit mode, the enter key saves the present data and the “return key” exits from the present interface.	No
Longitude	The longitude where the antenna is located, “E” means east longitude and “W” means west longitude.	0°~180°
Latitude	The latitude where the antenna is located, “N” means north latitude and “S” means south latitude	0°~90°
Antenna orientation	Reflector orientation in the resetting of antenna. When the heading angle of compass deviates seriously, the correct manually input orientation can be performed.	0°~359

Enter into Limit enable

Limit enable Limit prohibited

Fig5-12 Limit enable interface

Name	Description	Data
Limit enable	In case of limit enable, all the switches of	No

	antenna are at operating condition. The antenna is limit enable at normal operation, the enter key is for save and return key for exiting present interface.	
Limit prohibit	In case of limit prohibit, all the switches of antenna are at disabled status. The enter key is used to save present data and, in case of operating the manual antenna, the alarm will happen and the return key is used for exiting from the present interface.	No
Overspeed stow enable	In case of overspeed stow enable, the antenna will automatically stow when the car is over a certain speed (It can be set by user's requirement).	No
Overspeed stow prohibit	In case of overspeed stow prohibit, the function automatically stow is unavailable.	No

④ Enter into Data setting

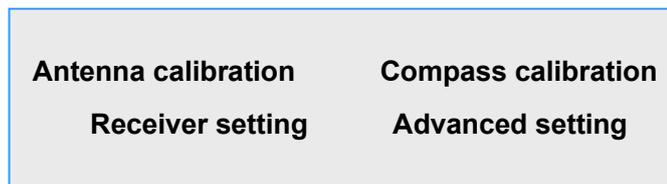


Fig 5-13 Calibrate operation interface

Name	Description	Data
Antenna calibration	Record the searching range and calibration of three axis of the antenna. These data are related whether the antenna can point to the satellite. The calibration of the antenna is completed and is not allowed to be modified by the customers.	Search range/EL/AZ/POL
Compass calibration	Record the heading angle and inclination angle of compass. The compass calibration was completed before delivery of antenna and is not allowed to be modified by the customers.	Heading angle/inclination angle
Receiver setting	Record AGC's amplification factor of	Amplification factor

	antenna, local oscillation selection of LNB and lock threshold of signal. Those data are set already before delivery of antenna and are not allowed to be modified by the customers.	of Local oscillation selection of AGC /LNB /lock threshold of signal
Advanced setting	Entering this option needs code, which is “left left left right” of the key, which records the data of “AZ zero” and “lower offset” of antenna. Those data are related to the normal resetting and stow of the antenna and the calibration has been finished before delivery of antenna and the customer is not allowed to modify.	AZ zero/Lower limit offset

Enter into Antenna calibration

Antenna Calibration			
Searching range	EL	AZ	POL
20.00	0.00	0.00	0.00

Fig 5-14 Calibration operation interface

Name	Description	Data
Antenna calibration	Those data are important. The customer is not allowed to modify it without instruction of presence of the manufacturer’s engineer.	Researching range/EL/AZ/POL
Searching range	The range traveled by the AZ when searching satellite by the antenna.	0~40
EL	The difference between the actual angle and theoretical angle of antenna EL.	-10~10
AZ	The difference between the actual angle and theoretical angle of antenna AZ.	-15~15
POL	The difference between the actual angle and theoretical angle of antenna POL.	-15~15

Enter compass calibration

Compass calibration:
Heading angle: 180.00 0.00
Inclination angle: 0.00
Calibration finish

Fig 5-15 Compass calibration

Name	Description	Data
Compass calibration	Those data are important. The customer is not allowed to modify it without instruction of presence of the manufacturer's engineer.	Heading angle/inclination angle
Heading angle	Display heading angle of compass	Present display prevails
Inclination angle	Display inclination angle of compass	Present display prevails

Enter into Receiver setting

AGC amplification factor: 1.0 Range (0.4-2.0)
Local oscillation selection: B
Lock threshold: 6.0 Range 4.0V-8.0V

Fig 5-16 Calibration interface of receiver

Name	Description	Data
AGC amplification factor	Express signal amplification factor of the present beacon.	0.4~2.0
Local oscillation selection	Selection of present LNB local oscillation	A: 11.25GHz B: 11.3GHz C: 5.15GHz
Lock threshold	After AGC level exceeds the lock threshold the satellite can be locked.	4.0V~8.0V

Enter into Advanced setting

Advanced setting	
AZ zero	Lower limit offset
0.00	0.00

Fig5-17 Advanced Setting Interface

Name	Description	Data
Advanced setting	For important data, the customer is not allowed to modify it without instruction of presence of the manufacturer's engineer.	AZ zero/ Lower limit offset
AZ zero	For the issue related to antenna resetting/stow the antenna support arm can be dropped in the middle position.	-15~15
Lower limit offset	When it comes to antenna stow, whether the antenna reflector can touch the reflector support.	0.0~9.0
Soft high limit	Angle of software limit protection	AZ high limit: 200° EL high limit: 90° Polarization limit: 120°
Soft low limit	Angle of software limit protection	AZ high limit: -200° EL high limit: -70° Polarization limit: -120°
Compass protection	When the compass data has a large deviation from the encoder data, it is regarded as abnormal	None
EL zero	EL compensation value, adjust the position relative to 0 degrees	None

⑤Enter menu Language

English

Fig 5-18 language selection

Name	Description	Data
Language	For the client using English	English
Chinese	Operation interface all in Chinese	Present display prevails
English	Operation interface all in English	Present display prevails

Enter menu Receiver

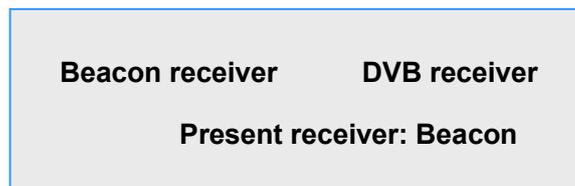


Fig 5-19 Selection interface of receiver

Name	Description	Data
Receiver	The following different alignment modes can be selected.	Beacon /DVB
Beacon receiver	The alignment mode is beacon mode.	None
DVB receiver	The alignment mode is DVB mode.	None
Present receiver	Means presently selected receiver	Beacon /DVB

Enter into menu Tracking

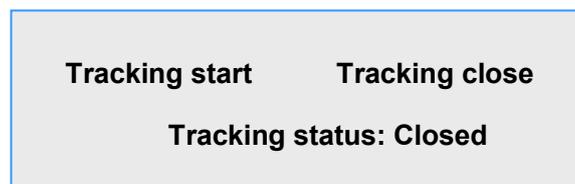


Fig 5-20 Selection interface of receiver

Name	Description	Dat
Tracking	Means the antenna enters into the tracking status.	Present display prevails
Tracking status	Means the present tracking on or off.	Present display prevails

5.1.2.3 Enter into Monitor display interface

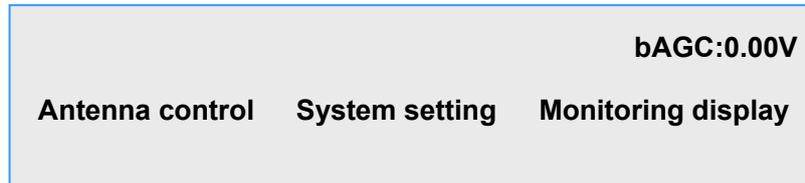


Fig 5-21 Submenu of system setting

Enter into option, press key “left” “right” and check the information.

Satellite	Antenna	Sensing	Limit	Alarm
Asia No.7(105.5E)				
Beacon frequency:	12749.30	POL mode:		
Horizontal				

Satellite	Antenna	Sensing	Limit	Alarm
AZ angle: Preset:	180.00	Present:	180.00	
EL angle: Preset:	32.00	Present:	-67.99	
POL angle: preset:	0.00	Present:	-90.00	

Satellite	Antenna	Sensing	Limit	Alarm
Heading angle:	180.00	Longitude:		
108.90E				
Inclination angle:	0.00	Latitude:	34.10N	

Satellite	Antenna	Sensing	Limit	Alarm
AZ: Left limit: -	Right limit: -	Zero: H		
EL: Up limit: -	Lower limit: -	Zero: -		
POL: CW limit: -	CCW limit: -	Zero:-		

Satellite	Antenna	Sensing	Limit	Alarm
W1	GPS not positions			

Fig5-22 Five interface diagrams displayed by the monitor

Name	Description	Data
Satellite	Display all information of the presently aligned satellite, including name and longitude of satellite, beacon frequency, POL mode, AGC level and receiver’s mode.	The present display prevails
Antenna	Displayed the preset angle of present EL, AZ and POL as well as presently actual angle.	The present display prevails
Sensing	Displayed present heading angle, inclination angle and rolling angle of compass, automatically locked local longitude and latitude of GPS and information that whether GPS locked or not.	The present display prevails
Limit	Displayed in real time present limit information of antenna, including limit information of AZ, EL and POL of antenna.	“-” means no limit, “S” means soft limit, “H” means hard limit, “SH” means soft limit + hard

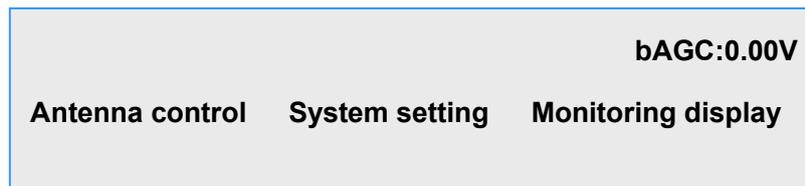
		limit.
Alarm	Show information of antenna alarm, as for detail, see alarm information table 2	The present display prevails
About	Display the hardware and software version of the antenna control system	The present display prevails

5.2 Quick Operation

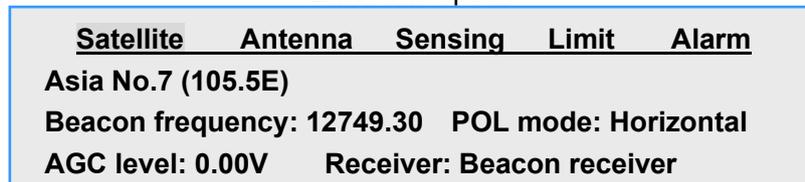
Step 1: Make sure that the system cables are connected correctly, which means the cables cannot be missed or false connection.

Step 2: Turn on the power of the ACU, check the "Alarm information", and confirm that there is no alarm in the system.

1. The antenna has no alarm



Enter into option



press key "left" "right" and check the information

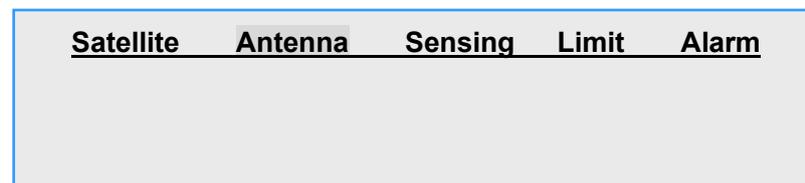
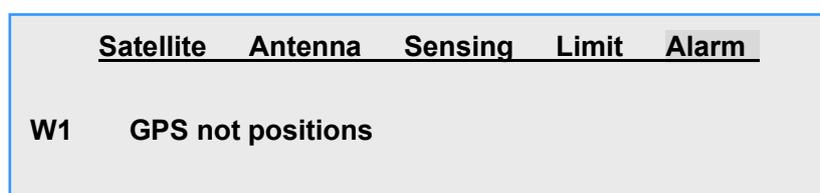


Fig 5-23 Antenna without alarm

2. The antenna alarms, and the GPS is not positioned. At this time, wait for the positioning to be completed, and then the alarm can be released.



Wait for the locating completment

Fig 5-24 GPS is not positioned

Antenna alarm, reset the antenna angle. At this point, an "angle reset operation" is required.

Satellite	Antenna	Sensing	Limit	Alarm
W13	Reset the angle			

Fig 5-25 Reset the angle of antenna

There are two ways to reset the angle:

- Method 1

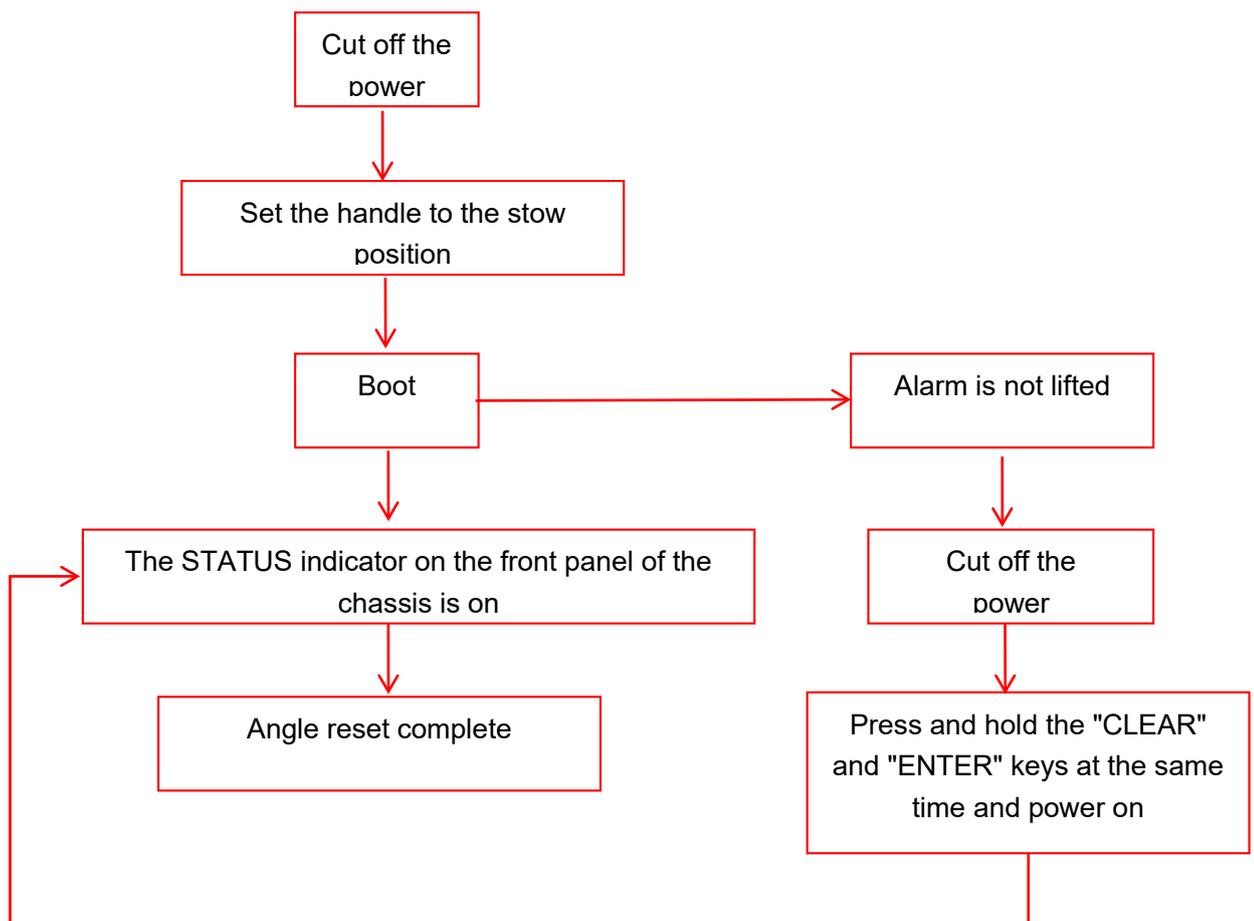


Fig 5-26 Method 1 of angle reset

- After restarting, reset the antenna, and then store the antenna to cancel the alarm, as shown in Figure 5-27. If the stow is not completely in place, please find the "enable switch" (password: up, down, left, and right) in the menu list to turn on the limit prohibition. Manually adjust the azimuth angle to the zero position/elevation angle to the stowed position, and the status indicator lights up to complete the angle reset, as shown in Figure 5-28.

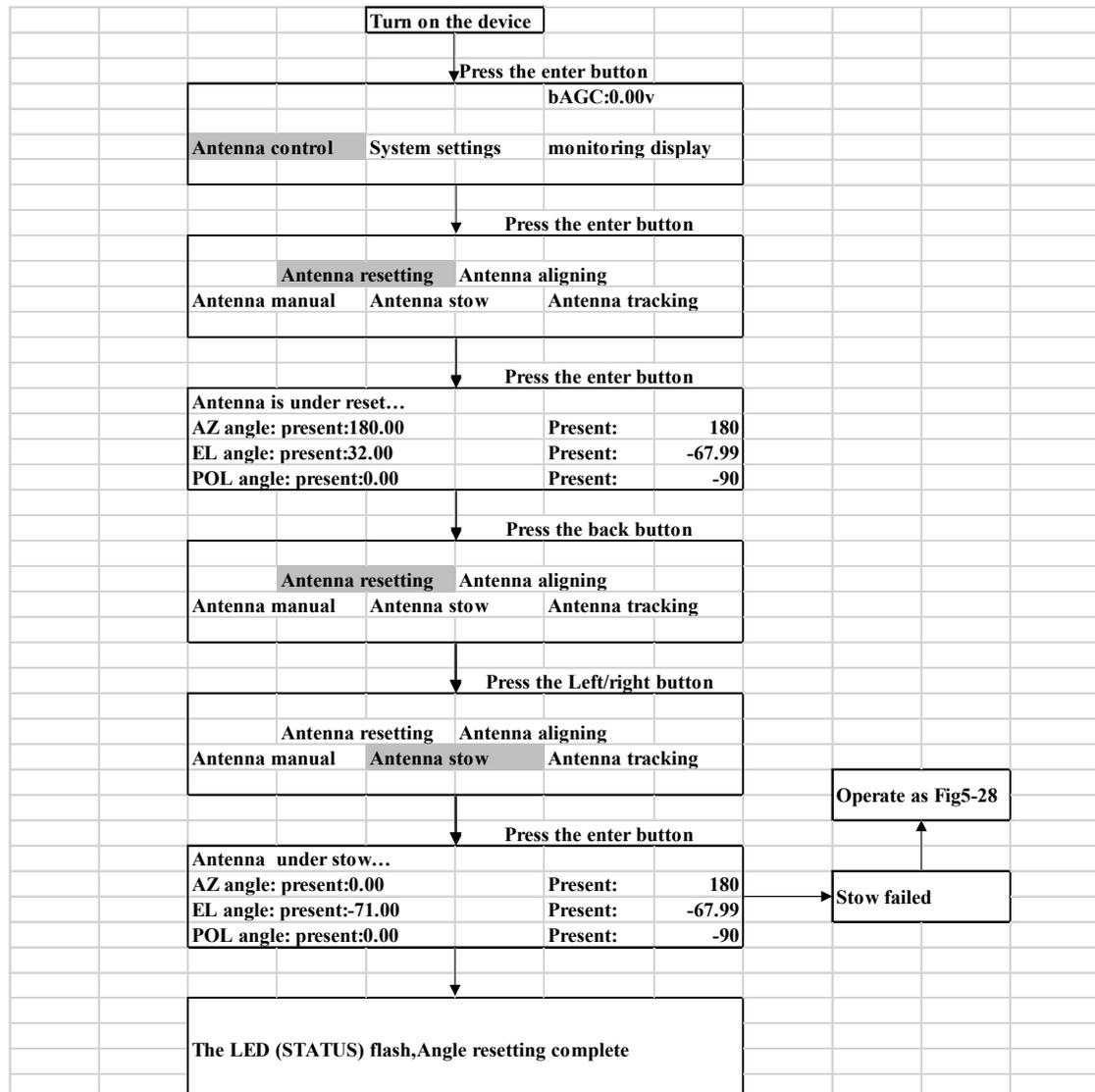


Fig 5-27 Method 2 of angle reset

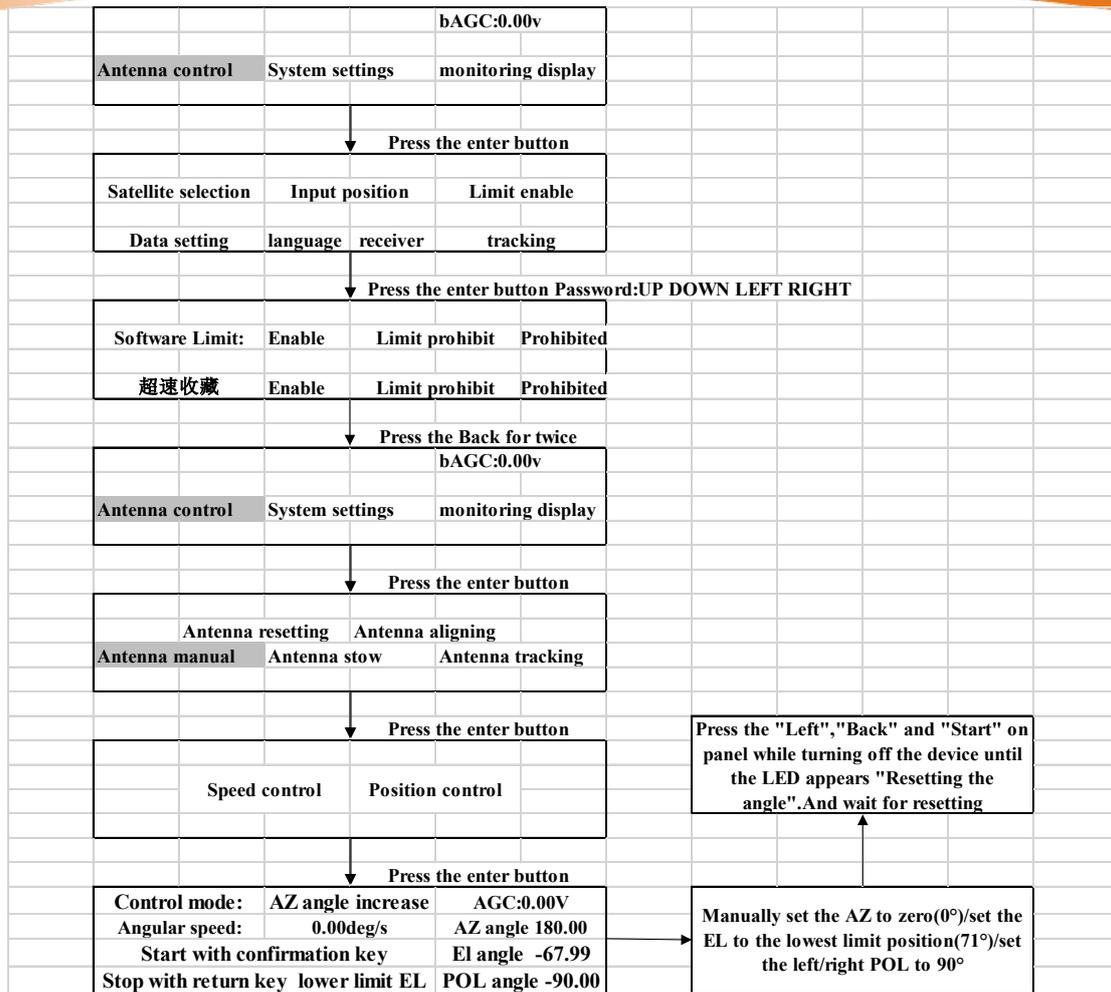


Fig 5-28 Manual adjustment

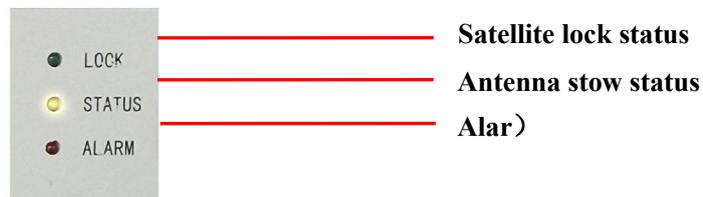


Fig 5-29 Schematic diagram of the light STATUS on

Step 3: Confirm the local oscillator settings

According to the LO of the selected LNB, confirm whether the "LO selection" in the parameter setting of the controller is correct.

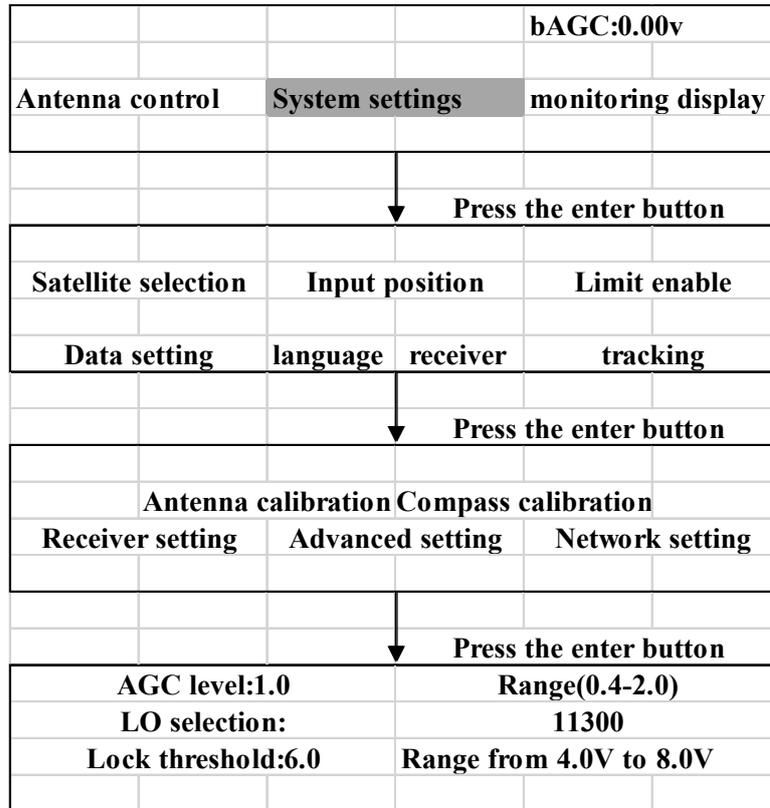


Fig 5-30 LO settings

Step 4: Confirm the signal receiver

Select "Beacon" or "DVB" in the receiver menu, depending on the way you plan to use the satellite.

			bAGC:0.00v
Antenna control	System settings	monitoring display	
			▼ Press the enter button
Satellite selection	Input position	Limit enable	
Data setting	language	receiver	tracking
			▼ Press the enter button
Beacon receiver		DVB receiver	
Present receiver:Beacon			

Fig 5-31 Receiver settings

Step5: Select the Satellite

Enter the satellite selection interface to select the satellite to be used, and confirm whether the satellite longitude, beacon frequency, polarization mode, and working frequency band are correct.

			bAGC:0.00v
Antenna control	System settings	monitoring display	
			▼ Press the enter button
Satellite selection	Input position	Limit enable	
Data setting	language	receiver	tracking
Name of satellite : Asia No.7			
*Longitude : 105.50E		Beacon frequency:0000.00	
Operating frequency:Ka19.60-21.20			
POL mode : Horizontal			

Fig 5-32 Select the satellite

Step 6: Automatically Align the Satellite

Click "Antenna Alignment" in the control menu, the antenna will automatically complete the alignment operation. After completion, the screen displays that alignment is complete, and the LOCK indicator is always on.

				bAGC:0.00v
Antenna control	System settings			monitoring display
			▼	Press the enter button
	Antenna resetting	Antenna aligning		
Antenna manual	Antenna stow	Antenna tracking		
			▼	Press the enter button
Asia No.7H has aligned ...				bAGC 7.20V
AZ: Preset:186.00				Present:186.00
EL: Preset:50.20				Present:50.29
POL: Preset:-6.00				Present:-6.00

Fig 5-33 Automatically align

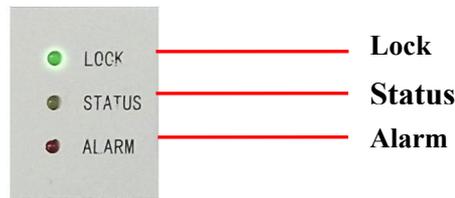


Fig 5-34 Schematic diagram of the LOCK indicator light on

Step 7: Automatically stow

Click "Antenna stow" in the control menu, the antenna automatically completes the collection operation, after completion, the screen displays the collection completed, and the STATUS indicator is always on.

			bAGC:0.00v
Antenna control	System settings	monitoring display	
▼ Press the enter button			
Antenna resetting		Antenna aligning	
Antenna manual	Antenna stow	Antenna tracking	
▼ Press the enter button			
Antenna under stow			
AZ: Preset:0.00		Present:0.00	
EL: Preset:-71.00		Present:-71.00	
POL: Preset:90.00		Present:90.00	

Fig 5-35 Automatically stow

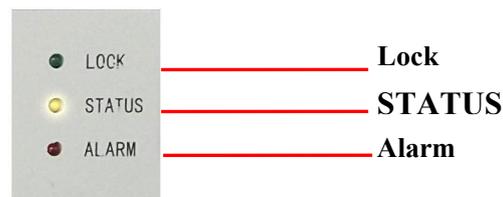


Fig5-36 Schematic diagram of the STATUS indicator on

6 Common Faults and Maintenance

6.1 Note on Alarm Fault Of Antenna

Table 2 Antenna Alarm Information

Code	Name	Solution	Remarks
E0	AZ drive is abnormal	Check the open circuit of wire	After appearance of the alarm, even the fault is eliminated, the alarm will not disappear automatically and it ends re start up.
E1	EL drive is abnormal	Check the open circuit of the wire	
E2	POL drive is abnormal	1. Check wire 2. Check blockage in the mechanism of the POL part	Contact with the manufacturer
E3	GPS not connected	1. Check wire 2. Reset delivery setting	Start up and check for one time, not real time.
E4	Compass not connected	1. Check wire 2. Reset delivery setting	Start up and check for one time, not real time.
E5	Beacon receiver not connected	Check cable connection	
E6	DVB receiver not connected	Check cable connection	
E7	POL fail in searching zero	1. Check whether POL zero switches is valid or not. 2. Check whether POL rotation is clogged or not.	
E8	AZ fail in searching zero	1. Check whether POL zero switches is valid or not. 2. Recovery angle of the manual stow antenna	
W1	GPS not positioned	1. Cold tart up of GPS needs time, wait for a few minutes. 2. Avoid GPS signal sheltering.	
E9	CAN communication is abnormal	Check cable connection	
W2	EL motion is limited	Rise EL angle	EL is protected

E10	AZ follow mistake	Motor is out of control	Contact with the manufacturer
E11	EL follow mistake	Motor is out of control	Contact with the manufacturer
E12	Data crossing line 1	1. Check longitude and latitude data. 2. The antenna's calibration is not in the reasonable range. 3. The AZ angle is not in the reasonable range.	Check the reasonable range value set by the related data
E13	Data crossing line 2	1. GPS value input by hand is not in the reasonable range; 2. Check the correctness of longitude and latitude parameters.	Refer to the setting value of GPS
E14	Hardware mistake 1	Data storage miss, the memory has hardware mistake	Contact the manufacturer
E15	Reset antenna angle	1. Stow antenna manually 2. Check compass 3. Check 3-axis drive of antenna	Restart antenna clearing the fault
E16	Mistake of limit switch	Check cable and switch	
E17	Communication is abnormal	1. Check cable connection	Contact the manufacturer
E18	Stow mistake	1. Check cable and switch	

Note:

The specific solutions are as follows:

1) E0 AZ drive is abnormal

Solution:

In the case of power failure, shake the orientation of the antenna by hand to observe whether there is a stuck point. If there is a stuck point, it may be an azimuth transmission problem. If there is no stuck point, it may be that the antenna driver is abnormal. When this abnormality occurs, please contact the manufacturer to solve it.

2) E1 EL drive is abnormal

Solution:

In the case of power failure, tilt the antenna by hand to observe whether there is a jamming phenomenon. If there is a jamming phenomenon, it may be a pitch transmission problem. If there is no jamming phenomenon, it may be an abnormality of the antenna driver. When this abnormality occurs, please contact the manufacturer to solve it.

Note: After the two kinds of alarms E0 and E1 appear, even if the fault is eliminated, the alarm will not disappear automatically and must be restarted.

3) E2 POL drive is abnormal

Solution:

Find "manual control" in the menu and click to adjust the polarization angle of the antenna, and observe its driving angle on the display screen, which may be abnormal transmission, loose and broken transmission belt or motor failure. When this abnormality occurs, please contact the manufacturer to solve it.

4) E3 GPS not connected

Solution:

- a) Check the line of GPS;
- b) Recovery to the factory settings;
- c) If the above methods cannot solve the problem, please contact the manufacturer;

5) E4 Compass not connected

Solution:

- a) Check the line of compass;
- b) Recovery to the factory settings;
- c) If the above methods cannot solve the problem, please contact the manufacturer;

6) E5 Beacon receiver not connected

Solution:

When this abnormality occurs, please contact the manufacturer to solve it.

7) E6 DVB receiver not connected

Solution:

When this abnormality occurs, please contact the manufacturer to solve it.

8) E7 POL fail in searching zero

Solution:

Check whether the polarization rotates normally, if it stops running, please refer to the solution of E2

If it rotates normally, please check whether the zero switch is valid (when the polarization switch and the magnet are close, check whether the polarization H is on through the monitoring display bar in the antenna controller. If H is not on, please check the polarization switch circuit).

bAGC:0.00V		
Antenna control	System setting	Monitoring display

<u>Satellite</u>	<u>Antenna</u>	<u>Sensing</u>	<u>Limit</u>	<u>Alarm</u>
AZ:	Left limit: -	Right limit: -	Zero: -	
EL:	Up limit: -	Lower limit: -	Zero: -	
POL:	CW Limit: -	CCW Limit: -	Zero: H	

9) E8 AZ fail in searching zero

Solution:

a) Check whether the azimuth switch is valid (you can observe whether the azimuth H is on through the monitoring display bar in the antenna controller when the azimuth switch and the magnet are close to each other. If H is not on, please check the azimuth switch circuit).

<u>Satellite</u>	<u>Antenna</u>	<u>Sensing</u>	<u>Limit</u>	<u>Alarm</u>
AZ:	Left limit: -	Right limit: -	Zero: -	
EL:	Up limit: -	Lower limit: -	Zero: -	
POL:	CW Limit: -	CCW Limit: -	Zero: H	

b) Manually save the antenna recovery angle.

<u>Satellite</u>	<u>Antenna</u>	<u>Sensing</u>	<u>Limit</u>	<u>Alarm</u>
AZ:	Left limit: -	Right limit: -	Zero: H	
EL:	Up limit: -	Lower limit: -	Zero: -	
POL:	CW Limit: -	CCW Limit: -	Zero: -	

10) W1 GPS not positioned

Solution:

- a) GPS cold boot takes time, wait a few minutes.
- b) Avoid GPS signal blocking.

11) E9 CAN communication is abnormal

Solution:

Check whether the pitch, azimuth, and polarization drivers work normally. For solutions, refer to E0, E1, and E2.

12) W2 EL motion is limited

Solution:

EL motion protection (azimuth deviation from zero position, the lowest position of pitching, which is a normal condition).

13) E10 Data crossing line 1

Solution:

- a) Check whether the latitude and longitude parameters are reasonable (local latitude and longitude)
- b) Check whether the antenna calibration value is within a reasonable range (the soft upper limit of pitch 90° and the soft lower limit of -70° are filled in according to customer requirements).

14) E11 Data crossing line 2

Solution:

If the GPS value entered by hand is not within a reasonable range, check whether the latitude and longitude parameters are correct (local latitude and longitude).

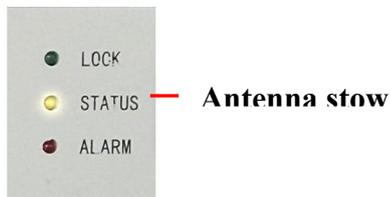
15) E12 Hardware mistake 1

Alarm reason: data storage lost, hardware error in memory (please contact manufacturer).

16) E13 Reset antenna angle

Solution:

- c) Manually stow the antenna to the stowed position (the status yellow light is on or the monitoring pitch lower limit H is on) and press CLEAR + right button to restore the antenna angle.



<u>Satellite</u>	<u>Antenna</u>	<u>Sensing</u>	<u>Limit</u>	<u>Alarm</u>
AZ:	Left limit: -	Right limit: -	Zero: H	
EL:	Up limit: -	Lower limit: -	Zero: -	
POL:	CW limit: -	CCW limit: -	Zero: -	

- d) Check the compass.
- e) Check the three-axis drive of the antenna.

Note: The antenna must be restarted after the fault is eliminated.

17) E14 Mistake of limit switch

Solution:

Check whether the corresponding cables and switches are normal. (Please contact the manufacturer)

18) E15 Communication is abnormal

Solution:

Check whether the corresponding cables and switches are normal. (Please contact the manufacturer)

19) E16 Stow mistake

Solution:

- a) Check whether the antenna is stored in place, if not, you need to manually control the antenna to adjust the EL down to the stored position. After the adjustment, observe whether the status light or the lower limit H of the EL is on.
- b) If the storage is in place, and the lower limit H of the EL is not illuminated, please check the switch and cable of the lower limit.
- c) After completing the adjustment, please execute the reset favorite again

Antenna resetting	Antenna acquisition
Antenna manual	Antenna stow
	Antenna tracking

6.2 Common Faults and Solutions

No.	Situation	Possible cause	Solution	Remarks
1	Controller screen is not light up after starting up.	1. Power wire is not plugged. 2. Fuse tube burns.	1. Check normality of power supply. 2. Check whether the fuse tube has burnt or not.	
2	Sudden power off during operation of antenna	Power off	Rotate AZ and EL by handle to stow the antenna.	
3	Signal fluctuation is big	The contact of RF cable is not good	Find the imperfect point and weld again.	
4	The difference between actual orientation of antenna and compass degree is big	The compass is externally interfered	Remove the antenna out of the interference area, if the result is not good, increase the searching range of the antenna.	
5	Abnormal noise during operation of antenna	Lubrication in the gear of rotation platform	Apply lubricants	
6	The support arm of antenna can not drop naturally.	Gas spring	Replace gas spring or apply lubricants at the gas spring	

6.3 System Maintenance

Under normal working conditions, the antenna should be regularly maintained. The main contents of antenna maintenance is shown in the following table:

No	Check and maintenance contents	Maintenance term
1	Regularly check the damage of the PTFE film of the feed speaker, and replace it in time if it is damaged	1 time/month
2	Regularly check the waterproof condition between the duplexer and each waveguide. If there is water seepage, dry it in time, and seal it with 704 or replace the damaged parts.	1 time/month
3	Regularly check the looseness and corrosion of the screws, and if they are loose or corroded, fasten them or replace them with new ones in time.	1 time/month
4	Regularly check whether there is any abnormal noise in the transmission of the antenna during use, and if so, clean up the the transmission part or lubricate the transmission part.	1 time/month
5	Regularly check the surface coating of each part of the antenna, if there are serious scratches, please deal with it in time.	1 time/month
6	Regularly clean the feed speaker membrane to ensure the signal is not affected.	1 time/month
7	Clean gas springs regularly and replace every three years if necessary.	1 time/year
8	Periodic inspection of azimuth, pitch and polarization drive belt wear, wear parts replaced every three years.	1 time/year
9	Regularly calibrate the antenna compass to ensure that the antenna can quickly find the stars.	1 time/year
10	When the antenna is not in use, please store the antenna in time; if it is not used for a long time, please place it indoors to avoid wind and sun, and slow down the aging speed of the antenna equipment.	Long term
11	It is recommended to maintain the mechanical transmission part every year to ensure the lubrication between the gears.	1 time/year
12	It is recommended to clean up the surface of antenna every three months.	Long term

7 Recovery of Delivery Setting

Press and hold the "ENTER" key to power on, the interface displays "Restore to Factory...", and the software performs the following operations:

1. Default English interface;
2. The search range is 20 degrees;
3. Azimuth compensation is set to 0;
4. Track enable cancel;
5. The search threshold is set to 6V;

Note: Do not restore factory settings without special circumstances.