Preface

Introduction

The introduction is applicable to V90 Plus products. V90 is a new type of GNSS receiver used for measurement. The introduction describes how to install, set and use V90 products.

In order to help you better use Hi-Target series products, Hi-Target suggests you carefully reading the instruction. If you are unfamiliar with V90 products, please refer to www.hi-target.com.cn/en/

Tips for safe use

Note: the contents here generally are special operations, needing your special attention. Please read the contents carefully.

Warning: the contents here generally are very important. In case of failing to operate based on warning contents, it will damage the machine, lose the data, break down the system and endanger personal safety.

Exclusions

Before using the products, please carefully read the operating instruction, and it will help you better use the product. Hi-Target Surveying Instrument Co., Ltd will not assume the responsibilities if you fail to operate the product according to the requirements in operating instruction, or operate the product wrongly because of failing to understand the operating instruction.

Hi-Target is committed to constantly perfect product functions and performance, improve service quality and reserve the rights to change the contents in operating instruction without separate notice.

We have checked the consistency between contents in

instruction and software & hardware, without eliminating the possibility of deviation. The pictures in operating instruction are only used for reference. In case of inconformity with products, the products shall prevail.

Content

CHAPTER

1

Product Introduction

This chapter describes:

- Preface
- Product characteristics
- Cautions for use

Preface

V90Plus is a new type of GNSS receiver used for measurement pushed forward by Hi-Target Brand,used a new design,Magnesium alloy construction,Linux3.2.0 operating system,Combined gravitational acceleration sensor, WiFi connectivity, it is a realization of lightweight, intelligent, easy to use measurement GNSS receiver.

Warning: 1、V90Plus receiver best to use 3G SIM card, if you still use 2G SIM card to work, affect instrument performance or operating units caused economic losses, the company will not be responsible!

2、the instruction represents no standard configuration. The articles within the box can be adjusted according to different user requirements. The specific configuration shall be subject to the outgoing list upon purchasing. The suggestions before using the machine: check whether the product package is damaged; please open the package carefully and confirm whether the articles are consistent with outgoing list; in case of loss or damage in the product and its accessories, please immediately contact with local office or dealers; please carefully read the operating instruction before carrying, transporting and using the product.

Product Characteristics

◇ A new generation of small intelligent BDS RTK，equipped with top drive core，provided intelligent mapping of the overall solution;

◇ Using multi-satellite and multi-frequency GNSS units，Support BDS, GPS, GLONASS.

◇ Equipped with CotexA8 platform、mass storage (16GB + SD card);

◇ With WiFi / 3G connectivity, to achieve long-distance transmission of data;

◇ Gravity acceleration sensor (electronic bubble);

◇ Equipped with iHand20 intelligent hand held;

◇ Designed for the Android development of customized smart metering software--Hi-Survey;

◇ A key Multifunction;

◇ New look，Magnesium alloy structure，more solid;

◇ Static data Dual Format storage（*.GNS / RINEX data）。

Cautions for Use

V90 Plus receiver used Chemical resistance and impact resistance design， but we also need sophisticated instruments careful use and maintenance.

Warning: the receiver shall be in stipulated temperature range upon using and storage. The detailed requirements are shown in Chapter V: Technical Parameters —> Environment.

In order to guarantee the quality of continuous tracking observation and satellite signals, it is required that the overhead observation station shall be open, without flaky barriers above 15° elevating angle; in order to diminish the interference of electromagnetic wave to GNSS satellite signals, the observation station shall be free form strong electromagnetic wave within the range of 200m, such as television tower, microware station and high-voltage transmission line; in order to avoid or reduce multipath effect, the observation station shall be far away from the terrain and ground features with strong reflection against electromagnetic wave signal, such as high-rise buildings, waters, etc.

CHAPTER

2

Introductions to Receiver

This chapter describes:

- Receiver appearance
- Control panel
- Upper cover
- Bottom cover
- Batteries
- Environmental requirements
- Electronic jamming

Receiver Appearance

The product appearance is divided into three sections， upper cover, bottom cover and control panel.

Figure 2-1

Control Panel

V90Plus middle frame for the control panel of the receiver, the control panel includes a power switch button, a button to include all the features of V90Plus receiver set. Three indicators, namely satellite lights, power light (bi-color light), light (bi-color light).

Figure 2-2

 Satellite light (green light)  status light (red and green light)

 power light (red and green light)

Power Button Functions: Startup,shutdown,operating mode switching, the mode switching confirmation status query, automatically set the base station, forced shutdown, reset the board and so on.

Upper Cover

Figure 2-3

◇ U-Loss Prevention boss:U-boss can effective anti-wear;

◇ Color mode: appearance of the structure, Clear ,beautiful, drop

Bottom Cover

Including battery compartment, five-pin socket, speaker, Mini USB interface.

1- Screw connection 2- speaker 3-USB interface and protective plug 4-GPRS/ Antenna Interface 5- Five-pin plug socket and protection 6- Battery compartment 7- SD card slot 8-SIM card slot 9- Battery Cover 10-SLC Power Block.

Figure 2-4

◇ connection screw: for the instrument fixed to the base or the pole.

◇ Trumpet: Real-time operation and status of the instrument voice broadcast.

◇ USB interface: For connection to the host and external devices, upgrade firmware and download the static data, can also be used as USB to serial port using a special mode of operation (need to install drivers).

◇ 3G / GPRS internal radio antenna connection: Connect 3G / GPRS antenna using the network, then the built-in UHF radio antenna when using the radio.

◇ Five-pin socket: For connection to the host and external data links and external power source.

◇ battery compartment: for housing lithium batteries.

◇ SD card slot: SD card for housing, can store large-capacity static data.

◇ SIM card slot: for receiving USIM / SIM card for data link communications and remote control.

◇ Battery cover: battery cover can dust and water, batteries and a host of spare parts have protection role.

◇ SLC power base: lithium is used to connect with the host.

◇ Protective plug: socket for dust and waterproof.

Note: 1. If it is unnecessary to use five-core socket, eight-core socket and difference antenna interface, please cover the rubber plug to prevent dust.

2. In case of inflowing, the trumpet may be silent or hoarse, which will recover normally after drying.

Batteries

Figure 2-5

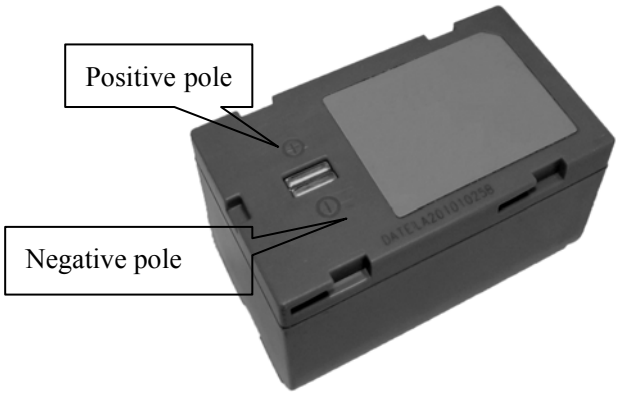


Figure 2-6

Environmental Requirements

The receiver shall operate in dry working environment regardless of waterproof materials. In order to advance the stability and service cycle of receiver, the receiver shall be prevented from extreme environment, such as:

- ◇ Moisture
- ◇ Temperatures above 65 degrees centigrade
- ◇ Below - 40 degrees centigrade
- ◇ Corrosive liquids or gases

Electronic Jamming

The receiver shall not be installed in the place near to strong electric power and interference signal, such as:

- ◇ Oil duct (spark plugs)
- ◇ Generator
- ◇ Battery-operated motor cycle
- ◇ DC-AC power supply changeover equipment
- ◇ Signal transmitting station (tower)
- ◇ Power supply

CHAPTER

3

Elementary Operation

This chapter describes:

- Control panel
- Function Key
- Status Inquiry
- LED Function
- Start and stop receiver
- Reset Motherboard
- Automatic setting station
- Static collection
- Static data storage
- RTK data storage

- U disk data download
- Firmware
- Electronic bubble
- Electronic bubble calibration
- WiFi password settings
- Power Supply System
- Radio frequency settings
- SIM card / USIM card
- Micro SD Card

Control panel

Most settings and operations of receiver are completed using two keys on control panel.

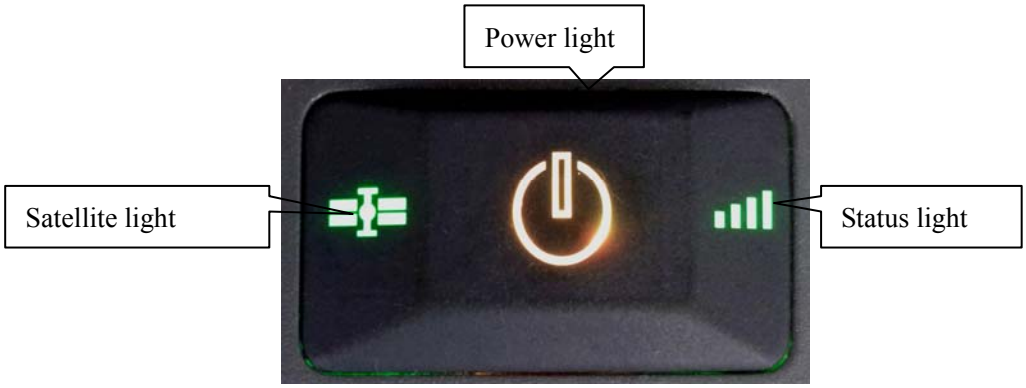


Figure 3-1

Function Key

Table 3.1 Description of keys operation time

Operation name	Note
on	Shutdown state, long press the button one second boot
off	Boot mode, three seconds ≤ pressing the button≤6 seconds, talking the first "buzz", release the button, normal shutdown
Automatic setting station	Shutdown mode, press the button six seconds long, broadcast "is automatically set base station", release the button, the instrument will automatically set the base station
Operating mode switching	Double-click the button to enter the operating mode switching, double-click each time a working mode switch
Operating mode switching confirmation	In operating mode switching process, click the button to confirm

Status Inquiry	See Schedule
Reset Motherboard	The boot state, long press the button more than 6 seconds, voice reporting second sound "ding dong", release the button, reset motherboard
Forced shutdown	The boot state, long press the button more than 8 seconds, forced shutdown

Status Inquiry

Table 3.2 Key Functions

Working status	Broadcast content
GSM base	GSM base
External base	External base
WiFi base	WiFi base
GSM rover	GSM rover
External rover	External rover
Static	Static collection interval X，Elevation angle X，Remaining storage is X，Satellites number X

LED Function

Different settings mode indicator displays the status of different, see Appendix 3: Control panel lights.

Table 3.3 LED Function Description

Operating	Meaning	
Power Light (Yellow)	Long-term lighting	Normal voltage: the battery> 7.6V, foreign> 12.6V
Power Light (Red)	Long-term lighting	Normal voltage: 7.1V <internal battery ≤7.6V, 11V <foreign ≤12.6V
	Slow flash	Undervoltage:the battery ≤7.1V, foreign ≤11V

	fast flash	Tip Power: 1-4 flash per minute under the direction of electricity
Signal light (Status Green)	Off	when you did not use GSM / WiFi client
	Long-term lighting	GSM / WiFi connected to the server
	Slow flash	GSM has landed on the 3G / GPRS network or connect to WiFi hotspots
	fast flash	GSM is landing when prompted 3G / GPRS networks or WiFi hotspots are connected
Data light (Status Red)	Slow flash	1, the data link transmit and receive data (mobile station to receive only tips, the base station only prompt emission) 2, static data collection
	Off	Data link device mobile or base station is using can not communicate, the communication module fails, no data output
Satellite lights (Green)	Long-term lighting	Satellite lock
	Slow flash	Star Search or satellites are lost
	Off	1, when resetting the receiver, motherboard failure, no data output 2, static mode, motherboard failure, no data output
Reset the motherboard, still when an error occurs (insufficient storage space)		Three lights flash irregular

Start and Stop Receiver

Table 3.4 Description of display state of indicator under startup and shutdown mode

Boot-s	Press the	All indicator	Starting music, work mode before

trap	power button for 1 second	lights on	previous startup and Voice prompt of data link mode
Shutdown	Long press power button for 3 seconds	All indicator lights off	Shutdown music

Reset motherboard

The boot state, long press the button more than 6 seconds, voice reporting second sound "ding dong", release the button, reset the motherboard.

Auto set basestation

Shutdown mode, press the button six seconds long, broadcast "is automatically set base station", release the button, the instrument will automatically set the base station

Static collection

V90Plus receiver can be used for static measurements, setting method to double-click the button to enter the operating mode switching, double-click each time a working mode switch; in operating mode switching process, click the button to confirm, set up after the success of the red status light interval seconds (depending set the sampling interval to be) flashes once they capture one epoch. Static measurements collected data is stored in host memory card (when the host memory below 2M, automatically switches to an external SD

memory card). After the static data file must be downloaded to a computer for processing a static post-processing software.

NOTE： Working mode switch: You can also switch by handheld, please refer to the specific operation "Hi-Survey Software User's Guide" → equipment → Accessibility → static capture settings.

Static acquisition step

1. Set up the instrument at the measurement point, the point is to strictly, and leveling.

2. Measure instrument height three times, each time not more than the difference between 3mm, take the average as the ultimate instrument height. High measuring instrument shall be measured to the center point mark stone on top of the instrument of measurement reference member. V90Plus receiver measuring reference member 0.130 m radius, phase center height 0.1018m.

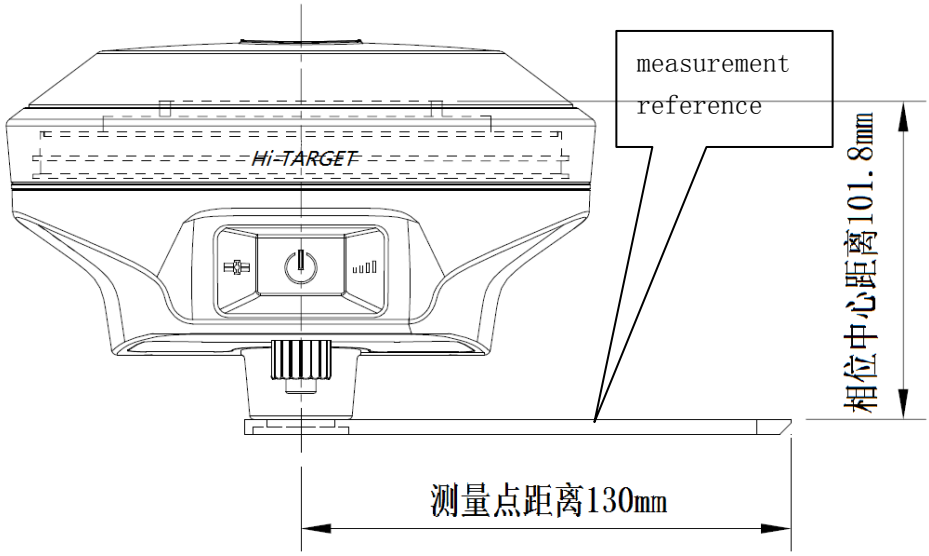


figure 3-2

3, the recording name, instrument number, instrument height, began observing time.

4, boot, set the host to the static measurement mode. Satellite Blinking is searching for satellites. Satellite into long bright lights from flashing status indicates locked satellites. Status lights flash once every few seconds, indicating that the acquisition of one epoch.

5, after the measurement is complete shutdown, shutdown time record.

6, download processing data.

Note ： You can not move the base in the acquisition, acquisition parameters can not be changed.

Static data storage

GNSS static data collection is stored in V90Plus receiver 16GB internal memory in the "static" letter, effective storage space 14GB, a total of three folders: log, gnss and rinex, log folder stores log information, gnss folder data storage format is * .gns, rinex folder store data format as a standard RINEX format data files. You can use the random configuration of USB data cable connected to the computer, use the U disk operation mode to copy static data to your
computer.

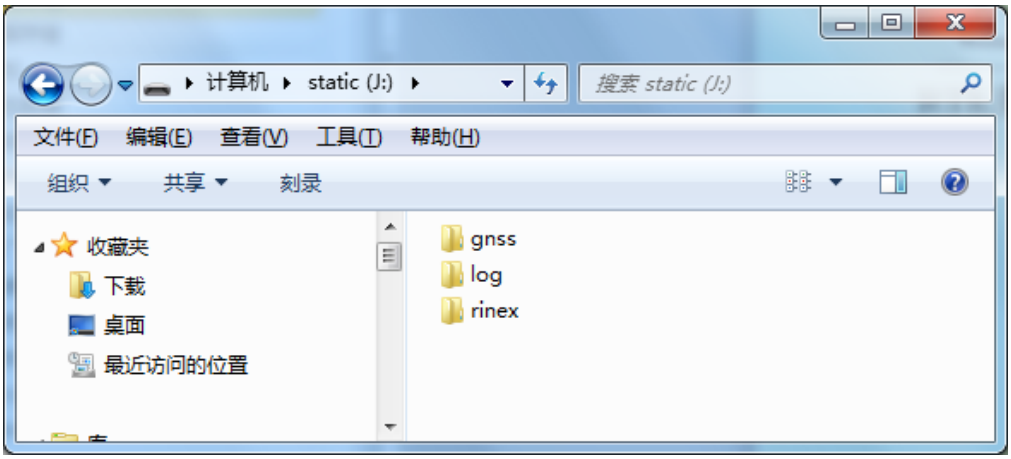


figure 3-3

Note： When the receiver inside and outside the storage space is less than 2MB, data light (red state) flash, and will stop recording data, the existing data files will not be overwritten.

RTK data storage

iHand20 handheld Haida V90Plus receiver can be connected via WiFi, Bluetooth or network, when work began after the setup is complete, the memory card handheld, you can book by hand random configuration data cable data collected RTK RTK data storage downloaded onto your computer.

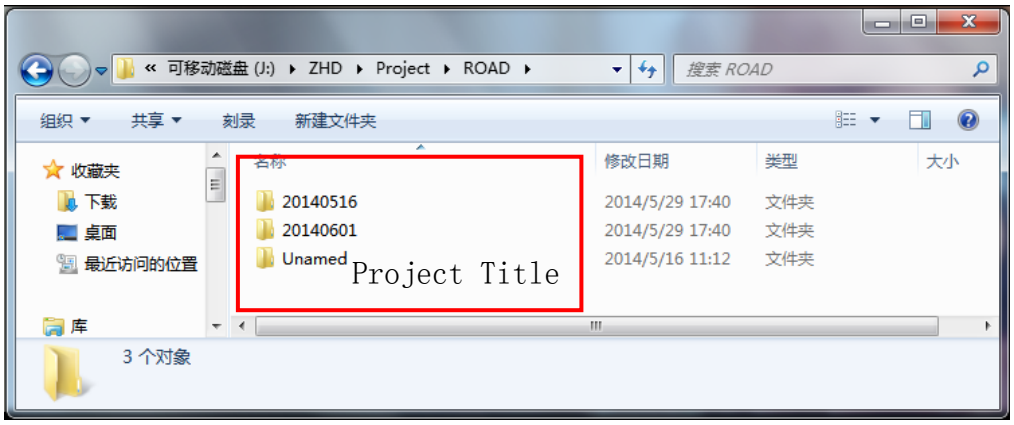


图3-4

For more information about the hand-book, read "Hi-Survey Software User's Guide."

U disk data download

Receiver file management is stored by USB drive. It can be used upon inserting and download by dragging directly without download programs. It can only download static data and unable to write or read the receiver.

The receiver can download USB drive data with Y-type data cable, one end is connected to computer USB and the other end is connected to eight-core socket on bottom of receiver. After connection, “static” disk and SD card will appear in computer. After opening the disk, it can copy the collected static file.

Figure 3-5

The steps to modify point name and antenna height of downloaded static file are:

1. Choose *. GNS and double click the mouse.

2. Pop up the dialogue of “file edit” to modify point name and input antenna height, and then click “ok”.

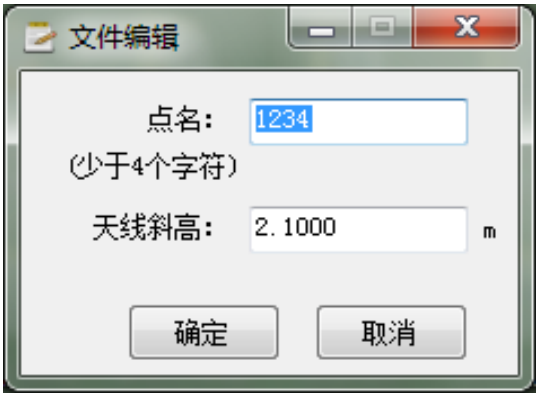


Figure 3-6

Note： the static files in removable disk can be deleted by GNSS receiver management software rather than deleting directly.

Firmware

The receiver uses the 3G network, the host firmware can be automatically upgraded (You can refer to: "Hi-Survey Software User's Guide" → equipment → Accessibility → receiver set) through the network, the user can also choose to manually U disk upgrade.

The manually steps of host firmware upgrade

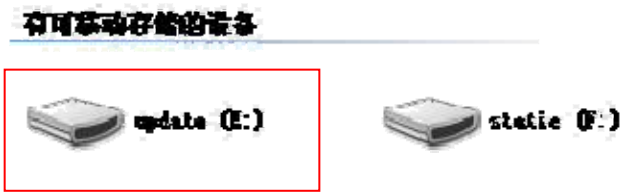


Figure 3-7

1, First need to open V90Plus receiver using a random configuration of the USB cable to the computer USB port connection. At this point turn on my computer, there will be "update" to upgrade the disk.

2, The host firmware (firmware can be downloaded from the official website or obtained from the technician) copy to "update" to upgrade disk, remove the U disk, unplug the cable, restart the receiver to complete the upgrade.

3, Restart the success or failure of the upgrade process, there will be a

corresponding voice prompts to upgrade if the upgrade fails again or contact technicians.

Electronic bubble

After Hi-Survey in demo mode, the built-in GPS or connect V90Plus, support electronic bubble measuring software interface schematic display electronic bubble position, the user can select the automatic collection in electronic bubble automatic measurement and automatic sampling sites according to the electronic bubble state. Electronic bubble has the following states:

Good center: bubble-set within tolerance, the center is good;

Wait center: Wait a user to adjust the pole, so that the bubble is centered;

Wait for measuring: Wait center 2S, measuring mode, sampling sites were in this state;

Wait Move: After the completion of the first sampling point, waiting for the user to move the pole, will start moving at once measure after a certain distance;

Tilt overrun: bubble-set within tolerance, deviation from the center position.

Figure 3-8

Figure 3-9

Electronic bubble calibration

When connecting V90Plus receiver, users can calibrate the electronic bubble under the [Accessibility].

Figure 3-10

To do the following:

[Device] → [Accessibility] → [electronic bubble calibration]

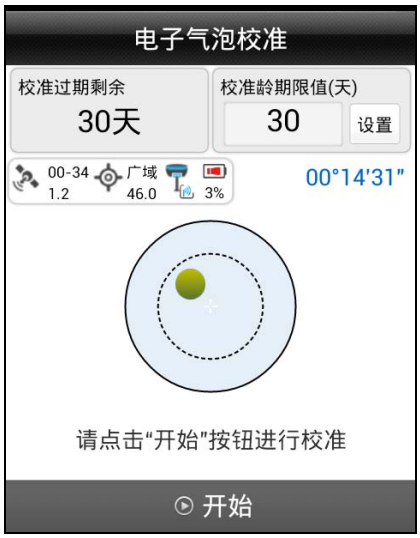


Figure 3-11

V90Plus receiver placed outside the strict leveling base remain stationary until the receiver locks satellite, ready when you are ready click on [Start] button to bring up the calibration check box.

Figure 3-12

Click the pop-up confirmation box OK button, the hosts began to calibrate the electronic bubble.

Figure 3-13

Figure 3-14

NOTE：Electronic bubble age calibration period recommended value is set to 30 days, more than the set number of days without calibration, the receiver will not work!

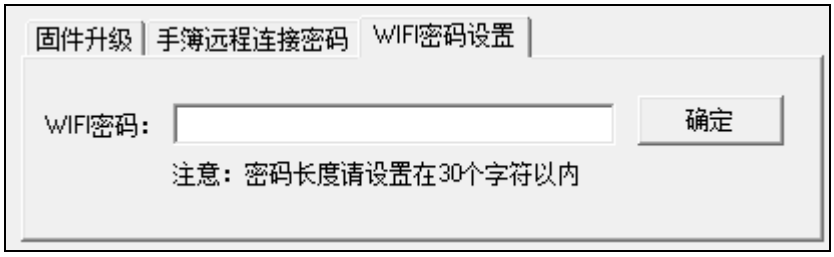
WiFi password setting

Set V90Plus host as a WiFi hotspot when connected to a password.

Figure 3-15

Note： 1, WiFi factory default password See Schedule 3;

2. If you have forgotten your own set of WiFi password, you can "GNSS receiver management software V1.4.2" → WiFi password, enter the password and click OK to. Specific methods of operation management software receiver, see: Annex 4.



Power Supply System

Battery installation and removal

Installation

1, the battery cover and push back gently press the metal buckle.

Figure 3-16

2, the battery cover up to open the shells.

Figure 3-17

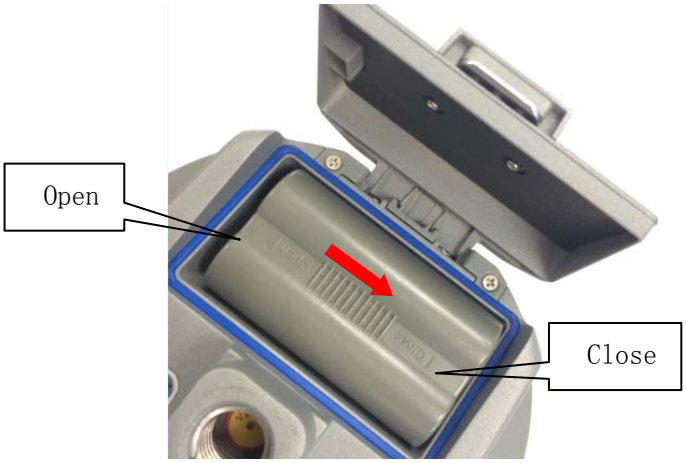


图 3-18

3, toward the end of marked "Close" gently press and push (red arrow) can complete the battery installation.

Remove:

Along with the name "Open" and hold the direction of launch, pour out the battery,the battery complete uninstall.

Battery, charger

table 3.5, the battery charger model

Name	Model
Lithium Battery	BL-5000
Charger	CL-8410/ CL-4400

Power supply

Table 3.6 Power Supply

power	Power supply	Lithium batteries; 5-pin external power socket
	Power range	DC power supply: 6 ~ 28V

V90Plus receiver can also be powered via 5-pin socket bottom of the main external power supply.

GSM mobile station external voltage range DC 6 ~ 28V, current is greater than 3000 mA. When there is an external power supply, the host will automatically detect the lithium battery and external power supply voltage, select high voltage power supply. To use an external power supply, you must use a dedicated power supply specified in Haida.

Note ： 1, the lithium battery time will be reduced as the temperature and increase the number of charge and discharge decreased use. Usually a new 5000 mAh lithium battery do static data collection can be used 10 hours, so the built-in network of the mobile station can be used for eight hours, do 2W built-in radio transmitter base station can be used for 7 hours.

2, in order to extend battery life, please charge the battery as soon as possible within 24 hours after the battery runs out, otherwise it will shorten battery life!

3. Long-term do not use batteries, please charge the battery once a month to extend battery life.

Charging

BL-5000 rechargeable lithium battery must use a dedicated CL-8410 / CL-4400 lithium battery charger, charging time is about 7 hours. CL-8410 Battery Charger charging indicator light is red during charging, charging is completed the light turns green, continue to charge 1 to 1.5 hours, then the battery is fully charged.

Figure 3-19

Charging operation

1、Insert the battery charger in the following illustration

Figure 3-20

2, along the "Close" direction, the red arrow shown in the figure above, push the battery until it clicks.

3. After connecting the power, "charging indicator" is displayed as red light is charging.

Caveat ： 1. Only use factory configuration of the battery and charger, do not put the fire or short-circuited with a metal electrode.

2, in use, during charging, or storing the battery become heat, deformation, leakage, emission of odor or other abnormal should stop using, please replace the battery.

3, if the time is shortened, please stop using the battery, the battery is aging, replace the battery.

SIM Card/USIM Card

V90Plus receiver supports SIM card and USIM card.

Table 3.7 SIM card / USIM card instructions

USIM Card	WCDMA（ZHD/VRS）
	GPRS（ZHD/VRS）
	GSM
SIM Card	GPRS（ZHD/VRS）
	GSM

Installation card

Use V90Plus Receivers RTK jobs, you need to prepare SIM or USIM card and open the corresponding data communication services. The required number of cards, depending on your system configuration RTK survey. Each host and each handheld for an installation card.

Whether the SIM card or USIM card has been launched 3G / GPRS services, if China Mobile users, please contact customer service hotline 10086 China Mobile, China Unicom users, please contact customer service 10010 China Unicom, China Telecom, China Telecom users can consult customer service 10000.

SIM card installation procedure is as follows:

1. Remove the battery cover, remove the battery to reveal the SIM card slot.

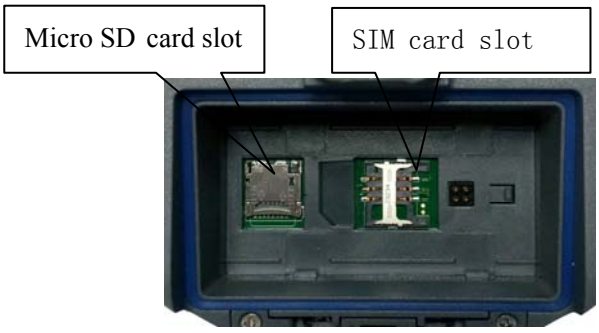


Figure 3-21

2, SIM card slot is consistent with the notch direction.

Figure 3-22

3, the SIM card in the deck, the front (with metal contact surface) down into the slot.

Figure 3-23

4, the entire SIM card into the slot to complete the installation.

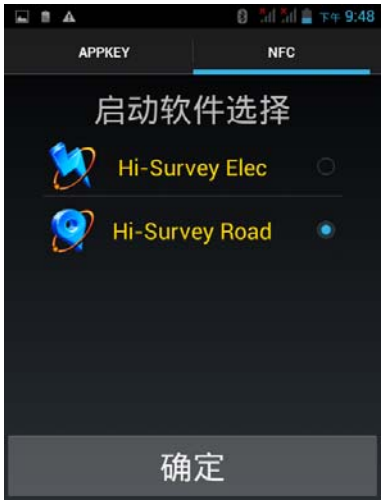
Note ： Before installing the card you must turn off the receiver! If the SIM card is installed in the boot state, the receiver will not detect the SIM card, the mode setting is invalid!

Micro SD card

Micro SD card can store data collection and program files.

Note ： Micro SD card (also known as TF card) for the small size external memory expansion cards, commonly used in mobile phones, PDA, note separately from normal SD card when you

buy zone configuration. Ordinary SD card Micro SD card volume by volume to be large to fit V90Plus use. V90Plus largest to 16GB Micro SD card.



2. The iHand20 induction area close V90Plus sensing area, Hi-Survey will automatically start V90Plus Bluetooth connection.

iHand20 located on the back of the sensing area:

V90Plus located atop the sensing area:

CHAPTER

4

Technical parameters

This chapter describes:

- GNSS section
- Receiver Accuracy
- Interface
- Function keys and indicators
- Physical Characteristics
- Environment

GNSS Section

◇ GPS：Synchronous tracking　L1

◇ BDS：Synchronous tracking B1、B2

◇ GLONASS：Synchronous tracking L1 C/A、L1 P、L2 C/A

◇ SBAS：Synchronous tracking L1 C/A、L5

◇ GIOVE-A：Synchronous tracking L1 BOC、E5A、E5B　E5AltBOC（Optional）

◇ GIOVE-B：Synchronous tracking L1 CBOC、E5A、E5B E5AltBOC（Optional）

◇ GALILEO：（Upgrade Reserved）

◇ Initialization time Typically <10 seconds

◇ Initialization reliability> 99.9%

◇ 1Hz、2Hz、5Hz、10Hz、20Hz 和 50Hz Position output (default 1Hz)

◇ Difference Scheme Support：sCMRx、CMR、CMR+、RTCM 2.1、2.2、2.3、3.0、3.1、3.2

◇ Navigation output format Support：ASCII：NMEA-0183 GSV、AVR、RMC、HDT、VGK、VHD、ROT、GGK、GGA、GSA、ZDA、VTG、GST、PJT、PJK、BPQ、GLL、GRS、GBS

Receiver Accuracy

◇ Static, rapid static accuracy：　Plane：$\pm(2.5+1\times10^{-6}D)$ mm

Height：$\pm(5+1\times10^{-6}D)$ mm

◇ RTK positioning accuracy：Plane：$\pm(8+1\times10^{-6}D)$ mm

Height： $\pm(15+1\times10^{-6}D)$ mm

Interface

◇ 1 x RS232 serial interface

◇ 1 x Mini USB interface

◇ 1 x SIM card interface

◇ 1 x SD card interface

◇ 1 x 3G / GPRS antenna interface

◇ 1 xBluetooth interface

◇ 1 x WiFi Interface

◇ 1 x Built-in lithium battery Interface

◇ 1 xFifth pin interface

Function keys and indicators

◇ 1 panels buttons: a power button on the receiver can be flexibly various settings, and a sound, light work with

◇ 3 LEDs: a satellite LED (monochrome), a status light (color), a power indicator light (color)

Physical Characteristics

◇ Core control chip CotexA8, built-in 16GB Flash memory

◇ Gravity acceleration sensor (electronic bubble)

◇ Volume:φ153mm×h83mm

◇ Weight: 1.0kg (without lithium battery)

◇ Anti-2 m natural drop, anti-two meters underwater temporary immersion.

◇ Built-in 5000mAh high-capacity lithium-ion battery. Voltage: 7.4V, a new battery continuous working time: 12 hours static, GPRS mode 9 hours, 2W station transmitting 7 hours.

◇ Can be an external DC power supply, wide input range 6 ~ 28V, internal and external power supply automatically switches

Host Power (static mode): ≤3.5W

Environment

◇ Protection class：IP67

◇ Working temperature: -40 ℃ ~ 65 ℃, Storage temperature:-40℃～75℃

CHAPTER

5

Socket and Main Accessories

This chapter describes:

- Preface
- Five-pin socket
- Five-wire
- Mini USB interface
- Mini USB wire
- Antenna Interface
- Antenna

Preface

The chapter will introduce the appearance and application of main interface of receiver and accessories. The following equipment does not represent all users purchased V90 Plus. According to different configurations, the specific configuration shall be subject to the delivery order upon purchasing.

Five-pin socket

Figure 5-1

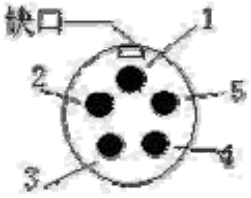


Figure 5-2

1,Five-pin socket:Also known as COM2/PW2,normally used to connect the host and external data link connection, external power source.

Table5.1 five-pin socket Signal Description

Fifth-core signal	
1	GND
2	GND
3	Vin
4	RXD
5	TXD

2, All the companies are in circular socket counterclockwise positive start numbering pin; pin round plugs are numbered starting with welding face counterclockwise.

3,All the above data (TXD), the (RXD) signals to receivers explained. TXD transmit data to the receiver signal line, RXD received data to a receiver line.

4. In addition, the computer serial port DB9 pin connector signals: 2 (RXD computer data reception signal line), 3 (TXD computer data transmission signal line), 5 (GND signal ground). Referred to as "2 receive 3 rounds."

Note： Above all when facing the host, the host at the bottom of the socket front icon (ie plug weld surface).

Five-wire

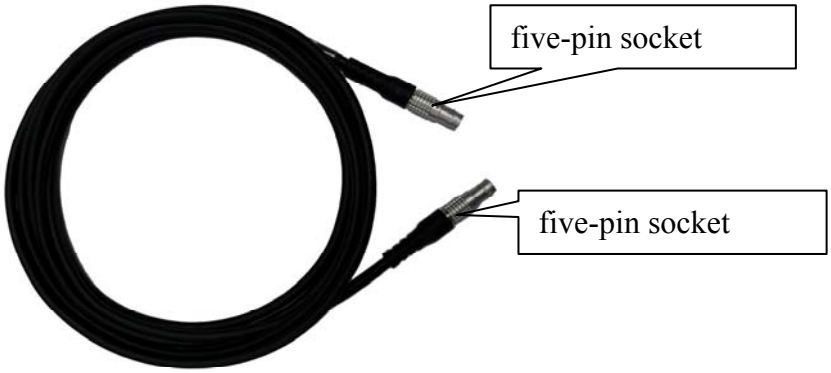


图 5-3

Five-wire：V90Plus host and plug for connection to the radio, differential data transmission;

Five-pin socket：For connecting the radio receiver and five-pin plug socket.

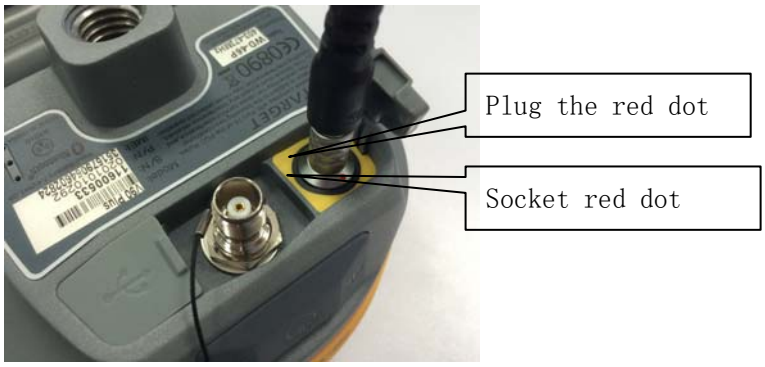


Figure 5-4

Mini USB Interface

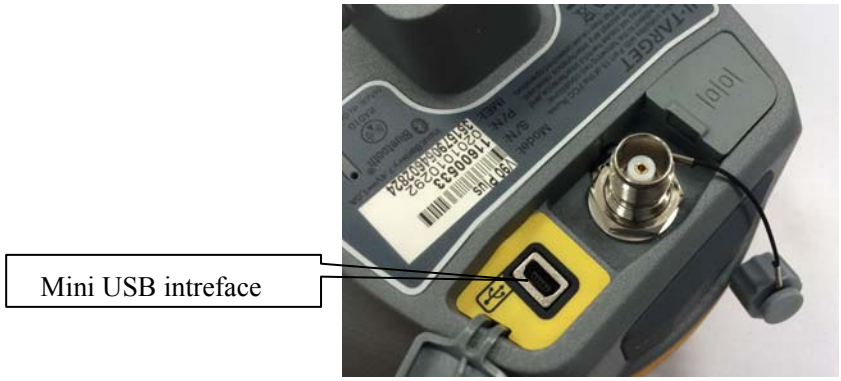


Figure 5-5

For connection to the host and external devices, upgrade firmware and download the static data, can also be used as USB to serial port using a special mode of operation (need to install drivers, see Annex 4).

Mini USB cable

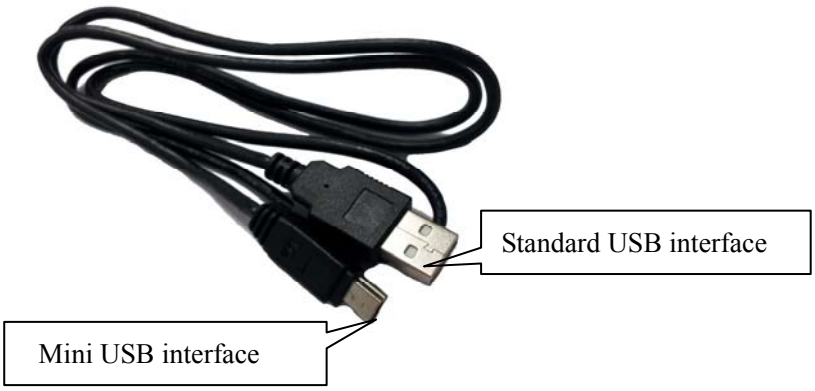


Figure 5-6

Mini USB cable, one end is a standard USB connector on one end and Mini USB interfaces; an external device connected to the host for data transmission.

Antenna Interface

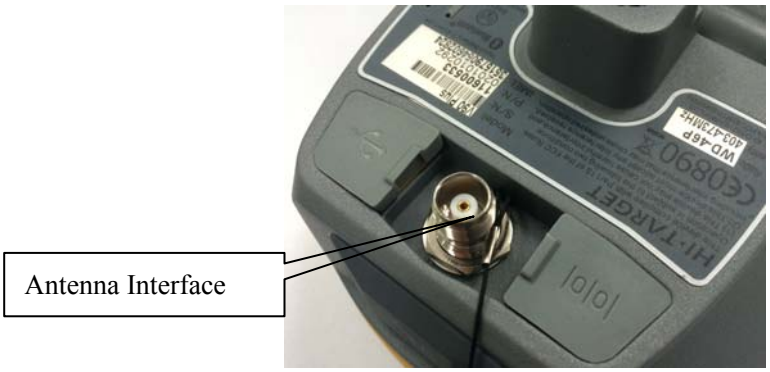


Figure 5-7

3G / GPRS radio antenna is built using the same antenna interface; connection 3G / GPRS antenna using the network.

Schedule 2 control panel lights

Table 2 control panel lights illustrate

Operating	Meaning	
Power light (yellow)	on	Normal voltage: the battery> 7.6V, foreign> 12.6V
Power light (red)	on	Normal voltage: 7.1V <internal battery ≤ 7.6V, 11V <foreign ≤12.6V
	Slow flash	Brown: the battery ≤7.1V, foreign ≤11V
	Fast flash	It indicates that the battery: Flash indicate the charge per minute for 1 to 4
Signal light （Status Green ）	off	When not using GSM
	on	GSM connected to the server
	Slow flash	GSM indicates that landed on the 3G / GPRS network
	Fast flash	When the instructions are landing GSM 3G / GPRS network
Data light (Status Red)	Slow flash	1, the data link transmit and receive data (mobile station to receive only tips, the base station only prompt emission) 2, static data collection
	Fast flash	1, the error still occurs (less than FLASH memory space) 2, static files being uploaded
	on	Data link device mobile or base station is using can not communicate, the communication module fails, no data output
Satellite lights (Green)	on	Satellite lock
	Slow flash	Star Search or satellites are lost
	Fast flash	Every minute or query when reporting a number of satellites in the satellite lock case
	off	1, when resetting the receiver, motherboard failure, no data output 2, static mode, motherboard failure, no data output

Schedule 4 USB virtual serial port driver installation

1）First, it confirms that our equipment has been launched USB virtual serial port functions. This step requires the use of the company's Android hand book binding Hi-Survey software to view and set in the "Device" → "Accessibility" → "Receiver Settings" → "USB Virtual Serial Port" → "ON".

2）Check if the function is open, with a Micro USB cable to connect the instrument and computer, install the driver. Win7 32bit system as an example to demonstrate. After testing, the drivers support Win7 32bit, Win7 64bit, Windows XP 32bit, other systems without making tests.

3）After connecting the cable, the system will prompt two devices need to install drivers.

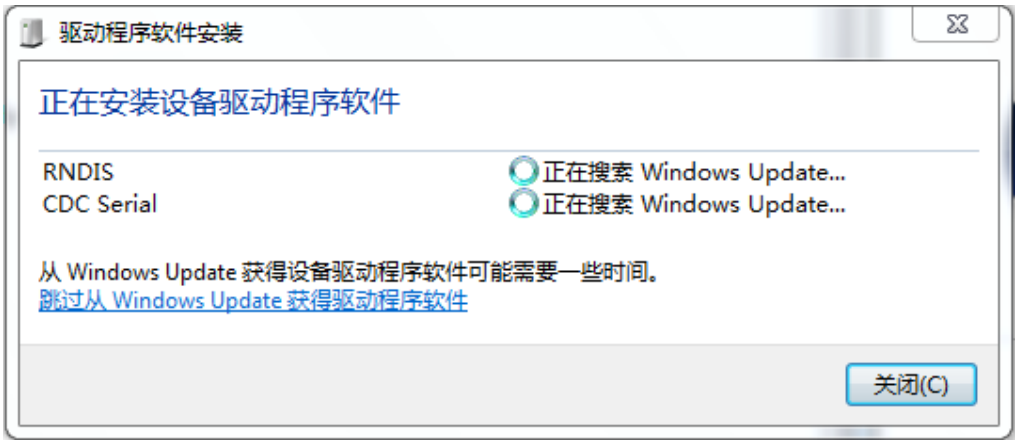


Figure 1

Now select "Skip obtaining driver software from Windows Update," because we need to manually install the driver. Failing such a prompt start directly from step 4).

4）Open Systems "Device Manager" in the "other" option, you will see two unidentified device. "CDC Serial" and "RNDIS".

Figure 2

5）Click "CDC Serial", right-select "Update Driver Software" in the pop-up window, select "Browse my computer for driver software (R)", then select the file drivers "linux_cdc_seial.inf" where the folder directory, then click "Next."

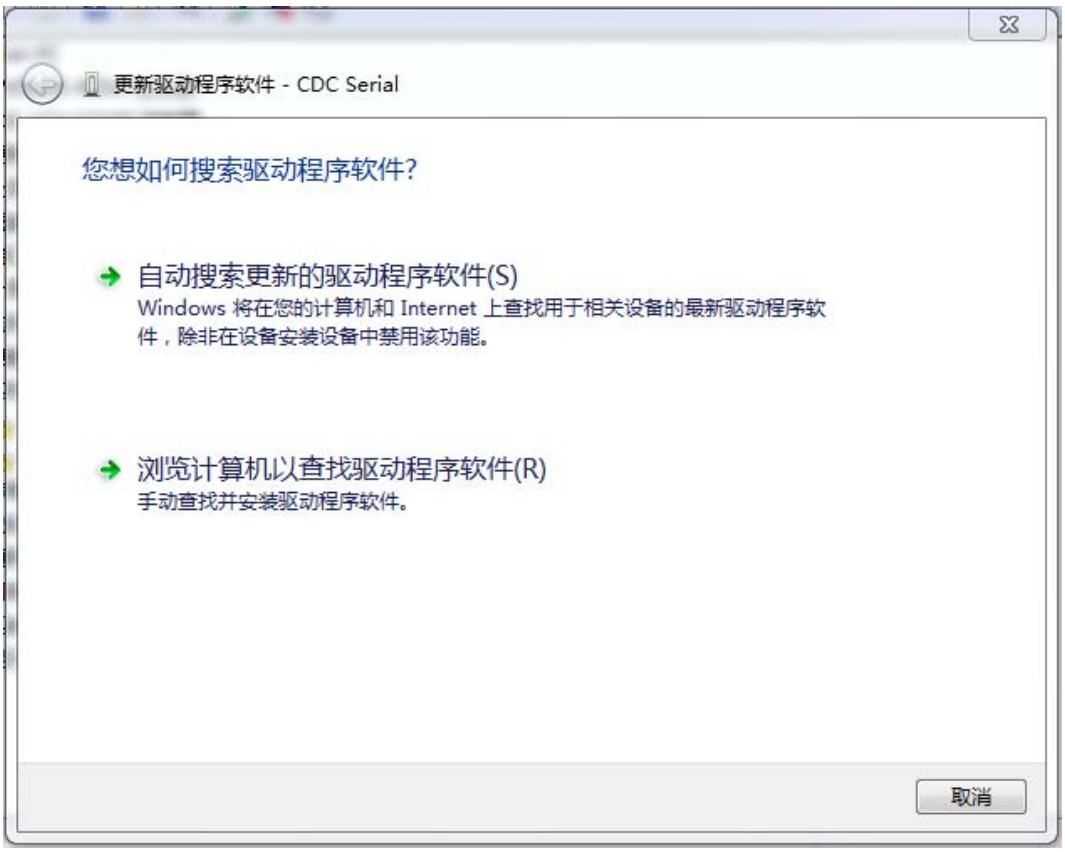


Figure 3

6）If you search for a valid drive, pop occurs.

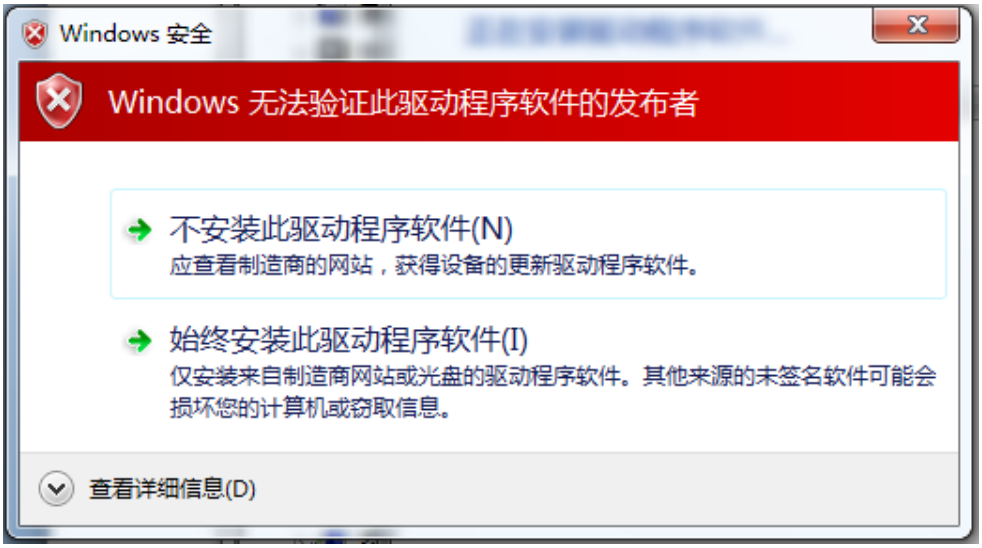


Figure 4

In this case, select the "Always install driver software." After a successful installation displays the following information.

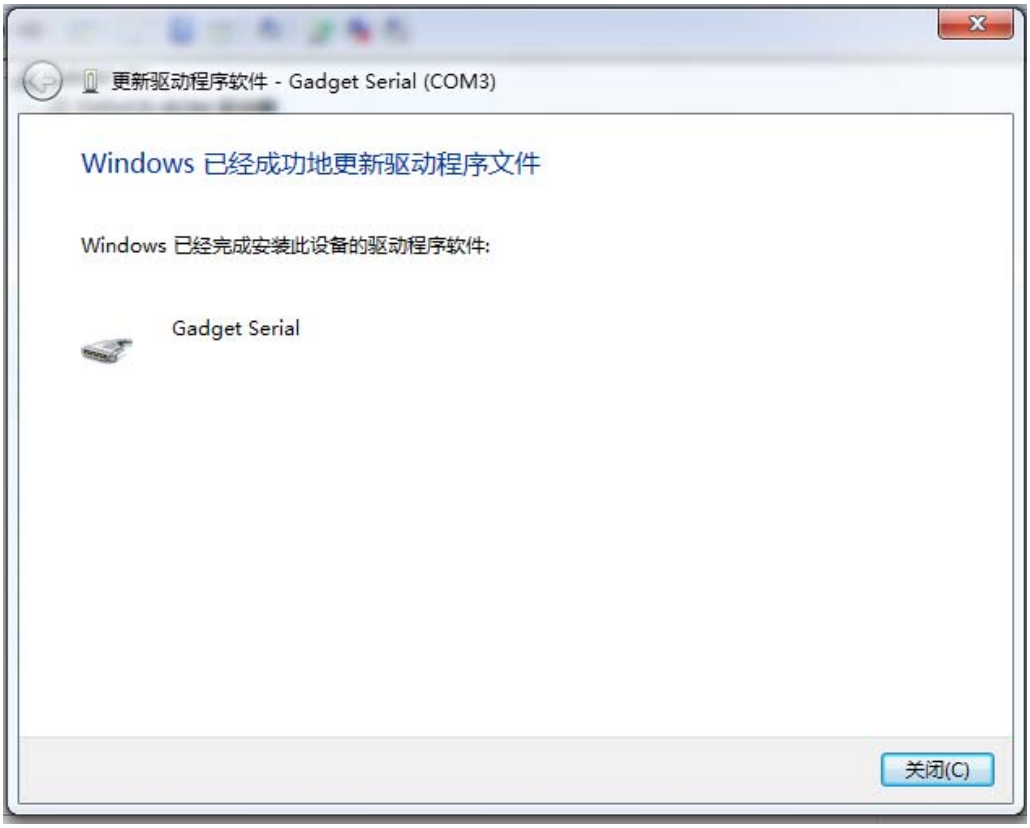


Figure 5

7）Then you can see the serial device, and serial number in the Device Manager.

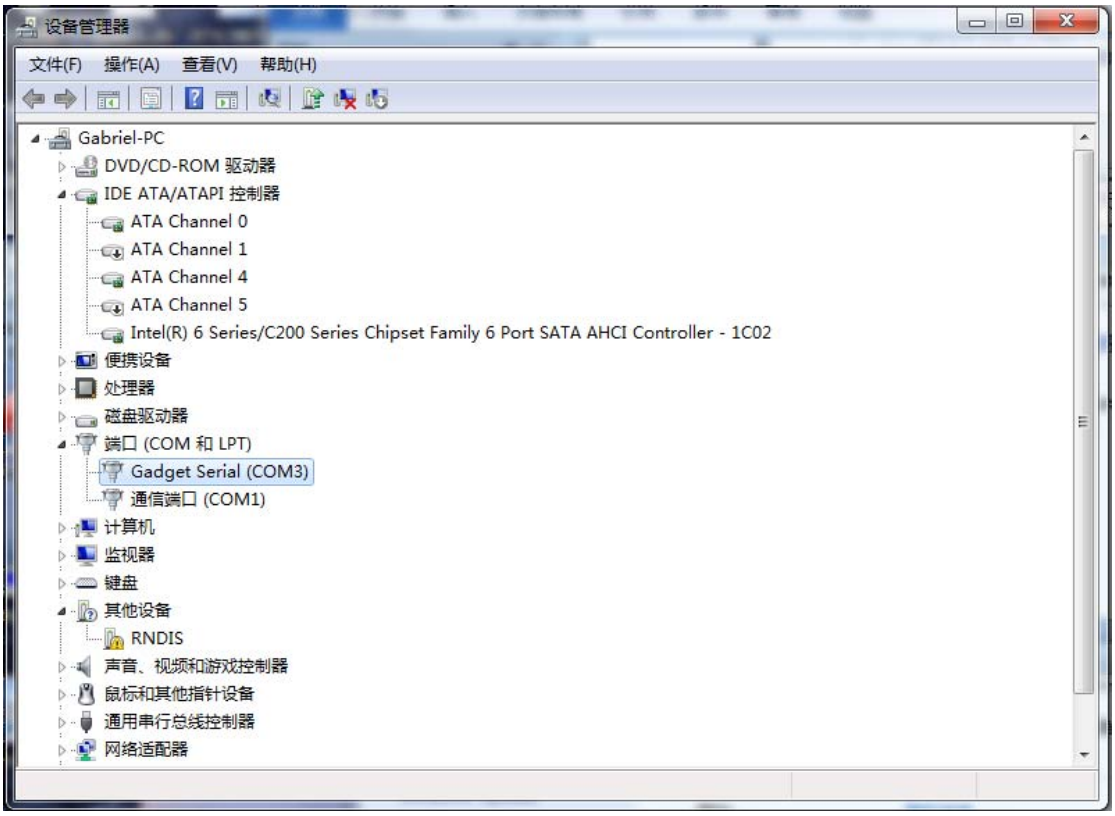


Figure 6

Since we did not use to "RNDIS" device, so it can not install the driver.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's 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.
This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

NOTE: 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 followingmeasures:
-- 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.