Pi-1 Cathodic Protection Current Interrupter Instruction Manual

The Taku Engineering Pocket Interrupter One (Pi-1) is a hand held, light weight three channel GPS time synchronized cathodic protection (CP) current interrupter. By its self, the Pi-1 is capable of interrupting two CP current sources of up to 1 amp and 20 volts each. All three interruption channels provide standard On/Off cycles from 1 second to 30 seconds long. With a Mobiltex external high current relay connected to it, a Pi-1 can interrupt up to 100 amps and 100 volts.

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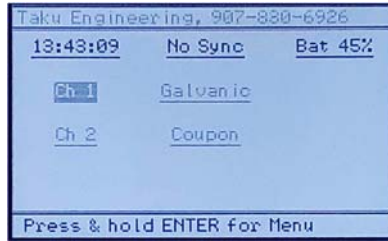
Controls and Connections

The Pi-1 is operated via the directional pad, enter, and back buttons located on the right-hand side of the display. The directional pad has four positions, they are up, down, left, and right. On the bottom left-hand side, end panel there is a Multi-Port connector that is used for charging, external relay control and channel two interrupter connections. On the top left hand side, end panel there are a pair of banana jack connections used for channel one galvanic interruption. A micro USB port is provided on the bottom right-hand side, end panel for charging and future updates.

Basic Functions

- To power on – Push and hold enter until a prompt appears on the display (approximately 3 seconds), then release.
- On the D-Pad, press **LEFT**, then **RIGHT**, and the unit will boot up to the main screen.
- To enter the menu – Press and hold **ENTER** until the menu screen appears.
- To select a menu item – Use **LEFT**, **RIGHT**, **UP**, and **DOWN** to highlight the item, then press **ENTER**.
- In the settings level of the menu you can change the value of an item by using the **UP** and **DOWN** arrows to scroll to it, then press **ENTER** to edit.
- Press **UP** or **DOWN** to change the value of the item then press **ENTER** to confirm the setting.
- To exit a menu item – Press **BACK**.

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Main Screen

Taku Engineering, 907-830-6926
13:43:09   No Sync   Bat 45%

Ch 1   Galvanic

Ch 2   Coupon

Press & hold ENTER for Menu

The main screen displays operational information in the middle area bracketed by two horizontal solid double lines. This area is divided into four rows and three columns. The areas above and below the double bars are also used for information. The following table shows the purpose of each information space:

Contact Information & Menu Path		
Local Time	GPS Time Synchronization	Remaining Battery Percentage
Channel 1 Function	Channel 1 System Type	(Blank)
Channel 2 Function	Channel 2 System Type	(Blank)
(Blank)	(Blank)	(Blank)
Operation Instructions		

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Channel One

Home>Main	Home>Main>Interrupt	Home>Main>Interrupt>Ch 1
Interrupt Power	Ch 1 Ch 2 Advanced	CP System Type Galvanic Cycle Length 4 Sec Off Length 1000 mSec Start Time 00:00 HH:MM End Time 00:00 HH:MM
Press ENTER to change interruption settings	Settings for galvanic and impressed current CP system interruption	Use UP & DOWN to scroll settings. Press ENTER to select, BACK to return to previous screen

Channel one (CH1) is the main interruption channel and is used for everyday instant off survey interruption. This channel can be used for either galvanic or rectifier interruption. When set to "GALVANIC", the internal solid state relay is engaged. The maximum current handling of the CH1 internal relay is 1 amp, and the maximum voltage is 20 volts. The banana jack connections for this channel are on the left hand side of the unit, and are **not** polarity sensitive.

When set to "IMPRESSED", the interrupter can be used with an external high current relay to interrupt impressed current systems. When CH 1 is set to this mode, the galvanic and coupon interruption channels are disabled.

Settings:

- CP System Type – Enables either the internal relay for galvanic interruption, or the external relay drive for impressed current (Note: When "IMPRESSED" is selected, the galvanic and coupon modes are disabled)
- Cycle Length – The total length of the cycle (On plus Off) in seconds *(Must be evenly devisable into 60)*
- Off length – The length of the Off portion of the cycle in milliseconds
- *Start Time – The time of day at which interruption will start
- *End Time – The time of day at which interruption will stop

*Note: Set Start Time and End Time to the same time to enable continuous 24-hour interruption.

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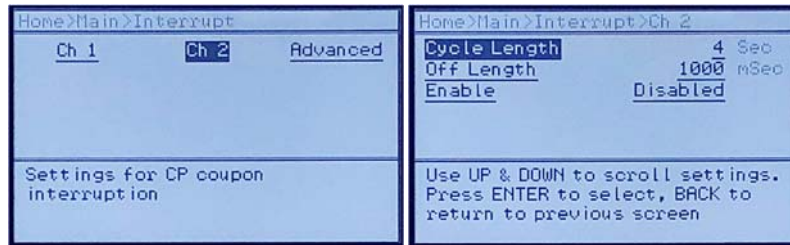
Channel Two

Channel Two (CH2) is a special testing/coupon interruption channel. The maximum current handling of this channel is 1 amp, and the maximum voltage is 20 volts. The connections for CH2 are provided via the Multi-Port connector located on the bottom left hand side, end panel of the interrupter. These connections are broken out to banana jack leads in the charge adapter cable. CH2 is also **not** polarity sensitive. When CH 2 is enabled, the impressed current feature of CH 1 is disabled.

CH2 allows a technician to set up a cycle independently of CH1.

Settings:

- Enable – Enables or disables CH2 interruption (Note: When "ENABLED" is selected, the "IMPRESSED" mode of CH1 is disabled)
- Cycle Length – The total length of the cycle (the sum of all delays) in seconds *(Must be evenly devisable into 60)*
- Cycle Length – The total length of the cycle (On plus Off) in seconds *(Must be evenly devisable into 60)*
- Off length – The length of the Off portion of the cycle in milliseconds

Advanced
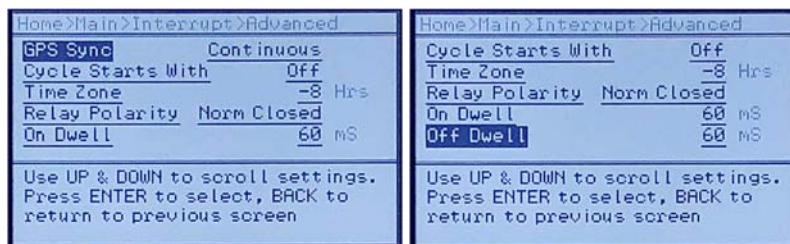
The advanced menu contains settings that are not typically changed during normal everyday CP survey tasks.

- GPS Sync – Allows the unit to be set to perform GPS time synchronization continuously (once every three hours) or only once at startup. This allows the unit to be GPS time synchronized in full view of the sky, then moved to a location with no GPS reception (inside a building for example) and interrupt based on the internal high accuracy real time clock. In this mode the interrupter will drift a maximum of 55 milliseconds per 12 hours.

- Cycle Starts With – Allows the unit to be set to start interruption cycles with the Off (industry standard) or On (uncommon) for CH1.
- Time Zone – Allows the user to change the time offset in hours for the time zone in which the unit will be used (Daylight savings time will be automatically compensated).
- Relay Polarity – Allows the EXT output to be setup for a normally closed (N/C) or normally open (N/O) relay. Use *(N/O)* for *Mobiltex* relays.
- On Dwell[1] – Adjusts the on dwell time compensation for the external relay in msS. Use *(5)* mS for *Mobiltex* relays.
- Off Dwell[1] – Adjusts the off dwell time compensation for the external relay in mS. Use *(5)* mS for *Mobiltex* relays.

[1]Dwell is the amount of time it takes a switch to change from one state to another (On to off or off to on).

Using Mobiltex High Current Relays with the Pi-1

The Pi-1 can be interfaced with Mobiltex SRL1 and DCR1+ solid state relays. To use the Pi-1 with an external relay, power up the Pi-1 and connect the appropriate seven pin adapter cable from the seven pin connector on the Pi-1 to the relay. The SRL1 requires an S1-AD1 adapter and the DCR1 requires a D1-A1 adapter. See the Ch1 "IMPRESSED", Advanced "Relay Polarity", and Advanced "On Dwell"/"Off Dwell" above for menu setup instructions.

Specifications

Time

- GPS time synchronization with U-Blox NEO-M8 GPS engine
- Highly accurate real time clock: +/- 4mS per hour. By default, GPS synchronization is performed every 3 hours for a maximum drift of +/- 12mS

Power

- Charging via seven pin connector: 6-24V AC or DC
- Charging via micro USB
- Full charge from empty: 5 hours
- Battery life: up to 6 days (**based on interrupting 24 hours a day, with a 4 second cycle and 1 second off and good GPS reception**)
- Battery: 2.5 Ah lithium polymer

Interruption

- Galvanic: Solid state relay: 1 amp, 0-20V AC or DC, non-polarity sensitive
- Coupon: Solid state relay: 1 amp, 0-20V AC or DC, non-polarity sensitive
- External: Universal output can be adapted to off the shelf relays

Mechanical

- Dimensions: 5.7" x 3.4" x 1.1"
- Weight: 10 oz

Environmental

- Water resistant

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