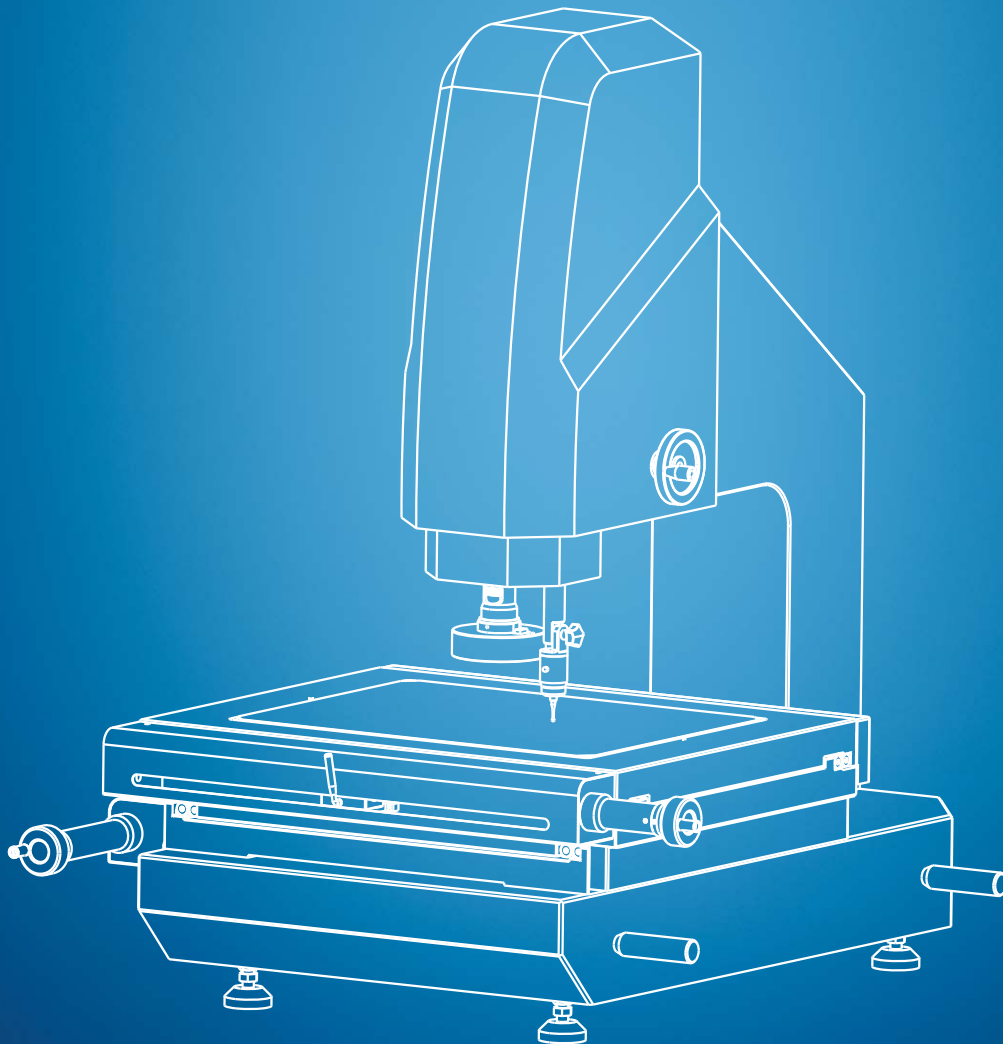# Manual Vision Measuring Machine

Operation Manual

Safety Instructions For Using

Dear Users,

In order to ensure the safety of your equipment and normal use, please read the following note.

Warning:

- When moving instrument, disconnected all the supply power, against hot plug.
- Handle with care when transportation, all of instruments put in the original package, place according to the iconic instruction, carried the goods in the way of closed type.
- Package material must be put in the place the children out of reach.
- The instrument must ground connection.
- Do not open the case to maintain by yourself. It is very dangerous for high pressure.

This marked warning operator attention to safety, for a variety of power supply, information line collection point and the place where there is a motor.

This marked a strong warning, do not touch.

This label is attached to the moving parts, such as no attention may cause harm to the human body.

This label requires professional personnel to operate, otherwise it is likely to cause damage to the machine or cause damage to personnel.

Grounding Mark.

Contents

1. Introduction of Instrument

1.1Application:

This new product is a non-contact vision measurement instrument, is composed of a high resolution CCD color camera, zoom lens, color display, video cross line generator, precision optical ruler, multifunctional data processor, high precision mechanical structure of the 2D data measurement software with high precision worktable, high efficiency photoelectric measuring instruments; measurement based on 2D and 3D measurement. It can also be widely used in precision in different kinds of industries, such as electronic components, precision molds, precision tool spring, screw machining, plastic, rubber, oil seal valve, camera parts, bicycle parts, auto parts, conductive rubber, PCB processing etc. all kinds of precision processing, machinery, electronics, instrumentation, light industry, plastic industry, universities, research departments and metrology measurement room, one of the measuring and testing laboratory equipment and production workshop indispensable.

1.2 Features:

- Using high precision Ji'nan granite base and column, to ensure that the machine has high stability and precision.
- With high precision and fast moving locking device, the return error of working table is less than 2um.
- A grade high precision optical scale with precision instrument table, ensure the accuracy within ≤3+L/200mm (L mean the length of be tested objective).
- Using HD zoom lens and high resolution color digital camera, to ensure that the quality is clear and no distortion.
- The programmable surface 4 ring 8 zone LED cold light source and the transmission LED parallel light source, as well as the built-in intelligent light control module, can freely control the light in the 4 ring 8 area of the brightness of any area.
- Powerful iMeasuring vision measurement software, to enhance the quality control to a new level.
- Optional imported contact probes and 3D measurement software, easy to upgrade the machine into a contact with the 3D measuring machine.
- The optional FexQMS measurement and data analysis and real-time monitoring software, enhance process control and reduce material consumption.

2. Specification Parameter of Instruments

Model	iMS-2010/F/P	iMS-2515/F/P	iMS-3020/F/P	iMS-4030/F/P	iMS-5040/F/P
Code#	521-140/F/P	521-150/F/P	521-160	521-170	521-200
Workbench	408x308mm	408x308mm	458x358mm	608x470mm	650x580mm
Glass Workbench	306x198mm	306x198mm	356x248mm	456x348mm	540x440mm
X/Y axis Travel	200x100mm	250x150mm	300x200mm	400x300mm	500x400mm
Z axis	High accuracy linear guide way， effective travel: 200mm				
X/Y/Z axis Resolution	0.0005mm				
X/Y axis Accuracy	≤3+L/200(um)				
Repeatability	2um				
Base and Column	High accuracy Ji'nan granite				
Illumination System(software control)	Surface 4 ring and 8 region stepless Led cold light source (adjustable per region)				
	Transmission LED parallel light source				
	LED laser navigation indicator light				
CCD	HD 700TVL Color CCD				
Zoom Lens	6.5X HD Fixed time zoom and objective lens				
	Optical magnification：0.7X~4.5X； Video magnification：23X~158X				
Working Environment	Temperature：20℃±2℃，temperature variation＜2℃/hr				
	Humidity：30~80%				
	Shake＜0.002g， ＜15Hz				
Measuring Software	iMeasuring				
Operating System	Support XP，WIN7，WIN8.1，32 Bit system				
Language	English, Chinese, Chinese Traditional, etc.				
Boundary Dimension(WxDxH)	790x617x1000 mm	790x617x1000 mm	838x667x1000 mm	1002x817x1043 mm	1076x820x1053mm
Net Weight	175Kg	175Kg	185Kg	350Kg	380Kg

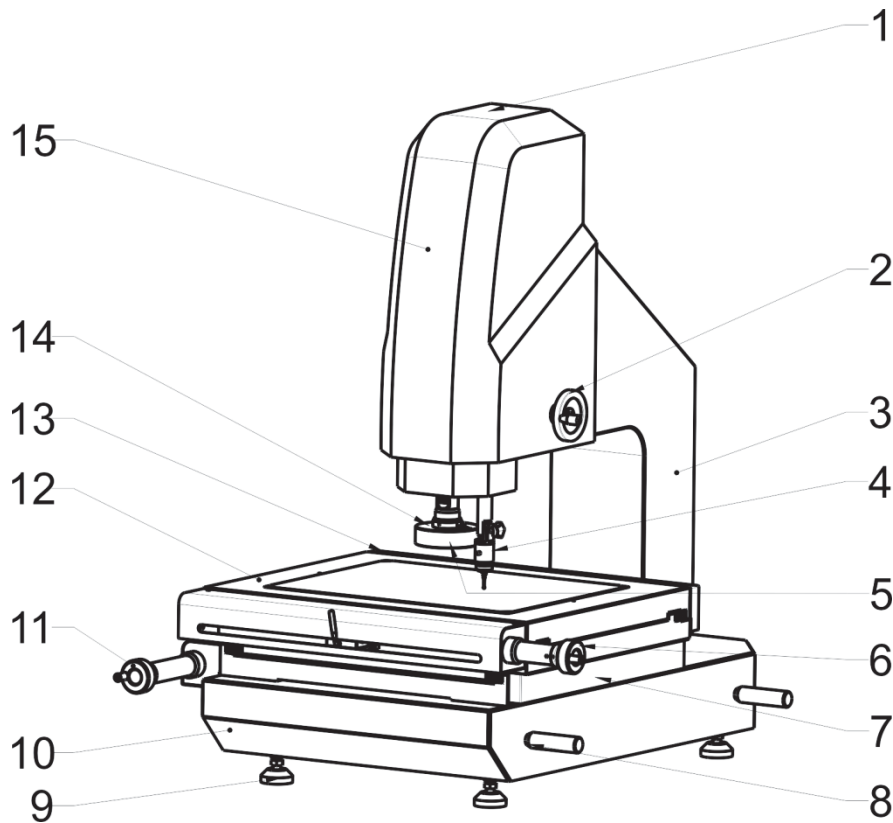# 3. Structure and Operating Principle

3.1 Structure

Fig 1 Structure

1. Outer cover	2. Z axis pilot wheel	3. Stand column	4. Probe
5. Surface illumination LED	6. X axis drive group	7. Y axis linear scale	8. Carry handle
9. Footing	10. Base	11. Y axis drive group	12. Workbench
13. X axis linear scale	14. Manual continuous zoom lens	15. Z axis linear scale	

Equipment structure could be divided into three parts (Fig 1)

1）Main Body , including :

Instrument base（10）stand column（3）, workbench（12）, X、Y axis consisted of polish rod and no teeth nut（6、11）.

2）Vision measuring system :

✧ Zoom lens (14): 0.7X-4.5X, and total magnifications is 23X~158X.

✧ Color CCD camera (inside mantle 1) get the image from Zoom lens, has a image of measured work-piece and change the video to digital signals, then it transfers the signal to computer color monitor via S-port. Color display generates the reticle with edge founder function.

✧ Contour light and surface light make use of the LED lamp-house, the LED lightness can be adjusted by switch (Fig 5) and the illumination is better, and LED longevity is 10 times than average bulbs.

3） Digital measuring system, includes as follows:

✧ X-axis(13) Y-axis(7) and Z-axis (15) linear scale generates the displacement signals by geometry movement of work-stage, the signal is collected by measuring software via signal capture card, and the measuring software show and process the data on the PC, Z axis is assistant measuring.

✧ Functional data: process and display measuring information.
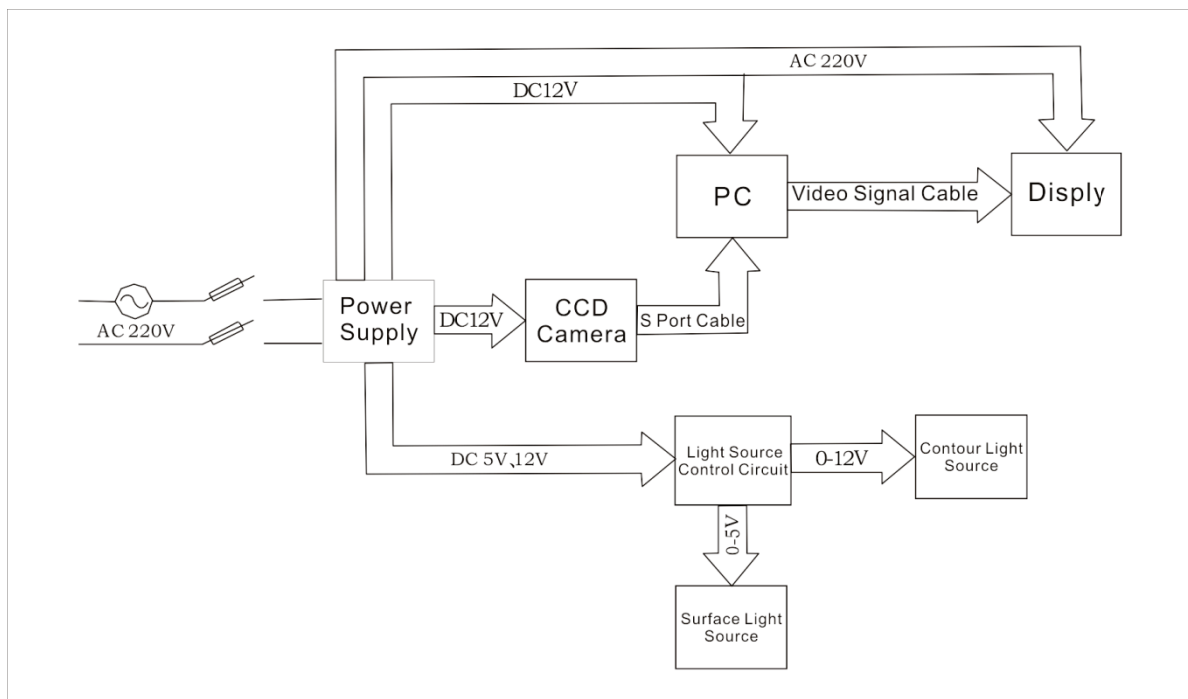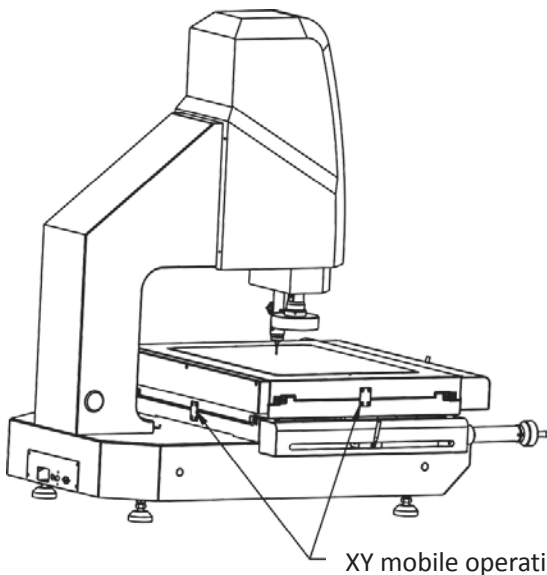
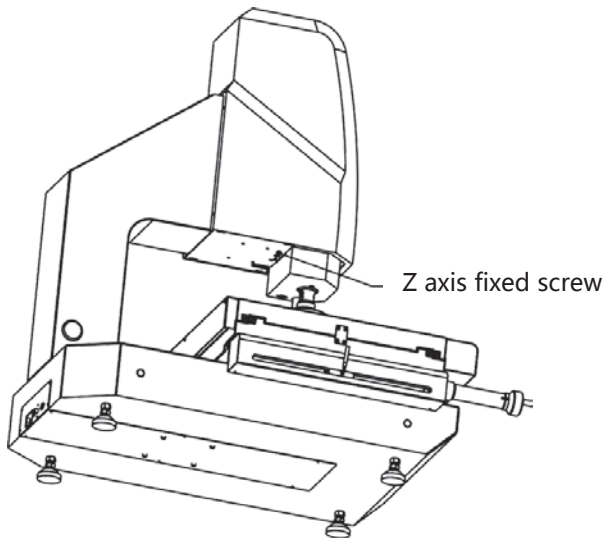## 3.2 Operating Principle

Fig 2 Operation Principle

Optical vision measurement is one of the high precision measuring method is more advanced at present, its working principle is shown in Fig 2, the measured Work piece(placed on the table 12) by LED surface (5)or contour light (table in lighting), the zoom lens (14), color CCD (1 cover) the uptake of images, even good computer by special measuring software for its target measurement, through Y to X, (longitudinal) to (horizontal movement) drives the grating (13 and 7) in X, mobile Y direction, by measuring software to complete the measurement work.

4. Open Box and Install of Instrument

✧ Remove the outside and inside package of instrument, take and read this part for installing instrument firstly.

✧ Place the instrument on a horizontal table, install the base screw and adjust it levelly.

✧ Take out the fixed ban of X, Y-axis and glide fixed screw of Z-axis (it is on the mantle), then X, Y, Z-axis can be driven.

✧ Instrument can work under power supply AC110V-220V, 50-60HZ, after connecting the computer, turn on the instrument power, if the image and data can be displayed on the monitor, the installation is finished.

✧ Read the operation manual carefully before using.

✧ Normally, the authorized distributors will install and check the instrument before the end customers using it.

As left, with six angle wrench were equipped with M4*12 XY removing the screws fixed table board is PCS, the XY workbench can lift the restriction of XY mobile operating table.

XY mobile operating table

As left, remove the Z axis fixed screw M4*10,4pcs with cross screwdriver, remove the Z axis fixed axis motion constraints, Z operation can be carried out.

Z axis fixed screw

5. Method of Measurement

Vision measurement can be roughly divided into three ways: profile measurement, surface measurement, Z axis measurement

5.1 Profile Measurement :

As the name suggests is the measurement of the workpiece contour, generally use the profile light at the bottom, can be applied on the surface of the light auxiliary lighting, let the measured line more clearly, is conducive to the measurement.

5.2 Surface Measurement :

The surface measurement is the main function of vision measurement, that can see the surface on the surface of circular size, light source, vision measuring instrument can measure almost, for example, the line size of copper foil on the circuit board, IC circuit. When the measured object is black plastic, rubber, vision measuring instrument can easily measure its size.

5.3 Z axis Measurement :

When equipped with high magnification objective, there is enough aiming and positioning accuracy, the vision measuring instrument can be used as Z axis measurement such as measuring the height of the steps of the workpiece, dark hole depth, the use of surface light measurement.

6. Equipment Care and Maintenance

Vision measuring system is a precision instrument that integrating the optic, mechanism, electricity and computer technology. In order to keep the excellent performance, it needs regular and upstanding maintenance.

✧ The instrument should be installed in a clean room, the temperature of which should be maintained at 20°± 5℃. The relative humidity of the room should not exceed 60％ so as to prevent the molding of optical parts, the rust of metallic parts and the dust drops on the drive guider to keep the high quality.

✧ Once the instrument has been finished using, the surface of work-stage should be cleaned with soft brushes and covered by dust cover.

✧ The drive and movement system should be regularly appended the lube to make the mechanism movement smooth and keep good using condition.

✧ If it is dirty on the glass-stage and paint-surface, it can be cleaned by neutral freshener or clean water, please don't use organic solvent to brush, or else, the paint-surface will lose the reflet.

✧ LED lamp-house has long longevity; please inform the distributor and professional engineers to replace it if it is bad.

✧ The precision parts of instrument, such as video system, work-stage, linear scale and Z-axis drive system have been precision adjusted in the factory, adjust screws and fixation screws are riveted in the factory, don't unbendingly take it out. If there are some problems, please get in touch with the distributor for after sales.

✧ The error compensation of measuring software has been enacted; please don't change it, or else, it will give rise t to inaccurate measuring results.

✧ Don't unbendingly take out the electric connectors, if it has already been took, please plug it into the right port, or else, there is possibility to make the instrument bad.

7. Failure analysis and solve the problem

※ **Failure 1:** Software is not open, no response.
   Solution: Confirm the encryption lock has been inserted, canceled or restart the computer, such as multiple times can not open, the encryption lock for a USB interface.

※ **Failure 2:** Software can not count.

※ **Solution:** Check the RS232 interface line, see whether it is loose, the device manager in the COM1 whether 1, the computer's COM1 whether damaged.

※ **Failure 3:** Not accurate for drawing, large measuring error.
   Solution: Check the software calibration whether accurate or not.
   The following is the attention of the instrument switch machine!

⚠ Boot Notes

First, we turn on the vision instrument and the host power switch, and then start the computer, after the start of the software icon on the desktop, run software, adjust the lights, the focal length to the most clear; can be measured.
In the measurement should pay attention to the following points.
1、Focal length adjustment.
2、Calibration scale.
3、Software window can only open one.

⚠ Shutdown Notes

In the shutdown should pay attention to the following points:
1、Turn off the software first.
2、The upper and lower left button to adjust light off.
3、Turn off the computer.
4、Turn off battery main last.

⚠ After Service Note:

All customers to purchase our vision measuring instrument could enjoy the following services:
1、Free operation training.
2、The same version of the software within a year of free upgrades.
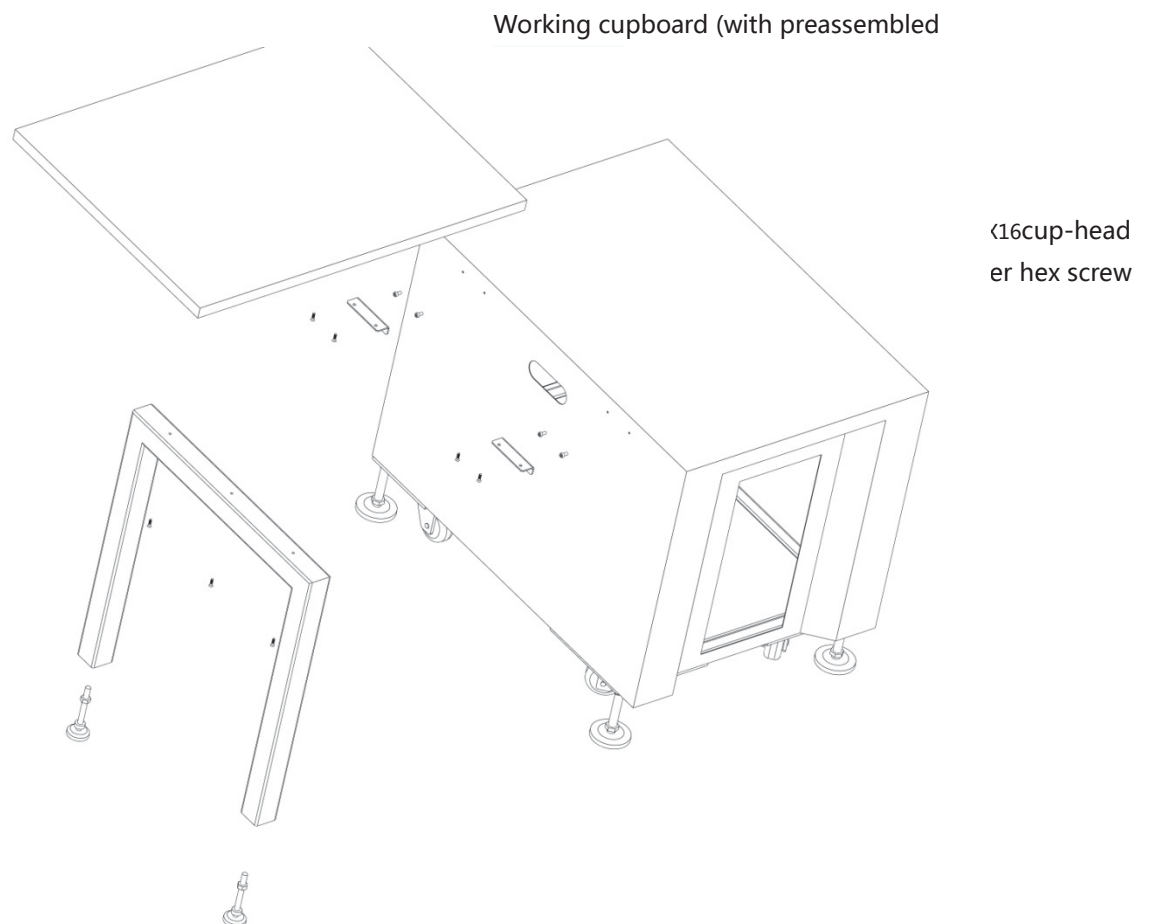3、Free warranty one year.
4、Maintain lifelong.

8.Installation Instructions of Working Cupboard

8.1 Configuration

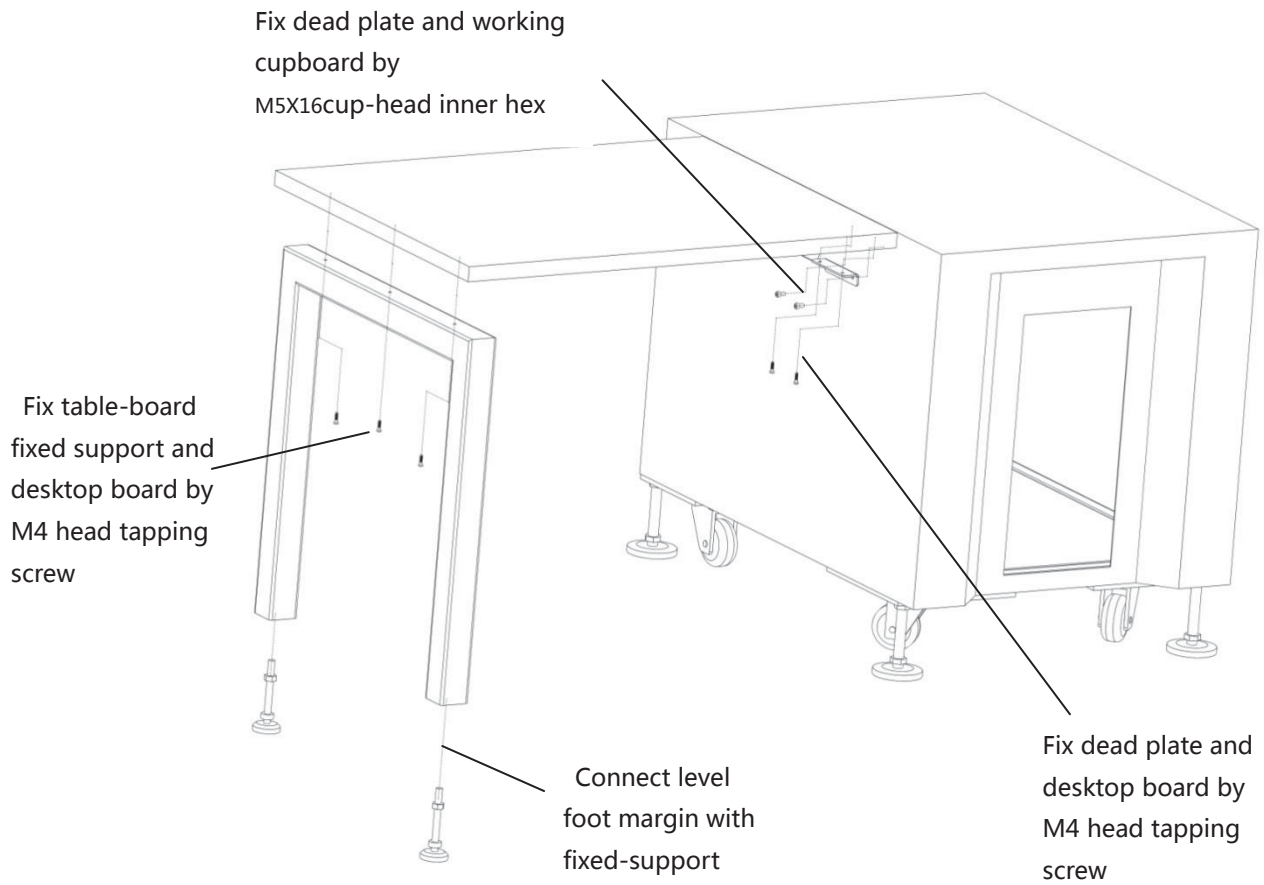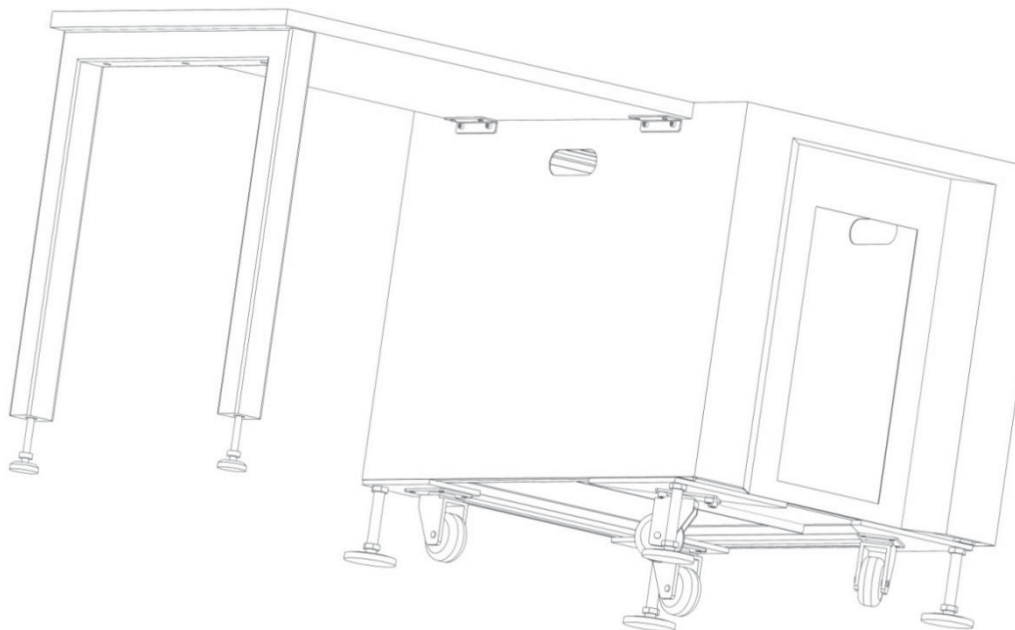| Items	Specification	Quantity
Level foot margin	M10X150	2
Level foot margin	M16X150 (preassembled)	4
Rigid caster	3cun (preassembled)	2
Swivel caster	3cun (preassembled)	2
Working cupboard	848X592X706 black stoving varnish	1
dead plate	100X30X20 black stoving varnish	2
Table-board fixed support	580X50X600 black stoving varnish	1
Desktop board	800X600X25 chipboard, surface coating timber grain	1
Cup-head inner hex screw	M5X16 finishing with black zinc	4
Cross countersunk head tapping screw	M4X20 galvanize	7

Remark: (1cun=1/3 decimetre)

8.2 Parts Diagram

Working cupboard (with preassembled

<16cup-head er hex screw

8.3 Installation Instructions Diagram

Fix dead plate and working
cupboard by
M5X16cup-head inner hex

Fix table-board
fixed support and
desktop board by
M4 head tapping
screw

Fix dead plate and
desktop board by
M4 head tapping
screw

Connect level
foot margin with
fixed-support

8.4 Product Diagram

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Authorized Distributors: