



Waikura Rectifier

SSEL Application Note 7 30 June, 2000

Introduction

This device is an accessory for the Waikura Data Logger and is intended for recording the parasitic AC voltages found on buried pipelines which have Cathodic protection applied.

Background

There is basically two sources of parasitic AC voltage to be found on buried pipelines with respect to the local ground potential.

1. Electric power transmission lines that run parallel to the pipe for a significant distance can induce a voltage gradient in the pipe by magnetic coupling, just the same as in a transformer. This voltage depends on the parallel distance, the proximity of the power line, and the current flowing in it.
2. The "multiple earth neutral" power system used in most countries of the world requires an earth connection at generator stations, substations and consumers premises. Large AC currents can flow in these earth systems and cause voltage gradients in the ground. The extent of this effect depends on the current flowing and the ground conductivity at the site.

Application

To use this device all that is required is to connect it in series with the wires, which normally connect the pipe and half-cell to the Waikura logger. The test leads usually used for connecting the pipe and half-cell to a multimeter can be used to connect to the Waikura rectifier, then connect Channel 1 of the logger to the DC terminals.

A half-cell is not strictly necessary as the DC potential is ignored. Any connection to the earth is OK but it needs to be a low resistance, less than say 10 000 ohms. Somebody else's screwdriver will be ideal.

The other available channels of the logger may be used to record other data at the same time but remember that both the black terminals are connected together inside the rectifier. The black terminal of the rectifier is normally connected to the pipe.

Connections:

Rectifier	2 Channel Waikura	4 Channel Waikura	
Red Terminal	Ch.1 Input Pin C, Black	Ch.1 Input Pin B, Brown	
Black Terminal	Ch.1 Common Pin A, Red	Ch.1 Common Pin A, Black	
Red Terminal		Or Ch.2 Input Pin C, Red	
Black Terminal		Or Ch.2 Common Pin A, Black	

Results:

Use an appropriate scanning interval setting in the Waikura. 1 second is suitable for a day's recording. 10 seconds will provide weeks of data but you may miss short events.

The voltage recording will look much different from the normal half-cell record and show much greater variations between sites. The variations with time will depend on the source of the parasitic ac voltage.