

# **Balancer For Grinding Wheels Of Grinding Machines**

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## **Zplus B USER MANUAL**

**Sanmenxia ZhongyuanJingmi Co.,Ltd**

## Preface

This manual introduces the functions, operation, and installation information of the existing models of the system, so as to facilitate the customer's technical and maintenance personnel to better understand the system.

The Zplus B grinding wheel balancing system provides an efficient and reliable method to solve the imbalance of grinding wheels for the practical application of grinding machines, thereby improving the production efficiency and quality of products.

The Zplus B grinding wheel balancing system consists of a vibration sensor, a balancing head, and a control electric box. During operation, the vibration signal of the grinding machine is measured by a vibration sensor installed inside the grinding head and close to the bearing, and the vibration signal is converted into an electrical signal, which is then transmitted to the control electric box. The analog circuit of the control electric box filters and samples the electrical signals, and then compares, analyzes, and processes the collected signals through an internal control program. The operation instructions are output to the balancing head section, which performs compensation for the imbalance of the grinding wheel, ultimately placing the grinding wheel in a balanced state that can ensure product quality requirements.

In the actual working process, the balancing system timely and effectively handles new excessive vibration caused by changes in the size of the grinding wheel during the processing process through online real-time measurement of the grinding wheel system of the grinding machine, to ensure that the vibration of the grinding wheel is within a limited range. This ensures stable product quality and avoids the reduction in production efficiency caused by frequent disassembly and balancing of grinding wheels.

**To ensure your safe use of this instrument, please observe the following items.**

**[Hazardous matter]**

1. There is electricity inside the instrument. Touching it may cause death and personal injury!
2. Do not remove the housing except for maintenance and inspection by professional maintenance personnel!
3. Before removing the housing, you must cut off the power supply and unplug the power plug!

**[Matters needing attention]**

1. The vibration sensor is a vibration sensitive component that should be handled with care to avoid damage to the sensor due to severe vibration caused by external causes such as bumps! When installing a sensor, first allow a small portion of the magnetic base to contact the mounting surface, and then slowly straighten the magnetic base to a vertical position. It is prohibited to install the parallel contact surface of the magnetic base on the installation surface as a whole! Shock can damage the sensor.
2. The balancing head is a sealed component to prevent debris such as coolant from entering. Non professional personnel are not allowed to open or disassemble the balancing head at will!
3. The balancing head is a heavy component, and care should be taken during installation and disassembly to prevent it from falling and damaging!
4. The operating temperature of the balancing head must not exceed 55 °C (130

°F)!

5. It is prohibited to store heavy objects on the housing of the electric box, and it is prohibited to sit or step on the electric box!

6. The power supply and grounding wires of all components must be grounded for safety reasons!

### **[About Carrying Abroad]**

Please inform our company in advance when taking this instrument out of the country due to various local regulations.

We are not responsible for any accidents that occur in the event of being carried abroad without declaration.

### **[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 display panel was shattered due to external impact.

(2) The user opened this product without authorization, which caused moisture and liquid ingress.

(3) The user's wiring error or abnormal power connection caused this product to malfunction.

# Catalogue

## Chapter 1 Installation Dimensions

- 1、 Sensor installation size and position..... (1)
- 2、 Installation dimension of Control unit..... (2)

## Chapter 2 Control unit description

- 1、 Control unit back construction..... (3)
- 2、 I/O Interface Description ..... (4)
  - (1) Electrical Connection Diagram..... (4)
  - (2) I/O Wiring Table ..... (5)
  - (3) I/O Function Description ..... (6)
- 3、 Display interface ..... (8)
- 4、 Parameter Setting ..... (14)

## Chapter 3 Equipment Maintenance..... (16)

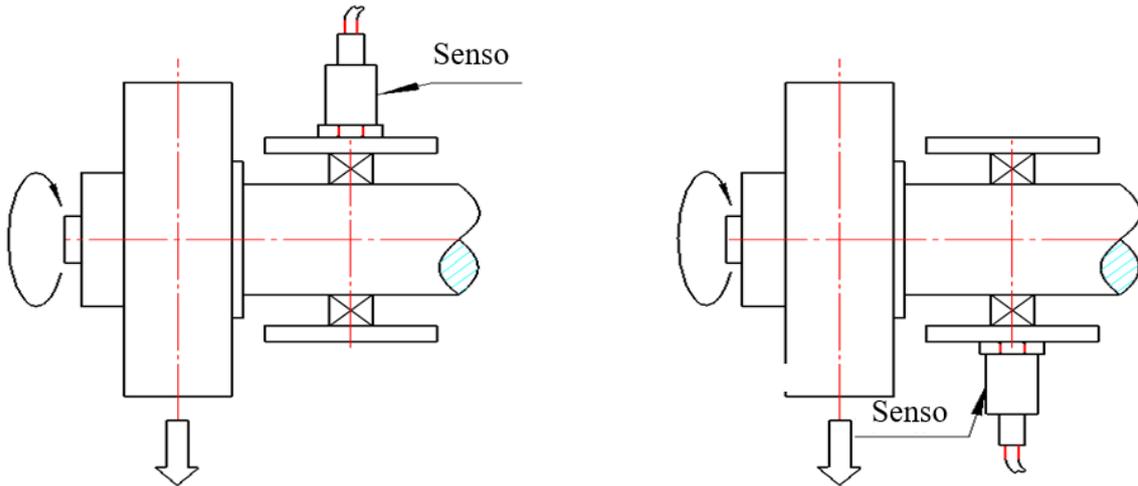
## Chapter 4 Appendices

- 1、 Balance head sensor..... (17)
- 2、 Installation instructions for balancing head..... (18)

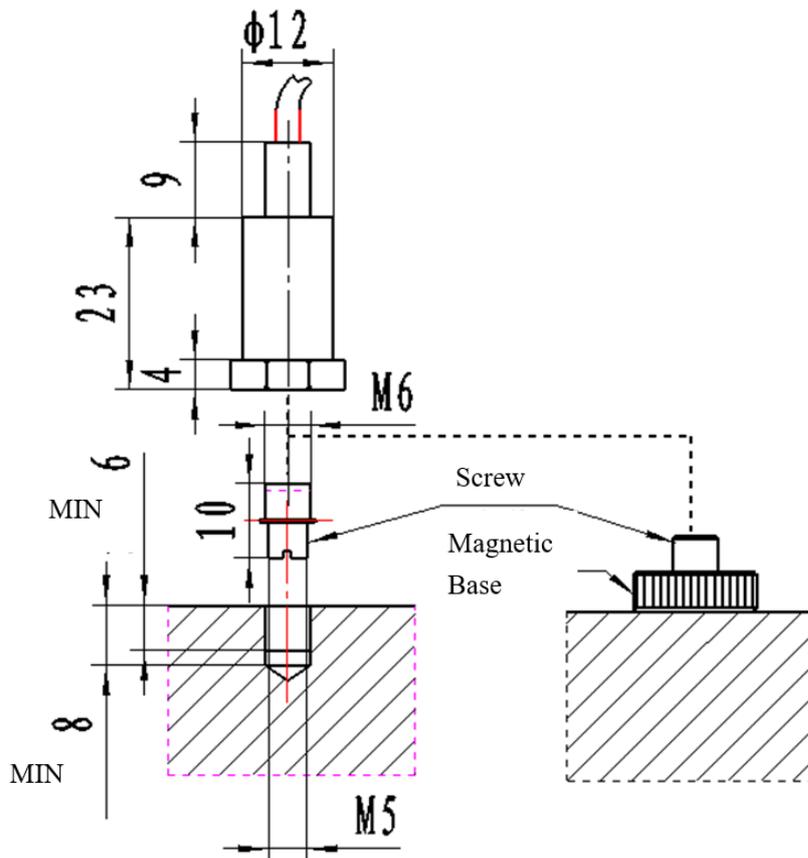
# Chapter 1 Installation Dimensions

## 1、Sensor installation size, location, and method (unit: mm)

The sensor should be installed on the grinding head close to the internal bearing and consistent with the feed direction of the grinding head.



There are two ways to install sensors:



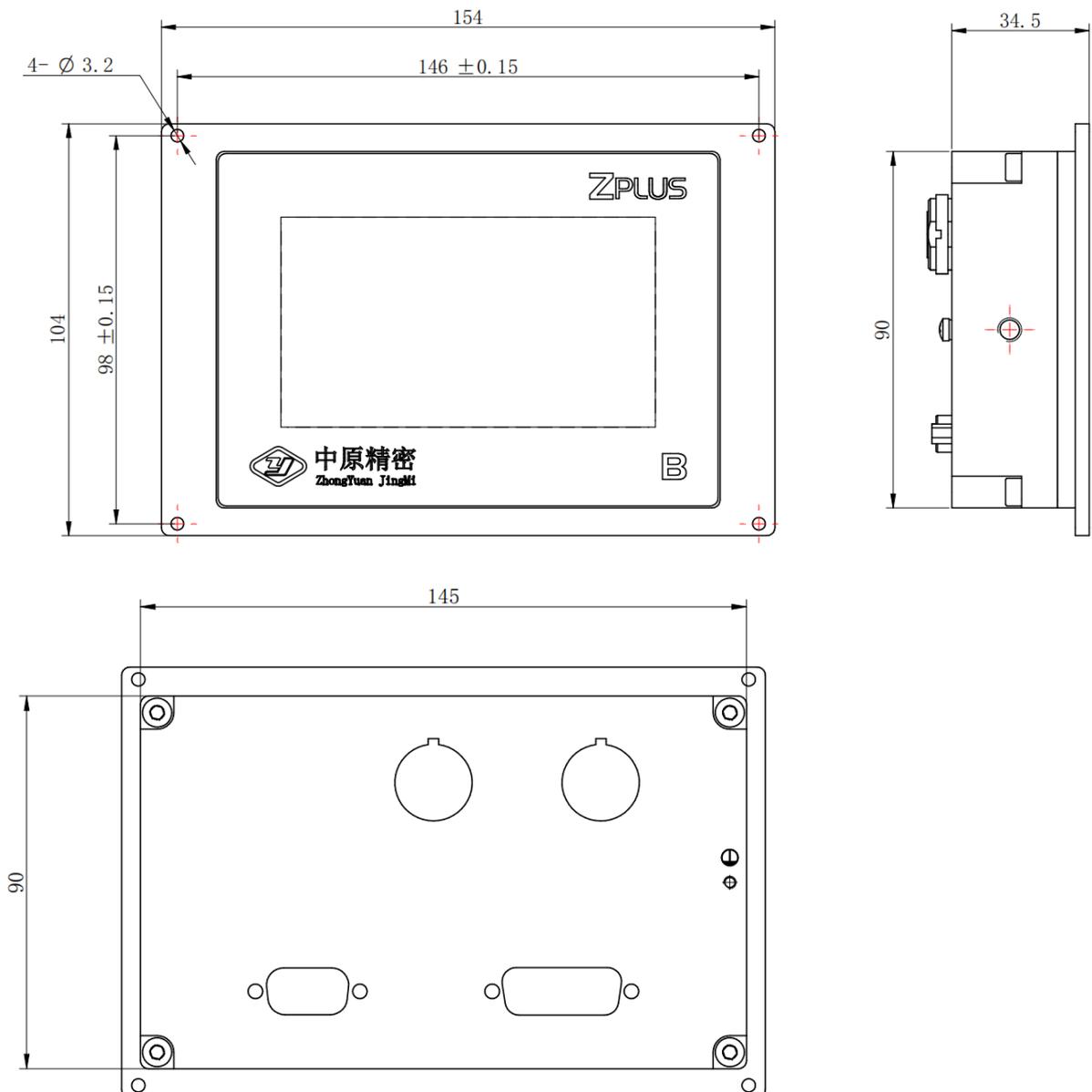
A. Direct type

The sensor head has an M6 screw protruding 5 mm from the sensor. When installing, drill a certain depth of M6 threaded holes at a suitable position on the grinder, and then fix the sensor.

B. Magnetic base type

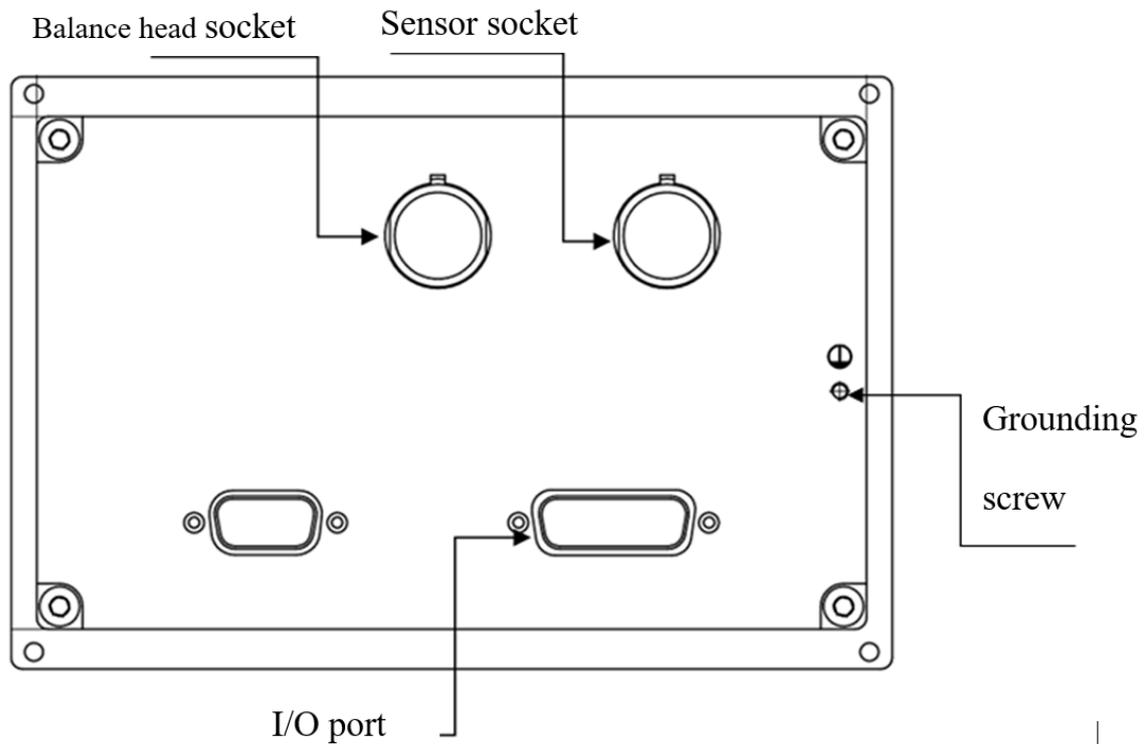
Select a suitable sensor installation location on the grinder, remove debris from that location, and then place the magnetic base on it. Remove the M6 screw from the sensor and install the sensor directly on the magnetic base.

2、Installation dimension of control unit (unit: mm)



## Chapter 2 Control Unit Description

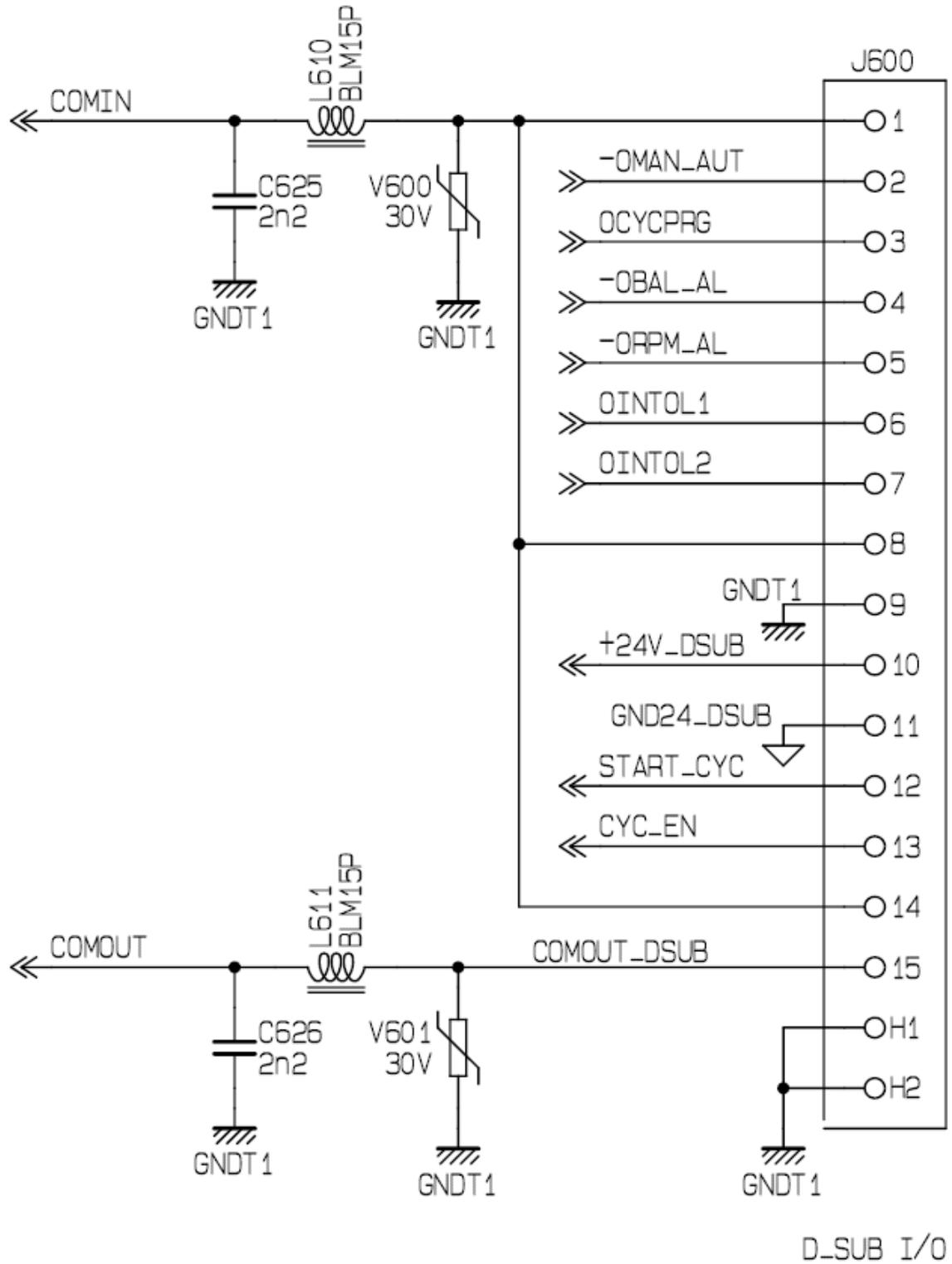
### 1、 Control unit back construction



- (1) Balance head socket: 6-core circular connector connected to the balance head.
- (2) Sensor socket: 5-core circular connector connected to vibration sensor.
- (3) I/O port: 15-core flat connection socket (needle) connected to 15-core I/O output line.
- (4) Grounding screw: connected to the ground wire of the machine tool.

## 2. I/O Interface Description

### (1) Electrical connection diagram



(2) I/O wiring table

Pin number	Line Color	Signal function
1	Empty	Nothing
2	Powder	OUT - Automatic/Manual
3	Pink Grey	OUT - In balance cycle
4	Yellow	OUT - Alarm
5	Yellow Brown	OUT - Rotation speed out of tolerance
6	Green	OUT-L1 signal point
7	White Yellow	OUT-L2 signal point
8	Black, Blue	Nothing
9	Empty	Shielding wire
10	Green Brown	Power supply (+24V)
11	Green White	Power supply (0V)
12	Brown	IN Loop start
13	White	IN Loop enable
14	Purple	Input common terminal (0V)
15	Red	Output common terminal (+24V)

Power supply: 24VDC  $\pm$  20% (> 10W)

Ground wire: connect the ground screw to the ground wire of the machine tool.

### (3)、I/O Function Description

#### A. Input signal

##### 12-pin ----- Cycle start

This signal only takes effect in automatic mode when the cycle enable signal is logic 1. When this signal changes from logic 0 to logic 1, balancing begins.

##### 13-pin ----- Cycle enable

In automatic mode, this signal of 1 causes the balance cycle to be activated by an external logic signal of "cycle start". The transition of the logic state from 0 to 1 can reset the alarm when the logic signal is 0.

#### B. Output signal

By connecting an external load (such as a relay or other capacitive load) to the output point and applying a 24V voltage to the output point and the common terminal, the state of the output point can be detected.

##### 2-pin ----- Automatic/Manual

The output terminal corresponding to this signal indicates the currently selected cycle mode. When it is 1, it indicates the automatic state, and when it is 0, it indicates the manual state.

##### 3-pin ----- In balance cycle

This signal represents the signal in the execution of the balancing cycle. When the balance starts, the signal is 1, and the balance end

signal is 0.

In automatic mode, this signal can be used to confirm whether the "cycle start" signal is effective.

#### **4-pin ----- Alarm**

Normally, the status is 1, and changing to 0 indicates that an alarm has occurred.

#### **5-pin ----- Rotational speed alarm**

The normal state is 1, and changing to 0 indicates that the grinding head rotational speed is not within the set rotational speed range.

#### **6-pin ----- L1 signal point**

When the signal is 1, it indicates that the vibration value is within the set L1 range.

When the signal is 0, it indicates that the vibration value exceeds the set L1 value.

The L1 signal point output signal is only valid when the "in balance cycle" signal is 0.

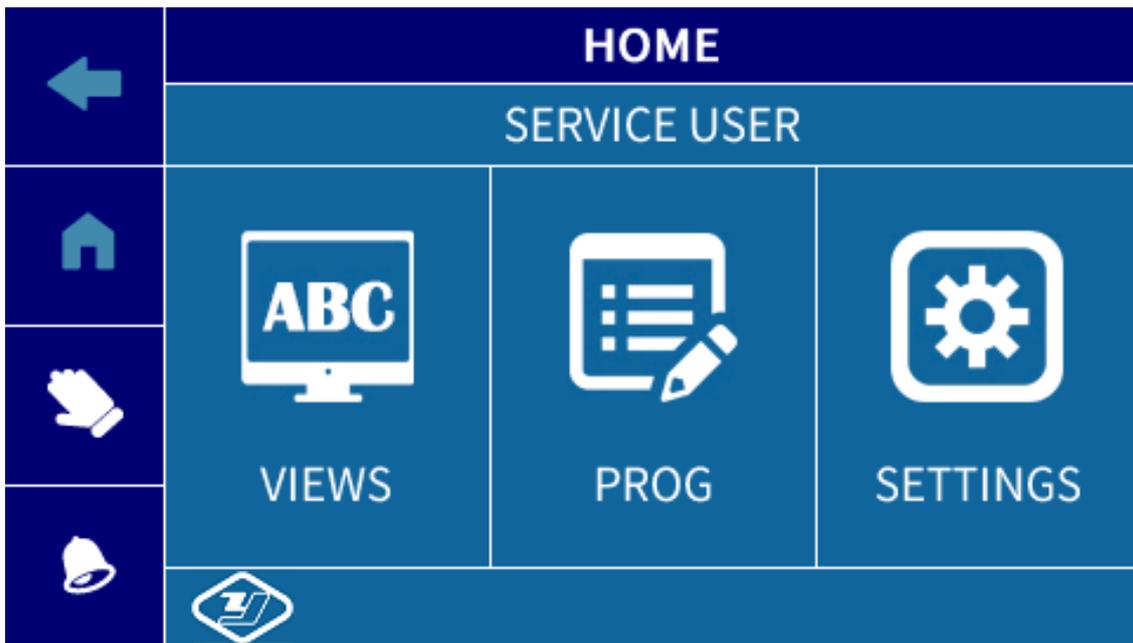
#### **7-pin ----- L2 signal point**

When the signal is 1, it indicates that the vibration value is within the set L2 range.

When the signal is 0, it indicates that the vibration value exceeds the set L2 value.

The L2 signal point output signal is only valid when the "in balance cycle" signal is 0.

### 3、 Display interface



Explain:

The Zplus B control unit is divided into three function windows for viewing, programming, and setting. The system enters the original position display interface by default.

From the "Original Location" interface, you can enter the following navigation sub environment:



#### **Display**

The menu page includes interfaces: unbalance amount, grinding wheel balance, and grinding wheel balance test.



#### **Programming**

Under this menu, parameters such as rotational speed, grinding wheel balance, and balancing algorithm can be set.

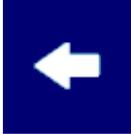


#### **Set up**

After entering the "Settings" menu, you can set all parameters of the electronic unit and the hardware connected to it.

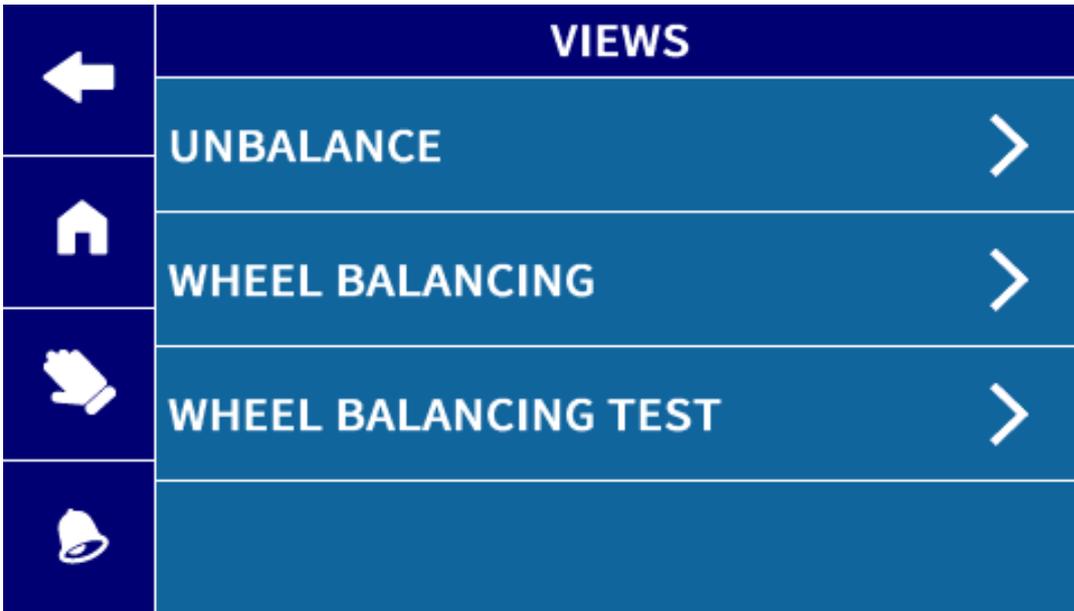
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The user bar contains the following command keys:

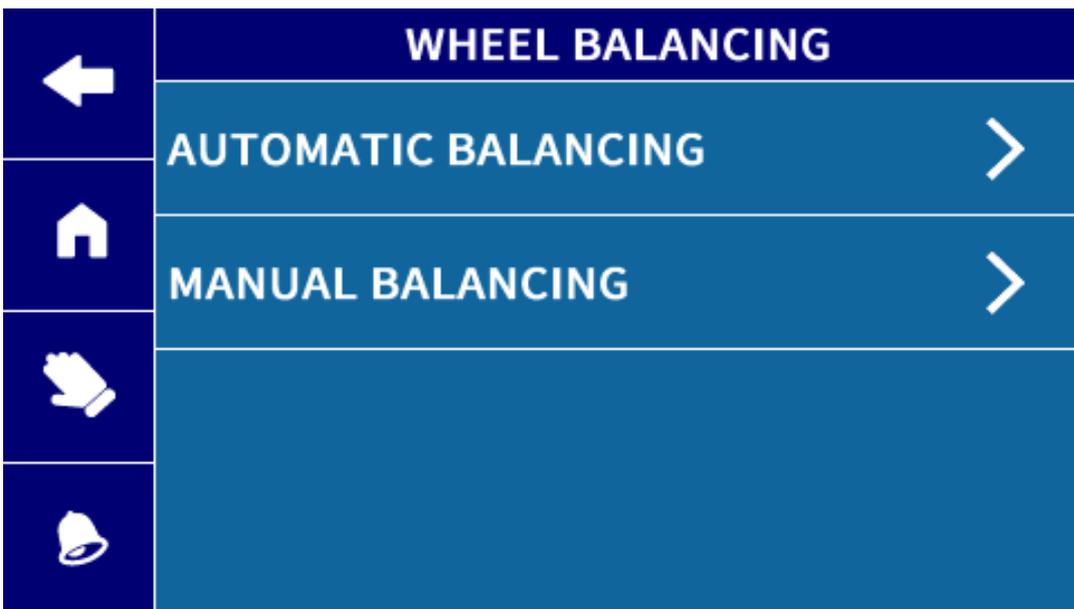
	<p><b>Arrowhead</b></p>	<p>Press this button to return to the previous page.</p>
	<p><b>Main Menu</b></p>	<p>Press this button to return to the "Main Page".</p>
 	<p><b>Alarm bell</b></p>	<p>Call the police          Blue=Normal          Red=Alarm prompt</p>
 	<p><b>Manual/Automatic</b></p>	<p>Operation mode          Click to switch between options          Small Hand Sign=Manual Mode          Cycle flag=Automatic mode</p>

### 3.1 Manual mode operation interface

Display  on the left side of the "Initial Position" interface, click , and then jump to the following "View" interface.

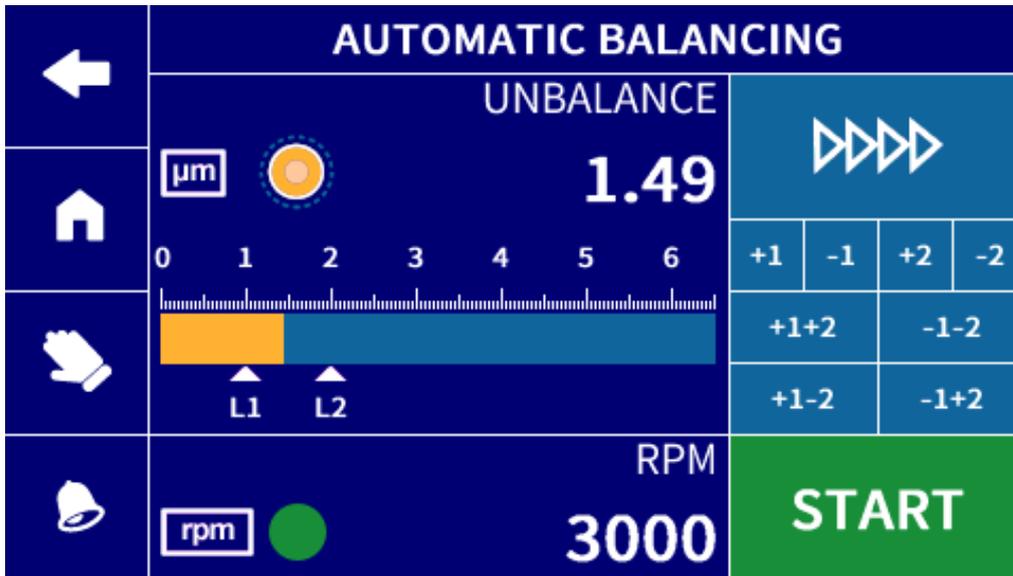


Click "Grinding wheel balance" to enter the "Automatic balance/Manual balance" selection interface, as shown in the following figure:



## A. Automatic balancing

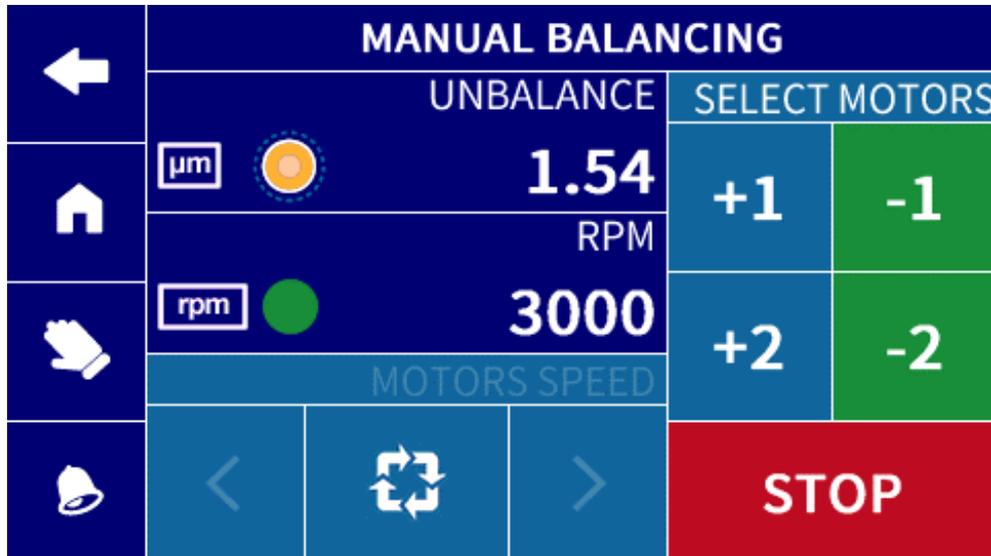
Click "Auto Balance" to enter the following interface:



After clicking Start, a semi-automatic balancing cycle begins. Stop until the vibration amount is less than the L1 set range.

## B. Manual balancing

Click "Manual Balance" on the grinding wheel balance interface to enter the following interface:



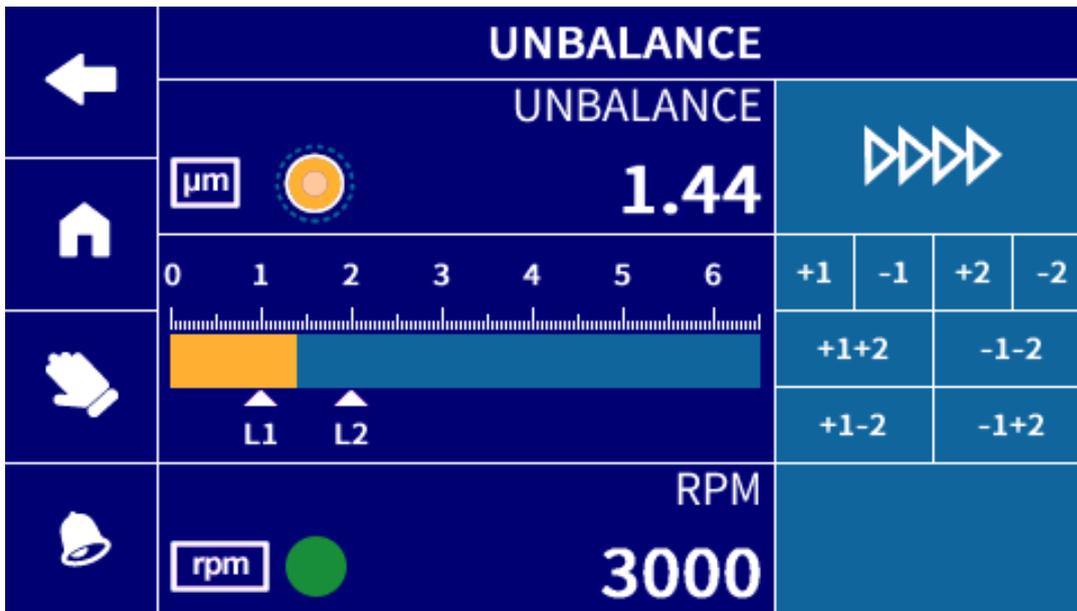
Right selection motor:

- +1: Balance weight 1 is forward.
- 1: Balance weight 1 is rearward.
- +2: Balance weight 2 is forward.
- 2: Balance weight 2 is rearward.

Select the motor and click Start to manually operate the motor for balancing. Click again to stop balancing.

### 3.2 Automatic mode operation interface

Click  on the left side of the "Initial Position" interface and select to switch to , indicating that the automatic mode is entered. Click  and then jump to the "View Interface". At this time, you can only choose to enter the "Unbalance Amount" interface. Click to enter the following interface.



In automatic operation, the balancing operation of the control unit depends on the status of the signal connected to the machine tool.

For example:

After the machine tool gives a "cycle start" signal, the control unit automatically starts a round of balancing operation, and after reaching the L1 range, the balancing operation automatically ends.

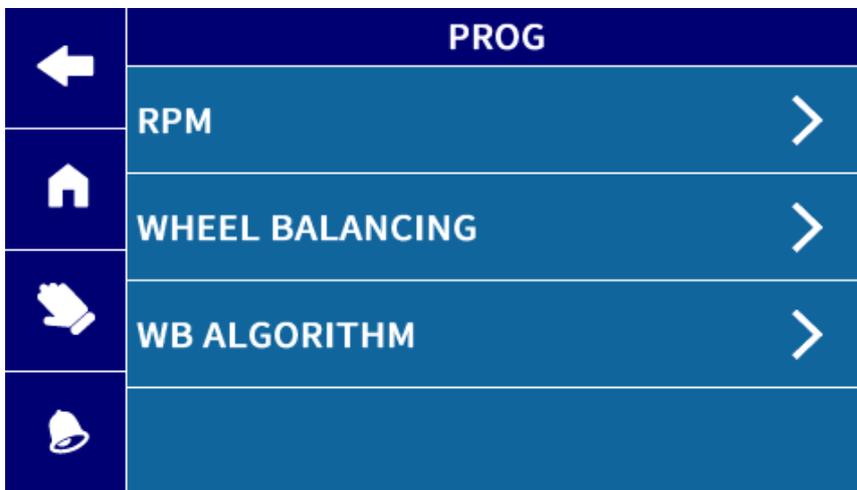
## 4. Parameter Settings

**Note: The main parameters of this machine have been set at the factory.**

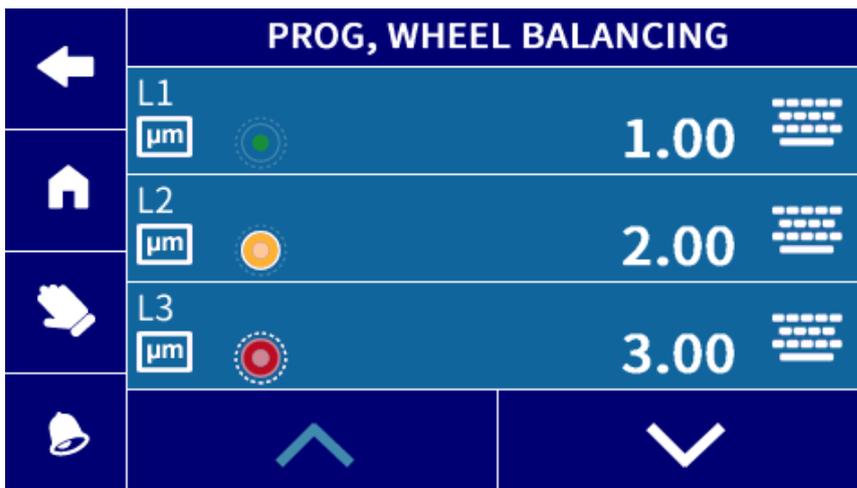
**Except for the signal points, other parameters do not need to be set unless otherwise specified.**

(1) Signal point setting

Click  on the original position interface to enter the programming interface;



Click on the grinding wheel balance to enter the following interface:



Click L1, L2, and L3 to set the signal point. After setting, click the upper left corner to return and save. Setting range of signal points:

L1 setting range
0.00~50.00um(Resolution ratio 0.01um)
0.00~19.68tenth(Resolution ratio 0.01tenth)
0.00~30.00mm/s(Resolution ratio 0.01mm/s)

L2、L3 setting range
0.00~60.00um(Resolution ratio 0.01um)
0.00~30.00tenth(Resolution ratio 0.01tenth)
0.00~45.00mm/s(Resolution ratio 0.01mm/s)

**Note: The set signal point must meet the rule of L1<L2<L3, otherwise the system will alarm.**

The values of signal points L1, L2, and L3 are related to actual conditions such as workpiece processing quality, so there is no universal standard value. The following recommended values can be used as reference values for initial adjustment.

	um	tenth of a thousands	mm/s 1000rpm	mm/s 1500rpm	mm/s 3000rpm
L1	1.0	.40	0.07	0.11	0.21
L2	1.5	.60	0.1	0.17	0.32
L3	30.0	12.0	2.22	3.33	6.66

The above recommended values can be modified according to the actual situation, but the smaller the L1 value, the longer the balancing time required.

## **Chapter 3 Equipment Maintenance**

### 1. Electronic instrument cleaning

Clean the interior and windows of electronic instruments with a soft surface cloth, and do not use soluble or corrosive products.

### 2. Regular inspection

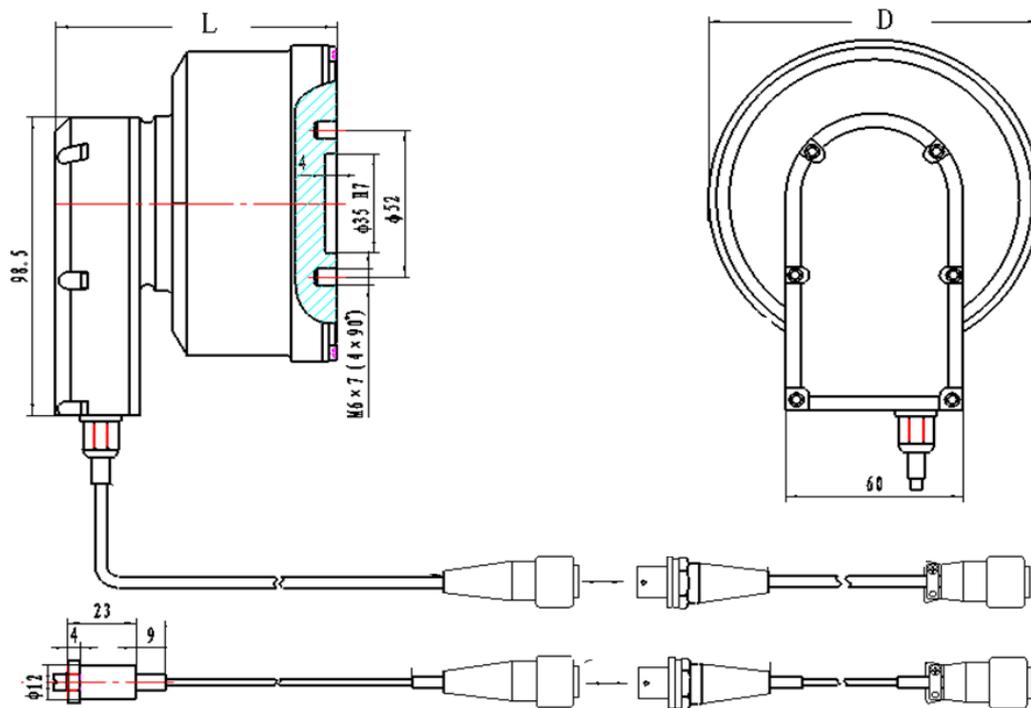
(1) Balance the condition of the head cable and sensor cable to avoid wear and tear.

(2) Check whether the balance head and sensor are loose.

(3) Is there any serious oil stain on the surface of the electric box? If the oil stain is heavy, it may penetrate into the electric box and cause corrosion and other damage to the internal circuit. At this time, it is necessary to clean the surface of the electric box and, if conditions permit, take measures to prevent heavier pollution sources.

## Chapter 4 Appendices

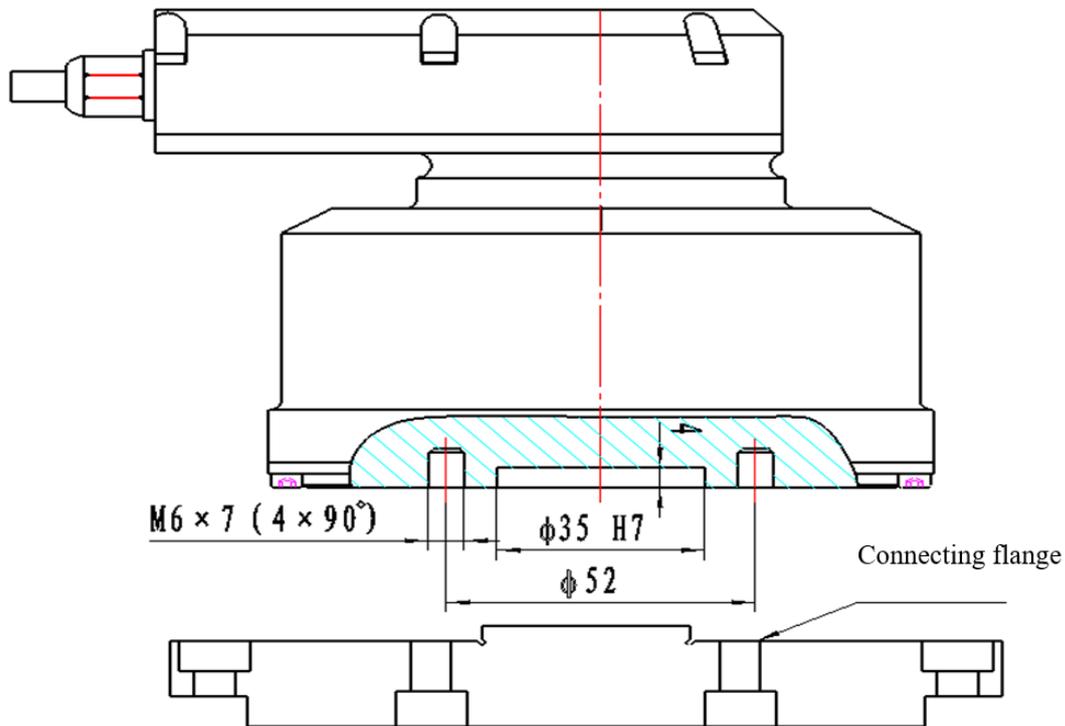
### 1. Dimensions of balancing head and sensor (unit: mm)



Balancing head model	Balance ability (gcm)	Maximum allowable rotational speed (rpm)	L	D
FL400	400	4000	108	112
FL600	600	4000	108	112
FL900	900	4000	108	112
FL1300	1300	4000	108	112
FL2000	2000	3000	108	112
FL3000	3000	3000	108.5	132
FL4500	4500	2000	108.5	132
FL6000	6000	1800	108.5	132

The length of the adapter wire between the balancing head and the sensor can be customized according to the actual situation on site.

## 2. Installation instructions for balancing head



2.1 The balancing head can be mounted to the grinding wheel in an appropriate manner by means of mounting nuts or transition flanges. The specific method shall be determined according to the actual situation.

2.2 The figure above illustrates an example of a fixed flange installation method. The size and method of the flange can be made by the user according to different spindle characteristics.

2.3 Regardless of the installation method adopted, in order to achieve a better balance effect, the coaxiality tolerance between the balancing head and the spindle and grinding wheel flange should be less than 50  $\mu\text{m}$ .

When replacing the grinding wheel, the balancing head must be removed before loosening the grinding wheel retaining nut.

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