Selection Guide

- A wide variety of dedicated types depending on the intended use.

**Linear Type**

Touch sensors are placed each direction and act directly.

**Multiple signal Type**

- **1 signal Type**
  - HA
  - →P3-3

- **Multiple signal Type**
  - HA
  - →P3-5

**Rotating Contact Type**

The shaft rotates when an edge pushes each touch sensor.

**Example of Clockwise**

**for CNC Lathes**
Summary

- Tool setters for CNC lathes are used to preset the tool bit.
- When a tool bit presses against the contact of the sensor, a signal from an ON-OFF switch demonstrating superior repeatability is output to the CNC or PC to automatically program the bit position.
  
  As a result, there is no longer necessary to repeat the process of test cutting, measuring, calculating and inputting to the CNC as in the past, thus the need for tool setting expertise is eliminated, and there are no more concerns over damaging machine due to setting errors.
- Tool bit breakage can be detected and the worn amount can be corrected.

Handling Precautions of Tool Setters for Lathes

- **Mechanical**
  
  **Mounting**
  
  Use the datum surface of the flange in order to attach the contact surface in parallel (in case of angular flange).
  
  If the flange does not have a datum surface (such as in case of round flange), use the contact surface as the datum surface.
  
  Place an indicator against the datum surface to confirm that the contact is mounted in parallel.
  
  **Cables**
  
  1) Since switch contacts may be damaged by the current higher than the rated due to induction of noise and surges, install cables as far away from motor power sources and noise sources as possible (particularly when bundling cables).
  
  2) Do not pull on cables with excessive force (up to about 30 N (3 kgf)).
  
  3) The cable bending radius should be R7 or more.
  
  4) Do not damage cables during wiring. This can impair water resistance capacity.
  
  5) Cover cables with protective tubes when there is a risk of damaging to cables by the usage environment.
  
  Minimum bending radius when using protective tubes is R 2.5 and the maximum length is 15 m.
  
  **Electrical**
  
  1) Contact rating: DC5~24V, 20mA (max)
  
  2) Make electrical connections so that the sensor is grounded when the machine body is grounded.
  
  3) Since sensors equipped with an LED have polarity, make sure the (+) and (-) terminals are properly connected. Recommended value: 10 mA, resistance load
  
  4) Refer to the technical guide for information on output structure when an interface unit is provided.

- **Proper Tool Contact**
  
  1) Ensure that the tool bit touches the contact along a straight line in the direction in which it is pushed.
  
  2) Since the speed at which the tool bit touches the contact is related to the electrical response speed of the machine, set the machine speed so as to not exceed the specified speed.
  
  It is recommended to set the speed as indicated below to ensure sensor accuracy.
  
  Repeatability of 0.001 mm at 50~200 mm/min (based on a response speed of within 0.5 msec of the machine control system)

  **Notes:**
  
  - Do not allow the sensor to push in excessively beyond the sensor stroke.
  
  The sensor or tool bit may be damaged if pushed in excessively.
  
  - Avoid using at a feeding speed of 10 mm/min or less.

- **Requesting Quotation**
  
  - Send us the quotation request along with attached spec sheet (with additional requirement if any) by Fax/E-mail.
  
  - Reference drawing(s) will be sent based on the requirements for customer’s confirmation.
  
  - Upon selection /confirmation by the client, quotation with tentative lead time will be sent for the selected model.

- **Ordering Replacement and Spare Parts**
  
  - Please specify the model name on the nameplate attached to the product.
  
  - Please add an "H" after the model name when not requiring accessories such as an I/F unit or relay cable (machine side).
  
  - Please add an "S" at the end of the model name when ordering a set.
Tool setters for CNC lathes are used for precise blade positioning, and detection of the wear and breakage.

Touch sensors are arranged and directly linked in each direction.

### Standard specifications

<table>
<thead>
<tr>
<th>Product name</th>
<th>HA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output mode</td>
<td>NC (Normally close)</td>
</tr>
<tr>
<td>Pretravel</td>
<td>Approx. 0</td>
</tr>
<tr>
<td>Stroke</td>
<td>2</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.001* (Recommended operating speed of 50 - 200mm/min)</td>
</tr>
<tr>
<td>Contact life time</td>
<td>3 million</td>
</tr>
<tr>
<td>Protective structure</td>
<td>IP67</td>
</tr>
<tr>
<td>Contact force</td>
<td>2N</td>
</tr>
<tr>
<td>Contact material</td>
<td>Tungsten carbide</td>
</tr>
<tr>
<td>Surface finishing</td>
<td>Grinding 4s</td>
</tr>
<tr>
<td>Contact rating</td>
<td>DC5V - DC24V 10mA (Max20mA) resistance load</td>
</tr>
<tr>
<td>Cable</td>
<td>Oil resistant φ5 / 2 cores, Tensile strength 30N, Minimum bending R7</td>
</tr>
<tr>
<td>LED lamp</td>
<td>Default : LED ON / Operating : LED OFF</td>
</tr>
</tbody>
</table>

*Repeatability of the arm is not included.

### Precautions

- Do not press the adjacent contact simultaneously.
- Do not turn the protective boot cover during cleaning and so forth. The rubber boot inside will not return properly if it becomes twisted.
- In the case of horizontal mounting, a D-cover (Downward cover) is highly recommended so as to prevent coolant from entering inside the cover when any one of the switches faces the ground.
- Rubber materials used in some products provide protection against water-soluble coolants and alkaline liquids. (Refer to P5-4)

- Precautions for Tool Setters .......... P3-1
- Precautions for sensor connecting .......... P5-1
- Cable options .................................. P5-2
- Technical guide ................................. P5-3
1 Signal Type

Tool Setter for CNC Lathes  Linear Type

Outer dimensions

H4A-001

Circuit diagram

Protective boot cover
Select a type that prevents coolant from entering through the gap and accumulating inside.

U type (standard)
Upward, sideways

D type
Downward
Detecting direction: select from ①～④

Not required
Always make sure to enclose when not in use.

Specification sheet

Date: (mm, dd, yy)

Optional specifications (Bold: Standard)

Location No. of detecting direction

Protective boot cover
① ② ③ ④ ⑤

U type Direction number including D type

Not required (Case of enclosed types)

Cable options (1m/unit)

Length / Protective cable

Connector (Refer to P5-2)

Machine side cable option

from connector (if desired)

Company: 

Dept. / Title: 

Customer name: 

Address: 

Tel: 

Fax: 

E-mail: 

Other (if any): 

Ordering and Inquiries

1. Customer

2. Metrol

3. Customer

4. Customer/Metrol

Fax or E-mail

E-mail to: touchsensor@metrol.co.jp

Download PDF sheet: http://toolsensor.com/builder.html

Placement of order

Fill out the specification sheet and send to Metrol.

Send the drawing(s) of specific model based on spec sheet received.

Select/confirm the specific model by the customer.

Metrol sends the quote, and the customer places the order for the same.
Tool setters for CNC lathe are used for precise blade positioning, and detection of the wear and breakage.

Touch sensors are arranged and directly linked in each direction.

A different signal is emitted for each direction (parallel).

### Precautions

- Do not press the adjacent contact simultaneously.
- Do not turn the protective boot cover during cleaning and so forth. The rubber boot inside will not return properly if it becomes twisted.
- In the case of horizontal mounting, a D-cover (Downward cover) is optionally required so as to prevent coolant from remaining inside the cover when any one of the switches faces to the ground.
- Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P5-4)

#### Precautions for Tool Setters .......................... P3-1

#### Precautions for sensor connecting .................. P5-1

#### Cable options ........................................ P5-2

#### Technical guide ....................................... P5-3

### Standard specifications  

<table>
<thead>
<tr>
<th>Product name</th>
<th>HA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output mode</td>
<td>NC (Normally close)</td>
</tr>
<tr>
<td>Pretravel</td>
<td>Approx. 0</td>
</tr>
<tr>
<td>Stroke</td>
<td>2</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.001* (Recommended operating speed of 50 - 200mm/min)</td>
</tr>
<tr>
<td>Contact life time</td>
<td>3 million</td>
</tr>
<tr>
<td>Protective structure</td>
<td>IP67</td>
</tr>
<tr>
<td>Contact force</td>
<td>2N</td>
</tr>
<tr>
<td>Contact material</td>
<td>Tungsten carbide</td>
</tr>
<tr>
<td>Surface finishing</td>
<td>Grinding 4s</td>
</tr>
<tr>
<td>Contact rating</td>
<td>DC5V - DC24V 10mA (Max20mA) resistance load</td>
</tr>
</tbody>
</table>
| Cable | Oil resistant φ5 / 2 cores  
Tensile strength 30N, Minimum bending R7 |
| LED lamp | Default : LED ON / Operating : LED OFF |

*Repeatability of the arm is not included.
**Multiple Signal Type**

**Tool Setter for CNC Lathes Standard Type**

### Outer dimensions

**H4A-002**

![Diagram](image)

- **4-LED Lamp**
- **4-4.5 Drill Hole**
- **4-Tungsten Carbide φ5**
- **O-Ring S20**

### Circuit diagram

- LED 5.1kΩ × 4
- BLACK +
- GREEN +
- ORANGE +
- YELLOW +
- COM WHITE −

### Protective boot cover

Select a type that prevents coolant from entering through the gap and accumulating inside.

- **U type (standard)**
  - Upward, sideways
- **D type**
  - Downward

**Detecting direction**: select from 1 to 4

**Not required**

Always make sure to enclose when not in use.

### Specification sheet

- **Date**: (mm, dd, yy)

**Optional specifications (Bold: Standard)**

<table>
<thead>
<tr>
<th>Location No. of detecting direction</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective boot cover</td>
<td>U</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cable options (1m/unit)**

<table>
<thead>
<tr>
<th>Length / Protective cable</th>
<th>m</th>
<th>Not required</th>
<th>Protective tube</th>
<th>m</th>
<th>Upper limit: 15m</th>
<th>Wire braid</th>
<th>m</th>
<th>Upper limit: 10m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector (Refer to P5-2)</td>
<td></td>
<td>Not required</td>
<td>Connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine side cable option</td>
<td></td>
<td>Length</td>
<td>Protective cable</td>
<td></td>
<td>Not required</td>
<td>Protective tube</td>
<td>m</td>
<td>Upper limit: 15m</td>
</tr>
<tr>
<td>from connector (if desired)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Ordering and Inquiries

1. **Customer**
   - Fax or E-mail
2. **Metrol**
   - Fax or E-mail
3. **Customer**
   - Fax or E-mail
4. **Customer / Metrol**
   - Fax or E-mail

**Placement of order**

- Fill out the specification sheet and send to Metrol.
- Send the drawing(s) of specific model based on spec sheet received.
- Select/confirm the specific model by the customer.
- Metrol sends the quote, and the customer places the order for the same.

**E-mail to**: touchsensor@metrol.co.jp


- Copy this page and use repeatedly.
Tool setters for CNC lathe are used for precise tool bit positioning, and detection of the wear and breakage.

Dimensions from the contact to the edge have been reduced.

### Standard specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>H4D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>H4D</td>
</tr>
<tr>
<td>Output mode</td>
<td>NC (Normally closed)</td>
</tr>
<tr>
<td>Pretravel</td>
<td>Approx. 0</td>
</tr>
<tr>
<td>Stroke</td>
<td>2</td>
</tr>
<tr>
<td>Rotating direction</td>
<td>Clockwise / Counterclockwise</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.001* (Recommended operating speed of 50 - 200mm/min)</td>
</tr>
<tr>
<td>Contact life time</td>
<td>3 million</td>
</tr>
<tr>
<td>Protective structure</td>
<td>IP67</td>
</tr>
<tr>
<td>Contact force</td>
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<tr>
<td>Surface finishing</td>
<td>Grinding 4s</td>
</tr>
<tr>
<td>Contact rating</td>
<td>DC5V - DC24V 10mA (Max20mA) resistive load</td>
</tr>
<tr>
<td>Cable</td>
<td>Oil resistant ø5/2 cores, Tensile strength 30N, minimum bending R7</td>
</tr>
</tbody>
</table>

*Repeatability of the arm is not included.

### Precautions

- Do not rotate in the opposite direction of the specifications.
- Rubber materials used in some products provide protection against water-soluble coolants and alkaline liquids. (Refer to P5-4)
- After pushing the detecting contact surface to the stroke end with your finger, do not remove your finger suddenly as shown in the drawing. Such action often causes a malfunction resulting from disengagement of internal components. When pushing the detecting contact by a tool during operation, do not slide the tool sideways while holding it down.

- Precautions for Tool Setter ..................................... P3-1
- Precautions for sensor connecting ............................ P5-1
- Cable options ...................................................... P5-2
- Technical guide .................................................... P5-3
Tool Setter for CNC Lathes  Rotating Contact Type

1 Signal Type

Outer dimensions

- Copy this page and use repeatedly -

Cable option (1m/unit)

<table>
<thead>
<tr>
<th>Length / Protective cable</th>
<th>m</th>
<th>Not required</th>
<th>Protective tube</th>
<th>m (Upper Limit: 15m)</th>
<th>Wire braid</th>
<th>m (Upper Limit: 10m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector (Refer to P5-2)</td>
<td>No</td>
<td>Not required</td>
<td>Connector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine side cable option</td>
<td>Length</td>
<td>m</td>
<td>Protective cable</td>
<td>Not required</td>
<td>Protective tube</td>
<td>m (Upper Limit: 15m)</td>
</tr>
<tr>
<td>from connector (if desired)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Company :
Dept. / Title :
Customer name :
Address :
Tel : Fax :
E-mail :
Other (if any) :

Date: (mm, dd, yy)

Optional specifications (Bold: Standard)

- Clockwise
- Counterclockwise
- Opposite side length
- Contact diameter

Specification sheet

Fax +81 42 528 1442
E-mail : touchsensor@metrol.co.jp

Ordering and Inquiries

1.Customer
2.Metrol
3.Customer / Metrol

Place the order for the same.