

RTK Verification and Validation

It is very important that you read and understand the information about **RTK Verification** and **Validation** contained in this manual.

Verify Settings	
Verify with V6 Reset	Verify w/o V6 Reset
Confidence Guard 0.131 / 0.23 ft	Confidence Level 5
Min RTK Engines at least 2	Consistency Level 10
Alarm on Resets	Max Groups 10
Validate Result with at least 2 engines	

Verify Settings Screen - Recommended Settings for Multipath Environments

When located in difficult environments and under tree canopy, all GNSS receivers are prone to give bad fixed solutions that may appear to be acceptable if they are not verified. Existing methods to verify GNSS solutions include “dumping” the receiver, turning it upside down to cause the RTK engines to reset, and re-observing the point at a later time.

J-Field automates these processes with its built-in software features of *Verify* and *Validate*. **Verify** automatically resets the RTK engines after every fixed epoch is collected in **Phase-1** of its process. Epochs are placed into *Groups* or buckets during **Phase-1**. Once a *Group* has the required **Confidence Level** **Phase-1** is complete.

The **Confidence Guard (CG)** determines the size of the *Group* or bucket. Each *Group* contains all the epochs located within a specified radius (the CG value) from its center and new *Groups* are created as necessary so that all epochs fall into at least one *Group*. Each *Group* has its own *Epoch Counter*, *Confidence Level* and *Elapsed Time*. A point may fall into more than one group. The current best group is shown within [] and others within ().

The number of groups is limited by the Max Groups setting. If this number of groups is exceeded, *Phase-1* will reset and start over. During *Phase-1*, the current best group will be displayed between the square brackets [] while the other groups are displayed between parenthesis ().

During **Phase-2** the engines are not reset and solutions which are located inside the CG of the selected *Group* are added to that *Group* for the remaining number of epochs that user has requested (**Epoch Number, EN**) in the **How to Stop** screen. Solutions which are outside the CG of the selected *Group* will be ignored; the RTK engines are reset if the epoch falls outside a sphere with a radius twice that of the CG. If the number of rejected epochs reaches 30% of epochs collected so far, the whole process will restart.

Validation is the final step of the process. With this feature enabled the RTK engines will reset one final time at the end of the observation and collect 10 additional epochs. Allowing sufficient time between *Phase-1* and the final *Validation* step will guarantee a bad solution is not allowed to be accepted. From extensive testing in the worst of multipath environments, a bad solution has yet to be accepted when *Verify* and *Validate* are enabled with **Phase-2** collecting epochs for at least 120 seconds. To accomplish this, set stop *After (EN)* to 120 epochs with 1 Hz corrections, 240 epochs with 2 Hz corrections or 600 epochs with 5 Hz corrections.

Confidence Level and *Consistency Level* are counters; the *Confidence Level* of a group increments each time an epoch with a new RTK initiation (Fix) is collected. It increments by values of 1, 1.25, 1.5, 1.75, 2.0, or 2.5 for 1 to 6 fixed engines, respectively. The *Consistency Level* of a group increments with every epoch collected by values of 0, 0.1, 0.25, 0.5, 1.0, and 1.5 for 1 to 6 fixed engines. The set *Consistency Level* must be met before *Phase-2* is allowed to end.

If high accuracy is needed in areas of high multipath and areas with limited views of open sky (under full tree canopy and urban canyon environments), longer observations will improve accuracy. Repeated observation can also be performed later (1 hour or more is recommended) to improve accuracy. These repeated points can then be averaged together with the *Average* function found in *Cogo Tools* or with the *Cluster Averaging* function.

Recommended Collection Settings

Control, Boundary and Multipath Environments

- ◆ Start with Start Button
- ◆ Stop After: 120(1 Hz), 240(2 Hz) 600(5 Hz) epochs, may be reduced to 30 in open sky
- ◆ Verify with V6 Reset
- ◆ Confidence Level: 5 to 10 (10 will cause *Phase-1* to take long but results in less incorrect *Phase-1* positions)
- ◆ Consistency Counter: 10
- ◆ Min RTK Engines: At least 2
- ◆ Validate Result: with at least 2 engines
- ◆ Correct for Tilts: Off (Rover pole must be plumbed)

Precise Topographic

- ◆ Start with Start Button or Start When Tilted

- ◆ Stop After: 10 epochs
- ◆ Verify with V6 Reset
- ◆ Confidence Level: 5
- ◆ Consistency Counter: 10
- ◆ Min RTK Engines: At least 2
- ◆ Validate Result: with at least 2 engines
- ◆ Correct for Tilts: On*

Quick Topo for use with Open Sky Environments

- ◆ Start with Start Button or Start When Tilted
- ◆ Stop After: 2 epochs
- ◆ Verify without V6 Reset
- ◆ Consistency Counter: 0
- ◆ Min RTK Engines: At least 4
- ◆ Correct for Tilts: On*

In all cases

- ◆ Accept Fixed Only, RMS: All, PDOP: All
- ◆ Confidence Guard: 0.164 ft

If you wish to review point statistics or if you wish to edit the ShapeTag, Code, Description and/or Attributes fields after data collection, Auto Accept must be set to Off. If these fields do not need to be changed and you desire fast data collection with the Quick Topo settings, set Auto Accept to On.

*If Correct for Tilts is on, the Level Offsets must be calibrated frequently if accuracies greater than 0.10' are needed.

If the point you are attempting to locate is near the edge of a building, tree trunk or other obstruction, it often best to use one of the CoGo Offset functions. When the most accurate measurements are needed, the *CoGo Resection* function found in the *Intersections* group is recommended.