

S900 External Radio User Manual

First Edition

**SOUTH SURVEYING & MAPPING
TECHNOLOGY CO., LTD.**

May 2026

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1. Product Introduction

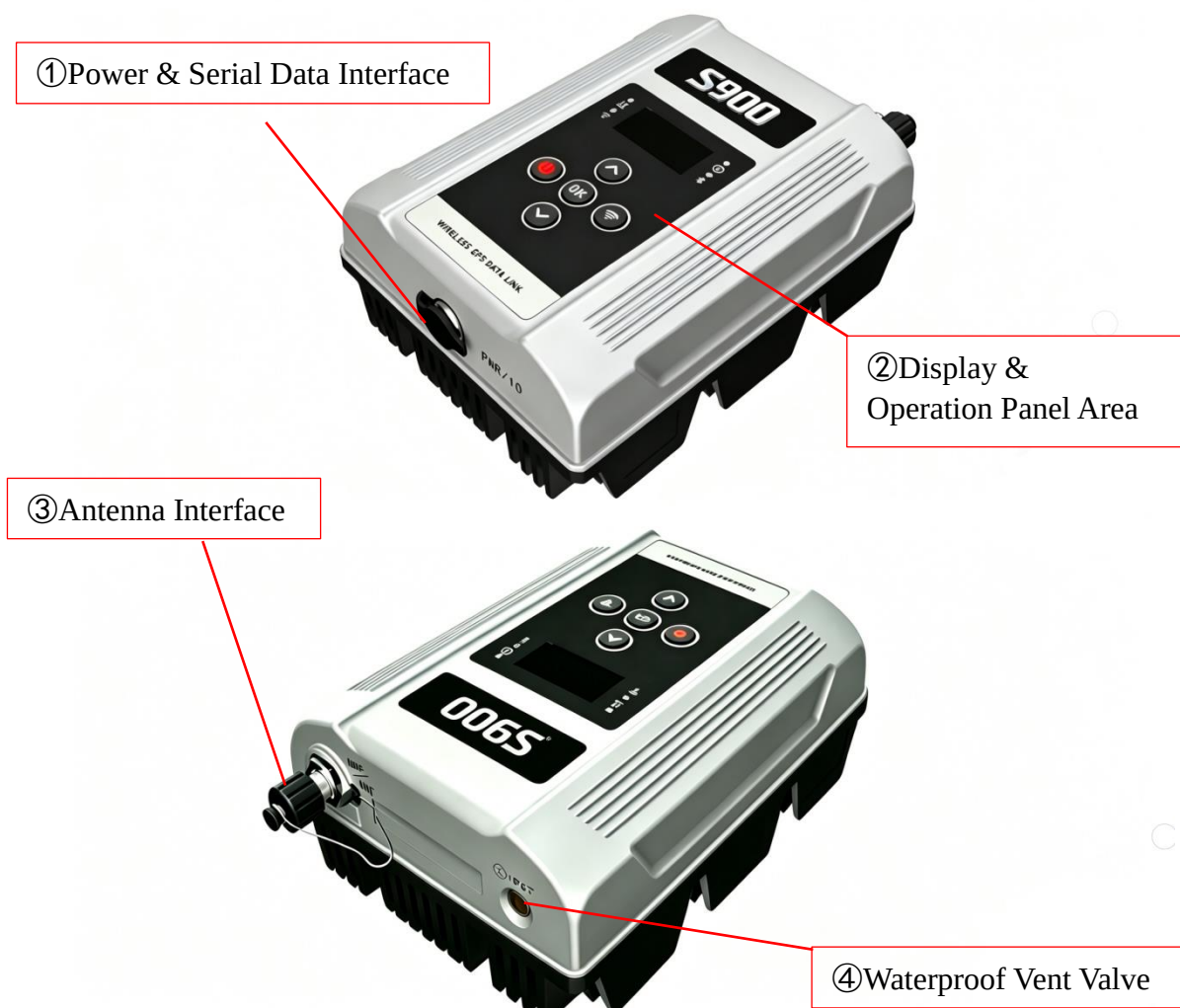
1.1. Product Overview

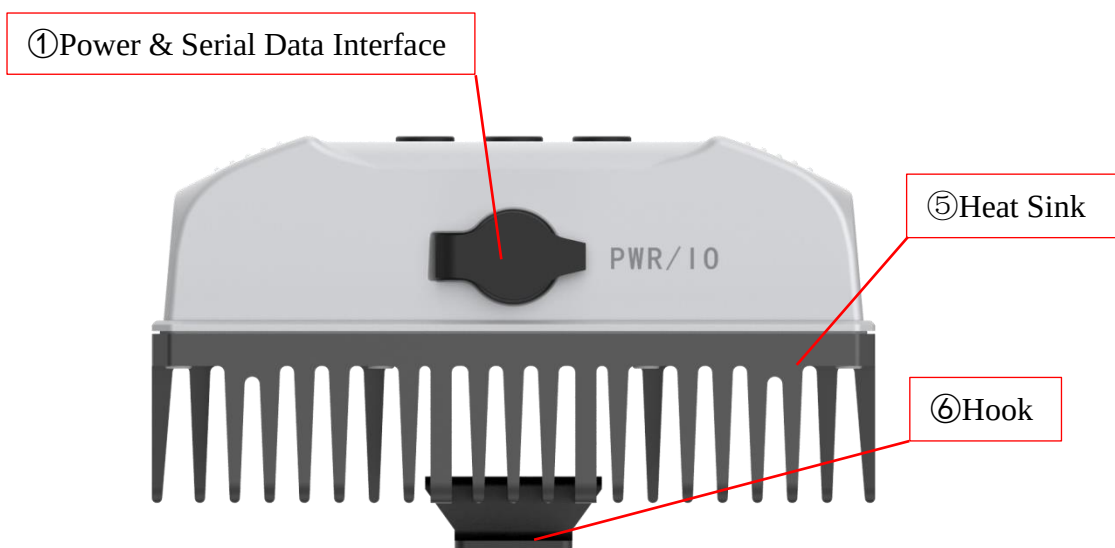
The S900 digital data radio is a wireless data transmission system developed by SOUTH, adopting an innovative frequency-hopping circuit design. It provides faster and more stable data transmission, a concise human-machine interface, and simple operation. It supports multiple transmission protocols and offers high compatibility with surveying instruments. The transmit power can be flexibly switched between high and low levels to adapt to various application scenarios. With excellent heat dissipation, the radio ensures high stability during long-term operation, making long-distance construction operation more efficient and safer.

2. General Description

2.1. Product Appearance and Accessories

2.1.1. Product Appearance





① Power & Serial Data Interface

As shown in Figure 2-1, this interface connects to an external power supply to power the unit and enables communication with other devices such as base stations. For detailed communication protocols, please contact the manufacturer.



Figure 2-1 Power & Serial Data Interface

Socket Specification: LEMO 5-core 1B

1 Pin: External power positive (+)

2 Pin: External power negative (-)

3 Pin: RXD (data receive)

4 Pin: GND (ground)

5 Pin: TXD (data transmit)

② Display & Operation Panel Area

Displays the radio's operating status, data, and configuration information. For details, refer to the control panel description in this manual.

③ Antenna Interface

TNC antenna connector for connecting an antenna or feeder, with an output impedance of 50 Ω (see Figure 3-1).



Figure 3-1 Antenna Interface

④ Waterproof Vent Valve

Protects the equipment from moisture, balances internal pressure, improves heat dissipation, and enhances the protection rating.

⑤ Heat Sink

Dissipates large amounts of heat generated during transmission.

⑥ Hook

Used to mount the unit on a tripod or other support.

WARNING: Do not cover the heat sink. Insufficient heat dissipation may cause overheating, equipment damage, or safety hazards.

2.1.2. Radio Accessories

Radio Transmit Antenna

The standard antenna included is a UHF transmit antenna designed for field use, operating at 902 MHz – 928 MHz. It is compact, lightweight, and durable (see Figure 4-1).



Figure 4-1 Transmit Antenna

Radio Data and Power Cable

Used to connect the radio to the host receiver, providing both power supply and data transmission (see Figure 4-2).

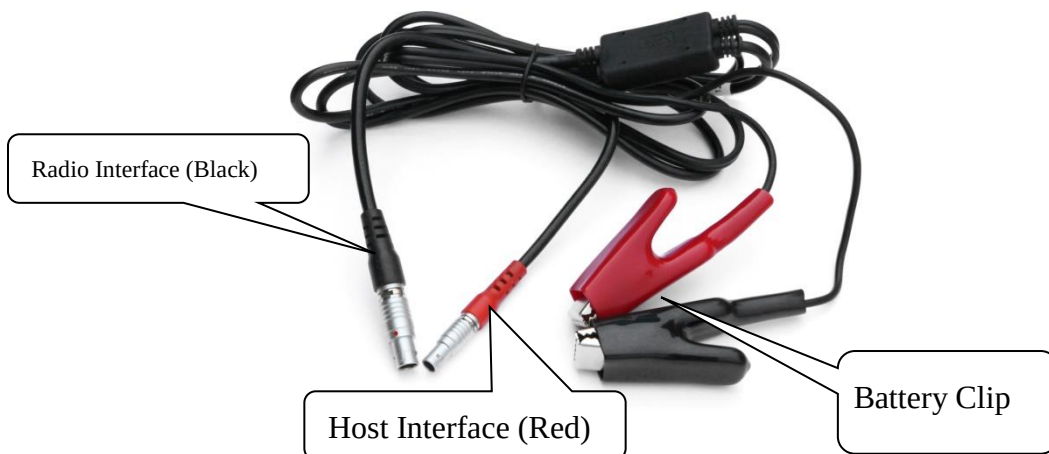


Figure 4-2 Radio Data & Power Cable

3. Panel Operation Instructions

3.1. Control Panel

The control panel supports key operation and OLED menu display. Menu functions include power off, low battery alert, factory reset, and parameter configuration (working mode: Master/Slave; network parameters: Network ID, Local ID, network mode, etc.). Menu pages are selected by pressing the corresponding keys.

The functions of keys and indicators on the radio panel are shown in Figure 5-1.

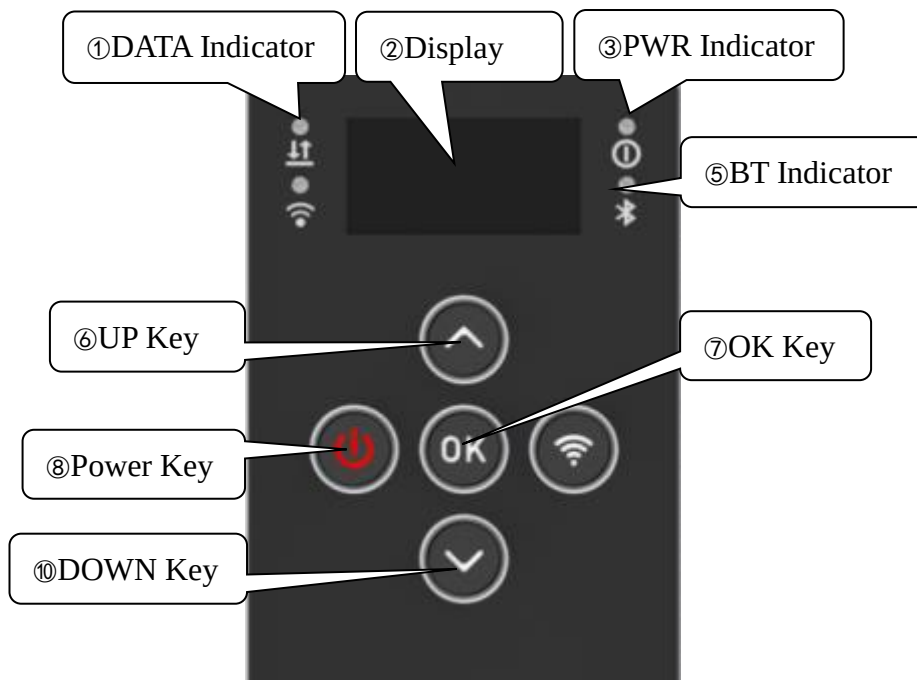


Figure 5-1 Radio Panel

Indicators and Keys

- ① DATA Indicator: Flashes during data transmission.

- ② Display: Shows operating status and parameter settings.
- ③ PWR Indicator: Lights up at power-on; steady under normal voltage; flashes when voltage < 10.9 V.
- ④ BT Indicator: Light up when Bluetooth is connected.
- ⑤ UP Key: Switches menus or selects parameters.
- ⑥ OK Key: Confirms selections and enters menus/submenus.
- ⑦ Power Key: Press and hold for 1 – 2 seconds to power on; press once to enter the shutdown screen. Also acts as LEFT key in submenus.
- ⑧ DOWN Key: Switches menus or selects parameters.

3.2. Power On

After connecting the power supply, press and hold the Power key for 1 – 2 seconds. The OLED display and PWR indicator turn on, showing the working mode and power level (see Figure 6-1).

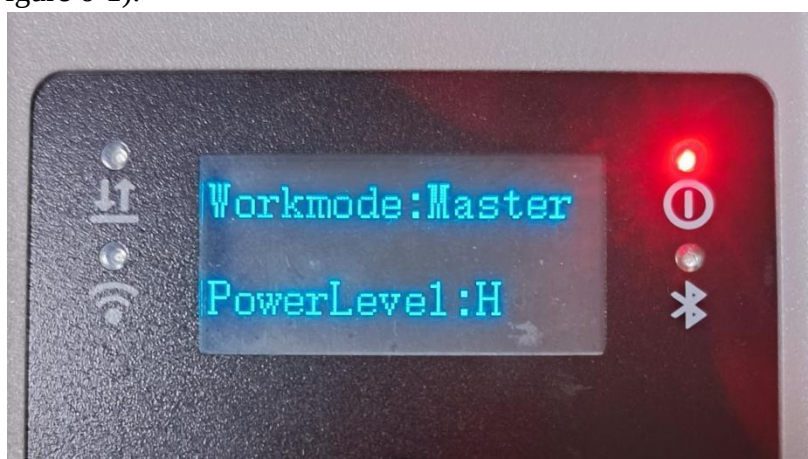


Figure 6-1 Power On

3.3. Working Mode Switching

Under normal operation, the display shows the current working mode (Master/Slave). Press the OK key once to enter channel configuration; a dashed line appears under *Workmode: *** (Figure 7-1). Use the UP/DOWN keys to select the working mode or power level. When a solid line appears under *Workmode: ***, press OK to enter the mode selection interface (Figure 7-2). Use UP/DOWN to switch modes, then press OK to confirm.

Note: Select Master for base station use; select Slave for rover station use.

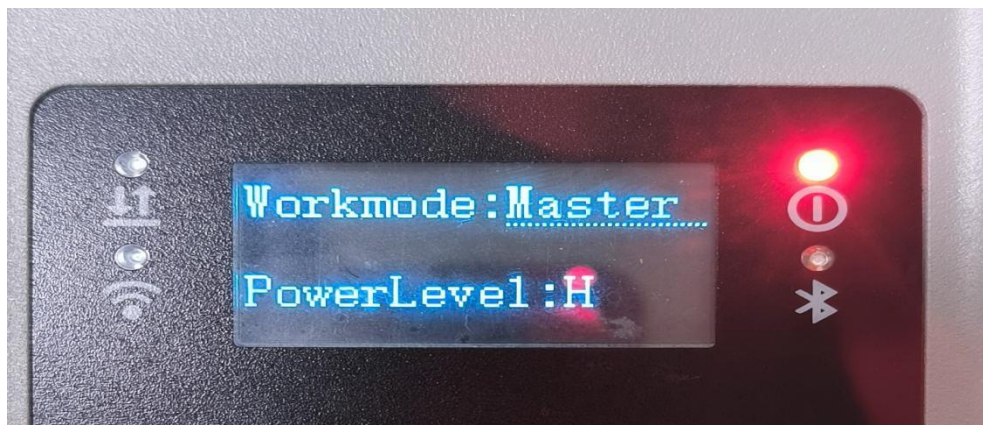


Figure 7-1

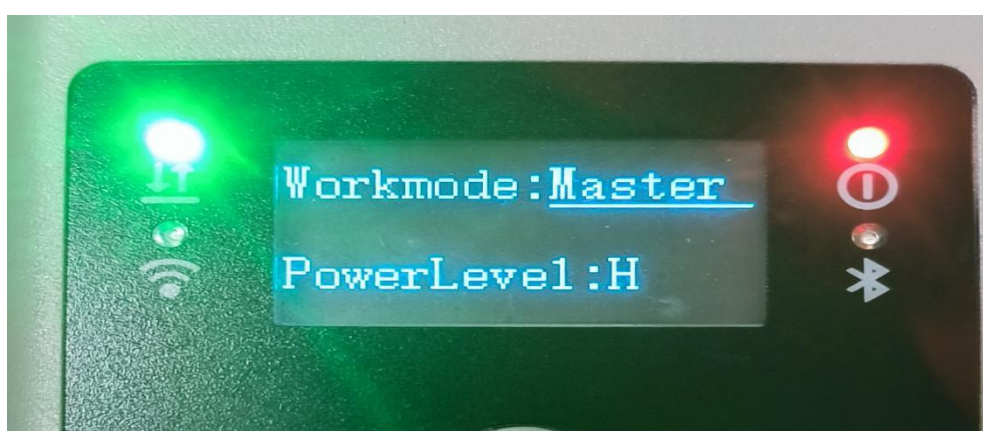


Figure 7-2

3.4. Power Switching

Note: Select H (High) for base station use; select L (Low) for rover station use.

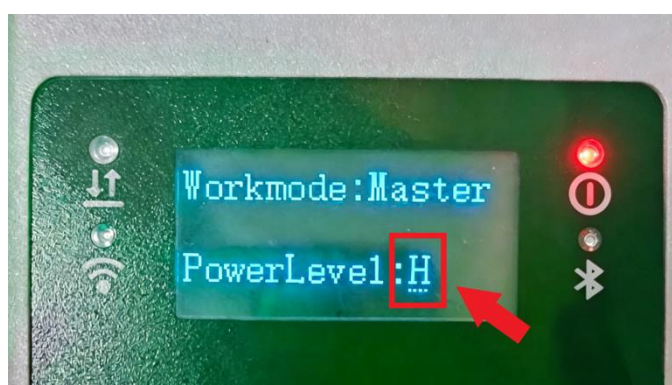


Figure 8-1 Power Switching

3.5. Transmission Indication

The DATA indicator flashes when data is input or output through the data port.

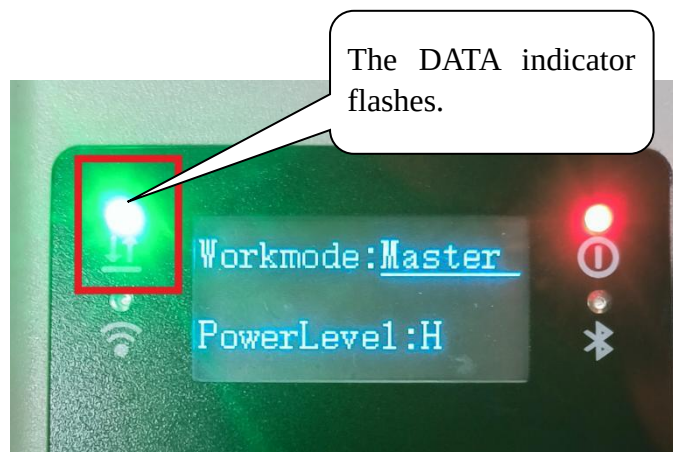


Figure 8-2 Transmission Indication

3.6. Radio Group Pairing ID Settings

After power-on, use the UP/DOWN keys to navigate pages. On the ID setting screen (Figure 9-1), set Network ID and Local ID. Radios can communicate only when they have the same Network ID. Each radio in the same network must have a unique Local ID.



Figure 9-1 Radio Group Pairing ID Settings

4. Host Base Station and Rover Station Parameter Settings

4.1. Launch Software and Connect to Base Station Host

Open SOUTH Engineering Star, tap Configuration, then tap Instrument Connection (Figure 9-2).



Figure 9-2 Launch Software and Connect to Base Station Host

4.2. Connect to Base Station Host for Configuration

Connect via Bluetooth to the RTK receiver connected to the base station radio. Return to the Engineering Star homepage, tap Configuration, then tap Instrument Settings (Figure 10-1).

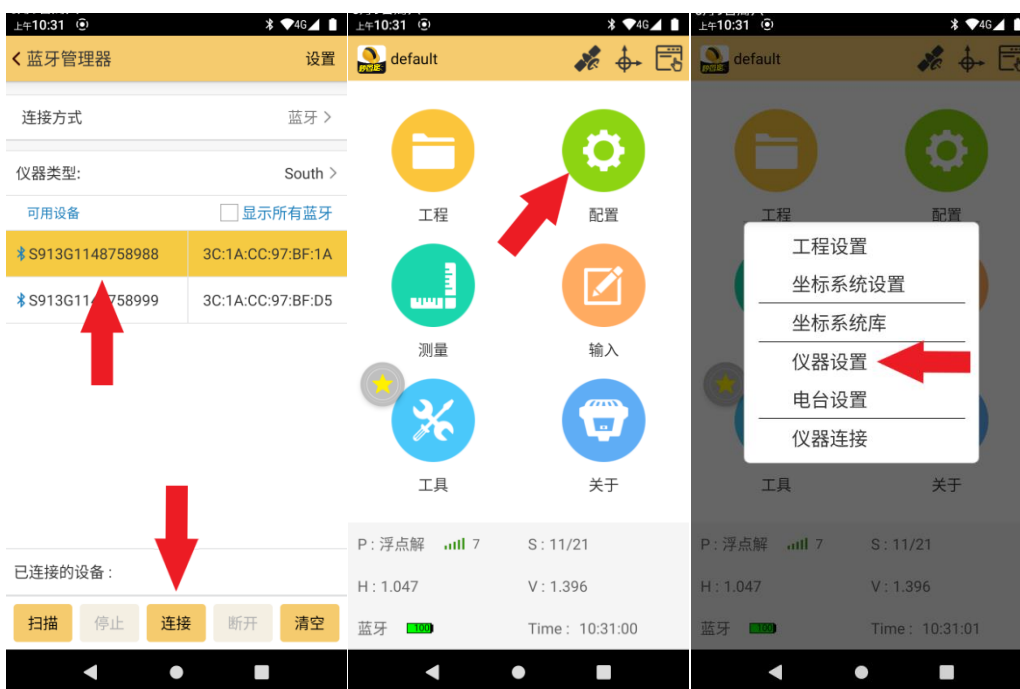


Figure 10-1 Connect to Base Station Host for Configuration

4.3. Base Station Host Settings

In Instrument Settings, select Base Station Settings. Set Data Link to Disabled. Save the settings and start the base station normally (Figure 10-2).

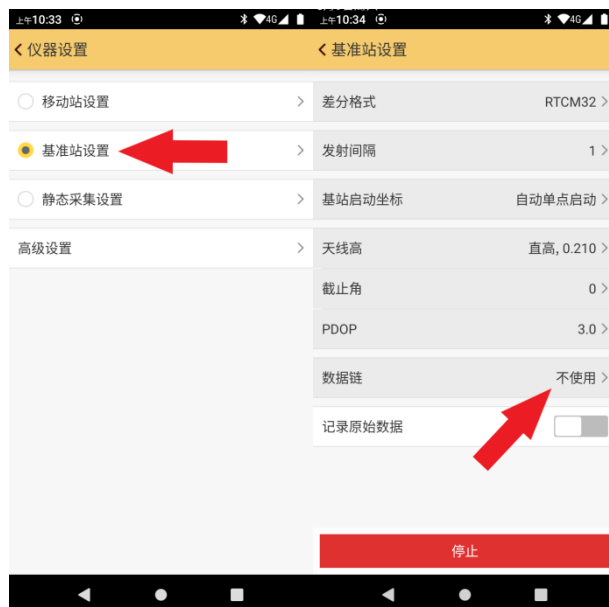


Figure 10-2 Base Station Host Settings

4.4. Rover Station Host Parameter Settings

Connect via Bluetooth to the RTK receiver connected to the rover radio. Return to the homepage, tap Configuration → Instrument Settings. Set the unit to Rover Mode and set Data Link to External Radio (Figure 11-1).

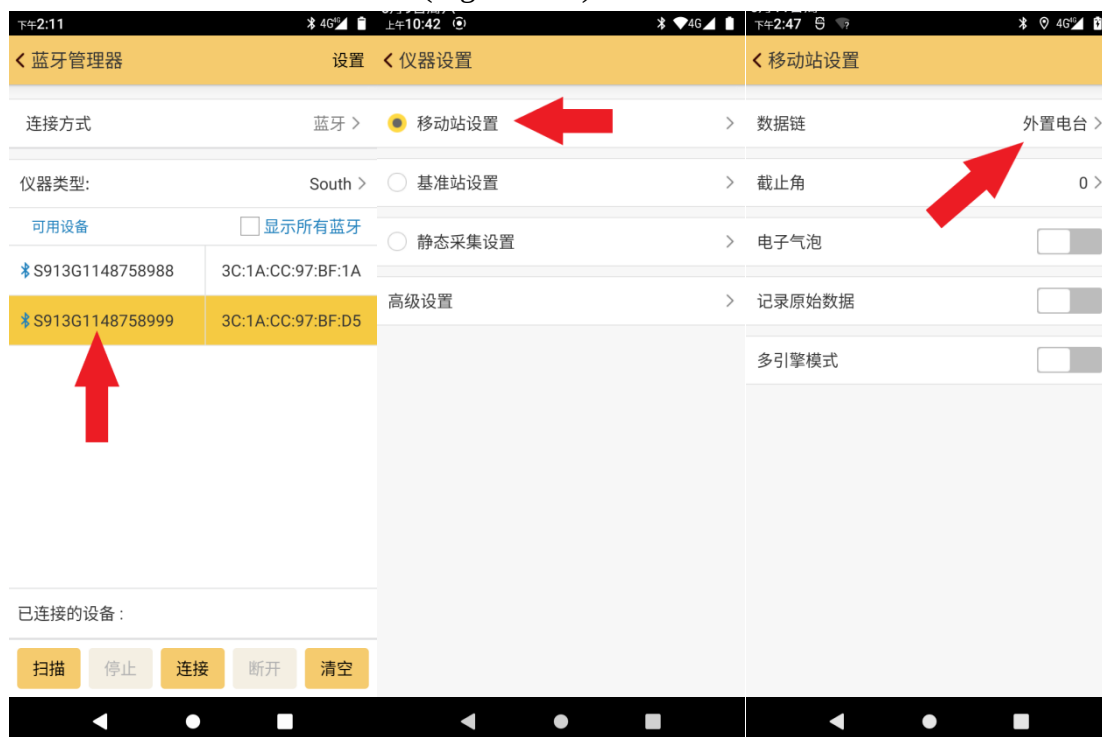


Figure 11-1 Rover Station Host Parameter Settings

5. Radio Usage Notes

- ① Power Supply: 9 – 16 V DC (typical 12 V).
- ② Transmit Power: Depends on input voltage; check voltage before use.
- ③ Power Level: Use Low (L) power whenever possible to reduce battery consumption and extend battery life. Mount the antenna at a higher position for better signal propagation.
- ④ Power Ripple: Must be less than 40 mV. Lower ripple reduces RF interference and improves communication quality.
- ⑤ Wiring: Ensure correct polarity of positive and negative power connections.
- ⑥ Electromagnetic Environment: Check the electromagnetic environment before use to avoid communication dead zones.
- ⑦ Antenna Matching: Select antennas based on bandwidth, frequency, gain, directivity, impedance, and VSWR. Typical effective bandwidth is 20 MHz. For long-distance transmission, use directional high-gain antennas. Ensure antenna and feeder impedance matches the radio (50 Ω).

Recommendations

- ✧ Use an external battery of at least 12 V / 40 Ah with a stable current of 2 A.
- ✧ Charge batteries in a timely manner; avoid over-discharging to prolong service life.
- ✧ Replace batteries every 6 to 12 months to maintain optimal radio range.

6. FCC Statement

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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Technical Specifications

Item	Configuration	Details
Radio Characteristics	Frequency Range	902 MHz–928 MHz
	Operating System	None
	Modulation Mode	GMSK/4FSK
	Channel Bandwidth	500 kHz@farlink, 25 kHz@other
	Air Data Rate	9600 / 19200 bps
Data Communication	Serial Communication	RS232
	Bluetooth	Bluetooth 4.2
Human-Machine Interface	Display	OLED
	Indicators	PWR, DATA, BT
	Keys	5 keys
	Bluetooth Configuration	Supported
External Interfaces	Antenna	TNC
	Power/Serial	5-core LEMO
Electrical Characteristics	Input Voltage	9–16 V DC
	Reverse Polarity Protection	Supported
	ESD Protection	Supported
Environmental Performance	Protection Rating	IP65
	Operating Temperature	-25 °C to +65 °C
	Storage Temperature	-40 °C to +85 °C
Physical Properties	Weight	1500 g
	Dimensions	205 mm × 135 mm × 77.4 mm