SC-200

SC-100

SC-300

Resson® Technologies

Easson®

SC-400

SC-400

Digital Readout System - Digital Counter - Operation Manual (Grinder Option)

SC-500

SC-600

VERIFICATION

OF COMPLIANCE With Low Voltage Directive

CE

Verification No.: 16TW0856-LVD

Applicable Standard: IEC 61010-1:2010;

EN 61010-1:2010

This Verification of Compliance is hereby issued to the below named company.
The test results of this report relate only to the tested sample identified in this report.

General Information

Document holder :**Resson Technologies Co., Ltd.**
5F-3, No. 12, Lane 609, Section 5, Chongxin Road,
Sanchong District, New Taipei City, 24159
TAIWAN(R.O.C)

Product Description : **Digital Readout System - Digital Counter**

Model Number
SC-102, SC-103, SC-202, SC-203, SC-204, SC-302,
SC-303, SC-402, SC-502, SC-503, SC-603, SC-613

Trademark : Resson Technologies

This device has been tested and found to comply with the stated standard(s), which is(are) required by the Council Directive of 2006/95/EC. The test results are indicated in the test report and are applicable only to the tested sample identified in the report

Winnie Chiu

Winnie Chiu/ Reviewer

Date: Oct.28, 2016

Global Compliance Co., Ltd.
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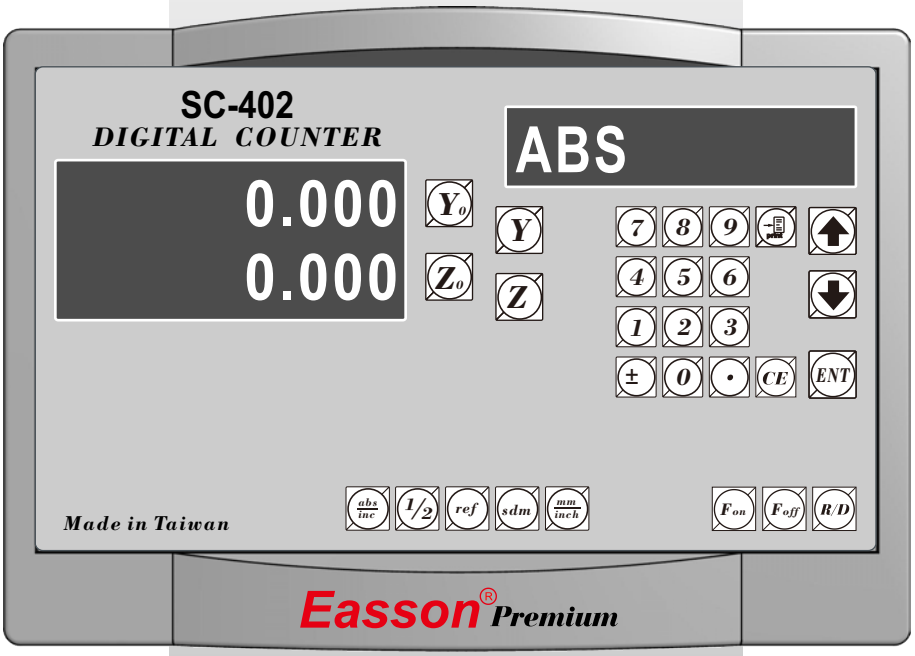
Easson® Premium

Made in Taiwan



SC-400

Digital Readout System
- Digital Counter -
Operation Manual
(Grinder Option)

Resson Technologies Co., Ltd.

Notes in Operation

Note before using this display !

- Use the defined voltage

  The rated power voltage supplied to this display should be 100V~230V, select correct voltage supply and try best supplying the power from lighting power line!

  Since the power circuit would become unstable under frequent power on/off and cause instant strong interference or even power shutdown; take special note on it!

- Ground the display!

  To guaranty user safety and stable & reliable system work, we strongly request user connecting the attached ground line (3-m yellow-green cable packed in the packaged box to the FC terminal at back of display to make good grounding connection!

- Insert each axis optic rule into correct position before turning on display; if doing the turn inversely, it might burn out the electronic devices in the optic ruler!

- Do not operate this display in elevated ambient temperature or under high humidity!
- Do not operate this display in strong electric field, magnetic field or noisy environment, or by electric machine that would be the main reason making system act in error!
- Use dry, soft cloth to wipe cleaning display surface!
- For stain hard to remove, use soft cloth wet by neutral detergent to clean it up!
- Do not use gasoline, diesel fuel, kerosene or alcohol to wipe cleaning the display surface!
- Do not use compressing air gun to blow display and optic scale assembly since it would blow oil, moisture, dust or chips into them from seam and cause system unstable and damage!

Elaborate maintenance, correct operation;

Extend operation lifetime and stabilize work performed

Thanks for buying our product! To use it correctly, read this Operation Manual carefully and in details.

SC-400 Specification

SC-400 Specification :

Number of axes : 2 Axes (SC-402)

Reslution : 0.05/0.02/0.01/0.005/0.002/0.001/0.0005/0.0002/0.0001mm

Display function : 8-digit LED

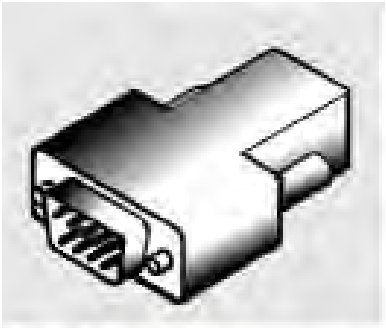
Response speed : 60m (198.6feet)/min

Quantizing error : ±1 count

Power source : AC100V～240V / 50～60Hz / 20VA

Temperature fange : Service:0～40℃ / Storage:-20～70℃

Linear Encoter (Scales) Electrical connector :



D-sub 9 pins connector

TTL

PIN	SIGNALS
1	N/C
2	0V
3	N/C
4	Inner shield
5	N/C
6	A
7	5V
8	B
9	R

N/C : No Connection

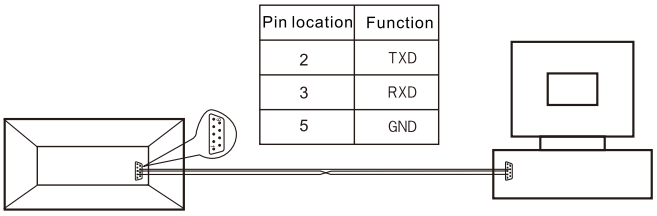
RS422

PIN	SIGNALS
1	A-
2	0V
3	B-
4	Inner shield
5	R-
6	A+
7	5V
8	B+
9	R+

RS-232C output Interface

RS232 output port

This display has RS232-C output port facilitating user to print out the measuring result or connect it to a computer; the port's picture is as below.

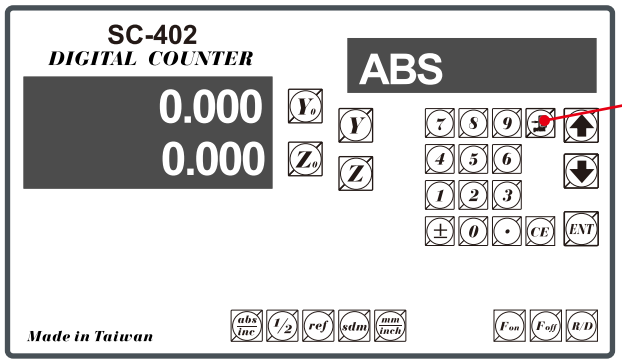


The display's RS232 output port transmission parameters are:

RAUD RATE : 38400/19200/9600/4800/2400/1200bps
DATA : 8 data bits
STOP BITS : 1 stop bit

Through the display's RS232 output port, we can output display data to a computer or send the output or reset command to display from the computer; such as asking axis X to reset CX, axis Y to reset CY and axis Z to reset CZ.

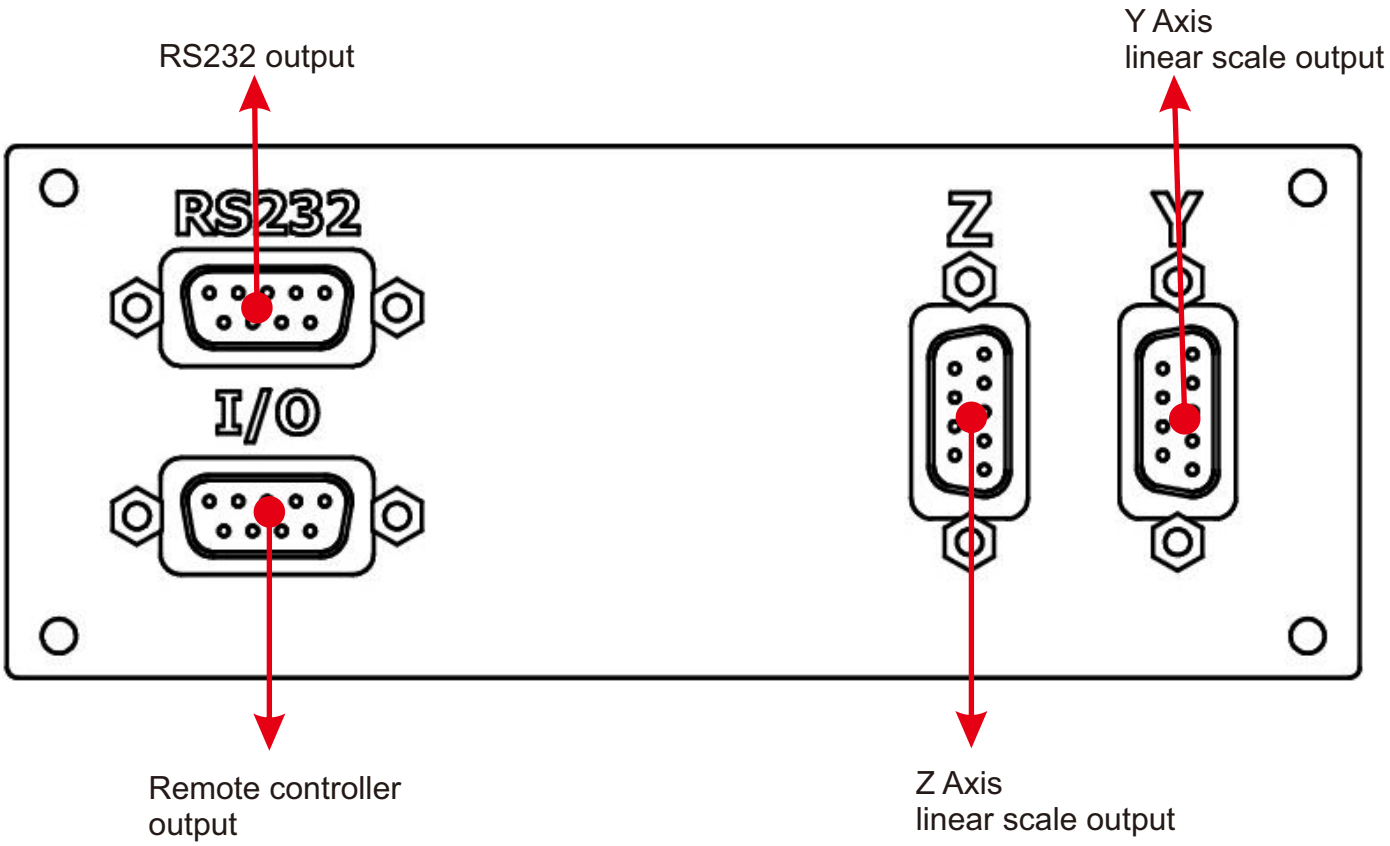
RS232 output function



Press print to output display data; and set the “print” option to “on”; to apply two-way communication, set the “print” option to off.

User may select EPSON LQ-300+RS232 as the working printer; set speed to 19200bps and turn on the print to standby.

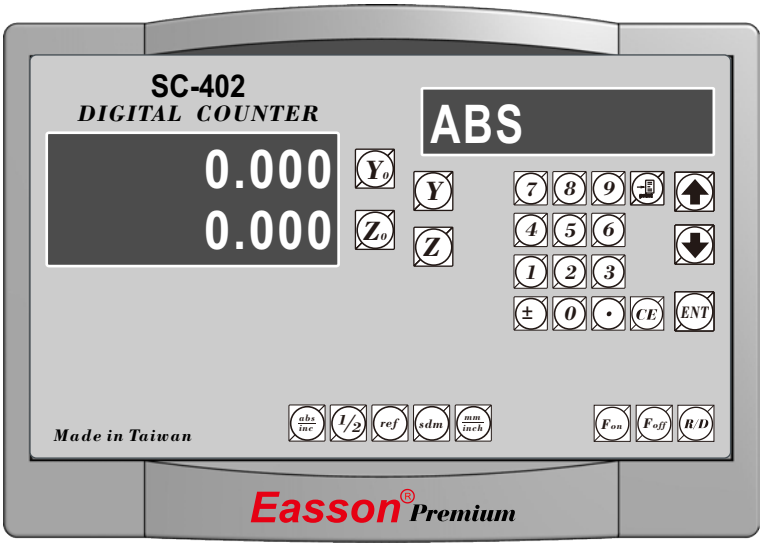
The back shell plug seat of DRO.



Content

1 Basic Functions 1
2 REF Datum Memory 7
3 Non Linear error Compensation 13
4 Digital Readout Setup Function 21

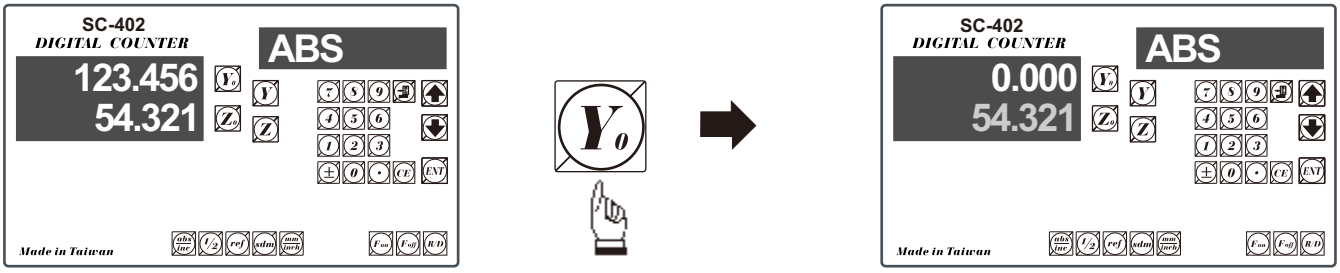
Basic Functions



Set Display to Zero

Purpose ： Set the current position for that axis to zero

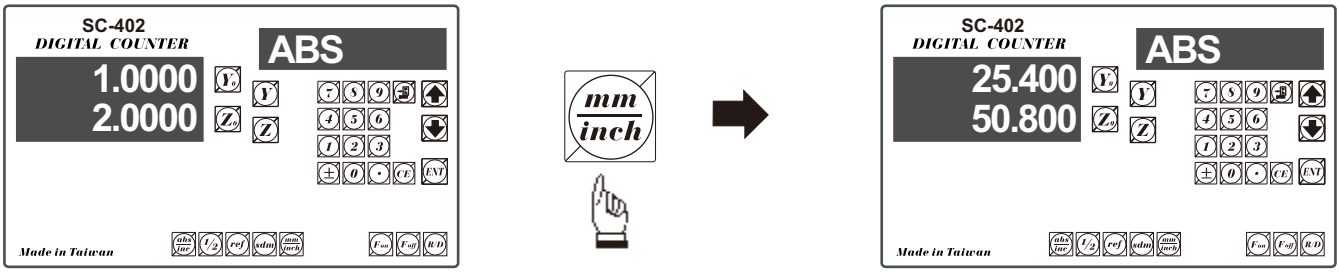
Example ： To set the current **Y Axis** Position to **zero**



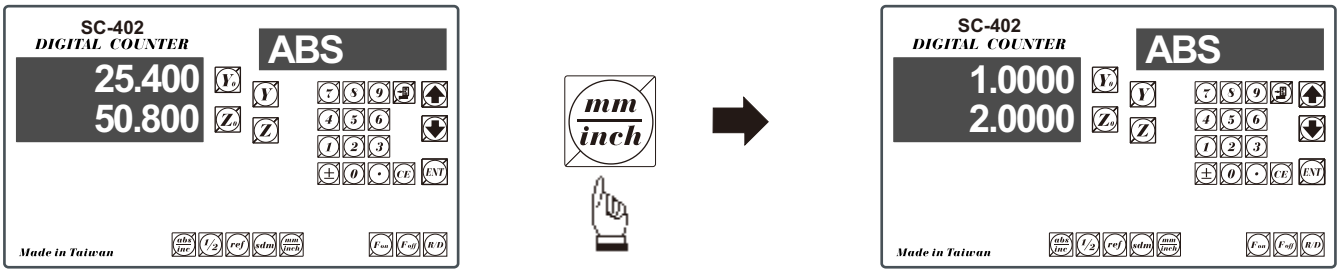
Inch/Metric Display Conversion

Purpose ： Switches between inch and metric display

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



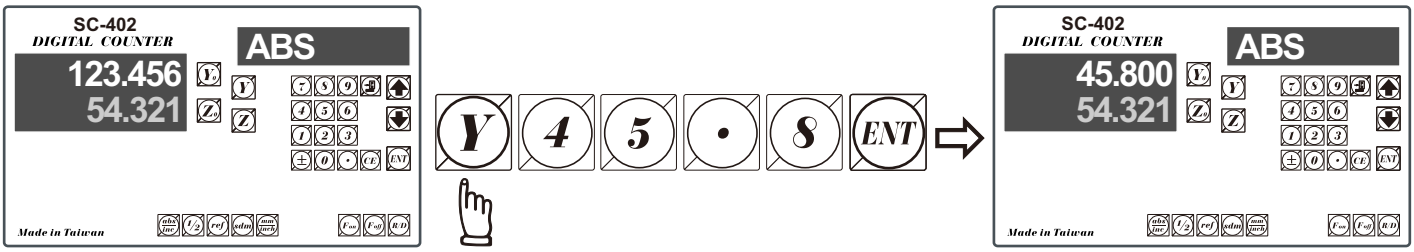
Example 2 ： Currently in **metric** display, to switch to **inch** display



Dimension Preset

Purpose ： **Set the current position for that axis to an entered Dimension**

Example ： To set the current **Y Axis** position to 45.800mm



ABS/INC coordinates display switches

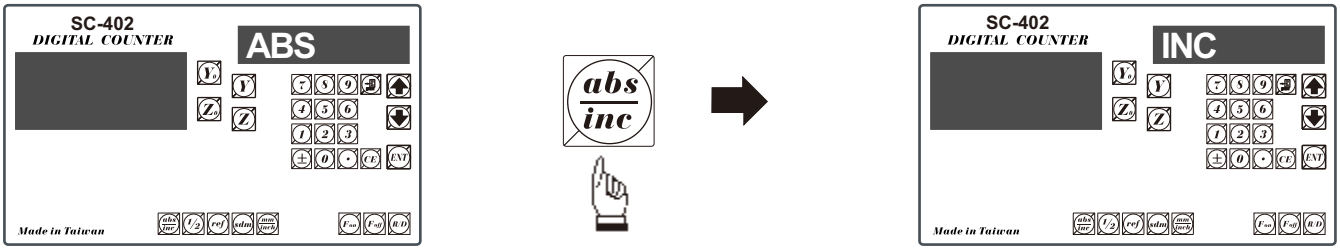
Purpose ： Counter provides two sets of basic coordinates display, they are **ABS** (absolute) and **INC** (incremental) displays.

During machining operations operator can store the work piece datum (zero position) in **ABS** coordinate, then switch to **INC** coordinate to continue machining operations.

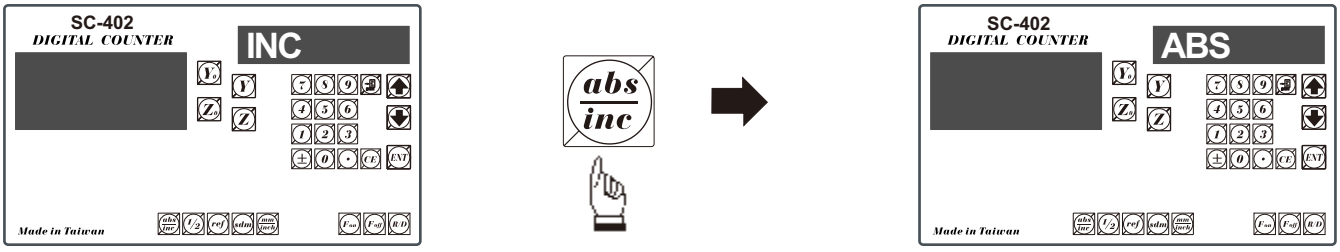
Then the operator is free to zeroing the axes or preset any dimensions into any axes in **INC** coordinate for any relative position machining. the work piece datum (work piece zero position) is still keep in **ABS** coordinate if counter.

Operator can then switches between **ABS** (absolute)and **INC** (incremental) coordinate without losing the work piece datum (work piece zero position).

Example 1 ： currently in abs display coordinate, to switch to inc display coordinate



Example 2 ： currently in inc display coordinate, to switch to abs display coordinate

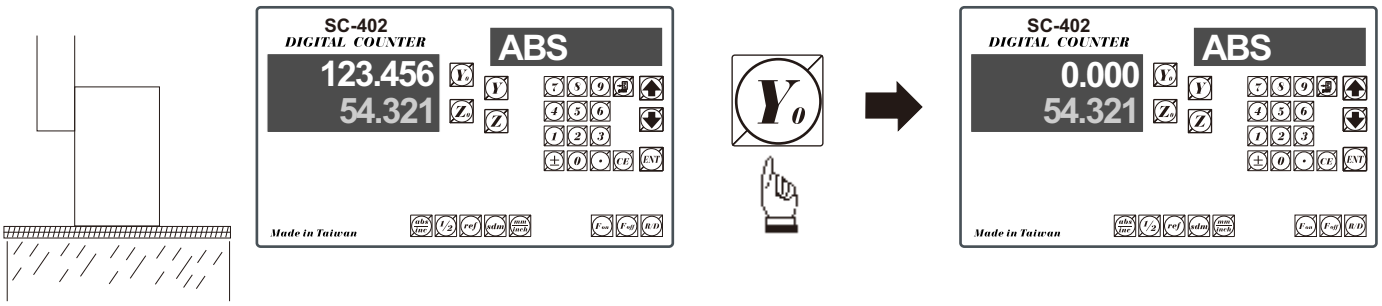


Center Find

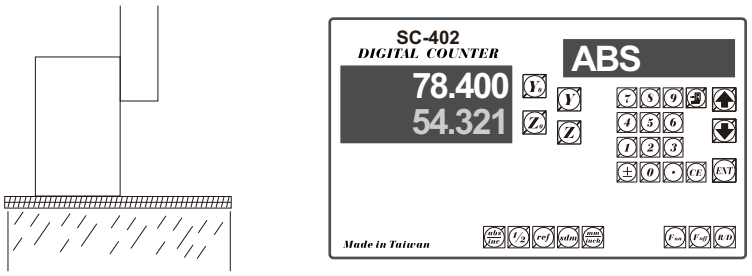
Purpose ： **Counter provide center find function by halfing the current display coordinate, so that the zero point of the work piece is located at the center of the work piece.**

Example ： To set the **Y** Axis zero point at the center of the work piece

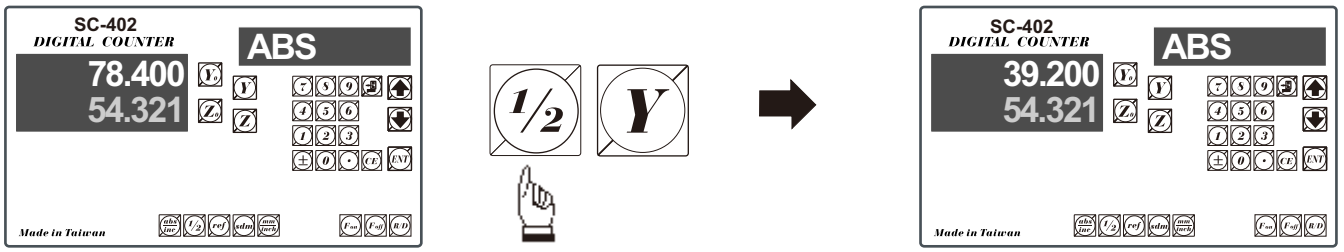
Step 1 ： Locate the edge finder at one end of the work piece, then zero the **Y** Axis.



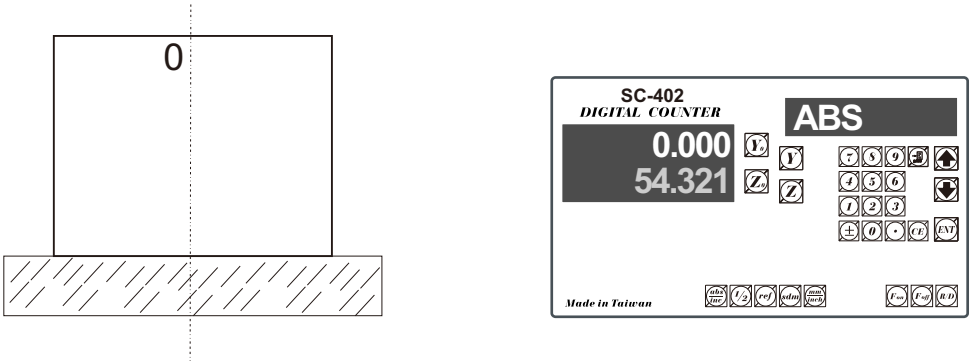
Step 2 ： Locate the edge finder at the opposite end of the work piece.



Step 3 ： Then half the display coordinate using center find function as per follows



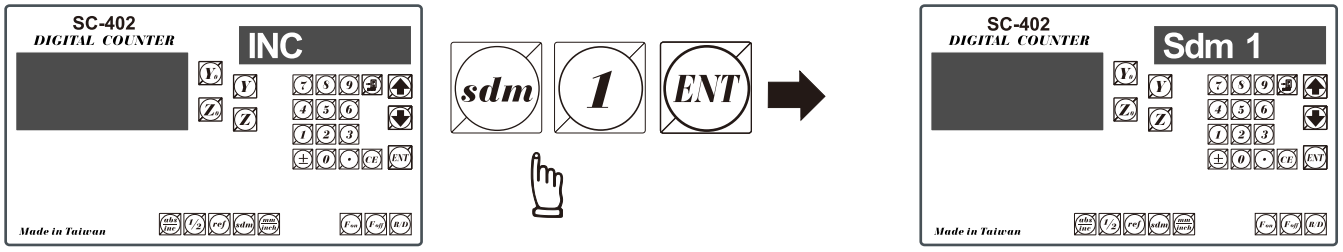
Now the Y Axis zero point (0.000) is located right at the Y center of the work piece.



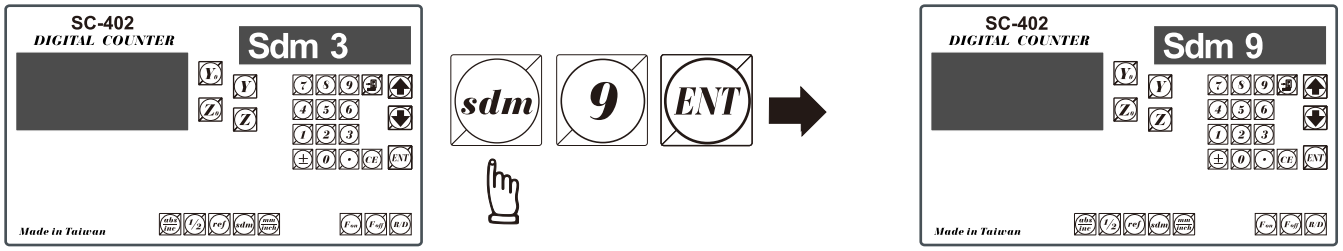
199 Subdatum memory

Purpose : The readout offer 199 subdatum memory function, it is offered as a supplement of ABS/INC coordinates. All subdatums are reference to the ABS coordinate (in offer word, all subdatums are independent to INC coordinate).

Example 1 : Currently in **INC** display, coordinate to switch to **Sdm** display coordinate



Example 2 : Currently in **Sdm 3** display coordinate, to switch directly to **Sdm 9** display coordinate



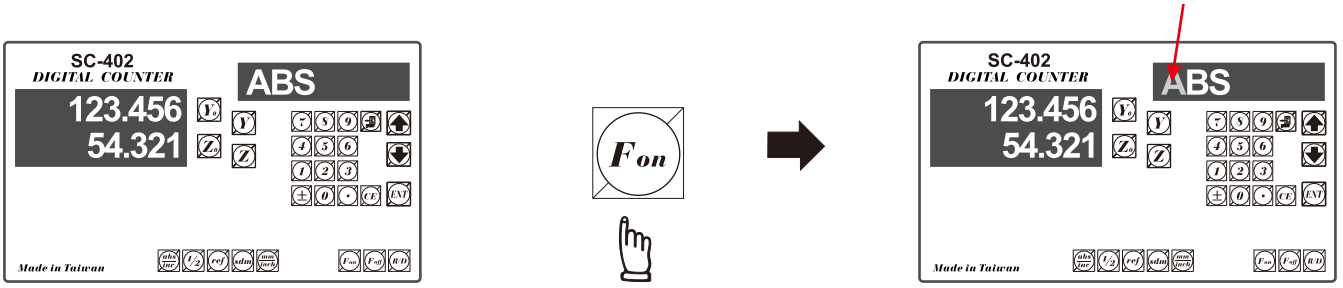
Vibration filtering

Purpose : High accuracy and high resolution (1u) display sre essential for grinder application. However, under The high resolution display, the last digit display may keep toggling caused by the vibration of the Machine during the machining process, especially in large grinder.

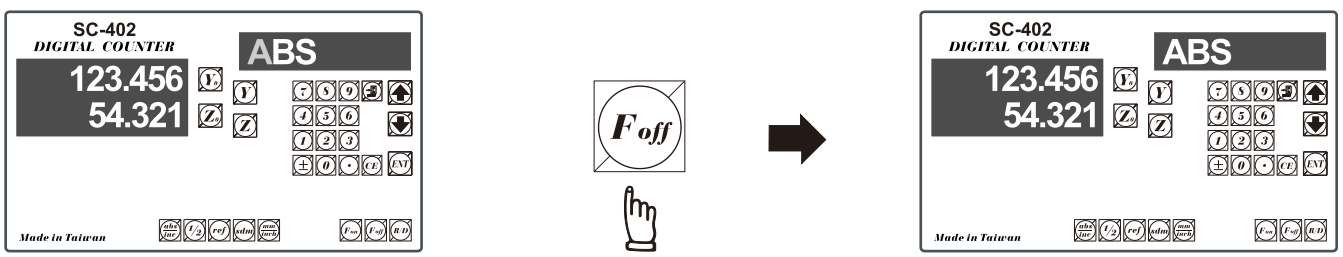
The innovative virbration filtering function can filter the display toggles to obtain a more comfortable readings, and hence reduces human mistake.

the first digit of the message display blinking indicate that the readout is vibration filtering mode.

Example 1 : The tum vibration filter **on.**



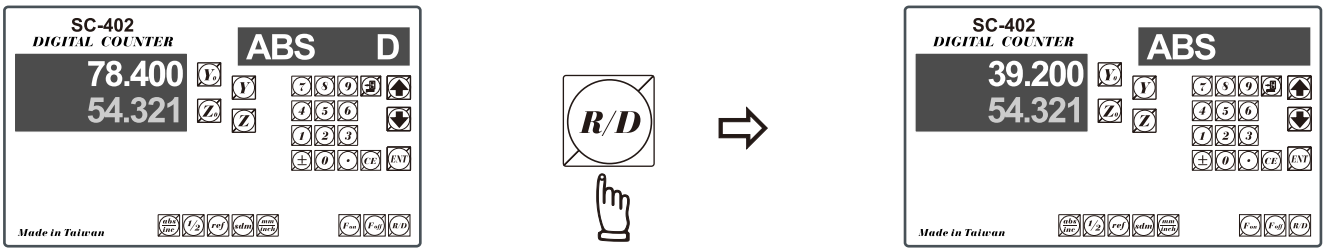
Example 2 : Vibration filter currently **on**, to turn it **off**



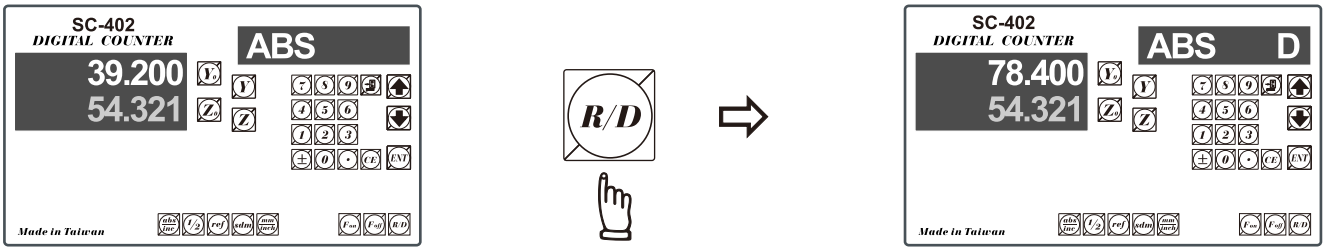
Radius/Diameter Display for Y Axis

Purpose ： **During the machining on lathe, because the turned part's size reduced at twice as much as the actual Y axis cross feed increment. Therefore, to obtain a direct diameter reading of the part that being machined, the readout offers Radius/Diameter display for Y axis.**

Example 1 ： Currently in **Radius** display, to switch to **Diameter** display



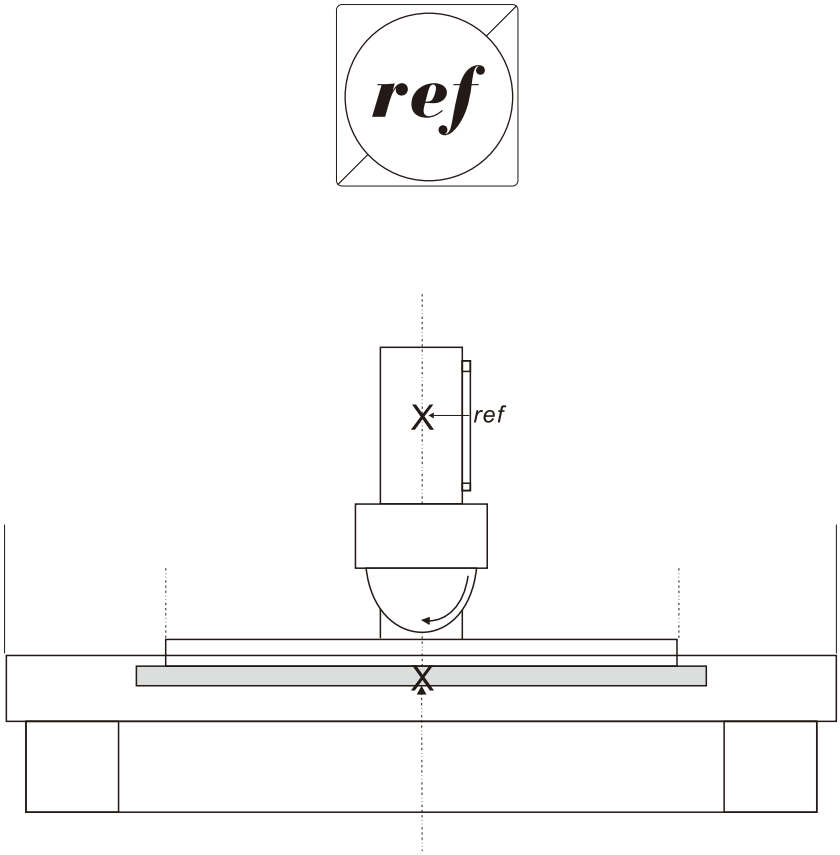
Example 2 ： Currently in **Diameter** display, to switch to **Radius** display



In Diameter display mode, the readout display double of the Y axis increment.

During the Diameter display, a 'd' appears on the leftmost Y axis digit display to indicate the readout is in Diameter display mode.

ref datum memory



ref datum memory function

Function : During the daily machining process, it is very common that the machining cannot be completed within one work shift, and hence the DRO have to be switched off after work, or power failure happen during the machining process which is leading to lost of the work piece datum (work piece zero position),the re-establishment of work piece datum using edge finder or other method is inevitably induce higher machining inaccuracy because it is not possible to re-establish the work piece datum exactly at the previous position.

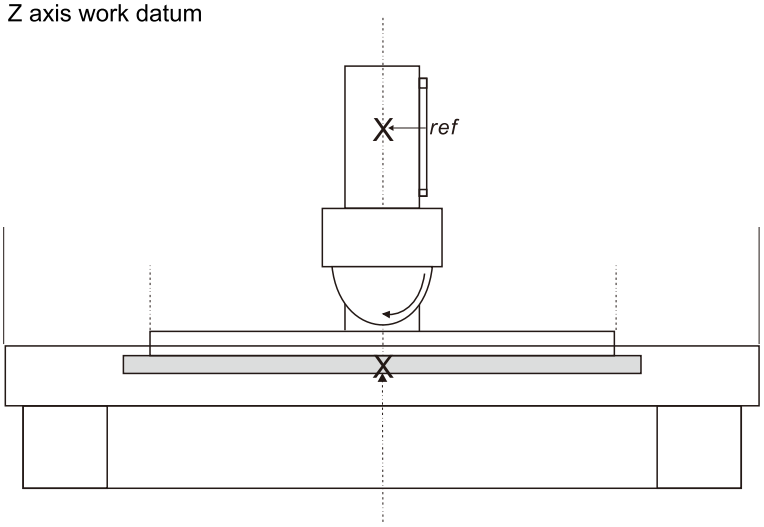
To allow the recovery of work piece datum very accurately and no need to re-establish the work piece datum using edge finder or other methods, every glass grating scale have a ref point location which is is equipped with ref positionto provide datum point memory function.

The working principal of the ref datum memory function are as follows.

-There are a permanent and fixed mark (position)in the centre of every glass grating scale, Normally called *ref* mark or *ref* point..

Since this *ref* point position is permanent and fixed, it will never change or disappear when the DRO system is switched off. Therefore, we simply need to store the distance between the *ref* point and the work piece datum (zeroposition) in DRO's memory. Then in case of the power failure or Counter being switched off, we can recover the work piece datum (zero position)by presetting the display zero position as the stored distance from the ref point.

Example : to store the Z axis work datum



Opertion: Counter provides one of the most easy to used *ref* datum memory function.

There is no need to store the relative distance between the *ref* mark and your work datum zero into Counter, whenever you alter the zero position of ABS coordinate, such as by zeroing, centre find, coordinate preset or etc.., Counter will automatically store the relative distance between ABS zero and the ref mark location into Counter's memory.

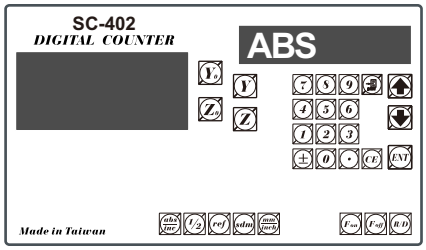
In daily operation operator simply need to find the *ref* mark position whenever they switch on the Counter to let Counter know where the *ref* mark position is, then Counter will automatically do the work datum storage on its' own whenever you alter the ABS zero position. In case power failure or the Counter switched off, the operator can recover the work piece datum easily by the RECALL 0 procedure.

ref datum memory function

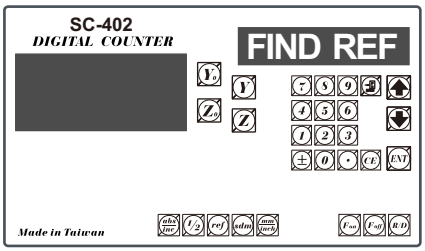
Function : Because in **Counter's** ref datum memory function, **Counter** will automatically store the relative distance between the ***ref*** mark position and the work piece datum (zero position) whenever the operator alter the **ABS** zero position, such as zeroing, centre find, coordinate preset or etc...

Therefore, ***Counter*** need to know where the ***ref*** mark position in prior to machining operation. In order to avoid the lost of work piece datum(zero position)during any accidential or unexpected events, such as power failure or etc..It is highly recommend that operator find the ref mark position using the (**FIND REF**)function whenever they switch on the **Counter**

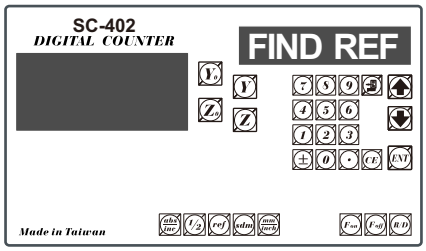
Step 1 : enter into the ref function, select the **FIND REF**(find ***ref*** mark)

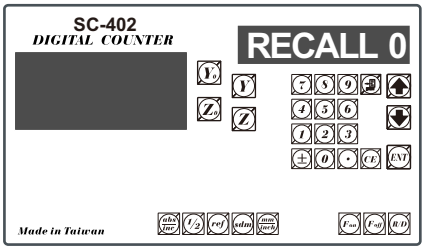


enter into ***ref*** function



FIND REF
(find **ref** mark)

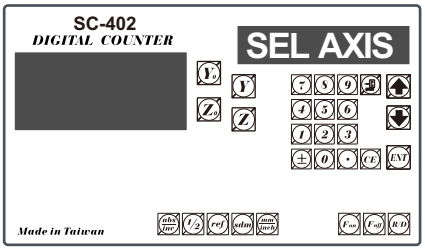




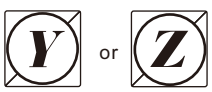
RECALL 0
(recall work zero)

Select the FIND REF
(find ***ref*** mark)

Step 2 : Select the axis of which ***ref*** mark needed to be found



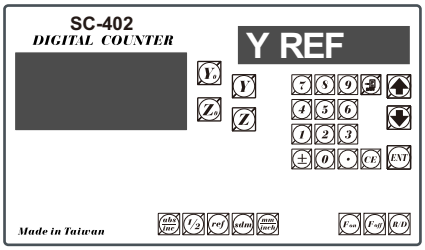
select Y or Z axis



or

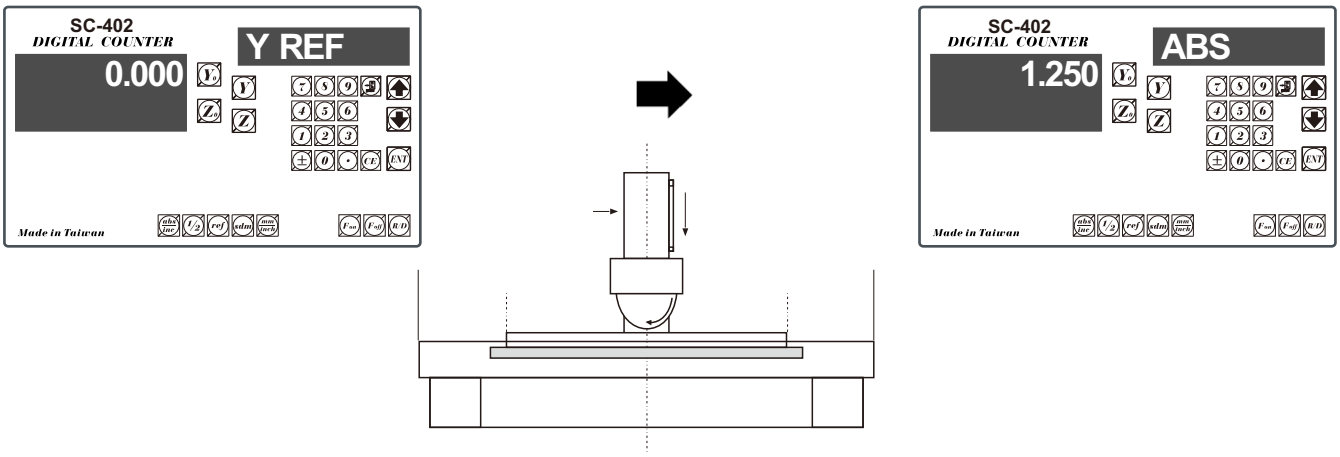
select all axis
Y, Z respectively

select Y axis
in this example



ref datum memory function

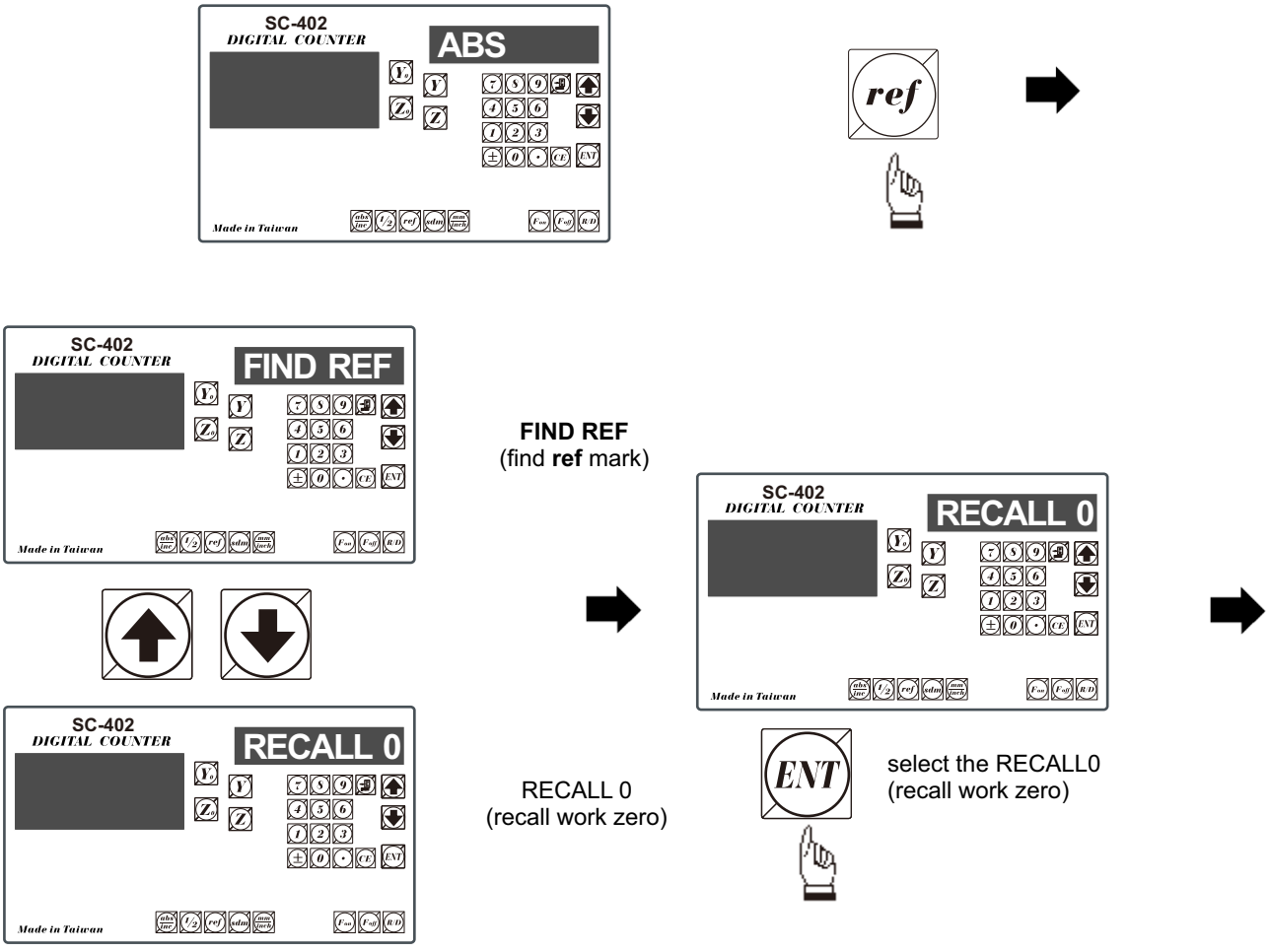
Step 3 : move the machine across the center of the glass grating scale until digits display in Counter start run.



recall the work datum zero (RECALL 0)

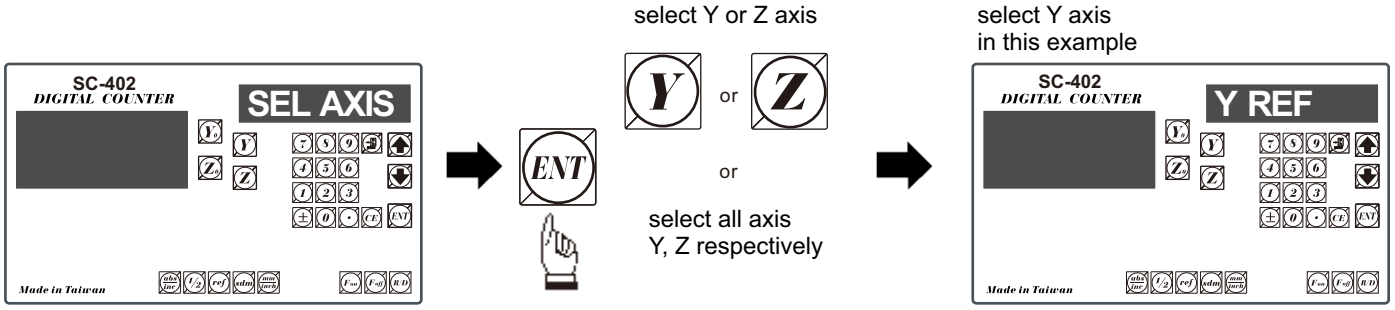
Function : after lost of the work piece datum due to power failure or switch off of Counter, the work piece datum Can be recover by **RECALL 0** function as per following procedures.

Step 1 : Enter into the **ref** function, select the **RECALL 0** (recall work piece zero)

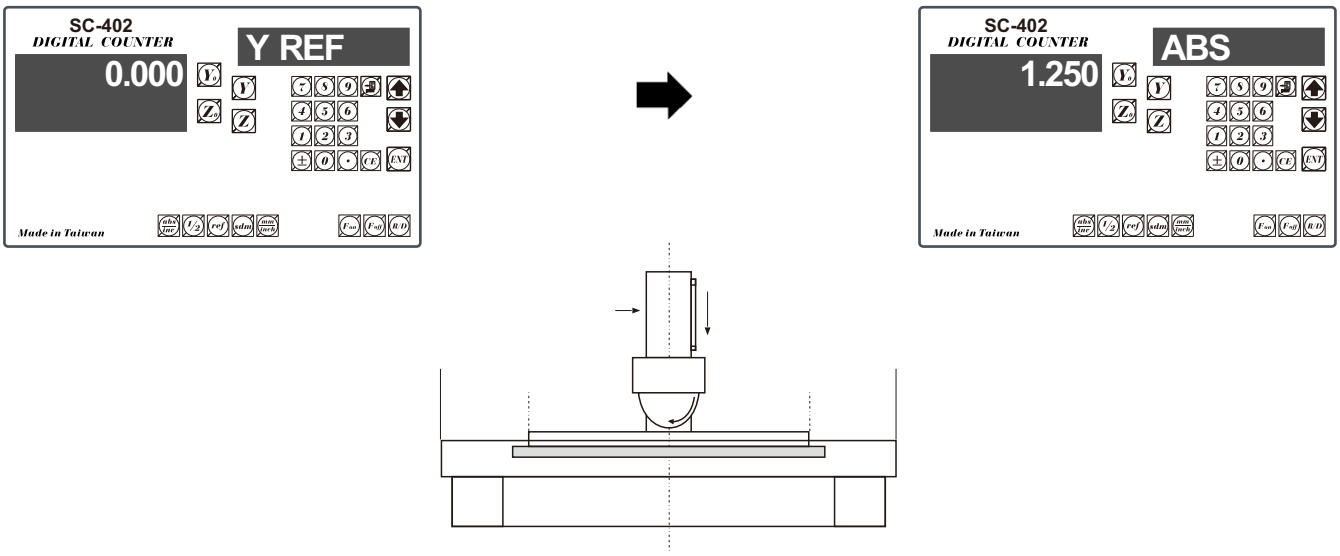


ref datum memory function

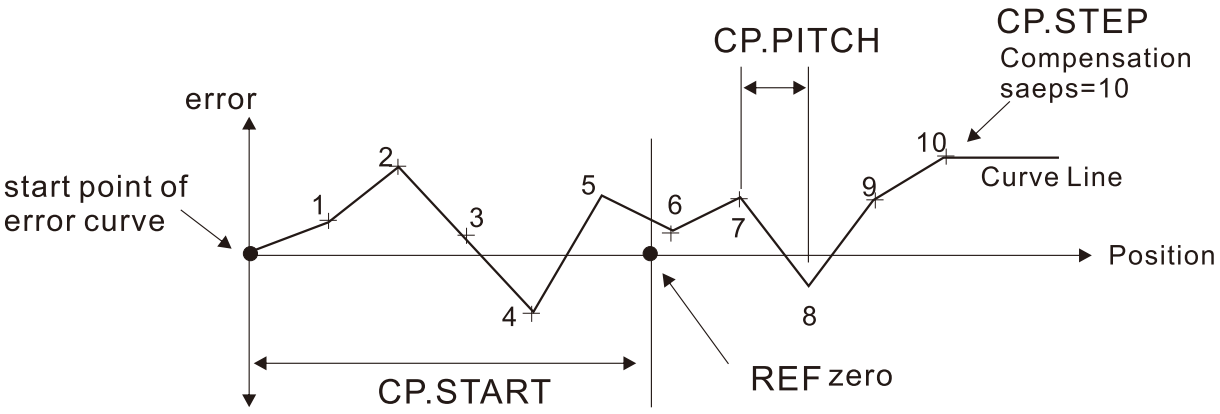
Step 2 : select the axis of which work datum (zero position) needed to be recovered

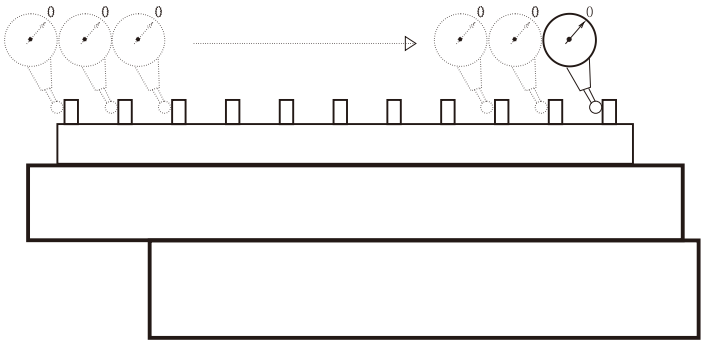


Step 3 : move the machine across the centre of the glass grating scale until digits display in Counter start run, then the work piece datum is recovered



Non Linear error compensation



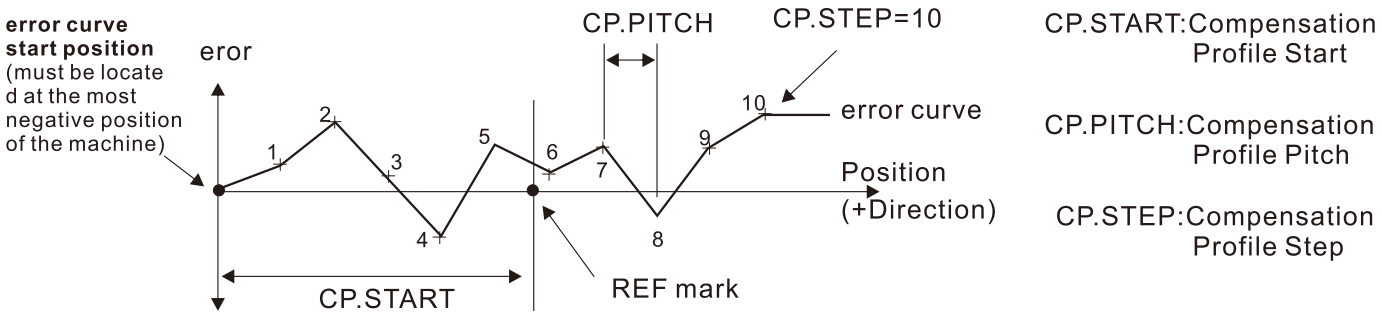


Non Linear error compensation

The Grinder readout offers non-linear error compensation to improve readout accuracy to maximum possible limit.

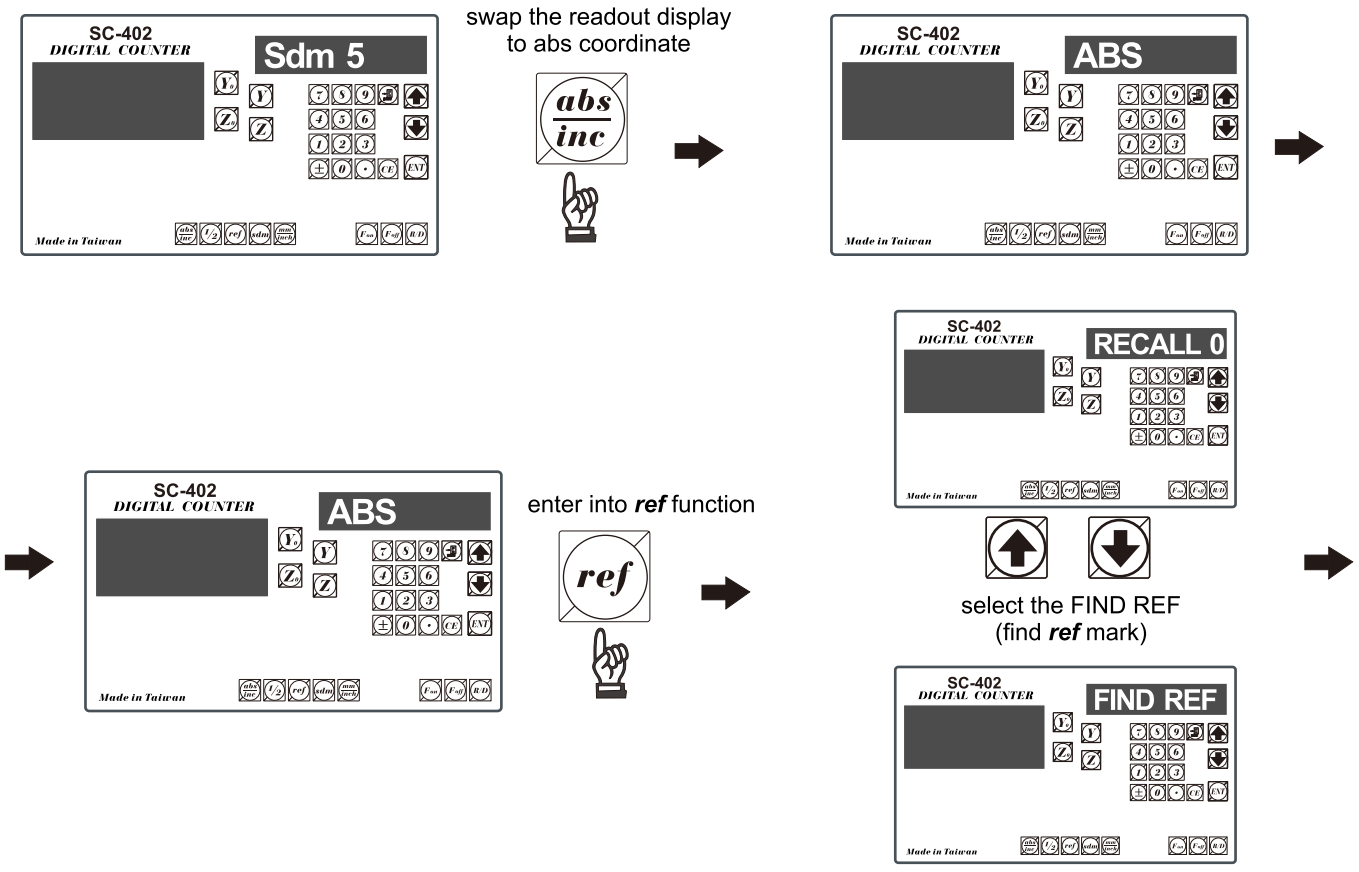
Principle of Operation:

Non-linear error compensation make use of the REF (reference mark) position of the linear scale to locate the absolute position of the machine. The readout's CPU then compensate the readout readings according to the error table that built in during the set up process. The compensation always started vital important to have the CP.START position located at most negative position of the machine. Counter offers a maximum of 30 non-linear compensation steps, the linear compensations is effect between the compensation steps.



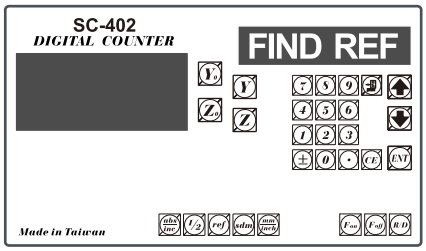
Operation procedure

1) Locate the REF zero at ABS coordinate:

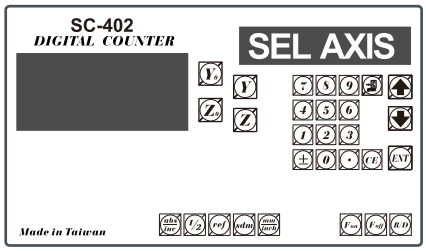


Non Linear error compensation

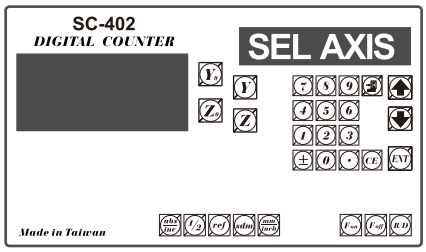
select the FIND REF
(find ***ref*** mark)



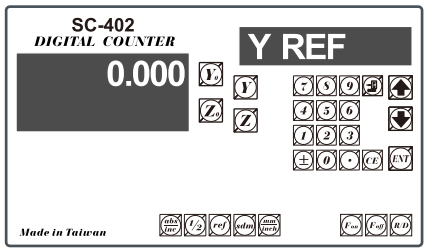
select Y or Z axis



Let's say take Y as an example



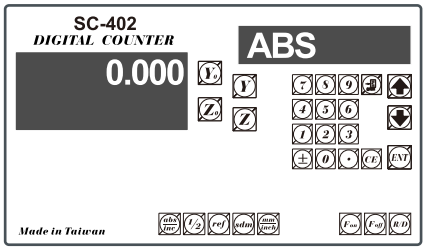
select the Y axis



move the machine across the ref mark of the scale until the digits display start run. **Please remember that to move the scale must be moved towards the positive direction.**

after the display digits start run, move the machine to Y=0.000,it is the ref mark position.

ref mark

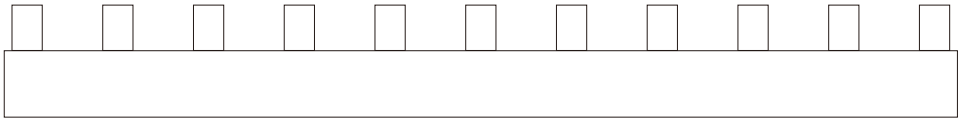


2) Locate the CP.START position:

The CP. START position is the absolute reference for the internal error compensation calculation of the readout, it is the start point of the error curve, to make fast real time calculation possible, the readout assume all internal error compensation calculations are only in positive direction. Therefore, the CP. START position should be located in the most negative position of the machine, so that all measured position in the error curve are located in positive position.

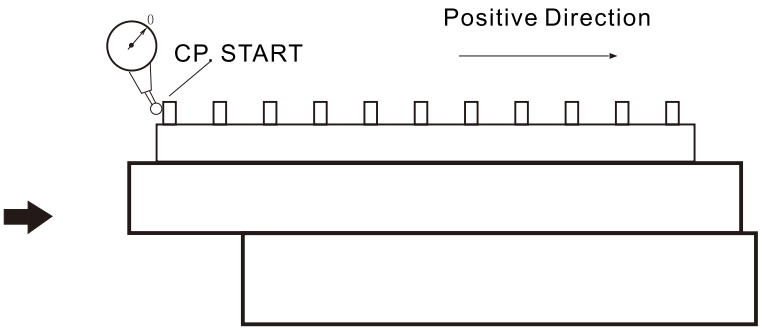
I.e. In the example below, we are using a step gage which have total measurement travel of 300mm as our measurement standard. The step pitch of the step gage is 25mm
Our maximum machine travel is 265mm. Therefore,

CP. PITCH = 25mm
CP. STEP = (265/25)= 10.6 steps, since steps must be in integer, then round up to = 10steps

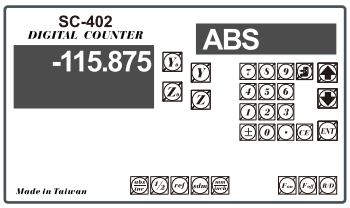


Non Linear error compensation

Using a dial indicator to locate the most negative position of the step gage, zero the dial indicator at that position, record down this position as the CP. START position.



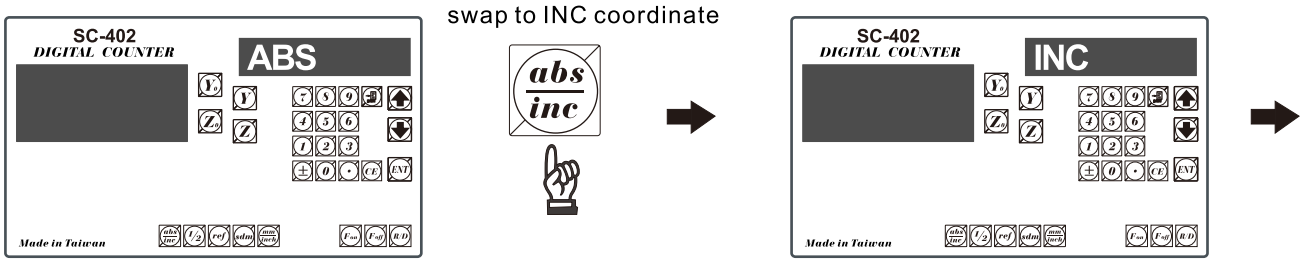
Because the CP. START position always in the most negative position of the machine, therefore, it should always be negative value.

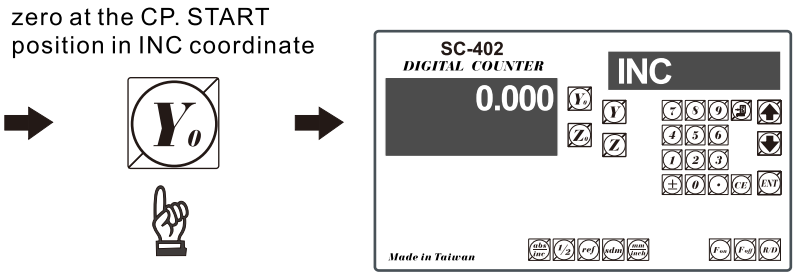


Please record down this position by pen, in this example, the CP.START position = -115.875

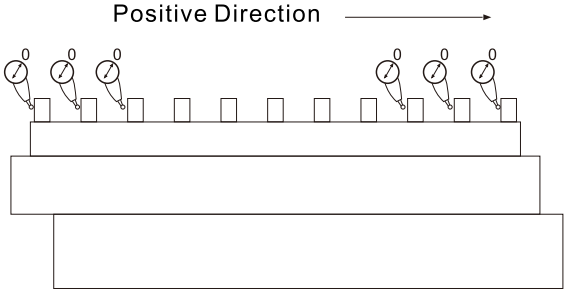
3) START measure the error, to build up a error curve.

To mark the error measurement more easy, swap to INC coordinate and zero at the CP. START position.





Start measure the error by positioning the dial indicator on the step gage. Take down the display value shown at the readout.



Non Linear error compensation

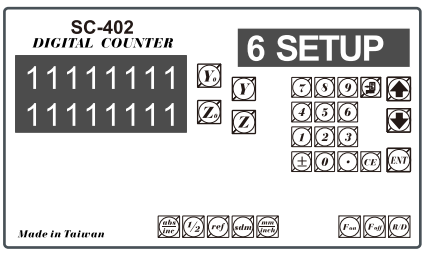
- Record down the measured value from the readout and fill up following table

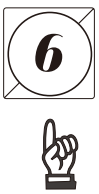
Standard position	Measured value
25.000	25.008
50.000	50.004
75.000	75.017
100.000	99.995
125.000	125.002
150.000	150.012
175.000	174.997
200.000	199.988
225.000	225.007
250.000	250.015

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

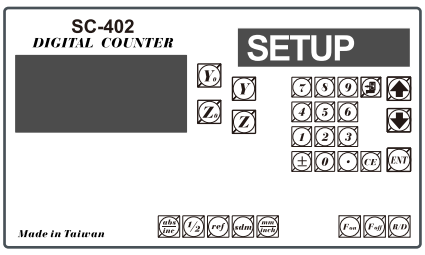
4) enter the error curve value into the readout

switch off the readout and them switch it on again



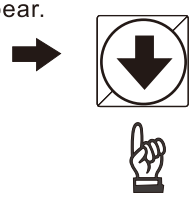


During the start up procedure, when the readout display the software version number, press "ent" once to enter the SET UP function

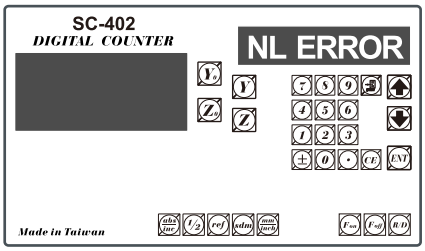


Non Linear error compensation

after entered the SET UP function of the readout, press "down" button until display "NL Error" appear.

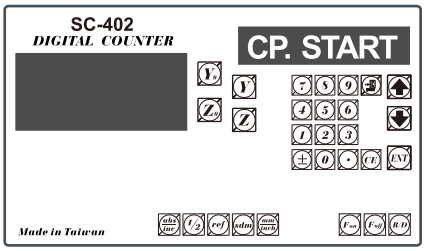


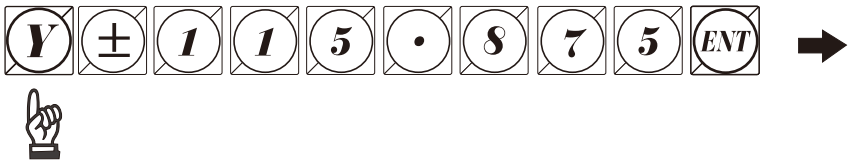
NL Error is Non-Linear Error (Non Linear Error Compensation)



Press ENT to enter into NL Error function

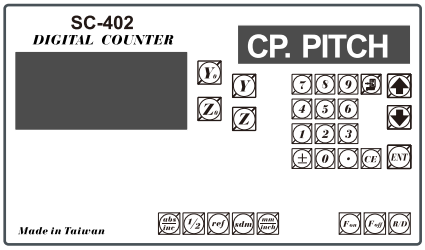
enter the CP.START

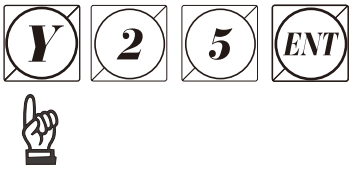




enter the CP.START

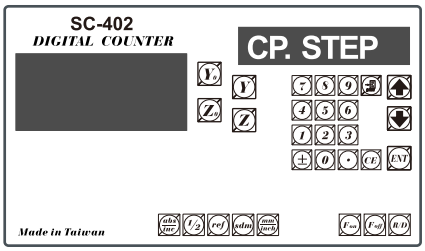
next step

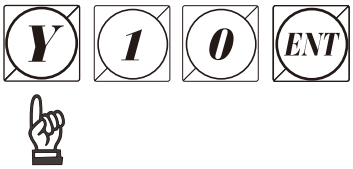




enter the CP.STEP

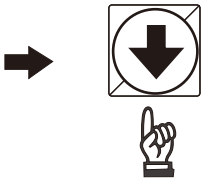
next step

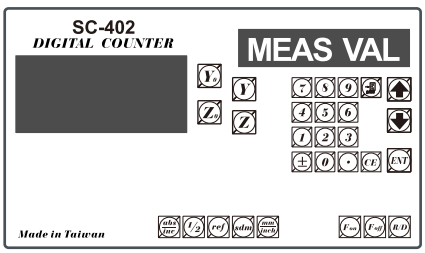




MEAS VAL is Measured Value

next step

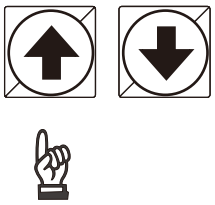


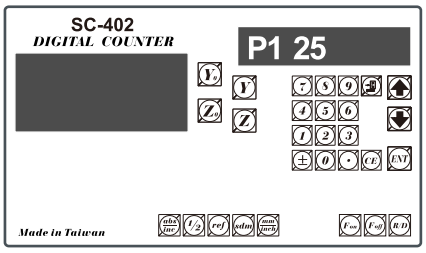


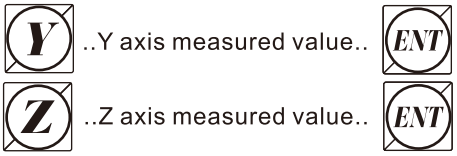
Press ENT to confirm the choice

Non Linear error compensation

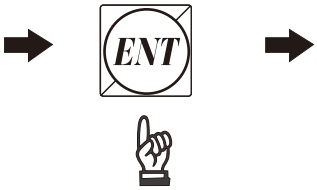
after enter the MEAS VAL mode
press "up" or "down" button
to select the step point value

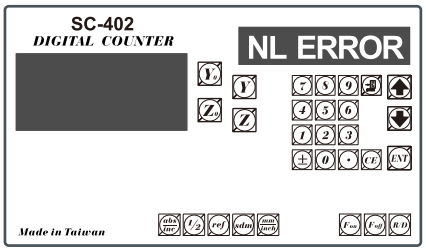




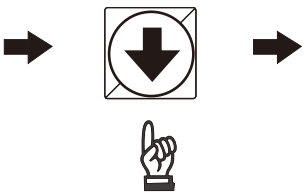


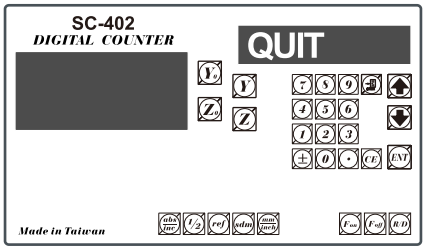
after all measured value
entered into the readout,
press"ent" to exit the
NL Error function





Press"down"key until
display shows"QUIT"

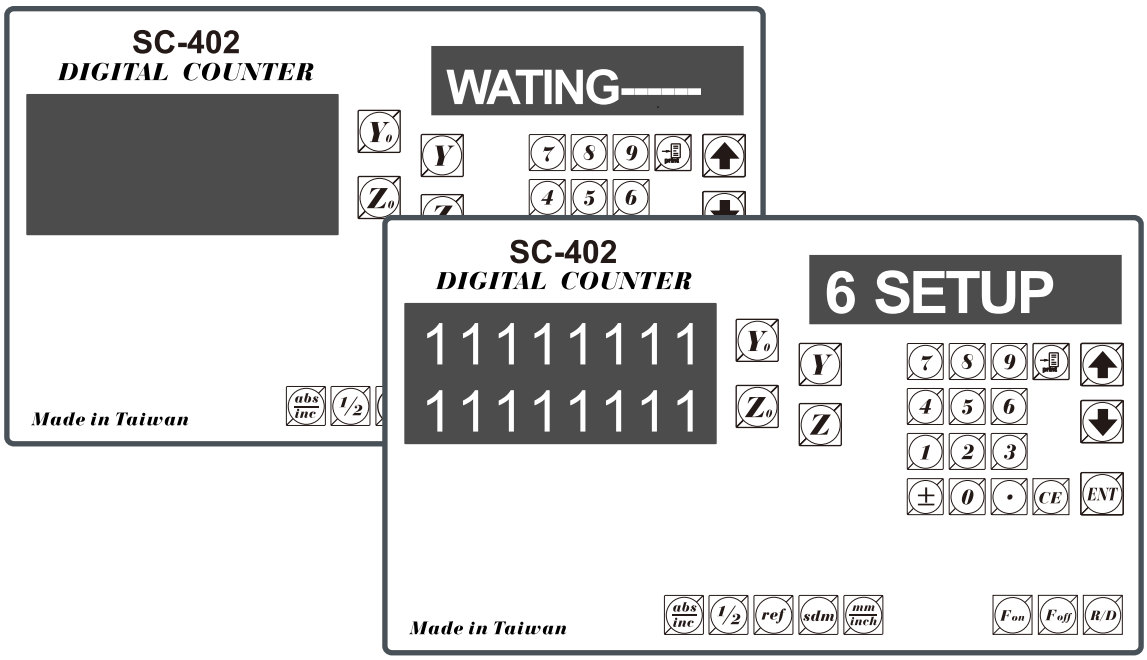




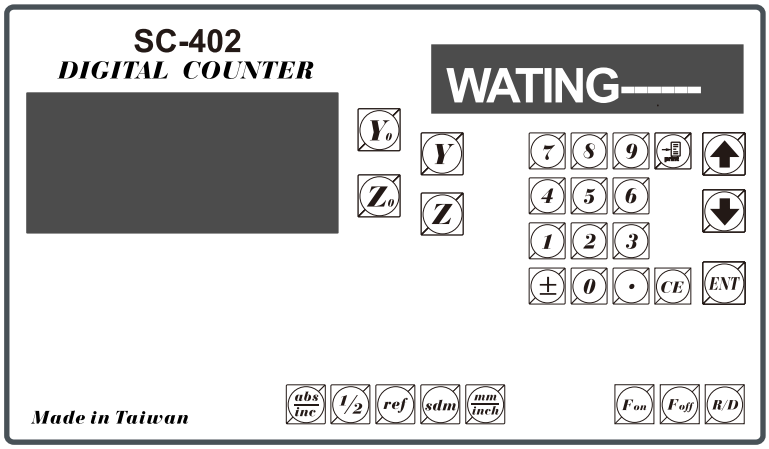
Press"ent"the quit
the SET UP function

* it is very important to remember to switch off the readout. The error curve data will be moved to the RAM memory of the readout only during the power star up procedure. Therefore, after entered the error curve data, the display must be switched off at least one time.

SC-400 Parameters Setup



Reset display's original parameter (RESET)



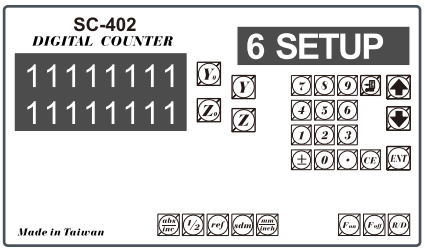
When the DRO is under the impact of abnormal voltage, or user's improper operation that cause parameter setting in error, it needs to default simple working parameters by resetting them to default value from memory. Yet, before parameter reset, check if there is any parameter value set in already; if so, write down the setting data and set it up after reset.

Operation steps:

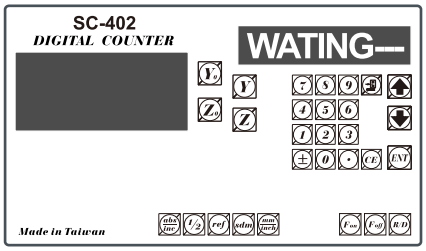
1) . Turn off the DRO power.

2) . Turn on the DRO; when "11111111" test signal is shown in the display window, press "0" and the display start performing "reset".

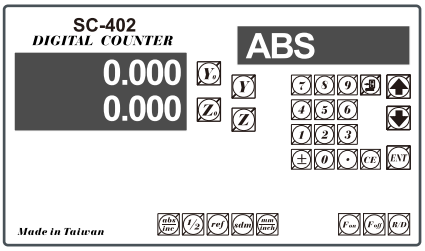
While turning on the display, it will perform self diagnosis and test; press 0



3). 1.When parameters reset, "WATING" will show on the display.



"WAITING --" is shown as parameter reset is underway.

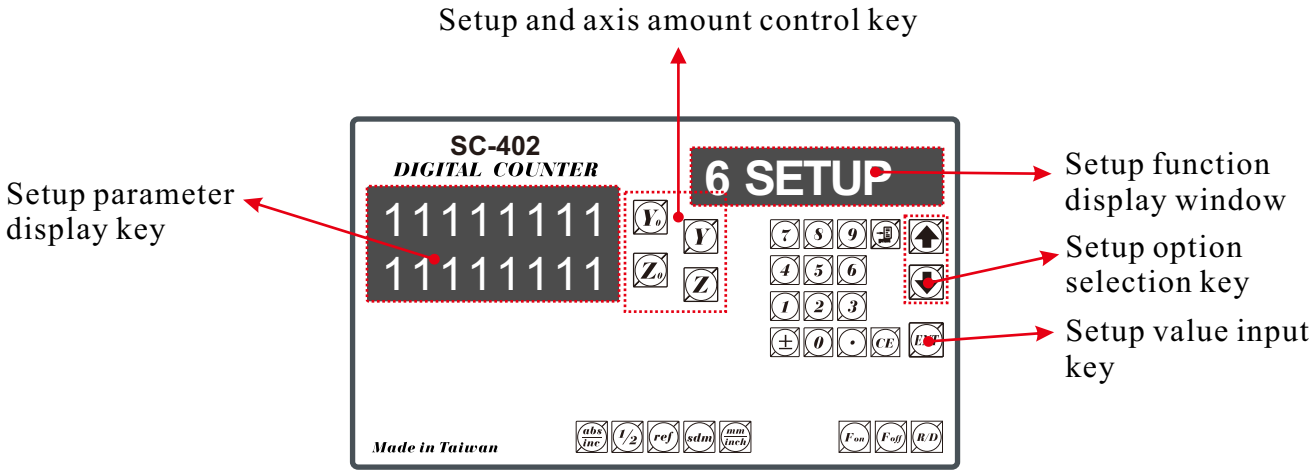


After coming backing to normal mode, the parameter reset process is complete.

Set up new parameters in display (SETUP)

When DRO-change IC is under the impact of abnormal voltage or improper operation, which cause the default disturbed; or user wants to change production process and needs to modify the default value, it needs to set up DRO and reset function values in memory.

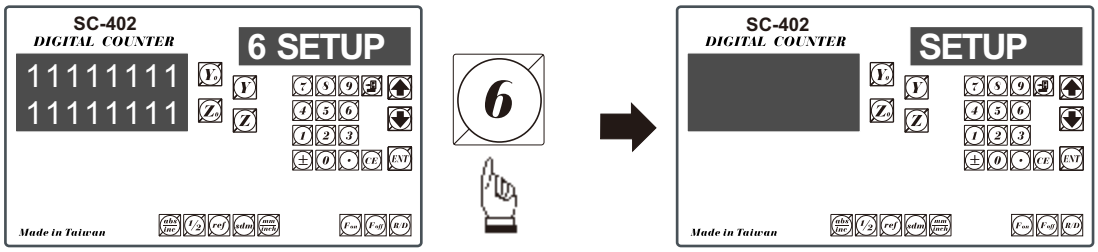
DRO in the display and related key locations in the SETUP process:



Operation steps:

1). 1.Turn off the DRO power.

2). Turn on the DRO; when self-diagnosis test signal is shown in the display window, press 6 and the display start performing "setup"



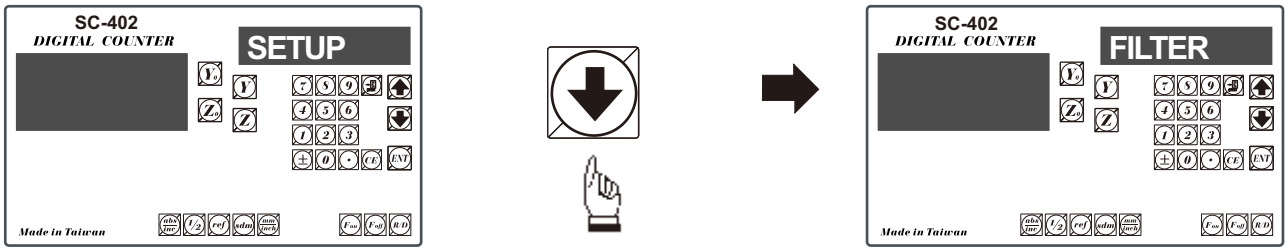
When messages are all displayed, it comes into the "setup" function.

The setup procedure is designed to option menu mode; the Definition List facilitates user to apply the following options.

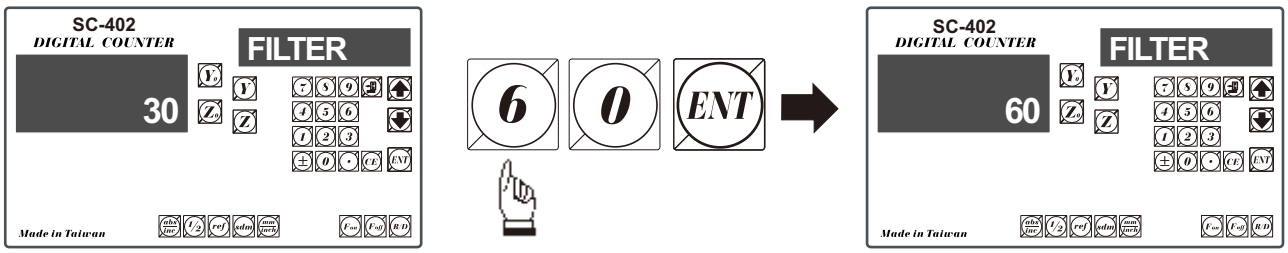
The first layer functions are, in turn, defined as below:

FILTER ..... permits the filter value to be set.
BAUD SET ..... set up RS232 transmission baud.
PRT ON/OFF ..... turn on/off printer.
BEEP ON/OFF ..... turn on/off beeper.
RESOLUTE ..... set up Linear scale resolution.
CP ERROR ..... compensate Linear scale error
LINEAR P ..... compensate linear error.
NL ERROR ..... compensate nonlinear error (point compensation)
DIRECT ..... set up direction.
EXIT ..... end and exit.

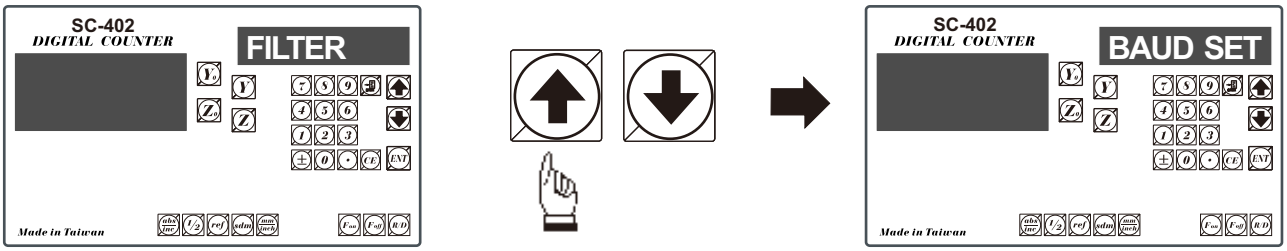
3) Press to "FILTER".



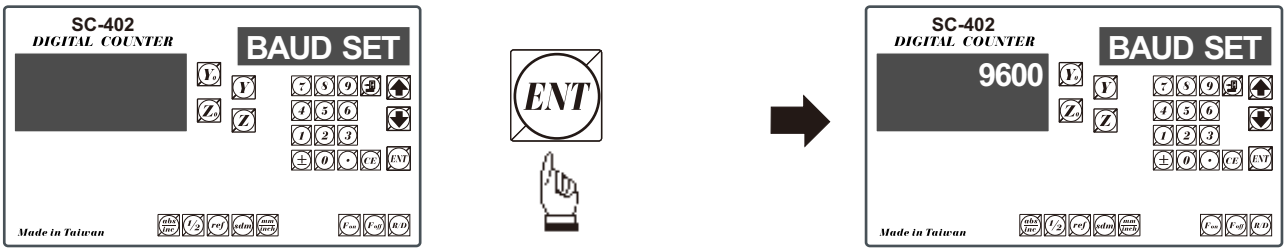
Press key into the digital filter setting function, then you can increase digital value until the digital does not pulsate. Please note that the value of DE (digital filter) is larger means the integrate is larger then the display is more stable.



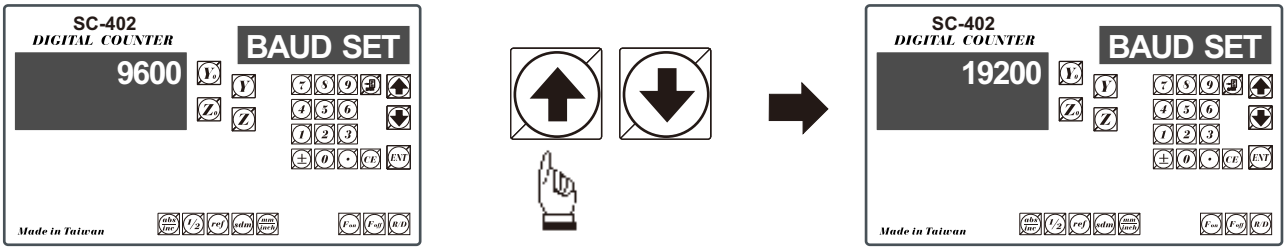
4) Press to "BAUD SET".



Press to enter the setting of RS232 transmission baud.

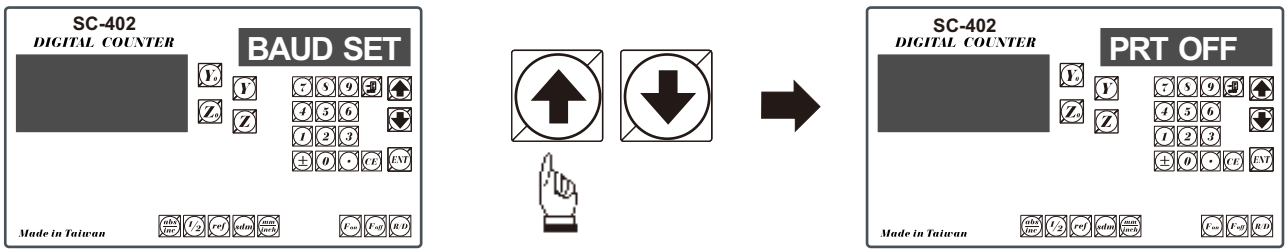


Press or to select the correct baud speed from 1200/2400/4800/9600/19200/57600.

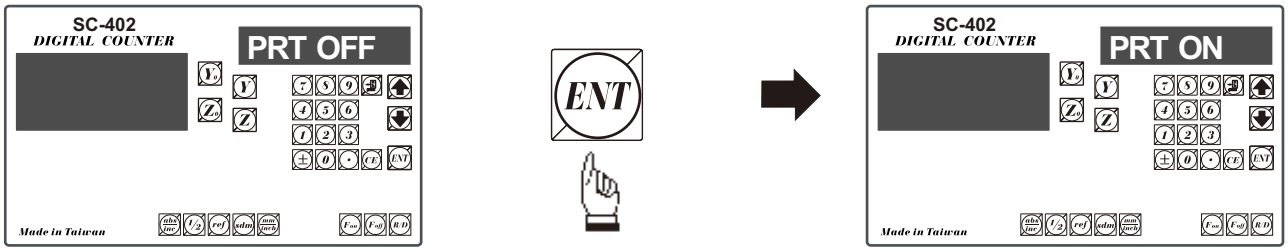


After baud speed is selected, press to end up this setting function.

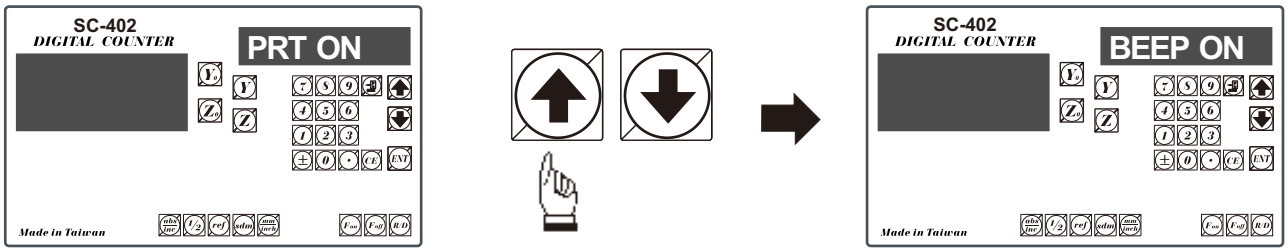
5) Press ▲ or ▼ and move to "PRT ON/OFF".



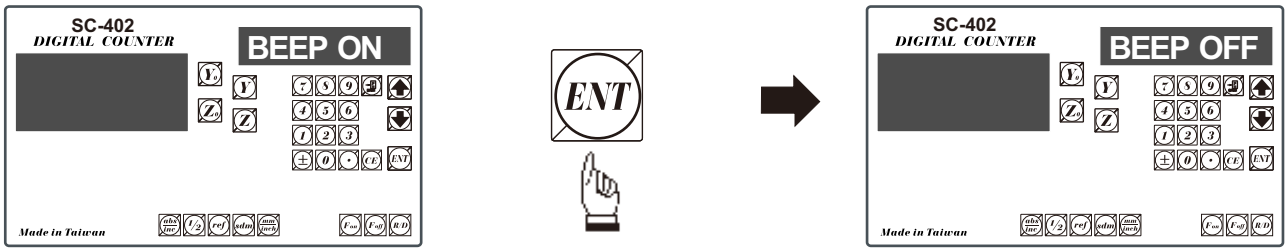
Directly press ENT to change over OFF & ON.



6) Press ▲ or ▼ and move to "BEEP ON/OFF".

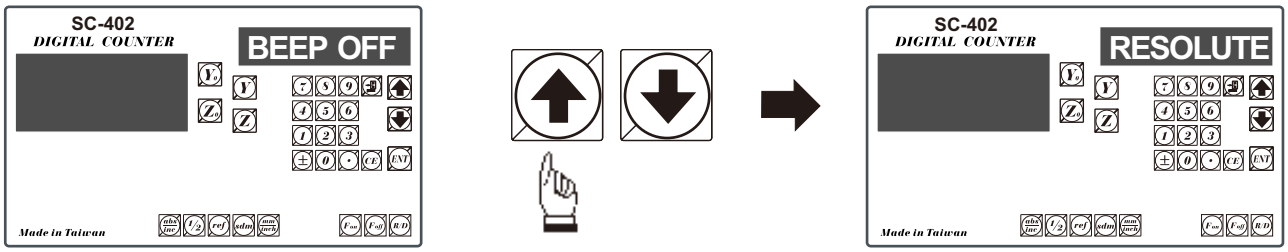


Directly press ENT to change over OFF or ON.

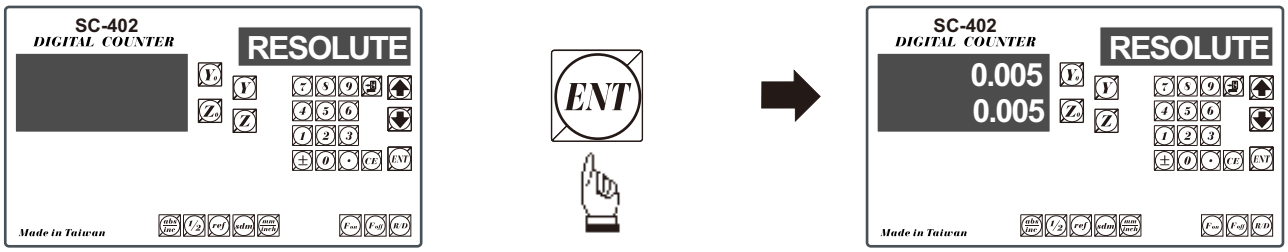


Setup Function

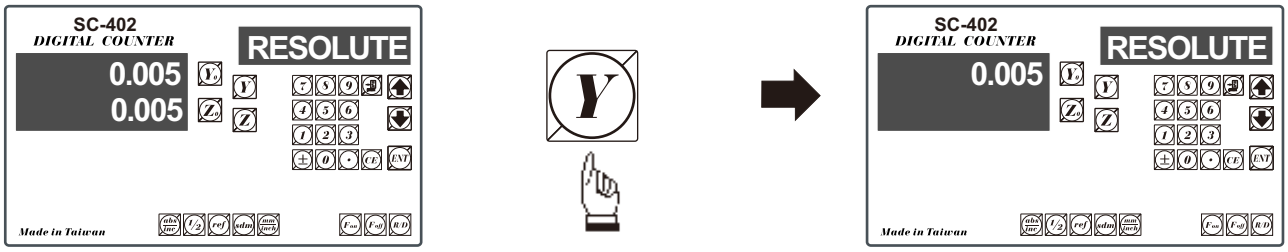
7) Press ▲ or ▼ and move to "RESOLUTE".



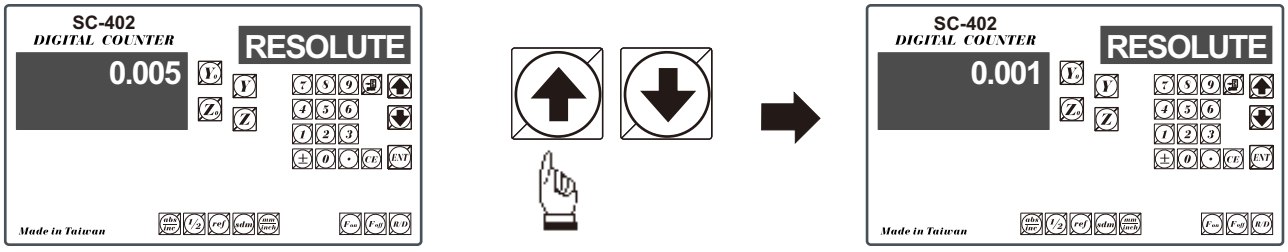
Press ENT to enter the linear scale resolute setup.



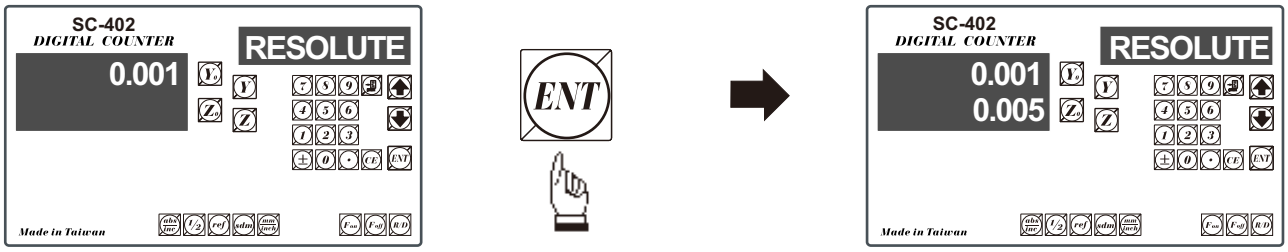
Press the axis going to be changed: Y 、 Z



Press ▲ or ▼ to switch to the correct resolution value from 0.05/0.02/0.01/0.005/ 0.002/0.001/0.0005/0.0002/0.0001mm

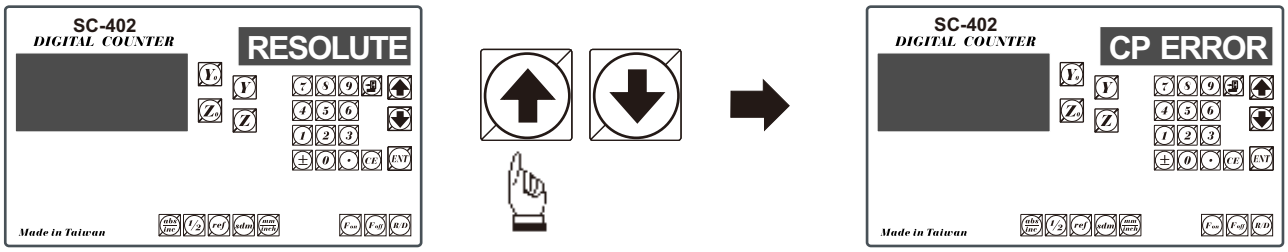


Press ENT to end up this axis's setup

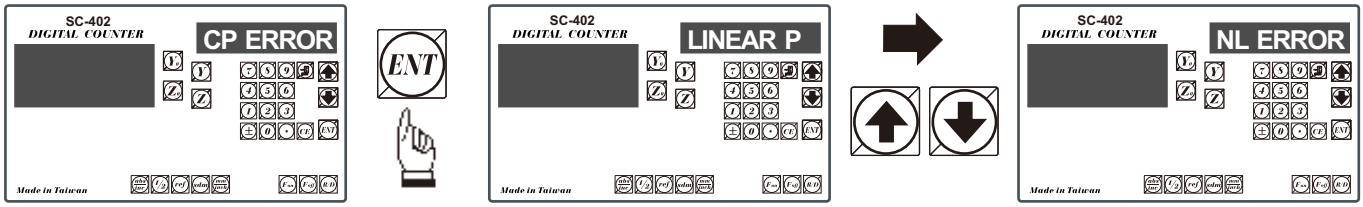


Then, press ENT to end up the linear scale resolute setup procedure.

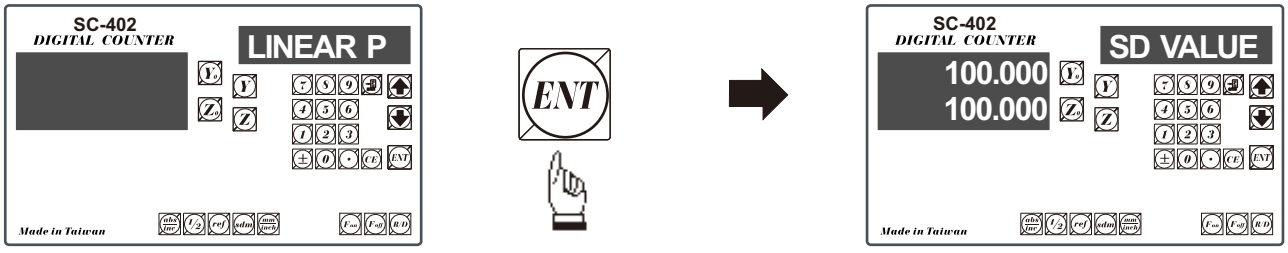
8) Press ↑ or ↓ to "CP ERROR" (error compensation).



Press ENT to enter the compensation setup; you can press ↑ or ↓ to switch between the "LINEAR P" (linear compensation) mode and "NL ERROR" (nonlinear compensation) mode; choose one alternatively.

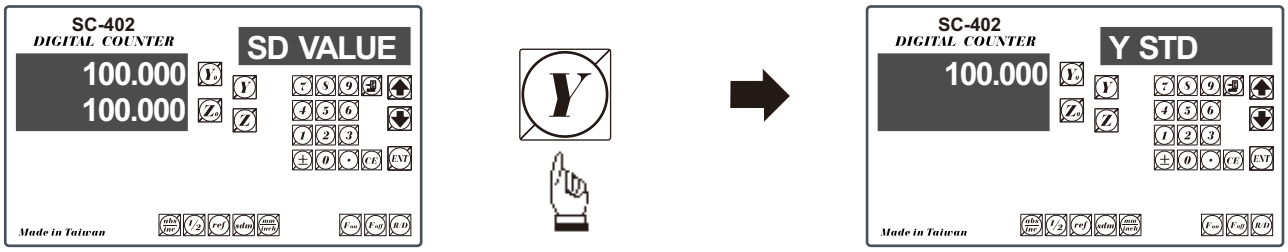


While selecting "LINEAR P", press ENT to enter the linear compensation process.

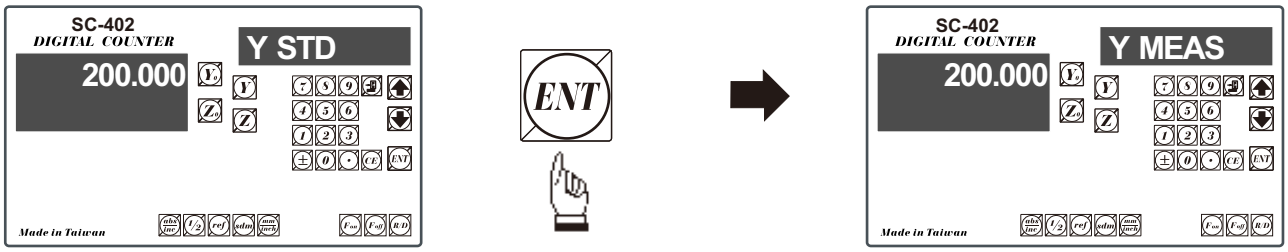


Setup Function

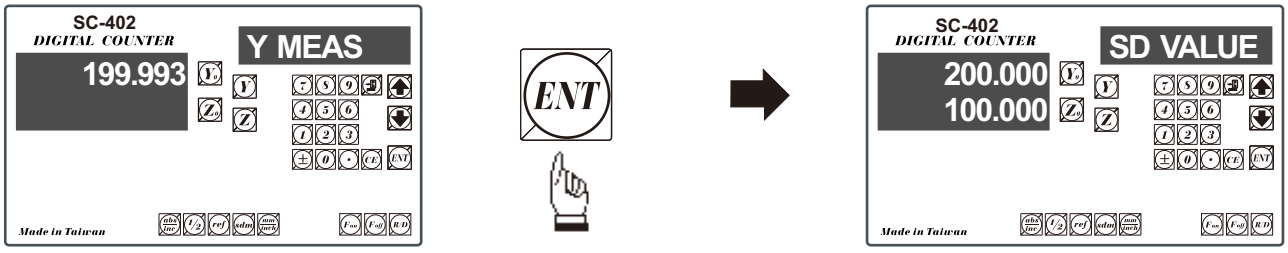
Press the axis Y , Z under compensation.



Input the length measured and press ENT .



Input the actual length and press ENT .

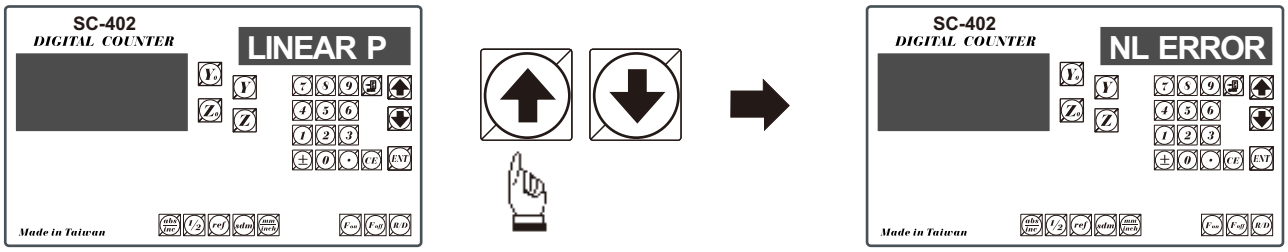


Press other axis Z under change and follow the above procedure to operate;

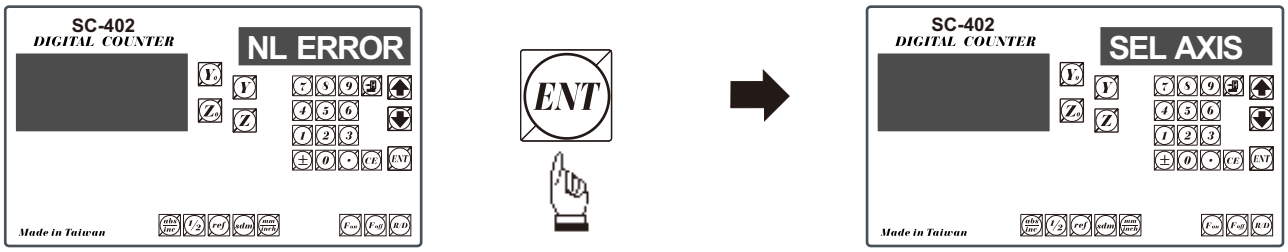
after the compensation procedure is done, press ENT to end up the compensation of linear scale.

Setup Function

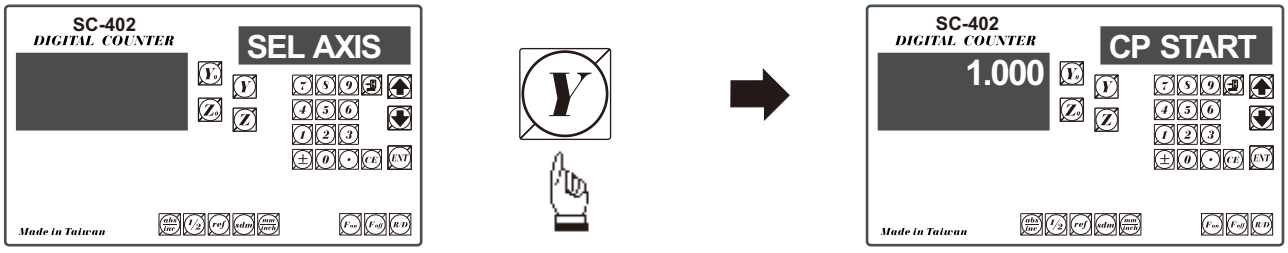
Press ▲ or ▼ to switch to "NL ERROR" (nonlinear compensation).



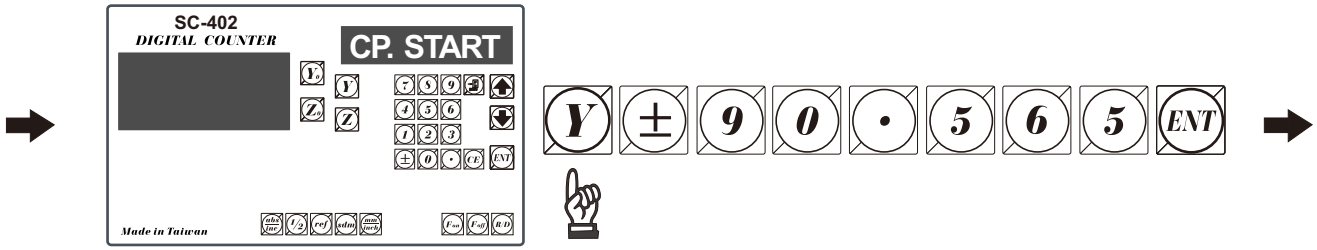
Press ENT to enter the nonlinear compensation setup.



Press the axis Y , Z under compensation.



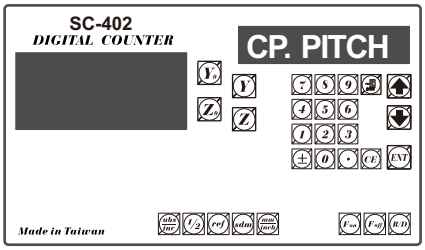
Input CP START



Setup Function

Input CP START

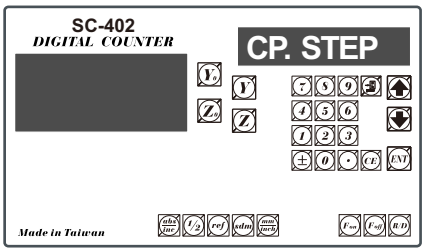
Next step



Y 1 0 ENT

Input CP STEP

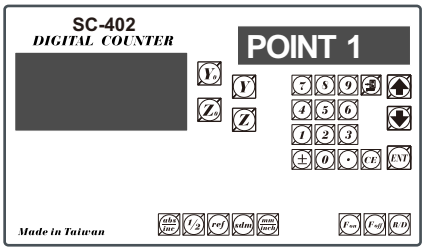
Next step



Y 2 0 ENT

After entering the "Point 1" status, press the up/down key to select the measuring result at the point selected.

Input the measuring result.

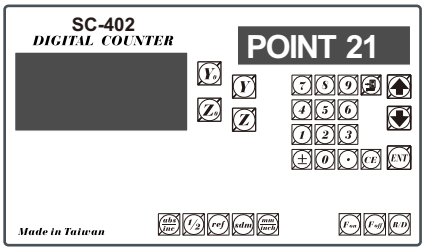


Y – The measuring result – ENT

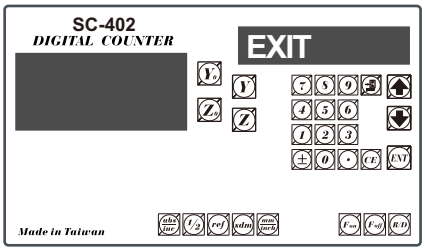
Z – The measuring result – ENT

After all data inputs are done, press CE to exit.

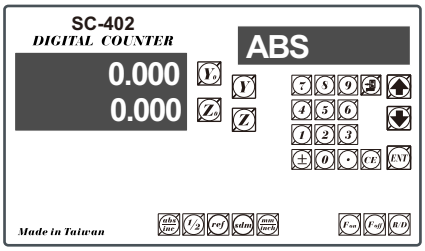
CE



Press up/down key till EXIT appears.

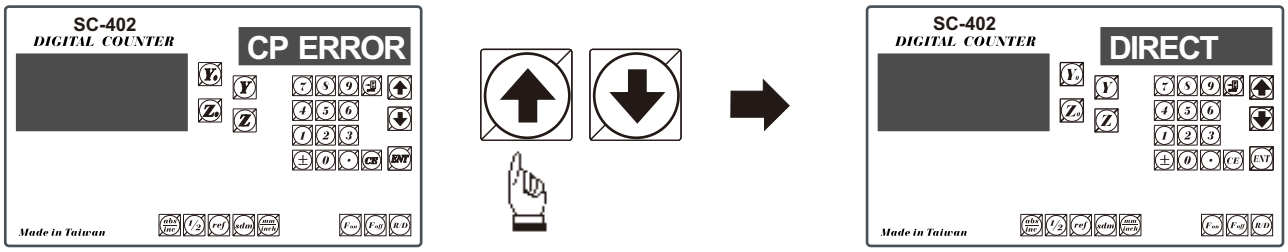


ENT

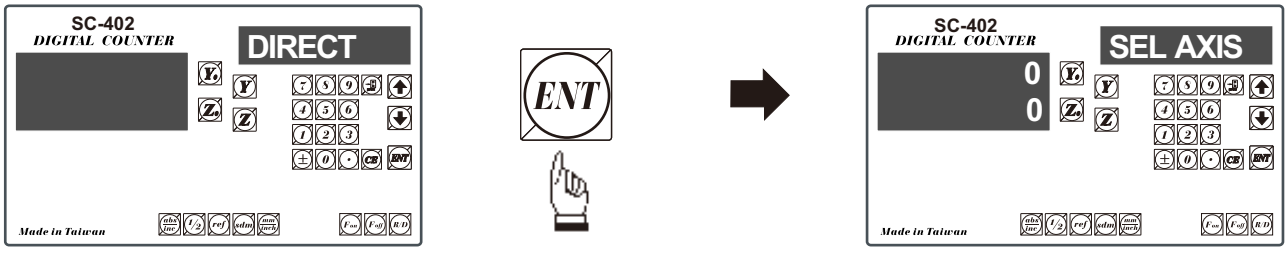


If use the error compensation function, you must turn off the DRO then power on the DRO again, otherwise your compensated value will invalid.

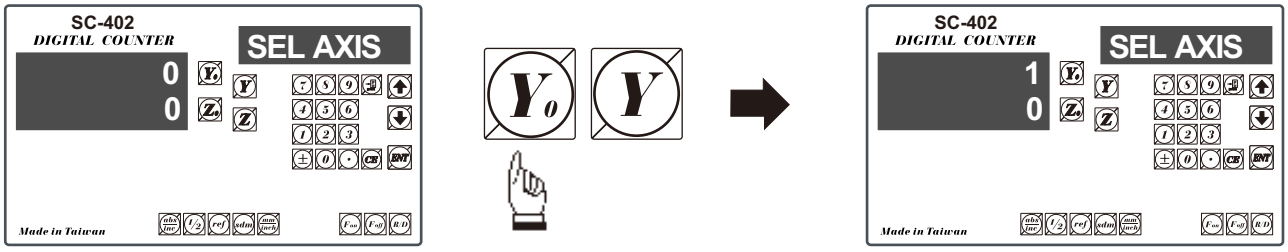
9) Press ▲ or ▼ to move the "DIRECT" (direction setup).



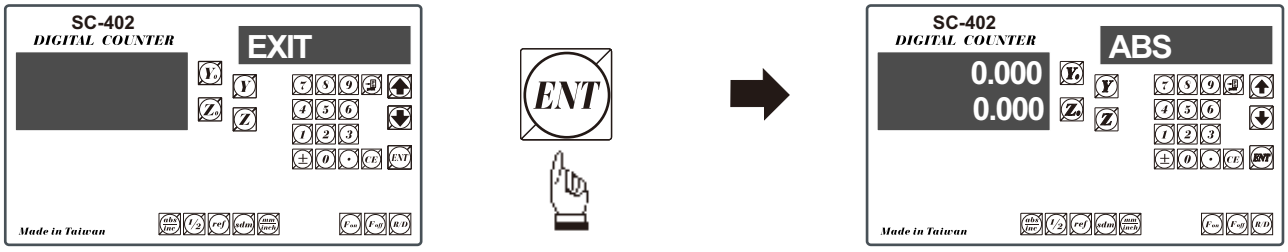
Press ENT to enter direction setup mode. "0" means in positive direction whereas "1" means the negative direction.



Press Y or Y_0 to set up Y-axis to "1" (negative direction); and do it to Z-axis similarly.



10) Press ENT to exit; and ▲ or ▼ to "EXIT" and end up the parameter setup.



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