



TECHNICAL NOTE (GTN 04/09/02)

TIE-POINT CORRECTIONS

Users who do not want to use the conventional magnetometer / base station correction method to correct for magnetic diurnal variations can use an alternate method referred to as the **tie-point correction**. Tie-point corrections involve the use of one magnetometer and the repeated measurement of magnetic values at a single survey station throughout the day's survey operations.

Specifically, the operator starts the day by making a tie point reading at the designated tie point station on the grid and then starts making regular measurements along the grid. At a designated time, say every hour, the operator returns to the tie point station and makes another tie point reading. This process repeats until the end of the day.

At the end of the day, the operator accesses a tie-point menu option and the survey is corrected automatically using linearly interpolated tie-points. Alternately, the operator can output the tie-point file to a computer for external evaluation and processing.

GEM's TIE-POINT METHODOLOGY

With GEM's tie-point methodology, certain considerations apply:

- Tie-point functionality is only implemented in v5.0 or earlier magnetometers (pending in v6.0 as a future upgrade).
- All tie-point readings and all survey readings to be corrected must be taken the same day.
- A maximum of 750 tie points are allowed (sufficient for one day's operations).
- Normally you correct tie-points within the magnetometer. However, you also have the option of dumping tie-points to a file using the RS-232 connection for visual display and quality control.



TIE-POINT ACQUISITION PROCESS

To acquire tie-points, perform the following steps:

1. From the main menu, press A-survey to access the “Survey” menu.
2. Press 8-tie-point. The system takes a tie-point reading.
3. If the noise is acceptable, press F-ok to accept the reading. Otherwise, repeat the reading.
4. After a good reading is obtained and you have pressed F-ok, the system takes you to the “Reading” menu.
5. Continue taking normal readings until you are ready to return to the tie-point station.
6. When ready to take another tie-point reading, return to the tie-point station and press A-menu to access the “Survey” menu.
7. Press 8-tie-point to take another tie-point measurement.
8. Proceed to the next regular station and continue with the survey and tie-point measurement process throughout the day.

TIE-POINT CORRECTION PROCESS

When you are finished measuring for the day and want to perform diurnal corrections, use the following procedure:

1. Access the “Main” menu.
2. Press 8-tie-point. The system displays the “Tie-point” correction menu.
3. Press C-diurnal correction. The system takes you to the “File” menu.
4. Select the file that you want to process. Note that there is typically only one tie-point file (file #1) but it can be used for correcting many survey files provided that they were all acquired on the same day.
5. Press F-ok. The system corrects the data. You can now dump all data as per the normal dumping process.

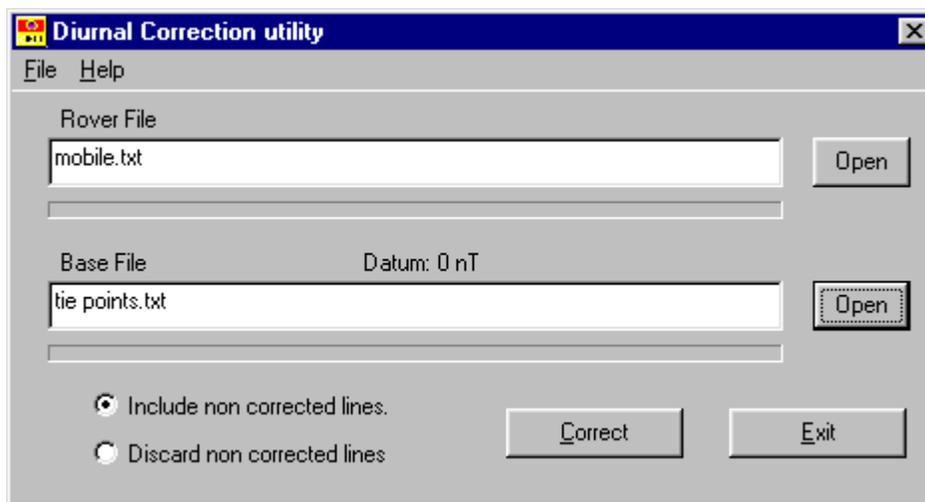


USING GEMLinkW TO MAKE DIURNAL CORRECTIONS

GEMLinkW can also be used to make diurnal corrections using dumped tie-point and data files. The only advantage would be greater user control over data quality – tie-points and data could be evaluated first and the correction performed after all problems are eliminated in the data.

To correct data using tie-points and GEMLinkW:

1. Start GEMLinkW (from the Programs menu). The system displays the GEMLinkW interface.
2. Select the Tools / Diurnal Correction menu. The system displays the Diurnal Correction utility dialog box.
3. Press <Open> and select a Rover file. The system displays the first 50 lines of the text.
4. Specify a Time Entry and Magnetic field value, and press <Ok>. The system returns you to the Diurnal Correction utility box.
5. Repeat this process for the tie-point file (i.e. in the Base File entry field). When completed, the Diurnal Correction utility text box should appear as follows:





6. Press <Correct>. The system corrects the file and outputs a file similar to the following:

A screenshot of the GEMLinkW software interface. The window title is "GEMLinkW D:\Program Files\GEMLinkW\Dumped\corrected.txt". The interface includes a menu bar (File, Options, Tools, Help), a port selection dropdown (COM1), a rate selection dropdown (38400), and a settings dropdown (n,8,1). The main display area shows a header line: "Gem Systems GSM-19 v5.0 7 IX 99 62537 ID 0 file 02 .m 15 II 00". Below this is a table with columns: "time", "line", "station", "field nT", and "corrected". The table contains seven rows of data. At the bottom of the window, there are status indicators: "Received: 0", "Text window: Active", "Data edit: Not Locked", and "Capture mode: OFF".

```
Gem Systems GSM-19 v5.0 7 IX 99 62537 ID 0 file 02 .m 15 II 00

time      line      station    field nT  field nT  corrected
231650.1  00000N   0000000 N   32253.76  00 -02674.70  i173
233040.8  00000N   0000000 N   28851.47  00 -09126.43  i656
233048.0  00000N   0000000 N   39986.46  00  02010.60  i656
233051.5  00000N   0000000 N   37653.88  00 -00320.99  i656
233103.0  00000N   0000000 N   38453.27  00  00481.65  i656
233107.4  00000N   0000000 N   34726.40  00 -03243.98  i656
233111.8  00000N   0000000 N   39164.77  00  01195.64  i656

0
0  readings corrected directly
7  readings corrected with interpolation
1  readings could not be corrected.
```

You are now ready to continue processing and interpreting your results.