

®

# Easson-TW Digital Readout System

*Always Committed to Quality, Technology & Innovation*

## ES-5 2D DRO Operation Manual



**CIRCLE**



**LINE**



**POINT**



**DISTANCE**



**Easson**



**ANGLE**



**INTERSECTION**



**PERPENDICULAR  
POINT**



**PRINT**

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**ES-5 2D Geometric Digital Readout System**

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**Operation Manual**

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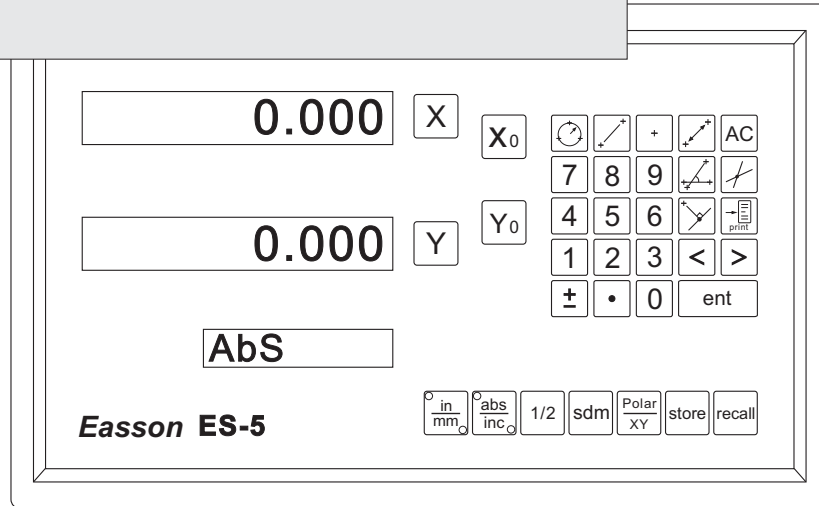
***Easson* Technologies Co., Ltd.**

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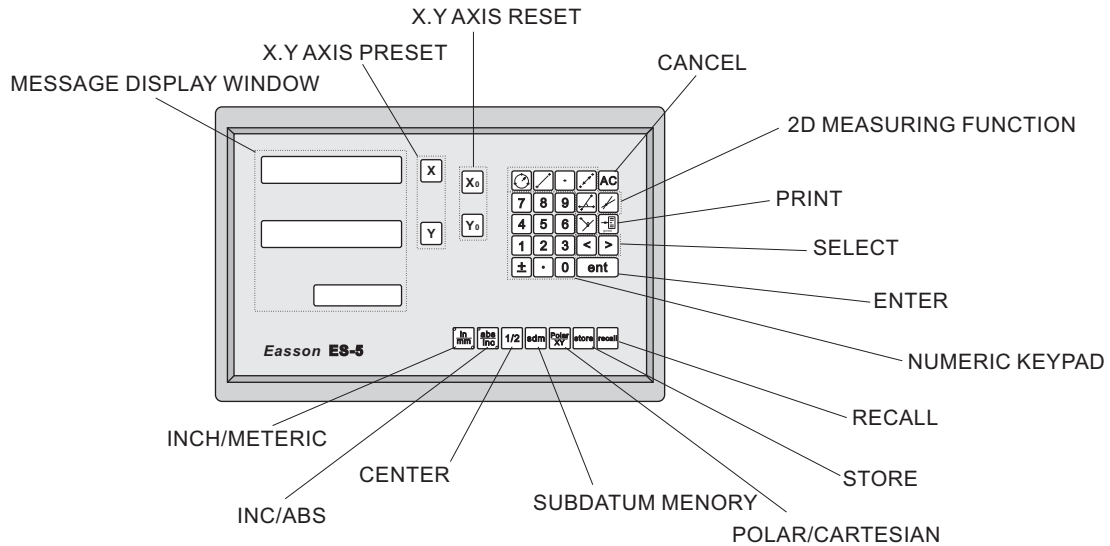
# Basic Functions



## ES-5 2D GEOMETRIC DRO

ES-5 is designed for 2D Geometric Measuring used in Profile Projector , Tool maker microscope \ CCD measuring machine.

Front panel description:

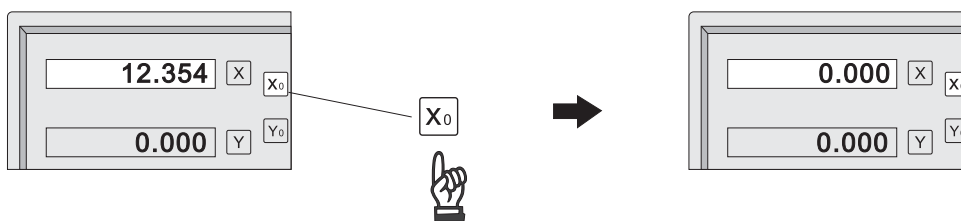


### operate description

#### 1) Set Display to Zero

Purpose: Set the current position for that axis to zero

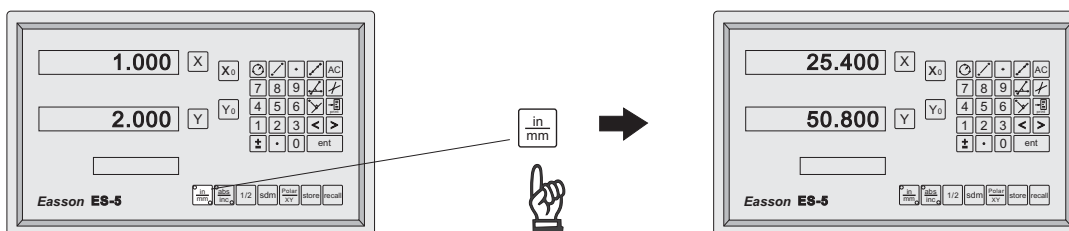
Example: To set the current X Axis position to zero



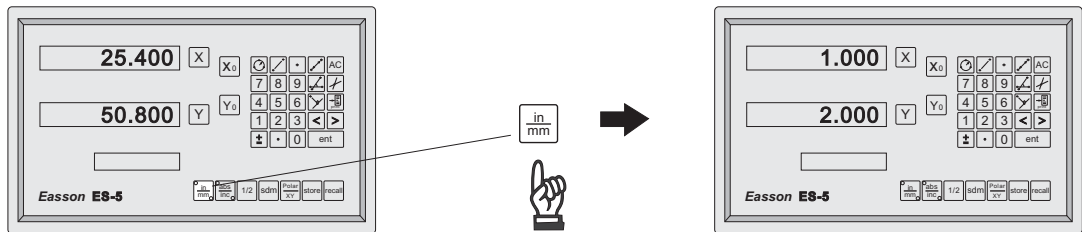
#### 2) Inch / Metric Display Conversion

Purpose: Switches between inch and metric display

Example 1: Currently in inch display , switch to metric display



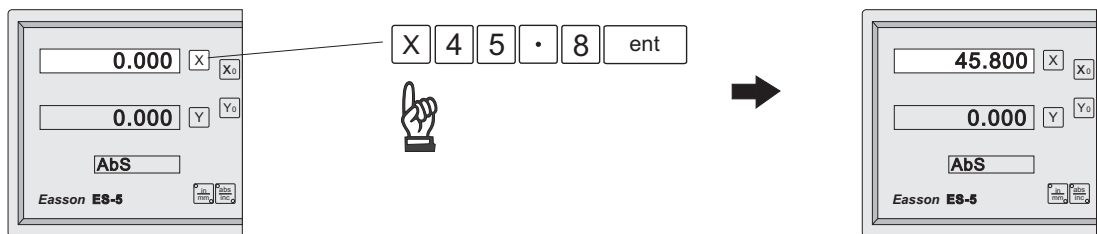
Example 2: Currently in metric display , switch to inch display



### 3) Enter Dimensions

Purpose: Preset the current position for that axis to an entered coordinate position

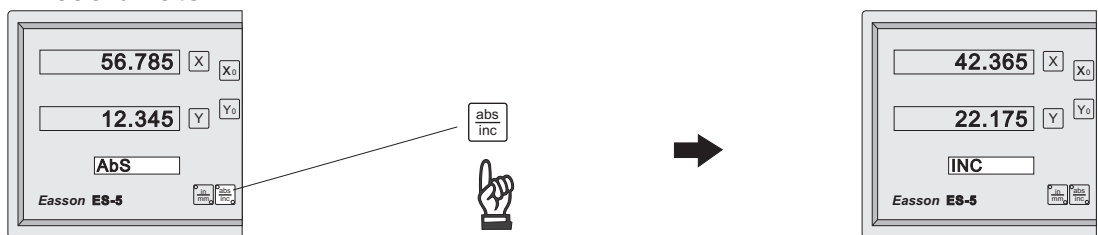
Example: To set the current X Axis position to 45.800 mm.



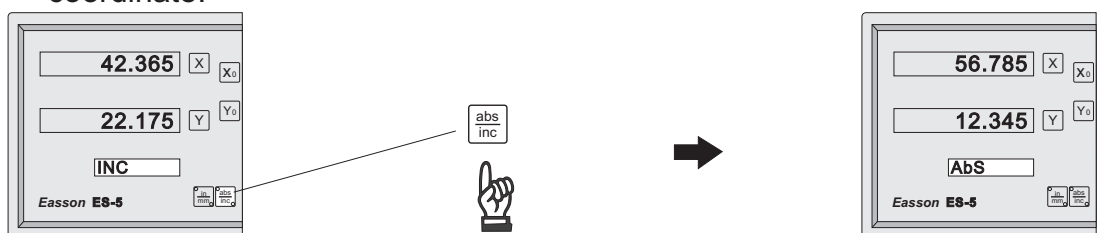
### 4) ABS/INC Coordinates display switches

Purpose: ES-5 provides two sets of basic coordinate display , they are ABS (absolute) and INC (incremental) display.

Example 1 : Currently in ABS display coordinate , switch to INC display coordinate.



Example 2 : Currently in INC display coordinate , switch to ABS display coordinate.



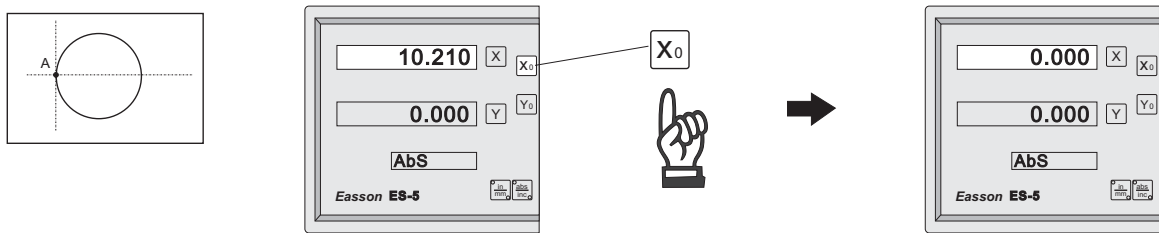
5) Centre-find

Purpose : ES-5 provides the centre-find function by halving the current display coordinate, so that the zero point of the work piece is located at the centre of the work piece.

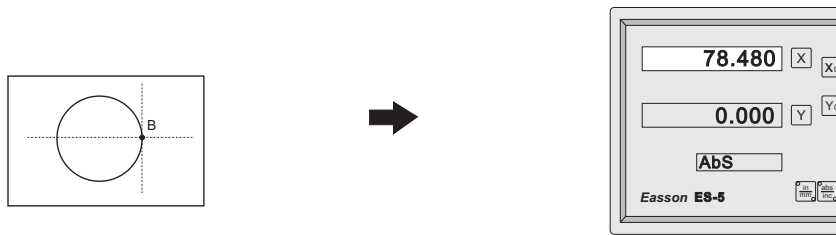
Example : To set the X Axis zero point at the centre of the work piece.

Step

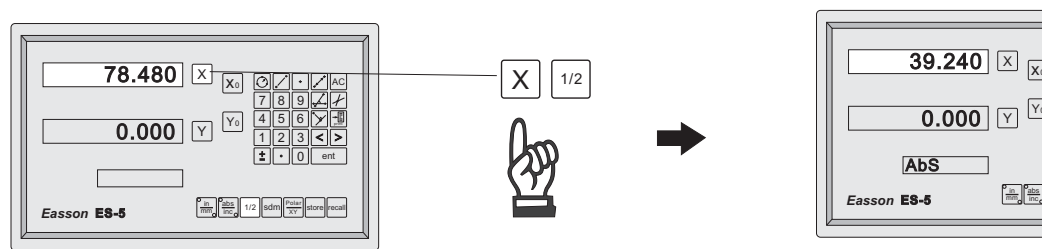
a) Locate the edge finder at one end of the work piece , then zero the X Axis.



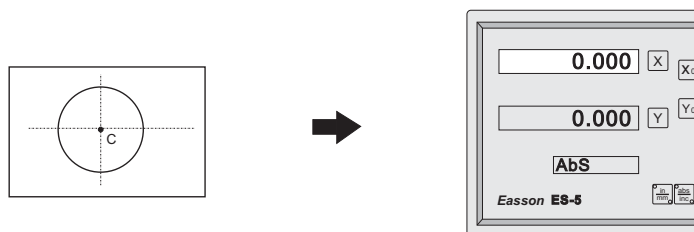
b) Locate the edge finder at the opposite end of the work piece.



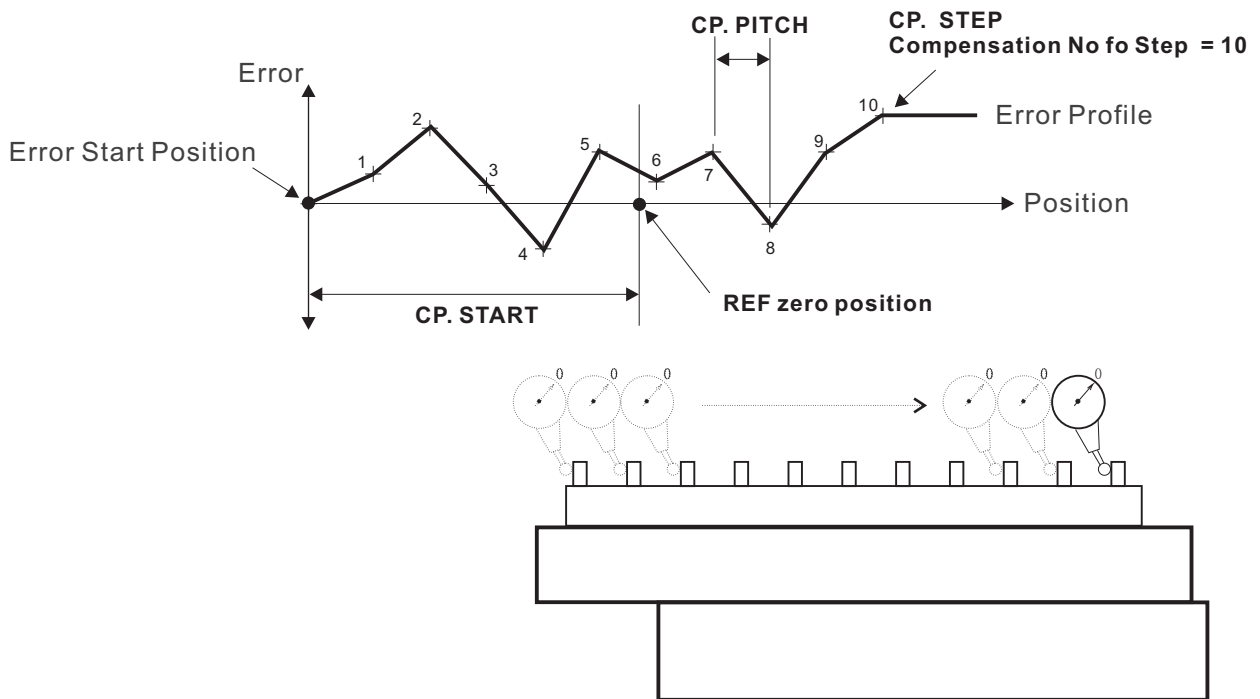
c) Then half the display coordinate using centre-find function as per follows.



d) Now the X Axis zero point (0.000) is located at the X centre of the work piece.



# Non-Linear Error Compensation



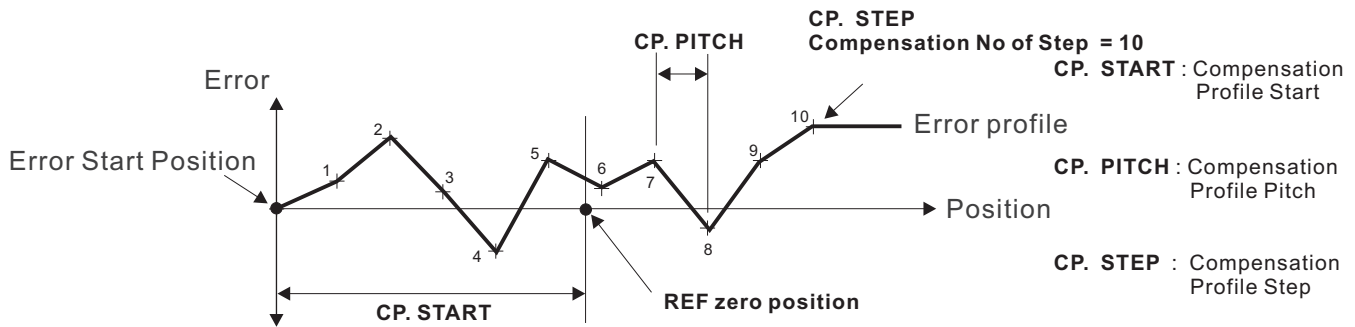


# ES-5 Non-Linear Error Compensation

The main function of ES-5 Non-Linear Error Compensation is to improve the measuring accuracy.

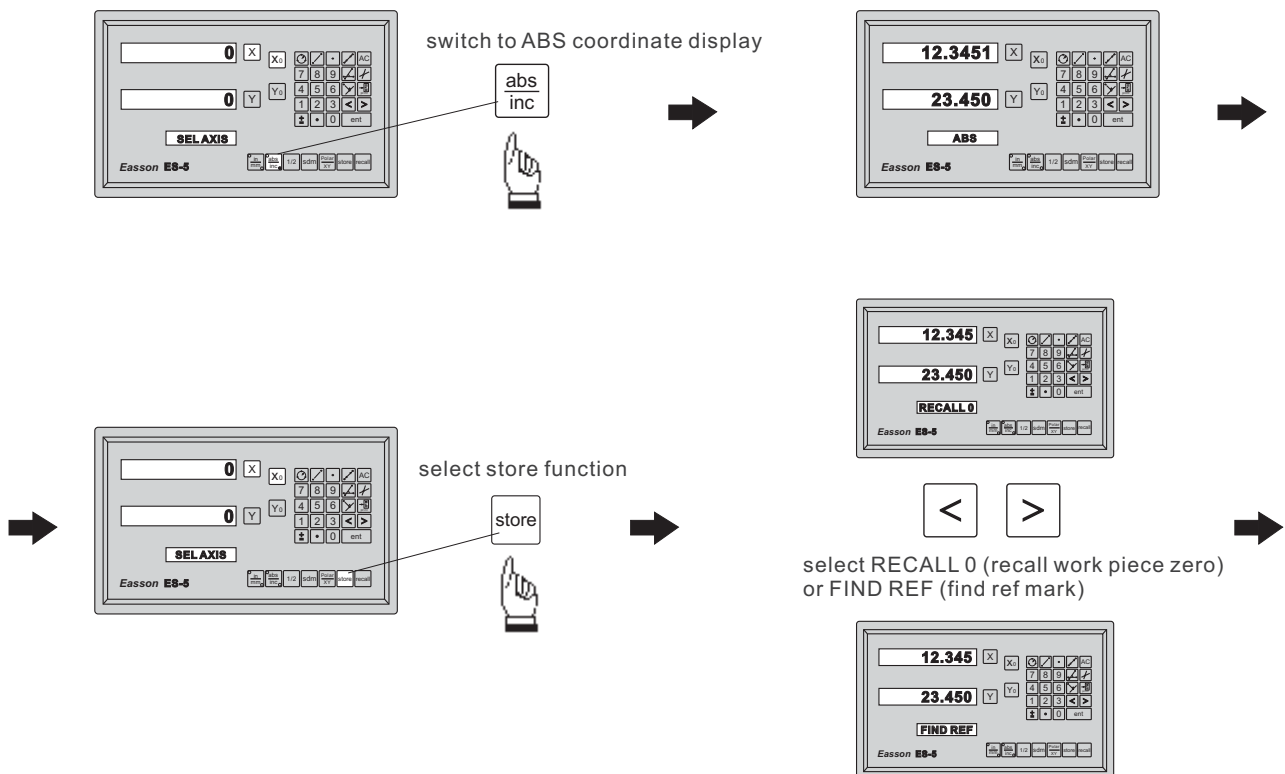
## Principle :

Non-Linear Error Compensation uses the ref mark (REF zero position) to be a reference datum point and from the Compensation Start (CP. START) memorizes the Error Profile in the RAM of ES-5. and then the microcomputer of ES-5 will compensation the error step by step upon the current position of scale.

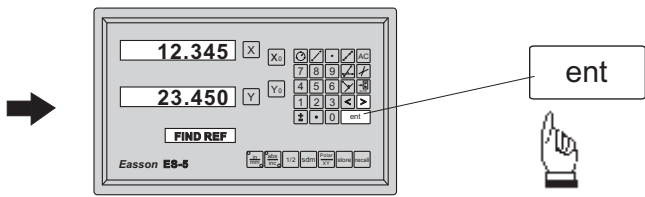


## Operational procedure :

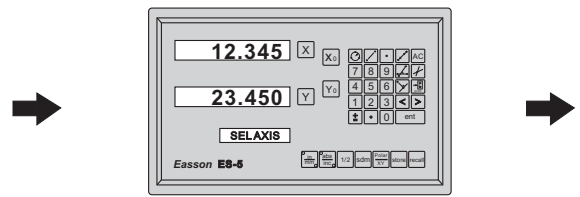
(1). Find ref mark position in ABS coordinate display :



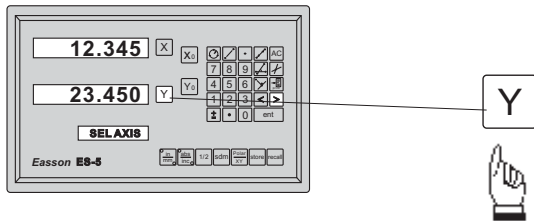
select FIND REF (find ref mark)



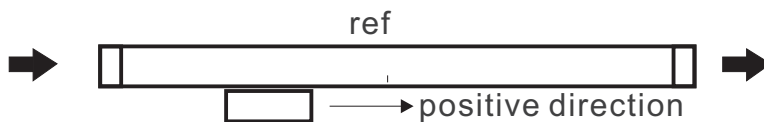
select X or Y axis



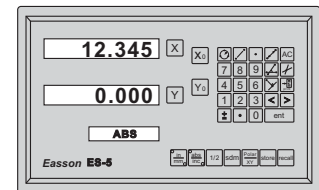
Examp l : select Y axis



move the Axis across the ref point by positive direction, until ES-5 figure displays.



ref mark position is in Y=0.000



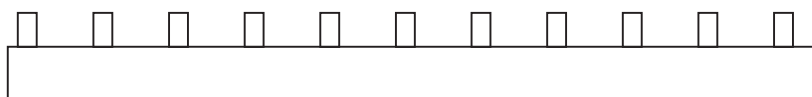
(2). Find CP. START position :

ES-5 Non-Linear Error Compensation always counts by positive direction, so CP. START position must be in the most negative point of Travel.

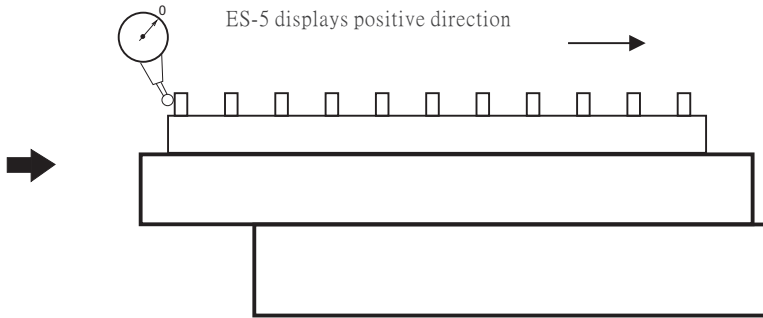
e.g. In this example. we use a step gauge 25mm pitch to be our measured norm and total compensation travel (the largest possible travel of step gauge) is 250mm, therefore

CP. PITCH = 25mm

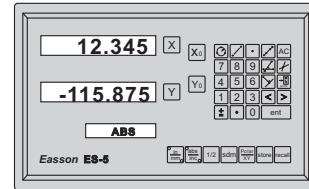
CP. STEP = (total compensation travel - 250mm) / CP. PITCH = 10



Put the start of step gauge in the most negative display of moving Axis and make the test indicator aim at this point is zero position.



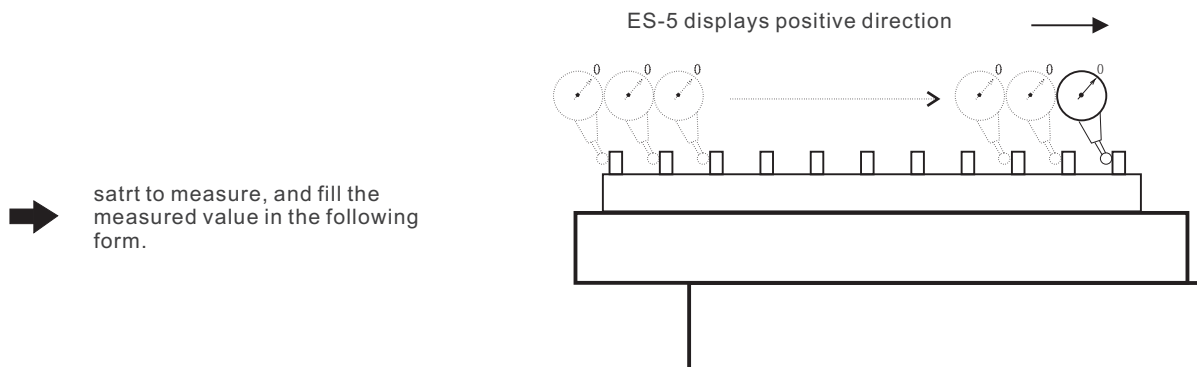
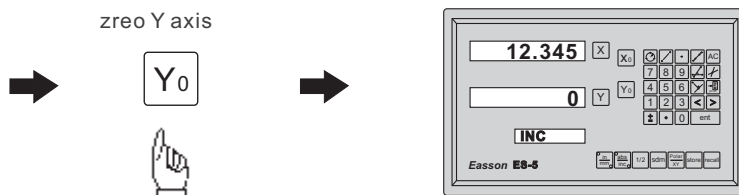
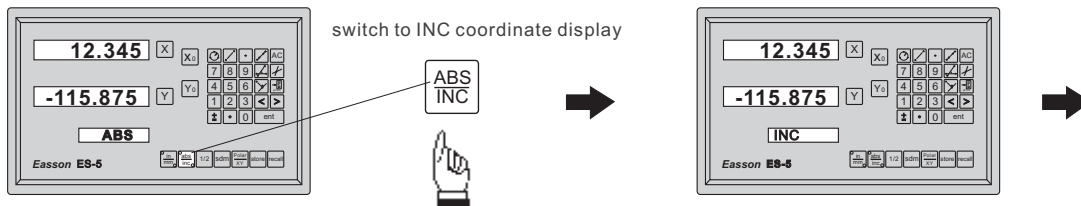
after you aim this point, the CP.START is the coordinate that show in the display window of Y Axis, please note that the compensation of ES-5 always toward the positive direction, so if the ref is the middle of Travel, the CP.START is a negative forever.



in this example, please write down the value CP. START = -115.875

**(3). Start to measure errors :**

In order to measure errors conveniently, we suggest ES-5 to switch to INC coordinate display and to zero in the first measured point, then start to measure.



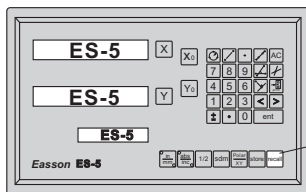
When use the Incremental Mode ES-5 non-linear compensation, you do not need to calculate the error only enter the measured value, therefore you need to design a form for the measured value as follows :

Standard position	Measured value
<b>25.000</b>	<b>25.008</b>
<b>50.000</b>	<b>50.004</b>
<b>75.000</b>	<b>75.017</b>
<b>100.000</b>	<b>99.995</b>
<b>125.000</b>	<b>125.002</b>
<b>150.000</b>	<b>150.012</b>
<b>175.000</b>	<b>174.997</b>
<b>200.000</b>	<b>199.988</b>
<b>225.000</b>	<b>225.007</b>
<b>250.000</b>	<b>250.015</b>

CP. START = -115.875  
 CP. PITCH = 25.000  
 CP. STEP = 10

(4). Enter the value of non-linear error compensation to ES-5 :

after turn off ES-5, please power on ES-5 once again.

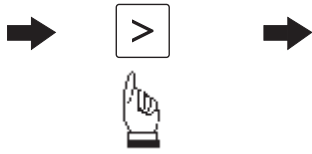


power on ES-5, after the display appears the message "ES-5", press F key to enter into the SETUP state.

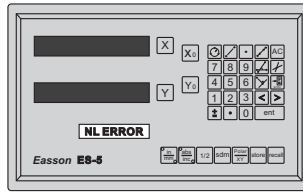
recall



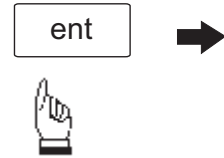
after enter into the SETUP state, press down key until the NL Error appears.



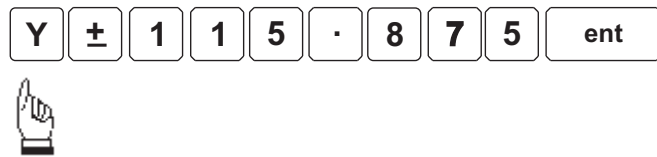
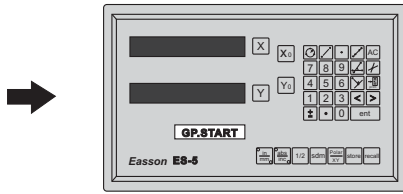
NL Error is Non-Linear Error



press ent key to confirm the selection.

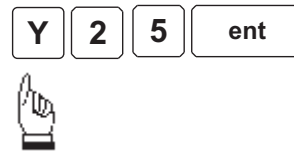
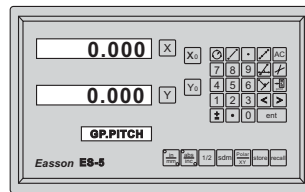
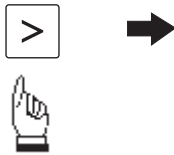


enter CP. START



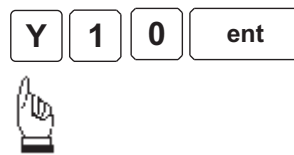
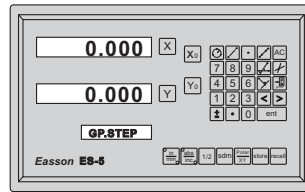
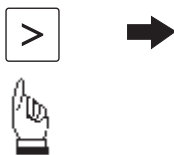
enter CP. PITCH

next step



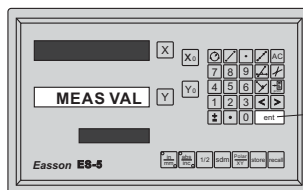
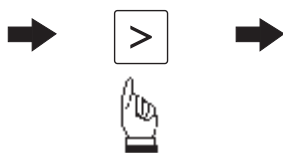
enter CP. STEP

next step

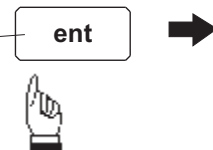


MEAS VAL is Measured Value

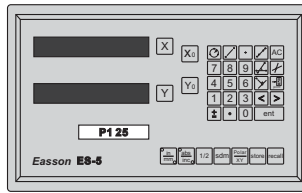
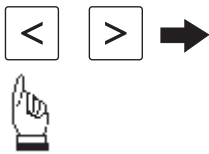
next step



press ent key to confirm the selection.



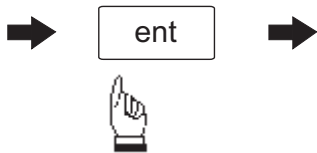
after enter into the MEAS VAL state, press down key to select Step of point.



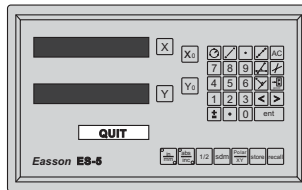
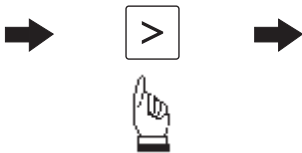
Y ...measured value...

P1 25	25.008
P2 50	50.004
P3 75	75.017
...	
P10 250	250.015

complete all procedures then press ent key to exit



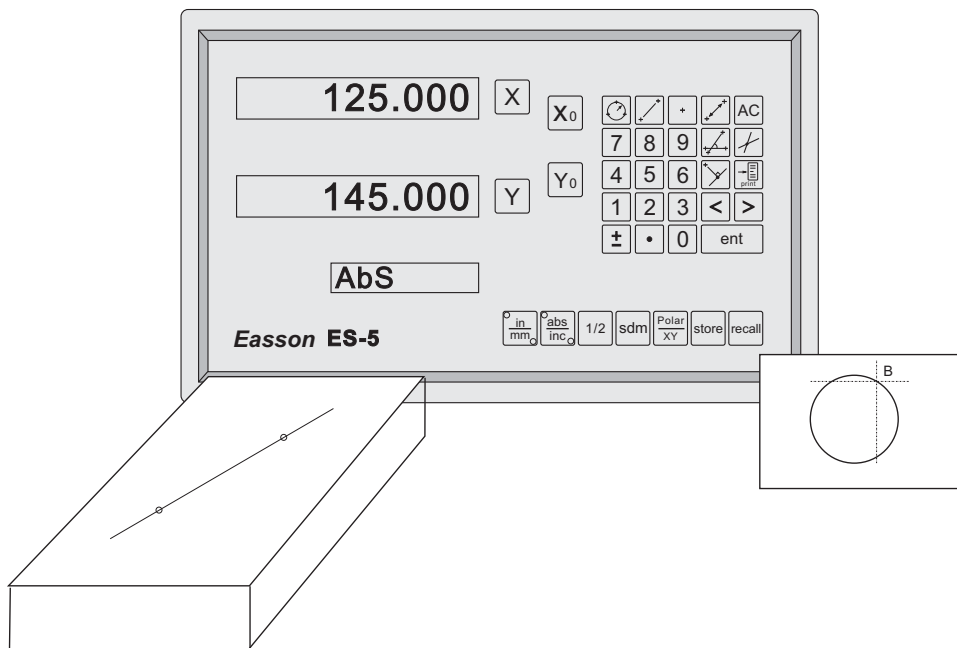
press down key until the QUIT appears



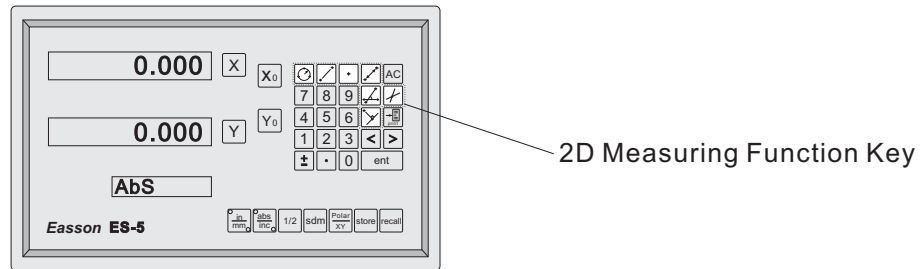
must turn off ES-5 then power on ES-5 once again, otherwise you cannot do the error compensation.

- After complete the error compensation function, you must turn off the ES-5 then power on the ES-5 again, otherwise your compensated value will invalid.








# 2D Measuring Function



ES-5 is designed for 2D Geometric Measuring, Used in profile projector, Toolmaker Microscope, CCD measuring Machine,.....etc.



2D Function :

-  CIRCLE
-  LINE
-  POINT
-  DISTANCE
-  ANGLE
-  INTERSECTION
-  PERPENDICULAR POINT

"PRINT" Function for print the measuring result, through RS-232 port to the printer (with RS-232 interface) or PC (Personal Computer)



All measured elements , POINT , LINE , CIRCLE , Is called feature (Geometric Element) in ES-5 , total 100 features memories the number is from 0 to 99 on ES-5.

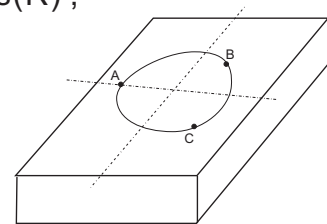
10 subdatum system , Inculc ABS , sd1 , sd2.....sd9 all features whose position coordinate is stored according to ABS position , Even the measuring was finished different subdatum.

The other specify INC coordinate system is used for store the center position of CIRCLE or POINT after measuring , The X. Y. display window will show the INC coordinate for user easy to use the new datum.

operate description

1) CIRCLE MEASUREMENT

Function : Given 3 point anywhere from measuring equipment ,  
The ES-5 enables you to calculate the Radius(R) ,  
and Center(C).



STEP :

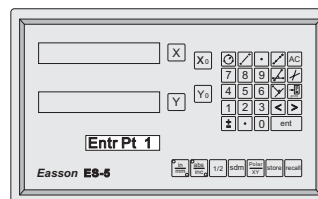
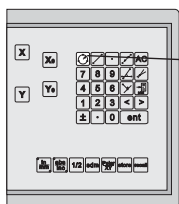
Two method to make CIRCLR :

- A)Direct measuring
- b)Recall data from memory

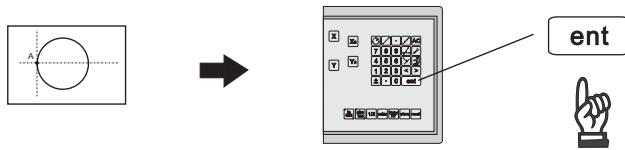
a) Direct measuring

1. Start circle

ES-5 show **Entr Pt 1**  
Request first point Enter

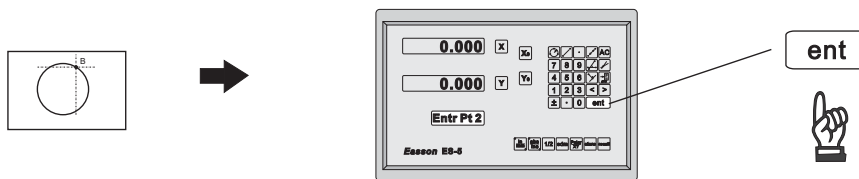


2. Move the workpiece to first point A then start



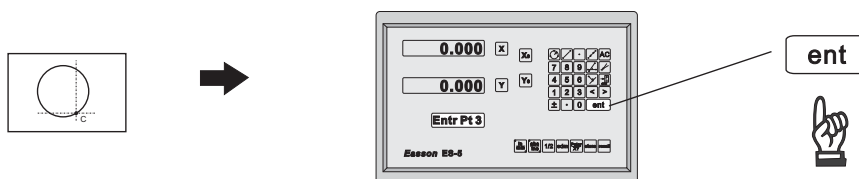
3. Move the workpiece to second point B then start

ES-5 show  , request second point Enter

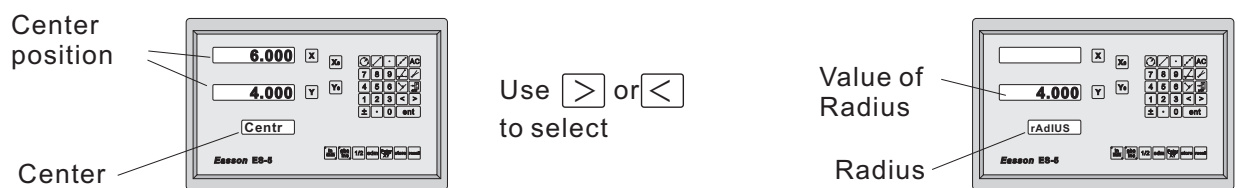


4. Move the workpiece to third point C then start

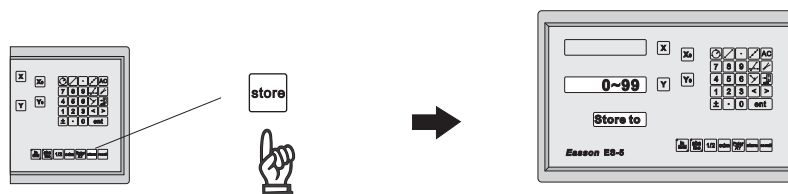
ES-5 show  , request third point Enter



5. After calculation the ES-5 will show the center position and Radius of Circle.

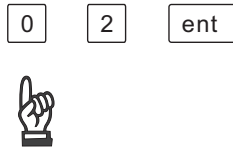
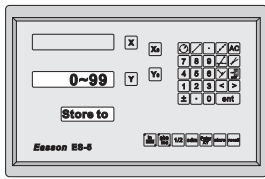


6. To store the circle feature to memory press



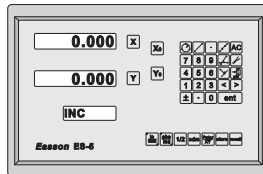
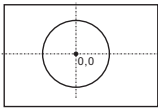
Enter the address number of memory

Memory address is from 0 to 99.



Store the circle feature to 02 address of memory.

The INC datum will instated of circle center position after store.

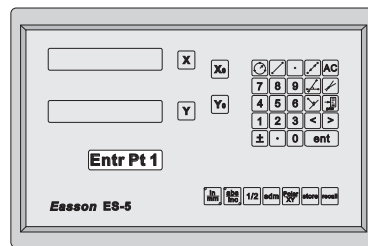
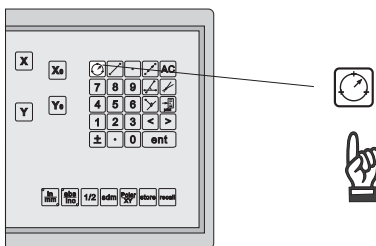



But the center position of circle is stored according to ABS coordinate position in memory.

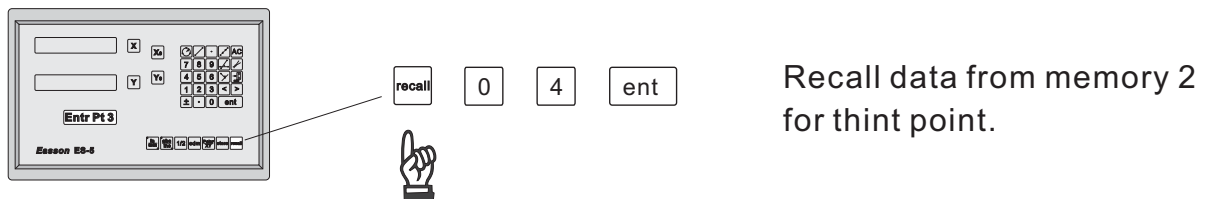
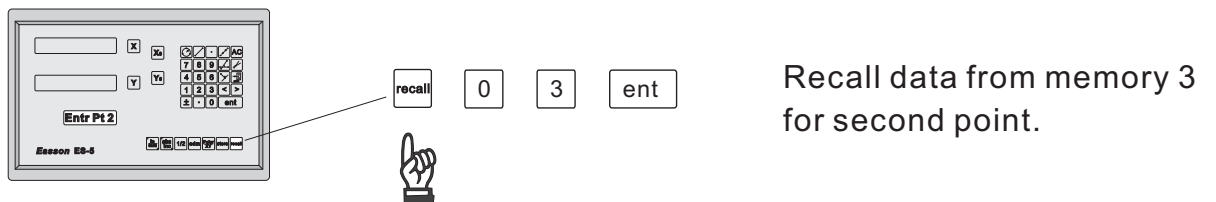
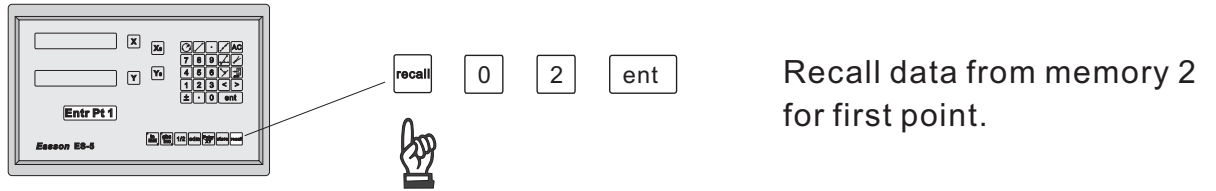
b) Recall data from memory

1. push  button

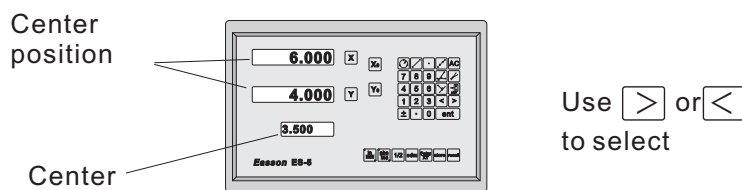
ES-5 show **Entr Pt 1**  
Request first point Enter




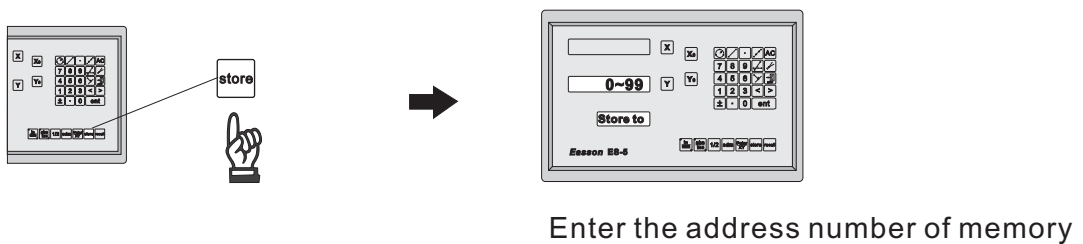
2. Example : Recall the data from memory address 2、3、4 ,Then push 



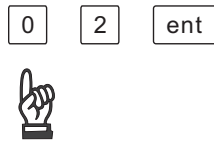
3. After calculation ,the ES-5 will show the center position and Radius of circle.



4. To store the circle feature to memory press 

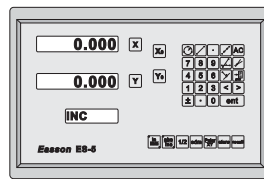
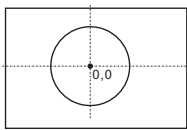


5. Memory address is from 0 to 99.



Store the circle feature to 02 address of memory.

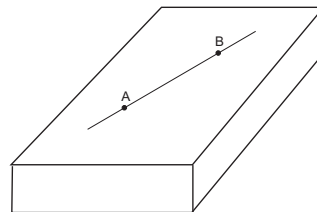
The INC datum will instated of circle center position after store.



But the center position of circle is store according to ABS coordinate position in memory.

**2) LINE MEASUREMENT**

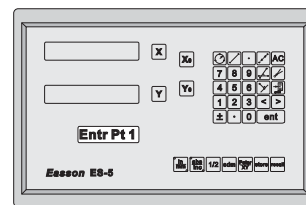
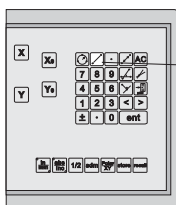
Function : Given 2 points anywhere from measuring Equipment ,combine to a Line.



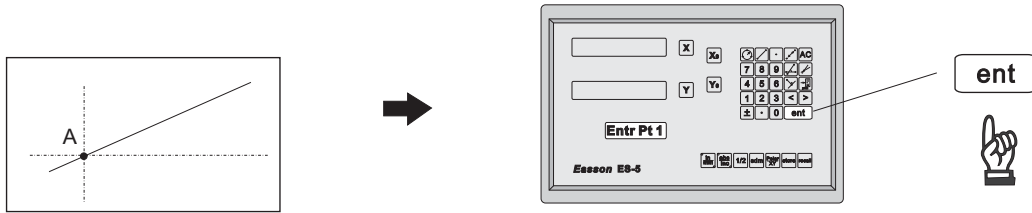
STEP :

a) start Line 

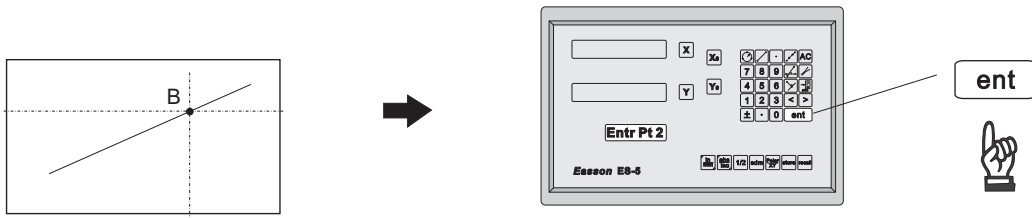
ES-5 show **Entr Pt 1**  
Request first point Enter



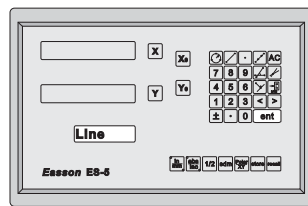
b) Move the workpiece to first point A then **ent**



c) Move the workpiece to second point B then **ent**

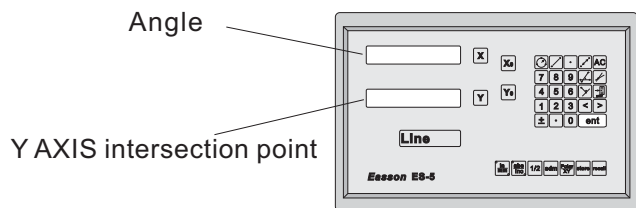
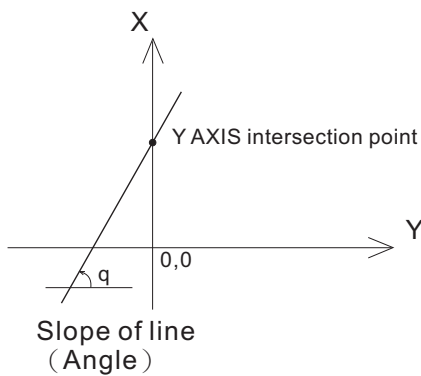


d) after data entered ES-5 show **Line**



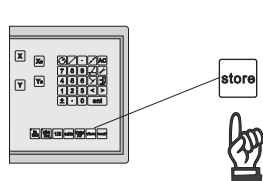
PRESS **ent** to confirm  
OR PRESS **AC** to quit,

e) press **ent**, ES-5 show the slope of line and the intersection point with Y AXIS .



Angle display format:  
 $\frac{X}{X} \frac{X}{X} \frac{X}{X} . \frac{X}{X} \frac{X}{X} . \frac{X}{X} \frac{X}{X}$   
Degree minute second

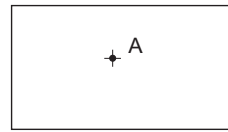
f) To store the line feature to memory press **store**



Enter the address number of memory

3) POINT MEASURE

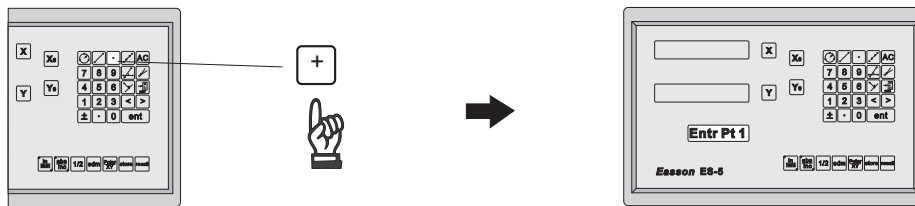
Function : Given a point anywhere from measuring equipment and store to ES-5 feature memory.



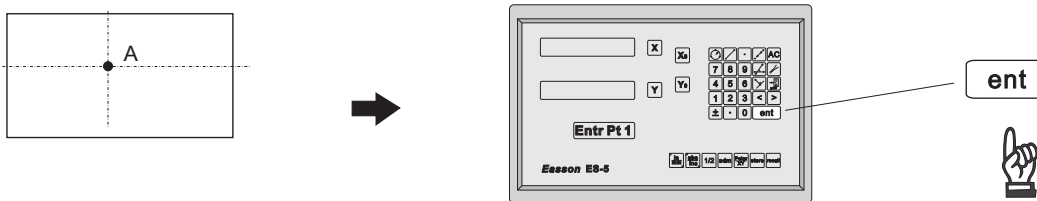
STEP :

a) start point

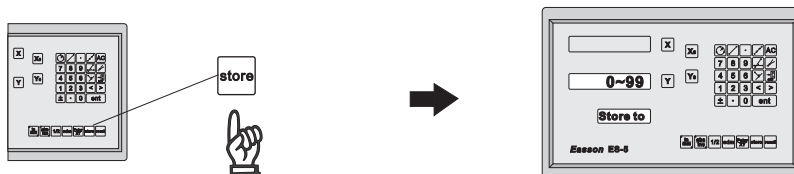
ES-5 show   
Request point Enter



b) Move the workpiece to point A then



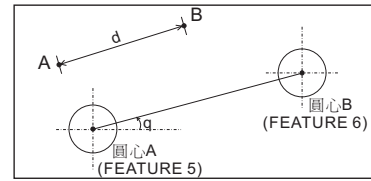
c) To store the point feature to memory press



Enter the address number of memory

#### 4) DISTANCE CALCULATION

Function: calculate the distance between two points or two circles.



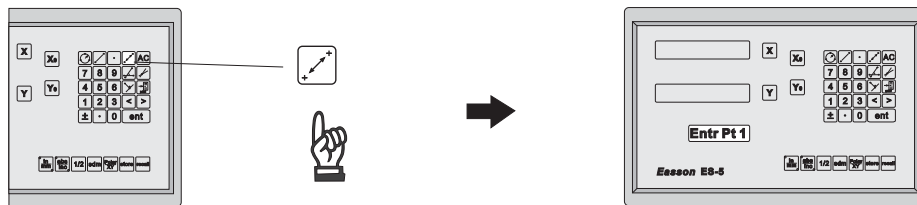
Procedure:

store the point (center of circle, intersect point, perpendicular point, point) features to memory for example :

Store two center point of circle in feature memory center A (Feature 5), and center B (feature 6).

a) start distance

ES-5 show **Entr Pt 1**  
Request first point Enter



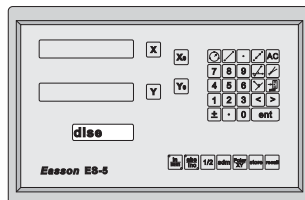
b) Recall first point feature number (FEATURE 5)

**recall** **0** **5** **ent**

c) Recall second point feature number (FEATURE 6)

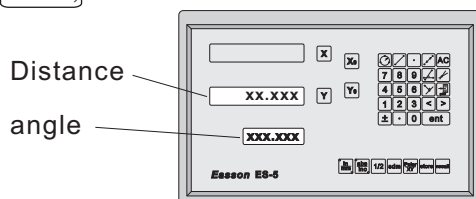
**recall** **0** **6** **ent**

d) After data enter ES-5 show **dise**



Press **ent** to confirm  
or press **AC** to quit

Press **ent**, ES-5 show the distance and angle.



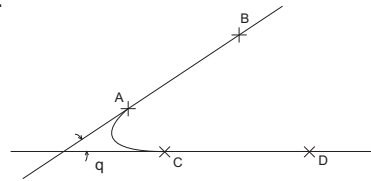
Angle display format:

$\frac{X}{\text{Degree}} \frac{X}{\text{minute}} \frac{X}{\text{second}}$




5) ANGLE MEASUREMENT

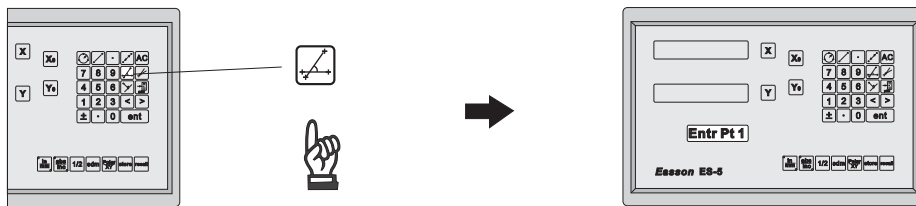
Function : Calculate the angle between 4 measured point.



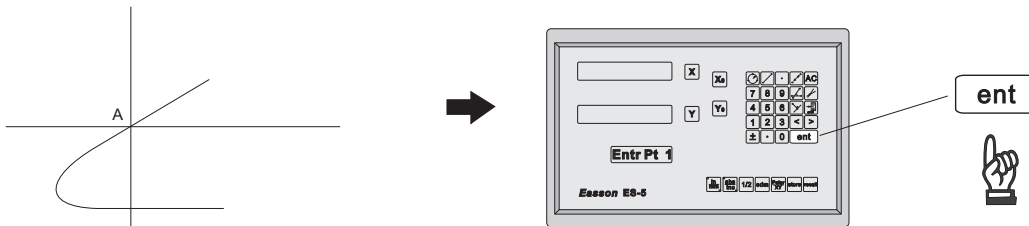
Step :

a) start angle 

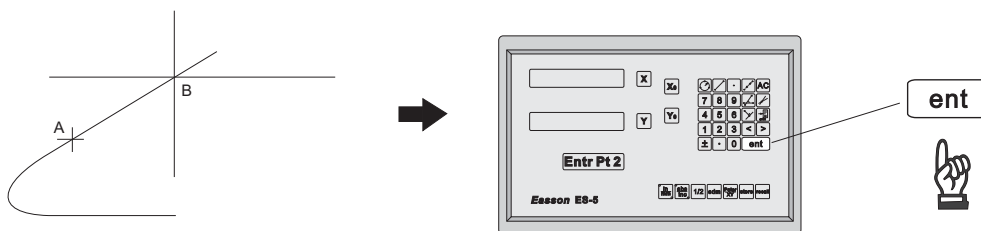
ES-5 show **Entr Pt 1**  
Request first point enter



b) Move the workpiece to first point A then **ent**

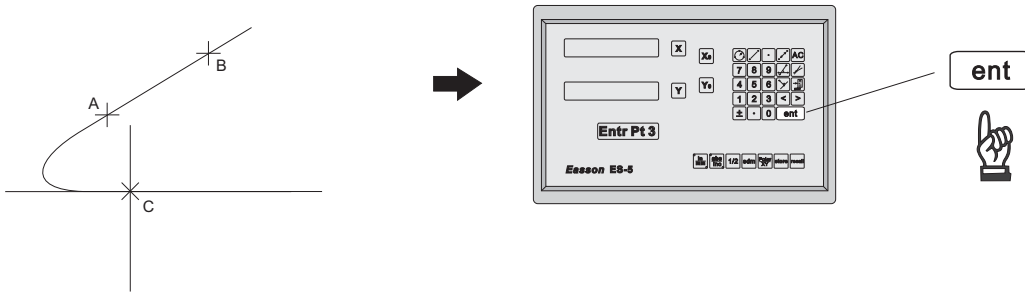


c) Move the workpiece to second point B then **ent**

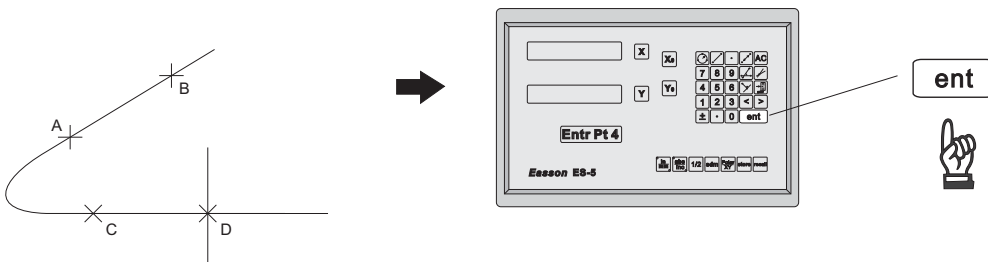


Then A.B two points combine to first line.

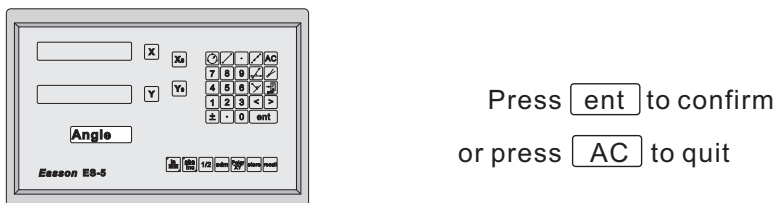
d) Move workpiece to third point C then **ent**



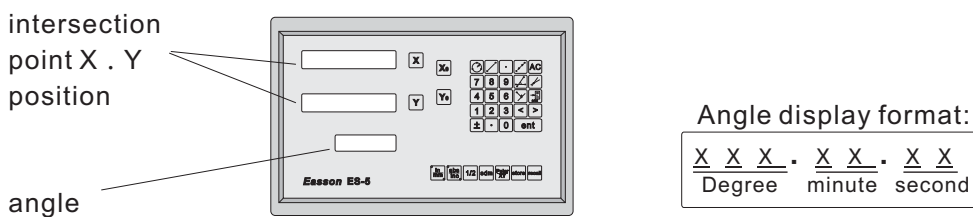
e) Move workpiece to fourth point D then **ent**



f) After data entered, ES-5 show **Angle**

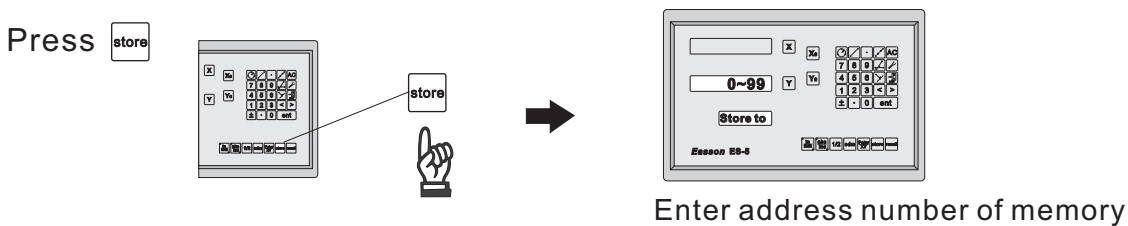


g) ES-5 show angle and intersection point .



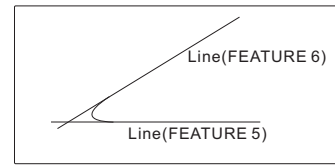
h) The intersection point position will instated of INC datum .

i) store the intersection point to feature memory.



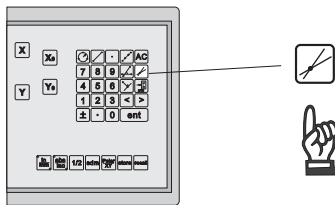
6) Intersection point and angle of 2 line

Function: Calculate the intersection point and angle between two recall line from feature memory.



STEP:

a) Press



ES-5 show **Entr Li 1**  
Request first point enter



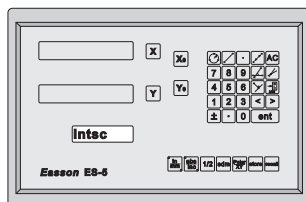
b) Input the Feature number of first line.

**recall** **0** **5** **ent**

c) Input the Feature number of second line.

**recall** **0** **6** **ent**

d) After datas entered, ES-5 show **Intsc**

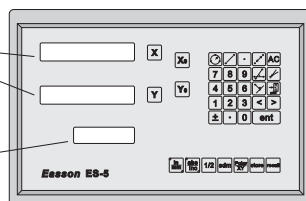


press **ent** to confirm  
or press **AC** to quit

e) Press **ent**, ES-5 show the angle and intersection point

intersection point X . Y position

angle



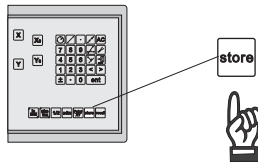
Angle display format:

$\frac{X}{\text{Degree}} \frac{X}{\text{minute}} \frac{X}{\text{second}} . \frac{X}{\text{Degree}} \frac{X}{\text{minute}} \frac{X}{\text{second}}$

f) The intersection point will instated of INC datum .

g) store the intersection point to feature memory,

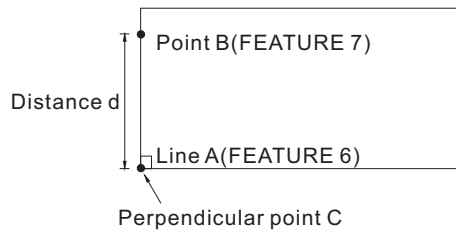
press 



Enter address number of memory

### 7) PERPENDICULAR

Function : Calculate the perpendicular point and distance between line and point.

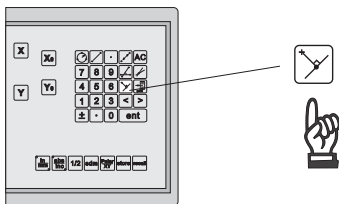


STEP :

a) Measure the line A use line function then store to feature 6.

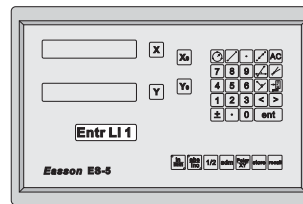
b) Measure the point B use point function then store to feature 7.

c) Press 



ES-5 show 

Request Line feature number enter



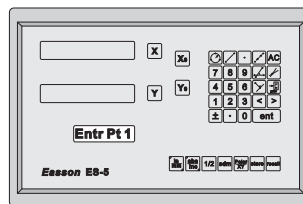
d) Enter line feature number

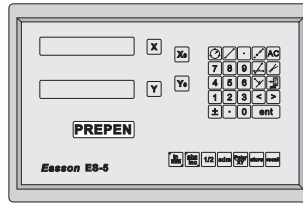
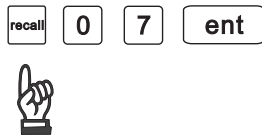


ES-5 show 

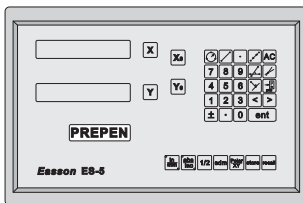
Request point feature number enter



e) Enter point feature number

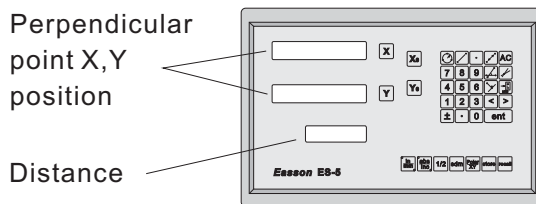


f) After data entered ES-5 show **PREPEN**



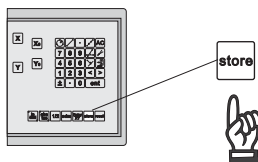
Press **ent** to confirm  
or Press **AC** to Quit

g) ES-5 show the distance and perpendicular point.



h) The perpendicular point position will instated of INC datum.

i) Store the perpendicular point to feature memory press **store**



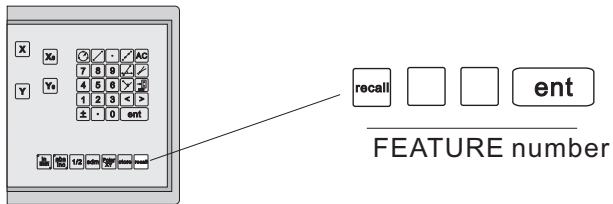
Enter address number of memory

### 8) Recall function (FEATURE RECALL)

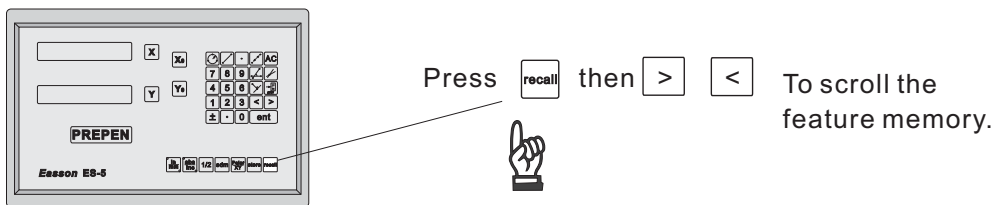
Recall the feature from ES-5 feature memory for point, line, circle result...etc.

STEP:

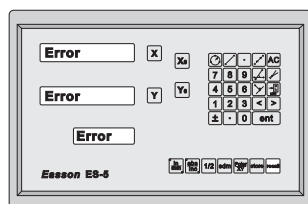
a) recall the FEATURE number



b) SCROLL

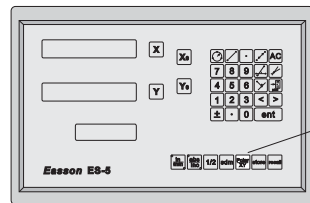


If the feature number without feature element the ES-5 will show error.



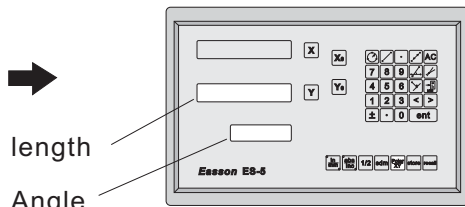
9) Polar coordinate display mode

Step :



Polar  
XY

Toggle switch the polar and cartesian coordinate.



length  
Angle

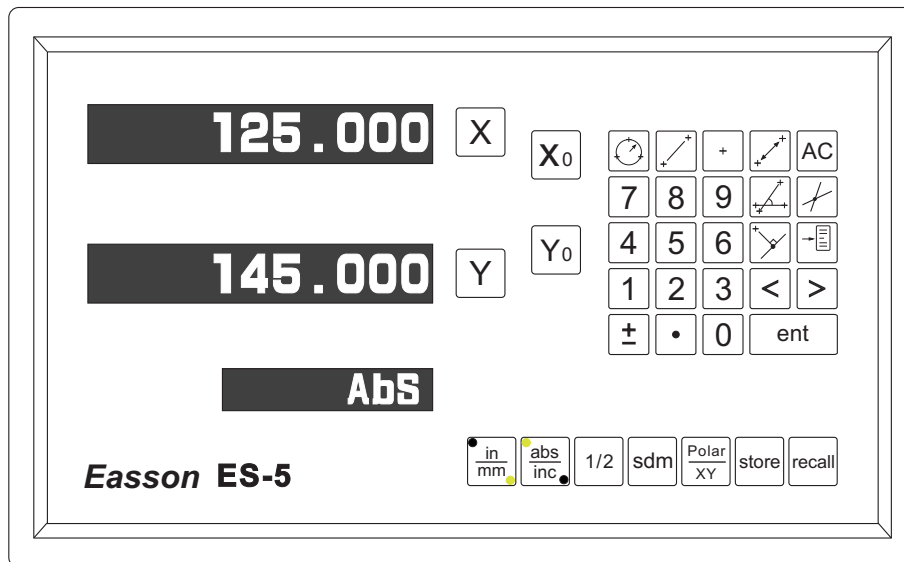
Polar coordinate display

in polar coordinate mode ,press **0** to reset.

press **Polar XY** retrun to cartesion coordinate.

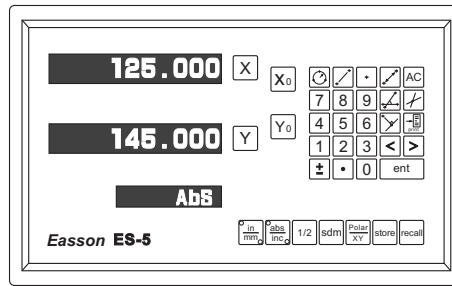
# ES-5

## *Digital Readout Setup Function*





# ES-5 ORIGINAL PARAMETER RESET FUNCTION

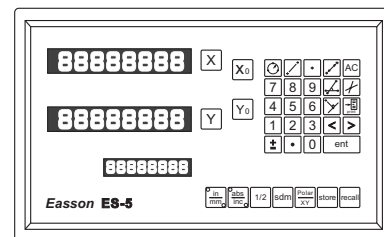


Some inscrutable cases or improper operations cause the chaos of parameter, then you need to initialize the parameter to reset the system.

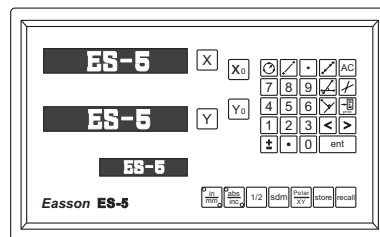
## Operational procedure :

- (1) Turn off the ES-5.
- (2) Power on ES-5 once again, when "ES-5" moving in display window, please press "8" key then ES-5 enters into the RESET function.

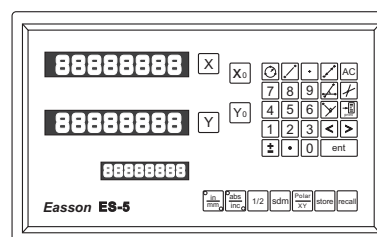
power on the DRO, then DRO starts the self-test function



when "ES-5" appears in display window, please press " 8 " key.



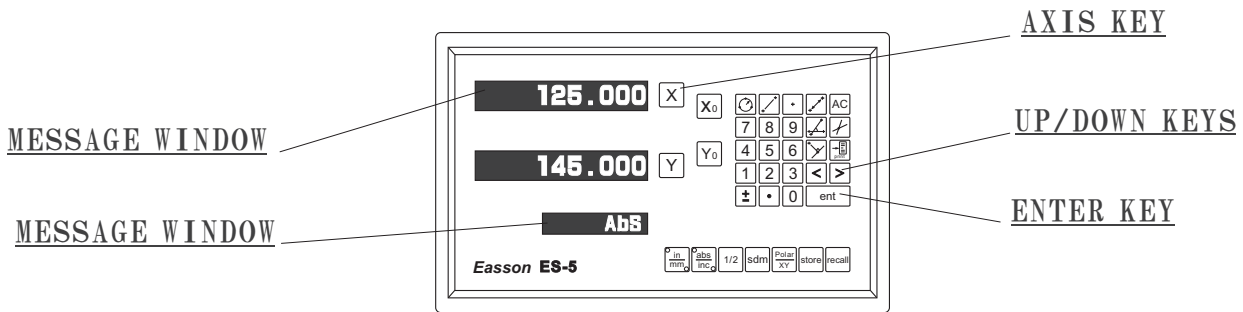
after press " 8 " key, the word "8" can appear and continuously move in display window.



(3). When enter into the RESET function, the word "8" appears and continuously moves in display window. After the word "8" moves 2~3 trips, the DRO will complete the reset.

(4). Turn off the DRO after complete the reset, then power on DRO once again.

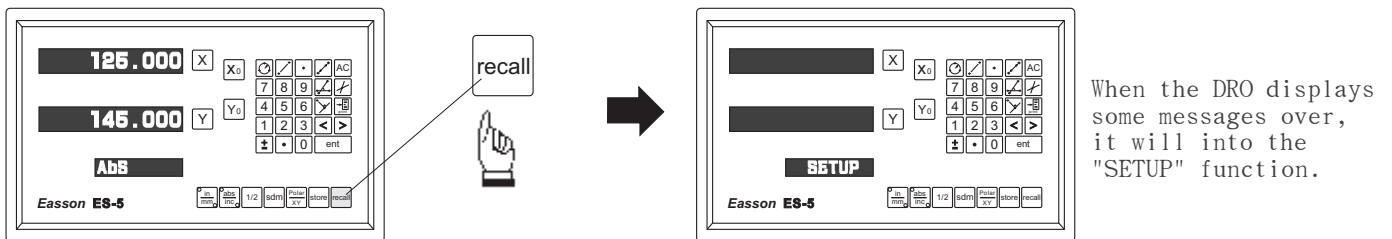
## ES-5 SETUP FUNCTION



During changing the different program version IC or some abnormal voltages and operations, you need to SETUP the DRO.

### Procedure :

- 1). Turn off the ES-5.
- 2). Power on the ES-5 once again, when the message "ES-5" showing in the MESSAGE WINDOW, please **recall** key immediately then the DRO ES-5 starts entering into the SETUP function.

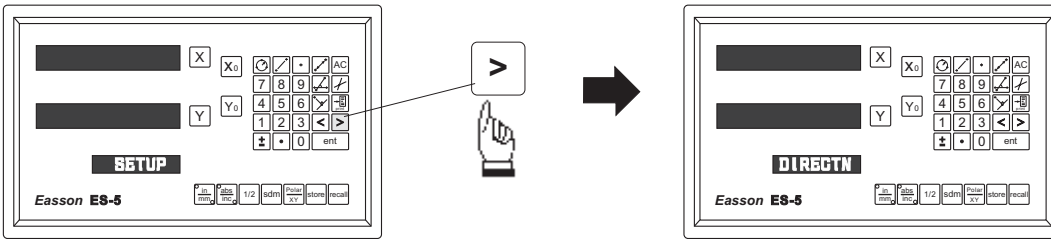


The SETUP procedure is written in a menu mode which enables you to scroll through the top level options and enter, configure and exit the sub-functions as they arise.

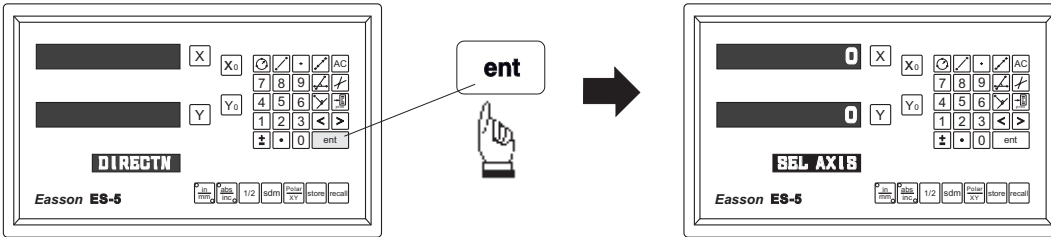
### The top level menu headers in order are as follows :

<p>DIRECTIN LIN COMP NL ERROR REF SIGN FILTER NORMAL QUIT</p>	<p>specifies the direction of count for each axis permits linear error compensation to be input permits non linear error compensation to be input (point compensation) specifies the signal of the reference point for each axis permits the filter value to be set returns the DRO settings to the factory preset values exits the SETUP function to proceed to normal working</p>
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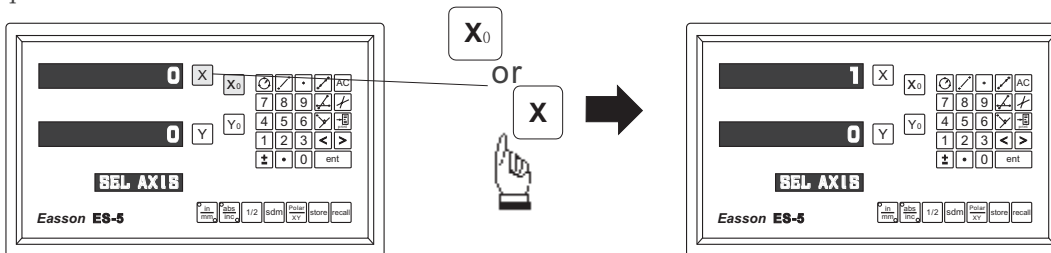
3.) Press **>** key to select the "DIRECTN" (counting direction) function. Press **<** key to return to the last function.



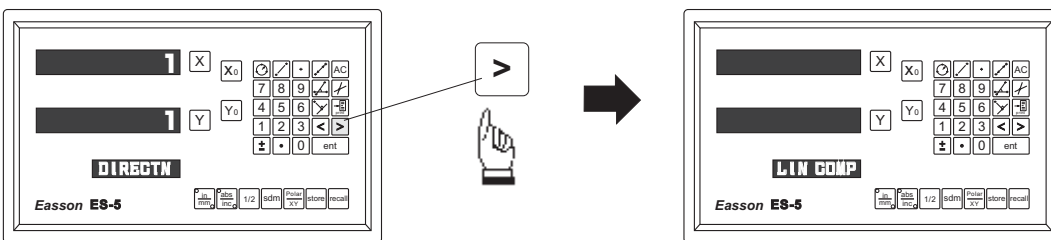
Press **ent** key into the direction setting function, the 0 represents a positive, 1 represents a negative.



Press **X<sub>0</sub>** or **X** key to set up a negative direction "1" for X Axis, make a same procedure for Y Axis.



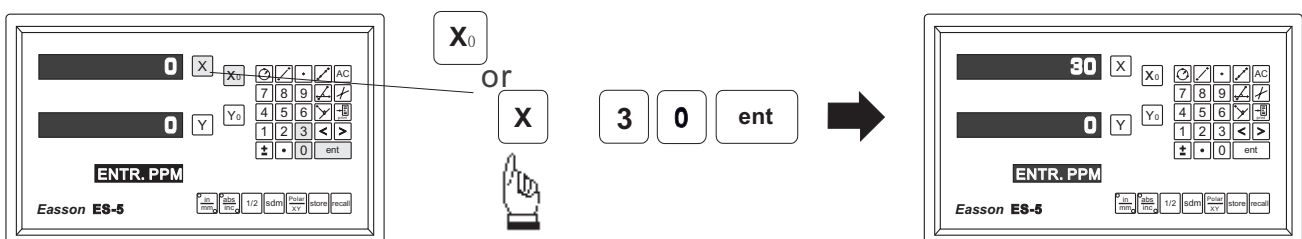
4.) Press **ent** key to make your setting, then press **>** key to select the "LIN COMP" (linear compensation) function.



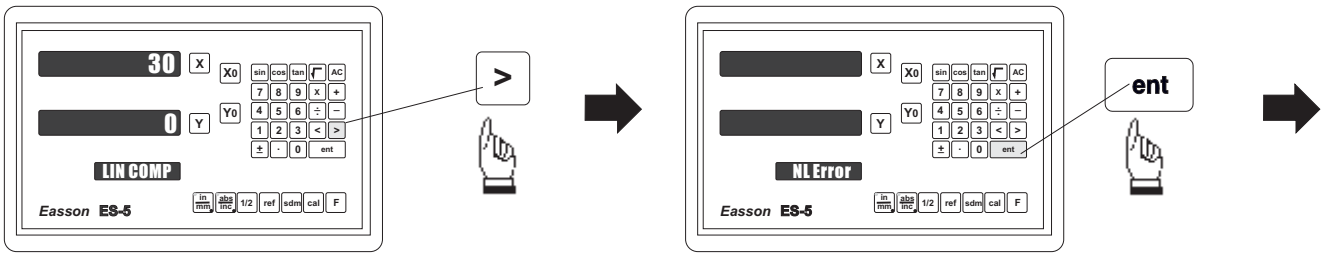
Press **ent** key into the linear error compensation function, the formula as below:  
 error value X  $-(1000/\text{measuring length}) = \text{compensation value}$   
 (ML) measuring length unit = mm, error unit =  $\mu\text{m}$

Example :      ML=500mm      Error =  $-15 \mu\text{m}$   
 $-15 \mu \times -(1000/500) = 30 \mu\text{m}$   
 the compensation value is  $30 \mu\text{m}$

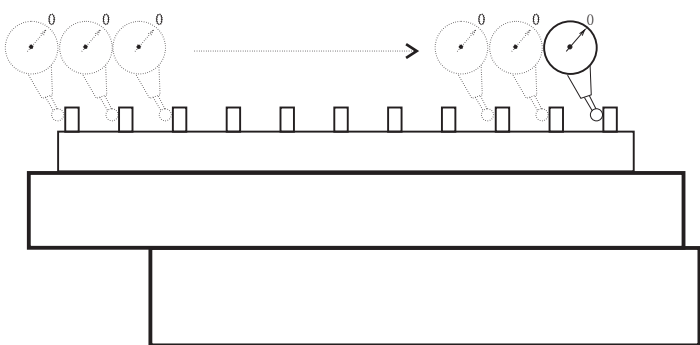
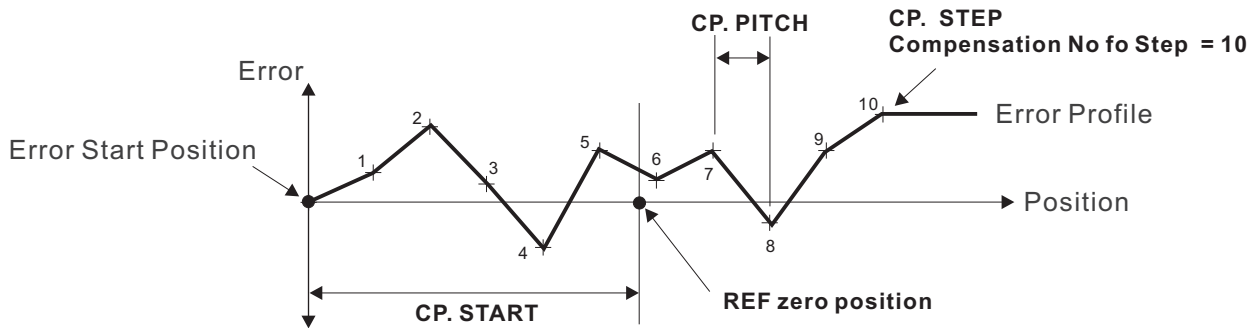
If set up the linear compensation value of X Axis = 30, through the AXIS key make a same procedure for Y Axis.



5.) Press **ent** key to make your setting, then press **>** key to select the "NL ERROR" (non-linear error compensation) function.



## Non-Linear Error Compensation

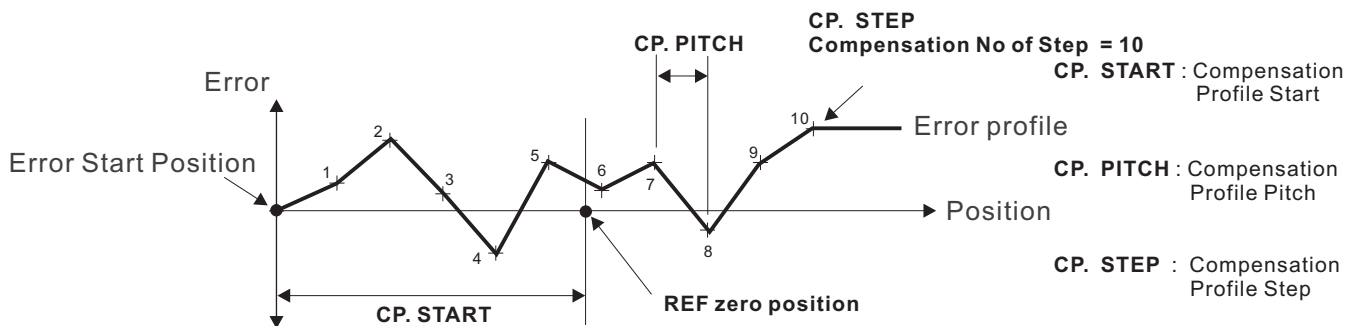


# ES-5 Non-Linear Error Compensation

The main function of ES-5 Non-Linear Error Compensation is to improve the measuring accuracy.

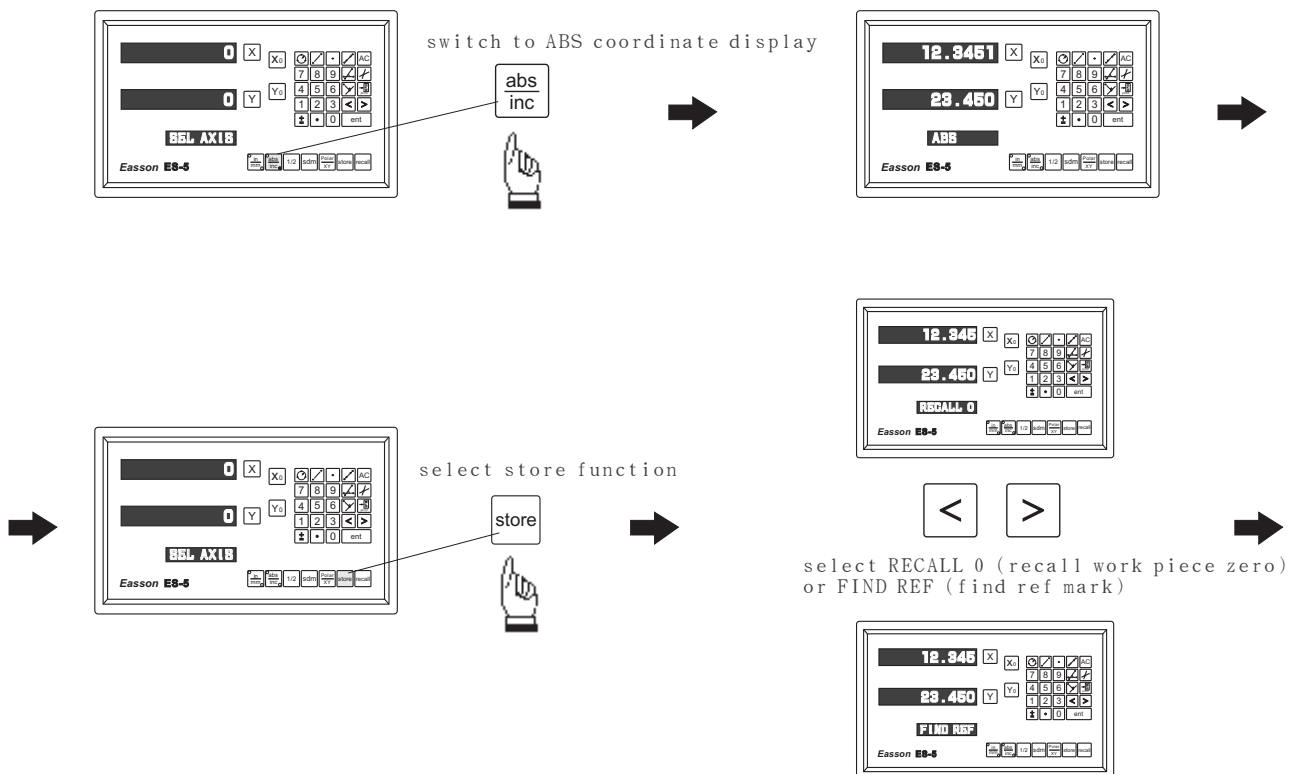
## Principle :

Non-Linear Error Compensation uses the ref mark (REF zero position) to be a reference datum point and from the Compensation Start (CP. START) memorizes the Error Profile in the RAM of ES-5. and then the microcomputer of ES-5 will compensation the error step by step upon the current position of scale.

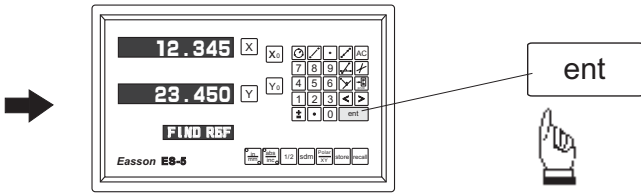


## Operational procedure :

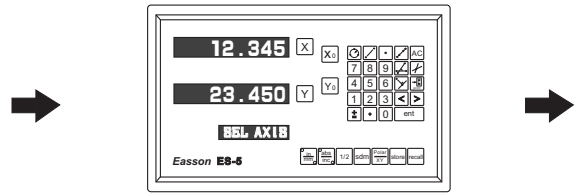
(1). Find ref mark position in ABS coordinate display :



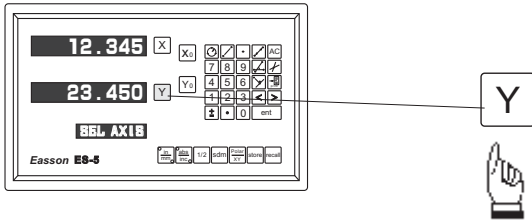
select FIND REF (find ref mark)



select X or Y axis

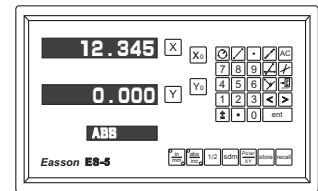
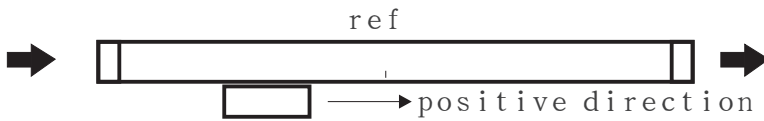


Examp1 : select Y axis



move the Axis across the ref point by positive direction, until ES-5 figure displays.

ref mark position is in Y=0.000



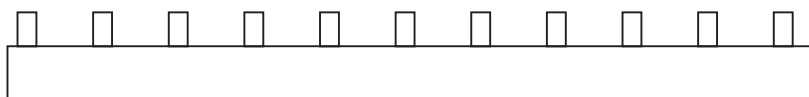
**(2). Find CP. START position :**

ES-5 Non-Linear Error Compensation always counts by positive direction, so CP. START position must be in the most negative point of Travel.

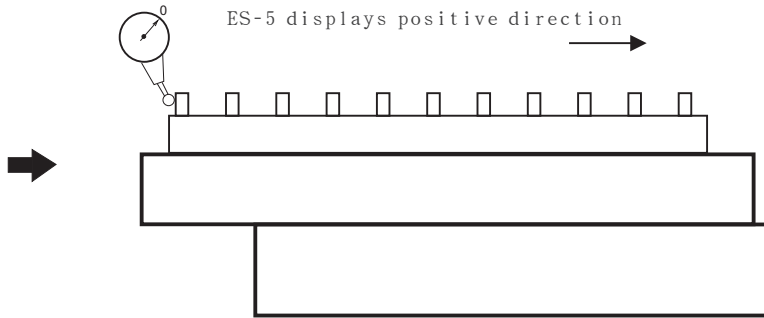
e.g. In this example. we use a step gauge 25mm pitch to be our measured norm and total compensation travel (the largest possible travel of step gauge) is 250mm, therefore

CP. PITCH = 25mm

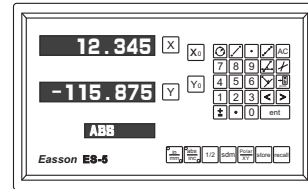
CP. STEP = (total compensation travel - 250mm) / CP. PITCH = 10



Put the start of step gauge in the most negative display of moving Axis and make the test indicator aim at this point is zero position.



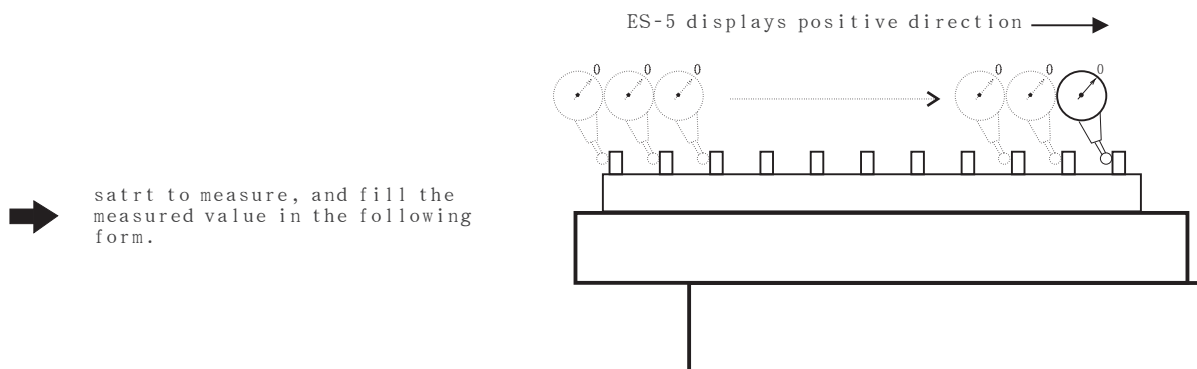
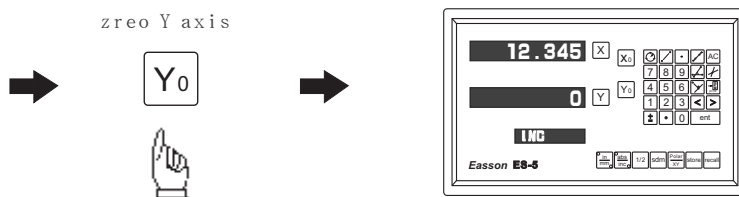
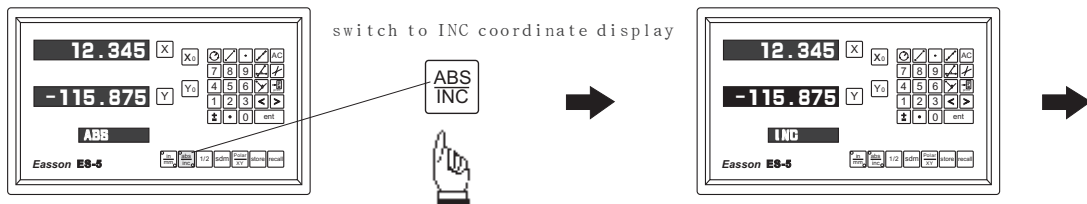
after you aim this point, the CP.START is the coordinate that show in the display window of Y Axis, please note that the compensation of ES-5 always toward the positive direction, so if the ref is the middle of Travel, the CP.START is a negative forever.



in this example, please write down the value CP. START = -115.875

**(3). Start to measure errors :**

In order to measure errors conveniently, we suggest ES-5 to switch to INC coordinate display and to zero in the first measured point, then start to measure.



start to measure, and fill the measured value in the following form.

When use the Incremental Mode ES-5 non-linear compensation, you do not need to calculate the error only enter the measured value, therefore you need to design a form for the measured value as follows :

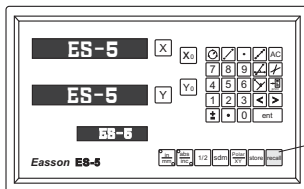
Standard position	Measured value
25.000	25.008
50.000	50.004
75.000	75.017
100.000	99.995
125.000	125.002
150.000	150.012
175.000	174.997
200.000	199.988
225.000	225.007
250.000	250.015

CP. START = -115.875  
 CP. PITCH = 25.000  
 CP. STEP = 10

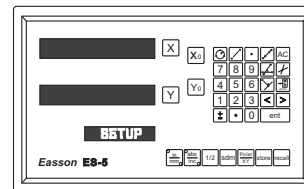
(4). Enter the value of non-linear error compensation to ES-5 :

after turn off ES-5, please power on ES-5 once again.

power on ES-5, after the display appears the message "ES-5", press F key to enter into the SETUP state.

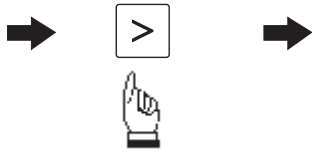


recall

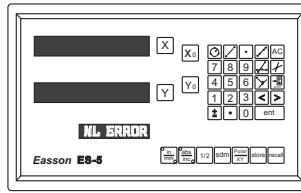




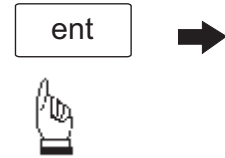
after enter into the SETUP state, press down key until the NL Error appears.



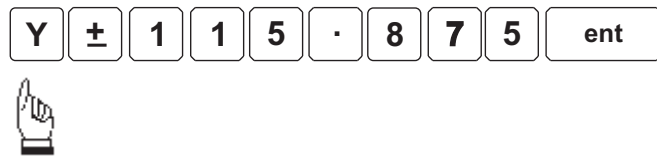
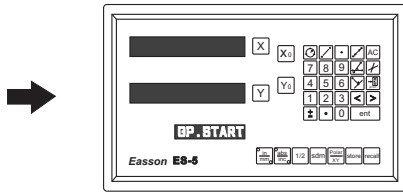
NL Error is Non-Linear Error



press ent key to confirm the selection.

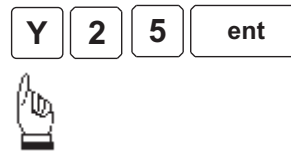
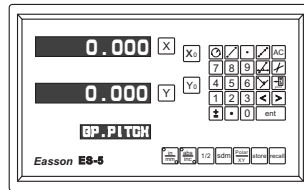
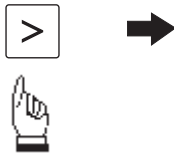


enter CP. START



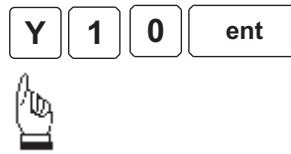
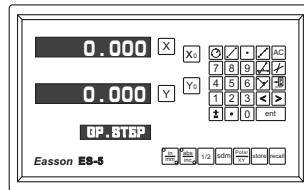
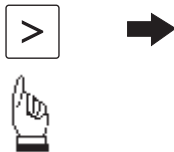
enter CP. PITCH

next step



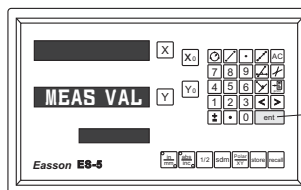
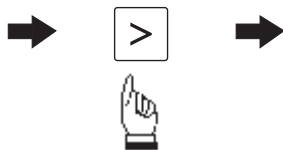
enter CP. STEP

next step

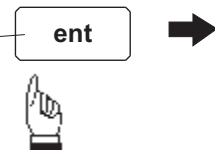


MEAS VAL is Measured Value

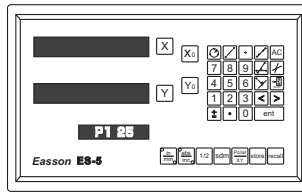
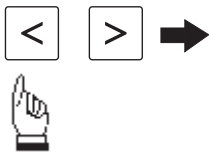
next step



press ent key to confirm the selection.



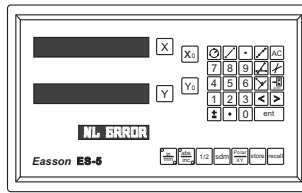
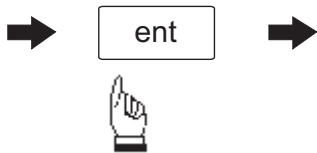
after enter into the MEAS VAL state, press down key to select Step of point.



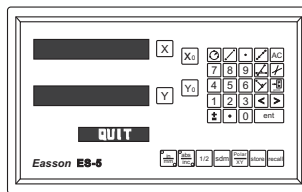
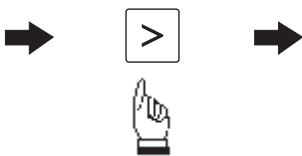
Y ...measured value.... ent

P1	25	25.008
P2	50	50.004
P3	75	75.017
.	.	.
.	.	.
P10	250	250.015

complete all procedures then press ent key to exit



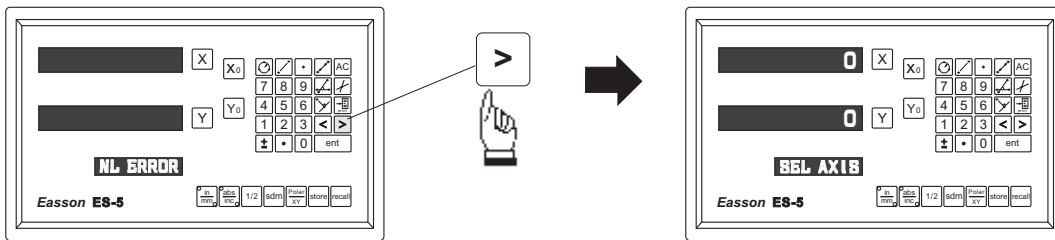
press down key until the QUIT appears



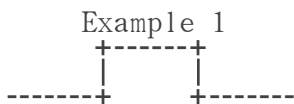
must turn off ES-5 then power on ES-5 once again, otherwise you cannot do the error compensation.

- After complete the error compensation function, you must turn off the ES-5 then power on the ES-5 again, otherwise your compensated value will invalid.

6). Press  key to select the "REF SIGN" function.



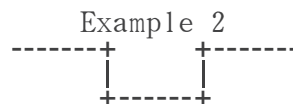
Press the UP/DOWN keys until the word "REF SIGH" is shown in the MEASSAGE WINDOW, Press the ENTER key to access the next menu level. Press the DOWN key once and the message "SEL AXIS" appears in the MESSAGE WINDOW. Press the individual axis key and enter a 0 or 1 in accordance with the instructions below. Press the ENTER key to store the value. Press the UP/DOWN keys to move to the next menu item. In the market there are many gratings using a 20 μm pitch. There are two types of electronic signal which generate the reference point. The first associates the signal with a rise in voltage, the second with a drop.



REF SIGN = 0  
Normal Voltage = 0V  
At ref point = 5V

Suppliers-Easson, Mitutoyo, Futaba

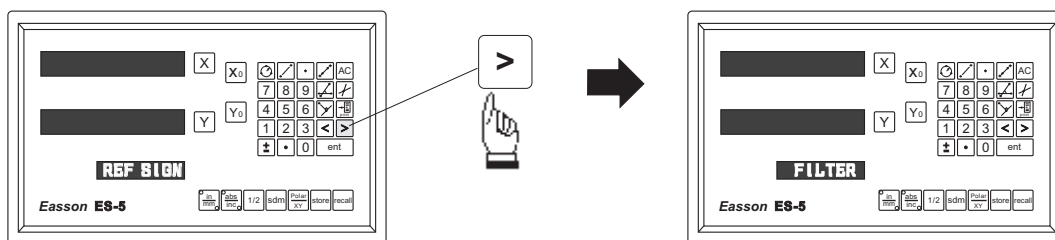
When fitting an EASSON scale always set to 0



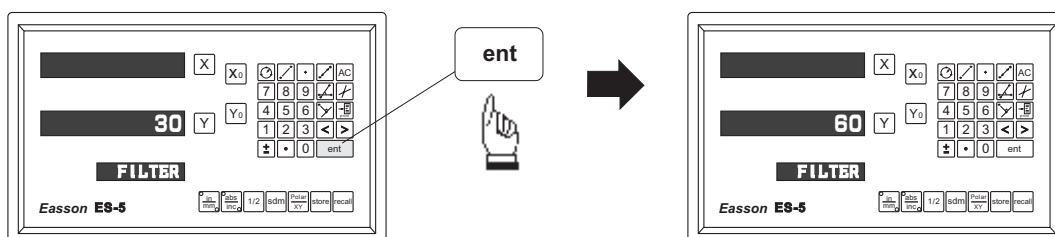
REF SIGN = 1  
Normal Voltage = 5V  
At ref point = 0V

Suppliers-Fagor

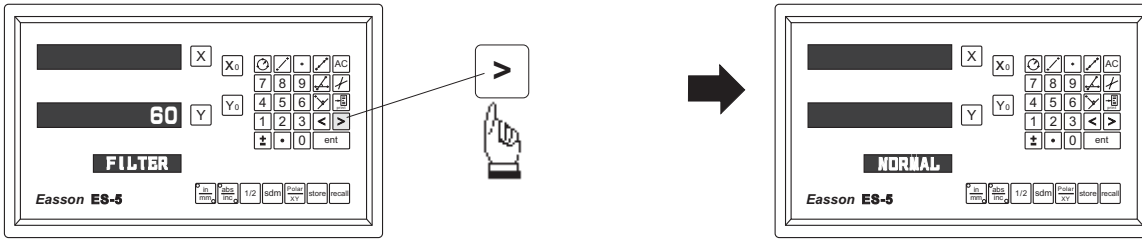
7.) Press  key to select the "FILTER" function.



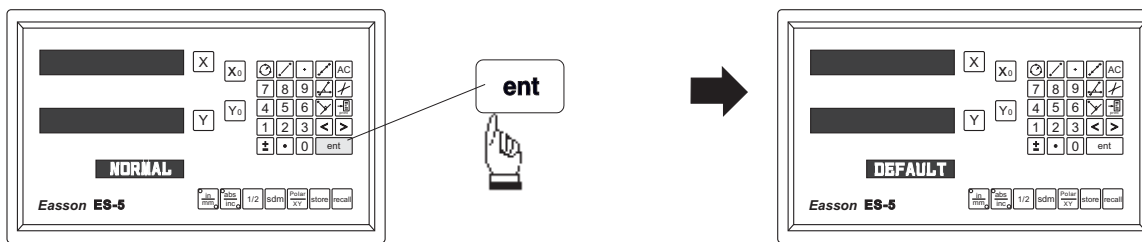
Press  key into the digital filter setting function, then you can increase digital value until the digital does not pulsate. Please note that the value of DE (digital filter) is larger means the integrate is larger then the display is more stable.



8.) Press **ent** key to make your setting, then press **>** key to select the "NORMAL" function.

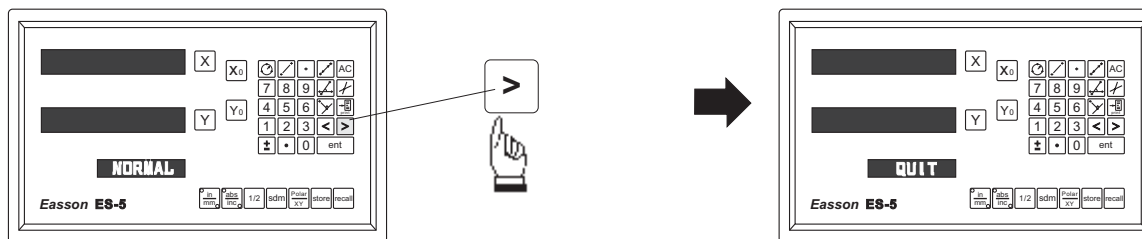


Press **ent** key into the setting function, the message "DEFAULT" is shown in the MESSAGE WINDOW.

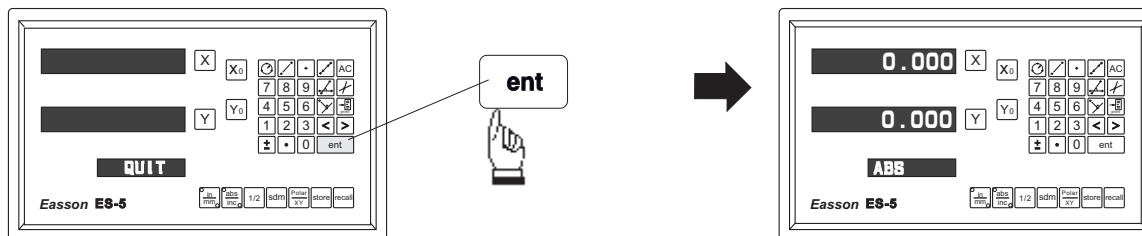


After entering the SETUP mode shown overleaf, push the UP/DOWN keys on the keypad until the word "NORMAL" is shown in the MESSAGE WINDOW. Press the ENTER key to access the next menu level. Press the DOWN key once and the message "DEFAULT" appears in the MESSAGE WINDOW. By pressing the ENTER key the software is restored to default level. Press the UP/DOWN keys to move to the next menu item.

9.) Press **ent** key to make your setting, then press **>** key to select the "QUIT" function.



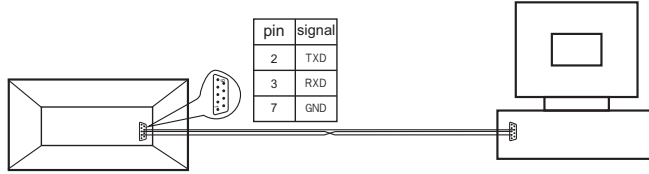
Press **ent** key to make your selection, then the DRO will exit the SETUP function and return to the "ABS" state.



By pressing the ENTER key the DRO exits the SETUP program and is ready for machining operations. If use the error compensation function, you must turn off the DRO then power on the DRO again, otherwise your compensated value will invalid.

**Appendix : RS-232C output Interface**

- ES-5 equipped with RS-232C output port to export data from ES-5 to a computer or an line printer, for measurement result print out or further data processing. pin layout of export port are as follows

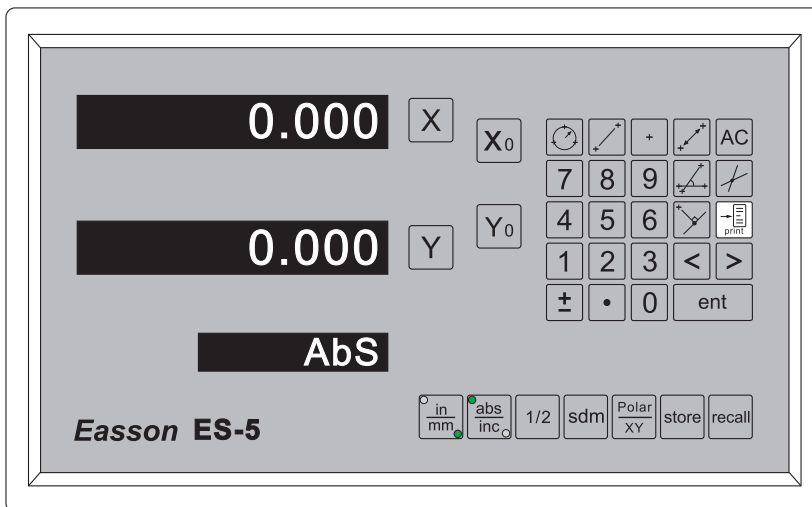


- ES-5's RS-232C output parameters are as follows :

BAUD RATE: 9600bps  
 DATA: 8 data bits  
 STOP BITS: 1 stop bit

- All data output from ES-5 are in ASCII format, the port can only export data from ES-5 to line printer or computer. ES-5 cannot accept any command from computer via the RS-232C port.

RS-232C output function



press **Print** to activate the output