# GETTING STARTED GUIDE
# X90

Shanghai HuaCe Navigation Technology Ltd.
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# Where to Find Information

This manual is designed to guide you through the basic X90 procedures. You can find additional information in the X90 Reference Manual and also the HuaCe Technical Training Video.

# FCC Statement

## Federal Communications Commission (FCC) Statement

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 of the device. You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

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.

## Content

# 1. Introduction

- Technical Assistance
- Your Comments

Thank you for choosing HuaCe X90 GNSS receiver.

This Getting Started Guide is designed to help you rapidly familiarize yourself with your new equipment. Only a selection of the many HuaCe X90 GNSS functions is presented in this guide.

## 1.1 Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local Dealer. Alternatively, please request technical support using the HuaCe Website at (www.chcnav.com) or HuaCe technical support email support@chcnav.com.

## 1.2 Your Comments

Your feedback about the supporting documentation helps us to improve it with each revision. E-mail your comments to feedback@chcnav.com.

# 2. Overview

- Safety Information
- Features
- Specification

## 2.1 Safety Information

This manual describes HuaCe X90 GNSS Receivers. Before you use your receiver make sure that you have read and understood this publication, as well as safety requirements.

### 2.1.1 Warning and Cautions

An absence of specific alerts does not mean that there are no safety risks involved.

A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

**WARNING**-A Warning alerts you to a likely risk of serious injury to your body and/or damage to the equipment.

**CAUTION**- A Caution alerts you to a possible risk of damage to the equipment and/or loss of data.

### 2.1.3 Use and Care

The receiver can withstand the rough treatment that typically occurs in the field. However, the receiver is high-precision electronic equipment and should be treated with reasonable care.

## 2.2 Features

The X90 GNSS receiver provides the following features:

- Submeter-accuracy, real-time positioning using pseudorange corrections.
- Automatic OTF initialization while moving
- Single Lithium-ion rechargeable battery
- One 10-Pin Lemo port for:
    - RTCM 2.X input and output
    - CMR input and output
    - NMEA outputs
- One TNC radio antenna connector
- Internal Memory for data storage

## 2.3 Specifications

Real Time Kinematic (RTK)
Horizontal: ± (10mm+1ppm) RMS
Vertical: ± (20mm+1ppm) RMS
Initializing Time: 10S
Initialization Reliability: Typical >99.9%

Static
Horizontal: ± (5mm+1ppm) RMS
Vertical: ± (10mm+2ppm) RMS

Data Format
RTCM2.1, RTCM 2.3, RTCM 3.0, CMR, RTCA, input and output
NMEA0183 outputs, GSOF outputs
Physical Reference
Size (H×D): 200mm×85mm
Weight: 1.4Kg (Without Battery)

Electrical Reference
Power Consumption: 2.8W
Battery Volume: 2400mAh
Battery Life: 6 Hours (Static)
1000 Recharges
External Power: 9-18V
Battery Power:6.8-7.4V

Environment

Working Temperature: -30 °C — +65 °C

Storage Temperature: -40 °C — +75 °C

Humidity: 100% condensation

Waterproof and Dustproof: IP67, protected from temporary immersion to depth of 1 meter, floating.

Shock and Vibration: Survive from 2 meters drop onto concretes

Characteristics

Buttons and Display: 2 buttons/4 LED lights

I/O: RS232, USB

Channel: 24 Channels*

*Channel Configuration: 12 L1, 12 L2 P(Y) or L2C Channels

# 3. Preparation

- Equipment Description
- Batteries and Power
- Parts of the Receiver (Control Panel)

## 3.1 Equipment Description

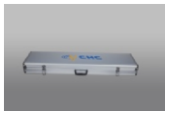
The tables below provide an overview of the different items composing the HuaCe X90 GNSS.

Depending on the different purchase, you may have some of the listed items. Basic Supply is the standard accessories for each kit. Transportation Cases Option and Accessories Options are depending on different orders requirements.

### Receiver Kit Basic Supply

| Item | Picture |
|---|---|
| X90 GNSS Receiver Base |  |
| Lithium Battery |  |
| H.I. Tape |  |
| Connector |  |

## Transportation Cases Options

| Item | Picture |
|---|---|
| Transport Case |  |
| Carry Pouch |  |
| Metal Transport Case for Poles and Antenna |  |

## Accessories Options

| Item | Picture |
|---|---|
| Double Bubbles Tribranch with High Adapter |  |
| Single Bubble Tribranch with Lower Adapter |  |
| External Power Cable |  |

## 3.2 Batteries and Power

**WARNING**-Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment may cause an explosion or fire, and result in personal injury and/or equipment damage.

To prevent injury or damage:

- Do not charge or use the battery if it appears to be damaged or leaking.
- Charge the Lithium-ion battery only in HuaCe products that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
- Discontinue charging a battery that gives off extreme heat or a burning odor.
- Use the battery only in HuaCe equipment that is specified to use it.
- Use the battery only for its intended use and according to the instructions in the product documentation.

**WARNING** –Do not damage the rechargeable Lithium-ion battery. A damaged battery may cause an explosion or fire, and result in personal injury and/or property damage.

To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to, discoloration, warping, and leaking battery fluid.
- Do not expose the battery to fire, high temperature, or direct sunlight.
- Do not immerse the battery in water.
- Do not use or store the battery inside a vehicle under hot weather condition.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.

**WARNING**-Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive, and contact with it can result in personal injury and/or property damage.

To prevent injury or damage:

- If the battery leaks, avoid with the battery fluid.
- If battery fluid gets into your eyes, immediately rinses your eyes with clean water and seek medical attention. Please do not rub your eyes!
- If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

### 3.2.1 External Power and Internal Battery

The receiver can be powered by its internal battery or by an external power source connected to Receiver Lemo Port. If an external power source is connected to Port, it is used in preference to the internal battery. When there is no external power source connected, or if the external power supply fails, the internal battery is used.

**External Power**

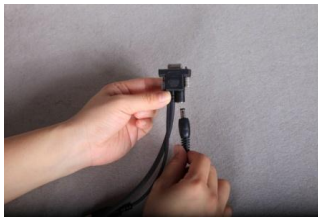


**Figure3.2-1**

There are two methods to provide the external power to the receiver by the HuaCe GPS to PC cable. The HuaCe GPS to PC cable has one Power port.

- In the office, the Power Adapter is connecting with AC power of 100-240V, the output port of the Power Adapter connects with the Power Port of the GPS to PC cable, shown as **Figure3.2-1**.
- In the field, the external power cable is connecting with the Car battery, the output port of the external power cable connects with the Power Port of the GPS to PC cable, shown as **Figure3.2-2**.

**Figure3.2-2**

**Internal Battery**

These receivers use a rechargeable lithium-ion battery. Make sure the battery is fully charged for each HuaCe X90 being used in the field.

### 3.2.2 Charging the Battery

The receiver is supplied with two rechargeable Lithium-ion batteries, and a dual battery charger for each RTK kit. The two batteries charge sequentially and take approximately three hours each to be fully charged.

The battery charger comes with a separate universal AC Power Adapter with a 1.5 meter output cable. Follow the instructions below to operate the charger.

- Connect the two parts of the Power Adapter and the Power Adapter output with the Battery Charger. The red LED on the Battery Charger is on, which means the whole charger system is ready.
- Put battery on the battery charger in right orientation (the battery terminals should come into contact with the two sets of connectors on the charger). When the battery is placed in the right place, the Green/Yellow LED will start to flash or turn on.
- There are three LED on the Battery Charger, shown as C. The middle red LED means the power condition of the Charger. The other Green and Yellow LED represent the working condition of two charger slot respectively. When the Green/Yellow LED is flashing, it means the battery is on charging, and the slower tells the less battery is going to be charged in, in other words, when a full charged battery put on the battery slot, the Green/Yellow LED will be turn on and no flashing.

### 3.2.3 The Battery Usage and Disposing Notices

The rechargeable Lithium-ion battery is supplied partially charged. The following recommendations provide optimal performance and extend the life of your batteries:

- Fully charge all new batteries prior to use.
- Do not allow the batteries to discharge below 5 V.
- Keep all batteries on continuous charge when not in use. Batteries may be kept on charge indefinitely without damage t the receiver or batteries.
- Do not store batteries in the receiver or external charger unless power is applied.

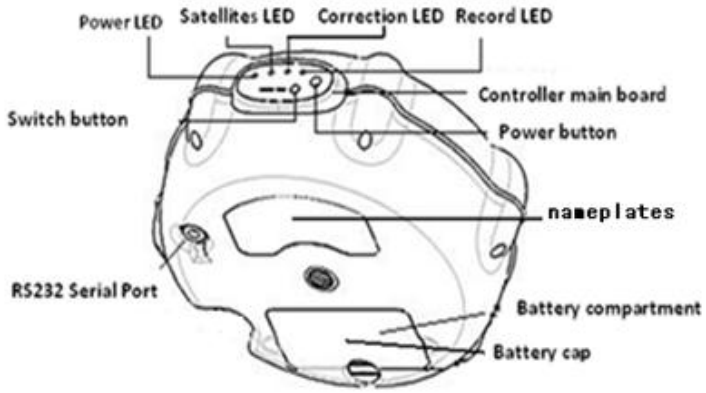
- If you must store the batteries, fully charge them before storing and then recharge them at least every three months.

**Disposing of the Rechargeable Lithium-ion Battery**

Discharge the lithium-ion battery before disposing of it. When disposing of the battery, be sure to do so in an environmentally sensitive manner. Adhere to any local and national regulation concerning battery disposal or recycling.

## 3.3 Parts of the Receiver (Control Panel)

### 3.3.1 Front Panel View




Power Button

To turn on X90 GNSS, hold the power button press and don't release until the power LED lights up.

Switch Button

The function of switch button is to switch X90 GNSS from RTK mode to static mode. The procedure can be divided into 2 steps.

Step 1: Switching

Hold the switch button press and don't release until you see the Record LED off.

Step 2: Check

Press the switch button, if the correction LED turns on, it means the switching succeed.

**CAUTION**: When you are doing check, if you press and hold the

switch button again, it will be back to RTK mode.

Power LED

This indicator is on when X90 GNSS is on, and off when it is off.

Satellite LED

This LED indicates how many satellites the receiver is tracking on, if the LED flashes 5 times and then stops, it means the receiver is tracking 5 satellites.

Record LED

The record LED only flashes in 2 situations

A. In the static mode

The interval of flashing shows the sample interval you set in the HC-Loader or HCGPSet.

B.RTK mode

When you are using PDA to send commands to set the receiver's configuration or just communicating with the receiver.

Correction LED

The Correction LED only flashes once per second when

A. Base station successfully sends out difference data in RTK mode.

B. Rover station successfully gets difference data from Base station.

### 3.3.2 Bottom View

RS232 Serial Port

RS232 serial port is a 9 pin 0-shell Lemo connector that supports RS-232 communications and external power input.

Adaptor

The 5/8" adaptor is used for setting up the receiver on the tripod.

Battery Compartment

**WARNINGS**:

- Do not store batteries in the receiver unless it is applied.
- Do not charge or use the battery if it appears to be damaged or leaking.
- Do not damage the rechargeable Lithium-ion battery. A damaged battery may cause an explosion or fire, and may result in personal injury and/or property damage.

- Do not expose the battery to fire, high temperature, or direct sunlight.
- Do not immerse the battery in water.
- Do not use or store the battery inside a vehicle under hot weather condition.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.

# 4. Setting up the Receiver

## 4.1Receiver Setup

Prerequisites:

- You need a tripod and a tribrach to install the base.
- To power the radio, you need a standard 12-V DC battery.

Mount the different items as shown on the picture.

# 5. Configuration

- Static Configuration
- RTK Configuration

## 5.1 Static Configuration

There are 3 ways to configure the receiver in Static Mode.

A. Using RS232 Port and HCLoader Software in the Office
First, connect X90GNSS to your computer through RS232 line.

Second, run the software HCLoader and click icon **Link** to make the receiver connected with computer.
Third, click icon **Setup** to set the sample interval (15S is recommended) and mask angle of the receiver (13 is recommended) and choose the **Data Log** mode as Auto, then click **Apply** to make the configuration work and click **Exit**.

Fourth, restart the receiver.

B. Using PDA and Software HCGPRSSet in the Field
First, use RS232 port connecting PDA with receiver.

Second, tap the icon **HCGPRSSet** on the PDA.

Third, click **Open** then you will see this picture, set the sample interval (15S is recommended and mask angle of the receiver (13 is recommended) you want and choose the data log mode as Auto, then click **Apply** to make the configuration works.

Fourth, restart the receiver.

C. Switch Button in the Field
The information has been introduced in Chapter 3.3.1