

HEXLOGGER

Model EPT/HEX-4000

CIPS, DCVG, and Data Logger GPS Survey Instrument



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readno	gpsdata	metric	highvol	lowvol
1	4353.6362,N,C	Metric	1533	1142
2	4353.6362,N,C	Metric	1533	1152
3	4353.6362,N,C	Metric	1533	1152
4	4353.6362,N,C	Metric	1533	1152
5	4353.6362,N,C	Metric	1533	1152
6	353.6362,N,C	Metric	1542	1152

Select a File Name: III

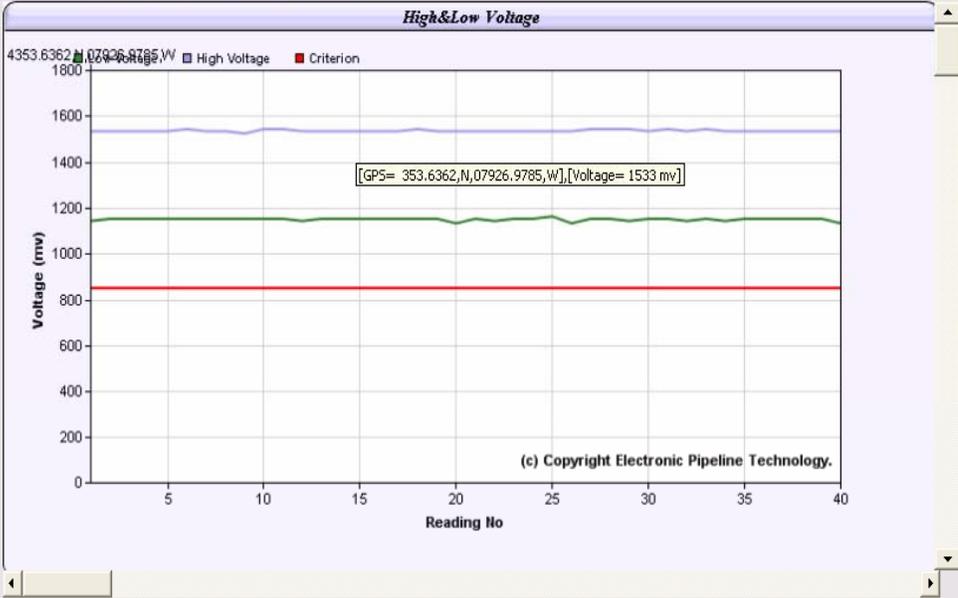
Select a Parameter: HighLow Voltage

Graph It!

X-Axis: Reading Number Distance

Absolute State: Absolute Real

Show Tag Information



- Pointer
- Zoom In
- Zoom Out
- Zoom Mode
- Zoom / Y Auto
- XY Zoom

Set Title

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1) Introduction:

The operator surveys the pipeline and records the potential ON and OFF to plot a graph that compares it with the critical protection line. By using this graph, the operator will be able to find the level of the Cathodic Pipeline Protection, and determine which part of the pipeline is in critical condition.

Hexlogger records the Pipeline potential; the distance from the starting point stamped with GPS coordinates date, and time.

This test may be Non-Interrupted Potential, Interrupted Potential or GPS Interrupted Mode.

The pipeline potential is interrupted by a Rectifier Interrupter instrument in the operator's station.

The Interrupter's timing program can be selected from a wide range of numbers; 0.5 up to 10 seconds for a Cycle (0.5, 1, 2, 3, 4, 5, 6, 10,). The "OFF" time ranges from 0.2 up to 8 seconds (0.2, 0.3, 0.5, 0.7, 1, 2, 3, 4, 5, 6, 8,).

The Interrupters will be synchronized with each other at 00 second of every minute with OFF Edge. The Hexlogger is able to obey the same rule in the GPS synchronized mode and understand whether it is ON/OFF.

To measure distance, there is a small wheel that is turned by the tiny wire that is connected to the test station. The wheel sends pulses for distance covered (almost 10 pulses per meter and 3 pulses per foot).

Time and date must be adjusted in the Hexlogger from the main menu by pushing "S".

Survey mode: Automatic or Manual

- 1 CIPS
- 2 DCVG
- 3 CIPS+ DCVG
- 4 Data Logger: measures High and low with desired logging time

Measurement Method:

a. Non- Interruption Method:

The Hexlogger measures a Potential and records it during a small period of time (2 mili seconds). The Hexlogger software deletes the Max and Min, and then calculates the average of the voltage.

b. High and Low Method:

Hexlogger measures two Potentials, High and Low in one period of an interruption cycle. All data logger channels work this way.

c. GPS Synchronized method:

Hexlogger measures only a momentary Potential for High and Low (100 miliseconds after OFF and 100 milliseconds after ON).

In this method, the Hexlogger software understands the time for measuring ON and OFF.

If the Hexlogger is programmed for a 1 second cycle and 0.3 seconds OFF, it means that the Potential of the rectifier in 00 second of every minute (hh/mm/00) will be OFF for 0.3 seconds and then will be ON for 0.7 seconds. The unit is recognizing this timing and will read ON and OFF exact its right place.

In a GPS mode, there are different Cycles from 0.5,1, 2, 3, 4, 5, 6, 10
Seconds and OFF time from 0.2, 0.3, 0.5, 0.7, 1, 2, 3, 4, 5, 6, 7, 8 Seconds.

What is difference between CIPS, and DCVG?

1- CIPS measurement:

Only the potential of channel A and ground (a tiny wire from wire dispenser ground is connected to the pipeline test point). In this setting, both Pogo sticks are parallel.

2- DCVG measurement:

This measurement is the difference between two channels A and B, and it recorded.

3- (DCVG+CIPS) measurement:

Measurements occur spontaneously at the same time. The measurement of one pogo stick is for the pipe to soil Potential (left pogo stick) and the difference between two pogo sticks is for DCVG measurement. In this mode, pogo sticks are not parallel.

2) Keypad Switch:

The Hexlogger's priority is to measure distance, potential, voltage gradient, Monitor time, GPS Engine Coordinates, and to display all of this information on a LCD and record the information with commands.

WARNING: Do not press the keypad hard, patiently wait to answer the commands.

G: GPS ON

O: GPS OFF

E: Export Data

F: Erase Memory

1: Set up in the main menu and record information in survey mode

2: Survey

3: File Directory

S: Set time and date,

Shift+S: Space for file name or tag information name

Shift + T: dash line for tag information

H: Erase File

F: Erase files information only

4: Back to main menu in survey mode, and Push 4 in main menu for tag information for quick menu.

Shift: Before attempting to type an alphabet, you must push Shift.

Before typing a number, you do not need to push Shift. If you already pushed shift and want to type a number, push shift again and then type your number.

Save your work: In case the operator decides to choose 1, 2, or any number from the menu, he needs to push "Y" to accept. If he decides to name your file containing alphabets such as A, B, Albert, the operator has to push shift to type and when it is typed press shift+ Y to accept.

Fn: If you push the Function key and Z, it goes directly to stand by and when you push Z again, it will come back to the main menu.

When the operator wants to select the file name in the programming or tag information in the quick menu, or if he wants to use alphabet letter, he must first push the shift key and then type the name. If he wants to select a number such as 3 for the file name or tag, he does not need to push shift first.

3) Accessories:

3.1) Wire dispenser: is a GPS Engine mounted on the back pack that has three important functions.

First: it electrically will connect the unit to the Pipeline test station with a tiny wire.

Second: will send information regarding the distance to the unit and the unit will show the distance. Distance information will be recorded including other information for every point of the survey.

Third: GPS Engine will send the coordinates information to the LCD unit. The magnet wire tail must be rubbed off the insulation, and connected to the terminal beside the magnet wire to provide electrical connection to the ground of the unit

3.2) Charger: is a constant current charger the will charge the 7.2 volt Nickel Cadmium Battery. It will work for 24 Hours and it takes 10 Hours to fully charge it. The operator can check the Battery voltage (BAT) in the main menu.

3.3) Pogo sticks and its cable: this unit has two pogo sticks and two cables that will connect the unit by half cell to the soil. Pogo sticks have a push button switch that when it's pushed the information will be saved in the memory with a confirmation alarm.

3.4) Half cell: it has one pair of half cells that must be filled with distill water carefully according the instruction.

3.5) Null modem communication Cable:

3.6) EP-TECH software: When this software is installed on the computer, the operator can send information to the computer, only by click a finger you can save this information, plot the graph, or export to Excel.

3.7) Manual Instruction: The instruction of how to program the unit and survey the pipeline.

3.8) USB/Rs232 Converter

4) Technical Information:

- 1- **Input voltage:** 7.2 volt/ 4000MA
- 2- **Large 240 x 64:** LCD Display Graphics
- 3- **Consumption:** Current 109 MA without GPS Engine and with GPS 149 MA
- 4- **Memory Capacity :** 2GB (2000MB)
- 5- **Ability to Tag information**
- 6- **Internal clock:** separate Lithium Battery and works separately from the Processor
- 7- **Keypad :** 7 x 4 tactile Switch keypad
- 8- **AC Active filter :** -73db for 50/60 HZ for Power Line interferences
- 9- **Input Impedance :** selectable 1000/ 100 MG Ohms
- 10- **Input:** differential input with two separate channels for survey
- 11- **Interruption Program:** Cycle from 0.5 up to 10 , OFF from 0.2 up to 10 seconds
- 12- **Data logger :** 4 local data logger channels
- 13- **Logging time :** from 1 second up to 64000 seconds automatic or manual
- 14- **Range of measurement:** +/- 5000 MV
- 15- **Size of the unit:** 182x 182 x 63 mm Aluminum box
- 16- **EP-Tech software:** downloading information via Rs232 or USB port, Export data to Excel, and plot the graph.
- 17- **Charger current:** constant current 400 MA
- 18- **Graph ability with EP-Tech Software**
- 19- **Graph Zooming ability**

5) How to make Files

To make a file for example named “A” push 3 in the main menu and select a number for example “0” and program your file. Then go to survey and collect some data and download the information.

By pushing “1” in the main menu, the selected program and file name (active file) will appear on the LCD.

If the operator goes to the main menu and pushes 3, he can see file A is allocate to the “0”

The operator can makes another file “B” by pushing 3 in the main menu and selecting a number from the file directory menu. By selecting a number (i.e. 1) the operator can accept and start programming, then by going to the survey mode collect some data. By making file “B” the file “A” will not be active any more. The latest file is always the active file and in the main menu only the active file can be surveyed, downloaded, or erased.

To active file “A” again, the operator has to go to the main menu and push 3, then push the allocate number of that file (for A is 0) then this file will be active and all functions in the main menu will work for file “A” again.

Pushing F will delete the active file information, but the file will still exist and the operator can continue his survey from the last reading.

Pushing H will delete the active file. Pushing E will download (export) the information of the active file to the computer.

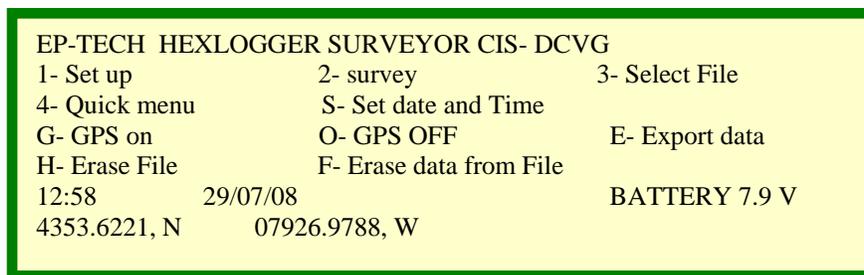
When you want to download information from the Hexlogger to the computer, you may clear the data base or delete a file that already exists. You may delete the file from the data base by using the graph page and type the name of the file.

By pushing 1 in the main menu, your active file will be displayed. Please only accept it and if you want to change the file, go back to the main menu and push 3 for the file directory and program your new file.

The operator can reprogram the same file without deleting that file, but it is better to select another name.

6) Programming

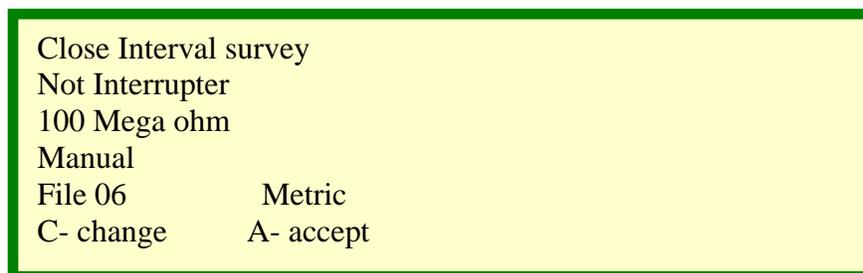
When the unit is turned ON it will start with welcome to EP-TECH Hexlogger surveyor and then will go to the main menu. It will save the old program and number of reading and distance. You have to reprogram if you are not agree with old program. Please select 3 from Main menu the select a number and program your file, If you erase the data of the file from the memory, still the old program of that file is ready to start survey with reading number and distance from that point.



BATTERY: shows the battery voltage when screen is on main menu

Close interval survey “not interrupted method”

Close interval survey checks the potential of Pipe to soil and therefore we need only one pogo stick and a wire dispenser that has a wire connected to the pipeline. In this test both pogo stick must become parallel and we have only one input Potential between the pogo stick on the soil and Hexlogger ground that is connected by wire dispenser. If select 1- set up the following screen appear. (Old program)



If selected A it must go to the main Menu
If selected C it must change to the following Screen

File 07
C- change File # N change file name
A- accept

If C we must able to change to a different file name
If A we must see the following screen

C- close interval survey
D- dcvg survey
M- CIPS + DCVG survey
L- Data logger

If select C the following screen must appear

Distance standard
1- Metric 2- imperial

If select 1 or 2 we will see the following screen

Measurement method
1- Not interrupted
2- High and low
3- GPS synchronized

If selected 1 the following screen must appears

Input Impedance
1- 100M 2- 1000 M

The operator can select the input impedance for his survey

Store GPS coordinate? Y N

You have option to record GPS coordinates

0

Select starting chain age point A- accept C- change

File 07
C- change File # N change file name

A- accept

1- positive increment
2-negative increment

A- Accept C- change

A brief program description will appear in the end.

Close Interval survey
Not Interrupter
100 Mega ohms
Manual
File 07 Metric
C- change A- accept

If selected A, it must go to the main menu and ready to go to survey

EP-TECH HEXLOGGER SURVEYOR CIS- DCVG
1- Set up 2- survey 3- Select File
4- Quick menu S- Set date and Time
G- GPS on O- GPS OFF E- Export data
H- Erase File F- Erase data from File
12:58 29/07/08 BATTERY 7.9 V
4353.6221, N 07926.9788, W

By pushing # 2 for Survey for the above set up must have the following screen

Average potential	1565	mv
Number of reading	0	
Chainage distance	0	
4353.6221, N	07926.9788, W	

By pushing a pogo stick switch every pulse will increase the number of reading and will change the distance for any movements.

Close interval survey "High and Low Measurement method"

If selected high and low measurement the following screen must appear

Close Interval survey	
High and low	
100 Mega ohms	
Manual	
File 06	Metric
C- change	A- accept

File 07	
C- Change File #	N change file name
A- Accept	

When you select the file name and accept the following screen will appear.

C- Close interval survey
D- dcvg survey
M- Close interval + dcvg survey
L- Data logger

By selecting C you will select Close Interval survey and the following screen will appears. .

Measurement method
1- Not interrupted
2- High and low
3- GPS synchronized

For high and low the operator must select 2 and the following screen will appears...

Distance standard
1- Metric 2- imperial

Then you have to select the measurement method

Measurement method
1- Not interrupted
2- High and low
3- GPS synchronized

Input impedance

1- 100M 2- 1000 M

store GPS coordinate? Y N

0

Select starting chainage point A- accept C- change

1- Positive increment
2-Negative increment

A- Accept C- change

3000 ms OFF
1000 mili second cycle
GPS Current interrupter program
A- Accept C- change

If you want to change the program you have to go to the following screen

1000 ms Cycle second
Current interrupter program
A- Accept C- change

300 ms OFF
Current interrupter program
A- Accept C- change

If selected C change must be able to change the off time program and if selected accept the following screen must appear.

Close Interval survey
High and low
100 Mega ohms
Manual
File 06 Metric
C- change A- accept

After complete programming and back to main menu and survey we have to see the following screen for close interval survey in high and low method.

Rectifier	on potential	-1250 mv
Rectifier interrupted off potential		-950 mv
Number of reading		0
Chainage distance		0
4353.6221, N		07926.9788, W

Close interval survey "GPS synchronized method"

If selected this method we will have the following screen.

It selected to work in this method the following screen will appear

300 ms OFF

GPS current interrupter program

A- Accept C- change

If C we have to able to change and if selected A the following Screen will appear

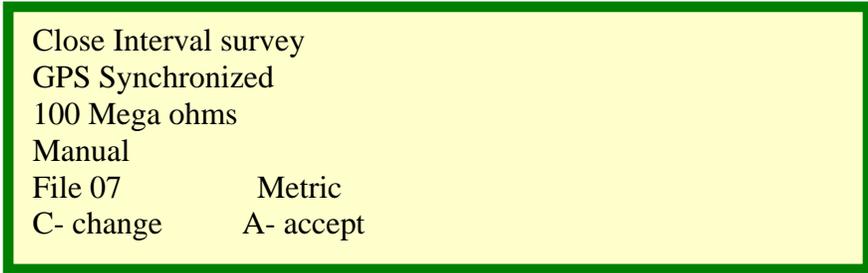
300 ms OFF
1000 mili second cycle

GPS current interrupter program

A- Accept C- change

Then continue programming as before for impedance and GPS store information

The reading in this position must happen 100 ms after starting for ON and 100 ms after starting OFF time in every cycle.



Close Interval survey
GPS Synchronized
100 Mega ohms
Manual
File 07 Metric
C- change A- accept

If A selected, it will return to main menu and ready to start the new survey.

DCVG

DCVG survey checks the voltage gradient around the pipeline because of the coating problem. It has two pogo sticks and it measures the voltage between the soil of the top of pipeline and remote soil around the pipeline. As before, we have to select the method of the measurement.

C- Close interval survey
D- DCVG Survey
M- Close interval + dcvg survey
L- Data logger
R- Soil test resistance

D must selected and it must been programmed exact as before. In the survey menu we must have the following screen. In this survey we have only one input voltage that will come of the voltage between two pogo sticks

Rectifier on potential - 1250 mv
Rectifier interrupted off potential -0960 mv
Swing voltage between ON and OFF -0290 mv
Chainage distance 00000111 12
File 07
4353.6221, N 07926.9788, W

Close Interval (CIP) +DCVG Survey

In this survey the potential of the pipeline to soil and swing voltage of ON and OFF of voltage gradient record both together. In set up we have to select M. In this survey we have to use a wire dispenser that wire connected to the pipeline and connected to the ground of the unit. It can program exactly as before with different method of measurements. Therefore in this survey we have two inputs. In survey mode we have the following

DCVG ON 450mv CIP ON -1250
DCVG OFF 250mv CIPS OFF -0960
DCVG swing 200mv CIPS swing -290
Chainage distance 111 12

4353.6221, N 07926.9788, W

Data Logger:

If selected L position, it will enter to the data logger program. The following screen will appear.

00004
Log time in seconds 5
C- Change A - accept

00004
Number of channels
C- Change A - accept

1000 ms Cycle second
Current interrupter program
A- Accept C- change

300 ms OFF
Current interrupter program
A- Accept C- change

Store GPS coordinate? Y N

Data logger logging time 5 seconds
Channels 4
File 07 C- change A- accept

If 'A' is selected it must go to the main menu and be ready for survey.
The following screen must appear for then survey:

Ch 1- ON	- 0065 mv	Ch1- OFF	0050 mv
Ch-2- ON	1300 mv	Ch2- OFF	1050 mv
Ch 3- ON	- 1250 mv	Ch3- OFF	960 mv
Ch 4- ON	- 1150 mv	Ch4- OFF	910 mv
Tue 07 August 07	22: 28		
4353.6221, N	07926.9788, W		

7) How to start Survey

7.1) Close Interval Potential Survey (CIPS):

The operator must program the unit for CIPS survey and connect the cable of the wire dispenser, GPS engine, and pogo sticks to the Hexlogger unit. Turn ON the unit and go to the main menu.

Wait for the GPS engine to be locked by the satellite. When it is locked, Coordinates will be appeared on the LCD screen.

Connect your survey wire to the test station. Be sure that wire insulation is rubbed off and is connected to the test station electrically.

In CIPS survey, both pogo sticks are parallel and the operator must place one on top of the pipeline, and the other one in their hand above the soil.

By pushing the Pogo stick switch the LCD information will be recorded in the unit. Then put the next pogo stick a meter forward to the soil on the top of the pipe and then take off the first pogo stick from the soil. Push the switch for recording. If it is programmed for automatic mode it will record automatically.

The operator must be aware of the wire dispenser and change the distance and recording alarm so that it confirms that the reading has been recorded. The operator must be patient and wait at least for one cycle time, then push the switch to record the data.

If the operator wants to save some tag information with the data information in the survey mode, the operator must push 4 to go main menu and then push 4 again to go to the quick menu. The operator must type the name (must first push the Shift Key, and then type the alphabet letter) and then accept it. Then he must push '2' in the main menu to go to the survey mode again and continue the surveying.

7.2) DCVG Survey:

In this survey, the operator will measure the voltage gradient around the pipe. The difference potential between two pogo sticks must be recorded as DCVG potential.

In this survey, two pogo sticks must be connected to the soil at the same time. One in the left hand, putting the pogo stick on the pipeline and the other in the right hand 1-2 meters away from the pipeline.

In this survey the operator doesn't need to connect the wire dispenser to the unit, except when he wants to record the distance.

7.3) CIPS+DCVG Survey:

In this survey the operator will record both CIPS and DCVG survey at the same time. One pogo stick will measure the pipe to soil potential and the difference between the two pogo sticks will be recorded as DCVG potential. In this survey, the operator has to put the left pogo stick on top of the pipeline and the right 1-2 meters away from the pipeline at the same time.

7.4) Data logger local survey:

Four channels are ready to record ON and OFF Pipe to soil potential with different cycles and OFF time accompany with GPS coordinates and Time. The log time is selectable and can go from 1 second up to 64000 seconds.

In this mode, there are two options: automatically or manually.

8) How to Download And Plot the Graph:

- 1- Operator has to install the EP-TECH software.
- 2- Connect the unit with Null modem (USB) cable to the computer
- 3- Open Hexlogger.exe file on your desktop and log in.
- 4- The operator may clear the database
- 5- Select the computer port(for USB : install a RS232/ USB converter then go to Device Manager and find the port number that allocates for this converter and put this number and accept it
- 6- Turn ON the Hexlogger, select the file to be downloaded from file directory (main menu: number 3) activate the file and push 'E' to export. The operator will hear an alarm and the computer will show receiving data from EP-TECH Hexlogger
- 7- When the transfer is complete, write this information to the data Base
- 8- Go to plot and select your file name and the variable function that you want (for example High and low, ON & OFF, etc...) then select number of readings or distance. By pushing graph, the plot will be created. ON and OFF and Critical Protection line will all appear in one graph. If Tag information box is checked mark, the Tag will appear on the graph.
- 9- The operator can use the zooming feature and select any part of the graph to zoom in or out. He has multiple of options, besides zooming.
- 10- The operator can edit the database information by going to C:\program files\ Electronic pipeline company\ Eptech hexlogger\ Hexlogger. mdb
- 11- All files, data information, GPS coordinates, and programs, are in different columns in this data base. The operator can zip data base with .rar and send the file to anyone to check or interpret.

- 12- The operator can to file and save their graph in the directory of their choice
- 13- The operator has the option to save their file in a multi- page graph by selecting their number of reading(s) per page in their desired directory
- 14- The operator can select 'export' which will transfer their file to Excel, and the information will also appear in Excel spreadsheet in different columns. The operator can also plot a graph using the data in the spreadsheet using excel graph features.

Some Important Points:

How to do program for CIPS: (high and low mode)

1- Push **3** in main menu and select a number for example **1** then Push **C** for change, then select a name for example " **111**" for file name, then accept it. Push **C** and select **close interval survey**.

2- Select **1** for Metric, then Select **2** for High and low mode. Then you can select **2** for 1000 mega ohm impedance, **Y** for accept for GPS information to save.

3- Select for **manual or automatic survey logging**, for starting distance measurement, push **C** and then put **1** and then accept it. You may accept **1** for positive counting distance too.

4- The next page is belonging to the interruption program. Push **C** for change and select **1000 ms** for Cycle and **300 ms** for OFF time (only an example) then accept the file. It will back to main menu.

This unit is programmed and if the operator pushes **2** it goes to survey mode and by pushing **1** in the keypad or pogo stick switch the operator will be able to save the display information to the memory in the survey mode.

In the survey mode display, there are High Potential and Low potential, time, distance, GPS coordinates, number of readings

Operator has to go to the survey mode and collects some information with the file name "**111**".

The operator has to save as the old data base in a safe directory place, then clear the data base, then start downloading the information. When it is finished the operator has to write to data base (Please clear the data base before)

If he goes to graph and select the file name "**111**" then select for **high & low** then push Graph, the graph will be appeared. He can export this information to excel too.

The operator can't select ON voltage and OFF voltage or any other function to graph it

CIPS: (GPS mode) It has similar programming with different name in other file directory. Instead of selecting **2** for high and low mode the operator has to select **3** for GPS mode. If there is only one interrupter the operator can use GPS mode too.

First download the information, then write to data base, for graph select the name of the file and **On & Off voltage**. Then the operator has to push the Graph. The operator can't select High &Low or any other options to graph.

In GPS mode the Hexlogger will save the potential 100 ms after rectifier is OFF for OFF potential and 100 ms after rectifier ON for ON Potential in one cycle.

In high and low mode the Hexlogger searches for High and Low potential in a cycle and will be updated every cycle time. It is evident that OFF potential is bigger that Low Potential and ON potential is smaller than High potential.

In graph the operator has to select file name and **On & Off** then push Graph. He can't select High & Low or any other option to graph.

How to do DCVG:

In this survey we will collect three potentials for DCVG OFF (low) and DCVG ON (high) and Swing

To perform DCVG survey, the Pogo sticks are not parallel. If the operator doesn't need distance measurement, he may not connect the survey wire.

The operator must put one pogo stick in the top of the pipeline and the other One 1-2 meter away of the pipeline in a vertical position with pipeline direction. He has to put both Pogo sticks in the same time to the soil and wait for at least one cycle time to update new information and the push the switch, if it is programmed manually.

How to Program for DCVG: (high and low mode)

1- Push **3** in main menu and select a number for example **2** then Push **C** for change. Select a name for example " **222**" then accept it. Push **D** and select **DCVG** for survey.

2- Select **1** for Metric, then Select **2** for **High and Low mode**. Select **2** for 1000 mega ohm impedance, **Y** for accept for GPS information to save.

3- Select for **manual or automatic survey logging**,

For starting distance measurement, push **C** and then enter **1** meter value and then accept it. He may accept **1** for positive counting distance too.

4- The next page is belonging to interruption program and push **C** for changer. Select **1000 ms** for Cycle and **300 ms** for OFF time then accept the file. It will back to main menu.

This unit is programmed and if the operator pushes **2** it goes to survey mode and by pushing **1** in the keypad or pogo stick switch he will save the display information in the memory.

In the Hexlogger survey display mode, there are DCVG High Potential and DCVG Low potential, Swing (difference between High and Low), number of readings, GPS coordinates, time, distance, and etc.

The Operator has to go to the survey mode and collects some data information with the file "**222**".

Then start downloading the information to the computer. When downloading is finished, the operator has to write to data base.

If he goes to graph and select the file name "**222**" then select for **DCVG High, DCVG Low , or swing Voltage** , then push Graph he will see the graph. He can export this information to excel too.

DCVG (GPS mode). It has similar programming with different name in other file directory. Instead of selecting **2** for high and low mode you have to select **3** for **GPS mode**. If there is only one interrupter, he can use GPS mode too. First download the information, then write to data base.

For graph, select the name of the file and **DCVG On Voltage, DCVG Off Voltage or Swing Voltage**. You can't select High & Low or any other option to graph.

When he wants to program a file he has to go to file directory and select an empty number and program the file. If there is not empty number he has to delete a file first and then program for new file.

If he made a file in DCVG and downloaded the information to the data base, then he made another file with the same name but in CIPS (old file is deflected form Hexlogger). When he downloads this information to the data base, this information will be mixed.

He must put a different name on the new file.

The data base is **hexlogger.mdb** an access file in **C:\Program file\Electronic pipeline company\ EP-tech Hexlogger** directory. The operator can open this file and see all the information in the file. He can zip this file with .rar extension and send it for check or interpret.

To active any file, the operator has to go to main menu push 3, and then push the number that assigned for that file, and then accept it. In this case the selected file will be the active file and the operator can continue his new survey with old file. If Key H is pushed, this file will be deleted. Key E is pushed; the information will be downloaded to the computer.

If the key F is pushed, the data of this file will be deleted but file will be ready to continue survey form the last reading without old information.

How to Verify the Unit is Working Correct:

CIPS Test:

1- Connect two cables to the unit without pogo sticks. Turn the Hexlogger ON and make active the file 111 by going to file directory and select the number that assigned for this file (1) and then accept it.

2- Please wait to main menu is completed, then push 2 for survey. The operator must have High & Low potential with time, distance, GPS coordinate, number of reading on the display. If the operator pushes 1 in the keypad the reading number must increased with a beep sound (if it is programmed for manual). If the operator applies 1.5 volt (AA Battery) between pin 1 and pin 3 of any of two cables (not difference which cable, they are parallel), the Potential around 1500 mv must be displayed as High & Low potential in the LCD display.

If the operator shorts pin 1 and Pin 3 of any of two cables, the potential in the LCD display must go to around zero. (Normally High potential is bigger than OFF potential a few mv).

In the test field the ground of Hexlogger will connect to the Pipeline test station by survey wire. Therefore be careful to rub the insulation of the both side of survey wire.

Connect the dispenser side to the test station and the tail wire of spool (in the bottom of spool) must be rubbed the insulation off and connected to the black terminal beside the spool.

If this wire in not connected electrically, the operator can not measure the Pipe to Soil Potential (the ground is not connected).

DCVG Test:

1- Connect two cables to the unit without pogo sticks. Turn the Hexlogger ON and make active the file 222 by going to file directory and select the number that assigned for this file (2) and then accept it

2- Wait to main menu is completed, then push 2 for survey. The operator must have DCVG High & DCVG Low, Swing potential with time, distance, GPS coordinates, number of readings on the LCD display.

If the operator applies 1.5 volt (AA Battery) between pin3 of one Cable and pin 3 of another Cable, the Potential around 1500 mv must be displayed as DCVG High & DCVG Low, swing potential in the LCD display.

If the operator shorts the pin 3 to two cables together, the DCVG high and DCVG low and swing must go around zero.

Please do the following simple test before going to the field.

1- The cables are straight throw. Please check both cables, if internal connections are correct (Pin 1 to Pin 1, pin 2 to pin 2 and pin 3 to pin 3 in any of two cables)

2- Connect the cable to pogo stick and test by your meter. When you push the pogo stick switch the pin 1 and Pin 2 in any cable must be shorted. Pin 3 must be connected to the screw beside the bottom Red dot in pogo stick body (half cell connection). The operator can test both cables and pogo sticks in this way.