

## Led Status Instructions

| Led                      | Instruction |  |
|--------------------------|-------------|--|
| Power led<br>(yellow)    | Always on   | In normal power pressure: inner power supply>7.6V, outer power supply>12.6V  |
| Power led<br>(red)       | Always on   | In normal power pressure: 7.2V < inner power supply≤7.6V, 11V<outer power supply≤12.6V   |
|                          | Slow flash  | Low power-pressure: inter≤7.2V, external≤11V   |
|                          | Fast flash  | Power status hints: once or four times of one min  |
| Satellite led<br>(green) | Always on   | More than 4 satellites tracked successfully  |
|                          | Slow flash  | Loss satellites and try re-track   |
|                          | Off         | 1. mother board error resulting in no data output while resetting receiver<br>2. mother board error resulting in no data output while in static mode |

## Led displaying in different mode:

**Elevation Angle** (must be in static work mode. Long press F1 to enter elevation angle setting. Then single click F1 to choose elevation angle. After that single click power button to confirm. If no confirming within 10 seconds, the receiver will automatically confirm the current settings.) :

• on      ○ off

| Choice | Satellite led<br>(green led) | Status led<br>(green led of dual-color led) |
|--------|------------------------------|---|
| 5      | •                            | ○   |
| 10     | ○                            | •   |
| 15     | •                            | •   |

**Collection Interval** (must be in static work mode. Long press F2 to enter collection interval setting. Then single click F2 to choose collection interval. After that single click power button to confirm. If no confirming within 10 seconds, the receiver will automatically confirm the current settings.)

• on      ○ off

| Choice | Satellite led<br>(green led) | Status led<br>(green led of dual-color led) |
|--------|------------------------------|---|
| 1      | •                            | ○   |
| 5      | ○                            | •   |
| 10     | •                            | •   |

## Turn On/Off Receiver

|          |   |             |  |
|----------|---|-------------|--|
| Turn on  | Press power<br>for 1 second                 | All leds on | With turning on music, receiver speaks out<br>the last settings of work mode, data link etc. |
| Turn off | Long press<br>power button<br>for 3 seconds | All leds on | With turning on music  |

## Static Data Storage

The GNSS static data collected by V30 receiver will be stored in its memory of 64M, in \*.ZHD format.

You can connect the V30 receiver with PC by USB port of Y cable, which is in the whole package. And then just copy the static data into your PC.



**Note:** in case of no more memory, the data led (red led of the dual-color status led) will be fast flashing while stop the current static data collection after storing it.

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## RTK Data Storage

Whether you use the iHand 10 or GIS+, both of which can be connected with RTK receiver via bluetooth or by cable, as the controller for the RTK receiver, the RTK data will be stored in controller.

After fieldwork finished, you can connect the controller with PC by the data cable in configured in the whole package, and then copy to download the RTK data.

## Reset Receiver

Super long press F1 to reset the mother board.



**Warning:** reset receiver will make the next tracking satellite time longer while needs users to set receiver work mode again.

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## Back to Original Settings

Super long press F2 to back to the original settings, in case of which, all modules will be rectified automatically.

The below are original settings in different mode:

| Work mode      | Original settings                                  |
|----------------|--|
| Static         | Elevation angle: 10° collection interval: 5 second |
| Data link mode | External   |



Warning: be carefully to use this back to original settings operation, or all you current settings will be lost.

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## Format Receiver

Format V30 receiver by Hi-Target V30 Receiver Management Software:

1. connect V30 with PC by serial port of Y data cable
2. turn on V30 receiver
3. choose right serial port and open port
4. after connection is successful as figure 4-2: the S/N will be showed in the below
5. click "Format/Delete All" to complete format receiver. After this operation, all current data will be deleted forever.

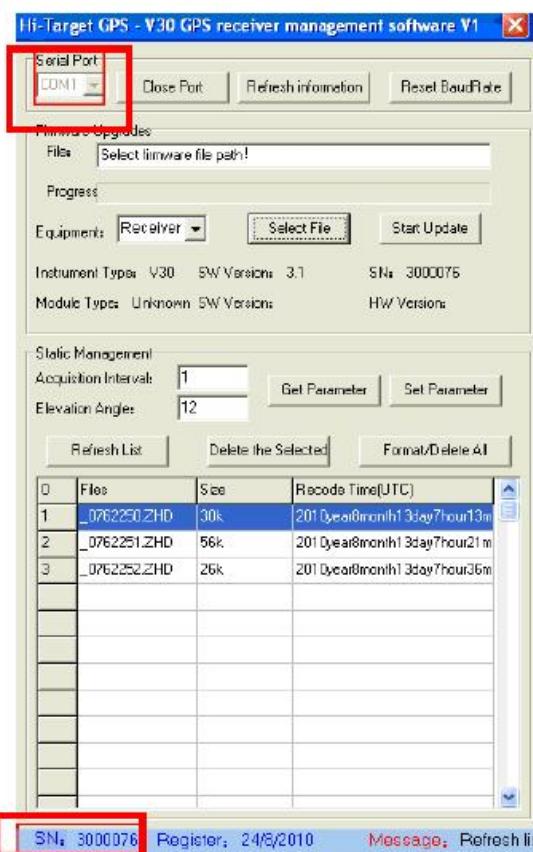


Figure 4-2



Warning: make sure all useful data has been copied to another place for spare, because all data will be deleted forever after this format receiver operation.

## Power Supply System

### ❖ Assembly and Disassembly of Battery Cover

#### Assembly:

1. Firstly insert one side

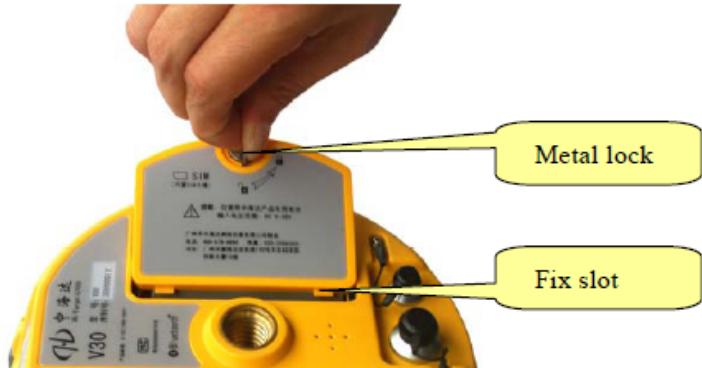


Figure 4-3

2. Turn the metal lock by 90° to the panel side and press it to be ok.



Figure 4-4

**Disassembly:**

1. pull the metal lock up and turn to the two ports direction by 90°



Figure 4-5

2. Pull the metal lock to get off the battery cover



Figure 4-6

❖ **Install and Uninstall Battery**

**Install:**



1. Match the  with the  in the battery slot to put in the battery



Figure 4-7

2. Insert battery towards "Close" end (see red arrow) to install it ok



Figure 4-8

**Uninstall:**

Slide the battery towards to the "Open" end, and then pull out battery is ok.



Figure 4-9

## ✧ V30 Receiver Battery Name and Model

| Name                           | Model   |
|--------------------------------|---------|
| 4400mAh lithium battery        | BL-4400 |
| V30 lithium battery<br>charger | CL-4400 |

## ✧ Power Supply Way

|              |                  |   |
|--------------|------------------|---|
| Power supply | Power supply way | 1. lithium battery;<br>2. eight-pin port and five-pin port on the mainframe for external power supply |
|              | Power range      | 6V ~ 36V  |

If use external power supply for V30 by the eight-pin port and five-pin port on the mainframe, the power supply should be 6~36V with current no less than 500 mAh.

When with both li-ion battery and external power supply, the receiver will check the power pressure of both and choose the higher one.

And please note that if use external power supply, must use the specified external power supply from Hi-Target to avoid any destroy to the receiver.



Note: usually one V30 li-ion battery can last 15 hours for static, 12 hours for RTK while 9 hours for base in UHF work mode with 2W internal radio. But the working time will be decreased along with the more and more charging times or in very low temperature.

## ✧ Charging battery

BL-4400 li-ion battery must be charged in specified CL-4400 charger of Hi-Target for about 6 hours. The indicator led of the charger will be in red while charging, and then green, and finally off when charging finished.

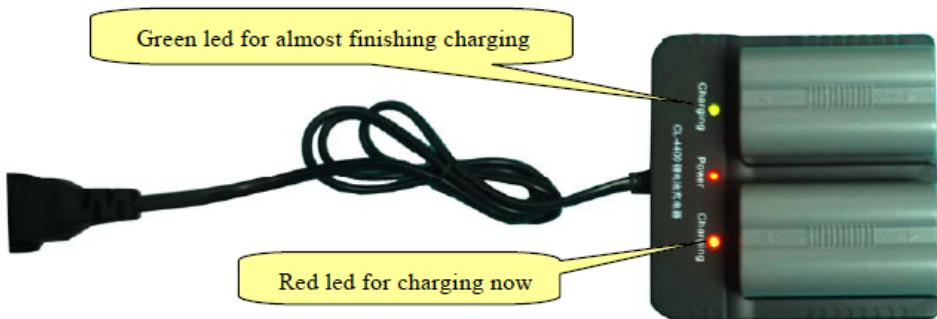


Figure 4-10

❖ **Charging Operations**

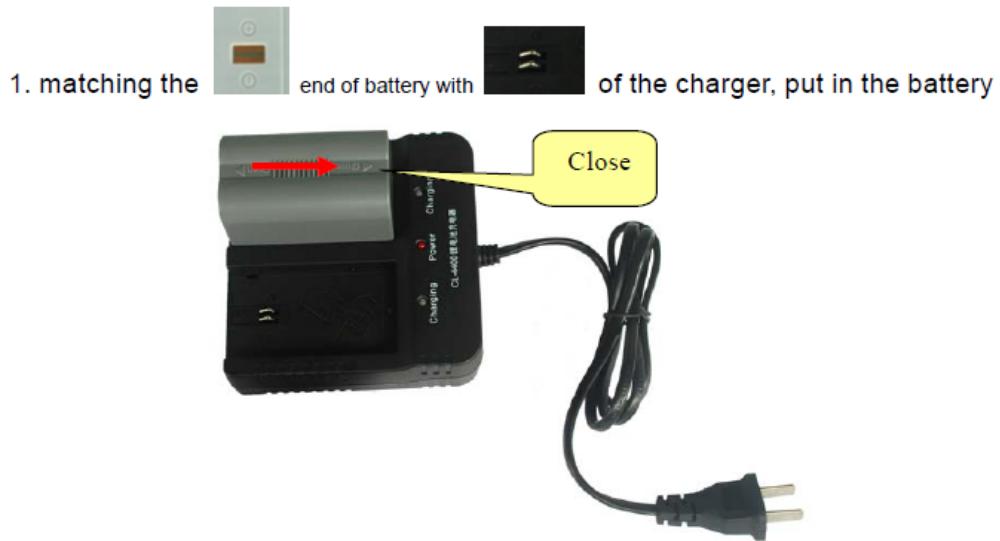


Figure 4-11

2. Slide battery towards "Close" end (as the above arrow direction) until battery is locked
3. After connecting charger with power supply, the "Charging" led becomes red



Warning: 1. only using Hi-Target specified charger and no putting into fire nor metal short electric circle

2. if heating, deformed, leaking, bad smells happens while charging, using or storing battery, please stop use the battery right now. And change another battery
3. if the working time obviously become very short, please stop use the battery right now. And change another battery

## Firmware

### ❖ Firmware upgrade

There are two kinds of upgrade for V30: 1. mainframe upgrade; 2. communication module upgrade. Except the choosing of "upgrade device" is different, all the other operations are the same. You can see the different choice as below:

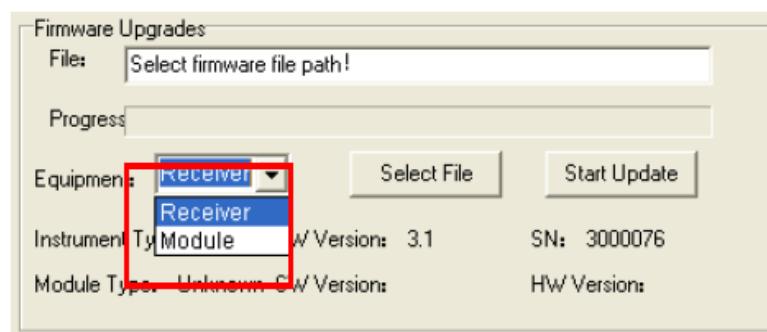


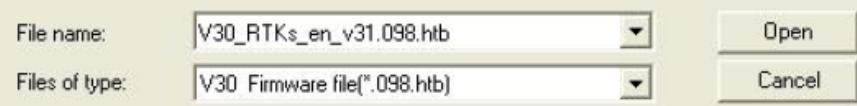
Figure 4-22

Steps for upgrade:

1. connect V30 with PC by serial port of Y data cable
2. turn on V30 receiver
3. choose right serial port and open port
4. after connection is successful as figure 4-2: the S/N will be showed in the below
5. choose the "upgrade device" to be "receiver" or "module" as you need, and then click "select file" to find the firmware file in you PC



**Warning: the firmware file must be in the name as \*.098.htb, or the upgrade must result in failed.**



6. click "upgrade" and then operate refer to the software hints: turn off receiver and turn on again
7. you can see the process of upgrade then while the three leds on the mainframe panel will flash in turn
8. when the software pop up information of successful upgrading, just restart your receiver to complete this firmware upgrade is ok

CHAPTER

5

# Static Collecting and Data Transmitting

## Introduction

- Introduction
- The procedure of V30 static survey
- Download data with pen drive
- Management software operation for Static Survey

## Instruction

V30 receiver can be used as dual-frequency static surveying instrument. You double click F1, when the satellite led and status led are on you press power button to fix. After the setting is done, the red status led flashes once while collecting an epoch in a few seconds (depends on the setting of sampling interval). The collected static survey data is saved in the memory card in the main frame. The static survey data have to be downloaded to PC with post-processing software to be processed.

## The procedure of V30 static survey

1. Locate the instrument on a control point, do centering and leveling.
2. Measure the height of instrument for three times, on condition that the difference of each measuring is less than 3mm and the final height of the instrument should be the average height. The height of instrument should be defined from the controlling point of base centre to upper edge of marker line. The antenna radius of V30 receiver is 0.087 meter; the height of phase center is 0.065 meter.



Figure 6-1 Instrument height measure point

3. Record point name, instrument S/N, instrument height, observing initiated

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time

4. Turn on the instrument and set the main frame as static surveying mode.

The satellite led flashing means the instrument is searching the satellites.

The satellites are fixed once the satellite led turns into constant on. Status led flashes due to your collection interval set. The default collection interval is 5 seconds, which means a epoch will be collected every 5 second. In static mode, the receiving led is off.

5. Turn off the instrument after the static survey is done and record the turn-off time.

6. Download and post-process data



**Note:** Don't move the tribrach nor change the collecting set while the instrument is collecting data.

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## Download data with pan drive

V30 saves the files with pan drive in file management, i.e. you can download the files by drag-drop. The static survey data only can be downloaded but not to re-write the data.

The data of V30 receiver can be downloaded in pan drive, you can use Y type data cable, connect one side to USB port of PC and the other side to the 8-core jack of main frame. After connected, RTK\_V30 new disk symbol shows up in the PC, like pan drive, you can copy the according files directly.

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**Note:** The series port can not be downloaded in pan drive, but to

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delete static data of V30 receiver.

## Management software operation for static survey

The main function of static file management software of V30 receiver:

- ◊ Delete original data
- ◊ Delete and format the whole
- ◊ memory
- ◊ Read parameters
- ◊ Set parameters
- ◊ Refresh list

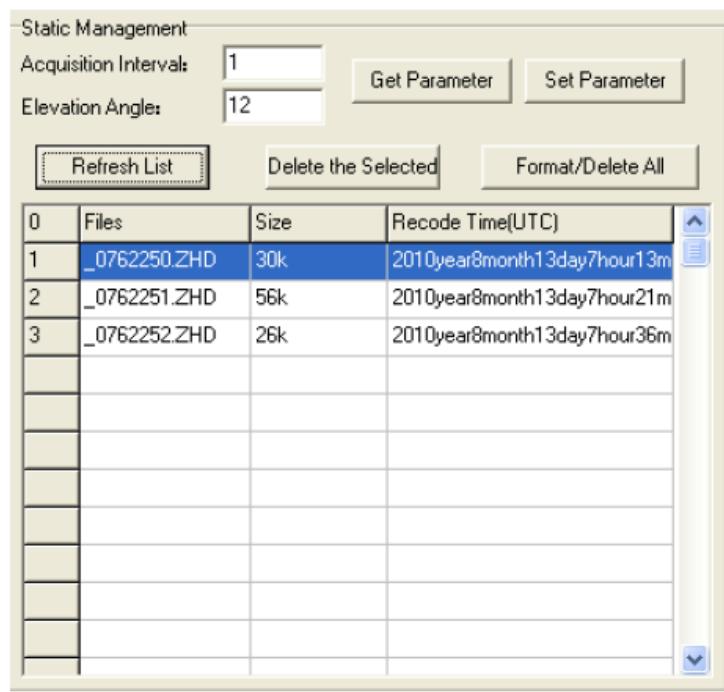


Figure 6-2

**Operating steps:**

1. Connect Y type data cable to 8-pin port of V30 receiver and the series port of PC
2. Choose the right PC port and click "connect port"
3. Refresh list, the observation data files will be in the list
4. File name: 8 digit character: the first chart is replaced by underline; the second, third, and forth are the last two numbers of S/N number of the receiver from which the data is collected; the fifth, sixth, and seventh is the year-accumulated-date; the last chard is the collecting period of the day
5. Set up time: GNSS time.
6. Delete data: choose the data need to be deleted, click delete files.
7. Change collecting interval and satellite cutoff/elevation angle: input value and click set parameters. Click read parameters to view the original collecting interval and satellite cutoff angle.

**Simple procedures of data processing:**

1. Run "HD2003 data processing software package", create new and set the project, and then set the coordinate system of the control network.
2. Import data, modify the antenna height, antenna type and antenna height measuring way of each observing file.
3. Process all the base line. For those baselines whose ratio is less than 3 while the base line with big error, please observe the residual plot of the base line, and delete bad satellites or part of the observing data. Or set the sampling interval and elevation mask angle in "static base line process setting".
4. Search repeated base line, closing error of base line, closing ring. If exceed, change the setting of the base line with big difference or delete satellites or delete part of the observing data to re-process. If still error exceed, choose delete base line. And then re-search repeated base line, closing

error of base line, closing ring until the closing error can match the tolerance.

5. Check network map, set adjustment parameters.
6. Input the coordinate of the known point, process network adjustment.
7. Open “adjustment report” in the processing report manual, print the surveying result.

Please refer to “HDS2003 Data Processing Software Manual” to find more details for data processing.

CHAPTER

6

# Technical Parameters

## Introduction

- Introduction
- Receiver
- Ports
- Function Key and Indicator Led
- Intelligent Voice Module
- Accuracy
- Physical Feature
- Working Environment

## Introduction

Here we list out all Technical Parameters of V30 GNSS RTK SYSTEM. The Technical Parameters will be a little different according to your purchase order. Please make sure about your configuration then find out Technical Parameters correspondingly.

## Receiver

- ◎ 220 channels
- ◎ GPS : Synchronous tracking L1 C/A, L2E, L2C, L5
- ◎ GLONASS : Synchronous tracking L1 C/A, L1 P, L2 C/A(only for GLONASS M) and L2P
- ◎ SBAS: Synchronous tracking L1 C/A, L5
- ◎ GIOVE-A: synchronous tracking L1 BOC, E5A, E5B and E5AltBOC (optional)
- ◎ GIOVE-B: synchronous L1 CBOC, E5A, E5B and E5AltBOC (optional)
- ◎ GALILEO: (Upgrade)
- ◎ Trimble Maxwell 6 of advanced user-defined GNSS Technology
- ◎ A high precision measurement in the relevant organs using for global navigation satellite system
- ◎ Very low noise GNSS carrier phase in Surveying, Accuracy < 1 mm within 1 HZ wide band
- ◎ Mature low elevation-angle tracking technology
- ◎ Initialization time < 10 S
- ◎ Initialization Reliability > 99.9%
- ◎ 1 Hz, 2 Hz, 5 Hz, 10 Hz, 20Hz and 50 Hz output (default 10Hz)
- ◎ Differential data format: CMR, CMR+, RTCM 2.1, 2.2, 2.3, 3.0, 3.1
- ◎ **Navigation Output Format:** ASCII: NMEA-0183 GSV, AVR, RMC,

HDT, VGK, VHD, ROT, GGK, GGA, GSA, ZDA, VTG, GSTPJT, PJK, BPQ, GLL, GRS, GBS and binary system: Trimble GSOF

## Ports

- ◎ 2 RS-232 serial ports
- ◎ 1 USB port
- ◎ 1 port for wireless blue-tooth communication
- ◎ 2 port for external DC power supply (Multiplex)
- ◎ 1 built-in Li-ion battery groove
- ◎ 1 built-in communication module port

## Function Key and LED

- ◎ 3 Panel buttons: 1 power switch key, 2 functional keys, with these combination you can set all the function with voice and Indicator Led flexibility
- ◎ 3 LEDs: 1 Satellite LED (Single color), 1 Communication LED ( Dual Color) ,1 Power LED ( Dual Color)

## Accuracy

- ◎ Static, Fast Static: Horizontal:  $\pm(2.5 + 1 \times 10^{-6}D)$  mm  
Vertical:  $\pm(5 + 1 \times 10^{-6}D)$  mm
- ◎ RTK Accuracy: Horizontal:  $\pm(10 + 1 \times 10^{-6}D)$  mm  
Vertical:  $\pm(20 + 1 \times 10^{-6}D)$  mm

## Physical Feature

- ◎ With ARM7 Corn Control Chip, built-in 64 M Flash Memory
- ◎ Dimension: φ19.5cm×h10.4cm
- ◎ Weight: 1.3 kg( Incl. li-ion battery)
- ◎ Anti-impact from 3 meters nature fall, waterproof in 2 meters deep water
- ◎ Internal Li-ion battery. With 2 standard battery in 4400 mAh , Voltage:7.4 V;  
One Single battery working continuously time: 15 hours in static mode, 12 hours in GPRS mode, and 8 hours in 2 W transmitting power
- ◎ 6~36V external DC power supported, external and internal power supply exchanged automatic
- ◎ Receiver Power Consumption: 2.5 W

## Environment

- ◎ IP Standard: IP67, waterproof, completely dust-proof and anti-impact.
- ◎ Working temperature: -45°C~65°C, storage temperature: -55°C~85°C
- ◎ 100% Humidity non-condensing

CHAPTER

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7

# **Ports and Main Accessory**

## **Introduction**

- Introduction
- Five-pin Port and Eight-pin Port
- Y Style Data Cable

## Introduction

This Section will introduce the outlook and operation for the main ports and accessory of V30 GNSS RTK SYSTEM. The Technical Parameters will be a little different according to your purchase order. Please make sure about your configuration then find out Technical Parameters correspondingly.

### Five-pin Port and Eight-pin Port



Figure 8-1 Five-pin Port and Eight-pin Port

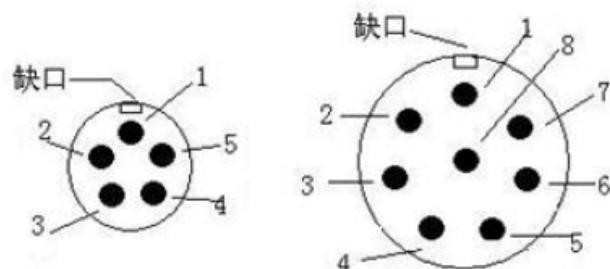


Figure 8-2 Five-pin Port Sketch Map

Eight-pin Port Sketch Map

1. **Five-pin port:** named as COM2/PW2, Generally used for the connection between the receiver mainframe and the external data link or the external power supply

**Eight-pin port:** Named as COM 1/USB/PW1, Generally used for the connection between the receiver mainframe and computer, controller, or for data download and data delete.

**Signal Definition**

| Small Five-pin Signal |                 | larger Eight-pin Signal |                        |
|-----------------------|-----------------|-------------------------|------------------------|
| 1                     | GND earth       | 1                       | RXD Data input         |
| 2                     | GND Earth       | 2                       | USB D-                 |
| 3                     | Vin Power Input | 3                       | USB D+                 |
| 4                     | RXD Data input  | 4                       | USB V+                 |
| 5                     | TXD Data output | 5                       | Vin Power input        |
|                       |                 | 6                       | GC-2 Cable insert Mark |
|                       |                 | 7                       | TXD data output        |
|                       |                 | 8                       | GND earth              |

1. Cable Insert Mark GC-1,GC-2 signal can work with the cable connect earth internal only.
2. All the round plug from Hi-Target are named the pin by positive counterclockwise; round plug are named the pin by welding face counterclockwise.
3. All above output data (TXD) and input( RXD) signal are base on receiver. TXD is a signal transmit line for receiver and RXD is receive line for receiver.
4. Another, the connect signal for PC serial port DB9 are: 2 (RXD computer data signal to receive), 3( TXD computer data signal to transmit),5(GND earth). In a simple word " two for receiver 3 for transmit"



Point: All above are for facing the main frame, it's the face icon for the socket of bottom main frame ( The plug welding surface)

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## Y Style Data Cable



Figure 8-5 Y Data Cable

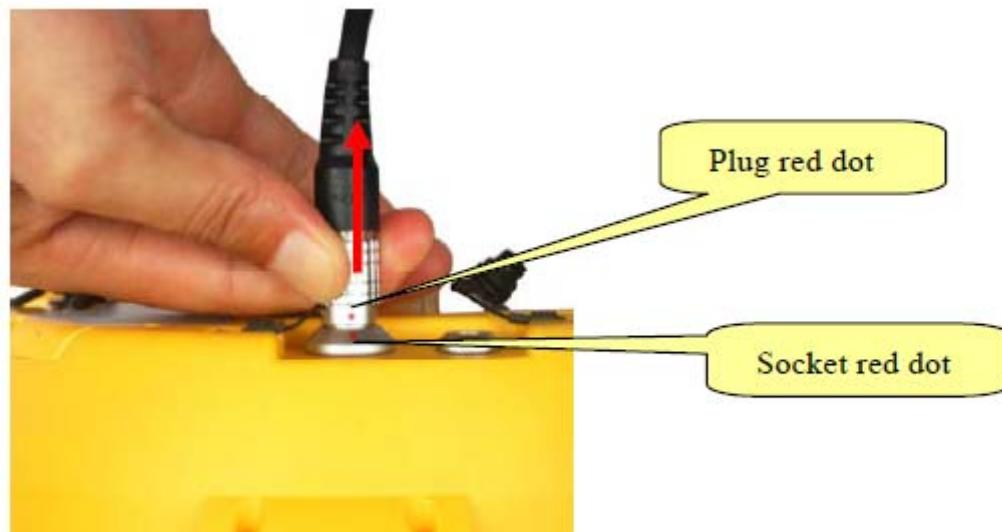
- ✧ Eight-pin Port: to connect with the eight-pin port of V30 receiver
- ✧ USB port: to connect with PC USD for data downloading from V30
- ✧ Serial port: to connect with PC serial port for V30 firmware upgrade, receiver settings, manage static data file, set radio parameters, etc.

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### Warning:



1. When connect plugs of all the V30 GNSS RTK system,( See below) please make sure to align two red points , one on plug and the other in the V30 receiver socket, otherwise, it will bring damage both to socket and plug.
2. When you finish your work, please take out of plug directly. No spin the plug.
3. In order to protect the plug, please store the cable in a good status and places without Extrusion.



## FCC WARNING

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 must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

NOTE 1: 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.

NOTE 2: Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

NOTE 3: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.