TX73 Excavator guide system

user manual

Catalogue

Use instructions

Welcome to the TX 73 Excavator Guide system.

This manual describes the installation, commissioning and use of the TX 73 excavator guide system. If you have any questions about this manual or product, please contact 025-84813134 for details.

Disclaimer

CHC is committed to the continuous improvement of the product, the product specifications and performance parameters will change with the product upgrade, without further notice, please understand. If there is any difference between the icon, picture and the physical object in the

instruction manual, please take the product object to prevail.

Technology and services

Free service hotline: 025-84813134, we will serve you wholeheartedly.

matters need attention

- Please follow the notes to note that the information is provided to minimize the risk of personal injury and / or property damage and to ensure the safe and stable operation of the equipment.
- Make sure that you are fully trained before using this equipment
- The maintenance of the equipment circuit can only be carried out by the qualified maintenance personnel. If inspected and repaired, the machine is stationary and the safety lock is open
- Please keep a safe distance from people or objects for system debugging
- When the equipment is not in use for a long time, please cut off the power supply of the equipment to prevent the mechanical battery from losing power
- Please strictly follow the operation instructions
- Hardware failure and damage of the equipment caused by human reasons are not within the scope of the product warranty

1.product presentation

1.1 Product Introduction

TX 73 excavator guide control system is China test navigation to improve earthwork construction quality and efficiency of 3D mechanical control products, the system adopts GNSS high precision positioning technology

and inertial tilt sensing technology, real-time calculation excavator bucket tip 3 d coordinates, and according to the car tablet in 3 d design drawings to guide mining, all independent research and development of EX-Tech excavator model algorithm, make dig fill accuracy of ± 3cm.

2.Product installation

2.1 Preparation of installation tools

See Annex 3

2.2 Mechanical inspection before installation

1. Confirm the machinery to install the system, and confirm the service life of the machinery and the gap size of the mechanical arm shaft;

- Check the excavator bucket shaft

Check whether the bucket can shake or shake slightly when the excavator rotates left and right, otherwise it is necessary to add gaskets or change the shaft, shaft sleeve, etc. The loosening of the bucket card shaft will still cause a few centimeters of error after the calibration is completed, and reduce the accuracy of the system.

- Check the hydraulic cylinder seal

The sealing of the hydraulic cylinder will affect our calibration of the sensor, adjust the excavator to the bucket hanging in the air, use a marker to mark the seal of the hydraulic cylinder, observe for about 10 minutes to see if the marker is sinking.

- Check the body shaking

If in the telescopic arm, the digging locomotive body also rotates, will affect the excavator correction, so that the correction results appear a large deviation, for such an excavator is not installed.

- Check the shaking of the bucket steel plate

In order to brush slope, excavator digging bucket will add steel plate, some steel plate is welded fixed, have a plenty of riveting fixed, welding fixed generally does not exist this problem, riveting fixed excavator plate will loose after a period of time, loose steel plate will not only

affect our calibration, will also affect the excavator system and mobile station detection contrast, cause calibration cannot pass.

2. Confirm the position and routing mode of the mechanical power supply to be installed;

3. Confirm that the installation position of the display bracket is fixed, so that the system can give users a better experience;

2.3 Welding and installation

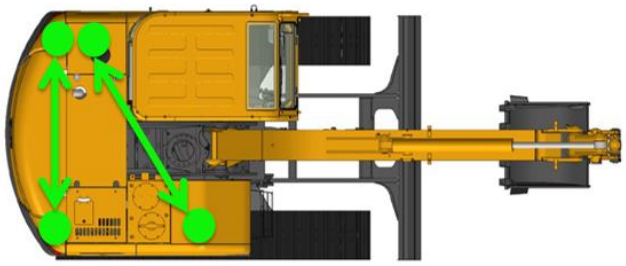
2.3.1 Installation of the antenna support base and AT315

The antenna support base can be welded to the ends of the excavator or to either position on either side.

The antenna support base can be welded to the car body

If you do not have the welding conditions, you can use the quick disassembly fixation rack in the product package to install it on the guardrail

The installation diagram and specific installation diagram are as follows:



After installing the support, install AT315 on the support base

Note: for more than 20 tons, the distance between the two antennas should be kept above 1.5M

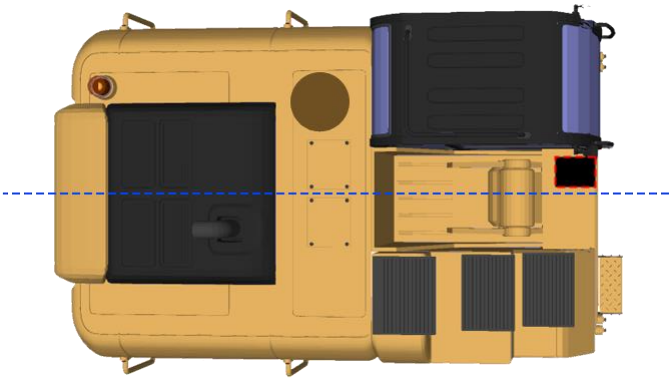
2.3.2, Sensor installation

- All sensors can be installed on the left or right side of the mechanical arm, but all sensors need to be installed on the same side. Plan the installation position before welding
- The sensor bracket can be welded to the vehicle body
- The back of the sensor bracket has a strong magnetic position, factory pre-installed 3M back glue, can also be used

1. Installation of the car body sensor

Body sensors are recommended to be installed in the distribution box of the excavator or in the flat position below the large arm

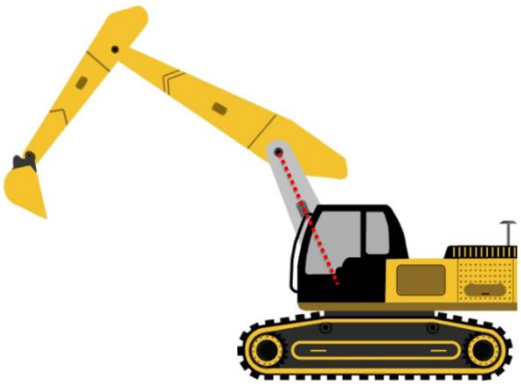
When the body sensor bracket is welded, the long side is parallel to the body side. The schematic diagram and actual installation diagram are as follows:



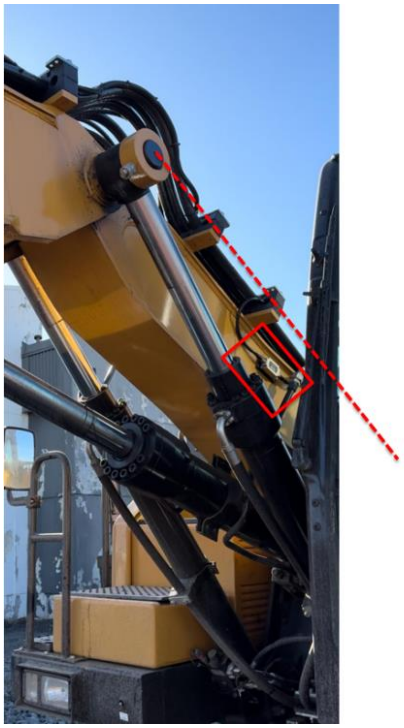
Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab

2. Installation of the second largest arm sensor (optional)

The third large arm sensor can be installed on the left or right side of the excavator. When installing the iron plate of the large arm sensor, ensure that the long side of the bracket is parallel to the connecting axis of the large arm (allowing an error within 10).

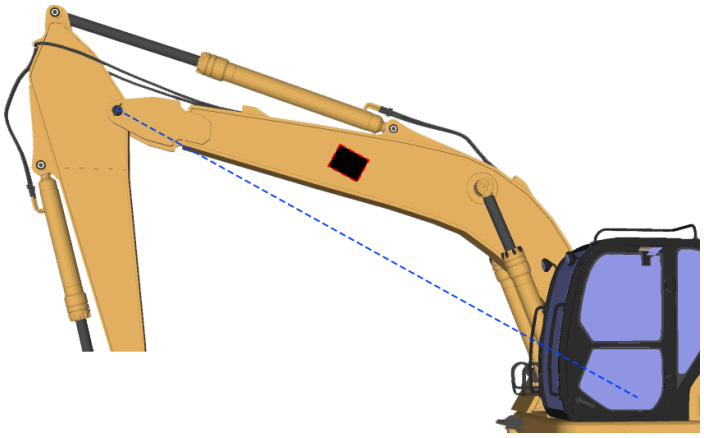


Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab



Large arm sensor bracket mounting

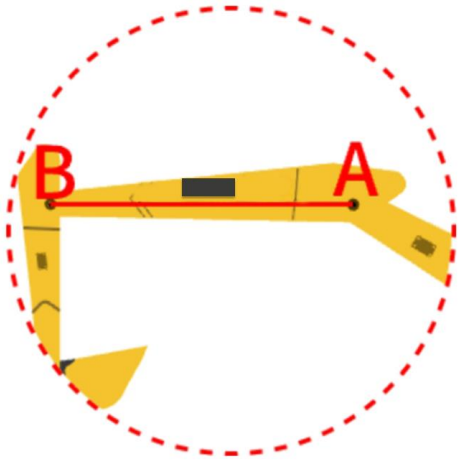
The large arm sensor can be mounted on the left or right side of the excavator. When installing the iron plate of the large arm sensor, ensure that the long side of the bracket is parallel to the connecting axis of the large arm (allowing an error within 10).



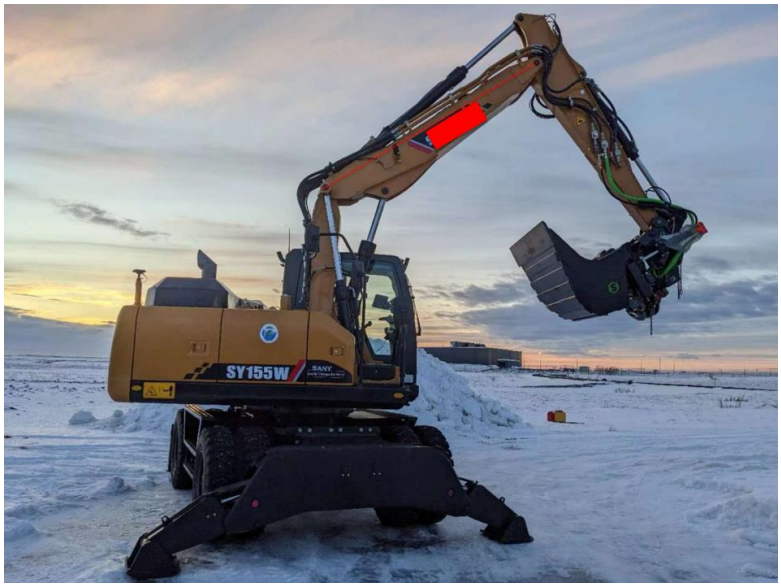
Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab

4. Install the second small arm sensor

The second small arm sensor can be mounted on the left or right side of the excavator. When installing the iron plate of the second arm sensor, ensure that the long side of the bracket is parallel to the connecting axis of the second arm (allowing error within 10).



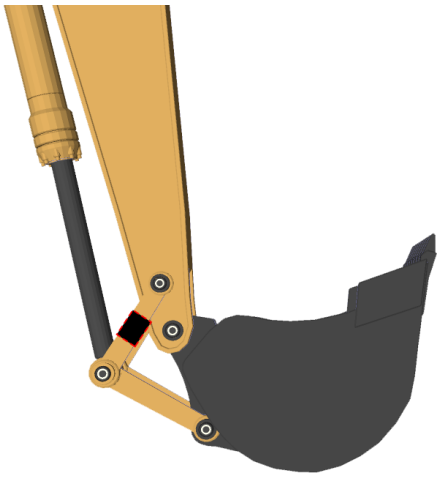
Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab



5. Install the rocker sensor

① method 1:

The remote sensing sensor can be installed on the left or right side of the excavator. When installing the iron plate of the remote sensing sensor, ensure that the long side of the bracket is parallel to the connection axis of the remote sensing (allowing an error within 10).



Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab

② method 2:

The rocker sensor can also be mounted on the inside of the quick removal device, with the long side of the bracket parallel to the connecting line of the two axles close to the bucket.

Attach the sensor to the bracket using the screws, the sensor arrow to the bucket and the indicator to the cab

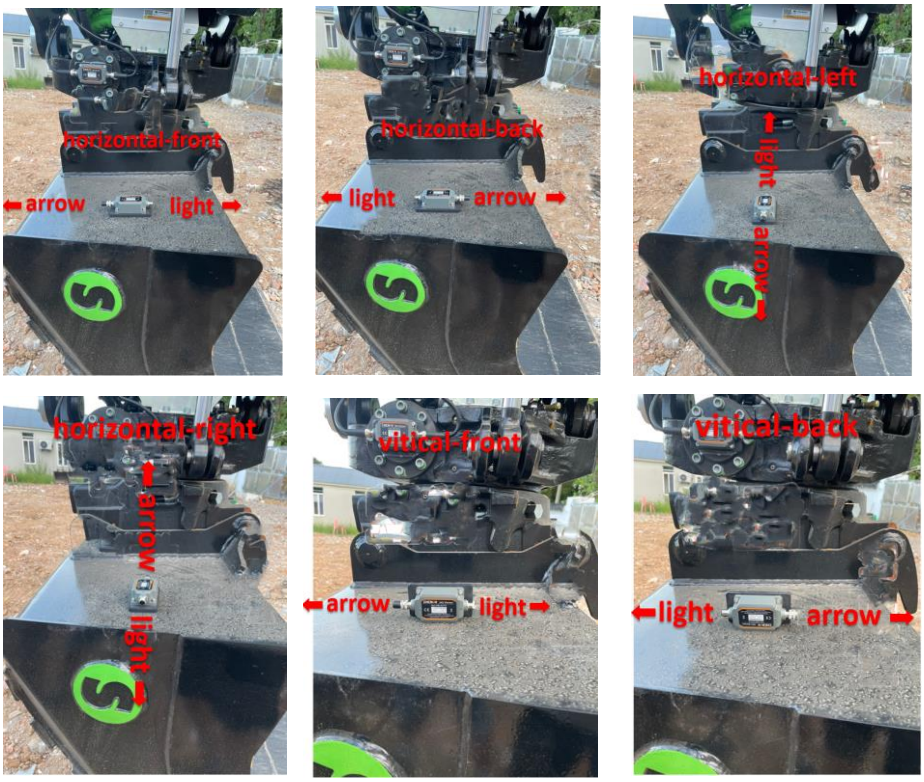
Note:

1.The product package is equipped with a sensor case by default. When installing remote sensing sensors, use the bracket corresponding to the case

2. When installing the remote sensing sensor, please install the plug at the interface of the arrow marked end

6. Installation of inclined bucket sensor (optional)

The tilt bucket sensor currently supports the following installation mode:



The long side of the sensor bracket is parallel to the long side of the corresponding surface of the bucket (allowing error within 10), and can be installed for installation.

Note:

1.The product package is equipped with a sensor case by default. When installing remote sensing sensors, use the bracket corresponding to the case

2. When installing the remote sensing sensor, please install the plug at the interface of the arrow marked end

2.3.3 Plate installation

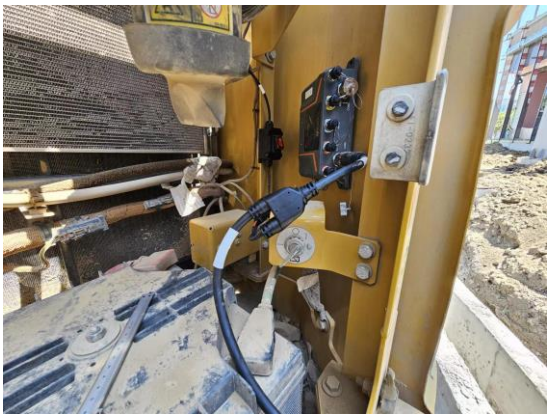
Select the appropriate position, attach the flat fixing base to the glass, then install the plate and adjust to the appropriate angle

2.3.4 Receiver installation

Select the appropriate position in the distribution box, should avoid high temperature, water leakage, ash and other harsh environment, use strong magnetic adsorption on the excavator.

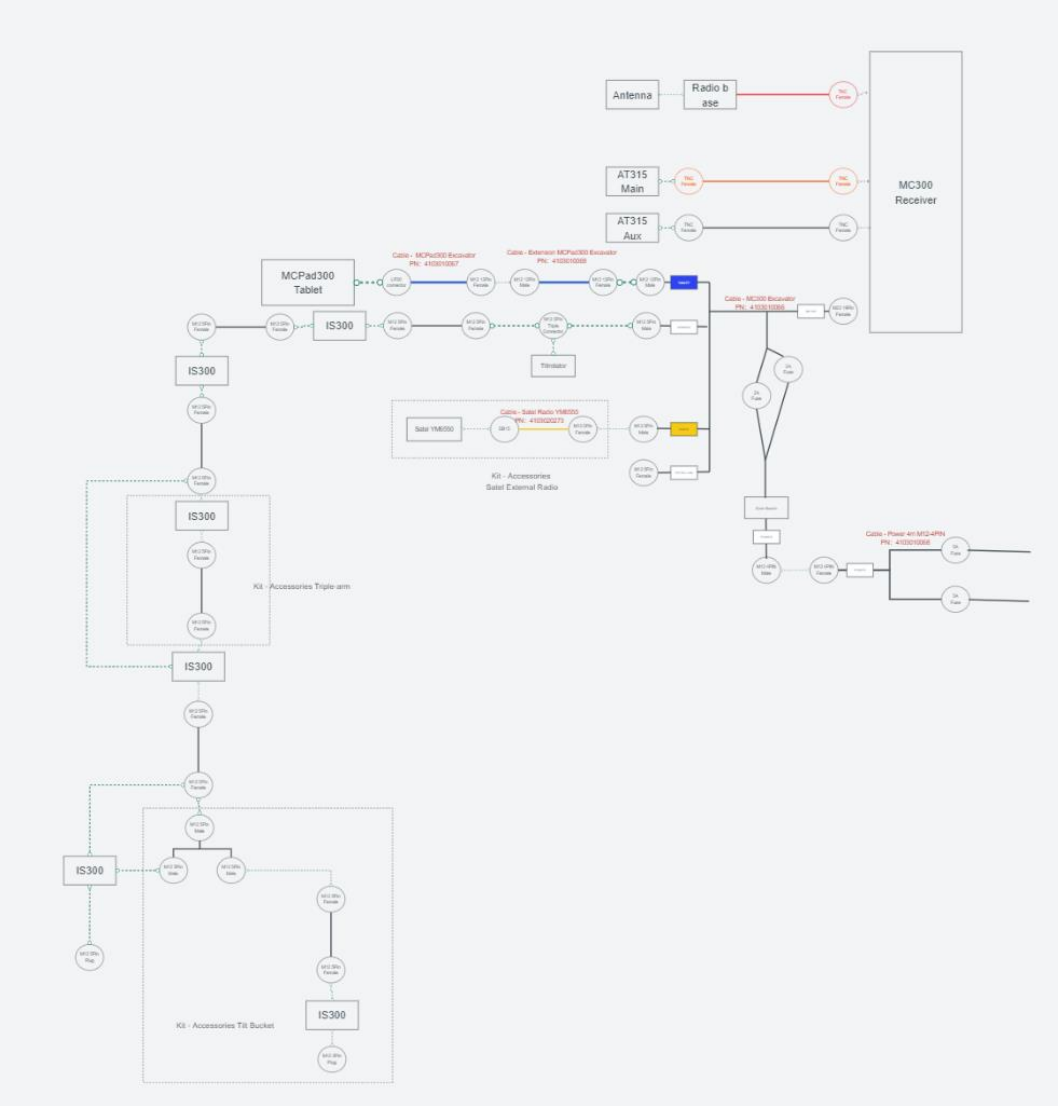
2.3.5 Switch installation

Choose the appropriate position in the distribution box, avoid high temperature, water leakage, ash and other harsh environment, and paste the switch in a place easy to human contact



2.3.6 Installation of the wiring harness

During the line running, the cable follows the mechanical hydraulic oil road, far away from the mechanical heating part (engine, exhaust pipe). Ring the excess cable after using the wire nose fixed. Do not fix the coil to the sensor connector.



Note:

When facing the cab, the antenna on the left side is the main antenna, using the orange GNSS cable connected to the GNSS 1 of the receiver

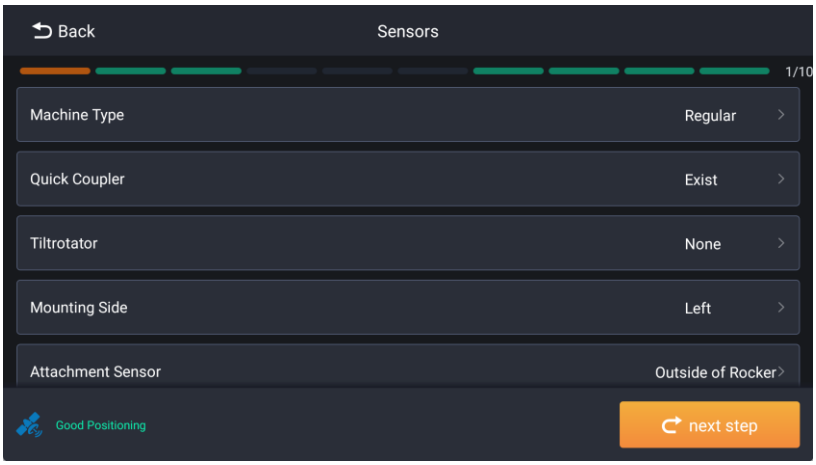
When facing the cab, the antenna on the right is the auxiliary antenna, and the white GNSS cable shall be connected to the GNSS 2 of the receiver

3.Mechanical measurement and calibration

Calibration is advanced menu, hidden by default, click menu-configuration-Admin mode, password: manav2025. After entering administrator mode, click Calibration-Calibration Guide to enter the calibration interface.

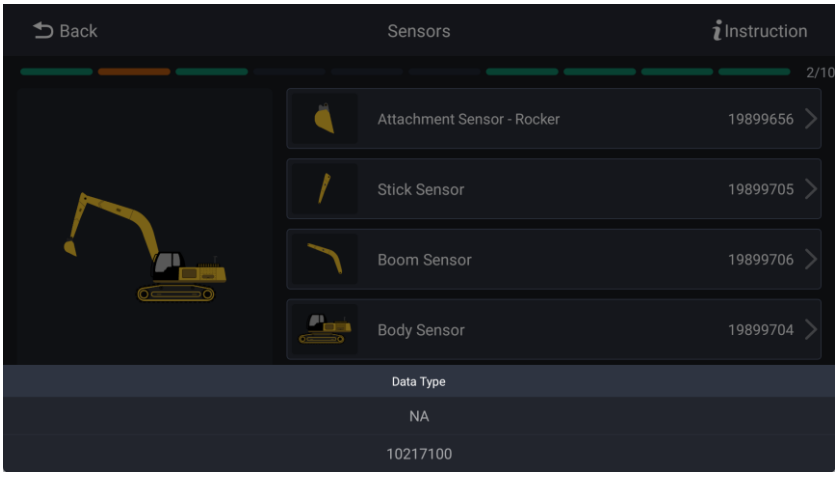
3.1 Mechanical type configuration

According to the actual situation, select the mechanical type, quick disassembly, tilt device, installation position, with a sensor



3.2 Sensor configuration

Select the sensor number corresponding to each position, which is the SN number of the sensor



3.3 Mechanical measurement and calibration

3.3.1 Calibration of vehicle body sensors

Before the calibration starts, park the excavator in a flat place, and Roll and Pitch shall be less than 2

① Rotate the excavator by 180

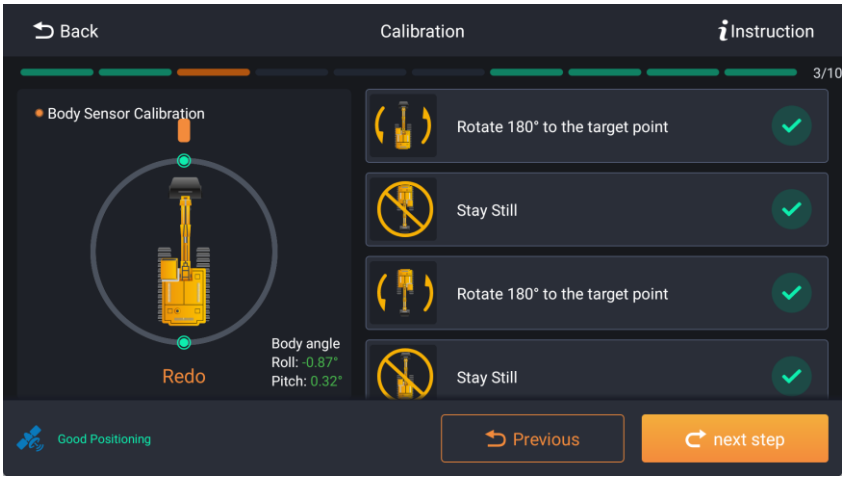
Do not move the mechanical arms and other parts other than the car body

② Stay still when the software prompts you and do not operate the machine

③ Continue to rotate the body 180 in the same direction

Do not move the mechanical arms and other parts other than the car body

Do not operate the machine by remaining still when the software prompts you

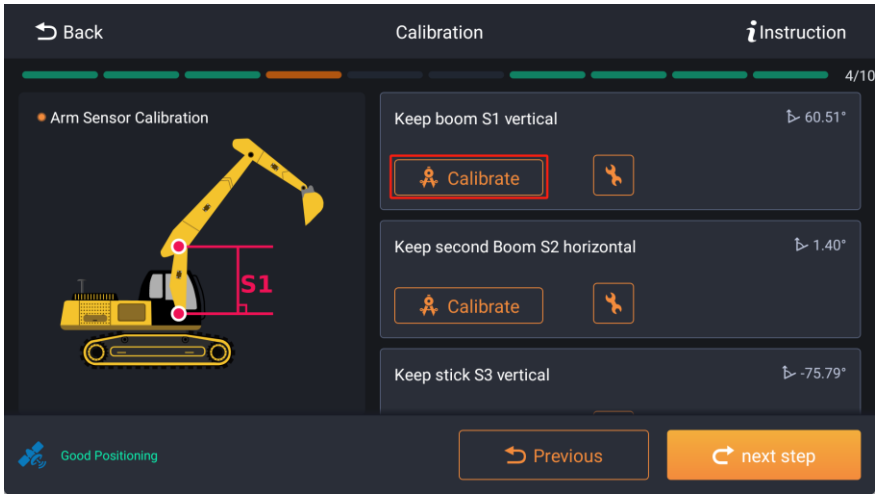


3.3.2 Calibration of the mechanical arm

①Large Arm Sensor Calibration (optional)

Method 1:

With the help of full station, adjust S1 to vertical and click [Calibration] button



Method 2:

When the point S1 cannot be adjusted to be vertical:

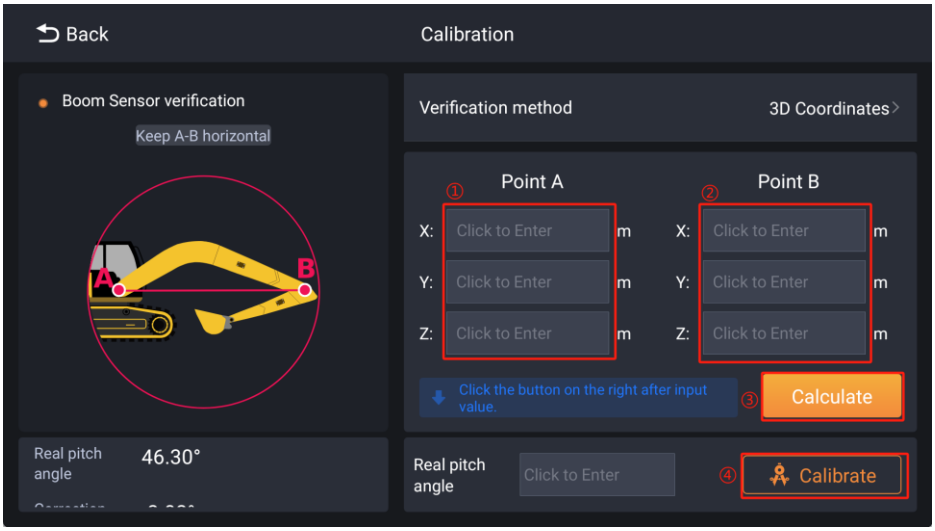
(1) Select the [coordinate] method

(2) Measure the coordinates of A and B by using the full station

(3) Enter these coordinates into the software

(4) Click the [calculation] button to calculate the angle of the sensor

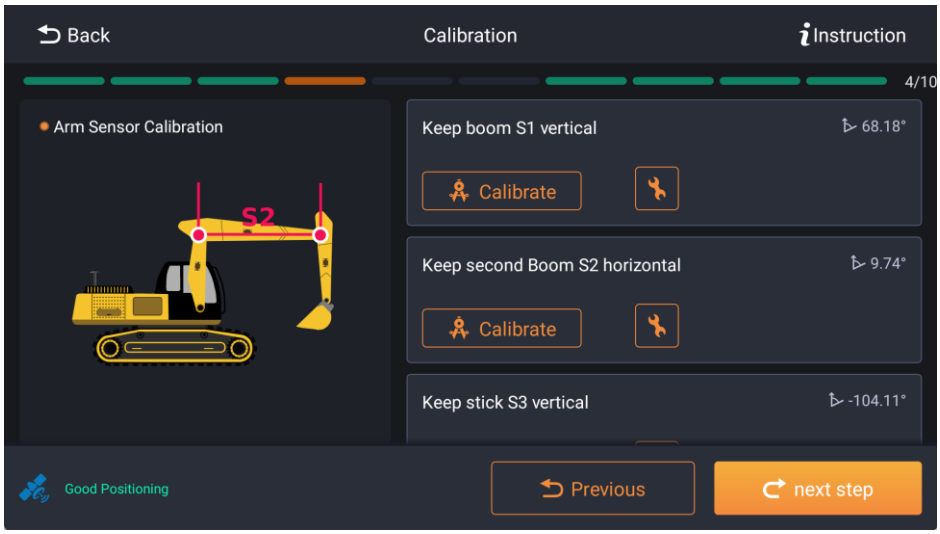
(5) Click the [Calibration] button after obtaining the Angle



3.3.3 Calibration of the second largest arm sensor

Method 1:

With the help of full station, adjust S1 to level and click [Calibration] button



Method 2:

When the S2 cannot be adjusted to a level:

(1) Select the [coordinate] method

(2) Measure the coordinates of A and B by using the full station

(3) Enter these coordinates into the software

(4) Click the [calculation] button to calculate the angle of the sensor

(5) Click the [Calibration] button after obtaining the Angle

3.3.4 Calibration of the stick sensor

Method 1:

With the help of the total station meter, adjust the S3 vertically. Then click the [calibration] button

Method 2:

When S3 cannot adjust to be vertical:

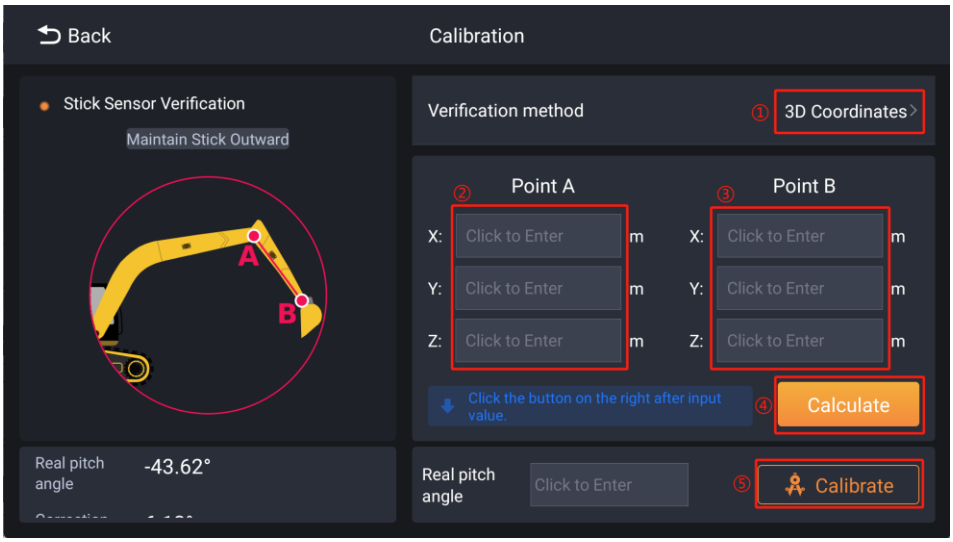
(1) Select the [coordinate] method

(2) Measure the coordinates of A and B by using the full station

(3) Enter these coordinates into the software

(4) Click the [calculation] button to calculate the angle of the sensor

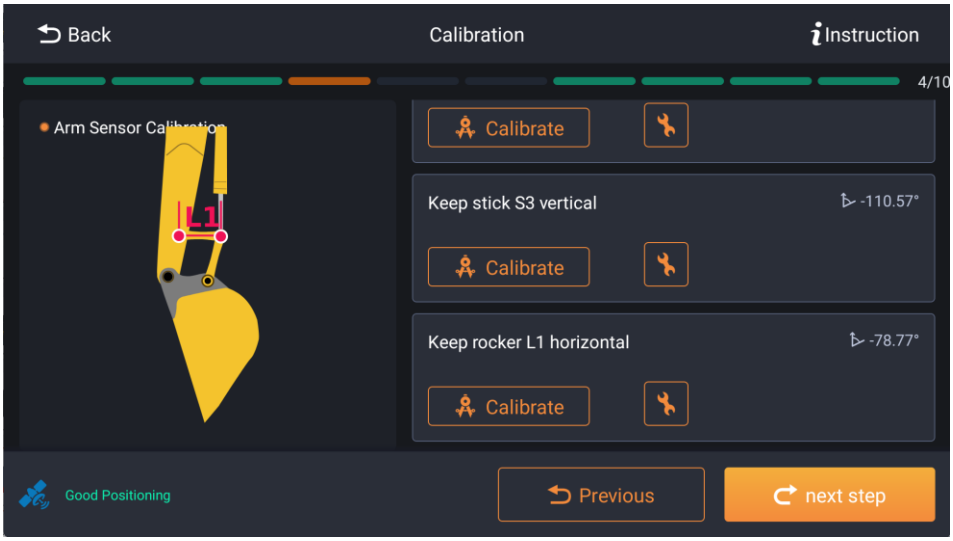
(5) Click the [Calibration] button after obtaining the Angle



3.3.5 Calibration of the rocker sensor

Method 1:

With the help of full station, adjust the L1 and click [Calibration] button



Method 2:

When L1 cannot adjust to be vertical:

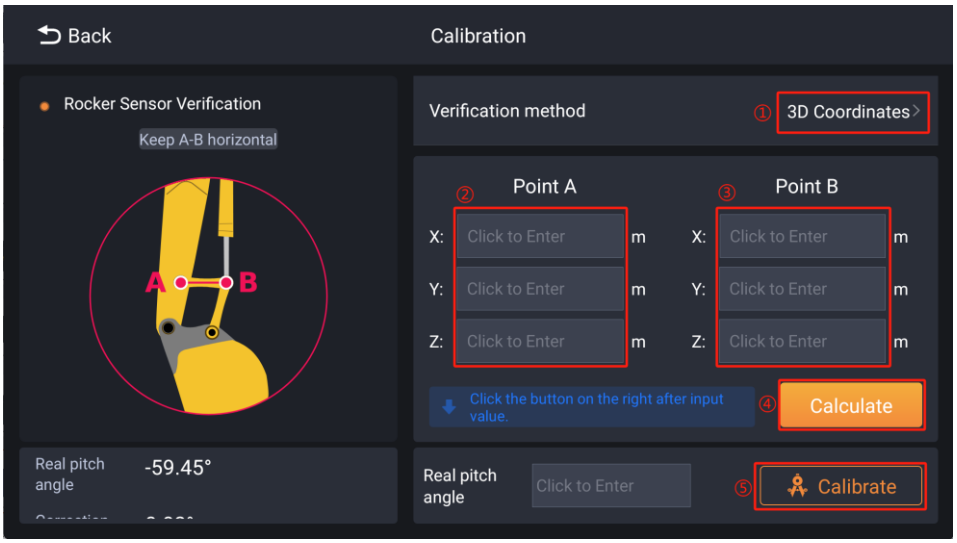
(1) Select the [coordinate] method

(2) Measure the coordinates of A and B by using the full station

(3) Enter these coordinates into the software

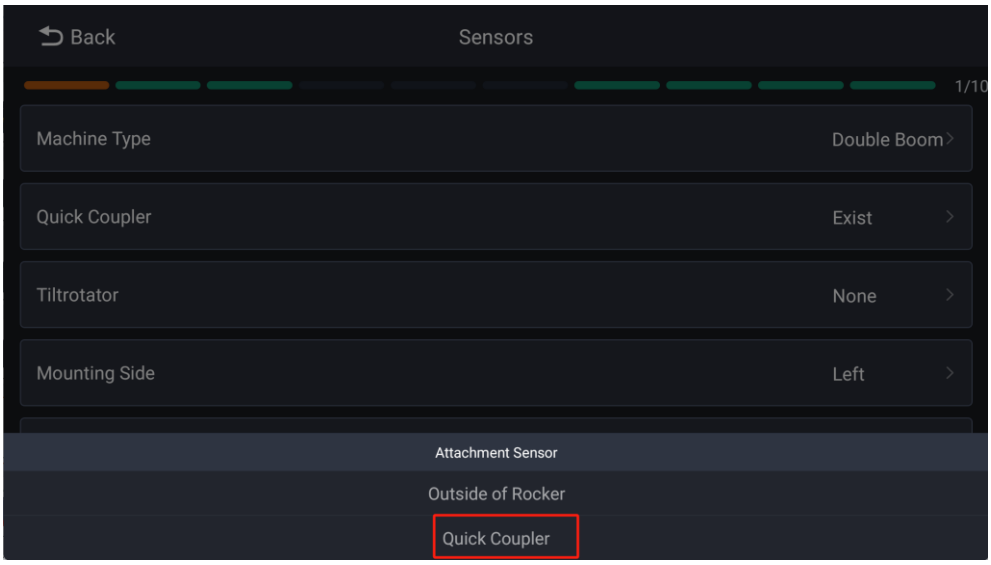
(4) Click the [calculation] button to calculate the angle of the sensor

(5) Click the [Calibration] button after obtaining the Angle



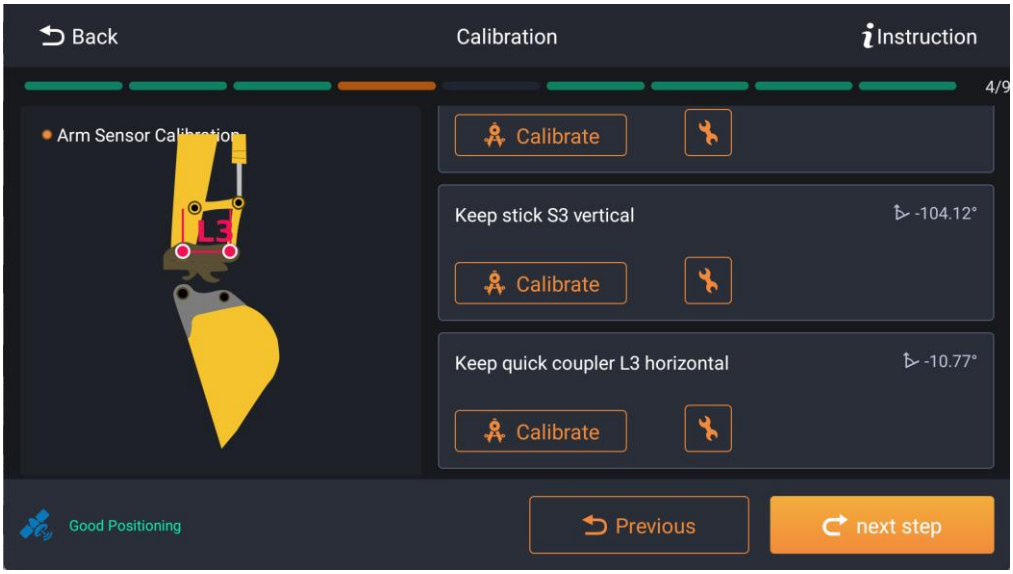
3.3.6 Quick disassembly and calibration (optional)

When the remote sensing sensor is installed on the quick disassembly, the genus sensor chooses the quick disassembly, which needs to calibrate the quick disassembly



Method 1:

Adjust the L3 to the level and click the [Calibration] button



Method 2:

When L3 cannot adjust to be vertical:

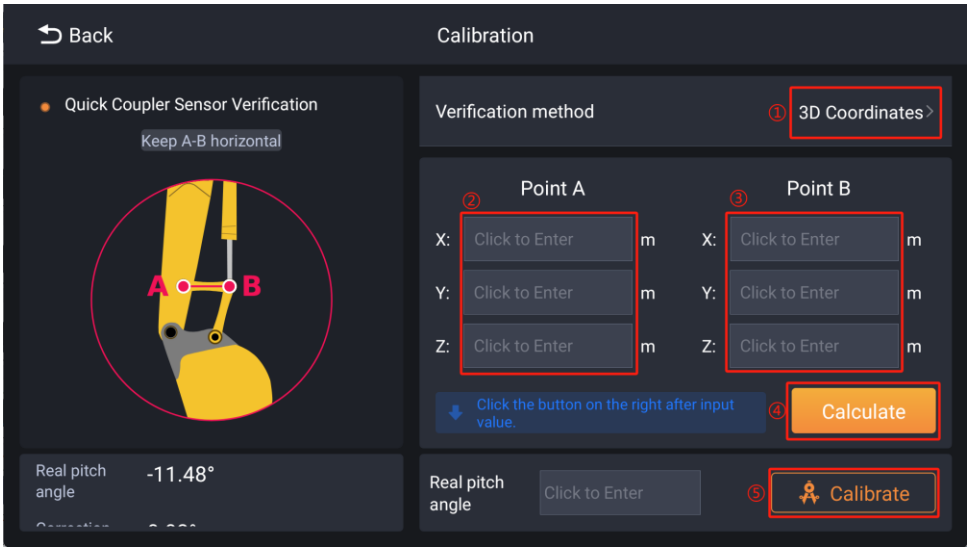
(1) Select the [coordinate] method

(2) Measure the coordinates of A and B by using the full station

(3) Enter these coordinates into the software

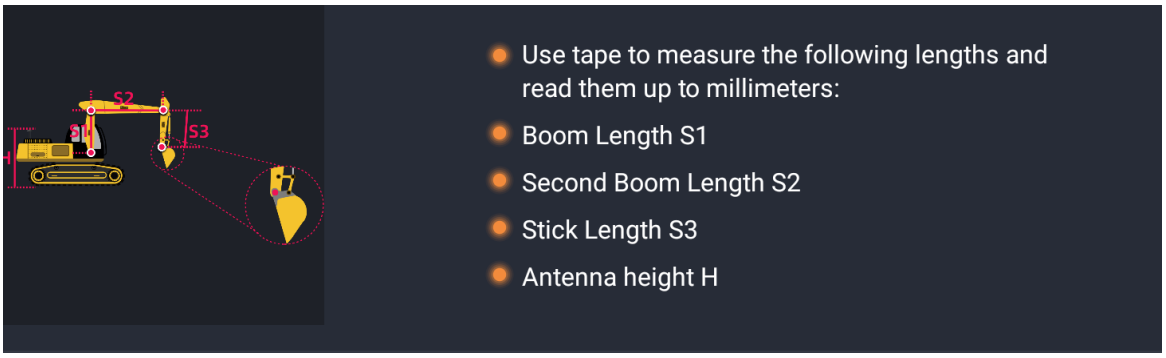
(4) Click the [calculation] button to calculate the angle of the sensor

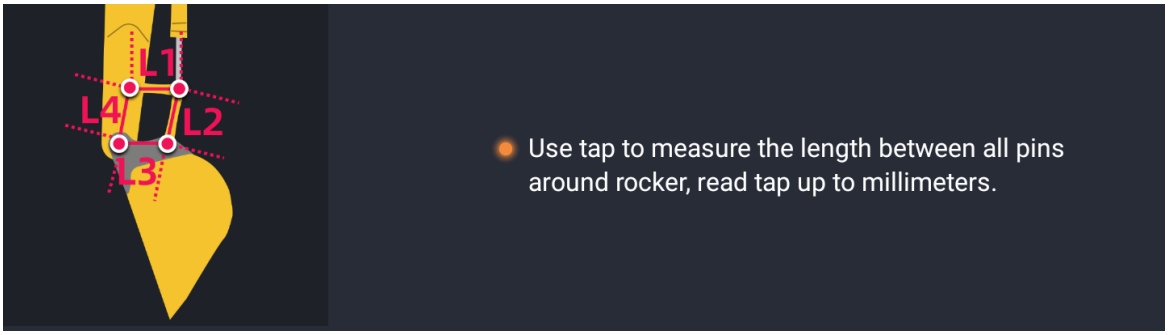
(5) Click the [Calibration] button after obtaining the Angle

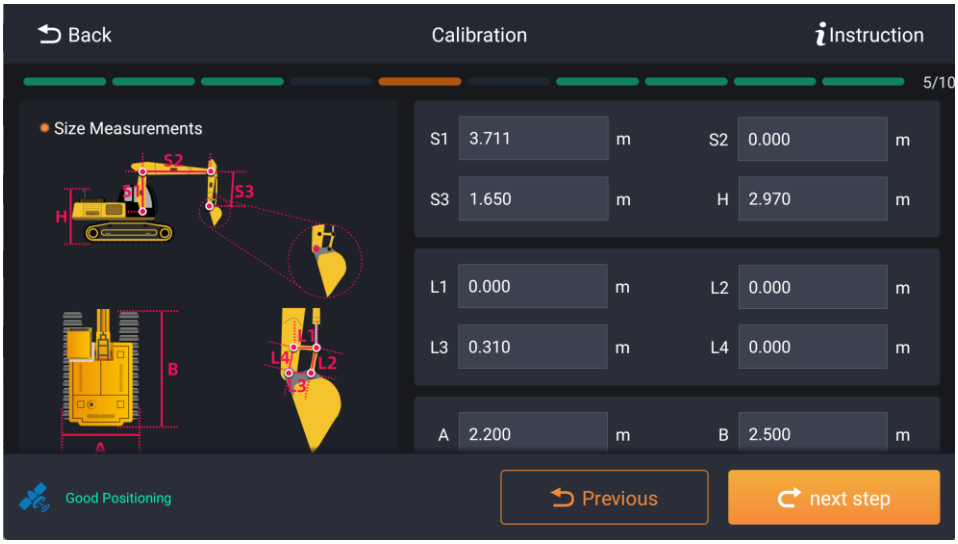


3.4 Dimension measurement

According to the software prompt, measure the corresponding size, and input into the software, the measurement accuracy needs to be accurate to the millimeter



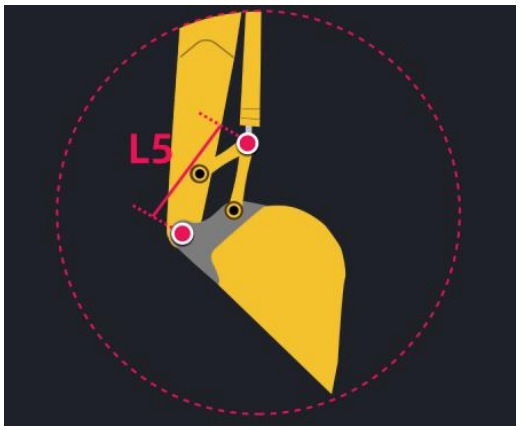




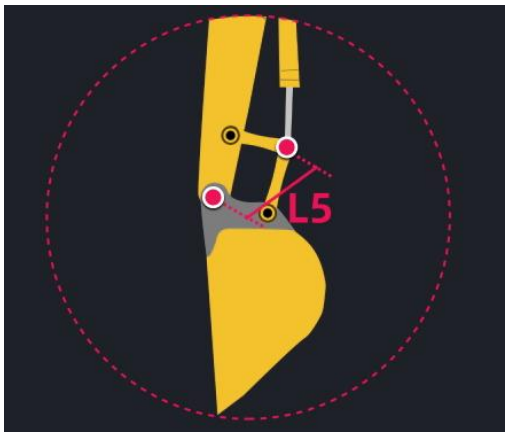
3.5 Remote sensing diagonal measurement

In this step, measure the L5 (the distance between the tick pin and the bucket pin) with a tape measure and read to millimeters

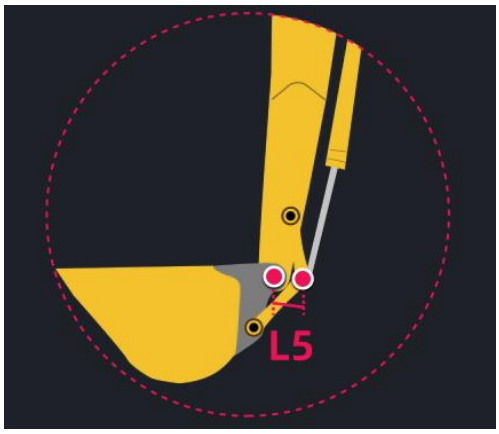
① Adjust the bucket to the valgus limit, fill in the measured L5 distance, and click check



② Adjust the bucket to the center, fill in the measured L5 distance, and click check

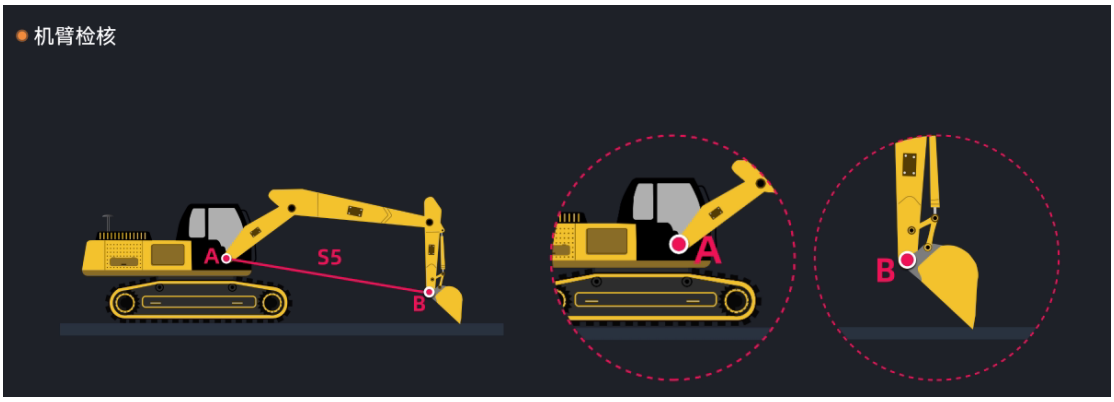


③ Adjust the bucket to the adduction limit, fill in the measured L5 distance, and click check



3.6 Machine m check

Place the machine in a flat field, adjust the small arm to roughly vertical, fully spread the bucket, drop the upper arm until the tip of the bucket touches the ground, and then measure S5 (the distance between the axis of the large arm to the inner axis of the bucket), and click the check

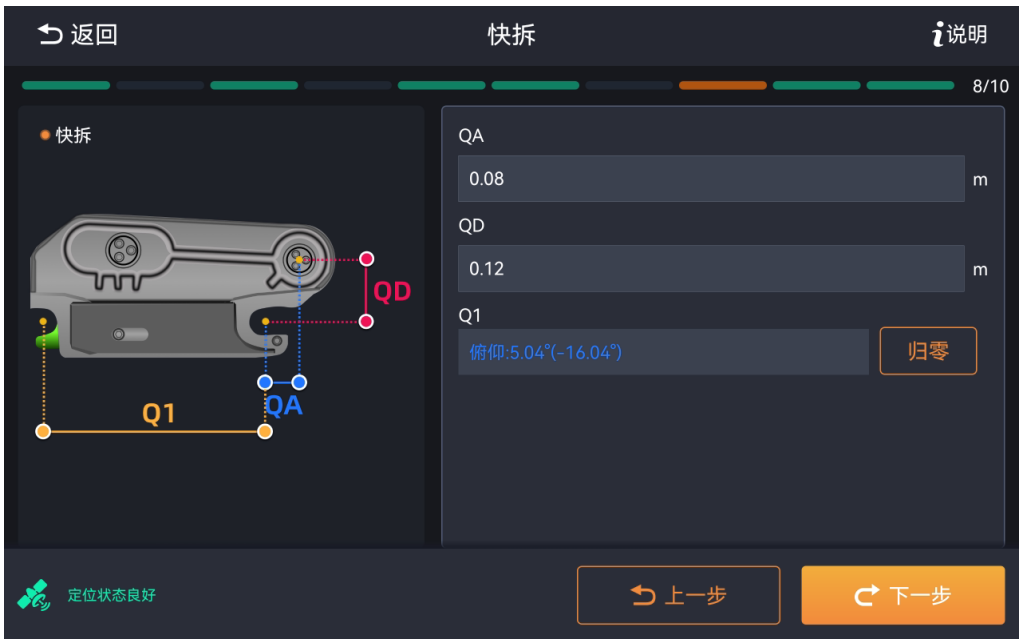


3.7 Quick disassembly and measurement

Measure and input the horizontal distance between the bottom and top domestic sales of the fast connector, QA.

Measure and input the vertical distance between the fast connector "QD".

Keep the lower part of Q1 horizontal and click to zero



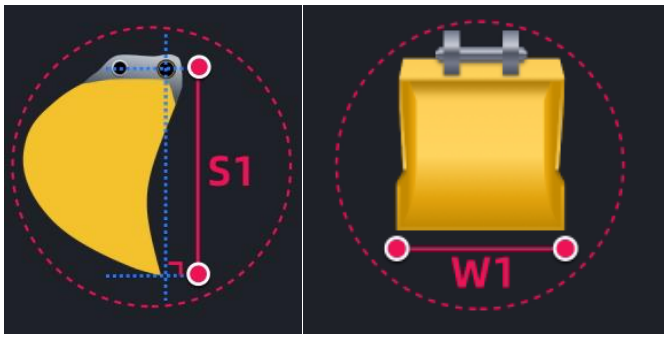
3.8 bucket configuration

3.8.1 Create a common digging bucket

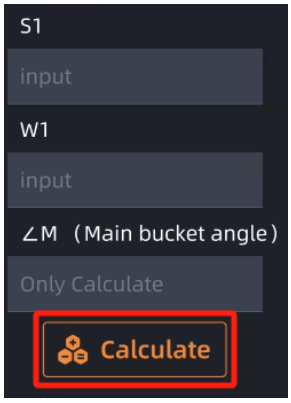
Pipe type selection [standard]

Vertical S1 (shaft and blade) to measure the distance of S1

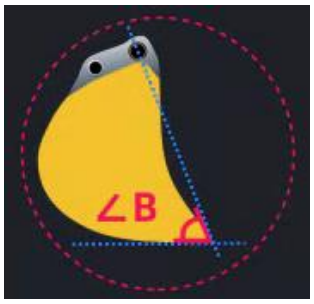
Measure W1 (width of tooth）



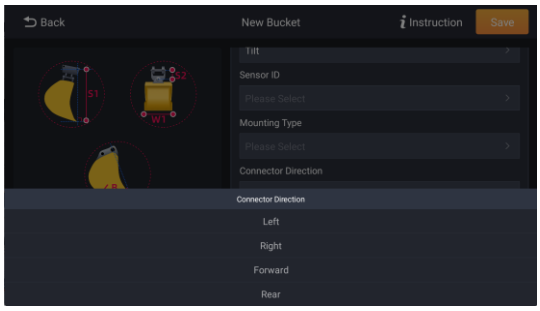
After input, click calculate to calculate M (main bucket Angle）

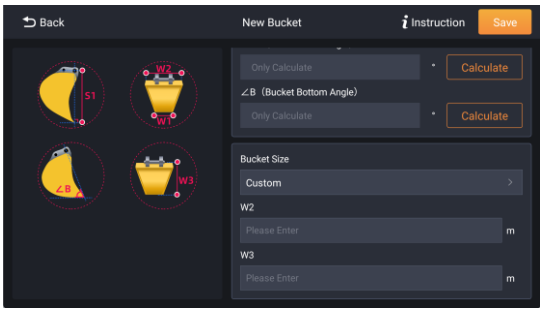


Use the horizontal ruler on the bottom plane position of the bucket, adjust the bucket until the bubble is centered, click [calculation] to calculate B (bottom corner）



If you have a trapezoidal ditch bucket, choose the bucket size, measure and enter the dimensions of W2 and W3

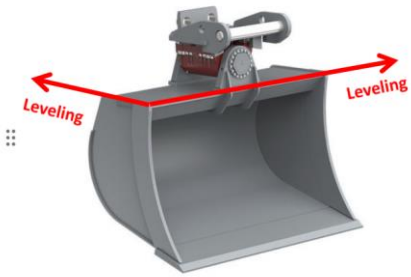


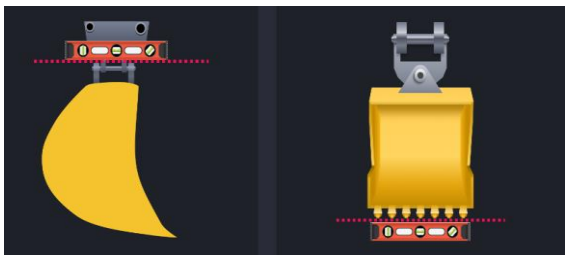


3.8.1 Create tilt bucket

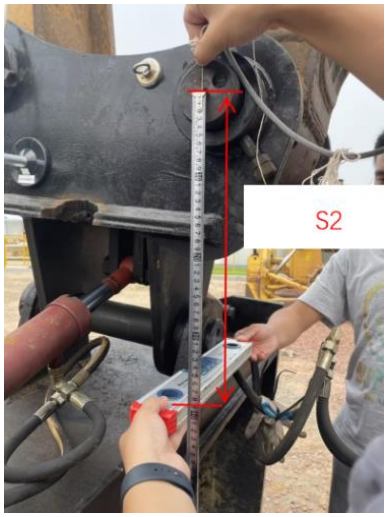
Dig bucket type selection [tilt], configure the sensor ID, select the installation type (horizontal, vertical), connector direction (left, right, front and rear, according to the actual installation situation of the sensor）

After configuring the basic information of the tilt bucket, adjust the left and right and rear directions of the tilt bucket, and click the [calculation] button to calibrate the tilt bucket sensor

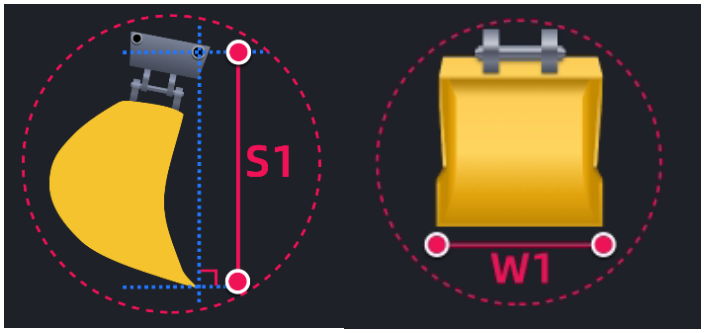




Measure S2 (vertical distance between the tilt axis and the top of the bucket at this horizontal attitude）



S1, W1, M, B are measured and aligned in a calibration manner with standard bucket



3.8 Antenna correction

Way 1:

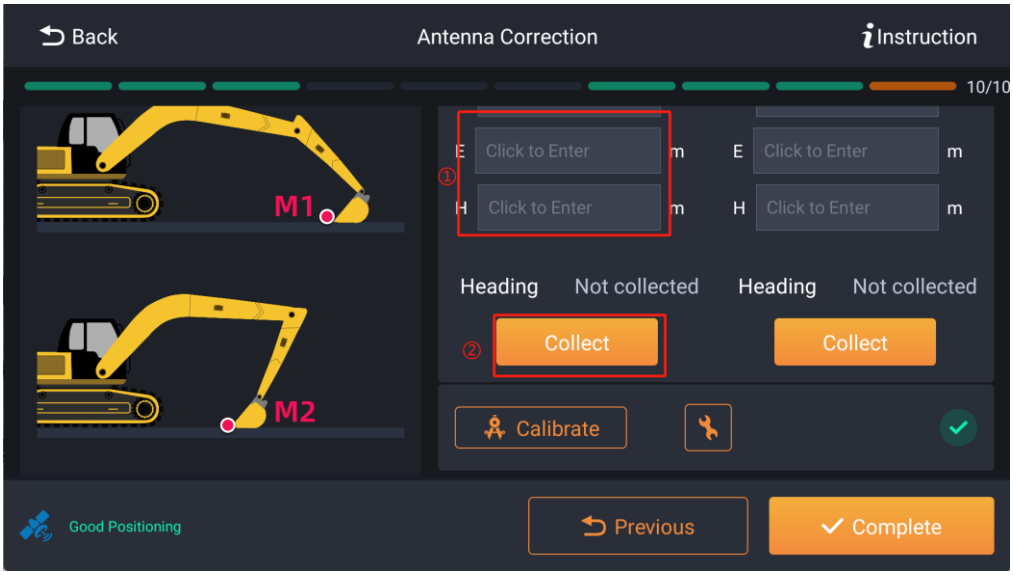
Select the boot point location (left, middle, or right）

① Extend the arms and forearm to the limit, place the tip to the ground, measure the coordinates of the tip using RTK and input them into the software

② Click on [Collection] to collect the heading direction of M1

③ shrink the arms and forearm to the limit, place the tip to the ground, measure the coordinates of the tip using RTK and input it into the software

④ Click on [Collection] to collect the heading direction of M2



Click the [calibration] button after completion

remarks:

① RTK and TX 73 require the same coordinate system

② When the heading difference between M1 and M2 is within 0.2, the calibration error should be about 3-4cm, and the greater the heading angle difference, the greater the error

③ In this process, only the arm, rod and bucket are allowed to move, and the body is not allowed to rotate. Please avoid the bucket also supports the excavator

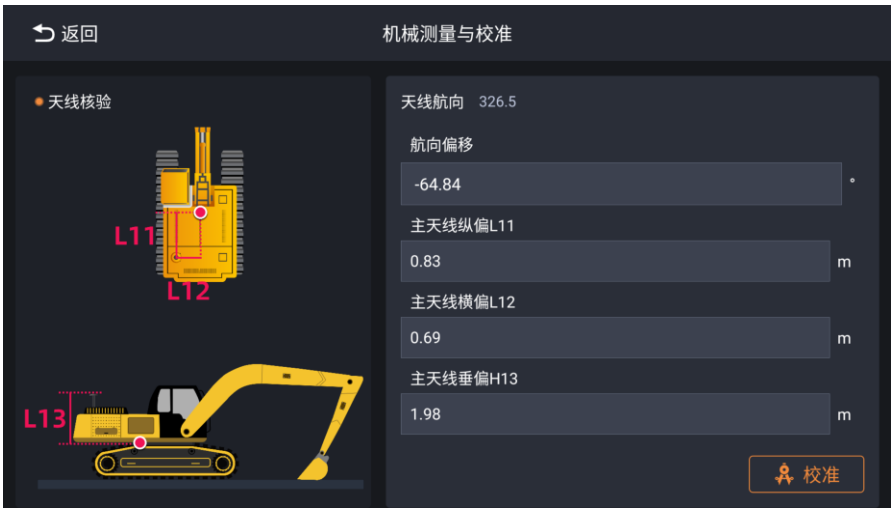
Method 2:

Manual measure of the following dimensions:

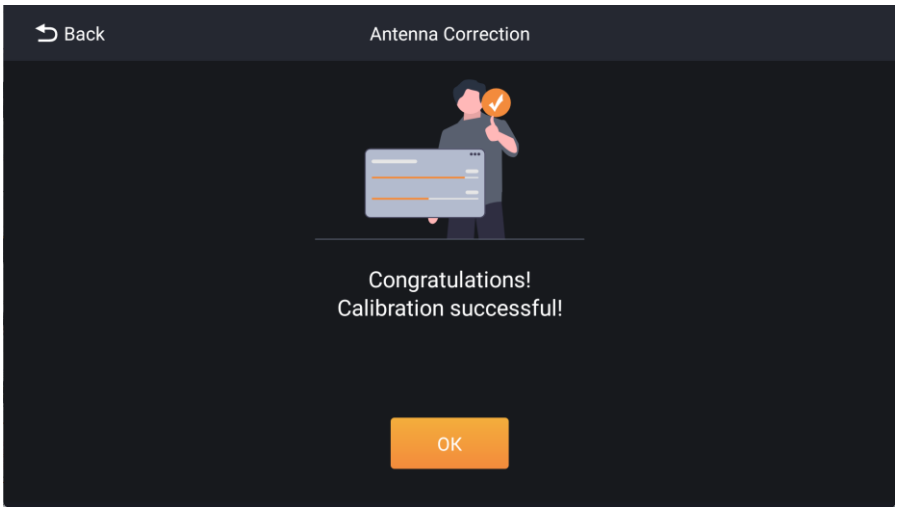
L11: the horizontal distance between the body and the main arm to the left and right main antenna

L12: The horizontal distance between the body and the large arm connecting the shaft and the main antenna in the front and rear direction

L13: the vertical distance between the body and large arm and the main antenna in the Z axis direction



Click the [calibration] button after completion



Attachment 3 List of tools

Name	Picture
monkey wrench	

Inside the hexagonal	
Phillips screwdriver	
plumb bob	
Strap tape (10m)	
multimeter	
insulating tape	

electric drill	
Adhesive (3M glue + AB glue)	 
pinchers	

FCC warning statements:

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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IC warning statements:

-English Warning Statement:

RSS-GEN ISSUE 5, 8.4 User manual notice

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

-French Warning Statement:

RSS - Gen version 5, 8.4 avis du manuel de l'utilisateur
Cet appareil contient un émetteur / récepteur sans licence conforme au RSS sans licence d'innovation, science et développement économique Canada.L'opération doit satisfaire aux deux conditions suivantes:
Cet équipement peut ne pas causer d'interférence.
L'équipement doit accepter toute interférence, y compris toute interférence qui pourrait entraîner un fonctionnement indésirable de l'équipement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that are deemed to comply without testing of specifc absorption ratio (SAR).Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement émet une énergie RF très faible qui est considérée conforme sans évaluation du débit d'absorption spécifque (DAS).

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
Lors de l'installation et du fonctionnement de cet équipement, la distance minimale entre le radiateur et le corps doit être de 20 cm.

Detailed external antenna info		
Manufacturer	:	Shanghai Huace Navigation Technology Ltd.
Antenna type	:	External 2.4G+4G Two-in-one antenna with TNC Internal thread needle *2
Model	:	6068F00114
Antenna gain	:	2.4GWIFI, max gain 1.59 dBi
Note: This radio transmitter 32467-A02059 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.