

INSTRUCTION MANUAL  
for  
DISPLAY UNIT

D U 8 0 0    S E R I E S

**SOKKI ELECTRONICS CORPORATION**

INSTRUMENTATION MANUAL  
for  
DISPLAY UNIT  
ELECTRONIC SERIES

SOHREI ELECTRONICS CORPORATION

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## 1. FEATURES

### † Simple operation

The Display unit has been designed for simple, efficient operation of single axis applications including reset, preset and recall of data.

### † Zero-warning audio tone

The distance that the warning audio tone sounds from the preset point can be changed in 0.1mm steps from 0.1mm to 1mm.

### † RS-232C output (DU811-R only)

Two-way communication is possible between the DU811-R and an external computer.

### † Choice of measuring resolution

The resolution can be set to  $0.5\mu\text{m}$ ,  $1\mu\text{m}$ ,  $2\mu\text{m}$ ,  $5\mu\text{m}$  or  $10\mu\text{m}$  ( $0.00002''$ ,  $0.00005''$ ,  $0.0001''$ ,  $0.0002''$ ,  $0.0005''$ ) in the display unit. For a selection of  $2\mu\text{m}$  resolution, the corresponding inch resolution is  $0.0001$  inch, for ease of use.

### † Easy-to-read display

Large (15mm) green fluorescent display prevents eyestrain.

### † Applicable to multi-axis operation

This unit can be combined with DU100 ~ 300 Display Units to function as an additional axis display counter.

### † Linear error compensation

The specific linear error value of a machine can be set to provide automatic compensation.

### † Error messages

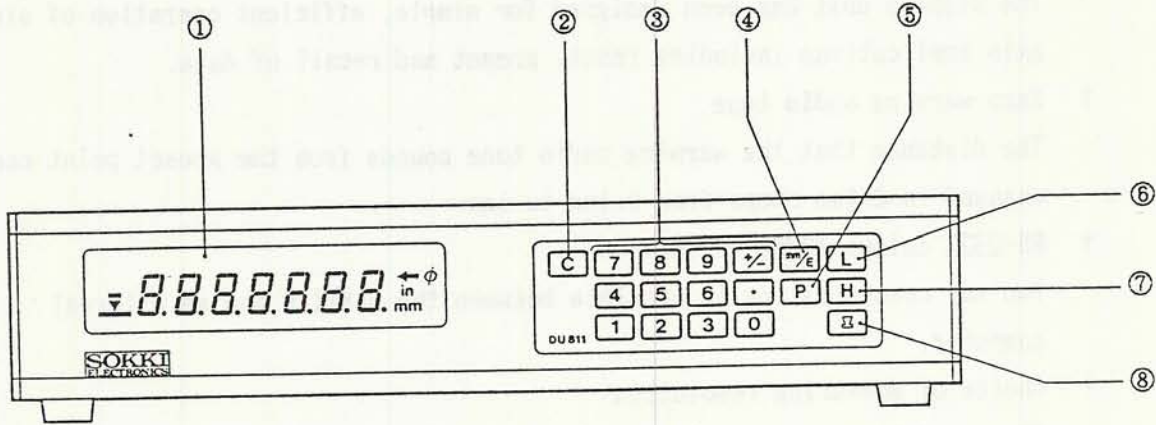
Error codes are displayed when the scale unit is moved faster than the response speed or when faults occur in the display unit.










### † Absolute zero point detecting function and touch probe function

The datum point can be defined and recalled at any time in combination with the JIKI Scales that have an absolute zero point (JS1, JS3 and JS5 series). When using the touch probe, the procedure for setting the machining datum surface and measurement of outer or inner object widths is simplified.

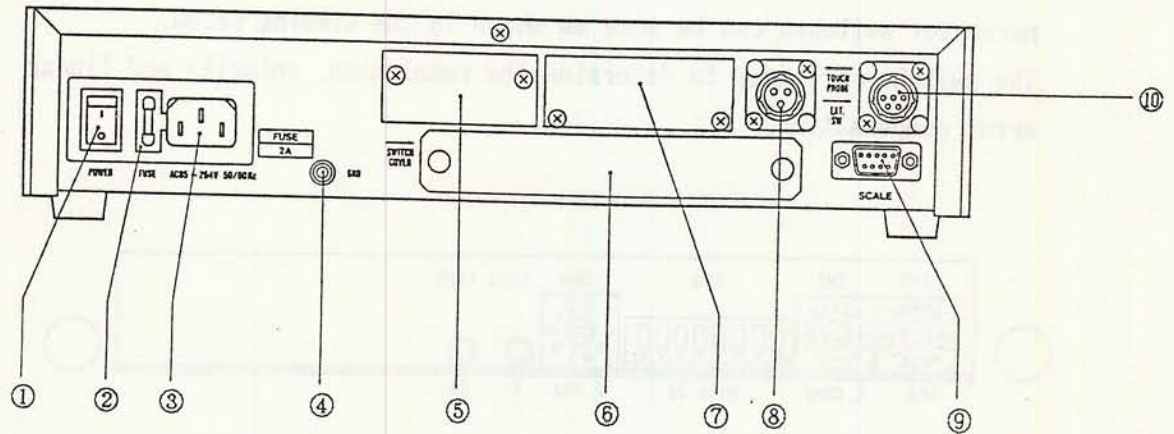
## 2. NAMES AND FUNCTION OF PARTS

### 2.1 Front Panel



- ① Display
- ② Clear key   
Clears the display.
- ③ Numeral setting keys  ~    
Enters the numerical values for positionings.
- ④ mm/inch selection key   
Selects inches or mm as the unit of measurement.
- ⑤ Preset key   
Used when presetting values and to set the position in relation to the present point.
- ⑥ LOAD key   
Used when performing the LOAD function with the touch probe or from the absolute zero point.
- ⑦ HOLD key   
Used when performing the HOLD function with the touch probe or from the absolute zero point.
- ⑧ Absolute zero point key   
Used when performing the absolute zero point function.

## 2.2 Rear panel



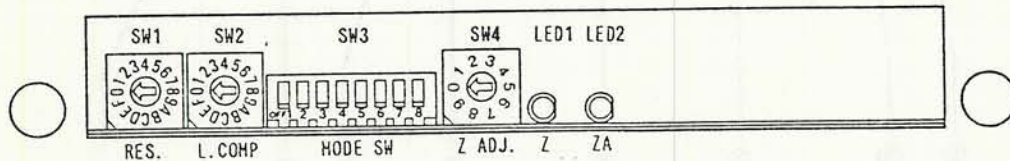
### DU811

- ① Power switch
- ② Fuse holder  
Midget fuse 19195-2A (250V AC, 2A)
- ③ Line input
- ④ Ground terminal
- ⑤ RS-232C output connector cover  
(DU811-R unit has a RS-232C data output connector in this position)
- ⑥ Parameter switch cover  
Remove to set parameter switches for various modes.
- ⑦ Optional connector cover
- ⑧ Touch probe input connector  
Connector for the optional touch probe.
- ⑨ Scale input connector  
For connection with JIKI Scale signal cable.
- ⑩ Switch box connector  
For connection with remote switch box SB series (optional).

## 2.3 Parameter Switches

When the parameter switch cover on the DU rear panel is removed, the parameter switches can be seen as shown in the drawing below.

The switches are used to determine the resolution, polarity and linear error compensation.



- SW1: Display Unit resolution and polarity switch.  
(RES.) This switch is used to set the resolution and polarity of the Display unit.  
(Refer to 3.4)
- SW2: Linear error compensation switch  
(L.COMP) This switch is used to set the linear error compensation value.  
(Refer to 5.2)
- SW3: Mode switch  
(MODE SW) This switch is used to change the display between diameter and radius, or to change the detection direction of the absolute zero point.



	S W 3	OFF		ON	
1	mm/inch conversion function	Display units are fixed in mm		<input checked="" type="checkbox"/> key usable	
2	Display magnitude	Standard ( $\times 1$ )		Diameter ( $\times 2$ )	
3	Sign of linear compensation value	+		-	
4	Magnitude of linear compensation value	$\times 1$		$\times 2$	
5	Direction of detecting absolute zero point	+		-	
6		OFF		/	
7	Setting of Baud rate for RS-232C output	OFF	ON	OFF	ON
8	(Refer to 7.2)	600	1200	2400	4800
		OFF	OFF	ON	ON

SW4: Absolute zero point adjustment switch

(Z ADJ.) This switch is used to adjust the absolute zero point.

(Refer to 3.5)

LED1: Zero point output LED

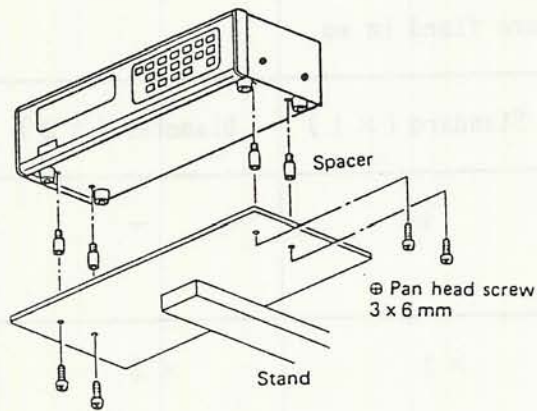
(Z) LED for signal monitor of the zero point.

LED2: Zero point adjustment LED

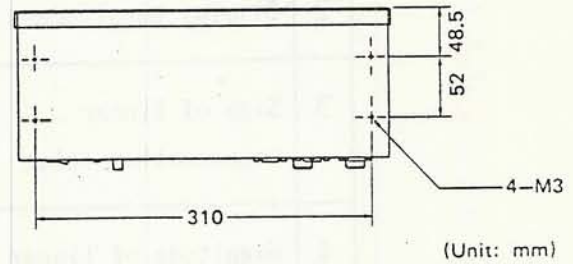
(ZA) Lighting of the LED shows that adjustment of the absolute zero point is complete.

### 3. INSTALLATION

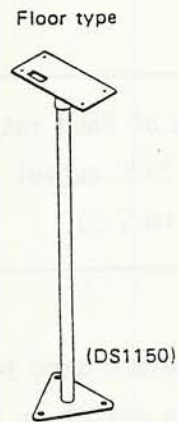
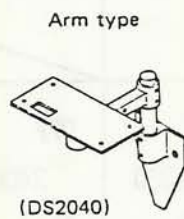
#### 3.1 Display Unit



Dimensions of mounting holes on display unit



Optional display stands are available as below.



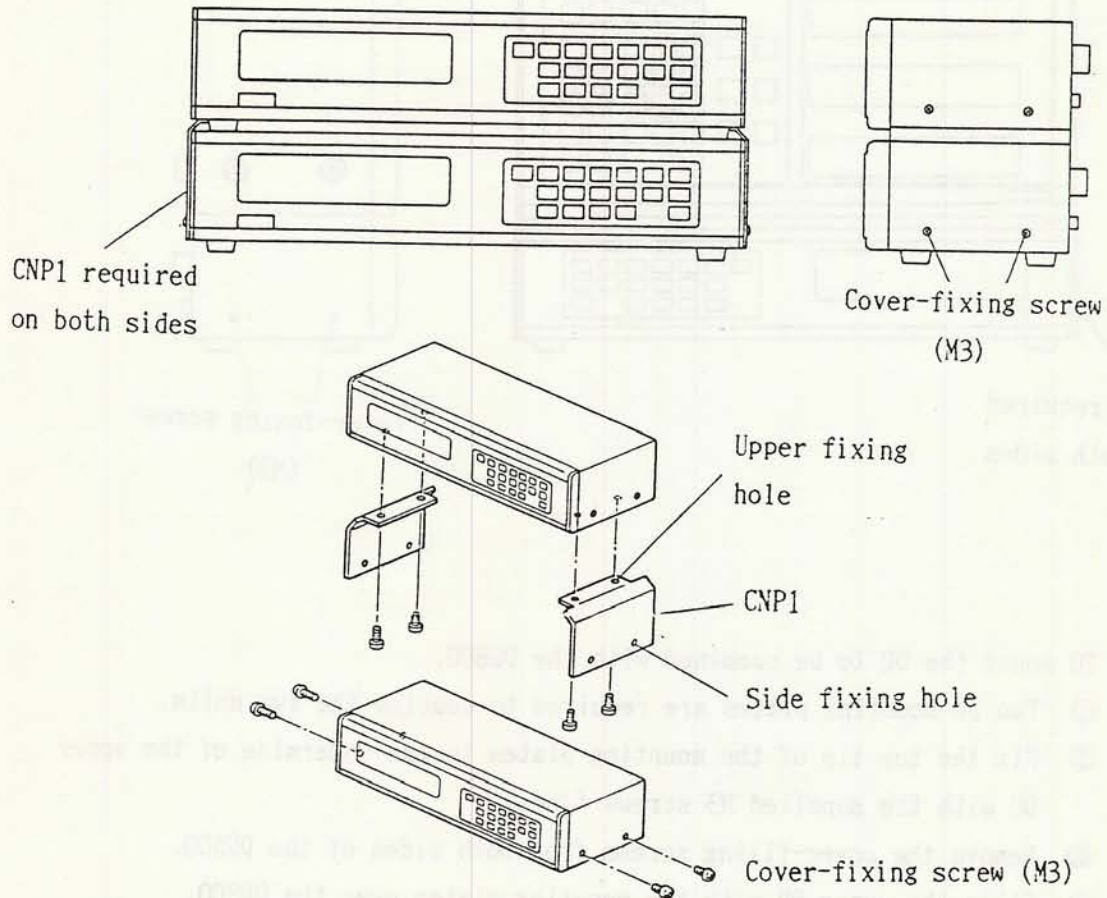
#### Precautions:

- 1) Use a power supply in the range of 100V to 240V AC (+10% ~ -15%), 50/60Hz. Never use a higher voltage.
- 2) Do not expose to coolant, swarf etc.
- 3) Maintain the ambient temperature in the range of 0°C to 45°C (32° F to 133° F). Do not expose to radiation from direct sunlight or other heat sources.
- 4) Mount the display unit on the stand with the screws provided.

### 3.2 Combining Display Units

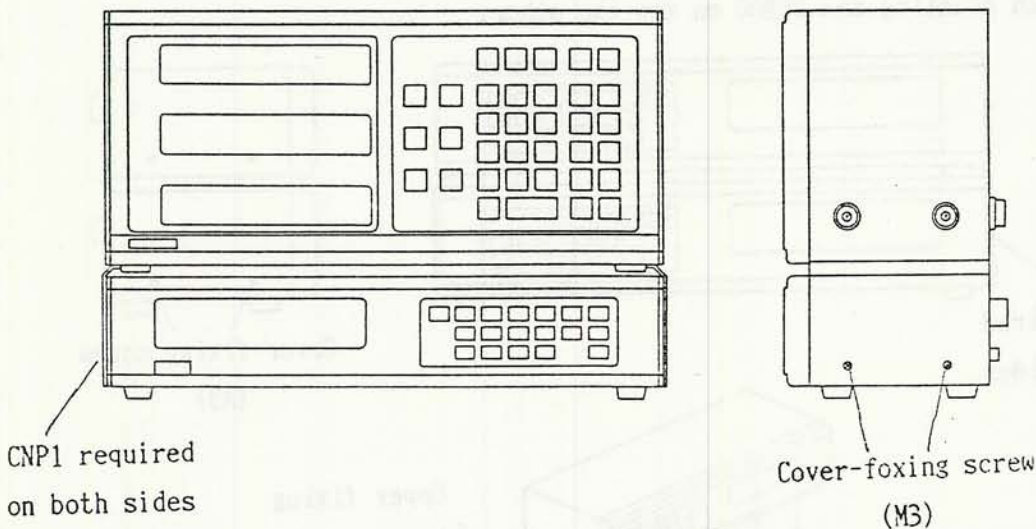
DU mounting plates (Model: CNP1) for combining units are optional accessories.

- 1) When mounting one DU800 on top the other:



- ① Two DU mounting plates are required to combine the two units.
- ② Fix the top lip of the mounting plates to the underside of the upper DU800 with the supplied M3 screws (4pcs).
- ③ Remove the cover-fixing screws from both sides of the lower DU800.
- ④ Slide the upper DU800 with the mounting plates over the lower DU800.
- ⑤ Securely fix both sides of the mounting plates to the lower DU with the same cover-fixing screws.
- ⑥ Several DU800 Display Units can be combined using this mounting procedure.

- 2) When combining the DU800 with DU100 ~ DU300 series Display Units, the mounting procedure is the same as in the previous section 1), but note that it is only possible to mount the DU800 below the DU100 ~ 300 Display Units.



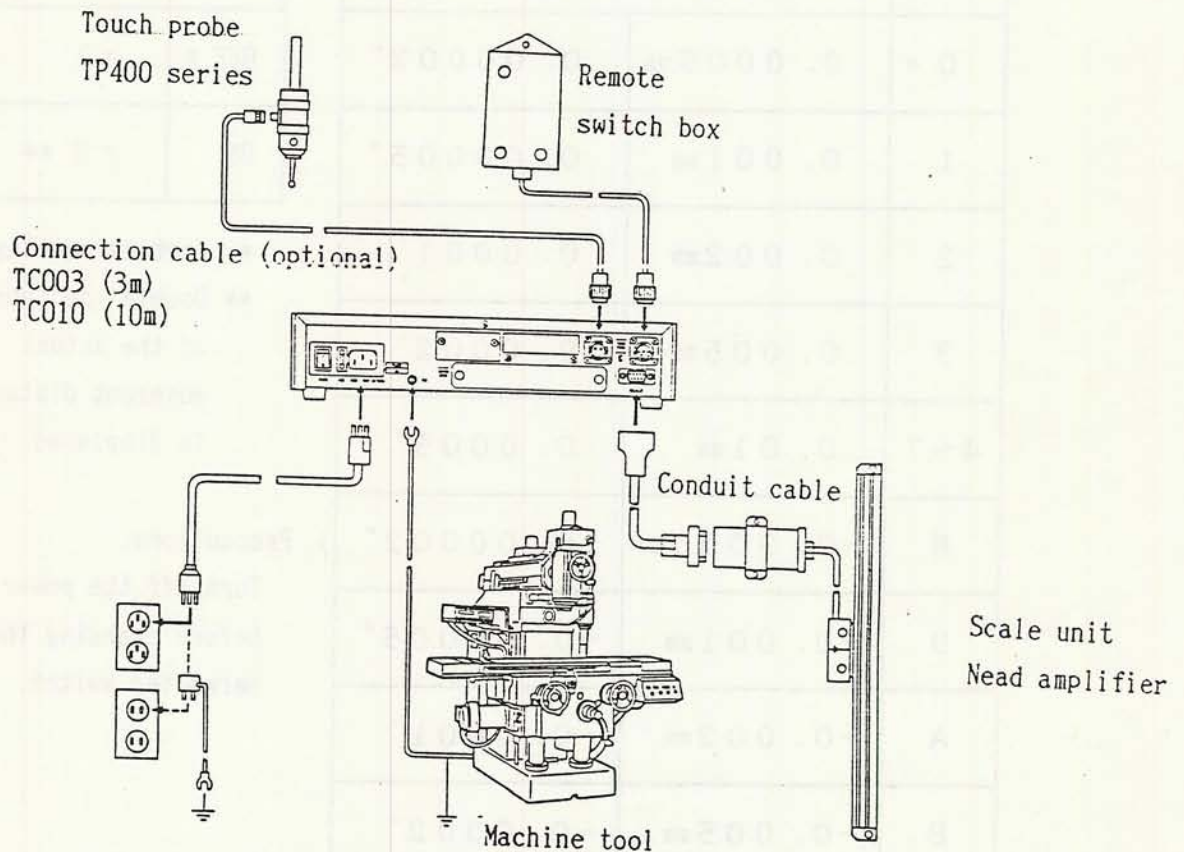
TO mount the DU to be combined with the DU800.

- ① Two DU mounting plates are required to combine the two units.
- ② Fix the top lip of the mounting plates to the underside of the upper DU with the supplied M3 screws (4pcs).
- ③ Remove the cover-fixing screws from both sides of the DU800.
- ④ Slide the upper DU with the mounting plates over the DU800.
- ⑤ Securely fix both sides of the mounting plates to the lower DU with the same cover-fixing screws.

### 3.3 Cable Connections in the Digital Read-Out System

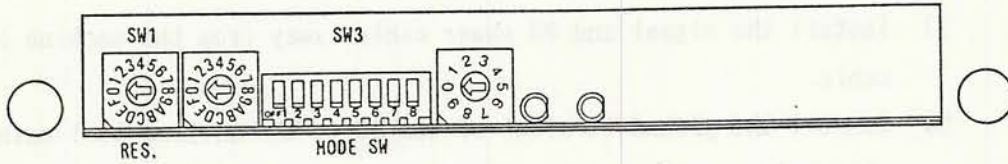
#### Precautions:

- 1) Connect the conduit cable between the head amplifier and the Display Unit DU800.
- 2) Install the signal and DU power cables away from the machine power cable.
- 3) Connect the ground terminal of the DU to the machine tool using the attached grounding cable. (The machine tool should also be grounded.)
- 4) Tighten the mounting screws of the connector.
- 5) Connect or disconnect the cables only after turning the power off.



### 3.4 Determining the Resolution, Polarity and Magnitude of the Display

Resolution and polarity can be determined by setting the parameter switch SW1. The magnitude can be selected by switch SW3-2.



SW 1	Resolution and Polarity	
0 *	0.0005 mm	0.00002"
1	0.001 mm	0.00005"
2	0.002 mm	0.0001"
3	0.005 mm	0.0002"
4~7	0.01 mm	0.0005"
8	-0.0005 mm	-0.00002"
9	-0.001 mm	-0.00005"
A	-0.002 mm	-0.0001"
B	-0.005 mm	-0.0002"
C~F	-0.01 mm	-0.0005"

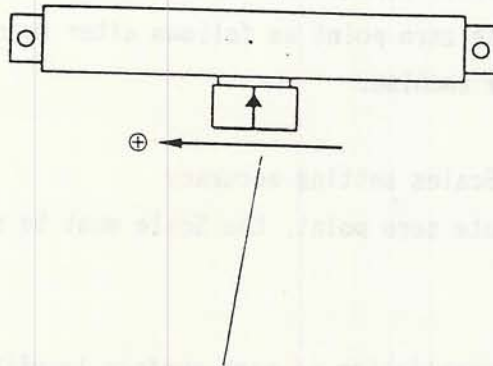
SW3-2	Magnitude
OFF *	× 1
ON	× 2 **

\* Factory setting  
 \*\* Double the length of the actual movement distance is displayed.

Precautions:  
 Turn off the power before changing the parameter switch.

Precautions:

In the table for SW1 on the previous page, the scale direction shown below is plus (increasing).



Movement direction of the head carrier (factory setting)



### 3.5 Adjustment of Absolute Zero Point

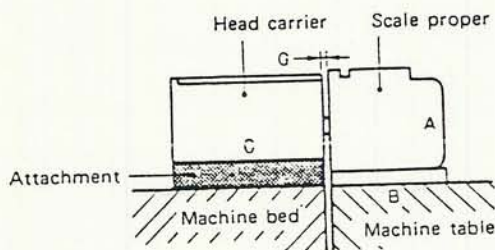
The Jiki Scales, "JS1 series", "JS3 series" and "JS5 series" are provided with an absolute zero point. By using the absolute zero point detecting function, the datum point can be defined and recalled at any time in combination with the DU800 series Display Unit and the Jiki Scales. Check and adjust the absolute zero point as follows after mounting the display unit and scales on the machine.

#### 1) Confirmation of Jiki Scales setting accuracy

- a) To detect the absolute zero point, the Scale must be mounted correctly to the machine.

• Mounting accuracy

Make sure that the parallelism of each surface is within the following limits before absolute zero point adjustment.



- A: Scale measuring surface  
B: Scale mounting surface  
C: Head carrier mounting surface  
G: Gap between scale proper and head carrier

A, B : within 0.1mm

C : within 0.1mm

Parallelism of B and C : within 0.1mm

Space between B and C :

$7 \pm 0.1\text{mm}$ (JS1)

$15 \pm 0.1\text{mm}$ (JS3 & JS5)

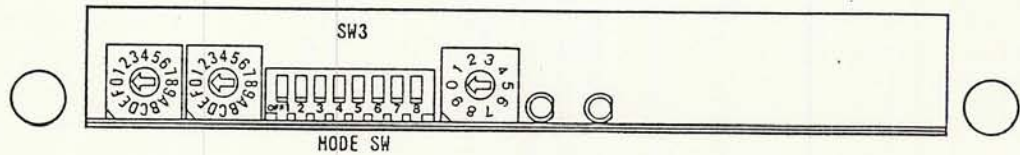
G :  $2.5 \pm 0.1\text{mm}$

- b) If the gap (G) is not  $2.5 \pm 0.1\text{mm}$ , insert the thickness gauge between the scale proper and the head carrier near the absolute zero point mark and adjust the gap using the mounting screws of the head carrier.

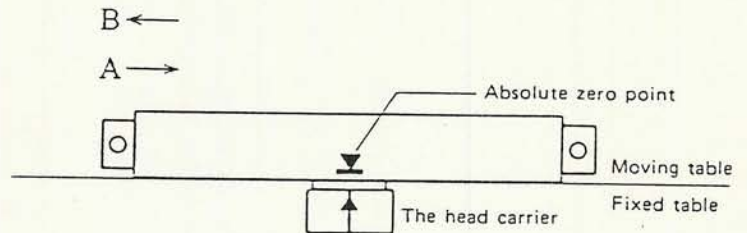


2) Setting the detecting direction

The absolute zero point is detected when the head carrier passes over the zero point while the machine table is being moved in one direction. The parameter switch, SW3-5, should be used to change the detecting direction of the absolute zero point.



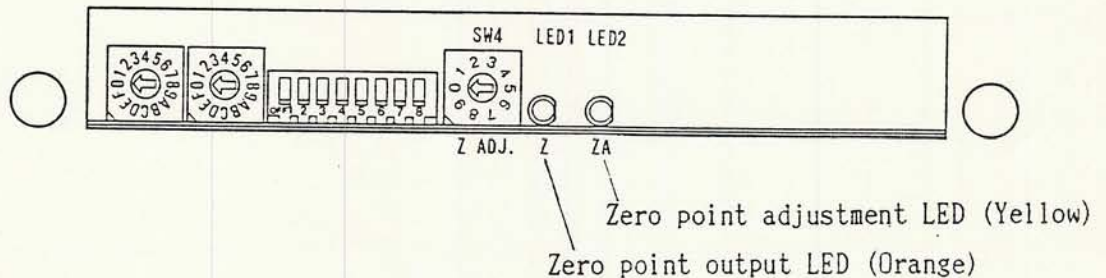
SW3-5	Detecting direction
OFF *	A direction
ON	B direction



\* Factory setting

Precaution: Turn the power off before changing the setting of switch SW3-5.

3) Adjustment

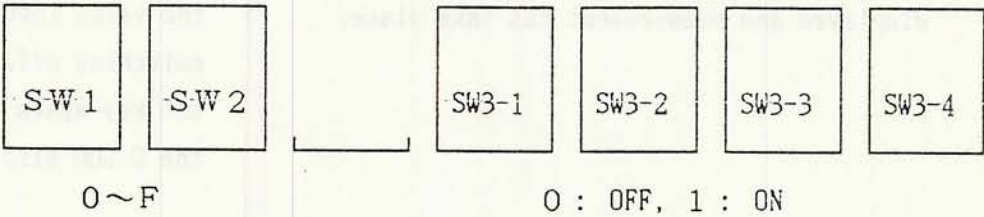
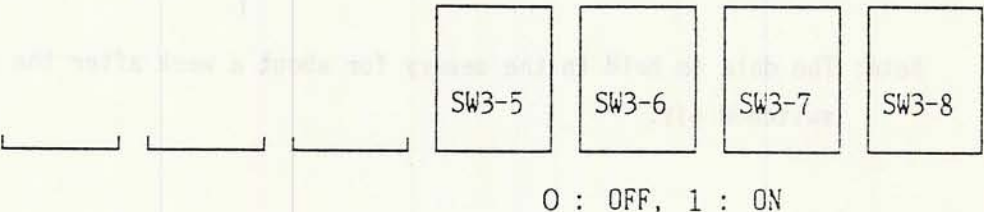
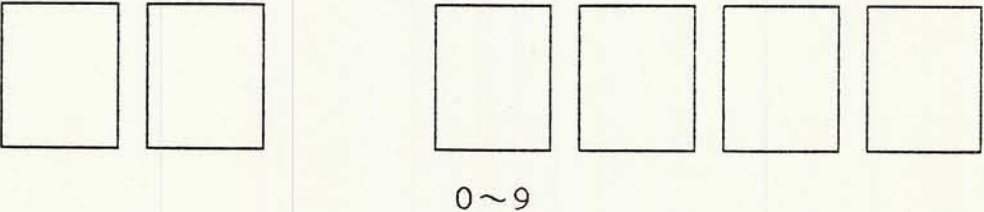


- a) After turning the power of the display unit on, move the table in the direction determined in the above section to pass the zero point. Move the table very slowly (i.e. 1m/min) and ensure that the zero point signal LED comes on at the moment the head carrier passes the absolute zero point.

b) If the zero point adjustment LED also lights, adjustment is complete. If not, turn the zero point adjusting switch (SW4) one point clockwise, and repeat procedures a) and b) until the zero point adjustment LED comes on. The zero point adjustment switch can be adjusted on a position of 0 to 7 points.

### 3.6 Review of Parameter Switch Setting

Just after turning on the power switch, the setting of the parameter switches can be displayed using the [P] key as follows:

Operation	Display
Power ON	Initial display
↓	
→ [P]	
↓	
[P]	
↓	
[P]	Service routine number
	
↓	
[C]	Normal display

## 4. OPERATION

### 4.1 Clearing the Data after Power-On

1) Power on

All segments will light briefly and then as shown at right. This indicates that all functions are operating normally.

(If E □ ! appears, see 6 ERROR DISLRY.)

2) □

After Power-on, previously stored data is displayed and measurement can take place.

3) □

The displayed data can be changed to 0 by pressing the □ key again.

Note: The data is held in the memory for about a week after the power is switched off.

< Display >

- - - - - mm

or

- - - - - in

e.g. 123.000 mm

This display indicates the value input before switching off. Press the key again to show the 0.000 display.

0.000 mm

## 4.2 Preset Positioning

The preset positioning key is used for positioning of the distance from the present point to the target point. In preset positioning, the keyed-in value is displayed as you entered it, therefore enter the distance from the target point to the present point (negative value from the present point to the target point).

### 1) Preset e.g. -123mm in normal measurement operation

< Operation >

Before operation

①  Z

②  1

③  2

④  3

⑤  P

Presetting completed

Notes:

- P must be pressed to enter the preset data.
- While inputting the preset data, an error can be cleared by pressing  C, then inputting the correct data.
- An audio tone sounds when the tool approaches the preset value position.
- The positioning is completed when the tool has been moved until the displayed value is zero.

< Display >

(e.g.)

100.000 mm

- 000 mm

- 1 mm

- 12 mm

- 123 mm

- 123.000 mm

### 2) Recalling a preset value e.g. -123mm

< Operation >

⑥  P

The preset value is displayed

⑦  P

Measurement starts when  P is pressed again.

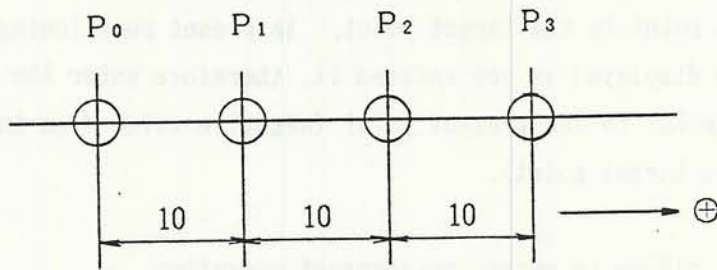
< Display >

- 123.000 ←

- 123.000 mm

Note: The data is held in the memory for about a week after the power-off.

3) Determining positions at equal intervals using the presetting and recalling operations



In the diagram above, it is possible to position P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> from P<sub>0</sub>, using the following method.

< Operation >

- ① Preset -10mm ie.  $\boxed{\text{Z}}\boxed{1}\boxed{0}\boxed{\text{P}}$   
(position of P<sub>1</sub> from P<sub>0</sub>)
- ② Move the tool until the displayed value becomes 0. (P<sub>1</sub> position)
- ③ Press  $\boxed{\text{P}}$  two times  
(Recall and set the initial preset value)
- ④ Move the tool until the displayed value becomes 0. (P<sub>2</sub> position)
- ⑤ Position P<sub>3</sub> by pressing  $\boxed{\text{P}}$  two times and moving the tool until the displayed value becomes zero.

< Display >	
- 10.	000 mm
0.	000 mm
- 10.	000 mm
0.	000 mm

4) Determining the zero-warning audio tone distance

An audio tone sounds a short distance before the tool reaches the preset value position. This distance can be altered as required.

① Power on.

The audio tone warning distance is displayed by pressing :

format: "P b 0. ××mm" or

"P b 0. ×××in"

② The warning distance can be altered by pressing  or  according to the following table.

Note: The audio tone setting value can be increased in steps of 0.1mm (0.005") by pressing  or decreased by the same amount by pressing .

	Setting value (mm)	Setting value (inch)	
<input type="checkbox"/>	* 0.1	* 0.005"	
	0.2	0.01"	
	0.3	0.015"	
	0.4	0.02"	
	0.5	0.025"	
	0.6	0.03"	
	0.7	0.035"	
	0.8	0.04"	
	0.9	0.045"	
<input type="checkbox"/>	1.0	0.05"	* Default value

- ③ For example, when the audio tone setting value has been set to 0.5mm, the audio tone sounds 0.5mm before the preset value position is reached.
- ④ Measurement is started by pressing .

Relative value (mm)	Setting value (mm)
0.000	0.1
0.010	0.2
0.020	0.3
0.030	0.4
0.040	0.5
0.050	0.6
0.060	0.7
0.070	0.8
0.080	0.9
0.090	1.0



#### 4.3 Setting the Machining Datum Point Based on the Absolute Zero Point and Recalling

##### 1) Storing the distance between the machining datum point and the absolute zero point

Measure the distance between the datum point and the absolute zero point to store it.

< Operation >

① Press  $\square$

Set the position of the datum point to 0 or preset it if an offset value is required.

② Press  $\square$

$\square$  is displayed.

③ Press  $\square$

Arrow (  $\leftarrow$  ) flashes.

④ Move the tool so that it passes the absolute zero point

When the tool passes the absolute zero point the displayed values are held and the arrow (  $\leftarrow$  ) stops flashing.

The value is stored in the memory.

⑤ Press  $\square$  to return to normal measurement mode.

< Display >

0.000mm

$\square$   $\leftarrow$

$\square$  0.000mm

(e.g.)

$\square$  12.345mm

2) Reviewing the machining datum point

Review the datum point by recalling the distance value between the datum point and the absolute zero point.

< Operation >

⑥ Press

$\varnothing$  is displayed

⑦ Press

The distance value between the datum point and the absolute zero point is recalled and the display value flashes.

⑧ Move the tool so that it passes the absolute zero point

When the tool passes the absolute zero point, the Display Unit changes back to normal measurement mode.

⑨ Move the tool until the displayed value becomes 0.

< Display >

$\varnothing$

12.345

12.345 mm

0.000 mm

The position where the displayed value becomes zero is the recalled machining datum point.

3) Determining a preset position from the absolute zero point

A required presetting position based on the position of the absolute zero point can be determined.

< Operation >

- ① Press  $\square$   
 $\square$  is displayed.
- ② Press  $\square\square\square\square$ .  
 Enter the distance value, e.g. set 10mm between the absolute zero point and the preset position and press  $\square$ .
- ③ Move the tool to pass the absolute zero point  
 When the tool passes over the absolute zero point the Display Unit changes back to the normal display operation.  
 In part ②, if  $\square$  and  $\square$  are entered instead, the display shows from 0.  
 (the absolute zero point)
- ④ Move the tool until the displayed value becomes 0.

< Display >

$\square$   $\square\square$

$\square$  10.000  $\square\square$

10.000 mm

0.000

Note: The maximum response velocity to detect the absolute zero point is as follows:

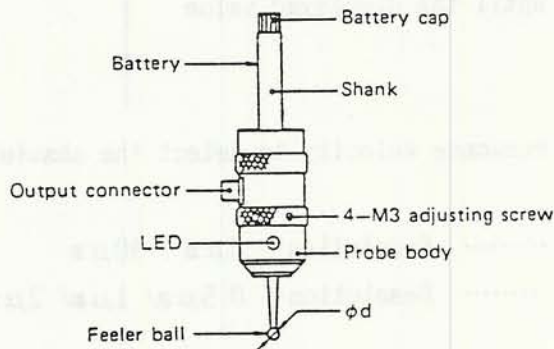
3.5m/min	.....	Resolution	5 $\mu$ m / 10 $\mu$ m
1.9m/min	.....	Resolution	0.5 $\mu$ m/ 1 $\mu$ m/ 2 $\mu$ m

#### 4.4 How to Use the Touch Probe

These are the instructions for the SOKKI TP400 series. When using any other touch probe, refer to the instructions especially for that probe.

##### 1) Names and functions of parts

- Shank:  
For attaching the touch probe to the machine tool spindle.
- Output connector:  
For connecting the touch probe with the Display Unit by cable.
- LED lamp:  
Lights immediately the feeler ball makes contact with the workpiece.
- Feeler ball:  
A steel ball of  $\phi 6\text{mm}$  diameter which has a vertical movement allowance of  $5\text{mm}$  and a horizontal allowance of  $\pm 8\text{mm}$ .



Refer to the relevant manual for the names of other parts.

- 2) Activate the LOAD function with the touch probe (Setting the Datum Plane)  
 In the LOAD function, the display counting stops when the  $\square$  key is pressed and starts at the instant the feeler ball touches the workpiece.  
 The position where the displayed value becomes zero is the datum point.

○ Setting the machining datum point (For the  $\phi 6\text{mm}$  feeler ball)

- ① Attach the touch probe to the tool.
- ② Set the feeler ball radius to  $-3\text{mm}$  and press the  $\square$  key. The display flashes.

$\square$   $\square$   $\square$   $\square$ .

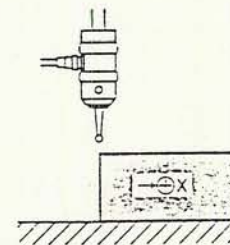
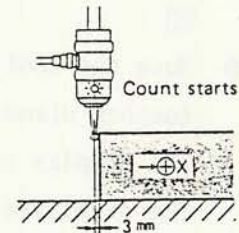
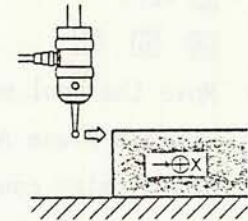
- ③ Move the tool until the feeler ball touches the datum plane of the workpiece.  
 Immediately the feeler ball touches the workpiece, an audio tone sounds. The display stops flashing and becomes:

$-3. \square \square \square \text{mm}$

and the display counting starts.

- ④ When the display becomes "0", The machine spindle is directly over the datum point.

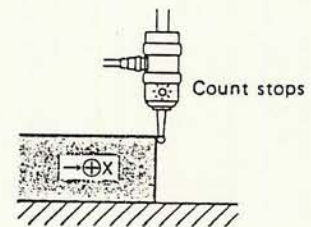
$\square . \square \square \square \text{mm}$



- 3) Activate the HOLD function with the touch probe  
 In the HOLD function, the display counting stops at the instant the feeler ball touches the workpiece.

- ① Press the  $\square$  key.
- ② Move the tool until the feeler ball touches the datum plane of the workpiece.

- Immediately the feeler ball touches the workpiece, the display counting stops.



○ Measuring the outer width of the workpiece

To measure the outer width of the workpiece, the negative value of the diameter of the touch probe (eg. -6mm) and the LOAD and HOLD functions are used.

- ① Input the negative value of the diameter of the feeler ball and press the  key.

- ② Move the tool until the feeler ball touches plane A.

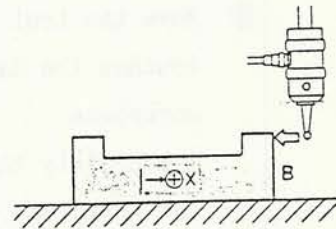
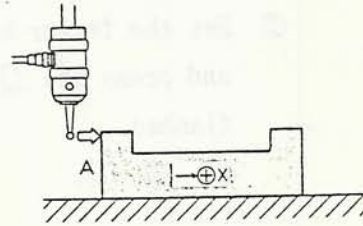
· The display counting starts.

- ③ Press the  key.

- ④ Move the tool until the feeler ball touches plane B.

· The display counting stops.

The displayed value at which counting stops is the outer width of the workpiece.



○ Measuring the inner width of the workpiece

To measure the inner width of the workpiece, the positive value of the diameter of the touch probe (e.g. 6mm) and the LOAD and HOLD functions are used.

- ① Input the positive value of the diameter of the feeler ball and press the  $\boxed{L}$  key.

$\boxed{6}$   $\boxed{L}$

- ② Move the tool until the feeler ball touches plane A.

• The display counting starts.

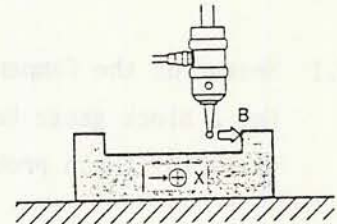
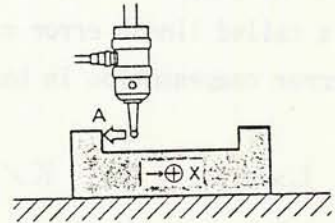
- ③ Press the  $\boxed{H}$  key.

$\boxed{H}$

- ④ Move the tool until the feeler ball touches plane B.

• The display counting stops.

The displayed value at which counting stops is the inner width of the workpiece.



## 5. LINEAR ERROR COMPENSATION

Machine tools possess a linear error due to the deflection peculiar to the individual machine. By measuring the compensation value beforehand and setting the value per meter to the parameter switch, the compensation value can be added to or subtracted from the actually measured value. This function is called linear error compensation. The displayed value ( $L_D$ ) after linear error compensation is based on the following equation.

$$L_D = L_s + L_s \cdot K / 1000$$

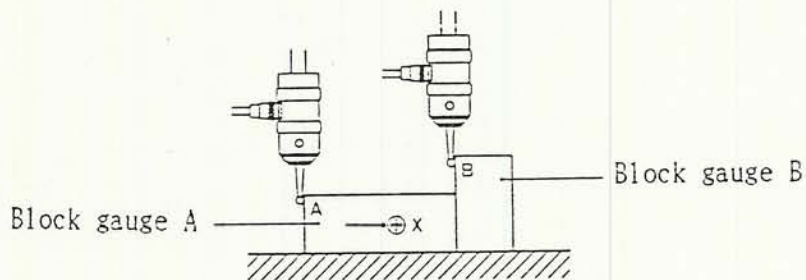
$L_D$  : displayed value (mm)

$L_s$  : measured value before compensation (mm)

$K$  : compensation value per 1m

### 5.1 Measuring the Compensation Value

Use a block gauge having a predetermined length, and measure that length using the touch probe.



#### 1) Setting plane A

Press  $\square$  and  $\square$  and then move the tool until the feeler ball touches plane A.

#### 2) Measure the length of the block gauge

Press  $\square$  and then move the tool until the feeler ball touches plane B. The measured value is displayed.



3) Find the value for K with the displayed value, using the following equation

$$K = (L_D - L_s) \times 1000 / L_s$$

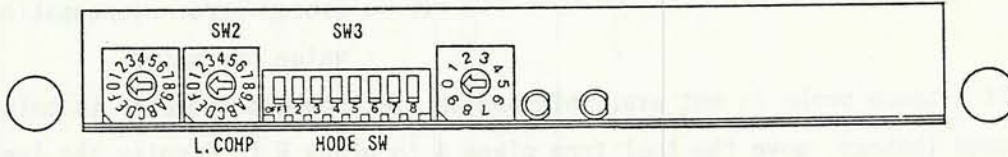
$L_D$  : length of block gauge (mm)  
 $L_s$  : measured value before compensation (mm)  
 $K$  : linear error compensation value per meter

If a touch probe is not available and an electronic micrometer is being used instead, move the tool from plane A to plane B to display the length of the block gauge in the display unit without the LOAD, HOLD functions, and then find the value for K using the displayed value.

Block Gauge Length (mm)	Measured Value (mm)	Linear Error Compensation (K)
0	0	0
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0
6	6	0
7	7	0
8	8	0
9	9	0
10	10	0
11	11	0
12	12	0
13	13	0
14	14	0
15	15	0
16	16	0
17	17	0
18	18	0
19	19	0
20	20	0
21	21	0
22	22	0
23	23	0
24	24	0
25	25	0
26	26	0
27	27	0
28	28	0
29	29	0
30	30	0

## 5.2 Setting the Compensation Value, K

The linear compensation value, K can be set with the parameter switches SW2, SW3-3 and SW3-4 as follows:



### 1) Setting the absolute value of the compensation value

Note: Linear compensation value, K, must be set in  $\mu\text{m}$ .

SW 2	SW 3 - 4	
	OFF *	ON (× 2)
0 *	0 $\mu\text{m}/\text{m}$	0 $\mu\text{m}/\text{m}$
1	4	8
2	12	24
3	16	32
4	20	40
5	25	50
6	35	70
7	60	120
8	80	160
9	100	200
A	110	220
B	130	260
C	140	280
D	180	360
E	230	460
F	250	500

\* Factory setting

2) Setting the sign of the compensation value

SW3-3	Sign of the compensation value
OFF *	+
ON	-

\* Factory setting

3) Example:

Inputting the compensation value,  $-12 \mu\text{m}$ .

SW2            2  
 SW3-4        OFF }  $12 \mu\text{m}$   
 SW3-3        ON    -

The linear compensation value,  $-12 \mu\text{m}$  has now been set.

Note: Turn the power off before the parameter switch is changed.

## 6. ERROR DISPLAY

If there is any fault in the measurement, the error codes shown in the following table will be displayed.

Display	Type of error	Cause	Operation
All the displays light up, then . . . . .	Power error	.During operation, power was interrupted. (The same display appears when the power is turned on)	Press $\square$ .
E 0 1	Memory back-up error	When power is turned on after the instrument has been left unused for more than a week. Note: Data will have been cleared from the memory.	Clear the display by pressing $\square$ and enter the data.
E 0 2	Scale signal error	The scale unit is not connected properly with the display unit.	Switch the power off and check if the scale unit is properly connected.
E .....	Over speed	The travelling speed of the scale exceeds the maximum response speed.	Press $\square$ .
F .....	Over flow	The measured value exceeds the maximum value that can be displayed.	

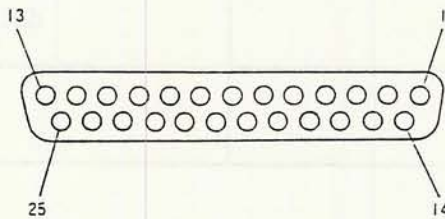
If error conditions other than the above codes appear, please contact the nearest SOKKI agent.

## 7. RS-232C SPECIFICATIONS (for DU811-R only)

The Display Unit, DU800 series, has a RS-232C interface according to the EIA (Electronic Industries Association) serial data communication standard. The data held by the display unit can be transmitted to a printer or another computer.

### 7.1 Input/output specifications

1) Signals	Signal type	EIA-RS-232C asynchronous
	Baud rate	600, 1200, 2400, 4800 BPS (converted by parameter switches, SW3-7 and 3-8)
	Start/stop bit	1 bit
	Data length	7 bits
	Parity	Even
2) Electric characteristics	Driver	Equivalent to SN75188N (TI Co.)
	Receiver	Equivalent to SN75189N (TI Co.)
	Supply power	Vcc+: +12V    Vcc-: -12V
3) Pin assignment		

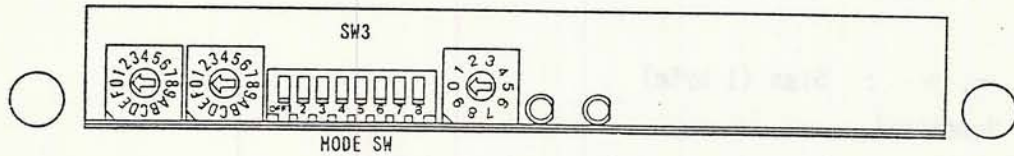


· RS232 pin definitions

Pin No.	Pin Name	Direction	Description
1	GND: Protective ground		
2	TXD: Transmission data	Output	Data transmitted from the display unit
3	RXD: Receiving data	Input	Data received by the display unit
6	DSR: Data set ready	Input	Signal showing that external equipment is ready to receive the data.
7	GND: Signal ground		
20	DTR: Data terminal ready	Output	Signal showing that the display unit is ready to receive the data.
others	NC:		

## 7.2 Setting the Baud Rate

The baud rate can be set with the parameter switches SW3-7 and SW3-8.



SW3-7	SW3-8	Baud rate
ON *	ON *	4800 BPS
OFF	ON	2400
ON	OFF	1200
OFF	OFF	600

\* Factory setting

## 7.3 Data Output Method

Switch off the display unit. Connect the display unit to the required external device using the signal cable.

Note: The signal cable should be less than 15m long.

- 1) When the No.3 Terminal (RXD) of the RS-232C interface receives a one character signal (Refer to 7.5), the displayed data is transmitted.
- 2) Data output, using the optional remote switch box  
Connect the remote switch box (SB series) to the connector on the rear of the display unit. The displayed data can be transmitted by pressing the  key of the switch box.

## 7.4 Data Output Format

### 1) Display data output format

- 1 2 3 . 4 5 6 \_CR/LF

-, + : Sign (1 byte)

Numerical

data : (8 bytes including a decimal point)

\_, E : mm, inch displayed

CR/LF : Return/New line

(which means the end of data, 2 bytes)

} Record length :  
12 bytes

Note: Leading zero suppression is not available in this data output format.

### 2) Error output format (data length: 12 bytes)

E-----\_CR/LF : Overspeed

F-----\_CR/LF : Overflow

\_\_\_\_\_CR/LF : Scale signal error ("E 0 2")

Note: No data is output for other errors.



## 7.5 External Computer Operations

Two way communication is possible between the DU811-R and an external computer.

External computer commands should be input according to the table below.

Computer input character	DU operation
0~9	0~9
-	∞
.	□
C	⊞
E	⊟
H	⊠
L	⊡
P	⊢
R	⊣
LF CR SPACE +	Ignored
other	RS232C output required

## 8. SPECIFICATIONS

### 8.1 Standard Specifications

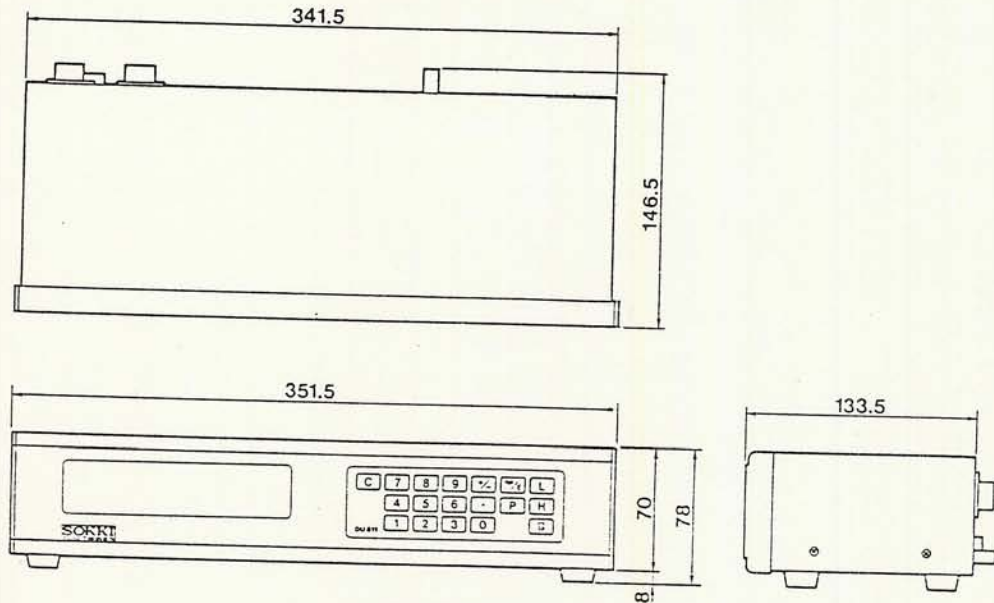
Display	7-digits with - sign Green fluorescent display tube												
Resolution	Selectable with the parameter switch (SW1) <table border="1" data-bbox="446 619 1258 829"> <tr> <td>mm</td> <td>0.5 <math>\mu\text{m}</math></td> <td>1 <math>\mu\text{m}</math></td> <td>2 <math>\mu\text{m}</math></td> <td>5 <math>\mu\text{m}</math></td> <td>10 <math>\mu\text{m}</math></td> </tr> <tr> <td>inch</td> <td>0.00002"</td> <td>0.00005"</td> <td>0.0001"</td> <td>0.0002"</td> <td>0.0005"</td> </tr> </table>	mm	0.5 $\mu\text{m}$	1 $\mu\text{m}$	2 $\mu\text{m}$	5 $\mu\text{m}$	10 $\mu\text{m}$	inch	0.00002"	0.00005"	0.0001"	0.0002"	0.0005"
mm	0.5 $\mu\text{m}$	1 $\mu\text{m}$	2 $\mu\text{m}$	5 $\mu\text{m}$	10 $\mu\text{m}$								
inch	0.00002"	0.00005"	0.0001"	0.0002"	0.0005"								
mm/inch conversion	mm or inch can be converted by the mm/E key												
Reset	The displayed values can be set to zero using the clear key												
Preset	A required value can be preset												
Radius /diameter conversion	Radius or diameter display can be changed for each resolution by the parameter switch												
Polarity conversion	Polarity can be changed using the parameter switch SW1												
Linear compensation	A required compensation value can be input												
Zero-warning audio tone	An audio tone sounds just before the preset data value is reached												

Memory back-up	Preset data, zero point data, zero approach setting data and displayed data are held in the memory for about one week after power-off																				
Maximum response speed	<table border="1"> <thead> <tr> <th>Speed</th> <th colspan="3">Resolution</th> </tr> </thead> <tbody> <tr> <td rowspan="2">50m/min</td> <td>0.5 <math>\mu\text{m}</math></td> <td>1 <math>\mu\text{m}</math></td> <td>2 <math>\mu\text{m}</math></td> </tr> <tr> <td>0.00002"</td> <td>0.00005"</td> <td>0.0001"</td> </tr> <tr> <td rowspan="2">75m/min</td> <td>5 <math>\mu\text{m}</math></td> <td>10 <math>\mu\text{m}</math></td> <td>—</td> </tr> <tr> <td>0.0002"</td> <td>0.0005"</td> <td>—</td> </tr> </tbody> </table>			Speed	Resolution			50m/min	0.5 $\mu\text{m}$	1 $\mu\text{m}$	2 $\mu\text{m}$	0.00002"	0.00005"	0.0001"	75m/min	5 $\mu\text{m}$	10 $\mu\text{m}$	—	0.0002"	0.0005"	—
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50m/min	0.5 $\mu\text{m}$	1 $\mu\text{m}$	2 $\mu\text{m}$																		
	0.00002"	0.00005"	0.0001"																		
75m/min	5 $\mu\text{m}$	10 $\mu\text{m}$	—																		
	0.0002"	0.0005"	—																		
Operating temperature	0°C ~ +45°C																				
Storage temperature	-10°C ~ +50°C																				
Power supply	AC 100/117/220/240V +10%-15% (AC 85V~264V), 50/60Hz, 15VA																				
Weight	About 2kg (display unit)																				

## 8.2 DU Type and Functions

Function		DU811	DU811-R
Standard	Touch probe	○	○
	Absolute zero point	○	○
	Switch box	○	○
	RS-232C Data output connector		○

## 9. DIMENSIONS



## 10. STANDARD ACCESSORIES

Power cable	1 pc
Plug	1 pc
Grounding wire	1 pc
DU mounting plates	1 set
Fixing screws	1 set
Axis display labels	1 set
Operation manual	1 pc
Fuse	1 pc housed in the fuse holder

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

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