

Trimble Access Monitoring

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Trimble Navigation Limited

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Getting Started

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Introduction

The specialized application for the Monitoring software extends the functionality of the Trimble Access software to expedite data collection for monitoring applications.

The workflow is streamlined for regular, but not necessarily continuous, control and deformation surveys. You can:

- Easily set up a station.
- Measure the backsight and all foresight targets and save their details to the job for subsequent site visits.
- Define the measurement parameters such as epoch interval and tolerance.
- View reports of movement above the specified tolerance - there is no need for major analysis in the field.
- View information on the measurement session while still in the field and then output reports that compare known coordinates with measurements over time.
- Import the JobXML file into Trimble office software such as Trimble Business Centre or Trimble 4D Control for further processing.

Monitoring software menus

From the Trimble Access menu, tap Monitoring to:

- Manage your [jobs](#).
- Connect to your [instrument](#).
- [Monitor](#) the points defined in your job.
- [Report](#) on points measured.

To start monitoring, you must be logged in to the Trimble Access software. Logging in defines the folders where monitoring jobs and observation files will be stored.

All monitoring jobs, observation files, and reports are stored in the [\\Trimble Data\<username>\Monitoring] folder.

Managing jobs

From the Monitoring menu, tap *Jobs*.

The following functions are available:

Tap...	To...
New	<ul style="list-style-type: none"> Define job properties. Enter the station information. Orient the instrument. Create the point list by measuring targets. Define the point tolerances. Define the epoch start times.
Open	<ul style="list-style-type: none"> Open a previously defined monitoring list.
Settings	<ul style="list-style-type: none"> Define settings for the current job, including unit settings and decimal places. Define job setup in Wizard or Expert mode.
Edit	<ul style="list-style-type: none"> Edit properties of the current job. Edit station information. Re-orient the instrument. Edit the monitoring list by adding, editing, redefining, or deleting points. Edit the point tolerances. Edit the epoch start times.
Delete	<ul style="list-style-type: none"> Delete the monitoring job file (*.mjob) and all associated observation files (*.mobs). Delete a specific observation file that contains all observations for a particular day for that job.
Orient	<ul style="list-style-type: none"> Orient the instrument after loading an existing job. Shortcut to edit the point list in the current job.

Monitoring points

From the Monitoring menu, tap *Survey* to start monitoring the points defined in your job file.

To view monitoring progress, select one of the following views:

- Summary shows the progress of the current epoch, and the timing details.
- List shows the point list and the number of epochs measured to each point.
- Map shows a graphical display of the points being monitored and the current orientation of the instrument.

Report on points measured

From the Monitoring menu, tap *Reports* to generate a report for measured points including any point movement. View these reports to check data while still in the field or to transfer data from the field to your client or to the office for further processing with the office software.

Further information

The contents of this file are installed on the controller with your application.

For information that extends or updates this Help, refer to the *Trimble Access Release Notes*. Go to <http://apps.trimbleaccess.com/help> to download the latest PDF file of the *Trimble Access Release Notes* or help file for each Trimble Access application.

Tip – For links between the Trimble Access application help PDF files to work, download PDF files to the same folder on your computer and do not change any of the file names.

The Monitoring software

The specialized application for the Monitoring software extends the functionality of the Trimble Access software to expedite data collection for monitoring applications.

The workflow is streamlined for regular, but not necessarily continuous, control and deformation surveys. You can:

- Easily set up a station.
- Measure the backsight and all foresight targets and save their details to the job for subsequent site visits.
- Define the measurement parameters such as epoch interval and tolerance.
- View reports of movement above the specified tolerance - there is no need for major analysis in the field.
- View information on the measurement session while still in the field and then output reports that compare known coordinates with measurements over time.
- Import the JobXML file into Trimble office software such as Trimble Business Centre or Trimble 4D Control for further processing.

Monitoring software menus

From the Trimble Access menu, tap Monitoring to:

- Manage your *jobs*.
- Connect to your *instrument*.
- *Monitor* the points defined in your job.
- *Report* on points measured.

To start monitoring, you must be logged in to the Trimble Access software. Logging in defines the folders where monitoring jobs and observation files will be stored.

All monitoring jobs, observation files, and reports are stored in the [\\Trimble Data\<username>\Monitoring] folder.

Managing jobs

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The following functions are available:

Tap...	To...
New	<ul style="list-style-type: none"> Define job properties. Enter the station information. Orient the instrument. Create the point list by measuring targets. Define the point tolerances. Define the epoch start times.
Open	<ul style="list-style-type: none"> Open a previously defined monitoring list.
Settings	<ul style="list-style-type: none"> Define settings for the current job, including unit settings and decimal places. Define job setup in Wizard or Expert mode.
Edit	<ul style="list-style-type: none"> Edit properties of the current job. Edit station information. Re-orient the instrument. Edit the monitoring list by adding, editing, redefining, or deleting points. Edit the point tolerances. Edit the epoch start times.
Delete	<ul style="list-style-type: none"> Delete the monitoring job file (*.mjob) and all associated observation files (*.mobs). Delete a specific observation file that contains all observations for a particular day for that job.
Orient	<ul style="list-style-type: none"> Orient the instrument after loading an existing job. Shortcut to edit the point list in the current job.

Monitoring points

From the Monitoring menu, tap *Survey* to start monitoring the points defined in your job file.

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Report on points measured

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Installing and updating the software

Use the Trimble Installation Manager to install software and updates for all Trimble Access applications on your controller, including the Monitoring software.

For more information, refer to the Trimble Installation Manager Help.

Licensing the software

Every Trimble Access application must be licensed in order for you to install and operate the software.

The Trimble Access Monitoring software is an optional extension to the Trimble Access base software and must be purchased separately.

To view the installed software licenses, tap the Trimble button in the Trimble Access task bar. The current version installed and the license expiry date is shown for each Trimble Access application.

When you purchase an additional component for the Trimble Access software, or extend an existing license, the license file is updated on the Trimble hosted server. To download the new license file, do one of the following:

- Connect the controller to the office computer through the Windows Mobile Device Center and then run the Trimble Access Installation Manager. This updates the license **and** the software.
- With an Internet connection established, tap the Trimble button in the Trimble Access task bar, or the task bar in the application that you are currently running and then select *About* from the drop down menu. Then tap the *License* button to begin the download process. This updates **only** the license.

About

To access a list of all Trimble Access applications installed on the controller, their version numbers, license information, and EULA (End User License Agreement), tap the Trimble button in the Trimble Access task bar, or the task bar in the application that you are currently running and then select *About* from the drop down menu.

Instruments

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Getting connected


The Trimble Access Monitoring software supports the following Trimble instruments. It communicates best with the firmware versions indicated in the table. The software can also communicate with any version later than that shown.

Trimble Instrument	Version
Trimble VX Spatial Station	R12
Trimble S6 total station	R12
Trimble S8 total station	R12
Trimble S5/S7/S9 total station	H1

Note - The Trimble Access Monitoring software does not support the Trimble tablet.

The Monitoring software does not connect to the instrument automatically. Use one of the following methods.

Connecting robotically to the instrument

1. Open the instrument form. Do one of the following:
 - From the Monitoring menu, tap *Instrument*.
 - Tap the instrument status button  and then tap *Connection*.
2. Check that the *Radio channel* and *Network ID* set on the controller match the instrument.
 - To change these values on the controller, tap *Change*, enter the required values and then tap *OK*.
 - To change these values on the instrument, do one of the following:


- Use the instrument face 2 display.
- Use a direct connection to the instrument:
 - On a Trimble CU controller, set the Connection type to *Clipped on*, and then tap *Connect*.
 - On a TSC2/TSC3 controller, set the Connection type to *USB*, and then tap *Connect*.

The radio settings configured in the controller will be set in the instrument on connection. Tap *Disconnect* to end the direct connection, and then disconnect the controller from the instrument.

3. Set the connection type to *Radio*.
4. Tap *Connect*.

Note - On an Trimble S8 total station, the instrument mode must be set to *Survey* to enable a robotic connection with the *Monitoring* software. If the instrument mode is set to *Monitoring* then the *Trimble Access* software will not connect with the instrument robotically. This mode can be updated on the instrument face 2 display.

Connecting directly to the instrument

1. Do one of the following:
 - On a Trimble CU controller, clip the controller onto the instrument.
 - On a TSC2/TSC3 controller, use the USB-to-hirose cable.
2. Open the instrument form. Do one of the following:
 - From *Monitoring*, tap *Instrument*.
 - Tap instrument status  and then tap *Connection*.
3. Select the connection type:
 - On a Trimble CU controller, select *Clipped On*.
 - On a TSC2/TSC3 controller, select *USB*.
4. Tap *Connect*.

Notes

- *The Monitoring software cannot share an instrument connection with other Trimble Access applications. Before you start Monitoring, make sure that the instrument is not connected to other software applications.*
- *The Monitoring software does not support Bluetooth or Serial connections.*

PIN lock security

When PIN lock security is enabled on a Trimble VX Spatial Station or Trimble S Series total station (except the S3), you must enter the correct PIN to communicate with the instrument.

To set or change the PIN, use the [Security] option on the face 2 display of the instrument.

To connect to and communicate with an instrument with PIN lock security enabled, do one of the following:

- On the controller, the *Instrument locked* screen appears when connecting to the instrument. Enter the PIN and then tap *Accept*.
- On the instrument, use the [Unlock Instrument] option on the face 2 display:
 - When the instrument is started, [Unlock Instrument] appears for 10 seconds.
 - From the [Waiting for connection] screen, press the instrument trigger button to access the [Unlock Instrument] option.




If the instrument is locked and you forget your PIN, contact your local Trimble dealer for help. Ten incorrect attempts to unlock the instrument using a PIN results in the instrument being blocked. If this occurs, you will need to unblock the instrument.

1. Close Monitoring.
2. Start General Survey and attempt to connect to the instrument.
3. Unlock the instrument by entering a PUK [Personal Unblocking Key] code. If you do not know the PUK for your instrument, contact your local Trimble dealer.






Note -The PIN lock security support is available only when using instrument firmware version R10.0.58 or later.

Status information

The instrument status icon that appears in the title bar has three main states:

Icon	Shows that
	<ul style="list-style-type: none"> • The instrument is connected, and • the instrument is level, or the compensator is disabled, and • the instrument battery is good.
	<ul style="list-style-type: none"> • The instrument battery is low.
	<ul style="list-style-type: none"> • The instrument connection is lost, or • the instrument is no longer level and the compensator is on, or • the instrument battery is critical.

For more details on the instrument status, tap the instrument status icon. The Connection, Level, and Battery icons that appear next show different images depending on their state. Tap the icon for more information:

Icon	Shows that
	The instrument is connected. Tap <i>Connection</i> to open the connection form .
	The instrument is not connected. Tap <i>Connection</i> to open the connection form .
	The instrument is level. Tap <i>Level</i> to view the level form.
	The instrument is not level. Tap <i>Level</i> to view the level form.
	Instrument battery status. The amount of yellow displayed indicates the level of power remaining. Tap <i>Battery</i> to view more details on the instrument power status and to access the controller battery status.

Job Operations

Jobs

Creating a new job

Opening a job

Orient to backsight

Editing a job

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Settings

Jobs

The job file contains all the information required to start monitoring points, including:

- Job properties, such as name, location, operator, and description.
- Station information for the instrument, including coordinates, station name, and instrument height.
- The list of points to be included during monitoring; their name, coordinates, and target information.
- Timing information, including start time and epoch intervals.
- Tolerances for point movement.
- Options such as the Face order, Observation order, and EDM timeout.
- Job settings, including units, Coordinate order, and Wizard/Expert mode.

The creation of a job includes all the parameters that define the station setup, as well as the location of the backsight and all foresight points.

There are no observations stored at this step, but the observations are used to calculate approximate coordinates. What is recorded is the general job properties, coordinates for the station point, the target details, and the approximate coordinates of all the points in the monitoring list. This information is used when the survey is started to turn to the appropriate place to take the observations.

The job file is stored in the [\\Trimble Data\<username>\Monitoring] folder and has the extension *.mjob.

You must either create a [new](#) job, or [open](#) an existing job before you can start monitoring.

When opening an existing job, you must tap *Orient* to set your orientation to a backsight before you can continue. The backsight measurement is used only to orient the instrument so the points can be measured successfully. An orientation is calculated separately for each epoch during monitoring.

Note – Monitoring jobs cannot be opened directly by other Trimble Access applications. If you import a Monitoring JobXML file into General Survey, only the last measured coordinates for each point are imported.

Creating a new job

To define a new list of points to monitor, you must create a new job, which includes connecting to the instrument and observing the backsight:

1. From Monitoring, tap *Instrument* and then [connect to the instrument](#).
2. From Monitoring, tap *Jobs*.
3. Tap *New*.
4. Enter the properties of the new job and then tap *Next*.
5. To import station, backsight and/or foresight coordinates from a *.csv file, tap the *Import* button.


Note - If you do not want to import a *.csv file, tap *Next* and then go to Step 6.

Select a *.csv file from the list then tap *Next*.

To select the station point, tap on one point in the list and then tap *Next*.


Note - If your station point is not in the *.csv file, tap *Next* without selecting a point from the list.

To select the backsights, tap on one or more points in the list and then tap *Next*.

Note - Tap  to *Select All*, *Select None* or *Invert selection*.

To select the foresights, tap on one or more points in the list, tap *Finish* and then tap *Next* to go to the next step in the New Job wizard.

Notes


- Tap  to *Select All*, *Select None* or *Invert selection*.
 - Any unselected points will not be imported into the job.
 - Any duplicate point names will be appended by an underscore, followed by a number.
6. Enter the details of the instrument station, including the station setup type, then tap *Next*. The station setup type must be one of the following:
 - **Known point**-To define the station setup, you must have at least one imported or measured backsight point.
 - **Resection**- Before you can take further measurements to new points, you must have at least two imported or previously measured backsight points in the job .
 7. Define the scale factor and then tap *Next*.

Note - If the scale factor is set to Free, before you can take further measurements to new points, a Known point setup must have at least one imported or previously measured backsight points in the job.

8. You will now be in the Monitoring list screen. From here you can view and edit backsight and foresight points. Points previously imported from a *.csv file will need to have target details added. To do this, tap on each point and select *Edit target*. Enter the target height, Prism and then tap *Accept*.
9. You can manually add points to the monitoring list, and/or import them from a *.csv file.

To manually add points to the monitoring list:

- a. Tap .

If there is no instrument connection, when you tap the Add button , you are prompted to connect to an instrument.

Alternatively, before you add points, tap the **instrument status** icon in the Trimble Access task bar.

- b. Enter the point details. At least one of the points must have the *Backsight* option selected.

Note - If you have not Oriented your instrument, the first point you add must be a backsight. After measuring the point, you will be prompted to enter an Azimuth for the backsight.

- c. Select the *Prism* type. When measuring to reflectorless (DR) targets, set the *Prism* type to DR.
- d. Select the *Target lock* method. This setting is used for all subsequent measurements in the monitoring session:


- In prism mode, select Autolock, FineLock or Long Range FineLock to lock on to the remote prism.

The prism lock status button  indicates when the instrument is locked to a prism.

A search is automatically performed if a measurement is initiated when Autolock is enabled but the instrument is not locked to the target.

- In either Prism or DR mode, select *Manual* to manually aim to a target rather than using Autolock.
- In DR mode, select *Automatic* to automatically measure the point.


When using this option, there is no automatic tracking. That is, the instrument always turns to the same angles and measures a distance in DR mode. This option is useful when you are only interested in whether the distance to the target is changing over time.

- You can switch on or switch off the laser pointer when the target lock option is set to *Manual* or *Automatic*. Tap  to turn the laser pointer on or off. The laser


pointer is used only in learning mode for locating the target, not during a monitoring session.

- e. Point to the target and then tap *Measure*.
- f. Repeat steps a through e until all backsights and foresights are measured.

To key in points to the monitoring list:

- a. Tap .
- b. Key in the Point name, Northing, Easting, and Elevation and then tap *Next*.
- c. Key in the target details of the point. Tap *Finish* to add the point.
- d. Repeat steps a to c above until all backsights and foresights are keyed in. At least one point must be a backsight.

To import points from a csv file:

- a. Tap .
- b. Select the *.csv file from the list and then tap *OK*. The system shows you the number of points imported. The points are added to the monitoring list.

Notes

- *.csv files must be saved in the [\\Trimble Data\<username>\Monitoring] folder.
- The *.csv file that can be imported into the Monitoring list has a different format to the one that can be imported at the start of the job wizard. The comma delimited file imported at the start of the jobs wizard can contain Pointname, First ordinate (Northing), Second ordinate (Easting), Elevation and Code. The comma delimited file imported into the Monitoring list can contain the following information:

Field...	Contains...
1	Point name
2	First ordinate (Northing)
3	Second ordinate (Easting)
4	Elevation
5	Code
6	Description 1
7	Description 2
8	Target height and Measurement method
9	Target type or Prism constant
10	Target mode

- The monitoring list **must contain** the first four fields. All other fields are optional. If fields 8 to 10 are null, the file can still be imported but the targets must be manually edited in the Monitoring software before you can save the monitoring list. To do this, tap and hold on a point with a null value and then select *Edit* from the menu.

- The Northing, Easting, Elevation, Target height, and Prism constant must be in the same units as the current job.
- Field 8: The Measurement method controls whether the measurement is true vertical height or it is measured to the bottom notch on a Trimble prism base. All target heights are assumed to be true vertical, unless the target height has a 'b' suffix (bottom notch), for example, '1.23b'.
- Field 9: When you use a Trimble target, the prism name is shown in this field. When you use a Custom target, the prism constant is shown in this field. The following table shows the allowable prism types and the applicable prism constants:

Prism type	Prism constant
VXSeriesMultiTrack	0.010
SSeries360Prism	0.002
SSeriesTraversePrism	-0.035
Small318mmTiltablePrism	0.000
Large635mmTiltablePrism	0.000
MiniPrism	-0.018
SuperPrism	0.000
Monitoring 25mm Prism	-0.017
Monitoring 62mm Prism	-0.040
Control point 62mm TiltablePrism	0.000


- Field 10: The Target mode field may contain one of the following:

Field 10 options	Details
DR	DR on
AutolockOff	Autolock off
AutolockOn	Autolock on, Target ID off
a number between [1] and [8]	Autolock always on, using the specified Target ID . Note that Target ID is not used by the Monitoring software so this is ignored and Autolock is used.
FineLock	FineLock on
LongRangeFineLock	LR FineLock on

- The *.csv file is in the same format as the rounds list, which you could export from the Trimble Survey Controller software when you use a Trimble VX Spatial Station or Trimble S Series total station and have the Survey Controller Engineering option (P/N 90100-02, 90100-03) enabled on your controller.
- You need not have an instrument connected to import *.csv files into the monitoring job.

- If you import a point, and a point of the same name already exists in the monitoring list, the imported point has *_1* appended to the name.

7. Once all of the monitoring points are added to the list, check the following requirements:

- At least one of the points is defined as the backsight ().
- The monitoring list is in the same order that you want the points to be observed. Tap the table header to sort by:
 - Backsights / foresights
 - Point Name
 - Azimuth

Notes

- You can enter multiple backsights. To change one of the backsight points, clear the Backsight check box for the current backsight, edit the new backsight and then select the Backsight check box. For more information, see [Editing a job](#).
- To view other options, tap and hold on a point. From the context sensitive menu, you can turn the instrument to the point, activate or deactivate a point, edit a point, and delete a point from the monitoring list.

8. Tap *Next*.

9. Define the Tolerances. Any movements outside the specified horizontal and vertical tolerances cause the system to generate an alert. For more information, see [Out of tolerance measurements](#). Tap *Next*.

10. Define the *Epoch start* time of each epoch:

- *Idle time (min)*: the wait time between the end of one epoch and the start of the next.
- *Interval time (min)*: the wait time between the start of one epoch and the start of the next. The minimum time varies depending on the time taken to complete each epoch; that is, the interval time must be longer than the time taken to measure an epoch.

11. Tap *Next*.

12. Define the *Face order*:

- *F1 only* - observations are taken on face 1 only
- *F1... F2...* - all face 1 observations are taken to all points and then face 2 observations are taken to all points
- *F1/F2* - face 1 and then face 2 observations are taken to the first point, face 1 and then face 2 observations are taken to the next point, and so on

13. Define the *Observation order*:

- *123.. 123* - observations on face 2 are taken in the same order as the observations on face 1
- *123.. 321* - observations on face 2 are taken in the reverse order to the observations on face 1

14. Define the *EDM timeout*.

Tip - You can reduce the EDM timeout to improve performance. If the instrument struggles to get a measurement due to, for example, reflective or dark surfaces, increase the EDM timeout.

Tap *Finish*.

15. When the job summary appears, tap *Survey* to begin.

Opening a job

If you have already created a Monitoring job, you can open it to generate reports or to monitor the same targets on a subsequent site visit:

1. From Monitoring, tap *Jobs*.
2. Tap *Open*.
3. Select the job. The *Jobs* menu appears again.

Note - When the Monitoring software starts, the last used job is automatically loaded.

Once you open a job, you can:

- [Orient](#) to the backsight.
- [Start a survey](#).
- [Edit details](#) of the current job. For example, add or remove points in the monitoring list.
- [Create reports](#).

Orient to backsight

To orient the instrument to a backsight in the current job:

1. From Monitoring, tap *Jobs*.
2. Tap *Orient*.

Note - If you are not already connected to an instrument, tapping *Orient* opens the *Instrument Connection* screen.

3. Check that the station details are correct. If necessary, edit the Instrument height.
4. If you have more than one backsight, the Select backsight screen opens. Tap on the backsight you want and then tap the *Select* button to open the Orient to backsight screen. If there is only one backsight, the Orient to backsight screen opens.
5. Check that the target details are correct, aim the instrument at the backsight and then tap *Measure*.
6. Once the instrument has measured the backsight, the results screen appears showing the Measured Horizontal and Vertical Distances, Calculated Horizontal and Vertical Distances, and the Differences. Tap *Accept* to return to the Jobs menu.

Note - To directly access the Orient to backsight screen, select *Orient to point* from the *Points* screen.

Editing a job

The [edit job wizard](#) lets you change many settings:

- Job properties, such as Location, Operator, Reference, Description, and Notes.
- Station details, such as the instrument height and coordinates.
- Epoch start times and tolerances.
- Observation order and EDM timeout
- From within the edit job wizard, the monitoring list screen offers a range of configuration options that allow you to:
 - [Reorient to the backsight](#)
 - [Change the backsight](#)
 - [Add a point to the monitoring list](#)
 - [Delete a point from the monitoring list](#)
 - [Rename a point or change target details](#)
 - [Disable a point](#)
 - Turn the instrument towards a point.
 - [Define the order that the points will be observed in.](#)

Notes

- *In Settings, if the Job setup UI is set to Expert, you can configure these options individually rather than going through the wizard.*
- *The controller must be connected to an instrument to:*
 - *reorient to the backsight point*
 - *remeasure a foresight point (only available for a new job)*
 - *add a new backsight or foresight point*

Editing a job

The following job setup is described in terms of Wizard mode:

1. Tap *Jobs*.
2. To open a job if the correct job is not already open, tap *Open*, select the job and then tap *OK*.
3. Tap *Edit*.
4. Modify the job properties, if required, and then tap *Next*.
5. Modify the Instrument height, if required, and then tap *Next*.
6. If required, modify the scale factor and then tap *Next*.
7. The monitoring list appears. Add or edit points in the monitoring list, if required, and then tap *Next*.

Note -*Before you can add points to the list, you must measure to a backsight.*

8. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Reorienting to the backsight


The easiest way to reorient to the backsight is to tap *Orient* from the Jobs menu. If the job has multiple backsights, select one backsight from the list that appears when you tap *Orient*.

You can also reorient to the backsight when editing a job. To do this:


1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap on the backsight and then select *Orient on point <point name>*.
3. Reconfigure the point details, if required, and then tap *Measure*.
4. Tap *Next*.
5. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Changing the backsight point

1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap and hold on the backsight and then select *Edit point*.
3. Clear the *Backsight* check box and then tap *Accept*.
4. Tap and hold on the new backsight and then select *Edit point*.
5. Select the *Backsight* check box and then tap *Accept*.
6. Tap *Next*.
7. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Note -  appears beside the backsight point name.

Adding a point

1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap .
3. Enter the point name and target details and then tap *Measure*.
4. Tap *Next*.
5. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Deleting a point

1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap on the point and then select *Delete point*.
3. Tap *Next*.
4. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Renaming a point or changing the target details

1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap on the point and then select *Edit point*.
3. Enter the point name and target details and then tap *Accept*.
4. Tap *Next*.
5. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Enabling or disabling a point

1. Follow steps 1 to 6 to [edit](#) the job.
2. From the monitoring list, tap on the point and then select or deselect *Active* to enable or disable the point.
3. Tap *Next*.
4. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Defining the order that the points are observed in

The monitoring list is in the same order that you want the points to be observed.

1. Follow steps 1 to 6 to [edit](#) the job.
2. Tap on the heading to sort by:
 - Backsight / foresights
 - Point Name
 - Azimuth
3. Tap *Next*.
4. Modify the Tolerances, Epoch start time, and Observation order, if required, and then tap *Finish*.

Deleting files

A monitoring project consists of the monitoring job (*.mjob) that contains all the details required to start a monitoring survey and the measured observation files (*.mobs).

When deleting files using Monitoring, you can delete the monitoring job file (*.mjob) and all associated observation files (*.mobs) or you can delete a specific observation file that contains all observations for a particular day for that job.

To delete files:

1. From Monitoring, tap *Jobs*.
2. Tap *Delete*.
3. Select the job. The associated observation files are displayed.
4. Do one of the following:

- To delete the monitoring job and all associated observations files, select the *Delete all* check box, and then tap *Delete*.
 - To delete specific observation files on a specific survey date(s), select the check box beside the required date(s) and then tap *Delete*.
5. Tap *Yes* to permanently delete the files.

Settings

All Monitoring settings and options are defined in the Monitoring application, not in the Settings application on the Trimble Access menu.

Tap *Jobs / Settings* to define the following:

- Units, including distance, angle, temperature, and pressure.
- The number of decimal places to display.
- Coordinate order, either North/East/Elevation or East/North/Elevation.
- Wizard or Expert mode for the job setup. Expert mode allows a more advanced user to move through job setup menus quickly rather than follow a wizard.
- Obs file rollover. Select this check box to create a new obs file (*.mobs) at midnight. This ensures that the file does not become too large.

Settings are saved with the job details. When you load an existing job, it includes the settings defined for that job.

When you create a new job, the last-used settings apply.

Time/Date

The observation file names are generated using the date and time defined in the operating system on the controller, so it is important that these are set correctly.

To set the time and date on a Trimble controller:

1. Do one of the following:
 - On a TSC3 controller:
 - a. Press the Windows Start button to open the *Start* menu.
 - b. Tap [Settings / Clock and Alarms].
 - On a TSC2 controller:
 - a. Press the Windows button to open the *Start* menu.
 - b. Tap [Settings / System / Clock and Alarms].
 - On a Trimble CU controller:
 - a. Press the Windows button to open the taskbar.
 - b. Double-tap the clock on the right of the taskbar.
2. Change the date and time as required. Press *Ok* to accept the new settings.

The time and date display format in the Monitoring is also defined from within the controller operating system.

To set the time and date **formaton** a Trimble controller:

1. Do one of the following:

On a TSC3 controller:

- a. Press the Windows Start button to open the *Start* menu.
- b. Tap [Settings / System / Regional Settings / Time or Date].

On a TSC2 controller:

- a. Press the Windows button to open the *Start* menu.
- b. Tap [Settings / System / Regional Settings / Time or Date].

On a Trimble CU controller:

- a. Press the Windows button to open the *Start* menu.
- b. Tap [Settings / Control Panel / Regional Settings / Time or Date].

2. Change the date and time format as required. Press Ok to accept the new settings.

Note -The observation files (*.mobs) are saved in the YYYYDDMM format. When exporting reports, the observation date and default report names are formatted using the controllers time and date format.

Survey

Monitoring

Atmospheric corrections

Failed measurements

Out of tolerance measurements

Monitoring

To start monitoring:

1. From Monitoring, tap *Instrument* and then [connect to the instrument](#).
2. Create a [new job](#) or [open](#) an existing job and orient the instrument.
3. To open the monitoring status form, do one of the following:
 - From the Monitoring menu, tap *Survey*.
 - From the Jobs menu, tap *Survey*.


The observations are stored to the *.mobs file. The observation file name is generated from the [date](#) on the controller.

Each day, a new observation file is created.





Note – The **Survey** button is enabled only when all of the following criteria have been met:

- A new job is created or a job is opened.
 - There is a connection to the instrument.
 - The backsight is defined and the instrument is oriented.
4. Tap *Start*.
 5. Enter the Temperature and tap *Accept*.
- The *Next epoch start* time field is updated and the status bar begins counting down the time until the survey starts.
- To start the next epoch immediately, tap *Start now*.
- When a job is defined to use *Idle time* between epochs, the survey starts immediately.

Notes

- Tap  to enter or update the *atmospheric correction* before you start the survey, or any time during the survey.
- If you enter an atmospheric pressure and want to return to using the internal atmospheric pressure of the instrument, you must restart the Monitoring application.
- If your instrument supports FineLock or Long Range FineLock technology, then before measuring, the appropriate mode is automatically set based on the distance to the target to give the most reliable results.
- If you selected Manual as the target lock method, the instrument automatically turns to the target and pauses to allow you to sight the target. You must manually sight the target and then tap Measure to continue.

During a monitoring survey, you can switch between the following forms:

Tap...	To view...
 Monitoring status	<ul style="list-style-type: none"> • the name of the observation file where all observations are being stored • the start time for the next epoch • monitoring status
 List view	<ul style="list-style-type: none"> • points in the monitoring list • the number of epochs measured • measurement progress within an epoch • monitoring status
 Map view	<ul style="list-style-type: none"> • a graphical display of the points in the monitoring list • the current orientation of the instrument
 Atmosphere	<ul style="list-style-type: none"> • to update the atmospheric corrections. The new values are applied the next time an epoch is saved.


During monitoring, tap the *Close* button to return to the main monitoring menu and generate *reports* on the measured epochs, or to view the *instrument status*. Monitoring will continue to run in the background.

To stop monitoring:

1. Tap *Stop* on any of the Monitoring status, List view, or Map view screens.
If measurements are not in progress the survey is stopped.
2. If measurements are in progress you are asked when to stop the survey.
 - Tap *Yes* to stop the survey immediately
 - Tap *No* to stop the survey after the current epoch has been completed.

Atmospheric corrections

The Monitoring software applies an atmospheric parts per million (PPM) correction that is applied to measured slope distances to correct for the effects of the earth's atmosphere. PPM is determined from observed pressure and temperature readings together with specific instrument constants.

The pressure and instrument constant is obtained directly from the instrument, but you must manually enter the temperature. Tap *Survey* and then tap . The Monitoring software automatically calculates the atmospheric correction based on these values.

If you enter an atmospheric pressure and want to return to using the internal atmospheric pressure of the instrument, you must restart the Monitoring application.

Note - *If you prefer to use an alternative pressure reading, you can overwrite the barometric pressure from the instrument.*

The temperature and pressure (and therefore, atmospheric correction) is saved in the observation file (*.mobs) with the measurements for every epoch. You can update the temperature at any time during monitoring—the corrections will apply to the next epoch.




Failed measurements

The instrument tries to measure each point for the time specified in the EDM timeout field. If the prism is obstructed, the measurement fails after this time and the point is skipped.

Tip - You can reduce the EDM timeout to improve performance. If the instrument struggles to get a measurement due to, for example, reflective or dark surfaces, increase the EDM timeout.

- If a point is skipped on face 1, the face 2 measurement automatically skips.
- If a point is skipped in one epoch (in either face 1 or face 2), the instrument still tries to measure the point in all subsequent epochs.
- All observations are recorded in the observation file. However, when either face order F1 F2 or F1/F2 is being used, all points must be measured on both faces for the monitoring software to detect any displacements in the epoch. The exception is when the F1 only method is used.
- Points measured on only 1 face will not appear in any reports if a face 2 observation is expected.
- When either face order F1 F2 or F1/F2 is being used, the backsight must be measured on both faces for the monitoring software to calculate coordinates or displacements for any of the foresight points in the epoch. If the backsight is not measured in both faces, coordinates are not calculated for any of the foresights. The exception is when the F1 only method is used.

The list view indicates the measurement progress for each point in the current epoch:

Icon	Measurement status...
	Measurement in progress
	Measurement successful
	Measurement failed

The monitoring software displays the *Point alert* screen at the end of each epoch with a list of points that could not be measured in that epoch.

Out of tolerance measurements

After each epoch is observed, the Monitoring software checks to see if any of the points within the epoch have moved more than the tolerance specified in the job.

Two types of tolerances are set in the job:

- Horizontal and vertical foresight displacement tolerances.
 - If any of the points have moved more than the specified tolerance, a Point alert warning appears with a list of the moved points.
 - Tap on a point to view more information, such as the movement compared with the first set of observations, or the movement compared with the previous epoch.
 - You can also see this information in the [Displacements](#) report.
- Horizontal and vertical backsight residual tolerances.
 - If the backsight observations are outside the residual tolerance, a Point alert warning appears with a list of the backsight residuals.
 - Tap on a point to view more information, such as the movement compared with the first set of observations, or the movement compared with the previous epoch.

Note -If an alert appears at the end of an epoch for backsight residuals, the Monitoring software will not show a point alert for any displacements in the foresight measurements for the observed epoch.

Tip The Monitoring software checks displacements to the reference coordinate and to the coordinates calculated in the previous epoch. In the scenario when a point moves once for more than the tolerance, and then does not move any further, an alert appears in the first epoch the displacement is noticed, and then in subsequent epochs because the comparison to the reference coordinate continues. Select the *Only show new displacements* check box when setting up the job tolerances to disable the reference coordinate check and to only report new displacements.

Reports

[Reviewing displacements](#)

[Exporting reports](#)

[Transferring files to the office](#)

Reports

Use the Report option to review observed displacements or to create custom ASCII files on the controller while in the field. You can use the predefined formats or create your own custom formats.

Reviewing displacements

To review all displacements for a specific observation date:

1. Open the job.
2. From the Monitoring menu, tap *Reports*.
3. Select the observation date that you want to report on and then tap *Displacements*.
4. Use the Compare to option to display the largest movement within each epoch with respect to the first (reference) epoch or with respect to the previous measured epoch.

Tap a line in the table to view all point displacements from that epoch. From the point displacements screen, tap on a point to view the displacements for that point with respect to the first (reference) epoch and the previous measured epoch.

Exporting reports

To export a report on the monitoring observations:

1. Open the job.
2. From Monitoring menu, tap *Reports*.
3. Select the Observation date, or select *All days* to create a report that includes observations from each day of the current job. Tap *Export*.
4. Select the required Export format. The following formats are available by default:

Select...	To create...
CSV coordinates (East-North)	A CSV file that shows a list of coordinates for every point at every epoch using East-North coordinate order.
CSV coordinates (North-East)	A CSV file that shows a list of coordinates for every point at every epoch using North-East coordinate order.
JobXML	A JobXML file that contains all points at every epoch. This file can be imported into Trimble 4D Control. If you import a Monitoring JobXML file into General Survey, only the last measured coordinates for each point are imported.
Epoch Comparison with Previous	A report that shows the movement of every point in every epoch, compared with the previous epoch. You can view this report on the controller. Any displacements that are above the tolerances specified in the job are highlighted in red.
Epoch Comparison with Reference	A report that shows the movement of every point in every epoch, compared with the first set of observations. You can view this report on the controller. Any displacements that are above the tolerances specified in the job are highlighted in red.
Raw observation csv file	A CSV file that contains a list of all raw observations at every epoch.
Point report (Word)	A report that displays a scatter plot and trend chart for each point, showing the displacements over time. This report can only be viewed on the office computer, using Microsoft Word.
Monitoring job	A monitoring job file that contains the average coordinates of each point over the number of epochs observed. You can then load this file into the Monitoring software to use as reference coordinates for subsequent epochs. Use this to improve the reference coordinates.
Observations XML	An XML file that can be copied to the office computer and processed using the ASCII File Generator to create other reports.

All exported files are saved in the [\\Trimble Data\<username>\Monitoring] folder.

Generating reports in the office using the ASCII File Generator

Use the ASCII File Generator utility program to apply custom export style sheets to monitoring data and generate reports on the office computer. This utility is useful for creating export files or reports for monitoring jobs that are too large to be processed on the Trimble CU or TSC2/TSC3 controllers (the Windows CE and Windows Mobile operating systems have limited memory available for carrying out style sheet transformations).

1. On the controller, export an Observations XML file.
2. Copy the *.XML file to the office computer using Windows Mobile Device Center.
3. Run the ASCII File Generator from the Start menu.

The ASCII File Generator can be downloaded from www.trimble.com/tsc_ts.asp?Nav=Collection-59798

4. Browse to the XML file on your office computer.
5. Browse to the output format (style sheet). You must use a style sheet created specifically for monitoring data. These can be downloaded from www.trimble.com/tsc_ts.asp?Nav=Collection-66456.

For more information, see the ASCII File Generator help.

Transferring files to the office

You can transfer various types of monitoring files between a Trimble controller and the office computer, however, not all formats can be opened directly with your office software.

File Type	Description	Transfer to PC using...	On your PC, open the file with...
Monitoring job file (*.mjob)	Contains the monitoring job information such as general job properties, coordinates for the station point, and the position of all the points in the monitoring list.	<ul style="list-style-type: none"> • Windows Mobile Device Center technology • the Trimble AccessSync service 	-
Monitoring observation file (*.mobs)	Contains the observations, atmospheric correction, and level information for each epoch. An observation file is created for each day.	<ul style="list-style-type: none"> • Windows Mobile Device Center technology • the Trimble AccessSync service 	-
Coordinates file (*.csv)	A list of coordinates for every point at every epoch.	<ul style="list-style-type: none"> • Windows Mobile Device Center technology • the Trimble AccessSync service 	Open the file using a text editor or Microsoft Office Excel
Reports (*.htm)	A report based on the survey data from one day of observations. There are several reports available including the Epoch Comparison with Previous and Epoch Comparison with Reference reports.	<ul style="list-style-type: none"> • Windows Mobile Device Center technology • the Trimble AccessSync service 	Open the file using a text editor or Internet Explorer.
Job XML file (*.jxl)	A generic format containing observation and coordinate data that can be imported by Trimble field and office	Any one of the following: <ul style="list-style-type: none"> • Windows Mobile Device Center technology 	Import a JobXML file into Trimble office software, such as Trimble 4D Control or

File Type	Description	Transfer to PC using...	On your PC, open the file with...
	software.	<ul style="list-style-type: none"> the Trimble AccessSync service Trimble Data Transfer utility Trimble office software (including Trimble 4D Control and Trimble Business Center) 	Trimble Business Center.

Note: The format that the Monitoring data is stored in cannot be used directly by other software. Therefore, Trimble recommends that you convert your data to an appropriate format on the controller by [exporting a report](#) before transferring any files to the office computer.

For more information on transferring files using Windows Mobile Device Center and the Trimble Data Transfer utility, refer to the File Transfer chapter of the General Survey help.

Transferring files to the office with the AccessSync Service

If you have purchased services for your Trimble Access system you can transfer monitoring files and reports back to the office from your controller in the field.

To transfer files back to the office, you will need to ensure that:

- You are logged in using the online mode on your controller.
- You have an Internet connection on your controller.
- The *Monitoring* folder is selected in the AccessSync application on the controller.

All files and reports within the [\\Trimble Data\

Tip - Trimble recommends that you transfer reports to the office rather than raw job data because monitoring jobs (*.mjob) and observation files (*.mobs) cannot be opened by the office software. To transfer reports using AccessSync, first export the required job information in the field, and then transfer the files using the AccessSync service.

For more information, see the AccessSync chapter in the Trimble Access help.

Viewing your monitoring data with the Trimble Business Center software

If you have exported your monitoring data to a JobXML (*.jxl) file, you can import this into the Trimble Business Center software.

- Connect your controller to your computer using Windows Mobile Device Center and then import the JobXML file directly from the controller by using the *Device Pane*.
- Import* the JobXML file from a location on your computer.

All monitoring observations are imported into the project and the coordinates used by the project are derived from the first epoch.

Tips

- Use the Project Explorer to view the observations from each epoch.
- Generate a point derivation report to view the coordinates for each epoch.
- Use the *Point Tolerances* option in *Project Settings* to define the point movement tolerances. Any coordinates outside these tolerances will be highlighted red in the reports and flagged as out of tolerance in the map window.

Viewing your monitoring data with the Trimble 4D Control software

If you have exported your monitoring data to a JobXML (*.jxl) file, you can import this into Trimble 4D Control software. To do this:

1. Insert a *Terrestrial Engine PP* module into your project.
2. Right-click on the module and then select *Process file*.
3. Select the JobXML file.

Use Trimble 4D Control software to analyze your monitoring data by viewing current displacements, displacement charts, and error ellipses.