



JIANGXI KMAX INDUSTRIAL CO., LTD.

VR Software for Practical Training on Maintenance of  
Construction Machinery Hydraulic System

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**PRODUCT INTRODUCTION**

# Content

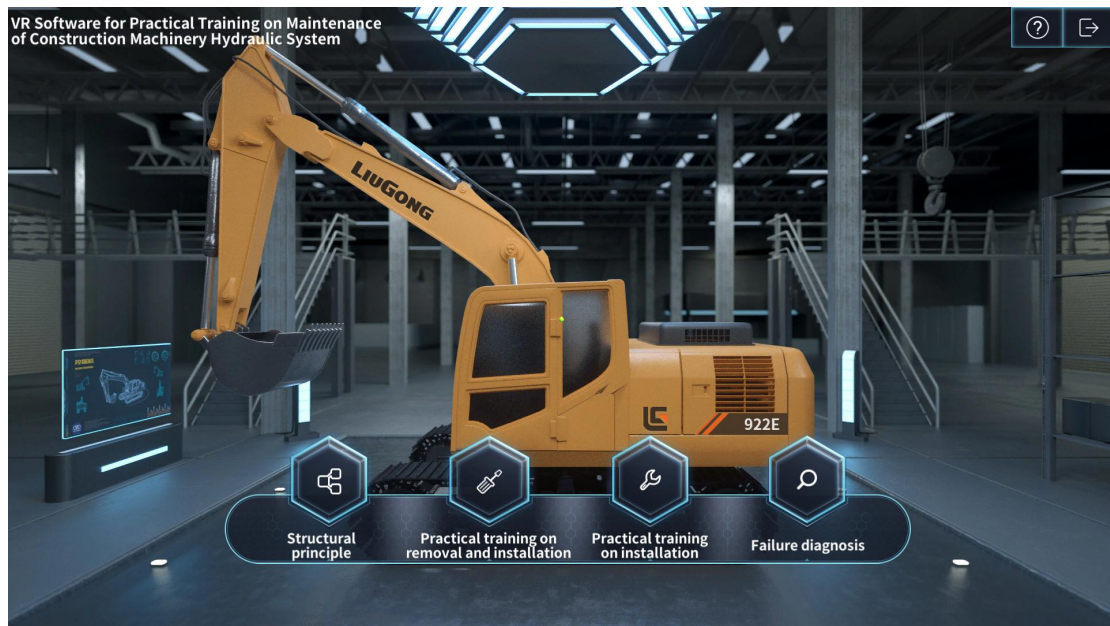
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# 1. Product Overview

VR Software for Practical Training on Maintenance of Construction Machinery Hydraulic System is a practical training product designed and developed for secondary vocational schools, higher vocational colleges, and applied undergraduate institutions to assist in the teaching of construction machinery. Based on the hydraulic systems of the Liugong CLG922E excavator and CLG856H loader, the software models these systems at a 1:1 scale according to their real structures. Utilizing the most advanced VR virtual simulation technology, the software simulates the disassembly, assembly, and principle demonstration of core components such as the travel motor, main control valve, and slewing center of construction machinery, through real data collection and institutional research. Students can complete the entire simulated training process in a virtual environment, achieving a perfect integration of theoretical and practical teaching.



## 2. Target Audience

The target users of this software are teachers and students in the construction machinery-related majors of community colleges, technical colleges and universities.

### 3. Compatible Devices

KMAX desktop VR All-In-One machine or PC.

### 4. Product Value

This VR teaching and training software effectively addresses the following pain points in the educational process:

- The software not only covers theoretical knowledge points from professional materials but also includes simulated practical operations such as the disassembly and assembly of the travel motor, main control valve, pilot valve (hand and foot), slewing center, slewing motor, and main pump. This ensures a seamless integration of theory and hands-on practice.
- The model resources are based on the hydraulic systems of the Liugong 922E excavator and CLG856H loader, with 3D solid modeling conducted at a 1:1 scale according to the dimensions of each component in the overall structure.
- The software strictly follows standardized procedures and the maintenance manual processes from the manufacturer to simulate operational steps, ensuring the professionalism and standardization of the teaching and training process.
- The software builds a comprehensive knowledge system that integrates theory and practice, from the display of the hydraulic system's structural principles to the overall disassembly and assembly operations. It constructs a three-dimensional knowledge framework through points, lines, and surfaces, which aligns with teaching principles and cognitive patterns.

## 5. Content List

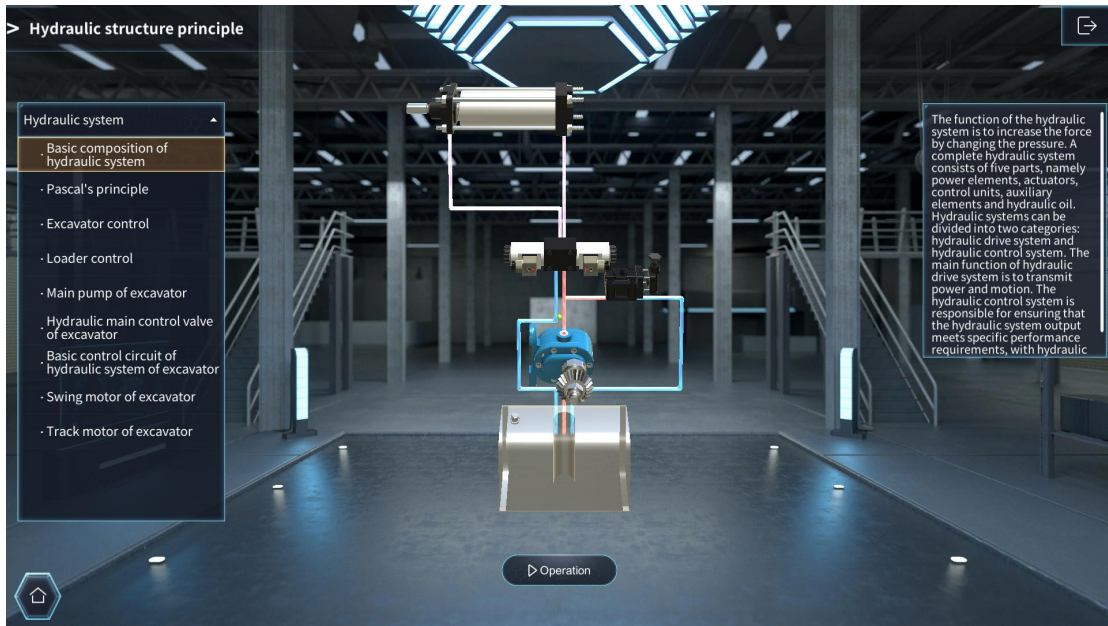
Module	Mode	Specific Content	Presentation Form
Structural Principles	Cognitive Learning	The basic composition of the hydraulic system, Pascal's principle, excavator control, loader control, excavator main pump, excavator hydraulic main control valve, basic control circuit of the excavator hydraulic system, excavator slewing motor, excavator travel motor.	Text Description, Model Display, Principle Animation
Disassembly Training	Practical Training	Disassembly of the travel motor, the main control valve, the pilot valve (hand and foot), the slewing center, the slewing motor and the main pump.	Interactive Practical, Training Exercises
Assembly Training		Assembly of the travel motor, the main control valve, the pilot valve (hand and foot), the slewing center, the slewing motor and the main pump.	
Fault Diagnosis		The excavator's dipper arm moves sluggishly and weakly, the entire excavator is inoperative, the excavator is unable to turn, the loader's boom operates slowly and weakly, and the loader is unable to turn.	

## 6. Functionality Introduction

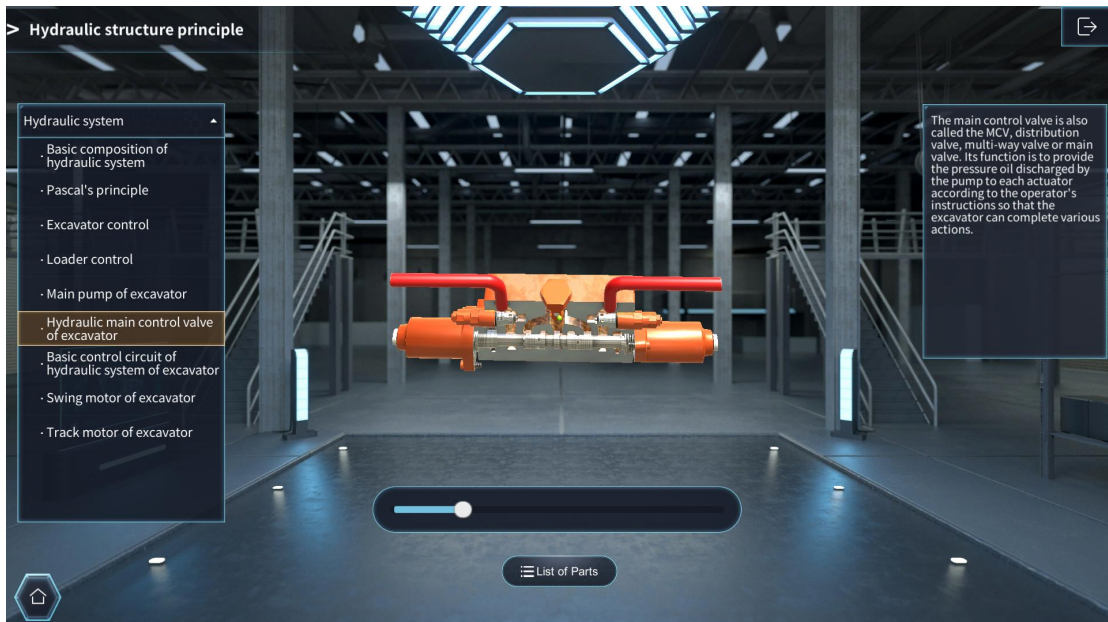
### 6.1. Structural Principles

On the Principles of hydraulic structure, the left side shows the module classification of the hydraulic system. Click on the first level menu and scroll down to expand the second level menu. Click the "Back" button in the bottom left corner to return to the homepage. The text description of the displayed model will be displayed in the prompt box on the right. Click the "Operation" button on the page to play the

corresponding principle animation of the model.



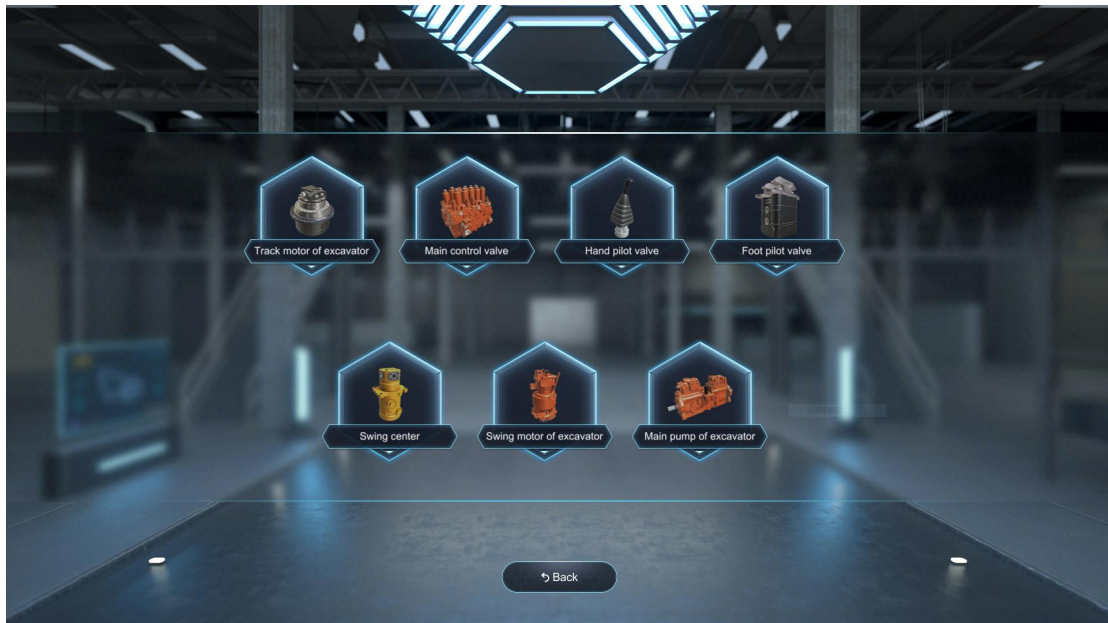
Clicking on the left menu bar allows users to switch between the structural principle displays of different components. Holding the middle button of the stylus enables users to drag the slider at the bottom of the scene, thereby playing the interactive animation between the model and the UI.





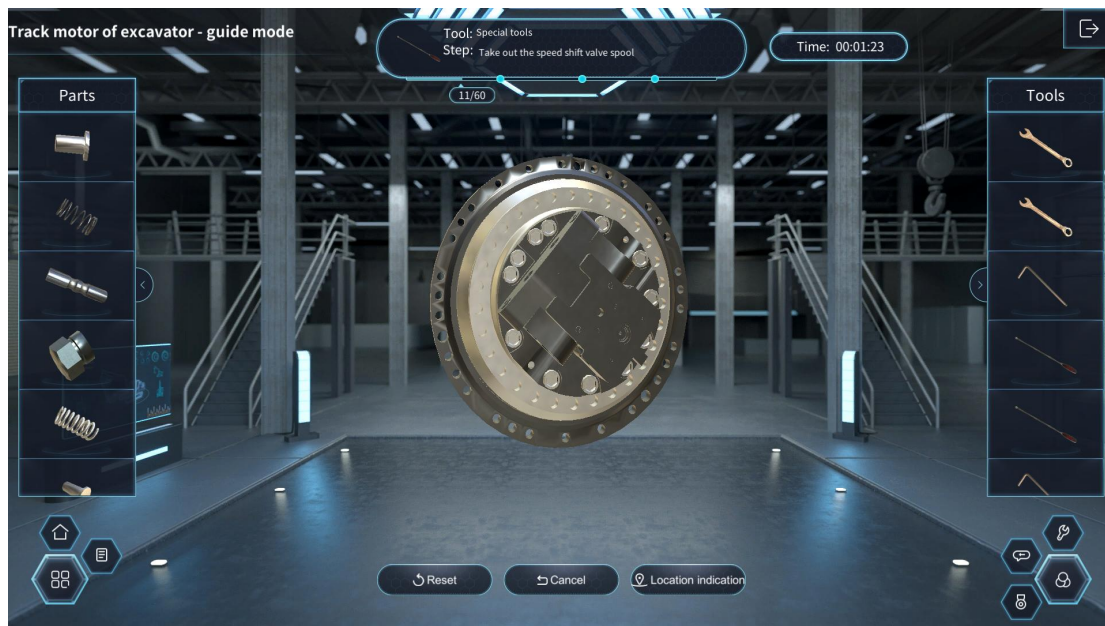
## 6.2. Disassembly and Assembly Training

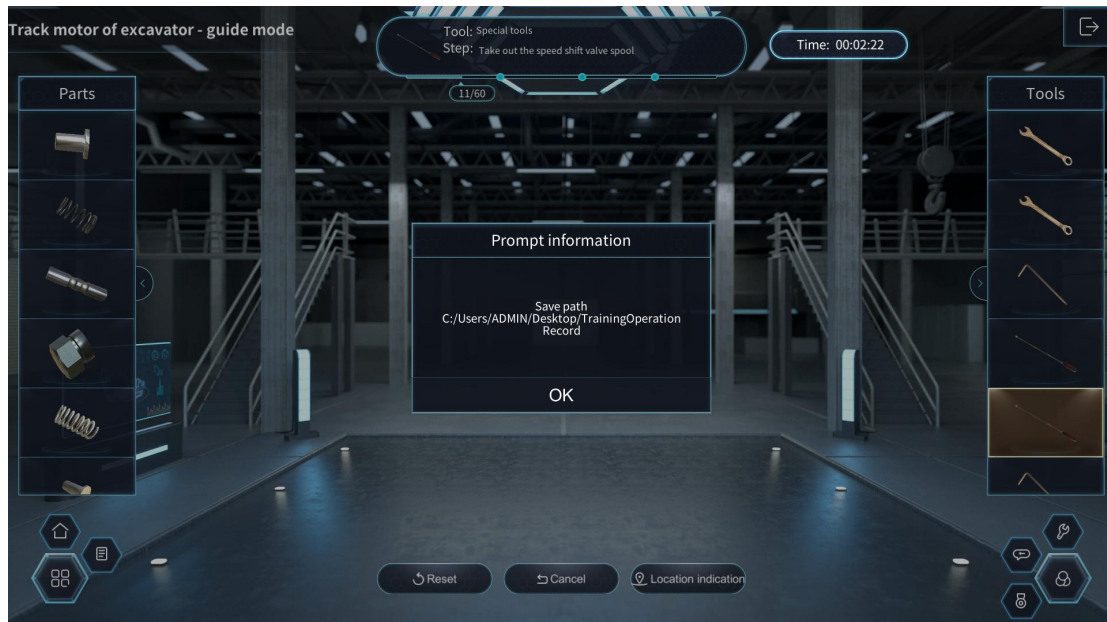
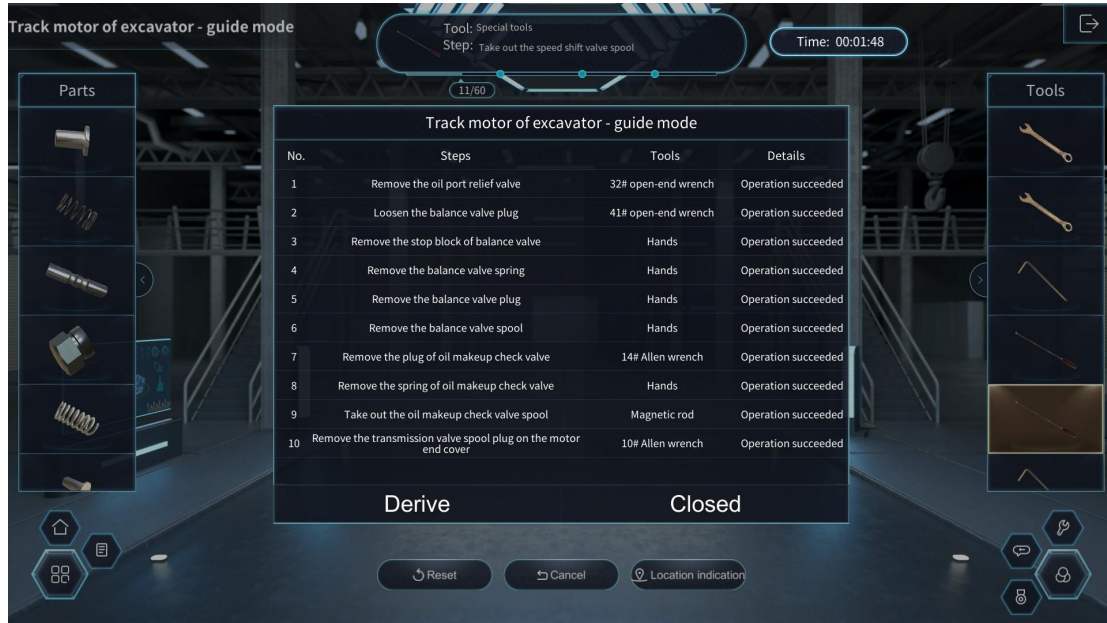
After clicking on "Practical Training on Removal" users will enter the transition interface for disassembly training, where users can select disassembly tasks. Clicking the “Back” button will take users back to the homepage.



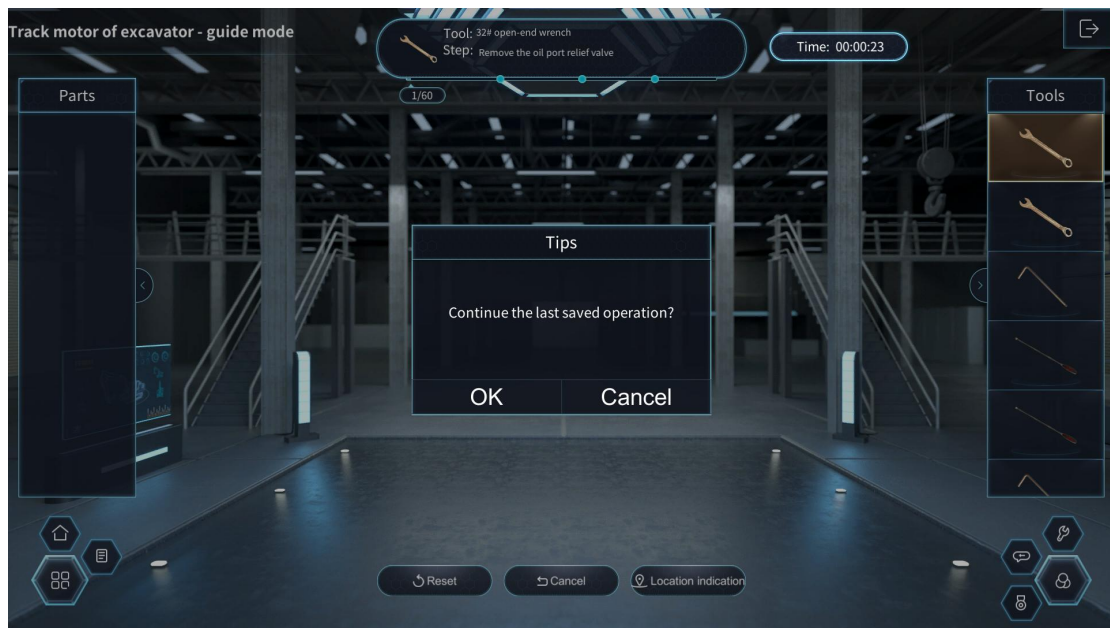
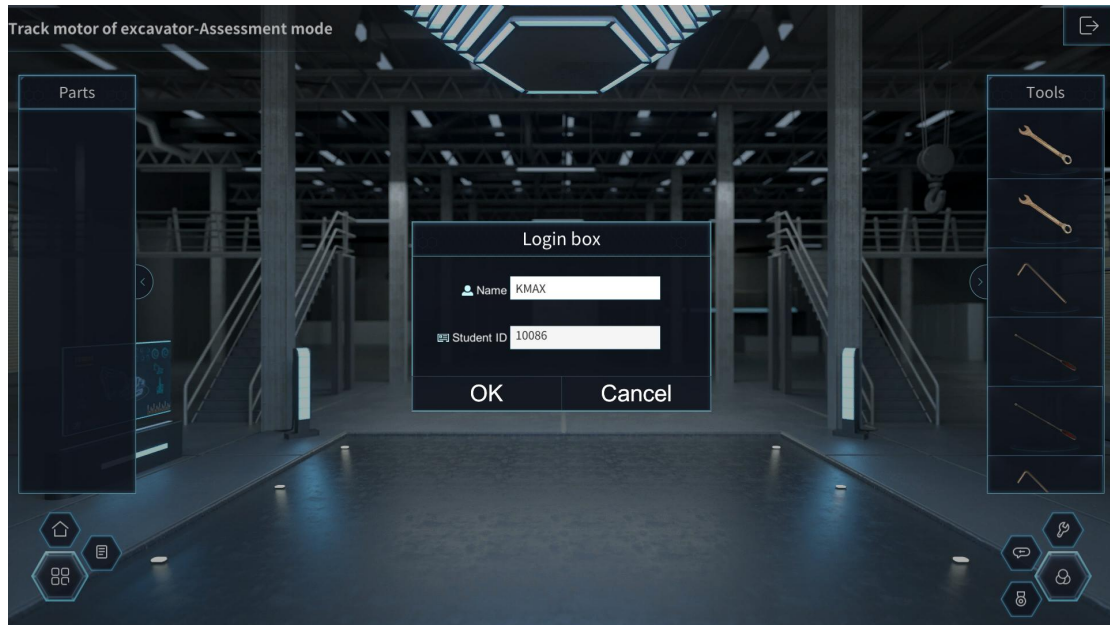
## 6.2.1. Track Motor of Excavator-Guide Mode

After entering the disassembly training scenario, the top of the page displays text prompts for the operation steps and the number of steps taken. At the bottom of the page are buttons for "Reset", "Cancel", and "Location Indication". Click "Reset" to return the model to its initial state; Click "Cancel" to return to the previous step when disassembling the model; Click on "Location Indication", and the required tool parts and operating points for this step will be highlighted in the scene. The bottom left corner is expanded into "Back" and "Record" buttons. On the left is the parts column, where you can click to select a part. On the right is the toolbar, where you can click to select the necessary tools for disassembly and assembly. Click on the semi-circular arrows on both sides to control the telescopic parts bar and toolbar; Click the circular button on the progress bar to jump to the next step.

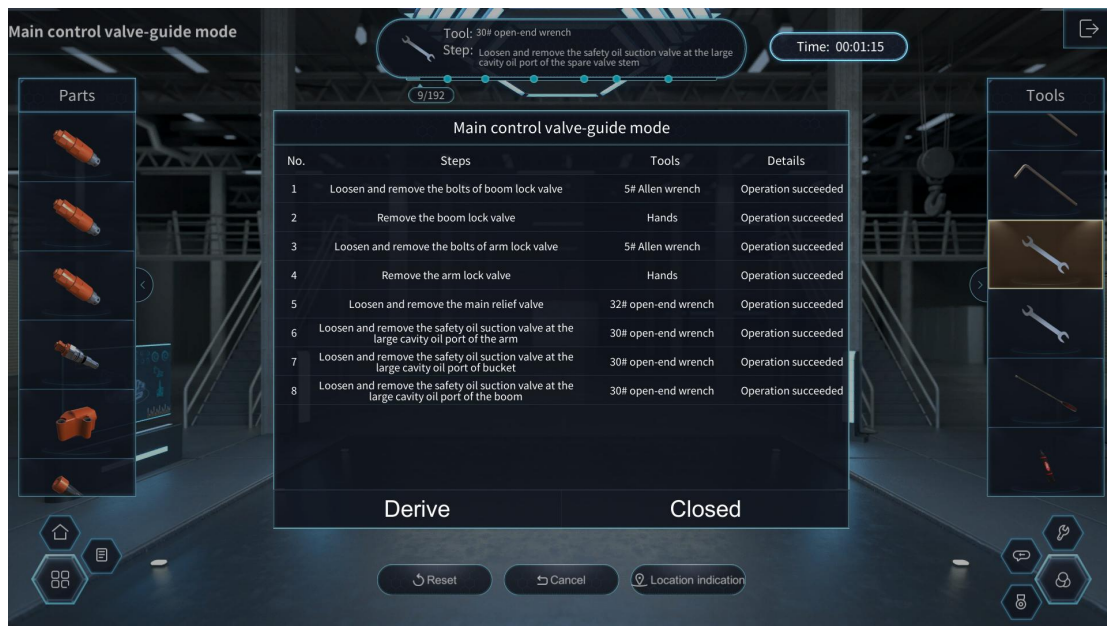
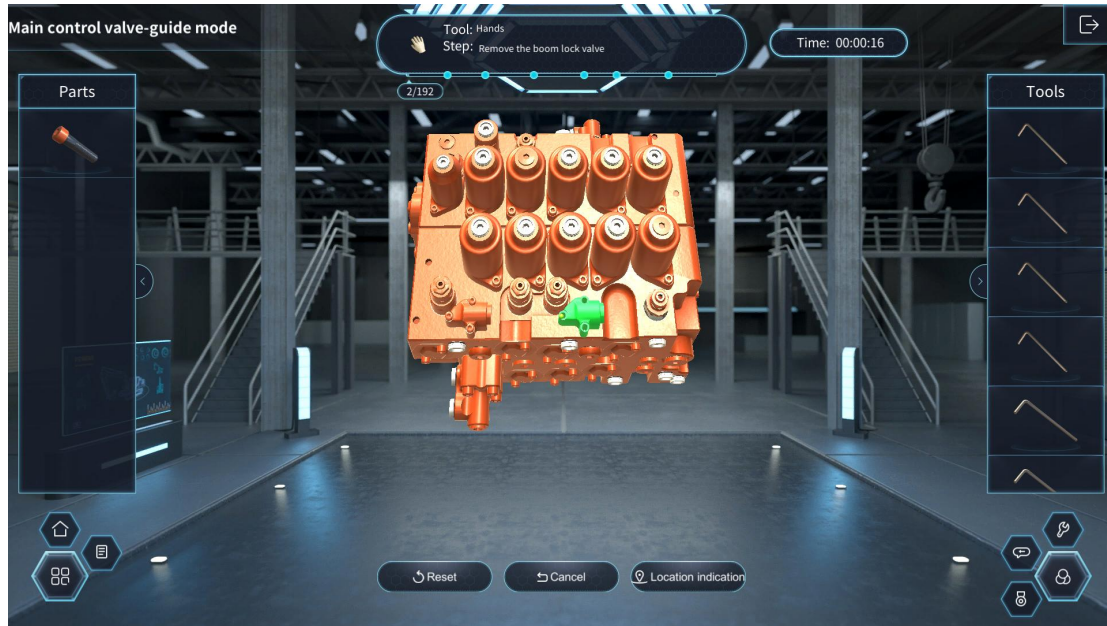




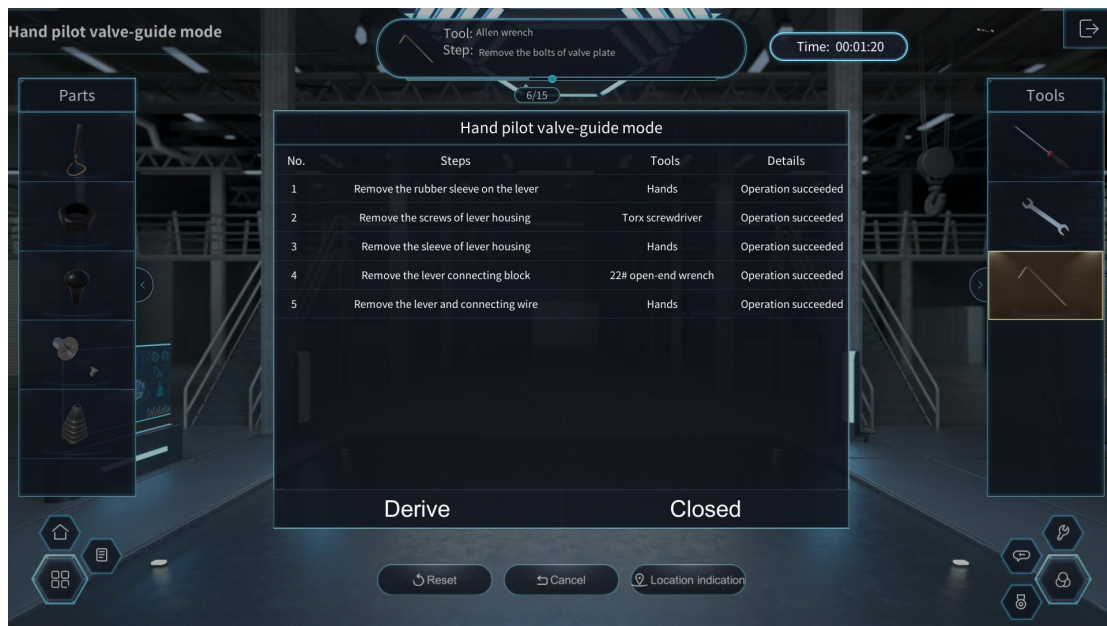
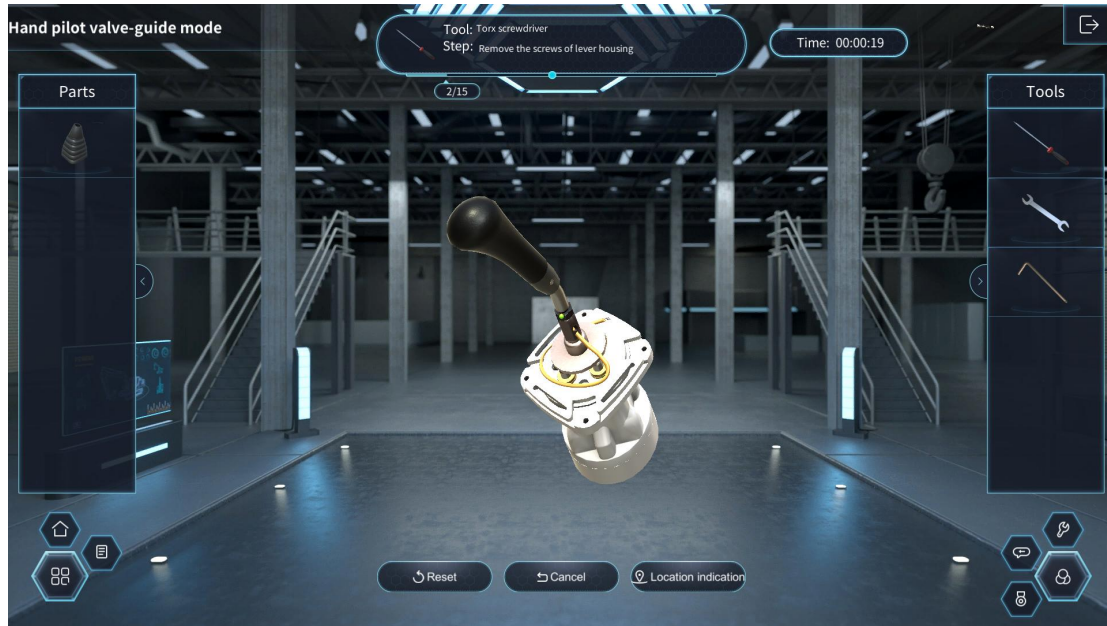
In the lower right corner, there are buttons for "Guide""Training" and "Assessment". Click on three buttons to switch between guidance mode, training mode, and assessment mode. Automatically prompt tool parts and operating positions in guidance mode; In the training mode, it is necessary to manually click the "Location Indication" button to prompt the tool parts and operation positions; In the assessment mode, the name and student ID of the assessed person need to be entered, and all prompt functions and operation timing functions need to be disabled.



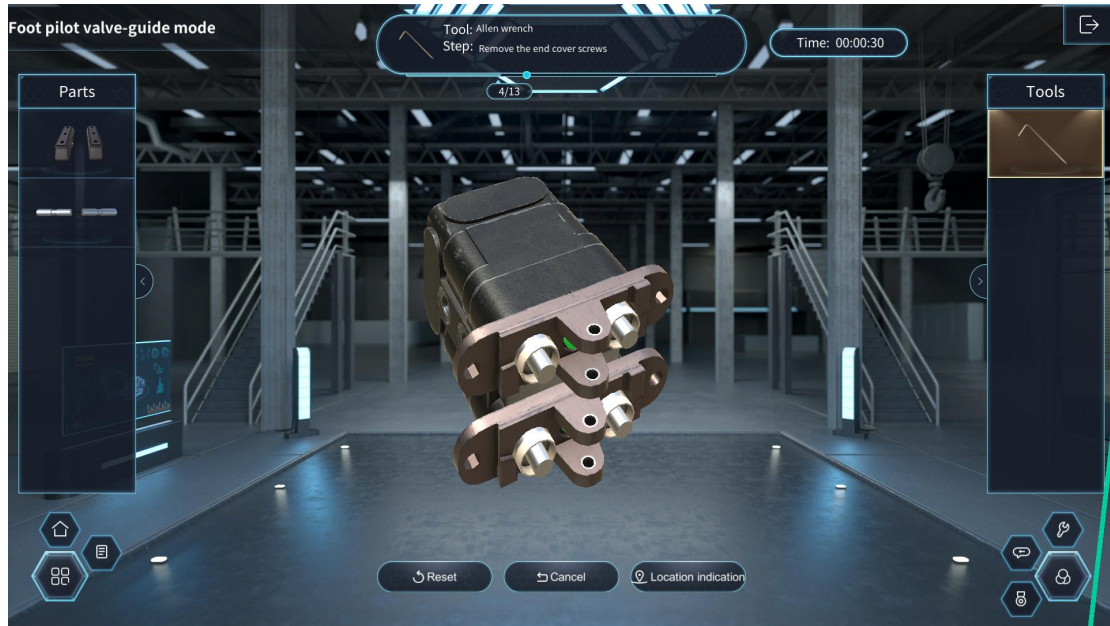
## 6.2.2. Main Control Valve-Guide Mode



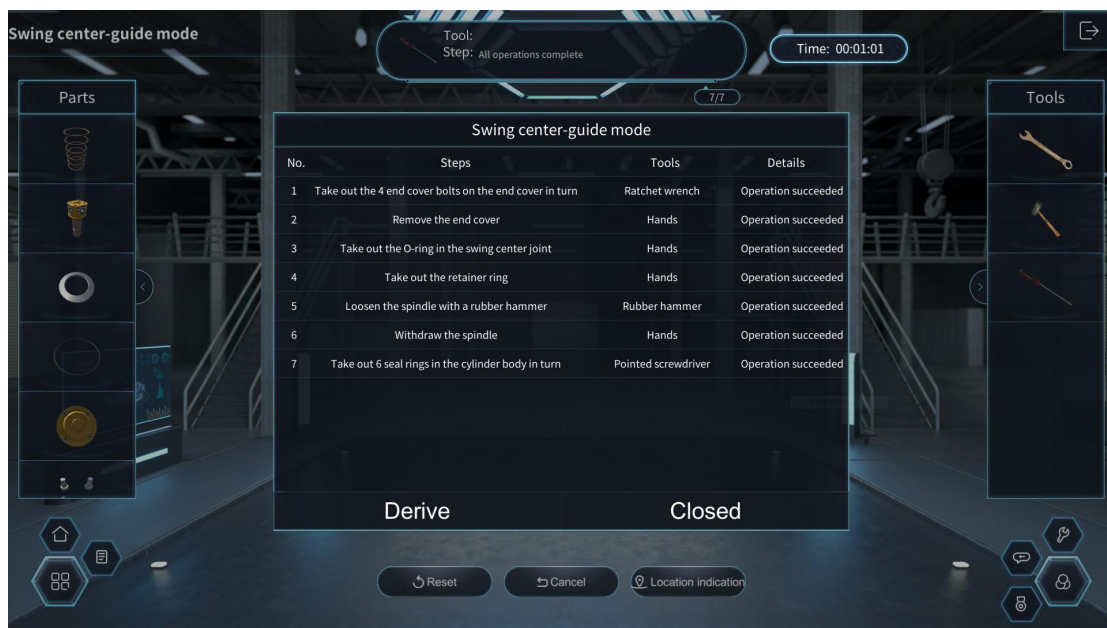
### 6.2.3. Hand Pilot Valve-Guide Mode



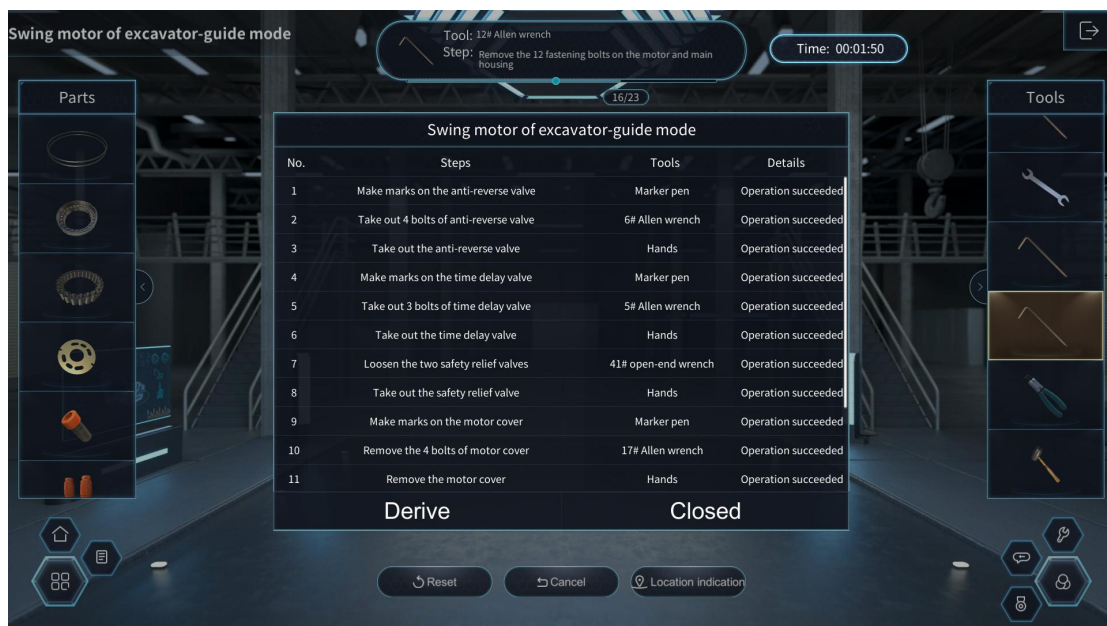
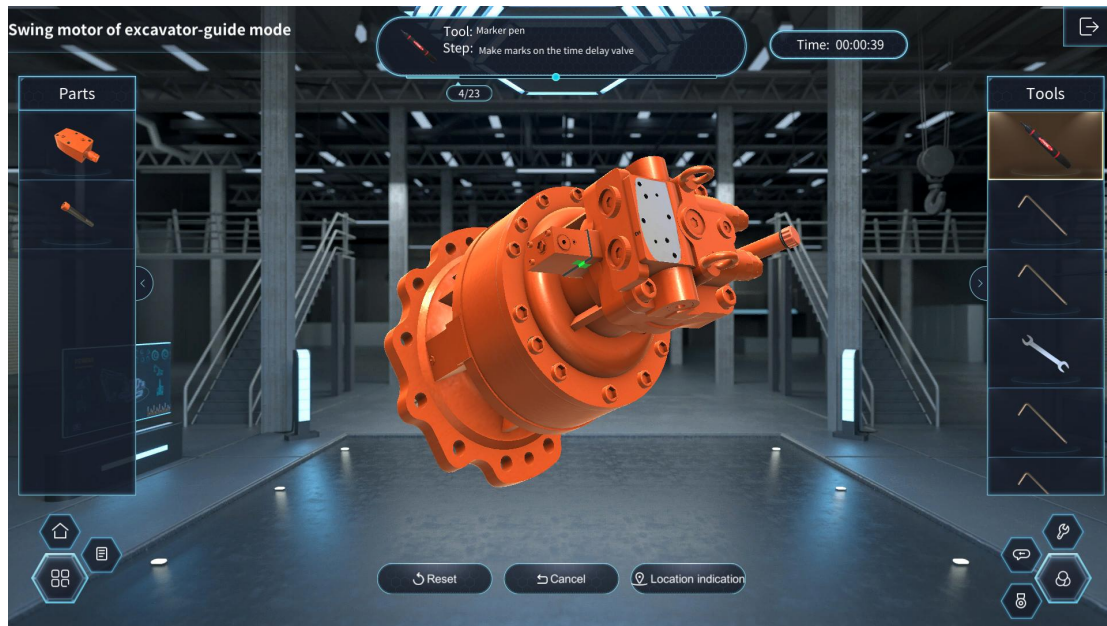
### 6.2.4. Foot Pilot Valve-Guide Mode



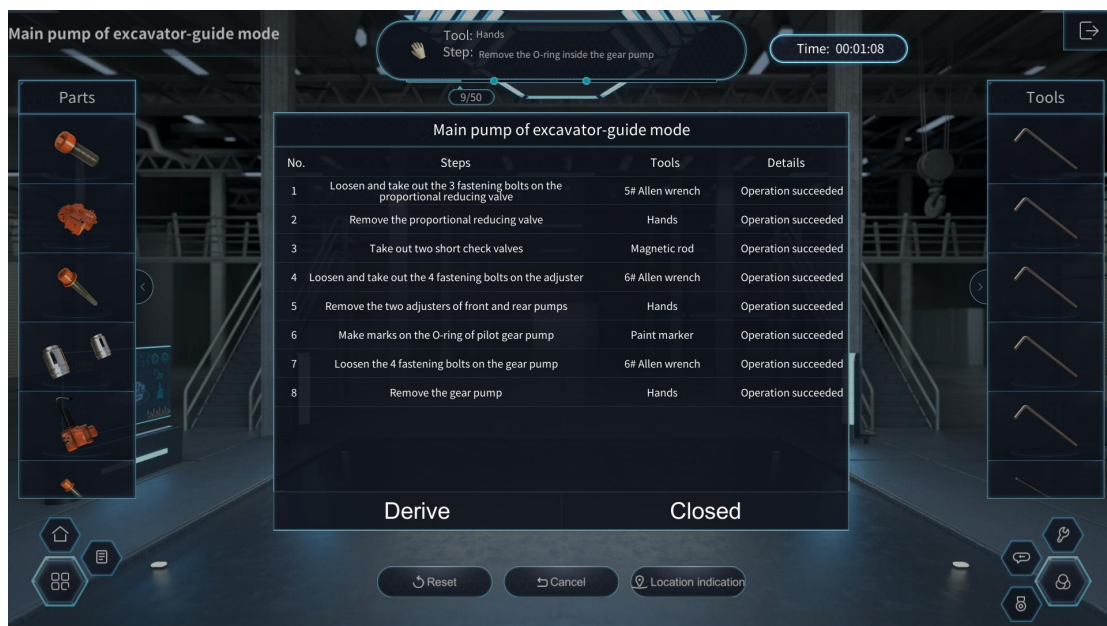
## 6.2.5. Swing Center-Guide Mode



## 6.2.6. Swing Motor of Excavator-Guide Mode



### 6.2.7. Main Pump of Excavator-Guide Mode



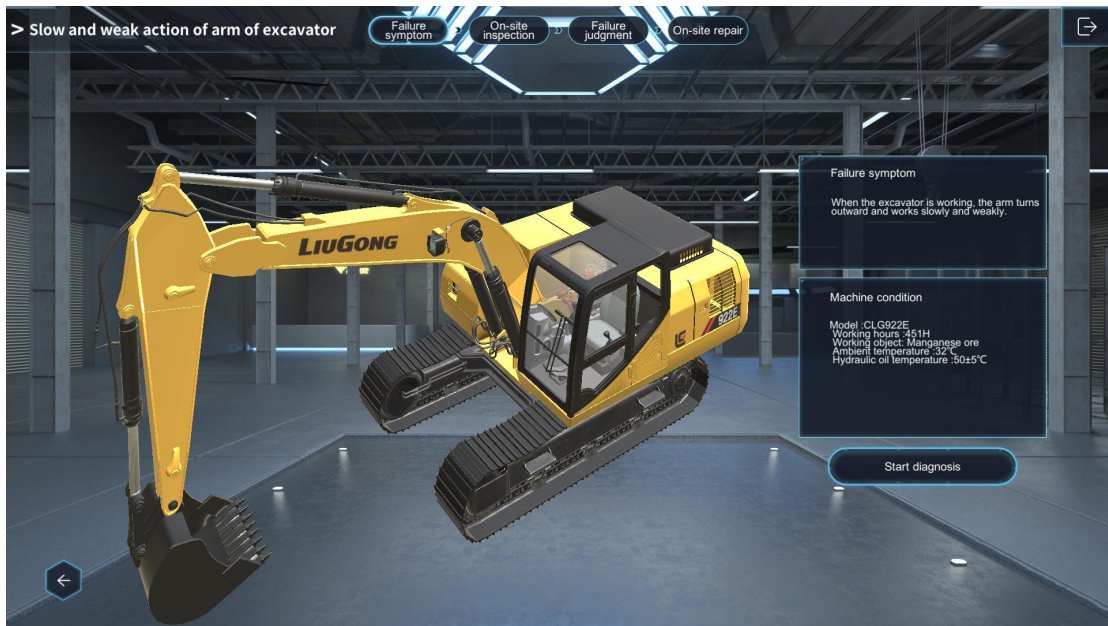
### 6.3. Fault Training

After clicking on "Fault Diagnosis", you will enter the transition interface for fault diagnosis, where you can select fault diagnosis tasks. The software contains a total of 5 fault points. Click the "Back" button to return to the homepage.



### 6.3.1. Slow and Weak Action of Arm of Excavator

Fault diagnosis is divided into four steps: fault symptoms, on-site inspection, fault diagnosis, and on-site maintenance.



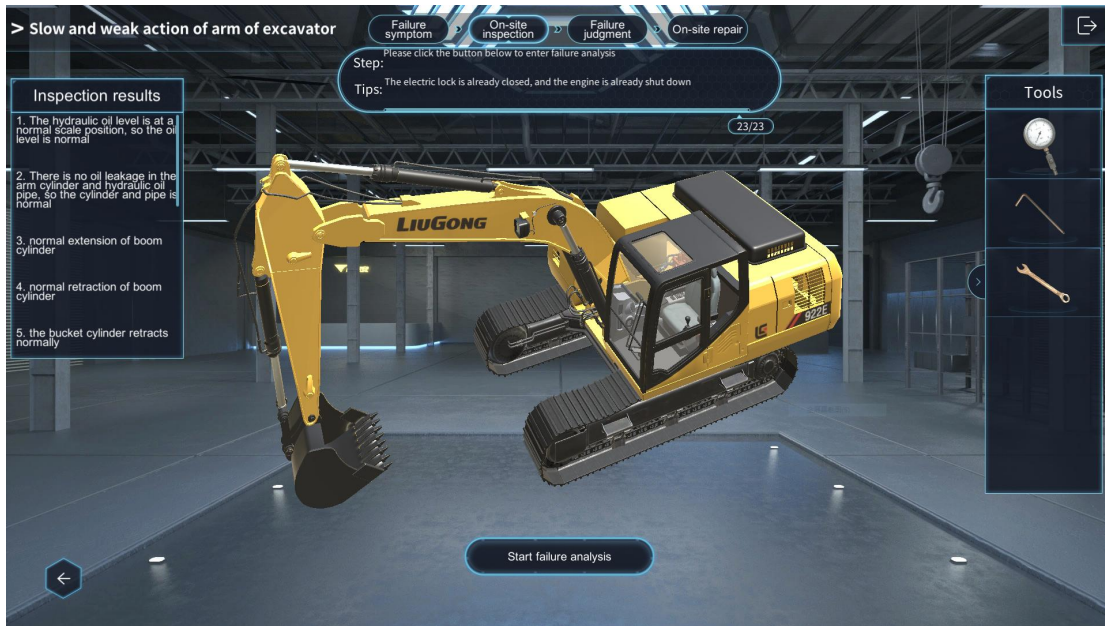
After entering the fault phenomenon scenario, the top of the page shows the current process position, the middle displays the fault phenomenon, the text box on the right displays the fault phenomenon and the overall condition of the machine, the bottom left corner of the page is the return button, which can return to the fault diagnosis transition interface, and there is a "Start Diagnosis" button at the bottom right of the

page, which can be clicked to enter the next step.

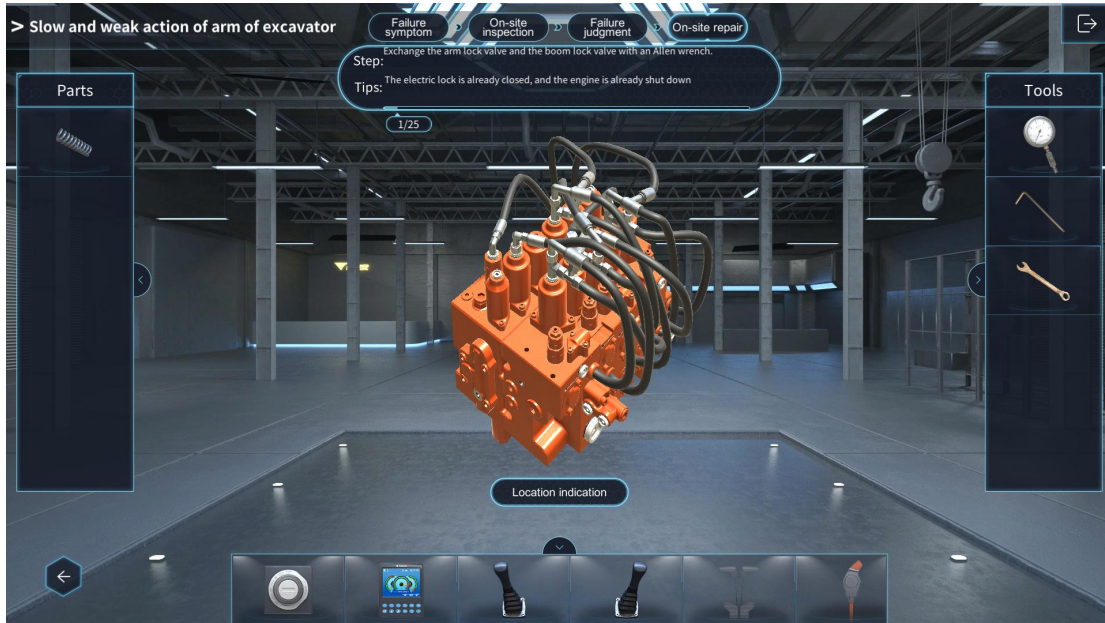


The middle of the page displays the entire machine or related components; At the top of the page are text prompts and step count displays for the operation steps. At the bottom of the page is the "Location Indication" button, as well as the switch operation bar. Clicking the "Location Indication" button displays the best perspective for the current operation. Clicking the switch component in the switch operation bar opens the corresponding switch UI for further operation; The text box on the left side of the page displays the inspection results, which can summarize and display the inspection text results of all previous inspection steps; On the right side of the page is the toolbar,

which can be clicked to use the tool

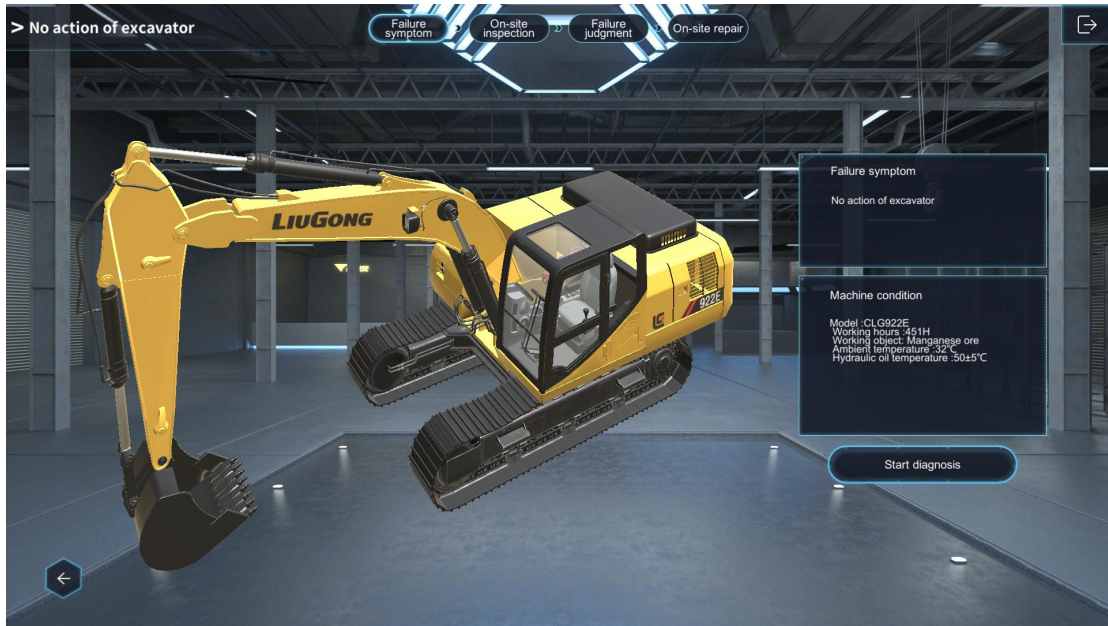


After entering the fault diagnosis scenario, the display and text description of possible fault causes are in the middle of the page, and the "View Schematics" button is in the upper right corner. Click to enter the schematic display page. On the left side of the page is the selection of possible causes of faults. Click to switch between possible fault causes. After viewing all fault causes, the "Start Repair" button will appear at the bottom of the page. Click to enter the on-site repair scenario.

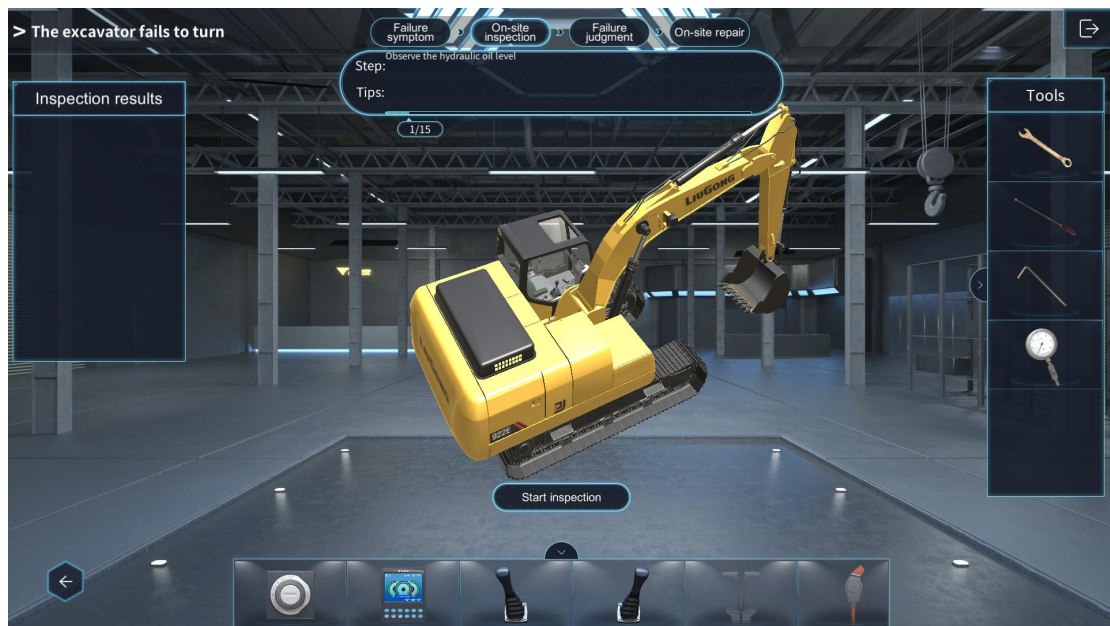


After entering the on-site maintenance scenario, the middle of the page displays models of the relevant complete machine or components; On the left side of the page is the parts column, where you can click to select parts for maintenance operations; At the top of the page are text prompts and step count displays for the operation steps. At the bottom of the page are the "Location Indication" button and the switch operation bar. Clicking the "Location Indication" button displays the best perspective for the current operation. Clicking the switch component in the switch operation bar opens the corresponding switch UI for further operation; On the right side of the page is the toolbar, where you can click to use the tool to check and confirm the status of the repaired component.

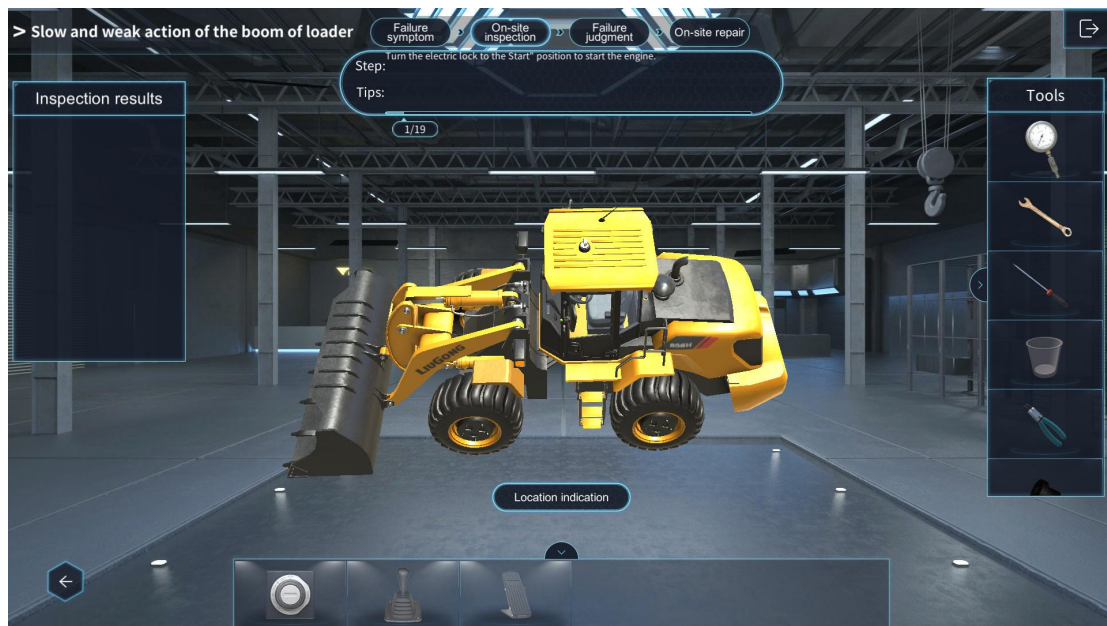
### 6.3.2. No Action of Excavator



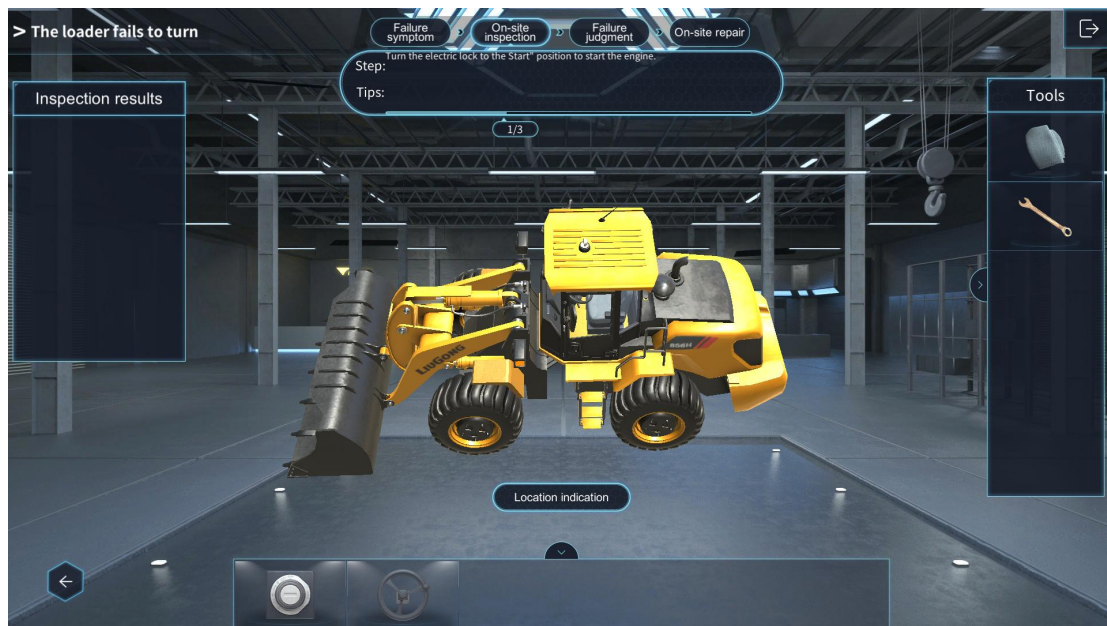
### 6.3.3. The excavator Fails to Turn



### 6.3.4. Slow and Weak Action of the Boom of Loader



### 6.3.5. The Loader Fails to Turn



## 7. Feature Highlights

- The software is a teaching software developed for engineering machinery electrical systems. From disassembly training to installation training, it can freely switch between guidance mode, training mode, and assessment mode, record training operation steps and duration, and comprehensively and effectively improve students' practical hands-on operation ability.
- The structural principle module allows for arbitrary dragging, free rotation, and scaling of the model; Clear and intuitive structure and principle analysis support operations such as pausing, replaying, and model explosion.
- The product can be installed on the world's leading KMAX desktop VR All-In-One Machine, and can also be used on a PC for better interactive operation experience and stronger display effect.

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