

A05

Vehicle-Mounted RTK Positioning Terminal



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Version Update

Version	Date	Modified by	Revision content
V1.0	2024.12.3	CHEN XIAN	Initial version
V1.1	2024.12.4	CHEN XIAN	Add function descriptions
V1.2	2025.1.15	CHEN XIAN	Template modification
V1.3	2025.2.6	CHEN XIAN	Modified SMA interface description
V1.4	2025.3.5	CHEN XIAN	Modified waterproof rating to: Customizable

1. Product Introduction

(1) The A05 Vehicle Positioning Terminal supports dual-frequency bands and full-frequency point positioning. It is equipped with an IMU (Inertial Measurement Unit) for inertial navigation and supports the JT808 communication protocol. It has an integrated TF card for data storage and an embedded SIM card slot. It is compatible with 4G, 5G, 3G, and 2G networks. Additionally, it can connect to external relays and fuel rods. It provides a reserved CAN bus port and GPIO interface for data collection from various external devices.

(2) The outdoor positioning uses a multi-satellite, multi-frequency module, with static positioning accuracy up to approximately 2.5cm~5 cm. In the absence of RTK (Real-Time Kinematic) processing, the standard single-point positioning accuracy can reach 3-5 meters.

(3) External 232 fuel rods can be connected, supporting dual fuel rods. The collected data can be uploaded to the platform. External relays can also be connected for remote power-off or power-on control.

(4) It supports dual-antenna positioning for direction, attitude, pitch angle, and heading angle, and integrates IMU inertial navigation. In the absence of satellite signals, the system will automatically compute the latitude and longitude data.

(5) Note: The single-antenna version requires only one positioning antenna, while the dual-antenna version uses two antennas. The single-antenna version does not support heading angle. Both the single and dual-antenna versions support IMU inertial navigation.

2. Product Features

➤ 5G/4G Multi-network Support | Full-band RTK Positioning (5G Optional)

- Full-band RTK Positioning Track playback
- Fuel Rod/Relay Temperature Sensor
- Built-in TF Card | IMU (Inertial Measurement Unit) Navigation
- Heading Angle & Pitch Angle

3. Product Specifications

Category	Attribute	Description
Main Features	5G /4G	Support local 5G bands
		Support Local 4G bands
	Operator	Support Local 4G/5G operators
	Communication Method	TCP、UDP
	Bluetooth	This function can be custom if needed
IMU	Positioning	Centimeter-level accuracy maintained after 3 seconds of GNSS antenna signal loss
	Accuracy	Meter-level accuracy maintained after 10 seconds of GNSS antenna signal loss
Attitude Features	Heading Accuracy	$(0.15/R)^{\circ}$, R is baseline length in meters. Baseline 0.5m = 0.3° error RSR (approximately 66% of values within this range)
	Pitch Angel Accuracy	$(0.25/R)^{\circ}$, R is baseline length in meters. Baseline 0.5m = 0.5° error RSR (approximately 66% of values within this range)

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Electrical Features	Operating Temperature	9V ~ 36V
	Operating Current	≤300mA @ DC12V
	Voltage Detection	Supported
Environmental Features	Operating Temperature	-20°C ~ +75°C
	Storage Temperature	-20°C ~ +75°C
	Operating Humidity	10%~85%RH (non-condensing)
Mechanical Features	Waterproof Rating	Support Custom Casing
	Terminal Dimensions	108×85×25mm
	Terminal Weight	80g
	Material	Aluminum Alloy
GNSS Features	Constellations & Frequencies	GPS: L1C/A, L2P, L2C
		BDS-2: B1I, B2I, B3I
		BDS-3: B1I, B3I

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		GLONASS: G1, G2
		Galileo: E1, E5b
		QZSS*: L1C/A, L2C
	RTK Positioning Accuracy	2cm+1ppm
	Velocity Accuracy	$\leq 0.02\text{m/s}$ (PDOP ≤ 4)
	Acquisition Time	Cold Start ≤ 35 sec
		Hot Start ≤ 10 sec
	Sensitivity	Tracking Sensitivity-155dBm
		Acquisition Sensitivity-138dBm
	Update Rate	1 ~ 10Hz (Default 1Hz)
	Baud Rate	115200 ~ 230400bps (Default 115200bps)
	Data Format	NMEA 0183
	Differential Data	RTCM3.3/3.2/3.1/3.0
Others	Explosion-proof	Can assist customers with explosion-proof certified

Note: Single frequency RTK, double frequency RTK, full frequency RTK, IMU multi-scheme is optional

4. Key Functions

Category	Attribute	Description	Status
Main	RTK Positioning	This product supports the NTRIP protocol. By	✓

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Functions		receiving differential signals from base stations, it achieves high-precision RTK positioning, with accuracy up to centimeter level.	
	JT/T808	This product supports JT/T 808-2013 protocol	✓
	SMS Configuration	This product supports remote adjustment of device working parameters via SMS, allowing users to easily configure the device without connecting to a platform.	✓
	JT/T808 Configuration	This product supports adjustment of device working parameters via the JT/T 808 platform. (Note: This function requires platform support.)	✓
	Remote Upgrade	This product supports firmware remote upgrade.	✓
	Peripheral Expansion	This product supports CAN, RS232 interface, speaker, external alarm, relay, digital fuel level sensor (oil rod), fuel circuit controller, temperature detection.	—
	Attitude Output	This product supports pushing heading, pitch, and other attitude information to a specified platform via JT/T 808.	—
	blind area	When the device is offline, JT/T 808 positioning	—

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	re-transmission	data is saved locally. After network recovery, the data is automatically pushed to the platform.	
	Dual IP Transmission	The device supports dual IP configuration and can simultaneously send JT/T 808 positioning data to two IP addresses.	✓
	TF Card	The TF card is used to store device operation logs	—

Function Status Description:

✓: Indicates implemented function

—: Indicates supported but reserved function

5. Product Indicator Definitions



Function Status Description:

✓: Indicates implemented function

—: Indicates supported but reserved function

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No.	Icon	Indicator	Color	State Description	LED Display	Function Status
1	4G	Communication	Red	No SIM card	Flash every 2 seconds	✓
				Searching Network/Card Out of Credit	Steady ON	✓
				Network Registration Successful	Flash every second	✓
				Server Connection Successful	Flash 5 times per second	✓
2	GNSS	Positioning	Yellow	No Fix	Flash every 2 seconds	✓
				2D Fix	Flash every second	✓
				Single Point Solution	Flash 2 times per second	✓
				Float Solution	Flash 5 times per second	✓
				Fix Solution	Steady ON	✓

6. Product External Interfaces



No.	Interface	Function	Status
1	GPIO	Can connect external relays, buzzers, temperature/humidity sensors, etc.	—
2	CAN	Can connect external engine control unit, vehicle body control unit, etc.	—
3	RS232	Can connect external vehicle diagnostic equipment, modems, etc.	—
4	POWER	Power Cable (wire sequence details in Figure 1 below)	✓
5	ANT	Positioning Antenna SMA Female Connector	✓
6	ANT	Heading Antenna SMA Female Connector	✓
7	ANT	4G Antenna SMA Female Connector	✓

Function Status Description:

✓: Indicates implemented function

—: Indicates supported but reserved function

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Figure 1: 8-pin Wire Sequence Definition



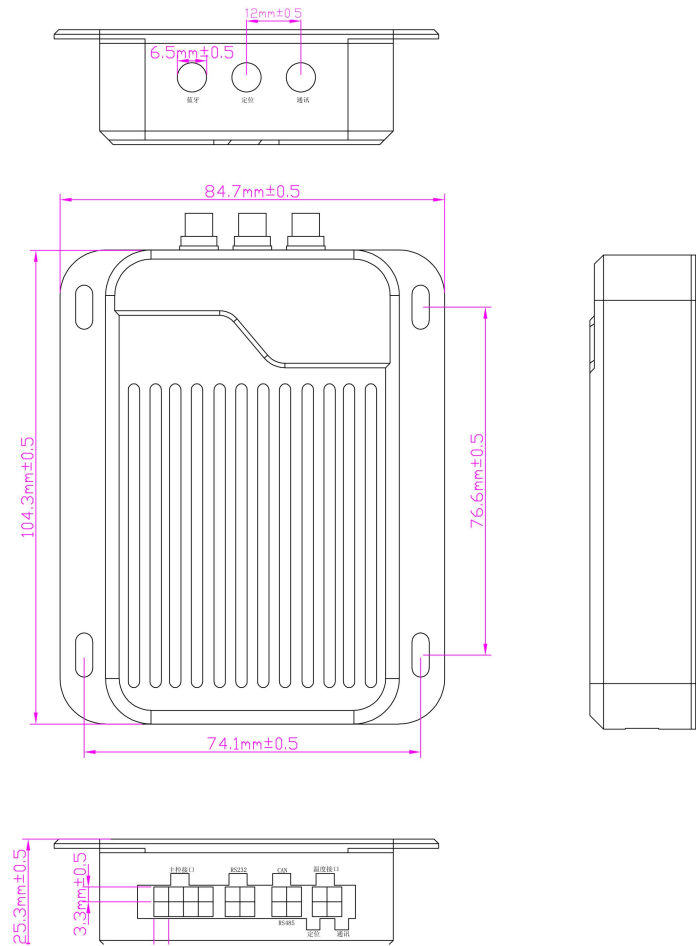
No.	Color	Function	Status
1	Red	Power Input (DC9-36V)	✓
2	Black	GND	✓
3	Orange	Analog Signal Input	✓
4	White	ACC	✓
5	Green	Fuel Cut-off	✓
6	Brown	Low-level Trigger	✓
7	Yellow	High-level Trigger	✓
8	Blue	Alarm	✓

Function Status Description:

✓: Indicates implemented function

—: Indicates supported but reserved function

7. Product Dimensions



Dimension

8. Product Pictures



Front View



Rear View

Top View



Bottom View



Third-angle View



Third-angle View

9. Packing List

No.	Name	Quantity	Unit	Pic
1	RTK Terminal	1	Set	
3	8pin Power Cable	1	Pcs	
4	4G Antenna SMA Male (1m)	1	Pcs	
5	Mushroom Survey Antenna	2	Set	
6	Mushroom Antenna Base (with magnet)	2	Set	
7	SMA to TNC Antenna Cable (5m)	2	Pcs	

10. Installation instructions

10.1 Check

Check whether the appearance of the vehicle terminal is damaged and whether the accessories are complete.

10.2 Insert SIM card



Remove the 4 screws to open the device



Insert the SIM card into the card slot

Open the back cover of the terminal and put the SIM card into the card holder. Please avoid damaging the card holder by excessive force, and do not insert or remove the SIM card while the device is powered on, and make sure that the SIM card is enabled for Internet access (the cell phone sends the terminal configuration parameters, which requires the SIM card to be enabled for SMS function)

10.3 Power Connection



A. Connect the "8pin power cable" to the terminal's "POWER" port.

B. Connect the "red and black wires" to a DC 9V ~ 36V power source. The LED lighting up indicates successful startup. The voltage must not be too high or too low; below this range, the device cannot

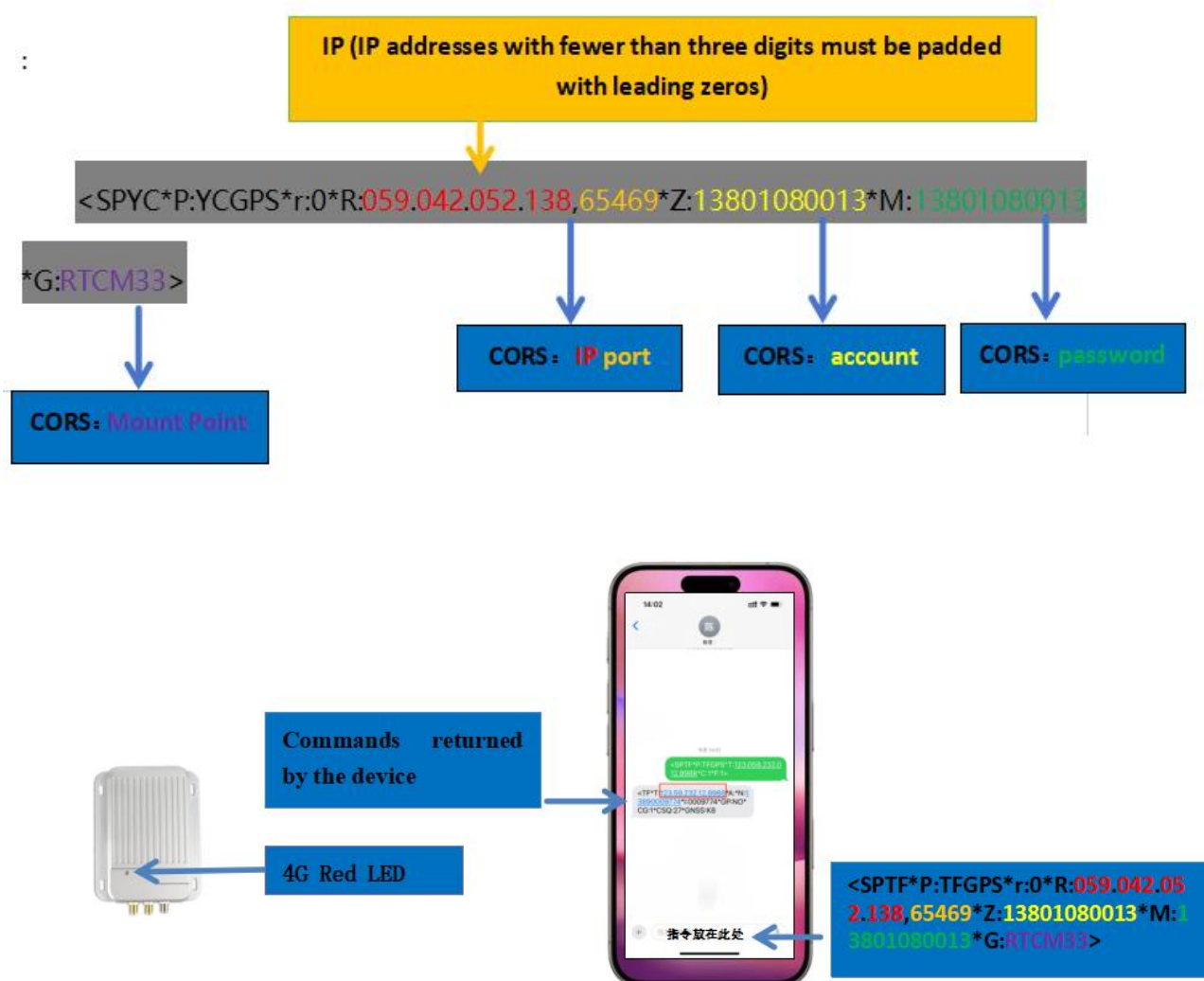
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work; above this range, it may cause device damage.

10.4 Setting NTRIP Account via Mobile SMS

A. After powering on the device, observe the flashing status of the red communication LED. If it blinks once per second, the device has successfully recognized the SIM card and completed dial-up.

B. Open the SMS editing interface on your phone. Send the command via SMS to the phone number of the device's SIM card. Upon receiving the configuration command, the device will reply with a confirmation SMS, indicating the command was successfully received and executed.



Example: If the inserted SIM number is "1385555555", edit the "NTRIP account" setting command as SMS content and send it to this number. The device will return its own set of parameters upon receiving

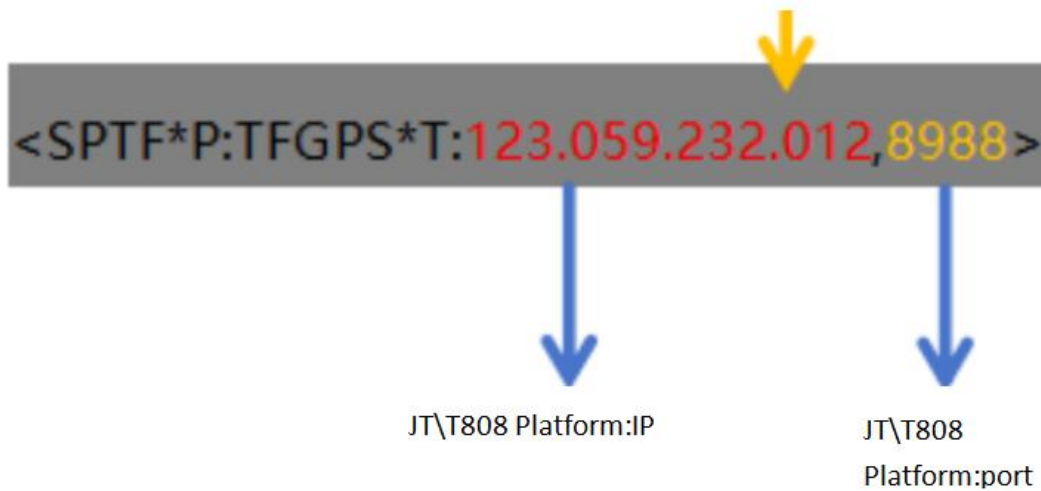
the SMS, indicating successful configuration.

10.5 Setting JT/T808-2013 Platform via Mobile SMS

The method for configuring the data push platform is the same as the operation in section "11.4".

Data Platform Setting Command

If the IP address is less than three digits,
add leading zeros



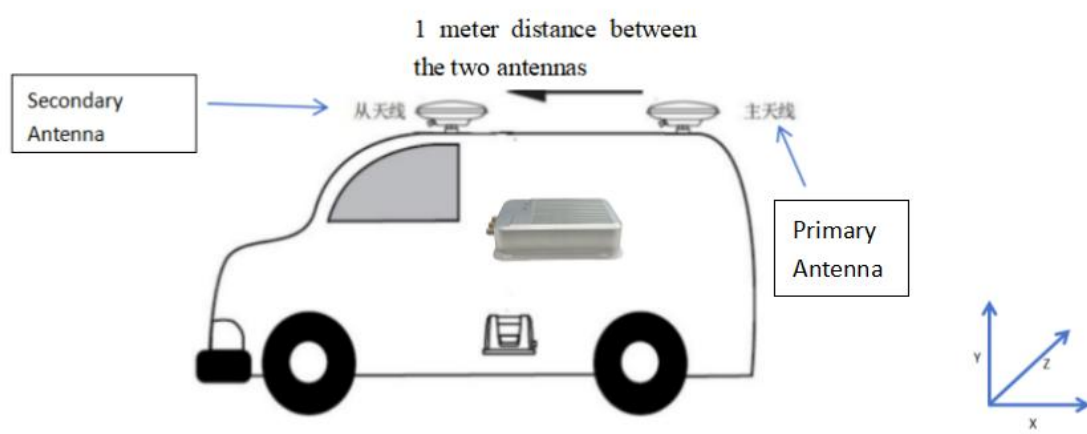
10.6 Antenna Connection Method



10.7 Recommended Installation Method

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- A. Place both antennas on the roof, with the secondary antenna in front and the primary antenna at the rear. A spacing of 1 meter is recommended between them.
- B. Place the terminal with the LEDs side facing up and the indicator arrow pointing towards the vehicle's front. Place the terminal even and ensure rigid connection to the vehicle to prevent detachment during travel.
- C. If using the integrated navigation function, measure the X, Y, Z offset from the primary antenna to the terminal for later use.



10.8 Configuring Integrated Navigation Parameters via MCU Serial Port

- A. Inertial navigation configuration commands can be sent to the device via SMS. Refer to "10.4 Setting NTRIP Account via Mobile SMS" for the sending method.
- B. Command Configuration:

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<SPGD*P:GDGPS*E:1>	Enable integrated navigation E:1 Disable E:0
<SPGD*P:GDGPS*N:5>	Set terminal axis orientation. Default is orientation 6
<SPGD*P:GDGPS*X:1*Y:1*Z:1>	Arm configuration. Fill in X, Y, Z offset based on error from the terminal to primary(main) antenna. Units in meters.
The above 3 commands are reserved and not yet implemented	

After configuring the above commands, the device's power must be disconnected and reconnected for the settings to take effect.

Note: The axis orientation parameter must not be configured incorrectly; otherwise, the latitude and longitude output by the integrated navigation will be abnormal.

11. Troubleshooting

Phenomenon	Cause analysis	Method
Device not on line	SIM card out of credit/suspended	Contact network operator to pay the bill
	Poor SIM card contact	Reinstall the SIM card
	Incorrect setting of on-line parameters	Refer to the manual 10.5 to reset the parameters.
	Vehicle in underground parking lot or tunnel with weak signal	Leave the area with poor signal.
Device unable to locate	Vehicle in underground parking lot, garage, tunnel Move to an open area	Move to an open area
	Antenna not installed/antenna face not pointing upwards	Re-adjust antenna position
	Positioning antenna is open circuit	Re-Connect the positioning antenna
Unable to Get Fixed Solution	SIM card out of credit/suspended	Contact network operator to recharge

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	Poor SIM card contact	Reinstall the SIM card
	Incorrect RTK account settings	Refer to section 10.4 for configuration.
	Incorrect RTK mount point configuration	Use the WGS84 coordinate system mount point by default.