

O.D/I.D. GAUGING UNITS

ZHD USER MANUAL

ZhongYuan JingMi CO.,LTD

DANGER

Hazardous voltage can cause injury or death.

- Do not take out covers except when servicing or checking is required.
- Turn off the power switch of this system and disconnect the power supply cable before taking out covers. (For products having the relay contact output circuits, disconnect the input/output signal connectors, too.)
- Turn off the power switch before changing the fuse.

WARNINGS

Hydraulic cylinder, when used, driving gage head forward (downward) or backward (upward) can cause injury.

- Make sure the machine using this system is not operating before touching the hydraulic cylinder.

Driven contacts of gage head can cause injury.

- Make sure the machine using this system is not operating before touching the gage head contacts.

CAUTIONS

Be sure NOT to operate this system when the gaging unit and/or control unit are in failure (such as when the READY signal has gone off).

Heavy load or strong force can deform the covers of control unit.

- Do not stand or step on the cover of control unit.

Operation without connecting grounding wires can cause malfunction of the system or electrical shock.

- Make sure to connect every grounding wire of the power supply unit and the other units to ground.

Preface

This instrument has developed by our experienced engineers with their every possible effort and technical cream in ceaseless pursuit of accuracy, and carefully manufactured by our skilled technicians with the most recent production equipment. It has passed very strict tests and verified excellent performance, ensuring its reliable operation at your site,

However, this kind of instrument of high accuracy demands correct handling and maintenance for continuing utilization of its entire functions under the best condition.

This document describes the points on correct and safety handling that the persons daily using this instrument must well know. We hope that this document can help you for the good use of this instrument.

Precautions

- 1) The gaging units under this Guide can form various gaging systems with our control units depending on applications.
For detail of a specific system configuration, see the separate Operation Manual of the system. (For a rather simple system configuration, its system Operation Manual may not be provided.)
- 2) Greatest care must be taken that an excessive shock or falling-down by mistake may result in malfunction of gage heads.
- 3) Gage head cables must be run without any possibility of compression or damage due to metal chips or moving items.
Fix the cable end of gage head side to protect it from friction and extension by the gage head movement.
- 4) Run each gage head cable apart from power cables of the other equipment more than 200mm, and use a separate duct.
- 5) Do not open covers of gage heads.
Do not turn or loosen clamp screws, adjusting screws or other screws without purposes.

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1. INTRODUCTION

1.1 General

The ZYJM Machine Control Gaging Systems measure workpieces in the machining process (in-process) or after the machining process (post-process) and generate signals to control machining equipment. The Gaging Systems can afford various advantages such as improvement of dimensional and profile accuracy, prevention of defective machining, reduction of skill-dependent works, automation and laborsaving, and enhancement of productivity.

The Size Sift type ZHD has a unique fulcrum design together with a special LVDT suitable to the gage head of the machine control gaging system. ZHD is made up as an integration of our engineering skills to meet the present needs of many users and to represent our concept on the tomorrow's machine control gage.

1.2 Features

[Automatic zero-setting (size shifting) in the range of 20mm for Longer Displacement type ZHD and in the range of 7mm for 80000 Series ZHD.

In the 20mm size change with Longer Displacement type ZHD and in 7mm change with 80000 Series ZHD (at the finger length 82mm), the gaging setup can be carried out fully automatically with the zero-setting by the external signal.

For an actual work size range over 20mm (7mm), once the contacts are adjusted or the attachment is replaced for the extension, the same range of 20mm (7mm) is applied to the new arrangement.

[Applicable to high-precision work pieces]

Having no slides or friction parts. it works excellently for high-precision workpieces.

[High durability and rigidity]

The unique L-shaped spring fulcrum ensure the gage head as a high-precision measuring instruments and also provides it with high durability and rigidity required for on-line gage.

[Easy maintenance]

The modular construction of precision components makes the maintenance very easy.

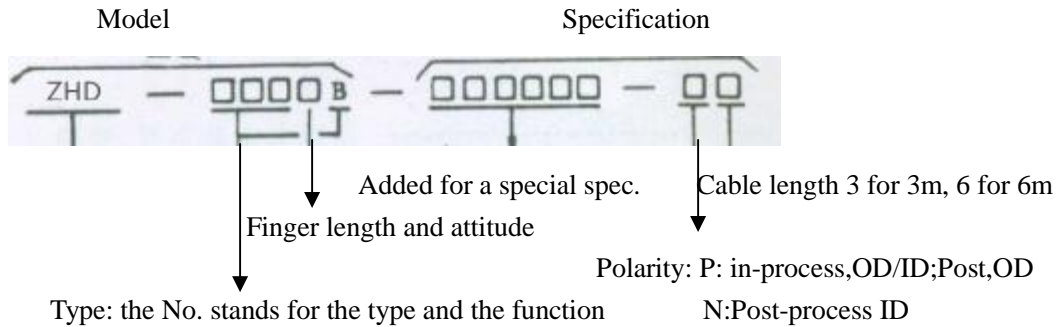
[High reliability]

The enhanced fulcrum stiffness and lighter movable parts ensure high reliable dynamic characteristics.

[Easy tool setting]

The exchangeable fingers permit rearrangement of contacts of right-hand of left-hand measuring position, and the gage body may be fixed in various attitudes, thus making the tool setting very convenient.

1.3 Models/Specifications



NO.	1	2	3	4
Finger length(mm)	42	82	42	82
Attitude	<p>on a vertical plane</p>		<p>on a horizontal plane</p>	

OD

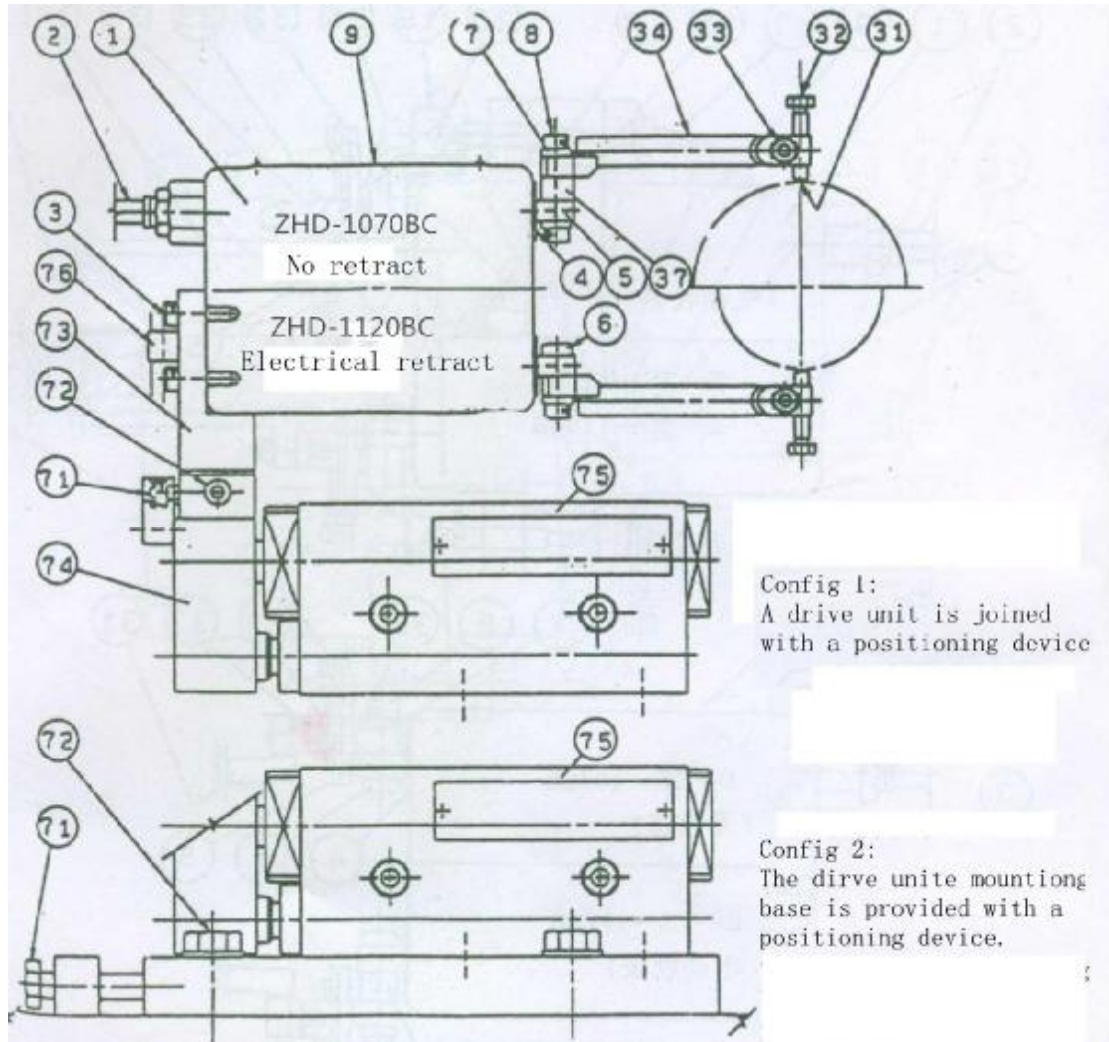
Model	Name	Output	Work		Retract			Application
			Continues	Interrupted	No	Elec	Air	
ZHD-1070BC		S	✓		✓			Cylinder OD/ outer width
ZHD-1020BC		D	✓			✓		Cylinder OD/ outer width
ZHD-1060BC		D	✓				✓	Cylinder OD/ outer width
ZHD-1190BC		D		✓			✓	Spline cylinder OD/outer width

ID

Model	Name	Output	Work		Retract			Application
			Continues	Interrupted	No	Elec	Air	
ZHD-1140BC		D	✓			✓		Cylinder ID/ Inner width
ZHD-1180BC		D	✓				✓	Cylinder ID/ Inner width
ZHD-1200BC		D		✓			✓	Spline ID

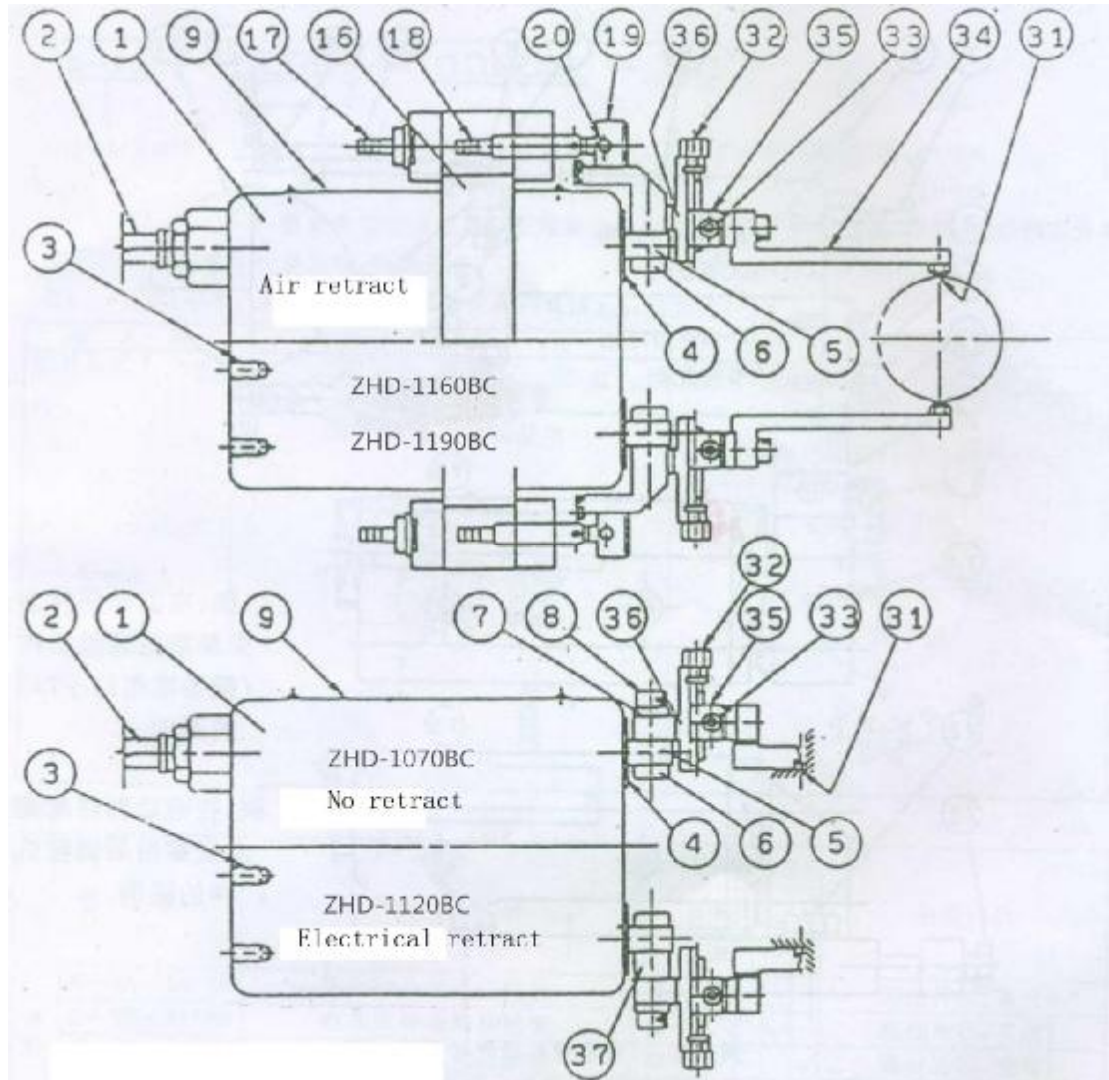
2. DESCRIPTION OF COMPONENTS

2.1 O.D. Gage Head (I)



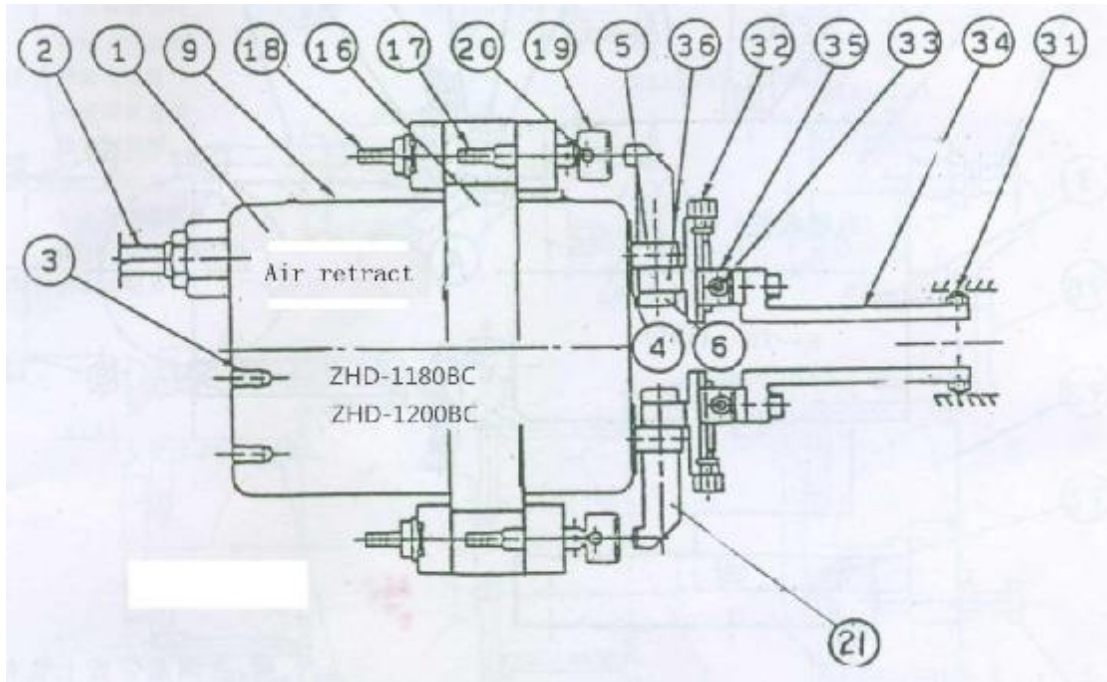
- | | | |
|-------------------------|----------------------------|-----------------------|
| 1. Gage head body | 31. Contact | 71. Positioning screw |
| 2. Cable | 32. Height adjusting screw | 72. Clamp screw |
| 3. Mounting screw | 33. Clamp screw | 73. Gage holder |
| 4. Boot | 34. Finger | 74. Support block |
| 5. Lever | 37. Extension rod | 75. Drive unit |
| 6. Stud | | 76. Cable clamp |
| 7. Washer | | |
| 8. Finger mounting bolt | | |
| 9. Name plate | | |

2.2 O.D. Gage Head (II)



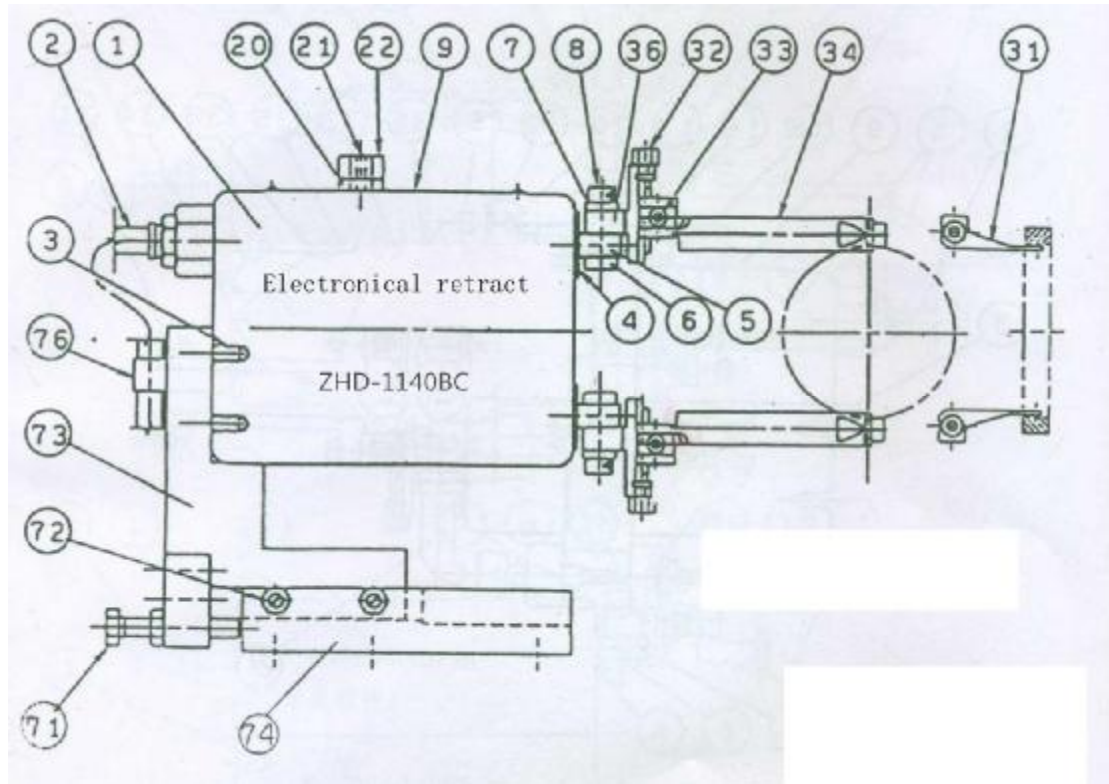
- | | | |
|-------------------------|------------------------|----------------------------|
| 1. Gage head body | 16. Air retract unit | 31. Contact |
| 2. Cable | 17. Air intake nipple | 32. Height adjusting screw |
| 3. Mounting screw | 18. Air exhaust nipple | 33. Clamp screw |
| 4. Boot | 19. Plunger head | 34. Finger |
| 5. Lever | 20. Lock screw | 35. Finger holder |
| 6. Stud | | 36. Slide block |
| 7. Washer | | 37. Extension rod |
| 8. Finger mounting bolt | | |
| 9. Name plate | | |

2.3 I.D. Gage Head (I)



- | | | |
|-------------------------|------------------------|----------------------------|
| 1. Gage head body | 16. Air retract unit | 31. Contact |
| 2. Cable | 17. Air intake nipple | 32. Height adjusting screw |
| 3. Mounting screw | 18. Air exhaust nipple | 33. Clamp screw |
| 4. Boot | 19. Plunger head | 34. Finger |
| 5. Lever | 20. Lock screw | 35. Finger holder |
| 6. Stud | | 36. Slide block |
| 7. Washer | | 37. Extension rod |
| 8. Finger mounting bolt | | |
| 9. Name plate | | |

2.4 I.D. Gage Head (II)

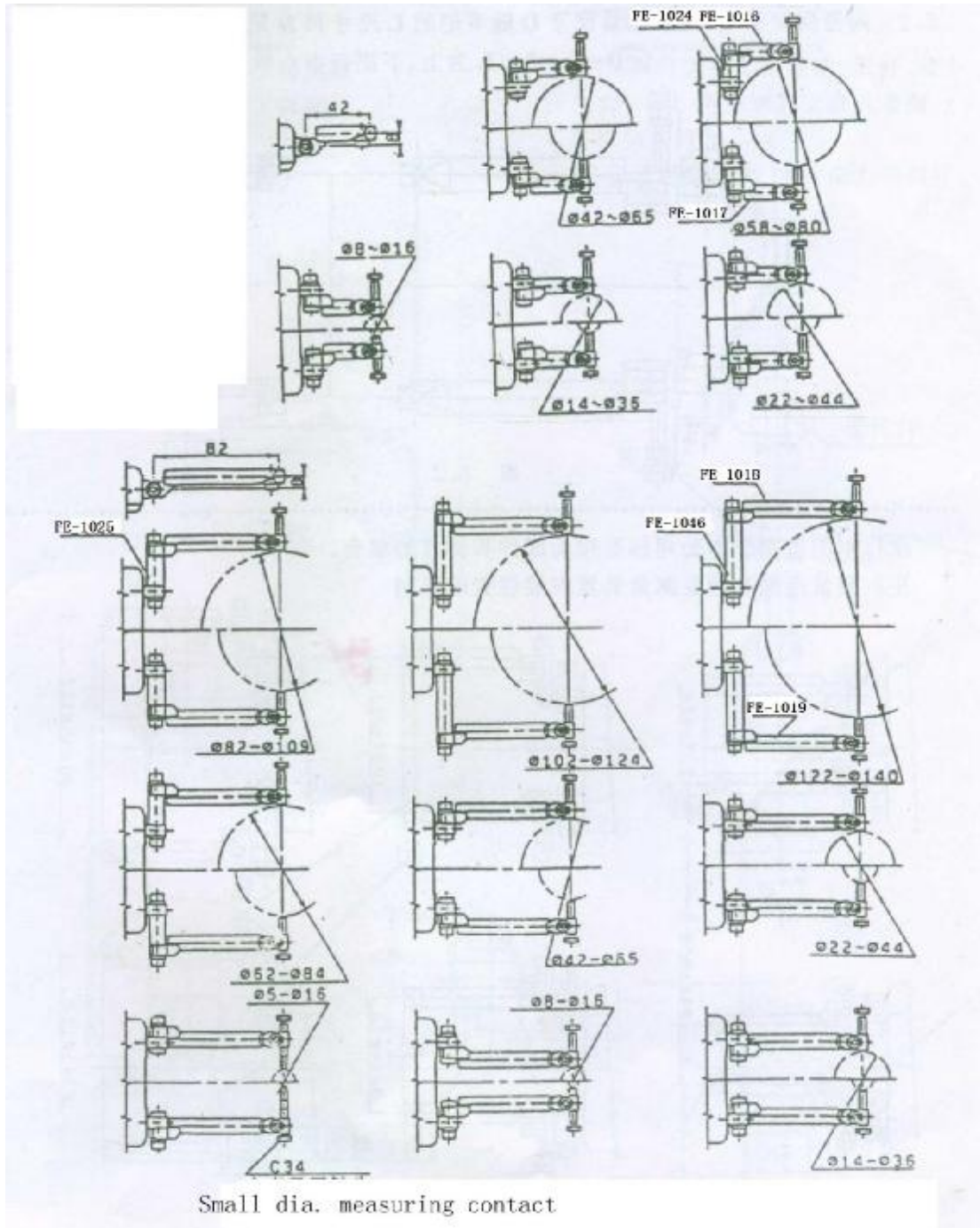


Note: There are adjusting examples on the gage equipment, all the adjusting parts are from 71~74.

- | | | | |
|-------------------------|---------------------|----------------------------|-----------------------|
| 1. Gage head body | 20. Lock nut | 31. Contact | 71. Positioning screw |
| 2. Cable | 21. Adjusting screw | 32. Height adjusting screw | 72. Clamp screw |
| 3. Mounting screw | 22. Cover | 33. Clamp screw | 73. Gage holder |
| 4. Boot | | 34. Finger | 76. Cable clamp |
| 5. Lever | | 36. Slide block | |
| 6. Stud | | | |
| 7. Washer | | | |
| 8. Finger mounting bolt | | | |
| 9. Name plate | | | |

3. MEASURING RANGE

3.1 O.D. Gage Head



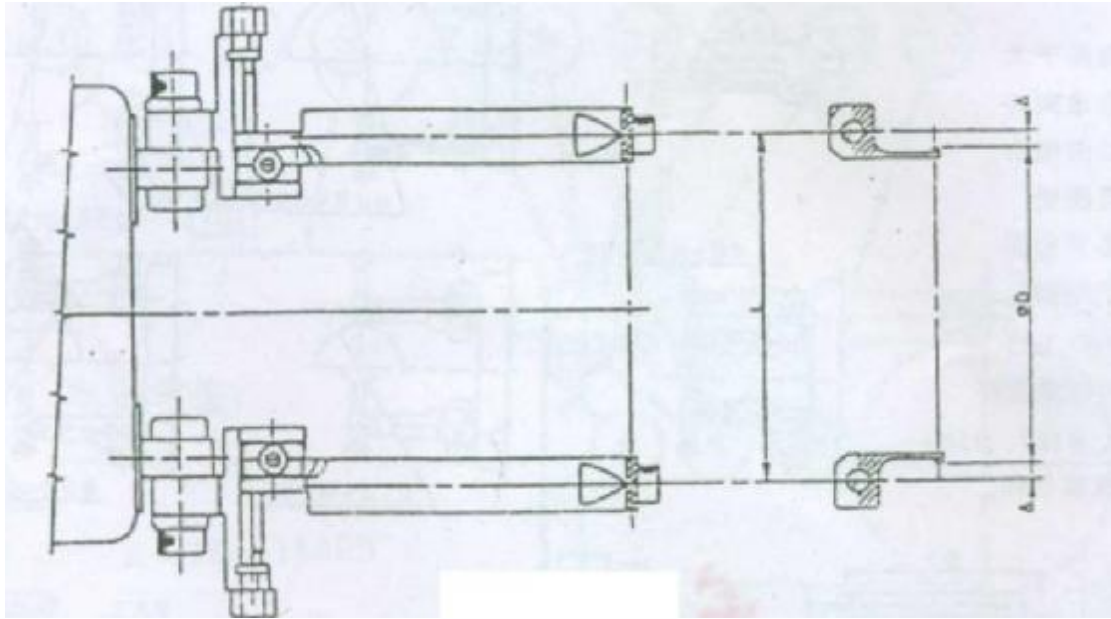
Notes:

- 1) The measuring ranges shown above apply to combinations of ZYJM standard fingers/contacts only.
- 2) Measuring ranges may be restricted by the tool setting.
- 3) FE-1018 and FE-1019 are the basic gage fingers, FE-1024, FE-1025 and FE-1046 are the basic extension rods.

3.2 I.D. Range

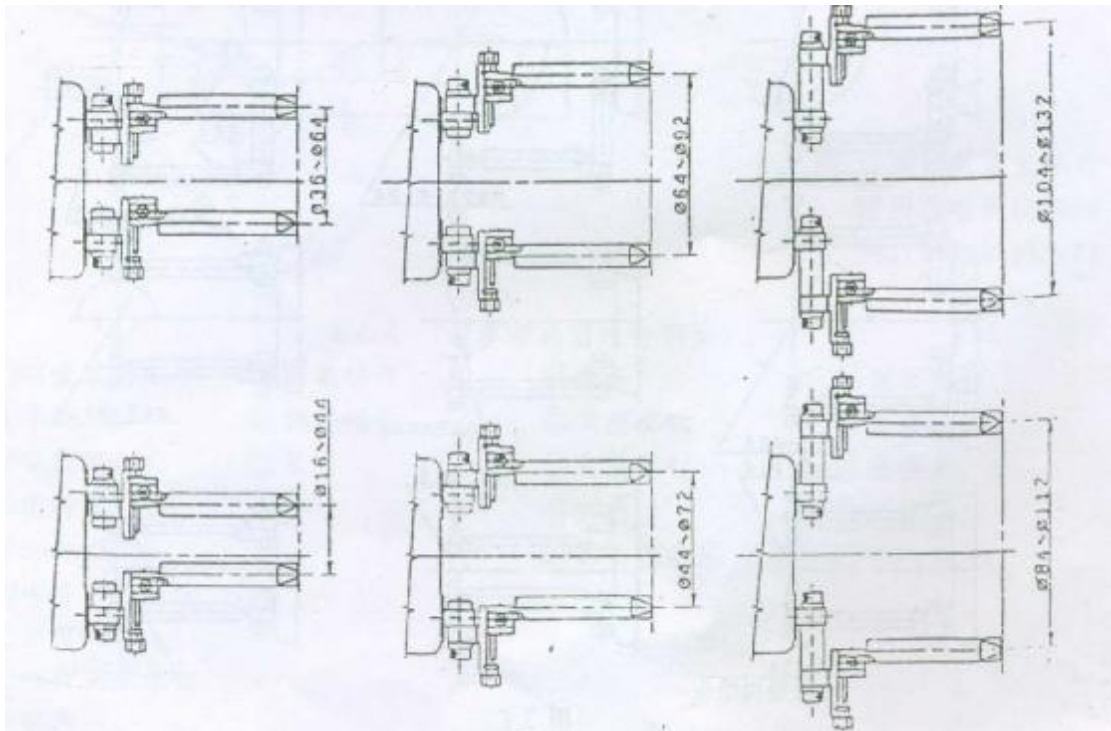
The measuring dimension ϕD is determined by the distance L and the dimension A of contact as shown below.

$$\phi D = L - 2A \quad (L = \text{distance between the M4 contact setscrews})$$



NOTE:

- 1) The measuring ranges shown below apply to combinations of the ZYJM standard fingers/contacts only.
- 2) Measuring range may be restricted by the tool setting position.



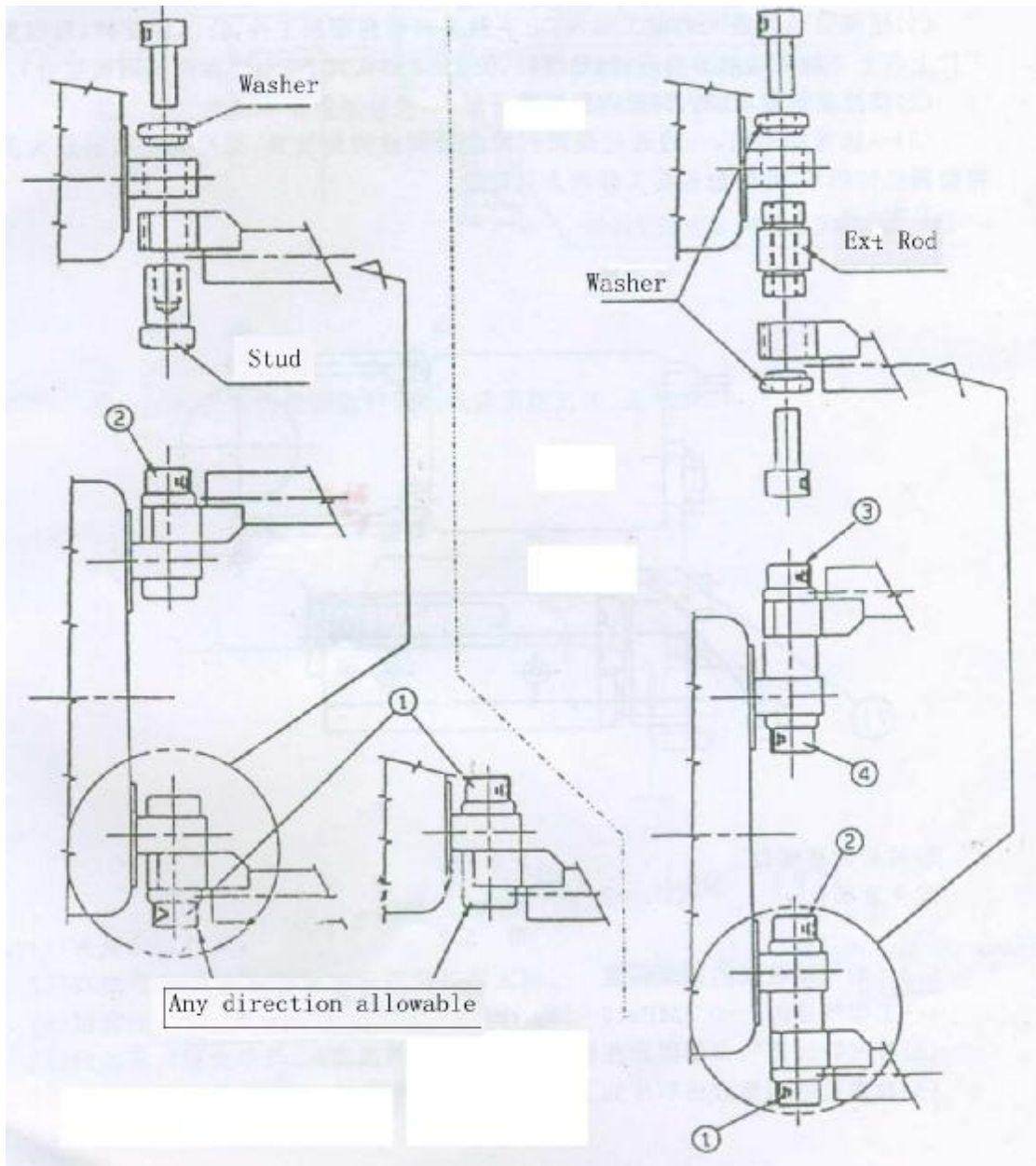
4. FINGER/EXT. ROD ARRANGEMENT

Without Extension Rod

- 1) Attach the lower finger with the bolt ①
- 2) Attach the upper finger with the bolt ②

Inserting Extension Rod

- 1) Attach the lower finger to the Ext.rod by the bolt ①
- 2) Fix the lower finger Accy to the gage body by the bolt ②
- 3) Attach the lower finger to the Ext.rod by the bolt ③
- 4) Fix the lower finger Accy to the gage body by the bolt④



5. PREPARATION FOR OPERATION

Check the following points just after setup of a gage head to a machine or replacement of a finger or contact. Ignorance of the points may result in the damage to the gage head or incorrect measurement.

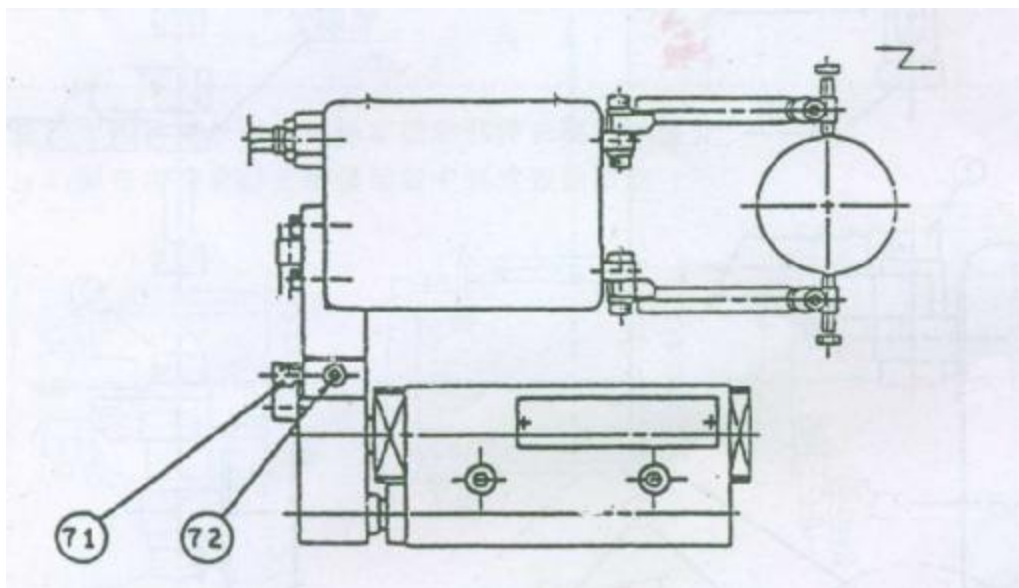
5.1 Checking clearance of contacts with work

Make sure that the contacts do not hit the work (or master) or other possible obstacles when the gage head is moved forward to the gaging position or the work (or master) is inserted in between the contacts.

5.2 Alignment of contacts with work

For circular work, align the contact position with the center of the work in the following steps:

- (1) Check the lateral displacement between the contacts (e.g. the upper contact to the right and lower contact to the left, or reverse) with the contact's scratch on the work in a trial gaging or with a square gage.
- (2) Adjust the "G1" contact for the measured value to become zero.
- (3) Observing the value on the display, adjust the gage head position in reference to the work center until the value become maximum; then fix the gage head position with clamp screw(s).

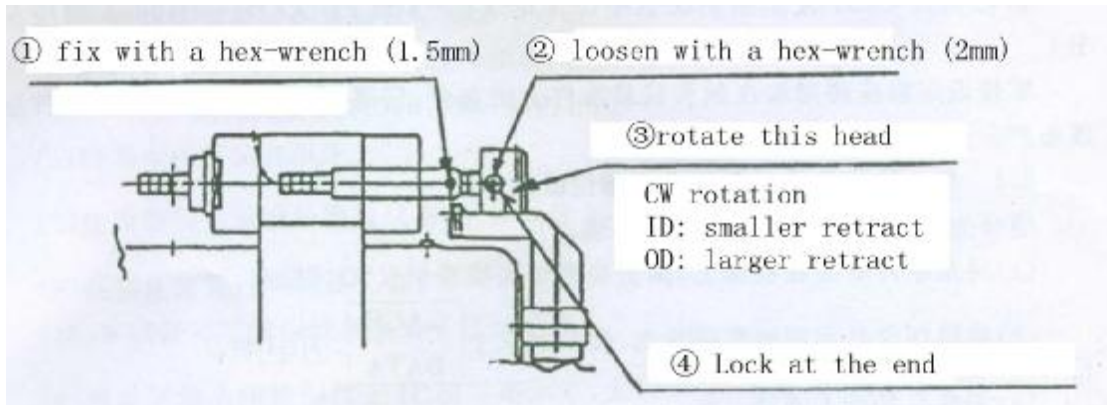


71 Positioning screw

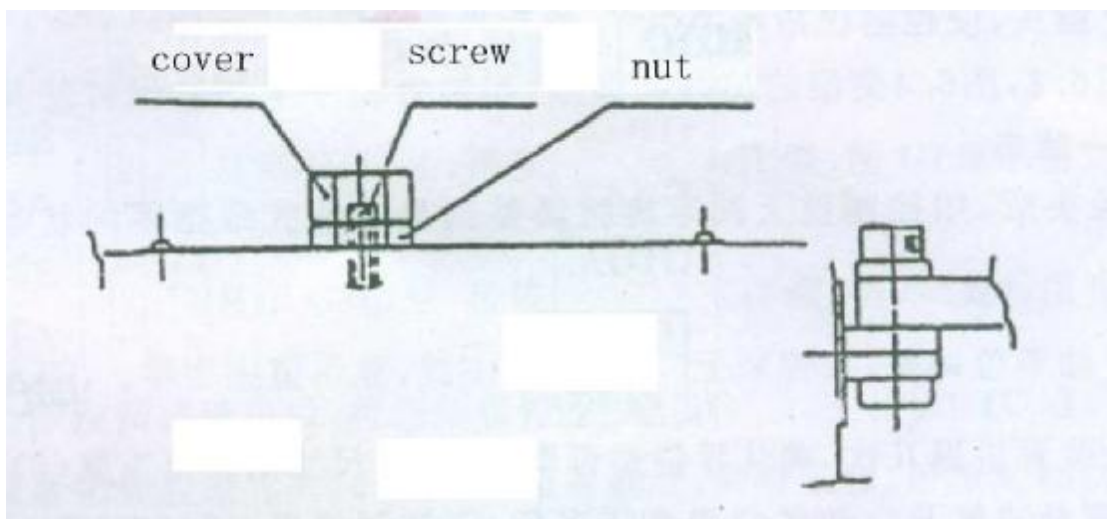
72 Clamp screw

5.3 Arrangement for the air-retract mechanism

- (1) Operating air pressure: 0.3~0.5 MPa
- (2) Fix the end of the exhaust tube to a place free from the coolant.
- (3) Adjust the amount of retract as shown below:



5.4 Arrangement for the Electronically-retract mechanism



- (1) Left-handed retain to open the top-cover
- (2) Loose the screw a little
- (3) Use a screwdriver to set the screw, right-handed to turn the screw will reduce the retract value.
- (4) When finished the arrangement setting, turn right to the lock the nut.
- (5) Confirm the retract value, if it is qualified, tight the cover.

6. AUTO-ZERO SETTING



Notes:

Before setting the zero position, dust, chips, etc. attached to the contacts and reference components should be removed, and worn reference components should be replaced with new ones.




6.1 Master setting for single signal output

The method for setting the zero position of the measurement device for a single output signal (ZHD-1070BC \ 1090BC \ 1080BC)

Taking ZHD-1070BC (Outer Diameter Continuous Measurement Device) as an example (the control instrument is ZX410, follow the instructions below for the zero position setting process):

Enter the startup interface and press the  or  keys below the interface to set the displayed value after compensation to 0. Install the reference component on the machine tool and connect the measuring device wire to the control instrument socket.





Adjust the upper and lower measuring elements to leave the measuring surface. Click the  button, and the system will enter the adjustment window. The interface will display G1, record the displayed value, adjust the sensor's lower sensor to make the displayed value about half of the initial value, lock the lower sensor, and then continue to adjust the sensor's upper sensor to make the displayed value around 0 (within ± 30), and lock the upper sensor. At this point, press the  button, the displayed value will change to 0, the compensation value of the measuring head will enter the reset value, and the adjustment will end. Press the  button to enter the measurement interface.




6.2 Master setting for dual signals output

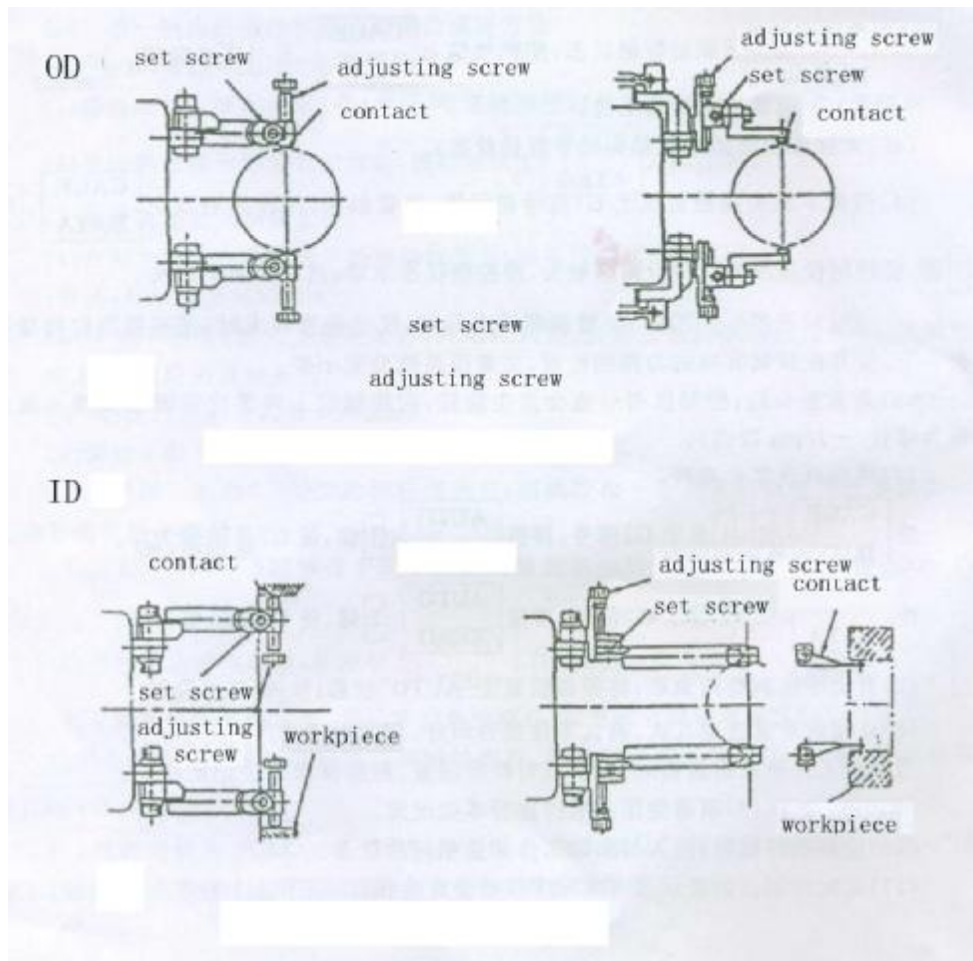
The method for setting the zero position of the measurement device for dual output signals (ZHD-1140BC, ZHD-1180BC, ZHD-1200BC, ZHD-1110BC, ZHD-1190BC, ZHD-1290BC, ZHD-1120BC, ZHD-1160BC)

The controller is ZX420, follow the instructions below for the zero setting process:

Enter the startup interface and press the or keys below the interface to set the displayed value after compensation to 0.

Adjust the upper and lower measuring elements to leave the measuring surface. Click the  button, and the system will enter the adjustment window. The interface will display G1, record the displayed value, adjust the sensor's lower sensor to make the displayed value around 0 (within ± 30), and lock the lower sensor. At this point, press the  button, the displayed value will change to 0, the compensation value of the probe will enter the reset value, and the adjustment of the lower probe will end.

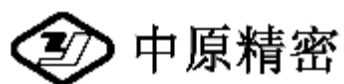
Press the  button to display G2, record the size of the displayed value, adjust the sensor's upper sensor to make the displayed value around 0 (within ± 30), and lock the upper sensor. At this point, press the  button, the displayed value will change to 0, the compensation value of the measuring head will enter the reset value, and the adjustment will end. Press the  button twice to enter the measurement interface.



7. Warranty Description:

1. This product warranty service is only valid under normal use.
2. Non product quality issues and malfunctions caused by abnormal use are not covered by warranty. For example, malfunctions caused by the following circumstances, including but not limited to, are not covered by warranty:
 - (1) The device is unable to measure deformation, bending, etc. due to external impact;
 - (2) Unauthorized disassembly of the device by the user may result in loose components, oil leakage, or liquid ingress;
 - (3) Malfunctions caused by failure to use as required and the device operating beyond its normal range of application.
- (2) Unauthorized disassembly of the device by the user may result in loose components, oil leakage, or liquid ingress;
- (3) Malfunctions caused by failure to use as required and the device operating beyond its normal range of application.

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