Xtreme+
User's Guide

AccuDRO

support@accudro.com
1-877-407-3515

Contents

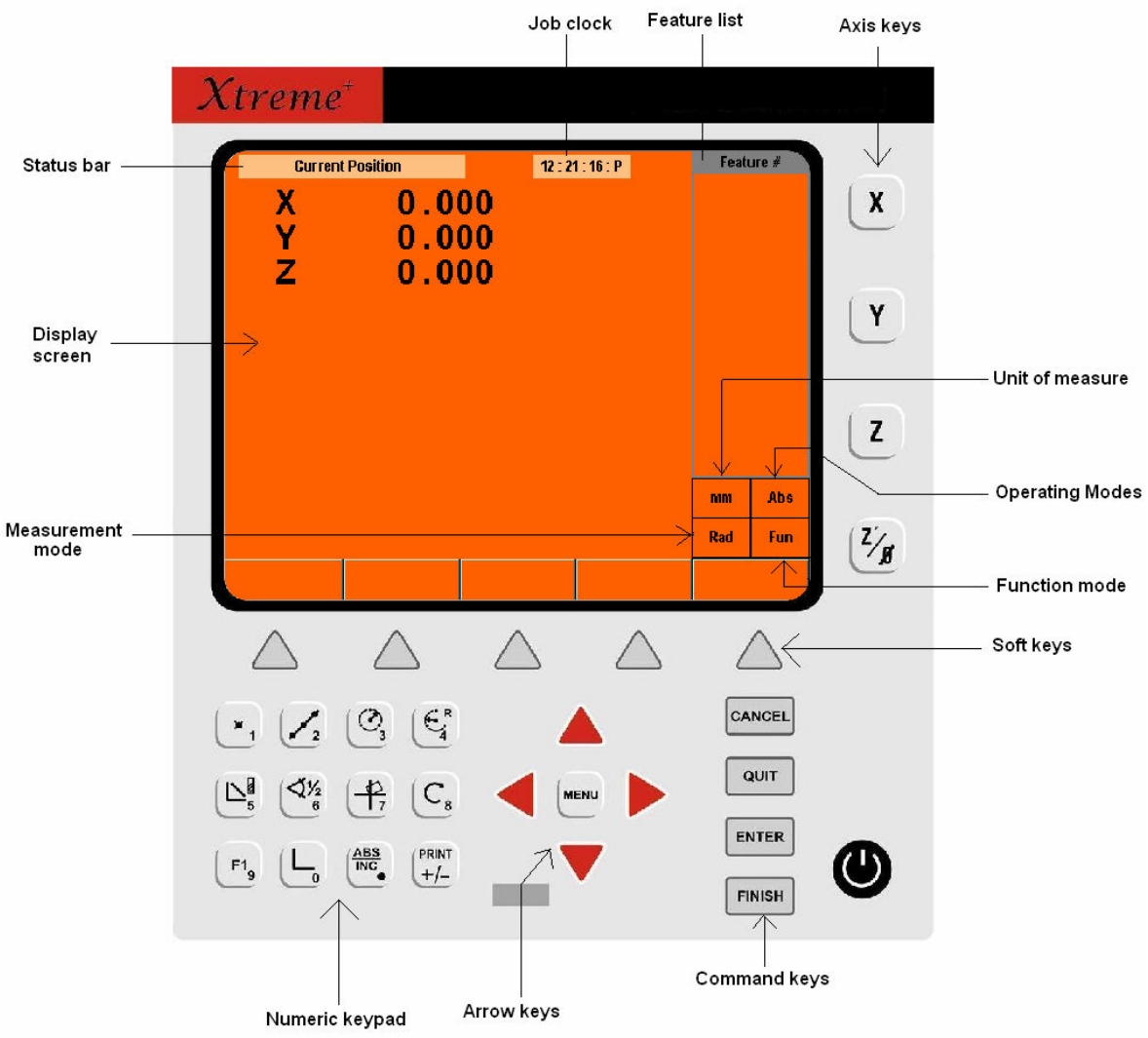
Chapter 1 Introduction

Introduction

About this Guide
There are in all 10 chapters in this manual. Each chapter gives a brief description from basic operating instructions to programming and system configuration. Chapters 1 through 3 contain the information for operating Xtreme+. Use the index to locate the information.

This guide is intended for operators, technicians, supervisors, and dealer representatives.

Layout of screen:-



Chapter 1 Introduction

Xtreme+ readout provides application-specific features that allow you to obtain the most productivity from your manual machine tools.

Status Bar - This displays the selected current function which will be applied to the machine.

Job clock – The selected clock time should be displayed on the screen. For more details you can refer setup mode functions.

Display Area - Indicates the current position of each axis. Also shows forms, Fields, instruction boxes, part views.

Measurement mode – This displays the measurement mode which you have to selected Radius or Diameter. For more details refer Extra mode (Rad/Dia)

Feature list – The measurement of job features is displayed on the feature list

Axis Keys – It indicates axis for corresponding axis keys.

Unit of measure – It displays unit of measurement “mm or inch”

Operating mode – It displays operating mode “ABS or INC”

Soft keys – It indicates that the various milling or turning functions.

Command keys – There are four command keys located beneath the numeric keypad CANCEL, QUIT, ENTER, FINISH.

Arrow keys – There are four *arrow keys* located on front panel of the system. Use the *arrow keys* to scroll through different lists and navigate menus.

Numeric keypad – As the name suggests it is used for numeric entry. Separate key for decimal *point and +/- are* provided.

Chapter 2 Operations

2.1 What is Xtreme+?

The Xtreme+ is a data processor which accepts set of points, applies geometric formulation on the points and finds the best fitting geometry which is commanded by the user. I.e. find a line which collects most of the points from the given points with minimum of error. Similarly you can find best fitting circle, arc. Using basic features like this it can generate variety of geometric constructions
Measurements may differ from actual as the results are statistic based and are not directly measured.

This User's Manual covers the functions of the Xtreme+ for both **milling** and **turning** applications. Operational information is arranged in three sections: General operations, Mill Special functions and Basic functions.

Xtreme+ can be used for

- Inspection of tiny jobs
- Compensating for part misalignments in the measurement system. Establishing a datum
- Measuring part geometry
- For milling machine
- Generating Inspection Reports
- Generating direct Script file that could be used to draw drawings directly in software's like AutoCAD

2.2 Getting Started

Read all the safety instruction before you start working with data processor Xtreme+. It is assumed that the user is familiar with the measurement system used and all conventions the measurement system and data processor uses.

NOTE
It is also assumed that Operators understands part featuring and probing techniques that apply to the measuring device connected to the Xtreme+.

2.3 Safety Reminders:

Location and mounting:
Mount the DRO on a stable surface. It is heavy and if fallen down can cause damage or injury.

Power cord and supply:
Do not connect power cord where it be stepped on which could unplug the DRO. Do not connect to supply which has electrically noise inductive loads like welding machines, motors nearby.
Modifying or overriding these features would create a safety hazard.

Power surge suppressor:
Use High quality surge suppressor to remove all electrical noise from the power source and limit the amplitude of potentially damaging power line transients caused by electrical machinery or lightning.

Liquids:
Keep DRO away from any form of liquids

Checking connections:
All connections (power, linear scales, serial cable etc) should be tight enough and loose connection could cause damage to the sensors or DRO. Perform routine inspection checks for connectors .Keep all connections clean and tight. Keep the cables away from moving objects. Use proper cables for connection with computers

CAUTION
Do not connect or disconnect any cables when the power supply of DRO is ON.

2.4 Configuration & System Setup:

Only qualified supervisors and dealer representatives should perform system configuration and setup. Operators are recommended not to alter the configuration of the Xtreme+.

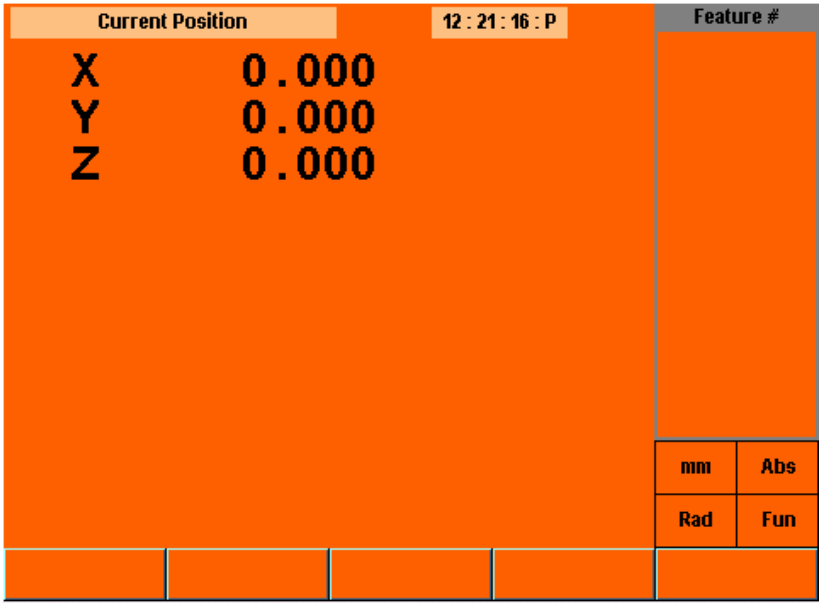
Applying power:

Turn on the power switch located on at the back of the DRO to the ON position and start the software. The system initializes and displays the power-up screen.

Booting screen (initializing screen)

The power-up screen is displayed each time the Xtreme+ is turned on.

Press any key to display the DRO screen. The DRO screen shows the current position of the encoders on each axis.

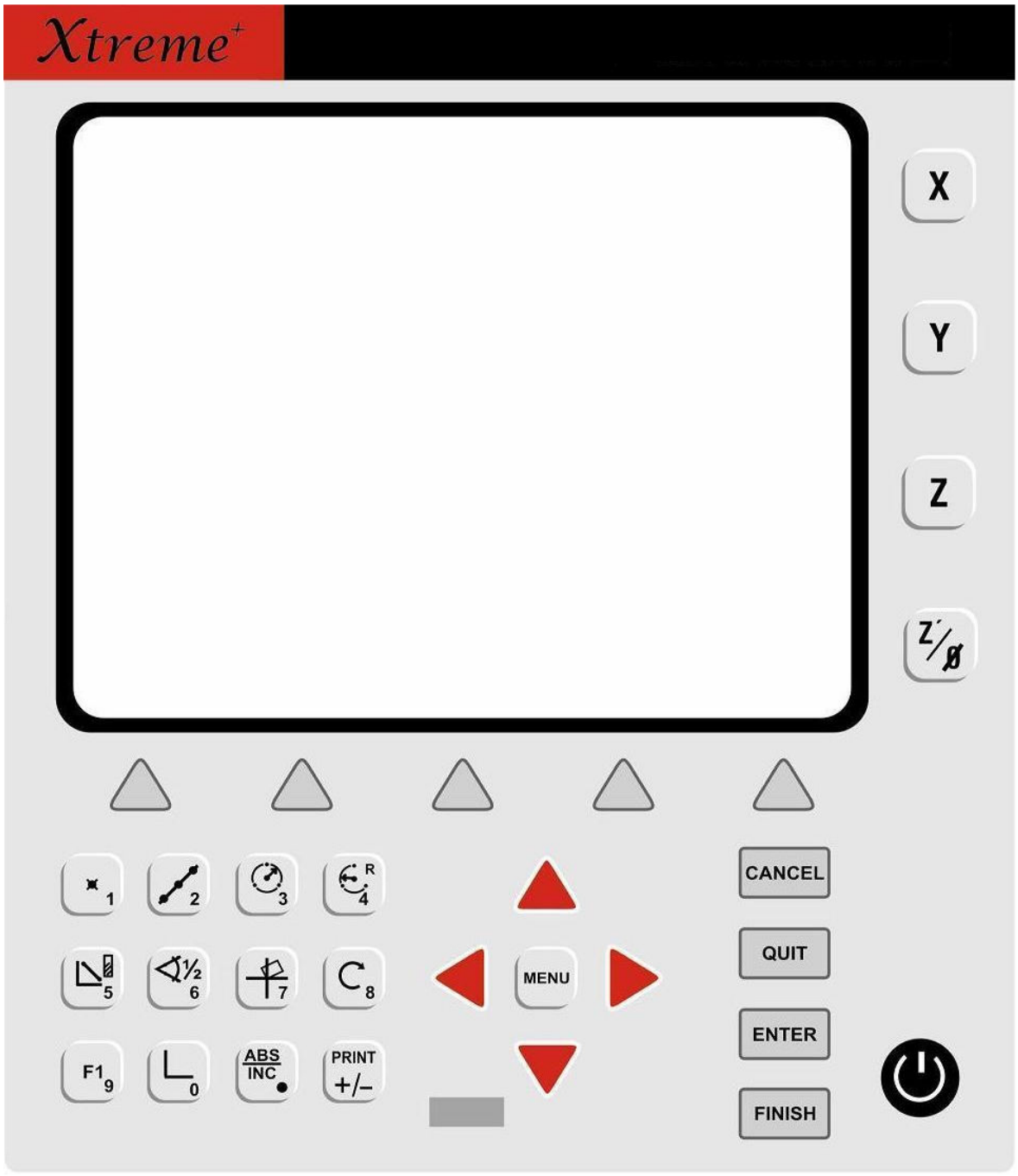


Adjusting Instrument (Xtreme+) LCD tilt

Tilting is done by an ergonomic stand specially designed by Microtechnika for better visibility of the LCD screen.

Chapter 3 Operations

2.5 Front panel graphics of keyboard



Chapter 2 Operations

There are several types of keys located on the front of Xtreme+.

- Feature selection
- Command keys
- Soft keys
- Fast keys
- Arrow keys
- Numeric keypad

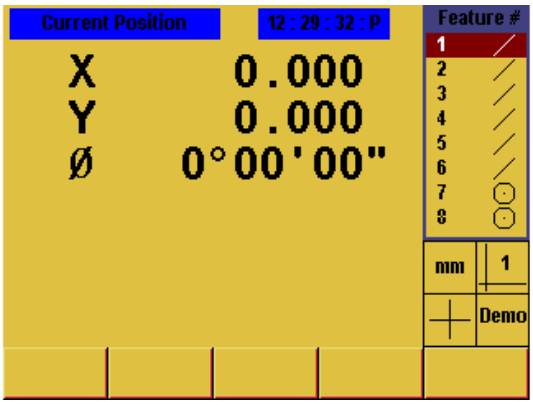
Polar/Cartesian

Step1 Press menu key.

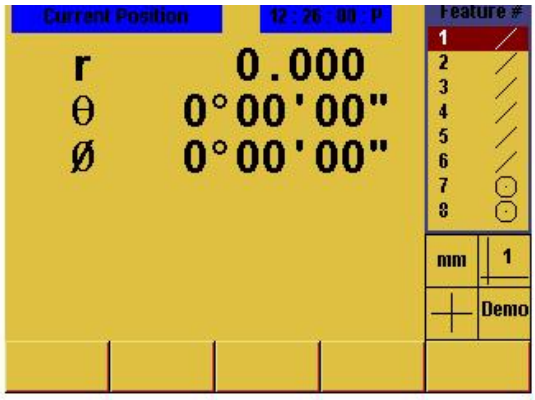
Step2 Press Extra soft key.

Pressing the *extra soft key* to go to extra menus. Use the up and down arrow keys to highlight items in the extra menu list and select the highlighted item ”Co - ordinates”. Then press the enter key to display following screen.

Coordinate systems are simply a way of describing the location of a point or points in a given space. There are two kinds of coordinate systems used by the Xtreme+ polar coordinates and Cartesian coordinates. Users can select the coordinate system appropriate for their specific application. Cartesian coordinates describe the locations of points as linear distances from the datum. For example, a point with the coordinates (2, 3) is located 2 units from the datum along the X axis and 3 units from the datum along the Y axis. Polar coordinates describe the locations of points as a radial distance and angle from the datum. For example, a point given as (2, 60 degrees) is located by following a 2 unit radial distance from the datum (pole) at an angle of 60 degrees.



CARTESIAN CORDINATE SYSTEM



POLAR CORDINATE SYSTEM

2.6 Feature selection keys

There are seven feature selection keys located beneath the soft keys on the Xtreme+. Use feature selection keys to measure and calculate features, skew parts, and activate Measure Magic.

NOTE
Use *auto repeat* to perform a series of measurements on a specific feature type. For example, use *auto repeat* for a series of circle measurements. Activate *auto repeat* by pressing the desired feature selection key twice. *Auto repeat* is allowed for point, line, circle, distance, angle, and measure magic measurements.

Point

Press the *point key* once to measure one point, or twice to use *auto repeat* to measure a series of points. One data point is required to measure a point.

Line

Pressing line *key* once will measure only one line, and twice will *auto repeat* line feature measurement. Minimum of two points (max. 100) are required to measure a line.

Circle

Press the *circle key* once to measure one circle, or twice to use *auto repeat* to measure a series of circles. Minimum three points (max. 100) are required to measure a circle.

Arc

Similar to *circle key but can* arcs of a given part.
Press the arc *key* once to measure one arc, or twice to use *auto repeat* to measure a series of arcs. Minimum three points (max. 100) are required to measure a arc.

Distance 

Press the *distance key* once to measure one distance, or twice to use *auto repeat* to measure a series of distances. Two points are required to measure a distance.

Angle 

Pressing the *angle key* once to measure one angle, and twice to use *auto repeat* the series of angles measurement. Minimum two points (max. 100) are required to measure each leg of an angle.

Skew 

Press the *skew key* to compensate electronically for non-square part alignment or milligged part axis in reference to optical axis of the Projector .Skew is already explained earlier.

Advanced Functions.

Press this *key* to measure advanced functions as per following. Refer advanced functions for more details.

ABS/INC 

Press this key to select operating mode Absolute or Increment. It is toggled.

2.7 Soft keys

There are in all five soft keys located beneath the LCD display. These are called soft keys as there function varies from mode to mode; these functions appear above the corresponding soft key at the bottom of LCD display
For example, the soft keys 1-5 above correspond to the NLCF, Extra, Part view, Position, Setup respectively.

2.8 Command keys

There are four command keys located beneath the numeric keypad:
CANCEL, QUIT, ENTER, FINISH.

Enter

Pressing the *enter key* probes points during feature measurements. The *enter key* is also used to enter data during other modes like setup mode etc.

Finish

Pressing the *finish key* will complete feature measurements. Pressing the *finish key* a second time returns the user to the DRO screen. As the name suggests users typically press the *finish key* after the final point in a measurement is entered.

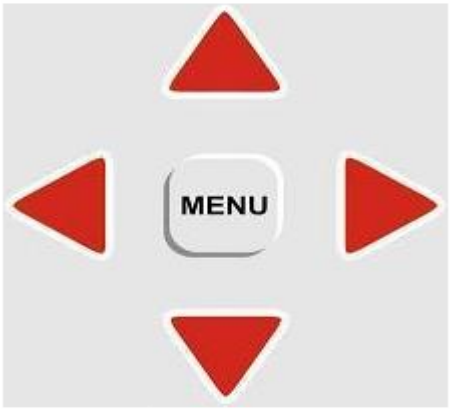
Cancel

Press the *cancel key* to cancel the last point that was probed or entered. The *cancel key* is also used to delete feature in feature list

Quit

Press the *quit key* to cancel the current task and return to main DRO screen. Use the *quit key* to exit from other modes also.

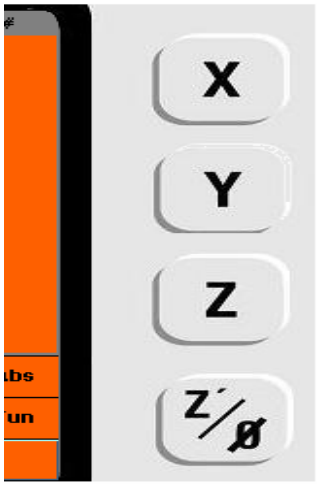
2.9 Arrow keys



There are four *arrow keys* located on front panel of the system. Use the *arrow keys* to scroll through different lists and navigate menus.

Press  **key to toggle the Z axis or Q axis.**

2.10 Zero axes keys

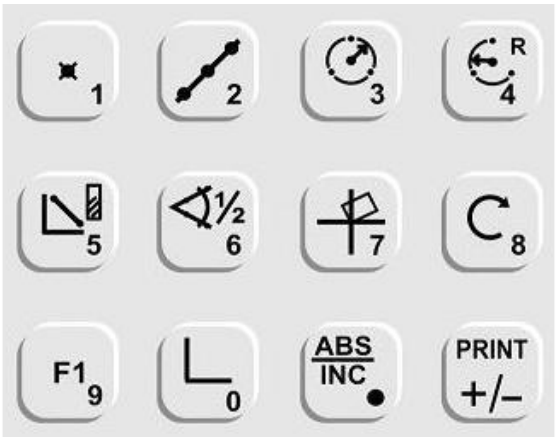


There are four zero *axes keys* located to the right of the LCD display.
Press ‘X’ key to zero X axis
Press ‘Y’ key to zero Y axis
Press ‘Z’ key to zero Z axis active only if third axis is linear
Press ‘Z/Q’ key to zero Q axis active only if third axis is Rotary

2.11 Fast track key

The programmable Quick *track key located* on the LCD display. By default the F1 Q*uick track key* is the similar to the enter key. The key is user programmable and their function can be set from set up menu described later.
This key ultimately speeds up the measurement process and makes operations possible on a single keystroke.

2.12 Numeric keypad



As the name suggests it is used for numeric entry. Separate key for decimal *point and +/- are* provided.

2.13 Misc. keys

Send/print 

Press the *print key* to transmit measurement results to a computer or printer.

LCD on/off 

Press the LCD on/off key to turn only the LCD OFF/ON

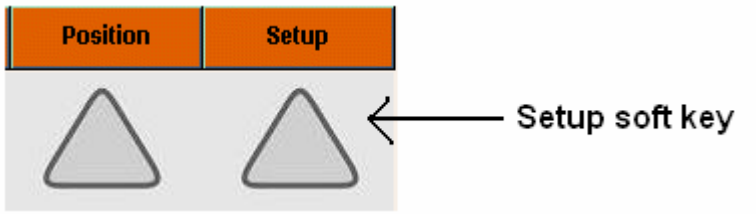
Menu key

Press the *menu key* to view soft key menus.

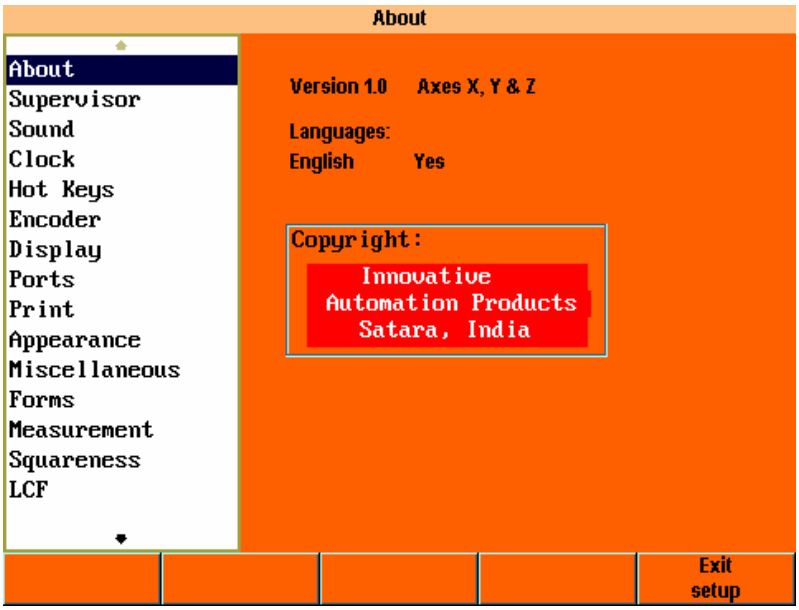
Menus

2.14 Setup menu

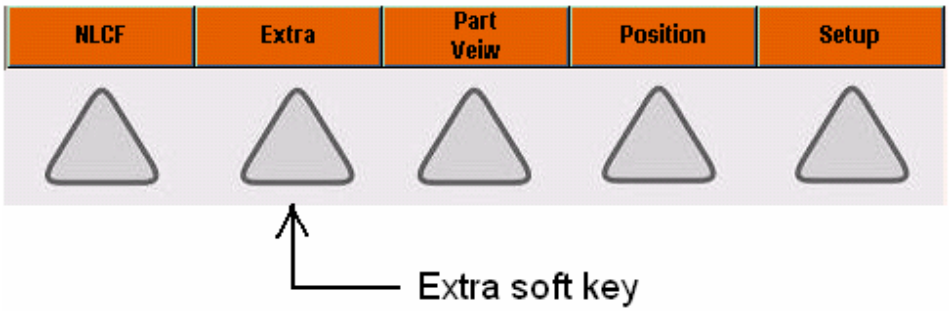
Press the setup menu soft key to access the Xtreme+ setup screens. Only qualified Technicians, Supervisors and dealer representatives shall use the setup menu to configure measurement, display, and communication parameters. Use the arrow keys to highlight the desired setup screen. The setup is self explainatory and does not require and additional explanation, still you can go through chapter for setup for your queries.



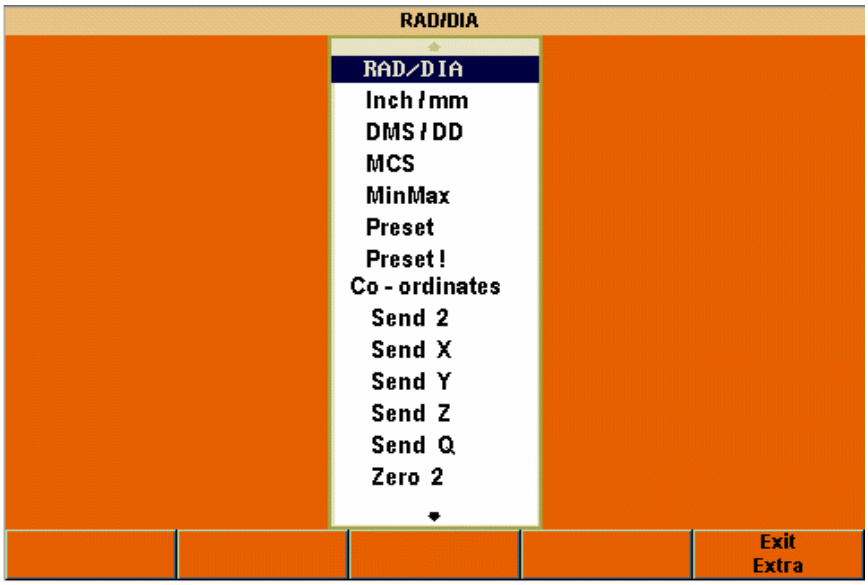
Press the soft key shown in above graphics an you will find screen that is shown below



2.15 Extra menu



Pressing the *extra soft key* to go to extra menus. Use the up and down arrow keys to highlight items in the extra menu list and than press the *enter key* to select the highlighted item. A brief explanation of each function is given below.

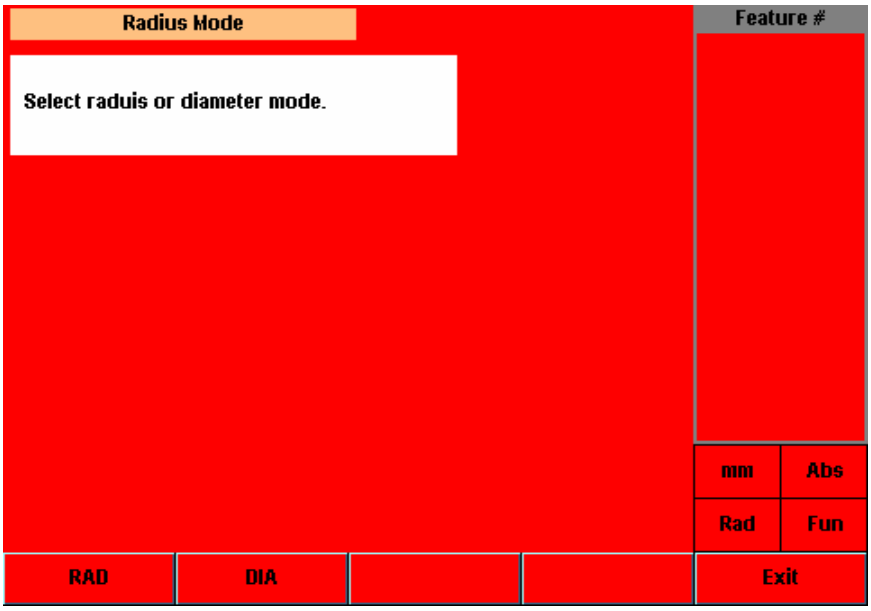


Note: Pressing exit extra soft key or Quit key any time will exit from extra menu and the data processor will return to main menu.

Use the up and down arrow keys to highlight items in the extra menu list and select the highlighted item

2.16 RAD/DIA

Press enter key to continue ENTER



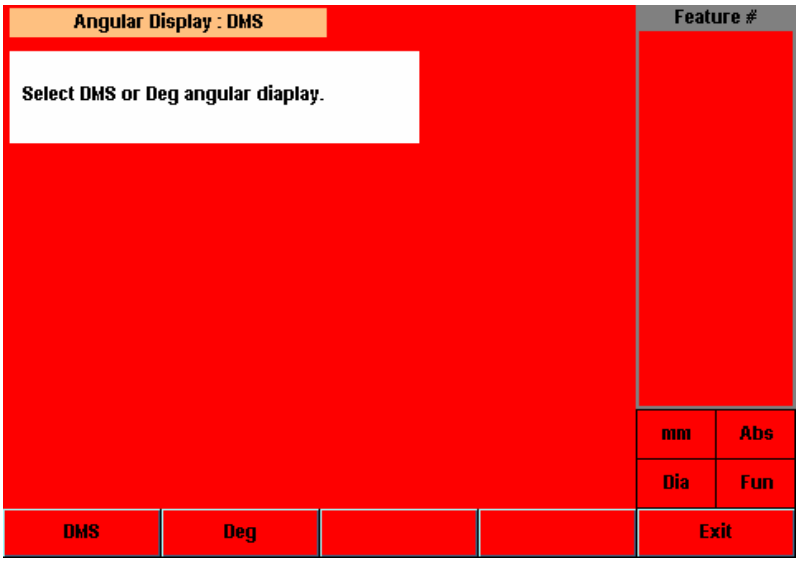
Press Soft key “RAD “or “DIA “to switch to Radius or Diameter mode.
Press quit or exit soft key to go back to menu screen.

2.17 Inch/mm

This key is used only to toggles the unit of measurement between INCH and MM.
Press enter key when Inch/mm is highlighted.

2.18 DMS/DD

This key is used only to toggles the display of angles between degrees, minutes and seconds and decimal degrees. Used only with Q axis i.e. Third rotary axis.
Press enter key when DMS/DD is highlighted.



Use soft keys to change the mode.
Press quit or exit soft key to go back to menu screen.

2.19 MCS – Machine Coordinates System

Reference - mark overshoot
After the power up counter reports you with the logo Press some key.
The counter asks you now to overshoot the reference mark.
Move the axis there to the little by little at one left side. After the both reference – mark are overshoot the display shows the count.

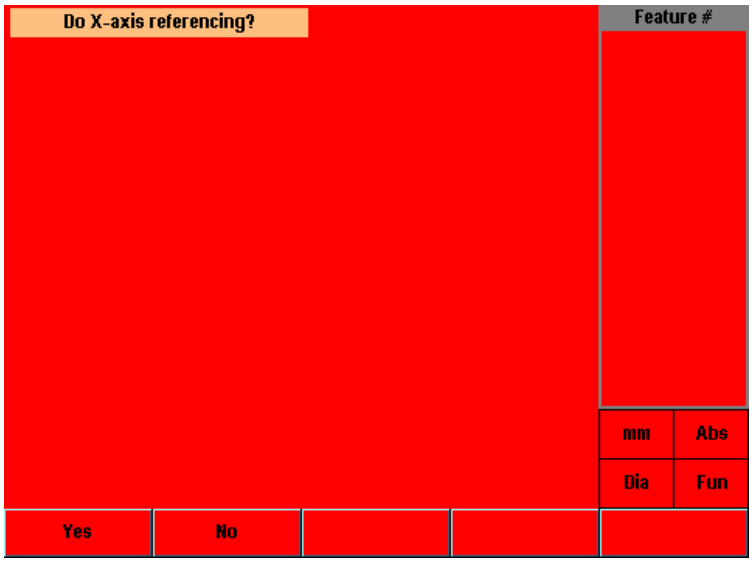
Note: Go to setup > encoders> reference of each axis to allow referencing in manual mechanical zero or reference pulse.

Parts arrange
The first steps in any measurement session will include adjusting the LCD viewing, setting measurement and display parameters, and setting the datum's.

Highlight *MCS* to clear datum's and re-establish machine coordinates.

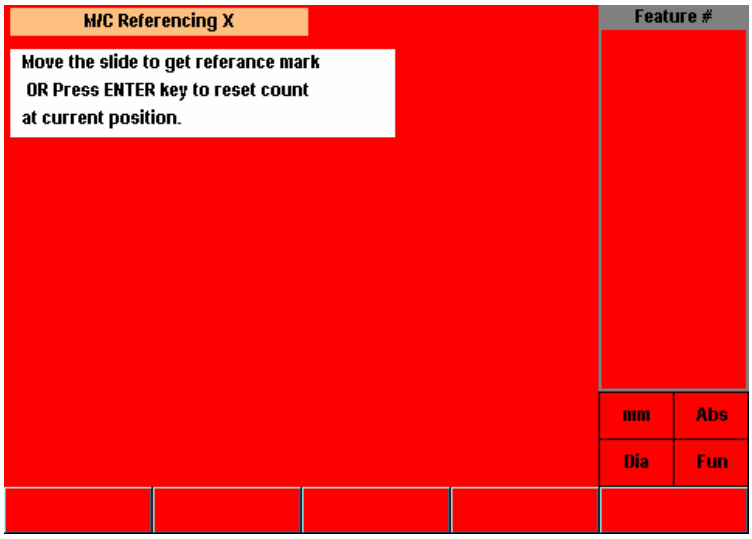
Step 1 On arrival to function MCS press ENTER key.

Following screen shows do X axis referencing?

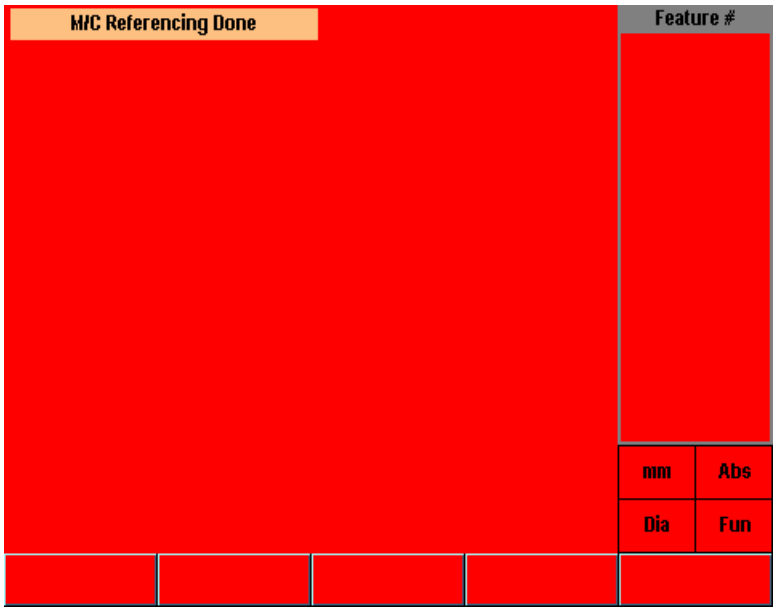


Step 2 Press "Yes" soft key.

After that move the slide to get reference mark OR press enter key to reset count at current position.



Step 3 Now machine referencing for X axis is done.



After that press “Quit” key then follows the same procedure of X axis is used to Y & Z axis machine referencing.

NOTE
Previous datum’s cannot be recovered once machine coordinates are re-established.

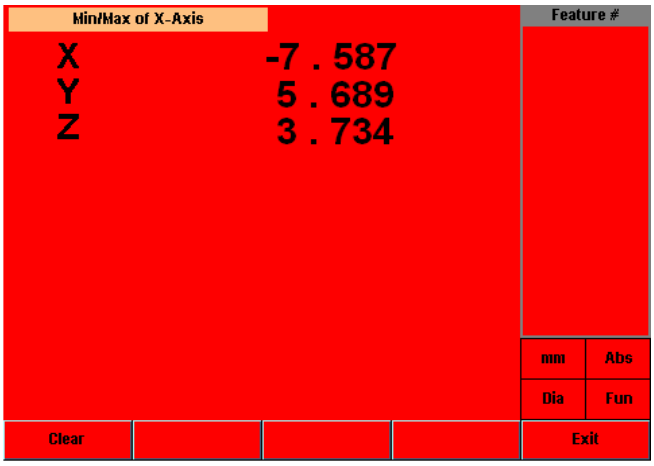
2.20 MinMax

Highlight *MinMax* to collect minimum and maximum point values until the *finish key* is pressed. Use *MinMax* for measurements of run out.

Step 1
After selecting min max mode, you will find the following screen.

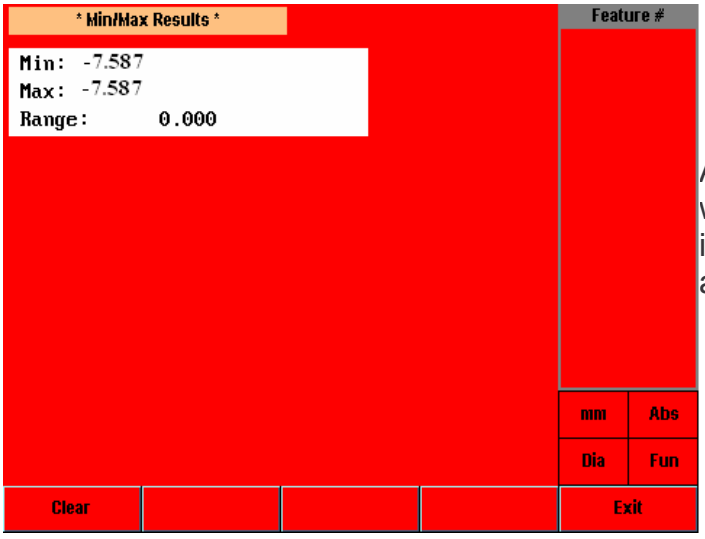
Here select either X, Y or Z axis using soft keys. This mode will find minimum and maximum readings from the readings until you press the finish key.

Step 2
After selecting the X axis soft key.



Here the Xtreme+ starts finding minimum and maximum of readings of X axis till you press the finish key. Press clear soft key if you want to restart tracking of min and max of selected axis

Step 3 Press finish key when you want to stop tracking (say after you turn around the shaft by 360 degrees, you can get the run out in it)



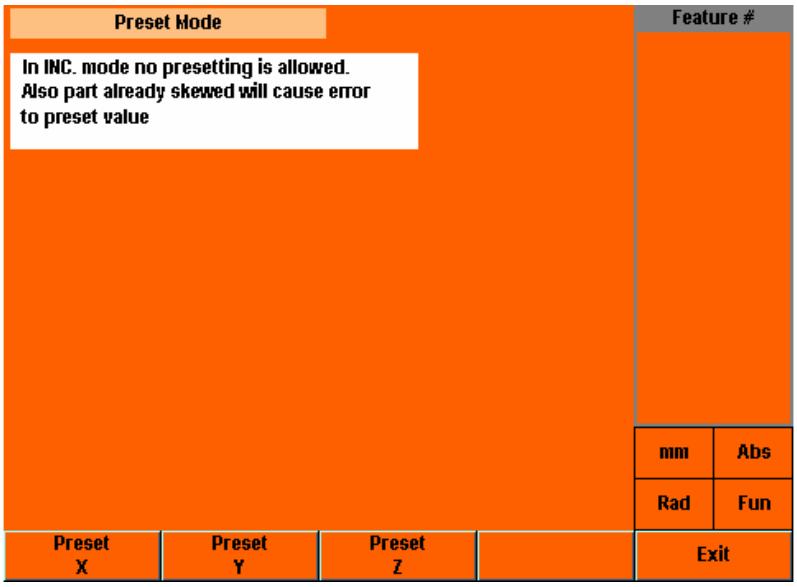
As the reading for start and finish were same and not changed range is zero, min and max both values are same.

2.21 Preset

Sets the axis or axes to the preset value.

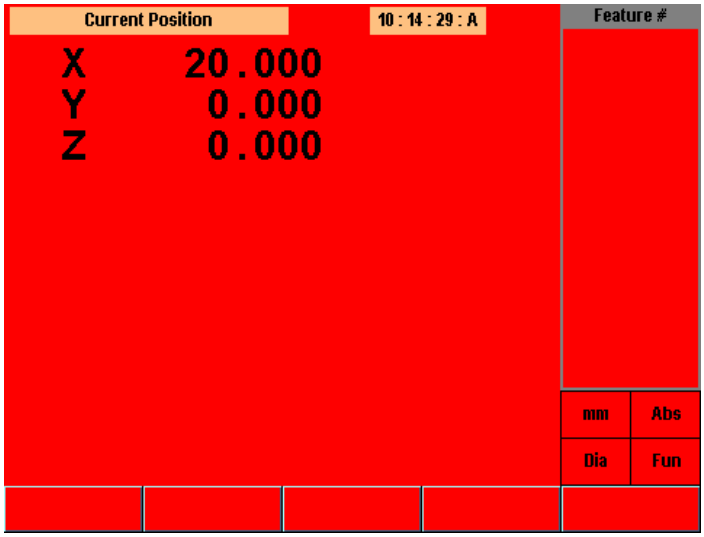
Step 1 On arrival to function Preset then press ENTER key.

Following screen shall appear. In Increment mode no presetting is allowed.



Step 2 Press “Preset X” soft key.
After that enter preset value as per your requirement by using numeric Keypad. For example enter preset X value = 20.

Step 3 Preset value is set to X axis as per shown in the following screen.



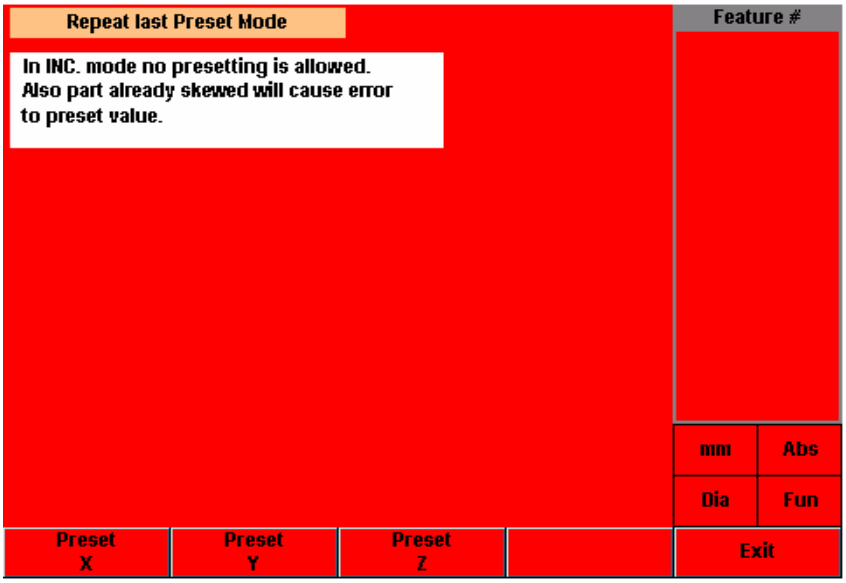
Now the same procedure of X axis presetting is used for Preset Y & Preset Z.
Press quit key to return extras menu.

2.22 Preset!

Sets the axis or axes to the last entered preset location.
Highlight *preset* to preset an axis or axes to a desired feature or location. Use the preset function to measure features that are datumed on another part. Typically this is required for component parts of larger assemblies. Another use for the preset function is to find the offset between the nominal and actual location of a preset feature.

After entering Preset! Function following screen shows repeat last preset mode,

- Press Preset X soft key to preset X axis.
- Press Preset Y soft key to preset Y axis.
- Press Preset Z soft key to preset Z axis.

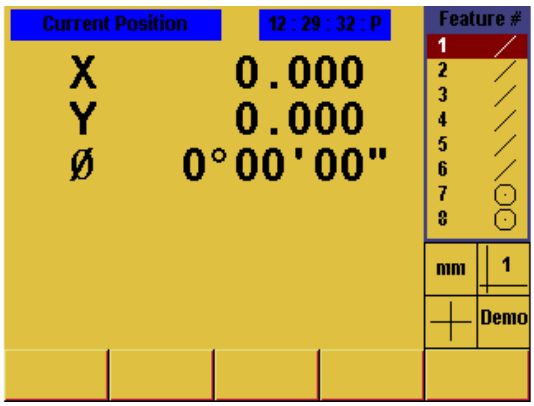


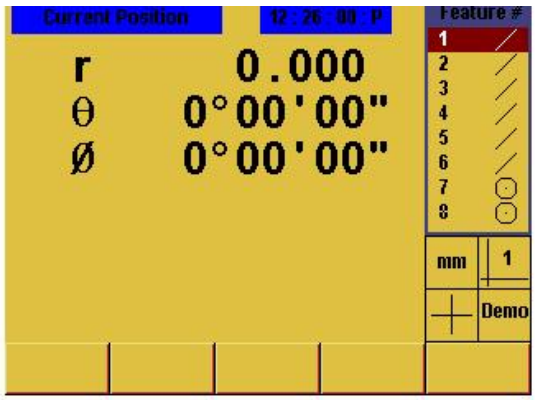
Press quit key to return extras menu.

2.23 Co – ordinates

This key is toggled to co- ordinates

This key is used only to toggles Co- ordinates between Polar and Cartesian
The highlighted function is used to select co ordinates is Polar or Cartesian mode.





2.24 Send 2

Select *send 2* to send the current X, Y axes data to a printer or computer.

NOTE

All send data menu items send data to the RS-232 port. These commands do not send data through the parallel port.

Press quit returning to extras menu

2.25 Send X

Select *send X to* send the X axis data to a computer.

2.26 Send Y

Select *send Y to* send the Y axis data to a computer.

2.27 Send Z

Select *send Z to* send the Z axis data to computer.

2.27 Send Q

Select *send Q to* send the Z axis data to computer.

2.28 Zero 2

Zeroes both X and Y axes in the current datum.

2.29 Cl Datums

Select Cl datums *to* clear the datums values of X, Y, or Z axis.

Chapter 3 Geometric Features

3.1 Features

Features are nothing but geometric construction of data points obtained by probing the geometry of the part. For example, Consider points probed along the perimeter of a circle. Using these points this equipment generates graphic and numeric values of parameters of the measured circle geometry. We refer this geometry as a feature.
Different features can be measured on Xtreme+

3.2 Features list

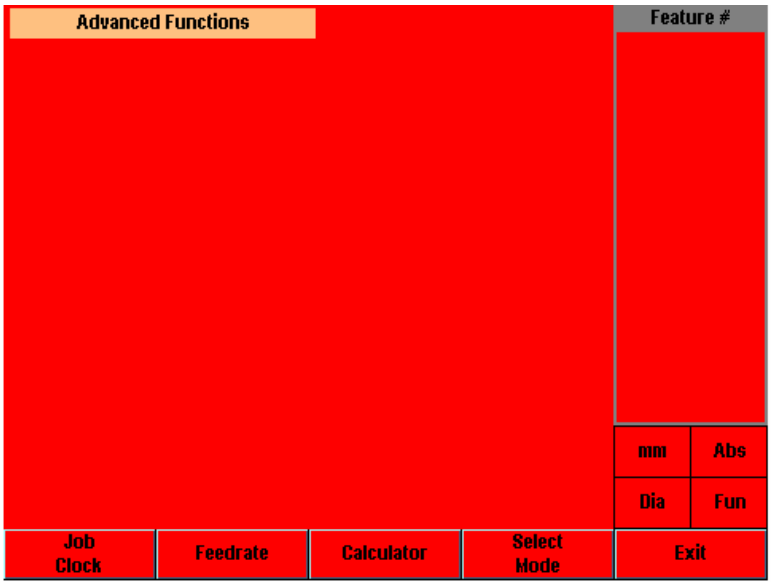
Each feature is added to the features list after successful measurement. The features list is simply a listing of all features measured in a given session. It is displayed on the right-hand side of the LCD screen and is visible in DRO and measuring modes. Features can be identified by number and an icon indicating its type (i.e. circle, line, angle, arc, distance, point etc). Up to 500 features can be added to the features list. Use the up and down arrow keys to scroll through the list.

You can readily view the details of feature list on canvas on the main screen and that to graphically and the points which constructed them. This makes user interaction very easy.
You can send the desired feature to recall, print, or send the feature data to a computer. You can use any features from the features list to construct new features. Users can also delete individual features or the entire list.

3.3 ADVANCED FUNCTIONS

Step 1 Press  key.

Following screen shall appear



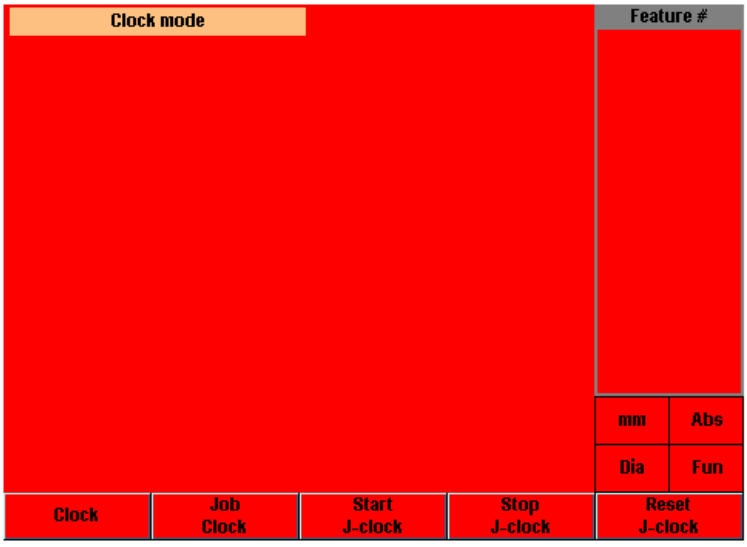
There are 4 different functions. Detailed information discussed as per following.

1. JOB CLOCK

This is a special function used for calculating the time required for completing a particular job. This helps in calculating productivity and job rate.

Step 1 Press “Job Clock” soft key.

Following screen shall appear



The job clock shows the hours (h), minutes (m), seconds (s). It operates like a stop watch showing elapsed time. (The clock starts timing from 0:00:00).
The Elapsed Time Field shows the total accumulated time from each interval.

There are 5 different sub menus. You can set different functions by using different soft keys.

Clock:
Select clock soft key clock mode will be set.

Job clock:
This function will set the Job clock mode.

Start J-clock:

This function will turn the job clock start. Job clock is always displayed on the normal counting mode screen.

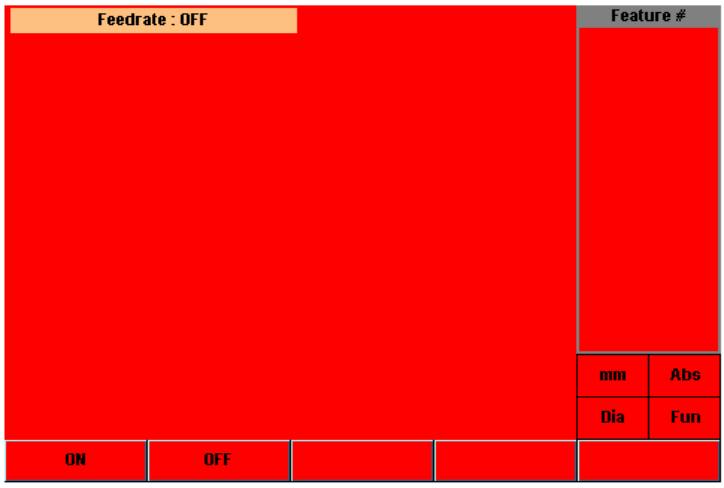
Stop J-clock:

This function will turn the job clock stop. Job clock is always displayed on the normal counting mode screen.

Reset J-clock:
This function shall reset the job clock.

2. Feedrate

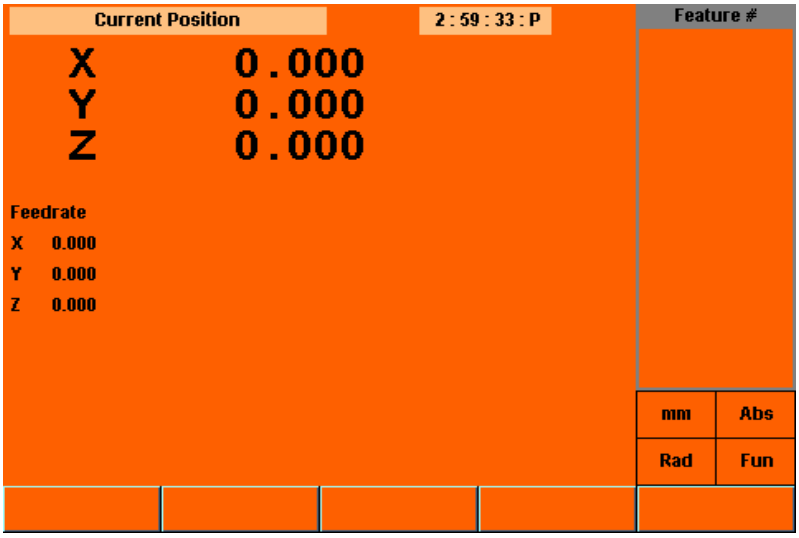
This function is used to display the feeding rate the slide moves. Used to improve the cutter life in case of auto transmission of slides as cutting rate effects the cutter life.
Step 1 After selecting advanced functions then select “Feedrate” soft key. Now following screen will display.



Step 2 Select particular soft key to feed rate On or feed rate Off.

Step 3 Select “Feedrate ON” soft key. Feedrate readings of X, Y, & Z axis will display on the normal counting mode screen

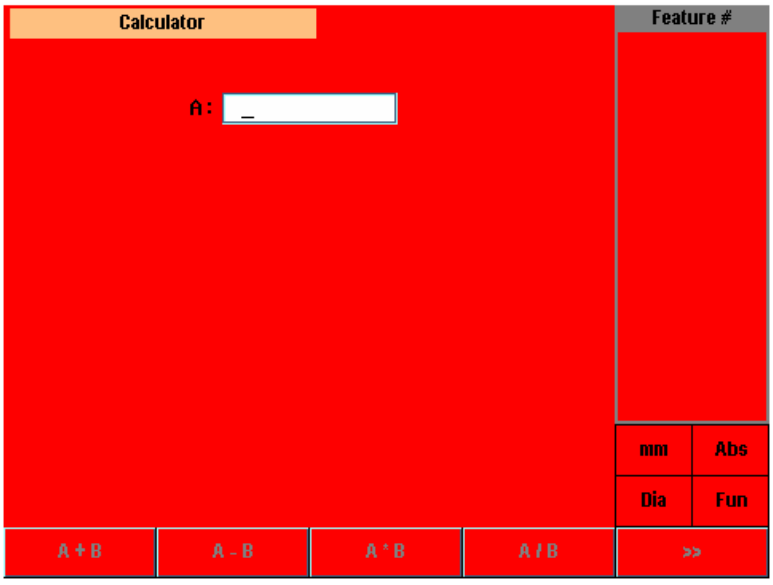
This signifies that X travels 0.00 mm per seconds in case of linear and 0 RPM in case of angular mode. (this is at standstill) and will display some value on movement .similar is for all other axis.



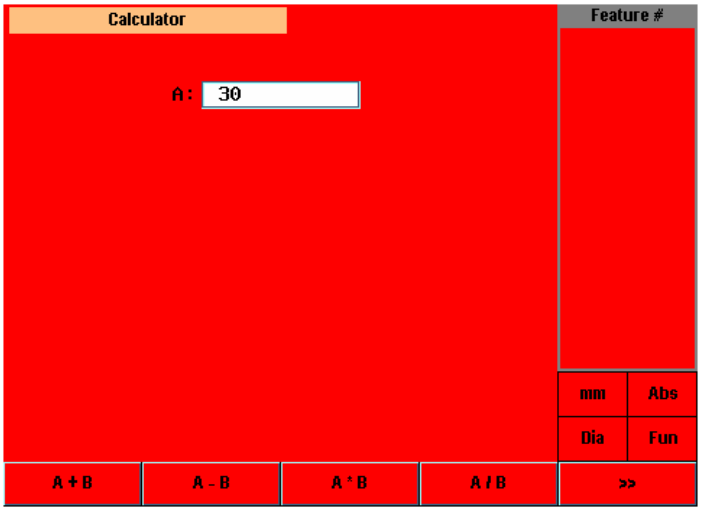
3. Calculator Mode:

This Dro has a state of art calculator function preloaded to facilitate the user with some basic geometry calculations like addition, subtraction, multiplication, division, sine, cosine, tan & square root

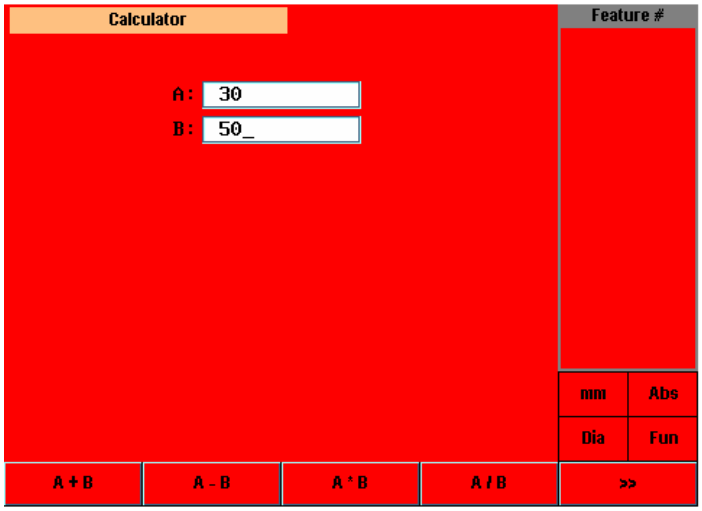
Step 1 After selecting advanced functions then select “Calculator” soft key. Now following screen will display.



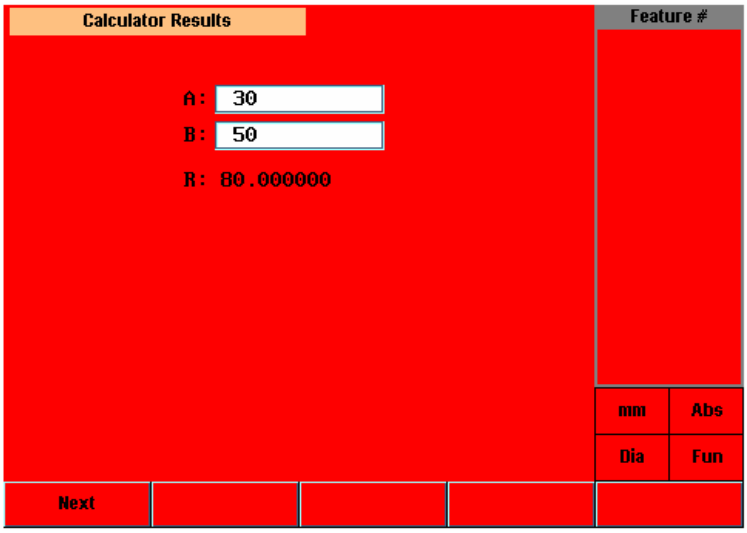
Step 2 Enter first value for calculation (‘A’) by using numeric keypad.
For example enter A = 30
After entering this value press Enter key.



Step 3 Select formulas by using particular soft key, which you have to calculate.
For example press “A+B” soft key.
After that enter second value for calculation (‘B’) e.g. Enter B = 50.



Step 4 Press enter key. Result will be displayed on the following screen.
For example Result = 80.000000



4 Measurement select Mode

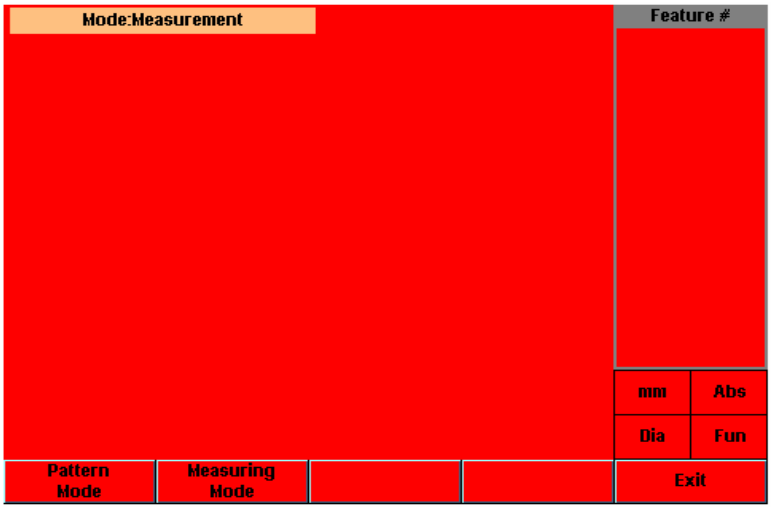
This mode is used to configure the DRO to user's need and requirement. This is a special mode and is generally intended to use by person adverse to DRO and its manual. We shall refer this mode as "Measuring mode" & "Pattern mode" hence forth.

1. Pattern mode:
In this mode you can measure the special functions of the dro i.e milling mode
Refer Chapter 3 "Geometric Features - Special functions" for more details.

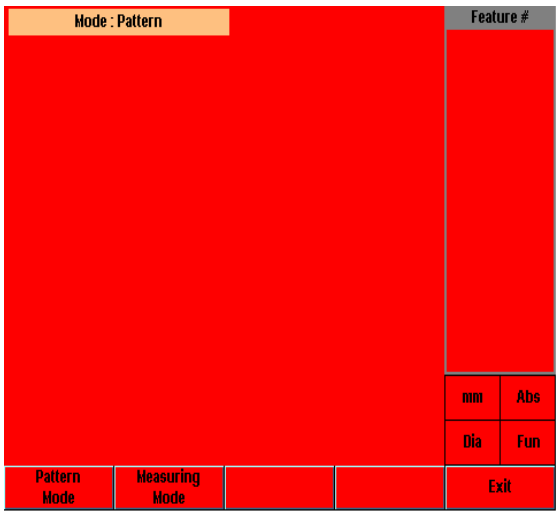
2. Measuring mode:
In this mode you can measure the Basic functions of the dro.
Refer Chapter 3 "Geometric Features – Basic functions" for more details.

Step 1 Press  key.

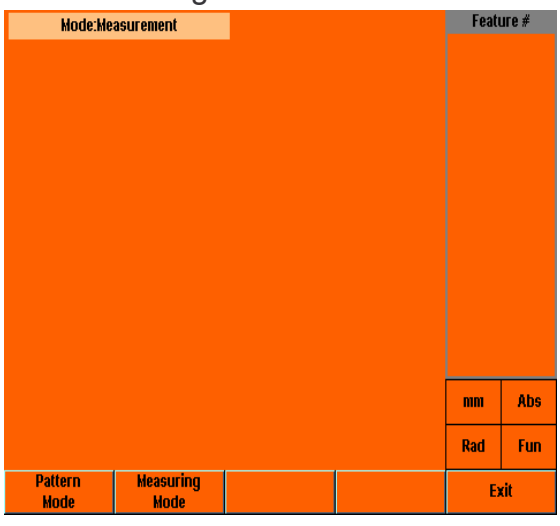
Step 2 After selecting advanced functions then select "Select Mode" soft key. Now following screen shall display.



Step 3 Press "Pattern Mode" soft key
Pattern mode will be selected.



Press "Measuring Mode" soft key
Measuring mode will be selected.



Basic Functions

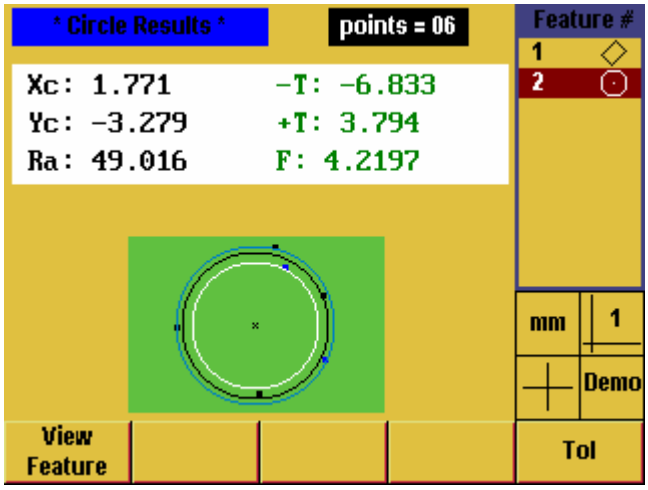
3.4 Tolerancing

The following tolerances are available on the Xtreme+

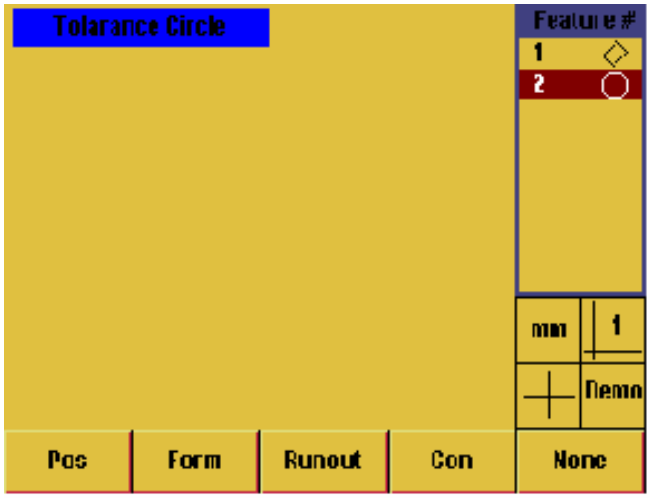
Below is a example for learning tolerancing with data processor Xtreme +

To perform a true position tolerance on a circle

Step 1 Highlight a circle in the features list as shown.

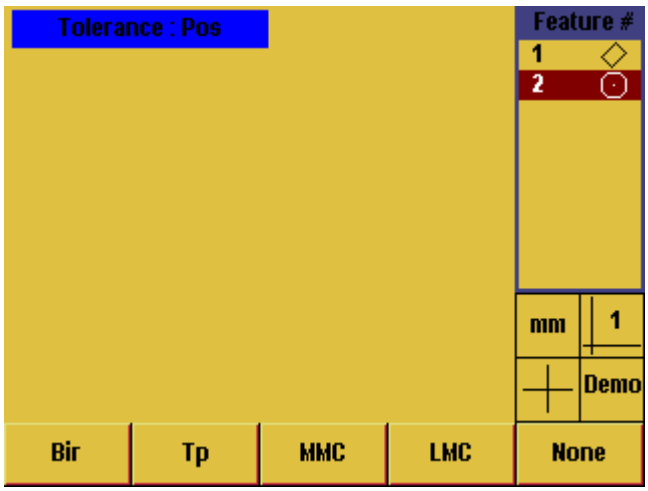


Step 2 Press the “Tol” *soft key*.

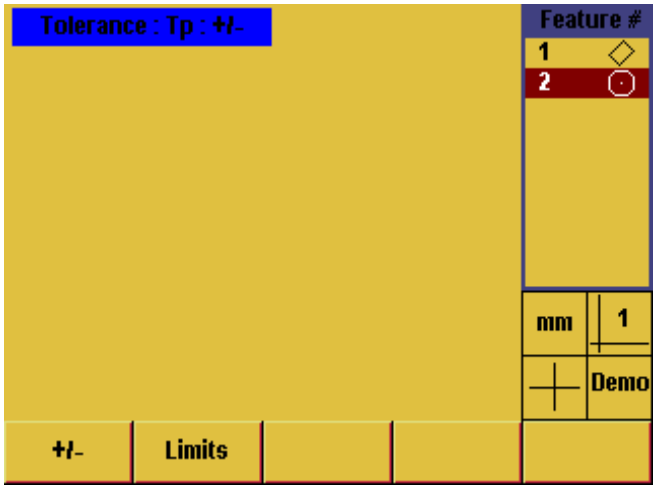


Step 3 Press the *positional tolerance (pos) soft key* to perform a positional tolerance.

Step 4 Press the *true position (TP) soft key*.



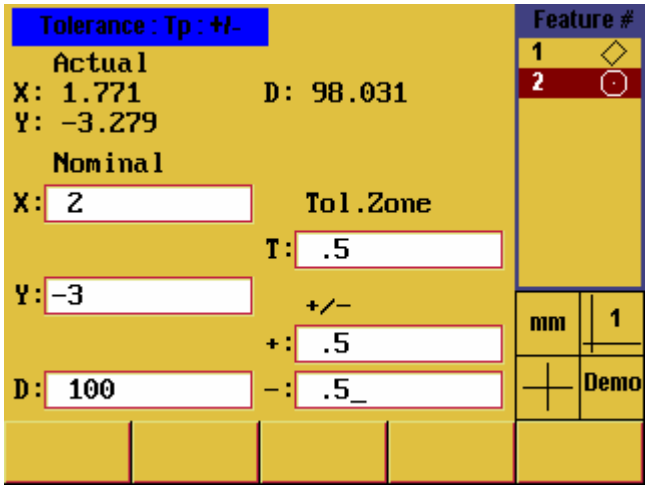
Step 5
Use the numeric keypad to enter the nominal values for X and Y.



There are two methods of tolerencing

1. Give the +/- deviation allowed for a particular dimension i.e. +/- in above graphics
2. Give tolerance as max allowed and min allowed dimension i.e. limit in above graphics

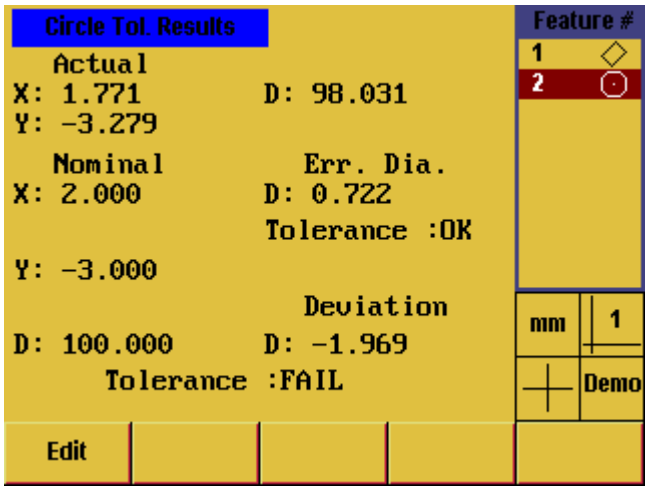
Step 6
Let us select +/- tolerance
Press Soft Key +/-



NOTE
user shall enter nominal values, in the respective field using numeric keys (press enter after every nominal entry to go to other nominal field.

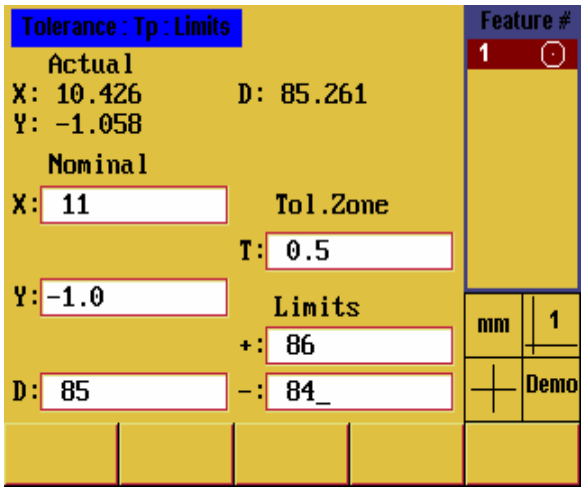
NOTE
The *tol zone (tolerance zone)* of the circle is the radius within which the center point of the circle must be. If the center point lies outside this radius the tolerance will fail.

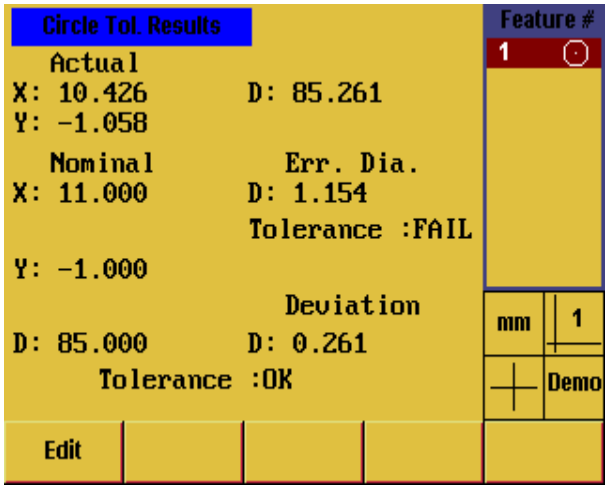
Step 7
Press Enter Key



Step 8
Observe the tolerance results and press quit to return to main menu.

NOTE
For limits Tolerancing,
Use the *limits field* to set upper and lower limits on a value. For example, a nominal value of 85mm (diameter) might have an upper limit of 86 mm and a lower limit of 84 mm.





The results for the tolerance are displayed as shown.

3.5 Skewing the part

It is must that the part shall be exactly aligned on the coordinate measurement system. An imperfectly aligned part creates errors in measurement. Skew function is used to convert machine coordinates to part coordinates and apply compensation for the misalignment. It is good practice to apply skew each time a new part is to be measured or the job is moved on the table where the measurement is to take place. Measure a skew line by probing a straight edge of known orientation. Use a minimum of 2 points and a maximum of 100 when probing the line. Remember that more points means greater accuracy.
Construct a skew line from previously measured features. For example, construct a skew line using two circles will generate a line joining center coordinates of both the circle and than the line will be used to calculate the skew angle. Keep in mind that the more points probed on features used in the construction of a skew line, the greater the accuracy.

NOTE
Place the part within 45 degrees of the measuring machine's true orientation.

Skew Compensation

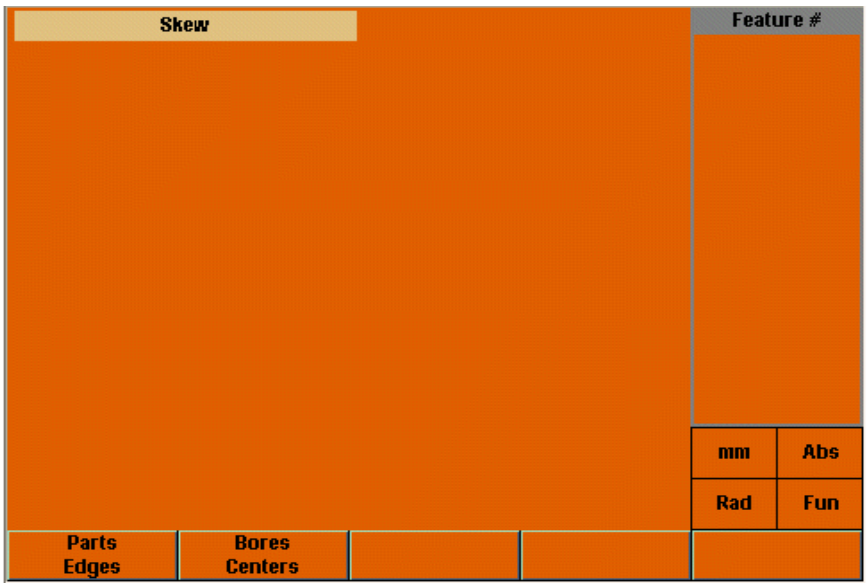
Skew compensation allows the user to drill holes on a workpiece without aligning the workpiece on the machine. Use this feature only for drilling holes.
The Skew Compensation setup form is found under Job Setup. The form is used to turn skew compensation on or off, to set or learn the skew angle, and to set the datum.

Defining the axes of orientation with respect to job edge.

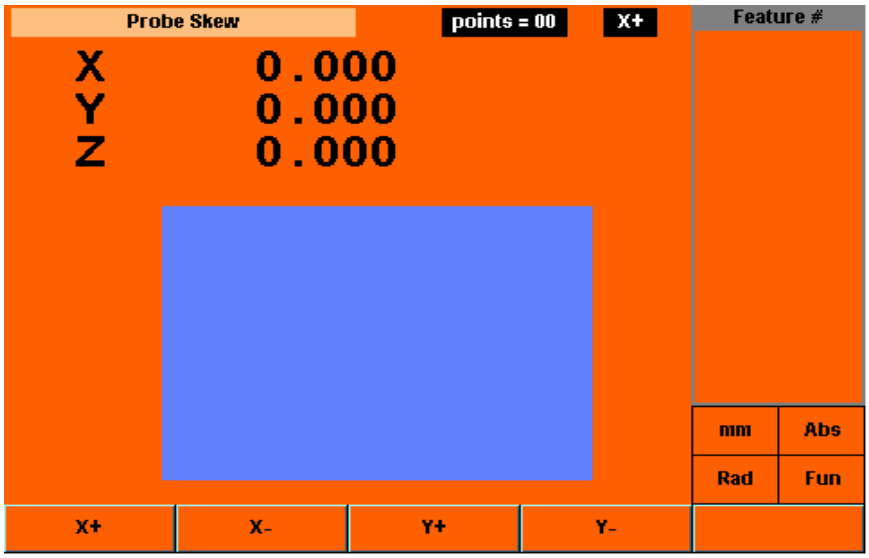
Step 1 Press the SKEW key. 

Following screen shall appear

Step 2 Press “Skew” soft key then go to the SKEW function.
Display shows the following screen.



Step 3 Press “Part Edges” soft key.
After that select direction such as X+, X-, Y+, and Y- then
Probe two or more points along the line as shown. Press the *enter key* after each point.

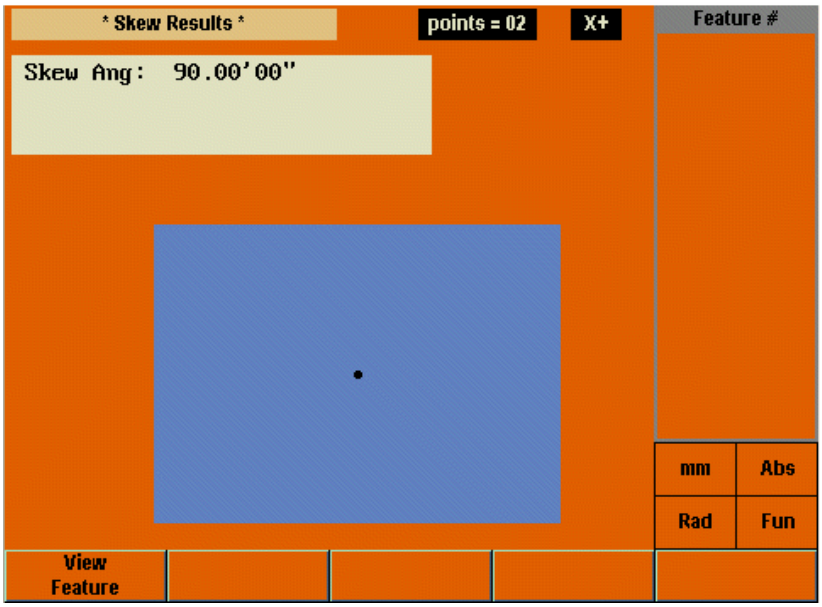


Step 4 When you are working with Test - pen or tool you must feel the touching point and then press the **ENTER** key to take the point by counter.

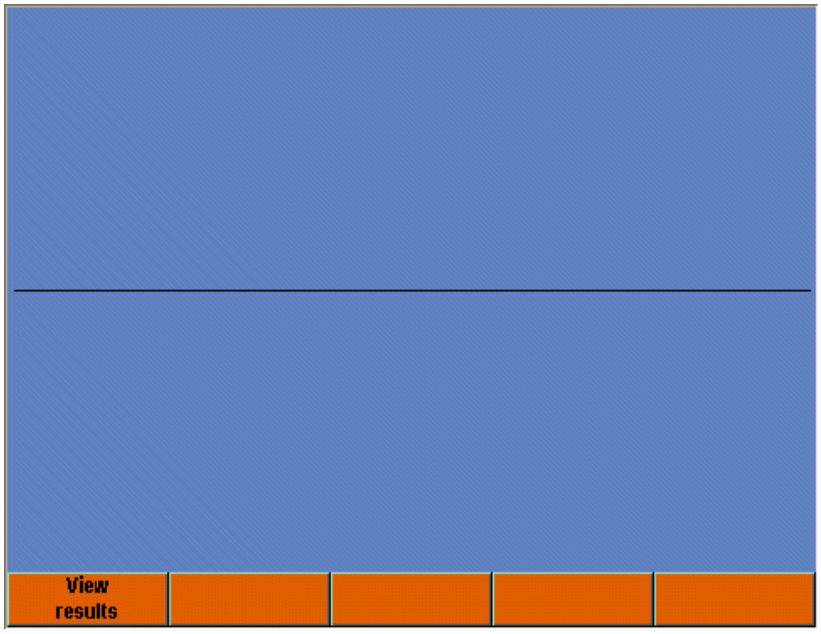
If the false points are taken then you can delete it by pressing **CANCEL** key.

Step 5 After entering the points, press “FINISH” key. 

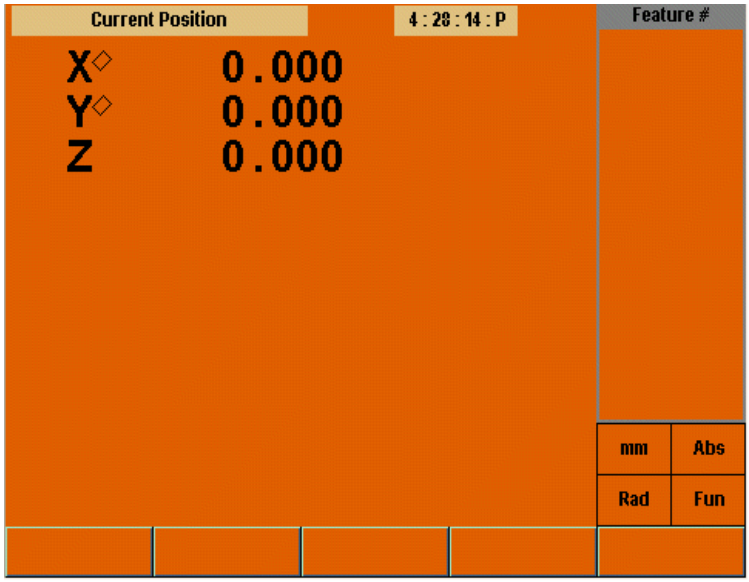
Skew results will be displayed on the screen.



The skew data screen is displayed and the skew is added to the feature list. The small skew icons displayed next to the X and Y axes indicate that the part is mechanically misaligned. An electronic alignment is applied to the skew line to compensate for the part skew. Hence forth the coordinates shown displays the electronically aligned part coordinates (i.e. actual XY plane of job is tilted to a new XY plane equal to skew angle) not the actual machine coordinates. If the part is perfectly aligned on the machine axis, the skew icons are not displayed and no compensation is applied. In real world applications, a perfectly aligned part is very rare. Graphic representation of the skew line (animated skew line) is shown on the screen. Press the *view Feature soft key to* see zoomed skewed line



Hence forth the main screen will be as follows. There will be a small square symbol like a degree mark just above X and Y character on the screen stating that the skew compensation is applied.



3.6 Datum Settings

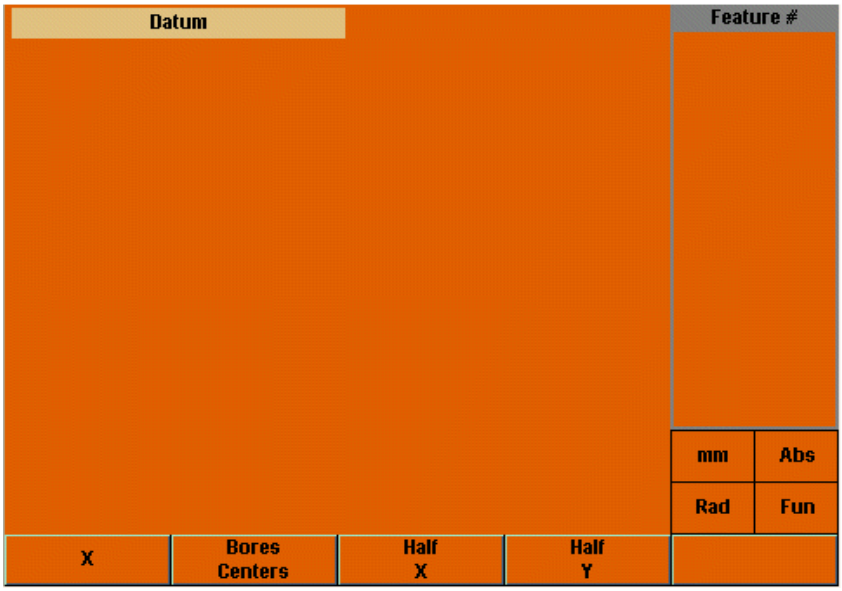
All measurements are relative to a datum. A datum is the zero point or origin of the coordinate system. With the axis orienting function, not only the orientation of the part is done but also a Datum. Point can be determined on the right side of the part. Assuming both the edges of part are in the right angle, you will get the zero point on the corner of the part where these two edges met each other.

To construct a datum

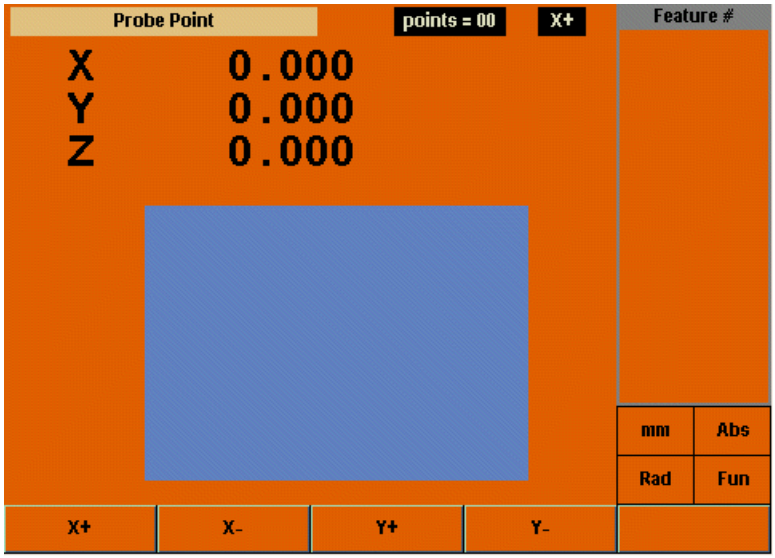
Step 1 Press the SKEW key. 

Following screen shall appear

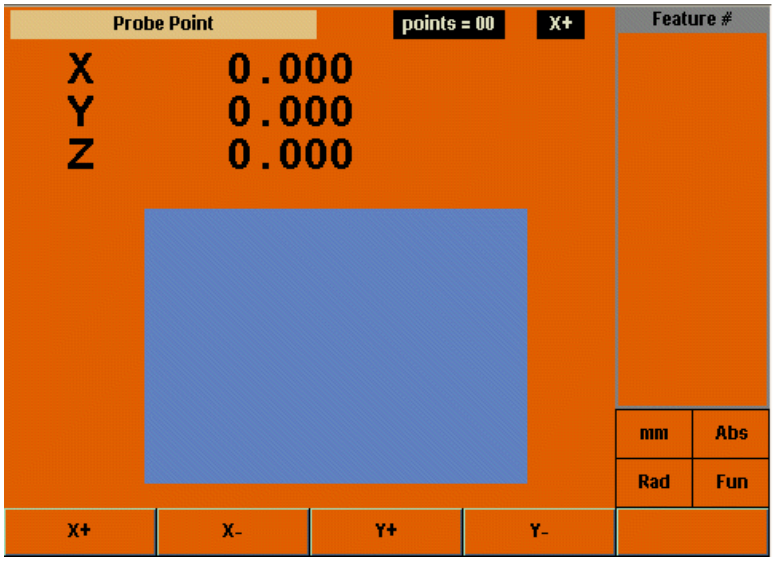
Step 2 Press “Datum” soft key.
Display shows the following screen.



Step 3 Press “X” soft key.
Following screen shall appear



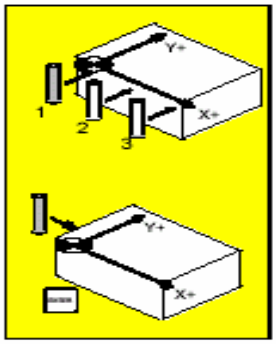
Step 4 After that you are requested to choose the axis, which you want to make zero (in this example "X").
Select direction of axis by using soft keys then probe point00 then press “Enter” key.



Step 5 When you are working with Test - pen or tool you must feel the touching point 01 and then press the **ENTER** key to take the point by counter.

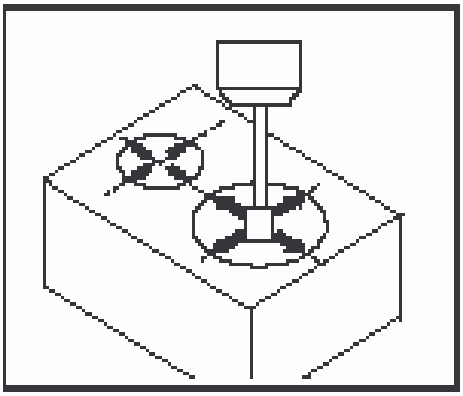
Step 6 Press “**FINISH**" key. After that constructed point appears on the screen
When you work with the edge-sensing device, arrange it closely.

Now at this point if press both X and Y axis keys the new constructed point will be your datum. At this point the coordinates are set to zero.
Following diagram shows the settings of datum & axis direction



Defining the axes - orientation or neutral point by means of bores centers

In the last we describe how both orientation of the part and zeroing is done on the edges of the part. Now by means of key SKEW and Bores, we are able to orient the job or make axes zero using the bores center points.



Step 1 Press the SKEW key. 

Step 2 Press “Datum” soft key.

.

Step 3 Press “Bores Centers” soft key.
Following screen shows the probe circle, points = 00

Step 4 After probing first points for circle then press “ENTER” key and probe the three points and press “FINISH “key.

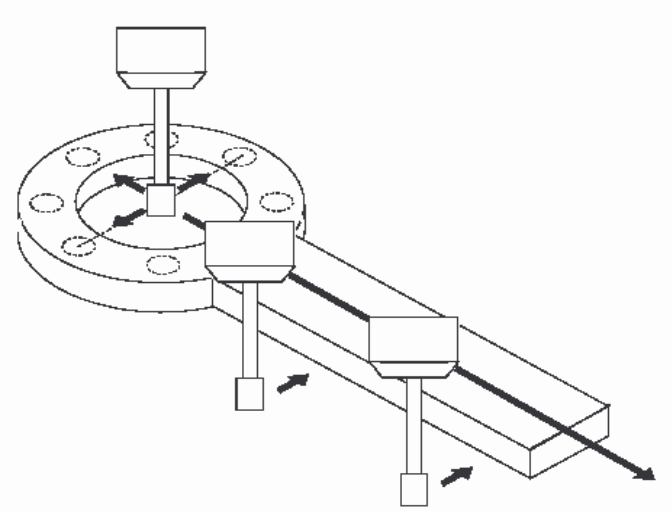
Step 5 You can increase the no. of bores to be taken by repeating step no. 3 & Step no. 4 then press “FINISH” to complete the process of taking bore.

Step 6 After computation of last bore press “FINISH” key.

Now at this point if press both X and Y axis keys the new constructed point will be your datum. At this point the coordinates are set to zero.

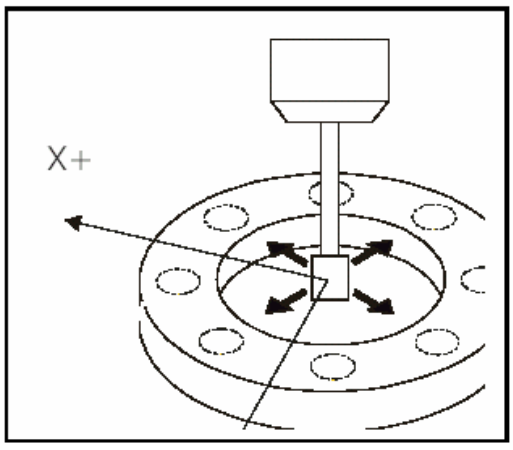
Example1
Arrange on one edge (Zero point is for the time being taken on the first bore measured); New set of neutral point on the hole center.

Arrange or null of point from bore have same principle as we study at part edges arranging. It is merely the center of bore hole which is to be used in this function to take the zero point.



Example 2

Null - set on one flange - center point.
Referring to the function setting bore center as zero point, take the points of the bore to calculate the center of bore. This center is used as zero point.



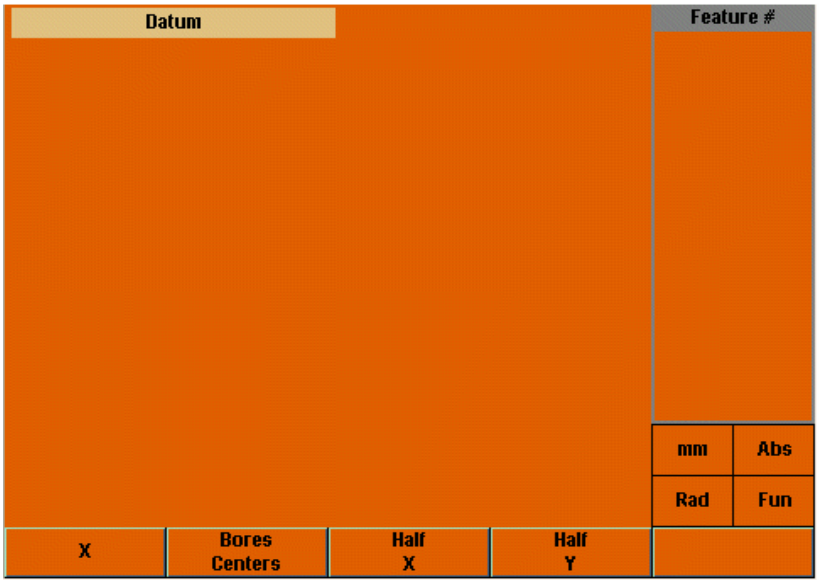
Press quit key to quit the current mode

3.7 Half X functions

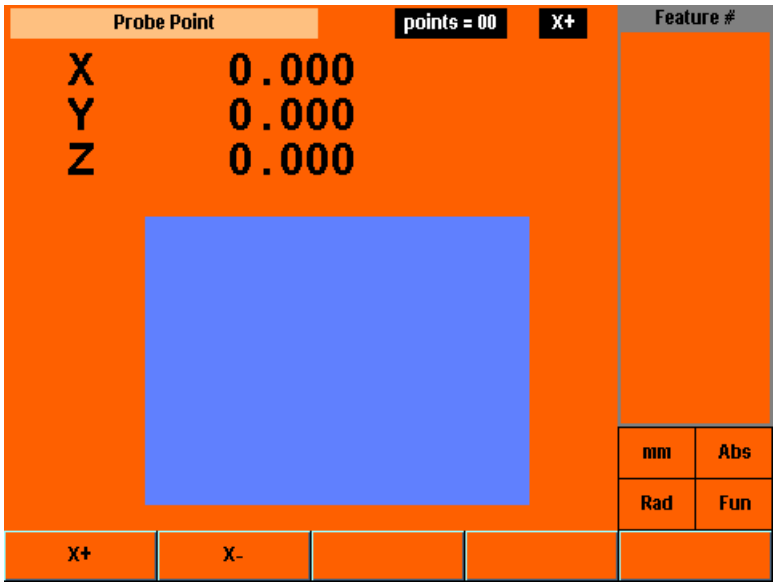
Step 1 Press the SKEW key.

Following screen shall appear

Step 2 Press “Datum” soft key.
Display shows the following screen.



Step 3 Press “Half X” soft key.
Following screen shall appears



Step 4 After that select direction of X axis.
then Probe Point for points = 00 then press “ENTER” key

Step 5 Probe Point for points = 01 then press enter key.

Step 6 After that datum value is half.

Half Y functions

The same procedure of Half X functions are follow to Half Y functions.

OR THE OTHER WAY TO CONSTRUCT DATUM

First select mode is pattern mode. Refer procedure to chapter 3 Geometric features - 4. Select Mode

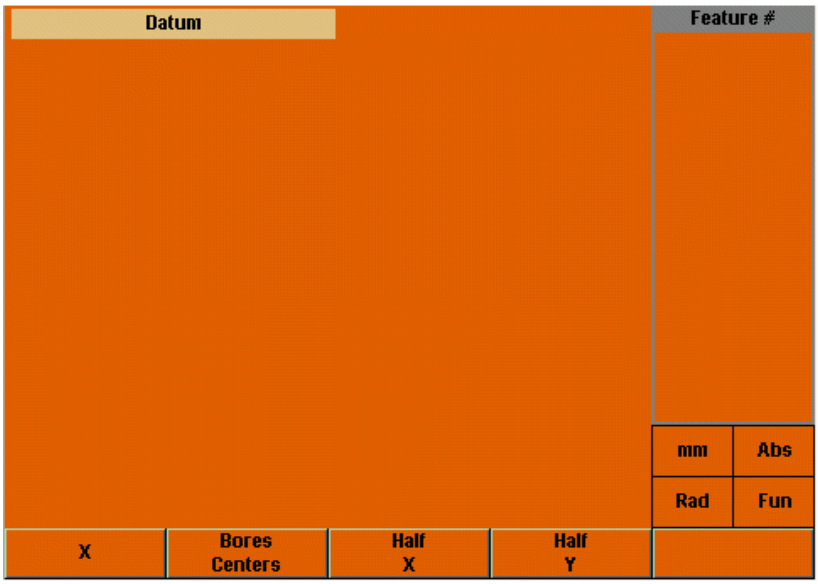
Step 1 Press point probing feature 

Step 2 Press soft key “construct Feature”

Step 3 Select any point feature from the feature list in the right top corner of the Screen

Step Press  key.

Following screen shall appear



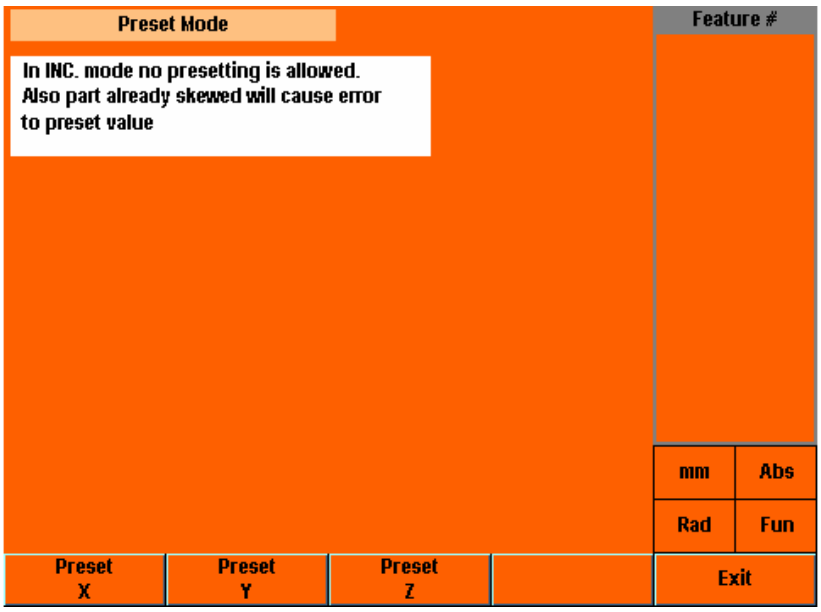
After that to set datum as per same procedure of Chapter 4 Geometric features - Datum settings

3.8 Preset Function

Use the preset function to measure features that are datumed on another part. Typically this is required for component parts of larger assemblies. Another use for the preset function is to find the offset between the nominal and actual location of a preset feature.

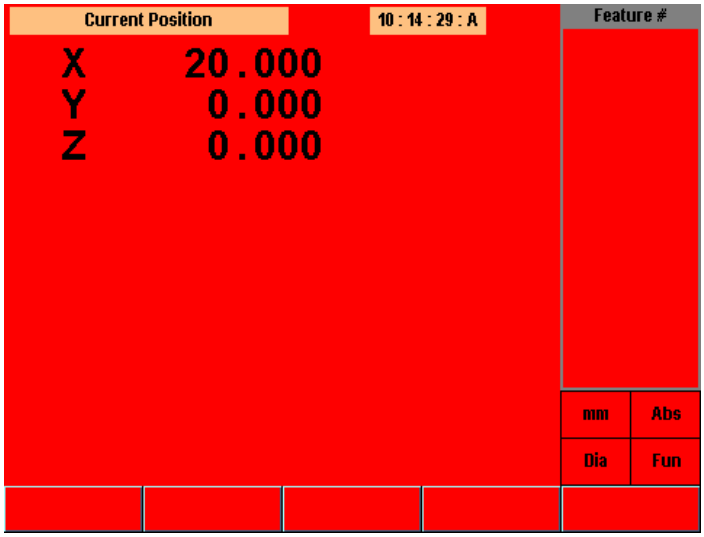
Step 1 Press the SKEW key.
Following screen shall appear

Step 2 Press “Preset” soft key.
Display shows the following screen.



Step 3 Press “Preset X” soft key.
After that enter preset value as per your requirement by using numeric keypad. For example enter preset X value = 20.

Step 4 Preset value is set to X axis as per shown in the following screen.



Now the same procedure of X axis presetting is used for Preset Y & Preset Z.

3.9 Measuring Features

Use the measurement procedures in this section to measure points, lines, circles, angles, and distances.

In case of point, line, distance and angle measurement following method is used

1. Select the touching direction between X+, X- , Y+ and Y- before taking every point.
2. This is the direction in which you are moving the slide.
3. Touch the probe to the job and press "ENTER" key.
4. Take necessary points and press "FINISH" key.
5. Result is showed.

3.10 Measuring points

Points are the simplest features to probe. Only one point is required to define the location. A maximum of two points can be probed to measure a single point. The Xtreme+ will average both the point to create one point

To measure a point

Step 1 Press the *point key*. 

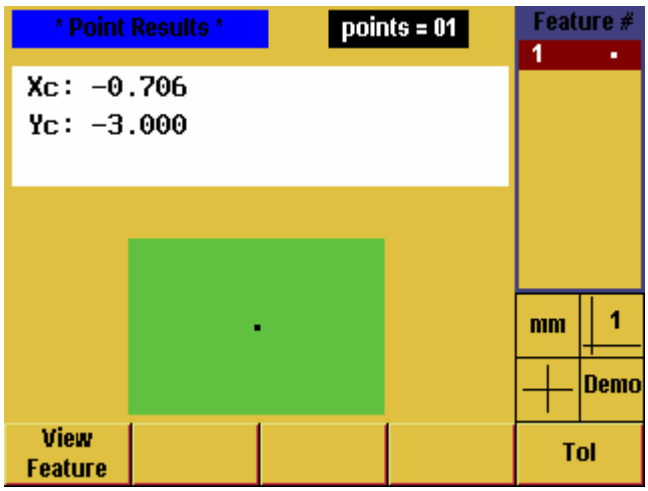
NOTE
Press the *point key* twice to measure a series of points using *auto repeat*.

Step 2 Probe the first point as shown.

Step 3 Press the *enter key*.

Step 4 Press the *finish key*.

The point feature data is displayed on the screen and added to the feature list. Press the *view feature soft key* for a graphic representation of the point feature.

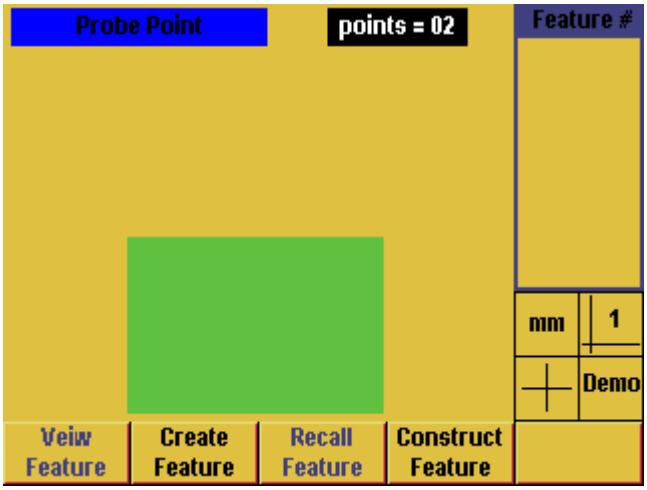


Above feature is explained using Backward annotation.

Point probing using forward annotation.

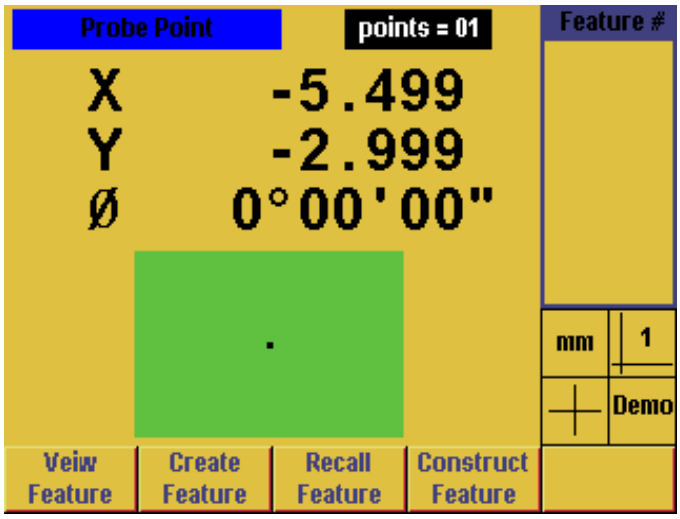
Consider forward annotation points are set to 2 nos

Step 1 Press the *point key*. 



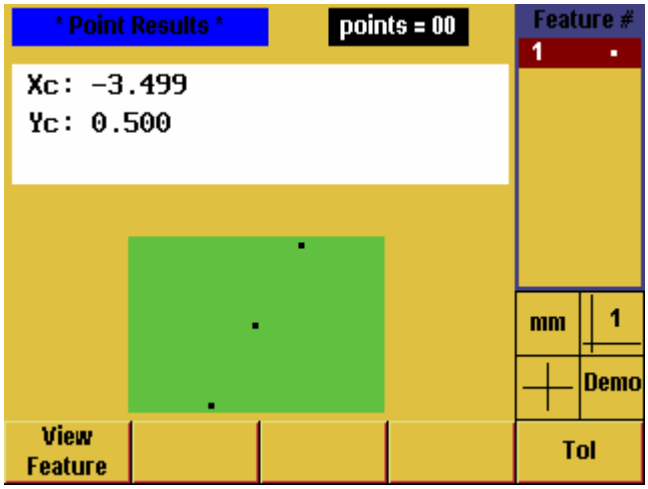
Step 2 Probe the first point and

Press Enter Key 



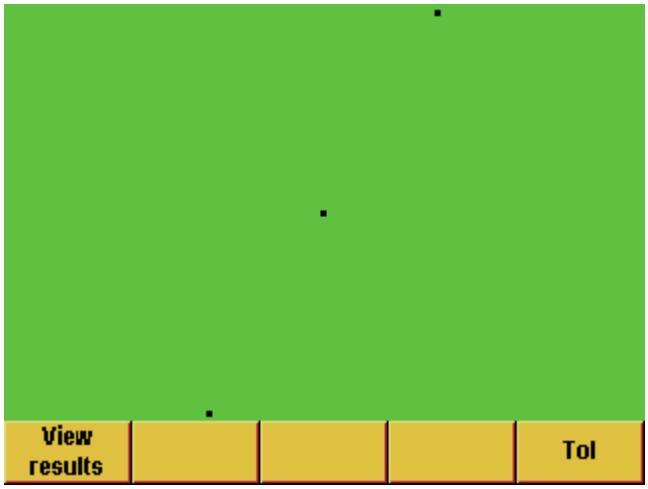
Probe the second point and

Press Enter Key 



The point constructed is average of two points that are probed.

You can view zoomed details if you press the soft key” view feature”



Press “View Results “to go back to feature screen
Press Quit Key to exit to main display screen

3.11 Measuring Lines

A minimum of two points are required to measure a line. Data processor allows maximum 100 points to measure a line. More the number of points better the accuracy. An innovative A best-fit algorithm is applied to the set of points (if more than 2 points are entered) to find the best line covering most of the points

To measure a line

Step 1 Press the *line key*. 

NOTE
Press the *line key* twice to measure a series of lines using *auto repeat*.

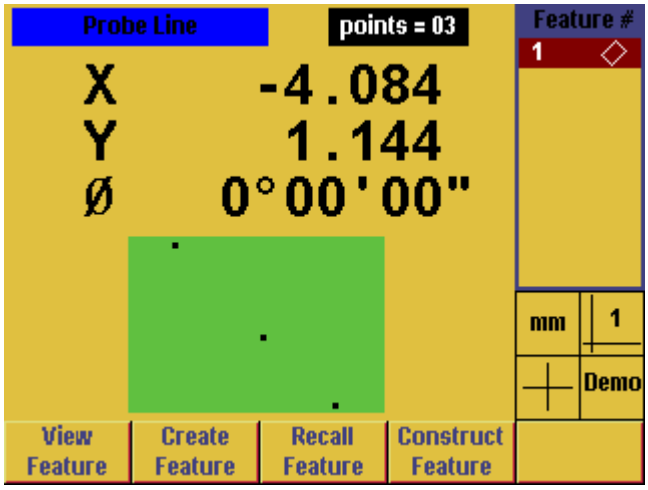
Step 2 Probe the first point as shown.

Step 3 Press the *enter key*.

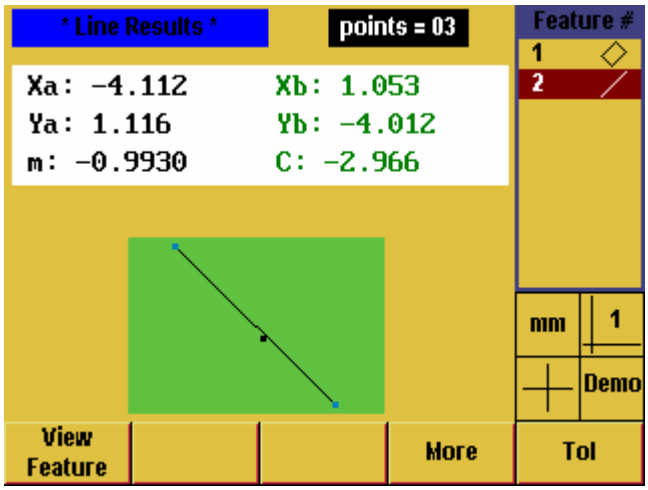
Step 4 Probe two more points along the line as shown. Press the *enter key* after each point.

Note:-Pressing cancel could cancel the last probed point

The screen will appear as



Step 5 Press the *finish key*.



All data with respect to measurement of current line is displayed on the main screen with all points and how the line has been drawn is displayed on a canvas on the main screen. The line symbol is added in the feature list.
Press the *view Feature soft key for* viewing zoomed presentation of the complete line and the points that created it
Note: Press more key to see other details of line equation

Step 6
Press Finish key to return to main screen.

3.12 Measuring Arcs

It requires minimum three points to draw a arc. Data processor Xtreme+ accepts minimum 3 points and maximum 100 points to draw a best fit arc passing through all those points. Like the line feature more the no of points better the accuracy. A best-fit algorithm is applied to arcs with more than three points. The resulting *F (Form) value* is included in the feature data.

Note: Point filtration algorithm starts for points more than 8 points, so it is recommended you to probe at least 10 points. Only 25% of wrong points are allowed. So if you probe 20 points, maximum 5 wrong points can be removed.

To measure a arcs

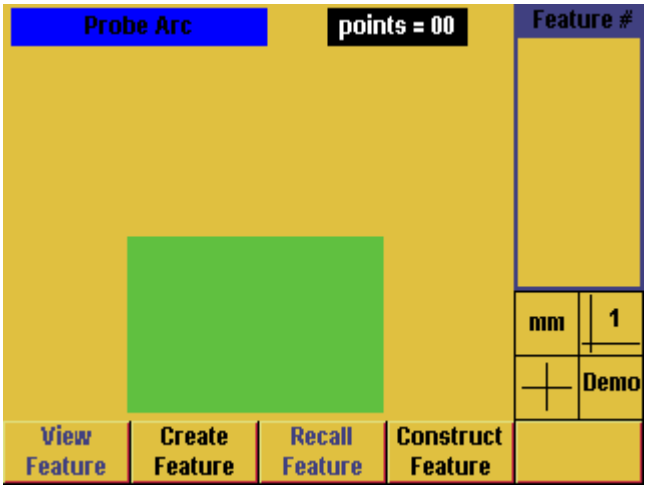
Step 1 Press the arc *key*. 

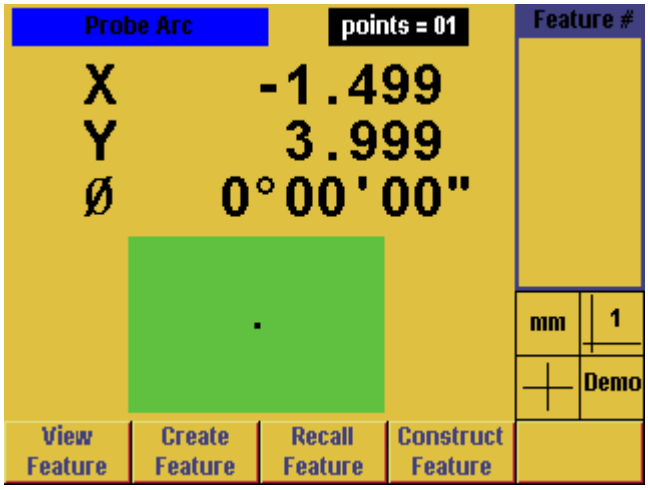
NOTE

Double clicking arc *key will put DRO in auto repeat mode for measurement of arcs*.

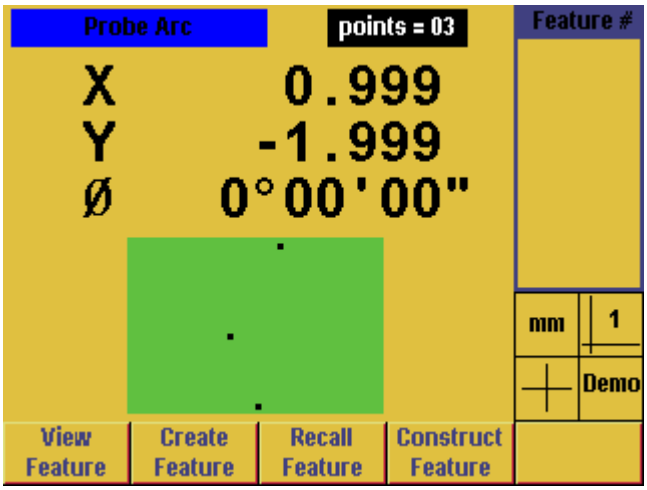
Screen for Step1

Step 2
Probe a point
Press Enter Key 





NOTE
Space points approximately 90 to 120 degrees apart for best results.



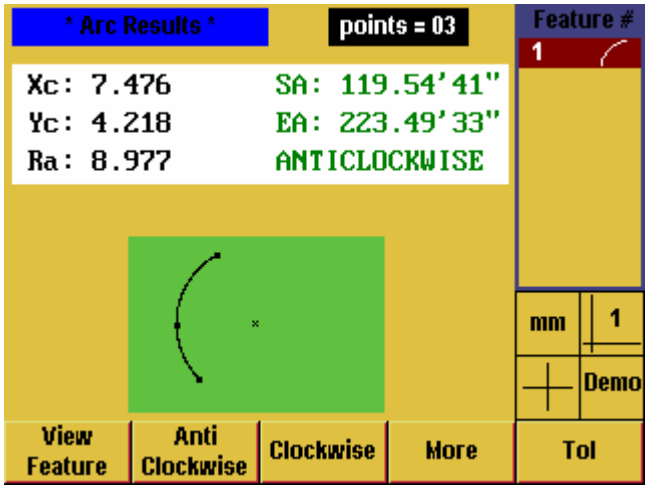
Step 3
Probe Second point as shown.

Press Enter Key 

Step 4
Like step 3 Probe n point (6 in this case)

Press Enter Key 

Screen is shown below



Xc,Yc are center coordinates of the arc

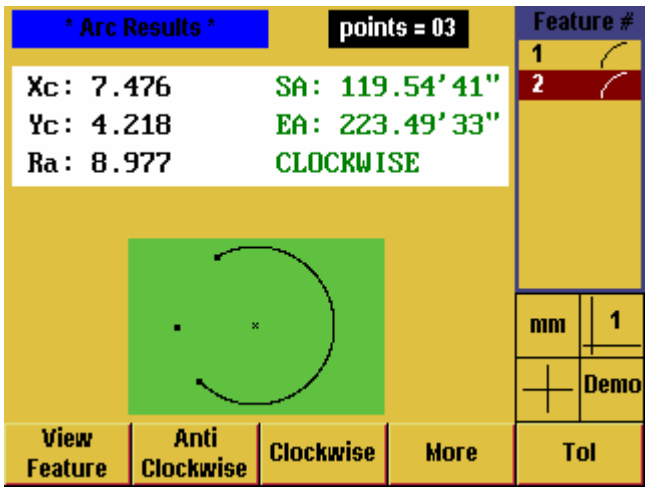
Ra is radius of the arc.

Step 5 Press Finish Key. 

Press View Feature soft key to get zoomed image of probed arc.

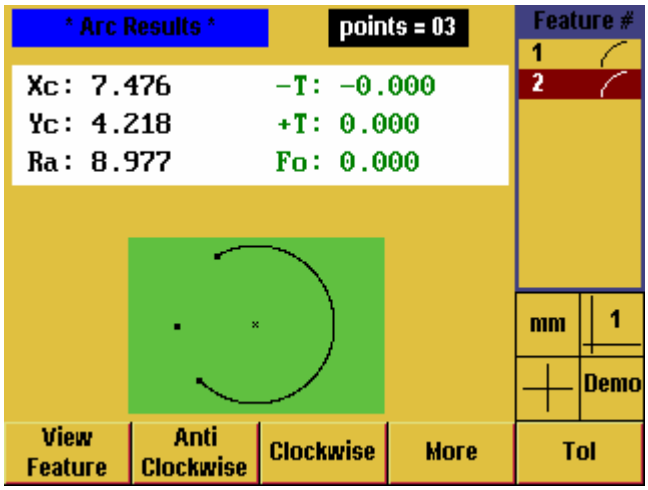
Arc can work both with forward and backward annotation, and also with Auto Repeat mode of operation.

You can select clockwise or anticlockwise arc by pressing respective soft keys



Clockwise formation of arc

Press “More” soft key for more details of results. The more screen is shown below.



3.13 Measuring Circles

It requires minimum three points to draw a circle. Data processor Xtreme+ accepts minimum 3 points and maximum 100 points to draw a best fit circle passing through all those points. Like the line feature more the no of points better the accuracy. A best-fit algorithm is applied to circles with more than three points. The resulting *F (Form) value* is included in the feature data.

Note: Point filtration algorithm starts for points more than 8 points, so it is recommended you to probe at least 10 points. Only 25% of wrong points are allowed. So if you probe 20 points, maximum 5 wrong points can be removed.

To measure a circle

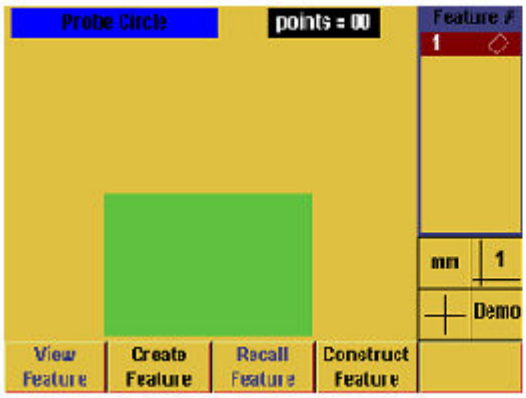
Step 1 Press the *circle key*. 

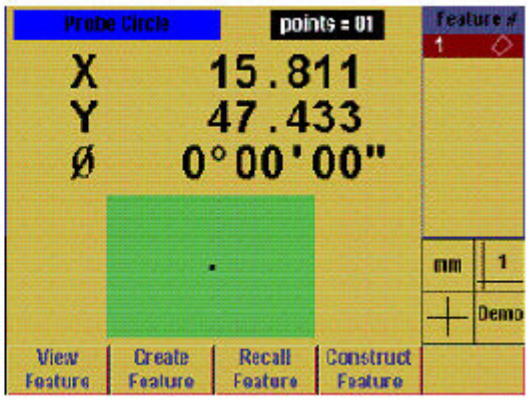
NOTE

Double clicking circle *key will put Xtreme+ in auto repeat mode for measurement of circles*.

Screen for Step1

Step 2
Probe second point
Press Enter Key 





NOTE
Space points approximately 90 to 120 degrees apart for best results.

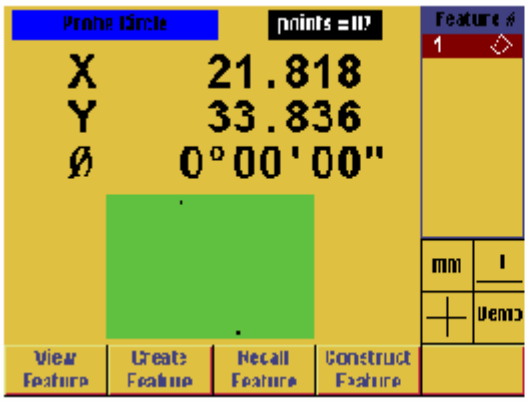
Step 3
Probe Second point as shown.

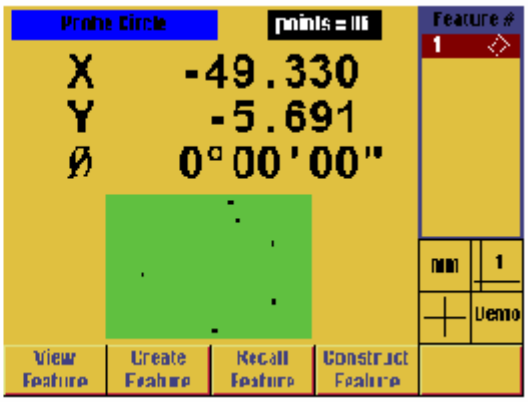
Press Enter Key 

Step 4
Like step 3 Probe n points (6 in this case)

Press Enter Key 

Screen is shown below





Step 5
Press Finish Key. 

Press View Feature soft key to get zoomed image of probed circle.

Circle can work both with forward and backward annotation, and also with Auto Repeat mode of operation.

3.14 Measuring distances

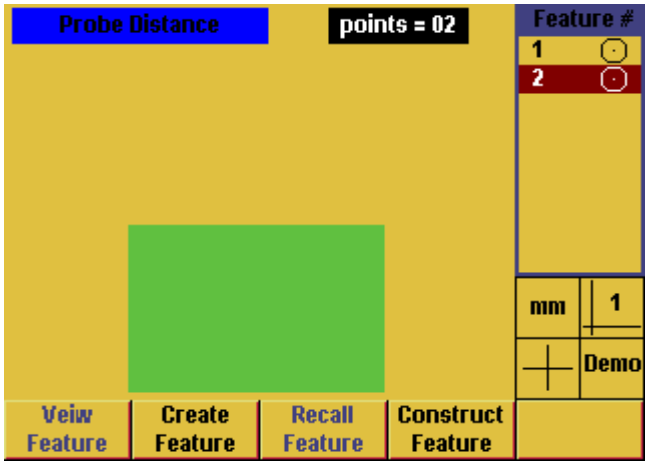
Distances is actual nothing but a relationship between two features and can be measured with only two points. User can measure distances by two methods

1. Probe two points to measure a distance
2. Construct a distance from two previously measured features.
   e.g. the distance between two circles. Measuring a distance by probing two points follows essentially the same as measuring a line. Let us discuss measurement of distance from two circles. See the *constructions* section for more details.

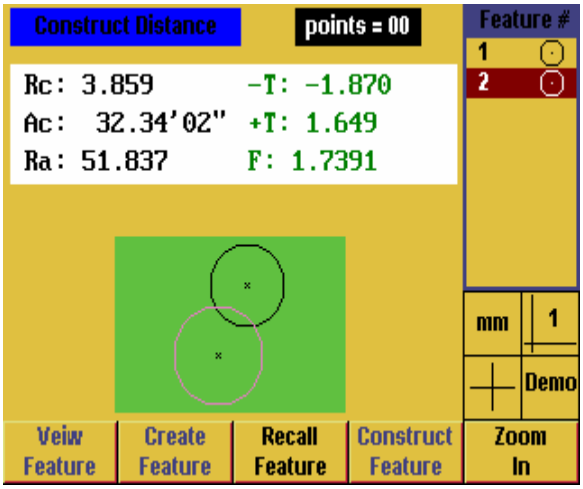
NOTE
Make sure there are two circles in the features list before attempting this demonstration.

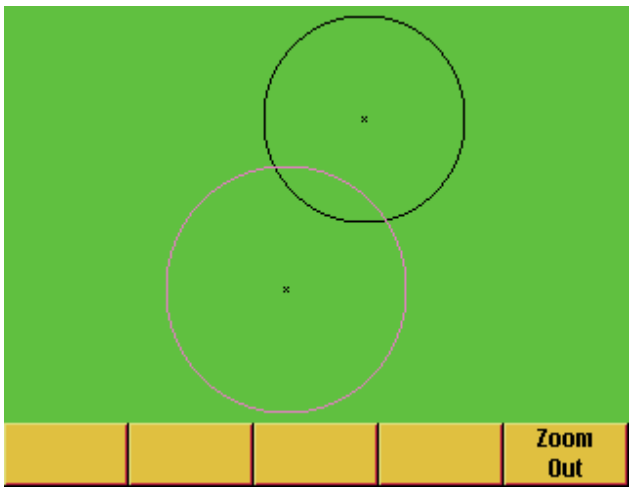
To construct a distance between two circles

Step 1 Press the *distance key*. 



Step 2 Use the arrow keys to highlight the first circle in the features list as shown if necessary.



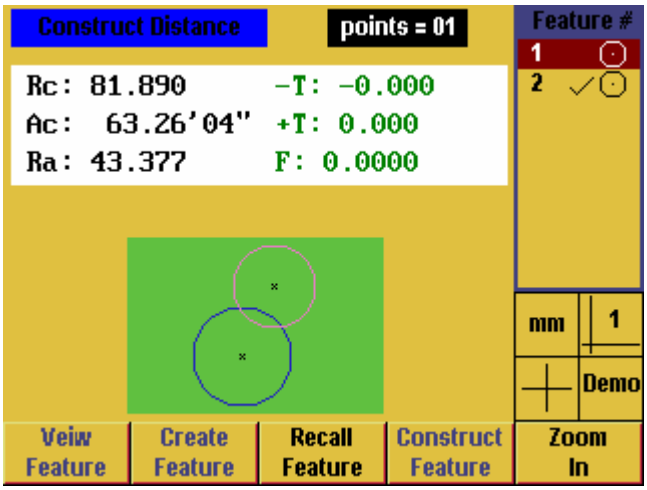


The canvas will show the whole features you have measured, and feature you have currently selected is marked with other color (here it is red).Press zoom in key to get full screen of the part you have measured for better clarity. Press Zoom out soft key to return to screen on left.

Step 3 Press the *enter key*. 

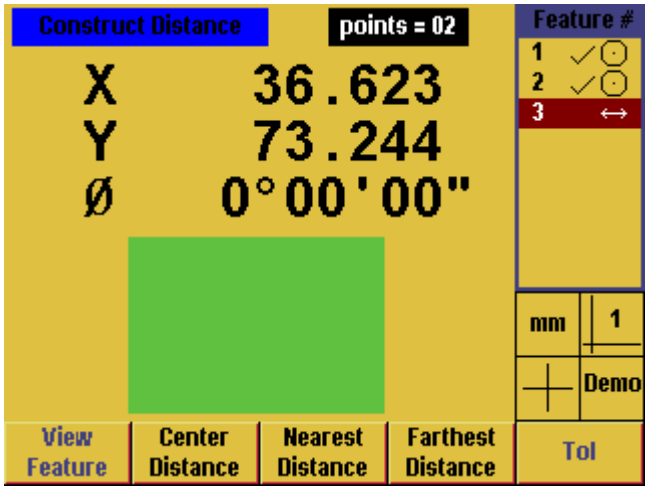
To select first circle.

Step 4 Highlight the second circle in the features list by pressing up or down arrow keys.

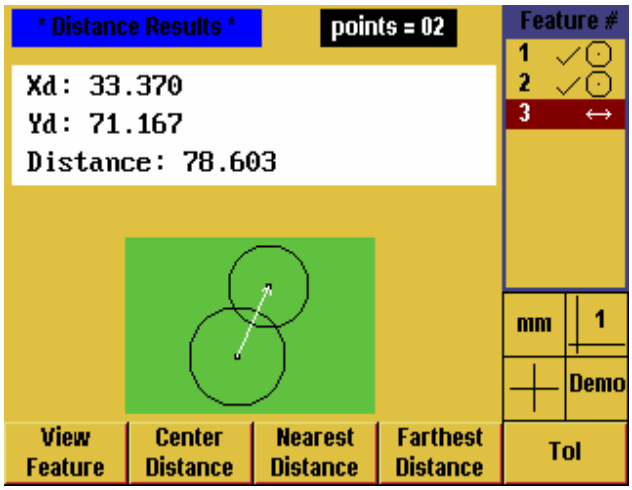


Step 5 Press the *enter key*. 

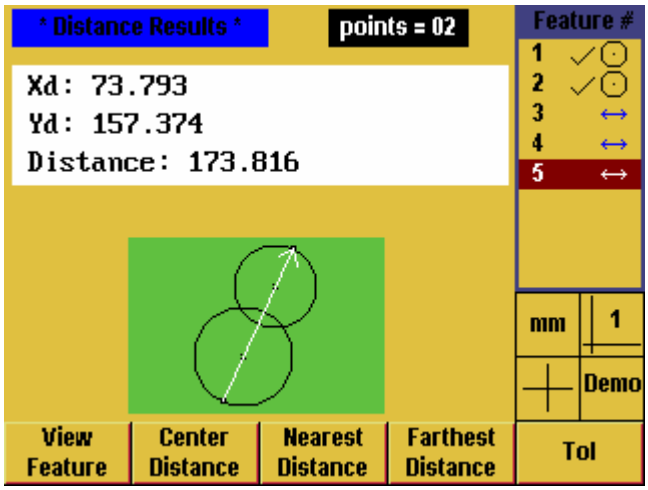
Step 6 Press the *finish key*. 



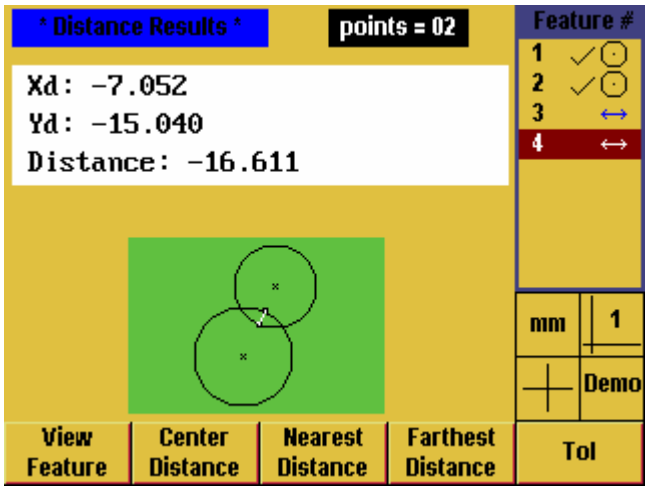
The distance feature screen displayed on the screen and added to the feature list. Here you have 3 options



Pressing soft key “center distance “



Pressing soft key “farthest distance”



Pressing soft key “Nearest Distance”

Select the option which you want and press Quit key.
Press the *view Feature soft key* for a Zoomed graphic

The number of features used in the construction is shown as: P*ts* = *2*. This means that two features were used in the current construction.

3.15 Measuring angles

Angles are measured by probing points on the two lines (legs) that make up the angle. Up to 100 points can be probed on each line. A minimum of two points (per leg) is mandatory. Use more points for greater accuracy. When more than two points are probed on any line, a best-fit algorithm determines the location of the line and a *form (F) value* is calculated the line. Angles can also be constructed from previously measured features.

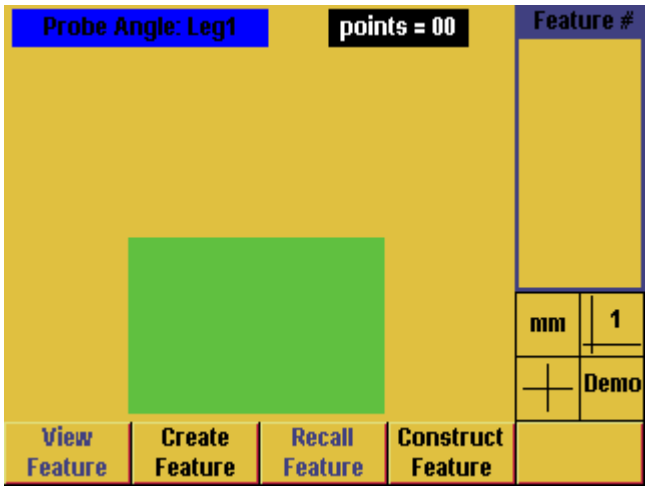
To measure an angle

Steps 1 through 4 measures the first leg of the angle.

Step 1 Press the *angle key*. 

NOTE
Press the *angle key* twice to measure a series of angles using *auto repeat*.

Step 2 The *probe angle screen* is displayed as shown.

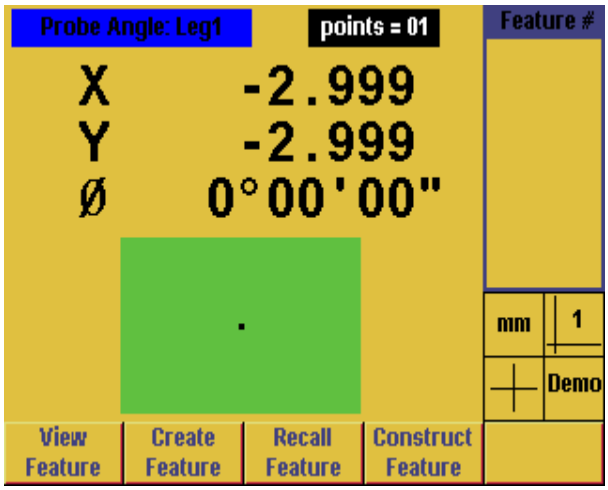


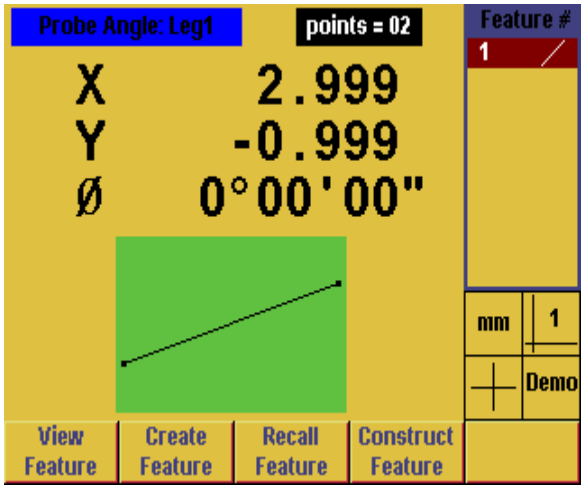
Leg 1 text displayed

Probe the first point as shown

Press the *enter key*. after each point 

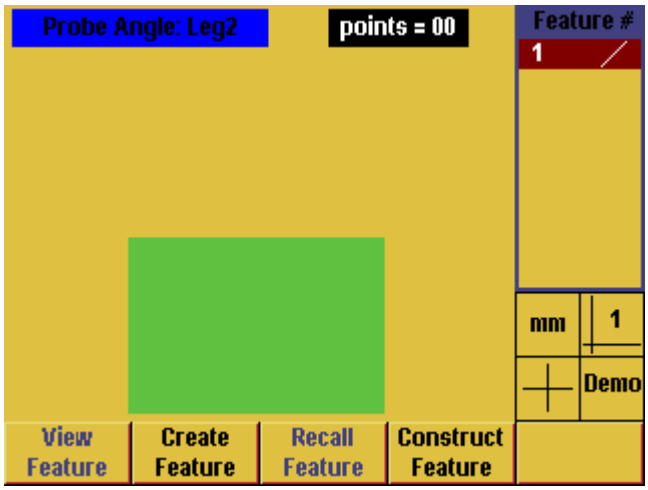
Similarly probe Min two points and press enter





Step 3 Press “FINISH” key after probing points for line leg 1, above screen on right appears here line feature is added to the feature list as shown.

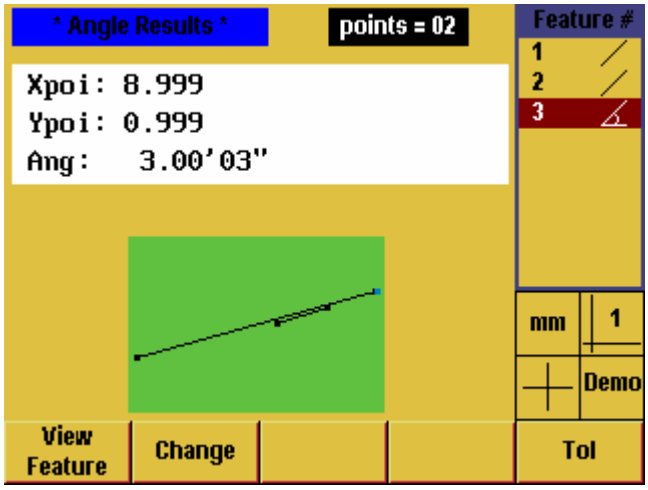
Step 4 Press enter following screen appears 



Leg 2 point no 1

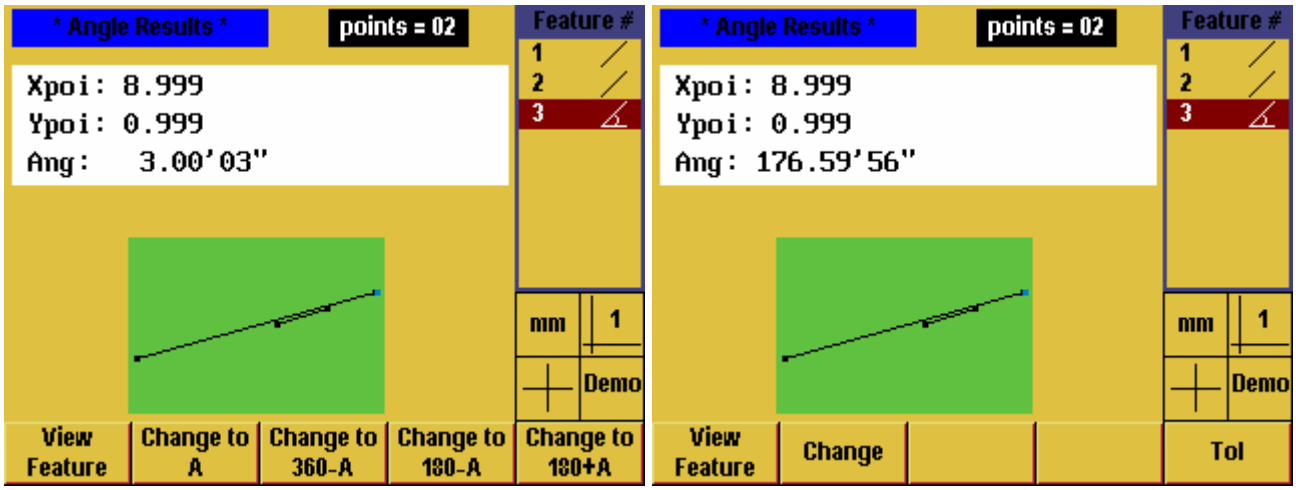
Probe first point for leg 2 and repeat step 2 and 3

Step 5 Following screen appears

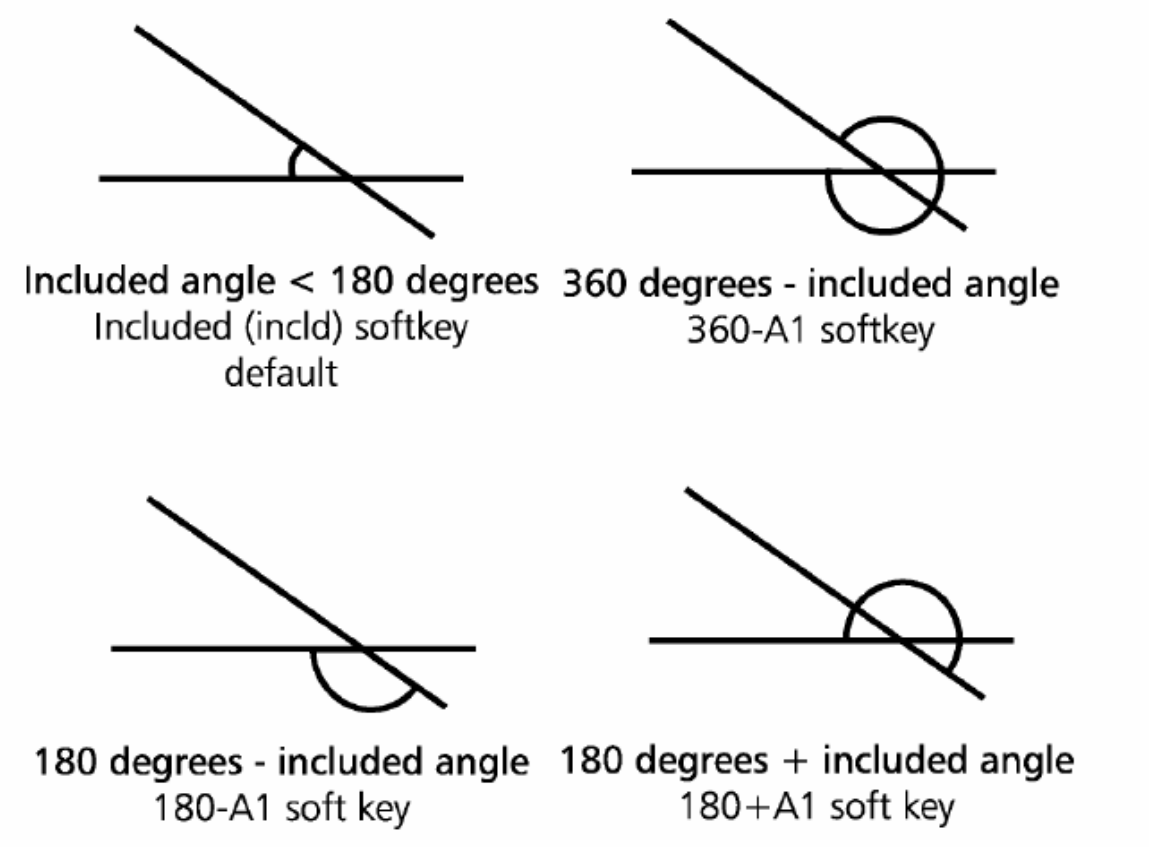


Here the canvas shows the whole geometry you have probed for angle measurement. A vertex point is generated and displayed with different color (here it is blue)
Angle feature is added to feature list, coordinates of vertex point (X poi, Y poi) are displayed with the angle two lines make with each other.
Press “View Feature “soft key to view zoomed canvas.
Press “Change “soft key” to change the quadrant of angle measurement

Screen for “change feature” soft key is shown below.



Screen on the right shows angle with option 180-A



Press Finish key to exit to main screen 

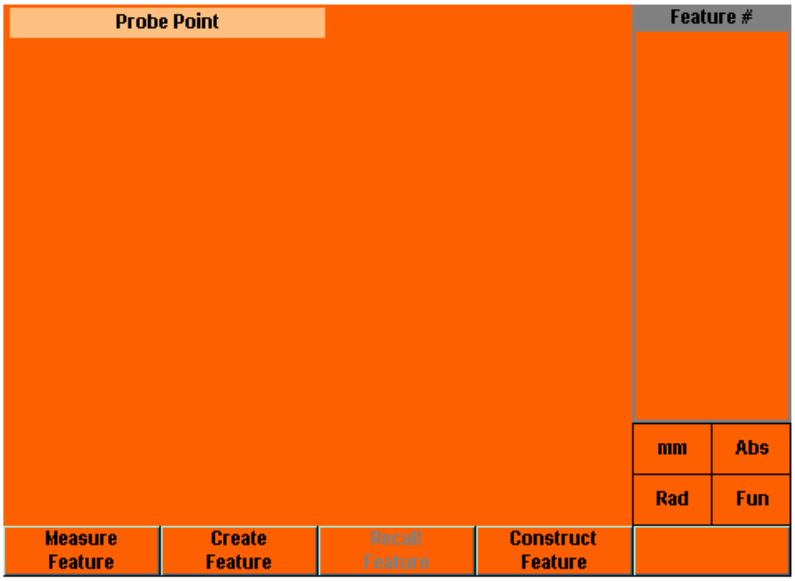
3.16 Creating Features

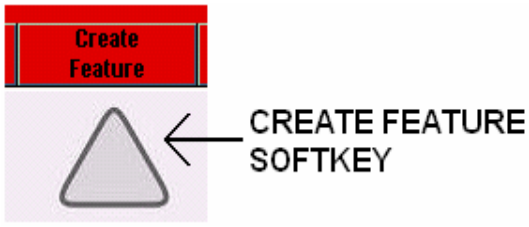
In some measurement it is necessary to create some features directly as these features cannot be directly measured. Created features are generally used as reference points for inspection purposes. User can create points, lines, circles, distances, angles, and part skews. Created features are the same as probed features except that the created features are geometrically perfect. Form and tolerance values are not included in the feature data for created features since they are geometrically perfect.

3.17 To create a point

Step 1 Press the *point key*. 

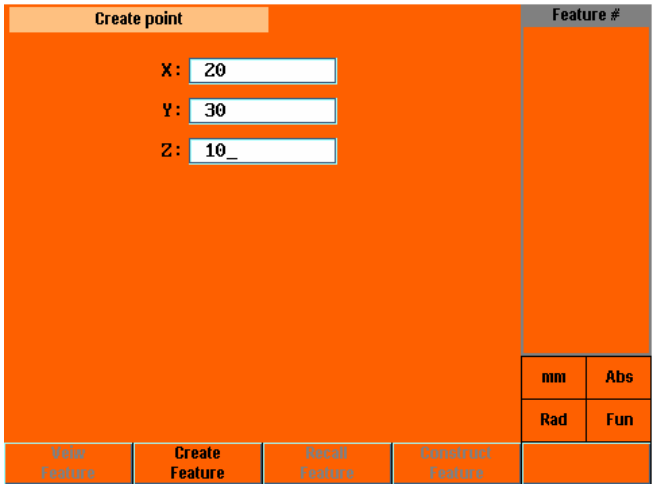
Following screen shall appear



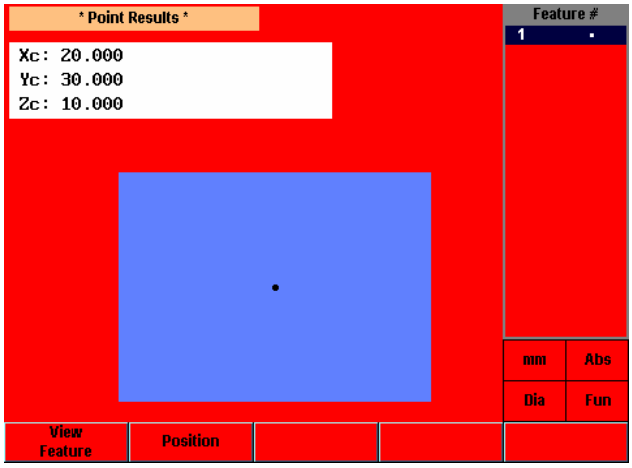
Step 2 Press the "*Create Feature" soft key.* 

Step 3 Following screen shall appears

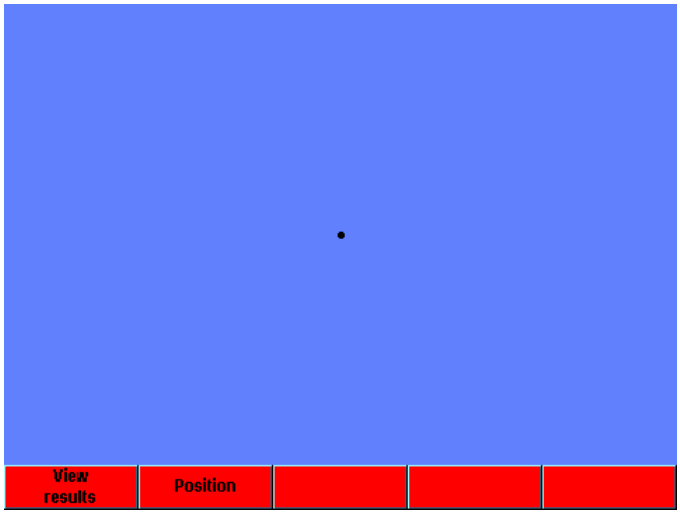
Use the numeric keypad to enter the X, Y and Z coordinates of the point. For example enter X = 20, Y= 30, & Z = 10.



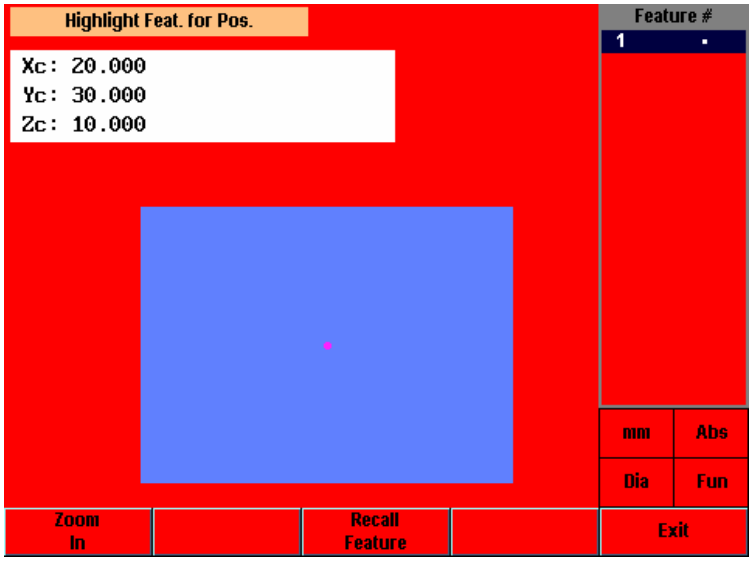
Step 4 Press the Enter Key. ENTER



The point results data is displayed on the screen and added to the feature list.
Step 5 Press the *view Feature soft* for a graphic representation of the point feature should be displayed on the following screen.

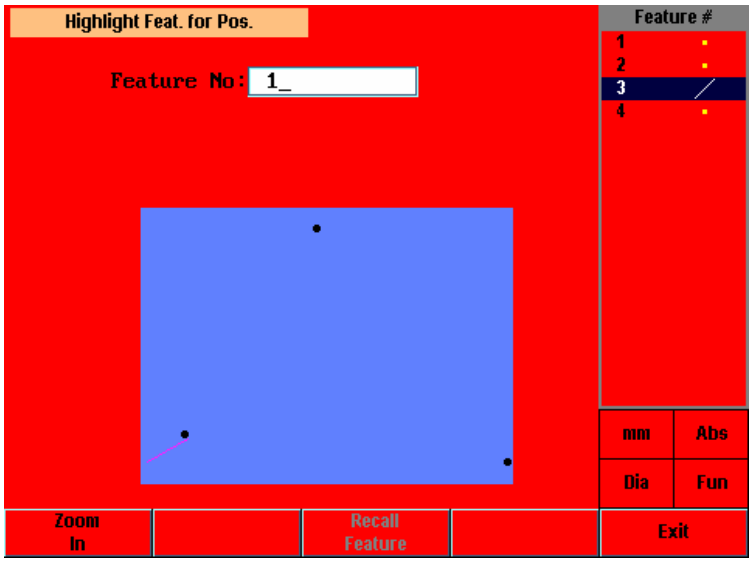


Step 5 Press the “Position” *soft key* for position of highlight feature should be displayed on the following screen.



Step 6 Press “Zoom in” soft key the selected feature will be zoomed.

Step 7 Pres ‘Recall Feature” soft key then enter recall feature number by using numeric keypad.



Step 8 Press the Enter Key. ENTER

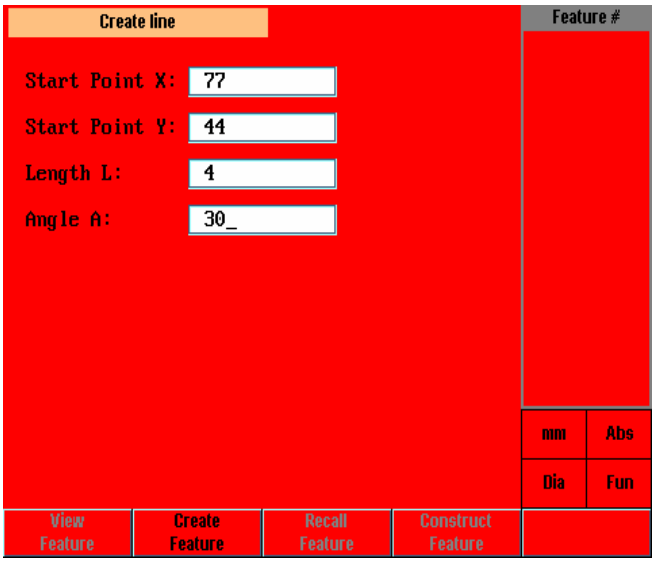
Now the selected feature will be displayed on the screen.

3.18 To create a line

Step 1 Press the *line key*. 

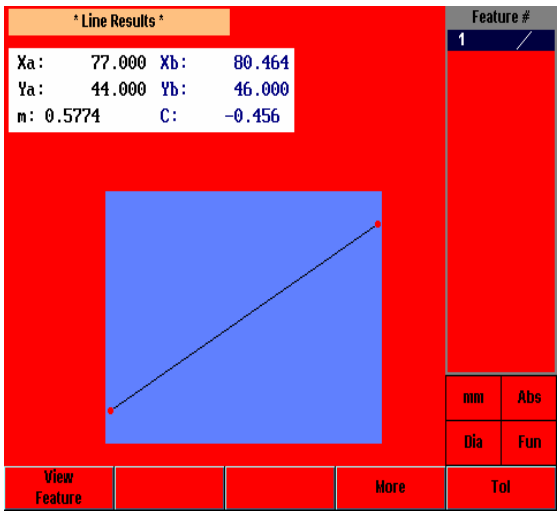
Step 2 Press the *create feature soft key*.

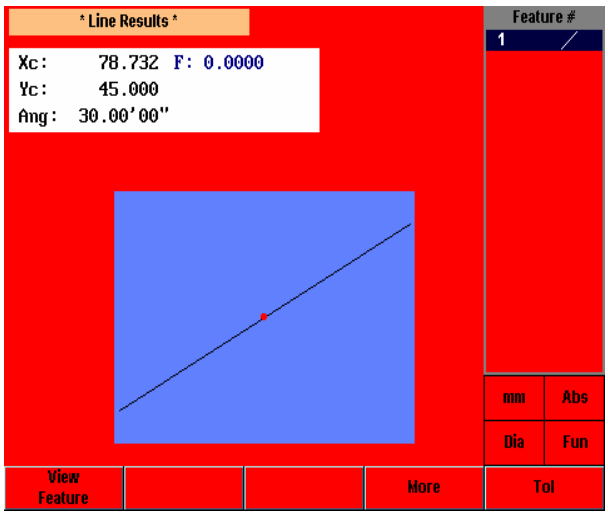
Step 3 Following screen appears,



X is X coordinate of line start point
Y is Y coordinate of line start point
L is length of line required
A is angle line makes with X axis
Use the numeric keypad to enter the Point coordinates for the first point.
Press enter key after each entry

Step 5
After entering angle and pressing enter key.
The line feature data is displayed on the screen and added to the feature list.
Press the *view soft key* for a graphic representation of the line feature.





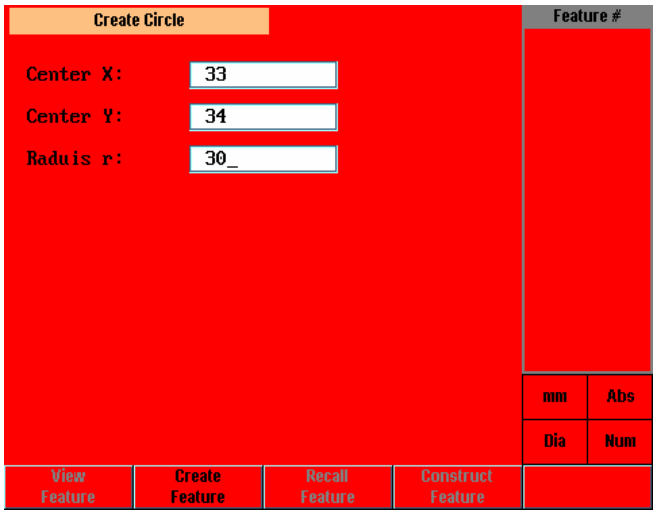
Screen after pressing more feature soft key

3.19 To create a circle

Step 1 Press the *circle key*. 

Step 2 Press the *create soft key*.

Step 3 Use the numeric keypad to enter the point coordinates for the center point and radius.

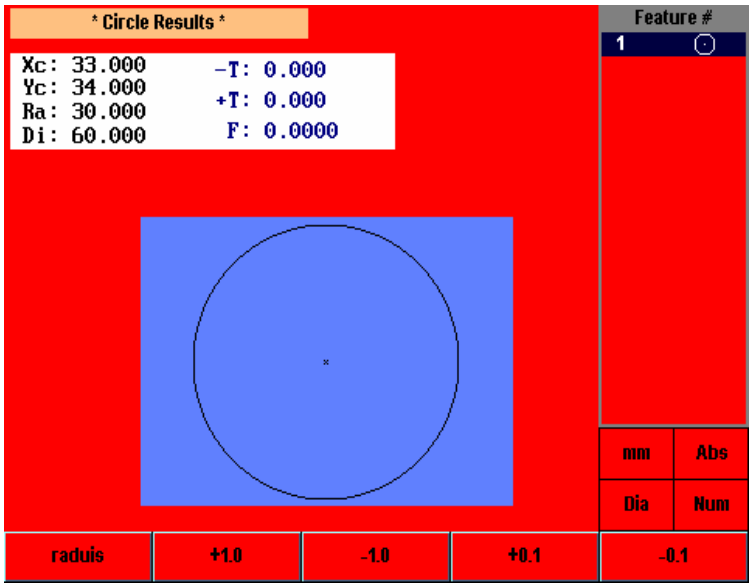


X is X coordinate of center of

Y is Y coordinate of center of

r is radius of circle.
Press enter after each entry.

Step 5 After entering radius following screen appears.



The circle feature data is displayed on the screen and added to the feature list. Press the *view Feature soft key* for a graphic representation of the circle feature.

3.20 To create a distance

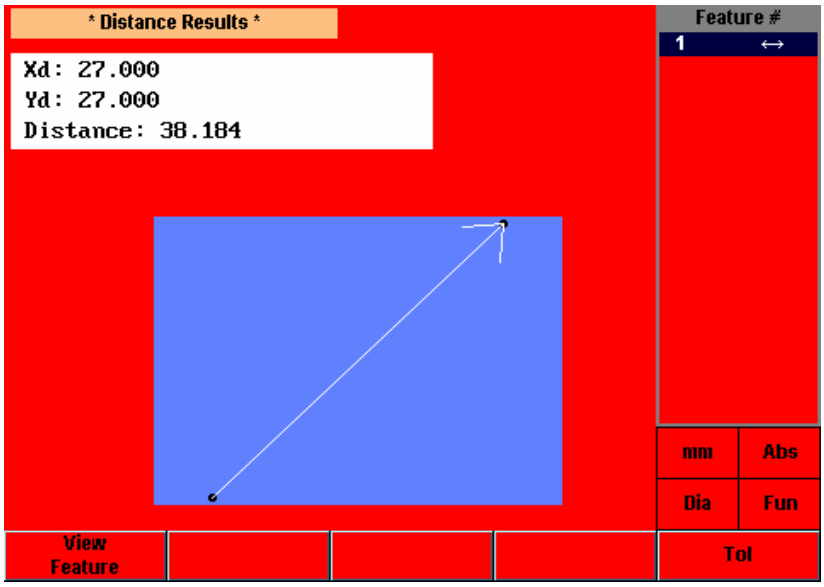
Step 1 Press the *distance key*. 

Step 2 Press the *create soft key*.

Step 3 Use the numeric keypad to enter the size for the X and Y axes. For example, the distance shown here has an X axis size of 1 mm and a Y axis size of 1mm.

Xa x coordinate of start point
Ya y coordinate of start point
Xb x coordinate of end point
Yb x coordinate of end point

Step 4 After entering Yb point following screen appears

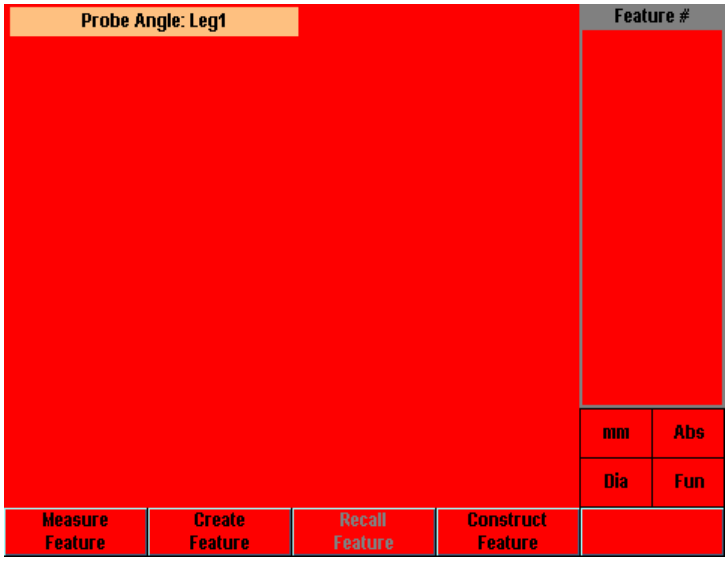


Step 5
Press Finish key to return to main menu.
The distance feature data is displayed on the screen and added to the feature list.
Press the *view soft key* for a graphic representation of the distance feature.

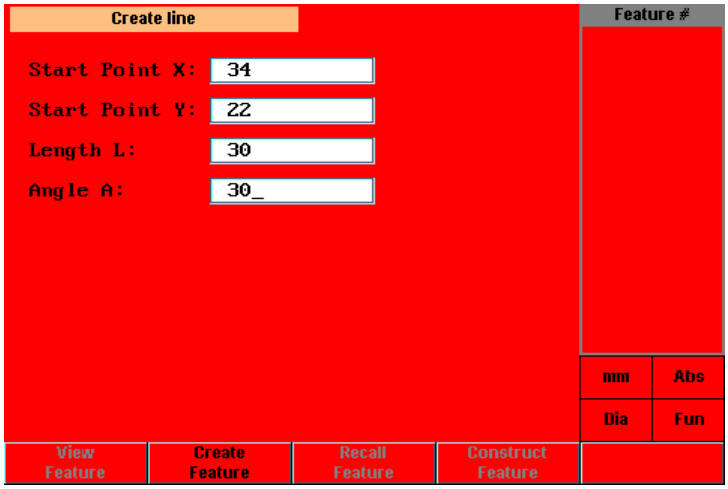
3.21 To create an angle

Step 1 Press the *angle key*.

Step 2 Following screen shows probe angle of Leg1 then Press the *Create Feature soft key*.

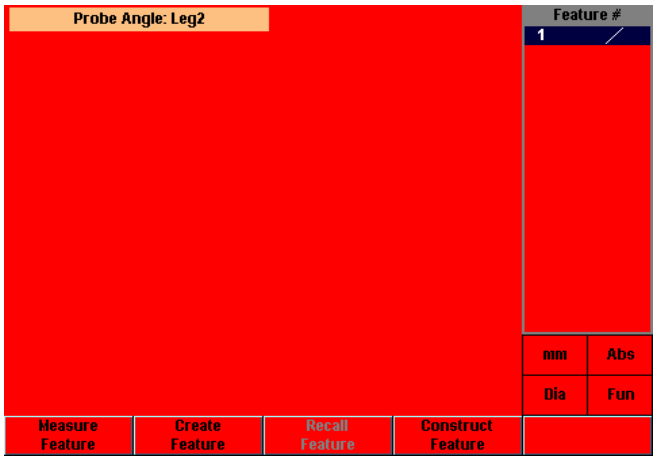


Step 3 Use the numeric keypad to enter the point coordinates for the vertex.



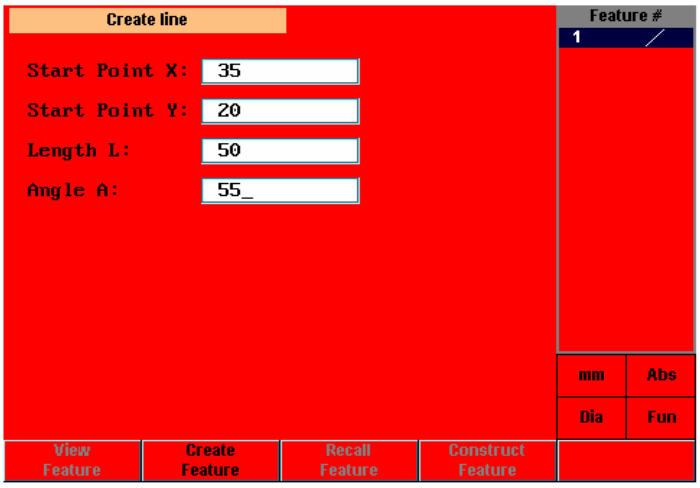
X is X coordinate of start point of leg 1 of angle
Y is Y coordinate of start point of leg 1 of angle
L is length of leg 1
A is angle made by above line segment with axis

Step 4 Press the enter *key* then following screen appears



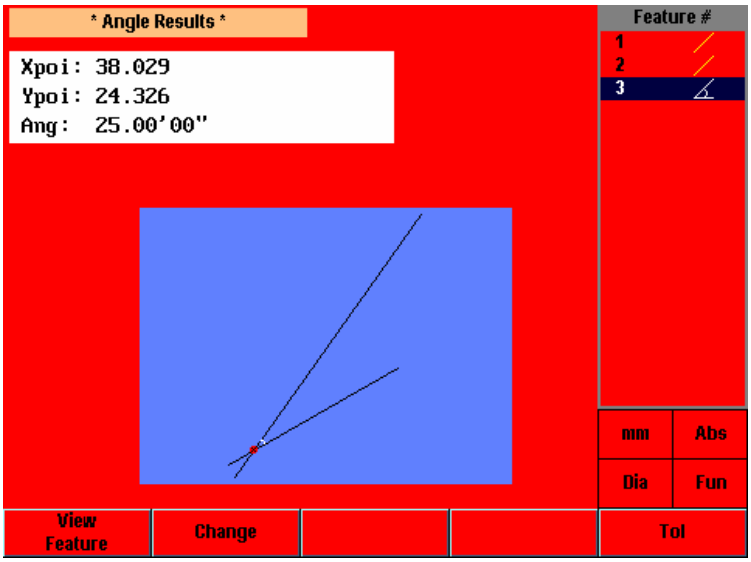
Step 5 Press the *create soft key*.

Step 6 Enter data in leg 2 of the angle.



Step 7 After that press Enter key, the angle feature data is displayed on the screen and added to the feature list.

Press the change *soft key* to change the quadrant of the angle

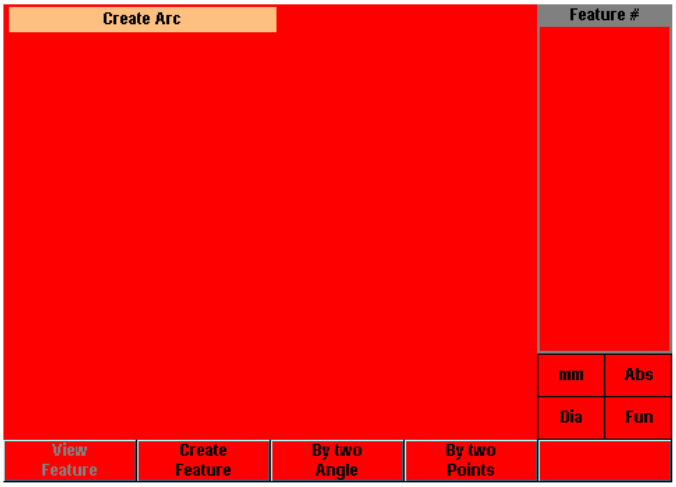


3.22 To create an arc

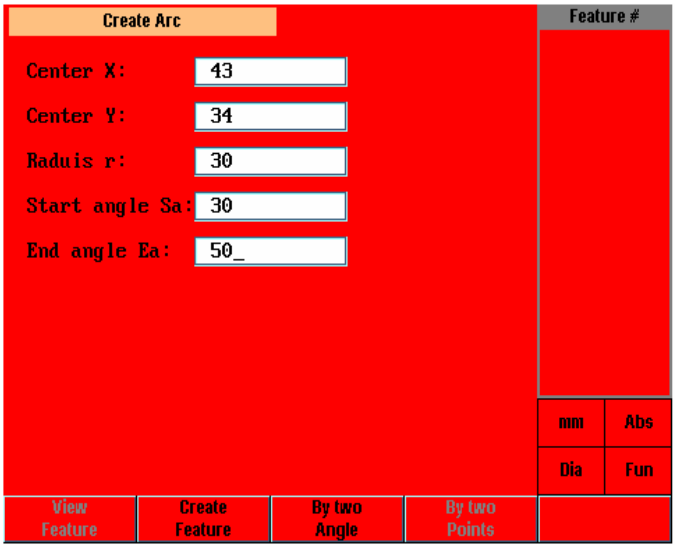
Step 1 Press the arc *key*. 

Step 2 Press the create feature soft key. Following screen appears on the Xtreme+.

Here there are two modes for constructions. Arc by two points or Arc by two angles.

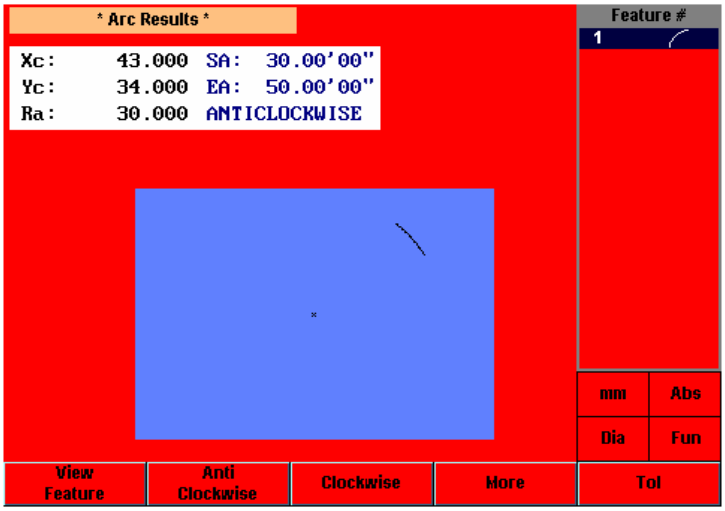


Step 3 If you Press the by two angles soft key.



X is x coordinate for center of arc
Y is y coordinate for center of arc
r is radius of arc
Sa is start angle of arc with respect to X axis.
Ea is end angle of arc with respect to Y axis.
Use numeric keys for value entry, and press enter key after each entry.

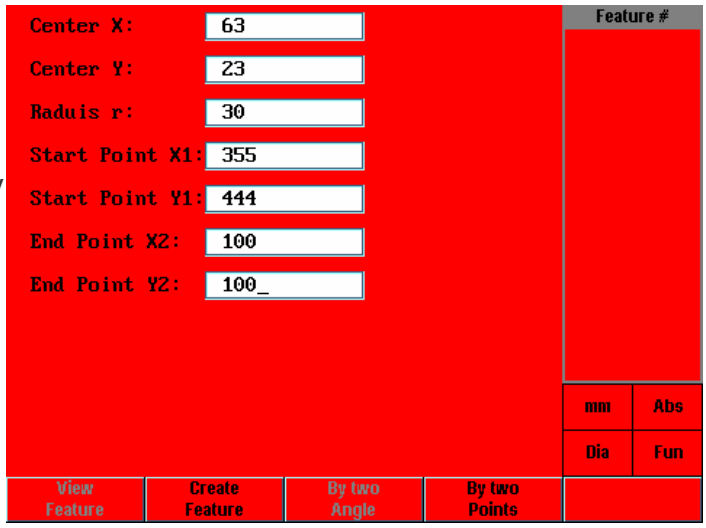
After entering all values



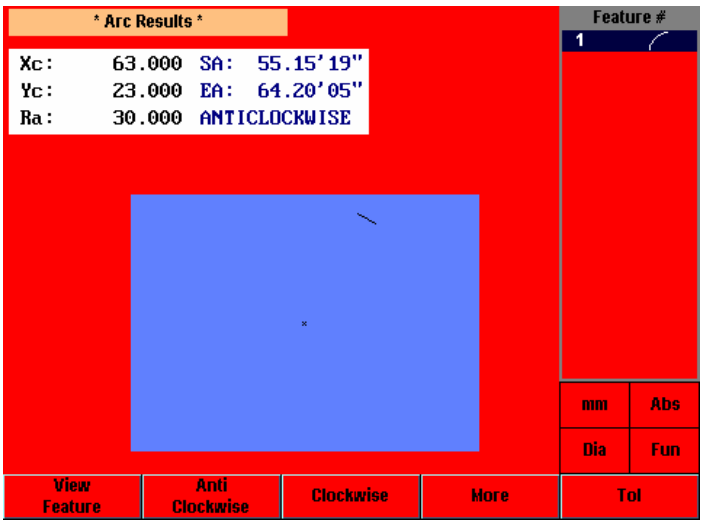
Arc is created and is added to feature list
Note: here you can change orientation of the arc with respective soft keys.

Step 4:
Press finish to exit to main screen.

If you press “by two points” soft key
X is x coordinate for center of arc
Y is y coordinate for center of arc
r is radius of arc
X1 is x coordinate start point of arc
Y1 is y coordinate start point of arc
X2 is x coordinate end point of arc
Y1 is y coordinate end point of arc



Use numeric keys for value entry, and press enter key after each entry
After entering all values arc results are displayed on the following screen.



3.23 Constructing Features

This is the most important feature. Here new features can be constructed from probed, created, or constructed features in the features list. Essentially, constructions uses previously measured features to build new features.

For example,
Press the *circle key* to construct a circle. Press the *recall* or *construct soft key.* Then select the required features from the features list. For example, select three points to construct a circle. Use the following pages to perform sample constructions. Below is listing of all possible constructions.
It is important to understand that constructed features are not the same as created features. Constructed features are built from previously measured features.

For example, to construct a line the user selects two points (or other suitable features) from the features list. The Xtreme+ then constructs the line from the points (or other features). Created features are defined by the user. For example, to create a circle, the user defines the location of the center point and the length of the diameter or radius.

Construction type	Features produced
Intersection	Constructs point(s) from the intersection of 2 lines, 2 circles, or a line and circle.
Duplicate	Constructs a duplicate of the selected feature.
Offset	Constructs an offset point, line, or circle from the selected feature(s).
Relationship	Constructs distance, angle, midpoint, or bisector line from the selected feature(s).
Perpendicular	Constructs a point or line perpendicular to the selected feature(s).
Complement	Constructs complementary angle of selected angle feature.

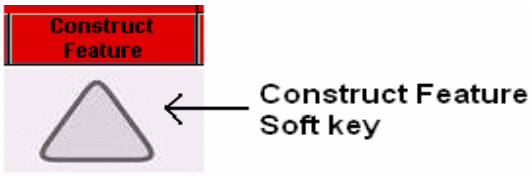
Using the *recall soft key*

It is sometimes inconvenient to scroll through the features list using the arrow keys. This is particularly true when there are many features in the features list. The *recall soft key* is a handy way to select a feature without scrolling through the entire features list. For example, if the cursor happens to be on *circle 73* and you want to view the results screen for *line 4*, press the *recall soft key* and enter *4*. The *recall soft key* is also useful for constructions.

3.24 To construct a distance from a point and circle

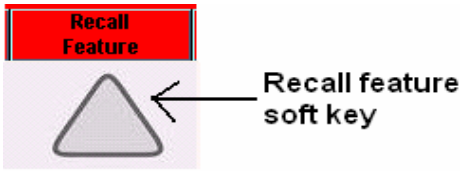
Step 1 Press the *Distance key*. 

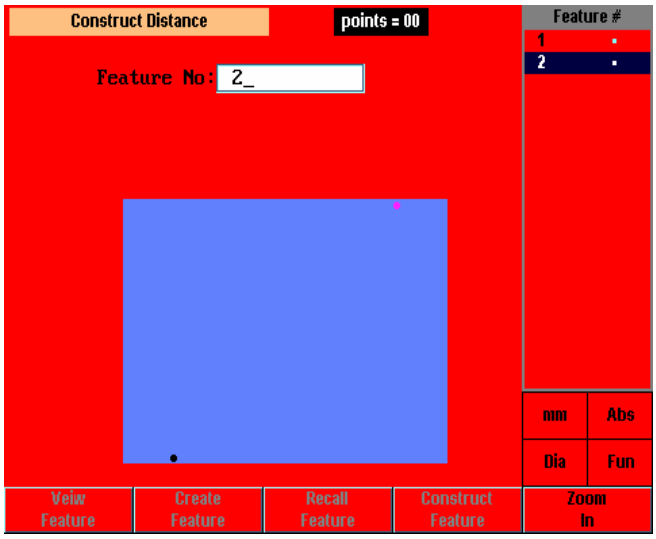
Step 2
Press the construct *soft key*.



NOTE
This example uses the *recall soft key* to select features for the construction. Users can select features using the arrow keys if they prefer. Suppose there are 2 points in feature list.

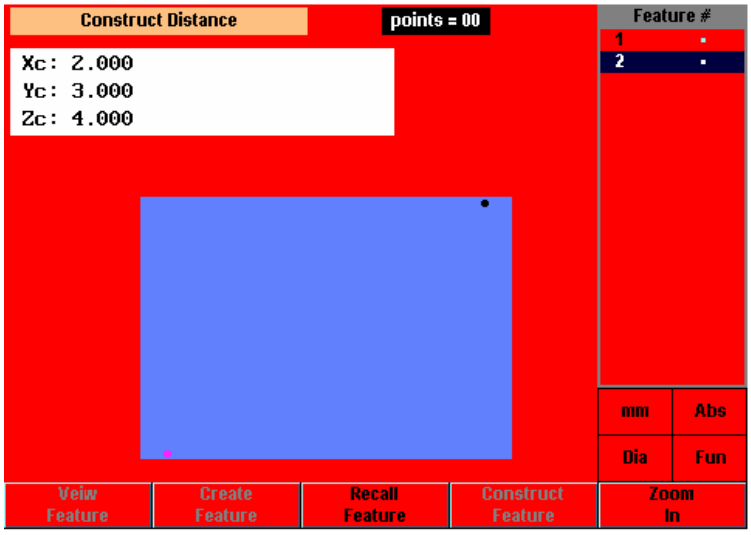
Step 3 Press the recall feature *soft key*.



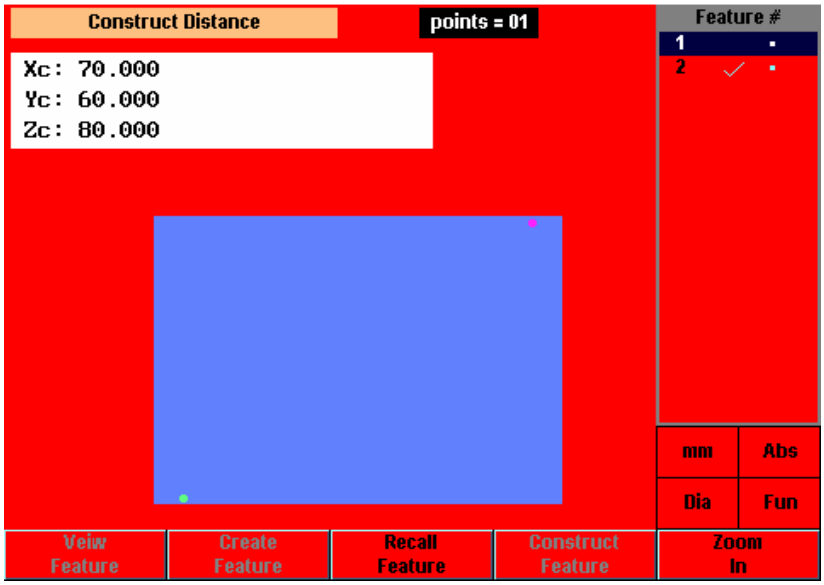


Use the numeric keypad to enter the feature number of the first feature used in the construction. This construction uses *point2* from the features list.

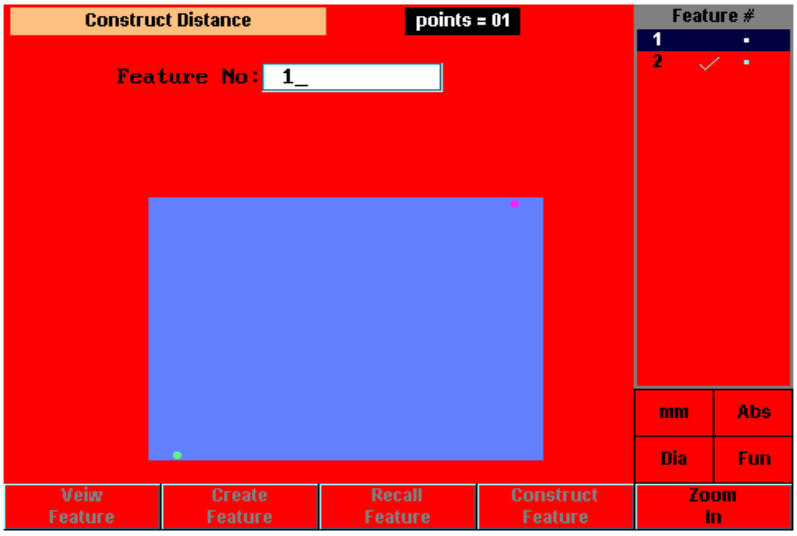
Step 4 Press the *enter key*.



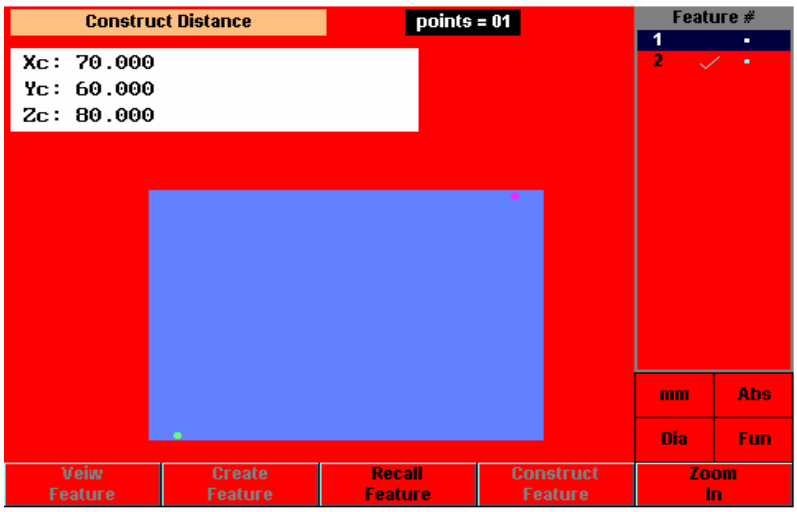
Step 5 Press enter key.
A tick mark appears on feature no 2 and the feature above feature recalled is high lighted.



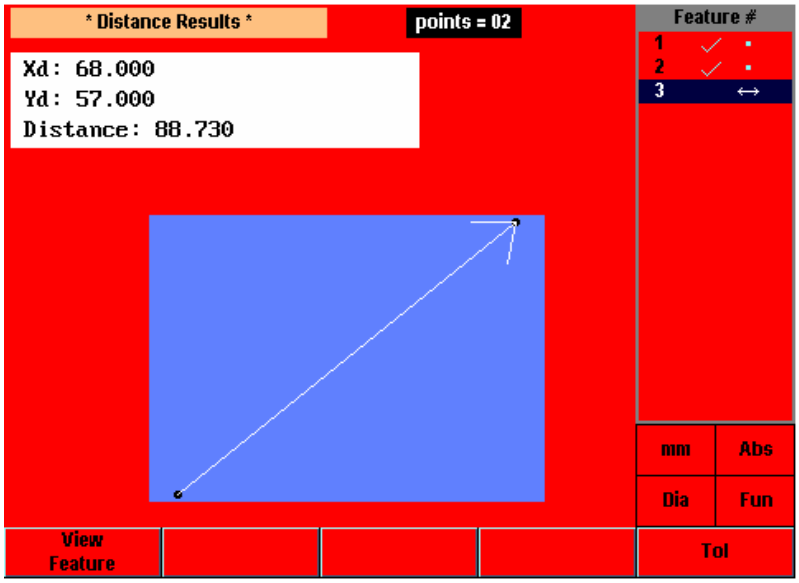
Step 6 Press the *recall soft key*. Use the numeric keypad to enter the feature number of the second feature used in the construction. This construction uses point 1 from the features list.



Step 7 Press the *enter key*.

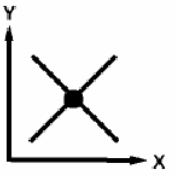


Step 8 Press the Enter *key*

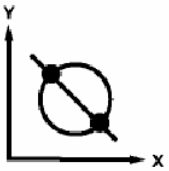


The constructed distance feature is displayed on the screen and added to the feature list. Press the vi*ew feature soft key* for a graphic representation of the zoomed feature.

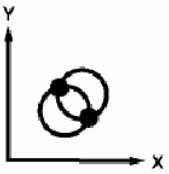
3.25 POINT CONSTRUCTION



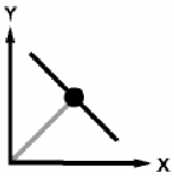
Intersection of two lines
1. Press the point key
2. Press the construct (constr) soft key
3. Select two intersecting lines



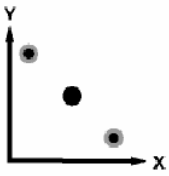
Intersection of a line and circle
1. Press the point key
2. Press the construct (constr) soft key
3. Select an intersecting line & circle



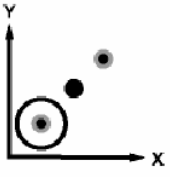
Intersection of two circles
1. Press the point key
2. Press the construct (constr) soft key
3. Select two intersecting circles



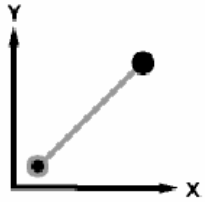
Point on line closest to datum
1. Press the point key
2. Press the construct (constr) soft key
3. Select the desired line



Mid-point between two points
1. Press the point key
2. Press the construct (constr) soft key
3. Select two points

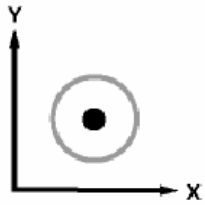


Mid-point between a point and circle
1. Press the point key
2. Press the construct (constr) soft key
3. Select a point and circle



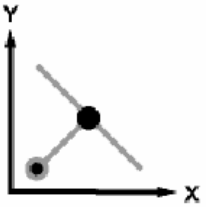
Offset distance from a point

1. Press the point key
2. Press the construct (constr) soft ke
3. Select a point and distance



Center point of a circle

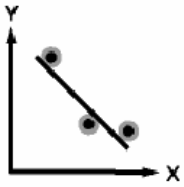
1. Press the point key
2. Press the construct (constr) soft ke
3. Select a circle



Perpendicular bisector between

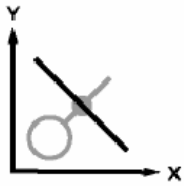
1. Press the point key
2. Press the construct (constr) soft ke
3. Select a line and point

3.26 LINE CONSTRUCTIONS



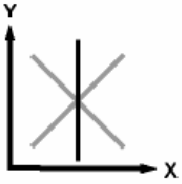
Best fit line

1. Press the line key
2. Press the construct (constr) soft key
3. Select the desired points



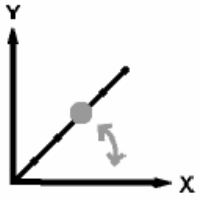
Perpendicular to line through feature

1. Press the line key
2. Press the construct (constr) soft key
3. Select the desired feature & line



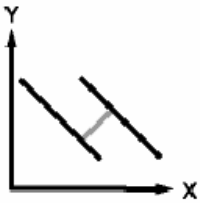
Bisector line

1. Press the line key
2. Press the construct (constr) soft key
3. Select any two interesecting lines



Calculated line

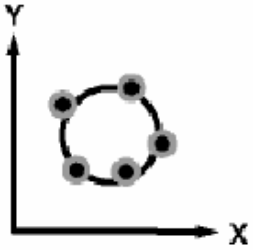
1. Press the line key
2. Press the construct (constr) soft key
3. Select a point & angle



Offset line

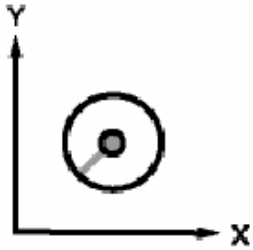
1. Press the line key
2. Press the construct (constr) soft key
3. Select a line & distance

3.27 CIRCLE CONSTRUCTION



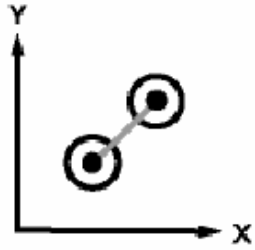
Best fit circle

1. Press the circle key
2. Press the construct (constr) soft key
3. Select the desired points



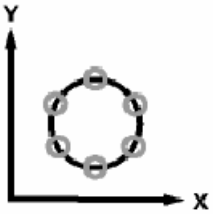
Calculated circle

1. Press the circle key
2. Press the construct (constr) soft key
3. Select a point & distance



Offset circle

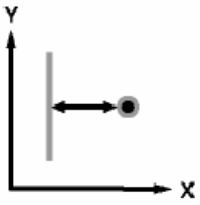
1. Press the circle key
2. Press the construct (constr) soft key
3. Select a circle & distance



Bolt hole circle

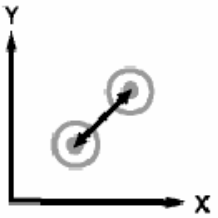
1. Press the circle key
2. Press the construct (constr) soft key
3. Select the bolt hole pattern features

3.28 DISTANCE CONSTRUCTION



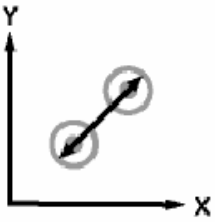
Straight line distance

1. Press the distance key
2. Press the construct (constr) soft key
3. Select two points, a point & line, a point & circle, or a line & circle



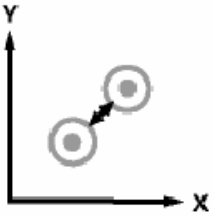
Distance between two circles (center-to-center)

1. Press the distance key
2. Press the construct (constr) soft key
3. Select two circles



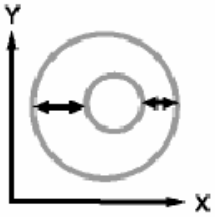
Distance between two circles (farthest)

1. Press the distance key
2. Press the construct (constr) soft key
3. Select two circles



Distance between two circles (nearest)

1. Press the distance key
2. Press the construct (constr) soft key
3. Select two circles



Distance between two annular circles (nearest/far

1. Press the distance key
2. Press the construct (constr) soft key
3. Select two circles

3.29 ANGLE CONSTRUCTION

Vertex angle of two lines

1. Press the angle key
2. Press the construct (constr) soft key
3. Select two lines

3.30 Special Functions

In this functions you can select measurement mode is “Pattern mode” (Refer Chapter 3 Geometric Features - Advanced functions for more details)

Step 1 Press  key.

Step 2 Press “Select Mode” soft key.

Step 3 Press “Pattern Mode” soft key.

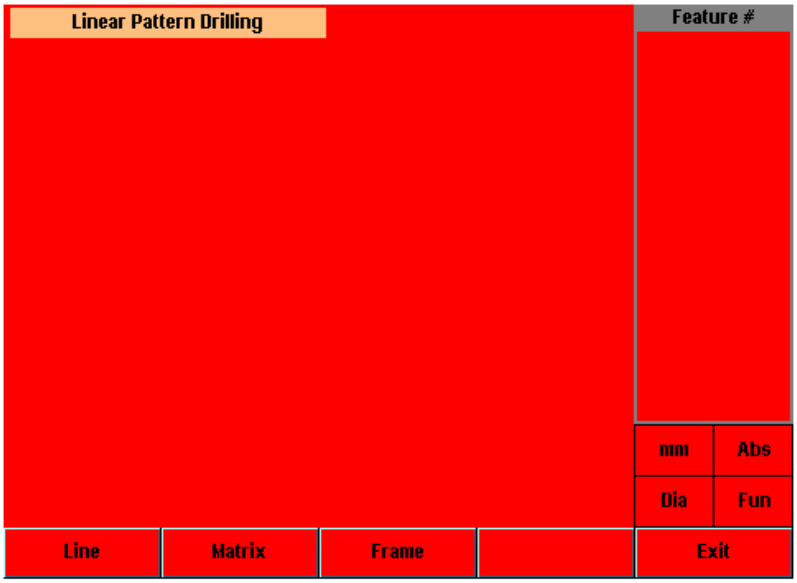
Line functions

3.31. Drilling on line:

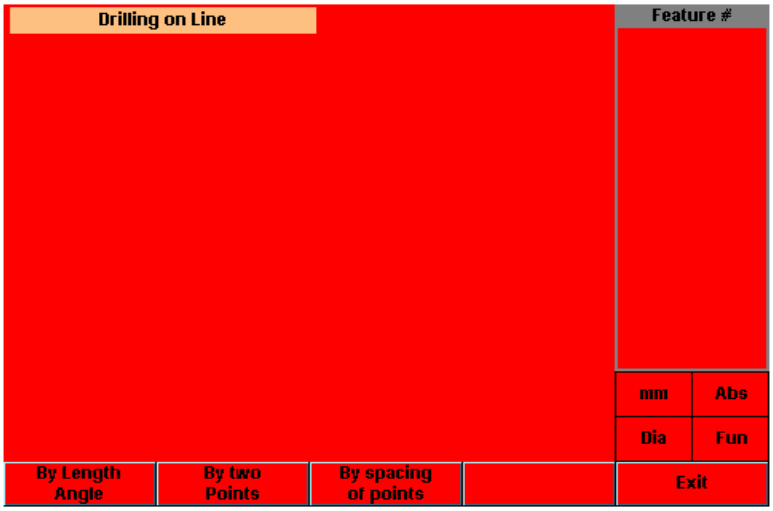
This mode is used to drill hole on specified distance on a line

Step 1 Press “Line” key. 

Following screen shall appear

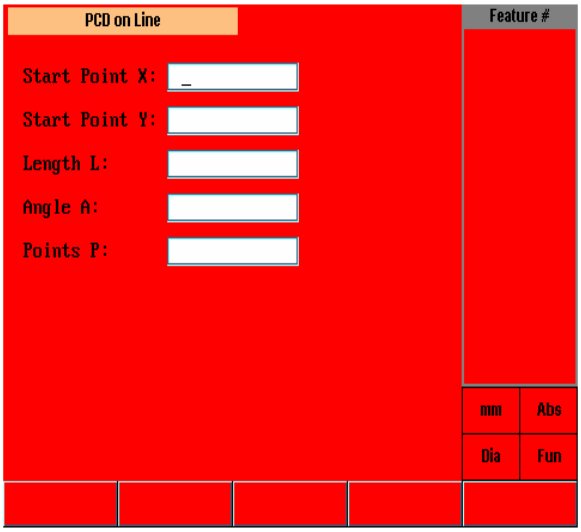


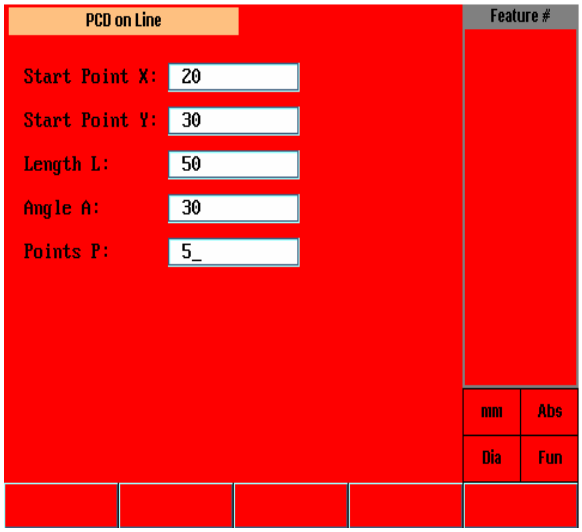
Step 2 Press “Line” soft key. Following screen shows the drilling on line by using different way such as – A) By Length Angle
B) By two Points
C) By spacing of points



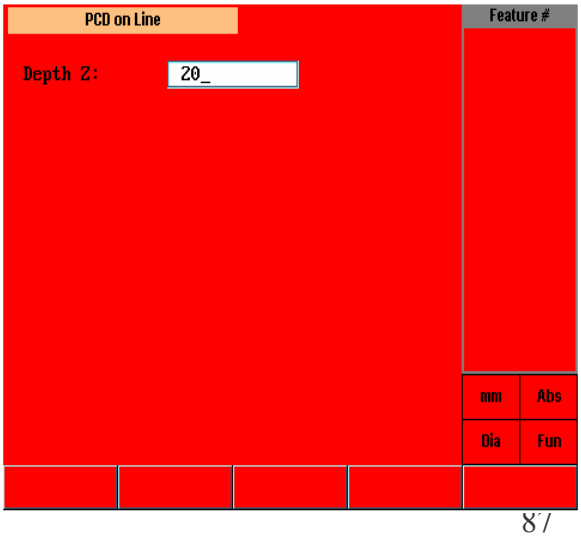
A) Drill on line by using length angle

Step 3 Press “By Length Angle” soft key.
After that user shall give the following parameters by using numeric keypad.



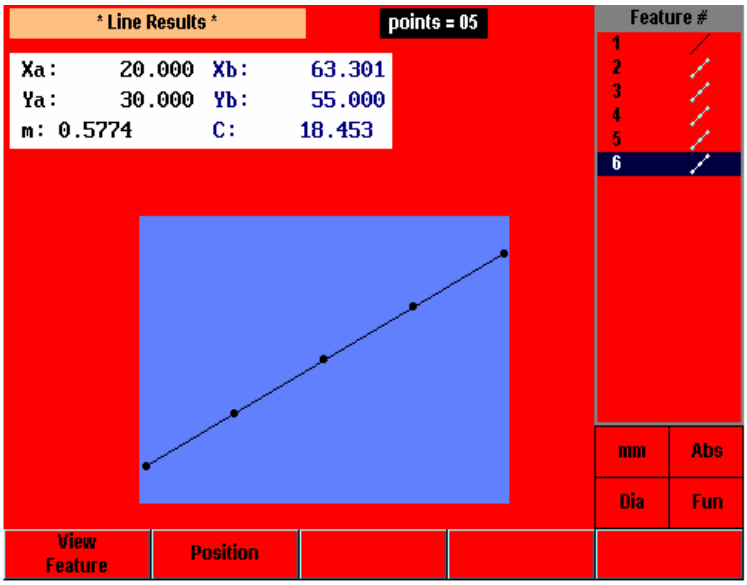


Step 4 After entering each parameters press Enter key.
Following screen appears

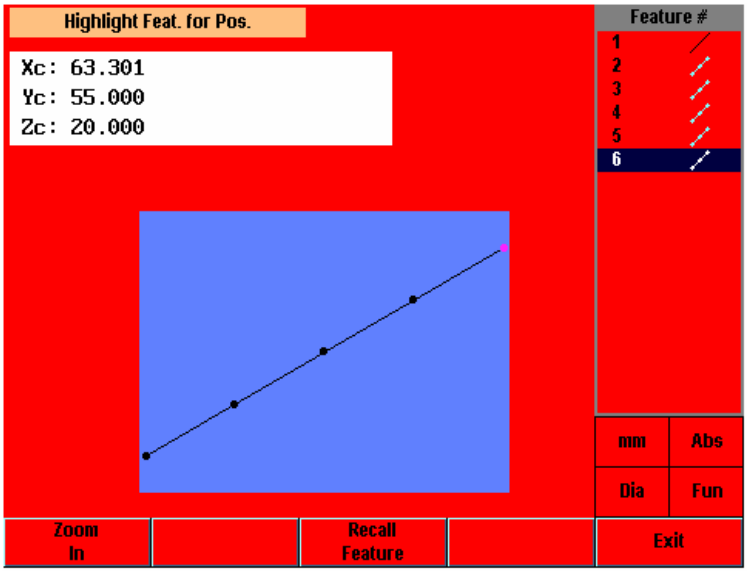


Step 5 Enter Depth on line for example enter Depth Z = 20

Step 6 Press Enter key then following screen shall show the line results of above defined example.



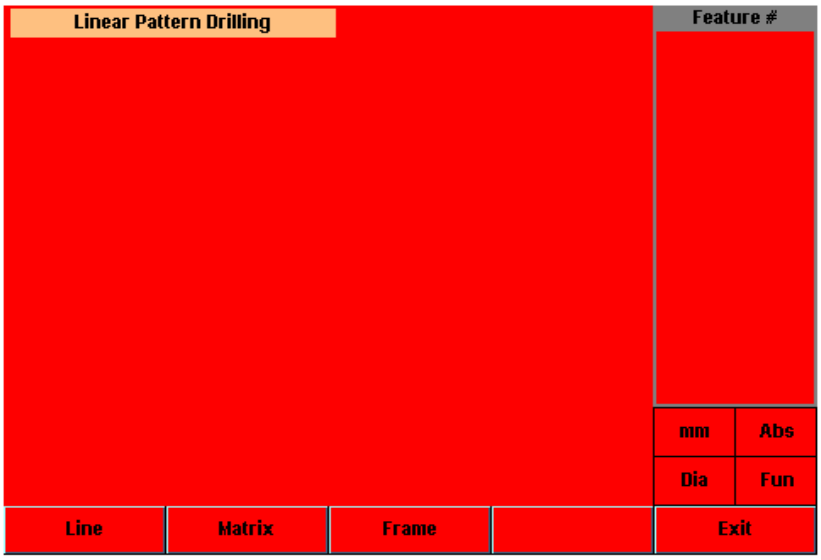
Step 7 Press “Position” soft key.
Highlight features for position results will be displayed on the screen



B) Drill on line by using two points

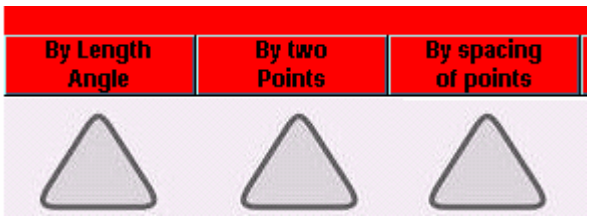
Step 1 Press “Line” key.

Following screen shall appear

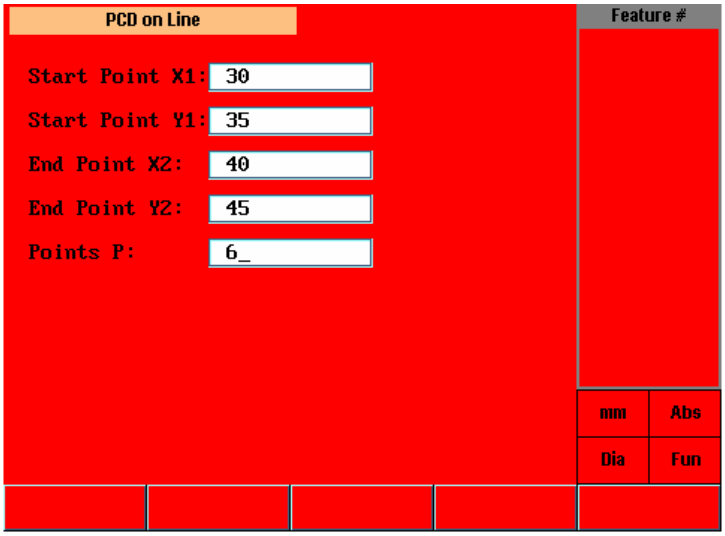


Step 2 Press “Line” soft key.

Step 3 After that press “By two options” soft key.



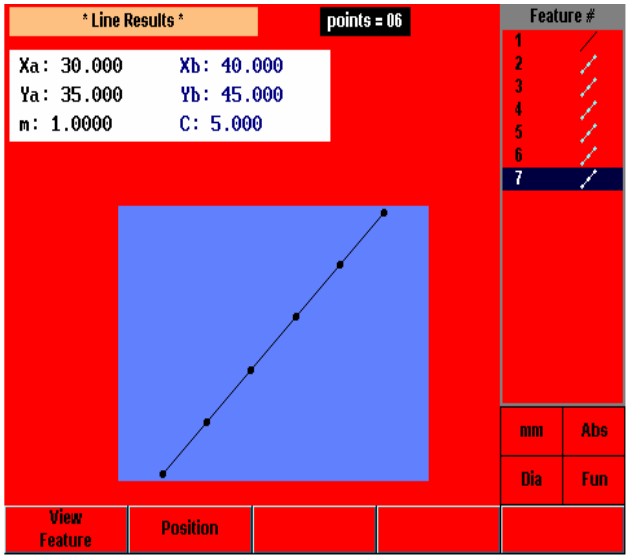
Step 4 Now user shall give the following parameters by using numeric keypad. After entering each parameters press Enter key. E. g. enter following parameters.

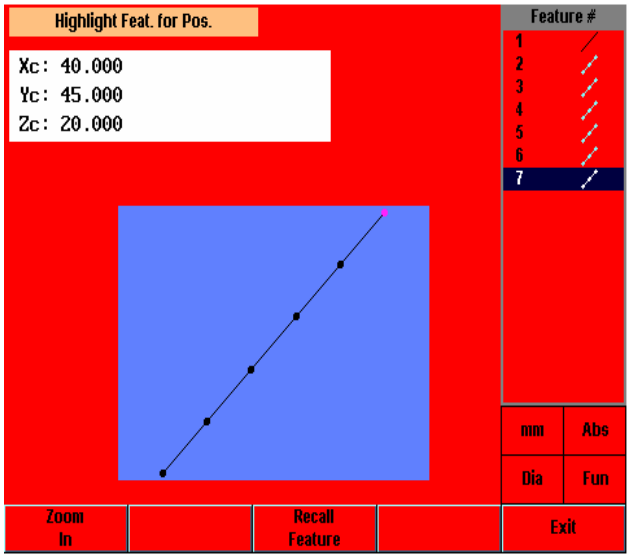


Step 5 Enter Depth Z e. g. Depth Z = 20.

Step 6 Press “Enter” key. Line results will be displayed on the screen.

After pressing “Position” soft key.
Following screen shall appears

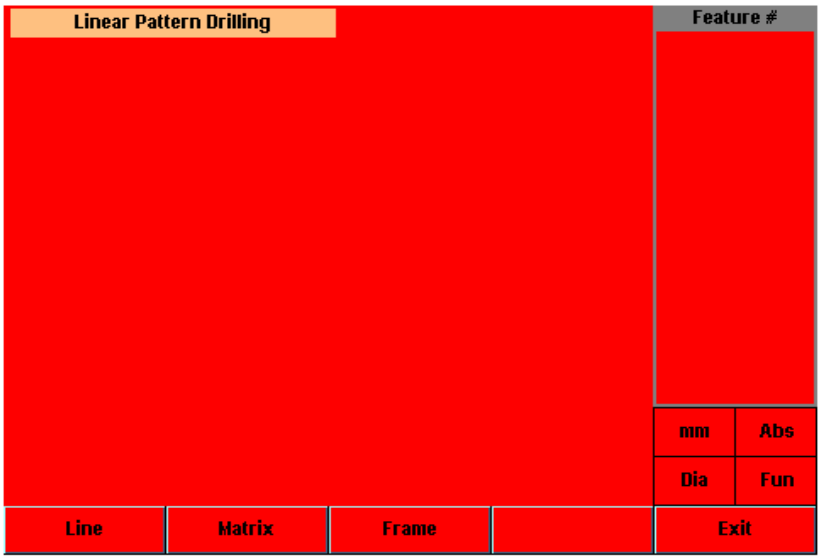




C) Drill on line by spacing of points

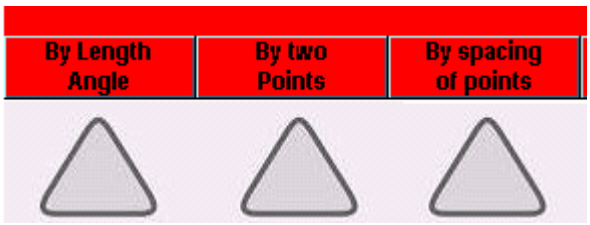
Step 1 Press “Line” key.

Following screen shall appear

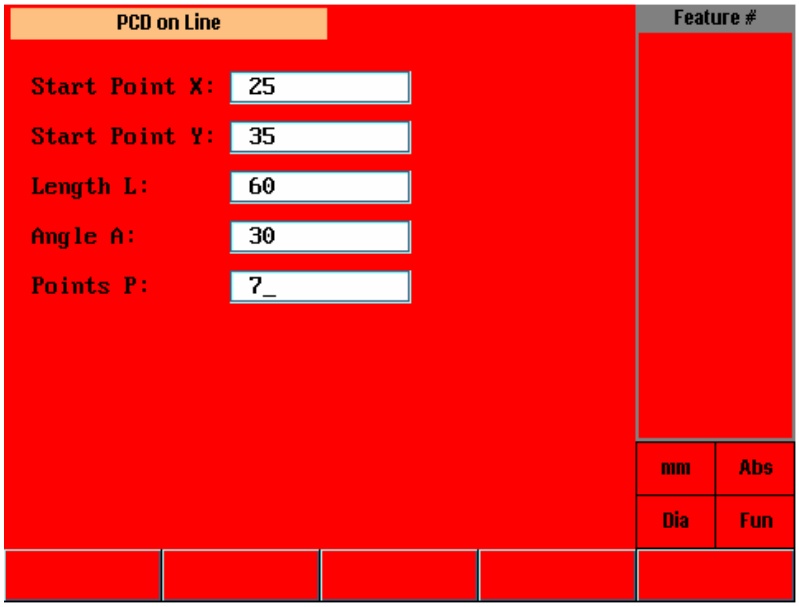


Step 2 Press “Line” soft key.

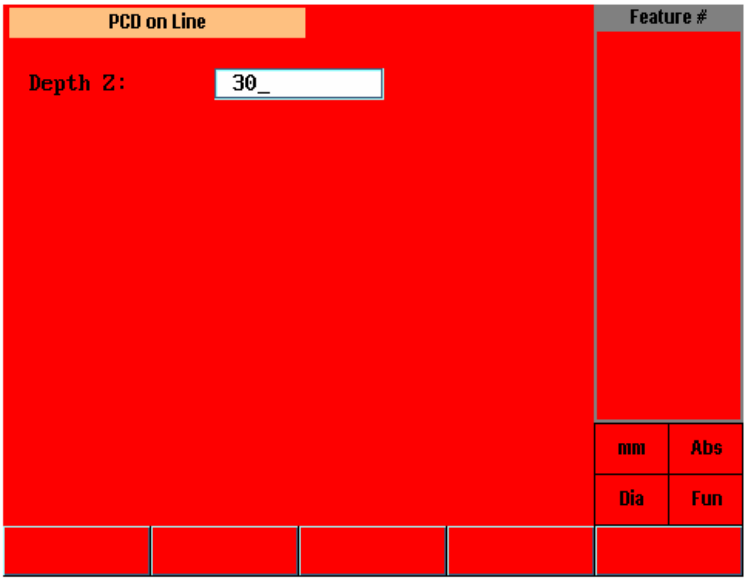
Step 3 After that press “By two options” soft key.



Step 4 Now user shall give the following parameters by using numeric keypad. After entering each parameters press Enter key. E. g. enter following parameters.

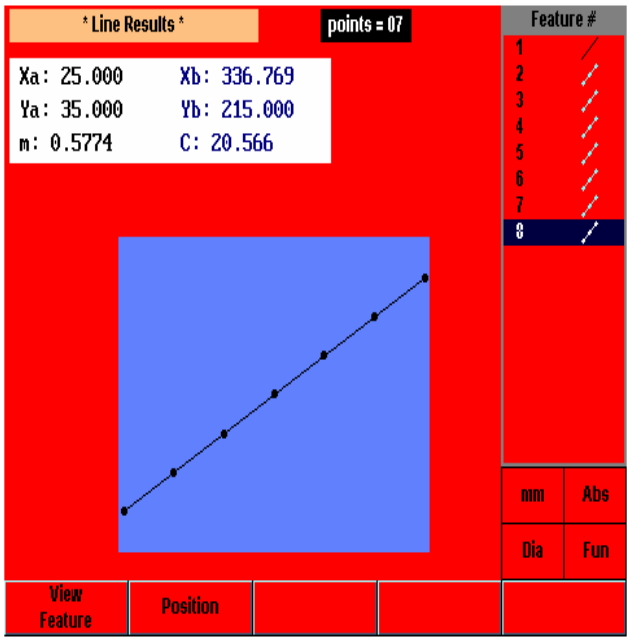


Step 5 Enter Depth Z e. g. Depth Z = 20.

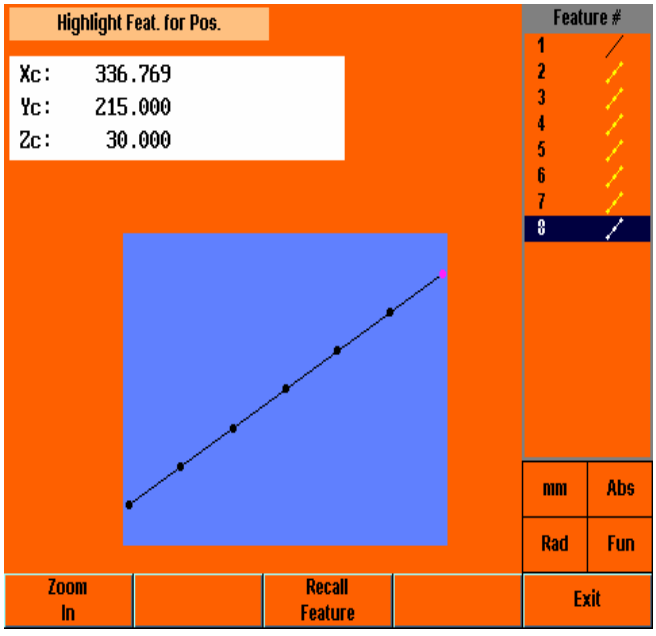


Step 6 Press “Enter” key. Line results will be displayed on the screen.

Line results displays on the Following screen



After pressing “Position” soft key. Following screen shall appears

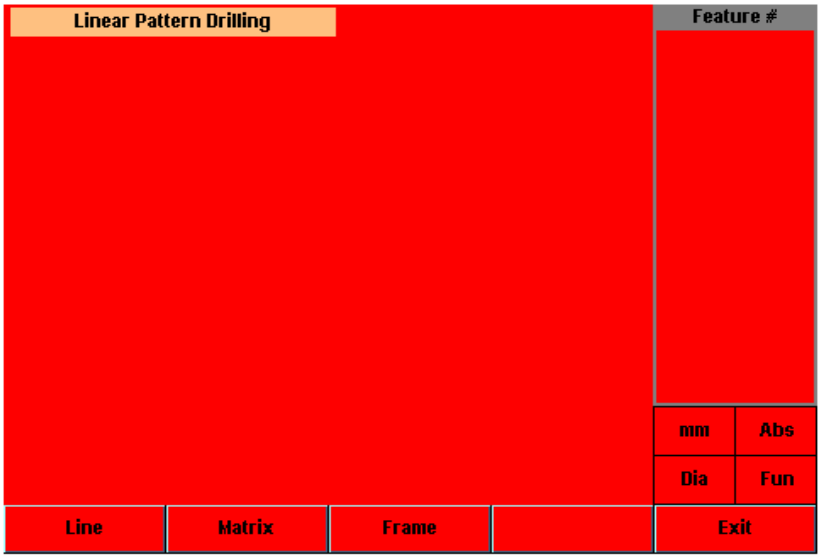


3.32 Drill on a matrix

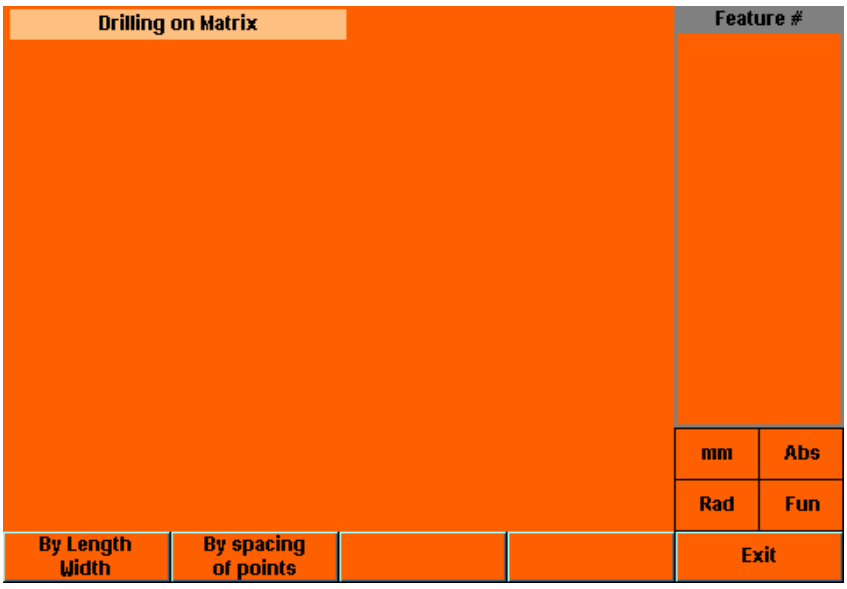
This is another useful mode where you could create a mesh of holes.
This function is used to drill hole at specified distance on a matrix plane.

A) Drill on a matrix by using line and widths

Step 1 Press “Line” key.
Following screen shall appear

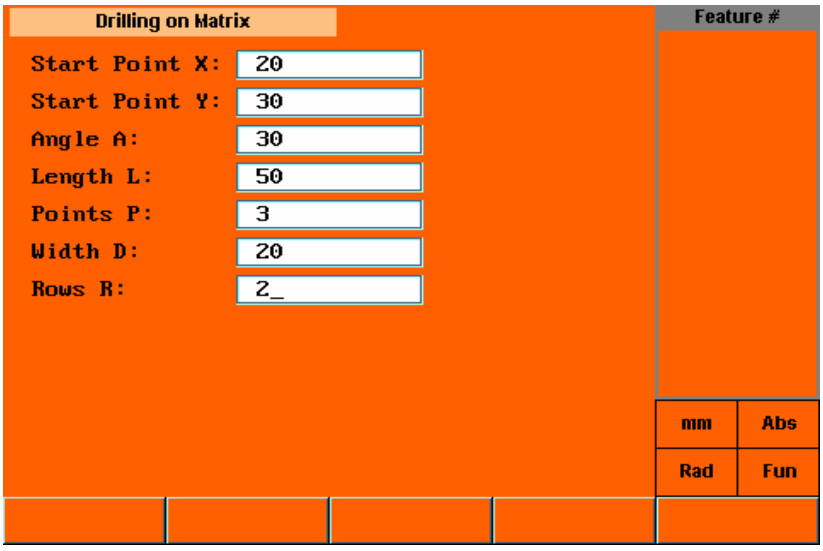


Step 2 Press “Matrix” soft key. Following screen shows the drilling on matrix by using two types such as – A) By Length Width
B) By spacing of points

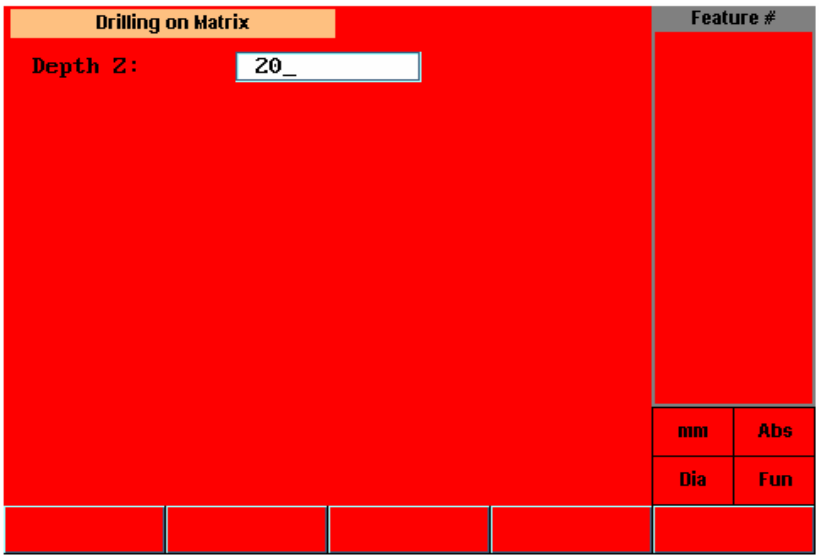


Step 3 Press “By Length Width” soft key.
Now following screen shall appears then enter following parameters.

For example: - Enter following dimensions
Start Point X: 20
Start Point Y: 30
Angle A: 30
Length L: 50
Points P: 3
Width D: 20
Rows: 2
Press “Enter” key after entering each parameters.

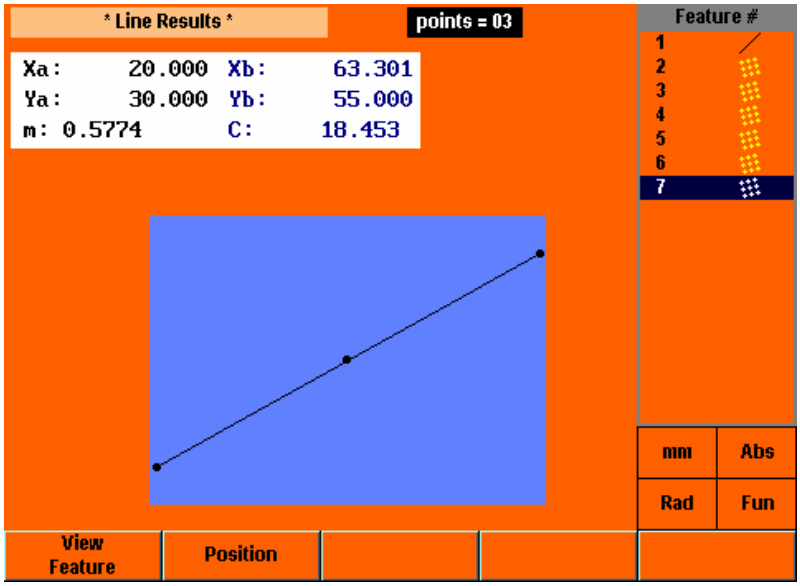


Step 4 Press “Enter” key
Following screen shall appear



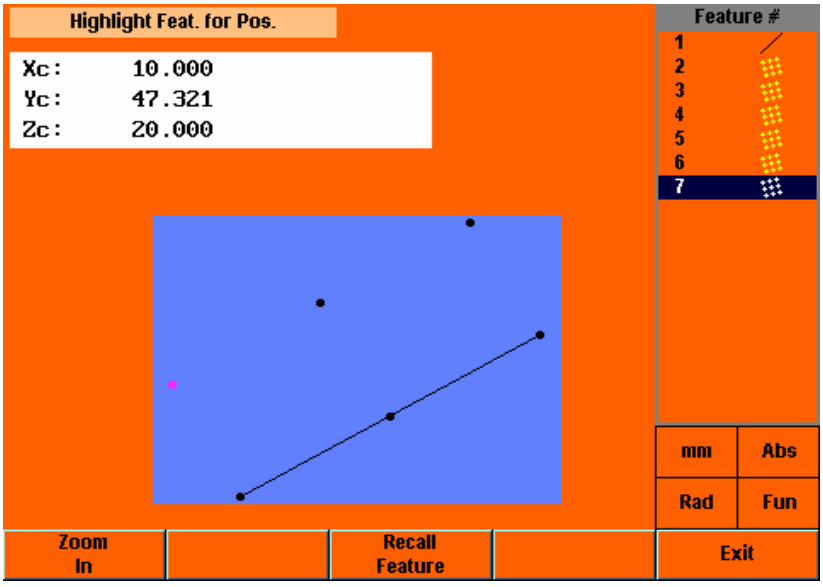
Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

Step 6 Press “Enter” key then Line results are displayed on the screen.



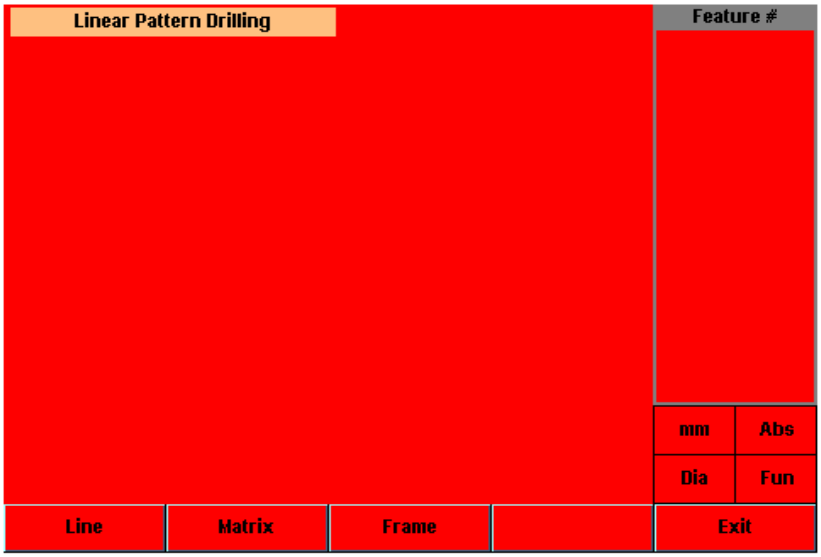
The line results feature is displayed on the screen and added to the feature list.
Press the vie*w feature soft key* for a graphic representation of the zoomed feature.

Step 7 Press “Position” soft key.
Highlight Feature for position are displayed on the following screen



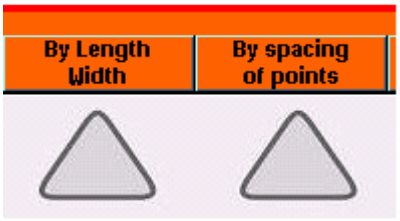
B) Drill on a matrix by spacing of points

Step 1 Press “Line” key.
Following screen shall appear



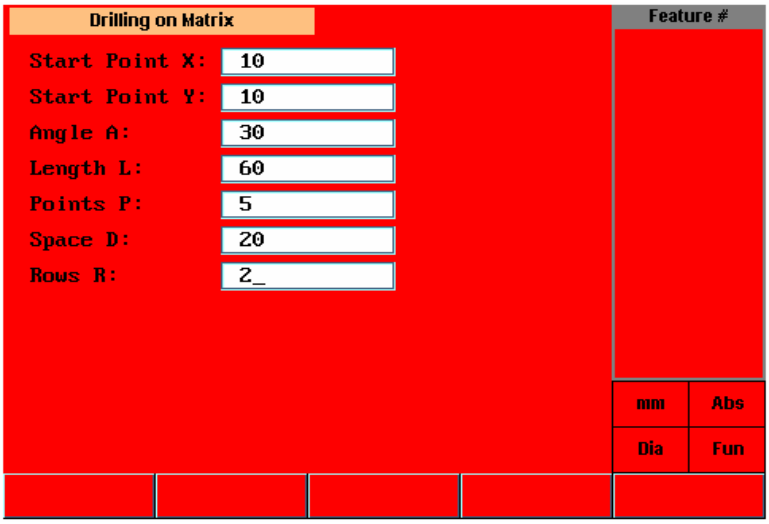
Step 2 Press “Matrix” soft key.

Step 3 Press “By spacing of points” soft key.

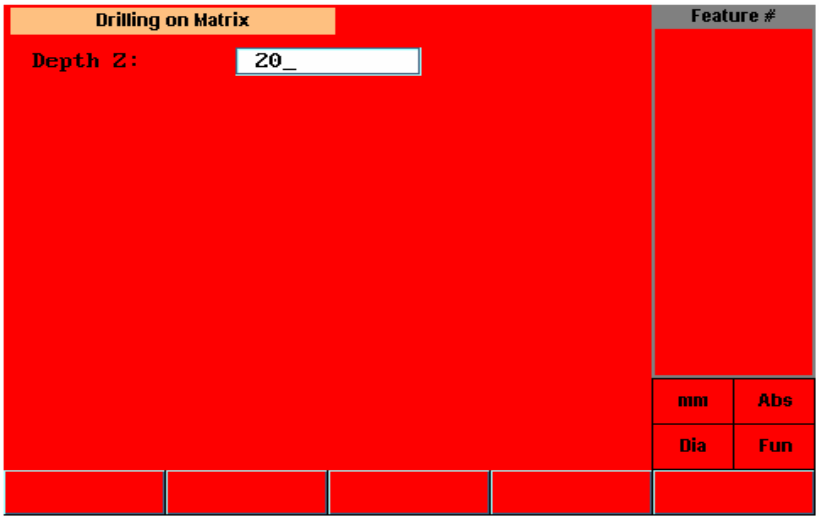


Step 3 Enter the following parameters by using numeric keypad.

For Example:- Enter following parameters value
Start Point X = 10
Start Point Y = 10
Angle A = 30
Length L = 5
Points P = 5
Space D = 20
Rows R = 2

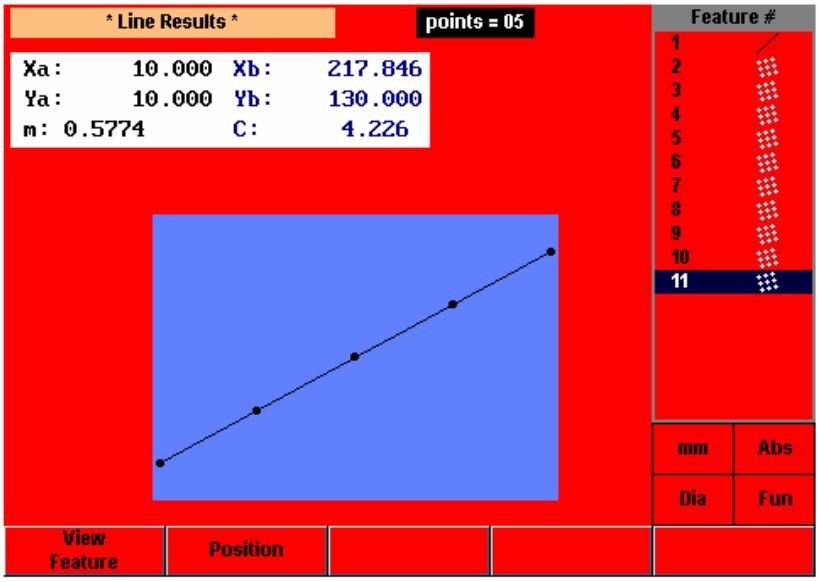


Step 4 Press “Enter” key.
Following screen shall appear



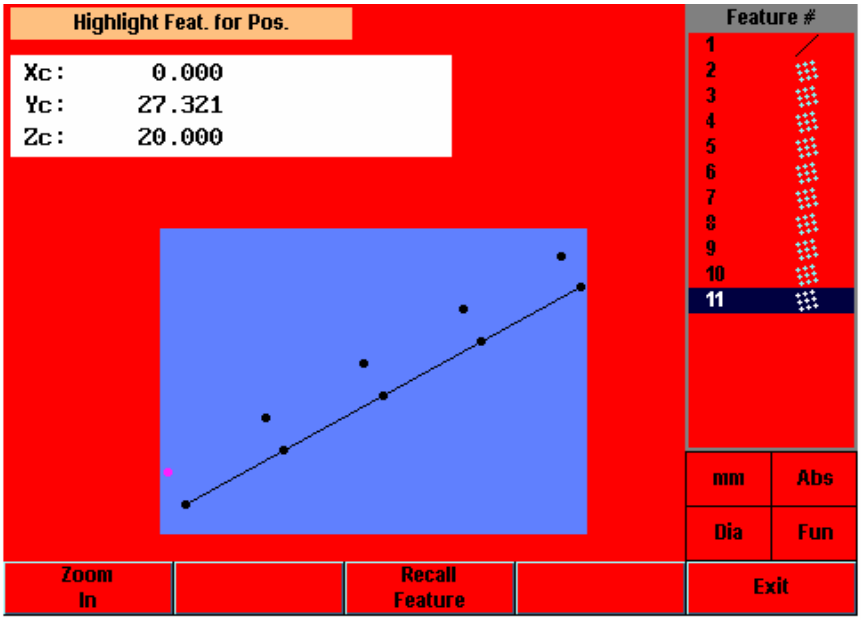
Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

Step 6 Press “Enter” key then Line results are displayed on the screen.



The line results feature is displayed on the screen and added to the feature list. Press the vie*w feature soft key* for a graphic representation of the zoomed feature.

Step 7 Press “Position” soft key.
Highlight Feature for position are displayed on the following screen.



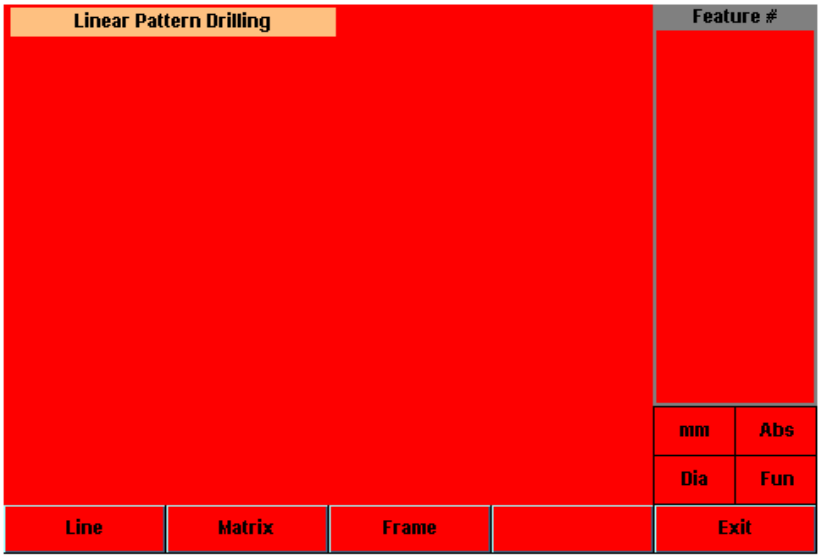
Step 8 Press “Exit” soft key to exit the function.

3.34 Drill on a Frame

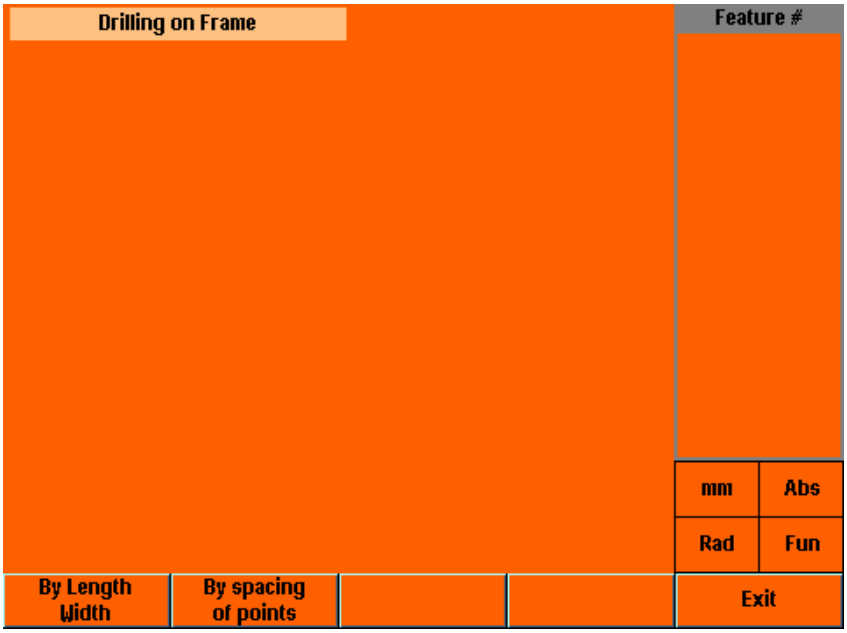
This is one another useful mode where you could create a mesh of holes.
This function is used to drill hole at specified distance on a frame plane.

Drill on a frame by using length & width

Step 1 Press “Line” key.
Following screen shall appear



Step 2 Press “Frame” soft key. Following screen shows the drilling on matrix by using two types such as – A) By Length Width
B) By spacing of points



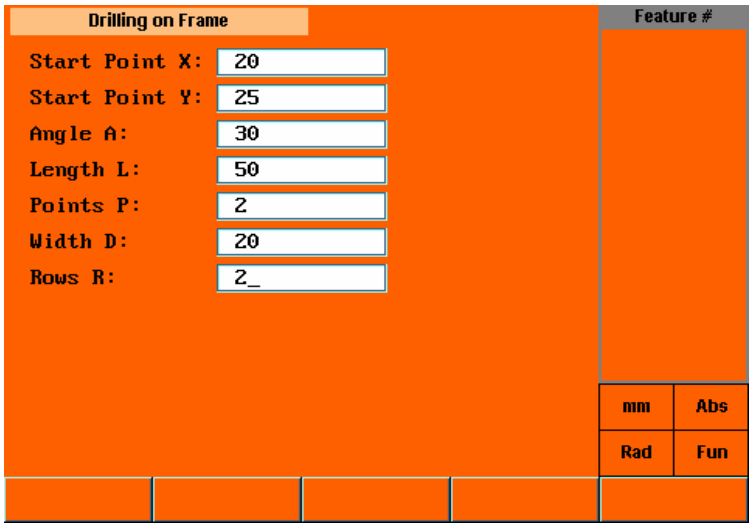
Step 3 Press “By Length Width” soft key.

Now following screen shall appears then enter following parameters.

For example: - Enter following dimensions

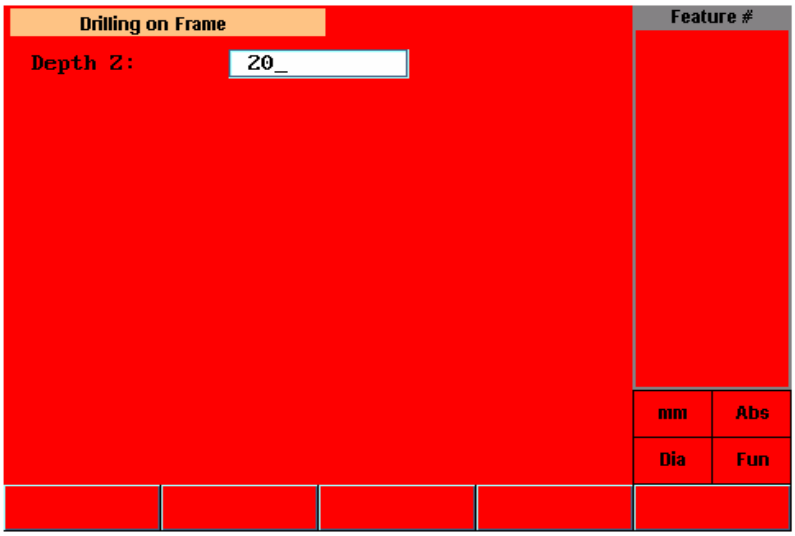
Start Point X: 20
Start Point Y: 25
Angle A: 30
Length L: 50
Points P: 2
Width D: 20
Rows: 2

Press “Enter” key after entering each parameters.



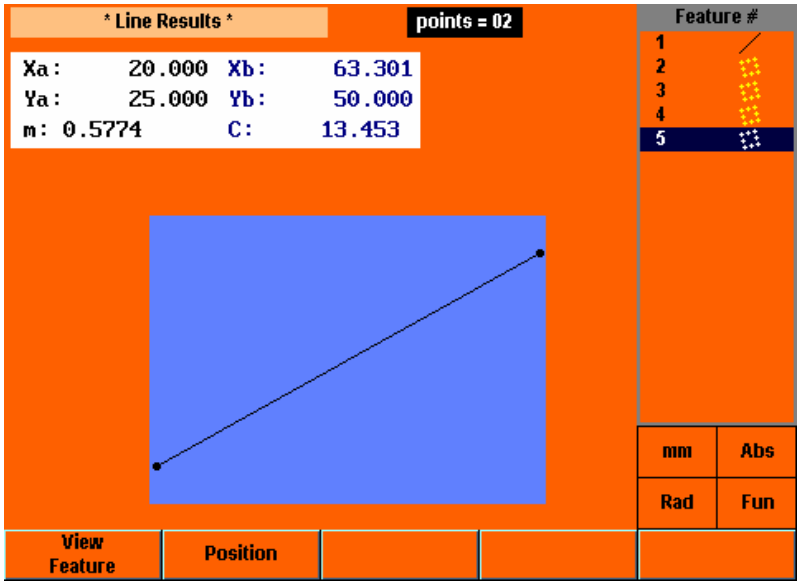
Step 4 Press “Enter” key.

Following screen shall appear



Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

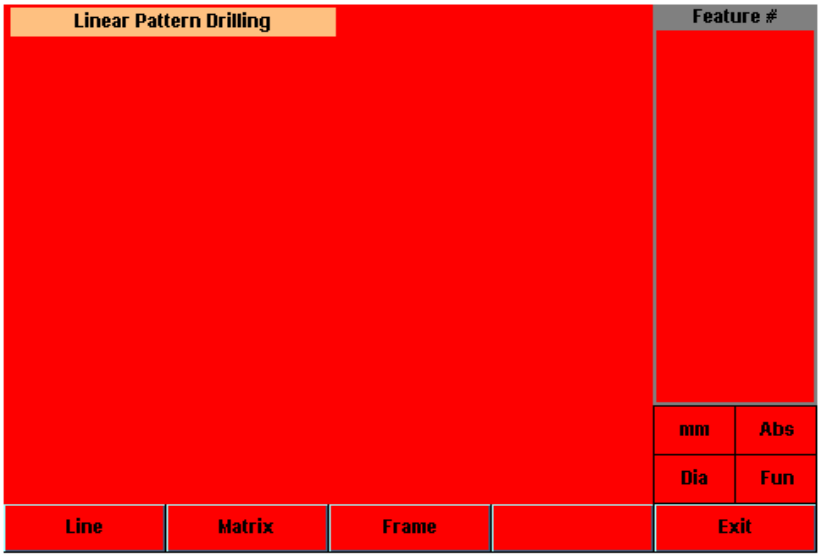
Step 6 Press “Enter” key then Line results are displayed on the screen.



The line results feature is displayed on the screen and added to the feature list. Press the vie*w feature soft key* for a graphic representation of the zoomed feature.

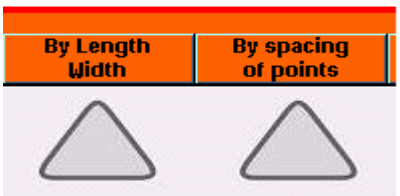
B) Drill on a frame by spacing of points

Step 1 Press “Line” key.
Following screen shall appear



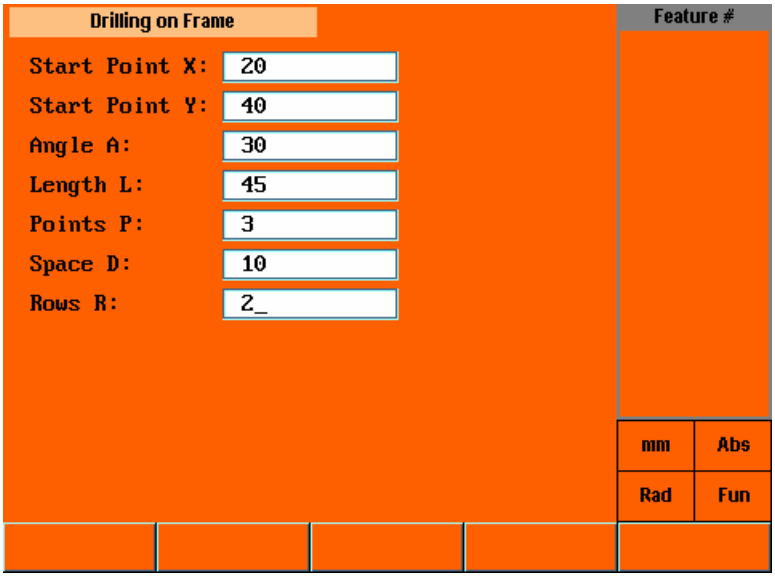
Step 2 Press “Frame” soft key.

Step 3 Press “By spacing of points” soft key.

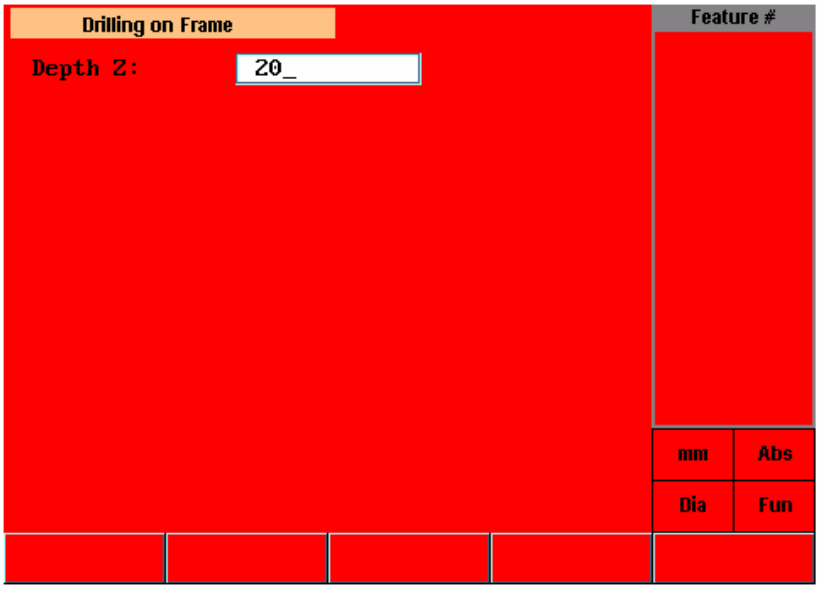


Step 3 Enter the following parameters by using numeric keypad.

For Example:- Enter following parameters value
Start Point X = 20
Start Point Y = 40
Angle A = 30
Length L = 45
Points P = 3
Space D = 10
Rows R = 2
Press “Enter” key after entering each parameters.

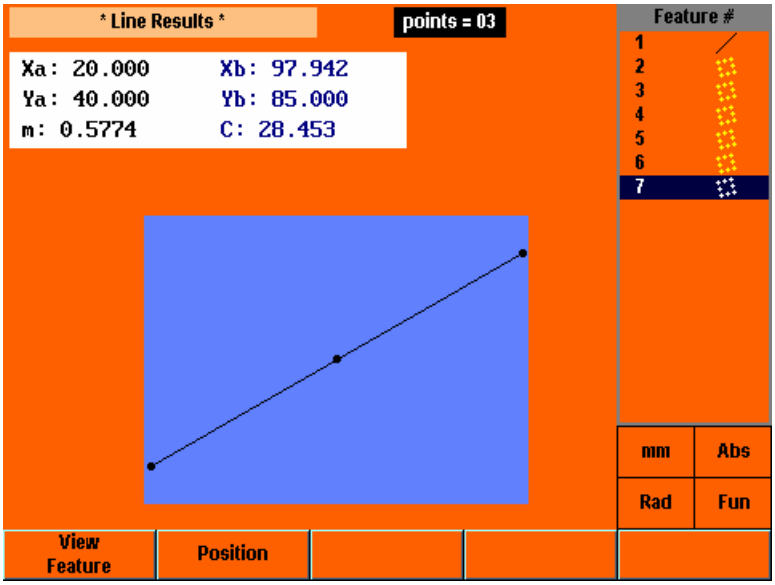


Step 4 Press “Enter” key.
Following screen shall appear



Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

Step 6 Press “Enter” key then Line results are displayed on the screen.



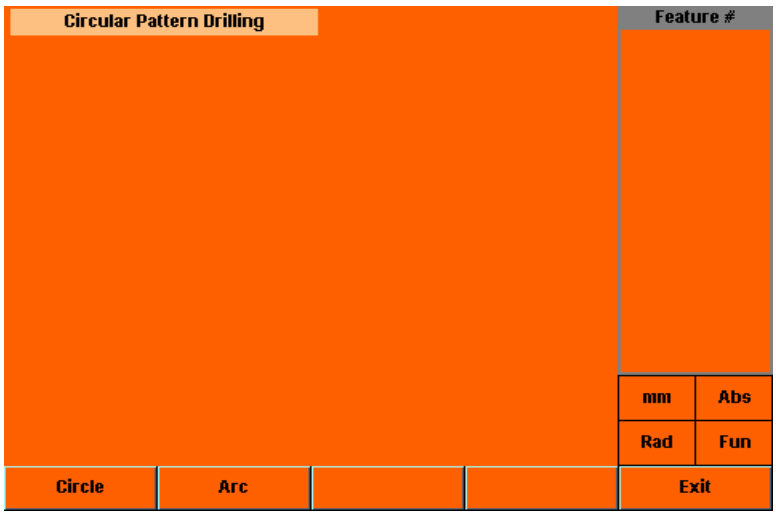
Line results are displayed on the screen and it will be added to feature list.
Press the vi*ew feature soft key* for a graphic representation of the zoomed feature.

3.35 PCD DRILLING:

This mode is used create the co-ordinates of the holes on the PCD of a circle. This is of great use in PCD drilling of holes. The user should give the data such as X origin, Y origin, circle radius, no. of holes (divisions) and starting angle of first hole. Maximum 1000 holes are possible. The holes are defined from no. “000” to “999”.

Step 1 Press  key.

Following screen shall appear



Step 2 Press “Circle” soft key.

Following screen shall shows create PCD then enter following parameters

For example:

Center X : 3

Center Y : 3

Diameter D : 10

Points P : 3

Angle : 30

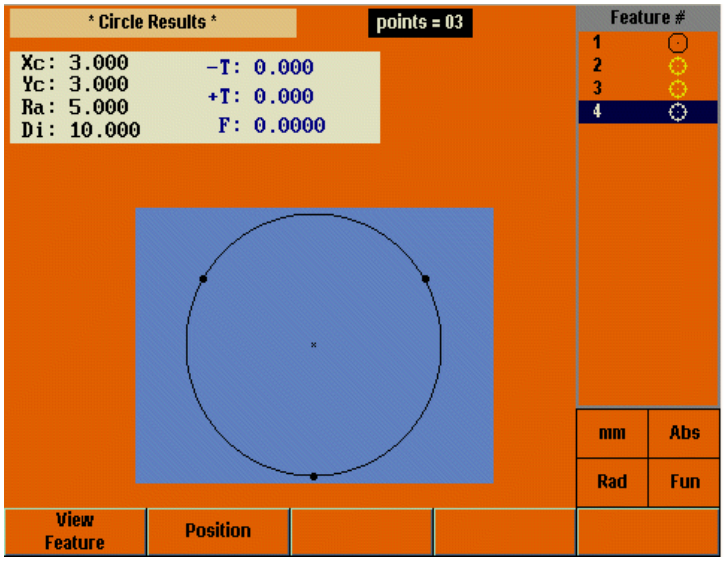
Press “Enter” key after entering each parameters.

Step 4 Press “Enter” key.

Following screen shall appear

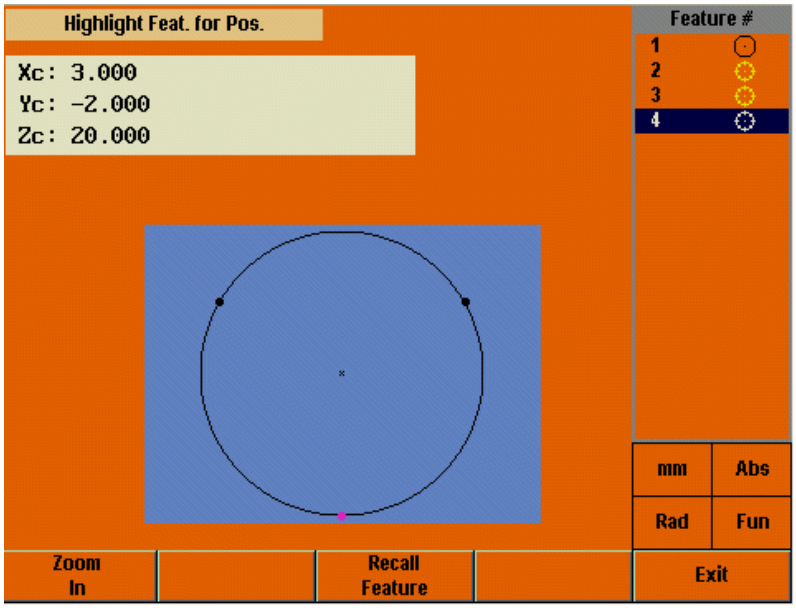
Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

Step 6 Press “Enter” key then “Circle results” are displayed on the screen.



Circle results are displayed on the screen and it will be added to feature list.
Press the vie*w feature soft key* for a graphic representation of the zoomed feature.

Step 7 Press “Position” soft key.
Highlight Feature for position are displayed on the following screen.



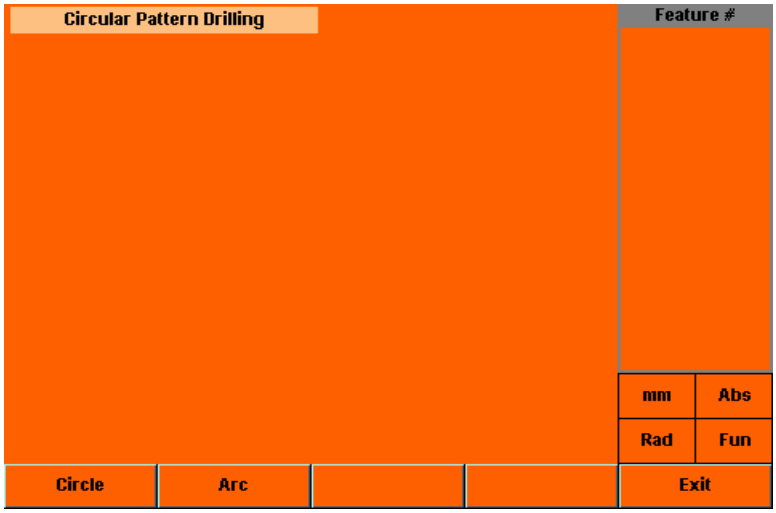
Step 8 Press “Exit” key to exit the function.

3.36 DRIL ON ARC:

This mode is similar to PCD function .In PCD the no of holes distributed throughout 360 degrees with equal angular distance. In “Drill on ARC “function you could restrict the no of hole to a specified angle of arc.

Step 1 Press  key.

Following screen shall appear



Step 2 Press “Arc” soft key.

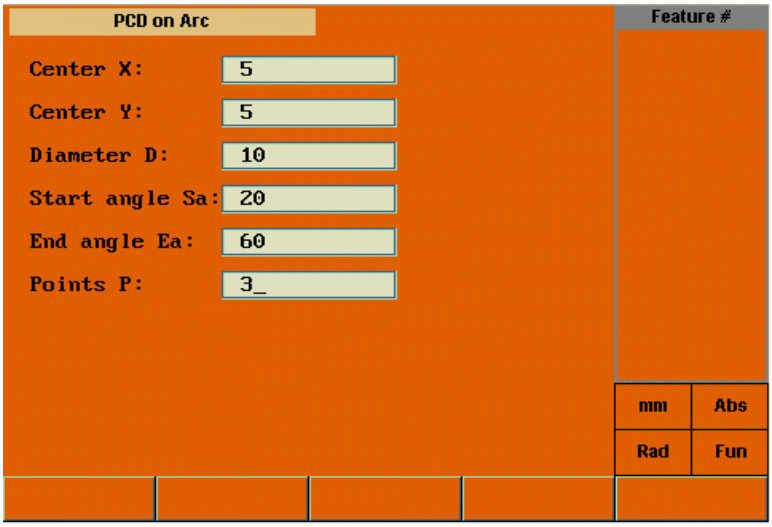
Following screen shall appear

Step 3 Select direction of arc if Anticlockwise or clockwise.

If you can create PCD on arc by using clockwise direction select clockwise soft key then enter following parameters.

Press “Anticlockwise” soft key.

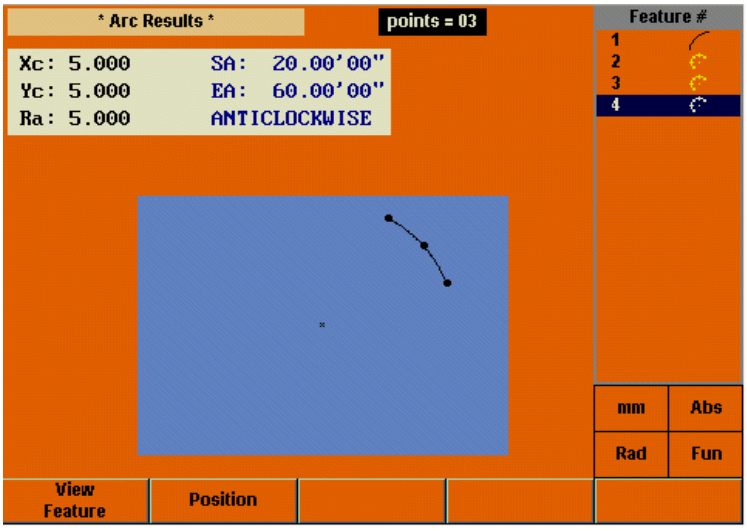
Step 4 Enter following parameters by using numeric keypad



Step 5 Press “Enter” key
Following screen shall appear

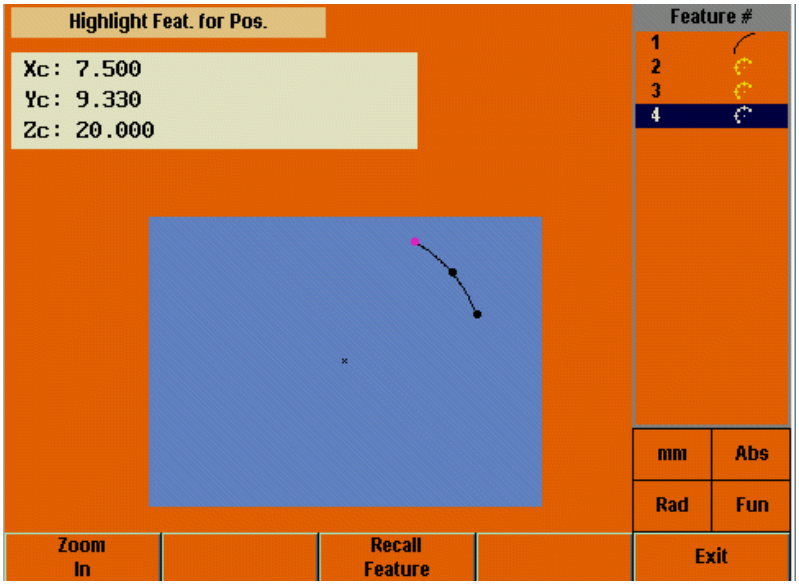
Step 5 Enter Depth Z. e.g. enter Depth Z = 20.

Step 6 Press “Enter” key then “Circle results” are displayed on the screen.



Arc results are displayed on the screen and it will be added to feature list.
Press the vi*ew feature soft key* for a graphic representation of the zoomed feature.

Step 7 Press “Position” soft key.
Highlight Feature for position are displayed on the following screen.



Step 8 Press “Exit” soft key to exit the function.

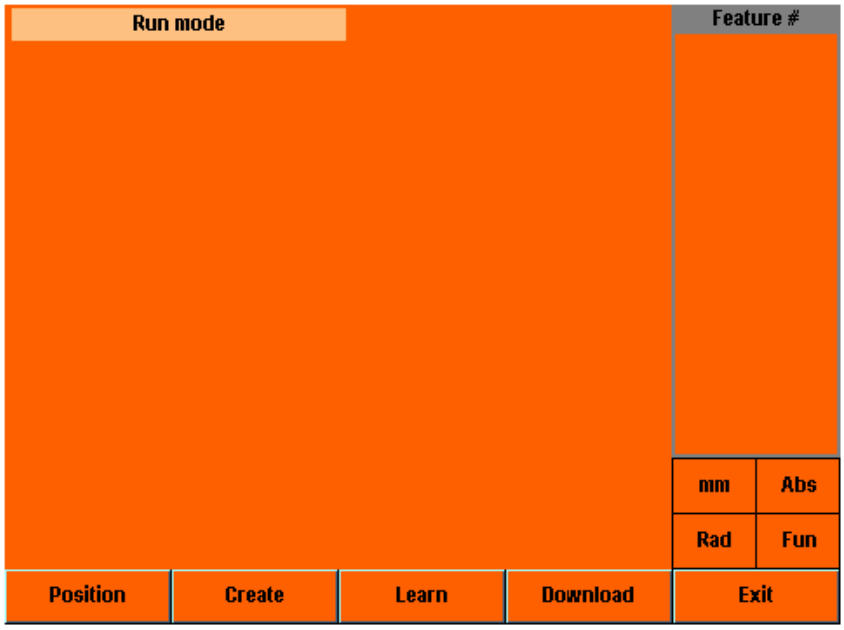
3.37 Run Mode

This mode is used for variety of jobs where variety of drills if to be dome in variety of co ordinates.

To create a point

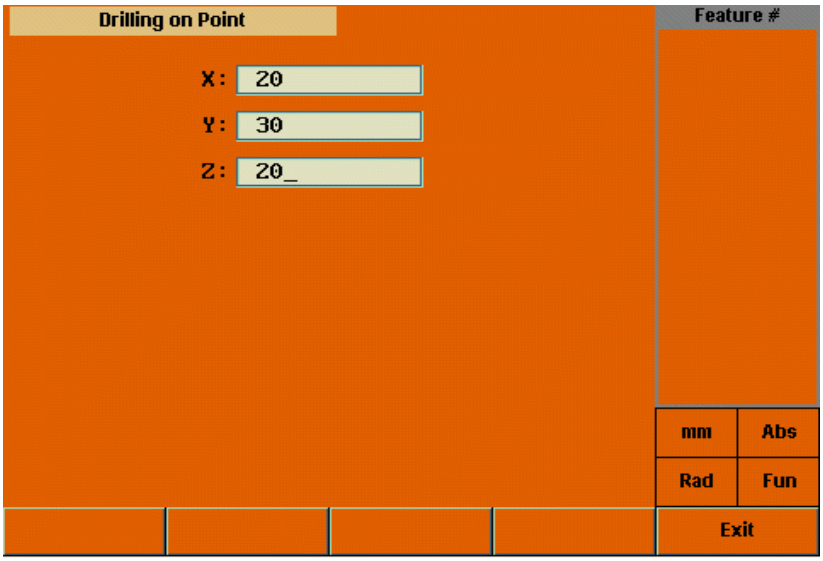
Step 1 Press  key.

Following screen shall appear



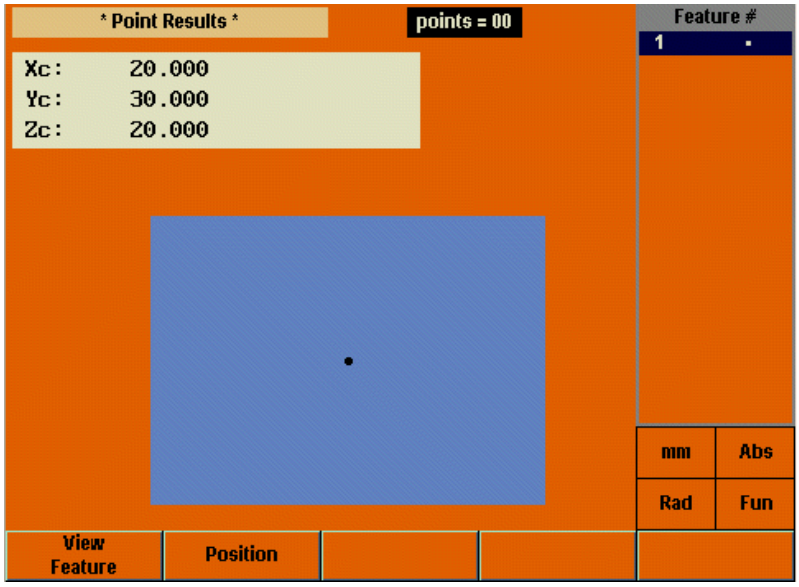
Step 2 Press “Create” soft key.

Following screen shall appear

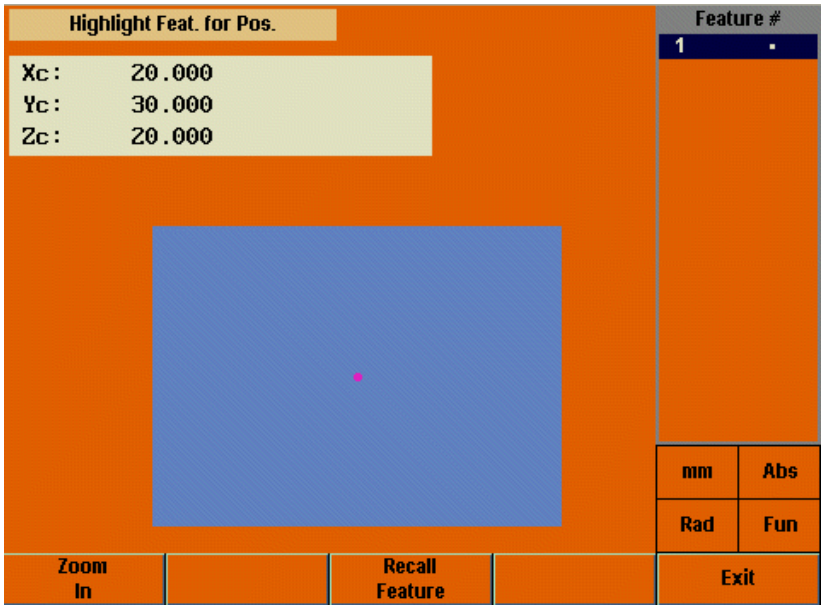


Step 3 Enter drilling on point by using numeric keypad.
e.g. Enter X = 20, Y = 30, Z = 20

Step 4 Press “Enter” key.
Point results are displayed on the screen and added to the feature list.



Step 5 Press “Position” soft key.
Following screen shall appear



Results are saved into feature list.

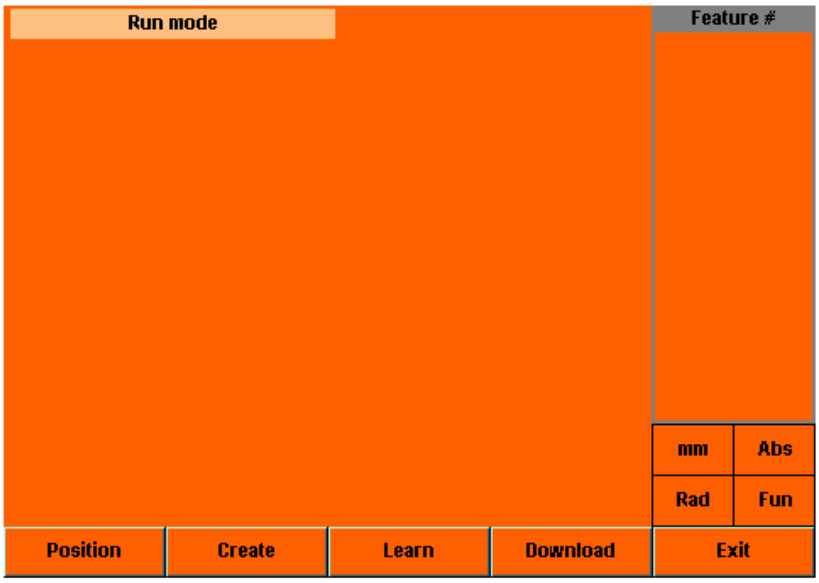
Step 6 Press “Exit” soft key to exit the function.

Learn mode

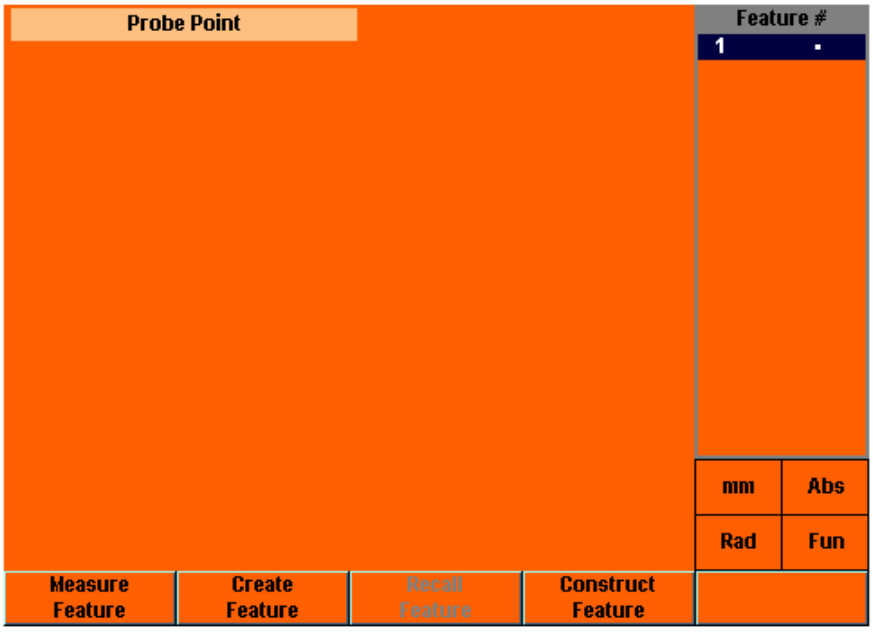
This mode is best used for reverse engineering where a master job is present and is placed on the machine. You need to load the job on the machine. Set the datum prior to start job learning. Position the spindle or positioning pin on hole no one and teach the co ordinates of hole to the unit using the following procedure.

Step 1 Press  key.

Following screen shall appear



Step 2 Press “Learn” soft key.
Following screen shall appear



Step 3 After that to probe point by using measure, create or construct feature. Refer more details chapter 3 geometric features – Measuring features, Constructing features or creating features.

Step 4 After probing the point features, features are saved into feature list.

Step 5 Press “Quit” key then go to main function.

Step 6 Press “Position” soft key, the highlighted features position will be displayed on the screen.

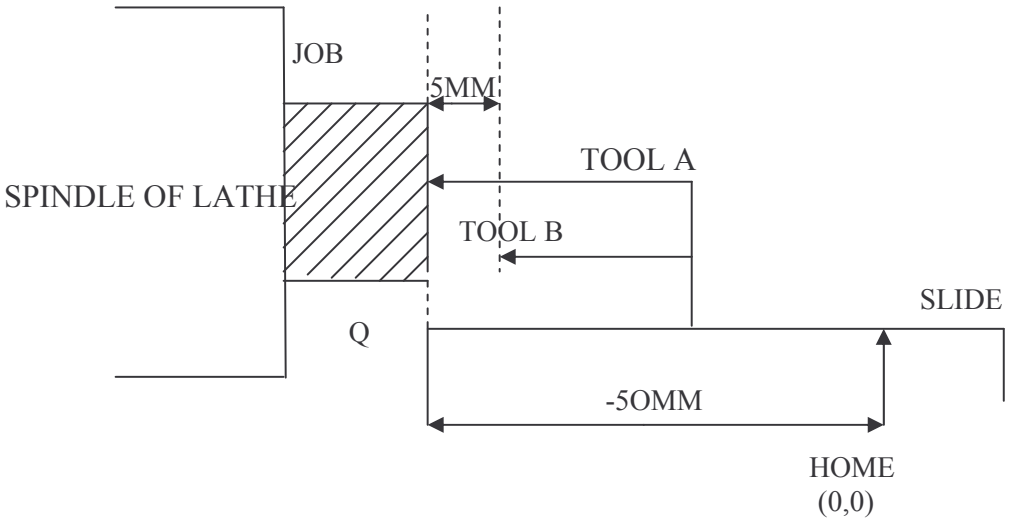
Step 7 Press “Download” soft key.

Measured values are downloading from computer to DRO by using Xtreme^{+} – v2 software.

3.38 TOOL OFFSET:

This mode is specifically used with caption/turret lathes where you have different tools to carry out different operations on single job.

EXAMPLE:



Consider you home the axis and find ‘0’ as shown. Position of tool away from origin is say -50mm for tool ‘A’. Now you index the turret to tool ‘B’. As tool lengths may vary, the tool ‘B’ will show a offset say tool offset = 5mm i.e. to touch the job it has to travel 5mm plus i.e. -55mm to achieve same result as tool

1. Execute home as fix some turret on slide.
2. Touch the tool ‘A’ to job.
3. Execute the tool-offset function & say zero.
4. Select tool ‘B’.
5. Again touch tool ‘B’ to job & say zero.
6. Offsets of both are stored.
7. Similarly you can store tool offsets.

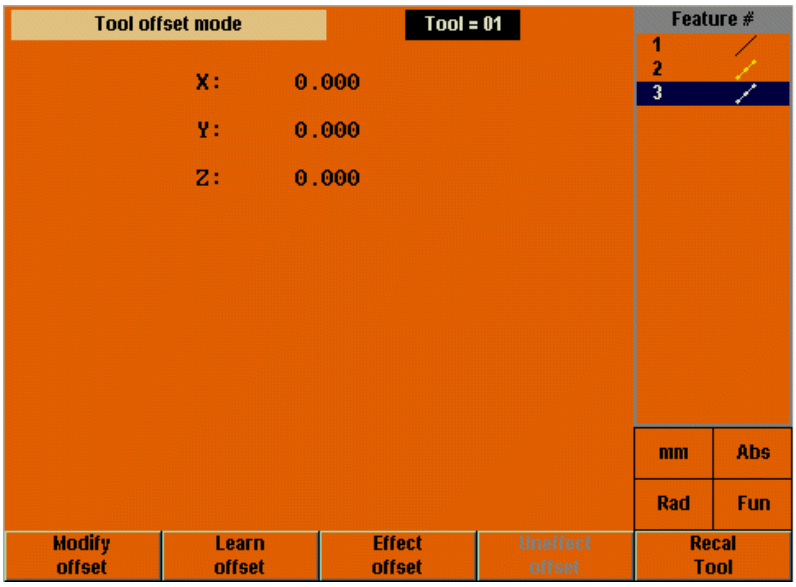
How does it works:

Say at point Q reading for tool ‘A’ is -50mm for X -axis. You need to show zero, then offset is 0-(-50) = 50
So at Home pulse position when you invoke tool offset for tool ‘A’ you will find reading as +50 & by the time you touch the tool to job you will get zero.

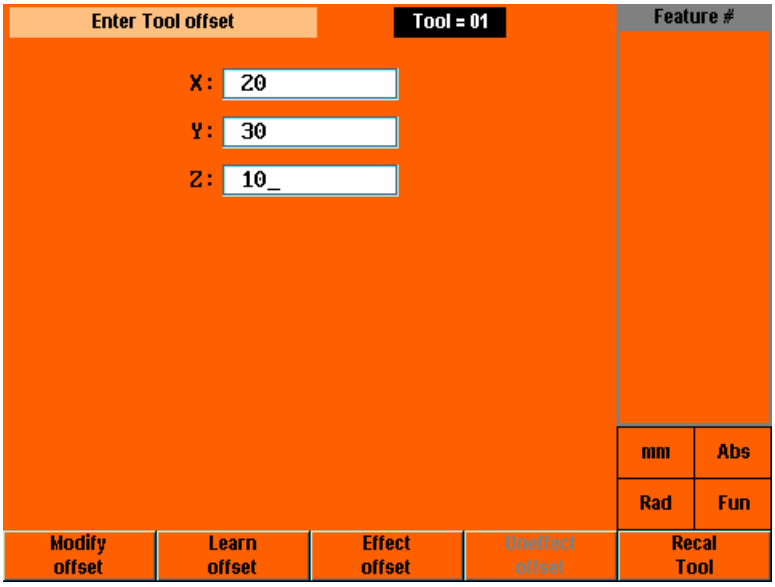
Modify offset

Step 1 Press  key.

Following screen shall appear



Step 2 Press “Modify Offset” soft key.
Following screen shows



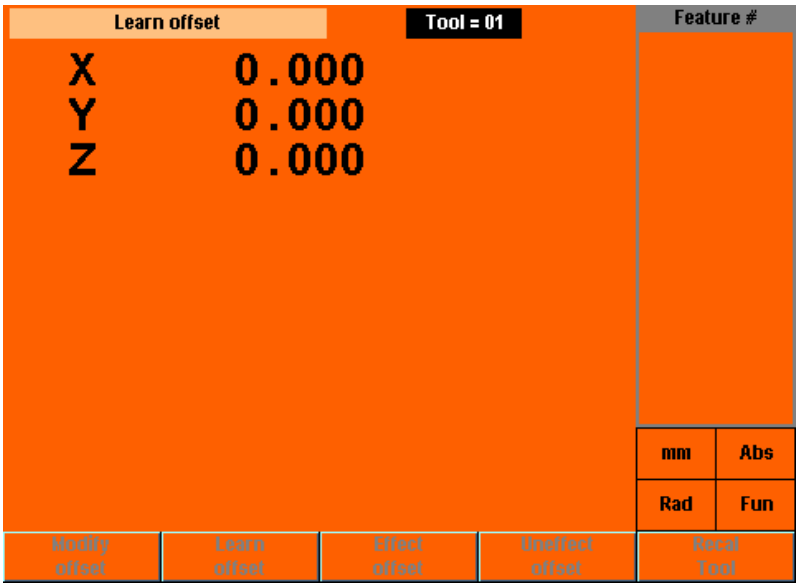
Step 3 Enter the new tool offset value for X, Y or Z axis. Press “Enter” key after each axis value.

Step 4 Modified offset value will be displayed on the screen.

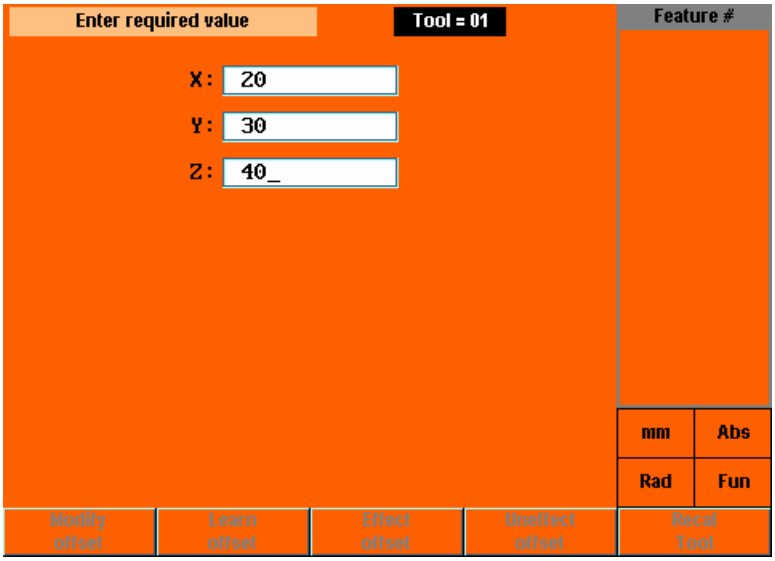
Learn offset

Step1 Press  key.

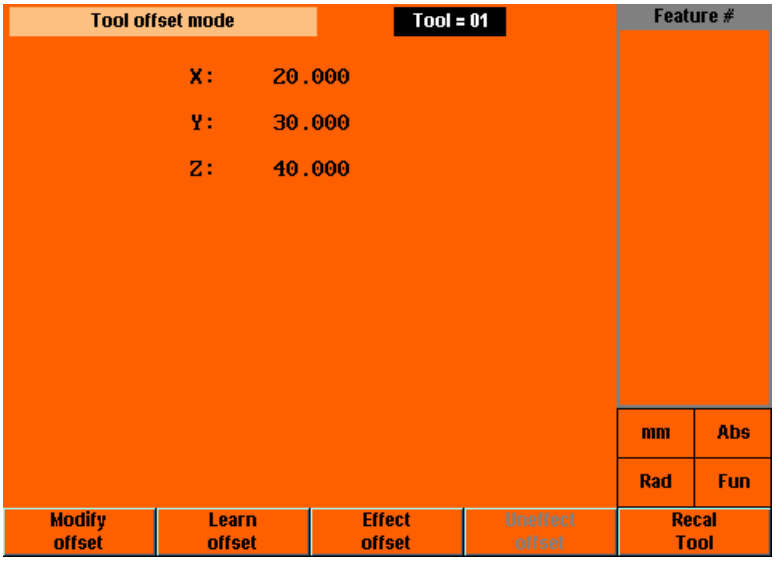
Step 2 Press “Learn offset” soft key.
Following screen shall appears



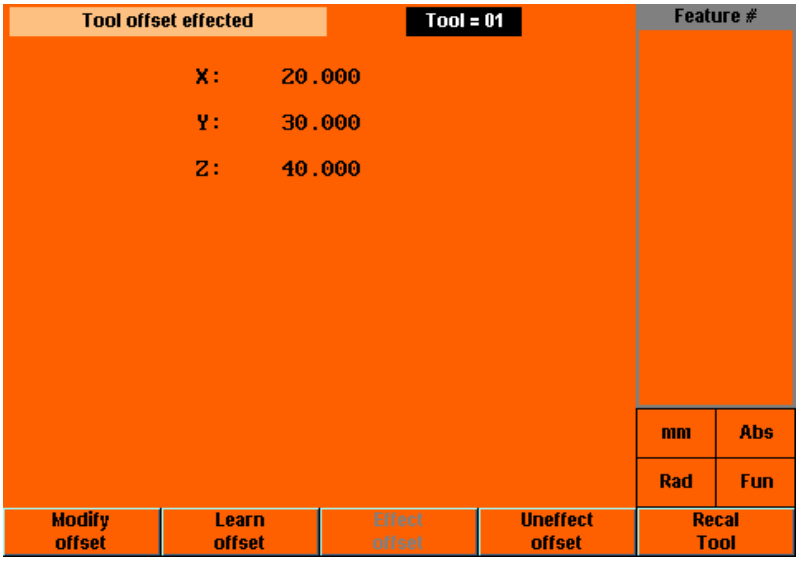
Step 3 Press “Enter” key.
After that enter required value for tool = 01. For example following screen shows enter X= 20, Y= 30, and Z = 40.Press “Enter” key after each value is entered.



Step 4 Now press “enter” key then modified offset value will be displayed on the screen.



Step 5 Press “Effect offset” soft key tool offset is effected.



Step 6 Press “Uneffect offset” soft key tool offset is uneffected.

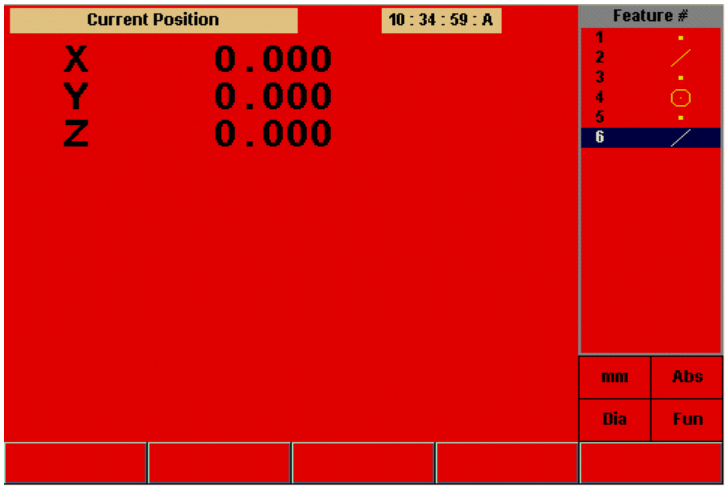
Step 7 Press “Recal tool” soft key then enter the tool number which you have to recall tool.

3.39 Deleting Features

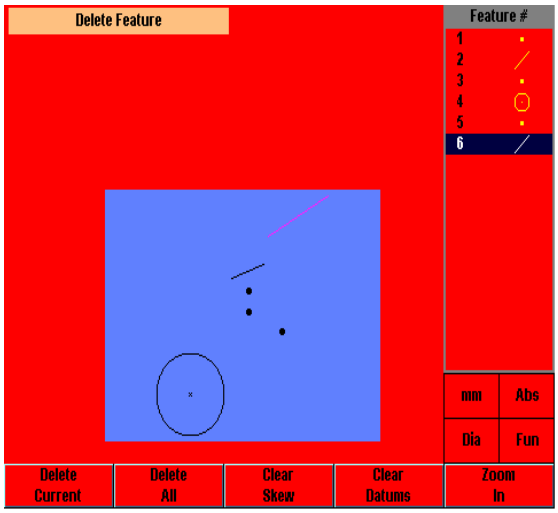
Users can delete features from the features list individually or delete the entire list. Deleted features cannot be restored. Make certain that features are no longer required before deleting them. The Xtreme+ requires users to verify the intent to delete features before actually deleting them

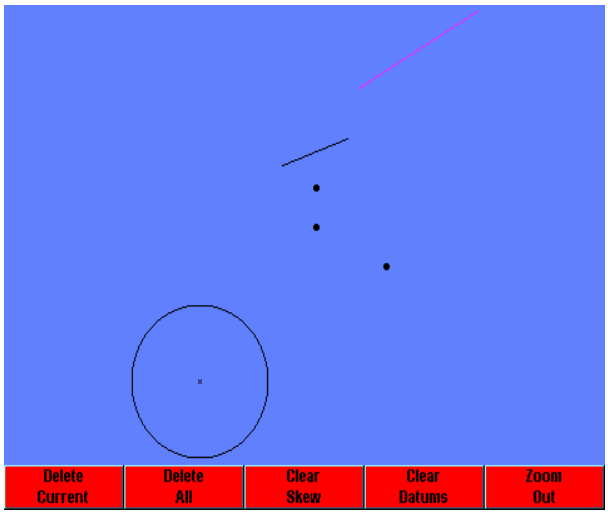
CAUTION
Deleted feature information cannot be restored.

To delete individual features
Step 1 Highlight the desired feature in the feature list using the arrow keys.



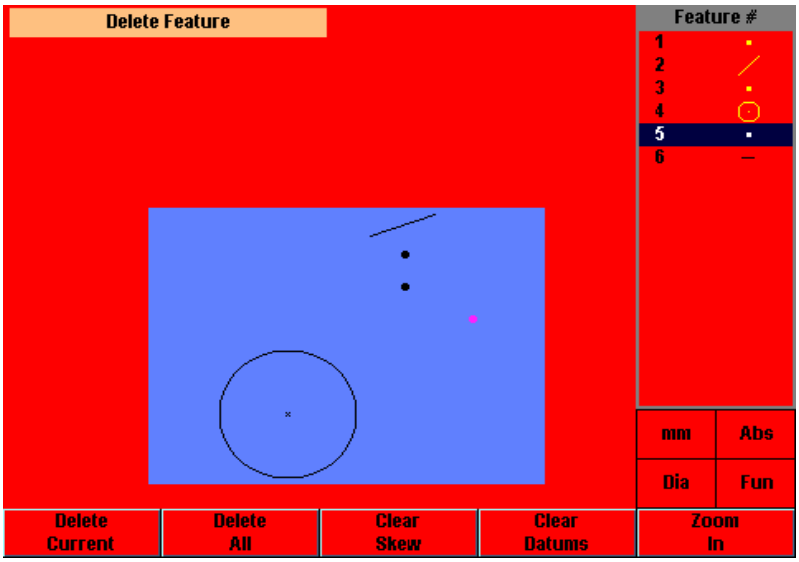
Step 2 Press the *cancel key*.





The above screen appears screen after pressing zoom in soft key
Here feature you have selected to delete is highlighted in
Different, Color presently red.

Step 3 Press the “delete current” soft key to delete selected feature.



Feature 6 is now deleted and feature 5 is highlighted, go to step 3 to delete more

Step 4 Press “quit “key to exit to main menu.

Note: Pressing “delete all” soft key will delete all features in the feature list.

NOTE: Deleting skew feature will remove the skewing effect on the machine coordinates.

Step 5 Press “Clear Skew” soft key will clear all skew.

Step 6 Press “Clear Datum soft key will clear the Datum value.

4.1 Setup

4.2 Before You Begin

Normal day to day use of Data processor Xtreme+ does not require re-configuration of system settings.
Most of the procedures discussed in this chapter are performed during initial installation of the data processor Xtreme+ and are rarely changed. It should be clearly noted that any changes directly affects the operation of the data processor Xtreme+, and shall be changed by properly trained supervisors only.
To prevent unintended or unauthorized changes to the system setup, many setup fields are password restricted. For example, the encoder setup screen is displayed on the left with password restriction.

4.3 Setup Screens

Press the "*MENU" key* and then the "*Setup" soft key* to view setup screens. Use the list on the left-hand side of the screen to select the desired setup screen. Setup Screens on the Xtreme+ are as follows:

- About
- Supervisor
- Sound
- Clock
- Hot keys
- Encoder
- Display
- Ports
- Print
- Appearance
- Miscellaneous
- Forms
- Measurement
- Squareness
- LCF
- NLCF
- SLCF
- Factory set

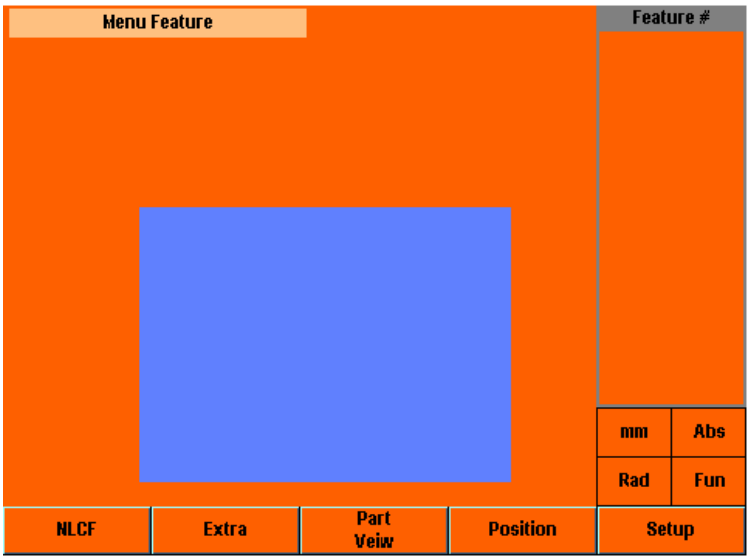
CAUTION

Do not change any Xtereme+ setup screens or fields unless you are certain what the change will do.

4.4 Entering the setup mode:

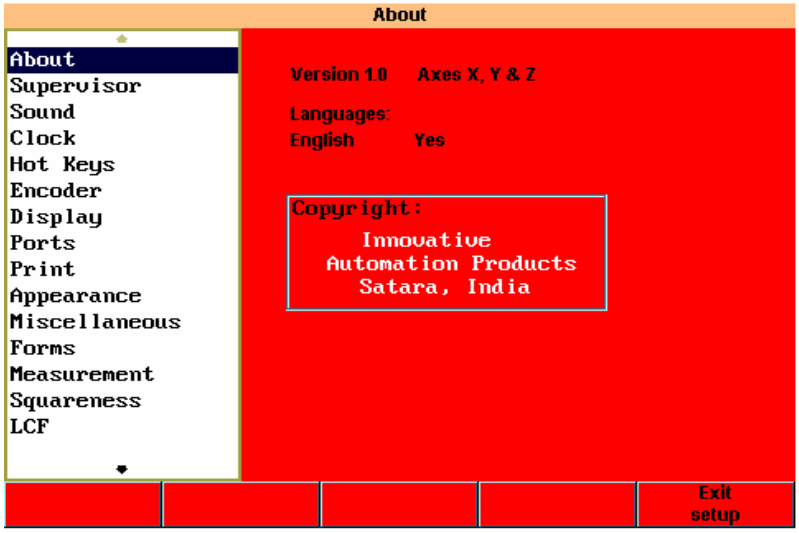
Step 1 Press menu key. 

Following screen appears.



4.5 Supervisor password

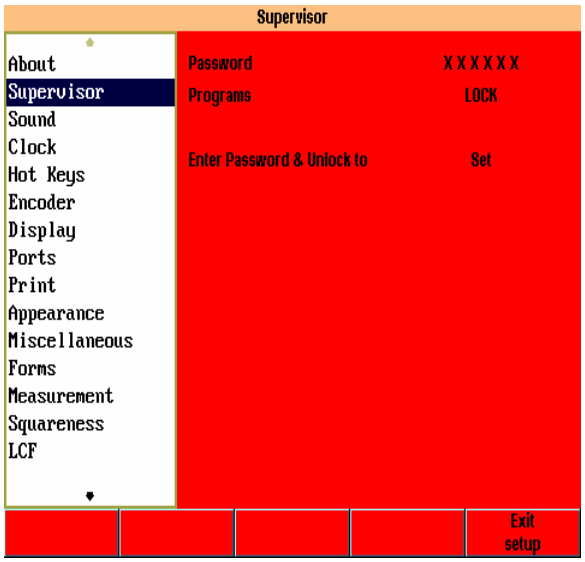
After entering the setup mode (Press setup soft key)
Following screen appears

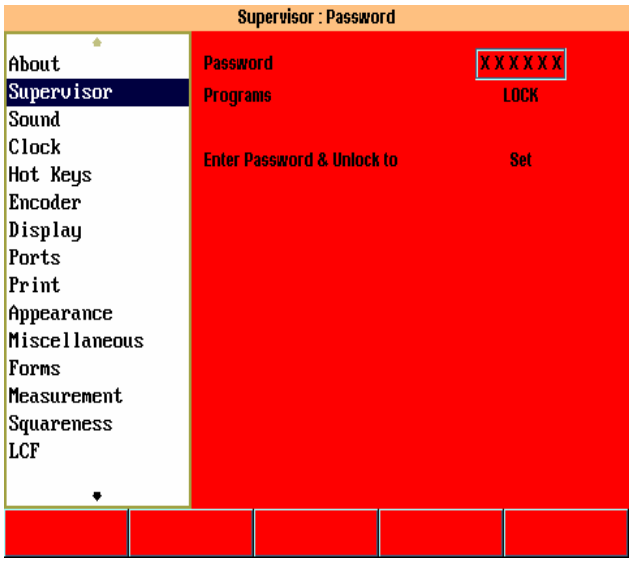


Scroll down using arrow keys to supervisor mode. 

Press right arrow key to got password option. 

Chapter 4 Setup

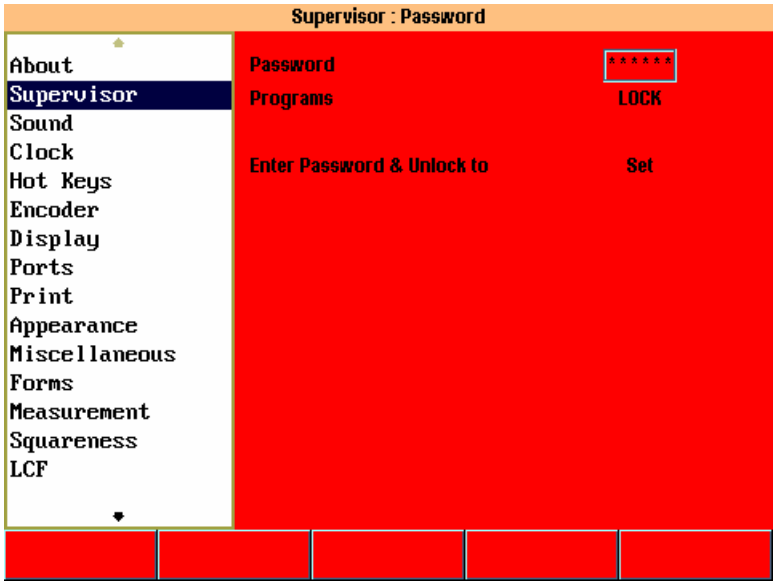




Enter the supervisor password on the supervisor setup screen to access password restricted setup fields. Limit password use to operators or supervisors properly trained to change Xtreme+ settings

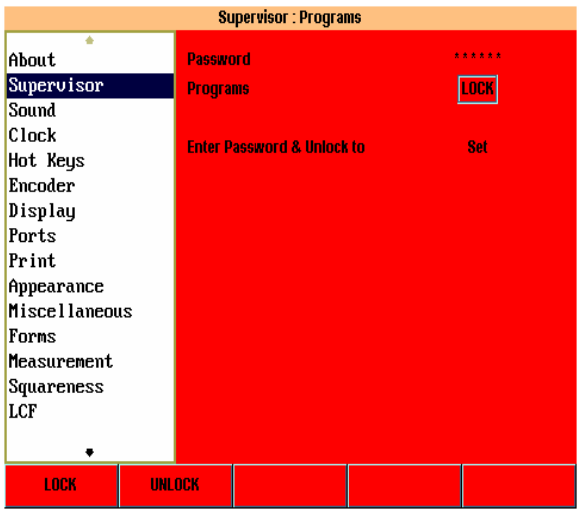
Password is provided to prevent non technical operators from changing the settings like resolution, correction factor etc which could affect the system performance.

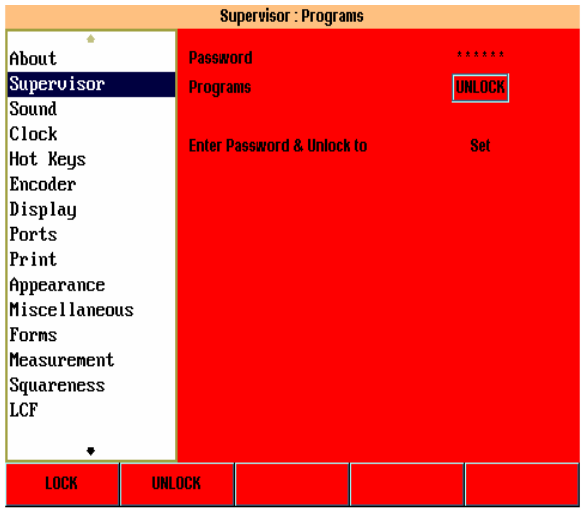
Generally the factory set pass word is “654321”.Enter the password using numeric keys. The password is displayed as stars



Press down arrow key  to come to programs option.

Now the screen is as displayed below



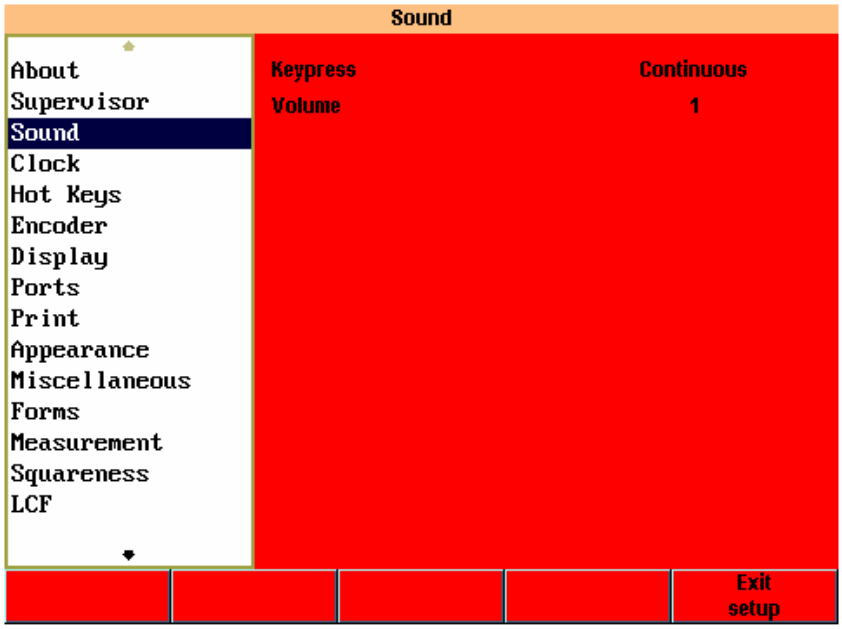


Press unlock soft key to unlock the programs.

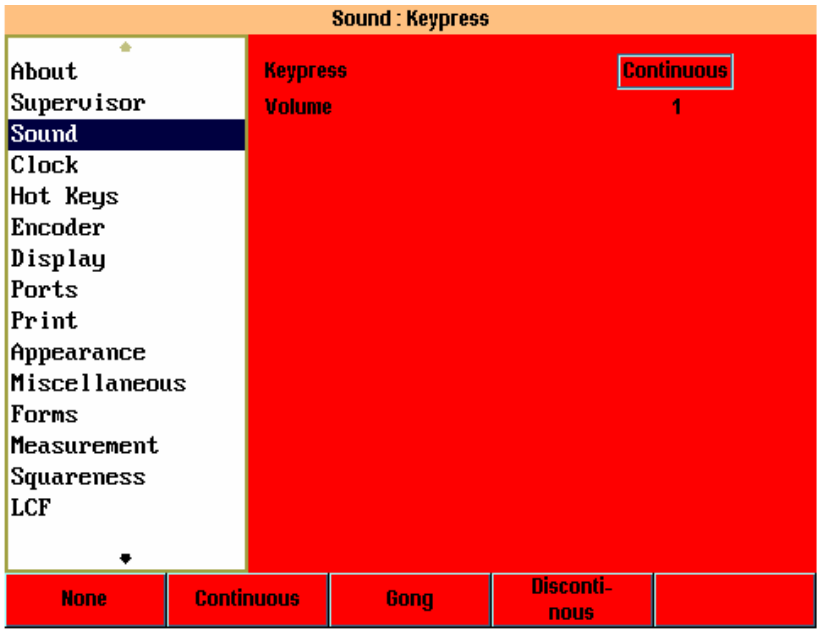
Now you are allowed to change setup menus.

4.6 Sound

Step 1 Xtreme+ has inbuilt audio system that generates different sounds during its operation. When you scroll down to sound menu in setup mode following screen appears.



Step 2 Use right arrow to go to sound menus.

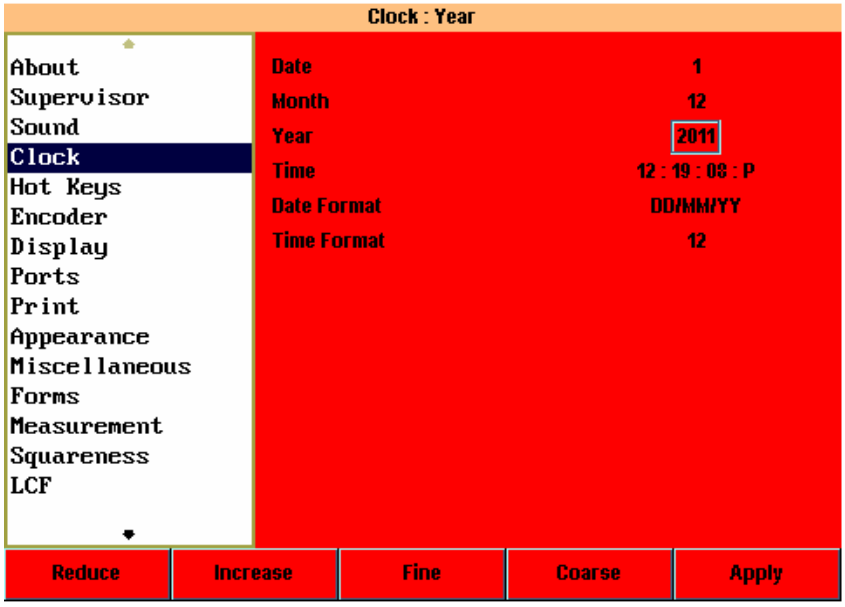


Step 3 Use soft keys to change to different options and down arrow key to select others options in sound menus.

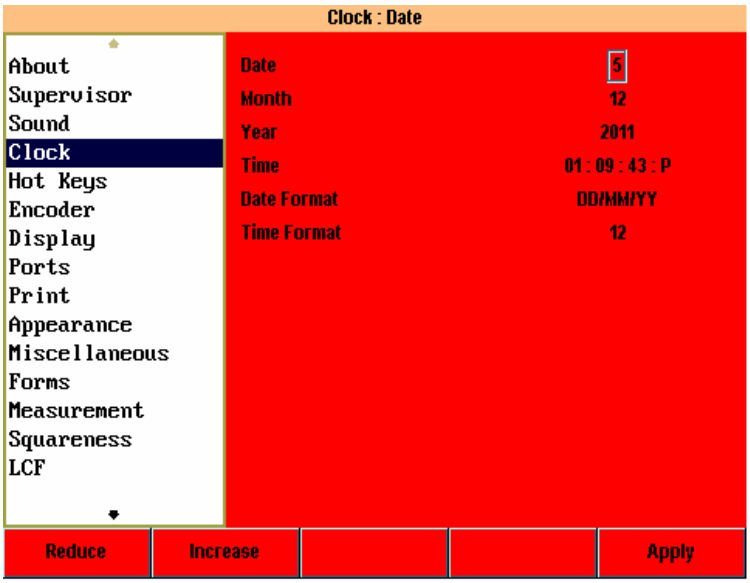
Step 4 Press left arrow key to return to other menu selection list or quit to quit setup.

4.7 Clock

Step 1 Select clock menu using arrow keys.



Step 2 Press the right arrow to enter different options of clock function.



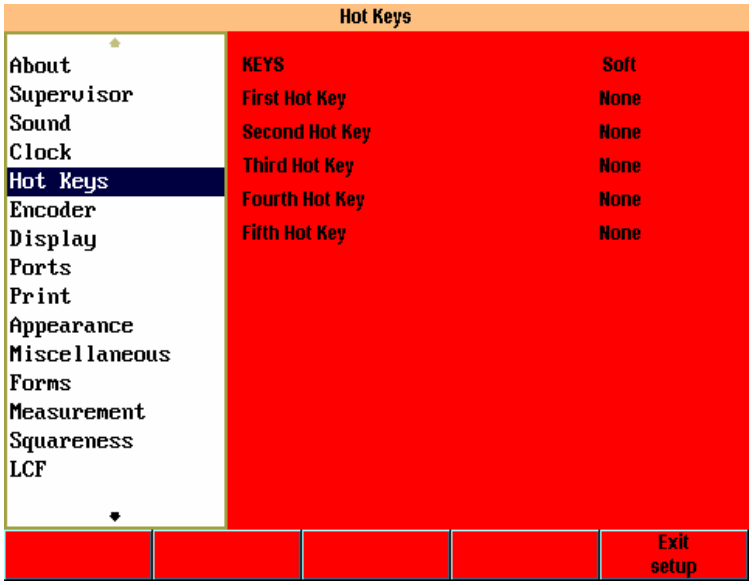
Step 3 Use soft keys to change settings.
Options are very much self explain try and need not need detail explanation

Step 4 Press right arrow to scroll through other options of setup menus or quit to exit setup

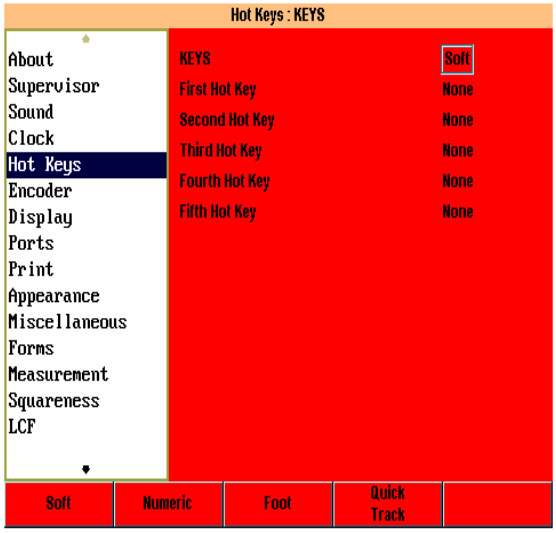
4.8 Hot keys

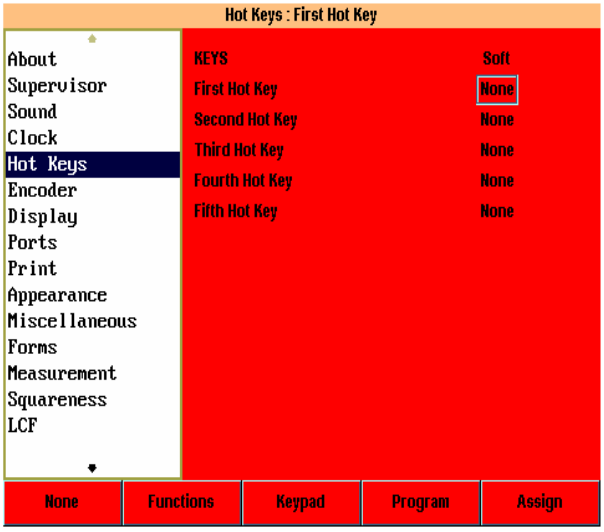
Use the *hot keys setup screen* to save time by assigning common or repetitive tasks as hot keys. For example, it takes four steps to clear all features from the features list. Save three steps by assigning the clear all function as a hot key.

Step 1 Following is the screen for hotkeys menu.



Step 2 Press right arrow key.

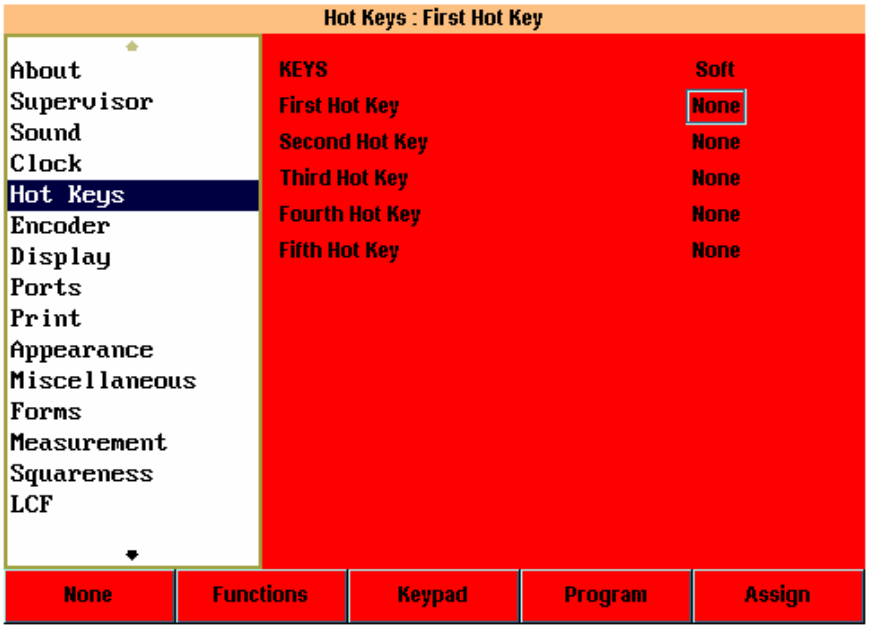




Highlight the keys field as shown.
Assign hot key functions to the following groups of keys:

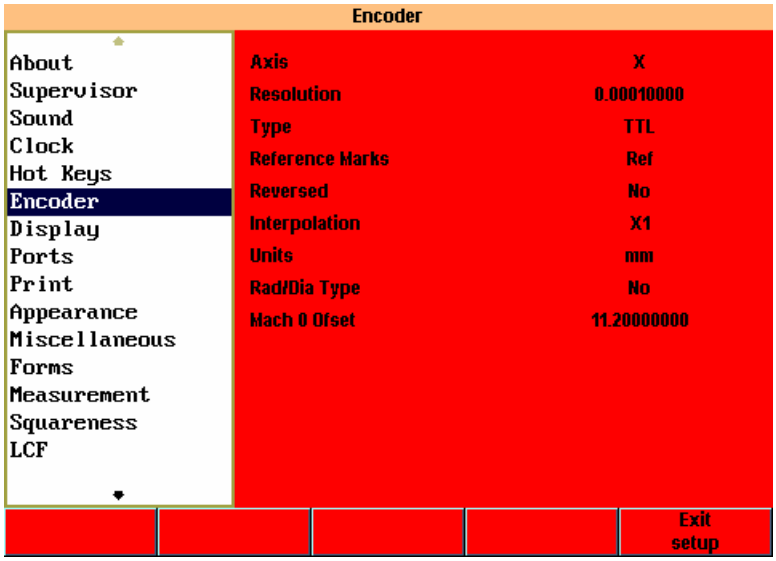
- soft keys
- numeric keys
- foot switch
- quick track keys

Press the *soft key* to assign a hot key function to a soft key button. Press the numeric *soft key* to assign a hot key function to numeric keys 0 through 9. Press the foot soft key to assign a hot key function to foot switch. Press foot switch to assign hot key to quick track keys.
If you select hot keys to soft keys.
Step 1



4.9 Encoders

Highlight the encoder field as shown.



Use the encoder setup screen to define encoder parameters for each axis. Match the resolutions entered on this screen exactly to the resolution printed on your TTL encoders. Resolution of analog encoders is determined by the following method. Multiply the interpolation (selected on this screen) by four and divide the glass pitch by the result. For example, a system with 8 micron pitch glass with an interpolation of X5 is as follows:

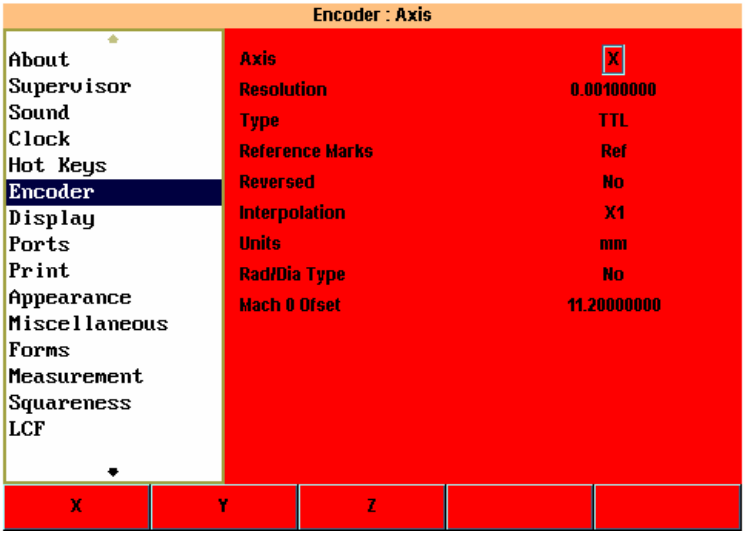
Enter the resolution values carefully; improperly entered resolutions result in inaccurate measurements. If you notice counting errors on a given axis check that the resolution for that axis is entered properly on this screen.

Highlight the type field and select the desired encoder type.

There are two types of encoder interfaces supported by the Xtreme+:

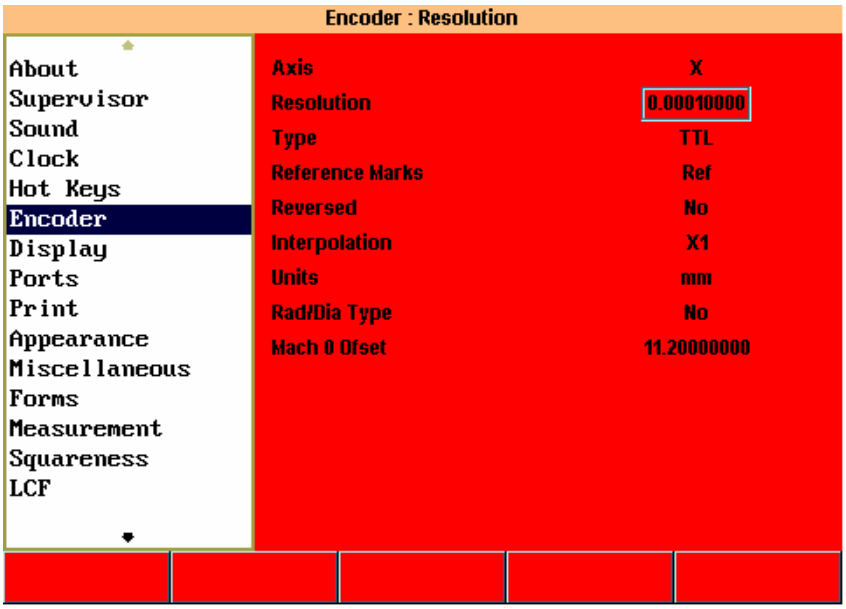
- TTL
- Analog (reserved presently)

Step 1 Select axis for setting initially



Use the soft keys for selecting the axis initially.

Step 2 Use down arrow key to high light resolution field



Here you can change resolution of encoder i.e. per pulse value of the encoder. Use numeric keys to set resolution of encoder. Ensure care while doing the same

Step 3 **TTL mode**
Use arrow keys to high light this option. Presently only TTL mode is active i.e. only TTL type of encoders can be connected to the Xtreme+.

Step 4 **Reference marks**
Highlight the *reference (ref marks) field* and select the desired reference marks. Reference marks are used for *segmented linear correction factor (SLCF)* or *non-linear correction factor (NLCF)*. There are four types of reference marks recognized by the Xtreme+
This is reserved field presently for further use

Step 4 **Interpolation**
Here you can decide weather to divide incoming quadrature signal by X1, X2, X5 or X10. Used if you select scales with sine wave output (1vpp for current o/p scales).

Step 5 **Units**
Press the soft key for the desired units of measure (millimeters or inches) that correspond to the encoder used.

Step 6 **Rad/Dia Type**
You can enable or disable this type you can press Yes or No soft keys.

Step7 **Match zero offset**
Here you can match zero offset by using numeric keypad.

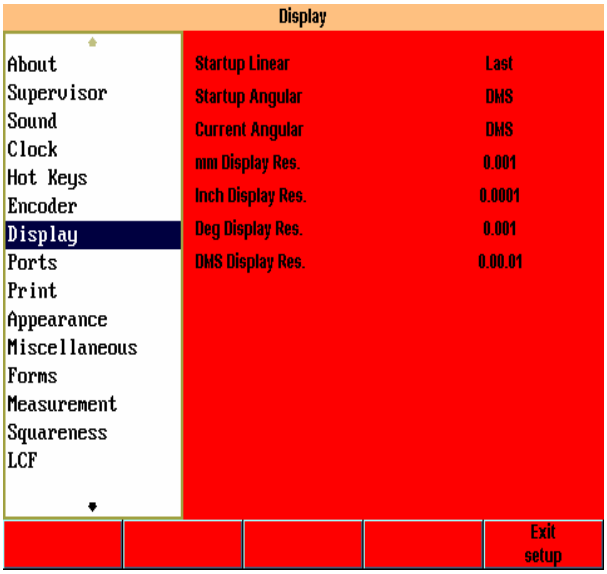
Step7
Use left arrow to go to setup functions, quit to exit setup.

NOTE
Perform the above encoder setup functions for each axis.

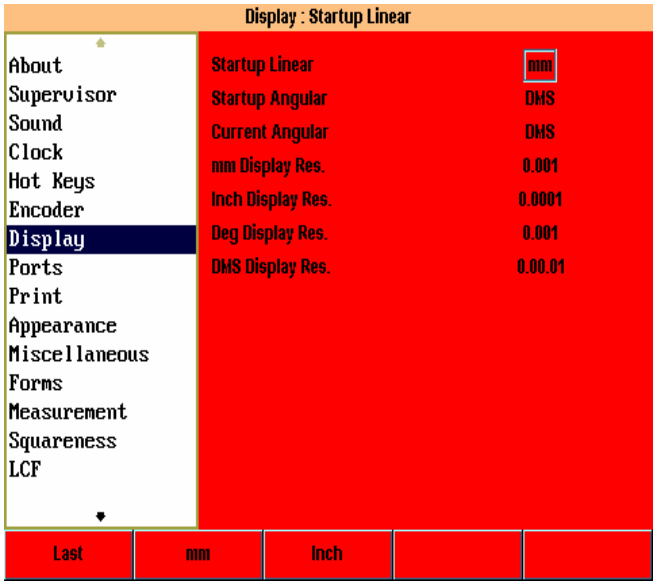
4.10 Display menu

Here you can change display resolution, encoder resolution, resolution for mm, inch for linear and degree minutes seconds or degrees for circular options. Also same settings for startups can be programmed.

Step 1
Initial screen for display option is as



After pressing right  arrow key



Sub option 1

Startup linear
Here you have three options

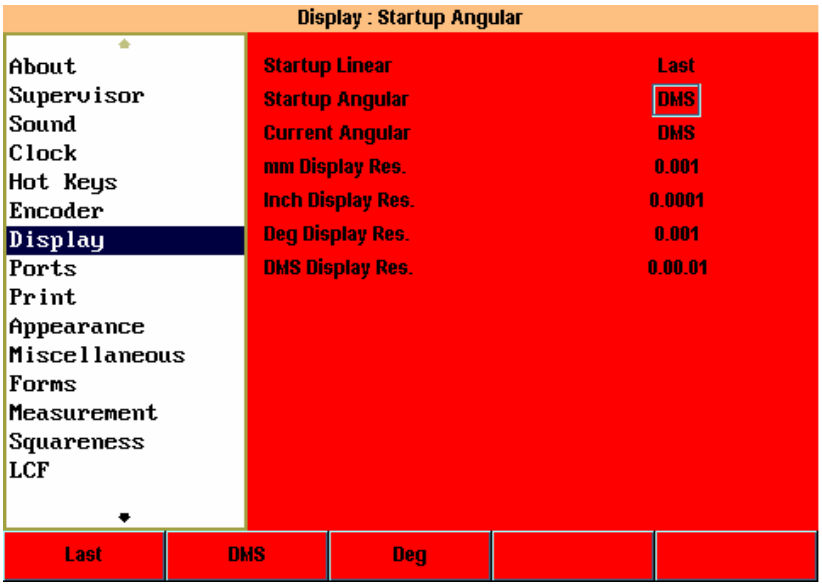
-1 mm: DRO will start in mm mode every time it is turned on
-2 Inch: DRO will start in inch mode every time it is turned on
-3 last: DRO will start in whatever mode (inch/mm) it was before restarting

Use soft keys to select above options

Sub option 2

Startup angular

Step 1
Scroll to startup angular using down  arrow key.

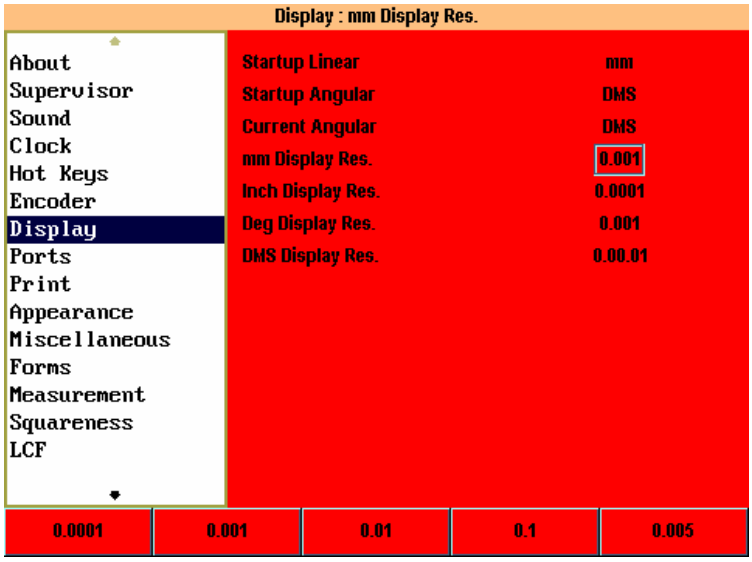


-1 DMS: DRO will start in Degree minute's seconds every time it is turned on
-2 DEG: DRO will start in DEG mode every time it is turned on
-3 last : DRO will start in whatever mode (DMS/Deg) it was before restarting

Use soft keys to select above options
This is used only for rotary axis.

Sub option 3
Current angular
This is same as sub option 2, only the current mode can be changed

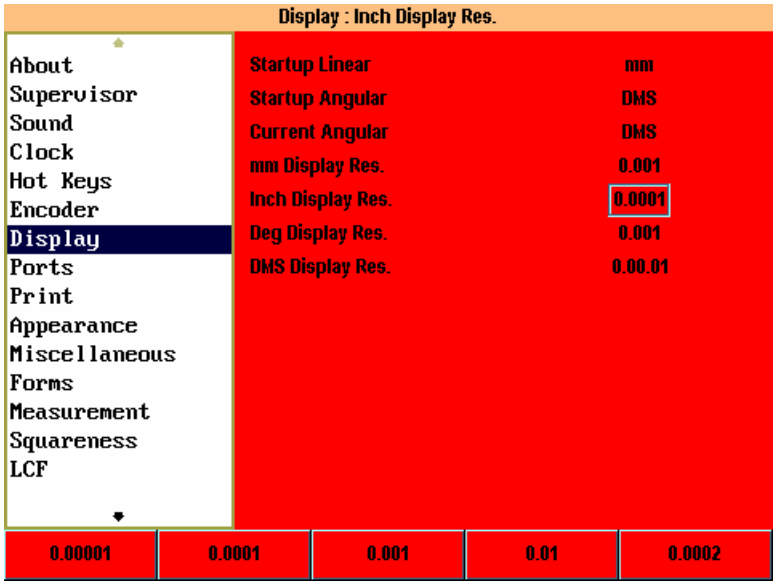
Sub option 4
Select mm display resolution following screen appears



Here soft keys will give you five different options for display resolution in mm mode
The screen itself is self explanatory.

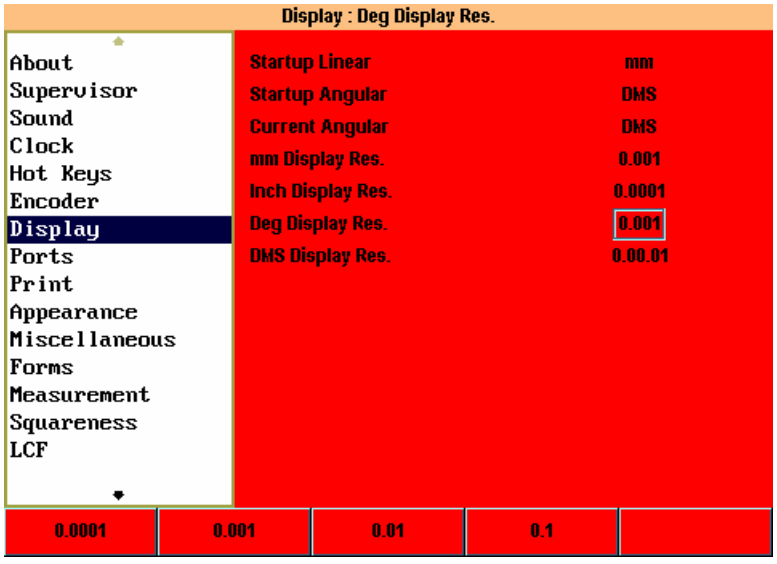
Chapter 4 Setup

Sub option 5
Inch display resolution.
Same as sub option 4 only following screen appears



Here soft keys will give you five different options for display resolution in inch mode
The screen itself is self explanatory.

Sub option 6
Deg display resolution.
Same as sub option 5 only following screen appears



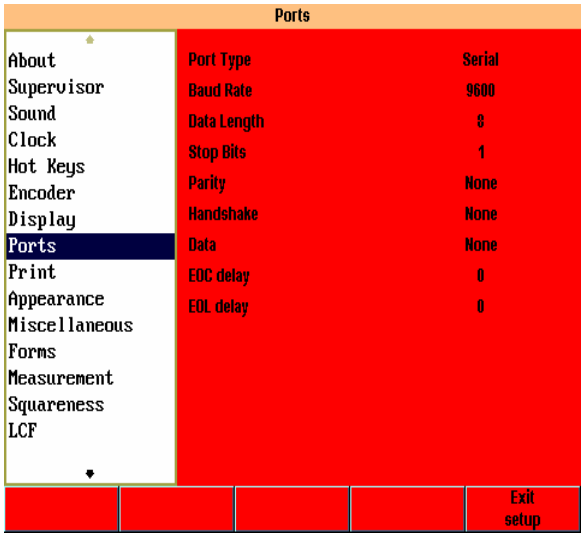
Here soft keys will give you five different options for display resolution in degree mode; i.e no of digits after fraction part can be set.
The screen itself is self explanatory.

Sub option 7
DMS display resolution
Presently have no options, reserved for future use

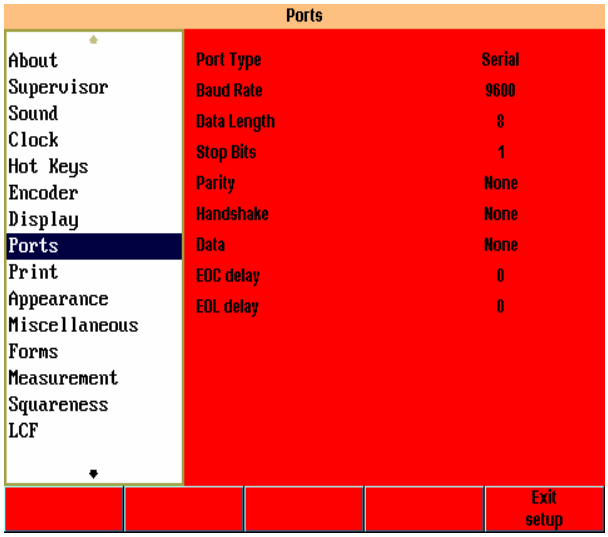
Press left arrow to return to other options of setup menu, quit to exit setup menu

4.11 Ports menu

Step 1
Following screen appears when you select port menu



Step 2
press right arrow key to enter sub menus



Sub menu 1
Port type

Here you have two options

1. serial : standard RS232 port
2. parallel : standard parallel port (presently reserved)

Sub menu 2

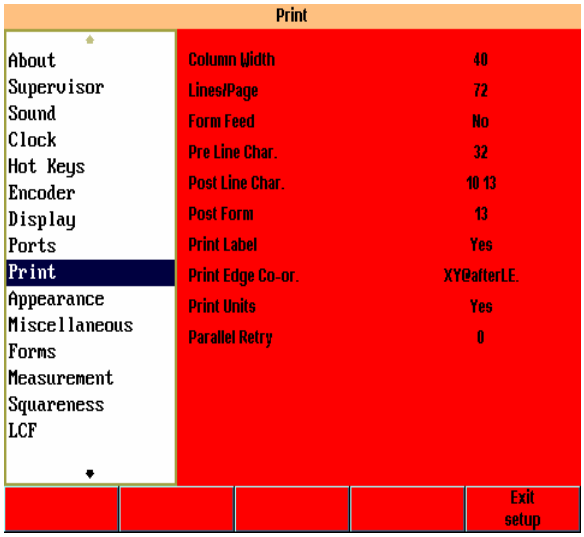
Baud rate

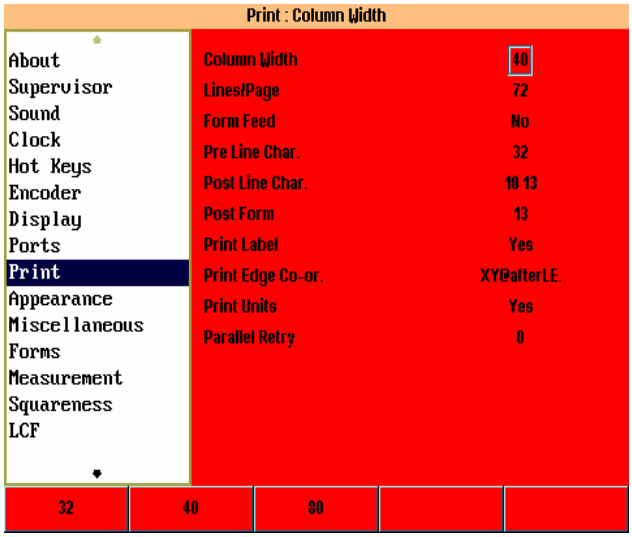
The data processor Xtreme+ is quipped with different baud rates as 300bps, 2400, and 9600 up to 1520bps.Use soft keys for increasing or decreasing the baud rate

Press left arrow to return to other options of setup menu, quit to exit setup menu.

4.12 Print menu

Used to configure the printer related options
Step 1
Following screen appears when you select the print menu, use right arrow key to enter the sub menus





Submenu 1
Column width

This sets the column width for the printer
Use soft keys to have options of 32, 40 or 80 character column width.
Other menus are all self explanatory.
Brief description of other sub menus is as under

Highlight the lines/page field as shown. Enter the desired number of lines per report page. Use a value between 1 and 999 in this field. A typical 8.5 by 11 page contains 60 lines of print.

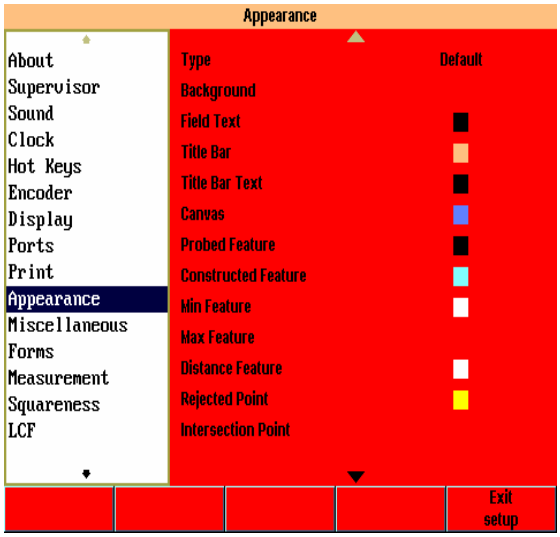
Highlight the form feed field as shown.
Use the yes and no soft keys to toggle on/off the form feed printer command.
Essentially, form feed advances the printer to the top of the next page after printing. This primarily used when printing on pre-formatted forms.

Highlight the *pre line field* as shown.
Use the numeric keypad to enter up to four ASCII key codes. ASCII key codes entered in the *pre line field* occur before each line of print on a report. For example, enter *ASCII key code 32* to insert a space before each line of print.

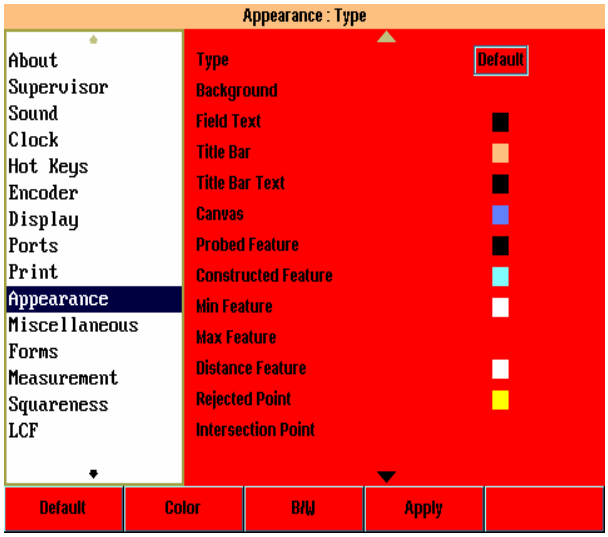
4.13 Appearance menu

This is a menu is used to change the colours of the lcd and different fields present on it. The beauty of DRO is that it has a built in color graphics display which makes the use of functions and there presentation more attractive and user friendly. Following is the screen that appears

When you select this menu



Enter right arrow to enter sub menus

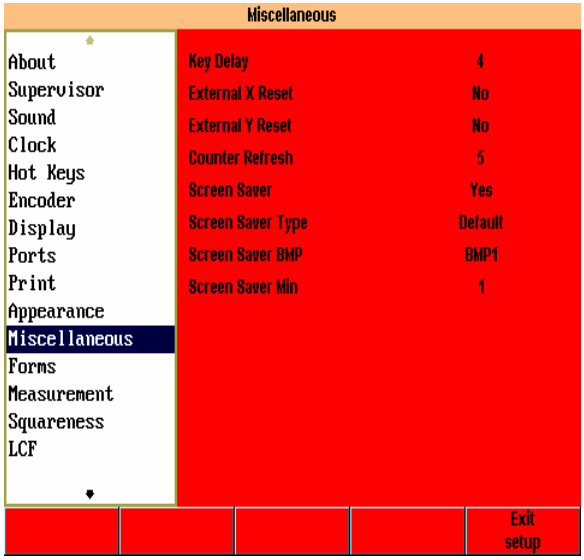


Changing colors is self explanatory and easy.
Press left arrow to return to other options of setup menu, quit to exit setup menu

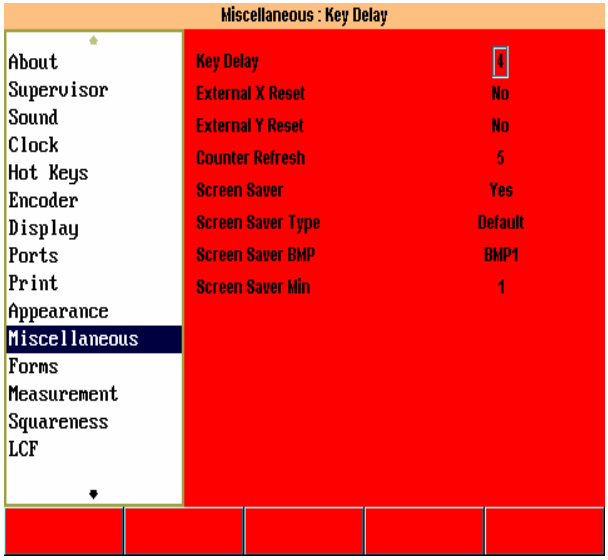
4.14 Miscellaneous menu

This menu is used to set different settings related to screensavers, counter refreshing etc

Initial screen looks as



Press right arrow



Here you have different sub menus as stated below. Use soft keys to change sub menus settings.

1. Key delay- presently reserved
2. External reset X-reserved
3. External reset Y -reserved
4. Counter refresh – time in millisecond (4*1000) the count is refreshed on the screen. Reduce time if you want immediate feedback of count changed on the screen
5. Screen saver type- There are two options, first is default factory programmed screen no saver or one of 4 selected from sub menu no 6

Default screen saver

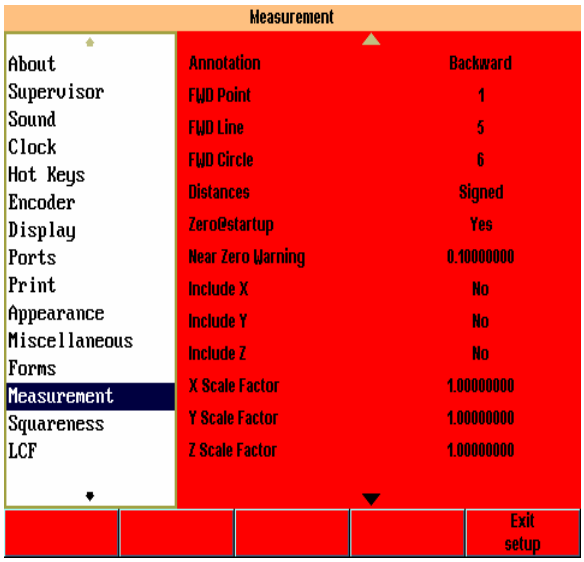
6. Screen saver bmp – 4 different screen savers can be set. these are to be downloaded initially
7. Screen saver min- time after which screen saver shall be active.

4.15 Forms menu

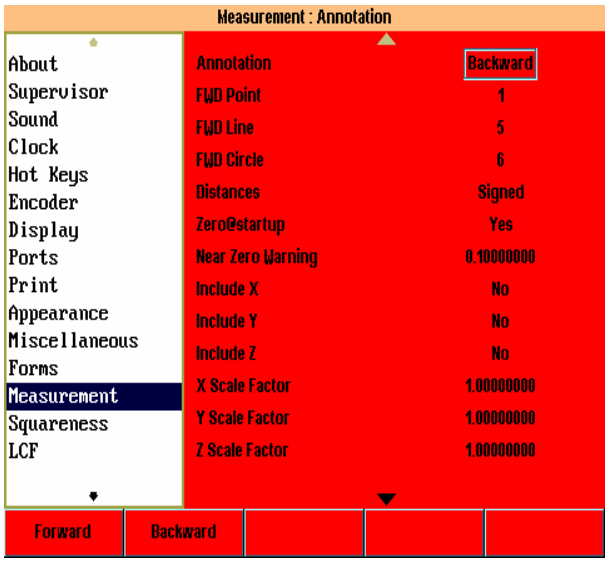
This is a reserved menu presently.

4.16 Measurement menu

Initial screen is



Press right arrow for selecting sub menus

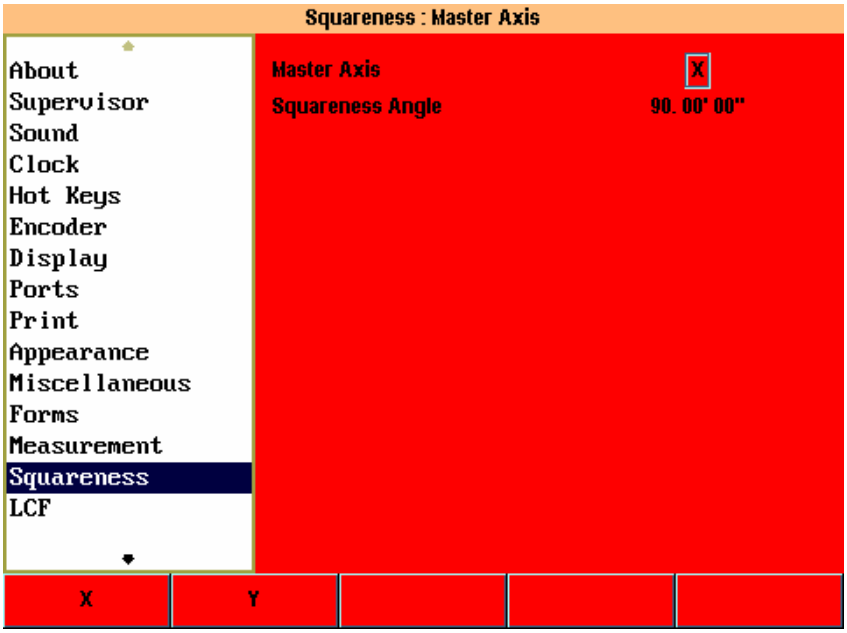


In all there are 14 sub menus
Use soft keys to change sub menu options

1. Annotation- change between forward and backward annotation (described earlier)
2. Fwd point – no of points for backward annotation for point feature
3. Fwd line – no of points for backward annotation for line feature
4. Fwd circle – no of points for backward annotation for circle feature
5. Distance - you can set distances as signed of absolute.
6. zero @ startup - weather to set count (X, Y, Z) to zero during startup or not
7. Near zero warning – set reading near to zero by using numeric keypad
8. Include X – If you can include or not include X axis value.
9. Include Y – If you can include or not include Y axis value.
10. Include Z – If you can include or not include Z axis value.
11. X Scale Factor – You can set scale factor of X axis by using numeric keypad.
12. Y Scale Factor – You can set scale factor of Y axis by using numeric keypad.
13. Z Scale Factor – You can set scale factor of Z axis by using numeric keypad.
14. Probe diameter – You can set probe diameter of X axis by using numeric keypad.

4.17 Square ness Menu:

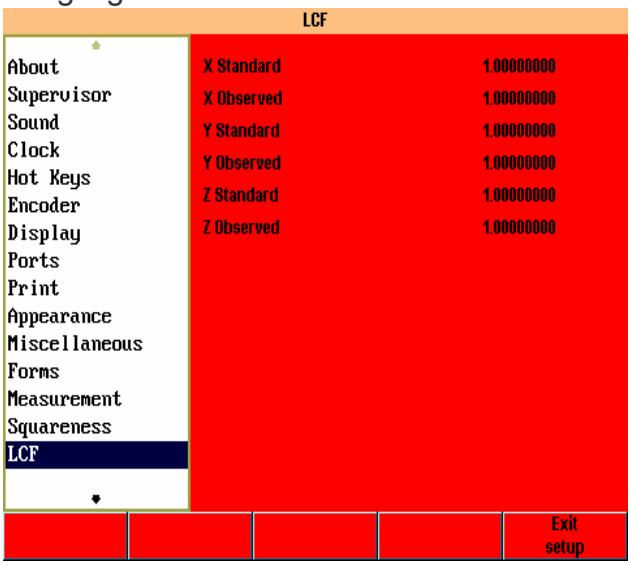
Use the *square ness menu* to compensate for small machine errors between the X and Y axes. Following screen appears on selecting the menu.
Use quit key to exit to main menu.

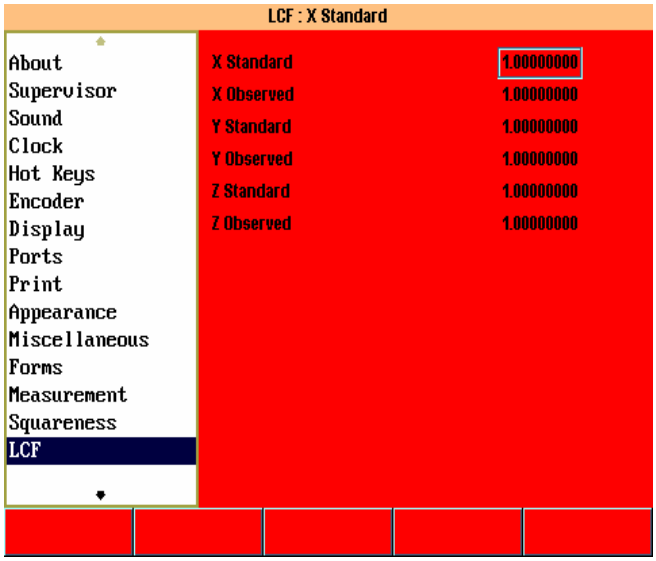


4.18 Lcf menu:

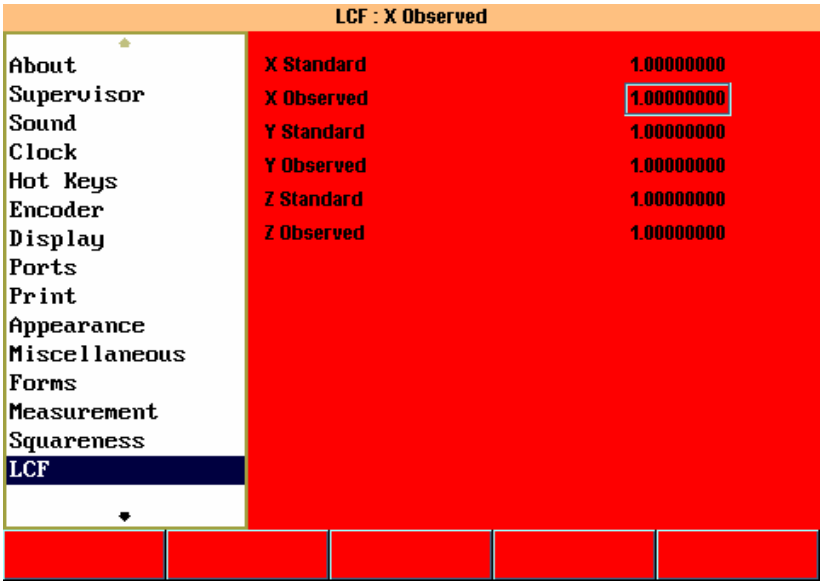
This is linear correction factor menu, i.e. linear error compensation menu.
This menu is used whenever there is any error in measurement due to error in machine tool you are using.

Highlight the Lcf field as shown.





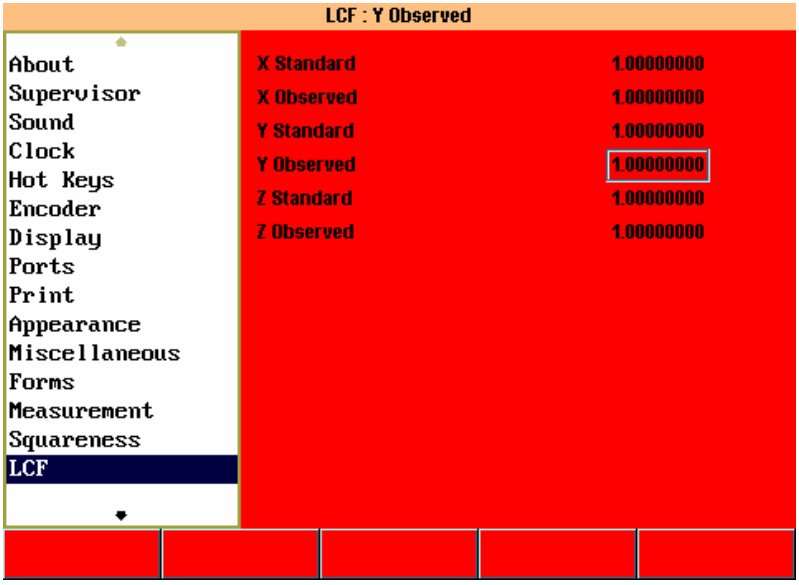
Use LCF to compensate for encoder and machine travel variations. Highlight the *X standard field* as shown. Use the numeric keypad to enter the nominal value of a point on the X axis of the standard. For example, if the scale on the standard indicates 1mm, enter 1mm in the *X standard field*.



Highlight the *X observed field* as shown above.
Use the numeric keypad to enter the actual value of the point as shown on the X axis DRO display.
Highlight the *Y standard field* as for X axis.

Use the numeric keypad to enter the nominal value of a point on the Y axis of the standard. For example, if the scale on the standard indicates 10 mm, enter 10 mm in the *Y standard field*.
Highlight the *Y observed field* as shown.

Use the numeric keypad to enter the actual value of the point as shown on the Y axis DRO display.



To setup linear error correction

Step 1 » Place a glass standard on the measuring device.

Step 2 » Zero the X and Y axes on the standard's datum.

Step 3 » Move the crosshair to the desired point on the X axis.

Step 4 » Record the X axis result on a piece of paper.

Step 5 » Move the crosshair to the desired point on the Y axis.

Step 6 » Record the Y axis result on a piece of paper.

Step 7 » Press the *menu key*.

Step 8 » Press the *setup soft key*.

Step 9 » Highlight the *Lcf field* as shown.

NOTE
Use the arrow keys to highlight the desired field.

Step 10 » Highlight the *X standard field* as shown and enter the nominal value of the point on the X axis of the standard.

Step 11 » Highlight the *X observed field* as shown.

Step 12 » Enter the actual value of the point as recorded from the X axis DRO display.

Step 13 » Highlight the *Y standard field* as shown and enter the nominal value of the point on the Y axis of the standard.

Step 14 » Highlight the *Y observed field* as shown and enter the actual value of the point as recorded from the Y axis DRO display. .

Step 15 » Press the *finish key* twice.

Linear correction factor (Lcf) setup is complete. The Lcf correction coefficient is applied to all subsequent measurements.

4.19 Factory set menu:

This mode is used initially during applying power to Xtreme+ for the first time or if DRO behaves in a erratic wave due to power disturbances, this happens as the memory inside gets corrupted due to noise on the power line.

Note: Factory setting will restore DRO to factory options, this destroys your correction factors and all other settings done by the operator.

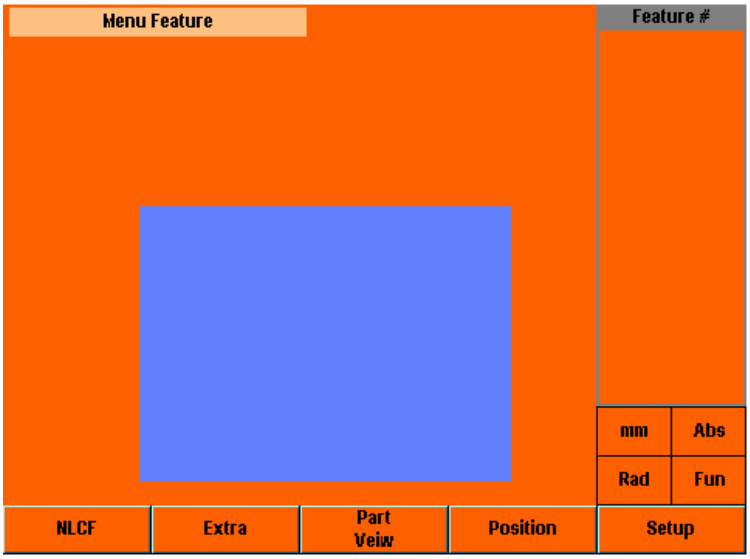
4.20 NLCF – Non linear correction factor

The non linear correction factor is used to find out counting error in machine. It can be evaluate by using this function machine. This function is only available on the reference marks scales. If you want to defined non linear correction factor then it will be applied to the reference marks of scale have been crossed.

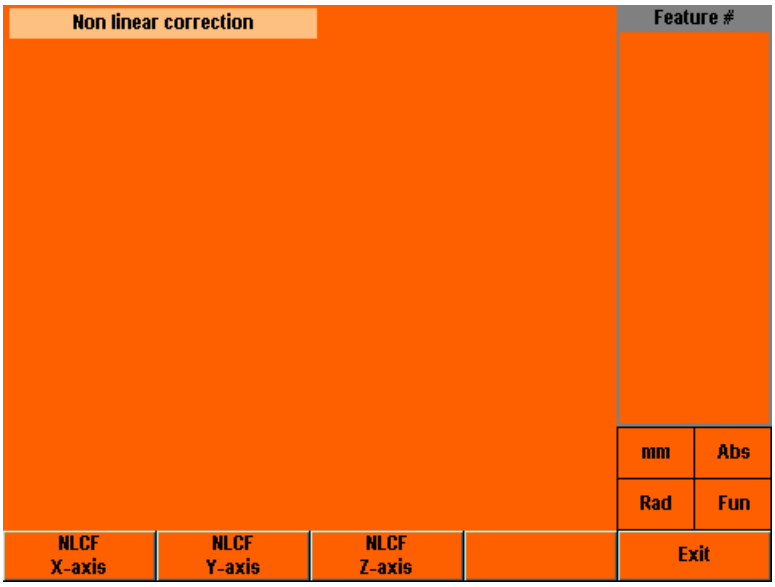
This function should be applied, if the results of scales are compared with reference standard show an alternating or oscillating deviation. It should be required correction value are calculated and modified value is entered.
If you apply this function, errors can be reduced and increases it's accuracy.

Step 1 Press menu key. 

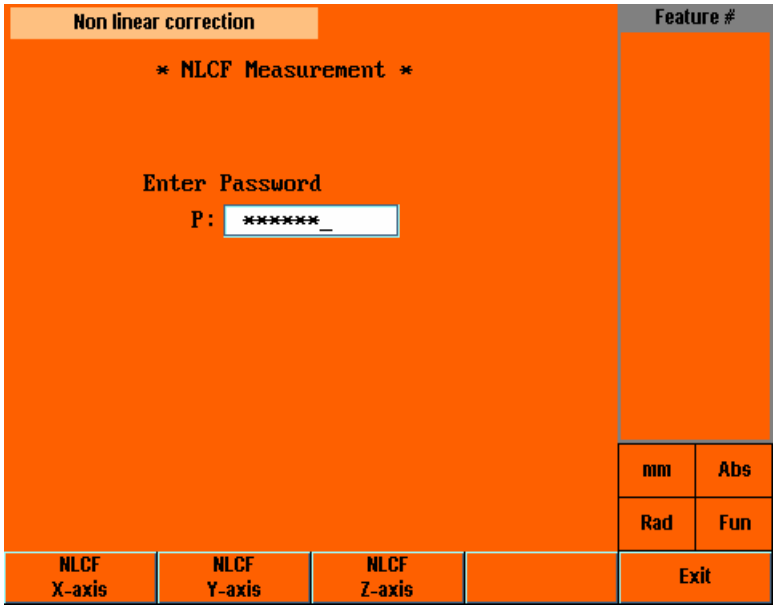
Following screen appears.



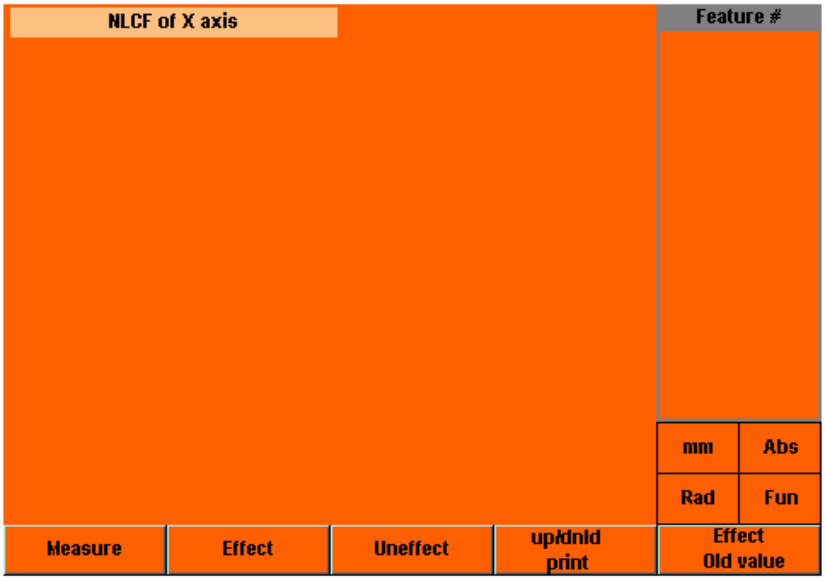
Step 2 Press “NLCF” soft key.
Following screen shall appear



Step 3 Press “NLCf X- axis” soft key.
Following screen shall appear

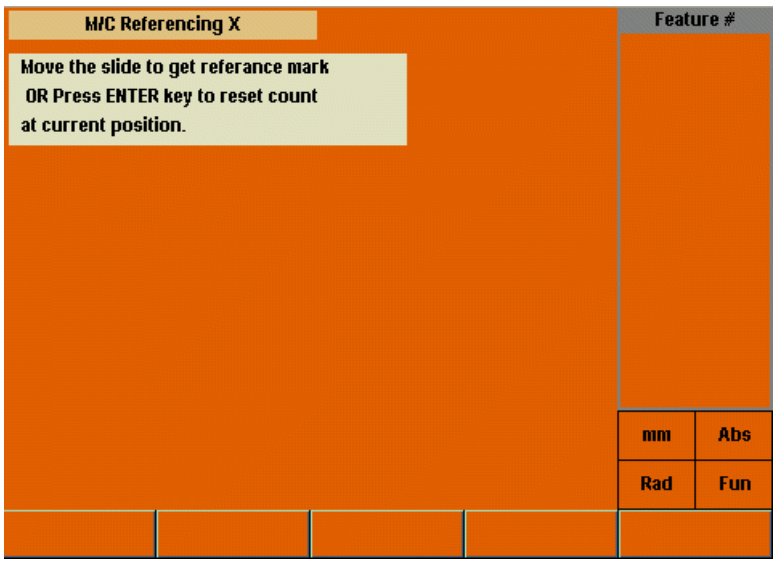


NLCF password is “******”
Enter the password using numeric keys. The password is displayed as stars
Now following screen shall appear



Step 4 Press Measure soft key.

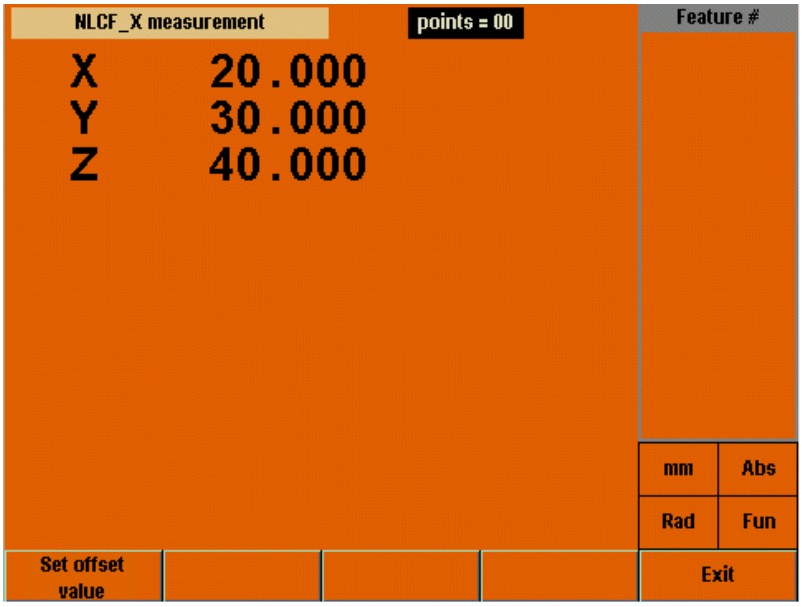
Following screen shall appear



This is very important as the nonlinear corrections are completely referenced and activated after achieving a machine reference. Move the slide to get reference mark or press enter key to reset count at current position then M/C referencing is done.

Step 5 Press “Quit” key.

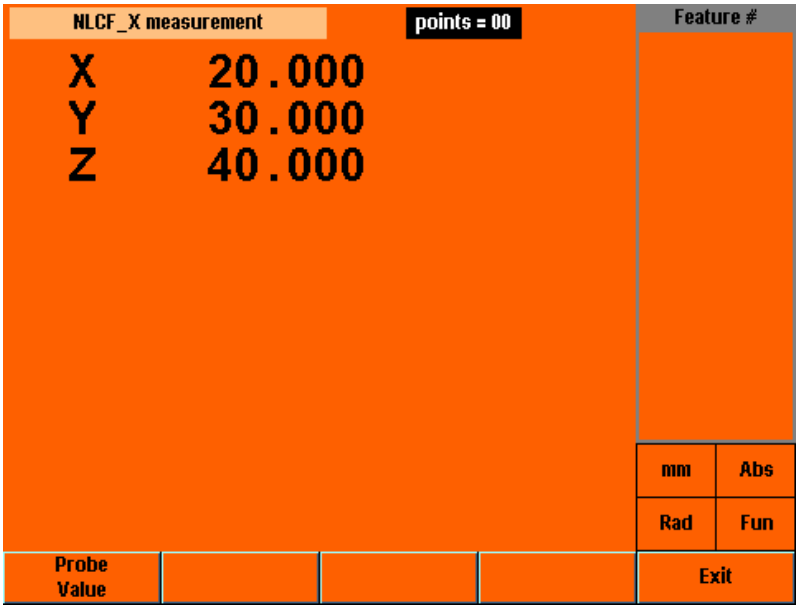
Now following screen shall appear



Step 6 Press “Set offset value” soft key.

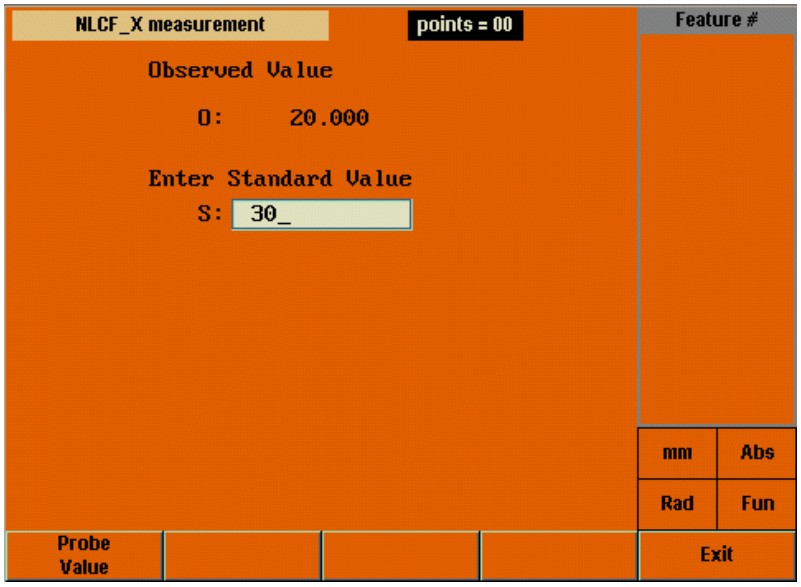
Set offset value then press “Enter” key.

Following screen shall appear



Step 6 Press “Probe Value” soft key.
After that probe value of points = 00 then press “Enter” key.

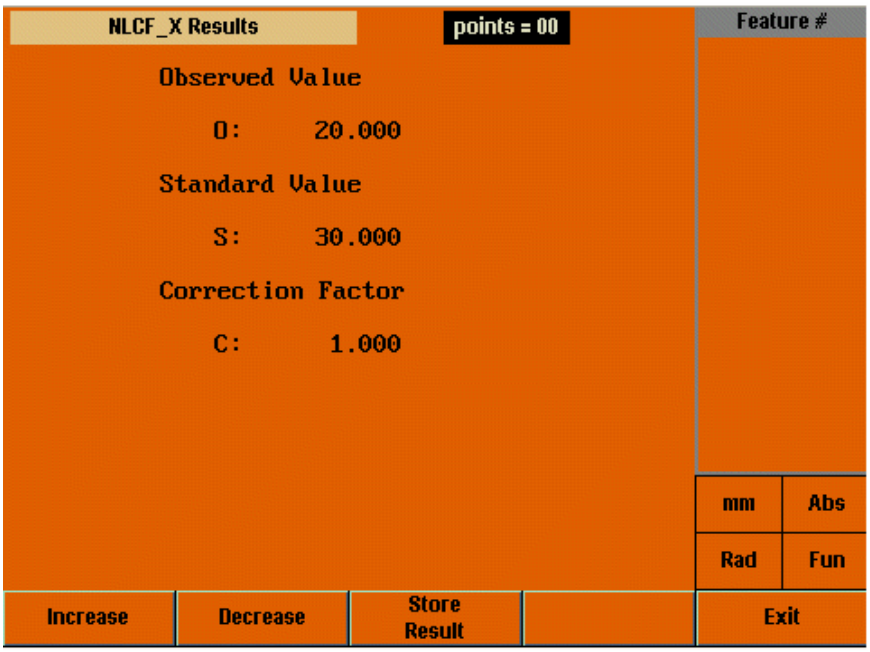
Enter standard value by using numeric keypad. E.g. standard value = 30
Following screen shall appears



Step 7 Press “Enter “key. Now probe value of points = 01 then press enter key

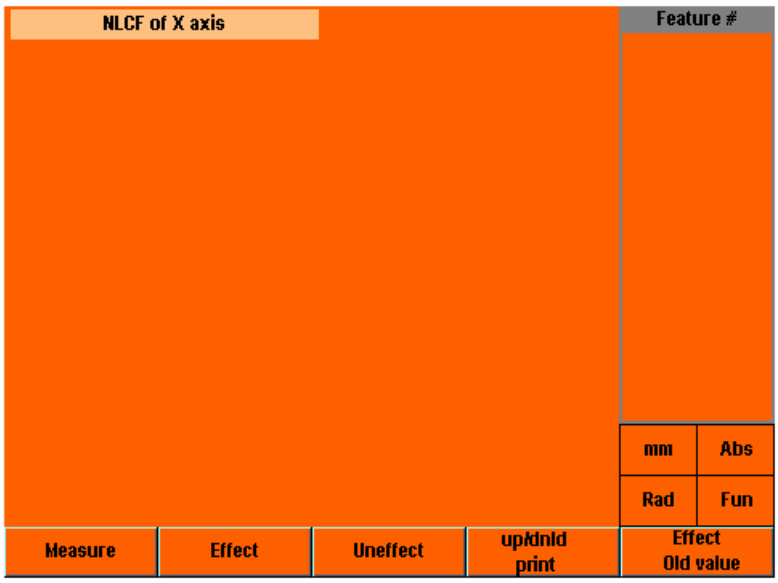
Step 8 Press “Finish” key.

NLCF_ X results are displayed on the following screen.



Step 9 Press “Store Result” soft key NLCF results are stored.

Step 10 Press “Exit” soft key to exit this function and go to main screen



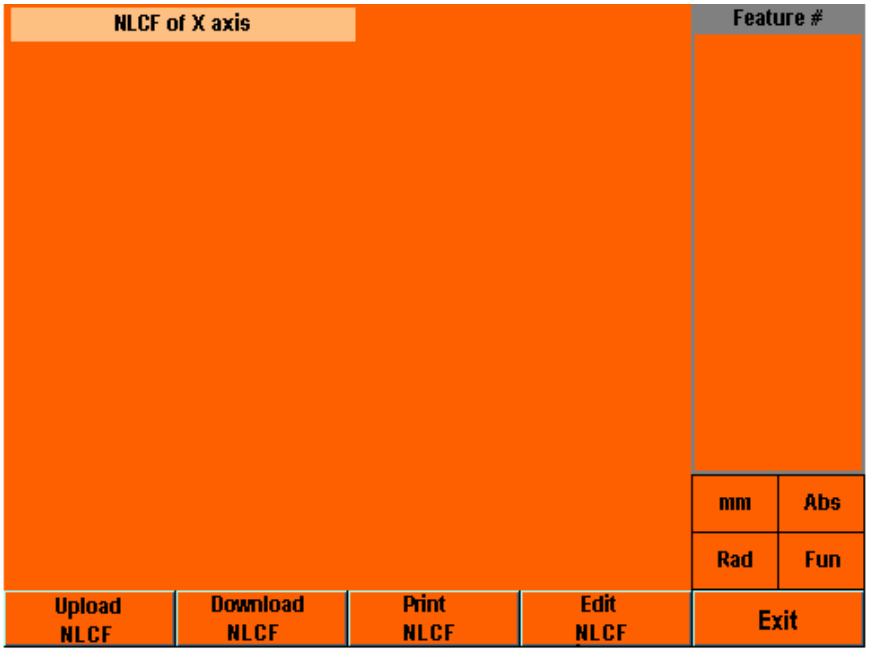
Step 11 Press “Effect” soft key. NLCF will be effected.

Step 12 Press “Uneffect” soft key. NLCF will be uneffected.

Step 12 Press “Effect Old value” soft key, NLCF is effected for old value.

Step 13 Press “up/dnld print” soft key.

Following screen shall appears



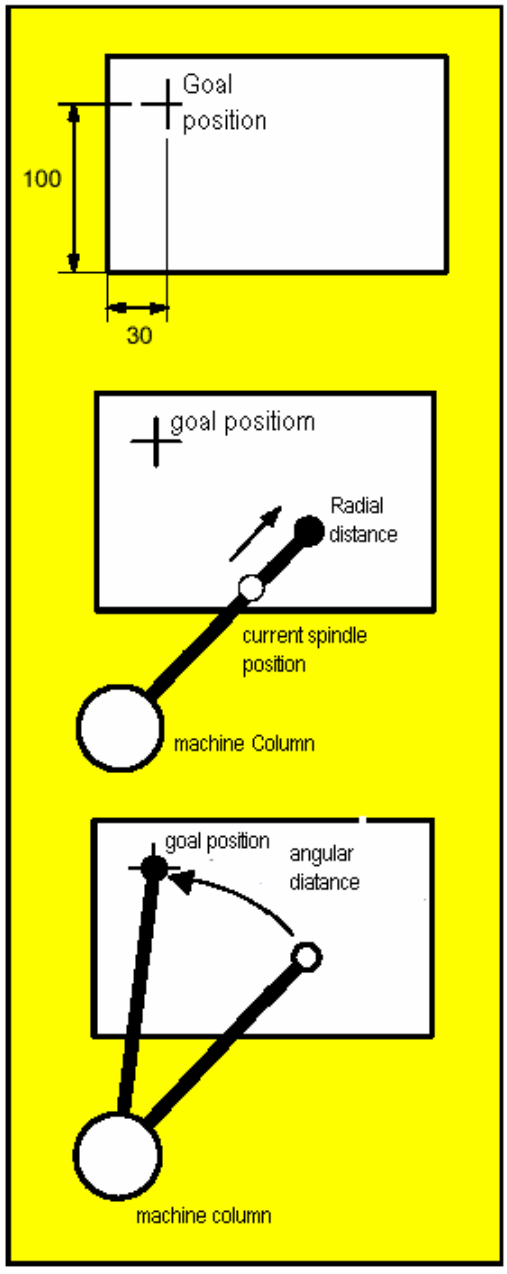
NLCF is transfer to computer by connecting serial cord between height master controller & computer.

- Press “Upload NLCF”, NLCF is uploaded.
- Press “Download NLCF”, NLCF is downloading.
- Press “Print NLCF”, NLCF results printed.
- Press “Edit NLCF”, NLCF is edit.

In this way you can set NLCF of X axis
To set NLCF of Y & Z axis as per procedure of NLCF X axis. Only select axis as per requirement

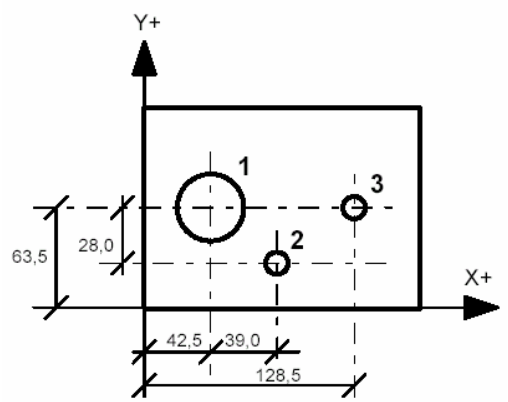
4.21 Positioning (Zero approaching).

XY-drilling coordinates -
With the positioning function you are able to work in either absolute or incremental XY drawing because it is easy to go to the target null position.
When you enter the target position (drill co-ordinates) as XY position, the counter calculates the path from the current position to the target position (goal position).
Now when you are approaching the goal i.e. zero position the remainder coordinates are not only shown as the XY values but also as a radius i.e. length to move the radial and in angle remain to rotate the arm. It goes into the down counting mode.



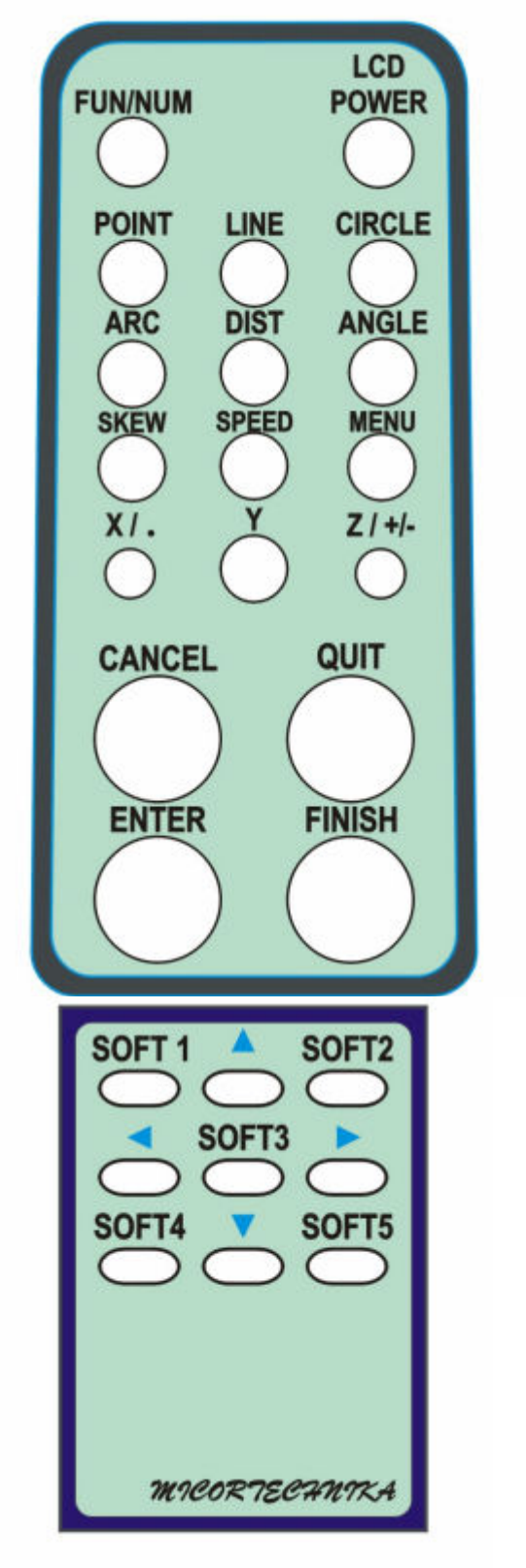
At first move the radius arm steadily to get the zero position on the display of RADUIS axis.
Then rotate the ARM so that the angle showed on display (A) should become zero.
Now lock the both the axis and do the drilling process.
During the positioning you can change the display mode by pressing XY/RA and INC/ABS buttons.

EXAMPLE



Dimensions of Bores 1 and 3 are absolute from reference-edges and bore 2 is in increment- measurement mode from bore 1

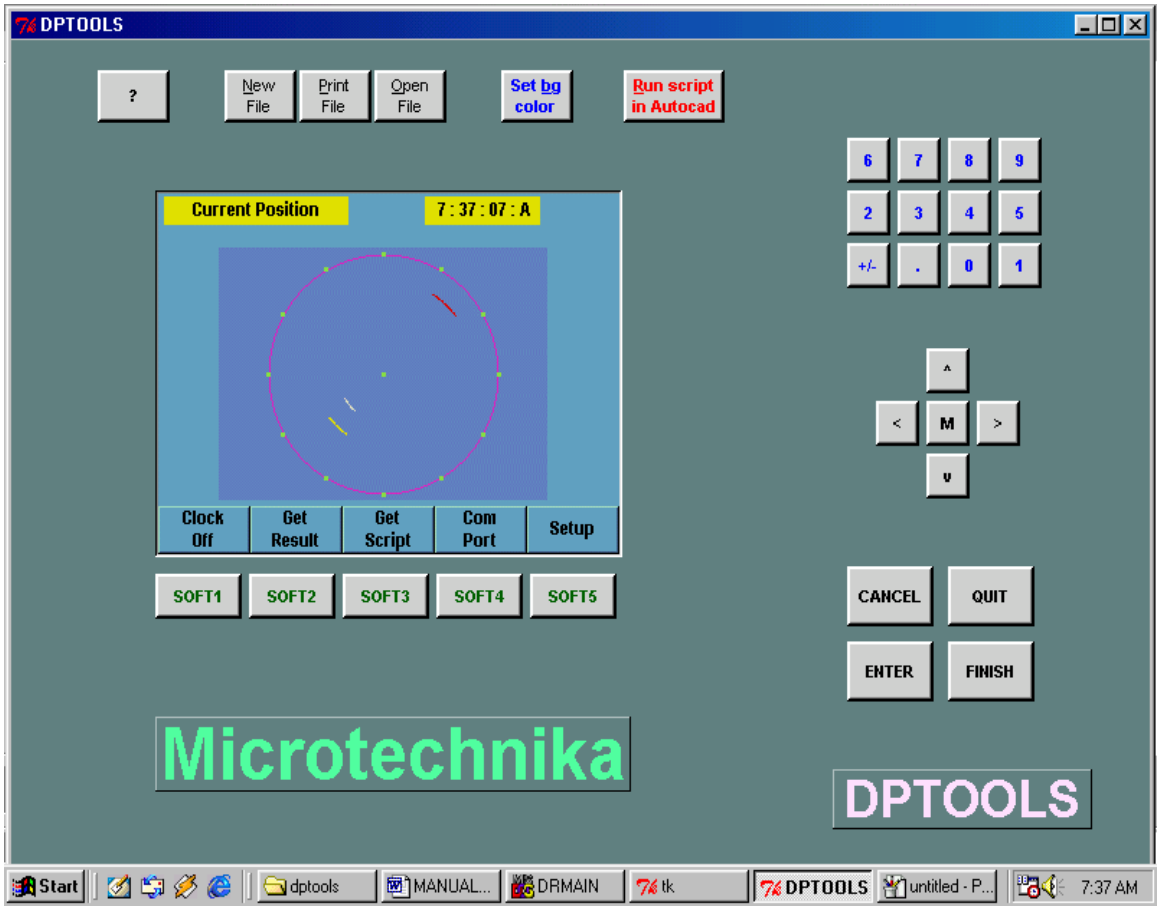
Chapter 5 REMOTE KEYBOARD SHOTKEYS



Here FUN/NUM key is used to select the function key or numeric key

FUNCTION KEYS	NUMERIC KEYS
POINT	1
LINE	2
CIRCLE	3
ARC	4
DIST	5
ANGLE	6
SKEW	7
SPEED	8
MENU	9
X	.
Y	0
Z	+/-

Chapter 6 DPTOOOLS SOFTWARE



Chapter 6 DPTOOOLS SOFTWARE

SYSTEM REQUIREMENTS FOR SOFTWARE DP200

1. PENTIUM 4 OR ABOVE (3.0GHZ MINIMUM).
2. 256MB RAM.
3. MONITOR SIZE 15 INCH (800*600 PIXELS MINIMUM).
4. WIN98 SECOND EDITION OR WINXP OPREATING SYSTEM WITH HYPERTERMINAL LOADED.
5. 9 PIN D'TYPE CONECTOR SERIAL COMMUNICATION PORT.
6. AUTOCAD2000 OR ABOVE VERSION SOFTWARE INSTALLED.

To run the software correctly do as follows strictly.

1. Extract the zip file dptools.zip to the path at c:\
2. To run the software double click the dptools.bat.
3. Then the software will run.
4. Press the button "Run script in Autocad"
5. The Autocad will run.
6. If there is problem to run the autocad then do the following
7. Check that the autocad is installed or not.
8. If autocad is installed then check the path.
9. I have taken the default path to run the autocad as "exec start /max c:/progra~1/acad2000/acad.exe /b c:/dptools/script.scr"
10. If the autocad is having different path i.e if it is inatalled at other location than above mentioned then do following.
11. Edit the new_front_panel.tcl in dos mode.
12. Search the acad.exe.
13. You will get the above path.
14. Modify the Path as per your requirement. Then save the new_front_panel.tcl.
15. Run the software by double clicking the dptools.bat.

16. If your platform is windows 2000 or windows nt or xp then to run the autocad modify the path in new_front_panel.tcl the as follows "exec c:/windows/system32/cmd.exe /c start /max c:/progra~1/acad2000/acad.exe /b c:/dptools/script.scr".
17. Do the same for cmd.exe
18. Do the same for wordpad.exe
19. Do the same for AcroRd32.exe
20. Also disable the antivirus protection software if our software is working slowly.

To check the dp200 is communating with the computer without running the dptools software use hyperterminal.

PROCEDURE TO GET NEW HYPERTERMINAL

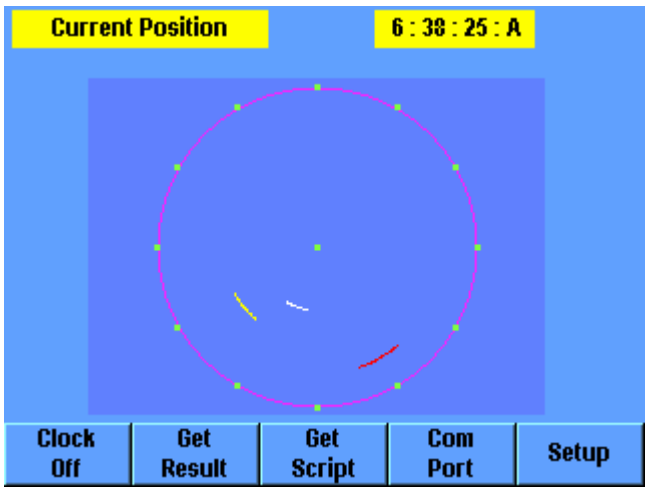
1. From program file go to Accessories.
2. From Accessories go to Communications.
3. From Communications go to Hyperterminal.
4. Then click the Hypertrm.
5. Then Hyperterminal will open.
   It ask Name. Then enter any name for e.g. INNOVATIVE.
   Also select the icon. Then click OK.
6. The window Connect to will appear where it will ask for country code, Area code, phone number & connect using. Here don't give any thing. In connect using take Direct to com1 or Direct to com2 which is available.
7. Then click ok. The com1 properties window will appear as-

   Port settings : Select following.

   Bits per second : 9600
   Data bits : 8
   Parity : None
   Stop bits : 1
   Flow control : Hardware

8. Then click ok. Then From file menu click save.
9. Now you will get a hyperterminal.
10. To get connected click Call & to disconnect click Disconnect.
11. While opening again click the icon that you have given the name.

Getting the result in the dptools software.



1. Press ‘NEW FILE’ key to make new report.txt file for printing.
2. When any feature such as point, line, circle etc is measured in DP200 then at final the result are shown on the screen as Point result, Line results, Circle results etc.
3. Now press ‘Get Result’ to add these results in the report.txt file.
4. Now send the results from DP200.
5. Do this for every feature.
6. You can also save all the results after all features are measured.
7. To get all the measured results do following.

7.1 Come to ‘Current Position’ screen in dp200.
7.2 Now press ‘M’ key to go to ‘Menu feature’ screen.
7.3 Now press ‘SOFT3’ (Part View) key see full part view.
7.4 Now press ‘SOFT5’ (Send all results) key to save all feature results in report.txt file.

8. You can also get the results one by one after all features are measured.
9. To get the required result one by one do following.

8.1 Come to ‘Current Position’ screen.
8.2 Now press ‘M’ key to go to ‘Menu feature’ screen.
8.3 Now press ‘SOFT2’ (Extra) key see extra functions.
8.4 Now scroll down to ‘Send Feat. Results’ comes.
8.5 Now press ‘ENTER’ key to go to ‘Highlight feature to Print’ screen.
8.6 Now highlight the required feature to see results.

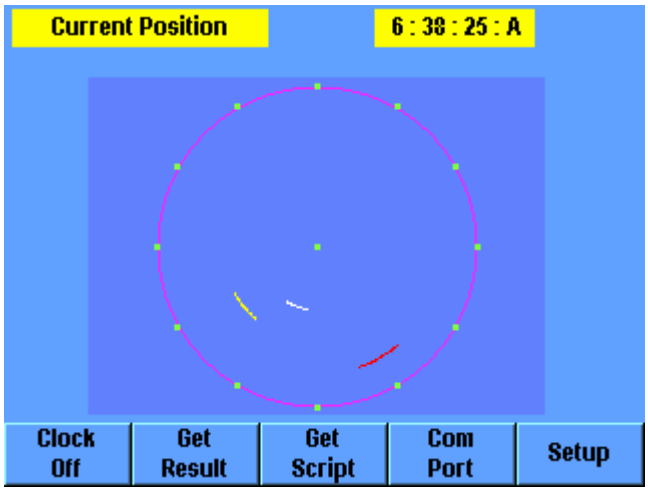
8.7 Now press ‘SAVE IN FILE’ to add these results in the report.txt file.
8.8 Do the step 8.6 and step 8.7 to add the required results in the report.txt file.
10. You can view the report.txt file so verify saved results by pressing ‘OPEN FILE’ key.
11. To print the report.txt to your default installed printer press ‘PRINT FILE’.

12. You can also save the tolerance results one by one after all features are measured.
13. To save the required result one by one do following.

12.1 Come to ‘Current Position’ screen.
12.2 Now press ‘M’ key to go to ‘Menu feature’ screen.
12.3 Now press ‘SOFT2’ (Extra) key see extra functions.
12.4 Now scroll down to ‘Send Feat. Tol’ comes.
12.5 Now press ‘ENTER’ key to go to ‘Highlight feature for tol’ screen.
12.6 Now highlight the required feature.
12.7 Now press ‘SOFT4’ (Tol) to go to tolerance the feature...
12.8 Select the tolerance type then enter the nominal values.
12.9 The Tol. Results are displayed on screen.
12.10 Now press ‘SAVE IN FILE’ to add these tol. results in the report.txt file.
12.11 Do the step 12.6 and step 12.10 to add the required results in the report.txt file.

14. You can now print the report.txt file by pressing ‘PRINT FILE’.
15. If there is error in printing the check the default printer installed in your computer.

Getting the drawing of measure features in Autocad2000 in the dptools software.



1. To get the drawing of measured features in the Autocad2000 do following.

   1.1 Press 'Get script' key in dptools software.
   1.2 Come to 'Current Position' screen in DP200.
   1.3 Now press 'M' key to go to 'Menu feature' screen.
   1.4 Now press 'SOFT3' (Part View) key see full part view.
   1.5 Now press 'SOFT4' (Send as script) key to save all features drawing in script.scr file.

2 This is a scripting file that you can run in the Autocad2000.
3 To see the drawing run the script.scr file in Autocad2000 by pressing 'RUN SCRIPT IN AUTOCAD' key.
4 Now the Autocad2000 software is started automatically and the script.scr file is executed automatically.
5 Now you can view the measured features in Autocad2000.
6 You can save this drawing as ***.dwg for storage purpose.
7 You can open this stored ***.dwg file in Autocad2000 at any time.

Chapter 9 SYSTEM REQUIREMENTS AND TROUBLE SHOOTING

SYSTEM REQUIREMENTS FOR SOFTWARE DPTOOLS

1. PENTIUM 4 OR ABOVE (3.0GHZ MINIMUM).
2. 256MB RAM.
3. MONITOR SIZE 15 INCH (800*600 PIXELS MINIMUM).
4. WIN98 SECOND EDITION OR WINXP OPREATING SYSTEM WITH HYPERTERMINAL LOADED.
5. 15 PIN D'TYPE FEMALE CONNECTOR SERIAL COMMUNICATION PORT.
6. AUTOCAD2000 OR ABOVE VERSION SOFTWARE INSTALLED.

To run the software correctly do as follows strictly.

1. Extract the zip file dptools.zip to the path at c:\
2. To run the software double click the dptools.bat.
3. Then the software will run.
4. Press the button "Run script in AutoCAD"
5. The AutoCAD will run.
6. If there is problem to run the autocad then do the following
7. Check that the autocad is installed or not.
8. If autocad is installed then check the path.
9. I have taken the default path to run the autocad as "exec start /max c:/progra~1/acad2000/acad.exe /b c:/dptools/script.scr"
10. If the autocad is having different path i.e if it is inatalled at other location than above mentioned then do following.
11. Edit the new_front_panel.tcl in dos mode.
12. Search the acad.exe.
13. You will get the above path.
14. Modify the Path as per your requirement. Then save the new_front_panel.tcl.
15. Run the software by double clicking the dp200.bat.

16. If your platform is windows 2000 or windows nt or xp then to run the autocad modify the path in new_front_panel.tcl the as follows "exec c:/windows/system32/cmd.exe /c start /max c:/progra~1/acad2000/acad.exe /b c:/dptools/script.scr".
17. Do the same for cmd.exe
18. Do the same for wordpad.exe
19. Do the same for AcroRd32.exe
20. Also disable the antivirus protection software if our software is working slowly.

To check the dp200 is communating with the computer without running the DPTOOLS software use hyperterminal.

PROCEDURE TO GET NEW HYPERTERMINAL

1. From program file go to Accessories .
2. From Accessories go to Communications.
3. From Communications go to Hyperterminal.
4. Then click the Hypertrm.
5. Then Hyperterminal will open.
   It ask Name. Then enter any name for e.g. INNOVATIVE.
   Also select the icon. Then click OK.
6. The window Connect to will appear where it will ask for country code, Area code, phone number & connect using. Here don't give any thing. In connect using take direct to com1 or Direct to com2 witch is available.
7. Then click ok. The com1 properties window will appear as-

   Port settings: Select following.

   Bits per second : 9600
   Data bits : 8
   Parity : None
   Stop bits : 1
   Flow control : Hardware

8. Then click ok. Then From file menu click save .
9. Now you will get a hyperterminal.
10. To get connected click Call & to disconnect click Disconnect.
11. While opening again click the icon that you have given the name.

PROTOCOL OF DATA COMING FROM DRO

Now press 'PRINT' key of dp200 to send data desire result data.

Proprietary Notice
Any information in this document is property of Innovative Automation Products (IAP). No part of the document should be reproduced/ changed /transferred electronically or by either means without prior intimation to the company.

IAP is not responsible for any damages caused by use of the product or the information in this manual

Disclaimer
The information contained in this document is subject to change without notice. IAP assumes no responsibility or liability for any errors or inaccuracies contained herein, or for incidental or consequential damage in connection with the furnishing, performance, or use of this guide.

Other product names used herein are for identification purposes only and may be trademarks of their respective owners.

Safety & Maintenance Considerations
General safety precautions must be followed when operating the system. Failure to observe these precautions could result in damage to the equipment, or injury to personnel. It is understood that safety rules within individual companies vary. If a conflict exists between the material contained in this guide and the rules of a company using this system, the more stringent rules should take precedence.

IAP recommends that you read all parts of this guide, prior to operating the DRO.

Location & Mounting
The DRO must be placed or mounted on a stable, reliable surface. For mounting instructions, refer to the Getting Started section of Chapter 2: Operations

Cleaning
Use only a cloth dampened with water and a mild detergent for cleaning the exterior surfaces.

Electrical
Do not open the counter as there is hazard of shock. Power supply should be electrically clean and with no loose connections.

RS232 SERIAL OUTPUT

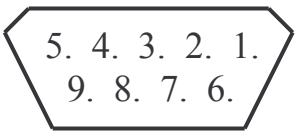
15 PIN D'TYPE LOW DENSITY SOLDERABLE MALE CONNECTOR

PIN NO.	SIGNALS
1	–
2	RX
3	TX
4	–
5	GND (O V)
6	–
7	–
8	–
9	–
10	–
11	–
12	–
13	–
14	–
15	–

CONNECTION DETAILS FOR RS232 CABLE FOR DP200

SIGNALS	9 PIN D TYPE SOLDERABLE FEMALE	15 PIN D TYPE LOW DENSITY SOLDERABLE FEMALE
RX	2	3
TX	3	2
GND	5	5
SHORT LINK	PIN NO 4 & PIN NO.6	PIN NO 4 & PIN NO.6
SHORT LINK	PIN NO 7 & PIN NO.8	PIN NO 7 & PIN NO.8

CONNECTOR DETAILS FOR 9 PIN DTYPE FEMALE CONNECTOR(X,Y,Z & Q AXIS)



PIN NO.	SIGNAL
1	REF
2	/REF
3	VCC (+5V)
4	GND(0V)
5	EARTH (SHEILD)
6	PHASE A
7	/PHASE A
8	/PHASE B
9	PHASE B

CONNECTION DETAILS FOR POWER SUPPLY CONNECTOR

PIN NO.	SIGNAL
1	POSITIVE(+)
2	NEGATIVE(-)