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# High Resolution Automatic Die Monitoring System

MODEL: **M I C R O N 2**

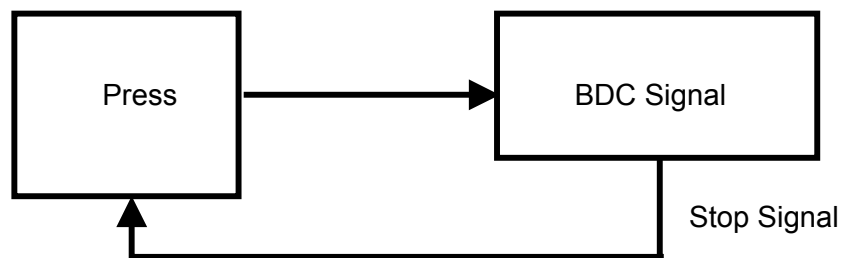
## Instruction Manual

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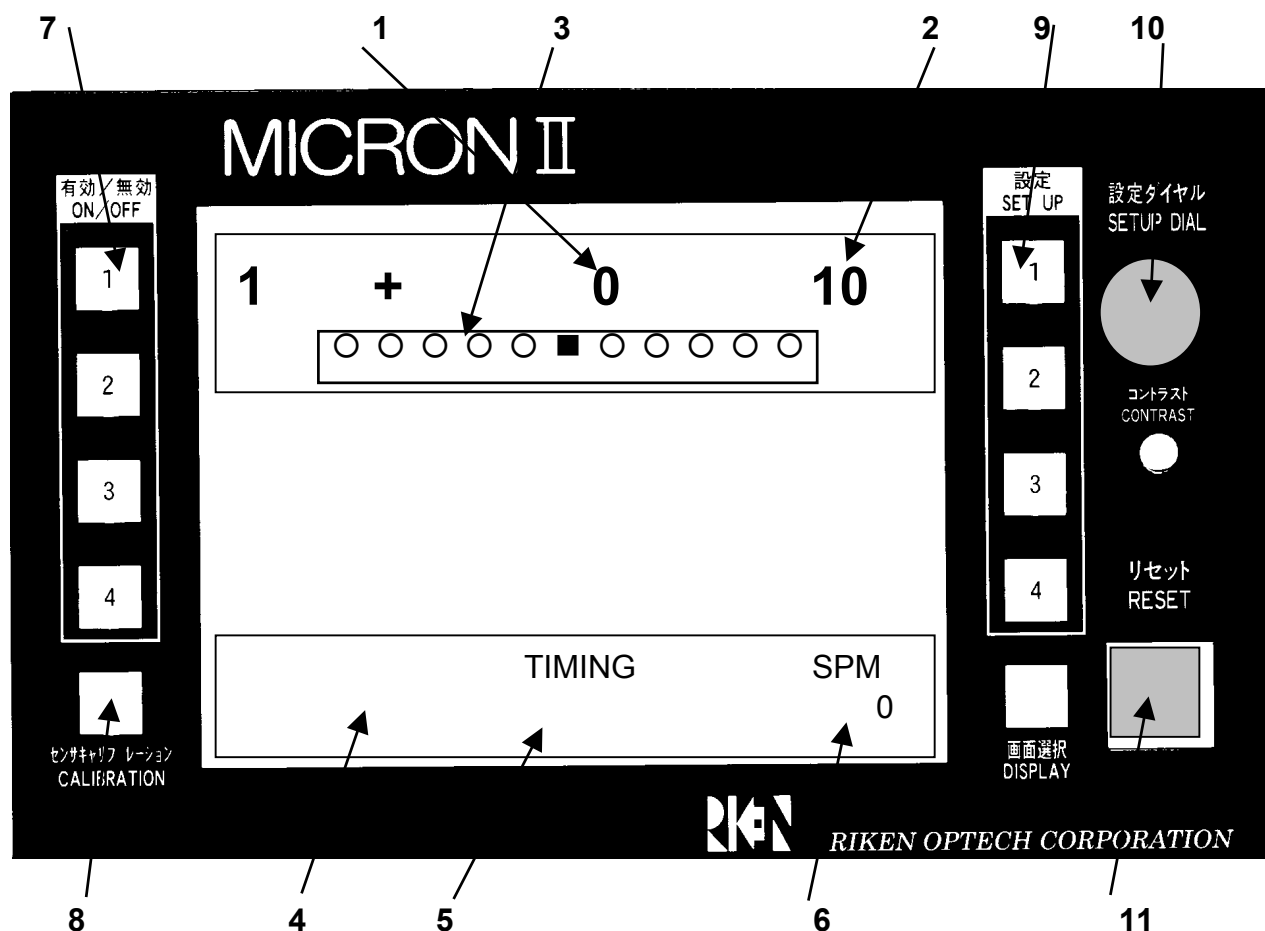
# Introduction

This device detects the BDC of a press using a proximity sensor and sends a fault signal to the outside when the difference between bottom dead center (BDC) positions at each stroke exceeds the monitoring range. As the device detects the BDC position by comparison with an average value, it can perform detection steadily without being affected by any variation in BDC due to temperature etc.



The device detects the BDC position normally in micrometers ( $\mu\text{m}$ ), but it can be reconfigured to detect in units of  $0.1\ \mu\text{m}$  in the initialization mode. This feature allows you to perform more minute detection even in press operations with less variation in BDC position.

# Description of Component Parts



## 1 Detected Value (unit: $\mu\text{m}$ )

Indicates the deviation of each stroke from the average of the sampled values.

## 2 Setting Value

Displays the setting of the control limit. If a detected value exceeds this limit, a stop signal is sent.

## 3 Bar Graph

Displays the status of the detected value with respect to the setting. The left side of the bar display is the minus (-) side of the setting, and the right side is the plus (+) side. (The center is 0. Each side is divided into five equal parts.)

Example: With a setting of 10, the bar display shows the following scale:

-10 -8 -6 -4 -2 0 +2 +4 +6 +8 +10  
 ○ ○ ○ ○ ○ ■ ○ ○ ○ ○ ○

Bar Graph scale (unit:  $\mu\text{m}$ )

# Description of Component Parts

## **4 Comments Indication**

Displays various operating conditions.

## **5 Timing Indication**

Displays TIMING while an external timing signal is on.

## **6 SPM Indication**

Displays the SPM of the press during operation.

## **7 ON-OFF Key**

Switches each channel on or off.

## **8 Sensor Calibration**

When a sensor or a sensor cable is replaced with the power on, press this key to adjust the sensor automatically.

## **9 Set Up Key (CH1-CH4)**

Press this key to change the setting for a channel.

## **10 Setup Dial**

Use this dial to change various settings including those in the initialization mode.

## **11 Reset Button (RESET)**

When a fault is detected the red lamp turns on to indicate an alarm.

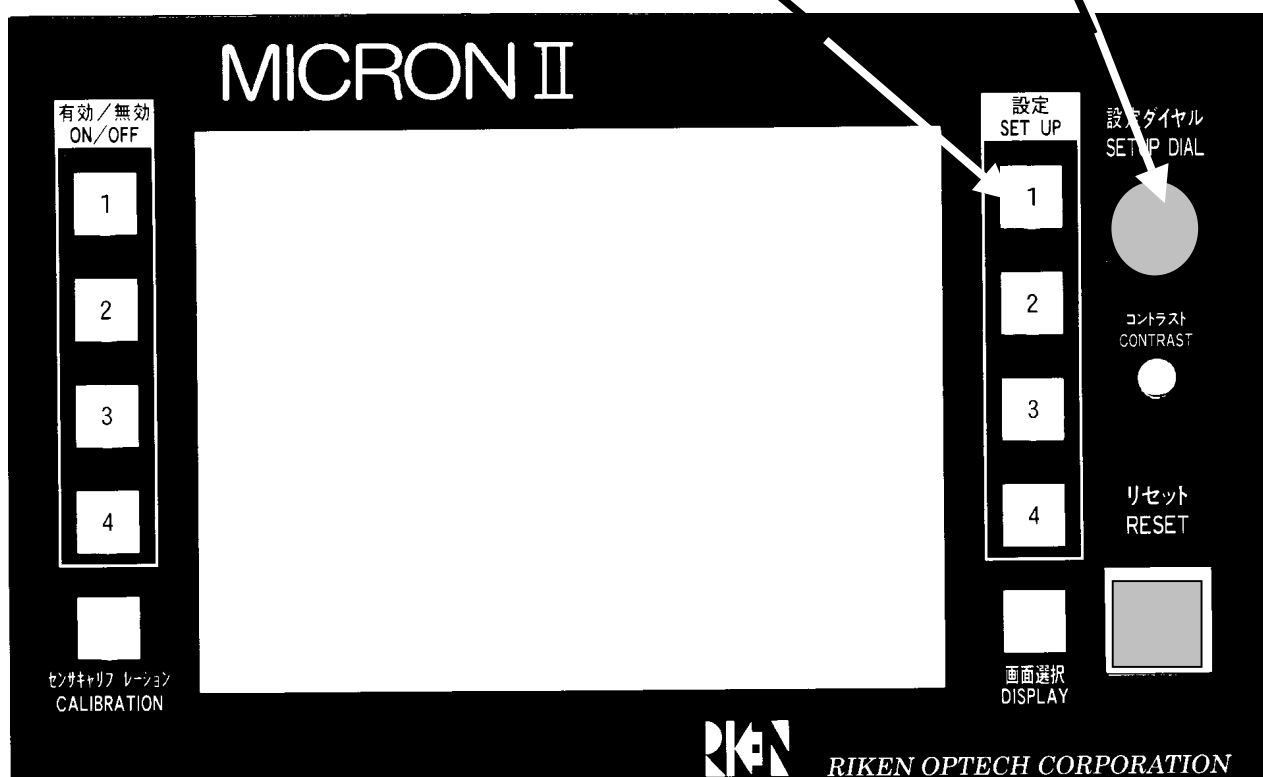
# Changing Setting

The control limit for each channel can be changed by pressing the set up button. Once the desired channel is illuminated, turn the set up dial to adjust control limit. The settable range is 0 to 99  $\mu\text{m}$  (unit:  $\mu\text{m}$ ).

Where high sensitivity is selected in the initialization mode, the setting is 5  $\mu\text{m}$  or less and the settable range is in units of 0.1  $\mu\text{m}$ . For 9  $\mu\text{m}$  or more, the settable range is in  $\mu\text{m}$ .

Turn the Setup dial to change the setting

To change the setting for a channel, press the Set Up key for that channel



# Specifications

## ● Power supply and output section

|                         |   |
|-------------------------|---|
| Power supply            | 100-240 VAC, 50 or 60Hz                         |
| Power consumption       | Less than 15W                                   |
| Output contact          | 1A -1B (emergency output, auxiliary output)     |
| Output contact capacity | Less than 250 VAC, less than 5A, Cos $\phi$ = 1 |

## ● Detection section

|                    |   |
|--------------------|---|
| Number of channels | 2 and 4                                     |
| Detection range    | 0.8 mm to 1.8 mm                            |
| Repeating accuracy | 1 $\mu$ m (0.1 $\mu$ m at high sensitivity) |
| Monitoring range   | Average $\pm$ 100 $\mu$ m                   |
| Sensor type        | Proximity sensor for slug detection         |

## ● Display section

|                                  |   |
|----------------------------------|---|
| Display                          | LCD. blue mode with back light (320 x 240 pixels) |
| Temperature compensation circuit | Internal  |
| Contrast control                 | External  |

## ● Others

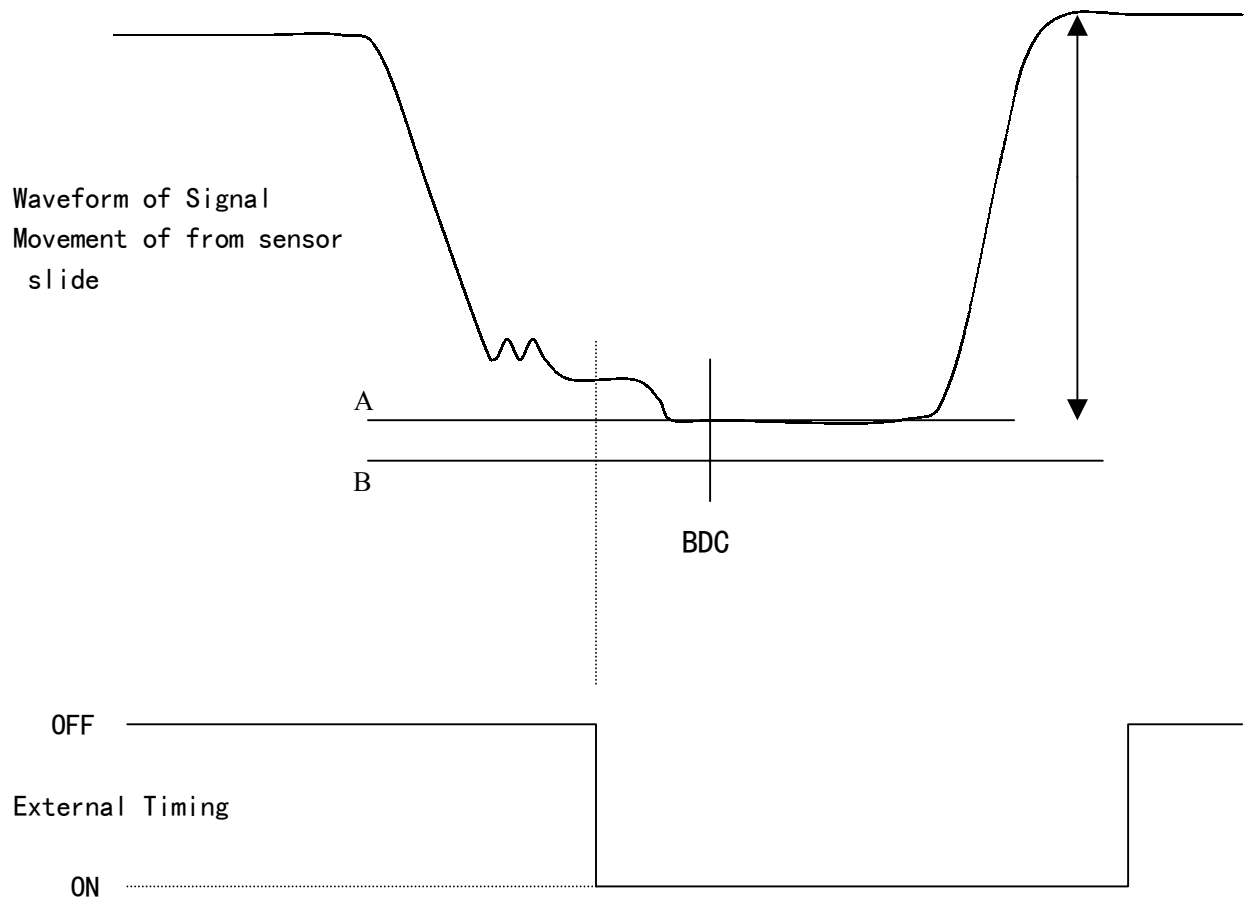
|                             |  |
|-----------------------------|--|
| Backup                      | Semiconductor memory<br>(Life of backup time: more than 10 years.)                                   |
| Maximum speed               | 2,400 SPM  |
| Operating temperature range | -10 to +50°C   |
| Retention temperature range | -20 to +75°C   |
| Humidity                    | 10-85% RH max.<br>(Wet bulb temperature shall be less than 29°C for prevention of dew condensation.) |

## ● Accessories

|                       |         |
|-----------------------|---------|
| Mounting bolt (M8-20) | Two (2) |
| Washer (for M8 bolt)  | Two (2) |
| User's guide          | One (1) |

# External Timing

The device has an external timing input. This input is used to specify the detection position in the vicinity of BDC,



Normally the device detects BDC at the lowermost position (position B in the figure). By using the external timing input, it is also possible to detect BDC at a position where the timing signal is turned on (position A in the figure).



# Details of Initialization

This device can be controlled in the initialization mode so it can function in various ways. Initial values are preset and do not need to be changed. However, there will be cases in which some changes have to be made to the data, depending on how the device is used. A description is given below of ways to make such changes.

## ● Start of Initialization Mode

After power-up, press the Set Up key for Channel 1 before the normal screen appears (within 5 seconds after power-up). The initialization menu screen appears, showing a total of 9 settable items.

## ● Changing Setting

- 1). To change the setting for an item, turn the Setup dial to select item on the menu screen.
- 2). After selecting the item, push the Reset button to display the data.
- 3). When the data screen is displayed, turn the Setup dial to change the setting.
- 4). After changing the setting, push the Reset button again to restore the initialization menu screen
- 5). To change the setting for another item, repeat the above steps (1-4).
- 6). When all changes are complete, turn the Setup dial clockwise to select End of Setting and the Reset button to terminate the initialization mode.

### End of Setting

Termination of initialization. Pushing the Reset button restores the normal screen, terminating the initialization mode.

### Initial Number of Strokes Bypassed

Sets the number of strokes to be bypassed after the start. (3-100) Initial value: 3

### Number of Samples for Averaging

Sets the number of detected values to be averaged. (1-100) Initial value: 8

### Sensitivity Selection

Sets the detection sensitivity. (High or Normal) Initial value: Normal

### Key Protect

Sets key protection from manipulation. To protect a key from manipulation, press the key to display a corresponding mark "←P." This mark indicates the key that is protected from manipulation. To return the key to the former state (to make it manipulable), press the key again to remove the mark "←P." After completing the change, push the Reset button to restore the initialization menu screen.

Initial value: All manipulatable

# Details of Initialization

## Reset Mode

Selects between two reset modes, manual reset with the press of the Reset button upon fault detection or automatic reset one second after fault detection.

Initial value: Manual

## External Timing Polarity

Selects the polarity of the external timing signal, i.e., selects whether to input the signal when it is on (the TIMING-IN terminal is shorted) or when off (the TIMING-IN terminal is open).

Initial value: Input when ON

## Emergency Output Mode

This device always measures the time from BDC to BDC and produces emergency output for one second when the BDC signal from the sensor does not come for a period of time twice that at the preceding stroke. (One-shot output) This item sets whether to turn the above function on or off.

Initial value: ON

## Sensor Characteristic

The sensor characteristic should be set to that of the sensor to be used. With this device, most of the proximity sensors for slug detection are available. In case a sensor is already installed in the die and it is impossible to adjust the clearance between sensor and approaching object at BDC, this function makes it possible to achieve the most suitable clearance adjustment on the device side. If the sensor cannot detect with the existing clearance, select one of the characteristics A, B and C which is most suitable for operation of the sensor in actual use.

Initial value: Characteristic B

## Detection Mode

Selects "Continuous" or "Single-stroke." For single-stroke operation, set the detection mode to "Single-stroke." When "Single-stroke" is selected, the initial bypass function does not work unless a reset is made upon fault detection etc. Moreover, setting to "Single-stroke" turns off the one-shot output even if the Emergency Output Mode of Item 7 above is set to "ON."

Initial value: Continuous

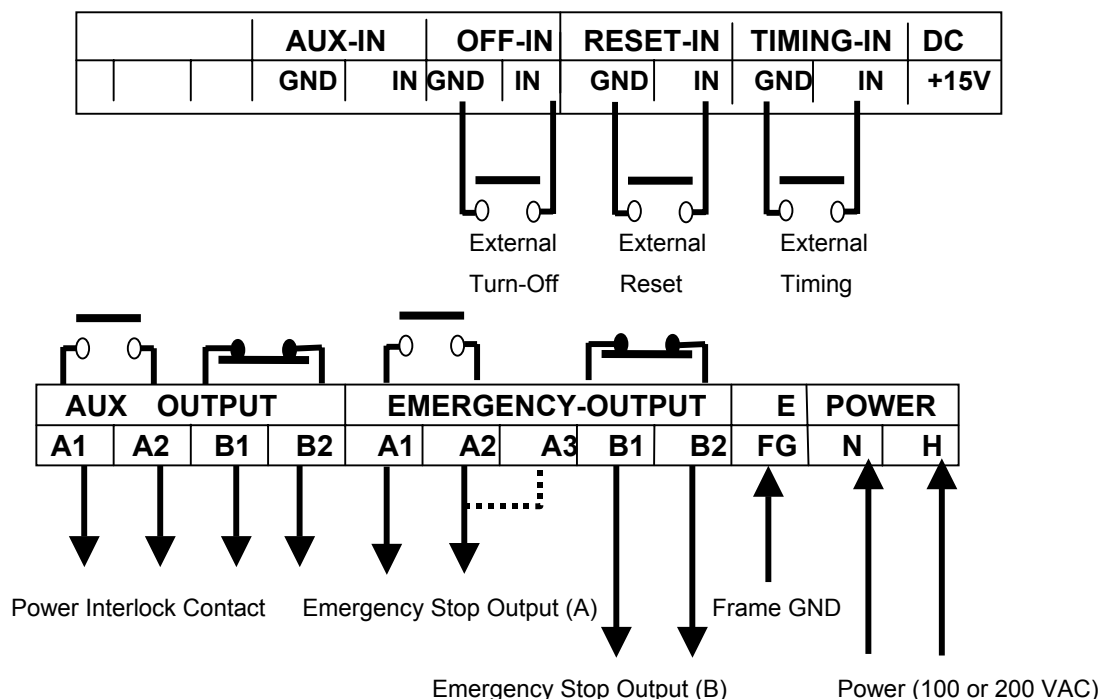
# Connections of Terminal Block

**RESET-IN:** Input terminal for external reset When this terminal is shorted, a reset is made (the same action as “RESET” on the front panel).

**OFF-IN:** External turn-off input terminal. Fault detection is off while the terminal is shorted.

**TIMING-IN:** External timing input terminal used to specify the detection position in the vicinity of BDC.

**AUX-IN:** Standby input not used currently.



**A3:** As a power switch contact is provided between A1 and A3, the circuit between A1 and A3 is shorted when the power switch is turned off. Therefore, connecting a jumper between A2 and A3 makes it possible to start the press even with the device power turned off.

**AUX OUTPUT:** Auxiliary relay normally linked with the turning on or off of the power supply.

|           | A1-A2 | B1-B2 |
|-----------|-------|-------|
| Power off | OFF   | ON    |
| Power on  | ON    | OFF   |

**EMERGENCY-OUTPUT:** Emergency stop output relay.

|                               | A1-A2 | B1-B2 |
|-------------------------------|-------|-------|
| Power off                     | OFF   | ON    |
| Power on in normal operation  | ON    | OFF   |
| Power on upon fault detection | OFF   | ON    |

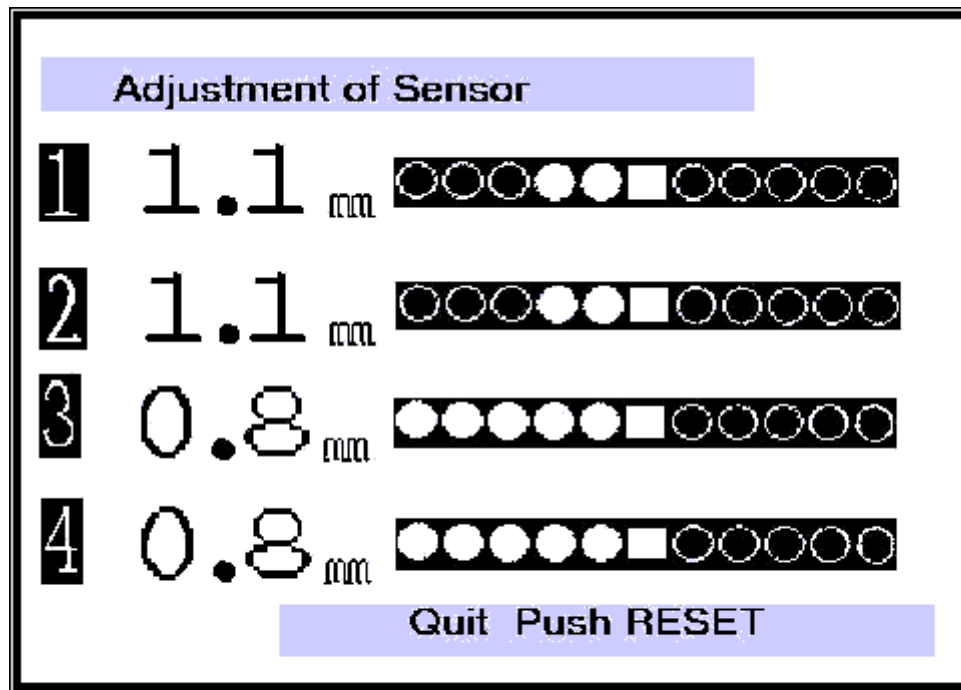
**E (FG):** Frame ground connected to the press frame.

**POWER:** Power input connected to single-phase 100-240 VAC.

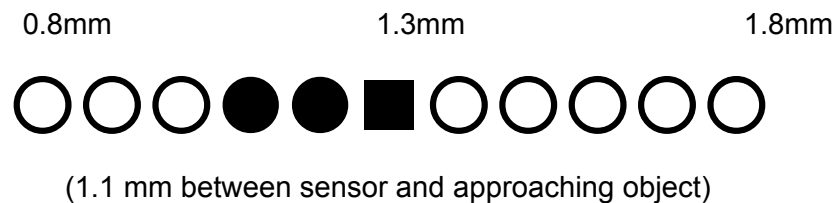
# Sensor Adjustment

Adjust the sensor in the following ways:

1. Set the slide at the BDC position.
2. Press and hold the display button, momentarily press the reset button. The "Adjustment of Sensor Menu" will appear.



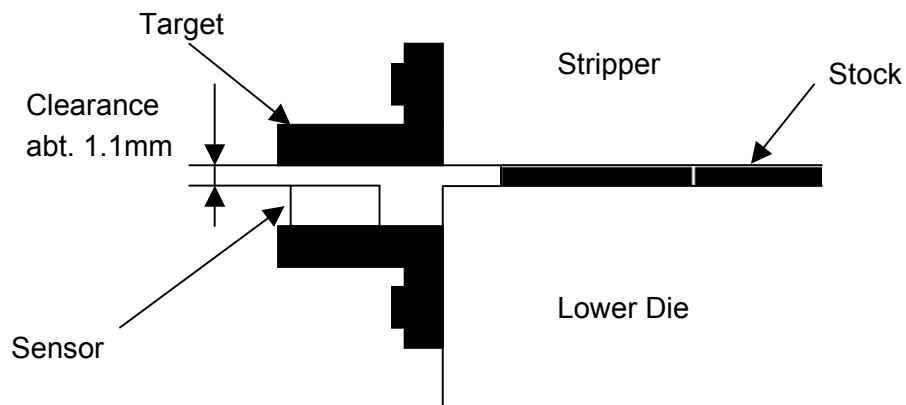
The bar display serves as a clearance gauge between sensor and approaching object.



The detection range of the sensor is 0.8-1.8 mm. The value shown at the leftmost end of the bar display is 0.8 mm or less, and the value shown at the rightmost end is 1.8 mm or more. When the clearance is 1.3 mm, the bar display is at the center only. Each position on the bar graph represents 0.1 mm.

# Sensor Adjustment

3. Set and fix the clearance between sensor and target to approximately 1.1mm.



4. Once adjusted push reset button to end the adjustment menu.
5. Return the slide to top dead center (TDC) push and hold the calibration button, while pushing the reset button. Autocal will be activated once the calibration button is released. **The phrase "Auto adjustment of sensor" will appear briefly at the bottom of the display.**

***Note: To insure proper sensor adjustment repeat steps 1-5.***

# Troubleshooting Guide

|   |  |
|---|--|
| Screen hardly visible (dark or light).                | Turn contrast control to a position where screen is easily visible.  |
| Back light not lit.                                   | Power is not turned on. If not so, check power supply, power terminal, etc.  |
| Operation normal, but Back light not lit.             | Probably LCD display unit is faulty. Ask for repair.   |
| Sensor trouble Indicated.                             | Probably sensor cable connection is improper or sensor is faulty. If there is no problem with sensor connection, replace sensor cable or sensor.   |
| EE appears in detected Value, and machine stops.      | Improper adjustment of clearance between sensor and approaching object. Readjust.  |
| Product is normal, but machine stops frequently.      | Sensor and proximity element is loosened or setting is incorrect. Check sensor mounting section. If there is no problem, readjust setting.   |
| Sometimes display Becomes strange, and Machine stops. | Probably this is due to effect of external noise. It is assumed that rather strong noise is emitted from somewhere, so eliminate noise source or attach a noise filter to power input section, emergency output section and timing input section of the device.  |
| Keys not manipulable.                                 | When a key is protected from manipulation, a mark indicating key protection is displayed. Cancel key protection in initialization mode. While press is operating at high speed, there are cases in which keys are not manipulable because priority is given to detection operation. In such cases, manipulate keys after stopping press. |
| “S” and TIMING stay Displayed.                        | While press is operating at high speed, these indicators stay displayed.   |
| Message “RESET Held Down” is displayed.               | Reset button on front panel s held down. There is a possibility of Reset button failing to return smooth due to contamination with oil, so clean Reset button with alcohol etc.  |