QUARK DIGITAL READOUT

Manual

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BEFORE USE

Pay attention to the following before use

1. Before installation, please open the box and check whether the set of accessories is complete, whether the surface of the digital display is undamaged during transportation. If anything is unusual, please contact us.
2. Before installation, you are supposed to link grating and power and then check whether the digital display are counting are normal.
3. This equipment is used with alternating current of AC230V, 50Hz. Power plug is an earthed three-pin plug which must be firmly earthed to avoid instability of the digital display.
4. User cannot open the cover so that personal injury is avoided, there is a high voltage power supply within.
5. Please keep the equipment powered off when not in use, this will lengthen the duration of the service time.
6. Please make sure that the power supply is switched off or the power cord is unplugged in a thunderstorm to avoid high-voltage lightning impacting the power grid and leading to the power supply of the equipment burning and unnecessary damage due to a sudden increase in voltage.
7. Once the grating used with power supply is damaged, do not link it with other brands of grating, every company has products of different characteristics, indicators and different ways of wiring. Without the guidance of technician, the digital display cannot be connected with other kinds of grating, otherwise it cause breakdown of the digital display.

Routine Maintenance

1. Before cleaning, switch off the power supply.
2. Clean the digital display and protective cover with a dry cloth or brush.
3. Do not clean the shell with toluene or ethanol.
4. The shell or display window of the digital display can be cleaned by mixing water and washing powder and drying the towel.

PARAMETERS

Parameter setup function

Instructions: before use, please setup the system parameters correctly according to the resolution of grating and installation directions. Please do not enter parameter setting state so as to avoid faulty operation, changing parameters that should not be set and affecting normal operation.

Parameter setup routine entrance

Turn on the digital display, during system initialization (0-9 appear), press 9 key and the command window will appear “EXIT”.

Parameter reset ‘ALL CLR’

After enter parameter setup, press ▲ or ▼ and observe the info window. After ‘ALL CLR’ item appears, press ENT key. The info window shows ‘waiting’ and there is a pause of 2mins. Then the info window will show ‘CLR OK’, which means that the parameter reset is finished. Usually when the digital display has malfunctioned or you forget which parameter has been set, you can use ‘ALL CLR’ to return to the original mode.

Shrinkage function setup (Parameter ‘SRK OFF’ sets up the openness and closeness of the shrinkage function).

Enter the parameter setup mode, press ▲ or ▼ key to select ‘SRK OFF’, press ENT key, the display will interchange between ‘SRK ON’ and ‘SRK OFF’.

Resolution Setup

Enter the parameter setup mode, press ▲ or ▼ key to select ‘RESOLUTE’, press ENT key and the character window will appear ‘0.005’ or ‘0.001’, which is the present resolution. Press X Y Z keys to set up the resolution of the X, Y and Z axis respectively. Each press will interchange between ‘0.005’, ‘0.01’ and ‘0.001’ in the character window, then select the resolution needed by pressing ENT key. Press ENT to return to the previous item.

Scale direction setup

Enter the parameter setup mode, press ↑ or ↓ key to select ‘DIRECT’ item. Press ENT key, the display will change to ‘SEL AXIS’, press X Y Z to change the direction of the X, Y and Z respectively. Press ENT to finish setup.

‘Lin Comp’ setup

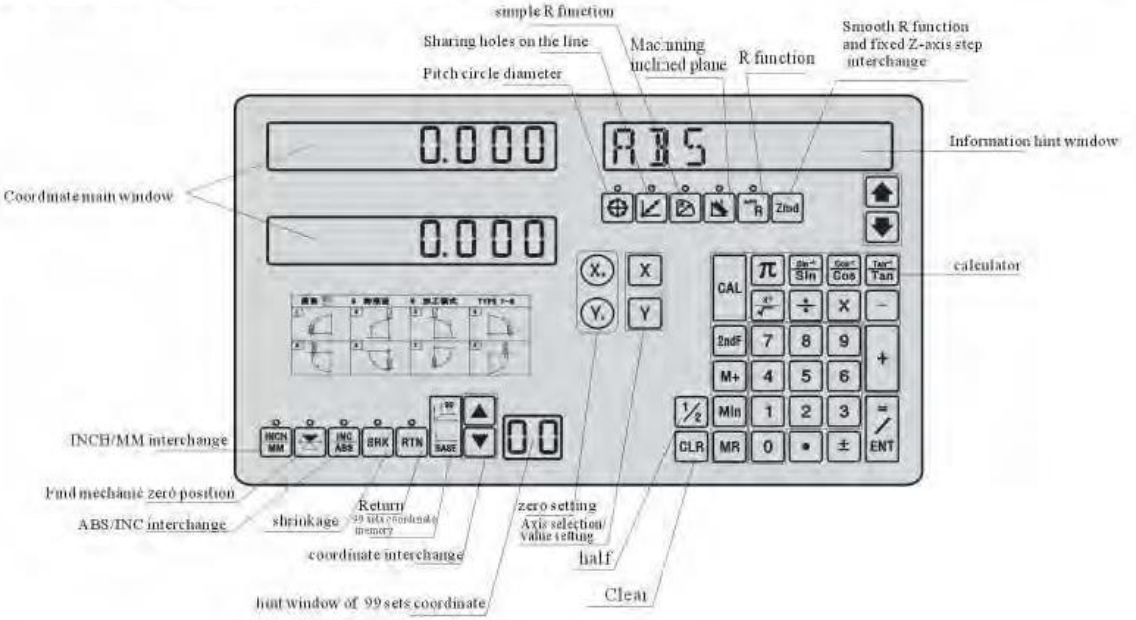
Enter the parameter setup mode, press ↑ or ↓ key to select ‘LIN COMP’ item. Press ENT key to enter the ‘LIN COMP’ setup function. The info window will appear ‘ENTER PPM’ and the character window will appear ‘0.000’. Press X Y Z to select the axis needed to change. Input the correct value of the selected axis (when error is +/- 0.01, input value is +/- 100, error +/- 0.03, input value +/- 300). Press ENT key to confirm the operation.

Exit parameter setup

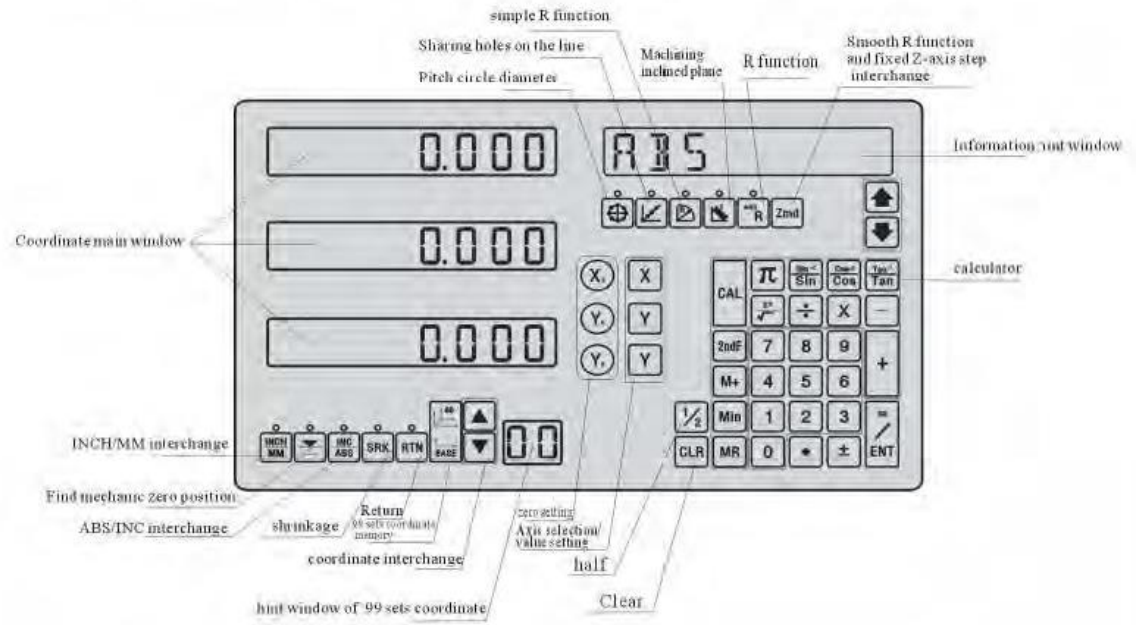
After the above operation is finished, press ↑ or ↓ key to select ‘Exit’.
Press ENT key to exit parameter function and return to normal mode. You can also switch off and turn on the display.

INSTRUCTION ABOUT THE PANEL AND BUTTONS

Two axis panel function key distribution



Three axis panel function key distribution



BASIC FUNCTION

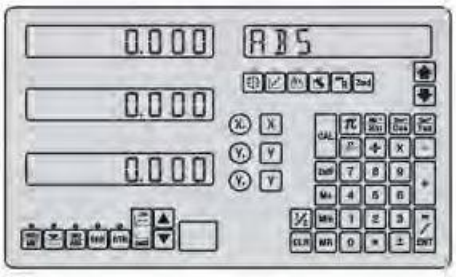
Clear: set to zero

Function: set to zero at any position.

Press X0 → X axis set to zero

Press Y0 → Y axis set to zero

Press Z0 → Z axis set to zero

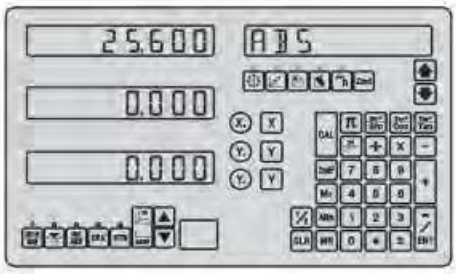


Input coordinate

Function: set any value to the present position of the machine.

Example: X axis set to 25.600mm

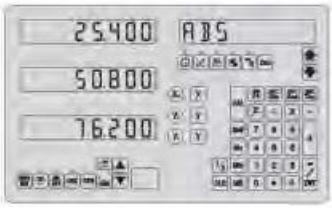
Press in order X 2 5 • 6 ENT



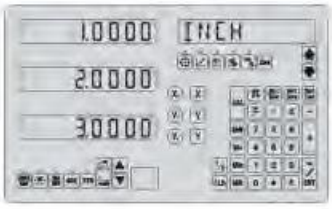
Metric/Imperial interchange

Function: mm or inch as the measuring unit.

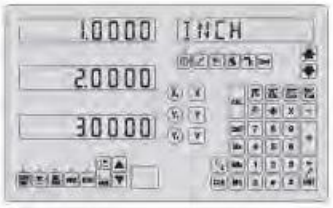
Example: Switch metric to inch



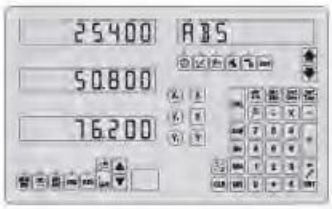
Press INCH/MM →



Example: inch to metric



Press INCH/MM →



ABS/INC coordinate

Function: digital display provides two sets of basic coordinate.
ABS (absolute) and INC (increment) display.
Operators can memorize datum point on ABS coordinate, and then change to INC coordinate to do the machining operation.
Clearing any position on INC coordinate will not influence the whole length that is within ABS and relative to the datum point of the workpiece. Within ABS, the whole length relative to the datum point of the workpiece will be stored in the whole process. Operators can check it any time.

Example: switch ABS to INCH

Example: switch INCH to ABS

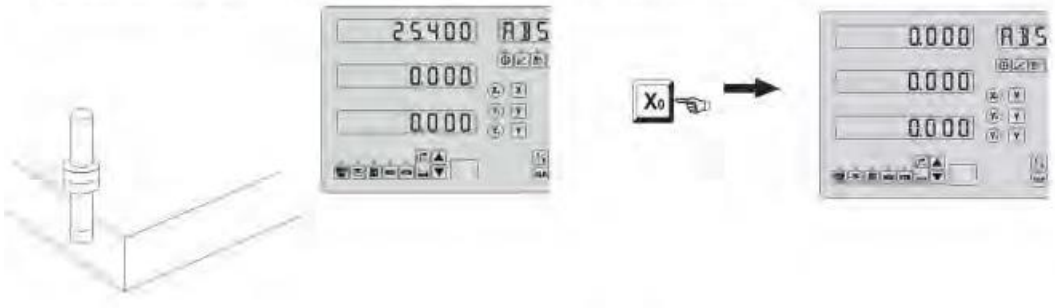
Automatic Half

Function: digital display provides automatic half function, the selected axis display is divided by 2 and zero point will be the centre of workpiece.

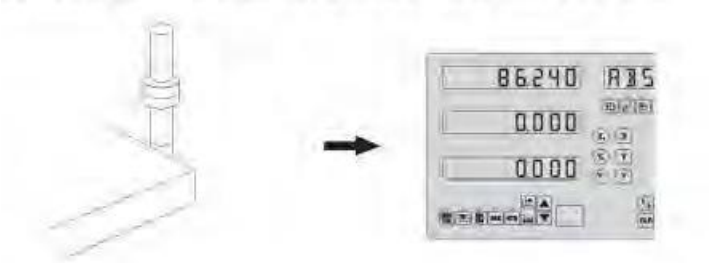
Example: set zero point of X axis as the centre of workpiece.

Operating Steps:

1) Locate the midsplit stick at one side of X axis and clear to zero.

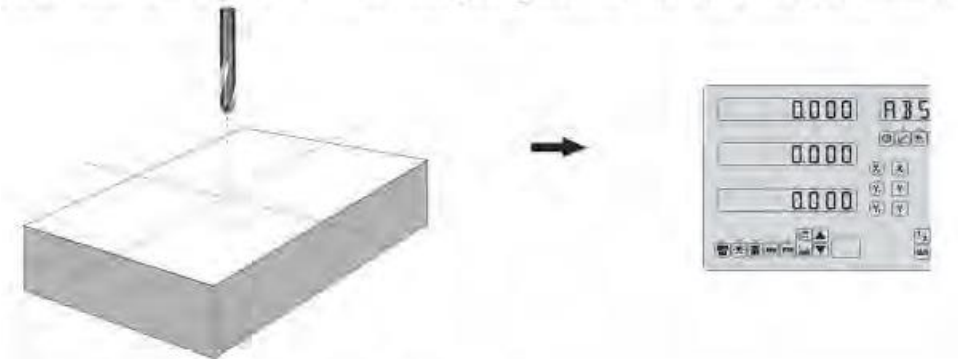


2) Locate the midsplit stick at the other side of X axis.



3) Press half function key and divide the present value of X axis by 2.

4) X axis centre of the workpiece is 0.000. Locate grating scale to 0.000 and it's the centre of the workpiece.



ZERO POINT MEMORY FUNCTION OF THE MACHINE

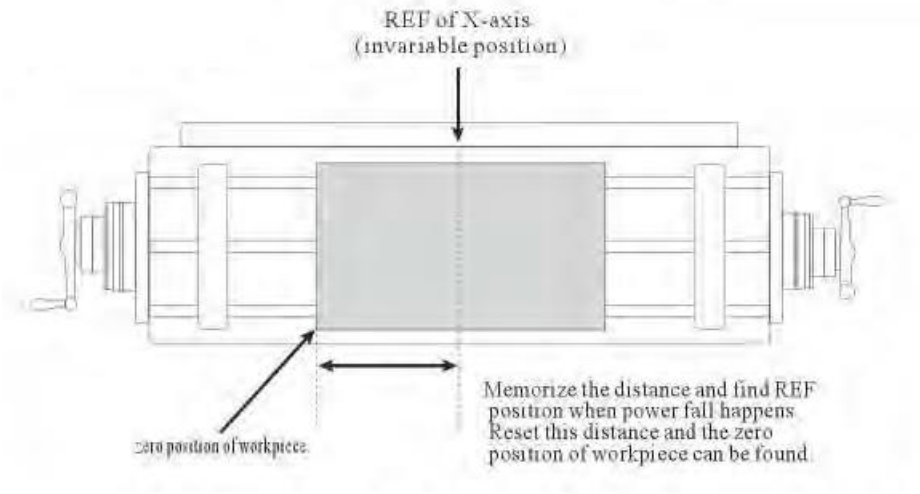
Re-establishing the workpiece zero position is very important during daily machining process when power fall happens. This function allows the user to catch and memorize the grating scale zero position (there is a fixed mark on the grating scale zero position) before processing. Users can restore the position when needed.

Principle of memorization of grating scale:

Every grating scale has an invisible zero position in the centre. We need only memorize the distance of zero position of the workpiece and grating scale. If the workpiece hasn't been dismantled during power off of the grating scale, the distance of zero positions of the workpiece and grating scale. Therefore, when restarting the grating scale, you only need find the zero point of the grating scale and reset the memorized distance of the zero positions of the workpiece and grating scale and the zero position of the workpiece will be found automatically.

CALCULATOR FUNCTION

Take X axis as an example:



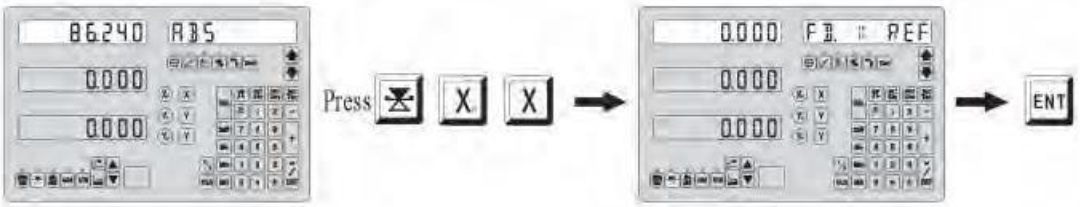
Function instruction: the digital display will clear to zero, half and input coordinates automatically in ABS mode. When the workpiece zero position function is affected, the distance of zero position of the workpiece and grating scale will be memorized automatically.

Therefore, users need only find the zero position of the grating scale before starting the digital display and machining. The digital display will memorize the centre position of the grating scale and process other data storage procedures automatically without manual operation.

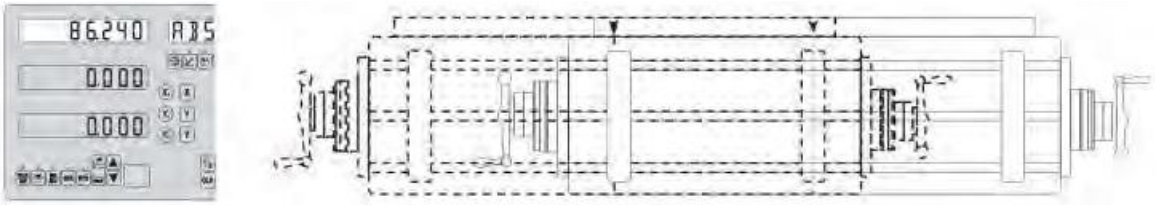
REF

Operating steps (X axis as an example)

Step 1: enter ABS function



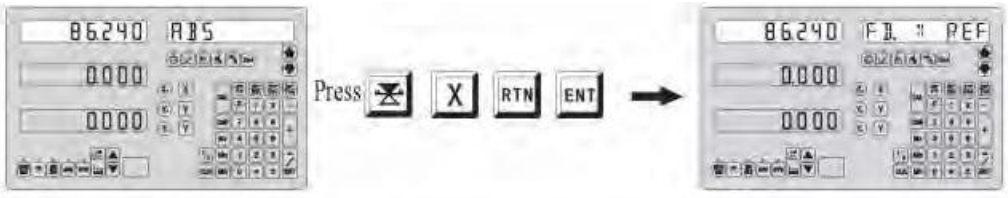
Step 2 let the workpiece pass the centre of scale until the number in the digital display starts hopping. The size shown in the digital display is the size relative to REF.



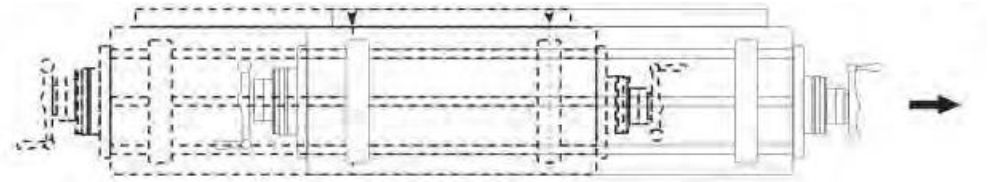
Recall zero

Operating steps:

Step1: enter ABS function

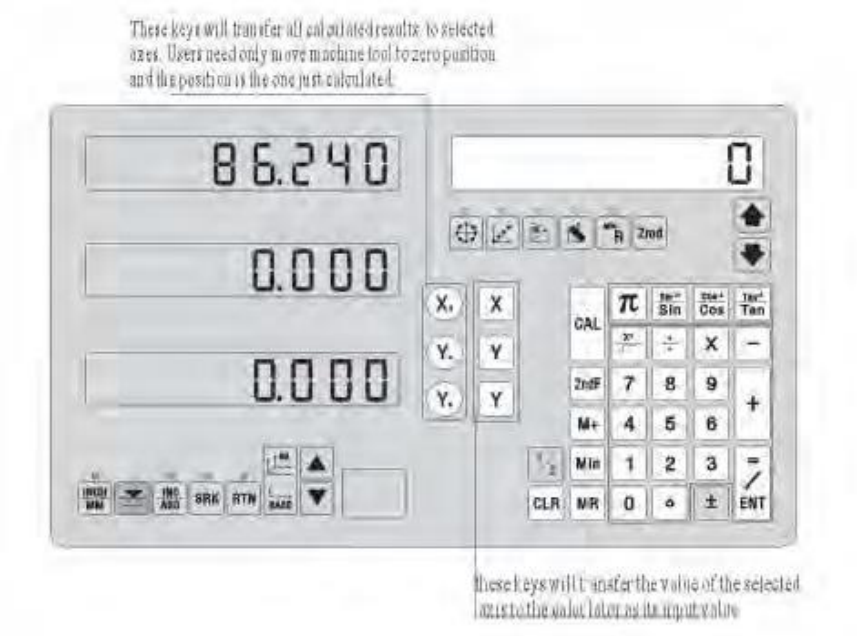


Step 2: let the machine tool pass the centre of the scale until the number in the digital display stops hopping. The size shown in the digital display is relative to the REF.



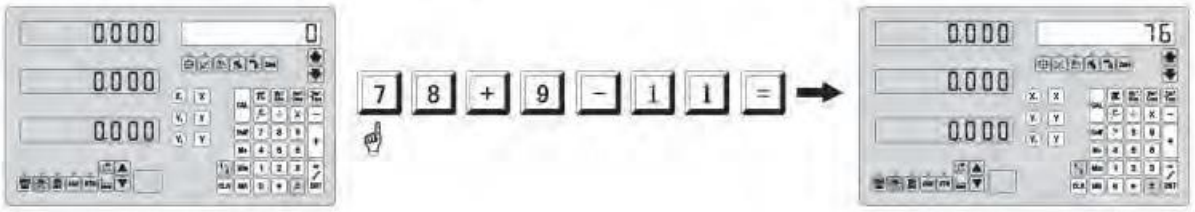
Calculator function

In daily machining, the most frequently used tool, except cutters, is calculator. The calculator of the digital display not only provides normal mathematical calculations such as ADD, SUBTRACT, MULTIPLY and DIVISION, but also provides useful trigonometric calculations that are frequently required during processes such as SIN, COS, TAN, SQR, inverse SIN, etc. Special RESULT TRANSFER function not only can pick up selected axis position counting value into the calculator as an operator, but also transfer all calculated result to selected axis. Thus users need only move the machine tool to zero and the position is the one just calculated.

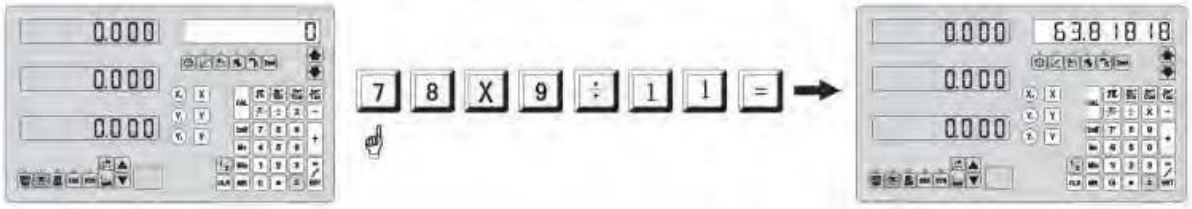


Calculator operating method

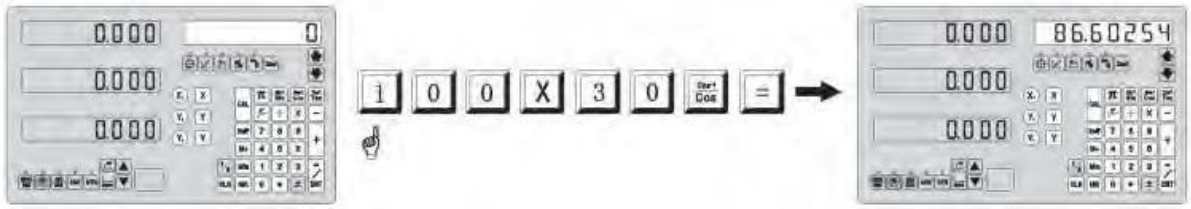
All operations are the same as a general calculator.
Basic ADD/SUBTRACT: 78+9-11=76



Basic MULTIPLY/DIVISION: 78X9/11=81738



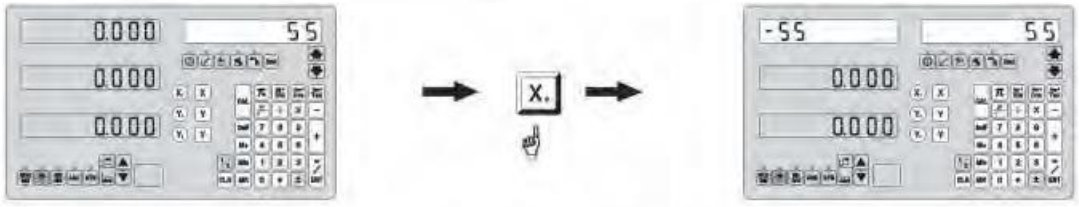
Trigonometric function operation $100\times COS30^{0}=86.6015$



Inverse trigonometric function operation: $SIN^{-3}0.5=30^{0}$

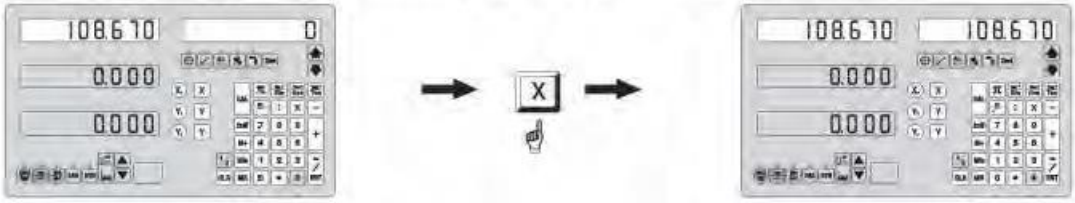
Transfer calculated result to selected axis

Transfer calculated result 55 to axis



Move X axis until display = 0.000, then the calculated position 55 is reached.

Press X to pick up X axis position as an operator into calculator.



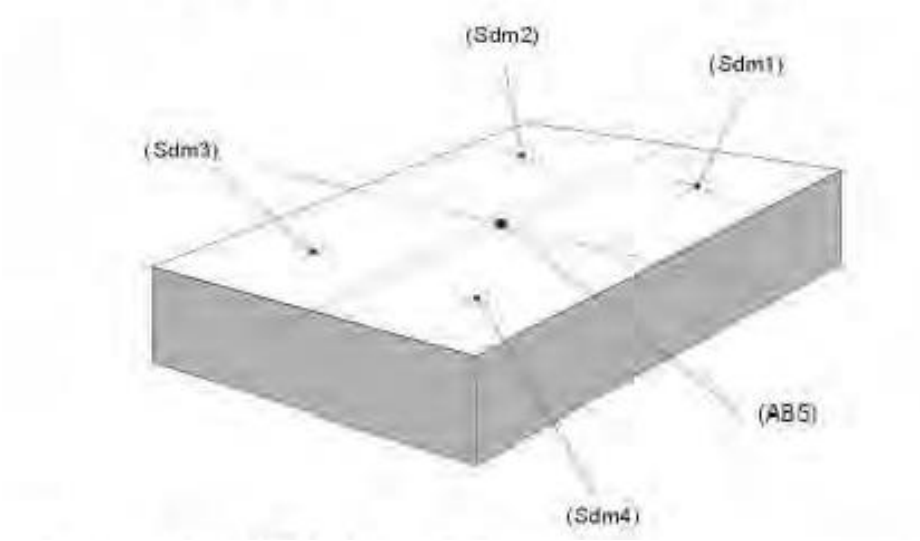
Using key CAL to end calculator function and return to normal mode.

99 SETS AUXILIARY POSITION FUNCTION

The digital display provides three coordinates: ABS, INC and 99 sets auxiliary coordinate which can be used as the zero position in the machining process with ABS as an absolute coordinate system. As the original datum point, 99 sets auxiliary coordinate is defined relative to ABS.

The digital display has a record window of user coordinate system to record these coordinate points, thus providing convenience for users. When the record window appears ‘00’, the coordinate point shown is the absolute coordinate zero point. When the record window appears ’01-99’, the coordinate shown is the user coordinate zero point. Users only need to press the  key to let the record window appear ‘00’ and move the workpiece until ‘0.000’ appears, which is the basic zero position of the workpiece.

Attention: under ABS coordinate and except setting basic zero position, users should not clear the coordinate to zero. Otherwise, basic zero position will change.



99 sets auxiliary coordinate (SDM coordinates)

- Useful in case of batch machining of repeat work and workpiece machining has more than two coordinates.
- Based on ABS zero point, setting and storing all referential zero point.
- Press  or  coordinate selection key to select xx coordinate zero point, move machine tool until ‘0.000’ which is the zero point appears.

Example:

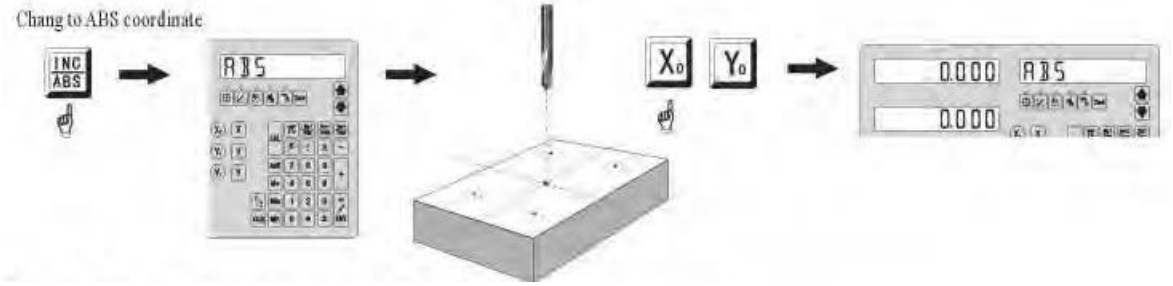
If 4 sets SDM coordinates (SDM1-SDM4) are needed on the workpiece, two methods can be used.

1. Set to zero after one SDM coordinate zero reached
2. Set dimensions of SDM coordinates zero position directly.

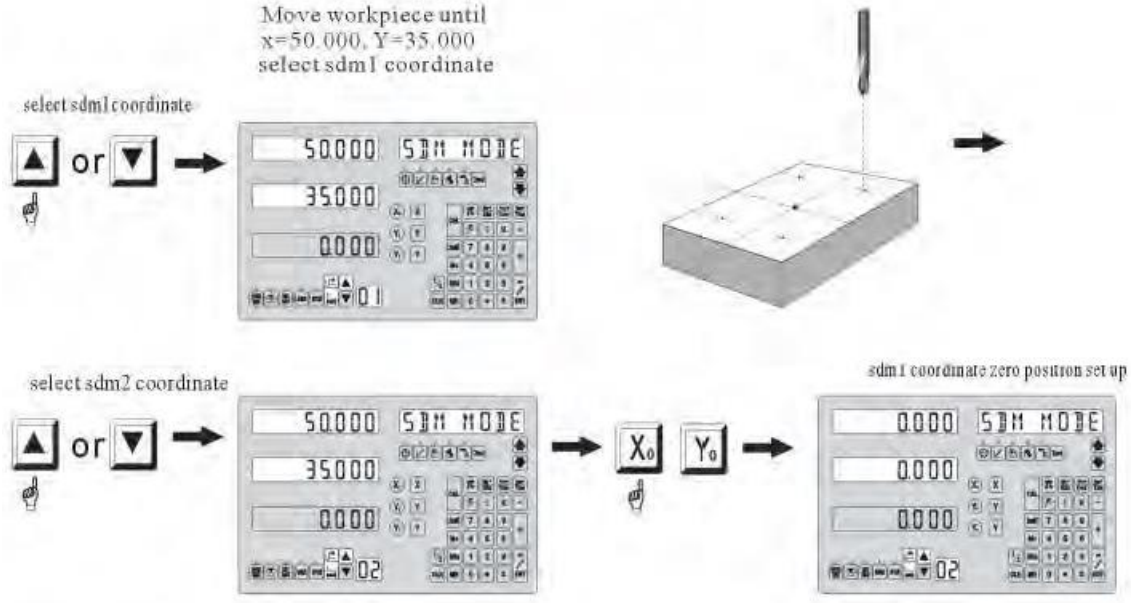
Method 1:

Clear the display to zero when the SDM coordinate zero position is reached. Under ABS coordinate, set basic zero position of the workpiece and move the workpiece to each auxiliary zero position, then press X and Y, thus memorizing zero position.

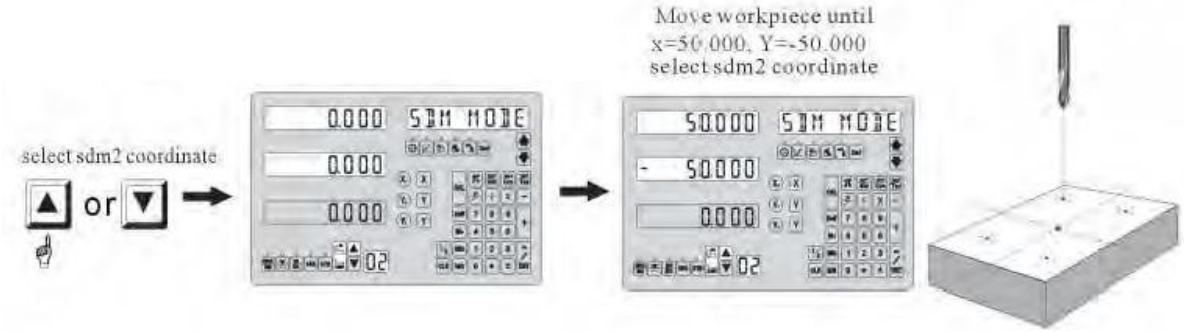
Step 1: Set workpiece ABS zero position.

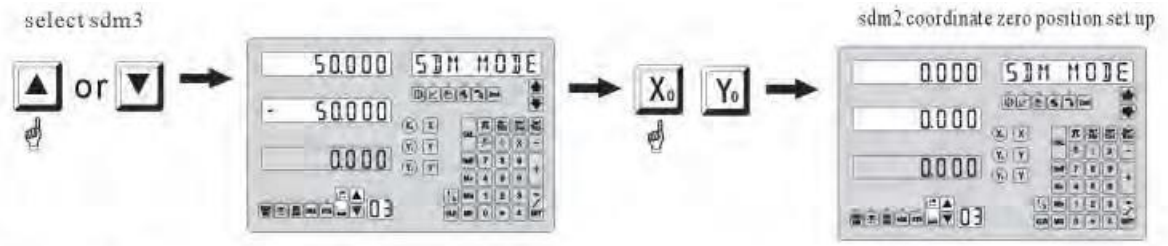


Step 2: the first point

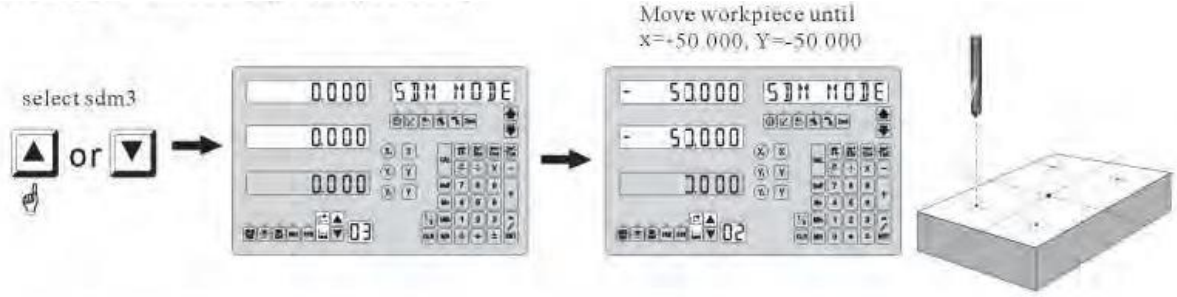


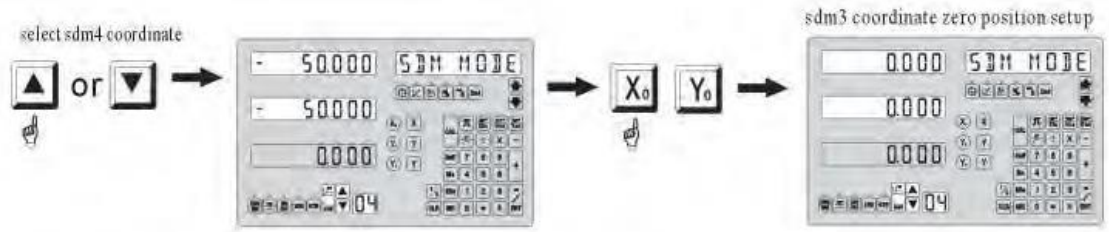
Step 3: the second point (SDM2)



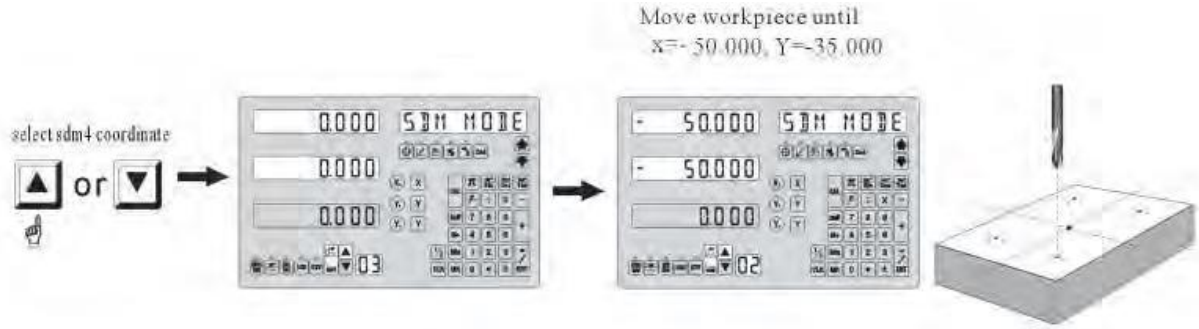


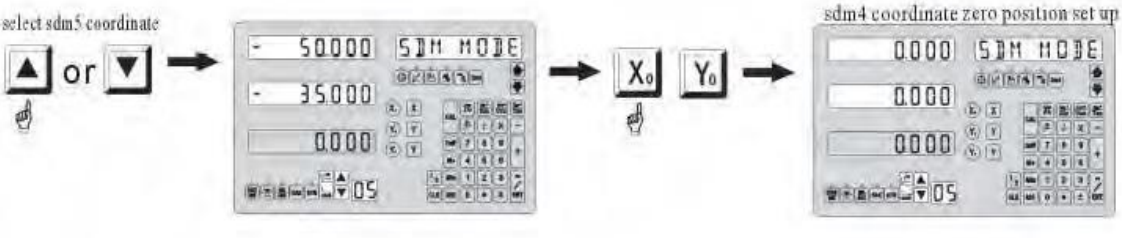
Step 4: The third point (SDM3)





Step 5: the fourth point (SDM4)

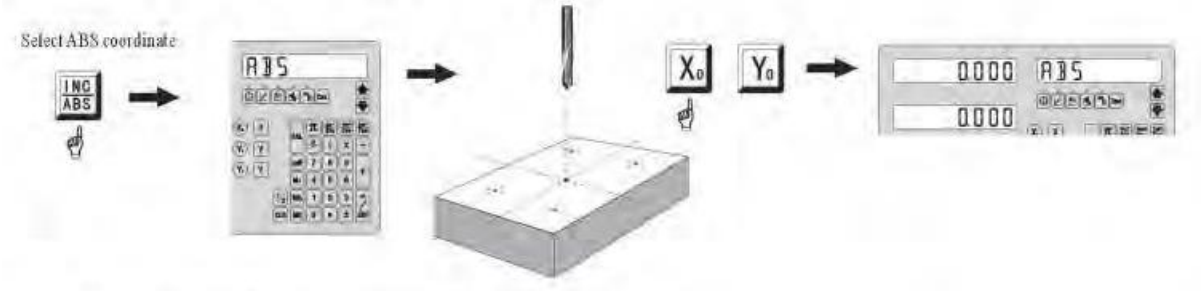




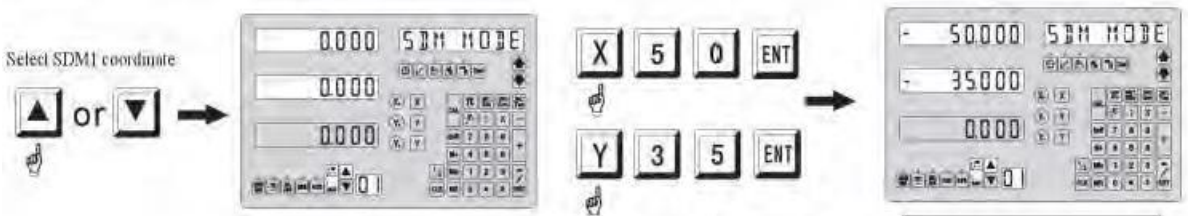
Method 2: Press SDM coordinate zero position

SDM keyboard input method moves the workpiece to ABS zero position directly after workpiece basic zero position of ABS coordinate is setup, then all the SDM zero coordinate is input by keyboard

Step 1: set workpiece ABS zero position

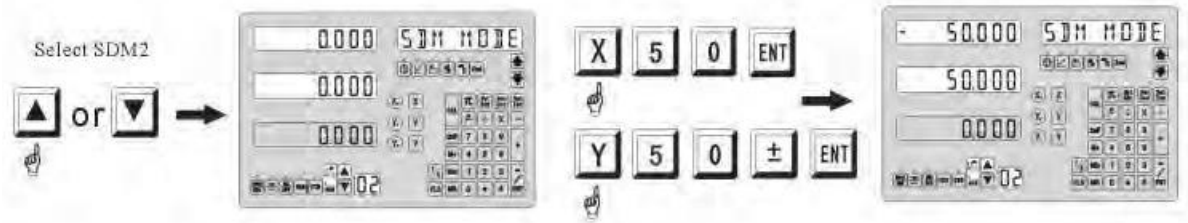


Step 2: Set the first point (SDM)



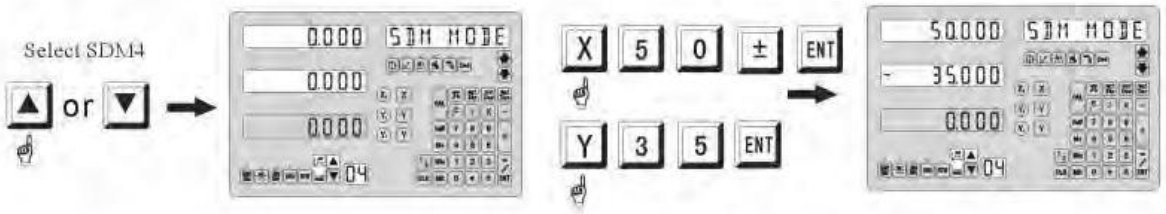
Attention:
when input SDM zero position, the coordinate shown is opposite to the input coordinate, which is normal and correct. The reason is that the machine tool is in the ABS zero position. The display is relative to SDM zero position, so the coordinate shown is positive-negative opposition.

Step 3: set the second position



Step 4: set the third position

Step 5: set the forth position

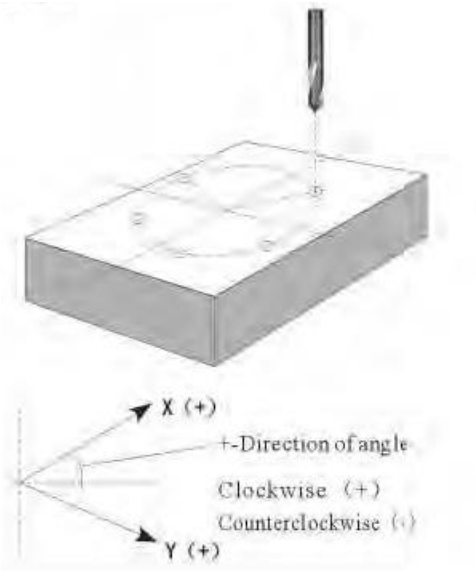


After pre-set all SDM coordinate zero position, user can use ▲ or ▼ key to select them.

PITCH CIRCLE DIAMETER (PCD) FUNCTION

The digital display provides convenient PCD function
Users need only enter the following:

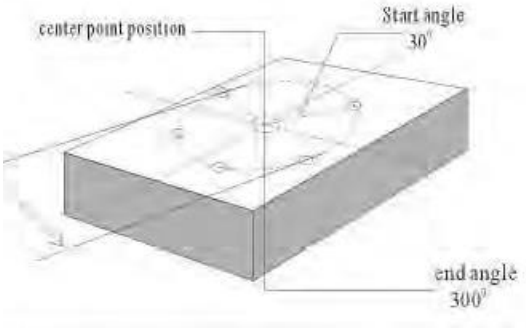
- Centre of the circle (CENTER)
- Diameter (DIA)
- Number of Holes (NO.HOLE)
- Start Angle (ST.ANG)
- End Angle (END.ANG)



After the above parameters have been entered into the display, it will calculate and pre-set all divided holes (number of holes) on the circle. Users can move ⬆ or ⬇ key to select one of the holes and move the work piece until display = 0.000. This hole's cutting position is locked.

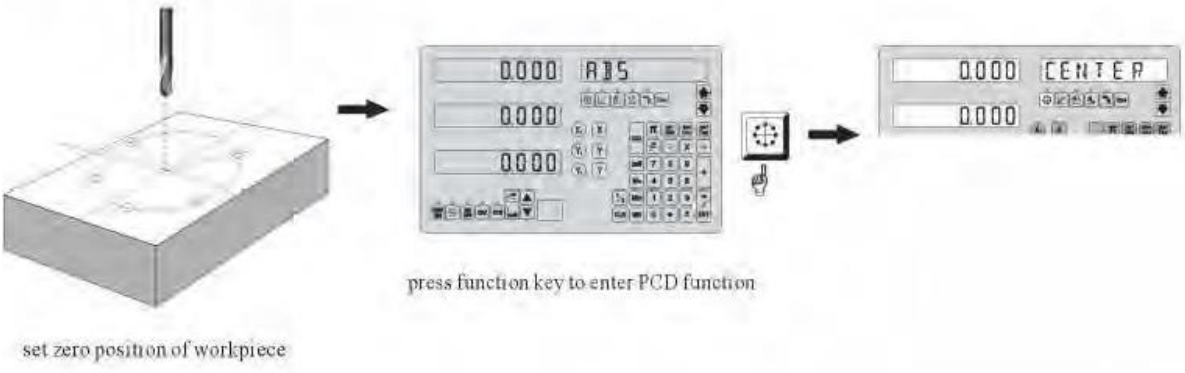
Example:

Center Coordinate (Center)---X=0.000, Y=0.000
Diameter (DIA)---80,000mm
Number of Holes (NO.HOLE)---5
Start Angle (ST.ANG)---30degree (clockwise)
End Angle (END.ANG---300degree (clockwise)

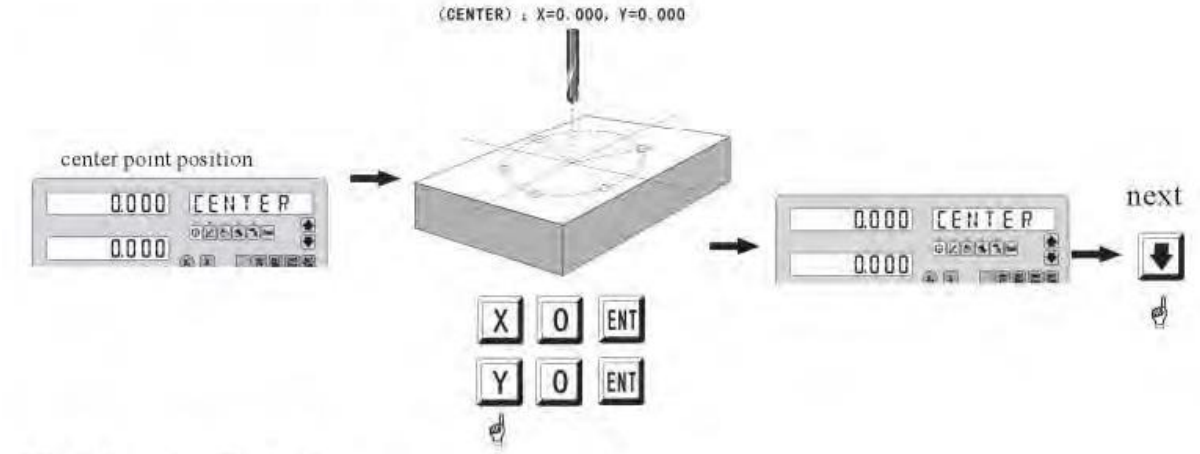


Attention: the above example is to share holes on an arc. If the sharing holes takes on a circle, the start angle is 0degrees and the end angle is 360degrees.

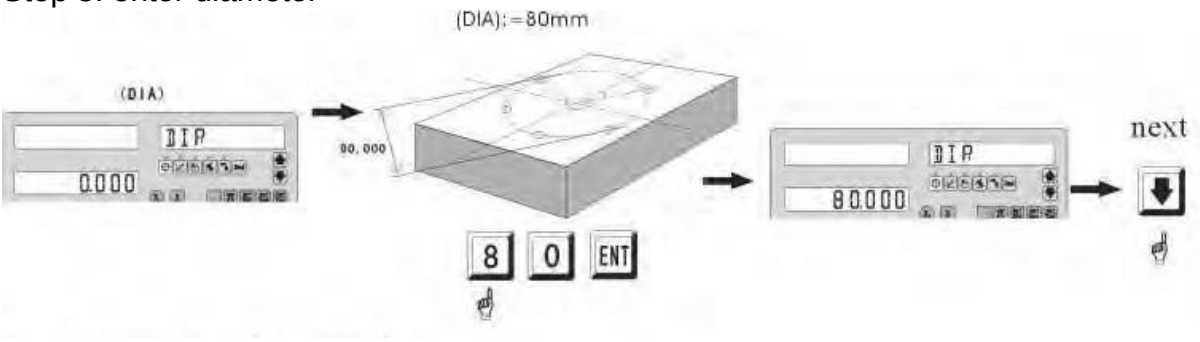
Step 1: set the workpiece zero position and press ⊕ to enter PCD function.



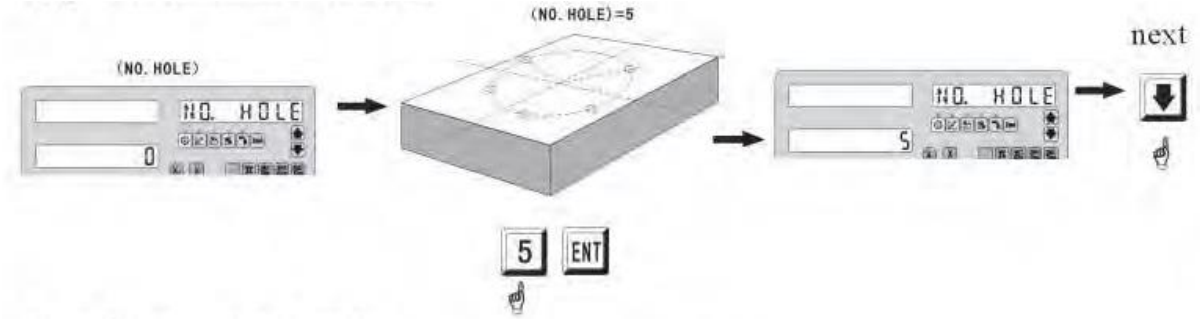
Step 2: enter center position



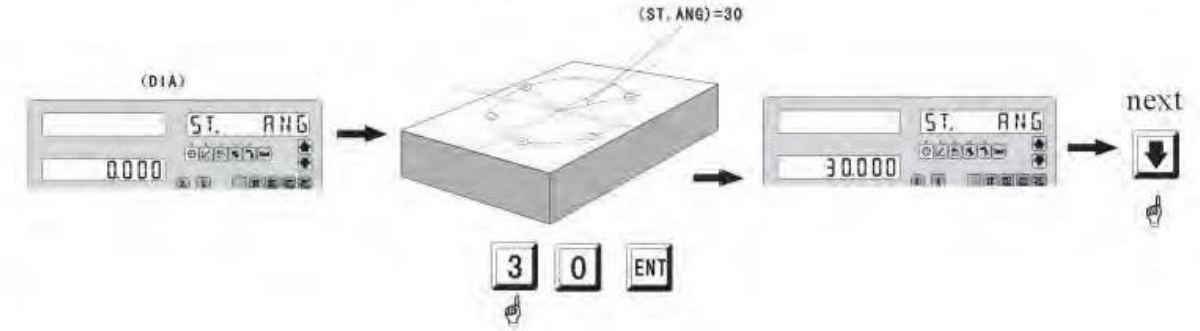
Step 3: enter diameter



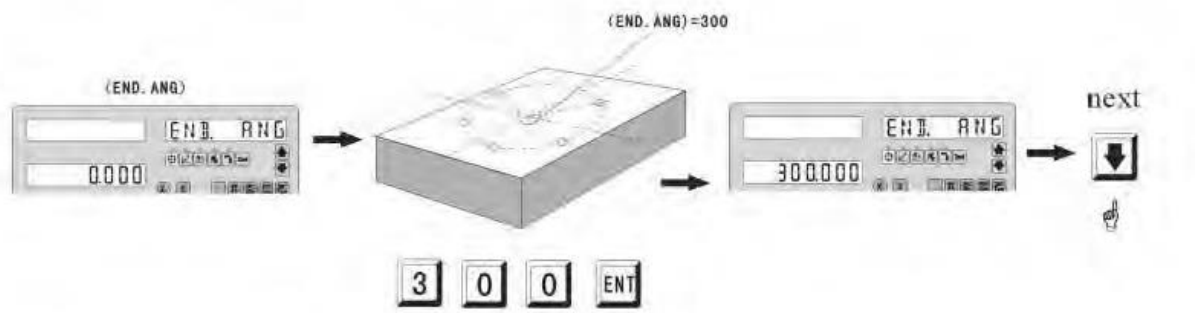
Step 4: enter the number of holes



Step 5: enter start angle



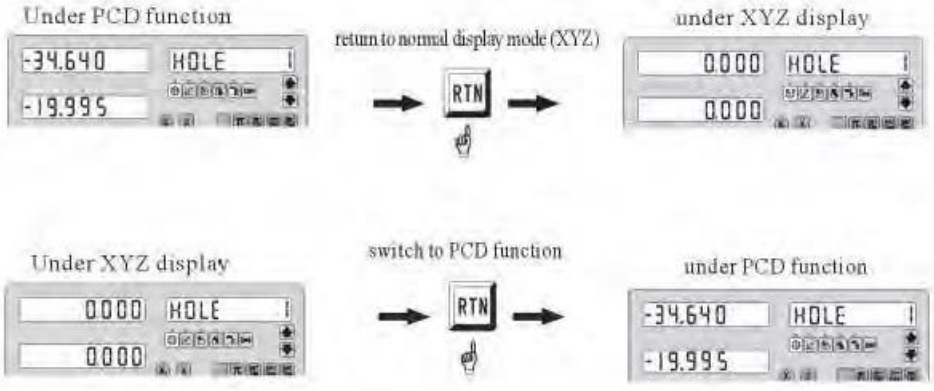
Step 6: enter end angle (END.ANG) =300



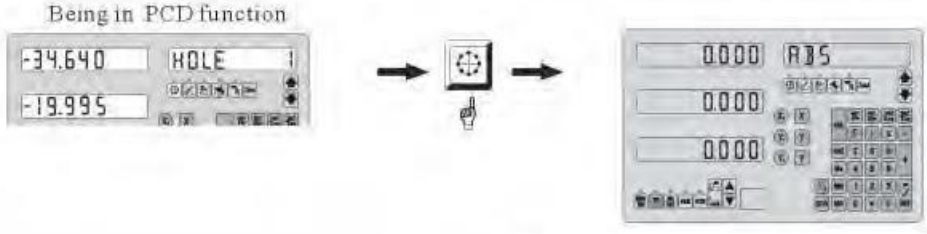
After entering all the parameters on the PCD, press key to enter in the machining mode.

Using or to select one of the holes, move the workpiece until the axis point to 0.000 to get the position of the circle diameter holes.

User can return to normal mode (XYZ) and temporarily exit PCD mode to check the calculated position at any time.



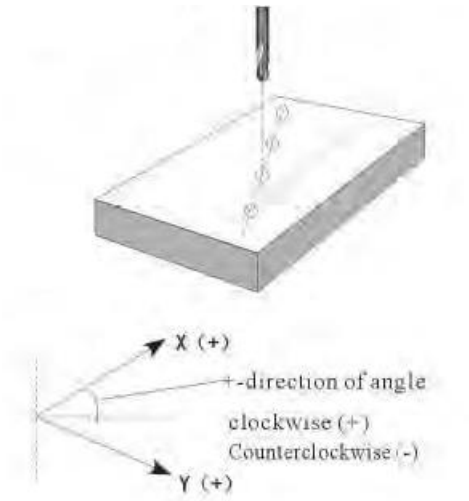
Finish PCD function and return to normal mode.



SHARING HOLES ON THE (SHL) FUNCTION

The digital display provides convenient SHL function.
Users need only enter the following:

- Length of the line (LIN DIST)
- Angle of the line (LIN ANG)
- Number of holes (NO.HOLE)

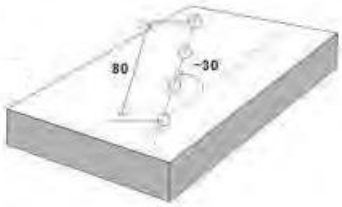


After all the parameters are set, the digital display will calculate the position of the holes on the line.

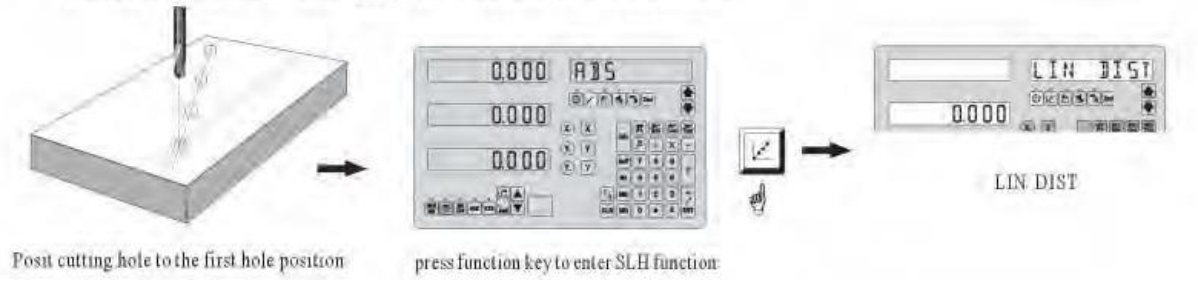
Users need only press ↑ or ↓ key to select one of the holes. Move the workpiece until the axis display 0.000, which is the position of the hole.

Example:

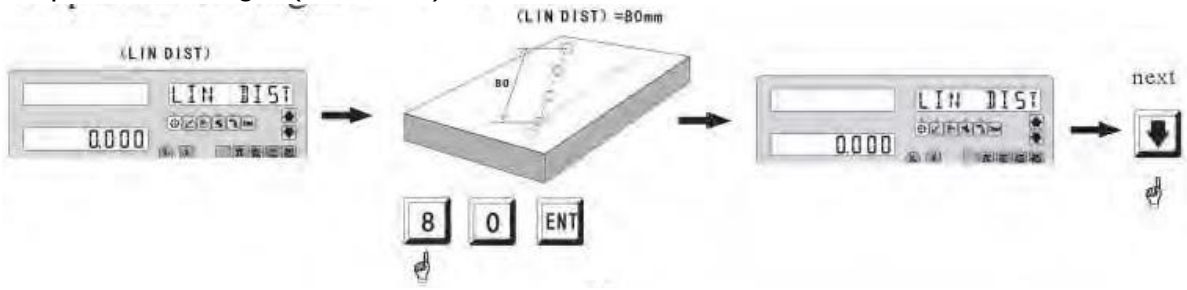
Length of the line (LIN DIST)---80mm
Angle of the line (LIN ANG)---30 degree
Number of holes (NO.HOLES)---4



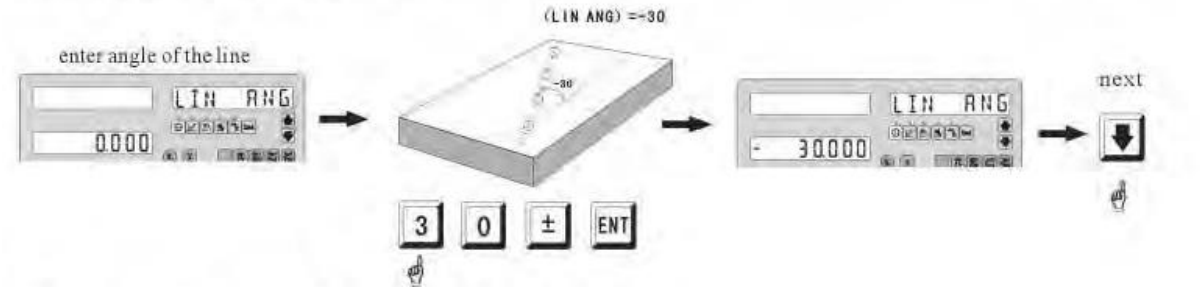
Step 1: Move the workpiece until the cutting hole posits to the first hole position, then press ↙ to SHL function.



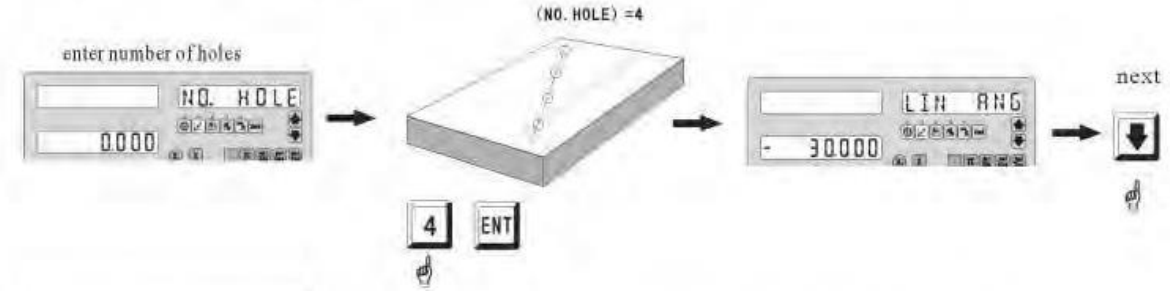
Step 2: enter length (LIN DIST)



Step 3: enter the angle of the line



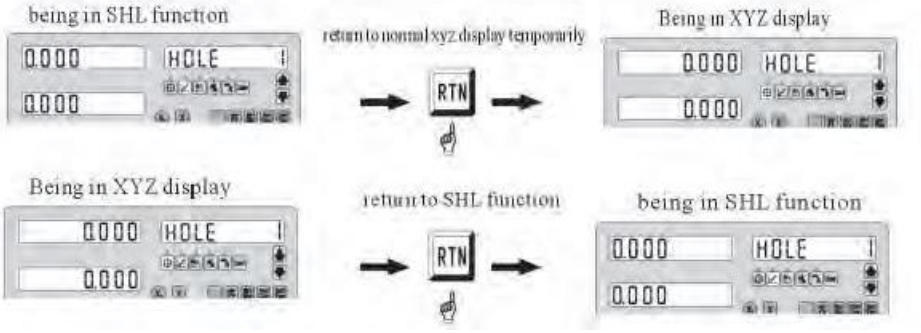
Step 4: enter the number of holes



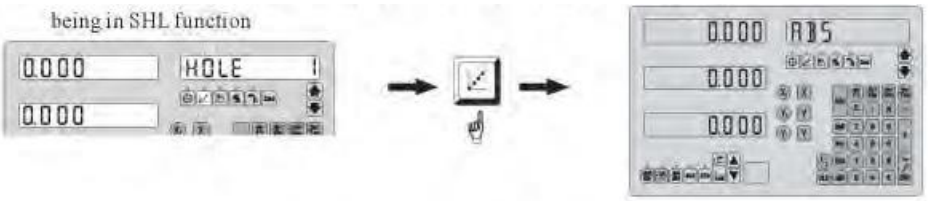
After entering all the parameters on the SHL, press ▼ key to enter machining mode.

Using ▲ or ▼ to select one of the holes. Move the workpiece until the axis display 0.000 to get the correct position.

Users can return to the normal (XYZ) and temporarily exit SHL mode to check the calculated position at any time.



Finish SHL function and return to normal mode.

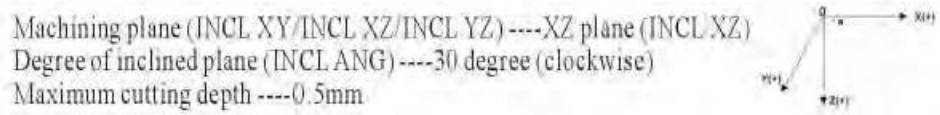


MACHINING INCLINED PLANE FUNCTION

The digital display provides convenient machining inclined plane function.
Users need only enter the following:

- Machining plane selection (INCL XY/INCL XZ/INCLYZ)
- Enter the degree of inclined plane (INCL ANG)
- Enter the maximum cutting depth (MAX CUT)

Example:

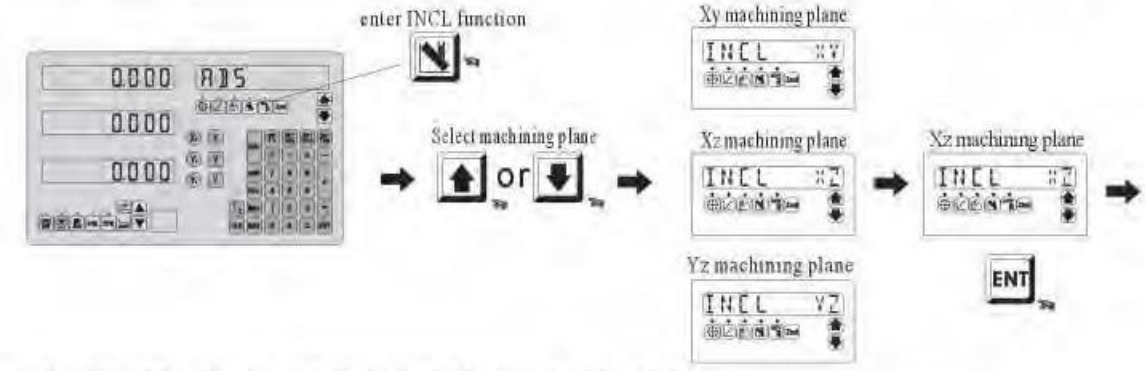


Firstly, fasten the workpiece on the machine tool and adjust the turning tool to 45degree. Then set the spring tab of Z axis as '0.000'

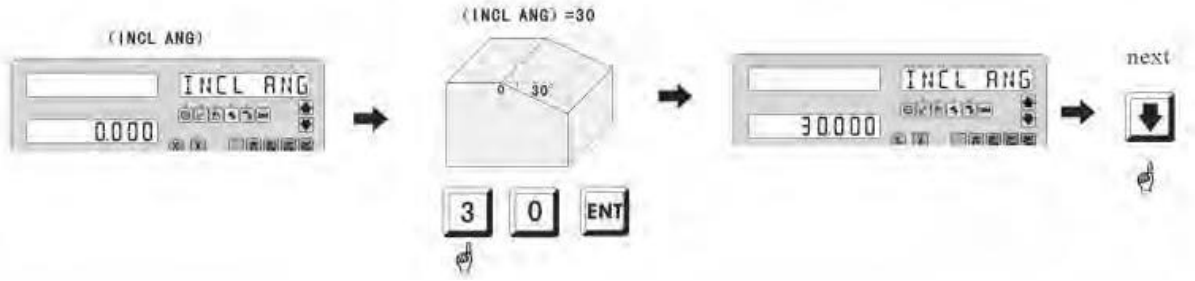
Enter the data of inclined place

Operating Steps

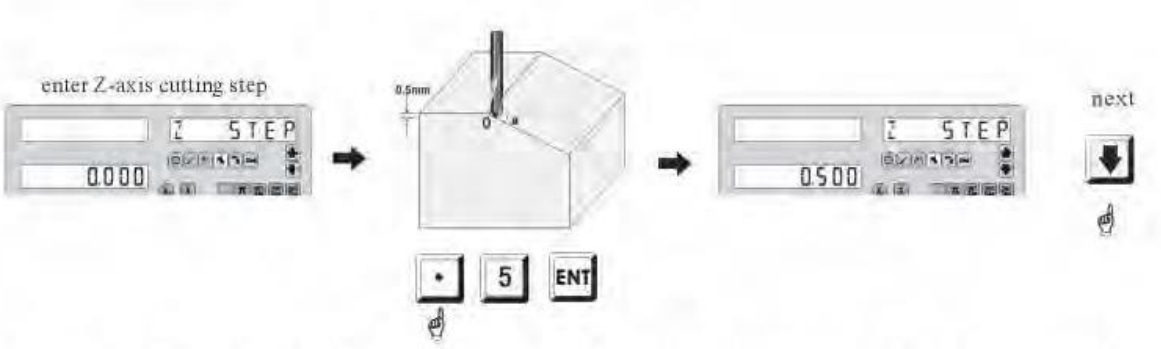
Step 1: enter the machining inclined plane function and select inclined XZ plane function.



Step 2: enter the degree of inclined plane

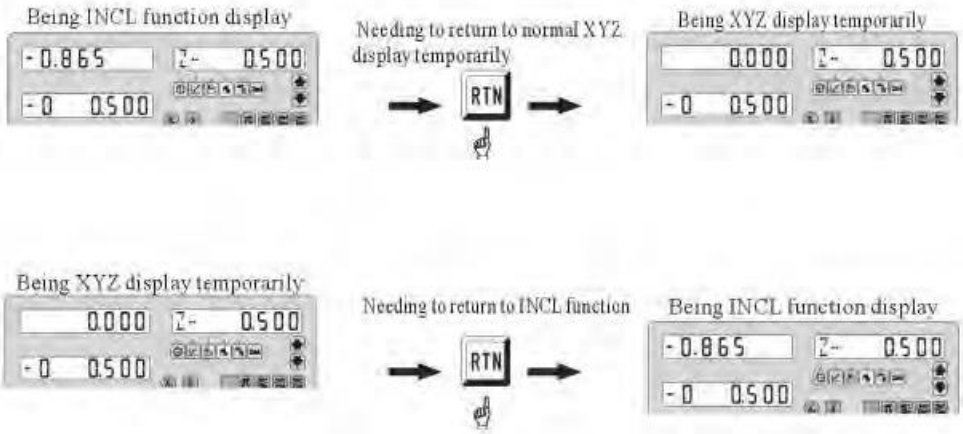


Step 3: input cutting depth of Z axis

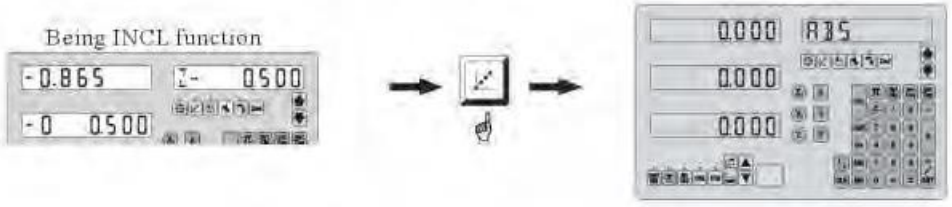


Since no Z axis is on the bi-axis digital display, ⬆ and ⬇ keys are used to set the Z axis position with emulated mode. By pressing the key ⬆ the machine tool is moved up one grade with emulated mode. By pressing the ⬇ key, the machine tool is moved down one grade with emulated mode. Before machining, move the Z axis of the machine tool to the initial Z axis position of the inclined plane and then set the spring tab of machine tool Z axis as '0.000'. The emulated Z axis position is shown on auxiliary display.

For checking the position computed in the digital display, the operator may make the digital display temporarily return to normal XYZ display from inclined plane machining mode (or function) at any time.

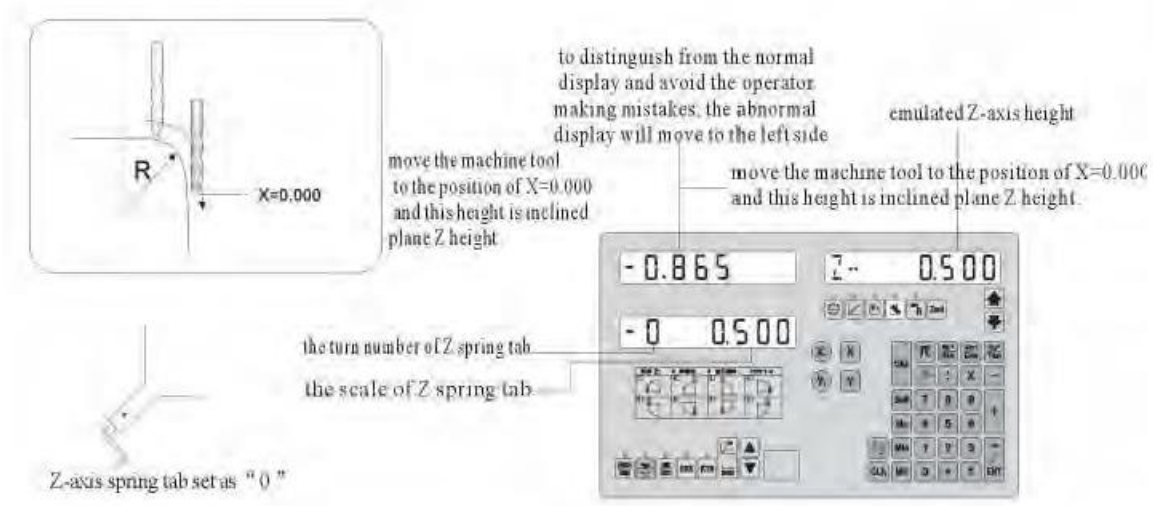


Returning to normal display after finishing INCL machining



The display and operation of bi-axis under INCL function

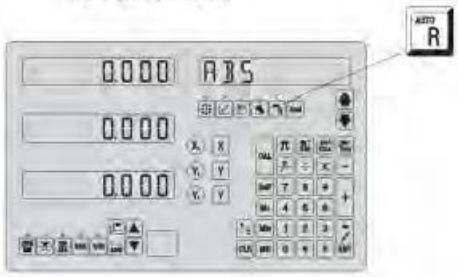
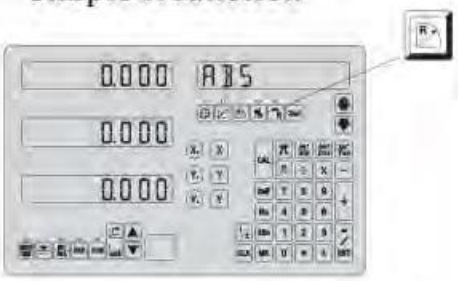
Since there is no Z axis on the bi-axis digital display, it has to display the spring tab scale and its turn number of Z axis in the way of emulation on the unoccupied axis. In the course of working, the initial point height of inclined plane on Z axis is set as '0.000' and in the working course of inclined plane, the spring tab scale and its turn number are automatically transformed from the current machining height of Z axis, which will lead the operator to complete the processing easily.



Note: the above is the operating instructions of the inclined plane function on two axis digital display. Inclined plane function of three axis display, except XY cutting plane, XZ and YZ need not input the cutting step as well as press or .
Select cutting step and move Z axis of grating directly, i.e. the cutting step of Z axis. The coordinate of X or Y will change with the cutting step and move the value to 0.000, i.e. the position of the machining.

R FUNCTION

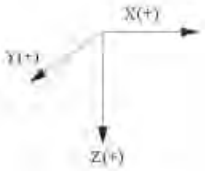
The R function set of this digital display has two R functions, namely R function and Simple R function.

R function	simple R function
	
R function: operator can use R function to process the most complete arc, even arc connecting arc. Advantage: processing the most complete arc, even extremely complicate arc connecting arc. Disadvantage: operation is complicate. Operator should know basic coordinate system in order to compute the starting point, end point and center point of R.	Daily machining arc by manually operated milling machine is simple. However, it may take one month to process one or two arcs by manually operated milling machine. Simple R function needs no computation and can process arc easily. Advantage: direct and simple operation. Operator needs not to know any calculator function or basic coordinate system Disadvantage: only 8 commonly used types can be processed. Comparatively complicate arc cannot be processed.

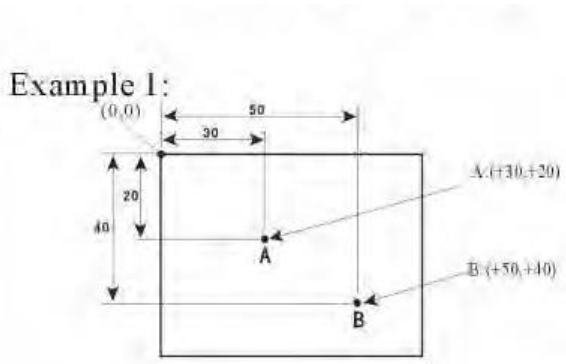
Coordinate system:

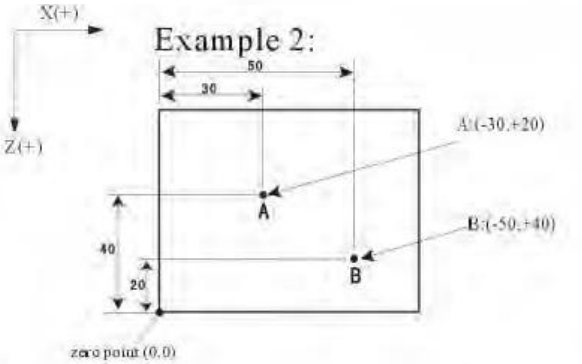
What is a coordinate?

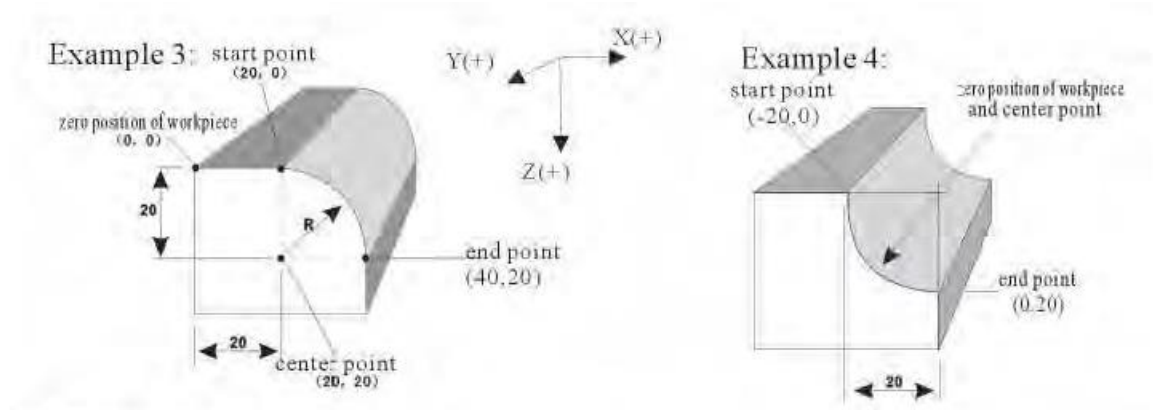
A coordinate is a way to express a position. In plane machining, every set of coordinates has two values and the distance is relative to the zero point of the plane.



The following are simple examples.

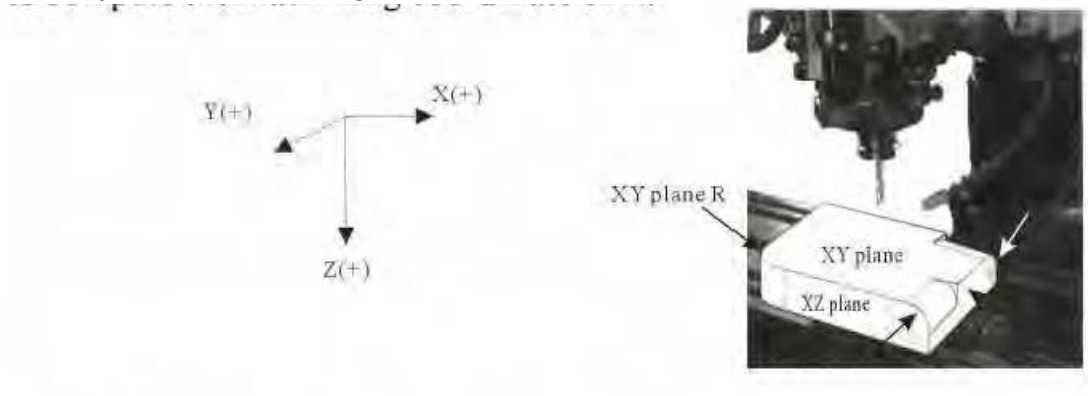






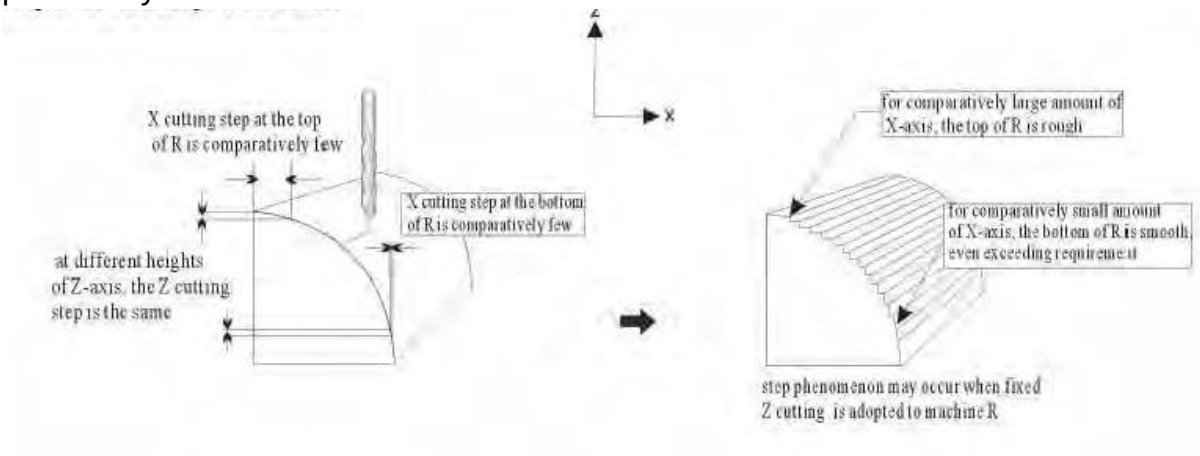
Plane machining:

R function can process arc in XY plane, XZ plane and YZ plane. When using R function, the operator needs to select the plane to machine and use the digital display to compute the machining coordinate of R.

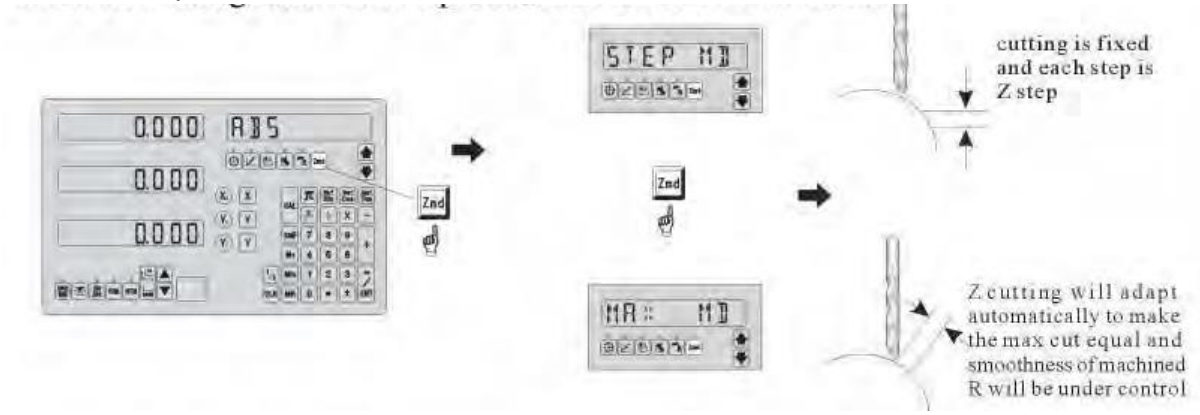


Smooth R function and fixed Z axis step.

Because of the geometric shape of R, the amount of machining is different when Z axis is at different heights. If fixed cutting of the Z axis is adopted to machine R, step phenomenon will appear. When processing small radius R, the disadvantage is particularly evident.



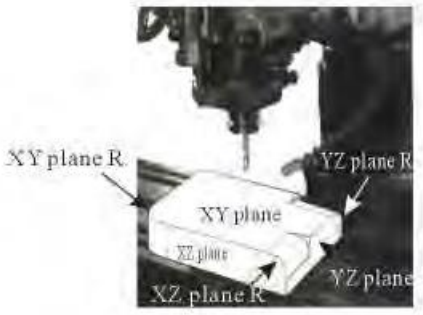
Smooth R function solves this problem perfectly. Smooth R function adopts calculus method and calculates the best cutting of Z axis. Press Znd repeatedly and it will change between step mode and fixed Z axis mode.



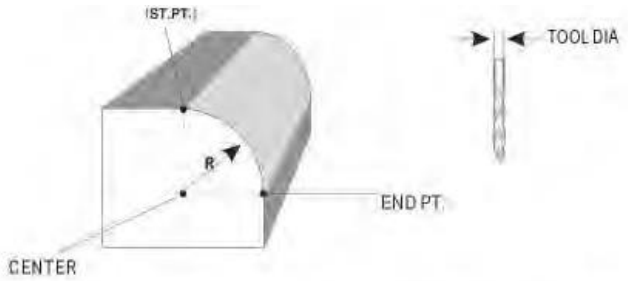
Attention: after the above selection is finished and enter R function or simple R function, the cutting of Z axis will step according to the mode selected.

When using R function, the operator needs to input the following data:

1. Select machining plane XY, XZ or YZ plane.

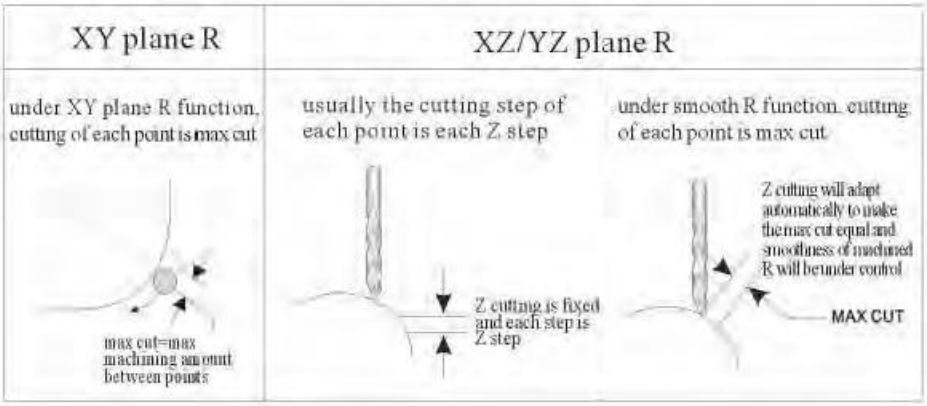


2. Center point of R (XY CENT/XZ CENT/YZ CENT)
3. Radius
4. Starting point of R
5. End point of R
6. Tool diameter
7. Select R+Tool or R-Tool



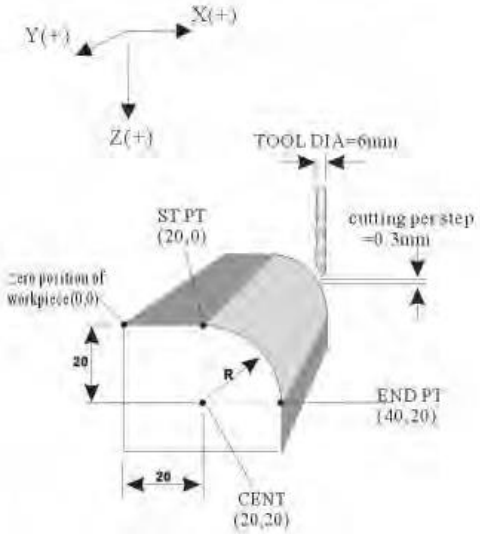
	Outside R+TOOL	Inside R-TOOL
XZ/YZ plane R		
XY plane R		

8. Maximum cut/ Z step



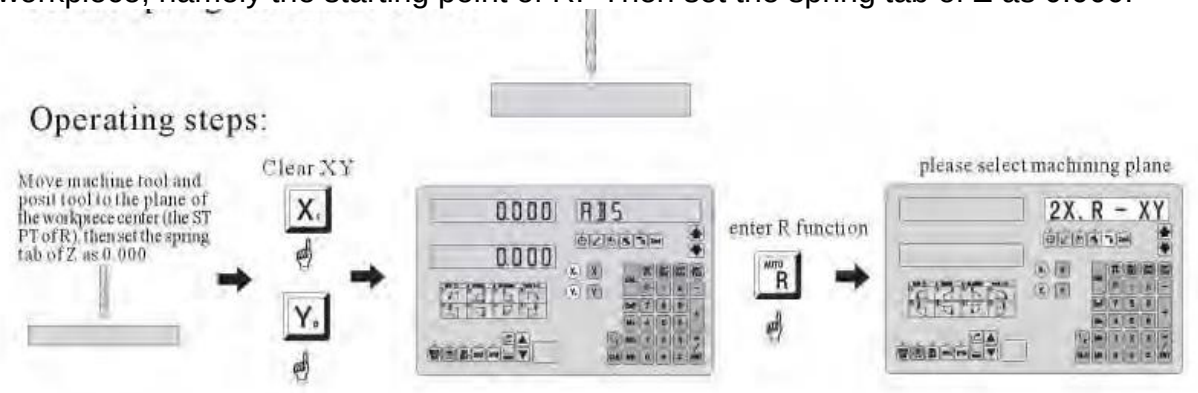
Example:

When using two-axis digital display and processing the following R, use R function of two axis digital display and input the following data:



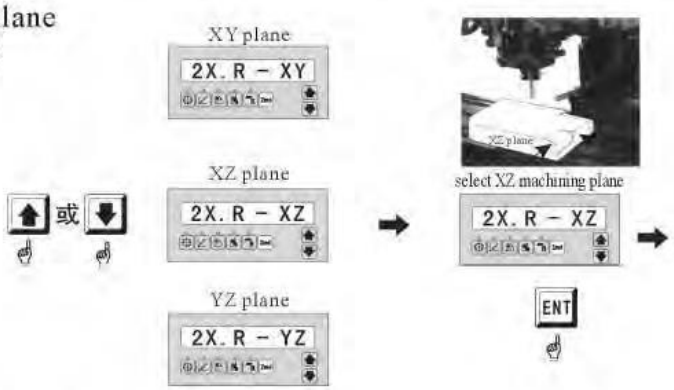
1. Select XZ plane to process R (2X R XZ)
2. Center point position (XZ CENT)---X=20,000, Z=20,000
3. Radius---20,000
4. Starting point---X=20,000, Z=20,000
5. End point---X=40,000, Z=20,000
6. Tool diameter--- 6.000mm
7. Select R+Tool, since practical arc is the radius of R+Tool
8. Cutting of each Z step---0.5mm

First, fix the workpiece on the machine tool and posit the tool to the center of the workpiece, namely the starting point of R. Then set the spring tab of Z as 0.000.

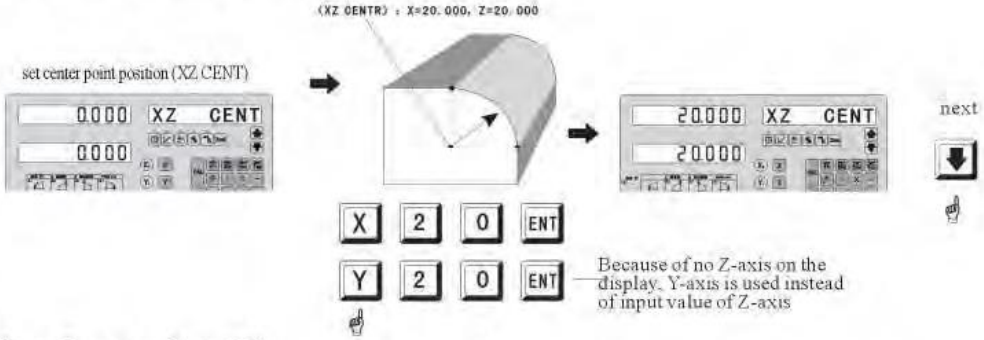


R function

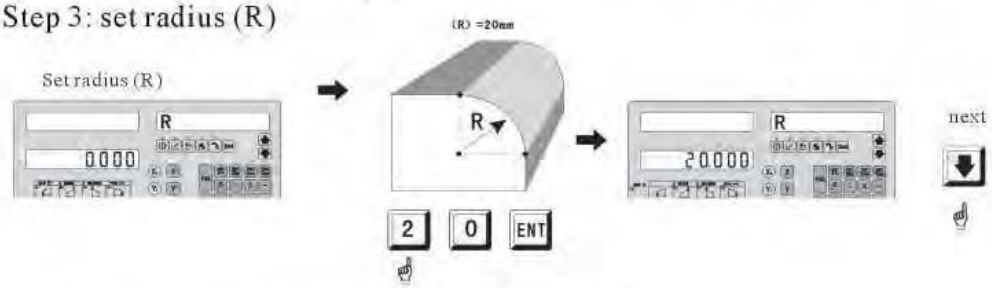
Step 1: select XZ plane
(2X.R-XZ)



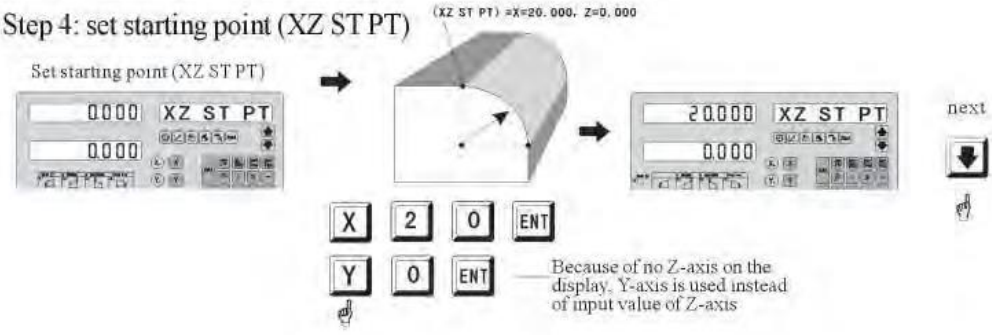
Step 2: set center point position (XZ CENT)



Step 3: set radius (R)

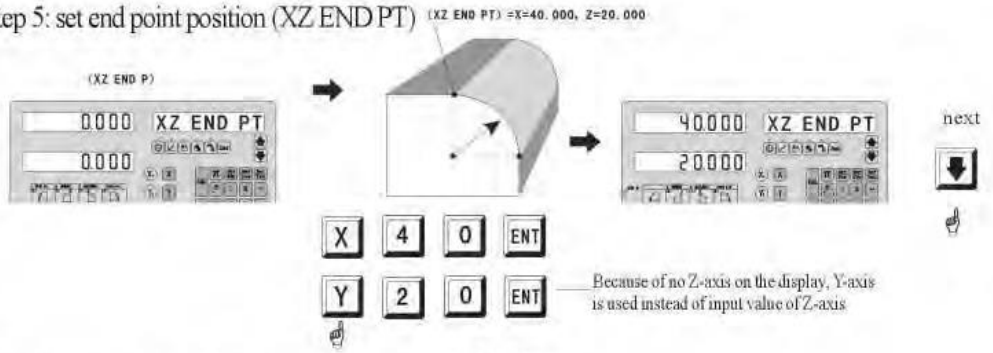


Step 4: set starting point (XZ ST PT)

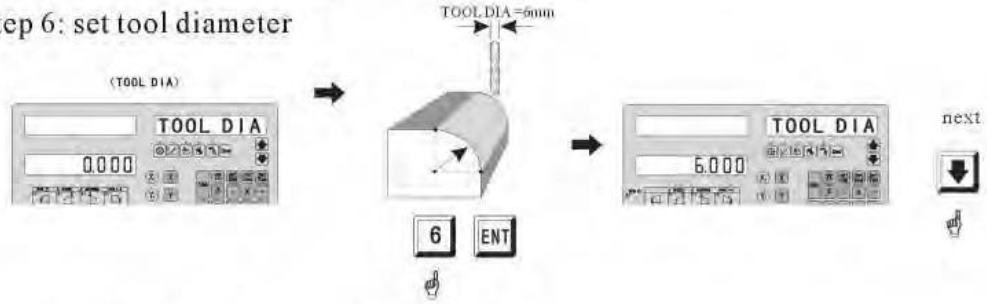


R function

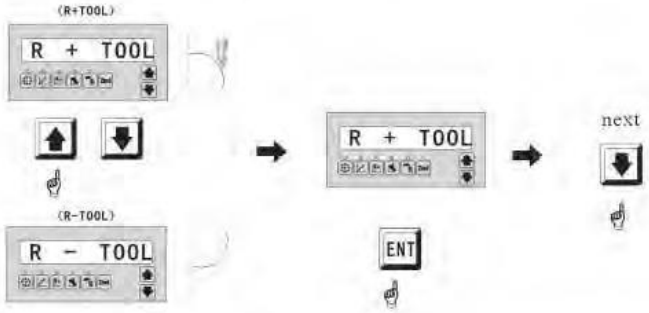
Step 5: set end point position (XZ END PT)



Step 6: set tool diameter



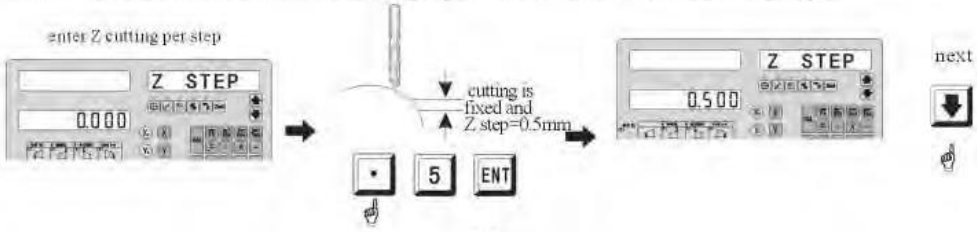
Step 7: set tool compensation direction



Step 8: set cutting per step distance

For digital display has advanced calculus function-smooth R function, it can help operator calculate the best cutting step and simply fix the cutting of Z per step to adapt to different requirements.

When operator selects fixed Z step, the state is in the following:



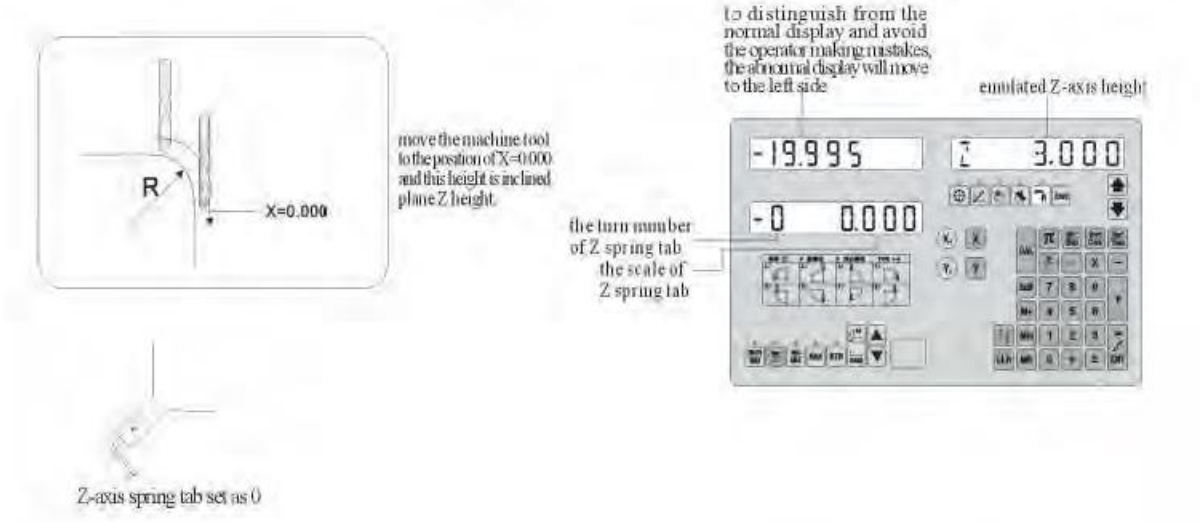
When operator elects smooth R function (MAX CUT), the state is in the following:

After all the parameters of R function has been set, enter the machine state.

Because two axis digital display does not have Z axis, use ⬆ and ⬇ to simulate the Z axis, ⬆ simulates Z axis UP one step, ⬇ simulates Z axis DOWN one step. Before the start of ARC cutting, please make sure the tool is posited at the start point of R and Z axis dial is set to zero.

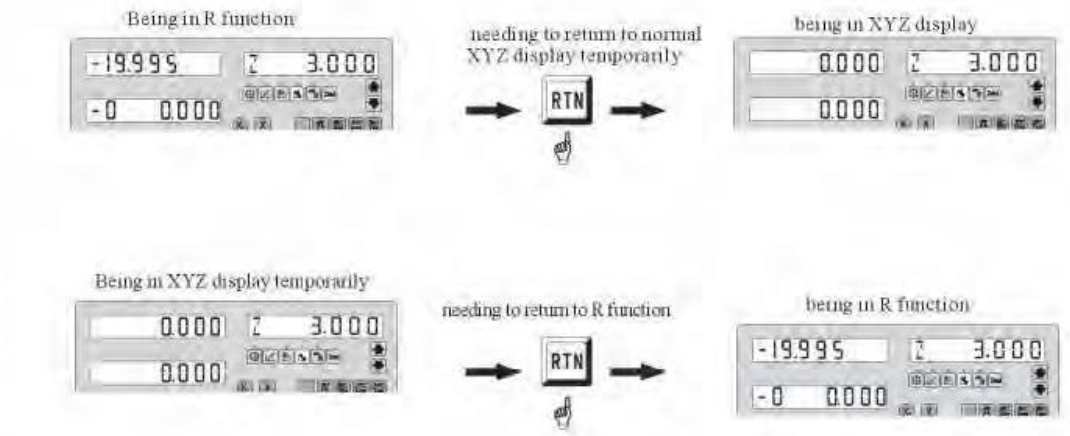
Display and operation of two-axis display under R function:

Since no Z axis on the bi-axis digital display, it has to display the spring tab scale and its turn number of Z axis in the way of emulation on the unoccupied axis. In the course of working, the initial point height of R on Z axis is set as '0.000' in the course of R machining processing, the spring tab and its turn number are automatically transformed from the current machining height of Z axis, which will lead the operator to complete the R processing easily.

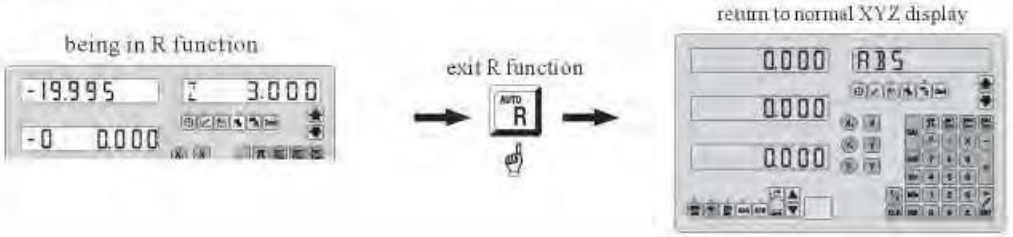


If the Z axis is beyond R scale, Z axis will display 'ZOU LI'

Anytime the user wants to return to normal XYZ to check the position calculated by the digital display, user can temporarily exit ARC mode.



Finish ARC cutting mode and return to normal mode



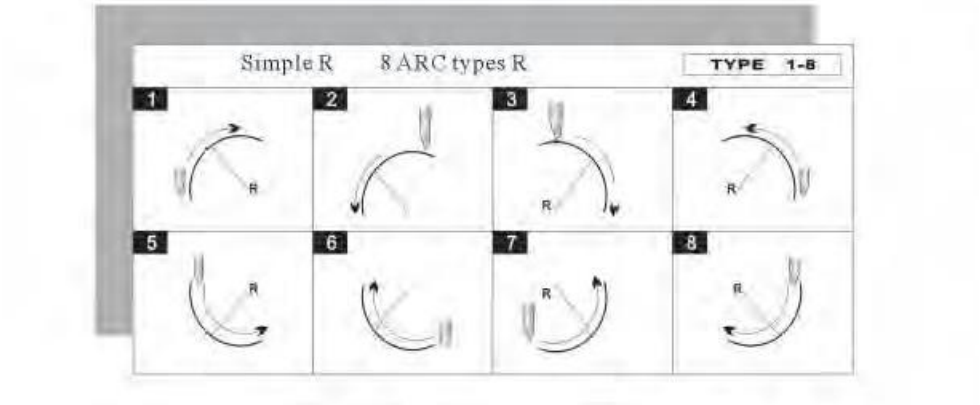
Note: the above is operating instructions of R function on two-axis digital display. R function of three-axis display except XY cutting plane, XZ and YZ need not input the cutting step as well as pressing ⬆ or ⬇. Select cutting step and move Z axis of the grating directly, i.e. the cutting step of Z axis. The coordinate of X or Y will change with the cutting step and move the value to 0.000, i.e. the positioning of the machining.

SIMPLE R FUNCTION

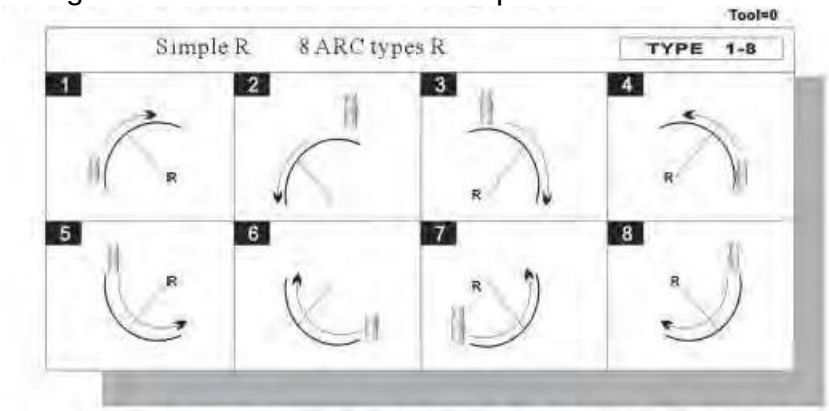
Simple R function:

In most cases, only 8 types of arc are used for the machine cutting. Therefore, simple R provides the following 8 types of machining mode.

Using ball nose slot drill to process machine cutting on XZ/YZ plane.

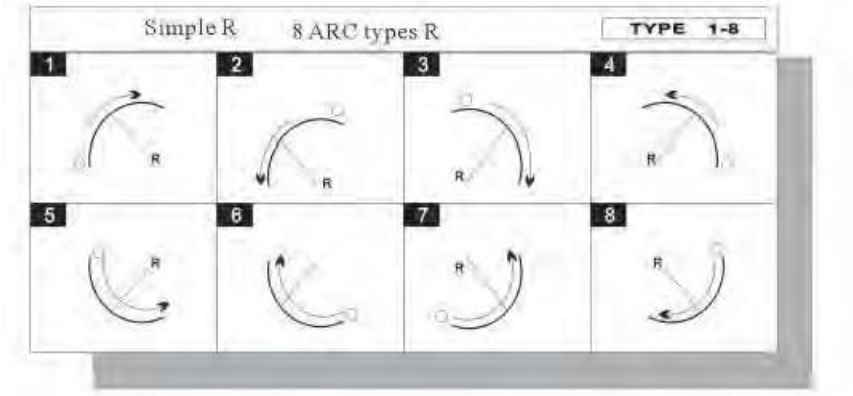


Using 4 flute end drill to cut XZ/YZ plane R



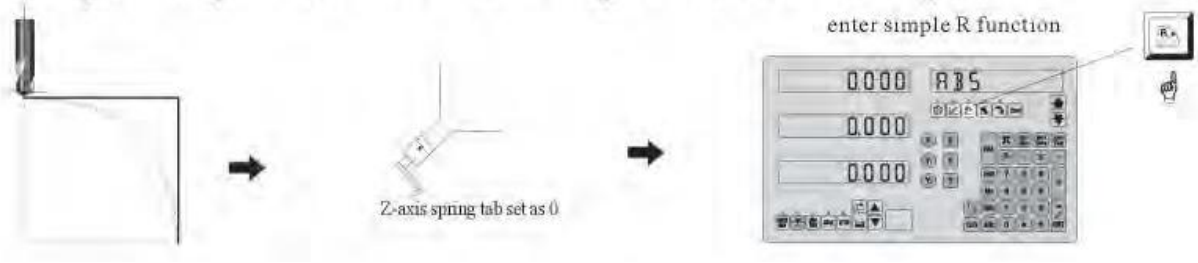
Notice: since processing R should be dealt with the tip, the tool diameter should be set as 0.000.

Using two flute (slot drill) for XY plane R.



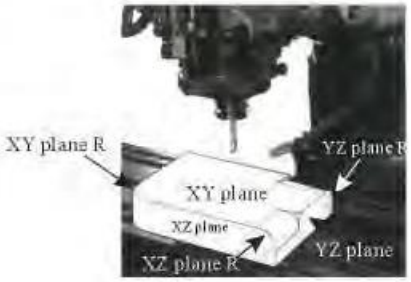
For using Simple R function, the following cutting parameters are needed.

Clamp the workpiece on the machine tool and posit the tool to the start point of R.

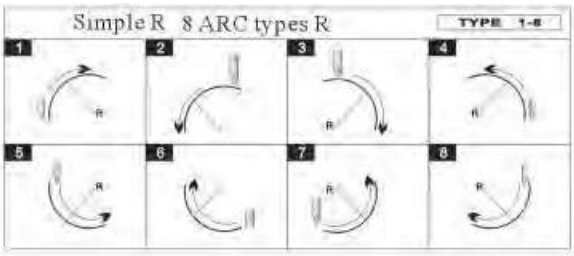


Input the following data:

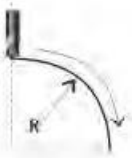
1. Select XY/XZ/YZ cutting plane



2. ARC types (1-8)

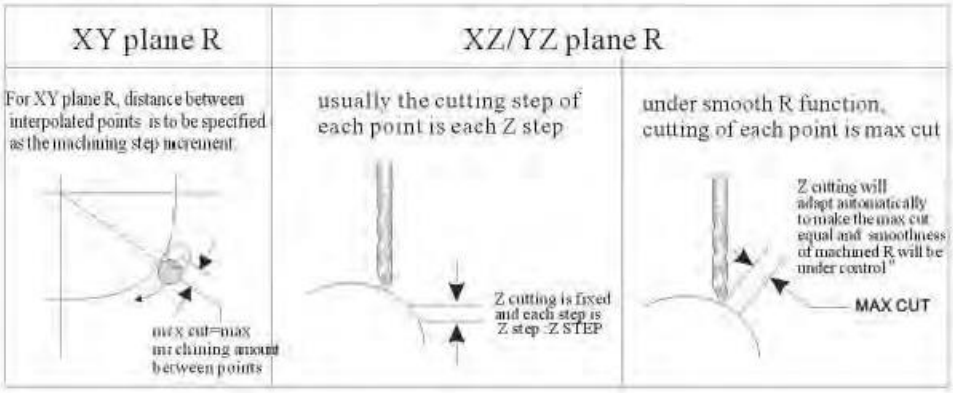


3. Radius



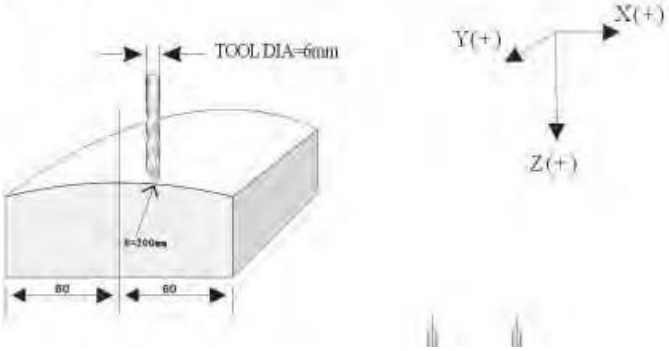
4. Tool diameter

5. Step increment

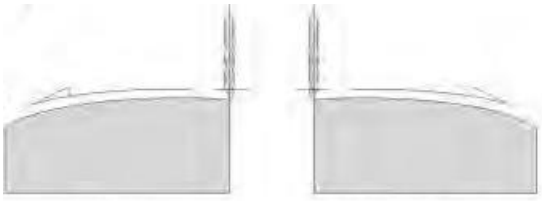


Example 1

Cutting a workpiece R = 200mm on the XY plane

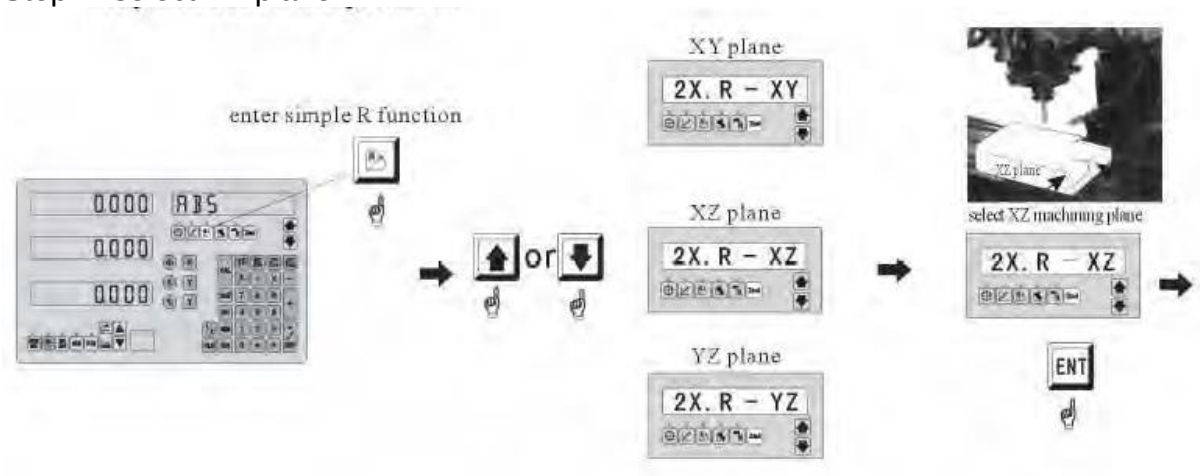


Share cutting into two parts to cut this R (simple 8 types only valid for quarter circle)

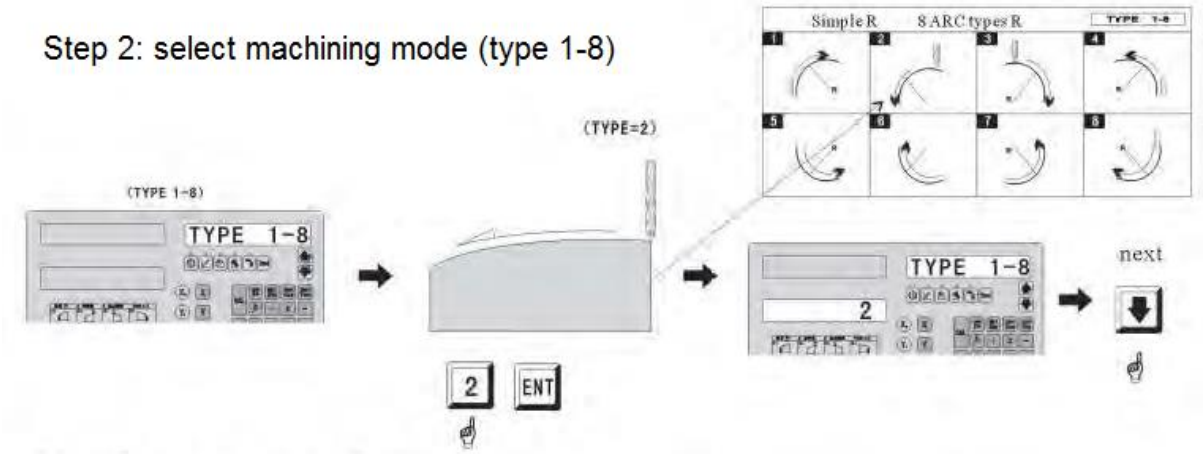


Posit the tool at the R starting point. Set the Z dial to zero.

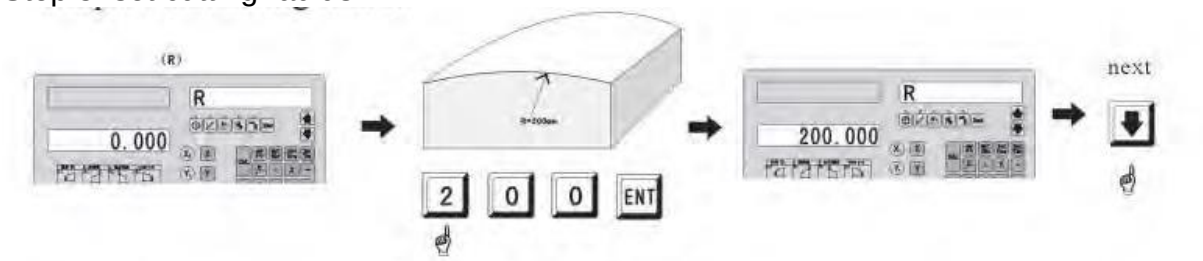
Step 1: select XZ plane R



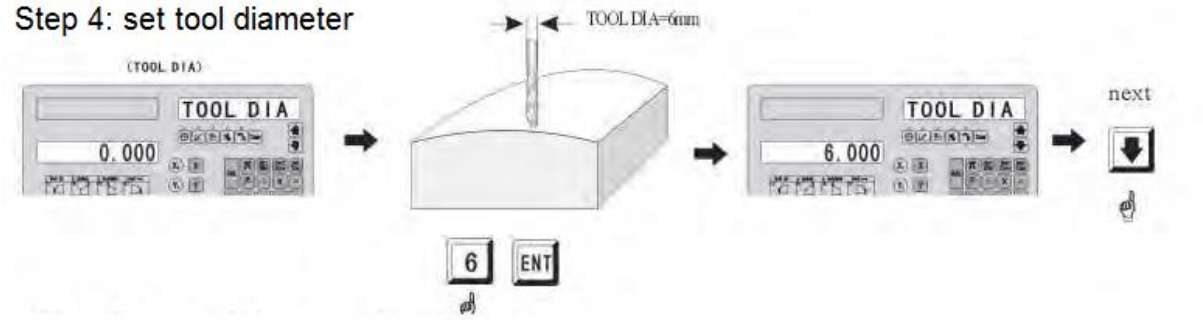
Step 2: select machining mode (type 1-8)



Step 3: set cutting radius



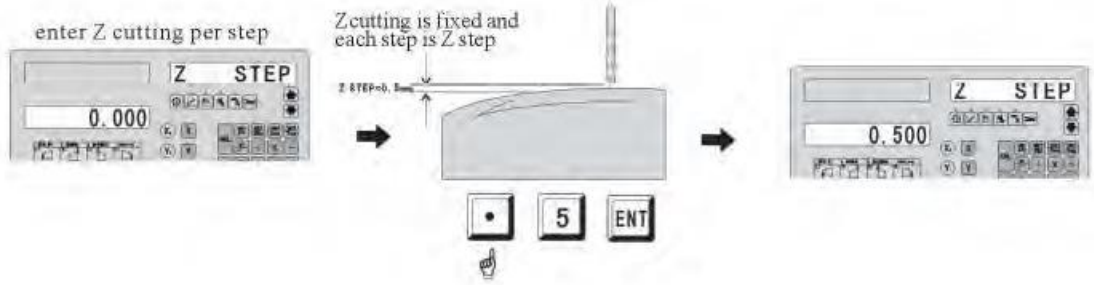
Step 4: set tool diameter



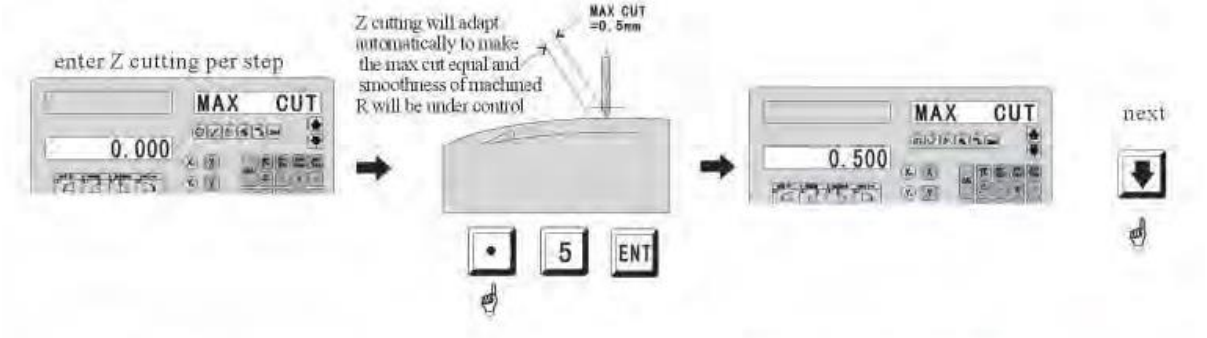
Step 5: set cutting per step distance

For digital display has advanced calculus function-smooth R function, it can help the operator calculate the best cutting step and simply fix the cutting of Z per step to adapt to different requirements.

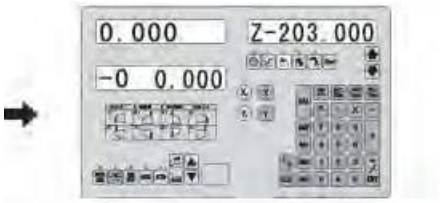
When operator selects fixed Z step, the state is in the following:



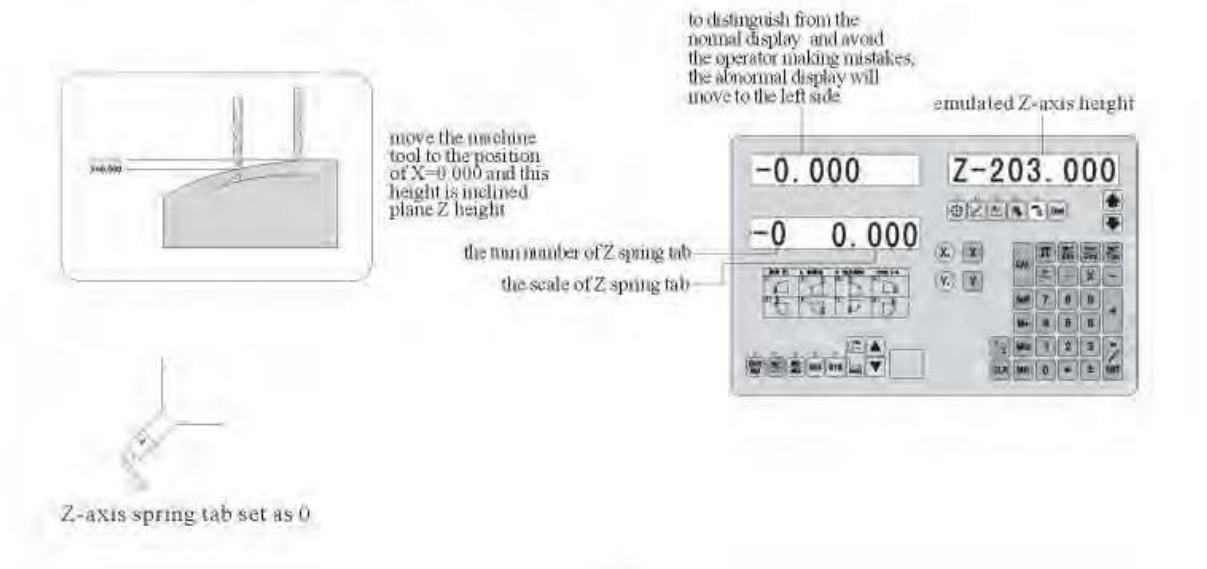
When the operator selects smooth R function (MAX CUT), the state is in the following:



After all the parameters of simple R function has been set, enter the machining state.

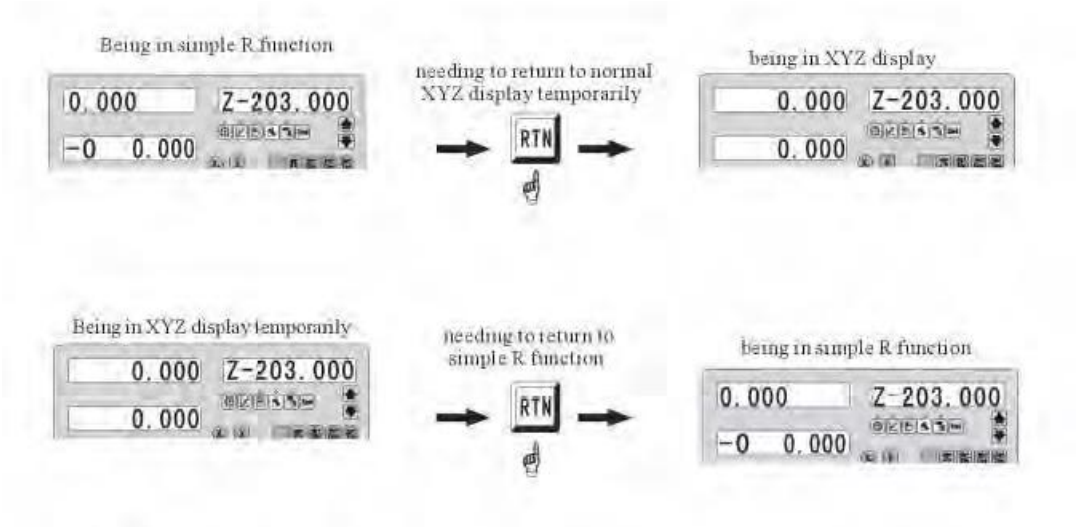


Because two-axis digital display does not have Z axis, use ⬆ and ⬇ to simulate Z axis, ⬆ simulates the Z axis UP one step, ⬇ simulates Z axis DOWN on step. Before the start of ARC cutting, please make sure the tool is posited at the starting point of R and Z axis dial is set to zero.

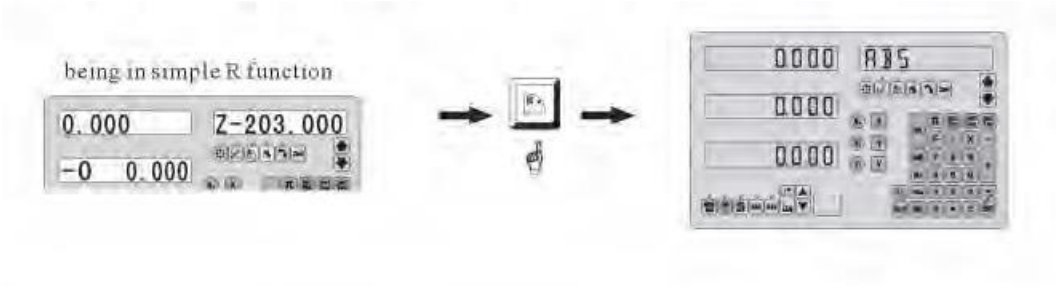


If Z axis is beyond R scale, Z axis will display ‘ZOU LI’

Anytime the user wants to return to the normal XYZ to check the position calculated by the digital display, the user can temporarily exit simple R mode.



Finish ARC cutting mode and return to normal mode.



Note: the above is operating instructions of simple R function on two-axis digital display. Simple R function of three-axis display except XY cutting plane, XZ and YZ need not input the cutting step as well as pressing ⬆ or ⬇. Select cutting step and move Z axis of the grating directly, i.e. the cutting step of Z axis. The coordinate of X or Y will change with the cutting step and move the value to 0.000, i.e. the positioning of the machining.

SHRINKAGE CALCULATION FUNCTION

Note: the parameter of shrinkage must be set as ‘SRK ON’.
The plastic objects will be shrunk after it is injected into form. When the process mould, it’s real processing dimension must be enlarged or shrunk according to the shrinkage based on the finished products dimension.

1. Setup shrinkage rate

It is important to setup correctly the shrinkage rate because the calculated results depend on multiplying the displayed or input by shrinkage rate.

Shrinkage rate setup: if shrinkage rate=1.005

Operating steps	XYZ display		Auxiliary display	Note
• enter shrinkage calculation function [SRK]	X		SHRINK	enter shrinkage calculation function and please input shrinkage rate
	Y	1.000		
• enter shrinkage rate [1] [.] [0] [0] [5]	X		SHRINK	
	Y	1.005		
• confirm this value setup [ENT]	X	0.000	SHRINK	end shrinkage function
	Y	0.000		

Move grating and the value displayed on each axis is the product by multiplying the dimension of movement and shrinkage rate.

• exit shrinkage calculation function [SRK]	X	0.000	ABS	exit shrinkage calculation function and return to normal calculation function
	Y	0.000		

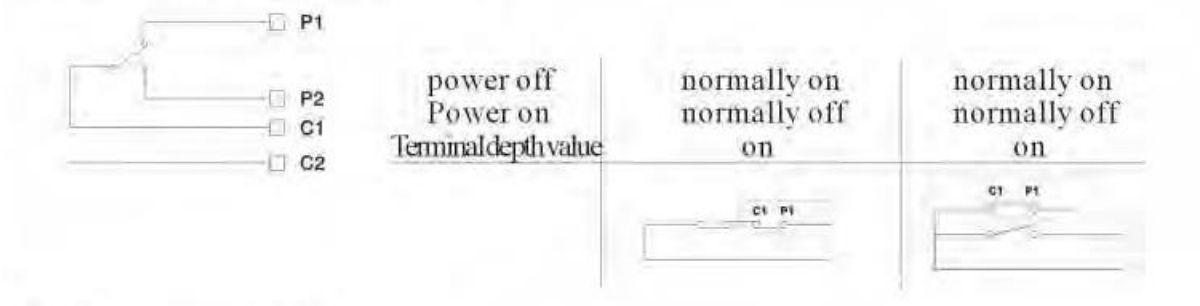
EDM DEPTH CONTROL FUNCTION

EDM is provided with EDM control function in the Z axis direction. The function in the X and Y axis directions are all the same with those of the standard serial digital display.

General Function

- Memory function: the special depth function is provided in Z axis direction
- Compensation function: to the error caused from electrode wear, it has compensation function
- Adding/Subtraction function: during machining, the processing depth can be changed in EMD digital display.
- Automatically stop function: when machining to the set terminal depth, the automatic stop signal is sent out to stop Z axis and the digital display.

Connection of control wire

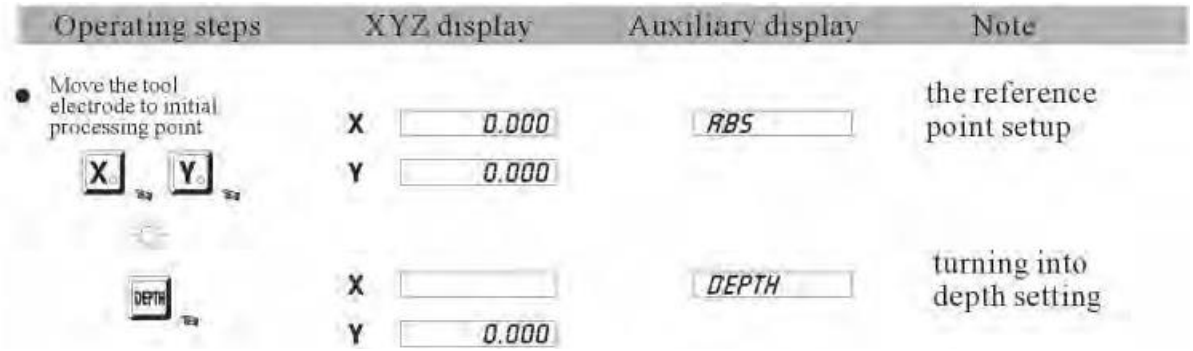


Definition of cable wire

Definition of cable wire	pin number	cable wire function
P1	1	normally off pin
C1	2	mid pin
P2	3	normally on pin
C2	4	screen line

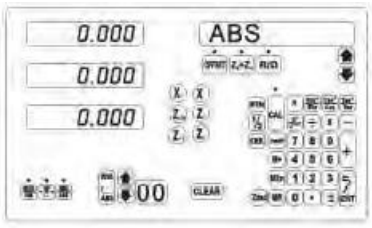
Example

A workpiece machining whose processing depth is 10mm.



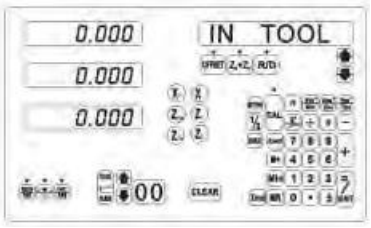
Operating steps	XYZ display		Auxiliary display	Note
1 → 0 →	X		DEPTH	the terminal depth value setting
	Y	10		
	Z			
ENT →	X	0.000	ABS	the input confirmation and turning into the normal display
	Y	0.000		
	Z	0.000		
● move the tool electrode along the Z direction to the reference plane (zero plane)	X	0.000	ABS	the reference plane setting
	Y	0.000		
Z →	Z	0.000		
EDM →	X	10.000	SPARKING	turning into EDM state and starting electrical machining X-axis display the terminal depth Y-axis display the maximal depth Z-axis display the current depth
	Y	0.000		
	Z	0.000		
OFFSET →	X		OFFSET	Turning into the electrode wear compensation setting state Compensation range ±9.995mm
	Y	0.000		
	Z			
. → 6 →	X		OFFSET	Setting the compensation value. In case of the value as 0.6mm
	Y	0.600		
	Z			
ENT →	X	0.000	ABS	Confirming the input and turning into the normal display
	Y	0.000		
	Z	0.000		
● Processing completed or during processing	X	0.000	ABS	Back to the normal display from the EDM state
	Y	0.000		
EDM →	Z	0.000		

LATHE FUNCTION



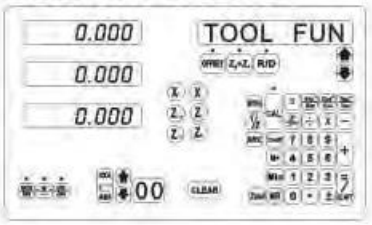
一、 , tool compensation ON/OFF

- press , switch on tool compensation function
- press or key to select number of tool
- press again to exit tool compensation function



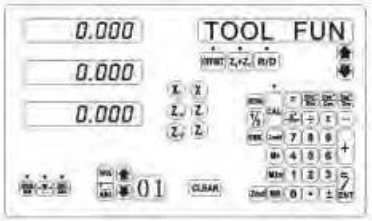
二、OFFSET, tool compensation ON/OFF

- Press offset, enter tool compensation dimension set mode
- Enter number of tool by numerical keys or or key
- Press , numerical keys, , ENT to set compensation dimension
- Press offset to exit

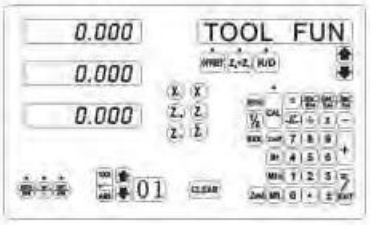


Example: tool compensation offset = 10 and number of tool = 01
Operating steps

1. Press OFFSET to enter



2. press to select tool 01



3. Press Z0、1、0、ENT、

4. Press OFFSET to return

三、Z0±Z1 (only valid for 3-axis display)

The key is used to select third axis (Z_1) display mode. It switches display between Z_1 and $Z_0 \pm Z_1$ When $Z_0 \pm Z_1$ is selected, LED is on and the value displayed moves forward.

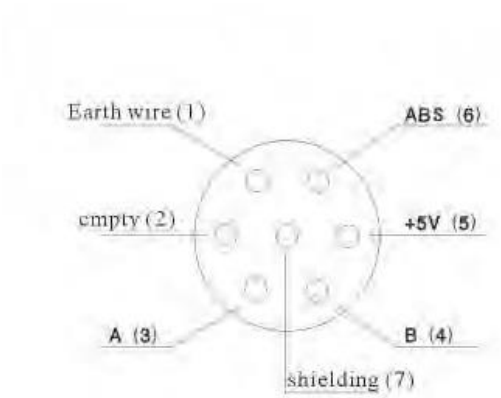
四、R/D

The key is used to select diameter or radius of X axis. When D is selected, LED above it is on.

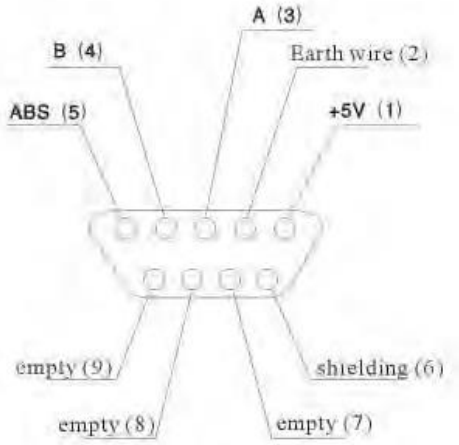
SPECIFICATIONS

Number of axis: 1, 2, 3
Resolution: 0.005/0.001/0.01
Display function: 8 LED
Response speed: 60mm (198.6 feet)/min
Quantizing error: +/- 1
Power Source: AC 230V 50Hz 30VA 0.5A
Temperature range: Service: 0-40degC/storage: -20-70degC
Input signal: TTL square wave

Type of display	Volume	Weight
Bc11	314x194x100	2.65Kg
TOP20	265x182x148	1.1Kg
Bc10	290x190x105	2.85Kg



7 pin



9 pin

ESTIMATION AND TREATMENT FOR COMMON FAILURES

No Display

1. Look over if the power plug keeps in good contact with the outlet
2. Look over if the fuse is melted
3. Look over if the voltage meets the requirement, namely 230V

Shell Charged

Earthing is not good: the tool connected with the meter bar, which should be connected to the earth. With rubber mat in the tool leg, the earth wire of the power source must be connected well with the power line. Otherwise, low voltage power source will affect operation.

The Displayed Number is Unchangeable

1. If all numbers on X, Y, Z axis are unchangeable, reset the system. Please refer to the system reset part in the manual.
2. Please look over if the connector stays in good contact with that of the grating.
3. If the failure happens on just one axis, make this axis connect with another grating to test whether grating or display is abnormal.

The Displayed Number on Display is Not Accurate, Doubled or Too Large

1. Accuracy of the guide rail of the tool is not good.
2. Installation of grating doesn't meet the requirement and parallelism has not been adjusted. Each part has not been firmly fixed.
3. Resolution of grating does not match actual resolution.
4. Compensation dimension of linear error is wrongly set.
5. Grating is broken and some number is missed.
6. Please refer to the system reset part in the manual

The Counting Direction of Display is Opposite to the Practical Direction

Please refer to the scale moving direction setting part of the manual to change the counting direction.

If the problem is not solved after treating by the above way, please contact the manufacturer. Never open the case to fix by yourself.