Selecting an Origo PhaseID System

Introduction

This white paper explains the different versions of the PhaseID System offered by Origo and offers insight into which version is most appropriate for a customer's particular needs.

Principal of Operation

The PhaseID System identifies phase by taking a field probe instantaneous phase measurement at an unknown phase location at the same instant of time that a base station takes an instantaneous reference phase measurement at a known phase location. The two instantaneous phases are then compared to determine the unknown phase.

So, a base station reference phase measurement must be available to compare to the field probe unknown phase measurement. Without a base station, phase identification is not possible.

Base Station Selection

Origo Remote Base Station:

Origo provides remote base stations in each of the 3 national grids (Eastern, Western, and Texas) as a convenience to customers who happen to lose data from their own base station or who choose to not purchase their own base station.

The procedure for using an Origo remote base station is as follows:

1. Take your field probe measurements.

2. Wait up to 10 minutes for the remote base station data to be uploaded to the Origo data website.

3. Download the remote base station data file to your base station PC.

4. Unzip the remote base station data file and place it in the PhaseID software Data directory on your base station PC.

5. Translate your field probe measurements to phase attributes in the same manner as when using your own base station.

Customer Base Station:

There are a number of advantages of owning your own base station. The main advantage is that the reference phase is instantly available and doesn't have to be downloaded from an Origo remote base station.

Since reference phase is instantly available, a real-time Datalogger field probe can be used which translates phase measurements to phase attribute while the field probe is still touching the line.

If the lineman is using a manual field probe, he can call in the phase measurement sequence to anyone at the utility who has the base station software on their PC and that person can translate the lineman's phase measurement for him. This procedure takes less than a minute after the lineman takes his measurement.

The final advantage is that a customer base station allows the Handheld field probe to be more easily used in some circuit situations than when using a remote base station. This is due to the fact that the Handheld field probe is more sensitive to varying phase offset that occurs when a very distant remote base station is used.

Regional Customer Base Station:

Multiple customers in the same general geographic area can share a common base station. The common base station can be shared in three different ways.

1. Persons at the common base station location can take calls from linemen in the field and translate their phase measurements for them.

2. Data from the common base station can be stored on a server file that all users can access from their own base stations. This is commonly done at large statewide utilities so all their divisions can use a single base station via their internal wide area network. This allows linemen to call in their Manual field probe measurements in the same manner as when a utility owns their own base station.

3. The common base station can be setup as a server. All other customers then automatically access this server using Origo's field PC software. This allows all customers and linemen to instantly translate phase measurements from Manual field probes, real-time Datalogger field probes, or simply by calling in the phase measurements to someone at their utility.

Tradeoffs:

All the tradeoffs are with respect to cost versus convenience. Using an Origo remote base station is the lowest cost (base station purchase not required) but the most inconvenient. Origo sells field probe only solutions to many very small coops who use phase identification only rarely and don't mind taking a little more time to translate phase

measurements. Purchasing a field probe only cuts the cost of phase identification in half.

A regional base station shared by multiple utilities is also a very low cost solution because multiple utilities split the cost of the base station. The convenience of a shared base station is essentially the same as a utility owning their own base station.

All large utilities purchase their own base station and sometimes multiple base stations. This provides redundancy and allows widely state separated regions to obtain the most stable phase references.

Field Probe Selection

Manual versus Datalogger:

Manual

The primary advantage of the Manual field probe is it's simplicity. A single push button controls all its functions using either a short press or a long press. The lineman can call in his phase measurements and doesn't have to setup or even understand tagging reference phase or configuration setup files. The base station PC handles all those tasks for him.

Determining phase attribute using the Origo Manual field probe is no more difficult than taking a voltage or current measurement. The lineman will not forget how to use the probe even if he only uses it once a month. Manual field probes are very low cost. Some large utilities purchase a large number of them so every truck that requires phase identification has one. Crews don't have to wait around for the "phase guy" to show up at the job site with his probe.

Linemen are typically talking to their dispatcher anyway to obtain clearances and instructions. It takes less than a minute to have the dispatcher translate their phase measurements into phase attribute for them.

Some utilities have PCs in their trucks and are connected by modem to the utility's network. For those linemen, they can simply translate their own Manual field probe measurements themselves by installing the base station software on their truck PC.

The Manual field probe is an excellent choice for the occasional user who doesn't want to be bothered remembering how to boot up a field PC, start the field PC software, and obtain a bluetooth connection to the probe simply to gather a few phase measurements.

Datalogger

In contrast to the Manual field probe, the Datalogger field probe has many more features but requires more setup to use.

The Datalogger field probe provides real-time phase identification if live Internet access is available. It also records the phase measurement sequence, the translated phase attribute, the GPS coordinates of the measurement, and any user notes to a measurement file. This file can then be imported into a GIS data base if desired.

The Datalogger field probe is an excellent choice for the lineman that uses it fairly routinely so he doesn't forget how to set it up each time. It is also an excellent choice if a large number of phase measurements must be gathered as quickly as possible.

Although the Datalogger version is slightly more expensive than the Manual version, it saves considerable labor costs when completely identifying an entire utility due to it's automation and speed.

The Datalogger can be used either in the automatic mode or in the manual mode. Therefore, a Datalogger field probe can still be used in the same simple manner as the Manual field probe.

Lineman versus Handheld:

Lineman

The Lineman field probe can be used on any live conductor that can be touched. On high voltage transmission conductors, the field probe only has to be placed near the conductor being measured.

Since the Lineman field probe actually touches the conductor, it can be used in crowded conductor situations where many different voltages and phases are present. It is very accurate and the reported phase error provides an additional confidence factor that the phase attribute is correct.

If a utility is only purchasing a single field probe version for all their phase identification needs, the Lineman field probe is the best choice.

Handheld

The Handheld field probe is a more specialized instrument than the Lineman field probe. It's primary advantage is that non-linemen can use it and an extendo stick is not required to obtain phase attributes on high overhead conductors.

The Handheld field probe operates by proximity. No actual contact is made to the energized conductor. It can be used on any transmission, distribution, secondary, or elbow test point voltage.

The phase attribute feeding a residence can be obtained simply by holding the Handheld field probe against a meter or wall socket on the residence. This capability can

save time and effort by eliminating the need to either open a padmount or use an extendo stick on an overhead line to obtain phase attributes.

The primary disadvantage of the Handheld field probe is that it can only be used on 1, 2, or 3 phase conductors that are positioned in a near, center, far arrangement. It cannot be used on underbuild lines where overhead distribution circuits (12KV for example) are strung under transmission circuits (69KV for example) on a pole. It is also difficult to use in a substation where many different voltage and phases are close to one another.

To use the Handheld, either the conductor being measured must be much closer to the probe than other conductors or only 2 or 3 conductors must be in a near, far or near, center, far relationship respectively to the probe.

For the right kind of construction, the Handheld is impressive. For single phase lateral overhead conductors, it is not necessary to even get out of the truck. Same for many isolated 3-phase overhead conductors.

The Handheld field probe is more sensitive to tagging reference phase offsets than the Lineman field probe. If a distant remote base station is being used, extra procedures are required to ensure variations in phase offset are being minimized.

Conclusion

Origo makes a variety of PhaseID System versions to address the different needs of different utilities. We try to provide an optimum solution for both small utilities who only have an occasional need for phase identification and for large utilities who wish to phase identify hundreds of thousands of circuits in the shortest possible time.

Hopefully, this white paper will assist you in selecting the PhaseID System version that is best for you. Much more information is available at www.origocorp.com. Feel free to email or call us with any questions you have. Thank you.

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