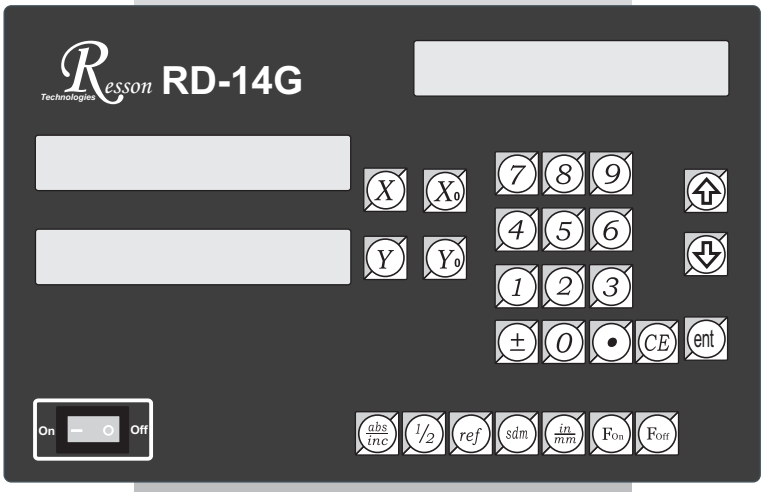
Resson Technologies

The People that Always Committed to Quality, Technology & Innovation



RD-14G

Digital Readout System Operation Manual (Grinder)

Resson Technologies Co., Ltd.

Precautions

For your protection, please read these safety instructions completely before operating the appliance.

- Selection of mains voltage
  The Digital readout unit is supplied for 100V～230V, 50Hz/60Hz, 20W max operation.
  Instructions prior to activation of unit
  1. Please ensure that the voltage rating corresponds to the mains supply prior to activation.
  2. If this unit is to be operayed via an autotransformer from mains supply of higher voltage, it must be ensured that the low end of the transformer is connected to the neutral wire of mains.

- The mains connector may only be inserted into a socket with earthing contact. The protective effect should not be cancelled by an extension lead without an earthed conductor.
  Any interruption of the earthed conductor either inside or outside of the unit or disconnection of the earthed conductor can render the equipment potentially dangerous.
  Any intentional break is not permissible.

- Please install the Linear Encoder finish after that switch on the Digital Readout Unit. If switches on Digital Readout Unit before install the Linear Encoder not finished yet. This may cause electronic parts burnt away of the Linear Encoder.

- Do not use the instrument in an extremely hot or humid place.

- Do not use the instrument near strong magnetic or magnetic field noise place. This is the main reason that causes instrument error working.

- Wipe the Digital readout unit surface with a soft cloth to remove fingerprints, dust, etc.

- Clean the Digital readout unit surface with a soft cloth slightly moistened with Neutral purger to remove serious dirt.

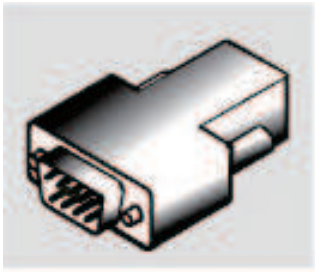
- Do not use the organic solvent products such as oil, diesel fuel, kerosene, alcohol,etc clean the Digital readout unit.

- Do not use the Air guns fanned Digital readout unit and Linear Encoder accessories to let grease, dust or bits get into the Digital readout unit. This may cause the system working unstable and malfunction.

RD-14G Specification :

Number of axes : 1、2
Reslution : 0.001mm
Display function : 8位 LED 發光管
Response speed : 60m (198.6feet)/min
Quantizing error : ±1 count
Power source : AC100V～230V / 50～60Hz / 20VA
Temperature fange : Service:0～40℃ / Storage:-20～70℃

Linear Encoter (Scales) Electrical connector :



D-sub 9 pins connector

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

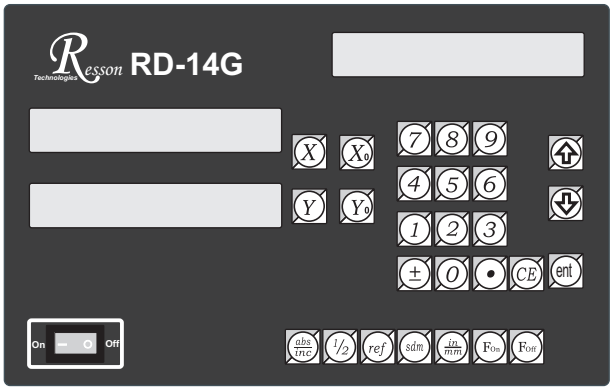
DIN 7 pins connector

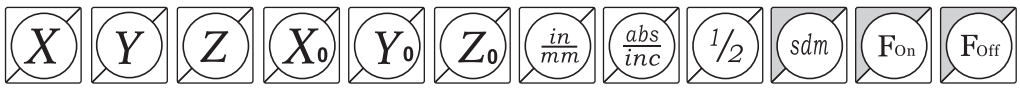
PIN	SIGNALS
1	0V
2	N/C
3	A
4	B
5	5V
6	R
7	Inner shield

N/C : No Connection

Content

Basic Functions

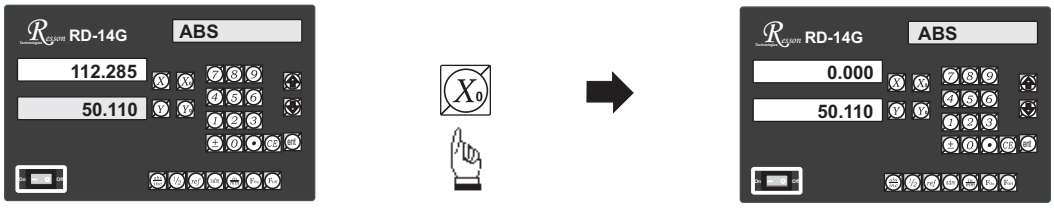




Set Display to Zero

Purpose : Set the current position for that axis to zero

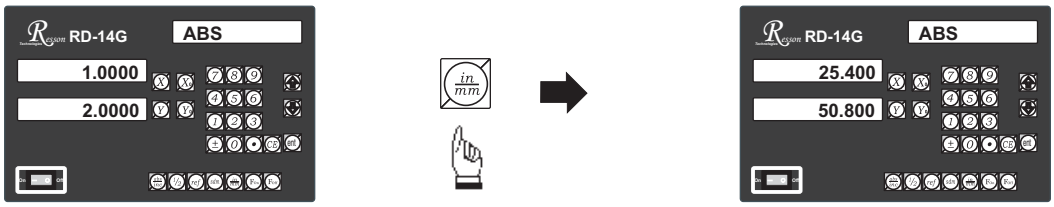
Example : To set the current **X Axis** position to **zero**



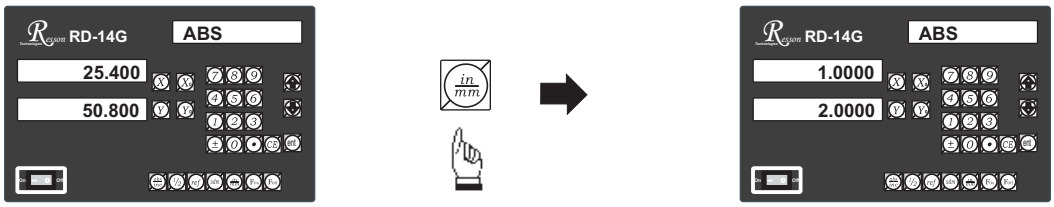
Inch / Metric Display Conversion

Purpose : Switches between inch and metric display

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



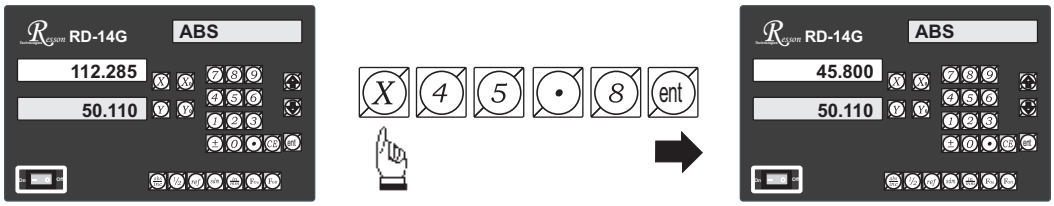
Example 2 : Currently in **metric** display, to switch to **inch** display



Enter Dimensions

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

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



ABS / INC Coordinates display switches

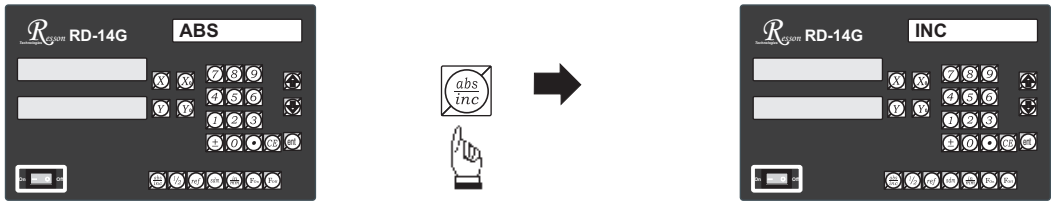
Purpose : **RD-14G** provides two sets of basic coordinate display, they are **ABS** (absolute) and **INC** (incremental) displays.

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

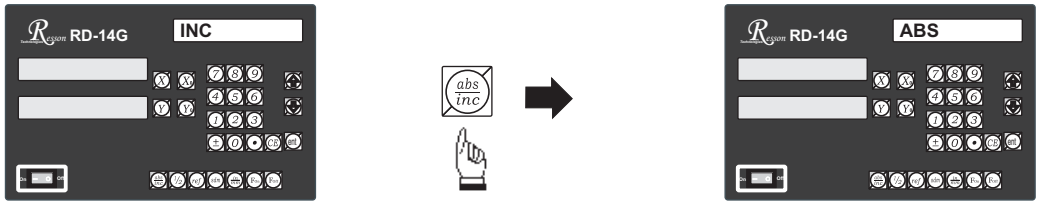
The operator is then free to zero the axes or preset any dimensions into any axis in **INC** coordinate for relative position machining. The work piece datum (work piece zero position) is still retained in **ABS** coordinate by the **RD-14G**.

Operator can then toggle between **ABS** (absolute) and **INC** (incremental) coordinates 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

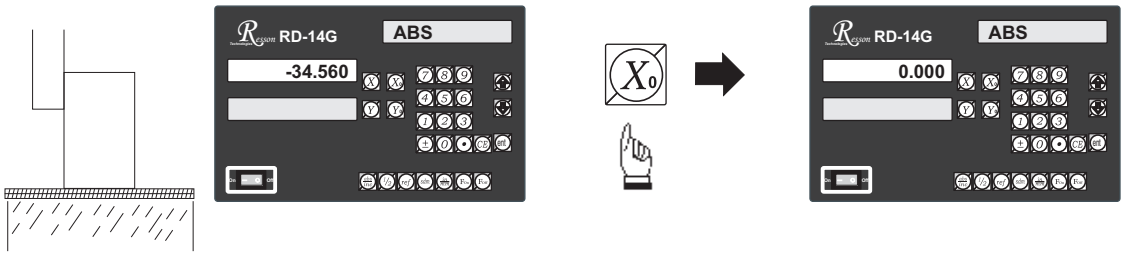


Centre-find

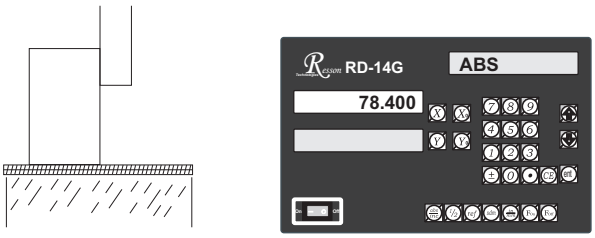
Purpose ： Counter provide center find function by halfing the current display coordinate, so that the zero point of the work piece is located at the center of the work piece.

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

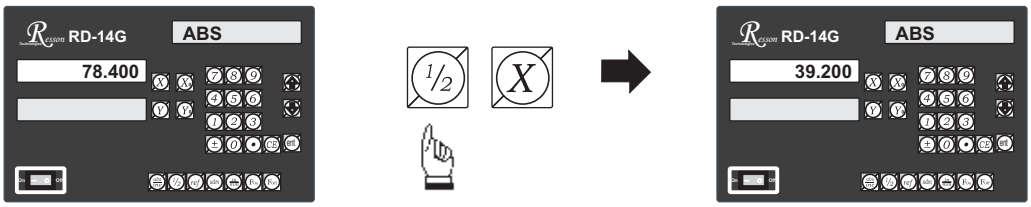
Step 1 ： Locate the edge finder at one end of the work piece, then zero the **X** Axis.



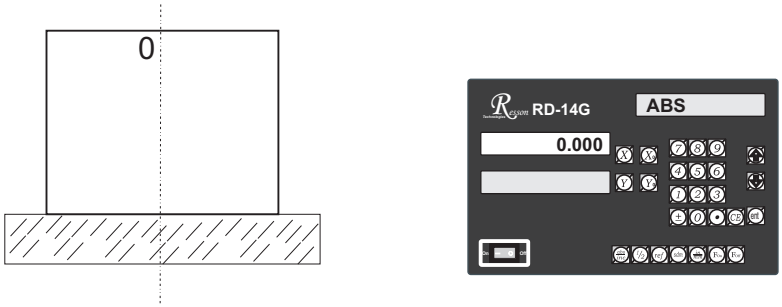
Step 2 ： Locate the edge finder at the opposite end of the work piece.



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



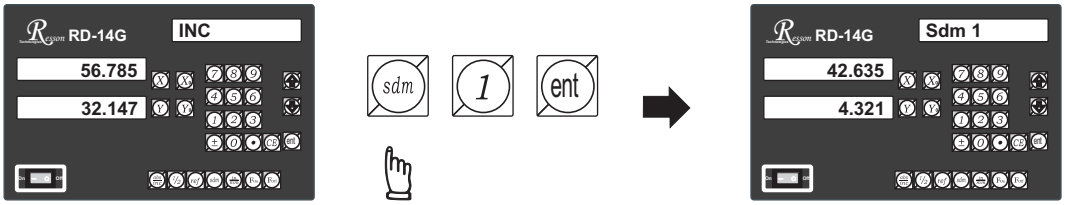
Now the X Axis zero point (0.000) is located right at the X center of the work piece.



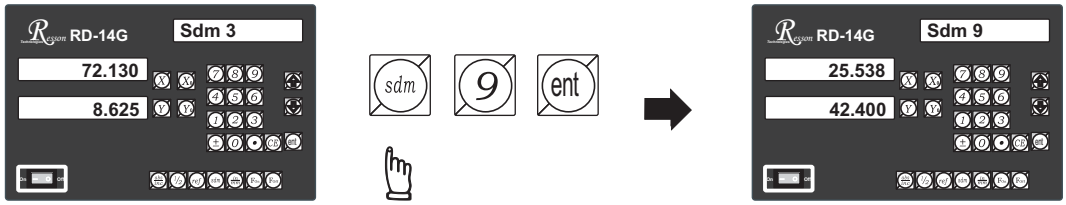
199 Subdatum memory

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



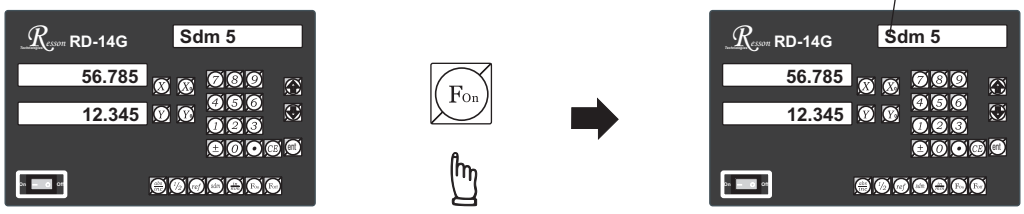
Vibration filtering

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.

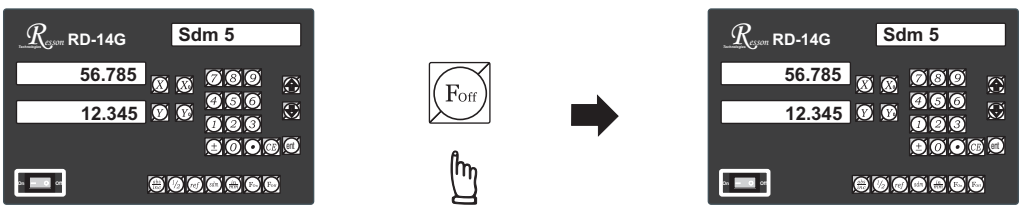
The innovative virbration filtering function can filter the display toggles to obtain a more comfortable readings, and hence reduces human mistake.

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

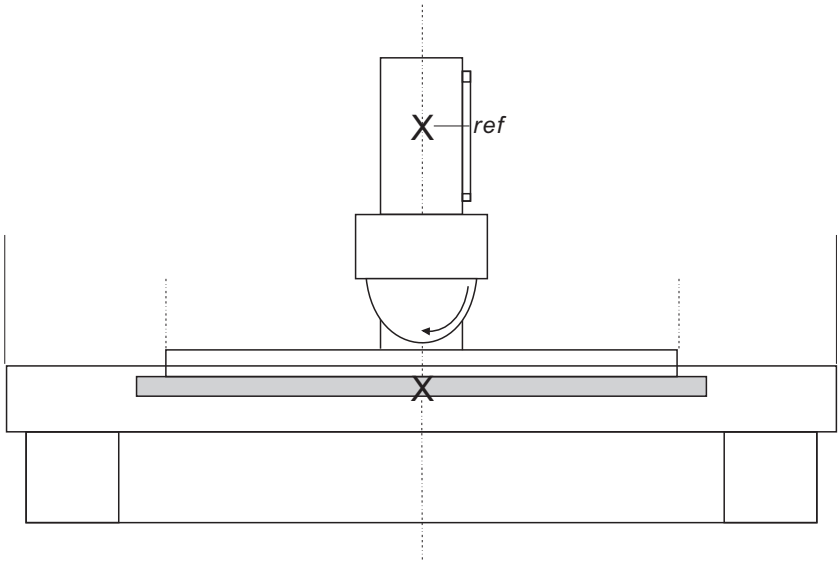
Example 1 : The tum vibration filter **on.**



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



ref datum memory



function : During the daily machining process, it is very common that the machining cannot be completed within one working shift, and hence the DRO has to be switched off, or less commonly, a power failure occurs whilst machining which leads to loss of the work piece datum (work piece zero position). The re-establishment of work piece datum using edge finder or other method inevitably introduces machining inaccuracies, because it is not possible to re-establish the work piece datum exactly at the previous position.

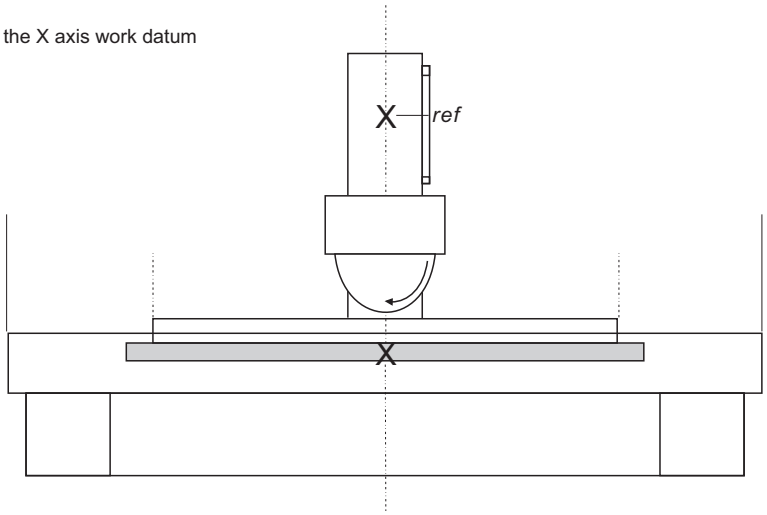
To allow the recovery of work piece datum very accurately, with no need to re-establish the work piece datum using an edge finder or other methods, every transducer has a reference point location to provide a datum point memory function.

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

- **There are a permanent and fixed mark (position) on the transducer, 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 (zero position) in DRO's memory. Then, in case of the power failure or the RD-14G 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 X axis work datum



Operation : **RD-14G** provides one of the most easy-to-use ***ref*** datum memory function.

There is no need to store the relative distance between the ***ref*** mark and your work datum zero into the **RD-14G**, *whenever you alter the zero position of **ABS** coordinate, such as by zeroing, centre find, coordinate preset or etc.., **RD-14G** will automatically store the relative distance between **ABS** zero and the **ref** mark location into **RD-14G**'s memory.*

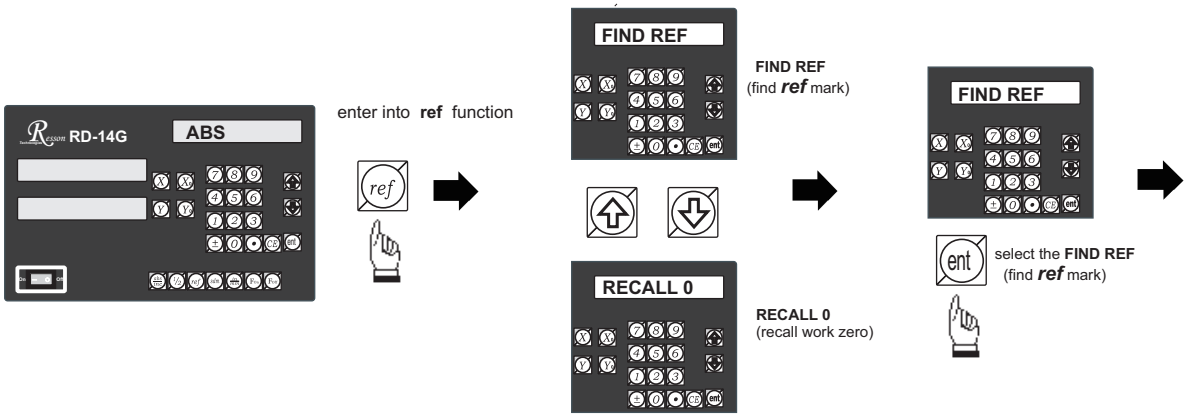
In daily operation, operator simply needs to locate the ***ref*** mark position whenever they switch on the **RD-14G** to let it know where the ***ref*** mark position is, then **RD-14G** will automatically do the work datum storage on its' own . In the case of a power failure or the **RD-14G** being switched off, the operator can recover the work piece datum easily by using the **RECALL 0** procedure.

Find the scale's *ref* mark position (**FIND REF**)

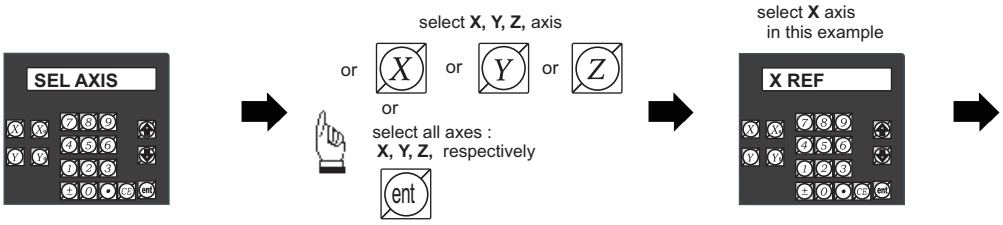
function : In ref datum memory function, the **RD-14G** will automatically store the relative distance between the ***ref*** mark position and the work piece datum (zero position) whenever the operator alter the **ABS** zero position, such as zeroing, centre find, co-ordinate preset or etc...

Therefore, the **RD-14G** needs to store the ***ref*** mark position prior to any machining operation. So that the loss of the work piece datum (zero position) is avoided during any accidential or unexpected events, such as power failure or etc.. it is recommend that the operator finds the ref mark position using the (**FIND REF**) function whenever he switches on the **RD-14G**.

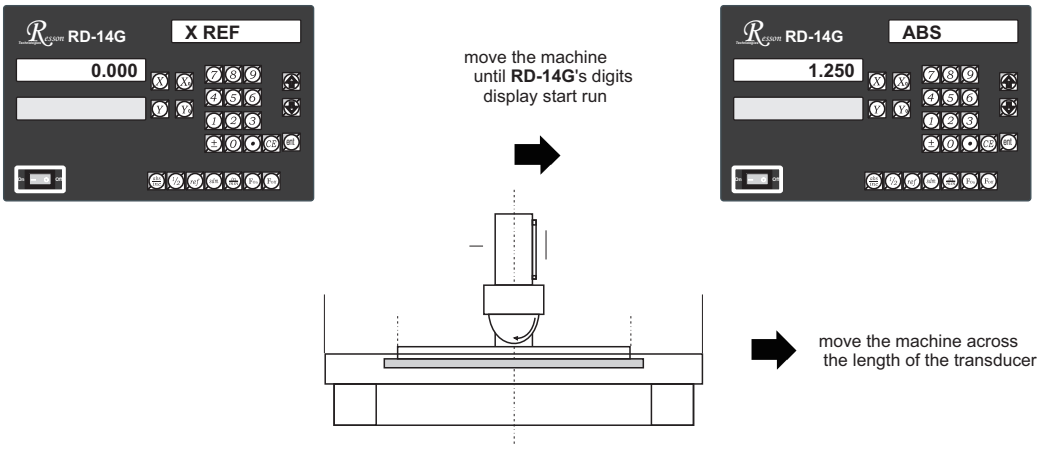
step 1 : To enter the ref function, select the **FIND REF** (find ***ref*** mark)



step 2 : select the axis of which ***ref*** mark needs to be found

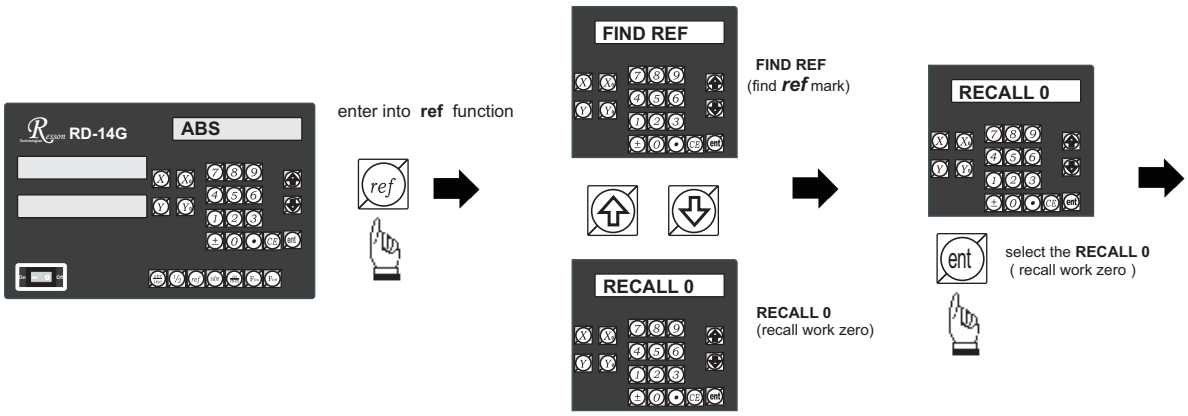


step 3 : move the machine reader head across the length of the transducer until digits display in **RD-14G** start to count.

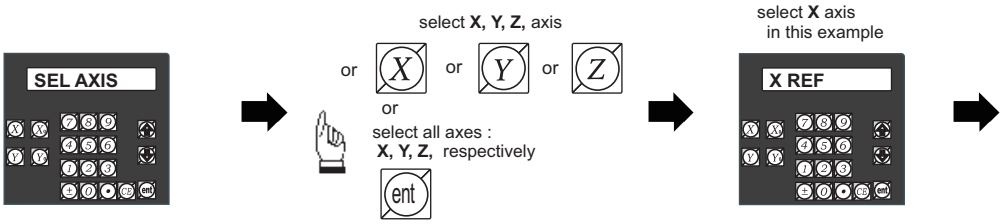


function : If the ref point is lost for any reason, the work piece datum can be recovered by **RECALL 0** function as follows:.

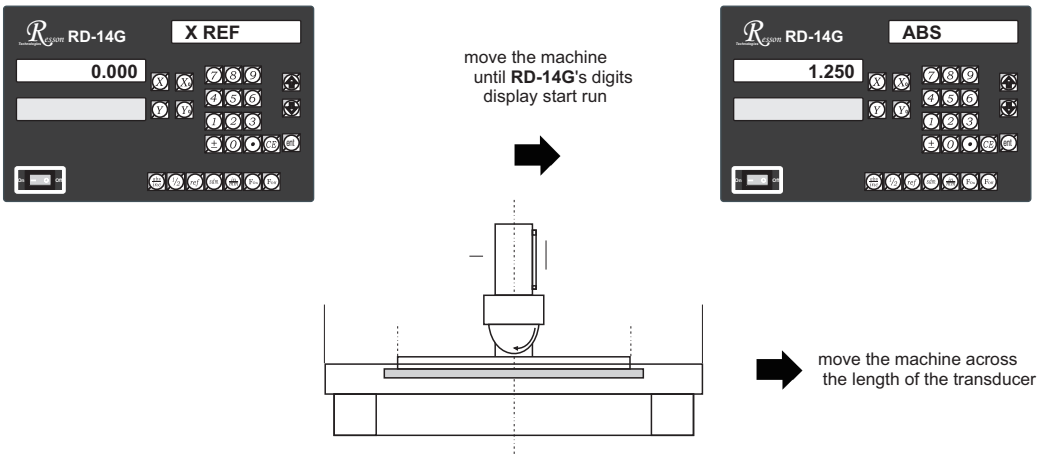
step 1 : enter into the **ref** function, select the **RECALL 0** (recall work piece zero)



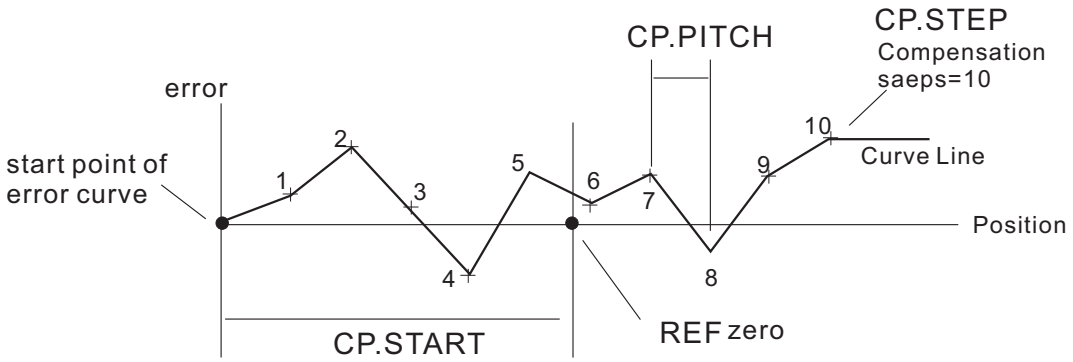
step 2 : select the axis of which work datum (zero position) needed to be recovered

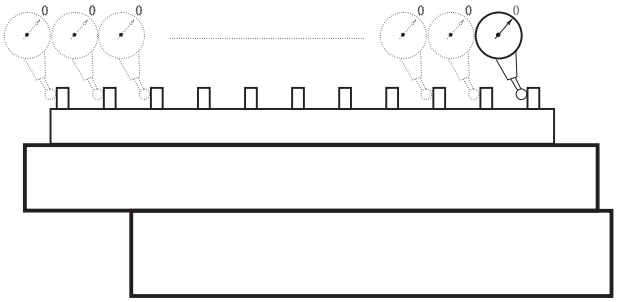


step 3 : move the machine across the length of the transducer until the **RD-14G** display starts to count, then the work piece datum is recovered



Non Linear error compensation

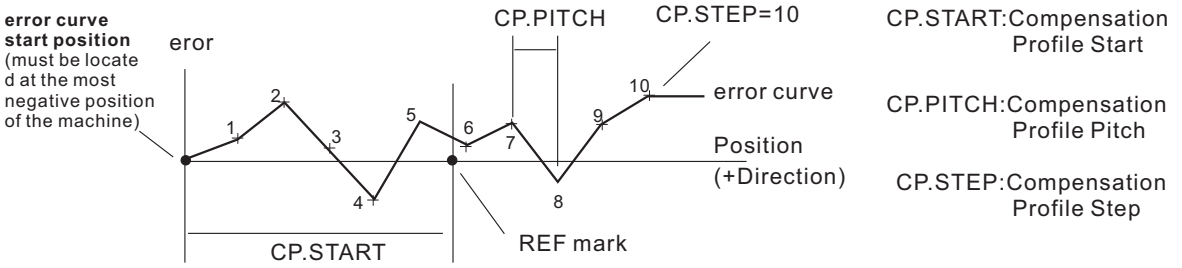




The Grinder readout offers non-linear error compensation to improve readout accuracy to maximum possible limit.

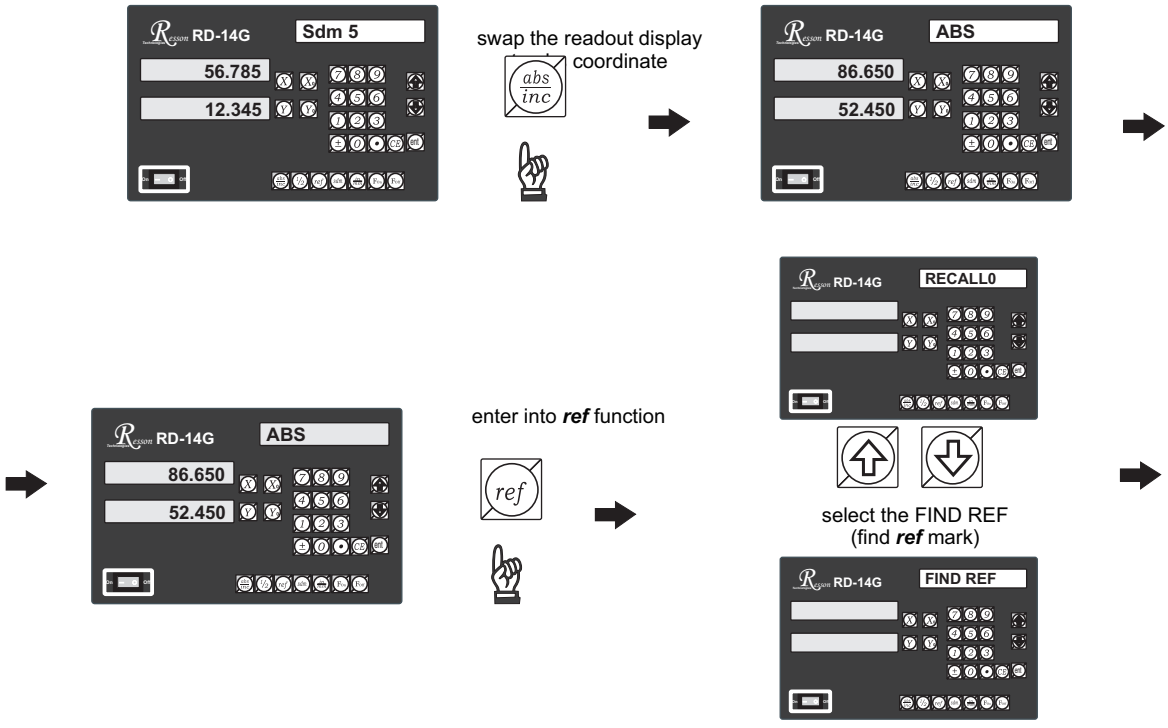
Principle of Operation:

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.



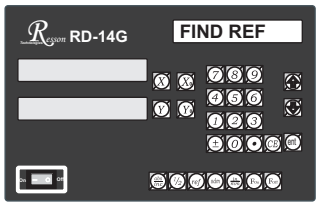
Operation procedure

1) Locate the REF zero at ABS coordinate:



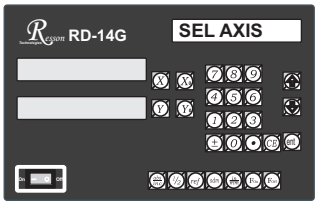
Non Linear error compensation

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

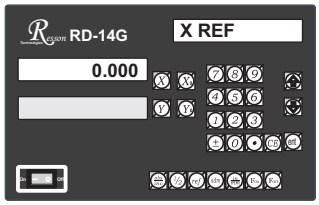


select Xor Z axis

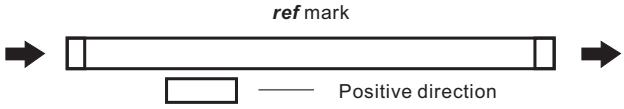
Let's say take X as an example



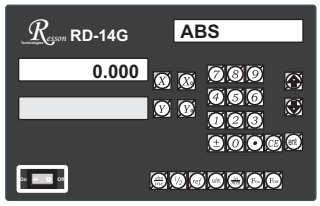
select the x axis



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 x=0.000,it is the ref mark position.

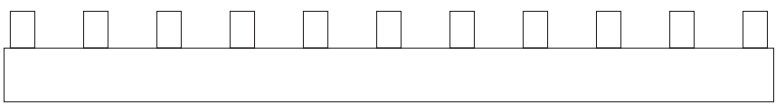


2) Locate the CP.START position:

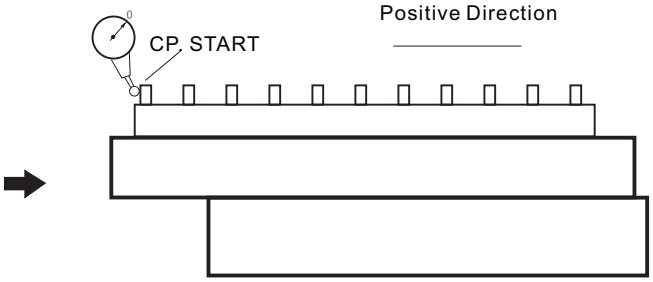
The CP. START position is the absolute reference for the internal error compensation calculation of the readout, it is the start point of the error curve, to make fast real time calculation possible, the readout assume all internal error compensation calculations are only in positive direction. Therefore,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



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.

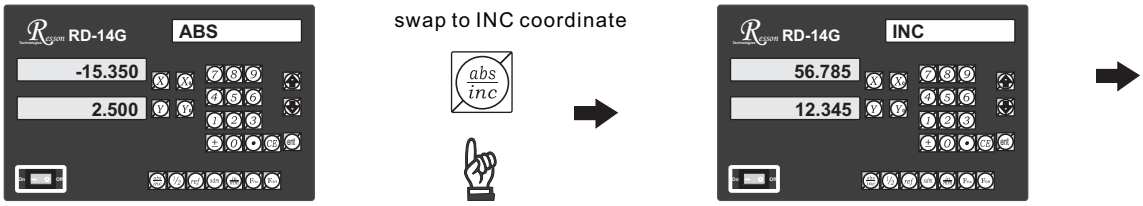


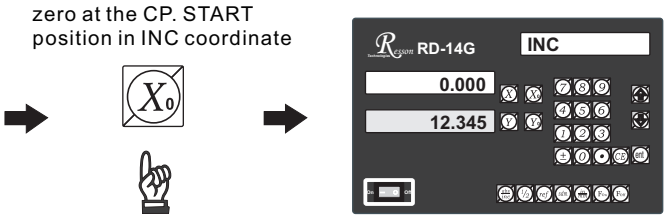
Because the CP. START position always in the most negative position of the machine, therefore, it should always be negative value.

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

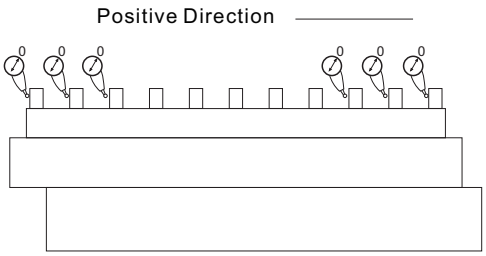
3) START measure the error, to build up a error curve.

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

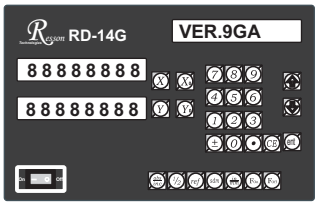
- Record down the measured value from the readout and fill up following table

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

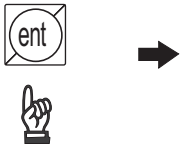
CP.START = -115.875
CP.PITCH = 25.000
CP.STEP = 10

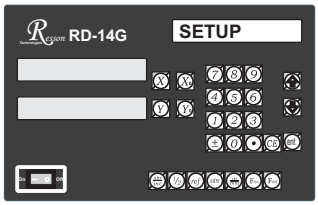
4) enter the error curve value into the readout

switch off the readout and them switch it on again

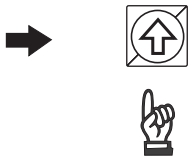


During the start up procedure, when the readout display the software version number, press "ent" once to enter the SET UP function

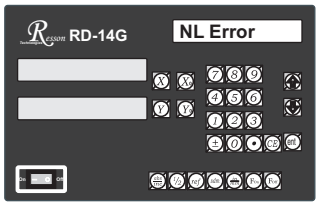




after entered the SET UP function of the readout, press "down" button until display "NL Error" appear.

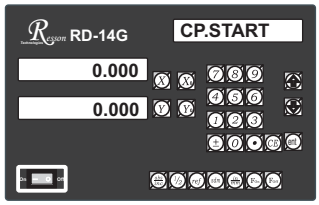


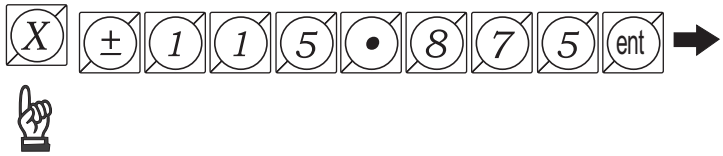
NL Error is Non-Linear Error
(Non Linear Error Compensation)



Press ent to enter into NL Error function

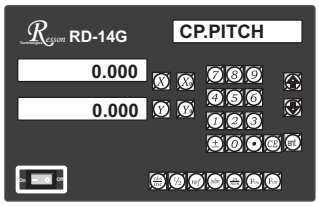
enter the CP.START

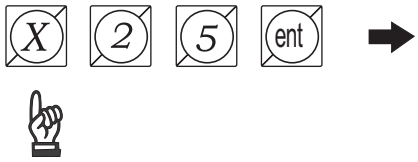




enter the CP.START

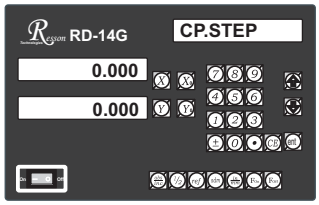
next step

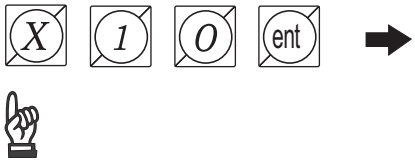




enter the CP.STEP

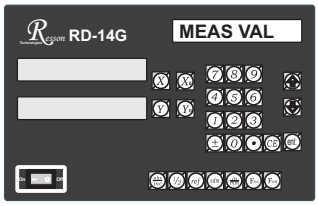
next step





MEAS VAL is Measured Value

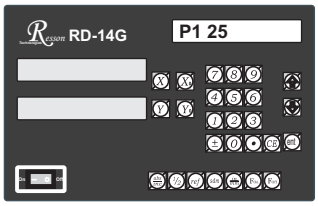
next step

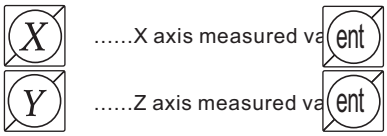


Press ent to confirm the choice

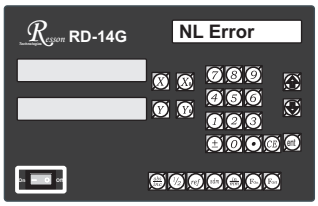
Non Linear error compensation

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

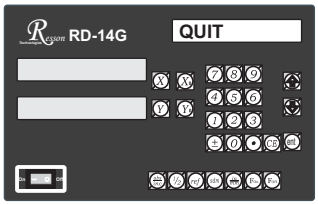




after all measured value
entered into the readout,
press"ent" to exit the
NL Error function



Press"down"key until
display shows"QUIT"

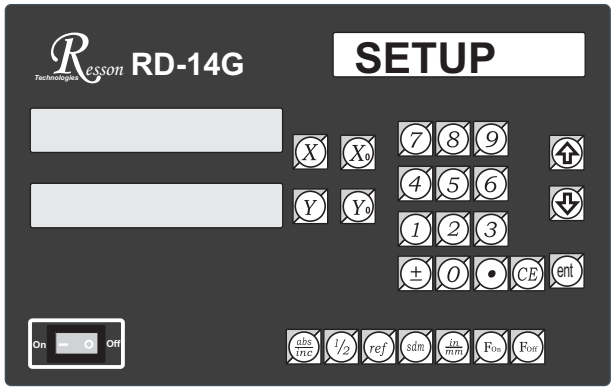


Press"ent"the quit
the SET UP function

* 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.

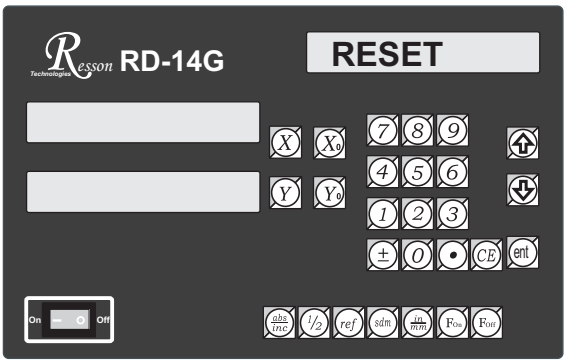
RD-14G

Digital Readout Setup Function



DIRECTIN	specifies the direction of count for each axis
LIN COMP	permits linear error compensation to be input
NL Error	permits non linear error compensation to be input (point compensation)
FILTER	permits the filter value to be set
QUIT	exits the SETUP function to proceed to normal working

RD-14G ORIGINAL PARAMETER RESET FUNCTION

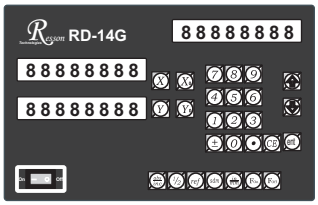


Some inscrutable cases or improper operations cause the chaos of parameter, then you need to initialize the parameter to reset the system.

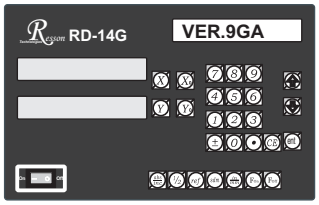
Operational procedure：

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

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

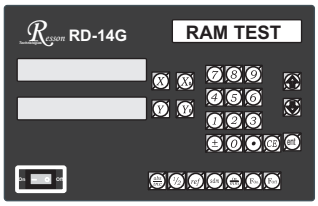


when "VER.9GA" appears in display window, please press "8" key.

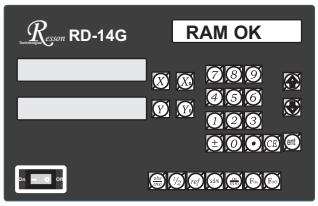


when some messages are displayed over, the DRO enters into the RESET function.

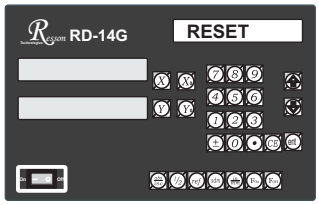
(3) When enter into the RESET function, DRO will display：



display "RAM TEST" that means the RAM is testing

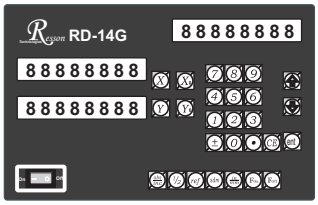


if the RAM function is normal，DRO can display "RAM OK"



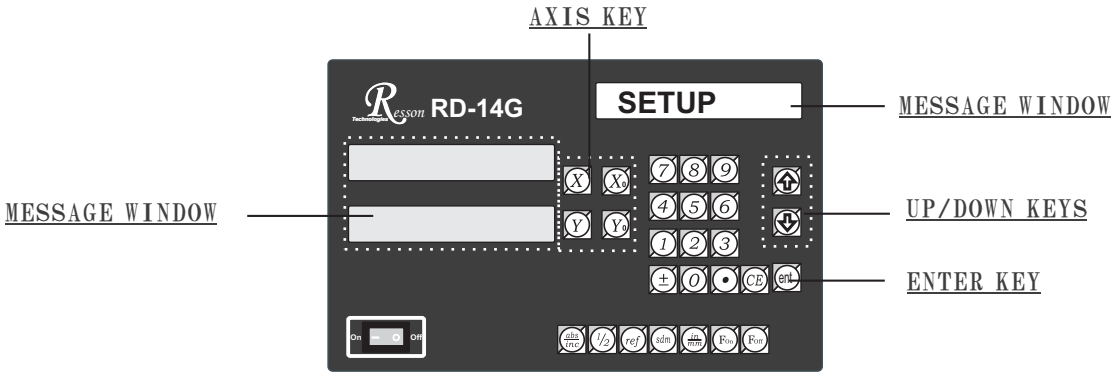
display "RESET" that means the parameter has reset

(4) The reset of parameter has completed then start to enter into the test procedure of display light.



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

RD-14G SETUP FUNCTION

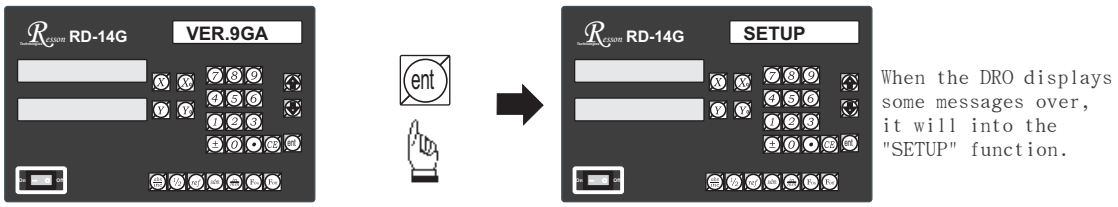


During changing the different program version IC or some abnormal voltages and operations, you need to SETUP the DRO.

Procedure :

1). Turn off the DRO.

2). Power on the DRO once again, when the message "VER.9GA" showing in the MESSAGE WINDOW, please Enter key immediately then the DRO starts entering into the SETUP function.



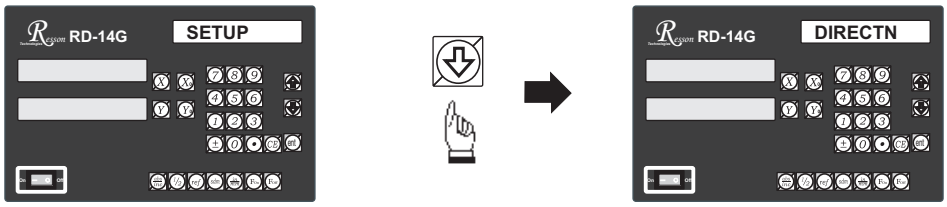
When the DRO displays some messages over, it will into the "SETUP" function.

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.

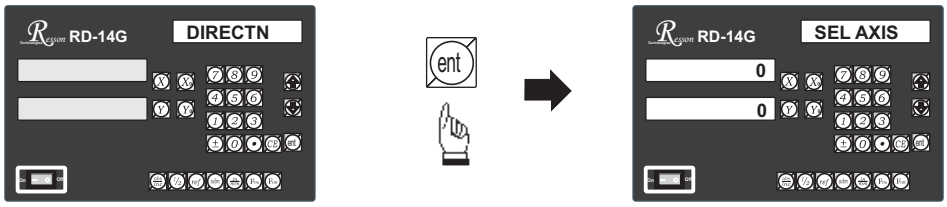
The top level menu headers in order are as follows :

DIRECTIN	specifies the direction of count for each axis
LIN COMP	permits linear error compensation to be input
NL Error	permits non linear error compensation to be input (point compensation)
FILTER	permits the filter value to be set
QUIT	exits the SETUP function to proceed to normal working

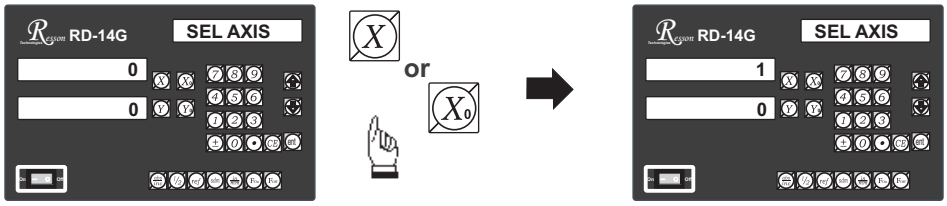
3.) Press key to select the "DIRECTN" (counting direction) function. Press key to return to the last function.



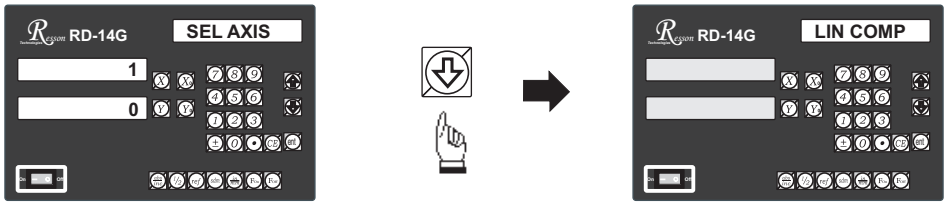
Press ent key into the direction setting function, the 0 represents a positive, 1 represents a negative.



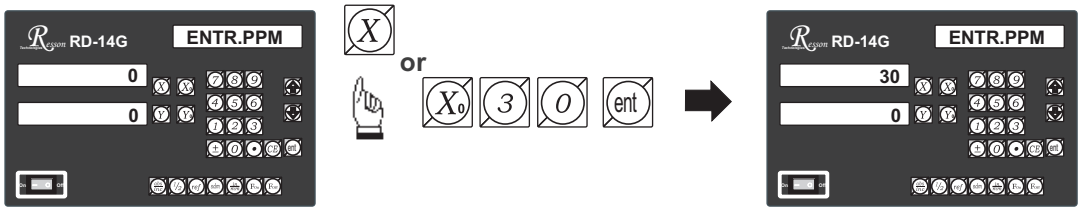
Press X or X0 key to set up a negative direction "1" for X Axis, make a same procedure for Y Axis.



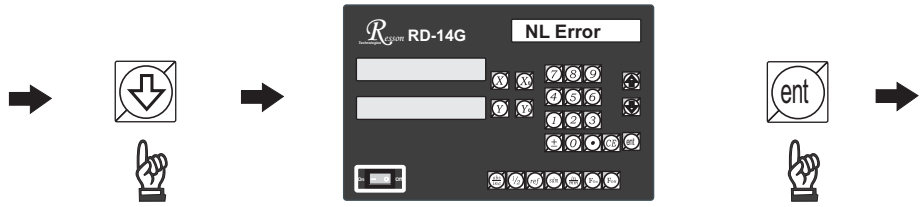
4.) Press ent key to make your setting, then press key to select the "LIN COMP" (linear compensation) function.



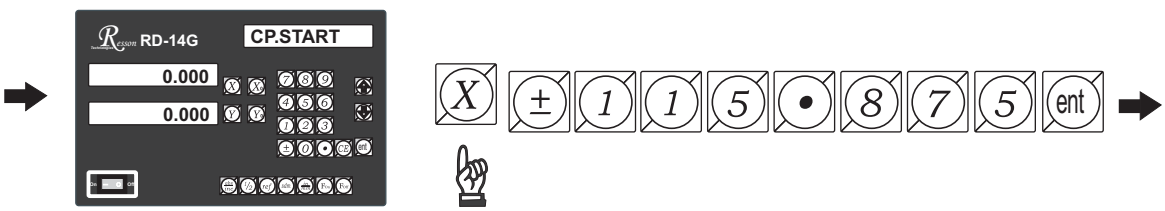
Press [ent] key into the linear error compensation function, the formula as below：
error value X -(1000/measuring length) = compensation value
(ML) measuring length unit = mm, error unit = ≒m
Example：
ML=500mm Error = -15≒m
-15≒ X -(1000/500) = 30≒m
the compensation value is 30≒m
If set up the linear compensation value of X Axis = 30, through the AXIS key make a same procedure for Y Axis.



5.) Press [ent] key to make you setting, then press [↓] key to select the "NL ERROR" (non-linear error compensation) function.

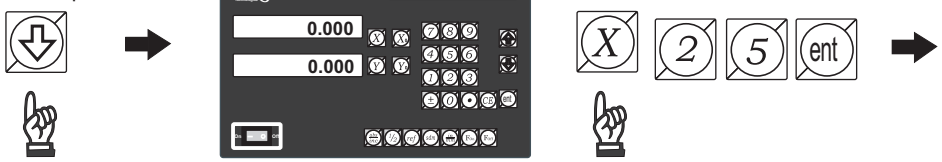


enter the CP.START



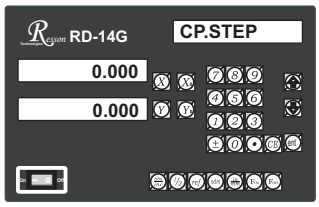
enter the CP.START

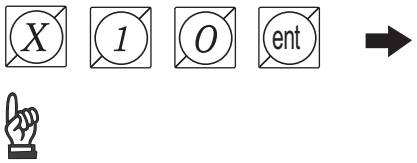
next step



enter the CP.STEP

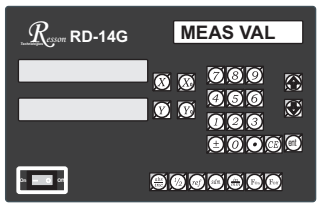
next step



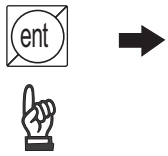


MEAS VAL is Measured Value

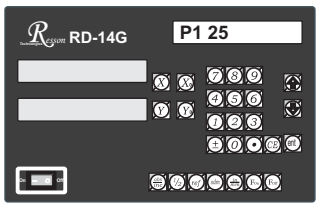
next step

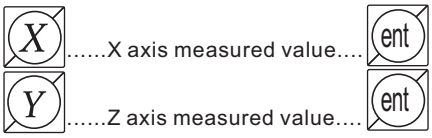


Press ent to confirm the choice

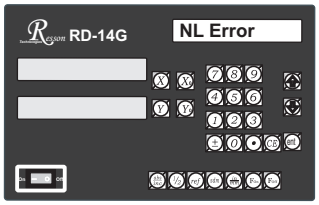


after enter the MEAS VAL mode
press "up" or "down" button
to select the step point value

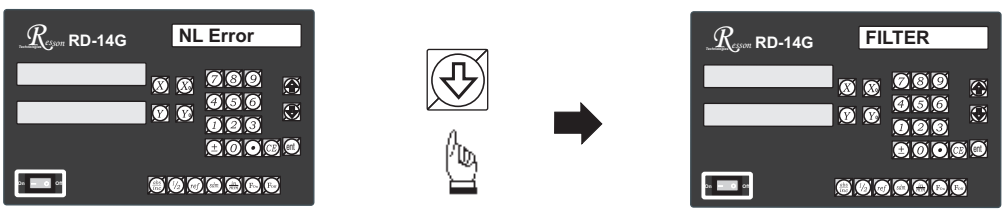




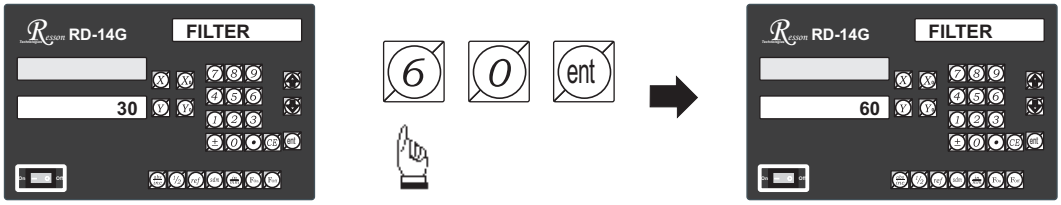
after all measured value
entered into the readout,
press"ent" to exit the
NL Error function



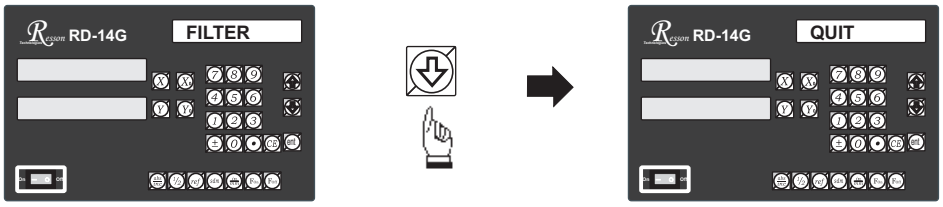
6.) Press key to select the "FILTER" function.



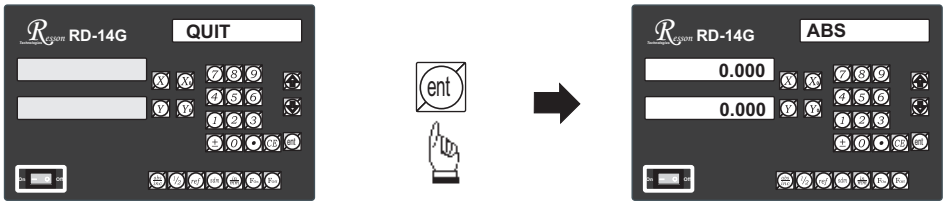
Press ent key into the digital filter setting function, then you can increase digital value until the digital does not pulsate. Please note that the value of DE (digital filter) is larger means the integrate is larger then the display is more stable.



7.) 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.