CATH-TECH

CORROSION CONTROL EQUIPMENT

Operation Manual for CI-15

GPS Synchronized Current Interrupter

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Table of Contents

Limited Warranty

All Cathodic Technology Limited (Cath-Tech) instruments and equipment are warranted against defects in materials, design or workmanship for a period of two years from date of sale. This warranty excludes damage due to misuse, abuse, tampering or acts of God such as fires, floods, wind damage, lightning etc.

We will repair or replace at our option any defective component, after examination in our manufacturing facility, if the fault is due to defective materials or labour, within two years of the purchase date. For warranty repair, a Returned Goods Authorization (RGA) must be obtained from Cathodic Technology Ltd prior to shipping the defective unit pre-paid to our location.

Note: ***There is no warranty expressed or implied on batteries.***

Cath-Tech Policy

- Cath-Tech extends a two-year in use warranty on all units, which have been designed and/or manufactured by Cath-Tech staff.
- Cath-Tech reserves the right to make any changes in design or specification which it deems an improvement, with no liability to make the same changes on existing equipment.
- This warranty is in lieu of all other warranties or guaranties, expressed or implied, which might otherwise exist. The purchaser is relying only upon this guarantee and not upon any representations not herein expressed.
- Any material or equipment being returned to the factory must first have a Returned Goods Authorization (RGA) from Cath-Tech.

Welcome

Thank you for selecting the CI-15 GPS synchronized current interrupter. CATH-TECH™ is the world leader in electronic equipment for corrosion control.

The CI-15 GPS synchronized current interrupter is equipped with a GPS engine to ensure accurate synchronisation with other interrupters no matter how far apart.

Your CI-15 GPS synchronized current interrupter is a precision instrument. It is designed to interrupt the current flow from your cathodic protection rectifier or sacrificial anode system on a cyclic basis.

Open and inspect your CI-15 GPS synchronized current interrupter on receipt. If any damage occurred during shipping, file a claim with the carrier immediately.

The CI-15 is rated for a maximum of 15 Amps and 50 V DC only. It will not interrupt AC current.

Safety

Do not operate the CI-15 GPS synchronized current interrupter during electrical storms. Damage to both the CI-15 GPS synchronized current interrupter and the rectifier could occur.

The installation of the CI-15 GPS synchronized current interrupter requires electrical connections in the rectifier. Only personnel who are trained in electrical safety should undertake this.

The CI-15 can only interrupt the **DC output current**. Please observe the following safety precautions when installing the interrupter.

1. Turn the AC supply to the rectifier OFF and verify with a volt meter before making any connections to the rectifier.

2. When interrupting the DC output of a rectifier observe polarities. The red lead must be connected to the most positive terminal. If the current flow to the ground bed is to be interrupted, connect the red lead to the rectifier positive (+) terminal and the black lead to the ground bed cable. If the current flow in the negative (structure) lead is to be interrupted, connect the black lead to the rectifiers negative (-) terminal and the red lead to the structure lead wire.

Charging

Before connecting the CI-15 to the rectifier, charge the battery overnight with the supplied battery charger. The CI-15 will run from mains power and/or the internal rechargeable nickel metal hydride battery. It is imperative that the battery be fully charged before installing the interrupter in a rectifier. When in operation the GPS engine and electronic circuitry will run from the internal battery or mains power.

If the CI-15 is turned on with a low battery, it is possible that the processor will stall. . Allow the CI-15 to charge for a few minutes then press the reset switch to reset the processor.

Setup

The CI-15 must be configured before initial use using a computer with RS232 serial port. A terminal emulation program must be available, e.g. Windows Hyper Terminal, Mirror or equivalent. Set up for 19200, N,8,1 with no handshaking.

Configure Hyper Terminal

Configure Hyper Terminal as follows:

- Go to Start

- Then to Programs
- Then to Accessories
- Then to Communication
- Select Hyper Terminal

You will be asked for a connection name, enter Current Interrupter then go to the arrow in connection and change the connection to:

Direct to COM 1 or whichever COM port your computer uses.

When the Port is selected go to File at the top of the screen, then to Properties in the drop down box and double click on Properties.

A New Box will appear and the COM port selected will be shown. Below this is a button labeled “configure”. Click on Configure and a new box will appear where you can change the configuration of the COM port.

Hyper Terminal is included in Windows 95 to XP. For Windows Vista, 7 and other operating systems go to www.hyperterminal.com and down load a copy of HyperTerminal or search on the internet for a com port data emulator.

- Baud Rate 19200
- Data Bits 8
- Stop Bits 1
- Parity NONE
- Flow Control X ON X OFF

Communicating With the Current Interrupter

Plug the GPS antenna into the CI-15, it will not communicate unless the GPS antenna is connected. Connect a 9 pin null modem cable to the CI-15 current interrupter and the com port on your computer. Switch the CI-15 on and then press the Reset switch to place the interrupter in RS-232 communication mode. Go to Hyper Terminal on the computer and from your keyboard send a ? to the current interrupter.

Note: The software is case sensitive; all commands must be in **CAPITAL** Letters

The following screen will appear if the GPS is not locked:

```
CATHODIC TECHNOLOGY LTD CURRENT INTERRUPTER OTP-128 2 VIII 2006
GPS NOT LOCKED
?-commands C-change-program D-display-program T-change-cycle R-run
```

The following screen will appear if the GPS is locked to the satellites:

```
CATHODIC TECHNOLOGY LTD CURRENT INTERRUPTER OTP-128 2 VIII 2006
21:23:16 02/02/10 UTC 4351.648N 07942.901W
?-commands C-change-program D-display-program T-change-cycle R-run
```

Note: RS232 interface is switched OFF to conserve power, 10 seconds after RESET or power ON, if no RS232 activity is detected.

Now you are ready to program the CI-15.

Programming

Note: The software is case sensitive; all commands must be in **CAPITAL** Letters

From the main screen, the following commands are available.

? = Display main menu

C = Change the program

D = Display the program

T = Change the timing cycle

R = Run the program

C - Change Program

When C is pressed to change the program the following appears:

```
      From  To    From  To
#     hhmm  hhmm  mmdd  mmdd
1     0000  2359  0101  1231  more? Y N
```

Where hhmm is hours and minutes in the UCT (GMT) time and mmdd is the month and day. Once you complete entering program 1, you have the option of programming more starting and ending cycles by pressing Y or N when prompted.

For example:

```
HHMM  HHMM  MMDD  MMDD
1200  2200  0201  0205
```

Would result in a program where the interruption of the rectifier starts at 12 noon GMT time and continues until 2200 Hours (10PM) GMT time starting on February 1 and continuing until February 5.

Program 1 must have the start and Stop Time and the Start and Stop Date entered. Other programs may be set to “0” (zero) if they are not required.

D - Display Program

This shows all the programs currently in the CI-15 memory.

```
      From  To    From  To
#     hhmm  hhmm  mmdd  mmdd
1     1030  1800  1105  1201
2     1200  2200  1205  1215
3     0000  0000  0000  0000
      0000  0000  0000  0000
      0000  0000  0000  0000
```

C - Change Cycle

```
0200ms off C—change N—ok
```

Enter the OFF time in milliseconds, send “N” to accept. Set the length of the OFF time in milliseconds from 10 to 10,000 (0.1 seconds to 10 seconds) then send an N to accept your

selection. Since the CI-15 operates using time the allowable cycle time are listed below. The cycle time must be longer than the OFF time.

The Cycle time must now be programmed.

```
1/4s cycle C—change N—ok
1/2s cycle C—change N—ok
  1s cycle C—change N—ok
  2s cycle C—change N—ok
  3s cycle C—change N—ok
  4s cycle C—change N—ok
  5s cycle C—change N—ok
  6s cycle C—change N—ok
 10s cycle C—change N—ok
 12s cycle C—change N—ok
 15s cycle C—change N—ok
 20s cycle C—change N—ok
 30s cycle C—change N—ok
 60s cycle C—change N—ok
```

Step through the cycle times by pressing “C” until the cycle time needed is displayed, then press “N” to accept.

R - Run

To place the CI-15 Mini interrupter in operation after completing the programming, send an “R” from the keyboard for run.

When the program is not interrupting the rectifier, the output is held ON to minimize depolarization of the cathodic protection levels. We recommend that the rectifier not be off for more than 20% of the interruption cycle.

Connection

Rectifier

Before connecting the CI-15 to the rectifier, turn the CI-15 ON and program the CI-15. Always turn the rectifier OFF and check with a meter before performing any work inside the rectifier case. Follow your company procedures for rectifier access.

Anode Circuit:

To connect to the anode or positive side of a rectifier, first turn OFF the rectifier and the CI-15. Then connect the CI-15 (Red Terminal) to the + terminal of the rectifier and the (Black Terminal) to the anode lead. Switch the CI-15 ON, then the rectifier.

Pipe or Structure Circuit:

To connect to the structure or negative side of a rectifier, first turn OFF the rectifier and the CI-15. Then connect the CI-15 (Red Terminal) to the Pipe Lead and the (Black Terminal) to the Negative (-) terminal of the rectifier. Switch the CI-15 ON, then the rectifier.

Sacrificial Anode Bed

To connect to a sacrificial anode bed, turn the CI-15 off and disconnect the anode bed from the structure. Connect the Positive (+) (Red Terminal) of the interrupter to the structure and the Negative (-) (Black Terminal) of the interrupter to the sacrificial anode bed. Switch the CI-15 ON.

GPS (Global Positioning System)

The GPS antenna is equipped with a magnet base to allow the antenna to be placed on top of the rectifier. The GPS antenna must be placed in a location where it has a clear view of the sky. In the Northern Hemisphere the GPS antenna should have a clear view of the southern sky and in the Southern Hemisphere the GPS antenna should have a clear view of the northern sky. GPS Antenna extension cables are available from Cathodic Technology Limited in 30 metre lengths.

If the CI-15 has been moved more than 50 Km. it may take a few minutes for the GPS engine to re-establish its almanac and obtain a lock on the Global Positioning Satellites. When the GPS engine has acquired the minimum number of satellites and it has calculated its position, the green LED will flash indicating a valid GPS lock.

Operation

Turn on the power with the main power switch, the CI-15 will start up and undertake a self test. The red LED will be illuminated indicating that the power is turned ON. The green LED will flash rapidly while the GPS engine is configured and tested. The amber LED will flash once to test the electronic relay.

When sufficient satellites have been acquired for accurate timing the green LED will flash once per second. If a valid program is present then the amber LED will flash at each interruption.

If a valid program is not available then it will be necessary to wait until the prescribed time and date for interruption to occur or to reprogram the Mini Interrupter. To reprogram the CI-15 follow the instructions earlier in this manual.

Maintenance

There are very few user serviceable parts on the CI-15. It is good practice to store the CI-15 in a cool, dry place when not in use. For best battery life, the battery should be fully charged once every 2 months.

If the unit does not interrupt;

- Ensure the battery is charged. Use a volt meter to check the voltage across the pins of the charger port, it should read above 12V.
- Check the program, it may not be programmed to interrupt that day.
- Remove and test the fuse on the right side of the instrument.

For other problems, please contact Cathodic Technology at ++1-905-857-1050 or ctl@cath-tech.com .

Spare Parts

Below is a list of spare or replacement parts available for the CI-15 from Cathodic Technology. Most parts are in stock and can ship in 2 business days.

Part No.	**Description**
CTL-217	DC interruption cables, 2 pc set
CTL-232	Battery charger, 110/220 V AC to 12V DC
CTL-233	Auxiliary 12V DC power cable (i.e. to hook up a car battery)
CTL-311	GPS magnet mount antenna with 5 m cable
CTL-532	12V 2AH internal battery
CTL-606	Main circuit board
CTL-607	Relay circuit board

Visit www.cath-tech.com to view our wide range of products and services.