

SW-3000

User's Guide

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0 Environment and Specification

Environment and *specification* illustrations are included before you getting started

0.1 Environment

Options	Condition
Temperature	0°~ 50°
Humidity	Vapor and gas is not allowed
Shock	Make sure that there is little shock around

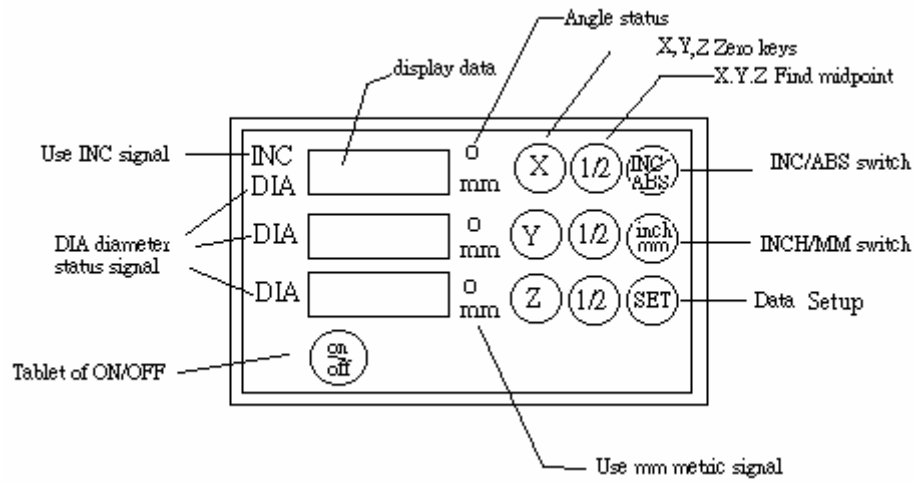
0.2 Caution

- (1) Never rinse the exterior surfaces with water.
- (2) Use only itself DC power, just not connect to the other outlet power.
- (3) Never use *luene* and *aether* to clean.
- (4) Keep away from *explosive* position, absolutely.
- (5) When pause your job in a long time, please switch off the power from rear panel.

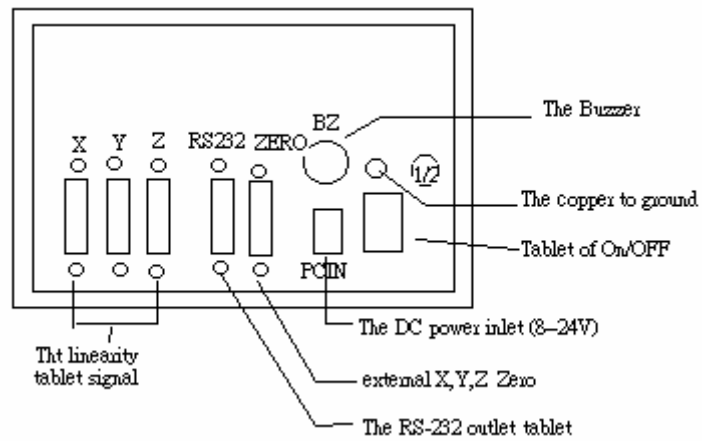
1 Installation

1.1 Outside organization

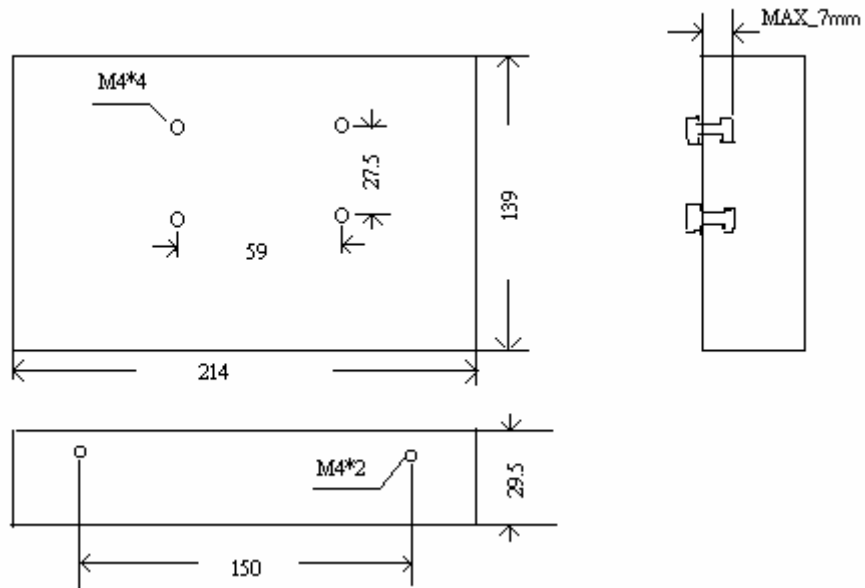
1.1.1 Front panel and keypad



1.1.2 Rear signal outlet and power switch



1.2 Installation dimension



Notes:(1)The length of bolt can not be too long, so that it could not touch the PCB panel.

(2) To avoid of becoming flexible, spring gaskets are required when you mount bolts.

2 · Basic Functions

2.1 Getting started

Press the power switch at the bottom of the rear panel. The following will be display in turn. All of the LED screens light immediately, message of model type and version number is displayed later. The data value which was stored when power off will be displayed following,

2.2 Show ON/OFF

When you press the ON/OFF key, the message of ON or OFF is displayed on LED screen.

However, the power is not off., you just press the key.

2.3 Zero axes

Zero the value of axes, and display the zero value on LED screen. For example:

2.345

Press the (X) key

0.000

the zero result is displayed

2.4 Find the midpoint

Divide the data value by 2 to find the midpoint. The value which has been divided will be displayed on LED screen. For example::

2.340

Press the $\frac{1}{2}$ key

1.170

the result is displayed

2.5 Change between INCH and MM

You can set INCH or MM metric mode to show data value as your favor.

25.400 mm

Press the $\frac{\text{inch}}{\text{mm}}$ key

1.000 mm

the result is displayed

2.6 Change between ABS and INC

You can change display coordinate mode from ABS mode to INC mode, or change from INC to ABS correspondingly.

1.000 mm
ABS mode


Press the $\frac{\text{ABS}}{\text{INC}}$ key in current


1.175 mm
mode


the result will be displayed in INC

2.7 Preset axes value

Set the axes data value to the special numerical value.

INC mm Press the  key, LED screen flash

INC mm Press the  key

INC mm Press the  key of X axes,
“INC/ABS” key, “INCH/MM” key, “+” key and “-” key in
turn

INC mm Set X axes value to “-2.500”, press
“SET” key to finish

INC mm Then go back to the operating state

3. System Setup

3.1 Introductions

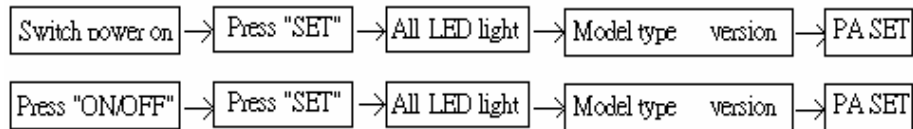
3.1.1 The linear scale(length value)

Display Code	Description	Default Value
RA	RA 1(DIR diameter) RA 0(RAD radius)	0
Dir	Dir 0(UP counting) Dir 1(Down counting)	0
PA	Set password	
L SCALE	Connect to linear scale	L SCALE
U	The resolution(0.0001~10mm)	0.005
L	The linearity compensate(0~9999)	0

3.1.2 The rotary encoder(angle value)

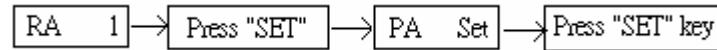
Display Code	Description	Default Value
En dp	En dp 0(DD) En dp 1(DMS)	0
Dir	Dir 0(UP counting) Dir 1(Down counting)	0
PA	Set Password	
0 Encod	Connect to rotary encoder	L SCALE
E	The resolution(1~999999) the pulses per cycle	1800
L	The linearity compensate(0~9999)	0

3.2 Getting started

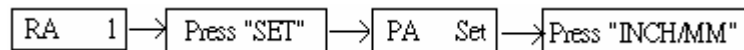


3.3 Exit setup

Go to internal reference setting, save settings and exit



Without saving settings and exit.



3.4 Functions Setup

3.4.1.1 R/D mode setup

To describe the part precisely, you can set R/D mode to diameter or radius. For example:

To set R/D mode of linear scale:

Go to the internal reference setup, until LED appear as follow:

PA Set

Press "X" key

RA 0

Press "1/2" key of X axes

RA 1

Now R/D mode was set to

diameter

3.4.1.2 Set display mode of rotary encoder

Select DD(or DMS) angle display mode

Go to the internal reference setup, until LED appear as follow:

PA Set

Press “X”

En dp 0

Press “1/2” of X axes

En dp 1

Describe angle value in DMS

mode.

Note: DD refer to decimal degrees;

DMS refer to degree minute second

3.4.2 Positive and negative axes

If you just don't like the positive axes, you can set the positive axes as your favor. Or otherwise, you have to set the positive axes because of the condition.

Go to the internal reference setting, until LED appear as follow:

PA Set

Press “X”

Dir 0

Press “1/2” of X axis

Dir 1

0: positive → 1:negative

3.4.3 Connect to linear scale or rotary encoder

You can set X axes connect to linear scale, and calculate the length it goes. Or, you can also set X axes connect to

rotary encoder and get the angle it run.

Go to the reference setup until LED display as follow:

PA Set Press “X” key

L SCALE Press “1/2” key of X axis

0 Encode Use DD format(with rotary encoder)

3.4.4 Resolution of linear scale

If any axes connect to linear scale, you can set the resolution of the linear scale.

Number	Display (mm)	Display (inch)	Number	Display (mm)	Display (inch)
0.1 μ m	0.0001	0.000005	0.1mm	0.1	0.005
0.2 μ m	0.0002	0.00001	0.2mm	0.2	0.01
0.5 μ m	0.0005	0.00002	0.5mm	0.5	0.02
1 μ m	0.001	0.00005	1mm	1	0.05
2 μ m	0.002	0.0001	2mm	2	0.1
5 μ m	0.005	0.0002	5mm	5	0.2
10 μ m	0.01	0.0005	10mm	10	0.5
20 μ m	0.02	0.001			
50 μ m	0.05	0.002			

Go to the reference setting until LED display as follow:

PA Set

Press “X” key

U 0.005

Press “1/2” key of X axis

U 0.001

The resolution of linear scale was set to 1 μ m.

3.4.5 Resolution of rotary encoder

Just enter the numeric data directly form keypad as the number of rotary encoder.

Go to the internal reference settings, until LED appear as follow:

PA Set

Press “X” key

E 001800_

Press “1/2” of X axis to increase, Press “INC/ABS” to displace.

E 003600

The resolution of rotary encoder is 3600 number.

Note: The number of rotary encoder refers to the count when the rotary encoder rotates a cycle. The angle resolution of rotary encoder equals to 360° per count*4.

3.4.6 Linearity compensate

To measure the part accuracy and precisely, you would have to set the linearity compensate of linear scale and rotary encoder.

Linearity Compensate= $((\text{standard value} - \text{measure value})/\text{measure value}) * 1000000$

For example:

Standard Value=1001000

Measure Value=1000000

Linearity

Compensate= $(1001000-1000000)/1000000 * 1000000=1000$

Go to the internal reference setting, until LED appear as follow:

PA Set

Press “X” key to zero X axis

L 0000_

Press “1/2” of X axis to increase, press “INC/ABS” to displace, press “inch/mm”, press “+” or “-”.

L 1000

The linearity compensate was set to 1000.

Number(n)	Unit	Number(n)	Unit
n<180	1°	n<180	1.00.00
180≤n<450	0.5°	180≤n<270	0.30.00
450≤n<900	0.2°	270≤n<360	0.20.00
900≤n<1800	0.1	360≤n<540	0.15.00
1800≤n<4500	0.05	540≤n<1080	0.10.00
4500≤n<9000	0.02	1080≤n<2700	0.05.00
9000≤n<18000	0.01	2700≤n<5400	0.02.00
18000≤n<45000	0.005	5400≤n<10800	0.01.00
45000≤n<90000	0.002	10800≤n<16200	0.00.30
90000≤n<180000	0.001	16200≤n<21600	0.00.20
180000≤n<450000	0.0005	21600≤n<32400	0.00.15
450000≤n<900000	0.0002	32400≤n<64800	0.00.10
900000≤n<999999	0.0001	64800≤n<162000	0.00.05
		162000≤n<324000	0.00.02
		324000≤n<999999	0.00.01

4 ° Other Options

4.1 Description of RS-232

The destination of these section is to show you how the RS-232 port communicate with the computer. So, you first must read about the behavior and the protocol of RS-232.

4.1.1 Behavior of RS-232

Baud Rate=9600 Parity=none
Data Length=8 bit Start Bit=1 bit Stop Bit=1
bit

4.1.2 Protocol of RS-232

Total have 17 bytes. Send back from 1stByte(bit 0) to 17th Byte(bit 7).

Byte 1st Head==0FEh (Hex value=0FEh)

Byte 2nd Sign

B7~B5=0(reserved)

B4: 0(mm), 1(inch)

B3: 0(reserved)

B2: Z-Sign 0('+'), 1('-')

B1: Y-Sign 0('+'), 1('-')

B0: X-Sign 0('+'), 1('-')

Byte 3rd Status(Error indicator)

B7~B3=0(reserved)

B2: Z-Sign 0(OK), 1(Error)

B1: Y-Sign 0(OK), 1(Error)

B0: X-Sign 0(OK), 1(Error)

Byte 4th ~7th X-axis value (BCD format)

$$X\text{-value} = B4 + B5 * 10^2 + b6 * 10^4 + b7 * 10^6$$

Byte 8th ~11th Y-axis value (BCD format)

$$Y\text{-Value} = B8 + B9 * 10^2 + B10 * 10^4 + B11 * 10^6$$

Byte 12th ~15th Z-axis value (BCD format)

$$Z\text{-Value} = B12 + B13 * 10^2 + B14 * 10^4 + B15 * 10^6$$

Byte 16th ~17th Check Sum(CS) (BCD format)

$$B17, B16 = B2 + B3 + \dots + B14 + B15$$

B16. b0: Least significant bit of check sum(LSB)

B17. b1: Most significant bit of check sum(MSB)

Note: (1) Don't care the data of non-exist axis

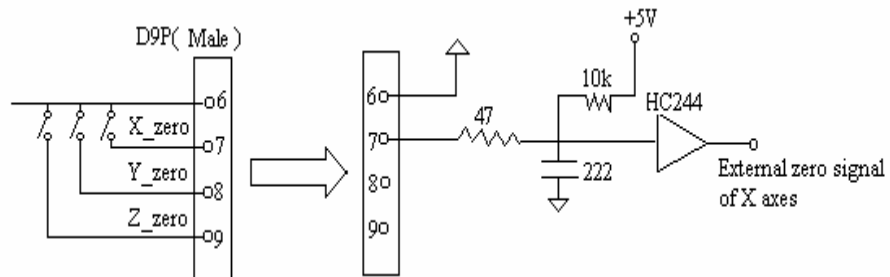
(2) B4: means 4th byte

(3) From B4 to B17 are BCD format

(4) B16.b0 means bit 0 of 16th Byte

4.2 Description of external zero signal of X.Y.Z axes

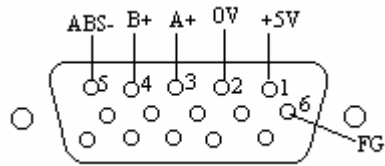
The external zero signal cause the system zero the axis. However, the buzzer dose not alarm. Here is the input interface:



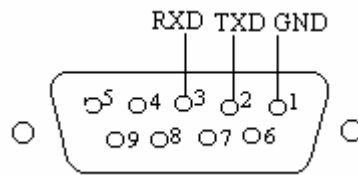
5. Maintenance Description.

5.1 Description of outlet signal

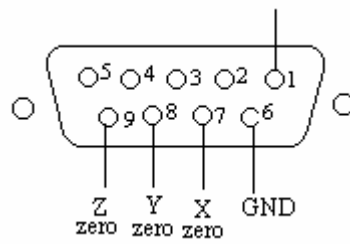
Linear scale output pin designation



RS-232 output pin designation



External zero output pin designation



5.2 Error description

Error Code	Description	Causation
Dsp OfL	The value is outside of range	(1) Error resolution (2) It goes too far then it can
Error 1	Read error signal	(1) Unstable signal of A, B (2) Something wrong with the connector or signal cable
Error 2	Read error signal	(1) Unstable signal of A, B (2) The isolation signal cable dose not Connect to ground
OfL 1	The internal counting exceed rang	(1) Repeat counting or zeroing (2) It exceed the value range