



# Insight V2 Technician Manual

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# **ChapterI Preface**

Read this chapter, you will have a brief knowledge of SOUTH Company and Insight V2 measurement system.

### **§1.1 Introduction**

Welcome to SOUTH SURVEYING & MAPPING TECHNOLOGY CO., LTD., which is China's leading manufacturer of surveying equipment including GNSS receivers and Total Stations. To know more about SOUTH, please visit our official website <u>https://www.southinstrument.com//</u> Our company detailed information is as follows:

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This manual is about Insight V2, to explain how to install, set up and use the RTK system as well as the accessories. We recommend that you read these instructions carefully before using the instrument.

# **§1.2 Main Features**

> AR Stakeout

Stakeout with the real scenes Visible and convenient

#### Fixed Solution in Seconds

Advanced SoC & ROS make fixed faster 5 constellations 16 bands 50+ satellites used in seconds

### Durable Battery & Fast Charging

Internal 6800mAh battery, capable of working for 24 hours. Type-C & PD protocol support fast charging Power bank supported for long-lasting projects

#### Internal Radio

Better signals receiving Farlink protocol for long distances communication



# Efficient IMU Maximum angles of 60° 200Hz Without leveling the bubble, working efficiency increases by 30%

# **ChapterII Hardware Component**

Reading this chapter, you can grasp the components, installation and the function of Insight V2 measuring system

# §2.1 Bottom Components



Components & Interface	Details	
UHF Antenna Interface	Install UHF antenna here	
Power Button	Turn on/off the receiver	
Type-C interface	Transmit data and charge the receiver	
Connector	Connect the receiver to a pole or a tripod	
Power Indicator	Indicate the present power	

# §2.2 Front Components



Image	Components	Details
	Power Button with Indicator	<ul> <li>Turn on/off the receiver</li> <li>Select work modes and confirm</li> <li>Glow in red when the receiver is on</li> </ul>
*	Bluetooth Indicator	OffNo Bluetooth connection Glow in blueBluetooth connected
म	Data Indicator	<ul> <li>UHF Mode:</li> <li>Flash at the data receiving intervals</li> <li>WiFi:</li> <li>Flashnetwork dial-up or WIFI connection (10Hz)</li> <li>After successful dialing, flash at the receiving interval</li> <li>Static Mode:</li> <li>Flash per secondrecord data</li> <li>Offnot record</li> <li>Rover Mode:</li> <li>Flash in greenfixed solution;</li> <li>Flash in redreceiving corrections but not fixed solution ;</li> <li>Offno corrections</li> </ul>

# **§2.3 Basic Operation**

# §2.3.1 Check Work Mode

Press the power button once in the state of power-on, the instrument will prompt with voice message about the current working mode (for example, "Rover, internal radio mode"). The power indicator at the bottom show the power. There are four lights and each light represents 25% of the

Insight V2 has 3 indicators and one button.

total power.

### §2.3.2 Power On

Press the power button when it is off. When you hear a beep and see all indicators are on, release the power button to turn on Insight V2.

### §2.3.3 Power Off

Press the power button and hold for a while. After 3 beeps and the "Power off" voice prompt at the third beeping, release the power button, then the instrument will switch off.

### §2.3.4 Set Work Mode

Press and hold the power button for about 6 seconds and pass over the state of power off (do not release the button even if the instrument says "power off"), then V2 will say "start to set work mode", at this moment, release the power button, the working mode will be repeated from Rover to Static.

### §2.3.5 Self-Check

Self-check is a useful operation to simply check the main hardware components if the instrument is not working properly.

Press and hold the power button for about 10 seconds and pass over the state of power off and mode selection (do not release the button even if the instrument says "power off" and "start to set work mode"), then V2 will say "start to self-check", at this moment, release the power button, the instrument will perform self-check automatically for the modules one by one.

The sequence of modules checking is:

- OEM board checking
- UHF module checking
- Sensors checking
- WiFi module checking
- Bluetooth module checking
- EPPROM checking

If all the modules are normal during self-check, the instrument will get into the state of power-on.

# §2.3.6 Factory Reset

Press and hold the power button for about 20 seconds and pass over the foregoing states ("power off", "start to set work mode", "start to self-check"), V2 will get into factory reset progress with voice message saying "start to restore manufactory default", at this moment, release the power button, all the indicators glow and the instrument will perform the factory reset automatically. After this progress is complete, the instrument will restart with the factory default settings.

# §2.4 AR Stakeout

Notice: AR stakeout need to work with a data controller, and it requires the software SurvStar.

AR stakeout is the innovative function of V2. To use this function, you need to have:

- ✓ Insight V2
- $\checkmark$  a data controller (with a SIM card available)
- ✓ a pole
- ✓ SurvStar software

First, run SurvStar and select Point Stakeout. Choose the point you want to stakeout.



Second, set pole height. Make sure it is consistent with the present pole height.



Third, initiate tilt survey. After successfully initiating, click

**Insight V2** 

to start AR stakeout.

JH





# **ChapterIII** Accessories

### §3.1 Instrument Case



The instrument case for Insight V2 contains two layers of packing: the inner layer fills with anti-collision foam; the host and other accessories can be dispersed and embedded; the outer layer is a sturdy instrument case, sealing-strong, wear-resistant and anti-wrestling. Compact, durable, effectively prevent impact; meanwhile, easy to clean.



# §3.2 Charger & Adapter



Adapter

USB cable

Red light: under charging Green light: fully charged

# §3.3 UHF Antenna



It is used for rover-internal radio mode.

# §3.4 Type-C Cable

The Type-C cable is to connect the receiver with PC, sending static data and update the firmware.It can also charge the data controller.



# **ChapterIV Web UI Management**

## **§4.1 Overview**

Utilizing the smart embedded Linux operating system and SOUTH intelligent cloud technology, the Web UI allows users to configure and monitor the status of V2 in real time. Both WiFi and USB are available to access Web UI.

### §4.2 Access by WiFi

The WiFi hotspot default setting is on. Search the WiFi hotspot named SOUTH\_xxxx using smartphones, tablets or laptops, then establish the WiFi connection, and input the **default IP** (10.1.1.1) into the browser. On the login interface, input "admin" as the username and password.

For example, search the WiFi hotspot from a Insight V2 receiver using a laptop PC, choose the WiFi hotspot and click on connect button to establish the connection without a password.



Run IE browser on a computer and input the default IP (10.1.1.1) into the address bar, after a while, the system login interface is refreshed, then input "admin" as username and password to log in.

Insight V2		SOUTH
C		(오 - · · · · · · · · · · · · · · · · · ·
IP Address: 10.1.1.1	GNSS Web Server	Username: admin Password: admin

# §4.3 Access by USB

In this mode, the 7-pin USB port USB port of Insight V2 must work as an Ethernet port, then internal Web UI shall be accessed via a USB cable connection with the computer.

First of all, a corresponding driver is required to install on the computer to activate this function.

The driver should be compatible with your computer operating system. The file bugvista64.inf is applied to 64-bit operating system, and linux.inf is for 32-bit operating system.

ile Edit View Tools	Help				
Organize 👻 Include in	n library 🔹 Share with 👻 New folder			800 -	
🙀 Favorites	Name	Date modified	Туре	Size	
E Desktop	bugvista64.inf	2016/3/15 15:23	Setup Information	3 KB	
Downloads	inux.inf	2015/10/19 15:24	Setup Information	7 KB	
🔤 Recent Places					

Choose the folder with the suitable driver





**NOTE:** The driver can be downloaded from the official website. You are welcome to contact us if you need more support.

If the driver has been successfully installed, the USB port of Insight V2 will be recognized as **Linux USB Ethernet/RNDIS Gadget**, and a local area connection will generate in **Network Connections** on the computer. For example, Local Area Connection 138 generates after connecting Insight V2 to the computer via USB network interface.

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However, sometimes the computer cannot detect the receiver by USB network interface because there is something wrong with acquiring IP; therefore, we need to do something to avoid such problems, that is to set a fixed LAN IP for the connection:

Right click on the local area connection which newly generates and choose properties to call out the local area connection properties window.



Then double click on Internet Protocol Version 4 (TCP/IPv4) option or click on properties button to call out Internet Protocol Version 4 (TCP/IPv4) properties window, set the fixed LAN IP address as shown in the following list, then click "OK" button and confirm the settings, return to the IE browser and use the IP address 192.168.155.155 to access the internal Web UI.

o oriding				
Connect using:	nemet/RNDIS Gadget		You can get IP settings assigned this capability. Otherwise, you n for the appropriate IP settings.	automatically if your network supports eed to ask your network administrator
		Configure	Obtain an IP address autor	natically
This connection use	s the following items:		- O Use the following IP addres	35:
Client for Mi	crosoft Networks t Scheduler		IP address:	192 . 168 . 155 . 100
Bile and Printer Sharing for Microsoft Networks			Subnet mask:	255 . 255 . 255 . 0
	teen I Versien C (TCD /ID)	C)		
Internet Pro	tocol Version 4 (TCP/IPv	(4)	Default gateway:	192.168.155.1
✓ Internet Pro     ✓ Internet Pro     ✓ Internet Pro     ✓ Unk-Layer     ✓ Link-Layer	tocol Version 4 (TCP/IPv ropology Discovery Mapp Topology Discovery Resp	4) per 1/U Driver	Default gateway:	192 , 168 , 155 , 1
<ul> <li>✓ Internet Pre</li> <li>✓ Internet Pre</li> <li>✓ △ Internet Pre</li> <li>✓ △ Link-Layer</li> <li>✓ △ Link-Layer</li> </ul>	tocol Version 4 (TCF/IFv Topology Discovery Map Topology Discovery Resp	49) 41) per 170 Driver xonder	Default gateway: Obtain DNS server address Ouse the following DNS server	192 , 168 , 155 , 1 automatically er addresses:
Install	tocol Version 4 (TCP/IPv Topology Discovery Map; Topology Discovery Resp Uninstall	Ab) 41 per 170 Driver bonder Properties	Default gateway: Obtain DNS server address Oute the following DNS server Preferred DNS server:	192 . 168 . 155 . 1 automatically er addresses:
Install	tocol Version 4 (TCP/IPv Topology Discovery Mapp Topology Discovery Resp	4) per 170 Driver sonder Properties	Default gateway: Obtain DNS server address Ouse the following DNS server Preferred DNS server: Alternate DNS server:	192 . 168 . 155 . 1 automatically er addresses:

Run IE browser on computer and input the default IP (192.168.155.155) into the address bar, after

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a while, the system login interface is refreshed, then apply "admin" for username and password to log in.

S login × +		
		Language : English 🗸
IP Address: 192.168.15	5.155	
	GNSS Web Server	
	username :	Username: admin Password: admin

# §4.4 Web UI main interface

After login the Web UI management of V2 by WiFi or USB connection, the main interface appears with displaying configuration items and positioning. As shown in the following figures.

COME	admin s 71318	1318 [logout]	> Position Information			
	Status		Location :			
*	Configuration		Lat: 23°10′54.088142"N	Lon: 113°24'59.949883"E	Alt: 59.550917m	Ellipsoid: WGS-84
1.4	configuration		RTK Status:			
×	Satellite Information		Solution: Single	CorrectionDelay: 0	HRMS: 0.439	VRMS: 1.086
11	Data Record	Đ	base X: 0.000000	base Y: 0.000000	base Z: 0.000000	base ID: 0
显	DataTransfer	<b>•</b>	DiffFormat: NONE			
•	Network Config	•	SLink:			
Î	Radio Config	•	SN: None		TrackingTime: 0	
£	Firmware Update	E	Azimuth: 0.00		Elevation: 0.00	
( <u>*11</u> )	Track Manage	<b>•</b>	SNR: 0.00		Solution: 0	
۲	Coordinate System	<b>E</b>	Tracked Satellite(51):			
\$	Online Service		GPS(9): 1,4,7,8,9,16,21,	27,30	GLONASS(7): 7,9,10,16,	19,20,21
2:	User Management	<b>H</b>	BDS(23): 1,2,3,4,5,6,7,9 40,44,45,56,57,59,60	,10,12,16,24,26,29,35,39,	GALILEO(8): 7,13,15,19,	21,26,27,30
		-	SBAS(0): None		QZSS(4): 2,3,4,7	
Ũ,		E	IRNSS(0): None			
11	System Log	+				

On the Web UI home page, the configuration items are listed on the left side. And the positioning information including coordinates information and satellites is displayed on the right side.

Ref	Component	Description
	Status	Positioning information, satellite tracking and others will be
-		displayed on this page

×	Configuration	It contains registration for the receiver, base configuration, antenna configuration, satellite configuration, receiver configuration and system configuration.
ж	Satellite Information	Display and control whether the satellites are used or not
11	Data Record	Configure the parameters for static mode and raw data download
묘	Data Transfer         Contains NTRIP configuration, TCP/IP configuration an transferring with PC	
$\oplus$	Network Config	Contains network parameters configuration, WiFi configuration and the other functions
	Radio Config	Configure the parameters and frequency for radio module
ŧ	<b>Firmware Update</b> It is used to upgrade the firmware for the rece module	
11	Track Manage	Record track file while doing measurement
$\oplus$	Coordinate System	Setup a local coordinate system for V2
-	Online Service Upload data onto a server in real time	
25	User Management	Add and manage the Web UI users
?	Help	Offers solutions

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### §4.4.1 Status

System Information, Work Status and Position Information are listed under the Status menu.

### **System Information**

On this page, all the information about V2 is displayed, such as serial number, hardware ID, MAC address, firmware version and so on.

admin 1318 S 71318 [logout]	> System Inform	nation
🖵 Status 🧧	Model:	InsightV2
System Information	Serial Number:	SF 1318
Work Status	Hardware ID:	NNN0EY0N0N10008003135G048F61
Position Information	Software ID:	210011000000000
* Configuration 7	Ethernet MAC:	00:00:00:00:00
	Ethernet IP:	192.168.1.1
🚿 Satellite Information 🛛 🚹	WiFi IP:	10.1.1.1
🛅 🛛 Data Record 🛛 🕂	Bluetooth MAC:	90:CD:1F:58:CF:64
💂 DataTransfer 🕂	Hardware Version:	0
Network Conference	Firmware Version:	1.09.221226.RF61PY
INETWORK COnfig	OEM Version:	609A9-21AT6-1
📱 🛛 Radio Config 🛛 🚹	Web Version:	1.09.221130.RG60WEB
🔹 Firmware Update 🔒	Expire :	20230711
🛅 🛛 Track Manage 🔒		
Coordinate System		
🗘 Online Service 🚹		
🧶 User Management 🚦		

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#### **Work Status**

The physical state of V2 such as working mode, datalink, host temperature, remaining power and free space is obtained from this page

admin 1318 SF 71318 [logout]	> Work Status	
🖵 Status 🧧	Work Mode: Rover	
System Information	Datalink: None	
Work Status	Host Temperature: 41.60 °C	
Position Information	OEM Temperature: N/A	
X Configuration 🕂	Power Type: Internal Battery	
	ExtPower Voltage: 0.00 ∨	
★ Satellite Information	BatteryVoltage: 7.59 V	
🛅 🛛 Data Record 🚹	Storage Type: Internal Memory	
🛃 DataTransfer 🕂	Battery Remaining	Disk Capacity
Network Config	Battery Remaining70%	OM Used60M Free4024.00M
🔋 Radio Config 🕂		
🕭 Firmware Update 🔒		
🛅 🛛 Track Manage 🕂		
🕀 Coordinate System 🕂		
🗘 Online Service 🕂		
🐉 User Management 🕂		

### **Position Information**

On this page, users can clearly glance through current position information and satellite information

admin 1318 SF 1318 [logout]	> Position Information			
🖵 Status 🗖	Location :			
System Information	Lat: 23°10'54.090160"N	Lon: 113°24′59.938717"E	Alt: 60.790503m	Ellipsoid: WGS-84
Work Status	RTK Status:			
Position Information	Solution: Single	CorrectionDelay: 0	HRMS: 0.450	VRMS: 1.104
🗙 Configuration 🔠	base X: 0.000000	base Y: 0.000000	base Z: 0.000000	base ID: 0
🚿 Satellite Information 🛛 🔠	DiffFormat: NONE			
🛅 🛛 Data Record 🔒	SLink:			
💂 DataTransfer 🕂	SN: None		TrackingTime: 0	
Wetwork Config	Azimuth: 0.00		Elevation: 0.00	
👔 Radio Config 🕂	SNR: 0.00		Solution: 0	
Einenvare Lindete	Tracked Satellite(49):			
TIRMware Update	GPS(9): 1,4,7,8,9,16,21,	27,30	GLONASS(6): 9,10,16,19	9,20,21
🛅 🛛 Track Manage 🔠	BDS(23): 1 2 3 4 5 6 7 9	10 12 16 24 26 29 35 29	GALILEO(7): 13 15 19 2	1 26 27 30
Coordinate System +	40,44,45,56,57,59,60 SBAS(0): None	,10,12,10,24,20,20,00,00,	QZSS(4): 2 3 4 7	1,20,27,00
🗘 Online Service 🔒	IRNSS(0): None			
🧞 User Management 🛛 🕂				

### §4.4.2 Configuration

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and Default Language are contained under the Configuration menu. Users are able to configure all kinds of parameters for Insight V2 under the Configuration menu, and all the settings will immediately take effect after saving.

### **General Config**

The registration of the receiver and work mode setting can be completed on this general configuration page.

dmin F 1318	1318 [logout]	> General Config		
Status	-	Register:		
Configuration		Serial Number:	SI 1318	
General Config		Code:	EFCE33DCE12093D424365D8B1890374183D	Register
Base Setup	=	ExpiredDate:	20230711	
Antenna Setup	<u> </u>	OnlineRegistration:	OnlineRegi	
Satellite Tracking		OEMRegisterCode:	0	Register
Receiver Operation				
System Setup				
Receiver Security		Mode Setting:		
✗ Satellite Information	ו 🛨	Work Mode:	Rover 🗸	
Data Record	Đ	Datalink:	Bluetooth 🗸	
B DataTransfer	•	Radio Router:	None 🗸	
Network Config	<b>±</b>	Radio Transfer:		
Radio Config	E	RTK Record:		
1 Firmware Update	<b>±</b>	xFillEnable:		
Track Managa		1PPS:		

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If the code of Insight V2 has expired or is ready to expire, please provide the serial number of your V2 for us to apply for another available code, then input the code into the blank or register the receiver online.

legister:		
Serial Number:	SI 1318	
Code:	EFCE33DCE12093D424365D8B1890374183D	Register
ExpiredDate:	20230711	
OnlineRegistration:	OnlineRegi	
OEMRegisterCode:	0	Register

V2 allows users to set work mode and datalink from this Web UI with only a mobile phone or a tablet through the WiFi hotspot.

Mode Setting :		
Work Mode :	Rover	~
Datalink :	Bluetooth	~
Radio Router :	None	~
Radio Transfer :		
RTK Record :		
xFillEnable :		
1PPS :	✓	
BDSPPP :		
WiseLinkRoute :		
EVENT :		
EVENT Polarity :	Negative	~
	Enter	Cancel

Work Mode: There are "Rover", "Base" and "Static" in this dropdown list

**Datalink:** Pull down the list and there will be all kinds of options for datalink, such as "Radio", "External", "Bluetooth", "WiFi".

Work Mode :	Rover 🗸
Datalink :	None 🗸
Radio Router :	None Radio Network
Radio Transfer :	External Dual
RTK Record :	Bluetooth WiFi IntelligentDataLink

### **Insight V2**

**Radio Router:** This function requires the Internet from external devices connected through Bluetooth or an internal SIM card. Through the Internet, V2 gets correction data from the reference station and then transfers the data to other rovers by radio, with which rovers will have the same reference coordinate. It is practical when you work somewhere with poor reference station signals or need several rovers but only have one SIM card. You can use the internal radio or connect to an external radio to transfer the correction data. This feature is only available in Rover mode.

Radio Router :	None 🗸
	None
Radio Transfer :	Inner Radio Router
	External Radio Router

**Radio Transfer:** This function, also known as Radio Repeater, acquires correction data from the Base station by radio and transfers the data to other rovers by the internal UHF (radio). It is a solution to extend the radio communication range.

Mode Setting:			
Work Mode:	Rover	~	
Datalink:	Bluetooth	~	
Radio Router:	None	~	
Radio Transfer:			
RTK Record:			
xFillEnable:			
1PPS:			
WiseLinkRoute:			
EVENT:			
EVENT Polarity:	Negative	~	
BDSPPP:	Disable	~	
	Enter	Cancel	

#### **Operation:**

1, Check the box of "Radio Transfer" on "General Config" dialog for Base station.

Mode setting		
Work Mode:	Base	•
Datalink:	Radio	•
RadioRoute:	None	-
Radi oTransfer:	<ul><li>✓</li></ul>	

2, Check the same function for Rover in critical status (when the Rover is close to the maximum working distance of Base internal UHF).

Mode setting		
Work Mode:	Rover	
Datalink:	Radio	
RadioRoute:	None	
RadioTransfer:	✓	

3, Configure the datalink of the other rovers to internal UHF mode, then make sure the channel, protocol and frequency are consistent with the "Radio Router" rover (Repeater).

*Note: Please take in mind that the Repeater should keep away from Base station to avoid signal interference.* 

**RTK Record:** This is used to enable raw data(STH or RINEX) recording in base mode or rover mode for post-processing

**xFillEnable:** The "**Fixed-keep**" function allows V2 to keep centimeter-level accuracy for a few minutes even when the correction data miss.

1 PPS: This option is for the 1 pulse per second output

BDSPPP: To use the BDS L-band corrections for centimeter-level real-time position system

WiseLinkRoute: Receivers use internet first to transmit and receive correction data (a internet server is needed), if lost the internet signals, then receivers will use radio transmit and receive correction data

**EVENT:** This option is for the EVENT marker input

**EVENT Polarity:** EVENT input method.

#### **Base Setup**

When Insight V2 works as a base, the basic configuration for the base is on this page. Users can input the correct coordinates or capture a current position for the base. Also, users can define what kind of correction format is transmitted.

admin SF 71318	1318 [logout]	> Base Setup			
Status	<b>H</b>	CMR ID:	30		
Configuration		RTCM2.x ID:	318		
General Config	Ξ	RTCM3.x ID:	318		
Base Setup Antenna Setup		Base Lon:	113 ° 25	0.850017	" • E • W
Satellite Tracking	Ξ	Base Lat:	23 ° 10	53.687056	* • N • S
Receiver Operation	Ξ	Base Alt:	51.465125		m
System Setup Receiver Security			Position Spa	аге	
Satellite Information		Starting Mode:	Auto By Current Point		~
Data Pacord		SLink Base Accuracy:	L		~
			Start Base Stop F	Base	
DataTransfer	<b>±</b>	Correction:	RTCM32		~
Network Config	<b>±</b>	DifferInterval :	1		~
Radio Config	-	PDOR Values	2		
Firmware Update		PDOP value:	3		
Track Manage	A	Base Status:	Base Stop		

CMR ID/RTCM2.X ID/RTCM3.X ID: Users can specify the ID for transmitting correction.

Position: Click this button to capture the coordinates for the current position

Spare: This is used for the repeat station

**Base Start Mode:** Here contain 3 methods to start the Base, manually start base, automatically start base by fixed point, and automatically start base by current point.

**Correction:** Here contains the global general used correction formats including RTCM30, RTCM32

DifferInterval: Base differential transmit interval (seconds/once)

**POP Value:** This value defines the PDOP limitation.

Status: Here will display the status of the base in real time.

#### Antenna Setup

The antenna parameters are configured on this page including the antenna height and measuring method.

UTH

admin SF 1318 [l	1318 ogout] > Antenna Setup	
Status	+ Antenna N	NC#: SFC 318
Configuration	Antenna He	ight: 1.800 m
General Config	MeasuringMet	hod: To The Bottom
Base Setup	M	odel: InsightV2-A
Antenna Setup	RIN	NEX: InsightV2-A
Receiver Operation	Anten	naR: 0
System Setup	Antennal	н 1: 727 3
Receiver Security		12.0
K Satellite Information	+	nl2; [/31.63
Data Record	<b>H</b>	
DataTransfer	•	Enter Cancel
Network Config	<b>•</b>	
Radio Config	•	
E Firmware Update	•	
Track Manage		

Antenna Height: This is the value for height from ground subjects point to receivers .

**Measuring Method:** Here provides several methods for measuring the antenna height such as carrier phase center, slant height, antenna edge, height plate and the bottom. Usually, we use carrier phase center, slant height, or To the bottom height.

Measuring Method:	Carrier phase center 🔹 🗸
	Carrier phase center
	Slant height
	Antenna Edge
	Height tape
	To the bottom

### **Satellite Tracking**

On this page, users can define the mask angle for satellite tracking, and check on the box of corresponding band from the constellation that to use this band or not

UTH

admin 13 SF 1318 [logo	B wt] ➤ Satellite Tracking		
🖵 Status	Mask Angle: 10		•
X Configuration			
General Config	Туре	Signal	
Base Setup	GPS	L1-C/A	
Antenna Setup	GPS	L1-P	
Satellite Tracking	GPS	L2-C/A	<ul> <li>Image: A start of the start of</li></ul>
System Setup	GPS	L2-P	<ul> <li>Image: A set of the set of the</li></ul>
Receiver Security	GPS	L5	Image: A start and a start
Ketelver Security	GLONASS	L1-C/A	<ul> <li>Image: A set of the set of the</li></ul>
Satellite Information	GLONASS	L1-P	
Data Record	+ GLONASS	L2-C/A	
DataTransfer	GLONASS	L2-P	
Network Config	GLONASS	L3	
	BDS	B1	
Radio Config	BDS	B2	
🐮 Firmware Update	BDS	B3	
Track Manage	BDS	B2A	Image: A start of the start

#### **Receiver Operate**

The page provides all kinds of operations to control the receiver such as self-check operation, clean epochs, factory reset, reboot and power off.

admin 1318 SF 1318 [logout]	> Receiver O	peration		
🖵 Status 🕂	Module Self-c	heck:		
X Configuration	Item	Module	Operation	Status
General Config 📃	1	OEM	Check	No Action
Base Setup 📃	2	Radio	Check	No Action
Antenna Setup	3 1	NetModule	Check	No Action
Receiver Operation –	4	WiFi	Check	No Action
System Setup	5	Bluetooth	Check	No Action
Receiver Security -	6	Sensor	Check	No Action
Data Record	7	EEPROM	Check	No Action
BataTransfer H				
Network Config			Check	( all
📱 Radio Config 🕂	Default Settin	gs: (Caution:T	nis operation will reset all	parameters())
💼 💼			Clean EPH	Factory Default
Track Manage	Restore Defa	ault : Etherne	t IP: 192.168.1.1 S	Subnet Mask: 255.255.255.0 Default Gateway: 192.168.1.1

**Self-check:** Users can also do the self-check from this configuration page, click on the Check all button to check all the modules or click on the check button corresponding to the modules to check one by one.

**Clean EPH:** Click this button to clear the remaining epochs to let receivers track the satellites better.

**Factory Default:** Click this button to bring the receiver back to factory default setting. **Reboot:** Click this button to restart the receiver.

UTH

Power Off: Click this button to power off the receiver.Reset OEM(cold): To reset OEM, and receiver will restartReset OEM(hot): To reset OEM, receiver will not restart

### System Setup

This page is used to control Voice prompt, volume of voice, power saving, USB mode and the default language for receiver.

admin SF 1318	1318 [logout]	> System Setup			
Status		Voice:			
X Configuration		OEMUserDefEnable:	Yes 💿 No		
General Config	Ξ	RTKEngine:	Yes 💿 No		
Base Setup		Volume:	Medium	~	
Antenna Setup		Power Mode:	Normal	~	
Receiver Operation		USB		~	
System Setup		Default Language:	Facility		
Receiver Security	Ξ	Delaut Language.	English	×	
🚿 Satellite Information	n 🖪	lime ∠one(h):	+8.0(Beijing China)	~	
Data Record	Đ	FixedMode:	Narrow	~	
		NmeaHeader:	GN	~	
Network Config	-	SelfDefine Module:	NULL	~	
		Authority Zone:	Default-20230711		
Kadio Config	E .	RTXSatellite:	Auto	~	
Firmware Update	E .	Satellite System:	All	~	
Track Manage	E	Catallita Pustamu	<b>P</b> 11		

**Voice:** Check on this box to turn on the voice guide for Insight V2, and uncheck it to turn off the voice prompt.

OEMUserDefEnable: Check "No" for V2

RTKEngine: Check "No" for V2

Voice Volume: Define the voice volume for Insight V2's speaker.

Power Mode: Configure the receiver to use the power saving mode or not.

**USB:** Now V2 supports the USB mode and Network interface at the same time through the USB 7-pin cable

**Default Language:** Configure the default language for Insight V2 which associates with voice prompt.

TimeZone(h): Use this to set the corresponding time zone for your country or area

**FixedMode:** Some receivers have the option for fixed mode narrow or wide, but this option is not working on V2

NMEAHeader: Choose the output data header in GN, GP or HE format

**Selfdefin module:** To set a user-defined work mode and output mode for receiver. Usually choose NULL

Authority code: Authority area (e-fence) code

Authority zone: NULL means no need for code, default means the default area. W means it can work all around the world

RTX satellite: Options for RTX satellite. V2 doesn't support RTK, so we don't need to choose it

**Receiver security:** To backup the receiver system, so that we can use the backup system if the receiver has any problem

KONE	admin	1318 [logout]	BackupSystem:	
	314 310		BackupSystem:	Start
_	Status	<b>•</b>	BackupProgress:	No Action
*	Configuration		BackupTime:	0
	General Config		Tips:	Please wait about 5 minutes!
	Base Setup			
	Antenna Setup			
	Satellite Tracking			
	Receiver Operation			
	System Setup			
	Receiver Security			

### §4.4.3 Satellite Information

The "Satellite Information" provides all kinds of tables, graphs and skyplot to check the information of tracking satellites. And it allows you to decide which satellites to use in constellation on/off page by checking on the corresponding box.

#### **Tacking list**

Here is the table to list all current used satellites and the other information about these satellites.

		-	-		1.4010	0.1	100010	0.1	1 COMP	0.1	0.4
Status 🛨	SN	Type	Elevation	Azimuth	LISNR	Code	L2SNR	Code	LSSNR	Code	Statu
Configuration	1	GPS	35.00	170.00	43.00	CA	48.00	P	49.00	1	In Use
	4	GPS	26.00	203.00	41.00	CA	45.00	Р	46.00	1	In Use
Satellite Information	7	GPS	52.00	323.00	45.00	CA	46.00	Р	0.00	8	In Us
TrackingList –	8	GPS	57.00	14.00	46.00	CA	49.00	Р	49.00	1	In Us
Skyplot –	9	GPS	32.00	241.00	43.00	CA	47.00	P	46.00	I.	In Us
GPS ON/OFF =	16	GPS	20.00	71.00	38.00	CA	22.00	P	0.00		In Us
GLONASS ON/OFF -	21	GPS	56.00	138.00	48.00	CA	41.00	Р	0.00	-	In Us
BDS ON/OFF -	27	GPS	26.00	36.00	40.00	CA	46.00	Р	43.00	L	In Us
	30	GPS	17.00	320.00	37.00	CA	41.00	Р	42.00	i.	In Us
	9	GLONASS	5 51.00	47.00	47.00	CA	50.00	Р	0.00		In Us
IRNSS ON/OFF =	10	GLONASS	5 33.00	344.00	41.00	CA	0.00	-	0.00		In Us
Data Record	16	GLONASS	6 18.00	105.00	42.00	CA	44.00	Р	0.00	-	In Us
	19	GLONASS	32.00	30.00	35.00	CA	40.00	Р	0.00		In Us
B DataTransfer +	20	GLONASS	6 76.00	155.00	36.00	CA	43.00	Р	0.00		In Us
Network Config +	21	GLONASS	6 17.00	200.00	45.00	CA	43.00	Р	0.00	2	In Us
Padio Config	1	PDS	45.00	125.00	44.00	1	44.00	1	41.00	1	In Lie

### Skyplot

On this page, all the tracking satellites are shown on the skypolt, a intuitively view of the current position of satellites.



	Status	•
*	Configuration	•
*	Satellite Information	
	TrackingList	Ξ
		Ξ
		Ξ
	IRNSS ON/OFF	Ξ
	Data Record	Ð
显	DataTransfer	+

### GPS on/off

For all the running GNSS constellations or the augmentation system, Insight V2 is able to decide which satellite to use.

In GPS on/off page, all the running satellites are listed, and unselect the box to stop using them.

	Status	E
s.	Configuration	-
~	Configuration	
×	Satellite Information	
		Ξ
	Tracking Chart	Ξ
	GPS on/off	
	GLONASS on/off	Ξ
	BDS on/off	Ξ
		Ξ
		Ξ
	QZSS on/off	Ξ
11	Data Record	÷
显	Data Transfer	E
æ	Network Config	-
	Network Cornig	
Ĩ	Radio Config	+

GLONASS on/off: To check and uncheck the satellites for tracking BDS on/off: To check and uncheck the satellites for tracking GALILEO on/off: To check and uncheck the satellites for tracking SBAS on/off: To check and uncheck the satellites for tracking QZSS on/off: To check and uncheck the satellites for tracking IRNSS on/off: To check and uncheck the satellites for tracking

### §4.4.4 Data Record

The "Data Record" can configure the parameters for receiver in static mode. Many operations can finish on Insight V2 Web UI, such as setting storage path, interval, data format and data file download.

### **Recording Config**

The page provides more practical operations for raw data storage.



🖵 Status	•	Storage Option :	Internal Memory	•
× Configura	tion 🔒	Interval :	1	▼ second
🚿 Satellite Infor	mation 🚹	File Interval :	24	▼ hour
Data Rec	ord 🔁	Data Format :	STH RINEX2.0 RINEX3.0 C	ompressRINEX3.0 RTCM
Recording (	Config 📃	Point Name :	6407	
Data Dowr FTP Transm	iload =	Auto Delete :	Yes 💿 No	
	sfer 🕂	Format :	Format Disk	
Network Co	onfig 🚹	Recording Mode :	auto	•
Radio Co	nfig 🚹	Once Record Enable :	Start Stop	
1 Firmware U	pdate 🚹		0	▼ minute
Track Mar	iage 🔒	Recording Status :	Recording 00:00:34	
Coordinate S	System 🚹	Tips :	Must enable the "RTK Record" item in the "Gener	al Config" page
Online Ser	vice 🚹			
& User Manag	ement 🚹		Enter Cancel	
System L	og 🕂			

**Storage Option:** Here are the options to select where the raw data will be stored--internal memory or external memory.

Interval: This is the sampling interval for data storage

File Interval: This setting defines the data storage time for the static file.

Data Format: Here are 3 formats for Insight V2 to store the data--STH, Rinex2.0 and Rinex3.0.

Point Name: A point name is necessary, and its default setting is the last 4 digits of SN.

**Auto Delete:** This setting is used to delete the previous data files automatically if the memory is full.

Format: Click this button to format the internal memory disk for Insight V2.

**Recording Mode:** Here are 2 options for Insight V2 to record raw data--automatically record the data if it achieves the sampling condition and not automatically record it.

Start/Stop: Click these buttons to start recording or stop recording the raw data.

**Once Record Enable:** Set a Timer for static recording. For example, if it sets 5 minutes, the receiver will only record for 5 minutes, after that the receiver will stop recording static data. **Recording Status:** Here shows the status of static data storage(recording time).

#### **Data Download**

This page provides the data files to download.

Choose the storage where the static data is recorded(Data Source) and file type. Then click on the blank of "Select Date" to choose a date and click "Get Data" button, all the files recorded in the date you choose will show in the table, tap download button to download the data files.

### Insight V2

as	dmin c l	ogout]	> Data Downlo	ad									
Ţ.	Status	•	Data Sour	ce :	• s	D Ca	ard	US	B Fil	е Тур	e: (	STH RINEX Compr	
*	Configuration	•			_					_			
* *	Satellite Information	10	Select Da	te : [	2023-	-02-2	24				Ge	t Data	
in .	Jutenite Information	-	Downblio	iT be				2 202			×	Save tarnet as"	
), II	Data Record		Downold				U	2, 202	2.3			oure larger us r	
	Recording Config	-	Item	-	Mon	Tue	Wed	Thu 2	Fri	Sat	Sun	Size	Data
	Data Download		4	-	6	7		0	10	11	12	22 026 KP	- Download
	FTP Transmission		-	_	0	-	°	9	10	-	12	33.830 KB	
			2		13	14	15	16	17	18	19	255.568 KB	[Download]
뮵	DataTransfer	<b>±</b>	3		20	21	22	23	24	25	26	2242.004 KB	[Download]
	Network Config	•	4		27	28						1137.124 KB	[Download]
T	Radio Config		5			5519	055E	M.sth				917.504 KB	+ [Download]

### **FTP Transmission**

FTP is a file transfer protocol.

By logging in to an existing or newly created FTP server, the user communicates with other hosts by means of file operations (such as file addition, deletion, modification, search, transmission, etc.)

Q	Status		Enable :	
*	Configuration		AnonymFlag :	
*	Satellite Information		Server Ip :	219.135.151.185
11	Data Record		Server Port :	21
	Recording Config		username :	admin
			password :	admin
	FTP Transmission	=	Path :	/
5	DataTransfer	÷	Delayed (min) :	0
۲	Network Config	•	UploadTest :	Test
Ĩ	Radio Config	Ð		
£	Firmware Update	•		Enter Cancel
		-		

### §4.4.5 Data Transfer

This performance contains General, Serial Port Config, TCP/IP Config, NTRIP Config and Data Flow Config. The "Data Transfer" can configure the output mode for raw observation data and differential data, as well as handle the NTRIP performance configuration.

### General

This page shows the service condition and the output contents of the ports. If the port item is displayed in green, it means the port is being used, and the port is not used while the item is displayed in red.

-	Status	🔁 📙	Туре	Port	Input	Output
×	Configuration		Serial	LENO (115200)	none	Navigation data
*	Satellite Information		Serial	BLUETOOTH (115200)	none	Navigation data
11	Data Record	•				
显	Data Transfer					
	General					
		Ξ				

### Serial port Config

This page can configure the baud rate, odd-even check and the data flow for the serial port (5-pin port).



-	Status	Ð	Item	Serial Port	Baud Rat	.e	Odd/E	ven	Data Flow	En	able
×	Configuration	8	1	LEMO	115200	•	None	•	Navigation Data	•	~
*	Satellite Information	Ð	3	BLUETOOTH	115200	•	None	•	Navigation Data	•	~
<u></u>	Data Record	8	1								
8	Data Transfer				Enter		Ca	ancel			
	General	Ξ									
	Serial port Config										



CAUTION: We strongly recommend not changing any default value on this page. If you really need to change the settings, please contact SOUTH technician for further support.

In the dropdown list of data flow, there are 4 items for selection.

Raw observation data: This is the raw observation data straight from OEM board.

Correction Data: This is the correction data straight from OEM board.

**Navigation Data:** This is the navigation data output from receiver such as NMEA-0183, GSV, AVR, RMC and so on. It is configured on Data Flow Config page.

SIC Observation Data: This is the user-defined format observation data from SOUTH.

**OpenSIC Observation Data:** This is the open version of SOUTH user-defined format observation data for secondary development.



### **TCP/IP Config**

It configures the raw data or uploads and transfers navigation data to a server. There are Caster and Server working mode for this function.

**Caster:** If this working mode is selected, Insight V2 will be a client to upload the data to a specific server when it connects to the internet by WiFi or GPRS connection with SIM card inserted. Input the specific IP and port for server, and decide the data format. Then users can see the uploaded data on server.

**Server:** Insight V2 will upload the data onto internet by the static WiFi if the server is selected, then users can obtain its dynamic data by accessing V2 through the IP.



											_
	Status	•	Item	Work Mode	Local Port	Server Ip	Server Port	Data Flow	Time Out	Status	Enable
*	Configuration	Đ	1	Caster 🗸	1111	58.248.35.130	2010	Navigation C 🗸	0	Disconnected	
16	Satellite Information	÷	2	Caster 🗸	2222	58.248.35.130	2010	Navigation C 🗸	0	Disconnected	
11	Data Record	•	3	Caster 🗸	3333	58.248.35.130	2010	Navigation C 🗸	0	Disconnected	
5	DataTransfer		4	Caster 🗸	4444	58.248.35.130	2010	Navigation E 🗸	0	Disconnected	
	General Serial Port Config	=	5	Caster 🗸	5555	58.248.35.130	2010	Navigation C 🗸	0	Disconnected	
	TCP/IP Config	Ξ	6	Caster 🗸	6661	58.248.35.130	2020	Navigation E 🗸	0	Disconnected	_
	NTRIP Config Multiple Ntrip		7	Caster 🗸	7771	58.248.35.130	2020	Navigation C 🗸	0	Disconnected	
	Data Flow Config	=	8	Caster 🗸	8881	58.248.35.130	2020	Navigation C 🗸	0	Disconnected	
	RTCM Config	-	9	Caster 🗸	9991	58.248.35.130	2020	Navigation C 🗸	0	Disconnected	
•	Network Config	Đ	10	Caster ¥	9911	58 248 35 130	2020	Navigation F 🗸	0	Disconnected	_
Ĩ	Radio Config	Đ		Guotor		1	1		1		
£	Firmware Update						-				
.11	Track Manage	•				Enter	Car	ncel			

### **NTRIP** Config

It configures the NTRIP modes when you connect a receiver to the internet. Insight V2 supports all NTRIP modes including NTRIP Client, NTRIP Server and NTRIP Caster.

	Status	-	NTRIP Client:	
*	Configuration		Status:	Disconnected
		-	Enable:	•
*	Satellite Information		Mode:	Eagle TCP/IP LARK WiseLink CMCC
11	Data Record	<b>E</b>	Address:	58 248 35 130
显	DataTransfer		Nitrie Client Dert.	
	General		Nuipolientron.	2010
	Serial Port Config		username:	usr
	TCP/IP Config		password:	password
	NTRIP Config		Access Point:	RTCM30 Get Point ~
	Multiple Ntrip	=	GetPoint Status:	Not acquired
	Data Flow Config	=	NTRIP Server:	
	RICM Config			
•	Network Config	<b>E</b>	Status:	Disconnected
Ĩ	Radio Config	<b>E</b>	Enable:	
±	Firmware Update	•	Version:	NTRIPv1.0 V
.11	Track Manage		Mode:	Eagle LARK WiseLink

### Multiple NTRIP

To transmit correction data to different servers at the same time through NTRIP protocol

### **Data Flow Config**

On this page, users can configure the specific contents, the update rate of data flow and which format to output.

Click on the dropdown list for each data format to define the update rate



	Status	63	Navigat	tion Data:										
2	Configuration		GGA:	OFF	~ (	GSA:	OFF	~	GSV	OFF	~	GST	OFF	~
-	comgulation		ZDA:	OFF	✓ E	BPQ:	OFF	~	PJK:	OFF	~	GLL:	OFF	~
it.	Satellite Information	-	RMC:	OFF	~ `	VTG:	OFF	~	HDT	OFF	~	GRS	OFF	~
11	Data Record	83	TRA	OFF		GGK	OFF	~						
8.	DataTransfer		SIC Na	vigation Data			on							
	General	-												
	Serial Port Config		PST:	1	• G	SSI:	5	~	BSI: 1	10	~	TPI: O	FF	~
	TCP/IP Config		VCV:	OFF	<b>~</b> 5	STA:	30	~	DEV:	WhenCha	anger 🗸	AAT:	OFF	~
			REC:	OFF	<b>v</b> (	DAL:	10	~	EDP:	OFF	~	SLB:	OFF	~
	Multiple Ntrip	=	TRA	OFF	V F	PJK	OFF	~	AVR	OFF	~	TCM	OFF	~
	Data Flow Config		1000				011			on	-		on	
	RTCM Config	-	SDF:	OFF	~									
۲	Network Config	63	Raw Of	oservation Data										
Ī	Radio Config			Output Interv	al: 1		<b>~</b> 1	5						
£	Firmware Update	<b>E</b>		GPS Ephemer	ris: W	henC	hanged				~			
	Track Manage		GLO	NASS Ephemer	ris: W	'henC	hanged				~			
•	Coordinate System	•		BDS Ephemer	ris: W	henC	hanged				~			
\$	Online Service	83	GAL	ILEO Epheme	ris: W	henC	hanged				~			
e.,	11 Management	-	(	QZSS Ephemer	ris: Ol	FF					~			

### **RTCM Config**

On this page, users can set differential signal formats.

_	Status		Enable:								
<	Configuration		RTCM32:								
€ Sa	atellite Information		RTCM1004:	OFF	$\sim$	RTCM1005:	OFF	~	RTCM1006:	OFF	~
	Data Pecord		RTCM1007:	OFF	$\sim$	RTCM1008:	OFF	~	RTCM1012:	OFF	~
2		-	RTCM1019:	OFF	~	RTCM1020:	OFF	~	RTCM1033:	OFF	~
5	Data Iransfer		RTCM1074:	OFF	~	RTCM1084:	OFF	~	RTCM1094:	OFF	~
	Serial Port Config		RTCM1124:	OFF	~	RTCM1042:	OFF	~	RTCM1046:	OFF	~
	TCP/IP Config		RTCM1045:	OFF	~	RTCM1230:	OFF	~	RTCM1044:	OFF	~
	NTRIP Config		RTCM1114:	OFF	~						
	Multiple Ntrip	Ξ	DECKOO								
	Data Flow Config		RIC#23:								
	RTCM Config		RTCM1819:	OFF	~						
	Network Config	<b>E</b>	RTD:								
	Radio Config	•	RTCM1: C	FF	~						
; 1	Firmware Update	•									
î	Track Manage	•									
) C	Coordinate System					Enter		C	ancel		

### §4.4.6 Network Config

#### WiFi Config

It configures the V2 WiFi with two mode to choose--AP mode and Client mode.

**AP:** It enables the WiFi hotspot of Insight V2 for mobile terminals such as smartphone or tablet to connect and access the Web UI.

Check the box of AP in Work Mode to enable the WiFi hotspot, and define the SSID, password, encryption method and broadcasting channel for WiFi connection.

DHCP IP Range: Allows users to set Web UI login IP.

1915			
RAFE	admin 13	18	
	SFC 318 [log	WIFI Config	
	Status	Enable: 🗸	
*	Configuration	Work Mode:      AP     Client	
*	Satellite Information	•	_
11	Data Record	+ AP_SSID: SOUTH_1318	
显	DataTransfer	AP_Password: southgnss.com.cn	
æ	Network Config	APEncode: Open	×
•	WIEL Config	APChannel: 7	×
	Bluetooth Config	DHCP IPRange: 192.168. 0/255.255.255.0(Default)	
	PortForwarding	0/255.255.255.0(Default)	
	Route	<ul> <li>10. 1</li> <li>. 0/255.255.255.0</li> </ul>	
	Network Testing		
Î	Radio Config	•	
£	Firmware Update	+ Enter Cancel	
.11	Track Manage	•	
	Coordinate System	•	

SOUTH

#### **Client:**

This option enables Insight V2 to search and connect to other WiFi hotspots that connect to the internet; the receiver is able to download and use the mountpoint from the reference station.

Client\_SSID: This is the WiFi hotspot to which Insight V2 is going to connect

Scan: Click this button to search available WiFi hotspots.

**Password:** This is the password that the WiFi hotspot requires.

**IP fields:** If Insight V2 successfully connects to the WiFi, there will be an LAN IP address generated by Insight V2.

ClearSSID: Click this button to clear the SSID list.

VALCOVE	admin S* 1318	1318 [logout]	> WIFI Config						
	Status	•	Enable:	✓					
*	Configuration	Ð	Work Mode:	AP	🖲 Cli	ent			
*	Satellite Information	•					1		
.11	Data Record	<b>±</b>	Client_SSID:	southgnss	; 		Scan	_	· · · · · · · · · · · · · · · · · · ·
泉	DataTransfer	-	password:	southgnss	s.com.cn				
<b>A</b>	Network Config	-	Encode:	WPA2					
			DHCP:	<ul> <li>Image: A start of the start of</li></ul>					
	Bluetooth Config		IP Address:	0	. 0	. 0	. 0		
	PortForwarding	Ξ	Subnet Mask:	255	. 255	. 255	. 0		
	Route		Default Gateway	0	0	0			
	Network Testing	Ξ	Deladit Galeway.		. 0				
Ĩ	Radio Config	-	Status:	Ununited					
±	Firmware Update	-	Signal:	<b>⊺X</b> III					
	Track Manago		Clear SSID List:	Clear	This acti	on will clear a	all connection re-	cords, please be carefull	
	ITACK IVIANAGE		Tips:	Reboot the	receiver after	er changing w	ifi work mode fr	om AP to Client!	
•	Coordinate System	t.							

**Bluetooth Config** 

### **Insight V2**

On this page, users can view the information and connection status of Bluetooth, such as the MAC of Bluetooth, discoverable or not, the PIN code, and the connected devices in the following table. The advanced Settings module enables Bluetooth search.

admin 1318 S <sup>r</sup> 1318 [logout]	> Bluetooth Confi	g		
Status 🕂	Bluetooth Config:			
X Configuration	Ena	ble: 🖌		
🚿 Satellite Information 🔒	Bluetooth M	AC: 90:CD:1F:58:CF:64		
🛅 Data Record 🕂	Discovera PIN C	ble: 🖌		
🗟 DataTransfer 🔒	Connected Dev	ice:		
Metwork Config	Connected Dev			
WIFI Config 📃	Item Devic	e Mac RFCOMM Channel	Device Name	Disconnect Action
Bluetooth Config 🛛 🖃	1			Disconnect
PortForwarding 📃	2			Disconnect
Route 📃				
Network Testing		Enter	Cance	ł
🔋 Radio Config 😑				
🔹 Firmware Update 🔒				
🛅 🛛 Track Manage 🕂				
🕀 Coordinate System 🔒				

### **Port Forwarding**

This page is mainly used to view and configure the internet transmission port of Insight V2, customize and debug receivers.

VICON	admin S* 4318 [	1318 [logout]	> PortForwarding		
Ļ	Status	E	HTTP Port:	80	
*	Configuration	÷	FTP Port:	21	
×	Satellite Information	8	TELNET Port:	23	
.11	Data Record	e	FTP Password:		
묘	DataTransfer	E			
•	Network Config			Enter Cancel	
	WIFI Config	Ξ			
	Bluetooth Config				
	PortForwarding				
	Route				
	Network Testing				



NOTE: We strongly recommend not changing any default value on this page. If you really need to change the settings, please contact SOUTH technician for further support.

#### Route

This is mainly used to view and configure the parameters of router, but only under the condition of customize and debug receiver.

### **Insight V2**

admin SI 1318 [l	1318 ogout]	> Route				
Status	•	Destination	Gateway	Mask	Sign	Interface
Configuration	-	192.168.155.0	0.0.0.0	0.0.0.0	U	bridge0
atellite Information	<b>E</b>	Change the default route:	PPP0	✓ Enter		
Data Record	=	Refresh				
DataTransfer	•					
etwork Config						
/IFI Config						
ooth Config						
rtForwarding						
twork Testing	=					
adio Config	E I	Add Route				
nware Update		Destination:				
rack Manage		Gateway:				
rdinate System		Mask:				
Ginace System	-	Interface:	PPP0 V	Enter		



NOTE: We strongly recommend not changing any default value on this page. If you really need to change the settings, please contact SOUTH technician for further support.

### Network testing

On this page, after entering the IP address, the user can confirm the network status.

	admin SI 318 [	1318 [logout]	> Network Testing	
Q	Status	•	InputIP:	PING
×	Configuration	Ð	PingStatus:	No Action
×	Satellite Information	Ð		
11	Data Record	Đ		
8	DataTransfer	•	PingResult:	
•	Network Config			
	WIFI Config			
	Bluetooth Config	=		
	PortForwarding			
	Route			
	Network Testing			
Ī	Radio Config	E		
£	Firmware Update	E		
11	Track Manage	•		
•	Coordinate System	Đ		

### §4.4.7 Radio Config

"Radio Config" can set V2 radio, and it is divided into "Radio Parameter" and "Radio



#### Frequency".

### **Radio Parameter**

This page is mainly used to configure the parameters for the internal radio module of Insight V2.

admin SFC 1318 [I	1318 ogout] > Radio Parameters		
Status	Enable:		
× Configuration	High Performance Mode:		
✗ Satellite Information	Air Baud Rate:	9600 ~	
Data Record	Data Baud Rate:	115200	•
	Channel Num:	1~20	•
Network Config	Channel:	12 ~	•
Radio Config	Power:	н	•
Radio Parameters	Protocol:	FarLink	•
Radio Frequency	LockBase:	Disable	•
Firmware Update	BaseNetID:	1111	
Track Manage	BaseAlarm:	Enable	
Coordinate System	Factory Default:	Factory Default	
Online Service			
🐉 User Management		Enter Cancel	
-			

**High performance mode:** To increase the radio performance in the forest and harsh environment; both Base and Rover should enable this function at the same time, and the protocol should be Farlink. If the Rover does not support Farlink protocol, then the Base should disable this function, otherwise, the Rover can not get fixed solution. We recommend disabling this function unless it is necessary.

**Air Baud Rate:** This represents the internal radio data transmission rate in the air; the higher value, the bigger of data size transmitted per second. We recommend keeping the default setting.

**Data Baud Rate:** This represents the rate of internal radio data transmission port. The rate should be the same in both Base and Rover. In general, the data baud rate of SOUTH radio module is 19200. We recommend keeping its default.

**Channel:** This is the communication channel of internal UHF, the value of the channel must be the same both in Base and Rover.

Power: This is only available in Base mode with 3 power settings--High, Middle or Low power.

**Protocol:** This is the radio communication protocol for data transmission; SOUTH (SOUTH), Farlink and TRIMTALK are optional on this page and SOUTH is the default setting. Base and Rover must use the same protocol for communication.

**LockBase:** If users choose the Farlink protocol, the rover will communicate with a specific base station without interfering by other base stations.

**BaseNetID:** If enable the LockBase, then you can input the ID of the Base you want to lock onto.

**BaseAlarm:** If the Base receiver moves(for some unexpected reasons), the rover will receive a notification about the base movement.

Factory Default: Click this button to restore the factory default for internal UHF module.

### **Radio Frequency**

For Insight V2, the powerful internal radio module supports much more radio channels with legal frequency in different countries or areas.

There are 20 radio channels listed on this page after clicking on radio frequency. Users are able to change the frequency in the channel spacing; click "Restore" button to bring all channels back to default setting.

V2 has integrated satellite tracking, GSM, WiFi, Bluetooth and radio into one antenna. There are three antenna options for the radio frequencies: 410MHz-430MHz, 430MHz-450MHz, 450MHz-470MHz. Please choose a suitable antenna for your V2.

admin SF6 1318	1318 [logout]	Radio Frequency					
L Status	•	Channel Num:	1~10		~		
* Configuration							
✗ Satellite Information	on 🔒	Channel1Frequency:	450.000	MHZ	Channel6Frequency:	455.000	N
Data Record		Channel2Frequency:	451.000	MHZ	Channel7Frequency:	456.000	N
		Channel3Frequency:	452.000	MHZ	Channel8Frequency:	457.000	N
B Data Iransfer		Channel4Frequency:	453.000	MHZ	Channel9Frequency:	458.000	N
Wetwork Config	<b>E</b>	Channel5Frequency:	454.000	MHZ	Channel10Frequency:	459.000	N
Radio Config							
Radio Parameter	s 🖃					_	
Radio Frequency	/ 🖃	E	nter	Cano	cel	Restore	
1 Firmware Update	e 🚹						
Track Manage	<b>•</b>						
Coordinate System	n 🚹						
Online Service	•						
& User Managemer	nt 🚹						

### §4.4.8 Firmware Update

Updating the latest firmware for receiver or for corresponding modules can be done in "Firmware Update".

### **Firmware Update**

This page displays all the information of the firmware installed on Insight V2, and allows updating the latest firmware for receiver. To get the latest firmware, please contact SOUTH technician.

WELCOM	admin SF 318 [	1318 logout]	> Firmware Update	
Ģ	Status		Firmware Information:	
×	Configuration	0	Firmware Version: 1.09.2	21226.RF61PY
*	Satellite Information		Core Engine Version: Purple	CowY.1.09
1	Data Record		Release Date: 20221	226
	DataTransfer		Oplina Lindata :	
•	Network Config		Latest Version	
Ī	Radio Config	÷	Update Status:	
±	Firmware Update		Download Status: 0%	
	Firmware Update	=	Last Update Time: 0	
	Module Update	Ξ	Online Update: Online	e Upda
11	Track Manage	÷	Tips: Please	make sure the network works properly before launching the online Update!
	Coordinate System	Đ		
*	Online Service	Đ		
8:	User Management	Đ	Local Update:	
<b>B</b> .		-	E ELD 4 1447	+ 14 + 14 + 2 / T I - 1 - 1 - 1 + 1 H

**Online Update:** Insight V2 supports updating the firmware online anytime if there is something updated or optimized.

Local Update: Update the latest firmware using a firmware file.

#### How to upgrade the firmware with Local Update

a) Click on "Choose File" button to load firmware file (Please take in mind that the firmware file is ended with **PY.ing** as its extension name).



b) And then click "Installation" button to start upgrading.

Local opticity .
FirmwareFilePath : Choose File 1.09.220914.RG60PY.img
Install
Status : Ready to update firmware, please wait

c) After the firmware completes upgrading, a dialog will appear saying "Firmware updated successfully! Host reboot, please log in later...", then the receiver will restart automatically.







SPECIAL REMIND: Insight V2 DOES NOT support updating the firmware with the help of INstar anymore. Updating the firmware for Insight V2 shall be done on Web UI.

### **Module Update**

This page is used to update the firmware for corresponding modules such as OEM board, radio module and sensor.

WHICOME	admin SF1 11 18	1318 [logout]	> Module Update
	Status	-	OEM Update:
*	Configuration		FirmwareFilePath: 选择文件 未选择任何文件
糸	Satellite Information	n 🚹	Install
.11	Data Record	E	Update Status: No Action
泉	DataTransfer		Firmware Version: 609A9-21AT6-1
@	Notwork Config	-	Tips: Update firmware need about 30 minutes!
	Network Coning		
Ĩ	Radio Config	<b>.</b>	Radio Update:
£	Firmware Update		FirmwareFilePath: [选择文件] 未选择任何文件
	Firmware Update	Ξ	Install
	Module Update		
.11	Track Manage	Đ	Update Status: No Action
۲	Coordinate System	e	RadioType: BERS02
ŵ	Online Service		Firmware Version: BERS02.1.0.220803
ð:	User Management	•	Sensor Update:
e.,			

### §4.4.9 Track Manage

V2 now supports recording the track while doing measurements, and uploading the data onto the server.

### **Parameter Setting**

### **Insight V2**

	Status	
	Status	
×	Configuration	
*	Satellite Information	+
11	Data Record	+
显	Data Transfer	÷
<b>A</b>	Network Config	
	D i o c	
Ĩ	Radio Config	-
±	Firmware Update	+
11	Track Manage	
	Parameter Setting	
	Data Download	Ξ
	Coordinate System	÷
ŵ	Online Service	+
25	User Management	+

#### **Record Setting**

Check on the box of "Record Enable" to activate the track recording function, and choose a proper recording interval in dropdown list of "Record Interval".

Record Setting		
RecordEnable	•	
RecordInterval	0.5	▼ second
RecordStatus	: No record	_

#### **EchoEnable Setting**

This configuration dialog is used to upload the recording data to a server in real time.

EchoEnable Setting	
Status:	Disconnect
EchoEnable:	
EchoIP:	58. 248. 35. 130
EchoPort:	2010
EchoUserName:	USER
EchoPassword:	OSWD
	Enter Cancel

#### **Data Download**

On this page, users can download the track data file from receiver. Choose the recording date and click "Get Data" to load all the data files recorded on that day; then choose the files and click download button.

### **Insight V2**

admin 1318 SF °1318 [logout]	➤ Data Downloa	d		
🖵 Status 🛨	Select Date	e: G	Set Data	
🗙 Configuration 🔒	DownbLoa	d Tips: Right click "Download" to choose	e "Save target as"I	
🚿 Satellite Information 🛛 🚹	Item	File Name	Size	Data
🛅 🛛 Data Record 🛛 🔒	1			👱 [Download]
Regional DataTransfer	2			👤 [Download]
	3			🚽 [Download]
Network Config	4			👤 [Download]
👔 Radio Config 🔒	5			🚽 [Download]
🏦 🛛 Firmware Update 🔒	6			🚽 [Download]
🛅 🛛 Track Manage 🔤	7			🚽 [Download]
Parameter Setting 📃	8			👤 [Download]
Data Download 🛛 🖃	9			🚽 [Download]
Coordinate System     H	10			摱 [Download]
🗘 Online Service 🕂	11			👤 [Download]
Se User Management	12			👤 [Download]
	13			摱 [Download]

### §4.4.10 Coordinate System(reserve)

V2 allows users to set the local coordinate system on internal Web UI management. The instrument would output the local coordinates according to this coordinate system.

admin 1318 SF 318 [logout]	> Coordinate System		
Status -	Coordinate Projection:		
X Configuration	Projection Name:	WGS84	
🚿 Satellite Information 🛛 🔒	Projection A:	6378137.000	
🛅 Data Record 🕂	Projection F:	298.257223563	
🛃 DataTransfer 🕂	Projection B0:	0.0	
Metwork Config	Projection E0:	500000.0	
🐒 Radio Config 🔒	Projection N0:	0.0	
🔹 Firmware Update 🔒	Projection SN0:	1.0	
🛅 Track Manage 🕂	Projection PS:	0.0	
Coordinate System			
Coordinate System 📃	Seven Parameter:		
🗘 Online Service 🕂	ΔX(m):	0.0	
🐉 User Management 🕂	ΔY(m):	0.0	
ê: 🛨	ΔZ(m):	0.0	

# §4.4.11 Online Service(reserve)

This function is to upload the data onto a server in real time, including Navigation data, raw



observation data, correction data, SIC observation data and open SIC observation data.

admin 1318 S* 1318 [logout]	> Online Service	
🖵 Status 🛨	Status:	Disconnect
🗙 Configuration 🔒	Enable:	0
🚿 Satellite Information 🛛 🔒	Be controlled:	
🛅 Data Record 🔒	Anonymous Login:	
💂 DataTransfer 🔒	Inactive In 2G Mode:	
Wetwork Config	Data Type:	Navigation Data 🗸
📱 🛛 Radio Config 🛛 🚹	Server Ip:	192.168.1.1
🏦 🛛 Firmware Update 🛛 🚹	Server Port:	6060
🛅 Track Manage 🔒	username:	UserName
Coordinate System	password:	
🖏 Online Service 🗧		
Online Service 📃		Enter Cancel

# §4.4.12 User Management

This page is used to manage the users login authority of Web UI, including the username, password and add users.

Status	•	Add User				
Configuration	0					
% Satellite Information	0	username	Jurisdiction	Status	Operating	Op
Data Record	•	admin	Administrator	Online	Louise.	
DataTransfer	0					
Network Config	•					
Radio Config						
Firmware Update	0					
Track Manage	•					
Coordinate System	0					
Online Service	0					
User Management						

# §4.4.13 System log

### System log

On this page, users can download the system log of the receiver (the log can help to backtrack the working status of the receiver).

NOTE: Only the administrator can modify parameters for receiver and manage users; ordinary users only have the right to view the relative parameters.





### Data log

On this page, users can record data and choose a duration.



# Appendix A Insight V2 Technical Specifications

Positioning Features	Signal Tracking	1000 channels BDS:B1I,B2I,B3I,B1C,B2a,B2b GPS: L1,L2,L5 GLONASS:G1, G2, G3 Galileo:E1,E5a,E5b,E6C,E5 AltBoc SBAS:L1C/A,L5 QZSS:L1C/A,L2C,L5,L1C,L1-SALF IRNSS:L5 L-Band
	GNSS Features	Positioning output rate: 1Hz ~ 20Hz Initialization time: <10 seconds Initialization reliability: > 99.9% All constellations available Reliable carrier wave tracking technology improves accuracy and provides high-quality raw data Dynamic positioning technology adapts to various environmental changes
	Code	Horizontal: 0.25 m + 1 ppm RMS
Positioning Precision	Differential	Vertical: 0.50 m + 1 ppm RMS
	GNSS	SBAS differential precision: typical<5m 3DRMS
	Positioning	
	GNSS Static	Horizontal: $\pm$ (2.5mm+0.5×10 <sup>-6</sup> D) Vertical: $\pm$ (5mm+0.5×10 <sup>-6</sup> D) (D is the measured baseline length)
	<b>Real-time</b>	Horizontal: $\pm (8mm+1 \times 10^{-6}D)$
	Kinematic	Vertical: $\pm (15 \text{mm} + 1 \times 10^{-6} \text{D})$
	(Baseline<30k	(D is the measured baseline length)
	<b>m</b> )	
	AR stakeout precision	Typical precision: 2cm
	Tilt Survey	Built-in IMU sensor supports tilt measurement by correcting coordinates according to the tilt direction and angle.
IMU+GNSS	IMU Refresh Rate	200HZ
	Tilt Angle	0° ~ 60°
	IMU Tilt Compensation	1.8 meters pole; RMS: 8 mm + 0.7 mm/° tilt (tilt is the tile angle)
	Operating	Linux
Interactive	System	
Interface	Button	Power Button
	Indicators	Kolida: 4 indicators + power indicator (at the bottom): satellite indicator,

		Bluetooth indicator, data indicator and power on indicator.		
		SOUTH/Sanding/Ruide/TianYu: 3 indicators + power indicator (at the		
		bottom): Bluetooth indicator, data indicator and power on indicator.		
	Web III	Built-in Web UI management platform supports Wi-Fi or USB		
	wed UI	connection to monitor the working status and configure the device $_{\circ}$		
		iVoice intelligent voice prompt		
	Voice Prompt	Default support Chinese, English, Korean, Russian, Portuguese, Spanish		
		and Turkish.		
Hardware	Size	131mm*80mm		
	Weight	800g		
	Material	Magnesium alloy		
	Temperature	Operating temperature: -45 °C to +75 °C		
		Storage temperature: -55 °C to +85 °C		
	Humidity	100% non-condensing		
	IP Grade	IP68		
	Shock	Withstand 2 meters fall with the pole		
	Power Supply	7-20V DC, over-voltage protection		
Electrical	Detter	Internal 6800mAhLi-ion battery; 7.2V; 18 hours for rover-Bluetooth		
Features	Battery	mode.		
	Pixel	2 mega-pixel		
AR Stakeout	Angle	75°		
	I/O Port	Type-C connector		
		Radio antenna connector		
	Radio	Internal radio		
Communication		Frequencies: 410-470MHz		
Communication		Protocol: Farlink, Trimtalk450s, SOUTH, HUACE, Hi-target		
	Bluetooth	BT4.2 (BR/EDR)		
	NFC	Passive: accepts but does not transmit		
	Support	802.11b/g/n		
		It can broadcast WIFI hot-spot for any intelligent devices to access and		
	WIFI	configure.		
WIFI	Hot-spot	Data controllers and other intelligent devices can communicate data with		
		the receiver through WIFI		
	WIFI	The receiver can link to WIFI. By WIFI, it can transmit and receive data.		
	Data-link			
Data Storage/ Transmission	Storage	4GBSSD, various sampling intervals, up to 20Hz raw data collection		
	Transmission	Support USB, FTP, HTTP		
		Static data format: STH, Rinex2.01, Rinex3.02 and etc.		
	Data Format	Differential format: RTCM 3.0, RTCM 3.2		
		GPS output data format: NMEA 0183, PJK plane		
		coordinate, SOUTH Binary code		

		Network model support: VRS, FKP, MAC, support NTRIP protocol
Sensor	Temperature	Built-in temperature sensor, temperature monitor technology, adjusts the receiver temperature in real time

# **Appendix B** Key Component Information

Item	Model	Manufacture	Key Performance Index
OEM board	K803S	Shanghai Sino GNSS	1000 channels
		Technology Co. LTD	
GNSS antenna	PM232	Shenzhen Kinvey	
		communication	Dual-band
		Technology Co. LTD	

# Appendix C Technical Terms

Ambiguity: unknown quantity is the integer number of cycles of the carrier phase measured from the satellite to the receiver.

Baseline: The connection line of the two measurement points, on which to receive GPS signals and collect observation data simultaneously.

Broadcast ephemeris: message released by the satellite demodulator satellite orbit parameters.

SNR (Signal-to-noise ratio): an endpoint signal power to noise power ratio.

Cycle skipping: interfere loop skips a few cycles from a balanced point, and stabilize in the new equilibrium point, this makes the phase integer number of cycles to generate an error.

Carrier: As the carrier, Frequency, amplitude or phase modulation of the modulated wave by a known reference value.

C / A code: GPS coarse / acquisition code, modulate the pseudo-random binary code for the 1023 bit duplex, the bit rate of which is 023MHz, and code repetition period of 1ms.

Difference measurement: GPS measurements employ cross-satellite cross-receiver and cross-epoch.

Difference Positioning: the method of determining the relative coordinates between two or more receiver by tracking the same GPS signal.

Geometric dilution of precision: Describe the contribution of satellite geometry errors factor in dynamic positioning

$$e = \sqrt{\frac{a^2 - b^2}{b^2}}$$

Eccentricity:  $V D^{a}$  where a, b of the semi-major axis and semi-minor axis. Ellipsoid: mathematical graphics formed when an ellipse moves around the minor axis of rotation in Geodetic Survey.

Ephemeris: the position of celestial bodies over time parameters.

$$f = \frac{1}{a}(a-b) = 1 - \sqrt{(1-e^2)}$$

Flattening:

a is the semi-major axis, b is the semi-minor axis, e is the eccentricity.

Geoid: similar to the mean sea level and extends to the mainland special planes. Geoid everywhere perpendicular to the direction of gravity.

Ionosphere delay: delay of radio waves through the ionosphere (non-uniform dispersion medium)

L-band: The radio frequency range of 390-1550MHz.

Multipath error: the positioning error caused by the interference between two or more radio signal propagation path.

Observing session: the use of two or more receivers at the same time to collect GPS data period.

Pseudo Range: GPS receiver in the time required to copy the code aligned with the received GPS code offset and multiplied by the speed of light to calculate the distance. This time offset is the difference between the signal reception time (time series of the receiver) and the signal emission time (satellite time series).

Receiver channel: GPS receiver RF mixer and IF channel, can receive and track satellites two carrier signals.

Satellite configuration: the configuration status of the satellite with respect to a specific user or a group of users within a specific time.

Static position: do not consider the point of measurement of the movement of the receiver.

### Appendix D 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.

Any changes or modifications not expressly approved by the party responsible for compliance

could void the user's authority to operate the equipment.

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 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.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 45cm the radiator your body: Use only the supplied antenna.