QUICKCLOSE
HP35S Surveying Programs - Version 1.1

USER REFERENCE GUIDE - for Evaluation

Important Note: Program steps are only included in the version of User Reference Guides available from resellers.

1   INTRODUCTION

The Hewlett Packard HP35S calculator is a "retro" style programmable hand-held calculator adopting the RPN (Reverse Polish Notation) style of operation familiar to many surveyors. The HP35S uses a keystroke programming language similar to that of the earlier HP32/HP32S and HP33S calculators. The HP35S has 30,192 bytes of memory available for storage of programs and variables.

The HP35S User's Guide should be referred to for a more detailed explanation of the calculator's operation and capabilities.

1.1   OVERVIEW OF QUICKCLOSE HP35S Survey Programs

The Quickclose HP35 Survey Programs have been designed to assist land surveyors with elementary field and desk calculations by computing:

Program	XEQ	Section	Page
Misclose for entered bearing and distance data	M	3.1-3.3	4-6
Coordinate traverses	T	3.21	5
Areas (unadjusted) for entered bearing and distance data	A	3.32	6
Misclose ratio for entered bearing and distance data	A	3.32	6
Two missing distances for entered bearing and distance data	D	3.4	6
Arc length and segment area for given chord length and radius	H	3.5	7
Missing line measurement (tie between two radiations)	E	3.6	8
Coordinate radiations	R	4.1	9
Coordinate radial inverses (joins)	J	4.3	10
Coordinate traverse inverses (joins)	I	4.4	11
Coordinates by line and offset	N	4.5	12
Offsets to line	O	4.6	13
Convert Links to metres	L	5.3	14
Convert Feet, Inches and fractions to metres	F	5.4	14
Polar to Rectanguar conversions	P	5.5	15
Rectangular to Polar conversions	Q	5.6	15

The programs are entered into the HP35S calculator using the calculator keyboard (Steps described in Appendix A).

1.2   BASIC OPERATION

The HP35S User's Guide should be referred to for a more detailed explanation of the calculator's operation.

1.21   Keyboard and Display

There are three main keyboards used;

- The **primary keyboard** is represented by the white labels on each key
- The **left-shift (orange) keyboard** is activated by pressing the [◄] key.
- The **right-shift (blue) keyboard** is activated by pressing the [►] key.

Keys are described by what is represented on the white labels. For example, the ENTER key is decribed by [ENTER].

                                                                                [^]
the cursor keys in the top right hand corner of the keyboard are indicated by [<]   [>]
                                                                                [V]

1.22   Entering negative numbers

To enter negative numbers, when prompted, press the [+/-] key **<u>after</u>** typing the number.

1.23   Fixing the number of decimals displayed

Press [◄] [<] [1] and then a number between 0 and 9 to fix how many decimal places are displayed.   For example, to show 4 decimal places, press [◄] [<] [1] [4]

2   INSTALLING QUICKCLOSE HP35S SURVEY PROGRAMS

2.01   Memory requirements.

The QUICKCLOSE HP35S Survey programs require 2,000 bytes of free USER memory on the calculator and use all available program labels and most direct variable registers. It is strongly recommended to remove existing programs or clear the memory prior to installation.

2.011 To check the free memory on the calculator

Press [◄] [v] (down arrow cursor key). There should be at least 5,000 bytes free (bottom right number in display beneath 2 PGM).

2.012 To clear the memory of the calculator

The memory of the calculator should be cleared prior to installation, as every program label is used.

To clear the memory, turn the calculator on, then press the bottom left [C], top left [R/S] and [i] keys simultaneously and the MEMORY CLEAR message is displayed.

2.014 Entering the Survey programs

There is no facility on the HP35S to upload programs via a cable or card reader, so each program step has to be manually entered using the HP35S keyboard. The sequence of key strokes is shown in Appendix A, together with line numbers and what should be displayed on the screen after key entry. It takes between 30 and 45 minutes to type in the program, and another 30-45 minutes to check the code and test each program. It is advisable to ensure there aren't any distractions or interruptions when doing this.

It is critically important that each program be tested with the test data in the examples described, to ensure that the program has been entered correctly.

To edit and delete programs, please refer to the HP35S User's Guide for details.
Program steps are described in Appendix A.

2.015 Tips for easier running of the programs.

The Run-Stop [R/S] is placed in a bad position for single handed operation of the HP35S, being located a long way from the numeric keyboard. A way to overcome this limitation is to use the left forefinger to press [R/S] and the right forefinger to operate the numeric keyboard.
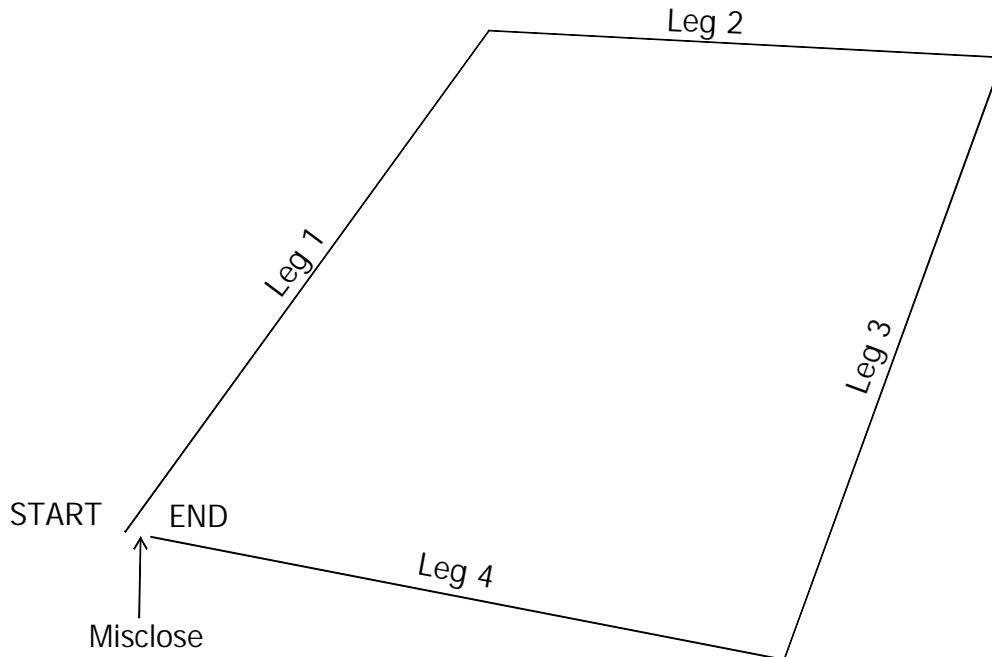
3   CLOSE AND TRAVERSE Programs

A close figure or traverse is a series of interconnected two-dimensional lines (vectors, boundary lines, traverse legs or arc chords). Each line is defined by a bearing and distance. The Quickclose HP35 close program prompts the user for Bearings and Distances for each known line (and also start coordinates in Coordinate mode). Once the data are entered, the misclose, proportional ratio, unadjusted area and two missing distances on additional lines with known bearings can be computed.

Distances in links or feet, inches and fractions of an inch can be converted to metres prior to data entry using programs L (Section 5.4 page 14) and F (Section 5.5 page 14).
Curved boundary segments (arc lengths and segment areas) can also be computed using program H (Section 3.5 page 7).

3.1   CLOSE/TRAVERSE program (no Coordinate mode)

3.11 Entering Close/traverse data (no Coordinate mode) - Program C

Press [XEQ] [XEQ] [ENTER] **(Program C)**

1. At the prompt **B?** type in the first bearing in DD.MMSSSS format and press [R/S]
        (for example 321°08′09″ would be typed in as 321.0809)
2. At the prompt **D?** type in the first distance and press [R/S]

Repeat steps 1 and 2 for each line of the close or traverse.

To compute the misclose only, run program M (refer to 3.31 page 5)
To compute the misclose, unadjusted area or proportional misclose, run program A (refer to 3.32 page 6).
To resume data entry (continuation of the traverse or close data entry after doing Misclose calcs) press [XEQ] [8] [ENTER]   (Program S)
Refer to 3.31 or 3.32 (pages 5 & 6) for worked examples of close/traverse data entry and misclose/area calculations.

3.111 To enter a reverse bearing (i.e. to add/subtract 180° to an entered bearing)

At the **B?** prompt, type in the bearing to be reversed and then press [+/-] and [R/S]
This adds or subtracts 180° from the entered bearing.

For example, 321°08′09″ typed in as -321.0809, would be converted to 141°08′09″ by the program.

3.112 To enter partial or summed distances

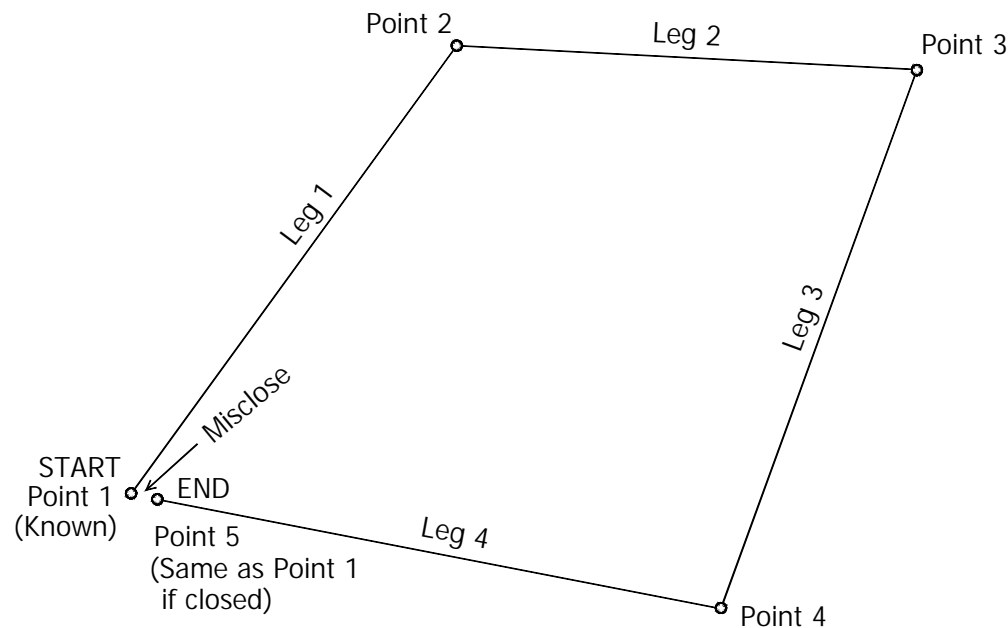At the **D?** prompt, type in the first partial distance and press [ENTER]
For each additional partial distance to be added or subtracted to the first running total;
type the distance and press [+] to add, or [-] to subtract (in RPN mode)
Press [R/S] to accept the summed distances.

For example, to enter 35 + 12 - 0.3, at the D? prompt type:
[3][5] [ENTER] [1][2] [+] [.][3] [-] [R/S] (the summed distance is 46.7m)

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3.2   CLOSE/TRAVERSE program (Coordinate mode)

3.21   Entering Close/traverse data (coordinate mode) - Program T

Press [XEQ] [9] [ENTER] **(Program T)**

1. At the prompt **E?** type in the Easting of the traverse start point and press [R/S]
2. At the prompt **N?** type in the Northing of the traverse start point and press [R/S]
3. At the prompt **B?** type in the first bearing in DD.MMSSSS format and press [R/S]
        (for example 321°08′09″ would be typed in as 321.0809)
4. At the prompt **D?** type in the first distance and press [R/S]
5. The Easting of the next point is displayed **E=**   . Press [R/S]
6. The Northing of the next point is displayed **N=**   . Press [R/S]

Repeat steps 3 to 6 for each line of the close or traverse.

To compute the misclose only, refer to 3.31 (below)
To compute the misclose, unadjusted area or proportional misclose refer to 3.32 (page 6)

To enter a reverse bearing (i.e. to add/subtract 180° to an entered bearing), refer to 3.111 (page 4)

To enter partial or summed distances, refer to section 3.112 (page 4)

3.3 Computing Misclose and Unadjusted Area

3.31 To view Misclose only - Program M

Press [XEQ] [1/x] [ENTER] **(Program M)**

After Close/Traverse data entry in programs C or T, the misclose (or closing bearing and distance back to the start of the traverse) can be computed.

The closing bearing is displayed **B=** (in DD.MMSS format)
e.g. 321°08′09″ would be displayed as 321.0809
Press [R/S]

The closing distance is displayed **D=**

To resume data entry for the close (only in non-coordinate mode)
press [XEQ] [8] [ENTER] (Program S)

Example:
Compute the Misclose of the figure defined by the following bearings and distances:
36°00′04″ 150.000   92°59′15″ 29.350   224°26′10″ 167.82

[XEQ] [XEQ] [ENTER] *B?* [3][6][.][0][0][0][4] [R/S] *D?* [1][5][0] [R/S]
B? [9][2][.][5][9][1][5] [R/S] *D?* [2][9][.][3][5] [R/S]
B? [2][2][4][.][2][6][1][0] [R/S] *D?* [1][6][7][.][8][2] [R/S]
[XEQ] [1/x] [ENTER] (Program M) **B=59.1637** [R/S] **D=0.015** [R/S]

3.32 To view Misclose, Unadjusted Area and Proportional Misclose - Program A

Press [XEQ] [R/S] [ENTER] **(Program A)**

After Close/Traverse data entry in programs C or T, the misclose (or closing bearing and distance back to the start of the traverse), unadjusted area and proportional misclose can be computed.

The closing bearing is displayed **B=** (in DD.MMSS format), Press [R/S]
e.g. 321°08′09″ would be displayed as 321.0809
The closing distance is displayed **D=** , press [R/S]
The area enclosed by the figure in square units is displayed **A=** , press [R/S]
The ratio of the proportional misclose (ratio between length and misclose) is displayed **R =**

Example:
Compute the Misclose, Unadjusted Area and proportional misclose of the figure defined by the following bearings and distances:
36°00′04″ 150.000   92°59′15″ 29.350   224°26′10″ 167.82

[XEQ] [XEQ] [ENTER] *B?* [3][6][.][0][0][0][4] [R/S] *D?* [1][5][0] [R/S]
B? [9][2][.][5][9][1][5] [R/S] *D?* [2][9][.][3][5] [R/S]
B? [2][2][4][.][2][6][1][0] [R/S] *D?* [1][6][7][.][8][2] [R/S]
[XEQ] [R/S] [ENTER] (Program A)
B=59.1637 [R/S] **D=0.015** [R/S] **A=1,845.52** [R/S] **R=23,324**

3.4 Computing two missing distances - Program D

Press [XEQ] [MODE] [ENTER] **(Program D)**

After Close/Traverse data entry of known lines in programs C or T, data for two additional lines with known bearings can be added to the data already entered, and the distances (missing distances) for these two lines can be computed, thus forming a closed figure.

Be careful to ensure that the bearings are not entered 180° the wrong way, as this will generate an invalid solution.

1. At the prompt **B?** type in the bearing of the first line with a missing distance in DD.MMSSSS
       format and press [R/S] (for example 321°08′09″ would be typed in as 321.0809)
2. At the prompt **B?** type in the bearing of the second line with a missing distance in
       DD.MMSSSS format and press [R/S]
3. The distance for the first line is given by **D=** , press [R/S]
4. The distance for the second line is given by **D=**

If the lines with missing distances are scattered in the data entry then enter the lines with
knwon data (bearings and distances) first using program C or T and then run program D to
enter the bearings for the lines with missing distances.
(for example lines 2 and 4 have missing distances and lines 1, 3 and 5 have bearings and
distances, then enter lines 1,3 and 5 in order using C or T and then enter lines 2 and 4 using
program D)

Example:
Compute the missing distance in the closed figure:
(1) 36°00′04″ 153.822   (2) 92°59′15″ Distance? (missing)
(3) 200° 159.100   (4) 280°58′   Distance? (missing)

Enter lines with known data (1 and 3) in order using program C
[XEQ] [XEQ] [ENTER] **B?** [3][6][.][0][0][0][4] [R/S] **D?** [1][5][3][.][8][2][2] [R/S]
B? [2][0][0] [R/S] **D?** [1][5][9][.][1] [R/S]
Then enter lines with missing distances (2 and 4) in order using program D
[XEQ] [MODE] [ENTER] **B?** [9][2][.][5][9][1][5] [R/S] **B?** [2][8][0][.][5][8] [R/S]
The missing distances (lines 2 and 4) in order are displayed:
D=127.912 , press [R/S] **D=166.785**

3.5 Computing curved boundary components (Arc Length and Segment Area) - Program H

Press [XEQ] [SIN] [ENTER] **(Program H)**

Curved boundary components (arc length and segment area) can be computed from a given
chord length and arc radius. The segment area can be added or subtracted to the polygon area
entered using the Close or Traverse program to get a total area of a lot with boundaries
consisting of arc segments.

At the prompt **D?** type in the long chord distance and then press [R/S].
At the prompt **R?** type in the radius of the arc and press [R/S] .

The arc length is displayed as **K =**   Press [R/S]
The segment area is displayed as **G =** Press [R/S]

To continue the program for other curved boundary computations, press [R/S]
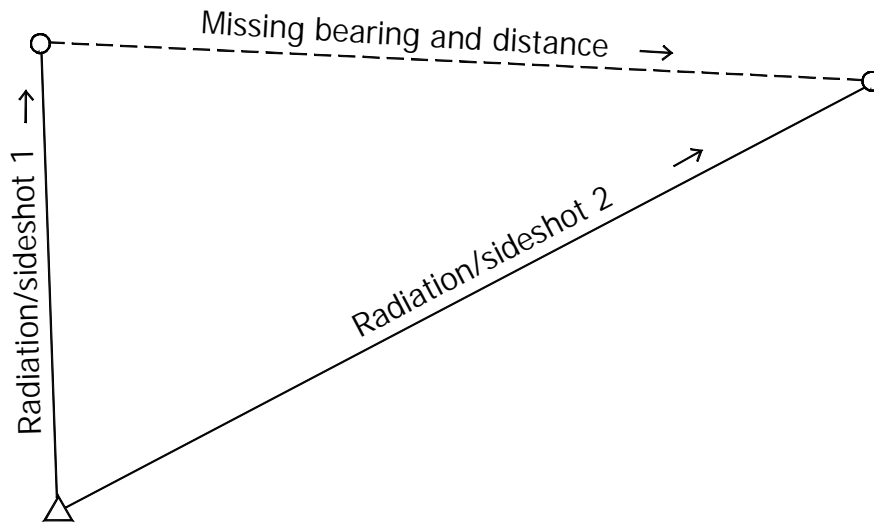
Example:
Compute the arc length and segment area for the given curve data:
Chord length (distance) 20.500   Radius 100

[XEQ] [SIN] [ENTER] **D?** [2][0][.][5] [R/S] **R?** [1][0][0] [R/S]
K=20.536 , press [R/S] **G=7.2**

3.6   Computing Tie between two radiations - Program E

Press [XEQ] [R↓] [ENTER] **(Program E)**

Computes the bearing and distance between two radiated points (tie)

1. At the prompt **B?** type in the bearing of the first radiation in DD.MMSSSS format and press
        [R/S] (for example 321°08′09″ would be typed in as 321.0809)
2. At the prompt **D?** type in the distance of the first radiation and press [R/S]
3. At the prompt **B?** type in the bearing of the second radiation and press [R/S]
4. At the prompt **D?** type in the distance of the second radiation and press [R/S]
5. The Bearing from the end points of the first radiation to the end of the second radiation is
        displayed as **B=**   Press [R/S]
6. The Distance between the two radiations is displayed as **D=** Press [R/S]

Example: Compute the bearing and distance of the tie between the two radiations:
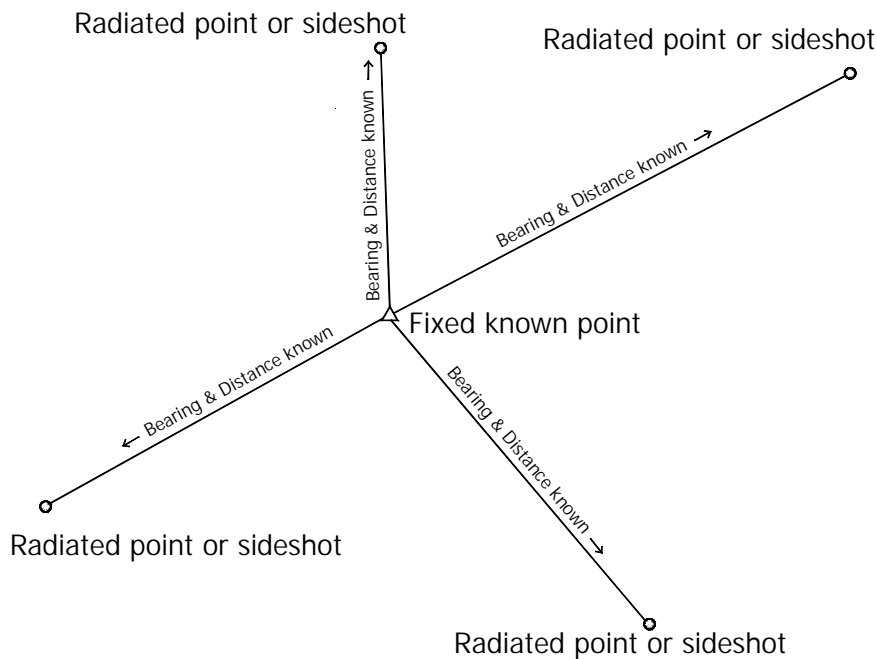321°08′09″ 24.898 and 45°03′12″ 14.56
[XEQ] [R↓] [ENTER] **B?** [3][0][0][.][0][8][0][9] **D?** [R/S] [2][4][.][8][9][8] [R/S]
B? [4][5][.][0][3][1][2] **D?** [R/S] [1][4][.][5][6] [R/S]
B=109.2027 [R/S] **D=27.479**

4 Coordinate Geometry (COGO) Programs

4.1   Computing Radiations (Sideshots) - Program R

Press [XEQ] [7] [ENTER] **(Program R)**

Computes the coordinates of a point given a bearing and distance from a start point.

1. At the prompt *E?* type in the Easting of the start point and press [R/S]
2. At the prompt *N?* type in the Northing of the start point and press [R/S]
3. At the prompt *B?* type in the Bearing in DD.MMSS format and press [R/S]
4. At the prompt *D?* type in the Distance and press [R/S]
5. The Easting of the second point is displayed as **E=**   Press [R/S]
6. The Northing of the second point is displayed as **N=** Press [R/S]

Repeat steps 3 to 6 for subsequent radiations (sideshots) from the same start point

Example: Compute the coordinates of the following radiations:
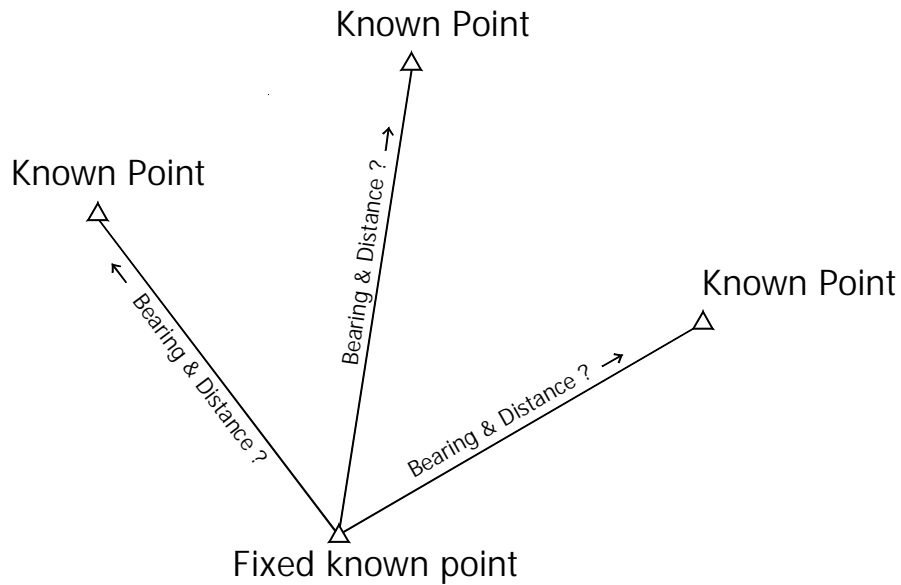From start point E300.000 N500.000,
Bearing 85°48′51″ Distance 150.424 and then Bearing 65°17′16″ Distance 368.519

[XEQ] [7] [ENTER] **E?** [3][0][0] [R/S] **N?** [5][0][0] [R/S]
B? [8][5][.][4][8][5][1][R/S] **D?** [1][5][0][.][4][2][4] [R/S]
E=450.023 [R/S] **N=510.980** [R/S]
B? [6][5][.][1][7][1][6][R/S] **D?** [3][6][8][.][5][1][9] [R/S]
E=634.770 [R/S] **N=654.063**

4.2 Computing Coordinate Traverses - Program T

Refer to 3.21 (Page 5)

4.3   Computing Joins (Inverses) - Program J

Press [XEQ] [TAN] [ENTER] **(Program J)**

Computes the bearing and distance between two points with given coordinates.
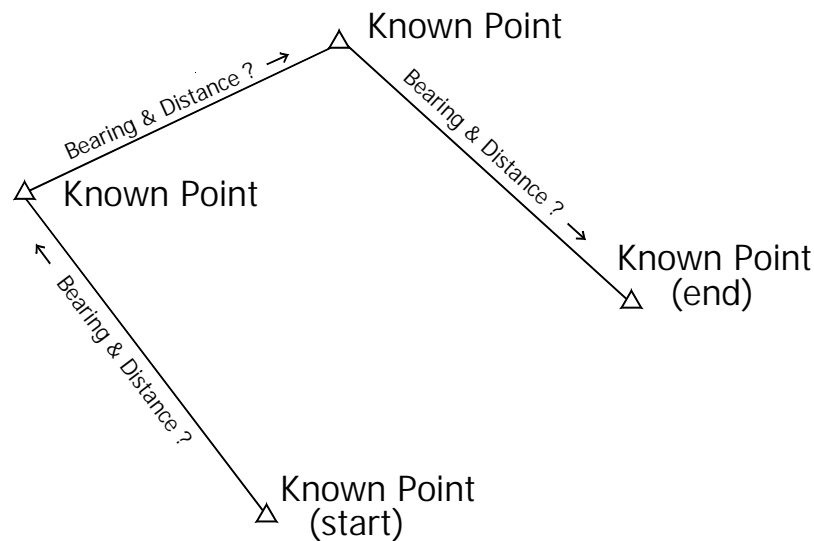
1. At the prompt *E?* type in the Easting of the start point and press [R/S]
2. At the prompt *N?* type in the Northing of the start point and press [R/S]
3. At the prompt *E?* type in the Easting of the second point and press [R/S]
4. At the prompt *N?* type in the Northing of the second point and press [R/S]
5. The Bearing in DD.MMSS format between the 2 points is displayed as **B=**   Press [R/S]
6. The Distance between the 2 points is displayed as **D=** Press [R/S]

Repeat steps 3 to 6 for subsequent inverse (join) computations from the same start point

Example: Compute the bearings and distances between
E300.000 N500.000, E450.023 N510.980 and E300.000 N500.000 and E634.769 N654.064

[XEQ] [TAN] [ENTER] **E?** [3][0][0] [R/S] **N?** [5][0][0] [R/S]
E? [4][5][0][.][0][2][3][R/S] **N?** [5][1][0][.][9][8][R/S] **B=85.4851** [R/S] **D=150.424** [R/S]
E? [6][3][4][.][7][6][9] [R/S] **N?** [6][5][4][.][0][6][4] [R/S] **B=65.1716** [R/S] **D=368.519**

4.4   Computing Inverses (Joins) in Traverse Mode - Program I
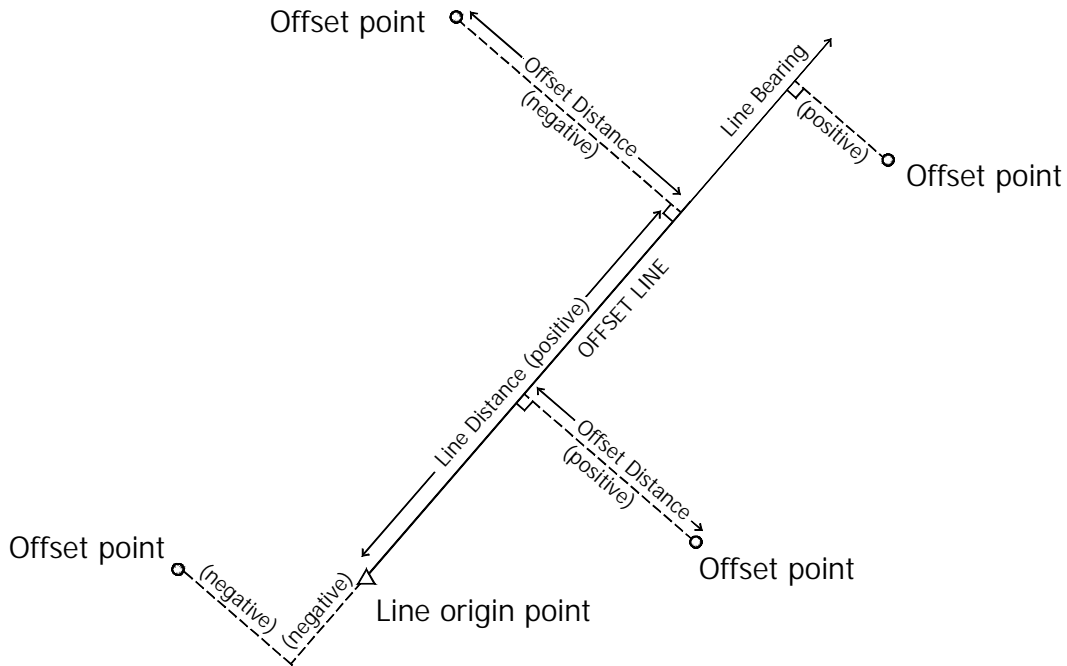

Press [XEQ] [COS] [ENTER] (Program I)

Computes the bearing and distance between coordinated points in traverse mode.

1. At the prompt *E?* type in the Easting of the start point and press [R/S]
2. At the prompt *N?* type in the Northing of the start point and press [R/S]
3. At the prompt *E?* type in the Easting of the next point and press [R/S]
4. At the prompt *N?* type in the Northing of the next point and press [R/S]
5. The Bearing in DD.MMSS format between the 2 points is displayed as **B=**   Press [R/S]
6. The Distance between the 2 points is displayed as **D=** Press [R/S]

Repeat steps 3 to 6 for subsequent inverses (joins) from the end of the previous point (in link or traverse mode)

Example: Compute the bearings and distances between
E300.000 N500.000, E450.023 N510.980 and then E450.023 N510.980 and E634.769 N654.064
[XEQ] [COS] [ENTER] **E?** [3][0][0] **N?** [R/S] [5][0][0] [R/S]
E? [4][5][0][.][0][2][3] [R/S] **N?** [5][1][0][.][9][8] [R/S] **B=85.4851**[R/S] **D=150.424** [R/S]
E? [6][3][4][.][7][6][9] [R/S] **N?** [6][5][4][.][0][6][4] [R/S] **B=52.1433** [R/S] **D=233.675**

4.5   Computing points by line distance and offset - Program N

Press [XEQ] [+/-] [ENTER] **(Program N)**

Points can be created by line distance and offset from a reference line. This is useful in construction grid and boundary surveys.

1. At the prompt *E?* type in the Easting of the start point of the reference line and press [R/S]
2. At the prompt *N?* type in the Northing of the start point of the reference line and press [R/S]
3. At the prompt *B?* type in the Bearing of the reference line (in DD.MMSS) and press [R/S]
4. At the prompt *L?* type in the distance along the line adjacent to where the point is offset and
       press [R/S] (if the distance is in the opposite direction make L negative [+/-])
5. At the prompt *O?* type in the offset distance from the line to the point and
       press [R/S] (if the offset is to the left of the line make O negative [+/-])
6. The Easting of the offset point is **E=** Press [R/S]
7. The Northing of the offset point is **N=**

For each additional offset point, press [R/S] after step 7 and repeat steps 4 to 7 above.

Example: Compute the coordinates of points defined by line and offset from a line starting at E300, N500 with a bearing of 357°02′ :
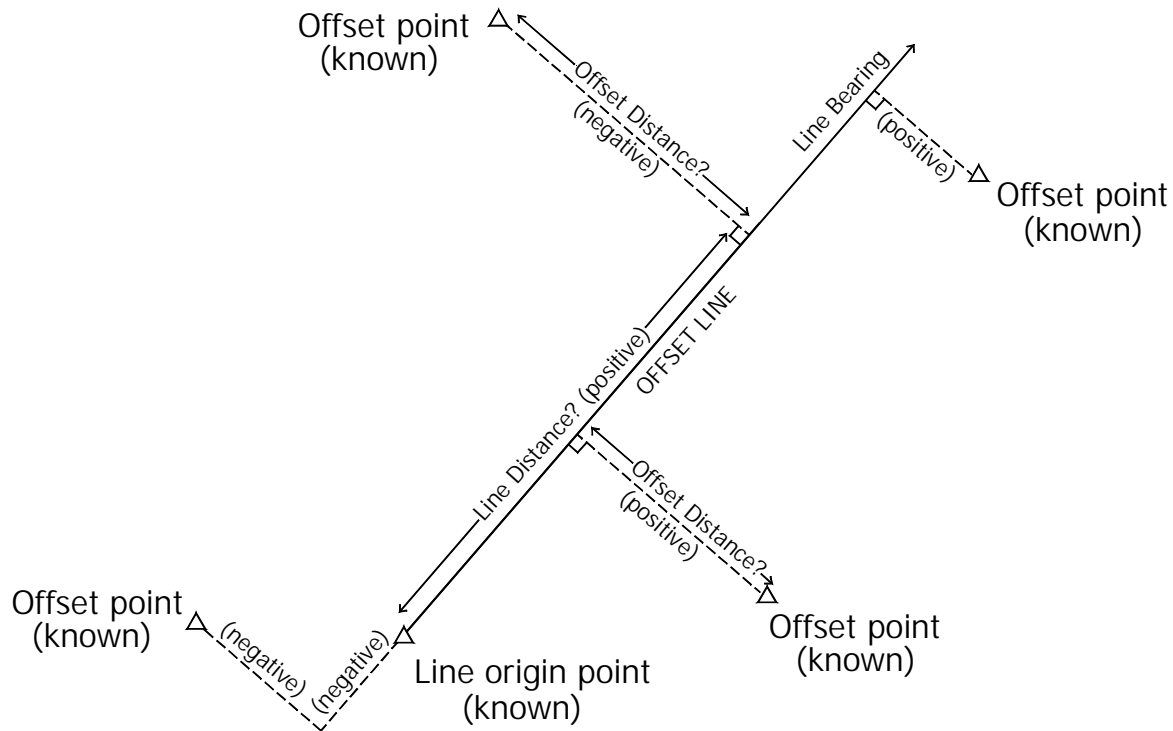Line Distance 54.35 and Offset 5.72 (along line and to the right)
Line Distance 0 and Offset -3 (to the left of the start point)
Line Distance -3 and Offset -2 (in the opposite direction and to the left of the line (brg. 267°02′)

[XEQ] [+/-] [ENTER] **E?** [3][0][0] [R/S] **N?** [5][0][0] [R/S] **B?** [3][5][7][.][0][2] [R/S]
L? [5][4][.][3][5] [R/S] **O?** [5][.][7][2] [R/S] **E=302.899** [R/S] **N=554.573** [R/S]
L? [0] [R/S] **O?** [3][+/-] [R/S] **E=297.004** [R/S] **N=499.845** [R/S]
L? [3] [+/-] [R/S] **O?** [2][+/-] [R/S] **E=298.158** [R/S] **N=496.901**

4.6   Computing line distance and offset between points - Program O

Press [XEQ] [E] [ENTER] **(Program O)**

Line distances and offsets from a reference line can be computed between two points, one point being on the reference line, and the other offset from the line. This computation is useful in construction grid and boundary surveys.

1. At the prompt *E?* type in the Easting of the start point of the reference line and press [R/S]
2. At the prompt *N?* type in the Northing of the start point of the reference line and press [R/S]
3. At the prompt *B?* type in the Bearing of the reference line (in DD.MMSS) and press [R/S]
4. At the prompt *E?* type in the Easting of the second point and press [R/S]
5. At the prompt *N?* type in the Northing of the second point and press [R/S]
6. The distance along the line from the first point to the point adjacent (offset) from the second point is given   **L=** Press [R/S] (if the point is behind the start point in the direction of the line bearing L will be negative)
7. The offset distance from the line to the second point is given   **O=** Press [R/S] (if the point is to the left of the line in the direction of the line bearing O will be negative)

For each additional offset point, press [R/S] after step 7 and repeat steps 4 to 7 above.

Example: Compute the line and offset distances for the following points from a reference line starting at E300, N500 with a bearing of 357°02′:
E 302.899 N 554.573,   E 297.004 N 499.845,   E 298.158 N 496.901

[XEQ] [E] [ENTER] **E?** [3][0][0] [R/S] **N?** [5][0][0] [R/S] **B?** [3][5][7][.][0][2] [R/S]
E? [3][0][2][.][8][9][9] [R/S] **N?** [5][5][4][.][5][7][3] [R/S] **L=54.350** [R/S] **O=5.720** [R/S]
E? [2][9][7][.][0][0][4] [R/S] **N?** [4][9][9][.][8][4][5] [R/S] **L=0.000** [R/S] **O=-3.000** [R/S]
E? [2][9][8][.][1][5][8] [R/S] **N?** [4][9][6][.][9][0][1] [R/S] **L=-3.000** [R/S] **O=-2.000**

5   Utility Programs

5.1   Converting Degrees, Minutes and Seconds to decimal degrees

Type in the angle in DD.MMSS format and press [↰] [8]. The angle is converted to decimal degrees.
For example 321°08′09″ would be typed in as 321.0809 and would be converted to 321.1358

To add or subtract two angles in DD.MMSS format, it is necessary to convert them to decimal degrees first, perform the addition or subtraction and convert the result back to DD.MMSS format.

5.2   Converting decimal degrees to Degrees, Minutes and Seconds

Type in the angle in decimal degree format and press [↱] [8]. The angle is converted to DD.MMSS format.
For example 321.1358° would be typed in as 321.1358 and would be converted to 321.0809 (321°08′09″)

5.3   Converting Links to metres - Program L

Press [XEQ] [y^x] [ENTER] **(Program L)**
To convert distances given in Links to metres

1 link = 0.201168 m, 100 links = 1 chain = 20.117 m = 66 feet,

At the *K?* prompt type in the distance in decimal links to be converted and press [R/S]
The converted distance is displayed as M=

For example: 150 links   = 30.175 m

5.4   Converting Feet, Inches and fractions to metres - Program F

Press [XEQ] [x<>y] [ENTER] **(Program F)**
To convert distances given in Feet, inches and fractions of an inch to metres

1 foot = 12 inches = 0.3048 m, 100 feet = 30.480 m, 1 inch = 0.0254 m

At the *F?* prompt type in the distance to be converted in the following format and press [R/S]:
FF.IIND, where FF is feet, II is inches (between 00 and 11), N is the numerator of the fraction (between 1 & 8) and D is the denominator of the fraction (between 1 & 8). If there is no fractional component enter the distance in FF or FF.II format only.

For example:

350′ 8 ¾″	would be typed in as 350.0834	(= 106.902 m)
7″	would be typed in as 0.07	(= 0.178 m)
10½″	would be typed in as 0.1012	(= 0.267 m)
600′	would be typed in as 600	(= 182.880 m)
100′ ¼″	would be typed in as 100.0014	(= 30.486 m)

The converted distance is displayed as M=

5.5   Polar to Rectangular conversions - Program P

To perform a Polar to Rectangular Conversion:

Type in the Bearing (in DD.MMSS format) and then press [˥] [8] to convert to decimal
(or type in the bearing in decimal degree format and press [ENTER])
Type in the Distance (don't press ENTER) and then press [XEQ] [( )] [ENTER] (Program P)

The difference in Eastings is shown on stack level 2
The difference in Northings is shown on stack level 1

Example: Compute the difference in Eastings and Northings of:
bearing 358°57'30" and distance 157.28

[3][5][8][.][5][7][3][0]   [˥] [8]   (the bearing is converted to 358.9583 decimal degrees)
[1][5][7][.][2][8]   [XEQ] [( )] [ENTER]

The Easting and Northing components are displayed as follows:
-2.8593   Difference in Easting on Stack level 2
157.2540   Difference in Northing on Stack level 2

5.6   Rectangular to Polar Conversion - Program Q

To perform a Rectangular to Polar Conversion (degrees, minutes and seconds format):

Type in the Difference in Eastings and then press [ENTER]
Type in the Difference in Northings (don't press ENTER) and then press [XEQ] [EQN] [ENTER]
(Program Q)

The bearing in decimal degrees is shown on stack level 2
The distance is shown on stack level 1

To view the bearing in DD.MMSS format, press [x<>y] [˥] [8]

Example: Compute the equivalent bearing and distance of the following components:
Difference in Eastings -48.878 Difference in Northings 7.789

[4][8][.][8][7][8] [+/-] [ENTER]
[7][.][7][8][9]   [XEQ] [EQN] [ENTER] (Program Q)

The Easting and Northing components are displayed as follows:
279.0543   Bearing in decimal degrees on Stack level 2
49.4947   Distance on stack level 1
Press [x<>y] [˥] [8] to view the bearing in DD.MMSS format (278°03'15")

6   Software Registration, Service Support and Free Updates

If problems or faults occur with the calculator contact the calculator supplier. For assistance
with installation please contact the supplier of the software. For all other problems, or for other
correspondence, please contact **Richard Stanaway** at *quickclose@quickclose.com.au*

Refer to the QUICKCLOSE web-page for updates, news and other support information.
The Quickclose web-page is: *http://www.quickclose.com.au*
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