

DC-3000 Measuring digital readout

Instructions

Forward

Esteemed users:

DC-3000 Measuring digital readout is a sort of the most latest measuring numeral display meter now, it provides some functions for OVH and Image Apparatus such as error multidrop correction、 coordinate screw、 fitting measurement、 Chinese/English eligibility LCD、 communicate with PC、 sutogamy micro printer、 foot switch,etc. Furthermore, our corporation has softwart and hardware development team being very experience,who can customize special function at the shortest notice base on consumer's request.

Safe matters need attention:



To warn:

- Examine whether the exterior is whole after open the box,if it has some problems,Please contact our corporation soon,never disassemble the maintenance byself.
- This equipment employs the 85V~250V and AC supply of 50~60Hz . The power source plug is three core attaching plug that is earthed,which ought to accord with Europe safety standards.
- Be sure the digital readout earth reliable.
- Users can't unfold the shell and mend,the high-tension probably to hurt somebody.



Careful:

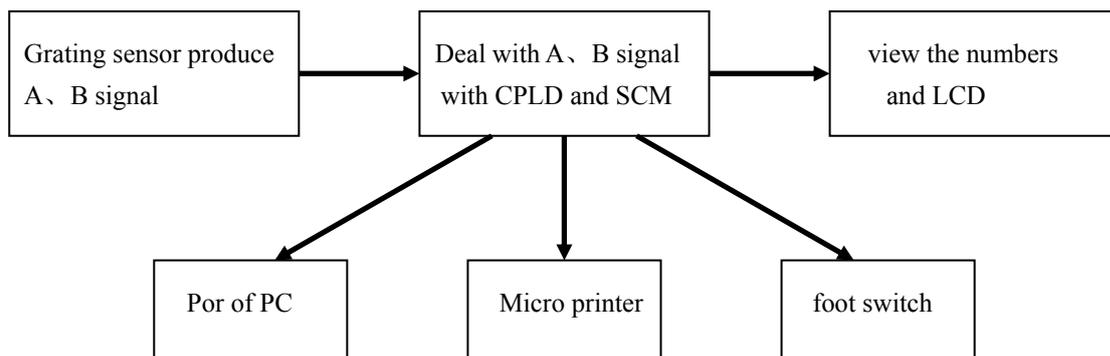
- The equipment do not have the blast resistant construction,don't use it in the Environment which have the flammability gas.
- Please turn off the electric power if you don't use it in a long time.
- Have all plugs out when being living thunderstorm weather.
- Don't unfold the shell or pull、 insert the plug of the raster before the electric power is turned off.
- Don't let any goods on the power cord,the decorate of power cord do not hinder somebody 's move or the machine work..

Routine attention:

- Turn off the electric power when clean.
- Cleanse the shell with pliable hollow fibaric or cotton gauze.
- Don't cleanse the shell with something such as methanol or aether.
- You can use neutral cleanser to cleanse the head windows.

Construction principle

The DC-3000 Measuring digital readout produced by my corporation is a size of fine measuring meter which provide graphics feature measurement for OVH and Image Apparatus. its principle of work as follows:



DC-3000 measuring digital readout standard and fittings:

Input voltage range	85V~250V
Maximum power dissipation	15W
Working temperature	0°C~40°C
Storage temperature	-20°C~40°C
Relative humidity	<90%
Weight	≈1.5Kg
Size	295×183×90 (Unit:mm)
Coordinate number	3
Operate keyboard	Sealing film touch keyboard
Raster interface	9PD
Raster signal	Two TTL square wave differ 90°,the ability of driving>10mA
Raster resolution	Installation(resolution:0.1μm、0.2μm、0.5μm、1μm、2μm、5μm,etc.)
RS232:	9PD,<-5V('1'0,>+5V('0')
Printer interface	: 9PD
Edge seek interface	: TTL or isolated current impulse
Foot switch interface	: short circuit contact
Micro printer	: (choice)

The workable condition of circumstance

- Avoid revealing under the burning sun or high temperature,the environment temperature must be between 0°C and 40°C;
- Removed from high voltage、 heavy current、 high magnetic fields, the lines of signal cable of raster remove from power cord;
- Avoid using it at the environment which have sweepings、 oil、 damp、 flour dust;
- Don't install the equipment on the worktable which vibrations very much or is not very rocky, avoid toppling、 tumble、 to let the equipment damage,even hurt the operator;
- Removed from causticity chemical which have the property of strong acid or alkali;

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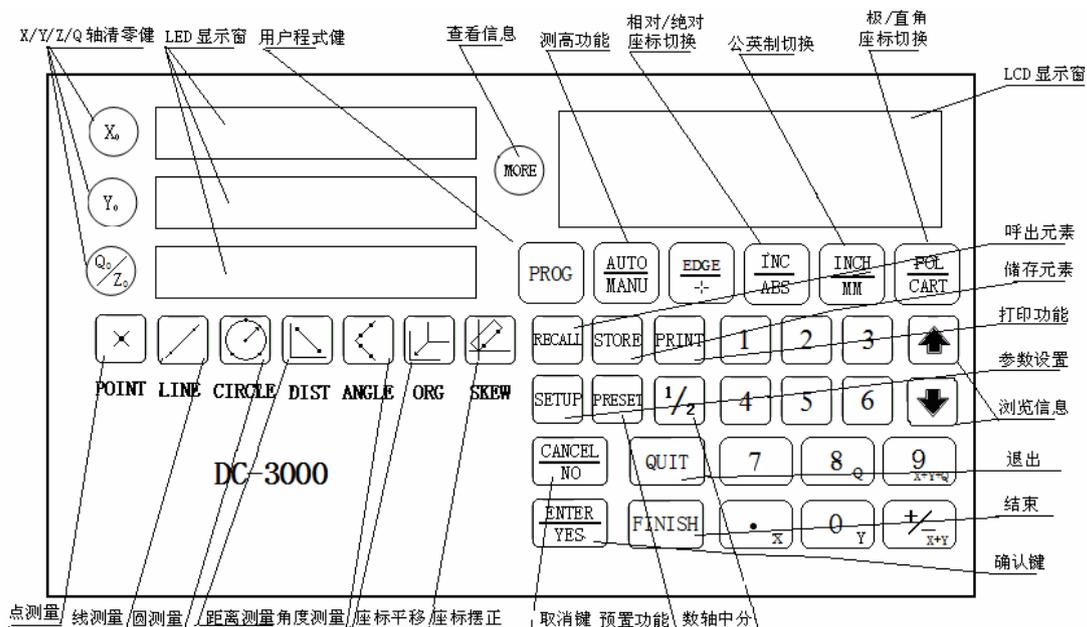
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Chapter One Panel and Keystroke

Kneading board and pressed key explanation

1.1 Kneading board cart



1.2 Pressed key explanation

	Pressed key mark	Key	Function explanation
1		Clear	Clear the appointed Axis
2		Midsplit	Eliminate the appointed Axis by 2
3		Absolute/Incremental	INC/ABS Mode of Axis switch
4		INCH/MM	Value switches between INCH and MM
5		Polar/Cartesian	Value switches between Polar and Cartesian
6		User program	Carries on the related User program the operation
7		Key of preseting	Carries on the related preseting the operation
8		Key of saving	Save
9		Key of recalling	Recall

10		Key of printing	Print
11		Function establishment	Carries on the establishment of the Internal function
12		Key of confirming	Confirm operations
13		Key of canceling	Cancels the inferior operation
14		Key of finishing	Finish operations
15		Key of quitting	Quit operations
16		Digital key	Set numbers
17		Decimal point	Put decimal point
18		Positive/negative sign	Put positive number or negative
19		Key of up and down	Browse graphics feature or function table
20		Key of More	Examines more contents
21		Origin of coordinates establishment	Coordinates move
22		Key of measuring point	Point feature operations
23		Key of measuring line	Line feature operations
24		Key of measuring circle	Circle feature operations
25		Key of measuring distance	Distance feature operations
26		Key of measuring angle	Angle feature operations
27		Key of Axis straighten	Skew Axis operations

Chapter two Fast introduction

This chapter introduces some system feature establishment which you will use when you do some operation such as measuring、 constructing or presetting,and you will understand this operations.you can obtain the very big help after studying this chapter.

The demonstration includes:

- Boot-strap
- Initialization of parameters of system
- Electronic straighten and move

More concrete operating procedure and demonstration will be introduced in Chapter three.

2.1 Boot-strap

Meets the 220V power source,presses down the power switch,the equipment enter the self-check condition.Press any key or the self-check completed,if all Axes is Linear Compensation ,the equipment enters the normal demonstration condition,but if some Axis is setted being Segment Compensation,there are two situation: (1) Only find the RI with Raster then to be normal demonstration condition; (2) if you are sure the Raster do not be moved

after boot-strap,Press ,go directly the normal demonstration condition.



Warning:

- ✧ Examine whether the connection of power cord is firm before Boot-strap;
- ✧ Examine whether the equipment is in abnormal condition,after Boot-strap,if it is ,immediately turn off the Boot-strap;
- ✧ Not pull or insert the signal wire when the equipment is running.

After Boot-strap,at normal situation,the system enter the self-check condition,the LCD views someinformation such as Ind Coope、 productname etc.if the system uses the Segment Compensation function,it request looking for the RI(Absolute Zero Position) after Boot-strap.

2.2 Initialization of system parameters

Under is setting parameters about measuring and viewing

2.2.1 Unit of measure(length)

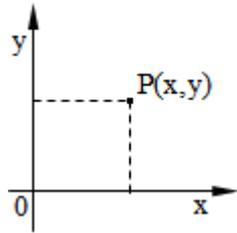
 Graphics display unit have MM and INCH,press  to switch between them.If the pilot lamp is bright, the current unit is INCH,otherwise is MM.

2.2.2 Absolute Coordinate or Incremental Coordinate

 Press  to switch between Absolute Coordinate and Incremental Coordinate.If the pilot lamp is bright, the frame of axes is Incremental Coordinate,otherwise is Absolute Coordinate.

2.2.3 Polar Coordinate or Cartesian Coordinate

 Return to normal situation,press  to switch between Polar Coordinate and Cartesian Coordinate,If the pilot lamp is bright,the current coordinate is “POL”,otherwise is “CART”.The two reference frames use two different ways to view the same information simply. The Cartesian Coordinate view the deviation value which at a distance of the origin in the direction of X and Y with a set of real numbers.The pic2.2-1 views the coordinate in the Cartesian Coordinate,and the pic 2.2-2 views the value of point coordinate in the Cartesian Coordinate.

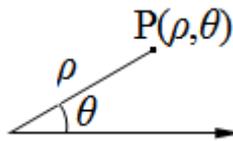


Pic2.2-1 coordinate in CART

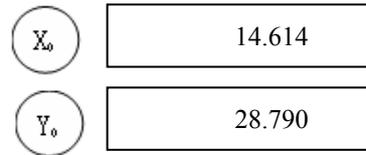


Pic2.2-2 the value in CART

When you use the Polar Coordinate, ρ show the distance of the point and the origin, and θ show the separation angle between the line of the point and the origin and the polar axis. The pic2.2-3 views the coordinate in the Polar Coordinate, and the pic 2.2-4, X_0 means ρ , and Y_0 means θ .



Pic2.2-1 coordinate in POL



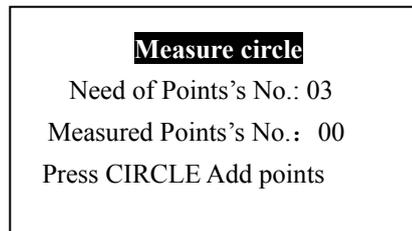
Pic2.2-2 the value in POL

2.2.4 Method of sampling points

Graphics sample point can be collected by cross location, this method is called the mode of cross location.

2.2.5 Preinstall the mode of sampling points

The mode of preinstalling sample points used by DC-3000 means that the operator set up the NO. of sample points for measuring graphics before operating. In the mode of preinstalling sample points, the NO. of sample points measured show on the LCD, and when you have measured a sample point, the count add one, like pic2.2-5:



Pic2.2-5

2.2.6 Set up angle unit

Make a reference to 《chapter five》.

2.3 Electronic straighten and move

Skew the frame of axes by some angle and move it to let the X-Axis or Y-Axis be coincident with some edge of the workpiece which will be measured, this operation is called coordinate straighten. This operation helps the operator to straighten the workpiece, speed measuring up. When the edge of the workpiece is irregular or it has an angle with the X-Axis or Y-Axis, the operator is allowed to skew the frame of axes by an angle, and make the X-Axis or Y-Axis be coincident with some edge of the workpiece, then the mechanical coordinate is converted to workpiece coordinate. Every time when you measure a new workpiece, you should use this function, it will help you to do the following work.

Straighten a workpiece, at first you must measure one line of the workpiece, then skew the frame of axes by an angle (the angular dimension is the size of the separation angle between the line and the positive direction of the X-axis) to make one coordinate axis be coincident with the line (this process is completed by the system automatically). It will be at least two sample points to measure a line, at most 50. The result will be great precision when the No. of sample points is more than two.

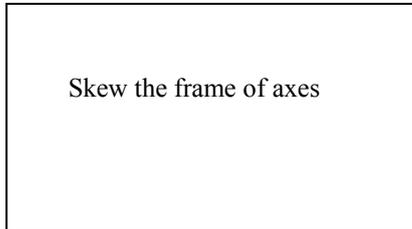
The following example shows how to straighten a workpiece by the position of X-Axis.

2.3.1 Workpiece straighten:

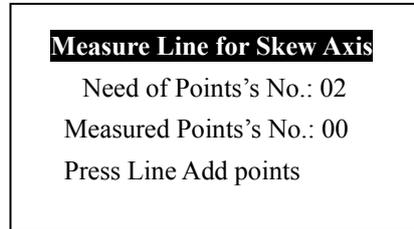
Skew the frame of axes to make the X-axis be coincident with the line L1 on the workpiece as show on pic.2.3-4.

First step

Return to the normal view situation. Press the  key, the LCD show as pic2.3-1, as following show as pic2.3-2.



Pic2.3-1

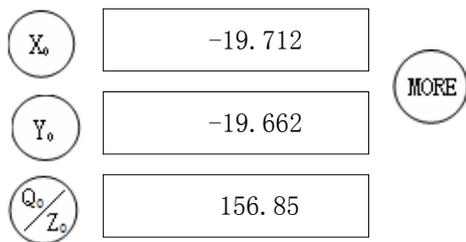


Pic2.3-2

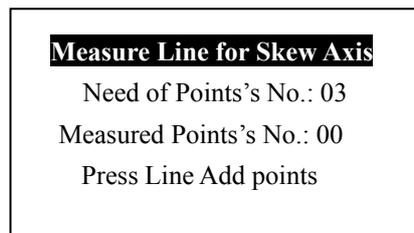
□ **Attention:** follow the LCD, every time press the  key, the NO. add one.

Second step

Press the  key once, Add one sample point. the LCD and the LED shows as the pic2.3-3:



Pic 2.3-3

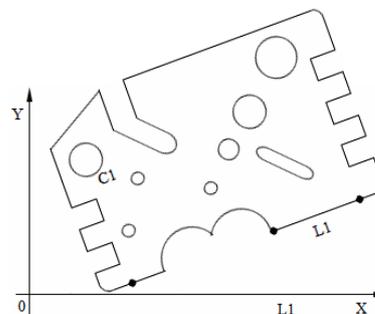


Third step

Like pic2.3-4, when the center of reticle on the

finder screen aim the sample point, press the 

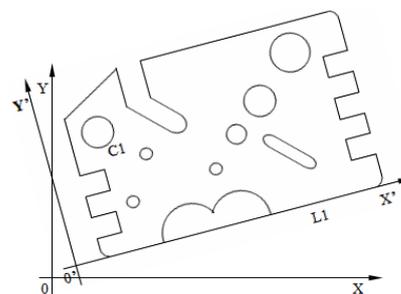
this point's data show as pic2.3-3, key, and the measured points's No. add one.



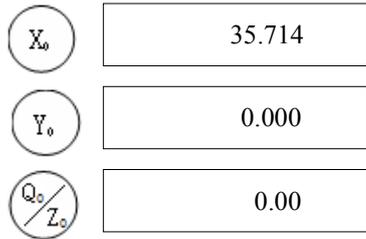
Pic 2.3-4

Forth step

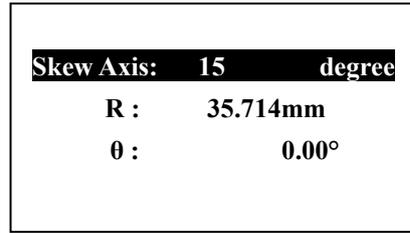
Follow the third step, collect the other two points on L1, after three sample points were collected, LED show as Pic2.3-5, and the LCD show as Pic2.3-6, after straightening completed, the result show as Pic2.3-7. the X'O'Y' on the Pic2.3.7 is the new frame of axes, its X-Axis is coincident with the L1 of the workpiece. the workpiece not justified get electronic compensation, the following measurement will use this result.



Pic2.3-7



Pic2.3-5



Pic2.3-6

Attention:

- (1) Do line measurement on the edge that must be straightened, make a reference to 《3.3.2》.
- (2) If successful, the LCD will show such as “X-Axis skewed!” or “Y-Axis skewed!”, moreover the other Axis will clear to zero beside the straightened Axis; if all sample points are the same, LCD will show “All Points on a point!”, the operation failed, if failed, the LCD will show “Skew failed!”.

- (3) If the coordinate has skewed successfully, press  key and release immediately, the box will switch incessantly between the skewed situation and no skew situation, if you press  key for 3 seconds, the box will ring with “hua hua”, and the LCD will show as “Cleared!”, it means that the skewed situation has been cancelled, and the coordinate returns to the original situation. Now you can do the electronic straighten again.

2.3.2 Coordinate move

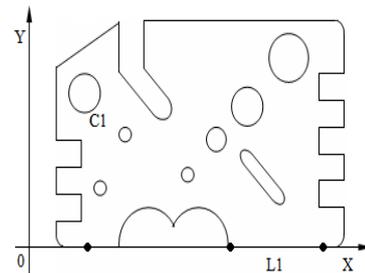
Origin of Absolute Coordinate must be set at the beginning of measuring at a time. The following example moves the origin of absolute coordinate to the point of intersecting by two lines.

Origin of Absolute Coordinate

First step

At normal situation press  key enter to the Measuring

Line, press  key again, add one sample point.

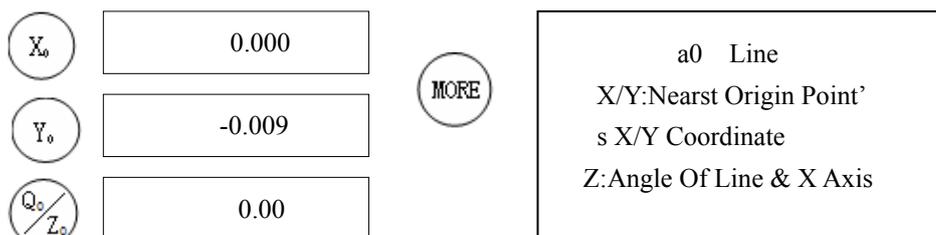


Pic2.3.2-1

Second step

Pic2.3.2-1, when the reticle center of the OVH aims one sample point on the L1, press  key to collect this sample point, every time you press  key, the measured No. add one. Continue to do this operation, collect the other two sample points on the L1. When the three sample points are completed, the system shows the information

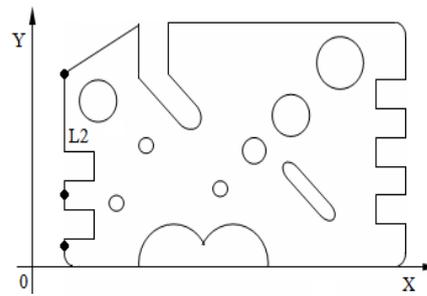
immediately as Pic 2.3.2-2, press  key, you can see the other information of this graphics.



pic2.3.2-2

Third step

Follow the step1、step2,select three sample points on a line which runs parall with the Y-Axis(like L2 of pic2.3.2-3),the result show as pic2.3.2-4,Press



Pic2.3.2-3

 key see the other information of this graphics.

	-25.040	
	-0.351	
	90.00	

a0 Line
 X/Y:Nearest Origin Point'
 s X/Y Coordinate
 Z:Angle Of Line & X Axis

Pic2.3.2-4

Attention:

When you have measured a new graphics,its position always is a0,and the original graphics a0 will occupy the positon of a1,the a1 occupy the position of a2, to reason by analogy one by one,until the a8 occupy the positon of

a9,the original graphics a9 will be lost.so if the data is useful,please save it,press  key to save the graphics feature.(Make a reference to 《chapter 3.1.7》 .)

Construct point of intersection

Fourth step

Press  key ,view measuring information(like Pic2.3.2-5).

Measuring Point

Need of Points's No.: 01

Measured Points's No: 00

Press POINT Add Points

Pic2.3.2-5

Fifth step

Select the two lines measured just now.press  key or  key,the system will show the information of L2

which have been measured a moment ago,like Pic 2.3.2-6, it is the line which we need, press  key,the LCD show like Pic2.3.2-7. the mark '*' signifys that the line have been selected.

	-25.040	
	-0.351	
	90.00	

a0 Line
 X/Y:Nearest Origin Point'
 s X/Y Coordinate
 Z:Angle Of Line & X Axis

pic2.3.2-6

* a0 Line
 X/Y:Nearest Origin Point'
 s X/Y Coordinate
 Z:Angle Of Line & X Axis

pic2.3.2-7

Sixth step

Similar to fifth step,select L1,like Pic2.3.2-8,press  key, select it.







Pic2.3.2-8

* a1 Line
 X/Y:Nearest Origin Point'
 s X/Y Coordinate
 Z:Angle Of Line & X Axis

Seventh step

Press  key,get the graphics point. The information shows like Pic2.3.2-9.







pic2.3.2-9

a0 Point
 X:Point's X Coordinate
 Y:Point's Y Coordinate
 Z:+T

Set Origin of Coordinate

Eighth step

Press  key, LCD show like Pic2.3.2-10, The

follow clue shows that if you press  now, it will move and skew coordinate by measuring three points.

If Press SKEW Key, Then
 ORG&SKEW Axis

 Press Up/Dn, See Feature

Pic2.3.2-10

Ninth step

Press  key or  key,select the point which is constructed at seventh step. make sure the LCD shows “a0 Point”,then press  to finish the operation.

Attention:

(1)Set the origin of coordinate at Incremental Coordinate is similar to at Absolute Coordinate. First you exchange

to Incremental Coordinate,it's Okey when the the pilot lamp of  key is bright,then do it follow the method of setting the origin of coordinate at Absolute coordinate above-mentioned.

(2) if you press  key or  key ,you can browse all the graphics features. make sure the coordinates of X-Axis、 Y-Axis are what you need,press  key to confirm.now the origin of coordinate reset,LED changed.

2.3.3 Coordinate Move And Skew

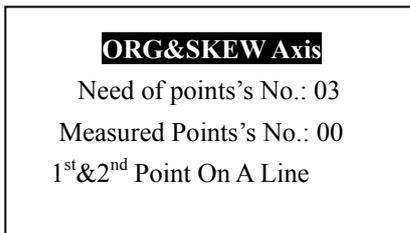
Move and skew is the special assemble play by skewing coordinate and moving the origin of coordinate. As following example,we straighten a workpiece and move the origin of coordinate to the point of intersection of two lines.

First step

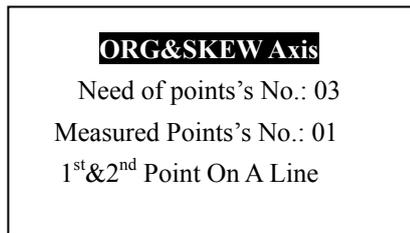
Press  key,LCD views like pic2.3.2-10,shows that it will do the operation of coordinate move and skew after pressing  key.

Second step

Press  key,LCD shows information like pic2.3.3-1.it means that it must collect three sample points to straighten and move coordinate,and the present sample points collected is Zero.the fourth line means that the frontal two sample points is on a line.



pic2.3.3-1

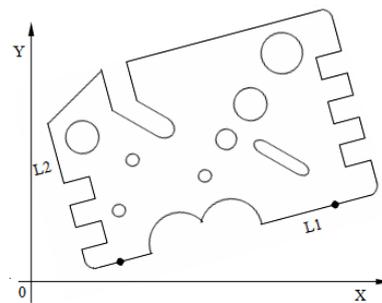


pic2.3.3-3

Third step

Like Pic2.3.3-2, when the reticle center of the OVH aims

one point on L1,press  key,LCD views like pic2.3.3-3, shows that a point have been collected.



Pic2.3.3-2

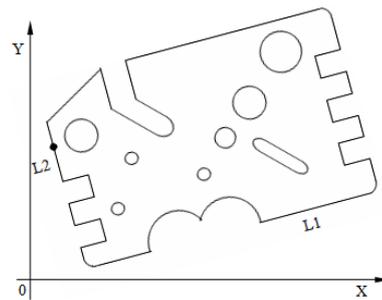
Fourth step

Follow third step,collected the other sample point on L1 at pic2.3.3-2.

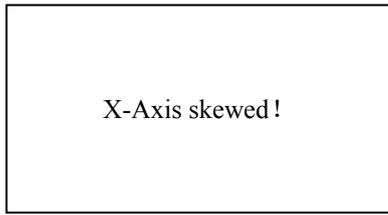
Fifth step

Like pic2.3.3-4.when the reticle center of the OVH aims

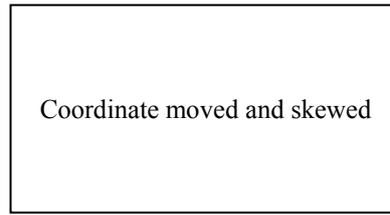
another point on L1,press  key, now three sample points have been collected,the measurement finished auto. the LCD views like pic2.3.3-5,then the LCD views like pic2.3.3-6.



Pic2.3.3-4



pic2.3.3-5



pic2.3.3-6

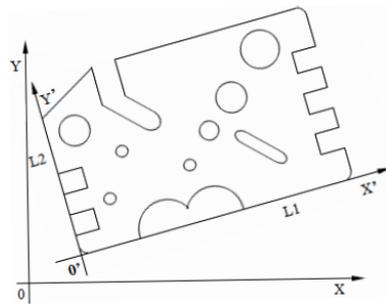
Finally it returns to normal situation. LCD views like pic2.3.3-7, and LED views like pic2.3.3-8. the result straightened views like pic2.3.3-9. the $X'0'Y'$ in pic2.3.3-9 is the new reference frame, its X-Axis is coincident with the L1 of the workpiece, and its Y-Axis is coincident with the L2 of the workpiece, the origin of coordinate is reset to point of intersection of L1 and L2. the following measurement will use this result.

X_0	0.000
Y_0	9.569
Q_0 / Z_0	0.00

pic2.3.3-8

Skew Axis:	15 °
R :	35.714mm
θ :	0.00°

pic2.3.3-7



pic2.3.3-9

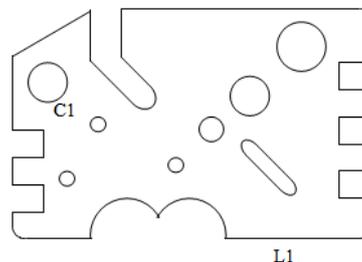
□ **Attention:**

- (1) Frontal two of the three sample points collected are on a line, the last one is a special point ordinary. The vertical point of this point to the line is the original of coordinate after moved.
- (2) In the second step, if you don't press  key, you can preplace original of coordinate. (make a reference to 《2.3.2》).
- (3) If succeed, LCD will view "X-Axis skewed" or "Y-Axis skewed" on pic2.3.3-5, and the LED of Axis straightened will clear to zero; if all the points is the same, LCD will prompt "All points on a line", it means that the operation failed; if that, the LCD shows that "Skewing failed".
- (4) If coordinate skews succeed, press  key and release immediately, the box will switch incessantly between the skewed situation and no skew situation, if you press  key for 3 seconds, the box will rang with "hua hua", and the LCD will show as "Cleared!", it means that the skewed situation have been cancelled, and the coordinate returns to the original situation. now you can do the electronic straighten again.

Chapter Three Operate

This chapter describe how to measure、preplace or construct graphics feature with DC-3000,it will have a lot of concept,some of them have been mensioned on frontal chapters and so this chapter will not introduce them, in addition,this chapter will introduce the meaning of the information viewed by LCD and LED.

This chapter use pic3.1 for workpiece model, the following example use it for pattern.the workpiece is make up of some basic graphics feature, some workpieces such as point、line、circle、arc、angle、rectangle and screw etc. its measurement is basic graphics feature's measurement .as follows,we find out some concept used in DC-3000.



Pic3.1

3.1 Concept

DC-3000 is a multifunction digital display operation system, to be used with OVH, and it can be to used to measure delicate geometry-workpiece. Workpiece measurement includes straightening workpiece、building origin of coordinate、measuring workpiece by collecting sample points.

3.1.1 Graphics feature (Feature)

Basic graphics features produced by DC-3000 include point、line、circle. Angle and distance is a assembly of above-mentioned graphics, but at DC-3000 we regard them as graphics feature too. Graphics feature sometimes is short for graphics or feature.

3.1.2 Feature List

When new graphics is produced, it is placed in Feature List.DC-3000 can store 100 permanent graphicses(0~99) and 10 temporary graphicses produced recent (a0~a9),the temporary graphicses can be saved to permanent graphics feature list by STORE.the permanent graphics feature can be exported and saved to temporary graphics feature list.

3.1.3 Targeting Point

At measurement, the coordinate datas can be input into the DC-3000 system,and be computed by DC-3000 to get the datas of graphics which you want to measure. Others graphics measurement can collect at most 50 sample points except distance measurement.

3.1.4 Method of producing graphics

3.1.4.1 Graphics measurement

Collect sample points at the workpiece which will be measured and use these points to produce graphics, this menthod is called Graphics measurement.

3.1.4.2 Graphics presetting

Input the information of the graphics by keyboard and produce new graphics, this menthod is called graphics presetting.

3.1.4.3 Graphics construction

A method construct new graphics with frontal graphics.

3.1.5 Temporary graphics feature

The graphics feature produced by three above-mentioned methods will be saved temporary in memory, their positions are from a0~a9, every new graphics is saved in a0, original graphics move to a1, to reason by analogy one by one, the original graphics a9 will be covered. Temporary graphics will disappear after shutdown, can't be recover.

3.1.6 Permanent graphics feature

Use the function STORE, you can save temporary graphics feature to permanent graphics feature or save permanent graphics feature to another permanent graphics feature. The serial number is from 00 to 99, can save 100 altogether.

When you save graphics, it requests you input a serial number, if the position of this serial number have graphics, the new graphics will cover the old graphics. Permanent graphics feature can be stored after shutdown, when turn on the machine next time, you can call out and do operation to them.

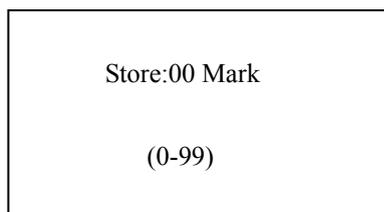
□Attention:

Graphics feature storage have two modes, temporary feature and permanent feature. Temporary feature will disappear after power-fail, but permanent feature still exist, so permanent feature is used for saving some staple and important feature. Temporary feature can be permanent feature by do operation of storing, and the permanent feature can be called out to be temporary feature a0.

3.1.7 Save graphics feature

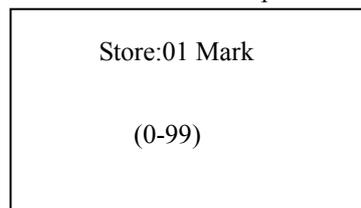
Operate as follows:

First step



Pic3.1-1

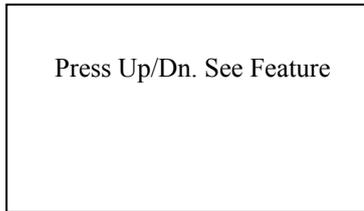
Return to normal situation, press  key. The information viewed in LCD point out the operator to input the serial number (like pic3.1-1).



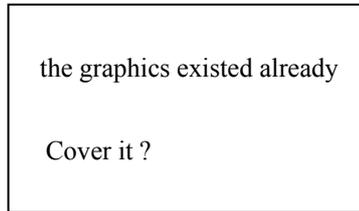
Pic3.1-2

Second step

A tolerant serial number shows at the LCD, if press  key direct to use the tolerant serial number, else please input a serial number. Like: after pressing  key the LCD shows as pic3.1-2(if this feature have existed already,LCD shows as pic3.1-3). Press  the enter or press  to quit.



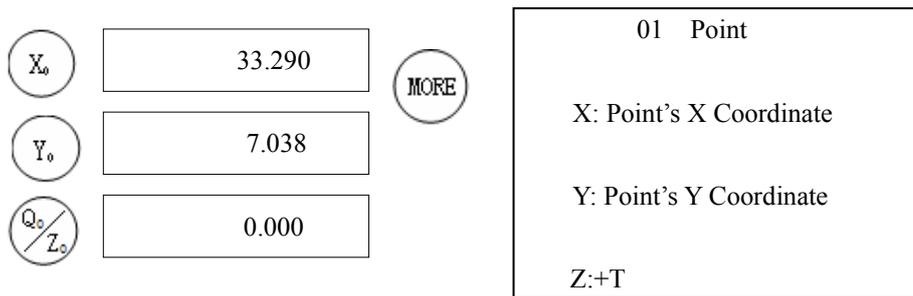
Pic3.1-4



Pic3.1-3

Third step

When the LCD shows as Pic3.1-4, Press  or  to find the graphics feature you want stored, the system views the information of present graphics feature, press  to enter. When the operation completed, the system views the information of the graphics feature which you stored just recently, like Pic3.1-5.

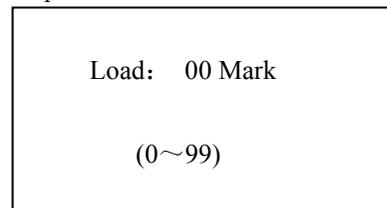


Pic3.1-5

□ **Attention:** the information showed at the LCD follows the practical situation.

3.1.8 Load graphics feature

Load the permanent feature have stored for temporary feature.



Pic3.1-6

First step

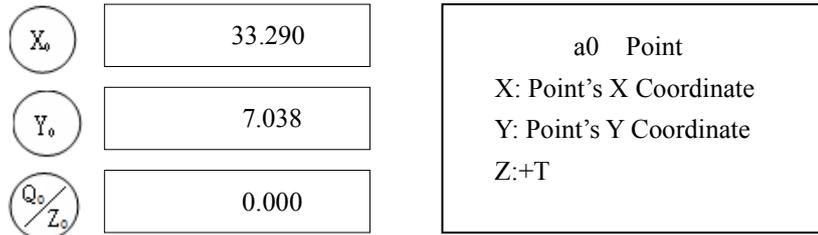
Press  , LCD shows like pic3.1-6. it request to input a serial number, and the LCD shows a tolerant serial number like Pic3.1-6.

Second step

If you use the tolerant serial number ,press  directly, else input a graphic serial number like 1, then press  to enter or press  to quit.

Third step

Then the LCD shows the information of present graphics feature, like pic3.1-7, means that the operation completed.



pic3.1-7

□ **Attention:**

- (1) It can't operate when the box is in other situation, now you must return to the normal situation
- (2) The information showed at the LCD follows the practical situation.
- (3) The result is in a0.

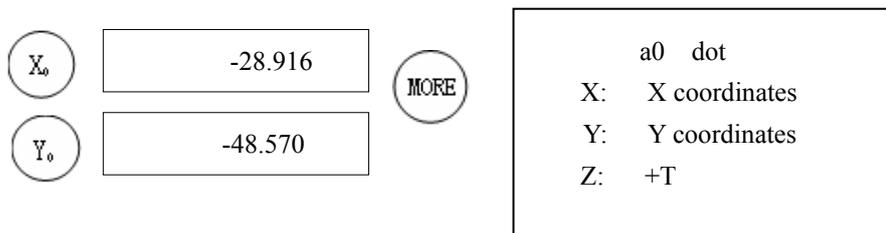
3.1.9 Method choice key



Length unit metric system and British system cut key. This place above indicating lamp bright expression current use unit of length is a British system, is not bright is the metric system.



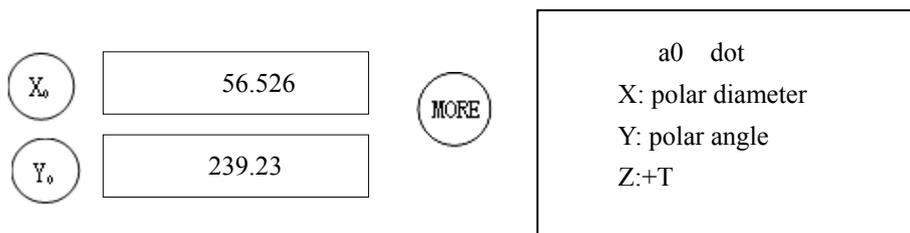
To coordinate system and relative coordinate system cut key. This place above indicating lamp bright expression at present the system is in the relative coordinate system, not bright indicated is in the absolute coordinate system. Rectangular coordinate system absolute Coordinate system choice cut key. Like the chart 3.1-8 is in the rectangular coordinate system next spot element displayed information.



Pic 3.1-8

Under rectangular coordinate system element displayed information

The chart 3.1-9 is in absolute Coordinate system under the identical spot element demonstration information.



Pic 3.1-9

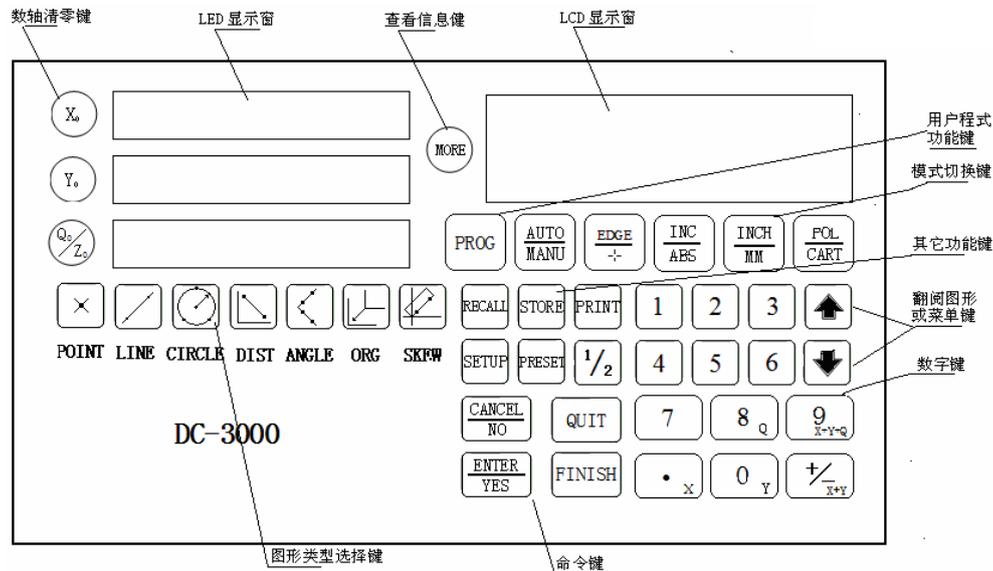
absolute Coordinate system elements displayed information

On chart 3.1-8 center LED demonstrated two values respectively are this and the coordinate system zero point in X and the Y axis direction deviation value. But attempts two values which on 3.1-9 center LED demonstrated, X axis value this is this and the coordinate system zero point distance, the Y axis value is this and the coordinate system zero point segment and the polar axis positive direction to the included angle. May refer to "2.2.3 Choices Polar coordinates/Rectangular coordinates". Above this cut key indicating lamp brightly indicates the present system use rho-theta system, otherwise uses the rectangular coordinate system.

3.1.10 key of graphics type select

Graphics type select key can select graphics measure, the structure function, presses these keys to inform DC-3000 at present to have to complete any operation.

When according to a graph type choice key, according to time enters the graph survey, in completes before the survey again presses the identical key to increase the sampling spot. When has pressed the graph survey key, on the LCD demonstration can prompt the user to have to survey any graph, surveys this graph to need to gather several types spots and so on.



POINT

Measure a position of point, require a sampling point.



LINE

Measure line, display information include angle and slope, the position of meeting point by vertical line who pass origin of coordinates and line. Require at least two sampling points but not more than fifty.



CIRCLE

Measure circle, the information of circle include the centre of a circle' coordinate, radius and diameter and the degree of proper circle. Require at least three sampling points but not more than fifty.



DISTANCE

Measure distance of the first sampling point to the second. Only require two sampling point.



ANGLE

Measure angle of two lines. Every line require at least two sampling points but not more than fifty.



ORG

Coordinate parallel move. Parallel move origin of coordinates to objective point.



SKEW

Straighten coordinate irregular workpiece. Pass over time of install or justification workpiece.

3.1.11 Key of command



Command key can be used for input sampling points, complete Measure, cancel or delete the last data item, quit operation and return to normal display state.

Input the sampling point data when measure graphics displayed in LED or validate parameter setting.



Input graphics feature when structure graphics accomplish. Validate print when want to print graphics feature.



Delete inputting sampling points when measure graphics or cancel the last inputting number when presetting.



Quit operation and return to normal display state, or return to previous menu when setting parameter.

3.1.12 Key of clear number axis

The left on LED of three row is the three keys of clear number axis. Corresponding axis data will be cleared then corresponding axis data will be cleared. You can parallel move origin of absolute or incremental coordinates by using them.

Attention:

- ◇ Can not clearing when the digital display is in other state.
If you want to clear, the digital display must be in normal display state. You can clear in INC/ABS states.
- ◇ When ABS(absolute coordinate) clearing, INC(incremental coordinate) cleared too.
When INC(incremental coordinate) clearing, ABS(absolute coordinate) not cleared.

3.1.13 Key of numbers

Used the digital data import. Below the regular display status, press key of number:  ,  ,  ,  ,



print present coordinate axis.

3.1.14 Else function key



Exhale out permanent feature save as temporary feature, always A0 operation such storage site. More information in 《3.1.8 Exhale out graphics feature》.



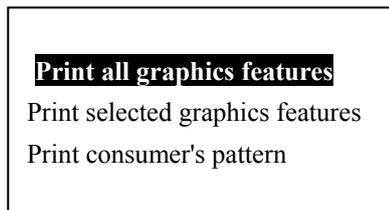
Save permanent feature and temporary feature as permanent feature in assign place. Minute view 《3.1.7 Graphics features stored》



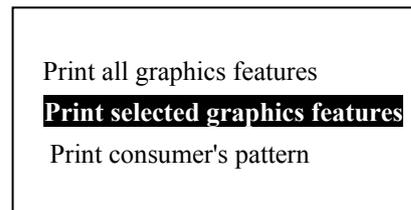
Print consumer's pattern or print graphics features. Print consumer's pattern will be explained in 《The 4th section: Consumer's pattern》, The next is introduced the way for print graphics features.

Step one:

Press  key, LCD will display as pic3.1-10.



pic3.1-10



pic3.1-11

Step two:

Press  or  key for select print mode. When the LCD display as pic3.1-11, express print

single graphics feature. Press  key then go into browsing the graphics feature.

Step three:

Press  or  key for browsing the graphics feature.

Press  key for selected graphics feature.

LCD display change: in front of graphics feature will display “*”, such as: “* a0”. Express selected the graphics feature.

Press  key, beginning print.

□ **Attention:**

- (1) The graphics feature must be stored when you want print it, otherwise you can't print it.
- (2) When print consumer's pattern, the import sequence sign is through 0 - 19. You must pay attention to this when print graphics feature.
- (3) If you want printing coordinate axis, the means introduced according to the top is can not complete. Pay

attention to these key: , , , ,  to show: X, Y, Z, X+Y, X+Y+Z and so on. Below the normal condition state press these key means print X axis, Y axis, Z axis, X and Y axis, X and Y and Z axis's position.



Go into system parameter setting. The 5th section will talk about how to setting system parameter.



Preset position of axis or preset graphics feature.



Part hair in the middle number axis. Numervalue shall be noic wadays display except for with two.

For example: X axis zero point builds up at the work heart.

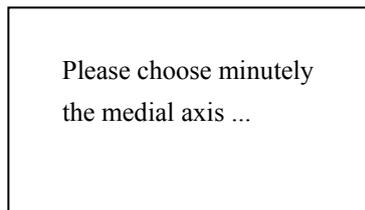
Step one

Move worktable make center point of reticle locate at one end of workpiece. Then press  key, clear X axis.

Step two

Move worktable make center point of reticle locate at other end of workpiece. Then

press  key, screen display as pic3.1-12



pic3.1-12

Step three

Press  key, X axis completed, Display screen return to normal state. Go on move worktable, find the point that X axis value is 0.000. The point is the workpiece's center of X axis.

□ **Attention:**

If you want to Y or Z axis, in step three press  or  key.

3.1.15 Key of consumer's pattern



Consumer's pattern is stored the press key sequence when measure accomplish or complete other function. In the future, take out these key action or edit them for add and delete some operation. Such instruction sequence is called consumer's pattern. The 4th section will talk about it.

3.2 Some explanation about DC-3000

3.2.1 Power cut memory

DC-3000 provide the power cut memory function, When the system falls the electricity, it can remember current condition immediately. After restores the power supply, it can restore to falls in front of the electricity the condition.

□ Attention:

- (1) After falls the electricity, temporary feature will vanish.
- (2) After falls the electricity, do not have to move the diffraction grating ruler, otherwise when turns on the power source once more cannot return to a survey the coordinate system.

3.2.2 Graphics feature information display

Graphics feature including dot, line, circle, distance, angle as well as rectangle and screw thread. Under cartesian coordinate and incremental coordinate, the display graphics feature information is different. When display graphics

dot coordinate has difference. Two coordinate systems display the information passable pressed  key to cut over.

Besides circle feature other graphics feature all passable pressed  key examination more information.

3.3 Prepares to measure the graphics

Measure process first step including setting measure and parameter, straighten the workpiece, setting origin of coordinates and so on. More information in 《2.2 Initialization system parameter》.

3.4 Straighten the workpiece

The coordinate system X or Y of axis rotation and translation with a side of the workpiece nearby some superposes, Is called straighten the workpiece. This function main effects is for help someone straighten the workpiece, Enhances the measure speed. When one side of the workpiece is irregular either has an angle with X or the Y axis, DC-3000's straighten workpiece function allows the operator to revolve an angle the coordinate system, Causes X or Y axis and one side of the workpiece some superposes, Transforms the mechanical coordinate into the workpiece coordinate. Each time measure a new workpiece should first use straighten workpiece function to be advantageous for the afterwards measure operation.

Straighten a workpiece, First measure some straight line on the workpiece, Latter revolves an angle with the coordinated system (The angle size for measures the straight line and X axis positive direction

to the included angle size) Causes some axis and this straight line superposition (This process automatically completes by the system). Measure straight line need two sampling points no more than fifty. It will produce quite precisely result when more than two sampling points. 《2.3.1 Straighten workpiece operation》, Specify how to straighten a workpiece in X axis direction.

3.5 Coordinate translation

When measure carries on the coordinate translation to be advantageous for the value data computation. (More information in 《2.3.2 Coordinate translation》)

3.6 DC-3000 Operation

This part will detail how to measure, structure and preset graphics. The graphics measure will include the dot, the line, the circle, the distance, the angle, the rectangle and the screw thread.

Attention:

- (1) Here operation and so on survey all supposes DC-3000 correctly to install. And any need measure or the display all has also established, Can satisfy the user's need. Each operation all is from the normal display state start.
- (2) In the operation above LCD display the value only is the example but the true value.

Measure graphics

Enters the measure graphics, a method is press the corresponding graphics type choice key, If measure dot

press  key enters measure dot.

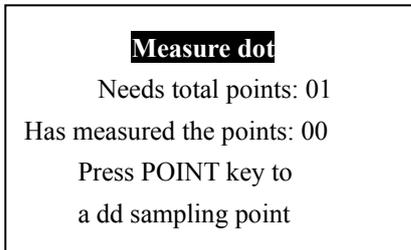
3.6.1 Measure dot feature

Measure dot is the simplest graphics survey, Because it only needs one sampling point to be allowed to define a position. May gather 1 to 50 sampling point, Then the system extracts their mean value to obtain the final dot feature.

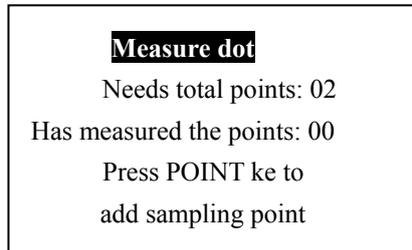
Dot measure

step one

Returns to normal display state, Press  key to enters measure dot function. This time this place above indicating lamp is bright, And LCD screen display like pic3.6-1. Numeral 01 indicated needs total sampling points, It may preset in the system setting. (Please refer 《The 5th section: System parameter setting》 and 《5.3.10 Setting sampling point for measuring dot》).



pic 3.6-1



pic 3.6-2

Attention:

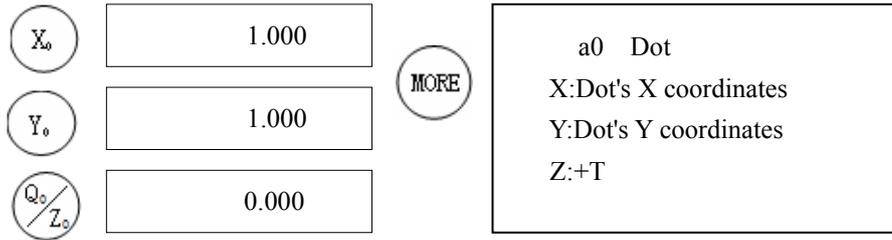
Sampling points display requests which in this example on LCD screen. The fourth line of prompt display which according to the LCD screen on may increase the sampling points according to this graphics survey

key. Press  key sampling point add one, like pic3.6-2.

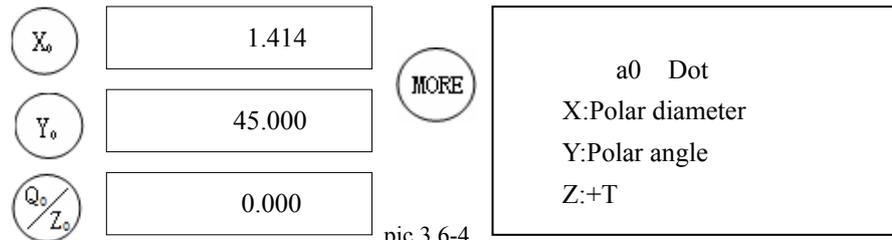
Step two

Moves the work table causes projection screen reticle's central point to aim at on the workpiece's sampling point,

Press  key, Measure graphics completes, This graphics also will increase to the graphics feature tabulates. Measure graphics look like pic3.6-3. On the LCD screen information indicated, Graphics a0 is a dot graphics. On current LED X axis and the Y axis Windows demonstrated data for this place list price. The Z axis Windows demonstrated the data is the spot +T value. It expresses the maximum distance value with graphics a0 and sampling point.



pic 3.6-3



pic 3.6-4

Explication:

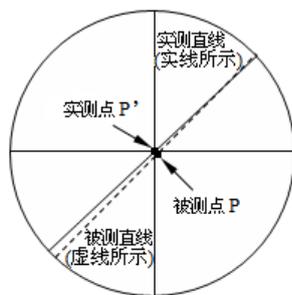
Under rectangular coordinates, Dot feature displayed information including X and Y coordinates position and +T value. pic3.6-3 Demonstrated the information expressed this is the dot feature which temporarily stores, Its rectangular coordinate position is(1.000,1.000). On LCD display the third line expressed LED Z the axis Windows

demonstration graphics feature +T value, its +T value is 0.000. Press $\frac{POL}{CART}$ key transforms the cartesian coordinates to the polar coordinate system, Under polar coordinate dot feature display content like pic3.6-4. X axis display the value expresses this to the current zero point distance, But the Y axis value expressed this with current zero point segment with X axis positive direction to clamps'degree.This dot's +T value is same with front.(pic3.6-3)

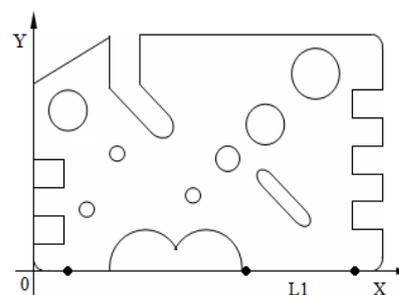
3.6.2 Measure dot feature

Measure a line feature on one side of workpiece through gathering 2 to 50 sampling point.Two point can determine a straight line in the geometry.But has several reasons in the survey to be able to create the error.

First is the machine itself error, Second is the aiming error, Third is miscounts.like pic3.6-5 Demonstrated has located a pattern sampling process with the cross.This was enlarged.Shortly comes in the person nearly not to have the error, this kind of error is the aiming error.Generally, in most wide range as far as possible gathers several types spots in the straight line to be possible to increase the graph element the precision.The gathering sampling points can display on the screen.When the sampling points more than two , The system basis samplingpoints extract a most appropriate straight line according to the use fitting algorithm.Reflected the straight line precision data +T and -T also can also extract. like pic3.6-6 Straight line L1, sampling takes in the pic three black points.



pic3.6-5

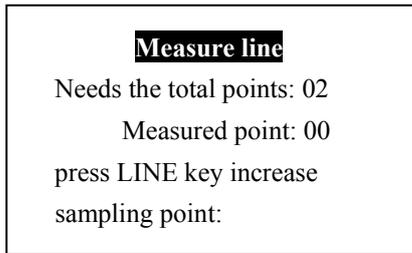


pic3.6-6

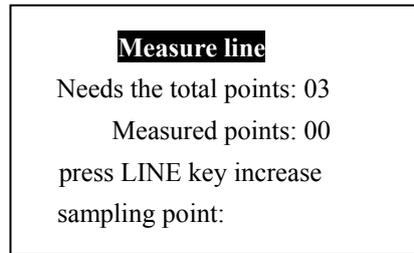
Measure line

Step one

Returns to the normal display state, Press  key to enters measure line. If has not completed in the survey, presses this key again will be increase the sampling points. like pic 3.6-7 On the LCD display monitor demonstrated measuring line now. The fourth line of prompt expressed presses  key again to be possible to increase needs a sampling total.



pic 3.6-7



pic 3.6-8

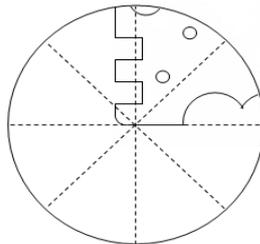
Step two

Press  key again, increase a sampling point. This time on LCD display like pic 3.6-8. Meant must measure this straight line to have to gather three sampling points at the present.

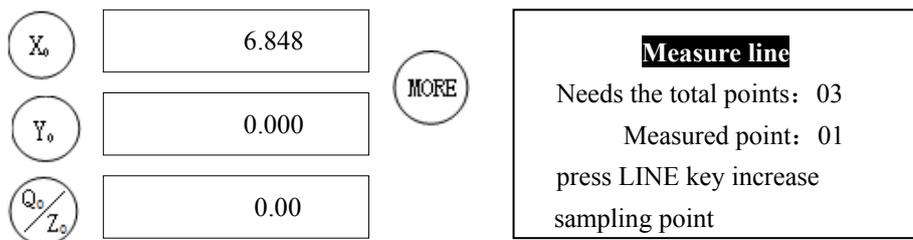
Step three

Moves the worktable's projection screen reticle centralized positioning hopes sampling point on the workpiece. like pic 3.6-9. Press  key, Localization objective point's position display in pic 3.6-10.

On the LCD display monitor demonstrated measured sampling point number increases 1. (After had measured a sampling points press  key, automatically increases 1)



pic 3.6-9



pic 3.6-10

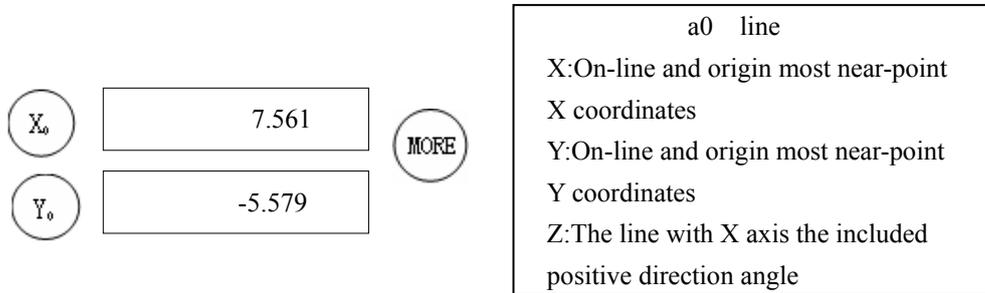
Technique:

When measure line gathers the sampling points must evenly distribute in line, also the sampling points is good at

more than two.

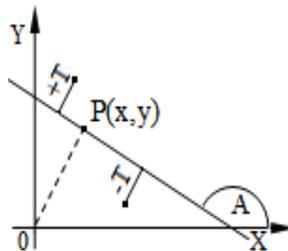
Step four

After continues the above step to gather sampling points to arrive needs points, Namely had measured the points and need the total points to be equal time, Automatic stop measure, Simultaneously the display monitor can demonstrate the graphics data like pic3.6-11.

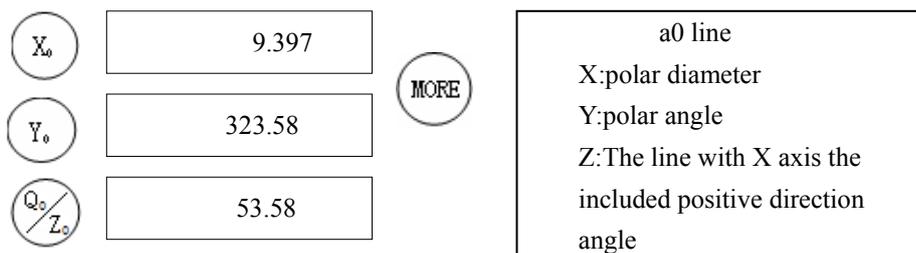


pic 3.6-11

In the picture on LCD demonstrated indicated this is a straight line, Its storage location in a0, On the LED Windows X, the Y axis demonstration is in this straight line some dot's coordinate value. This dot for hangs the origin of coordinates to this straight line (like pic 3.6-12 dot P). Its rectangular coordinates are (7.561, -5.579). The Z Windows demonstrates this straight line the angle (Namely this straight line included angle which positive direction approaches with X axis, like pic 3.6-12 angle A) is 53.58° . Press $\frac{\text{POL}}{\text{CART}}$ key return to polar coordinate system, Display monitor demonstration like pic3.6-13.



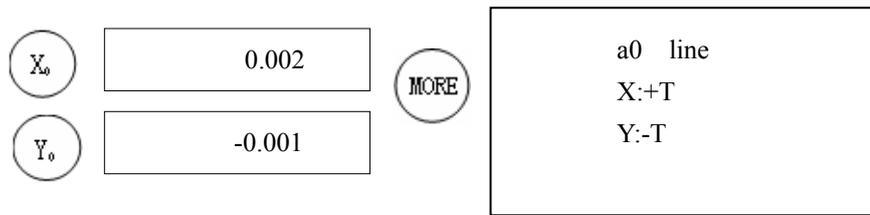
pic3.6-12



pic 3.6-13

Step five

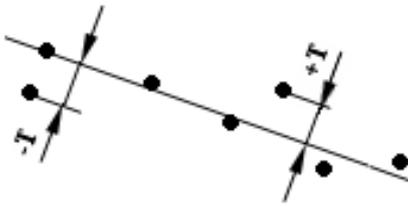
Press $\frac{\text{MORE}}{\text{MORE}}$ key, display like pic 3.6-14. On LCD demonstrated indicated on LED demonstrates is this straight line a0 straight dimension (Namely +T and -T value). Place above +T expression straight line is right and the straight distance maximum spot distance, But -T underneath expressed the straight line is left and the straight distance maximum spot distance. Straight line's +T and -T like pic3.6-12 and pic 3.6-15.



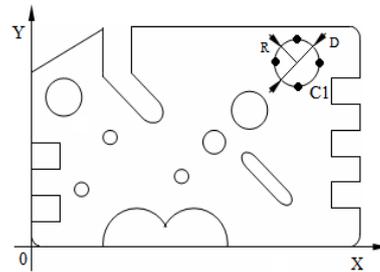
pic 3.6-14

Attention:

In operating process, you can press **QUIT** key to quit operation, when measure line, must gather the different sampling points, Otherwise display monitor demonstration“Same sampling point!”, The operation is not successful, The display monitor returns to the normal display state.



pic3.6-15



pic3.6-16

3.6.3 Measure circle feature

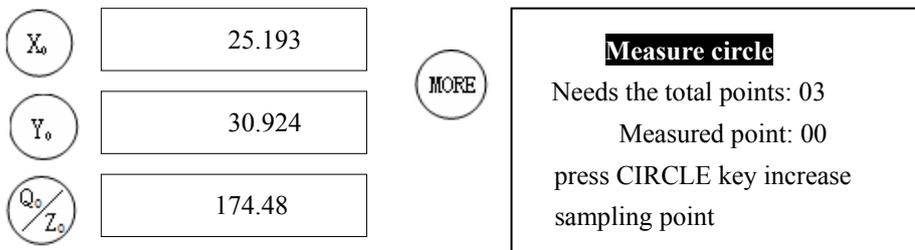
Measure circle passable has gathered 3 to 50 sampling points. Generally, three points may extract the circle's parameter, For the precision measuring, the gathering sampling points should be more than 3, Also the sampling points should evenly distribute in the circumference, Such system uses the fitting the algorithm to calculate measures the circle the parameter, +T and the -T value has reflected the result circle real roundness. We measure circle C1 like pic3.6-16 next.

Measure circle

Step one

Returns to the normal display state, Press  key to enters measuring circle, Display monitor demonstration like pic3.6-17 now. If has not completed in the survey presses this key again to be able to increase the sampling points. like pic 3.6-17. On the LCD display monitor demonstrated the explanation measuring circle at present ,

Altogether must gather 3 sampling points, The fourth line of prompt tells you to press  key to increase the sampling spot again. May preset the circle inside the system setting to need sampling total points (More information in 《The 5th section: System parameter setting》 and 《5.3.12 Setting points which circle needs》) .



pic 3.6-17

Measure circle
 Needs the total points: 04
 Measured point: 00
 press CIRCLE key increase
 sampling point

pic3.6-18

Step two

Press  key again, increase one sampling point. This time on LCD demonstrates like pic3.6-18. Meant measure this circle have to gather 4 sampling points.

Step three

Moves the work table causes projection screen reticle's central point to aim at on the workpiece's sampling point,

Press  key, Localization objective point position demonstration in pic3.6-19. Simultaneously the LCD display monitor demonstrated already the measuring point quantity increases 1. (Measured sampling points number automatically increases one when press  key).

	58.927		<p>Measure circle</p> <p>Needs the total points: 04</p> <p>Measured point: 01</p> <p>press CIRCLE key increase sampling point</p>
	-44.537		
	0.00		

pic 3.6-19

Technique:

Gathers sampling points must evenly distribute in surveys in the circumference.

Step four

After continues the above step to gather sampling points to arrive needs points. Namely had measured the points and need the total points to be equal time, Automatic stop measure, At the same time, the circle data will demonstrate (like pic 3.6-20). On LCD demonstrated indicated this is a circle, Its storage location in a0, On the LED Windows demonstrates is this circle center of a circle coordinates and the radius value.

	8.024		<p>a0 circle</p> <p>X: Center of a circle X coordinates</p> <p>Y: Center of a circle Y coordinates</p> <p>Z: radius</p>
	23.962		
	56.706		

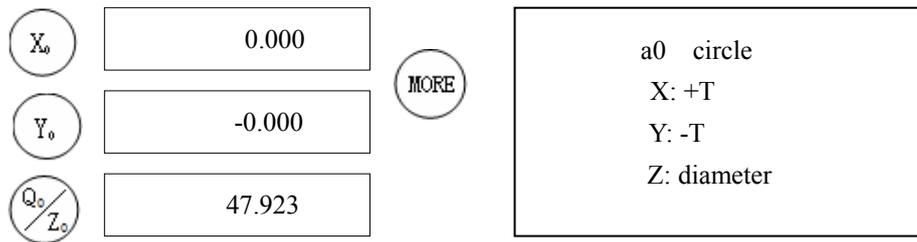
pic 3.6-20

On the LED Windows X axis Windows can demonstrate the center of a circle X axis grid reference, The Y axis Windows can demonstrate the center of a circle the Y axis grid reference, The Z axis Windows can demonstrate this circle the radius.

Step five

Press  key again, display like pic3.6-21. On LCD demonstrated the content indicated On the LED Windows X

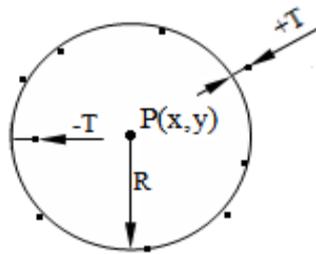
axis, in the Y axis Windows demonstrates is this circle real roundness(Namely +T and -T value), In the Z axis Windows demonstrates is this circle diameter value.+T expresses outside circle to circumference in distance maximum spot distance, But -T expresses in circle to circumference in distance maximum spot distance.



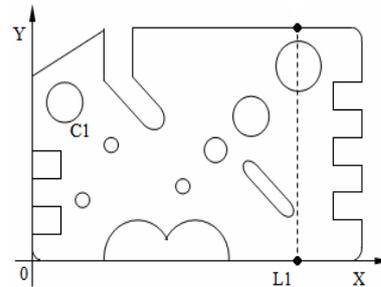
pic 3.6-21

Attention:

- (1) In operating process, Press key to quit operation, When measuring circle, Sampling points must not in the identical line, Otherwise display monitor demonstration “The survey is not successful, sampling points in identical line! ”.
- (2) In round center of a circle coordinates, radius, real roundness +T and -T. like pic 3.6-22.



pic3.6-22



pic 3.6-23

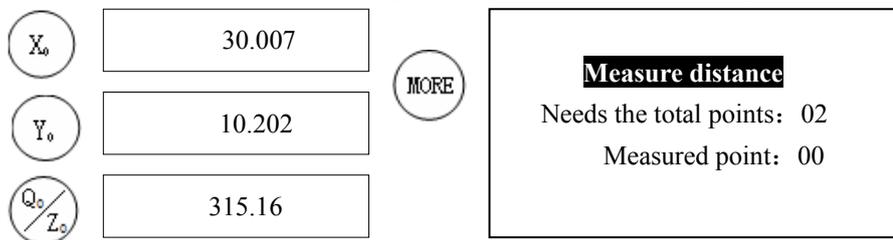
3.6.4 Measure distance feature

Through gathers two types spots survey distance. Supposes the sampling points pattern request to gather 2 points in advance, Every time gathers a sampling point, Had measured the points add one. This subtotal survey like pic 3.6-23 Two points distances.

Measure distance

Step one

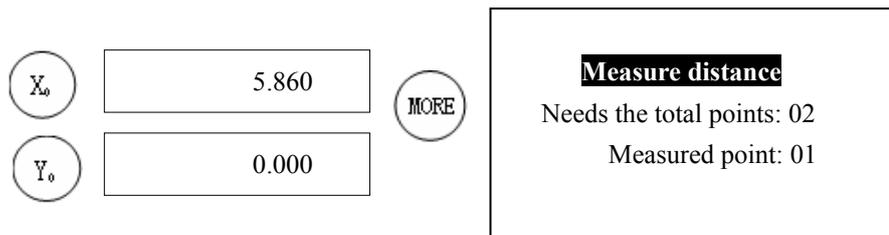
Press key to enters measure distance, display monitor demonstration like pic 3.6-24.



pic 3.6-24

Step two

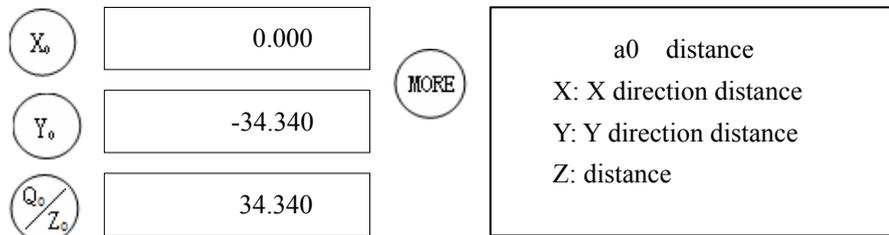
Moves the work table reticle centralized positioning on the first sampling point, Press key. Localization objective point position demonstration in pic 3.6-25, Simultaneously had measured the sampling points increase 1.



pic 3.6-25

Step two

Moves the work table reticle centralized positioning on the second sampling point. Press ENTER
YES key, After achieved needs points, Namely had measured the points and need the total points to be equal time, Survey conclusion. On demonstrates immediately from the graph element data in pic 3.6-26. On the LCD screen demonstrated pointed out graph a0 is a distance, In the LED Windows X, Y, on the Z axis Windows respectively demonstrates is two types spots on X axis difference, on the Y axis difference and two spots actual distance.



pic3.6-26

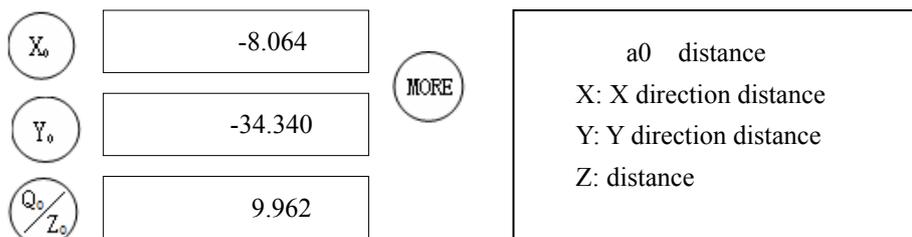
Step four

Press MORE key, May examine more informations about distance. Because is two spots distances therefore the point blank range, the most long-distance range and are away from all is same.

Explanation:

There are three screens information from the distance feature.

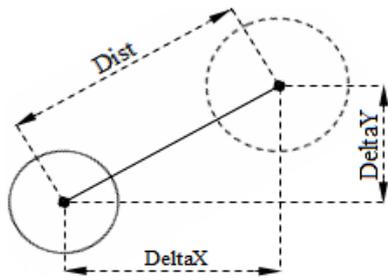
1) Distance feature displayed information like pic(3.6.4-1).



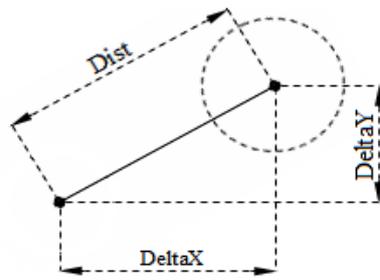
pic 3.6.4-1

On LCD demonstrates "01 distances" in the information 01 expressions to be supposed to be away from the element is the permanent storage element. The concrete content sees the pic 3.6.4-2. pic3.6.4-2's pic(a)、pic(b) and pic(c). Separately expresses circle to circle, the dot to circle and the line and circle distance practical significance.

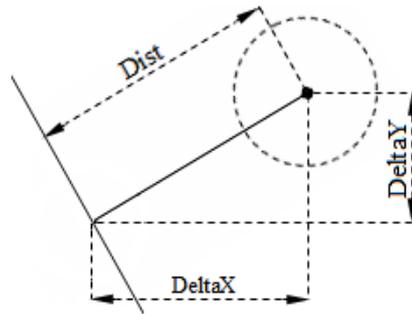
- X window: Δx
- Y window: Δy
- Z window: distance $\sqrt{\Delta x^2 + \Delta y^2}$



a) Two circles's distances



b) Dot to circle's distance



c) Line to circle's distance

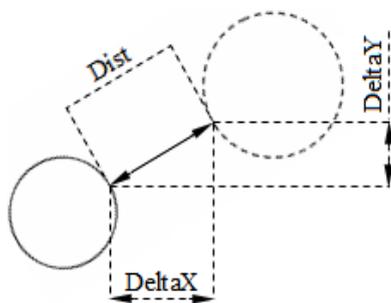
pic 3.6.4-2

2) Press MORE key, Demonstration like pic 3.6.4-3 displayed informations.

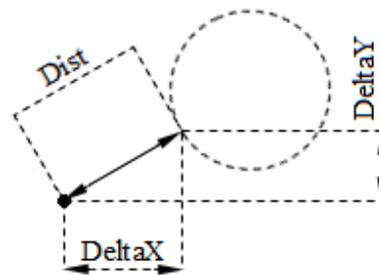
X_0	-4.037	MORE	01 minimum distance X: X direction distance Y: Y direction distance Z: distance
Y_0	2.928		
Q_0 / Z_0	4.987		

pic3.6.4-3

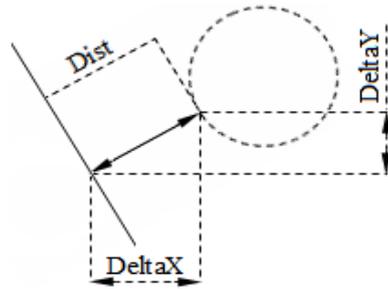
X, Y, Z axis demonstrated the value separately expresses in two graphs elements in X direction, the Y direction the most near-point difference (like pic3.6.4-4(a) DeltaX, DeltaY) In two graphics feature most near-point actual distance (like pic3.6.4-4(a) Dist), pic3.6.4-4(b) and (c) Separately expresses to between the circle and the line and the circle point blank range.



a) Two circles minimum distance



b) Dot to circle's minimum distance



c) Line and circle's minimum distance

pic3.6.4-4 minimum distance

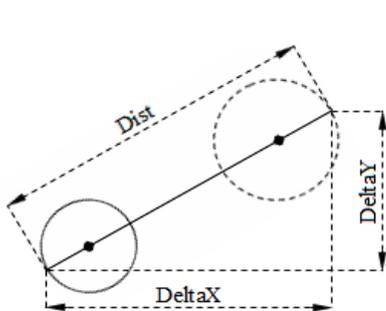
3) Press **MOORE** key, Demonstration like pic 3.6.4-5 displayed informations.

X₀	-4.037	MOORE	01 minimum distance X: X direction distance Y: Y direction distance Z: distance
Y₀	2.928		
Q₀/ Z₀	4.987		

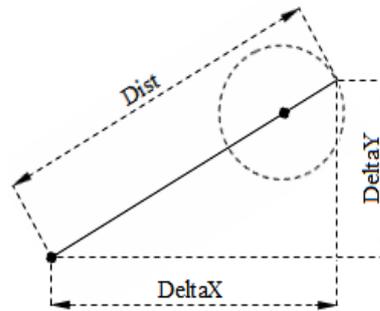
pic 3.6.4-5

X, Y, the Z axis demonstrated the value separately expresses in two graphs elements in X direction, the Y direction the most distant point difference(pic 3.6.4-6(a)DeltaX、DeltaY)In two graphics feature most distant point actual distance(pic3.6.4-6(a)Dist).

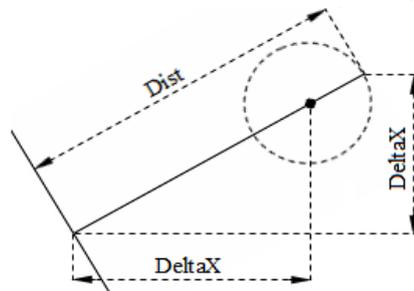
pic3.6.4-6(b)and(c)Separatelyexpresses to between the circle and line to circle max distance.



a) Two circle's max distance



b) Dot to circle's max distance



c) Line to circle's max distance

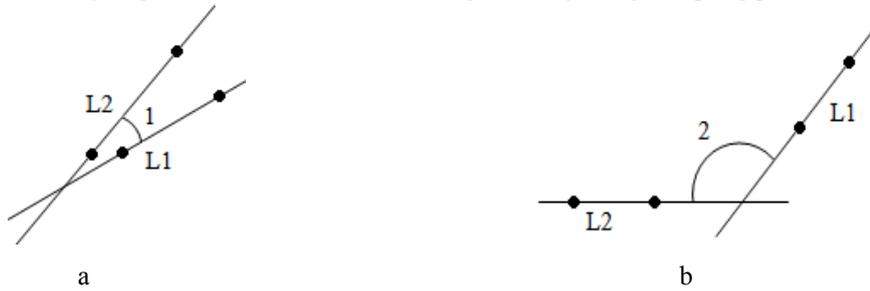
pic 3.6.4-6 max distance

3.6.5 Measure angle feature

Measuring angle feature has two methods:

- 1) Measure angle feature by two sides.
- 2) Measure angle feature by three sampling point (First sampling point must be an apex).

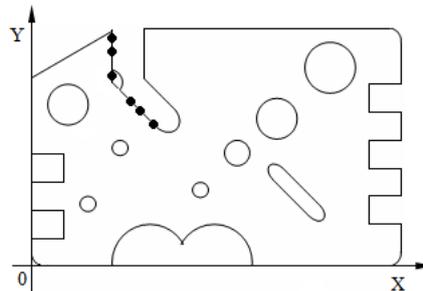
Uses the first method,DC-3000 system prompts the user Completes gathers the type spot, the structure angle, the computation apex process in two straight lines step by step.Each line may gather 2 to 50 sampling point.Generally, wants a precise survey angle that to have to use the straight line by many sampling points.



pic 3.6-27 line order in measure angle

Attention:

Use DC-3000 measure angle, The survey order must understand.In the survey process the first coarse thread, the second coarse thread is does not have fixedly, Generally, when survey the second coarse thread and the first coarse thread constitute the included angle is the counter clockwise revolves from the first straight line to the second straight line. like pic 3.6-27Shows for the angle constitution situation.In pic a, measure angle 1, first measure L1 then measure L2.In pic b, measure angle 2, first measure L1 then measure L2, Like this surveys the result is correct.Like this, Also has the similar problem by three surveys angles degree-hour, when survey must understand the measuring point the order.



pic 3.6-28

Attention:

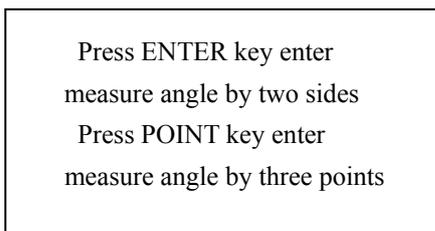
Measuring angle feature has two methods.In this example we are with the commonly used method, measure angle by two sides.like pic3.6-28.

Measure angle

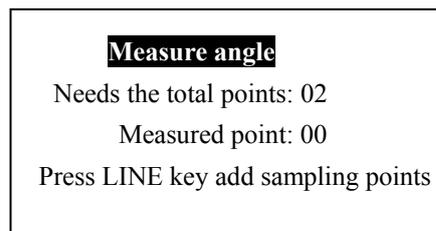
Step one

Press  key , enter measure angle , LCD display like pic3.6-29.The demonstration content prompts

us,Press  key enter measure angle by two sides, Press  key enter measure angle by three points.



pic 3.6-29



pic 3.6-30

Step two

Press key Enters two insulating clamps angles survey.LCD demonstration like pic 3.6-30.Its content pointed out the survey line needs the sampling points is two, Press key add one sampling points.Press key add one sampling point again.

Step three

Moves the work table,projection screen's reticle aims the first straight line's first sampling point, Press key, Its position data like pic 3.6-31.Its LCD demonstration content pointed out the present has gathered in the first straight line first type spot.

X_0	25.889	<input type="button" value="MORE"/>	<p style="text-align: center;">Measure angle</p> <p style="text-align: center;">Needs the total points: 03</p> <p style="text-align: center;">Measured point: 01</p> <p style="text-align: center;">Measure first line</p>
Y_0	31.456		
Q_0/Z_0	0.00		

pic 3.6-31

Step four

Moves the work table,projection screen's reticle aims the first straight line's second sampling point ,

Press key, Its position data like pic 3.6-32.

X_0	24.045	<input type="button" value="MORE"/>	<p style="text-align: center;">Measure angle</p> <p style="text-align: center;">Needs the total points: 03</p> <p style="text-align: center;">Measured point: 02</p> <p style="text-align: center;">Measure first line</p>
Y_0	29.984		
Q_0/Z_0	0.00		

pic 3.6-32

Step five

Continues the fourth step, inputs after this angle first straight line all types spot completes, The first article straight line data can calculate based on the system, Then surveys the second straight line.The LCD screen first demonstrates

like the pic3.6-33 and demonstration like pic 3.6-34 shows content. Press key add one sampling point.

Measure angle

Needs the total points: 03

Measured point: 03

The first line measured accomplish

pic 3.6-33

Measure angle

Needs the total points: 02

Measured point: 00

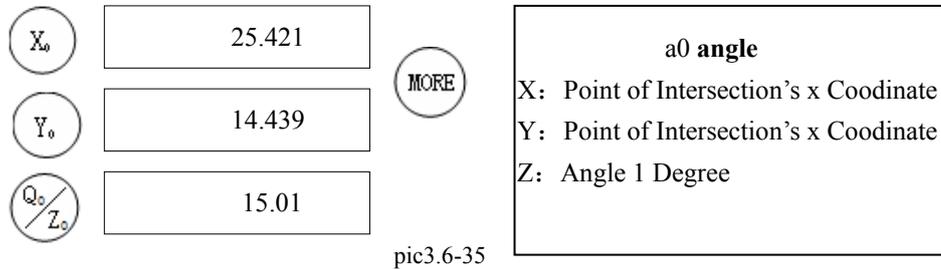
The second line measured accomplish

pic 3.6-34

Step six

According to third, the fourth step method on gathers all sampling point nearby angle second.The gathering type points achieved when request sampling points, namely had measured the points and need when the total points is

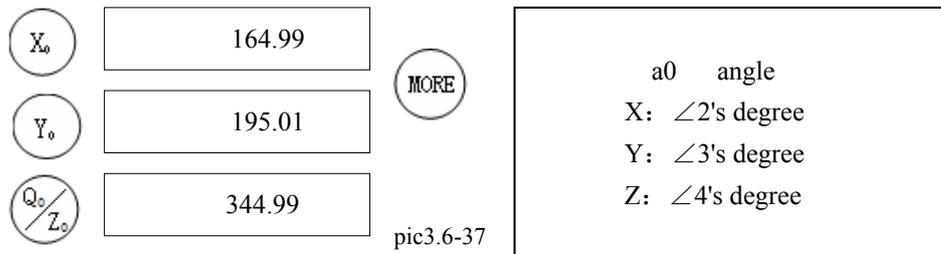
same, the angle element increases to temporarily stores the graph element to tabulate, Its data like pic 3.6-35 shows. On the first screen X axis demonstrates is by the take a bearing apex X coordinates, on the Y axis is demonstrated is by the take a bearing apex Y coordinates, on the Z axis is demonstrated is by the take a bearing size. The pic 3.6-36 showed by the take a bearing and with between other three angles relations which is connected by the take a bearing.



pic3.6-35

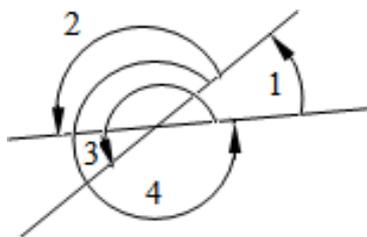
Step seven

Press **MORE** key, DC-3000 displayed $\angle 2$, $\angle 3$ and $\angle 4$'s value, like pic3.6-37.

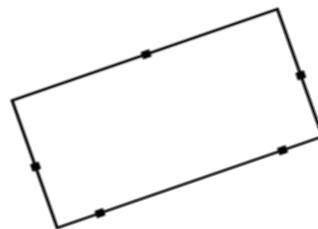


pic3.6-37

Press **MORE** key, The display monitor demonstrated returns to the sixth step of demonstration, so may circulate demonstration.



pic 3.6-36



pic 3.6-38

3.6.6 Measure rectangle feature

The rectangular survey in DC-3000 is one kind of special graph survey function. We introduce its operating procedure.

Attention:

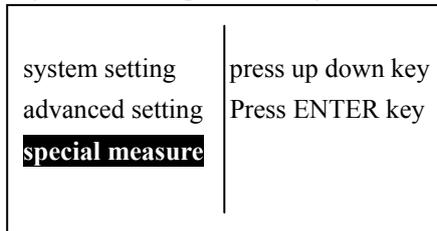
Uses the DC-3000 survey rectangle, must gather five types spots, also a sampling method must defer to pic 3.6-38 to gather.

First, the second type spot must nearby the rectangular identical strip on, then on gather other three types spot nearby other three. Also the gathering order is carries on gathering according to clockwise or the counter clockwise.

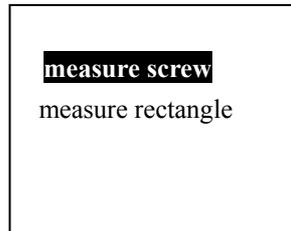
Measure rectangle

Step one

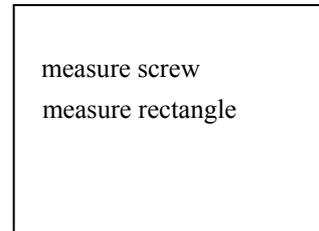
Press  key enters the parameter setting menu, The menu third item is the special measure. Press  or  key Selects the special survey, On the LCD screen demonstrated like the pic 3.6-39 shows.



pic 3.6-39



pic 3.6-40



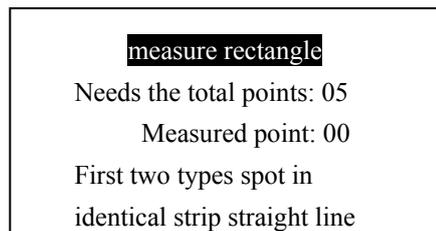
pic 3.6-41

Step two

Press  key enter special measure, The LCD screen demonstrated like the pic 3.6-40 shows the content, In the special survey first item is the thread survey. Press  or  key select measure rectangle, LCD to demonstrate like the pic3.6-41 contents.

Step three

Press  key enter measure rectangle. DC-3000 Demonstration content like pic 3.6-42, Indicated the present enters the rectangular survey prompt information to tell you to survey the rectangle to need to gather 5 sampling points.

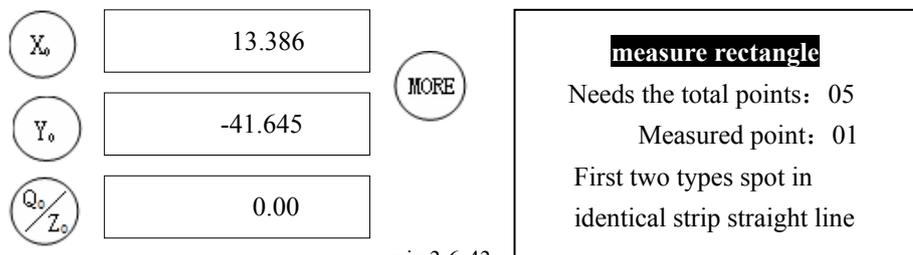


pic 3.6-42

Step four

Moves the work table, projection screen's reticle aims rectangular some side on the first sampling point,

Press  key, Its first sampling point position data like pic3.6-43.



pic 3.6-43

Step five

Moves the work table, projection screen's reticle aims nearby a step sampling on second sampling point,

Press  key, Its second sampling point position data like pic 3.6-44.

X_0	7.311	MOORE	measure rectangle Needs the total points: 05 Measured point: 02 According to clockwise or counter clockwise survey
Y_0	-4.615		
Q_0/Z_0	0.00		

pic 3.6-44

Step six

Moves the work table, projection screen's reticle aims the first step sampling adjacent side on to gather the third sampling point. Press **ENTER**/**YES** key, Its position data like pic 3.6-45.

X_0	2.818	MOORE	measure rectangle Needs the total points: 05 Measured point: 03 According to clockwise or counter clockwise survey
Y_0	5.570		
Q_0/Z_0	0.00		

pic3.6-45

Step seven

Go on gather two sampling points in opposite side and another side. After the gathering sampling point finished, the system calculate rectangular's parameter, The rectangle will increases to temporarily stores table. Its result like pic 3.6-46. In the pic on LCD demonstrated the content indicated a0 is a rectangle, Corresponds on X, the Y axis demonstration value is respectively long be this rectangle and the width, on the Z axis demonstration value for this rectangular central point X coordinates.

X_0	12.211	MOORE	a0 rectangle X:Rectangular length Y:Rectangular width Z:Central X coordinates
Y_0	9.726		
Q_0/Z_0	11.353		

pic3.6-46

Step eight

Press **MOORE** key, Will show the information, On X axis demonstration value is the rectangular central point Y coordinates, on the Y axis demonstration value is the rectangular area, on the Z axis demonstration value is the rectangular perimeter. like pic3.6-47.

X_0	0.785	MOORE	a0 rectangle X:Central Y coordinates Y:Rectangular area Z:Rectangular perimeter
Y_0	118.764		
Q_0/Z_0	43.874		

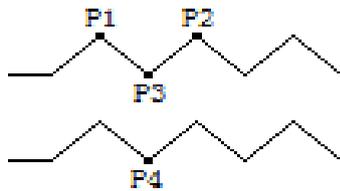
pic3.6-47

3.6.7 Measure screw

The thread survey is in DC-3000 another kind of special graph survey function, Its can survey the thread type has 1)common screw thread 2)metric trapezoidal screw thread 3)buttruss screw thread 4)miniature screw thread.

Attention:

When measure screw must gather four sampling point, Gathers the sampling points in the thread, like pic 3.6-48 to show.A sampling order is P1, P2, P3, P4. Picks the spot according to such method to be able to obtain the correct result, otherwise the result is not correct.

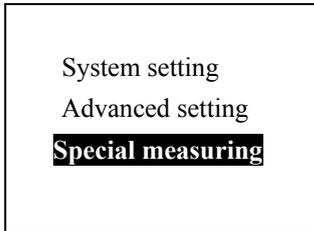


Pic 3.6-48

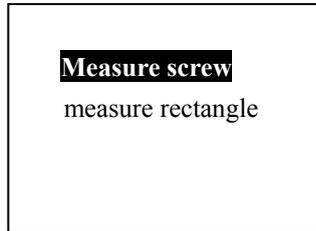
Measure screw

Step one

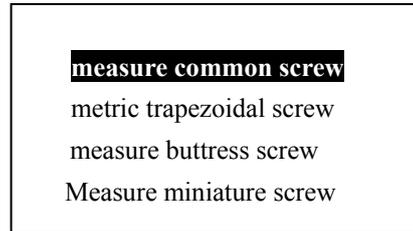
Returns to the normal demonstration state, Press key enters the parameter establishment menu. Press or key, Selects the special survey option. LCD demonstrated like the pic 3.6-49 shows the content.



pic3.6-49



pic3.6-50



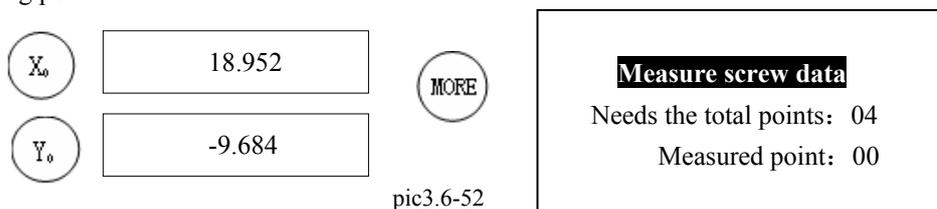
pic3.6-51

Step two

Press key enters special measuring, LCD demonstrates like the pic 3.6-50. In the special survey first item is the thread survey.

Step three

Press key enters screw measuring. On DC-3000 LCD demonstration like pic 3.6-51. Then chooses the thread type, choose other types the thread, Press or key Selects other types the thread. Press key enters measure common screw. LCD demonstrated like the pic 3.6-52 shows the content, waited for the operator inputs the sampling point.



pic3.6-52

Step four

Moves the work table, projection screen's reticle will aim the first sampling point (Like pic 3.6-48 P1), pressed

ENTER
YES key, its first type spot position data like pic 3.6-53.

Measure screw data
 Needs the total points: 04
 Measured point: 01

pic3.6-53

Step five

Moves the work table, projection screen's reticle will aim the second sampling point(Like pic 3.6-48 P2), pressed

ENTER
YES key, its first type spot position data like pic 3.6-54.

Measure screw data
 Needs the total points: 04
 Measured point: 02

pic3.6-54

Step six

According to 4th and 5th steps of institutes states. Gather sampling point P3, P4 In turn.

After gather P4, the measuring automatically completes, the system idea figures out surveys the thread the parameter. The screw thread graphics will increase to temporarily stores the graphics feature to table and demonstrated its result like pic3.6-55 will show.

In the pic on the LCD screen demonstrated the content indicated a0 is a thread, corresponds to X, Y, on the Z axis demonstration value respectively be this thread pitch, the pitch diameter and the thread's lead angle.

a0 screw
 X: apparent pitch
 Y: pitch diameter
 Q: lead angle

pic3.6-55

Step seven

Press **MORE** key Will see this information like pic 3.6-56. Demonstrates is measures the thread's butt end diameter and trail diameter.

a0 screw
 X: butt end diameter
 Y: trail diameter

Pic 3.6-56

3.7 Preset graphics

The DC-3000 system provides from the digital keyboard inputs the graph data the method to produce a new graph element, This method is called the preset graphics. The graph element which uses which this method to found the graph element and the use gathering type spot survey obtains to be same, the difference lies in the initialization the graph is only through the keyboard entry, is an ideal graph, therefore it does not have the erroneous value. May initialize the graph a little, the line, the circle, the distance, the angle and straight, but also may initialize X axis coordinates, the Y axis coordinates, the Z axis coordinate figure.

The pre-placed graph general step includes:

- Press  key, enters preset graphics.
- According to graphics type choice key to choice.
- Inputs this type data.

Gives an example for The preset graphics:

For example:

How has the under example demonstrated the pre-placed graphics.

□ **Attention:**

- (1) Initializes the element which obtained arrives for to temporarily store the element.
- (2) After enters the graphics preset function, carries on the initialization according to the graphics type choice key, presses other keys to withdraw from the pre-placed function

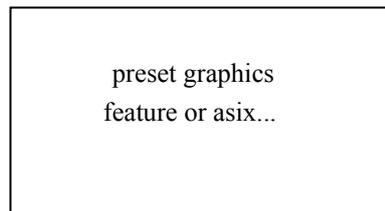
3.7.1 Preset dot

Step one

Returns to the normal display state,

Press  key, enters preset graphics function.

LCD displayed like the pic 3.7-1 shows.



Pic 3.7-1

Step two

According to graph type choice key,

Press  key, enters preset dot.

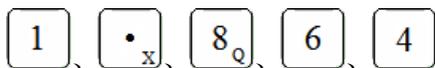
LCD displayed like the pic 3.7-2 shows.

This time waits for the input data.

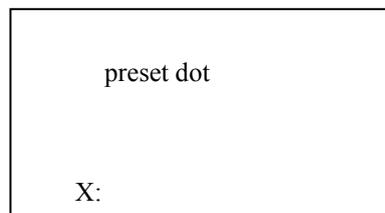
Step three

Use numeral keyboard input data 1.864.

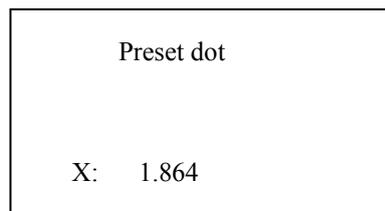
Then the pressed key order is in turn



LCD displayed like the pic 3.7-3 shows.



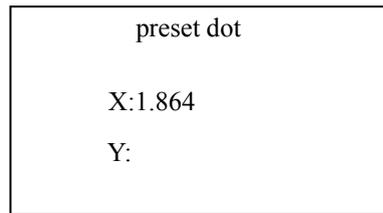
Pic 3.7-2



Pic 3.7-3

Step four

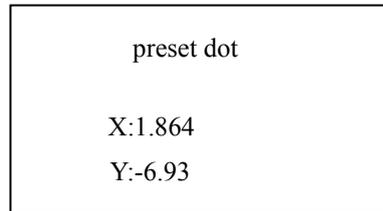
Press  key, input data,
LCD displayed like the pic 3.7-4 shows.



Pic 3.7-4

Step five

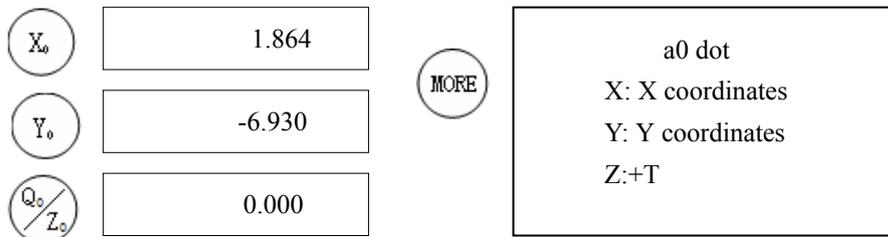
Press , , , , 
Key. LCD displayed like the pic 3.7-5 shows.



Pic 3.7-5

Step six

Press  key, like pic 3.7-6. Preset dot feature accomplish.



Pic 3.7-6

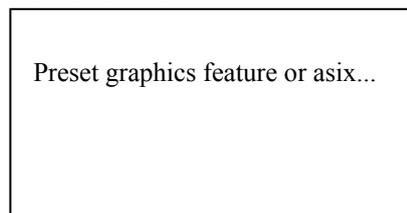
Attention:

When the data has mistake also has not pressed  key. You can press  key cancellation input a numeral. Also may carry on does not start the data-in condition. In above the DC-3000 graph like spot, the line, the circle, the distance, the angle and straight the method which all may use describes them to initialize, only is each kind of graph data item different, thus demonstrated the screen is somewhat different.

3.7.2 Preset line feature

Step one

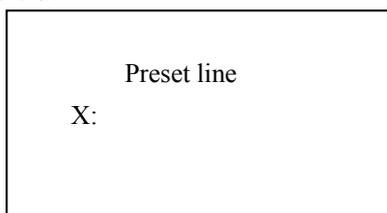
Returns normal display state, Press  key,
LCD displayed like the pic 3.7-7.



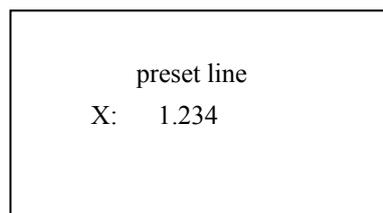
Pic 3.7-7

Step two

Press graphics type choice key , LCD displayed like the pic 3.7-8. Input X axis the coordinate figure 1.234, like pic 3.7-9.



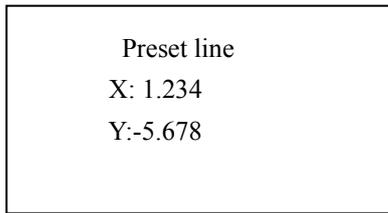
Pic 3.7-8



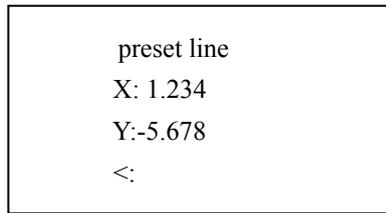
pic 3.7-9

Step three

Press  key Input Y axis the coordinate figure -5.678, like pic 3.7-10.



Pic 3.7-10

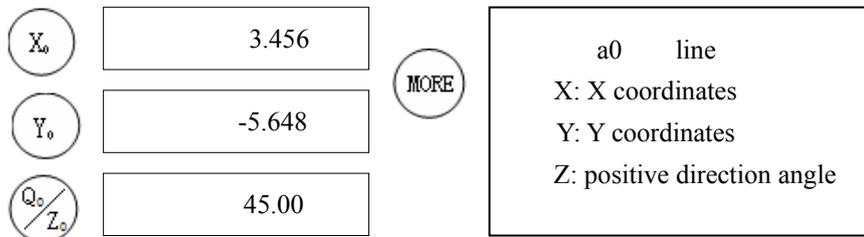


pic 3.7-11

Step four

Press  key, LCD display like pic 3.7-11. Shows the request input angle value, inputs initializes the straight line

with X axis positive direction to clamps angle value 45. Press  key, Completes the line graphics feature data the input. LCD displayed like the pic 3.7-12.



Pic 3.7-12

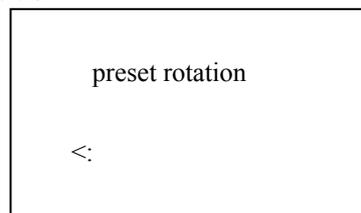
Attention:

Other graphs initialization operations is basic similar, only is requests the input the data item to have the difference. The pre-placed circle request inputs the center of a circle grid reference and radius. The initialization is away from only requests to input X and in the Y direction bad value. The pre-placed angle requests the input angle the size and the angle apex coordinates and so on.

3.7.3 Preset coordinates degrees rotation value

Step one

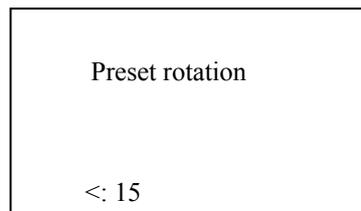
Press  key.



Pic 3.7-13

Step two

Press  key, like pic 3.7-13.



Pic 3.7-14

Step three

Press  ,  key, like pic 3.7-14.

Step four

Press  key, The system returns normal state,  On the key lamp is bright, The expression operates successfully.

3.8 Graphs elements structure

Tabulates from the graphics feature chooses the graphics feature which has to go to a structure new graphics feature the method to be called the structure graphics. Uses the graphics feature which this method finds with the graphics feature which obtains with the survey or the initialization method to be same may use in each kind of operation, like operation and so on structure, memory, printing.

Generally, the structure graphics step has:

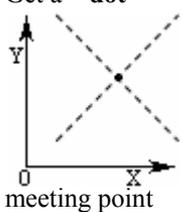
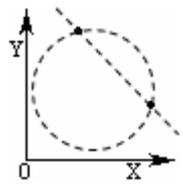
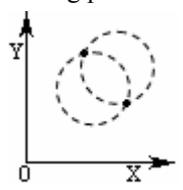
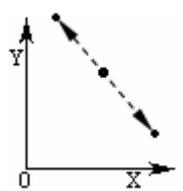
1. presses the graphics type choice key.
2. tabulates from the graph element chooses 2 or the many graphs.
3. press  key.

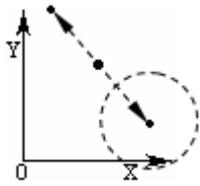
Graph construction table

Graph construction table help understanding permission structure graphics feature. Must use this table, first determined wants the structure the graphics type, according to the graphics type choice key, meets from is tabulating

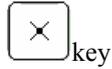
chooses the structure new graphics the graphics feature, after the choice completes presses  key.

3.8.1 Construct dot

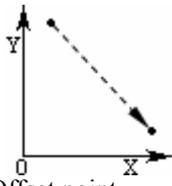
Get a dot	press key	choice
	 key	line 1 2
	 key	line and circle
	 key	circle 1 2
	 key	dot 1 2



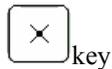
Middle point



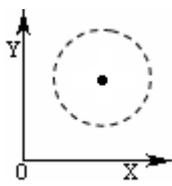
dot and circle



Offset point



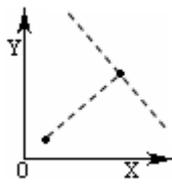
dot and diatance



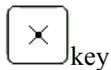
the centre of a circle



circle



Rpendicular dot



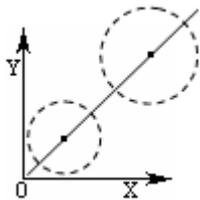
dot and line

3.8.2 Construct line

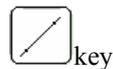
Get a line

Press key

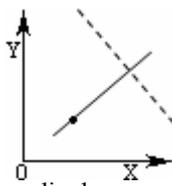
choice



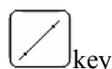
Line passed tow centre of circle



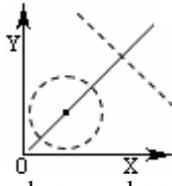
circle1 2



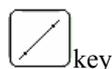
perpendicular passed dot



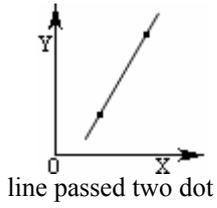
dot and line



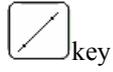
perpendicular passed centre of circle



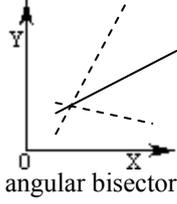
circle and line



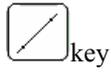
line passed two dot



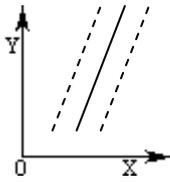
dot 1 2



angular bisector



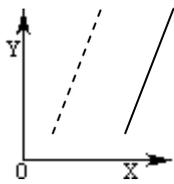
line 1 2



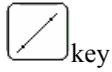
Two parallel center minute parallel line



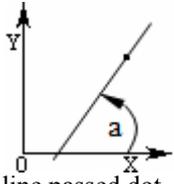
line 1 2



parallel line



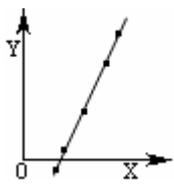
line and distance



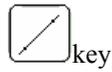
line passed dot



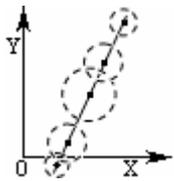
dot and angle



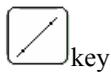
line passed dots



lots of dot



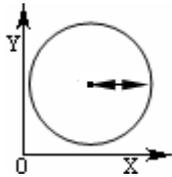
line passed lots of centre of circle



lots of circle

3.8.3 Construct circle

Get a circle



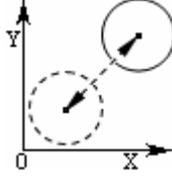
Press key

choice



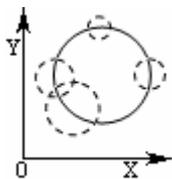
Circle

dot and distance



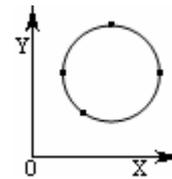
dot and distance

parallel move circle



lots of circles

circle by lots of circles



lots of dots

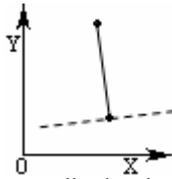
circle by lots of dots

3.8.4 Construct distance

Get a distance

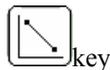
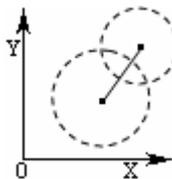
Press key

choice



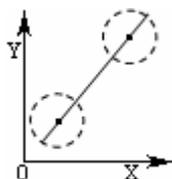
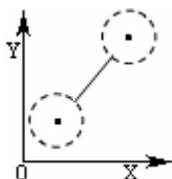
dot and line

Dot and Rpendicular dot



circle 1 2

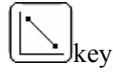
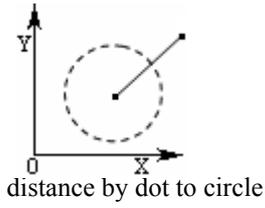
Two centre of circle



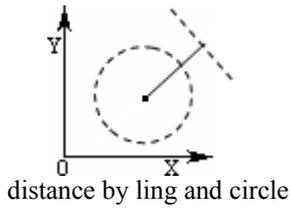
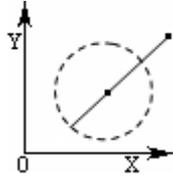
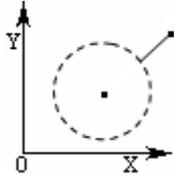
tion: Two circles distances include

- 1) two centre of circle
- 2) minimum distance
- 3) maximum distance

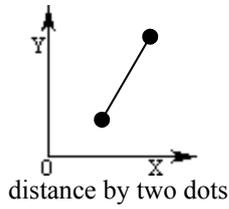
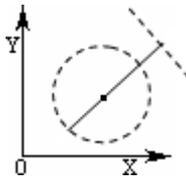
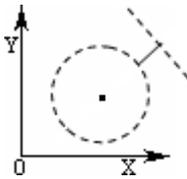
Two circle minimum distance and maximum distance



dot and circle

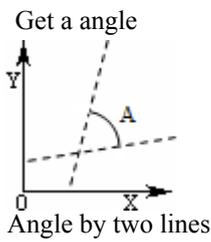


circle and line



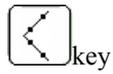
dot 1 2

3.8.5 Construct angle

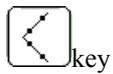
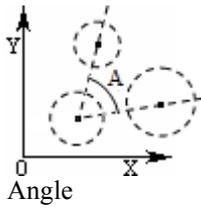


press key

choice



line 1 2



circle 1 2 3

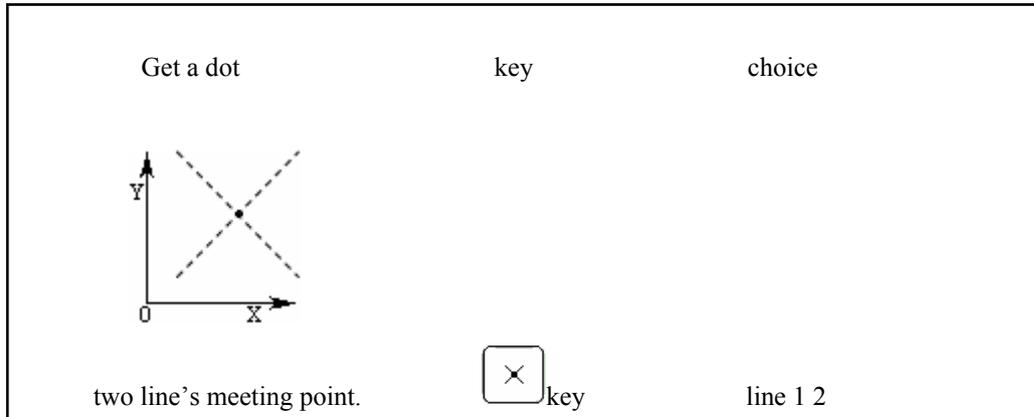
3.8.6 Construct example

Now, we use some typical examples specify through how to measuring and construct some special graphics.

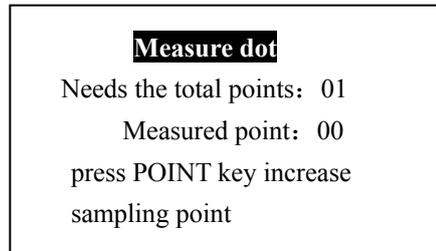
Example 1: By temporarily stores feature a1 and a5 construct dot feature..

Step one

A reference graph construction table construct feature are partial and found two line's meeting point.



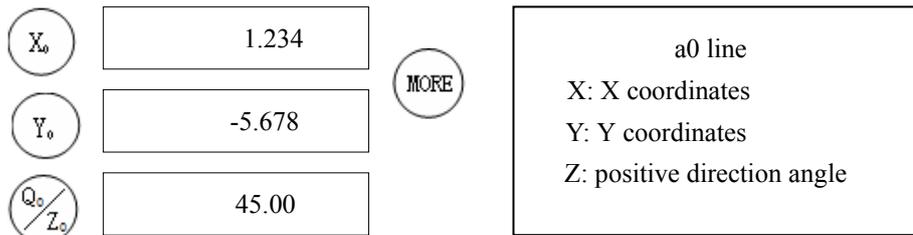
Want get two line's meeting point, returns to normal display state, according to POINT graphics choice key, enters measure dot feature. This time this place above indicating lamp is bright, and on the LCD screen demonstrated like the pic 3.8-1 .



pic 3.8-1

Step two

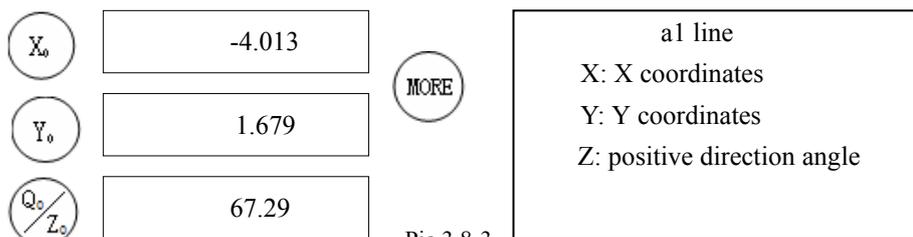
Press or key, DC-3000 system demonstration current graphics feature information like pic 3.8-2..



Pic 3.8-2

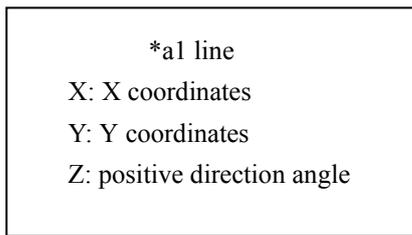
Setp three

Press or key, Demonstrates graphics feature a1 the information like pic 3.8-3. Press key, choice this line.

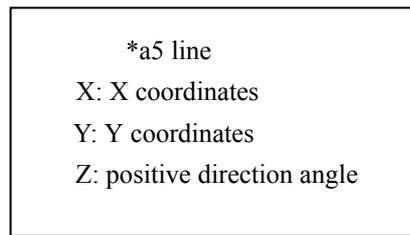


Pic 3.8-3

On the LCD screen demonstrated like the pic 3.8-4 shows.



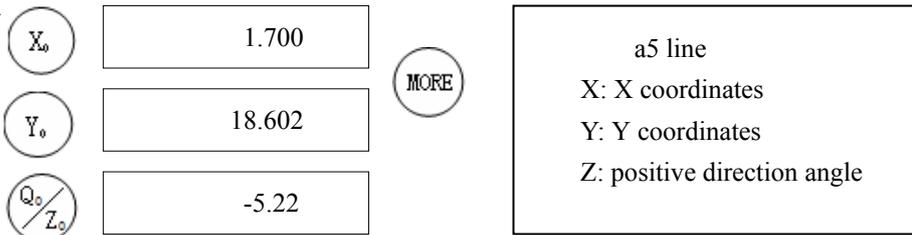
Pic 3.8-4



pic 3.8-6

Step four

Press or key, Found graphics feature a5, its displayed information like pic 3.8-5, Press key, choice this line.

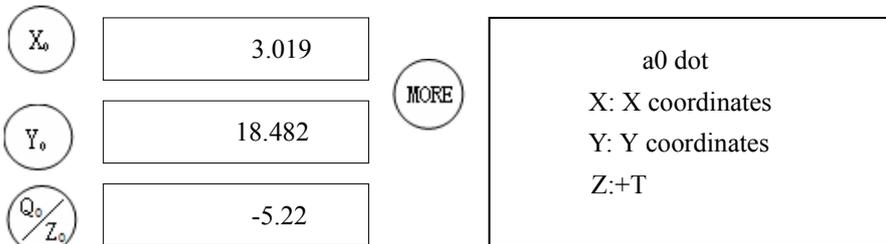


Pic 3.8-5

On the LCD screen demonstrated like the pic 3.8-6 shows.

Step five

Line a1 and a5 are choiced, Press key to construct a new graphics. The new dot feature increases to the graphis feature tabulates, its data display like pic 3.8-7.

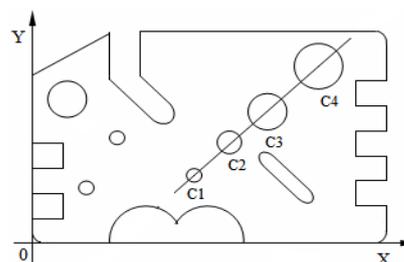


Pic 3.8-7

□ **Attention:**

- (1) in the step demonstrated the information only is expressed the demonstration related information, in the actual operation process, the demonstration information not necessarily can be same with the model.
- (2) After operates completes, has not demonstrated the graph element the information, then the expression structure has not succeeded.

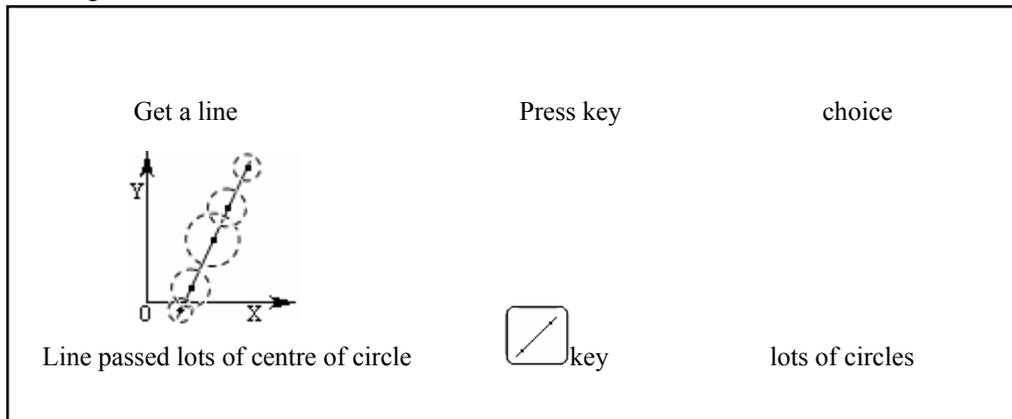
Example 2: Like the pic 3.8-8 shows, goes to a structure straight line with the pic in four circles. (In supposition pic four circles have used measuring technique to survey good its position respectively are a0, a1, a2, a3).



pic 3.8-8

Step one

The reference graph construction table construct line feature are partial and found excessively many centers of a circle the straight line.



Wants the structure straight line according to the graph choice key,
 Like the pic 3.8-9 on LCD demonstrated the explanation at present carries on the line survey.

Measure line
 Needs the total points:02
 Measured point:00
 press LINE key increase
 sampline point

Step two pic 3.8-9

Press or key, Found demonstration graphics feature a0 the information,

Press key, choice this circle, On the LCD screen demonstrated like the pic 3.8-10 shows the content.

X_0	3.214		* a0 circle X: X coordinates Y: Y coordinates Z: radius
Y_0	6.428		
Q_0 / Z_0	10.471		

Pic 3.8-10

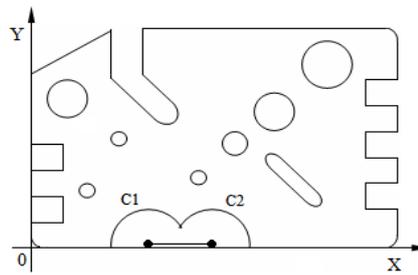
Step three

Continues the second step of operation, chooses other three circles,After completes presses key. The new line graphics feature increases to the graphics feature tabulates, its data display like pic 3.8-11.

X_0	3.294		a0 line X: X coordinates Y: Y coordinates Z: positive direction angle
Y_0	-9.638		
Q_0 / Z_0	50.34		

Pic 3.8-11

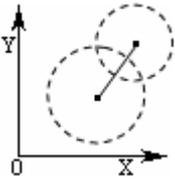
Example 3: Like the pic 3.8-12 shows, with asked two arcs center to be away from (supposition this two arcs to use measuring technique to survey good its position respectively is a0, a1).



Pic 3.8-12

Step one

The reference graphics construction table structure and found two centers of a circle from the element part the distances.

Get as distance	Press key	choice
 <p>Distance of two center of circle</p>	 key	circle 1 2

Wants the structure to be away from according to the graph element choice  key, like the pic 3.8-13 demonstrates the content on the LCD display monitor, explained at present carries on is away from the element survey.

Measure distance

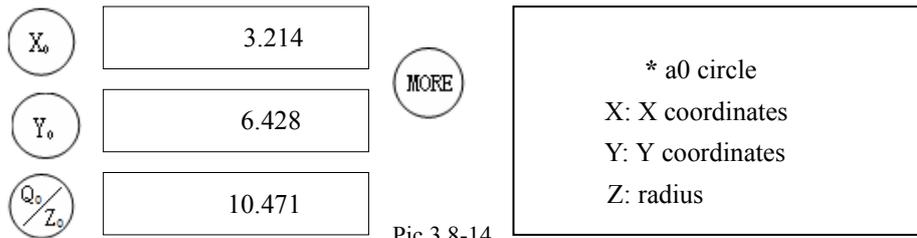
Needs the total points:02

Measured point:00

Pic 3.8-13

Step two

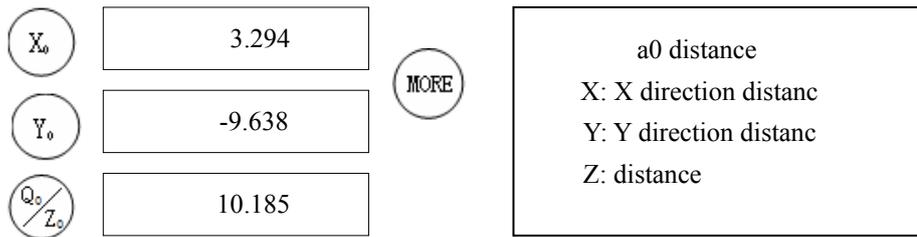
Press  or  key, Demonstrates graph element a0 the information, Press  key, In front of a0 has the mark symbol in the LCD demonstration "*" the expression to choose this circle, demonstrated like the pic 3.8-14 shows the content.



Pic 3.8-14

Step three

Continues the step of two operation, selects another circle, after completes the pressed FINISH key to complete the operation. The new distance graph element increases to the graph element tabulates, its data like pic 3.8-15 shows.



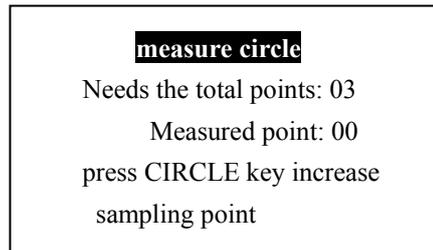
Pic 3.8-15

Chapter Four User's formula

The kneading board pressed key order may write down the memory to take the user formula, later might the pressed key order which will record assign out moves it. When surveys the first work piece, the recording survey step, surveys when other same work pieces transfers the user formula, may carry on the survey according to the same step.

When user formula execution, on the kneading board LCD screen can along with the user formula execution step demonstrate carries out the operation, the current grid reference position and some conditions instructed, if survey

circle then above the graph survey key  indicating lamp is bright, and on LCD demonstrated like the pic 4.1, these all indicated at present is carrying on the circle survey.



pic 4.1

DC-3000 possesses on the kneading board can control (for example system parameter establishment), the survey (for example survey circle and so on), function and so on initialization all can record in the user formula step. In the user formula step very is also easy to revise, the insertion or to delete, after demonstrated founded and moves a user formula we to discuss the user formula again the edition.

Under we found a user formula and move it. Although the example quite is simple, but its foundation and afterwards moves the unit process and the big user formula process is same. The small formula and during the big formula basic difference is step how many which contains. A big user formula has contained more steps.

□ Attention:

- (1) supposes in front of the foundation user formula, the system current condition for straight the condition, other conditions use to tacitly approve the condition.
- (2) in DC-3000 each user formula may save also only can save 100 formulas steps, will surpass will be invalid. Altogether may save 20 users formulas, therefore in establishment or time edition user formula must pay attention to this spot.

4.1 Establishment user formula

The under user formula will demonstrate the pressed key step which the record as follows will need:

- Eliminate straight, tabulate from the graphics feature deletes all graphics feature.
- X and Y axis clear zero.
- Measure a circle.
- Measure a line.
- Extracts the circle and the line's distance.



Warning

In front of user formula carries on the work piece straight is most important. Under the normal state cancels the

original work piece straight, so long as holds down the  key approximately for three seconds then. The elimination graph element tabulates is not the essential step, because produces by the user formula the new graph element can substitute the original graph element. However, Straight the work piece in the user formula first step, the original graph element will be insignificant.

Generally, establishment user formula including below several steps:

(1) on the work piece the determination and the sign summary survey graph, determines the most effective survey order.

Attention: When establishment and edition user formula, through the earnest careful appraisal determined your survey request, juxtaposes on the work piece the graph element and its the survey which surveys the order of priority, like this can save the time.

(2) installs the work piece on the machine.

(3) records the work piece straight, origin of coordinates definition and the graph survey step takes the user formula.

(4) moves the user formula to confirm the result.

(5) finally edits the user formula to make the final adjustment.

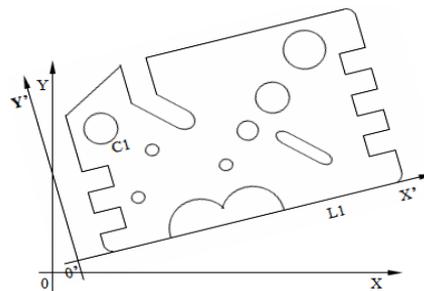
Under is 4.1-1 as regularly explains the user

formula take the pic the establishment,

the movement and the edition process.

The survey content includes:

- 1) carries on by straight line L1 straight.
- 2) surveys circle C1.
- 3) surveys straight line L1.
- 4) construct line and circle distance.

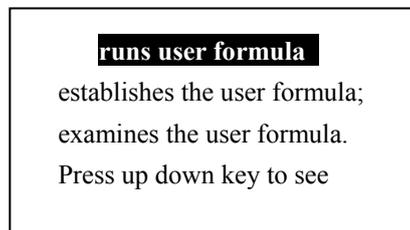


Pci 4.1-1

Initialization formula step:

Step one

Press  key, The LCD display monitor demonstrated like the pic 4.1-2 shows, enters the user formula, including three choices: (1) runs the user formula; (2) establishes the user formula; (3) examines the user formula.



Pic 4.1-2

Step two

Press  or  key, Until the display monitor demonstrated like the pic 4.1-3 shows. Press  key. On the  key indicating lamp does not stop glitters, LCD demonstrates like the pic 4.1-4 screens information, the

request input formula number.

Runs user formula
establishes the user formula
examines the user formula
Press up down key to see

Pic 4.1-3

formula : 00
(0-19)

pic 4.1-4

Step three

The use tacitly approves the serial number is 00 or number keyboard entry serial number. The pressed  key, the LCD screen demonstrated like the pic 4.1-5 expressions now is at the input condition, hereafter presses all effective keys and its the order (to conclusion establishment when up to) all by record.

establishes the user formula
Starts to input the formula...

Pic 4.1-5

Attention:

Above the  key indicating lamp continuously glitters until the conclusion user formula establishment only then extinguishes. Namely indicated henceforth when will start, operator's all pressed keys movement all will record in the user formula. In other words finished from this record, the user formula can complete the system in normal operation period can complete movement.

Straight new workpiece:

Step four

Press  key, LCD like pic 4.1-6.

The expression coordinates revolve survey the key to input the user formula.

establishes the user formula
01:skew

Pic 4.1-6

Step five

Because the coordinates revolve the survey line most little to need the sampling 2 sampling

points,so need press  key twice.

LCD demonstrates like the pic 4.1-7.

establishes the user formula
03:enter?

Pic 4.1-7

Setting new origin:

Step six

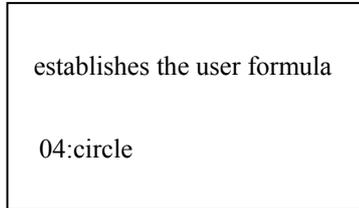
After the system straight the work piece automatically to return to the normal demonstration condition, separately

presses  and  to corresponding number axis clear zero, establishes the new origin of coordinates.

Measure a circle:

Step seven

Press  key. The pic 4.1-8 had demonstrated the survey circle key is input the user formula.

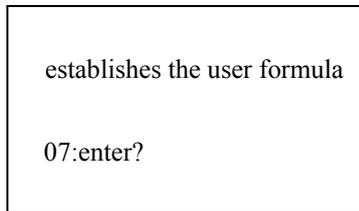


pic 4.1-8

Step eight

Because the survey circle must gather three sampling points, therefore

must press  key third, like pic



pic 4.1-9

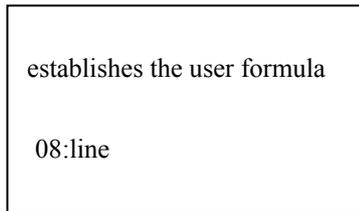
4.1-9 LCD to demonstrate press  keys three times input the user formula.

Measure line:

Step nine

According to graph survey key .

The pic 4.1-10 had demonstrated the 08:line survey line key is input the user formula.



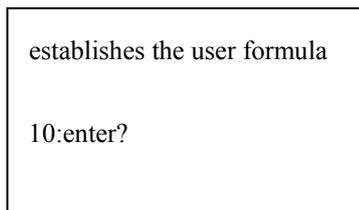
pic 4.1-10

Step ten

Because the survey straight line most little must gather two sampling points,

therefore must press  twice, like

the pic 4.1-11 show, LCD demonstrated



pic 4.1-11

 key pressed twice are input the user formula.

Construct distance by line and circle:

Prompting:

After the first several steps of surveys round element and the straight line element survey separately is stored temporarily stores the element to tabulate a1 and in the a0 number element.

Step eleven

Press  key to measure line.

Like the pic 4.1-12 shows, LCD demonstrated

the survey is input from key  the user formula.

Step twelve

Presses  key, indicated the browsing temporarily stores the element to tabulate the a0 number element,

like the pic 4.1-13, LCD demonstrated  are input the user formula.

Step thirteen

The expression temporarily stores the element th e a0

number to select. After that is pressing  ,

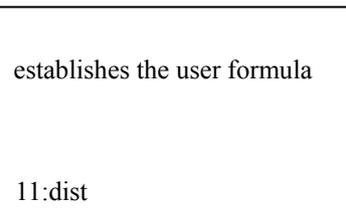
indicated glances over the a1 number to temporarily

store the graph element, again presses  and  to select it. Then pressed  expressed with a0 and the a1 number graph element structure which selected a moment ago is away from the element. The LCD screen demonstrated like the pic 4.1-14 shows.

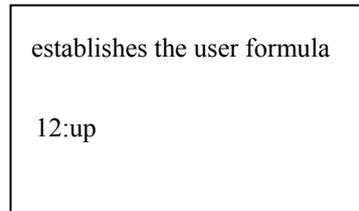
Finish establishes the user formula:

Step fourteen

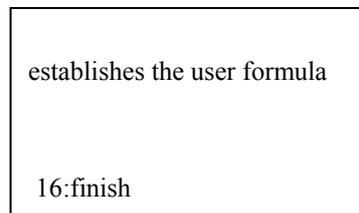
Press  key, LCD like pic4.1-15, Inquired whether record special pressed key .



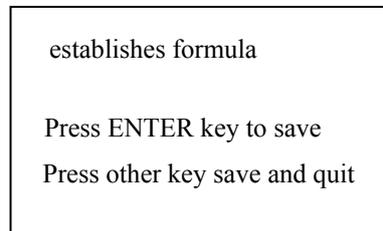
pic 4.1-12



pic 4.1-13



pic 4.1-14



Pic 4.1-15

Explanation:

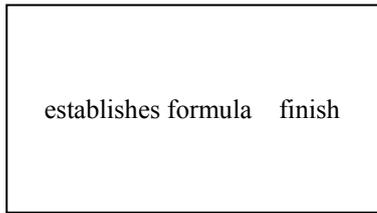
In the user formula contains the special key includes:

(1)  (Conclusion user formula key)... The LCD screen demonstrated the prompt like pic 4.1-14, expressed if presses  to store  , presses other to cause the record the user formula to be effective, guarantees the debit and credit user formula and the withdrawal user formula edition condition.

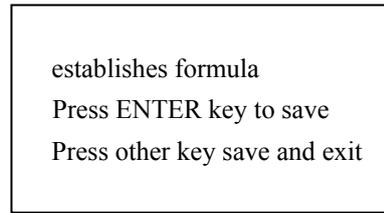
(2)enter?(The waiting confirmed?)...The expression inserts a waiting kneading board in the edition current position to input the  key the condition.

(3)  (quit key) ...The LCD screen demonstrated the prompt like pic 4.1-16, expressed if presses  to store  , presses other on directly to withdraw from the user formula the edition condition but not to make any

preservation.



Pic 4.1-17



pic 4.1-16

Step fifteen

According to besides  free key, preserved possesses the key a moment ago the input and the withdrawal.

LCD then demonstrated like the pic 4.1-17 shows the content, by now 1  on indicating lamp extinguished, indicated already withdrew from the user formula the establishment.

4.2 Run user formula

The user formula pressed key order includes completes all steps which the work piece survey needs. Below the movement user formula has the step:

- Makes the mark nearby the workpiece reference point
- Installs the workpiece on the work table
- Run user formula

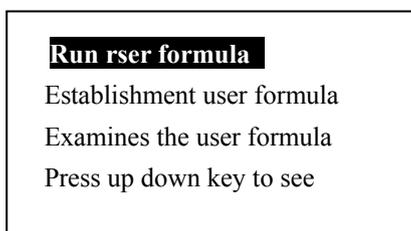
Before movement an establishment user formula, this user formula:

- Straight new workpiece
- X and Y axis clear zero
- Measure circle
- Measure line
- Construct distance

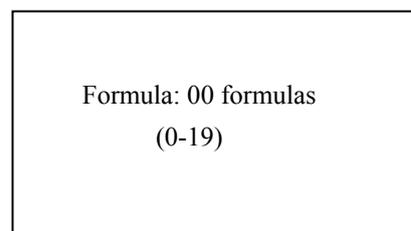
Run user formula:

Step one

Presses  key, the LCD screen demonstration like pic 4.2-1, enters the user formula. This time  on indicating lamp continuously is shining.



Pic 4.2-1



pic 4.2-2

Step two

Presses  key,  above indicating lamp started to flash, indicated entered the movement user formula, the user formula number like pic which the system request input had to move 4.2-2 shows. Tacitly approves is 0 formulas. The formula number cannot surpass 19.

Step three

Presses  key, the system starts to move the user formula 0, it first straight the new work piece, the formula movement stops in work piece straight, waiting user gathering type spot, display monitor demonstration like pic 4.2-3. The coordinates revolve the survey line

coordinates revolve measre line

Needs the total points: 02

Measured point: 00

Press LINE key increase sampline Point

Pic 4.2-3

measure circle

Needs the total points: 03

Measured point: 00

Press CIRCLE key increase sampling point

pic 4.2-4

Step four

Found an appropriate side on the work piece to carry on straight Gathers type points which the LCD display monitor demonstrated, carries on the work piece straight. After completes the system to number axis clear zero, the establishment origin of coordinates, eliminates temporarily stores the element and so on. If LCD display monitor demonstration like pic 4.2-4, and  place above indicating lamps are bright, then indicated said the present enters the circle survey.

Step five

Moves the work table to cause reticle aim at the first sampling point, the pressed  key, the sampling point position and the LCD display monitor demonstrated like the pic 4.2-4 shows

	78.310		<p>measure circle</p> <p>Needs the total points: 03</p> <p>Measured point: 01</p> <p>Press CIRCLE key increase Sampling point</p>
	18.184		
	106.811		

Pic 4.2-4

Step six

Continues fifth step to gather other two types spot, after achieved the enough type points the system computation survey result meets the display monitor to show like the pic 4.2-5 shows, also above under the  key indicating lamp bright expression carries on the line survey.

	30.130		<p>measure line</p> <p>Needs the total points: 02</p> <p>Measured point: 00</p> <p>Press LINE key increase sampling point</p>
	10.770		
	0.00		

Pic 4.2-5

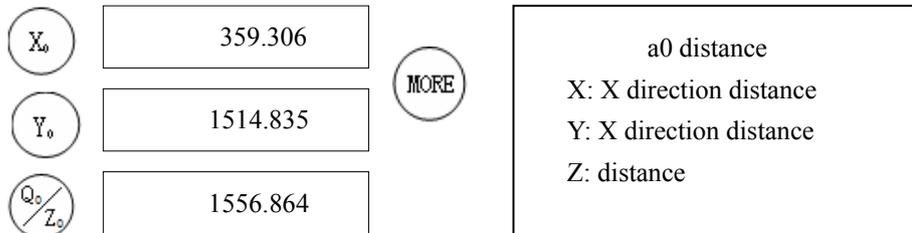
Step seven

According to LCD demonstration prompt information survey rectilinear figure element. After the survey completes enters the distance measurement.

Step eight

Structure distance. After the formula movement completed the system rapidly to demonstrate the structure distance

information like pic 4.2-6 showed the content. After the survey completes may press  examinations more information.



Pic 4.2-6

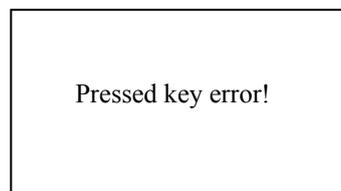
Attention:

When system movement user formula, carries out the different step to have the different instruction, when carries

out the work piece straight,  key above indicating lamp is glittering, indicated the current execution work

piece straight. When carries out the survey circle  key above indicating lamp is bright, the LCD display monitor demonstration like pic 4.2-4, on these kneading board condition had instructed the system current movement, asks the operator to pay attention Moreover when carries on the work piece straight and surveys round

sampling, when you have pressed other (not  key), then the system can demonstrate like the pic 4.2-7 shows the content, also the LCD display monitor returns to on the inferior demonstration condition.

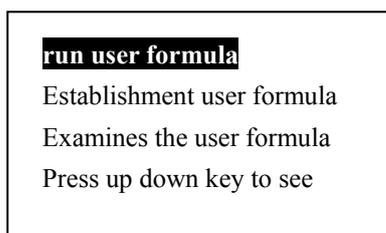


Pic 4.2-7

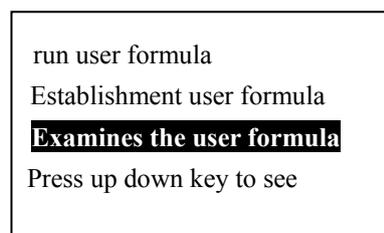
4.3 Examinations users formula

Step one

Press  key, LCD display monitor demonstration like pic 4.3-1.



Pic 4.3-1



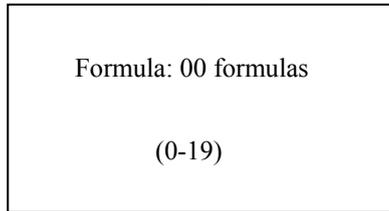
pic 4.3-2

Step two

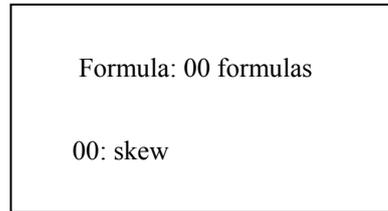
Press  or  key, Until the LCD display monitor demonstrated like the pic 4.3-2 shows content.

Step three

Press  key, the LCD display monitor demonstrated like the pic 4.3-3 shows the information, the request input user formula number, this display monitor has tacitly approved a formula serial number 0.



Pic 4.3-3



pic 4.3-4

Step four

This time presses , the LCD display monitor demonstration like pic 4.3-4, also may according to

 or  examinations formulas other steps.

Next catalogged the user formula 0 steps:

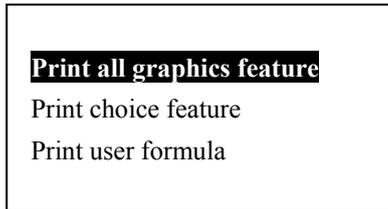
Step number	operation	explanation
00	skew	straight workpiece
01	enter?	gather sampling point, When movement waited for the operator presses  key
02	enter?	gather other sampling point
03	x0	X axis clear zero
04	y0	Y axis clear zero
05	circle	enter measure circle
06	enter?	When movement waited for the operator presses  key
07	enter?	
08	enter?	
09	line	enter measue line
10	enter?	
11	enter?	
12	dist	enter measue distance
13	up	Press  key show graphics feature
14	enter	choice graphics feature
15	up	find other graphics feature
16	enter	The choice found graphics feature
17	finish	Conclusion choice graphics featuret
18	00formula	Instructs the user formula number. The user formula reaches this point the conclusion, holds does not need to press  key

4.4 Printings users formula

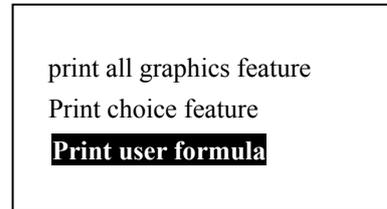
Each user formula formula step may print, under step user formula 0 each formulas steps.

Step one

Returns normally to demonstrate the condition, the pressed  key, the LCD display monitor demonstrated like the pic 4.4-1 shows the content.



Pic 4.4-1



pic 4.4-2

Step two

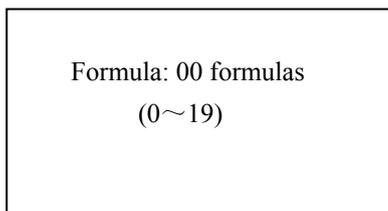
Prees  or  key, Until the display monitor demonstrated like 4.4-2 show the content, the expression printing user formula.

Step three

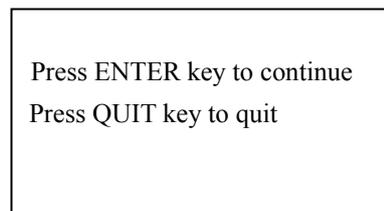
Presses , the display monitor demonstrated like the pic 4.4-3 shows the content, the user formula number which the request user input must print.

Step four

The input must print user formula number 0. Presses  to confirm that, starts to print. If printer not on-line then the LCD display monitor demonstrated like the pic 4.4-4 shows the content, this time may press  to withdraw from the printing, then the LCD display monitor returns to pic 4.4-2 to show the content. Printer not on-line!



Pic 4.4-3



Pic 4.4-4

Chapter Five Set system parameter

Before using the DC-3000, according to the installation of the reaster and box, you must set all sizes of parameters to make the system run regularly. The parameter which have set completely will maintain until you use the setting function to change it next time.

The system parameter DC-3000 can set:

1. The parameter about measurement
 - Unit of angle
 - Preinstall the No. of sample points
2. The parameter about raster
 - The direction of number axis
 - Set resolution
 - Compensation setting
3. The parameter about communication
 - RS232 Baudrate Setting
4. Other settings
 - Language
 - Default Setting
 - Z Axis Type Setting
 - Password Setting

5.1 How to set system parameter?

5.1.1 Enter parameter setting

In normal situation, press  to enter the parameter setting menu

5.1.2 Browse menu

Press  or  to browse menu.

5.1.3 Enter submenu or select some menu function

When browse some function, if you want enter submenu, press  key; some menu function shows at LCD,

press  key to select it.

5.1.4 Save settings and exit parameter setting

Press  to exit parameter setting from main menu, return to normal situation or return to upper menu from submenu.

□Attention:

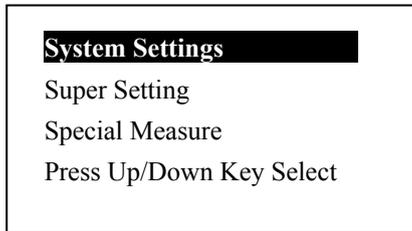
- (1)The menuitem have suspension points after it shows that this menu has submenu, such as “Compensation Settings...”.
- (2)When the menu have multiple-choice,if some menuitem have a “” before it,shows that this function have been selected, like: “Angle Type:DMS Angle” shows that the present angle unit is DMS, and “Angle Type:DMS Angle” shows that the system have not use it . As follows we introduce system parameter setting in detail

5.2 Parameter setting about measurement

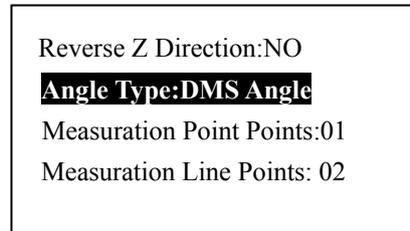
5.2.1 Set angle unit

First step

Press , enter system parameter setting. LCD shows like Pic5.2-1.



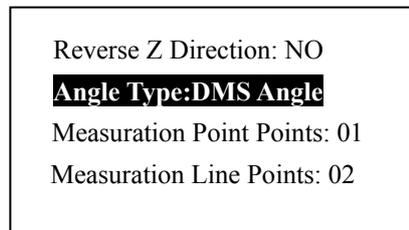
Pic5.2-1



pic5.2-2

Second step

Press , enter system parameter setting submenu. Press  or , until the LCD shows like pic5.2-2.



pic5.2-3

Third step

Press , the unit of Angle change to DMS, LCD shows like pic5.2-3.

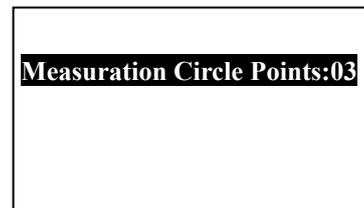
□ **Attention:** Press , the unit of Angle switch between DMS and DD, the information which shows at LCD switch between Pic5.2.2 and Pic5.2.3.

5.2.2 Preinstall the No. of sample points

Set the No. of measuring circle feature need.

First step

Press , enter system parameter setting. The LCD shows like Pic 5.2-1.



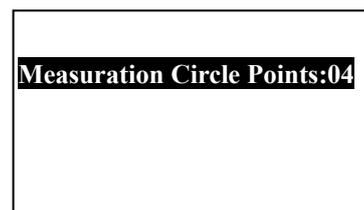
Pic5.2-4

Second step

Press , enter system parameter setting submenu. Press  or , when the LCD shows like pic 5.2.4

Third step

Measuring circle must collect three sample points default, the user can input suitable number to raise the metrical precision. Input 4, the LCD shows like Pic5.2-5



Pic5.2-5

□ **Attention:**

- (1) In order to raise measurement precision, we propose to use multimetering, but when do multimetering , it has a limit that we are allowed to collect 50 sample points at most. So , set the No. we need at measuring, it must not be greater than 50.
- (2) The setting about the No. which measure point feature or line feature needed is similar to the setting of measuring circle feature, there is no special introduction.

5.3 Set parameter about raster

5.3.1 Set the counting direction of Z axis

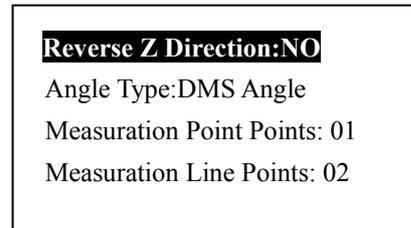
First step

Press , enter to the system parameter setting.

Second step

Press  to enter to the submenu of system setting. Press  or , until the LCD shows like pic5.3-1.

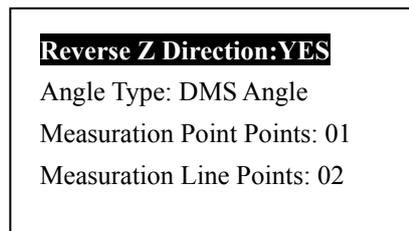
(Attention: in fact the LCD shows also like “Reverse Z Direction: YES”, according to the setting last time or default setting.)



Pic5.3-1

Third step

Now press , LCD shows like pic5.3-2, it means that the direction of Z axis is negative with the original direction.



Pic5.3-2

□ **Attention:**

- (1) Press , the direction of Z axis switch between the original direction opposite or not opposite ceaselessly.
- (2) The setting of other two axes is similar to the setting of Z axis.

5.3.2 Axis Resolution Settings

Different raster have different resolution, and the operator do not to change the setting easily, generally speaking, it is OK after leaving factory. As follows we set the resolution of X-Axis and Q-Axis.

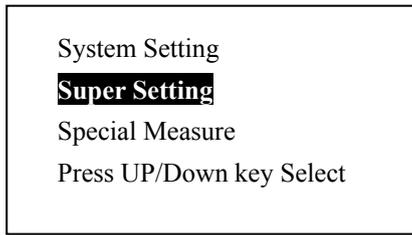
1. Set the resolution of X -axis to 0.005

First step

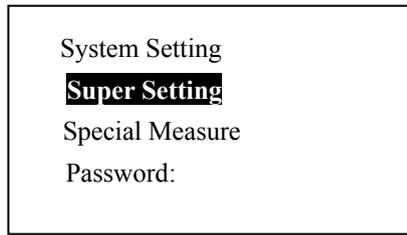
Press , enter to the system parameter setting.

Second step

Press  or , until the LCD shows like pic5.3-3.



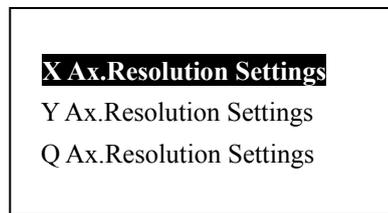
Pic5.3-3



Pic5.3-4

Third step

Press , enter to the submenu of super setting, the LCD shows like pic5.3-4.



Pic5.3-5

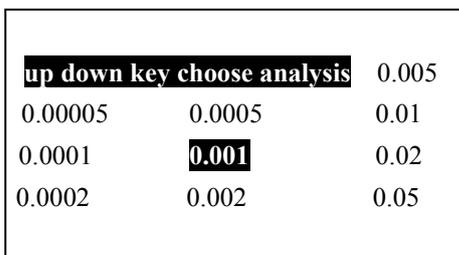
Fourth step

Input the password “3211”(attention: it is the password set when the DC-3000 leave factory. The user can set it again or amend it, make a reference to <5.5.4)

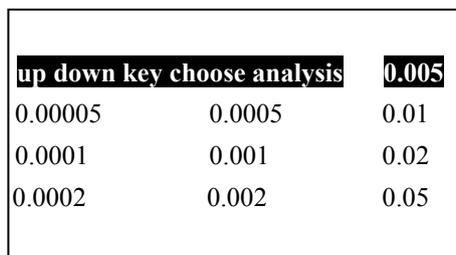
Fifth step

presses down the key to choose analysis

Press , enter to the submenu of X-axis resolution setting, the LCD shows like pic 5.3-6.



Pic5.3-6



Pic5.3-7

Sixth step

Press  or  to let the LCD shows like pic5.3-7.

Seventh step

Press , make sure the X-axis resolution is 0.005 which have been selected, then the LCD shows like pic5.3-5 again.

2. Q-axis resolution settings

□ **attention:**

Some difficult will find when you set Q-axis resolution, before you enter resolution settings, some preparative work must be done, for the Q-axis resolution of DC-3000 have a default, before you set it ,it must be cleared, then use the

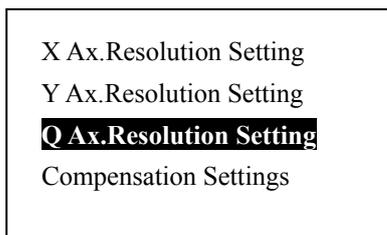
default to let the rotary encoder turn a lap and record the value, finally ,enter to the resolution setting, and input this value,then get the resolution of the Q-axis.

When the rotary encoder turn a lap,the value of Q-axis is not greater than 360, use the default resolution ,it's possible that the enumerated data is greater than 360 or more, so when you record the value, take care how many times(n) the value is greater than 360, then the (360*n+value) is the correct value(suppose the value is 120000).

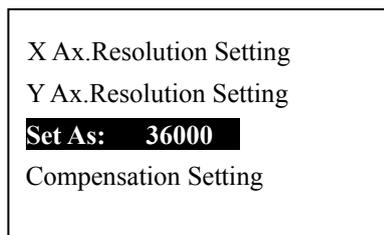
From first step to fourth step , the operation is the same to the set X-axis resolution, there is not to say it again. Follow the fourth step.

Fifth step

Press  or , until the LCD shows like pic5.3-8.



Pic5.3-8



Pic5.3-9

Sixth step

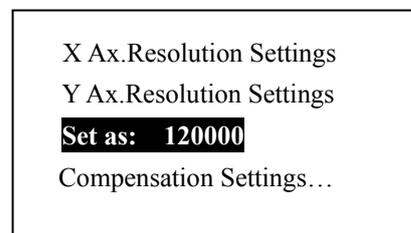
Press  to set the Q-axis resolution, the LCD shows like pic5.3-9.(attention:The LCD shows like “set as :36000”,the “36000” is the default Q-axis resolution.)

Seventh step

Input the value 120000 at the preparation stage, the LCD shows like pic5.3-10,Press  to make sure the value and finish the Q-axis resolution settings.

Attention:

The range of X、Y、Z axis Resolution is 0.05μ~50μ (0.00005、0.0001、0.0002、0.0005、0.001、0.002、0.005、0.01、0.02、0.05), the range of Q axis Resolution is 0.0001~0.1 or 0.1μ~100μ.



Pic5.3-10

5.3.3 Compensation Settings

The Axis compensation DC-3000 used have linear compensation and segment compensation.

The linear compensation comensate the same value for every unit, because the difference of the whole raster is linear. The segment compensation divide the raster to several section, at the every section we think they are linear, give them a compensation coefficient respectly. When counting , different section count followed different compensation value.finally totaling to get the view value. The Compensation Settings contain:compensation mode setting、compensation value setting. If the X-axis is use linear compensation or segment compensation,it's compensation mode setting; if the compensation mode is set as segment compensation, then it must look out the RI when do compensation setting, if you can not find the RI, then it is possible that the raster have no RI or it is bad. As follows enter the compensation settings.

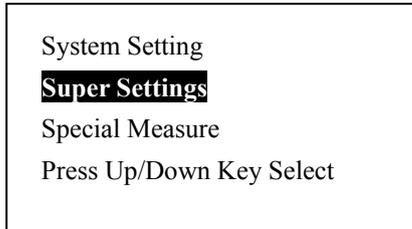
5.3.3.1 Compensation Settings

First step

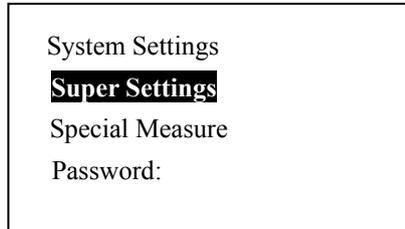
Press , enter to the system parameter setting.

Second step

Press  or , until the LCD shows like pic5.3-11.



pic5.3-11



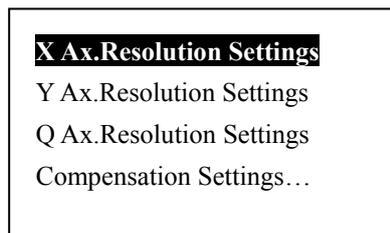
Pic5.3-12

Third step

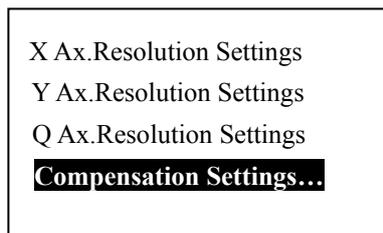
Press , enter to the super settings submenu, The LCD shows like pic5.3-12.

Fourth step

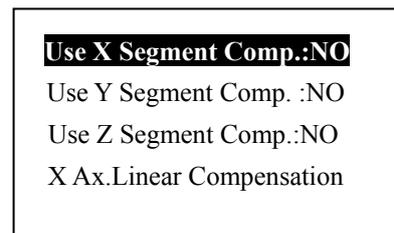
Input the correct password“3211”, The LCD shows like pic5.3-13.



Pic5.3-13



Pic5.3-14



Pic5.3-15

Fourth step

Press  or , until the LCD shows like pic5.3-14. Press , enter the Compensation settings submenu, The LCD shows like pic5.3-15.

5.3.3.2 Set the compensation mode.

The compensation mode of raster have linear compensation and segment compensation, which mode to be used base on the linearity, the linearity good use linear compensation , not good use segment compensation. As follows is how to set the Y-axis to the mode of segment compensation:

First step

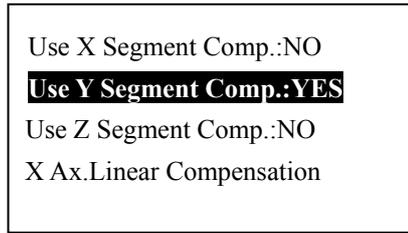
Follows the way of 5.3.3.1to enter to compensation setting.

Second step

Press  or , until the LCD shows like pic5.3-16. Press , the LCD shows like pic5.3-17. “YES” means that the Y-axis use segment compensation.



Pic5.3-16



Pic5.3-17

□ **Attention:**

(1) Set the mode of others coordinate compensation, the method is similar to this, just pay attention to select coordinate.

(2) In the second step, Press  to open or close the mode of segment compensation. When the mode is not segment compensation, the linear compensation will be used auto. When you set segment compensation, please close the mode of segment compensation.

5.3.3.3 Set the value of linear compensation

This tune discuss how to set the value of linear compensation, the method of linear compensation is very simple. As follows we complete the X-axis linear compensation by grading.

Explanation:

The length of X-axis this example used is 150mm.

Phase 1:

At normal situation, move the X-axis to the high order end, and make the crossing center line of the finder screen justified to some point of the standard rule (as 20mm), clear the X-axis, then move the raster to the low order end, make the crossing center line justified to some point of the standard rule (as 170mm), record the present view value of X-axis (as the value is 149.987). following:

Phase 2:

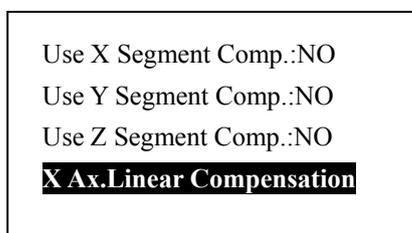
First step

According to 《5.3.3.1》 to enter compensation setting.

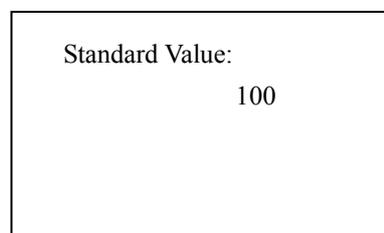
Second step

Press  or  until the LCD shows like pic5.3-18. Press , the LCD shows like pic5.3-19. If you don't

want to amend the standard value, press  directly.



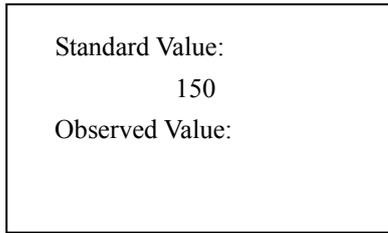
Pic5.3-18



Pic5.3-19

Third step

Input the standard value 150 and press , The LCD shows like pic5.3-20.



Pic5.3-20



Pic5.3-21

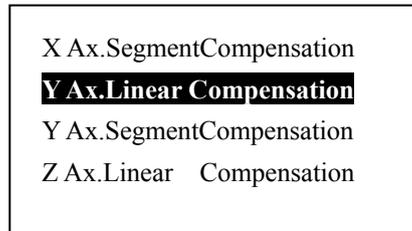
Fourth step

Input the observed value 149.987 and press , the LCD shows like pic5.4-21. It means the linear compensation settings have completed.

Attention:

- (1) This setting can revise the difference of measured value and standard value.
- (2) This is the operation steps of doing X-axis linear compensation.

(3) If you want to set the Y-axis, at the second step, Press  or  until the LCD shows like pic5.3-22.



pic5.3-22

(4) The counting of the value of linear compensation:

$$\text{The value of compensation} = \frac{\text{Measured value} - \text{Standard value}}{\text{Standard value}}$$

5.3.3.4 Set the value of segment compensation

As follows we introduce how to set the segment compensation value of Y-axis. There are three steps:

Phase 1: Preparation

- The equipment must measure the difference of not compensation value and standard value (do it for three times to and fro, and record them)
- Before you enter to compensation setting, move the raster to negative direction, and when do compensation, move the raster to forward direction.
- Before doing compensation, do default settings (make a reference to 《5.5.2》).
- Reference standard must be prepared (it request a standard rule be synchronous with the compensated coordinate)

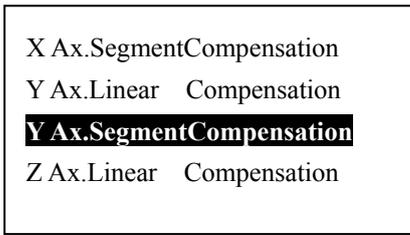
Phase 2: set compensation value.

First step

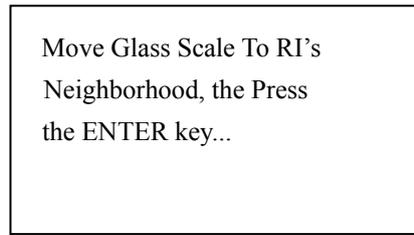
Follows the method 《5.3.3.1》 to enter compensation settings.

Second step

Press  or , until the LCD shows like pic5.3-23. Press , the LCD shows like pic5.3-24.



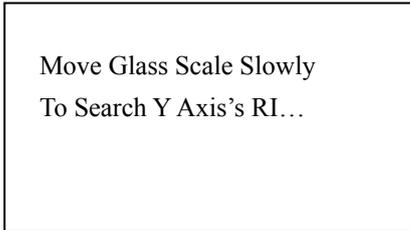
Pic5.3-23



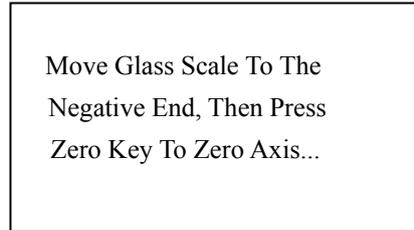
Pic5.3-24

Third step

Move the raster to negative direction, Press , the LCD shows like Pic5.3-25.



Pic5.3-25



Pic5.3-26

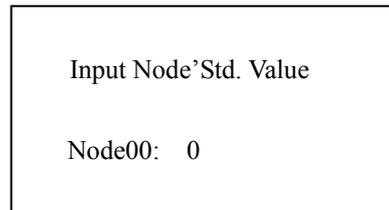
Fourth step

Move the raster , if the RI is found , the system emit a voice “hua”, the LCD shows like “the RI of main scale have been found), following that ,the LCD shows like pic 5.3-26.

Fifth step

Following the hint of the LCD, Move Glass Scale

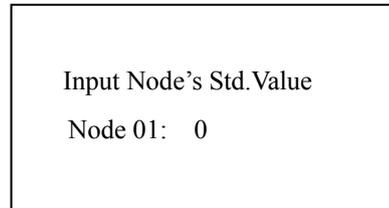
to the negative end.Press , the LCD shows like pic5.3-27, it means to waiting to input the first compensation value.At the same time, the Y-axis data of LED cleared.



Pic5.3-27

Sixth step

Input the standard rule value to the system Press , the LCD shows like pic5.3-28. It means that the first compensation value input completed, input the next compensation value next



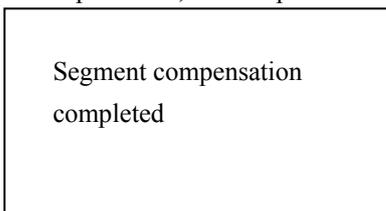
pic5.3-28

Seventh step

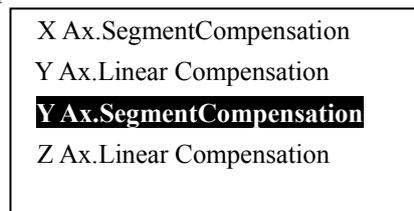
Do sixth step repeatedly, input other compensation value of other points. At least 2 points, at most 100 points.

Eighth step

When all compensation value input completely, press  to finish inputing, the LCD shows like pic 5.3-29. and return to pic5.3-30, the compensation settings completed.



Pic5.3-29



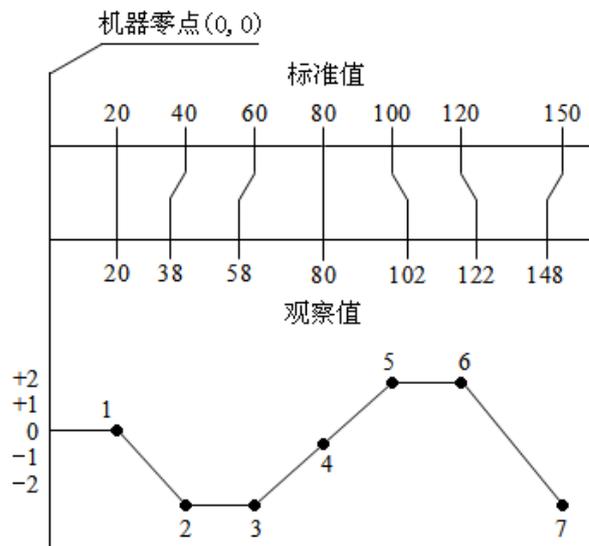
Pic5.3-30

Phase 3: the work afterwards

- Compensation setting finished, Press to quit parameter settings, then clear the opposite coordinate value.
- If you selected segment compensation, every time you open the DC-3000, the system will look out RI, now if you make sure the raster do not move after you close the DC-3000, Press the to quit, else it must look out RI, find it, the system can continue run latter program until the system return to normal situation.

□ Attention:

- (1) The Node value is the value of the standard value.
- (2) The standard rule must conform to measured rule.
- (3) This setting can revise the difference of the measured value and standard value.
- (4) Above-mentioned process is the operation step used on Y-axis segment compensation
- (5) If you want to set others coordinates compensation value, at the second step, press or to find relevant coordinate setting.
- (6) When you input the value of compensation point, it must input from one end to other end, the direction is the same to coordinate counting direction.
- (7) The standard value、observed value and compensation point is like pic5.3-31.
- (8) According to the segment not compensated, it will not compensate. according to the segment linear is good, input standard value is Okey, like above, the first segment needn't compensate, at factual operation, the Node 0 input 0, and the Node 1 input 20. it must not input 20 to the Node 0,.



Pic5.3-31

5.4 Set parameter about communication

The parameter about communication contains RS232 bandrate setting, this is DC-3000 transport value of coordinate to WINDOWS graphical software, for the graphical software to measure graphics.

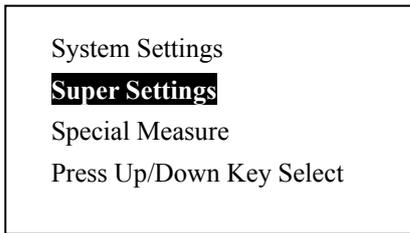
5.4.1 RS232 Baudrate Settings

First step

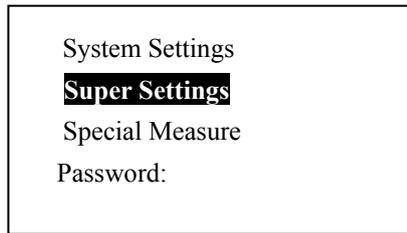
Press , enter system parameter setting.

Second step

Press  or , until the LCD shows like pic5.4-1.



Pic5.4-1



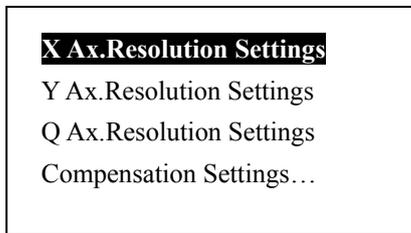
Pic5.4-2

Third step

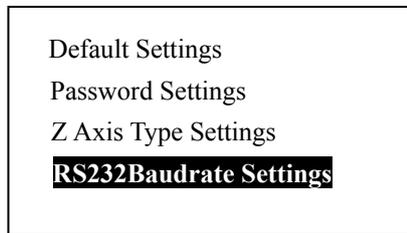
Press , enter super settings submenu like pic5.4-2.

Fourth step

Input correct password “3211”, the LCD shows like pic5.4-3.



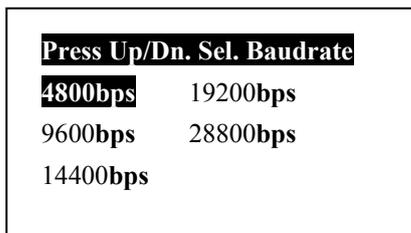
Pic5.4-3



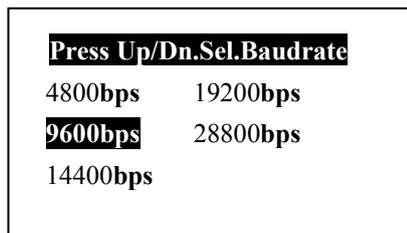
Pic5.4-4

Fifth step

Press  or , until the LCD shows like pic5.4-4. Press  enter to the submenu of baudrate settings, the LCD shows like Pic5.4-5.



Pic5.4-5



Pic5.4-6

Sixth step

Press  or , until the LCD shows like pic5.4-6.

Seventh step

Press , the LCD shows like pic5.4-4, return to the submenu of super settings. It means that the RS232 Baudrate set completely.

5.5 other relevant parameter installation

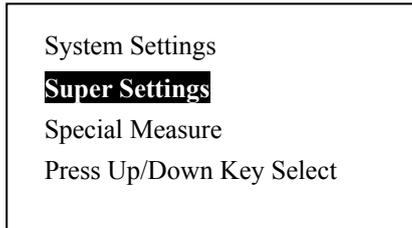
5.5.1 Language Select

First step

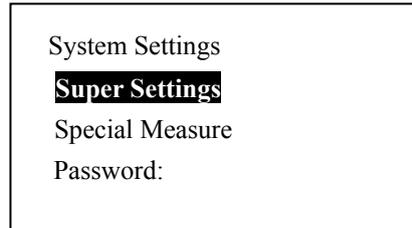
Press , enter to the menu of parameter settings.

Second step

Press  or  until the LCD shows like pic5.5-1.



Pic5.5-1



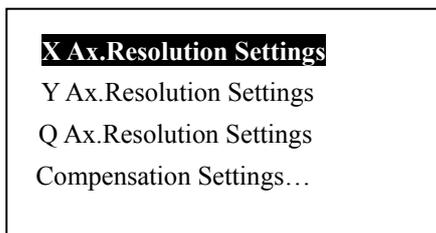
Pic5.5-2

Third step

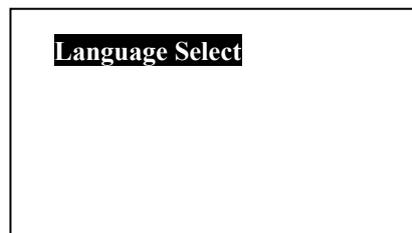
Press , enter to submenu of super settings like pic5.5-2.

Fourth step

Input the correct password“3211”, the LCD shows like pic5.5-3.



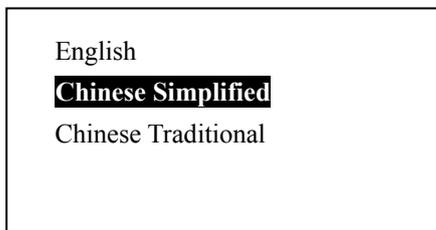
Pic5.5-3



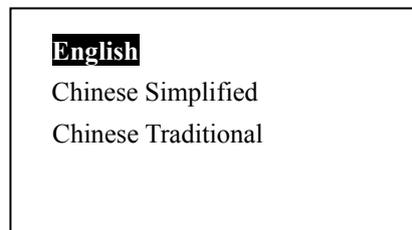
Pic5.5-4

Fifth step

Press  or , until the LCD shows like pic5.5-4. Press , the LCD shows like pic5.5-5, shows current language is Chinese simplified.



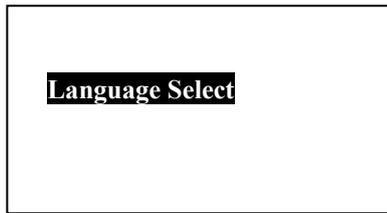
Pic5.5-5



Pic5.5-6

Sixth step

Press  or , the LCD shows like pic5.5-6, it means the selected language is English. Press , the LCD shows like 5.5-7, the language changed to English.



Pic5.5-7

□ **Attention:**the language have Chinese simplified、 chinese Traditional and english, selected it according to need.

5.5.2 Default settings

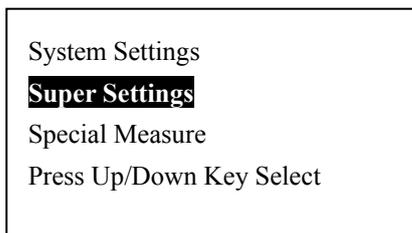
Default settings is to set some pivotal parameter to some value, for example the coordinate's decimal place is default to X-axis 3 bit、 Y-axis 3 bit,etc. these parameter is very important. If their value is not correct, it will have effect on view and the measurement result, so much so that the system can't run regularly. But this function can't be used as one wished, if the user have some problem which can't deal with, it has better to contact with agent or service part, don't to use this function unbending to set the system parameter to default.

First step

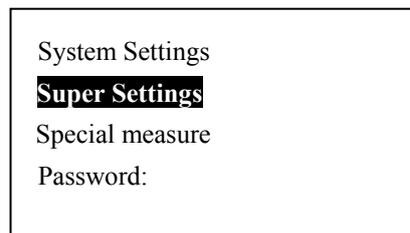
Press , enter system setting menu.

Second step

Press  or , until the LCD shows like pic5.5-8.



pic5.5-8



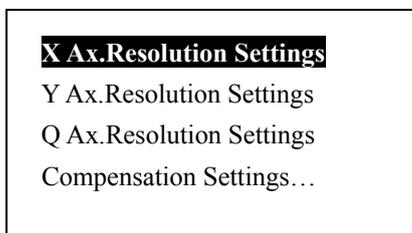
pic5.5-9

Third step

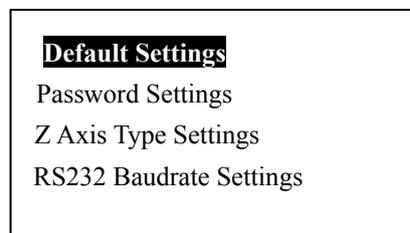
Press , enter the submenu of the super settings like pic 5.5-9.

Fourth step

Input the correct password“3211”, the LCD shows like pic5.5-10.



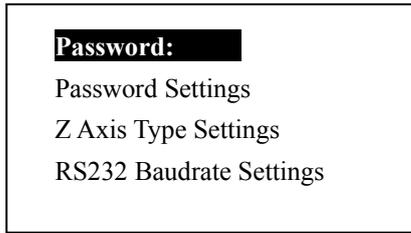
Pic5.5-10



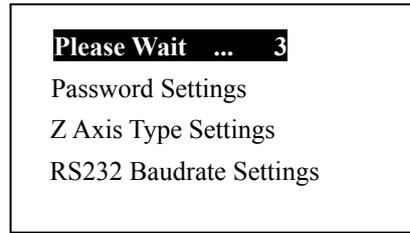
Pic5.5-11

Fifth step

Press  or , until the LCD shows like pic5.5-11.



Pic5.5-12



Pic5.5-13

Sixth step

Press , the LCD shows like Pic5.5-12. input the correct password “3211”, the LCD shows like pic5.5-13, wait a moment, the LCD shows “:) Please Wait... 2”, wait a moment again ,the LCD shows “:) Please wait...1”. Then wait a moment the LCD shows like “:)default was reseted!”, it means that the setting completed. At last the LCD shows like pic 5.5-11, the system returns to submenu of super settings.

Attention:

Some default as follows:

- (1) Clear the original of absolute coordinate.
- (2) Clear the original of incremental coordinate.
- (3) Clear the Axis skewed angle.The axis set to no skew.
- (4) The counting directions of X-axis、 Y-axis and Z-axis are set to forward direction .
- (5) X-axis、 Y-axis and Z-axis resolution set to 1μ, Q-axis resolution set to 10μ or 0.01°. the Z-axis set to rotary encoder. Angle Type set to DMS.
- (6) X-axis and Y-axis set to linear compensation. The linear compensation modulus set to 1.0.
- (7) The observed value and standard value of segment compensation cleared all, the linear compensation modulus set to 1.0.
- (8) The default No. of sample poits of point、 line and circle are 1、 2 and 3.
- (9) The RS232 baudrate is set to 9600bps.
- (10) All graphics feature(contain temporary and permanent) are cleared all.

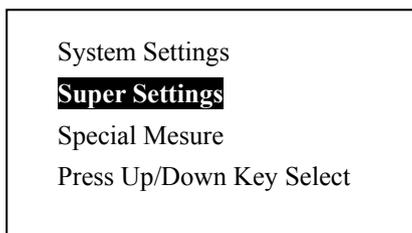
5.5.3 Z-axis or Q-axis type select

First step

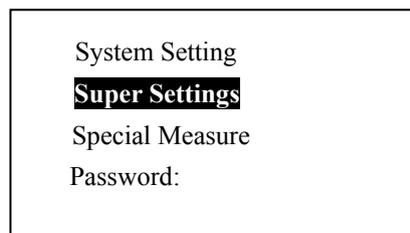
Press , enter system parameter setting.

Second step

Press  or , until the LCD shows like 5.5-14.



Pic5.5-14



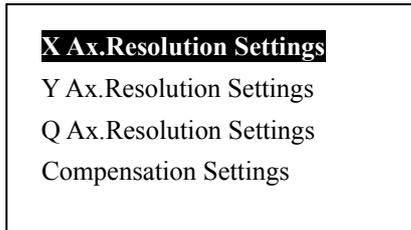
Pic5.5-15

Third step

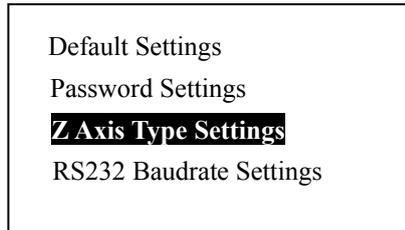
Press , enter to the submenu of super setting like pic5.5-15.

Fourth step

Input correct password“3211”, the LCD shows like pic5.5-16.



Pic5.5-16



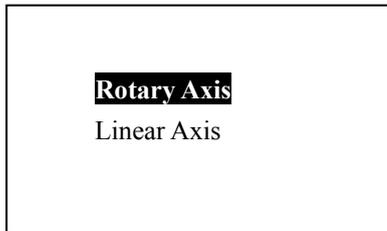
Pic5.5-17

Fifth step

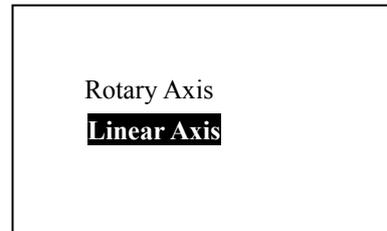
Press  or , until the LCD shows like pic5.5-17.

Sixth step

Press , enter the submenu of Z Axis Type Settings, the LCD shows like pic5.5-18. The present Z-axis set to rotary encoder, then the Z-axis is Q-axis.



Pic5.5-18



Pic5.5-19

Seventh step

Press  or , until the LCD shows like pic5.5-19.

Eighth step

Press , select it, now the LCD returns to show like pic5.5-17, the system returns to the submenu of super setting. It means that the Z-Axis is used for linear axis the same as X-axis、Y-axis.

5.5.4 Setting user password

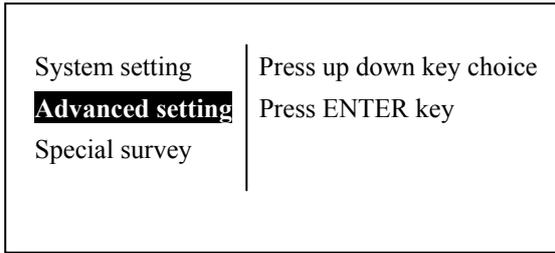
In order to prevent the other people make the revision or the establishment to system some important parameters affect the user the normal use. We use user password protection these parameters.

Step one

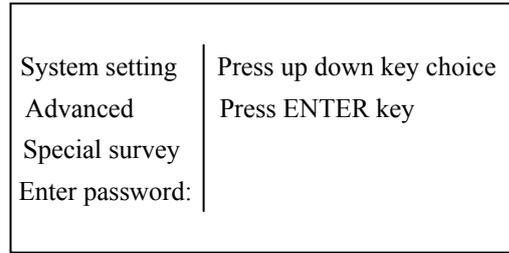
Press  key, Enters the system parameter setting.

Step two

Press  or  key, Until the LCD display monitor demonstrated like the pic 5.5-18 shows the content.



Pic 5.5-20



pic 5.5-21

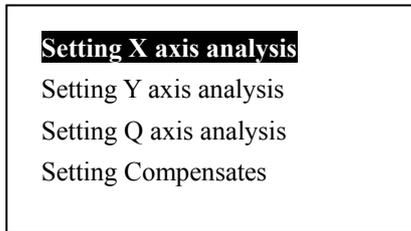
Step three

Press  key, Enters the advanced user setting sub- menu demonstration like pic 5.5-21.

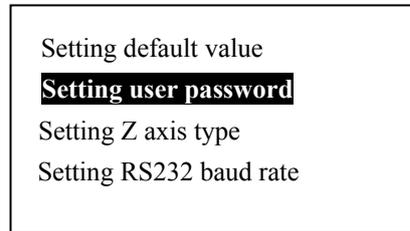
Step four

Inputs the correct password "3211", the system automatically enters the high-quality user establishment condition, LCD demonstrates like the pic 5.5-

Establishes X axis analysis



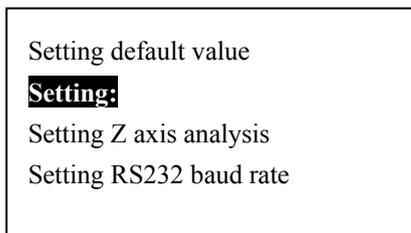
Pic 5.5-22



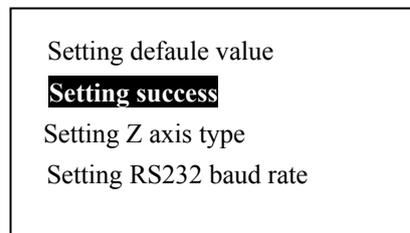
pic 5.5-23

Step five

Press  or  key, Until the LCD display monitor demonstrated like the pic 5.5-21 shows the content.



Pic 5.5-24



Pic 5.5-25

Step six

Presses  key, the display monitor demonstrated like the pic 5.4-24 shows the content, indicated waits for the user input user password.

Step seven

Press the number key, inputs 4 numerals. The system automatically establishes these 4 numerals as the user password, LCD demonstrates like the pic 5.5-25. Later the LCD demonstration returns to like the pic 5.5-23 displayed informations, indicated the establishment user password completes, the system returns to the high-quality user to establish the sub- menu.

□ **Attention:**

(1) When leaves the plant, the establishment tacitly approves the user password is "3211". The password all is 4 numerals.

(2) After establishes the user password, the user please remember the user password which oneself establishes. Will use when later this number will reveal the table, in the request input password place inputs the user password which you will establish. If forgot own user password causes to be unable normally to use, please use the super password: "1268".

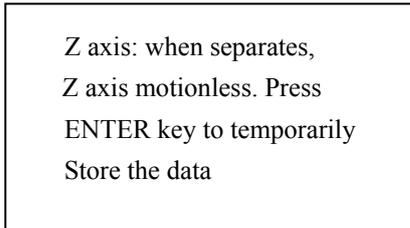
Chapter six Z axis height finder

This function coordination height finder use, can carry on automatically, accurately measuring.

Step one

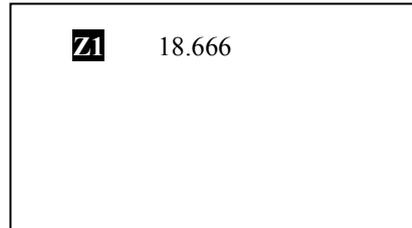
Under normal state. Press  key, LCD screen demonstration like pic 6-1. The expression enters the Z axis to measure the high function.

When the Z axis height finder separates, the Z axis is motionless. Presses the ENTER key to temporarily store the data



Z axis: when separates,
Z axis motionless. Press
ENTER key to temporarily
Store the data

Pic 6-1



Z1 18.666

pic 6-2

Step two

This time may slowly move the Z axis height finder, when the height finder when bumps touches separates, Z axis

automatic locking, Z the axis LED demonstration numeral no longer changes. This time, may press  the data display on the LCD screen like the pic 6-2. Altogether may demonstrate eight groups.

Step three

When height finder once more closed, the Z axis counts the automatic start, moves when the height finder Z the axis LED demonstration numeral changes once more. May carry on the second step of operation once more.

APPENDIX

A. Each kind lies between the surface to meet the foot chart

1. raster meets the foot pic

9PD socket

Foot NO.	signal	Power line color
7	+5V	red
2	0V	black
6	A+	palm
8	B+	yellow
9	ABS+	orange
1	NC	
3	NC	
4	NC	
5	FU	

2. RS232 The signal meets the foot pic

Foot NO.	signal	Power line color
1	NC	
2	TXD	yellow
3	RXD	orange
4	NC	
5	GND	palm
6	NC	Black
7	NC	red
8-9	NC	

3. The printer lies between the surface to meet the foot chart

9PD Plug for standard disposition

9PD socket

Foot NO.	signal	Power line color
1	+5V	red
2	GND	Palm
3	BUSY	Yellow
4		Orange
5	DATA	blue