



TRU-Sync Portable User Guide 2.1



DRAFT ONLY!

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1 INTRODUCTION

Thank you for purchasing one of Corrosion Instruments' TRU-Sync Portable interrupters.

Although relatively small, all models of TRU-Sync exhibit exceptional performance and offer the most powerful and extensive range of features.

If you want to do a basic instant off interruption cycle have requested a factory configuration of your TRUSync, its use will be only a matter of 'plugging in' and turning it on watch as the TRUSync gets a GPS fix and starts interrupting perfectly. However, if your applications are complex and ever changing you will find that configuring the TRUSync is extremely simple and that you have complete flexibility to do whatever you require.

We are confident that after only a few minutes of training with our App, the features will begin seem intuitive, and you will have no need for this user manual. For this reason, we are developing a series of short instructional videos which should replace the need for a manual, though we have prepared this short manual for reference in case the need arises.

[This video](#) will provide a fast overview of the main functions

2 OVERVIEW

TRU-Sync is capable of synchronised current interruption for all manner of CP applications.

2.1 HARDWARE OVERVIEW



Figure 1 – TRUSync Portable

Externally, the TRUSync is very simple, you will find:

- Two pushbuttons
- Four LEDs
- Two terminals
- One battery compartment
- Magnetic holder (some models)

The TRUSync is IP67 rated and will perform well in rain. However, where practical we do recommend keeping the TRUSync out of the elements.

2.2 FUNCTIONAL STATES

State	Description
Off	The TRUSync is Turned Off
Configuration Mode	TRUSync is being configured over Bluetooth from a mobile device
Survey Pending Mode	TRUSync is waiting for a specific date/time to start a survey
Survey Mode	TRUSync is doing a survey
Manual Mode	Trusync is acting like a switch
GPS Time Syncing	TRUSync is getting the precise time for the GPS satellite network

2.3 KEYPAD

The Keypad consists of two buttons and four LEDs. Key operations can be completed using the keypad, the function of the buttons depend on what state the TRUSync is in. The different combinations are listed below:

Unit state	Action
Off	Hold POWER for 2 seconds to turn on
Any	Hold Both Buttons for 2 seconds to turn off
Bluetooth Configuration Mode	Hold RELAY for 2 seconds to skip configuration
Manual Mode	Hold RELAY for up to 5 seconds to toggle Interruption
Survey Mode	Hold for up to one interrupt cycle (or 5 seconds for DCVG surveys) to end the survey and start Bluetooth Configuration

Table 1 - describes the function of the two pushbuttons depending on the device state

2.4 LED STATUS LIGHTS

There are four LEDs which provide feedback about what the TRU-Sync is doing:

- Power (PWR)
- Interruption (INT)
- Bluetooth (BT)
- GPS

	Power	Interruption	Bluetooth	GPS
Power On	On or Flash 1/5 seconds			
Relay Open		On		
Relay Closed		Off		
Bluetooth on			Flashing	
Bluetooth connected			On	
GPS satellite fix / syncing				Flashing
Thermal Lockout	Flash 1/second			

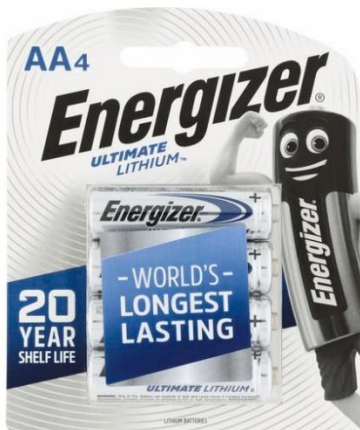
2.5 BATTERY INSTALLATION

To install or replace the specified batteries, use the supplied screwdriver to open the battery compartment.

Due to the exceptional power efficiency of the TRU-Sync and high quality of the supplied battery, TRUSync Portable should be able to will be able to interrupt for several weeks on a set of batteries. Always remove batteries when the TRUSync will not be used for an extended period of time.

⚠ IMPORTANT - only use specified batteries

Corrosion Instruments have specifically chosen batteries to ensure safe and reliable operation. The higher voltage of Energiser Ultimate lithium batteries is required to ensure full closure of the solid-state relay. Although alkaline batteries may appear to work, they have a lower working voltage will only partially close the relay - especially as the battery starts to flatten. This could result in only partial interruption of the CP current, undue temperature rises and damage to the TRUSync.



Handy Hint – We have found Bunnings to consistently be one of the cheapest places to buy these batteries.

2.6 GPS TIME SYNCHRONISATION

The TRUSync will complete a GPS synchronisation whenever it needs to.

This process can take up to a couple of minutes but this can happen seamlessly during all types of surveys without interrupting the interruption pattern.

You will notice the device doing a GPS time sync on start up (after the Configuration stage)

The GPS light will flash once when the syncing process starts, it will then flash every second once the device has a valid satellite fix (at least 4 satellites) and it will turn off once the process is complete.

2.7 CP CONNECTIONS

There are a variety of options for CP connections, including:

- 4mm banana sockets
- Binding posts
- Lugs

Connections are bi-polar, so it does not matter which way connections are made.

TRU-Sync can be installed in series with

- TRU and structure
- TRU and grounded
- Structure and Anode
- Structure and Coupon
- Structure and ERP
- Structure and Earth
- Structure and Structure

2.8 BLUETOOTH

By connecting to CI-Tools over Bluetooth, you can configure all parameters, schedule surveys, and view the status of your TRU-Sync Portable.

Simply open CI-Tools and navigate to:

CI-Tx / TRUSync / Configure

Then connect to the device with the correct serial number.

Depending on what your TRU-Sync is doing, it may take up to 1 minute for the TRU-Sync to connect and move to the Bluetooth Configuration Mode. You will know that the TRU-Sync is connected and ready when the time at the top of the configuration screen starts updating every second.

Refer to the CI-Tools UI section for more details. Note that you will need to be signed in to CI-Tools under your company, and once signed in, you are only be able to see and connect to devices which are registered to your company.

IMPORTANT – Turn Bluetooth off

The TRUSync generally turns the Bluetooth off when it is not being used. For example if you disconnect the app from the TRUSync, the Bluetooth will turn off. However, under certain and uncommon conditions, the Bluetooth may turn back on. You will notice the BT LED flashing. If this happens, simply hold the RELAY button for 2 seconds and Bluetooth will turn off. Even with the Bluetooth turned on, the device will function properly however you will be using much more power than you need to so will deplete the batteries unnecessarily.

2.9 USER INTERFACE

Note that visible fields will depend on what survey type is selected. For demonstration purposes, all fields are shown in the screenshot below.

Assistant		Save a configuration preset
Delete a configuration preset		Load a configuration preset
Select a survey type		Cycle off seconds
Cycle on seconds		
Cycle Pattern		
DCVG Pattern		
Survey Start Time		
Survey Stop Time		
Survey Period (hours)		
Manually open/close relay		
IIR Frequency		
IIR Interruption time (seconds)		
GPS Time Resync Frequency		
Time Shift for third party integration		
GPS Leap Seconds		
Disable buttons before a survey		Disable buttons during a survey
Poll Data (not usually required)		Tap done when you are finished
View GPS Data		Reset Interrupter

Figure 2 - CI-Tools User Interface

2.10 MODES AND SURVEY TYPES

TRU-Sync can be used to complete multiple types of survey including our proprietary Infrequent Interrupt Routine (IIR).

2.11 MONITOR MODE

Monitor Mode is a standby state where continual self-monitoring is completed and Bluetooth or LoRa configuration is enabled. For example, with LoRaWAN enabled devices, whilst in monitor mode, you can request a survey via CI-Tx Central or LoRa without having to touch the TRU-Sync.

2.12 MANUAL MODE

Manual Mode is similar to Monitor Mode, but gives you the option to toggle interruption by holding the RELAY button for 5-seconds or through the app.

2.13 INSTANT OFF

This is a traditional Instant Off survey cycle. You can select the On-Period and Off-Period, and which one comes first. A diagram of the interruption cycle is displayed at the bottom of the screen, where:

RED = Off

GREEN = On

You can set an auto start and auto stop time. Note that auto start will start a couple of minutes early to allow for GPS resynchronisation if required.

2.14 INFREQUENT INTERRUPT ROUTINE

This mode allows a single interrupt from 1-5 seconds long, once per hour, once per day or once per week.

Pattern	Interrupt will occur	Off First	On First
1/Hour	The start of every hour	X:X:0	X:X:On Seconds
1/Day	The start of every day	0:0:0	0:0:On Seconds
1/Week	The start of every week	Sunday @ 0:0:0	Sunday @ 0:0:On Seconds

When not interrupting, the TRU-Sync will operate in Monitor mode.

2.15 DEPOLARISATION

To enable a depolarisation survey, the relay will open at a specific time and remain open for the duration of the survey.

Prior to the survey start time the TRU-Sync will remain in Monitor mode. A couple of minutes before the survey start time, the interrupter will resynchronise its clock to ensure a start time which is accurate to the millisecond.

2.16 DCVG

DCVG will cycle the relay once per second with an adjustable duty cycle.

Resynchronisation will occur every hour in DCVG mode regardless of the user selected resync feature. If you require a long battery life, do not leave in DCVG mode for extended periods of time.

2.17 STRAY CURRENT

This mode is not available yet. It defaults to Monitor Mode.

2.18 IJ MONITORING

This mode is not available yet. It defaults to Instant Off Survey.


2.19 THIRD PARTY CROSSING

This mode is not available yet. It defaults to Instant Off Survey.

3 FEATURES

3.1 PRESETS

You can save and load preset configurations, without a limit on the number you may have saved to your device. Soon we will be integrating these presets to CI-Tx Central so that they can be shared company wide.

Tap  to store a preset.

Load a preset by selecting it from the Preset Picker.

3.2 AUTO START

Auto Start allows you to set a start time for a survey. The interrupter will remain in Monitor Mode with its relay closed (or open if you prefer) until a couple of minutes before the programmed start time. At this point it will resync its clock before starting a survey. **Surveys should not be scheduled to commence within 20 minutes of the current time.** If you cancel the Auto Start feature and the interrupter is in Instant Off or IIR mode, interruption will commence immediately after a GPS time synchronisation.

3.3 AUTO STOP

Auto Stop allows you to set a date and time to stop a survey. Once stopped, the TRU-Link will fall back to Monitor Mode.

3.4 RESYNC SCHEDULE

You can adjust the resync schedule: lower frequencies mean longer battery life, but allow more timing drift. For field surveys, 1-hour resyncs are recommended.

3.5 TIME SHIFT

Our interrupters have always been and will always be synchronised properly with UTC time. However, some third-party GPS interrupters may have synchronisation offsets of whole seconds. To allow for coordination with third party GPS interrupters, Time Shift allows shifting the clock by whole second increments in either direction.

3.6 LEAP SECONDS

Leap seconds are seconds added to or subtracted from the UTC to accommodate for the minute difference between the standard timekeeping principals of an atomic clock and observed solar time.

Failure to accommodate leap seconds correctly is the primary cause of the whole second offsets discussed above. By writing the leap seconds to the GPS receiver, we can ensure that it maintains precise timing.

3.7 RESET

Tapping this button will turn off the TRU-Link.

4 COMMON TASKS

4.1 CONFIGURING AN INSTANT OFF SURVEY

1. Hold POWER button for 2 seconds to start the TRUSync
2. Connect to the TRUSync with TRUSync Configurator
3. Select “Instant Off Survey” from the Survey Picker
4. If you want to schedule a delayed start, follow 4.2
5. Set your interruption cycle parameters (on seconds, Off Seconds and pattern)
6. Press DONE

If you are outside and ready to start interrupting the TRUSync will get a GPS satellite fix (this could take up to a couple of minutes) then start interrupting

If you are pre-configuring the TRUSync and/or are indoors, you can now turn the TRUSync off.

4.2 SCHEDULED SURVEYS

Depolarisation surveys and Instant-off surveys can be scheduled to start at a given date and time (see 3.2)

1. Turn on “Scheduled Survey”
2. Set the “Start Survey” date and time
3. Set the “Stop Survey” date and time (for instant off surveys) or set a survey duration (for depolarisation surveys)

Notes:

1. Surveys can only be scheduled up to 30 days out from the current date
2. if you don't set a “Stop Survey” date/time, an Instant Off survey will continue until either:
 - a) the TRUSync is turned off or
 - b) the TRUSync is connected to via Bluetooth or,
 - c) the batteries go flat.

4.3 AUTO-START FEASURE

If you have pre-configured the TRUSync, you can just turn it on, then hold the RELAY button for 2 seconds, this will skip the Bluetooth configuration stage and the TRUSync will start doing whatever it was configured to do. Watch [this video](#) for a demonstration. Typically, it will start by doing a GPS time synchronisation. If the TRUSync is configured with an Autostart the trusync will complete a GPS Time Sync then go into the Survey Pending state until the survey start time.



For FAQs and more information, please visit www.corrosioninstruments.com

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