China Starwin
Flat Panel Integrated Satellite Communication Terminal
User Manual

FL60P-E / FL60P-M / FL60F-M

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FCC ID: 2AUBBFL60P-E

FCC Statement

The device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Danger: FCC Radio Frequency Exposure Information

In order to comply with RF exposure requirements, antennas must be installed to ensure a minimum separation distance of 11.0m (antenna main beam) and 0.26m (out range of +/-10 degrees off-axis) and must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with accepted multi-transmitter product procedures.

Safety Considerations

For the following safety considerations, "Instrument" means the ‘satellite terminal Flat Terminal’ units, components and their cables.
It is necessary to read the instructions carefully before using the satellite terminal flat portable terminal. The terminal usage shall be carried out in accordance with the described steps and methods to ensure the safety and accuracy of equipment operation.

Radio

The instrument transmits radio energy during normal operation. To avoid possible harmful exposure, to this energy, do not stand or work for extended periods of time in front of its antenna. The long-term characteristics or the possible physiological effects of Radio Frequency Electromagnetic fields have not been yet fully investigated.

Caution

1. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.
2. Before connecting this instrument to a power source, make sure that the voltage of the power source matches the requirements of the instrument.

Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

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Some of the equipment provided by China Starwin and specified in this manual, is manufactured and warranted by third parties. All such equipment must be installed and handled in full compliance with the instructions provided by such manufacturers as attached to this manual or provided thereafter by China Starwin or the manufacturers. Non compliance with such instructions may result in serious damage and/or bodily harm and/or void the user's authority to operate the equipment and/or revoke the warranty provided by such manufacturer.

Instructions

The satellite terminal is a full satellite earth station system for communication in Ku-band. The satellite parameters shall be selected only according to the specific user conditions required.

The China Starwin satellite terminal User Manual provides operational instructions, for the device, which are standard for applications in Ku-band. However, the specific modem and antenna electrical performance parameters need to be taken in account. This manual is intended for technicians responsible for the installing, setting up and operating of the satellite terminal and for system administrators who are responsible for managing the system.

Safety Alert Messages

Safety alert messages call attention to potential safety hazards and tell you how to avoid them. These messages are identified by the signal words DANGER, WARNING, or NOTICE, as illustrated below. To avoid possible property damage, personal injury, or in some cases possible death, read and comply with all safety alert messages.

DANGER: Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: It is used for advisory messages concerning possible property damage, product damage or malfunction, data loss, or other unwanted results – but not personal injury.

Indicates a safety message that concerns a potential electric shock hazard.

Indicates a safety message that concerns a potential electric shock hazard.

Contents

1 Introducing the Flat Panel Integrated Satellite Communication Portable Terminal

The Flat Panel Integrated Satellite Communication Portable Terminal uses an advanced and ultra-modern high-gain flat array antenna system. This is a completely new and novel antenna system designed and produced for a new generation of flat- type integrated satellite communication terminals. All components – antenna system, RF unit, satellite router or receiver, LAN wireless devices and power supply are integrated into a flat compact terminal enclosure and covered by a special metal shield.

The satellite terminal has completely changed the form of the standard parabolic antenna systems that have been used for satellite communication and TV for many years. The satellite terminal provides users of satellite communication and television with a new, unique system that is both easy to deploy and operate. It aims to replace parabolic-shape antenna products that have been characterized by split type of installation, operation, debugging and maintenance.

Due to fast, simple and easy deployment, the satellite terminal flat portable terminals are suitable for emergency services, disaster recovery, military, security, government and enterprise communication applications. Portable satellite terminal flat terminals can be deployed within a very short time to achieve reliable data, voice and video transfer services in areas without terrestrial networks or in places where a temporary communication is required.

There are three types of satellite terminals: automatic satellite communication terminal (FL60P-E), manual satellite communication terminal (FL60P-M) and fixed satellite communication terminal (FL60F-M).

Figure 1-1 Automatic satellite communication terminal (FL60P-E)

Figure 1-2 Manual satellite communication terminal (FL60P-M)

Figure 1-3 Fixed satellite communication terminal (FL60P-M)

2 Technical Specification

Item		Flat Panel Integrated Satellite Communication Portable Terminal
Model No.		FL60P-E/FL60P-M/FL60F-M
Antenna Type		Slotted waveguide array antenna
Equivalent to parabolic antenna size		0.6m
Antenna Efficiency		85%
Frequency Range	Tx	13.75~14.50GHz
	Rx	10.95~12.75GHz
Polarization		Linear
Receiving Gain		≥35dBi
Transmitting Gain		≥36dBi
G/T		16dB/K
First Sidelobe		≤14dB
Satellite Acquisition		Automatic/Manual pointing to satellite when in a static position, level error<0.2dB
Azimuth Range		Unlimited, fine tuning ±80 °
Elevation Range		7 °~ 90 °
Polarization		±110 °
Power Supply		AC 90-264V (DC 24V ±5% Optional)
Max Power Consumption		100W (with 3W BUC)
		120W (with 8W BUC)
Terminal Dimensions (not including cables and backpack)		(L ×W ×H): 680 ×650 ×240
Total Terminal Weight (not including cables and backpack)		<18 Kg (Max)
Wind (Operational)		14m/s (50km/h)
Operational Temperature		-25 ℃ to +50 ℃
Ingress Protection		IP-66
Humidity		0 ~ 95%
Typical Satellite Modem		Any Modem whose size is below 240x200mm*
Typical BUC		3W or 8W
Typical LNB		PLL LNB 30K for TDMA systems PLL LNB 5K for SCPC systems
Wireless Router		Supported protocols: IEEE 802.11b/g/n at 2.4GHz
Number of supported WNICs		Up to 14
LAN Port (RJ45)		Gigabit Ethernet
Bluetooth Device		v.5.0
GNSS Device Supports		GPS/GLONASS/BeiDou

* According to customer's requirements

3 Packing List

3.1 Automatic Terminal (FL60P-E) Packing List

Basic configuration of the satellite terminal:

- Slotted waveguide array flat-panel terminal (equivalent to 0.6m Ku-band parabolic antenna)
- Satellite modem module
- BUC module
- LNB module
- GNSS module
- Display module
- Satellite search module
- Wireless router
- Power supply module
- Protective casing / Support platform

Unlike standard VSAT systems the above elements are integrated inside the satellite terminal. Upon request Starwin can investigate the feasibility of any customized configuration; that a customer may require.

The standard configuration is as follows:

Item	Photo	Part Name	Quantity	Remarks
01		Terminal Body	1	Standard
02		Network Cable – 5m CAT5 with two RJ-45 jacks (waterproof at the terminal side)	1	Standard
03		Power Cable -10m	1	Standard
04		Backpack	1	Standard

3.2 3.2 Manual Terminal (FL60P-M) Packing List

Basic configuration of the satellite terminal:

- Slotted waveguide array flat-panel antenna (equivalent to 0.6m Ku-band parabolic antenna)
- Satellite modem module
- BUC module
- LNB module
- GNSS module
- Display module
- Satellite search module
- Wireless router
- Power supply module
- Protective casing / Support platform

Unlike standard VSAT systems the above elements are integrated inside the satellite terminal. Upon request Starwin can investigate the feasibility of any customized configuration; that a customer may require.

The standard configuration is as follows:

Item	Photo	Part Name	Quantity	Remarks
01		Terminal Body	1	Standard
02		Network Cable – 5m CAT5 with two RJ-45 jacks (waterproof at the terminal side)	1	Standard
03		Power Cable -10m	1	Standard
04		Backpack	1	Standard

3.3 Fixed Terminal (FL60F-M) Packing List

Basic configuration of the satellite terminal:

- Slotted waveguide array flat-panel antenna (equivalent to 0.6m Ku-band parabolic antenna)
- Satellite modem module
- BUC module
- LNB module
- GNSS module
- Display module
- Satellite search module
- Wireless router
- Power supply module
- Protective casing / Support platform

Unlike standard VSAT systems the above elements are integrated inside the satellite terminal. Upon request Starwin can investigate the feasibility of any customized configuration; that a customer may require.

The standard configuration is as follows:

Item	Photo	Part Name	Quantity	Remarks
01		Terminal Body	1	Standard
02		Bracket	1	Standard
03		Hardware Components	1	Standard
04		Network Cable – 5m CAT5 with two RJ-45 jacks (waterproof at the terminal side)	1	Standard

05		Power Cable -10m	1	Standard

3.4 Unpacking and Inspection

When you receive the system containers, unpack and inspect the components and hardware to ensure that all parts have been received in good condition.

3.5 Freight Damage

If any parts appear to have been damaged in transit, immediately contact the freight carrier.

3.6 Material-Missing or Damaged

If any parts appear to be missing or damaged, but not as a result of handling in transit, contact your dealer or distributor.

4 Description of satellite terminal

4.1 Terminal Structure Diagram

4.1.1 Automatic Satellite Communication Terminal (FL60P-E)

Figure 4-1

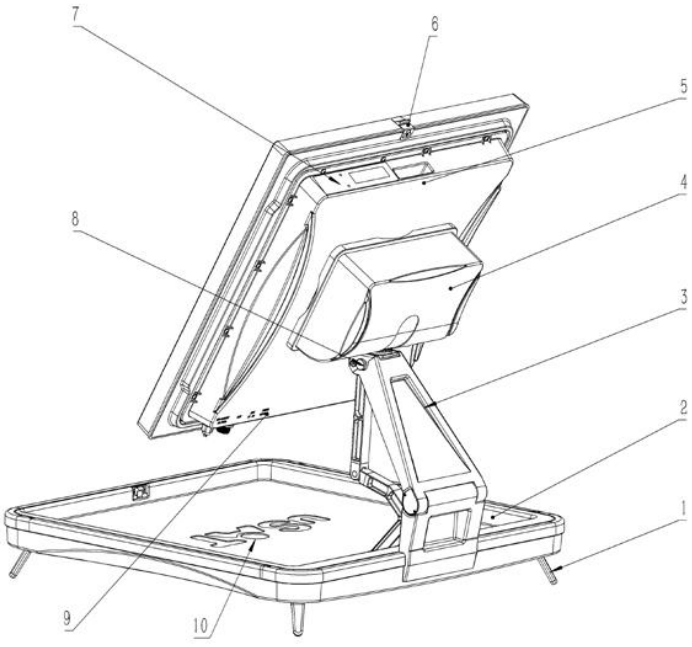


Figure 4-2

1- Support leg; 2- Protective casing / Support platform; 3- Support mechanism; 4- Motors cover; 5- Handle; 6- Antenna casing lock; 7- OLED Display; 8- Self-lock button; 9- Power ON/OFF button, 10- Compass

4.1.2 Manual Satellite Communication Terminal (FL60P-M)

Figure 4-3

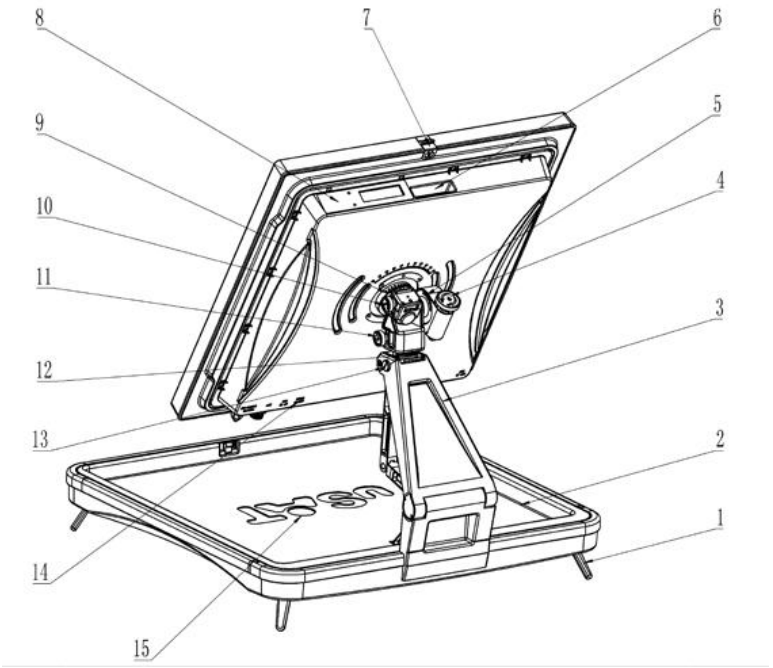
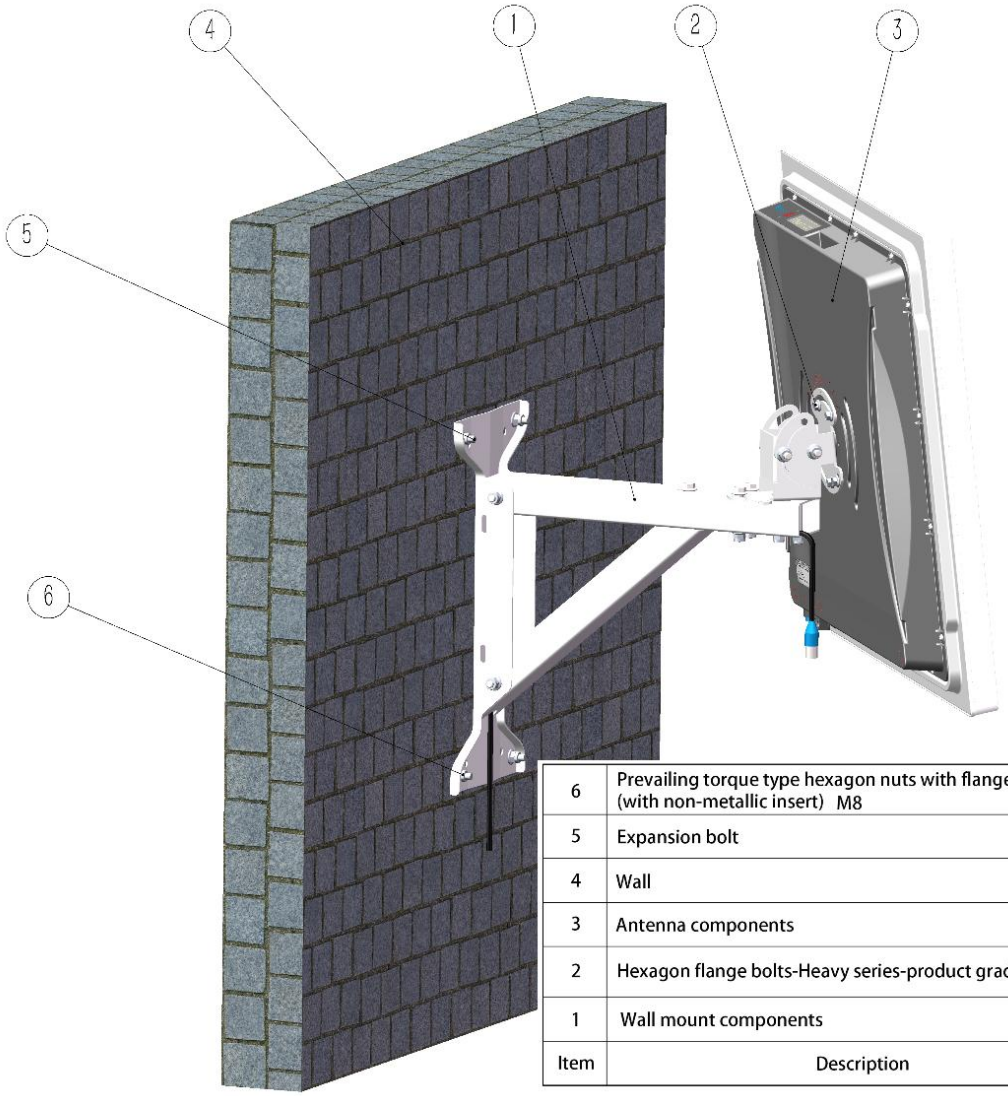


Figure 4-4

1- Support leg; 2- Protective casing / Support platform; 3- Support mechanism; 4- Elevation angle adjustment knob; 5- Elevation angle scale; 6- Handle; 7- Antenna casing lock; 8- OLED Display; 9- Polarization scale; 10- Polarization adjustment knob; 11- Azimuth adjustment knob; 12- Azimuth scale; 13- Self-lock button; 14- Power ON/OFF button, 15- Compass

4.1.3 Manual Satellite Communication Terminal (FL60F-M)

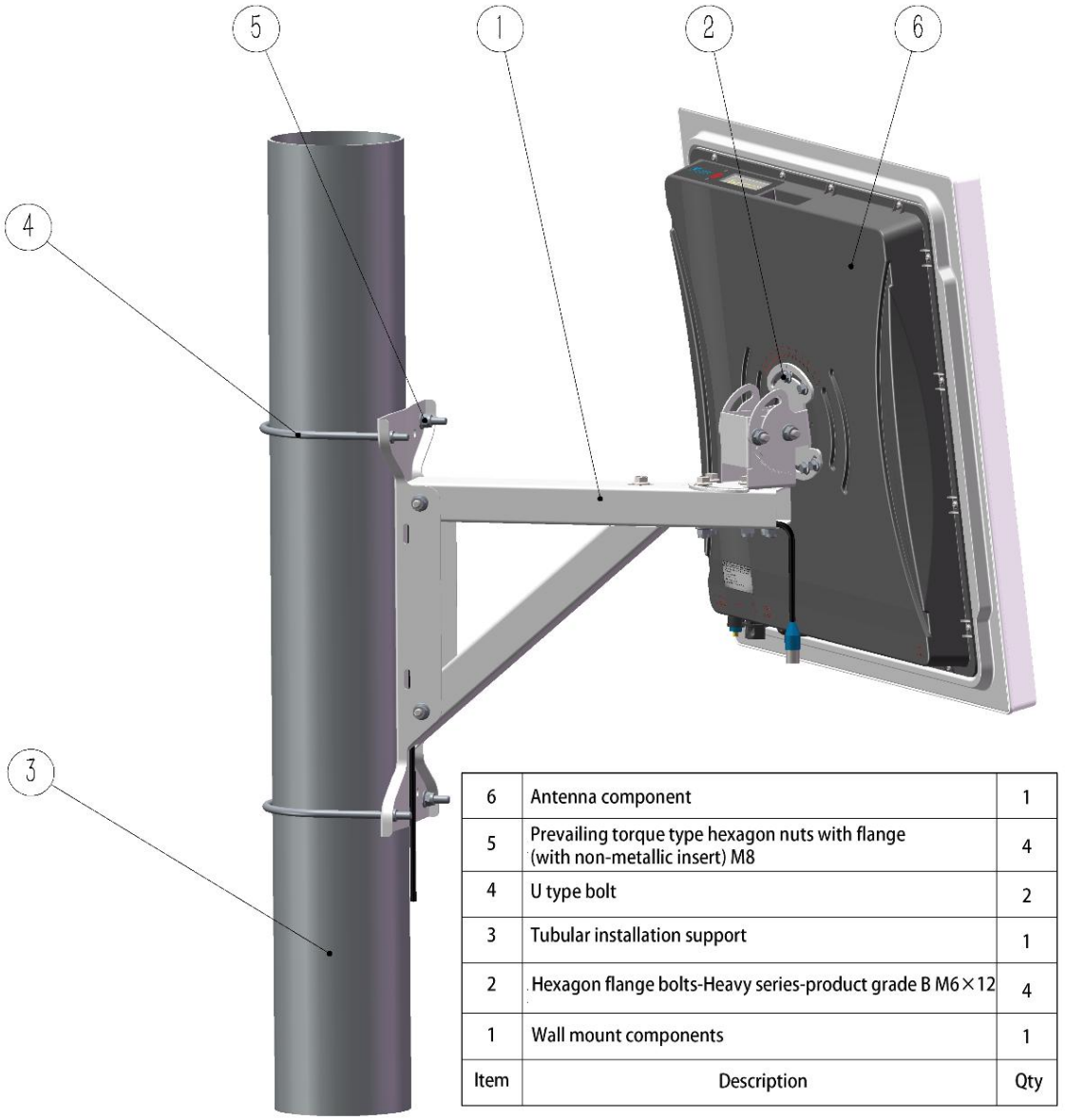
Wall Mount:



Item	Description	Qty
6	Prevailing torque type hexagon nuts with flange (with non-metallic insert) M8	4
5	Expansion bolt	4
4	Wall	1
3	Antenna components	1
2	Hexagon flange bolts-Heavy series-product grade B M6×12	4
1	Wall mount components	1

Installation diagram of the wall mounting type

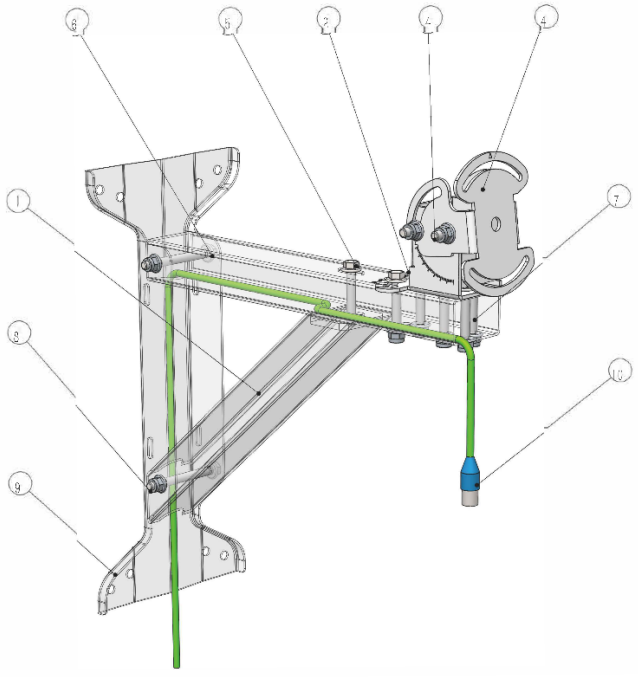
Pole Mount:



Item	Description	Qty
6	Antenna component	1
5	Prevailing torque type hexagon nuts with flange (with non-metallic insert) M8	4
4	U type bolt	2
3	Tubular installation support	1
2	Hexagon flange bolts-Heavy series-product grade B M6×12	4
1	Wall mount components	1

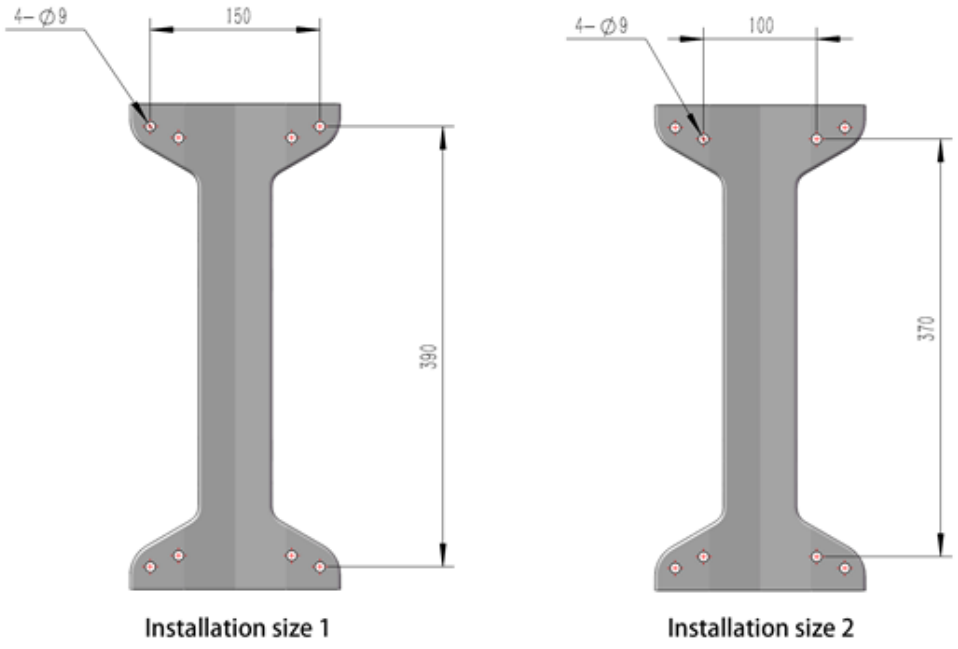
Installation diagram of the steel hoops type

Mount Bracket:



Item	Description	Qty
10	Power Cable	1
9	Wall Mount - Wall Bracket	1
8	Prevailing torque type hexagon nuts with flange(with non-metallic insert) M8	9
7	Hexagon flange bolts-Heavy series-product grade B M8×55	5
6	Hexagon flange bolts-Heavy series-product grade B M8×50	1
5	Hexagon flange bolts-Heavy series-product grade B M8×80	4
4	Wall Mount-Polarization Bracket	1
3	Wall Mount-Azimuth Bracket	1
2	Wall Mount-Inclined Bar	1
1	Wall Mount-Horizontal Bar	1

Installation diagram of the bracket



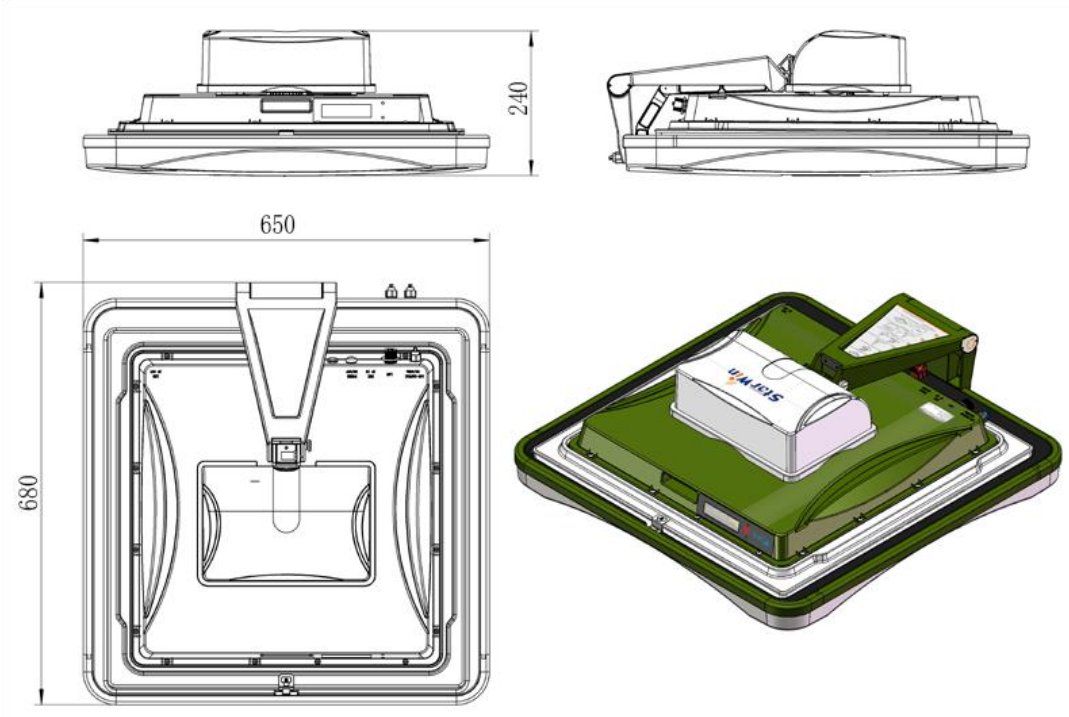
The position of installation hole

The hoops type installation: The external diameter of pole 3.5-5.5'' (89-140mm), wall thickness ≧2mm.

4.2 Terminal Dimensions

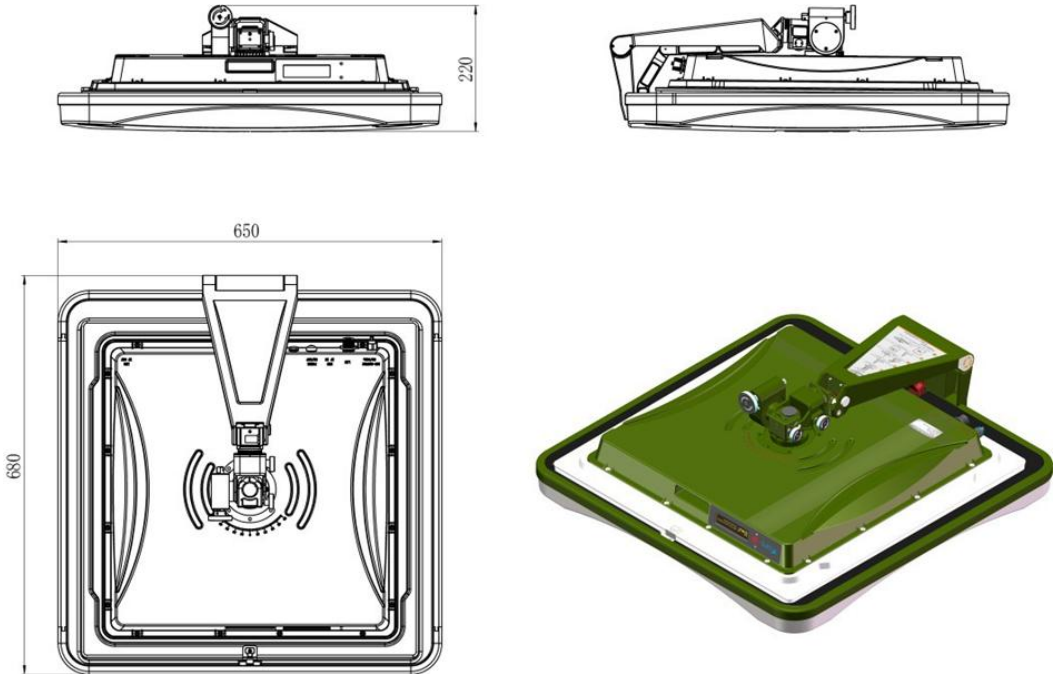
4.2.1 Automatic Satellite Communication Terminal (FL60P-E)

The dimension drawing of the satellite terminal Flat Terminal (Unit: mm)



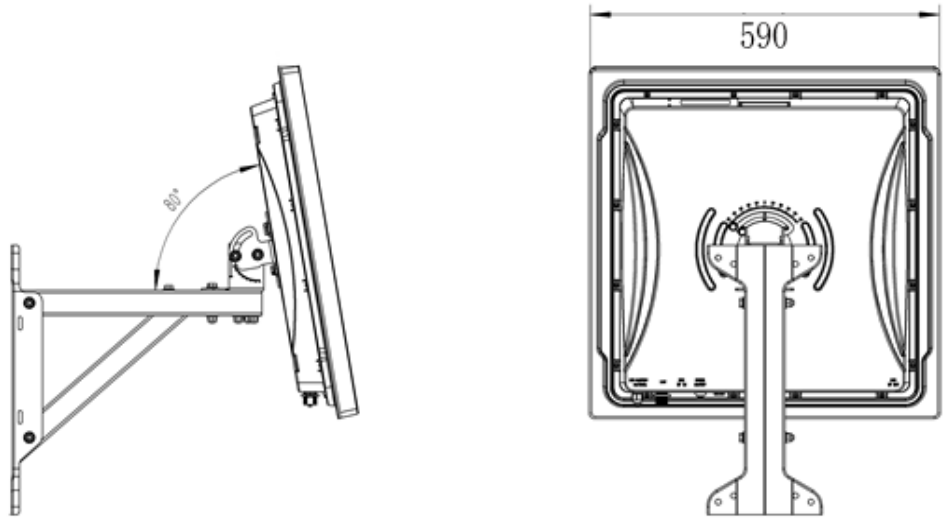
4.2.2 Manual Satellite Communication Terminal (FL60P-M)

The dimension drawing of the satellite terminal Flat Terminal (Unit: mm)



4.2.3 Fixed Satellite Communication Terminal (FL60F-M)

The dimension drawing of the satellite terminal Fixed Flat Terminal (Unit: mm)



4.3 Terminal Wireless Access Details

4.3.1 Automatic Terminal (FL60P-E) Wireless Access Details

Device Serial Number (S/N): PE201712**XXX**（**XXXX is the number of the following equipment)**
Wi-Fi Router:
SSID: HILINK-XXX **60PE-XXX**
Default IP Address: 192.168.16.254
User: admin Default Password: admin
Modem (iDirect-x7):
S/N: M012R44
Default IP Address: 192.168.0.1
User: admin Default Password: iDirect
Bluetooth: Device Name: FINDER**XXXX**
PIN: 1234
Polarization: Tx(H); Rx(V)

4.3.2 Manual Terminal (FL60P-M) Wireless Access Details

Device Serial Number (S/N): PE201712**XXX**（**XXXX is the number of the following equipment)**
Wi-Fi Router:
SSID: HILINK-XXX **60PE-XXX**
Default IP Address: 192.168.16.254
User: admin Default Password: admin
Modem (iDirect-x7):
S/N: M012R44
Default IP Address: 192.168.0.1

User: admin Default Password: iDirect
Bluetooth: Device Name: FINDER**XXXX**
PIN: 1234
Polarization: Tx(H); Rx(V)

4.3.3 Fixed Terminal (FL60F-M) Wireless Access Details

Device Serial Number (S/N): PE201712**XXX**（**XXXX is the number of the following equipment)**
Wi-Fi Router:
SSID: HILINK-XXX **60PE-XXX**
Default IP Address: 192.168.16.254
User: admin Default Password: admin
Modem (iDirect-x7):
S/N: M012R44
Default IP Address: 192.168.0.1
User: admin Default Password: iDirect
Bluetooth: Device Name: FINDER**XXXX**
PIN: 1234
Polarization: Tx(H); Rx(V)

4.4 Matters Needing Attention

1. The satellite terminal is a valuable instrument - treat it with care.
2. Dry out the satellite terminal, before stowing, after using it in rain or snow.
3. Store the satellite terminal in a dry environment.

5 Terminal Installation, Initialization and Alignment

5.1 Terminal Installation

5.1.1 Automatic Terminal (FL60P-E) Installation

1. Take the terminal out of the backpack and open four support legs, as shown in Figure 5-1-1-1 (below).

Figure 5-1-1-1

2. Place the terminal safely on the ground in a horizontal position.

DANGER

If you work on a roof, tower or other high structure or use a ladder or scaffold to access the work site, follow these precautions to prevent personal injury or death:

• Walk only on sound roof structures.
• Ensure that the antenna assembly and installation surface are structurally sound so that they can support all loads (equipment weight, ice, and wind).
• Use safety equipment (for example, a lifeline) appropriate for the work location.
• Follow all manufacturer safety precautions for all safety and other equipment used.
• Perform as many procedures as possible on the ground.

DANGER

• Do not work in high wind or rain; or if a storm, lightning, or other adverse weather conditions are either present or approaching.

DANGER

Do not connect the other side of the power cable to the power source until the terminal installation completion.

3. Take the power cable and connect it to the terminal's power socket (POWER), as shown in Figure 5-1-1-2 below. (Or 24V + 5% DC, according to configuration for selection)

DANGER

The standard requirements to Power Source are 100-240VAC 50/60Hz. (Or 24V + 5% DC, according to configuration for selection)

Figure 5-1-1-2 Power socket

4. Keep the protective casing stable by holding with one hand while pulling up the antenna, using the handle, with the other hand. Pull up until you hear the click of the elevation self-lock mechanism, which indicates the correct antenna deployment, as shown in Figures 5-1-3.

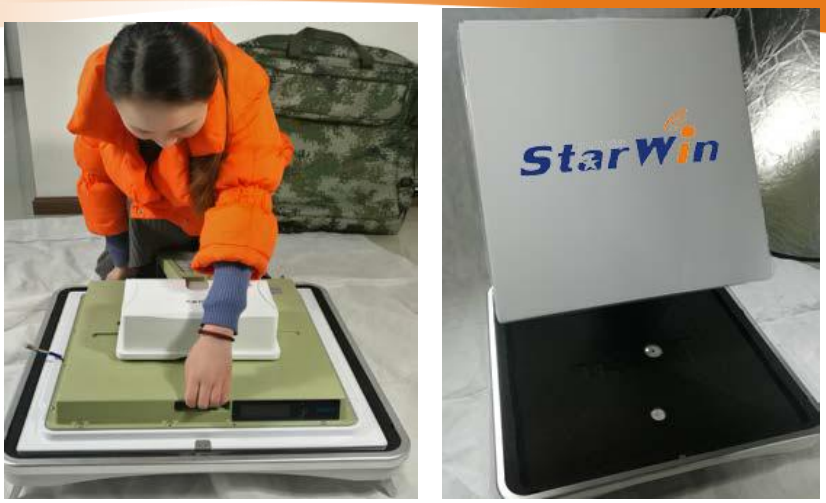


Figure 5-1-3 Deploying

5. Point the terminal, roughly, in the required direction using the built-in compass (Figure 5-1-1-4).

NOTICE

Direction to the satellite must be clean from obstacles during the terminal operation.

6. Using the air-bubble, ‘spirit-level’, built into the compass adjust the support legs to make the terminal horizontal. (Figure 5-1-1-4).

Figure 5-1-1-4 Compass

5.1.2 Fixed Terminal (FL60F-M) Installation

1. Firstly, the bracket is fixed on the antenna body, and the screw is not fastened, as shown in Figure 5-1-2-1 (below).

Figure 5-1-2-1 Bracket fixed of antenna body

2. The bracket is fixed on the wall by the expansion screw, as shown in Figure 5-1-2-2.

Figure 5-1-2-2 Schematic diagram of expansion screw fixation

DANGER

Do not connect the other side of the power cable to the power source until the terminal installation completion.

Figure 5-1-2-3 Interface of power supply

NOTICE

Direction to the satellite must be clean from obstacles during the terminal operation.

5.2 Terminal Initialization

1. Connect the Power cable to the Power Source. Upon connection, to the power source, the display will show the company logo (Figure 5-2-1).

Figure 5-2-1 Logo

DANGER

The standard requirements to Power Source are 100-240VAC 50/60Hz. (Or 24V + 5% DC, according to configuration for selection)

3. Press the “POWER ON/OFF” button. The display indicates current activity, using abbreviated text messages - see below for possible displays (Table 5-2-1). In addition, abbreviated text messages, representing the current terminal actions, are also displayed - as shown in Figure 5-6.

Indication					
Indicator flashes	General Power Supply is in process of detection	LNB Power Supply is in process of detection	BUC Power Supply is in process of detection	GNSS signal is in process of detection	Attitude is in process of detection
Indication					
Indicator lights continuously	General Power Supply is detected	LNB Power Supply is detected	BUC Power Supply is detected	GNSS signal is acquired	Attitude is detected

Table 5-2-1 Display instructions

Figure 5-2-2 Detection process

3. The GNSS signal acquisition process is displayed, as shown in figures 5-2-3 and 5-2-4. (**Lng** = Longitude, **Lat** = Latitude).

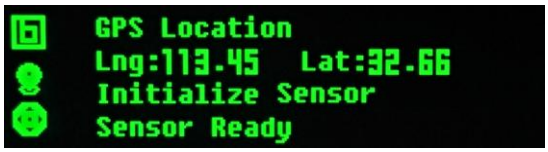


Figure 5-2-3: GNSS signals acquisition success

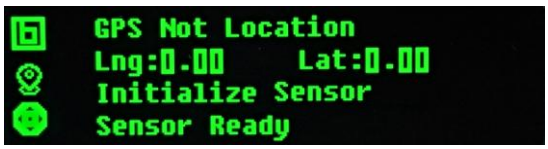


Figure 5-2-4: GNSS signals acquisition failure

4. Information on currently selected satellite (including the satellite name, satellite beacon frequency, beacon channel symbol rate and LNB Local Oscillator frequency) will be displayed - as shown in figures 5-2-5 and 5-2-6.

NOTICE

When the Terminal is used for the initial time, the 'App' for Terminal Control should be used first, to set up the satellite related parameters. If the Terminal has the polarization switch function, please use the App to switch the polarization mode. Please see the operational instructions in *section-5.5*.

NOTICE

The 'App' for Terminal Control should also be used if it is necessary to select a different satellite. Please see the operational instructions in *section-5.5*.

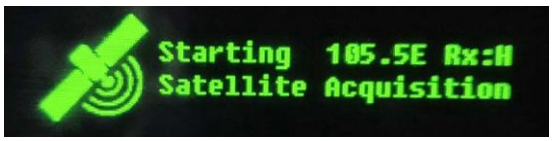


Figure 5-2-5 Satellite name

Figure 5-2-6 Satellite parameter

5. When the system is ready for alignment, to the satellite, the following display is shown, Figure 5-2-7.

Figure 5-2-7 Ready to point to the satellite

6. Waiting for ACU to connect to Modem correctly, the following display is shown, Figure 5-2-8.

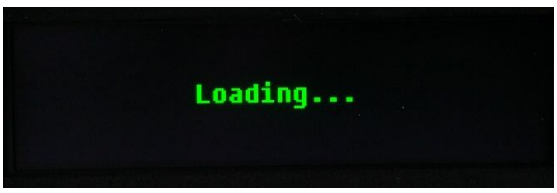


Figure 5-2-8 Ready to point to the satellite

5.3 Terminal Antenna Alignment

5.3.1 Automatic Terminal (FL60P-E) Alignment

1. The display indications for antenna adjustment are described in Table 5-3-1-1. The following abbreviations are used: **EL** – Elevation (Up and Down), **AZ** – Azimuth (Left and Right), **POL** – Polarization (Clockwise and Counter Clockwise).

EL		AZ		POL	
UP	DOWN	LEFT	RIGHT	CW	CCW
					

Table 5-3-1-1

2. When **EL** is displayed for the first time an automatic, coarse adjustment of antenna's Elevation angle is performed (Figure 5-3-1-1). The corresponding values are represented on the right side of the display. (**Ref** = Reference value, **Cur** = Current value). **LOCKED**, followed by the sign □ indicates, that the terminal is still not aligned to the satellite. **LOCKED**, followed by the sign ■ indicates, that the terminal is aligned to the satellite.

Figure 5-3-1-1: Elevation adjustment display

3. The coarse adjustment of the Elevation angle is completed when the indication, shown in Figure 5-3-1-2, is displayed.

Figure 5-3-1-2: Elevation angle coarse adjustment is completed

4. When **POL** is displayed for the first time, the automatic, coarse adjustment of antenna's Polarization is performed (Figure 5-3-1-3).

Figure 5-3-1-3: Polarization adjustment display

5. The coarse adjustment of the Polarization angle is completed when the indication, shown in Figure 5-3-1-4, is displayed.

Figure 5-3-1-4: Polarization angle coarse adjustment is completed

6. When **AZ** is displayed for the first time the automatic, coarse adjustment of antenna's Azimuth is performed (Figures 5-3-1-5). The current Beacon receiver signal-quality (**SQ**) and the maximum available signal quality (**MAX**) are represented on the right side of the display.

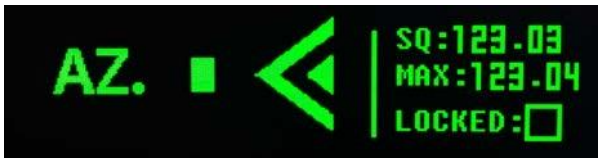


Figure 5-3-1-5: Azimuth adjustment display

7. The coarse adjustment of the Azimuth is completed when the indication, shown in Figure 5-3-1-6, is displayed.

Figure 5-3-1-6: Azimuth adjustment is completed

8. When **EL** is displayed for the second time the antenna performs an automatic fine-tune of the Elevation angle. The current Beacon receiver signal quality (**SQ**) and the maximum available signal quality (**MAX**) are represented, on the right side of the display.

Figure 5-3-1-7: Elevation angle fine-tune

9. The Elevation angle ‘fine-tune’ is completed when the indication, shown in Figure 5-3-1-8, is displayed.

Figure 5-3-1-8: Elevation angle fine-tune is completed

10. When **POL** is displayed for the second time the antenna perform an automatic fine-tune of the Polarization. The current Beacon receiver signal quality (**SQ**) and the maximum available signal quality (**MAX**) are represented, on the right side of the display.

Figure 5-3-1-9: Polarization angle fine-tune

11. The polarization ‘fine-tune’ is completed when the indication, shown in Figure 5-3-1-10, is displayed.

Figure 5-3-1-10: Polarization angle fine-tune is completed

12. When the complete alignment of the antenna is finished, the indication shown in Figure 5-3-1-11 is displayed (within 3 seconds).

Figure 5-3-1-11: Alignment completion indication

13. Within a further 3 seconds the antenna alignment message, shown in Figure 5-3-1-12 is displayed.

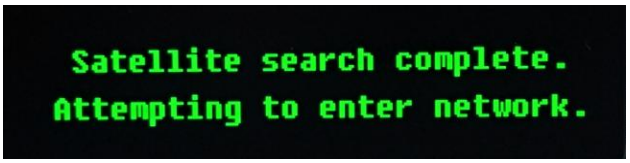


Figure 5-3-1-12: Alignment full completion message

Figure 5-3-1-13: Signal quality display

14. LED state:

OLED normal display, the LED flashing frequency is 1 second, two flashes at one time;

OLED Hibernation mode, the LED flashing frequency is 3 second, two flashes at one time;

Press the touch key, LED flash fast, when the OLED enter the Hibernation mode, can make the screen light up.

5.3.2 Manual Terminal (FL60P-M) Alignment

1. According to the satellite direction, adjust the antenna elevation, polarization, azimuth to point to the satellite, in the adjustment process, the user can refer to the hint information as shown in Figure. 5-3-2-1. The corresponding Elevation angles values are represented at the right side of the display. (**Ref** is abbreviation of Reference value, **Cur** is abbreviation of Current value). **LOCKED**, followed by the sign □ indicates, that the terminal is not aligned yet to the satellite. **LOCKED**, followed by the sign ■ indicates, that the terminal is aligned to the satellite.

Figure 5-3-2-1 Pointing prompt information

2. The adjustment of antenna elevation angle, by slow rotation of corresponding adjustment knob, according to the arrow direction, and refer to the display instructions. (Figure 5-3-2-2).

Figure 5-3-2-2 Elevation angle adjustment knob

3. The adjustment of antenna polarization angle, by slow rotation of corresponding adjustment knob, according to the arrow direction, and refer to the display instructions. (Figure 5-3-2-3).

Figure 5-3-2-3Polarization adjustment knob

4. The adjustment of antenna azimuth angle, by slow rotation of corresponding adjustment knob, according to the arrow direction, and refer to the display instructions. (Figure 5-3-2-4).

Figure 5-3-2-4 Azimuth adjustment knob

5. The antenna alignment message is displayed, as shown in Figure 5-3-2-5, that means that the process of satellite alignment has been completed. When modem indicates that the network is successful, the network can be used. If necessary, according to the signal quality shown in figure. 5-3-2-6, the elevation, azimuth and polarization handwheel can be adjusted manually to find better signal value.

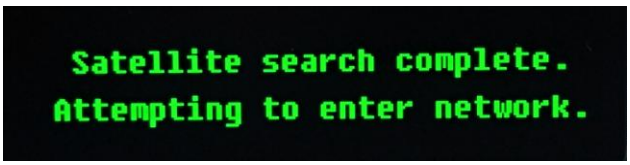


Figure 5-3-2-5 Alignment completion text message

Figure 5-3-2-6: Signal quality display

6. LED state:

   OLED normal display, the LED flashing frequency is 1 second, two flashes at one time;

   OLED Hibernation mode, the LED flashing frequency is 3 second, two flashes at one time;

   Press the touch key, LED flash fast, when the OLED enter the Hibernation mode, can make the screen light up.

5.3.3 Fixed Terminal (FL60F-M) Alignment

1. According to the direction of the satellite, adjust the elevation, polarization and azimuth of the terminal for point to the satellite. In the process of adjustment, you can refer to the prompt information as shown in Figure 5-3-3-1.

Figure 5-3-3-1 The prompt information of pointing

NOTICE

Slowly rotate adjustment knobs during the antenna pointing.

2. Adjust the direction of the azimuth, reference display indicator as shown in figure 5-3-3-2.

Figure 5-3-3-2 Azimuth adjustment diagram

3. Adjust the direction of the elevation, reference display indicator as shown in figure 5-3-3-3.

Figure 5-3-3-3 Elevation adjustment diagram

4. Adjust the direction of the polarization, reference display indicator as shown in figure 5-3-3-4.

Figure 5-3-3-4 Polarization adjustment diagram

5. The screen as shown in Figure 5-3-3-5, it shows the pointing is completed, after waiting for modem to indicate that the network is successful, you can use the network. If necessary, self-adjust the elevation, azimuth and polarization according to the quality of the signal as shown in Figure 5-3-3-6, to get better signal values, then tighten the fixed screw.

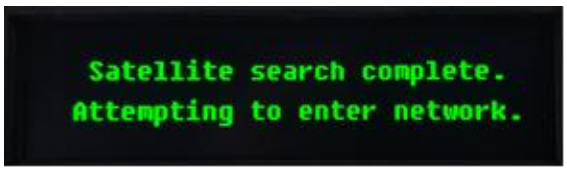


Figure 5-3-3-5 Polarization angle coarse adjustment is completed

Figure 5-3-3-6 Signal quality display

6. If it is used for the first time, please read the details in section-5.5 ***Application for Terminal Control*** and set up the satellite related parameters.

7. If the use is finished, press “POWER ON/OFF” again, unplug the power cable and RJ45 network cable.

8. LED state:

OLED normal display, the LED flashing frequency is 1 second, two flashes at one time;
OLED Hibernation mode, the LED flashing frequency is 3 second, two flashes at one time;
Press the touch key, LED flash fast, when the OLED enter the Hibernation mode, can make the screen light up.

5.4 Modem Status Indication

1. The Modem Status indication is shown in Figure 5-4-1.

POWER	TX	RX	STATUS	NET
Ready:				Not Ready:

Figure 5-4-1 Modem status indicator icon

2. The Modem status indication is shown in table 5-4-1.

Figure 5-4-2 Modem status

Indication	PWS	Tx	Rx	STS	NET
Indicator flashes	The modem Powering Status is NOT COMPLETED	The modem TX Status is OFF	The modem RX Status is NOT LOCKED	The modem LINK Status is CONNECTING	The modem NET Status is CONNECTING
Indicator lights continuously	The modem Powering Status is COMPLETED	The modem TX Status is ON	The modem RX Status is LOCKED	The modem LINK Status is CONNECTED	The modem NET Status is CONNECTED

Table 5-4-1 Modem status display

3. The modem's receive signal quality indication is shown on Figure 5-4-3.

Figure 5-4-1 Signal quality display

NOTICE

If necessary, perform additional alignment to get better signal quality values.

5.5 Application ('App') for Terminal Control

The User name and password of iOS is same with Android platform
User: admin **Password**: starwin

When APP prompts you to get location permissions, give APP location permission.

1. Choose the language, as shown in Figure 5-5-1.

Figure 5-5-1

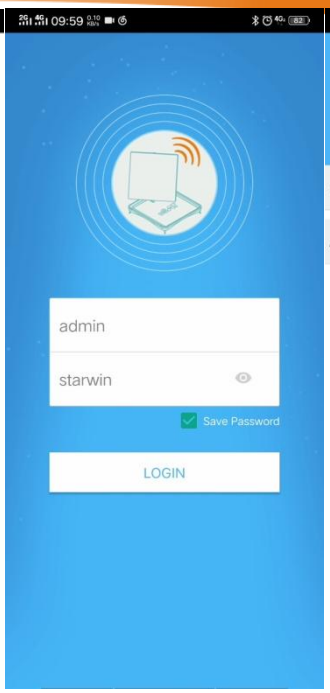


Figure 5-5-2

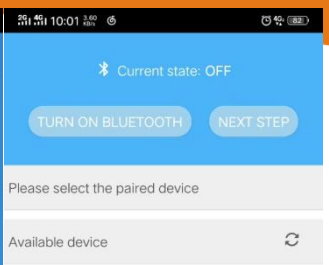


Figure 5-5-3

2. The APP prompts you for a username and password.
User Name: admin
Password: starwin
If necessary, please check "Save Password", as shown in Figure 5-5-2.

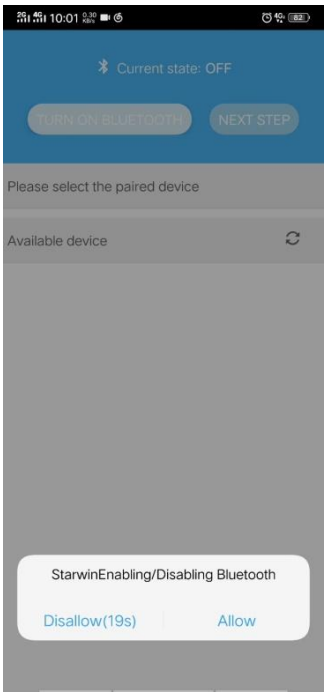


Figure 5-5-4

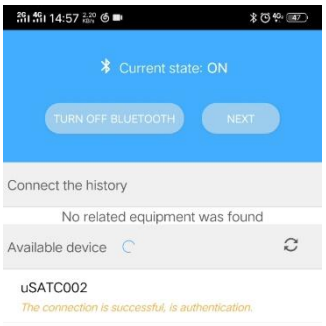


Figure 5-5-5

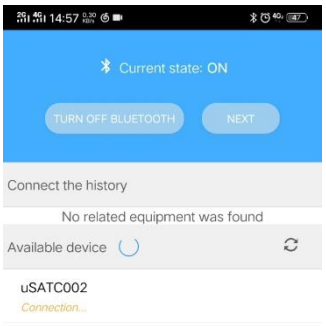


Figure 5-5-6

3. If you have already turned on Bluetooth, please jump to the fourth step;

   If you do not turn on Bluetooth, please click "TURN ON BLUETOOTH" and allow APP to open Bluetooth, as shown in Figures 5-5-3 and 5-5-4.

4. Click on the refresh icon behind the title "Available device". Search for new Bluetooth devices (satellite terminalxxxx, xxxx is numbers), then click the Bluetooth device name you want to connect, at this point, the APP needs to be authorized by the Terminal, as shown in Figure 5-5-6, when the terminal receives the request information of Bluetooth, the OLED display of the terminal will prompt the information shown in Figure 5-5-7, and the buzzer will make a sound prompt at a frequency of 1 second. It needs to be authorized by clicking the touch button on the OLED display screen of the terminal (as shown in Figure 5-5-8), allowing the connection of the mobile phone APP, and the APP will prompt "The connection is successful", as shown in Figure 5-5-9.

Figure 5-5-7

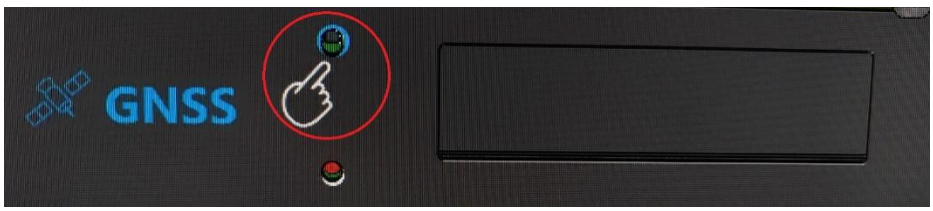


Figure 5-5-8 The touch button on OLED display screen

If the touch button does not click during the timeout (30 seconds), the authorization fails. APP will prompt "The connection is failed, please click retry", as shown in Figure 5-5-10.

NOTICE

This operation only needs to be done when APP connects to a terminal first time or reconnects a new terminal.

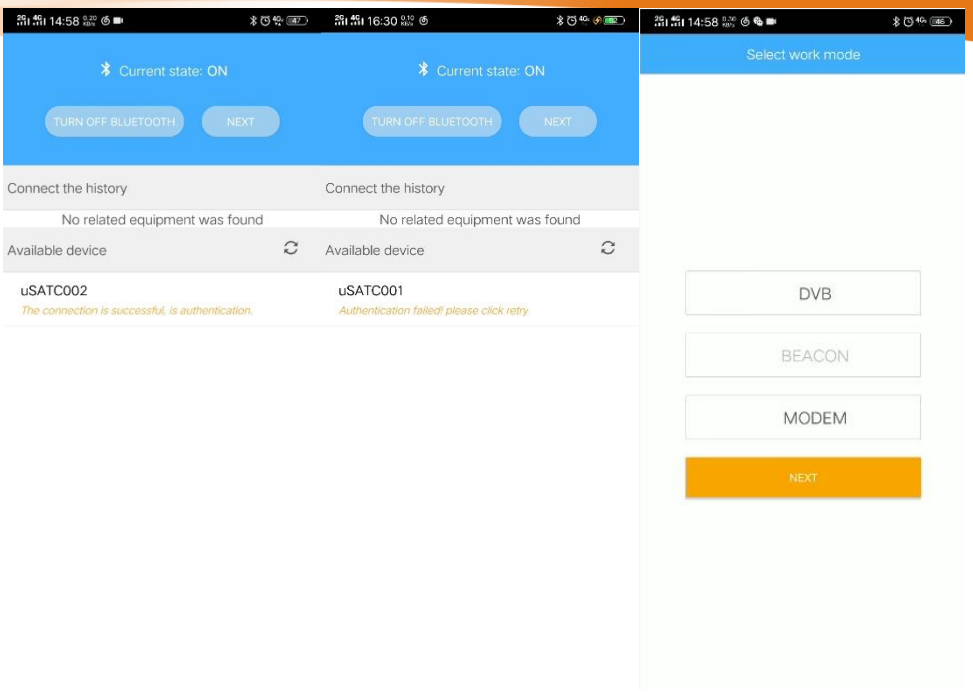


Figure 5-5-9 Figure 5-5-10 Figure 5-5-11

5. After the authorization is successful, select the device that needs to be connected in the list and click "NEXT", as shown in Figure 5-5-11.

6. Selecting the work mode, the device will be fed back to APP according to the mode that it can support. APP provides the mode of choice, as shown in Figure 5-5-11.

Select which mode you want to work, such as MODEM, and then enter the main interface, as shown in Figure 7-12.

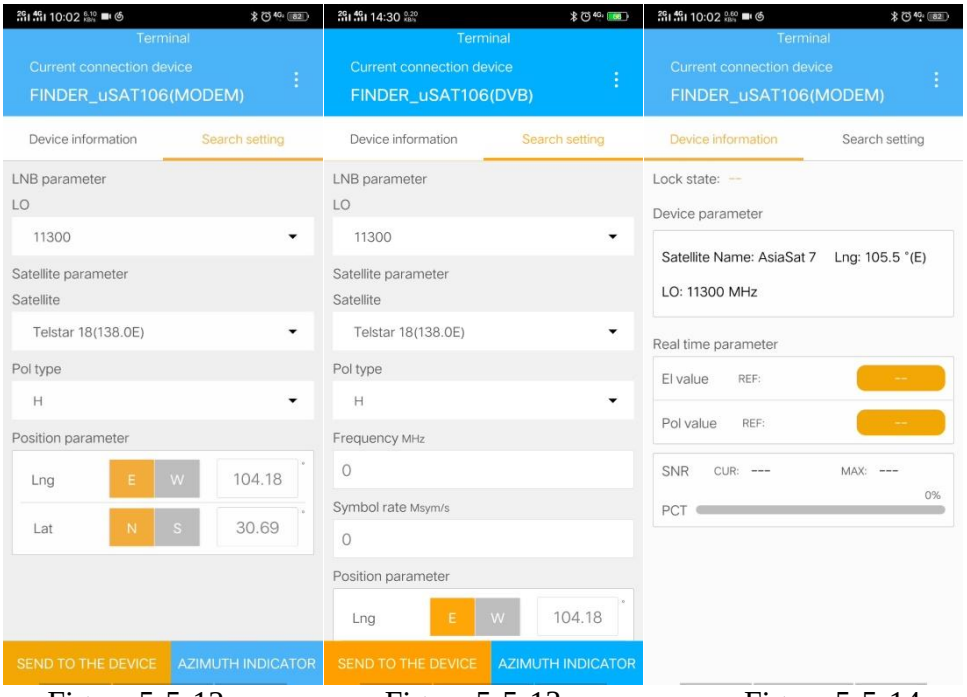


Figure 5-5-12 Figure 5-5-13 Figure 5-5-14

7. The main interface is divided into two main functions.

Device information: The current parameter configuration of the device, the display of device attitude, as well as the real time and maximum values of the signal quality obtained under the current mode, as shown in Figure 5-5-14.

Search setting: Local oscillator selection list, satellite selection list, polarization selection list, frequency input box (DVB mode), symbol rate input box (DVB mode), as shown in Figure 5-5-12 ***MODEM mode***, as shown in Figure 5-5-13 ***DVB mode***, and location parameters, after set up the satellite-searching parameters in this interface, click "SEND TO THE DEVICE", then confirm the parameters are correct, click "OK", the parameters can be sent to the device, and then according to the APP prompt, you can choose to reconnect the device or cancel, as shown in Figures 5-5-16 to 5-5-18, if canceled, the interface will return to Bluetooth device list interface as shown in Figure 5-5-9.

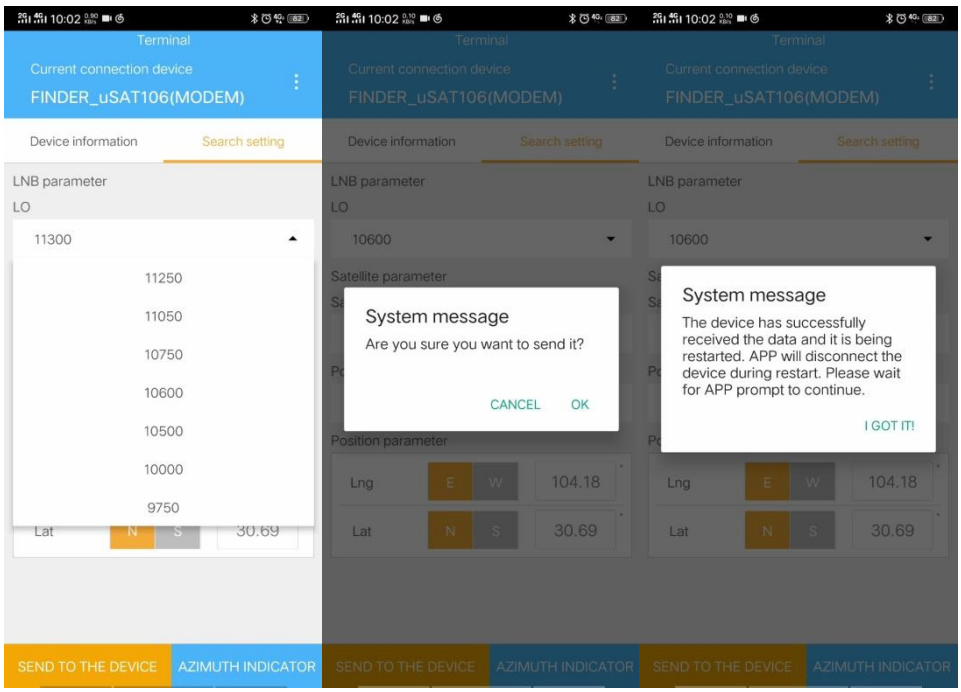


Figure 5-5-15 Figure 5-5-16 Figure 5-5-17

8. If you need to disconnect, click the three dots on the upper right corner and select "Disconnect device", then click the “Ok”, as shown in Figure 5-5-19.

9. Adding satellite: Click on the three dots in the upper right corner, then click “Management Center”, “Satellite management” in turn, APP has built in the frequently-used satellite,

If there are target satellite, you just check the circle front the satellite, as shown in Figure 5-5-20.

If there are not the target satellite, click the "+" on the upper right corner to enter the satellite add interface, as shown in Figure 5-5-19, enter the satellite name and satellite longitude, click "SAVE" to complete the addition, then return to the previous step, check

the newly added satellite and it will appear in the satellite selection list, as shown in Figure 5-5-21.

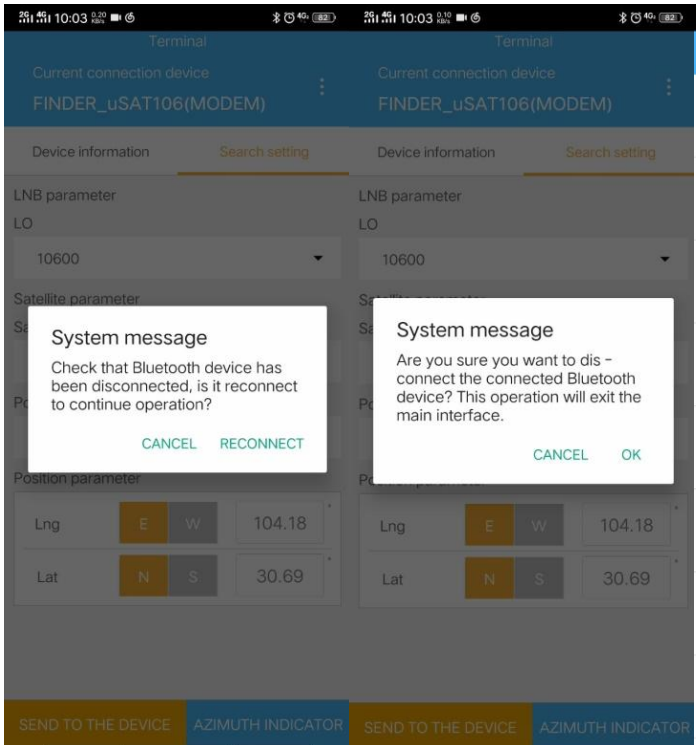


Figure 5-5-18

Figure 5-5-19

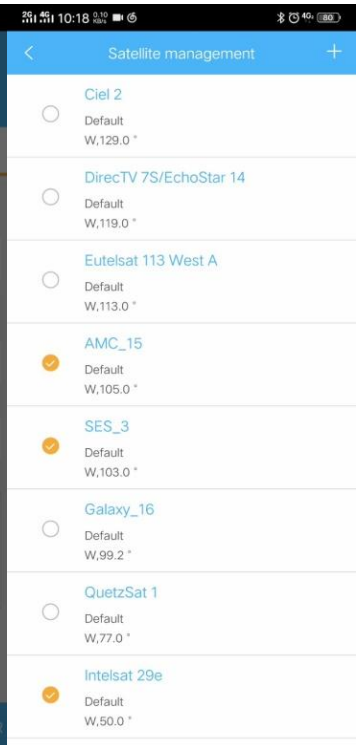


Figure 5-5-20

Figure 5-5-21

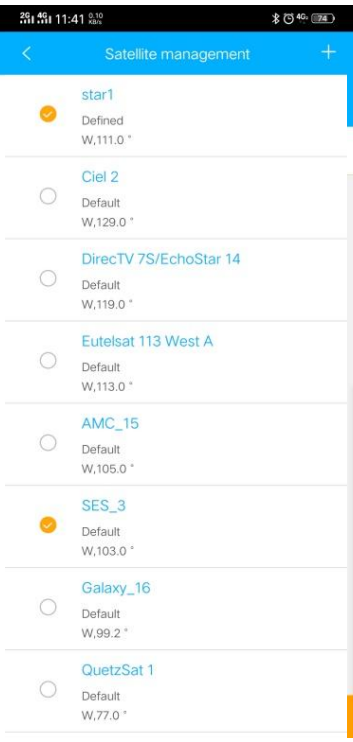


Figure 5-5-22

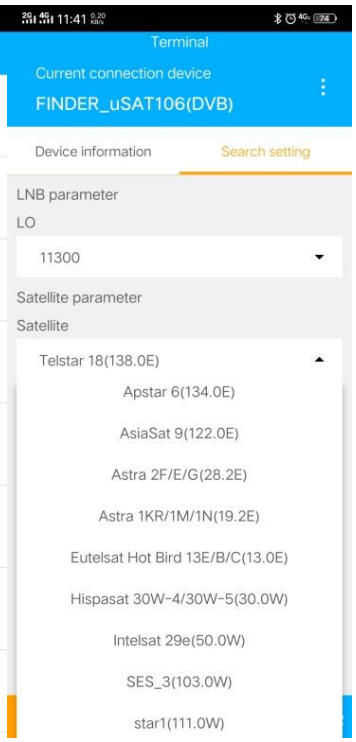


Figure 5-5-23

5.6 Terminal Stowing

Note: Only Manual and Automatic satellite communication terminals have stowing function, while fixed satellite communication terminals have no receiving function.

5.6.1 Automatic Terminal (FL60P-E) Stowing

1. Press the “POWER ON/OFF” button and verify that the display screen has changed to the company logo, as shown in Figure 5-6-1.

Figure 5-6-1-1. Logo

Within 2 minutes the Terminal’s motors (azimuth, polarization and elevation) automatically return the satellite terminal to the initial, starting position. This will allow for the stowing, as shown as in Figure 5-6-1-2.

Figure 5-6-1-2: The terminal in the initial position for stowing

2. While holding the Antenna handle with one hand and pressing/releasing the self-lock button with the other hand, fold down the antenna into its Protective casing, as shown in Figure 5-6-1-3, until there is an audible click of the Antenna casing-lock.

Figure 5-6-1-3: Self-lock button and folding down the antenna

3. Disconnect the power cable from power supply.
4. Disconnect the power cable from terminal power socket (POWER).
5. Disconnect the network cable.
6. Close support legs underneath the protective casing.
7. Put away the terminal and cables into the backpack.

Terminal Stowing in the case of a power failure:

1. To fold down the Terminal, in the case of a power failure or a faulty disconnection during usage, remove the motors' cover, using both hands, as shown in Figures 5-6-1-4.

Figures 5-6-1-4: Removing the motors' cover

2. Disconnect the power cable from the power source.

3. Return the Azimuth to the zero position by turning the corresponding knob. The zero

position can be found by referencing the Azimuth scale, as shown in Figures 5-6-1-5.

Figure 5-6-1-5: Position of the Azimuth adjustment knob

4. Return the Polarization to the zero position by turning the corresponding adjustment knob. The zero position can be found by referencing the Polarization scale, as shown in Figure 5-6-1-6.

Figure 5-6-1-6: Polarization adjustment knob position

5. Return the Elevation to the zero position by turning the corresponding adjustment knob. The zero position can be found by referencing the Elevation scale, as shown in Figure 5-6-1-7.

Figure 5-6-1-7: Elevation adjustment knob position

6. While holding the Antenna handle with one hand and pressing/releasing the self-lock button with the other hand, fold down the antenna into its Protective casing, as shown in Figure 5-6-1-8, until there is an audible click of the Antenna casing-lock.

Figure 5-6-1-8: Self-lock button for folding down the antenna

7. Re-install the motors' cover, to its original position.
8. Disconnect the power cable from terminal power socket (POWER).
9. Disconnect the network cable.
10. Close support legs underneath the protective casing.
11. Put away the terminal and cables into the backpack.

5.6.2 Manual Terminal (FL60P-M) Stowing

1. Press the “POWER ON/OFF” button and verify that the display screen has changed to the company logo, as shown in Figure 5-6-2-1.

Figure 5-6-2-1 Logo

2. Disconnect the power cable from power supply.

3. Return the Antenna Azimuth to zero position by using the corresponding adjustment knob, while referencing the Azimuth scale, as shown in Figure 5-6-2-2.

Figure 5-6-2-2 Azimuth adjustment knob and Azimuth scale

4. Return the Antenna Polarization to zero position by using the corresponding adjustment knob, while referencing the Polarization scale, as shown in Figure 5-6-2-3.

Figure 5-6-2-3 Polarization adjustment knob and Polarization scale

5. Return the Antenna Elevation to zero position by using the corresponding adjustment knob, as shown in Figure 5-6-2-4, while referencing the Elevation scale.

Figure 5-6-2-4 Elevation adjustment knob

6. While holding the Antenna handle with one hand and pressing/releasing the self-lock button with the other hand, fold down the antenna into its Protective casing, as shown in Figure 5-6-2-5, until there is an audible click of the Antenna casing-lock.

Figure 5-6-2-5 Self-lock button and folding the antenna down

7. Disconnect the power cable from terminal power socket (POWER).
8. Disconnect the network cable.
9. Close the support legs underneath the protective casing.
10. Put away the terminal and cables into the backpack.

6 Troubleshooting and Maintenance

6.1 Troubleshooting

Item	Problem and Indication	Corrective Action
01	Display does not work	Verify the power connection
02	Antenna does not work	Press the “POWER ON/OFF” button
03	No GNSS signals acquisition	Verify the terminal is under the open sky/has an unobstructed view. Re power on and reboot
04	Terminal can not lock the satellite	Check whether the antenna's approximate orientation is correct, terminal configuration parameters, and modem configuration parameters are correct
05	Terminal aligns to another satellite	Verify the satellite data entered via the ‘App’ for Terminal Control
06	Display switches off after the completion of alignment	Press down the “Icon” button (On the screen) for 3 seconds to activate the screen
07	The display indicates the terminal is in normal operational state but there is no data transfer	Verify that LAN or Wi-Fi are properly connected
08	Low signal quality	Perform additional alignment to get better signal quality values
09	Motor stalled	Manual reset, and perform a power reset, to reboot the Terminal

6.2 Maintenance

The satellite terminal parameters and performance can remain stable and provide normal operation for at least 10 years under a regular maintenance schedule. The periodical maintenance work includes:

1. Antenna system - it is highly recommended that a comprehensive examination of the entire system is completed, periodically, along with a thorough check of all the adjustment mechanisms.
2. Antenna mechanisms – it is recommended that a daily check is made of the adjustment mechanisms and any necessary lubricant is added, to prevent wear of the worms and gears.
3. Visual verification of terminal protective casing surface damages. If there is a damage, the special spray (NOT included in the standard system configuration) should be applied.
4. Check that all the screw fastenings are tight.
5. Close check of the antenna to look for any damage or cracks.
6. Regular cleaning of the terminal and antenna radome surfaces. Remove all dust, dirt, condensed salt and other contamination that may harm the signal quality and the terminal’s performance.

7 Technical Service Contact Information

China Starwin Science & Technology Co., Ltd
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Appendix Grease Model

Currently, the terminal adopts the Great Wall 7014-1 type high temperature grease, which is made by thickening synthetic oil with organic thickener and adding various additives such as oxygen resistance and corrosion resistance.

The typical specifications:

Item	7014-1 Type
Appearance	Light brown, smooth and uniform ointment
1/4 Worked Penetration Consistency, 0.1mm	67
Dropping Point, ℃	316
Evaporativity (200℃, 1h), % (m/m)	2.66
Pressure Oil Separation, % (m/m)	6.41
Steel mesh oil separation, (100℃, 24h), % (m/m)	1.65
Similar Viscosity, (-40℃, $10s^{-1}$), Pa s	653
Anti-Water Cascade Performance, (38℃±3℃), % (m/m)	1.83
Corrosion （$45^{\#}$ Steel sheet, 100℃, 3h）	Qualified
Operating Temperature Range	-40℃-+200℃
Meet the Standard	Q/SH PRD124-2008

The following grease brand equivalent to the performance of the Great Wall products as follows:

Great Wall	Japan	USA	Germany
7014-1	Chemiway WR-3	Dow corning 44	ISOFLEX NBU 15
		Caltex Unitemp Grease 550	
		Mobiltemp SHC 100	
		Mobiltemp SHC 32	

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