For users that need to use the X-PLAN right now X-PLAN F/F.C

Quick Reference User's Manual

We sincerely appreciate your selection of the X-PLAN.
Please start your work by picking out one or more from the following contents that meet your measuring purposes. Both the SET key and the Mouse key are available in order to set your conditions.
If you would like to know about the X-PLAN in more detail, please make detailed reference to the two manuals mentioned below.

- Operation Manual
- Interfacing Manual

You will find a lot of convenient functions there.

1. Measurement of Area
   a) Condition setting with SET
   b) Condition setting with MOUSE
2. Measurement of Segment and Outline lengths
   a) Condition setting with SET
   b) Condition setting with MOUSE
3. Measurement of Area and Outline length
   a) Condition setting with SET
   b) Condition setting with MOUSE
4. Measurement of Radius and Arc length
   a) Condition setting with SET
   b) Condition setting with MOUSE
5. Measurement of Coordinates (based on the origin and X-axis direction)
6. Measurement of Coordinates (based on two known coordinate points)
7. Affine coordinate transformation
8. Measurement of figures with horizontal and vertical scales that differ
9. Accumulating and averaging measured results
   (measuring area of a doughnut shape)
10. Tracing out points to mark

☆11. Measuring centers of arc and marking them

☆12. Measuring centroids and marking them

☆13. Measurement of radial distances
   a) Condition setting with SET
   b) Condition setting with MOUSE

☆14. Volume calculation

☆15. Revolutionary solid (volume / surface area / center of gravity): plain solid

☆16. Revolutionary solid (volume / surface area / center of gravity): hollow solid

☆17. Revolutionary solid (volume / surface area / center of gravity): plural solids

18. Confirming and setting measuring conditions 1
19. Confirming and setting measuring donditions 2

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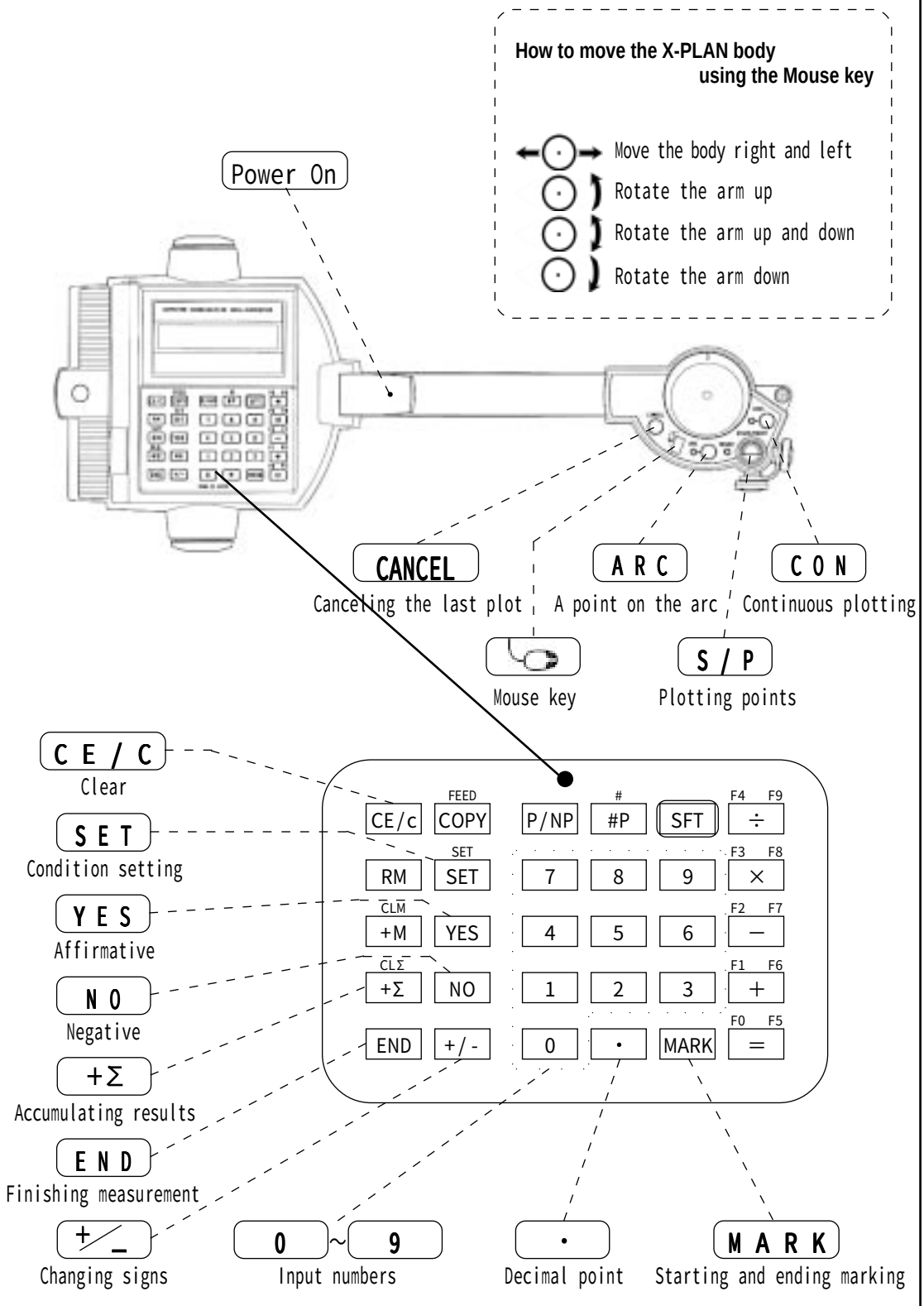
☆:function offered only with the X-PLAN F, not with the FC.

Keys and operations used in this manual

* Refer to the operation manual: Explanation of the Apparatus for more details of each key



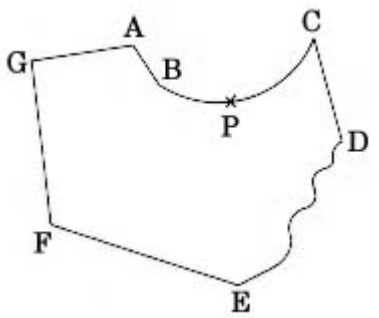
1a MEASUREMENT OF AREA (using the SET key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET)when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
NO	Coordinates unnecessary.
NO	Segment length unnecessary.
YES	Area necessary.
NO	Total length unnecessary.
NO	Radius unnecessary.
NO / YES	Select meters(m).
NO / YES	Select scale assignment.
1 0 0	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES.
NO / YES	Select 2nd decimal place.
NO / YES	Automatic Numbering unnecessary.

KEY OPERATION FOR MEASUREMENT

S/P	Pt. A.
S/P	Pt. B.
ARC	Pt. P (at or near the midpoint of the arc).
S/P	Pt. C.
CON	Switch to Continuous Mode at pt.D and trace the segment to. pt. E.
CON	Return to Point Mode at pt. E.
S/P	Pt. F.
S/P	Pt. G.
END	



[diagram]

CONDITIONS

Unit : m
Scale: 1/100
Decimal Place : 2nd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   N
AREA      (A)   Y
LINE      (L)   N
RADIUS    (r)   N
 m              Y
SCALE RATIO     Y
RX         100.
RY         100.
         D.P  2
WITHOUT #ing    Y
```

RESULTS PRINTOUT

```
END
A          8.00 m
```

· although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) It is not necessary to press S/P at pts. D or E.
2) It is not necessary to return to pt. A from pt. G.
3) Pt. P does not have to be the exact midpoint of arc BC.
4) SET may be pressed immediately after switching t he power on in order ot enter into the condition setting directly.
5) *means that the message appears with the F,but noto with the FC.

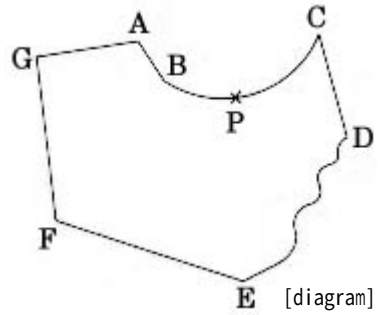
1b MEASUREMENT OF AREA(using the MOUSE key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS(using the MOUSE key)

POWER ON	Begin with step 4(☜)when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
☜	Enter Conditions Setting Mode.
* S/P	Start selecting measuring conditions.
←·→ S/P	Special measurement: Select None.
←·→ S/P	Basic measurement: Select A(area).
·) S/P	Units appear. Start unit setting.
←·→ S/P	Unit (system): select m(metric system)
←·→ S/P	Unit: Select m.
·) S/P	Scale appears. Start scale setting.
←·→ S/P	Select Scale:Ratio.
1 0 0	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES .
·) S/P	Decimal point place appears. Start selection.
←·→ S/P	Select D.P.2.
·) S/P	Numbering(#ING) appears. Start selection.
←·→ S/P	Select WITHOUT #ING.
☜	Setting ends.

KEY OPERATION FOR MEASUREMENT

S/P	Pt. A.
S/P	Pt. B.
ARC	Pt. P (at or near the midpoint of the arc).
S/P	Pt. C.
CON	Switch to Continuous Mode at pt.D and trace the segment to. pt. E.
CON	Return to Point Mode at pt. E.
S/P	Pt. F.
S/P	Pt. G.
END	



[diagram]

CONDITIONS

Unit : m
Scale: 1/100
Decimal Place: 2nd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   N
AREA      (A)   Y
LINE      (L)   N
RADIUS    (r)   N
 m              Y
SCALE RATIO     Y
RX         100.
RY         100.
         D.P  2
WITHOUT #ing    Y
```

RESULTS PRINTOUT

```
END
A          8.00 m
```

· although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) It is not necessary to press S/P at pts. D or E.
2) It is not necessary to return to pt. A from pt. G.
3) Pt. P does not have to be the exact midpoint of arc BC.
4) ☜ may be pressed immediately after switching the power on in order to enter into the condition setting directly.
5) *means that the message appears with the F,but not with the FC.

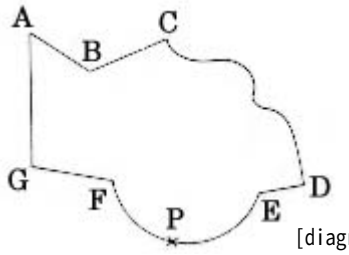
2a MEASUREMENT OF SEGMENT LENGTH AND CIRCUMFERENCE
(using the SET key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS (using the set KEY)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
NO	Coordinates unnecessary.
YES	Segment length necessary.
NO	Area unnecessary.
YES	Total length(circumference)necessary.
NO	Radius unnecessary.
NO / YES	Select kilometers(km).
NO / YES	Select scale assignment.
50000	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES
NO / YES	Select 1st decimal place.
NO / YES	Select Automatic Numbering (assigned during measurement) .

KEY OPERATION FOR MEASUREMENT

S / P	Pt. A.
S / P	Pt. B.
S / P	Pt. C.
CON	Switch to Continuous Mode at pt. C and trace the segment ot pt. D.
CON	Return to Point Mode at pt. D.
S / P	Pt. D.
S / P	Pt. E.
ARC	Pt. P(at or near the midpoint of the arc).
S / P	Pt. F.
S / P	Pt. G.
S / P	Pt. A.
END	



[diagram]

CONDITIONS

Unit : km
Scale: 1/50000
Decimal Place: 1st

CONTITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   Y
AREA      (A)   N
LINE      (L)   Y
RADIUS    (r)   N
km              Y
SCALE RATIO     Y
RX        50000.
RY        50000.
          D.P  1
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
# 2.
d           0.4km
# 3.
d           0.5km
# 4.
d           1.5km
# 5.
d           0.3km
# 6.
d           1.3km
# 7.
d           0.5km
# 8.
d           0.9km
END
L           5.4km
```

·although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) Automatic Numbering is not necessary, but using it clarifies the printout.
2) Pressing S / P at pts. C and D distinguishes the segments for separate segment length measurements.
3) When END is pressed, the circumference measurement will be outputted.
4) * means that the message appears with the F,but not with the FC.

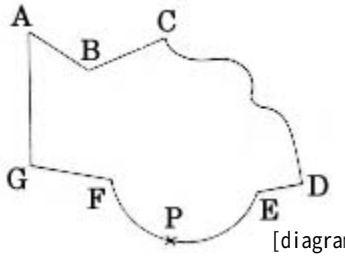
2b MEASUREMENT OF SEGMENT LENGTH AND CIRCUMFERENCE
(using the MOUSE key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS (using the MOUSE key)

POWER ON	Begin with step 4( ) when printer is not attached.
N O	Key explanation printout unnecessary.
N O	Set conditions printout unnecessary.
	Enter Conditions Setting Mode.
S / P	Start selecting measuring conditions.
* S / P	Special measurement: Select None.
S / P	Basic measurement: Select d(segment length),L(total length)
S / P	Units appear. Start unit setting.
S / P	Unit(system): select m(metric system).
S / P	Unit: Select km.
S / P	Scale appears. Start scale setting.
S / P	Select Scale:Ratio
5 0 0 0 0	Input RX scale ratio denominator.
Y E S	
Y E S	RY=RX, so simply press Y E S
S / P	Decimal point place appears. Start selection.
S / P	Select D.P.1.
S / P	Numbering(#ING)appears. Start selection.
S / P	Select #ING IN PLOT.
	Setting ends.

KEY OPERATION FOR MEASUREMENT

S / P	Pt. A.
S / P	Pt. B.
S / P	Pt. C.
C O N	Switch to Continuous Mode at pt. C and trace the segment to pt. D.
C O N	Return to Point Mode at pt. D.
S / P	Pt. D.
S / P	Pt. E.
A R C	Pt. P (at or near the midpoint of the arc).
S / P	Pt. F.
S / P	Pt. G.
	Pt. A.



[diagram]

CONDITIONS

Unit : km
Scale: 1/50000
Decimal Place : 1st

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   Y
AREA      (A)   N
LINE      (L)   Y
RADIUS    (r)   N
km              Y
SCALE RATIO     Y
RX        50000.
RY        50000.
          D.P  1
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
# 2.
d           0.4km
# 3.
d           0.5km
# 4.
d           1.5km
# 5.
d           0.3km
# 6.
d           1.3km
# 7.
d           0.5km
# 8.
d           0.9km
END
L           5.4km
```

·although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) Automatic Numbering is not necessary, but using it clarifies the printout.
2) Pressing S / P at pts. C and D distinguishes the segments for separate segment length measurements.
3) When E N D is pressed, the circumference measurement will be outputted.
4) *means that the message appears with the F,but not with the FC.

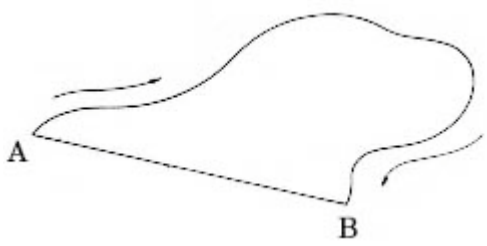
3a MEASUREMENT OF AREA AND OUTLINE LENGTH
(using the SET key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS(with the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
NO	Coordinates unnecessary.
NO	Segment length unnecessary.
YES	Area necessary.
YES	Total length (circumference) necessary.
NO	Radius unnecessary.
NO / YES	Select m/a.
NO / YES	Select scale assignment.
1 5 0 0	Input RX scale ratio denominator
YES	
YES	RY=RX, so simply press YES
NO / YES	Select 2nd decimal place.
NO / YES	Automatic Numbering unnecessary.

KEY OPERATION FOR MEASUREMENT

CON	Switch to Continuous Mode.
S/P	Pt. A(Start).
	Trace segment from pt. A to pt. B.
CON	Return to Point Mode at pt. B.
S/P	Pt. A.



[diagram]

CONDITIONS

Unit : m / a
(length in meters, area in ares)
Scale: 1/1500
Decimal Place : 2nd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   N
AREA      (A)   Y
LINE      (L)   Y
RADIUS    (r)   N
 m/ a           Y
SCALE RATIO     Y
RX        1500.
RY        1500.
          D.P  2
WITHOUT #ing    Y
```

RESULTS PRINTOUT

```
END
A         15.45 a
L        193.29 m
```

·although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) After beginning from pt. A, the measurement will automatically be completed upon returning to pt. A(a beep will sound) -> Auto-close Function
2) The measurement can be performed moving clockwise or counterclockwise.
3) Displayed measurements can be changed by pressing END .During measuring (before pressing END) , NO can change the displayed kind of measurements to another.
4) *means that the message appears with the F,but noto with the FC.

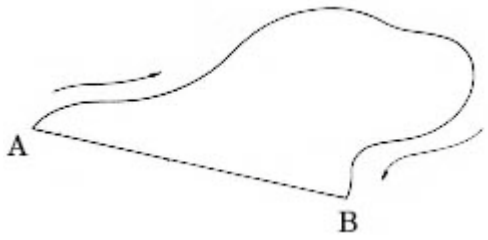
3b MEASUREMENT OF AREA AND OUTLINE LENGTH
(using the MOUSE key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS (using the MOUSE key)

	POWER ON	Begin with step 4(☜)when printer is not attached.
	N O	Key explanation printout unnecessary.
	N O	Set conditions printout unnecessary.
	☜	Enter Conditions Setting Mode.
	S / P	Start selecting measuring conditions
*	←·→ S / P	Special measurement: Select None.
	←·→ S / P	Basic measurement: Select A(area), L(total length)
	·) S / P	Units appear. Start unit setting.
	←·→ S / P	Unit(system): select m(metric system)
	←·→ S / P	Unit: Select m/a.
	·) S / P	Scale appears. Start scale setting.
	←·→ S / P	Select Scale: Ratio.
	1 5 0 0	Input RX scale ratio denominator.
	Y E S	
	Y E S	RY=RX, so simply press Y E S
	·) S / P	Decimal point place appears. Start selection.
	←·→ S / P	Select D.P.2.
	·) S / P	Numbering(#ING) appears. Start selection.
	←·→ S / P	Select WITHOUT #ING
	☜	Setting ends.

KEY OPERATION FOR MEASUREMENT

C O N	Switch to Continuous Mode.
S / P	Pt. A(Start).
	Trace segment from pt.A to pt.B.
C O N	Return to Point Mode at pt.B.
S / P	Pt. A.



[diagram]

CONDITIONS

Unit : m / a
(length in meters, area in ares)

Scale: 1/1500

Decimal Place: 2nd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   N
AREA      (A)   Y
LINE      (L)   Y
RADIUS    (r)   N
 m/ a           Y
SCALE RATIO     Y
RX        1500.
RY        1500.
          D.P  2
WITHOUT #ing    Y
```

RESULTS PRINTOUT

```
END
A         15.45 a
L        193.29 m
```

・although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) After beginning from pt. A, the measurement will automatically be completed upon returning to pt. A(a beep will sound) -> Auto-close Function
2) The measurement can be performed moving clockwise or counterclockwise.
3) Displayed measurements can be changed by pressing E N D .During measuring (before pressing E N D) N O can change the displayed kind of measurements to another.
4) *means that the message appears with the F,but noto with the FC.

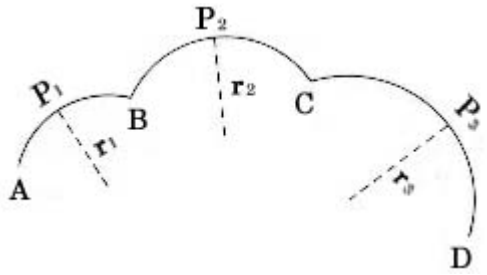
4a MEASUREMENT OF RADIUS AND ARC LENGTH
(using the SET key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
NO	Coordinates unnecessary.
YES	Segment length (arc length) necessary.
NO	Area unnecessary.
NO	Total length unnecessary.
YES	Radius necessary.
NO / YES	Select millimeters(mm).
NO / YES	Select scale assignment.
0 • 1	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES
NO / YES	Select 3rd decimal place.
NO / YES	Select automatic numbering (assigned during measurement).

KEY OPERATION FOR MEASUREMENT

S / P	Pt. A.
ARC	Pt. P_1.
S / P	Pt. B.
ARC	Pt. P_2.
S / P	Pt. C.
ARC	Pt. P_3.
S / P	Pt. D.



[diagram]

CONDITIONS

Unit : mm
Scale: 1/0.1
(enlarged 10 times)
Decimal Place: 3rd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   Y
AREA      (A)   N
LINE      (L)   N
RADIUS    (r)   Y
mm              Y
SCALE RATIO     Y
RX          0.1
RY          0.1
          D.P  3
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
# 2.
d          1.846mm
r          1.177mm
# 3.
d          2.758mm
r          1.295mm
# 4.
d          3.406mm
r          1.583mm
```

·although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) Pts. P_1, P_2, and P_3 do not have to be exact midpoints of the arcs; as long as they are near the middle of the arcs, an accurate measurement can be obtained.
2) In the case of enlarged scales (e. g. microscope photographs) decimals can be used as the scale ratio denominator, such as is done here.
3) *means that the message appears with the F,but not with the FC.

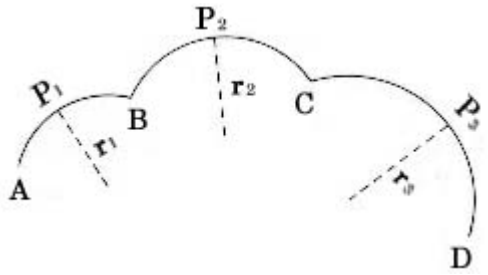
4b MEASUREMENT OF RADIUS AND ARC LENGTH
(using the MOUSE key to select conditions)

KEY OPERATION FOR SETTING CONDITIONS (using the MOUSE key)

POWER ON	Begin with step 4( ) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
	Enter Conditions Setting Mode.
S / P	Start selecting measuring conditions
* S / P	Special measurement: Select None.
S / P	Basic measurement: Select d(segment length), r(radius).
S / P	Units appear. Start unit setting.
S / P	Unit(system): select m(metric system)
S / P	Unit: Select mm.
S / P	Scale appears. Start scale setting.
S / P	Select Scale:Ratio.
0 • 1	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES
S / P	Decimal point place appears. Start selection.
S / P	Select D.P.3.
S / P	Numbering(#ING) appears. Start selection.
S / P	Select #ING IN PLOT.
	Setting ends.

KEY OPERATION FOR MEASUREMENT

S / P	Pt. A.
ARC	Pt. P_1
S / P	Pt. B.
ARC	Pt. P_2
S / P	Pt. C.
ARC	Pt. P_3
S / P	Pt. D.



[diagram]

CONDITIONS

Unit : mm
Scale: 1/0.1
(enlarged 10 times)
Decimal Place: 3rd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   Y
AREA      (A)   N
LINE      (L)   N
RADIUS    (r)   Y
mm              Y
SCALE RATIO     Y
RX          0.1
RY          0.1
          D.P  3
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
# 2.
d          1.846mm
r          1.177mm
# 3.
d          2.758mm
r          1.295mm
# 4.
d          3.406mm
r          1.583mm
```

·although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) Pts. P_1, P_2, and P_3 do not have to be exact midpoints of the arcs; as long as they are near the middle of the arcs, an accurate measurement can be obtained.
2) In the case of enlarged scales (e. g. microscope photographs) decimals can be used as the scale ratio denominator, such as is done here.
3) * means that the message appears with the F, but not with the FC.

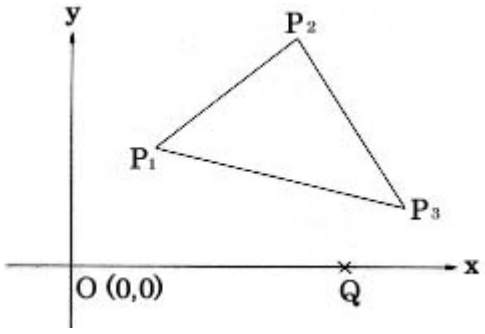
5 Coordinates Plotting 1
based on definition of origin and X-axis direction.

KEY OPERATION FOR SETTING CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
YES	Coordinates necessary.
NO	Segment length unncessary.
NO	Area unnecessary.
NO	Total length unnecessary.
NO	Radius unnecessary.
NO / YES	Select mm.
NO / YES	Select scale assignment.
1	Input RX scale ratio denominator.
YES	
YES	RY=RX, so simply press YES
NO / YES	Select Standard coordinates(horizontal X-axis).
S / P	"Point" the axes origin(pt. O)
S / P	"Point" pt. Q.
YES	Input origin bias XB=0.
YES	Input origin bias YB=0.
NO / YES	Select zero(0) decimal places.
NO / YES	Select automatic numbering (assigned during measurement)

KEY OPERATION FOR MEASUREMENT

S / P	Pt. P_1.
S / P	Pt. P_2.
S / P	Pt. P_3.



[diagram]

CONDITIONS

Unit : mm
Scale : 1/1 (actual Size)
Decimal Place : none
(integer only)

CONDITIONS PRINTOUT

```
COOR      (X.Y) Y
LINE SEG  (d)   N
AREA      (A)   N
LINE      (L)   N
RADIUS    (r)   N
mm              Y
SCALE RATIO     Y
RX          1.
RY          1.
STAND AXIS      Y
XO        0.000mm
YO        0.000mm
XX       34.313mm
YX        0.000mm
XB           0.mm
YB           0.mm
         D.P  0
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
X           10.mm
Y           15.mm
# 2.
X           28.mm
Y           29.mm
# 3.
X           42.mm
Y            8.mm
```

- although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) Pt.Q can be any point in the plus direction of the X-axis, but the farther it is from the origin, the more accurate the measurement will be.
2) Automatic numbering is used to make the printed results easier to identify.
3) When values other than 0 are inputted for the origin bias (XB,YB), the coordinate axes will be shifted ina a parallel fashion.
4) *means that the message appears with the F,but not with the FC.

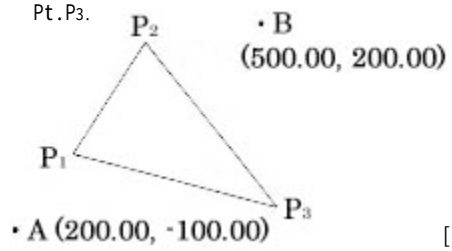
6 Coordinate Plotting 2
based on 2 points of known coordinates.

KEY OPERATION FOR MEASUREMENT CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurements unnecessary.
YES	Coordinates necessary.
NO	Segment length unnecessary.
NO	Area unnecessary.
NO	Total length unnecessary.
NO	Radius unnecessary.
NO / YES	Select m.
NO / YES	Provisionally select scale assignment.
YES	RX values will be calculated automatically.
YES	RY values will also be calculated automatically (RX=RY)
NO / YES	Select survey coordinates.
NO	Select coordinate assignment input ...(*)
2 0 0 YES	Input x-coordinate for pt.A(X1).
1 0 0 +/- YES	Input y-coordinate for pt.A(Y1).
S / P	"Point" pt.A.
5 0 0 YES	Input x-coordinate for pt.B(X2).
2 0 0 YES	Input y-coordinate for pt.B(Y2).
S / P	"Point" pt.B.
NO	(**)
NO / YES	Select 2nd decimal place.
NO / YES	Select automatic numbering(assigned during measurement)...clarifies printout.

KEY OPERATION FOR MEASUREMENT

S / P	Pt.P_1.
S / P	Pt.P_2.
S / P	Pt.P_3.



[diagram]

CONDITIONS
Unit : m
Scale : Automatically calculated frome given point coordinates
Decimal Place : 2nd
Direction of X-axis: (survey axes)

CONDITIONS PRINTOUT

```
COOR      (X.Y) Y
LINE SEG (d)   N
AREA      (A)   N
LINE      (L)   N
RADIUS    (r)   N
 m               Y
SCALE RATIO     Y
RX          1.
RY          1.
SURV AXIS       Y
X1         200. m
Y1        -100. m
X -27.22552939mm
Y  18.69137795mm
X2         500. m
Y2         200. m
X -0.764405427mm
Y   49.3446918mm
RX 10477.03986
RY 10477.03986
        D.P  2
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
X        306.86 m
Y        -31.90 m
# 2.
X        462.08 m
Y         50.90 m
# 3.
X        258.71 m
Y        240.17 m
```

- although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:
(*) ...If known point assignment was used in the previous measurement, this No display does not appear.
(**) ...In the case of 3 known points, operation can continue with (X3,Y3).
1) The scale ratio denominator that is automatically calculated from the known point coordinates can be reviewed. Furthermore, it will appear in the printout.
2) Determination of scale ratio based on known points can only be performed when horizontal and vertical scales are the same (RX=RY).
3) * means that the message appears with the F, but not with the FC.

7 Affine coordinate transformation

KEY OPERATION FOR SETTING CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET)when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurement unnecessary.
YES	Coordinates necessary
NO	Segment length unnecessary
NO	Area unnecessary
NO	Total length unnecessary
NO	Radius unnecessary.
NO / YES	Select mm.
NO / YES	Provisionally select scale assignment.*
YES	Enter RX scale ratio denominator
YES	RX=RY, so simply press YES
NO / YES	Select Survey/Standard coordinates.
NO NO	Select Affine.
0 YES	Input x-coordinate for pt.1.
0 YES	Input y-coordinate for pt.1
S/P	"Point" pt.1.
0 YES	Input x-coordinate for pt.2.
1 0 YES	Input y-coordinate for pt.2
S/P	"Point" pt.2.
1 0 YES	Input x-coordinate for pt.3.
1 0 YES	Input y-coordinate for pt.3.
S/P	"Point" pt.3.
1 0 YES	Input x-coordinate for pt.4.
0 YES	Input y-coordinate for pt.4.
S/P	"Point" pt.4.
NO	**
NO / YES	Select 0(integer only).
NO / YES	Select automatic numbering (#ING IN PLOT).

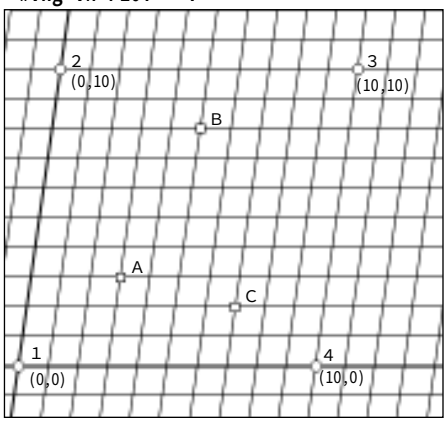
CONDITIONS
Measurement : coordinates
Unit : m
Scale : auto-calculation***
Decimal Place : 0
Numbering:#ING IN PLOT

CONDITIONS PRINTOUT

```
.......     1.
STAND AXIS     Y
X0          0.mm
Y1          0.mm
X -23.59556996mm
Y -21.38574613mm
X0          0.mm
Y2         10.mm
X -16.92834041mm
Y  17.57350216mm
X0         10.mm
Y3         10.mm
X  22.32696317mm
Y  16.33913461mm
X0         10.mm
Y4          0.mm
X  15.66846136mm
Y -22.62638799mm
AF 4
          D.P. 0
#ing IN PLOT   Y
```

RESULTS PRINT-

```
# 1.
X            3.mm
Y            3.mm
# 2.
X            5.mm
Y            8.mm
# 3.
X            7.mm
Y            2.mm
```



[diagram]

・although some slight discrepancy may occur,results should be very similar to those shown here.

KEY OPERATION FOR MEASUREMENT

S/P	Pt.A.
S/P	Pt.B.
S/P	Pt.C.

NOTES:

(*,***)...As the input coordinates get used to calculate the scale ratios, values to be input here are merely provisional.

(**) ...If there are more control points, continue the series of point input.

1) If the CANCEL key gets pressed while an x-coordinate input display appears,the last input coordinates(x and y) gets canceled.

2) For the Affine transfomation, at least three points need to be input. Maximum 25 points are acceptable with the X-PLAN.

3) *means that the message appears with the F,but not with the FC series.

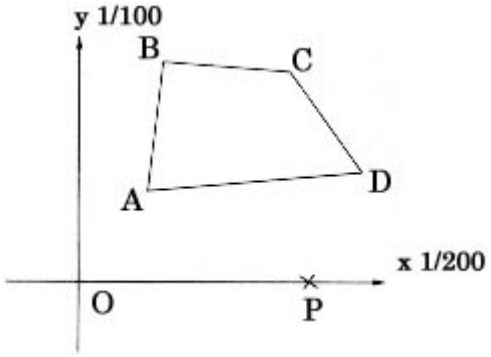
8 MEASUREMENT OF DIAGRAMS WITH DIFFERENT HORIZONTAL AND VERTICAL SCALES

KEY OPERATION FOR CONDITIONS (using the SET key)

POWER ON	Begin with step 4(SET)when printer is not attached.
NO	Key explanation print out unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurement unnecessary.
NO	Coordinates unnecessary.
YES	Segment length necessary.
YES	Area necessary.
NO	Total length unnecessary.
NO	Radius unnecessary.
NO / YES	Select meters(m).
NO / YES	Select scale assignment.
200 YES	Input horizonatal scale ratio denominator(RX).
100 YES	Input vertical scale ratio denominator(RY).
NO / YES	Select standard coordinate system.
S / P	"Point" origin (pt.O).
S / P	"Point" pt.P(definition of X-axis direction).
NO / YES	Select 1st decimal place.
NO / YES	Select automatic numbering (assigned during measurement)

KEY OPERATION FOR MEASUREMENT

S / P	Pt.A.
S / P	Pt.B.
S / P	Pt.C.
S / P	Pt.D.
S / P	Pt.A



[diagram]

CONDITIONS

Unit : m
Scale : 1/200 (hozizontal x-axis)
1/100 (vertical y-axis)
Decimal Place : 1st

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   Y
AREA      (A)   Y
LINE      (L)   N
RADIUS    (r)   N
 m               Y
SCALE RATIO     Y
RX        200.
RY        100.
STAND AXIS      Y
XO          0.00 m
YO          0.00 m
XX          5.75 m
YX          0.00 m
          D.P  1
#ing IN PLOT    Y
```

RESULTS PRINTOUT

```
# 1.
# 2.
d             1.7 m
# 3.
d             3.2 m
# 4.
d             2.2 m
# 1.
d             5.4 m
END
A             6.2 m
```

・although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) The X- and Y-axes respectively correspond with differing horizontal and vertical scales. When measuring length or plotting coordinates in diagrams where horizontal and vertical scales differ, it is essential that the axes and scale directions be correctly assigned.

2) When measuring only area, proper correspondence of axes and scale directions is not necessary, even when vertical and horizontal differ: also, the message requesting definition of X-axis direction will not appear.

3) * means that the message appears with the F, but not with the FC series.

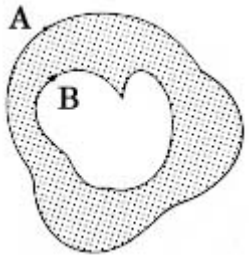
9 ACCUMULATION AND AVERAGING MEASURED RESULTS
(measuring area of a doughnut shape)

KEY OPERATION FOR SETTING CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
* NO	Special measurement unnecessary.
NO	Coordinates unnecessary.
NO	Segment length unnecessary.
YES	Area necessary.
NO	Total length unnecessary.
NO	Radius unnecessary.
NO / YES	Select meters(m).
NO / YES	Select scale assignment.
1 0 0 YES	Enter RX scale ratio denominator.
YES	RX=RY, so simply press YES
NO / YES	Select 2nd decimal place.
NO / YES	Automatic numbering unnecessary.

KEY OPERATION FOR MEASUREMENT

CON	Switch to Continuous Mode.
S / P	"Point" pt.A(start) and trace the outer line, returning to pt.A.(Auto-close).
+Σ	"Accumulate" the area of the larger contour.
S / P	"Point" pt.B(start) and trace the inner line, returning to pt.B(Auto-close).
+/-	Switch the area measurement of the smaller contour to a negative value.
+Σ	"Accumulate" the negative area value of the smaller contour.
NO NO NO	The average, number of accumulations, and accumulated value will be displayed.



[diagram]

CONDITIONS
Unit : m
Scale: 1/100
Decimal Place: 2nd

CONDITIONS PRINTOUT

```
COOR      (X.Y) N
LINE SEG  (d)   N
AREA      (A)   Y
LINE      (L)   N
RADIUS    (r)   N
 m              Y
SCALE RATIO     Y
RX        100.
RY        100.
        D.P  2
WITHOUT #ing    Y
```

RESULTS PRINTOUT

```
END
A          6.36 m

              +Σ
END
A          1.99 m

              +-
A         -1.99 m
              +Σ
X̄A         2.19 m
n            2.
ΣA         4.37 m
```

・although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

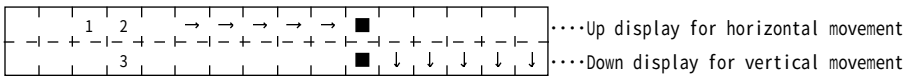
1) (Area of larger contour)+(negative area of smaller contour)=area of the doughnutshaped diagram; therefore, the accumulated value represents the area of the doughnutshaped diagram.

2) An area can be measured repeatedly, and the results averaged, to obtain a very accurate measurement; or a variety of areas can be measured, and a total area value obtained, using the Accumulation Function.

3) *means that the message appears with the F,but not with the FC series.

10 Tracing out points to mark

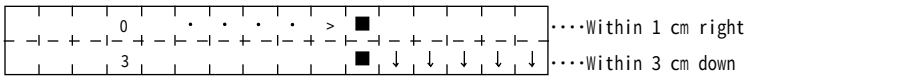
At coordinate displays, which are ready for marking, for example, just after a centroid is measured, pressing the Mark key will initiate a mark leading display as follows.



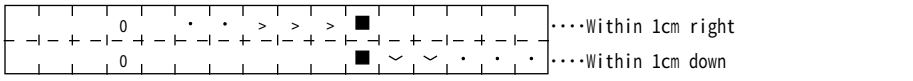
The above figures mean distances to the marking point(unit:cm)

The following operations should be carried out while holding the cylindrical knob of the (S / P) key lightly. The Marker hole* will reach the designated position easily and accurately by going through the following procedures.

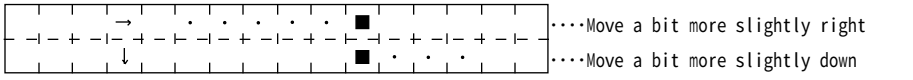
1 At first, move the X-PLAN in the arrow direction (in this case, right) by approximately 12 cm following the up display until 0 will appear in the up display. The result is as follows.



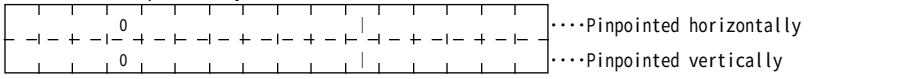
2 Then, following the down display, rotate the tracer arm in the arrow direction (in this case, down) by approximately 3 cm until 0 will appear inthe down line.



3 The designated position is still located slightly left and also slightly down. In the order of the up display(horizontal) and the down one (up & down), move the X-PLAN body finely as shown by the > < indicators, and rotate the arm slightly as shown by the ^ ˅ indicators. So, the direction signs will decrease in number as the mark hole is reaching the designated point.



4 At the above display, pressing the fine adjustment rollers** against the paper with your finger, and rotating them finely in the order of horizontal and vertical movements, ...will disappear and | will appear. It means "pinpointed". At that time, the arrows displayed at the extreme left will be replaced by 0.



5 Hold the arm in place by slightly pressing it against the paper, and insert a pen in the marker hole*** to mark the point. If the pinpointed status is lost in the process, repeat Step 4 for readujustment.

NOTES:

(*,***)The marking pen guides and marking pin are optional with the FC series.

(**) The FC series do not have the fine adjustment rollers. With the FC series, the fine adjustment should be made while pressing the (S / P) key.

For both rough and fine adjustments, adjusting horizontally first and vertically later will accelerate getting the pinpoint. The vertical direction mentioned here means the rotating direction of the tracer arm, not literally perpendicular.

11 Measuring centers of arc and marking

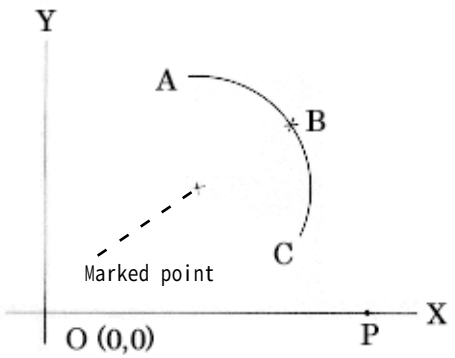
*for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
YES	Special measurement necessary.
NO / YES	Select ARC CENTER.
NO / YES	Select mm.
NO / YES	Select scale assignment.
1 YES	Enter RX scale ratio denominator.
YES	RX=RY, so simply press YES
NO / YES	Select Standard coordinates.
S / P	"Point" the axes origin (pt.0).
S / P	"Point" pt.P.(X>0,Y=0)
0 YES	Input origin bias XB=0.
0 YES	Input origin bias YB=0.
2 YES	Select 2nd decimal place.
NO / YES	Automatic numbering unnecessary.

KEY OPERATION FOR MEASUREMENT

S / P	Pt.A.
ARC	Pt.B.(to define an arc)
S / P	Pt.C.(auto-closed)
MARK	Follow the Mark leading display to move the X-PLAN and get the pinpoint display. Mark the point while pinpointed.
MARK	Press the Mark key again for Ready mode.



[diagram]

CONDITIONS
Results:
center(x,y) of arc and its marking on drawing
Unit : mm
Scale : 1/1(actual size)

CONDITIONS PRINTOUT

```
CENTROID (X.Y) Y
mm             Y
SCALE RATIO    Y
RX          1.
RY          1.
STAND AXIS     Y
XO         0.00mm
YO         0.00mm
XX        42.17mm
YX         0.00mm
XB           0.mm
YB           0.mm
         D.P. 2
WITHOUT #ing   Y
```

RESULTS PRINTOUT

```
END
XP        19.75mm
YP        16.37mm

MARK
MARK
```

・although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) The measuring functions of arc center, angle and triangular area can only be used independently of one another. They cannot be used in combination with Basic measurement functions, either.

12 Measuring centroids and marking them

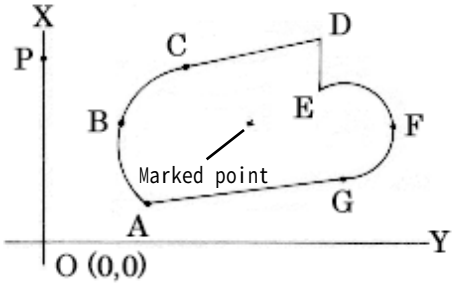
*for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(SET) when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
YES	Special measurement necessary.
NO / YES	Select CENTROID.
NO	Coordinates unnecessary
NO	Segment length unnecessary
NO	Area unnecessary
NO	Total length unnecessary
NO	Radius unnecessary
NO / YES	Select m.
NO / YES	Select scale assignment.
1 0 0 YES	Enter RX scale ratio denominator
YES	RX=RY, so simply press YES
NO / YES	Select Survey coordinates.
S / P	"Point" the axes origin (pt.0).
S / P	"Point" pt.P.(X>0,Y=0)
0 YES	Input origin bias XB=0.
0 YES	Input origin bias YB=0.
0 YES	Select 2nd decimal place.
NO / YES	Automatic numbering unnecessary.

KEY OPERATION FOR MEASUREMENT

S / P	Pt.A.(start point)
ARC	Pt.B.(to define an arc)
S / P • • • S / P	Pt.C,D and E.
ARC	Pt.F.(to define an arc)
S / P	Pt.G.
S / P	Pt.A.(auto-closed)
MARK	Follow the Mark leading display to move the X-PLAN and get the pinpoint display. Mark the point while pinpointed.
MARK	Press the Mark key again for Ready mode.



[diagram]

CONDITIONS
Results:
centroid coordinates and marking the position on a drawing
Unit : m
Scale: 1/100

CONDITIONS PRINTOUT

```
CENTROID (X.Y) Y
COOR     (X.Y) N
LINE SEG (d)   N
AREA     (A)   N
LINE     (L)   N
RADIUS   (r)   N
 m             Y
SCALE RATIO    Y
RX       100.
RY       100.
SURV AXIS      Y
XO         0.00 m
YO         0.00 m
XX         2.37 m
YX         0.00 m
XB           0. m
YB           0. m
        D.P. 2
WITHOUT #ing   Y
```

RESULTS PRINTOUT

```
END
XG         1.50 m
YP         2.62 m

MARK
MARK
```

·although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

1) The centroid measurement can be done at the same time as coordinates, segment length, total length and radius measurements.
2) Curved outlines of figures are to be traced in the Continuous mode, while arc outlines can be measured in the Arc mode by pointing two end points and a midpoint to define arc as shown in this example.

13a Measurement of radial distances
(using the SET key to select conditions)

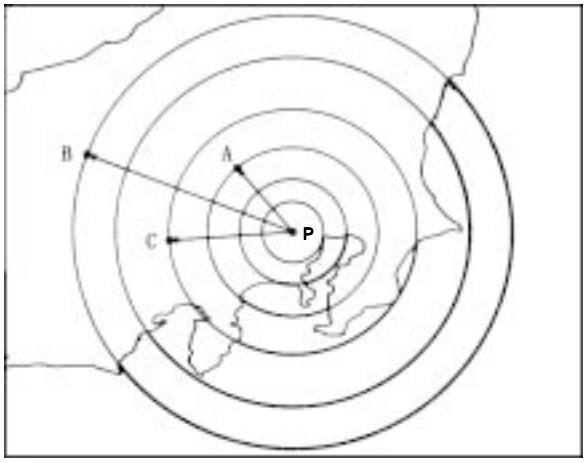
*for F series users only

KEY OPERATION FOR SETTING CONDITIONS(with the SET key)

POWER ON	Begin with step 4(S E T) when printer is not attached.
N O	Key explanation printout unnecessary.
N O	Set conditions printout unnecessary.
S E T	Enter Conditions Setting Mode.
Y E S	Special measurement necessary.
N O / Y E S	Select CON.DIS.
N O / Y E S	Select km.
N O / Y E S	Select scale assignment.
1 2 0 0	Enter RX scale ratio denominator
Y E S	RX=RY, so simply press Y E S .
N O / Y E S	Select 2nd decimal place.
N O / Y E S	Select #ING IN PLOT.

KEY OPERATION FOR MEASUREMENT

S / P	Pt. any point to initiate the radial distance measurement.
S / P	Pt.P.*
S / P	Pt.A.
S / P	Pt.B.
S / P	Pt.C.



Concentric distances from the center P to Point A,B and C get measured.

[diagram]

CONDITIONS
Measurement:
radial distances
Unit : km
Scale : 1/1200
Decimal place : 2
Numbering : #ING IN PLOT

CONDITIONS PRINTOUT

```
CON.DIS  (RL)  Y
km             Y
SCALE RATIO    Y
RX        1200.
RY        1200.
        D.P. 2
#ing IN PLOT   Y
```

RESULTS PRINTOUT

```
# 1.
RL         0.01km
# 2.
RL         0.03km
# 3.
RL         0.02km
```

· although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

(*) Just after all of the measuring conditions for radial distances are set, the 1st pressing of the S / P is to initiate the subject mode and the 2nd is to define the center(control)point.

1) The +Σ key is available only when the CONTINUOUS indicator is off.

2) Availability of other keys are as follows.
During continuous measurement: E N D C E / C
Continuous measurement off : E N D C E / C +Σ +/−

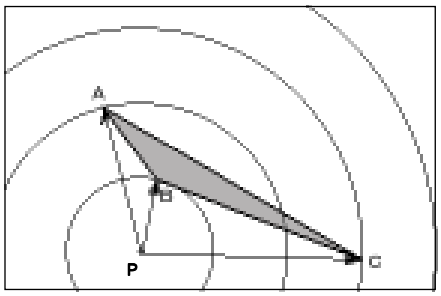
13b Measurement of radial distances
(using the MOUSE key to select conditions) *for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the MOUSE key)

POWER ON	Bigin with step 4( ) when printer is not attached.
N O	Key explanation printout unnecessary.
N O	Set conditions printout unnecessary.
	Enter Conditions Setting Mode.
S / P	Start selecting measuring conditions
S / P	Special measurement: Select RL(radial distance).
S / P	Units appear. Start unit setting.
S / P	Unit(system): select m(metric system)
S / P	Unit: Select cm.
S / P	Scale appears. Start scale setting.
S / P	Select Scale: Ratio.
1 0 0 Y E S	Enter RX scale ratio denominator.
Y E S	RX=RY, so simply press Y E S .
S / P	Decimal point place appears. Start selection.
S / P	Select D.P.FULL.
S / P	Numbering(#ING)appears. Start selection.
S / P	Select #ING IN PLOT.
	Setting ends.

KEY OPERATION FOR MEASUREMENT

S / P	Pt. any point to initiate the radial distance measurement.
S / P	Pt.P.*
S / P	Pt.A.
S / P	Pt.B.
S / P	Pt.C.



Concentric distances from the center P to the vertices A,B and C of the triangle get measured.

[diagram]

CONDITIONS
Measurement:
radial distances
Unit : cm
Scale : 1/100
Decimal place : not specified
Numbering : #ING IN PLOT

CONDITIONS PRINTOUT

```
CON.DIS  (RL)  Y
cm             Y
SCALE RATIO    Y
RX         100.
RY         100.
       D.P.FULL
#ing IN PLOT   Y
```

RESULTS PRINTOUT

```
# 1.
RL 199.7149294cm
# 2.
RL 98.17151271cm
# 3.
RL 288.4369006cm
```

* although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

(*) just after all of the measuring conditions for radial distances are set, the 1st pressing of the S / P is to initiate the subject mode and the 2nd is to define the center(control)point.

1) As the tracer point goes 5 mm or more off the control point(P) in the radial distance measurement mode, continuous display of radial distances get initiated. No radial distance display appears within 5 mm, but pressing the S / P at that time will show the distance from the tracer point to the control point.

14 VOLUME CALCULATION

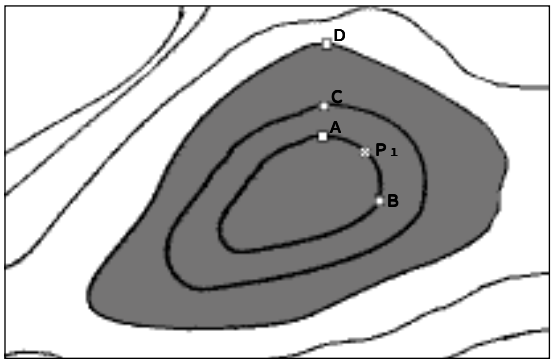
*for F series users only

KEY OPERATION FOR SETTING CONDITIONS(using the SET key)

POWER ON	Begin with step 4(SET)when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
YES	Special measurement necessary.
NO / YES	Select VOLUME.
NO / YES	Select m.
NO / YES	Select scale assignment.
1 0 0	Enter RX scale ratio denominator.
YES	
YES	RX=RY, so simply press YES .
NO / YES	Select D.P.FULL.
NO / YES	Select #ING IN PLOT.

KEY OPERATION FOR MEASUREMENT

S/P	Pt.A.
ARC	Pt.P1. (see "PSEUDO-ARC PROCESS)
CON	Trace the contour line from B to A
S/P	Pt.C. Trace around the contour C to Pt.C.
S/P	Pt.D. Trace around the contour D to Pt.D.
YES	Display to input the contour interval will appear.
2 0 YES	Input the interval here.



[diagram]

CONDITIONS

Measurement:volume
Unit :m
Scale:1/100
Decimal place:not specified
Numbering:#ING IN PLOT

CONDITIONS PRINTOUT

```
VOLUME   (GV)  Y
 m             Y
SCALE RATIO    Y
RX        100.
RY        100.
      D.P.FULL
#ing IN PLOT   Y
```

RESULTS PRINTOUT

```
GA 2.223209046 m
GA 5.745091221 m
GA 13.51763125 m
H          20. m
END
GV 272.3102274 m
```

<Pseudo-arc process>

Portions of contour lines that may be regarded as arcs, can be measured by using the ARC key much faster than in Continuous mode. This is referred to as the pseudo-arc process.

In this example, the contour portion AP(shorter) is regarded as an arc, and in order to define that arc, the ARC key is pressed at P1 (a midpoint of the arc).

The more the pseudo-arc process can be applied, the faster curved lines can be plotted.

・although some slight discrepancy may occur,results should be very similar to those shown here.

NOTES:

1) The input interval gets cleared under the following conditions.
   ・Pressing the CE/C key when contour areas are displayed
   ・Inputting another contour interval to calculate volumes
2) If YES is pressed when the volume result is displayed, a display to input a contour interval will appear for re-calculation.
3) With the +Σ key, the volume result can be saved. The area result of each contour cannot be saved.

15 REVOLUTIONARY SOLID : PLAIN SOLID
(VOLUME / SURFACE AREA / CENTER OF GRAVITY)

*for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(SET)when printer is not attached.
NO	Key explanation printout unnecessary.
NO	Set conditions printout unnecessary.
SET	Enter Conditions Setting Mode.
YES	Special measurement necessary.
NO / YES	Select VOLUME.
NO / YES	Select cm.
NO / YES	Select scale assignment.
1 0 YES	Enter RX scale ratio denominator.
YES	RX=RY, so simply press YES.
0 YES	Input bias origin XB=0.
0 YES	Input bias origin YB=0.
NO / YES	Select D.P.2.
NO / YES	Select WITHOUT #ING.

KEY OPERATION FOR MEASUREMENT

S/P	Pt.any point to initiate the revolution measurement.*
S/P	Pt.the revolution axis origin.
S/P	Pt.revolution axis(+)point ->Revolution axis definition completed: ready for measurement.
S/P	Pt.A.
S/P	Pt.B.
S/P	Pt.C.
ARC	Pt.P_1 (see <14>:PSEUDO-ARC PROCESS)
S/P	Pt.D.
ARC	Pt.P_2
S/P	Pt.E.
ARC	Pt.P_3
S/P	Pt.F.
END	Volume will appear.
END	Surface area will appear.
END	Center of gravity will appear.
MARK	Start marking the center of gravity.
MARK	The marking ends.

CONDITIONS

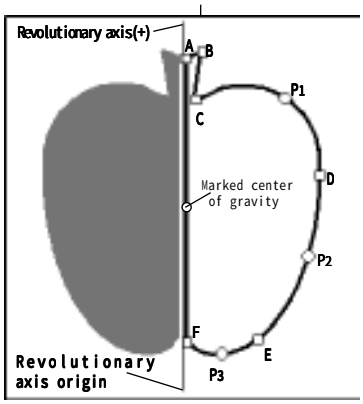
Measurement:
revolutionary solid
Unit: cm
Scale: 1/10
Decimal place: 2
Numbering: WITHOUT #ING

CONDITIONS PRINTOUT

```
REV.VOL (VA)   Y
cm               Y
SCALE RATIO    Y
RX          10.
RY          10.
XB           0.cm
YB           0.cm
        D.P.2
WITHOUT #ing   Y
```

RESULTS PRINTOUT

```
XO         0.00cm
YO         0.00cm
XX        48.36cm
YX         0.00cm
END
VA     27396.55cm
VF      4626.18cm
XV        24.14cm
YV         0.00cm
```



[diagram] ·although some slight discrepancy may occur,results should be very similar to those shown here.

Notes:

* Just after all of the measuring conditions for the revolution measurement are set, the 1st pressing of the S/P is to initiate the subject mode and the 2nd is to define the revolution axis origin.

1) The defined revolution axis gets cleared under the following conditions.
   ·Pressing the CE/C key when the measured results are displayed
   ·Inputting to alter the bias origins
2) The revolutionary solid measurement function is available only when both vertical and horizontal scales are the same (RX=RY).
3) The revolution axis cannot intersect the section diagram to measure.
4) Measured results by plotted points
   ·One point plotted: VA=0,VF=0,(XV,YV)impossible to calculate
   ·Two points plotted: VA=0,VF=good,(XV,YV)impossible to calculate
   ·Three points or more: all good

16 REVOLUTIONARY SOLID : HOLLOW SOLID
(VOLUME / SURFACE AREA / CENTER OF GRAVITY)

*for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(S E T)when printer is not attached.
N O	Key explanation printout unnecessary.
N O	Set conditions printout unnecessary.
S E T	Enter Conditions Setting Mode.
Y E S	Special measurement necessary.
N O / Y E S	Select VOLUME.
N O / Y E S	Select cm.
N O / Y E S	Select scale assignment.
1 0 0 Y E S	Enter RX scale ratio denominator.
Y E S	RX=RY, so simply press Y E S .
0 Y E S	Input bias origin XB=0.
0 Y E S	Input bias origin YB=0.
N O / Y E S	Select D.P.FULL
N O / Y E S	Select WITHOUT #ING

KEY OPERATION FOR MEASUREMENT

S / P	Pt.any point to initiate the revolution measurement.*
S / P	Pt.the revolution axis origin.
S / P	Pt.revolution axis(+)point.
	->Revolution axis definition completed: ready for measurement.
S / P	Pt.A.
A R C	Pt.P_1.
S / P	Pt.B.
E N D	The outer figure gets closed.
+ Σ	The result gets saved in memory.
S / P	Pt.C.
A R C	Pt.P_2.
S / P	Pt.D.
A R C	Pt.P_3.
S / P	Pt.C.The inner figure gets closed.
+/−	The sign gets changed.
+ Σ	The result gets accumulated in memory.
N O	Accumulated volume will appear.
N O	Averaged volume will appear.
N O	Accumulated surface area will appear.
N O	Averaged surface area will appear.
N O	Composed center of gravity will appear.
N O	Number of accumulations will appear.

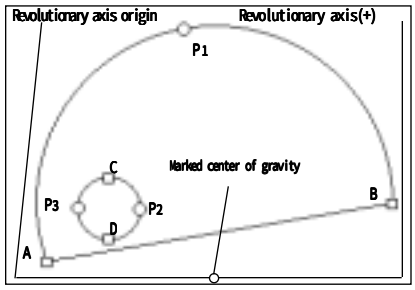
CONDITIONS
Measurement:
revolutionary solid
Unit: cm
Scale: 1/100
Decimal place: not specified
Numbering: WITHOUT #ING

CONDITIONS PRINTOUT

```
XO          0.cm
YO          0.cm
XX 506.2619149cm
YX          0.cm
END
VA 114741797.8cm
VF 1333241.261cm
XV 255.1932167cm
YV          0.cm

                +Σ
END
VA 2901883.769cm
VF 142959.4808cm
XV 122.1662073cm
YV          0.cm

                +-
VA-2901883.769cm
                +Σ
ΣA 111839914.1cm
ΣA 55919957.05cm
ΣF 1476200.742cm
ΣF  738100.371cm
ΣX  258.644837cm
ΣY          0.cm
n           2.
```



[diagram] · although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

(*) Just after all of the measuring conditions for the revolution measurement are set, the 1st pressing of the S / P is to initiate the subject mode and the 2nd is to define the revolution axis origin.

1) Composing centers of gravity is possible only when all figures to measure are located on the same side of the revolutionary axis.

2) If the revolutionary axis gets changed, only center of gravity data accumulated in + Σ get cancelled.

3) If the M A R K key is pressed when the composed center of gravity is displayed, that point can be marked on the drawing.

17 REVOLUTIONARY SOLID : PLURAL SOLID
(VOLUME / SURFACE AREA / CENTER OF GRAVITY)

*for F series users only

KEY OPERATION FOR SETTING CONDITIONS (using the SET key)

POWER ON	Begin with step 4(S E T)when printer is not attached.
N O	Key explanation printout unnecessary.
N O	Set conditions printout unnecessary.
S E T	Enter Conditions Setting Mode.
Y E S	Special measurement necessary.
N O / Y E S	Select VOLUME.
N O / Y E S	Select cm.
N O / Y E S	Select scale assignment.
5 0 Y E S	Enter RX scale ratio denominator.
Y E S	RX=RY, so simply press Y E S.
0 Y E S	Input bias origin XB=0.
0 Y E S	Input bias origin YB=0.
N O / Y E S	Select D.P.2.
N O / Y E S	Select WITHOUT #ING.

KEY OPERATION FOR MEASUREMENT

S / P	Pt. any point to initiate the revolution measurement.*
S / P	Pt. the revolution axis origin.
S / P	Pt. revolution axis(+) point.
	->Revolution axis definition completed: ready for measurement.
S / P	Pt.A.
S / P	Pt.B.
S / P	Pt.C.
E N D	The left figure gets closed.
+ Σ	The result gets saved in memory.
S / P	Pt.D.
S / P	Pt.E.
A R C	Pt.P1
S / P	Pt.F.
E N D	The right figure gets closed.
+ Σ	The result gets accumulated in memory.
N O	Accumulated volume will appear.
N O	Averaged volume will appear.
N O	Accumulated surface area will appear.
N O	Averaged surface area will appear.
N O	Composed center of gravity will appear.
N O	Number of accumulations will appear.

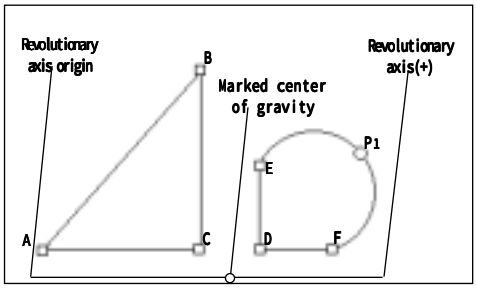
CONDITIONS
Measurement:
revolutionary solid
Unit: cm
Scale: 1/50
Decimal place: 2
Numbering: WITHOUT #ING

CONDITIONS PRINTOUT

```
XO          0.00cm
YO          0.00cm
XX        231.35cm
YX          0.00cm
END
VA   2187892.50cm
VF    145057.30cm
XV         82.49cm
YV          0.00cm

                +Σ
END
VA   1729927.67cm
VF     88444.33cm
XV       186.37cm
YV          0.00cm

                +Σ
ΣA   3917820.17cm
ΣA   1958910.09cm
ΣF    233501.63cm
ΣF    116750.82cm
ΣX       128.36cm
ΣY          0.00cm
n              2.
```



[diagram]

·although some slight discrepancy may occur, results should be very similar to those shown here.

NOTES:

(*) Just after all of the measuring conditions for the revolution measurement are set, the 1st pressing of the S / P is to initiate the subject mode and the 2nd is to define the revolution axis origin.

1) Composing centers of gravity is possible only when all figures to measure are located on the same side of the revolutionary axis.

2) If the revolutionary axis gets changed, only center of gravity data accumulated in + Σ get cancelled.

3) If the MARK key is pressed when the composed center of gravity is displayed, that point can be marked on the drawing.

18 Confirming and setting measuring conditions 1

In order to confirm/set measuring conditions for the X-PLAN, there are two ways available.

1.Using the SET key
2.Using the MOUSE key

Confirmation/Set using the SET key(1)

The last settings will appear in the order of the table of contents, every time the (SET) key is pressed. To change the last setting, press the (NO) key to input differently where necessary.

1	Selection for measuring functions
2	Units selection
3	Scale adjustment selection
4	Definition for coordinate axes
5	Origin bias specification
6	Decimal point placement
7	Auto-numbering selection

Confirmation/Set using the SET key(2)

By pressing the sequence numbers and the (SET) key successively, the numbered display will appear for measuring conditions setting.

ex. (3) (SET)····for display to select scale ratios
(6) (SET)···for display to select decimal point placement

Confirmation/Set using the MOUSE key

By pressing (key), the Mouse mode selection will be available.

- Measuring functions
- Units
- Scale adjustment ←→ (see Notes <2>)
- Coordinate axis ←→
- Bias origin ←→
- Decimal place
- Numbering
- Auto-closing
- Auto-power off
- Contents print (available only with nimi-printer attached)

While confirmation with the (key) key is being made, "M" blinks in the upper right of the display.By moving the tracer arm up and down, displayed messages will scroll in the same direction of the arm movement as mentioned above. To exit the Mouse mode, just press the (key) key again.

NOTES:

1) No matter where the tracer arm is located, the (key) key can be pressed for confirmation / Set.

2) The <-0-> statements that are described above and to the right, mean that more displayed messages will scroll left and right as the X-PLAN body moves left and right.

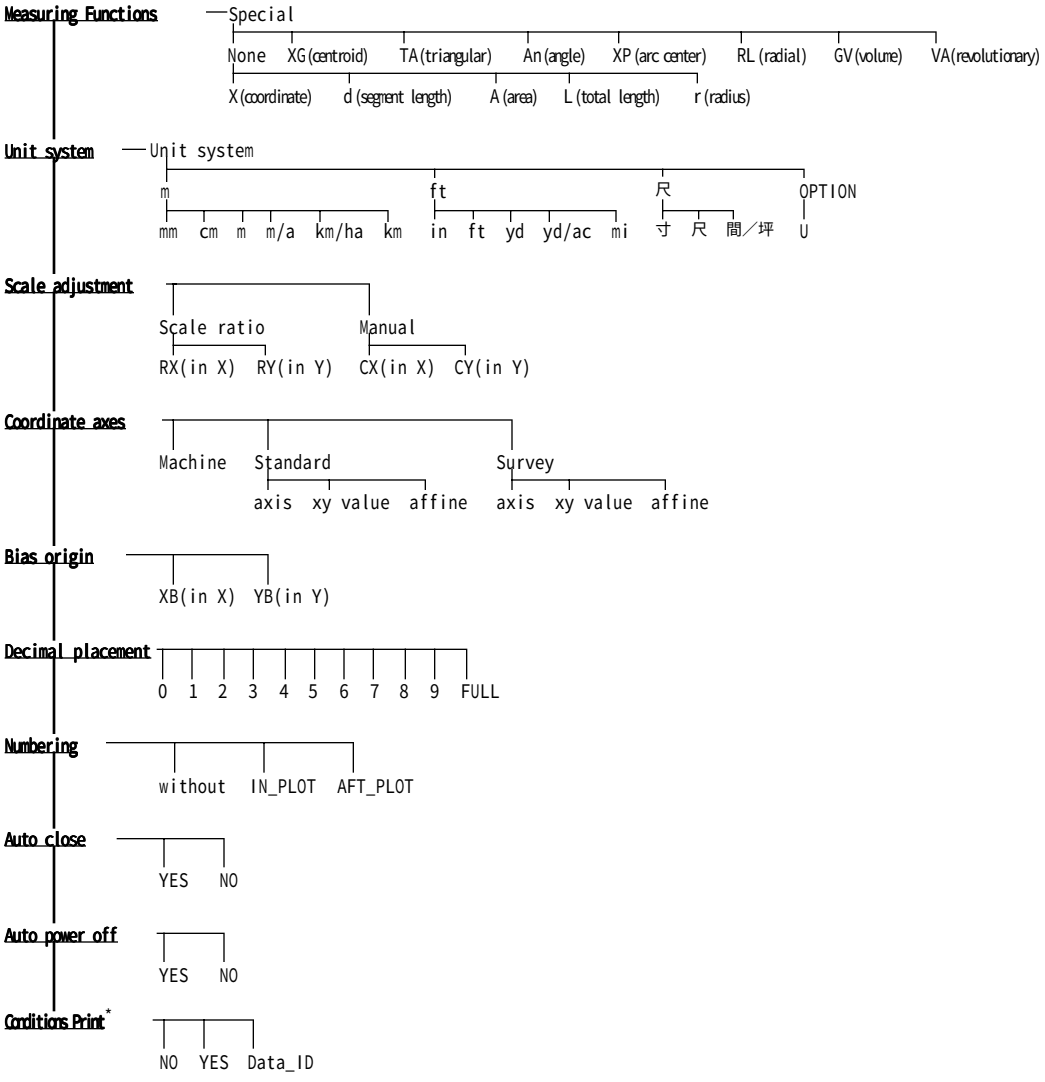
Scale adjustment: Scale ratios / XY for reference distance measurement
Coordinate axes : Orientation by using known points / Affine transformation
Bias origin : XY values as bias origin

19 Confirming and setting measuring conditions 2

Setting by using the Mouse key

Confirmation and setting for measuring conditions can be executed in the Mouse mode by pressing (Mouse) key. By pressing the (S / P) key when each function item is displayed (while "M" mark blinks in the upper right of display), the setting mode gets initiated. The menu structure is configured as follows.

< Structure of Mouse menu >



Pressing the (S / P) key, "M" will appear blinking and the displayed items get ready for selection. After selection or cancellation, move the tracer arm up or down to change to the confirmation mode. In order to exit the mouse mode after setting, just press the (Mouse) key again.

NOTES:

(*) available only with mini-printer attached.

1) Selections for the auto-closing and auto-power off functions are available only in Mouse mode.

2) If Conditions print out is selected, data(items) codes and their functions get printed.