

9412

## ZERO SETTER WITH CABLE (FIVE-SIDE) OPERATION MANUAL



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EN -- Please scan the QR code or visit the website for operation manual.

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CZ -- Pro návod prosím naskenujte QR kód nebo navštivte webovou stránku.

ES -- Por favor, escanee el código QR o visite la página web para ver el manual de instrucciones.

FR -- Veuillez scanner le QR Code ou visiter notre site web pour accéder aux manuels d'utilisation.

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PT -- Para aceder ao manual de instruções, por favor, faça a leitura do código QR ou visite o nosso site.

MN-9412-E

V0

**Attention**

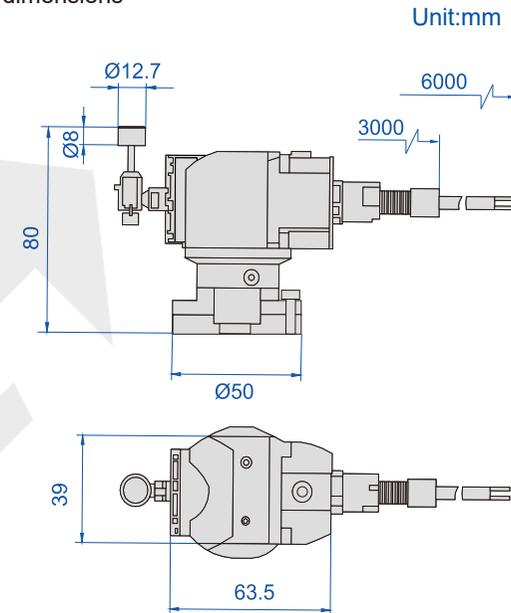
- Be sure to read this manual thoroughly before beginning to use the Model 9412 Tool Setter.
- Before installing the 9412 tool setter, you should first confirm that the logic of the output signal of the tool setter matches the requirements of the CNC system of the machine tool, and then use a multimeter to check whether the status of the output signal of the tool setter is normal.
- After installing a tool setter on the machine, always manually verify that the machine's CNC system is receiving and processing the tool setter output signals correctly before testing automatic tool setting.
- When the user installs and uses a tool setter without following the above procedure, a mismatch between the output signal of the tool setter and the signal required by the machine's CNC system may result in incorrect operation of the automatic tool setting process, which may damage the tool setter or even the machine tool.

**Description**

- The 9412 Cable Communication Tool Setter consists of a tool setter body, a mounting base and tool setting software, which is mainly used for tool setting and checking on various machining centers, CNC boring and milling machines, etc. The 9412 Cable Communication Tool Setter is a tool setter body, mounting base and tool setting software.
- The tool setter has a special trigger mechanism inside the body. When the tool comes into contact with its counterface and the position of the counterface changes slightly, the trigger mechanism immediately triggers the internal circuitry of the tool setter and generates a trigger signal. This trigger signal will continue until the tool setting surface is fully restored to its original position.

**Specification**

Main dimensions



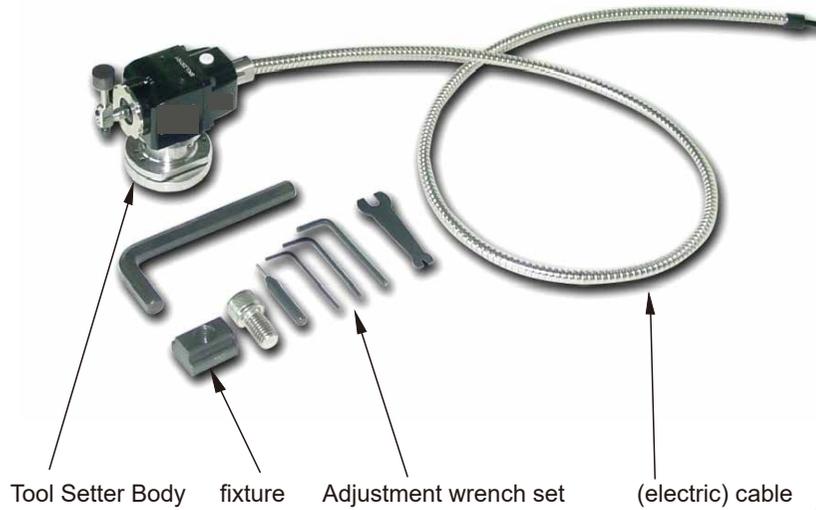
**SPECIFICATION**

<b>Height (factory setting)</b>	80±0.5mm
<b>Diameter of zero setter</b>	12.7mm
<b>Trigger direction</b>	±X, ±Y, +Z
<b>Trigger protection stroke</b>	X-Y: ±5mm, Z: 8mm
<b>Axial reset force</b>	3.4N-3.6N
<b>Repeated trigger accuracy</b>	≤1μm
<b>Hardness of the zero setter</b>	HM8.5
<b>Class of protection</b>	IP68
<b>Cable length *</b>	6m (stainless steel sheath 3m)
<b>Input voltage</b>	24V±10% (DC)
<b>Load current</b>	max: 50mA
<b>Signal type and logic **</b>	SSR (NC/NO)

\*The length of the cable can be customized

\*\*Before purchasing, it is necessary to confirm whether the working logic of the tool setter output signal matches CNC control system

Brief introduction



Note: The cable length is 6m (including stainless steel spiral sheath 3m, can be customized according to user needs to extend the cable length)

Tool Setter Installation

The parallelism between the working plane and the bottom surface has been adjusted to 0~0.003mm before leaving the factory, you can use the standard wrenches and fasteners to install the tool setter on the bench by following steps:

1. Loosen all the M4 and M6 screws on the 1 2 base.(Picture1)



2. Put the M12 screw into the central hole of the base and joint the base and the T-slot nut together.(Picture2)



3. Choose a right place on the bench to install the base and use the wrench to fasten the 3 4 screws.(Picture3)



4. Put the main part into the base and then fastened all the M4 and M6 screws. (Picture4,5,6)

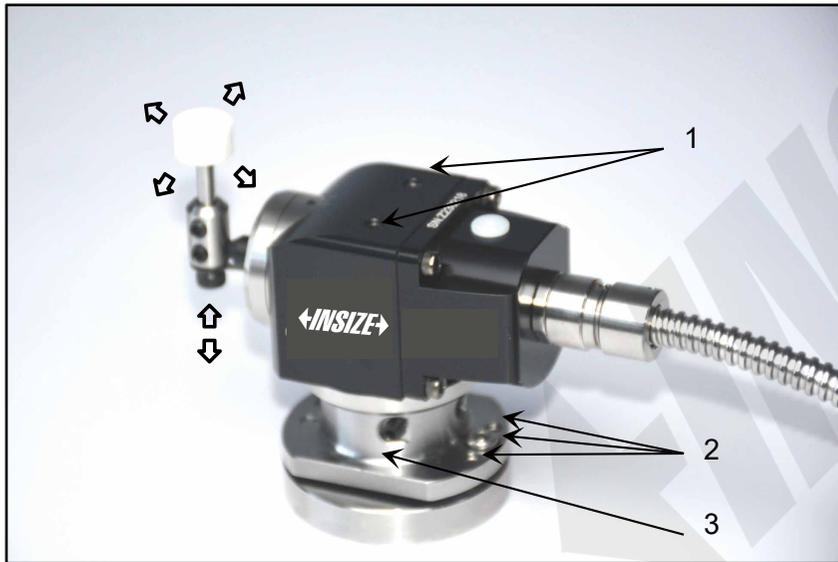


Attention: Make sure that there is no scissel chip on the surface of the tool setter and the bench, or it will influence the parallelism.

## Tool Setter Adjustment

You can use this tool setter directly after installing it on the bench. If you find the parallelism can not meet your needs, you can make phone calls to the salesman of Harbin Pioneer for the method to adjust it. As it shown in the right picture, there are three adjustment mechanisms on the 9412 tool setter:

1. Deflection adjusting screw
2. Pitching adjusting screws
3. Screws to adjust left and right. Please fastened all the screws after the adjustment.



9412 调整位置示意图

## Tool Setter Connection and Inspection

### 1. Measuring signal work logic conversion

In order to meet the different requirements of various CNC systems for input signals, the 9412 tool setter has a special signal conversion method. By changing the polarity of the power supply access to change the logic state of the input signal to the machine system. This special signal conversion method is a unique feature of our products, please refer to the "Signal Logic State Selection and Wiring Instructions" section for detailed instructions.

### 2. Measuring signal transmission and indication

When the tool to be measured is in contact with the tool setting surface, the switching signal generated by the tool setting device is transmitted to the numerical control system of the machine tool through the cable; at the same time, as an indication signal, the red indicator lamp on the body of the tool setting device lights up.



3. Connect the tool setter to the CNC sy

1. Choose the status of the signal and connect the cable

As it shown in the right picture, the cable of the TTC200 tool setter has four cores: red, green, blue and black. Logic status 1:

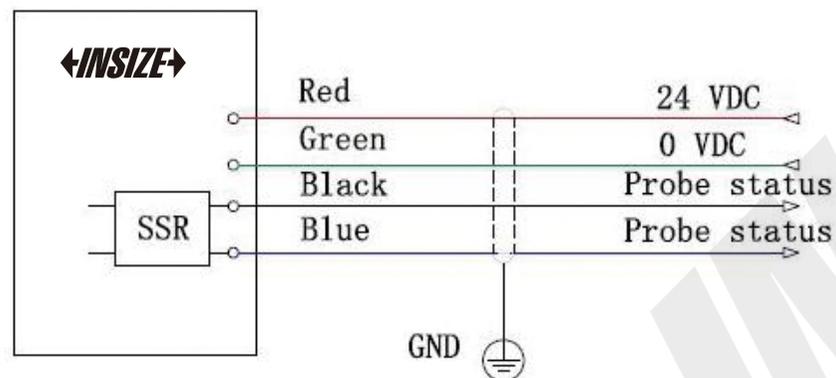
Connect the red line to +24V, the green one to 0V, the black and blue lines to the input of the CNCsystem, the logic status of the output signal is a normally opened signal (default setting).

Logic status 2: Connect the green line to +24V, red line to 0V,

the black and blue lines to the input of the CNC system,

the logic status of the output signal is a normally closed signal.

The logic status of the output signal should be set up exactly so that it can be distinguished by the CNC system.



4. Detection of the output signal of the tool setter Before connecting the tool setter to the CNC machine, connect the red and green wires of the signal cable to the 24V DC power supply provided in the control cabinet of the machine.

Power supply positive and negative connections. When the power switch of the CNC machine tool is closed, the resistance of the multimeter to detect the remaining two core lines of the communication cable of the tool setting device signal status.

Specific methods of operation are as follows: use the downward pressure on the tool setting device to the knife surface 1-2mm so that it triggers (tool setting device on the main body of the red indicator is always on), observe the status of the multimeter display.

(1) The multimeter shows "0L" (Figure 1), that is, the multimeter is disconnected, at this time, the signal logic of the tool setting device for the normally closed SSR signal.

(2) The multimeter shows a value (Figure 2), that is, the multimeter is on state, at this time, the signal logic of the tool setting device state is normally open SSR signal.

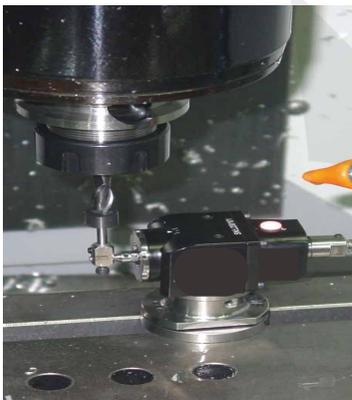


5. Detection of signals received by the CNC machine system

Confirmation of the output signal of the tool setting device and the CNC machine system requirements match, the black and blue wires of the tool setting device cable are connected to the signal input of the CNC machine system, and then perform a single-step simulation of the tool setting action, the specific operations are as follows: In the run of the tool setting program (tool setting program description see the specific software instruction manual), do not let the tool under test directly contact with the tool setting surface, but rather, the installer to hand pressure on the surface of the tool setting. When running the tool setting program (see the specific software manual for the description of the program), the measured tool is not allowed to contact the tool setting surface directly, but the installer presses down on the surface with his hand to make the surface of the tool setting surface micro-motion and quickly release it, at this time, the tool setting device sends out a trigger signal to the CNC machine tool to observe the movement of the machine tool and to determine whether the signal output from the tool setting device is correctly received by the CNC system.

6. Detection of automatic tool setting process

When confirming that the signal of the tool setting device can be correctly received by the CNC machine system, you can carry out the trial run of the automatic tool setting program. It is recommended to run the program for the first time using a single-step mode of operation, and at the same time, set the program feed speed to a slower level, once found that the program should stop the machine movement in a timely manner in the event of error. After the above operation is normal, you can carry out several automatic tool setting operations at normal speed to familiarize yourself with the operation process.



**Length and diameter tool setting**

The purpose of the length setting operation is to establish the position of the length of the tool in relation to the machined surface of the workpiece; the purpose of the diameter setting operation is to determine the actual diameter of the tool in the rotating state, which is accomplished with the help of the center coordinates of the tool setting ring and the value of the radius of the tool setting ring. The tool setter is a flexible device with a fixed height, which is fixed on the table of the machine tool. When the tool is in contact with the tool setting surface, the height of the tool setter establishes the positional relationship between the tool's end edge (or tip) and the table, thus indirectly obtaining the positional relationship between the tool's end edge and the surface of the workpiece.

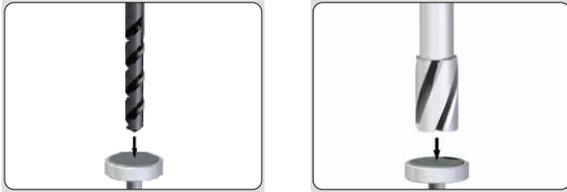
The specific operation process is as follows:

**Tool setting preparation:** manually control the movement of the machine spindle, so that the tool axis is located near the center of the tool setting surface, the end of the tool is located in the position of 10-20 mm above the surface of the tool setting (the specific value according to the parameters of the tool setting program to determine). **Semi-automatic tool setting:** The automatic tool setting program is run and at the end of the program, the length and diameter compensation values of the tool are written into the length and diameter parameters of the tool in the CNC. **Fully-automatic tool setting operation:** The tool setting preparation and semi-automatic tool setting operations are programmed and executed in one continuous program. A detailed description of the automatic tool setting program operation is given in the software manual.



### Functions of tool setting software

1. Automatic calibration of the tool block center position
2. Standard tool length setting
3. Semi-automatic and fully automatic tool setting for tool lengths



4. Semi-automatic and fully automatic tool setting for tool diameter



5. Automatic detection of tool wear and breakage



### Routine maintenance of the tool

1. Before each use of the Model 9412 Tool Setter, it is recommended that clean air be blown over the tool setting surface and the surface of the tool to be measured to ensure that the surface of the tool setting surface is clean and that the surface of the tool to be measured is free of metal cutting debris and oils, as failure to do so may result in a distortion of the measured data.

2. If the tool setter has not been used for a long time, when it is used for the first time, it should be used to test whether the automatic measurement process is completely correct by running at low speed and in a single step, and if abnormal phenomenon is found, it should be found out the reason, and then continue to use it after eliminating the abnormality.

3. The cable of the tool setter will move continuously during the movement of the machine tool, so you should check the integrity of the cable regularly, and if you find that the cable, cable connector and stainless steel sheath are damaged, you should deal with them in time, otherwise it may cause damage to the tool setter or the equipment, and other serious consequences.

Note: Model 9412 tool setter is a precision device, in the process of use and storage, should be avoided to make it subjected to strong shock and vibration; the swing mechanism of the tool setting surface has a certain mechanical fatigue life, usually should avoid excessive downward pressure on the tool setting surface by hand.

## troubleshooting

1. When the tool setting device occurs abnormal phenomenon, should be in accordance with the following order to find the cause of the failure: check the tool setting device program is correct; check the tool setting device triggered by the red indicator light is normal light; check the tool setting device and the CNC machine system connected to the cable signal line (black and blue line) whether the signal output; check the tool setting device and the CNC machine system between the cable, the cable plug, the connector is connected to normal; check the output power supply of the CNC machine system is normal; check the tool setting device is connected to the cable, the cable plug, the connector is normal. Check whether the output power of the CNC machine tool system is normal.
2. When abnormal phenomenon occurs in the accuracy of tool setting, should be in the following order to find the cause of the failure: check whether the tool setting surface of the tool setter is damaged, whether there is residual metal chips or other small particles on the surface of the tool setter; check whether the tool is adhering to the foreign body; check whether the reset of the surface of the tool setter is normal.

If the user checks the specific cause of the malfunction but is unable to eliminate the malfunction or determine the cause of the malfunction, please contact our technical service department to report the malfunction.