# **GENEQ F90 GNSS Receiver**



# User Manual

## Contents

1 Introduction	
1.1 Company Introduction	
1.2 Outstanding Features of F90	
2 General Information	
2.1 Outlook of F90	
2.2 Basic Operation	4
2.2.1 Turn on/off	4
2.2.2 Self check	
3 Equipment List	5
3.1 Packing List of Base	5
3.2 Packing List of Rover	7
4 Setting Up	9
4.1 Setting Up Base Station	9
4.1.1 Choose a suitable place	9
4.1.2 Set up instrument	9
4.1.3 Measure antenna height	
4.1.4 Transmit signal through external radio	
4.1.5 Transmit signal through internal radio	
4.1.6 Transmit signal through network	
4.2 Setting Up Rover Station	
4.2.1 Connect controller with rover	
4.2.2 Rover internal radio	
4.2.3 Rover network mode	
4.2.4 Rover controller network	
4.2.5 Download backup data	
4.3 Static Surveying	
4.3.1 Baseline network design	
4.3.2 Outdoor surveying	
4.3.3 Download data	
5 WEB UI Control	

5.2.3 Satellites	20
5.2.4 Information	20
5.3 Settings	21
5.3.1 Working mode	21
5.3.2 Satellites setting	25
5.3.3 Device configuration	
5.3.4 NMEA message	
5.3.5 View logs and configuration set	27
5.4 Download data	
5.4.1 Raw data	
5.4.2 Backup data	
5.5 Management	
6 Frequently Use Functions	
6.1 Device registration	
6.2 Download static data and Rinex change	
6.3 Upgrade firmware	
6.4 Restore factory settings	
7 Technical Parameters	

## **1-Introduction**

## 1.1 Company Introduction

GENEQ is a company professional in surveying and mapping industry. Advanced and high-quality products are our top priority. We try our best to offer prompt and good service to all our customers. Rich experience and abundant knowledge in this field guarantee that every decision we made is on the basis of scientific test. We strive to provide great products and service with reasonable price and believe it's the key to have more clients and gain more cooperation.

## 1.2 Outstanding Features of F90

Purchasing the right tools for a professional job is essential in today's competitive business environment. As the latest GNSS receiver, F90 distinguishes itself from other GNSS products. It is more compact and lightweight but integrating more advanced technology. Even still equipped with magnesium alloy fuselage, the dimension is only 140x157x76mm and the weight is just 1KG. Many revolutionary technology in F90 makes your survey work more quickly and efficiently. Some innovation features can be summarized as below :

#### (1) Board and L-Band

F90 is compatible with 3 kinds of GNSS board--Trimble BD990, NOVATEL 729, Hemisphere P328, makes it capable to track GPS, GLONASS, GALILEO, BEIDOU and can maximize the tracking to observe all visible GNSS satellites signal, thereby providing maximum performance of accuracy and real-time measurements. F90 also supports L-Band function, can get centimeter accuracy just with one receiver. L-Band is not standard configuration, need to pay for activation.

## (2) Multi-Connectivity

F90 provides two connecting methods for receiver and controller---Bluetooth connection and Wi-Fi connection. Data transmission proves to be more stable with these new connection ways. Besides, F90 supports "fast connection", put your controller close to the receiver, click "fast connection" and it will search and connect the receiver automatically via Bluetooth when power on.

#### (3) WEB UI control

The second generation WEB UI control is fully compatible with all devices and all browsers. It's more convenient with WEB UI control.

#### (4) 4G Network

F90 has advanced 4G module, guarantee 4G network can transmit world-widely. It enables more convenient and stable network communication.

#### (5) Tilt Survey

Inserted with high-sensitive E-bubble and brand-new tilt survey algorithm. F90 is calibration-free. Immune to magnetic disturbance and free from limitation of tilt angles. F90 can measure points where a vertical placement of the pole is not possible such as house corner.

#### (6) Dual Batteries

Inserted with 2 smart hot swappable Lithium batteries, F90 can work maximum of 10hours without stopping. Battery level can be viewed at the press of one button on battery. The battery is also same as controller.

#### (7) Alarm System

In UHF model, when base is moved, with low power or no satellites, Rover will alarm immediately.

All of these innovations will increase your productivity and taking your performance to a new level.

## 2- General Information

2.1 Outlook of F90





The indicator status : dark, light or blink... It represents different status of the RTK equipment :

Power Button	Turn on/off the device. Light when device is turned on. Turn to red when with low power
Satellites Indicator	Blink when normally receive satellites signals. The times it blinks, the number of satellite it tracks. Light without blinking indicates F90 gets fixed solution
Datalink Indicator	Blink regularly with green color means correction data is transmitting or receiving normally ; blink regularly with blue color means static data is recording
Wi-Fi Indicator	Light when device used as hotspot or being connected as client
Bluetooth Indicator	Light when device has been connected via Bluetooth

## 2.2 Basic Operation

## 2.2.1 Turn on/off

Turn F90 on. This is the very first step to use F90. When the receiver has power, keep pressing power button for 4 seconds, then you will see the power button light up and hear beep.Turn F90 off. With voice guide : Keep pressing power button for 4 seconds, then you will hear voice guide "power off", release and one press on the button again will turn the device off. Without voice guide : Keep pressing power button for 4 seconds, release and you can see all 5 indicators blink simultaneously, one press on the power button again will turn the device off.

## 2.2.2 Self check

F90 has self-checking function when you find some malfunctions like the indicators are abnormal or receiver can't work normally or the device can not connect via Bluetooth or Wi-Fi, radio mode is not workable or can't connect to CORS. Self-checking function covers radio mode check, GSM mode check, Bluetooth mode check and Wi-Fi mode check. There is voice guide to tell you whether it is OK or not.

When the receiver is turned on, keep pressing the power button for 4 seconds, then you hear "power off", release and keep pressing the power button again for 4 seconds. You hear "self-check" and then following checking process and the results of each check.

## 3- Equipment List

## 3.1 Packing List of Base

		F90 B	ASE SET		
		1. Ma	ain body		
Name	Туре	Description	Picture	Weight	QTY
Receiver main	F90	Mainboard :	157mm	1.2KG (with two	
body		BD990	F90	batteries inside)	1
			140mm		
		0EM729 P328 2 ∧cc	cessories		
Name	Туре	Description	Pict	ture	ΟΤΥ
		7.2∨	211-23 (Bouget), divid (201 and 40		
Battery	BP-5S				2
Duttery		3400mAH			
				A CONTRACTOR	
Charger	СН-04	Battery charger			1
			-	~	
Charger	DSA-40CA-12				1
Adapter					
UHF Antenna	QT440A	UHF antenna			1
Connector	RTK	connect Iribrach			1
Таре	MTSP4	3m tape			1

Supporting Pole			25cm FRP supporting pole			•	1
Pallet					• • • •		1
Base Case	YPCC1		yellow, rigid plastic carrying case	4	A contraction		1
		F9	0 Base	A Suite o	of Product		
		Carton	Packing	G.W.	N.W.	Volume(C	EBM)
		0*20*4	40CM	6.3KG	5.3KG	0.04	

## 3.2 Packing List of Rover

		F90 ROV	ER SET		
		1.Main k	oody		
Name	Туре	Description	Picture	Weight	QTY
Receiver main body	F90	Mainboard : BD990 OEM729 P328	157mm F90 F90 140mm	1.2KG(with two batteries inside)	1
		2.Access	ories		
Name	Туре	Description		Picture	QTY
Lithium Battery	BP-5S	7.2V 3400mAH		Margania Marga	2
Charger	CH-04	Battery charger			1
Charger Adapter	DSA- 40CA-12				1
UHF Anten- na	QT440A	UHF antenna			1
Connector	RTK	connect Tribrach and Plummet			1
Таре	MTSP4	3m tape	(		1
Bracket		B3			1

Carrying Case	YPCC2	yellow, rigid plas carrying case	tic		Contraction of the second seco		1
Pole		No Logo					1
F90 Rover A Suite of Product(Without Pole)							
		Carton Packing	G.W.		N.W.	Volu	me(CBM)
		50*20*40CM	6.45KG	Ì	5.4KG		0.04
	F90	Rover A S	uite of	Pr	oduct(With F	Pole)	
		Carton Packing	G.W.		N.W.	Volu	me(CBM)
		50*20*40CM	8.4KG		7.4KG	(	0.056

## 4- Setting Up

## 4.1 Setting Up Base Station

## 4.1.1 Choose a suitable place

A suitable place is essential for base station to better receive the satellites and transmit the UHF signals. A suitable position should comply with following conditions :

(1) Choose a wide open area in order to easy and better receive signal of satellites. Besides, make sure there is no covering like roof or heavy foliage.

(2) A higher place is better for transmitting the UHF signals. If rover is far away from base, then the enhanced antenna should be raised by tripod.

(3) Make sure there is no large area of water or objects intensely interfering the satellite signal.

(4) Check carefully that there is no high-power radio emission objects surrounded. And make sure there is no power lines around. Need keep at least 200m far from these objects.

## 4.1.2 Set up instrument

Mount the instrument to the tripod. Level and center the instrument precisely to ensure the best performance. You can set up base on random point or on given point. If you set base on random point, you just choose a position and level the instrument. If you set base on given point, you can follow below steps :

(1) Leveling and Centering the instrument

a.Setting up tripod

First, extend the extension legs to suitable length, make the tripod head parallel to the ground and tighten the screws.

b.Make the center of the tripod and the occupied point approximately on the same plumb line c.Step on the tripod to make sure if it is well stationed on the ground.

(2) Attaching the instrument on the tripod

Place the instrument carefully on the tripod head and slid the instrument by loosening the tripod screw.

(3) Roughly leveling the instrument by using the circular vial

a. Turn the leveling screw A and B to move the bubble in the circular vial as below Figure 4-1 shown, in which case the bubble is located on a line perpendicular to a line running through the centers of the two leveling screw being adjusted.



b. Turn the leveling screw C to move the bubble to the center of the circular vial.



(4) Precisely leveling by using the plate vial

a. Rotate the instrument horizontally by loosening the horizontal clamp screw and place the plate vial parallel to the line connecting leveling screw A and B, and then bring the bubble to the center of the plate vial by turning the leveling screws A and B.



Rotate the instrument 900 around its vertical axis and turn the remaining leveling screw or leveling C to center the bubble once more



(c) Repeat the above a&b steps for each 900 rotation of the instrument and check whether the bubble is correctly centered in all directions.

### 4.1.3 Measure antenna height

The antenna height must be measured when we use F90 to collect static data or use it as base station. It's the "a" show in below Figure 4-5, the height from ground measured point to phase center, only get this height can we know coordinate of the ground measured point. There are 3 measuring methods to get the antenna height :

#### (1) Slant height

Measure the distance from the ground measured point to the middle of mainframe scale mark. It's the "d" shown in Figure 4-5.

#### (2) Pole height

Measure the distance from bottom of device to ground directly. It's the vertical height "b" shown in Figure 4-5.

#### (3) Measuring plate

Measure the distance ground measured point to the upper edge of plate. It's the "c" shown in Figure 4-5.

Choose either one measuring method from above. Use measure tape measure the height you choose. Input the height in software. Then you can get the height from ground to phase center. The formula is as below :

a=b+L1



Figure 4-5 (Measure Antenna Height)

## 4.1.4 Transmit signal through external radio

Fix external enhanced antenna onto the tripod, and use connection cable to connect external radio with 5-pin port of receiver as shown in Figure 4-6. Plug power cable to external radio. Then turn on radio. You can set the channel on the external radio directly. The external serial port baud rate should be same as external radio. The baud rate for our device is 38400. If you use our radio, you have to set the baud rate to be 38400 for your receiver to match the radio.

## 4.1.5 Transmit signal through internal radio

For short distance, you can use internal radio to transmit the signal. First, fix the UHF antenna on F90 as shown in Figure 4-7. And then select internal radio mode via controller or WEB UI function. Internal radio covers distance around 5km.

## 4.1.6 Transmit signal through network

You can also use network (F90 has 4G module supports 4G network) to transmit signal. Insert SIM card into the receiver. And select network datalink via controller or WEB UI function.



Figure 4-6 (Base Station with external radio)



Figure 4-7 (Base station with internal radio)

## 4.2 Setting Up Rover Station

Rover station can receive data through different datalink methods--internal radio, rover network and controller network.

## 4.2.1 Connect controller with rover

Attached the controller bracket to the pole. If use internal 4G, you need to insert the SIM card in controller. If use internal radio, then fix UHF antenna. You can connect the controller with rover through Wi-Fi or Bluetooth as you prefer.

#### (1) Via Wi-Fi

F90 can be used as a hotspot, use controller to search the Wi-Fi signal of F90, the Serial NO. of F90 will show on controller, then select it to finish connect.

#### (2) Via Bluetooth

Use controller to search the Bluetooth signal of F90, once found, the Serial NO. of F90 will show on controller, then select it to finish connect.

#### 4.2.2 Rover internal radio

Fix UHF antenna on rover, then select internal radio mode on controller or via WEB UI function.

You can select radio channel and radio protocol, but make sure the channel and radio protocol are same as base. On controller, Channel 8 is able to edit. While channel 1~7 can not be edited.

### 4.2.3 Rover network mode

Insert SIM card on rover, then select network mode on controller or via WEB UI function. Input the CORS account and password, set APN and upload GGA..

## 4.2.4 Rover controller network

This method means the SIM card is inserted in controller. The controller gets the correction data and send to device via Bluetooth. It's less stable compare with device network.

## 4.2.5 Download backup data

Once finish surveying, you can download the backup data via WEB UI as shown in Figure 4-8. The backup data format is ".RTK"

F90 F90033804	035				
Status	<	Ortest	Name	Circ (AD)	0
Settings		Select	20180516 RTK	Size (MB)	Operation
Gettings	•	0	20100010.1011	0.003	Download Delete
L Download	~	Select All Back	Delete Selected		
Raw Data		GelecitAli			
Backup Data					



## 4.3 Static Surveying

Static surveying requests at least 2 receivers put on 2 points on a baseline. Keep these receivers in the same position and track at least 4 satellites then get relative distance of these 2 points. Static surveying provides the highest accuracy achievable and requires the longest observation times, from less than an hour to five hours or longer.

The static surveying function in F90 including outdoor surveying and indoor data post processing.

## 4.3.1 Baseline network design

#### (1) Synchronous pattern

As we know, static surveying uses at least two or more than two receivers track same satellites during same period. And then we can get data of these points. The pattern that formed by these points called synchronizing pattern. If use three or more than three receivers, the pattern formed by these points called synchronizing pattern cycle. As show in Figure 4-9.



#### Figure 4-9(synchronous pattern)

#### (2) Asynchronous patter

If there are too many points in one baseline network, you should connect these synchronous cycle together and form the asynchronous pattern.

Asynchronous pattern can be connected via three ways as shown in Figure 4-10 :

(a) point connecting. Point connecting network is defined as a figure by connecting two adjacent shapes by only one common point. The advantage of this type is high efficiency, fast extending. But it can not confirm the high precision surveying. Therefore, it is not recommended in precise working.

(b) side connecting. Side connecting network is defined as a figure by connecting two adjacent shapes by their same side. It is widely used in the surveying field due to its high precision.

(c) point and side connecting. Because every type of network has its own advantage and disadvantage, we can combine these types to achieve higher efficiency but lower investment in time. Mixed connecting network is common in surveying work.



#### Figure 4-10(asynchronous pattern)

## 4.3.2 Outdoor surveying

#### (1) Choose suitable points

Suitable points is essential to make sure whole surveying work goes smoothly and efficiently. The points should be fixed only after you well analyze and collect full information of the surveying area. Choose these points best suits your accuracy and surveying purpose. When choose the point in static surveying, you should pay attention to below :

a. The points should comply with your surveying purpose.

b. The points should also be easy-to-use for other surveying methods.

c. Convenient transportation. So it's easy for you to set up device.

d. Away from high power radio emission objects, make sure no magnetic field influence nearby.

e. Away from large water area or mirror building, reduce the multi-path interface.

f. Good ground foundation, so the point can be saved enduringly.

g. Make marks after choose the points, including its position info and sketch for surroundings.

(2) Setting up devices

After choose the points, you set up the device on these points. Power on the device, then you can set "Static Mode" via controller software or WEB UI. As shown in below Figure 4-11.

- <b>90 F9</b> 001380404	48		
Status	<	System Mode	● Static ◯ Rover ◯ Base
Settings	~		
Working Mode		Point Name	GINT00000
Satellite Settings		Antenna Height	1832 mm
Device Configuration		Antenna Measurement	Antenna slant height mode
NMEA Message		Pdop Threshold	99.00 [1-99]
View Logs		Interval	1HZ 🗸
Configuration Set		Auto Record	⊖ NO   YES
L Download	<		Save Cancel
Management			

#### Figure 4-11

You can define the point name and set interval frequency and input the antenna height and others. Once working, you can observe the satellite signal status and record the satellite data in device or in controller.

## 4.3.3 Download data

Connect F90 via WEB UI) for data downloading. File name given should comply with the notes of outdoor surveying made by yourself. Data file name includes points name, day of year and surveying times. It is easy for you to distinguish. If the file name is 34661171.F14, the first four numbers "3466" can be defined by yourself. The later three numbers "117" represent the day of year, which can not be edited. Last number means the surveying times, which can not be edited either. Convert the data to RINEX format.

## 5- WEB UI Control

## 5.1 Connect and register WEB UI

F90 can be a Hotspot. You can connect it with phone, controller, PC or other devices through its Wi-Fi. The default Wi-Fi name is device number, no password needed.

After connecting the Wi-Fi, input IP"192.168.10.1" into your web browser to turn it on.

÷	Cΰ	http://192.168.10.1/#
---	----	-----------------------

It will pop up a window like Figure 5-1, requests User name and password, default is as follow :

User name : admin	Password : password
Windows Security	×
Microsoft Edge	
The server 192.168.10.1 is askir password. The server reports the serv	ng for your user name and nat it is from F90023801005.
Warning: Your user name and p basic authentication on a conn	password will be sent using ection that isn't secure.
User name	
Password	
Remember my credentials	
OK	Cancel



The WEB UI includes Status, Position, Settings, Download and Management.

#### 5.2 Status

In status, you can see current work status of receiver and some basic information. Such as datalink, satellites and the device information.

#### 5.2.1 Position

In "Position" you can see the system mode, coordinate and satellites.

F90 Web UI	× [*
90 F900138040	39
Status	System Mode: Rover
Position	• Longitude: 113.430118357 °
	• Latitude: 23.166590567 °
Datalink	• Height: 65.859 m
0-1-171	Status: Single
Satellites	Satellites: 31 [GPS: 12, BeiDou: 9, Glonass: 7, Galileo: 3]
Information	• PDOP: 1.0
	• HDOP: 0.5
Settings	• TDOP: 0.5
Download	• HRMS: 1.331
Download	• VRMS: 2.396
Management	<ul> <li>Local Time: 2018-05-09 16:48:12</li> </ul>
	• UTC Time: 2018-05-09 08:48:12

#### Figure 5-2

#### 5.2.2 Datalink

In "Datalink" you can set the channel, frequency and protocol. And you can also do channel detection in this menu. Below pic shows internal radio datalink.

F90 F90034804060		
Status	~	UHF:
Position		• Channel: 4 • [444 MHz] Change
Datalink		Radio Protocol: TrimTalk 450S     Change
Satellites		Channel Detection
Information		
Settings	<	
<b>⊥</b> Download	<	
Management		

Figure 5-3

## 5.2.3 Satellites

In "Satellites" you can set the cutoff angle and can see satellites conditions.



#### Figure 5-4

#### 5.2.4 Information

In "Information", you are able to check information details about this receiver, such as firmware version of the receiver, GPS firmware version, UHF mode information, Network information etc.

F90 Web UI		×	
90 F900138040	39		
Status	~	Deceiver:	
Status		Device Model: F90	Serial No.: F90013804039
Position		Hardware Version: F90-V1.01	BOOT Version: 1.04
Datalink		Firmware Version: 0.22.180412	OS Version: 1.05
		MCU Version: 1.09	Sensor Version: 1.0
Satellites		Battery 1: No_Battery	Battery 2: 63%
Information		Power Source: battery	Data Memory: Total 6.74 GB; Free 6.74 GB
Settings	<	Antenna:	
Deveload		Antenna Type: FOFA90SX070A	R: 785
Download		H: 437	HL1: 347
9 Management		HL2: 255	
		GNSS Board:	
		GNSS Model: NovAtel-OEM729	GNSS Serial: BMGX18050134U
		GNSS Hardware Version: OEM729-2.01	GNSS BOOT Version: OM7BR0002RB0000
		GNSS Firmware Version: OM7MR0400RN0000	
		Network:	
		NETWORK Model: EC25-E	IMEI: 861107034367640
		Firmware Version: EC25EFAR02A09M4G	Network Provider: Undefined
		Network Type: 4G	Signal Level: 0%
		Protocol: NTRIP	Caster Address: 122.13.16.137:6070
		Mountpoint: 1000_RTCM32	
		UHF:	
		Radio Model: TRM101	Serial: TRU118041958
		Firmware Version: G001.02.12	Channel: 3 [460.350 MHz]

Figure 5-5

## 5.3 Settings

### 5.3.1 Working mode

In "Working Mode", you can select different work mode : static, rover and base. In different mode, you can define different configuration.

#### (1) Static Mode

As the pic shows, you can input the point name, antenna height, PDOP threshold. Select antenna measurement method and interval. Last is the auto record, if you choose "YES", the data will be collect automatically when the receiver is working.

F90 F9001380404	8		
Status	<	System Mode	● Static 〇 Rover 〇 Base
Settings	~		
Working Mode		Point Name	GINT00000
Satellite Settings		Antenna Height	1832 mm
Device Configuration		Antenna Measurement	Antenna slant height mode
NMEA Message		Pdop Threshold	99.00 [1-99]
View Logs		Interval	1HZ V
Configuration Set		Auto Record	○ NO
🛃 Download	<		Save Cancel
9 Management			



#### (2) Rover Mode

In rover mode, you can select different datalink. There are different configuration in each datalink method. The datalink methods are UHF, Network, External and Bluetooth.

If you choose UHF datalink, you can choose record raw data or not. Select the radio channel and radio protocol as you prefer. F90 is compatible with various protocols, such as : SATEL,P-CC-GMSK, TrimTalk 450S, South 9600, TrimMark III(19200) , South 19200, Hi-target 9600, Hi-target 19200.

F90 F9001380404	8		
Status	<	System Mode	⊖ Static ● Rover ⊖ Base
Settings	~	Current Datalink	O UHF ○ Network ○ External ○ Bluetooth
Working Mode			
Satellite Settings		Record Raw Data	● NO ⊖ YES
Device Configuration		Padio Channel	
NMEA Message		Radio Ghamier	444.000 MHz Default Frequency
View Logs		Radio Protocol	TrimTalk 450S 🗸
Configuration Set			25 OFF
🛃 Download	<		Save Cancel
Management			

## Figure 5-7 Rover mode(UHF datalink)

If you choose Network, you have to input the CORS and APN account, password and upload GGA.

F90 F9001380404	B		
<b>∎</b> Status	<	System Mode	⊖ Static
Settings	*	Current Datalink	◯ UHF ● Network ◯ External ◯ Bluetooth
Working Mode Satellite Settings		Record Raw Data	● NO () YES
Device Configuration		Relay Mode	○ Enable
View Logs		Network Link	○ WIFI CLIENT
Configuration Set	<	SET APN AUTOMATICALLY	⊖ YES  NO
Imagement		APN	
		APN User	
		APN Password	

Network Type	● Auto 〇 GSM 〇 CDMA1x	
Connect Mode	Ntrip 🗸	
Caster Address	122.13.16.137	
Caster Port	6070	
Mountpoint	F90013804048	
	Get Mountpoint	
Upload GGA	Disable 🗸 S	
User	TESTGINTC	
Password		
1 0550010	•••	
Auto Connect	● NO ○ YES	
	Save	

Figure 5-8 Rover mode(Network datalink)

If you choose External, it can connect to external radio. The external serial port baud rate has to be same with external radio. The baud rate for our device is 38400.

F90 F90013804048		
Status	< System Mode	⊖ Static   Rover ⊖ Base
Settings	✓ Current Datalink	◯ UHF ◯ Network
Working Mode		
Satellite Settings	Record Raw Data	● NO ○ YES
Device Configuration		
NMEA Message	External Serial Port Baud Rate	38400 V
View Logs		Save Cancel
Configuration Set		
L Download	<	
9 Management		

#### Figure 5-9 Rover mode(External datalink)

Status	<	System Mode	⊖ Static
Settings	~	Current Datalink	◯ UHF ◯ Network ◯ External 💽 Blue
Working Mode	-		
Satellite Settings		Record Raw Data	● NO () YES
Device Configuration	on		Save Cancel
NMEA Message			
View Logs			
Configuration Set			
L Download			

The last is Bluetooth, you can select record raw data or not as below pic shows.

Figure 5-10 Rover mode(Bluetooth datalink)

#### (3) Base Mode

Base mode also contains different datalink, most parameters are same as rover. Just base has more options that can be edited.

F90 F90013804048			
Status	<	System Mode	⊖ Static ⊖ Rover ● Base
Settings	*	Current Datalink	○ UHF ○ Network ○ External ○ Bluetooth   Dual
Working Mode Satellite Settings		Automatically Start Base	● NO () YES
Device Configuration		Data Type	RTCM3.2 V
NMEA Message		Site ID	8
View Logs		Pdop Threshold	99.0 [1-99]
Configuration Set		Base Position	O Single  Repeat Position
▲ Download	<		
9 Management		Coordinate	Degrees/Minutes/Seconds V
		Base Longitude	113 °25 '48.1019520 '

Figure 5-11 Base mode

If use External, you can connect F90 with external radio via Bluetooth. Besides, F90 can also connect with other devices via Bluetooth.

## 5.3.2 Satellites setting

In satellites setting, you can set the cutoff angle and select the satellites.

C (2) (2) http://19	2.168.10.1/index_General.php#	
<i>ि</i> F90 Web Ul	×	
F90 F90013804039		
Status	Cutoff Angle	10 ° [0-45]
Settings	GPS	● Enable ⊖ Disable
Working Mode	GLONASS	● Enable ⊖ Disable
Satellite Settings	Beidou	Enable      Disable
Device Configuration	GALILEO	● Enable ○ Disable
NMEA Message	SBAS	○ Enable   Disable
View Logs	Receiver Dynamic model	
Configuration Set	RTK Timeout	60 [1-300]
± Download	RTK MODE	NORMAL      Extra safe
9 Management	Save Cancel	

Figure 5-12

## 5.3.3 Device configuration

Device configuration can help you set many configuration. Such as select time zone, first storage position etc.

F90 F9003480406	D		
Status	<	Time Zone	GMT+8:00 •
Settings	*	Direct Link Mode	Disable ▼
Working Mode		Sensor	Disable ▼
Satellite Settings		7-pin Serial Port Baud Rate	115200 ▼
Device Configuration		Speaker	<ul> <li>Enable          Disable</li> </ul>
NMEA Message		First Storage	Internal Storage  SD Card
View Logs Configuration Set		Power on automatically when connected 5-pin cable	Enable Disable
± Download	<	Network Enable	Enable Isable
Management		WIFI Hotspot Share Network	Enable  Disable
		Static File Naming Way	RINEX 3.02 • RINEX 2.11
		s	ave Cancel

#### Figure 5-13

## 5.3.4 NMEA message

You can set the NMEA message, turn them on/off. You can also select the frequency here. NMEA includes GGA, GSA, GST, RMC, ZDA, GSV, VTG, GLL, GEDOP, GEREF, GESNR. Below pic shows the general settings.

🗲 🕞 🏉 http://19	02.168.10.1/index_General.php#
<i> </i> F90 Web UI	×
F90 F90013804039	
<ul> <li>Status</li> <li>Settings</li> <li>Settings</li> <li>Working Mode</li> <li>Satellite Settings</li> <li>Device Configuration</li> <li>NMEA Message</li> <li>View Logs</li> </ul>	GGA: 1Hz V ZDA: 1Hz V GEDOP: Off V GSA: 1Hz GSV: 55 V GEREF: 55 V GST: 1Hz V VTG: 1Hz V GESNR: 55 V RMC: Off V GLL: Off V Save Cancel
Configuration Set     Download	



## 5.3.5 View logs and configuration set

In "View logs", you can see previous malfunction record and see previous result of self-checking. You can view and download them.

F90 Web UI	×	
0 F90013804039		
Status	View Logs	
Settings	1. APP Log	Download View
Vorking Mode		Download
Satellite Settings	2. OS Log	Download View
Device Configuration		
IMEA Message		
/iew Logs		
Configuration Set		
Download	t l	



In "Configuration Set", you can save current configuration you set and you can also use previous setting directly if you had saved.

( ) ( ) http://192.16	8.10.1/index_General.php#		♂ ↓ Ů 搜索	_ ۲ ج (
🟉 F90 Web UI	×			
F90 F90013804039				
II Status	浏览	Uptoor Configuration		
Settings	Name	Create Time		Operation
Working Mode Satellite Settings Device Configuration NMEA Message View Logs	± Save Current Settings			
Configuration Set Download < Management				

#### Figure 5-16

#### 5.4 Download data

There are 2 kinds of data you can download--static data and backup data. For static data, you can convert it to Rinex.

#### 5.4.1 Raw data

Raw data means static data. The format for raw data is ".dat" You can download and package them together.

🎒 F90 Web U	I	× 📑						
F90 F9001380	4039							
Status	*	Select	Name	Size (MB)	Antenna Height (m)	Start Time	End Time	Operation
Settings	*		05081281.dat	0.244	1.832	2018-05-08 17:57:08	2018-05-08 17:58:07	Convert Download Delete
± Download	~		05081281_RINEX302.zip	0.121	-	-	-	Download Delete
Raw Data			05081282.dat	0.089	1.832	2018-05-08 18:13:12	2018-05-08 18:13:28	Convert Download Delete
Backup Data			05081283.dat	2.3	1.832	2018-05-08 18:16:31	2018-05-08 18:24:50	Convert Download Delete
Management			40391151.dat	0.137	0.000	2018-04-25 14:19:00	2018-04-25	Convert Download Delete
			colfort log	0.001				

Figure 5-17

#### 5.4.2 Backup data

Once you lose the data in controller. You can download backup data in WEB UI. The format for backup data is ".RTK"

<li>http://192.16</li>	8.10.1/index_General.php#			_ ר ק
🙋 F90 Web UI	×			
F90 F90013804039				
📰 Status <	Select	Name	Size (MB)	Operation
Settings <	Select Al Parkage Delete Selected			
🛓 Download 🔷 👻				
Raw Data				
Backup Data				
Management				

#### Figure 5-18

#### 5.5 Management

Management contains many functions, you can register the device, do self-checking, change the password and restart the receiver.

A A A http://1921	68 10 1/index General php#		<b>a</b> - C
@ F90 Web UI	× 📑		
F90 F90013804039			
II Status < © Settings < # Drawnload <	Install New Firmware 🕢	Upload File	
Management	Registration		
l	Expire Date:	20180525	
	Function:	L1+L2,GPS+GIonass+BeiDou+Galileo,50Hz	
	AuthCode:	Submit	
	GNSS Registration		
	GNSS Functionality:	FFNRNN5BN (GPS+Glonass+Galileo+BeiDou,5Hz,L5)	
	AuthCode	Submit	
	Security Seable Login Authentication Old Password: New Password: Confirm Password: Change		
	Format Internal Disk	ОК	
	Self Test	ок	
	Restore Factory Settings	OK	
	Reset	OK	



## **6- Frequently Use Functions**

## 6.1 Device registration

The register code a 32 numbers and letters. For example : F90034804060,20180821, A7ECAC8BB90494F57A1F2FDFFCBA4896, A7EC-AC8 B-B904-94F5-7A1F-2FDF-FCBA-4896

F90034804060 is serial number

20180821 is Expiration date of this code

A7ECAC8BB90494F57A1F2FDFFCBA4896 is register code, when you register, you just need input this in Web UI.

A7EC-AC8B-B904-94F5-7A1F-2FDF-FCBA-4896 is also register code, it's same just separate by "-".

You can register the receiver through two methods : via WEB UI or via Controller. Detailed steps are as follow :

Register via WEB UI

After connecting the Wi-Fi, input IP "192.168.10.1" into your web browser. Then you can see page as show in Figure 6-1. Click "Management", you can find "Registration". Input your registration code into "Authcode", then click "Submit". The receiver will be registered.

← <>	0.1/index_General.php#	ê *	Ċ
F90 F90013804039			
Datalink	浏览	Upload File	
Satellites	Registration		
Information	Expire Date:	20180525	
Working Mode	Function:	L1+L2,GPS+Glonass+BeiDou+Galileo,50Hz	
Satellite Settings	AuthCode:	s	Submit
Device Configuration	<b>GNSS Registration</b>		
NMEA Message View Logs	GNSS Functionality:	FFNRNN5BN (GPS+Glonass+Galileo+BeiDou,5Hz,L5)	
Configuration Set	AuthCode	s	Submit
L Download	•		
Raw Data	Security		
Backup Data	✓ Enable Login Authenticatio Old Password:		
	New Password: Confirm Password:		
	Change		

Figure 6-1

#### 6.2 Download static data and Rinex change

In WEB UI function, you can find Download. Click Download, then see Raw data, and you can see page as below pic. Choose the data you need and click "Download".

End Time 2018-05-15 10:10:59	Operation Convert Download Delete
End Time 2018-05-15 10:10:59	Operation Convert Download Delete
2018-05-15 10:10:59	Convert Download Delete
2018-05-15 10:10:59	Convert Download Delete
	Edit
2018-05-16 09:49:45	Convert Download Delete
2018-05-16 17:13:59	Convert Download Delete
2018-05-17	Convert Download Delete
	2018-05-16 17:13:59 2018-05-17

#### Figure 6-4

You can also see "Convert", click Convert, then there are few file forms for you to choose. You can choose "Rinex 3.02" to change the data to Rinex.

F90 F90013804	1048							English
Status	•	Select	Name	Size	Antenna Height	Start Time	End Time	Operation
Settings	<			(MB)	(m)			
L Developed	~	⊻	GIN100000_R_20181351010_000_01S.dat	0.132	Convert Downlo	oad Close -05-15 10:24	2018-05-15 10:10:59	Convert Download Delete
2 Download	· ·				Stonex 3.02 V Rinex 2.10			Edit
Raw Data			GINT00000_R_20181360851_000_01S.dat	10.939	Rinex 3.02 se C	Center -05-16	2018-05-16	Convert Download Delete
Backup Data					Stonex 3.02	08:51:27	09:49:45	Edit
<ol> <li>Management</li> </ol>			GINT00000_R_20181361657_000_01S.dat	3.733	BINEX - 1.832	2018-05-16	2018-05-16	Convert Download Delete
						16:57:21	17:13:59	Edit
			GINT00000_R_20181370853_000_01S.dat	17.358	1.832	2018-05-17 08:53:42	2018-05-17	Convert Download Delete
								Edit
		Selec	t All Package Delete Selected					



#### 6.3 Upgrade firmware

You can upgrade firmware in WEB UI function. In "management", you can find "Install New Firmware". Click "browse" to select new version of firmware. After select the right version, click"Upload file" to finish upgrade.

Image: F90 Web UI         ×         +           ←         →         O         for 192.168.	+ ~ .10.1/index_General.php#	□ ☆	r∕≡
F90 F90023801005			
■ Status Position Datalink	Install New Firmware 3 Browse Upload File		
Satellites Information Settings Working Mode Satellite Settings	Registration         Expire Date:       20180723         Function:       L1+L2,GPS+GIonass+BelDou+Galileo,50Hz         AuthCode:       Submit		
Device Configuration NMEA Message View Logs Configuration Set	GNSS Registration         GNSS Functionality:       564;0;00/00/2000;A;OPT=;5Hz;RTK;L2_L5;MULTI_GNSS;BEIDOUB3;ATLAS_LBAND;China_Onh         AuthCode       Submit	у	

#### Figure 6-6

## 6.4 Restore factory settings

In WEB UI, "management" you can find "Restore Factory Settings" You can click "OK" to reset the device.

Format Internal Disk	ОК
Self Test	ОК
Restore Factory Settings	ОК
Reset	ок

Figure 6-7

## 7- Technical Parameters

	ltems		Specification				
	GPS Board	OEM729	P328	BD990			
	Channel	555	394	336			
		GPS:L1CA/L1C/L2C/L2P/L5		GPS:L1CA/L2E/L2C/L5			
		GLONASS :L1CA/L2C/L2P/ L3/L5	GPS:L1CA/L1P/L1C/L2P/L2C/ L5	GLONASS :L1CA/L2CA/L3 CDMA			
GNSS		BeiDou :B1/B2/B3	GLONASS: G1/G2, P1/P2	BeiDou :B1/B2/B3			
	SATELLITE	Galileo :E1/E5/AltBOC/E5a/	BeiDou :B1/B2/B3	Galileo :E1/E5A/E5B/E5AltBOC/ E6			
		NAVIC : L5	GALILEO : E1BC/E5a/E5b QZSS : L1CA/L2C/L5/L1C	NAVIC : L5			
		SBAS:L1/L5	SBAS:L1 CA/L5	QZSS:L1CA/L1SAIF/L1C/L2C/ L5			
		QZSS:L1CA/L1C/L2C/L5/L6		SBAS:L1 CA/L5			
	Update rate	5Hz (Standard 5 Hz, can pay to activate 100HZ)	5Hz (Standard to 5 Hz, can pay to activate 50HZ)	50Hz (Standard 50 Hz)			
	Static Accuracy	Horizontal :±(2.5+1×10 <sup>-6</sup> D) mm	Horizontal :±(2.5+1×10 <sup>-6</sup> D) mm Vertical :±(5+1×10 <sup>-6</sup> D) mm	Horizontal :±(2.5+1×10 <sup>-6</sup> D) mm Vertical :±(5+1×10 <sup>-6</sup> D) mm			
		Vertical :±(5+1×10 <sup>-6</sup> D) mm					
	RTK Accuracy	Horizontal :±(10+1×10 <sup>-6</sup> D) mm Vertical :±(20+1×10 <sup>-6</sup> D) mm	Horizontal :±(8+1×10 <sup>-6</sup> D) mm Vertical :±(15+1×10 <sup>-6</sup> D) mm	Horizontal :±(8+1×10 <sup>-6</sup> D) mm Vertical :±(15+1×10 <sup>-6</sup> D) mm			
Power	Battery	Dual Battery, 7.2V/3400mAh*2	2 Can work at least 10 hours withou	ut stopping			
	Input	9~28V DC	9~28V DC				

	OS	Linux						
	Memory	Internal 8G, TF Extended, Max≥32G						
	Bluetooth	V2.1+EDR / V4.1 Dual Mode, Class2						
	WIFI	802.11 b/g/n						
		All areas without North America :						
			North Array					
		ЕС25-Е, 46	North America :					
		FDD LTE : B1/B3/B5/B7/B8/B20	EC25-A, 4G					
	4G	TDD LTE : B38/B40/B41	FDD LTE : B2/B4/B12					
		WCDMA: B1/B5/B8	WCDMA : B2/B4/B5					
		GSM : B3/B8						
		TRM101 :Power 1W, Frequency 410-470MHz						
	Internal UHF	Work Distance : 5km in good environment						
		SATEL, PCC-GMSK, TrimTalk 450S, South9600, TrimMark III(1	9200) , South 19200, Hi-target 9600,					
	Protocol	Hi-target 19200						
	Electric Bubble	ric Support, Support tilt survey						
	TNC	For UHF Antenna	For UHF Antenna					
Interface	5 pins	External radio and external power						
	7 pin	Connect to PC controller and other external device, such as Echo Sounder						
	Others	SIM slot and TF slot	SIM slot and TF slot					
	Button	Power button, also can show power status						
Interface	Indicator	5 indicators :Satellites, Datalink, Bluetooth, WIFI Status, Power	indicator					
	Language	Supports TTS Multi language voice						
Physical	Dimension	L40x157x76mm						
T Hysical	Weight	1.2KG with 2 batteries inside						
	Work Temperature	-30°C ~ +65°C						
	Stock	4020 0020						
	Temperature	-40°C ~ +80°C						
Environment	Protection	IP67						
	Shock	Withstand 2 meters pole drop, 1.2m drop without pole						
	Humidity	100 %						



10700 Secant St., Montreal (Quebec) Canada H1J 1S5 Tel: 514 354-2511 / 1 800 463-4363 Fax: 514 354-6948

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