

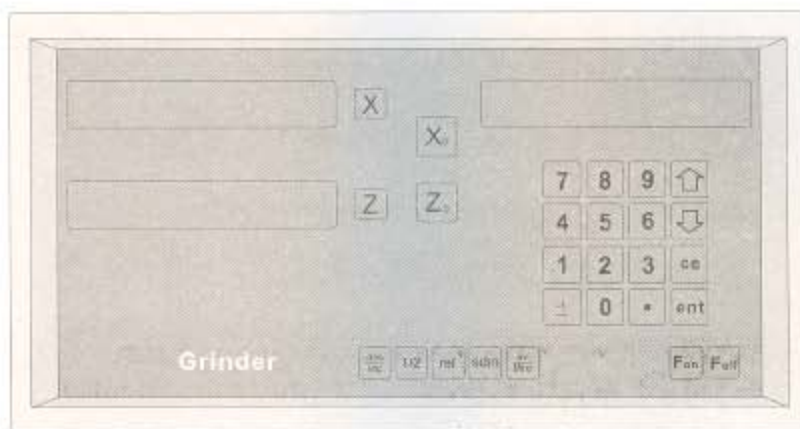
Always Committed to Quality, Technology & Innovation

**Digital Readout System
Operation Manual
(Grinder Option)**

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Basic Functions



Zero Setting

Function: Let the axes return to their zero position

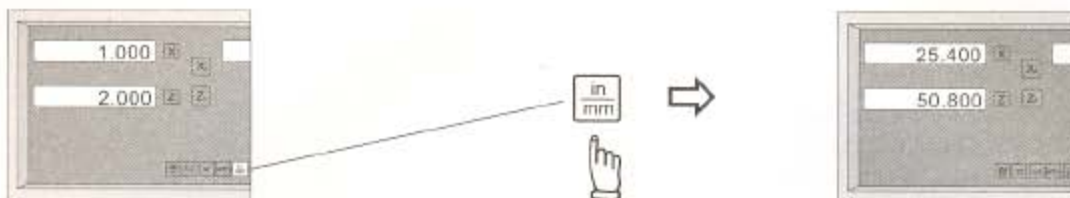
Example : Let Z axis return to its zero position.



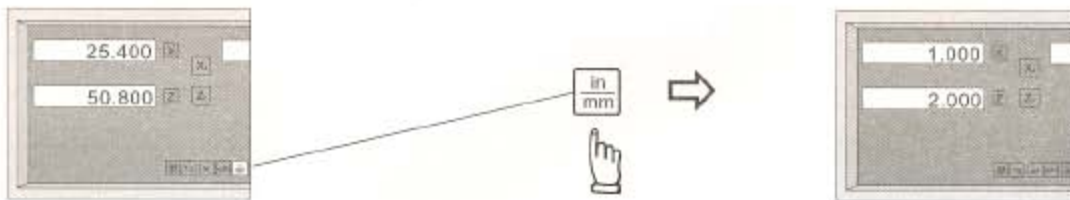
Inch/Metric Display Conversion

Function: Switch between Inch(in) and Metric (mm) mode

Example 1 : Current display is in Inch(in) mode, switch it to Metric(mm) mode



Example 2 : Current display is in Metric(mm) mode, switch it to Inch(in) display



Function: Input any datum you want to set the current axis position.

Example : Input 45.800mm to set the current X axis position.

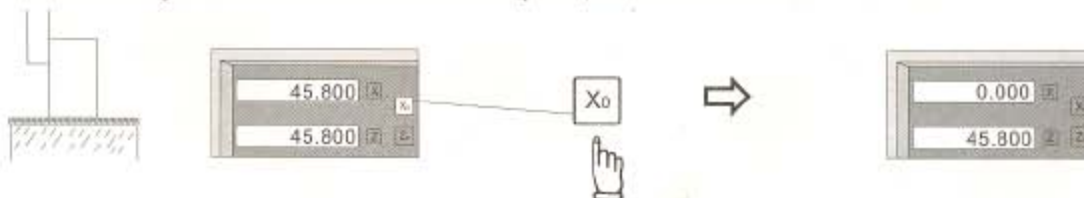


Center Find

Function : The counter has Center Find function, the current display coordinate is divided by 2, locate the center of work piece by zero point.

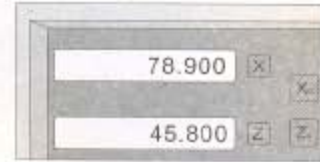
Example : Set the X axis zero point at the center of the work piece.

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

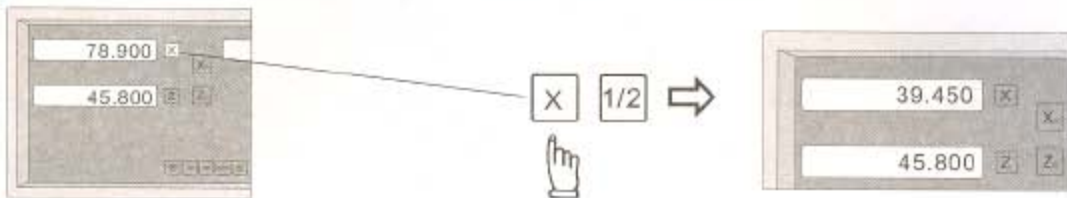


Center Find

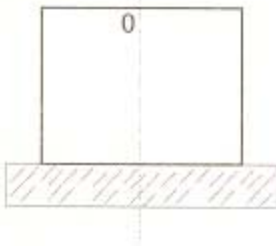
Step 2 : Locate the edge finder at the opposite end of the work piece.



Step 3 : According to Center Find function, current X axis display should be divided by 2 as follows:



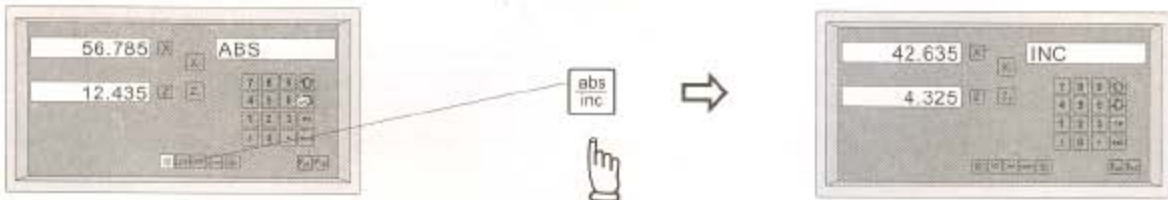
Now the X axis center of work piece is (0.000) ,move the transducer to 0.000,that is the center of the work piece.



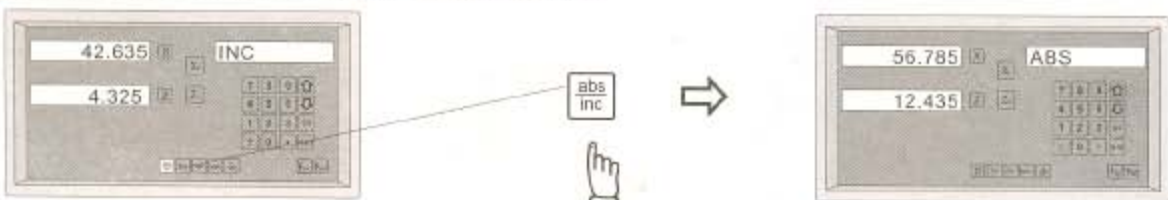
ABS/INC Coordinate Display Switches

Function: The counter provides two sets of basic coordinate modes, they are ABS (absolute) and INC (Incremental) modes. During machining operations, the operator can store the work piece datum (zero position) in ABS mode, then switch it to INC mode to continue machining operation. The work piece datum stored in ABS mode will not change no matter the operator set the display to zero any where in INC mode, the work piece datum stored in ABS mode will always be kept during the whole machining operation,so it is convenient for the operator to check the datum.

Example 1 : Current display is in ABS mode, switch it to INC mode.



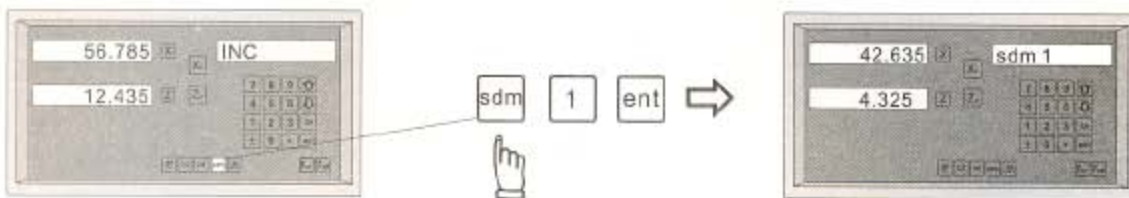
Example 2 : Current display is in INC mode, switch it to ABS mode



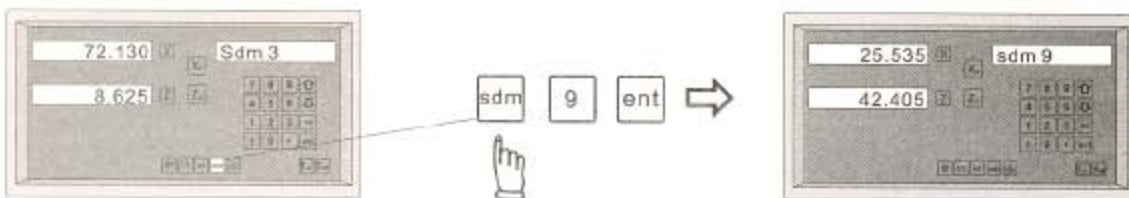
199 Sub-datum Memory

Function : The counter provides 199 sets sub-datum function, it is offered as a Supplement for ABS/INC function. All zero positions in sdm mode change along with the ones in ABS mode, but zero position in INC mode is completely independent.

Example 1 : Current display is in INC mode, switch it to sdm1 mode



Example 2 : Switch from the current sdm3 to sdm9

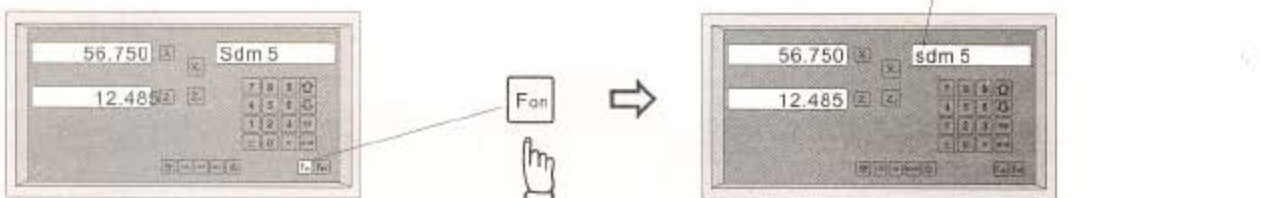


Vibration Filtering Function

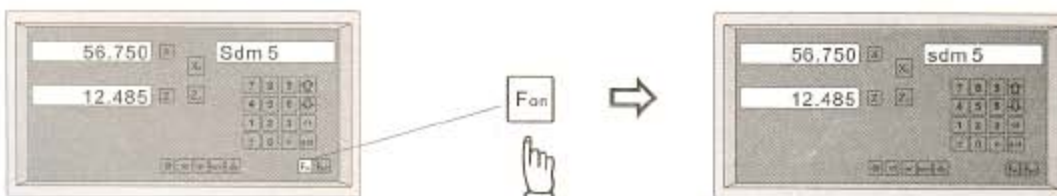
Purpose : Because the grinder itself is very precise, resolution of the machine is 1 μm (0.001mm). While vibration generated during machining exceeds 1 μm more often than not, resulting in instability of the display, making the operator be dazzled, run-out phenomenon of large-scale grinder is more obvious.

Vibration filtering function makes use of the accurate mathematics operation, after the transducer carries out real time position sampling, filter the run-out generated during machining, so as to display the optimum average value, it not only can make the operator feel more comfortable while working, but also can minimum the man-made judgment mistakes.

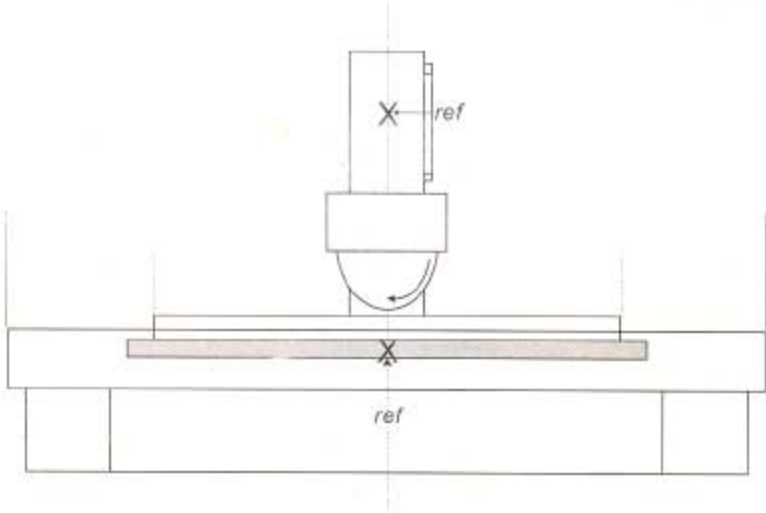
Example 1 : Vibration filtering function is ON



Example 2 : Vibration filtering function is OFF



REF Datum Memory



REF Datum Memory

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

The counter provides REF Datum Memory function, it makes use of REF of the transducer to remember zero point of the work piece, so it is easy for operator to recover zero point of the work piece very accurately after turning on the counter. It is not necessary to re-establish the work piece datum by edge finder or other methods.

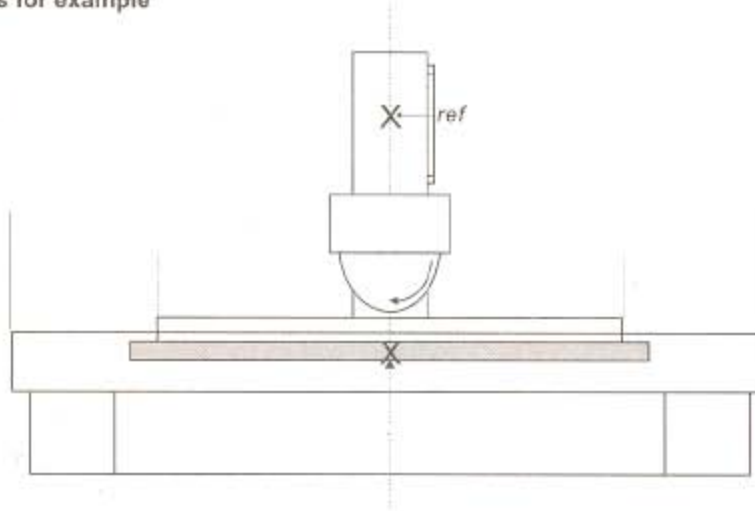
The operational principle of the REF datum memory function are as follows:

--There are a permanent and fixed mark (position) in the center of every transducer, we call it REF mark or REF point.

--It is only necessary for us to remember distance between zero position of work piece and REF mark of transducer, the distance will not change, if the work piece is not removed when the power supply to the machine is turned off.

--Therefore, we simply need to find the REF mark of transducer, then reset the stored distance between zero position of work piece and REF of transducer, zero point of work piece will be recovered automatically.

Example : Take Z axis for example



To operate as follows: .

In comparison with REF datum memory function of any other counters of the same kind, in present market, REF datum memory function of the counter we manufacture, is the most advanced and easiest one for use.

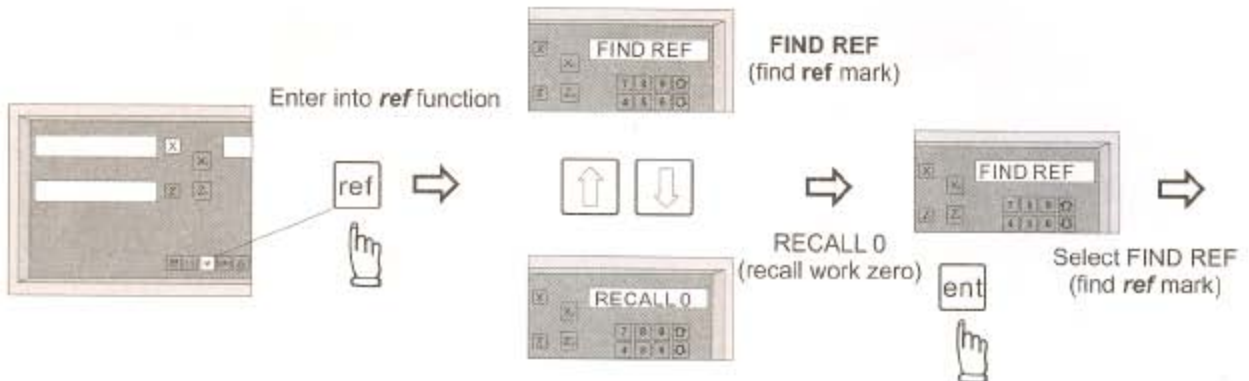
The counter will automatically store the relative distance between work piece zero position and the REF mark, no matter the operator return to zero, center find or input the datum in ABS mode.

In daily operation, operator simply need to find the *ref* mark position whenever they turn 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 being Switched off, the operator can recover the work piece datum easily by the RECALL 0 procedure.

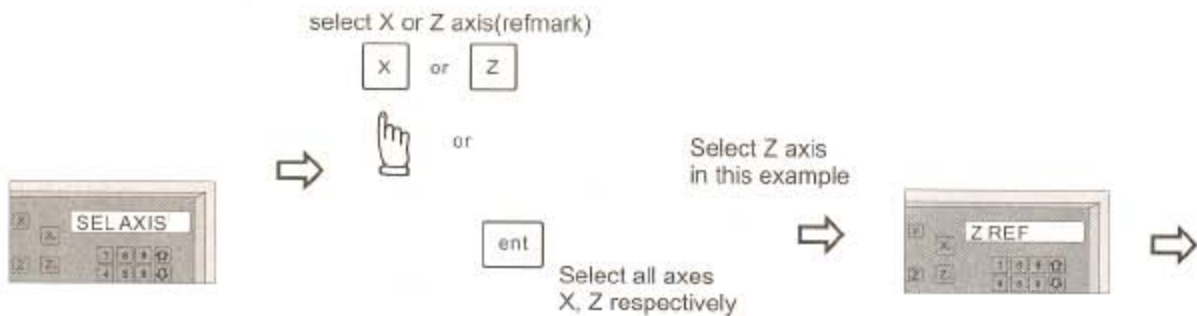
FIND REF

Function : If a very important(or complicated)work piece machining is to be performed,zero point of work piece should not be lost when the power supply to the machine is turned off or the machining.can not be completed within one work shift.Therefore,Counter needs to know where the ref mark position is,in ABS mode,prior to machining operation.The counter will memoryber the new distance between work piece zero point and the REF mark antomatically,in case thepower supply to the machine is turned off.No matter you reset work piece zero point such as zero setting,center,Find or Inputting Numbers in ABS mode afterwards.

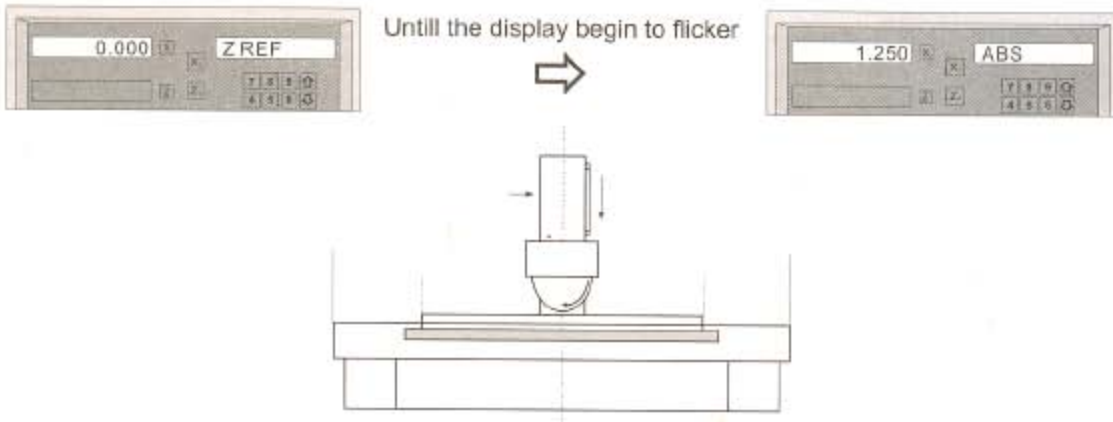
Step 1 : Enter into the ref function, select **FIND REF**(find *ref* mark)



Step 2 : Select the axis whose *ref* mark needs to be found



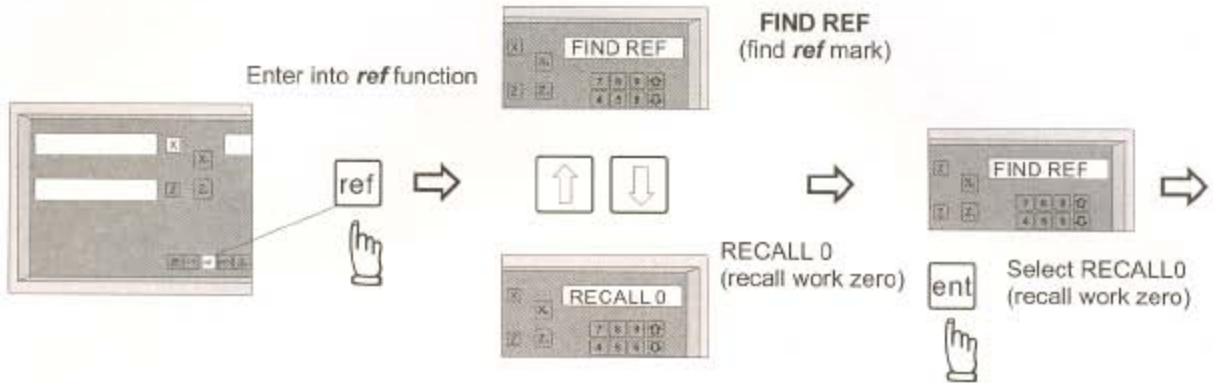
Step 3 : Move the machine across the center of the transducer until digit of the counter begin to flicker.



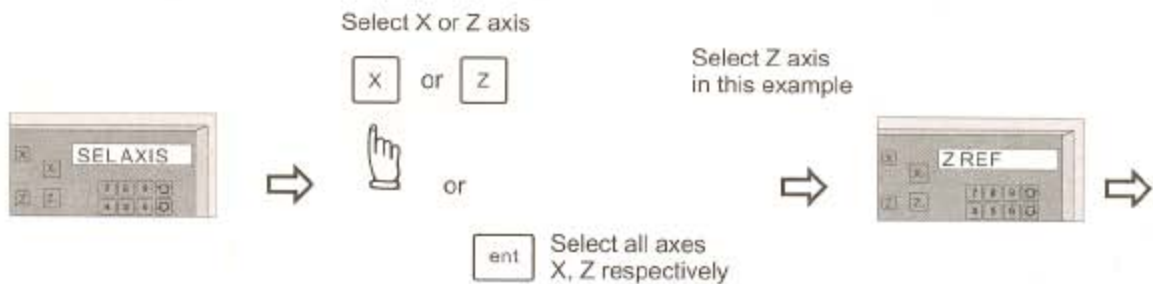
Recall the Work Piece Zero (RECALL 0)

Function : In case power failure happens or the machining can not be completed within one work shift, the work piece datum can be recovered by RECALL 0 function as per following procedures:

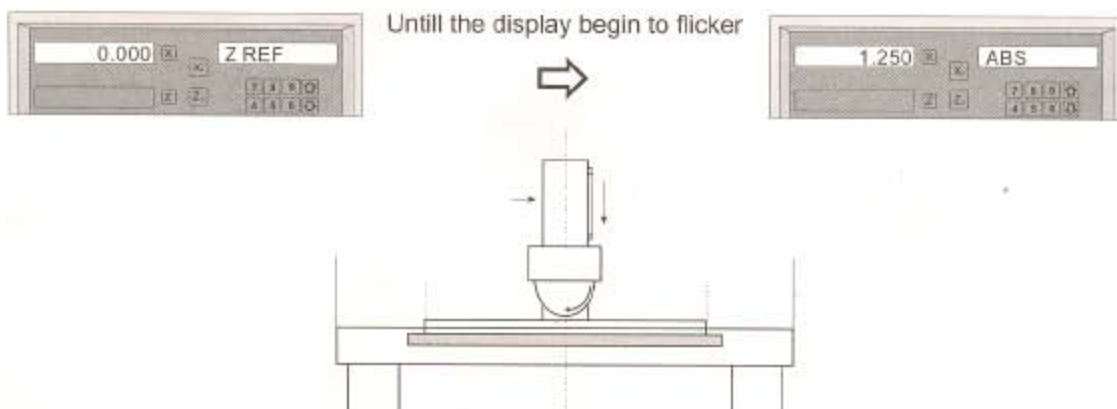
Step 1 : Enter into the **ref** function, select **RECALL 0** (recall work piece zero)



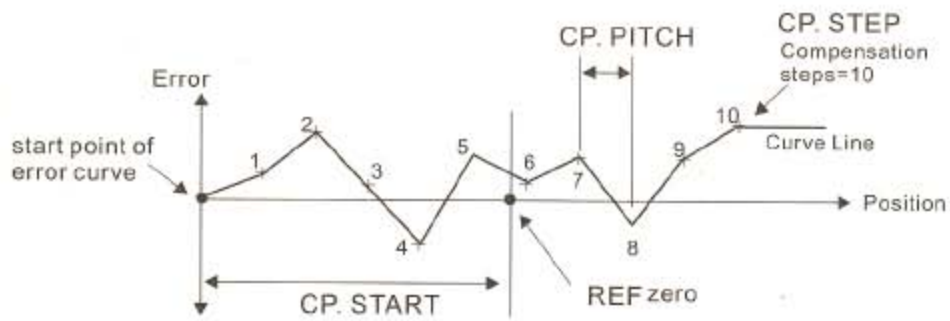
Step 2 : Select the axis whose work datum (zero position) needs to be recovered



Step 3 : Move the machine across the center of the transducer until digit of the counter begin to flicker, then the work piece datum is recovered



Non-linear Error Compensation Function

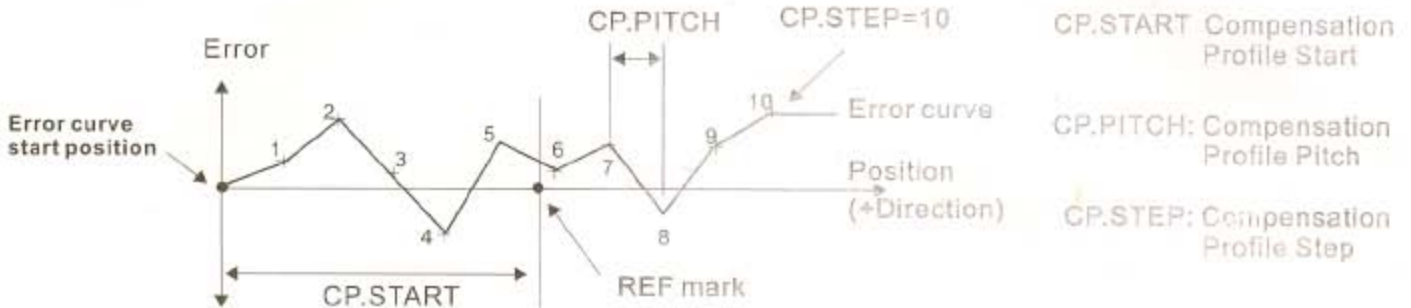


Non-linear Error Compensation Function

Non-linear error compensation function of the counter is mainly for grinder use, it can maximum the high precision of grinder to the full.

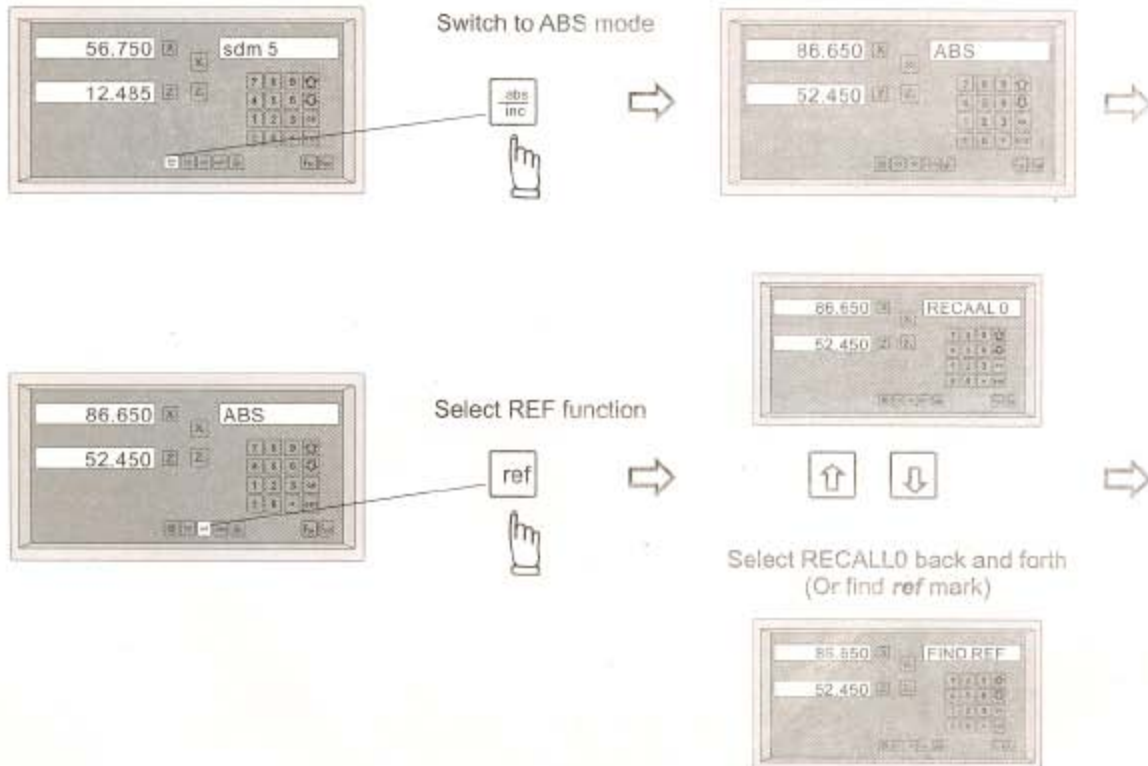
Operational Principle:

When using this function, the middle point (REF) of the transducer is taken as the reference point, each pitch's error value (refer to pitches cut from error curve start point to its end point) is stored in the Memory of the counter, then the build-in computer of counter will correct the grinder's error pitch by pitch accordingly.



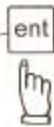
To operate as follows:

1 Find REF position in ABS mode



Non-linear Error Compensation Function

Select FIND REF
(find ref mark)



Select X or Y axis



Let's say take X as an example

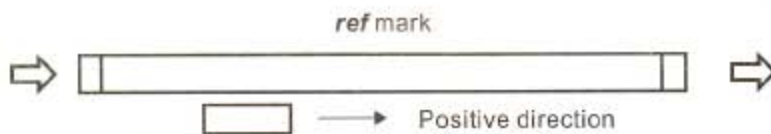


Select x axis



Move the table across the ref mark of the transducer along positive direction until the digit of ES-8P counter begin to flicker.

REF point is located at x=0.000.



2) Find out position of CP. START:

Non-linear compensation is always calculated in the positive direction, thus when using this function, you must start from the most negative direction to compensate.

Example: In this example, we take transducer whose leg space is 25 mm as the standard one, total compensation travel (maximum possible travel of the standard transducer or profile project) adds up to 250 mm. Therefore:

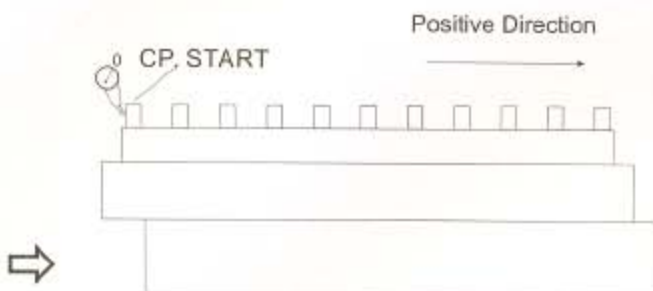
CP. PITCH=25mm

CP. STEP = (total compensation travel - 200mm)/CP. PITCH = 10



Non-linear Error Compensation Function

Put starting point of the transducer on the most minus display of profile projector, aims at that point with lens (for example lens whose magnification is 50 X)



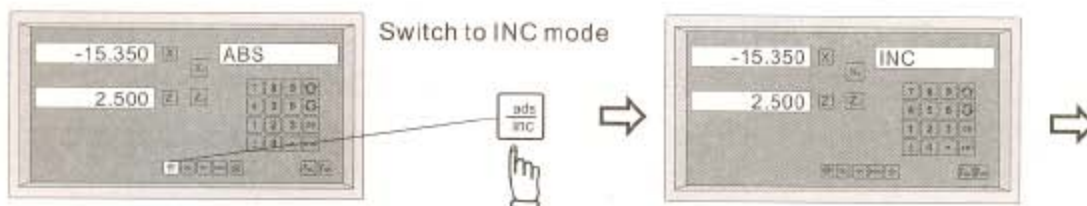
CP. START is the coordinate for X axis, while that point is aligned, please keep in mind that compensation of the counter is always in positive direction, so if REF is in the middle of profile projector, CP .START is always negative value.



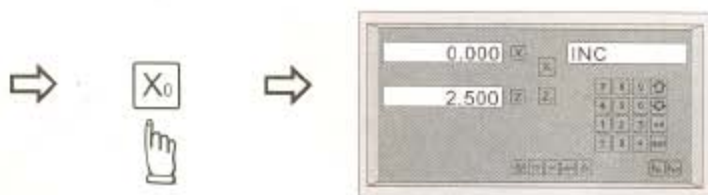
Please record the datum, in this example, the CP. START position=-115.875

3 Error Measurement

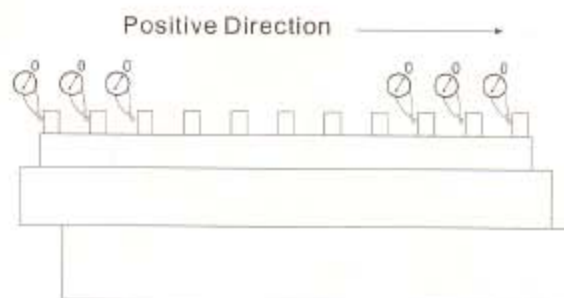
We recommend you switch to INC mode and return to zero at the first measuring point ,before carrying out the measurement.



X axis returns to its zero position



Begin to carry out the measurement, fill in the following table with the measurement results



Non-linear Error Compensation Function

- It is not necessary for us to calculate the error, input the measurement results instead, while using the non-linear error compensation function, so record the measurement results from the readout and fill in the following table:

Standard Position	Measurement Result
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

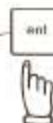
CP. START=-115.875
CP. PITCH=25.000
CP. STEP=10

4 Input the non-linear compensation datum to the counter:

Restart the counter after you turn it off



Press button "ENT" to enter SETUP mode, after you turn on the counter, and software version number appears.



Non-linear Error Compensation Function

After entering MEAS VAL mode, press the key below to select the test results accordingly



XX axis measurement result...

ZZ axis measurement result...

After all inputs are performed, exit by pressing button.



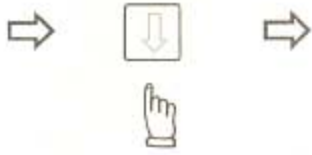
Press "down" key until "QUIT" appears



*It is necessary to turn off the counter before you turn it on, otherwise, the error compensation function does not work.

Non-linear Error Compensation Function

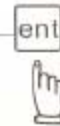
After entering SETUP mode, press "down" button until "NL error" appears



NL Error is Non-linear error (non-linear error compensation)



Press **ent** key to confirm the selection

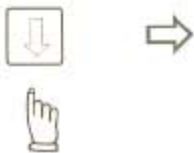


Input CP. START



X + 1 1 5 . 8 7 5 ent →

Next step

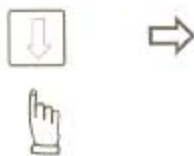


Input CP. PITCH



X 2 5 ent →

Next step

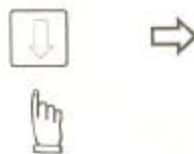


Input CP. STEP



X 1 0 ent →

Next step



MEAS VAL is Measured Value (Measurement result)



Press **ent** key to confirm the selection

