FUTUREPOINT SYSTEMS

Live Trace
Phase Identification System
User Guide

Introduction

The Live Trace Phase Identification System is developed as a non-contact mechanism for identifying the phase connection of single phase premises on an electricity distribution network. It is useful in load balancing operations and network surveys.

Components

The system comprises of two components; a transmitter, and a receiver. There are two types of receiver, a contact type, and a non-contact type.

The transmitter is connected to all 3 phases (and neutral) of the low voltage area where the identification is to take place. The transmitter superimposes a unique digital tag on each of the phase conductors to allow the receiver to differentiate between phases.

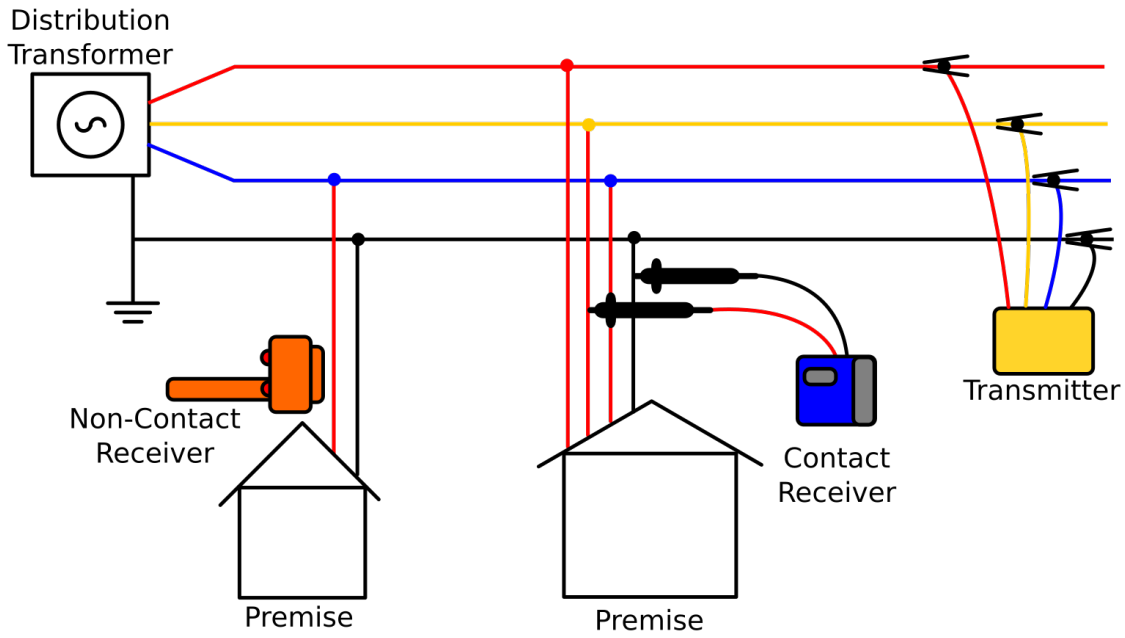
The receiver unit detects the phase of the LV conductor based on the digital tag. Depending on the receiver type (contact or non-contact), it will either emit a tone and flash the indication LED's to indicate the phase, or display the phase on the LCD.

TRANSMITTER

CONTACT RECEIVER

NON-CONTACT RECEIVER

Operation



Starting the Transmitter

First connect the transmitter to a point of known phasing on the LV network (please see the section “Selecting a Transmission Point”). The device leads should be connected in the order Neutral, A Phase, B Phase, C Phase. Once all of the leads of the transmitter are connected, the device will begin to count down to zero before commencing transmission. Once the device begins to transmit, it will indicate on the LCD display the phase rotation of the supply to which it is connected, confirm this is the correct rotation for the area.

Using Non-Contact Receiver

With the transmitter connected and transmitting confirm the receiver is operating by turning the power switch on the receiver to the ‘TEST’ position. The device will emit a continuous tone, and the 3 led’s on the underside of the receiver will remain constantly lit. If the receiver does not operate as expected, replace the batteries. If, after replacing the batteries the receiver still does not operate, return it for repair.

Turn the power switch on the receiver to the ‘ON’ position.

Next confirm that the transmitter is operating correctly by placing the receiver on, or as close as possible to the A phase conductor at the site where the transmitter is located, once a signal lock is achieved, the device will begin emitting the identification tones. The identification tone comprises of 1 to 3 short pulses followed by a long pause. The LED’s on the underside of the unit will indicate in sync with the tones. The indications are as follows:

One pulse = A phase Two pulses = B phase Three pulses = C phase

Keep the device in the same position until 3 identical identification tones in a row are observed. If you are unable to get 3 identical identification tones in a row, this indicates that the transmitter is not transmitting, or there is too much noise on the network to get a clear signal. Repeat the process for both B and C phases to confirm all 3 signals are being transmitted.

Next take the receiver to the location to be identified and place the receiver on, or as close as possible to the conductor to be identified (*please see the section "Selecting an Identification Location"*). Once a signal lock is achieved, the device will begin emitting the identification tones. **Keep the device in the same position until 3 identical identification tones in a row are observed.** If you are unable to get 3 identical identification tones in a row, this indicates that the transmitter is not transmitting, or the receiver is too far from the transmitter to get a signal. Also local generation from PV inverters can interfere with the transmitted signal (*please see the section "Selecting an Identification Location"*).

The receiver may now be taken to each site requiring identification, repeating the process.

Using Contact Receiver

Press the power button on the receiver, the receiver should go through a brief start up and then display "NO MAINS VOLTAGE" on the LCD. If the battery is low, a LOW BATTERY message will be displayed on the LCD. Replace the batteries if the message is observed.

Next confirm that the transmitter is operating correctly by placing the N lead of the receiver on the neutral conductor and the A lead on the A phase conductor at the site where the transmitter is located, once a signal lock is achieved, the device will display "A PHASE" on the LCD. Repeat the process for both B and C phases to confirm all 3 signals are being transmitted. **NOTE: The receiver is polarity sensitive, if you reverse the leads, the ID signal will not be received and the display will read "NO PHASE ID SIGNAL.** If you are unable to get a reading on any of the phases, this indicates that the transmitter is not transmitting. In this case return the transmitter and receiver for repair.

Next take the receiver to the location to be identified and connect the N lead on the receiver to the customer's neutral conductor and the A lead to the customer's active conductor. The LCD display will display the detected phase, or "NO PHASE ID SIGNAL" if the polarity is incorrect, or the signal can not be detected. If the display reads "NO MAINS VOLTAGE" when the leads are connected to a source of mains supply, this could indicate faulty leads, or a blown fuse.

The receiver may now be taken to each site requiring identification, repeating the process.

Stopping the Transmitter

After identification of all sites is complete, return to the transmission site and press the START/STOP button on the transmitter. This will suspend transmission and allow you to safely disconnect the transmitter leads. The transmitter lead should be disconnected in the order C Phase, B Phase, A Phase, Neutral. Safely store the device in a dry storage area.

Selecting a Transmission Point

The transmitter works by transmitting a high frequency identification pulse along the LV mains. Network loads have an impact on the distance over which a clear signal can be received. The largest (signal) load on the LV network is the supply transformer, because it couples the LV area to the rest of the HV network. For this reason the optimum location for signal generation is as far as possible from the supply transformer. The recommended method of operation is to connect the transmitter at the end of each leg of the LV area and identify back towards the supply transformer. Note that this is only a recommendation, and injecting at any point on the LV network is acceptable, assuming the operator is able to get positive indication as defined under the heading "Operation".

Selecting an Identification Location for the Non-Contact Receiver

The receiver works by synchronising with the AC mains waveform, and then looking for an identification tag at the appropriate phase angle. For the phase synchronisation to work the device must be in the presence of a strong phase reference.

To achieve the highest possible transmission distance, and the highest sensitivity, the non-contact receiver should be used at the customers switchboard, hand held by the operator (as opposed to attached to a link stick). The device has a sunrise fitting intended for use on open overhead conductors, but it should be noted that when used on an insulated operating stick the useable transmission distance is approximately 30% of what can be achieved when used by hand.

The use of insulating gloves does not affect the operation of the receiver.

Identification on Overhead Systems

When identifying on overhead conductors, the device must be placed against a live conductor and should be at least 300mm from any other phase or neutral conductor. This requirement means that the device is unsuitable for identifying most overhead services.

Interference from Local Generation

Local generation such as PV inverters can sometimes make it difficult to obtain a signal when using the non-contact receiver. If you find that you are unable to obtain a signal at a switchboard which is partly fed from a PV inverter, open the AC isolator of the PV inverter, and retry identification. The AC isolator can be closed after the identification is completed. Alternatively, the contact receiver could be used in this situation, without requiring disconnection of the PV system.

Specifications

Transmitter

Operating Voltage:	Nominal 240VAC (Line to Neutral)
Injection Current:	<10A RMS (mean injection measured over 100ms)
Duty Cycle:	100%
Insulation Class:	CATIV 300V (IEC61010)
Ingress Protection:	IP44 (with lid closed).
Power Supply:	240VAC supplied from Neutral and A Phase Connections

Non-Contact Receiver

Sensing Voltage:	Nominal 240VAC (Line to Neutral)
Insulation Class:	Non-Contact
Ingress Protection:	IP44
Power Supply:	3 x ‘C’ cell alkaline batteries

Contact Receiver

Operating Voltage:	Nominal 240VAC (Line to Neutral)
Insulation Class:	CATIV 300V (IEC61010)
Ingress Protection:	IP44 (with lid closed).
Power Supply:	6 x ‘AA’ cell alkaline batteries

Further Information

For more information, please contact FuturePoint Systems Development Manager, Mark Pointing

mark@futurepoint.com.au

+61405 057 586

www.futurepoint.com.au