



**- TRONICS, INC.**

*SETTING THE STANDARD FOR SERVICE*

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## **Model AT-9X Loaded Line Locator**

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The "Power Pup"

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# TABLE OF CONTENTS

General Information .....	1
Description .....	1
Operation .....	1
Battery Test .....	1
Definition of MAXIMUM or PEAK .....	1
Maximum Method .....	2
Definition of NULL .....	2
Null Method .....	2
Swinging the Locator .....	3
Depth .....	3
Locating low impedance ground faults .....	4
Service .....	5
Warranty .....	5

# GENERAL INFORMATION

The Power Pup has been designed for locating 50 or 60 Hz energized loaded power cables.

The Power Pup receiver is tuned to the magnetic field being radiated from a cable when current is present. The cable must be energized with some type of load. If the cable is energized and does not have a load, a 120 volt heater element, a power drill or similar appliance will provide the necessary current flow. The more current flowing in the cable, the easier the location will be.

## DESCRIPTION

The Model AT-9X Power Pup: A solid state receiver tuned to 50 / 60 Hz. It has a built in speaker to hear the signal being received and an analog meter to view signal strength.

## OPERATION

The on-off and null/peak rocker switch is located on the front panel. The depth gauge bubble level is to the left and the battery test push button is to the right. The sensitivity control knob is located below the handle.

## BATTERY TEST

The battery test button to the right of the dual rocker switches will not function until the instrument is turned on. If the batteries test below the battery OK mark on the meter, remove the battery cover, disconnect the battery connector and then remove the battery tray and replace the 6 alkaline AA batteries.

## MAXIMUM OR PEAK

See Fig. 1 A maximum meter reading will be found directly over the cable and the meter will decrease to lesser readings as the instrument moves away from either side of the cable location.

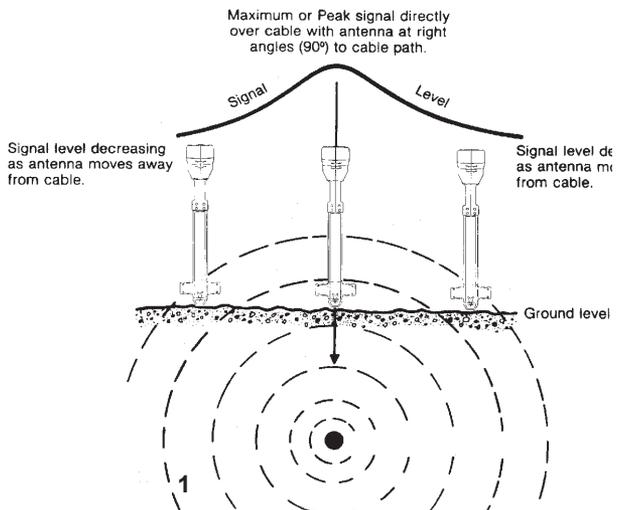


Figure 1

## **MAXIMUM METHOD**

With the instrument turned on, push the peak-null switch to the peak position. Hold the instrument with the receiving antenna close to the ground and right angles to the direction of the cable.

Adjust the sensitivity control up ( clockwise ) until an on scale meter reading is found. Walk in the direction that increases the meter reading. The meter will increase as you near the cable. If the meter goes off scale, decrease the sensitivity control for an on scale meter reading and continue to walk in that direction. At some point, the meter will start to decrease. Stop at the location where the highest meter reading was found. Rotate the instrument to the right and then to the left. When the highest meter reading has been found by rotating the instrument and by moving it side ways back and forth. The antenna is pointing at the cable and the instrument handle is in-line with the direction of the cable route.

Now that the cable has been located, the cable path can easily be traced. With the antenna directly over and at right angles to the cable path, walk in the direction to be traced. Keep moving the instrument from one side to the other and each time a maximum reading is found, the cable will be directly below the receiving antenna.

The loudspeaker audio will respond the same way the meter responds to the signal level. The maximum audio will be heard when the meter is reading its highest point.

When the cable has been found and the exact position is needed, turn down the sensitivity control until a very small movement of the meter can be seen as the antenna passes over the cable (the lowest reading the operator can detect on the meter). This will help insure other cables in the area are not influencing the location.

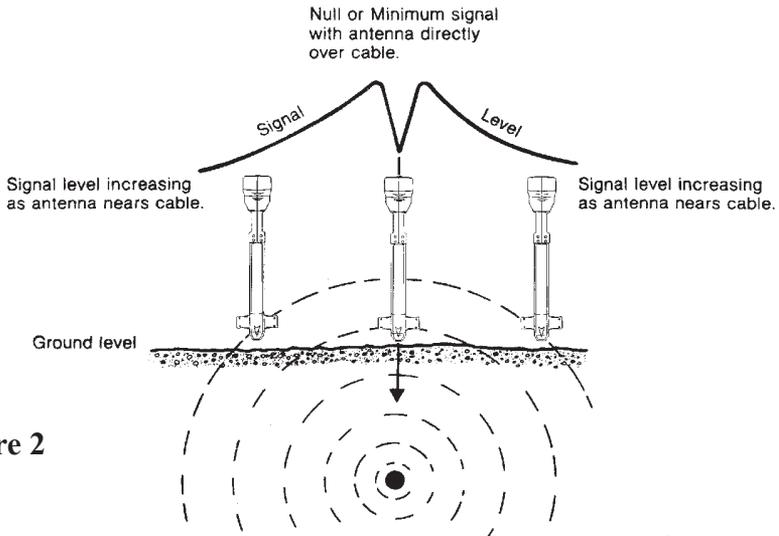
## **NULL**

See Fig. 2

The receiver will see a high signal on both sides of the cable and a loss or minimum signal directly over the cable. Unlike the peak method, in the null mode the instrument is unidirectional and will not provide direction to the cable route. The instrument antenna can be at any angle to the cable route and it will see the same signal level.

## **NULL METHOD**

With the instrument turned on, push the null-peak switch to the null position. As the instrument is moved toward the cable, the signal level on the meter will increase. As the receiving antenna crosses the cable, the signal level will drop to a very low



**Figure 2**

reading and then increase as the instrument crosses to the other side of the cable. By moving the instrument back and forth across the cable path, a sharp drop in signal will be directly over the cable and a high signal level will be on each side of the cable position.

Make free use of the sensitivity control. The wide null reading can be changed to a very sharp or narrow loss of signal by increasing the sensitivity..

The cable route can be found by finding two null points and then moving the instrument back and forth across the cable path as the route of the cable is located.

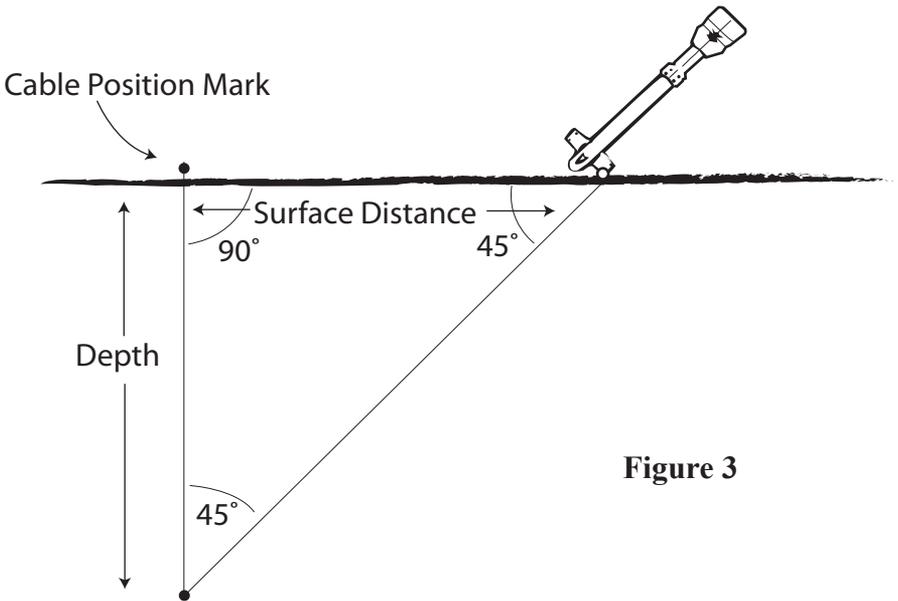
## **SWINGING THE LOCATOR**

It is easy to develop bad habits when making a locate. The receiving antenna should be perpendicular with the ground when the antenna is pointing at the cable; therefore, the receiver should be moved back and forth on a locate with the antenna parallel to the ground. Never swing the locator across the cable path. Swinging the instrument across a cable path can induce errors into the locate.

## **DEPTH**

The null or peak method could be used to determine a cable depth, but the null is the easiest. See Fig. 3

On a 45° triangle, two sides are equal. A 45° bubble level is located to the left of the null-peak ---- on-ff switch.. Once the cable has been located and marked, tilt the receiver to the right so the tip of the receiver and the end of the right antenna housing are both touching the ground. Move off to the side of the spot marked as



**Figure 3**

cable location. Move away until a sharp null has been found. You may have to increase the sensitivity a little to obtain the sharp null you are looking for. With the tip of the receiver and the right antenna housing both touching the ground, mark the ground where the side antenna housing is touching. The distance between this new mark and the mark made over the cable location is the depth of the cable. (NOTE: This is an approximate depth. A true 45° is when the bubble inside the depth gauge is equally spaced between the small circle in the center and the black outer ring.. Also consider that the slope of the ground may not be level. )

Other cables in the ground radiating signal can cover up a null on one side of the cable making a depth reading possible on one side only. Making the depth reading from both sides will help when accuracy is required. When depth readings from both sides agree, the depth will be accurate. If the two depths do not agree, the magnetic field being radiated from the cable is not round and the accuracy of the cable locate is now in question.

## **LOCATING A LOW IMPEDANCE SECONDARY GROUND FAULT**

Pull the meter and measure the voltage on the two hot legs. If a voltage reading is 60 volts or above, this method will not work because it is a high impedance fault and an earth gradient cable fault locator is needed.

If the voltage is 60 volts or less, the AT-9X may locate the fault. Since the meter is

at a low voltage, the transformer cannot maintain the proper voltage beyond the fault. This is an indication that a lot of current is going into the ground at the fault.

Trace the cable route in the peak mode starting at the transformer. Since a lot of current is going into the ground, there will be less current in the cable between the fault and the meter so the instrument will see a reduction in signal at the point of fault. Two things can produce the reduction in signal strength. The fault, or the cable going deeper. Because the magnetic field will be distorted in the area around the fault, the null method will not work on grounded faults.

## **SERVICE**

If for any reason assistance is needed with this instrument, contact the nearest Aqua-Tronics, Inc. sales outlet. You may also write, call, or email directly to Aqua-Tronics, Inc. and provide full details of your problem or needs. You can find your nearest sales office at [www.aquatronics.com](http://www.aquatronics.com) under REP LOCATOR.

## **WARRANTY**

All Aqua-Tronics products are warranted against defective materials and workmanship.

The AT-9X Power Pup has a one year warranty period from the date of purchase.

Aqua-Tronics, Inc. will repair or replace all products which prove to be defective during the warranty period. All warranty repair will take place at our manufacturing plant or at one of our field service centers. The decision of determining warranty defects from abuse or breakage, , and where the instrument is to be repaired, lies with Aqua-Tronics, Inc.

If products are sent to Aqua-Tronics, Inc. for service, please send it pre-paid. If the service is covered by warranty, the product will be returned pre-paid. No other warranty is provided or implied.



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