



TRU-Sync Portable V3 User Guide

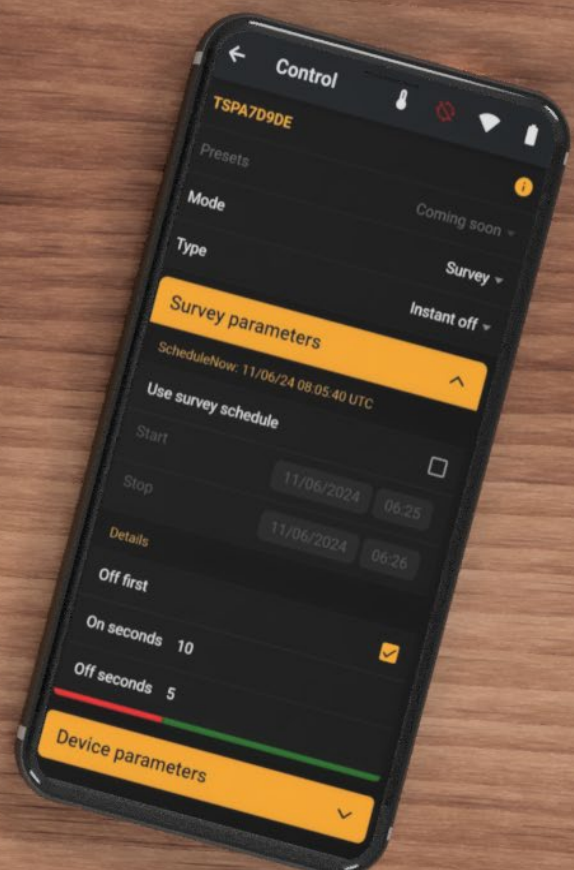


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1 INTRODUCTION

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 a powerful and extensive range of features.

If you want to do a basic instant-off interruption cycle and 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 more 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 seem intuitive, and you will have no need for this user manual. For this reason, we have developed a series of short instructional videos and in-app training which should replace the need for a manual, though we have prepared this short manual for reference in case the need arises.

These [videos](#) provide a quick overview of the main functions:

- [Configure and interrupt pattern](#)
- [Device parameters](#)
- [Scheduling a Survey](#)
- [Turning off the TRUSync Portable](#)
- [Autostart feature](#)
- [Unpairing a Bluetooth device - iOS](#)
- [Firmware updates](#)
- [BLE Settings](#)
- [GPS Settings](#)

Our [TRUSync Portable Support page](#) is a great place to get the latest version of this User Guide, the latest videos, FAQ's and other resources.

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 for 2xAA batteries
- M6 or M8 accessory adapter (some models)

The TRUSync is IP65 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
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

The TRUSync Portable is rated to 5A @ 30VDC.

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
Any	Hold RELAY for 2 start/stop survey
Manual Mode	Press RELAY to toggle Interruption

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

State	Power	Interruption	Bluetooth	GPS
Manual Mode	On			
Relay Open		On		
Relay Closed		Off		
Survey Running/pending	Flashing 100ms/1s			
Bluetooth connected			On	
GPS satellite fix/syncing	On			Off->Flashing
Thermal Lockout	Flashing 100ms/1s		Flashing 100ms/1s	

2.5 BATTERY INSTALLATION

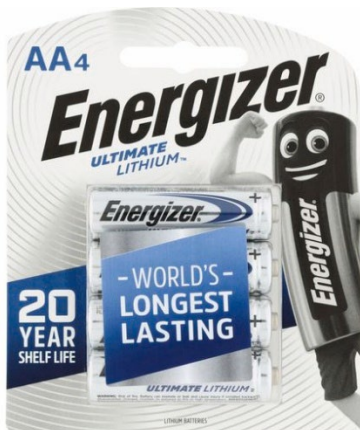
To install or replace the specified batteries, use a PH2 screwdriver to open the battery compartment.

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 or months on a set of batteries.

We recommend removing batteries when the TRUSync will not be used for an extended period.

⚠ 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. You can also perform a GPS synchronisation from the App if needed.

This process can take up to a couple of minutes but can happen seamlessly during all types of surveys without effecting the survey.

You will notice the device doing a GPS time sync: when scheduling a survey, before starting a survey, and routinely during a survey.

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

Typically, the TRUSync Portable is connected between Structure and Anode on sacrificial systems and between Structure and Ground bed on impressed current systems



Figure 2 - Illustrates the common configuration where the TRUSync Portable is connected between the Anode and Structure, with a test meter installed between Structure and Reference

The TRUSync Portable is bi-polar meaning that it does not matter which way it is connected. Both terminals are black, but the installation image show a red cable connecting one terminal to the Structure. This is common because test leads are usually purchased in red/black pairs.

The interrupter can also be connected between Structure and Coupon or Structure and Electrical Resistance Probe as per your requirements.

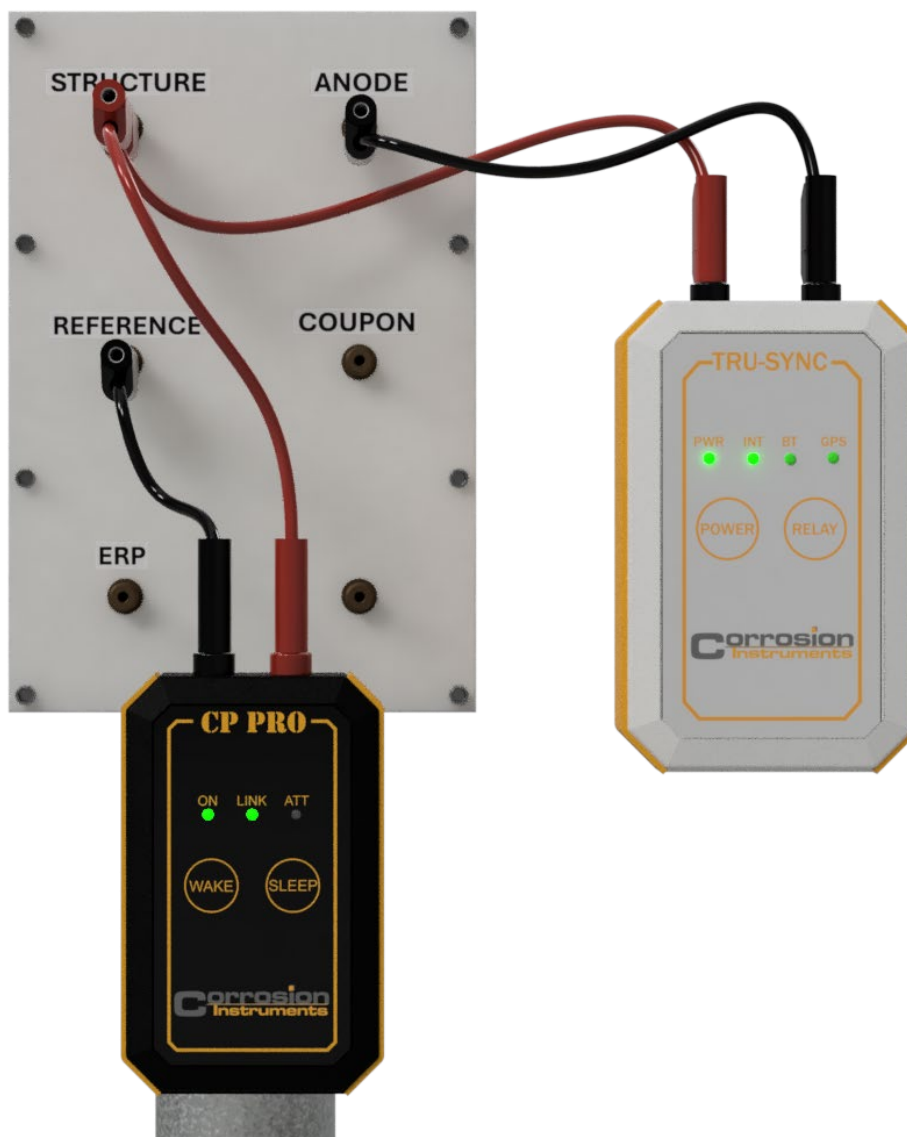


Figure 3 - Illustrates the common configuration where the TRUSync Portable is connected between the Anode and Structure, with a test meter installed between Structure and Reference

2.8 BLUETOOTH

2.8.1 Connect to device

TRUSync Portable V3 is configured using the app TRUSync Configurator V2

To connect a phone or tablet to the TRUSync:

- Open the app.
- Navigate to the “Connect” page.
- Swipe down to scan for devices.
- Tap the device that you want to connect to.
- When the app asks for a Bluetooth pin, tap (iOS) or long touch (Android) the text field and paste the pin.
- Tap CONNECT

2.9 USER INTERFACE

Note that visible fields will depend on what Mode and Survey Type are selected.

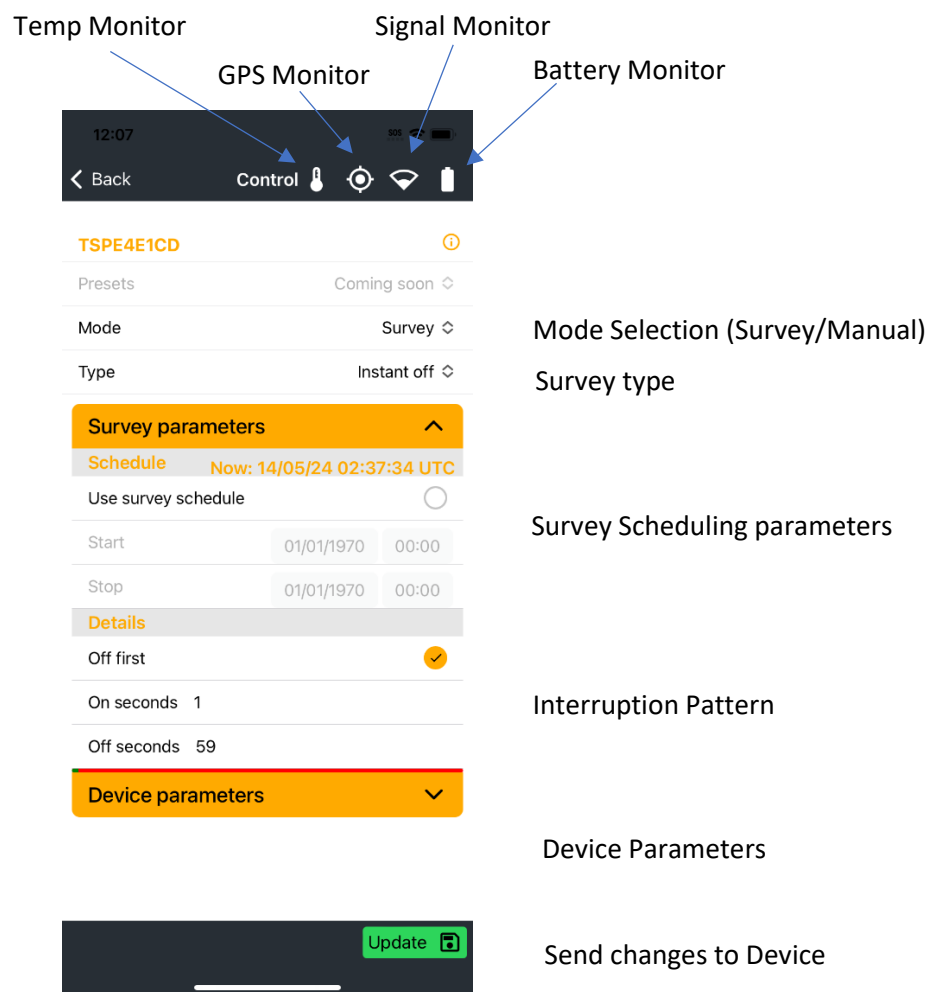


Figure 4 - CI-Tools User Interface

2.10 MODES AND SURVEY TYPES

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

2.10.1 Manual Mode

Manual Mode is the default mode of the TRUSync. In this mode, you can manually toggle interruption by pressing the RELAY or the toggle button in the app. When not doing a survey the TRUSync will be in manual mode

2.10.2 Pre-survey

Pre-survey mode occurs when a survey is scheduled but not yet started, the device will behave similar to manual mode until the scheduled start time/date. When the survey starts the interruption will be controlled by the specified survey and the keypad will be disabled for the period of the survey.

2.10.3 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 schedule a survey by setting an scheduled-start and scheduled-stop time. Note that the a GPS sync will happen a few minutes prior to the scheduled start time to ensure timing precision. **For this reason, do not schedule a survey to start within the next 10 minutes.** Instead, simply turn off the scheduling and start the survey immediately by holding the RELAY button until the GPS LED flashes.

Resynchronisation will occur every two hours during Instant-Off survey.

2.10.4 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:0:0	X:0: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

2.10.5 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 wait in pre-survey mode. A few minutes before the survey start time, the interrupter will resynchronise its clock to ensure a start time which is accurate to the millisecond.

2.10.6 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.

3 FEATURES

3.1 SCHEDULED SURVEYS

The Scheduled Survey feature allows you to set a start and stop time and date for a survey. The interrupter will remain in Pre-survey Mode until a few 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 10 minutes of the current time.**

3.2 RESYNC FREQUENCY

You can adjust the resync frequency: lower frequencies mean longer battery life, but allow more timing drift. This frequency only takes effect when in pre-survey mode. Whilst surveying, the time synchronisation is defined by the type of survey.

3.3 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.

3.4 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.

3.5 PRESETS

This feature is coming soon. It will allow you to save and share presets, this will assist you when configuring many TRUSyncs with an identical configuration.

3.6 HIGH TEMPERATURE SHUTDOWN

TRUSync Portable has a high-temperature override feature. This feature opens the relay circuit if a high temperature condition (greater than 60°C) is sensed. This is not a safety layer and should not be relied upon for ensuring safe operation of the TRUSync Portable. If the high-temperature override has engaged. The TRUSync Portable will need to be allowed to cool, and reset. Eliminate the cause of the high temperature before re-using the TRUSync Portable

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 Survey Mode
4. Select “Instant Off Survey” from the Survey Picker
5. If you want to schedule a delayed start, follow 4.2
6. Set your interruption cycle parameters (on seconds, Off Seconds and pattern)
7. Press BACK to disconnect from the TRUSync

If you are outside and ready to start interrupting, hold the RELAY button for 2 seconds until the GPS LED flashes once. The TRUSync will attempt a GPS time resync (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.

Watch [this video](#) for a demonstration

4.2 SCHEDULED SURVEYS

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

1. Configure a survey as per 4.1
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)
 - 4A. if you are ready to deploy the TRUSync, hold the RELAY button for 2 seconds to move into pre-survey mode
 - 4B. if you are not ready to deploy the TRUSync, simply turn it off. If this is the case you will need to deploy the device at least 10 minutes before the start of the scheduled survey and don’t forget to hold the RELAY button to move into pre-survey mode
4. When you deploy the TRUSync and put it into pre-survey mode you should ensure that it completes a GPS synchronization. If the GPS LED flashes once and the Power LED is on, then the TRUSync is attempting a GPS satellite fix. If the Power LED is flashing, then the GPS sync is not required and the TRUSync is in pre-survey mode (waiting for the scheduled start date/time)

Watch this [video](#) for a demonstration

4.3 AUTO-START FEATURE

If you have pre-configured the TRUSync, you can just turn it on, then hold the RELAY button for 2 seconds, TRUSync will start doing whatever it was configured to do, this could be an interruption pattern or a scheduled survey. Watch [this video](#) for a demonstration. Typically, it will start by doing a GPS time synchronisation. If the TRUSync scheduled survey was configured, the TRUSync will complete a GPS Time Sync then go into the Survey Pending state until the survey start time.

4.4 LORAWAN

All V3 TRUSync Portables are equipped with LoRaWAN capabilities. This enables long range remote control as well as batch control. Although not implemented yet, Corrosion Instruments plan to implement remote control of the TRUSync Portable in the coming months.

4.5 DEVICE FIRMWARE UPDATE

The TRUSync Portable's firmware can be easily updated from the TRUSync Configurator app.

Watch this [video](#) for a demonstration

5 SAFETY

TRUSync utilizes a solid-state relay (SSR) housed inside a small, sealed plastic enclosure. When used at higher currents, SSRs can produce a lot of heat in the closed state. If not used properly, this heat is enough to destroy the TRUSync and could cause fire or serious injury. It is important that the TRUSync is used correctly.

5.1 CIRCUIT PROTECTION.

The current rating of the TRUSync must be observed. When connected to a circuit that could supply more than the rated current (even if it is only under fault conditions), current-limiting equipment should be used. We recommend a slow-blow fuse rated at 5A.

5.2 BATTERIES

Section 2.5 discusses the need to use the correct batteries, but it is worth restating. Only use the specified batteries. Failure to do so could lead to device failure, fire or serious injury.

5.3 TEMPERATURE MANAGEMENT.

Ensure that the TRUSync is not operated in direct sunlight especially when used with loads close to its current rating.

6 GPS SYNCHRONISATION

TRUSync Portable uses GPS satellite time for synchronisation. This is necessary for all modes except for manual mode. To synchronise with the GPS system, the device must get a location fix on several satellites. To do this it needs to be outdoors. A little common sense goes a long way but let's pre-empt a few questions.

1. The TRUSync should be outdoors to get a GPS Sync
2. The RTC will resync to GPS before scheduling a survey, if required, before starting survey, and regularly during a survey.
3. A survey cannot start without a successful GPS Sync.
4. Once started, the survey will continue if subsequent resynchronisations fail. However, this could result in a minor drift in the time synchronisation.
5. Sometimes a GPS fix can work from near a window, inside an electrical panel, or from some other obscured locations. You can test this using the GPS icon in the app.

When the TRUSync starts a GPS synchronisation, the GPS LED will flash once. Once the GPS receiver has a fix on several satellites, the GPS LED will start flashing once per second. After around 10 seconds the GPS LED will turn off.



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

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