

Base Station Installation Manual

Introduction

The Origo PhaseID System identifies phase attributes in a power distribution system by using a GPS timing signal to simultaneously measure voltage phase at a base location and at a field location. By comparing the unknown phase at the field location to the known phase at the base location, the unknown field phase attribute can be determined.

This manual explains how to install the base station hardware and software. Refer to the base station software "Help" screens for information on how to use the software. Refer to the "Setup and Operation of Local and Remote Origo PhaseID System Base Stations" white paper in the Download section of www.origocorp.com for additional information on using Local and Remote base stations.

Antenna Installation

Mount the antenna where it has a clear view of most of the sky. Ideally, mount it at the highest point on a building and clear of any sources of radio frequency interference. That is, be cautious of mounting the antenna near transmitting antennas.

If an ideal location is not available, pick the best spot available. The antenna can even be mounted inside a building next to a window. However, mounting locations that can only observe a portion of the sky will cause the GPS receiver to randomly drop out a few GPS seconds during the day when satellite visibility is poor.

Lost GPS seconds are only a problem if the field probe uses one of these lost seconds to record a phase measurement. Experience indicates that mounting the antenna in a window that only sees one direction of the sky will lose a few hundred seconds a day. Since there are 86,400 GPS seconds in a day, the probability is low that one of these few lost seconds is used by the field probe. However, if one of these lost seconds is used by the field probe, you will get a "Data Not Available For Date Selected" error message when the field probe sequence is entered into the base station software.

To install the antenna, first mount a support bracket. The form of the support bracket will vary depending on where the antenna is mounted. For example, the vertical member of a simple "L" bracket can be mounted to the side of a building and the antenna then mounted to the horizontal member. Alternatively, a straight metal bar can be mounted horizontal on the edge of a flat roof such that the bar extends beyond the edge of the roof.

No matter what the form of the mounting bracket, the bracket must include a 1/4" diameter mounting hole for the antenna bolt. Once the bracket is mounted, simply remove the outer loose lock nut and first flat washer

from the antenna bolt, insert the antenna bolt through the ¼" bracket mounting hole, replace the outer flat washer, screw on the lock nut, and tighten.

Cable Installation

Both the antenna and coupler are shipped with approximately 5" of Belden 7928A LAN cable already attached. This is a high quality sunlight resistant cable that is certified for installation inside plenums. This attached cable is connected to your LAN cable using Thomas & Betts 709 connectors.

Your connecting cable can be any CAT 5 or CAT 6 LAN cable of your choosing. Generic computer LAN cable will work electrically just fine. Your only consideration should be the environmental properties of the cable. If your cable is routed outside or buried, then appropriate cable for this type of installation should be chosen.

If you wish to use the Belden 7928A cable, you can purchase small quantities from Origo for \$1 per foot. You can also purchase it from Belden, but they only sell it in 1000' rolls. However, if you can use generic computer LAN cable, it can be purchased at most electronic or computer supply stores for about 5 cents a foot.

The attached antenna LAN cable is supplied with pre-attached 709SC connectors which are filled with a moisture resistant compound that provides protection in the outside plant environment. The attached coupler LAN cable is supplied with unfilled 709SD connectors. You can purchase replacement or additional connectors from one of Thomas & Betts many distributors.

Coupler Installation

The coupler should be placed near the PC. The coupler is supplied with a 10' serial port cable. The coupler must be plugged into any standard 120V wall outlet. Be sure that the wall outlet is **NOT** on a UPS. The output phase of a UPS is not correlated to the grid phase.

You should, however, connect the PC to a UPS. If power is lost, the coupler will automatically restart once power is restored. The PC and base station program will not restart if its power is lost.

It is also important to either not power up the coupler or not connect the serial port cable to the PC until the PC has fully booted up. If serial port data is present when the PC boots up, the PC Plug & Play feature will assume it has found new hardware and lock up the serial port. Then, when the base station program is started, you will receive a message that COM 1 is not available. At that point, you will either have to select another COM port or disconnect the serial cable and reboot the PC.

Connecting the LAN Cables

After your LAN cable is routed, strip off approximately 2" of the outer jacket from each end of your installation cable and untwist each of the pairs. Generic LAN cable is much easier to work with than the Belden cable because the wire pairs of generic cable are not fused together.

If you use the Belden cable, be very careful not to nick the internal twisted pairs. Before untwisting each pair, note which wire is the solid color and which wire is the white/sold color. The blue, white/blue wires are hard to distinguish after this pair is untwisted.

Coil up any excess attached antenna cable and secure with a tie wrap. Be sure to leave enough of your LAN cable exposed so that its end can be cut off and re-connected to the antenna LAN cable if the antenna should ever have to be replaced.

For the Belden cable, untwist each pair and cut apart approximately 1". For either the generic LAN or Belden cable, do not strip the insulation from the individual wires. Hold the 709 connector with the lid and holes on top, insert the solid wire into the left hole and the white/solid color in the right hole. See the illustration in the Appendix.

******* VERY IMPORTANT *******

**CONNECT THE BLUE – WHITE/BLUE PAIR FIRST.
BE CERTAIN THE COLORS ON EACH SIDE OF THE CONNECTOR MATCH.
TRIPLE CHECK YOUR WORK BEFORE TURNING ON COUPLER.**

CROSS WIRING CAN DISTROY UNITS.

******* VERY IMPORTANT *******

Push the wires in as far as possible and squeeze the connector shut. Use pliers to further squeeze the connector shut. For the filled connectors, additional blue gel will ooze out as the connector is squeezed with the pliers.

Orient the antenna connectors so rain water will not pool on the connectors. That is, don't place the connectors at the bottom of a service loop. It would also be a good idea to shield the connectors from direct sunlight since it is not known how UV resistant the connectors are. Tape or shrink sleeve can be used to shield the connectors.

Installing the Software

Before connecting the serial port cable to the PC, power up the PC and download the latest version of the base station software from the Download section of www.origocorp.com. This ensures that you start with the latest version of the software.

Download the software to a temporary directory. Double click on the .exe file and follow the directions. If you accept all the defaults, the files will be place in your Program Files directory. If you wish to place it elsewhere, simply so indicate during the installation process.

Once the software is installed, the installation process will start the program and complete the setup process. Again, you can accept the defaults or enter your own. You can also change the setup parameters at anytime using the Setup tab.

As soon as the software setup completes, click on the Help tab and read the instructions on how to use the program. Each displayed screen can be printed if desired.

Starting the Coupler

Connect the serial port cable to the PC and plug in the coupler. Normally, you will use COM 1. However, any available COM port can be used. To use another COM port, select it under the Setup tab on the base station software program.

Plug in the coupler and note the LED lamps during power up. When first plugged in, the AC, DC, and HEAT lamps should light (the DATA lamp may not). After about 1 second, the DATA lamp will light and the red HEAT lamp will extinguish (unless the antenna is very cold). After 1 or 2 minutes, the green DATA lamp will blink once a second. As soon as the DATA lamp starts to blink, the Incoming Data Stream lamp on the base station software will turn green and the Local Time and Date fields will be updated. The Local Time field will update once a second.

When first starting up, the coupler may blink a few times, stop for awhile, and continue blinking. If the coupler AC or DC lamps are not on or the DATA lamp does not start blinking within 5 minutes, something is probably wrong. Try unplugging the coupler, wait a few seconds, and plug it in again. If that doesn't help, unplug it for a couple of minutes, to let all the internal circuits discharge, and plug it in again.

If the antenna is very cold, the red HEAT lamp will light and stay lit until the antenna warms up. If the antenna is very very cold, the processor may not start at all or it may continuously reboot itself as indicated by the red HEAT lamp turning off and on a number of times a minute. Just leave the coupler plugged in for 30 minutes to an hour to warm up the antenna. Then unplug the coupler and plug it in again. It should start normally. The HEAT lamp will then cycle on periodically to keep the antenna warm.

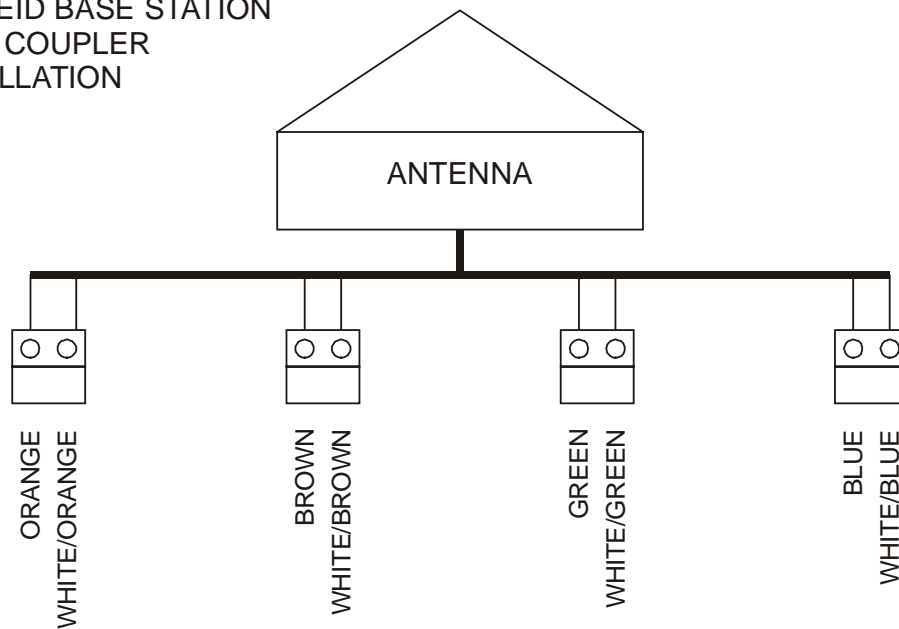
Data Upload

Starting with base station software Version 1.60, daily data files can be automatically uploaded to the Origo data website. Origo encourages all base station owners to use this feature to guard against lost data. If data from your base station is inadvertently discarded or not recorded, that day's data file can be replaced with a remote base station data file.

To use this feature, contact Origo to obtain a user name and password. Enter this information in the Upload section of the base station setup screen. The PC must have access to the Internet. At the end of each GPS day, your daily data file is compressed into a ZIP file and sent via FTP to the Origo data website. The ZIP file is about 750 kilobytes and only takes a few seconds to transfer over a broadband Internet connection.

Appendix

ORIGO PHASEID BASE STATION
ANTENNA TO COUPLER
CABLE INSTALLATION



The antenna and coupler are both shipped pre-wired to paired plastic connectors using high quality Belden 7928A Cat 5 LAN cable certified for in-building and outside wiring. However, you may use any Cat 5 LAN cable between these connectors.

If you use the same type cable, strip off approximately 2" of the black outer jacket from each end of your installation cable. Be very careful not to nick the internal twisted pairs. Before untwisting each pair, note which wire is the solid color and which wire is the white/solid color. The blue, white/blue wires are hard to distinguish after this pair is untwisted.

Untwist each pair and cut apart approximately 1". Do not strip the insulation from the individual wires. While holding the plastic connector with the lid and holes on top, insert the solid wire into the left hole and the white/solid color in the right hole. Be certain the colors on each side of the connector match. Push the wires in as far as possible and squeeze the connector shut. Use pliers to further squeeze the connector shut.

Orient the antenna connectors so rain water will not pool on the connectors. That is, don't place the connectors at the bottom of a service loop.

