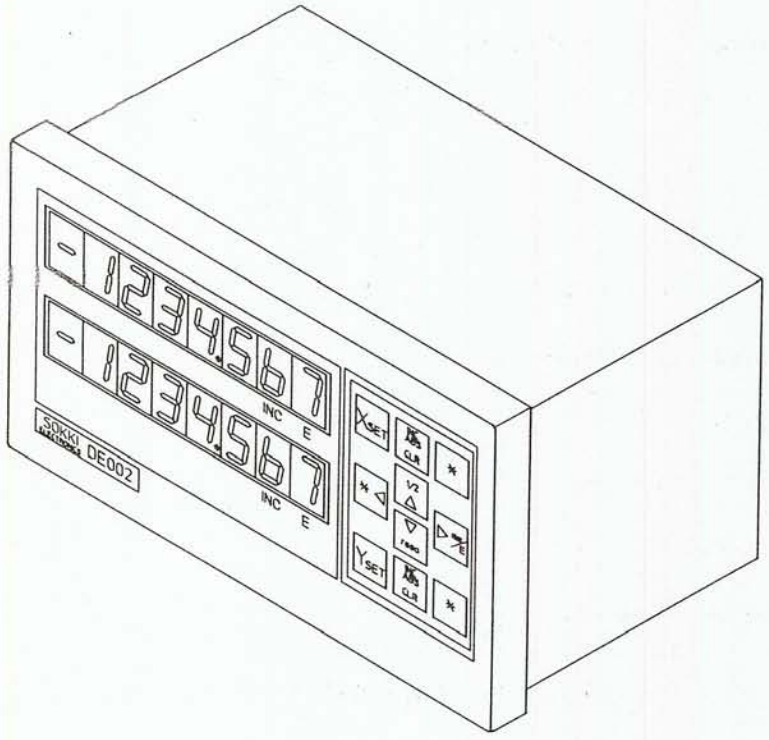
DIGITAL POSITIONING SYSTEMS

SOKKI
ELECTRONICS

DE002

DISPLAY UNIT



OPERATOR'S MANUAL

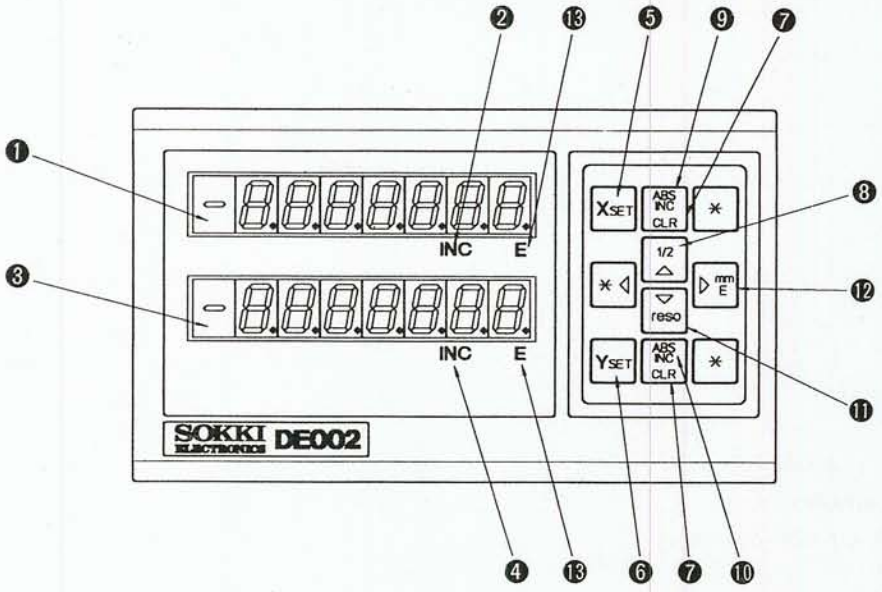
CONTENTS

1. FEATURES

- **Simple operation**
  Minimum required functions and very simple operation.
- **Small and light**
  Minimum installation space is required because the unit is small and light.
- **Dirt resistance**
  The flat keyboard protects the unit from oil and dirt.
- **Choice of display mode**
  The absolute (ABS) coordinate mode displays the distance of the present position from a reference point and the incremental (INC) coordinate mode displays the distance from a certain point of the present position from the target position. You can choose either mode depending on your needs to improve efficiency.
- **Preset function**
  Presets the absolute coordinate system to an arbitrary value.
- **Display**
  Capable of displaying in two units; mm and inch.
- **1/2 setting function**
  Capable of aligning easily.
- **Resolution changeover**
  Display resolution can be changed over with a key.
- **Display value memory backup function**
  Stores in the memory the value displayed at power-off and displays that same value at power-on.

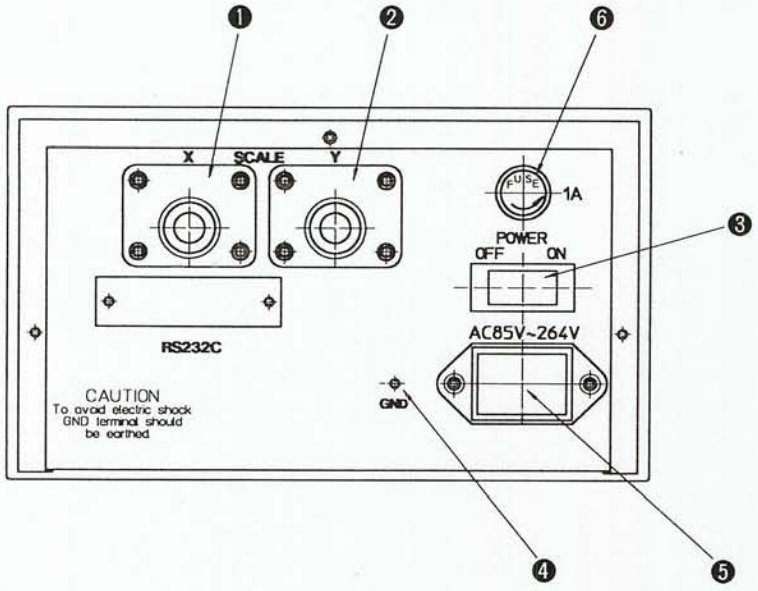
2. NAMES AND FUNCTION

2.1 FRONT PANEL



❶ X-axis display
❷ X-axis INC LED
❸ Y-axis display
❹ Y-axis INC LED
❺ X-axis key
❻ Y-axis key
❼ Clear key
❽ 1/2 key
❾ X-axis ABS/INC selector key
❿ Y-axis ABS/INC selector key
⓫ Resolution selector key
⓬ mm/inch selector key
⓭ Inch LED

2.2 REAR PANEL



❶ X-axis head amplifier
❷ Y-axis head amplifier
❸ Power switch
❹ Ground terminal
❺ AC input
❻ Fuse holder

3. OPERATION

3.1 POWER-ON

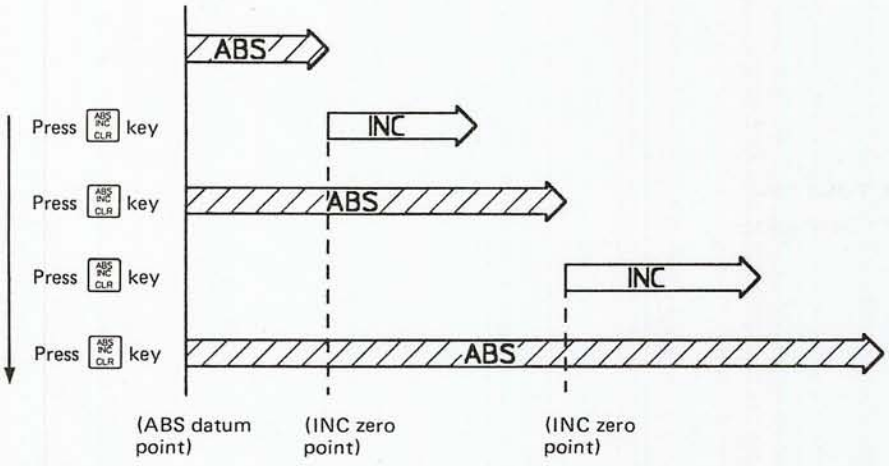
1) If the display unit is switched on, all display segments are illuminated, and then, the measurement position displayed at power-off is redisplayed.
2) The absolute coordinate system is selected.

3.2 CHANGING OVER THE COORDINATE SYSTEM

1) ABS to INC
   When the absolute (ABS) coordinate system is displayed, pressing the [ABS INC CLR] key displays the incremental (INC) coordinate system and sets the scale to 0.
   INC LED is illuminated.
2) INC to ABS
   When the incremental (INC) coordinate system is displayed, pressing the [ABS INC CLR] key displays the absolute (ABS) coordinate system and turns off the INC LED.

- The following figure shows what happens when changing over from the incremental (INC) to the absolute (ABS) coordinate system.

  Exmaple: X-axis



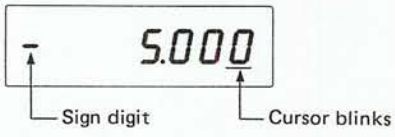
3.3 PRESET

This function presets the absolute (ABS) coordinate system to an arbitrary value.

1) When presetting the X-axis, press the [XSET] key, and when presetting the Y-axis, press the [YSET] key.

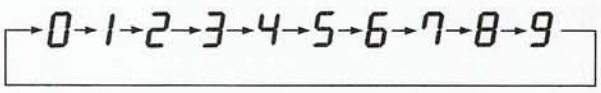
- A previously set value is displayed and the cursor blinks at the lowest digit to effect the preset mode.

Example:

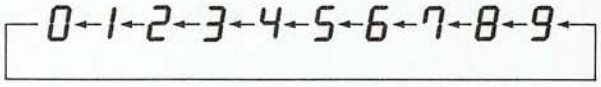


2) Press the [1/2 △] key or [▽ reso] key.

- Pressing the [1/2 △] key shifts a cursor blinking digit to the left sequentially as follows:



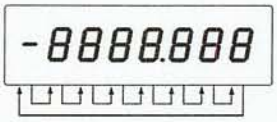
- Pressing the [▽ reso] key shifts a cursor blinking digit to the right sequentially as follows:



3) Press the [✱◁] key or [▷ mm/E] key.

- Pressing the [✱◁] key shifts the cursor to the left as follows:

- Pressing the [▷ mm/E] key shifts the cursor to the right as follows:



- For blinking of the cursor, this part [8] blinks. For the sign digit, this part [5] blinks. When the illuminated time is long, the sign is set to "−", and when short, it is set to "+".

4) With the [1/2 △], [reso ▽], [✳ ◁], and [mm/E ▷] keys, adjust to a desired value, and press the [XSET] key for the X-axis or [YSET] key for the Y-axis.

- The cursor stops blinking and counting starts at the set value.

  Note: Due to software restrictions, you cannot preset a value exceeding 4,277.331 inches.

5) The preset value has been stored. When you want to preset the same value, press the [XSET] key for the X-axis or the [YSET] key for the Y-axis, twice each.

○ Cancelling the preset function

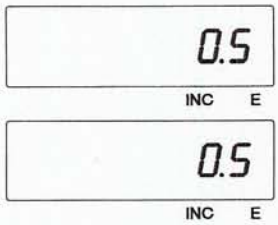
When you want to cancel the preset function during operation, press the [ABS/INC CLR] key for each axis. You are returned to the previous mode.

3.4 1/2 SETTING

Set the display value to 1/2.

1) Press the [1/2 △] key.

   The following is displayed.



2) Press the key for the axis which you want to set to 1/2.

- Press the [XSET] key when you want to set the X-axis to 1/2, or the [YSET] key when you want to set the Y-axis to 1/2.

  The specified axis displays 1/2 and counting starts.

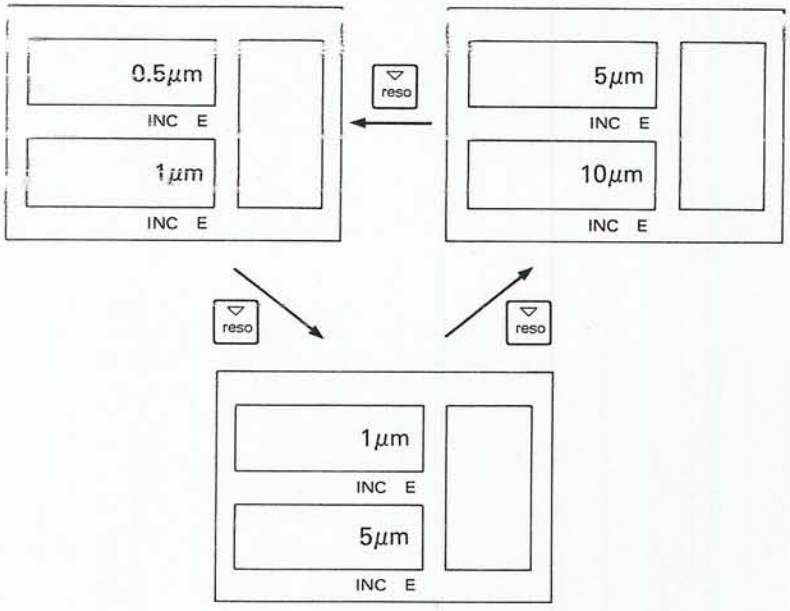
- When the axis is set to 1/2 in the absolute (ABS) coordinate system, the reference point shifts. In the incremental (INC) coordinate system, the absolute reference point does not shift.

○ Cancelling 1/2 setting

Go through the same operation as when cancelling the preset function.

3.5 CHANGING OVER THE RESOLUTION

Change over the display resolution with the reso key.

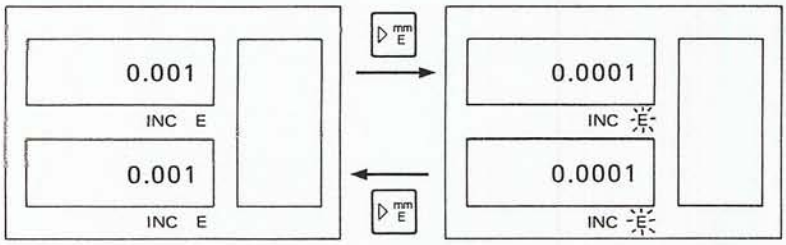


- When either the X- or Y-axis has 10μm resolution, it will be returned to the value set with the internal data the next time the reso key is pressed.
- When you cannot obtain the resolution you want to set with the reso key, change the resolution with internal data setting.

3.6 mm/inch CONVERSION

Changing over the display between mm and inch systems.

- When displayed in the inch system, the LED E is illuminated.



mm system inch system

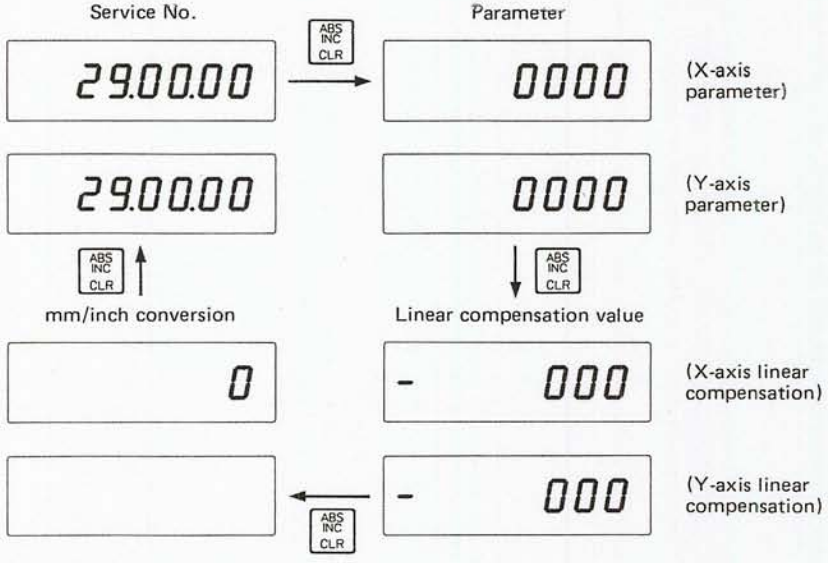
- If the internal data setting is fixed to the mm or inch system, you cannot change over between mm and inch systems.

4. INTERNAL DATA SETTING

Prior to starting your work, set the internal data such as parameters, linear compensation values, etc.
Once these data are set, they are stored. You do not have to set them again unless necessary.

4.1 SETTING THE PARAMETERS, LINEAR COMPENSATION VALUE, AND mm/inch CONVERSION

After turning on the power, press the [ABS INC CLR] key for the X-axis while all display segments are illuminated. This takes you into the parameter setting mode.
From this point, the display changes in the following order every time the [ABS INC CLR] key is pressed.



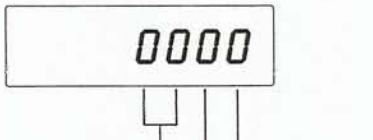
- Once you are in the parameter setting mode, the display backup data and preset data are initialized to 0.

(1) Setting the Parameter

Displayed parameters are polarity, diameter/radius, and display resolution.

1) Description of the display

- The X-axis parameter is displayed in the X-axis display, and the Y-axis parameter in the Y-axis display.



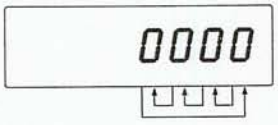
Polarity	* 0	+
	1	−
Diameter/ radius	* 0	Radius
	1	Diameter
Display resolution	00	0.5μm
	01	1μm
	*10	5μm
	11	10μm

*Setting upon shipment from the factory.

2) Setting method

Set with the [XSET], [YSET], [✳◁], and [1/2 △] keys.

- With the [XSET] and [YSET] keys, specify the axis for which you want to set the parameter.
- The cursor shifts in the following order by pressing the [✳◁] key.

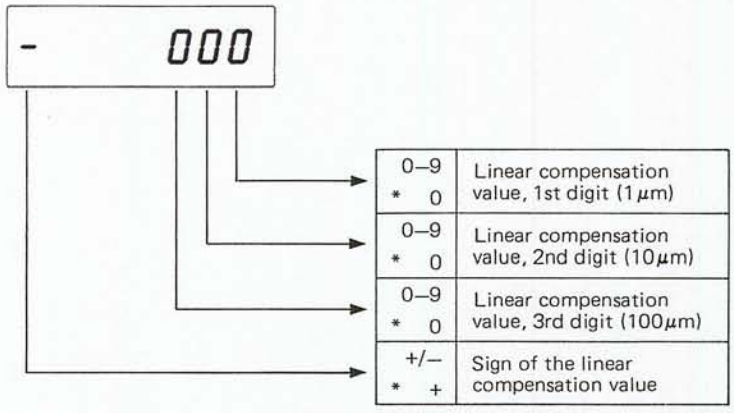


- The display value is changed over between 0 and 1 by pressing the [1/2 △] key.

(2) Setting the Linear Compensation Value

1) Description of the display

- The linear compensation value for the X-axis is shown in the X-axis display and that for the Y-axis in the Y-axis display.



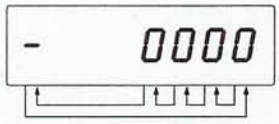
0–9 * 0	Linear compensation value, 1st digit (1 μm)
0–9 * 0	Linear compensation value, 2nd digit (10 μm)
0–9 * 0	Linear compensation value, 3rd digit (100 μm)
+/– * +	Sign of the linear compensation value

*Setting upon shipment from the factory.

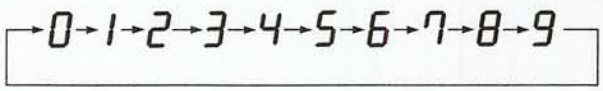
2) Setting method

Set with the [XSET], [YSET], [✱◁], and [½△] keys.

- With the [XSET] and [YSET] keys, specify the axis for which you want to set the linear compensation value.
- The cursor shifts in the following order by pressing the [✱◁] key.

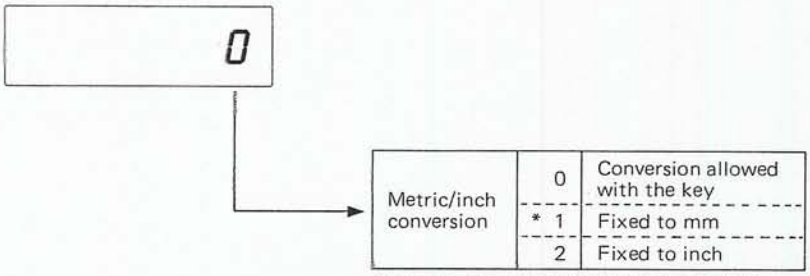


- The display value is changed over in the following order by pressing the [½△] key.



(3) Setting mm/inch Conversion

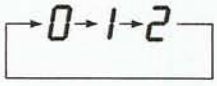
1) Description of the display



*Setting upon shipment from the factory.

2) Setting method

The display is changed over in the following order by pressing the [½ △] key.



- To end setting of the parameter, linear compensation value, or mm/inch conversion, turn off the power.

  When a setting is changed, be sure to press the [ABS INC CLR] key for the X-axis to present the subsequent display. Then, turn off the power.

4.2 INITIALIZING THE INTERNAL DATA

The following describes how to reset the internal data to the setting made when the instrument left the factory.

1) Method

After turning on the power, press the [ABS INC CLR] key for the Y-axis while all display segments are illuminated. This allows you to enter a service routine and keeps all segments illuminated.

Now, the internal data has been initialized. Turn off the power.

- The service routine is designed for inspection and has nothing to with operations other than initialization.

5. LINEAR COMPENSATION

The machine has a linear error for each machine axis due to deflection peculiar to it. By measuring each axial compensation value beforehand and storing it as a compensation value per meter in the display unit, it will be added to or subtracted from the actually measured value, and displayed.

This function is called linear compensation.

The displayed value L_D after linear compensation is calculated by the following expression:

$$L_D = L_S + \frac{L_S}{1{,}000} \times K$$

L_D: Displayed value
L_S : Measured value before compensation (mm)
K : Linear compensation value per 1 m

1) Measuring the linear compensation value
   Measure exactly a block gauge, etc. whose length is known.
2) Determining K
   Substitute the displayed measured value in the following expression to obtain the value of K.

$$K = \frac{S}{L_S} \times 1{,}000$$

L_D: Actual length of the block gauge (mm)
L_S : Measured value before compensation (mm)
K : Linear compensation value per 1 m

3) Storing K
   Store the value of K in the display unit by the operation described in Section 4.1.

6. ERROR DISPLAY

Self diagnostic results are displayed as follows during operation.

Display	Error	Cause	Remedy
F	Overflow	The measured value exceeds the maximum value that can be displayed.	Return the display to maximum displayable value.
E02	Scale signal error	The scale unit is not connected properly.	Press the [XSET] or [YSET] key. Or, turn off the power, connect the scale unit properly, and then, turn on the power.
E	Over speed	Travelling speed of the scale exceeded a maximum response speed.	Press the [XSET] or [YSET] key.

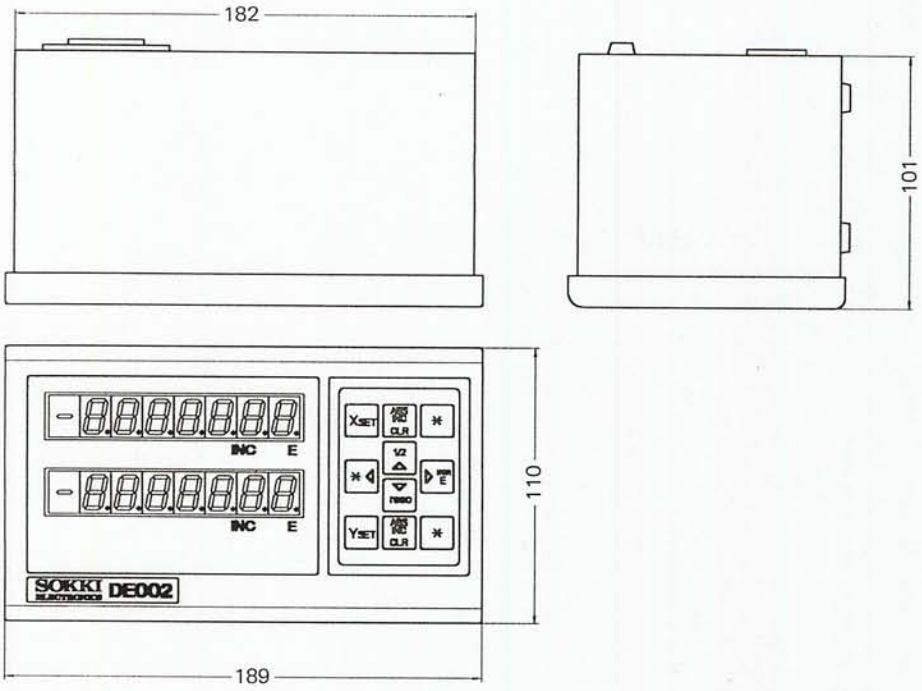
7. SPECIFICATIONS

Display	Displayed axes	2 axes; X and Y	
	Resolution or Display digits	Resolution	Display digits
		0.5μm 1μm 5μm 10μm	±999.9995 mm ±9999.999 mm ±9999.995 mm ±99999.99 mm
		0.00005 inch 0.0001 inch 0.0005 inch 0.001 inch	±99.99995 inch ±999.9999 inch ±999.9995 inch ±9999.999 inch
	Segment type	Orange 7-segment LED	
Function	Absolute coordinate system preset	By key operation	
	Incremental coordinate system zero set	By key operation	
	Metric/inch conversion	By key operation (can be fixed by internally setting)	
	Resolution changeover	By key operation	
	1/2 display set	By key operation	
	Preset value recall	By key operation (memory backup)	
	Linear compensation	By internal setting	
	Polarity changeover	By internal setting	
	Diameter/radius display	By internal setting	
	Displayed data backup	Storage of the displayedsdata at power-off	

Electrical maximum response speed (priority given to internal setting)	Resolution	Response speed
	0.5μm, 0.00005 inch 1μm, 0.0001 inch	50 m/min
	5μm, 0.0005 inch 10μm, 0.001 inch	70 m/min
Operating temperature	0°C to +45°C	
Storage temperature	-10°C to +50°C	
Power supply	AC 100/117/220/240 V +10% to -15% (AC 85 to 264 V), 50/60 Hz	
Consumption current	0.1 A at 100 V AC	
Weight	Approx. 1.1 kg (main body)	

8. DIMENSIONS

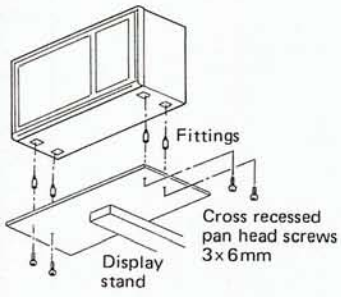
(Unit: mm)

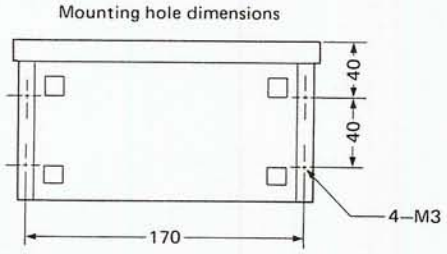


9. INSTALLATION

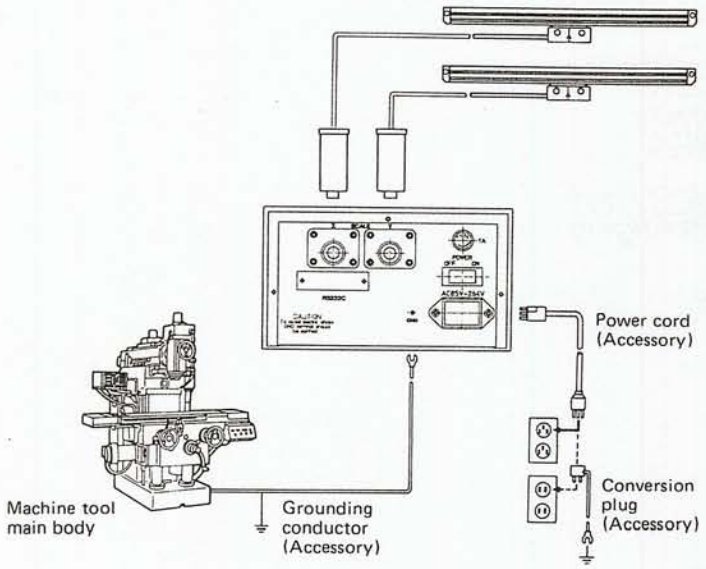
9.1 MOUNTING DIMENSIONS

(Unit: mm)





9.2 SCALE UNIT CABLE CONNECTIONS



Precautions for Installation:

1) Use the AC 100 to 240 V, 50/60 Hz commercial power supply (single-phase AC power supply). Never obtain from the power line.
2) Do not install the display unit in a place exposed to coolant or cutting chips.
3) Operating temperature range is 0 to 45°C. Do not install the display unit in a place close to an extreme heat source or where in direct sunlight.
4) Fix the display unit onto the display stand, etc. using the accessory fittings.

10. ACCESSORIES

Power cord	1 line
Conversion plug	1 pc.
Grounding conductor	1 line
Fitting	4 pcs.
Setscrew (Cross recessed pan head screw 3x6 mm)	4 pcs.
Axis indication label	1 set
Instruction manual	1 copy
Fuse (1 A)	1 pc.

The specifications and appearance of the products may be changed for improvement and may differ from those appearing in catalogs and in the instruction manual.

MEMO

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92.10.10.O Printed in Japan