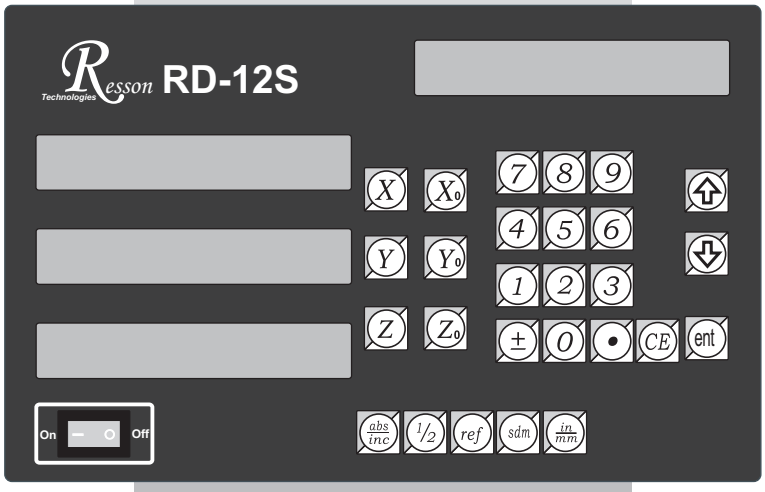
Resson Technologies

The People that Always Committed to Quality, Technology & Innovation



RD-12S

Digital Readout System Operation Manual (Standard)

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.

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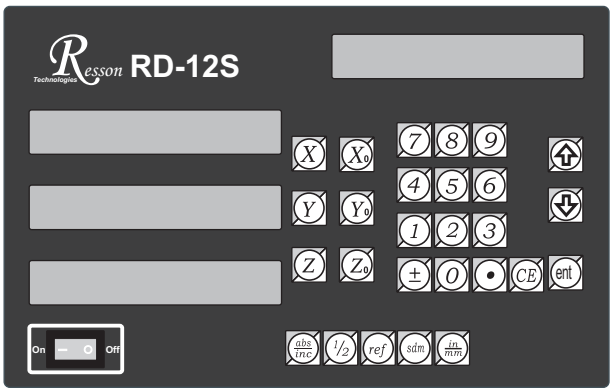
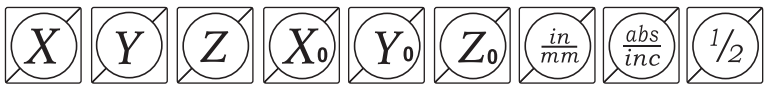
Basic Functions

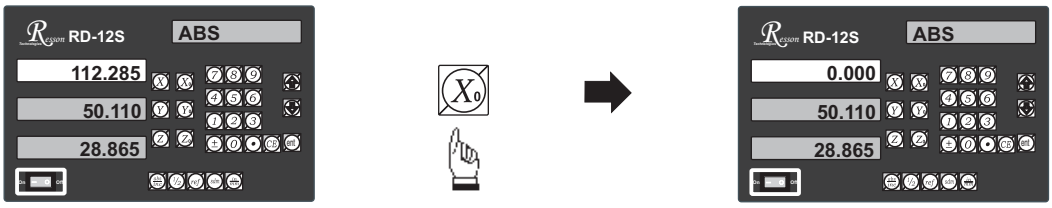




Set Display to Zero

Purpose : Set the current position for that axis to zero

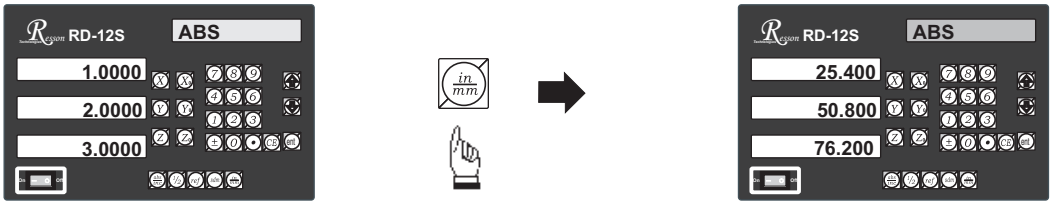
Example : To set the current **X Axis** position to **zero**



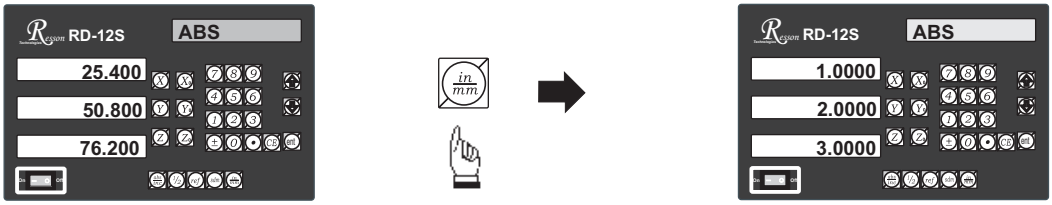
Inch / Metric Display Conversion

Purpose : Switches between inch and metric display

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



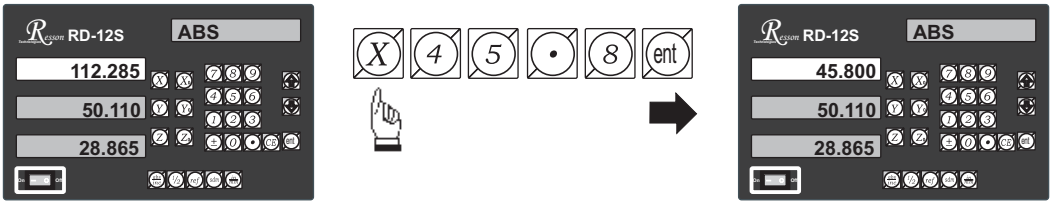
Example 2 : Currently in **metric** display, to switch to **inch** display



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

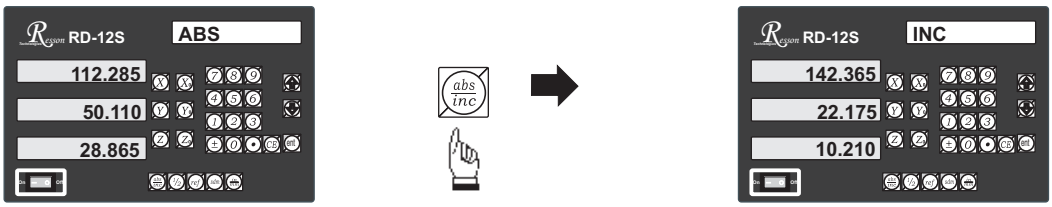
Purpose : **RD-12S** provides two sets of basic coordinate display, they are **ABS** (absolute) and **INC** (incremental) displays.

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.*

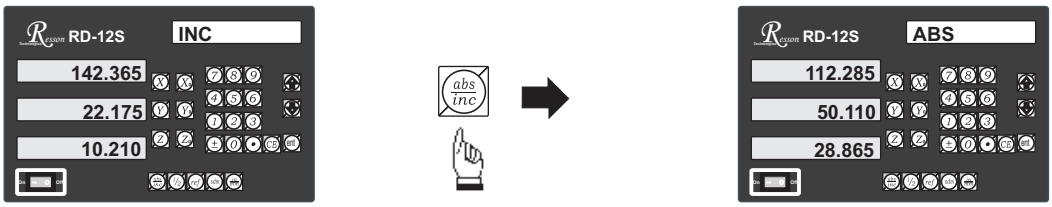
The operator is then free to zero the axes or preset any dimensions into any axis in **INC** coordinate for relative position machining. The work piece datum (work piece zero position) is still retained in **ABS** coordinate by the **RD-12S**.

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

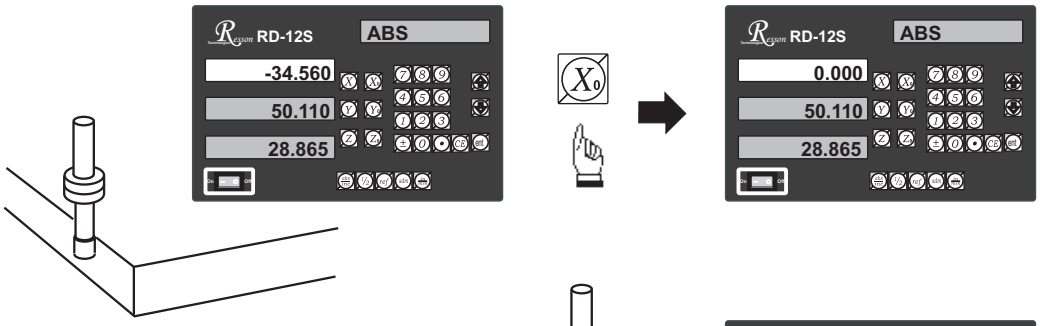


Centre-find

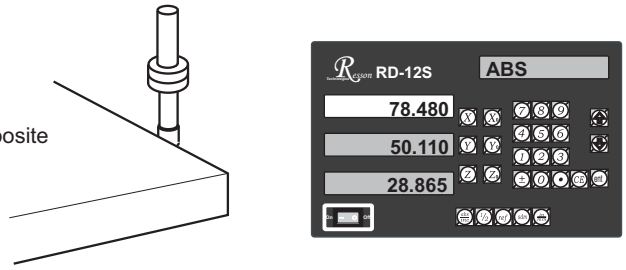
Purpose : **RD-12S** provides the centre-find function by halving the current display coordinate, so that the zero point of the work piece is located at the centre of the work piece.

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

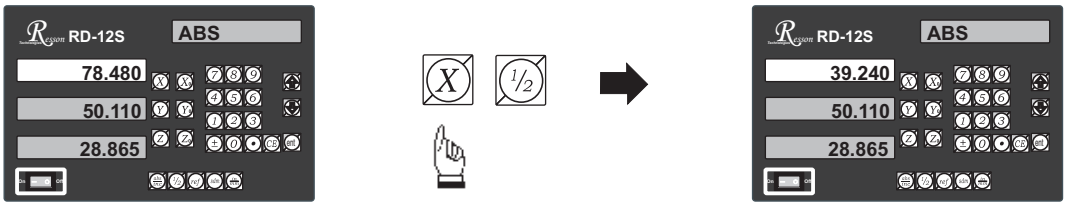
Step 1 : Locate the edge finder at one end of the work piece, then zero the X Axis.



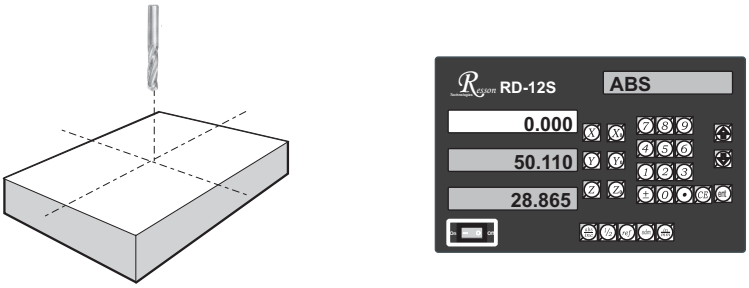
Step 2 : Locate the edge finder at the opposite end of the work piece.



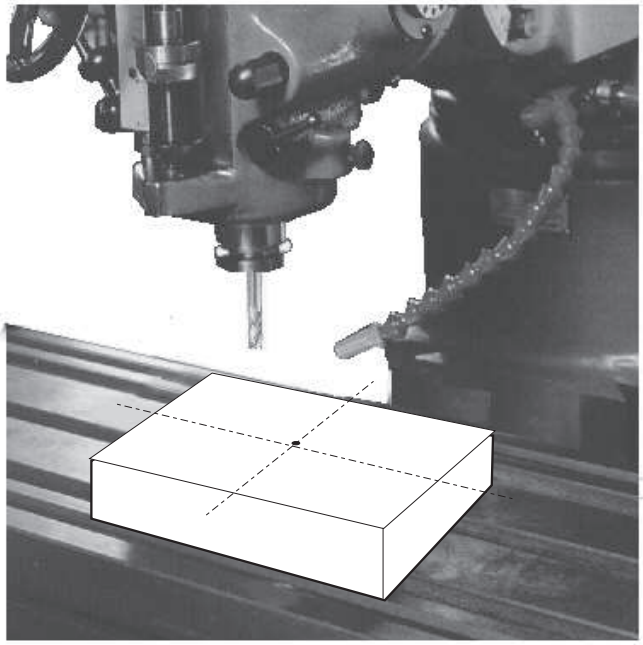
Step 3 : Then half the display coordinate using centre-find function as per follows:



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



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 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.

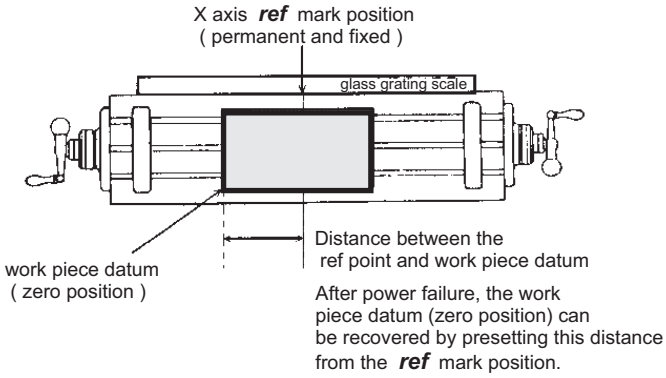
To allow the recovery of work piece datum very accurately, with no need to re-establish the work piece datum using an edge finder or other methods, every transducer has a reference point location to provide a datum point memory function.

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-12S 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-12S** provides one of the most easy-to-use ***ref*** datum memory function.

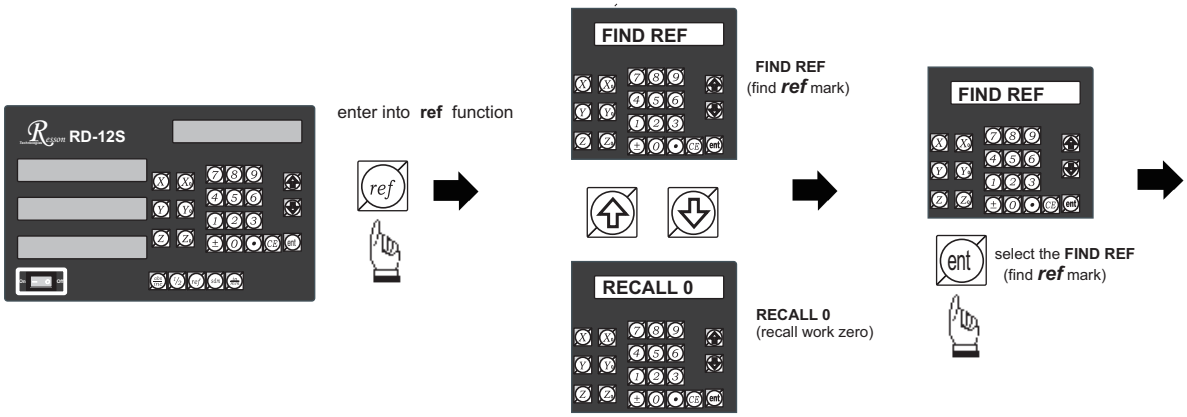
There is no need to store the relative distance between the ***ref*** mark and your work datum zero into the **RD-12S**, *whenever you alter the zero position of **ABS** coordinate, such as by zeroing, centre find, coordinate preset or etc.., **RD-12S** will automatically store the relative distance between **ABS** zero and the **ref** mark location into **RD-12S**'s memory.*

In daily operation, operator simply needs to locate the ***ref*** mark position whenever they switch on the **RD-12S** to let it know where the ***ref*** mark position is, then **RD-12S** will automatically do the work datum storage on its' own . In the case of a power failure or the **RD-12S** being switched off, the operator can recover the work piece datum easily by using the **RECALL 0** procedure.

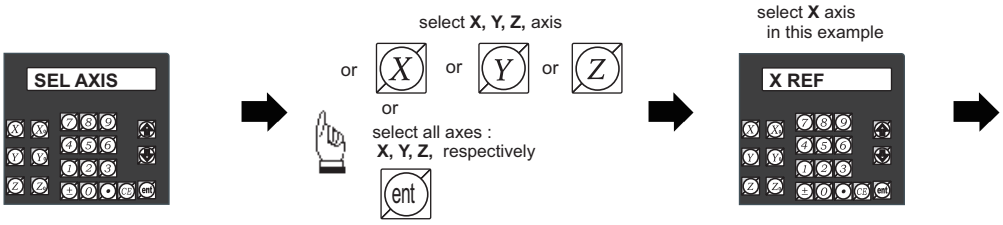
function : In ref datum memory function, the **RD-12S** will automatically store the relative distance between the ***ref*** mark position and the work piece datum (zero position) whenever the operator alter the **ABS** zero position, such as zeroing, centre find, co-ordinate preset or etc...

Therefore, the **RD-12S** 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-12S**.

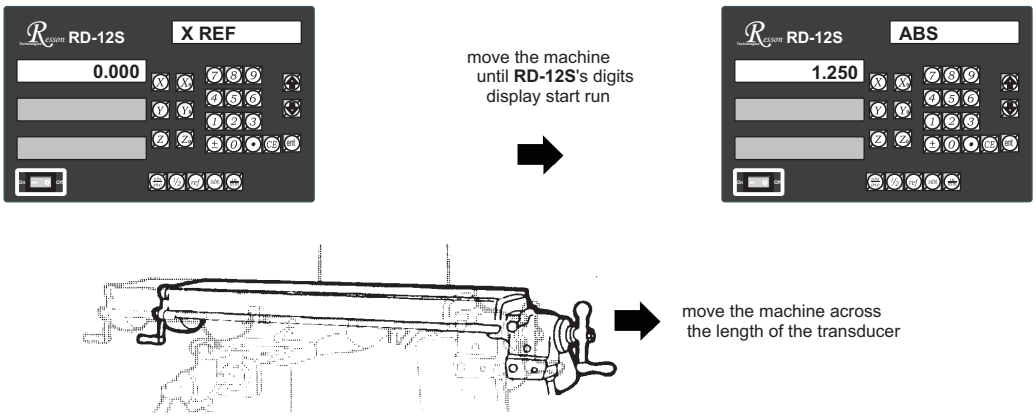
step 1 : To enter the ref function, select the **FIND REF** (find ***ref*** mark)



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

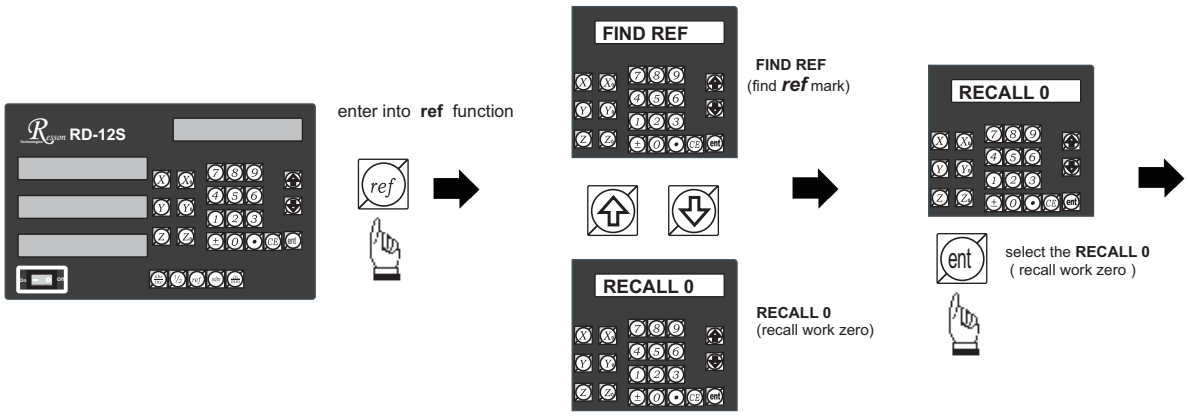


step 3 : move the machine reader head across the length of the transducer until digits display in **RD-12S** start to count.

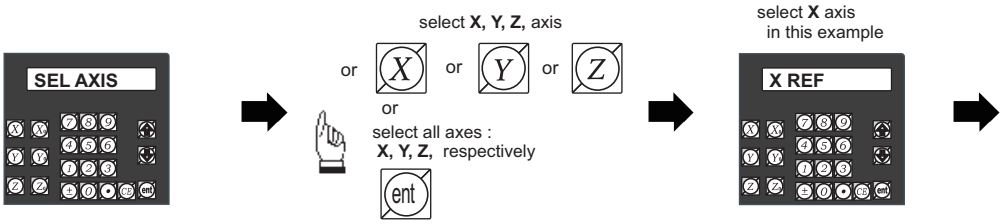


function : If the ref point is lost for any reason, the work piece datum can be recovered by **RECALL 0** function as follows:.

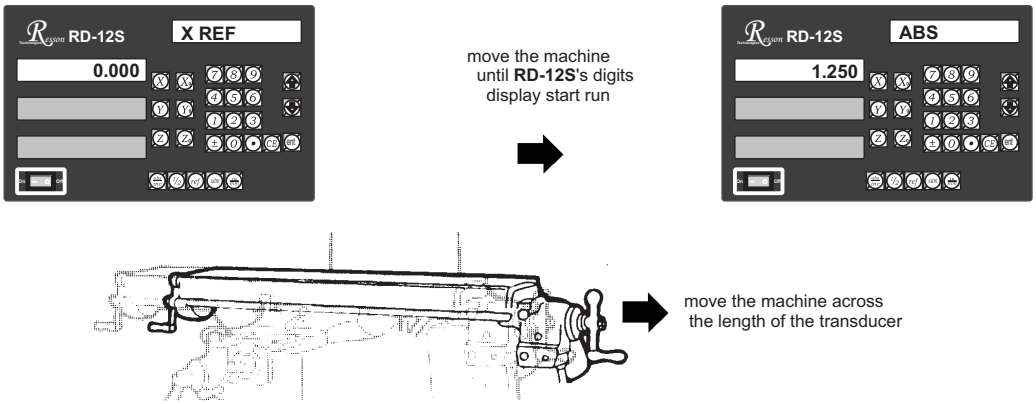
step 1 : enter into the **ref** function, select the **RECALL 0** (recall work piece zero)



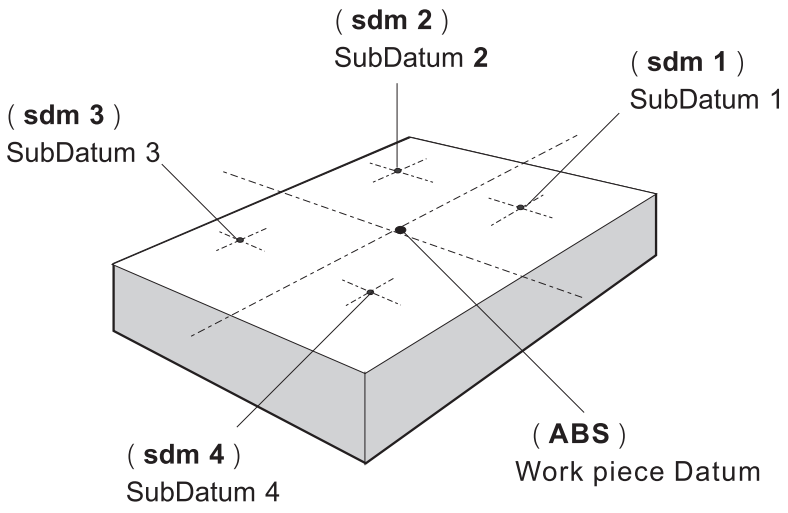
step 2 : select the axis of which work datum (zero position) needed to be recovered



step 3 : move the machine across the length of the transducer until the **RD-12S** display starts to count, then the work piece datum is recovered



199 SubDatum Function



199 SubDatum function

Purpose : Most **DRO** cabinet on the market provide just two set of work co-ordinates - **ABS/INC**. It was found that **ABS/INC** was inadequate and inconvenient to use, and, particularly in the case of complex machining or repetitive work, which needed more than just two sets of working co-ordinates.

ABS / INC operation has the following shortfalls :

- In much machining work, the work-piece machining dimensions are derived from more than two datums, therefore, the operator has to switch between **ABS** and **INC** to set up the machining datums time after time. This process is very time consuming and prone to error.

- In the case of batch machining of repetitive work, the operator has to set up and calculate all the machining positions time after time.

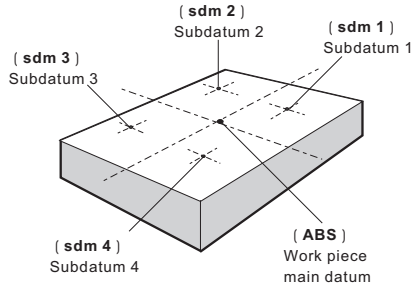
RD-12S provides a **199** subdatum (**sdm**) memory to cope with the shortfalls of **ABS/INC**. **SdM** function does not just simply provide **199** sets of **INC** co-ordinates, it is specially designed to provide much more convenient features for the operator to cope with repetitive work.
The difference between **INC** and **SdM** is as follows:.

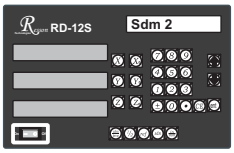
1. **INC** is independent of **ABS** and will not follow any change in **ABS** zero point. All **sdm** co-ordinates are relative to the **ABS** coordinates, so, all **SDM** positions will move together when the **ABS** zero position changes.

2. All **SdM** relative distance data to **ABS** can be entered directly into **RD-12S** memory using the keypad. No need for any additional calculations.

SdM application in a work piece that has more that one datum.

Operator can store all the work subdatums in RD-12S's memory as per follows.





Operator then can switch between the subdatums directly by pressing key

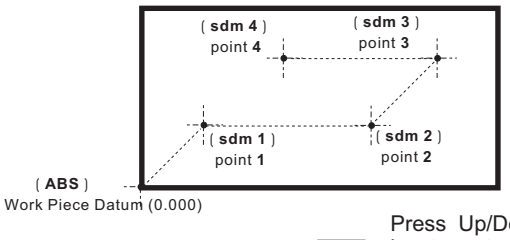
or

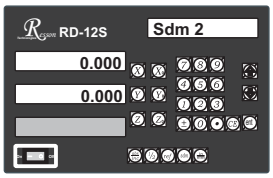
No need to refer back to ABS coordinate and set up the subdatums from their relative distance from ABS point

SdM application on the repetitive batch machining of parts

Because all sdm subdatums (0.000) are relative to ABS zero, so, for any repeative work, the operator just needs to set up the first work piece zero at ABS and store the machining position in subdatum zero.

For anymore repeative parts, just set up the 2nd, 3rd.. work piece zero at ABS, then all the machining positions will reappear





Press Up/Down key to go to machining points

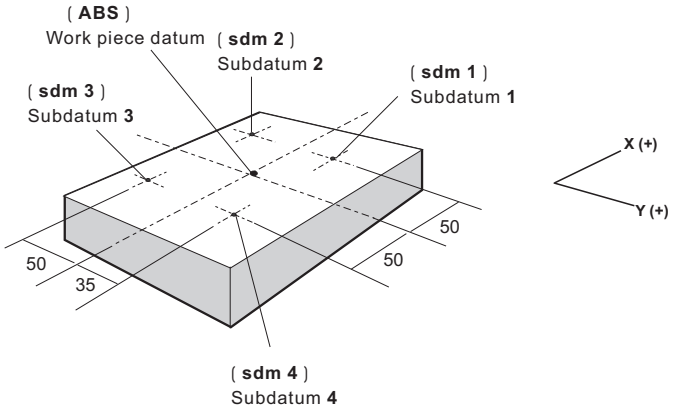
or

move the machine to display = 0.000, then machining location reached

Application example:

To set up four subdatum zero (**SdM 1** to **SdM 4**) the following two methods can be used

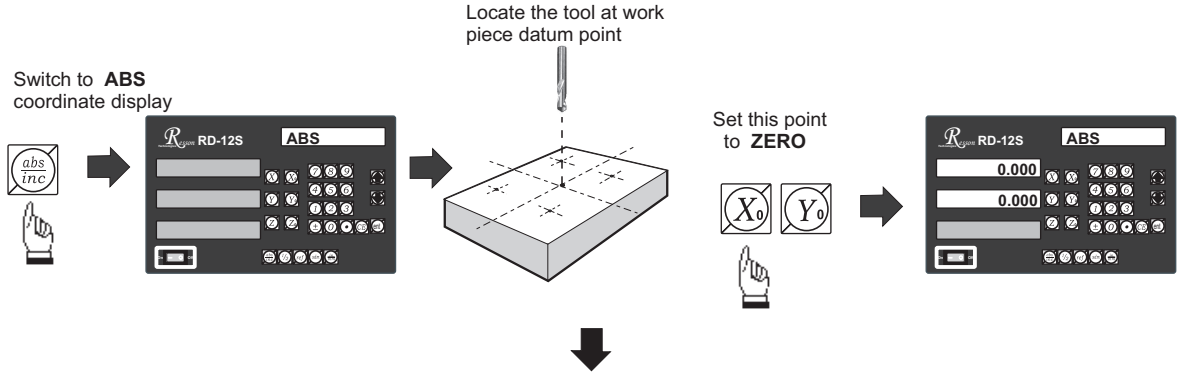
Either 1. Move machine to required subdatum position, then zero **SdM** display coordinates
Or 2. Directly key in the **sdm** zero position co-ordinates (co-ordinate relative to **ABS** zero)



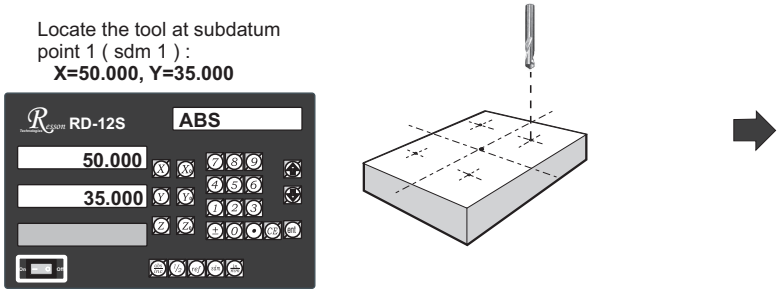
Method 1 : Move machine to required subdatum position, then zero SdM display coordinate

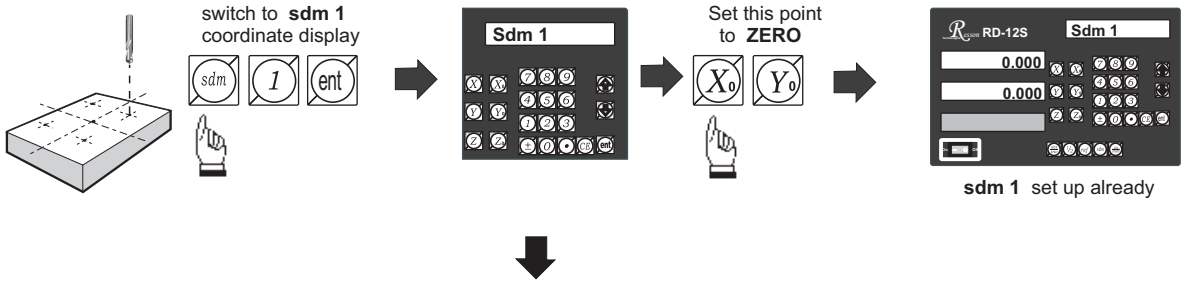
Set up the work piece datum in **ABS** co-ordinate, move the machine to the required subdatum position, then zero **SdM** display co-ordinate.

Step 1 : Set up the work piece datum in **ABS** co-ordinate

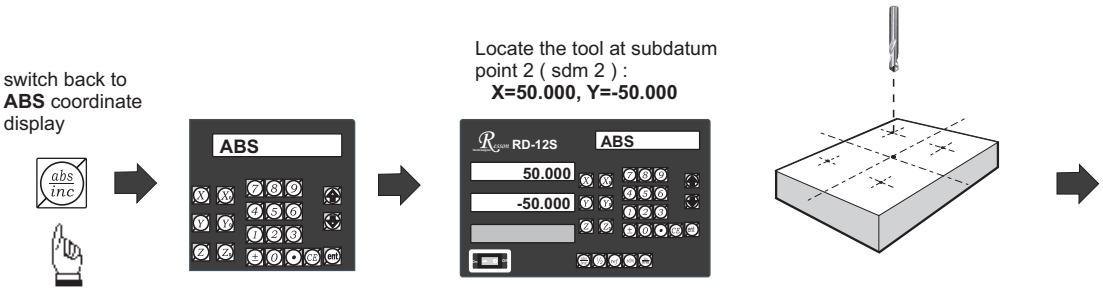


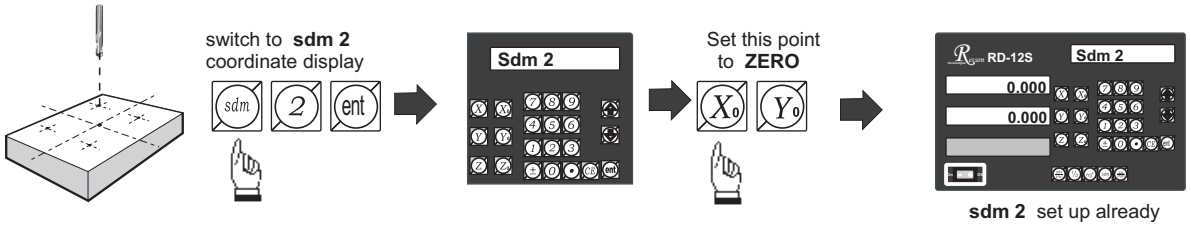
Step 2 : Set up the subdatum point **1** (**sdm1**)



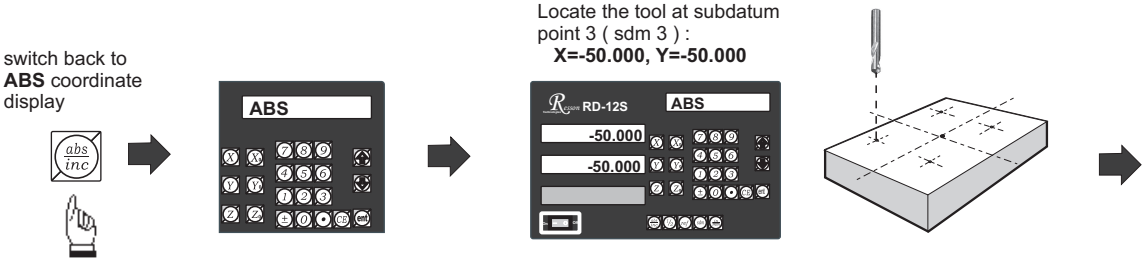


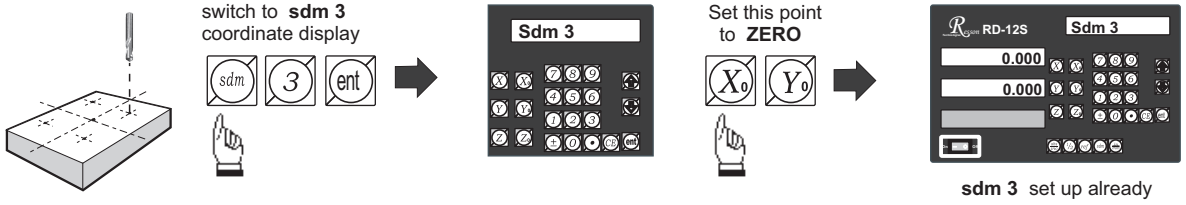
Step 3 : Set up the subdatum point 2 (sdm 2)





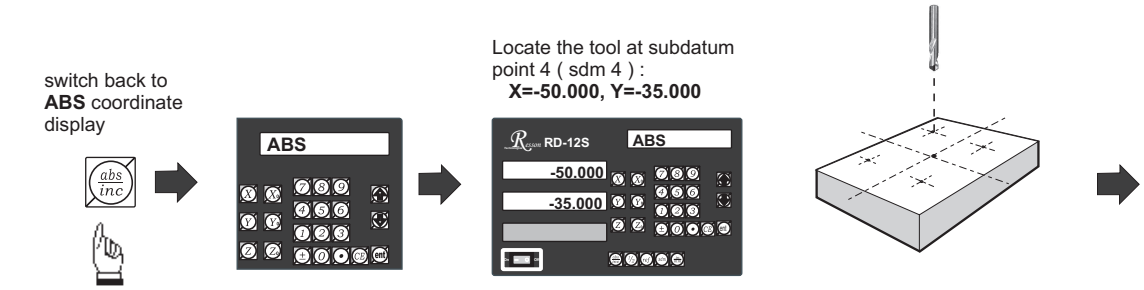
Step 4 : Set up the subdatum point 3 (sdm 3)

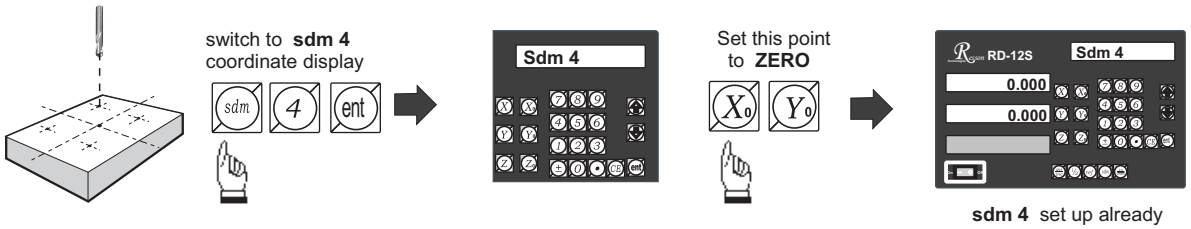




sdm 3 set up already

Step 5 : Set up the subdatum point 4 (sdm 4)



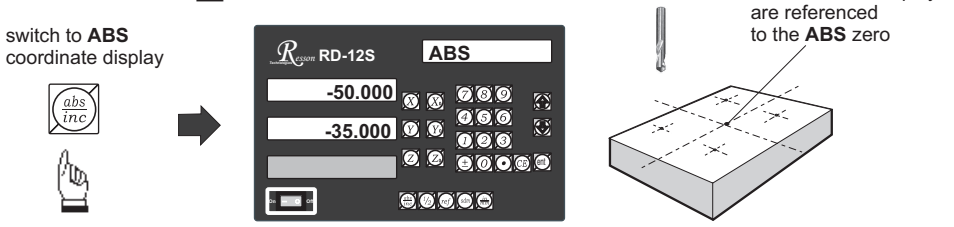


sdm 4 set up already

All the four subdatum points have already been set up

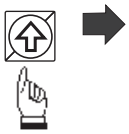
Operator can or to directly switch to the required subdatum (**sdm**) coordinate

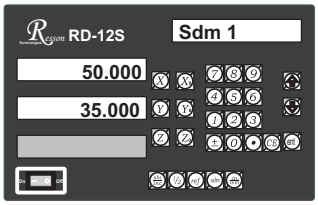
Example :

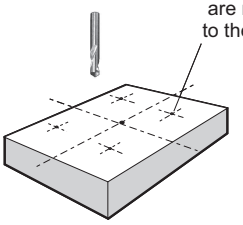


199 SubDatum function

switch to next (**up**)
sdm coordinate display

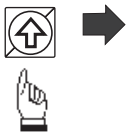


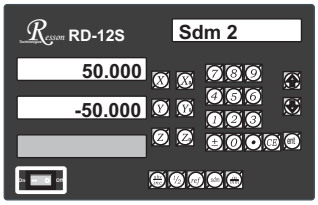


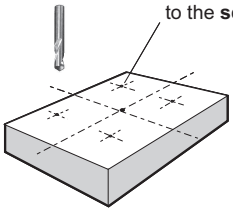


RD-12S's XY displays
are referenced
to the **sdm 1** zero

switch to next (**up**)
sdm coordinate display

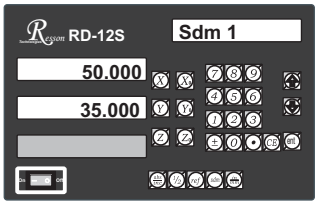


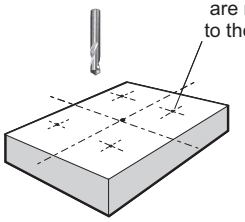




RD-12S's XY displays
are referenced
to the **sdm 2** zero

switch to previous (**down**)
sdm coordinate display





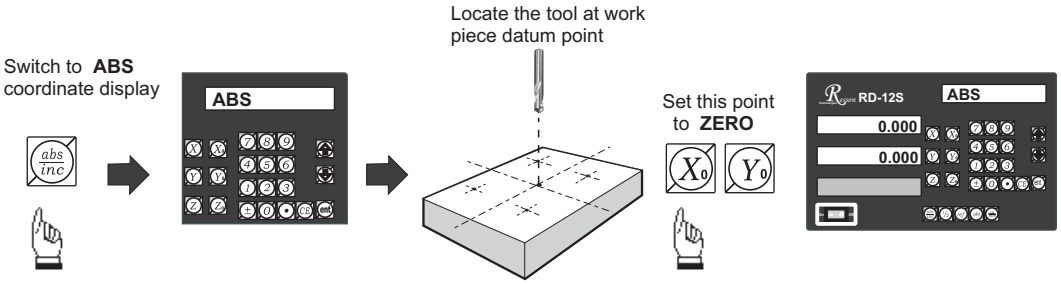
RD-12S's XY displays
are referenced
to the **sdm 1** zero

In a case where many subdatum (sdm) points need to be set up,the operator will find that the method of **direct keying in the of SdM zero position co-ordinates (co-ordinate relative to ABS zero)** is much quicker and less prone to error.

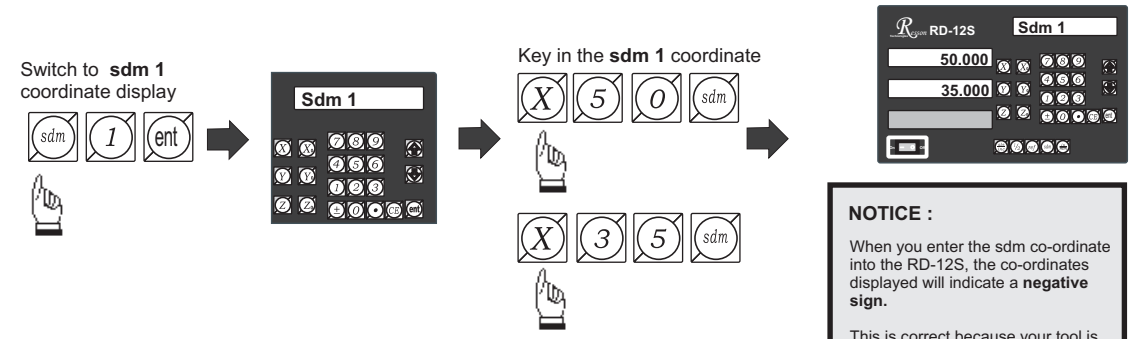
Mtheod 2 : Direct keying in the of SdM zero position co-ordinate (co-ordinate relative to ABS zero)

Set up the work piece datum (ZERO) at ABS co-ordinate, then move the tool located at the work piece datum (ABS zero point)and directly key in all subdatum point co-ordinates (the relative position to ABS zero) using the keypad.

Step 1 : Set up the work piece datum in ABS coordinate



Step 2 : Set up the subdatum point 1 (sdm 1)

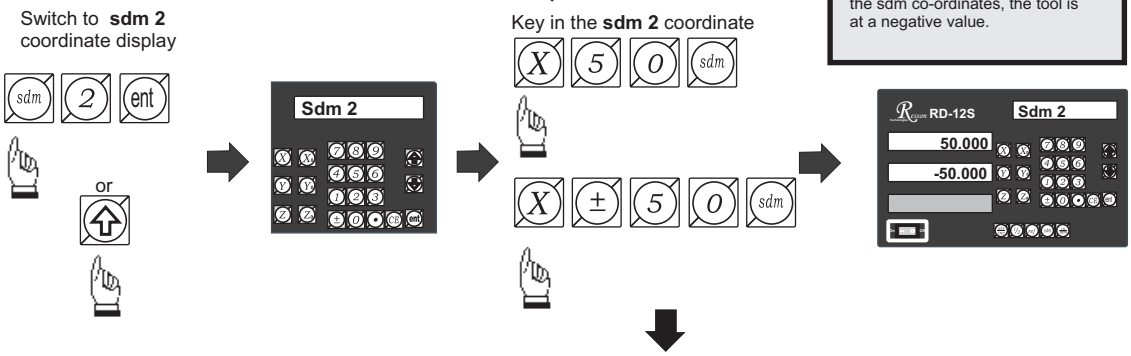


NOTICE :

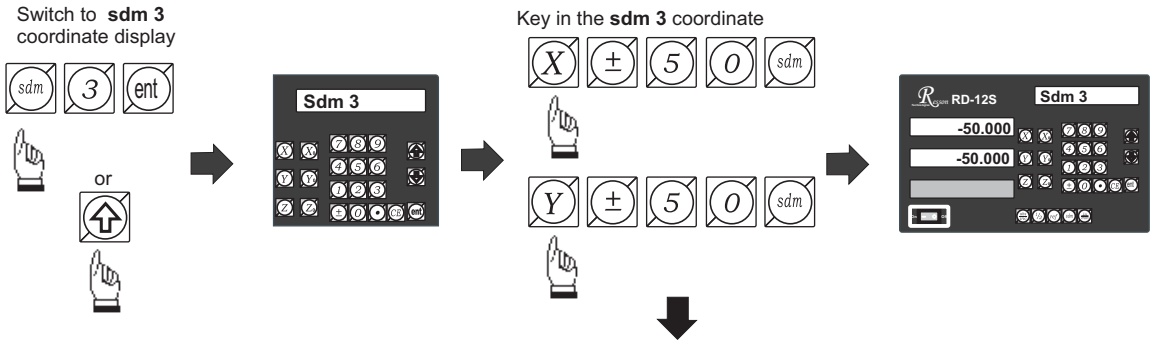
When you enter the sdm co-ordinate into the RD-12S, the co-ordinates displayed will indicate a **negative sign.**

This is correct because your tool is now located at zero position at ABS coordinate. If you calculate from the sdm co-ordinates, the tool is at a negative value.

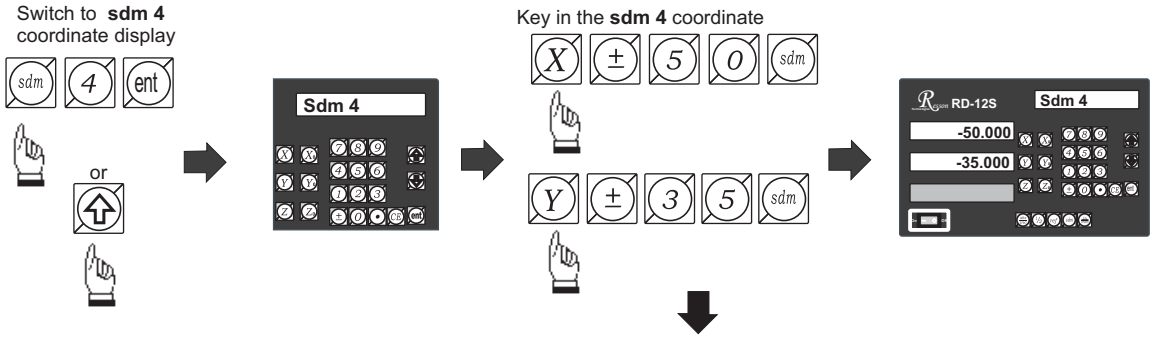
Step 3 : Set up the subdatum point 2 (sdm 2)



Step 4 : Set up the subdatum point 3 (sdm 3)



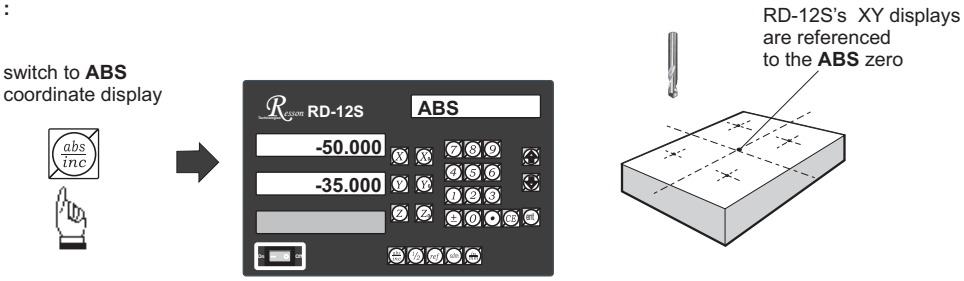
Step 5 : Set up the subdatum point 4 (sdm 4)



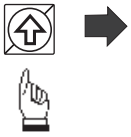
All the four subdatum points have already been set up

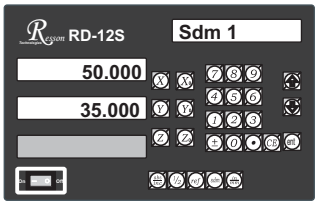
Operator can or to directly switch to the required subdatum (**sdm**) coordinate

Example :

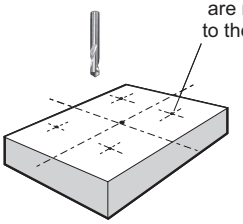


switch to next (**up**)
sdm coordinate display

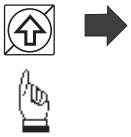


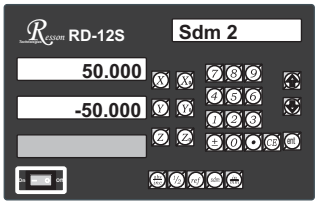


RD-12S's XY displays
are referenced
to the **sdm 1** zero

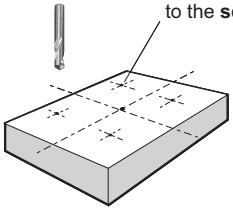


switch to next (**up**)
sdm coordinate display

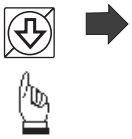


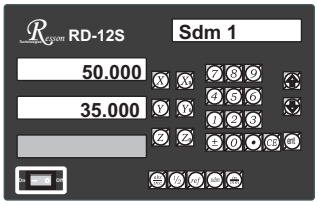


RD-12S's XY displays
are referenced
to the **sdm 2** zero

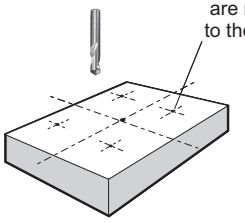


switch to previous (**down**)
sdm coordinate display



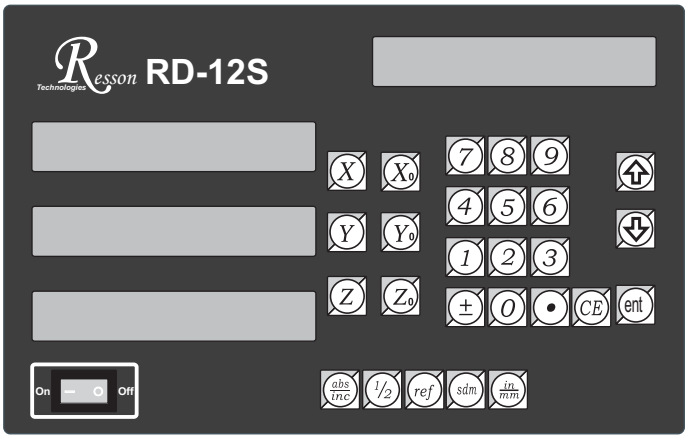


RD-12S's XY displays
are referenced
to the **sdm 1** zero



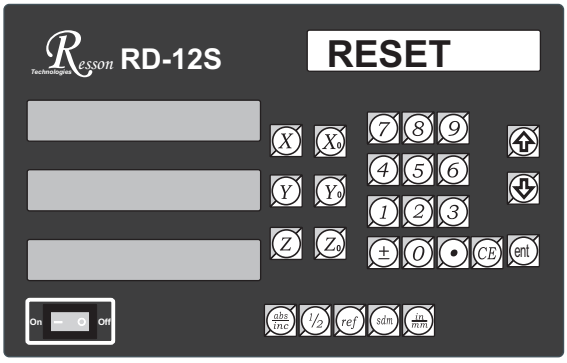
RD-12S

Digital Readout Setup Function



DIRECTIN	specifies the direction of count for each axis
LIN COMP	permits linear error compensation to be input
QUIT	exits the SETUP function to proceed to normal working

RD-12S ORIGINAL PARAMETER RESET FUNCTION

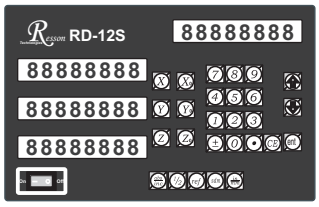


Some inscrutable cases or improper operations cause the chaos of parameter, then you need to initialize the parameter to reset the system.

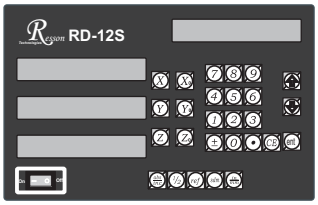
Operational procedure：

(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

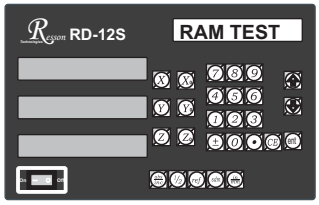


when "VER.9SA" appears in display window, please press " 8 " key.

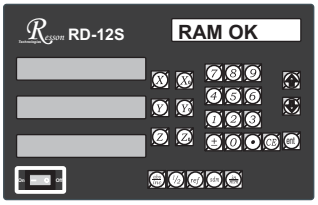


when some messages are displayed over, the DRO enters into the RESET function.

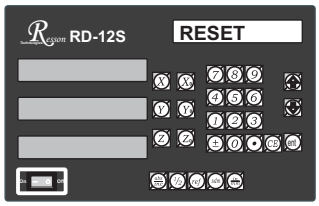
(3) When enter into the RESET function, DRO will display：



display "RAM TEST" that means the RAM is testing

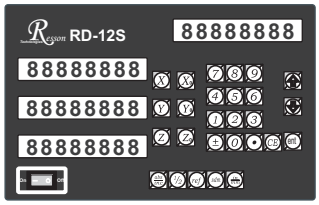


if the RAM function is normal，DRO can display "RAM OK"



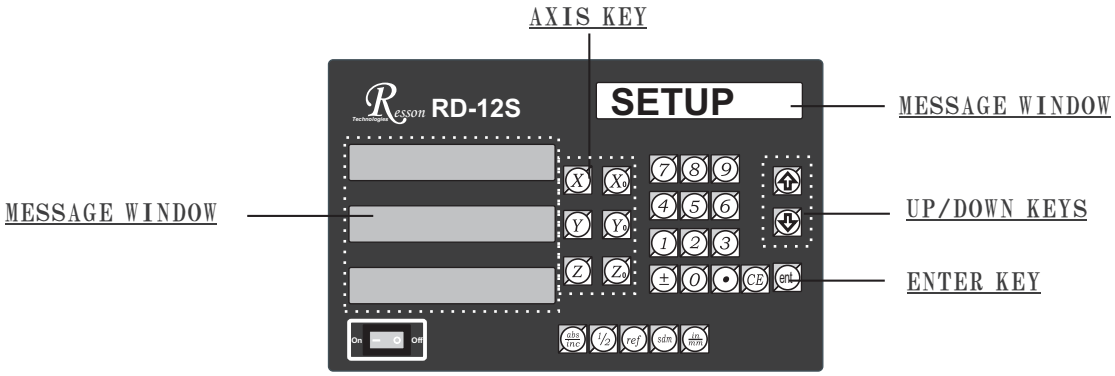
display "RESET" that means the parameter has reset

(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-12S SETUP FUNCTION

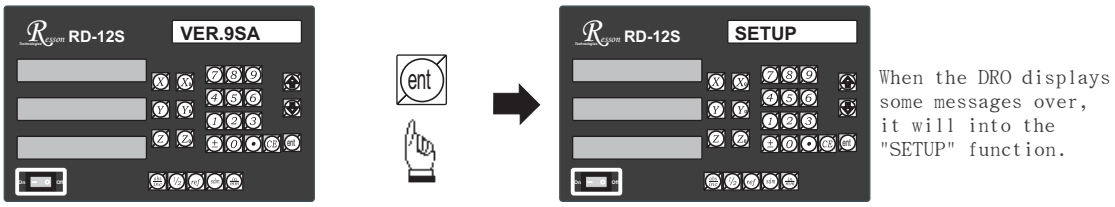


During changing the different program version IC or some abnormal voltages and operations, you need to SETUP the DRO.

Procedure :

1). Turn off the DRO.

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



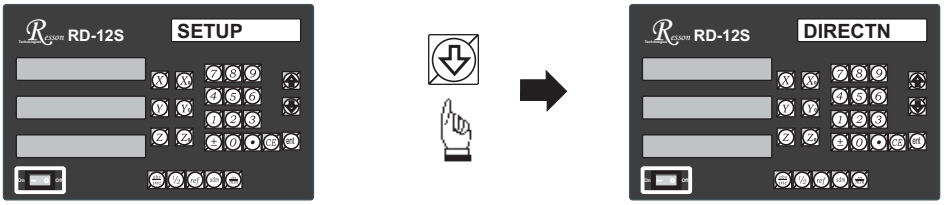
When the DRO displays some messages over, it will into the "SETUP" function.

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.

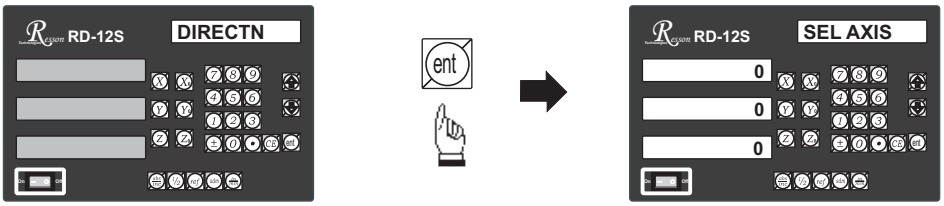
The top level menu headers in order are as follows :

DIRECTIN	specifies the direction of count for each axis
LIN COMP	permits linear error compensation to be input
QUIT	exits the SETUP function to proceed to normal working

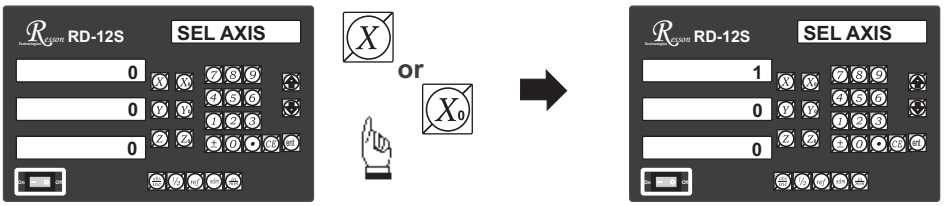
3.) Press ⇩ key to select the "DIRECTN" (counting direction) function. Press ⇧ key to return to the last function.



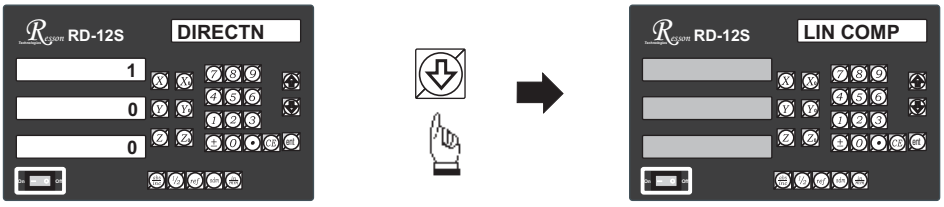
Press ent key into the direction setting function, the 0 represents a positive, 1 represents a negative.



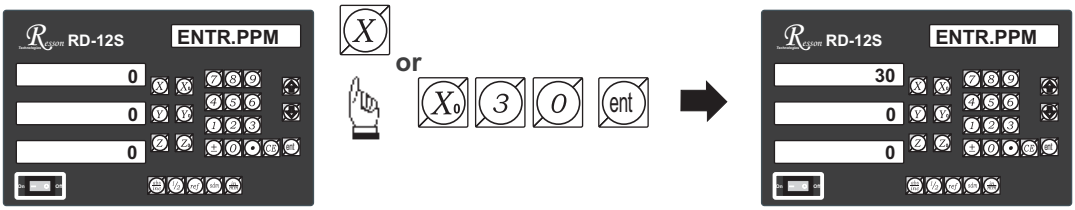
Press X or X0 key to set up a negative direction "1" for X Axis, make a same procedure for Y Axis.



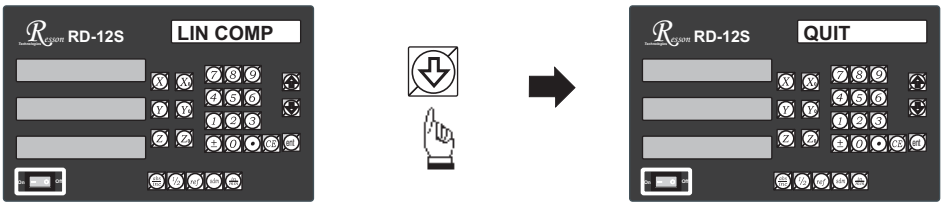
4.) Press ent key to make your setting, then press ⇩ key to select the "LIN COMP" (linear compensation) function.



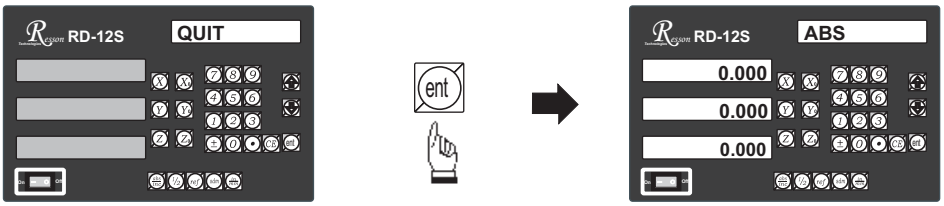
Press (ent) key into the linear error compensation function, the formula as below：
error value X -(1000/measuring length) = compensation value
(ML) measuring length unit = mm, error unit = ㎛
Example：
ML=500mm Error = -15㎛
-15㎛ X -(1000/500) = 30㎛
the compensation value is 30㎛
If set up the linear compensation 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 "QUIT" function.



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

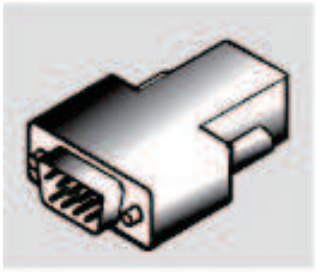


By pressing the ENTER key the DRO exits the SETUP program and is ready for machining operations. If use the error compensation function, you must turn off the DRO then power on the DRO again, otherwise your compensated value will invalid.

RD-12S Specification :

Number of axes : 1、2、3
Reslution : 0.005mm
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